MITSUBISHI ELECTRIC

AIR CONDITIONING CONTROL SYSTEMS

MELANS
Centralized Controller Technical Manual

3rd edition (Ver. 1.00)

- AE-200A/AE-50A/EW-50A Ver. 7.51
- AE-200E/AE-50E/EW-50E Ver. 7.51

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Safety precautions

- ► Thoroughly read the following safety precautions prior to installation.
- ► Observe these precautions carefully to ensure safety.
- ► After reading this manual, pass the manual on to the end user to retain for future reference.
- ► The user should keep this manual for future reference and refer to it as necessary. This manual should be made available to those who repair or relocate the units. Make sure that the manual is passed on to any future air conditioning system user.

⚠ WARNING	: indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	: indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
CAUTION	: addresses practices not related to personal injury, such as product and/or property damage.

1-1. General precautions

⚠ WARNING

Do not install the controller in areas where large amounts of oil, steam, organic solvents, or corrosive gases (such as ammonia, sulfuric compounds, or acids), or areas where acidic/alkaline solutions or special chemical sprays are used frequently. These substances may significantly reduce the performance and corrode the internal parts, resulting in electric shock, malfunction, smoke, or fire.

To reduce the risk of short circuits, current leakage, electric shock, malfunction, smoke, or fire, do not wash the controller with water or any other liquid.

To reduce the risk of electric shock, malfunction, smoke, or fire, do not touch the electrical parts, USB memory, or touch panel with wet fingers.

To reduce the risk of injury or electric shock, before spraying a chemical around the controller, stop the operation and cover the controller.

To reduce the risk of injury, keep children away while installing, inspecting, or repairing the controller.

If you notice any abnormality (e.g., burning smell), stop the operation, turn off the controller, and consult your dealer. Continuing the operation may result in electric shock, malfunction, or fire.

Properly install all required covers to keep moisture and dust out of the controller. Dust accumulation and the presence of water may result in electric shock, smoke, or fire.

⚠ CAUTION

To reduce the risk of fire or explosion, do not place flammable materials or use flammable sprays around the controller.

To reduce the risk of electric shock or malfunction, do not touch the touch panel, switches, or buttons with a sharp object.

To avoid injury from broken glass, do not apply excessive force to the glass parts.

To reduce the risk of injury, electric shock, or malfunction, avoid contact with the sharp edges of certain parts.

Consult your dealer for the proper disposal of the controller. Improper disposal will pose a risk of environmental pollution.

1-2. Precautions for relocating or repairing the unit

⚠ WARNING

The controller must be repaired or moved only by qualified personnel. Do not disassemble or modify the controller. Improper installation or repair may result in injury, electric shock, or fire.

1-3. Additional precautions

CAUTION

To avoid discoloration, do not use benzene, thinner, or chemical rag to clean the controller. When the controller is heavily soiled, wipe the controller with a well-wrung cloth that has been soaked in water with mild detergent, and then wipe off with a dry cloth.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

1. Contents of This Document

This document is a technical manual for connection of AE-200A, AE-200E, AE-50A, AE-50E, EW-50A and EW-50E to air conditioners.

[Throughout this document:]

- Centralized Controller AE-200A/AE-200E is referred to as AE-200.
- Centralized Controller AE-50A/AE-50E is referred to as AE-50.
- PAC-YG66DCA is referred to as DIDO controller.
- PAC-YG60MCA is referred to as PI controller.
- PAC-YG63MCA is referred to as AI controller.
- Advanced HVAC Controller is referred to as AHC.
- Heating, Ventilation and Air Conditioning is referred to as HVAC.
- Booster Unit and Water HEX unit are referred to as Air To Water (PWFY) unit.
- Hot Water Heat Pump unit is referred to as "HWHP (CAHV, CRHV, QAHV) unit."
- The e-series chiller unit (EAHV, EACV) is referred to as "Chiller unit."
- ** in the model names indicates the capacity of outdoor unit or indoor unit or the fan speed of LOSSNAY (when ** is 50, the fan speed is 500m³/hr at a High notch).
- Energy management and peak-cut control can be performed by inputting pulse signals from meters directly to CN7 of AE-200, AE-50 or EW-50 without the PI controller. In this document, this system is referred to as “pulse input for measurement” or “PI (Pulse Input).”

Remarks

- ○ When the apportioned electricity billing function is used, the M-NET of AE-200 cannot be used.
- ○ TG-2000A can be connected to EW-50 when the software Ver. 6.60 or later is used.
- ○ When a billing system has been established by using AE-200 and TG-2000A, the apportioned electricity billing function of AE-200 cannot be simultaneously used.
- ○ When the apportioned electricity billing function of AE-200 is used and the monitoring function of TG-2000A is used, use the software Ver. 6.60 or later.
- ○ When TG-2000A is used, the pulse input of AE-200, AE-50 or EW-50 cannot be used.

2. Outline of Product

[1] Outline

AE-200/AE-50 is a centralized air conditioning control system provided with a 10.4-inch color LCD panel, on which air conditioners and general equipment can be controlled and monitored.
Up to 50 indoor units can be controlled and monitored with one set of AE-200.
When more than 50 indoor units are connected, AE-50 (EW-50) can be added (Up to 3 or 4 sets) to control and monitor up to 200 indoor units.
When the controller is connected with a personal computer through LAN, the units can be controlled and monitored on the personal computer.

* To use the Web, a personal computer with Windows, Internet Explorer Ver8.0, 9.0, 10.0 or 11.0 and JAVA is required.
* To use the Integrated Centralized Control Web, a personal computer in which an OS, i.e. Windows7, Windows8.1, Windows 10, or MacOSX10.9, and a browser, i.e. Internet Explorer Ver.11.0 or later, Microsoft Edge, Google Chrome or Safari7 or later, have been installed is required. The browser can be used also on tablet terminals and smartphones. On smartphones, the functions which are available to general users can be used (monitoring and operation of block/EM block are not allowed).

In an environment where a router for Internet connection is connected on LAN, the units can be controlled and monitored remotely through the Internet. (To connect to the Internet, ensure the security.)
The energy management function displays the power consumption of the air conditioners in an easy-to-understand graphic form.
Data on power consumption, etc. can be output to the personal computer.
When AHC is connected, it is possible to monitor the operation condition, errors, temperatures and humidities of the general equipment connected to AHC.
Daily, season (the first to fifth weeks) and annual schedules can be set.
Optional functions, such as energy-saving control and peak-cut control, can be used by registering the licenses.

EW-50
EW-50 is a centralized controller without an LCD screen. This product enables to control and monitor air conditioners and general equipment on a personal computer. When EW-50 and AE-200 are connected to the LAN, up to 200 units can be controlled and monitored on the screen of AE-200.

[2] Monitor/Operation

<1> Monitoring/operation on LCD screen of AE-200 main unit

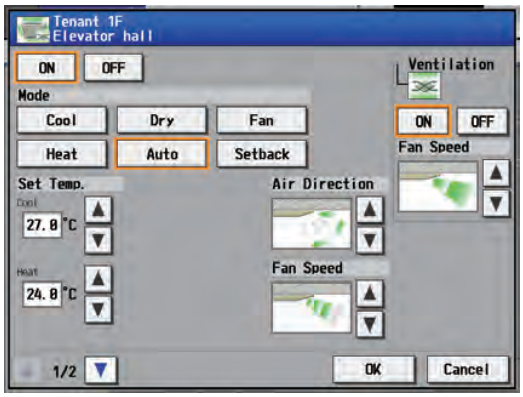
[Monitoring/operation of air conditioners]

1. The screen is used to start and stop the operation of the indoor unit groups, operate and monitor the operation mode and temperature settings and set the schedule.

<Monitoring screen: Without floor plan >

<Monitoring screen: With floor plan>

<Operation screen: Air conditioner group>

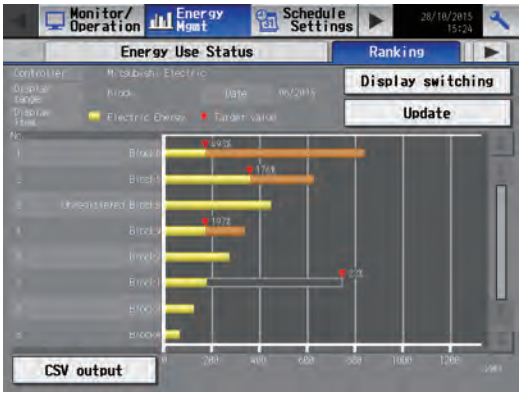


<Weekly schedule screen>

2. The energy management function clearly and graphically displays the apportioned power consumption, operation time, room temperature and temperature setting of each indoor unit or group. The original data used to display the graphs can be output as CSV files to an USB memory or personal computer.

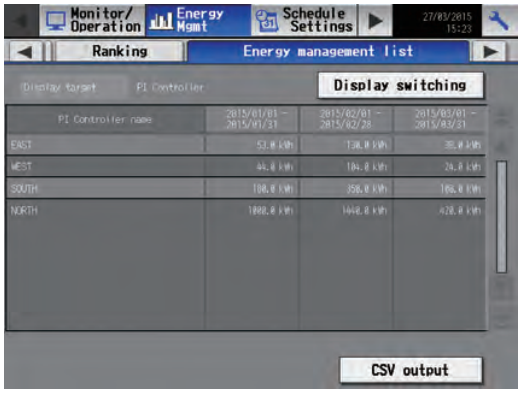
<Status of energy use: Monthly, display by group>

<Ranking: Monthly, display by block>



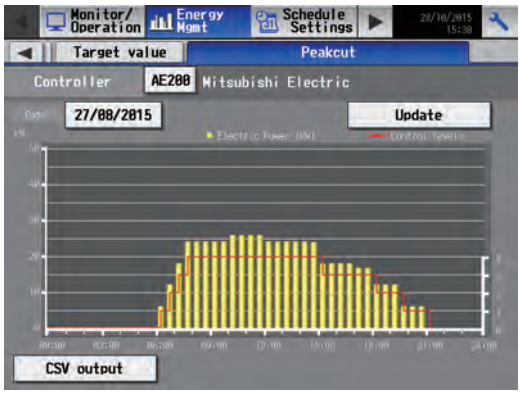
3. When the optional "Charge" license ("Energy Management License Pack") is introduced to apportion the electric charge by AE-200, the power consumption of each tenant can be displayed in the energy management list.

<Energy management list>



4. When the optional "Energy Management License Pack" is registered, up to four levels of peak-cut control can be set for the air conditioners and low-temperature devices to reduce the demand power.
The history of average power and peak-cut control level can be confirmed on the energy management screen and output to a CSV file.

<Status of peak-cut control>



<2> Monitoring/operation on Integrated Centralized Control Web screen

The air conditioners can be monitored and operated on the Integrated Centralized Control Web of the personal computer connected to the LAN. The building manager, tenant manager and general users can access the browser. (See <User management> in 2.6.1 “Major features.”)
In an environment where a router for Internet connection is connected on the LAN, they can be controlled and monitored also from a remote location via the Internet. (When connecting to the Internet, ensure the security by using VPN connection.)

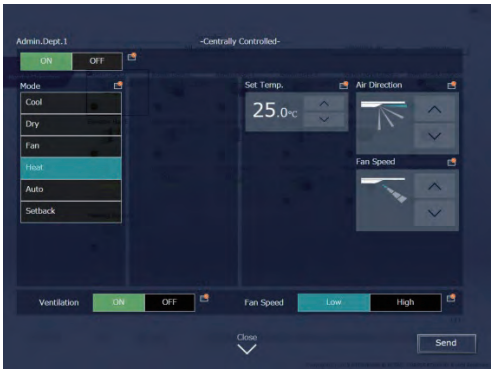
* To use the Integrated Centralized Control Web, a personal computer in which an OS, i.e. Windows7, Windows8.1, Windows 10, or MacOSX10.9, and a browser, i.e. Internet Explorer Ver.11.0 or later, Microsoft Edge, Google Chrome or Safari7 or later, have been installed is required. The browser can be used also on tablet terminals and smartphones. On smartphones, the functions which are available to general users can be used (monitoring and operation by block/EM block are not allowed).
For the operation environment to use the Integrated Centralized Control Web, see 2.6.2 “Operation environment.”

[Monitoring/operation of air conditioners]

● In the case of general users (PC/tablet terminal)

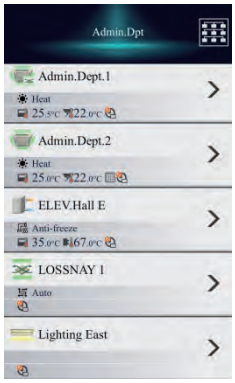
<Monitoring screen: Air conditioner group>

<Operation screen: Air conditioner group>



● In the case of general users (smartphone)

<Monitoring screen: Air conditioner group>

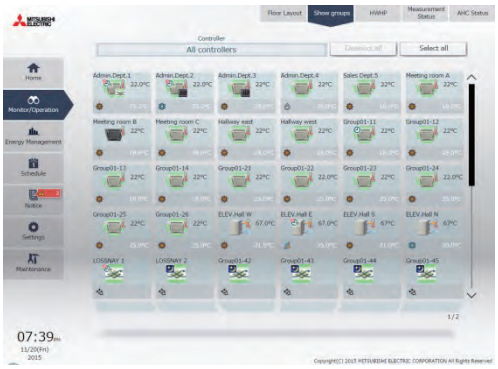


<Operation screen: Air conditioner group>

● In the case of building management user/tenant management users (PC/tablet terminal)
<Monitoring screen: With floor layout> is displayed only on the building management user's terminal.

<Monitoring screen: With floor layout>

<Monitoring screen: Display by group>



<Operation screen: Air conditioner group>

<Status of energy use: Daily, display by group>

When the optional "Energy Management License Pack" is registered, up to four levels of peak-cut control can be set for the air conditioners to reduce the demand power.
The history of power demand and peak-cut control level can be confirmed on the energy management screen and output to a CSV file.

<Status of peak-cut control: Average power for 30 minutes, display of peak-cut control level>

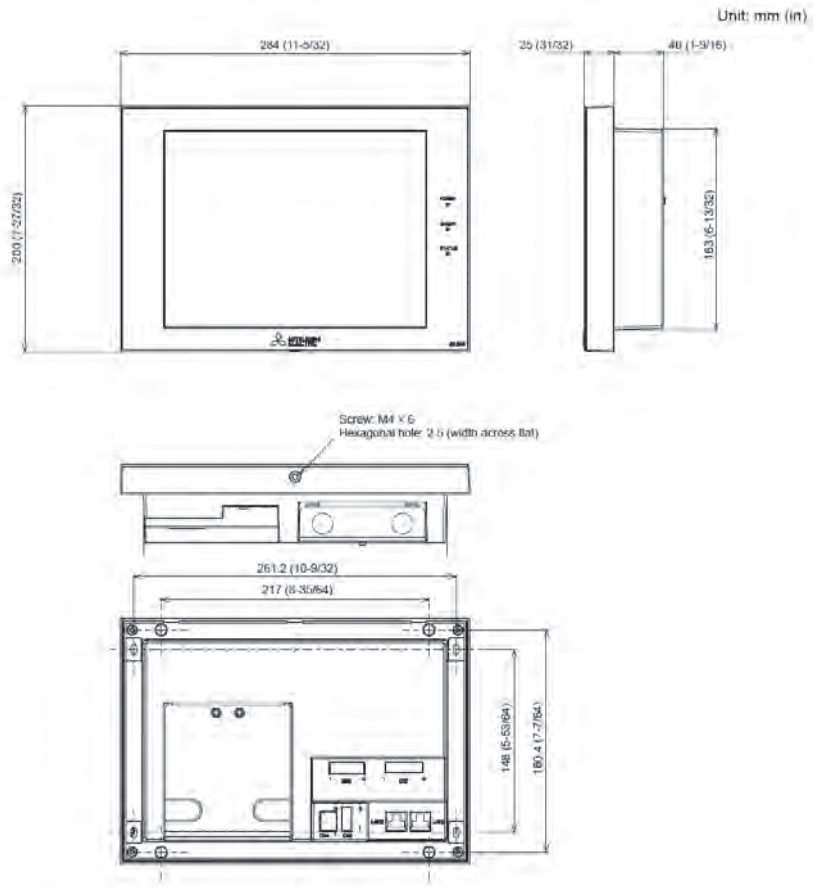
[3] Specification

<1> Specification of AE-200/AE-50

Item			Specifications	
Number of units which can be connected and controlled			Only AE-200	Indoor units per AE-200: 50 units (*1)
			AE-50 and EW-50 (*2)	Indoor units per AE-200: 200 units (*1) (When 3 units of AE-50 and EW-50 are connected) Note: When the M-NET of AE-200 is not used, up to 4 units can be connected.
LCD and operation			10.4 in., TFT color LCD, touch panel operation	
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			2.3kg (5-5/64 lbs)	
Power supply	Rated input		100–240 VAC ± 10%; 0.3–0.2 A 50/60 Hz Single-phase	
Communication I/F			M-NET	24 V DC (with power supply connector CN21, power supply from main unit)
			LAN	100BASE-TX
M-NET power feeding coefficient			0.75	
Equivalent power consumption			0	
Equivalent number of units			0	
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)	
Installation conditions			Indoor only **To be used in a business office or similar environment	
Material			Main unit: PC + ABS Cover: PC + ABS	
Power consumption			12 W	
Appearance color			Cover: Clear white	
Installation method			Installation on supplied mounting plate or in special embedded box (PAC-YE84UTB) or box for external installation on wall (PAC-YE82TB) or on mounting bracket in control panel (PAC-YE86TK)	

*1: The number of indoor units which can be controlled may vary depending on the model of indoor units. The number of units which can be controlled by the DIDO controller (PAC-YG66DCA) varies depending on the number of channels used (one channel for controlling one unit).

*2: Up to 200 indoor units can be controlled by adding the expansion controller AE-50 or EW-50.

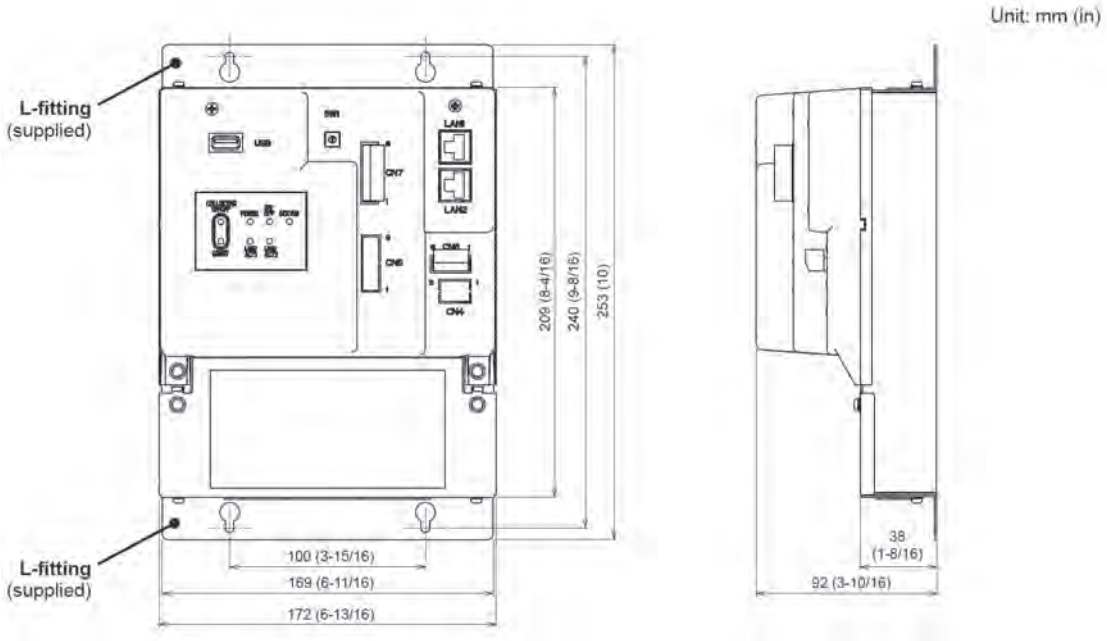


<2> Specification of EW-50

Item			Specifications	
Number of units which can be connected and controlled			50 indoor units per EW-50 (*1 *2)	
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)	
Power supply			100–240 VAC ± 10%; 50/60 Hz Single-phase	
Communication I/F			M-NET	24 V DC (with power supply connector CN21, power supply from main unit)
			LAN	100BASE-TX
M-NET power feeding coefficient			1.5	
Equivalent power consumption			0	
Equivalent number of units			0	
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)	
Material			Main unit: Electrogalvanized sheet steel	
Power consumption			12 W	
Installation conditions			Only in a metal control box indoors	

*1: The number of indoor units which can be controlled may vary depending on the model of indoor units. The number of units which can be controlled by the DIDO controller (PAC-YG66DCA) varies depending on the number of channels used (one channel for controlling one unit).

*2: Up to 200 indoor units can be controlled by combining with AE-200.



[4] Centralized air conditioning control

<1> Function List

(1) Normal operation screen

Table Function list

✓: Function provided

Item	Details	LCD	Integrated Web
Start/Stop/Test run	It is possible to start and stop the units in each group, in each block or on each floor or all units collectively. In the test run mode, test run of the units can be performed. (Only on the main unit screen)	✓	✓
Operation mode	The operation mode can be switched to COOL, DRY, HEAT, FAN, AUTO and Setback for the units in each group, in each block or on each floor or all units collectively. Air To Water (PWFY) unit: Heating, Heating ECO, Hot Water, Anti-freeze, Cooling HWHP (CAHV, CRHV) unit: Heating, Heating ECO, Hot Water, Anti-freeze HWHP (QAHV) unit: Mode 1 Chiller unit: Cooling, Heating, Heating Eco, Anti-freeze Note: The Setback mode can be selected on the AE-200A/AE-50A/ EW-50A,but not on the AE-200E/AE-50E/EW-50E.	✓	✓
Temperature setting	The indoor temperature can be set for the units in each group, in each block or on each floor or all units collectively (in steps of 0.5°C). <Setting range> Air conditioning unit Cool/Dry : 19°C–30°C (67°F–87°F) Heat : 17°C–28°C (63°F–83°F) Air To Water (PWFY) unit (Booster unit) Heating : 30°C–50°C (87°F–122°F) Hot Water : 30°C–70°C (87°F–158°F) Anti-freeze : 10°C–45°C (50°F–113°F) Water HEX unit Heating : 30°C–45°C (87°F–113°F) Anti-freeze : 10°C–45°C (50°F–113°F) Cooling : 10°C–30°C (50°F–87°F) HWHP (CAHV, CRHV) unit Heating : 25°C–70°C (77°F–158°F) Hot Water : 25°C–70°C (77°F–158°F) HWHP (QAHV) unit Mode 1 : 40°C (104°F) – (Outlet HW –3°C (6°F)) Chiller unit Cooling : 5.0°C–25.0°C (41°F–97°F) Heating : 30.0°C–55.0°C (87°F–131°F) Note: The settable temperature ranges depend on the unit model. Note: If the indoor unit supports the dual set point function in the Auto mode and when the operation mode above is set to Auto or Setback, two set temperatures for Cool mode and Heat mode can be set. Note: The temperature unit (°C or °F) can be selected on the [Unit Info.] screen.	✓	✓
Fan speed setting	The fan speed can be switched among 4 steps for the units in each group, in each block or on each floor or all units collectively. (The speed can be switched steplessly or in two, three or four steps depending on the model. Models with the automatic function can be operated in the automatic mode.) (When LOSSNAY is used, the fan speed can be switched to very weak, weak, strong and auto. The selectable fan speed varies depending on the model. In the case of interlocked LOSSNAY, the speed can be switched between two steps, weak and strong.	✓	✓
Air direction setting	The direction can be switched among 5 angles in the vertical direction, Auto and Swing for the units in each group, in each block or on each floor or all units collectively. (The selectable directions vary depending on the model.) The 5 angles in the vertical direction and Auto can be selected on models with such functions.	✓	✓
Ventilation mode (LOSSNAY)	The ventilation mode can be switched among normal, heat exchange and automatic modes for the units in each group, in each block or on each floor or all units collectively.	✓	✓
Start/stop of interlocked LOSSNAY	When interlocked LOSSNAY is connected, it is possible to operate (in the high or low mode) or stop the units in each group, in each block or all units collectively.	✓	✓
Status of energy use	The power consumption, outdoor temperature and operation time can be displayed in bar graphs or line graphs for comparison. Note: To display the electric energy, a PI controller and an electricity meter (pulse output type) must be connected. The electric energy cannot be displayed by connecting a PLC (electric power counting software). To display the outdoor temperature, an AI controller and a temperature sensor must be connected.	✓	✓

Table Function list

✓: Function provided

Item	Details	LCD	Integrated Web
Energy management list*1	The results of apportionment of energy consumption to EM blocks, meters, indoor units and outdoor units can be displayed. Note: This function can be used only when the apportioned electricity billing function of AE-200 is used.	✓	✓
Ranking	The power consumption and FAN operation time can be displayed in rank order. Note: The ranking of electric energy can be displayed only by block.	✓	✓
Target value setting	It is possible to set the target values of power consumption for each year, month, day of the week and block. The set target values will be displayed on the energy use status screen and ranking screen.	✓	
State of peak-cut control	The peak-cut control level and the average electric energy can be displayed. Note: The "Energy Management License Pack" is required.	✓	✓
Apportioned electricity billing function	Our unique method for supporting the apportionment of total electric energy and billing according to the operation conditions of indoor units determined based on the communication data between the indoor and outdoor units. * This function cannot be used for trading certificates defined by the Measurement Act.	✓	
Schedule	It is possible to set the weekly schedule based on the day of the week pattern, annual schedule and daily schedule for the units in each group, in each block or on each floor or all units collectively. • 24 times of schedule items can be set per day. The items include “start/stop,” “operation mode,” “temperature setting,” “air flow direction,” “fan speed” and “prohibition of operation of remote controller.” (In the case of LOSSNAY, “start/stop,” “ventilation mode,” “fan speed” and “prohibition of operation of remote controller” can be set in the scheduled operation.) • Five weekly schedules can be retained, and season schedules can be set. • One of the weekly, annual and daily schedules which have been set for the day is executed. The order of priority is as follows: Daily → Annual → Weekly 1 → … → Weekly 5. • In the annual schedule, it is possible to set the operation patterns for 50 days, such as public holidays and summer holidays, not according to the weekly schedule in the range from the current month to the 24th month. 5 kinds of operation patterns can be set for each group. • The optimum start can be programmed to attain the set temperature at the set time. (Only indoor units) Note: The items which can be set depend on the air conditioner model (function).	✓	✓
Enable/disable schedule	It is possible to enable or disable the schedule for the units in each group, in each block or on each floor or all units collectively.	✓	✓
Hold	Touch [ON] or [OFF] to enable/disable the Hold function. When the Hold function is enabled, the scheduled operations are disabled. Note: The operations that have been scheduled on the remote controller will also be disabled. Note: [Hold type] can be specified on the [Advanced] screen. Note: The Hold function can be used on the AE-200A/AE-50A/EW-50A, but not on the AE-200E/AE-50E/EW-50E.	✓	✓
Setting to prohibit remote operation	Operation items by the remote controller to be prohibited can be selected for the units in each group, in each block or on each floor or all units collectively. (The items which can be prohibited are start/stop, operation mode, temperature setting, filter sign, fan speed, air flow direction and timer.) Note: The items which can be prohibited vary depending on the model of air conditioner, LOSSNAY, etc.	✓	✓
External input function setting *2	For all controlled air conditioners, the items, emergency stop/normal, start/stop, prohibition/permission of operation of remote controller and demand level can be set by external voltage contact signals (12 V DC or 24 V DC). (Separately, the external input/output adapter, PAC-YG10HA-E, is necessary.) Note: It is necessary to connect the external input/output adapter to each set of AE-200, AE-50 and EW-50. (Emergency stop of the AE-50/EW-50 system cannot be performed by the external input to AE-200.)	✓	

Table Function list

✓: Function provided

Item	Details	LCD	Integrated Web
External output function setting *3	When one or more air conditioners are running, the “running” signal will be output. When an error has occurred in one or more air conditioners, the “error occurring” signal will be output. (The “running” signals of general equipment (DIDO controller connection) are not output. The “error occurring” signals of the devices are output.) (Separately, the external input/output adapter, PAC-YG10HA-E, is necessary.) Note: If the output function is set to externally output errors on AE-200, errors in any of AE-200, AE-50 and EW-50 will be output. If the function is set to output errors on AE-50/EW-50, errors only in AE-50/EW-50 will be output.	✓	
Reset of filter sign	The filter sign display can be reset for the units in each group, in each block or on each floor or all units collectively.	✓	✓
Resetting the cumulative filter usage time	The cumulative filter usage time is reset when the filters on air-conditioning units are cleaned.		✓
Error reset	The errors which have occurred can be reset.	✓	✓
Error history reset	The error history (unit errors and communication errors) can be erased.	✓	✓
Start/stop (collective)	The ON/OFF LED lamp indicates that the units in one or more groups are running (on) or the units in all groups are stopped (off). (Except general equipment (DIDO controller connection))	✓	
Operating state of each group	The items, start/stop, operation mode, temperature setting, fan speed, air flow direction, ventilation mode, start/stop of interlocked LOSSNAY, enable/disable scheduled operation, ON/OFF of hold function (only AE-200A/AE-50A/EW-50A), energy-saving, night setback and night purge are displayed for each group. Note: The items which can be displayed depend on the models in the group.	✓	✓
Display of filter sign	The filter sign can be displayed for the units in each group, in each block or on each floor or all units collectively.	✓	✓
Display of prohibition of remote operation	The operations by the remote controller which have been prohibited by this controller or another system controller are displayed.	✓	✓
Display of suspension	When an emergency stop signal is received through an external contact or from the building management system (BACnet®) or while the 30 minute operation suspension is executed by the Peak Cut function, the operation control setting will be indicated with icon and a message.		✓
Display of current error	The address of the unit in which an error has occurred, the error code and the address of the unit which has detected the error are displayed.	✓	✓
Monitoring of error history	Up to 512 errors which occurred in the past are stored. 128 errors of each set of AE-200, AE-50 and EW-50 (64 unit errors and 64 communication errors) are stored.	✓	✓
History of transmission of error notification e-mails	The history of transmission of error notification e-mails and e-mails upon recovery from error can be checked.	✓	✓
Monitoring of measurement state	The measurements on the temperature sensor and humidity sensor of AI controller, electricity meter of PI controller and water meter can be monitored.	✓	✓
Monitoring of operating state of outdoor units	The capability values, high pressures and low pressures of the outdoor units can be checked.		✓
Monitoring of state of free contacts	The input/output state of the free contacts of indoor units can be checked.		✓
AHC List	The input and output status of Advanced HVAC CONTROLLERs can be displayed.	✓	✓
Display of refrigerant systems	The list of the refrigerant systems connected to AE-200/AE-50 (information on connection between outdoor units and indoor units) can be displayed.	✓	

* The above-mentioned functions may be unavailable depending on the connected devices or the combination of devices.

*1: The "Charge" license is required separately. If the license has not been registered, the function can be set, but the control will not be performed.

*2: The external input functions for emergency stop, start/stop and demand level are not capable of emergency stop, start/stop and peak cut control of general equipment (connected to DIDO controller).
However, the emergency stop input can be used for emergency stop of general equipment (connected to DIDO controller) by setting DIDO controller switch.

*3: The state of operation of general equipment (connected to DIDO controller) cannot be output.

(2) Initial setting screen

Table Function list

✓: Function provided

Item	Details	LCD	Initial Setting Tool	Initial setting Web	Integrated Web
Present date and time setting	The present date and time can be set.	✓		✓	✓
Registration of license	The purchased license can be registered.	✓		✓	✓
Unit information (basic system)	Items common to main units and Web browsers of AE-200, AE-50 and EW-50. The main unit name, identification number, expansion, date display format, time display format, temperature display format, pressure display format, room temperature display and availability of illuminance sensor and motion sensor can be set. Items only on main units of AE-200 and AE-50 The displayed language (Chinese, English, French, German, Italian, Japanese, Portuguese, Russian, Spanish, or Turkish*7) can be switched, and the LCD illuminance, sound volume, availability of test run and availability of screen lock function can be set. Items only on Web browsers The display of the group name on the list screen and the display or non-display of the filter sign can be set.	✓	✓	✓	
Network setting	The IP addresses, subnet masks and gateways relating to the LAN of AE-200/AE-50/EW-50 can be set, and the M-NET addresses, range of prohibition of remote operation and external input relating to M-NET can be set.	✓		✓	
Advanced setting	The time master and sub controllers can be set, the old model compatibility mode can be turned on or off, the hold type can be set to Normal or ON (AE-200A/AE-50A/EW-50A only), and the season schedule setting can be enabled or disabled.	✓	✓	✓	
Group setting	The indoor units, LOSSNAY, general equipment, Air To Water (PWFY) units, HWHP (CAHV, CRHV) units, Chiller units, remote controllers, sub system controllers, and AHC are registered in groups.	✓	✓	✓	
HW supply setting	The HW supply units are registered in groups.	✓			
Block setting	Set groups are registered in each block. Note: A block across the AE-200, AE-50 and EW-50 systems cannot be set.	✓	✓	✓	
Energy management Block setting	Blocks can be set across AE-200, AE-50 and EW-50 systems.	✓	✓		
Interlocked LOSSNAY setting	For interlocked LOSSNAY, the indoor units are registered as interlocking sources.	✓	✓	✓	
Floor layout setting	The basic floor plan, group display positions and plan view can be set. Note: To display plan views on the Integrated Centralized Control Web, it is necessary to set the plan views with the Initial Setting Tool.	✓	✓		
Error notification e-mail setting	Various items, such as the mail server to use the notification of errors through e-mail and the error notification e-mail destinations, can be set. Note: The items must be set for each of AE-200, AE-50 and EW-50.			✓	
Energy-saving/peak-cut control setting *4 *5	The method to use the energy-saving/peak-cut control and the method of controlling indoor and outdoor units can be set.	✓		✓	
Measurement setting	The conditions of the temperature and humidity sensors of AI controller and the electricity meter and water meter of the PI controller can be set.	✓	✓	✓	
Temperature setting range limit setting	When the temperature ranges to be controlled by the remote controllers are limited, the temperature range can be set for each remote controller. Note: The ranges which can be monitored and controlled vary depending on the model. This function is unusable on P/M/S series.			✓	
Energy management setting	The outdoor temperature measuring unit, apportionment mode and electricity meter used as the base of apportionment can be set.	✓		✓	
Night mode schedule setting	When the night mode (low-noise operation) of outdoor units is used, the time period in which the units will be operated in the night mode can be set. Note: This mode cannot be set for P/M/S sereis.			✓	
System changeover setting	All indoor units (cooling/heating) connected to one outdoor unit can be automatically switched according to the change in room temperature. (Except R2 Series) The outdoor units to be automatically switched between cooling and heating and the switch mode (automatic/representative group) can be set.			✓	

Table Function list

✓: Function provided

Item	Details	LCD	Initial Setting Tool	Initial setting Web	Integrated Web
Outdoor temperature interlock control	The outdoor temperature measuring unit to be used to use the outdoor temperature interlock control function can be selected, and the control level can be set for each group.	✓		✓	
Night setback function	The control time period to use the night setback function can be set, and the upper and lower limit temperatures can be set for each group.	✓		✓	
Interlock control *6	Interlock control is provided between connected devices for which the interlock conditions have been set. (Up to 200 interlock conditions can be registered for each set of AE-200 and AE-50.)		✓	*8	
Night Purge *4	It is possible to enable or disable the night purge function and set the days of the week, start time, end time, outdoor temperature threshold and initial fan speed to perform purging.	✓		✓	
Maintenance user	The maintenance user name and password can be set.	✓		✓	
Building Manager (administrator user)	The building manager name (administrator user), password and available functions can be set.	✓		✓	
Screen display setting	The items relating to screen display can be set.				✓
User management	The building manager ID and password can be changed, and the tenant manager and general users can be registered.				✓

*4: On some models, these methods cannot be set.
*5: The "Energy Management License Pack" must be separately obtained.
*6: The "Interlock control" license must be separately obtained.
*7: Turkish is not supported on the Initial Setting Web.
*8: Make the settings for Ver. 7.50 and later from the Initial Setting Tool.

(3) Other functions

Table Function list

✓: Function provided

Item	Details	LCD	Initial Setting Tool	Initial setting Web	Integrated Web
Data backup	Setting data and user information can be saved.	✓	✓*1	✓	
Data loading	Setting data and user information can be loaded.	✓	✓*1	✓	
CSV output	Operation data (billing parameters and electric energy data) for up to 62 days can be saved in a USB memory.	✓			✓
Output of energy management data	The energy management data can be output. Note: It is necessary to output the data on each set of AE-200 and AE-50.	✓			✓
Correction of touch panel	The touching positions on the touch panel can be corrected.	✓			
Software updating	The software can be updated by two methods: inserting a USB memory stick into the main unit of AE-200/AE-50 and operating on the LCD, and inserting a CD into the PC and operating on the Web browser.	✓			
Gas amount check	The amount of refrigerant gas can be checked.	✓			✓
Backup of group setting information/ interlocked LOSSNAY information	Even if power is disconnected, the group setting information and interlocked LOSSNAY setting information are retained.	✓			
Backup of error information	Even if power is disconnected, the error history data is retained.	✓			
Backup of schedule setting	Even if power is disconnected, the schedule information set for each group is retained.	✓			
Backup of present date and time	When power is disconnected, the present time is backed up for approx. 3 days by the built-in capacitor. (It takes approx. 1 day to charge the built-in capacitor. It is unnecessary to replace the capacitor.)	✓			
Locking function	The touch panel can be locked to prevent unintentional operation. It cannot be operated until the user name and password are input.	✓			
Cleaning of touch panel	The touch panel can be locked and cleaned.	✓			
Time control	The time of the controlled controllers and units is adjusted once a day. (Applicable only to controllers and units with time adjustment function)	✓			
Error alert	Communication errors regarding centralized controls or air-conditioning unit groups under the control of Integrated Centralized Control Web will be notified with an alarm sound and a popup window.				✓

*1: Only the items which can be set with the Initial Setting Tool.

Remarks

- ○ When performing the setting to prohibit operation of remote controller on another system controller, set the range of prohibition of operation in the network setting of AE-200/AE-50/EW-50 to “Only RC.”
- ○ However, since AE-200/AE-50/EW-50 is the top-level controller, the operation of AE-200/AE-50/EW-50 cannot be prohibited from any other system controller in any case.
- ○ In the group controlling LOSSNAY, only the start/stop and filter sign reset operations can be prohibited.
- ○ The prohibition of operation to reset the filter sign is displayed only while the filter sign is on.

<2> Number of connected units and M-NET addresses

The number of connected air conditioners and M-NET address ranges are shown below.

<Air conditioners>

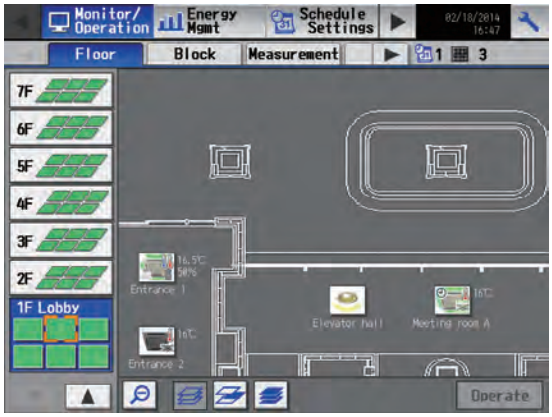
<table>
<tr><th colspan="2">Unit or controller</th><th>Symbol</th><th>Max.number of connected units</th><th>M-NET address setting range</th><th>Method for determining M-NET address</th></tr>
<tr><td>Indoor unit
CITY MULTI, Large Capacity Floor Standing PAC</td><td rowspan="4">Base unit/sub unit</td><td>IC</td><td rowspan="4">50</td><td rowspan="4">01 to 50</td><td rowspan="4">Give the lowest number to the indoor unit to be used as the base unit in the group, and give sequential numbers to the other indoor units in the group.</td></tr>
<tr><td>Mr. Slim
(adapter for connecting M-NET)</td><td>AIC</td></tr>
<tr><td>Room air conditioner
(Interface for connecting M-NET)</td><td>RA</td></tr>
<tr><td>Free Plan LOSSNAY/
OA processing unit</td><td>LC, FU</td></tr>
<tr><td rowspan="2">Hot water heat pump
(CAHV, CRHV)</td><td>Main Box</td><td>CE</td><td>50</td><td>01 to 50</td></tr>
<tr><td>Sub Box</td><td>CL</td><td>50</td><td>51 to 100</td><td>Assign an address that equal the addresses of the main and sub units in the Main Box plus 50 to the units in the Sub Box.</td></tr>
<tr><td colspan="2">Hot water heat pump (QAHV)</td><td>CE</td><td>24</td><td>01 to 50</td><td>Make the settings in the same way as with indoor unit .
When units other than QAHV units exist in a system, count each QAHV unit as equivalent to two air-conditioning units. Assign sequential addresses to the units in the same group.</td></tr>
<tr><td rowspan="2">Chiller (EAHV, EACV)</td><td>Main Box</td><td>CH</td><td>24</td><td>01 to 50</td><td>Make the settings in the same way as with indoor unit .
When the only units connected are chiller units, a maximum of 24 units can be connected.
When units other than chiller units exist in a system, count each chiller unit as equivalent to three air-conditioning units.
Assign sequential addresses to the units in the same group.</td></tr>
<tr><td>Sub Box</td><td>CL</td><td>24</td><td>51 to 100</td><td>Assign an address that equal the addresses of the main and sub units in the Main Box plus 50 to the units in the Sub Box.</td></tr>
<tr><td colspan="2">PI controller</td><td>PI</td><td>15</td><td rowspan="3">01 to 50</td><td>A maximum of twenty PI controllers can be connected to an AE-200 system with an expansion controller.</td></tr>
<tr><td colspan="2">AI controller</td><td>AI</td><td>50</td><td></td></tr>
<tr><td colspan="2">DIDO controller</td><td>DDC</td><td>50</td><td>A maximum of fifty DIDO controllers can be connected, counting each contact as one unit.</td></tr>
<tr><td rowspan="2">M-NET remote controller</td><td>Main remote controller</td><td rowspan="2">ME</td><td rowspan="2">100</td><td>101 to 150</td><td>Add 100 to the lowest indoor unit number in the group.</td></tr>
<tr><td>Sub remote controller</td><td>151 to 200</td><td>Add 50 to the main remote controller address.</td></tr>
<tr><td colspan="2">MA remote controller</td><td>MA</td><td>—</td><td colspan="2">It is unnecessary to set the address.
(However, when two remote controllers are used, the main/sub selector switch must be set.)</td></tr>
</table>

Unit or controller		Symbol	Max.number of connected units	M-NET address setting range	Method for determining M-NET address
Outdoor unit CITY MULTI, Large Capacity Floor Standing PAC		OC	50	51 to 100	Add 50 to the lowest indoor unit address among the indoor units in the refrigerant system.
Auxiliary outdoor unit	Heat storage unit	TU		52 to 100	Add 1 to the outdoor unit address in the refrigerant system.
	BC controller (base unit)	BC			Add 50 to the lowest indoor unit address among the indoor units connected to the distribution sub controller.
	BC controller (sub unit 1,sub unit 2)	BS1, BS2			
	HBC controller(base unit)	HB			Add 50 to the lowest indoor unit address among the indoor units connected to the water system distribution sub controller.
	HBC controller(sub unit 1, sub unit2)	HS1, HS2			
System controller	Group remote controller	GR	4	201 to 250	Add 200 to the lowest number of the group to be controlled.
	System remote controller	SR, 50AT			Set the address arbitrarily in the range shown left.
	ON/OFF remote controller	ANR			Add 200 to the lowest number of the group to be controlled.
	Schedule timer	ST			Set the address arbitrarily in the range shown left.
	AHC ADAPTER	AHC	1	201 to 250	Set the address arbitrarily in the range shown left.
	Centralized controller	AE-200/ AE-50/ EW-50	—	0 (201 to 250)	Set the address to 0. However, when the BM adapter is connected, set on of their addresses to 201 to 250.

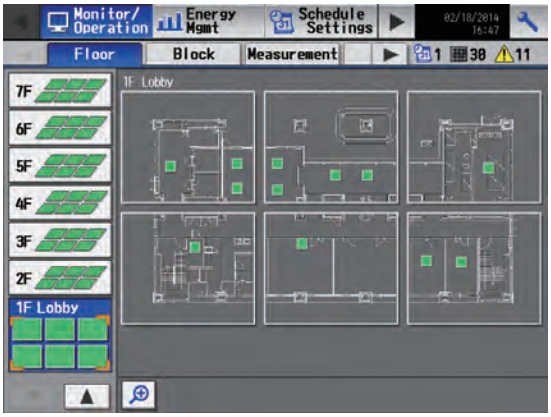
<3> Images of LCD screens on AE-200 main unit

The images of the monitoring screens on the LCD on AE-200 main unit are shown below.

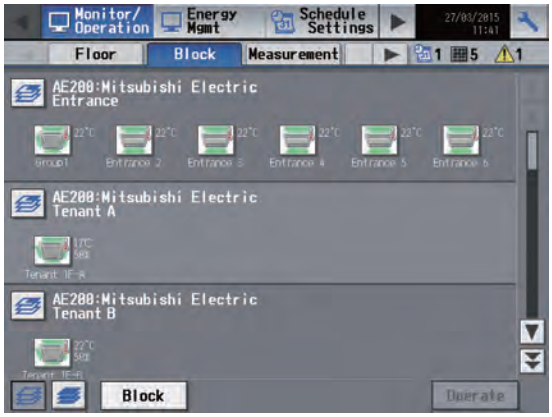
Floor list screen (display of icons)



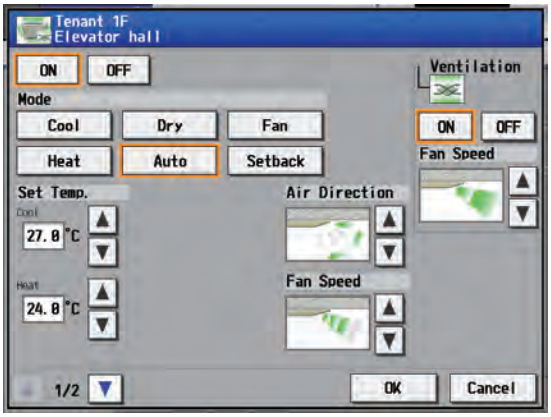
Floor list screen (list screen)



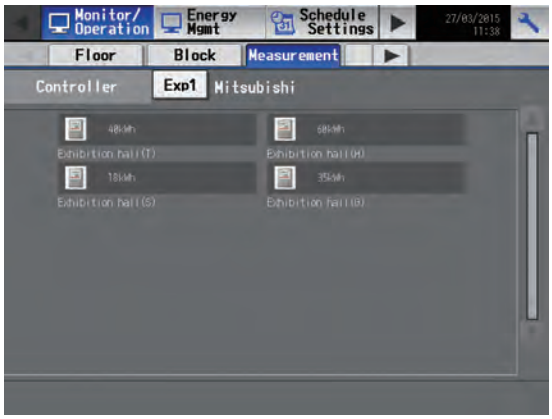
Block list screen



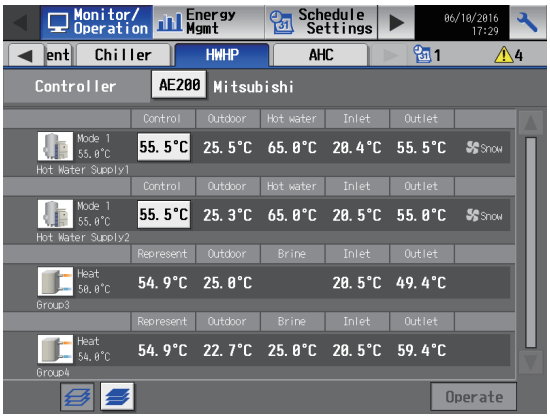
Air conditioner operation screen



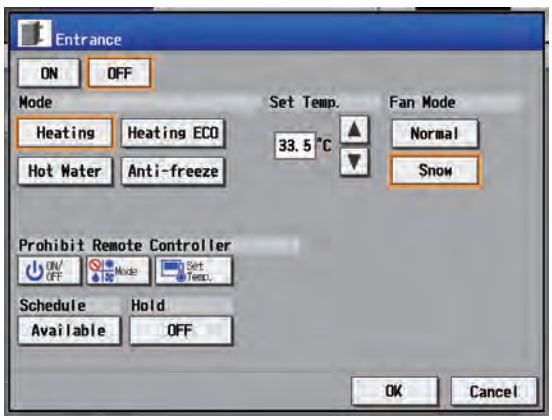
Measurement list screen



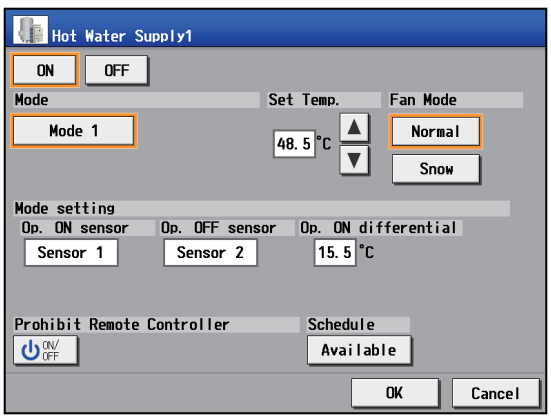
HWHP list screen



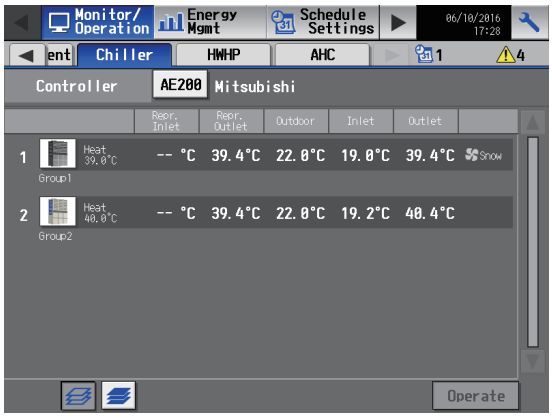
HWHP operation screen (CAHV, CRHV)



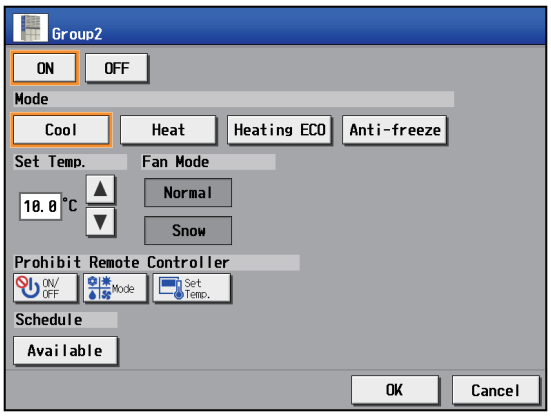
HWHP operation screen (QAHV)



Chiller list screen



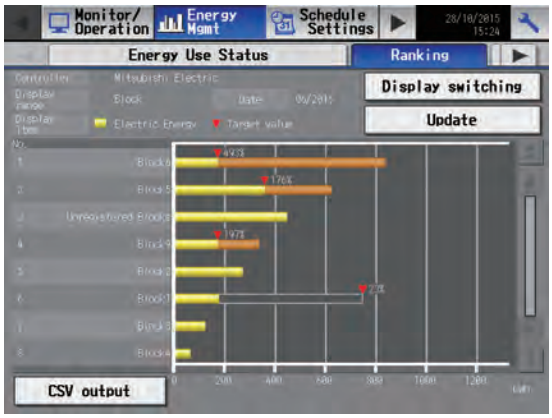
Chiller operation screen



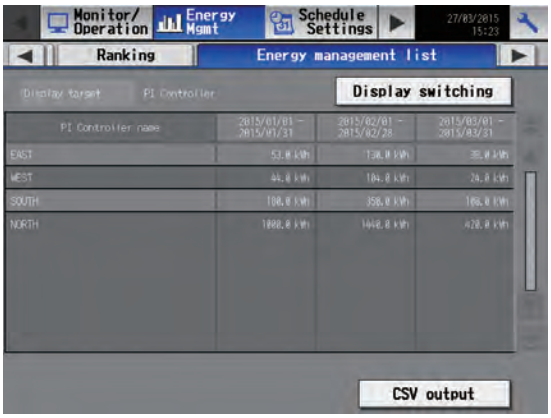
AHC status monitor screen

Energy use status screen

Ranking screen

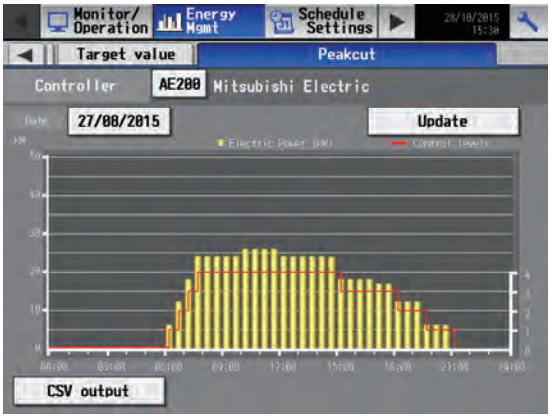


Energy management list screen

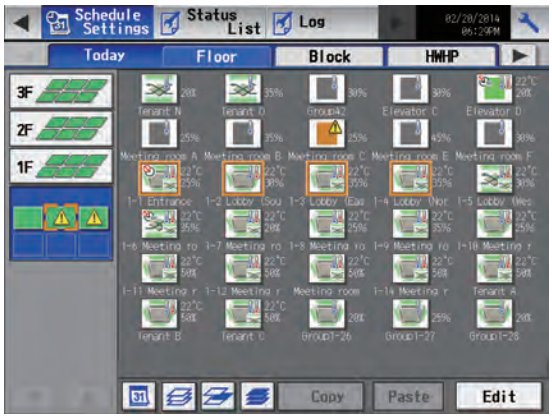


Target value setting screen

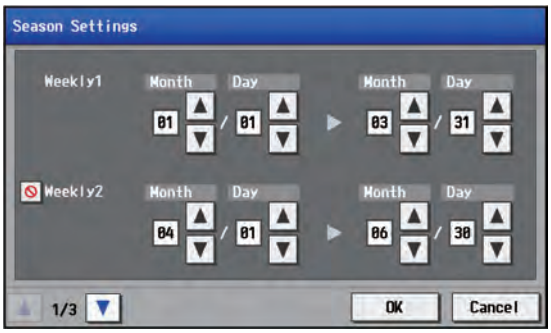
Peak-cut control status screen



Schedule setting screen

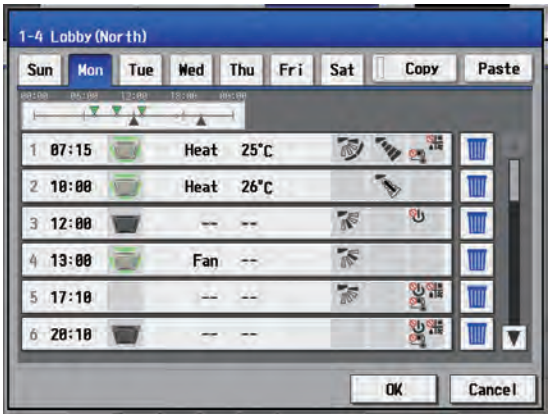


Season setting screen

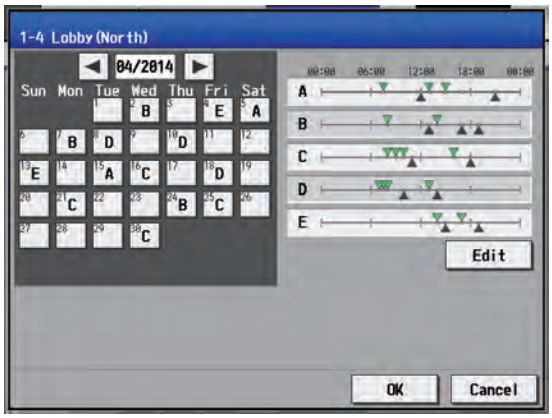


Schedule on current day

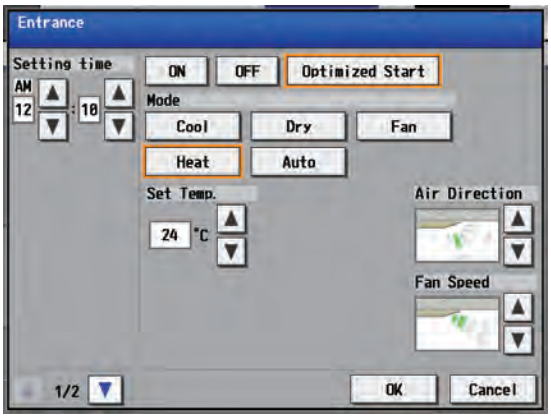
Weekly schedule



Annual schedule

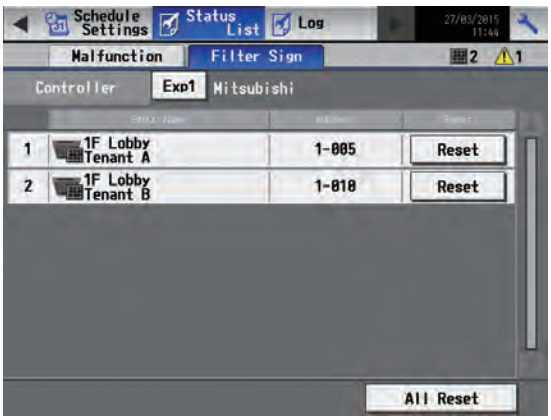


Schedule data setting screen

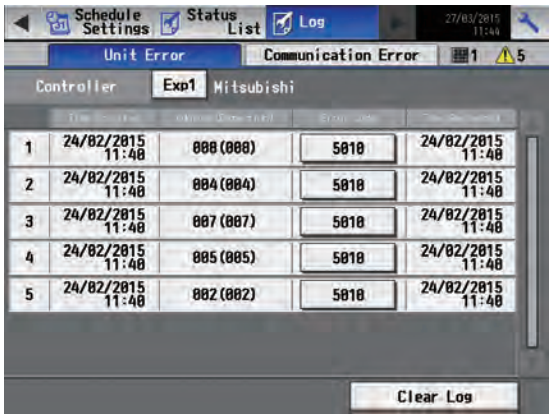


Screen of units in trouble

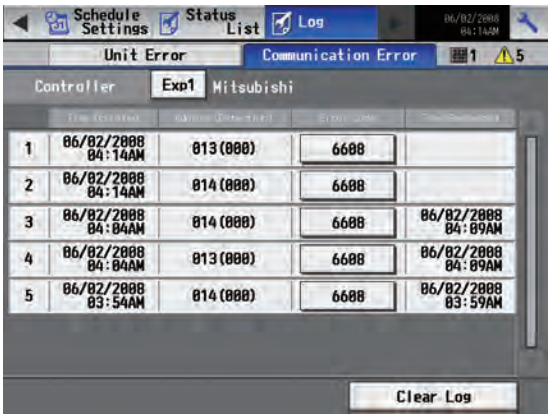
Screen of units with filter sign displayed



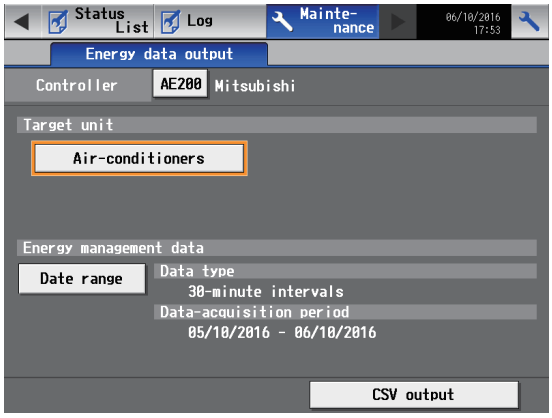
Unit error log screen



Communication error log screen



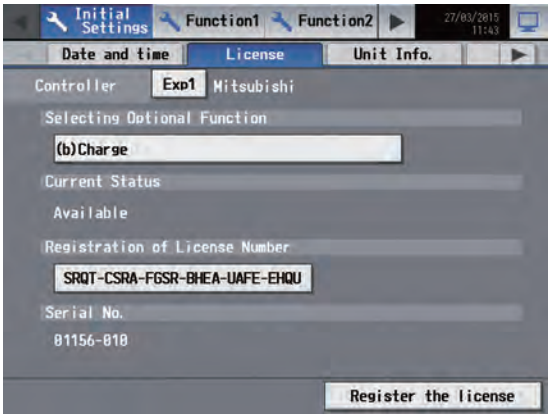
Energy management output screen



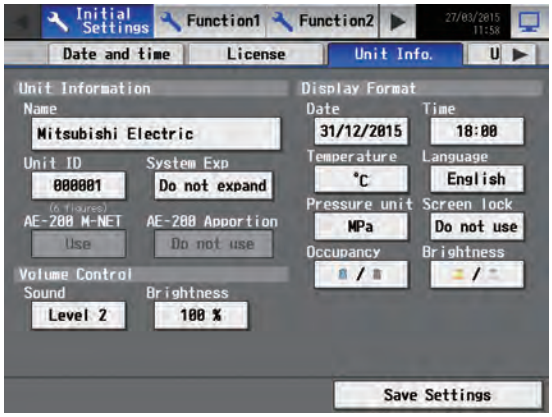
The images of the initial setting screens on the LCD on AE-200 main unit are shown below.

Current date and time setting screen

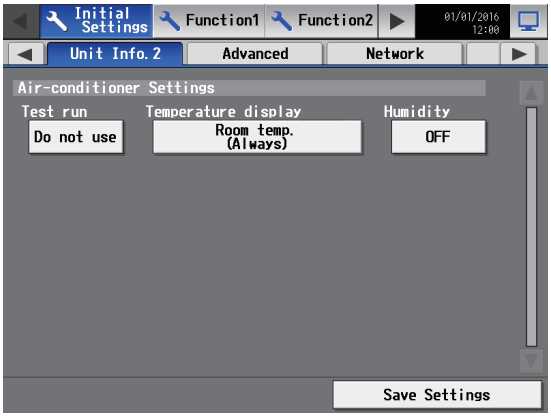
License registration screen



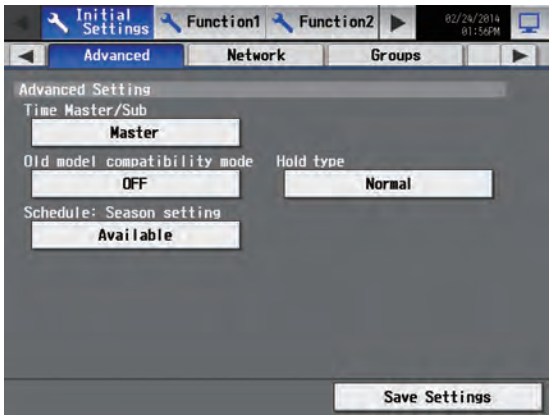
Unit information screen



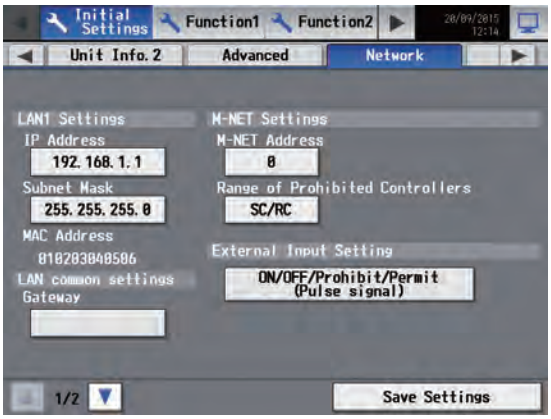
Unit information 2 screen



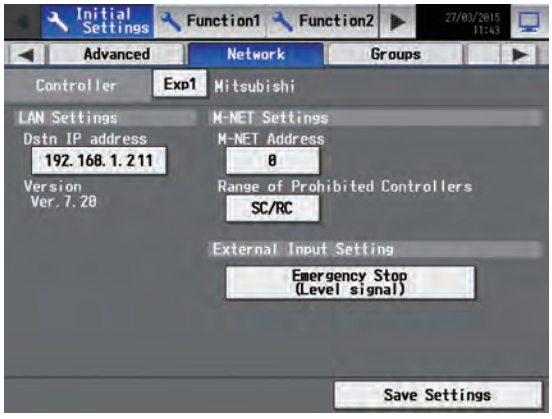
Advanced setting screen



Network setting screen

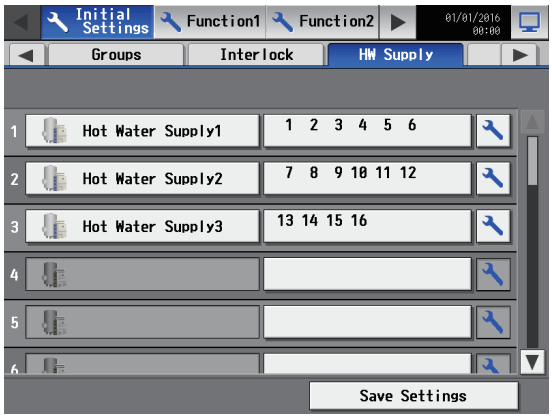


Network setting screen (expansion controller IP setting)



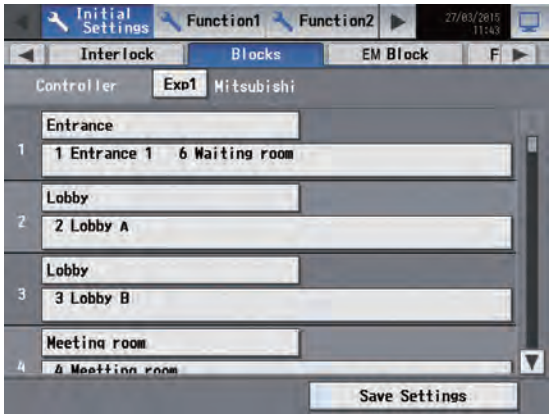
Group setting screen

HW Supply setting screen



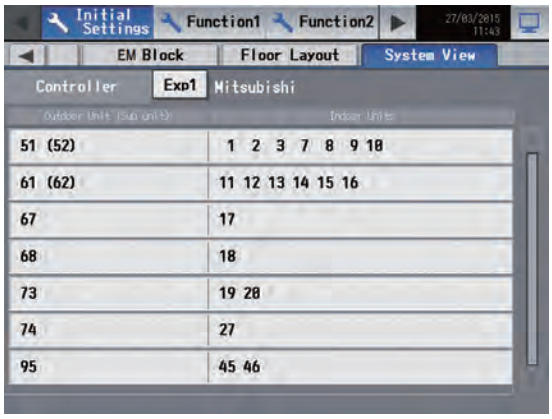
Interlocked LOSSNAY setting screen

Block setting screen

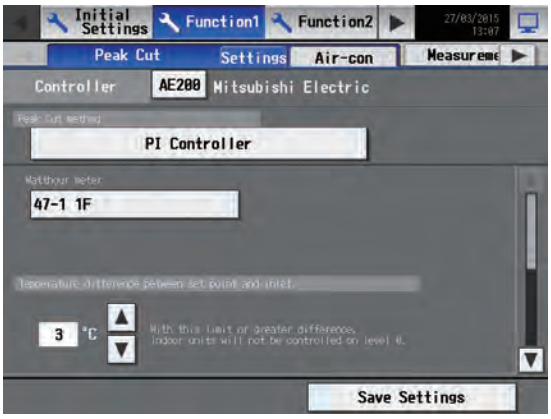


Floor layout setting screen

Refrigerant system display screen

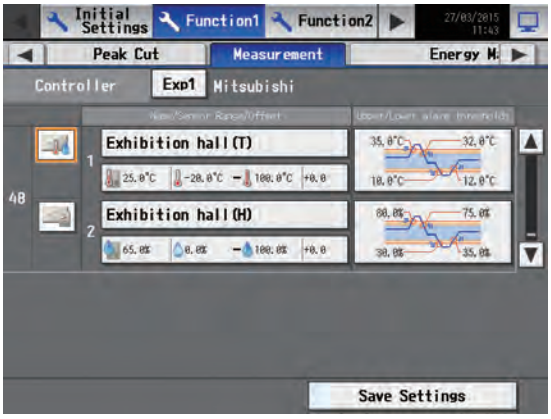


Peak-cut setting screen (configuration)



Peak-cut setting (air conditioners)

Measurement setting screen

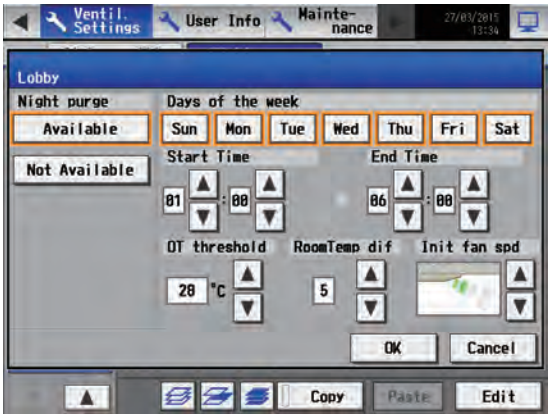


Energy management setting screen

Outdoor temperature interlock screen

Night setback control setting screen

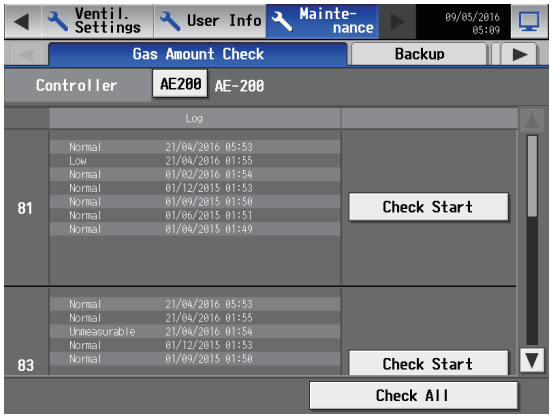
Night purge setting screen



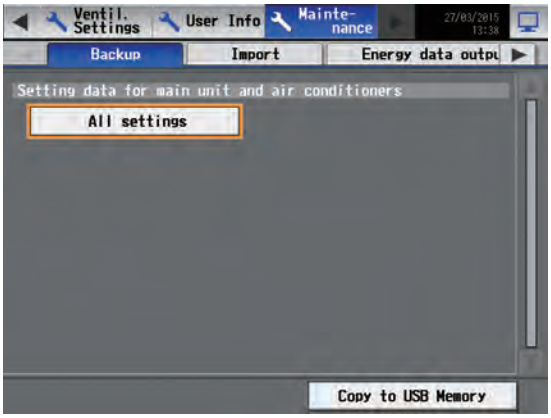
Maintenance user setting screen

Building manager setting screen

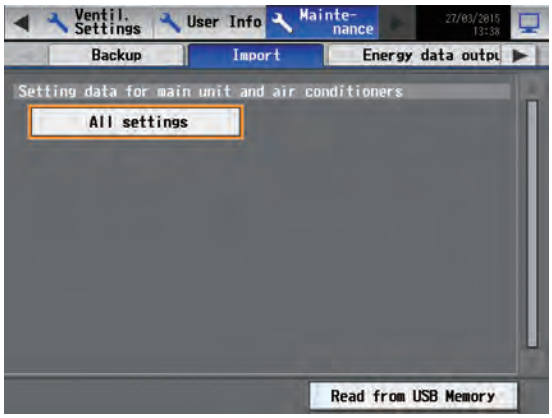
Gas amount check screen



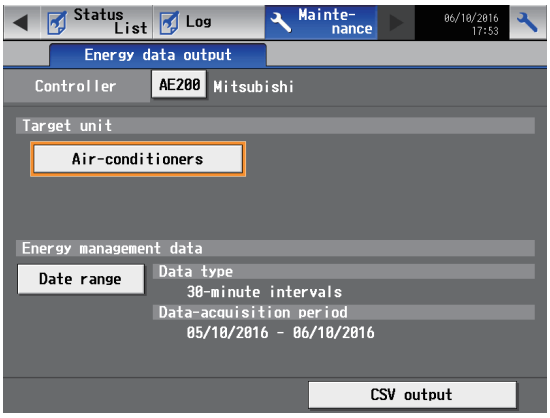
Data backup screen



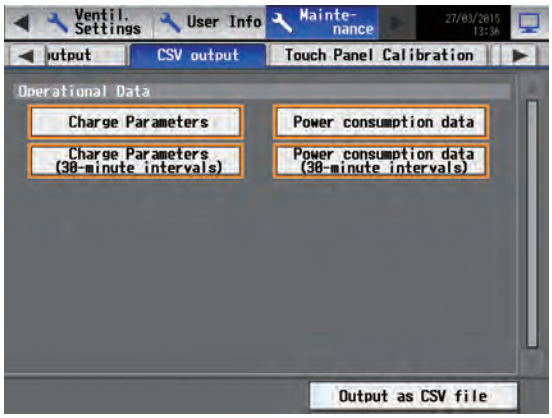
Data loading screen



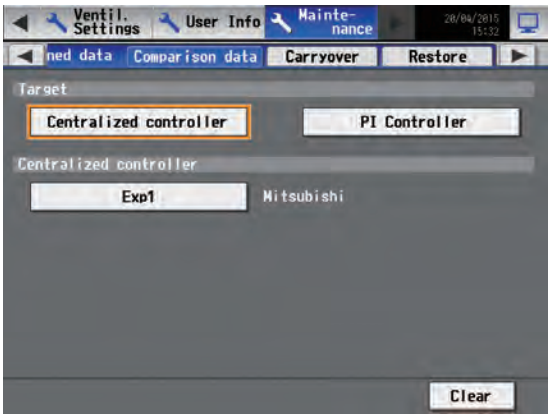
Energy management data output screen



CSV output screen



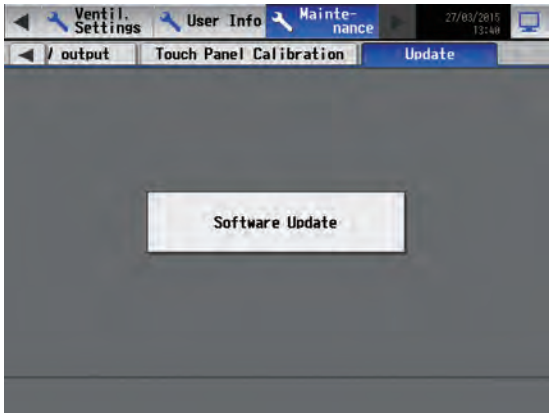
Screen for clearing data for comparison of apportioned electric energy



Screen for cleaning data on carryover of apportionment

Touch panel calibration screen

Software update screen



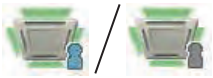
<4> Status of icons

The following icons will be displayed on the LCDs and Web browsers.

(1) Air conditioner group

ON	OFF	Error	Filter sign *1	Interlocked LOSSNAY ON *2, *3, *7
				

Interlocked LOSSNAY OFF *3, *7	Schedule set *5	Schedule disabled	HOLD ON *14	Energy-saving ON *4,*12
				

Night setback mode *10	Starting up *11	Occupied/Vacant *5, *6, *7	Bright/dark *8, *9, *10	Room temperature *12, *13
		 (Blue) (Gray)	 (Yellow) (Gray)	 (Red)

Humidity *12, *13
 (Blue)

*1: Displayed only on the Web browsers

*2: When LOSSNAY is interlocked with Mr. Slim air conditioner, the “Interlocked LOSSNAY ON” icon is displayed also while only LOSSNAY is operating.
(Applicable M-NET adapter model: PAC-SF48/50/60/70/80/81MA-E)

*3: When LOSSNAY is interlocked with indoor units in more than one group, LOSSNAY may be running even if the “Interlocked LOSSNAY OFF” icon is displayed.

*4: The “Energy-saving control” icon is displayed in the following case.
The peak-cut control is performed for the group or the outdoor units connected in the group.

*5: The “Occupied/Vacant” icon is displayed only when [ ] (blue), [ ] (gray) or [ ] (blue/gray) has been selected in “Motion sensor display” in “Display setting” on the unit information screen or the basic system setting screen of the Web browser for initial setting.

*6: The “Occupied/Vacant” icon is displayed only when an ME remote controller (PAR-U01MEDU/PAR-U02MEDA) provided with a motion sensor is used for the group.

*7: The “Occupied/Vacant” icon is displayed in priority to the “Interlocked LOSSNAY ON” and “Interlocked LOSSNAY OFF” icons.

*8: This icon is displayed only when [ ] (yellow), [ ] (gray) or [ ] (blue/gray) has been selected in “Brightness sensor display” in “Display setting” on the unit information screen or the basic system setting screen of the Web browser for initial setting.

*9: The “Bright/dark” icon is not displayed when the remote controller for the group is not provided with an Brightness sensor.

*10: The “Night setback mode” icon is displayed in priority to the “Bright/dark” icon.

*11: If the air conditioner is not recognized after startup, this icon keeps being displayed. Check the connection and group setting of the air conditioner.

*12: The “Energy-saving control” icon is displayed in priory to the “Room temperature” and “Humidity” icons.

*13: The display and non-display of room temperature and humidity can be switched on the initial setting screen.

*14: The Hold function can be used on the AE-200A/AE-50A/EW-50A, but not on the AE-200E/AE-50E/EW-50E.

Remarks

○ The icons of the air conditioner group can be displayed not only in four directions, but also in two directions or in a suspended style. The icon display type can be set on the group setting screen.

(2) LOSSNAY group

ON	OFF	Error	Schedule set	Schedule disabled
				

HOLD ON *1	Energy-saving ON *2	Filter sign *3	Night purge ON/OFF *4
			 ON (Yellow) OFF (Gray) *5

*1: The Hold function can be used on the AE-200A/AE-50A/EW-50A, but not on the AE-200E/AE-50E/EW-50E.
*2: The “Energy-saving control” icon is displayed when the peak-cut control is performed for the LOSSNAY group.
*3: This icon is displayed only on the Web browsers.
*4: When the scheduled operations exist during the Night purge operation, the “Night purge ON” icon takes priority over the “Schedule set” icon. When the scheduled operations exist but are disabled during the Night purge operation, the “Night purge ON” icon takes priority over the “Schedule disabled” icon.
*5: The “Night purge OFF” icon will appear only on operation setting screens.

(3) OA Processing unit group (AE-200E/AE-50E/EW-50E only)

ON	OFF	Error	Filter sign *1	Schedule set
				

Schedule disabled	Energy-saving control *2
	

*1: This icon is displayed only on the Web browsers.
*2: The “Energy-saving control” icon is displayed when the peak-cut control is performed for the group or the outdoor units connected in the group.

(4) Air To Water (PWFY) unit group and HWHP (CAHV/CRHV/QAHV) unit group

ON	OFF	Error	Schedule set	Schedule disabled
				

Energy-saving ON *1	Water temperature display *2	HOLD ON *3
		

*1: The “Energy-saving ON” icon will appear while the Peak-Cut control is performed on the Air To Water (PWFY) unit group. This icon will not appear for the HWHP (CAHV/CRHV/QAHV) unit groups.
*2: The “Water temperature display” icon will not appear for the HWHP (CAHV/CRHV/QAHV) unit groups.
*3: The Hold function can be used on the AE-200A/AE-50A/EW-50A, but not on the AE-200E/AE-50E/EW-50E.

(5) Chiller unit group

ON	OFF	Error	Schedule set	Schedule disabled
				

(6) General equipment group

ON	OFF	Error	Schedule set*1	Schedule disabled
				

HOLD ON*2


*1: When schedule has been set for the DIDO controller prohibited from being operated ([Prohibited] has been specified in [Operation setting] on the group setting screen), the “Schedule set” icon is displayed, but the DC will not be operated according to the schedule.

*2: The Hold function can be used on the AE-200A/AE-50A/EW-50A, but not on the AE-200E/AE-50E/EW-50E.

Remarks

- Connecting the DIDO controller enables to turn on and off the lights and pumps and perform interlock control with a card key. In this case, the light and pump icons and card key can be selected.
- The icons can be selected on the group setting screen.

<5> List of icons

The icons of the air conditioners and general equipment connected to AE-200, AE-50 and EW-50 are shown below.

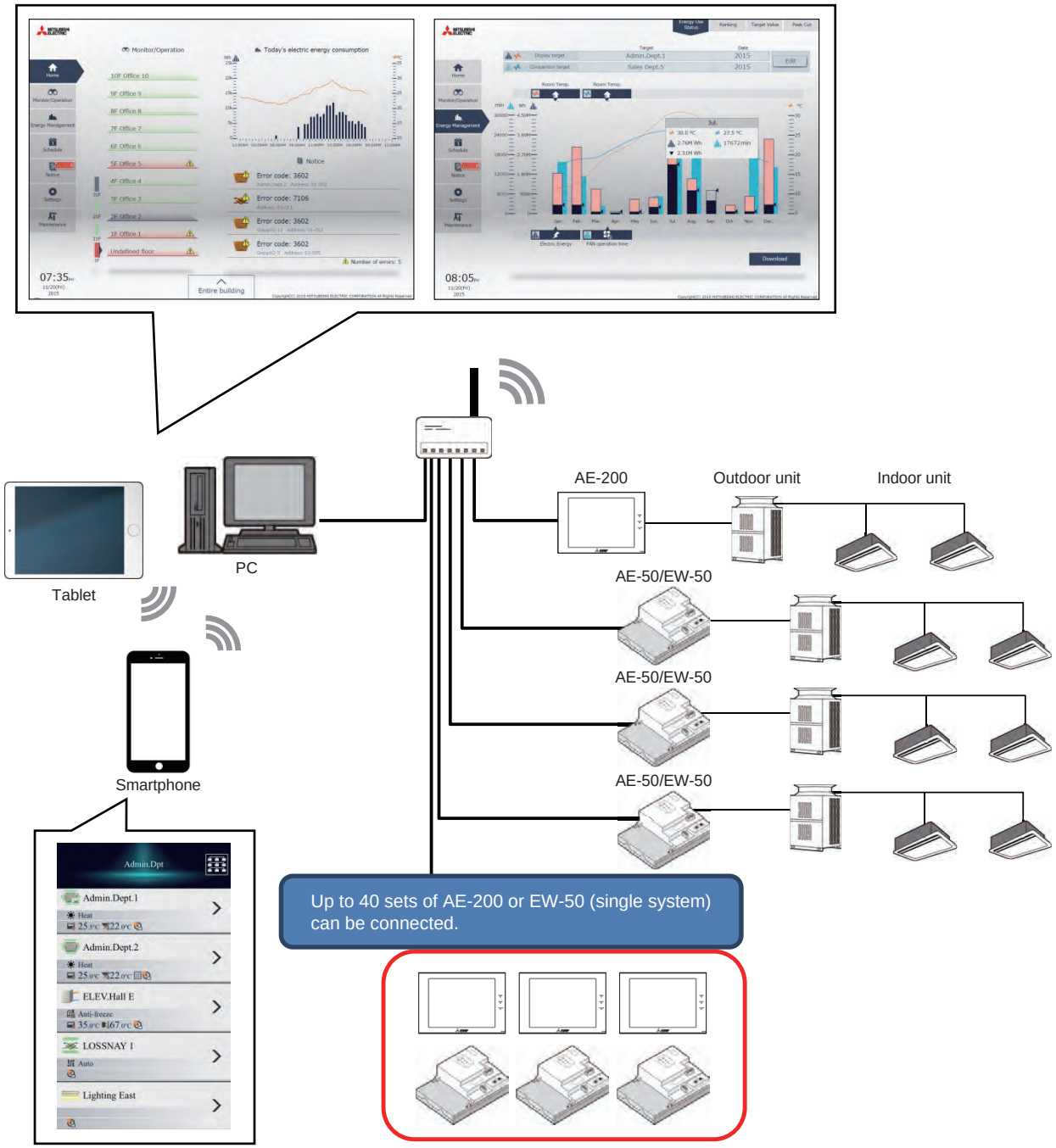
	ON	OFF	Error		ON	OFF	Error		ON	OFF	Error
Ceiling cassette type (4-way blow)				Floor type 3				Humidifier			
Ceiling cassette type (2-way blow)				Floor type 4				Window			
Ceiling cassette type (1-way blow)				Lossnay				Card key			
Ceiling embedded type 1				General equipment				Temperature sensor		–	
Ceiling embedded type 2				Pump				Humidity sensor		–	
Ceiling suspended type				Fan				Electricity meter		–	
Wall mounted type				Door (electronic)				HWHP (CAHV, CRHV)			
Floor type 1				Illumination (fluorescent lamp)				HWHP (QAHV)			
Floor type 2				Illumination (down light)				Chiller (EAHV, EACV)			

<6> Centralized monitoring/operation by Integrated Centralized Control Web

When AE-200, AE-50 or EW-50 is connected with a personal computer through the LAN, the personal computer on the desk, tablet terminal or smartphone can be used as a terminal for operating the air conditioners. If the "Integrated Centralized Control" license is registered, up to 40 M-NET systems can be connected, and the air conditioners can be monitored and operated on one Web browser. The air conditioners can be operated collectively or by block, group or energy management block.

Remarks

- ○ The software versions of AE-200/AE-50/EW-50 to be controlled on the Integrated Centralized Control Web must agree to one decimal place.
  (Example: When the version of one of them is 7.30, the versions of others must be 7.3 or later.)
- ○ To centrally monitor and operate more than one set of AE-200 or EW-50 (single system) using the Integrated Centralized Control Web, the "Integrated Centralized Control" license is required.
- ○ AE-200 which does not use M-NET is not included in the restricted number of units (up to 40 units) connected on the M-NET system of the Integrated Centralized Control Web.
- ○ To use the Integrated Centralized Control Web, it is necessary to set the conditions using the Initial Setting Tool. For more information, see Instruction Book for AE-200/AE-50/EW-50 (Initial Setting)."



Access AE-200/EW-50 to which you have logged in from the Integrated Centralized Control Web, and you can collectively operate and monitor 50 air conditioners registered in each set, up to 2000 air conditioners.
The users are classified into general users, tenant managers and building manager as shown in 2.6.3 “Functions available to each user.” The available functions vary depending on the user type.

<Login URL>
URL for PC and tablet terminal: http://[IP address of AE-200/EW-50]/control/index.html
URL for smartphone: http://[IP address of AE-200/AE-50/EW-50]/mobile/index.html

Remarks

- When connecting AE-200/AE-50/EW-50 through the Internet, ensure the security using a VPN router. When connecting them to the company intranet, contact the system administrator to ensure that the VPN router can be used.
- This system can encrypt communication data using the HTTPS (SSL). If this system is connected to a LAN which many and unspecified users can access, it is recommended to connect the system by using the HTTPS.
- When using the SSL, it is necessary to SSL enable each set of AE-200/AE-50/EW-50 on the terminal side.
- To use a tablet terminal or a smartphone not through the Internet, it is necessary to create a Wi-Fi environment.
- If a tablet terminal or a smartphone is Wi-Fi connected to a wireless LAN not connected to the Internet, it is impossible to establish Internet communication and send or receive e-mails on the tablet terminal or the smartphone.

If you log in as building manager, it may take about 1 minute until the Integrated Centralized Control Web is enabled after you log in depending on the number of air conditioners to be controlled. The Integrated Centralized Control Web will transfer a large amount of data to and from the centralized controller to display the home screen and display the screen in two stages. (1) “Menu, floors and notification” will appear first, and (2) “Energy use status” will appear.

Home screen

Standard time to display the screen depending on the number of air conditioners to be controlled

Number of air conditioners to be controlled	Time to display	
	① Menu, floors and notification	② Energy use status
200 units	6 sec	11 sec
2,000 units	41 sec	47 sec

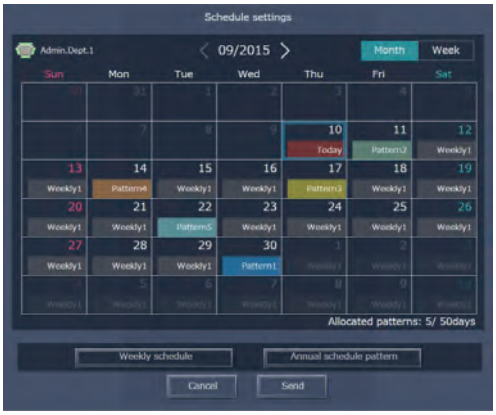
<6-1> Major features

The major features of the Integrated Centralized Control Web are shown below.

<Monitoring/operation functions>
Up to 2000 air conditioners connected to more than one centralized controller AE-200/AE-50/EW-50 can be monitored and operated.
If the floor layout is set to display the air conditioners in any positions on the floor layout drawing, the visibility will be improved, and the time and labor for management can be significantly reduced.

<Energy management>
Energy management conditions, such as power consumption and operation time of air conditioners and outdoor temperature, can be graphically displayed. Energy-saving measures can be examined and confirmed by understanding the current operating state and checking the energy-saving effect. If the power consumption is abnormally high, the maintainability can be improved by understanding the air conditioner state.

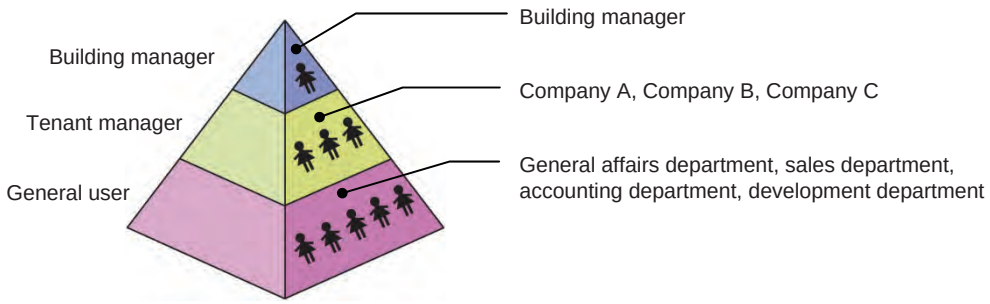
<Scheduled operation>
The air conditioners can be operated according to the schedule by setting the operation start time and end time.
Weekly schedules for setting the operation on each day of the week and annual schedule for setting the operation on holidays can be made. It is possible to change the contents of the schedule on the current day without making changes to the weekly or annual schedule.

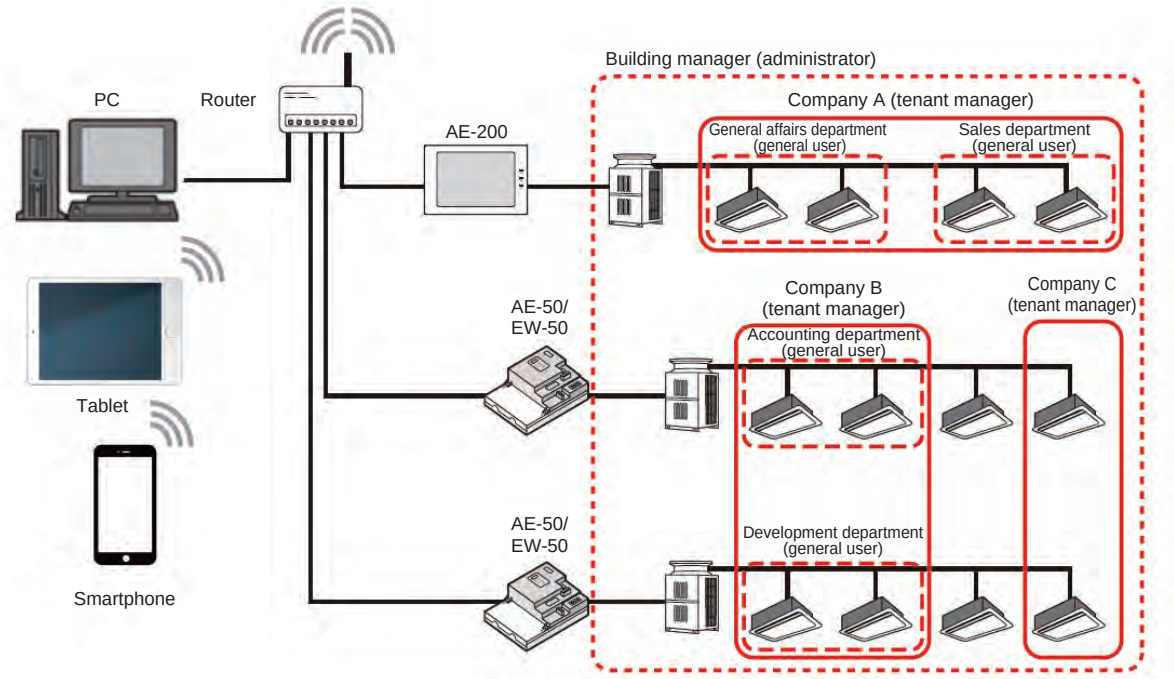


<User management>
In addition to the building manager user who can control all air conditioners, the tenant manager who can control specified air conditioners and general users who can only monitor and operate the air conditioners can be set. The available functions vary depending on the user type. The users can be managed as needed.

User	Number of users	Air conditioners to be controlled
Building manager	1	All
Tenant manager	200	Air conditioners specified by user management function
General user	2000	Air conditioners specified by user management function

● Example of setting of users
The air conditioner group to be controlled by each user can be set as shown below.





<A number of monitoring/operation terminals>
If centralized controllers are connected with a wireless LAN router, the air conditioners can be monitored and operated by using tablet terminals and smartphones. Smartphones can be used for this purpose only by the general users.

	PC	Tablet	Smartphone
Building manager	○	○	–
Tenant manager	○	○	–
General user	○	○	○

<6-2> Operation environment

The following table shows the supported operating systems, browsers, and models for using this Integrated Centralized Control Web with PCs, tablets, and smartphones.
Operation with any operating environment other than the following cannot be guaranteed.

Item		Requirement
PC	CPU	1 GHz or faster (2 GHz or faster recommended)
	Memory	2 GB or more
	Screen resolution	1024 x 768 or higher (1920 x 1080 recommended)
	OS	● Microsoft® Windows® 7, 8.1, or 10 ● Mac OS® X10.11
	Browser	● Microsoft® Internet Explorer® 11 ● Microsoft® Edge® ● Google Chrome™ Ver. 54 ● Safari® 10
	Microsoft® Excel®	● Microsoft® Excel® 2010/2013/2016

	Browser	Model
Smartphone	Safari® 10	● iPhone 6s (Plus) (iOS 10.1.1) ● iPhone 7 (Plus) (iOS 10.1.1) ● iPhone SE (iOS 10.1.1)
	Google Chrome™ Ver. 54	● Galaxy S7 edge (Android™ 6.0.1) ● HUAWEI P9 (Android™ 6.0) ● Nexus 5X (Android™ 7.0) ● Xperia Z5 (Android™ 6.0)
Tablet	Safari® 10	● iPad Air 2 (iOS 10.1.1) ● 9.7-inch iPad Pro (iOS 10.1.1)
	Google Chrome™ Ver. 54	● Galaxy Tab S 8.4 (Android™ 5.0.2) ● MediaPad T2 7.0 Pro (Android™ 5.1.1)

Note: The operating environments were verified with AE-200/AE-50/EW-50 Ver. 7.5.

Note: Registered trademarks

- Android is a registered trademark of Google Inc. in the U.S. and other countries.
- Apple is a trademark of Apple Inc., registered in the U.S. and other countries.
- Google is a registered trademark of Google Inc.
- Google Chrome is a registered trademark of Google Inc. in the U.S. and other countries.
- Edge is a trademark or registered trademark of Microsoft Corporation in the U.S. and other countries.
- Internet Explorer is a trademark or registered trademark of Microsoft Corporation in the U.S. and other countries.
- The official name of Internet Explorer is “Microsoft® Internet Explorer Internet browser”.
- iOS is a trademark or registered trademark of Cisco in the U.S. and other countries and is used under license.
- iPad is a trademark of Apple Inc., registered in the U.S. and other countries.
- Mac OS is a trademark of Apple Inc., registered in the U.S. and other countries.
- Microsoft Office Excel is a product name of Microsoft Corporation in the U.S.
- Windows is a trademark or registered trademark of Microsoft Corporation in the U.S. and other countries.
- The official name of Windows is “Microsoft® Windows® Operating System”.
- Safari is a trademark or registered trademark of Apple Inc. in the U.S.
- Nexus is a registered trademark of Google Inc. in the U.S. and other countries.
- Xperia is a trademark or registered trademark of Sony Corporation.
- Galaxy is a trademark or registered trademark of Samsun Co., Ltd.

Note: Company name or product name that is described in this manual may be a trademark or a registered trademark of each company.

<6-3> Functions available to each user

The available functions of the Integrated Centralized Control Web vary depending on the user who logs in to the browser.

Function		Details	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.	✓	✓ *6	✓ *6
	Chiller	The operating state of chiller 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 list *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: "Energy Management License Pack" 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.	✓	–	–
Settings	Screen display settings	The items related to screen display can be set.	✓	–	–
	User registration	The building manager, tenant manager and general users can be set.	✓	–	–
	Date and Time Settings	The current date and time can be set.	✓	–	–
	License Registration	Licenses can be registered in each set of AE-200/AE-50/EW-50.	✓	–	–
Maintenance	Send Mail Log	The history of transmission of error notification e-mails can be displayed in list form.	✓	–	–
	Outdoor Unit Status	The capacity values, high pressure values and low pressure values of the outdoor units can be checked.	✓	–	–
	Free Contact	The input/output state of the indoor unit free contacts can be checked.	✓	–	–
	Gas Refrigerant Amount Check	The coolant quantity of the outdoor unit can be inspected.	✓	–	–
	Reset Emergency Stop	Emergency stop can be canceled.	✓	–	–
	CSV Output *5	The apportionment parameters, power consumption and energy management data can be output in CSV format.	✓	–	–

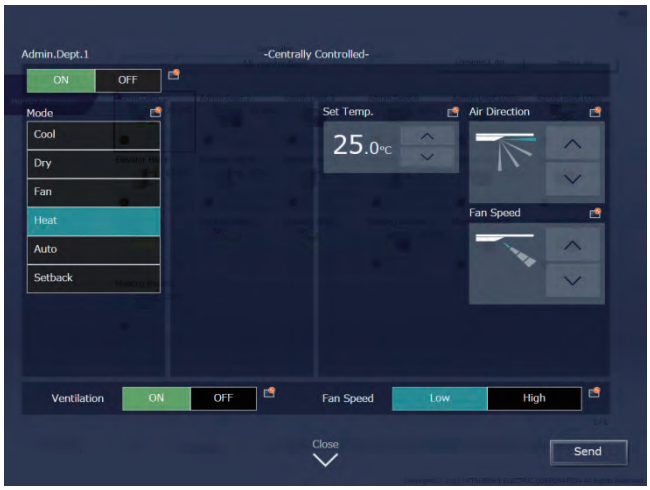
*1: The table can be displayed only when the "Charge" license has been registered.
*2: The target values cannot be set on the Integrated Centralized Control Web.
*3: The data can be displayed only when "Energy Management License Pack" has been registered.
*4: The tenant management users cannot set the weekly schedule for each season.
*5: The data can be output in CSV format only on personal computers. The data cannot be output in CSV format on tablet terminals.
*6: Except QAHV units

<6-4> Images of Integrated Centralized Control Web screen

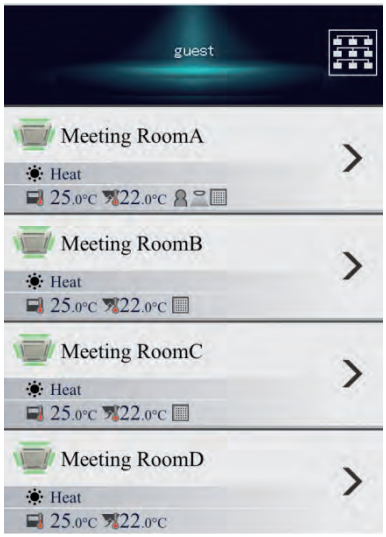
[General user]

Monitoring of operating state/operation (display by group)

Monitoring of operating state/operation (operation screen)



Monitoring of operating state/operation (display by group)



Monitoring of operating state/operation (operation screen)

[Tenant manager]

Monitoring of operating state/operation (display by group)

Status of energy use

[Building manager]

Monitoring of operating state/operation(floor layout)

Monitoring of operating state/operation(display by group)

Monitoring of operating state/operation(group operation screen)

Monitoring of measurement state

Units in trouble

Units with filter sign displayed

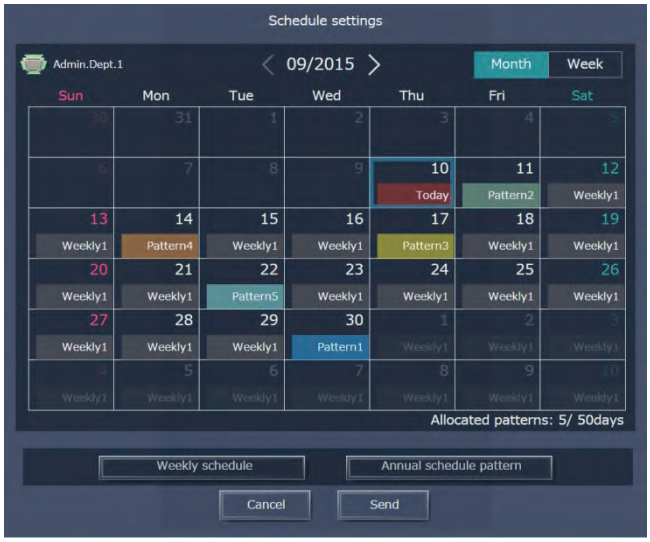
Status of energy use

Ranking

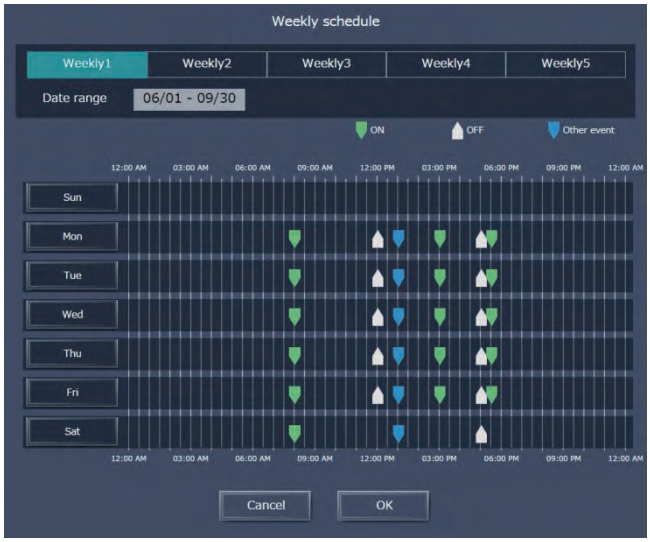
Confirmation of target values

Status of peak-cut control

Schedule setting list screen(monthly display)

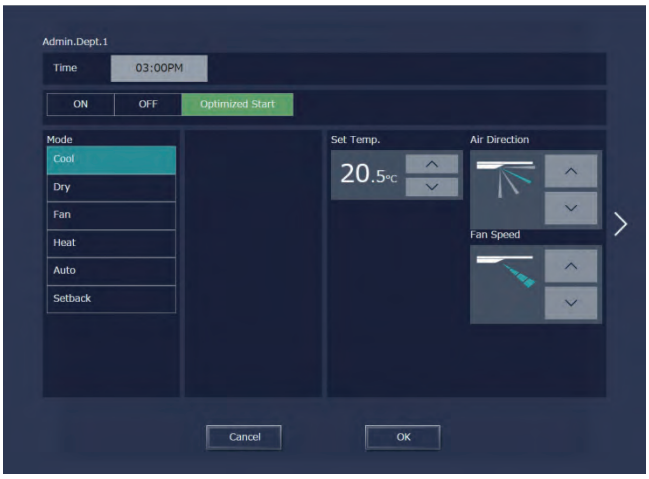


Schedule setting list screen(weekly display)



Schedule setting

Schedule setting screen



<6-5> User management

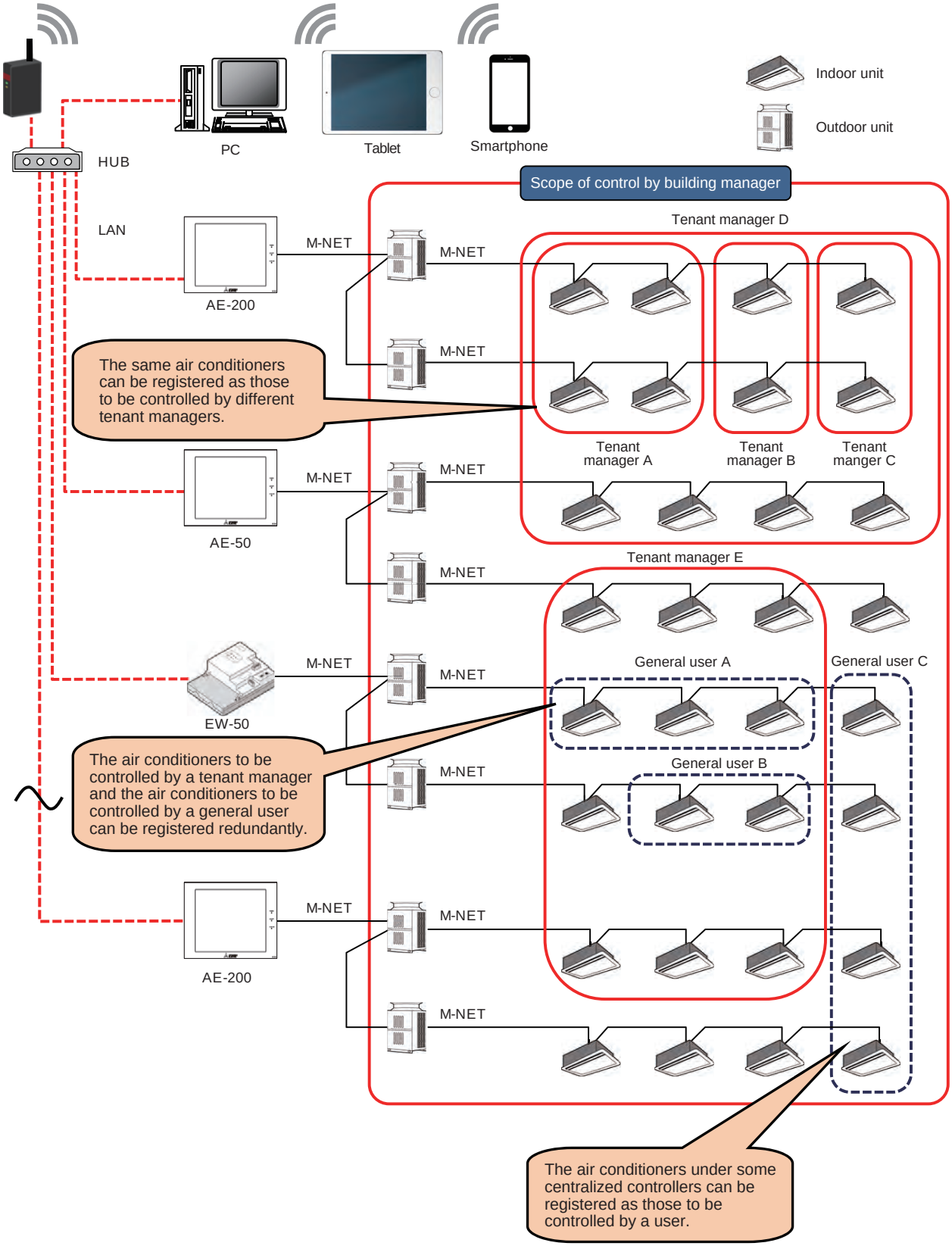
The available functions of the Integrated Centralized Control Web vary depending on the user who logs in to the browser.
It is possible to set the tenant manager who can monitor and operate the air conditioners in each group, set the schedules and use the energy management functions and the general users who can monitor and operate the air conditioners in each group.

−: Not registered ○: Possible ×: No function (impossible)

	User type	General user	Tenant manager	Building manager
User information	User name (default)	−*1	−*1	administrator*2
	Password (default)	−*1	−*1	admin*2
	Max. set number	2000*3	200*3	1*3
Available basic functions	Monitor/Operation	○*4	○*4	○
	Energy management	×	○*4	○
	Schedule	×	○*4	○
	Notice (error state)	×	×	○
	Settings	×	×	○
	Maintenance	×	×	○
Available devices	PC	○	○	○
	Tablet terminal	○	○	○
	Smartphone	○	×	×

*1: The tenant manager and general users have not been registered before shipment. Log in as building manager, and set the users on the user setting screen.
*2: The name and password are different from those of the building manager on the LCD screen.
*3: The browser can be accessed simultaneously from up to 50 sets of PCs, tablet terminals and smartphones.
*4: These functions can be used only for the air conditioner groups set on the user setting screen.

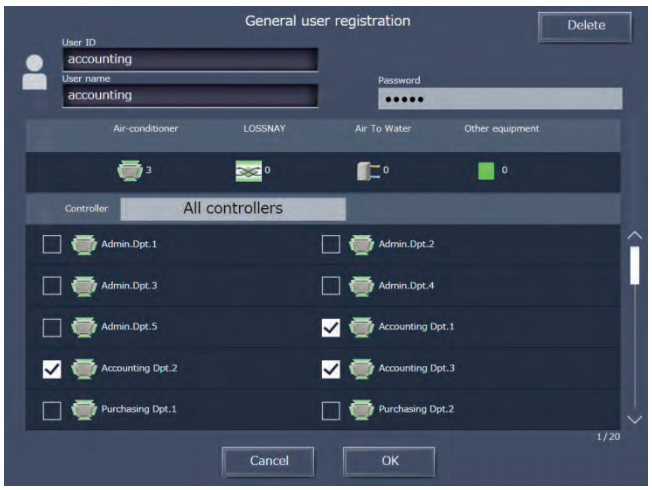
<Example of registration of users>



<User setting screen for building manager>

<User setting screen for tenant manager>

<User setting screen for general user>



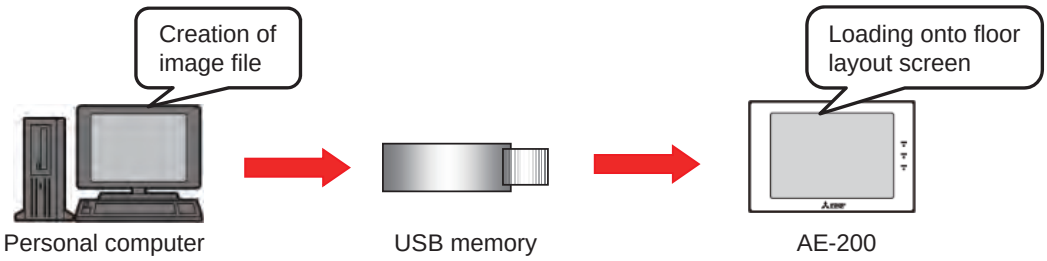
<7> Plan view function

(1) Loading of plan view on LCD

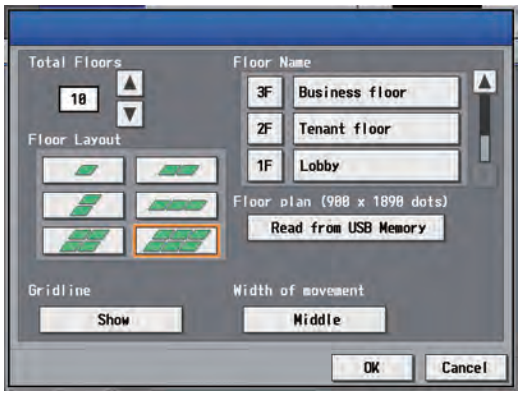
The plan views of up to 10 floors can be set on the LCD screen on AE-200/AE-50 main unit. Air conditioners can be located in each room on the plan view, and the air conditioners can be easily operated and monitored.

Create a GIF file on the personal computer, and load a plan view into AE-200/AE-50 main unit through the USB memory.

* The plan views cannot be loaded into EW-50.



Save the plan view file with a specific file name and fixed size in the root folder in the USB memory, and load the image selecting Load on the LCD screen of AE-200/AE-50. A GIF-format file with a size of 900 dots (vertical) × 1890 dots (horizontal) per floor can be loaded.



File size	900 (vertical) × 1890 (horizontal) dots
File format	gif
File names	

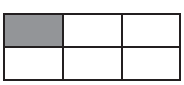
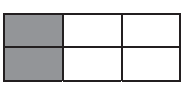
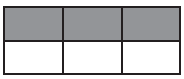
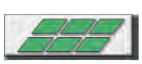
Floor	File name	Floor	File name
1	floor_01.gif	6	floor_06.gif
2	floor_02.gif	7	floor_07.gif
3	floor_03.gif	8	floor_08.gif
4	floor_04.gif	9	floor_09.gif
5	floor_05.gif	10	floor_10.gif

Storage location	In root folder in USB memory

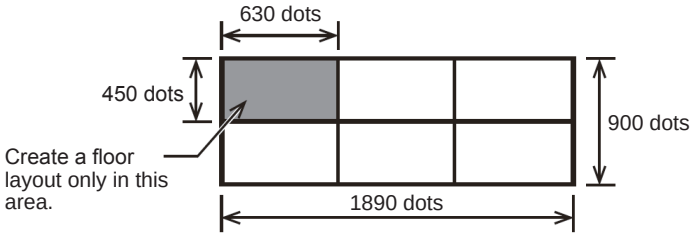
(2) Number of divisions of floor

The number of areas in the floor layout displayed on the LCD screen on AE-200/AE-50 main unit can be set.

Create a file with a size of 900 (vertical) × 1890 (horizontal) dots regardless of the number of displayed areas.

Layout button	Displayed areas	Layout button	Displayed areas
			
			
			

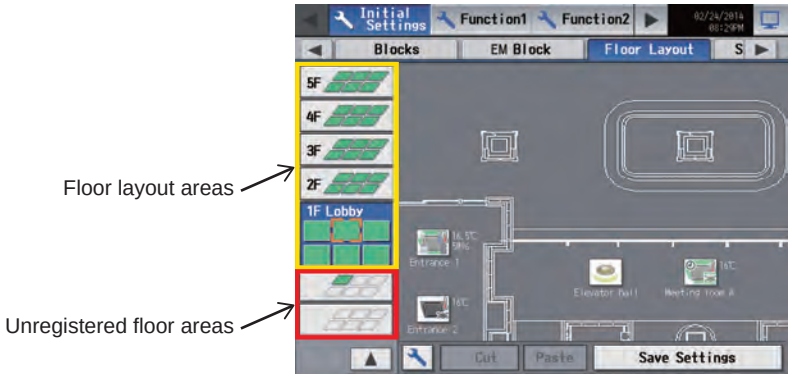
Example) When one area is displayed, create a file with a size of 900 (vertical) × 1890 (horizontal) dots, and create the layout only in the upper left area among the six divisions.



(3) Arrangement of icons

Icons can be arranged on the floor layout loaded onto the LCD screen on AE-200/AE-50 main unit.
The positions of the icons can be changed by using Cut and Paste or dragging*1.

*1: The icons in the unregistered floor areas are displayed in a line and cannot be dragged.
Arrange the icons after moving them onto the floor layout from the unregistered floor area.



(4) Floor layout drawing on AE-200/AE-50/EW-50

AE-200/AE-50 can display the floor layouts on the Integrated Centralized Control Web as well as on the LCD.
EW-50 can display the floor layouts on the Integrated Centralized Control Web.

○: Possible –: No function (impossible)

Classification	AE-200	AE-50
	LCD	LCD
Display of floor layouts	○	○
Display of floor layouts of air conditioner groups registered in other AE-50/EW-50	○	–
Explanation	The icons on AE-50/EW-50 can be arranged on the floor layouts on AE-200.	To display the floor layouts on the Integrated Centralized Control Web of AE-50, it is necessary to read and set the floor layouts on AE-50. Only the air conditioner groups registered in AE-50 are displayed.

[5] License

<1> License list

To use some functions on AE-200/AE-50/EW-50, the licenses may be required.

[Explanatory note] ✓: License
A:AE-200A/AE-50A/EW-50A
E:AE-200E/AE-50E/EW-50E

Function	Supplementary note	License not required	License					
			PLC for General Equipments	Interlock control	Charge	Energy Management License Pack	BACnet connection	Integrated Centralized Control
Integrated Centralized Control Web	When one set of AE-200 or EW-50 (single system) is used	✓						
	When more than one set of AE-200 or EW-50 (single system) is used	A						E
Comprehensive management (TG-2000A)	More than one set of AE-200/AE-50/ EW-50 can be integrally controlled.	✓						
Notification of error by e-mail	Information on errors and recovery of air conditioners can be transmitted by e-mail from AE-200/AE-50/EW-50.	✓						
Annual/weekly schedule		✓						
AE-200 Billing by apportionment of electric energy (manual input of electric energy)	Method using AE-200 but not using an electricity meter				✓			
AE-200 Billing by apportionment of electric energy (counting of electric energy)	Method using AE-200 for charging for electricity consumed by air conditioners				✓			
AE-200 Billing by meters (pulse count)	Function using AE-200 for charging for general electricity from outlets, gas and water				✓			
TG-2000A Billing by apportionment of electric energy (manual input of electric energy)	Method using TG-2000A but not using an electricity meter				✓			
TG-2000A Billing by apportionment of electric energy (counting of electric energy)	Method using TG-2000A for charging for electricity consumed by air conditioners				✓			
TG-2000A Billing by meters and apportionment (pulse count)	Function using TG-2000A for charging for general electricity from outlets, gas and water				✓			

Function		Supplementary note	License not required	License					
				PLC for General Equipments	Interlock control	Charge	Energy Management License Pack	BACnet connection	Integrated Centralized Control
Operation and monitoring of general equipment	DIDO controller method		✓						
	Free contact method	TG-2000A is required.		✓					
	PLC method	TG-2000A is required.		✓					
Interlock control of general equipment	DIDO controller method				✓				
	Free contact method (AE-200/AE-50/EW-50)	Register the interlock control setting (table) in AE-200/AE-50/EW-50.			✓				
	Free contact method (when the PLC for general equipment is used)	Register the interlock control setting (table) in the PLC for general equipment. TG-2000A is required.		✓					
	PLC method (between PLCs)	TG-2000A is required when the interlock control by the PLC function is used.	✓						
	PLC method (between air conditioner and PLC)	TG-2000A is required when the interlock control of AE-200/AE-50/ EW-50 is used.		✓					
Night mode			✓						
Outdoor temperature interlock control			✓						
Night setback function			✓						
Limitation of temperature setting range			✓						
Measurement of temperature and humidity		It is necessary to connect the AI controller.	✓						
Upper/lower limit alarm e-mail		It is necessary to connect the AI controller.	✓						
Energy-saving control							✓		
Peak-cut control		For the peck-cut control method, see 18.8 “Peak-cut control method.”					✓		
Energy management function			A			✓ *1	E		
BACnet® connecrtion								✓	

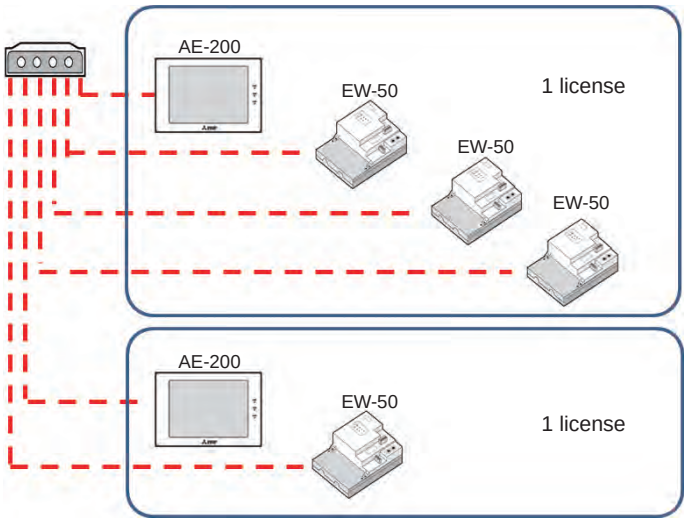
*1 The energy management function requires an electricity meter for each set of AE-200/AE-50/EW-50. However, when the apportioned electricity billing function is used by AE-200, the electricity can be apportioned to AE-200/AE-50/EW-50 to which electricity meters are not connected in the AE-200 system.

- The licenses must be registered in each set of AE-200/AE-50/EW-50. However, it is unnecessary to register the licenses in AE-200/AE-50/ EW-50 which do not use the license functions.
- The above functions are subject to change for improvement without notice.

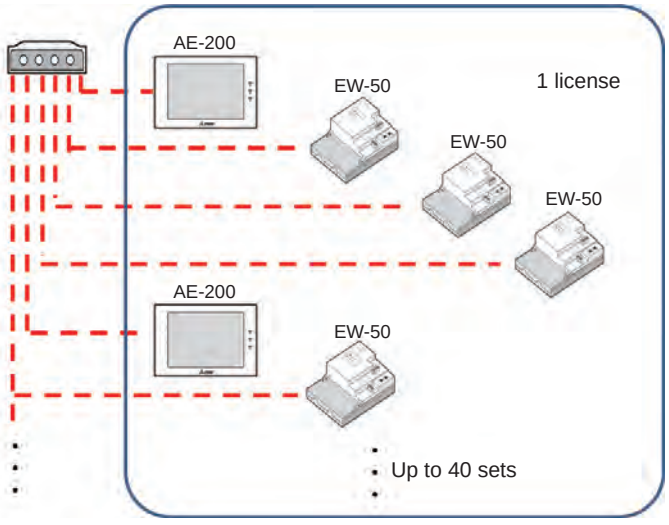
Remarks

○ The number of required licenses varies depending on the system configuration and license type. The license registration is classified into the following three patterns.

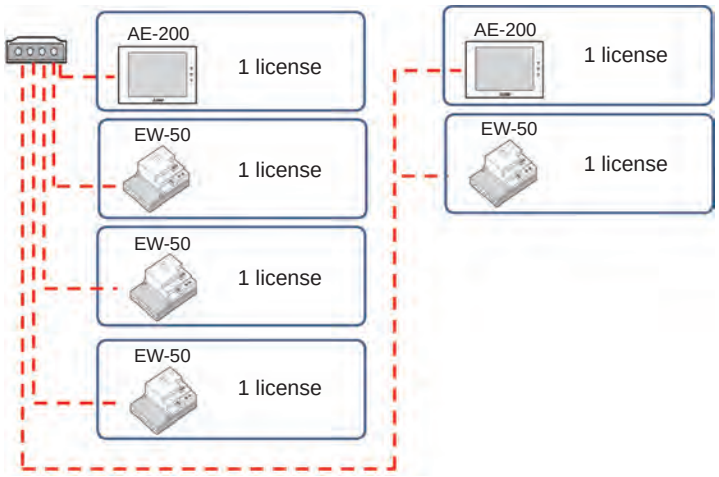
<Pattern 1>

Licenses	"Energy Management License Pack" license, "Charge" license, "Interlock control" license and "PLC for General Equipments" license
Method of counting licenses	1 license is required for each AE-200 system or EW-50 (single system). * Regardless of whether or not expansion controllers are connected
Example	2 licenses are required for the following system configuration. * It is necessary to register the license in each set of AE-200/AE-50/EW-50. 

<Pattern 2>

Licenses	"Integrated Centralized Control" license * Required only for AE-200E/AE-50E/EW-50E
Method of counting licenses	1 license is required for AE-200E system or up to 40 sets of EW-50E (single system). * When 41 sets or more are connected, one license is required for every 40 sets.
Example	1 license is required for the following system configuration. * It is necessary to register the license in each set of AE-200/AE-50/EW-50. 

<Pattern 3>

Licenses	"BACnet connection" license
Method of counting licenses	1 license is required for each set of AE-200/AE-50/EW-50. * When the apportioned electricity billing function is simultaneously used, the license is not required for AE-200 not using M-NET.
Example	6 licenses are required for the following system configuration. 

<2> Product list

The functions of AE-200, AE-50 and EW-50 and the devices and licenses necessary to use the functions are shown below.

[Explanatory note] ○: Required

Function[*1] / Required device[*2]		Centralized control					Support for billing for air conditioners [*6]					
							AE-200 Billing by apportionment of electric energy			TG-2000A Billing by apportionment of electric energy		
		Web integrated control	Display of plan view [*3]	Energy management	Daily/seasonal/weekly/annual schedule	Remote monitoring	Manual input of electric energy	Billing by pulse input for electric energy apportionment [*4]	Billing by PI controller for electric energy apportionment [*5]	Manual input of electric energy	Billing by PI controller for electric energy apportionment	Billing by electric energy apportionment PLC
Main unit	Centralized controller: AE-200	○	○	○	○	○	○	○	○	○	○	○
	Centralized controller: EW-50 [*7]	○	○	○	○	○				○	○	○
	Expansion controller: AE-50 [*8]	○	○	○	○	○	○	○[*9]	○[*9]	○	○	○
	Expansion controller: EW-50 [*7]	○	○	○	○	○	○	○[*9]	○[*9]	○	○	○
	Integrated software: TG-2000A		○[*10]		○[*10]	○[*10]				○	○	○
License	"Charge" license [*11]			○[*12]			○	○	○	○	○	○
	"Energy Management License Pack" license			○			○	○	○	○	○	○
	"Interlock control" license											
	"PLC for General Equipments" license											
	"BACnet connection" license											
	"Integrated Centralized Control" license	○[*13]										
Others	Sequencer (PLC) [*14]											○
	Electric energy counting software (PLC) [*14]											○
	External system											
	PI controller: PAC-YG60MCA [*14]			○					○		○	
	DIDO controller: PAC-YG66DCA											
	AI controller:PAC-YG63MCA			○								
	External input/output adapter: PAC-YG10HA-E											

*1: Some functions cannot be used or the use of some functions is restricted depending on the connected devices.
*2: Note that this list does not show all necessary devices.
*3: One floor can be divided into up to 6 areas, and the plan views of up to 10 floors can be displayed.
*4: AE-50/EW-50 used as an expansion controller inputs electric energy pulses by using the pulse input function built in the main unit.
*5: A billing system using PI controller (PAC-YG60MCA)
*6: The apportioned electricity billing functions of AE-200 and TG-2000A cannot be used simultaneously.
*7: EW-50 can be used as a single unit (centralized controller) or an expansion controller.
When it is used as a single unit, the air conditioners can be monitored and operated from the Integrated Centralized Control Web and BACnet®.
*8: AE-50 cannot be used as a single unit.
*9: AE-50/EW-50 used as an expansion controller is connected for the "Charge" license used on AE-200.
*10: It is unnecessary when the control is monitored on the main unit or Web.
*11: The license is shared by AE-200 and TG-2000A. It is supplied with a Charge Calculation Tool and an Initial Setting Tool.
TG-2000A does not use the Charge Calculation Tool and Initial Setting Tool.
*12: When the energy management function is used, an electricity meter is required for each of AE-200, AE-50 and EW-50. When the apportioned electricity billing function is used on AE-200, electric energy can be apportioned also to AE-200, AE-50 and EW-50 to which electricity meters are not connected by connecting at least one electricity meter in the AE-200 system.
*13: When some sets of AE-200E or EW-50E (single system) are integrally controlled by one Integrated Centralized Control Web, the "Integrated Centralized Control" license is required.
*14: It is impossible to simultaneously use the PI controller and the electric energy counting PLC. Select one of them.

[Explanatory note] ○: Required

Function[*1] / Required device[*2]		Energy-saving/peak-cut control					Others					
		Energy-saving	Peak-cut (1) Connection of PI controller	Peak-cut (2) Pulse input	Peak-cut (3) From external system	Peak-cut (4) External contact input	BACnet® connection	Integrated Centralized Control Web	General control (use of PLC)	Monitoring and operation of general equipment (PAC-YG66DCA)	Interlock control	Measurement of temperature and humidity (connection of commercially available sensors)
Main unit	Centralized controller: AE-200	○	○	○	○	○	○[*9]	○	○	○	○	○
	Centralized controller: EW-50 [*3]	○	○	○	○	○	○	○	○	○	○	○
	Expansion controller: AE-50 [*4]	○	○	○	○	○	○	○	○	○	○	○
	Expansion controller: EW-50 [*3]	○	○	○	○	○	○	○	○	○	○	○
	Integrated software: TG-2000A	○	○		○	○			○	○	○[*5]	○
License	"Charge" license											
	"Energy Management License Pack" license	○	○	○	○	○						
	"Interlock control" license										○	
	"PLC for General Equipments" license								○[*6]			
	"BACnet connection" license						○					
	"Integrated Centralized Control" license							○				
Others	Sequencer (PLC) [*7]								○[*8]			
	Electric energy counting software (PLC) [*7]											
	External system				○							
	PI controller: PAC-YG60MCA [*7]		○									
	DIDO controller: PAC-YG66DCA									○		
	AI controller:PAC-YG63MCA											○
	External input/output adapter: PAC-YG10HA-E					○				○		

*1: Some functions cannot be used or the use of some functions is restricted depending on the connected devices.
*2: Note that this list does not show all necessary devices.
*3: EW-50 can be used as a single unit (centralized controller) or an expansion controller.
When it is used as a single unit, the air conditioners can be monitored and operated from the Integrated Centralized Control Web and BACnet®.
*4: AE-50 cannot be used as a single unit.
*5: To operate devices connected to free contacts, TG-2000A is required.
*6: For the interlock control of air conditioning equipment by using PLC, the license is required.
*7: It is impossible to simultaneously use the PI controller and the electric energy counting PLC. Select one of them.
*8: For the general control by the sequencer (PLC), TG-2000A is required.
*9: When the apportioned electricity billing function is used, the "BACnet connection" license is not required for AE-200 because AE-200 is not connected to M-NET.

<3> Outline of licenses

The following optional licenses are available.
The air conditioner energy-saving operation and apportioned electricity billing function can be enabled by registering the licenses in the main units of AE-200, AE-50 and EW-50. The license number is issued for each of the serial numbers of AE-200, AE-50 and EW-50.

<List of licenses relating to energy-saving control>

License name	Energy-saving effect by introduction of license	Outline of control
"Energy Management License Pack" license	Basic charge mainly in cooling/heating operation mode	Air conditioners are operated in the energy-saving mode for the purpose of reduction of basic charge of electricity. 4-level peak-cut control of air conditioners is performed.
	Meter charge mainly in cooling/heating operation mode	The energy-saving operation is performed based on the energy-saving control items and control time which have been set for each operation block of indoor units or each outdoor unit. One-level (1-kind) energy-saving control of the indoor units or outdoor unit is performed.

<List of licenses relating to billing and interlock control>

License name	Outline of control	
"Charge" license*1	AE-200 Apportionment	The electric energy is measured by electricity meters, and AE-200 apportions the electric energy to each unit or block based on the air conditioner operation data to support the electricity billing.
	TG-2000A Apportionment	The electric energy is measured by electricity meters, and the electric energy is apportioned to each unit or block based on the air conditioner operation data to support the electricity billing.
"Interlock control" license	Interlocked operation among air conditioners or among air conditioners and general equipment other than air conditioners can be performed. The air conditioners can be started and stopped by signals from the security system of a tenant building. This function is effective in preventing failure in turning off air conditioners.	
"PLC for General Equipments" license	Interlocked operation among air conditioners and general equipment connected to PLC other than air conditioners can be performed. The air conditioners can be started and stopped by signals from the security system of a tenant building. This function is effective in preventing failure in turning off air conditioners. This function is effective when a lot of general equipment are used. TG-2000A is required to use the function.	

*1: The license can be shared for apportionment by AE-200 and TG-2000A. The apportioned electricity billing function using TG-2000 does not require the use of the Charge Calculation Tool and Initial Setting Tool.

<List of BACnet® license>

License name	Outline of control
"BACnet connection" license	AE-200/AE-50/EW-50 can be connected to BACnet®.

<List of license related to integrated control>

License name	Outline of control
"Integrated Centralized Control" license	Some sets of AE-200 or EW-50 (single system) can be integrally controlled from the Web browser by registering "Integrated Centralized Control" license. Note: To monitor and operate one M-NET system from the Web browser, "Integrated Centralized Control" license is not required. To use the Integrated Centralized Control Web, it is necessary to set the relevant centralized controller to “Control” by “Floor hierarchy setting for Integrated Centralized Control Web” of the Initial Setting Tool. Note: "Integrated Centralized Control" license is not required for AE-200A/AE-50A/EW-50A.

[6] Connectable models

<1> List of connectable models

The following table shows the devices which can be controlled by AE-200, AE-50 and EW-50.

Table Devices to be controlled
○: Applicable ×: Inapplicable

Model \ Function		Monitoring/ operation
City Multi	City Multi Y *1	○
	Zubadan-Multi Y *1	○
	Zubadan-Multi R2 *1	○
	City Multi R2 *1	○
	City Multi WR2 *1	○
	City Multi WY *1	○
	City Multi S	○
	HYBRID City Multi	○
Large capacity floor standing PAC		○
Air To Water (PWFY)		○
HWHP (CAHV) *3		○
HWHP (CRHV) *4		○
HWHP (QAHV)		○ *5
Chiller		○
Mr. Slim/P-Series		○ *2
M-series (RAC)		○ *2
LOSSNAY (with M-NET)		○
Computer room air-conditioner (PFD)		○
K-control model		×

*1: Including Replace City Multi
*2: An adapter is required.
P-Series M-NET connecting adapter
M-Series M-NET control interface
*3: HWHP (CAHV, QAHV) is the abbreviation for Hot Water Heat Pump unit of air-cooled system.
*4: HWHP (CRHV) is the abbreviation for Hot Water Heat Pump unit of geothermal system.
*5: Can only be connected to AE-200.

Remarks
○ The above-mentioned connectable models are subject to change for improvement without prior notice.
○ The applicable functions vary depending on the model connected.

<2> Models subject to energy management and display items

The following table shows whether or not the graphs of each model can be displayed on the energy use status screen and ranking screen of the energy management function.

○: Displayed ×: Not displayed –: Not applicable

Data displayed in graph / Model	Bar graphs						Line graphs				
	Electric energy	Fan operation time	Thermo ON time (total)	Thermo ON time (cooling)	Thermo ON time (heating)	Measured value	Outdoor temperature	Cooling temperature setting	Heating temperature setting	Indoor temperature (inside temperature)	AI controller
City Multi	○	○	○			Values measured by PI controller (PAC-YG60MCA) can be displayed.	Values measured by AI controller (PAC-YG63MCA) is displayed.	○	○	○	Values measured by AI controller (PAC-YG63MCA) can be displayed.
Large capacity floor standing PAC	○	○	○					○	○	○	
Mr. Slim/P-Series	○	○	○					○	○	○	
M-series (RAC)	×	○	×					○	○	○	
LOSSNAY (with M-NET)	– *1	○	– *2					–	–	–	
OA processing unit (FU attribute)	○	○	○	–	–			○	○	○	
OA processing unit (IC attribute)	○	○	○					○	○	○	
Air To Water (PWFY)	○	○	○					○	○	○	
HWHP (CAHV)	×	×	×					×	×	×	
HWHP (CRHV)	×	×	×					×	×	×	
HWHP (QAHV)	×	×	×					×	×	×	
Chiller	×	×	×					×	×	×	
Device connected to DIDO controller	– *1	×	– *2					–	–	–	
Device connected to PLC for general equipment	– *1	×	– *2					–	–	–	
Computer room air-conditioner (PFD)	○	○	○					○	○	○	

*1: Without outdoor unit
*2: Refrigerant not used

<3> Models compatible with apportioned electricity billing function

The models compatible with the apportioned electricity billing function of the main unit of AE-200 are shown below.

[Explanatory notes] ○: Apportionment possible △: Apportionment impossible (compatible by directly reading) ×: Incompatible

Function / Model	Apportioned electricity billing function		Remarks
	Electric energy measuring method	Electric energy manual input method	
Y series *2	○	○	
HP series *2	○	○	
R2 series *2	○	○	
WY series *2	○	○	
WR2 series *2	○	○	
HVRF series *2	○ *5	○ *5	
Inverter of packaged air conditioner for equipment (PEAV)	○	○	Separately install an electricity meter for packaged air conditioner for equipment.
Packaged air conditioner for equipment (PEV/PFV)	△	○	
LOSSNAY	○	○	
OA Prosessing unit	○	○	Power for humidifying is not taken into account.
A-control unit (Mr. Slim) *3	○	○	Separately install an electricity meter for Mr. Slim air conditioner.
AK-control unit (Mr. Slim) *3	○	○	Apportioned in the same manner as to City Multi
Room air conditioner (RAC)	△	×	
Housing air conditoner (HAC)	△	×	
Air To Water Booster unit/ Air To Water HEX unit	○	○	
HWHP (CAHV/CRHV/QAHV)	×	×	
General equipment through general-purpose DC	△	×	
General equipment through indoor unit free contact	△	×	Out of scope of monitoring and operation on AE-200/AE-50/EW-50
K-control unit	×	×	Out of scope of monitoring and operation on AE-200/AE-50/EW-50

*1: The function is inapplicable to some air conditioning units. Restrictions will be imposed on large indoor units in case of trouble.
*2: Replace Multi is included.
*3: Apportionment in the outdoor unit power consumption apportionment mode “capacity save amount” is possible only when one of the following models of M-NET adapter is used.
PAC-SJ10MA, PAC-SJ18MA and PAC-SJ31MA
When another model is used, set the apportionment mode to “Thermo ON time” or “FAN operation time.”
*4: Select one of two configurations, one with same power supply for outdoor and indoor units and one with different power supplies for outdoor and indoor units.
*5: Power consumptions of outdoor units will be apportioned based on Thermo-ON time, even when the setting is made to apportion it based on the capacity save amount.

[7] Comparison of new and old controllers and devices

<1> Differences between AE-200 and AG-150

AE-200/AE-50 differ from AG-150 (old model) in the following points.

Table Differences between AE-200 and AG-150

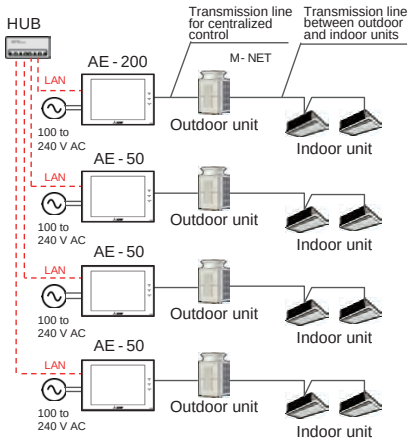
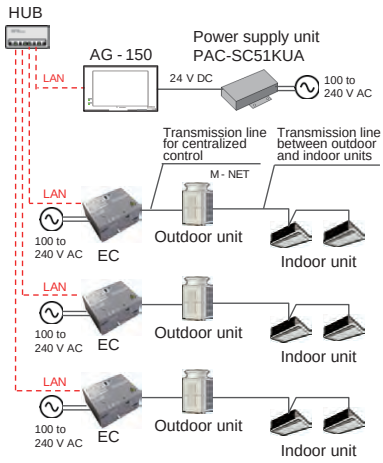
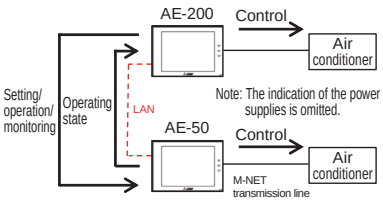
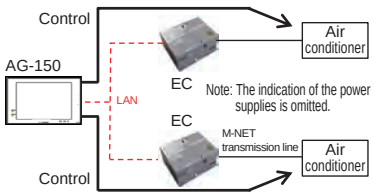
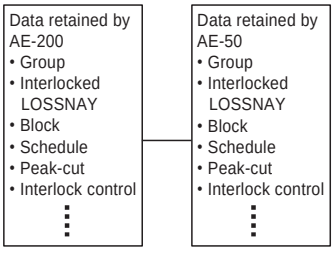
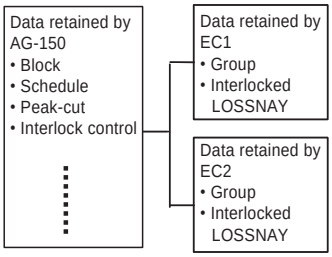
	New model AE-200	Old model AG-150
Appearance	Screen size: 10.4 in. Number of pixels: 800 dots × 600 dots 	Screen size: 9 in. Number of pixels: 800 dots × 480 dots 
Number of connected units	Up to 200 units	Up to 150 units
Connection	M-NET of AE-200 can be used even when AE-50 is connected to increase the number of units. AE-200/AE-50 must be supplied with 100 to 240 V AC.  Note: The indication of the power supplies for the outdoor and indoor units is omitted. Note: To connect a system controller or the like to the transmission line for centralized control, a power supply unit (PAC-SC51KUA) is necessary.	To connect an expansion controller (PAC-YG50ECA), M-NET line of AG-150 cannot be used. For AG-150, a power supply unit (PAC-SC51KUA) is necessary.  Note: The indication of the power supplies for the outdoor and indoor units is omitted.
Control	Each set of AE-200 and AE-50 controls the air conditioner. (Decentralized control)  	AG-150 controls all air conditioners connected to the expansion controller (PAC-YG50ECA). (Centralized control) 
Retained data	Each of AE-200/AE-50 retains the data only on its own system. AE-200 does not retain the data on AE-50 system. AE-200 collects and uses the data on AE-50 as needed. When a communication error occurs in AE-50, the data retained by AE-50 cannot be displayed or set on AE-200.  	The data retained by the expansion controller includes only the data on group and interlocked LOSSNAY. AG-150 retains the data on all other systems. 

Table Differences between AE-200 and AG-150(continued)

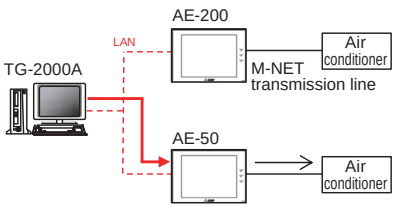
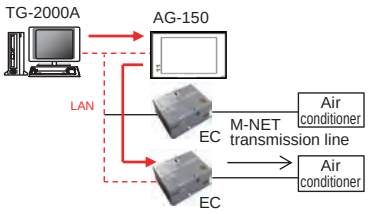
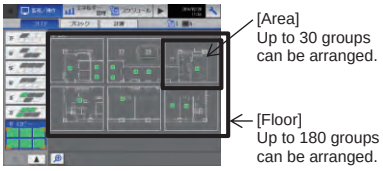
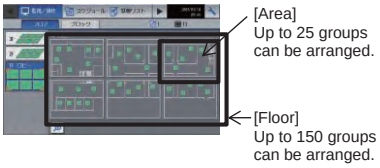
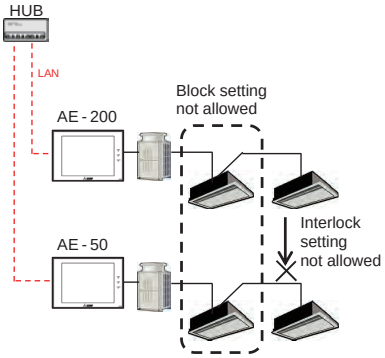
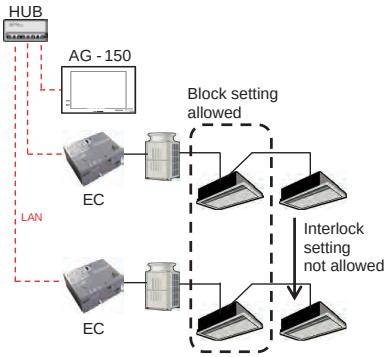
	New model AE-200	Old model AG-150
Communication with host device	Commands from TG-2000A are transmitted to each of AE-200 and AE-50.  Note: The indication of the power supplies is omitted.	Commands from TG-2000A are transmitted only to AG-150 and transmitted to the expansion controller by AG-150.  Note: The indication of the power supplies is omitted.
Energy management function	○ See Chapter 8, “Energy Management Function.”	×
AHC connection	○	×
Number of floors	10 floors (in any case of 1 to 6 divisions)	3 floors (6 divisions), 5 floors (4 or 3 divisions), 8 floors (2 divisions) or 10 floors (1 division)
Number of groups which can be arranged on one floor	Up to 180 groups (The maximum number of groups arranged in one area is 30 groups, and the maximum number of groups can be arranged when one floor is divided into 6 areas.) 	Up to 150 groups (The maximum number of groups arranged in one area is 25 groups, and the maximum number of groups can be arranged when one floor is divided into 6 areas.) 
Number of conditions for interlock control	200 (150 for Ver. 7.46 or earlier) conditions for each set of AE-200/AE-50/EW-50 Interlocked control of units that are connected via an expansion controller is possible on Ver. 7.50 or later.	150 conditions for whole AG-150 system Interlock control across some sets of EC can be made.
Updating of software on LCD main unit using USB	○	×
Block setting/interlock control across some expansion controller systems	×  Note: Block setting and interlock setting across some sets of AE-200/AE-50 cannot be performed even if TG-2000A is used. Note: The indication of the power supplies is omitted.	○  Note: The indication of the power supplies is omitted.
Registration of license	Registration for each set of AE-200/ AE-50	Registration only for AG-150
Display of Web page	Centralized controller is controlled by accessing the Integrated Centralized Control Web address of the log-in target centralized controller. To control two or more systems under the control of centralized controllers from the Integrated Centralized Control Web, a license for Integrated Centralized Control Web is required. (For AE-200, AE-50, and EW-50)	One Web page address for AG-150 (switching among EC(1) to EC(3) with tags)
HOLD function (only North American models)	○ Turning on HOLD will disable both the schedule set by AE-200/AE-50 and the schedule set by the system controller or the remote controller.	×

Table Differences between AE-200 and AG-150 (continued)

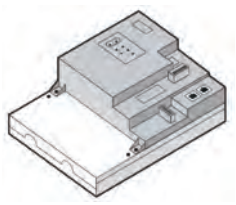
	New model AE-200	Old model AG-150
Measurement by main unit (pulse input)	○ (Cannot be connected to AE-200 when the apportioned electricity billing function is used or M-NET is not used.)	×
Peak-cut setting	LCD screen Web browser screen	Only Web browser screen
Outdoor unit capacity control for peak-cut	90/80/70/60/50%	90/80/70/60%
Necessity of transmission line power supply unit	No power supply unit is required when the transmission line for centralized control does not have units, such as system remote controllers, which have power consumption factors.	The transmission line power supply unit PAC-SC51KUA is required.
Introduction of apportioned electricity billing function	• Apportioned electricity billing can be performed on AE-200 main unit, and it is unnecessary to constantly connect or start the personal computer. • The function can be used also on TG-2000A.*1	The function can be used on TG-2000A. It is necessary to constantly connect and start the personal computer for TG-2000A.
Connection of K-control devices	×	○
Setting with Initial Setting Tool	○ The setting data can be preliminarily created with the Initial Setting Tool without AE-200 main unit. The apportioned electricity billing function to be used on AE-200 main unit can be set only with the Initial Setting Tool.	×
Data backup	All data including the schedule setting can be backed up (except the main unit IP address and license information).	Data can be backed up (except the main unit IP address, license registration information and schedule setting).

*1: The apportioned electricity billing functions in TG-2000A and AE-200 main units cannot be simultaneously used.
(Use the apportioned electricity billing function in any of TG-2000A and AE-200.)

<2> Differences among EW-50, EB-50 and GB-50ADA

The differences among EW-50, EB-50 and GB-50ADA are shown below.

Table Differences among EW-50, EB-50 and GB-50ADA

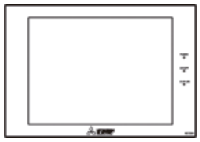
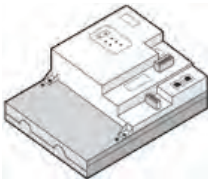
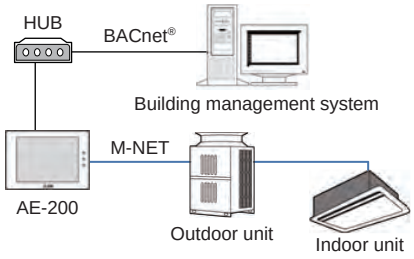
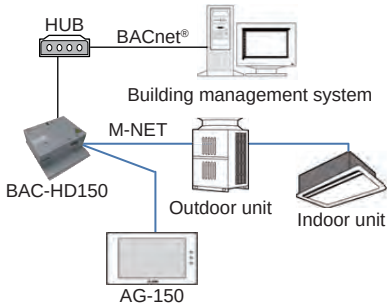
	New model EW-50	Old model EB-50	Old model GB-50ADA
Appearance			
Number of connected units	Up to 50 units	Up to 50 units	Up to 50 units
Operation as expansion controller	○ • When M-NET is connected to AE-200, up to 3 units can be connected. • When M-NET is not connected to AE-200 (for billing, etc.), up to 4 units can be connected.	× Only one unit can be operated.	× Only one unit can be operated.
Necessity of transmission line power supply unit	Required when the power supply factor exceeds 1.5 *1	Required	Required when the power supply factor exceeds 6
Measurement on main unit (pulse input)	○	×	×
Outdoor unit capacity control for peak-cut	90/80/70/60/50%	90/80/70/60%	90/80/70/60%
Introduction of apportioned electricity billing function	The function can be used on TG-2000A. When combined with AE-200, the function can be used, and it is unnecessary to constantly connect or start the personal computer.	The function can be used on TG-2000A. It is necessary to constantly connect and start the personal computer for TG-2000A.	The function can be used on TG-2000A. It is necessary to constantly connect and start the personal computer for TG-2000A.
Energy management function	○	○	×
Connection of K-control devices	×	×	○
Setting with Initial Setting Tool	○ The setting data can be preliminarily created with the Initial Setting Tool without EW-50 main unit.	×	×
Data backup	○ Data can be backed up from the Web browser screen.	○ Data can be backed up from the Web browser screen.	○ Data can be backed up from the USB memory in the main unit.

*1: When GB-50ADA is replaced with EW-50, the power supply factor may be insufficient depending on the system configuration used. When the power consumption factor of the devices in the system is larger than the power supply factor of EW-50, 15, it is necessary to add a power supply unit.

<3> Differences between AE-200/AE-50/EW-50 and BAC-HD150 (BM adapter)

The differences between AE-200/AE-50/EW-50 and BAC-HD150 are shown below.

[Explanatory notes] ○: Usable ×: Unusable

		AE-200/AE-50	EW-50	BAC-HD150
Appearance				
Function		Integration of BACnet® connecting function in system controller		Only BACnet® connecting function
System configuration		Air conditioner control and BACnet® connection can be realized only by AE-200/AE-50/EW-50. 		A system controller (or a system remote controller) for air conditioner control must be connected in addition to BAC-HD150. 
LCD		Provided	Not provided	
M-NET power feeding capability		Power feeding coefficient 0.75	Power feeding coefficient 1.5	Power feeding coefficient 6
Apportioned electricity billing function		○ *1		×
Control by PI controller		○		×
Control by BACnet®	System alarm signal	○		×
	Temperature setting in 0.5°C increments	○		×
	Thermo ON/ OFF	○ *2		×
	Night purge	○ *2 *3		×
	Auto fan speed	○		×
	Prohibition Fan Speed	○		×
	Error Code Detail	○ *2		×
	External Heat Source	○ *2		×
"BACnet connection" license		Necessary		Unnecessary
Setting tool		Initial Setting Tool and BACnet® Setting Tool		Setting tool

*1: To use the function, the "Charge" license is required. The charge information cannot be read out from BACnet®.
*2: Only status monitoring.
*3: Applicable only to LOSSNAY and OA processing unit.

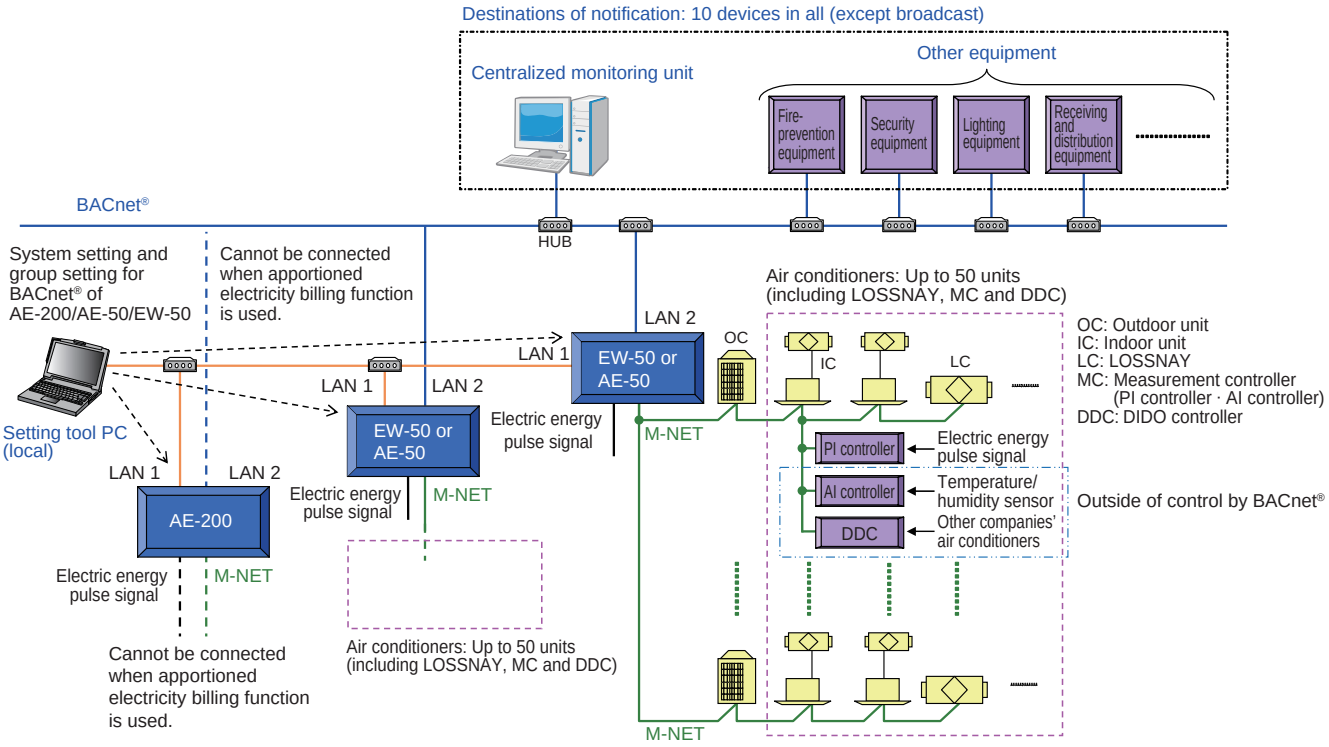
[8] BACnet® connection

<1> Outline

The centralized monitoring unit can be connected to BACnet® by using the BACnet® communication function (license) of AE-200/AE-50/EW-50.
The BACnet® communication specifications conform to ANSI/ASHRAE Standard 135-2010.

<2> System configuration diagram

The system configuration diagram of the centralized controller AE-200/AE-50/EW-50 is shown below.



Remarks

- For BACnet® connection, the "BACnet connection" license is required.
- 8.3 “List of functions for BACnet®” includes all functions of BACnet® of AE-200/AE-50/EW-50. The functions to be actually used among all functions vary depending on the building management system and interlocks among settings. Therefore, determine the functions to be used through preliminary discussion with the building management system side.
  Some of the functions which can be used on AE-200/AE-50/EW-50’s LCDs cannot be used by BACnet® functions. For details, see 5.1 “Controller functions and BACnet® functions” in “Instruction Book – BACnet® function –.”

<3> List of functions for BACnet®

(1) List of operation and monitoring functions which can be used from BACnet®

The following list shows the operation and monitoring functions which can be used from BACnet® by connecting BACnet® of AE-200/AE-50/EW-50.

✓: 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, air-blowing, auto or drying) of the units in each group can be set. The operation modes (cooling, heating, air-blowing, auto or drying) of the units in each group can be monitored.	✓	✓			✓	✓
Fan speed	The fan speed (low, high, medium 2, medium 1 or auto) of the units in each group can be set. The fan speed (low, high, medium 2, medium 1 or auto) of the units in each group can be monitored.	✓	✓		✓	✓	✓
Air direction	The air direction (horizontal, downward 60%, downward 80%, downward 100% or swing) of the units in each group can be set. The air direction (horizontal, downward 60%, downward 80%, downward 100% or swing) of the units in each group can be monitored.	✓				✓	✓
Indoor temperature	The current value of indoor temperature of the room 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.	✓	✓			✓	
External heat source state	Monitors the status of external heat source unit in each group	✓	✓		✓	✓	
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 (4-digit) can be received.	✓	✓		✓	✓	
Error code	Error code (four digits) and error codes (four-digit error codes categorized into nine types) 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 (4-digit) can be received.					✓	

Item	Description	Indoor unit	OA processing unit (IC attribute)	OA processing unit (FU attribute)	LOSSNAY not interlocked	State monitoring	Setting/operation
Apportioned electricity billing 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 apportioned electricity billing 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 apportioned electricity billing 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 30 minutes (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).

(2) Initial setting screen

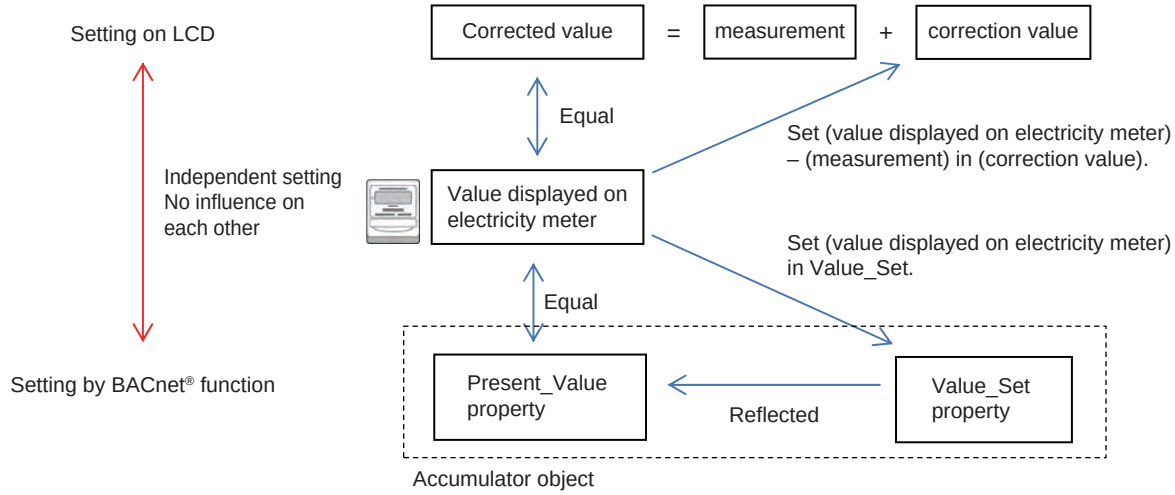
✓: Function provided

Item	Description	LCD	Initial setting Web browser	Initial Setting Tool	Integrated Centralized Control Web	BACnet® Setting Tool
LAN2(BACnet®)	The IP address of LAN2 (BACnet®) can be set.	✓	✓			✓
License registration	The "BACnet connection" license can be registered.	✓	✓		✓	

* Use the BACnet® Setting Tool for initial setting of the items of BACnet® other than those shown above.

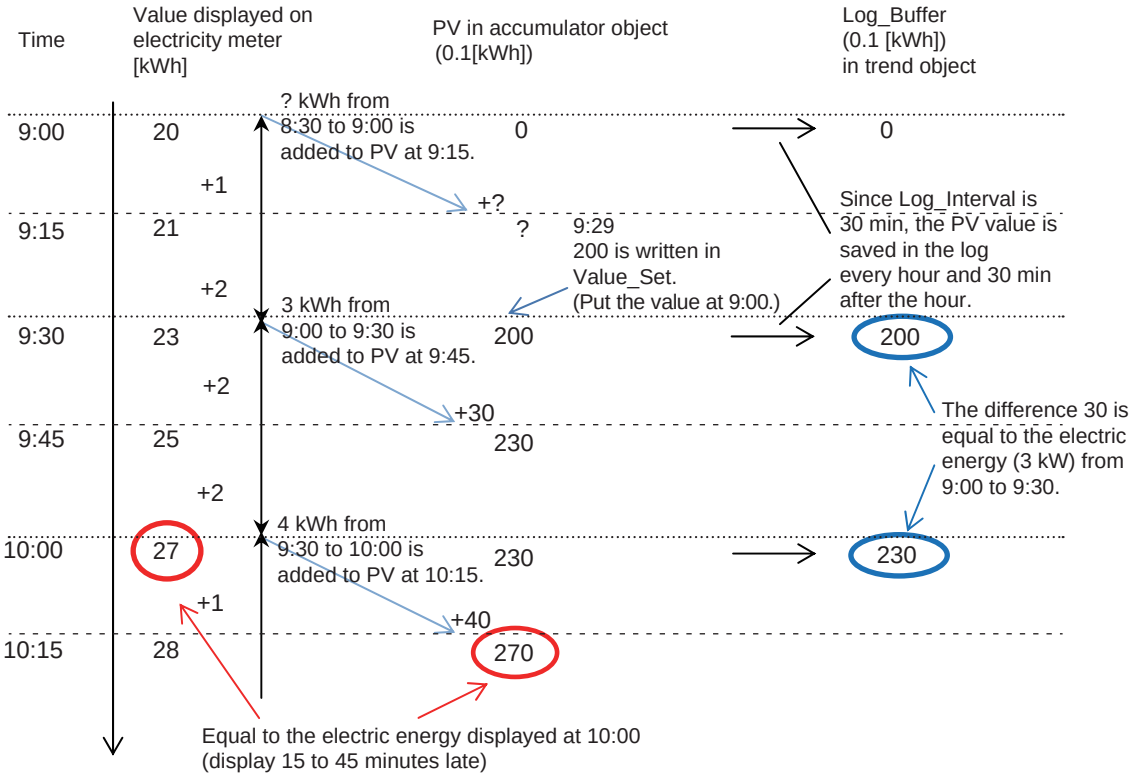
<4> Power consumption on BACnet®

When an electricity meter is connected to AE-200 system, the measurements are corrected, but the setting on the LCD and the setting by the BACnet® function do not have influence on each other.



Since the electric energy obtained every 30 minutes is reflected 15 minutes after the measurement to determine the electric energy (Present_Value property (PV) in the accumulator object) by the BACnet® function, the determined electric energy is not equal to the real-time electric energy displayed on the electricity meter in the state where electric power is consumed.

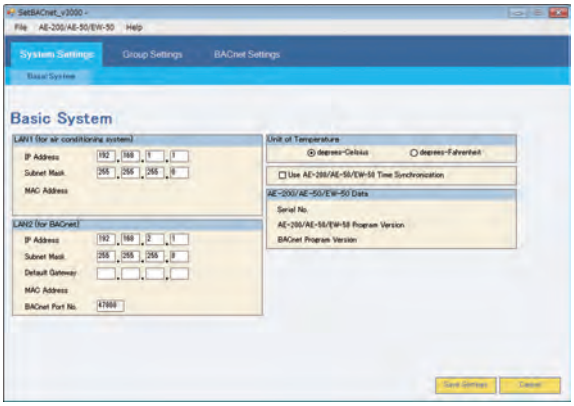
An example of correction of the value at 9:29 in the state where electric power is consumed is given below. (The value of PV in the accumulator object before correction is 0 at 9:00, and the Log_Interval property in the trend object is 180000 (0.01 [sec]) (= 30 min)).



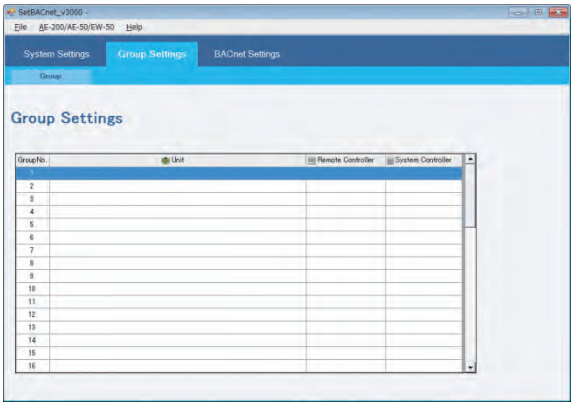
<5> Images of BACnet® Setting Tool screen

The images of the BACnet® Setting Tool screen are shown below.

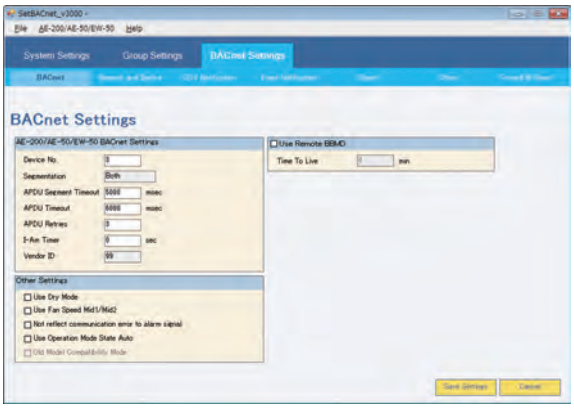
<System settings>



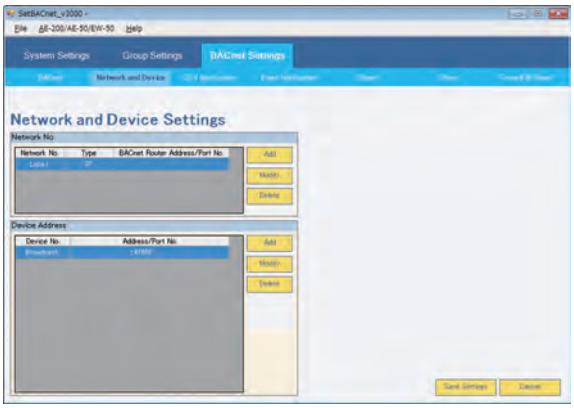
<Group settings>



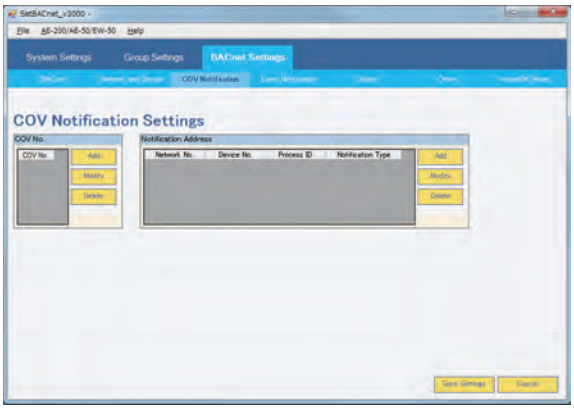
<BACnet settings: BACnet>



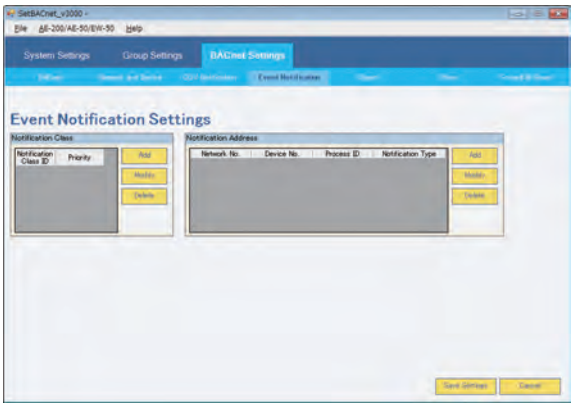
<BACnet settings: Network and devices>



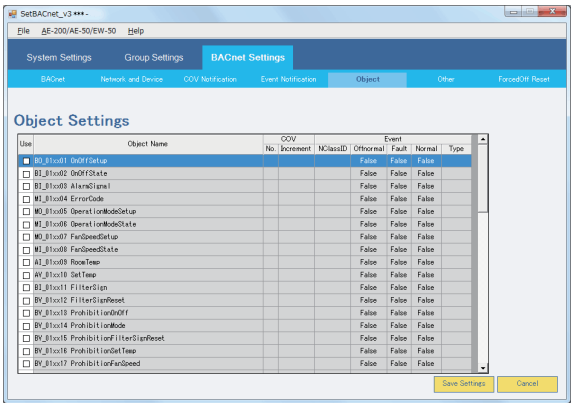
<BACnet settings: COV notification>



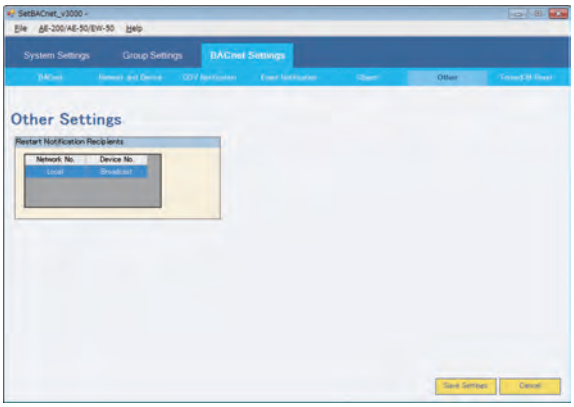
<BACnet settings: Event notification>



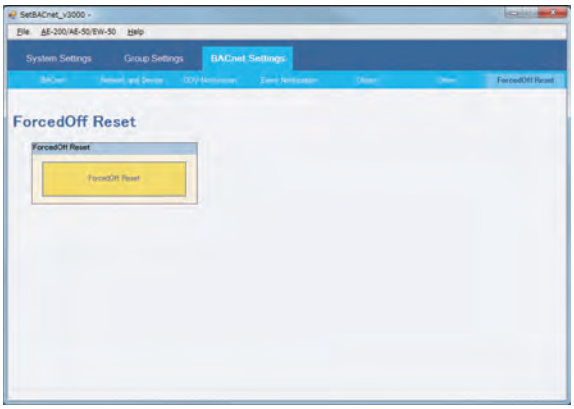
<BACnet settings: Object>



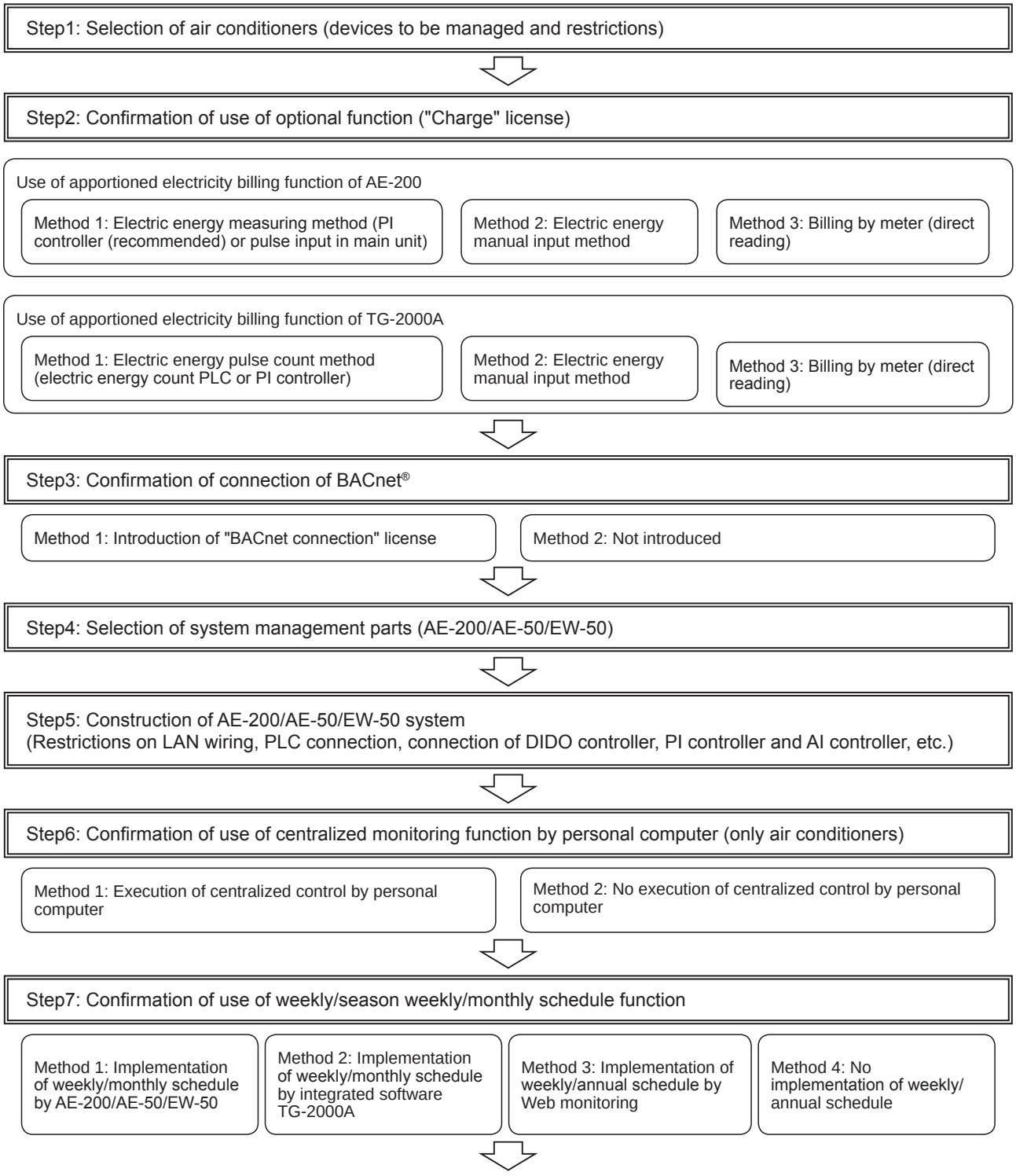
<BACnet settings: Others>



<BACnet settings: Forced Off Reset>



3. System Design Flow



Step8: Confirmation of use of optional function ("Energy Management License Pack" license)

Method 1: Energy-saving control

Method 2: Peak-cut control
(1) Electric energy monitoring method or pulse input in main unit (PI controller or electric energy count PLC)
(2) Demand controller method (external contact input or demand PLC)
(3) Other systems

Method 3: No implementation

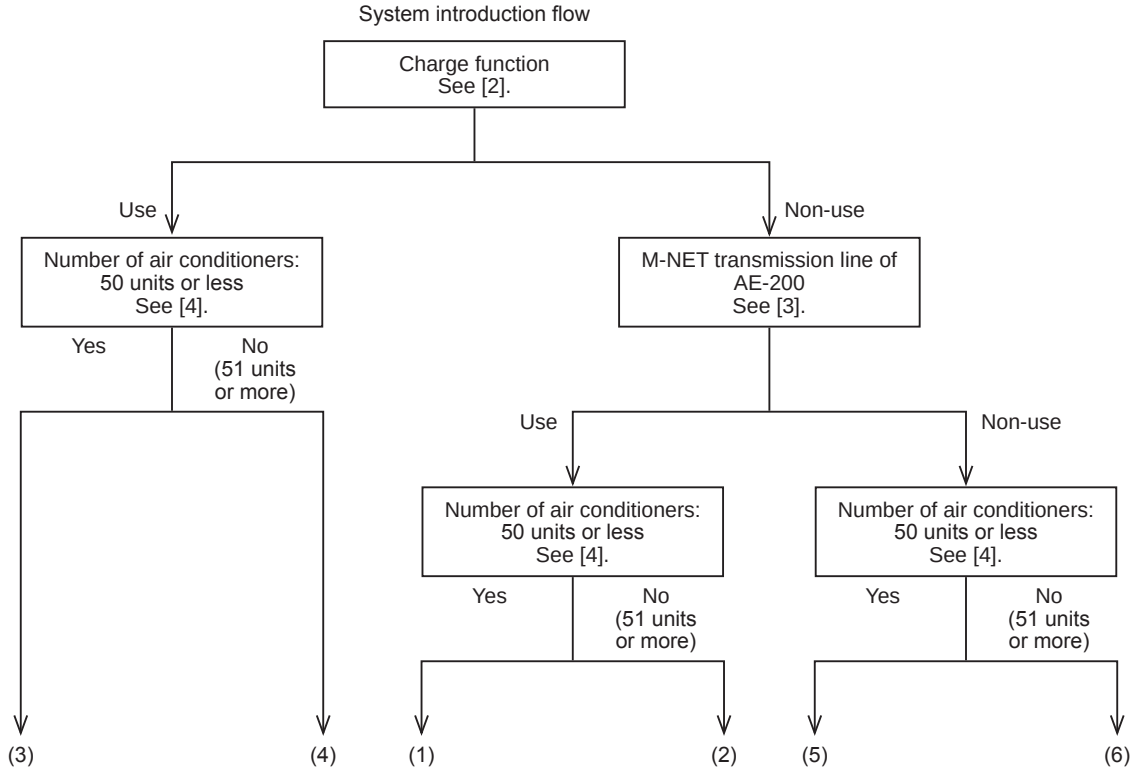
Step9: Confirmation of use of general equipment control function (AHC, PLC for general equipment or DIDO controller)

Step10: Confirmation of use of interlock control (AE-200/AE-50/EW-50, DIDO controller or AHC) (only air conditioners)

4. System Configuration

[1] System configuration

Up to 200 air conditions can be monitored and operated by using AE-200/AE-50/EW-50. This section explains the system configuration.
The system configuration varies depending on the functions to be used and the scale.
Follow the flowchart below, and refer to section [5] Connection diagram.
When connecting HWHP (CAHV, CRHV, or QAHV) units, refer to section [5]-7, and when connecting chillers (EAHV or EACV), refer to [5]-8.



○: Yes (use) ×: No (non-use)

No. in 4.5 “Connection diagram patterns”	Number of units controlled in system: 51 units or more	Use of apportioned electricity billing function	Use of M-NET transmission line of AE-200
(1)	×	×	○
(2)	○	×	○
(3)	×	○	×
(4)	○	○	×
(5)	×	×	×
(6)	○	×	×

(1) Apportioned electricity billing function is not used, M-NET transmission line of AE-200 is used, and number of air conditioners is 50 or less. See [5]-(1).
(2) Apportioned electricity billing function is not used, M-NET transmission line of AE-200 is used, and number of air conditioners is 51 or more. See [5]-(2).
(3) Apportioned electricity billing function is used, and number of air conditioners is 50 or less. See [5]-(3).
(4) Apportioned electricity billing function is used, and number of air conditioners is 51 or more. See [5]-(4).
(5) Apportioned electricity billing function is not used, M-NET transmission line of AE-200 is not used, and number of air conditioners is 50 or less. See [5]-(5).
(6) Apportioned electricity billing function is not used, M-NET transmission line of AE-200 is not used, and number of air conditioners is 51 or more. See [5]-(6).

Note: When the apportioned electricity billing function is used, the M-NET transmission line of AE-200 cannot be used. The M-NET transmission line is a line for communication between AE-50/EW-50 and air conditioners.
Note: HWHP (QAHV) cannot be connected to AE-50 or EW-50.
Note: The apportioned electricity billing function of HWHP (QAHV, CAHV, or CRHV) or chillers is not available. To use the apportioned electricity billing function for air-conditioning units, connect a separate AE-200 that does not use the apportioned electricity billing function, and connect HWHP (QAHV, CAHV, or CRHV) or chillers to it.

[2] Controllers applicable to functions

The expansion controllers AE-50 and EW-50 can be connected to AE-200. EW-50 can be used as a single unit. The controllers applicable to the functions are shown below.

Notes: ◎: Required ○: Usable ×: Unusable

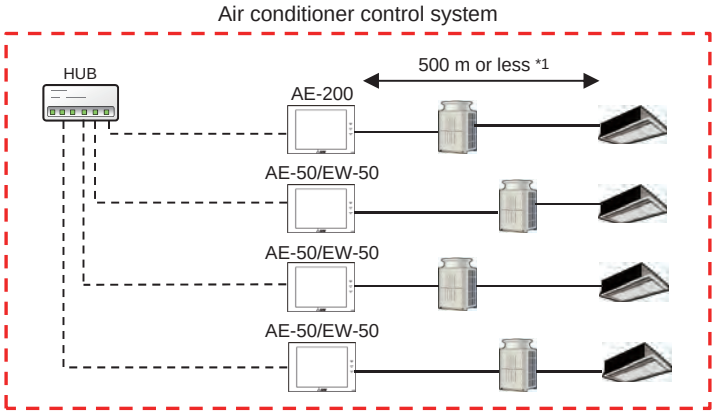
	AE-200	AE-50	EW-50
Use as single unit	○	×	○
Use as expansion controller	×	○	○
Billing system	◎	○ *1	○ *1

*1: Any of AE-50 and EW-50 is required.

[3] M-NET transmission line of AE-200

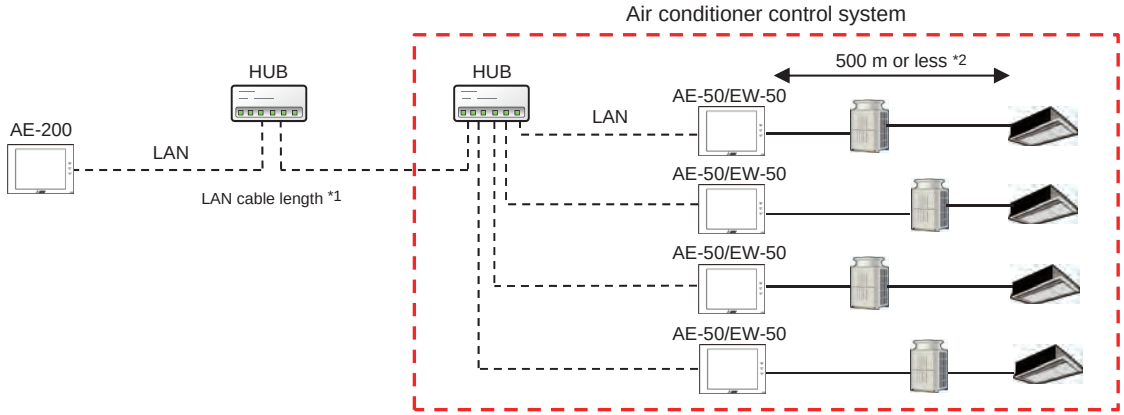
It is possible to determine whether or not to use the M-NET transmission line of AE-200. If “Non-use” is selected, up to 4 expansion controllers AE-50/EW-50 can be connected.
When the M-NET transmission line of AE-200 is used, the distance to the air conditioner must be within 500 m because of restriction on wiring length. To comprehensively monitor and control the air conditioners remotely by using AE-200, a system can be established without the restriction on wiring length of M-NET transmission line if the M-NET transmission line of AE-200 is not used.

1. When M-NET transmission line of AE-200 is used
The distance between AE-200 which comprehensively control AE-50/EW-50 and the air conditioner must be 500 m or less because of restriction on wiring length of M-NET transmission line.



*1: Another restriction (200 m) may be imposed depending on voltage drop. See 4.-[7] “Wiring” for more information.

2. When M-NET transmission line of AE-200 is not used
Since AE-200 does not control air conditioners, AE-200 which comprehensively controls AE-50/EW-50 can be installed in a remote location.



*1: Although the LAN cable length can be increased without limitation, the transmission delay time between AE-200 and AE-50 must be less than 4000 ms. (If the LAN cable length exceeds the specification for LAN, it is necessary to install switching hubs.)
*2: Another restriction (200 m) may be imposed depending on voltage drop. See 4.-[7] “Wiring” for more information.

[4] Use of expansion controllers AE-50 and EW-50

When the expansion controllers AE-50/EW-50 are connected to AE-200, up to 200 air conditioners can be comprehensively controlled on the floor layout on the LCD screen of AE-200.
This section explains the purposes of use of the expansion controllers AE-50 and EW-50.

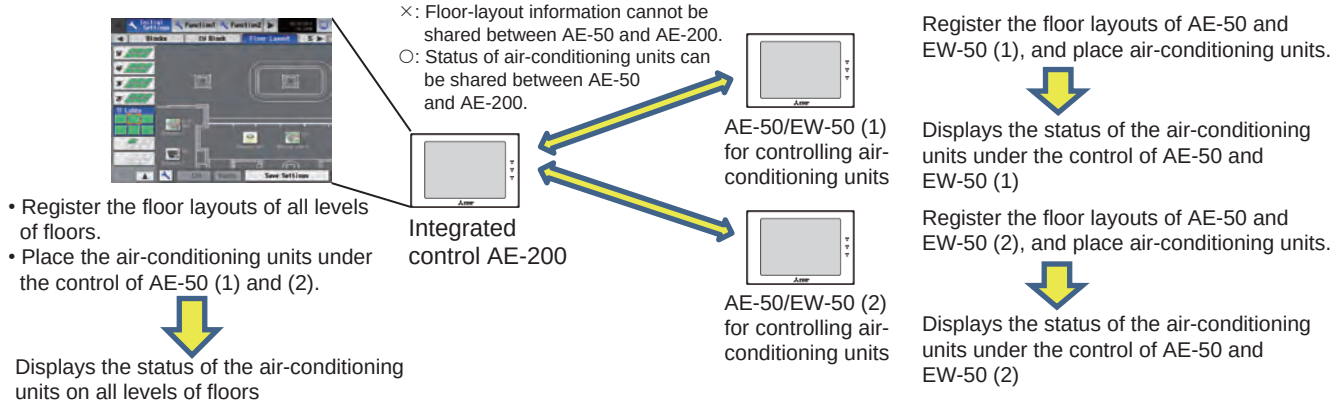
<1> About integrated control

Table below summarizes the availability of integrated control by AE-200, display functions of AE-200's LCD, Integrated Centralized Control Web, and BACnet® from AE-200, AE-50, and EW-50. When a given system is under the integrated control from AE-200, floor-layout display is available only from the LCD of AE-200.

Display type	Display content	Integrated control from AE-200	AE-50	EW-50
LCD screen	Floor layout	○ • Air-conditioning units under the control of AE-50 or EW-50 can be placed on the floor-layout screen of AE-200.	○ • Individually set for each AE-50 (Data sharing not possible)	× (No LCD screen)
	Air-conditioning unit status	○ • Displays the status of the air-conditioning units under the control of AE-50 or EW-50	○ • Displays only the status of air-conditioning units under the control of AE-50	× (No LCD screen)
Integrated Centralized Control Web	Floor layout	○ • Displays the floor layout for the Web that has been set from the Initial Setting Tool	○ • Displays the floor layout for the Web that has been set from the Initial Setting Tool	○ • Displays the floor layout for the Web that has been set from the Initial Setting Tool
	Air-conditioning unit status	○ • Displays the status of the air-conditioning units under the control of AE-50 or EW-50	○ • Displays only the status of air-conditioning units under the control of AE-50	○ • Displays only the status of air-conditioning units under the control of EW-50
BACnet® connection	Floor layout	× • Does not support the floor-layout display function	× • Does not support the floor-layout display function	× • Does not support the floor-layout display function
	Air-conditioning unit status	○ • Displays only the status of air-conditioning units under the control of AE-200	○ • Displays only the status of air-conditioning units under the control of AE-50	○ • Displays only the status of air-conditioning units under the control of EW-50

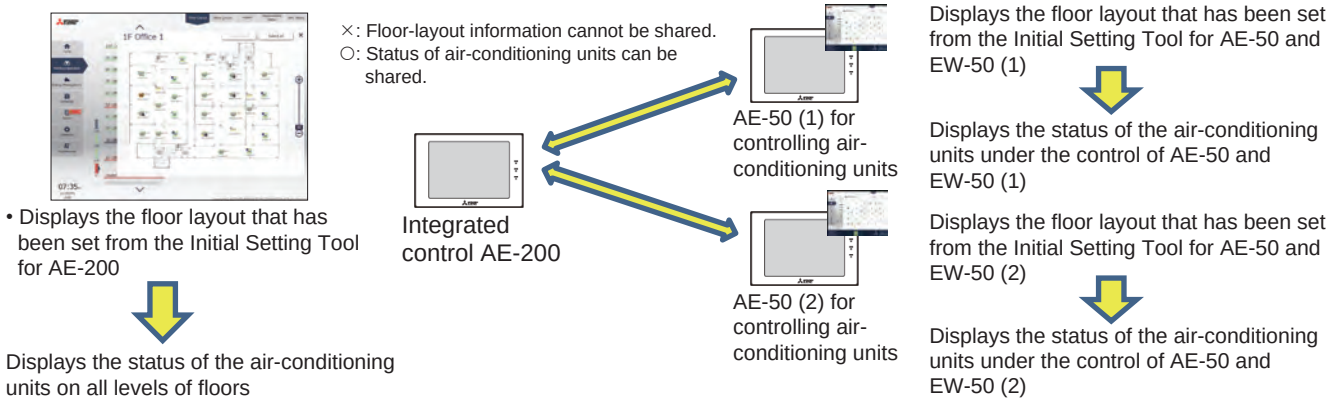
(1) LCD screen

AE-200 displays the status of all air-conditioning units under the control of AE-200, AE-50, and EW-50 and integrally controls all units.



(2) Integrated Centralized Control Web

The Integrated Centralized Control Web screen of AE-200 displays the status of air-conditioning units under the control of AE-200, AE-50, and EW-50. The floor layout appears in the format selected on the Initial Setting Tool.



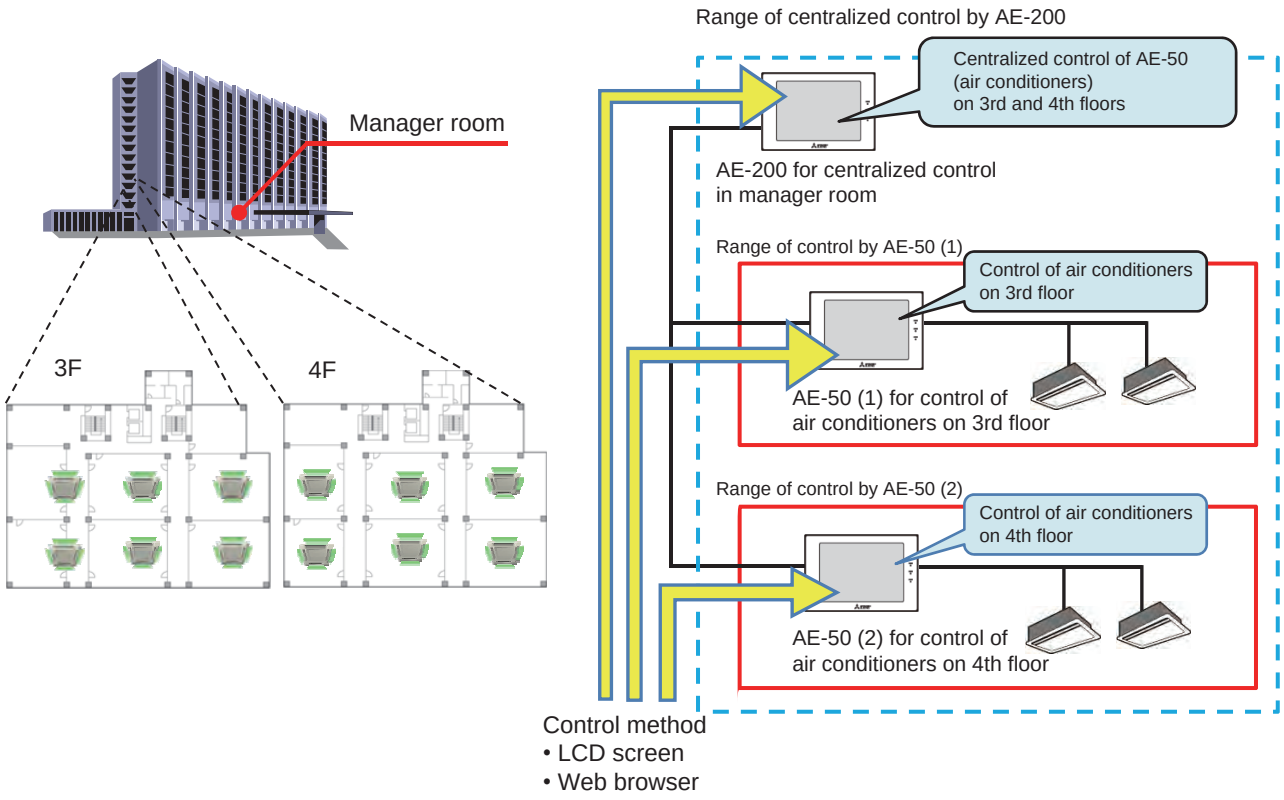
<2> Examples of use

Examples of use of the expansion controllers AE-50 and EW-50 are shown below.

(1) When AE-50 is used

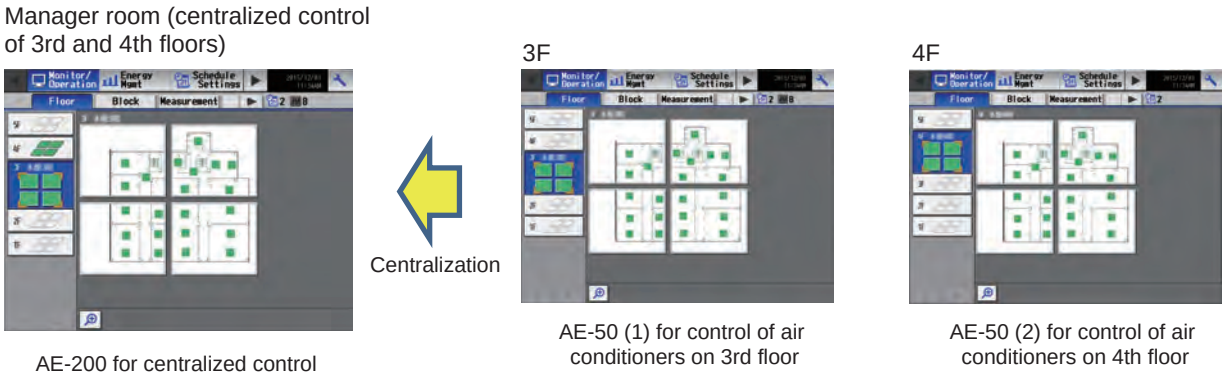
The operating conditions of the air conditioners on each floor can be controlled on the LCD screen of AE-50 or Web browser screen, and the operation conditions of the air conditioners on all floors can be comprehensively controlled on the LCD screen of AE-200 in the manager room.

This system is effective to control the air conditioners on the LCD screen of AE-50 installed on each floor.



1. Control on LCD screen

The conditions of the air conditioners controlled by AE-50 on each floor can be comprehensively controlled on the LCD screen of AE-200 for centralized control in the manager room.



2. Control by Integrated Centralized Control Web

The air conditioners can be controlled by using the Integrated Centralized Control Web screen after logging in to AE-200.

Manager room
(3rd and 4th floors are integrated.)

AE-200 for integrated control

Integration

3rd floor

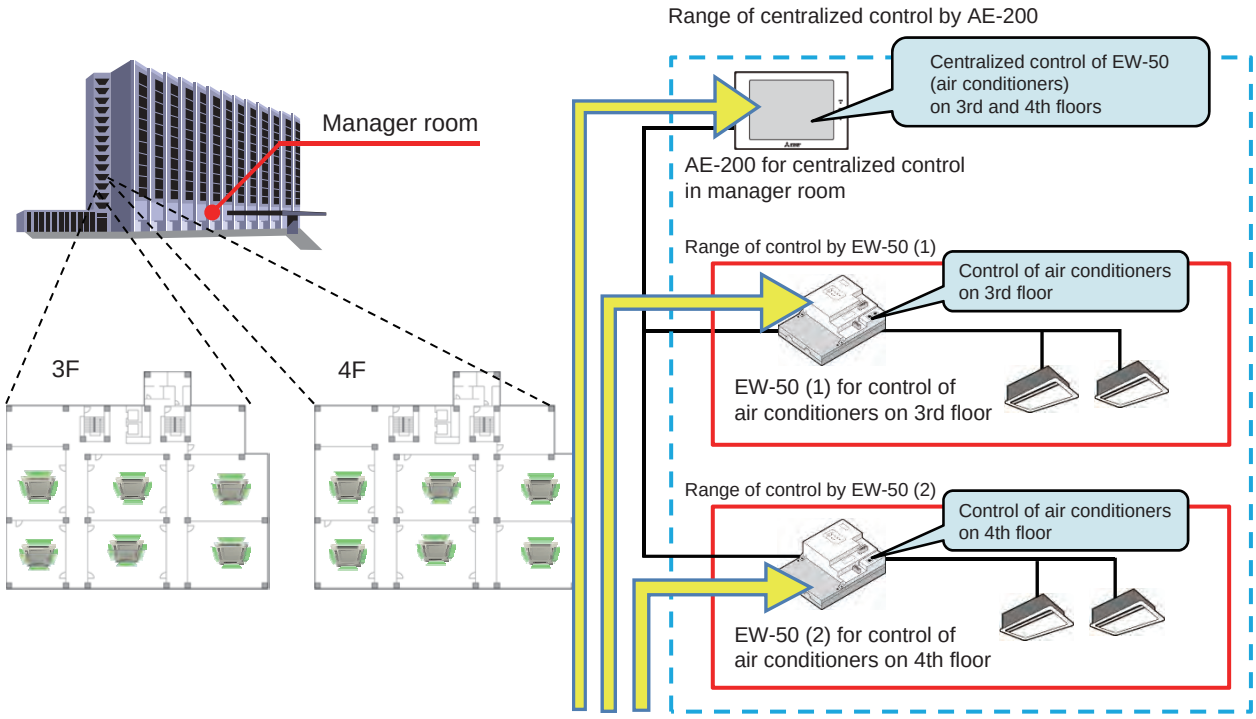
AE-50(1) for control of
air conditioners on 3rd floor

4th floor

AE-50(2) for control of
air conditioners on 4th floor

(2) When EW-50 is used

The operating conditions of the air conditioners on each floor can be controlled on the Web browser screen of EW-50, and the operating conditions of the air conditioners on all floors can be comprehensively controlled on the LCD screen of AE-200 in the manager room.

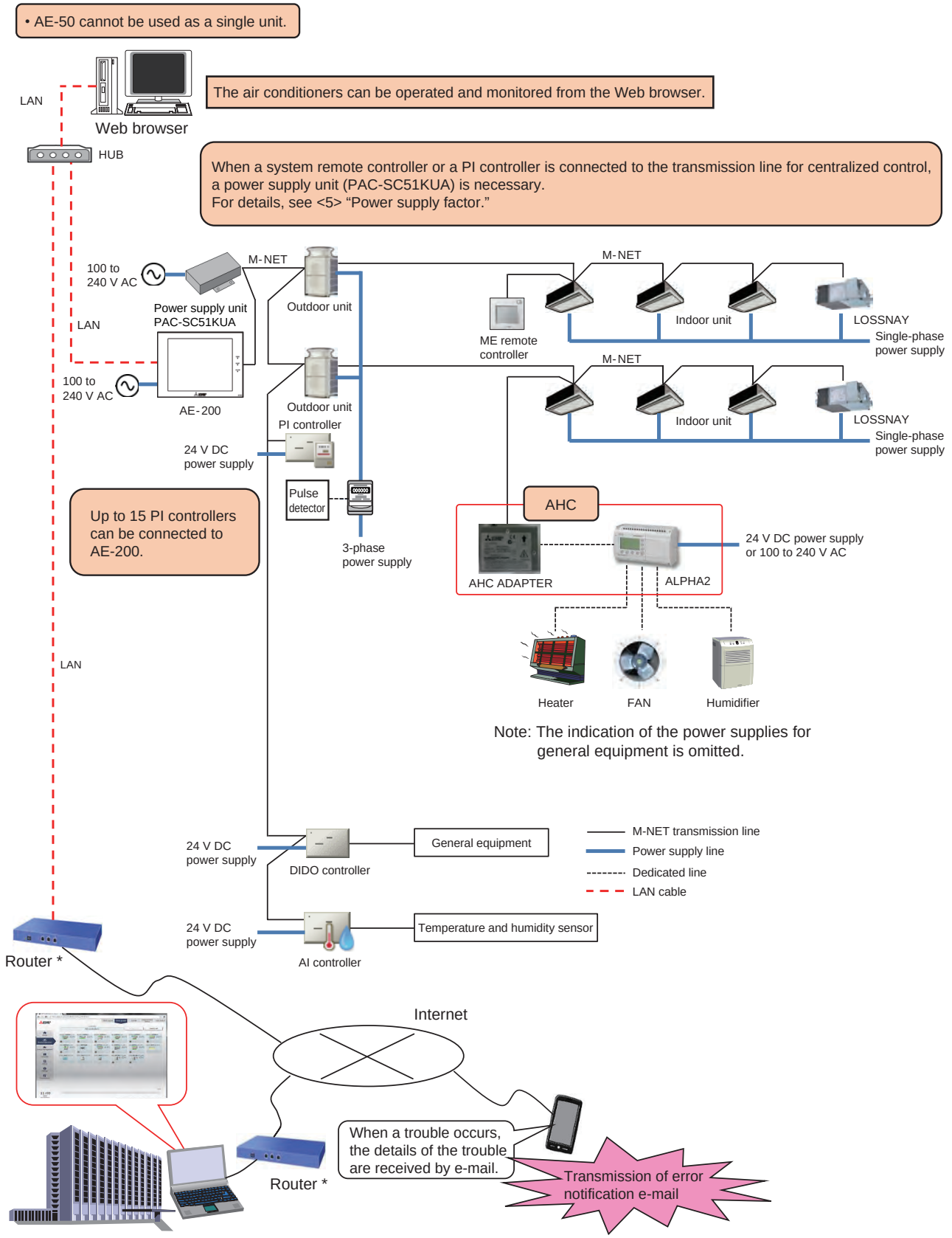


Control method
• Web browser

[5] Connection diagram patterns

(1) When the M-NET transmission line of AE-200 is used and the number of air conditioners is 50 or less (the apportioned electricity billing function is not used)

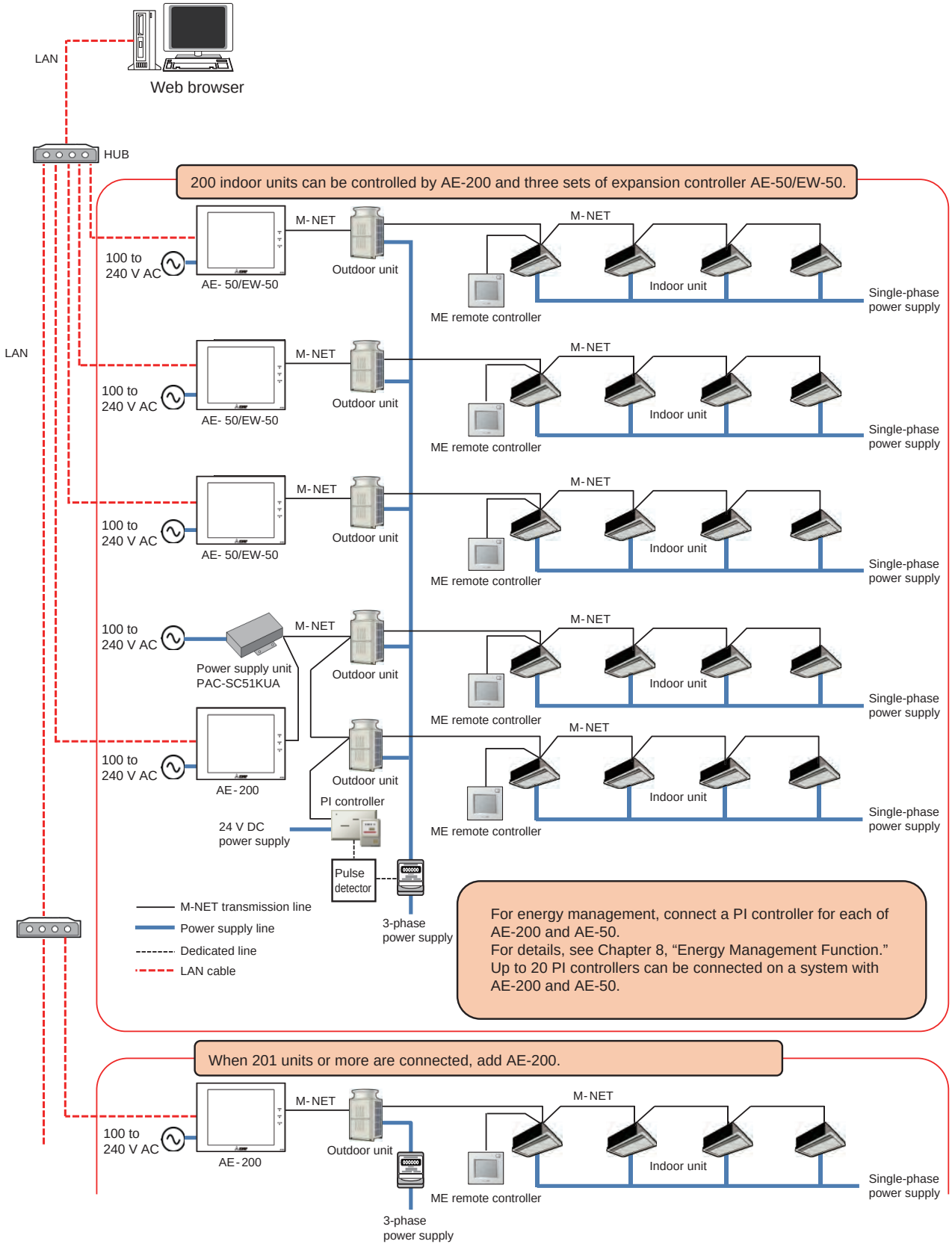
Up to 50 air conditioners can be monitored and operated by one AE-200.
When EW-50 is connected in place of AE-200, the air conditioners can be monitored and operated from the Web browser.



* When AE-200/AE-50/EW-50 is connected via the Internet, ensure the security.
When connecting it to the corporate intranet, make sure that the VPN routers can be used.

(2) When the M-NET transmission line of AE-200 is used and the number of air conditioners is 51 or more (the apportioned electricity billing function is not used)

To control 51 to 200 units, connect AE-50/EW-50 for expansion in addition to AE-200.
Up to 50 units can be connected to one set of AE-50/EW-50, and 3 sets of AE-50/EW-50 can be connected to a system with AE-200. So, up to 200 units can be connected.

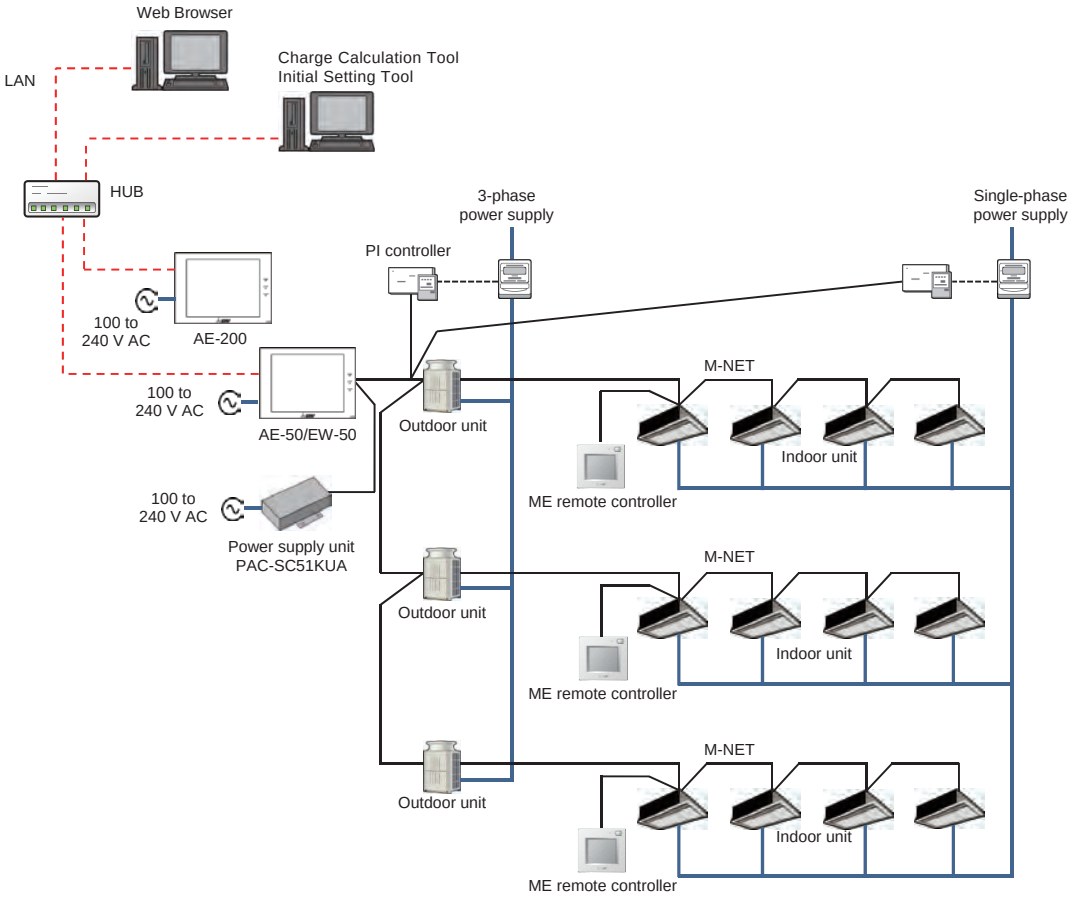


Note: The indication of the power supplies for the outdoor and indoor units is omitted on the following pages.

(3) When the apportioned electricity billing function is used and the number of air conditioners is 50 or less

Up to 50 air conditioners can be monitored and operated by using the apportioned electricity billing function and one expansion controller AE-50/EW-50.

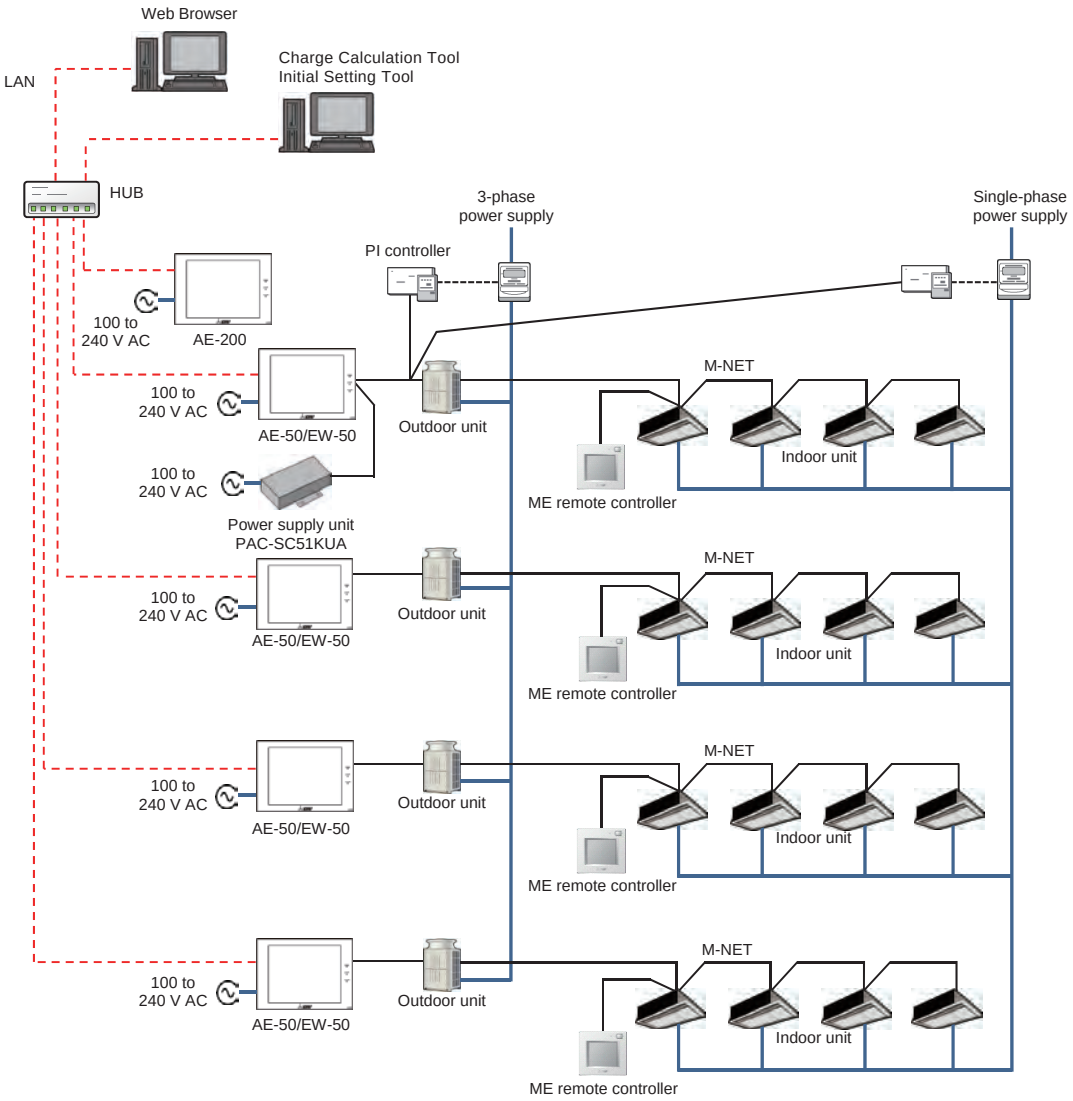
- When the apportioned electricity billing function is used, the M-NET transmission line of AE-200 cannot be used.
- When the Web browser function is used, access AE-50/EW-50 to monitor and operate the air conditioners.
- In a system that includes both the HVRF series of City Multi units and other series of City Multi units, use separate electricity meters for each series.



(4) When the apportioned electricity billing function is used and the number of air conditioners is 51 or more

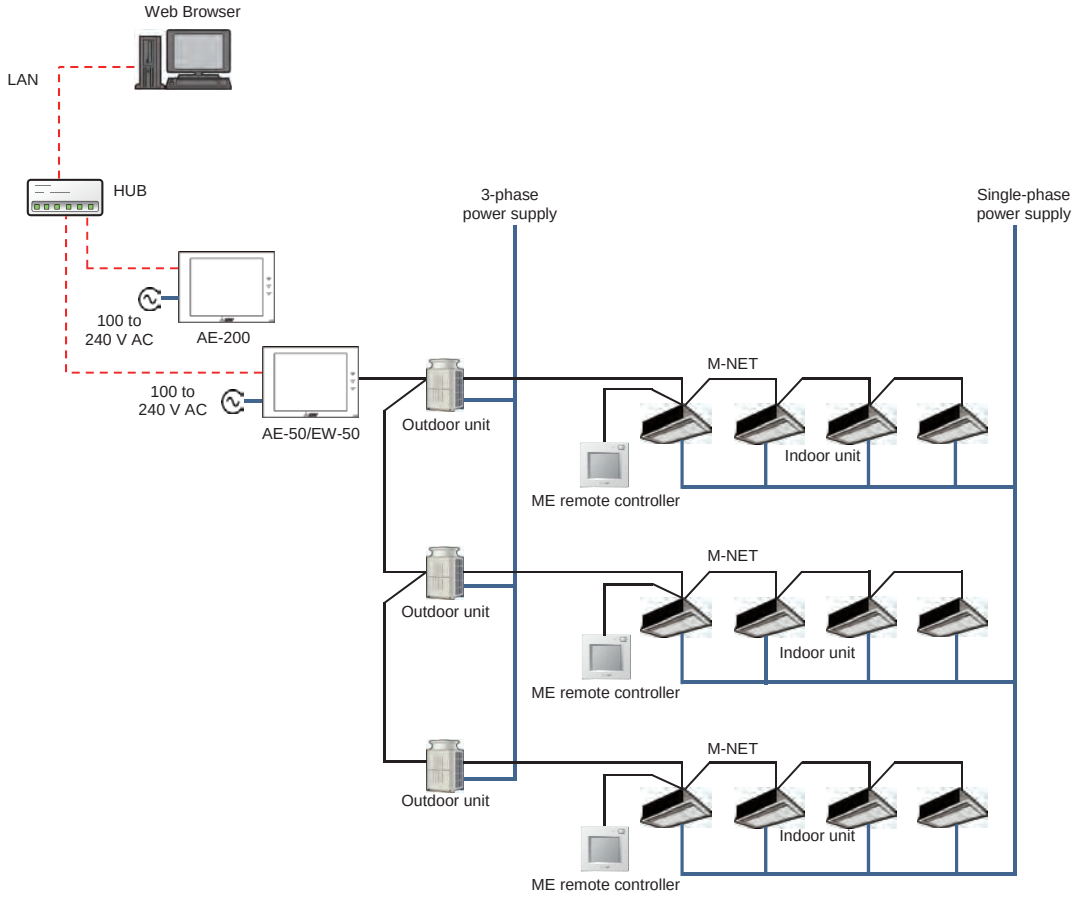
Up to 200 air conditioners can be monitored and operated by using the apportioned electricity billing function and 4 expansion controllers AE-50/EW-50.

- When the apportioned electricity billing function is used, the M-NET transmission line of AE-200 cannot be used.
- When the Web browser function is used, access AE-50/EW-50 to monitor and operate the air conditioners.
- In a system that includes both the HVRF series of City Multi units and other series of City Multi units, use separate electricity meters for each series.



(5) When the number of air conditioners is 50 or less (the apportioned electricity billing function is not used and the M-NET transmission line of AE-200 is not used)

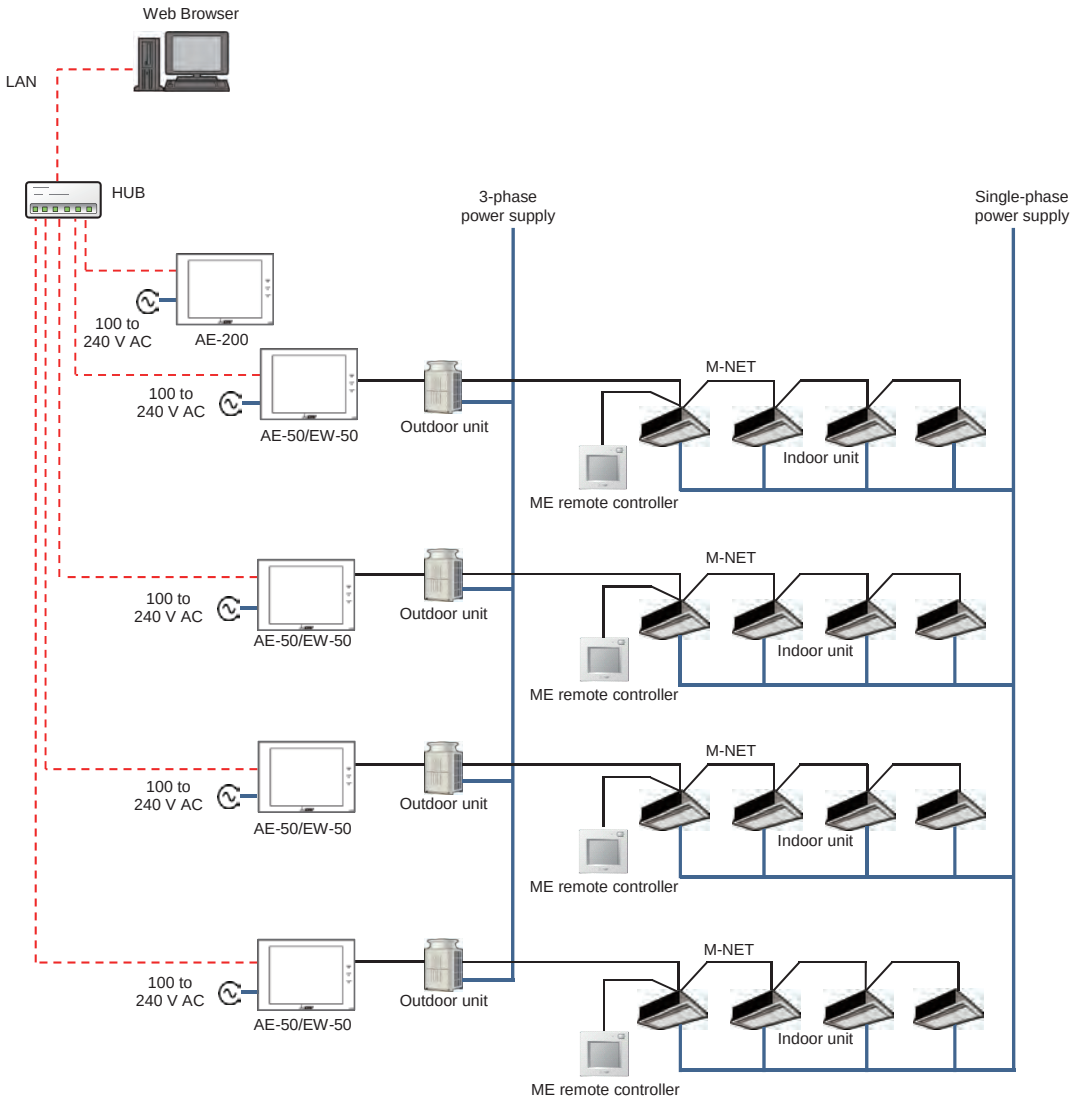
Up to 50 air conditioners can be monitored and operated by connecting AE-200 and one expansion controller AE-50/EW-50.



(6) When the number of air conditioners is 51 or more (the apportioned electricity billing function is not used and the M-NET transmission line of AE-200 is not used)

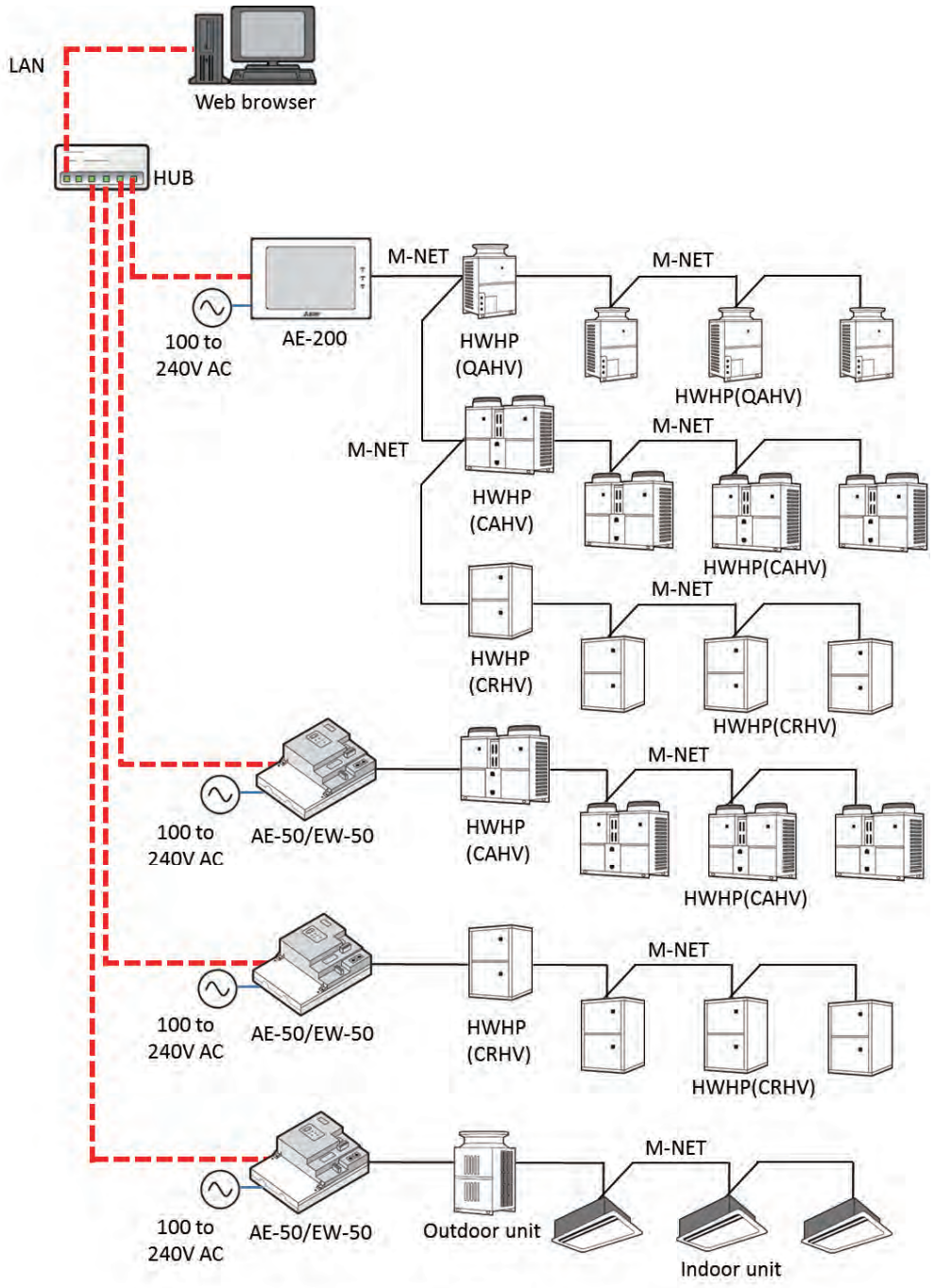
Up to 200 air conditioners can be monitored and operated by connecting AE-200 and four expansion controllers AE-50/EW-50.

- When the Web browser function is used, access each of AE-200, AE-50 and EW-50 to monitor and operate the air conditioners.
- AE-50/EW-50 can be connected as an expansion controller.



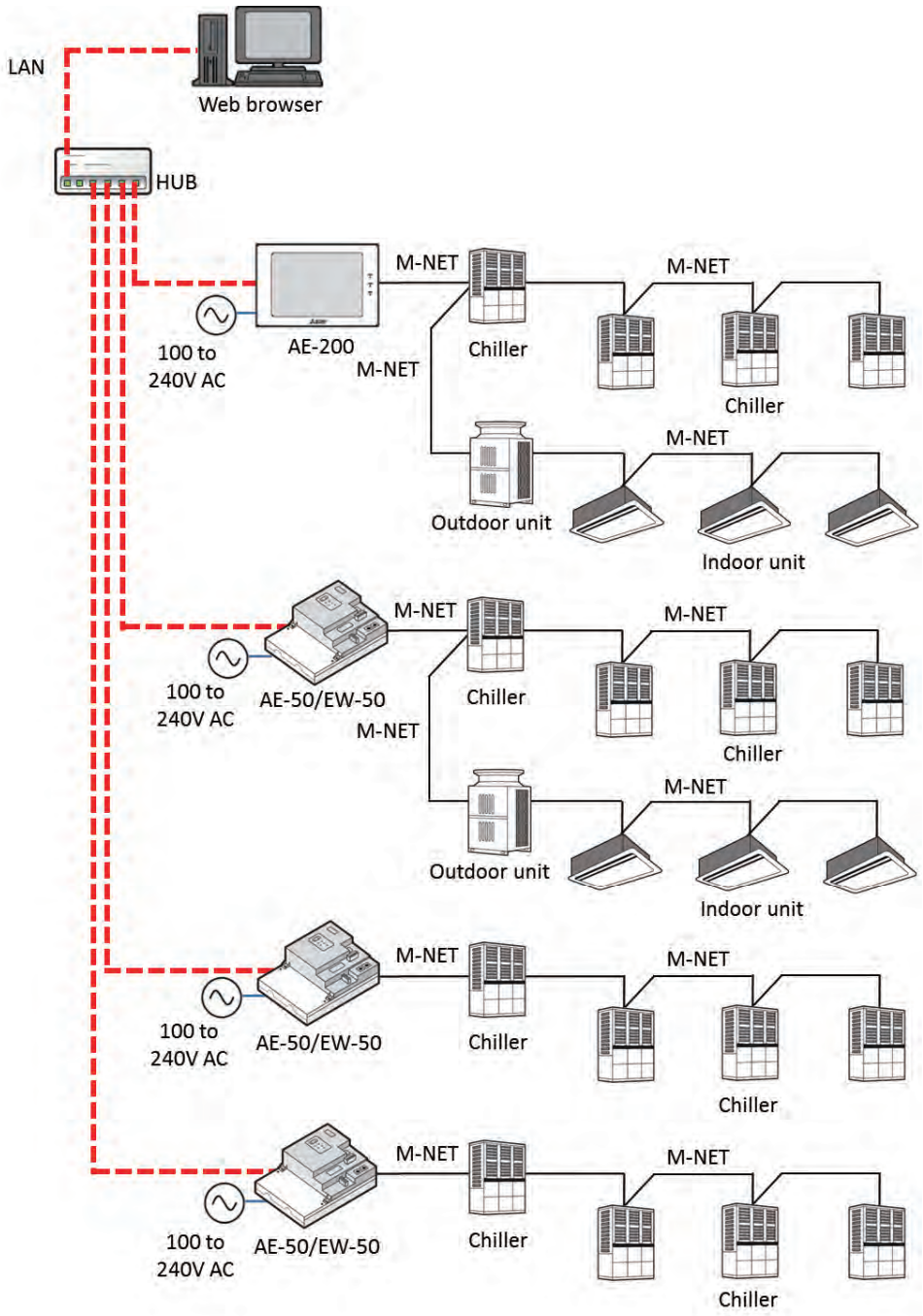
(7) Connecting the HWHP (CAHV, CRHV, QAHV) units

- Count each HWHP (CAHV, CRHV) unit as one air-conditioning unit.
- HWHP (CAHV) units cannot be connected to AE-50 or EW-50.
- A maximum of 24 HWHP (QAHV) units can be connected to each AE-200.
- When using HWHP (QAHV) units in combination with other models of units, count each HWHP (QAHV) unit as two air-conditioning units.
- Up to 50 air conditioners can be moniterd and operated by one AE-200/AE-50/EW-50



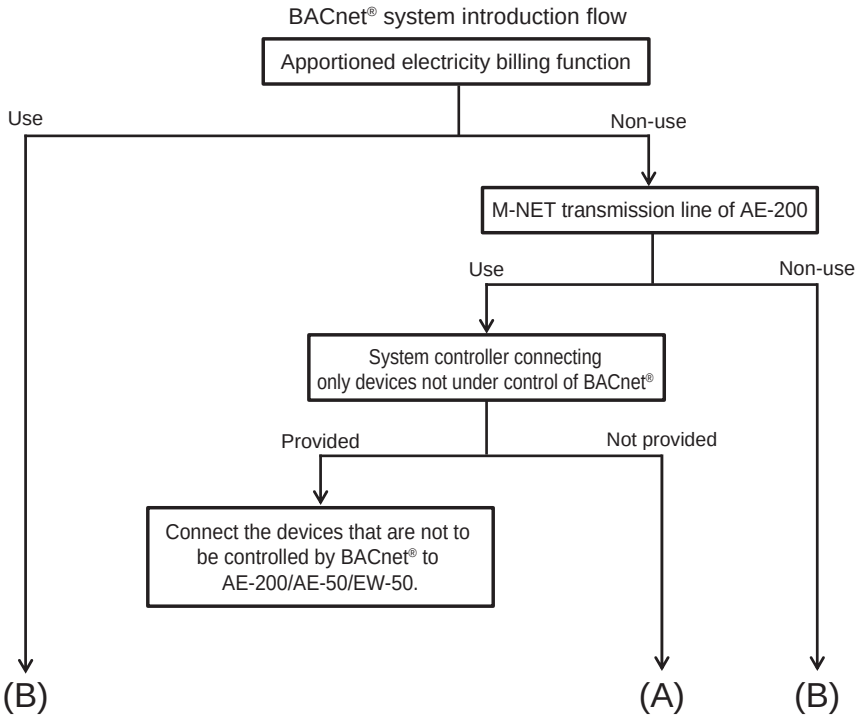
(8) Connecting the chiller (EAHV, EACV) units

- A maximum of 24 chiller units can be connected to each AE-200.
- When using chiller units in combination with other models of units, count each chiller unit as three air-conditioning units.
- Up to 50 air conditioners can be moniterd and operated by one AE-200/AE-50/EW-50



[6] BACnet® system configuration

This section shows the system configuration for connecting AE-200/AE-50/EW-50 to BACnet® by using the BACnet® function. The configuration for connecting to BACnet® varies depending on the functions to be used and the devices to be connected. Determine the configuration in accordance with the following flow.

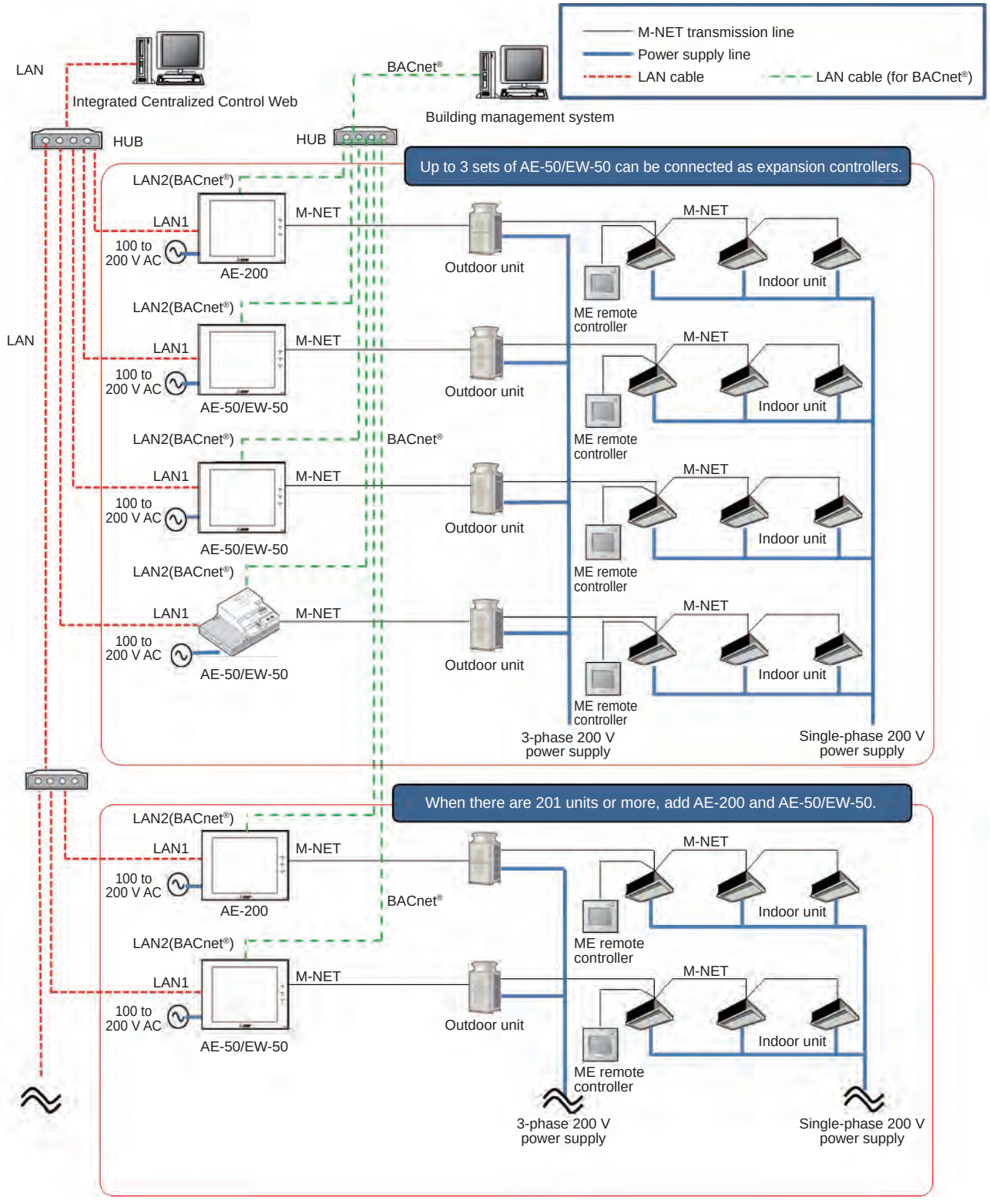


It is necessary to prepare the "BACnet connection" license for each of AE-200/AE-50/EW-50 to be connected to BACnet® and register the license in each of them.
Do not connect LAN1 and LAN2 (BACnet®) of AE-200/AE-50/EW-50 to the same hub.
Do not duplicate the IP address between LAN1 and LAN2 (BACnet®) of AE-200/AE-50/EW-50.

(A) Standard BACnet® system configuration

Connect all sets of AE-200/AE-50/EW-50 to BACnet®.

The building management system controls the units by the set of AE-200/AE-50/EW-50 (up to 50 units under each set).

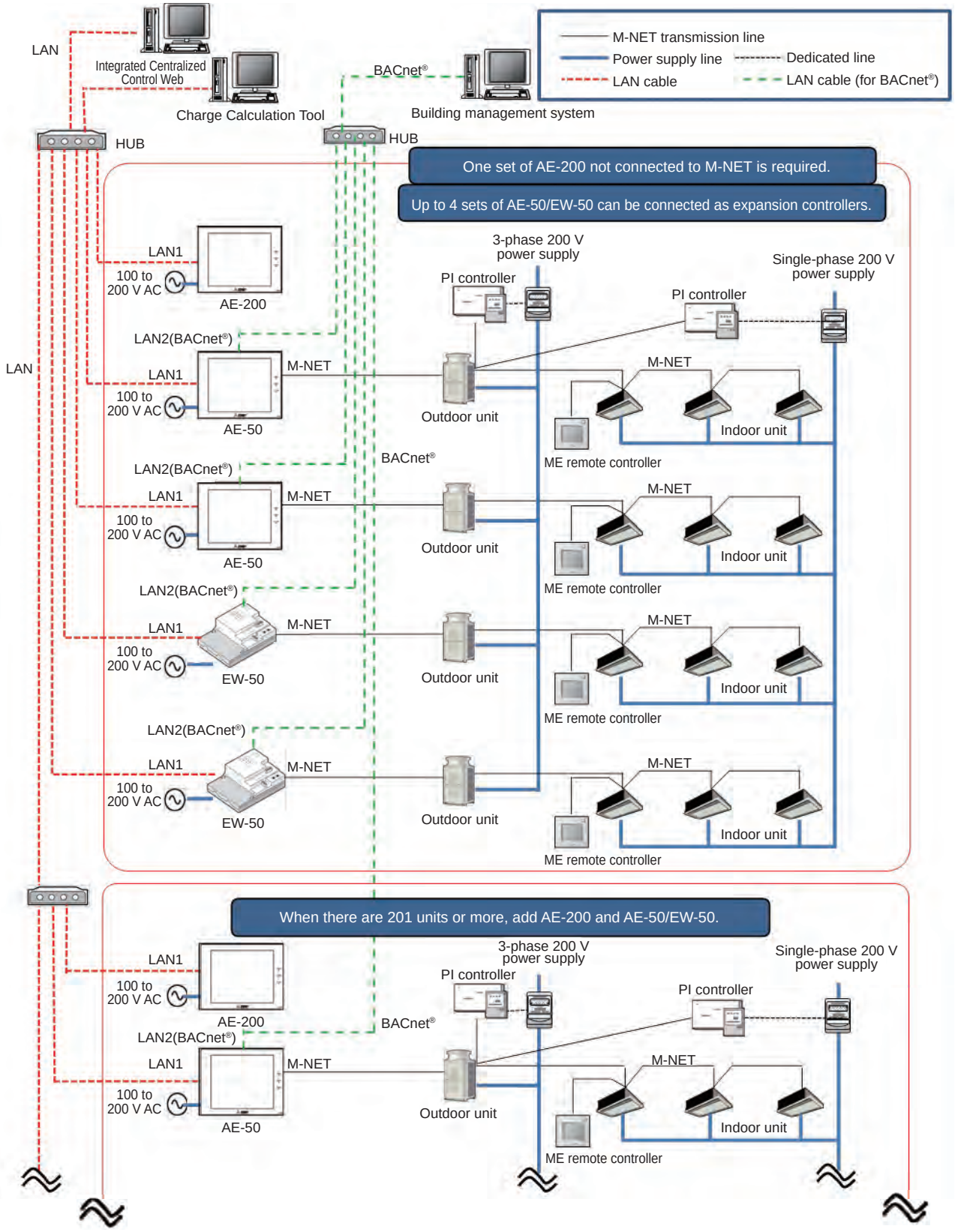


(B) BACnet® system configuration without connection of AE-200 to M-NET

Connect AE-50/EW-50, except AE-200 not connected to M-NET, to BACnet®.

To synchronize the time from the building management system, set the time Master/Sub of AE-200 not connected to M-NET to Sub, so that the time is synchronized with AE-50/EW-50 connected to BACnet®.

When the apportioned electricity billing function is used, configure the system as shown below.



[7] System chart for each function

The system configurations of electricity meters (with pulse transmitters) to use the apportioned electricity billing function, peak-cut control and energy management function are shown below.

<1> System configuration for apportioned electricity billing function

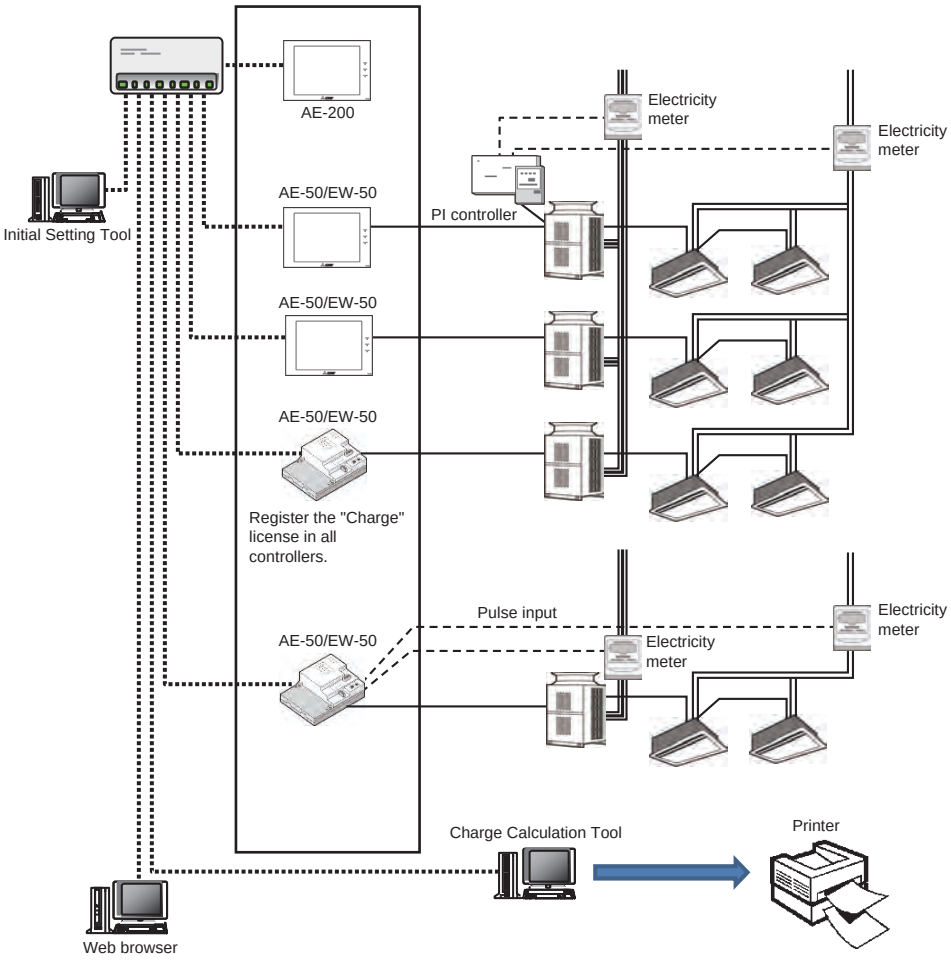
The system configuration for the apportioned electricity billing function is explained.
The apportioned electricity billing function has two methods; electric energy measurement method and electric energy manual input method.
The electric energy measurement method is designed to collect the electric energy data from the PI controller or the pulse input in AE-50/EW-50 main unit*1 and apportion the electric energy with the Charge Calculation Tool. The electric energy manual input method is designed to obtain the ratio of operation amount of outdoor units and indoor units in each energy management block with the Charge Calculation Tool.

*1: When the apportioned electricity billing function is used, it is recommended to use the electric energy measurement method by PI controller. If the pulse input method is used, pulse input cannot be obtained during power interruption in AE-50/EW-50, power shutdown and software updating, and the measured electric energy may be different from the actual value.

<1-1> Electric energy measurement method (with meters)

<Outline of operation>

1. AE-50/EW-50 collects the operation information of air conditioners.
2. AE-50/EW-50 collects the electric energy data from the PI controller or the electricity meters connected to the pulse input in AE-50/EW-50 main unit.
3. AE-200 apportions the electric energy to the outdoor unit and each indoor unit every 30 minutes. The results of apportionment are stored as data obtained every 30 minutes for 4 days, daily data for 62 days and weekly data for 25 months.
4. AE-50/EW-50 receives the results of apportionment of electric energy from AE-200 and backs up the data.
5. The results of apportionment are displayed in bar graphs on the energy use status and ranking screens of the energy management function of AE-200/AE-50/EW-50.
   The electric energy (kWh) is displayed in the energy management list on AE-200.
6. The results of apportionment can be checked on the LCD screen of AE-200 and output to a CSV file.
7. The charge is calculated with the Charge Calculation Tool by multiplying the unit price (1 to 5) in each time slot based on the electric energy apportioned to each energy management block. The charge can be calculated also based on the values measured by each meter. The calculation results can be displayed, printed and output to a CSV file.



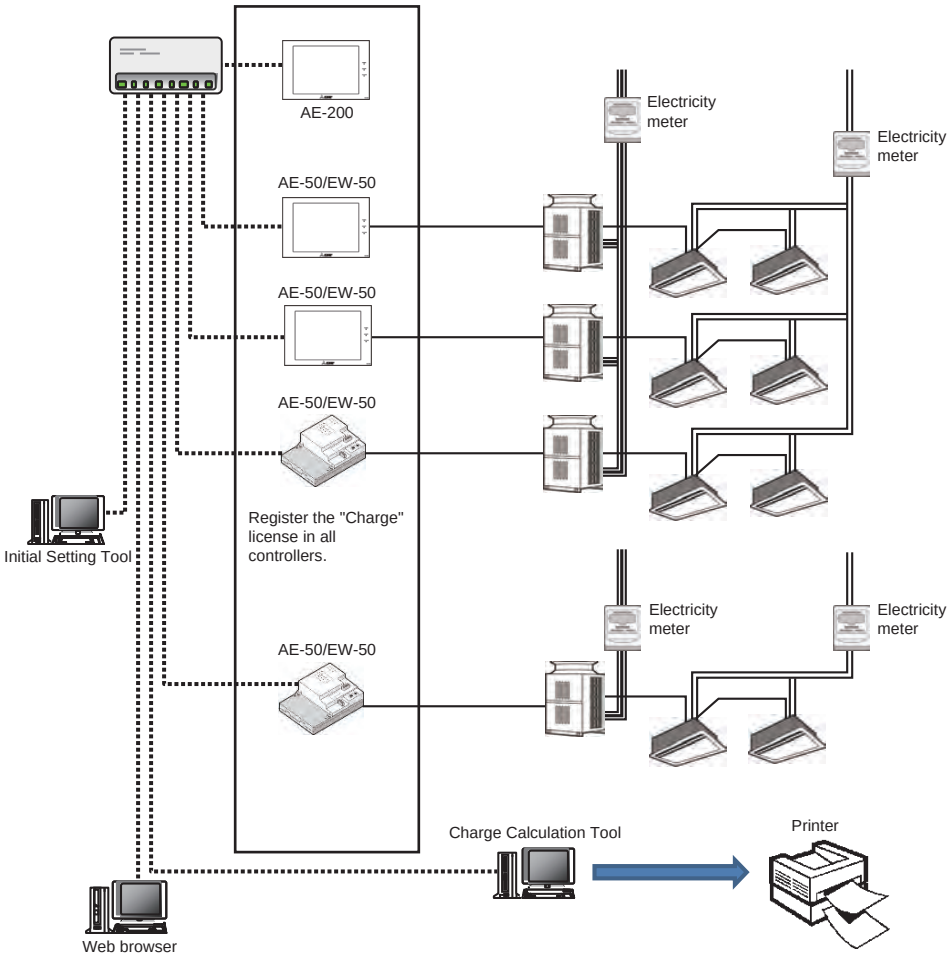
<Points>

1. When the apportioned electricity billing function is used, AE-200 is used only for power apportionment and billing, and therefore air conditioners and PI controller cannot be connected to the M-NET of AE-200. In addition, the pulse input cannot be used.
2. To apportion the electric energy in one M-NET system (up to 50 air conditioners) by AE-200 main unit, one set of EW-50 or AE-50 is required.
3. To apportion the electric energy in four M-NET systems (up to 50 air conditioners × 4 systems) by AE-200 main unit, four sets of EW-50 or AE-50 are required.
4. Register the "Charge" license in all of AE-200/AE-50/EW-50.
   Even if part of AE-50/EW-50 connected to AE-200 is not subject to billing, register the "Charge" license in all of AE-200/AE-50/EW-50.
5. Electric energy pulses are input from the PI controller or the pulse input on AE-50/EW-50 main unit. (The pulse count PLC cannot be used.)
6. When the electric energy in four M-NET systems (up to 50 air conditioners × 4 systems) is apportioned by AE-200 main unit, the PI controller connected to the M-NET system of any of four sets of EW-50 or AE-50 or at least one electricity meter connected to the pulse input is required.
   (At least one electricity meter is required for electric energy apportionment to outdoor units. When electric energy is apportioned to the indoor units, at least one electricity meter is required separately for the indoor units.)
7. In the case of the electric energy measurement method, the electric energy consumed by each outdoor unit can be divided into consumed electricity and standby electricity. It is possible to include the standby electricity of the outdoor unit in the consumed electricity without separating it. (One of the methods can be selected.)
8. It is possible not to measure or apportion the electric energy consumed by the indoor units. When the electric energy consumed by the indoor units is measured, the electric energy can be divided into consumed electricity and standby electricity. It is possible to include the standby electricity of the indoor units in the consumed electricity without separating it.
9. In the case of the electric energy measurement method, it is possible to whether or not to include the standby electricity of outdoor units and indoor units in charge calculation by the Charge Calculation Tool.
10. The apportioned electricity billing function can be set by the Initial Setting Tool.
    (It cannot be set on the LCD or Web browser screen.)
11. In a system that includes both the HVRF series of City Multi units and other series of City Multi units, use at least one electricity meter for each series. Do not use a single electricity meter to measure the electricity use of both series of units.

<1-2> Electric energy manual input method (without meters)

<Outline of operation>

1. AE-50/EW-50 collects the operation information of air conditioners.
2. AE-200 calculates the apportionment parameters of outdoor unit and each indoor unit every 30 minutes. The results of calculation are stored as data obtained every 30 minutes for 4 days, daily data for 62 days and weekly data for 25 months.
3. The apportionment parameters are displayed in the energy management list as the results of calculation. (They are updated every month.)
   The apportionment parameters can be checked on the LCD screen of AE-200, and the data displayed on the screen can be output to a CSV file.
4. The Charge Calculation Tool calculates and displays the charging ratio of the outdoor units and indoor units in each energy management block, and the calculation results can be printed and output to a CSV file. Apportion the separately measured electric energy to the tenants by using the charging ratio of the outdoor units and indoor units in each energy management block calculated by the Charge Calculation Tool.

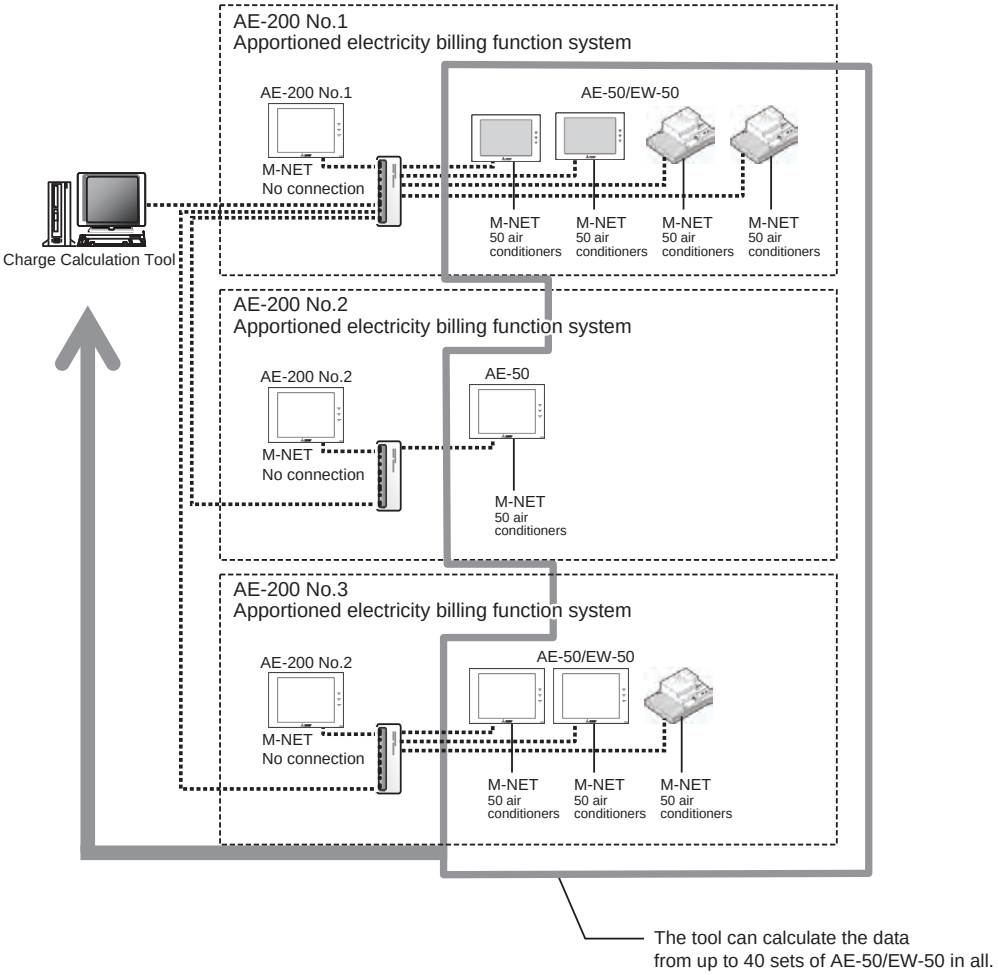


<Points>

1. When the apportionment parameters are calculated by AE-200 main unit, the M-NET of AE-200 cannot be used.
2. To calculate the apportionment parameters for one M-NET system (up to 50 air conditioners) by AE-200 main unit, one set of EW-50 or AE-50 is required.
3. To calculate the apportionment parameters for 4 M-NET systems (up to 50 air conditioners × 4 system) by AE-200 main unit, four sets of EW-50 or AE-50 are required.
4. To calculate the apportionment parameters by AE-200 main unit, register the "Charge" license in all of AE-200/AE-50/EW-50.
   Even if part of AE-50/EW-50 connected to AE-200 does not calculate the apportionment parameters, register the "Charge" license in all of AE-200/AE-50/EW-50.
5. The standby electricity of outdoor units and indoor units is not taken into account for the apportionment parameters.
6. The apportioned electricity billing function can be set by the Initial Setting Tool.
   (It cannot be set on the LCD or Web browser screen.)
7. In a system that includes both the HVRF series of City Multi units and other series of City Multi units, set the apportioning setting for the electricity use by outdoor units to Thermo-ON time or to fan operation time to ensure appropriate measurement.

Remarks

- ○ The Charge Calculation Tool enables calculation of electric energy, charge and charging ratio of up to 40 sets of AE-50/EW-50.
- ○ AE-200 using the apportioned electricity billing function are not included in the number of units.



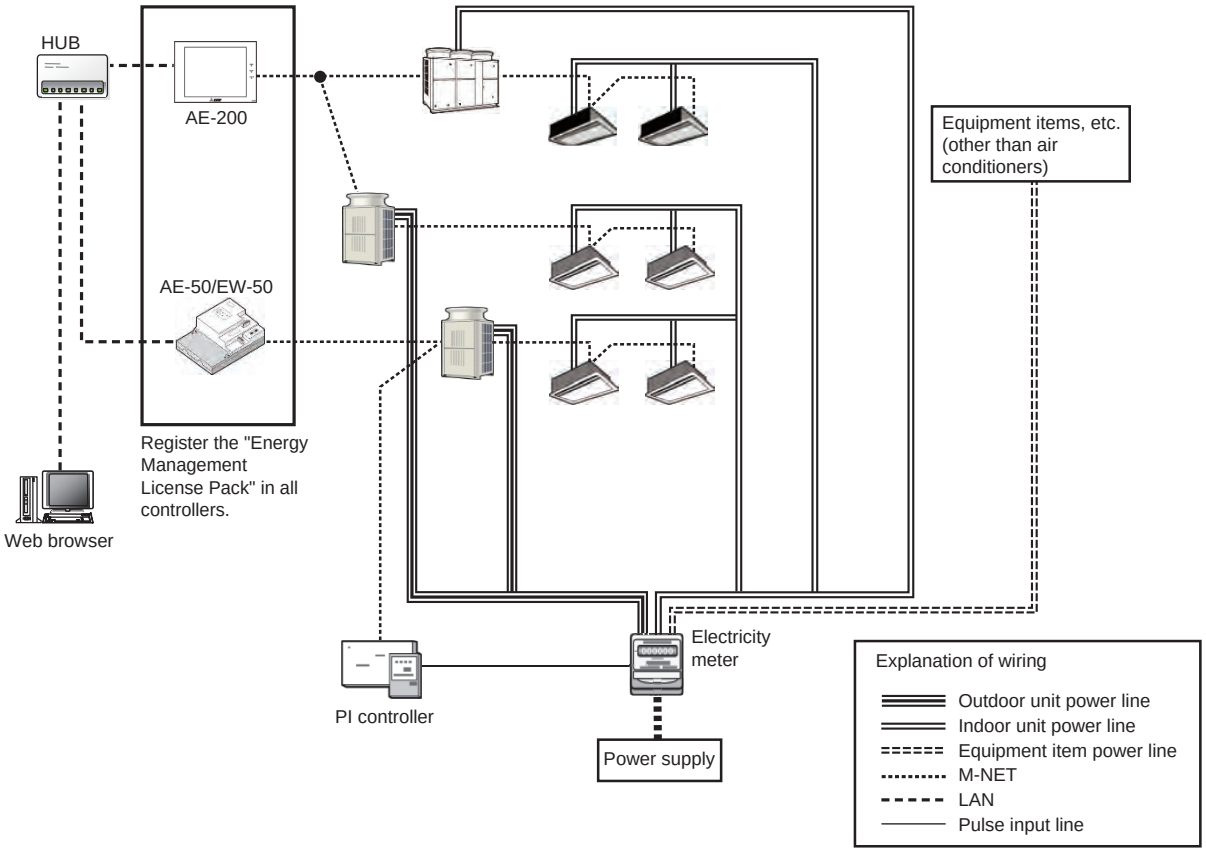
<2> System configuration for peak-cut control (demand) function

The system configuration for the peak-cut control function is explained.

<Outline of operation>

The outline of the operation in the following system configuration is described below.

1. AE-50/EW-50 collects electric energy data from the PI controller.
2. AE-50/EW-50 determines the peak-cut control (PI controller method) level of AE-50/EW-50 based on the collected electric energy data.
3. Peak-cut control is performed on the air conditioners controlled by AE-50/EW-50 according to the determined peak-cut control level.
4. Set the peak-cut control method of AE-200 to “Other AE,” and monitor the control level of AE-50/EW-50 from AE-200.
5. AE-200 performs peak-cut control on the air conditioners controlled by AE-200 based on the obtained control level.



<Points>

1. To perform the peak-cut control, register "Energy Management License Pack" in all of AE-200/AE-50/EW-50.
2. Obtain the electric energy data to be used for peak-cut control from the PI controller or the pulse input in AE-200/AE-50/EW-50 main unit.
3. The air conditioners can be controlled (peak-cut control) to reduce the power consumption of the whole equipment by using the main electricity meter that covers the air conditioners and equipment items other than the air conditioners for the peak-cut control.
4. When “Other AE” has been selected as the peak-cut control method, a delay of up to 1 minute will occur in execution of the peak-cut control because the control is started after the control levels of other AE controllers are monitored.
5. As “Other AE,” up to 3 sets of AE-200/AE-50/EW-50 to which electricity meters are not connected can be selected.

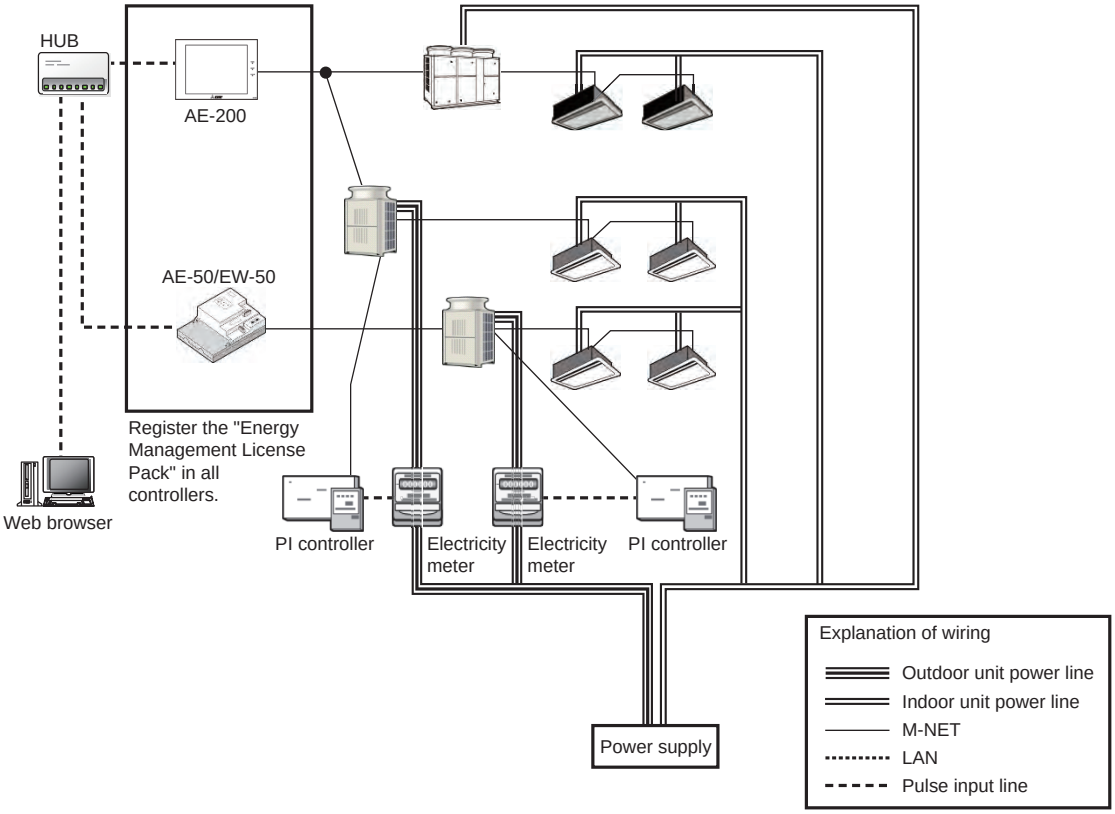
<3> System configuration for energy management function

The system configuration for the energy management function is explained.

<Outline of operation>

The outline of the operation in the following system configuration is described below.

1. AE-200/AE-50/EW-50 collects electric energy data from the PI controller.
2. AE-200 calculates the electric energy consumed by each outdoor unit every 30 minutes.
   The results of calculation are stored as data obtained every 5 minutes for 2 months, data obtained every 30 minutes for 2 months, daily data for 25 months, monthly data for 25 months and annual data for 5 years.
3. The calculation results are displayed in bar graphs on the energy use status and ranking screens of the energy management function of AE-200/AE-50/EW-50.
4. The calculation results can be checked on the LCD screen of AE-200 and Web browser screen of AE-200/AE-50/EW-50 and output to a CSV file.



<Points>

1. Obtain the electric energy data from the PI controller or the pulse input in AE-200/AE-50/EW-50 main unit.
2. Install an electricity meter for outdoor unit for each of AE-200/AE-50/EW-50.
   However, when the apportioned electricity billing function is used, electric energy can be apportioned also to AE-200/AE-50/EW-50 to which an electricity meter is not connected within AE-200 system.
3. The energy management function does not handle the electric energy consumed by the indoor units.
   However, when the apportioned electricity billing function is used, also the electric energy consumed by the indoor units is included.
4. In a system that includes both the HVRF series of City Multi units and other series of City Multi units, use at least one electricity meter for each series. Do not use a single electricity meter to measure the electricity use of both series of units.

[8] Wiring

<1> Kinds of wiring

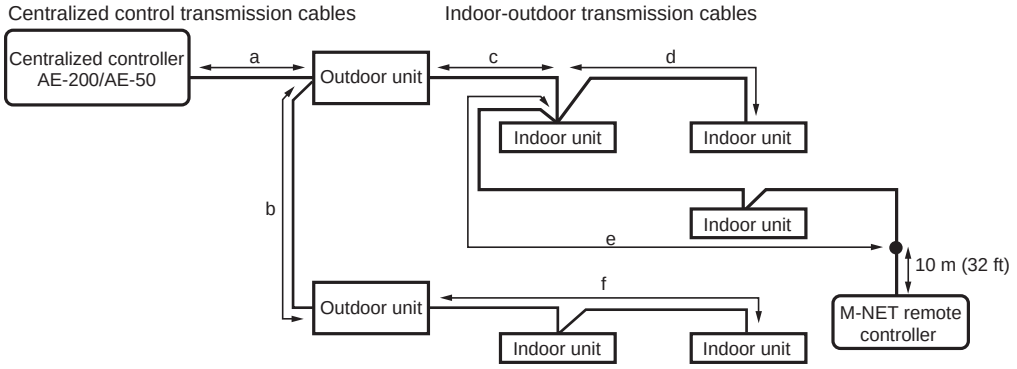
The M-NET transmission line, LAN cable and pulse input line shall conform to the following specifications.
For other wiring, see each manual.

Transmission cable	Type: Sheathed vinyl cable • CPEVS ø1.2 to ø1.6 mm • CVVS Min. 1.25 to 2 mm² *CPEVS: PE insulated PVC jacketed shielded communication cable *CVVS: PVC insulated PVC jacketed shielded control cable
LAN cable	Category 5 or above straight cable (Max. 100 m (328 ft))
Electrical wire for pulse input	Type: Copper wire that is suitable for the terminal block Size • Single wire: ø0.65 to ø1.2 mm, AWG 21 to 16 • Twisted wire: 0.75 to 1.25 mm², AWG 18 to 16

<2> M-NET transmission cable length

Observe the maximum total length of M-NET transmission cables to ensure proper signal transmission to and from the connected equipment over the M-NET transmission cables. If the maximum total length is exceeded, the M-NET signals will be attenuated, resulting in communication error and control failure.

- Maximum total length of M-NET transmission cables: 500 m (1640 ft)
- Maximum total length of power feed: 200 m (656 ft)



(1) Maximum total length of M-NET transmission cables
a + c + d (e) ≤ 500 m (1640 ft)
a + b + f ≤ 500 m (1640 ft)
d (e) + c + b + f ≤ 500 m (1640 ft)

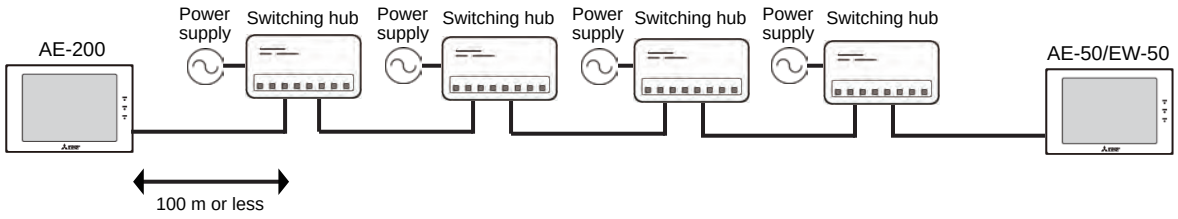
(2) Maximum total length of power feed for the indoor-outdoor transmission cables
f ≤ 200 m (656 ft)
c + d (e) ≤ 200 m (656 ft)

(3) Maximum total length of power feed for the centralized control transmission cables
a ≤ 200 m (656 ft)
a + b ≤ 200 m (656 ft)

<3> LAN cable length

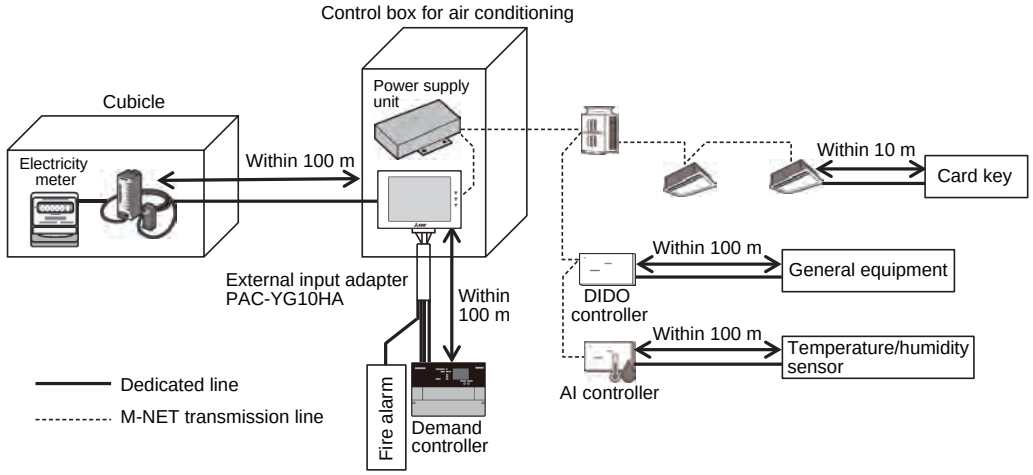
The maximum cable length of 100BASE-TX to be connected to AE-200/AE-50/EW-50 is 100 m.
If the LAN cable length exceeds 100 m, the distance between the personal computer for centralized control and AE-200 and between AE-200 and AE-50/EW-50 can be increased by using switching hubs.
Although the number of connected switching hubs is not restricted, if the network load is increased, a delay may occur, and the network may not be normally connected.

Note: The round-trip transmission delay time shall be within 4 seconds.
See the installation manual for AE-200/AE-50/EW-50 for the method for determining the transmission delay time.
Note: The maximum cable length varies depending on the LAN cable specification.



<4> Length of other lines

The external input/output contact signal lines of AE-200/AE-50/EW-50 and the free contact lines from indoor units shall be up to 10 m. However, do not lay these lines parallel to AC power lines, etc. to prevent entry of noise.



[9] Power supply factor for M-NET

<1> Power consumption factor and power supply factor

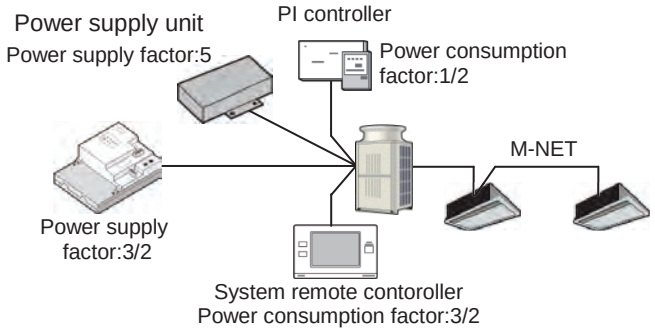
The power supply factors of AE-200, AE-50, EW-50 and power supply unit for transmission line and the power consumption factors of DIDO controller, PI controller and AI controller are shown below. When system controllers or remote controllers are not connected to the M-NET transmission line for centralized control, it is unnecessary to connect the power supply unit (PAC-SC51KUA).

Table Power supply and power consumption factor

Product name	Model name	Power consumption factor	Power supply factor
Centralized air conditioning control system	AE-200	0	0.75
Centralized air conditioning control system (expansion controller)	AE-50	0	0.75
Centralized air conditioning control system (Controller without LCD)	EW-50	0	1.5
Power supply unit for transmission line	PAC-SC51KUA	–	5
Transmission booster	PAC-SF46EPA	–	25
DIDO controller	PAC-YG66DCA	1/4	–
PI controller	PAC-YG60MCA	1/4	–
AI controller	PAC-YG63MCA	1/4	–
System remote controller	AT-50	3/2	–
ON/OFF remote controller	PAC-YT40ANRA	1	–
ME remote controller	PAR-U01MEDU PAR-U02MEDA	1/2	–
AHC ADAPTER	PAC-1F01AHC-J	1/2	–

Remarks

○ If the system remote controller or PI controller is connected to the transmission line for centralized control and the power consumption factor is larger than the power feeding capacity of AE-200, AE-50, and EW-50, it is necessary to use the power supply unit or transmission booster.



<2> Setting of power supply connector

The following table shows the necessity of the power supply unit and the setting of the power supply connector.

Table Necessity of power supply unit and setting of power supply connector (AE-200/AE-50)

	Power supply unit for transmission line	Power supply connector of AE-200	Power supply connector of outdoor unit
(1) Without other system controller	Unnecessary	With CN21 (Default)	All CN41 (Default)
(2) With other system controller (Sum of power consumption factors: 0.75 or less)	Unnecessary	With CN21 (Default)	All CN41 (Default)
(3) With other system controller (Sum of power consumption factors: more than 0.75)	Necessary	Without CN21 (Remove CN21.)	All CN41 (Default)
(4) With other system controller (connected to transmission line between indoor and outdoor units)	Unnecessary	With CN21 (Default)	All CN41 (Default)

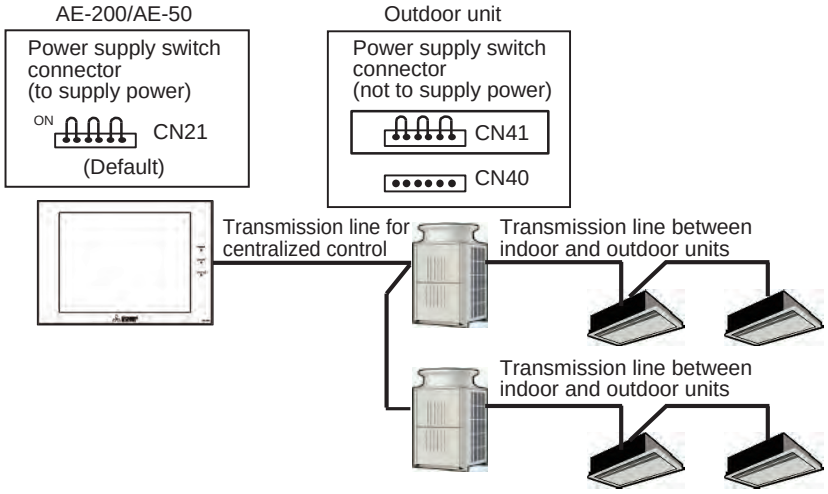
* Connect AE-200/AE-50 to the transmission line for centralized control.
* When the M-NET of AE-200 is not used, leave the power supply connector of AE-200 in the factory default state.

Table Necessity of power supply unit and setting of power supply connector (EW-50)

	Power supply unit for transmission line	Power supply connector of AE-200	Power supply connector of outdoor unit
(1) Without other system controller	Unnecessary	With CN21 (Default)	All CN41 (Default)
(2) With other system controller (Sum of power consumption factors: 1.5 or less)	Unnecessary	With CN21 (Default)	All CN41 (Default)
(3) With other system controller (Sum of power consumption factors: More than 1.5)	Necessary	Without CN21 (Remove CN21.)	All CN41 (Default)

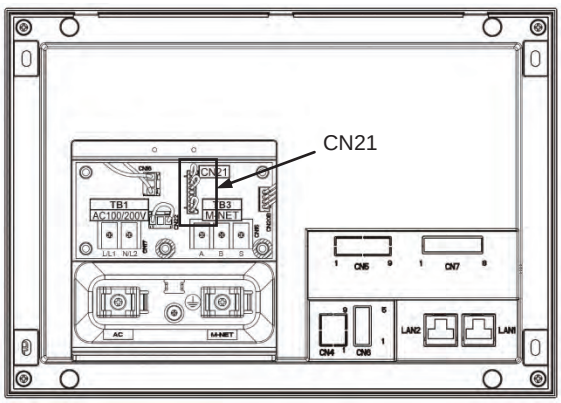
* Connect EW-50 to the transmission line for centralized control.

(1) Without other system controller

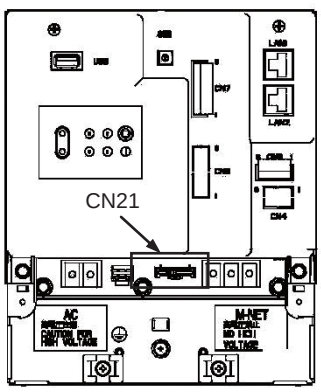


Remarks

○ To access the power supply connector (CN21) of AE-200/AE-50/EW-50, remove the service cover on the back of the main unit. It is in the position shown below.

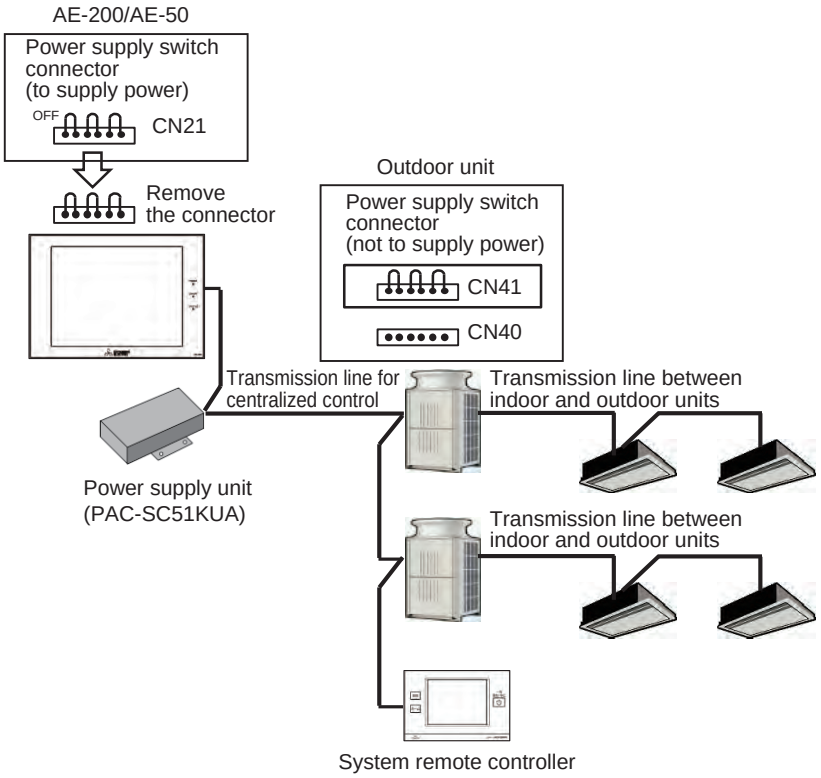


Back of AE-200/AE-50

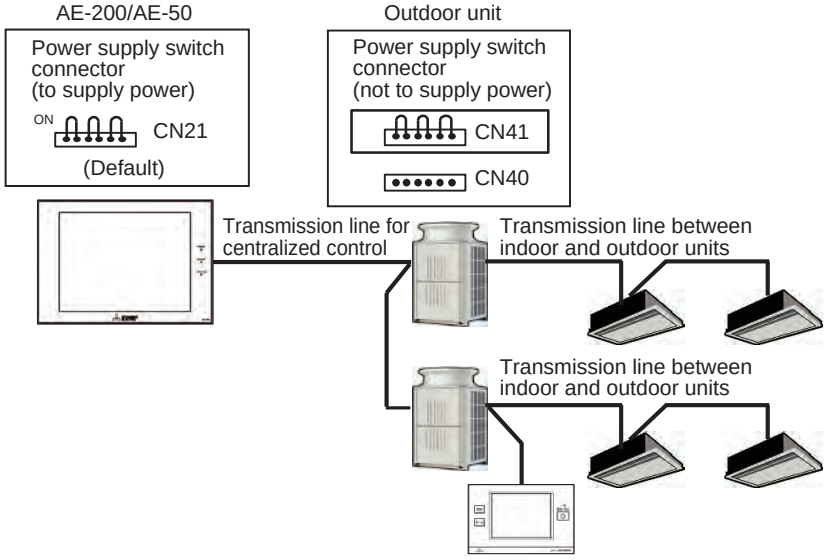


Back of EW-50

(2) With other system controller (connected to transmission line for centralized control)
The power supply unit (PAC-SC51KUA) is required.



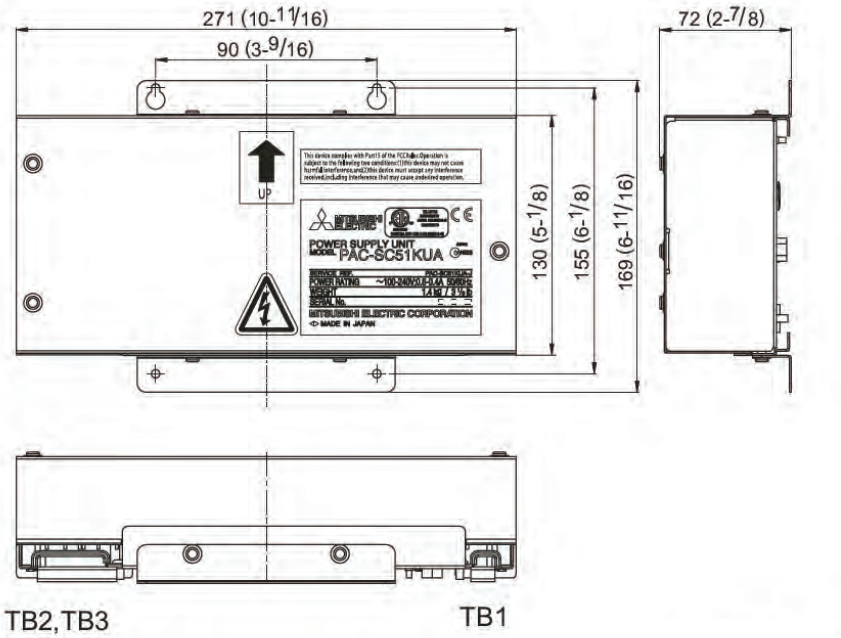
(3) With other system controller (connected to transmission line between indoor and outdoor units)



Note: When the power supply capacity for the outdoor units through the transmission line between indoor and outdoor units is insufficient, connect the transmission booster (PAC-SF46EPA) to the transmission line between indoor and outdoor units.

<3> Power supply unit for transmission line

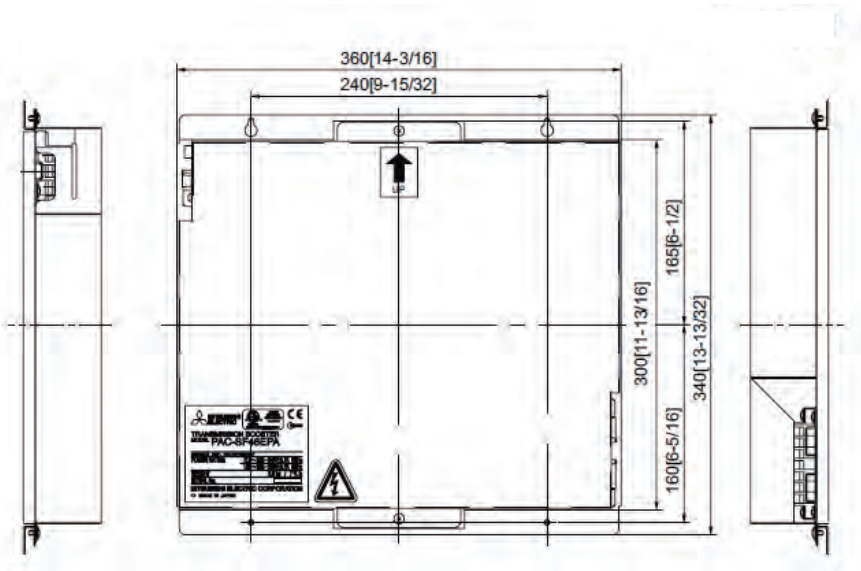
(1) Power supply unit for transmission line : PAC-SC51KUA



Unit: mm (in.)

Item	Specifications		
Electrical requirements	Rated input voltage and current	100-240 VAC ±10%; 0.8 A - 0.4 A 50/60 Hz Single-phase	
	Fuse: 250 VAC 6.3 A Time-delay type (IEC127-2 S.S.5)		
Output voltage/current	M-NET	23.0 - 32.0 VDC	
	DC power supply	24 VDC ±5% 0 - 0.75 A	
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.		
Power feeding capacity	5		

(2) Transmission booster: PAC-SF46EPA



Unit: mm (in.)

Item	Specifications		
Source power requirement	Input voltage 220-240 VAC; 0.7 A (Maximum loading) 50/60 Hz Single-phase		
	Fuse: 2.0 A F (IEC127-2)		
Voltage/current of output on the transmission booster side	28-30 VDC 1.7 A (Maximum loading)		
Environmental condition	Temperature	Operating range	0 to +40°C / +32 to +104°F
		Storage range	-20 to +60°C / -4 to +104°F
	Humidity	30-90%RH (No condensation)	
Dimensions	340 (H) × 360 (W) × 59.2 (D) mm		
Weight	3.5 kg (7.8 lbs.)		
Installation environment	Indoor		
Power feeding capacity	25		

[10] Restrictions on system when more than one model is connected

<1> Connection of two sets of AE-200/EW-50 and BM adapter

When two sets of AE-200/EW-50 are connected on the same M-NET line or AE-200/EW-50 and BM adapter are connected, there are restrictions on the functions and setting method.

(1) System configuration

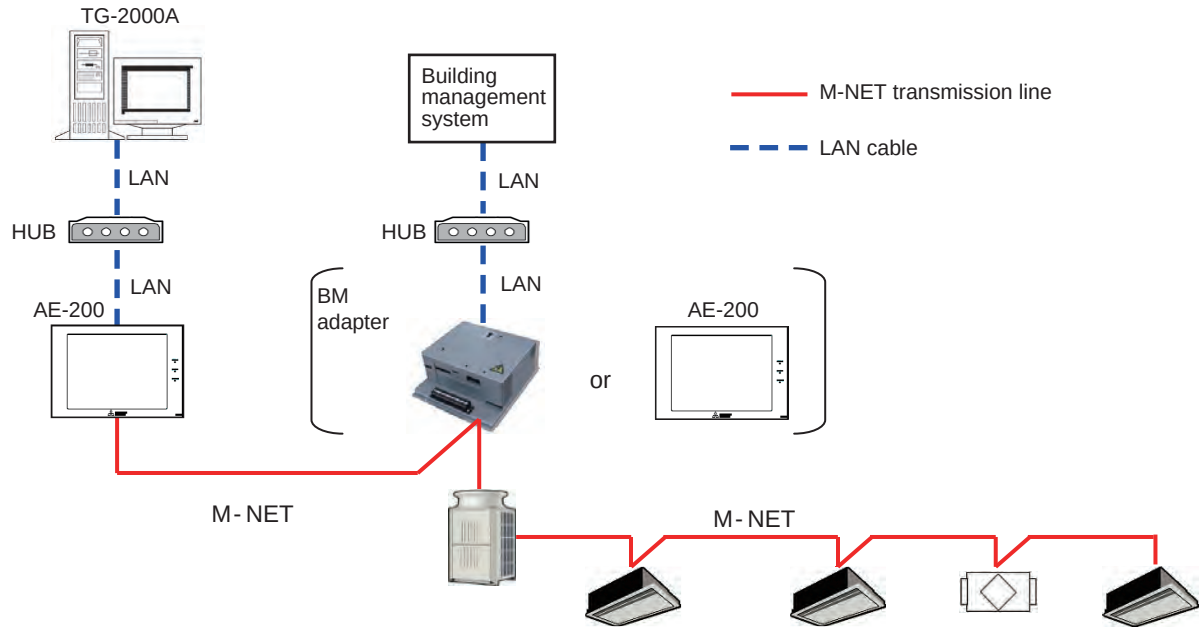
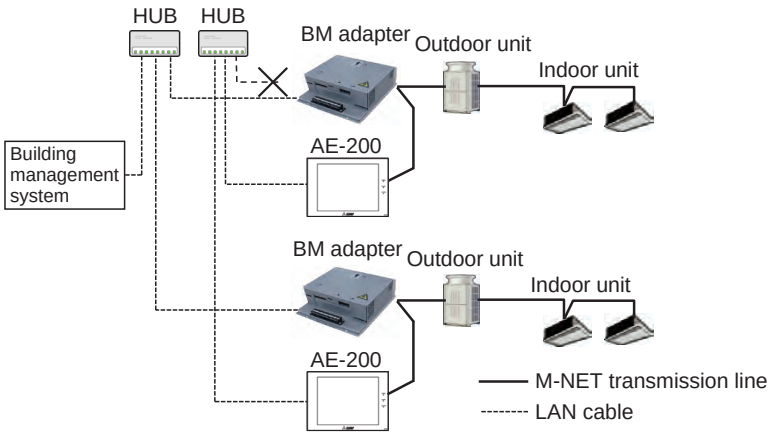


Fig. System configuration

Remarks

- ○ The BM adapter cannot be added with the expansion unit (PAC-YG50ECA).
- ○ One set of AE-200/EW-50 can be connected on one M-NET line. However, up to two sets can be connected with restrictions.
  Even when two sets are connected, the maximum number of indoor units which can be connected is 50.
- ○ One set of AE-200/EW-50 and one BM adapter can be connected on one M-NET line.
- ○ It is impossible to connect AE-200 and AE-50 on one M-NET line.
- ○ The BM adapter has a power supply factor of 6.
- ○ When supplying power through the BM adapter, install the M-NET power supply connector of the outdoor unit to CN41 (not to supply power), and remove the M-NET power supply connector (CN21) of AE-200 (not to supply power).
- ○ When two sets of AE-200 are installed on one M-NET line, install the M-NET power supply connector (CN21) only to one of them (factory default), and remove that from the other.
- ○ Determine the M-NET address taking care not to duplicate an address.
- ○ Both AE-200/EW-50 and BM adapter must be applicable to the models to be connected. For the models to which AE-200/EW-50 is applicable, see 2.-<3> “List of connectable models.”
  For the models to which the BM adapter can be connected, see the instruction manual for the BM adapter.
- ○ *When the BM adapter is connected, communication load increased by an increased number of broadcasts. Divide the LAN into two systems for the BM adapter and AE-200/EW-50.



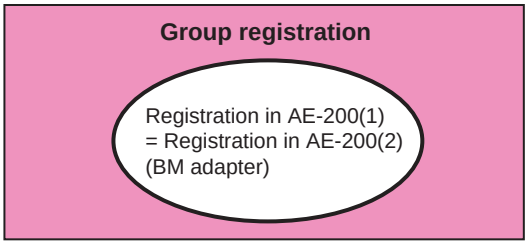
Note: The indication of the power supplies is omitted.

(2) Restrictions on connection of more than one controller

When two sets of AE-200 or one set of AE-200 and BM adapter are connected to M-NET, the contents of group registration in them must be identical.

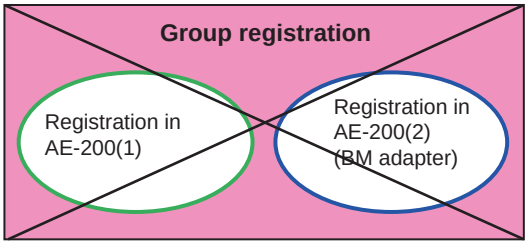
However, the DIDO controller, PI controller and AI controller must be registered only in AE-200 because the BM adapter is not applicable to them.

All in same group



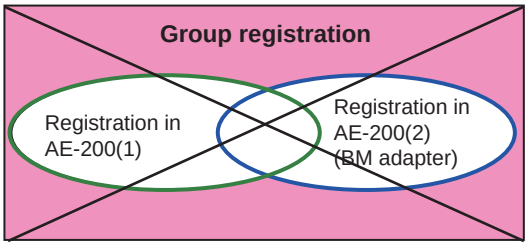
OK

All in different groups



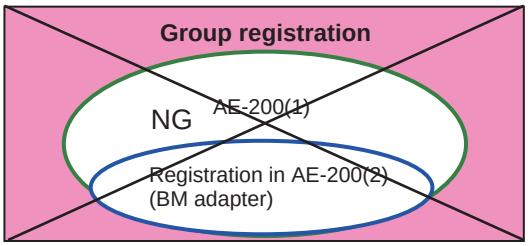
NG

Partially common



NG

AE-200(1) including all in AE-200(2) (BM adapter)



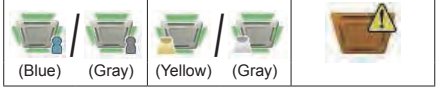
NG

The following table shows the restrictions on connection of more than one controller.

Table Restrictions on connection of more than one controller

	Operational restrictions ○: None △: Operational and setting restrictions imposed	Restrictions	Subject ✓: Applicable	
			AE-200	BM adapter
Language displayed on AE-200 screen	○	The language can be set for each set of AE-200.	✓	
Group setting	△	The contents of group registration in both controllers must be identical.	✓	✓
Group name	○	It is necessary to set for each set of AE-200.	✓	
Registration in block Block name	○	It is necessary to set for each set of AE-200.	✓	
Floor layout	○	It is necessary to set for each set of AE-200.	✓	
Operation of air conditioners	○		✓	✓
Operation of DIDO controller	○		✓	
Monitoring of air conditioners	○		✓	✓
Monitoring of DIDO controller	○		✓	
Monitoring (AI controller and PI controller)	△	One AI controller or PI controller can be monitored only by one set of AE-200.	✓	
Energy management	○		✓	
Operation prohibition (screen operation and external input)	△	Only one controller can be set to the operation prohibition mode. (While one controller is in the operation prohibition mode, the other controller can be used to operate the units. The operation prohibition mode is not displayed on the other controller.)	✓	✓
Emergency stop	△	Input the external contact to one controller.	✓	✓
External input (start/stop, level signal)	△	Input the external contact to one controller.	✓	
External input (pulse signal)	○		✓	
External output	○		✓	
Demand level contact input	△	The input can be connected and set only on one controller.	✓	
Time setting and display	△	Use one controller as the master for time setting.	✓	✓

Table Restrictions on connection of more than one controller (continued)

	Operational restrictions ○: None △: Operational and setting restrictions imposed	Restrictions	Subject ✓: Applicable	
			AE-200	BM adapter
Schedule	△	Set the schedule on one controller. (If schedules are set on some controllers (including a remote controller) for one group, priority will be given to the last schedule.)	✓	✓
Display of error history	○		✓	
Energy-saving/peak-cut Auto changeover	△	(1) Set the mode only on one controller. Register the license only for the controller for which the mode must be set. (2) When a unit in the energy-saving/peak-cut control mode is operated from another controller, priority will be given to the last operation. (3) In the energy-saving/peak-cut mode, the energy-saving control icon is displayed only on the controller on which the mode was set.	✓	
Setback Outdoor temperature interlock Interlock control	△	(1) Set the mode only on one controller. Register the license only for the controller for which the mode must be set. (2) The setback control icon is displayed only on the controller on which the mode was set.	✓	
Connection of TG-2000A and apportioned electricity billing function	△	Connect TG-2000A to one set of AE-200. Communication errors of AE-200 not connected to TG-2000A will not be displayed on it.	✓	
Display of icons on AE-200	△	Displayed only on specified AE-200 With schedule / Schedule invalid / Energy-saving ON*1 / Night setback mode  *1: The icon of energy-saving function by outdoor unit is displayed on all sets of AE-200. During demand control by external input to indoor unit, the icon is displayed on all sets of AE-200. Displayed on all sets of AE-200 During operation of interlocked LOSSNAY / During stop of interlocked LOSSNAY / Display of room temperature*2  (Gray) Occupied/Vacant*2 / Bright/dark*2 / Error  (Blue) (Gray) (Yellow) (Gray) *2: These icons are displayed or not displayed depending on the setting. Displayed on AE-200 being started Starting up 	✓	

(3) Setting procedure

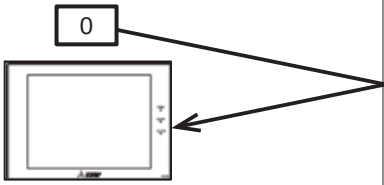
When two sets of AE-200 are connected, it is necessary to register each M-NET address in the system controller registration button on the other side.

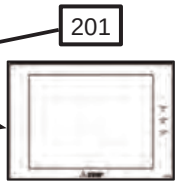
When the BM adapter is connected, register the address of the BM adapter in the system controller registration button on AE-200.

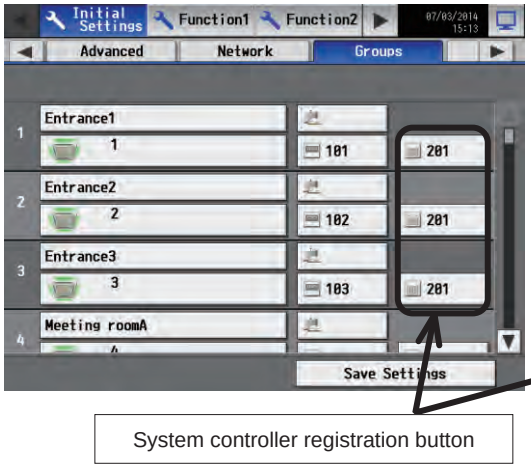
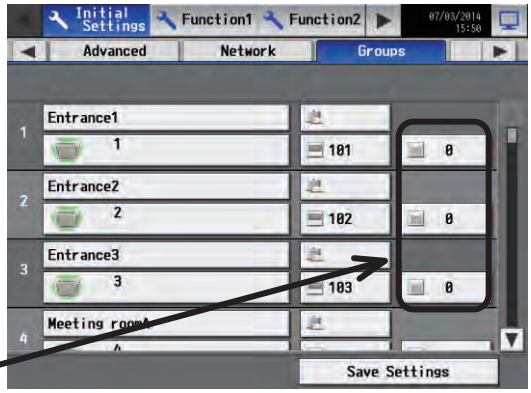
For the procedure for registering the BM adapter, see the instruction manual for the BM adapter.

Select [Initial Setting] – [Group Setting], and input the address of the other controller in the system controller registration button.

[Example] Registration of AE-200 (1) (M-NET address 0) and AE-200 (2) (M-NET address 201)

<table>
<tr><td>Address</td><td>M-NET address of AE-200 (1)
 

Register the M-NET address of the other.</td><td>M-NET address of AE-200 (2)
 

Register the M-NET address of the other.</td></tr>
<tr><td>Operation</td><td>Register the address of AE-200 (2), 201, in the system controller registration button.
 
</td><td>Register the address of AE-200 (1), 0, in the system controller registration button.
 
</td></tr>
<tr><td>Caution</td><td colspan="2">It is necessary to register the addresses in the system controller registration buttons for all registered group numbers.</td></tr>
</table>

● It is necessary to register the addresses in the system controller registration buttons for all registered group numbers. If the addresses are not registered, the air conditioners will stop when the power supply is reset.

Remarks

○ For the procedure for setting the address on the BM adapter, see the instruction manual for the BM adapter.

<2> Possibility of connection

The following table shows whether or not AE-200/AE-50 can be connected with AG-150 and whether or not AE-200 and AE-50 can be connected in each case of combination.

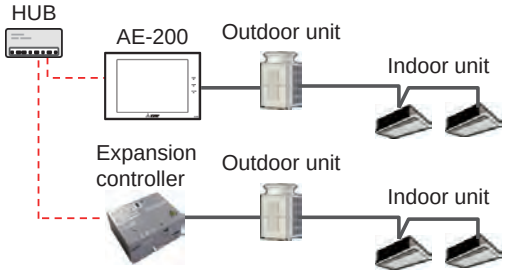
Note: The indication of the power supplies is omitted.

(1) Connection of AG-150 and expansion controller (PAC-YG50ECA)

<table>
<tr>
<td>

✕

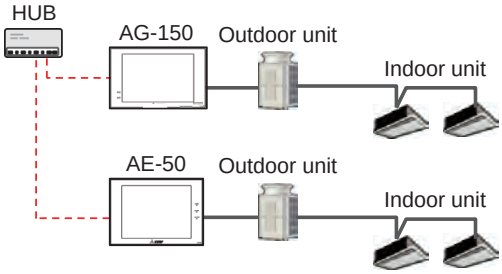
The expansion controller (PAC-YG50ECA) cannot be connected for expansion of AE-200.



</td>
<td>

✕

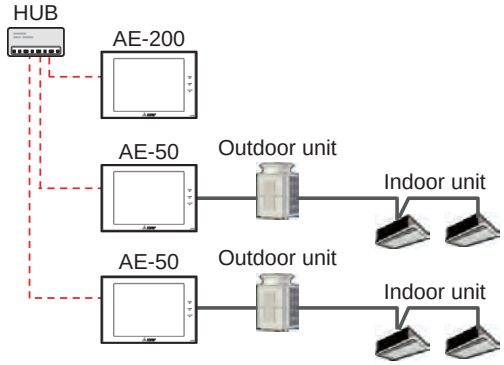
AE-50 cannot be connected for expansion of AG-150.



</td>
</tr>
<tr>
<td colspan="2">(2) Other connection methods</td>
</tr>
<tr>
<td>

○

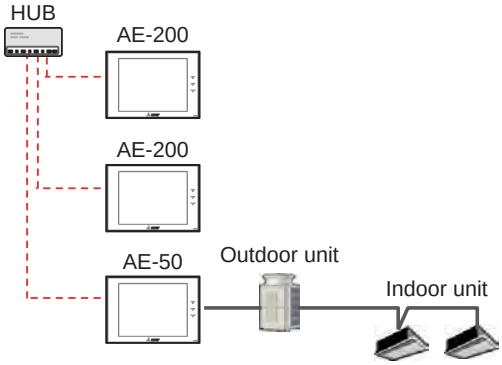
It is possible to monitor and operate the units from AE-50 not connected to AE-200 through M-NET.



</td>
<td>

○

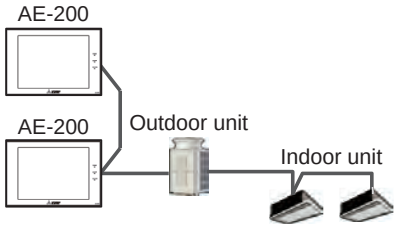
It is possible to operate and monitor the units on the AE-50 system from more than one set of AE-200. (only Ver. 7.20 and later)



</td>
</tr>
<tr>
<td>

△

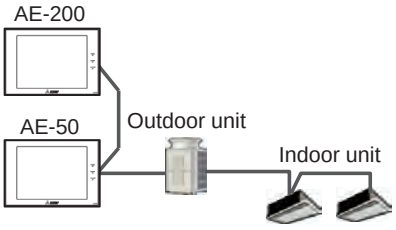
It is possible to connect more than one set of AE-200 on the same M-NET line. However, some restrictions are imposed on this connection. See [9]-<1> “Connection of two sets of AE-200/EW-50 and BM adapter.”



</td>
<td>

✕

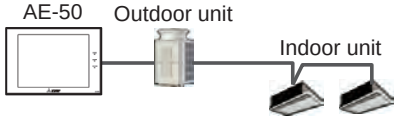
It is impossible to connect AE-200 and AE-50 on the same M-NET line.



</td>
</tr>
<tr>
<td>

✕

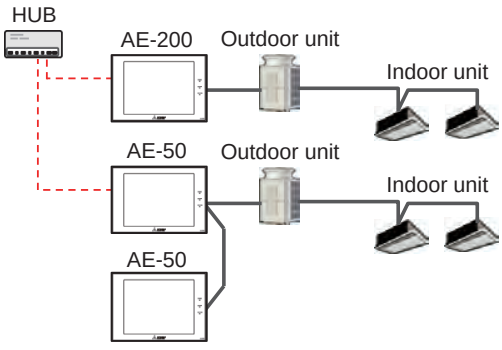
A system cannot be configured only with AE-50.



</td>
<td>

✕

It is impossible to connect more than one set of AE-50 on the same M-NET line.



</td>
</tr>
</table>

[11] Pulse input for measurement

<1> Functions that can use pulse input for measurement

The electric energy data collected by using the pulse input can be used by the apportioned electricity billing function and the energy management function.

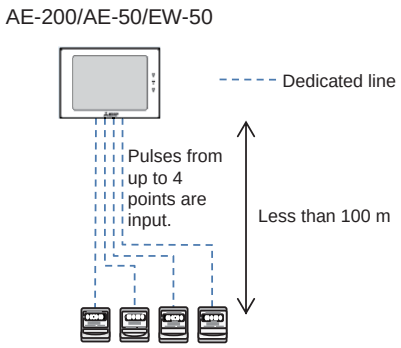
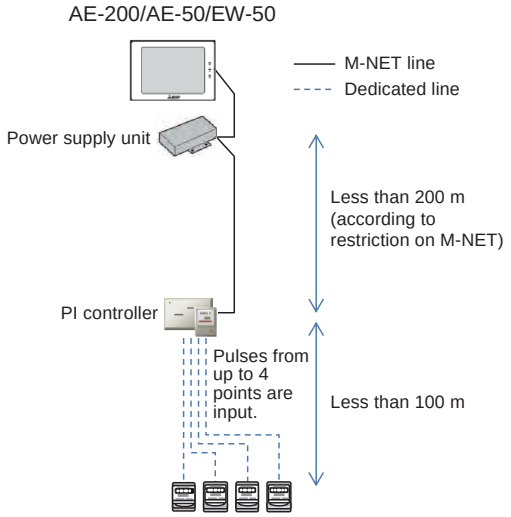
Notes: ○: Usable △: Restricted ×: Unusable

Function	AE-200	AE-50	EW-50
Apportioned electricity billing function	× *1	△ *2	△ *2
Energy management function	○	○	○
Peak-cut function	○	○	○

*1: The pulse input of AE-200 cannot be used for the apportioned electricity billing function. Use the pulse input of AE-50 or EW-50.
*2: When the apportioned electricity billing function is used, it is recommended to use the electric energy measurement by the PI controller. If the pulse input is used, pulse input cannot be obtained during power interruption in AE-50/EW-50, power shutdown and software updating, and the measured electric energy may be different from the actual value.

<2> Capturing pulses from electricity meter

The pulses from the electricity meter can be captured into AE-200/AE-50/EW-50 by inputting electric energy pulses directly to AE-200/AE-50/EW-50 (pulse input for measurement) and inputting electric energy pulses to the PI controller.

	Pulse input method	PI controller method
Connection diagram		
Peak-cut	Electric energy data is captured from the pulse input, and peak-cut control is performed. The demand is forecast at 1-minute intervals.	Since AE-200/AE-50/EW-50 receives electric energy data from the PI controller every minute, a delay of up to 1 minute will occur in execution of the peak-cut control.
Connected devices	Connect the devices directly to CN7.	PI controller The PI controller and power supply unit may be required. For the necessity of the power supply unit, see [8] “Power supply factor for M-NET.”
Wiring length	The distance between AE-200/AE-50/EW-50 and the electricity meter must be less than 100 m.	The distance between the power supply unit and AE-200/AE-50/EW-50 or PI controller must be less than 200 m. The distance between the PI controller and electricity meter must be less than 100 m.

Remarks

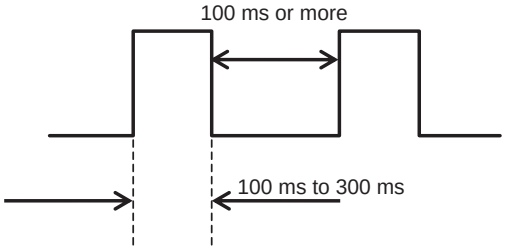
○ Up to 15 PI controllers can be connected to each of AE-200, AE-50 and EW-50.
In the AE-200 system, up to 20 PI controllers can be connected.
However, when the pulse input function in AE-200/AE-50/EW-50 main unit is used, the function is counted as one PI controller.

[Example] When one set of AE-200 and three sets of EW-50 are used in a system and the pulse input of each of AE-200 and EW-50 is used, 14 PI controllers (15 – 1) can be connected to each of AE-200 and EW-50, and the total number of PI controllers which can be connected in the AE-200 system is 16 (20 – 4).

<3> Electricity meter used for pulse input

For the pulse input, select an electricity meter which meets the following specifications.

- No-voltage a contact pulse is output every pulse unit.
- Output pulse method: Semiconductor relay
- Pulse width: 100 ms to 300 ms (pause period 100 ms or more)
- Output pulse unit: 0.1/1.0/10/100 [kWh/pulse] (1.0 kWh/pulse or less recommended)



[12] LAN system configuration

<1> LAN setting procedures

<1-1> Setting procedures to connect to dedicated LAN

The setting procedures for configuration of AE-200/AE-50/EW-50 system through the dedicated LAN wiring are shown below.

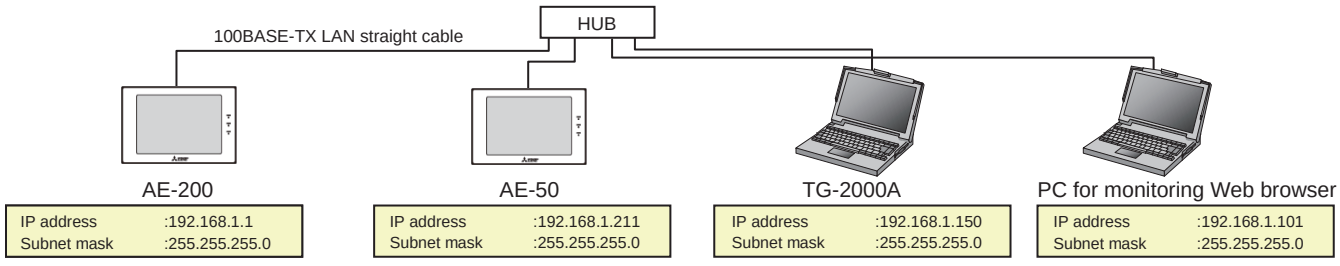
(1) Set the IP addresses.

When LAN wiring is newly laid for AE-200/AE-50/EW-50, assign the IP addresses to AE-200 starting from [192.168.1.1].
Set the IP addresses of the Web monitoring PCs for AE-200/AE-50/EW-50 and the Initial Setting Tool to the network addresses of the same line.
The IP address initial value of AE-200/AE-50/EW-50 is [192.168.1.1]. For the second and following units, the IP addresses must be changed.
The recommended ranges for dedicated LAN are shown below.

Model	IP address setting range
AE-200	[192.168.1.1] to [192.168.1.40]
EW-50 (used as single unit)	[192.168.1.1] to [192.168.1.40]
EW-50/AE-50 (used as expansion controller)	[192.168.1.211] to [192.168.1.250]
Personal computer for monitoring Web browser	[192.168.1.101] to [192.168.1.149]
Personal computer for integrated software (TG-2000A)	[192.168.1.150]
PLC	[192.168.1.151] to [192.168.1.200] For pulse count: [192.168.1.151] to [192.168.1.155] For general control: [192.168.1.171] to [192.168.1.190] Peak-cut: [192.168.1.191] to [192.168.1.194] (Demand controller method)

(2) Set the sub-net mask.

Normally, set to [255.255.255.0] (initial value).



* Some hubs have dedicated ports for connection between hubs.
Connect AE-200/AE-50/EW-50 and the personal computer for monitoring Web browser to the normal ports.

Remarks

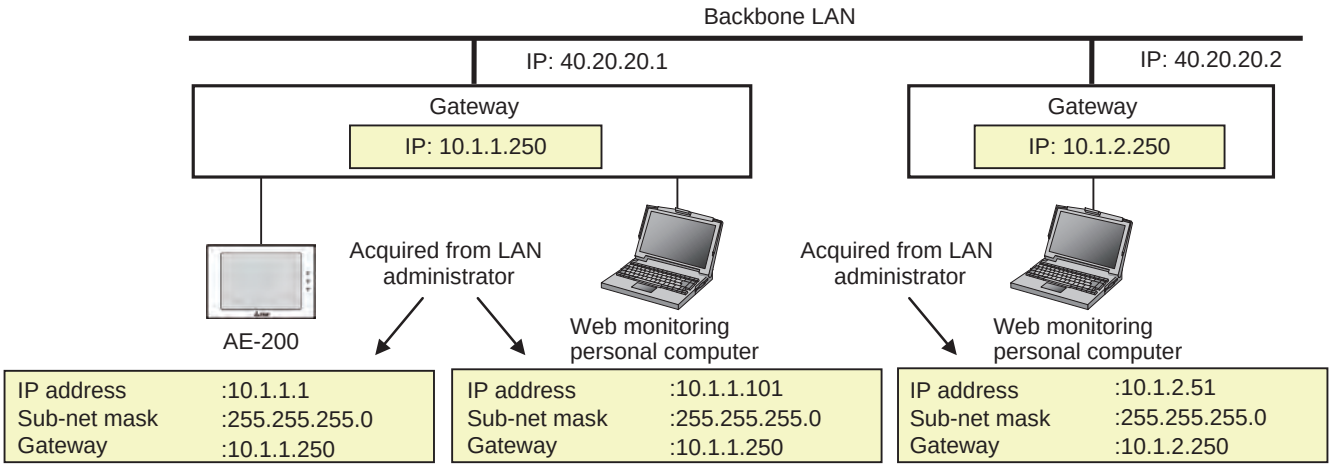
○ When AE-200/AE-50/EW-50 is connected directly with a personal computer through a LAN cable, normal communication may not be made depending on the compatibility with the LAN board.
It is recommended to connect AE-200 and personal computer with a LAN cable through a hub.

<1-2> Setting procedures to connect to existing LAN

The setting procedures for configuration of AE-200/AE-50/EW-50 system through existing LAN wiring are shown below.

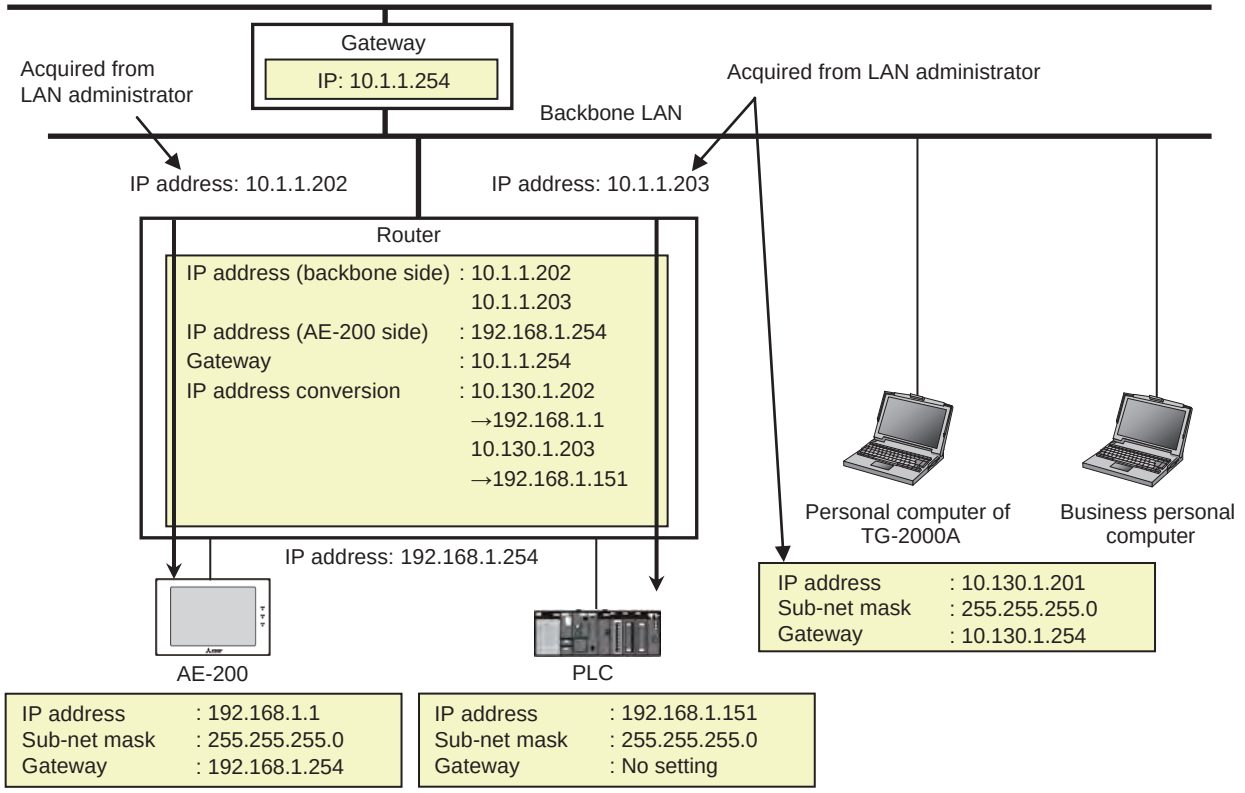
(1) In the case of centralized monitoring by Web browser

When installing AE-200/AE-50/EW-50 in existing LAN wiring, such as a corporate LAN, consult with the network administrator who manages the LAN to set the IP addresses, sub-net mask and gateway address.
The gateway address can be set with the Initial Setting Tool or on the initial setting screen on the Web.

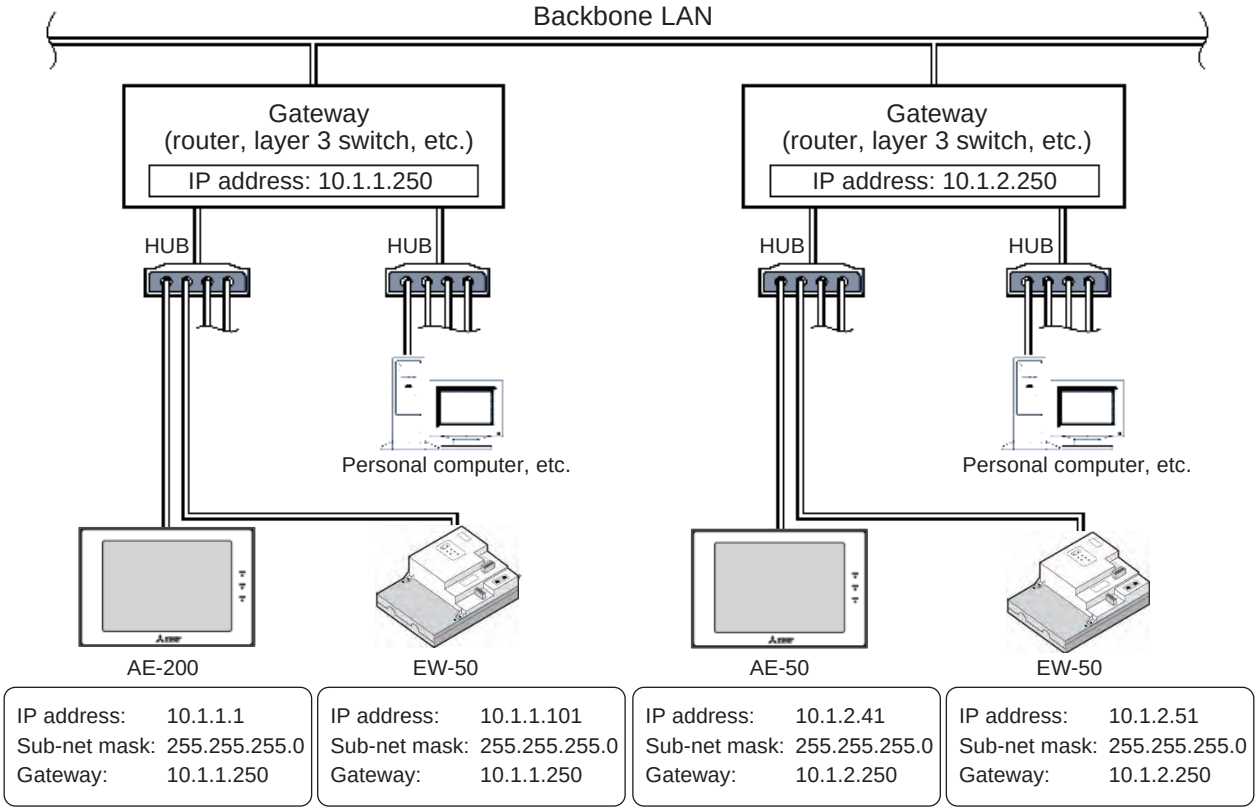


(2) In the case of centralized monitoring by TG-2000A

When TG-2000A is used for centralized monitoring, apportioned electricity billing function or peak-cut function, it is recommended to separate the system by using a router.
This is a means to maintain the reliability of each device because a lot of signals are transmitted on the LAN under an environment where many business personal computers are installed in the existing LAN.
Assign IP addresses appropriate to the IP address format on the backbone LAN to AE-200/AE-50/EW-50, and access any of them with the address. Then, the router will convert the address to make communication.
The router address (default gateway address) must be registered as the gateway address in AE-200/AE-50/EW-50 installed under the router.



(3) In the case of centralized monitoring by connection of AE-200 and expansion controllers
When expansion controllers (AE-50/EW-50) are connected to the existing LAN, consult with the network administrator to set the IP addresses, sub-net mask and gateway address.

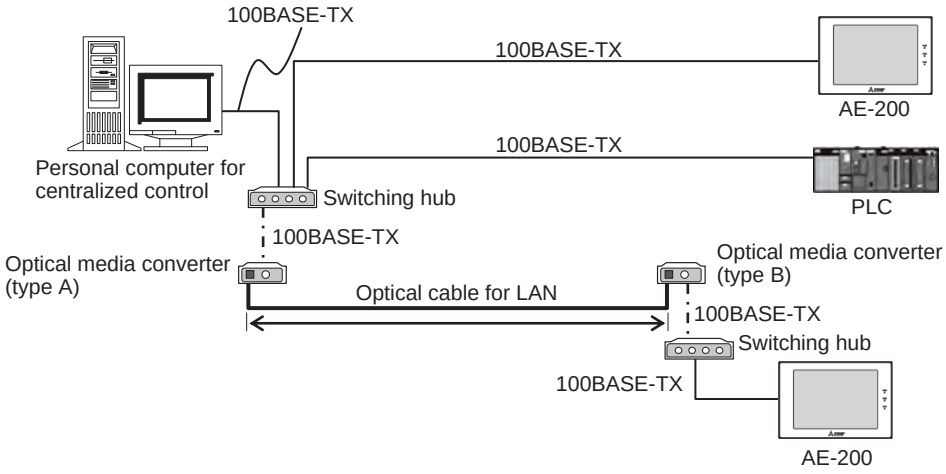


Remarks

- ○ Use switching hubs.
- ○ The number of stages of gateways, routers, layer 3 switches and hubs for connecting AE-200 and expansion controller must be 4 or less. The round-trip transmission delay time between AE-200 and expansion controller must be 4 seconds or less.

<1-3> In the case of system using optical cable for LAN

The LAN wiring length of AE-200/AE-50/EW-50 system can be increased by connecting hubs.
However, if the wiring length is increased to several kilometers and the power supplies for the hubs cannot be secured in the middle of the wiring, they can be connected by using an optical cable.



(1) Switching hub
The switching hub is designed to store the IP address of the device connected to the hub and hold the route to the destination. Therefore, signal collision does not occur theoretically, and the number of stages is not restricted.

(2) Optical media converter
This converter is used to convert normal LAN signals to optical signals.
The recommended optical media converters made by Buffalo come in Type A and Type B. They must be used in pairs.

(3) Optical cable for LAN
This cable is an optical cable for LAN.
A system with a long wiring length can be configured by using this cable.

<2> Recommended devices for LAN connection

The recommended devices for LAN connection are shown below.

Device name		Remarks
Hub: Select a hub having the number of ports appropriate to the number of connected units, and connect AE-200/AE-50/EW-50 and the personal computer through the hub.		
	Hub for 100BASE-TX (for 5 ports)	Switching hub (100BASE-T with automatic switching function)
	Hub for 100BATSE-TX (for 8 ports)	Switching hub (100BASE-T with automatic switching function)
LAN cable: Connect the hub, AE-200/AE-50/EW-50 and personal computer with a LAN cable.		
	100BASE-TX	Use a cable of Category 5 or higher.
	LAN straight cable for 100BASE-TX (twisted pair cable)	Use to connect an optical cable. * Cables of Categories 5, 6 and 6e can be used.
Router: Add routers when connecting to a high-traffic corporate LAN or connecting to a network with a different network address.		
	Router	Use a router when connecting a PLC to an existing LAN, such as a corporate LAN. Install AE-200/AE-50/EW-50 and demand input PLC on the same line.
Devices related to optical cable connection: Recommended devices for connection through optical cable		
	Optical media converter (Type A)	Use Type A and Type B in pairs.
	Optical media converter (Type B)	↑
	Optical cable for LAN	Use a single-mode or multi-mode cable.
	Switching hub (for 8 ports)	Connect with the optical media converter through a LAN cable, and connect AE-200/AE-50/EW-50 and personal computer to other ports.
	LAN cable (twisted pair cable)	To connect to the optical media converters, use LAN cables of Category 5 to 6e conforming to 100BASE-TX.

<3> Number of devices connected to LAN

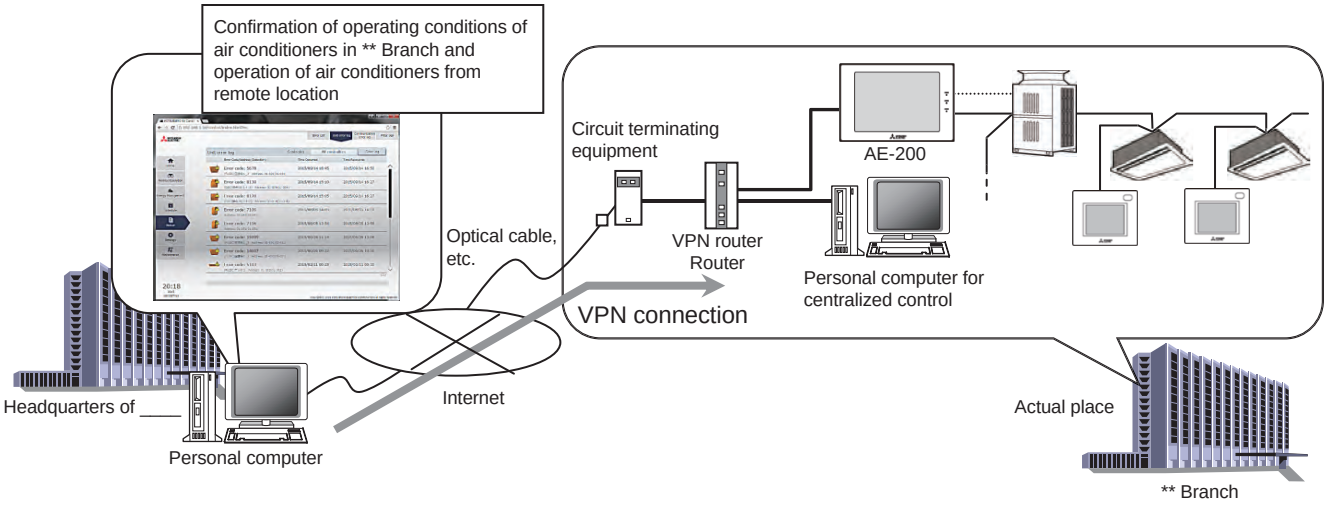
The devices which can be connected to the LAN in the AE-200 system and the number of connected devices are shown in the following table.

Connected device	Max. number of connected devices *3	Remarks
Integrated Centralized Control Web (Building manager)	A maximum of 50 PCs, tablet PCs, and smart phones can be connected.	Up to 50 sets can be connected in AE-200 system. [Example] ● AE-200: 1 set ● AE-50: 1 set ● EW-50: 1 set ● TG-2000A: 1 set
Integrated Centralized Control Web (Tenant manager)		
Integrated Centralized Control Web (General user)		
Web browser for administrator	Up to 10 sets of each of AE-200, AE-50 and EW-50	
Web browser for general users	Up to 10 sets of each of AE-200, AE-50 and EW-50	
TG-2000A	Up to 1 set in whole system	
Demand input PLC *1	Up to 1 set of each of AE-200, AE-50 and EW-50	
Electric energy counting PLC *2	Up to 1 set of each of AE-200, AE-50 and EW-50	
Maintenance Tool	Up to 1 set of each of AE-200, AE-50 and EW-50	
Other systems	Up to 1 set of each of AE-200, AE-50 and EW-50	

*1: One set of demand input PLC can communicate with 10 sets of AE-200/AE-50/EW-50.
*2: One set of electric energy counting PLC can communicate with 14 sets of AE-200/AE-50/EW-50.
*3: Including the number of sets of AE-200/AE-50/EW-50

<4> Setting for remote monitoring function

The system can be monitored for abnormalities and operated through the Internet from a remote location by using the VPN router.
The following devices are required for remote monitoring through the Internet.
When the VPN router is used, the operator at the remote location can operate the system only by implementing the standard Windows VPN connection after connecting to the Internet as if he/she directly accessed the LAN in the actual place.



Device name	Remarks
VPN router	Router applicable to VPN connection A private network equivalent to LAN can be established on the Internet by using this router. * Some routers require the VPN connection software for the personal computer at the remote location.
Circuit terminating equipment	Use the equipment designated by the carrier. * ADSL, optical fiber lines and cable TV lines can be used. When any of these lines is used, use the equipment designated by the carrier.
Hub for 100BASE-T	The hub is required when the number of connected sets of AE-200/AE-50/EW-50 and personal computers exceeds the number of hub ports in the VPN router or when the wiring length is extended.
100BASE-T LAN straight cable	Use a cable of Category 5 to 6e conforming to 100BASE-TX.

Remarks

○ When connecting AE-200/AE-50/EW-50 and TG-2000A through the Internet, do not connect them directly to the Internet. Connect them through a router with VPN function, and ensure the security. If the security is not ensured, the system may be tampered or the air conditioners may be operated without permission through the Internet.

Contract name	Remarks
Internet connection contract	An internet connection contract must be made in both actual and remote places. In the actual place, make a contract with a carrier of ADSL, optical fiber line or cable TV line which can be constantly connected.
Global IP address contract or DDNS (dynamic DNS) contract	To identify the VPN router on the Internet, the user in the actual place must make a contract for fixed IP address or fixed URL (when DDNS is used). One fixed IP address or fixed URL is required for one VPN router (some sets of AE-200/AE-50/EW-50 can be connected under the VPN router). The fixed IP address service is provided by providers (Internet providers), and the DDNS service is provided by router manufacturers or providers. Generally, the DDNS service requires a lower cost. For the details of the contract, consult each provider.

Remarks

- ○ The system configuration is based on the specifications for use in the private network.
  If the system is connected to the Internet, do not disclose AE-200/AE-50/EW-50 directly to the Internet to prevent tampering on the Internet. Connect the system through a router with the VPN function to ensure the security.
- ○ For the procedures for setting and connecting the VPN router, see the instruction manual for the router.

(1) Setting procedures in actual place

(1-1) Set the VPN router.

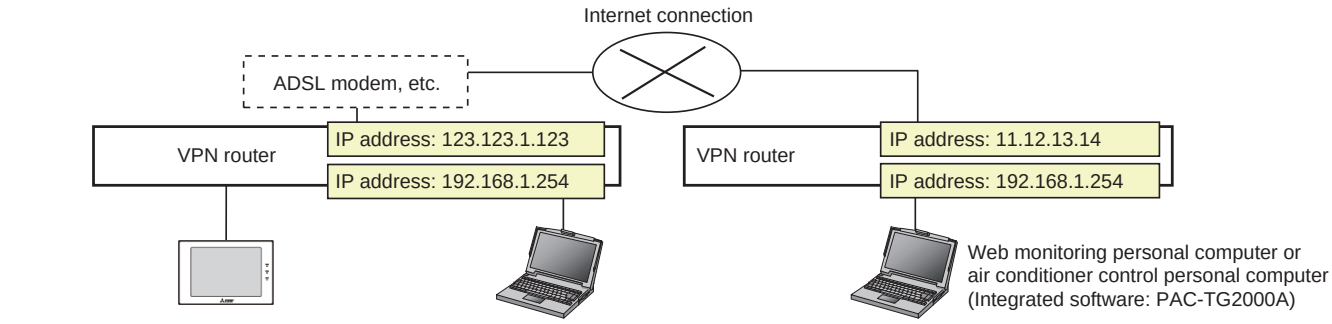
Assign a fixed IP address or a fixed URL to the VPN router, and set the router to connect the Internet (WAN side) to the LAN side.

It is recommended to set the IP address of the VPN router on the LAN side to [192.168.1.254] and the IP address of the personal computer at the remote location to [192.168.1.210].

(1-2) Set the network of AE-200/AE-50/EW-50.

Set the IP addresses, sub-net mask and gateway address of AE-200/AE-50/EW-50 with the Initial Setting Tool or on the initial setting screen on the Web.

As the gateway address, set the IP address of the VPN router.



IP address	: 192.168.1.1
Sub-net mask	: 255.255.255.0
Gateway	: 192.168.1.254

IP address	: 192.168.1.101
Sub-net mask	: 255.255.255.0
Gateway	: No setting

For VPN connection, it is recommended to assign the IP address [192.168.1.210] to the router or modem at the remote location.

* It is recommended to set the IP address on the LAN side of the VPN router to [192.168.1.254]. For the IP address setting method, read the instruction manual for the VPN router.
* When the VPN router is used, it is necessary to connect a modem (designated by the carrier) between the VPN router and the Internet network.

(2) Setting procedures at remote location

(2-1) VPN connection setting

Create a new VPN connection in Network setting in the Control Panel, and set the fixed URL (host name) or fixed IP address of the VPN router in the actual place to enable connection with the VPN router.

For the details of setting for VPN connection, see the instruction manual for each VPN router.

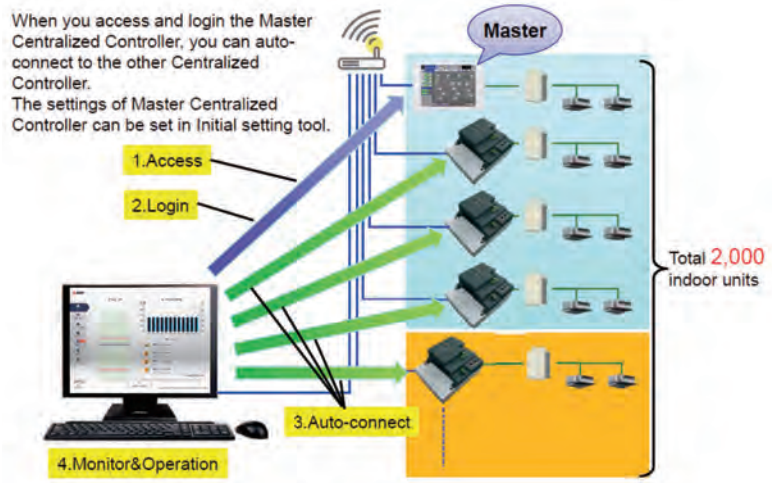
(2-2) Monitoring operation from the Web browser

To monitor operation from the Web browser, connect the monitoring PC to the Internet, click the VPN connection setting that was created in section (2-1) to connect to the Web page of AE-200/AE-50/EW-50 in the same way as with monitoring operation within the building.

Note: Integrated Centralized Control Web integrally displays information about the air-conditioning units connected to all AE-200, AE-50, and EW-50 on the Web browser, using the port number 80 and IP addresses assigned to each unit from AE-200, AE-50, and EW-50.
For this reason, connection method such as NAT or IP masquerade, which converts IP addresses on the router side.

Communication method used by the Integrated Centralized Control Web

1. Integrated Centralized Control Web accesses master AE-200 or EW-50 controller that was selected by using the Initial Setting Tool.
2. Master AE-200 or EW-50 returns the IP addresses of AE-200, AE-50, and EW-50 that were selected as control target from the Initial Setting Tool to the Integrated Centralized Control Web.
3. Integrated Centralized Control Web connects to AE-200, AE-50, and EW-50, using the returned IP addresses.



Reason why the communication method above cannot be used

① Client PC accesses master AE.
http://166.155.14.168/control/index.html

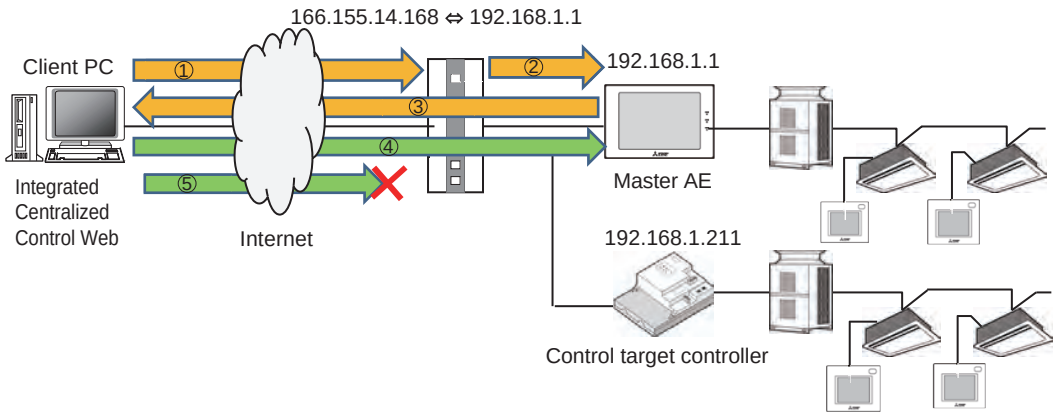
② Master AE is accessed using converted IP address (166.155.14.168 ⇔ 192.168.1.1 Port number 80[*1]).

③ Master AE sends the IP address (192.168.1.211) of the control target to the client PC.

④ Information on air-conditioning units connected to the master AE is acquired.

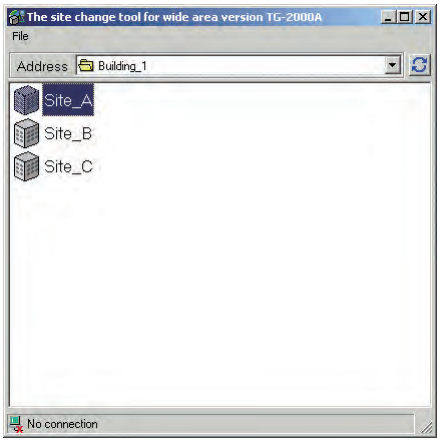
⑤ Request to acquire information on the air-conditioning units will be attempted, using the IP address (192.168.1.211) acquired in Step ③ above. This attempt will result in a connection error because the address 192.168.1.211 does not exist on the client PC network.

*1 When the port number other than 80 is used, master AE cannot be accessed and the connection ② above cannot be established. In this case, an error message of the browser will be displayed.

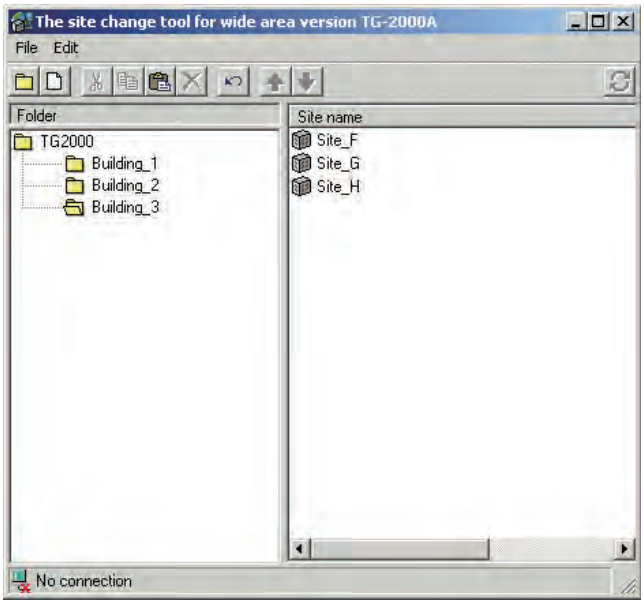


(2-3) Monitoring by TG-2000A in wide-area mode

To remotely monitor the systems in some buildings by TG-2000A, install TG-2000A in the wide-area mode.
When TG-2000A in the wide-area mode is started, the site switching screen will appear. Click the building to be connected to connect it. After this, it can be monitored in the same manner as when TG-2000A in the normal mode is used.



Trouble information of each building can be obtained by e-mail and displayed on the screen (the information can be obtained and displayed also by the standard mode version).
First of all, click the mail tool icon on the desktop to start it, and set the conditions related to mail. After the completion of setting, when an error notification e-mail is received, the building name and error code will be displayed as shown right.



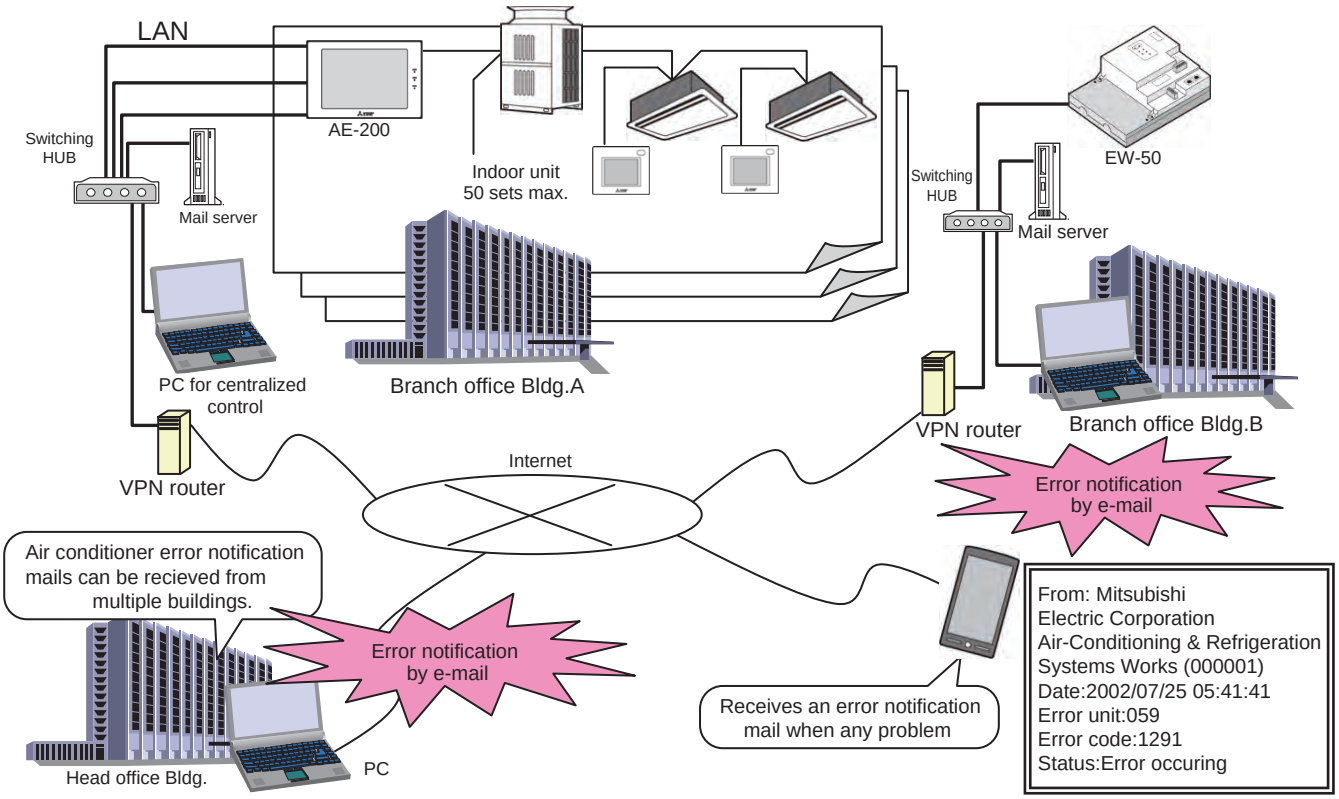
Remarks

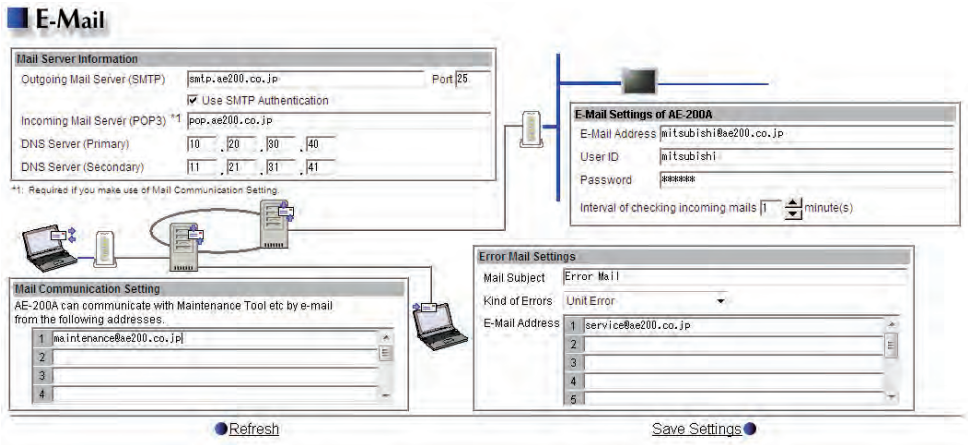
- When the e-mail tool of TG-2000A in the wide-area mode is used, set the error notification e-mail conditions for AE-200/AE-50 in the actual place as shown in the following section.
- When TG-2000A in the wide-area mode is used, the VPN connection name set on the OS must be less than 20 characters long.
- To receive error notification e-mails from a destination other than the VPN connection destination (through a LAN adapter not connected to the VPN), uncheck “Use default gateway on remote network” under TCP/IP settings in Dial-up connection.

<5> Issue of error notification e-mail

If e-mail server information is obtained by connecting to the corporate LAN or establishing an account with an Internet service provider and registering the information in AE-200/AE-50/EW-50, an error code can be issued to the designated e-mail addresses when a trouble occurs.
If information on occurrence of trouble is transmitted to the mobile phone of a serviceperson, prompt measures can be taken against air conditioner trouble. Set the e-mail server information on the e-mail setting screen of the initial setting Web browser of AE-200/AE-50/EW-50.

Applicable equipment	Error types	Notes
Air conditioner	Communication/abnormality	Notification target is selectable.
General equipment	Problems with general equipments	Monitoring by PLC for the general equipment
PLC for General Equipment	Problems with PLC for general equipments	
DIDO controller	Problems with DIDO controller	



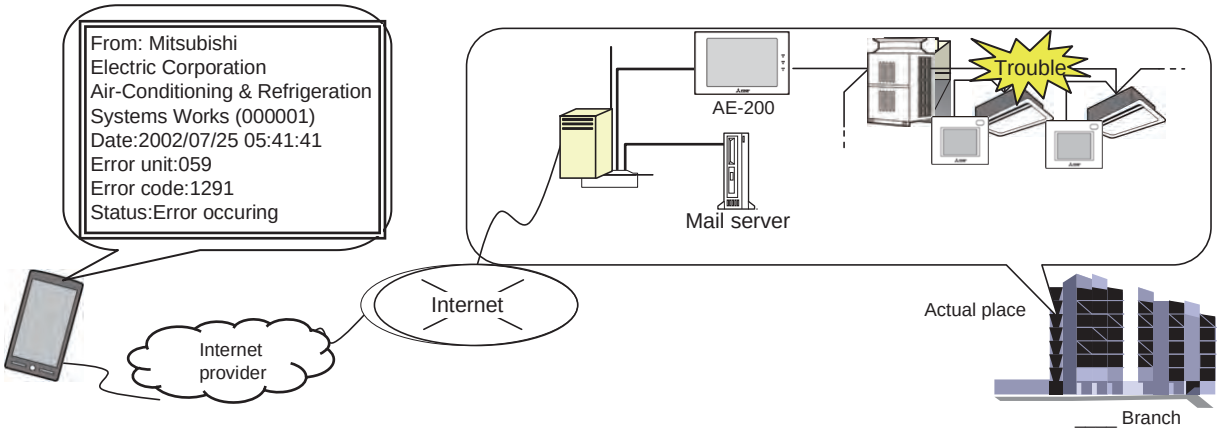


<5-1> Outline

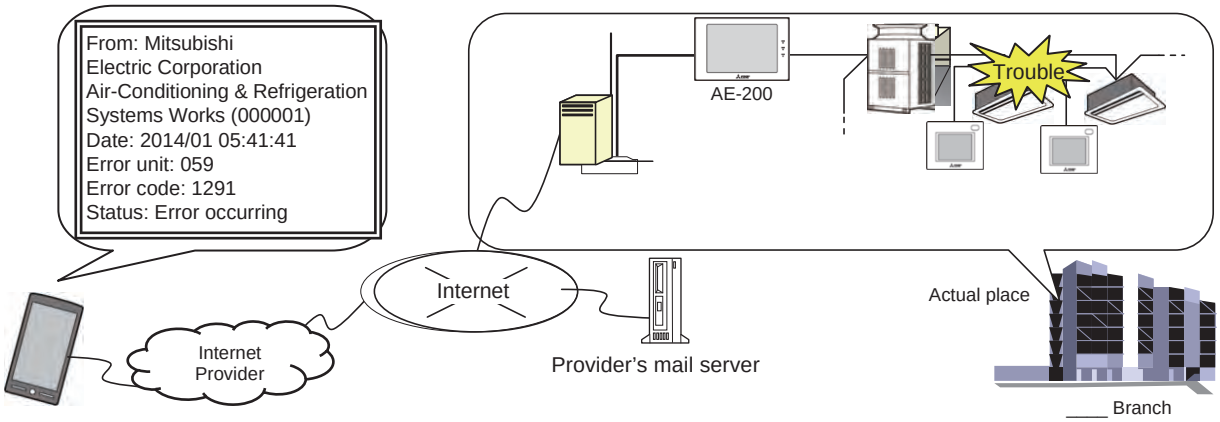
AE-200/AE-50/EW-50 has a function for reporting errors of air conditioners and general equipment to predetermined e-mail addresses.
When the measurement obtained by any temperature/humidity sensor connected to the AI controller exceeds the predetermined upper or lower limit, such an e-mail will be sent.
The e-mail transmission conditions can be set by the administrator user of the Web browser.
To use the e-mail function, it is necessary to register an e-mail server.
In the case of a corporate network, consult the network administrator about the e-mail server information.
When using a mail server on the Internet, establish an account with a provider, connect a designated broadband router, and set the information on connection with the provider's mail server.

<5-2> Image of connection

(1) When there is a mail server in the company



(2) When there is not a mail server in the company



<5-3> Types of e-mail transmission

Function	Type	Description	Number of registered e-mail addresses	Person in charge of setting and remarks
E-mailing upon occurrence of trouble	Unit trouble	Transmitted when an air conditioner trouble occurs.	10 addresses	Web browser administrator [Function selection 1] → [E-mail setting]
	Unit trouble notice	Transmitted when an air conditioner trouble notice occurs.	10 addresses	
	Communication error	Transmitted when an M-NET communication error occurs.	10 addresses	
	General equipment	Transmitted when a trouble with general equipment connected to the PLC for general equipment occurs.	10 addresses	
	User setting 1	Register any 10 error codes in each category. When any registered error occurs, an e-mail will be transmitted to the registered e-mail addresses.	10 addresses	
	User setting 2		10 addresses	
	User setting 3		10 addresses	
	User setting 4		10 addresses	
	User setting 5		10 addresses	
	User setting 6		10 addresses	
Transmission of e-mail about temperature/humidity upper/lower limit		An e-mail is transmitted when the measurement obtained by any temperature or humidity sensor connected to the AI controller becomes out of the predetermined range and when the temperature or humidity returns to the range.	10 addresses	Web browser administrator [Function setting 1] → [Measurement setting]

<5-4> Devices necessary for e-mailing

Required devices or information	Description
Mail server	This server actually transmits the e-mails received from AE-200/AE-50/EW-50 to the designated e-mail addresses. In the case of a corporate network, the server may be installed in the company. Consult with the network administrator about the e-mail server information necessary for setting. If there is no e-mail server in the company, establish an account with a provider, and the information on the provider's e-mail server will be provided.
Broadband router	When there is an e-mail server in the company, the router is unnecessary. It is required when the system is connected to the e-mail server of the provider with which an account has been established.
100 BASE-TX HUB	Required to connect AE-200/AE-50/EW-50 to a router, etc.
100 BASE-TX LAN straight cable	

<5-5> Preparation for transmission of error mail

(1) Making a contract with an Internet provider to transit mails at the ide of user
An internet access needs to be obtained unless a mail server is available on the LAN.
A provider contract on which access point, user ID, and certification password are written will be sent later.
This information is necessary when setting up AE-200/AE-50/EW-50 and the dial-up router/broadband router.

(2) Obtaining the IP address for mail server
The IP address for the mail server may be written on the contract.
If the IP address is not found on the contract, take the following steps to acquire one.
Create an internet environment by connecting to the access point from the computer to be used for monitoring.
Execute the MS-DOS prompt (command prompt on Windows 2000/XP).
Enter "PING send mail server name1" (SMTP server name), and press enter to acquire the IP address of the mail server.

(3) Setting for broadband router and dial-up router
When a broadband router is used, set the connection ID and password obtained when an account is established. Set the provider access point phone number, connection ID, and password to the dial-up router.

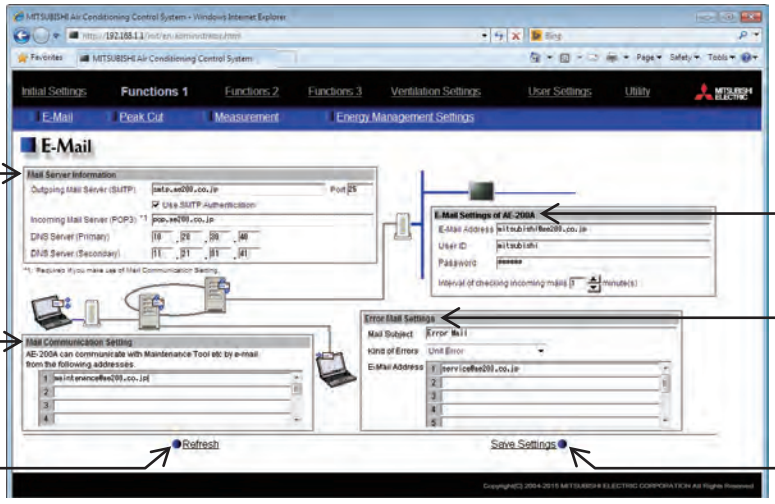
(4) Network setting for AE-200/AE-50/EW-50
Set AE-200/AE-50/EW-50 IP address, subnet mask, and gateway address from the initial setting web or the main unit LCD screen. For gateway address, use the IP address of broadband router or dial-up router .

(5) Mail settings for AE-200/AE-50/EW-50
Set mail address, mail server IP address, and error mail destination from the initial setting web.

<5-6> Setting for transmission of error notification e-mails

To transmit e-mails, an e-mail server is necessary.
E-mail setting is required to use the error notification e-mail function or e-mail communication function. The error notification e-mail function is designed to send error information to specific e-mail addresses. The e-mail communication function is designed to send unit maintenance data to specific e-mail addresses of the personal computers on which the Maintenance Tool has been installed.
Click [Setting function 1] – [E-mail setting] on the menu to open the e-mail setting screen. Set the e-mail conditions, and click [Save settings] to save the settings in AE-200/AE-50/EW-50.

Remarks ○ If you have logged in as the administrator user, you may be prohibited from e-mail setting.



E-mail server information
Set the e-mail server/DNS server information.

E-mail communication setting
Set the e-mail addresses of the PCs which receive maintenance data through the e-mail communication function.

Updating
The settings are loaded from AE-200/AE-50/EW-50.

E-mail setting for AE-200/ AE-50/EW-50

Error notification e-mail setting
Input the e-mail information of the error notification e-mail function.

Save settings
The settings are saved in AE-200/AE-50/EW-50.

(1) E-mail setting for AE-200/AE-50/EW-50
Input the e-mail information obtained from the Internet provider or system administrator. The setting items vary depending on the function to be used. See the following table.

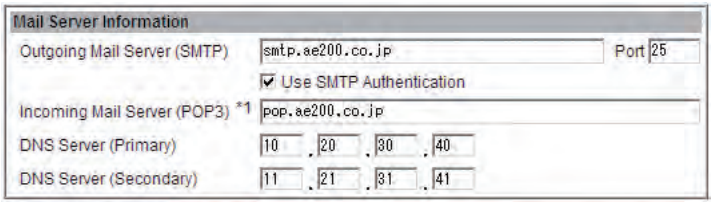
Remarks ○ When transmitting e-mails through an Internet provider, it is necessary to establish an account with the Internet provider.

Items to be set (e-mail setting for AE-200)

○: Required to be set –: Not required to be set

Item	Error notification e-mail function		E-mail communication function	
	Without SMTP authentication	With SMTP authentication	Without SMTP authentication	With SMTP authentication
E-mail address	○	○	○	○
User ID	–	○	○	○
Password	–	○	○	○
Interval between received e-mail checks	–	–	○	○

(2) Mail Server Information



Input the e-mail information obtained from the Internet provider or system administrator. The setting items vary depending on the function to be used. See the following table.
Either the IP address or the host name (server name) can be entered in the [Outgoing Mail Server (SMTP)] and [Incoming Mail Server (POP3)] fields.

Remarks

○ The default number of the transmit port of the outgoing mail server (SMTP) is 25. If the number 25 cannot be used, change the number to the designated number. However, the mail server to which 465 has been designated cannot be used.

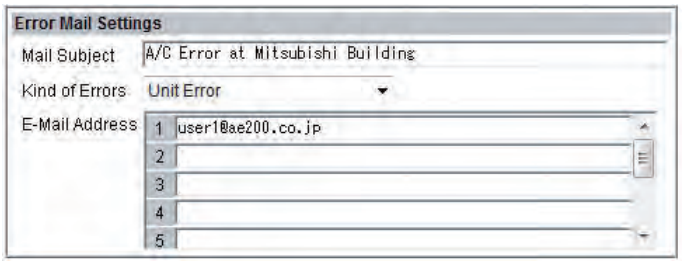
Items required to be set (Mail server infomation)

○: Required to be set –: Not required to be set

Items	Error notification e-mail function		E-mail communication function	
	Without SMTP authenticationi	With SMTP authentication	Without SMTP authentication	With SMTP authentication
Outgoing Mail Server (SMTP)	○ IP address or host name	○ Host name	○ IP address or host name	○ Host name
Port number	25	587	25	587
Use SMTP Authentication *2	–	○	–	○
Incoming Mail Server (POP3)	–	–	○ IP address or host name	○ IP address or host name
DNS Server (Primary)	(○) *1	○	(○) *1	○
DNS Server (Secondary)	(○) *1	○	(○) *1	○

*1: Not required if the IP address is entered in the [Outgoing Mail Server (SMTP)] or [Incoming Mail Server (POP3)] field
*2: When the SMTP authentication is required, it is necessary to input the user ID and password on the e-mail setting screen.

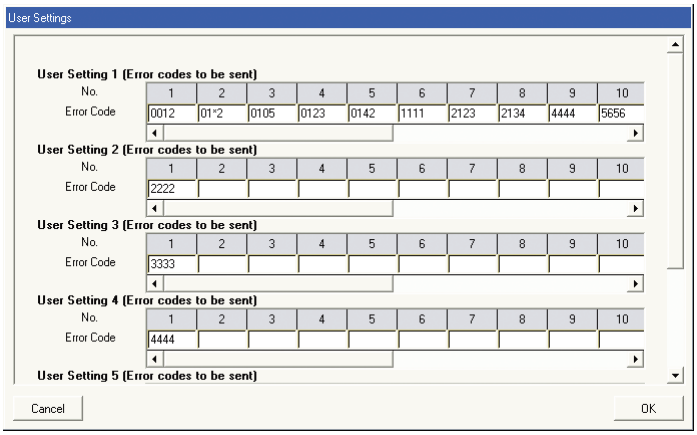
(3) Error Mail Settings



1. In the [Mail Subject] field, enter the mail subject to be used for the error notification e-mail function in 40 characters or less.

2. In the [Kind of Errors] field, select the error type out of the following: [Unit Error], [Preliminary Unit Error], [Communication Error], [General Equipment], and [User Setting 1] through [User Setting 6]. Then, in the [E-Mail Address] field, enter the e-mail addresses of the recipients of the error notification e-mail.

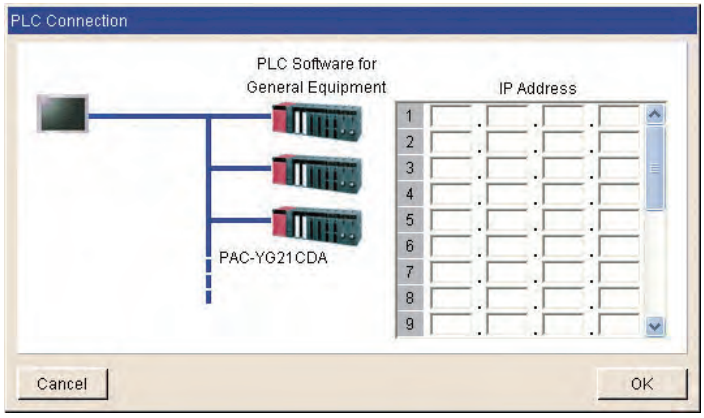
3. If [User Setting 1] through [User Setting 6] is selected in the [Kind of Errors] field, a [User Settings] button will appear. To send error notification e-mail only upon occurrences of certain errors, click [User Settings] to display the User Settings screen.
   Enter the error codes to be notified. Up to 20 error codes can be set for each user setting. In addition to specific error codes such as [1302] or [6607], codes that use asterisks as wildcards such as [10**] or [12**] can also be used.
   If [10**] is entered, for example, error notification e-mail will be sent upon an occurrence of any type of errors between [1000] and [1099]. If error codes are entered on this screen, confirm that the e-mail addresses of the recipients are registered.



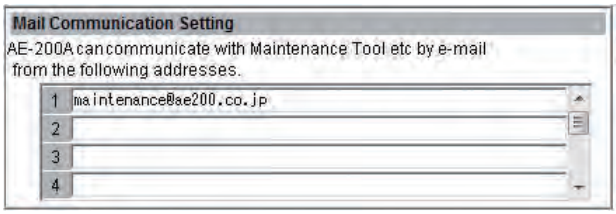
4. If [General Equipment] is selected in the [Kind of Errors] field, a [PLC Connection] button will appear. To send error notification e-mail upon occurrences of errors on the general equipment that are connected to PLC Software for General Equipment, click [PLC Connection] to display the [PLC Connection] screen. Enter the IP addresses of PLC Software for General Equipment.

   The row number that corresponds to each IP address will appear in the error notification e-mail as a PLC number. (e.g., When an error occurs on the general equipment #20 connected to the PLC Software in the second row, “PLC2-20” will appear in the [Error unit] section in the error notification e-mail.)

   Note: A TG-2000A is required to monitor the status of the general equipment that is connected to the PLC Software for General Equipment.



(4) Mail Communication Setting



To use an e-mail communication function, enter the addresses of the PCs that will receive the units' maintenance data in the [Mail Communication Setting] section. Up to 10 e-mail addresses can be set.

(5) E-mail format

Error notification e-mail will be sent in the format shown below.

From: Mitsubishi Building (000001)
Date: 01/06/2014 16:32:12
Error unit: 065
Error code: 1302
Status: Occurrence

Mail subject	The mail subject entered in section <5-6>-(3)-1 will appear.
From	The name and ID of AE-200/AE-50/EW-50 input on the basic system setting screen are displayed.
Date	The date is displayed in the format specified on the basic system setting screen.
Error unit	-- When an error occurs on air conditioning units or general equipment, the M-NET address of the unit in error will appear. -- When an error occurs on general equipment connected to PLC Software for General Equipment, PLC number* (1 to 20) and connection number of general equipment (1 to 32) will appear. -- When a communication error occurs on PLC Software for General Equipment, PLC number* (1 to 20) will appear. * PLC number indicates the row number on the [PLC Connection] screen. Note: When an error occurs on the general equipment connected via DIDO controller, M-NET address of the DIDO controller will appear. (The recipients will know that an error has occurred on one of the general equipment that is connected to the DIDO controller.)
Error code	Error code (4-digit) will appear. -- When an error occurs on air conditioning units, refer to the service manual of the unit for the error codes. -- When an error occurs on general equipment, "0091" (General equipment error) will appear. -- When a communication error occurs on PLC Software for General Equipment, "0003" (LAN communication error to PLC) or "0007" (PLC program stopped) will appear.
Status	Error status "Occurrence" (The error is occurring) or "Recovery" (The error has been resolved) will appear.

<5-7> E-mail alarm function settings

To receive an e-mail alarm when the temperature or the humidity exceeds certain predetermined values, set the e-mail settings by following the instructions below.

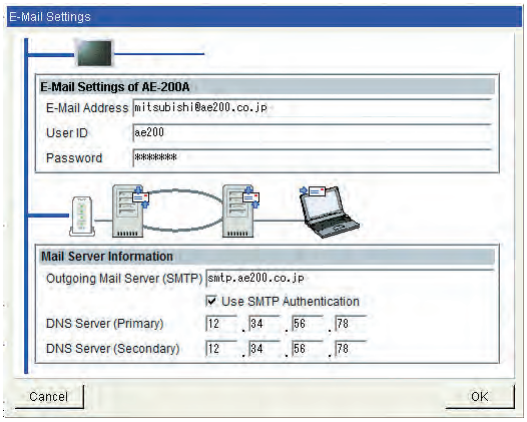
1. In the [Type of E-Mail] field, select [Out-of-limit alarm].Then, enter the mail subject and the e-mail addresses.
   Note: The following characters cannot be used in the [Mail Subject] field: <, >, &, “, or ‘

   An e-mail alarm will be sent in the format shown below.

```
From: Mitsubishi Building (000001)
Date/Time: 13/03/2014 09:38:39
Address: 50-1
Current value: 24.9 deg C
Status: Exceeded lower limit
Trend Data:
09:38 25.2 deg C
09:37 25.4 deg C
09:36 25.6 deg C
09:35 25.8 deg C
09:34 26.1 deg C
09:33 26.4 deg C
09:32 26.7 deg C
09:31 27.0 deg C
09:30 27.5 deg C
09:29 27.7 deg C
```

Item	Format
From	AE-200/AE-50/EW-50 name + Unit ID
Date/Time	yyyy/mm/dd hh:mm:ss
Address	M-NET address of AI controller + sensor No.
Current value	Current temperature or humidity (one decimal place) Note: [**.*] may appear until the value measured by sensor becomes stable.
Status	“Exceeded upper limit,” “Recovered from upper limit,” “Exceeded lower limit,” or “Recovered from lower limit”
Trend Data	Time + Temperature or humidity values (for the last 10 minutes)

2. Click [E-Mail Settings] to enter the mail server information.
   Note: The setting details are the same as those described in sections 5-6. Refer to those sections for details.



5. External Input/Output

[1] Outline

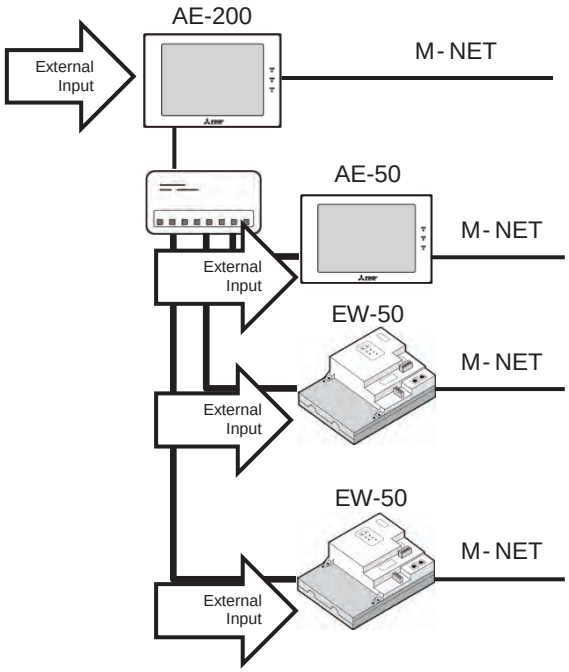
The main unit of the AE-200/AE-50/EW-50 is equipped with an external input/output function.
Control the external input on each set of AE-200/AE-50/EW-50.
This function uses the main unit of the AE-200/AE-50/EW-50's CN5. For use, please purchase the optional external input/output adapter (PAC-YG10HA).

[2] External input function

<1> External signal input function

The operation of external signal input shown in V-[2]<3> can be controlled by using the external contact signal (12 V or 24 V DC).

- Connect the external input/output adapter (PAC-YG10HA) to each set of AE-200/AE-50/EW-50.
- The demand input can be controlled by batch input to AE-200. However, since a delay in control occurs for reasons of system configuration, it is recommended to input individually to each device.



<2> External signal input specifications

CN5	Lead wire (PAC-YG10HA-E)	Mode 1	Mode 2	Mode 3	Mode 4	Mode 5
		Demand mode (Level signal)	Emergency Stop (Level signal)	Emergency Stop/ Restoration mode (Level signal)	ON/OFF (Level signal)	ON/OFF/ Prohibit/Permit (Pulse signal)
No.5	Orange	Demand Level 1	Emergency stop/ normal input	Emergency stop/ normal input	ON/OFF	ON input
No.6	Yellow	Demand Level 2	Demand Level 2	Demand Level 2	Not used	OFF input
No.7	Blue	Demand Level 3	Demand Level 3	Demand Level 3	Not used	Local remote controller operation prohibit input
No.8	Gray	Demand Level 4	Demand Level 4	Demand Level 4	Not used	Local remote controller operation enable input
No.9	Red	External DC source "+ 12 VDC" or "+ 24 VDC"				

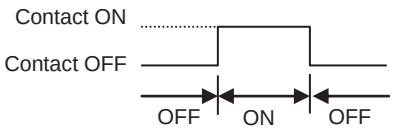
<3> Operations of external signal input

Mode	Setting mode	Description
Mode 1	Demand mode (Level signal)	The use of the level signal: ● enables selection of the “demand level 1 to 4” input from 4 levels. (When no external signal is input, use Mode 1.)
Mode 2	Emergency stop (Level signal)	The use of the level signal: ● enables selection of the “demand level 2 to 4” input from 3 levels, ● stops all air conditioners connected to each line of AE-200/AE-50/EW-50 when “emergency stop” is input, ● prohibits the starting/stopping operation from a remote controller and prohibits the starting/stopping operation and prohibition/permission setting on AE-200/AE-50/EW-50 when “emergency stop” is input, and ● discontinues the scheduled operation, night setback control and night purge operation and interlock control when the system is stopped.
Mode 3	Emergency stop/ Restoration mode (Level signal)	The use of the level signal: ● enables selection of the “demand level 2 to 4” input from 3 levels, ● stops all air conditioners connected to each line of AE-200/AE-50/EW-50 when “emergency stop” is input, ● prohibits the starting/stopping operation from a remote controller and prohibits the starting/stopping operation and prohibition/permission setting on AE-200/AE-50/EW-50 when “emergency stop” is input, and ● discontinues the scheduled operation, night setback control and night purge operation and interlock control when the system is stopped. ● To cancel the emergency stop and restore the system, operation on the main equipment (LCD screen or Web screen) is required.
Mode 4	ON/OFF (Level signal)	The use of the level signal (emergency stop): ● starts and stops all air conditioners connected to each line of AE-200/AE-50/EW-50 when “ON/OFF” is input, ● prohibits the starting/stopping operation from a remote controller and prohibits the starting/stopping operation and prohibition/permission setting on AE-200/AE-50/EW-50 when “ON/OFF” is input, and ● discontinues the scheduled operation, night setback control and night purge operation and interlock control.
Mode 5	ON/OFF/ Prohibit/Permit (Pulse signal)	The use of the pulse signal: ● starts and stops all air conditioners connected to each line of AE-200/AE-50/EW-50 when “ON/OFF” is input, and ● prohibits or permits the operation of the air conditioners connected to each line of AE-200/AE-50/EW-50 from a remote controller when “prohibition/permission” is input.

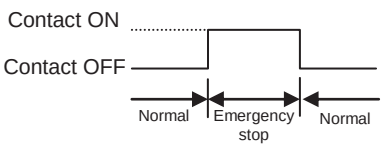
<4> Level signal and pulse signals (12 or 24 VDC)

(A) Level signal

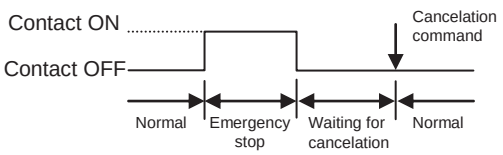
In the case of level signal ON/OFF



In the case of emergency stop/normal

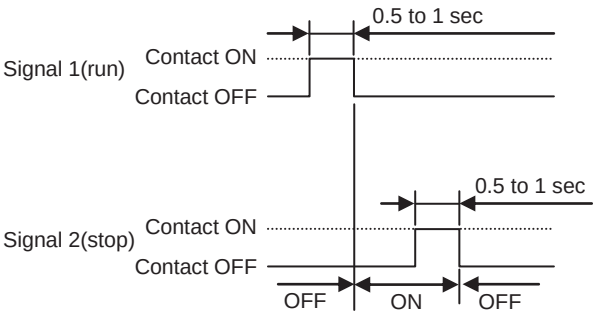


In the case of restoration from emergency stop/normal



(B) Pulse signal

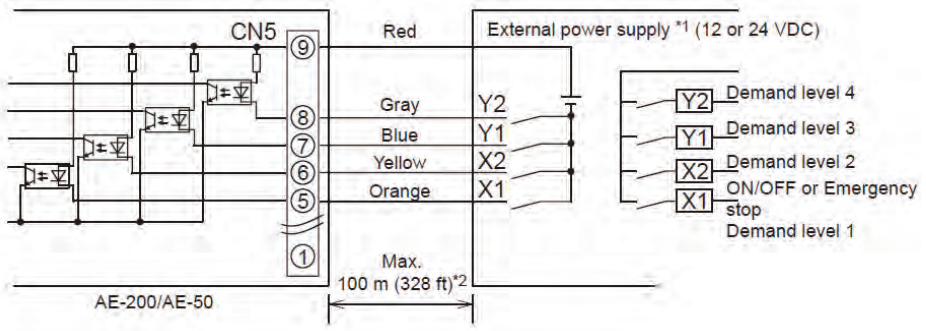
In the case of ON/OFF
(The prohibit/enable input is the same)



Note: The pulse width of the contact must be 0.5 to 1 sec.

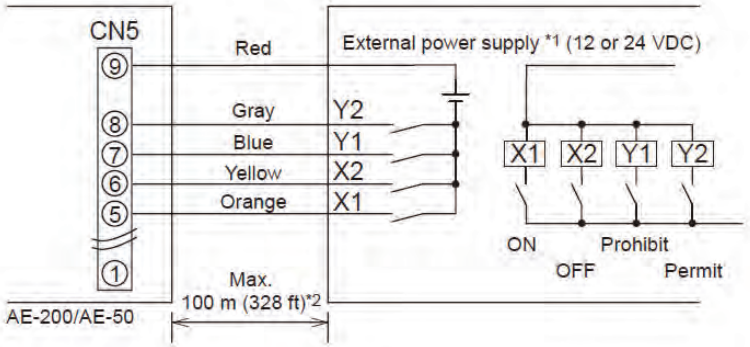
<5> Recommended circuit

(A) For level signal



Use relays X1, X2, Y1, and Y2 that meet the following specifications.
Contact rating
Rated voltage: 12 or 24 VDC
Rated current: 0.1 A or above
Minimum applied load: DC 1 mA

(B) For pulse signal



*1: Select an external power supply suitable for the relays used. (12 or 24 VDC)
Connect the external power supply in the correct polarity to input and output the signals.
Connect ⑤−⑧ (see the figure at left) to the negative side.

*2: Take sufficient precautions against noise when the cable length is long.

Important

- **Be sure to use an external power supply (12 or 24 VDC) to avoid malfunctions.**
- **Connect the external power supply in the correct polarity to avoid malfunctions.**

Notes

- The relays, DC power supply, and extension cables are not supplied.
- The total length of the lead wire and extension cable should not exceed 100 m (328 ft). (Use an extension cable of 0.3 mm^2 or thicker.)
- Cut the excess cable near the connector, and insulate the end of the unused cable with tape.

<6> Emergency stop restoration mode

(1) Emergency stop restoration mode

In the emergency stop restoration mode, the system is maintained in the stopped state (wait state for cancelation) also after the external contact is turned off, and the state after cancelation from the LCD screen or Web screen can be selected.

(2) Differences between emergency stop mode and emergency stop restoration mode

In the emergency stop mode, the system will be urgently stopped when the external contact to AE-200/AE-50/EW-50 is turned on, and, when the contact is turned off, the emergency stop will be canceled, and the system will be set to the stopped state.

In the emergency stop restoration mode, even when the contact is switched from ON to OFF, the system will be in the wait state for cancelation of emergency stop and kept in the stopped state, and the operation of the remote controller will be continuously prohibited.

For restoring the system from the wait state for cancelation of emergency stop (restoring indoor units to ON state), the LCD screen or Web screen can be used.

There are the following three methods for restoring the system from the wait state for cancelation of emergency stop.

① Restoration to the state just before emergency stop: Restoration to the ON/OFF state just before emergency stop

② Restoration according to schedule setting: Restoration to the ON/OFF state from the state before emergency stop according to the schedule which was executed during emergency stop (If the schedule was not executed during emergency stop, the system will be restored to the state just before emergency stop.)

③ No restoration: The ON/OFF state will not be restored (the system will be kept in the stopped state).

When a host device is defective, the emergency stop can be canceled on the emergency stop cancelation screen of AE-200/AE-50 main unit or AE-200/AE-50/EW-50 Web browser.

The emergency stop restoration mode is designed to return the air conditioners to the state before emergency stop (or after the schedule is executed) at the same time when the emergency stop is canceled, for example, in the case where a fire alarm is false.

* The air conditioners which have been set to the emergency stop state by the set back control, demand control or interlock control are not subject to restoration.

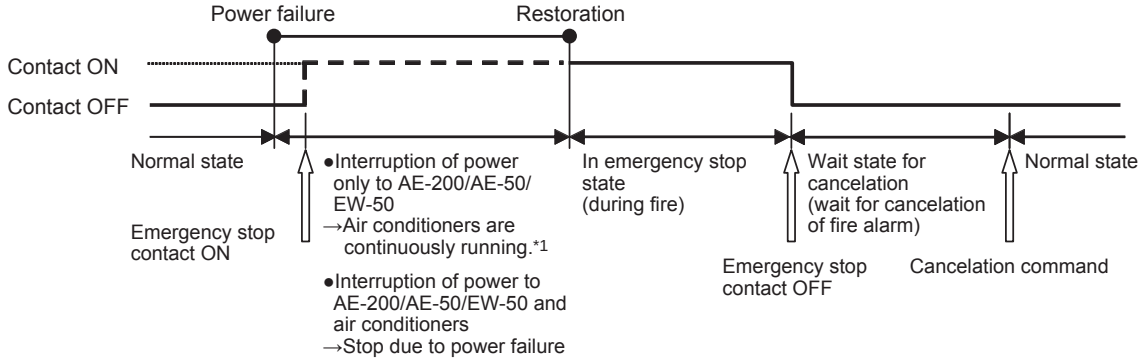
The following table shows the differences between the emergency stop and emergency stop restoration modes in the operating state and the state of prohibition of remote controller operation.

Operation		Emergency stop mode	Emergency stop restoration mode
1	Emergency stop contact is turned on.	Shift to emergency stop state (Stopped/prohibition of operation by remote controller)	Shift to emergency stop state (Stopped/prohibition of operation by remote controller)
2	Scheduled operation during emergency stop	Ignored	Stored
3	Emergency stop contact is turned off.	Emergency stop and prohibition of operation by remote controller are canceled. After cancelation, the system is in the stopped state.	Shift to wait state for cancelation (Stopped state and prohibition of operation by remote controller are continued.)
4	Cancelation from main unit LCD screen or Web browser		Emergency stop and prohibition of operation by remote controller are canceled. The state after cancelation can be selected from the followings. ① Restoration to the state just before emergency stop ② Restoration according to schedule setting ③ No restoration (in the stopped state)

(3) Operation after power failure in emergency stop restoration mode

(3-1) When the emergency stop contact is turned on during power failure

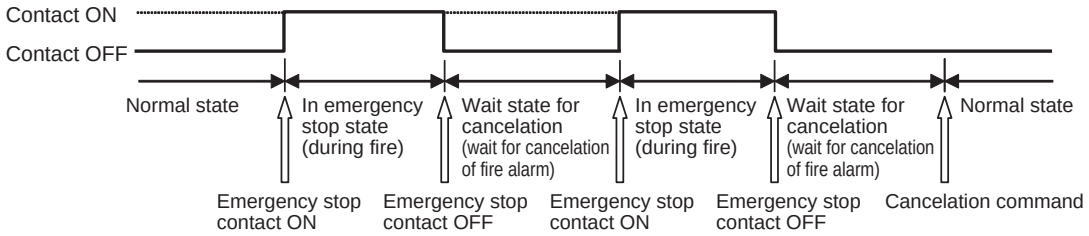
When power is restored, the system will be set to the emergency stop state. After this, when the emergency stop contact is turned off, the system will be set to the wait state for cancelation, and, when the cancelation command is given by a host device, it will return to the normal state.



*1: They will be stopped after 3 minutes at the earliest if there is not a remote controller or a system controller.

(3-2) When the contact is turned on again in the wait state for cancelation

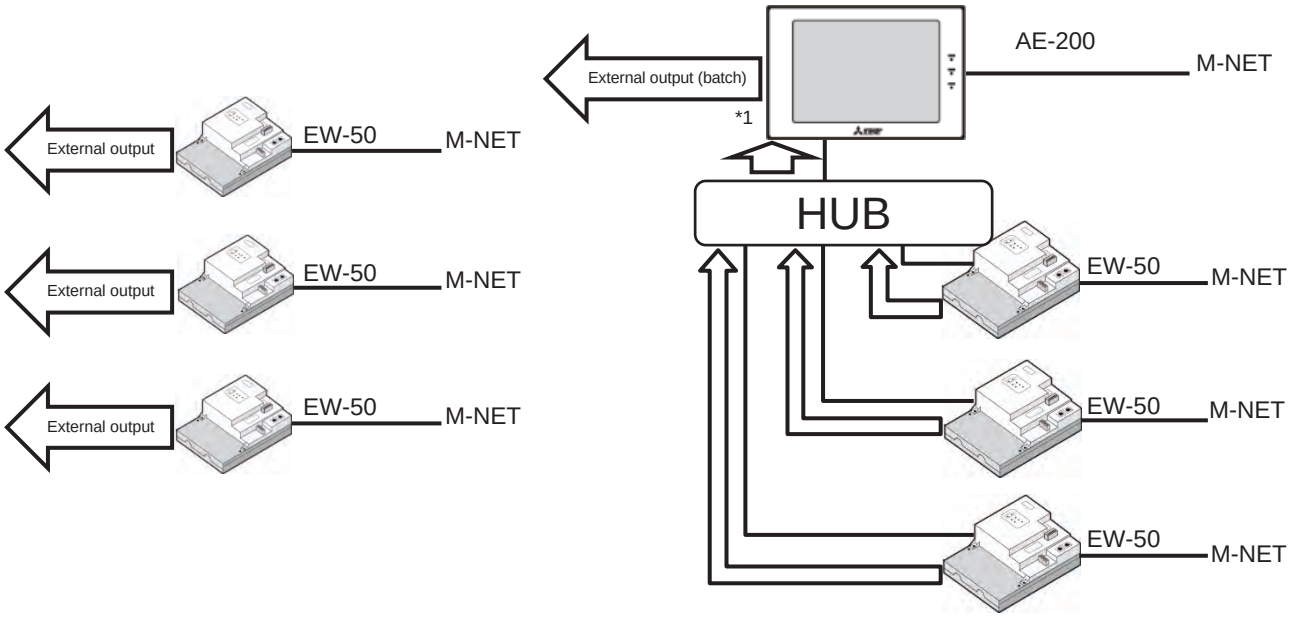
If the emergency stop contact input is turned on again in the wait state for cancelation, the system will return to the emergency stop state. Then, when the emergency stop contact input is canceled, the system will enter the wait state for cancelation.



[3] External output function

<1> External signal output function

An ON signal is output when one or more units are in operation, and an Error signal is output when one or more units are in error.



*1: Signals of all centralized control systems managed by AE-200 can be collectively output.

<2> External signal output specifications

CN5	Lead wire (PAC-YG10HA-E)	Signal
No. 3	Brown	Error signal, Normal signal
No. 2	Black	ON signal*, OFF signal
No. 1	Green	Common ground for external output (Ground for the external power supply)

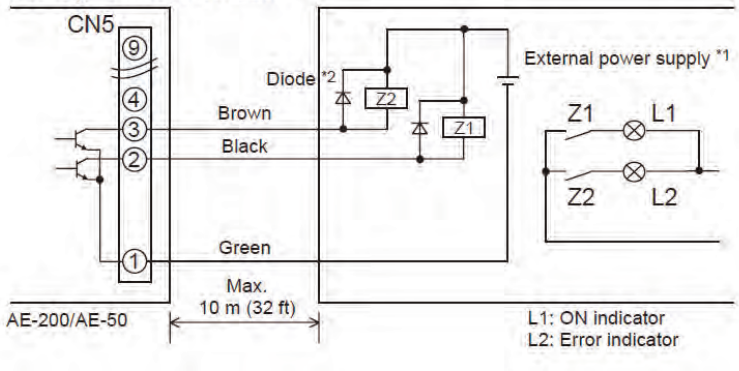
* The operation status of general equipment (via a DIDO controller (PAC-YG66DCA)) will not be output.
* The ON signal will be output even during an error.

<3> Operation of external signal output

Setting	Description
Start/stop output Abnormal/normal state output	(Air conditioners) ● The operating state and error state of air conditioners connected to all lines of AE-200 and AE-50/EW-50 are output with level signals. When one or more air conditioners are operating, the ON signal is output. When one or more air conditioners are in trouble, the Error signal is output.

<4> Recommended circuit

Relay-driven circuit



Use relays Z1 and Z2 that meet the following specifications.
Operation coil
Rated voltage: 12 or 24 VDC
Power consumption: Max. 0.9 W

*1: Select an external power supply suitable for the relays used. (12 or 24 VDC)Connect the external power supply in the correct polarity to input and output the signals.Connect ① (shown in the figure at left) to the negative side.

*2: Use a diode at both ends of the relay coils.

Important

- **Be sure to use an external power supply (12 or 24 VDC) to avoid malfunctions.**
- **Connect the external power supply in the correct polarity to avoid malfunctions.**
- **Do not connect the external power supply without relays being connected to the controller (no load).**

Notes

- The relays, lamps, DC power supply, diodes, and extension cables are not supplied.
- The total length of the lead wire and extension cable should not exceed 10 m (32 ft). (Use an extension cable of 0.3 mm^2 or thicker.)
- Each element will turn on during operation and when an error occurs.

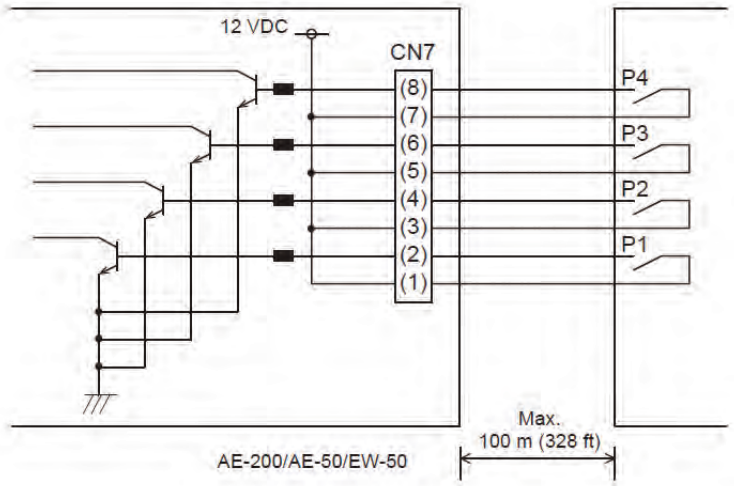
[4] Pulse signal input function

Using pulse signals directly input from metering device such as watt-hour meter, billing data and energy management data will be obtained based on the cumulative number of pulse signal input.

<1> Pulse signal input specifications

CN7	Signal
No.1,2	Metering device 1 (count input)
No.3,4	Metering device 2 (count input)
No.5,6	Metering device 3 (count input)
No.7,8	Metering device 4 (count input)

<2> Recommended circuit



A voltage of 12 VDC is applied to CN7. Do not apply a power voltage from any other power source.

Contact rating
Rated voltage: 12 VDC
Rated current: 0.1 A or above
Minimum applied load: DC 1 mA

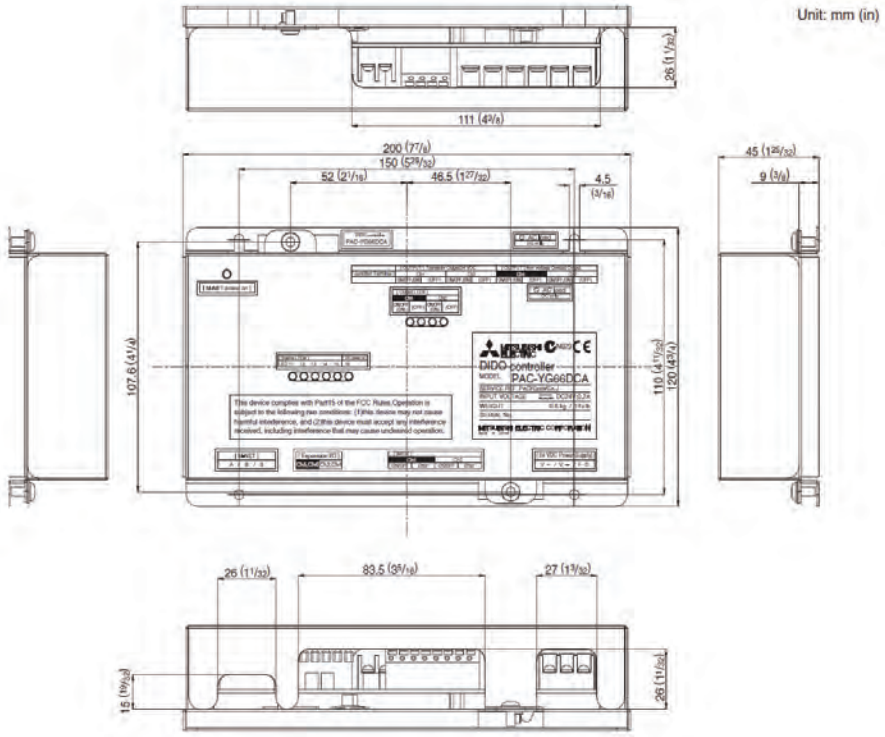
Notes

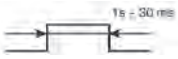
- The total length of the lead wire and extension cable should not exceed 100 m (328 ft). (Use an extension cable of 0.3 mm^2 or thicker.)
- Cut the excess cable near the connector, and insulate the end of the unused cable with tape.
- Do not run the signal input cable adjacent to M-NET transmission and power cables. Do not let the cable form a loop.
- Peel off the sheath to 6 ±1 mm (4/16 ±1/16 in) from the end, and securely insert the cable into the terminal.
- Leave adequate slack in the cables so that the weight of them will not strain the terminal connectors. Use cable clamps or trunk terminals as necessary.

6. DIDO Controller/PI Controller/AI Controller

[1] Specification

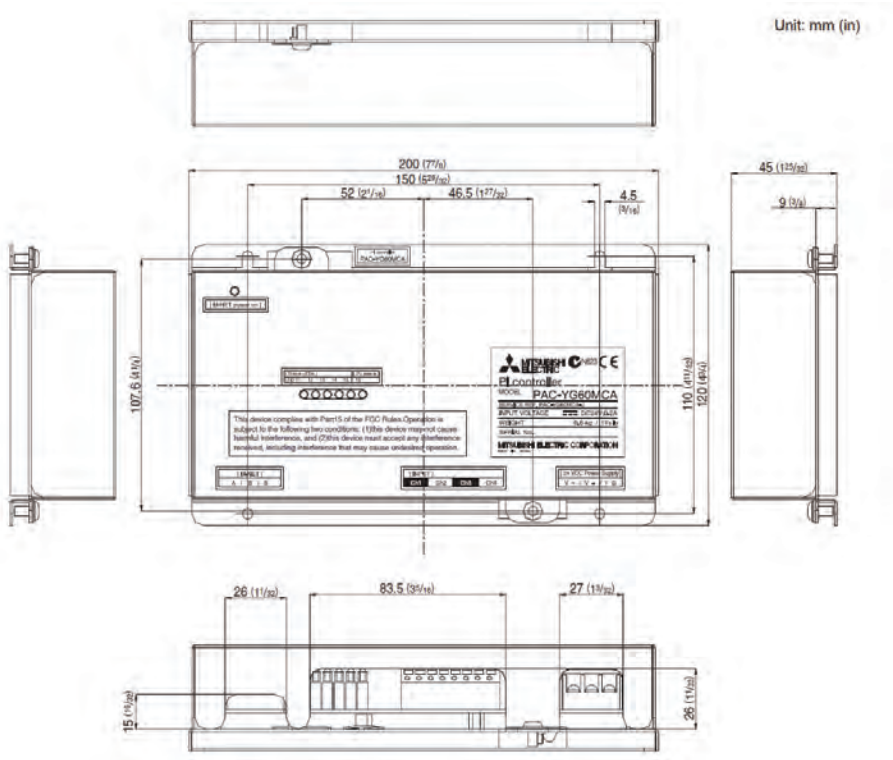
<1> DIDO controller PAC-YG66DCA

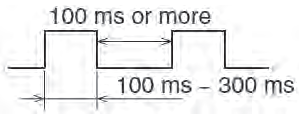


Item	Rating and specification					
Power supply	24 VDC±10%: 5 W					Screw terminal block (M3) *8
Interface	M-NET communication			17 to 30 VDC *1		Screw terminal block (M3) *8
	Standard	Output *2	ON/OFF, (ON) *3	Non-voltage relay contact (2)	Applied load MAX: 24 VDC, 5 W MIN: 5 VDC, 2 mW * AC loads cannot 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		
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).

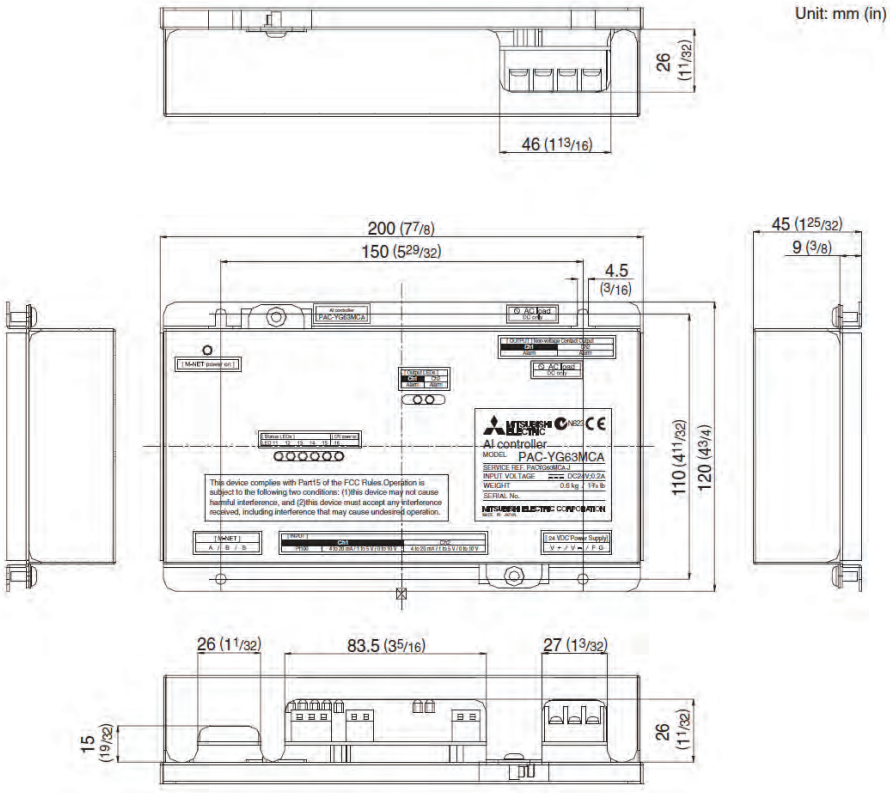
<2> PI controller



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
	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)  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).

<3> AI controller



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).

[2] Outline

One AE-200/AE-50/EW-50 can control and monitor up to 50 units including DIDO Controller (PAC-YG66DCA), PI Controller (PAC-YG60MCA), AI Controller (PAC-YG63MCA), indoor units, and LOSSNAY units.

(1) DIDO controller

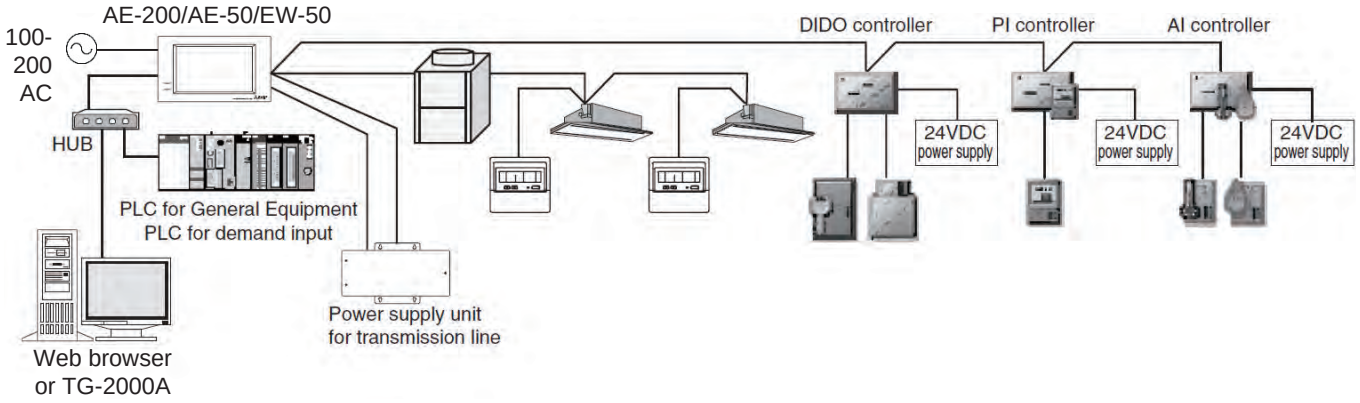
The DIDO Controller have Max. 6 sets of contact input/output terminals and can monitor and operate ON/OFF/Malfunction of up to 6 general equipments.
The general equipments can be monitored or operated from AE-200/AE-50 LCD, AE-200/AE-50/EW-50 Web browser or TG-2000A.
Also, Run/Stop schedule of the general 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.

(2) PI controller

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.

(3) AI controller

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.

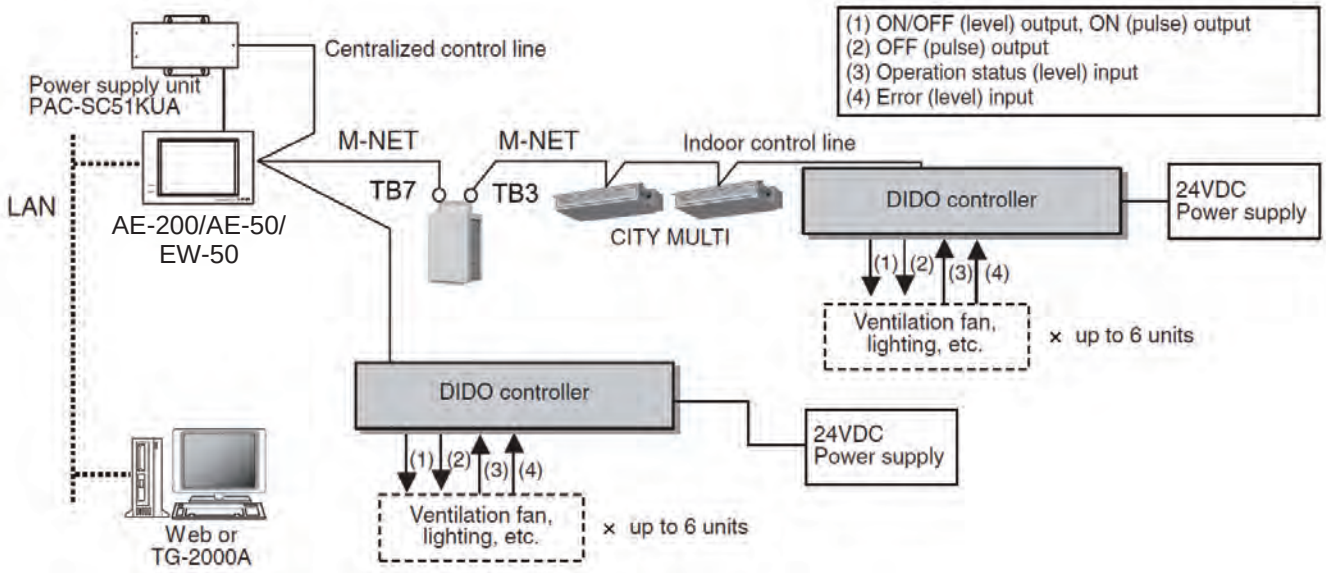


[3] DIDO controller

<1> Connection with DIDO controller

ON/OFF operation status and error status of general equipment can be monitored by using the DIDO controller input/output AE-200/AE-50/EW-50. Also, DIDO controller is equipped with the connector for two sets of standard terminal (channel 1, 2). Up to 6 sets of input/output will be possible by using the external I/O adapter (PAC-YG10HA-E) (2Ch of input/output per adapter, up to 2 adapters connectable).
Up to 50 DIDO controllers (50 contacts) can be connected per an AE-200/AE-50/EW-50 unit, or per an Expansion Controller.
Monitoring/operation are possible from AE-200/AE-50 LCD, AE-200/AE-50/EW-50 Web browser or TG-2000A.
This device supports interlock operation functions such as ON/OFF of units or changing the set temperature for the indoor units and devices connected via M-NET, based on changes in input at the contact point. But we recommend you not to use this device for disaster prevention or security control.
It is advised to prepare a circuit which enables ON/OFF from an external switch in case of malfunction of DIDO controller.
NOTE: DIDO controllers can be controlled from only one of the system controllers.

WARNING Do not use this device in life critical applications.



<2> Connection of the DIDO controller and signal lines

Relays, power supply for the relays, terminal blocks, and cables are field-supplied parts. The maximum allowable wiring length is 100 m.
However it is recommended to keep the length within 10m for longer wiring is more susceptible to noise.
Connect an additional relay within 10 m from the DIDO interface, to receive an input from a point farther than 10 m. The table below summarizes input/output signal specifications.
The pulse signal output width is 1 s ± 30 ms.

Terminal (Ch No.)	Input/output	Connection method	Status	Signal type	Explanation
Standard terminal (Ch1,Ch2)	Input	Non-voltage contact input	ON/OFF	Level	Closed contact: Run; Open contact: Stop
			Error/Normal	Level	Closed contact: Error; Open contact: Normal *1
	Output	Non-voltage relay contact output	ON/OFF	Level	Operation output: Closed contact Stop output: Open contact *2
				Pulse	Contact point closes according to the output signal
		Transistor output	ON/OFF	Level	Operation output: Transistor ON Stop output: Transistor OFF *2
				Pulse	Transistor turns on or off according to the output signal
Expansion connector (Ch3-6)	Input	24VDC	ON/OFF	Level	Closed contact :Run; Open contact: Stop
			Error/Normal	Level	Closed contact: Error; Open contact: Normal *1
	Output	Transistor output	ON/OFF	Level	Operation output: Transistor ON Stop output: Transistor OFF *2
				Pulse	Transistor turns on or off according to the output signal.

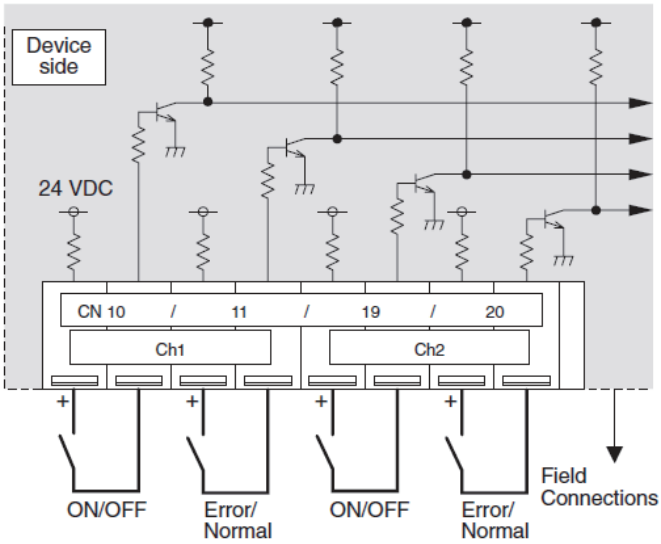
*1: The opposite (Open contact = Error, Closed contact = normal) applies to a b-contact (normally closed).
*2: Operation output can only be used as a-contact (normally open), but not as b-contact (normally closed).

Standard Terminal (Ch1,Ch2)

Input (CN10/11/19/20)

(a) Non-voltage contact input

Certain settings are required before use. Refer to “Initial settings” in the Installation/Instructions Manual that came with the unit.



Note Connect the ON/OFF inputs so that closing the contact operates (ON) the device and opening the contact stops (OFF) the device.

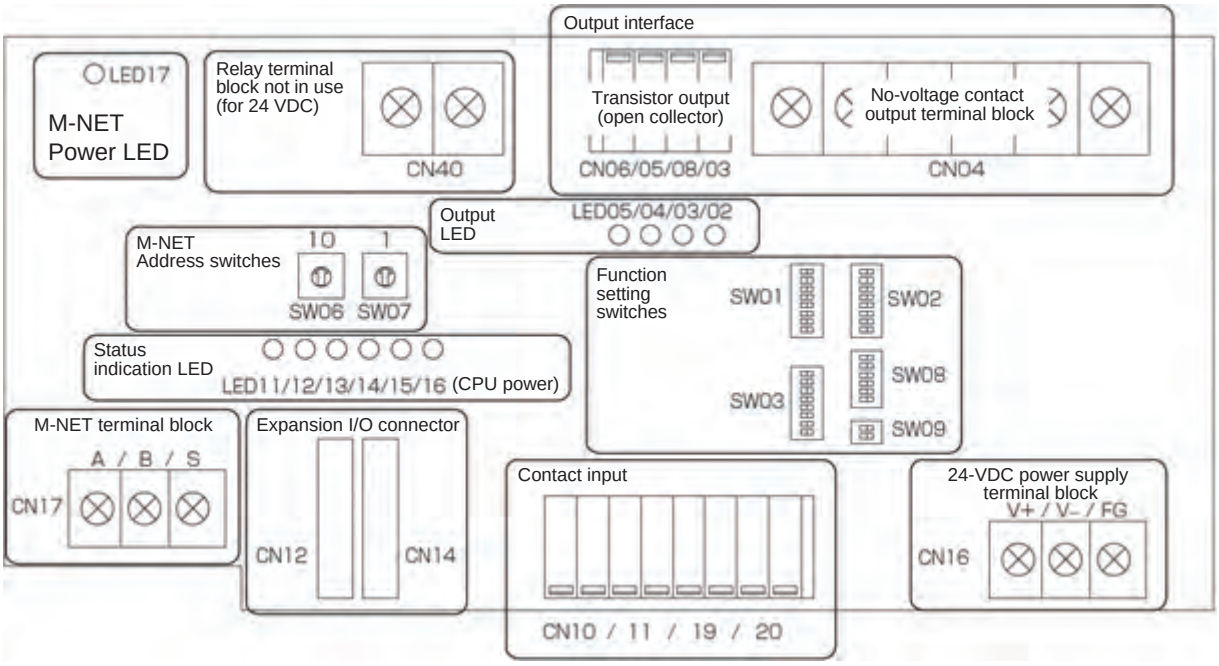
Note The error/normal inputs of channels 1 and 2 can be switched between a-contact and b-contact.

CAUTION

- Be sure to match the polarity when using contacts that have polarity.
- Select a contact with a minimum applicable load of 1 mADC or less.
- Supply 24 VDC 1 mA from the positive terminal to the external contacts.
- Do not install alongside or in contact with other wires.
- Strip 12±1 mm of the wire coating and insert firmly into the terminal.
- Make sure that the copper wiring is not shortcircuiting the plates (cover, lower case) or neigboring wires.
- Perform wiring with some space so that the terminal block is not strained.
  If strained, use a wire guide or junction terminal to alleviate the stress on the terminal block.

Contacts closed: Operate (ON); detected an error detection
Contacts open: Stop (OFF); detected as normal detection
* Error/normal detection becomes inverted from contact open/closed logic for a b-contact setting.

Input/output connector layout drawing

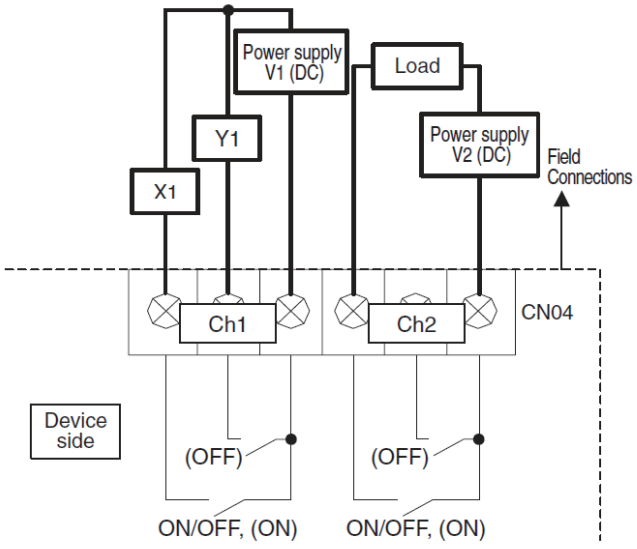


Output

Either Non-voltage relay contact or transistor can be used for the output. These units are not designed to be used at the same time.

(a) Non-voltage contact output

Certain settings are required before use. Refer to “Initial settings” in the Installation/Instructions Manual that came with the unit.



( ) is in the case of a pulse.

Tightening torque for terminal screws: 1 N · m

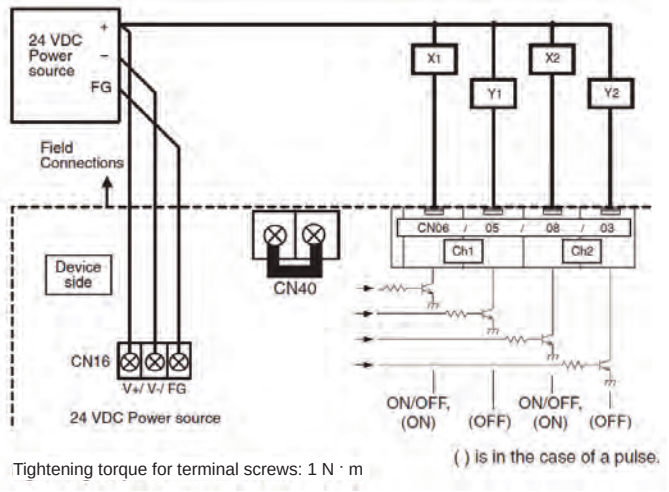
CAUTION

- Use X1 and Y1 relay, that satisfies the followings.
  Operating coil
  [Applied load]
  MAX: 24 VDC, 5 W (Diode built-in model)
  MIN: 5 VDC, 2 mW (Diode built-in model)
  *1: AC loads cannot be connected
  *2: Provide power supply (V1, V2) that matches the load and relay to be used.
- To drive a direct load, use ones within the followings.
  [Applicable load]
  MAX: 24 VDC, 5 W
  MIN: 5 VDC, 2 mW
  *AC loads cannot be connected.
- Make sure that the copper wiring is not short-circuiting the plates (cover, lower case) or neigboring wires.
- Perform wiring with some space so that the terminal block is not strained. If strained, use a wire guide or junction terminal to alleviate the stress on the terminal block.
- Do not connect the wires directly from the top of the control panel to the terminal block. Moisture may enter this device along the wiring and cause electric shock or wire.

Contacts closed: Operate (ON) output
Contacts open: Stop (OFF) output
* For pulse output, the (ON), (OFF) contacts close according to the output content.

(b) Transistor output (Open collector) (CN06/05/08/03)

Certain settings are required before use. Refer to “Initial settings” in the Installation/Instructions Manual that came with the unit.



Tightening torque for terminal screws: 1 N · m

CAUTION

- Use X1, X2 and Y1, Y2 relay that satisfies the following specifications.
  Operating coil
  Rated voltage: 24 VDC (Diode built-in model)
  Power consumption: 0.9 W or less
  *1: Be sure to use the ones with the voltage rated above. Exceeding the rated voltage may affect the ON/OFF of other outputs.
  *2: When using a separate power supply for this device, connect GND of the power supply to V of CN16 of the terminal block of this device.
  *3: Use a relay with a withstanding voltage at least 2000 VAC between the coil and contact. Otherwise, there is the likehood of an electric shock or fire.
- Peel off the sheath to 12 ±1 mm from the end, and securely insert the wire into the terminal.
- Do not let the copper wire short with the metal sheet parts (cover and bottom case) or other wires.
- Provide some slack in the wire to keep undue force from being exerted on the terminal block when the wire is pulled on.
  Use cable clamps or trunk terminals as necessary.
- Do not connect the wires directly from the top of the control panel to the terminal block. Moisture may enter this device along the wiring and cause electric shock or wire.

Operate (ON) output: Transistor ON (sink)
Stop (OFF) output: Transistor OFF (open)
* For pulse output, the (ON), (OFF) transistors turn ON (sink) according to the output content.

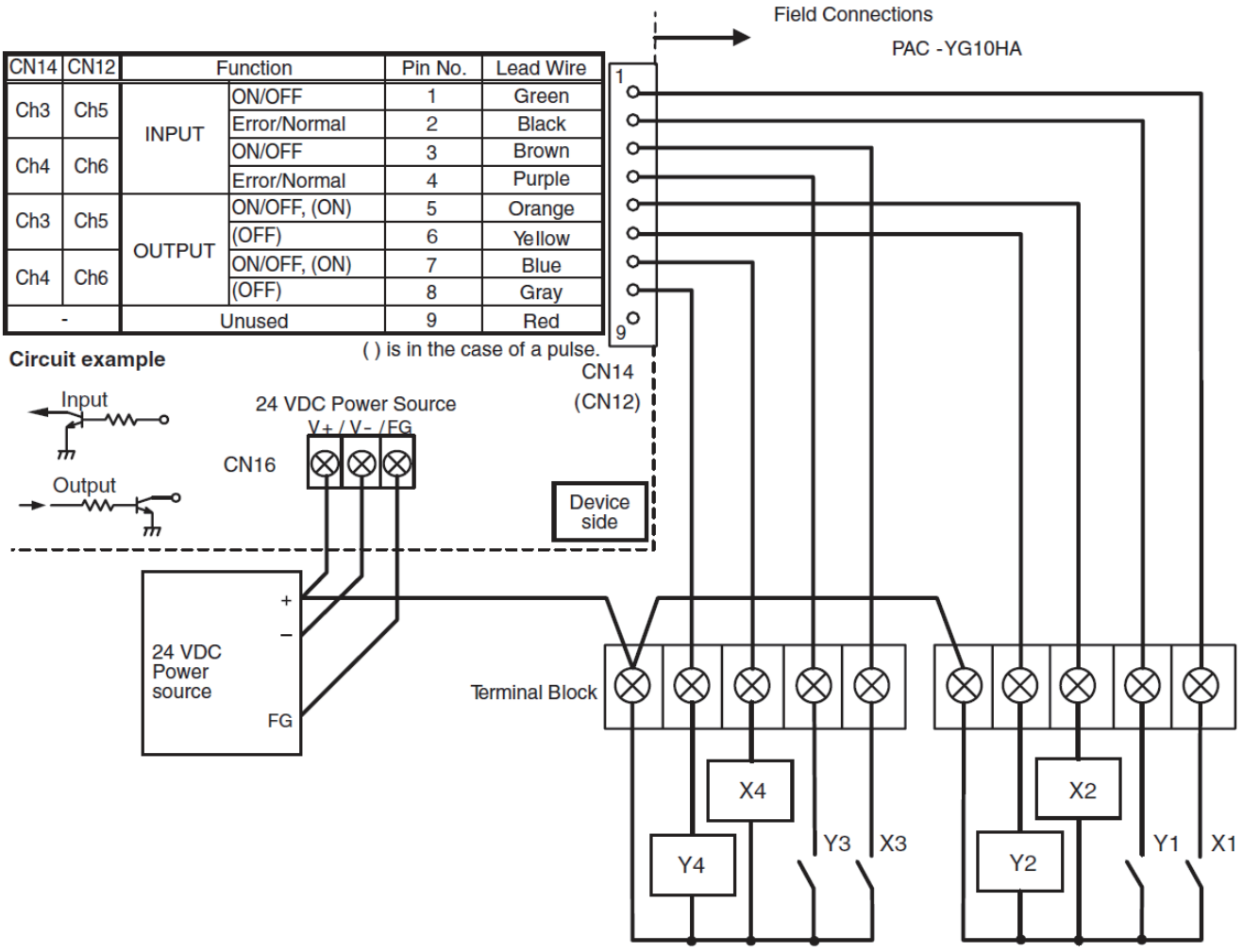
Expansion Connector (Ch3-6)

(a) Expansion I/O (CN12/14)

Please purchase the external I/O adapter (PAC-YG10HA) to use the expansion I/O.
Certain settings are required before use. Refer to “Initial settings” in the Installation/Instructions Manual that came with the unit.

CN14	CN12	Function		Pin No.	Lead Wire
Ch3	Ch5	INPUT	ON/OFF	1	Green
			Error/Normal	2	Black
Ch4	Ch6		ON/OFF	3	Brown
			Error/Normal	4	Purple
Ch3	Ch5	OUTPUT	ON/OFF, (ON)	5	Orange
			(OFF)	6	Yellow
Ch4	Ch6		ON/OFF, (ON)	7	Blue
			(OFF)	8	Gray
-		Unused		9	Red

( ) is in the case of a pulse.



[Input]
Contacts closed (24 VDC applied): ON; error detection
Contacts open: OFF; normal detection
* Error/normal detection becomes inverted from contact open/closed logic for a b-contact setting.

[Output]
Operate (ON) output: Transistor ON (sink)
Stop (OFF) output: Transistor OFF (open)
* Upon pulse output, the (ON), (OFF) transistors turn ON (sink) according to the output content.

CAUTION

- Use X1, X2, X3, X4, Y1, Y2, Y3, and Y4 relays that satisfies the following specifications.
  Operating coil
  Rated voltage: 24 VDC (Built-in diode)
  Power consumption: 0.9 W or less
  *1: Be sure to use the ones with the voltage rated above. Exceeding the rated voltage may affect the ON/OFF of other outputs.
  *2: When using a separate power supply for this device, connect GND of the power supply to V of CN16 of the terminal block of this device.
  *3: Use a relay with a withstanding voltage at least 2000 VAC between the coil and contact. Otherwise, there is a possibility of an electric shock or fire.
- Select a contact with a minimum applicable load 1mADC or less for the input contact.
- Do not install alongside or in contact with other wires. Moisture may enter this device along the wiring and cause electric shock or wire.

<3> Field supplied parts for the DIDO controller

Required parts	Specification
Unit fixing screws	M4 screw x 4 (*M4: ISO metric screw thread)
Power supply	Commercially available power supply: 24 VDC±10% 5 W Ripple noise: Lower than 200 mVp-p When using transistor output (including extension output) for the 24 VDC output of this device, increase the capacity to match the number used. • 1set used ····· 8 W • 2set used ····· 10 W • 3set used ····· 12 W • 4set used ····· 15 W • 5set used ····· 18 W • 6set used ····· 20 W
Power line	Use a sheathed vinyl code or cable. At least 0.75 mm^2 (AWG18)
M-NET transmission line	Use a sheathed vinyl code or cable. Type of the cables·····CPEVS, CVVS or MVVS Size of the cables ·····(1) Solid wire: 1.2 mm-1.6 mm (2) Stranded wire: 1.25 mm^2 (AWG16) -2 mm^2 (AWG14) Power needs to be supplied to M-NET of this device. Use an outdoor unit or a separately purchased power supply unit for the transmission line. M-NET Power consumption coefficient is [1/4]
Signal	Use electric wire of an appropriate size for the terminal block of this device. Cable size·····(1) Solid wire: ø0.65 mm (AWG21) -1.2 mm (AWG16) (2) Stranded wire: 0.75 mm^2 (AWG18) -1.25 mm^2 (AWG16) Single stand: At least 0.18 mm Please purchase the external I/O adapter (PAC-YG 10HA) to use the expansion I/O.

[Optional Accessories]

Name	Model	Application	Remark
Power supply unit for transmission line	PAC-SC51KUA	Power supply to M-NET transmission line	Not required when power is supplied from an outdoor unit.
External I/O adapter	PAC-YG10HA	Connection adapter for using an expansion input/output. Two devices (2 channels) can be connected with one adapter. To connect four devices (4 channels) to an expansion I/O, two adapters are required.	Required when expansion I/O is used.

[Commercial Parts]

Name	Application	Remark
External 24 VDC power supply *1	Supplied power for using the DIDO controller or transistor output	Refer to “Power supply for this device” in “Required parts” above for the power supply capacity.
Relay device	Requires commercially available relay device depending on the electric specifications with an external device.	

*1: Reference: Commercially available external 24 VDC power supply
Please designate and use the 24 VDC Power supply based on the Major safety standards UL60950-1, EN60950-1 or the products based on the PSE law.
The following tables shows some of the 24 VDC power supplies that are available on market.
Contact the manufacturer for details.

<4> Monitoring/operation by DIDO controller

<4-1> Outline

General equipment (lighting equipment, etc.) other than air conditioners and air conditioners other than our products can be monitored and operated from AE-200/AE-50/EW-50.
This section explains the procedures for monitoring and operating these devices from AE-200/AE-50/EW-50 by using the DIDO controller.

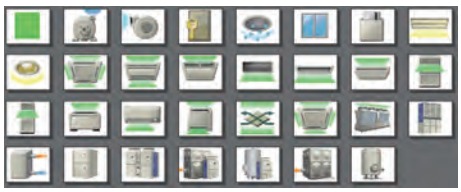
(1) Functions of DIDO controller
The following general equipment can be monitored and operated.

Examples of general equipment	Monitoring item	Operation item	Remarks
Lighting equipment	● Monitoring of ON/OFF state ● Monitoring of normal/abnormal state	Starting/stopping operation	● To monitor errors, an error output terminal must be provided on the general equipment side.
Ventilating fans			
Air conditioners other than our products			
Opening/closing of windows	Monitoring of open/closed state	–	
Upper limit water level of water tank	Monitoring of normal/abnormal state	–	
Lower limit water level of water tank	Monitoring of normal/abnormal state	–	

(2) Selection of general equipment monitoring/operating method
General equipment can be monitored and operated by the following two methods.
Select the method that suits your needs referring to the features and selection points.

Method / Explanation	Use of DIDO controller (PAC-YG66DCA)	Use of free contact of indoor unit
Features (screen for monitoring and operation)	● The devices can be easily monitored and operated from the LCD screen of AE-200/AE-50. ● They can be monitored and operated also from the Web browser screen of AE-200/AE-50/EW-50.	● The devices are displayed on the screen of TG-2000A. ● A system can be configured by using the connectors on the control board of indoor unit. (The DIDO controller and PLC for general equipment are not required.)
	● Schedules can be set.	● Schedules can be set from TG-2000A. (Schedules cannot be set on AE-200/AE-50/EW-50.)
	* When TG-2000A is used, they can be displayed also on the screen of TG-2000A.	* They cannot be displayed on the LCD screen of AE-200/AE-50.
		It is possible only to monitor the input/output state on the administrator's Web browser screen of AE-200/AE-50/EW-50. They cannot be operated.
Points of selection	● 6 general equipment can be connected to one DIDO controller. ● One contact of the DIDO controller is counted as one unit. When 6 general equipment are connected to one DIDO controller, they are counted as 6 units.	● Connect the general equipment to the connectors (input/output terminals) on the control board of indoor unit. ● Up to 4 input terminals and up to 3 output terminals of indoor unit can be used. ● M-NET addresses are not consumed. ● Up to 350 input/output contacts can be connected to one set of AE-200/AE-50/EW-50.*1
Required devices	● DIDO controller (PAC-YG66DCA)	For monitoring/operation of free contact *2 ● TG-2000A ● Adapter for free contact connection Adapter for remote starting and stopping (2 input points) Remote display kit for M control (2 input points and 3 output points) ● "PLC for General Equipments" license

*1: The function of the indoor unit free contact enables to connect up to 350 general equipment (7 input/output points × 50 devices in all). However, when the integrated software TG-2000A is used, up to 2000 general equipment can be connected by the indoor unit free contact function.
*2: The state of the indoor unit free contact can be monitored on the Web browser screen of AE-200/AE-50/EW-50.
The contact cannot be operated. To operate it, use TG-2000A.

Method / Explanation	Use of DIDO controller (PAC-YG66DCA)	Use of free contact of indoor unit
Icons which can be selected for general equipment	<Example of LCD screen of AE-200/AE-50> 	● Any icons created by the user can be registered on the screen of TG-2000A.
Necessity of license	● No license is required for monitoring and operating only. ● The "Interlock control" license is required to interlock the air conditioners and general equipment.	● No license is required for monitoring by using the Web browser screen of AE-200/AE-50/EW-50. ● For monitoring and operating by using TG-2000A: 1. The "PLC for General Equipments" license is required. 2. To interlock the air conditioners and general equipment, the "PLC for General Equipments" license or "Interlock control" license is required.
Reference for detailed explanation	● See the Instruction Book for AE-200/AE-50/EW-50.	● See the Instruction Book for AE-200/AE-50/EW-50 Web browser. ● TG-2000A: See the Instruction Book for TG-2000A.

<4-2> Configuration of general equipment monitoring/operating system

(1) By using DIDO controller

General equipment can be easily monitored and operated on the LCD screen of AE-200/AE-50 on a simple system. The devices can be monitored and operated also on the Web browser screen of AE-200/AE-50/EW-50.
They can be displayed also on the screen of TG-2000A.
Below explained are the procedures for monitoring and operating general equipment on the LCD screen of AE-200/AE-50 using the DIDO controller or monitoring and operating them on the Web browser of AE-200/AE-50/EW-50.
Up to 50 general equipment can be monitored and operated by one set of AE-200/AE-50/EW-50. When air conditioners are contained, the sum of the number of indoor units and the number of controlled general equipment is 50.
Six general equipment can be connected to one DIDO controller.

Monitoring the state on the screen

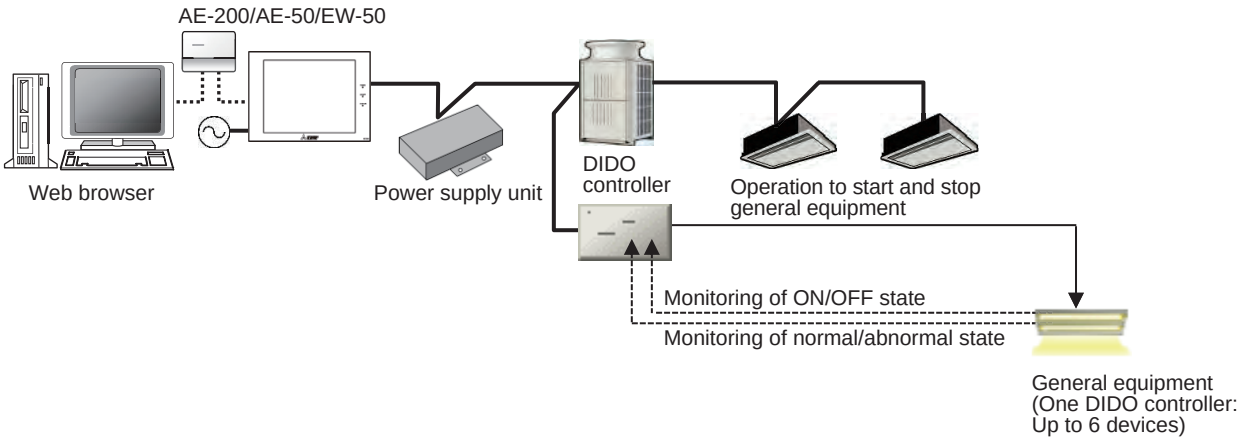
When the general equipment to be monitored has a terminal to output the ON/OFF state and normal/abnormal state, the state can be displayed on the LCD screen of AE-200/AE-50 or the Web browser screen of AE-200/AE-50/EW-50 by capturing the state signals by the general-purpose controller.
* To monitor the error state, the general equipment must have an error output terminal.
* It is possible to monitor one of the ON/OFF state and the normal/abnormal state.

Operating on the screen

When the general equipment to be operated has a terminal for starting and stopping operation, the state can be displayed on the LCD screen of AE-200/AE-50 or the Web browser screen of AE-200/AE-50/EW-50 by outputting the operation signal by the DIDO controller.
The device can be started and stopped at the predetermined time by the schedule setting function.

* When AT-50 is connected to a low-order system controller, the DIDO controller cannot be monitored on AT-50.

(2) Outline of system

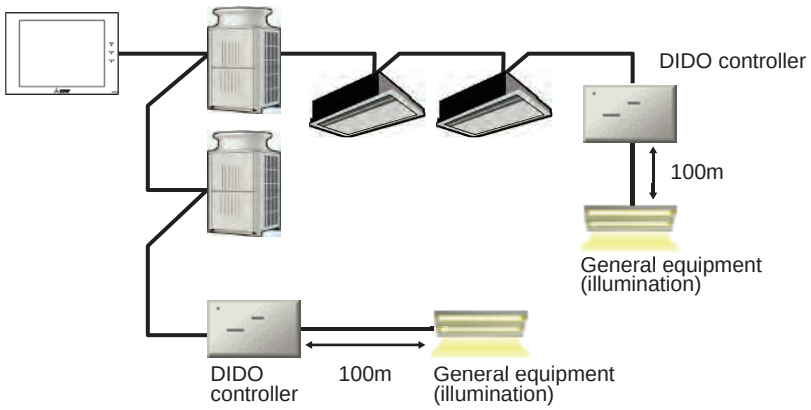


* Supplementary explanation
1. To connect general equipment and DIDO controller, field instrumentation work is required to connect them through relays, etc. For details, see 6. [3] <2> “Connection of the DIDO controller and signal lines.”
2. No license is required for monitoring or operation of general equipment.
   However, for interlock control among the monitored and operated general equipment or among the monitored and operated general equipment and the air conditioners connected to M-NET, the "Interlock control" license is required. For details, see Chapter 8, “Interlock Control.”

(3) Required devices

Device name (model name)	Manufacturer	Remarks
AE-200/AE-50/EW-50	Mitsubishi Electric	EW-50 enables monitoring and operation only from the Web browser and TG-2000A.
DIDO controller (PAC-YG66DCA)	Mitsubishi Electric	Up to 6 general equipment can be connected to one controller. To connect 3 or more general equipment to one DIDO controller, the following external input/output adapter is required.
External input/output adapter (PAC-YG10HA)	Mitsubishi Electric	To connect 3 or 4 general equipment to one DIDO controller, one set of the following external input/output adapter is required. To connect 5 or 6 general equipment to one DIDO controller, two sets of the following external input/output controller are required.
Power supply unit for transmission line (PAC-SC51KUA) Power supply expansion unit for transmission line (PAC-SF46EPA)	Mitsubishi Electric	Although the DIDO controller can be connected to AE-200/AE-50/EW-50 without the power supply unit, if a DIDO controller or a system remote controller exceeding the value of the supply capacity of AE-200/AE-50/EW-50 is connected to the transmission line for centralized control, the power supply unit for transmission line or the power supply expansion unit for transmission line is required.
Connection with general equipment (relay circuit, power supply, etc.)	Locally procured products (field work)	To connect the general equipment and DIDO controller, field instrumentation work for connection through relays is required.* For details, see 6. [3] <2> “Connection of the DIDO controller and signal lines.”

* The distance from the DIDO controller to general equipment must be up to 100 m.



(4) Required setting

Setting item	Description	Reference
Group setting	Registration of group of general equipment connected to AE-200/ AE-50/EW-50	Instruction Book for AE-200/AE-50/EW-50

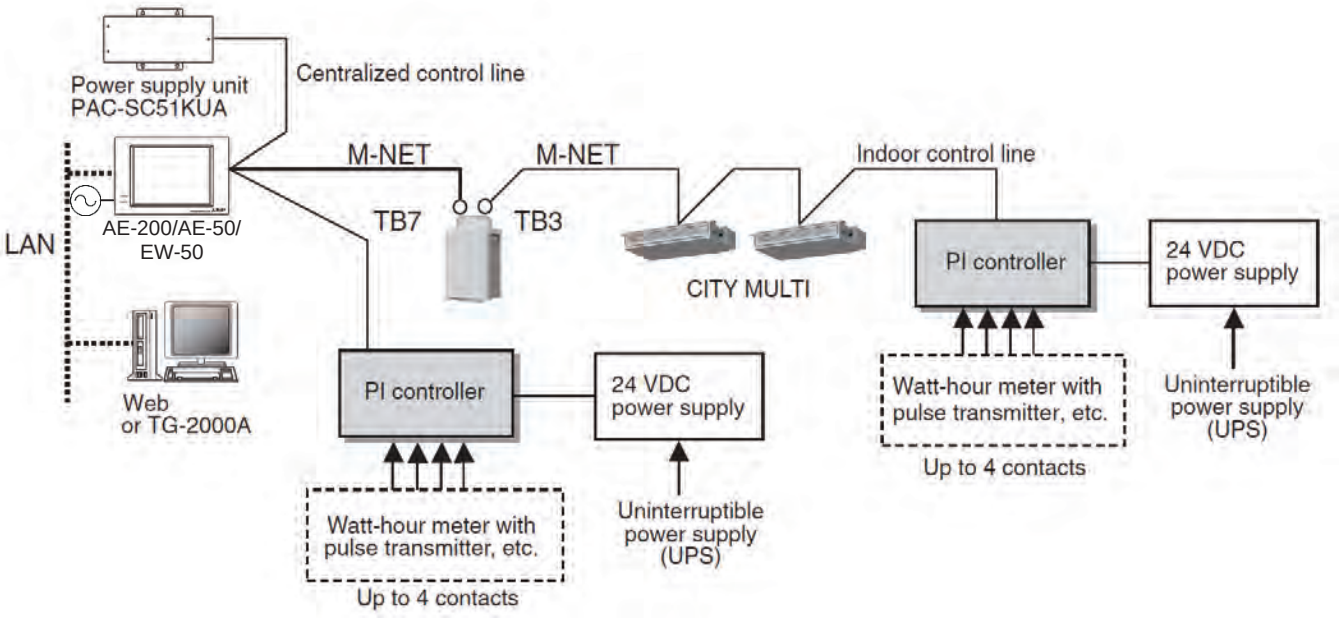
[4] PI controller

<1> Connection of the PI controller

PI controller is a device which counts pulse from a power meter, gas meter, water meter, and calorimeter.
On a control system with AE-200 (1 set) and 200 expansion controllers (AE-50/EW-50) (for 4 M-NET lines), up to 20 PI controllers (80 ch. in all) can be connected.
Meters that does not have pulse oscillation cannot be used with the PI controller. Add an external converter circuit to enable the use of pulse signal input.

Notes

- **Charge function will not work when there is combination of pulse count PLC and PI controller in a system. (For charge function, use either PLC or PI controller.)**
- Charging function is not available for the DIDO controller.
- It is recommended to connect the UPS to the PI controller power supply.

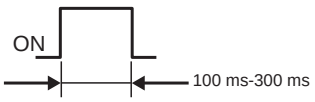


<2> Connection of PI controller and the signal wire

Terminal blocks and cables are field-supplied parts. The maximum allowable wiring length is 100 m.
Longer wiring is more susceptible to interference noise. It is recommended to keep the length within 10 m for longer wiring is more susceptible to noise.
The table below summarizes input/output signal specifications.

Terminal (Ch No.)	Input/ Output	Connection	Operation	Signal type	Explanation
Input terminal (Ch 1-4)	Input	Non-voltage contact input	Pulse count	Pulse	Calculates the measured value at the preset pulse unit (weight) Ex). 1 kWh per a pulse input in the case that the pulse unit (weight) is 1 kWh/pulse.

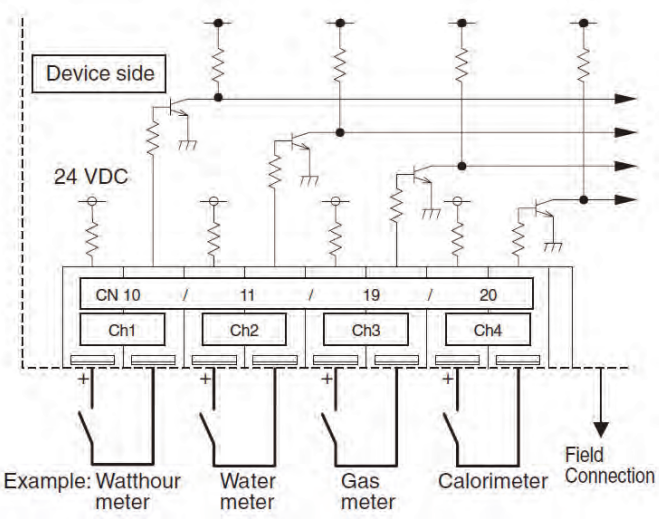
[Recommended watt-hour meter]
The table below shows the model of watt-hour consumption meter with pulse signal function.
Use the pulse-oscillation meters for gas, water and calorie as well.

Item	Explanation
Manufacturer (Reference)	MITSUBISHI ELECTRIC CORPORATION
Model name (Reference)	M1L (H) M-K11 (V), M1L (H) M-K12 (V) R, M2L (H) M-K11 (V), M2L (H) M-K12 (V) R, M7P-K30VR, M8P-K30VR
Output pulse method	Semiconductor relay
Pulse range	100-300 ms (100 ms or larger) Output non-voltage a-contact pulse for each pulse unit 
Output pulse unit	0.1/1.0/10/100 [kWh/pulse] *1 kWh/pulse or less recommended *1

*1: Use the watt-hour meter of 1 kWh or less/pulse for charge apportioning.

(a) Pulse input (non-voltage a-contact)

Certain settings are required before use. Refer to “Initial settings” in the Installation/Instructions Manual that came with the unit.



A pulse is counted each time the output pulse of the meter goes on.

Note Pulse unit (weight) can be set for each channel (Ch1-4).
Set the pulse unit (weight) from the AE-200/AE-50/EW-50 or TG-2000A.
* Make the “SC setting” (default value) for the dip switch SW02 (pulse unit (weight) value setting).

Note This unit is not applicable to the levelmethod meters.
When using the level-method meters, install the external convertible circuit for the pulse input.

CAUTION

- Be sure to match the polarity when using contacts that have polarity.
- Supply 24 VDC 1 mA from the positive terminal to the external contacts. Select the measuring instrument that works with its contact at 1 mA.
- It is recommended to use watt-hour meter with pulse unit of 1 kWh/pulse as the use of those with more kWh/pulse may cause greater margin of error for apportioning.
- Do not run the sensor input wire adjacent to M-NET transmission line and power supply cable.
- Peel off the sheath to 12 ±1 mm from the end, and securely insert the wire into the terminal.
- Do not let the copper wire short with the metal sheet parts (cover and bottom case) or other wires.
- Provide some slack in the wire to keep undue force from being exerted on the terminal block when the wire is pulled on. Use cable clamps or trunk terminals as necessary.

<3> Field supplied parts for the PI controller

Required parts	Specification
Unit fixing screws	M4 screw x 4 (* M4: 250 metric screw thread)
Power supply	Commercially available power supply: 24 VDC±10% 5 W Ripple noise: Lower than 200 mVp-p
Power line	Use a sheathed vinyl code or cable. At least 0.75 mm^2 (AWG18)
M-NET transmission line	Use a sheathed vinyl code or cable. Type of the cables·····CPEVS, CVVS or MVVS Size of the cables ·····(1) Solid wire: 1.2 mm-1.6 mm (2) Stranded wire: 1.25 mm^2 (AWG16) -2 mm^2 (AWG14) Power needs to be supplied to M-NET of this device. Use EW-50 or a separately purchased power supply unit for the transmission line. M-NET Power consumption coefficient is [1/4]
Signal	Use electric wire of an appropriate size for the terminal block of this device. Cable size···· (1) Solid wire: 0.65 mm (AWG21) -1.2 mm (AWG16) (2) Stranded wire: 0.75 mm^2 (AWG18) -1.25 mm^2 (AWG16) Single stand: At least 0.18 mm

[Optional Accessories]

Name	Model	Application	Remark
Power supply unit for transmission line	PAC-SC51KUA	Power supply to M-NET transmission line	Not required when power is supplied from an outdoor unit or AE-200/AE-50/EW-50.

[Commercial Parts]

Name	Application	Remark
External 24 VDC power supply *2	Supplies power to the PI controller	Refer to “Power supply for this device” in “Required parts” above for the power supply capacity.

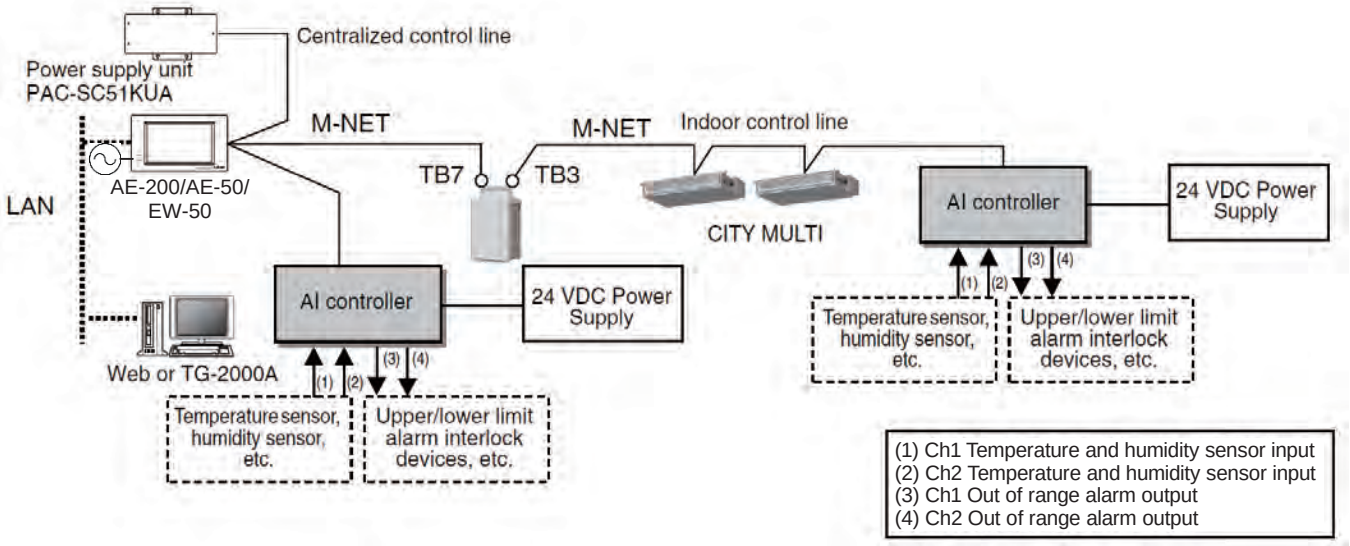
*2: Reference: Commercially available external 24 VDC power supply
Refer to the section marked with *1 in the “Field-supplied parts for the DIDO controller” for more details on commercially available external 24 VDC power supply.

[5] AI controller

<1> Connection for the AI controller

The AI controller is a device that measures temperature and humidity. The measurement data can be monitored from the AE-200/AE-50/EW-50, or TG-2000A. Settings can be made so that alarm signals are output when the measurement value exceeds a preset upper or lower limit.
Up to 50 AI controllers can be connected to each AE-200/AE-50/EW-50.
This device supports interlock operation functions such as ON/OFF of units or changing the set temperature for the indoor units and devices connected via M-NET, based on changes in temperature or humidity.
Do not use this device for disaster prevention control or security control.

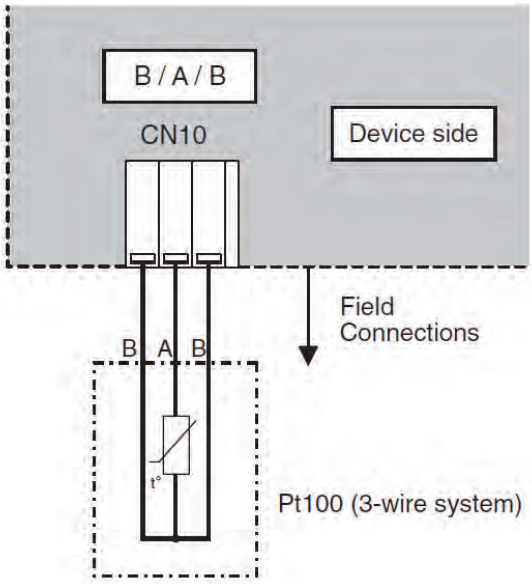
WARNING In particular, do not use this device in life critical applications.



<2> Connecting sensors to the AI controller

Ch 1 supports Pt100 detection, DC4-20 mA, 1-5 VDC, and 0-10 VDC analog input.
Ch 2 supports DC4-20 mA, 1-5 VDC, and 0-10 VDC analog input.
A different sensor can be connected to each Ch.The allowable wiring length depends on the sensor specifications.
However, it is recommended to keep the length within 12 m for longer wiring is more susceptible to noise.
Use a sensor cable with a shield, and connect the shield to the FG terminal on AI controller or on control board.

(a) Ch1 Pt100 input
Certain settings are required before use. Refer to “Initial settings” in the Installation/Instructions Manual that came with the unit.

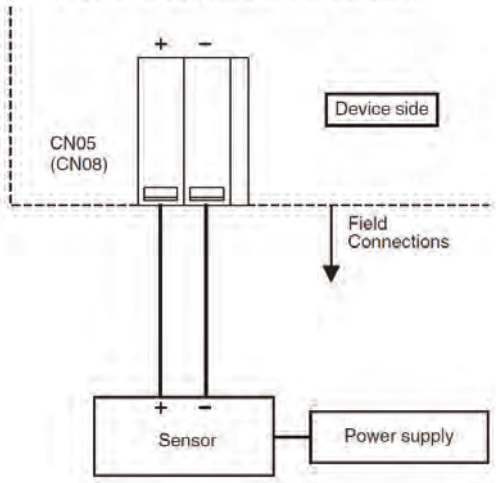


CAUTION

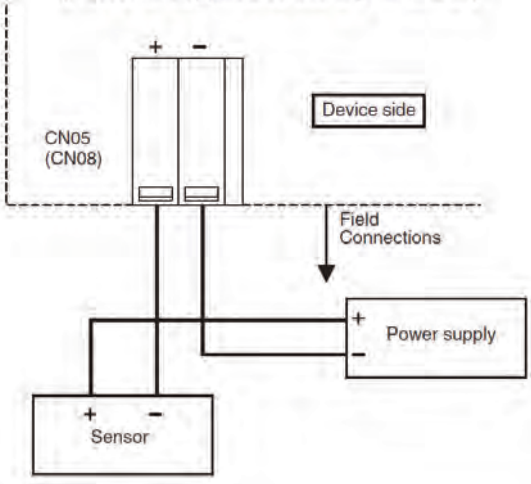
- Only use shielded cables.
- Pt100 has A and B poles. Observe the polarity.
- Do not run the sensor input wire adjacent to the M-NET transmission line and power supply cable. Do not let the cable form a loop.
- Strip 12±1 mm of the wire coating and insert firmly into the terminal.
- Make sure that the copper wiring is not short-circuiting the plates (cover, lower case) or neigboring wires.
- Perform wiring with some play so that the terminal block is not strained. If strained, use a wire guide or junction terminal to alleviate the stress on the terminal block.

(b) Ch1 (Ch2) Analog input (DC4-20 mA, DC1-5 V, DC0-10 V)
Certain settings are required before use. Refer to “Initial settings” in the Installation/Instructions Manual that came with the unit.

① 1-5 VDC, 0-10 VDC and 4-20 mADC
(Power is supplied to the sensor.)



② 4-20 mADC
(Power is supplied to the signal cable.)



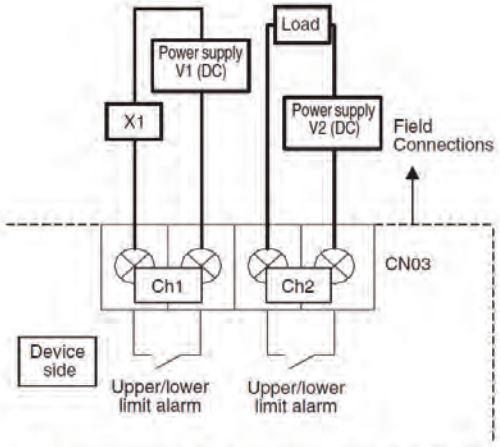
CAUTION

- Select the power supply that suits the sensor.
- Do not run the sensor input wire adjacent to M-NET transmission line and power supply cable. Do not let the cable form a loop.
- Peel off the sheath to 12 ±1 mm from the end, and securely insert the wire into the terminal.
- Do not let the copper wire short with the metal sheet parts (cover and bottom case) or other wires.
- Provide some slack in the wire to keep undue force from being exerted on the terminal block when the wire is pulled on. Use cable clamps or trunk terminals as necessary.

<3> Connecting upper/lower limit alarm (Non voltage contact)

The maximum wire length is 100 m. Longer wiring is more vulnerable to noise interference. It is recommended to keep the length within 10 m for longer wiring is more susceptible to noise.
Certain settings are required before use. Refer to section “Initial settings” in the Installation/Instructions Manual that came with the unit.
The output signal specifications are shown below.
When the temperature or humidity exceeds the upper or lower limit alarm value specified on the measurement setting screen on the main unit LCD screen or Web browser screen, a level signal can be output from the terminal of ch1 or ch2.
For the setting of the upper and lower limit alarm values, see the Instruction Book for AE-200/AE-50/EW-50.

Terminal (Ch No.)	Input/ output	Connection	Usability	Signal type	Refrirant Type
Standard terminals (ch1, ch2)	Output	Non-voltage contact output	upper and lower limits	Level	Upper/lower limit alarm detected: contact closed; Upper/lower limit alarm not detected: contact open.



Tightening torque for terminal screws: 1 N · m.

* While the upper/lower limit alarm is being detected, the built-in relay contact will always be ON. (level signal output)

CAUTION

- Use the relay (X1) that meets the following specifications.
  Operating coil
  [Load]
  Maximum: 24 VDC, 5 W (Built-in diode)
  Minimum: 5 VDC, 2 mW (Built-in diode)
  *1: AC loads cannot be connected.
  *2: Provide the power supply (V1, V2) that matches the load and relay to be used.
- To drive a direct load, use ones within the followings.
  [Load]
  Maximum: 24 VDC, 5 W
  Minimum: 5 VDC, 2 mW
  * AC loads cannot be connected.
- Do not let the copper wire short with the metal sheet parts (cover and bottom case) or other wires.
- Provide some slack in the wire to keep undue force from being exerted on the terminal block when the wire is pulled on. Use cable clamps or trunk terminals as necessary.
- To keep water from trickling down the cable and causing current leak or fire, do not route the cable from the top of the control board directly to the terminal block on the controller.

<4> Field-supplied parts for the AI controller

Required parts	Specification
Unit fixing screws	M4 screw x 4 (* M4: 250 metric screw thread)
Power supply for this device	Commercially available power supply: 24 VDC±10% 5 W Ripple noise: Lower than 200 mVp-p
Power supply for sensors	A separate power supply may be required for sensors. When 24 VDC is used, power can be supplied to the sensor by increasing the capacity of the power supply to the AI controller using it to feed power to the sensor.
Power line	Use a sheathed vinyl code or cable. At least 0.75 mm^2 (AWG18)
M-NET transmission line	Use a sheathed vinyl code or cable. Type of the cables·····CPEVS, CVVS or MVVS Size of the cables ·····(1) Solid wire: 1.2 mm-1.6 mm (2) Stranded wire: 1.25 mm^2 (AWG16) -2 mm^2 (AWG14) Power needs to be supplied to M-NET of this device. Use an outdoor unit or a separately purchased power supply unit for the transmission line. M-NET Power consumption coefficient is [1/4].
Signal	Use electric wire of an appropriate size for the terminal block of this device. Select the signal wire based on the sensor specifications. Only use shielded cables. Cable size···· (1) Solid wire: 0.65 mm (AWG21) -1.2 mm (AWG16) (2) Stranded wire: 0.75 mm^2 (AWG18) -1.25 mm^2 (AWG16) Single stand: At least 0.18 mm

[Optional Accessories]

Name	Model	Application	Remark
Power supply unit for transmission line	PAC-SC51KUA	Power supply to M-NET transmission line	Not required when power is supplied from an outdoor unit or AE-200/AE-50/EW-50.

[Commercial Parts]

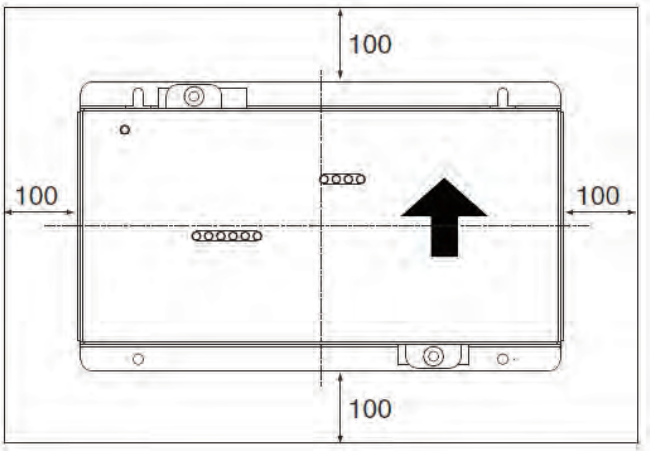
Name	Application	Remark
External 24 VDC power supply *1	Supplies power to the AI controller	Refer to “Power supply for this device” and “Power supply for sensors” in “Required parts” above for the power supply capacity.
Sensor	Measures temperature and humidity	Temperature sensor (PAC-SE40TSA, PAC-SE41TS) cannot be connected.

*1: Reference: Commercially available external 24 VDC power supply
Refer to the section marked with *1 in the “Field-supplied parts for the DIDO controller” for more details on commercially available external 24 VDC power supply.

[6] Installation/Wiring method (applicable to all controllers)

<1> Installation

DIDO, PI, or AI controller does not have a waterproof structure.
Prepare a control panel capable of storing the controller such as the one shown in the figure below. Install the controller (device) in a controller panel strong enough to withstand a weight of 0.6kg [13/8 lbs].
This device can be installed flat or vertically. Clear the space shown below when installing.



Space required to install a controller

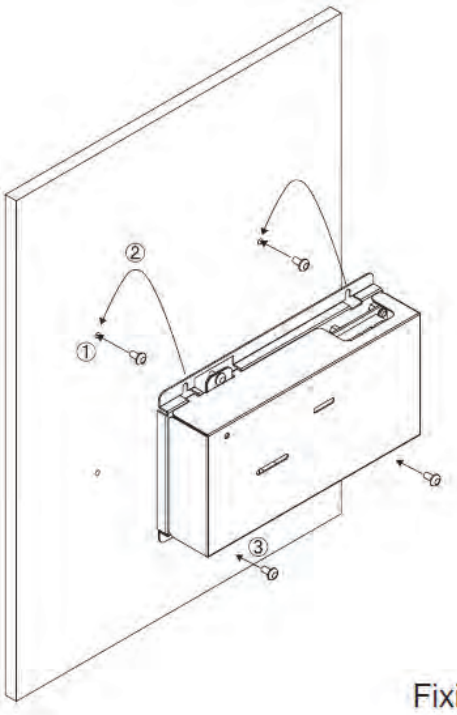
Size of the device: 200 (W) x120 (H) x 45 (D) mm

Unit: mm

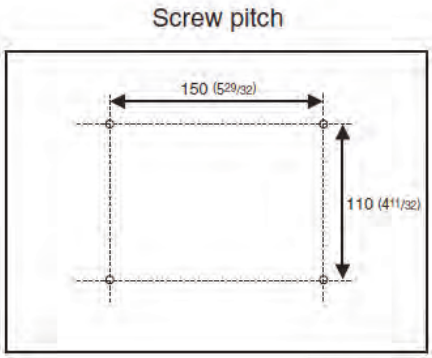
Notes

- The space indicated above does not include the space for peripheral parts.
  The amount of space required for installation depends on which functions are used and how the cables are routed.
  Secure adequate space for a given type of installation.
- In the case of installing horizontally in the control board, the upper part of the cover should be hooked to the lower case, as it is originally designed to be installed vertically.
  For horizontal installation, be sure to install carefully holding the upper case and screwfix with the lower case to avoid the fall.

(1) Fix the top of this device to the control panel at two points by loosely tightening the screws (M4) procured locally.
Fix the bottom in place with two screws and then tighten all four of the screws.

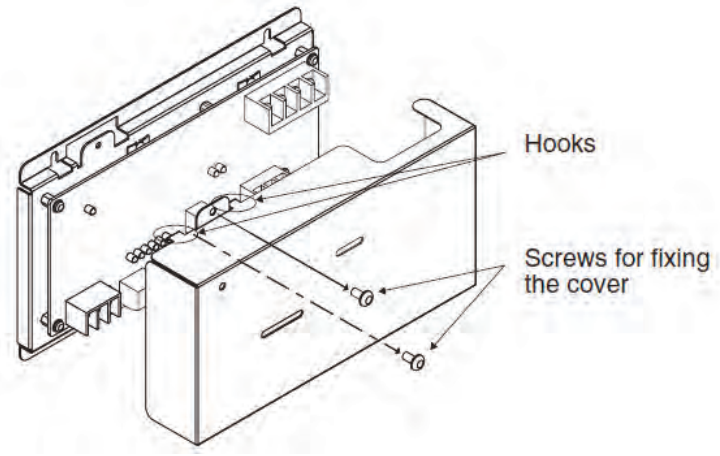


Fixing the unit



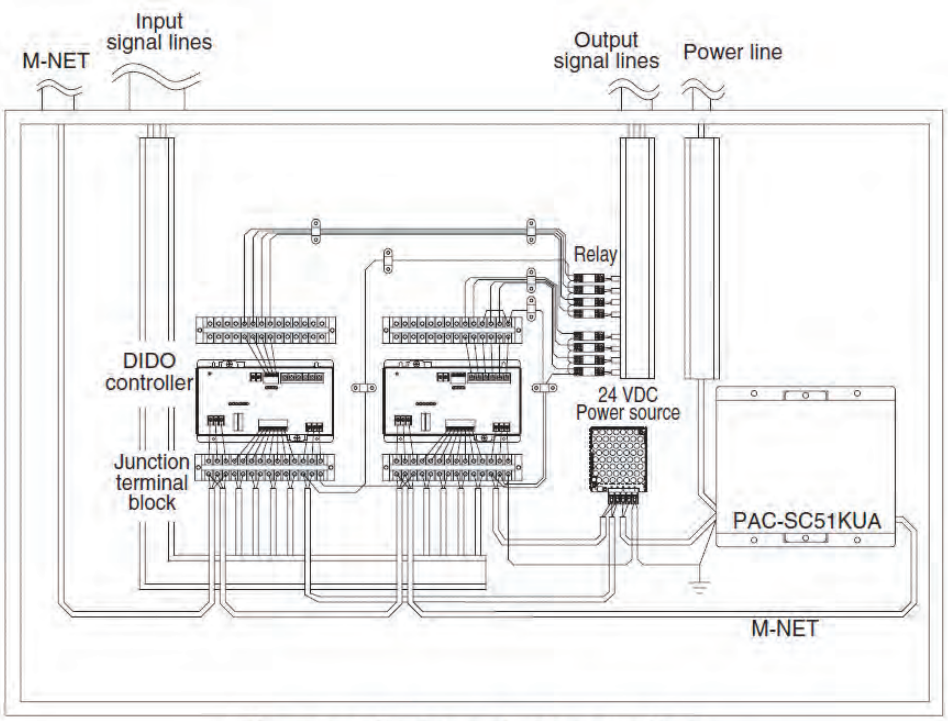
Unit: mm (in)

(2) To remove the cover, as shown in the figure, remove the two screws fixing the cover and then remove the cover by unhooking the upper hook section from the lower case.
To attach the cover, hook the upper hook section on the lower case and then fix the cover in place with the two screws that were removed.



Note Two hooks are located on the upper section of the cover.

(3) Connect the power wire and M-NET transmission line by following the instructions in the section “Connecting the power wire and M-NET line.”



* The wiring in the diagram has been simplified.

Inside the control panel (DIDO Controller)

CAUTION

- Perform wiring with some play so that the terminal block is not strained. If strained, use a wire guide or junction terminal to alleviate the stress on the terminal block.
- Do not connect the wires directly from the top of the control panel to the terminal block. Moisture may enter this device along the wiring and cause electric shock or wire.

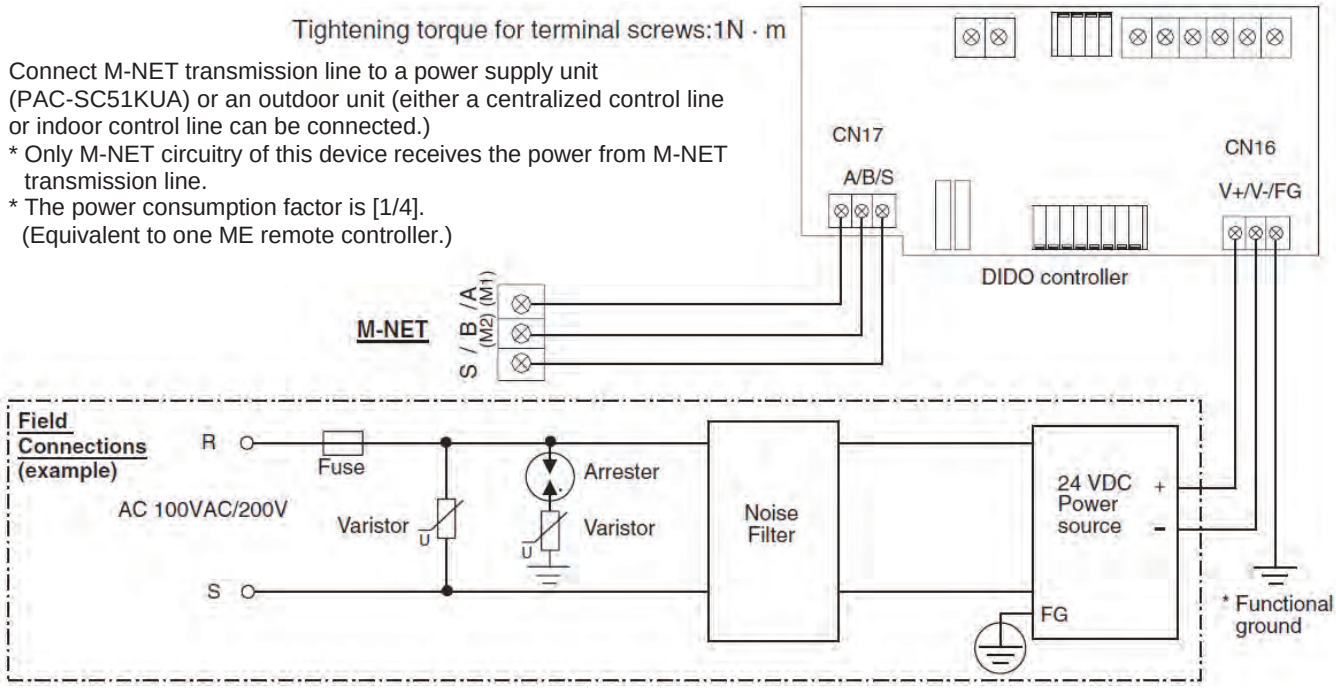
Note

Do not install the input signal wire alongside or in contact with M-NET transmission line or other wires.

<2> Connecting the power wire and M-NET cable

Tightening torque for terminal screws:1N · m

Connect M-NET transmission line to a power supply unit (PAC-SC51KUA) or an outdoor unit (either a centralized control line or indoor control line can be connected.)
* Only M-NET circuitry of this device receives the power from M-NET transmission line.
* The power consumption factor is [1/4]. (Equivalent to one ME remote controller.)



CAUTION

- Use a power line and M-NET transmission line that satisfy the specifications described in “Parts to Procured Locally”.
- Attach a circuit comprising the following component to the supply primary side of the 24 VDC power supply. (1) Varistor (2) Arrester (3) Noise filter (4) Fuse
- It is important to pay attention to the polarity when connecting the 24 VDC power supply terminal block. Connecting the positive and negative in the reverse order will cause a failure.
- Fix the power line and M-NET transmission line in place on the outside to ensure that the terminal block is not affected by any external force.
  Not securely connecting and fixing the wires in place may cause heat generation and fire.
- Make sure that the copper wiring is not short-circuiting the plates (cover, lower case) or neigboring wires. Cover the shielded line of M-NET transmission line with materials such as vinyl tape and prevent short-circuiting with the plates.

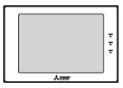
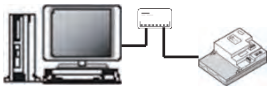
Note If this device is connected to an M-NET indoor control line and the outdoor control unit shuts down due to service failure, the DIDO controller cannot be controlled from the system controller.

Note The use of an uninterruptible power supply (UPS) is recommended for PI controllers in order to prevent the loss of pulse data in the event of a power failure.
If the connection of the UPS is not possible, it is recommended that the power of the 24 VDC-objective unit (100/200 VAC system) is supplied from the same power source as the AC power supply line.

7. Schedule Function

AE-200, AE-50 and EW-50 have a weekly (5 kinds), annual and daily scheduling function.

[1] Outline

	AE-200/AE-50	AE-200/AE-50/EW-50 Web	TG-2000A
			
Schedule setting	Setting on AE-200/AE-50	Setting on Web monitoring PC	Setting on TG-2000A software
Weekly schedule	No. of operation per day: 24 times Operation items: ON/OFF, set temperature, operation mode, fanspeed, air flow direction, local remote controller prohibition/permision Time setting unit: 1 minute Operation subjects: Group, Block, All groups Pattern: 5 different schedule settings can be made. Each schedule can have time period. (Weekly 1, Weekly 2, Weekly 3, Weekly 4, Weekly 5) * Operation settings can be made separately such as “Set temperature only” or “Operation mode only”.		No. of operation per day:24 times Operation items: ON/OFF, set temperature, operation mode, fanspeed, air flow direction, local remote controller prohibition/permision Time setting unit: 1 minute Operation subjects: Groups, (All) Floors blocks, Whole building Pattern: Possible to set for 5 patterns for Summer/Winter * Operation settings can be made separately such as “Set temperature only” or “Operation mode only”.
Annual schedule	Possible to set for a maximum of 50 days and up to 24 months including the current month No. of pattern: 5 patterns		
Today schedule	Today schedule can be changed without changing the weekly schedules or the annual schedules.		
Optimized start-up	Units start automatically in order to reach the scheduled temperature at the scheduled time.		

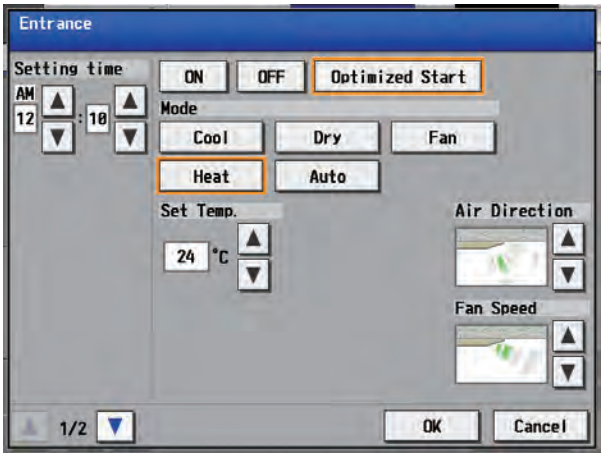
(1) What is the weekly schedule?
This term refers to the operation schedule of each day of the week.

(2) What is the seasonal schedule?
5 sets of weekly schedules (Weekly 1, Weekly 2, Weekly 3, Weekly 4, Weekly 5) can be set, and each can be designated its scheduled term.

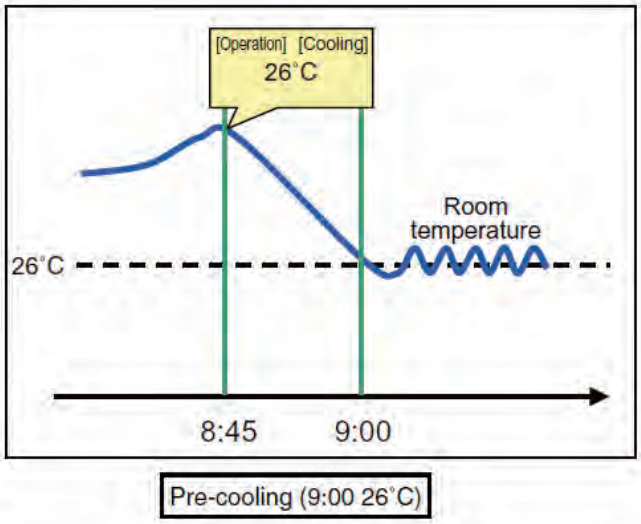
(3) What is the annual schedule?
In addition to the weekly schedule, for special days (national holidays, summer vacation, and etc.) a different schedule can be set for a maximum of 50 days up to 24 months (including the current month) in advance.
During the days set in the annual schedule, the weekly schedule settings will not be performed while the schedule set in the annual schedule will be performed.

(4) What is today’s schedule?
After setting the weekly and annual schedules, today’s schedule can be used for sudden changes in the regular schedule.
When today’s schedule is set, the weekly and annual schedule settings will not be performed.
However, from the following day, operations will resume according to the weekly and annual schedules settings.

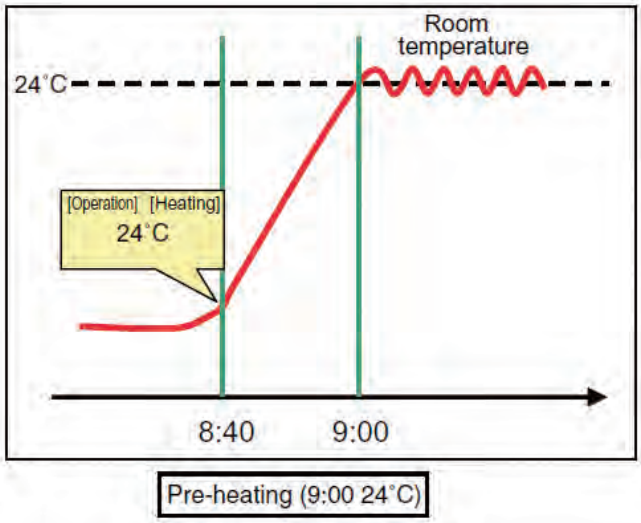
(5) Optimized start-up function
When this function is scheduled, the units start automatically in order to reach the scheduled temperature at the scheduled time. To schedule this function, select “Optimized startup” button on schedule setting screen.



The left graph below shows the example to make the room temperature 26°C at 9:00 during cooling operation.
The right graph shows the example to make the room temperature 24°C at 9:00 during heating operation.



Pre-cooling (9:00 26˚C)



Pre-heating (9:00 24˚C)

[2] Annual/Weekly/Today schedule

The annual, weekly (Weekly 1 to Weekly 5) and today's schedules can be set on the main unit or Web browser by the standard function of AE-200/AE-50/EW-50.

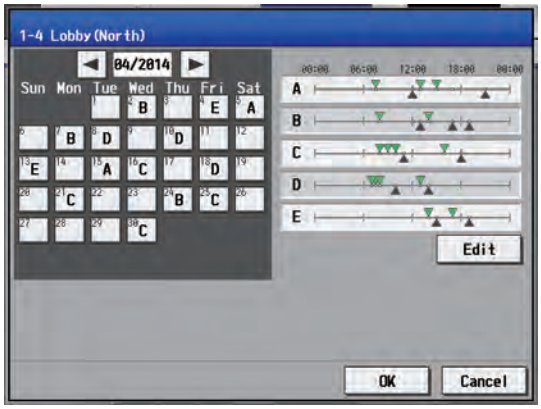
[Weekly schedule]
1. It can be set in 1-minute interval.
2. Items can be set 24 times per a day (each day of a week).
   8 times per day for HWHP (QAHV) (each day of a week)
   Partial setting, such as only operation mode setting or temperature setting, is available.
3. Settable items are as follows; ON/OFF, operation mode, temperature, fan speed, air flow direction, and operation prohibition from the local remote controllers.
4. Objectives can be set for each group, block, floor or all groups.
5. 5 patterns of weekly schedule (Weekly 1 to Weekly 5) can be set.
6. The period (month, day) for each of Weekly 1 to Weekly 5 can be set.

[Annual schedule]
1. It can be set in 1-minute interval.
2. 50 specific days can be set within the period of 24 months including the current month.
3. Objectives can be set for each group, block, floor or all groups collectively.
4. Up to 5 schedule patterns can be set and allotted each pattern to a specified day.
   (Setting contents are the same as the weekly schedule.)
   Weekly and seasonal schedule shall not be executed on the day the annual schedule is also set.

[Today schedule]
1. It can be set in 1-minute interval.
2. Objectives can be set for each group, block, floor or all groups collectively.
3. The today's schedule is implemented in priority to other schedules.
   (Setting contents are the same as the weekly schedule.)

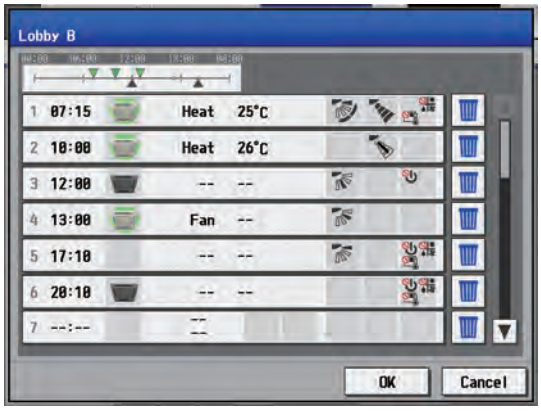
<1> Setting on main unit LCD screen

Annual schedule

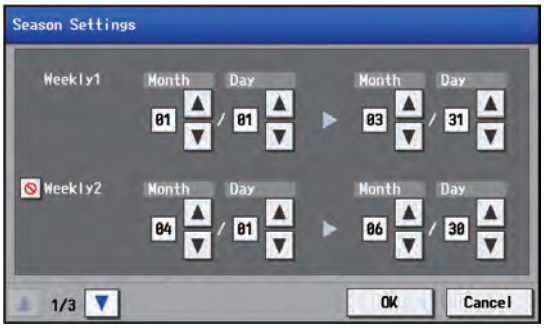


Weekly schedule

Today schedule

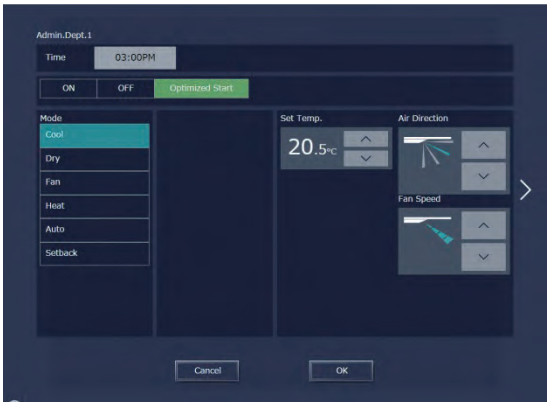


Season setting

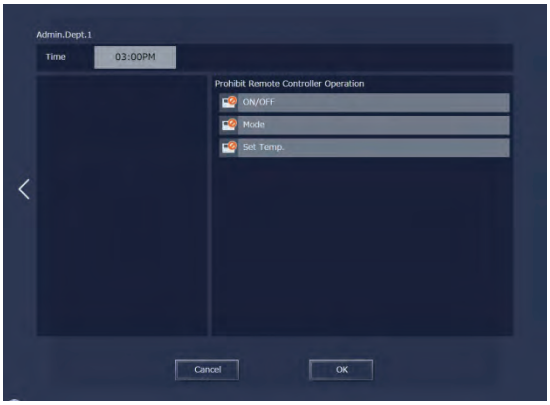


<2> Setting on Web browser

<Weekly scheduling screen Details>



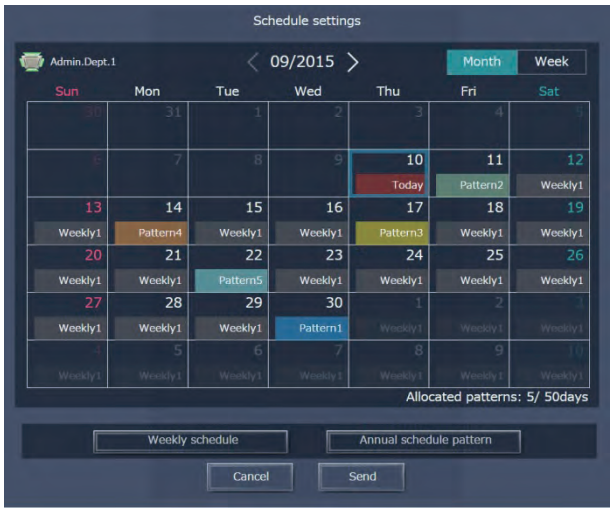
<Weekly scheduling screen>



Set the details of operations for each setting unit (group, block or all groups) on the screen shown left.

<Schedule period setting screen>

<Annual schedule period setting screen>

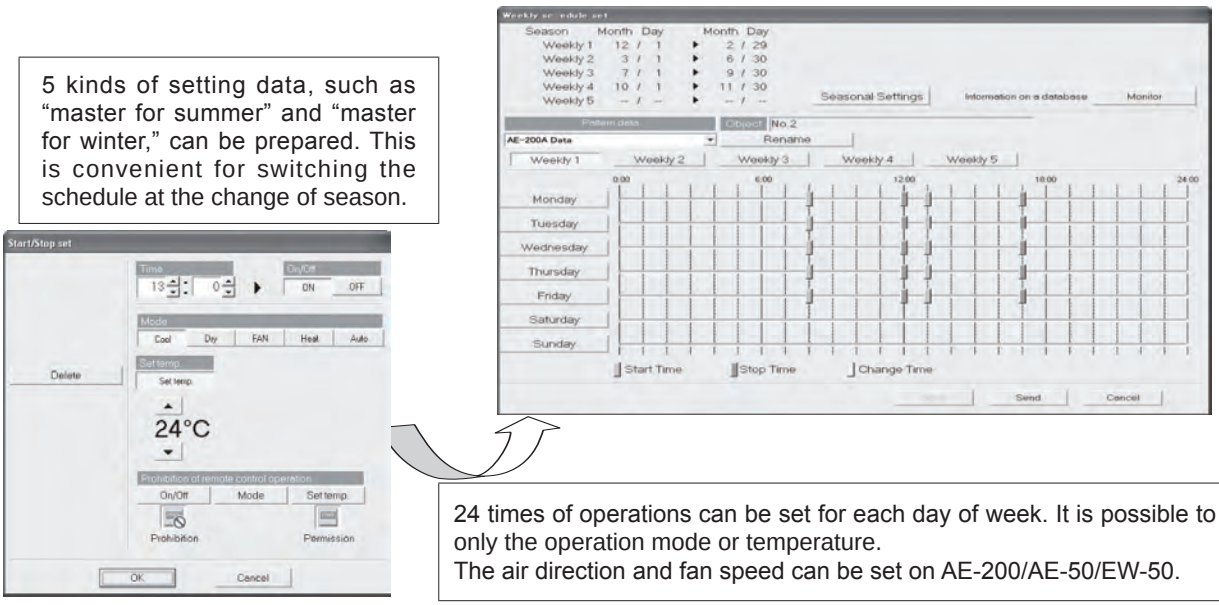


<3> Weekly schedule of TG-2000A

The integrated software TG-2000A allows scheduling for air conditioners without consciousness of AE-200/AE-50/EW-50. Set the schedule for each setting object (group, block, floor, etc.).

<TG-2000A schedule setting screen>

5 kinds of setting data, such as “master for summer” and “master for winter,” can be prepared. This is convenient for switching the schedule at the change of season.



24 times of operations can be set for each day of week. It is possible to set only the operation mode or temperature.
The air direction and fan speed can be set on AE-200/AE-50/EW-50.

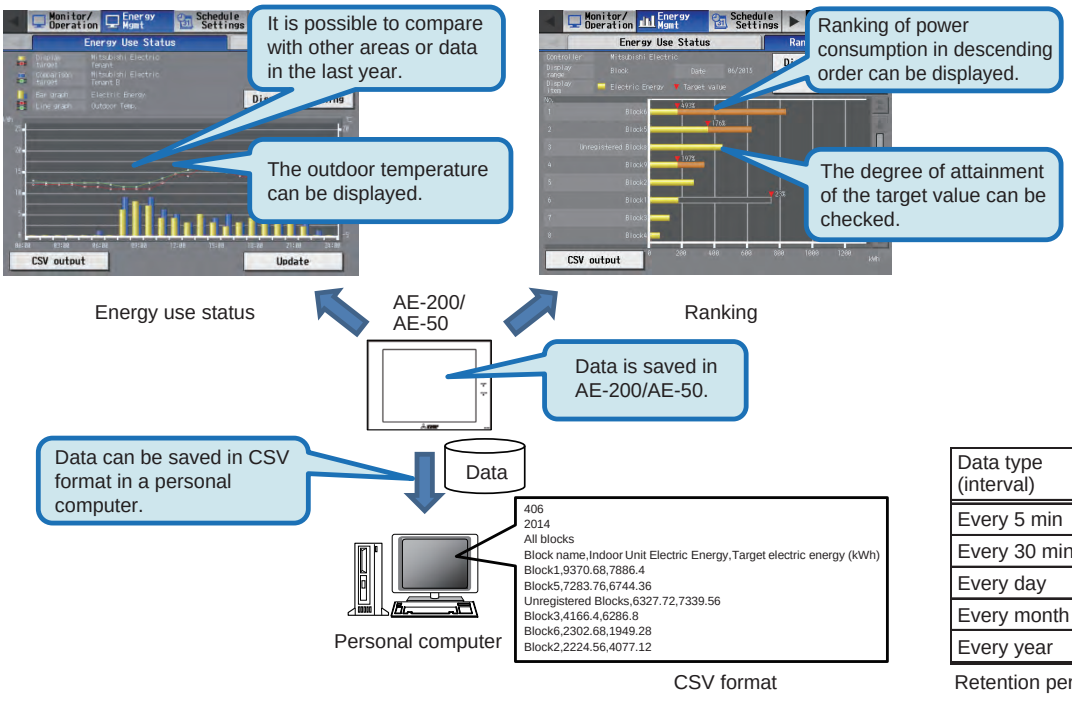
The scheduling function of TG-2000A can change the schedules set by AE-200/AE-50/EW-50 in the same manner as the settings on the Web browser.

8. Energy Management Function

[1] Outline

The energy management function can graphically display the conditions relating to energy management, such as power consumption, operation time and outdoor temperature.
The energy management data is saved in AE-200/AE-50 and can be output in CSV format to a personal computer.
5-minute, 30-minute, daily, monthly and yearly data are saved. The data are retained for 2 months (5-minute), 25 months (30-minute, daily and monthly) and 5 years (yearly).
For more information, see 8.[11]<5> “List of energy management data.”
It is possible to display the data of each block, group or unit address specifying the day, month and year and check the status of use of energy by the relevant indoor unit in detail.
It is possible to display the status of use of energy by indoor units in different areas (blocks) on the same screen for comparison.
The data can be compared with the data in the last year.
This function visualizes the energy and, therefore, can be used for the following purposes.

1. Understanding of current status
   The actual energy (electric energy) use status and operation condition (operation time, temperature setting, etc.) can be understood.
   According to the operation condition, it is possible to check for wasteful factors (failure to turn off, excessive temperature setting, etc.) and examine the energy-saving measures.
2. Confirmation of effect of energy-saving
   The reduction in power consumption after the energy-saving measures are taken and the effect of improvement of operation condition can be confirmed.
3. Understanding of condition of air conditioner
   It is possible to check that the power consumption of each air conditioner is appropriate to the operation time.
   If the power consumption of any air conditioner is not appropriate, the capability of the air conditioner may have decreased, or the external environment may have affected it. Checking the condition can give an opportunity to examine the air conditioner.



CSV format

Data type (interval)	Data retention period
Every 5 min	Last 2 months
Every 30 min	Last 25 months
Every day	Last 25 months
Every month	Last 25 months
Every year	Last 5 years

Retention period of CSV data

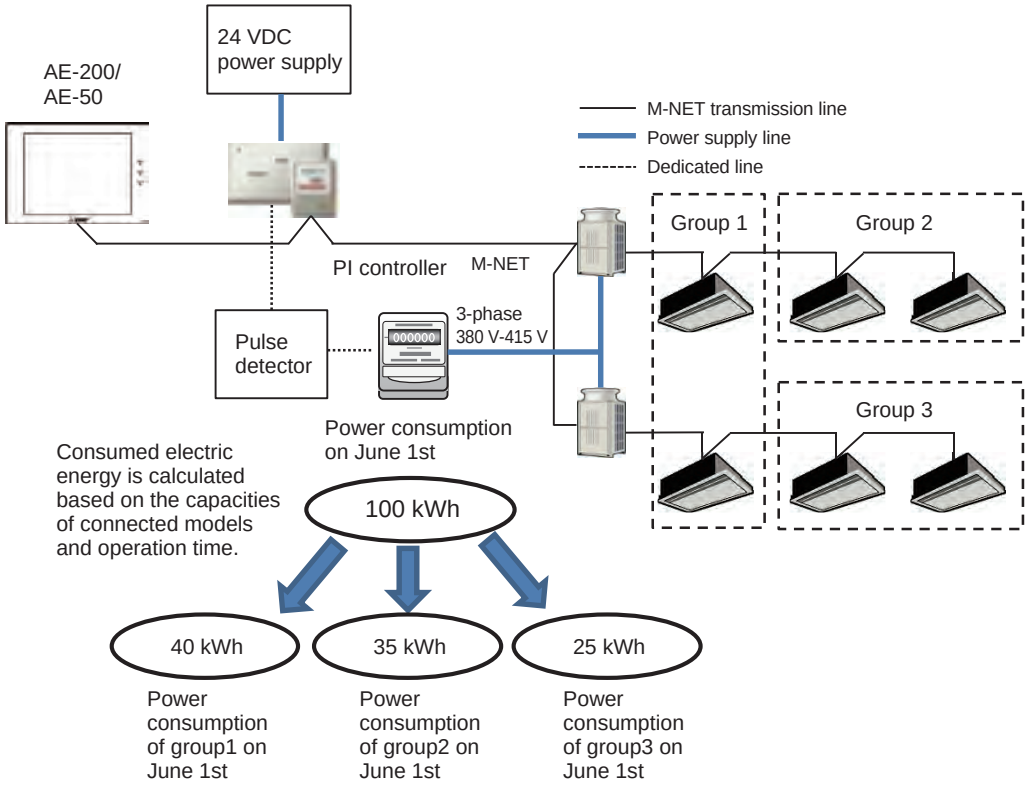
Remarks

- In case of failure of AE-200/AE-50, periodically save the energy management data in a personal computer. For the saving procedure, see 4.[10] “Data downloading” and 4.[11] “CSV output.”
- For more information on the retention period of CSV data, see 4.[11]<5> “Energy management data list.”
- The power consumption is calculated based on the electric energy consumed by outdoor units. The power consumption of indoor units is not taken into account. The power consumption data shall be used for reference only.
- The power consumption calculated by the energy management function must not be used for charging tenants for air conditioning fee.
  The data cannot be used for transactions or certifications (by measurement) prescribed by the Measurement Act.
- The energy management function cannot be used for air feeding fans, devices connected to DIDO controller or devices connected to PLC for general equipment.
  For the possibility of apportionment of electric energy, see 4.[4]<3> “Selection of apportionment mode when more than one models are connected.”

[2] Electric energy calculation method

<1> Calculation of electric energy

The energy management function apportions the power consumption of the outdoor units according to the amount of operation (usage) of each indoor unit and calculates the electric energy consumed by each indoor unit.
The calculated power consumption is displayed graphically on the energy use status and ranking screens.
Only the power consumption of outdoor units is included in the calculation.
The power consumption of indoor units is not included.



Note: The indication of the power supplies for the indoor units is omitted.

<2> Transition of energy management screens

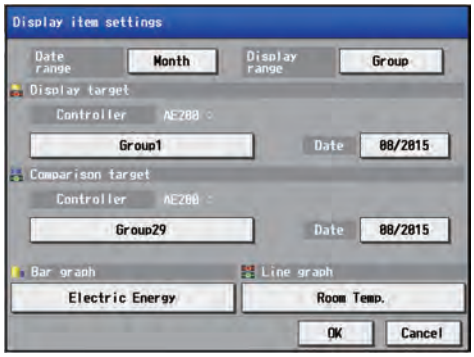
To display the energy use status and ranking, it is necessary to set the date, display device and display item.
To display the target values on a graph, it is necessary to set the target values.
Transition of these screens is shown below.

(1) Energy use status

Touch [Display switching].

Touch [OK] or [Cancel].

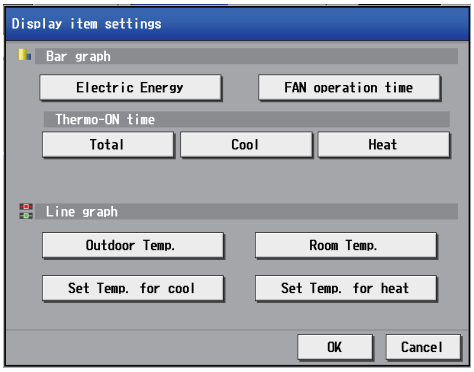
Set the target to be displayed on the graph and the period.



Touch [Bar graph] or [Line graph].

Touch [OK] or [Cancel].

Select the item to be displayed in bar graph or line graph.

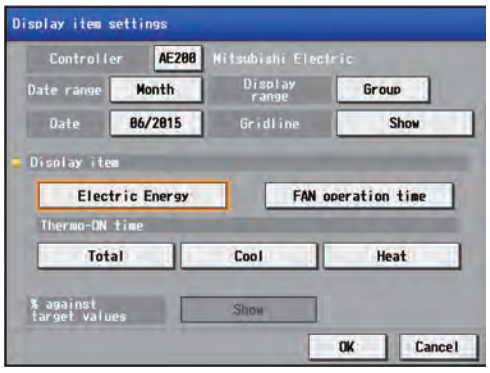


(2) Ranking

Touch [Display switching].

Touch [OK] or [Cancel].

Set the target of ranking to be displayed, date and display item.

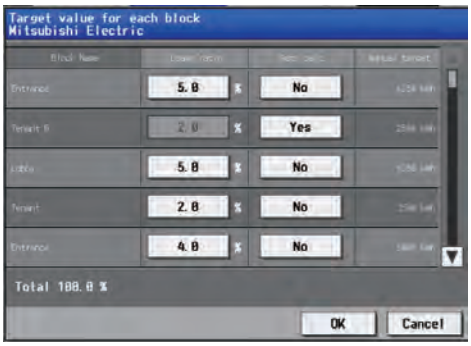


(3) Setting of target values

Touch [Edit] of [Target value for each block].

Touch [OK] or [Cancel].

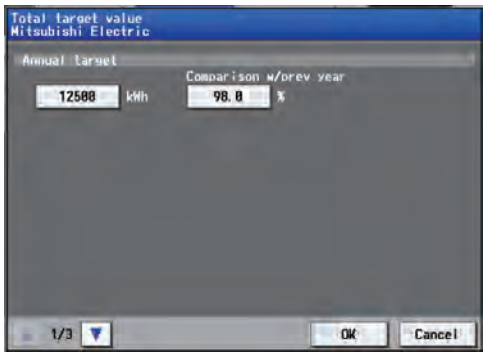
Set the usage ratio of each block.



Touch [Edit] of [Total target value].

Touch [OK] or [Cancel].

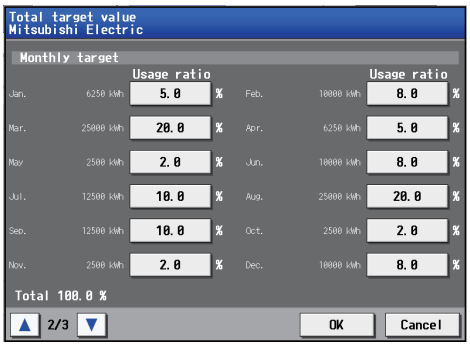
Set the usage ratio in each month.



Touch [▼].

Touch [▲].

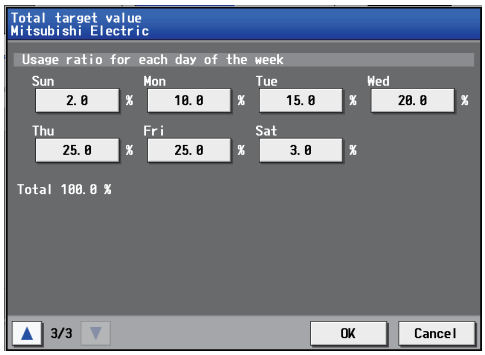
Set the usage ratio in each month.



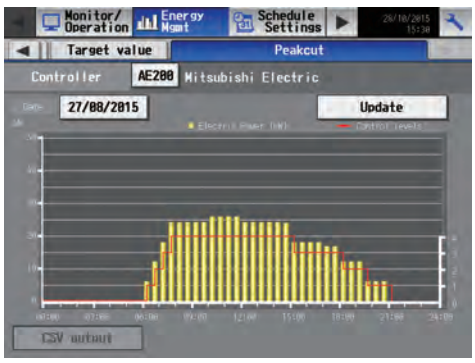
Touch [▼].

Touch [▲].

Set the usage ratio on each day of the week.



(4) Peak cut control status



<3> Apportionment mode (base data for apportionment)

Select the base data for apportionment among outdoor units from the following three items.
Set the mode on the Web browser for initial setting.
For the setting procedure, see 5.[5]<2> “Setting of apportionment mode for indoor units.”

(1) Capacity save amount … Default
(2) Thermo ON time (time of use of refrigerant)
(3) FAN operation time (working time)

The differences among these apportionment modes are shown in the following table.

	Capacity save amount	Thermo ON time	FAN operation time
Measurement method	Value approximate to amount of refrigerant used by each indoor unit	Time during which refrigerant is being fed into each indoor unit	Operation time of indoor unit
Accuracy of apportionment	◎	○	△
	Since the calculation is based on values approximate to the amounts of refrigerant fed into the indoor units, the power consumption can be calculated with the highest accuracy.	The time during which the cooling thermostat is on or the heating thermostat is on is counted. The time of air blowing (the refrigerant is not used) is not counted.	Since the FAN operation time is counted, the time of air blowing is also counted.

If Mr. Slim air conditioner is used, power can be apportioned based on “Capacity save amount” in the outdoor unit apportionment mode only when the following model of M-NET adapter is used. If another model is used, set the apportionment mode based on “Thermo ON time” or “FAN operation time.”
M-NET adapter: PAC-SJ10MA, PAC-SJ18MA and PAC-SJ31MA

<4> Selection of apportionment mode when more than one models are connected

The applicable apportionment modes vary depending on the connected models.
Select the apportionment mode for each set of AE-200/AE-50 according to the following table.

Note: If an apportionment mode inapplicable to a connected model is selected, the electric energy cannot be calculated correctly. Select an apportionment mode applicable to all connected models.

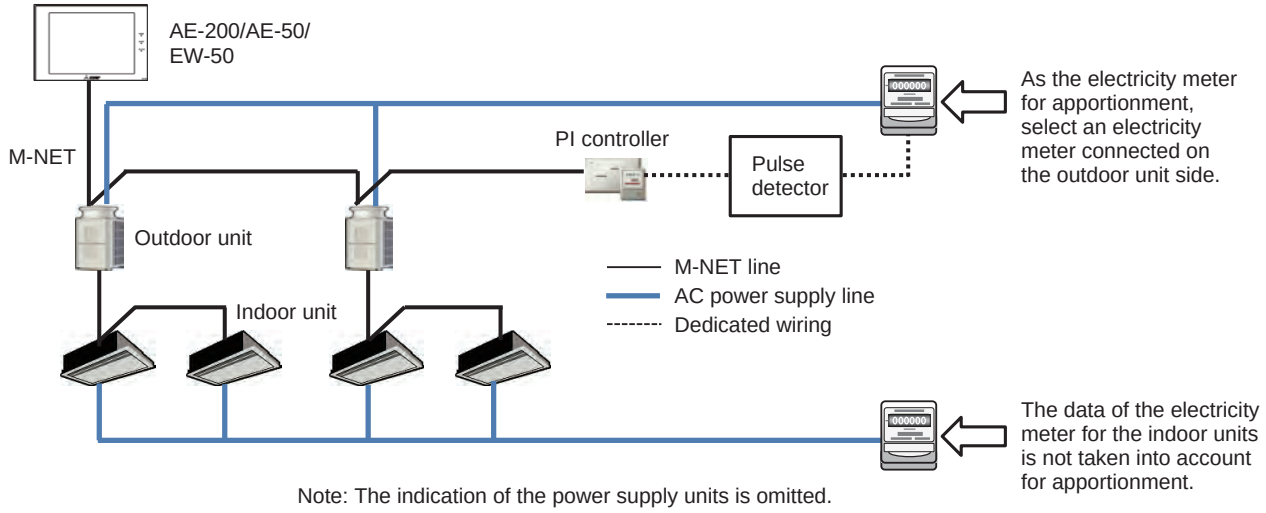
Electric energy apportionment mode	CITY MULTI (Including Multi S)	CITY MULTI (HVRF series)	Equipment PAC	A-control	RAC/HAC		Free plan LOSSNAY	
				Mr. Slim (simultaneous)	Independent	Multi	Interlocked	Independent
Capacity save amount	○	*1	○	○	–	–	–	–
Thermo ON time	○	○	○	○	–	–	–	–
FAN operation time	○	○	○	○	–	–	–	–

Electric energy apportionment mode	OA Processing Unit		Air to Water (PWFY)	HWHP (CAHV) HWHP (CAHV, CRHV, QAHV)	Device connected to DIDO controller	Device connected to PLC for general equipment	Heat storage model	Chiller
	Interlocked	Independent						
Capacity save amount	–	○	○	–	–	–	–	–
Thermo ON time	–	○	○	–	–	–	–	–
FAN operation time	○	○	○	–	–	–	–	–

*1: Apportioned based on Thermo-ON time, even when the setting is made to apportion it based on the capacity save amount.

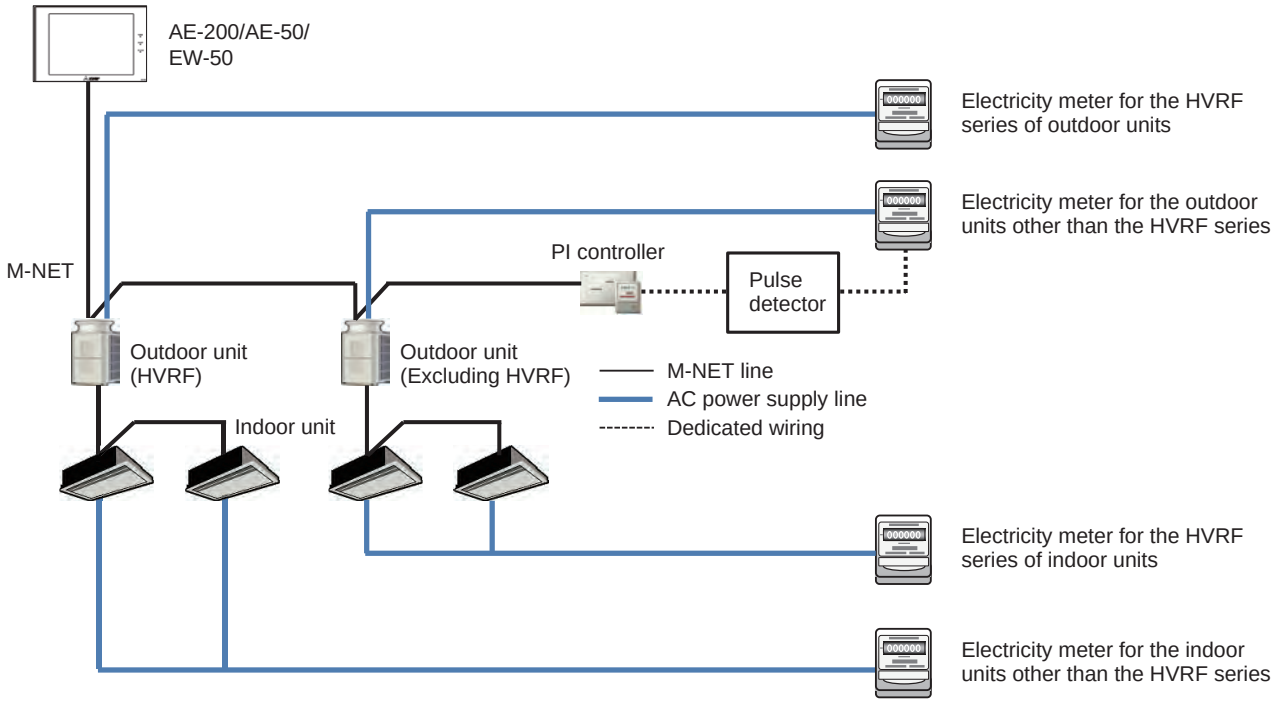
<5> Setting of electricity meter for apportionment

Set the electricity meter for apportionment.
Select an electricity meter on the outdoor unit side.
Set the meter on the Web browser for initial setting.
For the setting procedure, see 5.[5]<3> “Setting of electricity meter for apportionment to indoor units.”



Note: The indication of the power supply units is omitted.

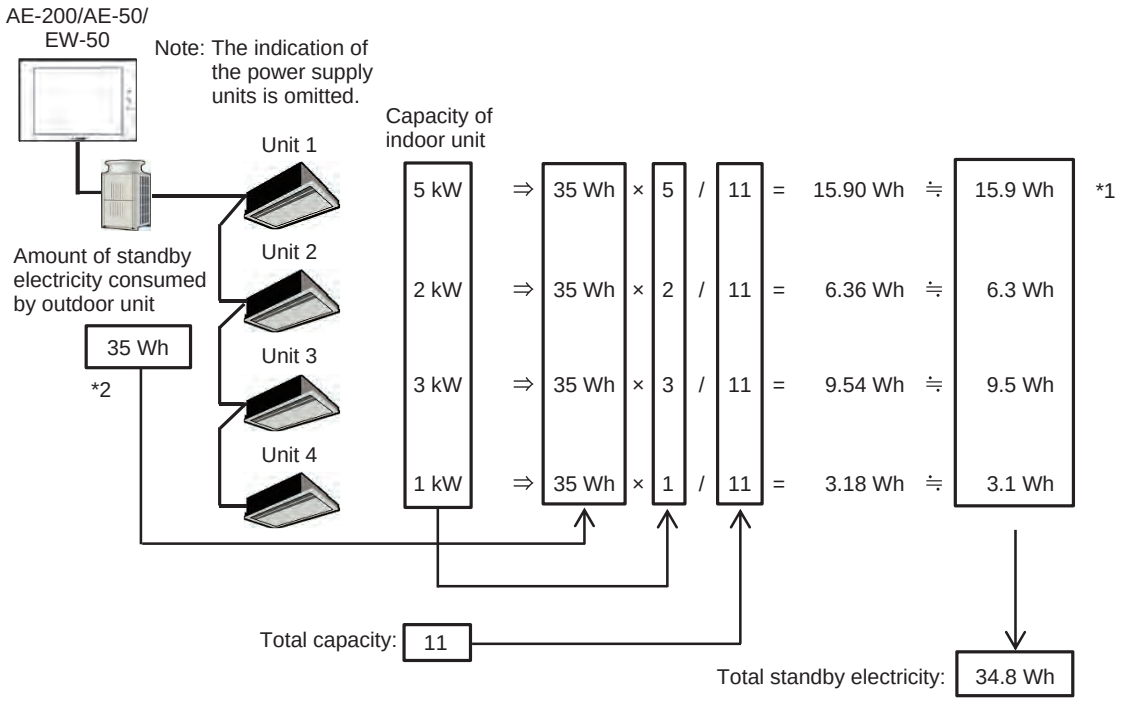
When a system includes both the HVRF series and other series of City Multi units, install a separate electricity meter for each series.



<6> Method of calculating amount of standby electricity (in the case of connection only of CITY MULTI)

The amount of standby electricity consumed by one outdoor unit for 30 minutes is calculated as a fixed amount, 35 Wh (70Wh for 1 hr).
(The amount is fixed regardless of model, capacity and operating state.)
The amount of standby electricity is distributed according to the indoor unit capacities.
When only CITY MULTI is connected, the amount of standby electricity is calculated as stated below.

[Example] Method of calculating the amount of standby electricity for 30 minutes (An example for 30 minutes is shown because the apportionment calculation is performed every 30 minutes.)

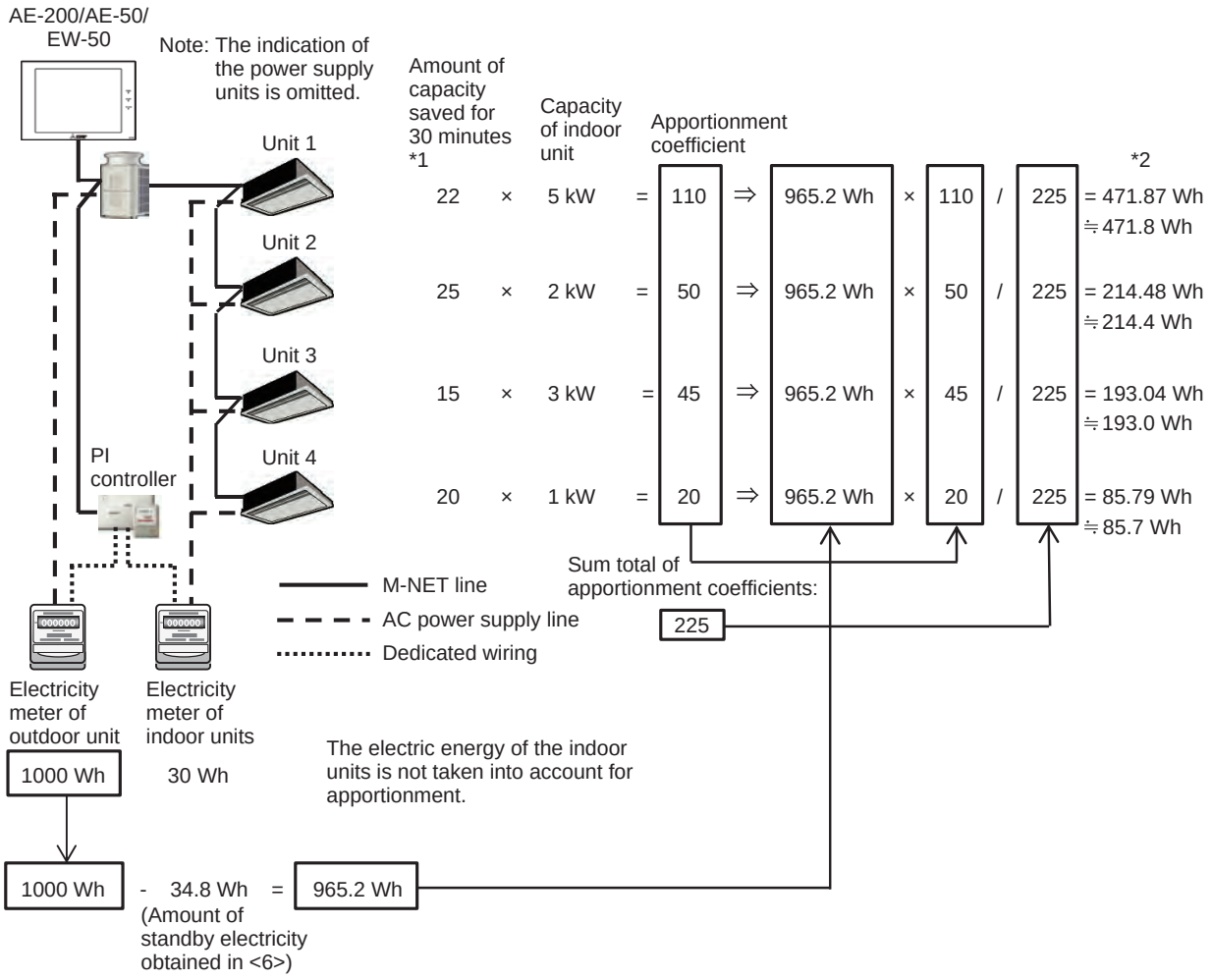


*1: The values are rounded down to one decimal place.
Therefore, the total standby electricity is 34.8 Wh, and there is a difference from the amount before calculation (35 Wh).
*2: When the outdoor units are connection type, the amount of standby electricity is 35 Wh per unit.
[Example]
When one unit of OC and two units of OS are connected, the amount of standby electricity is: 35 Wh × 3 = 105 Wh.

<7> Method of calculating electric energy (in the case of connection only of CITY MULTI)

When only CITY MULTI is connected, the electric energy for 30 minutes is calculated as stated below.
Note: In the case where the capacity save amount has been selected as the apportionment mode

[Example] Method of calculating the electric energy for 30 minutes (An example for 30 minutes is shown because the apportionment calculation is performed every 30 minutes.)



	Amount of standby electricity consumed by outdoor unit obtained in <6>		Results of apportionment		
Unit 1:	15.9 Wh	+	471.8 Wh	=	487.7 Wh
Unit 2:	6.3 Wh	+	214.4 Wh	=	220.7 Wh
Unit 3:	9.5 Wh	+	193.0 Wh	=	202.5 Wh
Unit 4:	3.1 Wh	+	85.7 Wh	=	88.8 Wh

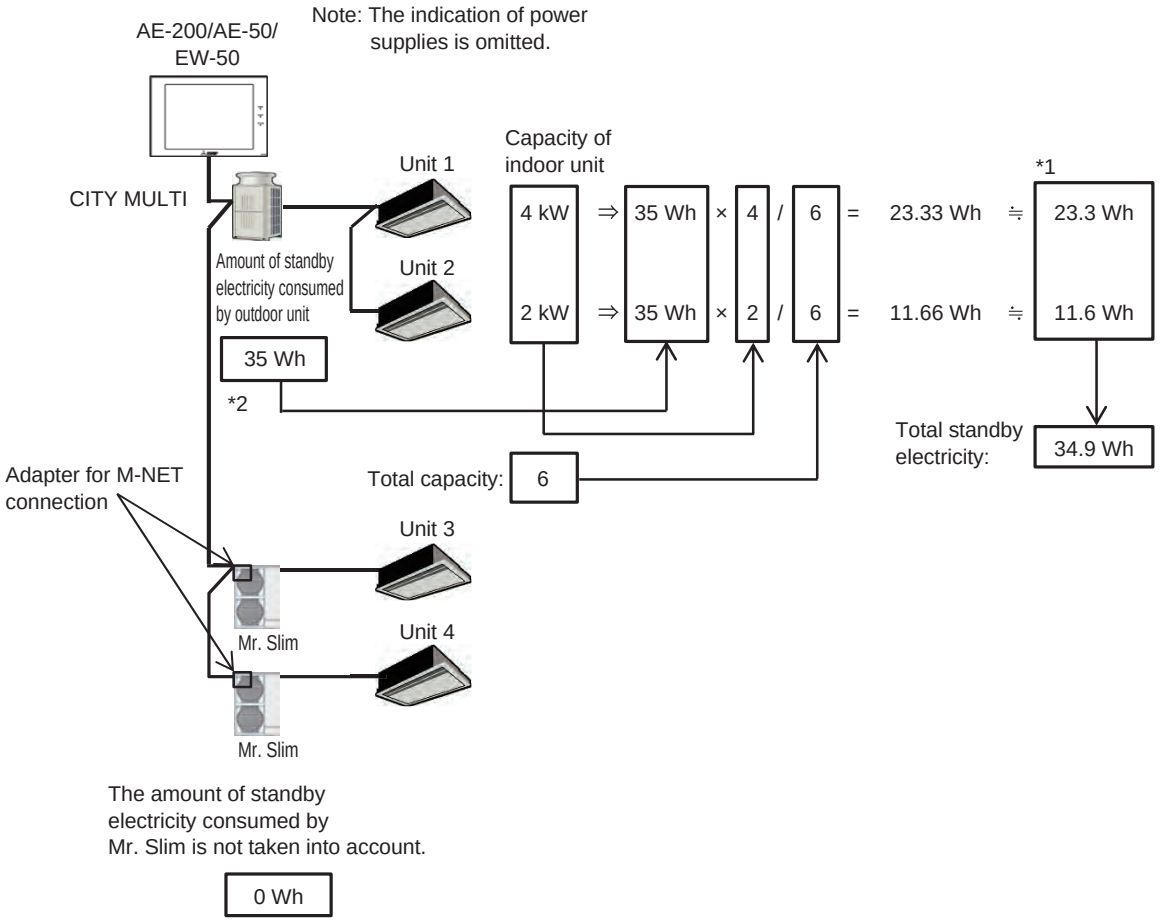
*1: The capacity save amount (100 to 0%) is counted every minute, and the integrated value for 30 minutes is divided by 100.
[Example] 1 minute: 100 %, 2 minutes: 0 %, … 30 minutes: 100 %
(100 + 0 + … 100) /100 = capacity save amount for 30 minutes

*2: The values are rounded down to one decimal place.

<8> Method of calculating amount of standby electricity (in the case of connection of CITY MULTI and Mr. Slim)

When CITY MULTI and Mr. Slim are connected, the amount of standby electricity for 30 minutes is calculated as stated below.
Note: The standby electricity of Mr. Slim is not taken into account.

[Example] Method of calculating the amount of standby electricity for 30 minutes



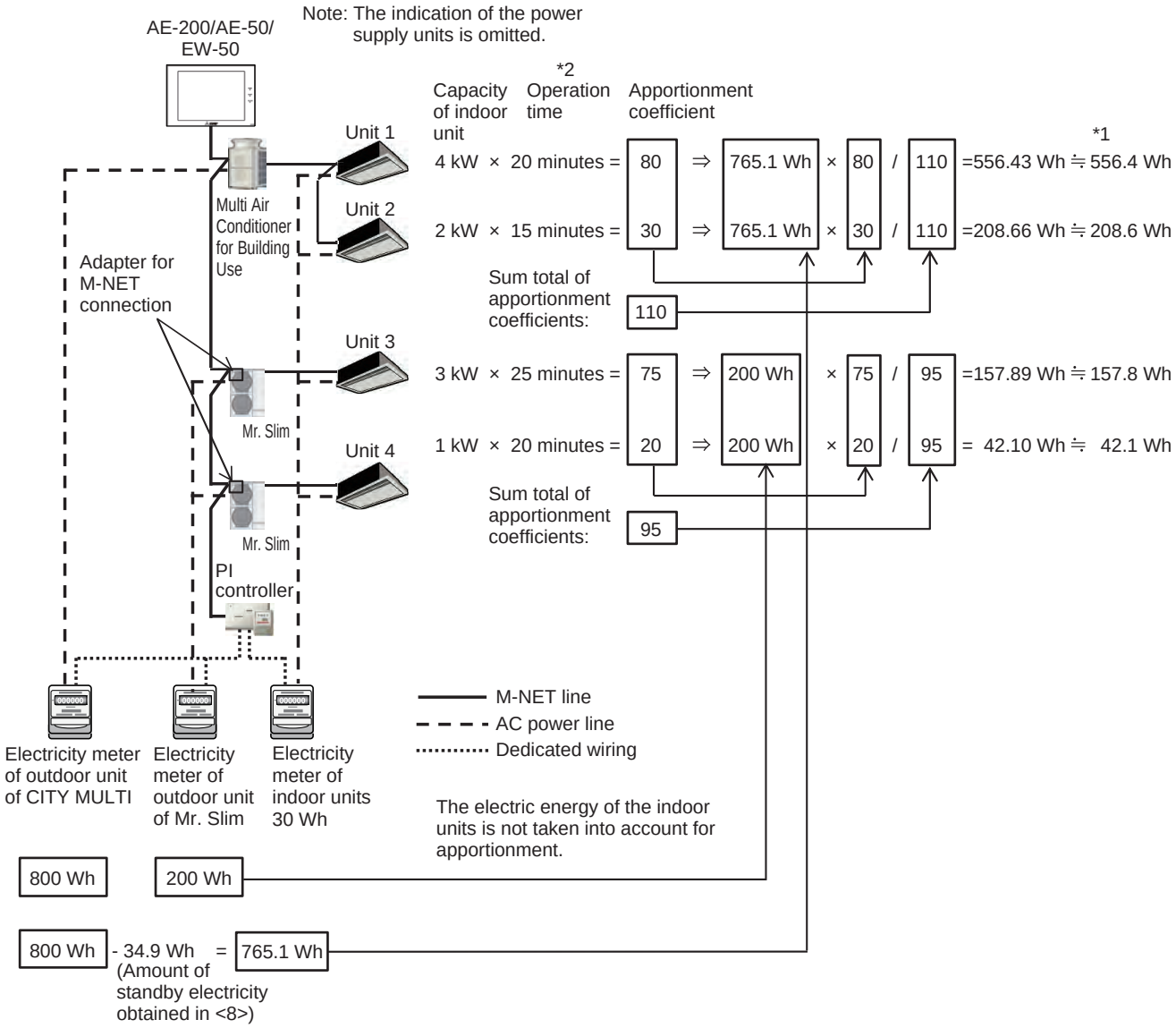
*1: The values are rounded down to one decimal place.
Therefore, the total standby electricity is 34.9 Wh, and there is a difference from the amount before calculation (35 Wh).

*2: When the outdoor units are connection type, the amount of standby electricity is 35 Wh per unit.
[Example]
When one unit of OC and two units of OS are connected, the amount of standby electricity is: 35 Wh × 3 = 105 Wh.

<9> Method of calculating electric energy (in the case of connection of CITY MULTI and Mr. Slim)

When CITY MULTI and Mr. Slim are connected, the electric energy for 30 minutes is calculated as stated below.
Note: In the case where the capacity save amount has been selected as the apportionment mode

[Example] Method of calculating the electric energy for 30 minutes



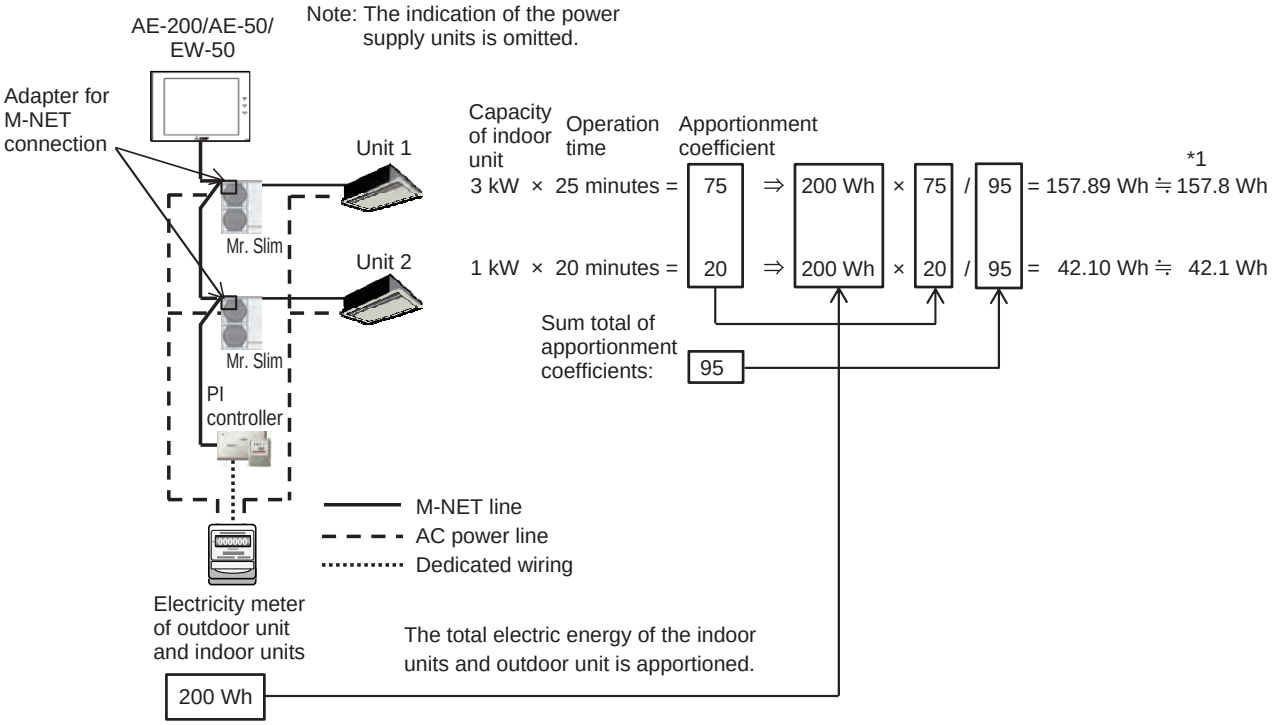
	Amount of standby electricity consumed by outdoor unit obtained in <8>		Results of apportionment		
Unit 1:	23.3 Wh	+	556.4 Wh	=	579.7 Wh
Unit 2:	11.6 Wh	+	208.6 Wh	=	220.2 Wh
Unit 3:	0 Wh	+	157.8 Wh	=	157.8 Wh
Unit 4:	0 Wh	+	42.1 Wh	=	42.1 Wh

*1: The values are rounded down to one decimal place.
*2: When two or three Mr. Slim Air Conditioners are connected, if even one of the indoor units is operating, the operation time of the unit will be counted.

<10> Method of calculating electric energy (in the case of connection only of Mr. Slim) (When the outdoor unit and indoor units are powered by the same power supply)

When Mr. Slim is connected and the outdoor unit and indoor units are powered by the same power supply, the electric energy is calculated as stated below.

[Example] Method of calculating the electric energy for 30 minutes



Unit 1 : 157.8 Wh

Unit 2 : 42.1 Wh

*1: The values are rounded down to one decimal place.

*2: When two or three Mr. Slim Air Conditioners are connected, if even one of the indoor units is operating, the operation time of the unit will be counted.

[3] Initial setting of energy management function

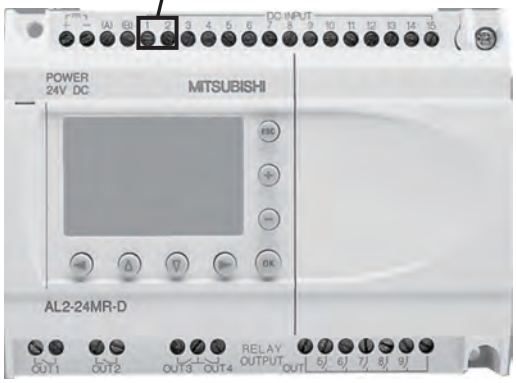
To use the energy management function, it is necessary to set the conditions on the Web browser for initial setting or main unit LCD screen.
Without the initial setting, the graphs of outdoor temperature, electric energy and target values will not be displayed on the energy use status screen or ranking screen.
The conditions cannot be set on the screen of any of AE-200 and AE-50 main units. The conditions for each set of AE-200 and AE-50 must be set individually on each Web browser. Set them on AE-50 without fail.
The energy management function requires the AI controller (PAC-YG63MCA) or AHC for measurement of outdoor temperature and the PI controller (PAC-YG60MCA) for measurement of electric energy. (The AI controller or AHC is required only when the outdoor temperature must be displayed.)
For each set of AE-200 and AE-50, one or more AI controllers or AHCs and one or more PI controllers are required. The power consumption measured by the PI controller(s) connected to each set of AE-200/AE-50 will be apportioned only among the indoor units connected to the same set of AE-200/AE-50. The power consumption cannot be apportioned across some AE-200/AE-50 systems.

The initial setting items are shown below.
1. Setting of outdoor temperature measurement unit
2. Setting of apportionment mode for indoor units
3. Setting of electricity meter for apportionment among indoor units
4. Setting of target values

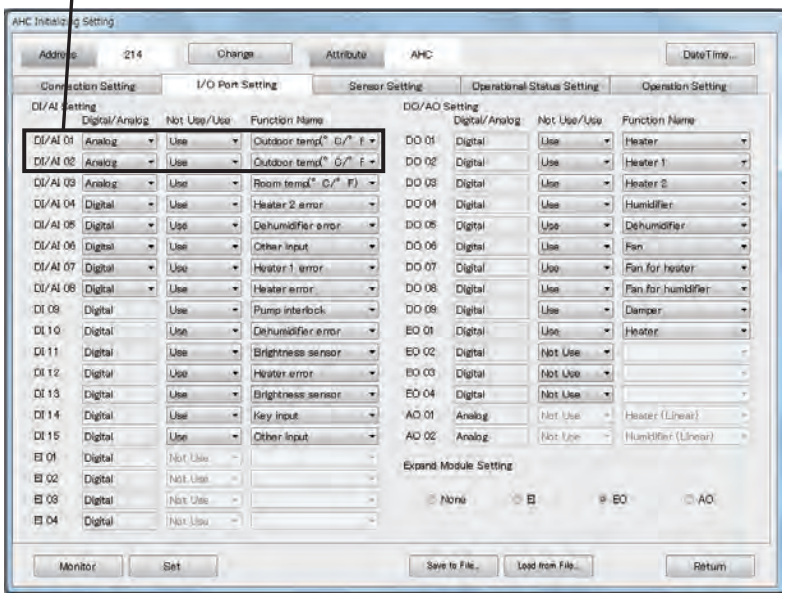
*1: When the apportioned electricity billing function of AE-200 is used, it is unnecessary to set the apportionment mode and electricity meter for apportionment.

Before performing the initial setting of the energy management function, set the conditions of the AI controllers, AHCs and PI controllers. To set the conditions of the AI controllers and PI controllers, select Functions 1 – Measurement setting on the initial setting screen on the main unit to open the Measurement setting screen, or select Functions 1 – Measurement setting on the Web browser for initial setting to open the Measurement setting screen.
The conditions of AHCs must be set with the Maintenance Tool.
The temperature sensor to be used for the energy management function must be connected to Input 1 or Input 2 of DC power type α2 (AL2-14MR-D/AL2-24MR-D) of AHC.
If it is connected to another input, the temperature cannot be displayed on the energy management screen.

Connect to the temperature sensor.



Set the conditions of DI/AI 01 and 02 on the I/O Port Setting screen of the Maintenance Tool.
Digital/Analog: Select Analog.
Not Use/Use: Select Use.
Function Name (°C/°F): Select Room Temp (°C/°F) or Outdoor (°C/°F).
For details, see Chapter 3.18 “Initial Settings and Monitoring AHC ADAPTER” of the manual for Maintenance Tool for MN Converter & Centralized Controller.

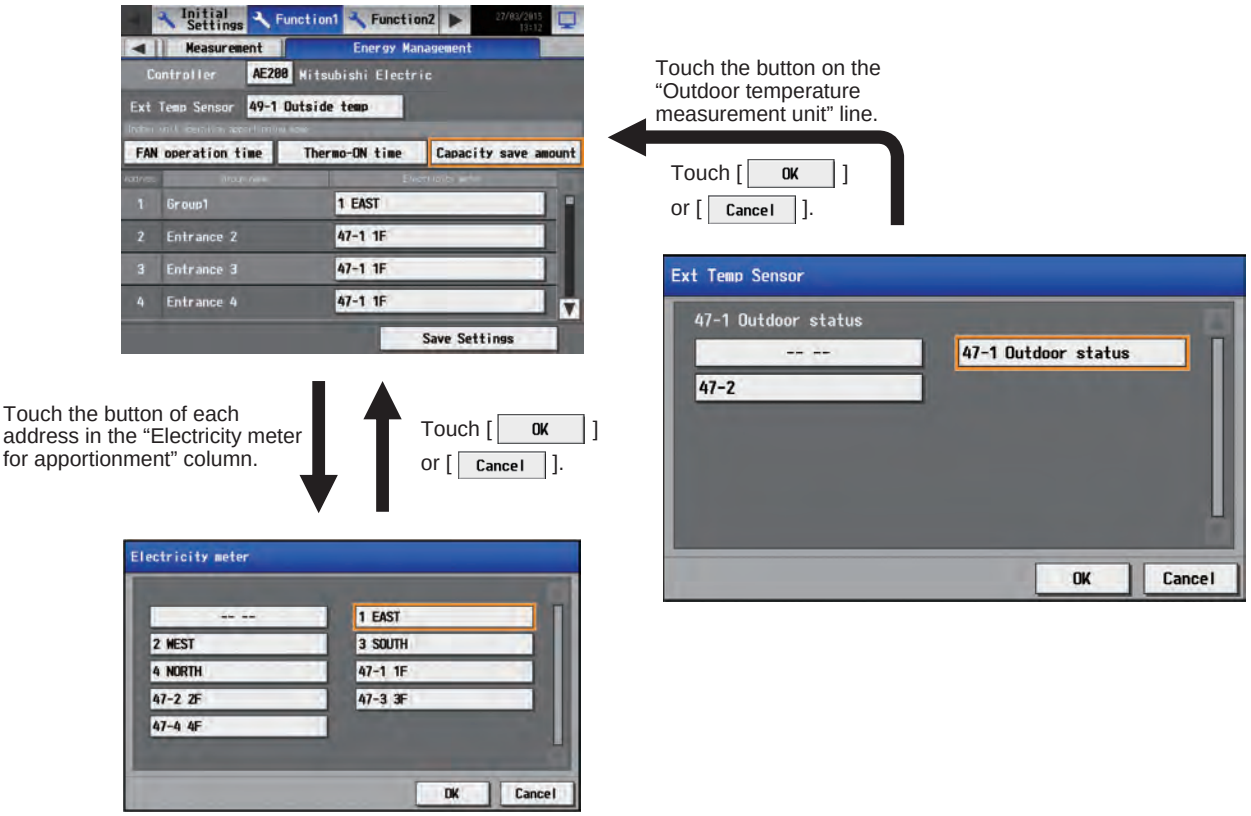


- The temperature sensor cannot be connected to AC power type α2 (AL2-14MR-A/AL2-24MR-A).
- Before the initial setting of the energy management function, make sure that all units have been started up and correctly connected.

Remarks

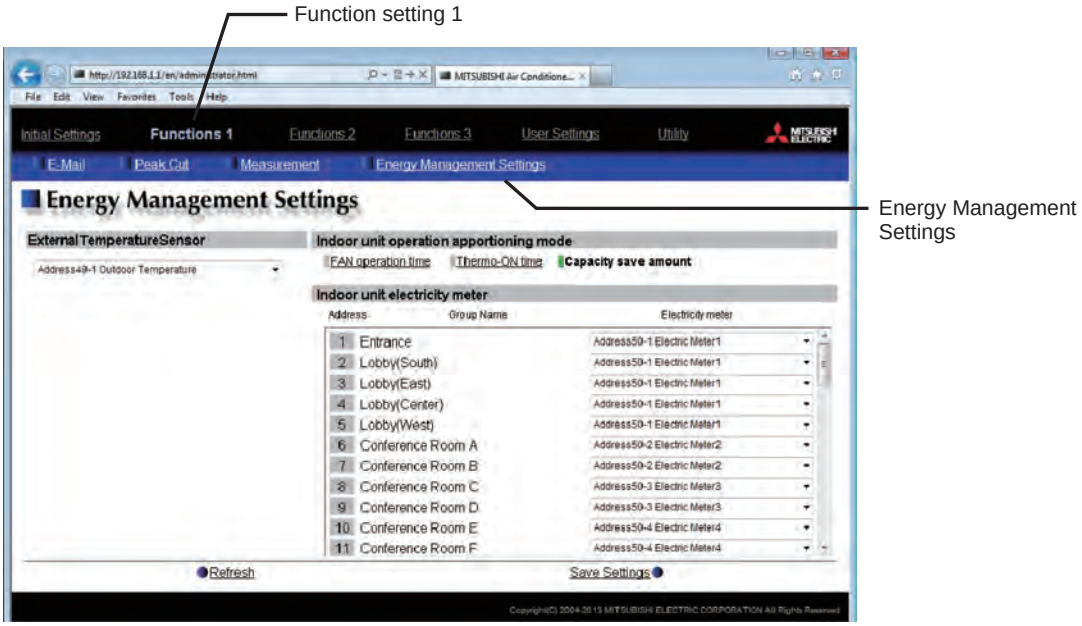
- ○ The initial setting of the energy management function can be performed only on the Web browsers for initial setting.
  (Only the target values can be set on the main unit screens.)
- ○ One or more AI controllers or AHCs and one or more PI controllers are required for each set of AE-200 and AE-50.
  (The PI controllers and AHCs are required only when the outdoor temperature must be displayed.)
- ○ "Energy Management License Pack" is required.
- ○ The electric energy counting PLC cannot be used for the energy management function.

(1) Setting on LCD screen



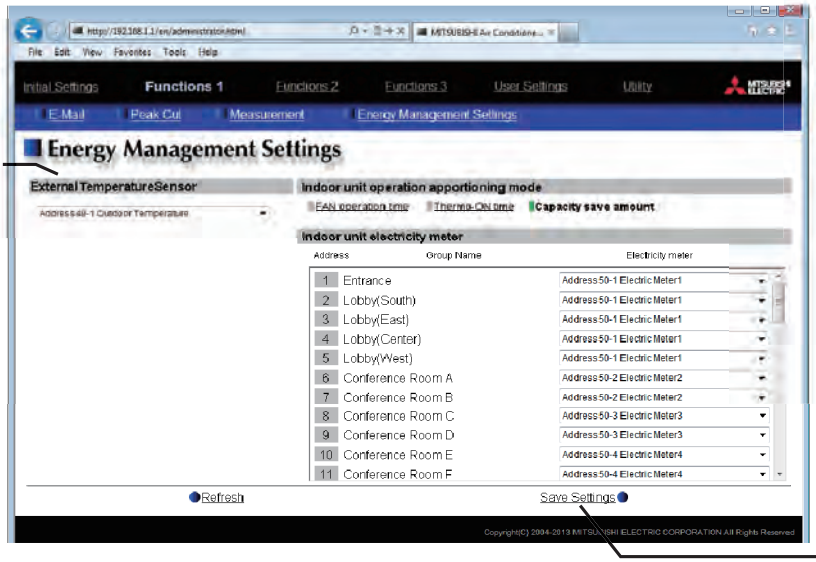
(2) Setting on Web browser screen

Energy Management Settings on the Web browser for initial setting to open the energy management setting screen.



<1> Setting of outdoor temperature measurement unit

Specify the sensor for the AI controller (PAC-YG63MCA) or AHC which measures the outdoor temperature.
When the outdoor temperature is selected on the energy use status screen, the outdoor temperature measured by the outdoor temperature measurement unit specified on this screen will be displayed in a line graph.
Considerations of energy-saving can be made by comparing the electric energy, FAN operation time and thermo ON time (bar graph) with the outdoor temperature.
If it is unnecessary to display the line graph of outdoor temperature, this setting is unnecessary.



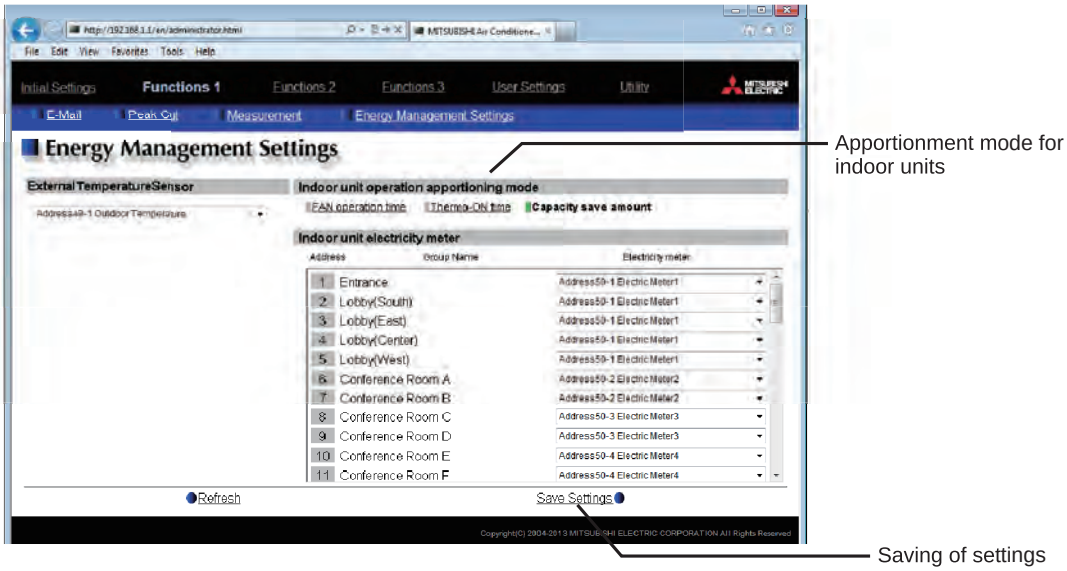
Select a temperature sensor for measuring the outdoor temperature in External Temperature Sensor.
The pull-down menu shows the temperature sensors connected to the AI controller or AHC. Only one of the temperature sensors can be selected.
Click the Save Settings button to save the settings in AE-200/AE-50.

<2> Setting of apportionment mode for indoor units

Set the apportionment mode for the indoor units. The electric energy measured by the PI controller will be apportioned to the indoor units in the apportionment mode set on this screen, and the power consumption in each block, group or unit address will be displayed graphically on the energy use status screen and ranking screen.

The following three apportionment modes for indoor units are available. Select one of them. The capacity save amount mode is recommended.
(1) Capacity save amount (default): Usage of capacity of outdoor unit (converted to time)
(2) Thermo ON time: Time during which indoor unit thermo was on
(3) FAN operation time: Time during which indoor unit was running

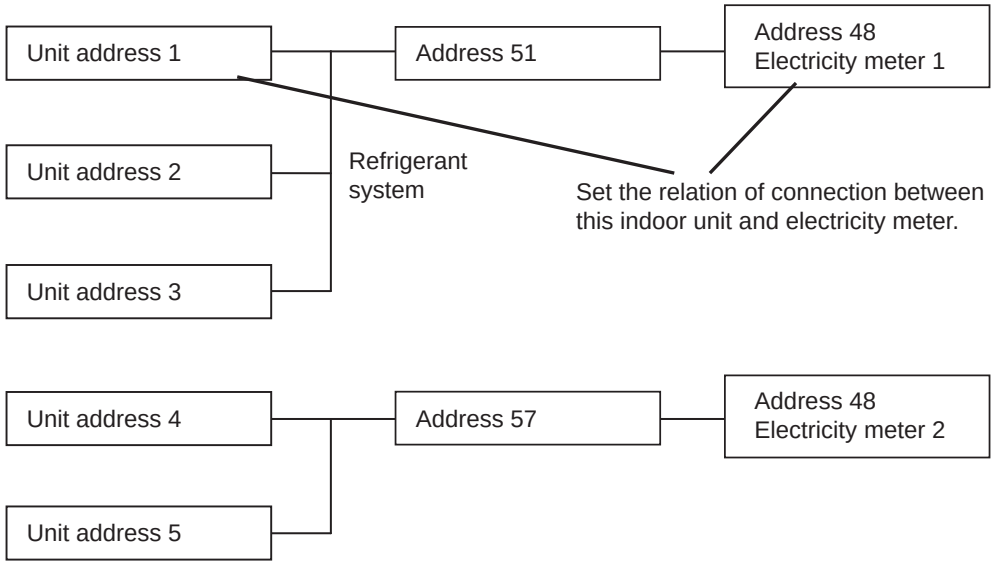
For the details of each mode, see 4.[4]<2> “Apportionment modes” and 4.[4]<3> “Selection of apportionment mode when more than one models are connected.”



Select one of FAN operation time, Thermo ON time and Capacity save amount in Indoor unit operation apportioning mode.
Click the Save Settings button to save the settings in AE-200/AE-50.

<3> Setting of electricity meter for apportionment to indoor units

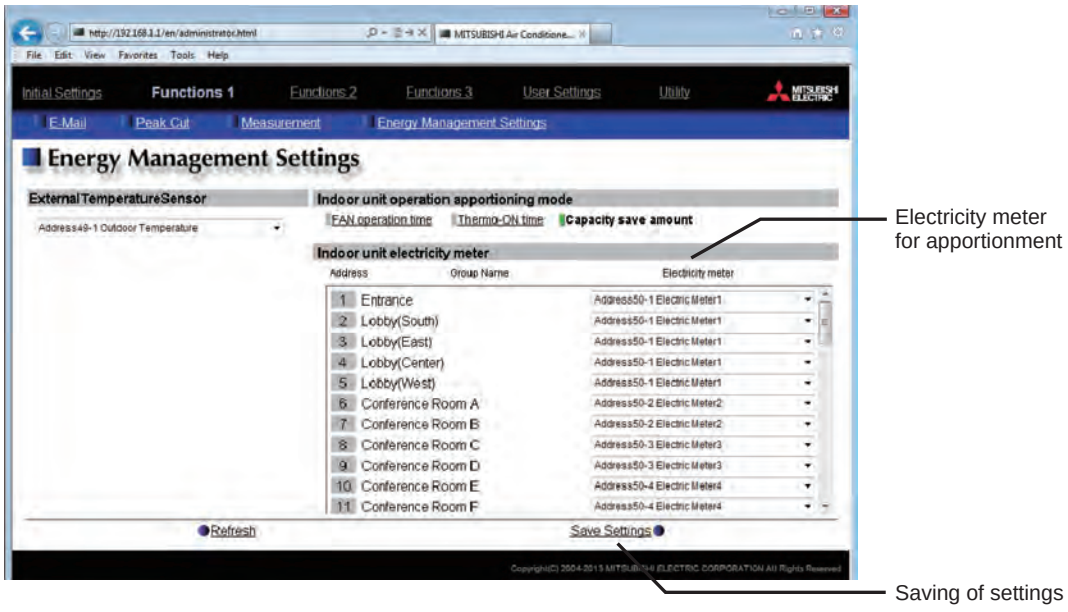
Specify the electricity meter for measuring the power consumption of the outdoor unit to which the indoor units in the group are connected (refrigerant system).
The power consumption of the outdoor unit measured by the specified electricity meter will be apportioned to the connected indoor units (refrigerant system). Correctly set all indoor units.



Remarks

- ○ The power consumption of the outdoor unit will be apportioned. The power consumption of the indoor units is not included in the apportionment calculation.
- ○ When the PI controller gets out of order and is replaced with a new one, the power consumption during replacement may be counted abnormally largely. (Since the integrated value of power consumption of the PI controller is 0 on the counter, the difference from the integrated value on the counter of the previous PI controller is large.)
- ○ Set an electricity meter for each indoor unit. If any meter is not set for a unit, the apportionment calculation cannot be performed correctly.

- Before operating, make sure that the outdoor unit and electricity meter are correctly connected. If they are connected improperly, the apportionment calculation will not be performed correctly.
  Run the indoor units connected to the outdoor unit, and make sure that the power consumption of the outdoor unit is correctly counted on the electricity meter.



In Electricity meter, select the electricity meter to be used to measure the power consumption of the indoor units in each group.
The pull-down menu will show [Address + address of PI controller + “-” + electricity meter number + electricity meter name].

Click the Save Settings button to save the settings in AE-200/AE-50.

Remarks

- ○ Some group names may not be displayed completely depending on the length.
- ○ If a group name has not been registered, [Group + group number] will be displayed.
- ○ Only the electricity meters whose measurement unit has been set to kWh on the measurement setting screen can be selected.
- ○ Groups with LOSSNAY or DIDO controller only are not displayed (they are out of the scope of apportionment calculation).

[4] Energy use status

On the energy use status screen, the conditions relating to energy management, such as power consumption, operation time and outdoor temperature, are graphically displayed. The energy use status of the target indoor units can be checked in detail by displaying the data of each group, block, energy management block(EM block) or unit address on the specified date. In addition, it is possible to display the energy use status of other indoor units on the screen for comparison.
The energy use status every hour, day or month can be displayed graphically to visualize the energy-saving status. It is possible to make an energy-saving plan according to the transition of power consumption and room temperature with time. If the target values are set, energy-saving measures can be taken timely by comparing the current energy use status with the target value.
Note: For some display items, "Energy Management License Pack" is required.
For details, see 4.[6]<5> “Display range and items which can be displayed in graphs.”

The data will be saved in each set of AE-200,AE-50 and EW-50. The data on AE-50/EW-50 will not be saved in AE-200.
In each of AE-200 or AE-50 or EW-50, the data only on the units connected to M-NET of the controller will be saved. When the screen is displayed on AE-200, it will receive the data from AE-50/EW-50 and display the data.
The retention periods of the data are shown below.

Period of display	Data retention period
Day	For last 24 months *
Month	For last 24 months *
Year	For last 2 years

* The data for 25 months are retained internally. However, the data for 24 months can be displayed in graphs.

The data is saved in an SD card (= a nonvolatile memory: data will not be deleted even if power is turned off from AE-200/AE-50/EW-50) every hour on the 15 minute.
To display the graphs, the initial setting is required. The initial setting can be performed on the LCD or the energy management screen of the Web browser for initial setting.
On the main unit screen of AE-200, the energy use status of connected AE-50/EW-50 can be displayed by switching the display mode.
On the main unit screen of AE-50, the energy use status only of AE-50 can be displayed.
On the Web browser, the status of each set of AE-200/AE-50/EW-50 can be displayed. On the browser of each set of AE-200/AE-50/EW-50,the status of the units connected to M-NET of the controller can be displayed.
The units under more than one set of AE-200 can be displayed on the Integrated Centralized Control Web.

Remarks

- ○ The initial setting must be performed on the Web browsers for initial setting.
- ○ In case of failure of AE-200/AE-50, it is recommended to periodically save the data on the energy use status screen on each Web browser in a file in CSV format with the download function or from the CSV output screen.
  For details, see 4.[10] “Data Downloading” and 4.[11] “CSV Output.”

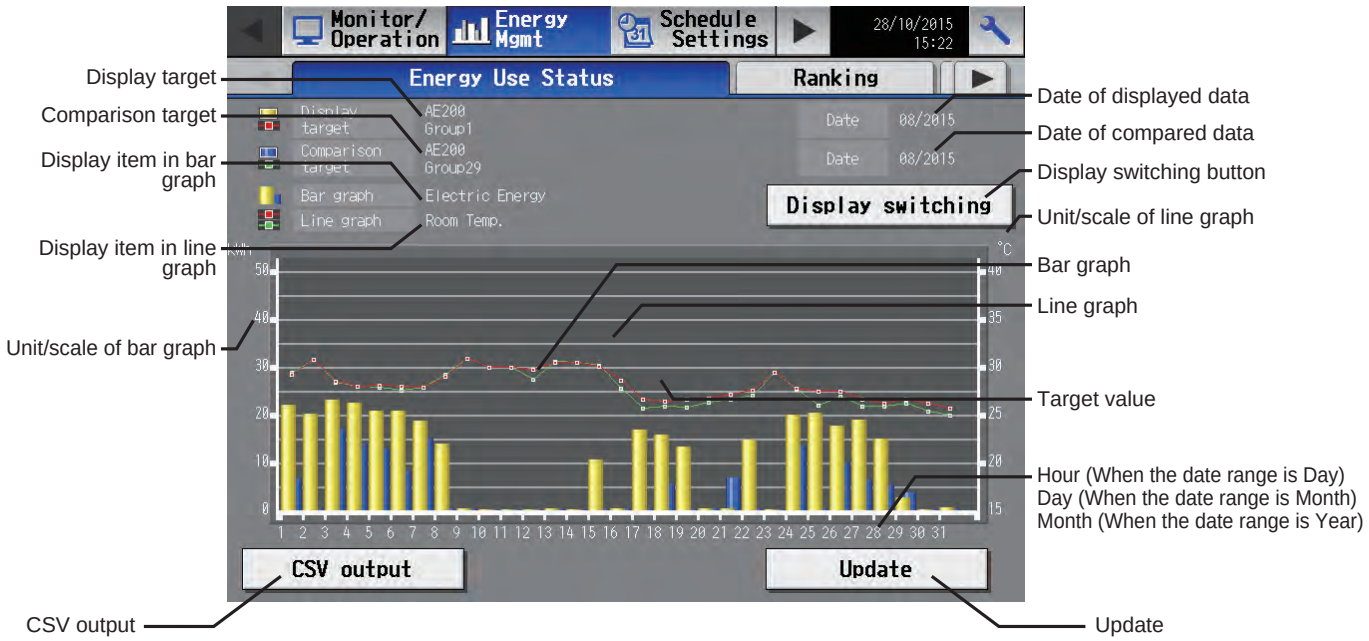
<1> Differences in functions between LCD and Integrated Centralized Control Web

The differences in energy management functions between LCD and Integrated Centralized Control Web are shown below.

Item	LCD	Integrated Centralized Control Web
Display of bar graphs	One item common to the display target and comparison target is displayed.	The item to be displayed can be selected for each of the display target and comparison target.
Display of line graphs	Two items in the same unit can be selected for the display target and comparison target. * However, only in the case of air conditioners Two items for each of the display target and comparison target are displayed, and up to 4 line graphs are displayed.	The item to be displayed is selected for each of the display target and comparison target. Therefore, up to 2 line graphs are displayed.
Data display interval	60 minutes * When the screen is opened or the button is manually pressed, the most recent data at the time will be displayed (the data will be updated at 15 minutes).	30 minutes * Automatic updating (The non-volatile most recent data will be displayed 10 minutes and 40 minutes after the Web screen is started. The data will be updated at 15 minutes.)

<2> Contents displayed on screens

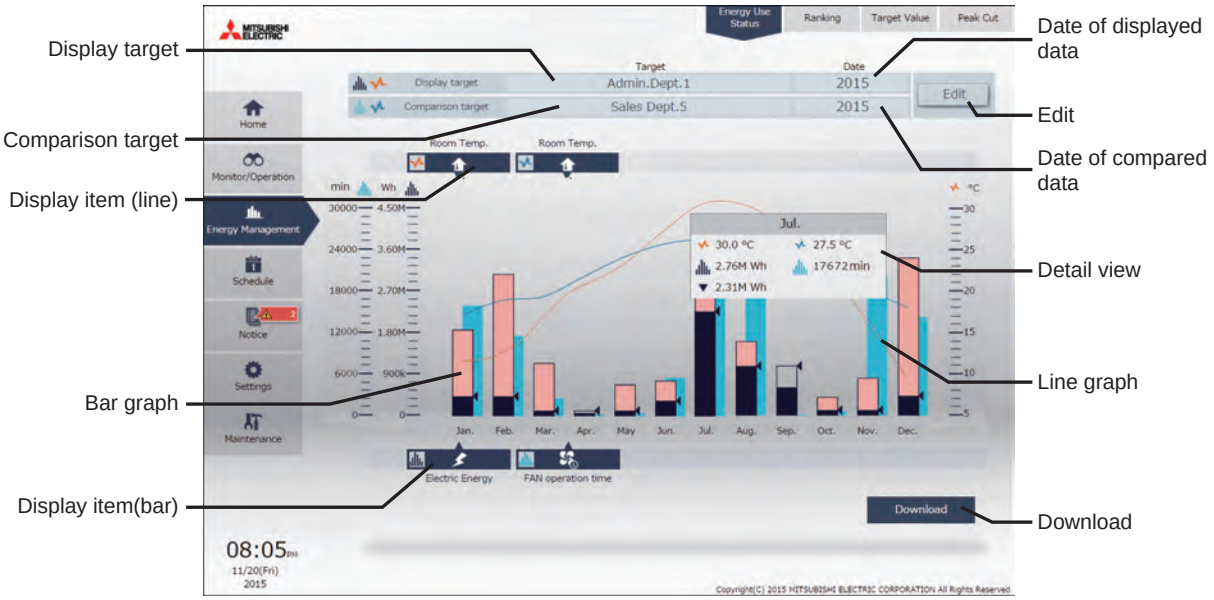
Main unit screen



Item	Details		Remarks
Display target	Upper stage	The name of AE-200/AE-50/EW-50 is displayed.	● If AE-50 has been selected when AE-50/EW-50 was connected, the name of AE-50/EW-50 is displayed.
	Lower stage	The block name, group name or address number of the displayed bar graph or line graph is displayed.	
Comparison target	Upper stage	The name of AE-200/AE-50/EW-50 is displayed.	● If AE-50 has been selected when AE-50 was connected, the name of AE-50 is displayed.
	Lower stage	The block name, group name or address number of the bar graph or line graph displayed for comparison is displayed.	● This graph can be displayed to compare the displayed data with the data on another indoor unit.
Display item in bar graph	The item displayed in a bar graph is displayed.		
Display item in line graph	The item displayed in a line graph is displayed.		
Date of displayed data	The date of displayed data is displayed.		
Date of compared data	The date of data displayed for comparison is displayed.		● The displayed data can be compared with the previous data by specifying the same block, group or address as that of the Display target for the Comparison target and changing the date of data to be compared.

Item	Details	Remarks
Display switching button	To display a graph, first touch this button. Then, the screen for setting the contents of graph will appear. The graph will be displayed according to the contents set on the display item setting screen.	● For details, see 4.[6]<5> “Display range and items which can be displayed in graphs.”
Unit/scale of bar graph	The unit and scale of the bar graph are displayed.	● The unit appropriate to the Display item is displayed. ● The scale is automatically adjusted according to the maximum value of the data.
Unit/scale of line graph	The unit and scale of the line graph are displayed.	● The unit appropriate to the Display item is displayed. ● The scale is automatically adjusted according to the data range. The temperature is displayed in the range for 25°C in 5°C steps. When the data are not included in the range for 25°C, the range will be automatically increased. (The humidity is displayed in the range for 50% in 10% steps.)
Bar graph	The bar graph is displayed.	● For the display format, see 4.[6]<4> “Graph display formats.” ● When any Comparison target has not been selected, only the data on the selected Display target will be displayed in a graph. ● If a time period during which there is no data is caused by changing the present time setting, the data during the period will not be displayed. If time is duplicated by changing the present time setting, the last data will be displayed in a graph as the data at the duplicated time.
Line graph	The line graph is displayed.	
Target value	The target value graph is displayed.	● This graph is displayed only when the Display range is Block and the Date range is Month or Year. ● For the display format, see 4.[6]<4> “Graph display formats.”
Hour Day Month	The time axis is displayed according to the date range.	● When the Date range is Day, the scale is graduated in hour, but the time is displayed in intervals of 3 hours. ● The date is displayed in the format specified on the unit information screen.
CSV output	Click Download, and the displayed measurement data will be output in CSV format.	For details, see <9> “CSV output on energy use status screen.”
Update	The graphs are updated to the most current state.	Retained data are updated once an hour.

Web browser screen



Item	Details	Remarks
Display target	The display target displayed in graph is displayed.	
Date of displayed data	The date of the display target displayed in graph is displayed.	● The date will be displayed in the format specified on the basic system setting screen on the Web browser for initial setting.
Comparison target	The comparison target displayed in graph is displayed.	
Date of compared data	The date of the comparison target displayed in graph is displayed.	● The date will be displayed in the format specified on the basic system setting screen on the Web browser for initial setting.
Display item(line)	The item of the displayed line graph is displayed. Clicking will hide the graph.	For the display format, see 8.[4]<4> “Graph display formats.” ● If a time period during which there is no data is caused by changing the present time setting, the data during the period will not be displayed. If time is duplicated by changing the present time setting, the last data will be displayed in a graph as the data at the duplicated time.
Display item(bar)	The item of the displayed bar graph is displayed. Clicking will hide the graph.	
Bar graph	The data of the display target (navy blue) and the data of the comparison target (light blue) are displayed in bar graphs. When the target electric energy has been set, the graph will turn orange if the target value is exceeded (only the display target).	● The data of the display target is displayed in front. ● The line graph is displayed in front. ● When the unit of the item selected for the display target is different from that for the comparison target, 2 axes are displayed. ● When the memory exceeds 1,000, 1,000,000 and 1,000,000,000, the unit will change to k, M and G, respectively.
Line graph	The data of the display target (orange) and the data of the comparison target (blue) are displayed in line graphs. When AI controller has been selected and the upper and lower limit alarms have been set, a red line graph will be displayed.	
Detail view	The graph data at the mouse cursor position is displayed.	When a tablet is used, this view is not displayed.
Download	Click Download, and the displayed measurement data will be output in CSV format.	For details, see <9> “CSV output on energy use status screen.”

<3> Items which can be displayed in graphs

Two kinds of graphs, bar graph and line graph, can be displayed on the energy use status screen.
One item of bar graph and two items of line graphs can be simultaneously displayed.
The following table shows the items which can be displayed in each graph.

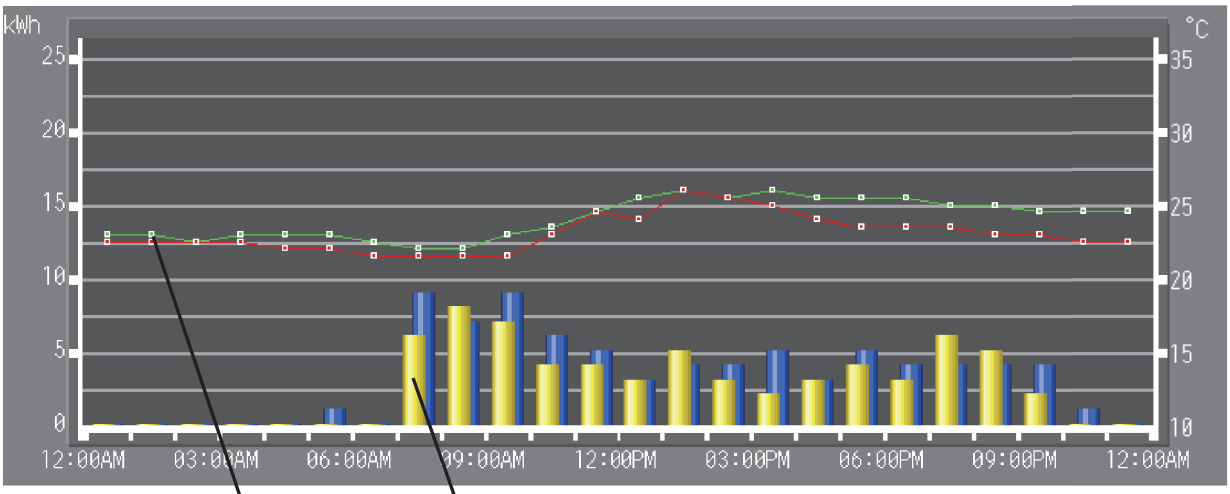
Type of graph	Display target	Display item	Remarks
Bar graph	Indoor unit	Target values	● The target electric energy automatically calculated from the annual total power consumption, ratio of power consumption in each month and ratio of power consumption on each day of the week set on the target setting screen is displayed. ● Since the target values are determined for each block, the values are displayed only when the display range is Block. ● Also the future target values can be displayed. ● When target values are changed, the target value graph in the past will be unchanged, but the graphs on and after this day will be displayed with the new target values.
		Electric energy	● The power consumption of an outdoor unit is apportioned to the indoor units, and the obtained electric energy is displayed. The power consumption of the indoor unit is not displayed. ● Only the electric energy measured by the PI controller (PAC-YG60MCA) is displayed. ● The electric energy consumed by an outdoor unit is measured by the PI controller and apportioned based on the air conditioner usage of indoor units, and the obtained results are displayed. ● To display the graph of electric energy, it is necessary to preliminarily set the electricity meter (name of PI controller electricity meter) for each unit on the energy management setting screen of the Web browser for initial setting. ● The air conditioner usage of indoor units is calculated based on the indoor unit apportionment mode which has been set on the energy management setting screen of the Web browser for initial setting. The following three indoor unit apportionment modes are available. Select one of the modes. The capacity save amount mode is recommended. (1) Capacity save amount (default) (2) Thermo ON time (3) FAN operation time (working time) For the details of each mode, see 4.[4]<2> “Apportionment modes.” ● The power consumption is calculated from the capacities of the indoor units and the air conditioner usage. Since the capacity of each indoor unit is automatically obtained from the indoor unit (through M-NET), it is unnecessary to set the capacities on AE-200/AE-50/EW-50. ● The power consumption includes the standby electricity of each indoor unit obtained by apportionment of the standby electricity of outdoor unit. For details, see 4.[4]<5> “Method of calculating standby electricity.” ● Insignificant power consumption may be displayed on the graph although no indoor units are used. This is because the standby electricity is apportioned to the units, and there is no problem. ● The electric energy consumed by LOSSNAY cannot be displayed.
		FAN operation time	● Time during which the indoor unit is running ● AE-200/AE-50/EW-50 obtains the operating state of the indoor unit (through M-NET) and counts the time every minute. ● When the display range is Group, the data on the unit having the lowest number in the group is displayed. ● The data on LOSSNAY can be displayed.
		Thermo ON time (total)	● Time during which the indoor unit is in the thermo ON state. ● AE-200/AE-50/EW-50 obtains the thermo ON state from the indoor unit (through M-NET) and counts the time every minute. ● When the display range is Group, the data on the unit having the lowest number in the group is displayed. ● The data on LOSSNAY cannot be displayed.

Type of graph	Display target	Display item	Remarks
Bar graph	Indoor unit	Thermo ON time (cooling)	● Time during which the indoor unit is in the thermo ON state in the cooling mode. ● AE-200/AE-50/EW-50 obtains the thermo ON state and mode from the indoor unit (through M-NET) and counts the time every minute. ● When the display range is Group, the data on the unit having the lowest number in the group is displayed. ● The data on LOSSNAY cannot be displayed.
		Thermo ON time (heating)	● Time during which the indoor unit is in the thermo ON state in the heating mode. ● AE-200/AE-50/EW-50 obtains the thermo ON state and mode from the indoor unit (through M-NET) and counts the time every minute. ● When the display range is Group, the data on the unit having the lowest number in the group is displayed. ● The data on LOSSNAY cannot be displayed.
	PI controller (PAC-YG60MCA)	Measurements	● Measurements (electric energy, quantity of water and quantity of heat) measured by the PI controller (PACYG60MCA) ● The measurements can be displayed only for the channels for which the units have been set to kWh, m^3 and MJ on the measurement setting screen.
Line graph	–	Outdoor temperature	● The temperature measured by the AI controller or AHC which has been specified as the outdoor temperature measurement unit on the energy management setting screen of the Web browser for initial setting. ● It is necessary to preliminarily set on the energy management setting screen of the Web browser for initial setting. ● One sensor (connected to the channel of AI controller or AHC) can be specified for each set of AE-200/AE- 50/ EW-50. ● To display the outdoor temperature graph for each set of AE-200/AE-50/EW-50, it is necessary to measure the outdoor temperature with the AI controller or AHC of each set of AE-200/AE-50/EW-50. ● The outdoor temperature can be displayed in a graph regardless of the display target.
	Indoor unit	Cooling temperature setting	● The temperature setting in the cooling mode is displayed. ● When the unit is running in the heating mode, the marker and line graph are not displayed. ● In the case of a model on which the cooling and heating temperatures in the automatic mode can be individually set, the cooling temperature setting is constantly displayed. ● The data on LOSSNAY cannot be displayed.
		Heating temperature setting	● The temperature setting in the heating mode is displayed. ● When the unit is running in the heating mode, the marker and line graph are not displayed. ● In the case of a model on which the cooling and heating temperatures in the automatic mode can be individually set, the heating temperature setting is constantly displayed. ● The data on LOSSNAY cannot be displayed.
		Indoor temperature	● The indoor temperature (suction temperature) is obtained from the indoor unit (through M-NET) and displayed. ● The data on LOSSNAY cannot be displayed.
	AI controller (PAC-YG63MCA)	Temperature	● The temperature is displayed.
		Humidity	● The humidity is displayed.
	AHC	Temperature	● The temperature is displayed

<4> Data for graphs

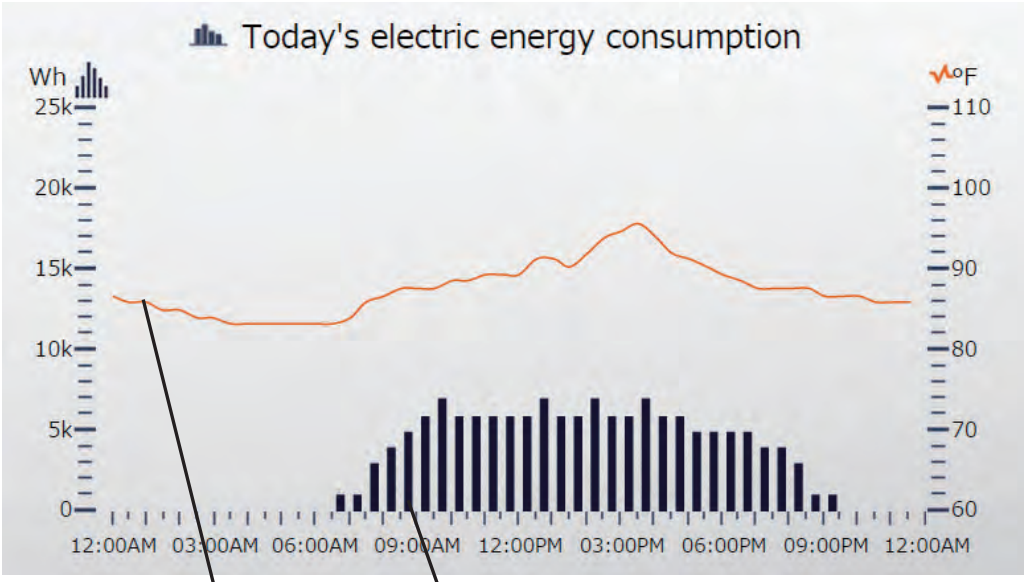
The values displayed in bar graph and line graph vary depending on the date range.
Select the date range from Day, Month and Year.
When Day is selected, the graph from 0:00 to 24:00 on the day will be displayed on an hourly basis.
When Month is selected, the graph from the 1st to the 31st in the month will be displayed on a daily basis.
When Year is selected, the graph from January to December in the year will be displayed on a monthly basis.
The data only during the period during which power was supplied to AE-200/AE-50/EW-50 are displayed in graphs. The data during the period during which power was not supplied to AE-200/AE-50/EW-50 are not displayed.
The values displayed in each mode are shown below.

When the date range is Day



Bar graph The integrated value for 1 hour is displayed.

Line graph The instantaneous value on the hour (00 min) is displayed.
If the data was not obtained owing to a communication error or a sensor trouble,the value is not displayed.
The line of the graph is not displayed in the period before and after the time at which the data was not obtained.

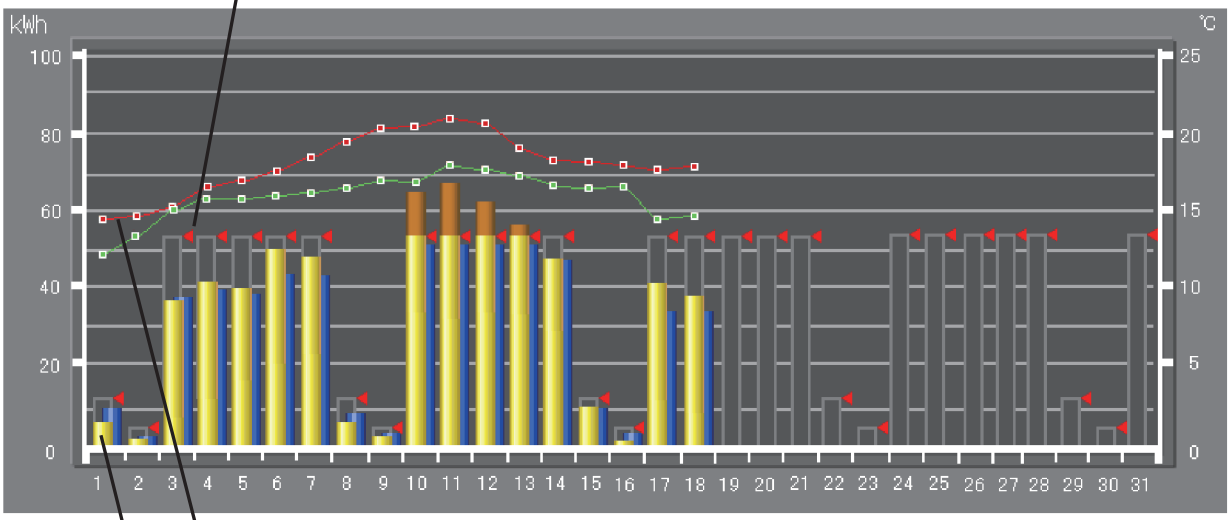


Bar graph
The integrated value for 30 minutes is displayed.

Line graph
The instantaneous value on the hour (00 min) is displayed.
If the data was not obtained owing to a communication error or a sensor trouble,the value is not displayed.
The line of the graph is not displayed in the period before and after the time at which the data was not obtained.

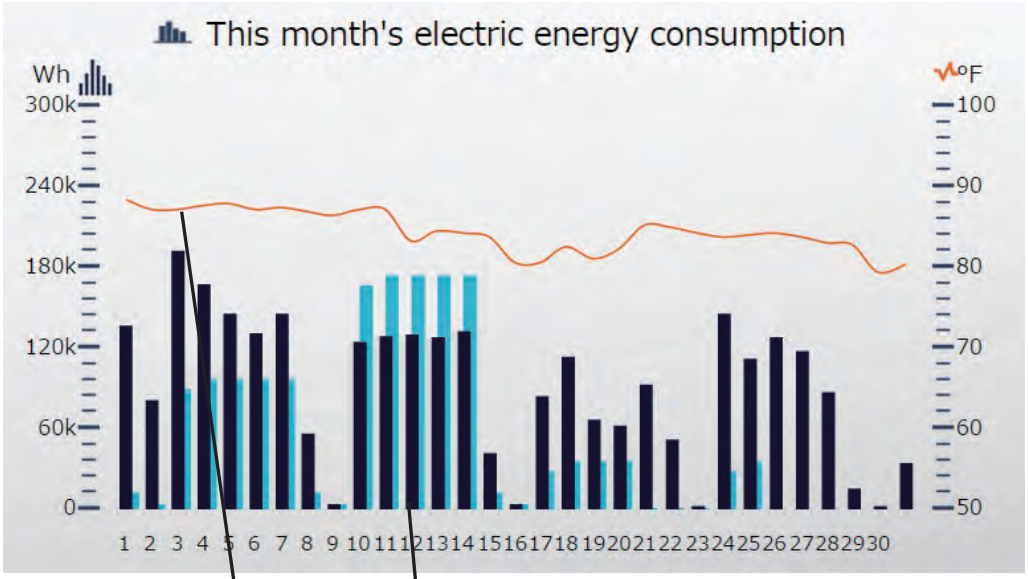
When the date range is Month

Bar graph, target value
The target electric energy in one day is displayed.
The target electric energy automatically calculated frome the ratio of power consumption on each day is displayed.



Line graph
The average value in one day is displayed.
The average value is determined from the instantaneous values on the hours from 0 to 23.
The displayed value for this day is the average of the values obtained by the hour just before the time when the graph was displayed.
Example: When the graph is displayed at 6:40, the displayed value for this day is the average value of the instantaneous values obtained at 0:00, 1:00, 2:00, 3:00, 4:00 and 5:00.

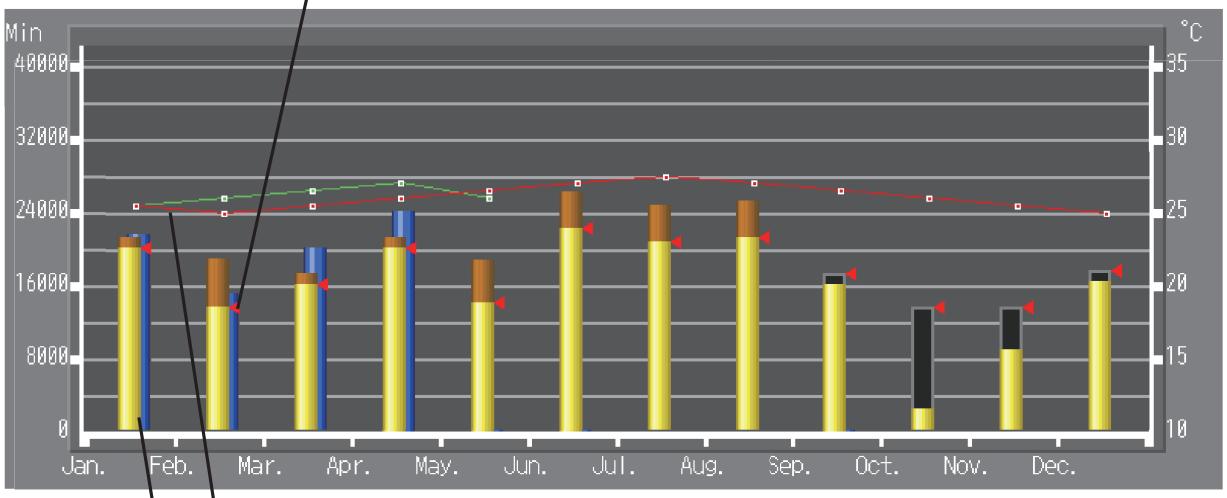
Bar graph
The sum of the hourly integrated values on the day is displayed.
The displayed value for this day is the sum of the values obtained by the hour just before the graph was displayed.



Bar graph
The sum of the hourly integrated values on the day is displayed.
The displayed value for this day is the sum of the values obtained by the hour just before the graph was displayed.

Line graph
The average value in one day is displayed.
The average value is determined from the instantaneous values on the hours from 0 to 23. The displayed value for this day is the average of the values obtained by the hour just before the time when the graph was displayed.
Example: When the graph is displayed at 6:40, the displayed value for this day is the average value of the instantaneous values obtained at 0:00, 1:00, 2:00, 3:00, 4:00 and 5:00.

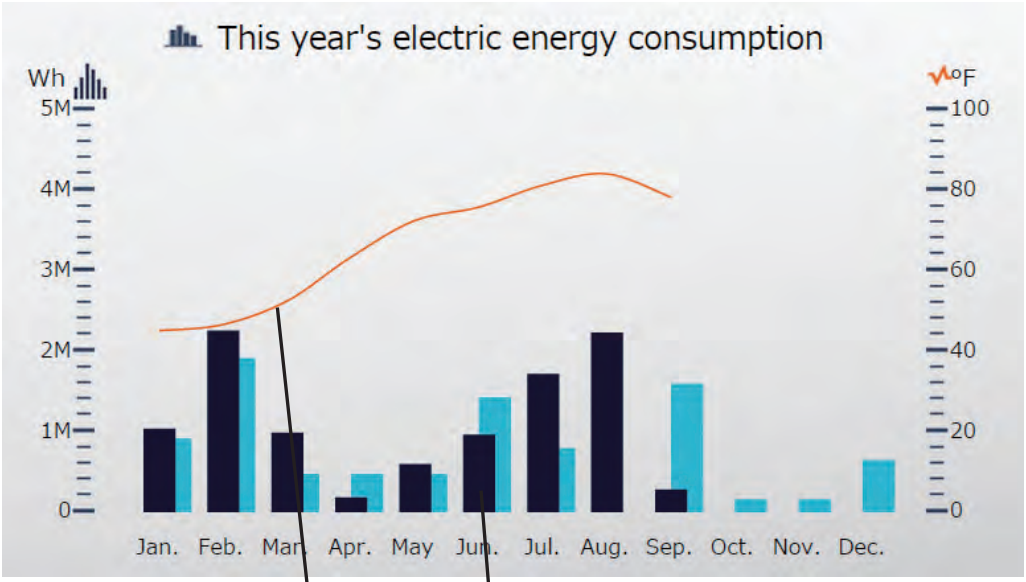
When the date range is Year



Bar graph, target value
The target electric energy in one day is displayed.
The target electric energy automatically calculated frome the ratio of power consumption on each day is displayed.

Line graph
The average value in one month is displayed.
The displayed value for this month is the average of the values in one month including the average value on this day on which the graph was displayed.
(The average value on this day is the average of the instantaneous values on the day including the instantaneous value on the hour just before the time when the graph was displayed.)

Bar graph
The sum of the daily integrated values in one month is displayed.
The displayed value for this month is the sum of integrated values in the month including the integrated value on this day on which the graph was displayed.



Bar graph
The sum of the hourly integrated values on the day is displayed.
The displayed value for this day is the sum of the values obtained by the hour just before the graph was displayed.

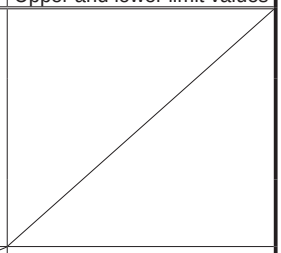
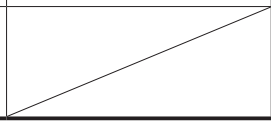
Line graph
The average value in one day is displayed.
The average value is determined from the instantaneous values on the hours from 0 to 23. The displayed value for this day is the average of the values obtained by the hour just before the time when the graph was displayed.
Example: When the graph is displayed at 6:40, the displayed value for this day is the average value of the instantaneous values obtained at 0:00, 1:00, 2:00, 3:00, 4:00 and 5:00.

<5> Graph display formats

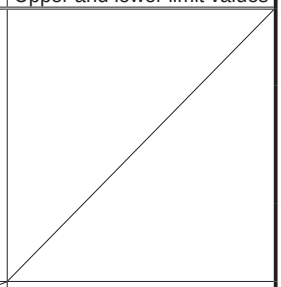
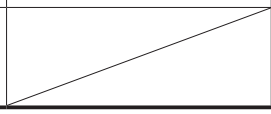
The bar and line graph display formats and colors are shown below.
The bar graph of the comparison target is displayed on the right side of the graph of the display target. When the comparison target has not been selected, its bar graph is not displayed.
The line graph of the comparison target is displayed on the same horizontal axis as that of the display target. When the line graph of the comparison target overlaps with that of the display target, the graph of the display target comes to the front.
The target value is displayed when the display range is Block and the display item is Electric energy. The upper and lower limit values are displayed when the display target is the AI controller (PAC-YG63MCA) and the upper and lower limit values have been set.

Note: For the AHC, the upper and lower limit values cannot be set.

Main unit screen

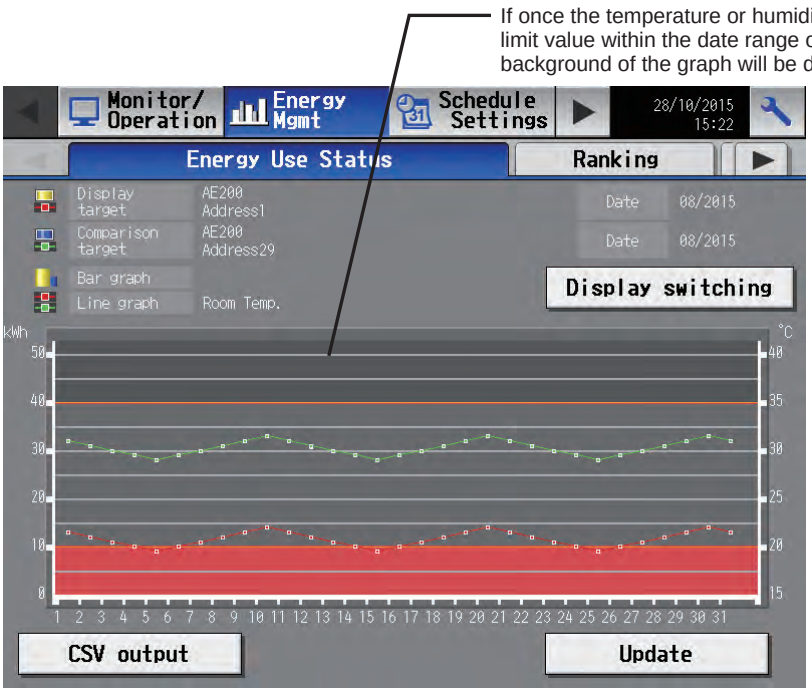
Graph type	Display target	Comparison target	Target value	Upper and lower limit values
 Bar graph	 (Yellow) When the target value is exceeded, the part over the target value is displayed in orange.)  (Orange)	 (Blue)	 (Gray frame and red triangle on top)	
 Line graph	 (Red,Orange)	 (Green,Blue)		(Orange)

Web browser screen

Graph type	Display target	Comparison target	Target value	Upper and lower limit values
 Bar graph	 (Deep blue) When the target value is exceeded, also the part over the target value is displayed in the same color.  (Pink)	 (Light blue)	 (Gray frame and Deep blue traiangle on top)	
 Line graph	 (Orange)	 (Blue)		 (Red)

If once the temperature or humidity exceeds the upper or lower limit value after the graph of temperature or humidity measured by the AI controller (PAC-YG63MCA) is displayed, the whole background of the graph above the upper limit or under the lower limit will be displayed in red on the main unit screen. Even if the temperature or humidity returns to the range between the upper and lower limit values, the background will be kept in red.

Note: For the AHC, the upper and lower limit values cannot be set.



<6> Display range and items which can be displayed in graphs

Select the display range from Address, Group and Block. Some items cannot be displayed in graphs depending on the display range. After the display range is selected, the selection buttons for the items which cannot be displayed will not be displayed on the screen.

The items which can be displayed in graphs in each range are shown below.

Table Display range and items which can be displayed in graphs

○: Displayed –: Not displayed

Type of graph	Display target	Display item	Display range			
			Address	Group	Block	EM Block
Bar graph	Indoor unit	Target value (kWh)	–	–	○ *1	○ *1
		Electric energy (kWh)	○ *1	○ *1	○ *1	○ *1
		FAN operation time (min)	○ *1	○ *1	–	–
		Thermo ON time (total) (min)	○ *1	○ *1	–	–
		Thermo ON time (cooling) (min)	○ *1	○ *1	–	–
		Thermo ON time (heating) (min)	○ *1	○ *1	–	–
	PI controller (PAC-YG60MCA)	Measurements (kWh, m^3, MJ)	○ *2	–	–	–
Line graph	–	Outdoor temperature (°C) (°F)	○	○	○	–
	Indoor unit	Cooling temperature setting (°C) (°F)	○ *1	○ *1	–	–
		Heating temperature setting (°C) (°F)	○ *1	○ *1	–	–
		Indoor temperature (°C) (°F)	○ *1	○ *1	–	–
	AI controller (PAC-YG60MCA) *3	Temperature (°C) (°F)	○ *2	–	–	–
		Humidity (%)	○ *2	–	–	–
	AHC *3	Temperature (°C) (°F)	○ *1	–	–	–

*1: “Energy Management License Pack” is required.

*2: If “Energy Management License Pack” has not been registered, only Day is available for selection as a Date range. To select Month or Year, “Energy Management License Pack” is required.

*3: When the temperature sensor of the AI controller or AHC is set to measure the outdoor temperature (°C) (°F), the line graph will be displayed in any display range of Address, Group and Block.
For the setting procedure, see 4.[5]<1> “Setting of outdoor temperature measurement unit.”

<7> Procedure for displaying graphs

Main unit screen

To display graphs on the main unit screen, touch the Display switching button on the energy use status screen.

The display item setting screen will appear. Set the display item, touch the OK button, and the graphs will be displayed.

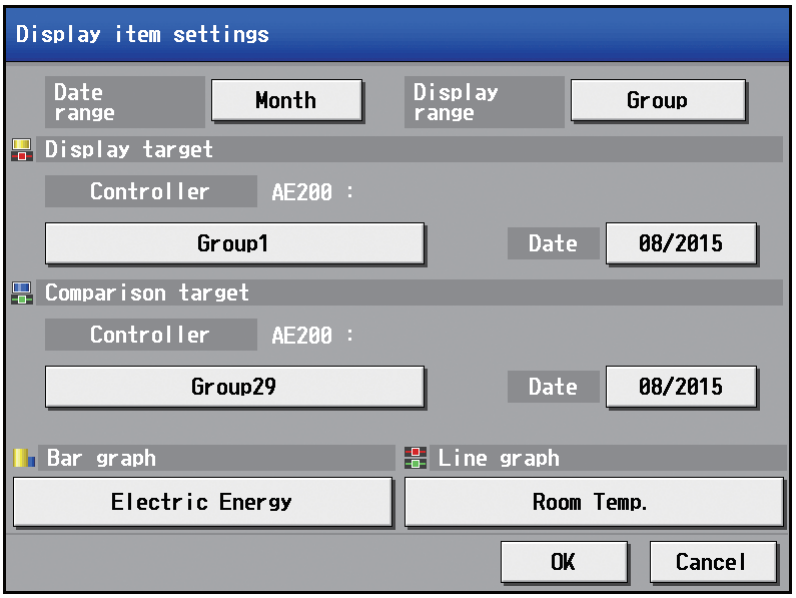
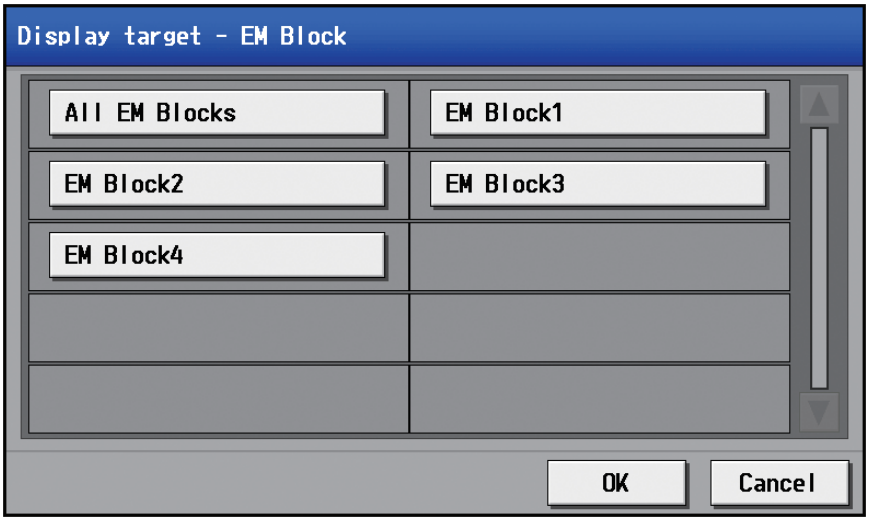
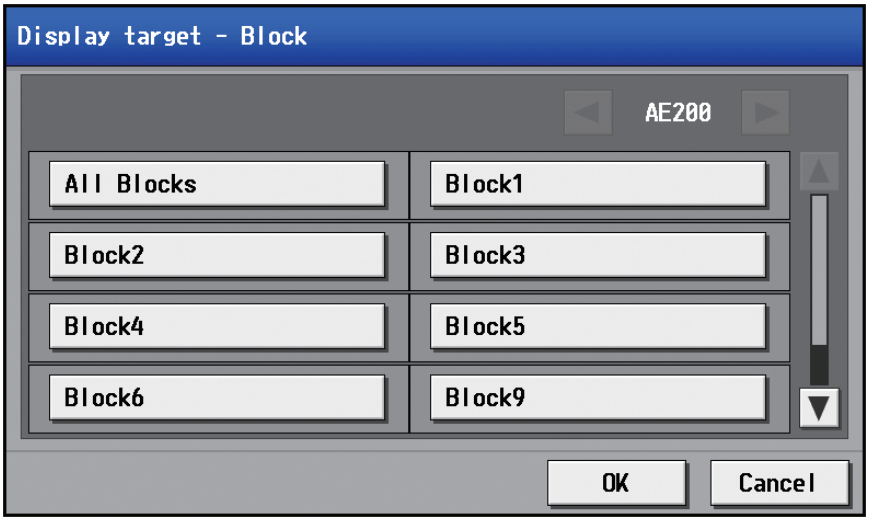


Table Display item setting screen

<table>
<tr><th colspan="2">Item</th><th>Details</th><th>Remarks</th></tr>
<tr><td colspan="2">Date range</td><td>Select Day, Month or Year.</td><td>● When Day is selected, the hourly data from 0:00 to 24:00 on the day will be displayed in graphs.
● When Month is selected, the daily data from the 1st to 31st in the month will be displayed in graphs.
● When Year is selected, the monthly data from January to December in the year will be displayed in graphs</td></tr>
<tr><td colspan="2">Display range</td><td>Select the range of data to be displayed from EM Block, Block, Group and Address.</td><td></td></tr>
<tr><td rowspan="2">Display target</td><td>Display target</td><td>To display the data on AE-200, select AE200.
To display the data on each set of AE-50/EW-50, select Exp1, Exp2, Exp3 or Exp4.
Select the EM Block name, block name, group name or address number of the display target.</td><td></td></tr>
<tr><td></td><td>● When Display range is EM Block:
 

The Energy management block name list will be displayed.
“All EM blocks” will be shown in the upper left corner. The blocks will be shown in the first line in the left column, in the first line in the right column, in the second line in the left column, in the second line in the right column, in the third line in the left column, … in the order of EM block number.
For EM blocks whose names have not been registered, [EM Block + EM block number] will be displayed.

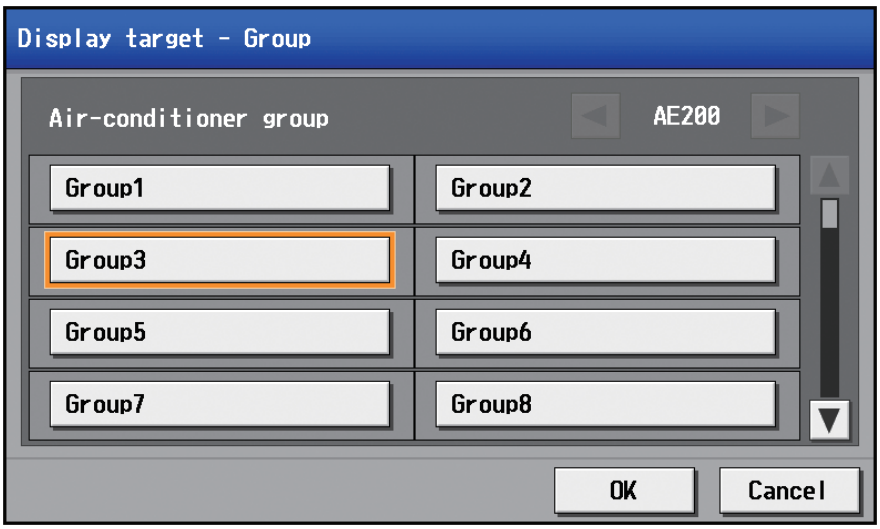
● When Display range is Block:
 

The block name list will be displayed.
“All blocks” will be shown in the upper left corner. The blocks will be shown in the first line in the left column, in the first line in the right column, in the second line in the left column, in the second line in the right column, in the third line in the left column, … in the order of block number. “Unregistered block” will be shown in the last field. For blocks whose names have not been registered, [Block + block number] will be displayed.
The blocks of DIDO controller will not be displayed.</td></tr>
</table>

Table Display item setting screen (continued)

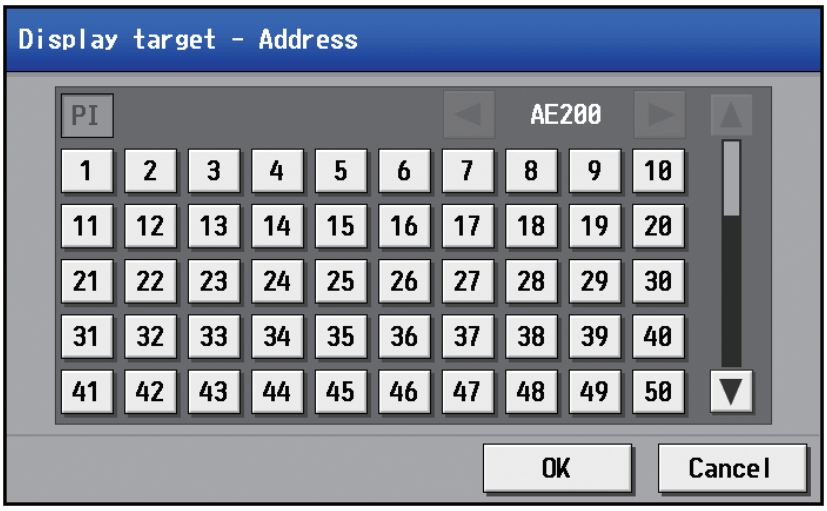
Item		Details	Remarks
Display target	Display target	Select the EM block name, block name, group name or address number of the display target.	

● When Display range is Group:



The group name list will be displayed.
The group names will be shown in the first line in the left column, in the first line in the right column, in the second line in the left column, in the second line in the right column, in the third line in the left column, … in the order of group number.
For groups whose names have not been registered, [Group + group number] will be displayed.
The groups of DIDO controller will not be displayed.

● When Display range is Address

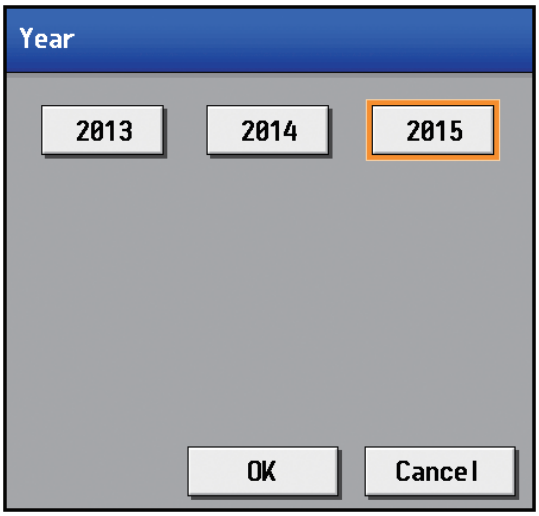


The address list will be displayed.

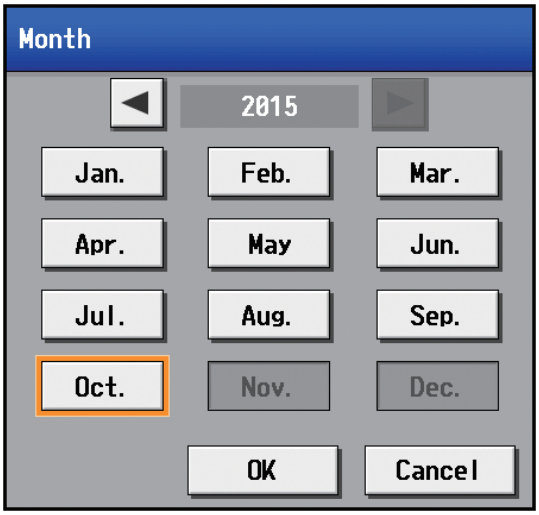
Table Display item setting screen (continued)

Item		Details	Remarks
Display target	Date	Specify the date of the data to be displayed in graphs.	

● When Date range is Year



● When Date range is Month

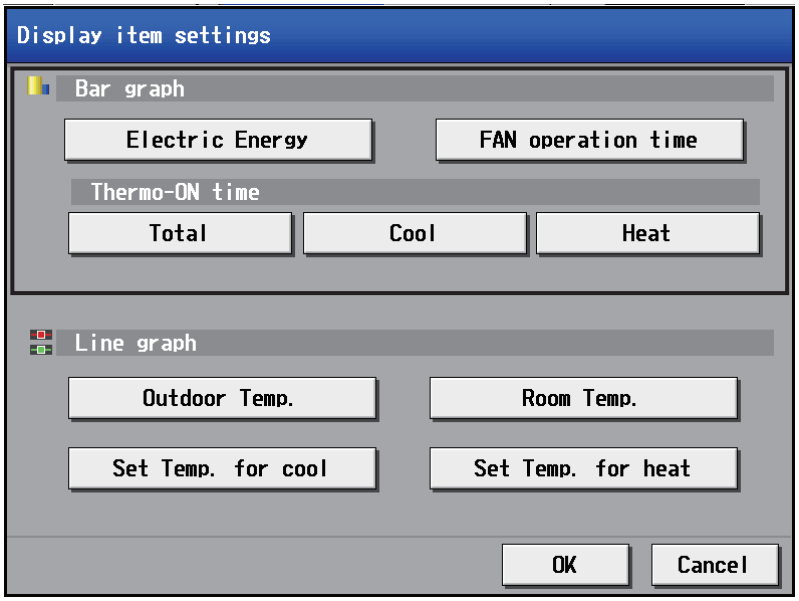


● When Date range is Day

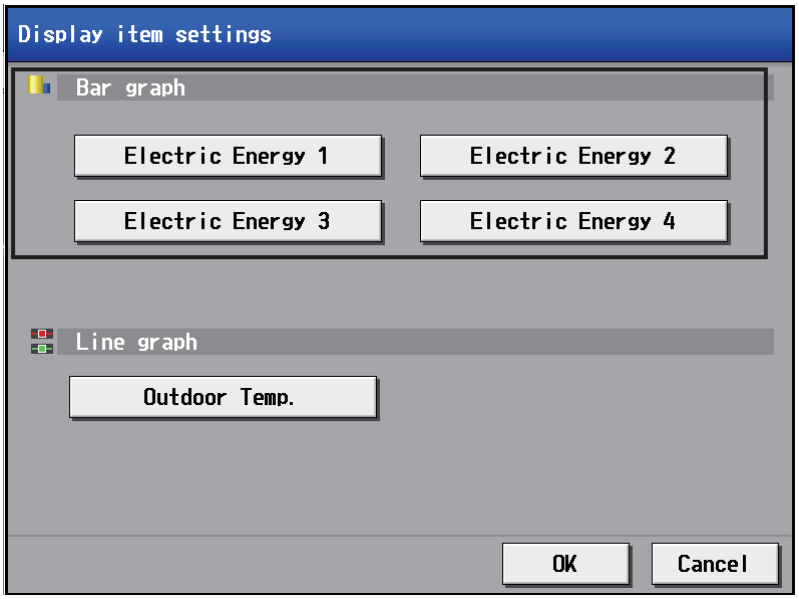
Table Display item setting screen (continued)

Item		Details	Remarks
Comparison target	Device	To display the data on AE-200, select AE200. To display the data on each set of AE-50/EW-50, select Exp1, Exp2, Exp3 or Exp4. (The screen is the same as that for the display target.)	
	Comparison target	Select the block name, group name or address of the comparison target. (The screen is the same as that for the display target.)	● Only the Display range (EM block, block, group or address) selected for the display target can be selected.
	Date	Specify the date of the data to be displayed in graph. (The screen is the same as that for the display target.)	

Table Display item setting screen (continued)

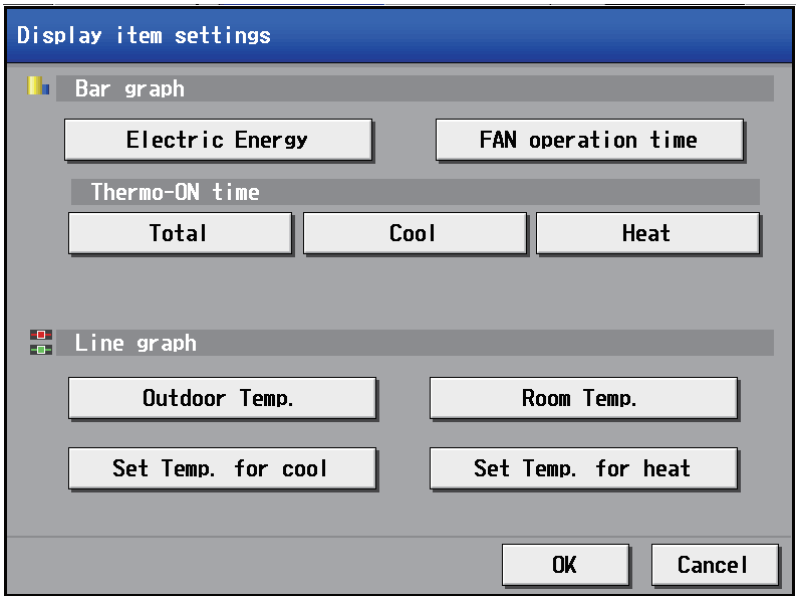
<table>
<tr><th>Item</th><th>Details</th><th>Remarks</th></tr>
<tr><td rowspan="2">Bar graph</td><td>Select the item to be displayed in a bar graph.</td><td>● Only one item can be selected from the bar graph field.
● The item to be displayed in a line graph can be selected at the same time.</td></tr>
<tr><td>● To display the data on indoor units
 

The display item buttons, Electric Energy, FAN operation time and Thermo-ON time Total, Cool and Heat, will be displayed. The buttons of the items which cannot be displayed for the selected display range will not be displayed.
When Display range for LOSSNAY is Group or Address, only the FAN operation time button will be displayed.

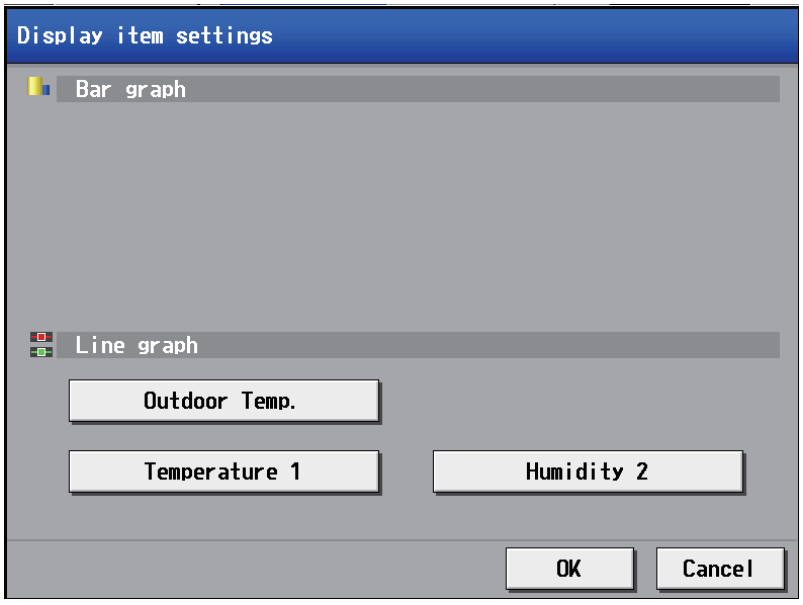
● To display the data on PI controller (PAC-YG60MCA)
 

The display item buttons of the names of the meters connected to the PI controller will be displayed. The names have been set on the measurement setting screen.
If the names have not been registered, Electric Energy 1 to Electric Energy 4, Water quantity 1 to Water quantity 4 and Heat quantity 1 to Heat quantity 4 will be displayed when the meter unit is kWh, m^3 and MJ, respectively.</td></tr>
</table>

Table Display item setting screen (continued)

<table>
<tr><th>Item</th><th>Details</th><th>Remarks</th></tr>
<tr><td rowspan="3">Line graph</td><td>Select the item to be displayed in a line graph.</td><td>● Only one item can be selected from the line graph field.
● The item to be displayed in a bar graph can be selected at the same time.</td></tr>
<tr><td colspan="2">● To display the data on indoor units
 

The display item buttons, Outdoor Temp., Room Temp., Set Temp. for cool and Set Temp. for heat, will be displayed. Two items can be selected simultaneously. The buttons of the items which cannot be displayed for the selected Display range will not be displayed. The Outdoor Temp. button will be displayed only when an outdoor temperature measurement unit has been set on the energy management setting screen.
For LOSSNAY, only the Outdoor Temp. button will be displayed.

● To display the data on AI controller (PAC-YG63MCA) or AHC
 

The Outdoor Temp. button and the display item buttons of the names of the sensors connected to the AI controller or AHC will be displayed. The names have been set on the measurement setting screen.
The Outdoor Temp. button will be displayed only when an outdoor temperature measurement unit has been set on the energy management setting screen.</td></tr>
<tr><td>OK button</td><td colspan="2">Touch the OK button, and the graphs will be displayed.</td></tr>
</table>

Web browser screen

To display the graphs on the Web browser screen, press the Edit button on the energy use status screen to display the display target selection screen.

Edit

After the display target selection screen appears, select the display target, bar graph item and line graph item of the display target, comparison target and bar graph item and line graph item of the comparison target.

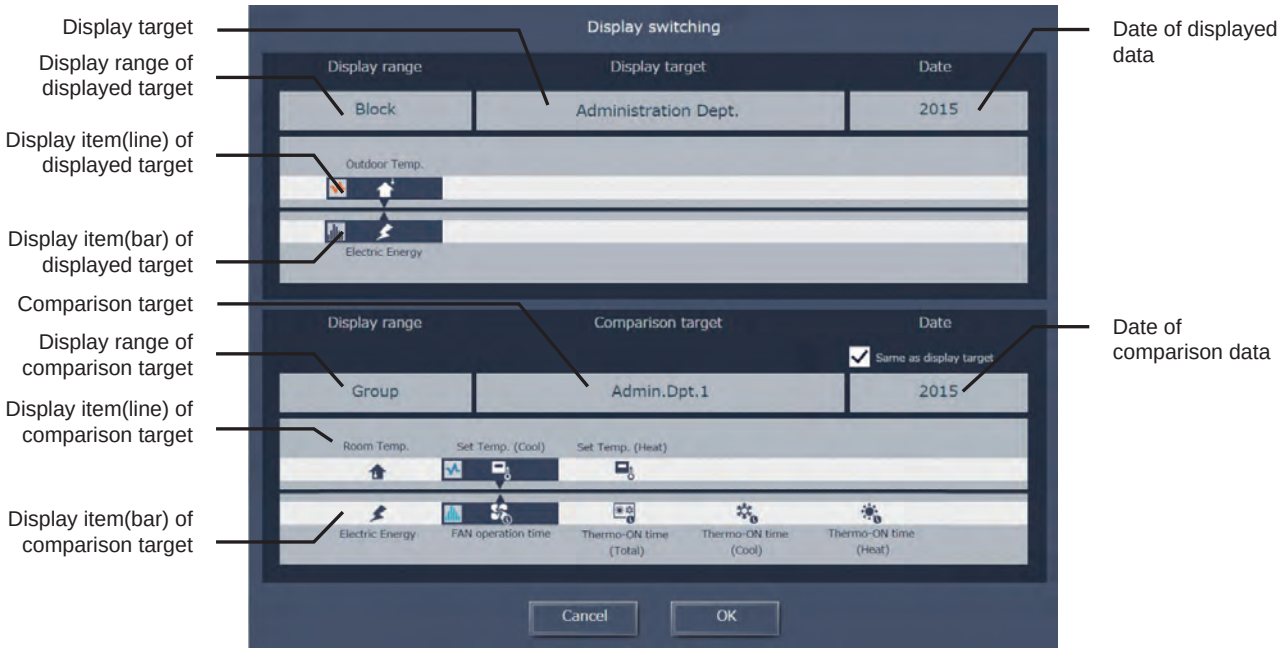


Table Web browser screen

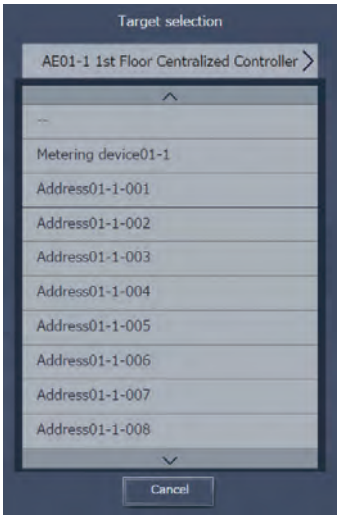
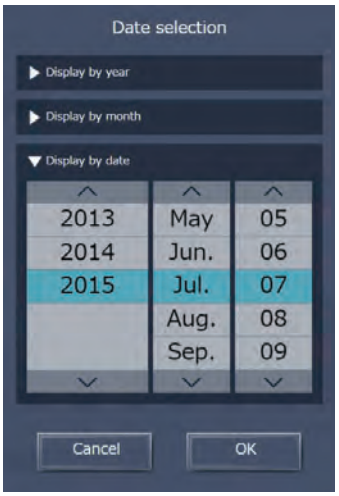
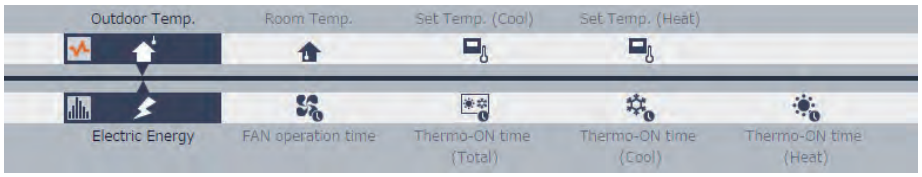
Item	Details	Remarks
Display range of displayed target /Display range of comparison target	Select the range of data to be displayed from Energy mgmt block, Block, Group and Address.	● It is possible to set different display ranges for the display target and comparison target.
Display target /Comparison target	Select the energy management block name, block name, group name or address number of the display target or comparison target. 	● When Display range is Energy mgmt block The Energy management block name list will be displayed. For EM blocks whose names have not been registered, [EM Block + EM block number] will be displayed. If [--] is selected, the screen will return to the state with no target selected. ● When Display range is Block The block name list will be displayed. “All blocks” will be displayed in the uppermost line. “Unregistered block” will be displayed in the lowermost line. For blocks whose names have not been registered, [Block + block number] will be displayed. The blocks of DIDO controller will not be displayed. ● When Display range is Group. The group name list will be displayed. For groups whose names have not been registered, [Group + group number] will be displayed. The groups of DIDO controller will not be displayed. ● When Display range is Address. The address list will be displayed. ● If “Same as display target” is checked, the same settings as those for the display target will be made.
Date of displayed data /Date of comparison data	Specify the date of the data to be displayed in graphs. Select one of year, month and day, and select the date of the data to be displayed. 	● Only the same unit can be selected for the display target and comparison target. ● If “Same as display target” is checked, the same date as that of the display target will be set.

Table Web browser screen (continued)

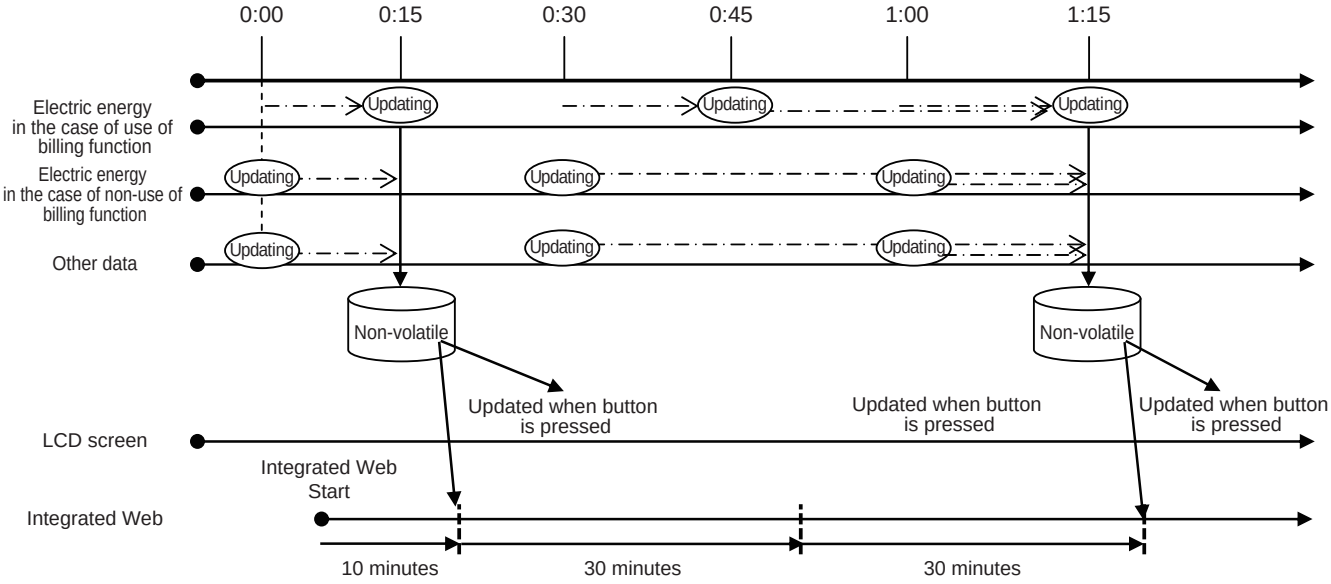
<table>
<tr><th>Item</th><th>Details</th><th>Remarks</th></tr>
<tr><td rowspan="2">Display item(line)of displayed target /Display item(line)of comparison target</td><td>Select the bar graph item and line graph item.</td><td>● One item can be selected for each of the display target and comparison target for each of the bar graph and line graph.
● The selectable items vary depending on the selected target and display range.</td></tr>
<tr><td colspan="2">
● To display the data on indoor units
When Group or Address has been selected, the following items can be selected.
<table>
<tr><th>Bar graph</th><th>Line graph</th></tr>
<tr><td>Electric Energy
Fan operation time
Thermo-ON timeTotal
Thermo-ON time Cool
Thermo-ON time Heat</td><td>Outdoor Temp.
Room Temp.
Set Temp. for cool
Set Temp. for heat,</td></tr>
</table>
When Block or Energy mgmt block has been selected, only Electric Energy and Outdoor Temp can be selected.


● To display the data on LOSSNAY units
When Group or Address has been selected, the following items can be selected.
<table>
<tr><th>Bar graph</th><th>Line graph</th></tr>
<tr><td>Fan operation time</td><td>Outdoor Temp.</td></tr>
</table>
● To display the data on PI controller (PAC-YG60MCA)
<table>
<tr><th>Bar graph</th><th>Line graph</th></tr>
<tr><td>Meter 1 *1
Meter 2 *1
Meter 3 *1
Meter 4 *1</td><td>Outdoor Temp.</td></tr>
</table>
*1:The display item buttons of the names of the meters connected to the PI controller will be displayed. The names have been set on the measurement setting screen. If the names have not been registered, Electric Energy 1 to Electric Energy 4, Water quantity 1 to Water quantity 4 and Heat quantity 1 to Heat quantity 4 will be displayed when the meter unit is kWh, m^3 and MJ, respectively.


● To display the data on AI controller (PAC-YG63MCA) or AHC
<table>
<tr><th>Bar graph</th><th>Line graph</th></tr>
<tr><td>-</td><td>Outdoor Temp.
Measurement 1 *2
Measurement 2 *2</td></tr>
</table>
*2:The display item buttons of the names of the sensors connected to the AI controller or AHC will be displayed. The names have been set on the measurement setting screen.
</td></tr>
<tr><td>OK button</td><td colspan="2">Touch the OK button, and the graphs will be displayed.</td></tr>
</table>

<8> Display updating

The main unit screen will not be automatically updated. The screen will be updated by pressing the Update button, pressing the OK button on the display switch screen or reopening the energy use status screen. The Integrated Centralized Control Web screen will be updated every 30 minutes while the energy use status screen is open (at 10 minutes and 40 minutes after the Web screen is started).
However, since the data for every one hour is displayed, the data will be updated once an hour (at 15 minutes).
Also when the date range is Month or Year, the graphs plotted with the data obtained for every one hour will be displayed every hour on the hour.



<9> CSV output on energy use status screen

<9-1>Output from LCD

To output the data in CSV format from the LCD, touch [CSV output] on the energy use status screen, and the displayed measurement data will be output to USB memory in CSV format.
The data will be output in the following format with the following name according to the selected date range.

■ File name

[When a comparison target has been selected in Comparison target]

Date range: Day

EM_DailyTrend_(yyyy)-(mm)-(dd)_(display target)_(YYYY)-(MM)-(DD)_(comparison target)_(type of bar graph)_(type of line graph1)_(type of line graph2).csv

Date range: Month

EM_MonthlyTrend_(yyyy)-(mm)_(display target)_(YYYY)-(MM)_(comparison target)_(type of bar graph)_(type of line graph1)_(type of line graph2).csv

Date range: Year

EM_AnnualTrend_(yyyy)_(display target)_(YYYY)_(comparison target)_(type of bar graph)_(type of line graph1)_(type of line graph2).csv

[When a comparison target has not been selected in Comparison target]

Date range: Day

EM_DailyTrend_(yyyy)-(mm)-(dd)_(display target)_(type of bar graph)_(type of line graph1)_(type of line graph2).csv

Date range: Month

EM_MonthlyTrend_(yyyy)-(mm)_(display target)_(type of bar graph)_(type of line graph1)_(type of line graph2).csv

Date range: Year

EM_AnnualTrend_(yyyy)_(display target)_(type of bar graph)_(type of line graph1)_(type of line graph2).csv

■ Contents of file name

Contents of file name	Format	
(yyyy)	Year specified in Date of displayed data	
(mm)	Month specified in Date of displayed data	
(dd)	Day specified in Date of displayed data	
(display target)	Address	AE number(1 to 4) +"-" + "A" + M-NET address (000 to 250) + "_" + (In the case of indoor unit) "00" (In the case of PI controller, AI controller or AHC) meter No., sensor No. (00 to 04) * No M-NET address in the case of built-in meter * To output the data in AE-200, the AE number field must be left blank. If the field is blank, "-" after the blank will be hidden.
	Group	AE number(1 to 4 or blank) + "-" + "G" + group No. (001 to 050) + "_" + "00" *To output the data in AE-200, the AE number field must be left blank. If the field is blank, "-" after the blank will be hidden.
	Block	AE number(1 to 4 or blank) + "-" + "B" + block No. (000,001 to 050 or 999 *1) + "_" + "00" *To output the data in AE-200, the AE number field must be left blank. If the field is blank, "-" after the blank will be hidden.
	Energy management block	"E" + Energy management block No.(001 to 200 or 999*1) + "_" + "00"
(YYYY)	Year specified in Date of compared data	
(MM)	Month specified in Date of compared data	
(DD)	Day specified in Date of compared data	
(comparison target)	Address	AE number(1 to 4) +"-" + "A" + M-NET address (000 to 250) + "_" + (In the case of indoor unit) "00" (In the case of PI controller, AI controller or AHC) meter No., sensor No. (00 to 04) * No M-NET address in the case of built-in meter *To output the data in AE-200, the AE number field must be left blank. If the field is blank, "-" after the blank will be hidden.
	Group	AE number(1 to 4 or blank) + "-" + "G" + group No. (001 to 050) + "_" + "00" *To output the data in AE-200, the AE number field must be left blank. If the field is blank, "-" after the blank will be hidden.
	Block	AE number(1 to 4 or blank) + "-" + "B" + block No. (000,001 to 050 or 999 *1) + "_"+ "00" *To output the data in AE-200, the AE number field must be left blank. If the field is blank, "-" after the blank will be hidden.
	Energy management block	"E" + Energy management block No.(001 to 200 or 999*1) + "_" + "00"

*1: "B000" = Group in which no blocks have been registered, "B999" = Total of all blocks, "E999" = Total of all energy management blocks

Contents of file name	Format
(type of bar graph)	B01: Electric energy (indoor unit)
	B02: FAN operation time
	B03: Thermo ON time (total)
	B04: Thermo ON time (cooling)
	B05: Thermo ON time (heating)
	B06: Electric energy on PI controller and built-in meter
	B08: Quantity of water on PI controller and built-in meter
	B09: Quantity of heat on PI controller and built-in meter
	B00: No selection
(type of line graph)	L00: No selection
	L01: Temperature setting (cooling)
	L02: Temperature setting (heating)
	L03: Indoor temperature
	L04: AI controller temperature
	L05: AHC temperature
	L06: Outdoor temperature
	L08: AI controller humidity

■ File format

<table>
<tr><th>Line</th><th>Item</th><th>Date range</th><th colspan="3">Format</th></tr>
<tr><td rowspan="3">1st line</td><td rowspan="3">Classification of file</td><td>Day</td><td colspan="3">401</td></tr>
<tr><td>Month</td><td colspan="3">402</td></tr>
<tr><td>Year</td><td colspan="3">403</td></tr>
<tr><td rowspan="3">2nd line</td><td rowspan="3">Date</td><td>Day</td><td colspan="3">yyyy/mm/dd:YYYY/MM/DD *1</td></tr>
<tr><td>Month</td><td colspan="3">yyyy/mm:YYYY/MM *1</td></tr>
<tr><td>Year</td><td colspan="3">yyyy:YYYY</td></tr>
<tr><td rowspan="4">3rd line</td><td rowspan="4" colspan="2">Target</td><td>Address</td><td colspan="2">“Address” + address No. (display target)/“Address” + address No.(comparison target)
* In the case of PI controller, AI controller or AHC, the address number is “address No. + meter No. or sensor No. (1 to 4).”
* In the case of built-in meter, the address number is “built-in meter - (1 to 4).”</td></tr>
<tr><td>Group</td><td colspan="2">Group name (display target)/group name (comparison target) *3</td></tr>
<tr><td>Block</td><td colspan="2">Block name (display target)/block name (comparison target) *3</td></tr>
<tr><td>Energy management block</td><td colspan="2">Energy management block name (display target)/
energy management block name (comparison target) *3</td></tr>
<tr><td rowspan="4">4th line</td><td rowspan="4">Measurement item</td><td>Day</td><td>“Time”</td><td rowspan="4">Address
Group
Block
Energy management block</td><td>“Address” + address No. (display target) (bar) + “-” + display item (bar), “Address” + address No. (comparison target)(bar) + “-” + display item (bar), “Address” + address No. (display target) (line) + “-” + display item 1(line), “Address” + address No. (comparison target) (line) + “-” + display item 1(line), “Address” + address No. (display target) (line) + “-” + display item 2(line),“Address” + address No. (comparison target) (line) + “-” + display item 2(line)
* In the case of built-in meter, “built-in meter” + “-” + sensor No. (1 to 4) is set in place of “Address” + address No.</td></tr>
<tr><td>Month</td><td>“Day”</td><td>Group name *3 (display target) (bar) + “-” + display item (bar), group name *3 (comparison target)(bar) + “-” + display item (bar), group name *3 (display target)(line) + “-” + display item 1(line), group name *3 (comparison target) (line) + “-” + display item 1(line), group name *3 (display target)(line) + “-” + display item 2 (line), group name *3 (comparison target) (line) + “-” + display item 2(line)</td></tr>
<tr><td rowspan="2">Year</td><td rowspan="2">“Month”</td><td>Block name *3 (display target) (bar) + “-” + display item (bar), block name *3 (comparison target)(bar) + “-” + display item (bar), “target electric energy [kWh]” *2, block name *3 (display target)(line) + “-” + display item (line), block name *3 (comparison target) (line) + “-” + display item (line)</td></tr>
<tr><td></td><td></td><td>Energy management block name *3 (display target) (bar) + “-” + display item (bar), Energy management block name *3 (comparison target)(bar) + “-” + display item (bar), “target electric energy [kWh]” *2</td></tr>
<tr><td rowspan="3">5th line and following *5</td><td rowspan="3">Data *4</td><td>Day</td><td>hh:mm,</td><td colspan="2" rowspan="3">Data value (bar), comparison data value (bar), target electric energy value *2, data value1 (line), comparison data value1 (line), data value2 (line), comparison data value2 (line),</td></tr>
<tr><td>Month</td><td>dd,</td></tr>
<tr><td>Year</td><td>mm,</td></tr>
</table>

*1: The dates will be displayed in the formats set on the basic system setting screen on the Web browser for initial setting or main unit LCD screen.

*2: The “target electric energy [kWh]” and target electric energy value will be displayed only when the data is displayed in a graph.

*3: If the group name has not been given, [“Group” + AE number + “-” + group No.] will be shown. If the block name has not been given, [“Block” + AE number + “-” + block No.] will be shown. If the EM block name has not been given, [“EM block” +EM block No.] will be shown.

*4: As the data delimiters and decimal point delimiters, the characters selected on the measurement setting screen on the Web browser for initial setting will be used.

*5: The number of lines varies depending on the selected date range. (Day: 5th to 28th lines, Month: 5th to 35th lines, Year: 5th to 16th lines)

■ Examples of files
(When Display range is Block)

Date range: Day

```
401
2014/08/19:2013/06/01
Block 1/Block 5
Time, block 1 – indoor unit electric energy [kWh], block 5 – indoor unit electric energy [kWh], block 1 – outdoor temperature [°C], block 5 – outdoor temperature [°C]
00:00, 0.61, 0.25, 23.2, 17.8
01:00, 0.65, 0.51, 23.1, 17.6
02:00, 0.66, 0.48, 22.1, 18.1
03:00, 0.66, 0.58, 23.3, 18.2
04:00, 0.63, 0.47, 24.5, 17.5
05:00, 0.59, 0.39, 26.8, 19.1
06:00, 0.52, 0.52, 28.1, 22.1
:
23:00, 0.59, 0.23, 23.4, 17.1
```

Date range: Month

```
402
2014/08:2013/06
Block 1/Block 5
Day, block 1 – indoor unit electric energy [kWh], block 5 – indoor unit electric energy [kWh], target electric energy [kWh], block 1 – outdoor temperature [°C], block 5 – outdoor temperature [°C]
01, 24.69, 8.74, 22, 26.2, 17.9
02, 25.31, 8.22, 22, 27, 17.4
03, 12.36, 22.33, 10, 25.2, 16.6
04, 10.37, 21.36, 10, 25.1, 19.3
05, 27.02, 17.55, 22, 27.7, 20.5
06, 24.55, 16.58, 22, 26.3, 19
07, 24.69, 17.96, 22, 24.9, 18.9
:
31, 13.2, 20.22,10, 27.3, 20.2
```

Date range: Year

```
403
2014:2013
Block 1/Block 5
Month, block 1 – indoor unit electric energy [kWh], block 5 – indoor unit electric energy [kWh], target electric energy [kWh], block 1 – outdoor temperature [°C], block 5 – outdoor temperature [°C]
01, 675.17, 661.93, 600, 0.4, 0.5
02, 697.38, 683.71, 700, 0.3, 3.2
03, 528.63, 518.26, 400, 4.5, 3.8
04, 403.67, 395.75, 500, 9.8, 10
05, 420.28, 412.04, 500, 15.9, 15.6
06, 450.33, 477.88, 500, 18.2, 20.6
07, 594.13, 582.48, 550, 22.8, 24.8
:
12, 602.58, 590.76, 550, 3.3, 3.4
```

Remarks

○ When data is output with the date range setting “Day,” the data of the bar graph to be output in each time line is the data obtained between the hour (00 minute) of the time and the hour (00 minute) after one hour. The data of the line graph is the instantaneous value at the hour (00 minute) of the time.

Example: When data is output at the present time 22:27, the data will be output as shown below.

```
22:00, 12, 15.0
21:00, 15, 15.2
22:00,,15.3          The data of bar graph at 22:00 is blank.
23:00,,
```

<9-2>Output from Web screen

To output the data in CSV format from the Web screen, touch [Download] on the energy use status screen, and the displayed measurement data will be output to USB memory in CSV format.
The data will be output in the following format with the following name according to the selected date range.

■ File name

[When a comparison target has been selected in Comparison target]

Date range: Day

EM_DailyTrend_(yyyy)-(mm)-(dd)_(display target)_(type of bar graph1)_(type of line graph1)_(YYYY)-(MM)-(DD)_(comparison target)_(type of bar graph2)_(type of line graph2).csv

Date range: Month

EM_MonthlyTrend_(yyyy)-(mm)_(display target)_(type of bar graph1)_(type of line graph1)_(YYYY)-(MM)_(comparison target)_(type of bar graph2)_(type of line graph2).csv

Date range: Year

EM_AnnualTrend_(yyyy)_(display target)_(type of bar graph1)_(type of line graph1)_(YYYY)_(comparison target)_(type of bar graph2)_(type of line graph2).csv

[When a comparison target has not been selected in Comparison target]

Date range: Day

EM_DailyTrend_(yyyy)-(mm)-(dd)_(display target)_(type of bar graph1)_(type of line graph1).csv

Date range: Month

EM_MonthlyTrend_(yyyy)-(mm)_(display target)_(type of bar graph1)_(type of line graph1).csv

Date range: Year

EM_AnnualTrend_(yyyy)_(display target)_(type of bar graph1)_(type of line graph1).csv

■ Contents of file name

Contents of file name	Format	
(yyyy)	Year specified in Date of displayed data	
(mm)	Month specified in Date of displayed data	
(dd)	Day specified in Date of displayed data	
(display target)	Address	AE number + “A” + M-NET address (001 to 250) + “_” + (In the case of indoor unit) “00” (In the case of PI controller, AI controller or AHC) meter No., sensor No. (01 to 04) * No M-NET address in the case of built-in meter *To output the data in AE-200, the AE number field must be left blank. If the field is blank, “-” after the blank will be hidden.
	Group	AE number(1 to 4 or blank) + “-” + “G” + group No. (001 to 050) + “_” + “00” *To output the data in AE-200, the AE number field must be left blank. If the field is blank, “-” after the blank will be hidden.
	Block	AE number(1 to 4 or blank) + “-” + “B” + block No. (000,001 to 050 or 999 *1) + “_”+ “00” *To output the data in AE-200, the AE number field must be left blank. If the field is blank, “-” after the blank will be hidden.
	Energy management block	“E” + Energy management block No.(001 to 200) + “_” + “00”
(YYYY)	Year specified in Date of compared data	
(MM)	Month specified in Date of compared data	
(DD)	Day specified in Date of compared data	
(comparison target)	Address	AE number + “A” + M-NET address (001 to 250) + “_” + (In the case of indoor unit) “00” (In the case of PI controller, AI controller or AHC) meter No., sensor No. (01 to 04) * No M-NET address in the case of built-in meter *To output the data in AE-200, the AE number field must be left blank. If the field is blank, “-” after the blank will be hidden.
	Group	AE number(1 to 4 or blank) + “-” + “G” + group No. (001 to 050) + “_” + “00” *To output the data in AE-200, the AE number field must be left blank. If the field is blank, “-” after the blank will be hidden.
	Block	AE number(1 to 4 or blank) + “-” + “B” + block No. (000,001 to 050 or 999 *1) + “_”+ “00” *To output the data in AE-200, the AE number field must be left blank. If the field is blank, “-” after the blank will be hidden.
	Energy management block	“E” + Energy management block No.(001 to 200) + “_” + “00”

*1: “B000” = Group in which no blocks have been registered, “B999” = Total of all blocks

Contents of file name	Format
(type of bar graph)	B01: Electric energy (indoor unit)
	B02: FAN operation time
	B03: Thermo ON time (total)
	B04: Thermo ON time (cooling)
	B05: Thermo ON time (heating)
	B06: Electric energy on PI controller and built-in meter
	B08: Quantity of water on PI controller and built-in meter
	B09: Quantity of heat on PI controller and built-in meter
	B00: No selection
(type of line graph)	L01: Temperature setting (cooling)
	L02: Temperature setting (heating)
	L03: Indoor temperature
	L04: AI controller temperature
	L05: AHC temperature
	L06: Outdoor temperature
	L08: AI controller humidity
	L00: No selection

■ File format

<table>
<tr><th>Line</th><th>Item</th><th>Date range</th><th colspan="3">Format</th></tr>
<tr><td rowspan="3">1st line</td><td rowspan="3">Classification of file</td><td>Day</td><td colspan="3">401</td></tr>
<tr><td>Month</td><td colspan="3">402</td></tr>
<tr><td>Year</td><td colspan="3">403</td></tr>
<tr><td rowspan="3">2nd line</td><td rowspan="3">Date</td><td>Day</td><td colspan="3">yyyy/mm/dd:YYYY/MM/DD *1</td></tr>
<tr><td>Month</td><td colspan="3">yyyy/mm:YYYY/MM *1</td></tr>
<tr><td>Year</td><td colspan="3">yyyy:YYYY</td></tr>
<tr><td rowspan="4">3rd line</td><td rowspan="4" colspan="2">Target</td><td>Address</td><td colspan="2">“Address” + address No. (display target)/“Address” + address No.(comparison target)
* In the case of PI controller, AI controller or AHC, the address number is “address No. + meter No. or sensor No. (1 to 4).”
* In the case of built-in meter, the address number is “built-in meter - (1 to 4).”</td></tr>
<tr><td>Group</td><td colspan="2">Group name (display target)/group name (comparison target) *3</td></tr>
<tr><td>Block</td><td colspan="2">Block name (display target)/block name (comparison target) *3</td></tr>
<tr><td>Energy management block</td><td colspan="2">Energy management block name (display target)/
energy management block name (comparison target) *3</td></tr>
<tr><td rowspan="4">4th line</td><td rowspan="4">Measurement item</td><td>Day</td><td>“Time”</td><td rowspan="4">Address
Group
Block
Energy management block</td><td>“Address” + address No. (display target) (bar) + “-” + display item1 (bar), “Address” + address No. (comparison target)(bar) + “-” + display item2 (bar), “Address” + address No. (display target) (line) + “-” + display item 1(line), “Address” + address No. (comparison target) (line) + “-” + display item 2(line),
* In the case of built-in meter, “built-in meter” + “-” + sensor No. (1 to 4) is set in place of “Address” + address No.</td></tr>
<tr><td>Month</td><td>“Day”</td><td>Group name *3 (display target) (bar) + “-” + display item1 (bar), group name *3 (comparison target)(bar) + “-” + display item2 (bar), group name *3 (display target)(line) + “-” + display item 1(line), group name *3 (comparison target) (line) + “-” + display item 2(line)</td></tr>
<tr><td>Year</td><td>“Month”</td><td>Block name *3 (display target) (bar) + “-” + display item1 (bar), block name *3 (comparison target)(bar) + “-” + display item2 (bar), “target electric energy [kWh]” *2, block name *3 (display target)(line) + “-” + display item1 (line), block name *3 (comparison target) (line) + “-” + display item2(line)</td></tr>
<tr><td>Energy management block name *3 (display target) (bar) + “-” + display item 1(bar), Energy management block name *3 (comparison target)(bar) + “-” + display item2 (bar), “target electric energy [kWh]” *2</td></tr>
<tr><td rowspan="3">5th line and following *5</td><td rowspan="3">Data *4</td><td>Day</td><td>hh:mm,</td><td colspan="2" rowspan="3">Data value (bar), comparison data value (bar), target electric energy value *2, data value (line), comparison data value (line)</td></tr>
<tr><td>Month</td><td>dd,</td></tr>
<tr><td>Year</td><td>mm,</td></tr>
</table>

*1: The dates will be displayed in the formats set on the basic system setting screen on the Web browser for initial setting or main unit LCD screen.

*2: The “target electric energy [kWh]” and target electric energy value will be displayed only when the data is displayed in a graph.

*3: If the group name has not been given, [“Group” + AE number + “-” + group No.] will be shown. If the block name has not been given, [“Block” + AE number + “-” + block No.] will be shown. If the EM block name has not been given, [“EM block” + AE number + “-” + EM block No.] will be shown.

*4: As the data delimiters and decimal point delimiters, the characters selected on the measurement setting screen on the Web browser for initial setting will be used.

*5: The number of lines varies depending on the selected date range. (Day: 5th to 28th lines, Month: 5th to 35th lines, Year: 5th to 16th lines)

■ Examples of files
(When Display range is Block)

Date range: Day

```
401
2014/08/19:2013/06/01
Block 1/Block 5
Time, block 1 – indoor unit electric energy [kWh], block 5 – indoor unit electric energy [kWh], block 1 – outdoor temperature [°C], block 5 – outdoor temperature [°C]
00:00, 0.61, 0.25, 23.2, 17.8
01:00, 0.65, 0.51, 23.1, 17.6
02:00, 0.66, 0.48, 22.1, 18.1
03:00, 0.66, 0.58, 23.3, 18.2
04:00, 0.63, 0.47, 24.5, 17.5
05:00, 0.59, 0.39, 26.8, 19.1
06:00, 0.52, 0.52, 28.1, 22.1
:
23:00, 0.59, 0.23, 23.4, 17.1
```

Date range: Month

```
402
2014/08:2013/06
Block 1/Block 5
Day, block 1 – indoor unit electric energy [kWh], block 5 – indoor unit electric energy [kWh], target electric energy [kWh], block 1 – outdoor temperature [°C], block 5 – outdoor temperature [°C]
01, 24.69, 8.74, 22, 26.2, 17.9
02, 25.31, 8.22, 22, 27, 17.4
03, 12.36, 22.33, 10, 25.2, 16.6
04, 10.37, 21.36, 10, 25.1, 19.3
05, 27.02, 17.55, 22, 27.7, 20.5
06, 24.55, 16.58, 22, 26.3, 19
07, 24.69, 17.96, 22, 24.9, 18.9
:
31, 13.2, 20.22,10, 27.3, 20.2
```

Date range: Year

```
403
2014:2013
Block 1/Block 5
Month, block 1 – indoor unit electric energy [kWh], block 5 – indoor unit electric energy [kWh], target electric energy [kWh], block 1 – outdoor temperature [°C], block 5 – outdoor temperature [°C]
01, 675.17, 661.93, 600, 0.4, 0.5
02, 697.38, 683.71, 700, 0.3, 3.2
03, 528.63, 518.26, 400, 4.5, 3.8
04, 403.67, 395.75, 500, 9.8, 10
05, 420.28, 412.04, 500, 15.9, 15.6
06, 450.33, 477.88, 500, 18.2, 20.6
07, 594.13, 582.48, 550, 22.8, 24.8
:
12, 602.58, 590.76, 550, 3.3, 3.4
```

Remarks

○ When data is output with the date range setting “Day,” the data of the bar graph to be output in each time line is the data obtained between the hour (00 minute) of the time and the hour (00 minute) after one hour. The data of the line graph is the instantaneous value at the hour (00 minute) of the time. Example: When data is output at the present time 22:27, the data will be output as shown below.

```
22:00, 12, 15.0
21:00, 15, 15.2
22:00,,15.3          The data of bar graph at 22:00 is blank.
23:00,,
```

<10> Energy management data list

The following table “Data items” shows the energy management items which can be output in CSV format, measurement units and data ranges for the data types.
The following table “Data periods” shows the amount of data (number of months or years) which can be contained in each CSV file.

Table Data items

Unit type	Item	Data type (interval)					Measurement unit	Data range *11
		5-minute	30-minute	Daily *6	Monthly *7	Annual *8		
Outdoor unit	Data 1 *1	○	○	○	○	○	–	0 to 999999.99
	Data 2 *1	○	○				–	0 to 9999.99
	Data 3 *1	○	○	○	○	○	–	0 to 99.99
	Outdoor temperature	○	○ *2	○ *3	○ *4		°C, °F	-100.0 to 1000.0
Indoor unit	Cooling temperature setting	○	○ *2	○ *3	○ *4		°C, °F	-100.0 to 1000.0
	Heating temperature setting	○	○ *2	○ *3	○ *4		°C, °F	-100.0 to 1000.0
	Room temperature	○	○ *2	○ *3	○ *4		°C, °F	-100.0 to 1000.0
	FAN operation time		○ *9	○ *10	○ *10	○ *10	minute	0 to 2147483647
	Cooling operation time		○ *9	○ *10	○ *10	○ *10	minute	0 to 2147483647
	Heating operation time		○ *9	○ *10	○ *10	○ *10	minute	0 to 2147483647
	Thermo On time		○ *9	○ *10	○ *10	○ *10	minute	0 to 2147483647
	Thermo ON time for cooling		○ *9	○ *10	○ *10	○ *10	minute	0 to 2147483647
	Thermo ON time for heating		○ *9	○ *10	○ *10	○ *10	minute	0 to 2147483647
	Thermo ON/OFF count *5		○ *9				–	0 to 2147483647
	Capacity save amount		○ *9	○ *10	○ *10	○ *10	minute	0 to 21474836.47
	Cooling capacity save amount		○ *9	○ *10	○ *10	○ *10	minute	0 to 21474836.47
	Heating capacity save amount		○ *9	○ *10	○ *10	○ *10	minute	0 to 21474836.47
	Apportioned electric energy		○ *9	○ *10	○ *10	○ *10	kWh	0 to 999999.9999
	Target electric energy			○ *10	○ *10	○ *10	kWh	0 to 4294967
MCP (PI controller)	MCP1	○ *9	○ *9	○ *10	○ *10	○ *10	kWh, m^3, MJ	0 to 999999.99
	MCP2	○ *9	○ *9	○ *10	○ *10	○ *10	kWh, m^3, MJ	0 to 999999.99
	MCP3	○ *9	○ *9	○ *10	○ *10	○ *10	kWh, m^3, MJ	0 to 999999.99
	MCP4	○ *9	○ *9	○ *10	○ *10	○ *10	kWh, m^3, MJ	0 to 999999.99
MCT (AI controller)	MCT1	○	○ *2	○ *3	○ *4		°C, °F, %	-1000.0 to 1000.0
	MCT2	○	○ *2	○ *3	○ *4		°C, °F, %	-1000.0 to 1000.0
AHC	AHC temperature 1	○	○ *2	○ *3	○ *4		°C, °F	-1000.0 to 1000.0
	AHC temperature 2	○	○ *2	○ *3	○ *4		°C, °F	-1000.0 to 1000.0

*1: These values are for factory use only. Do not use them for any other purposes.
*2: These values are temperature or humidity values measured at 00 minute and 30 minutes of every hour.
*3: These values are the daily average values of the temperatures or humidity values measured at 00 minute of every hour.
*4: These values are the monthly average values of the temperatures or humidity values measured every day.
*5: The Thermo ON/OFF count indicates the number of times the unit was switched from the thermo OFF mode to the thermo ON mode.
*6: When the data to be output includes the data on the current day, the data up to the point of output of the CSV file will be output.
*7: The data in the current month includes the data up to the point of output of the CSV file.
*8: The data in the current year includes the data up to the point of output of the CSV file.
*9: These are the values accumulated since the start of operation. When any value exceeds the maximum value, it will return to 0.
*10: These values are the sum totals in the measurement period (1 day, 1 month or 1 year).
*11: The number of displayed decimal places varies depending on the data item. For example, when the data range is 0 to 99.99, the values will be displayed to two decimal places.

[5] Ranking

On the ranking screen, the power consumption, FAN operation time and thermo ON time (total, cooling and heating) of indoor units in each energy management block or block or group or unit address can be displayed in bar graphs in descending order to visualize the energy-saving state. Blocks and groups which consume more electric energy will be visually indicated to facilitate preparation of an energy-saving plan.
Energy-saving measures can be taken timely by setting the target values and comparing the present energy use status with the target value.

Note: To display the ranking screen, "Energy Management License Pack" is required.

The data will be saved in the internal memory in each AE-200, AE-50 and EW-50. In AE-200, the data on AE-50/EW-50 will not be saved. The data only on the units connected to M-NET of each controller will be saved in it. The ranking of units on the AE-50/EW-50 system can be displayed on the screen of AE-200. AE-200 will receive the data from AE-50/EW-50 when the ranking screen for AE-50/EW-50 is displayed.
The retention periods of data are shown below.

Period of display	Data retention period
Day	For last 24 months *
Month	For last 24 months *
Year	For last 5 years

* The data for 25 months are retained internally. However, the data for 24 months can be displayed in graphs.

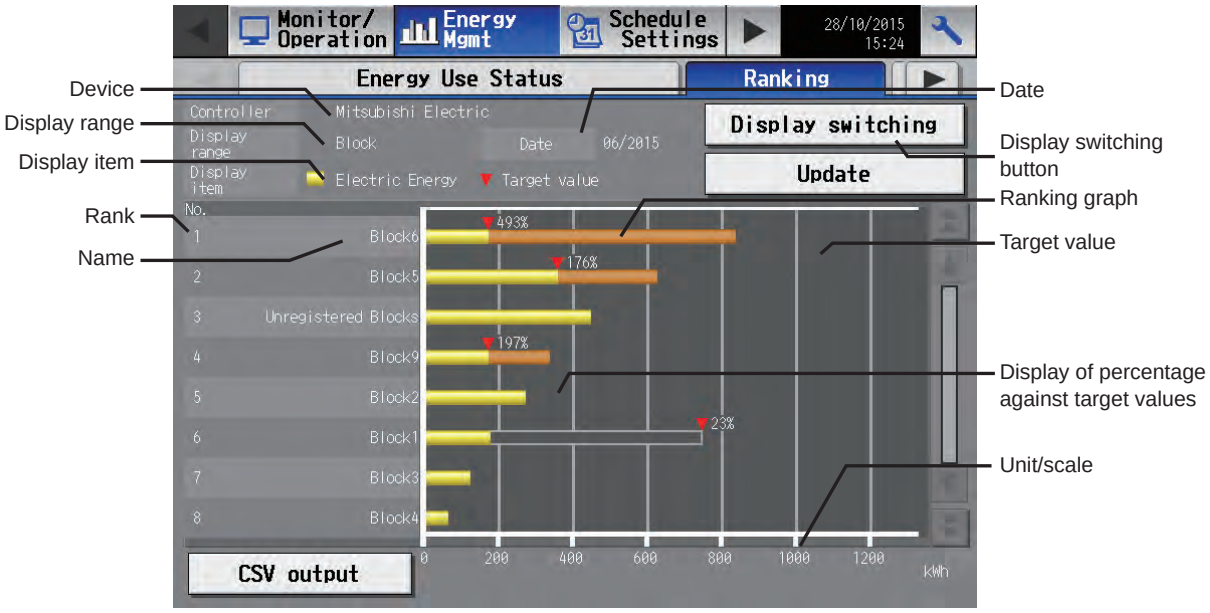
The data is saved in an SD card (= a nonvolatile memory: data will not be deleted even if power is turned off from AE-200/AE-50/EW-50) every hour on the 15 minute.
To display the graph, the initial setting is required. The initial setting can be performed only on the energy management setting screen on the Web browser for initial setting. The initial setting cannot be performed on the main unit screen of AE-200/AE-50. It is necessary to perform the initial setting individually on the Web browser for initial setting of each set of AE-200,AE-50 and EW-50.
To display the target values, it is necessary to set the target values for each unit on the target value setting screen on the main unit (in percentage against all units).
On the main unit screen of AE-200, the ranking of the units connected to AE-50/EW-50 can be displayed by switching the display mode.
On the main unit screen of AE-50, the ranking of the units only of AE-50 can be displayed.
On the Web browser, the ranking of the units of each set of AE-200/AE-50/EW-50 can be displayed. On the browser of each set of AE-200/AE-50/EW-50, the ranking of the units connected to M-NET of the controller can be displayed.

Remarks

- ○ The initial setting must be performed on the Web browsers for initial setting.
- ○ In case of failure of AE-200/AE-50/EW-50, it is recommended to periodically save the data on the energy use status screen on each Web browser in a file in CSV format with the download function or from the CSV output screen.
  For details, see 4.[10] “Data Downloading” and 4.[11] “CSV Output.”

<1> Contents displayed on screens

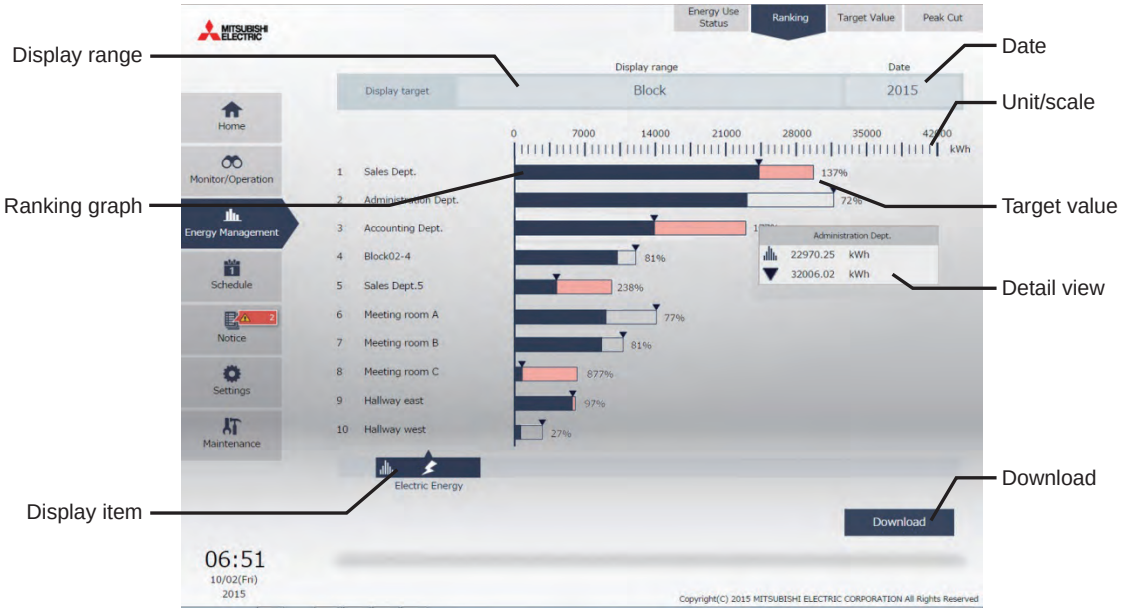
Main unit screen



Item	Details	Remarks
Device	The name of AE-200/AE-50/EW-50 is displayed.	● When AE-50/EW-50 is selected after AE-50/EW-50 is connected, the name of AE-50 /EW-50 will be displayed. ● When the ranking of all controllers is displayed, “All controllers” will be displayed.
Display range	The display range of ranking graph is displayed. The graph can be displayed in an address, group,block or energy management block unit.	● The ranking of energy management blocks can be displayed when “All controllers” has been selected.
Display item	The item displayed in the ranking graph is displayed.	● The display item is one of electric energy, FAN operation time, thermo ON time (total), thermo ON time for cooling and thermo ON time for heating.
Rank	The units are displayed in ascending order of power consumption or operation time from the first one.	● Even if some units show the same power consumption, FAN operation time or thermo ON time, the units will not be displayed in the same rank. The unit having a lower EM block number, block number, group number or unit address number will be ranked higher.
Name	The energy management block name, block name, group name or unit address number is displayed.	● The name changes depending on the item selected in Display range. ● For a block whose block name has not been registered, [EM Block +EM block number] will be displayed ● For a block whose block name has not been registered, [Block + block number] will be displayed. ● For a group whose group name has not beenregistered, [Group + group number] will be displayed.
Date	The date of the ranking graph is displayed.	
Display switching	To display a graph, touch this button first of all. Then, the screen for setting the data to be displayed in a graph will appear. The graph will be displayed with the data set on the display item setting screen.	● For details, see 4.[7]<5> “Display range and items which can be displayed in graphs.”
Ranking graph	The ranking graph is displayed.	● For the display format, see 4.[7]<4> “Graph display format.”
Target value	A red triangle is displayed at the position of each target value.	● The target values will be displayed only when Display range is Block and Date range is Month or Year. ● For the display format, see 4.[7]<4> “Graph display format.” ● When the target values have not been set or are 0, they will not be displayed.

Display of percentage against target values	The ratio (percentage) of the present value to the target value is numerically displayed. When the present value exceeds the target value, the percentage will be more than 100 %.	● The target values will be displayed only when Display range is Block and Date range is Month or Year. ● For the display format, see 4.[7]<4> “Graph display format.” ● When the target values have not been set or are 0, they will not be displayed. ● The display and non-display can be switched on the display item setting screen. (The default is Display.)
Unit/scale	The unit and scale of the ranking graph are displayed.	● The unit appropriate to the Display item will be displayed. ● The scale will be automatically adjusted according to the maximum value in the data.
Update	The data will be updated to the most recent information.	● The most recent information is retained every hour.

Web browser screen



Item	Details	Remarks
Display range	Select the range of the units to be displayed from Block, Group and Address.	Click in the field, the setting window will be displayed.
Date	Specify the date of the data to be displayed in a graph.	● Click in the field, the setting window will be displayed. ● When Day has been selected in Date range, the setting window will be displayed. Select a year, month and day in the last 24 months from the current date. ● When Month has been selected in Date range, select a year and month (yyyy/mm) in the last 24 months from the current month. ● When Year has been selected in Date range, select a year (yyyy) in the last 5 years from the current year. ● The date will be displayed in the format set on the basic system setting screen on the Web browser for initial setting.
Ranking graph	The data is displayed in a bar graph.	● For the display format, see 4.[7]<4> “Graph display format.”
Unit/scale	The unit and scale of the ranking graph are displayed.	● The unit appropriate to the Display item will be displayed. ● The scale will be automatically adjusted according to the maximum value in the data.
Target value	A deep blue triangle is displayed at the position of each target value.	● The target values will be displayed only when Display range is Block and Date range is Month or Year. ● For the display format, see 4.[7]<4> “Graph display format.” ● When the target values have not been set or are 0, they will not be displayed.
Detail view	The graph data at the mouse cursor position is displayed.	● When a tablet is used, this view is not displayed.
Display item	Select the item to be displayed in a graph.	● The selectable display items vary depending on Display range. ● For details, see 4.[7]<5> “Display range and items which can be displayed in graphs.”
Download	Click Download, and the displayed data will be output in CSV format.	● For details, see 4.[10] “Data downloading.”

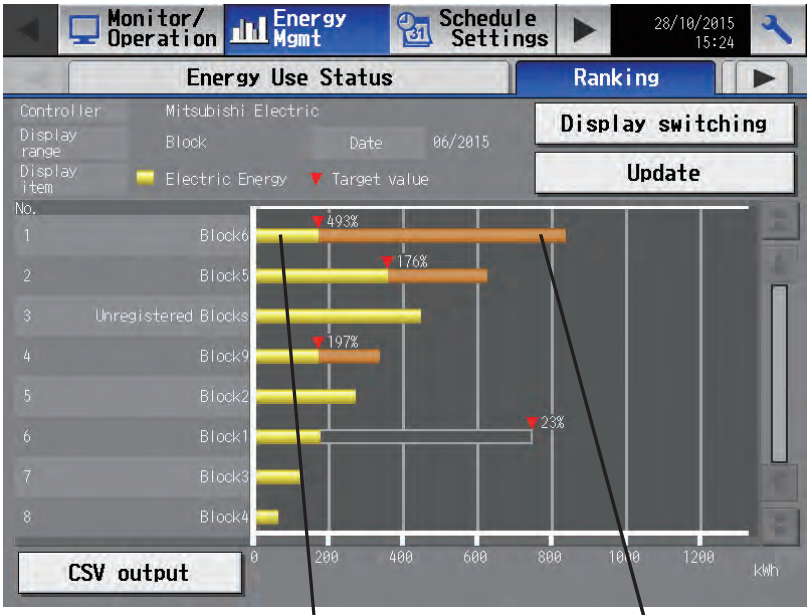
<2> Item which can be displayed in graphs

On the ranking screen, only one of the display items, electric energy, FAN operation time and thermo ON time, can be displayed in a graph. The items which can be displayed in graphs are shown below.

Display item	Remarks
Target values	● The target electric energy automatically calculated from the annual total power consumption, ratio of monthly power consumption and ratio of daily power consumption set on the target value setting screen is displayed. ● The target values are displayed only when Display item is electric energy. ● When the target values are changed, the displayed target values in the past will not be changed, but the new target values will be displayed on and after the day of change.
Electric energy	● The displayed electric energy is obtained by apportioning the power consumption of the outdoor unit to the indoor units. The power consumption of the indoor units is not displayed. ● Only the electric energy measured by the PI controller (PAC-YG60MCA) is displayed. The electric energy cannot be displayed by connecting the PLC (electric energy counting software). ● The results of apportionment of the electric energy of the outdoor unit measured by the PI controller according to the air conditioner usage of the indoor units are displayed. ● To display the electric energy graph, it is necessary to set the electricity meter (name of electricity meter of PI controller = Ch) for each indoor unit in advance on the energy management setting screen on the Web browser for initial setting. ● The air conditioner usage of each indoor unit is calculated in advance based on the apportionment mode of indoor units set on the energy management setting screen on the Web browser for initial setting. The following three apportionment modes are available for indoor units. Select one of them. The capacity save amount mode is recommended. (1) Capacity save amount (default) (2) Thermo ON time (3) FAN operation time For the details of these modes, see 4.[4]<2> “Apportionment mode.” ● The power consumption is calculated from the capacity and usage of each indoor unit. Since the capacity of each indoor unit is automatically obtained from the indoor unit (through M-NET), it is unnecessary to set the capacity on AE-200/AE-50/EW-50. ● The power consumption includes the standby electricity determined by apportionment of the standby electricity of outdoor unit. For details, see 4.[4]<5> “Method of calculating standby electricity.” ● Insignificant power consumption may be displayed on the graph although no indoor units are used. This is because the standby electricity is apportioned to the units, and there is no problem. ● The electric energy for LOSSNAY cannot be displayed.
FAN operation time	● Time during which the indoor unit is running. ● AE-200/AE-50/EW-50 obtains the operating state of the indoor unit (through M-NET) and counts the time every minute. ● When the display range is Group, the data on the unit having the lowest number in the group is displayed. ● The data on LOSSNAY can be displayed.
Thermo ON time (total)	● Time during which the indoor unit is in the thermo ON state. ● AE-200/AE-50/EW-50 obtains the thermo ON state from the indoor unit (through M-NET) and counts the time every minute. ● When the display range is Group, the data on the unit having the lowest number in the group is displayed. ● The data on LOSSNAY can be displayed.
Thermo ON time (cooling)	● Time during which the indoor unit is in the thermo ON state in the cooling mode. ● AE-200/AE-50/EW-50 obtains the thermo ON state and mode from the indoor unit (through M-NET) and counts the time every minute. ● When the display range is Group, the data on the unit having the lowest number in the group is displayed. ● The data on LOSSNAY can be displayed.
Thermo ON time (heating)	● Time during which the indoor unit is in the thermo ON state in the heating mode. ● AE-200/AE-50/EW-50 obtains the thermo ON state and mode from the indoor unit (through M-NET) and counts the time every minute. ● When the display range is Group, the data on the unit having the lowest number in the group is displayed. ● The data on LOSSNAY can be displayed.

<3> Data for graph

Select the date range from three types, Day, Month and Year.
The integrated values in the selected day, month or year including the selected date will be displayed in a bar graph.



The integrated value is displayed.

The target value is displayed.
The target value may be changed according to operation.
The target value which was set at the time is displayed.
(Even if the target value is changed, that in the past will not be changed.)
The graph of data in the date range including the day of change will be displayed with the new target value.

The integrated value is displayed.

The target value is displayed.
The target value may be changed according to operation.
The target value which was set at the time is displayed.
(Even if the target value is changed, that in the past will not be changed.)
The graph of data in the date range including the day of change will be displayed with the new target value.

<4> Graph display format

The graph display formats and colors are shown below. The target values will be displayed when the display range is Block.

Main unit screen

Table Display of graph on main unit screen

Integrated value	Integrated value (excess from target value)	Target value
 (Yellow)	 (Orange) The part over the target value is displayed in orange.	 (Gray frame + red triangle at upper right corner)

Web browser screen

Table Display of graph on Web browser screen

Integrated value	Integrated value (excess from target value)	Target value
 (Deep blue)	 (Pink) The part over the target value is displayed in pink.	 (Gray frame + Deap blue triangle at upper right corner)

<5> Display range and items which can be displayed in graphs

Select the display range from Address, Group, Block and EM Block. Some items cannot be displayed in graphs depending on the display range. After the display range is selected, the selection buttons for the items which cannot be displayed will not be displayed on the screen.
The items which can be displayed in graphs in each range are shown below.

Table Display range and items which can be displayed in graphs

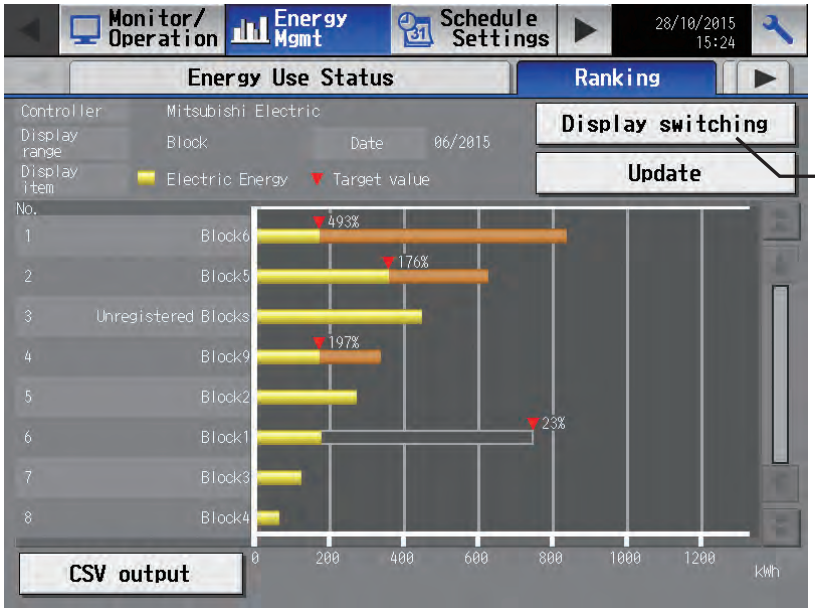
○: Displayed –: Not displayed

Display item	Display range			
	Address	Group	Block	EM Block
Target value (kWh)	–	–	○	○
Electric energy (kWh)	○	○	○	○
FAN operation time (min)	○	○	–	–
Thermo ON time (total) (min)	○	○	–	–
Thermo ON time (cooling) (min)	○	○	–	–
Thermo ON time (heating) (min)	○	○	–	–

<6> Procedure for displaying graphs

Main unit screen

To display a graph on the main unit screen, touch the Display switching button on the energy use status screen.
Pressing Update will update the graphs to the most current state.



Display switching button

The display item setting screen will appear. Set the display item, touch the OK button, and the graph will be displayed.

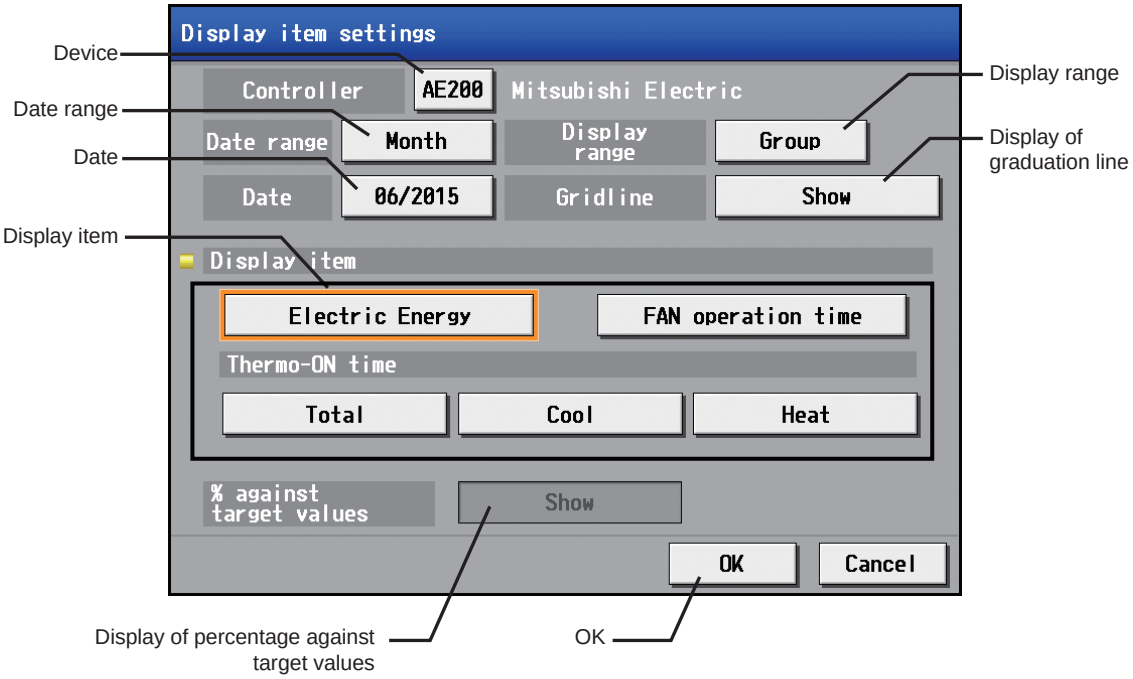


Table Display item setting screen

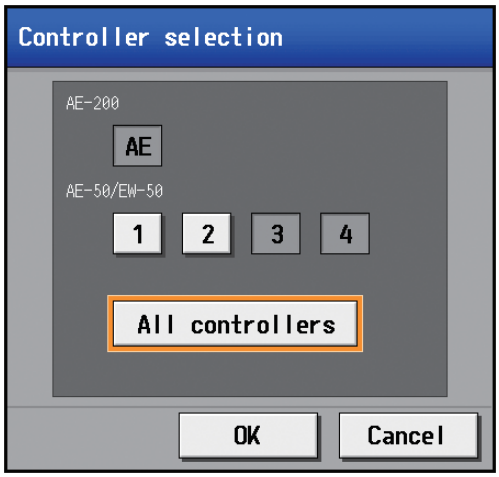
Item	Details	Remarks
Device	The name of AE-200/AE-50/EW-50 is displayed. Touch the button, and a controller can be selected. To display the data of AE-200, select AE. To display the data of any set of AE-50/EW-50, select 1, 2, 3 or 4. When “All controllers” has been selected, the ranking of all devices will be displayed.	• If AE-50/AE-50 is selected when AE-50/EW-50 has been connected, the name of AE-50/EW-50 will be displayed. • On the screen of AE-50, no buttons or names will be displayed.
		
Date range	Select Day, Month or Year.	• When Day is selected, the daily ranking graph on the day will be displayed. • When Month is selected, the monthly ranking graph in the month will be displayed. • When Year is selected, the annual ranking graph in the year will be displayed.
Display range	Select the EM block, block, group or address.	

Table Display item setting screen (continued)

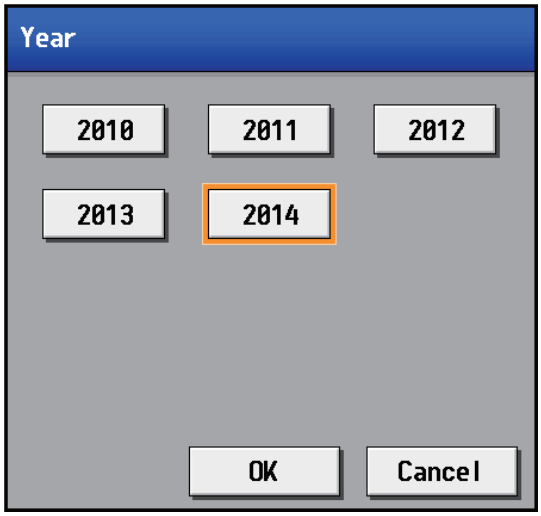
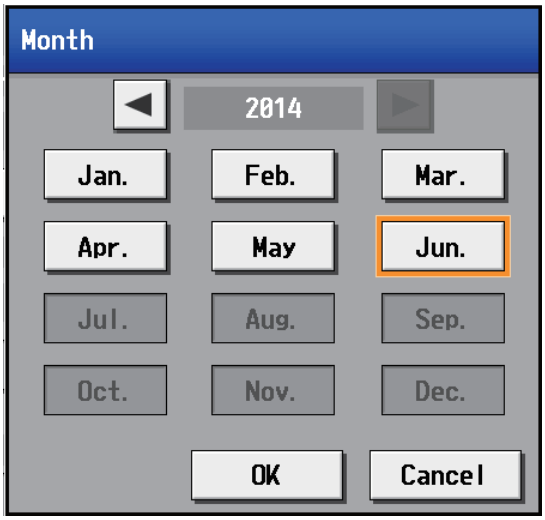
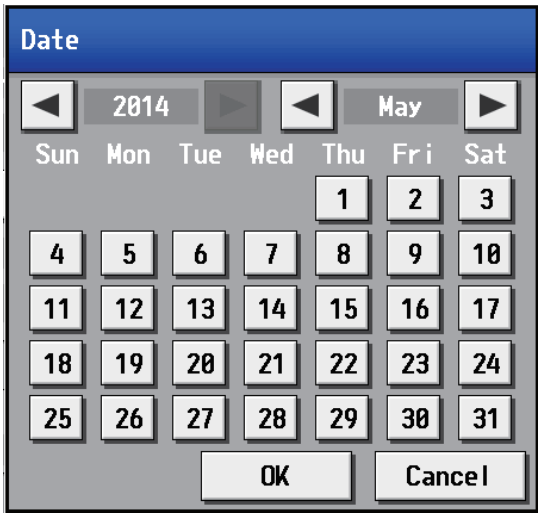
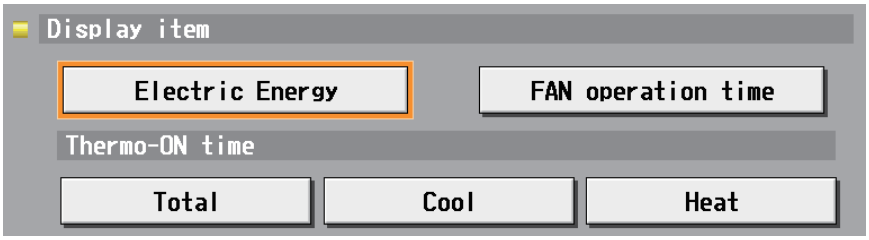
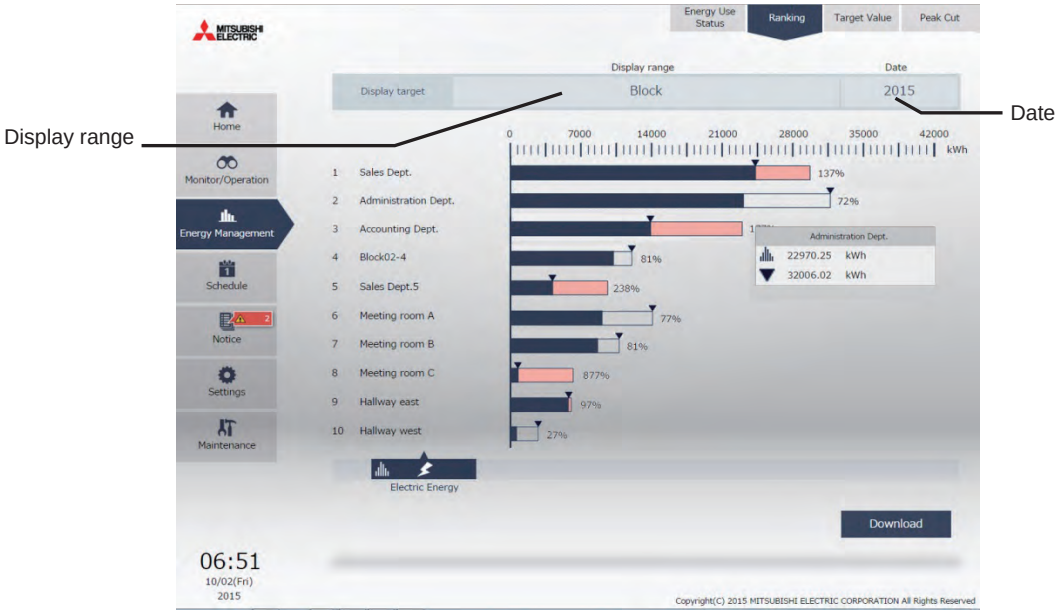
Item	Details	Remarks
Date	Specify the date of the data to be displayed in a graph.	
	● When Date range is Year  	
	● When Date range is Month  	

Table Display item setting screen (continued)

Item	Details	Remarks
Date	● When Date range is Day 	
Display of graduation line	To display the graduation line of the ranking graph, select Show. Not to display, select Hide.	● The default is Hide. The setting will be returned to the default by turning off the power to AE-200/AE-50/EW-50.
Display item	Select the item to be displayed in a ranking graph.  The display item buttons, Electric Energy, FAN operation time and Thermo-ON time Total, Cool and Heat, will be displayed. When Display range is Block, the display item buttons except Electric Energy will not be displayed.	
Display of percentage against target values	To display the percentages against target values in the ranking graph, select Show. Not to display, select Hide.	● The default is Show. The setting will be returned to the default by turning off the power to (restarting) AE-200/AE-50/EW-50. ● The percentage of the present integrated value against each target value is displayed. If the value exceeds the target value, the percentage will exceed 100%.
OK button	Touch the OK button, and the graph will be displayed.	

Web browser screen

To display the ranking graph on the Web screen, click the Display range button or Date button, and set the Display range and Date.
If the Date range is changed, other selections will be cleared.



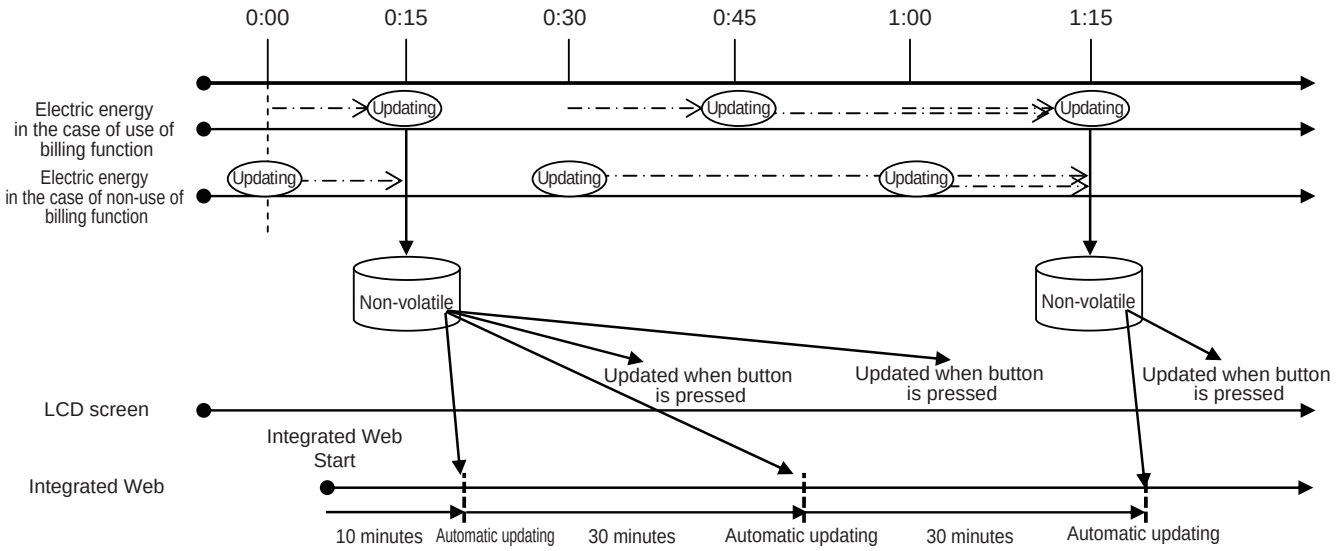
The Display items which can be displayed for the selected Display range will be displayed. Select a display item, and the graph will be displayed.

Table Web browser screen

Item	Details	Remarks
Display range / Date	Click, and a window for selecting the display range and date will appear. Select the display range and date in the displayed window. 	
Display item	● When Display range is Group or Address  The display item buttons, Electric Energy, FAN operation time and Thermo-ON time Total, Cool and Heat, will be displayed. ● When Display range is Block  The display item button, Electric Energy, and Target value will be displayed.	

<7> Display updating

The main unit screen will not be automatically updated. When the display item is changed by pressing the Update button or display switching button, the screen will be updated.
The Integrated Centralized Control Web screen will be updated every 30 minutes while the screen is open (at 10 minutes and 40 minutes after the Web screen is started).
However, since the data for every one hour is displayed, the data will be updated once an hour (at 15 minutes).



<8> CSV output of ranking

Click Download, and the displayed measurement data will be output in CSV format.

The data will be output in the following format with the following name according to the selected date range.

■ File name

Date range: Day
EM_DailyRanking_(yyyy)-(mm)-(dd)_(display range)_(type of ranking graph).csv
Date range: Month
EM_MonthlyRanking_(yyyy)-(mm)_(display range)_(type of ranking graph).csv
Date range: Year
EM_AnnualRanking_(yyyy)_(display range)_(type of ranking graph).csv

■ Contents of file name

Contents of file name	Format	
(yyyy)	Year specified in Date	
(mm)	Month specified in Date	
(dd)	Day specified in Date	
(Display range)	Address	AE number + “-” + “A999” *1
	Group	AE number + “-” + “G999” *1
	Block	AE number + “-” + “B999” *1
	EM Block	“ALL-E999”
(Type of ranking graph)	B01: Electric energy (indoor unit)	
	B02: FAN operation time	
	B03: Thermo ON time (total)	
	B04: Thermo ON time (cooling)	
	B05: Thermo ON time (heating)	

*1: The AE number is blank when AE-200 has been selected, one of 1 to 4 when one of Exp1 to 4 has been selected and ALL when ALL has been selected. When the AE number is blank, “-” after the blank will be hidden.

■ File format

Line	Item	Date range	Format	
1st line	Classification of file	Day	404	
		Month	405	
		Year	406	
2nd line	Date	Day	yyyy/mm/dd *1	
		Month	yyyy/mm *1	
		Year	yyyy	
3rd line	Display range		Address	“All addresses”
			Group	“All groups”
			Block	“All blocks”
			EM Block	“All EM blocks”
4th line	Measurement item		Address	“Address No.”, display item
			Group	“Group name *2”, display item
			Block	“Block name *2”, display item, “target electric energy [kWh]” *3
			EM Block	“EM Block name *2”, display item, “target electric energy [kWh]” *3
5th to 28th lines	Data *4		Address	Address No., data value
			Group	Group name *2, data value
			Block	Block name *2, data value, target electric energy value *3
			EM Block	EM Block name *2, data value, target electric energy value *3

*1: The dates will be displayed in the formats set on the basic system setting screen on the Web browser for initial setting.
*2: If the group name has not been given, [Group + group No.] will be shown. If the block name has not been given, [Block + block No.] will be shown. If the EM block name has not been given, [EM Block + block No.] will be shown.
*3: The “target electric energy [kWh]” and target electric energy value will be displayed only when the data is displayed in a graph.
*4: As the data delimiters and decimal point delimiters, the characters selected on the measurement setting screen on the Web browser for initial setting will be used.

■ Examples of files
(When Display range is Block)

Date range: Day

```
404
2014/06/01
All blocks
Block name, indoor unit electric energy [kWh], target electric energy [kWh]
Block 1, 25.19, 21.2
Block 5, 19.58, 18.13
Block 3, 11.2, 16.9
Block 6, 6.19, 5.24
Block 2, 5.98, 10.96
```

Date range: Month

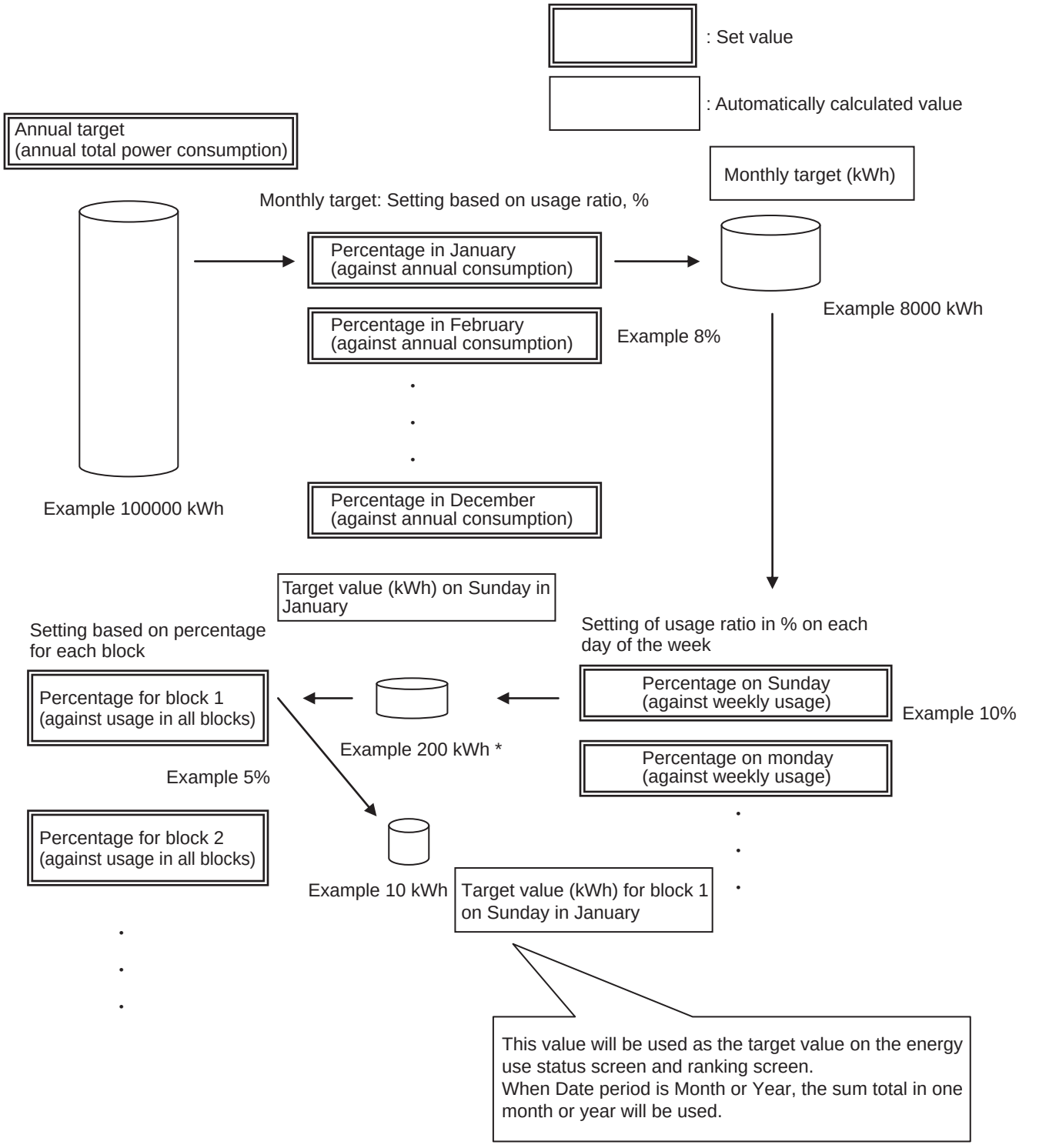
```
405
2014/06
All blocks
Block name, indoor unit electric energy [kWh], target electric energy [kWh]
Block 1, 780.89, 657.2
Block 5, 606.98, 562.03
Block 3, 347.2, 523.9
Block 6, 191.89, 162.44
Block 2, 185.38, 339.76
```

Date range: Year

```
406
2014
All blocks
Block name, indoor unit electric energy [kWh], target electric energy [kWh]
Block 1, 9370.68, 7886.4
Block 5, 7283.76, 6744.36
Block 3, 4166.4, 6286.8
Block 6, 2302.68, 1949.28
Block 2, 2224.56, 4077.12:
```

[6] Setting of target values

On the target value setting screen, you can set the target values to be displayed on the energy use status screen and ranking screen.
First of all, set the target value of annual total power consumption, and set the percentage in each month or on each day of the week. Then, the daily target electric energy will be automatically calculated. The annual target value is the total power consumption in January to December.
Based on the automatically calculated daily target electric energy, the target electric energy in each block will be automatically calculated according to the percentage set for the block.
It is unnecessary to input the target electric energy for each day. Input only the percentage, and the target electric energy for each block will be automatically calculated. So, the target values (electric energy) can be set easily.



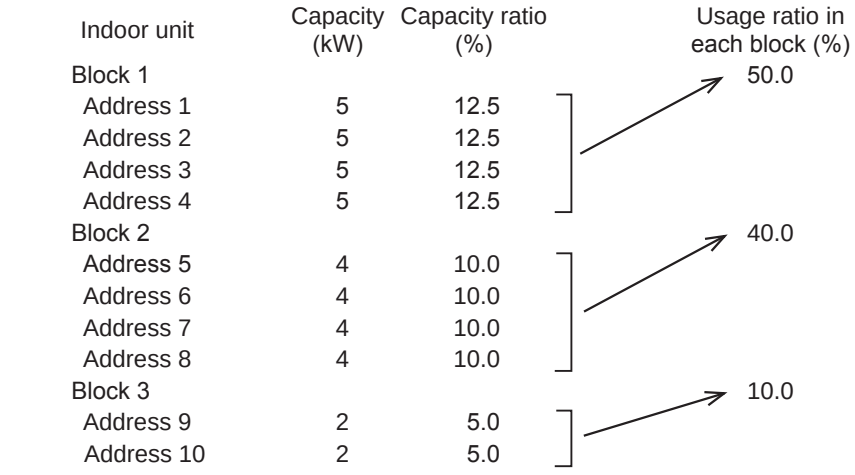
* Actually, the value is calculated simply based on the number of days of the week in one month.
In this example, the value is calculated on the condition that one month has 4 weeks (28 days) and there are four Sundays in a month.

Set the target values based on the energy-saving plan for this year referring to the record in the previous year if available.
In the first year without the record in the previous year, use the monthly usage ratio and the daily usage ratio which have been preset as the default values, or make a plan of use, and change the preset values.
(By default, the percentages for cooling in the summer months and for heating in the winter months are set higher, and the percentages on the weekdays are set higher and those on Saturdays and Sundays are set lower. Change the values according to the actual usage conditions.)
The percentages can be set to one decimal place.
The default percentage for each block will be automatically calculated based on the ratio of the capacity of each indoor unit to the capacity obtained from the indoor unit through M-NET. If the target values cannot be determined properly because the record in the previous year is not available and the usages in the blocks are unclear, the usage ratio in each block can be set by the automatic calculation. When the record in the previous year is available, set the usage ratio in each block according to the usage condition in each block in the previous year based on the energy-saving plan for this year.

Table Default percentages of usage

Monthly usage ratio		Daily usage ratio		Usage ratio in each block	
Month	Default value (%)	Day of the week	Default value (%)	Block	Default value (%)
1	8.0	Sunday	2.0	Each block	Automatic calculation *
2	8.0	Monday	18.0		
3	2.0	Tuesday	18.0		
4	2.0	Wednesday	18.0		
5	2.0	Thursday	18.0		
6	6.0	Friday	18.0		
7	20.0	Saturday	8.0		
8	20.0				
9	20.0				
10	2.0				
11	2.0				
12	8.0				

* Procedure for automatic calculation of usage ratio in each block (in the case of automatic calculation of percentages for all blocks)



Remarks

○ When the usage ratio in each block is automatically calculated, the capacities of the indoor units to be used for the calculation will be obtained from the indoor units through M-NET. Therefore, it is unnecessary to set the capacities.

The target values can be set on any of the main unit screen and the Web browser for initial setting.
On the main unit screen of AE-200, the target values for connected AE-50/EW-50 can be set by switching the display mode.
On the main unit screen of AE-50, the target values only for AE-50 can be set.
The target values must be set for each set of AE-200/AE-50/EW-50. It is necessary to set the annual total power consumption, monthly usage ratio and daily usage ratio for each unit (block) connected to M-NET of each set of AE-200/AE-50/EW-50.
If target values are changed after the start of operation, the target values on the graphs on the energy use status screen and ranking screen in the past will not be changed, but the graphs for the period including the day of the change and in the future will be displayed with the new target values.
The new target values will be reflected on the graphs on the energy use status screen and ranking screen after the next hour. (The graphs are updated on the hour every hour. However, the screens will not be automatically updated. It is necessary to refresh the screens.)

- Set the target values in the state where all units are correctly connected after they have started up.

Remarks

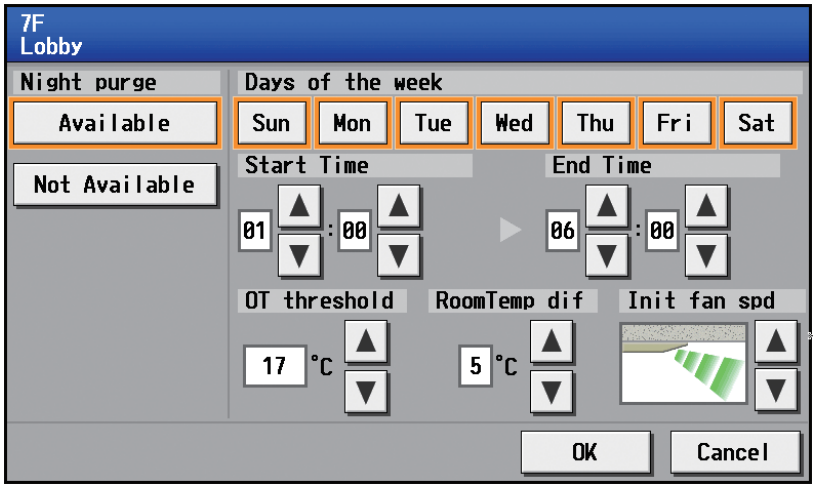
- ○ Set the target values on each set of AE-200,AE-50 and EW-50.
- ○ When setting the monthly usage ratio, daily usage ratio or percentage for each indoor unit, ensure that the sum total of the percentages is 100%. If the sum total is not 100%, the values cannot be set.
- ○ When the percentage for each block is automatically calculated, if some blocks have the same number of units with the same capacity, the percentages may not be identical among the blocks for a reason of rounding, and differences may be caused among them.

9. Ventilation Setting

[1] Night purge

The night purge function is designed to take the outdoor air into a room in the night at lower outdoor temperatures and discharge the air in the room to reduce the cooling load at the start of cooling on the next day.
The night purge function is activated when the room temperature is high and the difference from the outdoor temperature is large.
The execution of the night purge is controlled by the main unit of LOSSNAY.

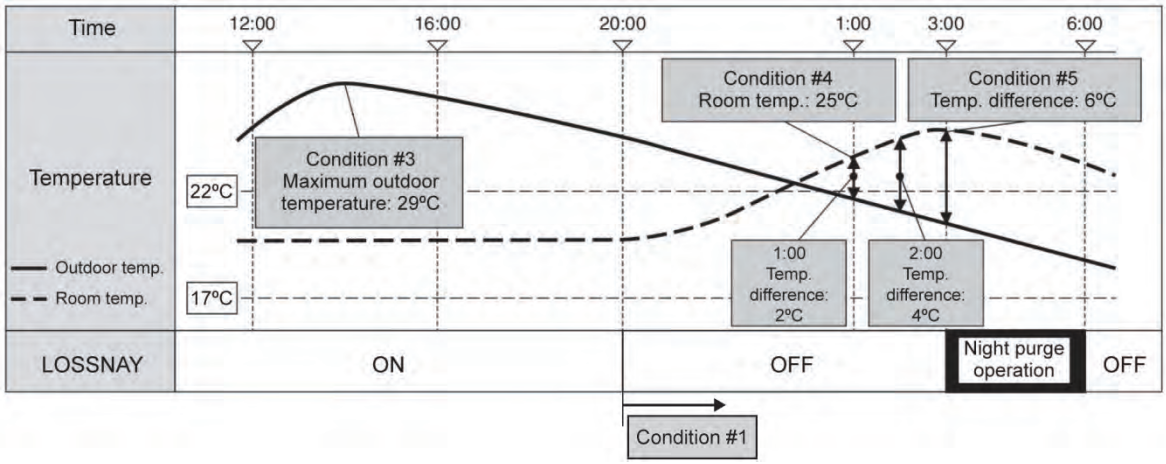
<1> Details of control



* During the night purge, the system is running in the normal ventilation mode. (The ventilation mode cannot be changed.)
* The outdoor temperature threshold setting range is from 15°C to 30°C.
* The setting range of indoor-outdoor temperature differential is from 0°C to 7°C.
* When selecting the day of the week on which the night purge is executed, set the day of the week on which the night purge will be started. For example, when the start time is 23:00, the end time is 6:00 and Monday is selected, the night purge will be started at 23:00 on Monday and ended at 6:00 on Tuesday. More than one day of the week can be selected. When some groups are selected and the screen is opened, all days of the week are selected.

Starting condition
Condition #1: LOSSNAY units stop at 20:00.
Condition #2: Between the start time 1:00 (setting value 1) and the end time 6:00 (setting value 2).
Condition #3: LOSSNAY units detected the outdoor temperature threshold 17°C (setting value 3) or higher in the past 24 hours.
Condition #4: The current room temperature is higher than 22°C. (Cannot be set from AE-200, AE-50, or EW-50)
Condition #5: The temperature difference between room temperature and outdoor temperature is greater than the temperature difference 5°C (setting value 4).

- LOSSNAY units start the night purge operation at 3:00 when the temperature difference between room temperature and outdoor temperature exceeds 5°C.
- The night purge operation is not activated at 1:00 or 2:00 because the temperature difference between room temperature and outdoor temperature less than 5°C.



When the following conditions 1 to 3 are met, the night purge will be stopped.
Condition 1: When the indoor temperature is 22°C or less
Condition 2: When the indoor-outdoor temperature differential is lower than the set temperature
Condition 3: When the end time has come

* The indoor and outdoor temperatures detected by LOSSNAY are applied.
* For the details of night purge starting conditions, see the technical data on LOSSNAY.
* The night purge is started when the night purge starting conditions are met and LOSSNAY is not working.
* The start time and end time can be set only on AE-200/AE-50/EW-50.
(They cannot be set on the remote controller.)

<2> System restrictions

① Grouping
It is prohibited to include units compatible with the night purge and incompatible units in one group.
If both types of units are included in a group and the parent unit (the unit with the lowest address in the group) is incompatible with the night purge, the night purge function is disabled even when the child units are compatible with the night purge.
* The unit with the lowest address in a group serves as the parent unit.

② The night purge function does not work during level operation by external input.

③ Restart of night purge
If the night purge is suspended, the night purge will not be restarted on the day.

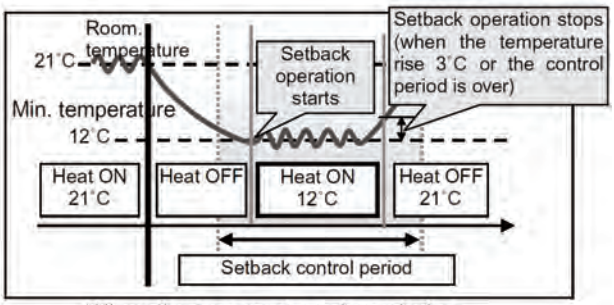
④ Schedule setting
If any event during the night purge period has been scheduled, priority will be given to the schedule.

⑤ Interlock control
If interlock control during the night purge period has been set, priority will be given to the interlock control.

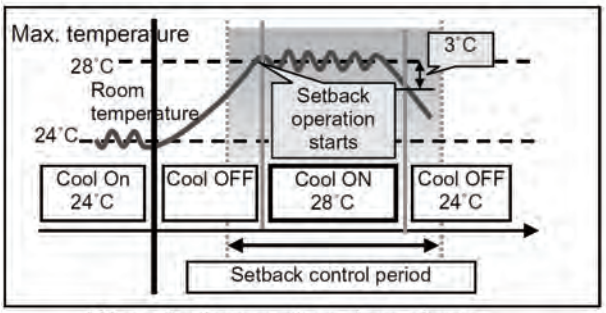
10. Night Setback Control

[1] Outline

Night Setback control prevents indoor dew or excessive temperature rise by heating or cooling automatically when the room temperature goes outside of the specific range during the scheduled time.
The following figures show the operation patterns of the unit that the setback control is active.



When the temperature drops below the Min. temperature (heating control)



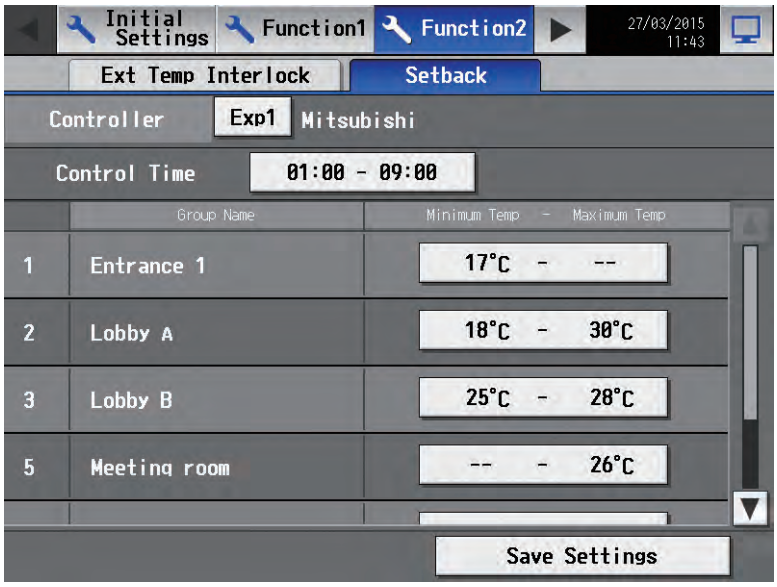
When the temperature rises above the Max. temperature (cooling control)

Remarks

- This control starts heating operation when the control object group stops and the temperature drops below the Min. temperature. Also this control starts cooling operation when the control object group stops and the temperature rises above the Max. temperature.
- If the room temperature is measured by the air-conditioner's suction temperature sensor, the temperature may not be correct when the air-conditioner is inactive and the air is not fresh. When the temperature is not measured correctly, switch the sensor to external temperature sensor (PAC-SE40TSA/PAC-SE41TSA) or remote control sensor.
- Only air conditioner groups can be controlled. LOSSNAY and general equipment cannot be controlled.

[2] Details of control

This control setting is made on the AE-200 or via the Web browser.
① Set the time to enable the night setback operation.
② Set the maximum/minimum temperature for each group.
When the room temperature goes outside of the range that is set in ② above during the night setback control period, night setback control is automatically performed.

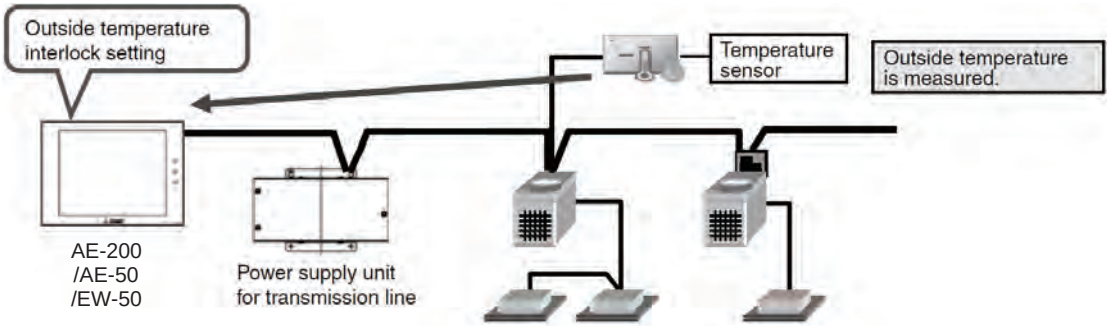


* When the temperature becomes lower than the lower limit, heating operation will be started. When the temperature becomes higher than the upper limit, cooling operation will be started.
* Even if the setback operation is suspended, the setback control will be restarted when the restart conditions are met.

11. Outside Temperature Interlock Function

[1] Outline

Outside temperature interlock function controls the temperature during the cooling operation so that the air temperature difference between outside and inside (entrance area) is reduced. This function prevents our physical shock (heat shock) by the extreme temperature difference when entering into a building.
The temperature difference of 6°C does not cause the physical shock to most people, but some people feel physical discomfort when the temperature difference exceeds 3°C or so. This outside temperature interlock function controls the temperature so that the temperature difference that most people feel comfort can be kept.
This function also saves energy by raising the set temperature during the cooling operation.

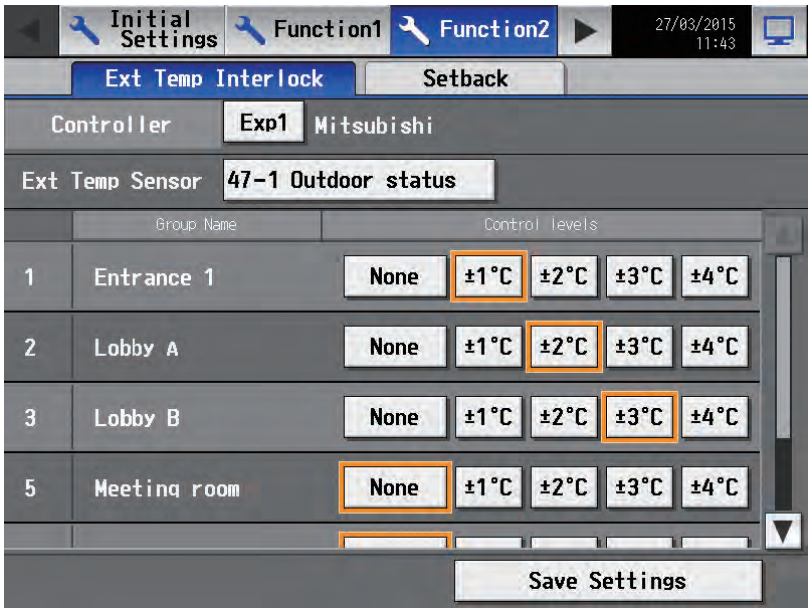


Remarks

- ○ Connect our AI controller (PAC-YG63MCA) or AHC to measure outside temperature.
- ○ Only air conditioning group can be controlled. LOSSNAY and general equipment cannot be controlled.

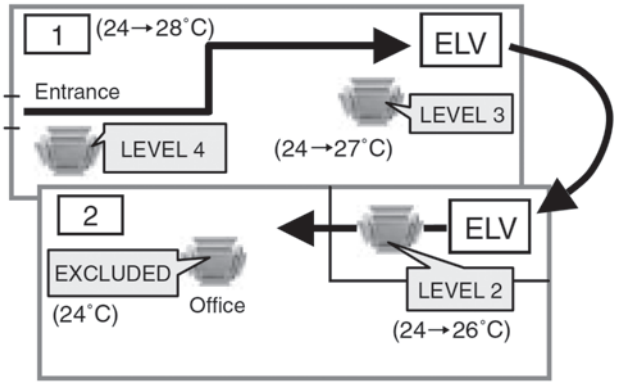
[2] Details of control

The set temperature variation range can be selected for each air conditioning group. Level 1 through 4 can be selected depending on the temperature difference of the areas. (Preset temperature: ±1°C through ±4°C) The certain areas can be excluded for the outside temperature interlock control.

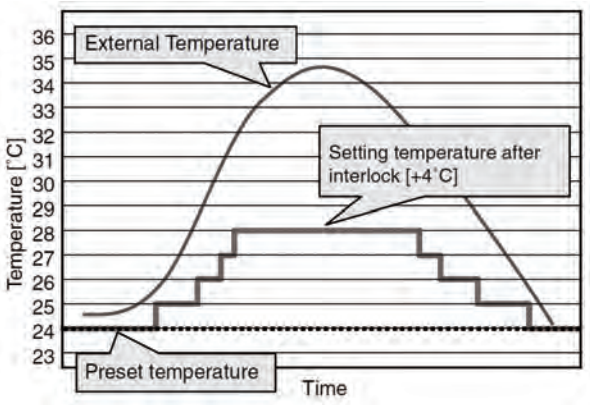


[11. Outside Temperature Interlock Function]

The followings are the example settings.
Level 4 : entrance area where the temperature difference is large
Level 3 : hallway
Level 2 : office entrance
Excluded : inside the office
Setting the levels for each place helps to reduce the temperature difference from the building entrance to the office. This setting also helps to prevent the physical shock by the extreme temperature difference and to maintain space comfort.

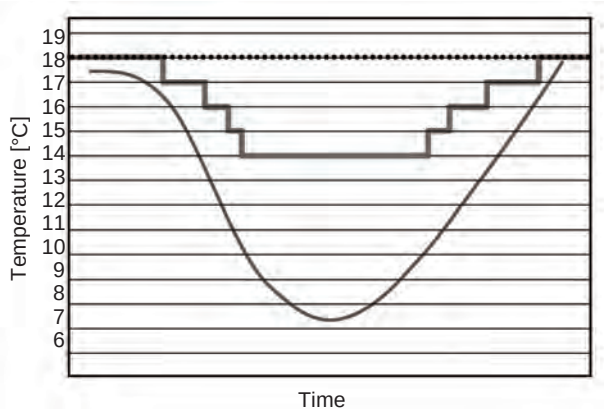


(1) In cooling or dry mode



External Temperature	Set Temperature
External Temperature ≤ Preset temperature +1.4°C	Preset temperature
External Temperature ≥ Preset temperature +1.5°C	Preset temperature +1°C
External Temperature ≥ Preset temperature +4.5°C	Preset temperature +2°C
External Temperature ≥ Preset temperature +6.5°C	Preset temperature +3°C
External Temperature ≥ Preset temperature +7.5°C	Preset temperature +4°C

(2) In heating mode



External Temperature	Set Temperature
External Temperature ≥ Preset temperature -3.9°C	Preset temperature
External Temperature ≤ Preset temperature -4.0°C	Preset temperature -1°C
External Temperature ≤ Preset temperature -6.0°C	Preset temperature -2°C
External Temperature ≤ Preset temperature -8.0°C	Preset temperature -3°C
External Temperature ≤ Preset temperature -10.0°C	Preset temperature -4°C

[3] Required items

Table shows the required items for outside temperature interlock function.

Parts name	Manuracturer	Notes
Centralized controller (AE-200)	MITSUBISHI ELECTRIC CORPORATION	
AI controller (PAC-YG63MCA)	MITSUBISHI ELECTRIC CORPORATION	24 VDC power is required.
AHC ADAPTER	—	Refer to 14 "Connection of AHC" for details.
Temperature sensor	—	Refer to 6.5.1 “Connection for the AI controller” for details.

12. Energy-Saving/Peak-Cut Control

[1] Outline

This function is optional (only for AE-200E, AE-50E and EW-50E). Register "Energy Management License Pack" in each set of AE-200/AE-50/EW-50 to be controlled.
This section explains the air conditioner energy-saving control and peak-cut control.

Notes

- The software of PLC vary depending on the method.
- The energy-saving control function is included in the "Energy Management License Pack."
- The control devices connected to DIDO controller (PAC-YG66DCA) or PLC software for general equipment do not support energy-saving and peak-cut control.
- Depending on the air conditioning unit model, the restrictions for energy-saving and peak-cut control vary.
- When the indoor unit rotation control is used during heating operation, time is taken to restart the operation from the viewpoint of prevention of feeling of cold air, and the performance cannot be delivered for a certain period after the restart. To avoid this, it is recommended to use the capacity saving function (energy-saving without stop of compressor) for the outdoor unit when the energy-saving control is used during heating. When the energy-saving control for indoor units is used, set the control time shorter (setting of 3 minutes is recommended).

CAUTION

- During the use of the peak-cut function, any damage such as the exceeding of power consumption than the contract demand due to the trouble of AE-200/AE-50/EW-50, PLC or PI controller such damage will not be indemnified, for which your kind understanding is requested.
- When power to either the AE-200/AE-50/EW-50 units (power supply unit) or to the PLC supply is cut off due to instantaneous power failure or power failure, their peak-cut control and the alarm level will be reset. Even after power is restored, it may take time for the peak-cut to function normally. There is a possibility that power consumption will go above peak-cut level.
  It is recommended that the uninterruptible power supply system (UPS) is installed to the AE-200/AE-50/EW-50 when using the peak-cut function.

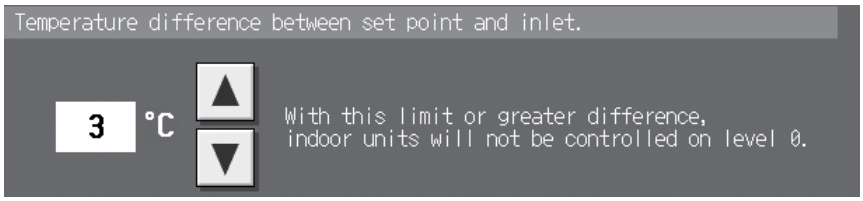
[2] Details of control

The details of the energy-saving/peak-cut control are explained below.

Indoor unit control method	Control time	Control unit	Details of control of indoor units	Number of energy-saving/ peak-cut control levels
±2°C	Selection from 3 min, 6 min, 9 min, 15 min and 30 min	Operation block	The set temperature is shifted. It is shifted by +2°C during cooling and drying and by -2°C during heating. It is shifted by ±2°C at the control start time and returned to the set temperature at the control end time. The temperature shifted during control is displayed on the remote controller, etc. * The temperature is not controlled during air blowing or in the automatic operation mode. * If the control continues after the set temperature is changed by operation or according to the schedule during the control, the newly set temperature is shifted by ±2°C. This operation is performed in 1-min cycles. * Even if the set temperature is changed by operation or according to the schedule during the temperature control and the temperature at the end of the control differs from the set temperature at the start of the control, the temperature will not be returned to that before the start of the control.	5 levels from 0 to 4 * Level 0 corresponds to the energy-saving control.
Air blowing			The indoor units are set to the thermo OFF state at the start of the control and returned to the original operating state at the end of the control. “Cooling/heating” is kept displayed on the remote controller during control. * If the mode is changed by operation or according to the schedule during the temperature control and the units are not in the air blowing mode at the end of the control, they will not be returned to the operation mode before the start of the control at the control end time.	
Stop			The indoor units are stopped at the start of the control and returned to the original operating state at the end of the control. The remote controller displays “Stop” during stop control. When the control time has been set to 30 min, the indoor units cannot be operated from the remote controller, LCD screen, Web browser, TG-2000 or schedule. (The operation prohibition sign will be displayed.) * When the control time has been set to 3 to 15 min, if the control continues after the units are started by operation on the remote controller or according to the schedule during stop control, they will be stopped again. This operation will be performed in 1-min cycles.	

Outdoor unit control method	Control time	Control unit	Details of control of outdoor unit	Number of energy-saving/ peak-cut control levels
Selection from 50%, 60%, 70%, 80% and 90%	Selection from 3 min, 6 min, 9 min, 15 min and 30 min	Outdoor unit address	This control is designed to maintain the operating capacity of the outdoor unit compressor within the maximum value although its operating capacity fluctuates depending on the load to the indoor units. * Note that the energy-saving effect is not obtained while the outdoor unit is running at a capacity lower than that set by the compressor according to the load to the indoor units.	One of 5 levels from 0 to 4 can be set for each address.

Setting of difference between set temperature and indoor temperature for peak-cut setting



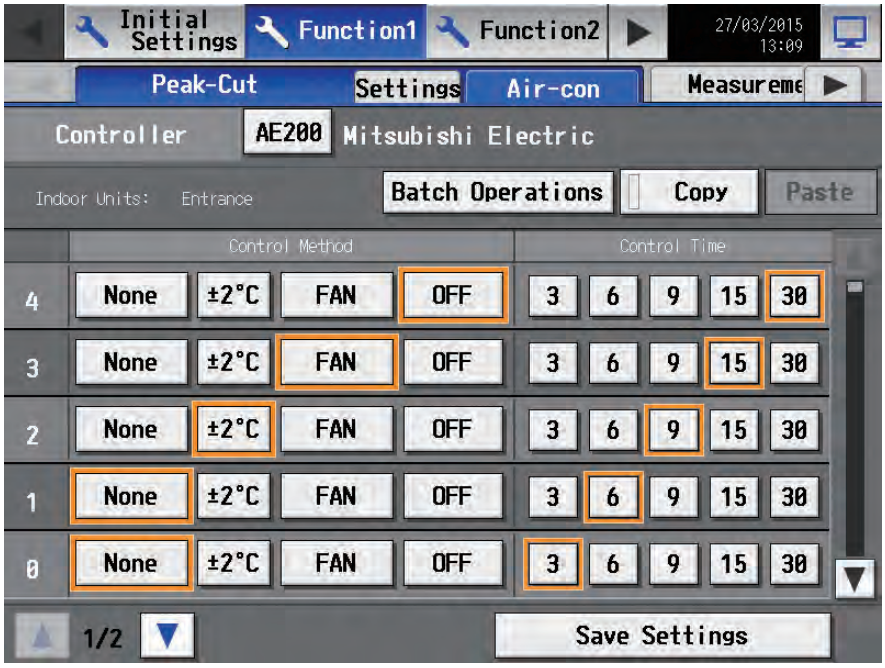
By setting the difference between set temperature and indoor temperature, it is possible to avoid the start of "Energy Management License Pack" or energy-saving peak-cut control on level 0 when the difference between the set cooling/heating temperature and indoor temperature is large.
The temperature setting range is -- and 3°C to 9°C (in 1°C units). The default is --, which means no setting.

[3] Control setting screen

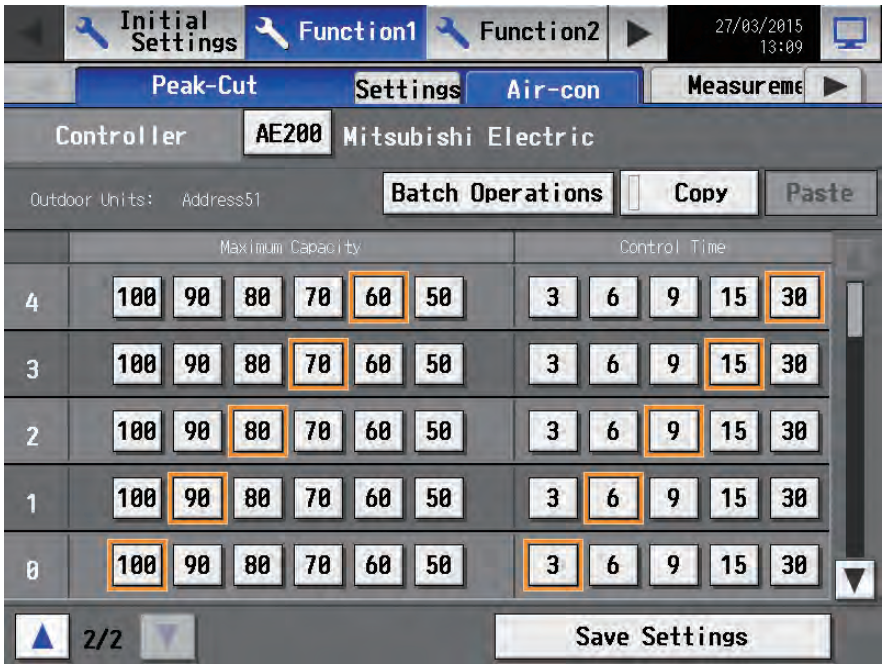
This screen is used to set the energy-saving/peak-cut control conditions.

<Setting screen on LCD of AE-200/AE-50>

Indoor unit setting



Outdoor unit setting



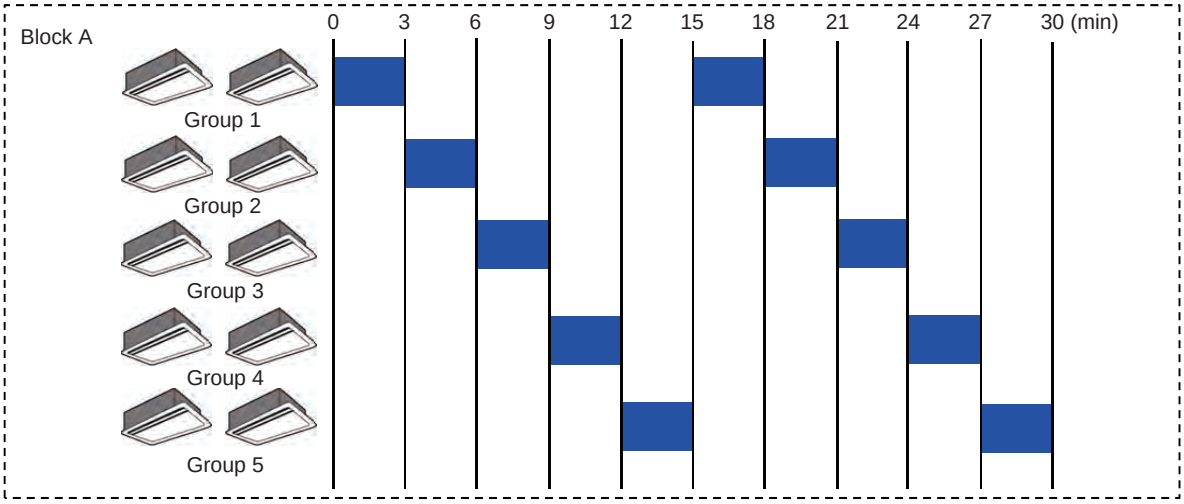
[4] Control action

<1> Energy-saving control for indoor unit

For the energy-saving control by indoor units, select one from 3/6/9/15/30 minutes to specify how many minutes in 30 minutes the control selected in “Control method” will be performed in each group. The groups in an operation block will be controlled in rotation in ascending order of group numbers at equal intervals.
This rotation is controlled so that, if possible, the energy-saving control is not performed at the same timing in some groups in the operation block. Some examples of rotation control timing are shown below.
Reference: When “Control method: Stop” or “Control time: 30 min” has been specified for the energy-saving control, no groups in the operation block can be operated from any controller.

Example of indoor unit rotation 1

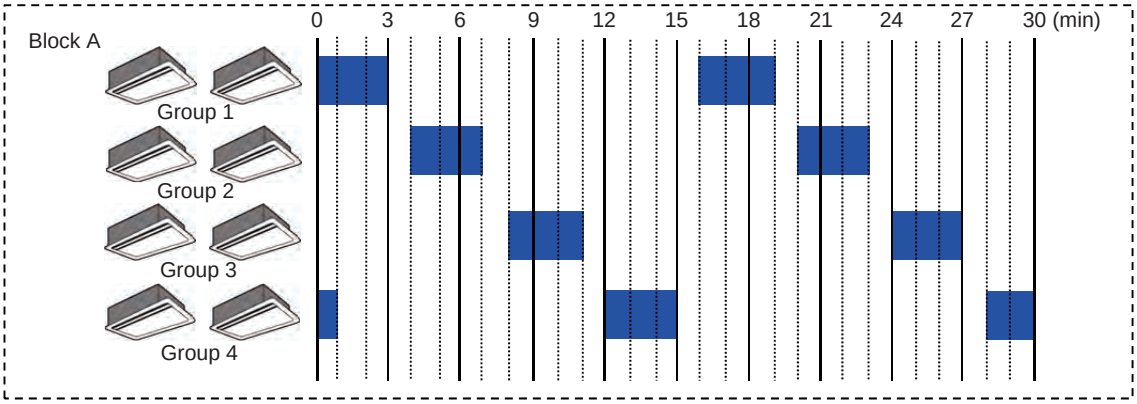
[In case of the energy-saving control of indoor unit for 6 minutes when 5 groups are in one block]



① Times of rotation:
For 6 minutes control, 3 minutes control is applied for 2 times (= 6 min/3 min).
② Cycles of rotation:
From the times of rotation in ①, the cycle of rotation for 30 minutes is to be 15 minutes (= 30 min/2 times).
③ Intervals of rotation:
From the rotation cycles in ②, the rotation interval of each group in a block counts for 3 minutes (= 15 min/5 groups). (If indivisible, round it to the nearest whole number.)

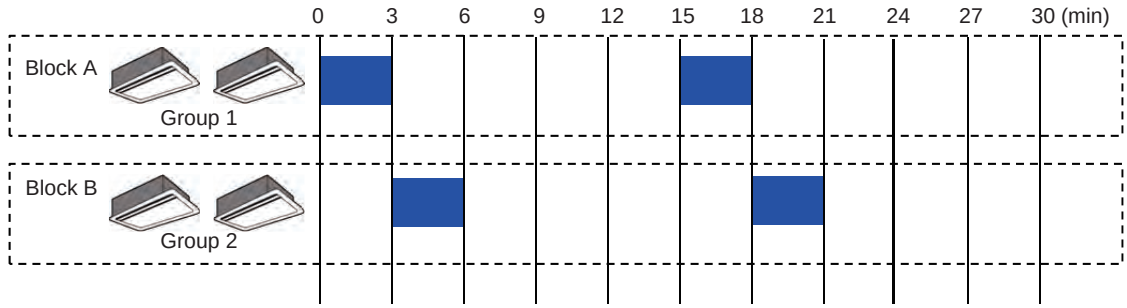
Example of indoor unit rotation 2

[When 6-min indoor unit energy-saving control is implemented for Block A containing 4 groups]



① Times of rotation:
For 6 minutes control, 3 minutes control is applied for 2 times (= 6 min/3 min).
② Cycles of rotation:
From the times of rotation in ①, the cycle of rotation for 30 minutes is to be 15 minutes (= 30 min/2 times).
③ Intervals of rotation:
The rotation interval of each group in the block is obtained from the cycles of rotation ②, 15 min/4 = 3.75. When the time is indivisible, the quotient is rounded off. Therefore, the interval is 4 minutes.

However, if one operation block has only one group, the control is always performed at the same timing. Note that the control is not performed in rotation in each group.



① Times of rotation:
For 6 minutes control, 3 minutes control is applied for 2 times (= 6 min/3 min).

② Cycles of rotation:
From the times of rotation in ①, the cycle of rotation for 30 minutes is to be 15 minutes (= 30 min/2 times).

③ Intervals of rotation:
The rotation interval in each group in each block is 15 minutes (15 minutes/group) according to the cycles of rotation ②. (When the time is indivisible, the quotient is rounded off.)

Notes

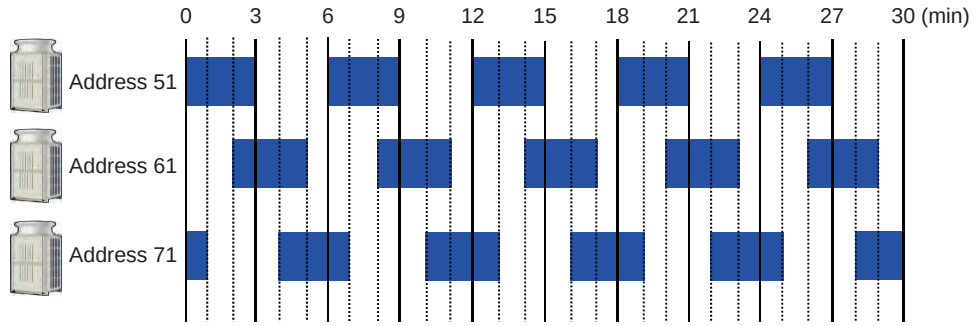
- Block setting must be made for energy-saving control.
- When a block has been set across AE-200/AE-50/EW-50 from TG-2000, only the units controlled by each of AE-200/AE-50/EW-50 are set as a block in it. In this case, each of AE-200/AE-50/EW-50 controls the groups in the block in rotation.
- When the fan/thermostat OFF control is selected, Free Plan models and A-control Mr. Slim models are provided with the thermostat OFF (capacity saving control) command.
- Setting energy-saving ineffective temperature difference allows not applying the level 0 control to the block with the temperature difference between return air temp. and set temp. exceeds the set value.
- Operation control from Web browser or TG-2000A provides the screen display of [ON] for 1 minute maximum (when automatic updating) but does not allow to run the air conditioner.
- The control is not always started from Group 1. The group controlled first varies depending on the time. For example, when the control is started at 10:06, Group 3 will be controlled first.

<2> Energy-saving control for outdoor unit

Energy-saving control for outdoor unit, select a time portion to be applied to the energy-saving control from 3/6/9/15/30 minutes. The operation time is divided evenly by the number of outdoor units, and energy-saving control is performed so that their operation times does not overlap.

Example of rotation of outdoor units

[In case of the energy-saving control of 3 outdoor units for 15 minutes]



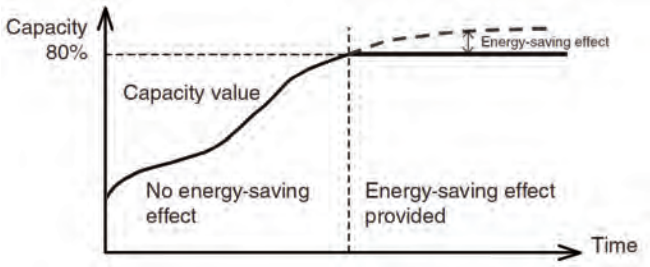
① Times of rotation:
For 15 minutes control, 3 minutes control is applied for 5 times (= 15 min/3 min).

② Cycles of rotation:
From the times of rotation in ①, the cycle of rotation for 30 minutes is to be 6 minutes (= 30 min/5 times).

③ Intervals of rotation:
From the rotation cycles in ②, the rotation interval of each group counts for 2 minutes (= 6 min/3 groups).

CAUTION

- The capacity saving control is a control to suppress the maximum value of the outdoor unit. Therefore, no energy-saving effect can be obtained under the setting to 80% if the operation is conducted with the capacity below 80%.



- In case of energy-saving control to outdoor units, capacity saving control is applied to the outdoor unit individually.
  For this reason, be careful that the control will be applied to the indoor unit not targeted if the group setting is made by stepping over the refrigerant system.
- In case of capacity saving control to the outdoor unit, control for a short time may not provide a normal effect. Control for 30 or 15 minutes is recommended.
- Do not set the capacity saving control to Multi S models other than the following models.

R410A Multi S for Europe	PUMY-P**KM or later
R410A Multi S for Australia	PUMY-P**KM-A or later
R410A Multi S for U.S.A.	PUMY-P**NKMU or later
R410A Multi S for China	PUMY-P**HMC-S or later
	PUMY-P**HMC-C or later
	PUMY-P**KMC-C or later
R410A Multi S for Asia	PUMY-P**YKM.TH(-T) or later

[5] Energy-saving control system design flow

The following are the steps to be taken to execute an energy-saving control plan.

(1) Decide the energy-saving control
Energy-saving control

Perform energy-saving control regardless of the consumed electricity. Reduce electric power consumption charge	⇒Energy-saving control
Perform energy-saving control according to the consumed electricity. Reduce contracted electricity charge	⇒Peak-cut control (electricity amount monitoring method)
Perform energy-saving control in addition to the demand controller.	⇒Peak-cut control (demand controller method)

(2)Required Materials
Prepare the materials required for a given energy-saving control system.

(3) Deciding on the level of energy-saving control
Five levels of control needs to be set to perform the peak-cut control.
Take into consideration the current contract demand and target contract demand, and determine the highest level (Level 4).
Then determine each of the remaining levels.

[Example] Target contract demand: 100 kW

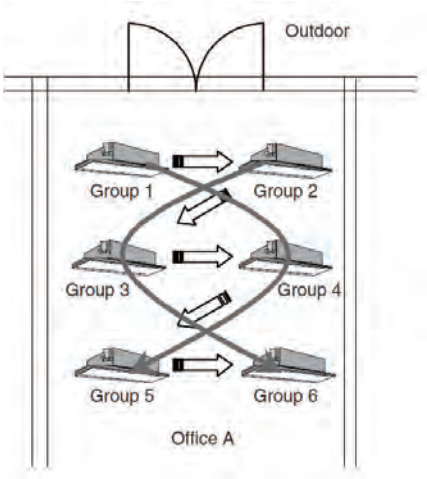
Level 4: 85 kW ~ 90 kW
Level 3: 75 kW ~ 85 kW
Level 2: 65 kW ~ 75 kW
Level 1: 55 kW ~ 65 kW
Level 0: ~ 55 kW

Determine the value for each □.
The value setting is not required for a system running on the demand controller method because control is performed by the level signals.

(4) Select the energy-saving control method
As an energy-saving control method, choose either [energy-saving control using indoor units], [energy-saving control using outdoor units], or both.
[Example] Use both indoor unit and outdoor unit energy-saving control.

(5) Confirm the energy-saving area
The energy-saving control of indoor units rotate group operation among operation block. The energy-saving control of outdoor units is done by rotating the outdoor unit in numerical order of small address.
The control order is sequenced from a small group number. Therefore, you confirm the order of control within the operation block.

[Example] In the figure shown on the right, Group 1 to Group 6 belong to the same operation block (Office A). In this case, Group 1 and Group 2 on the window side will be controlled consecutively and the room temperature rises temporarily compared to the Group 5 and Group 6 side of the room (in summer).
By rearranging the groups, you can provide energy-saving control with great comfort.
In this case, Group 4 should become Group 2, Group 5 should become Group 3, Group 2 should become Group 4, and Group 3 should become Group 5. By doing so, you can avoid two window side units having energy-saving control at the same time and improve the comfort level.



(6) Control settings

Make appropriate control settings for the operation block and for each outdoor unit. To run an energy-saving control on both indoor and outdoor units at the same level, make a setting for each unit.

[Example] Target contract demand: 100 kW

Level	Office A	Outdoor unit 51
Level 4: 85 kW ~	30 minutes OFF	30 minutes Capacity saving 60%
Level 3: 75 kW ~ 85 kW	6 minutes Fan control	30 minutes Capacity saving 70%
Level 2: 65 kW ~ 75 kW	3 minutes Fan control	30 minutes Capacity saving 80%
Level 1: 55 kW ~ 65 kW	3 minutes Fan control	30 minutes Capacity saving 80%
Level 0: 0 kW ~ 55 kW	3 minutes Temperature	0 minutes N/A

Advantages and disadvantages of various types of control.

Items		Advantages	Disadvantages
Indoor units	Temperature control (Set temperature ±2°C)	● Although not as energy-saving as other types of control, maintains comfort in a room.	Not very energy-saving when room temperature is high. (When the set temperature is 23°C and the room temperature is 29°C, no effects of energy-saving control can be expected when the set temperature is changed from 23°C to 25°C.) ● The changes in the set temperature are indicated on the remote controller, so the users will know if the unit is running an energy-saving operation.
	Fan control (Thermo OFF)	Energy-saving effect can surely be obtained.	Although solidly energy-saving, the level of comfort in a room may be compromised.
	Stop control	Energy-saving effect can surely be obtained.	● Although solidly energy-saving, the level of comfort in a room may be compromised. ● Because the unit makes periodical stops, it tends to be mistaken that the unit is having problems.
Outdoor units	Capacity saving	Rapid temperature changes do not occur because the capacity is limited.	When running below the capacity saving value set by the outdoor unit, energy-saving effect cannot be expected.

CAUTION

● For control Level 4, choose a setting that will certainly lower the power consumption.
Example: OFF, Thermo OFF
Also, set the control time “30 minutes” for Level 4 so that the power consumption will certainly lower.

[6] Peak-cut control method

<1> Peak-cut control methods

Six peak-cut control methods are available.
Set the peak-cut control conditions on the following screen on each of AE-200/AE-50/EW-50.
The setting and required items for each method are shown below.

No.	Peak-cut method	Required items	Remarks
1	External contact input	● "Energy Management License Pack" license ● External input adapter ● Demand controller	The control level signals from the demand controller are input directly to AE-200/AE-50/EW-50.
2	PI controller	● "Energy Management License Pack" license ● External input adapter ● Pulse detector	AE-200/AE-50/EW-50 predicts the control level using the pulse input for measurement (electric energy pulse is input directly to AE-200/AE-50/EW-50).
		● "Energy Management License Pack" license ● Measuring MC ● Pulse detector	Electric energy pulses are input to the measuring MC, and AE-200/AE-50/EW-50 predicts the control level.
3	Other systems	● "Energy Management License Pack" license	The control level is input to AE-200/AE-50/EW-50 through LAN.
4	Electric energy counting PLC	● "Energy Management License Pack" license ● PLC (a set of CPU, power supply, etc.) ● Electric energy counting software ● Pulse detector	Electric energy pulses are input to the PLC, and AE-200/AE-50/EW-50 predicts the control level. One electric energy counting PLC can be connected with 14 sets of AE-200/AE-50/EW-50.
5	Demand input PLC	● "Energy Management License Pack" license ● PLC (a set of CPU, power supply, etc.) ● Demand input PLC software ● Demand controller ● Pulse detector	The control level signals from the demand controller are input to AE-200/AE-50/EW-50 through the PLC and LAN. One demand input counting PLC can be connected with 10 sets of AE-200/AE-50/EW-50.
6	Other AE	● "Energy Management License Pack" license	The peak-cut control levels of other AE-200/AE-50/EW-50 are referred to. * This method can be used only when at least one set of LAN-connected AE-200/AE-50/EW-50 uses any of the peak-cut methods No.1 to No.5. * When using this method, understand that the timing of the peak-cut control is delayed because a delay of up to 1 minute is caused for referring to (monitoring) the peak-cut control levels of other AE-200/AE-50/EW-50.

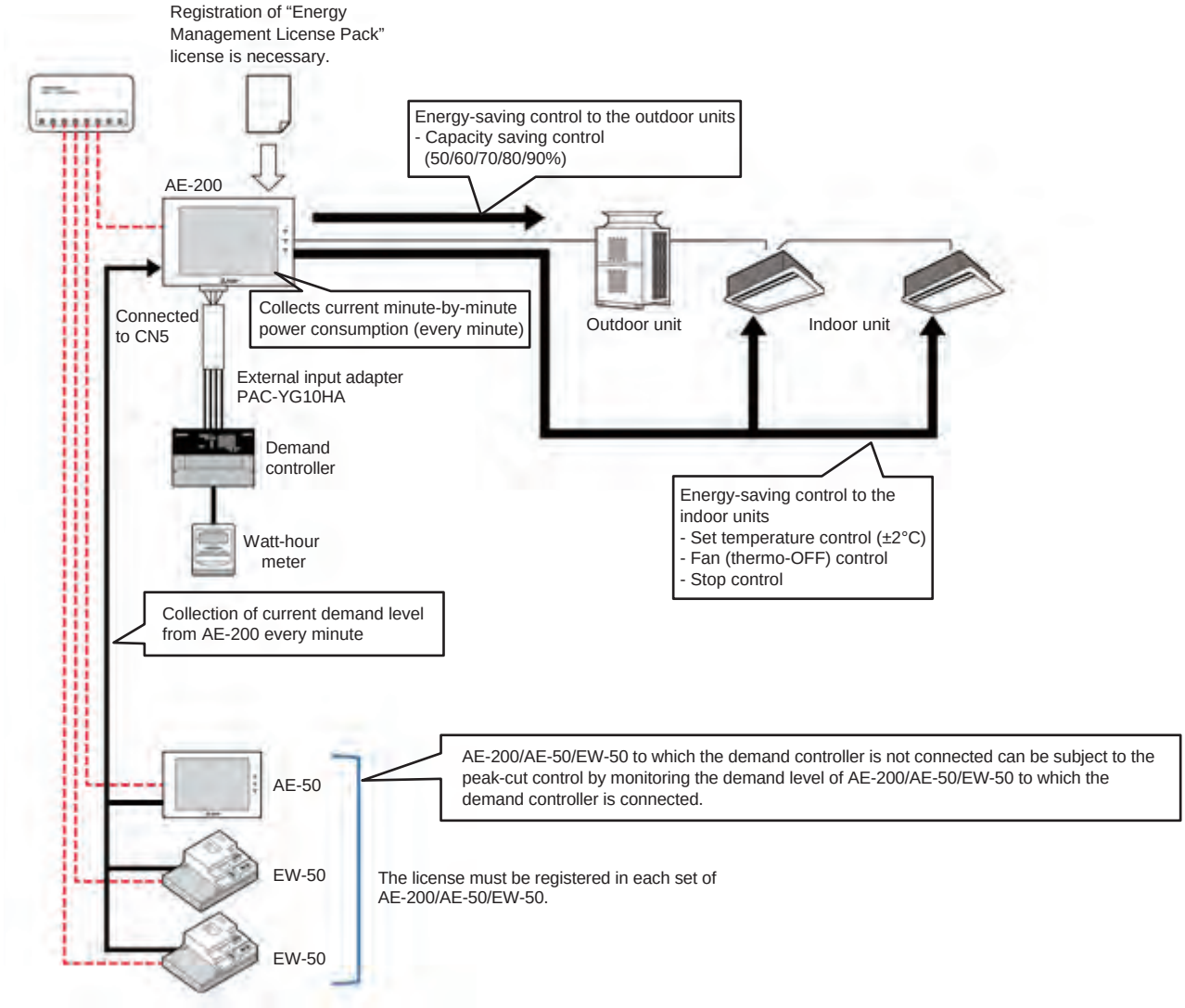
<2> Selection of energy-saving/peak-cut control method and setting screen

The six energy-saving/peak-cut control methods are briefly explained below.

(1) External contact input method

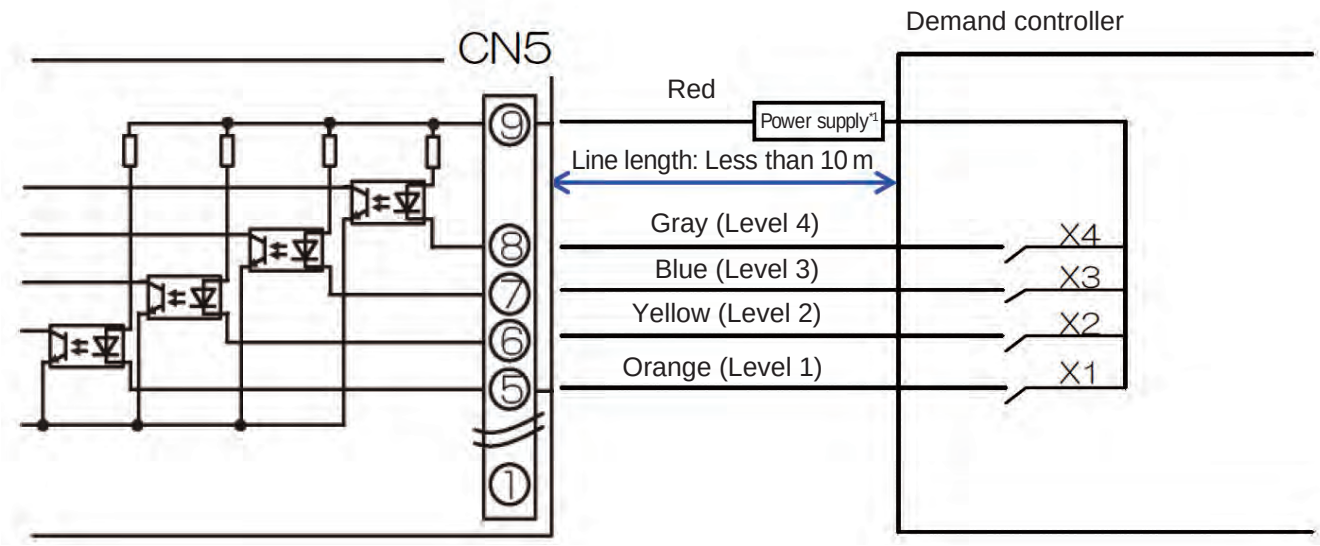
The demand level signals from the demand controller are input directly to AE-200/AE-50/EW-50.

(1-1) Connection diagram



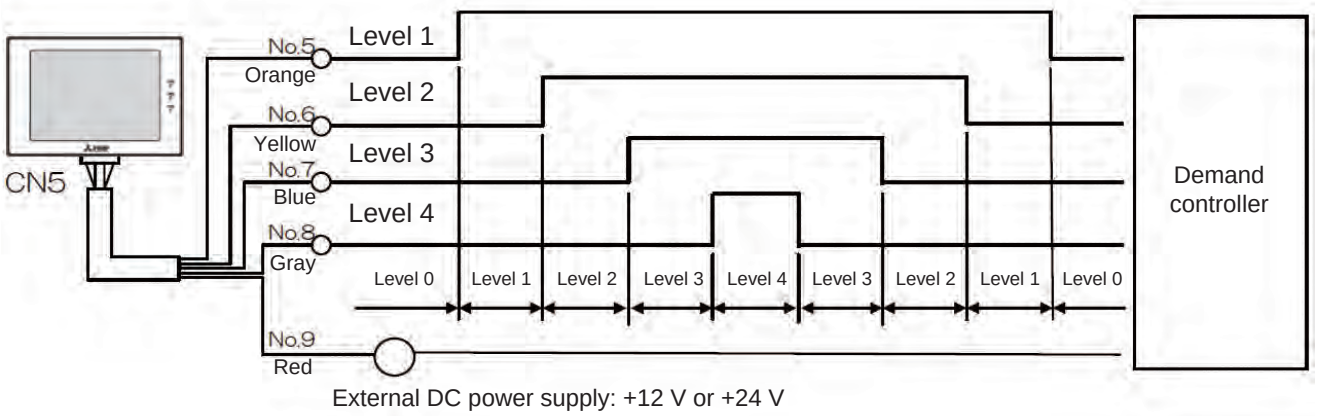
Note: When the demand controller is connected to AE-50/EW-50, the demand level can be monitored by other AE-200/AE-50/EW-50.

(1-2) Connection with demand controller



*1 When the contact of the demand controller used is non-voltage, prepare an external power supply.
(External DC power supply: +12 V or +24 V)

The control by demand level signals is performed as shown below.



CAUTION

- Because the energy-saving control on AE-200/AE-50/EW-50 is performed once per minute, the change does not take place immediately when the level of demand controller is changed. Lower the judgment value setting for the demand controller's control level as necessary.
- While AE-200/AE-50/EW-50 or the equipment connected via LAN are experiencing problems or during a power outage, energy-saving control will not function.
- When a demand level signal is input, the signal must be overlapped with the previous one.
  (When the level is switched from 1 to 2, the level 1 signal must be kept on.)
- When the external input setting is "Emergency stop" or "Emergency stop restoration mode," CN5 No.5 is used as emergency stop input and cannot be used for the demand signal.
- When "ON/OFF level signal" or "ON/OFF, prohibition/permission pulse signal" has been selected, this method cannot be used.

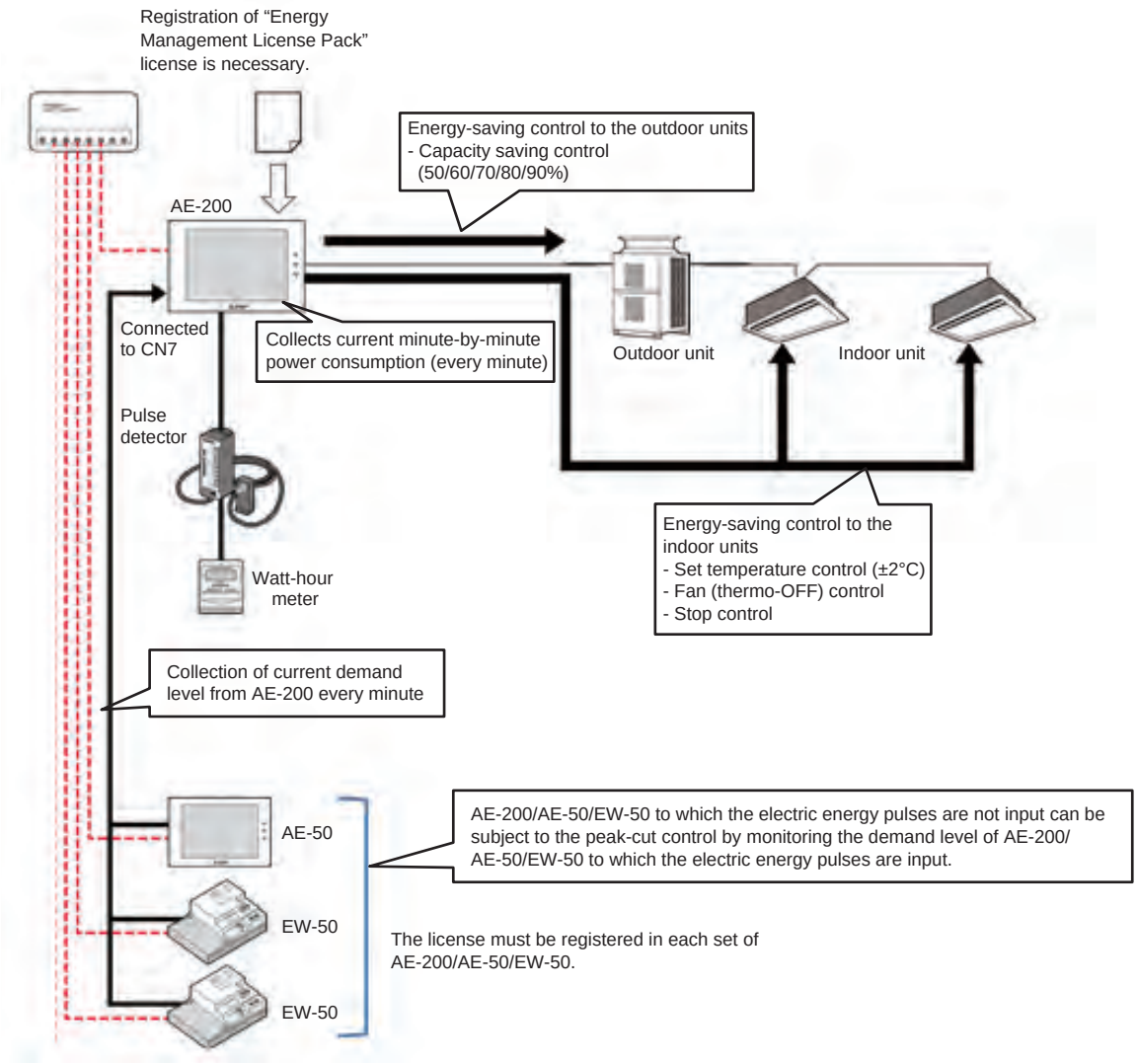
(1-3) Required materials

The required items are shown in the following table.

Name (Model name)	Maker	Remarks
Centralized controller (AE-200/AE-50/EW-50)	Mitsubishi Electric	
"Energy Management License Pack"	Mitsubishi Electric	Requires for each AE-200/AE-50/EW-50
External input/output adapter (PAC-YG10HA)	Mitsubishi Electric	

(2) Power consumption monitoring method (measuring pulse input method)
Electric energy pulses are input directly to AE-200/AE-50/EW-50.
For details, see 4.10 “Measuring pulse input.”

(2-1) Connection diagram

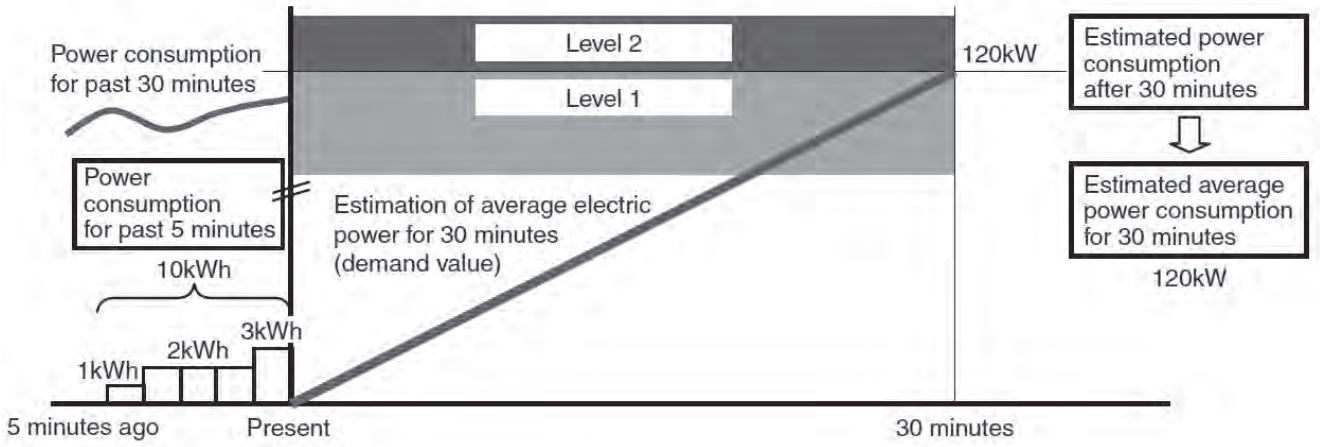


Note: When the electric energy pulses are connected to AE-200/AE-50/EW-50, the demand level can be monitored by other AE-200/AE-50/ EW-50.

Connecting Watt-hour meter allows conducting the energy-saving control divided into 5 levels (Level 0 to Level 4) by estimating the power consumption for 30 minutes.
Meantime, the control level is judged by AE-200/AE-50/EW-50 with an interval of 1 minute, applying the higher level of control in accordance with the measured power consumption for the past 30 minutes and estimated value.

[How to obtain the estimated value]
Estimated value (kW) = Power consumption in the past 5 minutes (kWh)
· 6 (Power consumption for 30 minutes) · 2 (kWh → kW <30 minutes> converted) ----- ①

An example is shown in the following figure. It is assumed that the control at the energy-saving Level 1 is being conducted in accordance with [Power consumption for the past 30 minutes].
In this occasion, the estimated value after 30 minutes is calculated from [Power consumption for the past 5 minutes] by Equation ①, reaching the energy-saving Level 2. In this case, the energy-saving control set at the energy-saving control Level 2 will be carried out.
By making the energy-saving ineffective temperature difference effective, under the control of Level 0, when the temperature difference between the set and inlet temperature is exceeding 3°C (6°F) to 9°C (18°F) (able to set in a unit of 1°C (2°F)), it is possible not to allow conducting the energy-saving control set at Level 0 in consideration of comfort.
(The control set at Level 1 to Level 4 will be conducted regardless of the temperature difference.)



By setting the target demand value and [Stopping control for 30 minutes] of the energy-saving control item, the peak-cut control can be practiced as an application of the level control above.

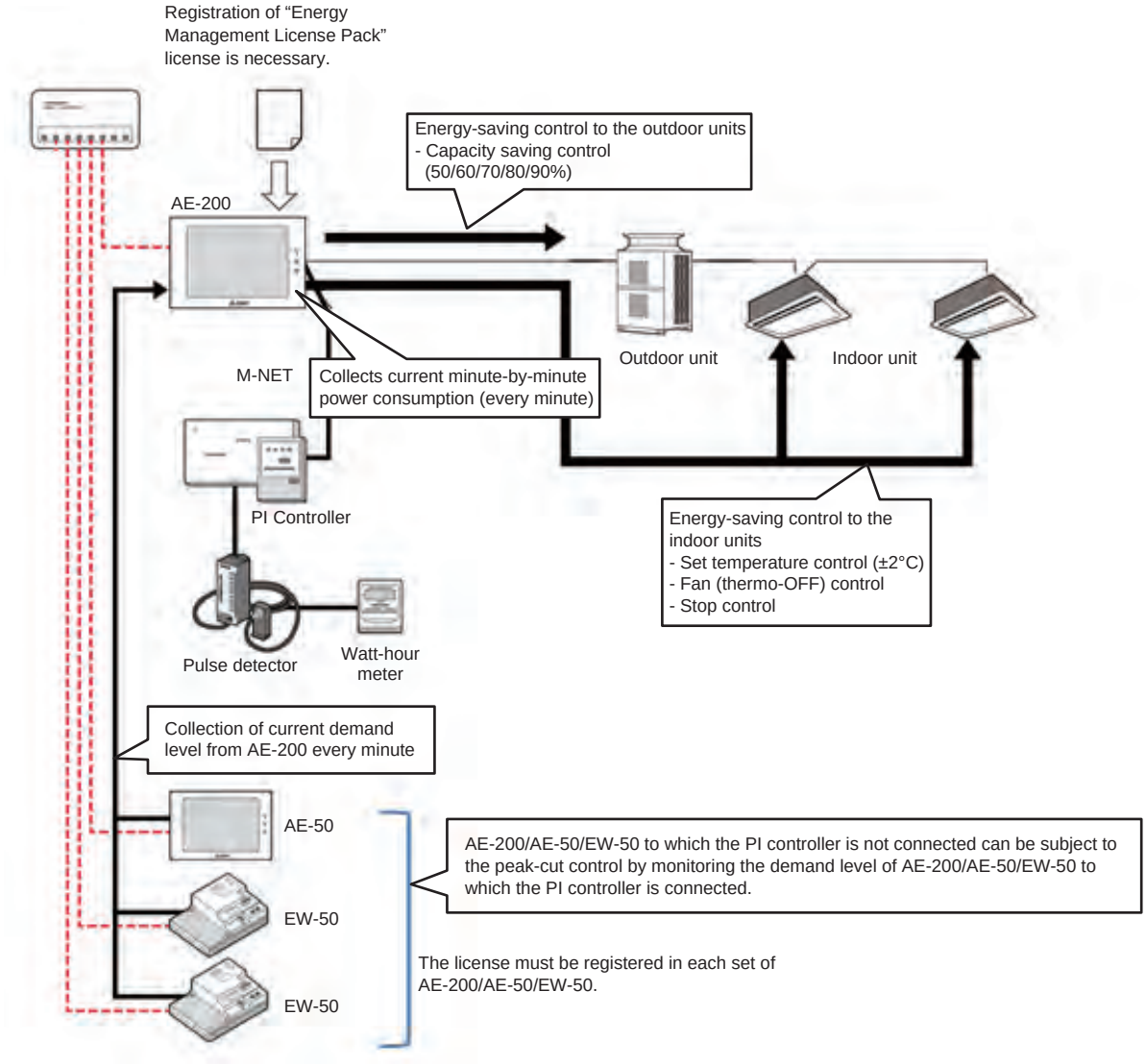
(2-2) Required materials
The required items are shown in the following table.

Name (Model name)	Maker	Remarks
Centralized controller (AE-200/AE-50/EW-50)	Mitsubishi Electric	
"Energy Management License Pack"	Mitsubishi Electric	Requires for each AE-200/AE-50/EW-50
PI controller	Mitsubishi Electric	It can be used with the one used for the meter charging.

(3) Power consumption monitoring method (PI controller PAC-YG60MCA)

Electric energy pulses are input to the measuring MC.

(3-1) Connection diagram

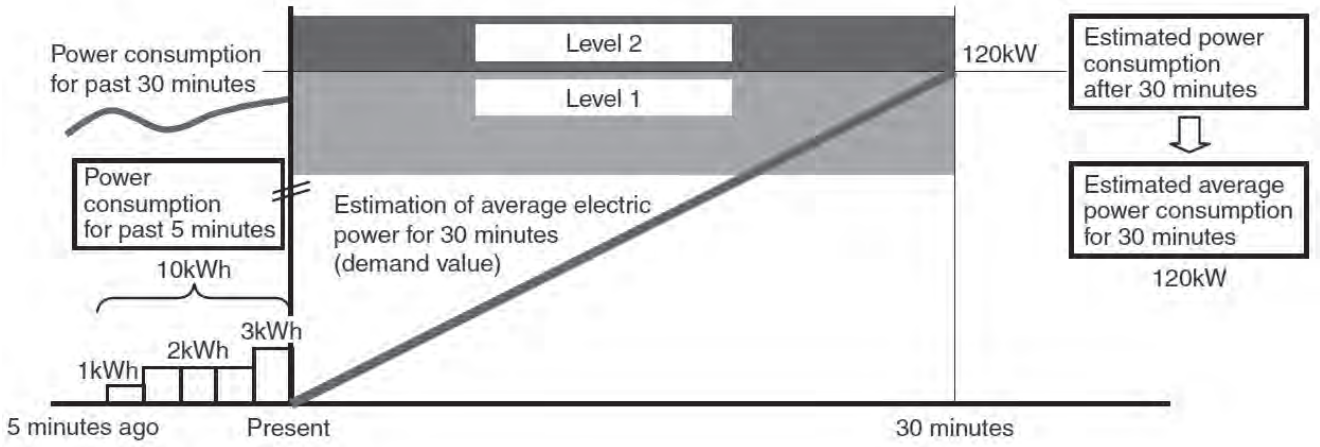


Note: When the electric energy pulses are connected to AE-200/AE-50/EW-50, the demand level can be monitored by other AE-200/AE-50/EW-50.

Connecting Watt-hour meter allows conducting the energy-saving control divided into 5 levels (Level 0 to Level 4) by estimating the power consumption for 30 minutes.
Meantime, the control level is judged by AE-200/AE-50/EW-50 with an interval of 1 minute, applying the higher level of control in accordance with the measured power consumption for the past 30 minutes and estimated value.

[How to obtain the estimated value]
Estimated value (kW) = Power consumption in the past 5 minutes (kWh)
· 6 (Power consumption for 30 minutes) · 2 (kWh → kW <30 minutes> converted) ----- ①

An example is shown in the following figure. It is assumed that the control at the energy-saving Level 1 is being conducted in accordance with [Power consumption for the past 30 minutes].
In this occasion, the estimated value after 30 minutes is calculated from [Power consumption for the past 5 minutes] by Equation ①, reaching the energy-saving Level 2. In this case, the energy-saving control set at the energy-saving control Level 2 will be carried out.
By making the energy-saving ineffective temperature difference effective, under the control of Level 0, when the temperature difference between the set and inlet temperature is exceeding 3°C (6°F) to 9°C (18°F) (able to set in a unit of 1°C (2°F)), it is possible not to allow conducting the energy-saving control set at Level 0 in consideration of comfort.
(The control set at Level 1 to Level 4 will be conducted regardless of the temperature difference.)



By setting the target demand value and [Stopping control for 30 minutes] of the energy-saving control item, the peak-cut control can be practiced as an application of the level control above.

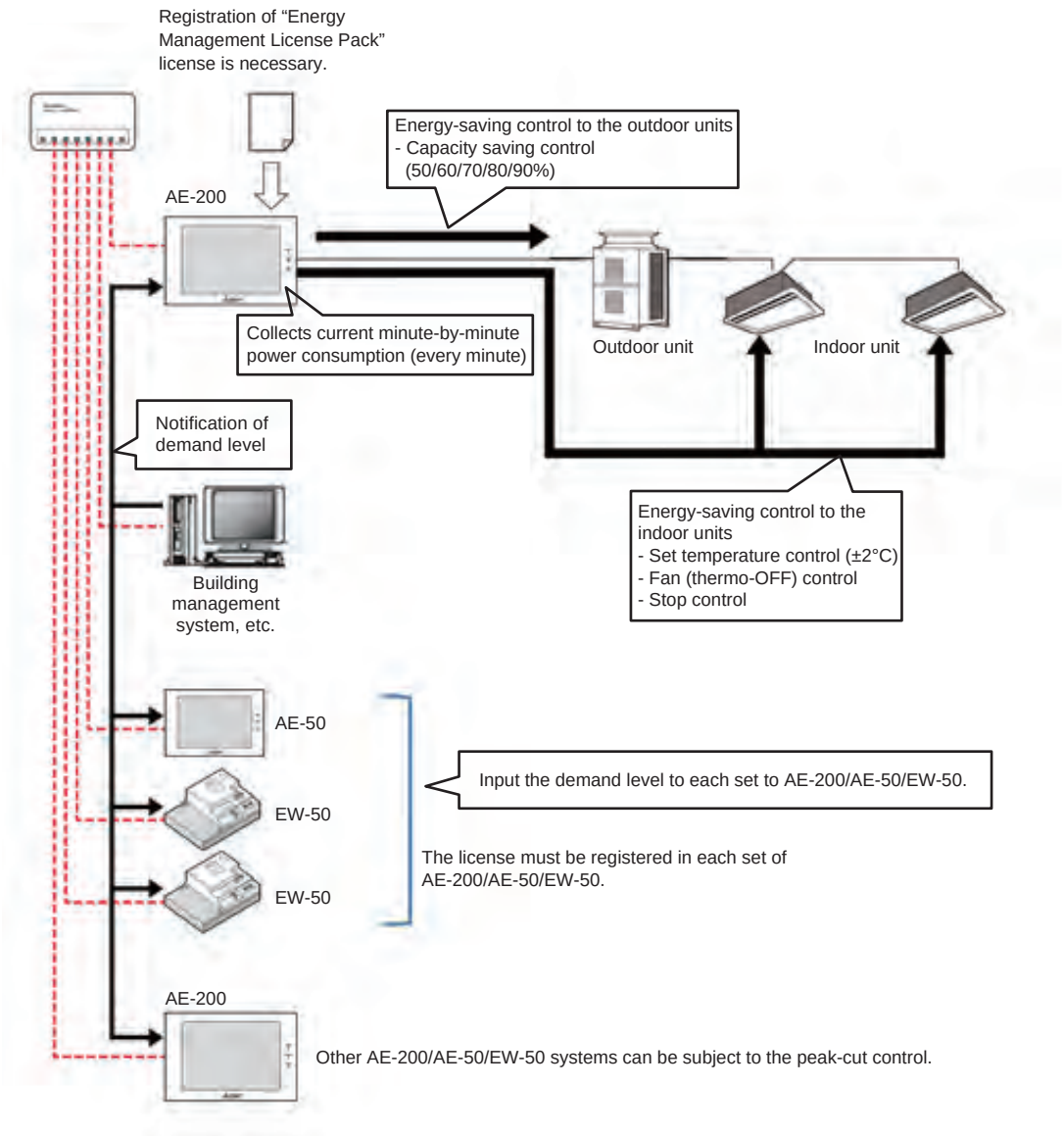
(3-2) Required materials
The required items are shown in the following table.

Name (Model name)	Maker	Remarks
Centralized controller (AE-200/AE-50/EW-50)	Mitsubishi Electric	
"Energy Management License Pack"	Mitsubishi Electric	Requires for each AE-200/AE-50/EW-50

(4) Method by other systems

Demand level signals from other systems are input to AE-200/AE-50/EW-50 through LAN.

(4-1) Connection diagram



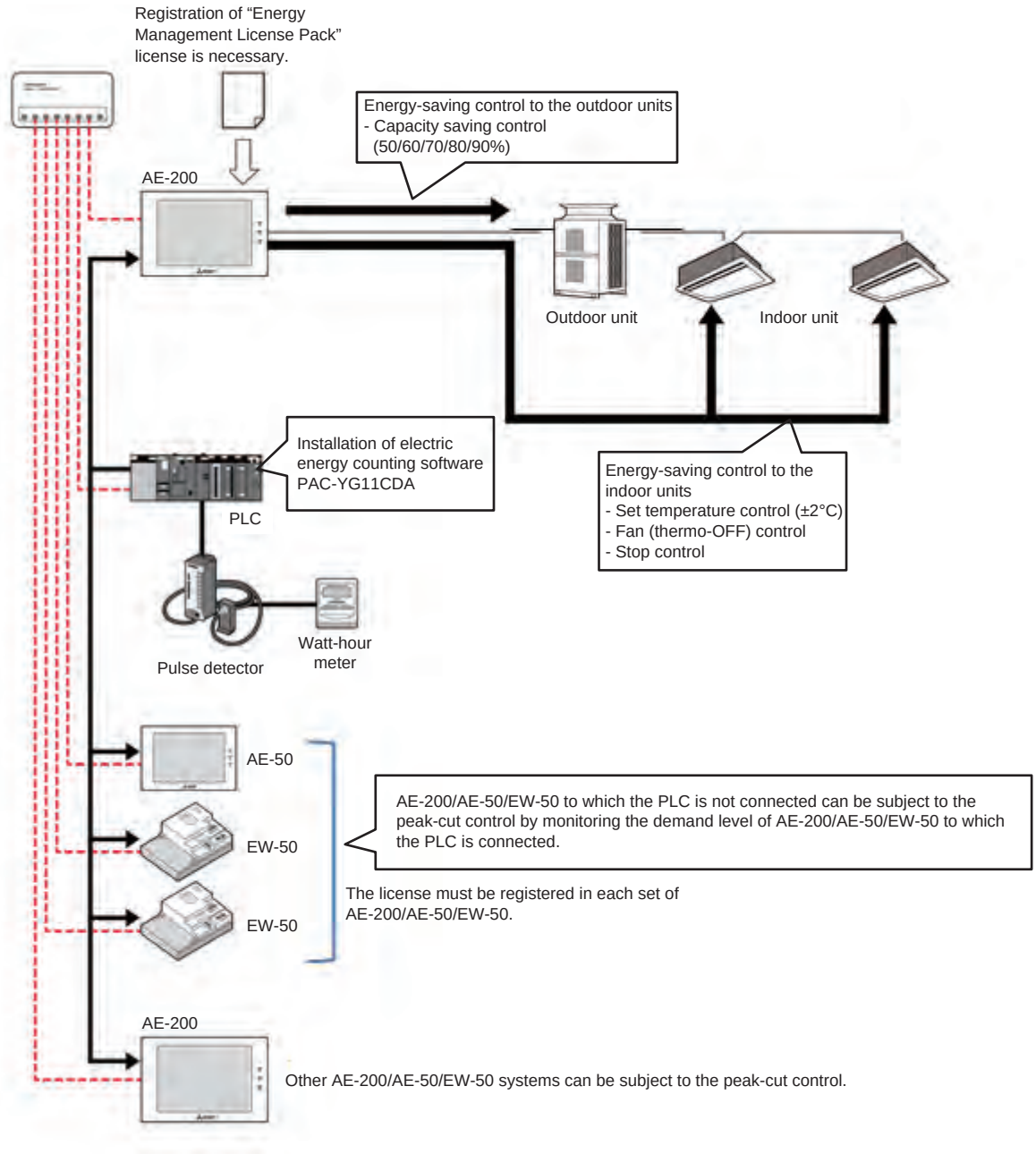
(4-2) Required materials

The required items are shown in the following table.

Name (Model name)	Maker	Remarks
Centralized controller (AE-200/AE-50/EW-50)	Mitsubishi Electric	
"Energy Management License Pack"	Mitsubishi Electric	Requires for each AE-200/AE-50/EW-50

(5) Power consumption monitoring method (PLC)
Electric energy pulses are input by using the PLC (mounted with the electric energy counting software).

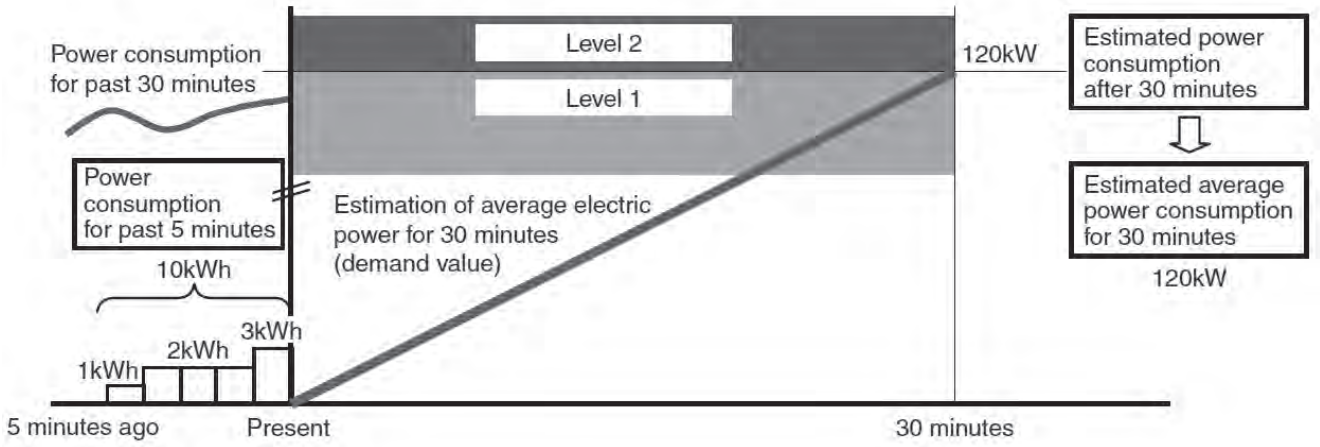
(5-1) Connection diagram



Connecting watt-hour meter (PLC) allows conducting the energy-saving control divided into 5 levels (Level 0 to Level 4) by estimating the power consumption for 30 minutes.
Meantime, the control level is judged by AE-200/AE-50/EW-50 with an interval of 1 minute, and the control of higher level is applied in accordance with the measured power consumption for the past 30 minutes and estimated value.

[How to obtain the estimated value]
Estimated value (kW) = Power consumption in the past 5 minutes (kWh)
· 6 (Power consumption for 30 minutes) · 2 (kWh → kW <30 minutes> converted) ---- ①

An example is shown in the following figure. It is assumed that the control at the energy-saving Level 1 is being conducted in accordance with [Power consumption for the past 30 minutes].
In this occasion, the estimated value after 30 minutes is calculated from [Power consumption for the past 5 minutes] by Equation ①, reaching the energy-saving Level 2. In this case, the energy-saving control set at the energy-saving control Level 2 will be carried out.
By making the energy-saving ineffective temperature difference effective, under the control of Level 0, when the temperature difference between the set and inlet temperature is exceeding 3°C (6°F) to 9°C (18°F) (able to set in a unit of 1°C (2°F)), it is possible not to allow conducting the energy-saving control set at Level 0 in consideration of comfort.
(The control set at Level 1 to Level 4 will be conducted regardless of the temperature difference.)



By setting the target demand value and [Stopping control for 30 minutes] of the energy-saving control item, the peak-cut control can be practiced as an application of the level control above.

(5-2) Required materials
The required items are shown in the following table.

Name (Model name)	Maker	Remarks
Centralized controller (AE-200/AE-50/EW-50)	Mitsubishi Electric	
"Energy Management License Pack"	Mitsubishi Electric	Requires for each AE-200/AE-50/EW-50
Sequencer (PLC)	Mitsubishi Electric	Can be used with the one used for WHM charging.
Electric amount count software (PAC-YG11CDA)	Mitsubishi Electric	

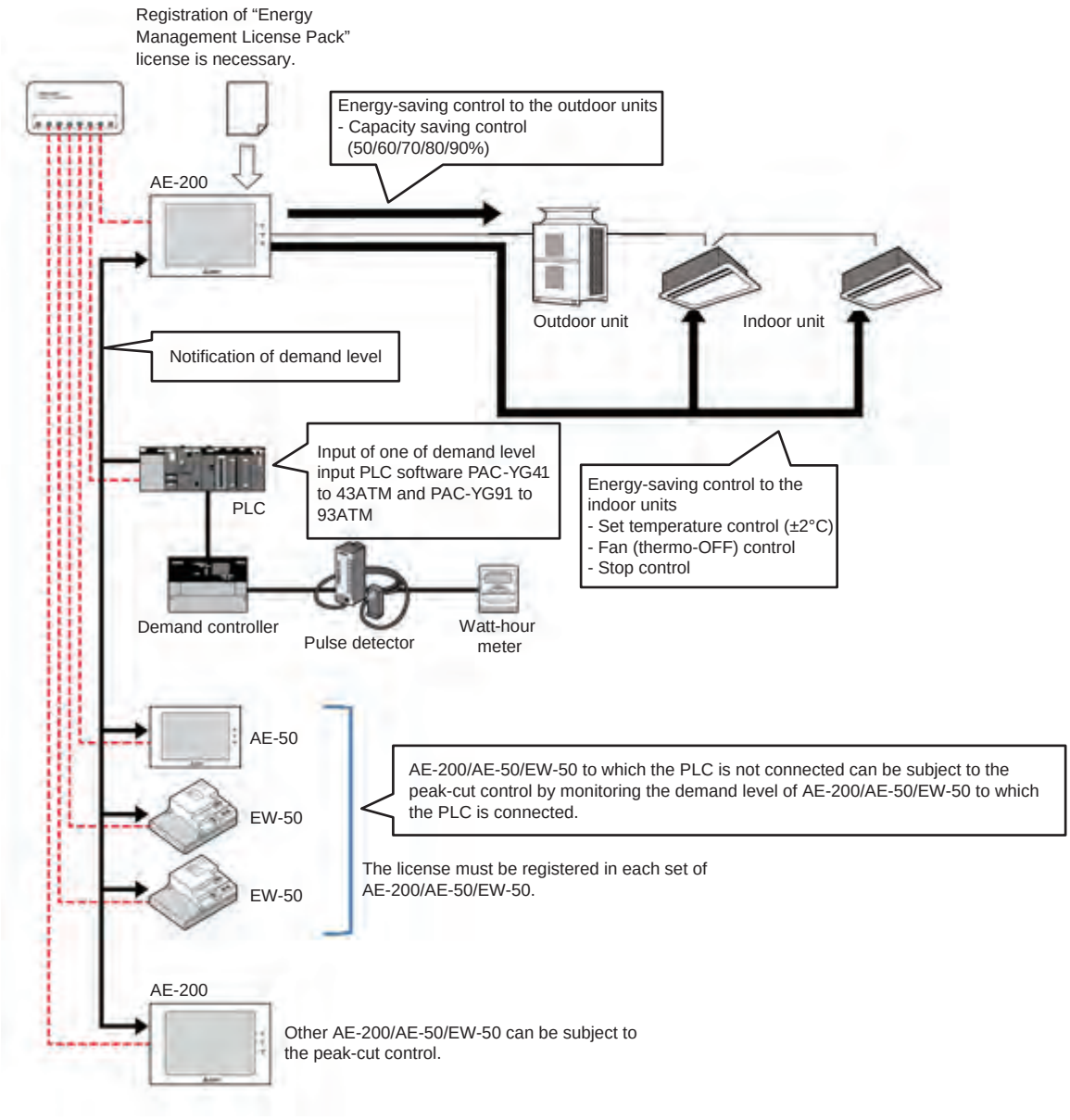
(6) Peak-cut control by Demand controller (PLC)

The demand level signals from the demand controller are input by using the PLC (mounted with the demand input PLC software).

Note

- It is recommended to connect them by the demand level contact input method if the wiring length is not restricted.

(6-1) Connection diagram



(6-2) Required materials

The required items are shown in the following table.

Name (Model name)	Maker	Remarks
Centralized controller (AE-200/AE-50/EW-50)	Mitsubishi Electric	
"Energy Management License Pack"	Mitsubishi Electric	Requires for each AE-200/AE-50/EW-50
Sequencer (PLC)	Mitsubishi Electric	Can be used with the one used for WHM charging.
PLC software for demand input (PC-YG41CDA etc.)	Mitsubishi Electric	

[7] Energy-saving control status/History monitor

<1> Current energy-saving control status

You can confirm whether or not an air-conditioning group is under energy-saving control.
If energy-saving control is ON, operation status icons shown below will be indicated on the display by the AE-200 or web browser, or TG-2000A.

	Temperature setting control, fan control, or capacity control of outdoor unit is set to ON. * Pre-scheduled operation or an interlocked unit connection icons will also be displayed.
	Stop control or capacity control of outdoor unit is set to ON. * Pre-scheduled operation or an interlocked unit connection icons will also be displayed.

* When status is monitored, only the air conditioning group under energy-saving control will have icons displayed.
* During level 0 control, if a difference between the set temperature and return air temp. Is ineffective for energy-saving, energy-saving will not be executed and there will not be an energy-saving control icon on the display for the group.

<2> Peak-cut status history

From the menu bar in the TG-2000A control screen, select [tool]-[peak-cut data] and you will be able to output peak-cut status history daily report and monthly report as a CSV file.1.
The daily and monthly report files will automatically be stored in the automatic trend output folder for two years.

CAUTION Daily and monthly reports * TG-2000A is required to use this function.

<Automatic output file>

The automatic output file is automatically created daily (or monthly) as TG-2000A gathers information from AE-200/AE-50/EW-50 and PLC. Therefore it is not created if TG-2000A is not running.

<Manual output file>

You can manually output each file from the TG-2000A tool bar. Monthly data will be created from TG-2000A database while daily data for the current day, the day before and two days before will be collected from AE-200/AE-50/EW-50.

(The data earlier than that will be created from TG-2000A database.)

(1) Peak-cut status history (daily report)

Control level at every one minute and power consumption (kWh) data by the unit of 30 minutes can be output as a CSV file. The daily report can be selected and output for the past 31 days (Maximum).

* This function for consumed electricity in each 30 minutes is available only in the electricity amount monitoring method.
* Power consumption for each 30 minutes equals the amount of power consumption (kWh) x 2.

(2) Peak-cut status history (monthly report)

Power consumption data per day can be output as a CSV file. The monthly report can be selected and output for the past 62 days (Maximum).

* This function is available only for the electricity amount monitoring method.

(3) Creation of daily report/monthly report trend graphs

You can turn a CSV file (trend graph) into a graph using “Trend graph display tool” that comes with TG-2000A.

[Peak-cut status history on AE-200/AE-50 and WEB browser]

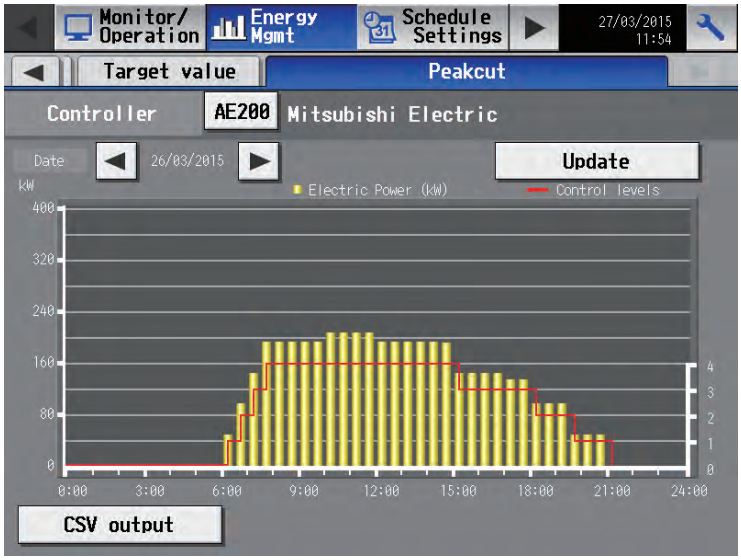
(1) Peak-cut status history (daily report)

The control level at 1 minute intervals and the power consumption in 30 minutes increments (kWh) can be output in the CSV format. The daily reports of today, yesterday, and the day before yesterday can be selected to be output.

* The power consumption in 30 minutes increments is output only when electric amount monitoring method is selected.
* Power consumption in 30 minutes increments equals the amount of power consumption (kWh) x 2.

(2) Daily trend graph

Select [Energy management] on the Web browser or the screen of AE-200/AE-50, and select [Peak-cut control status]. The peak-cut status history (daily report) will be displayed in graph form. The graph can show the peak-cut status history of today, yesterday, and the day before yesterday. Also, the displayed data can be downloaded in the CSV format.



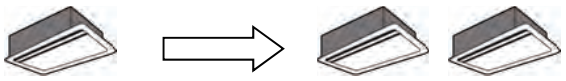
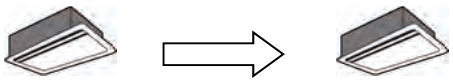
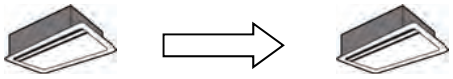
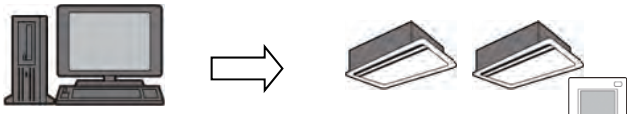
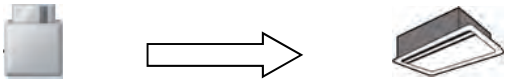
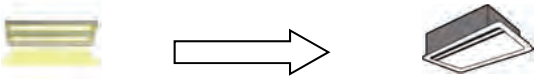
13. Interlock Control

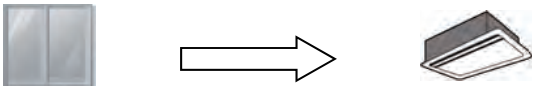
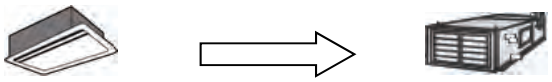
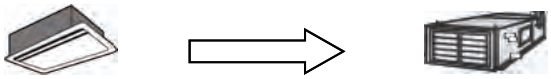
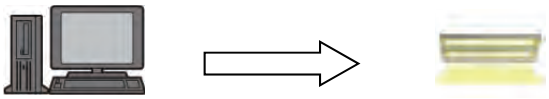
[1] Outline

The interlock control is designed to interlock the air conditioners connected to AE-200/AE-50/EW-50.
To use the interlock control, it is necessary to register the "Interlock control" license.

<1> Operations which can be realized by interlock control

The following table shows examples of uses of the interlock control which can be realized by registering the optional "Interlock control" license in AE-200/AE-50/EW-50.

Example	Interlock item	Usage	Classification of interlock method
1	Interlock among air conditioners (prevention of wasteful operation)	When the representative indoor unit is started or stopped, other indoor units are started or stopped in conjunction with the unit.  Representative indoor unit: Started/stopped　　Other indoor units: Started/stopped	Interlock control among air conditioners
2	Interlock among air conditioners (synchronization of operation mode)	When the operation mode of the representative indoor unit is changed, the operation mode of other indoor units is changed in conjunction the unit.  Indoor unit: Heating	
3	Interlock among air conditioners (backup operation)	An alternative air conditioner is operated in conjunction with the trouble signal of an indoor unit.  Indoor unit: In trouble　　Alternative: Started	
4	Security interlock	● All air conditioners in the target group are stopped in conjunction with the exit signal of the last exiting person. If necessary, it is possible to set the condition to prohibit the operation of the remote controllers in conjunction with the exit signal (contact) of the last exiting person. ● The prohibition of operation of the remote controllers of all air conditioners in the target group is canceled in conjunction with the cancel of the exit signal (contact) of the last exiting person.  Security system: Exit signal ON/OFF　　Indoor unit group: Stopped Remote controllers: Operation prohibited/ canceled	Interlock control between general equipment and air conditioners
5	Interlock between card key and air conditioner	● The air conditioner in a hotel room is started in conjunction with insertion of the card key (presence). ● The air conditioner in a hotel room is stopped in conjunction with removal of the card key (absence).  Card key: Inserted/removed　　Indoor unit: Started/stopped	
6	Interlock with lighting equipment	The air conditioner is started and stopped in conjunction with ON/OFF of lighting equipment.  Lighting equipment: ON/OFF　　Indoor unit: Started/stopped	

Example	Interlock item	Usage	Classification of interlock method
7	Interlock between window operation and air conditioner	The air conditioner is stopped or started in conjunction with window operation (opening or closing). * For hotels, etc., it is required to stop the air conditioner in each room when the window is opened.  Window: Open/closed → Indoor unit: Stopped/started	
8	Interlock with another manufacturer's ventilator	Another manufacturer's ventilator is started and stopped in conjunction with start and stop of air conditioner.  Indoor unit: Started/stopped → Another manufacturer's ventilation fan: Stopped/started	
9	Interlock between air conditioners and another manufacturer's ventilator	When any of the air conditioners A and B is started, another manufacturer's ventilation fan will be started. When all air conditioners A and B are stopped, another manufacturer's ventilation fan will be stopped. Air conditioners A and B: One of them started → Another manufacturer's ventilation fan: Started  Air conditioners A and B: All stopped → Another manufacturer's ventilation fan: Stopped	
10	Security interlock	Lighting equipment is turned off in conjunction with the exit signal (contact) of the last exiting person. * Example when no interlock is provided between security system and air conditioner  Security system: Exist signal ON → Lighting: OFF	Interlock between general equipment

<2> Operations which cannot be realized by interlock control

Control which cannot be realized by the interlock control is explained below.

Example	Interlock item	Usage	Remarks
A	Interlock between room temperature and operation mode	● When the room temperature (suction temperature) reaches 30°C, cooling operation will be started. ● When the room temperature (suction temperature) reaches 10°C, heating operation will be started.	The room temperature (suction temperature) cannot be used as an interlocking source condition.
B	Interlock between card key and air conditioner temperature setting	● When a guest is absent in a hotel room (the card key has been removed), the set cooling temperature will be raised in the summer. ● When a guest is absent in a hotel room (the card key has been removed), the set heating temperature will be reduced in the winter.	The interlock operation activated by one signal cannot be varied between cooling and heating.
C	Interlock between demand signal and air conditioner	● The set cooling and heating temperatures of air conditioner are shifted in conjunction with the demand signal. ● When the demand signal is canceled, the set cooling/heating temperature of air conditioner is returned to the value before the activation.	The temperature shift function is not provided. The function to return the operation to the previous state is not provided.
		● The air conditioner is stopped in conjunction with activation of demand signal. ● When the demand signal is canceled, the air conditioner is returned to the state before the activation. (It is possible only to stop the air conditioner by the demand signal.)	
D	Interlock by outdoor temperature	The air conditioner is stopped or the ventilator is started in conjunction with the outdoor temperature.	Factors, such as temperature, humidity and CO_2 concentration, which change linearly cannot be set as interlocking source conditions.
		● When the outdoor temperature is comfort, the air conditioner is stopped. ● When the outdoor temperature is lower than the indoor temperature, the air conditioner is stopped, and the ventilator is operated to take in the outdoor air for cooling.	
E	Switching of ventilation fan speed according to CO_2 sensor value	The ventilation fan speed level is changed according to the CO_2 sensor value. (The fan speed can be used as an interlocking source condition if a signal is given when the concentration reaches the set value on the CO_2 sensor side.)	
F	Interlock control of outdoor unit	● The capacity of outdoor unit is saved by the contact input from the host system. ● The outdoor unit is operated in the night mode by the contact input from the host system.	Interlock control to outdoor unit cannot be performed.

[2] Selection of interlock control method and system configuration

<1> Selection of interlock control method

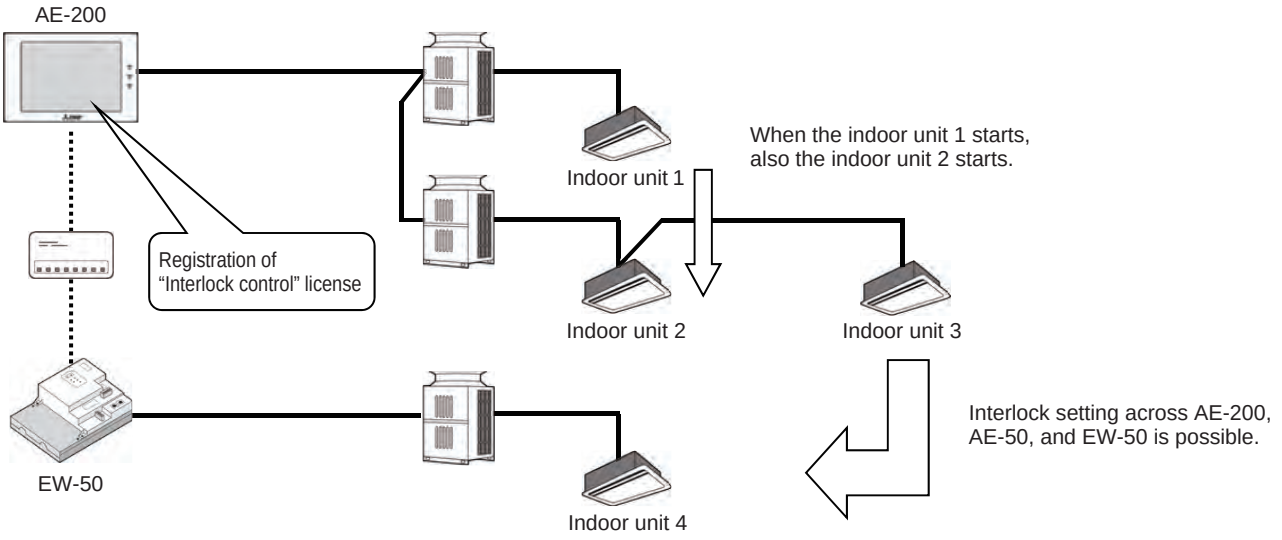
The interlock control can be achieved by using AE-200/AE-50/EW-50 or PLC for general equipment.
This document explains the method by using AE-200/AE-50/EW-50.

Item \ Method	Method by using AE-200/AE-50/EW-50
Features	● Interlock can be set across AE-200, AE-50 and EW-50 Ver. 7.5 or later. ● More than one device can be selected as interlocking sources for one interlock control condition. ● Interlock control among air conditioners can be realized. ● Interlock control between general equipment connected to the DIDO controller and air conditioners can be realized. ● Interlock control among general equipment connected to the DIDO controller can be realized. * Up to 6 contacts can be connected to one address of the DIDO controller. One contact is counted as one connected device. ● A general equipment connected to a free contact of an indoor unit can be set as an interlocking source or destination.
Place of registration of interlock conditions	Each set of AE-200/AE-50/EW-50
Number of interlock conditions	● 200 (150 for Ver. 7.46 or earlier) conditions for each set of AE-200/AE-50/EW-50 Interlocked control of units that are connected via an expansion controller is possible on Ver. 7.50 or later.
Interlock setting	● To be set from the Initial Setting Tool on Ver. 7.5 or later ● To be set from the Initial Setting Web on Ver. 7.46 or earlier (or from the interlock setting tool)
Required items 1	● Main unit of AE-200/AE-50/EW-50 ● "Interlock control" license
Required items 2 Items required only for setting	● Initial Setting Tool (personal computer and LAN)
Required items 3 For connection of general equipment	● DIDO controller (PAC-YG66DCA) ● Adapter for remote start/stop (PAC-SE55RA): When free contact is used ● M-control remote display kit (PAC-YU80HK): When free contact is used

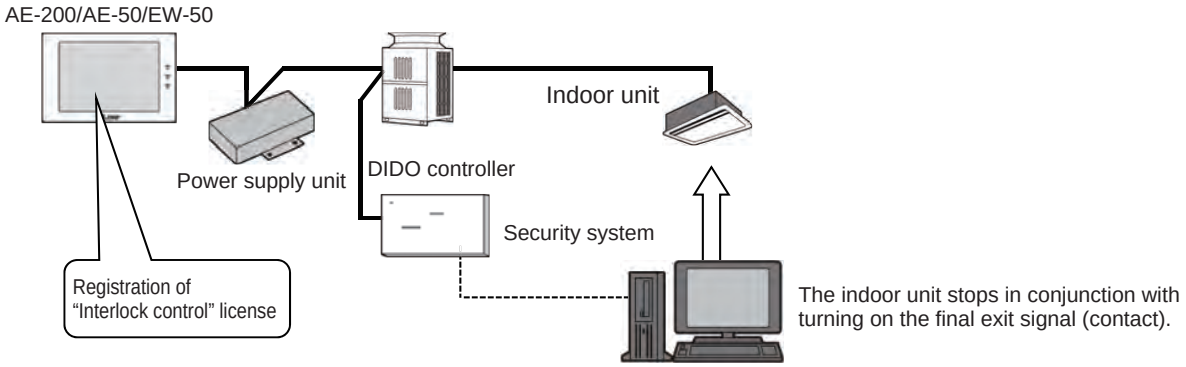
<2> System outline

The system outline is explained below.

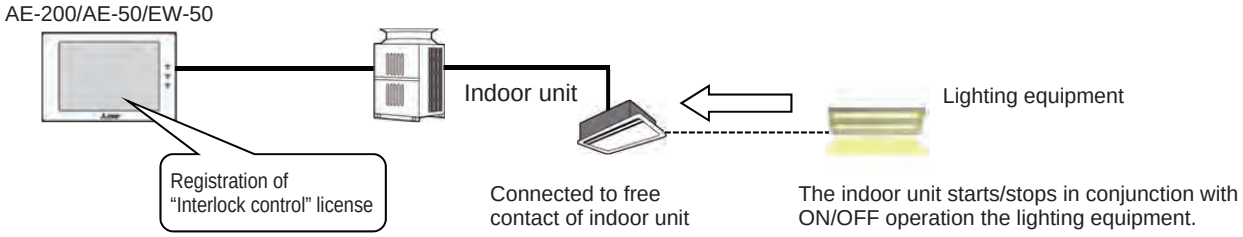
<In the case of interlock control among air conditioners>



<Interlock control between air conditioner and general equipment connected to general-purpose DC>



<Interlock control between air conditioner and general equipment connected to free contact>



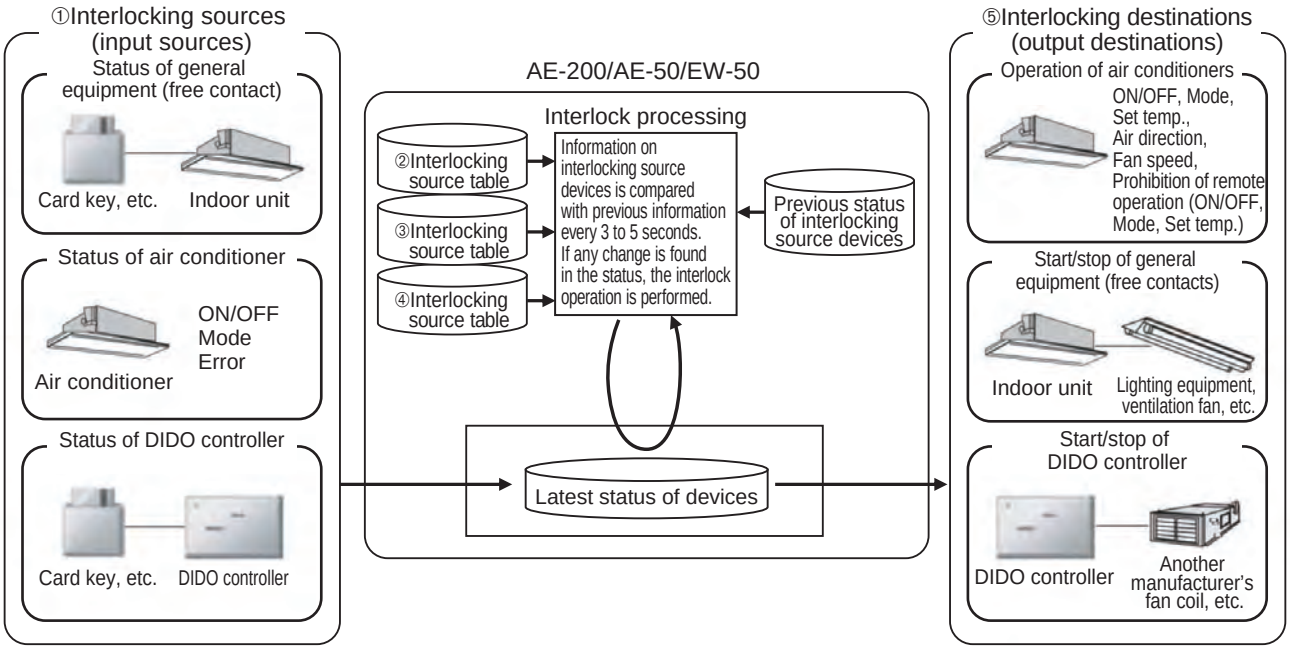
Remarks

- For the items and setting necessary for interlock control by using AE-200/AE-50/EW-50, see 13.-3 “Interlock control using AE-200/AE-50/EW-50.”
- For the connection of general equipment to the DIDO controller, see 6.-3 “DIDO controller.”

[3] Interlock control using AE-200/AE-50/EW-50

<1> Features

The interlock control of AE-200/AE-50/EW-50 sends a predetermined signal to the interlocking destinations (output destinations) ⑤ when any change is caused in the status of the interlocking sources (input sources) ① as shown in the following figure.
The device status set in the interlocking source table is obtained every 3 to 5 seconds, and, if any change is found in the interlocking source table ②, the units registered in the interlocking destination table ③ are operated as specified in the interlock operation table ④.
These settings have been registered in AE-200/AE-50/EW-50.



Interlocks of AE-200/AE-50/EW-50 can be set by two methods, by registering directly from the Web browser of AE-200/AE-50/EW-50 and by using the interlock setting tool.
For the procedures for registering from the Web browser, see 13.-[3]-<3> “Interlock setting by Web browser” and “Operation of Web Browser for Initial Setting” in the Instruction Book.
For the procedures by using the interlock setting tool, see 13.-[3]-<4> “Interlock control setting by interlock setting tool” and the Instruction Book for interlock setting tool for AE-200/AE-50.

Remarks

- ○ Make the settings for AE-200 when performing interlocked control across AE-200, AE-50, or EW-50. When the range of control is limited within AE-200, AE-50, or EW-50, make the settings for each type of controllers.
- ○ “ON/OFF” and “Error” of general equipment, “Contact input ON/OFF” of free contacts and “ON/OFF” of air conditioners can be used as input signals from the interlocking sources.
- ○ For the interlock control to general equipment, “ON/OFF” can be set.
- ○ For the interlock control to free contacts, “ON/OFF” can be set.

CAUTION

- ● Do not set conditions under which processing as shown below is repeated.
  The ON/OFF operations in the conditions 1 and 2 will be repeated permanently, and the air conditioners may be disordered.
  Condition 1: When Group 1 is turned on, Group 1 is turned off.
  Condition 2: When Group 1 is turned off, Group 1 is turned on.

<2> Required materials

Required items	Description
AE-200/AE-50/EW-50	
"Interlock control" license	The license must be registered in each set of AE-200/AE-50/EW-50 connected to the devices to be interlocked.
Personal computer for Web browser *1	Required to set the interlocks of AE-200/AE-50/EW-50.
Interlock setting tool *1	Tool for creating interlock setting data on a personal computer and writing and reading the data into and from AE-200/AE-50/EW-50 through LAN or USB.

*1: The interlocks of AE-200/AE-50/EW-50 can be set by any of these methods. (Both are not required.)

When general equipment are connected to the DIDO controller, the following items are required.

Required items	Description
DIDO controller (PAC-YG66DCA)	6 general equipment can be connected one DIDO controller. One M-NET address is used for one general equipment. (When 6 general equipment are connected to one DIDO controller, 6 M-NET addresses are used.)
External input/output adapter (PAC-YG10HA)	When 3 or 4 general equipment are connected to one DIDO controller, one unit of the following external input/output adapter is required. When 5 or 6 general equipment are connected to one DIDO controller, two units are required.
Power supply unit for transmission line PAC-SC51KUA Power supply extension unit for transmission line PAC-SF46EPA	When the DIDO controller is connected to AE-200/AE-50/EW-50, the power supply unit for transmission line is required. The DIDO controller can be connected to EW-50 without the power supply unit. However, if a DIDO controller or a system remote controller whose power supply capacity exceeds that of EW-50, 6, is connected to the transmission line for centralized control, the power supply unit for transmission line or the power supply expansion unit for transmission line is required.
Connection with general equipment (relay circuit, power supply, etc.)	To connect general equipment and DIDO controller (PAC-YG66DCA), field instrumentation work, such as connection through a relay, is required.*

* The distance from general-purpose DC to general equipment must be up to 100 m. It is recommended to connect them within 10 m.

To connect a general equipment to the free contact of an indoor unit, also the following items are required.

Required items	Description
Adapter for remote start/stop	Required to connect general equipment to free contact of indoor unit. The status of the general equipment can be connected to the input (2 points).
M-control remote display kit	Required to connect general equipment to free contact of indoor unit. The status of the general equipment can be connected to the input (2 points) and the output for operation (3 points).
Connection with general equipment (relay circuit, power supply, etc.)	To connect a general equipment and the free contact of an indoor unit, field instrumentation work, such as connection through a relay, is required.

* The distance from the free contact of an indoor unit to a general equipment must be up to 10 m.

<3> Interlock setting

Remarks

- To use the interlock control function, another license is required. Ensure that the required license has been correctly registered on the Optional function license registration screen.
- If you have logged in as an administrator user, the interlock control setting may be prohibited.
- When “External input setting” has been set to “ON/OFF mode (level input),” the interlock control is not enabled.
- When changing or deleting a group selected as an interlocking source device or an interlocking destination device on the group setting screen, delete the interlock control settings for the group, and reset the conditions as needed.

(1) Setting of conditions for interlocking sources

Setting of interlocking source type and interlock conditions
Select an interlocking source type and interlock conditions 1 and 2 referring to the following table.

Interlock conditions for each interlocking source type and unit of device selection

Options for interlocking source type	Interlocking source icon	Options for interlock conditions *1 *2		Unit of interlocking source selection
		Interlocking source condition (upper stage)	Interlocking source condition (lower stage)	
Group (ON/OFF) *3		All Groups On All Groups Off One or more Groups On One or more Gropus Off	—	Group
Group (Mode) *4*5		All groups in the mode All groups out of the mode One or more groups in the mode One or more groups out of the mode	Cool, Dry, Fan, Heat, Auto, Setback Bypass(LOSSNAY), Heat Recovery(LOSSNAY), Auto(LOSSNAY)	Group
Group (Error/Normal)		All units in error, All units in normal operation, One or more units in error, One or more units in normal operation	—	Group
Free input points (ON/OFF)		All Units On, All Units Off, One or more Units On, One or more Units Off	—	Unit (contact)

*1: For the interlock conditions 1 and 2, select the status after change of the status of interlocking source device from the right column of the following table.
(The devices are in the status shown in the left column before change of the status.)

Before change of status of interlocking source device	After change of status of interlocking source device
Stop of one or more groups	Start of all groups
Start of one or more groups	Stop of all groups
Stop of all groups	Start of one or more groups
Start of all groups	Stop of one or more groups

*2: More than one interlocking source type cannot be selected for one interlock condition.
*3: When Group (ON/OFF) or Group (Error/Normal) is selected as the interlocking source type, a group of air conditioners, LOSSNAY or general-purpose DC (PAC-YG66DCA) can be selected from the interlocking source devices.
*4: When Group (Mode) is selected, functions which the interlocking source devices do not have cannot be interlocked. If any function other than the functions of these devices is set, the devices may be damaged.
*5: When Group (Mode) is selected, the group of general-purpose DC (PAC-YG66DCA) cannot be set as an interlocking source device.

(2) Setting of operation at interlocking destination

Setting of interlocking destination type and interlock operation
Select an interlocking destination type and interlock operation referring to the following table.

Interlock operation of each interlocking destination type and selection unit

Options for interlocking destination type	Interlocking destination icon	Options for interlock operation *1		Selection unit
		Item	Options	
Group *1 *2 *3		ON/OFF	ON|OFF	Group
		Mode	(Air conditioner) Cool | Dry | Fan | Heat | Auto | Setback (LOSSNAY) Bypass | Heat Recovery | Auto	
		Set Temp.	14 to 35°C (Cool, Dry) 4.5 to 28°C (Heat) 14 to 28°C (Auto)	
		Air Direction	Mid 3 | Mid 2 | Mid 1 | Mid 0 | Horizontal | Swing | Auto	
		Fan Speed	Low | Mid 2 | Mid 1 | High | Auto	
		Prohibit Remote Controller Operation (ON/OFF) (Mode) (Set Temp.)	Permitted | Prohibited	
Free output points		ON/OFF	ON | OFF	Unit (contact)

*1: When Group is selected as the interlocking destination type, a group of air conditioners, LOSSNAY or general-purpose DC (PAC-YG66DCA) can be selected from the interlocking destination devices.
*2: Do not set a different type of group (air conditioners, LOSSNAY or general-purpose DC (PAC-YG66DCA)) as the interlocking source device.
*3: When Group (Mode) is selected, functions which the interlocking source devices do not have cannot be interlocked. If any function other than the functions of these devices is set, the devices may be damaged.

<4> Cautions for system configuration

1. Do not configure a system which may affect human life.
   - Do not configure a system which will interlock devices in case of disaster or emergency.
   - The interlock control cannot be performed when a power failure occurs or a device, such as AE-200/AE-50/EW-50, is disabled.
   - Do not configure a control system associated with disaster prevention or security. If such a system is configured for an unavoidable reason, take into consideration the measures to be taken upon occurrence of power failure.
   - In any case, provide a switch circuit which can stop the system in an emergency, e.g. trouble with AE-200/AE-50/EW-50.

2. Design a system in consideration of lag in interlocking.
   - It takes 10 seconds (in the case of 1 unit) to 90 seconds (in the case of some units) to complete the operation at the interlocking destination after the status of the interlocking source changes.
     However, it may take up to 3 minutes depending on the device status.
   - When control other than the interlock control, e.g. scheduled operation or energy-saving control, is executed concurrently, a delay may be caused in interlock control.
   - When the ON/OFF mode (level input) has been selected for external input, the interlock control will not be performed.
   - Time may be required for execution of the control depending on the system condition.

3. Conduct test runs to check the interlocks among devices.
   - If any change is made in the air conditioner group configuration in AE-200/AE-50/EW-50, check the interlocking sources and destinations without fail.
   - If settings made before the group configuration is changed are left, unspecified interlocks will work.
   - If any devices in the system are powered off or disabled, the interlock control will not work normally.
   - The interlock control will start immediately after the power supply of AE-200/AE-50/EW-50 is started.

4. Others
   - Set the interlock conditions within the operating ranges of the interlocking destination and source devices.
   - Setting out of the ranges may cause malfunction or damage the devices.
   - More than one interlocking source type cannot be selected for one interlock.
   - Up to 50 units can be connected to one set of AE-200/AE-50/EW-50 *.
   - The general equipment controlled by the DIDO controller are counted by replacing the number of general equipment contacts by the number of units.
     * Indoor units, LOSSNAY, DIDO controllers and AI controllers

5. Free contacts of indoor units
   - The free contacts can be used when the software version of the indoor units applicable to R410A or R407C is 33 or later. (Check the software version of the indoor units with the Maintenance Tool.)

6. The interlock control cannot be performed in the following cases.
   - When the signals for energy-saving control or peak-cut control to the group is “Stop” or “Prohibition of operation” However, the interlock control of the indoor unit free contacts and the interlock control of the DIDO controller can be performed.
   - When the external input signal is “Emergency stop”
     However, the interlock control of the indoor unit free contacts can be performed.
   - When the external input signal is “ON/OFF (level input)”

<5> System design for the general equipment to be connected to the free contact point on the indoor unit

(1) Indoor unit selection and switch setting method

In order to monitor and control general equipment connected to the free contact point on the indoor unit, choose an R410A-compatible indoor unit.*1

In order to make the function of the free contact point effective, set the dipswitch (SW1) as the following while the unit is stopped.

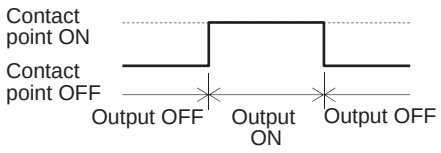
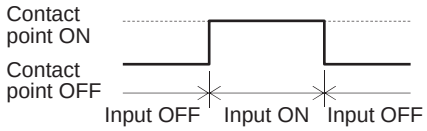
*1: Free contact point may be used by R410A compatible indoor units or R407C compatible indoor units (S/W version 33 or later).Check the S/W version of the indoor units with the Maintenance Tool.

Indoor unit SW1			Function
No.5	No.9	No.10	
ON	ON	ON	Free contact point function is effective (Auto-recovery after power failure)
OFF	ON	ON	Free contact point function is effective (Normal operation (remains stopped after power restoration))

(2) Verifying the input/output specifications of the general equipment

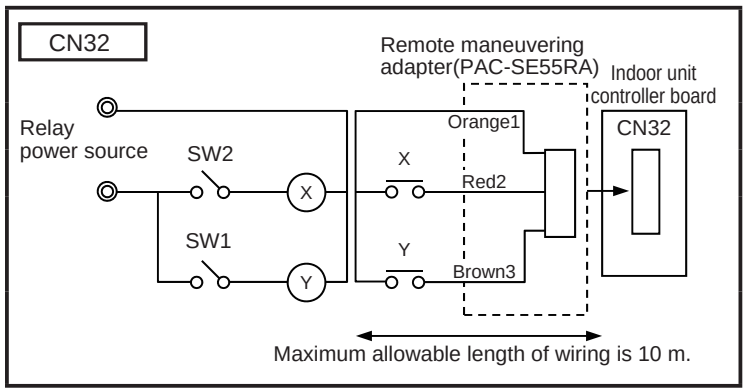
Confirm the general equipment to be connected to the free contact point on the indoor unit.

Those general equipment to be controlled must be able to handle the following signals because controlling and monitoring of the equipment is performed via the connected indoor unit.

	Signal specifications	Contact point specifications		Connector number
Operation	Relay contact point output	Output signal1 to 3		Output 1 : CN52-2 Output 2 : CN52-3 Output 3 : CN52-4
Monitor	Level input with or without voltage	Intput signal1 to 4		Input 1 : CN32-2 Input 2 : CN32-3 Input 3 : CN51-2 Input 4 : CN52-5

(3) Specifications for free contact point connection

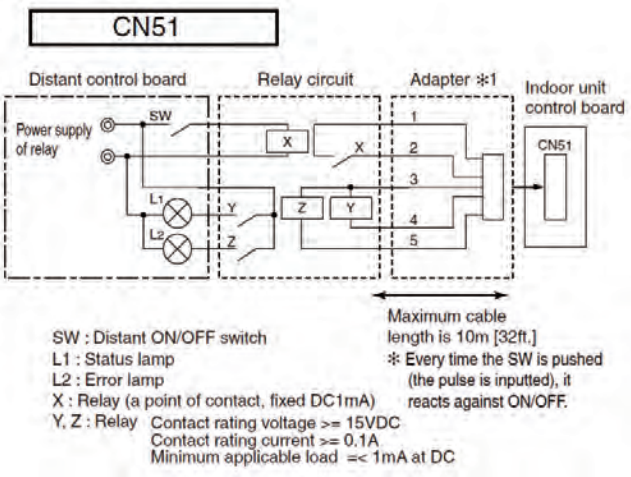
When using input 1 and 2 (CN32), connect a remote maneuvering adapter (PAC-SE55RA) on the indoor unit, and send input signals to the indoor unit via a relay.



SW1	Switch for input 1 CN32-2 port
SW2	Switch for input 2 CN32-3 port
X, Y	Relay (Contact point: Minimum applied load 12 VDC 1 mA)

For using the input 3 (CN51), input 4, output 1, output 2, output 3 (CN52), input the signal via a relay using adapter PAC-SA88MA connected to indoor unit.

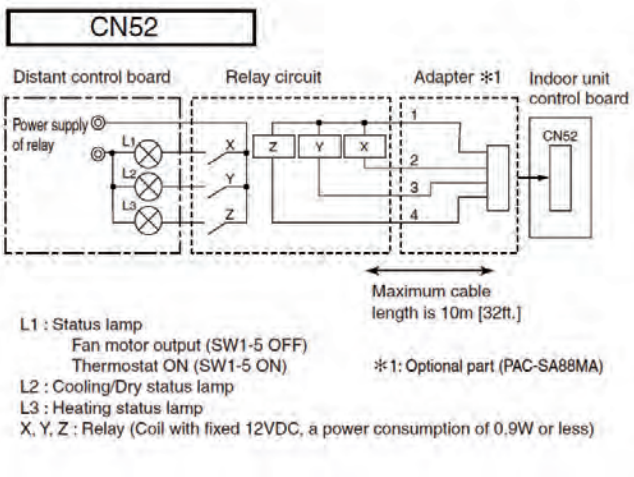
● Input



SW : Distant ON/OFF switch
L1 : Status lamp
L2 : Error lamp
X : Relay (a point of contact, fixed DC1mA)
Y, Z : Relay Contact rating voltage >= 15VDC
Contact rating current >= 0.1A
Minimum applicable load =< 1mA at DC

※ Every time the SW is pushed (the pulse is inputted), it reacts against ON/OFF.

● Output



L1 : Status lamp
Fan motor output (SW1-5 OFF)
Thermostat ON (SW1-5 ON)
L2 : Cooling/Dry status lamp
L3 : Heating status lamp
X, Y, Z : Relay (Coil with fixed 12VDC, a power consumption of 0.9W or less)

※1: Optional part (PAC-SA88MA)

<In the case of with-voltage input (with-polarity)>

External power supply	12 to 24 VDC Input current (per a contact) about 10 mA (12 VDC)
SW12	Switch for Input CN51-port 2
SW22	Switch for Input CN52-port 5

<In the case of non-voltage input>

SW11	Switch for Input CN51-port 2
SW21	Switch for Input CN52-port 5
Contact rating current 12 VDC 1 mA	

<Relay contact output>

Power supply for the display	30 VDC A 100 ADC/200 ADC 1 A
L1	Operation status display lamp
L2	Error status display lamp
L3	Lamp for Output CN52-port 2
L4	Lamp for Output CN52-port 3
L5	Lamp for Output CN52-port 4
XA to XE	Relay (current capacity 10 mA to 1 A)

14. Connection of AHC

[1] Outline

The operation condition, error status, temperature and humidity of the devices connected to the AHC can be monitored on the screen of AE-200/AE-50 or the Web browser.
Note: The devices connected to the AHC cannot be started or stopped from AE-200/AE-50/EW-50.

The AHC (Advanced HVAC CONTROLLER) is a generic name for combinations of SIMPLE APPLICATION CONTROLLER α2 (hereinafter, referred to as α2) and AHC Adapter made by Mitsubishi Electric Corporation.
One AHC requires one α2 and one AHC Adapter. More than one α2 cannot be connected to one AHC Adapter.

On a PC on which the α2 programming tool has been installed, the interlock control can be set (programmed) for α2.
This enables the interlock control between M-NET devices and other manufacturers' devices or between other manufacturers' devices.
Note: The interlock control for devices connected to the AHC cannot be set (programmed) from AE-200/AE-50/EW50.

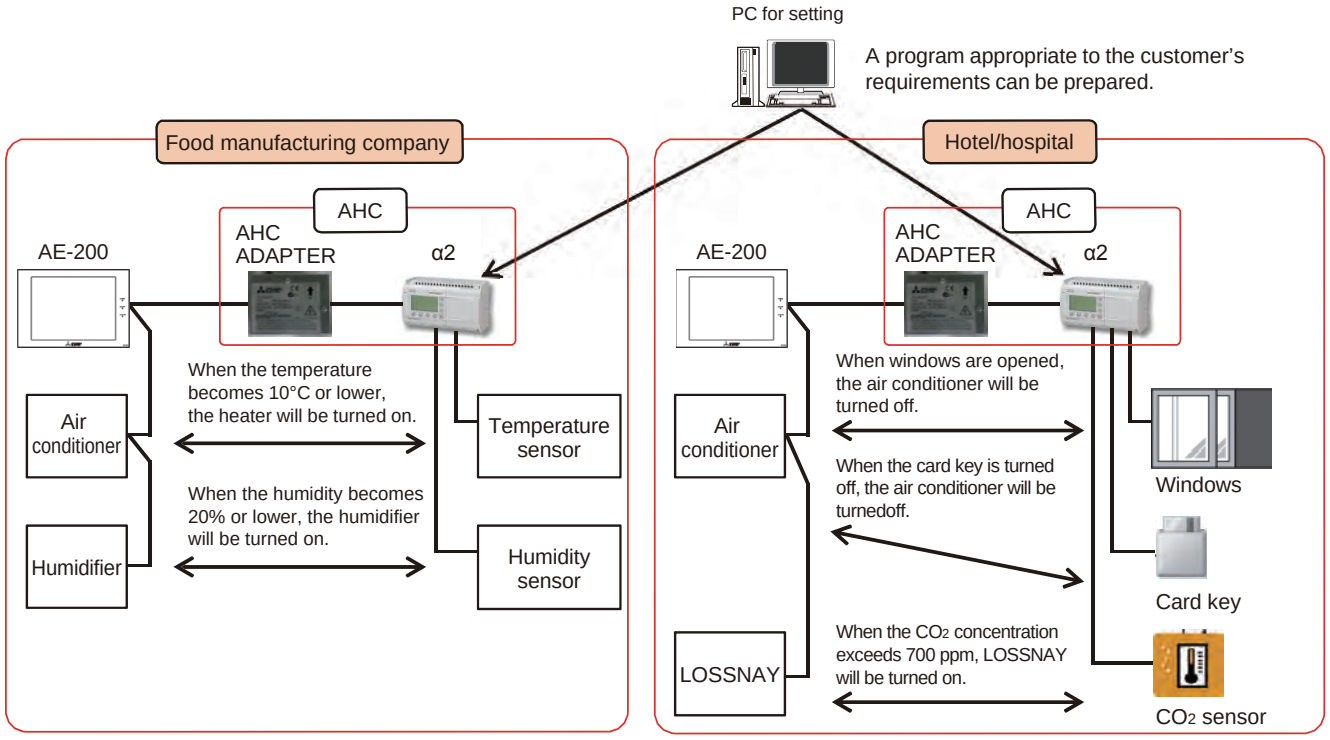
The following α2 controllers are applicable to the AHC.
- AL2-14MR-A
- AL2-14MR-D
- AL2-24MR-A
- AL2-24MR-D

Note: AL2-10MR-A and AL2-10MR-D cannot be connected with α2.

Up to 50 AHCs can be connected to each set of AE-200/AE-50/EW-50. However, when air conditioners are connected, the following restrictions are imposed.
When the maintenance monitors are connected: The maximum number of indoor units and AHCs is 60.
When maintenance monitors are not connected: The maximum number of indoor units and AHCs is 70.

When using the AHC, connect at least one remote controller or centralized controller that is compatible with the AHC. As the AHC status cannot be displayed if no controller is connected, it may not be possible to observe the error status. The AHC must be set to a group containing at least one indoor unit. A maximum of one AHC can be connected to a group.

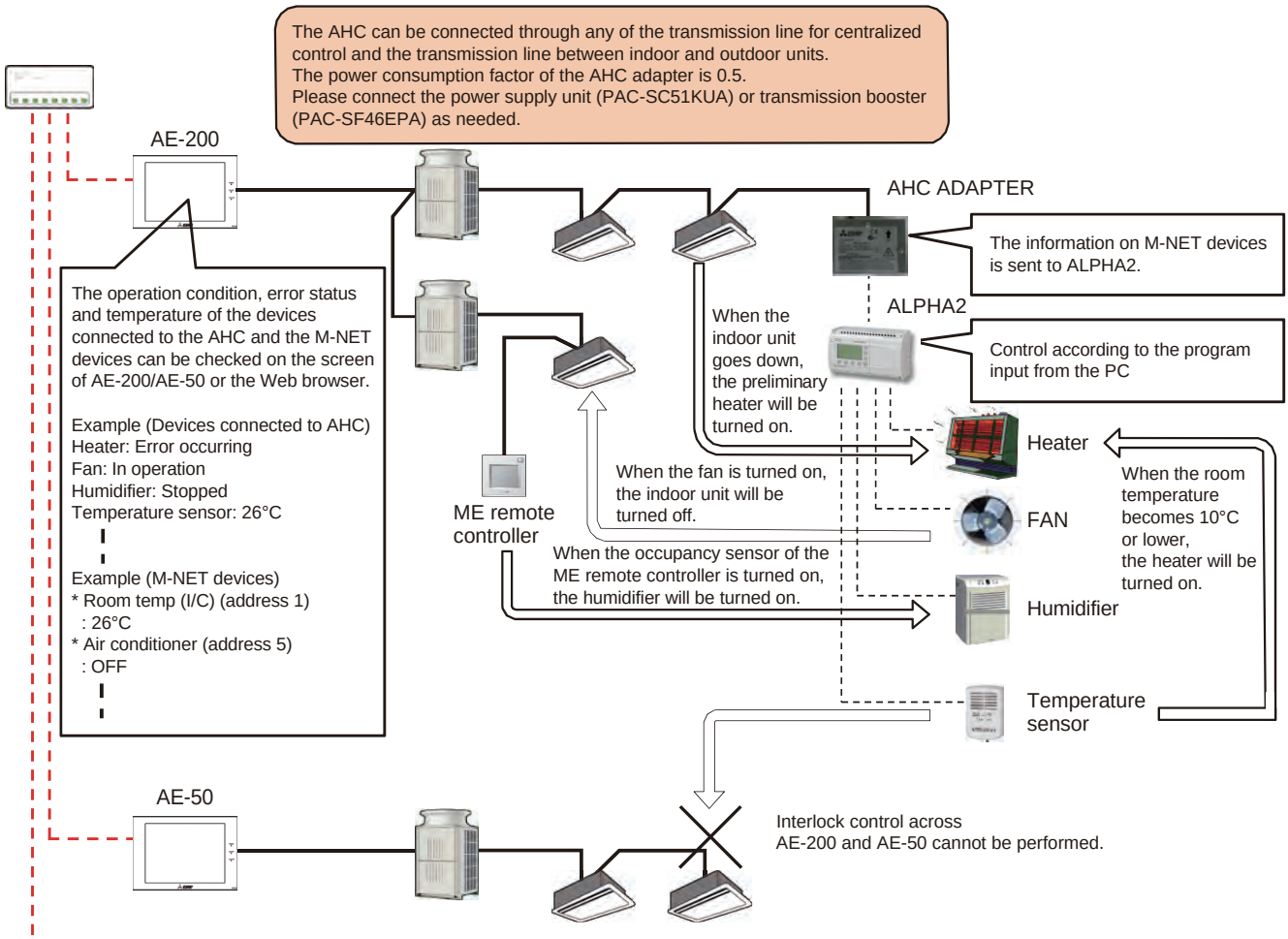
For the AHC, a program appropriate to the customer's requirements can be prepared on a PC.



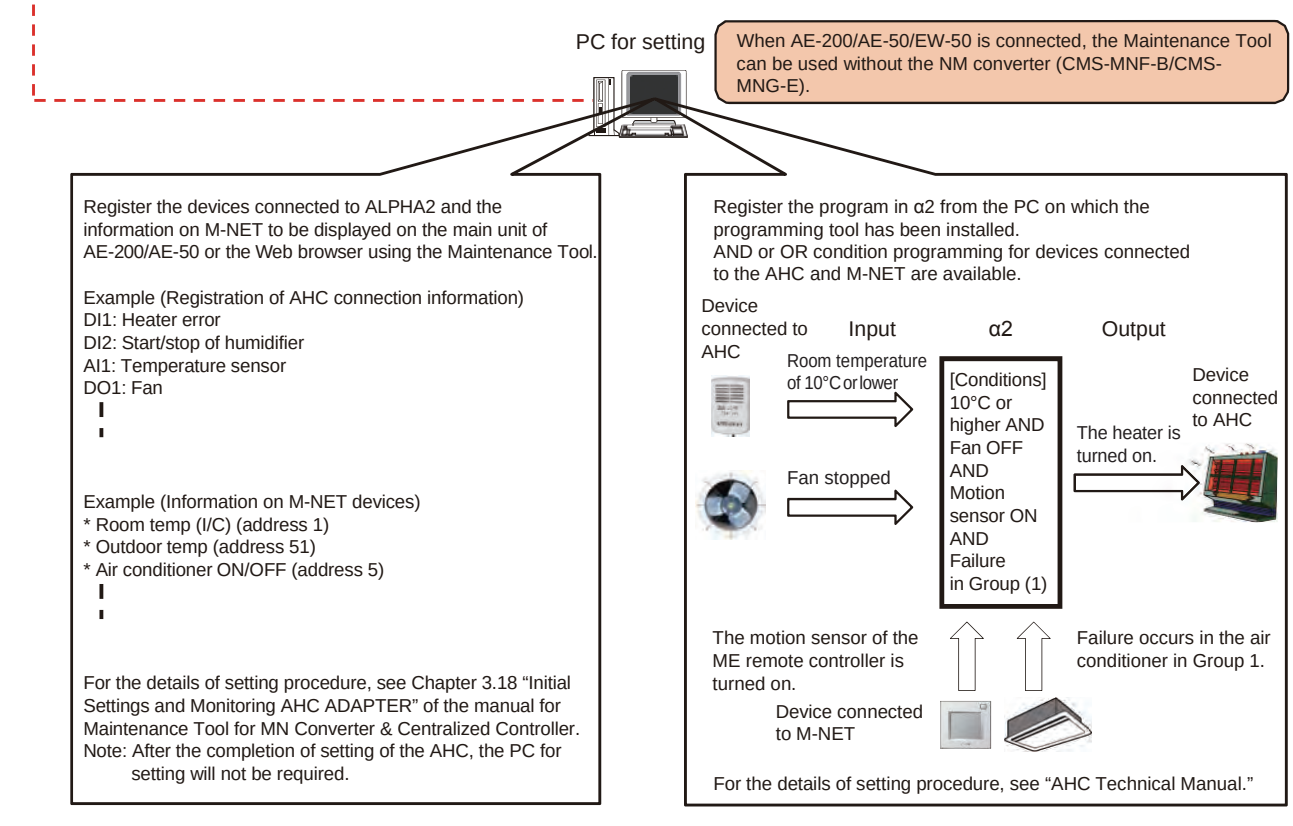
Note: The indication of the power supplies is omitted.

[2] System configuration

<1> Connected devices



Note: The indication of the power supplies is omitted.



<2> Required devices

Table Required devices

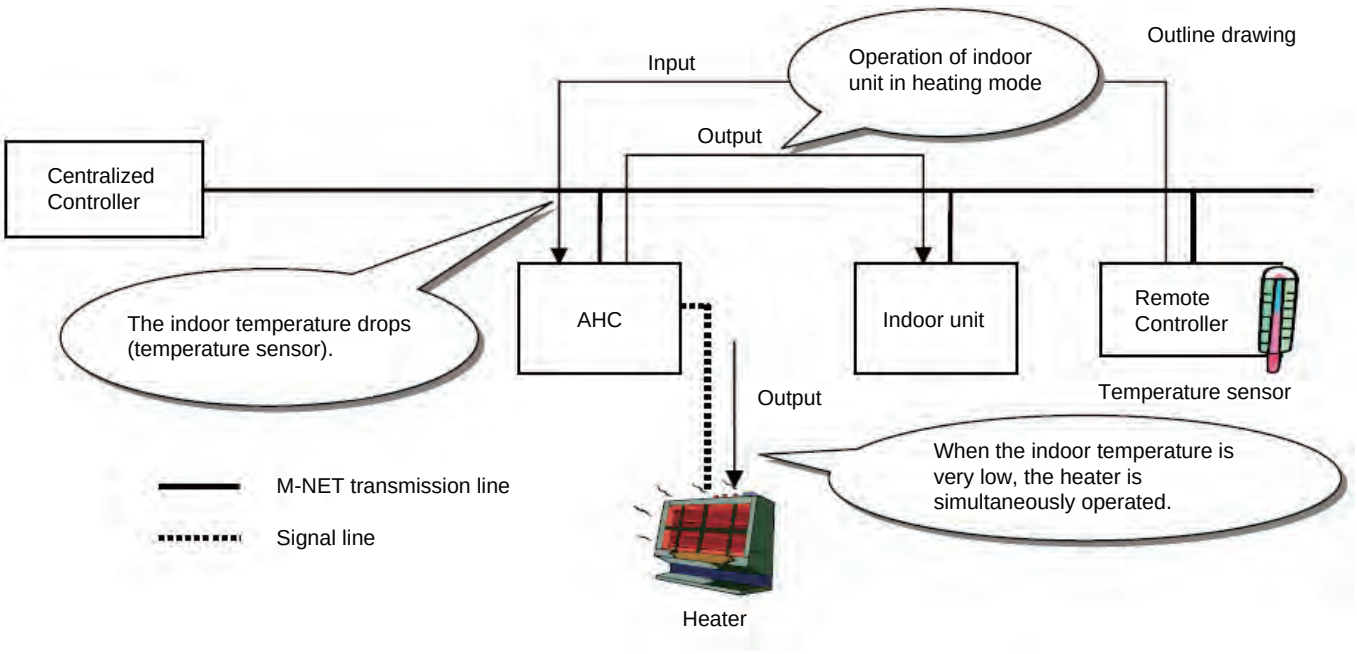
Device name	Manufacturer	Remarks
SIMPLE APPLICATION CONTROLLER α2	Mitsubishi Electric Corporation	The DC type and AC type are available. For the DC type, a 24 V DC power supply is required. To use analog input and output (temperature/humidity sensor and CO2 sensor), the DC type α2 is required.
AHC Adapter	Mitsubishi Electric Corporation	The power consumption factor is 0.5. Connect the power supply unit or transmission booster unit as needed.
Maintenance Tool	Mitsubishi Electric Corporation	It is necessary to install the Maintenance Tool on the PC for setting. The Maintenance Tool must be installed without fail for the input of the devices connected to the AHC. It can be installed also on the PC for Web browser.
"Maintenance Tool" license	Mitsubishi Electric Corporation	The license must be registered for each set of AE-200/AE-50/ EW-50. When connecting using the MN converter (CMS-MNF-B/CMS-MNG- E), the license is unnecessary.
α2 programming tool	Mitsubishi Electric Corporation	For programming, it is necessary to install this tool on the PC for setting. It can be installed also on the PC for Web browser.
Connection cable (AL-232CAB) between α2 and PC	Mitsubishi Electric Corporation	It is necessary to download the program prepared on the PC to α2. The connection cable is required only when the program is downloaded to α2.

<3> Examples of control

Table Examples of control

AHC function	Example of control	Supplementary note
(1) Control of another manufacturer's device using suction sensor of indoor unit or remote controller sensor	• Another manufacturer's heater can be interlocked by using the temperature sensor of the indoor unit or remote controller.	Since the sensor of the indoor unit or remote controller can be used, it is unnecessary to install a new sensor.
(2) Control of another manufacturer's device interlocked with unit con- nected to M-NET	• Interlock control can be performed to run another manufacturer's heater when an indoor unit is running or in the heating mode. • Interlock control can be performed to run another manufacturer's humidifier when even one of indoor units is running.	
(3) Control of unit connected to M-NET	• On/off control of indoor unit interlocked with connection and disconnection of card reader can be performed.	
(4) Control in combination of above (1) to (3)	• The drying operation of indoor unit can be controlled by using the humidity sensor on the remote controller.	
(5) Monitoring of input/output status of α2 on AE-200/AE-50/EW-50		

[In the case of interlock control with another manufacturer's heater]



<4> List of functions which can be displayed on AE-200/AE-50

The data displayed on AE-200/AE-50 are shown below.
However, the names can be changed on the Web browser.
For details, see 14.[3]<6> “Setting of individual names of AHC ports.”

Table Function list

Digital Input (On/off display)	Analog Input	Digital Output (On/off display)	Analog Output (% display)
● Heater Error	● Room Temp (°C/°F)	● Heater	● Heater (Linear)
● Heater 1 Error	● Outdoor Temp (°C/°F)	● Heater 1	● Humidifier (Linear)
● Heater 2 Error	● SA Temp (°C/°F)	● Heater 2	● Damper (Linear)
● Humidifier Error	● Water Temp (°C/°F)	● Humidifier	● Fan (Linear)
● Dehumidifier Error	● Other Temp (°C/°F)	● Dehumidifier	● Valve (Linear)
● Fan Error	● Room Humidity (%)	● Fan	● Pump (Linear)
● Fan Error (Heater)	● Outdoor Humidity (%)	● Fan for Heater	● External Unit (Linear)
● Fan Error (Humidifier)	● CO_2 Sensor (ppm)	● Fan for Humidifier	
● External Unit Error	● Static Pressure Sensor (%)	● Damper	
● Brightness Sensor	● Brightness Sensor (%)	● Valve	
● Occupancy Sensor	● Water Level (%)	● Pump	
● Pomp Interlock	● Other Sensor (%)	● Error Output	
● Key Input		● Light	
● Other Input		● Ventilation	
		● Key Output	
		● External Unit	

<5> List of connected models

The input/output data held by our air conditioners include information input from the units connected to M-NET and data output to operate the units connected to M-NET. Table shows a list of the units holding input data and the units which can be operated.

Table Possibility of interlock control

Unit name	Input (capture of information)	Output (unit operation)
Indoor Unit (I/U)	Possible	Possible
Outdoor Unit (O/U)	Possible	Possible
Remote Controller (R/C)	Possible	Impossible
LOSSNAY	Possible	Possible
Air to Water (PWFY)	Possible	Possible
Hot Water Heat Pump (CAHV) *	Possible	Possible
AHC	Impossible	Possible

* Hot Water Heat Pump (CAHV) is not available in North America.

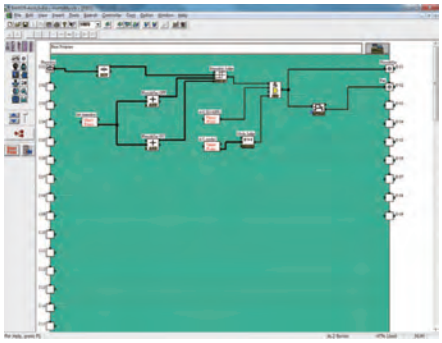
[3] Initial setting of AHC

<1> Transition of initial setting

To control the system with the AHC, it is necessary to perform programming with “ALVLS Programming Software”, initial setting for AHC ADAPTER and registration of the AHC group.

(1)Programming

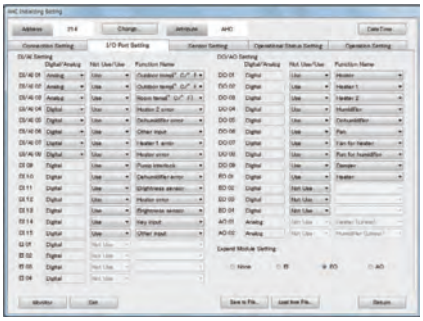
Program the interlock control between the devices connected to the AHC and the devices on M-NET using “ALVLS Programming Software”.



(2)Initial setting for AHC ADAPTER

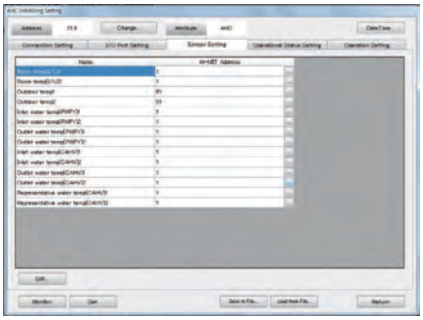
<I/O port setting>

Register other manufacturers’ devices connected to the AHC.



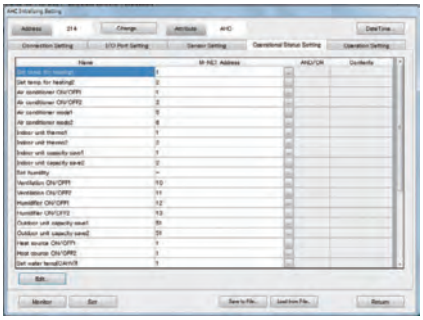
<Sensor information setting>

Register the information on the sensors to be controlled by the AHC among the M-NET devices.



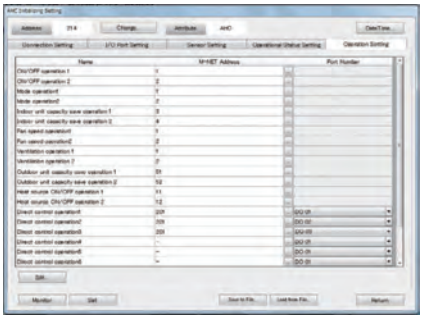
<Operation information setting>

Register the settings of operation information on the units to be controlled by the AHC among the M-NET devices.



<Operation device setting>

Register the settings for operation of the M-NET devices from the AHC.



(3)Setting of individual names of devices connected to AHC

The data set by the Maintenance Tool will be displayed in “AHC port names” on the administrator Web browser.

Change the names as needed.

[LCD]

The operation condition of the devices connected to the AHC can be checked on the LCD or the administrator Web browser.

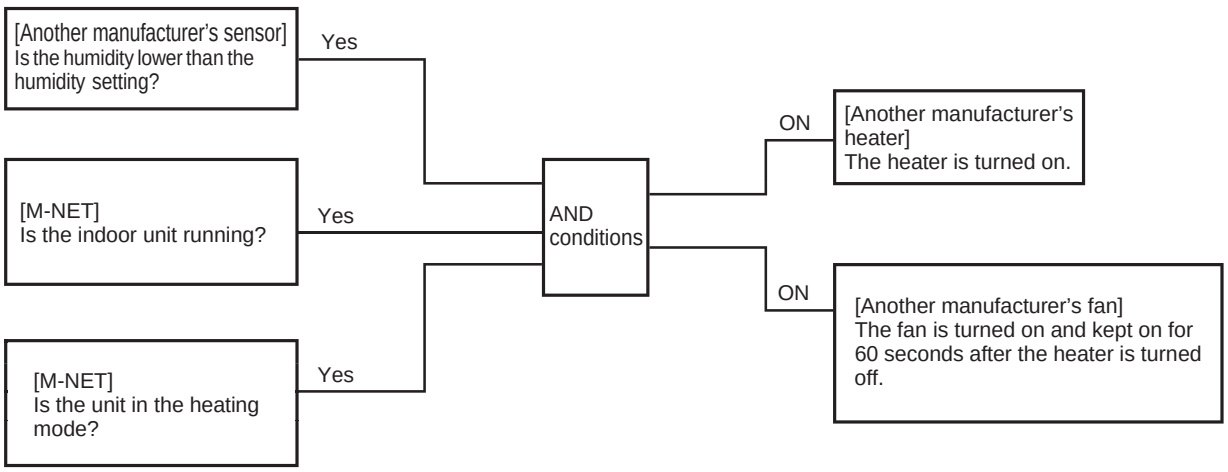
[LCD]

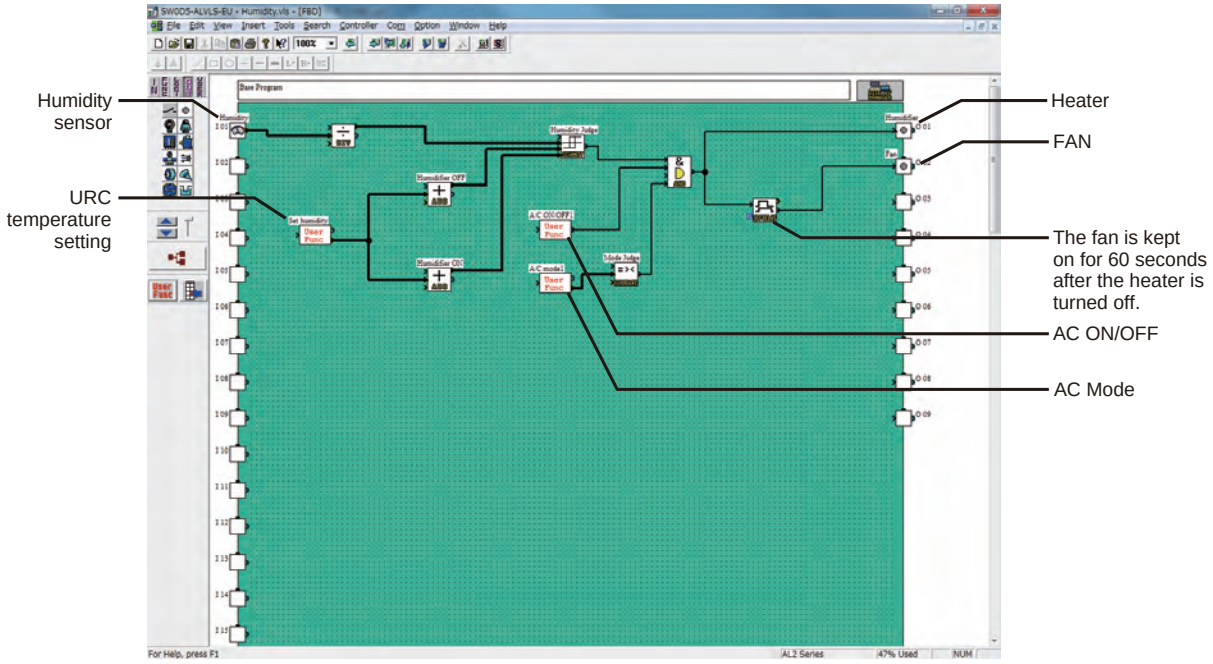
Touch Status of related equipment, and the operation condition, temperature, humidity and error status of the M-NET devices set by the Maintenance Tool can be checked.

<2> Programming

To control the air conditioners connected to M-NET and other manufacturers' air conditioners by using the AHC, program the control on a PC on which "ALVLS Programming Software" has been installed.
For the details of programming, see the technical manual for AHC.

[Example]





<3> Registration of AHC in group

Register the M-NET address of the AHC in AE-200/AE-50/EW-50.

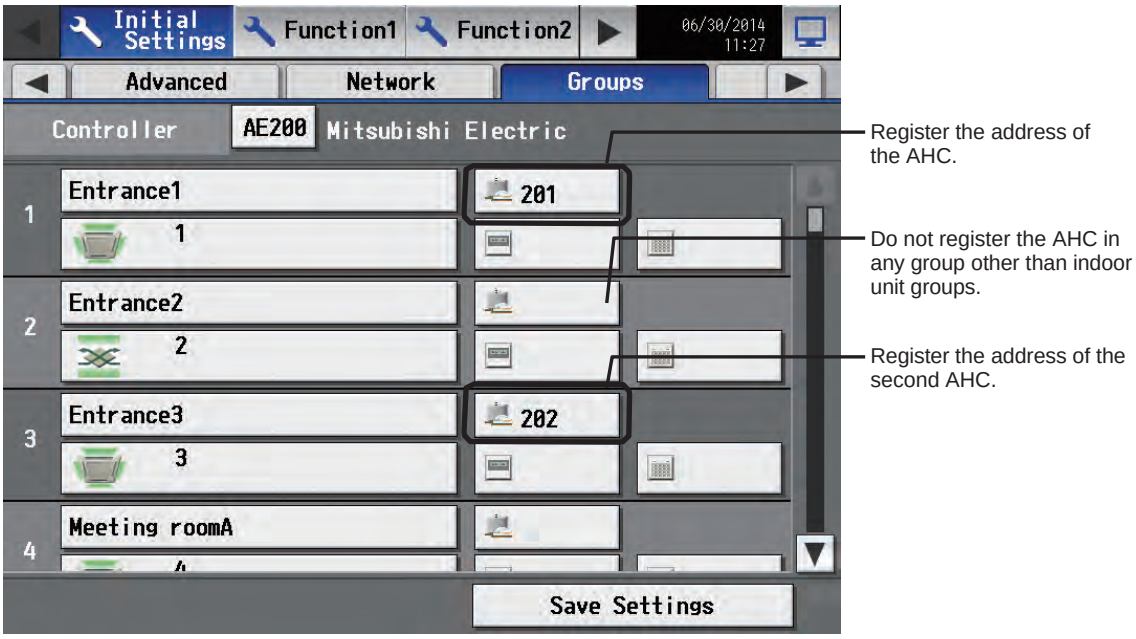
Note: Only one AHC can be registered in one group.

Note: Register the AHC in a group in which indoor units have been registered.
(The AHC can be registered in any group of indoor units.)

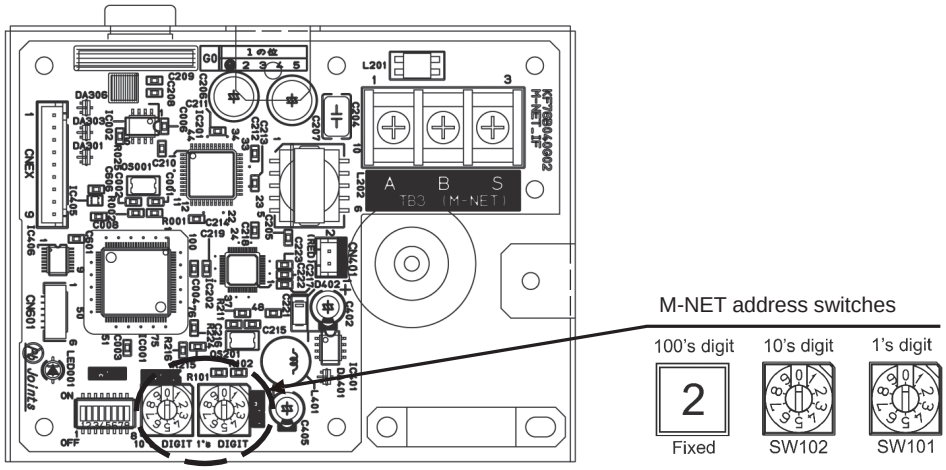
Note: Do not register the AHC in any group in which water heaters, LOSSNAY, HWHP (CAHV) or DIDO controller have been registered.

Note: When connecting more than one AHC, register each AHC in another group of indoor units.

Note: If the indoor units in a group in which the AHC has been registered are deleted, the registered AHC will be also deleted.



The M-NET address of AHC can be seen by removing the cover of α2.



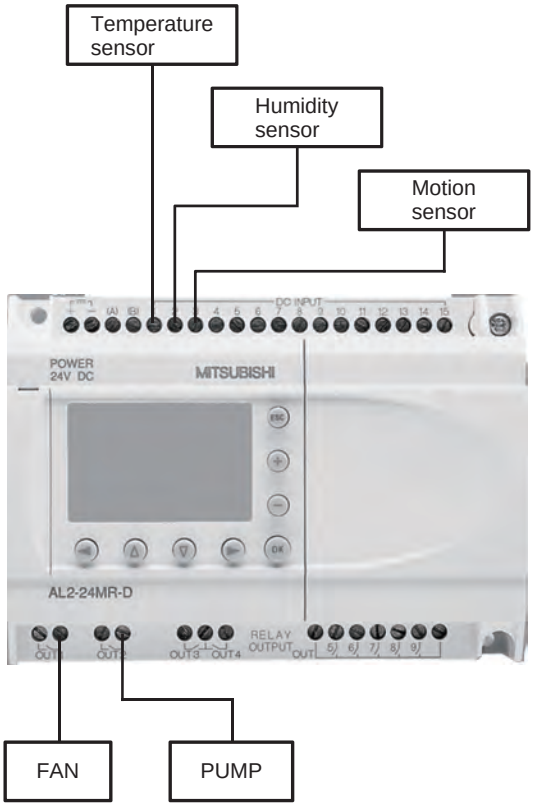
<4> Initial setting for AHC ADAPTER (devices connected to AHC)

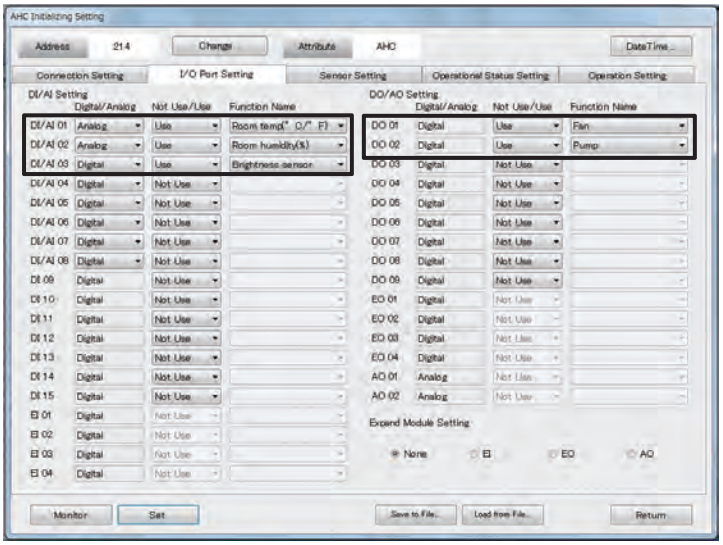
(1) I/O port setting

Associate the information on the devices connected to the ports of α2 on a PC on which the Maintenance Tool has been installed.

For the details of setting procedure, see Chapter 3.18 “Initial Settings and Monitoring AHC ADAPTER” of the manual for Maintenance Tool for MN converter & Centralized Controller.

The following example shows the registration in the case where a temperature sensor, a humidity sensor, a motion sensor, a fan and a pump are connected.





	Connected device	Digital/Analog	Not Use/Use	Function Name
DI/AI 01	Temperature sensor	Analog	Use	Room Temp (°C/°F)
DI/AI 02	Humidity sensor	Analog	Use	Room humidity (%)
DI/AI 03	Motion sensor	Digital	Use	Brightness sensor
DO 01	FAN	Digital	Use	FAN
DO 02	Pump	Digital	Use	Pump

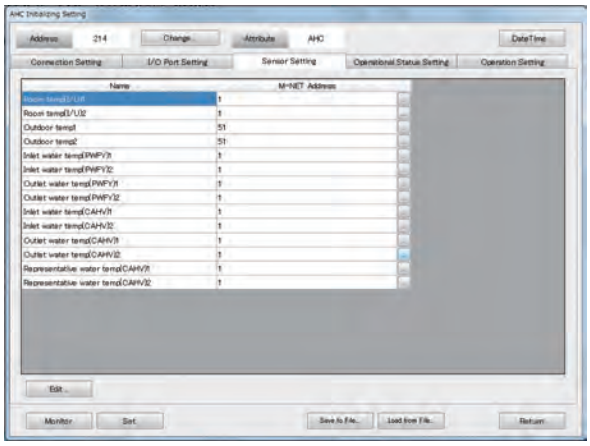
Remarks

- ○ To display the outdoor temperature by the energy management function, connect the temperature sensor to DI/AI 01 or DI/AI 02. If it is connected to another port, the outdoor temperature will not be displayed on the energy management screen.
- ○ The Function names to be displayed on the LCD screen or Web browser can be changed. For details, see %[3]<6> “Setting of AHC port names.”

<5> Initial setting for AHC ADAPTER (devices connected to M-NET)

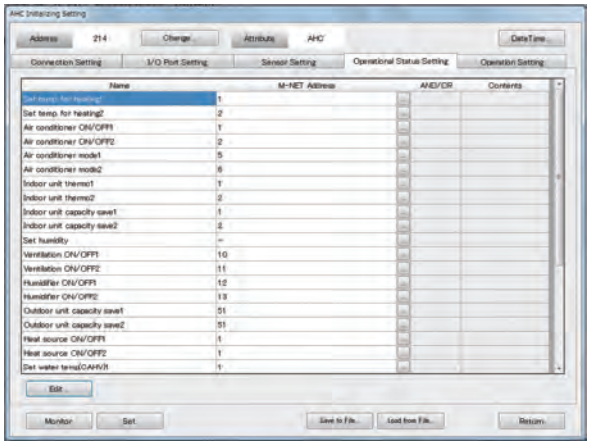
Set the operation information and contents of operations of the sensors and units to be controlled by the AHC among the M-NET devices.
For the details of setting procedure, see Chapter 3.18 “Initial Settings and Monitoring AHC ADAPTER” of the manual for Maintenance Tool for MN converter & Centralized Controller.

(1) Setting of sensor information
Click the Sensor Setting tag, and register the sensors and M-NET addresses of the M-NET devices to be controlled by the AHC.



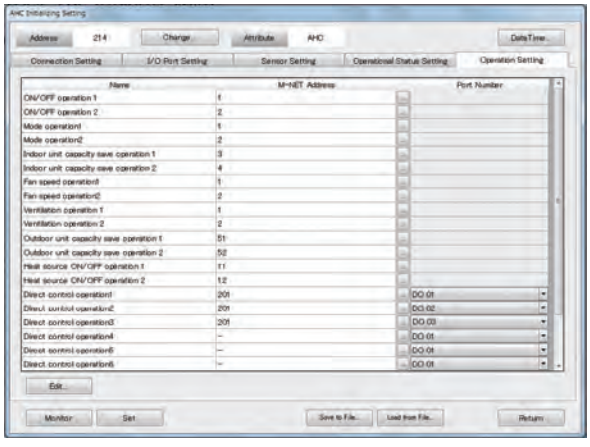
Name	M-NET address range
Room temp (I/U) 1, 2	1 to 50
Room temp (R/C) 1, 2	151 to 200
Indoor humidity 1, 2	151 to 200
Indoor occupancy sensor 1, 2	151 to 200
Indoor brightness sensor 1, 2	51 to 100
Outdoor temp 1, 2	1 to 50
Inlet water temp (PWFY) 1, 2	1 to 50
Outletwater temp (PWFY) 1, 2	1 to 50
Inletwater temp (CAHV) 1, 2	1 to 50
Outletwater temp (CAHV) 1, 2	1 to 50
Representative water temp (CAHV) 1, 2	1 to 50

(2) Setting of operation information
Click the Operational Status Setting tag, and register the operational status and M-NET addresses of the M-NET devices to be controlled by the AHC.



Name	M-NET address range
Set temp.for heating 1, 2	1 to 50
Set temp.for cooling 1, 2	1 to 50
Air conditioner ON/OFF 1, 2	1 to 50
Air conditioner mode 1, 2	1 to 50
Indoor unit thermo 1, 2	1 to 50
Indoor unit capacity save 1, 2	1 to 50
Set humidity	–
Ventilation ON/OFF 1, 2	1 to 50
Humidifier ON/OFF 1, 2	1 to 50
Outdoor unit capacity save 1, 2	51 to 100
Heat sorce ON/OFF 1, 2	1 to 50
Set water temp (CAHV) 1, 2	1 to 50
Analog signal 1, 2	–
unit error 1, 2	1 to 50
M-NET communication error	–
M-NET popwer supply status inf?	–
defrost 1, 2	1 to 50

(3) Setting of operation devices
Click the Operational Setting tag, and register the contents of operations and M-NET addresses of the M-NET devices to be operated by the AHC.



Name	M-NET address range
ON/OFF operation 1, 2	1 to 50
Mode operation 1, 2	1 to 50
Indoor unit capacity save operation 1, 2	1 to 50
Fan speed operation 1, 2	1 to 50
Ventilation operation 1, 2	1 to 50
Outdoor unit capacity save operation 1, 2	51 to 100
Heat source ON/OFF operation 1, 2	1 to 50
Direct control operation 1, 2, 3, 4, 5, 6, 7, 8, 9, 10	201 to 250

<6> Setting of individual names of AHC ports

Set the names of the devices connected to the AHC and the error information names on the AHC port name setting screen. The names set by the Maintenance Tool have been registered as the default names.

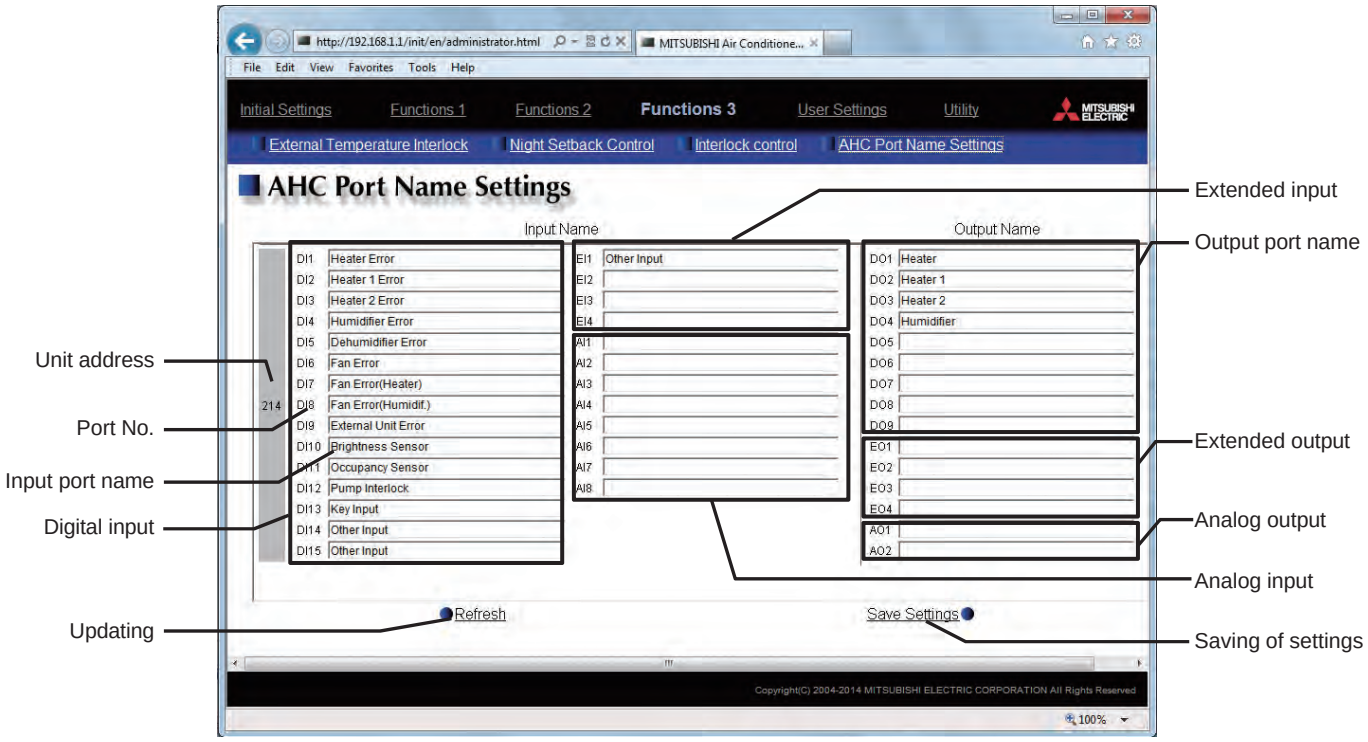
Note: If it is not required to change the default names, this setting is unnecessary.

Note: The names can be set only on the Web browser for initial setting.

Note: If an administrator who is not allowed to set the AHC conditions has logged in, the administrator cannot input the names.

Note: The set names will be displayed on the LCD screen, administrator Web browser and AHC monitor screen.

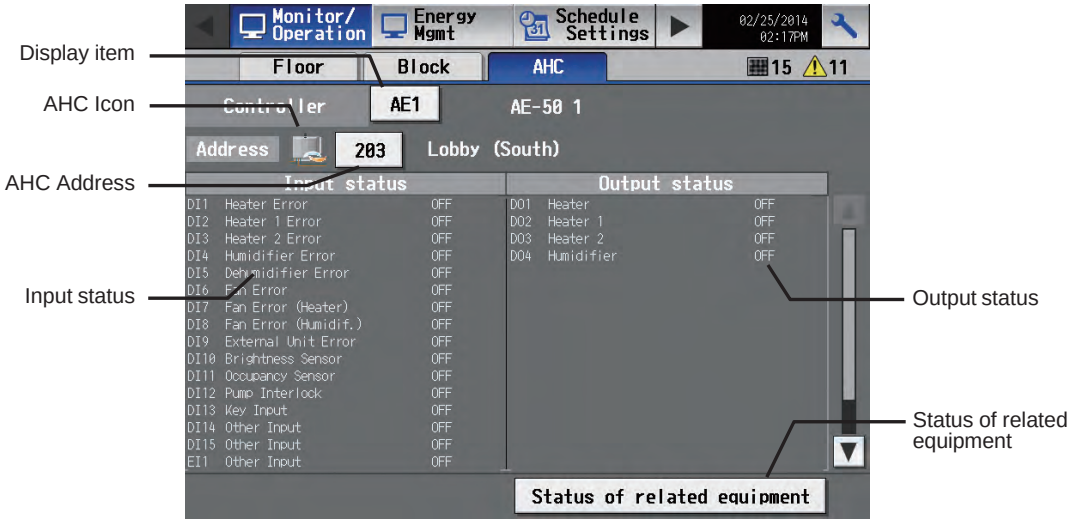
Note: On the AHC status monitors of the LCD screen and Web browser, the names of the port numbers not connected to the AHC will not be displayed.

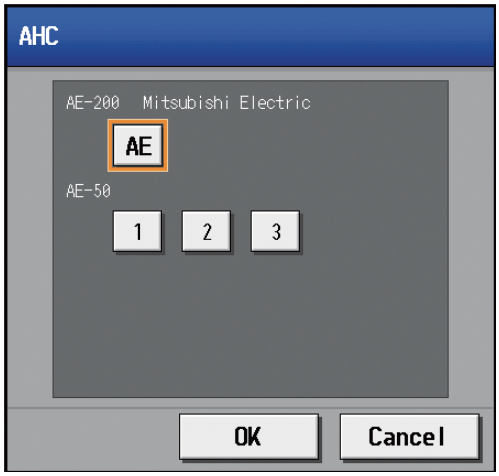


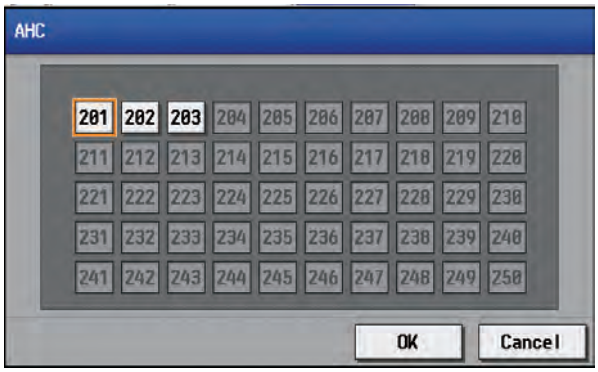
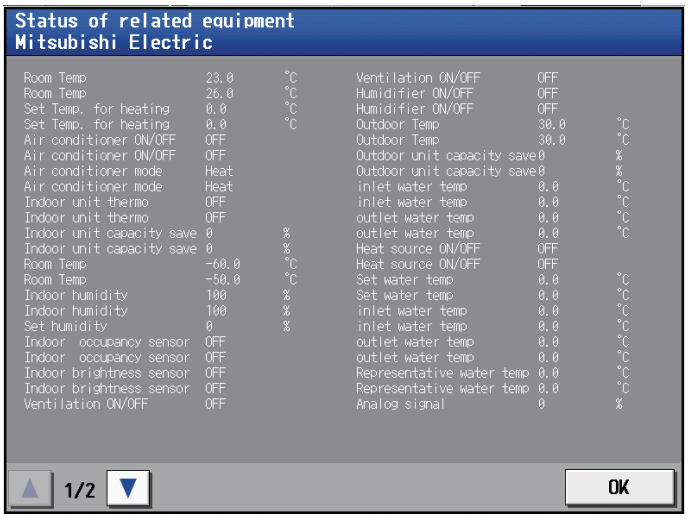
Item	Details	Remarks
Unit address	The M-NET address of the AHC is displayed.	
Port No.	The port number of the AHC is displayed.	The port number is displayed regardless of whether the AHC port is connected or not.
Input port name	Set the names to be displayed on the AHC monitor screen for the error status of the connected devices and input status of the illuminance sensors, etc.	Each name must be 20 characters or less long. In the Input port name column, the following characters cannot be used: < > + & ″ ’
Digital input	The data set in DI/AI01 to 08 and DI09 to 15 of the Maintenance Tool are displayed.	The digital input 1 to 8 or the analog output 1 to 8 can be used.
Extended input (1 to 4)	Up to four points of digital input can be added. The data set in EI01 to 04 of the Maintenance Tool are displayed.	The analog input cannot be extended. When the extended input is used, the extended output and analog output cannot be used.
Output port name	Set the names to be displayed on the AHC monitor screen for the error status and the operation condition output status of the connected devices.	Each name must be 20 characters or less long. In the Output port name column, the following characters cannot be used: < > + & ″ ’
Digital output	The data set in DO 01 to 09 of the Maintenance Tool are displayed.	
Extended output	Up to four points of digital output can be added. The data set in EO 01 to 04 of the Maintenance Tool are displayed.	When the extended output is used, the extended input and analog output cannot be used.
Analog input	The data set in AI01 to 08 of the Maintenance Tool are displayed.	To display the temperature and humidity, it is necessary to perform the setting with the α2 programming tool.
Analog output	Up to two points of analog output can be added. The data set in AO 01 and 02 of the Maintenance Tool are displayed.	When the analog output is used, the extended input and extended output cannot be used.

[4] AHC status monitor

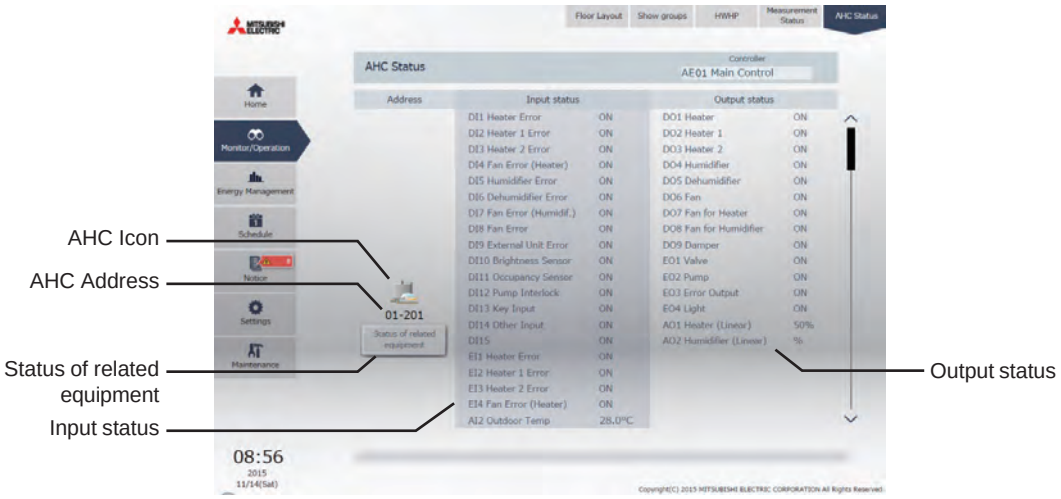
Main unit screen



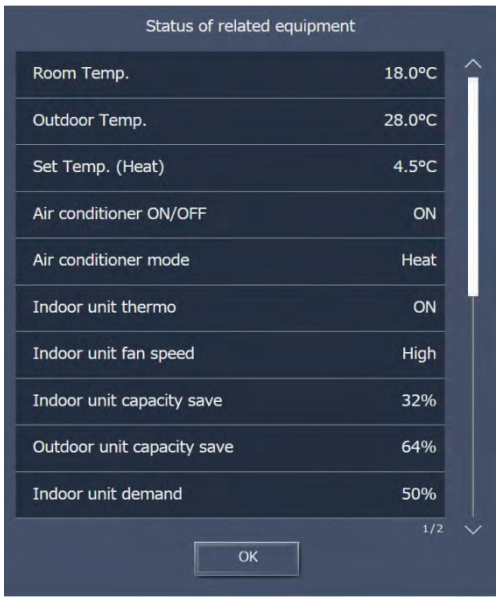
Item	Details	Remarks
Display item	To display the data of AE-200, select AE. To display the data of AE-50, select 1, 2 or 3.	
		
AHC icon	The status of the AHC is displayed with one of the following icons.  :Normal  :When a communication error occurs or an error signal is input to the AHC	Even if an error occurs in any device connected to the AHC, the error icon will not be displayed. The display will be updated every minute.

Item	Details	Remarks
AHC address	The M-NET address of the connected AHC is displayed. 	
Input status	Among the devices connected to the AHC, the items set in 14. [3]<4> “Initial setting for AHC ADAPTER (devices connected to AHC)”are displayed in the format “input port No.* + input port name + input status.” * DI1 to DI15 are digital input ports, EI1 to EI4 are extended digital input ports, and AI1 to AI8 are analog input ports. When the names have been set in 14. [3]<6> “Setting of individual names of AHC ports”, the names will be displayed.	● If the numbers of ports not connected to α2 have been set with the Maintenance Tool, the input status of the ports are displayed. However, the digital devices are kept OFF, and the analog devices are kept 0. ● For DI1 to DI15 and EI1 to EI4, the ON/OFF status is displayed. ● For AI1 to AI8, the values and units are displayed. ● When the AHC has been set to display the temperature, the values of AI1 to AI8 will be displayed in °C or °F. When it has been set to display the humidity, the values will be displayed in %. ● In the case of CO_2, ppm will be displayed as the unit. In other cases,“-” (no unit) will be displayed. ● The display will be updated when the screen is switched.
Output status	Among the devices connected to the AHC, the items set in 14. [3]<4> “Initial setting for AHC ADAPTER (devices connected to AHC)” are displayed in the format “output port No.* + output port name + output status.” * DO1 to DO9 are digital output ports, EO1 to EO4 are extended digital output ports, and AO1 to AO2 are analog output ports. When the names have been set in 14. [3]<6> “Setting of individual names of AHC ports”, the names will be displayed.	● If the numbers of ports not connected to α2 have been set with the Maintenance Tool, the input status of the ports are displayed. However, the digital devices are kept OFF, and the analog devices are kept 0. ● DO1 to DO9 and EO1 to EO4: ON or OFF is displayed. ● AO1 to AO2: The values and units are displayed. (Unit: %, fixed) ● The display will be updated when the screen is switched.
Status of related devices	Click Status of related equipment, and the status of the related devices connected to the AHC will be displayed. The items set in 14. [3]<5> “Initial setting for AHC ADAPTER (devices connected to M-NET)” are displayed. For the displayed names and units, see the following page. Note: The display will be updated when Status of related equipment is touched. It cannot be updated by pressing the page changing button ▲ or ▼. 	

Web browser screen



Item	Details	Remarks
Update	Click to show the most recent conditions. When [Auto] is selected, the conditions are updated automatically every minute.	
AHC icon	The status of the AHC is displayed with one of the following icons.  :Normal  :When a communication error occurs or an error signal is input to the AHC	Even if an error occurs in any device connected to the AHC, the error icon will not be displayed.
AHC address	The M-NET address of the connected AHC is displayed. When some AHCs are connected, the next AHC addresses will be displayed by moving the scroll bar downward.	
Input status	Among the devices connected to the AHC, the items set in 14. [3]<4> “Initial setting for AHC ADAPTER (devices connected to AHC)” are displayed in the format “input port No.* + input port name + input status.” * DI1 to DI15 are digital input ports, EI1 to EI4 are extended digital input ports, and AI1 to AI8 are analog input ports. When the names have been set in 14. [3]<6> “Setting of individual names of AHC ports”, the names will be displayed.	● The status of the ports not in use is not displayed. ● When a communication error occurs in the AHC, the port information will not be displayed. ● For DI1 to DI15 and EI1 to EI4, the ON/OFF status is displayed. ● For AI1 to AI8, the values and units are displayed. ● When the AHC has been set to display the temperature, the values of AI1 to AI8 will be displayed in °C or °F. ● When the AHC has been set to display the humidity, the values will be displayed in %. ● In the case of CO_2, ppm will be displayed as the unit. In other cases, “-” (no unit) will be displayed.
Output status	Among the devices connected to the AHC, the items set in 14. [3]<4> “Initial setting for AHC ADAPTER (devices connected to AHC)” are displayed. The names set in 14. [3]<6> “Setting of individual names of AHC ports” are displayed. The names are displayed in the format “output port No.* + output port name + output status.” * DO1 to DO9 are digital output ports, EO1 to EO4 are extended digital output ports, and AO1 to AO2 are analog output ports.	● The status of the ports not in use is not displayed. ● When a communication error occurs in the AHC, the port information will not be displayed. ● For DO1 to DO9 and EO1 to EO4, the ON/OFF status is displayed. ● For AO1 to AO2, the values and units are displayed. (Unit: %, fixed)

Item	Details	Remarks
Status of related devices	Click Status of related equipment, and the status of the related devices connected to the AHC will be displayed. The items set in 14. [3]<5> “Initial setting for AHC ADAPTER (devices connected to M-NET)” are displayed. For the displayed names and units, see Table “List of related device statuses.” Note: The display will be updated when Status of related equipment is touched. 	

15. Apportioned Electricity Billing Function

[1] Outline

The apportioned electricity billing function can be implemented by using AE-200 or the integrated software (TG-2000A). This document explains the procedures for implementing the apportioned electricity billing function by AE-200.

The following features can be used by introducing the optional "Charge" license into Ver. 7.23 or later of AE-200/AE-50/EW-50.

<Features of apportioned electricity billing function>

- The electric energy consumed by air conditioners can be calculated, and the electric energy (kWh) and graphs can be displayed.
- One of two methods, electric energy measurement method and electric energy manual input method, can be selected.
  The electric energy measurement method enables calculation of electric energy used by each tenant and charge to the tenant.
  The electric energy manual input method enables calculation of ratio of consumption (charge rate) by each tenant.
- The results of calculation of electric energy and charges can be printed on a printer from a personal computer.
- The results of calculation of electric energy and charges can be output to a CSV file from a personal computer.
- The charges in each day or month or in both can be automatically calculated.
- Not only the electric energy consumed by air conditioners, but also the values indicated by meters, such as gas meters and water meters, can be displayed, and the charges can be calculated.
- AE-200 apportions the electric energy and retains the results. The results of apportionment are saved (backed up) also in the expansion controllers AE-50/EW-50 to enhance the reliability.

Notes The user using the apportioned electricity billing function of Mitsubishi Air Conditioning Control System AE-200 is considered to have agreed on the following terms.

- Mitsubishi Electric Corporation and its distributors do not accept liability for incidental, consequential or special damages to customers in any cases even if the seller has been informed of the possibility of occurrence of such damages.
  They do not assume any liability for claims of rights from third parties.

Before using the function, the building owner shall gain agreement and sign individual contracts with each tenant on condition that the tenant will be charged for use of electricity (including temporary measures against failure) based on apportionment in consideration of the operation condition of air conditioners.

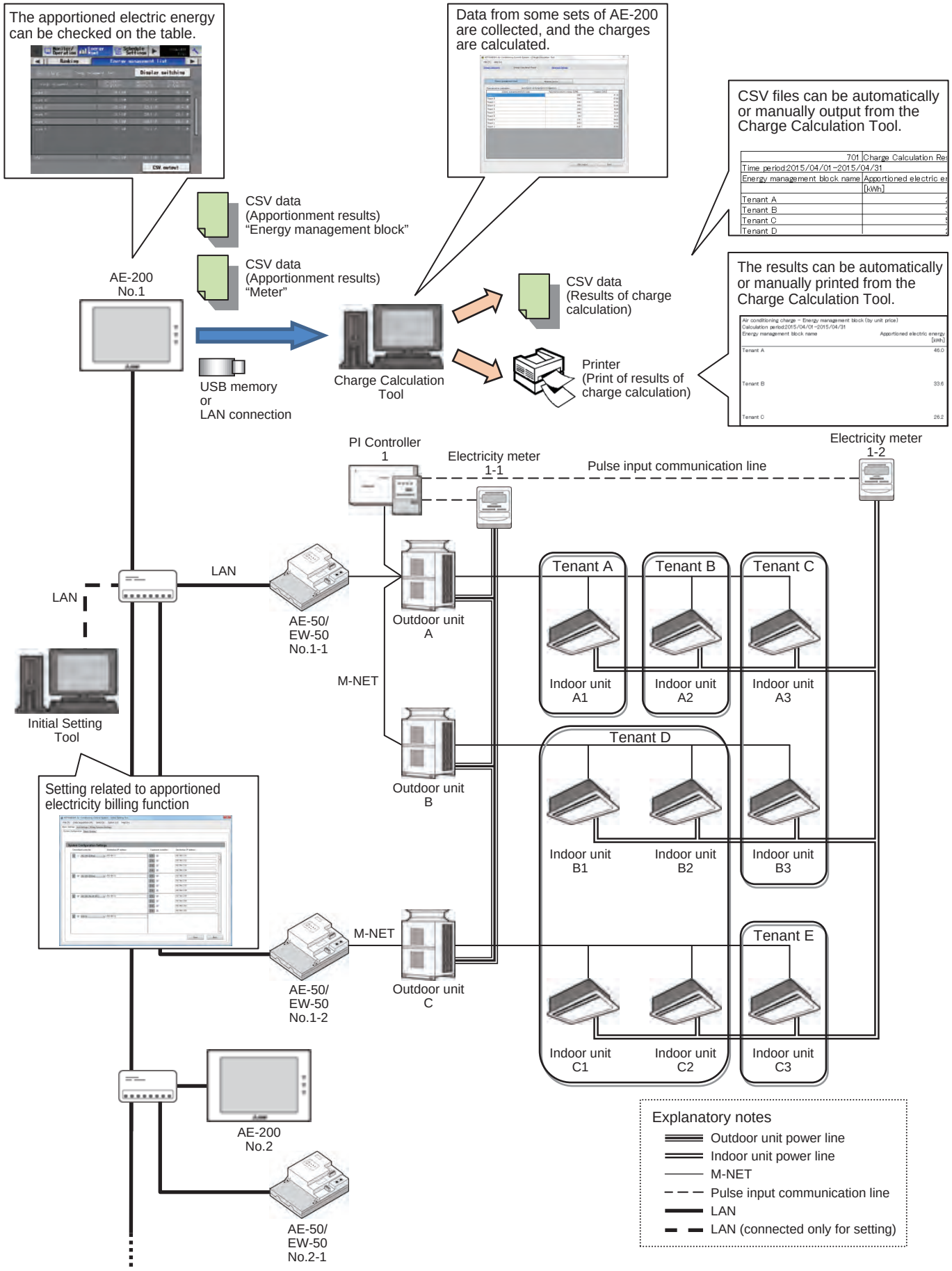
- This system is designed to estimate the electric energy consumed by air conditioners. Therefore, **the function cannot be used for trading and certification defined by the Measurement Act (based on measurement).**
  Also, the electricity meters cannot be used for trading certificates because they count electricity through pulse conversion.
- It is not a system that measures the electric energy consumed by each air conditioner directly at the power supply point (nor an equivalent system).
- Since the function apportions electric energy based on the operation conditions of air conditioner indoor units, the power consumption may vary depending on the outdoor unit configuration and operation conditions even if the indoor units were operated for the same time.
  (The apportioned electric energy may be different from that measured by the electricity meter installed for each air conditioner.)
- Current is being applied to air conditioners even while they are stopped. The electricity will be apportioned as standby electricity even if the air conditioners are not used.
- The electric energy, water usage and gas usage are captured through pulse conversion. The performance and accuracy depend on the meters. Therefore, we do not have any responsibility for them.
- The charge to each tenant (energy management block) is calculated by rounding down to the indicated digit for each unit price. Therefore, the calculated charge may differ from the charge for overall power consumption.
- If a time lag occurs, errors will be caused in the apportionment results. Periodically set the clock to the right time on AE-200.
  (Even if the clock on AE-50/EW-50 is set, the time will be overwritten by the time on AE-200.)

Remarks

- ○ The apportioned electricity billing function to be used on AE-200 main unit is applicable to Ver. 7.23 or later.
- ○ When the apportioned electricity billing function on AE-200 main unit and TG-2000A are used simultaneously, the following restrictions are imposed.
  1) Use Ver. 6.60 or later of TG-2000A.
  2) Do not use the apportioned electricity billing function of TG-2000A.
- ○ For the billing by TG-2000A, see the Instruction Book for TG-2000A.
- ○ If the apportioned electricity billing function on AE-200 main unit is used, the M-NET (outdoor units and indoor units) cannot be connected to AE-200. To connect them, an expansion controller is required.
- ○ The PI controller (recommended) and AE-50/EW-50 with built-in pulse input (PI) can be used to capture electric energy data to be used by the apportioned electricity billing function on AE-200 main unit. AE-200 with built-in pulse input (PI) and PLC software for electric amount count cannot be used.
- ○ Electric energy data must be captured to each AE-200 system. Capture the electric energy data to each AE-200 system by the PI controller (recommended) or AE-50/EW-50 with built-in pulse input (PI).

[15. Apportioned Electricity Billing Function]

The image of the system configuration is shown below.



<1> Functions of devices

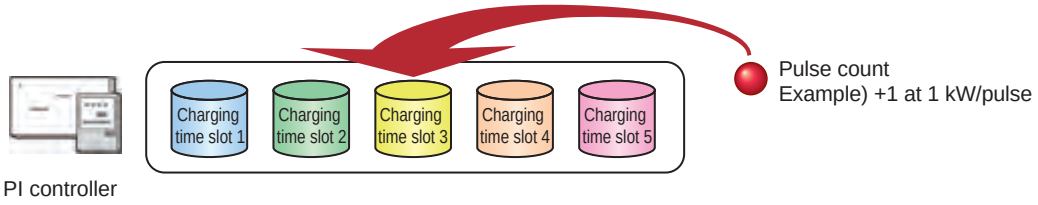
Below are given brief descriptions of the major devices used by the apportioned electricity billing function explained in this section.
The details are explained in each item.

① Electricity meter with pulse oscillator

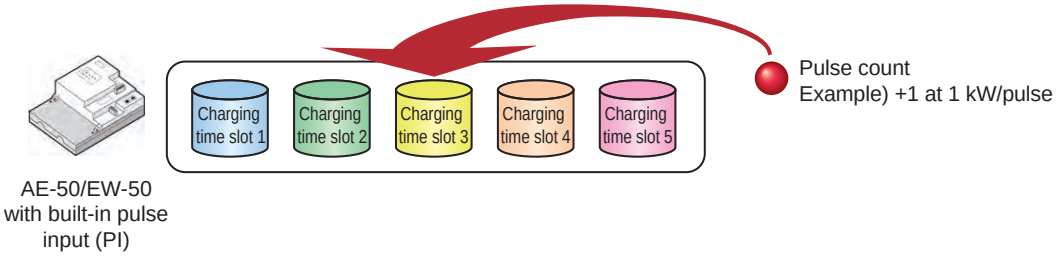
The electricity meter with pulse oscillator is used to output pulses according to the power consumed by air conditioners. There are some pulse units (weight), such as 1 kWh/pulse and 0.1 kWh/pulse. (1 kWh/pulse or less is recommended.)
This electricity meter is required when the electric energy measurement method or meter pulse count (direct reading) method is used.
It is not required for the electric energy manual input method.
* If an electricity meter without pulse oscillator is used, it is necessary to install a pulse detector.

② PI controller (PAC-YG60MCA)

The PI controller is a device to send the pulses output from the meters to AE-50/EW-50. It integrates the measurement in each of the time slots of unit prices 1 to 5.
Up to 4 electricity meters with pulse oscillator can be connected to one PI controller.



AE-50/EW-50 has a built-in pulse input (PI) function, and up to 4 electricity meters with pulse oscillator can be connected to one set of AE-50/EW-50 as to the PI controller.
When AE-50/EW-50 with built-in pulse input (PI) is used, pulses cannot be obtained during power interruption in AE-50/EW-50 and software updating, and the measured electric energy may be different from the actual value. Accordingly, the measurement by PI controller is recommended.
When using AE-50/EW-50 with built-in pulse input (PI), ensure that the customer understands the above restriction.



Up to 20 PI controllers can be connected to one AE-200 system, and up to 15 PI controllers can be connected to one set of AE-50/EW-50. When AE-50/EW-50 with built-in pulse input (PI) is used, it is counted as one PI controller.

Remarks

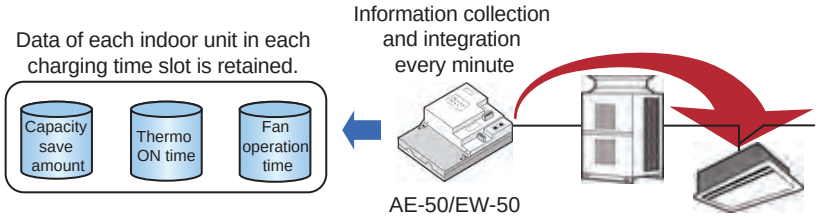
○ The apportioned electricity billing function of AE-200 cannot use the PLC software for electric amount count.

③ AE-50/EW-50

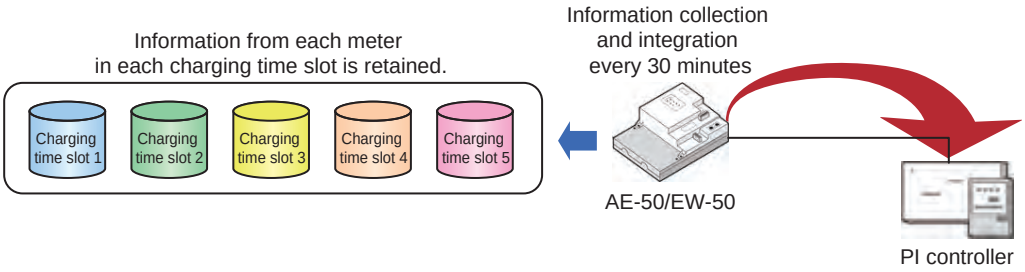
AE-50/EW-50 monitors the operation amounts of indoor units every minute and retains the data in each charging time slot.

There are the following three operation amounts.

① Capacity save amount
② Thermo ON time
③ Fan operation time



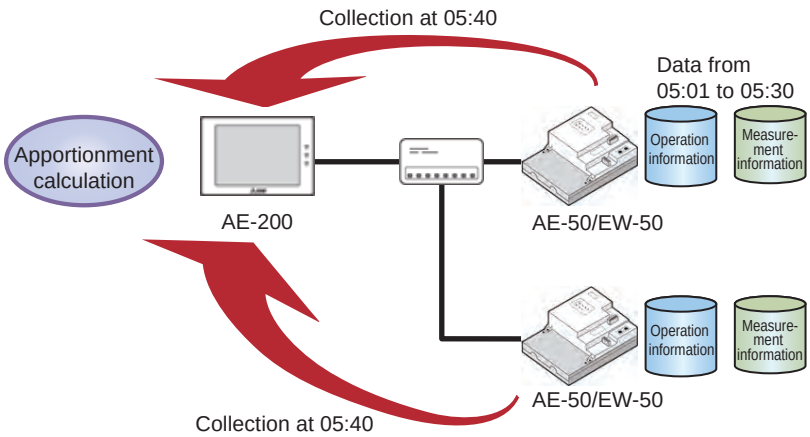
AE-50/EW-50 monitors the information on integrated values of electric energy in the PI controller every 30 minutes (XX:00 and XX:30) and retains the data in each charging time slot.



④ AE-200

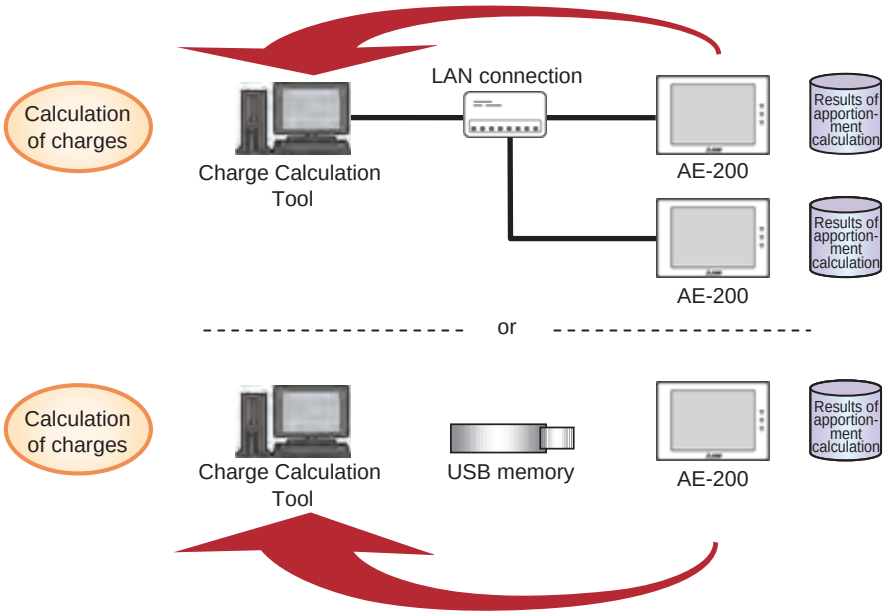
AE-200 collects the operation information and measurement information for 30 minutes from AE-50/EW-50 at 10 and 40 minutes past the hour and apportions the electric energy.
It calculates the electric energy consumption from XX:31 to XX:00 at 10 minutes past the hour and that from XX:01 to XX:30 at 40.
The electric energy or apportionment parameter can be displayed in the energy management list after 0:15 on the day after the adjustment date in each month.
When the apportioned electricity billing function is used on AE-200 main unit, the M-NET of AE-200 cannot be used.

Example: Apportionment calculation at 05:40

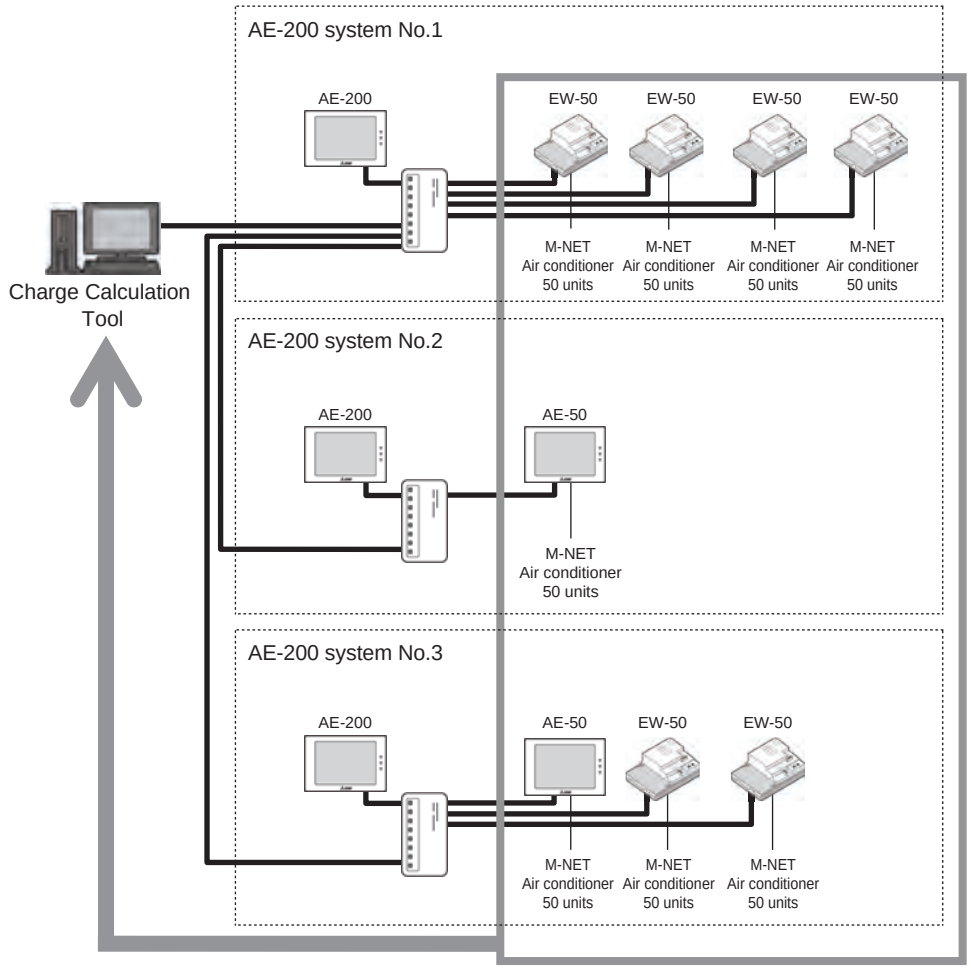


⑤ Charge Calculation Tool

The Charge Calculation Tool is dedicated to AE-200/AE-50/EW-50.
It can display and print the charge to each energy management (billing) block of tenant and output the data to a CSV file using the results of apportionment of electric energy by AE-200.
It can display the values not only of electric energy consumed by air conditioners, but also of the values measured by electricity meters, gas meters and water meters, calculate the charges for them, print the data and output CSV files.
The Charge Calculation Tool is supplied with the "Charge" license.



The charges for 40 sets of AE-50/EW-50 in all (up to 2000 air conditioners) can be calculated collectively.



In this example of configuration, 8 sets of AE-50/EW-50 are connected in all.

The charges to other 32 sets can be calculated simultaneously.

⑥ Initial Setting Tool

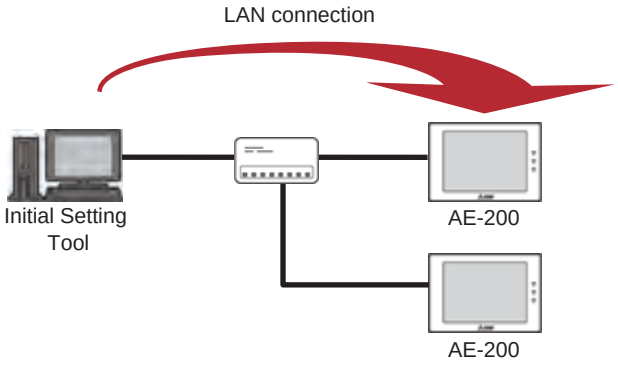
The Initial Setting Tool is dedicated to AE-200/AE-50/EW-50.

The apportioned electricity billing function conditions are set with the Initial Setting Tool.

The setting data created by the Initial Setting Tool is loaded to AE-200/AE-50/EW-50 from the personal computer through LAN.

Up to 40 sets of AE-50/EW-50 can be initialized collectively.

The Initial Setting Tool is supplied with the "Charge" license.



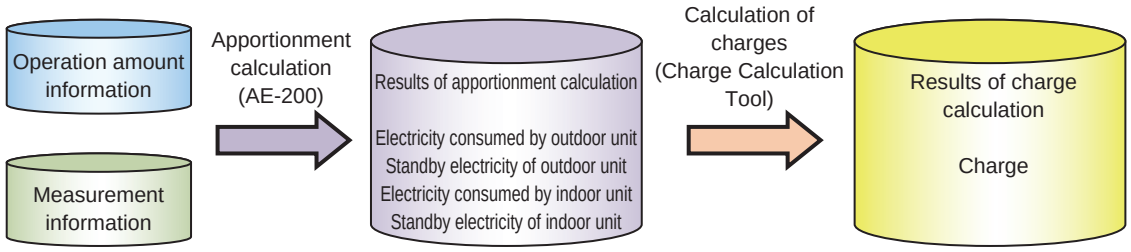
<2> Definitions of terms

The major terms related to the apportioned electricity billing function are defined below.

① Electricity meter measurement (with meters) method

The electric energy consumed by each of outdoor and indoor units is apportioned according to the ratio of use of the indoor unit.

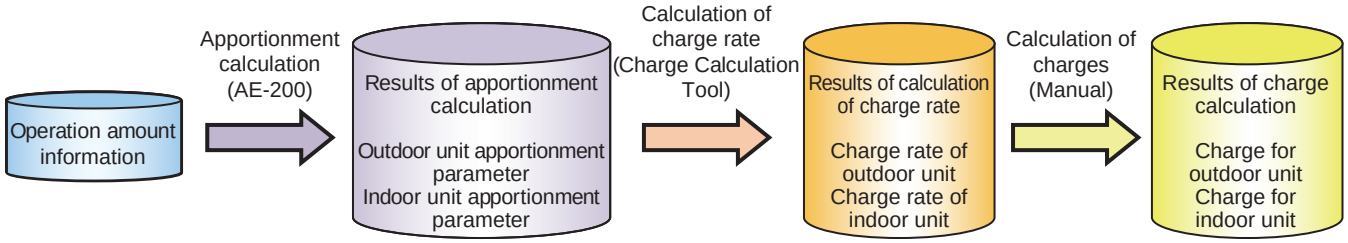
The PI controller or AE-50/EW-50 with built-in pulse input (PI) integrates the electric energy pulses output from the electricity meter with pulse oscillator by unit price.



② Electric energy manual input (without meters) method

The charge rate of each of outdoor and indoor units is determined.

The charge can be determined by separately multiplying the electric energy and unit price by the charge rate.



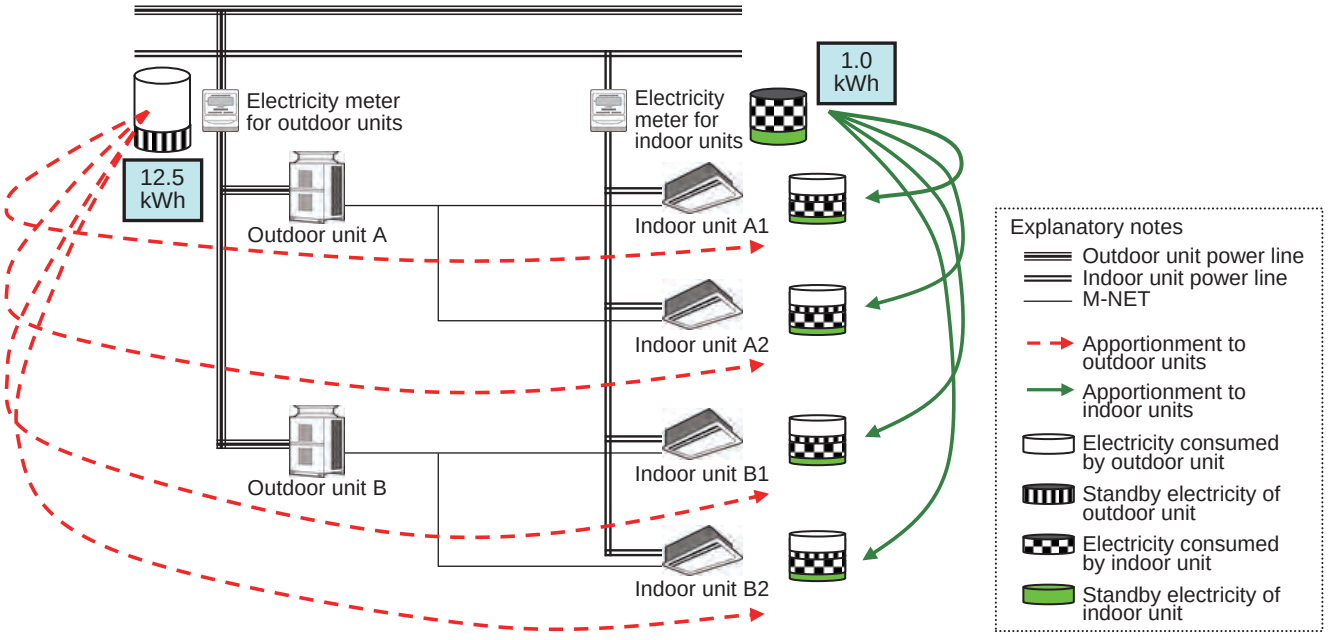
The apportionment parameter is determined by the rated capacity and operation time of indoor unit and used as the basis of calculation of the ratio to the total electricity used by all blocks. The apportionment parameter is used for reference for calculation of the charge rate.

③ Apportionment of electric energy

The electric energy consumed by each of outdoor and indoor units is determined according to the ratio of use of the indoor unit.

For example, in the case of the following configuration, the electricity meter for outdoor units measures the electric energy consumed by the outdoor units A and B and apportions the energy to each indoor unit.

The electricity meter for indoor units measures the electric energy consumed by the indoor units A1, A2, B1 and B2 and apportions the energy to each indoor unit.



④ Charges
Charges for electricity, gas and water actually consumed by air conditioners and tenants
The charges can be output to a printer and to a CSV file.
The charges can be calculated by the following three methods.

● Calculation on adjustment date (automatic calculation)
The charges are automatically calculated by the Charge Calculation Tool connected with AE-200 main unit through LAN.
The monthly and daily charges can be calculated.
Daily: The charge for each utility in the previous day is automatically calculated at 5:00 am.
Monthly: The charge for each utility in one month is automatically calculated at 5:00 am on the day after the adjustment date registered in the Charge Calculation Tool.
The adjustment date can be selected from two types, end of month and designated date. For the designated date, 29, 30 and 31 cannot be designated.
The adjustment results can be output to a printer and/or a CSV file.

Remarks

○ Prepare a personal computer (Charge Calculation Tool) meeting the following requirements.
- The personal computer and AE-200 must be connected through LAN.
- The personal computer must be on and not in the standby or sleep mode at the time (5:00 am) at which the data is automatically output.
  In the case of a personal computer which must be logged in, the personal computer must have been logged in.
- The printer must be on at the time (5:00 am) at which the data is automatically output (only when the data must be printed).
- The Charge Calculation Tool must not be started before the time (5:00 am) at which the data is automatically output.

○ When using the automatic calculation, observe the following instructions.
- Set the clocks of the personal computer and AE-200 to the right time about once a month to avoid time lag between them.
  The clocks of AE-50/EW-50 are automatically synchronized with the time in AE-200.
- Some unauthorized operations may be caused while the personal computer is running for a long time. Periodically restart the personal computer.
- Periodically replenish the printer with paper to prevent running out of paper. (Only when the data must be printed)

● Calculation of charges in specified period (manual calculation by obtaining data through LAN)
The charges are calculated with AE-200 main unit and the Charge Calculation Tool connected through LAN.
It is unnecessary to connect AE-200 and personal computer through LAN except when the charges are calculated.
The charges in any desired period of 62 days before the previous day (including the previous day) can be calculated.

● Calculation of charges in specified period (manual calculation by obtaining data from USB)
The charges are calculated by using the CSV file of apportionment calculation results output to an USB memory from AE-200 main unit.
The data for 62 days from the previous day (including the previous day) can be output to an USB memory. The charges in the specified period are calculated from the CSV file containing the data in the period.

⑤ Charging time slot

One day can be divided into up to 10 time slots, and the unit prices in these time slots can be selected from 5 unit prices according to operation amounts and measured values to change the charge unit prices in the morning, afternoon, overtime work hours and weekend.

Since the unit price can be set for each meter unit (kWh, MJ, m^3, -- (no unit specified)), the charge can be determined precisely by each meter. The unit prices (yen/meter unit) are common to the weeks, seasons and specific days.

One charging time slot setting can be made on one AE-200 system, and one charge unit price (** yen/kWh) setting can be made by the Charge Calculation Tool. Different settings for meters or tenants cannot be made.

Therefore, when the charge unit prices of all buildings are the same although the charging time slots vary by building (AE-200 system), the charges to the buildings can be collectively calculated by the Charge Calculation Tool.

Example of setting with charge unit price divisions 1 to 3 and 5

Charge setting	From 0:00 to 7:00	From 7:00 to 12:00	From 12:00 to 15:00	From 15:00 to 23:00	From 23:00 to 24:00
	Charge unit price 1 = Midnight charge (15 yen/kWh)	Charge unit price 2 = Daytime charge (20 yen/kWh)	Charge unit price 3 = Peak charge (25 yen/kWh)	Charge unit price 2 = Daytime charge (20 yen/kWh)	Charge unit price 1 = Midnight charge (15 yen/kWh)

⑥ Weekly charge

The charging time slots for 7 days from Monday to Sunday can be set. This enables, for example, to charge for electricity used only for overtime hours on weekdays and charge for entire day on holidays.

Monday	From 0:00 to 7:00	From 7:00 to 17:00	From 17:00 to 24:00
	Charge unit price 1 = Charged (15 yen/kWh)	Charge unit price 2 = Not charged (0 yen/kWh)	Charge unit price 1 = Charged (15 yen/kWh)
Tuesday	From 0:00 to 7:00	From 7:00 to 17:00	From 17:00 to 24:00
Wednesday	From 0:00 to 7:00	From 7:00 to 17:00	From 17:00 to 24:00
Thursday	From 0:00 to 7:00	From 7:00 to 17:00	From 17:00 to 24:00
Friday	From 0:00 to 7:00	From 7:00 to 17:00	From 17:00 to 24:00
Saturday	From 0:00 to 24:00		
	Charge unit price 1 = Charged (15 yen/kWh)		
Sunday	From 0:00 to 24:00		

⑦ Seasonal charge

The weekly charges can be managed in two categories, for example, seasonal charge in summer and regular charge.

This enables, for example, to charge at a higher unit price than the regular price in the summer months (July to September) because the electricity usage for air conditioning is high in these months.

Example of setting of seasonal charge periods

Seasonal setting	From Jan. 1 to June 30	From July 1 to Sept. 30	From Oct. 1 to Dec. 31
	Regular charge	Seasonal charge	Regular charge

⑧ Specific days

50 specific days can be set in the range of the next 24 months (including the current month) separately from the above weekly charge and seasonal charge.

Set five specific day patterns, and assign the patterns to up to 50 days.

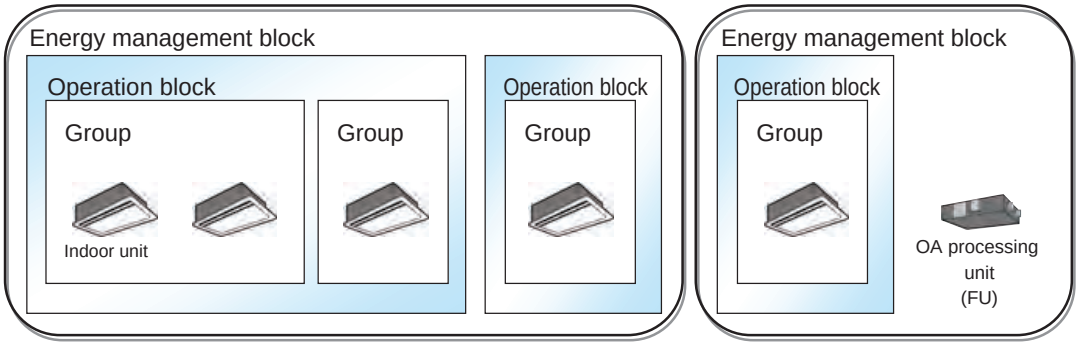
This enables, for example, to apply the holiday charge to holidays.

Pattern A	From 0:00 to 24:00
	Charge unit price 1 = Charged (15 yen/kWh)

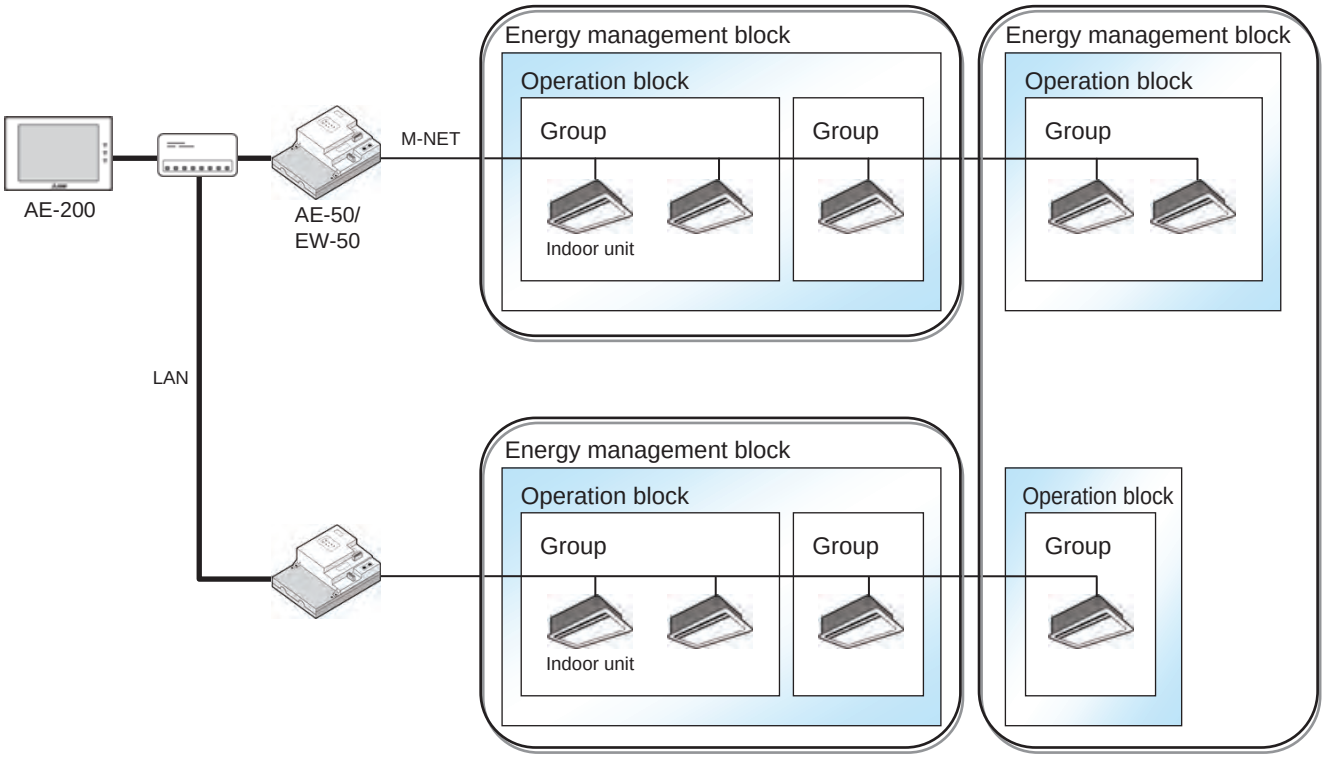
⑨ Energy management block

Unit for displaying and outputting the results of calculation of electric energy and charges. Up to 200 energy management blocks can be set per one AE-200 system.
Set each tenant as an energy management block.
* The block corresponds to the Charge Block on TG-2000A.

One energy management block consists of one or more operation blocks, one or more OA Processing units in FU attribute or both.



Energy management blocks controlled by more than one expansion controller (AE-50/EW-50) can be created.

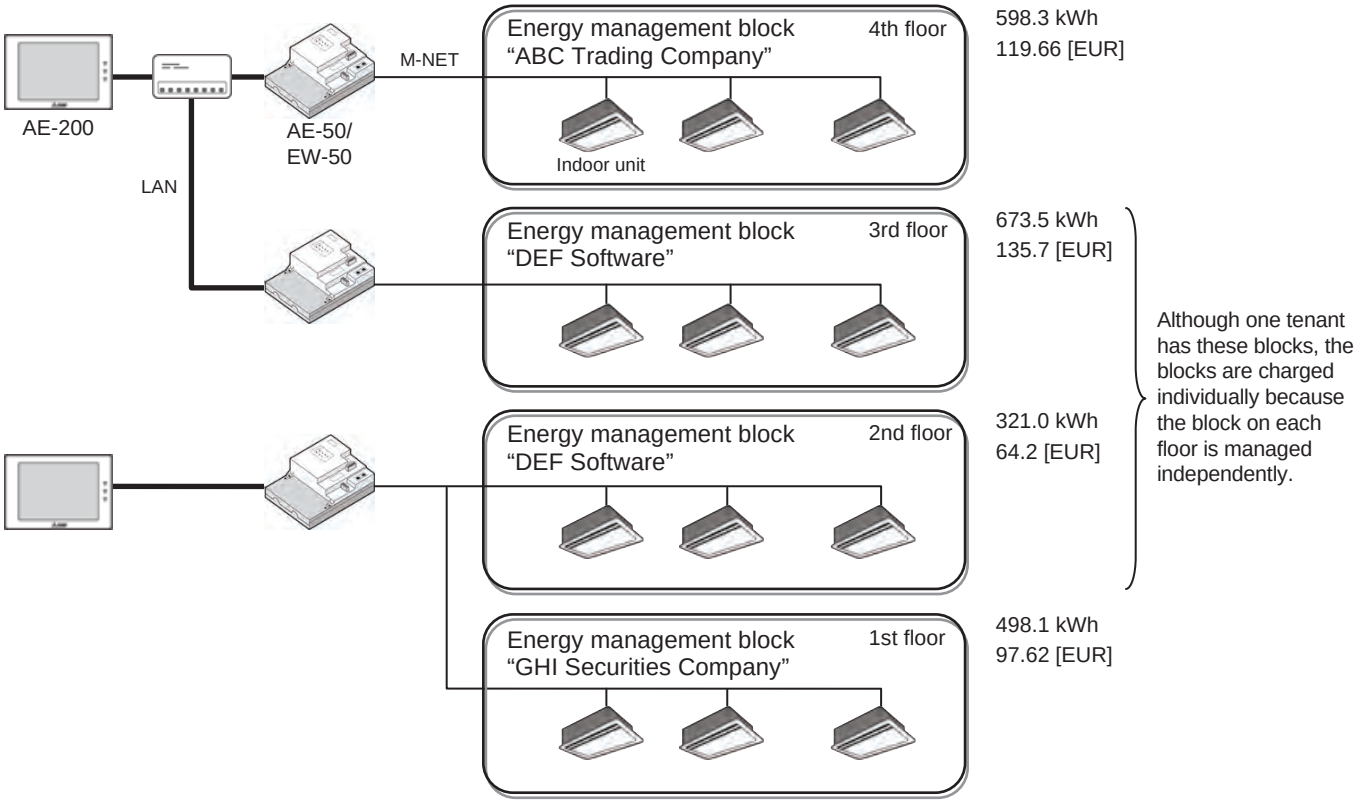


The following table shows whether groups, operation blocks and energy management blocks under more than one controller can be set.

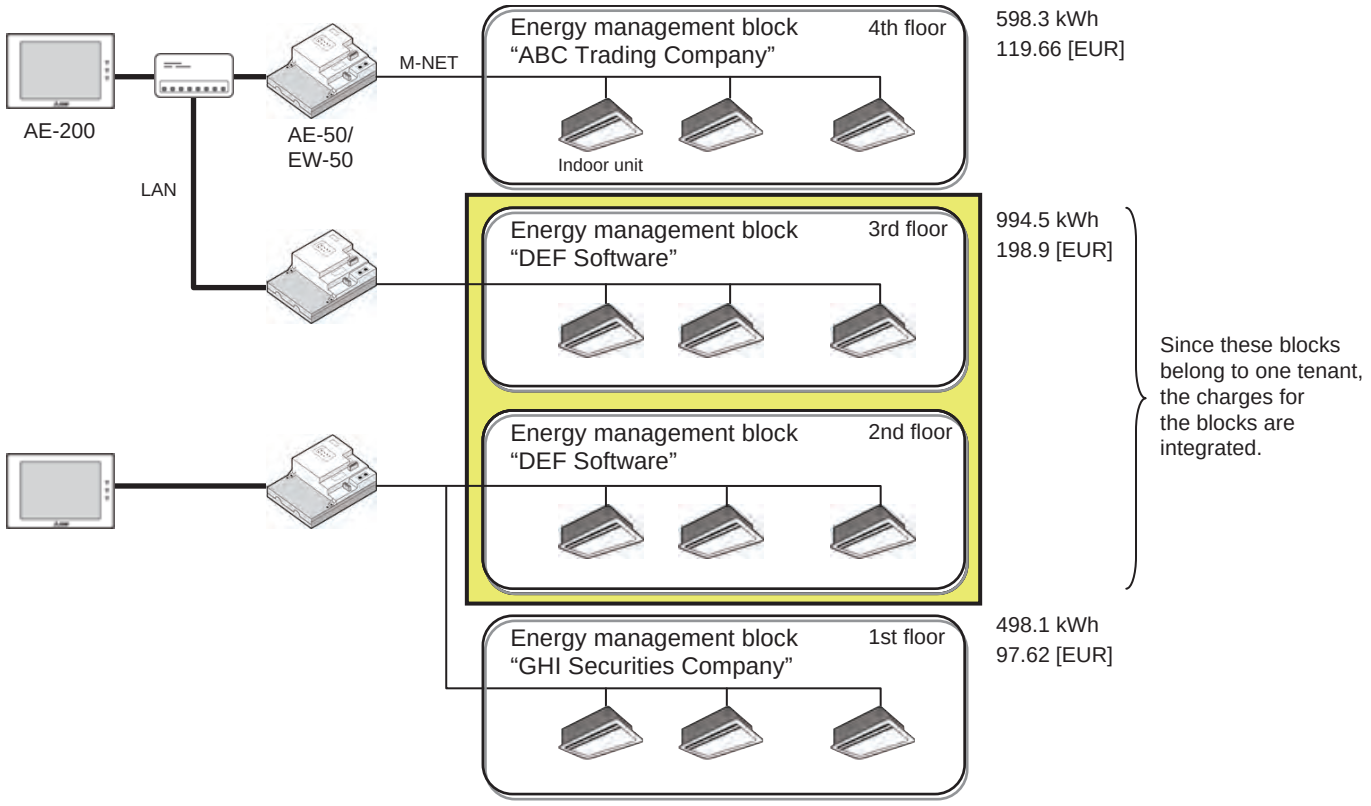
Type \ Controller	Under more than one AE-200	Under more than one expansion controller (AE-50/EW-50)
Group	×	×
Operation block	×	×
Energy management block	Possible only for Charge Calculation Tool	○

It is possible to connect energy management blocks having the same name to the Charge Calculation Tool so that a tenant having blocks under more than one AE-200 can be charged.
(It is possible to determine whether or not to integrate the blocks by the relevant setting item of the Charge Calculation Tool.)

[When energy management blocks having the same name are not integrated]



[When energy management blocks having the same name are integrated]



<3> Operations which can be performed by apportioned electricity billing function

The apportioned electricity billing function on AE-200 main unit, the standard energy management function (without "Charge" license) and the apportioned electricity billing function of TG-2000A are compared in the following table to explain the differences among these functions.

○: Possible ×: Impossible

No.	Function		AE-200 Apportioned electricity billing function	AE-200/AE-50/EW-50 Energy management function (without "Charge" license)	(Reference) TG-2000A Apportioned electricity billing function
1	Max. number of units in 1 system	Centralized controller	4 sets of AE-50/EW-50	Each set of AE-200/AE-50/EW-50	40 sets of AE-200/AE-50/EW-50, AG-150A/GB-50ADA or G-50A/GB-50A
		Air conditioner	200 units	50 units	2000 units
		Meter	20 PI controllers (80 meters) * 15 units per set of AE-50/EW-50 (60 meters) * At least 1 unit per AE-200 system (at least 2 units when also electricity for indoor units is measured)	15 PI controllers (60 meters) * At least 1 unit per AE-200/AE-50/EW-50	80 PI controllers (320 meters) or 5 units of PLC software for electric amount count (160 meters) * At least 1 unit per TG-2000A system (at least 2 units when also electricity for indoor units is measured)
2	Max. number of sets for charge calculation		40 sets of AE-50/EW-50 (Charge Calculation Tool)	×	40 sets of AE-200/AE-50/EW-50, AG-150A/GB-50ADA or G-50A/GB-50A
3	Apportionment calculation	Calculating equipment	AE-200	AE-200/AE-50/EW-50	TG-2000A
		Method	Electric energy measurement (with meters) method Electric energy manual input (without meters) method	Electric energy measurement (with meters) method	Electric energy measurement (with meters) method Electric energy manual input (without meters) method
		Intended units	Outdoor units (consumed and standby electricity) Indoor units (consumed and standby electricity) *1, 2	Outdoor units (consumed and standby electricity)	Outdoor units (consumed and standby electricity) Indoor units (consumed electricity) *3
		Cycle	Every 30 min	Every 30 min	Every day
4	Calculation of charges	Calculating equipment	Charge Calculation Tool	×	TG-2000A
		Intended units	● Charge to each energy management block ● Charge by each meter		● Charge to each charge block ● Charge by each meter
		Basic charge	×		○
		Period (for automatic calculation)	Every day or month		Every month
		Max. period for manual calculation	For 62 days before current day		For 122 days before current day
		Outputting method	Printing and outputting to CSV file (Charge Calculation Tool)		Printing, outputting to CSV file and sending e-mail
		Assist in preparing bills	× *4		○
5	Graphical display of apportioned electric energy		○ Energy management and ranking	○ Energy management and ranking	×
		Data updating timing	15 past the hour	15 past the hour	
6	Display of apportioned electric energy in table		○ Energy management list	×	○ Air conditioning charge
		Data updating timing	0:15 on day after adjustment date		4:40 on day after adjustment date
		Data retention period	25 months		3 months
7	Output of apportioned electric energy for billing to CSV file		○	×	○
		Type of output and retention period	Every month: 25 months before current month Every day: 62 days before current day Every 30 min: Past 3 days from current day		Every month: 3 months before current month Every day: 122 days before current day
8	Operation of personal computer for billing		● In the case of automatic output, the personal computer must be constantly on. ● In the case of manual output, start the personal computer only when calculating the charges.	×	● The dedicated personal computer must be constantly on.
9	Apportionment to K-control models		×	×	○ *5
10	Apportionment to heat storage models		×	×	○

No.	Function	AE-200 Apportioned electricity billing function	AE-200/AE-50/EW-50 Energy management function (without "Charge" license)	(Reference) TG-2000A Apportioned electricity billing function
11	Destination to save apportioned electric energy data	● Stored in AE-200 main unit ● Stored in AE-50/EW-50 as backup data ● Retained in the personal computer with Charge Calculation Tool after calculation of charges	● Retained in each of AE-200/ AE-50/EW-50 main units	● Retained in TG-2000A

*1: Energy management blocks controlled by several sets of AE-50/EW-50 can be set.
*2: Energy management blocks controlled by several sets of AE-200 cannot be set.
However, if energy management blocks having the same name are set in more than one set of AE-200, the electric energy (in the case with meters) or charge rate (in the case without meters) of the energy management blocks can be totalized by the Charge Calculation Tool.
*3: Charge blocks under some sets of AE-200/AE-50/EW-50 can be set.
*4: If necessary, separately prepare the bill for each energy management block (Charge Block) based on the output results of charge calculation.
*5: K-control models can be connected only to AG-150A/GB-50ADA or G-50A/GB-50A.

The differences between electric energy measurement (with meters) method and electric energy manual input (without meters) method are shown in the comparison table.

No.	Function		Electric energy measurement (with meters) method	Electric energy manual input (without meters) method
1	AE-200 Max. number of units in 1 system	AE-50/EW-50	4 units	4 units
		Air conditioner	200 units	200 units
		Meter *1, 2	20 PI controllers (80 meters) *3 * 15 units per set of AE-50/EW-50 (60 meters)	–
2	Max. number of Charge Calculation Tools		Up to 40 sets of AE-50/EW-50 (Up to 2000 air conditioners)	Up to 40 sets of AE-50/EW-50 (Up to 2000 air conditioners)
3	Apportionment calculation	Intended units	Outdoor units (consumed and standby electricity) Indoor units (consumed and standby electricity)	Outdoor units (consumed electricity) Indoor units (consumed electricity)
		Cycle	Calculation of electric energy from XX:31 to XX:00 at 10 min past the hour and that from XX:01 to XX:30 at 40 min past the hour.	Calculation of electric energy from XX:31 to XX:00 at 10 min past the hour and that from XX:01 to XX:30 at 40 min past the hour.
4	Calculation of charges	Intended units	● Charge to each energy management block	● Charge rate of outdoor unit in each energy management block ● Charge rate of indoor unit in each energy management block
		Period (for automatic calculation)	Every day or month Calculated at 5:00 am	Every day or month Calculated at 5:00 am
		Max. period for manual calculation	For 62 days before current day	For 62 days before current day
5	AE-200 Display on AE-200 LCD screen (energy management list)	For air conditioners	● Electric energy consumed by each energy management block	● Outdoor unit apportionment parameter for each energy management block ● Indoor unit apportionment parameter for each energy management block
		For meters	● Value measured by each meter	–
		Data retention period	For 25 months before current month	For 25 months before current month
6	Display on personal computer with Charge Calculation Tool	For air conditioners	● Electric energy consumed by each energy management block ● Charge to each energy management block	● Charge rate of outdoor unit in each energy management block ● Charge rate of indoor unit in each energy management block
		For meters	● Value measured by each meter ● Charge by each meter	–
		Data retention period	25 months	25 months
7	AE-200 Output of CSV file	Results of apportionment calculation	Every month: 25 months before current month Every day: 62 days before current day Every 30 min: Past 3 days from current day	Every month: 25 months before current month Every day: 62 days before current day Every 30 min: Past 3 days from current day
8	Output of CSV file of Charge Calculation Tool	Results of charge calculation (for automatic calculation)	Daily or monthly Calculated and output at 5:00 am	Daily or monthly Calculated and output at 5:00 am
		Results of charge calculation (for manual calculation)	Designated period (for 62 days before current day)	Designated period (for 62 days before current day)
9	Print of data of Charge Calculation Tool	Results of charge calculation (for automatic calculation)	Daily or monthly Calculated and output at 5:00 am	Daily or monthly Calculated and output at 5:00 am
		Results of charge calculation (for manual calculation)	Designated period (for 62 days before current day)	Designated period (for 62 days before current day)

*1: The PLC software for electric amount count cannot be used.
*2: The PI controller can be connected for any purpose other than the apportioned electricity billing function.
*3: 15 units (60 meters) per set of AE-50/EW-50. When AE-50/EW-50 with built-in pulse input (PI) is used, it is counted as one PI controller.

<4> Models to which apportioned electricity billing function is applicable

The models to which the apportioned electricity billing function is applicable are shown below.

○: Supported *1
△: Apportioning function not available (direct meter reading)
×: Not supported

		Apportioned electricity billing function		Remarks
		Systems where electric energy is metered (with-metering-device method)	Systems where electric energy is entered manually (no-metering-device method)	
City Multi *2	Y series	○	○	
	HP series	○	○	
	R2 series	○	○	
	WY series	○	○	
	WR2 series	○	○	
	HVRF series	○	○	Power consumptions of outdoor units will be apportioned based on Thermo-ON time, even when the setting is made to apportion it based on the capacity save amount.
Inverter of packaged air conditioner for equipment (PEAV)		○	○	Separately install an electricity meter for packaged air conditioner for equipment.
Packaged air conditioner for equipment (PEV/PFV)		△	○	
LOSSNAY		○	○	
OA Processing Unit		○	○	Power for humidifying is not taken into account.
A-control unit (Mr. Slim) *3*4		○	○	Separately install an electricity meter for Mr. Slim air conditioner.
AK-control unit (Mr. Slim) *3		○	○	Apportioned in the same manner as to City Multi.
Room air conditioner (RAC)		△	×	
Housing air conditioner (HAC)		△	×	
Air To Water Booster unit/Air To Water HEX unit		○	○	
HWHP (CAHV/CRHV/QAHV)		×	×	
Chiller unit		×	×	
General equipment via DIDO controller		△	×	
General equipment via indoor unit free contact		△	×	Cannot be monitored or operated with the AE-200/AE-50/EW-50.
K-control unit		×	×	Cannot be monitored or operated with the AE-200/AE-50/EW-50.

*1: Some types of this model of units do not support the apportioned electricity billing function.
*2: REPLACE Multi is included.
*3: Only when the following M-NET adapter is used, apportionment is possible by setting the apportioning mode for the outdoor unit electric energy to [Capacity save amount].
PAC-SJ10MA, PAC-SJ18MA, PAC-SJ31MA
When other model of M-NET adapter is used in the system, set the apportioning mode to [Thermo-ON time] or [Fan operation time].
*4: Select one of the “Power source of A-control unit” setting options from [Same power source (O/U - I/U)] and [Separated power source (O/U- I/U)].

<5> Number of connected units and M-NET address

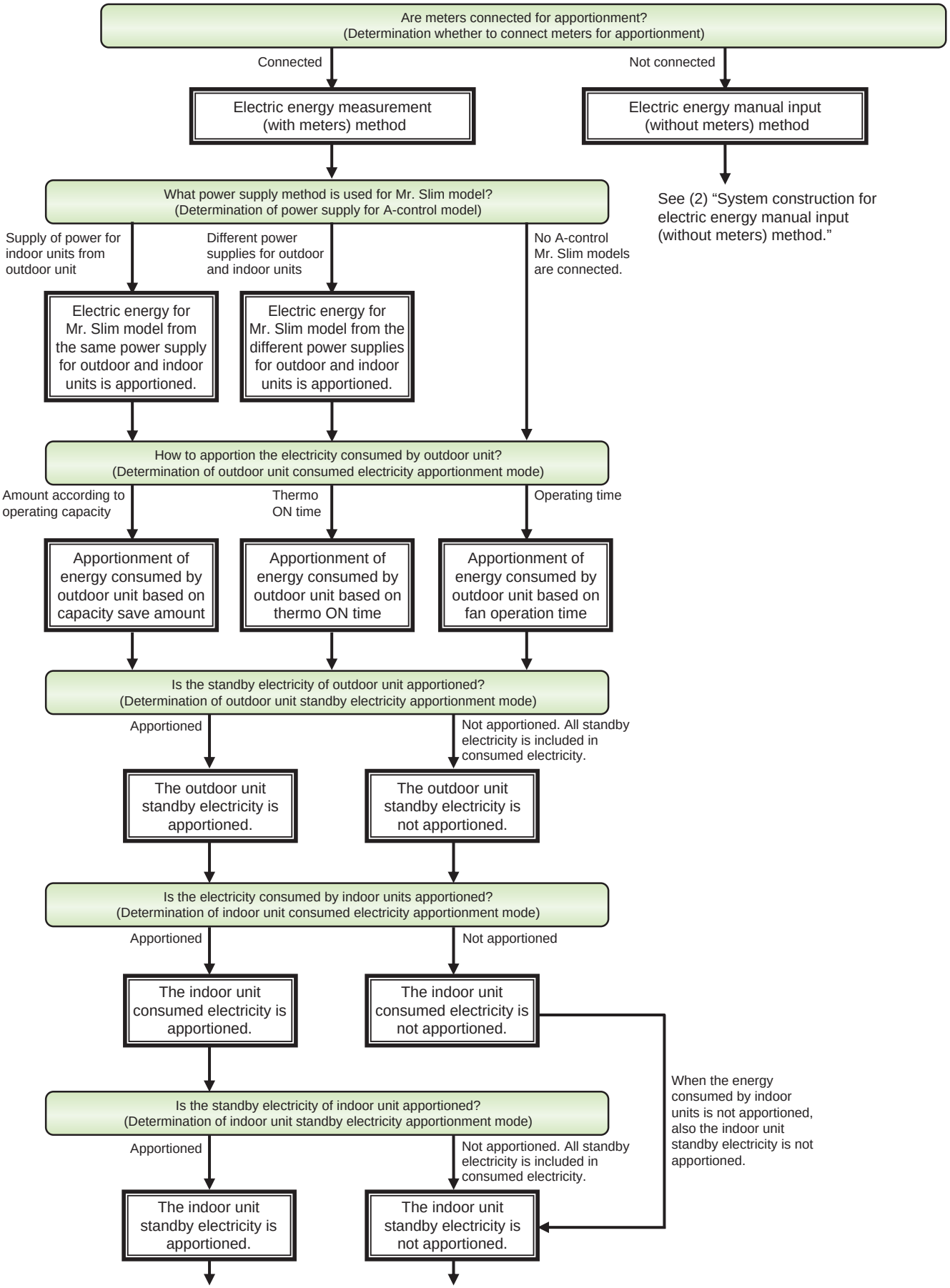
The number of connected air conditioners and the M-NET address range are shown below.

<table>
<tr><th colspan="2">Unit or controller</th><th>Symbol</th><th>M-NET max. number of connected units *1</th><th>M-NET address setting range</th><th>Method for determining M-NET address</th></tr>
<tr><td>City Multi Equipment PAC indoor unit</td><td rowspan="5">Base unit, sub-unit</td><td>IC</td><td rowspan="5">50</td><td rowspan="5">01 to 50</td><td rowspan="5">Assign the lowest address to the indoor unit to be used as the base unit in a group, and assign sequential numbers as the addresses to the indoor units in the same group.</td></tr>
<tr><td>Mr. Slim (Adapter for M-NET connection)</td><td>AIC</td></tr>
<tr><td>Room air conditioner (Interface for M-NET control)</td><td>RA</td></tr>
<tr><td>Free Plan Lossnay/ OA processing unit</td><td rowspan="2">LC, FU</td></tr>
<tr><td colspan="2">LOSSNAY · OA processing unit</td></tr>
<tr><td rowspan="2">M-NET remote controller</td><td>Main remote controller</td><td rowspan="2">ME</td><td rowspan="2">100</td><td>101 to 150</td><td>Set to the lowest indoor unit address in the same group + 100.</td></tr>
<tr><td>Sub remote controller</td><td>151 to 200</td><td>Set to the address of the main remote controller + 50.</td></tr>
<tr><td colspan="2">MA remote controller</td><td>MA</td><td>–</td><td>–</td><td>It is unnecessary to set the address. (However, when two remote controllers are used for operation, a main-sub selector switch setting is required.)</td></tr>
<tr><td colspan="2">Outdoor unit
City Multi, equipment PAC outdoor unit</td><td>OC</td><td rowspan="5">50</td><td>51 to 100</td><td>Set to the lowest indoor unit address among the indoor units in the refrigerant system + 50.</td></tr>
<tr><td rowspan="4">Auxiliary outdoor unit</td><td>Sub outdoor unit</td><td>OS1, OS2</td><td rowspan="4">52 to 100</td><td rowspan="3">Set to the outdoor unit address in the refrigerant system + 1.</td></tr>
<tr><td>Heat storage unit</td><td>TU</td></tr>
<tr><td>Distribution controller (Base unit)</td><td>BC</td></tr>
<tr><td>Distribution controller (Sub unit 1, sub unit 2)</td><td>BS1, BS2</td><td>Set to the lowest indoor unit address among the indoor units connected to the distribution sub controller + 50.</td></tr>
<tr><td rowspan="5">System controller</td><td>Group remote controller</td><td>GR</td><td rowspan="4">4</td><td rowspan="4">201 to 250</td><td>Set to the lowest No. of group to be controlled + 200.</td></tr>
<tr><td>System remote controller</td><td>SR, SC</td><td>Set any address in the range shown left.</td></tr>
<tr><td>ON/OFF remote controller</td><td>ANR</td><td>Set to the lowest No. of group to be controlled + 200.</td></tr>
<tr><td>Schedule timer</td><td>ST</td><td>Set any address in the range shown left.</td></tr>
<tr><td>Integrated monitoring system</td><td>AE-200/AE-50/ EW-50</td><td>–</td><td>0 (201 to 250)</td><td>Set to 0. However, when the BM adapter is connected, set any of them to 201 to 250.</td></tr>
</table>

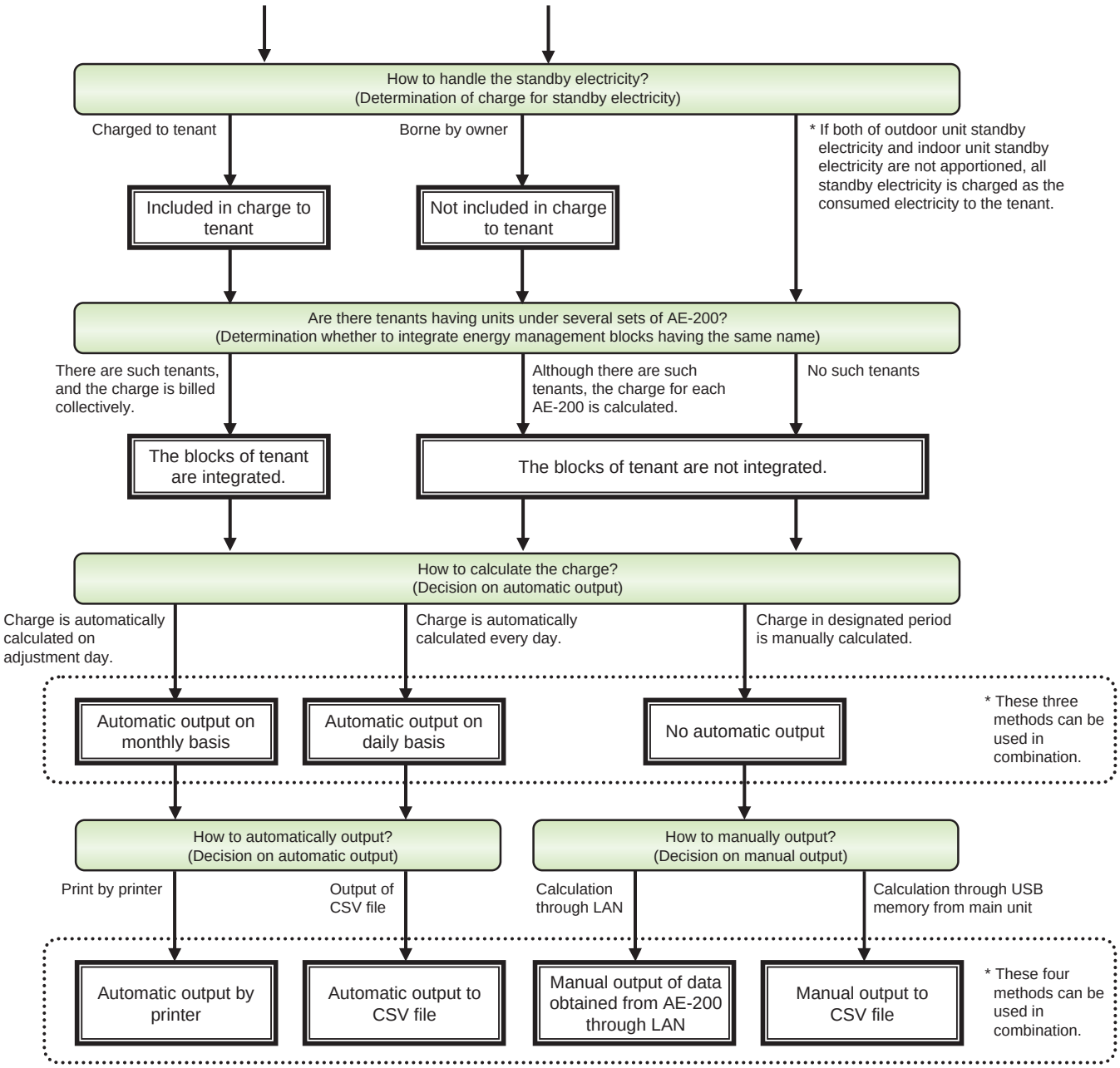
*1: The number of connected units may be restricted depending on the connected device. See the instruction manual for the connected device.

[2] System configuration

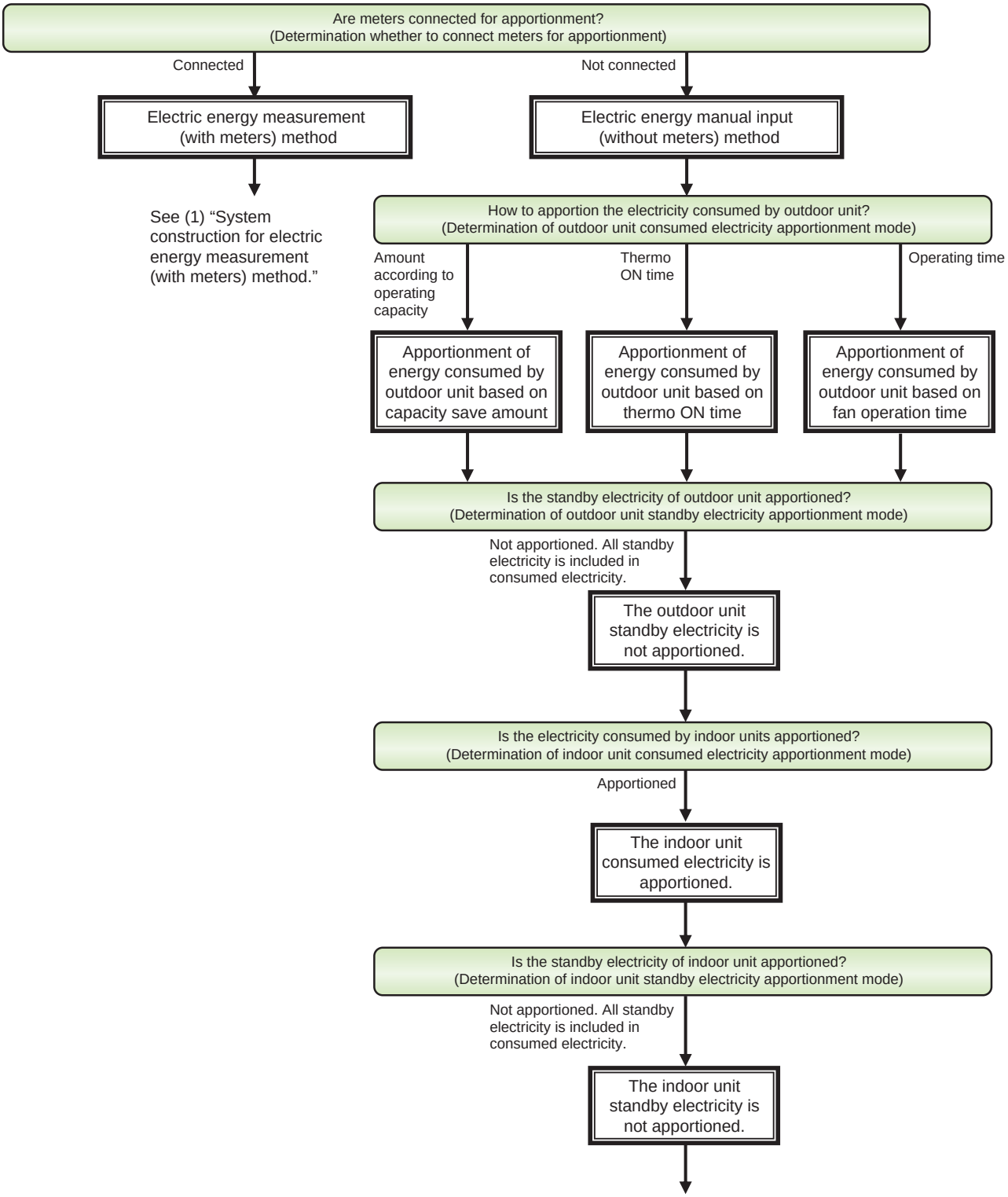
Information necessary for system configuration for the apportioned electricity billing function is explained in a flow chart.
(1) System configuration for electric energy measurement (with meters) method

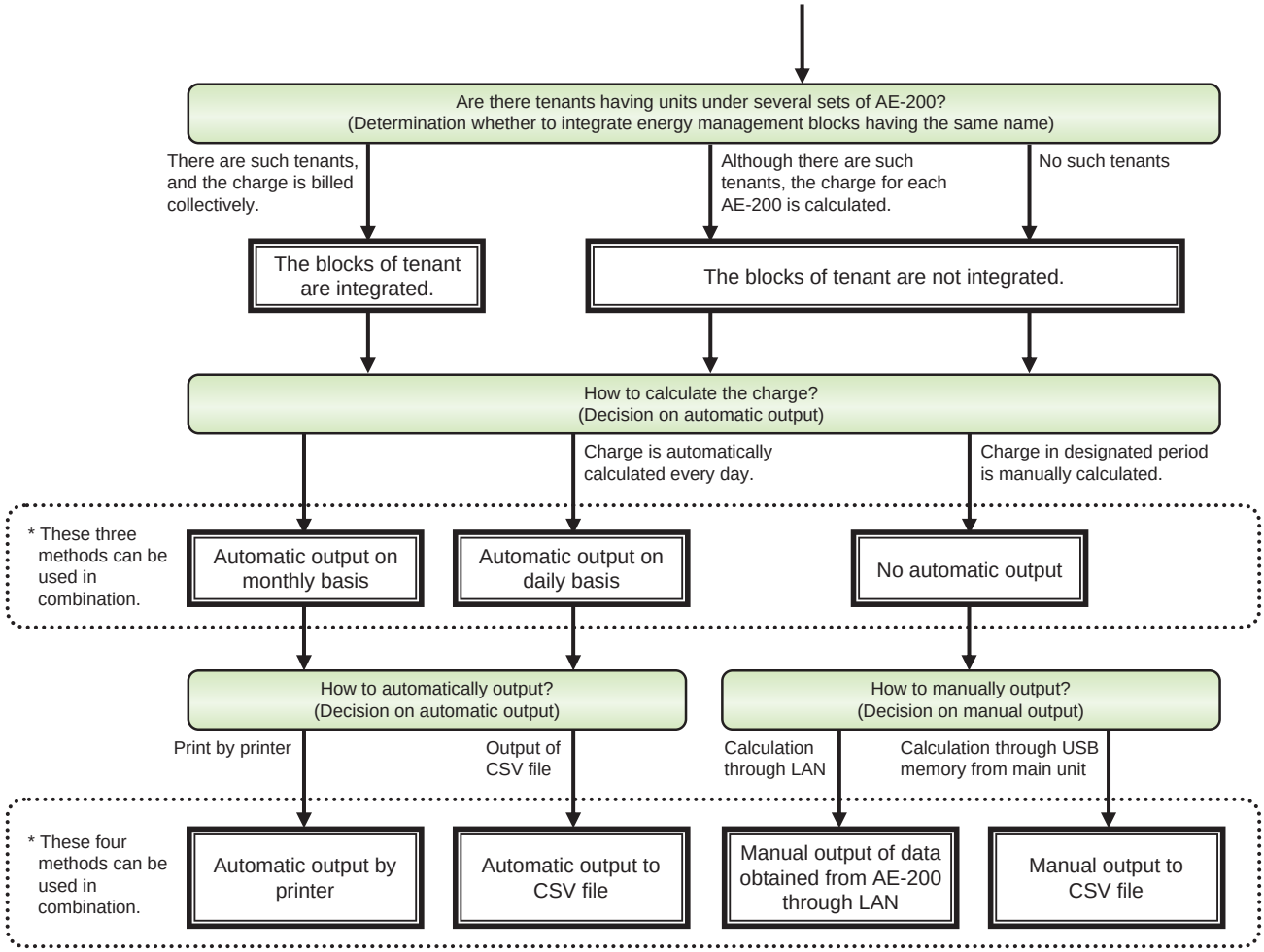


[15. Apportioned Electricity Billing Function]



(2) System construction for electric energy manual input (without meters) method

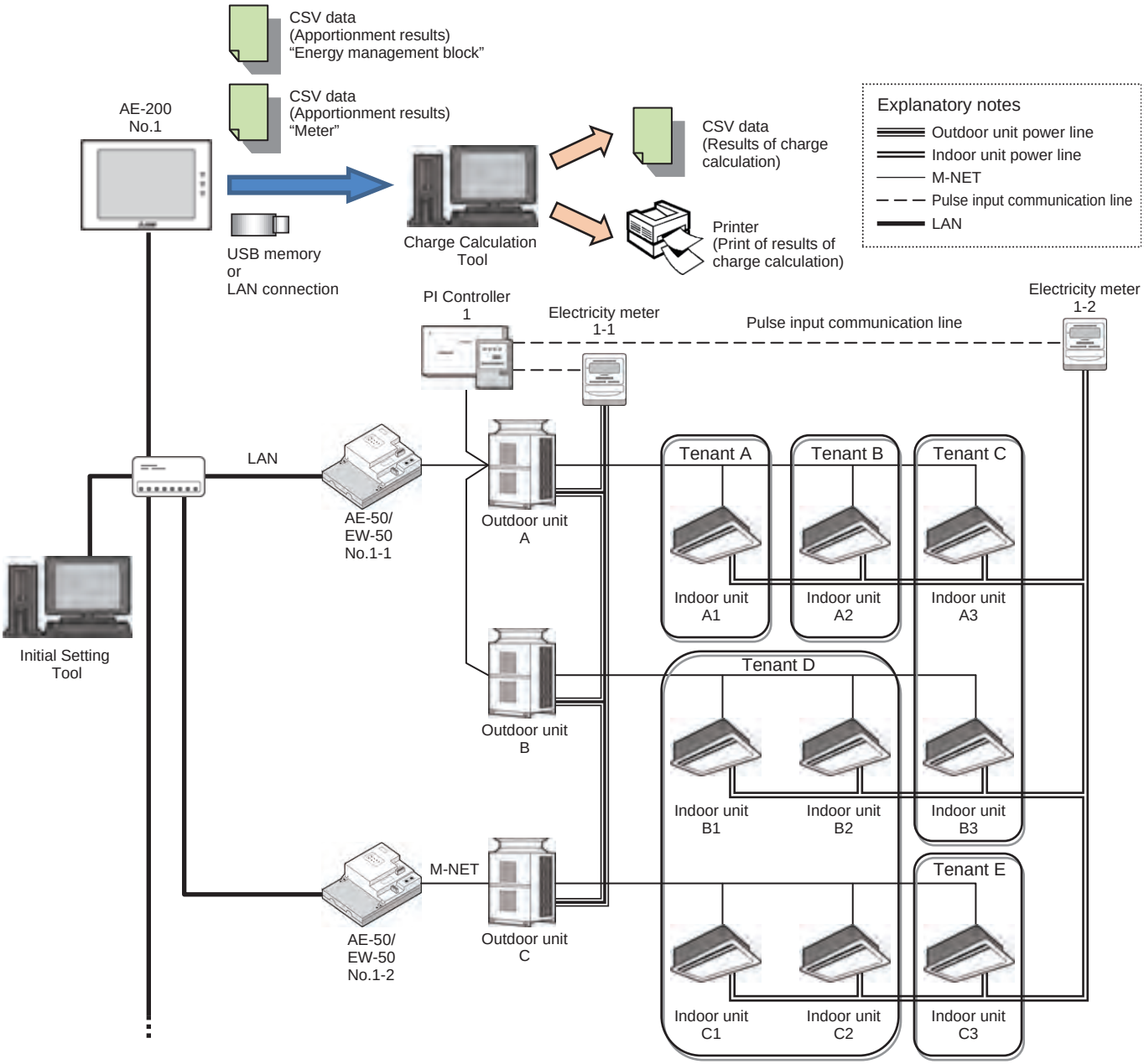



Are there tenants having units under several sets of AE-200?
(Determination whether to integrate energy management blocks having the same name)
There are such tenants, and the charge is billed collectively.
Although there are such tenants, the charge for each AE-200 is calculated.
No such tenants
The blocks of tenant are integrated.
The blocks of tenant are not integrated.
How to calculate the charge?
(Decision on automatic output)
Charge is automatically calculated every day.
Charge in designated period is manually calculated.
* These three methods can be used in combination.
Automatic output on monthly basis
Automatic output on daily basis
No automatic output
How to automatically output?
(Decision on automatic output)
How to manually output?
(Decision on manual output)
Print by printer
Output of CSV file
Calculation through LAN
Calculation through USB memory from main unit
* These four methods can be used in combination.
Automatic output by printer
Automatic output to CSV file
Manual output of data obtained from AE-200 through LAN
Manual output to CSV file

<1> Electric energy measurement (with meters) method

1. AE-50/EW-50 collects the operation amounts of air conditioners.
2. AE-50/EW-50 collects the electric energy data from the PI controller and the electricity meters connected to AE-50/EW-50 with built-in pulse input (PI).
3. AE-200 apportions the electric energy to the outdoor unit for each indoor unit and each indoor unit every 30 minutes. The results of apportionment are stored as monthly data for 25 months, daily data for 62 days and data obtained every 30 minutes for 4 days.
4. AE-50/EW-50 receives the results of apportionment of electric energy from AE-200 and backs up the data.
5. The results of apportionment are displayed in bar graphs on the energy use status and ranking screens for energy management function by AE-200/AE-50/EW-50. The electric energy (kWh) is displayed in the energy management list on AE-200.
6. The results of apportionment can be checked on the energy management list on the LCD screen of AE-200 and output to a CSV file.
7. The charge is calculated with the Charge Calculation Tool by multiplying the unit price (1 to 5) in each time slot based on the electric energy apportioned to each energy management block. The charge can be calculated also based on the value measured by each meter.
   The calculation results can be displayed, printed and output to a CSV file.

① Connection diagram



* The power lines other than those for outdoor units and indoor units are omitted.
* When the electricity meters do not have pulse oscillators, pulse detectors are required.

② Required devices

<table>
<tr><th>Device name (model name)</th><th>Manufacturer</th><th>Remarks</th></tr>
<tr><td>AE-200</td><td>Mitsubishi Electric Corporation</td><td></td></tr>
<tr><td>AE-50/EW-50</td><td>Mitsubishi Electric Corporation</td><td></td></tr>
<tr><td>PI controller
PAC-YG60MCA</td><td>Mitsubishi Electric Corporation</td><td>A device through which the pulses from the electricity meters are automatically introduced to AE-200/AE-50/EW-50.
Up to 4 meters can be connected to one PI controller.</td></tr>
<tr><td>Power supply unit
PAC-SC51KUA
Transmission booster
PAC-SF46EPA</td><td>Mitsubishi Electric Corporation</td><td>AE-50: When the PI controller, system remote controller, etc. are connected to the transmission line for centralized control, a power supply unit is required.
EW-50: When the power consumption factor of the PI controller, system remote controller, etc. connected to the transmission line for centralized control exceeds 6, a power supply unit is required.</td></tr>
<tr><td>"Charge" license</td><td>Mitsubishi Electric Corporation</td><td>The license must be registered in all sets of AE-200/AE-50/EW-50.
Register it in AE-50/EW-50 which do not have units to be subjected to apportionment under AE-200 system.</td></tr>
<tr><td>Initial Setting Tool</td><td>Mitsubishi Electric Corporation</td><td>This tool is used for initial setting.
It is supplied with the "Energy Management License Pack."</td></tr>
<tr><td>Charge Calculation Tool</td><td>Mitsubishi Electric Corporation</td><td>This tool is used for charge calculation.
It is supplied with the "Energy Management License Pack."</td></tr>
<tr><td>Pulse type electricity meter
(for outdoor units)</td><td>Commercially available product</td><td>For measurement of electric energy consumed by outdoor units.
For the specifications for electricity meter applicable to the PI controller, see the remarks on the pulse detector.
In a system that includes both the HVRF series of City Multi units and other series of City Multi units, use at least one electricity meter for each series.</td></tr>
<tr><td>Pulse type electricity meter
(for indoor units)</td><td>Commercially available product</td><td>For measurement of electric energy consumed by indoor units.
When the electric energy consumed by indoor units is not apportioned, it is not required.
For the specifications for electricity meter applicable to the PI controller, see the remarks on the pulse detector.
In a system that includes both the HVRF series of City Multi units and other series of City Multi units, use at least one electricity meter for each series.</td></tr>
<tr><td>Pulse detector</td><td>Commercially available product</td><td>Pulse width: 100 to 300 ms
Pulse unit: 0.1 kWh/pulse recommended
1.0 kWh/pulse recommended
* Required only when the electricity meters are not provided with pulse oscillators.</td></tr>
<tr><td>Personal computer</td><td>Commercially available product</td><td>A personal computer on which the Initial Setting Tool and Charge Calculation Tool are installed.
The hardware requirements for the personal computer are shown below.
<table>
<tr><th>Item</th><th>Requirement</th></tr>
<tr><td>CPU</td><td>1 GHz or more
(2 GHz or more recommended)</td></tr>
<tr><td>Memory</td><td>2 GB</td></tr>
<tr><td>Screen resolution</td><td>1024 × 768 or more</td></tr>
<tr><td>Operation environment</td><td>Windows7,
Windows8.1 (32 bit/64 bit)
Windows 10 (64 bit)
.NET Framework 4.5.2 or later</td></tr>
<tr><td>Built-in LAN port or LAN card</td><td>100BASE-TX or higher</td></tr>
<tr><td>Pointing device</td><td>Mouse, etc.</td></tr>
</table></td></tr>
<tr><td>Printer</td><td>Commercially available product</td><td>A printer is required to print the results of charge calculation from the Charge Calculation Tool.</td></tr>
<tr><td>USB memory</td><td>Commercially available product</td><td>An USB memory is required to obtain the CSV data (results of apportionment calculation).</td></tr>
<tr><td>LAN cable</td><td>Commercially available product</td><td rowspan="2">A LAN cable is required to connect AE-200, AE-50/EW-50 and personal computer.</td></tr>
<tr><td>Switching hub</td><td>Commercially available product</td></tr>
</table>

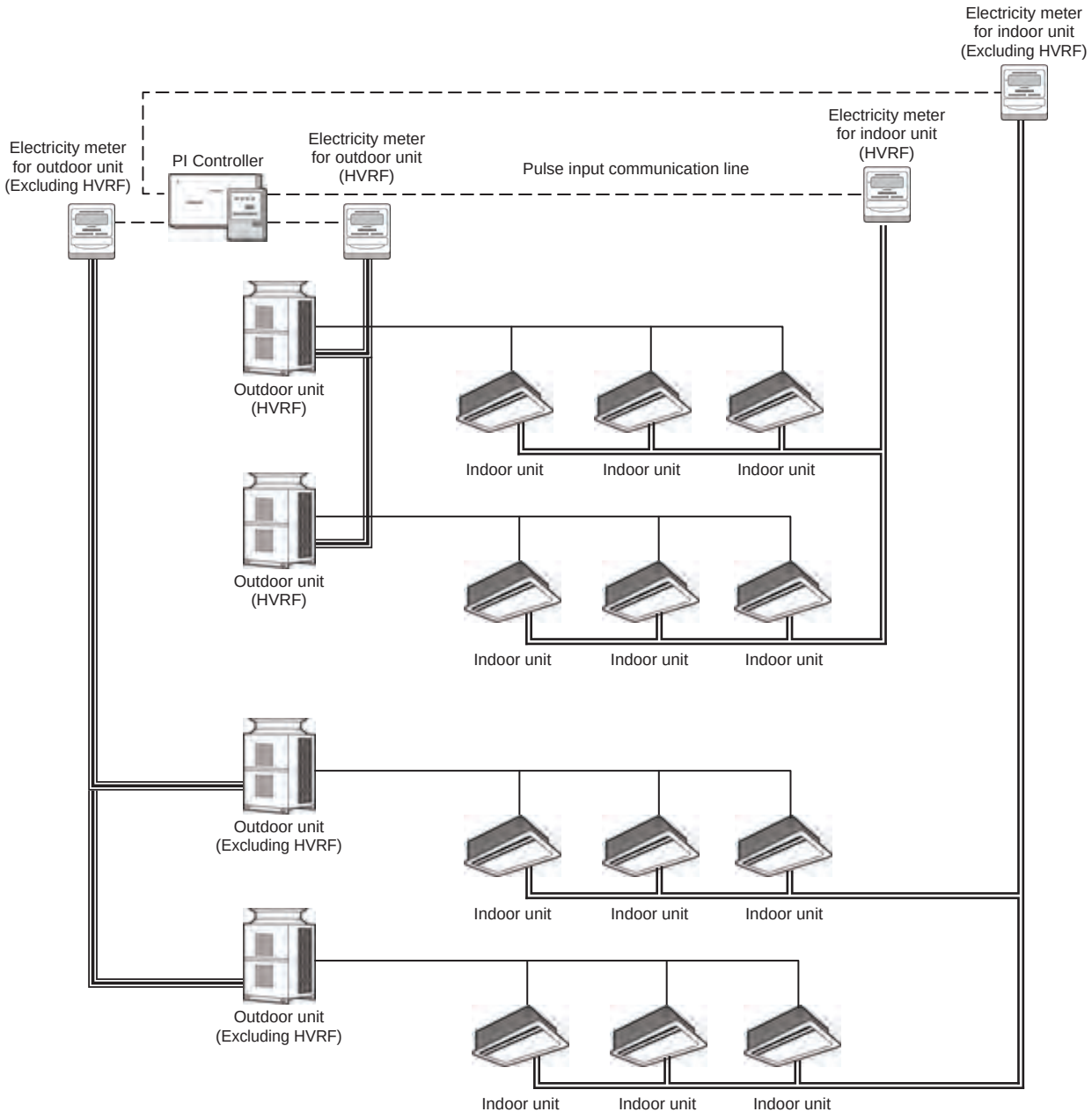
③ Required setting

Before setting the following items, complete the unit setting, network setting, license registration, group setting, operation block setting and measurement setting.

Classification of setting	Setting screen	Setting item	Description
AE-200	Maintenance Initial setting	License registration	Register the "Charge" license in all sets of AE-200/AE-50/EW-50.
		Unit information	The apportionment function of AE-200 is enabled.
Initial Setting Tool	Unit setting	Refrigerant system setting	Set the conditions of connection of outdoor units and indoor units to the refrigerant system.
		Energy management block setting	Set each tenant as an energy management block.
	Billing setting	Apportionment by connected meters	Set to “Connected.”
		A-control model power supply	Specify whether to use the same power supply or different power supplies for the outdoor units and indoor units of Mr. Slim model.
		Outdoor unit consumed electricity apportionment mode	Select one of the following three apportionment modes for outdoor units. ① Capacity save amount (operating ability) … Default ② Thermo ON time (time during which refrigerant is being fed) ③ Fan operation time (operating time)
		Outdoor unit standby electricity apportionment mode	Specify whether or not to apportion the standby electricity of outdoor units.
		Indoor unit consumed electricity apportionment mode	Specify whether or not to apportion the energy consumed by indoor units.
		Indoor unit standby electricity apportionment mode	Specify whether or not to apportion the standby electricity of indoor units. * This item can be set only when the indoor unit consumed electricity apportionment mode is “Apportion.”
	Outdoor unit setting		Input the following data on each of the outdoor units and sub outdoor units. ① Outdoor unit standby electricity (kW) * Standby electricity of 0.07 kW is recommended. However, for a model provided with two compressors in one outdoor unit address, set the standby electricity twice as high (0.140 kW).
	Indoor unit setting		Select the model of each indoor unit, and input the following data. ① Indoor unit cooling capacity (kW) ② Indoor unit fan power consumption (cooling) (kW) ③ Cooling unit standby electricity (kW) * Standby electricity of 0.005 kW is recommended. * When a model not included in the database in the Initial Setting Tool is used, see the catalog, and input the model name.
	Measurement setting		Set the following conditions. ① Correspondence between outdoor units and meters ② Correspondence between indoor units and meters
	Charge setting	Period of seasonal charge	Determine whether or not to apply two unit prices, for example, seasonal and regular prices in summer, and determine the periods.
		Weekly charge time	Predetermined 5 charge zones can be set in up to 10 time slots on each day of week. When the seasonal charge has been set, set the charge zones in each of the two periods. This setting is common to all energy management blocks and meters.
		Charge time on specific days	Set five charging time slot patterns, and the five patterns can be set on 50 days in the range from the current month to the 24th month.
		Adjustment date	Set the period for totalizing the data in one month on the energy management list.

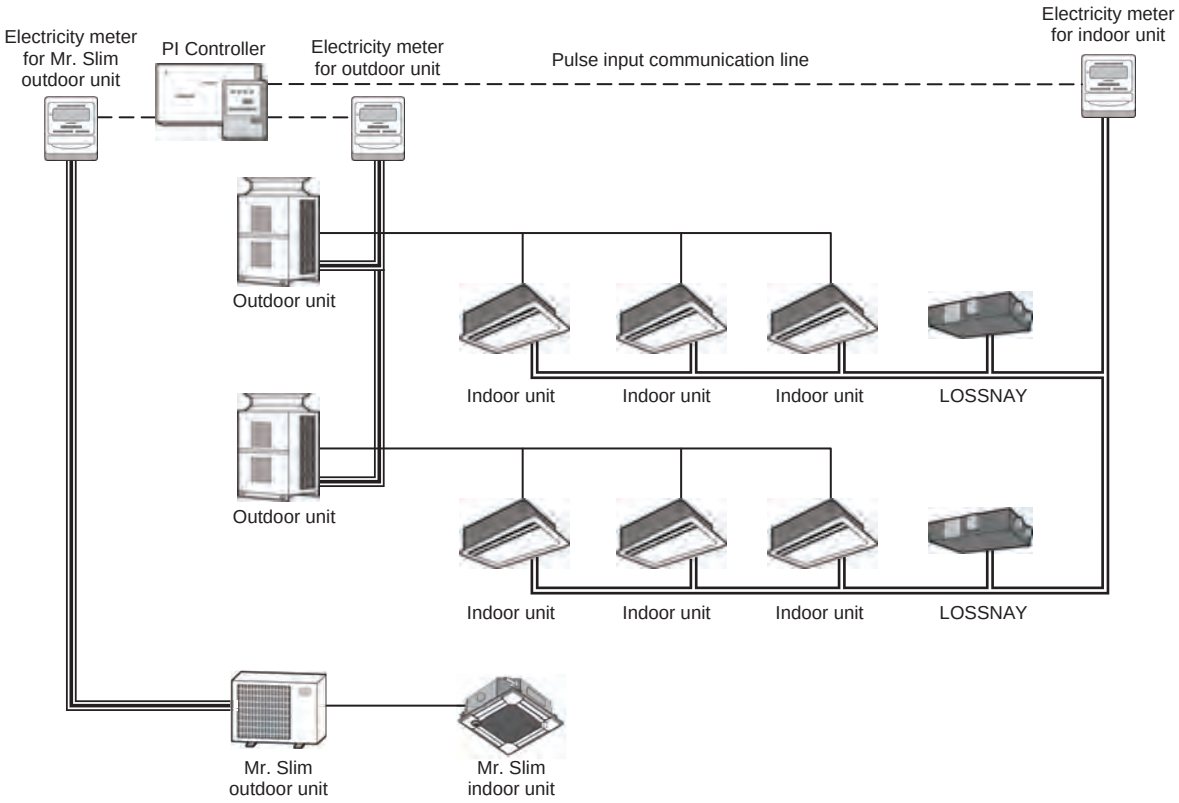
Classification of setting	Setting screen	Setting item	Description
Charge Calculation Tool	Detailed setting for charge calculation	Apportionment by connected meters	Set to “Connected.”
		Calculation of charge for standby electricity	Determine whether or not to charge for standby electricity. * When the price for standby electricity is not charged (not included in the charge), set the standby electricity apportionment mode in the Initial Setting Tool to “Apportion.”
		Currency unit	Set the currency unit and the number of decimals. The charges will be rounded down to the set number of decimals.
		Order of display of results of charge calculation	Set the sorting order of energy management blocks to be displayed on the screen of the Charge Calculation Tool, output to a CSV file and printed to “By No.” or “By name.”
		Integration of energy management blocks having the same name	Determine whether or not to integrate the results of calculation of charges to energy management blocks having the same name. When the air conditioners of one tenant are controlled under some sets of AE-200, the results of charge calculation can be integrated if the energy management blocks have the same name.
		Decimal marker for CSV file Separator for CSV file	Set the same decimal marker and separator as those for CSV file in AE-200.
		Charge unit price setting	Set up to five charge unit prices for each of electricity meters and other meters.
		Automatic output setting	Determine whether or not to automatically print or output a CSV file every day or month.
		Adjustment date setting	Set the date for automatic output of monthly data. The data will be automatically output on the day after the set date. * Set the same adjustment date as that set by the Initial Setting Tool.
		IP address setting	Set the IP address of AE-200 which will automatically output data.

④ When a system includes both the HVRF series and other series of City Multi units, install a separate electricity meter for each series.



⑤ Billing by apportionment to Mr. Slim models and LOSSNAY

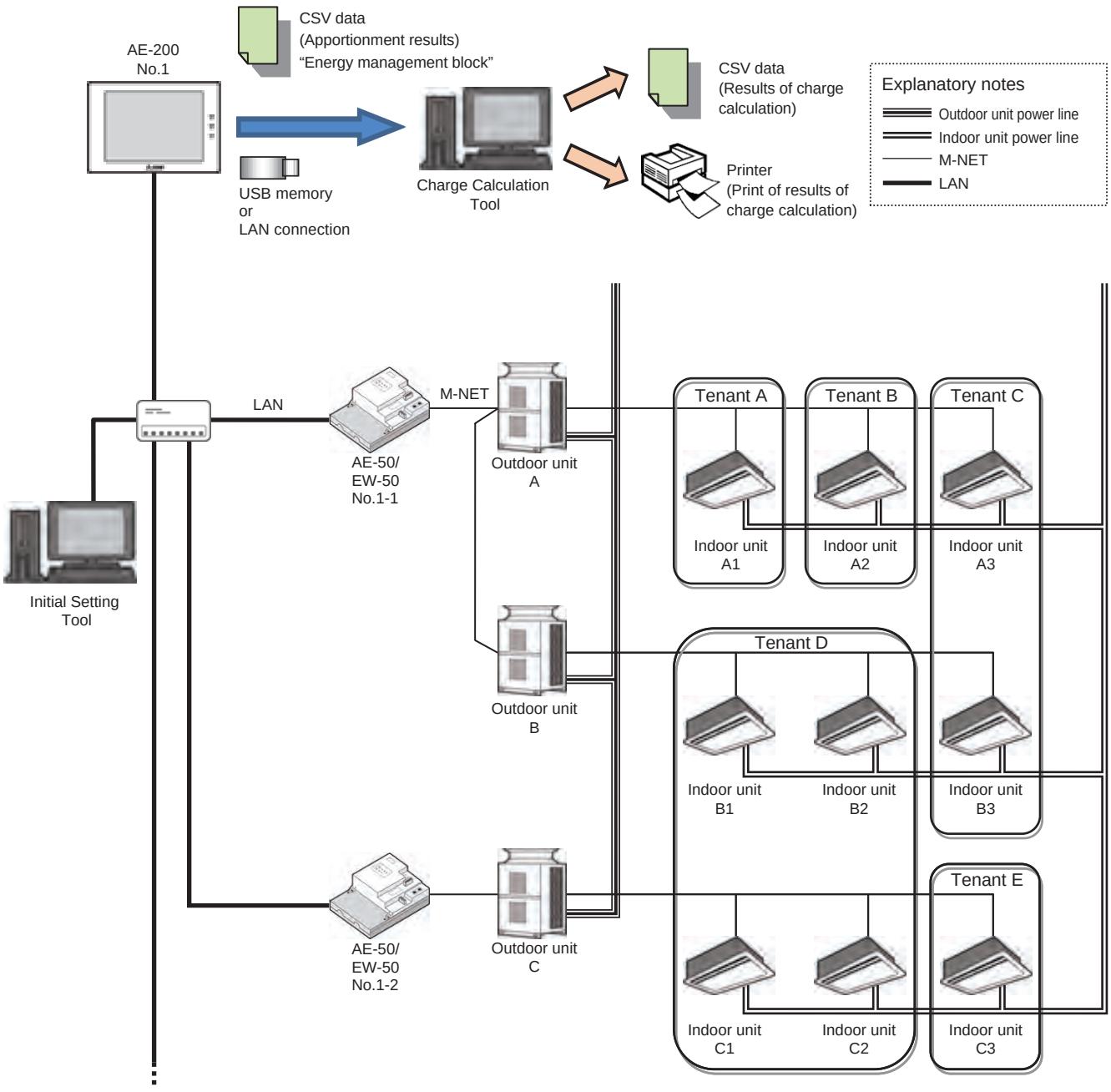
Since the charges for electric energy consumed by these units may not be precisely calculated owing to their energy-saving capabilities, it is recommended to install an electricity meter for outdoor unit of each model as shown below.



<2> Electric energy measurement (without meters) method

1. AE-50/EW-50 collects the operation amounts of air conditioners.
2. AE-200 calculates the apportionment parameters of outdoor unit for each indoor unit and indoor units every 30 minutes. The calculation results are stored as monthly data for 25 months, daily data for 62 days and data obtained every 30 minutes for 4 days.
3. The calculation results can be checked on the energy management list on the LCD screen of AE-200 and output to a CSV file.
4. The Charge Calculation Tool can calculate the charge rates of the outdoor and indoor units in each energy management block and output the rates to a printer or a CSV file. Apportion the separately obtained electric energy to each tenant using the charge rates of outdoor and indoor units in each energy management block calculated by the Charge Calculation Tool.

① Connection diagram



* The power lines other than those for outdoor units and indoor units are omitted.

② Required devices

<table>
<tr><th>Device name (model name)</th><th>Manufacturer</th><th>Remarks</th></tr>
<tr><td>AE-200</td><td>Mitsubishi Electric Corporation</td><td></td></tr>
<tr><td>AE-50/EW-50</td><td>Mitsubishi Electric Corporation</td><td></td></tr>
<tr><td>"Charge" license</td><td>Mitsubishi Electric Corporation</td><td>The license must be registered in all sets of AE-200/AE-50/EW-50.
Register it in AE-50/EW-50 which do not have units to be subjected to apportionment under AE-200 system.</td></tr>
<tr><td>Initial Setting Tool</td><td>Mitsubishi Electric Corporation</td><td>This tool is used for initial setting.
It is supplied with the "Charge" license.</td></tr>
<tr><td>Charge Calculation Tool</td><td>Mitsubishi Electric Corporation</td><td>This tool is used for charge calculation.
It is supplied with the "Charge" license.</td></tr>
<tr><td>Personal computer</td><td>Commercially available product</td><td>A personal computer on which the Initial Setting Tool and Charge Calculation Tool are installed
The hardware requirements for the personal computer are shown below.
<table>
<tr><th>Item</th><th>Requirement</th></tr>
<tr><td>CPU</td><td>1 GHz or more
(2 GHz or more recommended)</td></tr>
<tr><td>Memory</td><td>2 GB</td></tr>
<tr><td>Screen resolution</td><td>1024 × 768 or more</td></tr>
<tr><td>Operation environment</td><td>Windows7,
Windows8.1 (32 bit/64 bit)
Windows 10 (64 bit)
.NET Framework 4.5.2 or later</td></tr>
<tr><td>Built-in LAN port or LAN card</td><td>100BASE-TX or higher</td></tr>
<tr><td>Pointing device</td><td>Mouse, etc.</td></tr>
</table></td></tr>
<tr><td>Printer</td><td>Commercially available product</td><td>A printer is required to print the results of charge calculation from the Charge Calculation Tool.</td></tr>
<tr><td>USB memory</td><td>Commercially available product</td><td>An USB memory is required to obtain the CSV data (results of apportionment calculation).</td></tr>
<tr><td>LAN cable</td><td>Commercially available product</td><td rowspan="2">A LAN cable is required to connect AE-200, AE-50/EW-50 and personal computer.</td></tr>
<tr><td>Switching hub</td><td>Commercially available product</td></tr>
</table>

③ Required setting

Before setting the following items, complete the unit setting, network setting, license registration, group setting, operation block setting and measurement setting.

Classification of setting	Setting screen	Setting item	Description
AE-200	Maintenance Initial setting	License registration	Register the "Charge" license in all sets of AE-200/AE-50/EW-50.
		Unit information	The apportionment function of AE-200 is enabled.
Initial Setting Tool	Unit setting	Refrigerant system setting	Set the conditions of connection of outdoor units and indoor units to the refrigerant system.
		Energy management block setting	Set each tenant as an energy management block.
	Billing setting	Apportionment by connected meters	Set to “Not connected.”
		Outdoor unit consumed electricity apportionment mode	Select one of the following three apportionment modes for outdoor units. ① Capacity save amount (operating ability) … Default ② Thermo ON time (time during which refrigerant is being fed) ③ Fan operation time (operating time) * In a system that includes both the HVRF series of City Multi units and other series of City Multi units, set the apportioning setting for the electricity use by outdoor units to Thermo-ON time or to fan operation time to ensure appropriate measurement.
		Indoor unit consumed electricity apportionment mode	Specify whether or not to apportion the energy consumed by indoor units.
	Indoor unit setting		Select the model of each indoor unit, and input the following data. ① Indoor unit cooling capacity (kW) ② Indoor unit fan power consumption (cooling) (kW) * When a model not included in the database in the Initial Setting Tool is used, see the catalog, and input the model name.
	Charge setting	Period of seasonal charge	Determine whether or not to apply two unit prices, for example, seasonal and regular prices in summer, and determine the periods.
		Weekly charge time	Predetermined 5 charge zones can be set in up to 10 time slots on each day of week. When the seasonal charge has been set, set the charge zones in each of the two periods. This setting is common to all energy management blocks.
		Charge time on specific days	Set five charging time slot patterns, and the five patterns can be set on 50 days in the range from the current month to the 24th month.
		Adjustment date	Set the period for totalizing the data in one month on the energy management list.
Charge Calculation Tool	Detailed setting for charge calculation	Apportionment by connected meters	Set to “Not connected.”
		Order of display of results of charge calculation	Set the sorting order of energy management blocks to be displayed on the screen of the Charge Calculation Tool, output to a CSV file and printed to “By No.” or “By name.”
		Integration of energy management blocks having the same name	Determine whether or not to integrate the results of calculation of charges to energy management blocks having the same name. When the air conditioners of one tenant are controlled under some sets of AE-200, the results of charge calculation can be integrated if the energy management blocks have the same name
		Decimal marker for CSV file Separator for CSV file	Set the same decimal marker and separator as those for CSV file in AE-200.
		Charge unit price setting	Set up to five charge unit prices for each of electricity meters and other meters.
		Automatic output setting	Determine whether or not to automatically print or output a CSV file every day or month.
		Adjustment date setting	Set the date for automatic output of monthly data. The data will be automatically output on the day after the set date. * Set the same adjustment date as that set by the Initial Setting Tool.
		IP address setting	Set the IP address of AE-200 which will automatically output data.

[3] Apportionment calculation

This section explains the procedures for apportioning the electric energy to air conditioners based on the operation amount (consumed electricity) of each indoor unit.

<1> In the case of City Multi

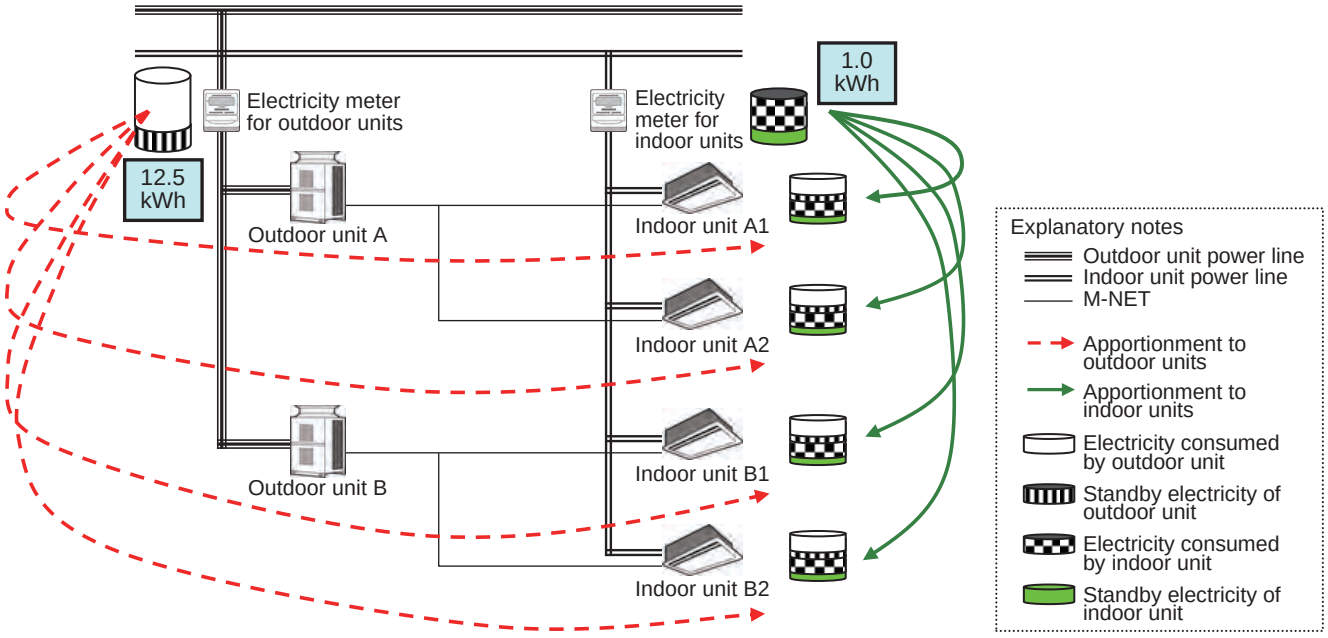
(1) Outline of apportionment

The electric energy consumed by outdoor units A and B is measured, and the energy is apportioned to electricity consumed by outdoor units and standby electricity of the units.

The electric energy consumed by indoor units A1, A2, B1 and B2 is measured, and the energy is apportioned to electricity consumed by indoor units and standby electricity of the units.

* When the charge unit price has been set for each time slot, the electric energy is counted by unit price.

The apportionment in this case is schematically shown below.



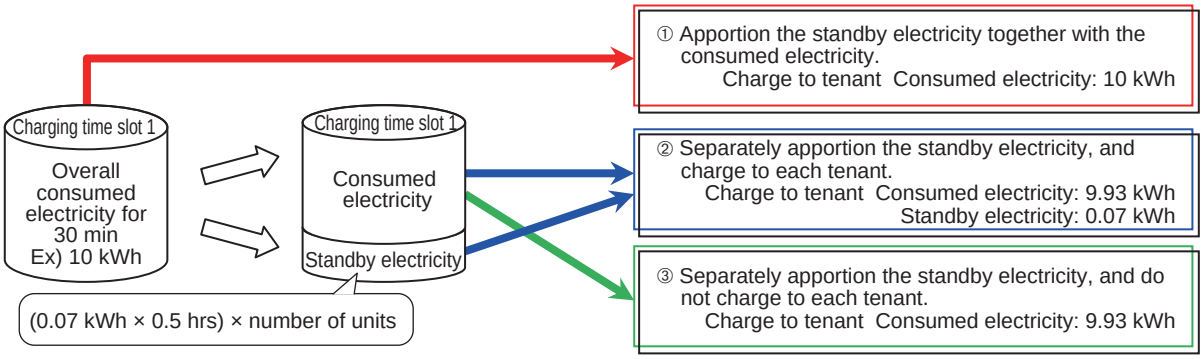
* AE-200, AE-50/EW-50, PI controller and pulse detector are omitted.

(2) Method for calculating outdoor unit standby electricity

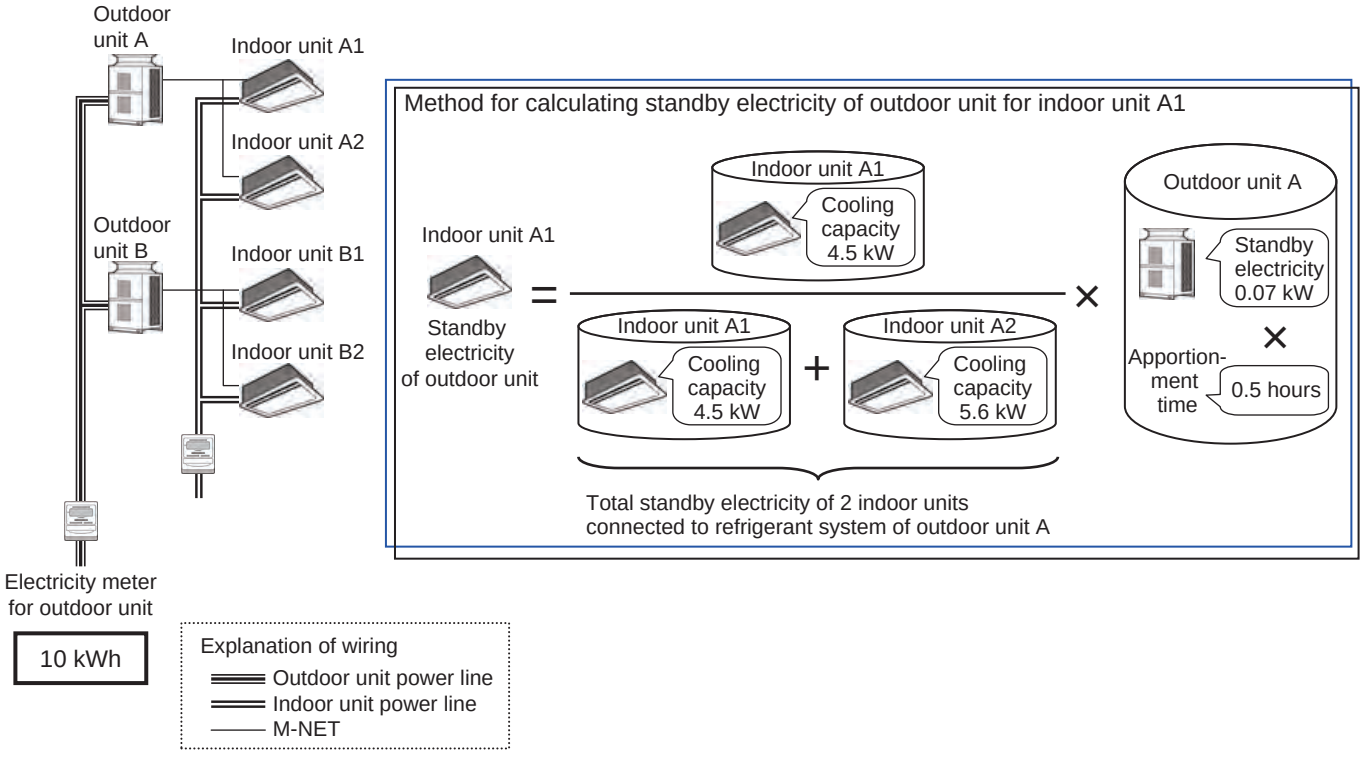
The calculation method varies depending on how to handle the outdoor unit standby electricity.
The standby electricity is calculated on condition that it is consumed for 24 hours.

Calculation method	Outdoor unit standby electricity apportionment mode (Initial Setting Tool)	Calculation of charge for standby electricity (Charge Calculation Tool)
① Apportion the standby electricity together with the consumed electricity.	Not apportioned	–
② Separately apportion the standby electricity, and charge to each tenant. (Default)	Apportioned	Included in charge
③ Separately apportion the standby electricity, and do not charge to each tenant.	Apportioned	Not included in charge

* In the case of the electric energy manual input method, the calculation method is constantly "① Apportion the standby electricity together with the consumed electricity."



The method for calculating outdoor unit standby electricity for each indoor unit is explained below. The calculation is performed for each outdoor unit every 30 minutes.



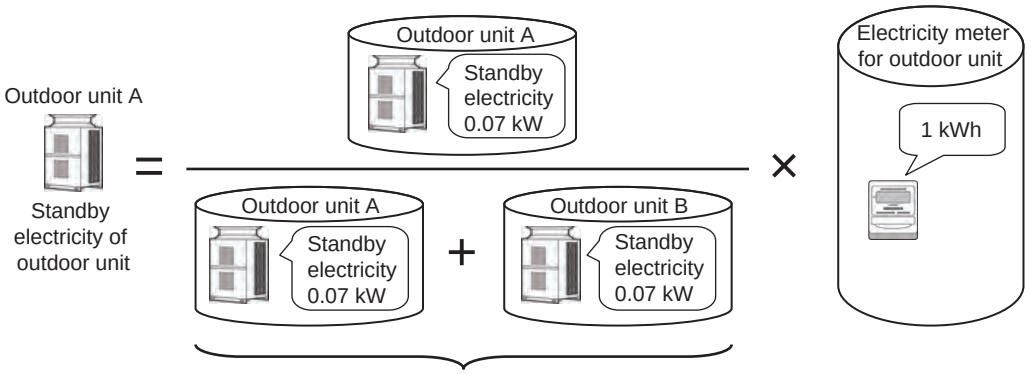
[Exceptional case of calculation of standby electricity of outdoor unit]

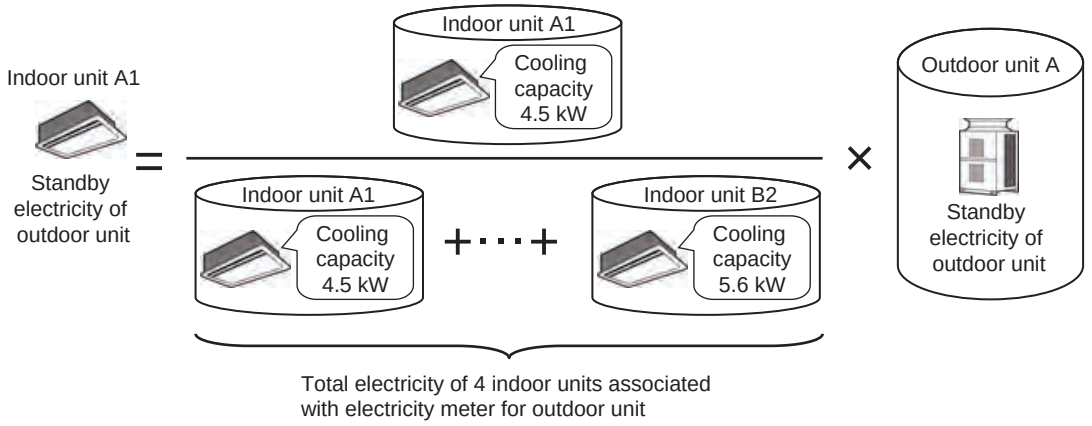
If the indoor units are not running, the calculation result (standby electricity of outdoor unit) shown on the previous page may be different from the increase on the electricity meter for outdoor unit.

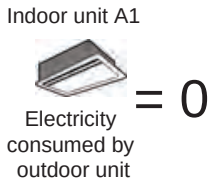
The calculation result shown on the previous page may be larger than the increase on the electricity meter for outdoor unit depending on the pulse input timing.

In such a case, the ratio of outdoor unit standby electricity is calculated as shown below in place of the calculation shown on the previous page to make the standby electricity equal to the increase on the electricity meter for outdoor unit. In this case, the electricity consumed by outdoor unit is 0.

Method for calculating the ratio of outdoor unit standby electricity to electricity consumed by outdoor unit for indoor unit A1 when the indoor units are not running and the outdoor unit standby electricity is not equal to or is larger than the increase on the electricity meter for outdoor unit





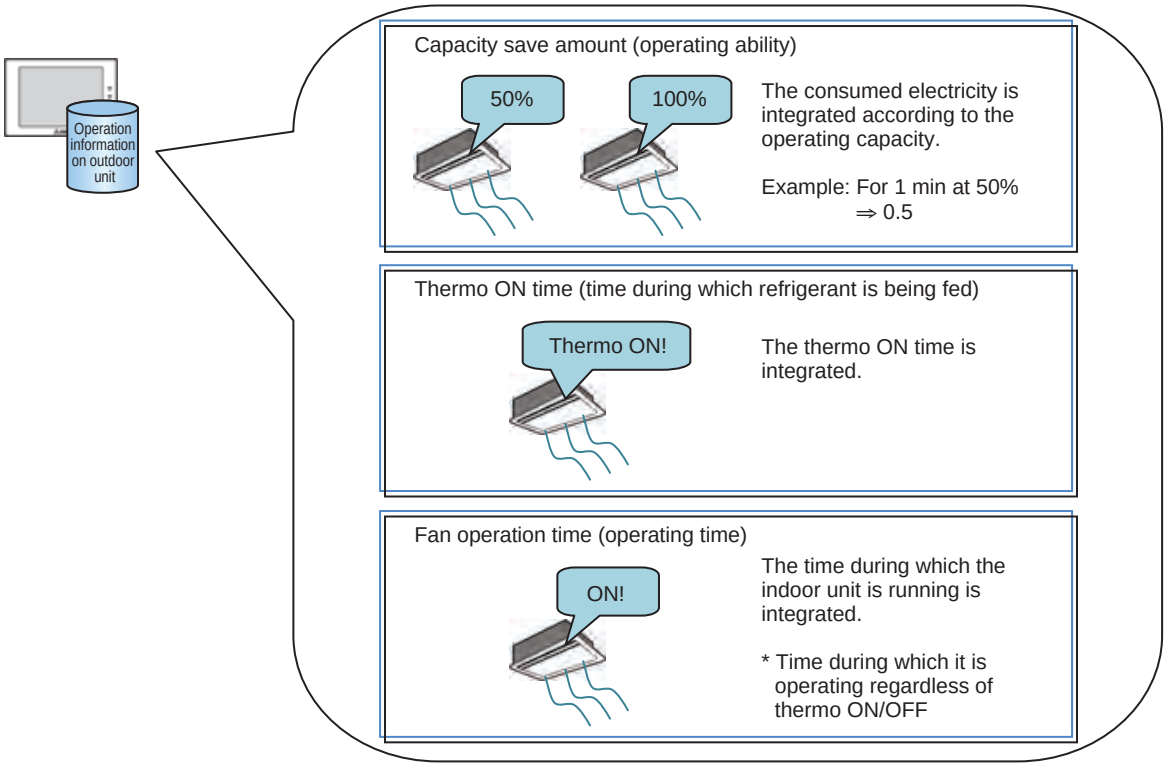


(3) Method for calculating electricity consumed by outdoor unit

There are the following three kinds of base data for apportionment of electricity consumed by outdoor unit. Select one of them.

	Capacity save amount	Thermo ON time	Fan operation time
Measurement method	Value approximate to amount of refrigerant used by indoor unit	Time during which refrigerant is being fed to indoor unit	Indoor unit operation time
Apportionment accuracy	◎ *1 The consumed electricity is calculated with the highest accuracy because a value approximate to the amount of refrigerant fed into the indoor unit is used.	○ The cooling thermo ON or heating thermo ON time is counted. The time is not counted during air blowing (while the refrigerant is not used).	△ The fan operation time is counted. The time is counted also during air blowing.

*1: Electricity use of the HVRF series of City Multi units is apportioned based on Thermo-ON time.

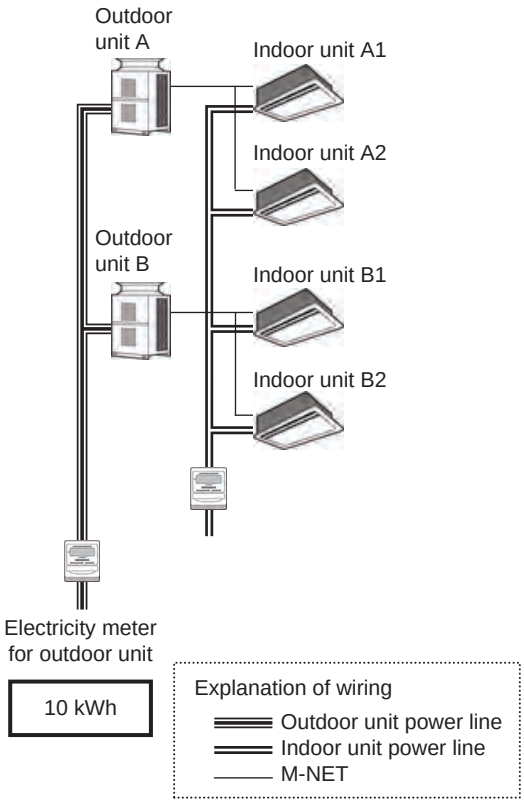


AE-50/EW-50 integrates these data of each indoor unit in each charging time slot, and AE-200 collects the data every 30 minutes.

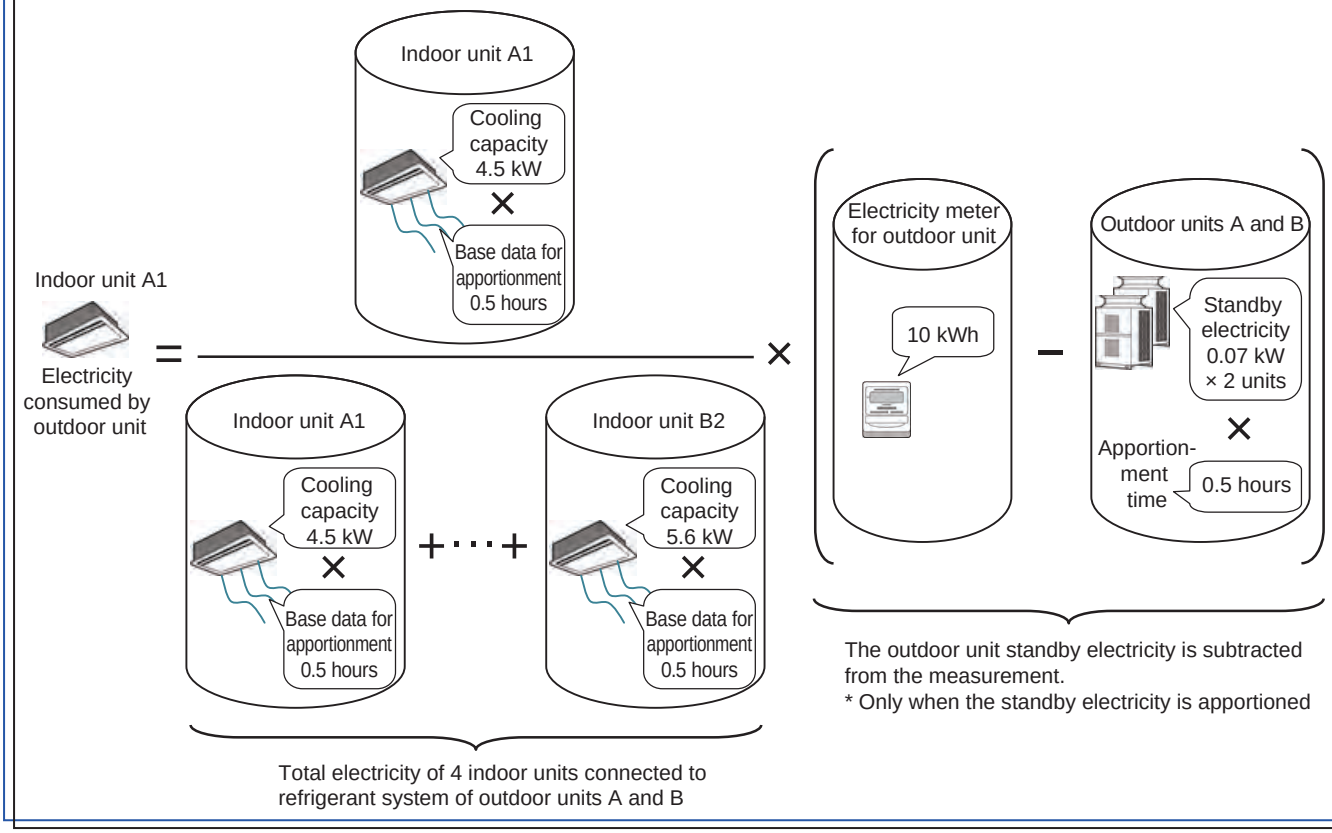
[15. Apportioned Electricity Billing Function]

The method for calculating the electricity consumed by outdoor unit for each indoor unit is explained below. The calculation is performed on each meter for outdoor unit every 30 minutes.

* The meter for outdoor unit regards the outdoor units as one large outdoor unit. Therefore, the influence of the energy-saving capabilities of the outdoor units is not included in the calculation.
  To take the energy-saving capabilities of the outdoor units into account, it is recommended to install an electricity meter for each outdoor unit.



Method for calculating electricity consumed by outdoor unit for indoor unit A1

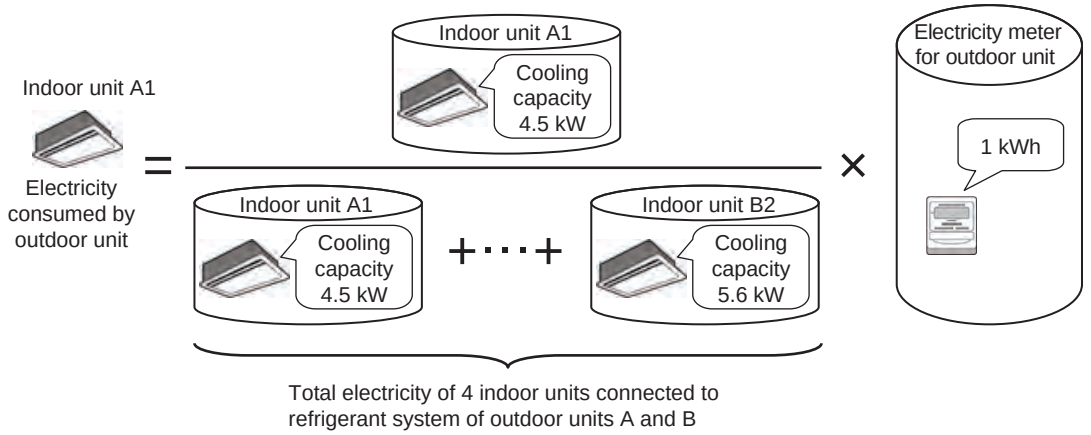


[Exceptional case of calculation of electricity consumed by outdoor unit]

When the outdoor unit standby electricity apportionment mode is “Not apportioned,” the pulse of the electricity meter for outdoor unit may be increased by the outdoor unit standby electricity even if no indoor unit is running.

In this case, the ratio of outdoor unit consumed electricity is calculated in place of the calculation shown on the previous page to make the electricity equal to the increase on the electricity meter for outdoor unit.

Method for calculating the ratio of electricity consumed by outdoor unit for the indoor unit A1 when the outdoor unit standby electricity apportionment mode is “Not apportioned,” the indoor units are not running and the increase on the electricity meter for outdoor unit is larger than 0.



Remarks

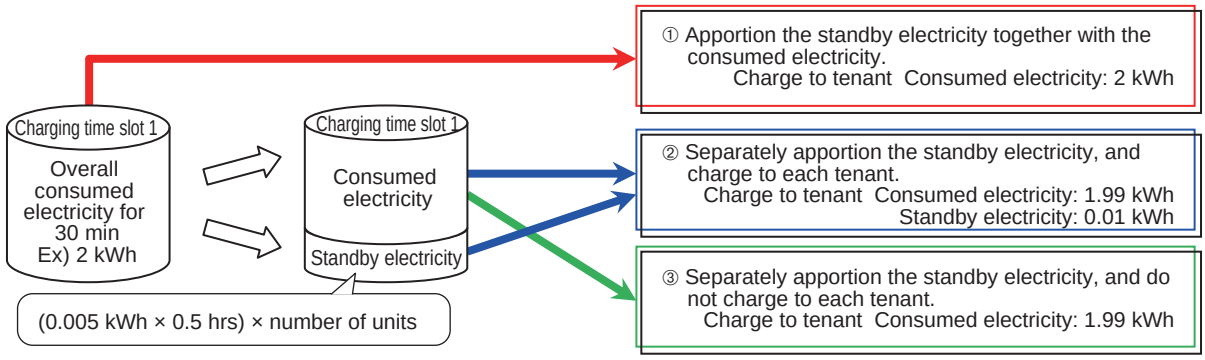
○ When the outdoor unit standby electricity apportionment mode is “Not apportioned,” in the above exceptional case, **the electricity consumed by outdoor unit may increase as if all indoor units were running although they are not running.**

(4) Method for calculating indoor unit standby electricity

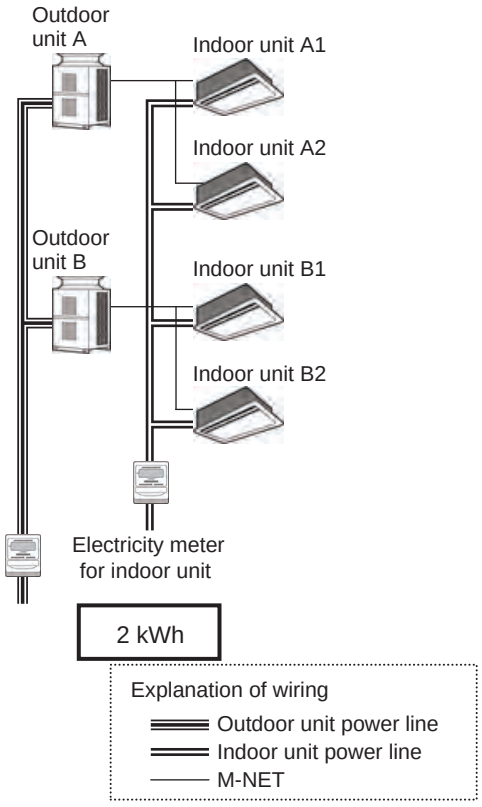
The calculation method varies depending on how to handle the indoor unit standby electricity.
The standby electricity is calculated on condition that it is consumed for 24 hours.

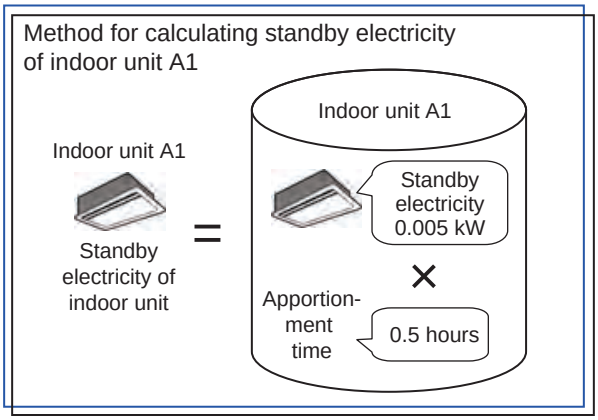
Calculation method	Indoor unit standby electricity apportionment mode (Initial Setting Tool)	Calculation of charge for standby electricity (Charge Calculation Tool)
① Apportion the standby electricity together with the consumed electricity.	Not apportioned	–
② Separately apportion the standby electricity, and charge to each tenant. (Default)	Apportioned	Included in charge
③ Separately apportion the standby electricity, and do not charge to each tenant.	Apportioned	Not included in charge

* In the case of the electric energy manual input method, the calculation method is constantly "① Apportion the standby electricity together with the consumed electricity."



The method for calculating indoor unit standby electricity for each indoor unit is explained below. The calculation is performed for each indoor unit every 30 minutes.



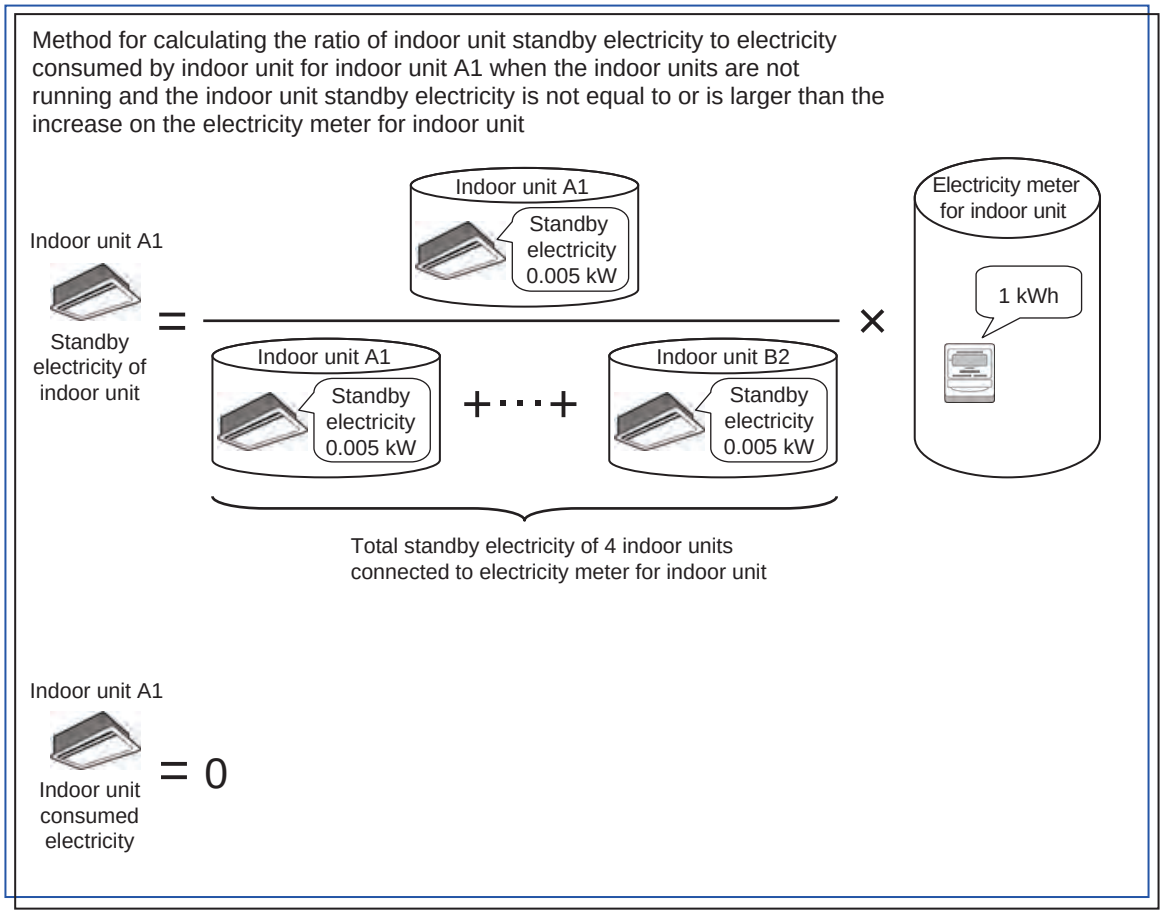


[Exceptional case of calculation of standby electricity of indoor unit]

If the indoor units are not running, the calculation result (standby electricity of indoor unit) shown on the previous page may be different from the increase on the electricity meter for indoor unit.

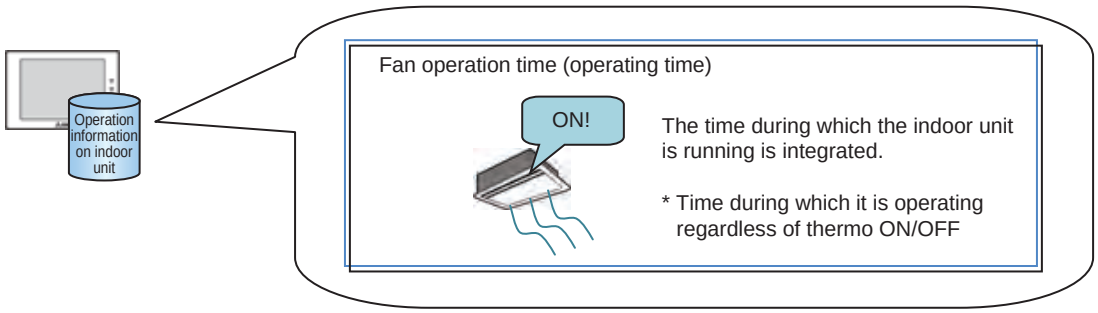
The calculation result shown on the previous page may be larger than the increase on the electricity meter for indoor unit depending on the pulse input timing.

In such a case, the ratio of indoor unit standby electricity is calculated as shown below in place of the calculation shown on the previous page to make the standby electricity equal to the increase on the electricity meter for indoor unit. In this case, the electricity consumed by the indoor unit is 0.



(5) Method for calculating electricity consumed by indoor unit

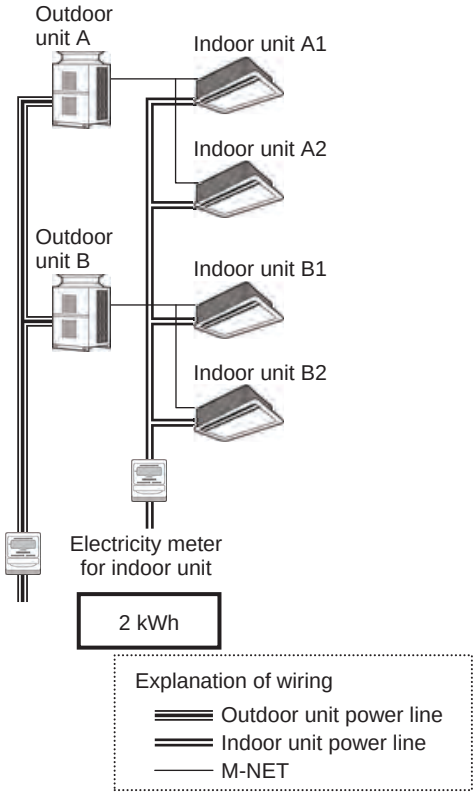
For apportionment of electricity consumed by indoor unit, the fan operation time is used.



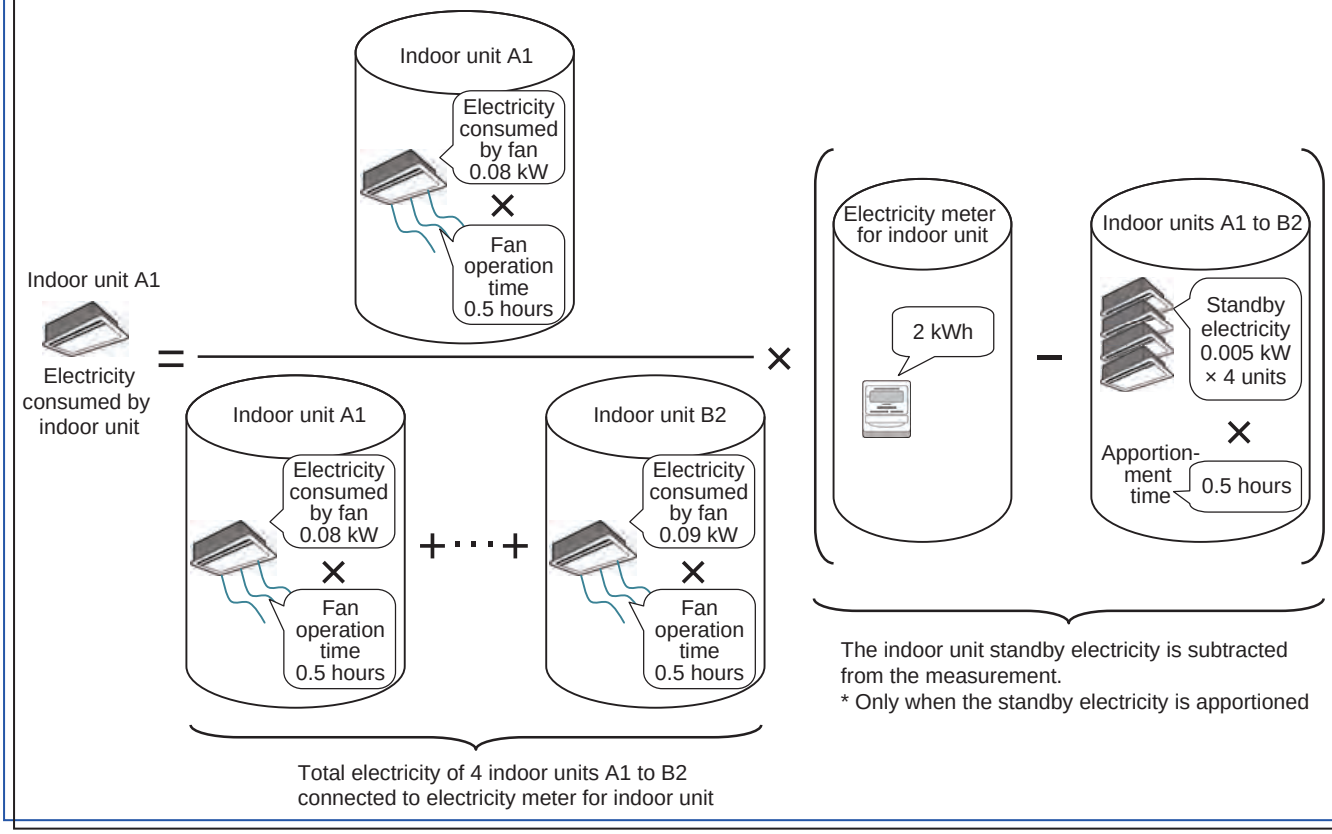
AE-50/EW-50 integrates this data of each indoor unit in each charging time slot, and AE-200 collects the data every 30 minutes.

[15. Apportioned Electricity Billing Function]

The method for calculating the electricity consumed by indoor unit for each indoor unit is explained below. The calculation is performed on each indoor unit meter every 30 minutes.



Method for calculating electricity consumed by indoor unit A1

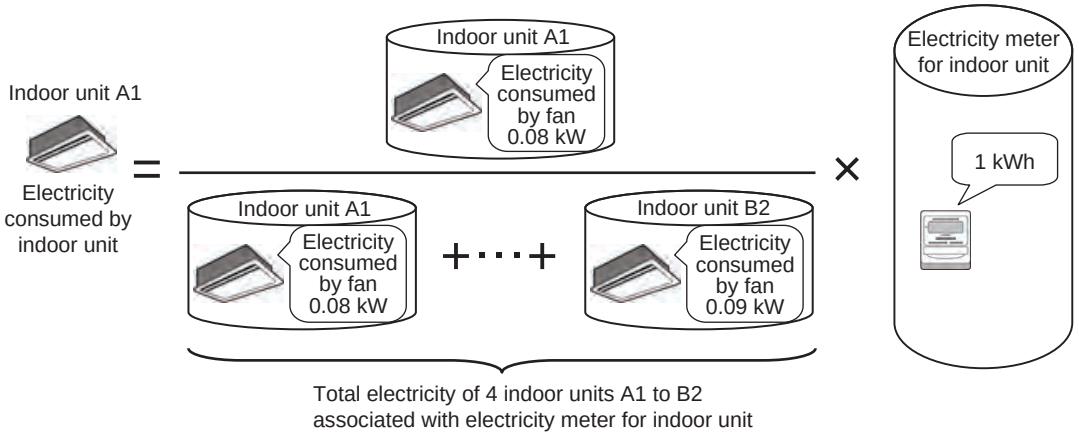


[Exceptional case of calculation of electricity consumed by indoor unit]

When the indoor unit standby electricity apportionment mode is “Not apportioned,” the pulse of the electricity meter for indoor unit may be increased by the indoor unit standby electricity even if no indoor unit is running.

In this case, the ratio of indoor unit consumed electricity is calculated in place of the calculation shown on the previous page to make the electricity equal to the increase on the electricity meter for indoor unit.

Method for calculating the electricity consumed by the indoor unit A1 when the indoor unit standby electricity apportionment mode is “Not apportioned,” the indoor unit is not running and the increase on the electricity meter for indoor unit is larger than 0.



Remarks

○ When the indoor unit standby electricity apportionment mode is “Not apportioned,” in the above exceptional case, **the electricity consumed by indoor units may increase as if all indoor units were running although they are not running.**

(6) Vacant stores

When there are vacant stores, one of the following three kinds of measures can be selected.

Measures	Vacant stores	Other stores
① The charge for consumed electricity and standby electricity of vacant stores are apportioned to all other tenants.	Consumed electricity: 0 Standby electricity: 0	Consumed electricity: The charge for consumed electricity and standby electricity of vacant stores is added to the charges to other tenants according to the ratio of electricity consumed by the tenants. Standby electricity: Calculated as usual
② The charge for standby electricity of vacant stores is apportioned to all other tenants. The charge for electricity consumed by vacant stores is borne by the building owner.	Consumed electricity: Calculated as usual Standby electricity: 0	Consumed electricity: The charge for consumed electricity of vacant stores is added to the charges to other tenants according to the ratio of electricity consumed by the tenants. Standby electricity: Calculated as usual
③ The charge for consumed electricity and standby electricity of vacant stores is borne by the building owner.	Consumed electricity: Calculated as usual Standby electricity: Calculated as usual	Consumed electricity: Calculated as usual Standby electricity: Calculated as usual

For the vacant stores, set the outdoor unit and indoor unit conditions as shown below in each of the cases ① to ③.

Measures	Outdoor unit setting	Indoor unit setting
① The charge for consumed electricity and standby electricity of vacant stores are apportioned to all other tenants.	Outdoor unit standby electricity: 0 kW	Cooling capacity: 0 kW Fan power consumption: 0 kW Indoor unit standby electricity: 0 kW
② The charge for standby electricity of vacant stores is apportioned to all other tenants. The charge for electricity consumed by vacant stores is borne by the building owner.	Outdoor unit standby electricity: 0 kW	Cooling capacity: Set a value appropriate to the indoor unit. Fan power consumption: Set a value appropriate to the indoor unit. Indoor unit standby electricity: 0 kW
③ The charge for consumed electricity and standby electricity of vacant stores is borne by the building owner.	Outdoor unit standby electricity: Set a value appropriate to the outdoor unit.	Cooling capacity: Set a value appropriate to the indoor unit. Fan power consumption: Set a value appropriate to the indoor unit. Indoor unit standby electricity: Set a value appropriate to the indoor unit.

Remarks

- ○ When any method other than ③ is selected, **change the vacant store settings every time a tenant moves in or out.**
- ○ When the outdoor unit standby electricity apportionment mode is “Not apportioned,” it is unnecessary to set the outdoor unit standby electricity.
- ○ When the indoor unit consumed electricity apportionment mode is “Not apportioned,” it is unnecessary to set the indoor unit cooling capacity.
- ○ When the indoor unit standby electricity apportionment mode is “Not apportioned,” it is unnecessary to set the indoor unit standby electricity.

<2> In the case of Mr. Slim (with same power supply for outdoor and indoor units)

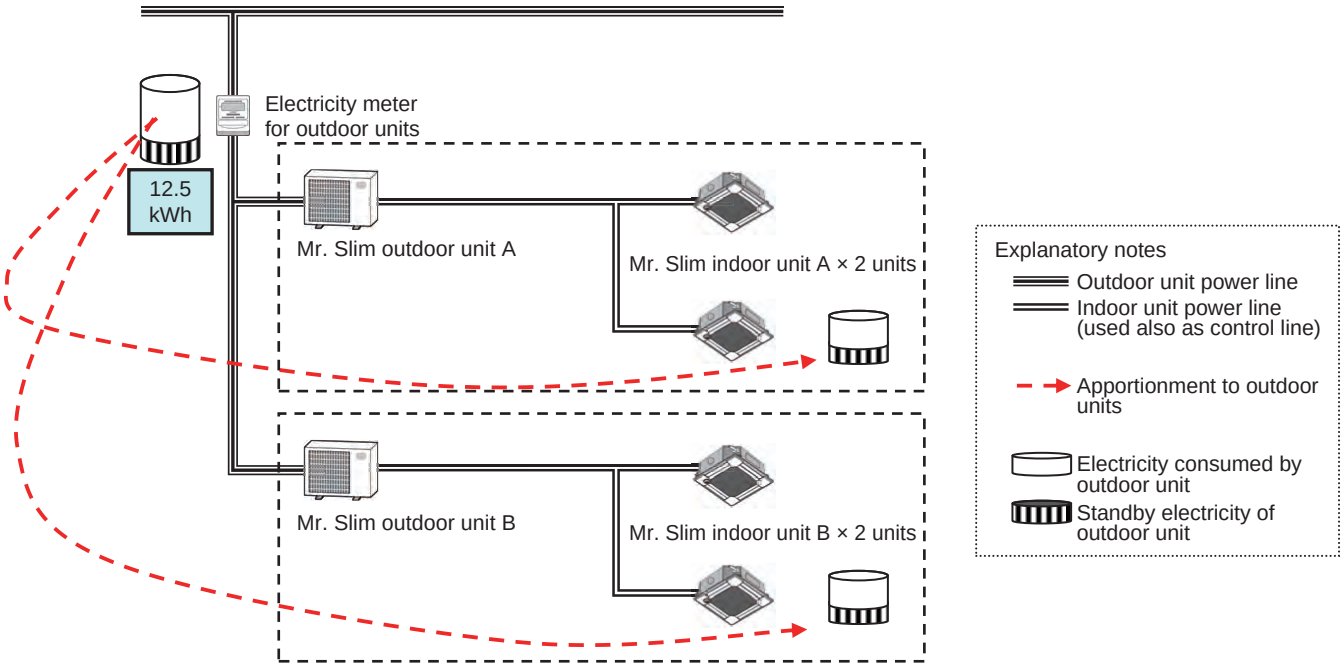
When the apportioned electricity billing function is used for Mr. Slim models using the same power supply for outdoor and indoor units, set “A-control model power supply” to “Same power supply for outdoor and indoor units” by the Initial Setting Tool.

(1) Outline of apportionment

The electric energy consumed by outdoor units A and B is measured, and the energy is apportioned to electricity consumed by outdoor units and standby electricity of the units.

* When the charge unit price has been set for each time slot, the electric energy is counted by unit price.

The apportionment in this case is schematically shown below.



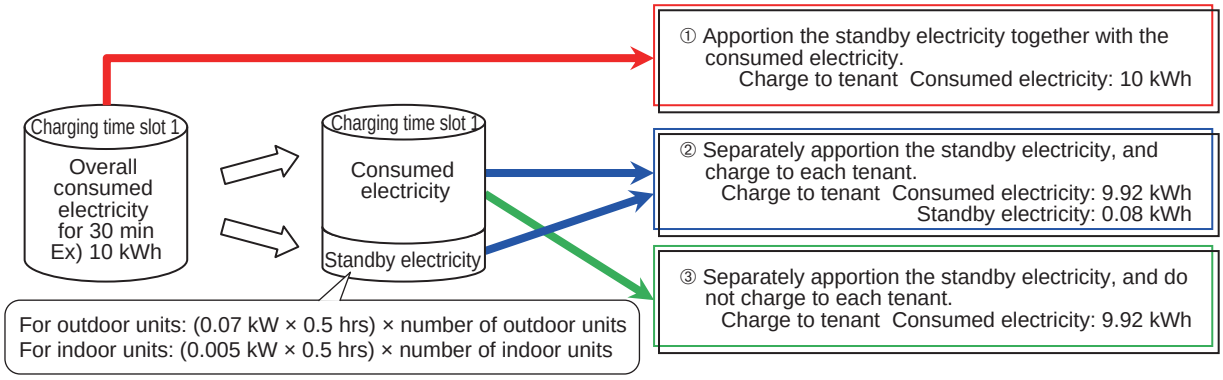
* For Mr. Slim models (simultaneous type), the units enclosed by a dotted line are regarded as one indoor unit (including the outdoor unit).
* AE-200, AE-50/EW-50, PI controller and pulse detector are omitted.

(2) Method for calculating outdoor unit standby electricity

The calculation method varies depending on how to handle the outdoor unit standby electricity.
The standby electricity is calculated on condition that it is consumed for 24 hours.

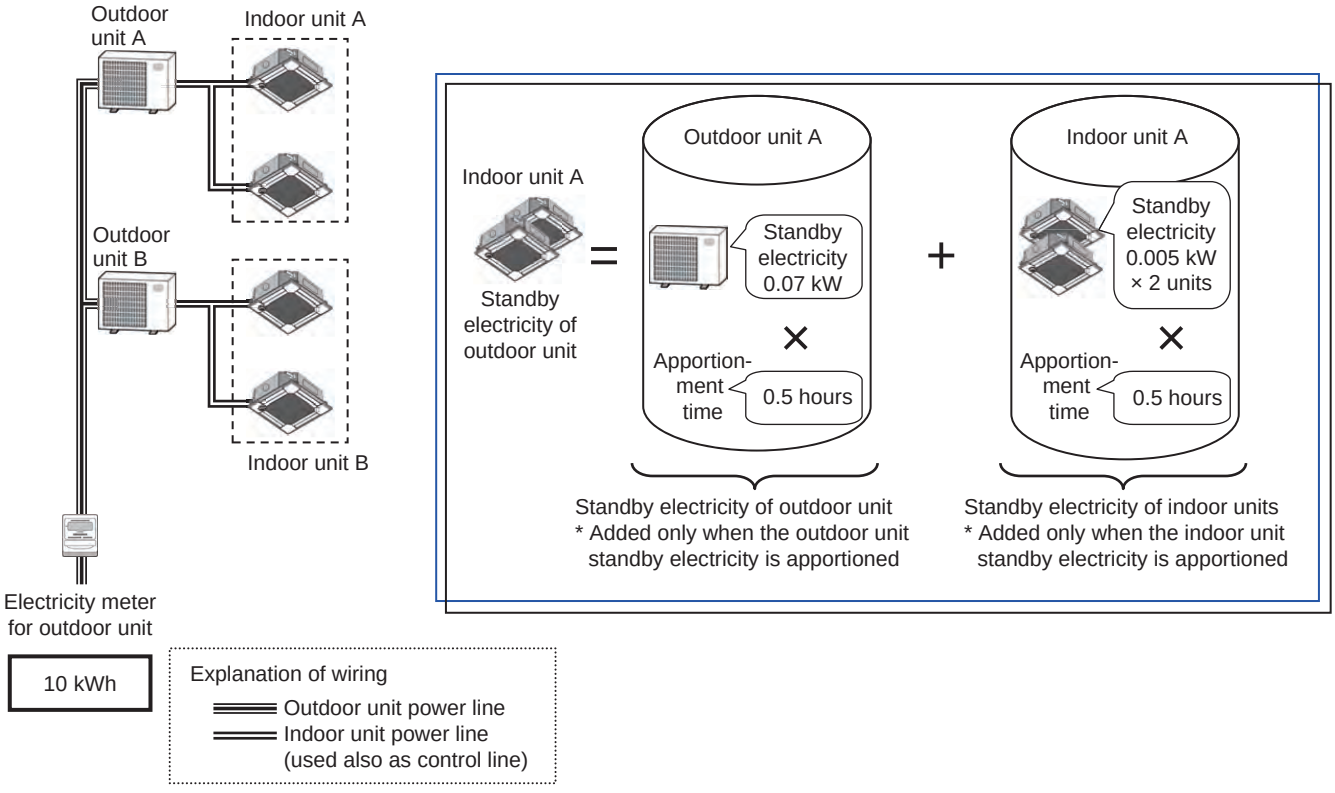
Calculation method	Outdoor unit standby electricity apportionment mode Indoor unit standby electricity apportionment mode (Initial Setting Tool)	Calculation of charge for standby electricity (Charge Calculation Tool)
① Apportion the standby electricity together with the consumed electricity.	Not apportioned	–
② Separately apportion the standby electricity, and charge to each tenant. (Default)	Apportioned	Included in charge
③ Separately apportion the standby electricity, and do not charge to each tenant.	Apportioned	Not included in charge

* In the case of the electric energy manual input method, the calculation method is constantly "① Apportion the standby electricity together with the consumed electricity."



The method for calculating outdoor unit standby electricity for each indoor unit is explained below. The standby electricity of each outdoor unit is calculated every 30 minutes.

When the outdoor units and indoor units are powered by the same power supply, the indoor unit standby electricity is added to the outdoor unit standby electricity.



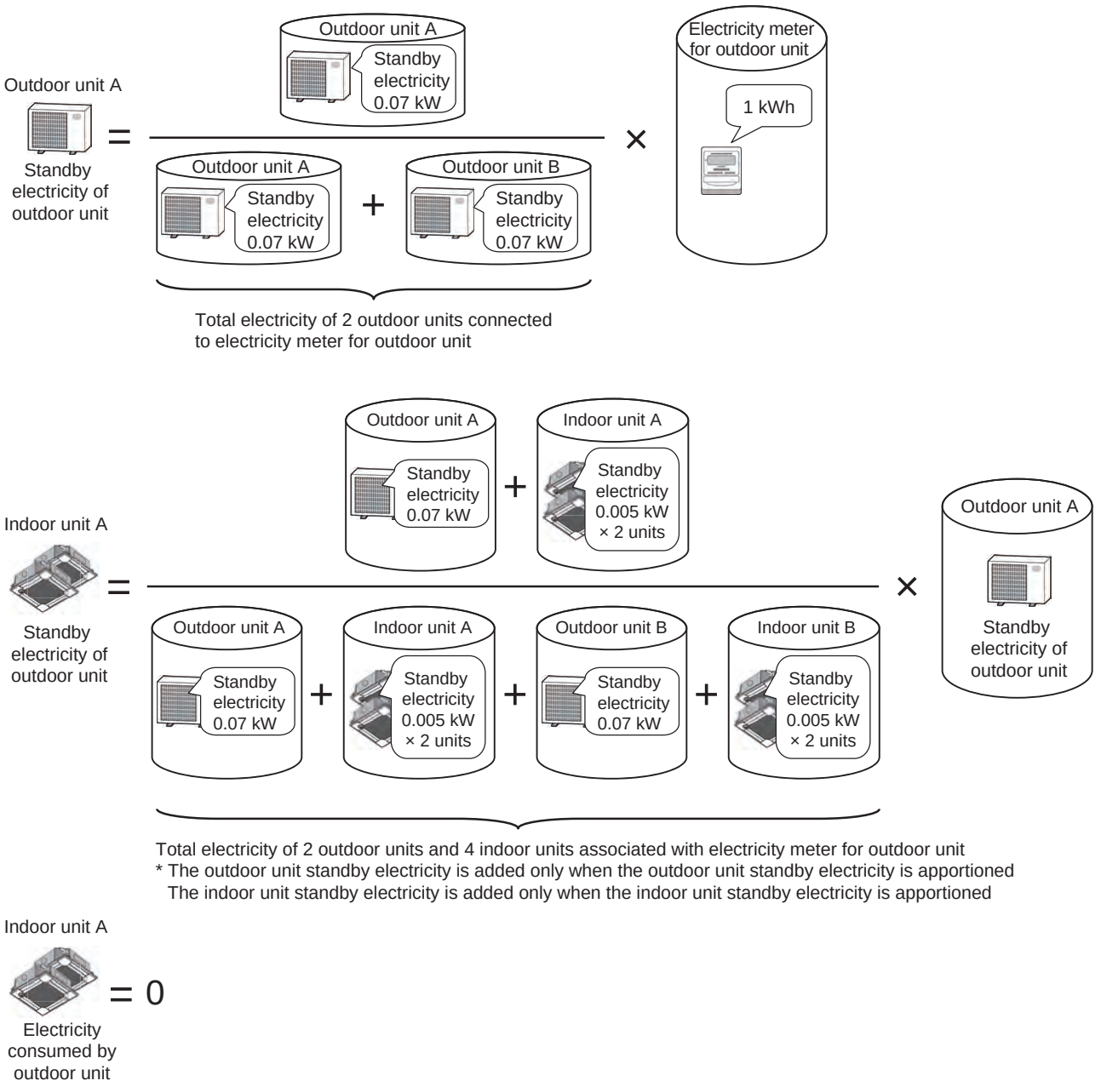
[Exceptional case of calculation of standby electricity of outdoor unit]

If the indoor units are not running, the calculation result (standby electricity of outdoor unit) shown on the previous page may be different from the increase on the electricity meter for outdoor unit.

The calculation result shown on the previous page may be larger than the increase on the electricity meter for outdoor unit depending on the pulse input timing.

In such a case, the ratio of outdoor unit standby electricity is calculated as shown below in place of the calculation shown on the previous page to make the standby electricity equal to the increase on the electricity meter for outdoor unit. In this case, the electricity consumed by the outdoor unit is 0.

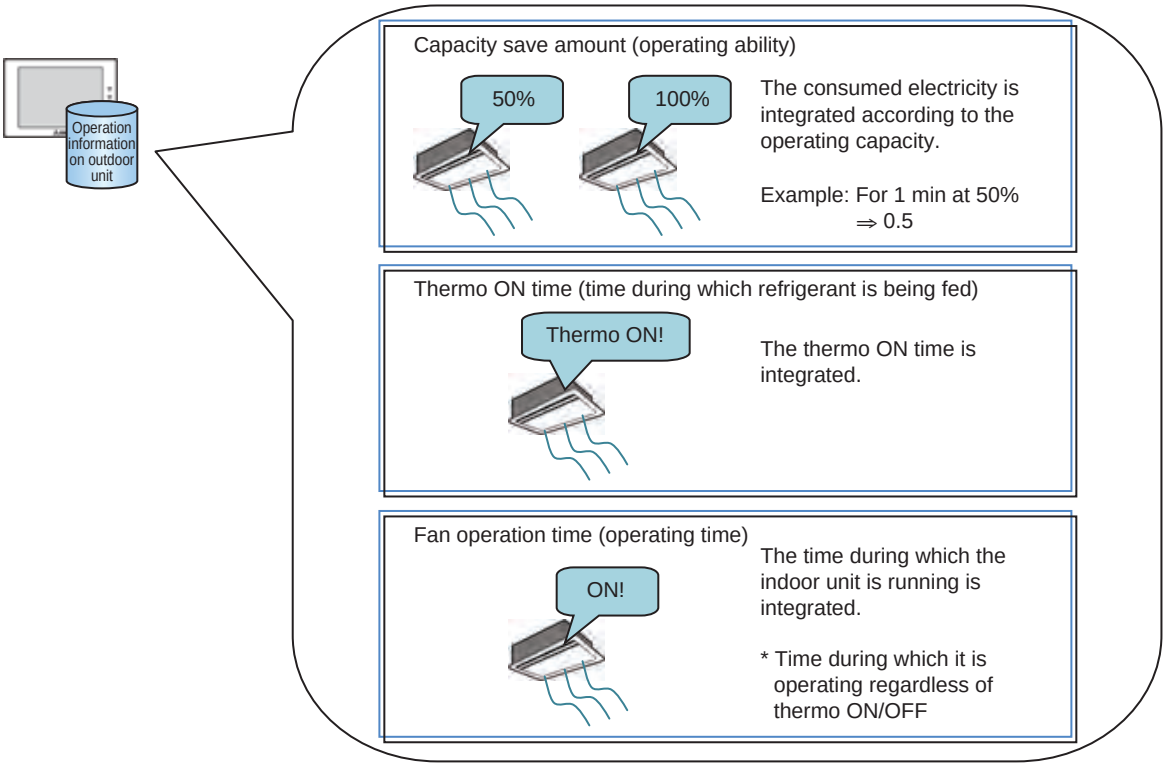
Method for calculating the ratio of outdoor unit standby electricity to electricity consumed by outdoor unit for indoor unit A1 when the indoor units are not running and the outdoor unit standby electricity is not equal to or is larger than the increase on the electricity meter for outdoor unit



(3) Method for calculating electricity consumed by outdoor unit

There are the following three kinds of base data for apportionment of electricity consumed by outdoor unit. Select one of them.

	Capacity save amount	Thermo ON time	Fan operation time
Measurement method	Value approximate to amount of refrigerant used by indoor unit	Time during which refrigerant is being fed to indoor unit	Indoor unit operation time
Apportionment accuracy	◎ The consumed electricity is calculated with the highest accuracy because a value approximate to the amount of refrigerant fed into the indoor unit is used.	○ The cooling thermo ON or heating thermo ON time is counted. The time is not counted during air blowing (while the refrigerant is not used).	△ The fan operation time is counted. The time is counted also during air blowing.



AE-50/EW-50 integrates these data of each indoor unit in each charging time slot, and AE-200 collects the data every 30 minutes.

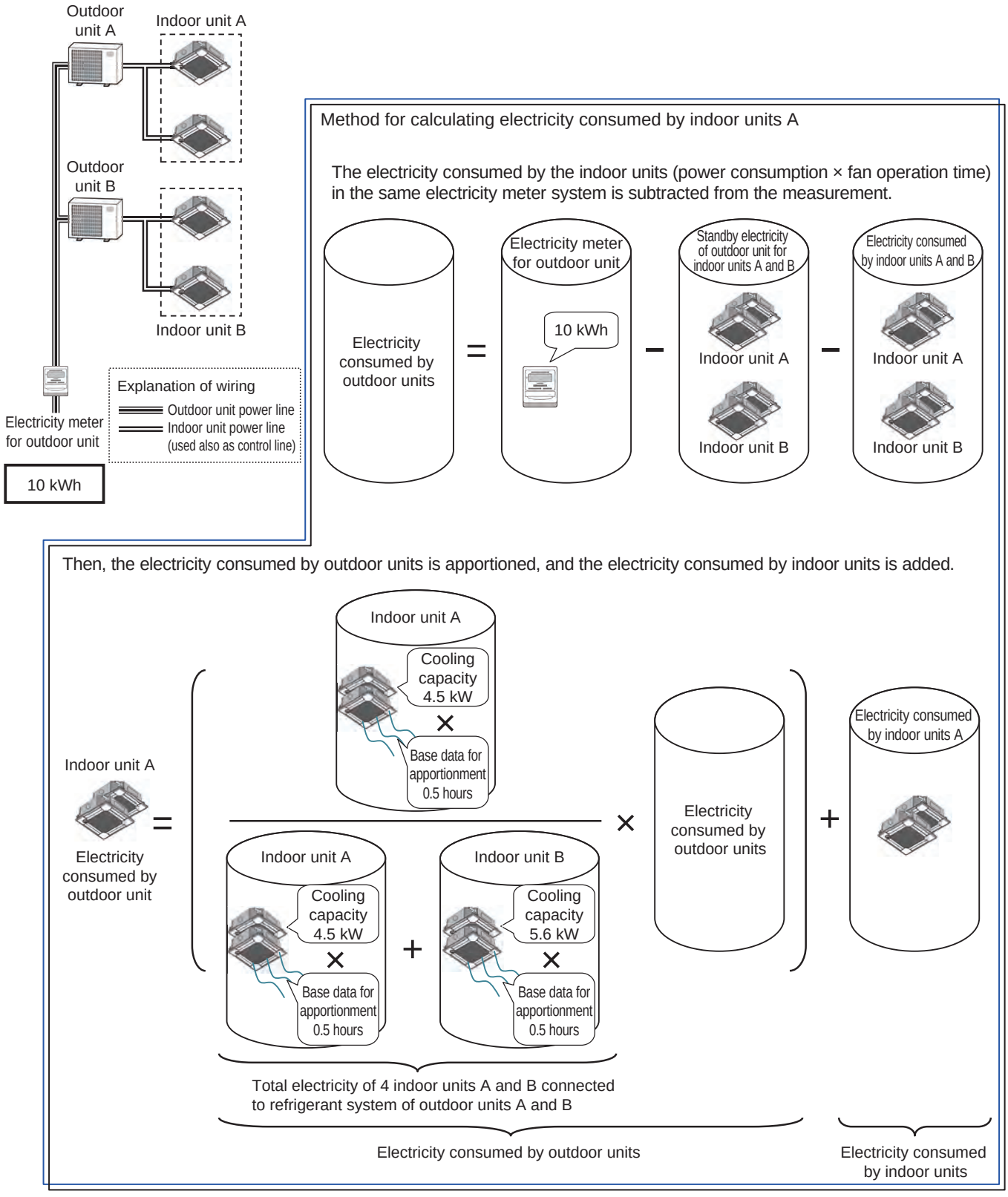
Remarks

○ Only when any of the following models of M-NET connection adapters is used, apportionment can be performed in the outdoor unit power consumption apportionment mode, “capacity save amount mode.”
PAC-SJ10MA, PAC-SJ18MA, PAC-SJ31MA
When another model of M-NET connection adapter is used, set the apportionment mode to “thermo ON time” or “fan operation time.”

The method for calculating the electricity consumed by outdoor unit for each indoor unit is explained below. The calculation is performed on each outdoor unit meter every 30 minutes.

* The outdoor unit meter regards the outdoor units as one large outdoor unit. Therefore, the influence of the energy-saving capabilities of the outdoor units is not included in the calculation.
  To take the energy-saving capabilities of the outdoor units into account, it is recommended to install an electricity meter for each outdoor unit.

When the outdoor units and indoor units are powered by the same power supply, the indoor unit standby electricity is added to the outdoor unit standby electricity.

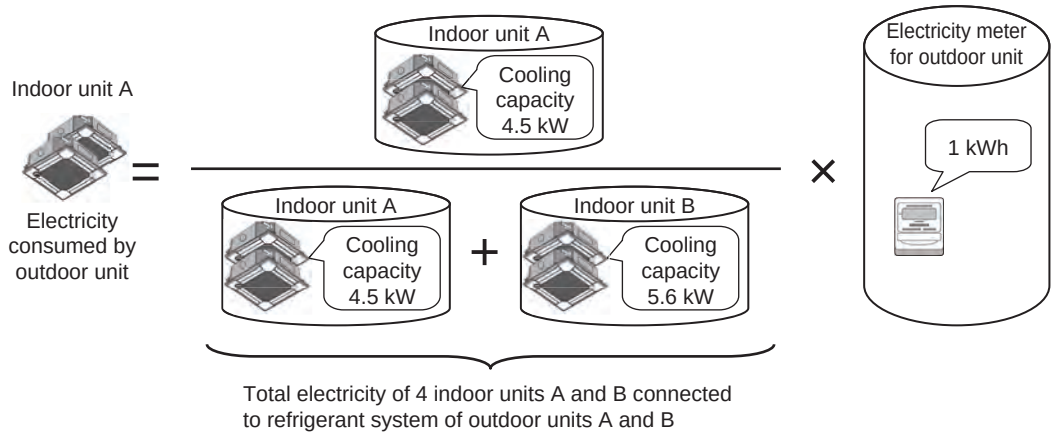


[Exceptional case of calculation of electricity consumed by outdoor unit]

When the outdoor unit standby electricity apportionment mode and indoor unit standby electricity apportionment mode are “Not apportioned,” the pulse of the electricity meter for outdoor unit may be increased by the outdoor and indoor unit standby electricity even if no indoor unit is running.

In this case, the ratio of outdoor unit consumed electricity is calculated in place of the calculation shown on the previous page to make the electricity equal to the increase on the electricity meter for outdoor unit.

Method for calculating the ratio of electricity consumed by outdoor unit for indoor unit A when the outdoor unit standby electricity apportionment mode and indoor unit standby electricity apportionment mode are “Not apportioned,” the indoor units are not running and the increase on the electricity meter for outdoor unit is larger than 0.



Remarks

○ When the outdoor unit standby electricity apportionment mode and indoor unit standby electricity apportionment mode are “Not apportioned,” in the above exceptional case, the electricity consumed by outdoor unit may increase as if all indoor units were running although they are not running.

(4) Vacant stores

When there are vacant stores, one of the following three kinds of measures can be selected.

Measures	Vacant stores	Other stores
① The charge for consumed electricity and standby electricity of vacant stores are apportioned to all other tenants.	Consumed electricity: 0 Standby electricity: 0	Consumed electricity: The charge for consumed electricity and standby electricity of vacant stores is added to the charges to other tenants according to the ratio of electricity consumed by the tenants. Standby electricity: Calculated as usual
② The charge for standby electricity of vacant stores is apportioned to all other tenants. The charge for electricity consumed by vacant stores is borne by the building owner.	Consumed electricity: Calculated as usual Standby electricity: 0	Consumed electricity: The charge for consumed electricity of vacant stores is added to the charges to other tenants according to the ratio of electricity consumed by the tenants. Standby electricity: Calculated as usual
③ The charge for consumed electricity and standby electricity of vacant stores is borne by the building owner.	Consumed electricity: Calculated as usual Standby electricity: Calculated as usual	Consumed electricity: Calculated as usual Standby electricity: Calculated as usual

For the vacant stores, set the outdoor unit and indoor unit conditions as shown below in each of the cases ① to ③.

Measures	Outdoor unit setting	Indoor unit setting
① The charge for consumed electricity and standby electricity of vacant stores are apportioned to all other tenants.	Outdoor unit standby electricity: 0 kW	Cooling capacity: 0 kW Fan power consumption: 0 kW Indoor unit standby electricity: 0 kW
② The charge for standby electricity of vacant stores is apportioned to all other tenants. The charge for electricity consumed by vacant stores is borne by the building owner.	Outdoor unit standby electricity: 0 kW	Cooling capacity: Set a value appropriate to the indoor unit. Fan power consumption: Set a value appropriate to the indoor unit. Indoor unit standby electricity: 0 kW
③ The charge for consumed electricity and standby electricity of vacant stores is borne by the building owner.	Outdoor unit standby electricity: Set a value appropriate to the outdoor unit.	Cooling capacity: Set a value appropriate to the indoor unit. Fan power consumption: Set a value appropriate to the indoor unit. Indoor unit standby electricity: Set a value appropriate to the indoor unit.

Remarks

- ○ When any method other than ③ is selected, **change the vacant store settings every time a tenant moves in or out.**
- ○ When the outdoor unit standby electricity apportionment mode is “Not apportioned,” it is unnecessary to set the outdoor unit standby electricity.
- ○ When the indoor unit consumed electricity apportionment mode is “Not apportioned,” it is unnecessary to set the indoor unit cooling capacity.
- ○ When the indoor unit standby electricity apportionment mode is “Not apportioned,” it is unnecessary to set the indoor unit standby electricity.

<3> In the case of Mr. Slim (with different power supplies for outdoor and indoor units)

When the apportioned electricity billing function is used for Mr. Slim models using the different power supplies for outdoor and indoor units, set “A-control model power supply” to “Different power supplies for outdoor and indoor units” by the Initial Setting Tool.

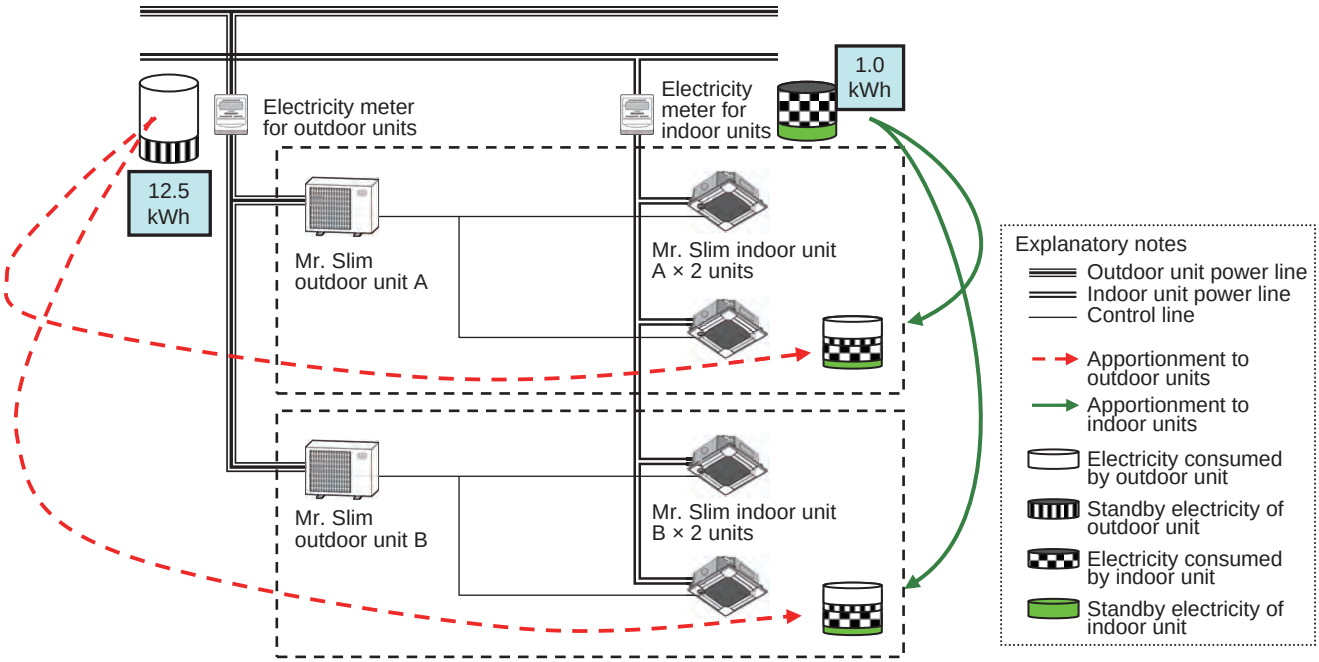
(1) Outline of apportionment

The electric energy consumed by outdoor units A and B is measured, and the energy is apportioned to electricity consumed by outdoor units and standby electricity of the units.

The electric energy consumed by indoor units A and B is measured, and the energy is apportioned to electricity consumed by indoor units and standby electricity of the units.

* When the charge unit price has been set for each time slot, the electric energy is counted by unit price.

For the apportionment procedures in this case, see <1> “In the case of City Multi.”



* For Mr. Slim models (simultaneous type), the units enclosed by a dotted line are regarded as one indoor unit (including the outdoor unit).
* AE-200, AE-50/EW-50, PI controller and pulse detector are omitted.

Remarks

○ Only when any of the following models of M-NET connection adapters is used, apportionment can be performed in the outdoor unit power consumption apportionment mode, “capacity save amount mode.”
PAC-SJ10MA, PAC-SJ18MA, PAC-SJ31MA
When another model of M-NET connection adapter is used, set the apportionment mode to “thermo ON time” or “fan operation time.”

<4> In the case of LOSSNAY

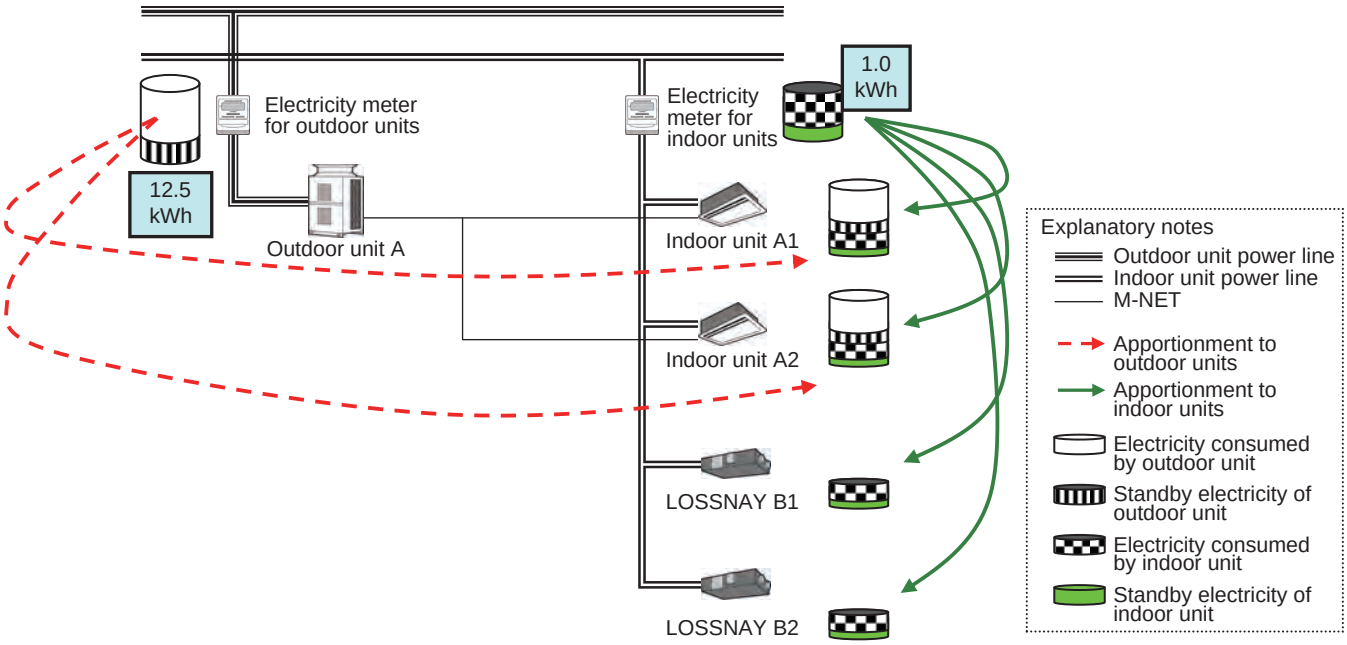
(1) Outline of apportionment

The electric energy consumed by indoor units A1 and A2 and LOSSNAY B1 and B2 is measured, and the energy is apportioned to electricity consumed by indoor units and standby electricity of the units.

* When the charge unit price has been set for each time slot, the electric energy is counted by unit price.

For the apportionment procedures in this case, see <1> “In the case of City Multi.”

However, since outdoor units are not connected to LOSSNAY, only the electric energy for the indoor units is calculated.



* AE-200, AE-50/EW-50, PI controller and pulse detector are omitted.

Remarks

○ Electric energy cannot be apportioned to interlocked LOSSNAY not registered in any group. Register also the interlocked LOSSNAY in the group, operation block or energy management block in the same manner as single LOSSNAY.

<5> In the case of OA processing unit (individually operated by remote controller)

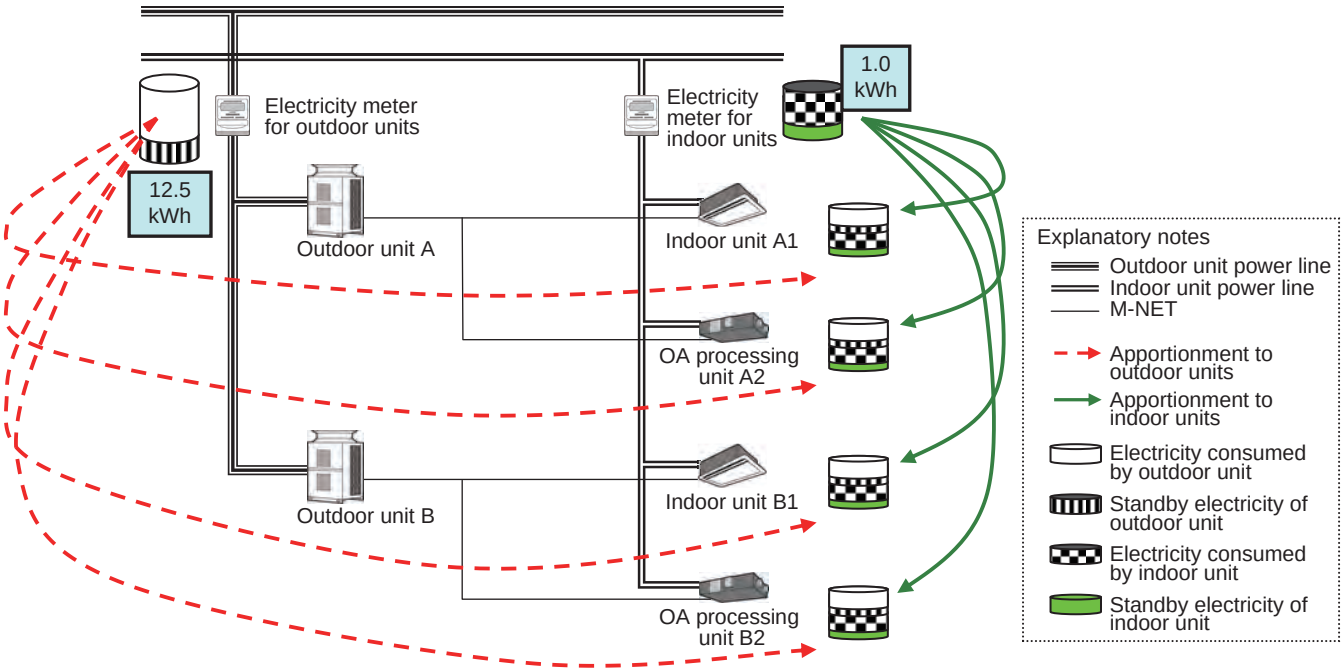
(1) Outline of apportionment

The electric energy consumed by outdoor units A and B is measured, and the energy is apportioned to electricity consumed by outdoor units and standby electricity of the units.

The electric energy consumed by indoor units A1 and B1 and the OA processing units A2 and B2 (individually operated by remote controller) is measured, and the energy is apportioned to the electricity consumed by indoor units and standby electricity of the units.

* When the charge unit price has been set for each time slot, the electric energy is counted by unit price.

For the apportionment procedures in this case, see <1> “In the case of City Multi.”



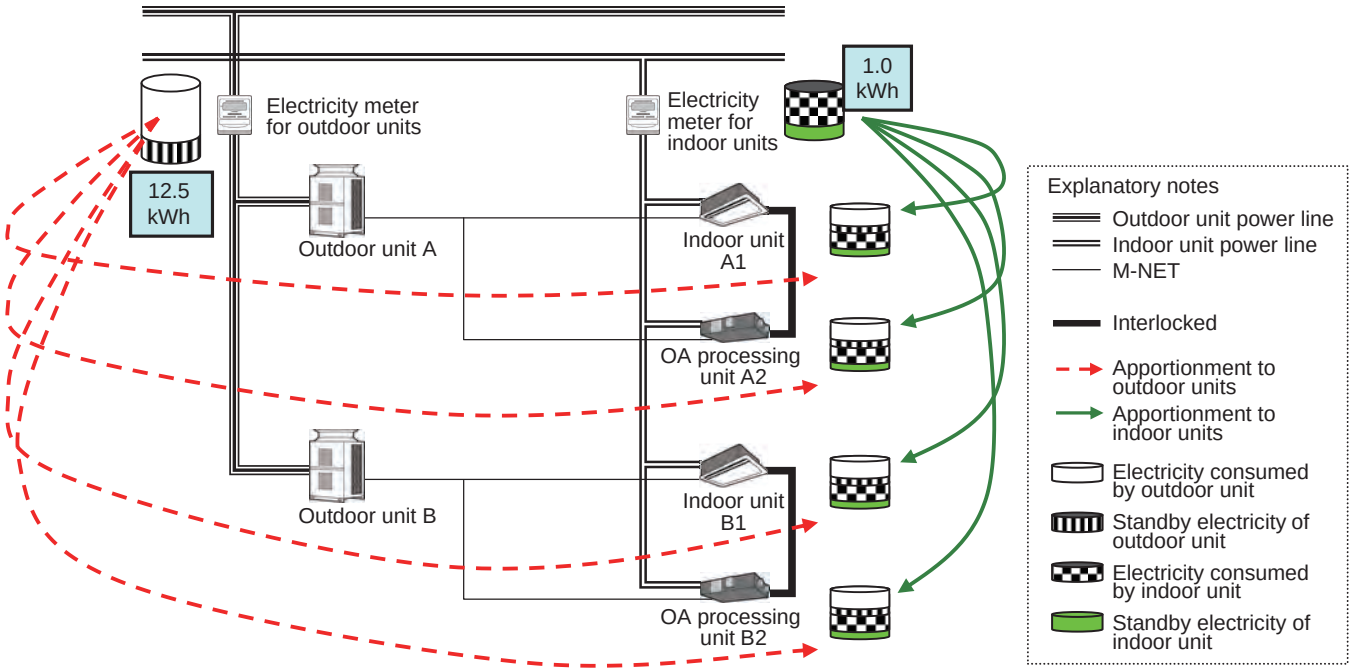
* AE-200, AE-50/EW-50, PI controller and pulse detector are omitted.

<6> In the case of OA processing unit (interlocked with City Multi)

(1) Outline of apportionment

The electric energy consumed by outdoor units A and B is measured, and the energy is apportioned to electricity consumed by outdoor units and standby electricity of the units.
The electric energy consumed by indoor units A1 and B1 and the OA processing units A2 and B2 (interlocked with City Multi) is measured, and the energy is apportioned to the electricity consumed by indoor units and standby electricity of the units.
* When the charge unit price has been set for each time slot, the electric energy is counted by unit price.

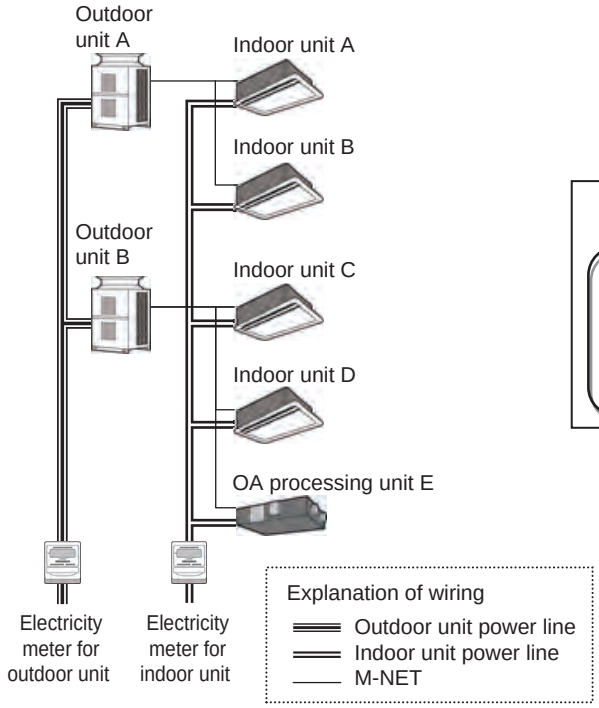
The apportionment in this case is schematically shown below.

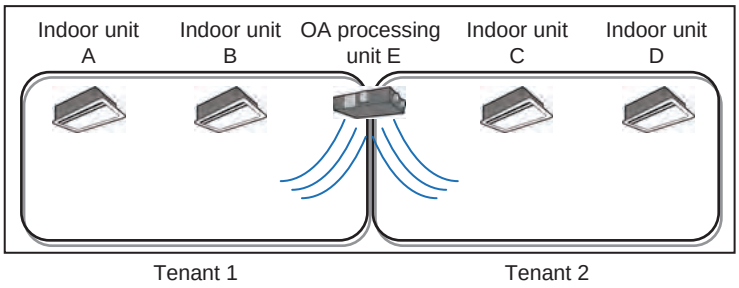


* AE-200, AE-50/EW-50, PI controller and pulse detector are omitted.

The OA processing units (interlocked with City Multi) cannot be registered in groups. They must be registered in the energy management blocks of the relevant units.
The setting method varies depending on whether or not one OA processing unit (interlocked with City Multi) is interlocked with units of different tenants (energy management blocks).

(2) When one OA processing unit (interlocked with City Multi) is interlocked with different energy management blocks (tenants)





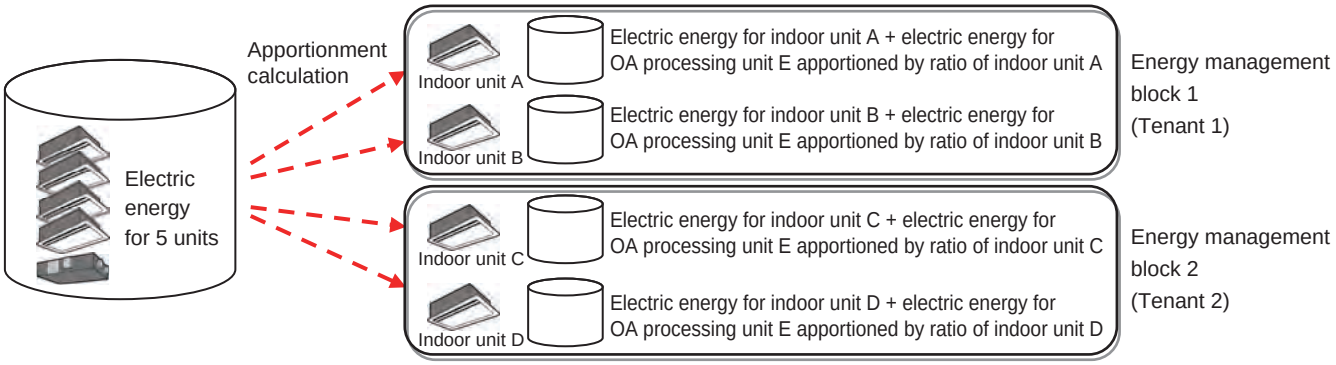
In this case, the electric energy in the OA processing unit can be allocated to the tenants on the same electricity meter system by setting the OA processing unit (interlocked with City Multi) as shown below.

- By the refrigerant system setting function of the Initial Setting Tool, disconnect the OA processing unit E so that the outdoor unit consumed electricity and standby electricity are not apportioned to the OA processing unit E.
  (In the actual environment, the refrigerant system is connected as shown above.)
  The settings for this case are shown below.
  Outdoor unit A: Indoor unit A, indoor unit B
  Outdoor unit B: Indoor unit C, indoor unit D

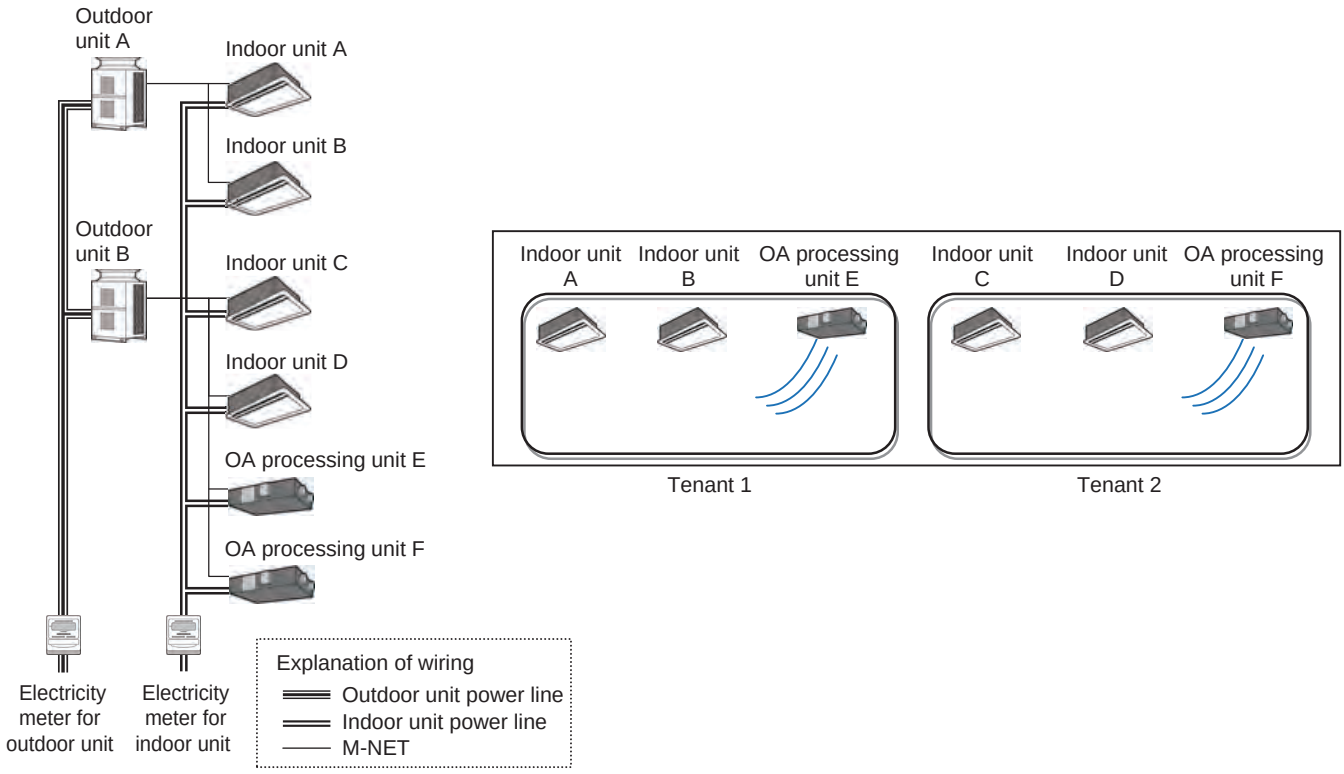
- By the meter setting function of the Initial Setting Tool, disconnect the OA processing unit E from the indoor unit meter so that the indoor unit consumed electricity and standby electricity are not apportioned to the OA processing unit E.
  (In the actual environment, the electric energy is measured as shown above.)
  The settings for this case are shown below.
  Electricity meter for outdoor unit : Outdoor unit A, outdoor unit B
  Electricity meter for indoor unit : Indoor unit A, indoor unit B, indoor unit C, indoor unit D

- Unregister the OA processing unit E from the energy management block.
  The settings for this case are shown below.
  Energy management block 1 (tenant 1): Indoor unit A, indoor unit B
  Energy management block 2 (tenant 2): Indoor unit C, indoor unit D

When the conditions are set as shown above, the electric energy for the five units, the indoor units A to D and OA processing unit E, are apportioned to the indoor units A to D, and the electric energy for the OA processing unit E is apportioned according to the use ratio of the indoor units A to D.



(3) When OA processing units (interlocked with City Multi) are interlocked with different energy management blocks (tenants)



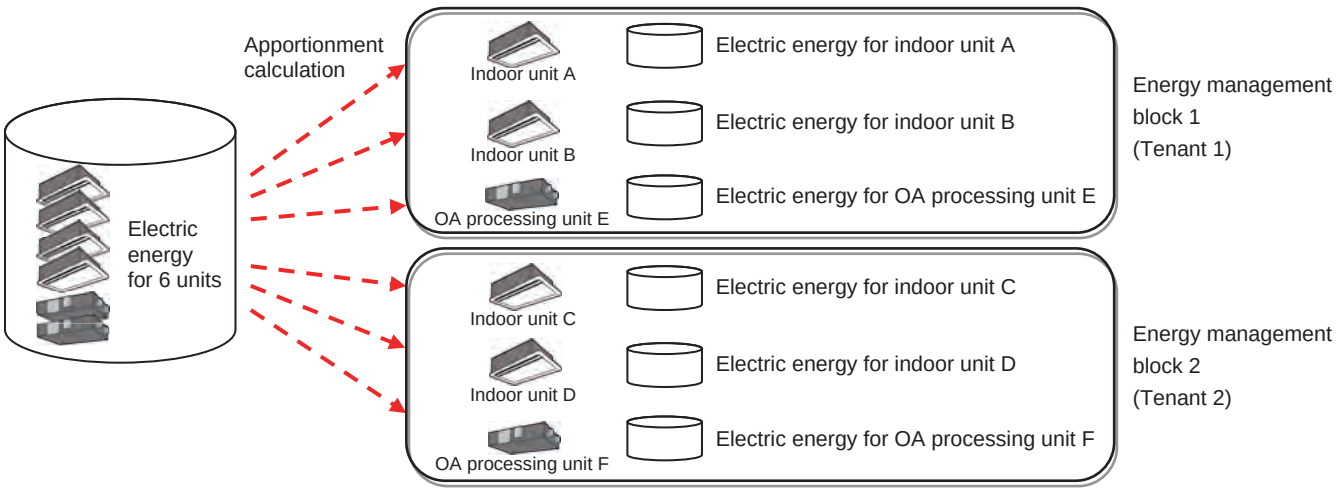
In this case, the electric energy for the OA processing units can be included in the charges to the tenants by setting the OA processing units (interlocked with City Multi) as shown below.

- Set the OA processing units E and F by the refrigerant system setting function of the Initial Setting Tool.
  The settings for this case are shown below.
  Outdoor unit A: Indoor unit A, indoor unit B
  Outdoor unit B: Indoor unit C, indoor unit D, OA processing unit E and OA processing unit F.

- Set the OA processing units E and F for the indoor unit meter by the meter setting function of the Initial Setting Tool.
  The settings for this case are shown below.
  Electricity meter for outdoor unit: Outdoor unit A, outdoor unit B
  Electricity meter for indoor unit : Indoor unit A, indoor unit B, indoor unit C, indoor unit D, OA processing unit E, OA processing unit F

- Register the OA processing units in the energy management blocks.
  The settings for this case are shown below.
  Energy management block 1 (tenant 1): Indoor unit A, indoor unit B, OA processing unit E
  Energy management block 2 (tenant 2): Indoor unit C, indoor unit D, OA processing unit F

In the case of the above settings, the electric energy for the OA processing units (interlocked with City Multi) is apportioned to the energy management blocks. For the apportionment calculation method, see <1> “In the case of City Multi.”

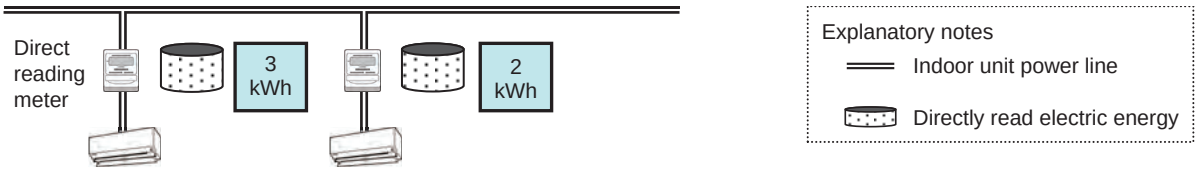


<7> In the case of meter pulse count (direct reading)

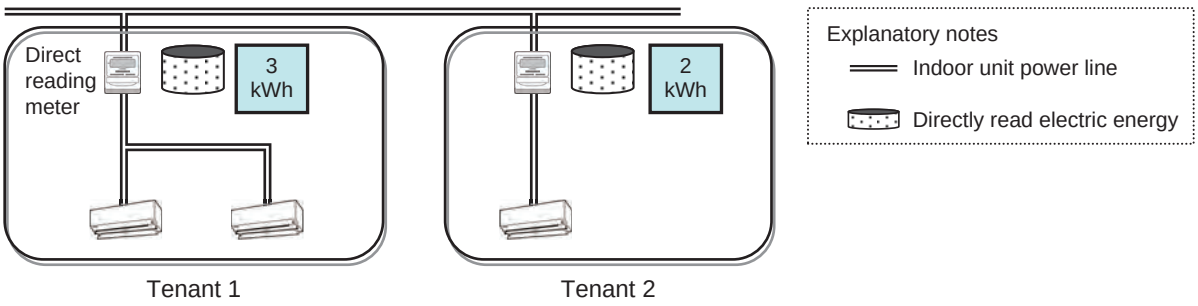
(1) Outline of apportionment

Apportionment calculation is not performed.

Systems, such as M-Series (RAC), that directly read electric energy, use directly the electric energy data collected by the meters.



When some direct reading systems are installed in one tenant, the direct reading meters can be arranged as shown below.



* AE-200, AE-50/EW-50, PI controller and pulse detector are omitted.

When using direct reading meters, set the unit type as shown below.

- Set the unit type to “Other” by the meter setting function of the Initial Setting Tool.

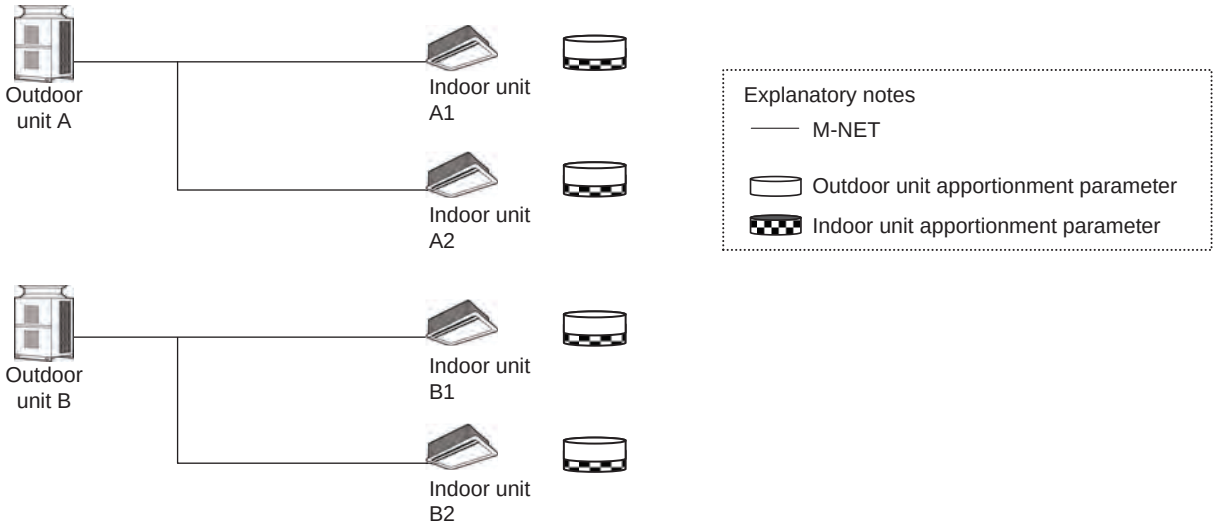
<8> In the case of electric energy manual input (without meters) method

In the case of the electric energy manual input method, the electric energy is calculated by using the meter readings without the use of PI controller.

(1) Outline of apportionment parameters

The electric energy manual input method is used to calculate the apportionment parameters that indicate the power consumption by AE-200 instead of apportioning electric energy.

The apportionment parameters calculated by AE-200 will be used for calculation of the charge rate to the total of all energy management blocks by the Charge Calculation Tool.

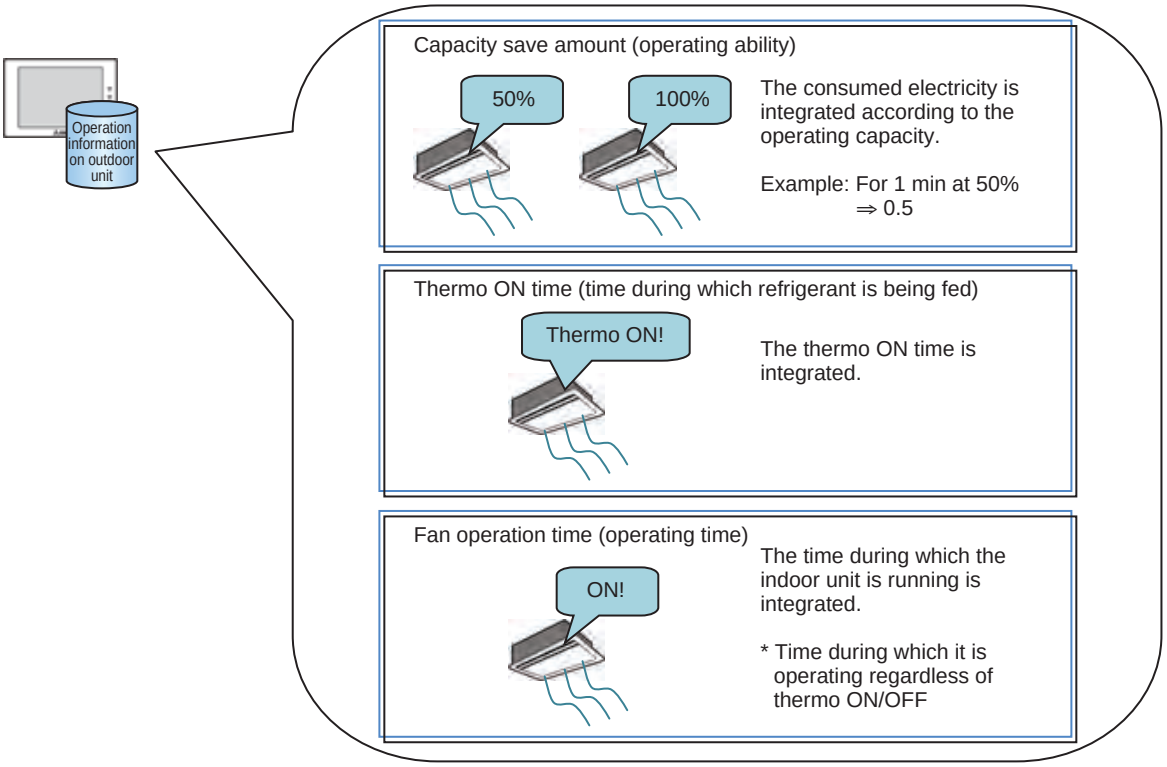


* AE-200 and AE-50/EW-50 are omitted.

(2) Method for calculating outdoor unit apportionment parameter

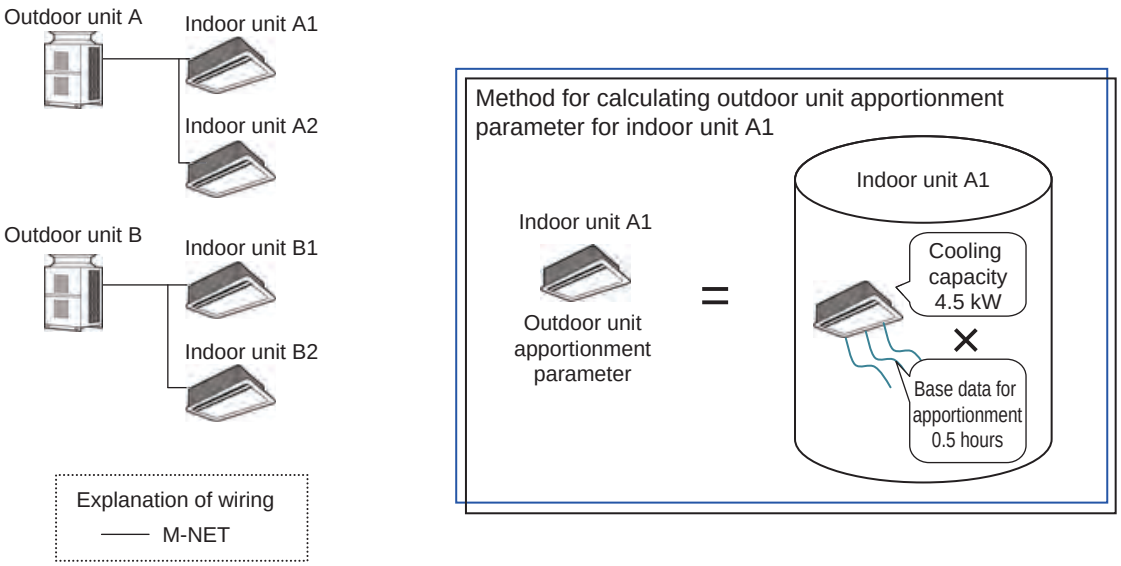
There are the following three kinds of base data for calculation of outdoor unit apportionment parameter. Select one of them.

	Capacity save amount	Thermo ON time	Fan operation time
Measurement method	Value approximate to amount of refrigerant used by indoor unit	Time during which refrigerant is being fed to indoor unit	Indoor unit operation time
Apportionment accuracy	◎ The consumed electricity is calculated with the highest accuracy because a value approximate to the amount of refrigerant fed into the indoor unit is used.	○ The cooling thermo ON or heating thermo ON time is counted. The time is not counted during air blowing (while the refrigerant is not used).	△ The fan operation time is counted. The time is counted also during air blowing.



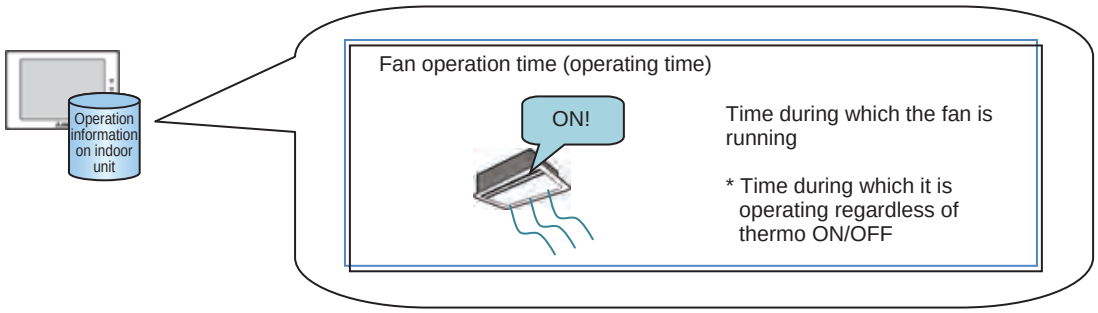
AE-50/EW-50 integrates these data of each indoor unit in each charging time slot, and AE-200 collects the data every 30 minutes.

The method for calculating the outdoor unit apportionment parameter for each indoor unit is explained below. The calculation is performed for each indoor unit every 30 minutes.



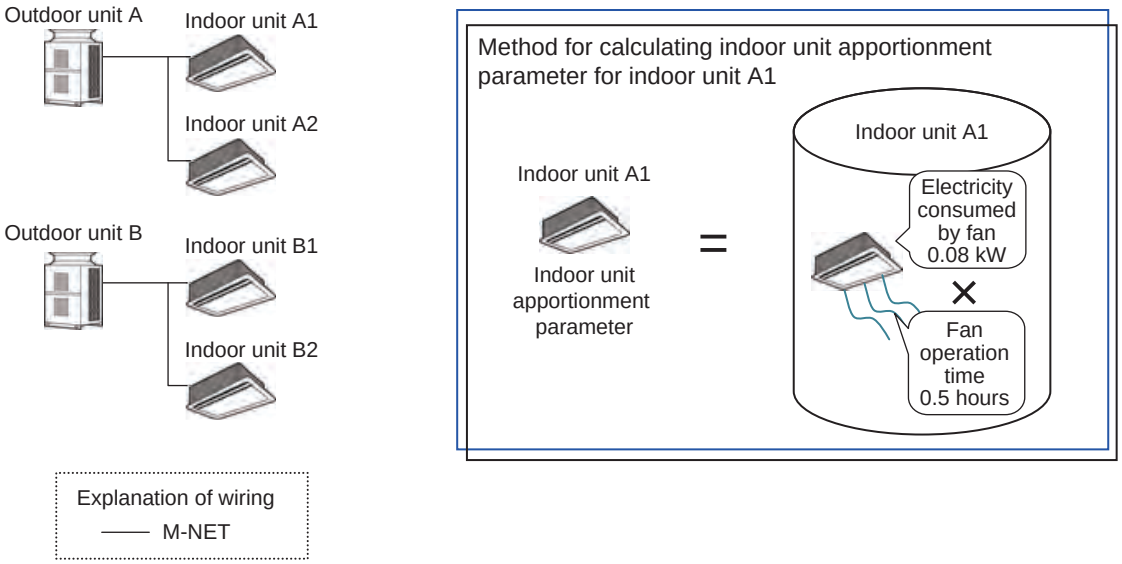
(3) Method for calculating indoor unit apportionment parameter

For calculation of the indoor unit apportionment parameter, use the fan operation time.



AE-50/EW-50 integrates this data of each indoor unit in each charging time slot, and AE-200 collects the data every 30 minutes.

The method for calculating the indoor unit apportionment parameter for each indoor unit is explained below. The calculation is performed for each indoor unit every 30 minutes.

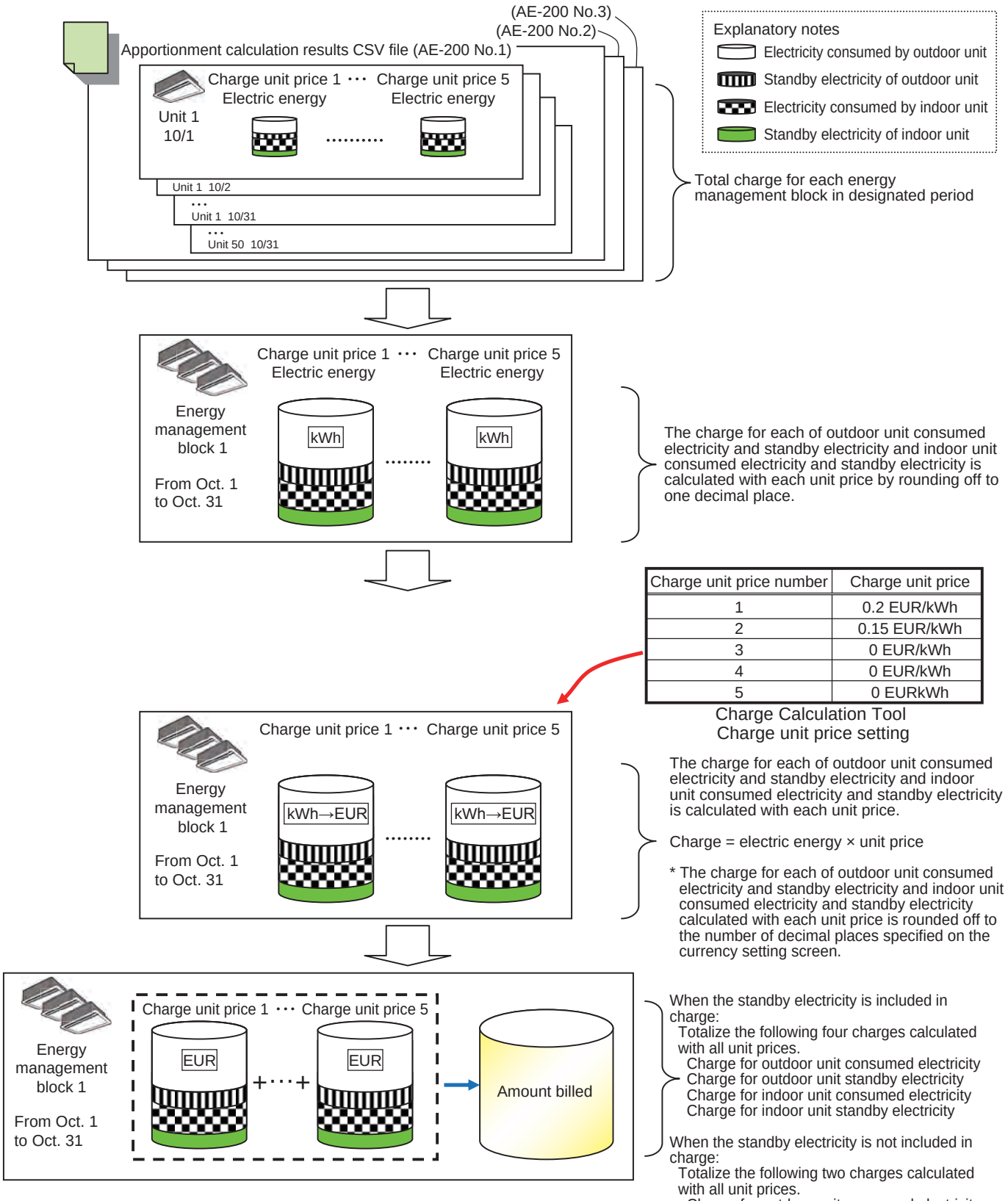


[4] Charge calculation

The methods for calculating the charges with the Charge Calculation Tool based on the results of apportionment calculation are explained.

<1> Electric energy measurement (with meters) method

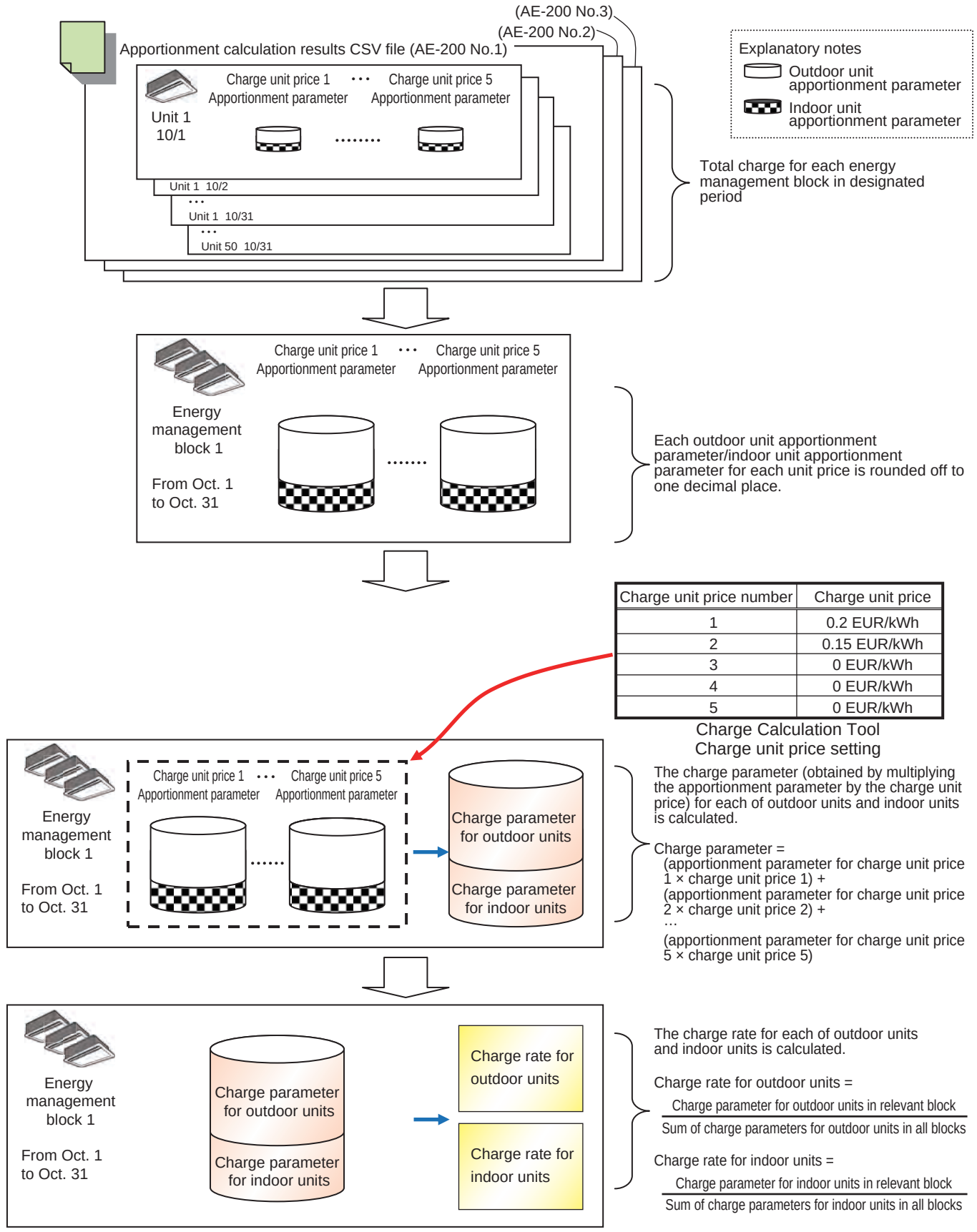
In the case of the electric energy measurement (with meters) method, the charge for each energy management block is calculated based on the apportioned electric energy to each unit output from AE-200.



Charge unit price number	Charge unit price
1	0.2 EUR/kWh
2	0.15 EUR/kWh
3	0 EUR/kWh
4	0 EUR/kWh
5	0 EURkWh

<2> Electric energy manual input (without meters) method

In the case of the electric energy manual input (without meters) method, the charge rates of outdoor units and indoor units in each energy management block are calculated based on their apportionment parameters output from AE-200.
The total rate for all sets of AE-200 calculated by the Charge Calculation Tool is 100%.
The charge to each tenant can be determined by multiplying the total energy charge by the charge rate.



Charge unit price number	Charge unit price
1	0.2 EUR/kWh
2	0.15 EUR/kWh
3	0 EUR/kWh
4	0 EUR/kWh
5	0 EUR/kWh

[5] Screen display and output

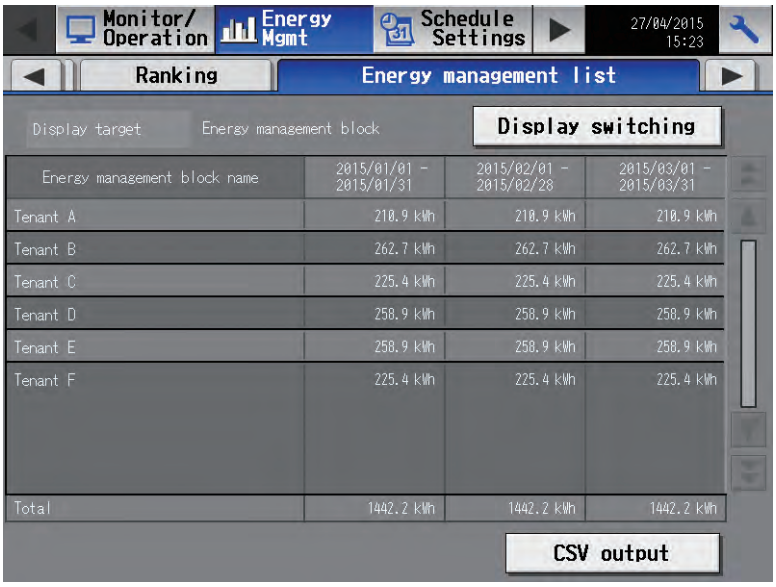
<1> AE-200 LCD

The results of monthly apportionment calculation can be checked on the LCD screen of AE-200. The results of apportionment calculation can be output to a CSV file from this screen.
The data for past 25 months from the previous month can be displayed.

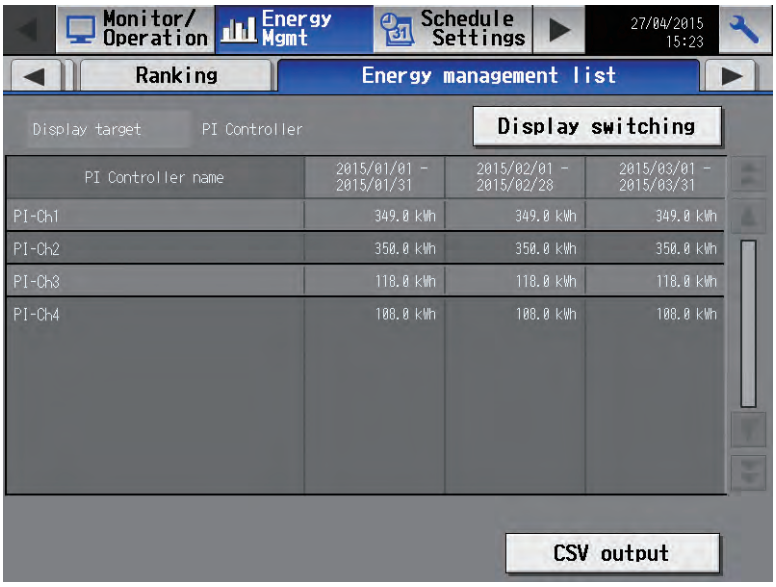
Remarks ○ The results of apportionment calculation cannot be displayed on AE-50/EW-50.

(1) Electric energy measurement (with meters) method
Two kinds of data, data on energy management blocks and on meters, can be displayed.

● Example of display of data on energy management blocks
The apportioned electric energy to each energy management block in each month is displayed.



● Example of display of data on meters
The value measured by each meter in each month is output.

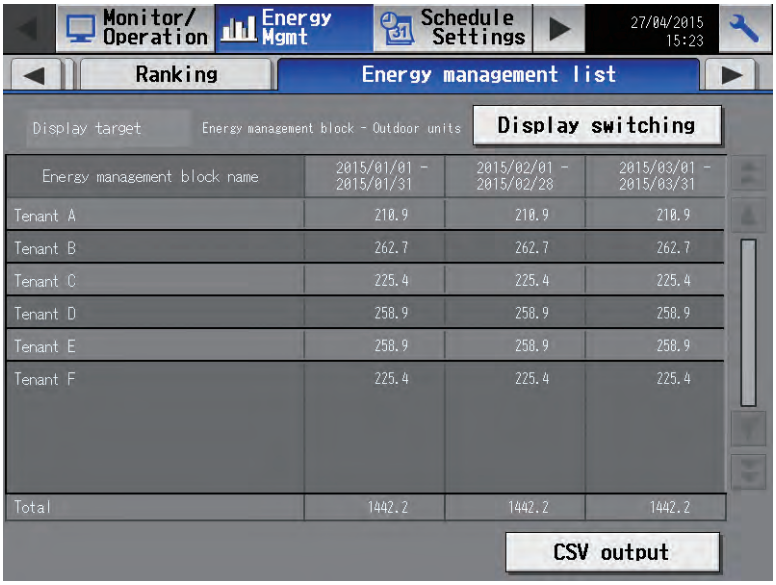


(2) Electric energy manual input (without meters) method

Two kinds of data, data on outdoor units and on indoor units in each energy management block, can be displayed on the screen.

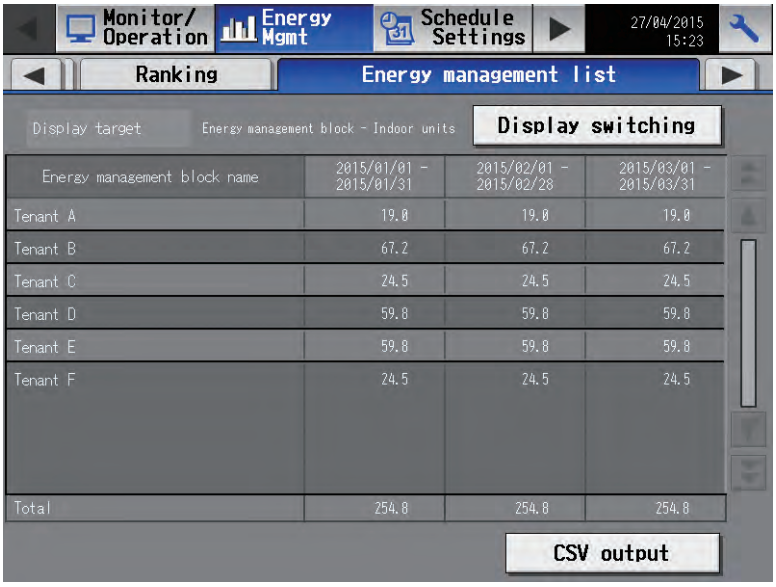
● Example of display of data on energy management blocks (outdoor units)

The apportionment parameter for outdoor units in each energy management block in each month is displayed.



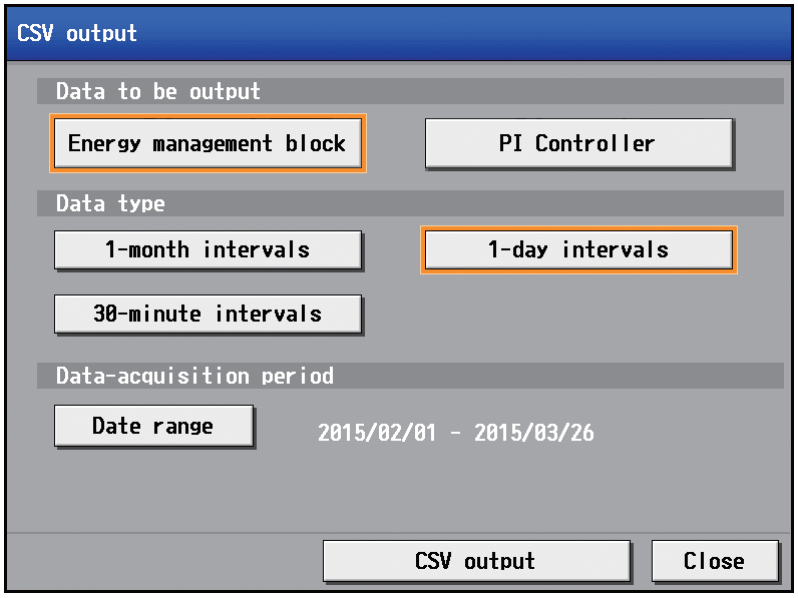
● Example of display of data on energy management blocks (indoor units)

The apportionment parameter for indoor units in each energy management block in each month is displayed.



<2> Output of CSV file from AE-200

CSV files can be output by pressing the CSV output button on the energy management list screen of AE-200.



The following three kinds of CSV files can be output.

Kind	Period of data which can be output
1-month intervals	For 25 months before current month
1-day intervals	For 62 days before current day
30-minute intervals	For past 3 days from current day

Remarks

- ○ Files cannot be output from AE-50/EW-50.
- ○ For calculation of charges by the Charge Calculation Tool, daily data is used.

(1) Electric energy measurement (with meters) method
Two kinds of data, data on energy management blocks and on meters, can be output.

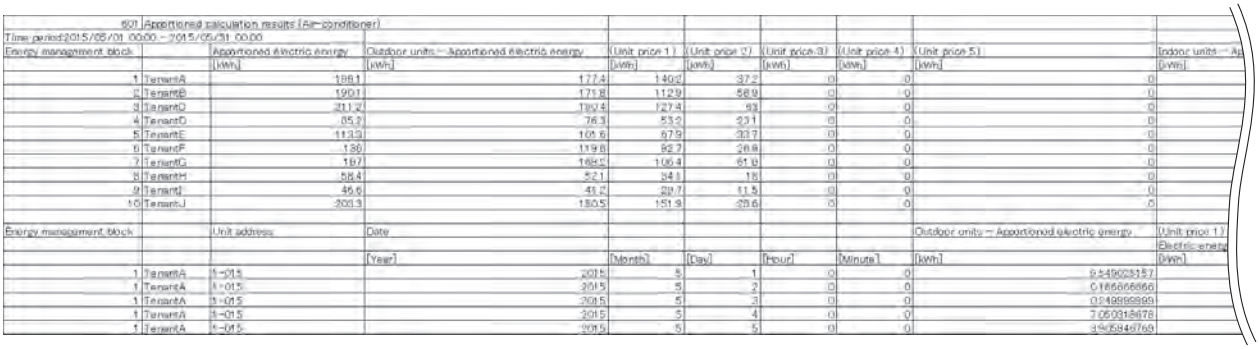
The CSV file is output to the "¥[serial number of AE-200]¥ApportionData" folder in the USB memory.
Example: When the serial number is 12345-123 → "¥12345-123¥ApportionData¥"

The name of the file of the results of apportionment calculation for each energy management block is shown below.
Monthly: "App_IC_M_[start year]-[start month]_[end year]-[end month].csv"
Example: Output of data from Feb. 2015 to Mar. 2015
→ "App_IC_M_2015-02_2015-03.csv"
Daily: "App_IC_D_[start year]-[start month]-[start day]_[end year]-[end month]-[end day].csv"
Example: Output of data from Feb. 26, 2015 to Mar. 25, 2015
→ "App_IC_D_2015-02-26_2015-03-25.csv"
Every 30 minutes: "App_IC_30 m_[start year]-[start month]-[start day]-[start hour]-[start minute]_[end year]-[end month]-[end day]-[end hour]-[end minute].csv"
Example: Output of data from Feb. 26, 2015 to Feb. 28, 2015
→ "App_IC_30 m_2015-02-26-00-30_2015-02-28-24-00.csv"

The name of the file of the results of apportionment calculation by each meter is shown below.
Monthly: "App_MC_M_[start year]-[start month]_[end year]-[end month].csv"
Example: Output of data from Feb. 2015 to Mar. 2015
→ "App_IC_M_2015-02_2015-03.csv"
Daily: "App_MC_D_[start year]-[start month]-[start day]_[end year]-[end month]-[end day].csv"
Example: Output of data from Feb. 26, 2015 to Mar. 25, 2015
→ "App_IC_D_2015-02-26_2015-03-25.csv"
Every 30 minutes: "App_MC_30 m_[start year]-[start month]-[start day]-[start hour]-[start minute]_[end year]-[end month]-[end day]-[end hour]-[end minute].csv"
Example: Output of data from Feb. 26, 2015 to Feb. 28, 2015
→ "App_MC_30 m_2015-02-26-00-30_2015-02-28-24-00.csv"

Remarks
○ IC, MC, M, D and 30 m in the file names indicate the energy management block, PI controller, monthly data, daily data and data every 30 minutes, respectively.

● Example of display of data on energy management blocks
The electric energy apportioned to each energy management block is output.

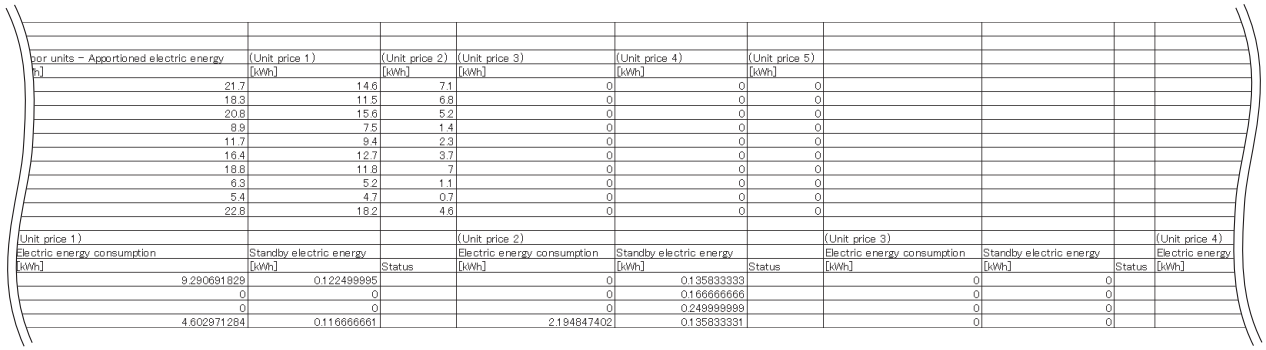


601 Apportioned calculation results (Air-conditioner)

Time period:2015/05/01 00:00 – 2015/05/31 00:00

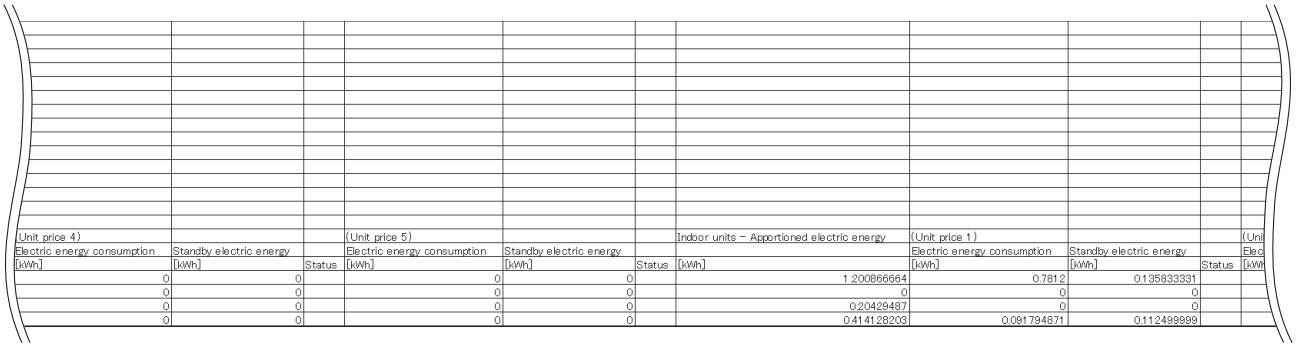
Energy management block		Apportioned electric energy [kWh]	Outdoor units – Apportioned electric energy [kWh]	(Unit price 1) [kWh]	(Unit price 2) [kWh]	(Unit price 3) [kWh]	(Unit price 4) [kWh]	(Unit price 5) [kWh]	Indoor units – Ap [kWh]
1	TenantA	186.1	177.4	140.2	37.2	0	0	0	
2	TenantB	190.1	175.8	112.9	58.9	0	0	0	
3	TenantC	211.2	190.4	127.4	63	0	0	0	
4	TenantD	85.7	76.3	53.2	23.1	0	0	0	
5	TenantE	113.3	105.5	67.9	33.7	0	0	0	
6	TenantF	130	119.8	82.7	29.8	0	0	0	
7	TenantG	167	156.5	106.4	41.8	0	0	0	
8	TenantH	58.4	52.1	34.1	18	0	0	0	
9	TenantI	46.6	45.2	29.7	11.5	0	0	0	
10	TenantJ	200.3	180.5	151.9	28.6	0	0	0	

Energy management block		Unit address	Date					Outdoor units – Apportioned electric energy	(Unit price 1) Electric energ
			[Year]	[Month]	[Day]	[Hour]	[Minute]	[kWh]	[kWh]
1	TenantA	1-015	2015	5	1	0	0	9.549023157	
1	TenantA	1-015	2015	5	2	0	0	0.166666666	
1	TenantA	1-015	2015	5	3	0	0	0.249999999	
1	TenantA	1-015	2015	5	4	0	0	7.050318478	
1	TenantA	1-015	2015	5	5	0	0	3.405946769	

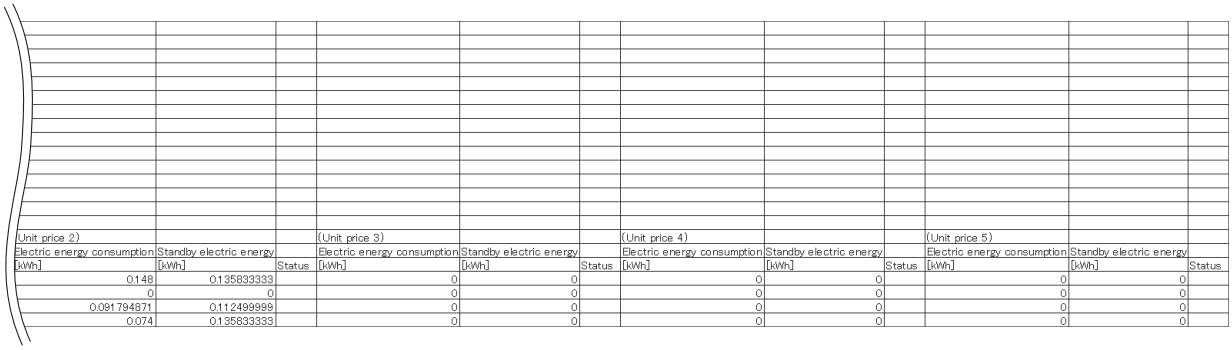


oor units – Apportioned electric energy h]	(Unit price 1) [kWh]	(Unit price 2) [kWh]	(Unit price 3) [kWh]	(Unit price 4) [kWh]	(Unit price 5) [kWh]
21.7	14.6	7.1	0	0	0
18.3	11.5	6.8	0	0	0
20.8	15.6	5.2	0	0	0
8.9	7.5	1.4	0	0	0
11.7	9.4	2.3	0	0	0
16.4	12.7	3.7	0	0	0
18.8	11.8	7	0	0	0
6.3	5.2	1.1	0	0	0
5.4	4.7	0.7	0	0	0
22.8	18.2	4.6	0	0	0

(Unit price 1) Electric energy consumption [kWh]	Standby electric energy [kWh]	Status	(Unit price 2) Electric energy consumption [kWh]	Standby electric energy [kWh]	Status	(Unit price 3) Electric energy consumption [kWh]	Standby electric energy [kWh]	Status	(Unit price 4) Electric energy [kWh]
9.290691829	0.122499995		0	0.135833333		0	0		
0	0		0	0.166666666		0	0		
0	0		0	0.249999999		0	0		
4.602971284	0.116666661		2.194847402	0.135833331		0	0		



(Unit price 4) Electric energy consumption [kWh]	Standby electric energy [kWh]	Status	(Unit price 5) Electric energy consumption [kWh]	Standby electric energy [kWh]	Status	Indoor units – Apportioned electric energy [kWh]	(Unit price 1) Electric energy consumption [kWh]	Standby electric energy [kWh]	Status	(Uni Elec [kW
0	0		0	0		1.200866664	0.7812	0.135833331		
0	0		0	0		0	0	0		
0	0		0	0		0.20429487	0	0		
0	0		0	0		0.414128203	0.091794871	0.112499999		



(Unit price 2) Electric energy consumption [kWh]	Standby electric energy [kWh]	Status	(Unit price 3) Electric energy consumption [kWh]	Standby electric energy [kWh]	Status	(Unit price 4) Electric energy consumption [kWh]	Standby electric energy [kWh]	Status	(Unit price 5) Electric energy consumption [kWh]	Standby electric energy [kWh]	Status
0.148	0.135833333		0	0		0	0		0	0	
0	0		0	0		0	0		0	0	
0.091794871	0.112499999		0	0		0	0		0	0	
0.074	0.135833333		0	0		0	0		0	0	

● Example of display of data on meters
The values measured by each meter are output.

611	Apportioned calculation results (Metering device)								
Time period:2015/05/01 00:00 – 2015/05/31 00:00									
Metering device name	Unit address	Measurement value	(Unit price 1)	(Unit price 2)	(Unit price 3)	(Unit price 4)	(Unit price 5)	Measurement unit	
PI-Ch1	1-049-1	349	253	96	0	0	0	kWh	
PI-Ch2	1-049-2	286	223	63	0	0	0	kWh	
PI-Ch3	1-049-3	164	126	38	0	0	0	kWh	
PI-Ch4	1-049-4	127	99	28	0	0	0	kWh	
Metering device name	Unit address	Date					(Unit price 1)		(Unit price 2
		[Year]	[Month]	[Day]	[Hour]	[Minute]		Status	
PI-Ch1	1-049-1	2015	5	1	0	0	45		12
PI-Ch1	1-049-1	2015	5	2	0	0	41		13
PI-Ch1	1-049-1	2015	5	3	0	0	13		7
PI-Ch1	1-049-1	2015	5	4	0	0	28		5

	(Unit price 3)		(Unit price 4)		(Unit price 5)		Measurement unit
Status		Status		Status		Status	
	0		0		0		kWh
	0		0		0		kWh
	0		0		0		kWh
	0		0		0		kWh

Remarks

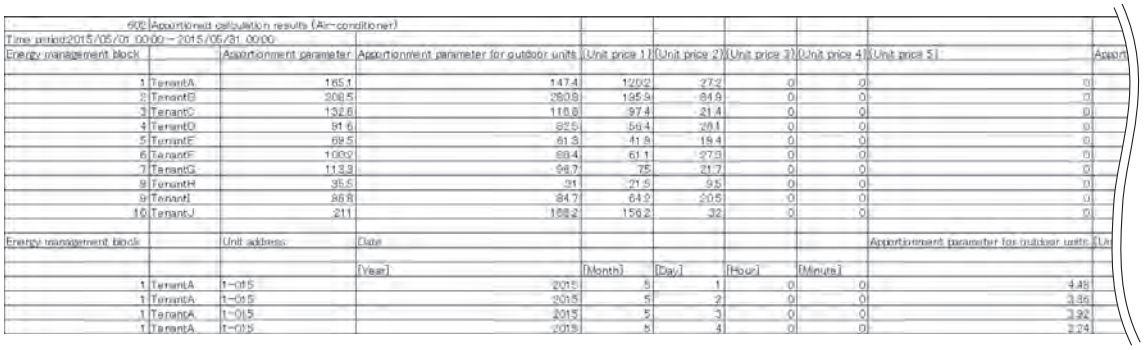
○ The indications in the “Status” columns in the CSV file have the following meanings.
No indication: Normal
-1: Any trouble has occurred.
-2: Carry-over is caused for any reason, for example, apportionment calculation could not be performed on the day (in the month or for the 30 minutes).

(2) Electric energy manual input (without meters) method
One kind of data, data on energy management blocks, can be displayed on the screen.

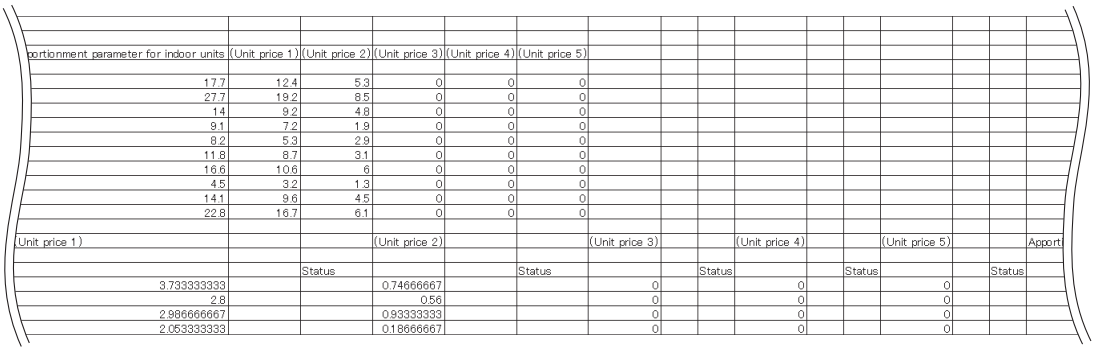
The CSV file is output to the “¥[serial number of AE-200]¥ApportionData” folder in the USB memory.
Example: When the serial number is 12345-123 →“¥12345-123¥ApportionData¥”

The name of the file of the results of apportionment calculation for each energy management block is shown below.
Monthly: “App_IC_M_[start year]-[start month]_[end year]-[end month].csv”
Example: Output of data from Feb. 2015 to Mar. 2015
→ “App_IC_M_2015-02_2015-03.csv”
Daily: “App_IC_D_[start year]-[start month]-[start day]_[end year]-[end month]-[end day].csv”
Example: Output of data from Feb. 26, 2015 to Mar. 25, 2015
→ “App_IC_D_2015-02-26_2015-03-25.csv”
Every 30 minutes: “App_IC_30 m_[start year]-[start month]-[start day]-[start hour]-[start minute]_[end year]-[end month]-[end day]-[end hour]-[end minute].csv”
Example: Output of data from Feb. 26, 2015 to Feb. 28, 2015
→ “App_IC_30 m_2015-02-26-00-30_2015-02-28-24-00.csv”

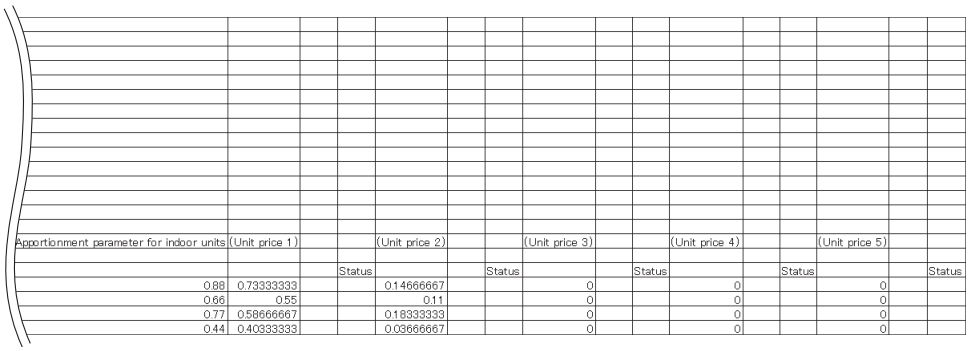
● Example of display of data on energy management blocks
The apportionment parameters for each energy management block are output.



,900,Apportionment calculation results (Air-conditioner)										
Time period:2015/05/01 00:00 – 2015/05/31 00:00										
Energy management block		Apportionment parameter	Apportionment parameter for outdoor units	(Unit price 1)	(Unit price 2)	(Unit price 3)	(Unit price 4)	(Unit price 5)		Apport
1	TenantA	165.1	147.4	120.2	27.2	0	0	0		
2	TenantB	208.5	260.8	195.9	64.9	0	0	0		
3	TenantC	132.6	118.8	97.4	21.4	0	0	0		
4	TenantD	81.6	82.5	56.4	26.1	0	0	0		
5	TenantE	69.5	61.3	41.9	19.4	0	0	0		
6	TenantF	100.2	88.4	61.1	27.3	0	0	0		
7	TenantG	113.3	96.7	75	21.7	0	0	0		
8	TenantH	35.5	31	21.5	9.5	0	0	0		
9	TenantI	86.8	84.7	64.2	20.5	0	0	0		
10	TenantJ	211	188.2	156.2	32	0	0	0		
Energy management block		Unit address	Date					Apportionment parameter for outdoor units		(La
			[Year]		[Month]	[Day]	[Hour]	[Minute]		
1	TenantA	1-015	2015		5	1	0	0	4.48	
1	TenantA	1-015	2015		5	2	0	0	3.56	
1	TenantA	1-015	2015		5	3	0	0	3.92	
1	TenantA	1-015	2015		5	4	0	0	2.24	



ortionment parameter for indoor units	(Unit price 1)	(Unit price 2)	(Unit price 3)	(Unit price 4)	(Unit price 5)												
17.7	12.4	5.3	0	0	0												
27.7	19.2	8.5	0	0	0												
14	9.2	4.8	0	0	0												
9.1	7.2	1.9	0	0	0												
8.2	5.3	2.9	0	0	0												
11.8	8.7	3.1	0	0	0												
16.6	10.6	6	0	0	0												
4.5	3.2	1.3	0	0	0												
14.1	9.6	4.5	0	0	0												
22.8	16.7	6.1	0	0	0												
(Unit price 1)			(Unit price 2)			(Unit price 3)			(Unit price 4)			(Unit price 5)			Apport		
		Status			Status			Status			Status			Status			
3.733333333			0.74666667			0			0			0					
2.8			0.56			0			0			0					
2.986666667			0.93333333			0			0			0					
2.053333333			0.18666667			0			0			0					



Apportionment parameter for indoor units	(Unit price 1)			(Unit price 2)			(Unit price 3)			(Unit price 4)			(Unit price 5)		
			Status			Status			Status			Status			Status
0.88	0.73333333			0.14666667			0			0			0		
0.66	0.55			0.11			0			0			0		
0.77	0.58666667			0.18333333			0			0			0		
0.44	0.40333333			0.03666667			0			0			0		

Remarks

○ IC, MC, M, D and 30 m in the file names indicate the energy management block, PI controller, monthly data, daily data and data every 30 minutes, respectively.

○ The indications in the “Status” columns in the CSV file have the following meanings.
No indication: Normal
-1: Any trouble has occurred.
-2: Carry-over is caused for any reason, for example, apportionment calculation could not be performed on the day (in the month or for the 30 minutes).

Remarks

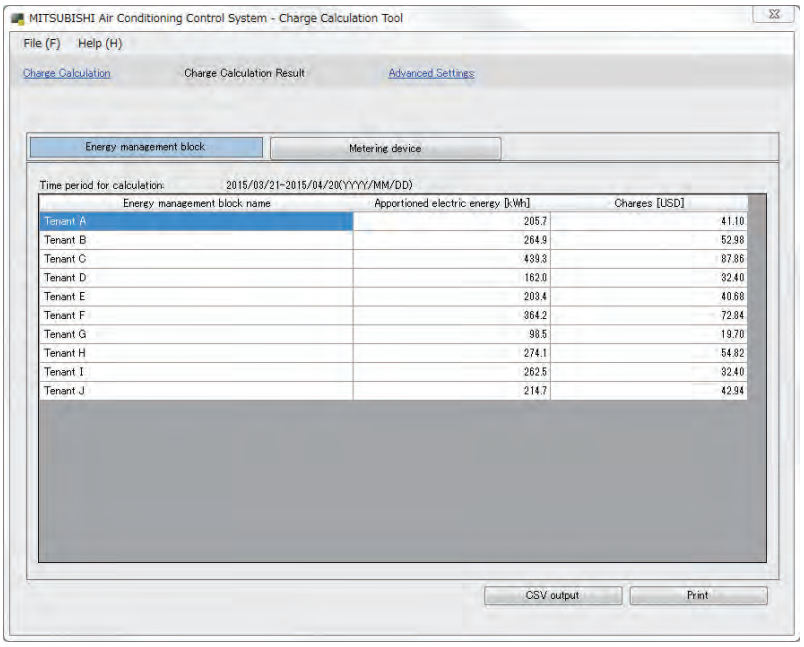
- ○ Out-of-date data will be automatically deleted. It is recommended to periodically output the data to a CSV file and save the file.
- ○ It is recommended to periodically output the data to a CSV file and save the file in case AE-200 goes down.
- ○ Do not remove the USB memory while the data is being written to it.
- ○ Use a USB memory device that meets the following conditions.
  - ● Supports USB 2.0
  - ● Formatted with FAT32 or FAT (FAT16)
  - ● Security function is not provided or not required to be set.
- ○ If the data cannot be output to the USB memory device after a writing error occurs and the device is replaced, reboot the AE-200/AE-50 (turn off the power and restart). Do not use the USB memory device that has experienced writing error once.
- ○ The data in the addresses of unconnected devices are not output.

<3> Display on Charge Calculation Tool screen

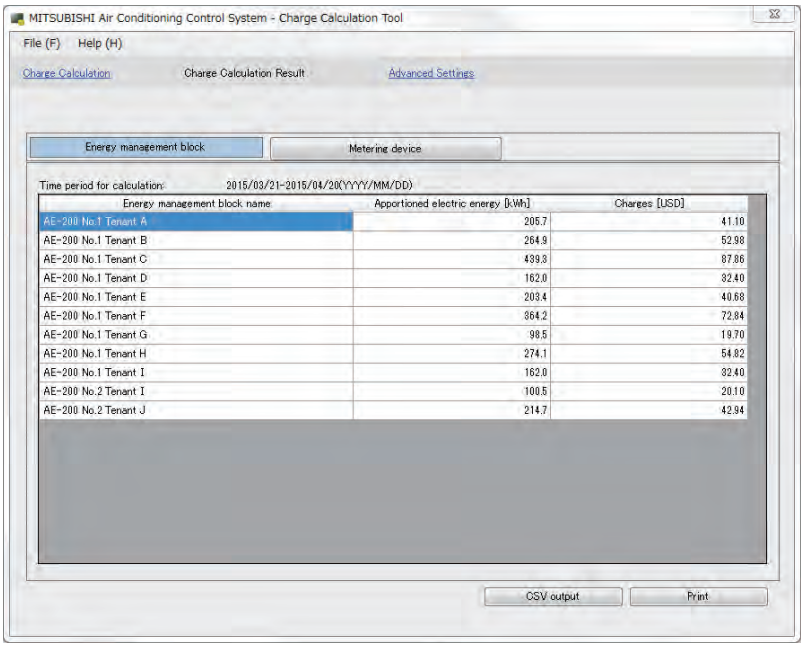
(1) Electric energy measurement (with meters) method

Two kinds of data, data on energy management blocks and on meters, can be displayed on the screen.

- Example of display of data on energy management blocks (when energy management blocks are integrated)
  The apportioned electric energy and charge to each energy management block are displayed.
  When there are energy management blocks having the same name, these blocks are displayed as one integrated energy management block.

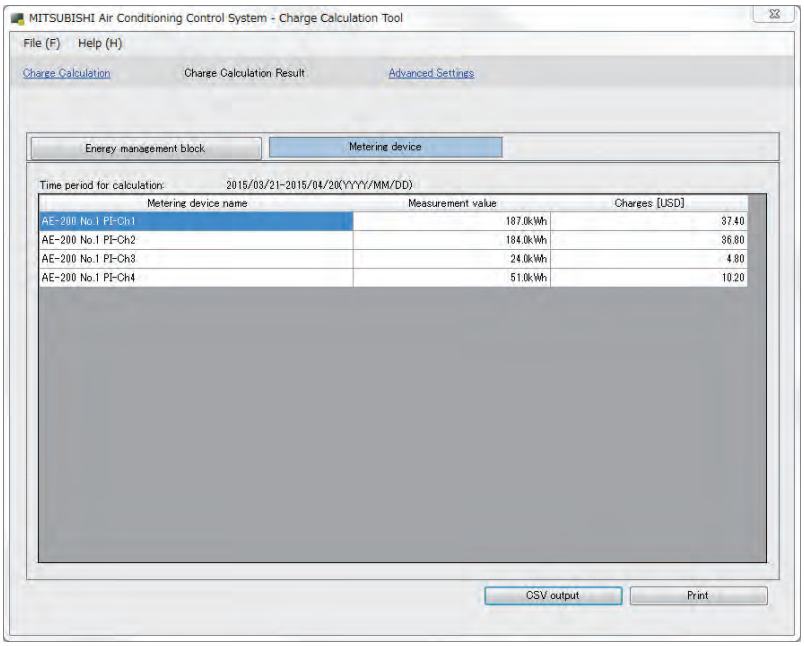


- Example of display of data on energy management blocks (when energy management blocks are not integrated)
  The apportioned electric energy and charge to each energy management block are displayed.
  When there are energy management blocks having the same name, these blocks are not integrated and are displayed as different energy management blocks.



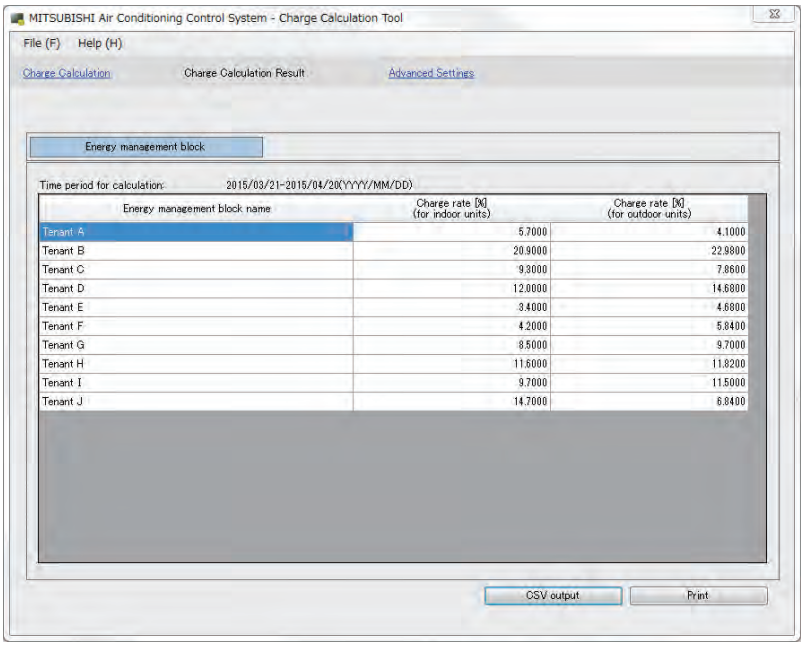
Remarks ○ Determine whether or not to integrate the energy management blocks with the Charge Calculation Tool.

- Example of display of data on meters
  The measurement and charge determined by each meter are displayed.

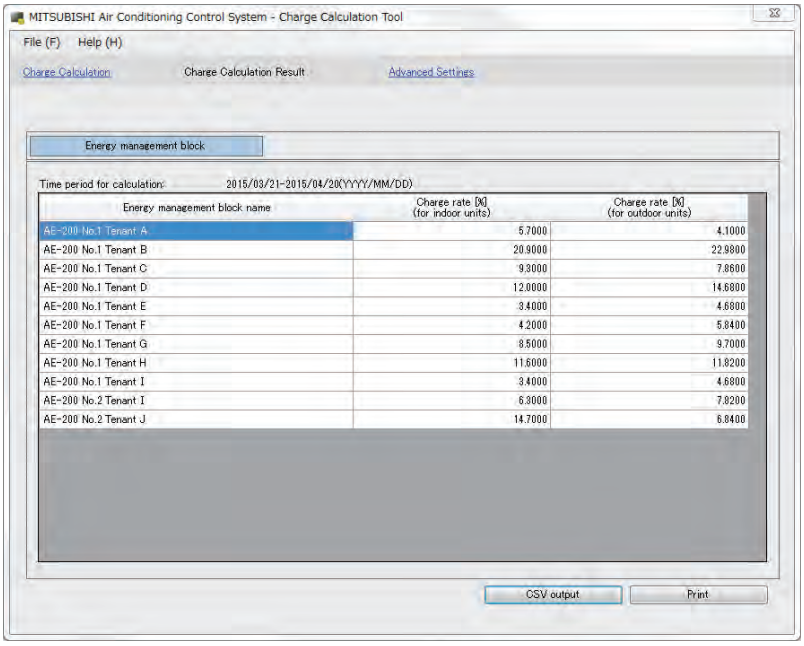


(2) Electric energy manual input (without meters) method
One kind of data, data on energy management blocks, can be displayed on the screen.

● Example of display of data on energy management blocks (when energy management blocks are integrated)
The charge rates of outdoor units and indoor units in each energy management block are displayed.
When there are energy management blocks having the same name, these blocks are displayed as one integrated energy management block.



● Example of display of data on energy management blocks (when energy management blocks are not integrated)
The charge rates of outdoor units and indoor units in each energy management block are displayed.
When there are energy management blocks having the same name, these blocks are not integrated and are displayed as different energy management blocks.



<4> Output of CSV file of data obtained by Charge Calculation Tool

The results of calculation of electric energy and charges obtained by the Charge Calculation Tool can be output to a CSV file.

(1) Electric energy measurement (with meters) method

Two kinds of data, data on energy management blocks and on meters, can be output.

The automatically output CSV file is stored in the folder with the preset CSV file destination folder name + ¥[year]¥[month]¥.
The output file is dated based on the year and month (day) of the adjustment date.
Example: When the file is output at 5:00 am on Feb. 1, 2015 (day after adjustment date)
The folder name is “C:\CCTool\ChargeFile\2015\01\.”

The name of the file of the results of calculation of charges to energy management blocks is shown below.
Daily: “[year] [month] [day] B.csv” Example: Output on Feb. 1, 2015 → “20150131B.csv”
Monthly: “[year] [month] B.csv” Example: Output on Feb. 1, 2015 → “201501B.csv”

The name of the file of the results of calculation of charges to meter is shown below.
Daily: “[year] [month] [day] W.csv” Example: Output on Feb. 1, 2015 → “20150131W.csv”
Monthly: “[year] [month] W.csv” Example: Output on Feb. 1, 2015 → “201501W.csv”

● Example of output of data on energy management blocks (when energy management blocks are integrated)
The apportioned electric energy and charge to each energy management block are output.
When there are energy management blocks having the same name, these blocks are output as one integrated energy management block.

701	Charge Calculation Result (Energy management block)								
Time period:2015/04/01-2015/04/31									
Energy management block name	Apportioned electric energy	Outdoor units - Apportioned electric energy	(Unit price 1)	(Unit price 2)	(Unit price 3)	(Unit price 4)	(Unit price 5)	Indoor units - Apportioned electric energy	(Unit
	[kWh]	[kWh]	[kWh]	[kWh]	[kWh]	[kWh]	[kWh]	[kWh]	[kWh]
Tenant A	261.3	221.5	175.3	46.2	0	0	0	39.8	
Tenant B	347.4	292.7	224.3	68.4	0	0	0	54.7	
Tenant C	532.8	449	374.1	74.9	0	0	0	83.8	
Tenant D	204.5	182.4	144.9	37.5	0	0	0	22.1	
Tenant E	260.7	238.4	185.3	53.1	0	0	0	22.3	
Tenant F	471.6	435	337.1	97.9	0	0	0	36.6	

Unit price 1)	(Unit price 2)	(Unit price 3)	(Unit price 4)	(Unit price 5)		Apportioned charges	Outdoor units - Apportioned charges	(Unit price 1)	(Unit price 2)	(Unit price 3)	(Unit price 4)	(Unit price 5)	Indo
Wh]	[kWh]	[kWh]	[kWh]	[kWh]		[USD]	[USD]	[USD]	[USD]	[USD]	[USD]	[USD]	[US
30.4	9.4	0	0	0		52.26	44.3	35.06	9.24	0	0	0	
40.6	14.1	0	0	0		69.48	58.54	44.86	13.68	0	0	0	
65.2	18.6	0	0	0		106.56	89.8	74.82	14.98	0	0	0	
17.1	5	0	0	0		40.9	36.48	28.98	7.5	0	0	0	
18.1	4.2	0	0	0		52.14	47.68	37.06	10.62	0	0	0	
27.1	9.5	0	0	0		94.32	87	67.42	19.58	0	0	0	

door units - Apportioned charges	(Unit price 1)	(Unit price 2)	(Unit price 3)	(Unit price 4)	(Unit price 5)
SD]	[USD]	[USD]	[USD]	[USD]	[USD]
7.96	6.08	1.88	0	0	0
10.94	8.12	2.82	0	0	0
16.76	13.04	3.72	0	0	0
4.42	3.42	1	0	0	0
4.46	3.62	0.84	0	0	0
7.32	5.42	1.9	0	0	0

● Example of output of data on energy management blocks (when energy management blocks are not integrated)
The apportioned electric energy and charge to each energy management block are output.
When there are energy management blocks having the same name, these blocks are not integrated and output as different energy management blocks.

701	Charge Calculation Result (Energy management block)								
Time period:2015/04/01-2015/04/31									
Energy management block name	Apportioned electric energy	Outdoor units - Apportioned electric energy	(Unit price 1)	(Unit price 2)	(Unit price 3)	(Unit price 4)	(Unit price 5)	Indoor units - Apportioned electric energy	(Unit
	[kWh]	[kWh]	[kWh]	[kWh]	[kWh]	[kWh]	[kWh]	[kWh]	[kWh]
AE-200 No.1 Tenant A	261.3	221.5	175.3	46.2	0	0	0	39.8	
AE-200 No.1 Tenant B	347.4	292.7	224.3	68.4	0	0	0	54.7	
AE-200 No.1 Tenant C	532.8	449	374.1	74.9	0	0	0	83.8	
AE-200 No.1 Tenant D	204.5	182.4	144.9	37.5	0	0	0	22.1	
AE-200 No.1 Tenant E	240.9	220.3	170.7	49.6	0	0	0	20.6	
AE-200 No.2 Tenant E	19.8	18.1	14.6	3.5	0	0	0	1.7	
AE-200 No.2 Tenant F	471.6	435	337.1	97.9	0	0	0	36.6	

nit price 1)	(Unit price 2)	(Unit price 3)	(Unit price 4)	(Unit price 5)		Apportioned charges	Outdoor units - Apportioned charges	(Unit price 1)	(Unit price 2)	(Unit price 3)	(Unit price 4)	(Unit price 5)	Indo
Wh]	[kWh]	[kWh]	[kWh]	[kWh]		[USD]	[USD]	[USD]	[USD]	[USD]	[USD]	[USD]	[US
30.4	9.4	0	0	0		52.26	44.3	35.06	9.24	0	0	0	
40.6	14.1	0	0	0		69.48	58.54	44.86	13.68	0	0	0	
65.2	18.6	0	0	0		106.56	89.8	74.82	14.98	0	0	0	
17.1	5	0	0	0		40.9	36.48	28.98	7.5	0	0	0	
16.6	4	0	0	0		48.18	44.06	34.14	9.92	0	0	0	
1.5	0.2	0	0	0		3.96	3.62	2.92	0.7	0	0	0	
27.1	9.5	0	0	0		94.32	87	67.42	19.58	0	0	0	

door units - Apportioned charges	(Unit price 1)	(Unit price 2)	(Unit price 3)	(Unit price 4)	(Unit price 5)
SD]	[USD]	[USD]	[USD]	[USD]	[USD]
7.96	6.08	1.88	0	0	0
10.94	8.12	2.82	0	0	0
16.76	13.04	3.72	0	0	0
4.42	3.42	1	0	0	0
4.12	3.32	0.8	0	0	0
0.34	0.3	0.04	0	0	0
7.32	5.42	1.9	0	0	0

Remarks ○ Determine whether or not to integrate the energy management blocks with the Charge Calculation Tool.

● Example of output of data on meters
The measurement and charge obtained by each meter are output.

711	Charge Calculation Result (metering device)													
Time period:2015/04/01-2015/04/31														
Metering device name	Measurement value	(Unit price 1)	(Unit price 2)	(Unit price 3)	(Unit price 4)	(Unit price 5)	Measurement unit		Charges	(Unit price 1)	(Unit price 2)	(Unit price 3)	(Unit price 4)	(Unit price 5)
									[USD]	[USD]	[USD]	[USD]	[USD]	[USD]
AE-200 No.1 PI-Ch1	349	253	96	0	0	0	kWh		69.8	50.6	19.2	0	0	0
AE-200 No.1 PI-Ch2	286	223	63	0	0	0	kWh		57.2	44.6	12.6	0	0	0
AE-200 No.1 PI-Ch3	164	126	38	0	0	0	kWh		32.8	25.2	7.6	0	0	0
AE-200 No.1 PI-Ch4	127	99	28	0	0	0	kWh		25.4	19.8	5.6	0	0	0

(2) Electric energy manual input (without meters) method
One kind of data, data on energy management blocks, can be output.

The automatically output CSV file is stored in the folder with the preset CSV file destination folder name + ¥[year]¥[month]¥.
The output file is dated based on the year and month (day) of the adjustment date.
Example: When the file is output at 5:00 am on Feb. 1, 2015 (day after adjustment date)
The folder name is “C:\CCTool\ChargeFile\2015\01\.”

The name of the file of the results of calculation of charges to energy management blocks is shown below.
Daily: “[year] [month] [day] B.csv” Example: Output on Feb. 1, 2015 → “20150131B.csv”
Monthly: “[year] [month] B.csv” Example: Output on Feb. 1, 2015 → “201501B.csv”

● Example of output of data on energy management blocks (when energy management blocks are integrated)
The charge rates of outdoor units and indoor units in each energy management block are output.
When there are energy management blocks having the same name, these blocks are output as one integrated energy management block.

702	Charge Calculation Result (Energy management block)								
Time period:2015/04/01-2015/04/31									
Energy management block name	Apportionment parameter	Apportionment parameter for outdoor units	(Unit price 1)	(Unit price 2)	(Unit price 3)	(Unit price 4)	(Unit price 5)	Apportionment parameter for indoor units	(Unit
Tenant A	165.1	147.4	120.2	27.2	0	0	0	17.7	
Tenant B	308.5	280.8	195.9	84.9	0	0	0	27.7	
Tenant C	132.8	118.8	97.4	21.4	0	0	0	14	
Tenant D	91.6	82.5	56.4	26.1	0	0	0	9.1	
Tenant E	69.5	61.3	41.9	19.4	0	0	0	8.2	
Tenant F	100.2	88.4	61.1	27.3	0	0	0	11.8	

(Unit price 1)	(Unit price 2)	(Unit price 3)	(Unit price 4)	(Unit price 5)		Charge rate (for outdoor units) [%]	Charge rate (for indoor units) [%]
12.4	5.3	0	0	0		17.7169	20.0000
19.2	8.5	0	0	0		37.1081	31.4783
9.2	4.8	0	0	0		14.2263	16.3478
7.2	1.9	0	0	0		11.0198	9.5652
5.3	2.9	0	0	0		8.1887	9.6522
8.7	3.1	0	0	0		11.7402	12.9565

● Example of output of data on energy management blocks (when energy management blocks are not integrated)
The charge rates of outdoor units and indoor units in each energy management block are output.
When there are energy management blocks having the same name, these blocks are not integrated and output as different energy management blocks.

702	Charge Calculation Result (Energy management block)								
Time period:2015/04/01-2015/04/31									
Energy management block name	Apportionment parameter	Apportionment parameter for outdoor units	(Unit price 1)	(Unit price 2)	(Unit price 3)	(Unit price 4)	(Unit price 5)	Apportionment parameter for indoor units	(Unit
AE-200 No.1 Tenant A	165.1	147.4	120.2	27.2	0	0	0	17.7	
AE-200 No.1 Tenant B	308.5	280.8	195.9	84.9	0	0	0	27.7	
AE-200 No.1 Tenant C	132.8	118.8	97.4	21.4	0	0	0	14	
AE-200 No.1 Tenant D	91.6	82.5	56.4	26.1	0	0	0	9.1	
AE-200 No.1 Tenant E	62.7	56.5	38.4	18.1	0	0	0	6.2	
AE-200 No.2 Tenant E	6.8	4.8	3.5	1.3	0	0	0	2	
AE-200 No.2 Tenant F	100.2	88.4	61.1	27.3	0	0	0	11.8	

(Unit price 1)	(Unit price 2)	(Unit price 3)	(Unit price 4)	(Unit price 5)		Charge rate (for outdoor units) [%]	Charge rate (for indoor units) [%]
12.4	5.3	0	0	0		17.7169	20.0000
19.2	8.5	0	0	0		37.1081	31.4783
9.2	4.8	0	0	0		14.2263	16.3478
7.2	1.9	0	0	0		11.0198	9.5652
3.9	2.3	0	0	0		7.5698	7.3913
1.4	0.6	0	0	0		0.6190	2.2609
8.7	3.1	0	0	0		11.7402	12.9565

Remarks

○ Determine whether or not to integrate the energy management blocks with the Charge Calculation Tool.
○ To calculate the charges from the charge rates, use the following formulas.
Charge for outdoor units = charge rate of outdoor units in energy management block × difference value on electricity meter for outdoor unit in period × unit price
Charge for indoor units = charge rate of indoor units in energy management block × difference value on electricity meter for indoor unit in period × unit price

<5> Printing from Charge Calculation Tool

The results of calculation of electric energy and charges obtained by the Charge Calculation Tool can be printed.

(1) Electric energy measurement (with meters) method
Two kinds of data, data on energy management blocks and on meters, can be output.

- Example of output of data on energy management blocks (when energy management blocks are integrated)
  The apportioned electric energy and charge to each energy management block are output.
  When there are energy management blocks having the same name, these blocks are output as one integrated energy management block.

Air conditioning charge – Energy management block (by unit price)
Calculation period:2015/04/01–2015/04/31

Energy management block name	Apportioned electric energy [kWh]	Item Unit price	[kWh]	[USD]	Total air conditioning charge [USD]
Tenant A	46.0	Unit price 1	46.0	9.20	9.20
		Unit price 2	0.0	0.00	
		Unit price 3	0.0	0.00	
		Unit price 4	0.0	0.00	
		Unit price 5	0.0	0.00	
Tenant B	33.6	Unit price 1	33.6	6.72	6.72
		Unit price 2	0.0	0.00	
		Unit price 3	0.0	0.00	
		Unit price 4	0.0	0.00	
		Unit price 5	0.0	0.00	
Tenant C	26.2	Unit price 1	26.2	5.24	5.24
		Unit price 2	0.0	0.00	
		Unit price 3	0.0	0.00	
		Unit price 4	0.0	0.00	
		Unit price 5	0.0	0.00	

- Example of output of data on energy management blocks (when energy management blocks are not integrated)
  The apportioned electric energy and charge to each energy management block are output.
  When there are energy management blocks having the same name, these blocks are not integrated and output as different energy management blocks.

Air conditioning charge – Energy management block (by unit price)
Calculation period:2015/04/01–2015/04/31

Energy management block name	Apportioned electric energy [kWh]	Item Unit price	[kWh]	[USD]	Total air conditioning charge [USD]
AE-200 No.1 Tenant A	46.0	Unit price 1	46.0	9.20	9.20
		Unit price 2	0.0	0.00	
		Unit price 3	0.0	0.00	
		Unit price 4	0.0	0.00	
		Unit price 5	0.0	0.00	
AE-200 No.1 Tenant B	33.6	Unit price 1	33.6	6.72	6.72
		Unit price 2	0.0	0.00	
		Unit price 3	0.0	0.00	
		Unit price 4	0.0	0.00	
		Unit price 5	0.0	0.00	
AE-200 No.1 Tenant C	26.2	Unit price 1	26.2	5.24	5.24
		Unit price 2	0.0	0.00	
		Unit price 3	0.0	0.00	
		Unit price 4	0.0	0.00	
		Unit price 5	0.0	0.00	

Remarks ○ Determine whether or not to integrate the energy management blocks with the Charge Calculation Tool.

● Example of output of data on meters
The measurement and charge obtained by each meter are output.

Air conditioning charge - Metering device (by unit price)
Calculation period:2015/04/01-2015/04/31

Metering device name	Mesurement value	Unit	Item Unit price		Total air conditioning charge [USD]
AE-200 No.1 Outdoor unit 1～4F	44.0	kWh	Unit price 1 Unit price 2 Unit price 3 Unit price 4 Unit price 5	44.0	8.80
AE-200 No.1 Outdoor unit 5～8F	49.0	kWh	Unit price 1 Unit price 2 Unit price 3 Unit price 4 Unit price 5	49.0	9.80
AE-200 No.1 Outdoor unit 9～12F	51.0	kWh	Unit price 1 Unit price 2 Unit price 3 Unit price 4 Unit price 5	51.0	10.20

(2) Electric energy manual input (without meters) method
One kind of data, data on energy management blocks, can be output.

● Example of output of data on energy management blocks (when energy management blocks are integrated)
The charge rates of outdoor units and indoor units in each energy management block are output.
When there are energy management blocks having the same name, these blocks are output as one integrated energy management block.

Air conditioning charge - Energy management block (by unit price)
Calculation period:2015/04/01 -2015/04/31

Energy management block name	Apportionment Parameter (inclusive sum)	Item Unit price	Apportionment Parameter (for indoor unit)	Charge rate[%] (for indoor unit)	Apportionment Parameter (for outdoor unit)	Charge rate[%] (for outdoor unit)
Tenant A	42.0	Unit price 1	23.3	50.9847	18.7	21.9741
		Unit price 2	0.0		0.0	
		Unit price 3	0.0		0.0	
		Unit price 4	0.0		0.0	
		Unit price 5	0.0		0.0	
Tenant B	29.6	Unit price 1	10.9	23.8512	18.7	21.9741
		Unit price 2	0.0		0.0	
		Unit price 3	0.0		0.0	
		Unit price 4	0.0		0.0	
		Unit price 5	0.0		0.0	
Tenant C	23.6	Unit price 1	5.4	11.8162	18.2	21.3866
		Unit price 2	0.0		0.0	
		Unit price 3	0.0		0.0	
		Unit price 4	0.0		0.0	
		Unit price 5	0.0		0.0	

● Example of output of data on energy management blocks (when energy management blocks are not integrated)
The charge rates of outdoor units and indoor units in each energy management block are output.
When there are energy management blocks having the same name, these blocks are not integrated and output as different energy management blocks.

Air conditioning charge - Energy management block (by unit price)
Calculation period:2015/04/01 -2015/04/31

Energy management block name	Apportionment Parameter (inclusive sum)	Item Unit price	Apportionment Parameter (for indoor unit)	Charge rate[%] (for indoor unit)	Apportionment Parameter (for outdoor unit)	Charge rate[%] (for outdoor unit)
AE-200 No.1 Tenant A	42.0	Unit price 1	23.3	50.9847	18.7	21.9741
		Unit price 2	0.0		0.0	
		Unit price 3	0.0		0.0	
		Unit price 4	0.0		0.0	
		Unit price 5	0.0		0.0	
AE-200 No.1 Tenant B	29.6	Unit price 1	10.9	23.8512	18.7	21.9741
		Unit price 2	0.0		0.0	
		Unit price 3	0.0		0.0	
		Unit price 4	0.0		0.0	
		Unit price 5	0.0		0.0	
AE-200 No.1 Tenant C	23.6	Unit price 1	5.4	11.8162	18.2	21.3866
		Unit price 2	0.0		0.0	
		Unit price 3	0.0		0.0	
		Unit price 4	0.0		0.0	
		Unit price 5	0.0		0.0	

Remarks

○ Determine whether or not to integrate the energy management blocks with the Charge Calculation Tool.

○ To calculate the charges from the charge rates, use the following formulas.

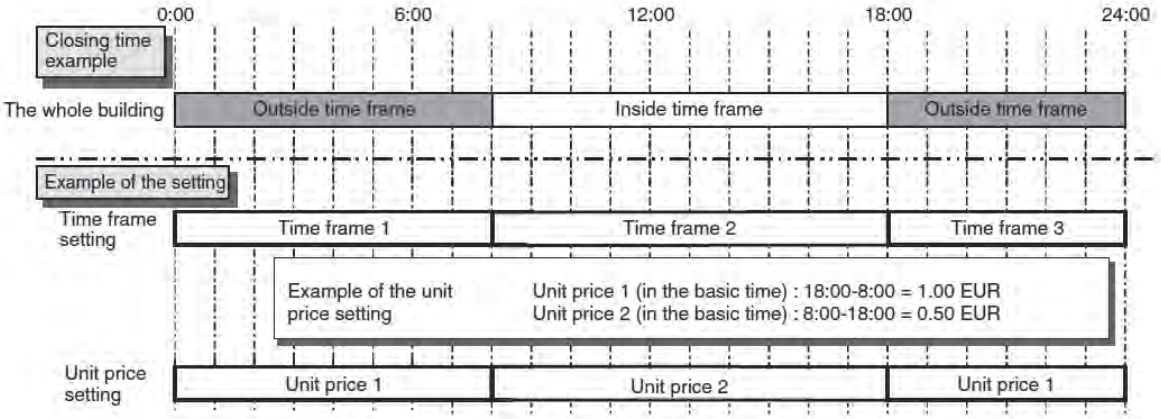
Charge for outdoor units = charge rate of outdoor units in energy management block × difference value on electricity meter for outdoor unit in period × unit price

Charge for indoor units = charge rate of indoor units in energy management block × difference value on electricity meter for indoor unit in period × unit price

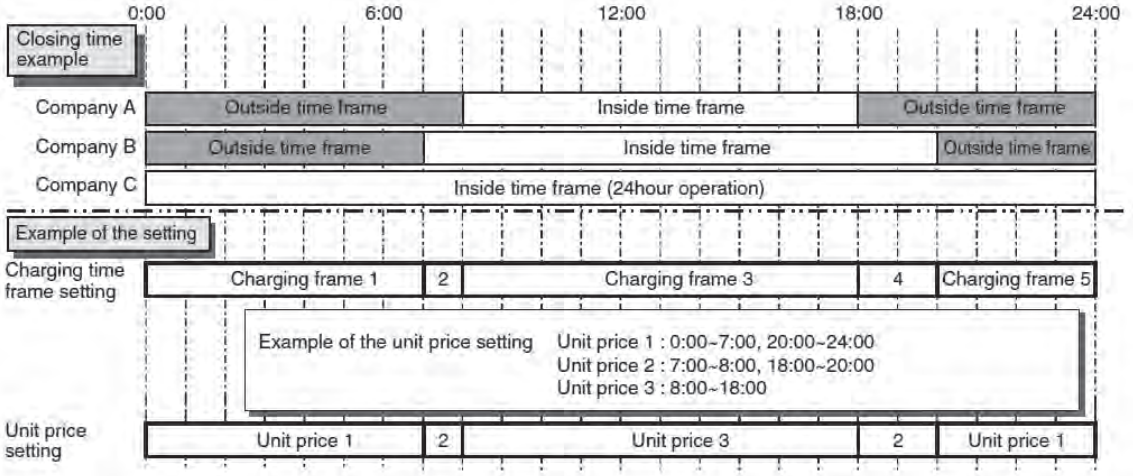
[6] Charging system

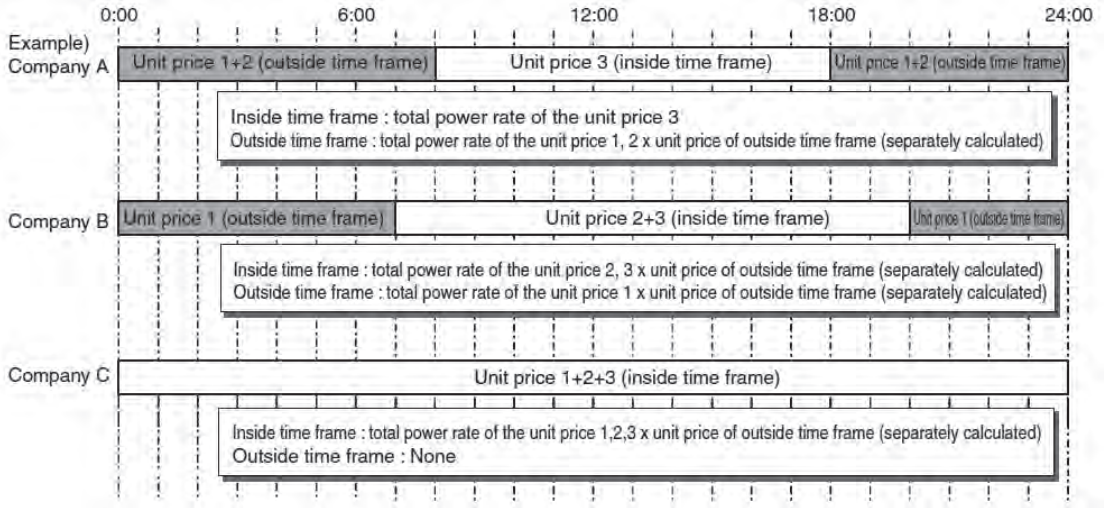
To determine the charges on this system, 24 hours from 0:00 to 24:00 on each day of week can be divided into 10 charging time slots, and one of 5 unit prices can be allocated to each slot as shown below. (Apportionment is performed for each unit price.)

One charging time slot setting can be made on one AE-200 system, and one charge unit price (** EUR/kWh) setting can be made by the Charge Calculation Tool. Different settings for meters or tenants cannot be made.



If the charging time slots vary depending on tenant, the time slots can be set as shown below.
If the unit prices vary depending on tenant, separately calculate the charge to each tenant by adding the apportioned electric energy in each unit price and multiplying the value by the unit price.





* The charging time slots can be set by the Initial Setting Tool, and the unit prices can be set by the Charge Calculation Tool.

[7] Cautions when using apportioned electricity billing function

Note To prevent troubles after construction or application of the system where the apportioned electricity billing function is used, obtain prior consent from the user through written confirmation to ensure that the proposed system configuration conforms to the user's requirements.
Retain the written confirmation.

When using the apportioned electricity billing function, note the following points. See also the cautions in Chapter 1.

<1> Cautions about charging for air conditioning

- When using the apportioned electricity billing function, the building owner shall gain agreement and sign individual contracts with each tenant on condition that the tenant will be charged for use of electricity (including temporary measures against failure) based on apportionment in consideration of the operation condition of air conditioners.
- It is recommended to retain the results of calculation of charges for air conditioning in a form other than the data in the personal computer for the Charge Calculation Tool.
  (For example, print the results, and retain the sheets.)
- The "Charge" license shall be registered in all sets of AE-200/AE-50/EW-50 registered in the Charge Calculation Tool.
  If any of them is not registered, the apportioned electricity billing function will not normally operate.
- When using the apportioned electricity billing function, constantly run AE-200/AE-50/EW-50, PI controllers and devices on the LAN.
  If any of the devices is stopped or powered off, the apportionment of charge may not be performed correctly.
- When AE-50/EW-50 with built-in pulse input (PI) is used, pulses cannot be obtained during power interruption in AE-50/EW-50, power shutdown and software updating, and the measured electric energy may be different from the actual value. Accordingly, the measurement by PI controller is recommended.

<2> Calculation of air conditioning charge

- The air conditioning charge is calculated by our unique air conditioning charge calculation system; the consumed electric energy is apportioned by using the billing parameter data based on the operation conditions of air conditioners. Therefore, the results differ from those obtained by electricity meters installed at the power supply points of air conditioners.
  When the electric energy consumed by some outdoor units is apportioned by one electricity meter, the units are considered to be one large outdoor unit, and the charge is calculated. Therefore, the energy-saving capability of each outdoor unit cannot be taken into consideration.
  To take the energy-saving capabilities of the outdoor units into consideration, it is recommended to install an electricity meter for each outdoor unit.
- When a system trouble occurs, take appropriate measures, e.g. execution of apportionment calculation on the following day or discontinuation of apportionment calculation.
- Since the air conditioning charge is calculated for each energy management block, the electric energy consumed by indoor units not registered in the energy management block will not be reflected in the charge.
- Since the air conditioning charge is rounded down to the indicated digit, an error will occur between the charge obtained by the meters and the total charge for the block.

<3> Cautions for operation and setting

- When the apportioned electricity billing function is used, perform adjustment processing before making any changes to the system configuration or billing system settings.
  If changes are made to the system configuration, change the settings of the billing system by the Initial Setting Tool and Charge Calculation Tool, and perform a test run.
- Time setting
  The change in time affects the calculation of air conditioning charge by the apportioned electricity billing function. Do not change the time unnecessarily.
  (Correct the time on each set of AE-200 once a month. Never change the time to change the date.)
- After the completion of initial setting, perform a test run for checking in accordance with "AE-200/AE-50/EW-50 Instruction Book – Apportioned Electricity Billing Function –" to confirm that the charges can be correctly calculated.

16. Q&A

1. About the whole system

No.	Question	Answer
1	Can other manufacturers' air conditioners be controlled centrally?	The stop/start and error status can be controlled by connecting other manufacturers' air conditioners to the contacts of the DIDO controller and receiving the information in the contacts from the air conditioners through AE-200/AE-50.
2	What means are available for remote monitoring?	There are two methods, a method by connecting through a broadband router using a phone line and a method *1 by connecting through a router *2 using the Internet line. To use the Internet line, it is necessary to establish an account with an Internet provider and obtain a global IP for identification of the router on the Internet (or use a dynamic DNS). Error notification e-mails can be received on a mobile phone or personal computer which can receive e-mails*3 by establishing an account with a provider. *1: This method cannot be used when there is a proxy server on the communication pathway. (Note that the internal LAN cannot be connected to a remote router in many cases.) *2: Ensure the security. When connecting to the corporate intranet, make sure that the VPN routers can be used. *3: This function is not applicable to SMS.
3	Although an error occurred, an error notification e-mail was not sent. Why?	Check the followings. (1) Error notification e-mail setting Check that the error notification e-mail setting has been performed. For the setting procedure, see Section 5.1 "E-mail" of the Instruction Book for operation of Web browser for initial setting. (2) LAN connection Check that AE-200/AE-50 is connected to the LAN of the personal computer. (3) Gateway address setting Check that the gateway addresses of AE-200/AE-50 and the personal computer for the Web browser have been set. For the setting procedure, see Section 2.1 "Setting the IP Address of the PC" of the Instruction Book for operation of Web browser for initial setting. (4) Confirmation of port number For sending e-mails from AE-200/AE-50 and TG-2000A, the port No.25 is used. If the port No.25 is blocked by the mail server, e-mails cannot be sent. Contact the system administrator.

2. About Web browser

No.	Question	Answer
1	Is the Web browser compatible with Microsoft VM?	It is not compatible with Microsoft VM. * Java® runtime environment (Java Plug-in made by Oracle®) is necessary. The operations on Oracle®'s Java Plug-in Ver. 1.7.0_51 and Ver. 1.8.0_05 have been confirmed. * The version of Oracle's Java Plug-in can be checked in "Java" in the control panel. * Install Oracle's Java Plug-in appropriate to your operating system. When using Internet Explorer (64-bit), install Java Plug-in (64-bit).
2	We use Windows8.1. Can Internet Explorer (IE) on the start screen be used?	It cannot be used. Use Internet Explorer (IE) on the desktop screen. If IE is started on the start screen, once close IE, switch the screen to the desktop screen, and restart IE. For the screen switching procedure, see the instruction manual for Windows8.1.  Start screen  Desktop screen

3. About AE-200/AE-50

No.	Question	Answer
1	Is it necessary to register the license on each set of AE-50?	Register the license on each set of AE-200/AE-50. The licenses for AE-50 (1) to (3) can be registered on the main unit screen of AE-200.
2	When will the backlight of the main unit LCD go out? Can it be kept on constantly?	The backlight will go out when 3 minutes have passed without input of any operation. However, the backlight will be kept on while an error is pending. It cannot be kept on constantly.
3	Can error codes to be notified through e-mail be selected?	Error codes to be notified can be selected by the error code notification setting.
4	Can the K transmission converter (KA) be registered in a group?	The K transmission converter (KA) is not compatible.
5	Are there recommended USB memories?	● Use USB memories formatted with FAT16 or FAT32. ● Use those compatible with USB2.0. ● Use those without security function or which can be used without security function. The operations of the following models have been confirmed. (1) Manufacturer: Transcend Model: TS4GJF300 4G Bytes (2) Manufacturer: Transcend Model: TS16GJF300 16G Bytes (3) Manufacturer: Transcend Model: TS32GJF700 32G Bytes (4) Manufacturer: Sony Model: USM8GU B 8G Bytes (5) Manufacturer: Sony Model: USM16GR B 16G Bytes (6) Manufacturer: imation Model: Nano-f 16G Bytes
6	Can AE-200/AE-50 be locked to avoid accidental operation?	They can be locked on the login screen by selecting Initial setting screen – Unit information screen and enabling the screen lock function. When the screen lock function is enabled, they will be automatically locked if they are not operated for a certain period (3 minutes). * However, when an error occurs, the screens will not be automatically locked.
7	How many icons can be arranged on one floor?	One area on a floor can contain 30 groups (icons). When a floor is divided into 6 areas, up to 180 groups can be arranged on the floor.
8	If some of the schedules for the first to fifth weeks are set on the same day, which schedule will be executed?	Priority will be given to the schedule of week 1, and the schedule will be executed. The order of priority is shown below (higher priority for the left). Schedule on current day > Annual schedule > week 1 > week 2 > week 3 > week 4 > week 5
9	Is it necessary to register the ME remote controller?	It is necessary to register it in a group. (The ME remote controller and system remote controller must be registered in a group. However, it is unnecessary to register the MA remote controller in a group.)
10	Can the display or non-display of the indoor (suction) temperature be selected?	It is possible to select one of “Display”, “Non-display” and “Display only during operation”. When “Display” is selected, the indoor (suction) temperature will be displayed constantly. When “Display only during operation” is selected, it will be displayed on the upper right of the group icon only during operation.
11	Can the plan view of TG-2000A be used as the plan view of AE-200/AE-50?	No. Since the plan view of AE-200/AE-50 differs in size and format from that of TG-2000A, prepare the plan views separately.
12	What measures should be taken when we forget the administrator login password?	Inform the agency or distributor of the serial number of AE-200/AE-50. You will be informed of the login password. After logging in, change the password.
13	Can restrictions on temperature setting range be imposed for Slim from AE-200/AE-50 through the M-NET adapter?	The restrictions on temperature setting range cannot be set through the M-NET adapter. Perform the setting for the MA remote controller on the MA remote controller. The setting for the ME remote controller can be performed because it is connected not through the M-NET adapter.
14	Can restrictions on temperature setting range be imposed for PAC-SF44SRA from AE-200/AE-50?	The restrictions cannot be set for the system remote controller (44SR). They can be set only for the remote controllers (ME and MA) (depending on the model).
15	Can the night mode (low noise mode) be set in schedules?	The mode can be set from the Web browser and the general control software (TG-2000A).
16	When a fire occurs, can we stop the system only on the floor of the origin without stopping the whole system?	This is possible if AE-200/AE-50 is connected according to the floor range to input the fire alarm signal only to the relevant AE-200/AE-50.
17	Is the "Charge" license necessary for output of the electric energy data and billing parameters to the USB memory of AE-200/AE-50?	The license is necessary. The data cannot be output without registration of the license. However, energy management data can be output without license.
18	Can the schedule settings be backed up to a USB memory?	Yes.
19	Can Mr. Slim Air Conditioner and LOSSNAY be interlocked by setting on AE-200/AE-50?	Yes. They can be interlocked also by connecting LOSSNAY directly with Mr. Slim (MA remote controller is required) through the LOSSNAY interlock cable.
20	The error codes of Mr. Slim are two-digit codes. How will they be displayed when it is connected to AE-200/AE-50?	For models (Mr. Slim, RAC/HAC) which can be connected with AE-200/AE-50, errors will be displayed with the error codes (4-digit) for AE-200/AE-50.
21	Is there a method for deleting the suction temperature displayed on AE-200/AE-50 during stop?	It is possible to select the room temperature display mode from “Constantly displayed”, “Displayed during operation” and “Not displayed” in Unit information of Initial setting of the main unit of AE-200/AE-50. When “Displayed during operation” is selected, the temperature will not be displayed during stop.
22	How long will the backup data be retained when power is disconnected from AE-200/AE-50 owing to power failure?	The present time will be backed up for 1 week and then reset. The peak-cut control data will be deleted. Other settings will be retained. However, 24 hours of charging time is required for AE-200/AE-50.

No.	Question	Answer
23	When four indoor units are controlled by one ME remote controller, can the icons of the individual four units be placed in the floor layout of AE-200/AE-50 not by group, but by unit?	No. To place the icons individually, it is necessary to divide the group for each unit. However, the ME remote controller can control only one group, and the remaining three indoor units cannot be controlled.
24	If AE-200/AE-50 goes down after the setting for prohibiting operation of remote controller is performed from AE-200/AE-50, can the prohibition of operation of remote controller be canceled?	The prohibition will be canceled approx. 15 minutes after communication from AE-200/AE-50 is interrupted.
25	How will the air conditioners operate if power is disconnected from AE-200/AE-50 owing to power failure?	They will stop. However, they can be operated continuously if the remote controller or system controller is available. If not, they will stop after 13 minutes or less.
26	Can the peak-cut control be performed on the AE-50 system by connecting a demand controller to the external input of AE-200?	Yes. Set the conditions in accordance with the following procedure. (1) Select [Function setting 1] – [Peak-cut setting] – [System setting] on the Web browser for initial setting of AE-50, and select [Other AE]. (2) The IP address input field will be displayed. Input the IP address of AE-200 to which the external input is connected. Note: The peak-cut control of AE-200/AE-50 for which [Other AE] has been selected will be started with a delay of up to 1 minute.
27	If AE-200/AE-50 goes down during emergency stop caused by the external input of AE-200/ AE-50, can the emergency stop be canceled?	The emergency stop will be canceled after 30 minutes or less.
28	Is the optical cable length limited?	The length varies depending on the optical media converter. For more information, see the instruction manual for the optical media converter to be used.
29	Can AE-200/AE-50 be connected with TG-2000A?	Yes. However, update the version of TG-2000A to 6.50 or later.

4. About energy management

No.	Question	Answer
1	Can the energy management data be output from the main unit screen?	The data cannot be output from the LCD. Click Download on the energy use status screen of the administrator Web browser, or click CSV file output on the CSV output screen.
2	Can the electric energy from the PLC (electric energy counting software) be displayed by the energy management function?	The electric energy cannot be displayed by the energy management function even if the PLC (electric energy counting software) is connected. To use the energy management function, use the PI controller.
3	Can the energy management graphs be printed?	No. However, the CSV data can be output from the Web browser, and the CSV data can be processed on Excel and displayed and printed in graphs.
4	Why are graphs not displayed even if the energy use status and ranking conditions are set?	The initial setting on the Web browser must be done. For details, see $ [5] “Initial Setting of Energy Management Function.”
5	When the apportionment mode is changed (from the capacity save amount mode to the thermo ON time mode) on 13:15, in which apportionment mode is the electric energy from 13:00 to 13:30 calculated?	The electric energy will be calculated in the apportionment mode which is active at the time of apportionment calculation (0 min or 30 min). Therefore, that from 13:00 to 13:30 will be calculated in the thermo ON time mode.
6	When an air conditioner is added on 13:15, when will the air conditioner be subject to apportionment?	The electric energy will be apportioned to the air conditioner at next 1 minute after it is registered in a group and a block (as needed) and the setting stated in $ [5] “Initial Setting of Energy Management Function” is completed.

5. About optional functions

No.	Question	Answer
1	Can the energy for other manufacturers’ air conditioners and lights be saved?	No. The energy-saving control performed by the AE-200/AE-50 system can cover only Mitsubishi’s air conditioners (products provided with M-NET).
2	What is the energy-saving/peak-cut control unit?	The control of indoor units is performed by group in the operation block. The control of outdoor units is performed by outdoor unit.
3	Can the power consumption be reduced to 80% when the capacity save amount of outdoor unit is reduced to 80%?	The maximum frequency of compressor will be saved to 80%. The electric energy will not be reduced to 80%.
4	Is the outdoor unit capacity saving function applicable to all of room air conditioners, Mr. Slim and Multi air conditioners?	It is not applicable to room air conditioners. It is applicable to the inverter outdoor units of CITY MULTI and Mr. Slim. It is not applicable to City Multi S.
5	Can only the energy-saving control be performed when the PI controller is not connected?	If "Energy Management License Pack" has been registered, the control can be performed.

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.

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE: TOKYO BLDG 2-7-3 MARUNOUCHI CHIYODA-KU TOKYO 100-8310, JAPAN

MEES16K115

New publication effective Mar. 2017
Specifications subject to change without notice