

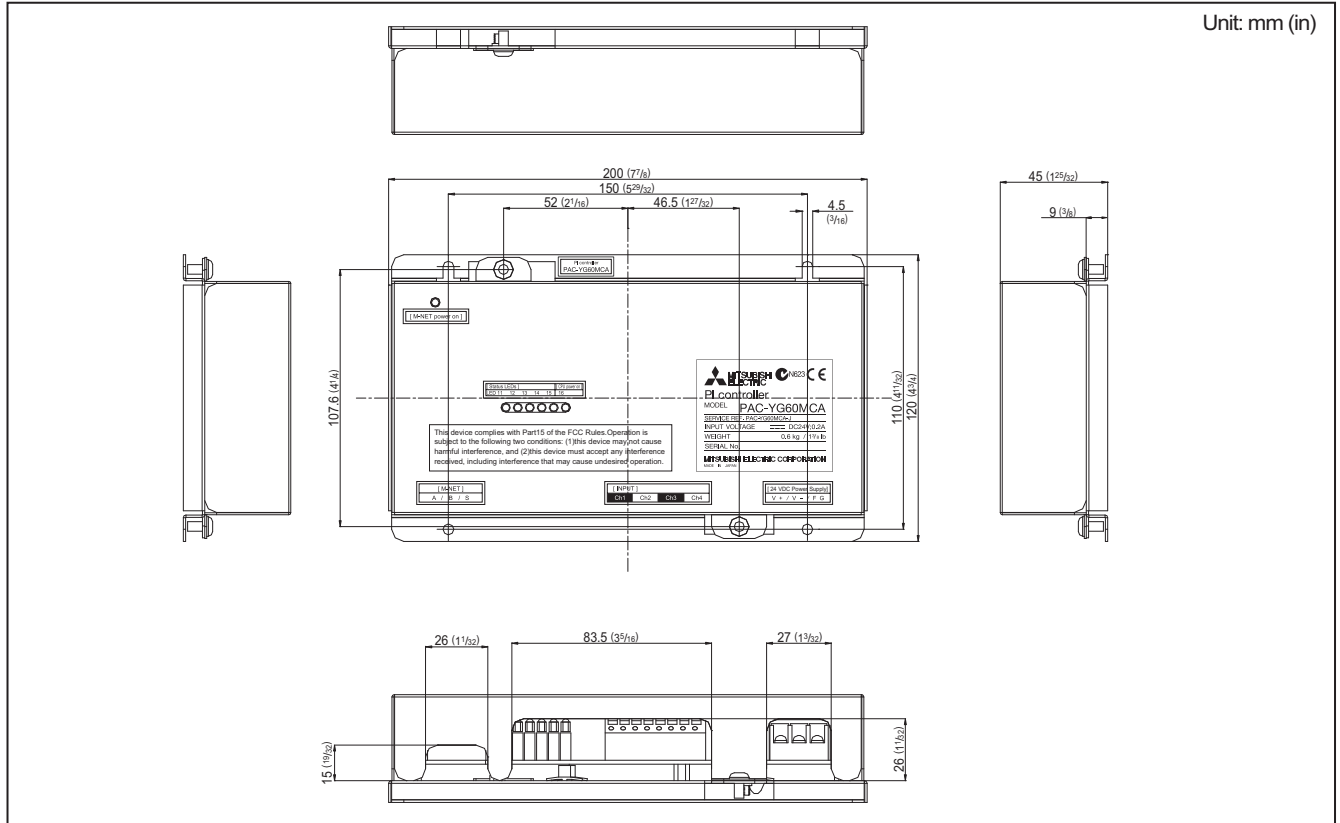
3-9. PI controller [PAC-YG60MCA]

The PI controller counts pulses from a power meter, gas meter, water meter, and calorimeter.

Combining the use of the AE-C400E and EW-C50E allows for calculating the charges for each unit and performing peak-cut (e.g., demand control) operation.

The meters can be monitored on AE-C400E LCD.

External Dimensions



CAUTION

Usage Restrictions

- Mitsubishi Electric does not take financial responsibility for damages caused by issues beyond our control or special circumstances (predicable or unpredictable); and secondary or accidental damages, and damages to other objects. We also do not take financial responsibility for opportunities lost as a result of device failure, or electrical power failure at the end-user site.

Mitsubishi Electric does not take financial responsibility caused by end-users' requests including, but not limited to, device testing, startup, readjustment, and replacement.

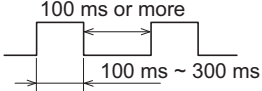
- Because the PI controller only counts pulses, accuracy and performance of pulse conversion depend on the meter.

Mitsubishi Electric does not take financial responsibility for damages caused by issues beyond our control or special circumstances (predicable or unpredictable); and secondary or accidental damages and damages to other object.

- Depending on each country's laws and regulations, etc., there may be cases these measured charges cannot be used for certificate of transaction.

1. Specifications

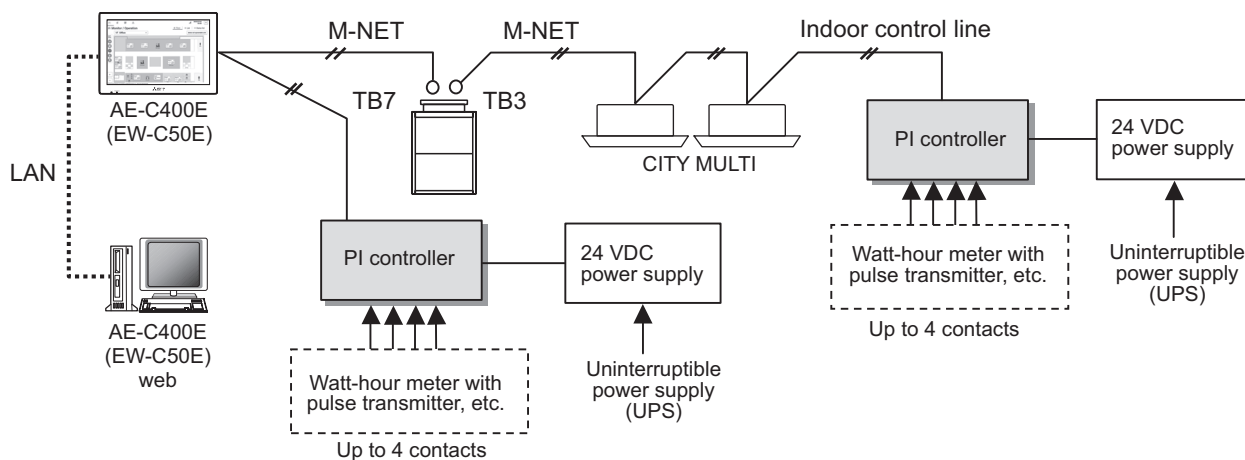
(1). Device Specifications

Item	Rating and Specification	
Power Supply	24 VDC ±10%: 5 W	
Interface	M-NET communication	17 to 30 VDC (*1)
	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)
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 / 77/8 (W) × 43/4 (H) × 125/32 (D) in	
Weight	0.6 kg / 13/8 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 the metal control board (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 the M-NET circuitry of this device is "1/4".

*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).



*This figure omits the power supply line and only shows the transmission line.

<Restrictions>

The maximum settable total number of built-in PI controllers and PI controllers (PAC-YG60MCA) for each AE-C400E/EW-C50E is 15. The number of units that can be connected to one AE-C400E/EW-C50E is up to 50 including this device, indoor units, LOSSNAY units, etc.

NOTE

- For the shield ground of the M-NET centralized control line for central control, use single-point grounding at the power unit for the transmission line.
However, when supplying electric power to the M-NET centralized control line from the R410A-Series outdoor unit*1 without using a power supply unit for the transmission line, use single-point grounding at the TB7 of that outdoor unit. *1 : Except PUMY model.
Furthermore, when connecting this device to the M-NET indoor control line, use grounding at the TB3 for each outdoor unit system.
- Connecting an Uninterruptible power supply (UPS) to the 24 VDC power supply is recommended in order to prevent the loss of pulse data in the event of a power failure.
If a UPS cannot be connected, try to make the AC power supply to the 24 VDC power supply as much same as the AC power supply line to the meters.
- This device does not support level meters. To use a level meter, incorporate a Converter circuit externally and convert to pulse input.
- If the M-NET transmission line of this device is connected to an M-NET indoor control line and the outdoor unit is down because, for example, the power supply is interrupted for servicing or there is a failure, the PI controller cannot be controlled from the system controller.

(2). Parts Purchased Separately

Prepare the following parts to install this device.

CONTROLLER

Required Part	Specification
Unit fixing screws	M4 screw × 4 (* M4: ISO metric screw thread)
Power supply for this device	Power source: 24 VDC 0.2 A (Minimum loading), SELV circuit, power line with grounding terminal Ripple noise: Lower than 200 mVp-p Compatible specification Authorized or CE marked products Subject to regulations: - IEC60950 (or EN60950) - CISPR22/24 (or EN55022/24) - IEC61000-3-2/3-3 (or EN61000-3-2/3-3)
Power line	Use a sheathed vinyl cord or cable. At least 0.75 mm ² (AWG18)
M-NET transmission line	Type of the cable: Sheathed vinyl cords or cable which comply with the following specifications or equivalent. • CPEV ϕ 1.2 mm to ϕ 1.6 mm • CVVS 1.25 mm ² to 2 mm ² (AWG16 to 14) * CPEV: PE insulated PVC sheathed shielded communication cable * CVVS: PVC insulated PVC sheathed shielded control cable PE: Polyethylene PVC: Polyvinyl chloride Power needs to be supplied to the M-NET circuitry of this device. Use an outdoor unit or a separately purchased power supply unit for the transmission line.
Signal lines	Shows the size of the electric wire (copper wire) that is adapted to the terminal block of this device. Electric wire size..... (1)Solid wire: ϕ 0.65 mm (AWG21) - ϕ 1.2 mm (AWG16) (2)Stranded wire: 0.75 mm ² (AWG18) - 1.25 mm ² (AWG16) Single strand: At least ϕ 0.18 mm

[Parts to be Purchased Separately]

Name	Model	Application	Remark
Power supply unit	PAC-SC51KUA	Power supply to the M-NET transmission line	This is not required when power is to be supplied from an outdoor unit.

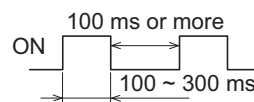
[Commercially available parts]

Part	Use	Remark
External 24 VDC power source	Supplies power to the PI controller.	Refer to "Power supply for this device" in "Required Part" above for the capacity of the power supply.

[Recommended Pulse Specifications]

Prepare a measuring instrument that measures the type of pulse signals indicated in table below.

Type	Specification
Output pulse relay method	Semiconductor relay method
Output pulse width	100 ~ 300 ms (100 ms and above) Choose an instrument that outputs non-voltage a-contact point pulse per each pulse output.
Pulse unit	Watt-hour meter: 0.1 kWh/pulse, 1 kWh/pulse recommended Water meter: m ³ /pulse Gas meter: m ³ /pulse Calorimeter: MJ/pulse * Except for the watt-hour meter, select instruments that take measurements in the appropriate pulse unit.



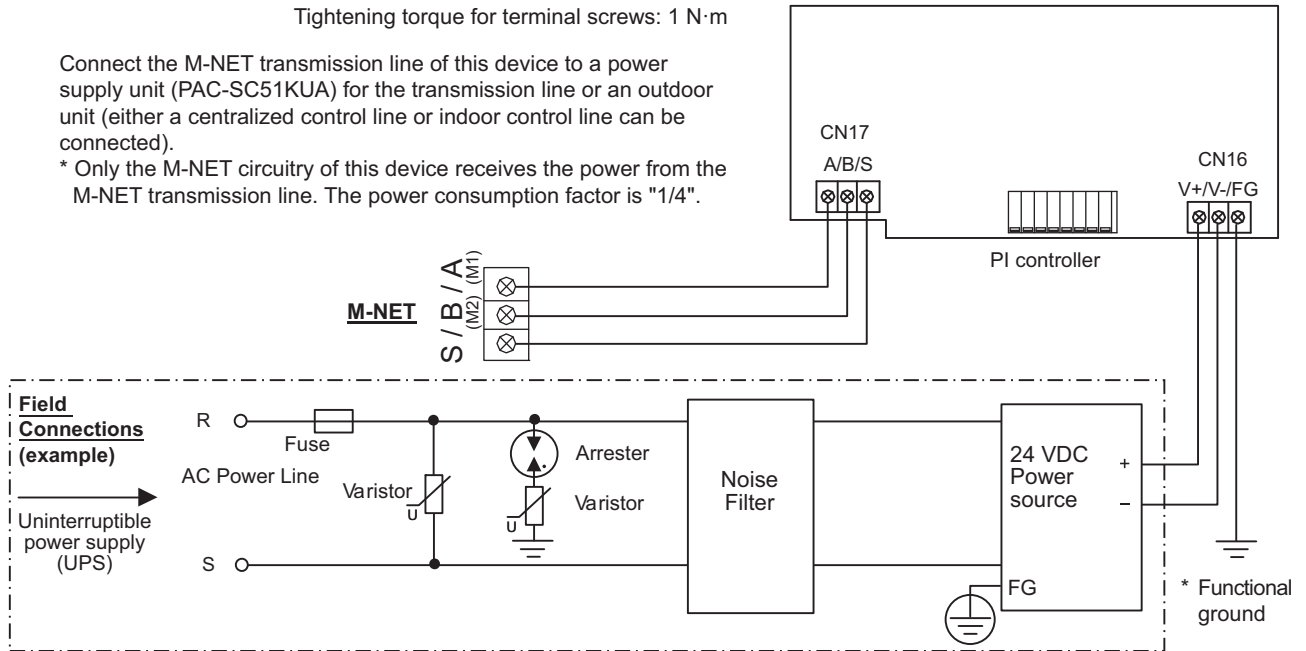
2. Wiring Instructions

(1). Connecting the Power and M-NET Transmission Lines

Tightening torque for terminal screws: 1 N·m

Connect the M-NET transmission line of this device to a power supply unit (PAC-SC51KUA) for the transmission line or an outdoor unit (either a centralized control line or indoor control line can be connected).

* Only the M-NET circuitry of this device receives the power from the M-NET transmission line. The power consumption factor is "1/4".



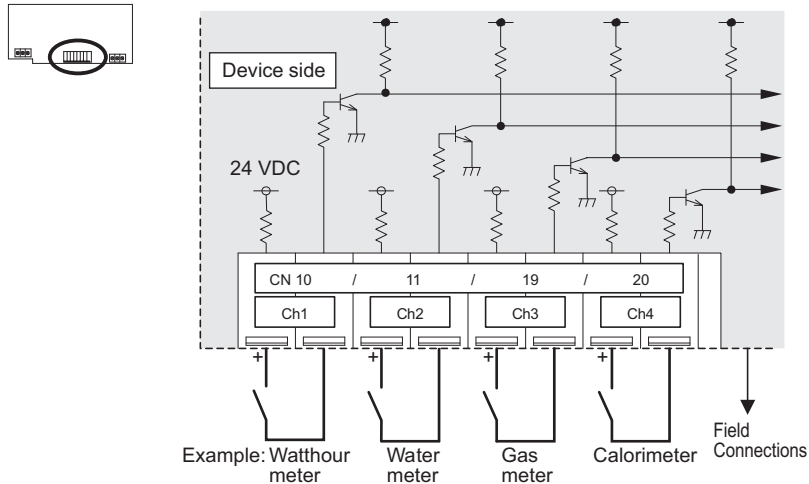
CAUTION

- Use a power line and M-NET transmission line that satisfy the specifications described in "1-(2). Parts Purchased Separately".
- Attach a circuit comprising the following components 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 to 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 neighboring wires. Cover the shielded line of the M-NET transmission line with materials such as vinyl tape and prevent short-circuiting with the plates.

(2). Connecting the Signal Lines

- Separately procure items such as terminal blocks and cables locally.
- The maximum wire length is 100 m (328 ft).
However, since the use of long wires makes the device susceptible to noise, using wires shorter than 10 m (32.8 ft) is recommended.

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

**NOTE**

- The pulse unit (weight) can be added to each of the inputs of channels 1 to 4.
- Be sure to set the pulse unit (weight) settings from a system controller (AE-C400E/EW-C50E).
If the pulse unit (weight) value has not been set as required, the charge function and peak cut control will not work normally because correct measurement of usage amounts will not be made.
- This device does not support level meters.
To use a level meter, incorporate a Converter circuit externally and convert to pulse input.

CAUTION

- The polarity of the input terminals is important, so be sure to match the polarity when using contacts that have polarity.
- Select a contact with a minimum applicable load of 1 mA or less.
- Supply 24 VDC 1 mA from the positive terminal to the contacts of the meters.
- The pulse unit of the watt-hour meter being used should be 1 kWh/pulse or less. Note that the apportioning error will increase if a watt-hour meter with large pulse unit is used.
- The input signal line should not come into contact with or be installed alongside the M-NET transmission line and power supply line. Care must also be taken to avoid wiring loops.
- Strip 12 ± 1 mm ($15/32 \pm 1/32$ in) 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 neighboring wires.
- Perform wiring 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.

3. System Operation Test

Do not turn the power OFF after starting operation. The power rate will not be counted while the power interruption.
Forcible pulse input must never be carried out after startup.