

AIR CONDITIONING CONTROL SYSTEMS



# MELANS

## Centralized Controller Technical Manual

- ▶ AE-C400A/EW-C50A
- ▶ AE-C400E/EW-C50E
- ▶ AE-C400E-X/EW-C50E-X

# 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.

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

## ■ 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.

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**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.**

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## ■ 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.**

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## ■ 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.**

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# 1. Air Conditioning Control System (MELANS)

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## 1-1. Summary

This chapter explains how to connect the units for constructing the Air Conditioning Control System (MELANS), and the restrictions on them.

### [1] MA remote controller control line (A control)

This method is used when directly connecting an MA remote controller to an indoor unit.

For the connection procedure, refer to the specified page. "MA Remote Controller Control Cable Connections and Restrictions (page 6)".

### [2] M-NET transmission line

With this method, an address is assigned to each unit in order to control it.

Depending on the connectors for the outdoor unit, a centralized control transmission cable or an indoor/outdoor transmission cable is used.

For the connection procedure of each unit, refer to the specified page. "M-NET Transmission Cable Connections and Restrictions (page 11)".

#### Note

- ♦ For details of the connected units, refer to the installation manual for each unit.

# 2. MA Remote Controller Control Cable Connections and Restrictions

This chapter explains how to connect the MA remote controller and the restrictions which apply.

## 2-1. MA remote controller control cable type and conductor cross-section area

Select a cable which satisfies the conditions below to use for connecting the MA remote controller.

	Simple remote controller Remote controller for hot water supply Remote controller for e-Series LOSSNAY remote controller	MA remote controller - (A)	MA remote controller - (B) Signal receiving unit
Cable type	Sheathed cable*1		VCTF, VCTFK, CVV, VVR, VVF, VCT
Number of wires	2-core cable		
Conductor cross-section area	0.3 mm <sup>2</sup> (AWG22)		0.3 to 1.25 mm <sup>2</sup> (AWG22 to 16)

\*1: PAC-YT81HC (10 m) and PAC-YT82HC (20 m) optional cables can also be used.

When using a total wiring extension length of 10 m or more with a CITY MULTI S (PUSY-P80 model 112) or Mr. SLIM K (PUZ-KP140 model 160), use shielded cable (MVVS 0.3 mm<sup>2</sup>, 2 cores).

## 2-2. Restrictions on wiring length of the MA remote controller control cable

The length of the cable that can be used for the MA remote controller varies depending on the combination of units.

Design so that the length does not exceed the length in the table below.

		MA remote controller - (A)	Simple remote controller (PAC-SF01CR)	Simple remote controller (other than those at left) Remote controller for hot water supply Remote controller for e-Series LOSSNAY remote controller	MA remote controller - (B) Signal receiving unit
Maximum wiring length	PAC for stores and offices Mr. Slim air conditioning unit	500 m (with 1 remote controller) 200 m (with 2 remote controllers)	150 m (with 1 remote controller only)	500 m	500 m
	CITY MULTI for buildings	200 m (with 1 remote controller)*1 100 m (with 2 remote controllers)*2	70 m (with 1 remote controller only)	200 m	200 m
	Ventilation equipment, OA handling unit (LOSSNAY unit with built-in heater/humidifier)	200 m*3	—	200 m*3	—
	e-Series, hot water supply	—	—	250 m	250 m

\*1: Wiring length may vary depending on the model. Refer to the installation manual for that model.

\*2: Applicable to the cases where the model name of the indoor unit ends with DMG1 or later.

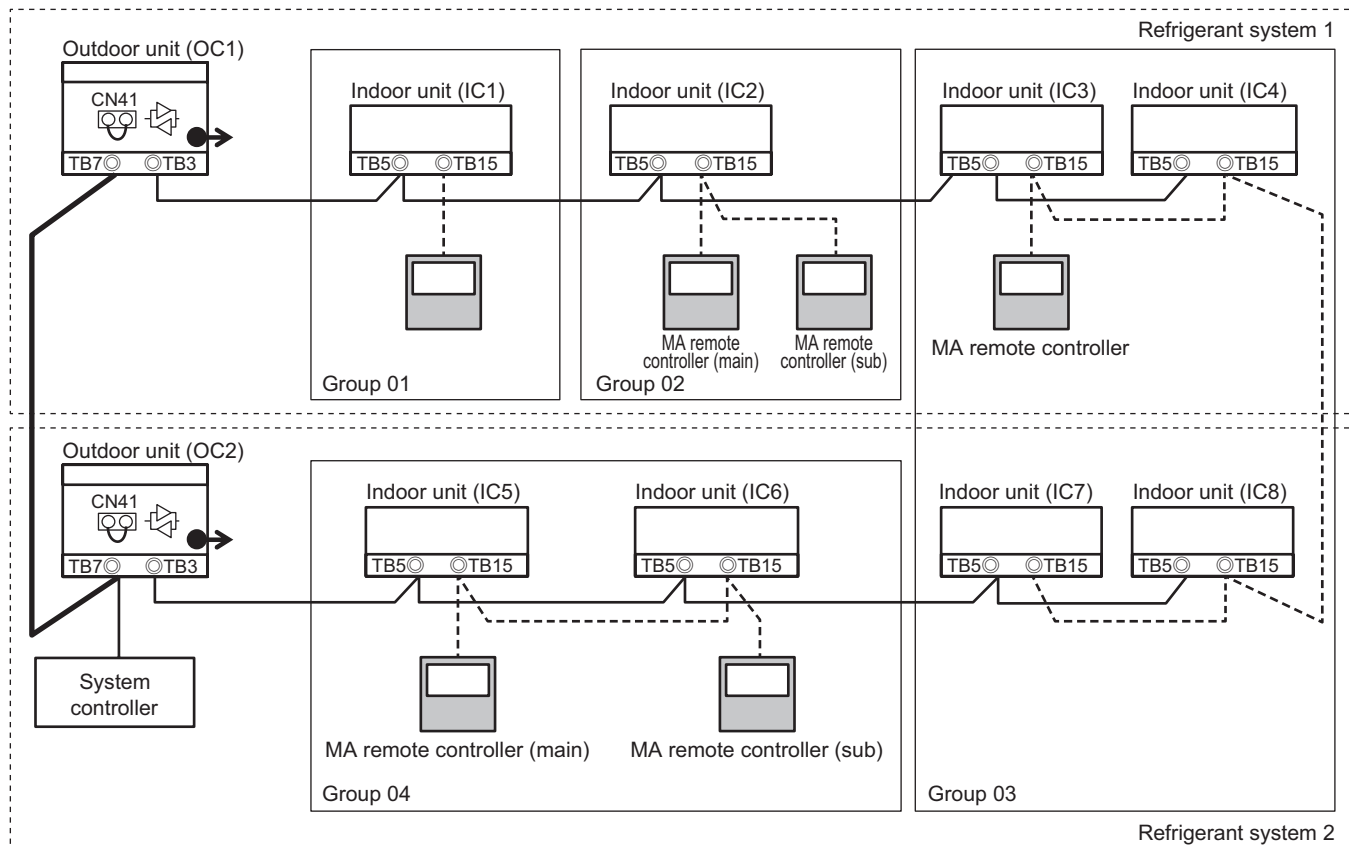
\*3: Total of wiring between units, wiring between unit remote controllers, and wiring.

## 2-3. Example of wiring

Connect the MA remote controller control cable to the MA remote controller terminal block of each unit.

- The MA remote controller control cable does not have polarity.

### 2-3-1. Connecting with multiple air conditioning systems



#### (1) Wiring between remote controller and indoor unit

- Connect to the MA remote controller terminal block (TB15) on the indoor unit.

#### (2) When using group operation (group 03 and group 04 in the figure)

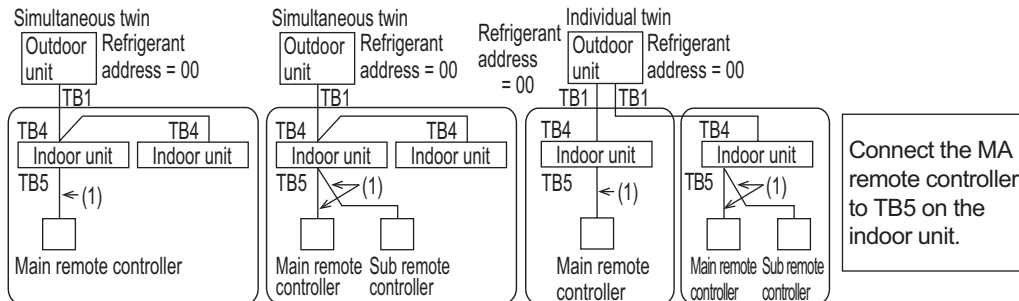
- Connect transmission cables between the MA remote controller terminal blocks (TB15) on the indoor units that are operated in a group, and connect the MA remote controller to any one of the terminal blocks (TB15).
- When using a system controller, configure the group settings on the system controller in the same way as the remote controller wiring.
- A maximum of two MA remote controllers can be connected in one group. In this case, set one as the main remote controller and the other as the sub remote controller.
- The maximum number of indoor units that can be connected to a single MA remote controller is 16.

### 2-3-2. Connecting to a Mr. Slim air conditioning unit

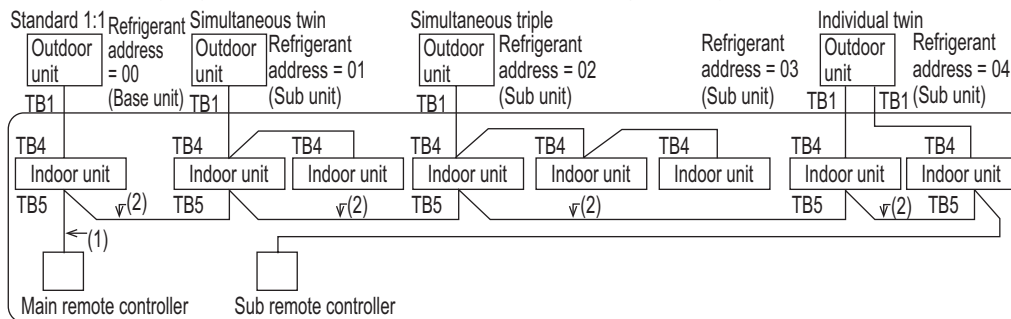
The MA remote controller wiring varies depending on the system configuration. Follow the examples below when connecting.

- The refrigerant address is set using the DIP switches on the outdoor unit.  
(For details, refer to the installation manual for the outdoor unit.)
- All indoor units surrounded by a box are controlled as one group.

#### When a remote controller is connected for each refrigerant system



#### When making a group of indoor units of different refrigerant systems



#### (1) Wiring between remote controller and indoor unit

- Connect to the MA remote controller terminal block (TB5) on the indoor unit.
- With a simultaneous multi type, when different models of indoor units are present, connect the remote controller to the indoor unit that has the most functions (fan speed, vanes, louver, etc.).

#### (2) Wiring for a group of different refrigerant systems

- Group the indoor units using the remote controller cables. Connect transmission cables between the MA remote controller terminal blocks (TB5) on the representative indoor units of each refrigerant system to be grouped.
- When different models of indoor units are present in a single group, set the indoor unit that has the most functions (fan speed, vanes, louver, etc.) as the base unit (refrigerant address = 00). When the base unit is a simultaneous multi type, the conditions in (1) above must be satisfied.
- With an MA remote controller, a maximum of 16 refrigerant systems can be controlled as a single group.

#### Note

- Do not connect transmission cables between the MA remote controller terminal blocks (TB5) of indoor units in the same refrigerant system. Doing so may prevent the system from operating correctly.
- When connecting to the MA remote controller terminal block (TB5) on an indoor unit, a maximum of two cables can be connected to one terminal block. Connecting more cables may result in contact failure or wiring disconnection.
- Multiple cables cannot be connected to a remote controller terminal block.

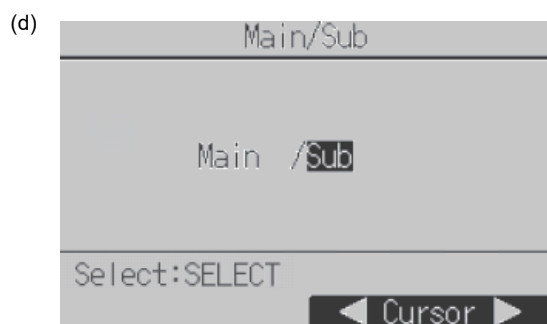
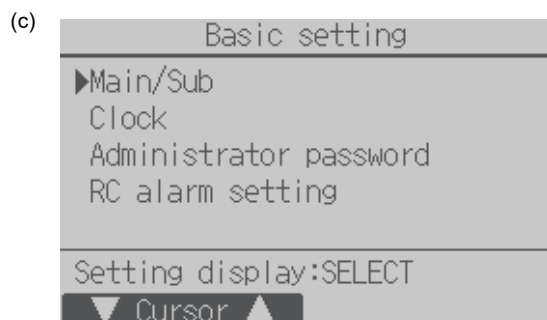
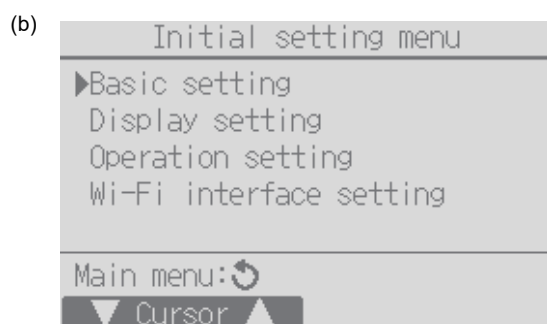


## 2-4. Remote controller main/sub setting


When two MA remote controllers are connected in one group, set one as the main remote controller and the other as the sub remote controller.

Example: PAR-45MA main/sub setting

The setting method varies depending on the remote controller to be used. Refer to the remote controller installation manual for details.



### Step

1. Press the [MENU] button on the remote controller to display screen (a) "Main menu."
2. Move the cursor to select [  ] "Initial setting." Press the [SELECT] button to display screen (b) "Initial setting menu."
3. Select "Basic setting" to display screen (c) "Basic setting."
4. Select "Main/Sub" to display screen (d) "Main/Sub."
5. Select "Main" or "Sub," and press the [SELECT] button to save the setting.

## 2-5. List of supported models

The relationships between the product names and models are as shown below.

\* The remote controller models are current as of December 2023.

Product name	Model	Product name	Model
MA Remote Controller - (A)	PAR-41MAA PAR-41MAAU PAR-40MAAC PAR-30MAOA PAR-32MAAC PAR-40MAAT PAR-41MAR PAR-41MAAM PAR-41MAAB	MA Remote Controller - (B)	PAR-21MAA PAR-21MAAC
Simple Remote Controller	PAC-YT51CRB PAC-YT52CRA PAC-YT53CRAU	Simple MA Touch Remote Controller	PAR-CT01MAA-S PAR-CT01MAU-SB PAR-CT01MAC-PB PAR-CT01MAA-PB/SB PAR-CT01MAT-PB PAR-CT01MAR-PB/SB
Signal Receiving Unit	PAR-FA32MA PAR-FA32MAC		
LOSSNAY Remote Controller	PZ-60DR-E PZ-61DR-E	Remote Controller for e-Series/HWHP	PAR-W31MAA

# 3. M-NET Transmission Cable Connections and Restrictions

Controller models are abbreviated as "AE-C" or "EW-C" in this manual.

Units and devices are referred to by their product name in this manual. For their model names, see the Table of product names and models in "3-1-8. Tables."

## 3-1. Restrictions on M-NET system design

This chapter explains the restrictions that apply to the M-NET transmission cable (centralized control transmission cable or indoor/outdoor transmission cable).

When designing an M-NET system, all restrictions 1 to 7 in the table below must be satisfied. If the restrictions are not satisfied, equipment operation failure or communication error may occur. For details of each restriction, refer to the corresponding section.

- ◆ While it is possible to branch the M-NET transmission cable to connect it freely between units, the centralized control transmission cable and indoor/outdoor transmission cable must not be connected in a loop.
- ◆ M-NET transmission cables have no polarity.

No.	Restriction type	Details
Restriction 1	Restriction related to the transmission cable	Restriction related to cable type and conductor cross-section area of the transmission cable for the purpose of conducting stable communication and power supply "3-1-1. [Restriction 1] Restriction on M-NET transmission cable type and conductor cross-section area (page 12)"
Restriction 2	Restriction on maximum total cable length	Restriction related to transmission distance between terminals for the purpose of preventing communication errors caused by signal delays "3-1-2. [Restriction 2] Restriction on maximum total cable length (page 12)"
Restriction 3	Restriction on number of connectable units	Restriction related to the number of units that can be connected in one M-NET system "3-1-3. [Restriction 3] Restriction on number of connectable units (page 18)"
Restriction 4	Restriction on number of controlled units	Restriction related to the number of controlled units within the system for the purpose of preventing communication errors caused by increased volume of communication "3-1-4. [Restriction 4] Restriction on number of controlled units (page 18)"
Restriction 5	Restriction on power supply/power consumption	Restriction related to the total power consumption and power supply of all connected equipment "3-1-5. [Restriction 5] Restriction on power supply factor/power consumption factor (page 21)"
Restriction 6	Restriction on equivalent number of units	Restriction related to the number of connected units for the purpose of preventing communication errors caused by reduction of signal integrity "3-1-6. [Restriction 6] Restriction on equivalent number of units (page 24)"
Restriction 7	Restriction on power supply distance	Restriction related to the wiring length from the power supply unit for the purpose of preventing operation failures caused by voltage drop "3-1-7. [Restriction 7] Restriction on power supply distance (page 25)"

### [Legend]

The symbols used in the figures in this chapter and their meanings are as shown below.

In each system configuration diagram, centralized control transmission cables are shown as thick lines and indoor/outdoor transmission cables are shown as thin lines.



Indicates that power is supplied to M-NET from the power supply unit.



Indicates that the power jumper is connected to CN41 on the outdoor unit, and that power is not supplied to TB7.



Indicates that the unit contains a built-in repeater (M-NET signal relay device).

### 3-1-1. [Restriction 1] Restriction on M-NET transmission cable type and conductor cross-section area

Use a cable which satisfies the following specifications for the M-NET transmission cable and ME remote controller cable.

		10 m or less	More than 10 m <sup>*4</sup>
ME remote controller cable	Type	Shielded cable CVV-S, CPEV-S, MVV-S Environmentally friendly cable <sup>*1</sup> (reference) EM-CEE-S, EM-CPEE-S, EM-MEE-S	
	Number of wires	2-core cable	
	Cross-section area or cable size <sup>*2</sup>	0.3 to 1.25 mm <sup>2</sup> (AWG 22 to 16) or $\varnothing$ 0.65 to $\varnothing$ 1.2 mm <sup>*3</sup>	1.25 mm <sup>2</sup> or $\varnothing$ 1.2 mm (AWG 16)

M-NET transmission cable	Type	Shielded cable CVV-S, CPEV-S, MVV-S Environmentally friendly cable <sup>*1</sup> (reference) EM-CEE-S, EM-CPEE-S, EM-MEE-S
	Number of wires	2-core cable
	Cross-section area or cable size <sup>*2</sup>	1.25 mm <sup>2</sup> or $\varnothing$ 1.2 mm or larger (AWG 16)
	Maximum wiring length	Refer to the sections below and design the system so that the restrictions on wiring length are satisfied. • Maximum total cable length 1,000 m (500 m): "3-1-2. [Restriction 2] Restriction on maximum total cable length" • Power supply distance 200 m: "3-1-7. [Restriction 7] Restriction on power supply distance"

\*1: For environmentally friendly cables, select a flame-resistant cable with a black sheath.

\*2: The upper limits on cross-section area and cable size vary depending on the model. Check the installation manual for that model.

\*3: A maximum cable size of 0.75 mm<sup>2</sup> is recommended. PAC-YT81HC (10 m) optional cables can also be used.

\*4: Include the portion exceeding 10 m in the maximum length of the indoor/outdoor transmission cable.

### 3-1-2. [Restriction 2] Restriction on maximum total cable length

#### [1] Summary

Regarding the wiring length for the M-NET transmission cable (centralized control transmission cable or indoor/outdoor transmission cable), the maximum transmission distance (wiring length) between units and the number of repeaters that signals pass through must satisfy the following conditions.

For the wiring length when connecting a ME remote controller, refer to the specified page. "Example of calculating the maximum total cable length and power supply distance when using an ME remote controller (page 15)".

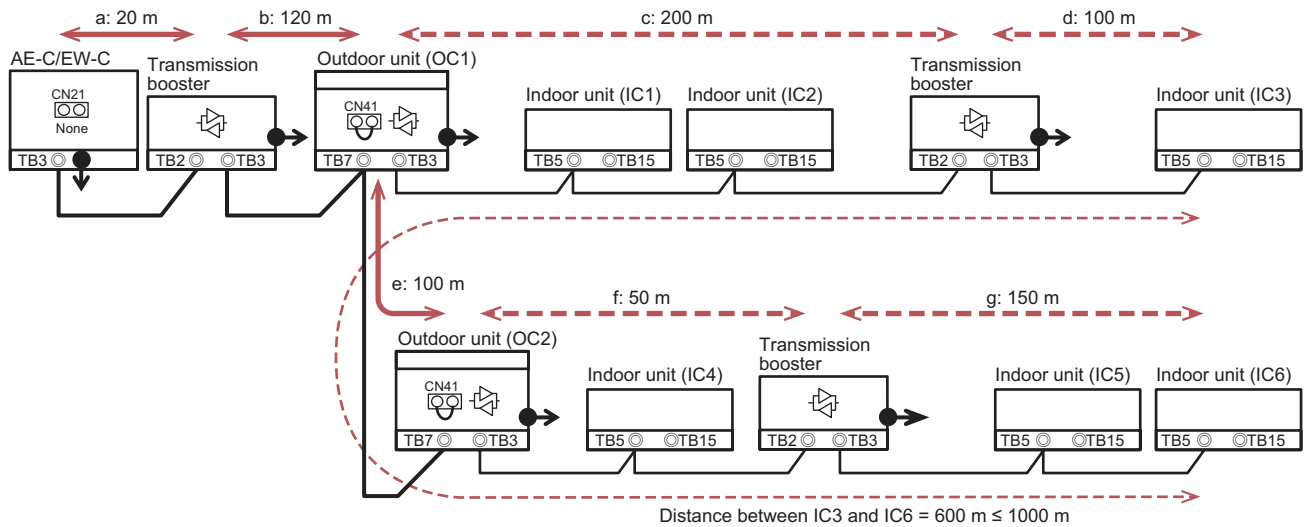
#### Restrictions

- ◆ When all connected units support a transmission distance of 1 km: 1,000 m or less
  - ◆ When the system includes one or more units that do not support a transmission distance of 1 km: 500 m or less
  - ◆ The number of repeaters that signals pass through between the far-end units must be four or less.
- \* To determine whether a unit to be connected supports a transmission distance of 1 km, refer to "List of compatible devices by function."

## [2] Calculating the maximum total cable length

### (1) Example of unit wiring and calculating the maximum total cable length (1)

(When all units support a transmission distance of 1 km (1,000 m))



The transmission distance, a distance between the far-end units in the M-NET system, can be calculated based on the wiring length.

In this wiring example, the transmission distance between the far-end units is calculated as shown below.

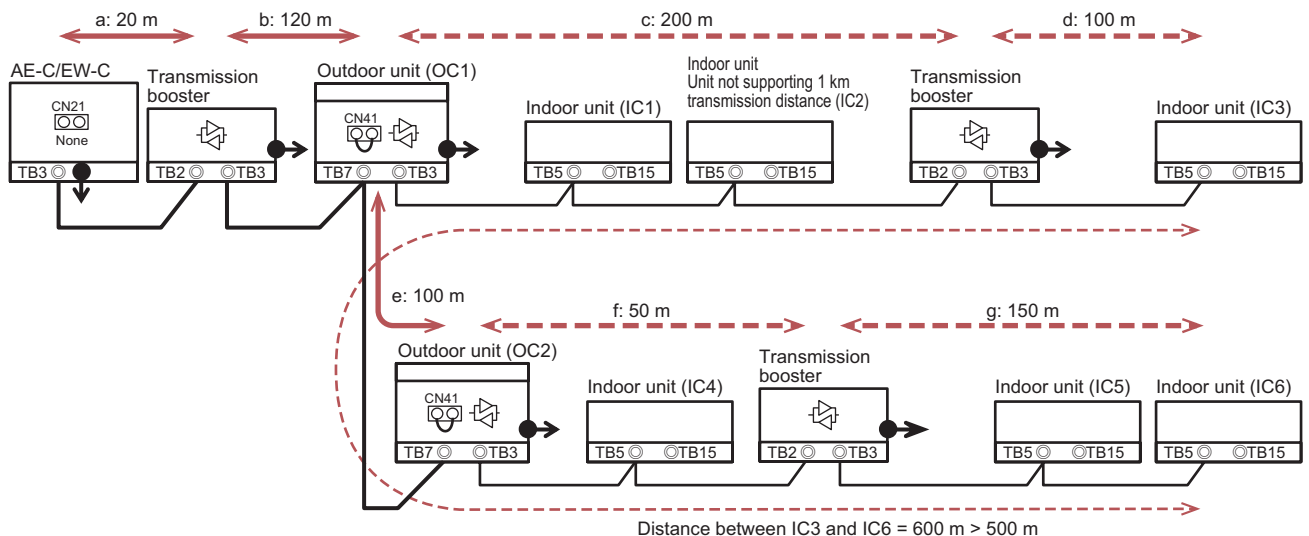
- (1) Distance between AE-C and IC6 = a: 20 + b: 120 + e: 100 + f: 50 + g: 150 = 440 m
- (2) Distance between AE-C and IC3 = a: 20 + b: 120 + c: 200 + d: 100 = 440 m
- (3) Distance between IC6 and IC3 = g: 150 + f: 50 + e: 100 + c: 200 + d: 100 = 600 m

The transmission distance between the far-end units is 600 m as shown by the distance between IC6 and IC3 (3) above. Since all units connected to this M-NET system support a transmission distance of 1 km (1,000 m), the restriction is satisfied.

$$600 \text{ m} \leq 1000 \text{ m}$$

### (2) Example of unit wiring and calculating the maximum total cable length (2)

(When the system contains one or more units that do not support a transmission distance of 1 km (1,000 m))



The transmission distance, a distance between the far-end units in the M-NET system, can be calculated based on the wiring length.

In this wiring example, the transmission distance between the far-end units is calculated as shown below.

- (1) Distance between AE-C and IC6 = a: 20 + b: 120 + e: 100 + f: 50 + g: 150 = 440 m
- (2) Distance between AE-C and IC3 = a: 20 + b: 120 + c: 200 + d: 100 = 440 m
- (3) Distance between IC6 and IC3 = g: 150 + f: 50 + e: 100 + c: 200 + d: 100 = 600 m

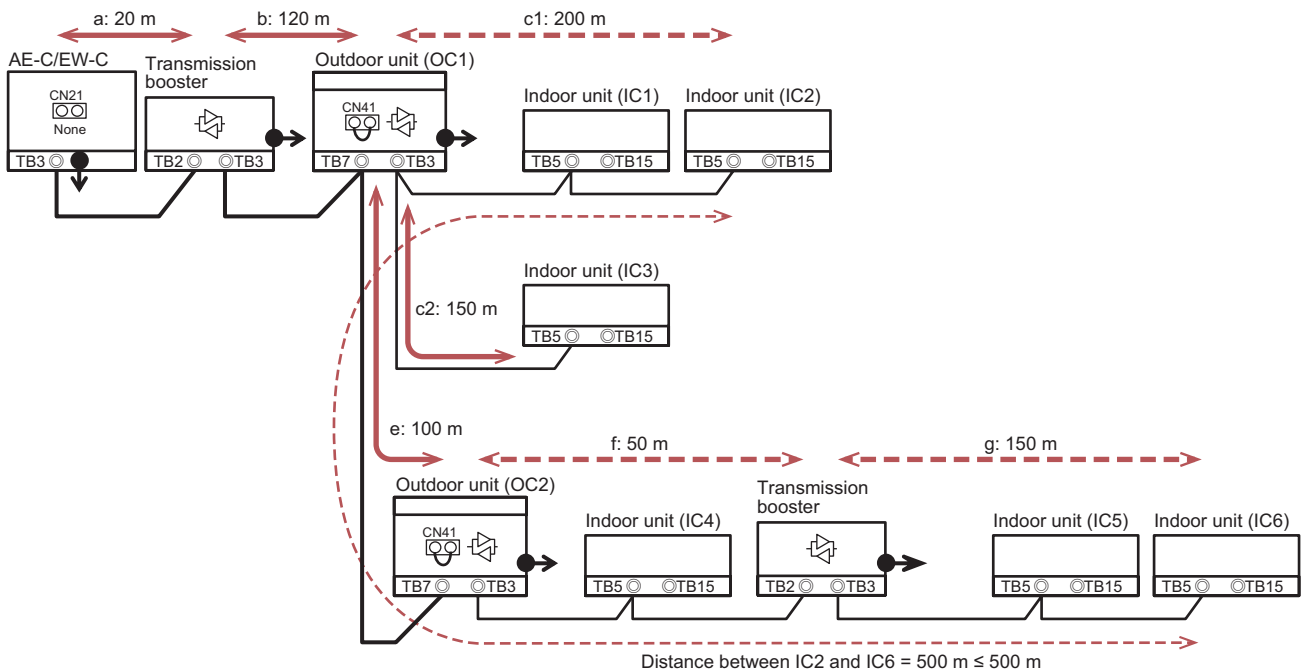
The transmission distance between the far-end units is 600 m as shown by the distance between IC6 and IC3 (3) above. Since there is one or more units that do not support a transmission distance of 1 km (1,000 m) in this M-NET system, the restriction is not satisfied.

Distance between IC3 and IC6 = 600 m > 500 m

In this case, it is necessary to review the wiring. An example of wiring review is shown on the following page.

**(3) Example of reviewing M-NET wiring to reduce the wiring length to within the restriction on maximum total cable length**

**(Shown below is an example of reducing the maximum total cable length to within the restriction by branching the wiring from OC1.)**



In this example, the position of the IC3 connection is reviewed to improve the transmission distance between the units as shown below.

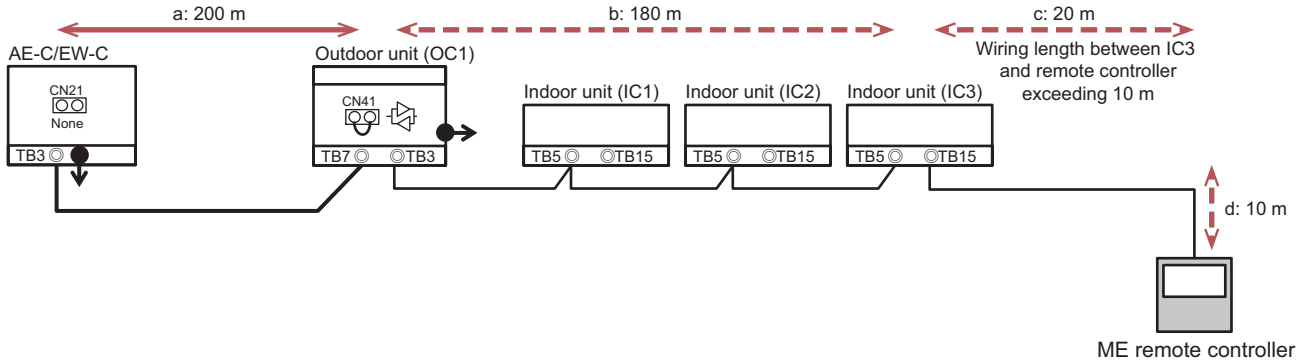
- (1) Distance between AE-C and IC2      a: 20 + b: 120 + c1: 200 = 340 m
- (2) Distance between AE-C and IC3      a: 20 + b: 120 + c2: 150 = 290 m
- (3) Distance between AE-C and IC6      a: 20 + b: 120 + e: 100 + f: 50 + g: 150 = 440 m
- (4) Distance between IC2 and IC6      c1: 200 + e: 100 + f: 50 + g: 150 = 500 m
- (5) Distance between IC3 and IC6      c2: 150 + e: 100 + f: 50 + g: 150 = 450 m

The transmission distance between the far-end units is 500 m as shown by the distance between IC2 and IC6 (4) above. Even when there is a unit that does not support a transmission distance of 1 km (1,000 m) in this M-NET system, the restriction is satisfied.

500 m ≤ 500 m

**(4) Example of calculating the maximum total cable length and power supply distance when using an ME remote controller**

If the wiring length exceeds 10 m when an ME remote controller is used, include the wiring length in excess of 10 m in the power supply distance and maximum total cable length, and design the wiring so as to satisfy the restrictions.



In the example above, the power supply distance and maximum total cable length are as follows.

- (1) Power supply distance from OC1 to ME remote controller =  $b + c = 180 + 20 = 200$  m
- (2) Maximum total cable length from AE-C to ME remote controller =  $a + b + c = 200 + 180 + 20 = 400$  m

**[3] Restriction on the use of repeaters**

A repeater is a relay device that amplifies and rectifies the signal waveform on the M-NET transmission cable, and is built in a unit such as a transmission booster and an outdoor units of CITY MULTI for buildings. Configure the system so that the number of repeaters that signals pass through between units is four or less.

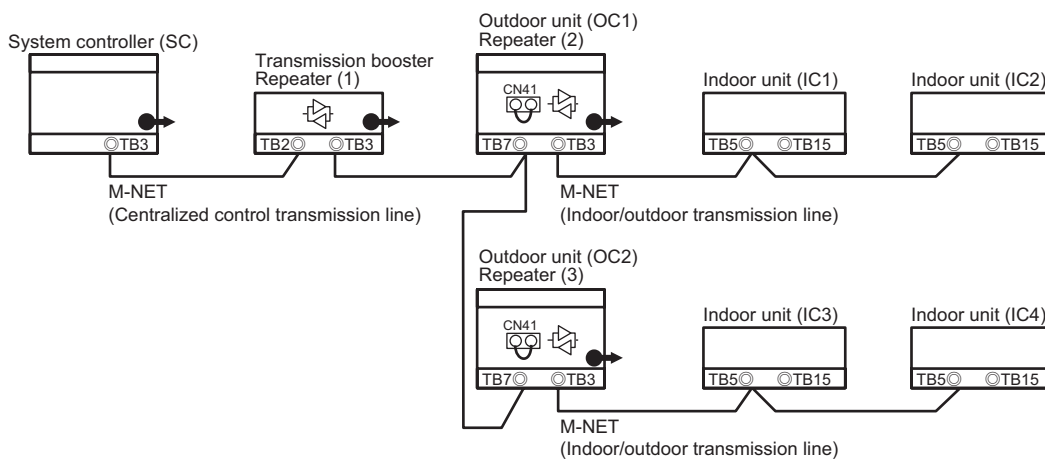
Units with built-in repeaters:

- Transmission booster
- Outdoor units of CITY MULTI for buildings
- e-Series
- Hot water supply

**(1) When a transmission booster is connected to the centralized control transmission line**

When a transmission booster is connected to the centralized control transmission line, follow the instructions below.

- Use transmission boosters with their TB2 and TB3 connected.
- Connections of the TB7 connectors between outdoor units must not be counted as repeaters.



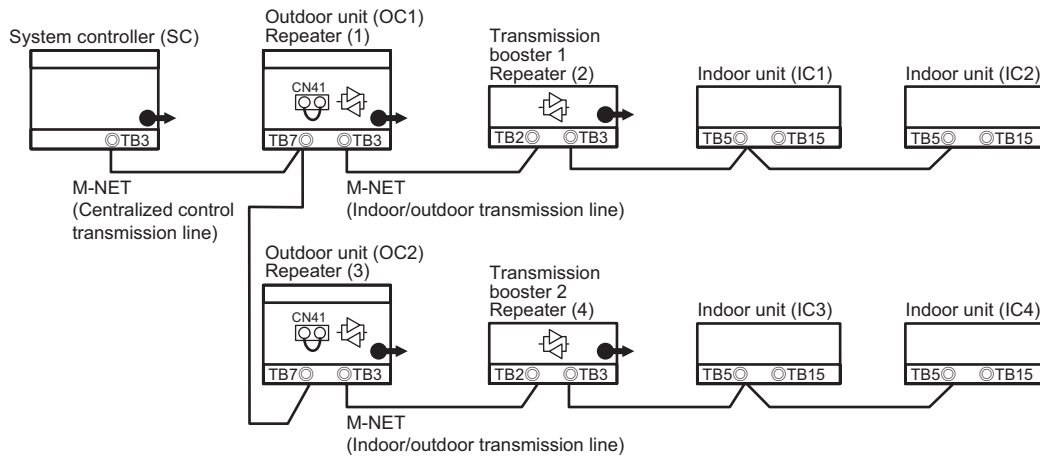
In the example above, the number of repeaters is as follows. In all cases, the restriction that the number of repeaters must be four or less is satisfied.

- (1) Between system controller (SC) and indoor unit (IC2) = 2
- (2) Between system controller (SC) and indoor unit (IC4) = 2
- (3) Between indoor unit (IC2) and indoor unit (IC4) = 2

**(2) When a transmission booster is connected to the indoor/outdoor transmission line**

When connecting a repeater to the indoor/outdoor transmission line, configure the system so that the number of repeaters is four or less.

- ◆ Do not connect transmission boosters in series.



In the example above, the number of repeaters is as follows. In all cases, the restriction that the number of repeaters must be four or less is satisfied.

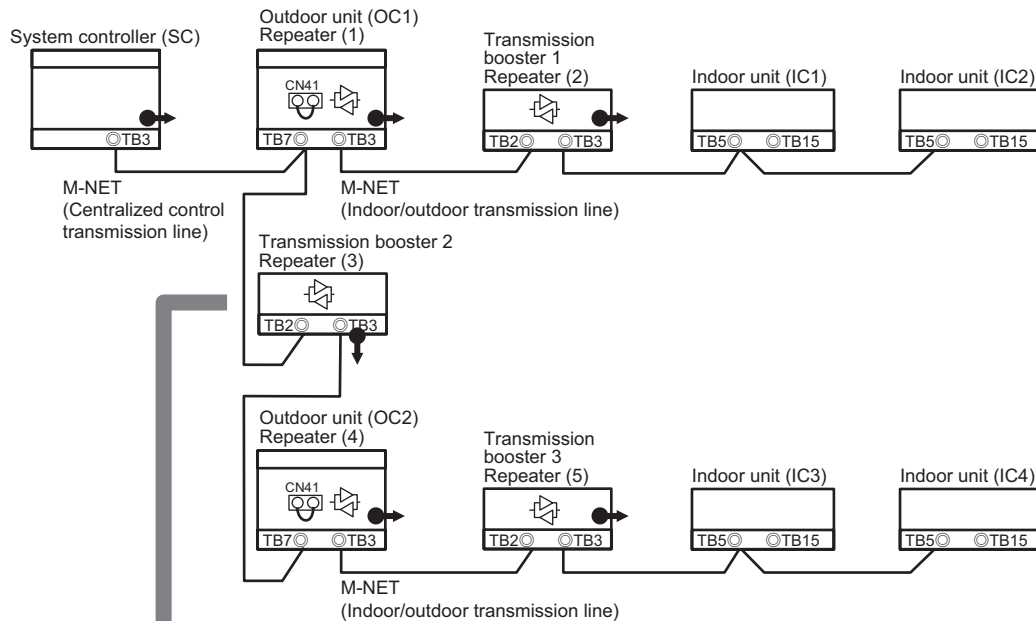
- (1) Between system controller (SC) and indoor unit (IC2) = 2
- (2) Between system controller (SC) and indoor unit (IC4) = 2
- (3) Between indoor unit (IC2) and indoor unit (IC4) = 4



**(3) Example where the restriction is not satisfied**

In the wiring example below, the number of repeaters between indoor unit (IC2) and indoor unit (IC4) is five, and the restriction is not satisfied.

Review the positions where repeaters are connected to reduce the number of repeaters to four or less.

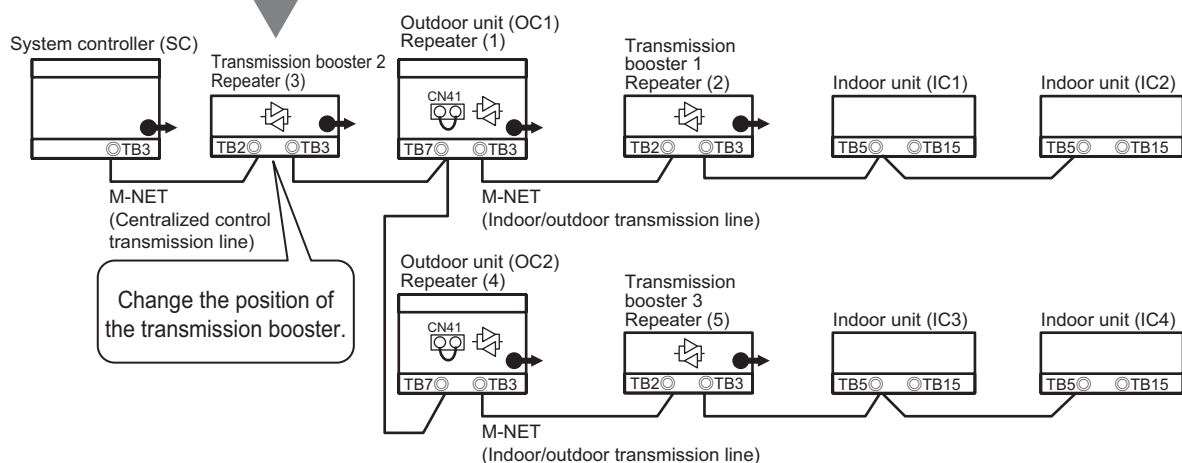


In the layout example shown above, the number of repeaters is as follows.

- (1) Between system controller (SC) and indoor unit (IC2) = 2
- (2) Between system controller (SC) and indoor unit (IC4) = 3
- (3) Between indoor unit (IC2) and indoor unit (IC4) = 5

The largest number of repeaters is five, and the restriction is not satisfied.  
 $5 > 4$

In this case, it is necessary to review the wiring.



After the review, the number of repeaters is as follows.

- (1) Between system controller (SC) and indoor unit (IC2) = 3
- (2) Between system controller (SC) and indoor unit (IC4) = 3
- (3) Between indoor unit (IC2) and indoor unit (IC4) = 4

The number of repeaters has been reduced by reviewing the connection positions.

### 3-1-3. [Restriction 3] Restriction on number of connectable units

The number of units connected to M-NET (one system) must satisfy the following restrictions.

- ♦ The maximum number of connected air conditioning units must be 50 or less (when converted to the number of indoor units).
- ♦ Convert the number of units to the number of indoor units to determine the maximum number of connected units, referring to the table below.

	Converted number of units	Maximum number of connectable units
Air conditioning unit	1	50
Ventilation equipment	1	50
Chiller (e-Series)	3	16 17 to 24*1
Hot water supply	2	24

\*1: When 17 to 24 units are connected, other types of units must not be present in the system.

### 3-1-4. [Restriction 4] Restriction on number of controlled units

#### [1] Summary

The restriction on the number of controlled units is a restriction related to the number of air conditioning units and other units controlled by the ME remote controller/system controller for the purpose of preventing communication errors caused by increased volume of communication.

Count the number of units that are controlled by the ME remote controllers/system controllers that are connected to the M-NET transmission line (one system), and design the system so that the total value is within the restriction.

#### Restriction

- ♦ Total number of units controlled by each ME remote controller/system controller: 150

#### [2] Calculating the number of controlled units


- (1) Count the number of units controlled by one ME remote controller/system remote controller.
- (2) Total the counted values for all ME remote controllers/system remote controllers in one system, and check that the total satisfies the restriction.

[Notes for counting]


- ♦ Count an indoor unit that contains two control boards as two units, because two M-NET addresses are set for such indoor unit.
- ♦ Although an e-Series unit has two addresses for CH and CL, count it as three units in consideration of the communication traffic (convert the number).
- ♦ Although a hot water supply has one address, count it as two units in consideration of the communication traffic (convert the number).

**(1) Example of determining the total number of M-NET controlled units**


Following is an example where the indoor units of a CITY MULTI for buildings are controlled by a main system controller (AE-C/EW-C), sub system remote controller, and ON/OFF remote controller.




(1) Number of indoor unit addresses controlled by **main system controller AE-C/EW-C** = 21  
 Converted number of e-Series and hot water supply addresses controlled by **the same AE-C/EW-C** = 3 + 2  
 Number of PI controller and AI controller addresses controlled by **the same AE-C/EW-C** = 2 ⇒  
**Total number of M-NET controlled units = 28**




e-Series: address 001 + 051 ⇒ Converted number of addresses = 3




Industrial Eco-Cute: address 002 ⇒ Converted number of addresses = 2



PI controller: address 023 (4 watt-hour meters connected)



AI controller: address 024 (temperature sensor and humidity sensor connected)




(2) Number of addresses for 10 indoor units controlled by **sub system controller PAC-SF50AT(1)**  
 = 10 ⇒ **Total number of M-NET controlled units = 10**

Group 1
.....
Group 9


Indoor unit  
Address 003

.....




Indoor unit  
Address 011

.....

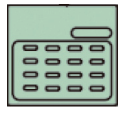


Indoor unit  
Address 012

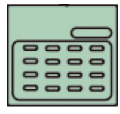
.....



When controlling Groups 009 and 010 with this ME remote controller



(3) Number of addresses for 10 indoor units controlled by nine **ME remote controllers**  
 = Total 10 ⇒ **Total number of M-NET controlled units = 10**

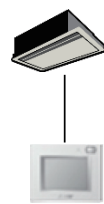


(4) Number of addresses for nine indoor units controlled by **sub system controller's ON/OFF remote controllers** = 11 ⇒ **Total number of M-NET controlled units = 11**

Group 10
.....
Group 14
.....
Group 15
.....
Group 18


Indoor unit  
Address 013

.....



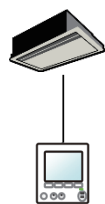
Indoor unit  
Address 017  
Address 018  
\*1

.....



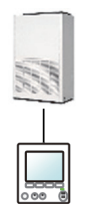
Indoor unit  
Address 019

.....



Indoor unit  
Address 022  
Address 023  
\*1

.....



(5) Number of addresses for five indoor units controlled by five **ME remote controllers** = Total 6  
 ⇒ **Total number of M-NET controlled units = 6**

(6) Number of addresses for four indoor units controlled by five **MA remote controllers** = Total 5  
 There is no restriction on the number of units controlled by MA remote controllers.  
 ⇒ **Total number of M-NET controlled units = 0**

\*1: Example when two control boards are installed

19

MEES24K001

**(2) Judgement results of total number of M-NET controlled units**

No. in illustration	Controlled remote controller/ System controller	Reference (number of air conditioning units)	Number of air conditioning unit addresses	Converted number of e-Series addresses	Converted number of hot water supply addresses	Number of PI and AI controller addresses	Subtotal number of controlled units
(1)	AE-C/EW-C	(19)	21	3	2	2	28
(2)	System remote controller PAC-SF50AT(1)	(10)	10	—	—	—	10
(4)	ON/OFF remote controller	(9)	11	—	—	—	11
(3) + (5)	ME remote controller	(10+5)	10+6	—	—	—	16
(6)	MA remote controller	(0)	0	—	—	—	0
Total number of M-NET controlled units							65
Judgement result		Total number of M-NET controlled units = 65 (which is not more than 150 = acceptable)					

### 3-1-5. [Restriction 5] Restriction on power supply factor/power consumption factor

#### [1] Summary

The restriction on the power supply/power consumption is a restriction related to the power consumed for M-NET communication by the units connected to the M-NET transmission line and to the power supply capacity of the equipment that supplies power to those units.

The power supply factor of the power supply unit must be equal to or above the total power consumption factor of the connected units.

#### Restriction

- ◆ Power supply factor  $\geq$  Power consumption factor
- ◆ It is not possible to supply power from multiple power supply units to a single transmission line.  
(Summation of power supply factors is not allowed.)

#### [2] Power supply method and settings

Explained below is major power supply methods and settings.

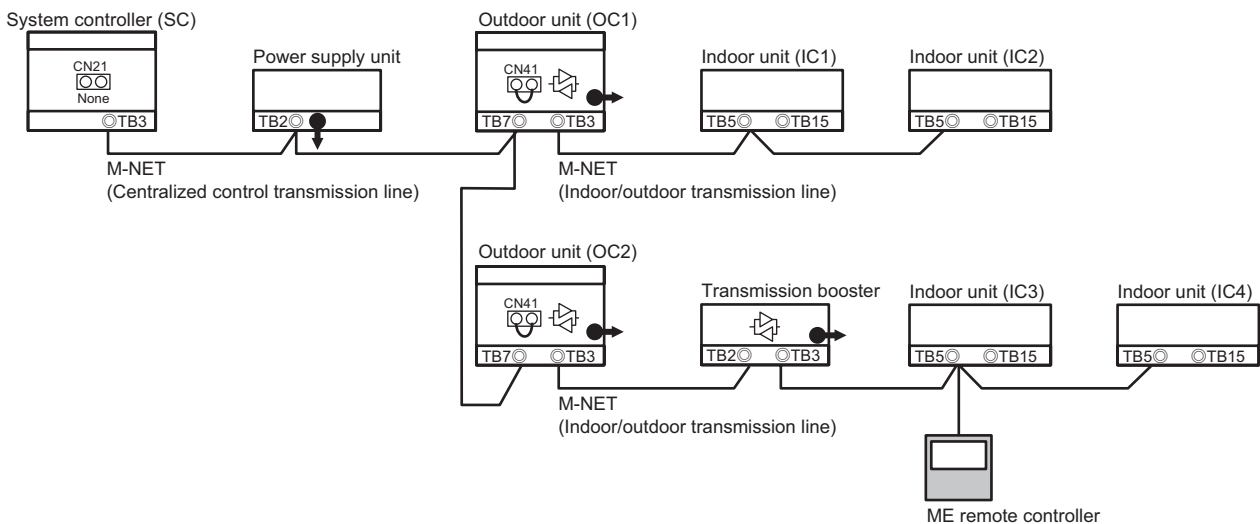
##### (1) When supplying power from a power supply unit

When supplying power to the centralized control transmission line (outdoor unit TB7 side), use a power supply unit or a transmission booster.

- ◆ When connecting the AE-C/EW-C and power supply unit, disconnect the CN21 connector on the AE-C/EW-C.
- ◆ Connect the power jumper to CN41 on the outdoor unit.
- ◆ For the distance from the power supply unit to each unit, follow "3-1-7. [Restriction 7] Restriction on power supply distance"

When supplying power to the indoor/outdoor transmission line (outdoor unit TB3 side), use a transmission booster.

For details, refer to the specified page. "Restriction on the use of repeaters (page 15)".

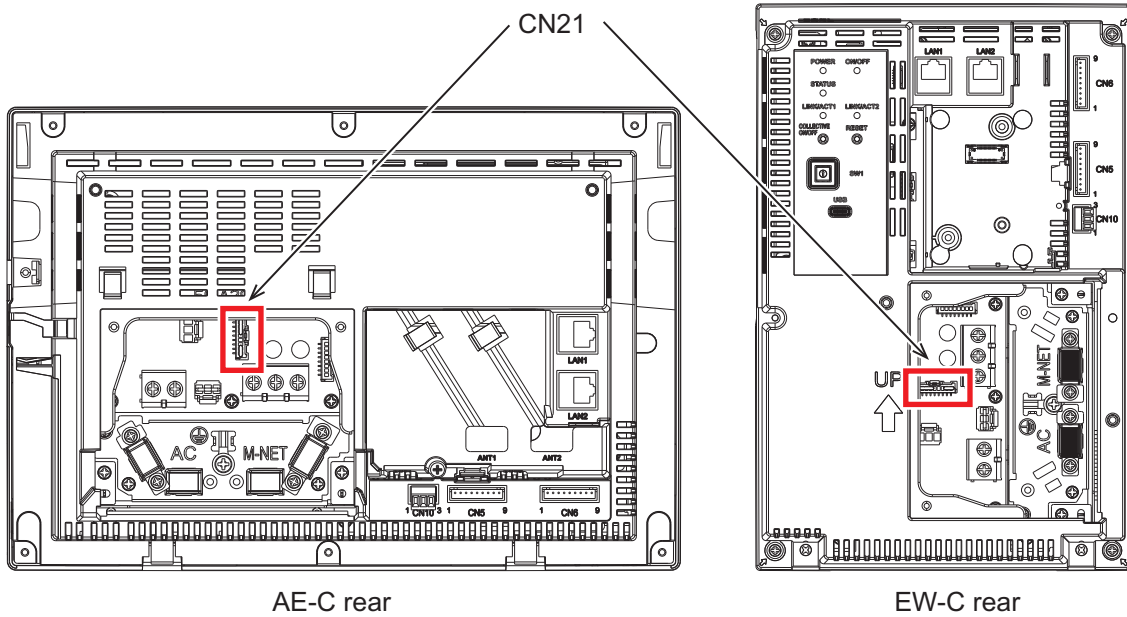


#### Note

- ◆ When connecting the AE-C/EW-C and power supply unit, disconnect the CN21 connector on the AE-C/EW-C.
- ◆ Connect the power jumper to CN41 on the outdoor unit.

**(2) When supplying power from the AE-C/EW-C**

When supplying power from the AE-C/EW-C that is connected to the centralized control transmission line, keep the CN21 connector connected.



**Note**

- When supplying power from a power supply unit that is connected to the same centralized control transmission line, disconnect the CN21 connector in order to prevent double power supply.

**(3) When supplying power from an outdoor unit to the centralized control transmission line**

It is possible to supply power from an outdoor unit to the centralized control transmission line by connecting/disconnecting the outdoor unit power jumper (CN40/CN41). When supplying power from the outdoor unit, connect the power jumper to CN40. When not supplying power, connect the power jumper to CN41. Setting examples are shown in the table below.

Refrigerant system	System controller (Centralized control transmission line)	Power supply unit	Multiple refrigerant grouping operation	Outdoor unit power jumper	Outdoor unit central control switch SW5-1*2
Single refrigerant	No	—	—	CN41	OFF
Multiple refrigerants	No	No	No	CN41 on all units	OFF
		No	Yes	CN40 on one unit only*1	OFF
	System controller	Yes	Yes/No	CN41 on all units	ON
		No	Yes/No	CN40 on one unit only*1	ON

\*1: Connect the power jumper to CN40 only on one outdoor unit in the system, and connect the power jumper to CN41 on the other outdoor units.

\*2: When connecting the system controller, turn the central control switch (SW5-1) to "ON" on all connected outdoor units.

\*3: When power is supplied from an outdoor unit to a system controller connected to the centralized control transmission line, the system controller will stop when the outdoor unit malfunctions or stops, which may affect the operation of other units controlled by the system controller, and may cause an error to be displayed on the screen.

**Note**

- ♦ When connecting a system controller, turn the central control switch (SW5-1) to "ON" on all connected outdoor units.
- ♦ The power jumper is connected to CN41 at the time of factory shipment.

**[3] Checking the power supply factor and power consumption**

Check that the power supply factor of the power supply to the M-NET transmission line is equal to or above the total power consumption factor of the connected units.

[A] Determine the method of supplying power to the M-NET transmission line and calculate the power supply factor from the units.

For details, refer to the specified page. "List of power supply factors (page 28)"

[B] Calculate the total from the power consumption factors of the units connected to M-NET.

For details, refer to the specified page. "List of power consumption factors and equivalent numbers of units (page 29)"

Design the M-NET wiring so that power supply factor [A] is larger than power consumption factor [B].

If the above condition is not satisfied, it is necessary to add a power supply unit or transmission booster to M-NET.

### 3-1-6. [Restriction 6] Restriction on equivalent number of units

#### [1] Summary

This is a restriction related to the number of connected units for the purpose of preventing communication errors caused by reduction of signal integrity on the M-NET transmission line.

Based on the power consumption factor and equivalent number of units, calculate the total equivalent number of units for all the units that receive electrical power for each power supply system, and design the system so that the restrictions are satisfied.

#### Restriction

- Total equivalent number of units for units receiving electrical power  $\leq 40$

With a centralized control transmission line

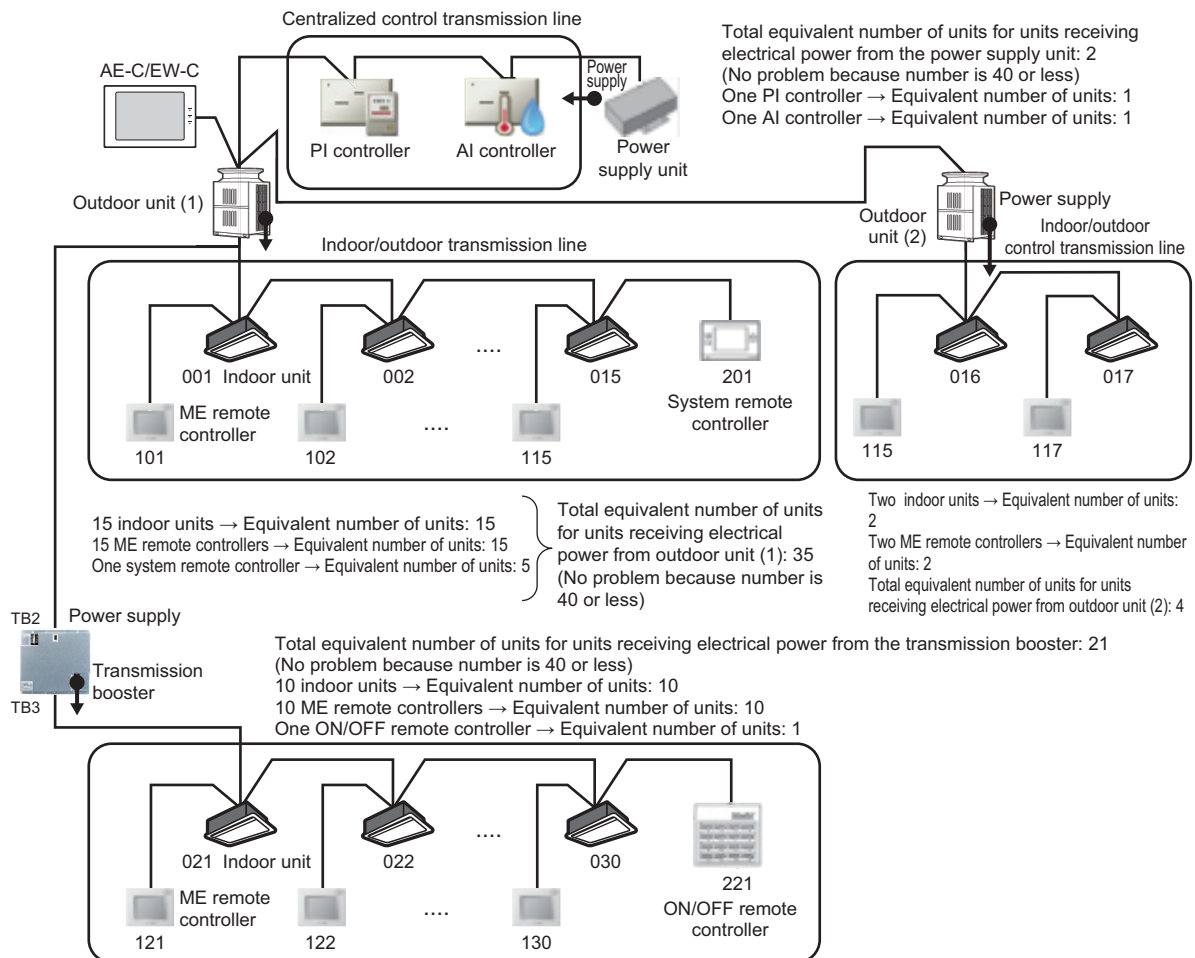
- Total equivalent number of units for units receiving electrical power from the power supply unit
- Total equivalent number of units for units receiving electrical power from the transmission booster
- Total equivalent number of units for units receiving electrical power from the system controller that has power supply capability

With an indoor/outdoor transmission line

- Total equivalent number of units for units receiving electrical power from the outdoor unit
- Total equivalent number of units for units receiving electrical power from the transmission booster

#### [2] Calculating the equivalent number of units

<Example of calculating the equivalent number of units>





### 3-1-7. [Restriction 7] Restriction on power supply distance

#### [1] Summary

The restriction on power supply distance is a restriction to prevent the effects of voltage drops caused by the routing of transmission cables.

It is necessary to install a separate power supply unit for the centralized control transmission line and the indoor/outdoor transmission line. Design the system so that the distance between the power supply unit and each connected unit is 200 m or less.

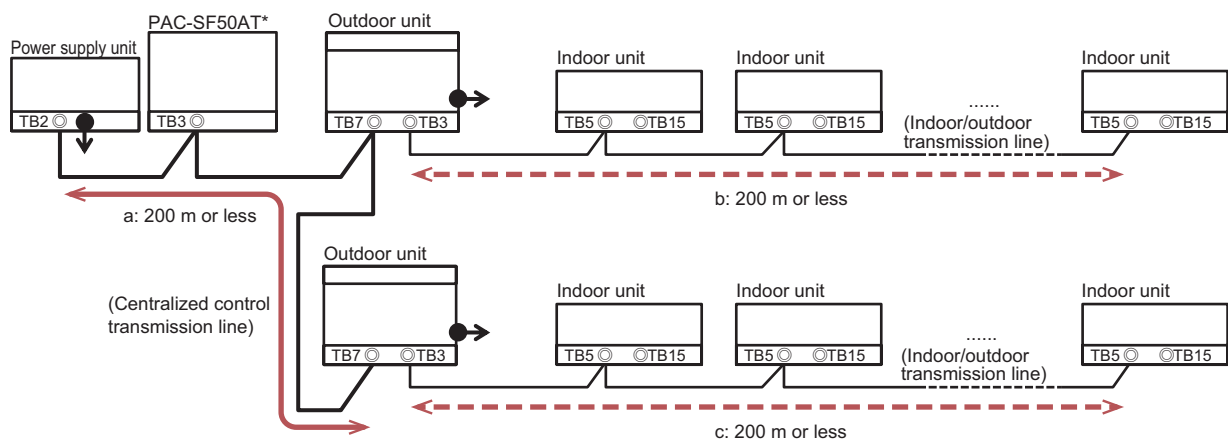
- For details of the power supply unit, refer to "Unit supplying power to the M-NET transmission line (page 25)"
- For the power supply capacity, refer to "[Restriction 5] Restriction on power supply factor/power consumption factor (page 21)".

#### Restriction

- Distance between power supply unit and each connected unit: 200 m or less

#### [2] Calculating the maximum power supply distance

Shown below is an example of the wiring for each unit.



Calculate the distance (wiring length) between the M-NET power supply unit and each connected unit, and ensure that the distances (a, b, and c in the figure above) are 200 m or less.

- When using an ME remote controller, it is necessary to consider the remote controller wiring length. For details, refer to the specified page. "Example of calculating the maximum total cable length and power supply distance when using an ME remote controller (page 15)"

#### Unit supplying power to the M-NET transmission line

○: Function provided ×: Function not provided

Product name	Power supply to centralized control transmission line	Power supply to indoor/outdoor transmission line
Outdoor unit for CITY MULTI for buildings	○*1	○
e-Series		
Hot water supply	×	×
Air Conditioning Control System (with CN21)	○	×
Power supply unit	○	×
Transmission booster *2	○	○

\*1: When the power jumper is connected to CN40

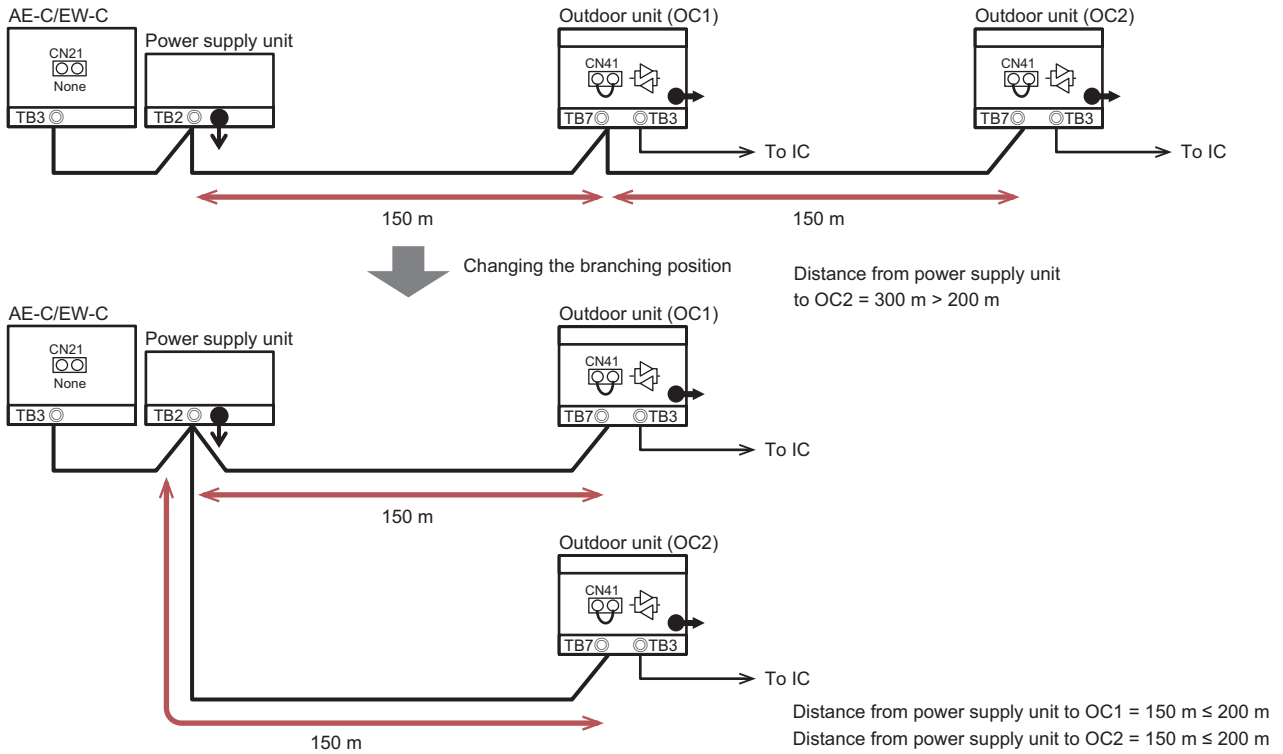
\*2: Cannot be used with TB3 only. Connect the M-NET transmission cable securely to both TB3 and TB2.

**[3] Example of improvement when power supply distance exceeds 200 m**

For wiring where the power supply distance exceeds 200 m, use the methods below so that the power supply distance is no more than 200 m.

**(1) When the power supply distance of the centralized control transmission line exceeds 200 m**

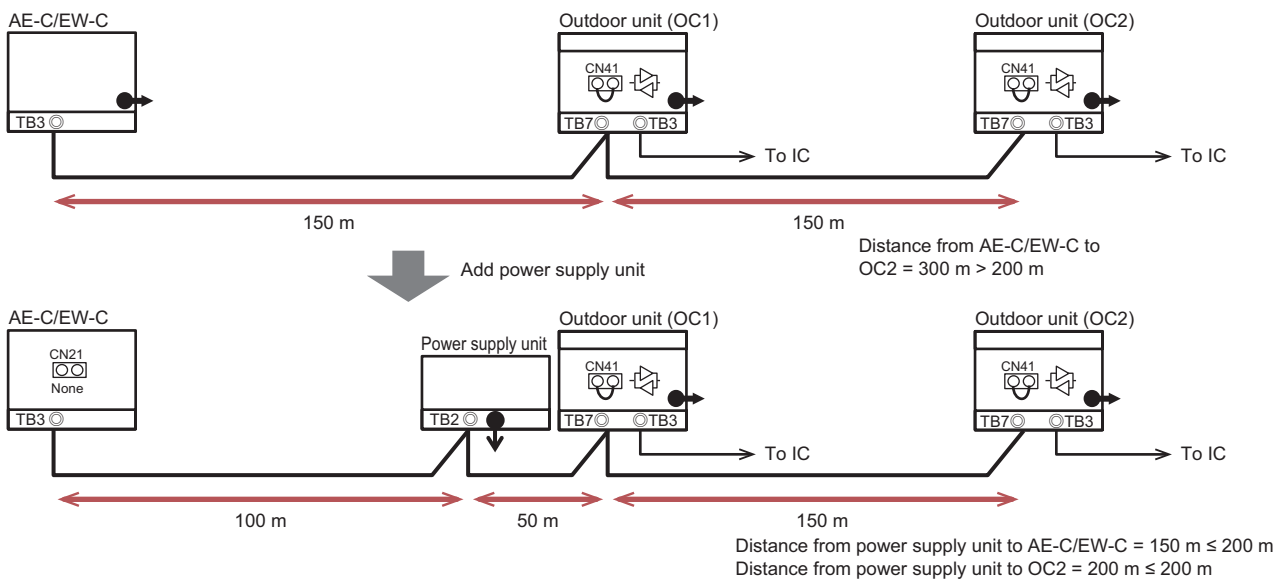
**Improvement example 1: Changing the branching position of the centralized control transmission line**



**Improvement example 2: Adding a power supply unit**

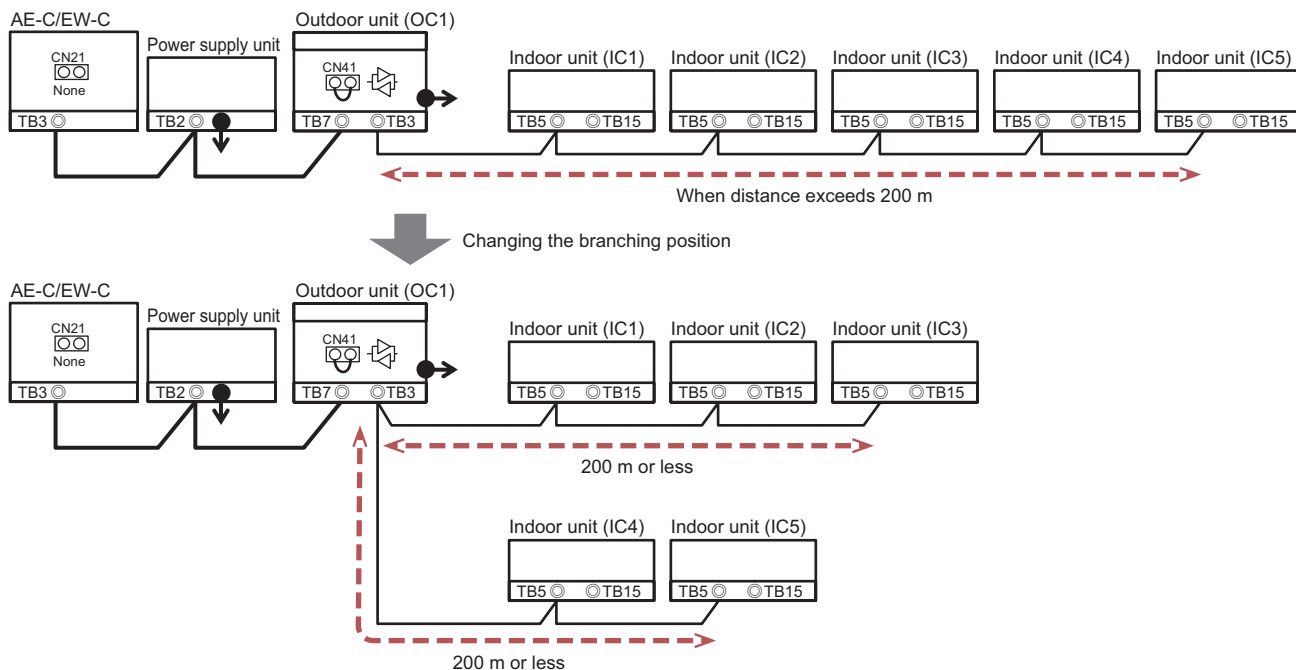
In the wiring example shown below, by adding a power supply unit, the power supply distance between the system remote controller and OC2 can be increased to 300 m.

- It is also possible to increase the power supply distance by using a transmission booster.
- For details, refer to the specified page. "Restriction on the use of repeaters (page 15)"



**(2) When the power supply distance of the indoor/outdoor transmission line exceeds 200 m**

**Improvement example 1: Branching the indoor/outdoor transmission line can reduce the power supply distance to 200 m or less.**



**Improvement example 2: Adding a transmission booster**

For details, refer to the specified page. "Restriction on the use of repeaters (page 15)"

- ◆ A power supply unit cannot be connected to the indoor/outdoor transmission line.

### 3-1-8. Tables

#### [1] Table of product names and models

The relationships between the product names and product models referred to in this document are shown below.

Product name	Product model
Air Conditioning Control System System controller	AE-C, EW-C AE-200*, AE-50*, EW-50*
System remote controller	AT-50*
ON/OFF remote controller	PAC-YT40ANR-W*
Transmission booster	PAC-SF46EP*
Power supply unit	PAC-SC51KU*

\* indicates additional alphabet letters or numbers.

#### [2] List of power supply factors

For power supply factor of each unit, refer to the table below.

Product name	Power supply factor	Power supply to centralized control transmission line (TB7)	Power supply to indoor/outdoor transmission line (TB3)
Outdoor unit for CITY MULTI for buildings <sup>1</sup>	32 (128) <sup>2</sup>	Max. 7.50 (30)	32 (128) - Amount used for TB7
Outdoor unit for CITY MULTI for buildings <sup>3</sup>	16 (64) <sup>2</sup>	0 <sup>4</sup>	16 (64)
Outdoor unit for CITY MULTI for buildings Multi-S	12 (48)	0 <sup>4</sup>	12 (48)
Power supply unit	5 (20)	5 (20)	—
Transmission booster	25 (100) <sup>2</sup>	25 (100) for either	
Air Conditioning Control System (AE-C, EW-C)	0.75 (3)	0.75 (3)	—
Air Conditioning Control System (AE-200*, AE-50*)	0.75 (3)	0.75 (3)	—
Air Conditioning Control System (EW-50*)	1.5 (6)	1.5 (6)	—
Cloud system connective device (MCC-50)	1.5 (6)	1.5 (6)	—

\* indicates additional alphabet letters or numbers.

Figures in parentheses are the old factors.

- 1 Excepting CITY MULTI S, CITY MULTI YGR standard series P224/P280(S), and high-efficiency series P140 to P280(S).
- 2 When a P224 or higher indoor unit is connected, the value will be the power supply factor minus 24.
- 3 CITY MULTI YGR standard series P224/P280(S), and high-efficiency series P140 to P280(S).
- 4 It is possible to connect a unit with power consumption factor 0 to a CITY MULTI S, CITY MULTI YGR standard series P224/P280(S), and high-efficiency series P140 to P280(S). When a unit with power consumption factor 1 or higher is connected, use a power supply unit (optional) or power supply board (optional).

**[3] List of power consumption factors and equivalent numbers of units**

For the power consumption factor of each unit and the equivalent number of units, refer to the table below.

Product name	Power consumption factor	Equivalent number of units
Indoor units for CITY MULTI for buildings (P160 or less)	1 (4)	1
Indoor units for CITY MULTI for buildings (P224 or more, and OA handling air conditioners)	2 (8)	2
BC controller	2 (8)	1
Shut-off valve kit	0.75 (3)	1
Industrial stand-alone humidifying unit	0 (0)	0
Fan/LOSSNAY unit (connected by free plan adapter for fan-related devices)	0 (0)	0
Air conveying fan (connected by free plan adapter for fans)	0 (0)	0
System remote controller	1.5 (6)	5
ON/OFF remote controller	1 (4)	1
ME remote controller	0.5 (2)	1
PI controller (60)	0.25 (1)	1
DIDO controller (66)	0.25 (1)	1
AI controller (63)	0.25 (1)	1
Simple interface (connected by M-NET connection adapter or system control adapter)	0 (0)	0
System control interface	0 (0)	0
Outdoor unit for CITY MULTI for buildings (TB7)	0 (0)	0
e-Series (TB7)	0 (0)	0
Hot water supply (TB7)	0 (0)	0

Figures in parentheses are the old factors.

## **3-2. M-NET address / system configuration**

### **3-2-1. Overview of setting the M-NET addresses**

In order to control air conditioning units and other units with M-NET, it is necessary to assign a unique M-NET address to each unit. This section explains how to set the M-NET addresses.

### **3-2-2. M-NET address and system configuration**

Shown below is the address setting range and system configuration diagram for each system configuration.  
\* "TB\*" in the configuration diagram indicates a terminal block, and the number indicates an example of the address setting.

**[1] CITY MULTI for buildings**

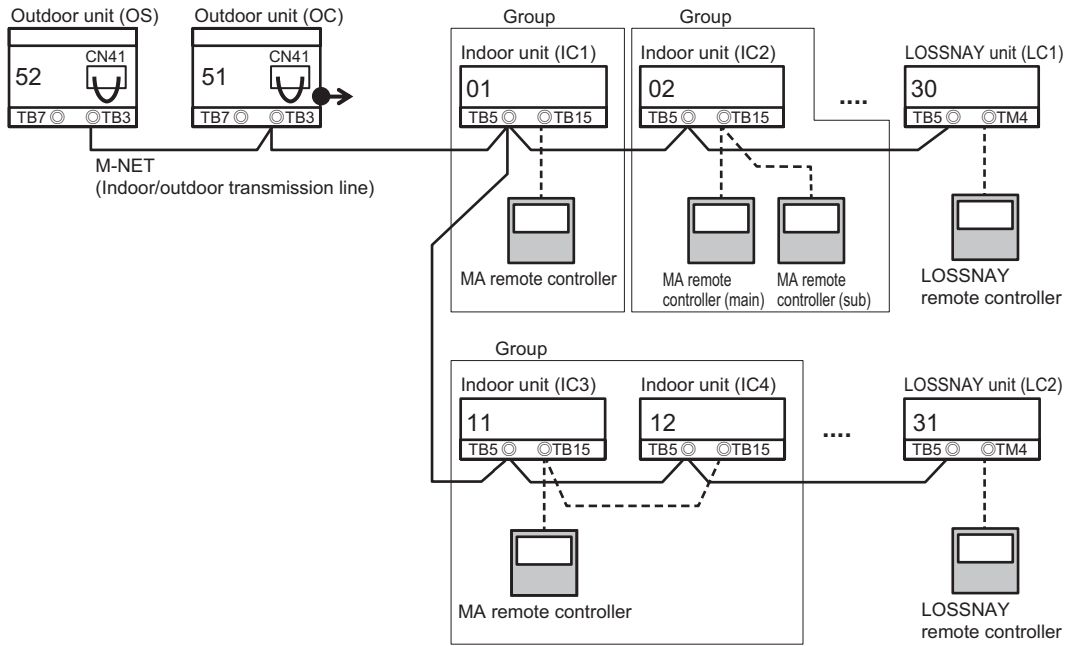
The number of connectable units of CITY MULTI for buildings units and the M-NET address range are shown below.

Unit or controller		Symbol	Maximum number of connectable units in 1 M-NET system	M-NET address setting range	Method for determining M-NET address
Indoor unit		IC	50	01 to 50 (00)	Assign the lowest number to the indoor unit to be used as the base unit in the group, and assign sequential numbers to the other indoor units in the group.
Outdoor unit	Base unit	OC	50	51 to 100 (00)	Assign sequential addresses to the outdoor units in the same refrigerant circuit. Outdoor units are automatically identified, and they are set as OC, OS1, and OS2 in descending order of their capacity (when their capacity is the same, they are set in ascending order of their address).
	Sub unit	OS			
BC controller	Base unit	BC	50	51 to 100 (00)	Assign the address of the outdoor unit to which the BC controller is connected + 1.
	Sub unit	BS			Assign the lowest address of the indoor units that are connected to the BC controller sub unit +50.
ME remote controller	Main remote controller	ME	50	101 to 150 (101)	Assign the lowest indoor unit address in the same group + 100.
	Sub remote controller		50	151 to 200 (101)	Assign the main remote controller address + 50.
MA remote controller		MA	Address setting is not necessary because the unit cannot be connected to M-NET. A maximum of two units can be connected to one group.		

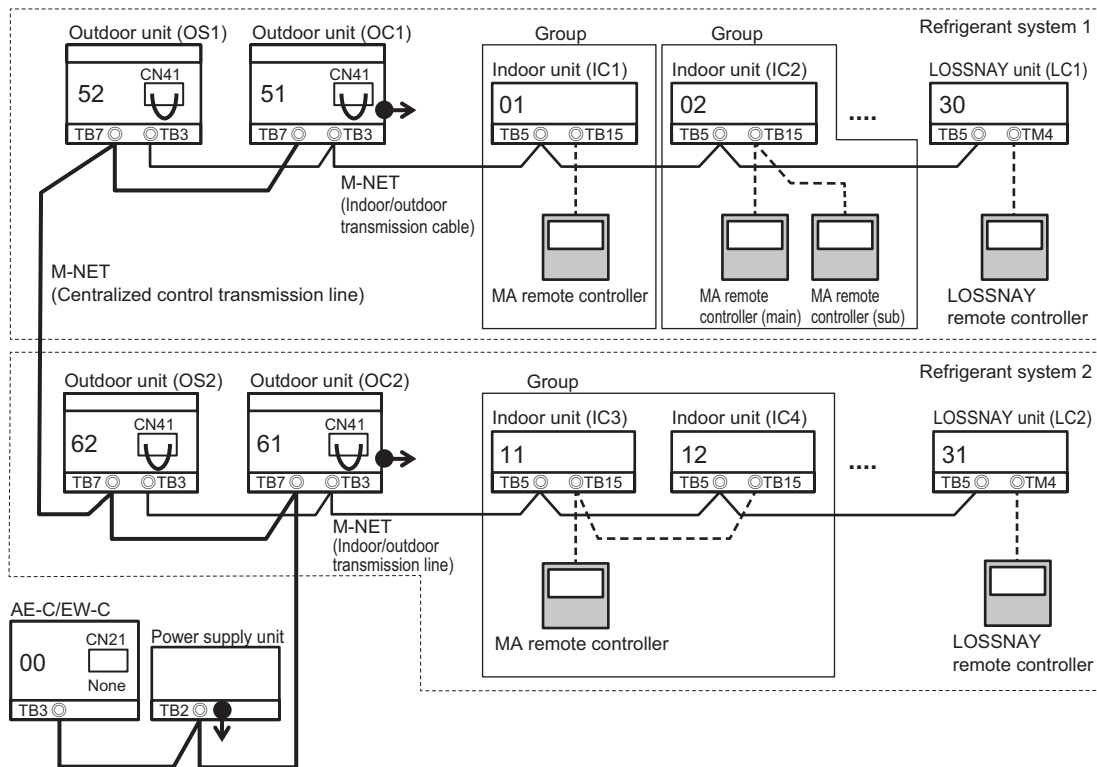
Figures in parentheses are factory defaults.

(1) Y Series

- When using a single refrigerant system (indoor/outdoor manual address startup)



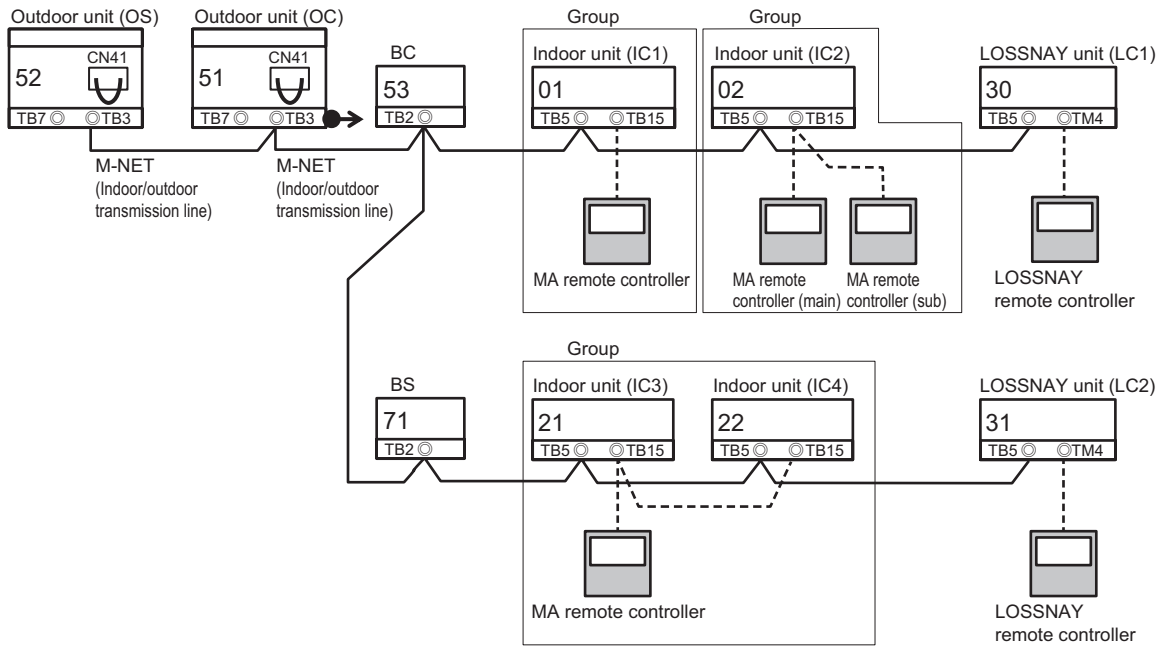
- When connecting a system controller to the centralized control transmission line and supplying power from the power supply unit



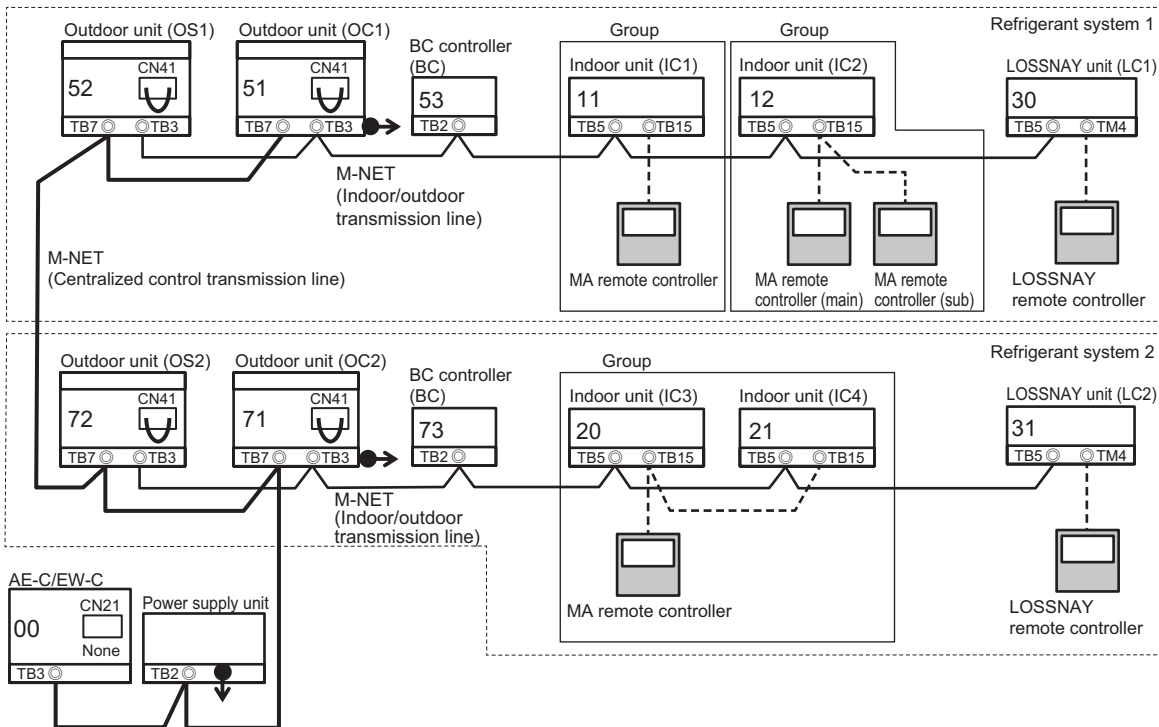


**(2) R2 Series**

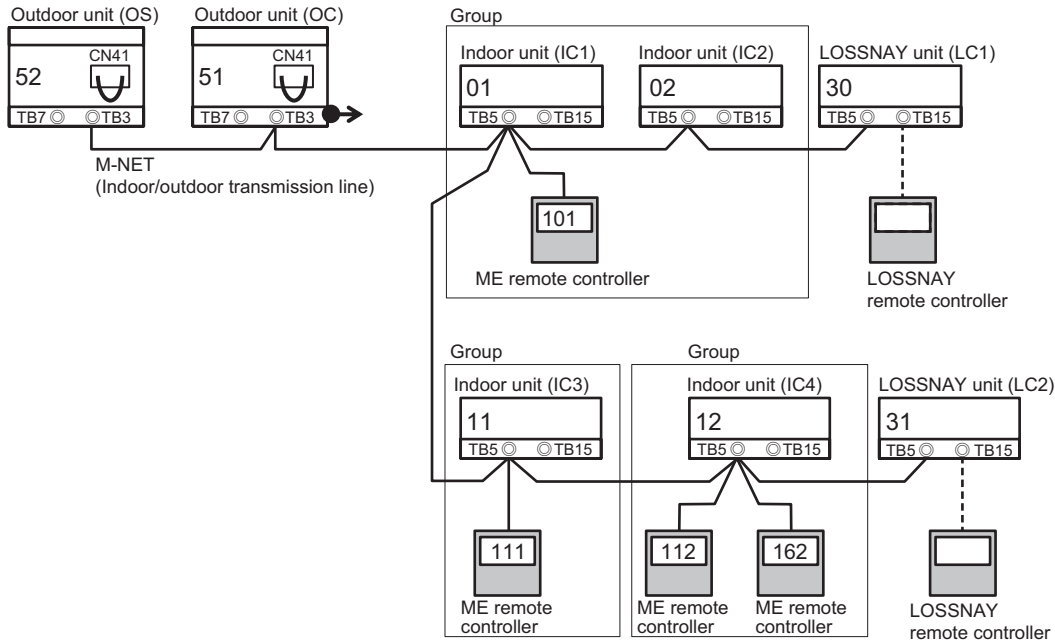
- When using a single refrigerant system (indoor/outdoor manual address startup)



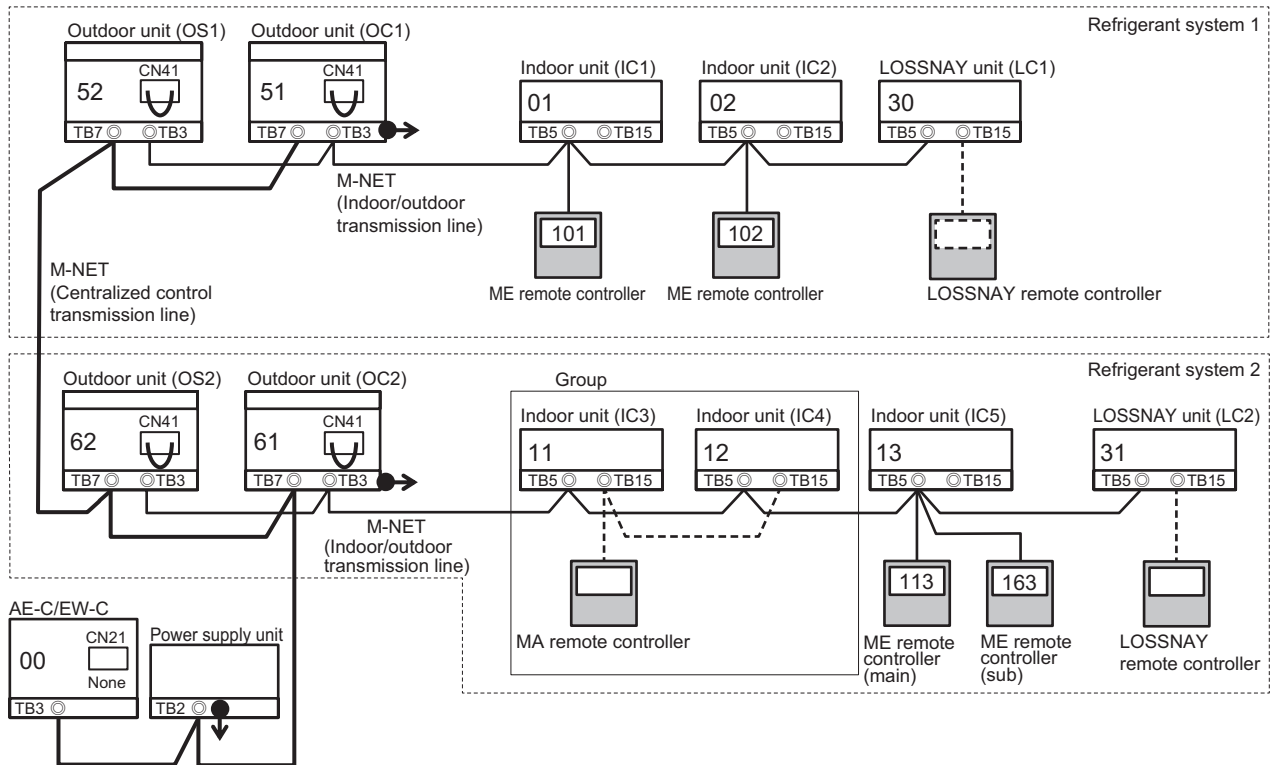
- When a system controller is connected



**(3) Example of connection using an ME remote controller**



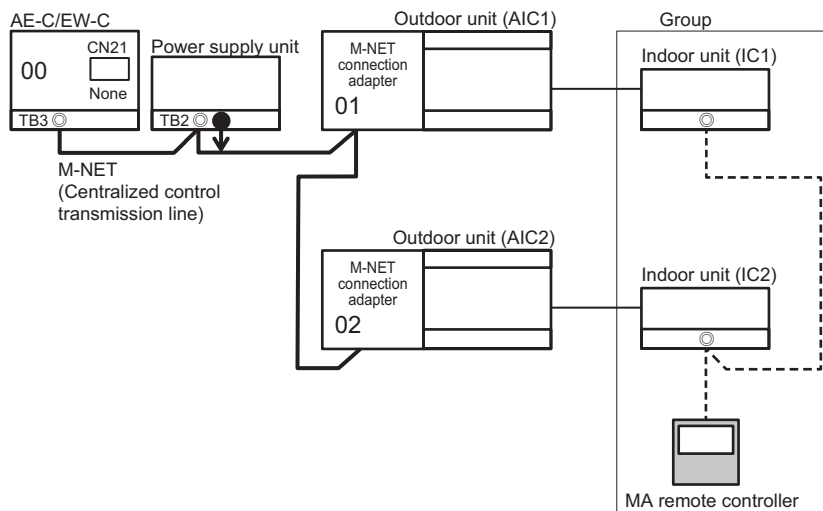
- Example of system connections when an MA remote controller, ME remote controller, and system controller are connected



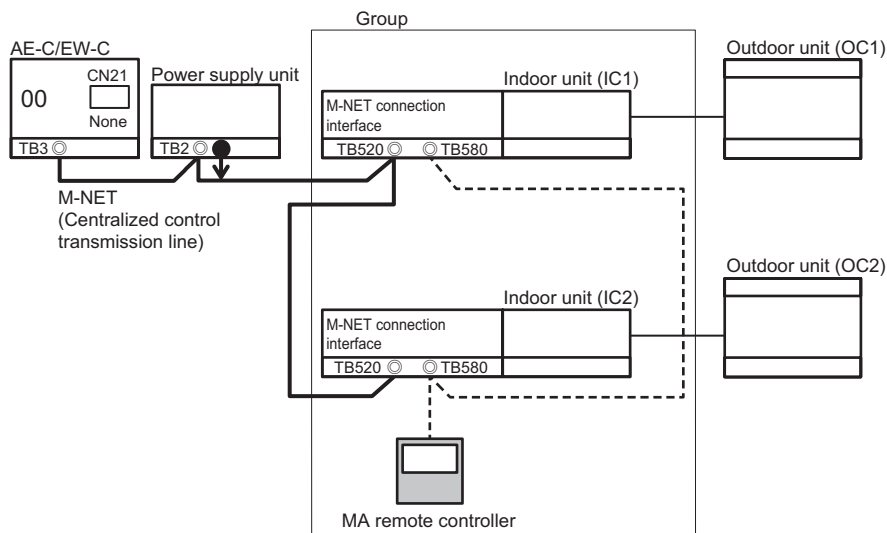
[2] PAC for stores and offices

Unit or controller		Symbol	Maximum number of connectable units in one M-NET system	M-NET address setting range	Method for determining M-NET address
Indoor unit	Simple interface (connected by M-NET connection adapter or M-NET connection interface)	AIC	50	01 to 50	Assign the lowest address to the indoor unit to be used as the base unit in the group. Assign sequential addresses to the other indoor units in the group.

Connecting outdoor units



Connecting indoor units



**[3] Ventilation equipment**

Unit or controller		Symbol	Maximum number of connectable units in one M-NET system	M-NET address setting range*1	Method for determining M-NET address
Ventilation equipment	LOSSNAY unit (free plan supporting model)		50	01 to 50 (00)	Assign the lowest address to the indoor unit or ventilating unit to be used as the base unit in the group. Assign sequential addresses to the units in the group.
	Industrial stand-alone humidifying unit (free plan supporting model)				
	Fan/LOSSNAY unit (connected by free plan adapter for fan-related devices)				
	Air conveying fan (connected by free plan adapter for fans)				
	OA handling unit (direct expansion type with built-in heater/humidifier)	Attribute IC (setting)	IC		
	Attribute FU (setting)	FU		Assign any address within the range shown at left.	

\*1: Figures in parentheses are factory defaults.

\*2: For system configuration diagrams, refer to the specified page. "CITY MULTI for buildings (page 31)".

## [4] e-Series

The number of connectable e-Series units and M-NET address range are shown below.

An e-Series unit has two control boards that require M-NET address setting. In this manual, the symbols of those boards are "CH" and "CL."

The combination of CH and CL comprises one e-Series unit.

	Unit	Symbol	Maximum number of connectable units	M-NET address setting range*1	Method for determining address
(1)	System representative unit (main) (and representative unit of the simultaneous operation group (main))	CH	24	1 to 50 (01)	Assign the lowest address to the system representative unit (main) in the same system.
(2)	Sub unit (main) of the simultaneous operation group connected to the system representative unit (main)				Assign sequential addresses beginning from the address of the system representative unit (main). (Maximum 6 units in a simultaneous operation group)
(3)	Representative unit of the simultaneous operation group (main)				Assign the lowest address to the representative unit (main) in the simultaneous operation group.
(4)	Sub unit connected to the simultaneous operation group (main)				Assign sequential addresses beginning from the address of the representative unit in the simultaneous operation group (main). (Maximum 6 units in a simultaneous operation group)
(5)	System representative unit (sub) Representative unit of the simultaneous operation group (sub)	CL		51 to 100 (51)	Assign the address of the system representative unit (main) or representative unit in the simultaneous operation group (main) + 50.
(6)	Sub unit (sub)				Assign the address of the sub unit (main) + 50.
(7)	Local remote controller	—	—		Address setting is not necessary.

\*1: Figures in parentheses are factory defaults.

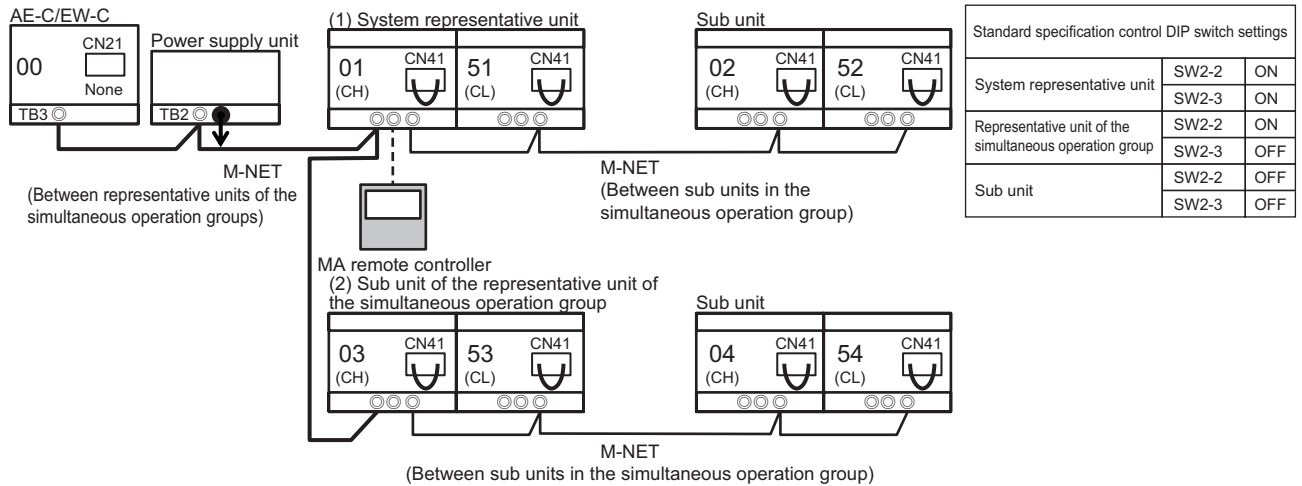
### (1) System configuration

#### 1) Example of e-Series standard system control

##### ◆ Summary

System	A collection of water piping is referred to as a "system," consisting of a "cooling system" and "heating system." The operating commands are input separately for the "cooling system" and "heating system." A total of 24 e-Series units can be connected to the "cooling system" and "heating system" in one system. The units connected within the same system must have the same horsepower.
System representative unit (also: representative unit of the simultaneous operation group)	This unit receives operation commands and performs control within the system. It sends operating commands to the representative unit of the simultaneous operation group within the system.
Simultaneous operation group	A group of units that are connected to a common primary pump and operate simultaneously is referred to as a "simultaneous operation group." Control for the number of units is performed separately for each simultaneous operation group. A maximum of six units can be connected in a simultaneous operation group. (Difference in number of units: Operation is possible up to 1.5×.)
Representative unit of the simultaneous operation group	The representative unit in a simultaneous operation group is referred to as the "representative unit of the simultaneous operation group." The representative unit in a simultaneous operation group receives commands from the system representative unit, and sends them to sub units within the group.
Sub unit	The units in a simultaneous operation group which are not the representative unit of the simultaneous operation group are referred to as "sub units." Sub units operate based on the commands received from the representative unit of the simultaneous operation group.

**2) Wiring and DIP switch settings**



**(2) Simultaneous cooling and heating system control**

**1) Summary**

Operation representative unit	This is a unit setting necessary for simultaneous cooling and heating control. It is referred to as the "cooling representative unit" or "heating representative unit" for each operating mode. It receives operating commands, and the operation representative unit sends operating commands to the representative unit of the simultaneous operation group with the same operating mode (cooling/heating). The combination of CH and CL comprises one e-Series unit.
Cooling representative unit (also: representative unit of the simultaneous operation group)	This unit receives operating commands, and controls the units in the cooling system.
Heating representative unit (also: representative unit of the simultaneous operation group)	This unit receives operating commands, and controls the units in the heating system.
Representative unit of the simultaneous operation group	This unit receives either cooling or heating commands and operates based on commands received from the cooling representative unit or heating representative unit.
Sub unit	This unit operates based on commands received from the representative unit of the simultaneous operation group. A group is registered for each unit.

**Definitions and restrictions**

1) When using simultaneous cooling and heating system control, connect an AE-C/EW-C to the cooling representative unit.

When connecting each unit to M-NET, connect all units to the centralized control transmission line.

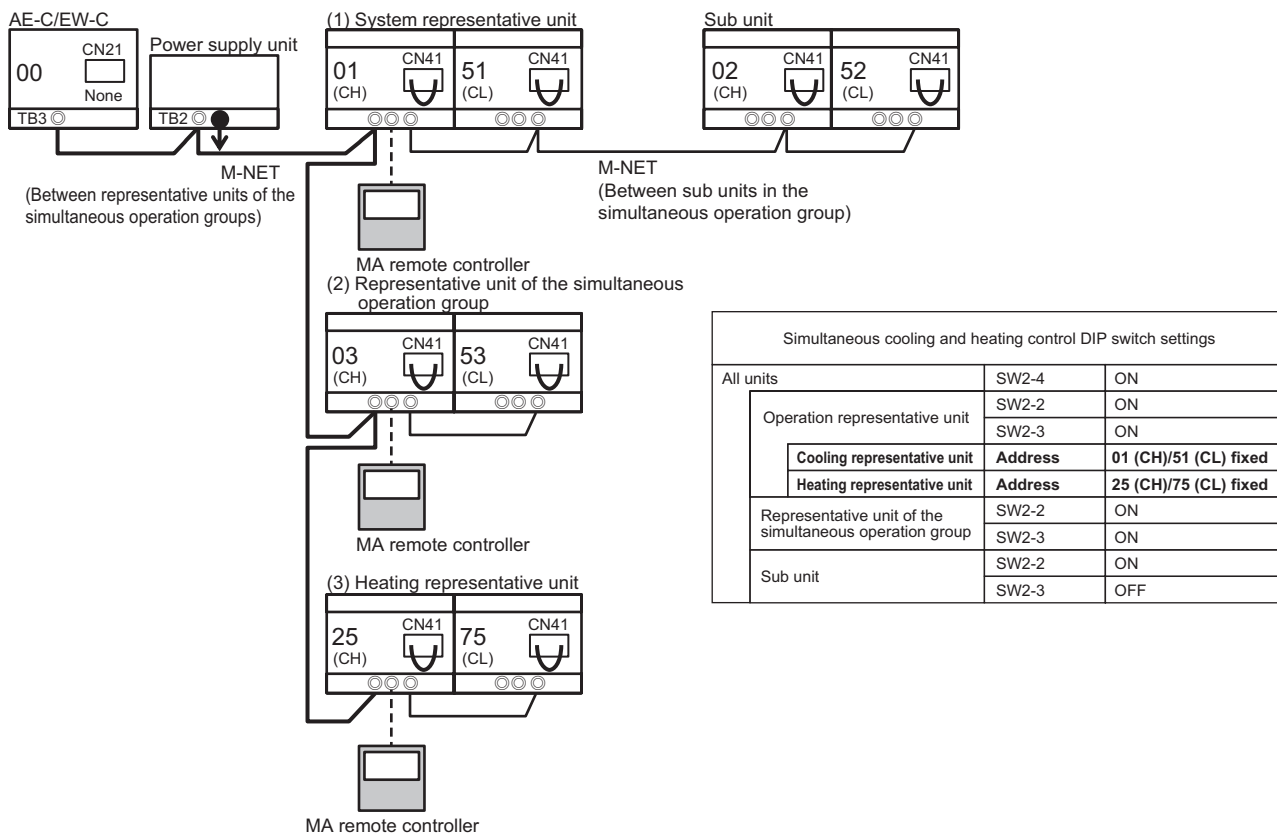
2) Set the following addresses for the cooling or heating representative unit.

- For the cooling representative unit, CH: Address = 1, CL: Address = 51
- For the heating representative unit, CH: Address = 25, CL: Address = 75

3) Output of energy management data

The data that is output for each system by the standard system representative will be the output for each system of the cooling or heating representative unit and the representative unit of the simultaneous operation group.

2) Wiring and DIP switch settings



[5] Hot water supply

Unit or controller	Symbol	Maximum number of connectable units	M-NET address setting range*1	Method for determining M-NET address
Hot water supply	CE	24	1 to 50	Assign the lowest address to the hot water supply to be used as the sensor representative unit for that system, and assign sequential addresses to the other hot water supplies in the same system. (Maximum 16 units per system)
Remote controller			Address setting for the hot water supply remote controller is not necessary.	

\*1: Figures in parentheses are factory defaults.

[6] System controller

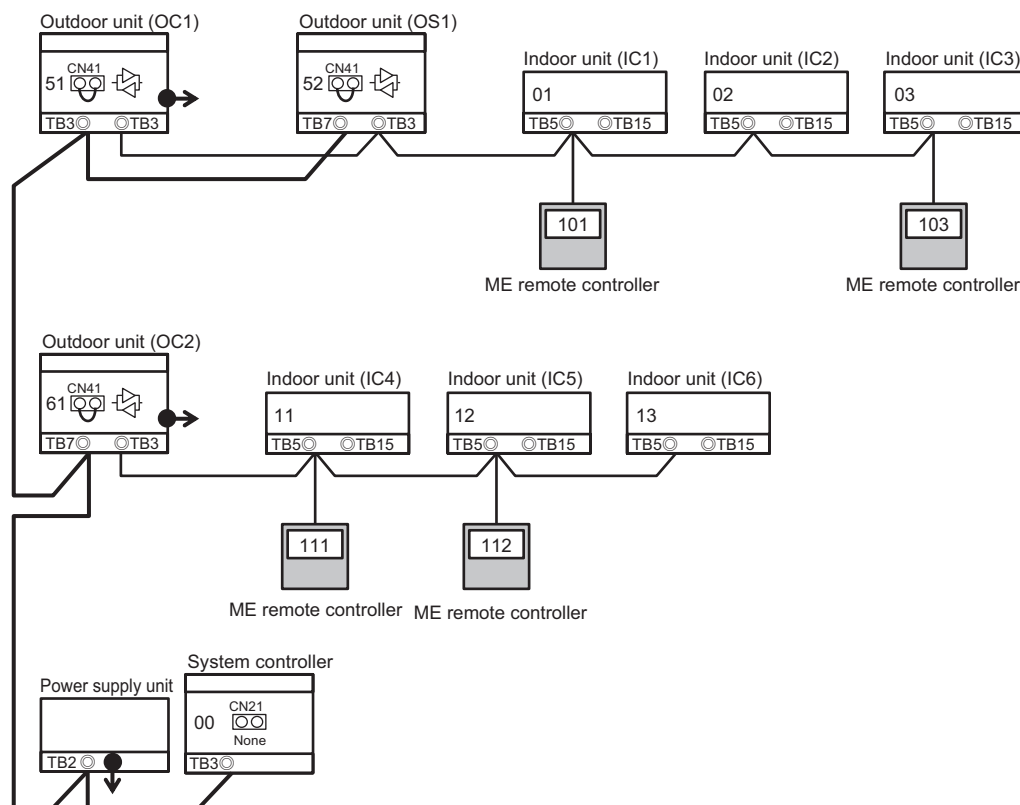
Unit or controller		Maximum number of connectable units in one M-NET system	M-NET address setting range*1	Method for determining M-NET address
System controller	Air Conditioning Control System	1 *3	0, 201 to 250 (0)	Assign 0.
	System remote controller	*3	0, 201 to 250 (0)	Assign any address within the range shown at left.
	ON/OFF remote controller			Assign the smallest group number to be controlled + 200.

\*1: Figures in parentheses are factory defaults.

\*2: Set one address for one M-NET connection adapter, including the cases of simultaneous twin, three, and four models. Set one address for one M-NET connection interface, including the cases of simultaneous twin, three, and four models.

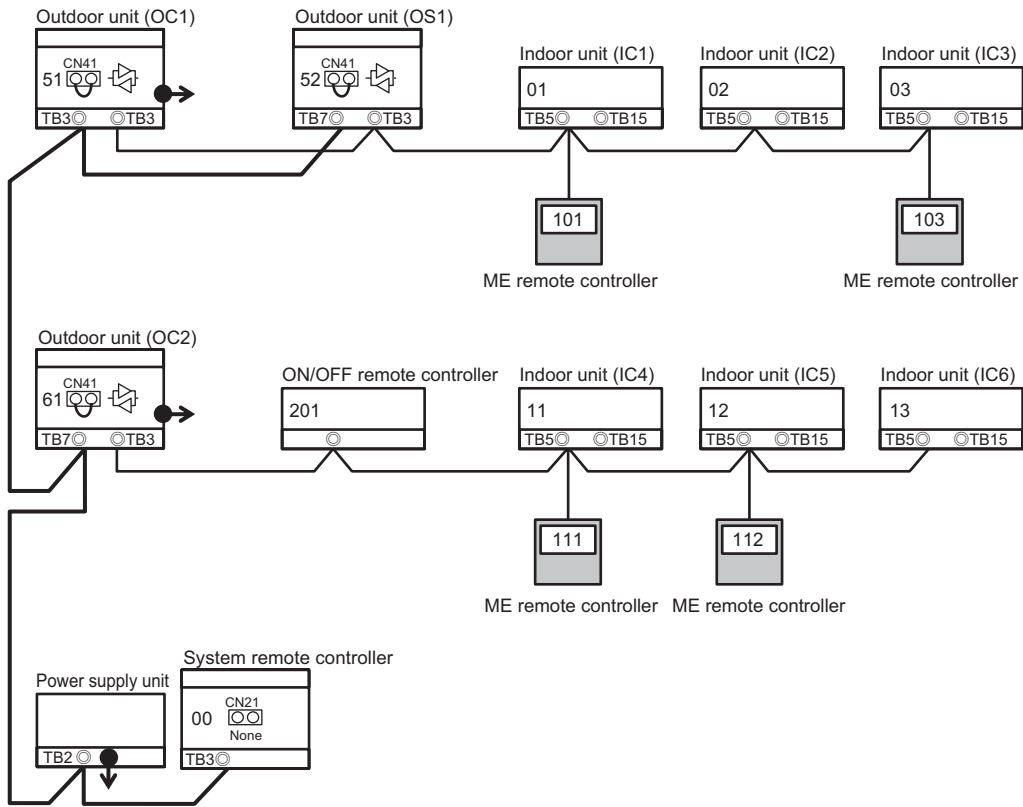
\*3: There is a restriction on the number of system controllers that can be connected to one M-NET system.

(1) System controller





**(2) System remote controller or ON/OFF remote controller**



[7] Other related devices

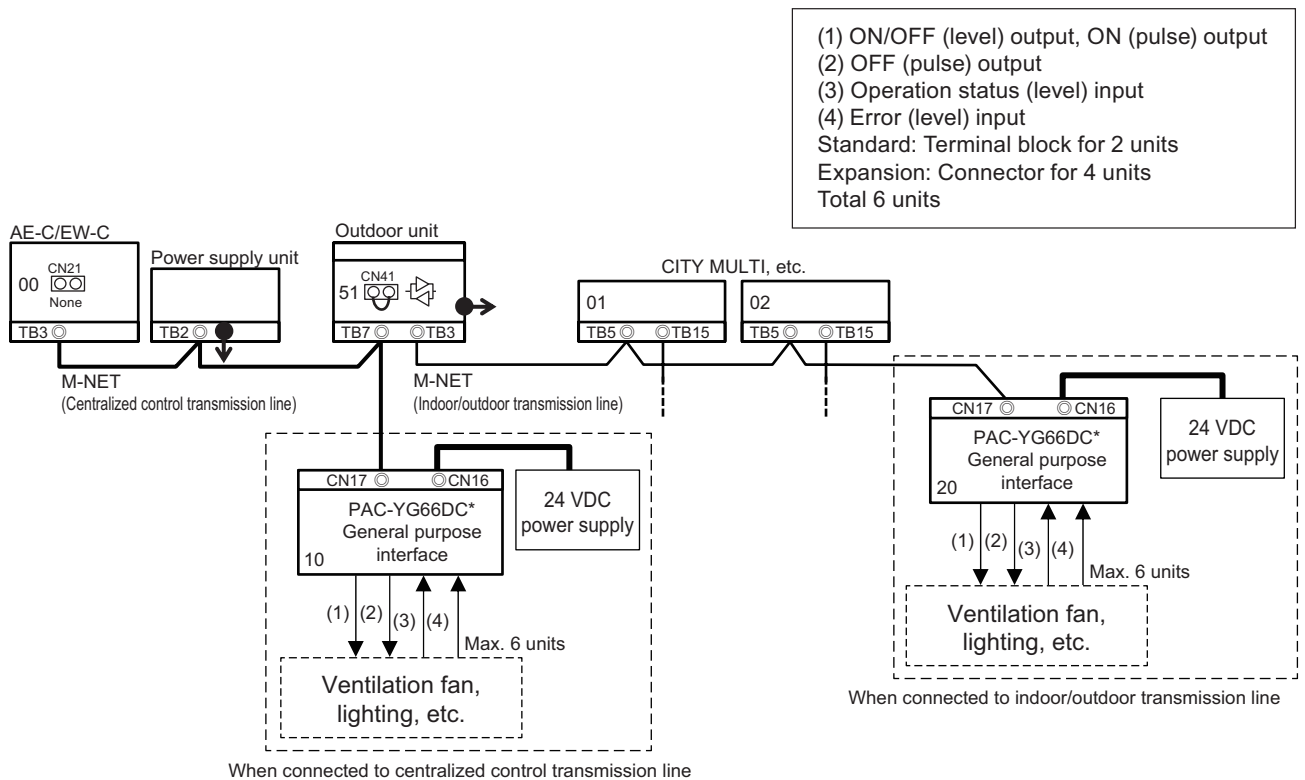
Unit or controller		Symbol	Maximum number of connectable units in one M-NET system	M-NET address setting range* <sup>1</sup>	Method for determining M-NET address
Other general equipment	DIDO controller (66)	DC	50* <sup>2</sup>	01 to 50 (01)	Assign any address within the range shown at left.
	PI controller (60)	MCP	15* <sup>3</sup>		
	AI controller (63)	MCT	50		

\*1: Figures in parentheses are factory defaults.

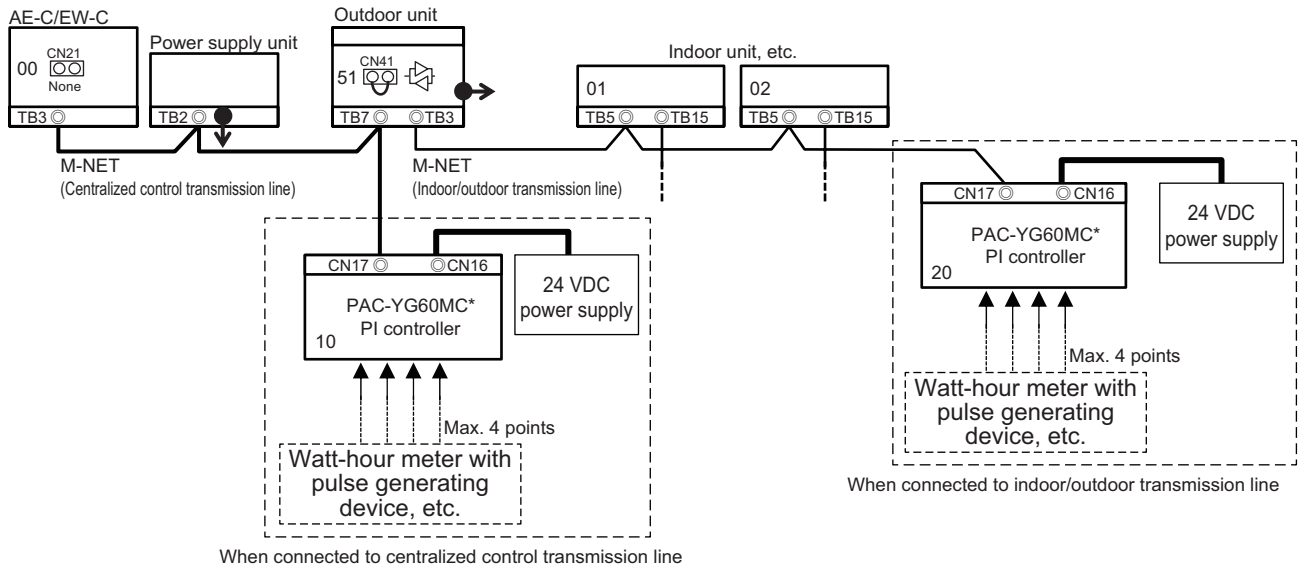
\*2: A maximum of six contacts (one contact for an ON/OFF remote controller) can be used for one DIDO controller (one M-NET address).

\*3: When using a Modbus watt-hour meter, count it as one PI controller.

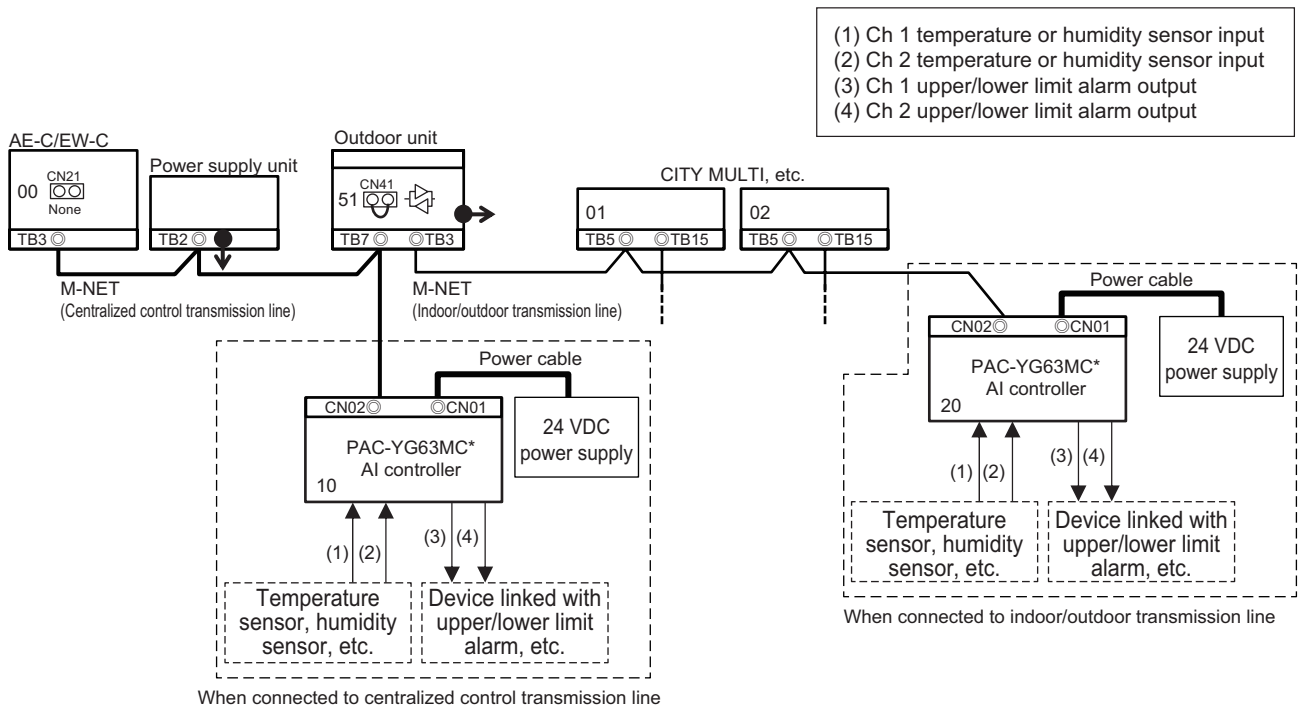
(1) DIDO controller (66)



**(2) PI controller (60)**



**(3) AI controller (63)**

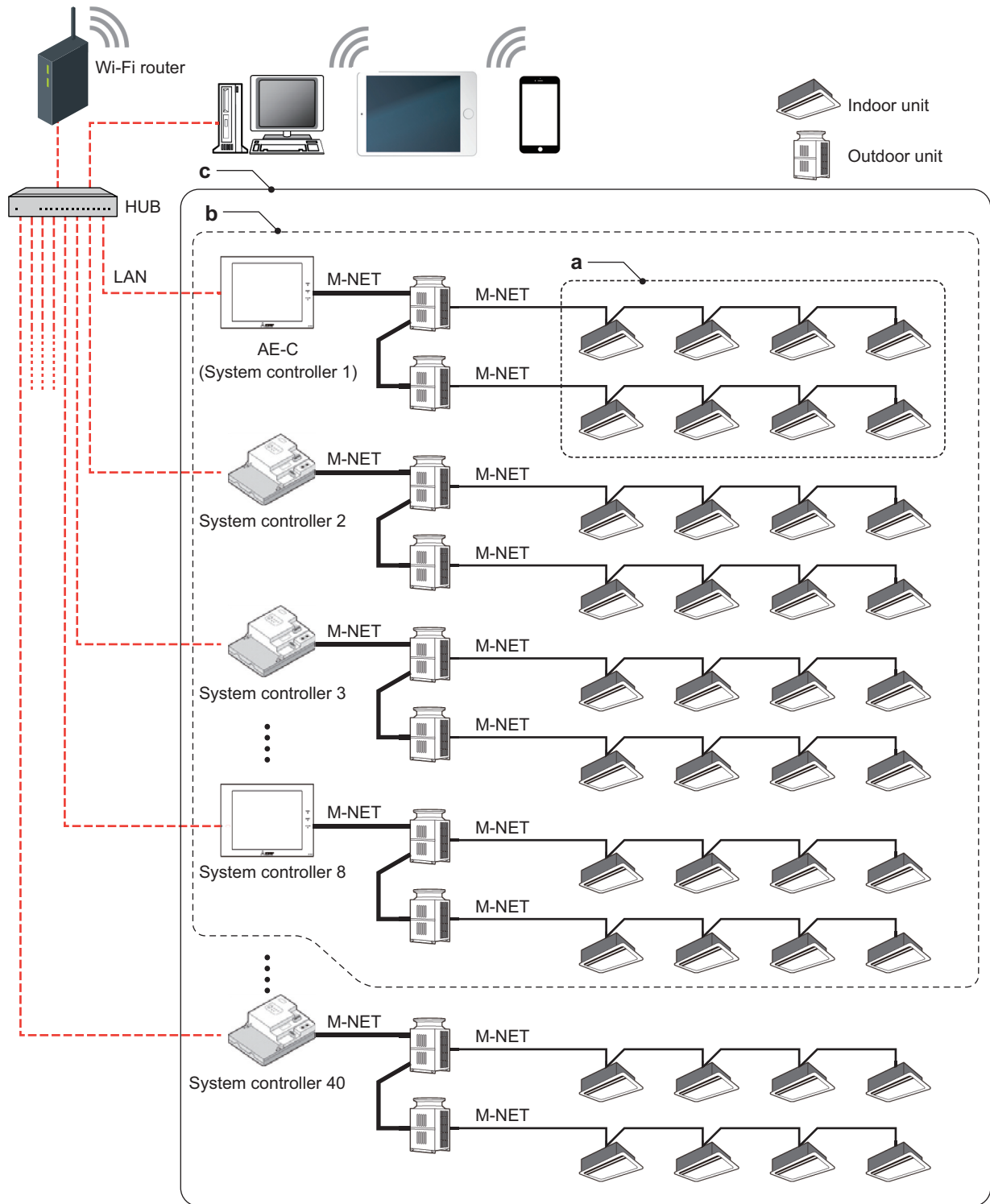


## 4. Expanding the Number of Controlled and Monitored Units Using LAN

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- Up to 50 indoor units can be controlled and monitored with one AE-C/EW-C (a in the figure below). To control more indoor units or air conditioning units in a remote location, connect AE-C/EW-C via LAN in order to expand the number of units to be controlled and monitored.
- When AE-C/EW-C is connected via LAN (b in the figure below), it becomes possible to expand the number of indoor units that are controlled and monitored on the AE-C's screen to eight systems and 400 units.
- By connecting a PC or tablet to the LAN-connected AE-C/EW-C and using a browser, it becomes possible to expand the control and monitoring range up to the number of units controlled by 40 AE-C/EW-C controllers (2,000 indoor units) (c in the figure below).

Maximum system configuration diagram



\* Number of units is converted to indoor units.

# 5. Connecting to External LAN

By connecting a PC or other device to the AE-C/EW-C via LAN, the number of connected units can be increased.

The AE-C/EW-C is equipped with two LAN ports.  
The purpose of each port is as follows.

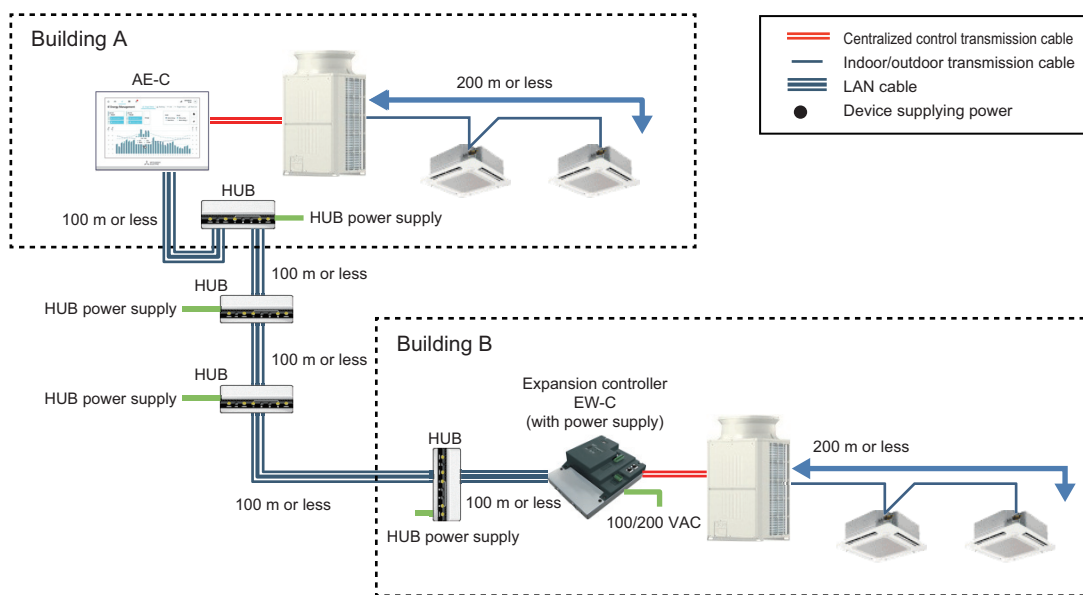
- LAN1: Consolidating connections to other AE-C/EW-C controllers, connecting to a browser PC, or connecting to a PC for the Initial Setting Tool or other peripheral tool
- LAN2: BACnet connection to a higher-level building management system monitoring tool

## 5-1. Using LAN to extend the wiring length

By extending the LAN cable via a hub, the AE-C can be installed in a location remote from the air conditioning units.

This is effective when the building where the air conditioning units are used is remote from the building containing the manager room where the AE-C is installed.

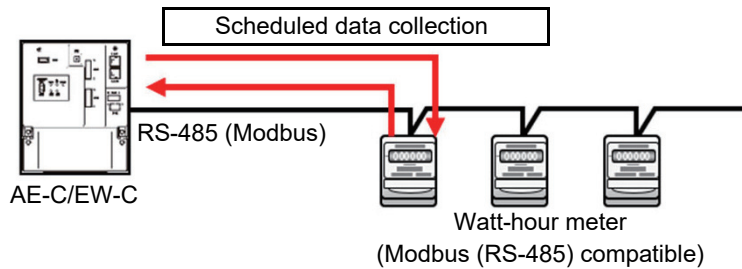
Shown below is an example of extending the LAN connection via hubs between the AE-C installed in Building A and the EW-C in Building B to monitor and operate the air conditioning units in Building B from the AE-C in Building A.



# 6. Connecting to Modbus watt-hour meter

## 6-1. Summary

By connecting a watt-hour meter that supports Modbus communication, you can collect electric energy data.



## 6-2. Basic settings

Before using a Modbus watt-hour meter connected to the controller, make the following settings.

Controller settings

### (1) Modbus connection settings

- 1) Modbus address: Set the address in order from 1.
- 2) Name: Set an easy-to-understand watt-hour meter name.
- 3) Model: Select the model (model name) of the watt-hour meter to be connected.

### (2) Modbus connection settings

- 1) Baud rate: 19200
- 2) Stop bit: 1
- 3) Parity bit: EVEN

Watt-hour meter settings

Make the following settings, referring to the instruction manual for the watt-hour meter.

### (1) Communication settings

### (2) Termination resistance (when the watt-hour meter is the last terminal)

## 6-3. Specifications

Item	Specifications
Communication system	RS-485 2-wire half-duplex communication
Synchronization method	Start-stop synchronization
Communication protocol	Modbus RTU (binary data communication)
Baud rate	19200 (default), 9600, 38400, 57600, 115200 bps
Bit length	8 bits
Stop bit	1 (initial value), 2 bit
Parity bit	EVEN (default), ODD, NONE
Termination resistance	120 $\Omega$ , built-in (non-removable) Install the controller as a terminal. Attach a termination resistor to the watt-hour meter located at the end of the transmission line.
Topology	Cascade connection (cross-wiring) (Star wiring and midway branching are not acceptable.)
Number of units connected	Max. 4 units
Address setting	Watt-hour meter 1 to 4

## 6-4. Transmission distance

Maximum transmission distance  $\leq$  500m.

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