

- Before using this unit, read both this manual and the detailed version carefully to handle the unit correctly.
- Be sure to forward the manual to the end user and keep it ready to hand and accessible for future use at all times.

ABOUT MANUALS

You can download the User's Manual (Details) of the unit (IB63E89) from the following site.
http://www.mitsubishielectric.com/fa/worldwide/index.html

If you are considering using this unit for special purpose such as nuclear power plants, aerospace, medical care, or passenger vehicles, please refer to our sales representative.

1. Features

- This unit is a device to control equipment load by contact output and analog output.
- Control status information can be transmitted to superior monitoring systems through MODBUS RTU communication. MODBUS is a trademark of Schneider Electric USA Inc.
*If it is necessary to do via other communication standards, prepare the option unit.
- Energy saving control can be easily realized by combining a measuring function and control function.
*This unit does not have the measuring function. To combine with the measuring function, connect the extension unit.
- Writing settings in this unit from Knowledge Engineering Tool (Model: EMU4-KNET) enables the control. The Knowledge Engineering Tool can be downloaded for free from the Mitsubishi FA Global site.
- This unit has version up function because the unit function is further to be added or improved. The unit can be updated to the latest version by using Knowledge Engineering Tool (Model: EMU4-KNET).

2. Checking package contents

The following items are included in the package of this product. When unpacking your package, check all the contents.
(1) Energy Measuring Unit x1 (2) User's Manual (Digest) x 1 (3) Lithium battery (Model: EMU4-BT) x 1 *Stored in the battery cover

3. Safety Precautions

For personal and product safety, be sure to read and observe the precautions in this section.

3.1 Precautions for Operating Environment and Conditions

When using this unit for equipment that may affect property due to the unit failure, be sure to allow extra characteristics and performance figures, and incorporate safety measures such as double circuit.

The unit is intended for use in pollution degree 2 *Note1 environment. When using in higher pollution degree, protect the unit from pollution with another device to be incorporated.

The overvoltage category of auxiliary power circuit (MA, MB) of the unit is CAT III *Note1. Do not use the product in the places listed below. Failure to follow the instruction may cause a malfunction or life reduction of the product.

- The Ambient temperature exceeds the range -5 to +55°C.
- Altitude exceeds 2000 m.
- Exposed to strong magnetic fields or large exogenous noise
- Exposed to direct sunlight
- Exposed to rain or water drop.
- The average daily temperature exceeds +35°C.
- Exposed to much dust, corrosive gas, salty environment, or oil smoke
- Exposed to excessive vibration or impact
- Metal fragments or conductive substances are scattered.
- The Relative humidity exceeds the range 30 to 85% RH, or Condensing

The unit is an open type device, which is designed to be housed within another system for prevention of electric shock. Be sure to install it in the system such as control panel. For the precautions to conform the system constructed with the unit to the EMC Directives, refer to the User's Manual (Details).

*Note1: For the definitions of the pollution degree and the overvoltage category, refer to EN-61010-1/2010.

3.2 Precautions for preparation before use

- Observe the use environment and conditions for installation place.
- This unit has a built-in lithium battery. It is not connected to the product when shipped from the factory. Connect the battery before use.
- To set up the unit, Knowledge Engineering Tool (Model: EMU4-KNET) is necessary. For the setting method, refer to the User's Manual (Details).

3.3 Installation and Wiring Precautions

⚠ Danger

- **Shut off the external power supply for this unit in all phases before installing or wiring. Failure to do so may cause an electric shock or damage to the unit.**
- **Work under the electric outage condition when installing and wiring. Failure to do so may cause an electric shock, a failure of the unit, or a fire.**

⚠ Caution

- A qualified electrician must install and wire the unit for safety.
- Secure a space of 100 mm or more around the unit in all directions (except the back side).
- When tapping or wiring, take care not to enter any foreign objects such as chips and wire pieces into the unit.
- Check the connection diagram when wiring. Wrong wiring may cause a failure of the unit, a fire, or an electric shock.
- For protection against noise, **transmission lines and output signal lines shall not be placed close to or bound together with the power lines or high-voltage lines.**
- Strip the wires by appropriate length. If the stripping length is too long, this may cause an electric shock or short-circuit with the next wire. Contrariwise, if it is too short, this may cause contact failure due to bad fitting of wires.
- Take care not to short-circuit the next terminal by a filament. (Do not plate the wires with solder.)
- Do not connect three wires or more to one terminal of the terminal block. Otherwise, the connection gets loose and the wires may come off.
- Use appropriate size wires. If an inappropriate size wire is used, this may cause a fire due to generated heat.
- Tighten the screws with a specified torque. Insufficient tightening can cause a drop, short-circuit, or malfunction of the unit. Over-tightening can damage the screws and/or unit, resulting in the drop, short-circuit, or malfunction.
- After tightening the screws, be sure to check all the screws tightened. Forgetting to tighten the screws may cause a malfunction of the unit, a fire, or an electric shock.
- Be sure to attach the terminal cover to prevent an electric shock.
- Use crimp-type terminals appropriate for the size of electric wires. If an inappropriate crimp-type terminal is used, a malfunction, failure, or burnout of the unit, or a fire may occur caused by a wire breakage or a contact failure.
- The FG terminal must be grounded with D-type grounding. (The ground resistance is 100Ω or less.)
- The FG terminal should be independent grounding. It may cause the malfunction by the noise from equipment that becomes a noise source such as an inverter.
- Do not directly touch any conductive parts or electrical circuits of the unit. Failure to follow the instruction can cause an electric shock or a failure/malfunction of the unit.
- The wires to be connected to the unit must be placed in a duct or fixed with clamps. Failure to follow the instruction may result in damage to the unit or wires due to cable dangling or movement, or unnecessary careless tension, or cause a malfunction due to poor connection.
- When you remove the wires from the unit, do not pull them with a strong force. If you pull them connected to the unit, this may cause a malfunction or damage to the unit or wires.
- Do not exceed the specified voltage when performing an insulation resistance test or a commercial frequency withstand voltage test.
- To protect persons with little knowledge about electric equipment from electric shock, you must take either of the following measures against the panel. Lock the panel so that only those who have gotten an education about electric equipment and have the sufficient knowledge can unlock it, or construct a structure that shuts off power supply automatically by opening the panel. Cover the dangerous voltage part of the unit with a cover.

3.4 Precautions for Use

- This unit cannot be used for deal and proof of electric energy measurement stipulated in Measurement Act.

⚠ Caution

- Use the unit within the ratings specified in this manual. If it is used outside the ratings, this may cause not only a malfunction or failure but also ignition or burnout.
- Do not disassemble or modify the unit. Failure to follow the instruction may cause a failure, a malfunction, injury, or a fire.
- For protection against electric shock, use an insulation precision screwdriver when pressing the reset button at the front of the unit.
- Do not touch live parts such as connection terminals. Failure to follow the instruction may cause an electric shock, electric burn injury, or burnout of the unit. If any exposed conductor is found, stop the operation immediately and take an appropriate action such as isolation protection.
- Check that the communication connectivity is secured between a PC that operates Knowledge Engineering Tool (Model: EMU4-KNET) and this control unit.
- The unit has a built-in clock. Before use, set to the current date using Knowledge Engineering Tool (Model: EMU4-KNET).
- When you turn off the power supply while the BAT LED is on, present time data is deleted. If the BAT LED lights up, change the battery.

3.5 Maintenance Precautions

- Use a soft dry cloth to clean off dirt of the unit surface. Do not leave a chemical cloth on the surface for a long time or wipe the surface with thinner or benzene.
- Conduct the following inspections to properly use the unit for a long time.
 - (1) Daily maintenance
 - (a) No damage on the unit
 - (b) No abnormality with LED display
 - (c) No abnormal noise, smell or heat
 - (2) Periodical maintenance (Every 6 months to once a year)
 - No looseness of installation and terminal connection
 - Replace the lithium battery every 3 years or when the battery voltage is dropped (BAT LED lights up).

⚠ Caution

- Do periodical maintenance under the electric outage condition. Failure to follow the instruction may cause an electric shock, failure of the unit, or a fire. Tighten the terminals regularly to prevent a fire. In the case that a display unit is attached to a sensor unit, get off the display unit during maintaining or tightening the terminals.
- When you turn off the power supply while the BAT LED is on, present time data is deleted. If the BAT LED lights up, replace the battery. For the replacement method, refer to the User's Manual (Details).

3.6 Storage Precautions

To store this unit, turn off the power, remove the wires, and put them in a plastic bag. If you turn off the power for a long time, remove the battery from the unit. (The cumulative power interruption backup time is 1 year. If you used the battery over the backup time, present time data might be deleted.)

For long-time storage, avoid the following places. Failure to follow the instruction may cause a failure or reduction life of the unit.

- The Ambient temperature exceeds the range -10 to +60°C.
- The Relative humidity exceeds the range 30 to 85% RH, or Condensing
- Exposed to much dust, corrosive gas, salty environment, or oil smoke
- The average daily temperature exceeds +35°C.
- Exposed to excessive vibration or impact
- Exposed to rain, water drop, or direct sunlight.
- Metal fragments or conductive substances are scattered.

3.7 Disposal Precautions

- When disposing of this unit, treat it as industrial waste.
- The Lithium battery is disposed of according to the local regulation.
- In EU member status, there is a separate collection system for waste batteries. Dispose of the batteries property at the local community waste collection/recycling center.

The symbol shown upper right is printed on the packaging of the unit.

[Note] This symbol mark is for EU countries only. This symbol mark is according to the directive 2012/19/EU Article 14 Information for users and Annex IX, and to the directive 2006/66/EC Article 20 Information for end-users Annex II.

This symbol means that electrical and electronic equipment, batteries and accumulators, at their end-of-life, should be disposed of separately from your household waste.

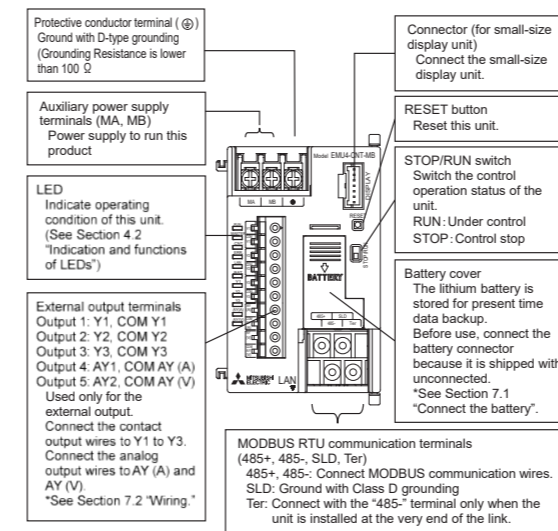
⚠ Caution There may be remaining electrical capacity in the lithium battery removed from the unit. Treat it separately because, when it contacts other metals, heat generation, rupture, or ignition may occur.

3.8 About packaging materials and this manual

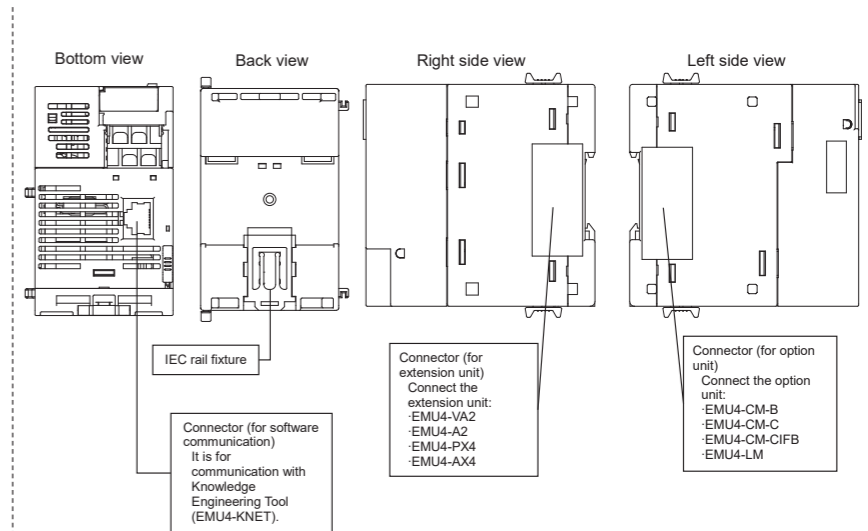
For reduction of environment load, packaging materials are produced with cardboard, and this manual is printed on recycled papers.

4. Name and function of each part

- (1) EMU4-CNT-MB



- (2) Bottom view, Back view, Side view



4.2 Indication and functions of LEDs

The names and operations of LEDs are as follows.

Name	Color	Function	Status
RUN LED	Red	Indicate the operating status of this unit.	ON: Normal condition OFF: Power off or hardware failure *Note 1
MASTER LED	Red	Indicate the operating status of master/slave station of MODBUS RTU communication	ON: This unit is set to master station OFF: This unit is set to slave station
CNT. LED	Red	Indicate the control execution status.	ON: Under control (STOP/RUN switch state is RUN) OFF: Control stop (STOP/RUN switch state is STOP)
ERR. LED	Red	Indicate the error status.	ON: Error occurrence *Note 1 OFF: No error
LAN LED	Red	Indicate the LAN communication status.	ON: In communication OFF: Not communicating
BAT. LED	Red	Indicate the remaining battery level.	ON: Battery voltage low condition *Note 2 OFF: Battery voltage normal condition
Y1 LED	Red	Indicate the ON/OFF status of Contact output Y1.	ON: Contact status is ON OFF: Contact status is OFF
Y2 LED	Red	Indicate the ON/OFF status of Contact output Y2.	ON: Contact status is ON OFF: Contact status is OFF
Y3 LED	Red	Indicate the ON/OFF status of Contact output Y3.	ON: Contact status is ON OFF: Contact status is OFF
AY(A) LED	Red	Indicate the output status of Analog output (Current output: 4 to 20 mA). *When the setting of analog output type is voltage (0 to 5 V), LED status is OFF.	ON: Under analog signal output OFF: Analog signal output stop
AY(V) LED	Red	Indicate the output status of Analog output (Voltage output: 0 to 5 V). *When the setting of analog output type is current (4 to 20 mA), LED status is OFF.	ON: Under analog signal output OFF: Analog signal output stop

*Note 1: For details, refer to the User's Manual (Details).

*Note 2: When you turn off the power supply during battery voltage drop, present time data is deleted. If the BAT LED lights up, replace the battery.

5. Optional products connectable to this unit

Optional products connectable to this unit are as follows.

	Product	Model	Connection terminal
Extension Unit	Energy Measuring Unit: Extension for the system with the same voltage	EMU4-A2	The connector on the right side of the unit
	Energy Measuring Unit: Extension for the system with different voltage	EMU4-VA2	The connector on the right side of the unit
	Energy Measuring Unit: Pulse Input Unit	EMU4-PX4	The connector on the right side of the unit
	Energy Measuring Unit: Analog Input Unit	EMU4-AX4	The connector on the right side of the unit
Option Unit	B/NET Communication Unit for Energy Measuring Unit	EMU4-CM-B	The connector on the left side of the unit
	CC-Link Communication Unit for Energy Measuring Unit	EMU4-CM-C	The connector on the left side of the unit
	CC-Link IE Field Basic Communication Unit for Energy Measuring Unit	EMU4-CM-CIFB	The connector on the left side of the unit
	Logging Unit for Energy Measuring Unit	EMU4-LM	The connector on the left side of the unit
Accessories	Small-size Display Unit for Energy Measuring Unit	EMU4-D65	The connector on the front of the unit

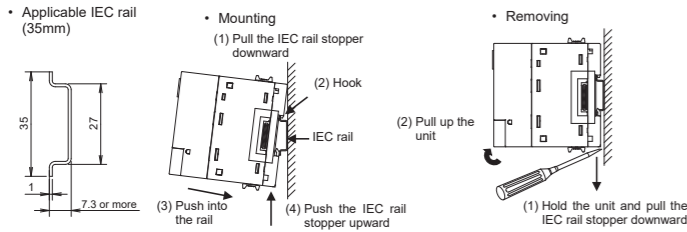
* EMU4-A2 cannot be directly connected to the unit. For the use of it, connect EMU4-VA2 between it and the unit.

* For the details of each product and the way to connect, refer to the manual of the product.

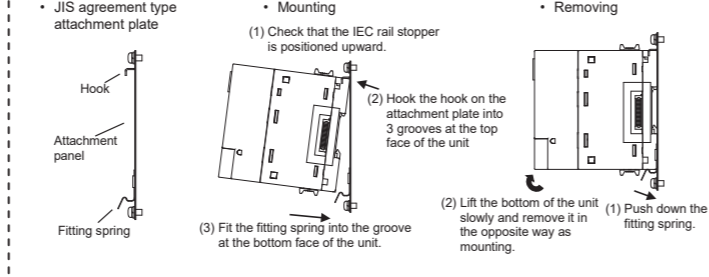
6. Attaching and removing the unit

*The figure below is an example using EMU4-CNT-MB.

6.1 Mounting on IEC rail



6.2 Mounting on JIS agreement type attachment plate

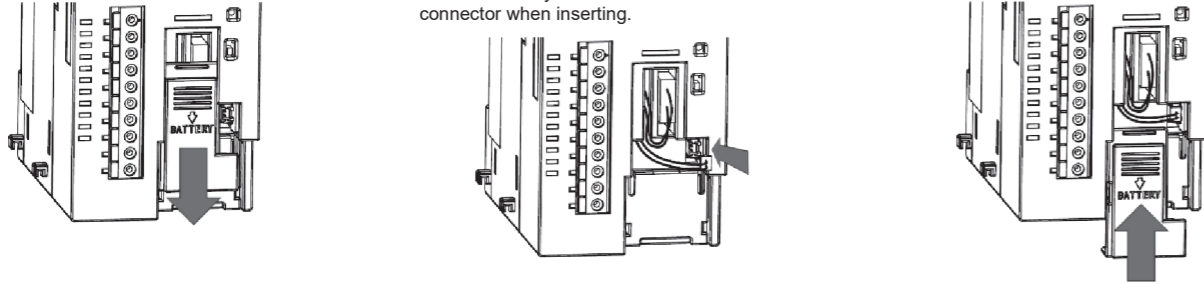


7. How to wire

7.1 Connect the lithium battery

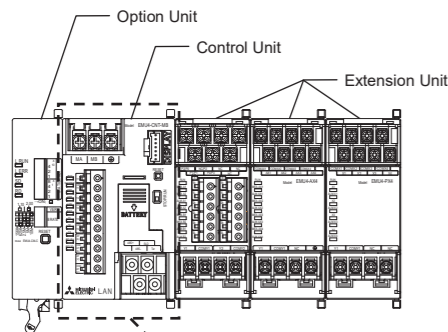
Caution When connecting the lithium battery, work under the electric outage condition. Failure to follow the instruction may cause an electric shock, a failure of the unit, or a fire.

- Slide the battery cover downward to open it.
- Connect the connector of the lithium battery to the control unit. Pay attention to the direction of connector when inserting.
- Slide the battery cover upward to fix to the unit.



7.2 Wiring

Follow the wiring diagram for external connections of the unit.



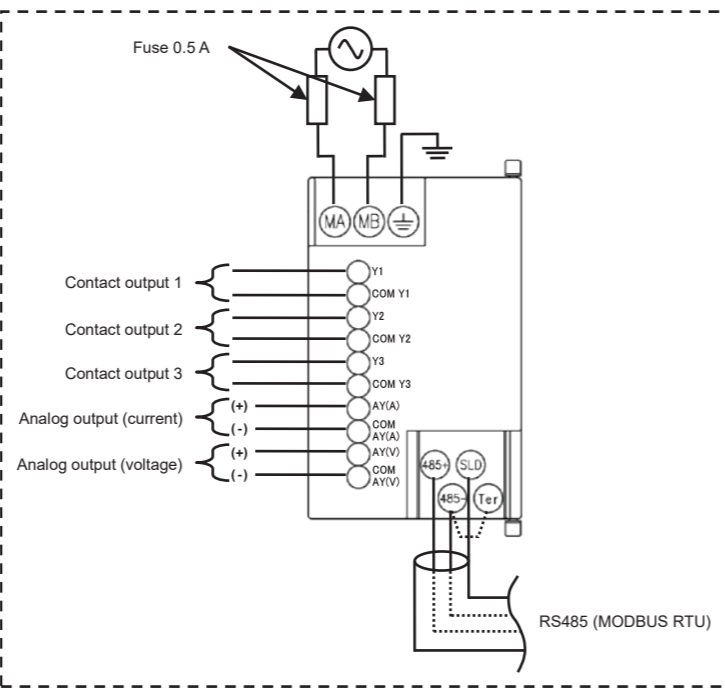
- (Note 1) Refer to the manual of each unit about wiring diagrams for Extension unit and Option Unit.
 (Note 2) We recommend that you connect Fuse for the auxiliary voltage input (MA and MB terminals).
 A fuse is necessary to have the unit system conform to the UL standards. Please use P405H (by Daito Communication Apparatus Co.,Ltd) or it's equivalent.

Caution

- For protection against noise, transmission lines and output lines shall not be placed close to or bound together with the power lines and high-voltage lines. Keep a distance between them as below. (except the input part of the terminal block) If there is concern about the influence of noise even if the distance is as follows, we recommend using a shielded cable.

Conditions	Distance
High-voltage line 600V or less	300 mm or more
Other high-voltage line	600 mm or more

- For the actual use, ground the FG terminal with D-type grounding Connect it directly to the ground terminal.
- Do not connect to the FG terminal during the insulation resistance test and pressure test. For the applied place, refer to the User's Manual (Details).



7.3 How to connect wires

<Auxiliary power supply terminals, MODBUS RTU communication terminals>

- Use applicable crimp-type terminals. The applicable crimp-type terminals are shown in the table below.
- Use applicable electric wires and tighten the terminal screws with a specified torque as the listed below.

	Applicable wire	Tightening torque	Applicable crimp-type terminal
Auxiliary power supply terminals	Stranded wire: AWG22 to 16 (0.3 to 1.3 mm ²) Single wire: AWG22 to 16 (φ0.65 to 1.25 mm)	0.8 to 1.0 N·m	For M3.5 screw with external diameter of 7.1 mm or less
MODBUS RTU communication terminals	SPEV(SB)-MPC-0.2 × 1P	0.5 to 0.6 N·m	For M3 screw with external diameter of 6.1 mm or less

- To conform to UL standards, Observe the following 2 conditions for wiring.
- Do not insert 3 or more wires into the terminal.

Wire with crimp type terminals.

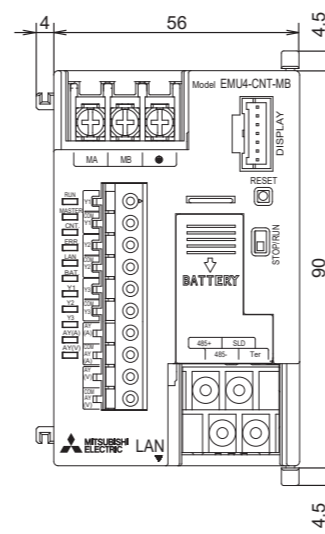
<External output terminals>

- Stripping length of the wire for use must be 10 to 11mm.
- When using stranded wires, use rod terminals or twist the wire tip so that the filaments do not scatter.
- When attaching and detaching wires to/from the terminal block, use the push button. After inserting the wires, check that the wires are securely inserted.
- Insert the wires as deep as possible into the terminal block. The conductive part should not be outside the terminal block.
- Use applicable electric wires as shown below.

Applicable wire	Applicable crimp-type terminal
Stranded wire: AWG20 to 16 (0.5 to 1.3 mm ²) Single wire: AWG24 to 17 (φ0.5 to 1.2 mm)	TGV TC-1.25-11T (produced by NICHIFU) equivalent

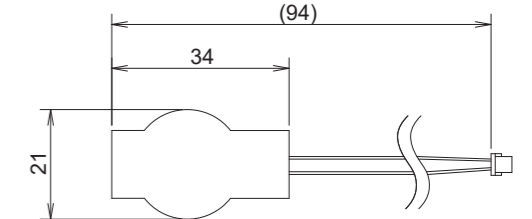
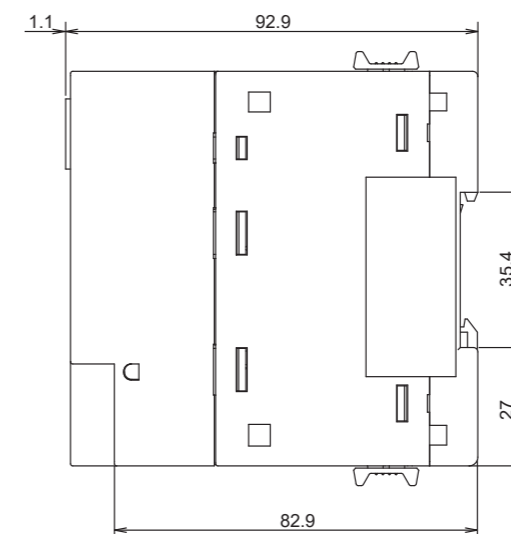
8. Dimensions

•EMU4-CNT-MB



•EMU4-BT (Optional consumables)

Unit [mm]



9. Specifications

9.1 Control Unit

Item	Specifications
Model	EMU4-CNT-MB
Auxiliary power supply rating	100 to 240V AC (+10%, -15%), 50Hz / 60Hz, Transient overvoltage 4000 V
Consumption VA	unit
	largest component *Note1
Transient overvoltage	Auxiliary power supply: CAT III.
External output	Number of output points
	Output signal type
	Rated open/close voltage/current
Analog output	Number of output points
	Output voltage/current
Power interruption backup	Setting value
	Event log
	Error history
Operating Environment	Operating temperature range
	Operating humidity range
Standard *Note 2	Storage temperature range
	Operating altitude
Optional supplies *Note 3	

- *Note 1: The largest component consists of combination of this unit, 3 Pulse Input Units (Model : EMU4-PX4), a CC-Link Communication Unit (Model: EMU4-CM-C), and a Small-size Display Unit (Model: EMU4-D65).
 *Note 2: When this unit is combined with a B/NET Communication Unit (Model : EMU4-CM-B), this does not meet the UL standards.
 *Note 3: For purchase of optional parts or supplies, contact the supplier you bought this unit. Using in a high ambient temperature makes the battery life shorter. (For your reference: 50 days under the temperature of 55°C)

9.2 Knowledge Engineering Tool

Knowledge Engineering Tool is software to install on a PC for use. The following table shows the recommended system environment of the PC where the software is to be installed. Please refer to the User's Manual(Details) for other items.

Item	Specifications
Model	EMU4-KNET
OS	Microsoft Windows 10 Pro (32-bit/64-bit)
Language	Japanese, English, Simplified Chinese
.NET Framework	Microsoft .NET Framework 4.6.2

10. Contained harmful substances

(1) 电器电子产品有害物质限制使用标识



根据《电器电子产品有害物质限制使用管理办法》，该标识适用于在中国销售的电器电子产品，其中的数字为产品的环保使用期限。只要遵守本产品在安全和使用寿命方面的注意事项，从生产日期起的环保使用期限内不会造成环境污染或对人体、财产产生深刻的影响。
 注) 产品正常使用废弃后，应按照国家地方的法律法规完成该电器电子产品的回收和再利用。此环保使用期限不涵盖产品附带的电池。产品所附带的电池，其环保使用期限为3年。

(2) 产品中有有害物质的名称及含量

本产品中所含有的6种有害物质的名称、含有信息及含有部件如下表所示。

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
基板	×	○	○	○	○	○
箱子	○	○	○	○	○	○
端子台	○	○	○	○	○	○
端子盖	○	○	○	○	○	○
螺钉	○	○	○	○	○	○
铭牌	○	○	○	○	○	○
电池	○	○	○	○	○	○
接线	○	○	○	○	○	○
接线皮	○	○	○	○	○	○

本表格依据 SJ/T11364的规定编制。
 ○: 表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572规定的限量要求以下。
 ×: 表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T26572 规定的限量要求。
 且虽然目前业界没有成熟的替代方案，但是符合欧盟RoHS 指令要求。

11. Warranty

- The warranty period is for 1 year after the date of your purchase or 18 months after manufacturing, whichever is earlier. However, even during the warranty period, repair shall be charged in the case that failures occur due to customer's intent or negligence.
- Check that ALM A1 LED and ALM A2 LED lighting is off. (ALM A1 LED and ALM A2 LED lighting show that errors occur)
- If the unit is used in a manner not specified by the manufacturer, the protection provided by the unit may be impaired.
- Our company shall not be liable to compensate for any loss arising from events not attributable to our company, opportunity loss or lost earning of the customer due to failure of the product, loss, secondary loss, or accident caused by a special reason regardless of our company's predictability, damage to other products besides our products, or other operations.

Caution If an abnormal sound, odor, smoke, or heat generation occurs from the unit, stop using it and switch it off promptly.

12. Customer Service

MITSUBISHI ELECTRIC CORPORATION
 HEAD OFFICE: TOKYO BUILDING, 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, Japan

Please refer to "catalog" or "user's manual (Details)" for more detail.