



CC-Link Communication Unit for Energy Measuring Unit (EcoMonitorLight)

EcoMonitorPlus)
Model EMU4-CM-C

User's Manual

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.

- 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.com/fa/worldwide/index.html

1 Features

- This Unit is the optional dedicated product for Energy Measuring Unit (EcoMonitorLight, EcoMonitorPlus)
- This Unit enables to transfer measured data to programmable controllers for data acquisition via CC-Link communication.

2 Checking package content

These following items for this device are included in package. Check that no items are missing.
(1) CC-Link Communication Unit x1 (2) Connector for CC-Link communication (Included in the Unit) x1
(3) User's manual x1

3 Safety Precautions

3.1 Precautions for Operating Environment and Conditions

This Unit is premised on being used in pollution degree 2 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

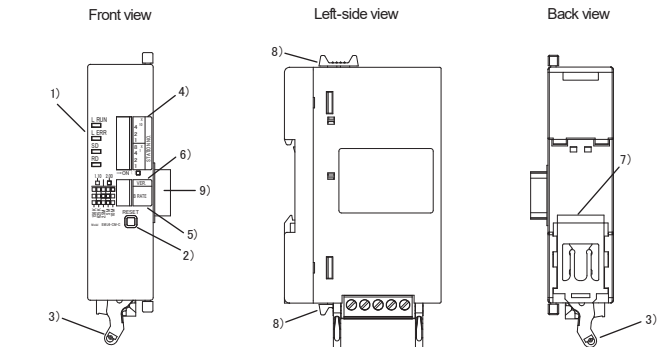
- Use the Unit in the specified usage environment and conditions.
- Before using this Unit, set CC-Link station, transmission speed and version of this Unit.
- Please refer to "9. Setting methods"

3.3 Installation Precautions

CAUTION 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.

CAUTION 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.

4 Name and function of each part



<Name and function of each part>

No.	Name of part	Functions
1)	L RUNL ERR/SD/IRD LED	Operation status of CC-Link communication is displayed.
2)	RESET switch	Press after having set and changed STATION, B RATE and VER.
3)	Connector for CC-Link communication	This connects CC-Link signal wire.
4)	STATION switch	Station setting switch Set the station number of CC-Link.
5)	B RATE switch	Baud rate setting switch Set communication speed of CC-Link.
6)	VER. switch	Version change switch Set CC-Link version.
7)	IEC rail stop	This is used to fix to an IEC rail.
8)	Connection stop	This is used to connect the CC-Link communication Unit to the Energy Measuring Unit.
9)	Connector	This is used to connect the Energy Measuring Unit.

5 Procedure for operation

The following describes the procedure for operation before using this Unit.

No.	Procedure	Details
1)	Connect the CC-Link communication Unit to the Energy Measuring Unit.	Refer to "6. Connect the CC-Link communication Unit to the Energy Measuring Unit" of this Manual.
2)	Attach the Energy Measuring Unit and the CC-Link communication Unit to the plate.	Refer to "7. Installation" of this Manual.
3)	Set station number (STATION) of the CC-Link communication Unit.	Refer to "9.1. Setting of station number (STATION)" of this Manual.
4)	Set transmission speed (B RATE) of the CC-Link communication Unit.	Refer to "9.2. Setting of transmission speed (B RATE)" of this Manual.
5)	Set CC-Link version (VER.) of the CC-Link communication Unit.	Refer to "9.3. Setting of CC-Link version (VER.)" of this Manual.

CAUTION

- When tapping or wiring, take care not to entering any foreign objects such as chips and wire pieces into this Unit.
- Check the connection way when connecting this Unit to the Energy Measuring Unit. Wrong wiring may cause failure of the Unit, a fire or electric shock.
- For protection against noise, do not lay CC-Link communication signal wires and input/output lines close to any power lines or high-voltage lines, and do not bind these lines. When these CC-Link communication signal wires and input/output lines are laid in parallel with any power lines or high-voltage lines, keep the distance 10cm between them. However, when equilibrating a long distance, place it more than 30 cm apart. For usage, connect the FG terminal to ground.
- Use specified cables for CC-Link connection cables. Multi using of dedicated cable and high-performance dedicated cable for CC-Link should be avoided. In the case of multi using of these cables, the safety of the correct data transmission is not guaranteed. The termination resistances differ according to dedicated cable type.
- Shielded cable of the CC-Link connection cable should be connected to "SLD" and "FG" terminal must be D-type ground (ground resistance is not exceed 100Ω).
- Tighten the screw within the specified torque for cables of CC-Link communication connectors. Under tightening can cause drop of the screw, short circuit or malfunction. Over tightening can damage the screw and/or Unit, resulting in drop, short circuit or malfunction. Refer to Section "8. Wiring methods" of this Manual.

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 expose 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.

DANGER

- 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.

CAUTION

- Do not disassemble or modify this Unit. It may cause failure, malfunction, injury or fire.
- Do not touch the CC-Link 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.
- Do not touch the following switches directly with your hands, as there is a risk of electric shock in the event of a single failure.
RESET switch, STATION switch, B RATE switch, VER. switch

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
- Vibration and impact exceed the specifications
- Places the Relative humidity exceeds the range 30 to 85% or places with dewfall
- 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.

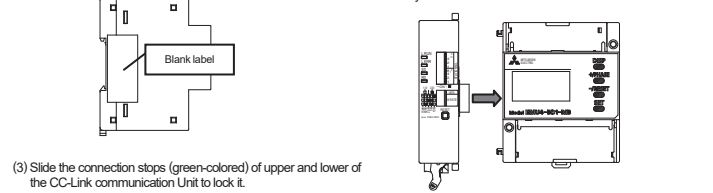
6. How to wire

Connect the CC-Link communication Unit to the Energy Measuring Unit.

*This unit can be attached to EcoMonitorLight in below. This unit can be attached to EcoMonitorPlus as well.

*In EcoMonitorPlus, connect to the base unit (model name: EMU4-BM1-MB/EMU4-HM1-MB/EMU4-LG1-MB/EMU4-CNT-MB).

- (1) Remove the blank label stuck to the left side of the Energy (2) Insert the connector of the CC-Link 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 CC-Link communication Unit to lock it.

CAUTION

- 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.

7. Mounting the Unit

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

7.1 Mounting the Unit on an IEC rail

*This unit can be attached to EcoMonitorLight in below. This unit can be attached to EcoMonitorPlus as well.

● Applicable IEC rail ● Mounting ● How to remove

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

(2) Hook on the rail

(3) Push the stopper of the IEC rail above.

(4) Push the Unit down

(5) Push the stopper of the IEC rail down.

More than 7.3

7.2 JIS agreement size mounting

*This unit can be attached to EcoMonitorLight in below. This unit can be attached to EcoMonitorPlus as well.

● JIS agreement type mounting ● Mounting ● How to remove

(1) Push the stopper of the IEC rail above and store it.

(2) Hitch 3 chases at upper part of the Unit to the hook on the attachment plate.

(3) Push the Unit down and fit in the spring fitting in chases at the lower part of the Unit.

(4) Lift the lower part of the Unit slowly to remove in reverse order of mounting.

(5) Push down the spring fitting.

7.3 Screw mounting *EcoMonitorLight only.

● Panel cut dimension

External dimensions

Attachment

Attach the plate by screws (M3x10). Tightening torque: 0.63N·m

Mounting screw

Attachment

Recommended mounting screw

Cross recessed pan-head screw with captive spring or plain washer JIS B 1188 Two screws (M3x10)

7.4 Screw mounting (When using the attachment for panel mounting model: EMU4-PAT) *EcoMonitorLight only.

● Panel cut dimension (※1) ● Attachment

External dimensions

Attachment for panel mounting

Mounting screw (※2)

Attachment plate

Screws for fixing the attachment (※2)

Cut (※3)

※1. Panel cut dimensions are made larger than the product considering tolerance in panel cut. If you want to prevent dust and other intrusion the gap of panel cut, cut the panel according to the product to be mounted.

※2. The mounting screws and the screws for fixing the attachment are included in Attachment (optional part).

※3. Before use, you need to cut each part of the attachment.

8. Wiring methods

Connector for CC-Link communication

Levers

Cable tightening screw

Installation in the middle of the transmission route

Installation at the end of the transmission route

9.3 Setting of CC-Link version (VER.)

- When setting "VER" setting switch, change it with narrow screwdriver.
- Relation between CC-Link version and setting switch is as below: (■ shows position of switch.)

CC-Link version	Ver.1.10	Ver.2.00
Setting	■	■
	⇒ ON	⇒ ON

※ When setting Ver.2.00, setting is fixed to one station occupied and eightfold.

Push the reset switch when setting or changing station numbers, transmission speed or version after energizing.

- Detailed setting items will be not set if you do not push the reset switch.
- Reset require a few seconds. Continue to press the reset switch and release the reset switch after having confirmed "L RUN LED" turns off.

Supplement

- Maximum total extension cable length and length between stations differ depending on the transmission speed.
 - Avoid setting the same station numbers in the identical transmission path. The same station numbers result in errors.
- Number of devices to be connected is according to the conditions 1 and 2 below. Can connect up to 42 devices maximum when only this unit is connected. (When connecting only remote device station of one station occupied.)
- Condition 1: $\{(1 \times a) + (2 \times b) + (3 \times c) + (4 \times d)\} \leq 64$
- a: Number of devices with one occupied station
b: Number of devices with two occupied stations
c: Number of devices with three occupied stations
d: Number of devices with four occupied stations
- Condition 2: $\{(16 \times A) + (54 \times B) + (88 \times C)\} \leq 2304$
- A: Number of devices of Remote I/O stations
B: Number of devices of Remote device stations
C: Number of devices of local station

10. External dimensions

Unit: mm

11. 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方面的注意事项，从生产日期算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。

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。

Wire type	When connecting one wire	When connecting two wires
Single wire	from 0.2mm ² to 2.5mm ²	2 × 0.2mm ² to 1.0mm ²
Stranded wire	from 0.2mm ² to 2.5mm ²	2 × 0.2mm ² to 1.5mm ²
Stranded wire with bar terminal (without insulating sleeve)	from 0.25mm ² to 2.5mm ²	2 × 0.25mm ² to 1.0mm ²
Stranded wire with bar terminal (with insulating sleeve)	from 0.25mm ² to 2.5mm ²	—

Supplement

- Strip the signal wires 7mm. Do not plate the wires with solder.
- Use specified cables for CC-Link connection cables. Multi using of dedicated cable and high-performance dedicated cable for CC-Link should be avoided. In the case of multi using of these cables, the safety of the correct data transmission is not guaranteed.
- The termination resistances differ according to dedicated cable type.
- For the specifications of the CC-Link dedicated cables or any other inquiries, visit website for CC-Link Partner Association.
- Shielded cable of the CC-Link connection cable should be connected to "SLD" and "FG" terminal must be D-type ground (ground resistance is not exceed 100Ω). "SLD" and "FG" are connected inside of the Unit.
- CC-Link communication wire must be dedicated wire, and observe total wiring distance, distance between stations and termination resistances value according to the B RATE. No use of dedicated wire or unsatisfying wiring condition may cause abnormal communication. (Refer to CC-Link Master Unit instruction manual about dedicated wires and wiring conditions.)
- Connect the termination resistances which are included in CC-Link Master Unit to both ends Units of the CC-Link communication line. Connect it between DA terminal and DB terminal if the Energy Measuring Unit is at the end of the CC-Link transmission line.
- The termination resistances values differ according to CC-Link dedicated cable type. The termination resistances values differ according to CC-Link dedicated cable type. Refer to instruction of termination resistances included in CC-Link Master Unit.

9 Setting methods

When connecting this Unit to CC-Link transmission line, set different stations (STATION) before energizing according to each unit and set transmission speed (B RATE), CC-Link version (VER.). For Units with CC-Link communication function, set station numbers and transmission speed to ensure mutual communication at the setting transmission speed by using with the station numbers.

CAUTION

- Do not use a mechanical pencil when changing station number switch and transmission speed switch. Several shreds from a pencil which had been sharpened may fly into internal circuits and cause malfunction or damage of the product.
- 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.

9.1 Setting of station number (STATION)

- This Unit is Remote Device Station of one station occupied. Station number setting range is from 1 to 64.
- Station number is the total of the Station Setting Switch value which is "ON".
- When switching "ON" of the Station Setting Switch, change it with narrow screwdriver or a stick.
- For example, when setting the Station number of this Unit as station number 36, set as below:
Set "ON" of 1 and 2 of side x10, 2 and 4 of side x1 of the Station Setting Switch.
*Symbol direction is "ON". ■ shows position of switch.

x10 (Digit of 10) = (1+2) x 10 = 30

x1 (Digit of 1) = (2+4) x 1 = 6

⇒ 30+6 = 36... Station number is 36

9.2 Setting of transmission speed (B RATE)

- When switching the "B RATE" setting switch, change it with narrow screwdriver.
 - Relation between transmission speed and setting switch is as below: (■ shows position of switch.)
- | Transmission speed | 156K | 625K | 2.5M | 5M | 10M |
|--------------------|------|------|------|------|------|
| Setting | ■ | ■ | ■ | ■ | ■ |
| | ⇒ ON | ⇒ ON | ⇒ ON | ⇒ ON | ⇒ ON |
- ※ Do not set other combination than described above. It will result in error.

12. Specifications

<Basic Specifications>		
Item	Specifications	
Product	Energy Measuring Unit (EcoMonitorLight) CC-Link Communication Unit	
Model	EMU4-CM-C	
Rating	6.4V DC (powered by the Energy Measuring Unit)	
Accommodating model	Energy Measuring Unit EcoMonitorLight Model: EMU4-BD1-MB/ EMU4-HD1-MB/ EMU4-BD1A-MB/ EMU4-HD1A-MB EcoMonitorPlus Model: EMU4-BM1-MB/ EMU4-LG1-MB/ EMU4-CNT-MB (Data acquisition of EMU4-A2/ EMU4-VA2/ EMU4-PX4/ EMU4-AX4 connected to the above EcoMonitorPlus is also possible.)	
Standard	EMC : EN-61326-1: 2013	
Operating 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
Weight	Operating altitude	Not more than 2000m
		0.1kg ※Mass of the CC-Link Communication Unit only

* CC-Link Communication Unit produced after December, 2015 confirms UL in combination with EcoMonitorPlus.

<CC-Link Communication specifications>

Item	Specifications
Number of occupied stations	Remote device station with one occupied station
Version (VER.)	Ver.1.10, Ver.2.00 (set by Version change switch)
Station (STATION)	Set within 1 to 64 (set by Station setting switch)
Transmission speed (B RATE)	Changed according to setting 156K/ 625K/ 2.5M 5M 10M (set by B rate setting switch) (Maximum total extension cable length and length between stations differ depending on the transmission speed.)
Maximum connection devices	Up to 42 Units can be connected under the system configured only with this Unit.
Cable termination resistances	Use specified cables for CC-Link connection cables. The termination resistances differ according to dedicated cable type.

13. After-sales service

- 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, lever break out from this Unit, switch it off promptly and don't use it.

14. Customer Service

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE: TOKYO BUILDING, 2-7-3, MARUNOUCHI, CHYODU-KU, TOKYO 100-8310, Japan
Please refer to "catalog" or "user's manual (Details)" for more detail.