

# MODBUS TCP Communication Unit for Energy Measuring Unit (EMU4-FD1-MB)

Model EMU4-CM-MT

## User's Manual

- Before using the product, please read this manual carefully to ensure correct use.
- Make sure that the end users read this manual and then keep the manual in a safe place for future reference.
- Make sure to deliver this manual to the end-user.

About this manual  
 You can download User's manual of this Unit from the following site.  
<http://www.mitsubishielectric.co.jp/haisei/lvs/downloads/handling.htm>

If you are considering using this module 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 the optional dedicated product for Energy Measuring Unit (EcoMonitorLight Model: EMU4-FD1-MB)
- This Unit enables to transfer measured data to programmable controllers for data acquisition via MODBUS TCP communication.

### 2. Checking package content

These following items for this device are included in package. Check that no items are missing.  
 (1) MODBUS TCP Communication Unit ×1 (2) User's manual ×1

### 3. Safety Precautions

#### 3.1 Precautions for Operating Environment and Conditions

This Unit is premised on being used in pollution degree II environment. When used in higher pollution degree, protect this Unit from pollution on another device side to be incorporated. For the definition of the pollution degree and the over voltage category, refer to EN61010-1/2010. Do not use this product in the places listed below. Failure to follow the instruction may cause malfunctions or decrease of product-life.

- Places the Ambient temperature exceeds the range -5 to +55°C
- Dust, corrosive gas, saline and oil smoke exist
- Places the Relative humidity exceeds the range 30 to 85% or places with dewfall
- Places exposed to rain or water drop
- Operating altitude exceeds 2000m
- Vibration and impact exceed the specifications
- Places metal fragments or conductive substance are flying
- Places the average daily temperature exceeds +35°C
- Places in strong electromagnetic field or places large amounts of external noise exist
- Places exposed to direct sunlight

This unit is the open type device, which are designed to be housed within another device for prevention of electric shock. House this unit within the device such as the control panel before use. (Indoor use)

#### 3.2 Matters concerning the precaution before use

- Use the Unit in the specified usage environment and conditions.
- Before using this Unit, set MODBUS TCP IP address, Subnet mask, Default gateway existence and Default gateway address.
- ※ Please refer to "user's manual of EMU4-FD1-MB".

#### 3.3 Installation Precautions

<b>⚠ DANGER</b>	• For installation and wiring works, make sure that the power source is shut off for all outside phases. If all phases are not turned off, it may cause an electric shock or product damages.
<b>⚠ CAUTION</b>	• Any person who is involved in installation and wiring of this Unit should be fully competent to do this work. • Work under the electric outage condition when installing and wiring. Failure to do so may cause electric shock or a failure of the Unit, a fire etc.
<b>⚠ CAUTION</b>	• In 100Mbps communication by the 100BASE-TX connection, a communication error may occur under the influence of high frequency noise from devices other than this device in the installation environment. • Take the following action to prevent the influence of high frequency noise in the construction of a network system. (1) Wiring connection • Do not install a twisted pair cable together with the main circuit and power cables, etc. • Place the twisted pair cable in a duct. (2) Communication system • Increase the number of communication retries if necessary. • Change the hub used for connection into a 10Mbps hub, and make communication at a transmission speed of 10Mbps.

#### 3.4 Precautions for Use

- Before operating the product, check that active bare wire and so on does not exist around the product. If any exposed conductor is found, stop the operation immediately and take an appropriate action such as isolation protection
- In the event of a power outage during the setting, the Unit is not set correctly. Please set again after power recovery.
- When you connect to Energy Measuring Unit of the Unit, Contrast of the LCD display of Energy Measuring Unit is reduced to small.

<b>⚠ DANGER</b>	• Do not touch the live part. It may cause electric shock, electric burn injury or burnout of the device. • Work under the electric outage condition when installing and wiring.
<b>⚠ CAUTION</b>	• Do not disassemble or modify this Unit It may cause failure, malfunction, injury or fire. • Do not touch the MODBUS TCP communication connectors when communicating. It may cause a malfunction or failure of the Unit. • Push the RESET switch with an appropriate force (1.6N). The addition of force than necessary, it may cause a malfunction or failure of the Unit.

#### 3.5 Maintenance Precautions

- Use a soft dry cloth to clean off dirt of the Unit surface. Do not let a chemical cloth remain on the surface for an extended period of time nor wipe the surface with thinner or benzene.
- Check for the following items to use this Unit properly for long time.  
<Daily maintenance>  
(1) No damage on this Unit (3) No abnormal noise, smell or heat  
(2) No abnormality with LED indicators (4) No looseness with installation and wire connection  
(Check item No.4 under the power failure condition. Failure to do so may cause electric shock, failure of the Unit or a fire.)

#### 3.6 Storage Precautions

- To store this Unit, put it in a plastic bag. For long-time storage, avoid the following places. Failure to follow the instruction may cause a failure and reduced life of the Unit.
- Places the ambient temperature exceeds the range -10 to +60°C
  - Places the average daily temperature exceeds +35°C
  - Places exposed to rain, water drop or direct sunlight
  - Places the Relative humidity exceeds the range 30 to 85% or places with dewfall
  - Vibration and impact exceed the specifications
  - Places metal fragments or conductive substance are flying
  - Places where dust, corrosive gas, saline and oil smoke exist

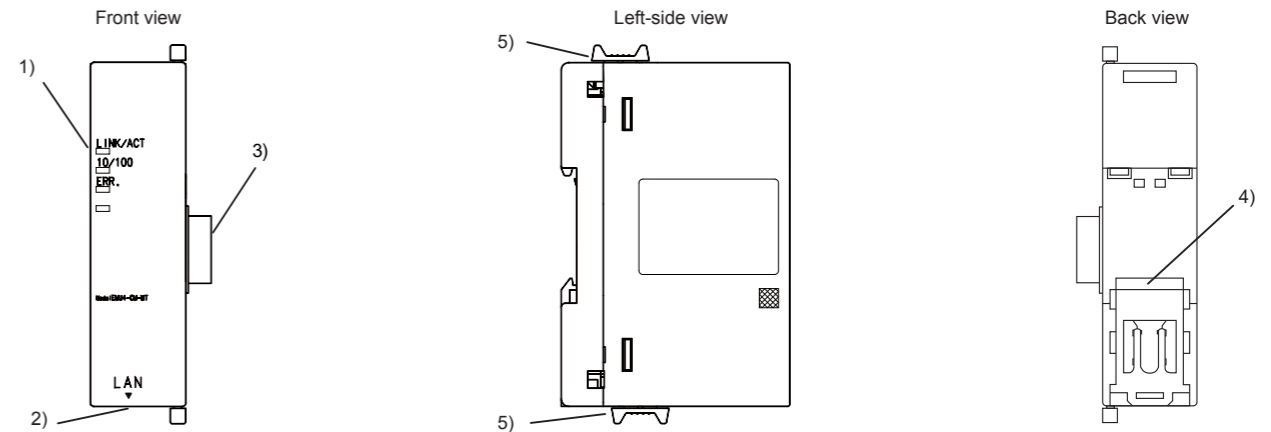
#### 3.7 Disposal Precautions

- When disposing of this Unit, treat it as industrial waste.

#### 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 paper.

### 4. Name and function of each part



<Name and function of each part>

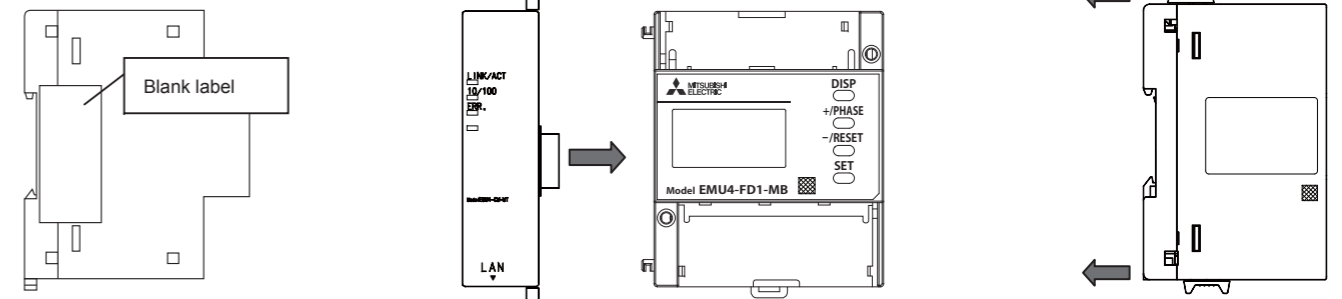
No.	Name of part	Functions
1)	LED	Operation status of MODBUS TCP communication is displayed.
2)	Connector for MODBUS TCP communication	10BASE-T/100BASE-TX connector (RJ45)
3)	Connector for main unit	Connect the Energy Measuring Unit.
4)	IEC rail stop	This is used to fix to an IEC rail.
5)	Connection stop	This is used to connect the MODBUS TCP communication Unit to the Energy Measuring Unit.

### 5. How to wire

Connect the MODBUS TCP communication Unit to the Energy Measuring Unit.

\*This unit can be attached to EcoMonitorLight in below.

- (1) Remove the blank label stuck to the side of the Energy Measuring Unit.
- (2) Insert the connector of the MODBUS TCP communication Unit into the connector of the Energy Measuring Unit and make these Units closely-attached.
- (3) Slide the connection stops (green-colored) of upper and lower of the MODBUS TCP communication Unit to lock it.



<b>⚠ CAUTION</b>	• Work under the electric outage condition when connecting the Energy Measuring Unit. Failure to do so may cause electric shock, a failure of the Unit, a fire etc.
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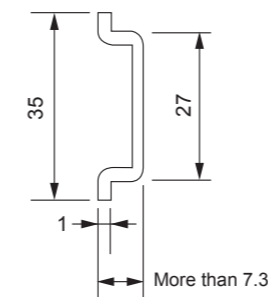
### 6. Mounting the Unit

There are two mounting methods, surface mounting and panel mounting.

#### 6.1 Mounting the Unit on an IEC rail

\*This unit can be attached to EcoMonitorPlus as well.

• Applicable IEC rail



• Mounting

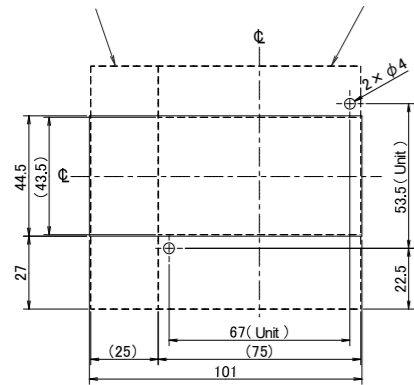
- (1) Hold the module and pull the stopper of IEC rail down.
- (2) Hook on the rail
- (3) Push the Unit
- (4) Push the stopper of the IEC rail above.

• How to remove

- (1) Hold the module and pull the stopper of IEC rail down.
- (2) Pull the module

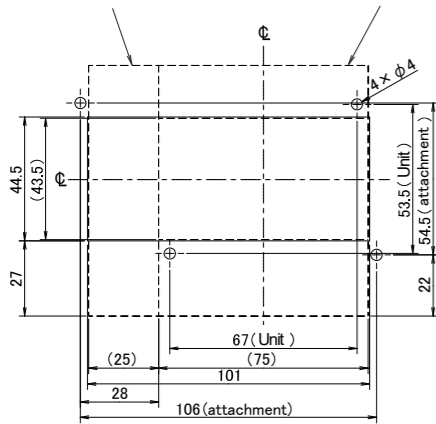
## 6.2 Screw mounting

- Panel cut dimension
- External dimensions of MODBUS TCP communication Unit
- External dimensions of Energy Measuring Unit

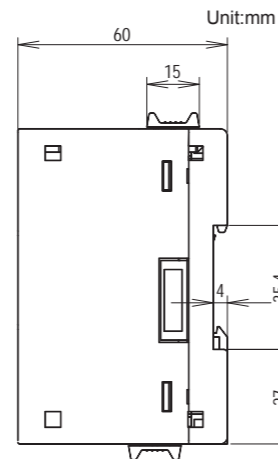
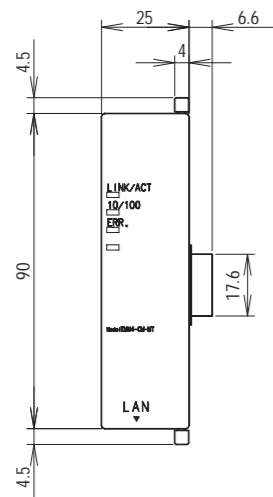


## 6.3 Screw mounting (When using the attachment for panel mounting (Model: EMU4-PAT))

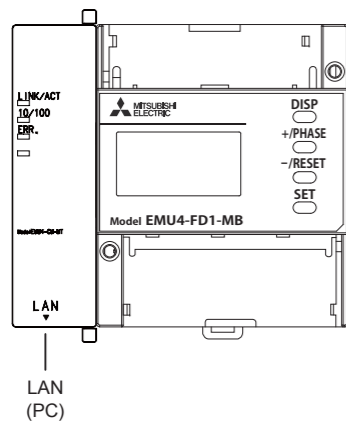
- Panel cut dimension
- External dimensions of MODBUS TCP communication Unit
- External dimensions of Energy Measuring Unit



## 7. External dimensions



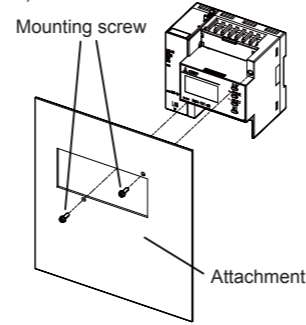
## 8. Wiring Diagram



**CAUTION** Use the RJ-45 connector to the EMU4-CM-MT.

## Attachment

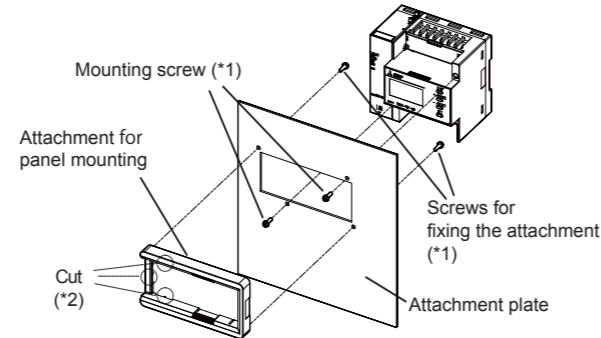
- Attach the plate by screws (M3×10).
- Tightening torque:0.63N·m



Recommended mounting screw	Cross recessed pan-head screw with captive spring or plain washer JIS B 1188 Two screws (M3×10)
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## Attachment

- Mount on the plate by screws (M3×10), then mount the panel mounting attachment on the plate. Tightening torque:0.63N·m



- \*1. The mounting screws and the screws for fixing the attachment are included in Attachment (optional part).
- \*2. Before use, you need to cut each part of the attachment.

## 9. Specifications

<Basic Specifications>

Item	Specifications	
Product	Energy Measuring Unit (EMU4-FD1-MB) MODBUS TCP Communication Unit	
Model	EMU4-CM-MT	
Accommodating model	Energy Measuring Unit EcoMonitorLight Model:EMU4-FD1-MB	
Standard	EMC:EN-61326-1:2013	
Usage environment	Operating temperature	from -5 to +55°C (average daily temperature is not more than +35°C)
	Operating humidity	30 to 85% RH (No condensation)
	Storage temperature	from -10 to +60°C
	Operating altitude	Not more than 2000m
Mass	0.1kg ※Mass of the MODBUS TCP Communication Unit only	

<MODBUS TCP Communication specifications>

Item	Specifications	
Interface	1 port (10BASE-T/100BASE-TX)	
Transmission method	Base band	
Number of cascade connection stages *1	Max. 4 stages (10BASE-T), Max. 2 stages (100BASE-TX)	
Maximum node-to-node distance	200m (656.16ft.)	
Maximum segment length *2	100m (328.08ft.)	
Connector applicable for external wiring	RJ45	
Cable	10BASE-T	Cable compliant with the IEEE802.3 10BASE-T Standard (unshielded twisted pair cable (UTP cable), Category 3 or more)
	100BASE-TX	Cable compliant with the IEEE802.3 100BASE-T Standard (shielded twisted pair cable (STP cable), Category 5 or more)
Protocol	MODBUS TCP (Port number 502)	
Number of simultaneously connection	Max. 4 connection	
Functions supported	Auto negotiation (10BASE-T/100BASE-TX automatically detected) Auto MDIX function (straight/crossover cable automatically detected)	

- \*1. This is the maximum number of cascade connection stages when a repeater hub is used.  
For the maximum number of cascade connection stages, contact to the manufacturer for the switching hub used.
- \*2. Length between a hub and a node.

## 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》，该标记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 and 地方的法律法规完成该电器电子产品的回收和再利用。

(2) 产品中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。

产品中有害物质的名称及含量

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	○	○	○	○	○	○
铭牌	○	○	○	○	○	○

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

If you have any questions or the product is broken down, contact our sales representative near you.

- The charge-free warranty is effective until the earlier of 1 year after the date of your purchase or 18 months after manufacturing.
- The gratis warranty shall apply if the product fails even though it is being used properly in the conditions, with the methods and under the environments in accordance with the terms and precautions described in the catalogs, the instruction manual, caution label on the product, etc.
- Regardless of Gratis Warranty Period, our company shall not be liable to compensate for any loss arising from events not attributable to our company, opportunity loss and lost earning of the customer due to failure of the product, and loss, secondary loss, accident compensation, damage to other products besides our products and other operations caused by a special reason regardless of our company's predictability.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

**CAUTION** If an abnormal sound, bad-smelling smoke, fever break out from this Unit, switch it off promptly and don't use it.

## 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.