MITSUBISHI ELECTRIC

Logging Unit for Energy Measuring Unit

MODEL

EMU4-LM

User's Manual (Details)

- Before operating the instrument, you should first read thoroughly this operation manual for safe operation and optimized performance of the product.
  Deliver this user's manual to the end user.

Read first

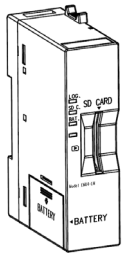
Thank you for purchasing the Energy Measuring Unit.

- This manual describes setup and usage for this unit. Before using the product, please read this manual carefully to ensure correct use.
  Especially, in the case of where this unit is to be installed, please read “1. Safety Precautions” 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.
- 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.（For details, please see at the end of this manual.）

■Notations in this manual
Use the following marks in this manual.

Mark	Meaning
⚠Danger	This mark indicates that incorrect handling may result in death or severe injury, ignoring this marking.
⚠Caution	This mark indicates that incorrect handling may result in injury or property damage, ignoring this marking.
✓ Supplement	This mark indicates that precautions to avoid a malfunction and to work the unit properly.
☛	This mark indicates that the pages described that related matters.

■Checking package contents
The following items for this device are included in package. Check that no items are missing.



(1) Logging Unit x1


(2) Battery x1
*Stored in the battery box


(3) User's Manual (Digest) x1

This unit is intended for Energy Measuring Unit (EcoMonitorLight, EcoMonitorPlus) only.

Trademarks

- Microsoft Excel is the registered trademark of the U.S. Microsoft Corporation in the U.S. and other countries.
- SD logo and SDHC logo are the trademarks of SD-3C, LLC.
- Other company and product names herein are trademarks or registered trademarks of their respective owners.
- In the text, trademark symbols such as "TM" and "®" may not be written.

Features

- This unit can memorize the data of various quantities related to electricity such as voltage, current, power and energy and various pulse count values and analog input data(hereinafter referred to as measured data) measured by Energy Measuring Unit (EcoMonitorLight, EcoMonitorPlus) for a certain period. (☛Page 13)
- Memorized measured data can be output to an SD memory card in CSV format. (☛Page 16)
- You can check the data files output to the SD memory card by Microsoft Excel or GX LogViewer (Version 1.30G or after).

Table of Contents

1. Safety Precautions

Precautions for Operating Environment and Conditions

- This unit is premised on being used in pollution degree II [Note 1] environment. When used in higher pollution degree, protect this unit from pollution on another device side to be incorporated.
- Do not use this product in the places listed below. Failure to follow the instruction may cause malfunctions and a life decrease of product.
  - ・Places the operating temperature exceeds the range from -5 to +55°C
  - ・Places the average daily temperature exceeds +35°C
  - ・Places the operating humidity exceeds the range from 30 to 85%RH or places with dewfall
  - ・Vibration and impact exceed the specifications
  - ・Dust, corrosive gas, saline and oil smoke exist
  - ・Places exposed to direct sunlight
  - ・Places exposed to rain or water drop
  - ・Places in strong electromagnetic field or places large amounts of external noise exist
  - ・Places metal fragments or conductive substance are flying
  - ・Operating altitude exceeds 2000m

[Note 1] For the definition of the pollution degree and the over voltage category, refer to EN61010-1/2010.

<For prevention of electric shock>

- This unit is the open type devices, 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 which is grounded before use.
- To prevent persons with little knowledge about electric equipment from electric shock, panel must be taken either following measure.
  - ・Lock the panel so that only those who get an education about electric equipment and have sufficient knowledge can unlock, or shut off power supply automatically by opening the panel.
  - ・Cover the dangerous part of this unit. (Required protection code is higher than IP2X.)

Matters concerning the precaution before use

- Use the unit in specified usage environment and conditions.
- Before using this unit, set “Present time”, “Logging ID”, “Logging mode”, “Logging start time (if Logging mode is set to “Date nomination”)”, “Detail data logging cycle” and “Logging item”. If you do not set these values, the unit logs in the initial values. (☛Page 24)
- This unit stores a lithium battery. It is not connected at the factory. Connect it before use. (☛Page 7)

Installation and Wiring Precautions

Make sure to read this manual carefully before installation and wiring.

⚠Caution

<Electric work precautions>

- Any person who is involved in installation and wiring of this unit should be fully competent to do this work.
- Work under electric outage condition when installing and wiring.
  Failure to do so may cause electric shock, a failure of the unit, a fire etc.
- When tapping or wiring, take care not to enter any foreign objects such as chips and wire pieces into this unit.
- Check the connection way when connecting to the Energy Measuring Unit. Wrong wiring may cause failure of the unit, a fire or electric shock.

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.
- During communication with the SD memory card, the operations such as power-off, reset and ejection of the memory card may cause data corruption of the memory card or failure of this unit or the memory card. Power off or reset the unit, or eject the SD memory card after checking that SD C.LED turns off.
- Make sure to use the SD memory card manufactured by Mitsubishi Electric Corporation (Model EMU4-SD2GB).
  Using the other types of the SD memory card may cause the trouble such as data destruction of the memory card or system failure.
- Format an SD memory card in the way specified in this manual. (☛Page 34)
- Insert the SD memory card with the write protect switch “OFF”. If the write protect switch is “ON”, the logging unit does not communicate with an SD memory card.
- Present time data and logging data are erased by power-off with BAT. LED on. (“Logging ID”, “Logging mode”, “Logging start time”, “Detailed data logging cycle” and “Logging item” are not erased, which are memorized in the nonvolatile memory.) If BAT. LED turns on, output logging data to the SD memory card and change a battery.

- All logging data of the Logging Unit is erased when you change the setting of “Phase wire system”, “Primary voltage (Use or non-use of VT , Direct Voltage , Primary voltage with VT , Special primary voltage)”, “Primary current (Direct sensor , 5A sensor , Special primary current)” or “Sensor type” of the Energy Measuring Unit (EcoMonitorLight Model: EMU4-BD1-MB/ EMU4-HD1-MB/EMU4-FD1-MB, EcoMonitorPlus Model: EMU4-BM1-MB, EMU4-HM1-MB, EMU4-VA2, EMU4-A2) and “Phase wire system” and “Measurement mode” of the Energy Measuring Unit with Insulation Monitoring (Model: EMU4-LG1-MB). Before changing the setting of the Energy Measuring Unit, output the logging data to the SD memory card and check the output data in the PC whether the logging data is memorized properly.
- All logging data of the Logging Unit is erased when you change the setting of “Present time”, “Logging mode”, “Logging start time”, “Detailed data logging cycle” or “Logging item” of the Logging Unit. Before changing the setting of the Logging Unit, output the logging data to the SD memory card and check the output data in the PC whether the logging data is memorized properly.
- The Logging Unit should not be used for multiple Energy Measuring Units. Otherwise all logging data of the Logging Unit may be erased, or there may be some data for different Energy Measuring Units in the Logging Unit.

⚠Danger
● Do not touch the electrically charged portion. It may cause electric shock, electric burn injury or burnout of the device. ● Work under the electric outage condition when installing.

⚠Caution
● Do not disassemble or modify this unit. It may cause failure, malfunction, injury or fire.

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 benzine.
- Check for the following items to use this unit properly for long time.
  <Daily maintenance>
  (1) No damage on this unit
  (2) No abnormality with LED indicators
  (3) No abnormal noise, smell or heat

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 storage temperature exceeds the range from -10 to +60°C
  ・Places the average daily temperature exceeds +35°C
  ・Places the relative humidity exceeds the range from 30 to 85% or places with dewfall
  ・Vibration and impact exceed the specifications
  ・Dust, corrosive gas, saline and oil smoke exist
  ・Places metal fragments or conductive substance are flying
  ・Places exposed to rain, water drop or direct sunlight

Disposal Precautions

- When disposing of this unit, treat it as industrial waste.
- Lithium batteries are disposed of according to local regulation.

⚠Caution	Removed lithium batteries may have electric charge. Store them separately so as not to touch other metal, otherwise evolution of heat, burst or ignition may occur.

About packaging materials and this manual

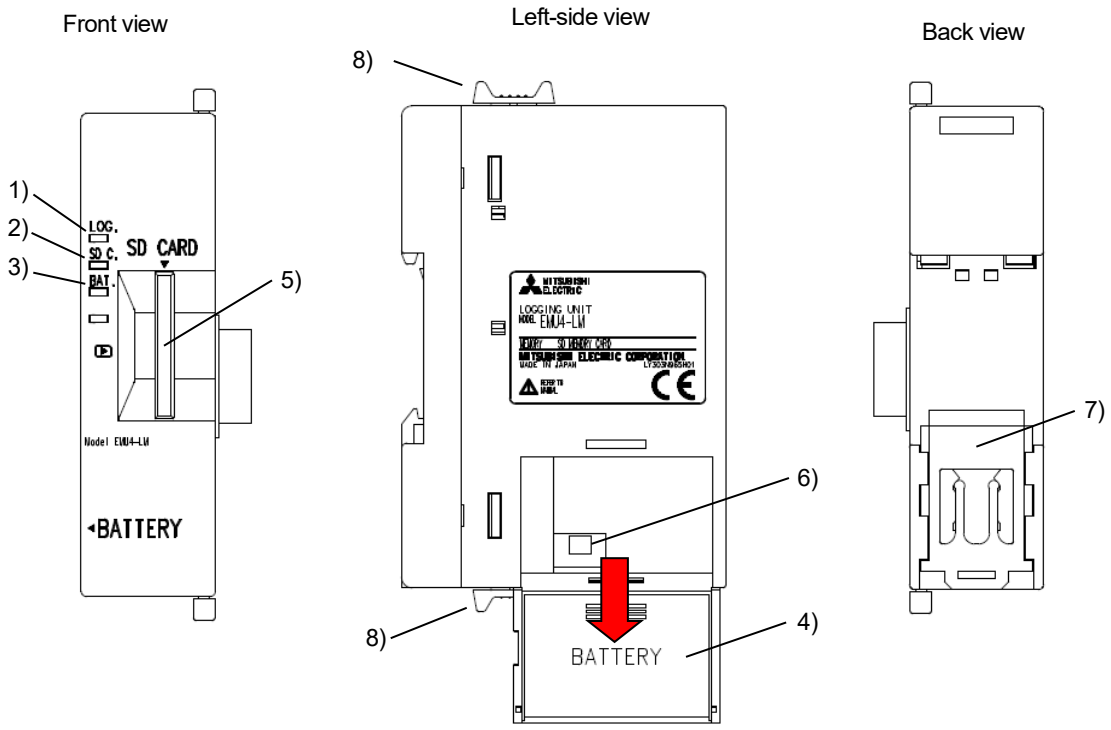
For reduction of environment load, packaging materials are produced with cardboard, and this manual is printed on recycled paper.

2. Disclaimer

- It is prohibited to reprint or copy all contents of this document in any form without our permission.
- The contents of this document will be updated to follow revisions to software and hardware, however under unavoidable circumstances it may not be synchronized.

3. Name and function of each part

■Name of each part



Name and function of each part

No.	Name	Function
1)	LOG. LED	This indicates a state of logging operation. Turn on: Logging is running Turn off: Logging is stopped Blink slowly [Note 1] (5 seconds) : Change of logging condition settings finished Blink quickly [Note 2] (30 seconds) : Change of logging condition settings failed [Note 3] Blink quickly [Note 2]: Error occurrence(*3)
2)	SD C. LED	This indicates a state of communication with the SD memory card. Turn on: Communicating Turn off: Stop communicating Blink quickly [Note 2] : SD memory card error [Note 3]
3)	BAT. LED	This indicates a state of battery voltage. Turn on: Low battery voltage [Note 4] Turn off: Normal battery voltage
4)	Battery box	This stores a battery to back up present time data, logging data and system log data.
5)	SD memory card slot	This is a slot to insert an SD memory card.
6)	Battery connector	This connects a battery
7)	IEC rail stop	This is used to fix to an IEC rail.
8)	Connection stop	This is used to connect the Logging Unit to the Energy Measuring Unit.

[Note 1] Blink slowly: Repetition of 0.5-second on and 0.5-second off
[Note 2] Blink quickly: Repetition of 0.25-second on and 0.25-second off
[Note 3] Refer to “Error display and measures” if this indicates. (☛Page 35)
[Note 4] resent time data and logging data are erased by power-off with battery voltage low. (“Logging ID”, “Logging mode”, “Logging start time”, “Detailed data logging cycle” and “Logging item” are not erased, which are memorized in the nonvolatile memory.) If BAT.LED turns on, change a battery.

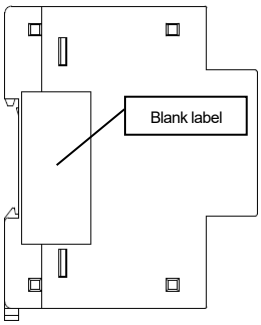
4. How to wire

How to connect to and disconnect from the Energy Measuring Unit

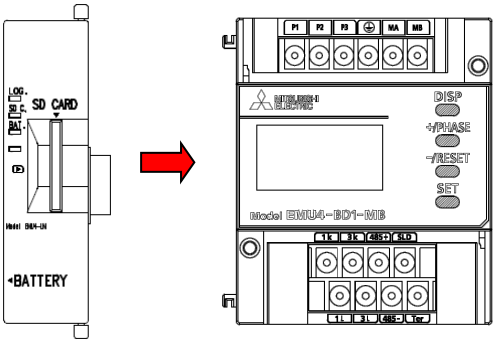
*This unit is can be attached to EcoMonitorLight in below. This unit canconnect and disconnect to EcoMonitorPlusas well.

■How to connect the Logging Unit

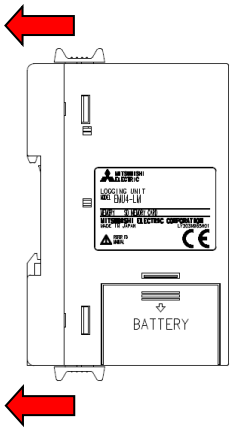
(1) Remove the blank label stuck to the left side of the Energy Measuring Unit.



(2) Insert the connector of the Logging Unit into that of the Energy Measuring Unit and contact the unit.

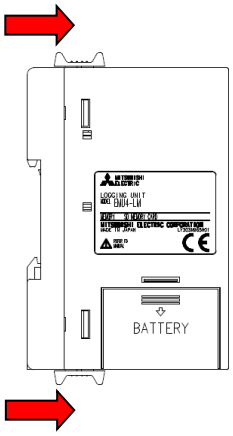


(3) Slide the connection stops (green-colored) in upside and downside of the Logging Unit to lock it.

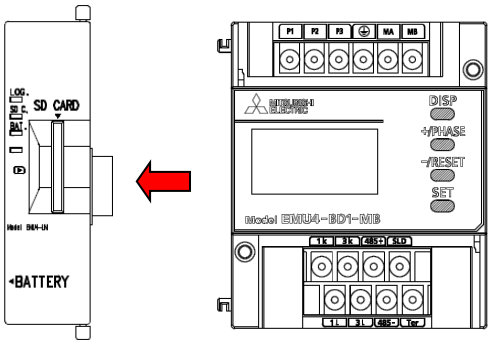


■How to disconnect the Logging Unit

(1) Slide the connection stops (green-colored) in upside and downside of the Logging Unit to unlock it.



(2) Pull the Logging Unit to disconnect from the Energy Measuring Unit.

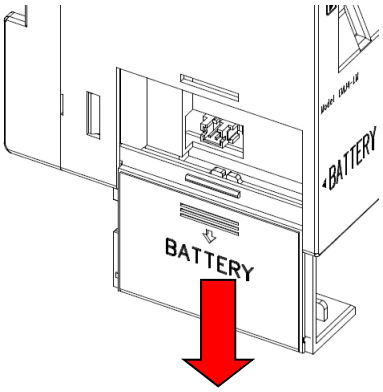


⚠**Caution**	・Work under the electric outage condition when connecting and disconnecting the Energy Measuring Unit. ・The Logging Unit should not be used for multiple Energy Measuring Units. Otherwise all logging data of the Logging Unit may be erased, or there may be some data for different Energy Measuring Units in the Logging Unit.

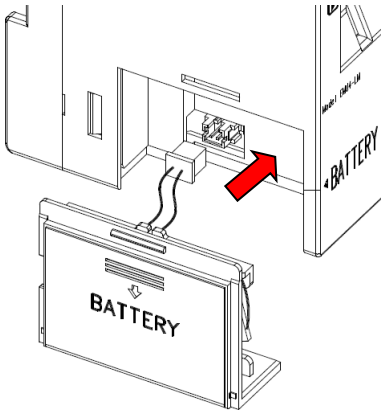
How to connect and change a battery

■How to connect the battery (just after the purchase)

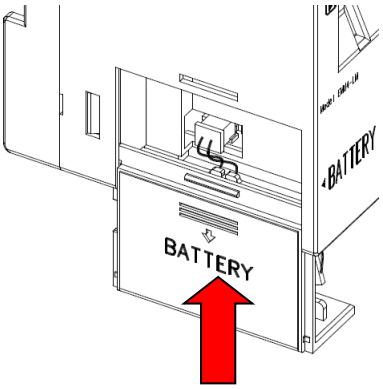
(1) Slide the battery box down to open it.



(2) Connect the connector of the battery cable to the battery connector.



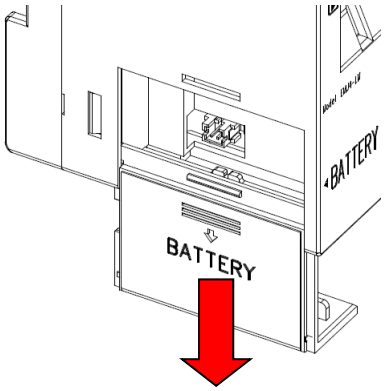
(3) Fix the battery box to the Logging Unit.



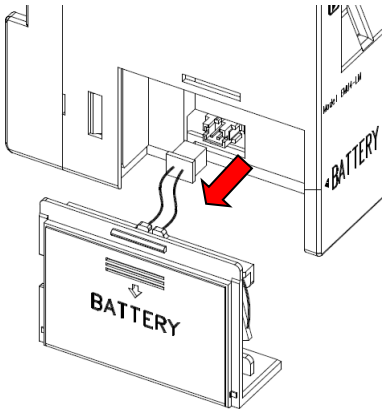
⚠**Caution**	・Work under the electric outage condition when connecting battery. Failure to do so may cause electric shock, a failure of the unit, a fire etc. ・Please secure a space under the logging unit to replace the battery.

■How to change a battery

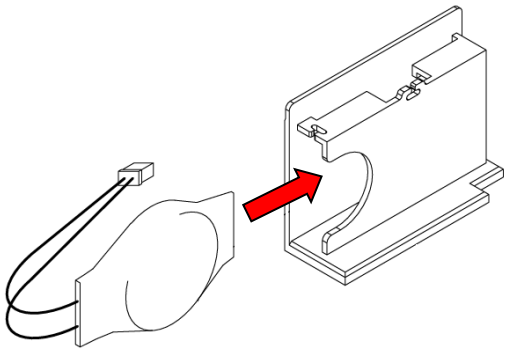
(1) Slide the battery box down to open it.



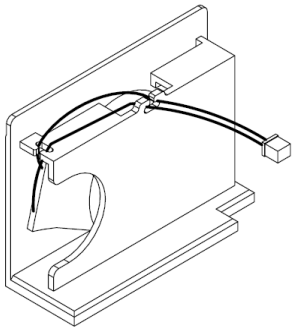
(2) Remove the connector of the battery cable to the battery connector.



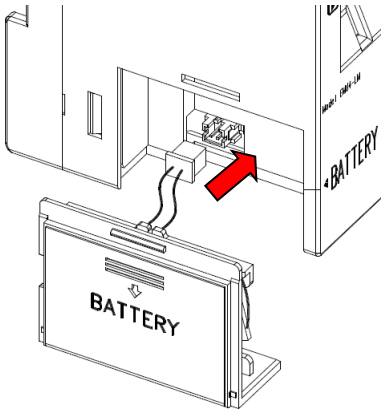
(3) Remove old battery and put new battery in battery box.



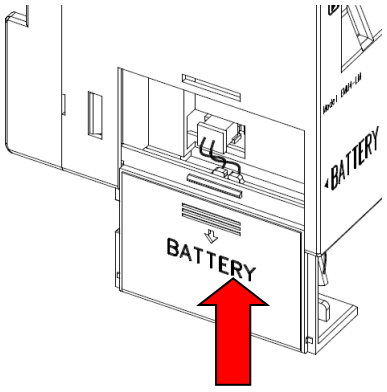
(4) Attach the cable to the battery box. (2 places)
* When attaching to the battery box, please insert two wires one by one.



(5) Connect the connector of the new battery cable to the battery connector.



(6) Fix the battery box to the Logging Unit.

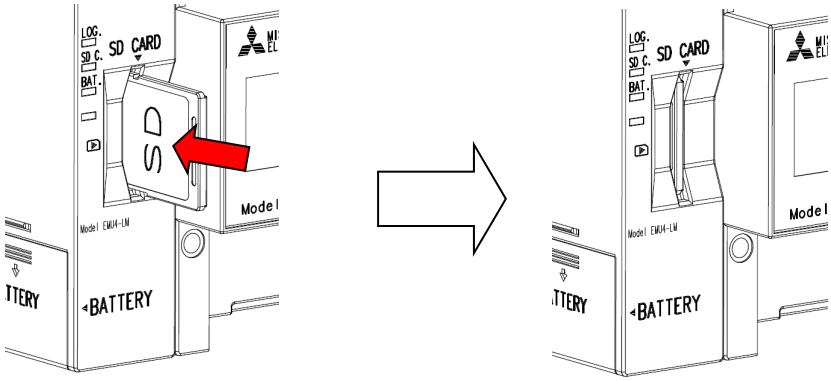


⚠**Caution**	・Work under the electric outage condition when connecting and disconnecting battery. Failure to do so may cause electric shock, a failure of the unit, a fire etc. ・Present time data and logging data are erased by power-off with BAT. LED on. (“Logging ID”, “Logging mode”, “Logging start time”, “Detailed data logging cycle” and “Logging item” are not erased, which are memorized in the nonvolatile memory.) Output logging data to the SD memory card before power-off. ・Change a battery when BAT.LED turns on or every 3 years. ・Please secure a space under the logging unit to replace the battery.

How to insert and eject the SD memory card

■How to insert the SD memory card

Slide the SD memory card straight into the slot until it clicks into place.

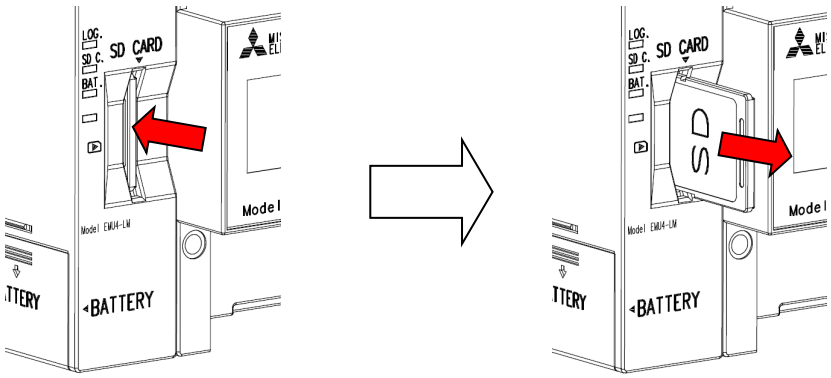


⚠Caution	・Make sure to use the SD memory card manufactured by Mitsubishi Electric Corporation (Model EMU4-SD2GB). Using the other types of the SD memory card may cause the trouble such as data destruction of the memory card or system failure. ・Format an SD memory card in the way specified in this manual. (☛Page 34) ・Insert the SD memory card with the write protect switch “OFF”. If the write protect switch is “ON”, the logging unit does not communicate with an SD memory card.

For the SD memory card on the market, please refer to the Sales and Service No.YAMA192 from our site. However, at the time of use, please verify sufficient by the customer that there is no problem.

■ How to eject the SD memory card

Push the SD memory card in until it clicks into place. The SD memory card comes out by itself.



⚠Caution	During communication with the SD memory card, ejection of the memory card may cause data corruption of the memory card or failure of this unit or the memory card. Check that SD C.LED turns off to eject the SD memory card.

5. Installation

⚠Caution
・Any person who is involved in installation and wiring of this unit should be fully competent to do this work.

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

* Surfacing mouting only in EcoMonitorPlus.
When installing, this unit should be connected to the Energy Measuring Unit. (☛Page 6)

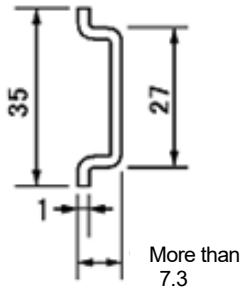
Surface mounting

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

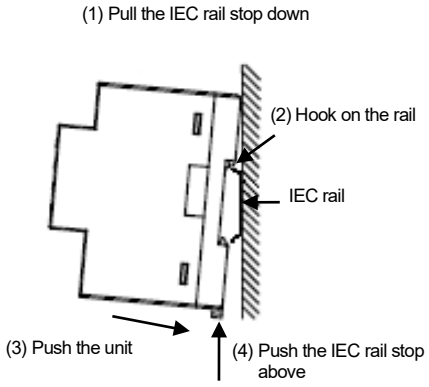
*In EcoMonitorPlus, connect to the base unit (model name: EMU4-BM1-MB/ EMU4-HM1-MB/ EMU4-LG1-MB/ EMU4-CNT-MB).

(1) How to mount to an IEC rail

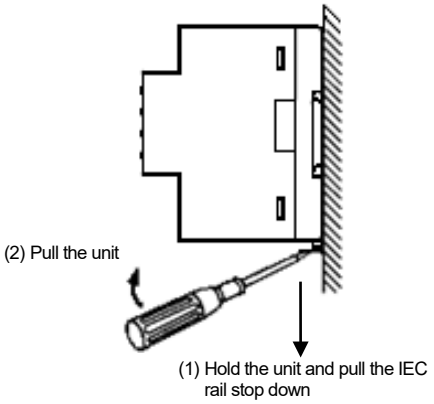
●Applicable IEC rail



●How to mount

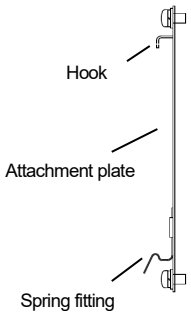


●How to remove

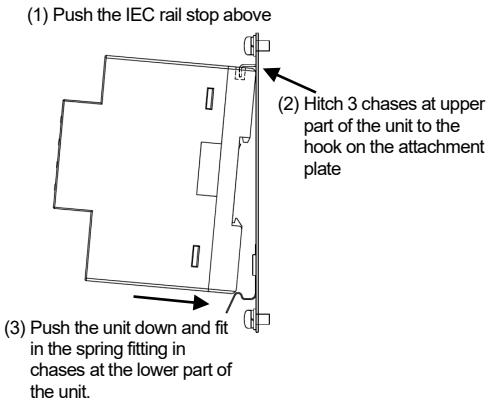


(2) JIS agreement type attachment

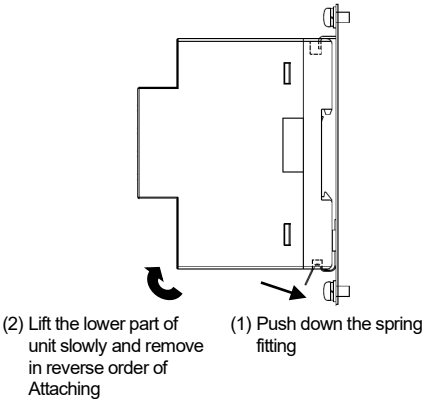
●Attachment plate



●How to mount



●How to remove

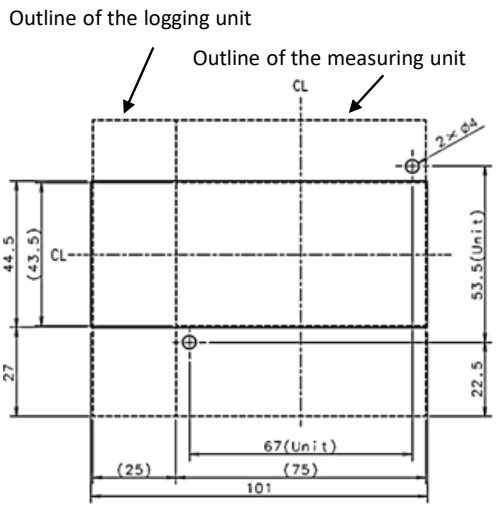


Panel mounting

(1) Screw mounting (Measuring unit)

* EcoMonitorLight only.

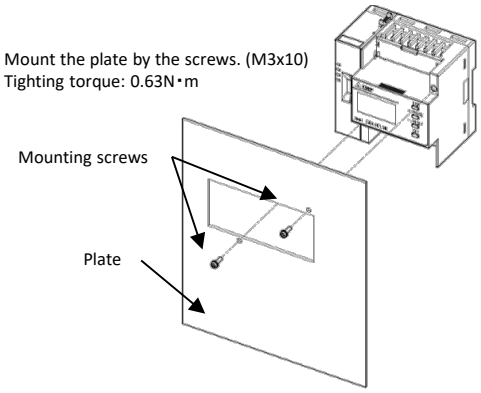
●Panel cut dimension (76×44.5)



* 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.

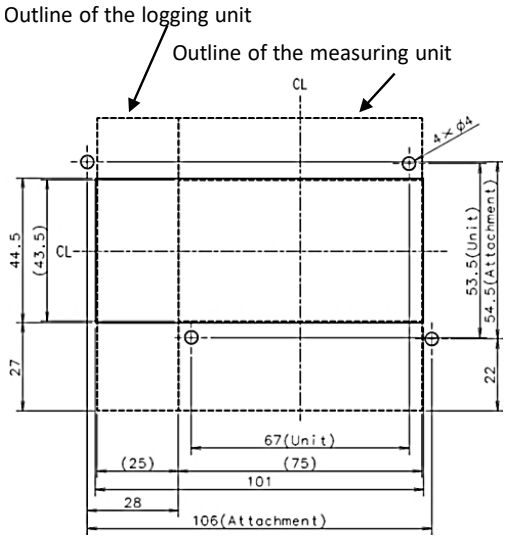
●How to mount



[Recommended mounting screw]
Cross recessed pan-head screw with captive spring or plain washer JIS B 1188 M3x10 2 screws

(2) Screw mounting (When using the attachment for panel mounting)

●Panel cut dimension (101×44.5)



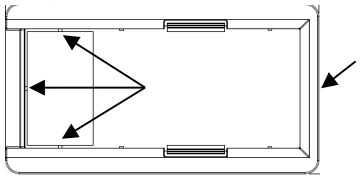
* Panel cut dimensions are made larger than the product considering tolerance in panel cut.

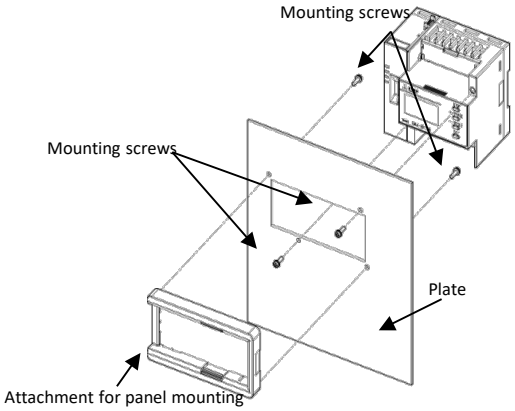
* If you want to prevent dust and other intrusion the gap of panel cut, cut the panel according to the product to be mounted.

●How to mount

Mount the plate by the screws (M3x10), then install the attachment on the plate.

Tighting torque: 0.63N・m





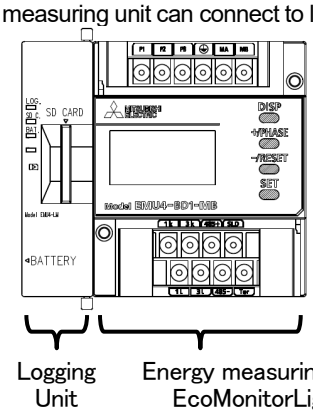
* Please screw up the panel mounting attachment where there are high levels of vibration.

* The screws (mounting screws and screws for panel mounting attachment) are supplied with panel mounting attachment.

6. The number of logging circuits and connected units

In the case of connect to EcoMonitorLight

Only 1 energy measuring unit can connect to logging unit. You can measure and logging 1 circuit .



In the case of connect to EcoMonitorPlus

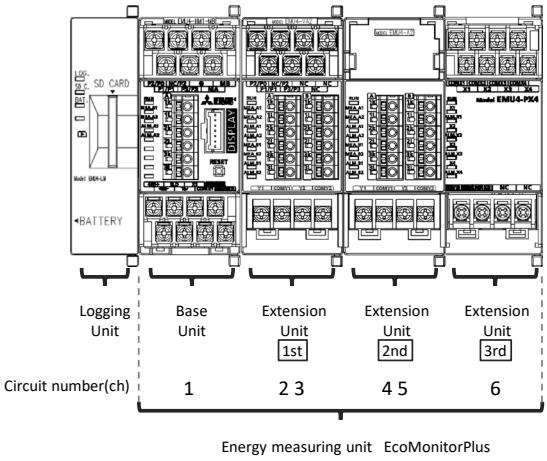
Max 4 energy measuring units can connect to logging unit.(1 Energy Measuring unit and Max 3 Expansion unit)
You can measure and logging Max 7 circuits.
The circuit number (ch) of each unit is determined by the sum of the number of occupied circuit IDs.

Unit kind	Name	Model	Occupied circuit ID number
Base unit	Energy Measuring Standard Model	EMU4-BM1-MB	1
	Energy Measuring High Performance Model	EMU4-HM1-MB	1
	Insulation Monitoring Model	EMU4-LG1-MB	1
	Contorol unit	EMU4-CNT-MB	1
Extension unit	Extension Model for Same Voltage System	EMU4-A2	2
	Extension Model for Different Voltage System	EMU4-VA2	2
	Extension Model for Pulse Input	EMU4-PX4	1
	Extension Model for Analog Input	EMU4-AX4	1

<Example>

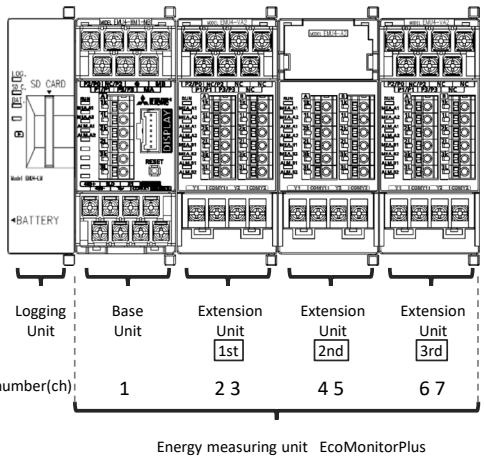
Example 1:

Unit kind	Model	Occupied circuit ID number
Base unit	EMU4-HM1-MB	1
Extension unit 1st	EMU4-VA2	2
Extension unit 2st	EMU4-A2	2
Extension unit 3st	EMU4-PX4	1



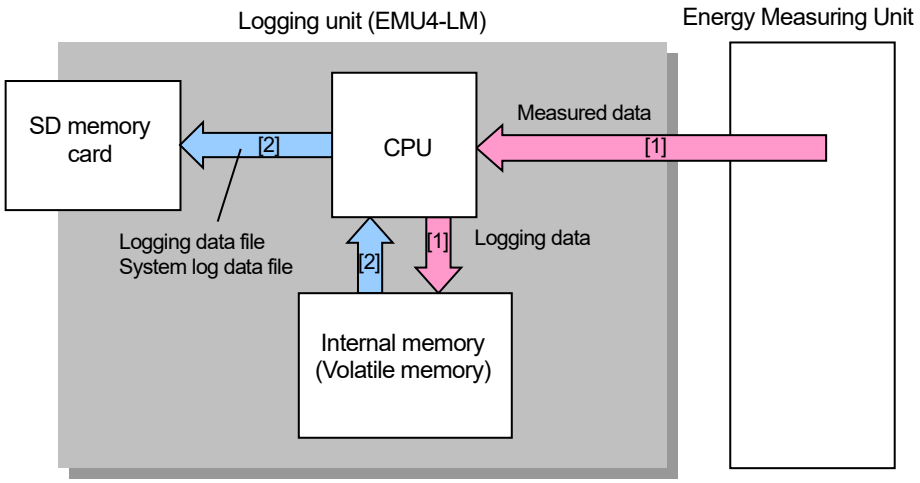
Example 2:

Unit kind	Model	Occupied circuit ID number
Base unit	EMU4-HM1-MB	1
Extension unit 1st	EMU4-VA2	2
Extension unit 2st	EMU4-A2	2
Extension unit 3st	EMU4-VA2	2



7. Operations

The following figure indicates the summery of operation of this unit.



<Summery of operation>

[1] This unit memorizes measured data acquired from the Energy Measuring Unit as logging data in the internal memory (volatile memory).
For details, refer to “Logging operation”. (☛Page 13)

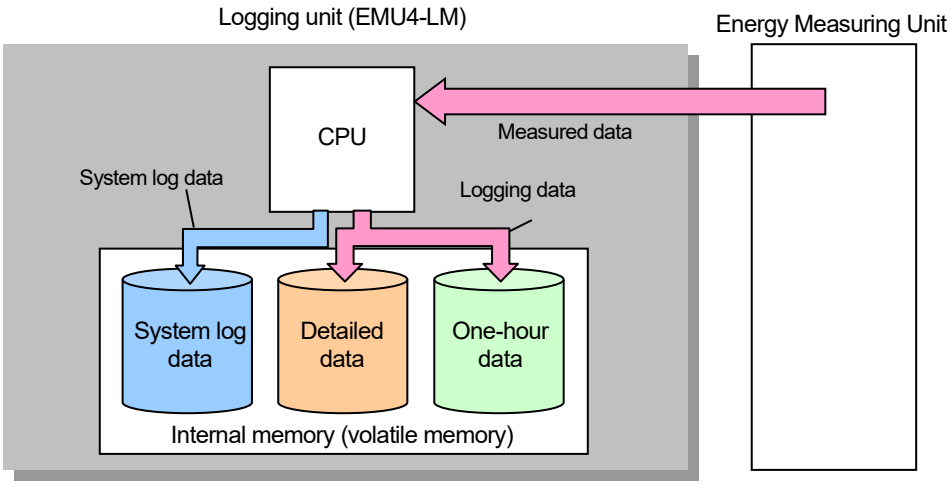
[2] This unit outputs logging data or system log data memorized in the internal memory (volatile memory) of the Logging Unit as logging data file or system log data file to the SD memory card.
※ For details, refer to “Logging data output”. (☛Page 16)

Logging operation

This unit memorizes measured data acquired from the Energy Measuring Unit as logging data in the internal memory as follows.

(1) Type of logging data

This unit memorizes measured data as both detailed data and One-hour data at the same time.
And this memorizes events occurred in the Logging Unit as system log data.



For the content of detailed data and One-hour data, refer to the next page.

<table>
<tr><th>Type of logging data</th><th>Features</th></tr>
<tr><td>Detailed data</td><td>・Memorize measured data in the specified “Detailed data logging cycle” (1 second, 1 minute, 5 minutes, 10 minutes, 15 minutes or 30 minutes).
・Memorizing time is as follows:
<table>
<tr><th>Detailed data logging cycle</th><th>Memorizing time</th></tr>
<tr><td>1 second</td><td>Every second</td></tr>
<tr><td>1 minute</td><td>Every minute</td></tr>
<tr><td>5 minutes</td><td>Every hour and 5, 10, 15, 20, 25, 30, 35, 40, 45, 50 and 55 minutes past the hour</td></tr>
<tr><td>10 minutes</td><td>Every hour and 10, 20, 30, 40 and 50 minutes past the hour</td></tr>
<tr><td>15 minutes</td><td>Every hour and a quarter, a half and three quarters past the hour</td></tr>
<tr><td>30 minutes</td><td>Every hour and a half past the hour</td></tr>
</table>
・This data is output to the SD memory card as detailed data file.</td></tr>
<tr><td>One-hour data</td><td>・Memorize measured data in a hour cycle.
・Memorizing time is every hour.
・This data is output to the SD memory card as One-hour data file and One-day data file.</td></tr>
</table>

(2) The number of logging items

This unit can set logging items by logging data type.

<table>
<tr><th>Type of logging data</th><th>The number of logging items</th></tr>
<tr><td>Detailed data</td><td>・Depend on the specified “Detailed data logging cycle”.
<table>
<tr><th>Detailed data logging cycle</th><th>The number of logging items</th></tr>
<tr><td>1 second</td><td>Up to 4 items</td></tr>
<tr><td>1, 5, 10, 15 and 30 minute(s)</td><td>Up to 10 items</td></tr>
</table>
・Settable logging items depend on the connected Energy Measuring Unit and setting.
Refer to “List of logging items”. (☛Page 45)</td></tr>
<tr><td>One-hour data</td><td>・Up to 10 items
・Settable logging items depend on the connected Energy Measuring Unit and setting.
Refer to “List of logging items”. (☛Page 45)</td></tr>
</table>

(3) Maximum logging period

Refer to “11.Specifications”.

*1 : The maximum logging period of this product depends on the number of circuits of the connected unit.

*2 : The maximum logging period differs between Detailed data and One-hour data.

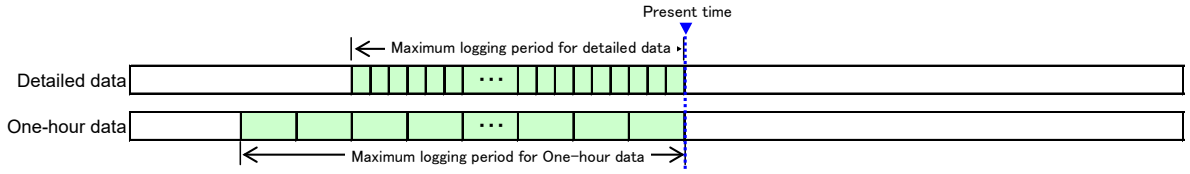
(4) Logging modes

The following logging modes are available. You can choose a suitable mode.

Logging mode	Features
Auto updating	・Logging operation starts right after the settings are finished. ・After memorable maximum logging period, the oldest data is erased to overwrite new one with the passing of time. ・LOG.LED is always on.
Date nomination	・Logging operation starts from the specified “Logging start time”. ・After maximum logging period, logging operation is stopped automatically. Stop time of logging operation of detailed data is different from that of one-hour because maximum logging period of detailed data is different from that of one-hour. ・LOG.LED turns on until the end of maximum logging period of One-hour data.

[Note] Logging operation is stopped when the Energy Measuring Unit is in the test mode.

◆ Auto updating



This unit store in the internal memory of the data logging period the from current time.
Data older than the maximum logging period is erased.

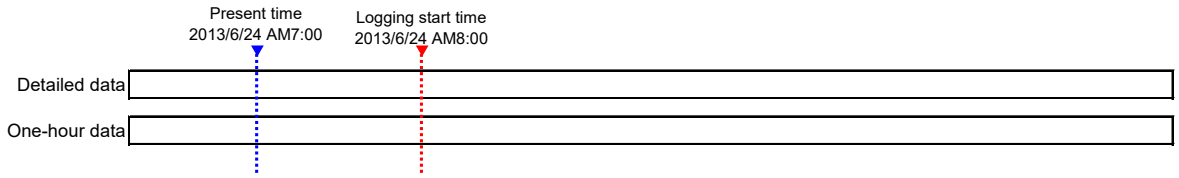
◆ Date nomination

【Example】

<Settings>

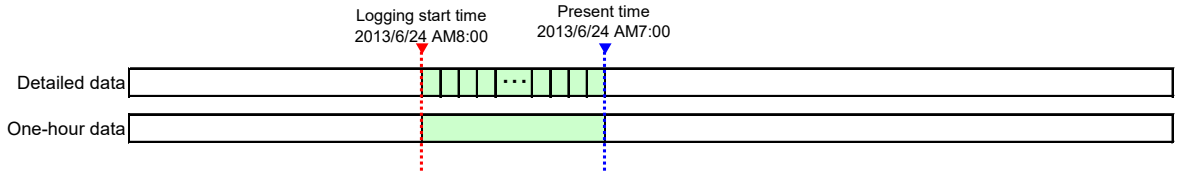
Detailed data logging cycle → 1 minute　　Logging start time → 2013/6/24 AM 8:00

① 2013/6/24 AM 7:00



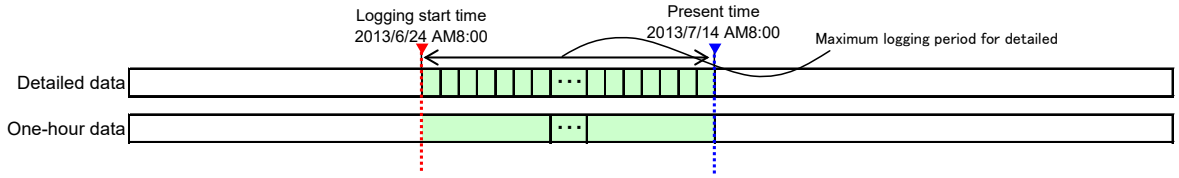
Logging operation is not started, current time has not passed the logging start time.

② 2013/6/24 AM 9:00



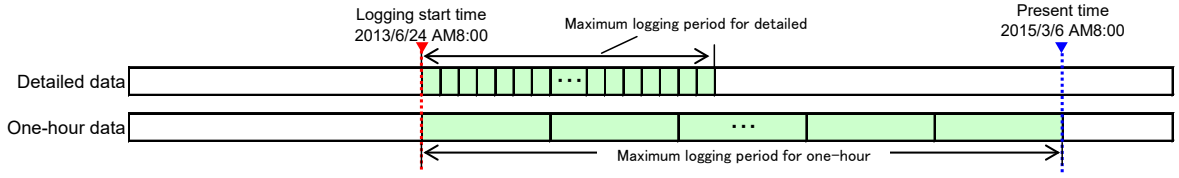
Logging operation is started, current time has passed the logging start time.

③ 2013/7/14 AM 8:00



Detailed data logging operation is stopped, current time has passed the maximum logging period for detailed data.
One-hour data logging operation is continued.

④ 2015/3/6 AM 8:00



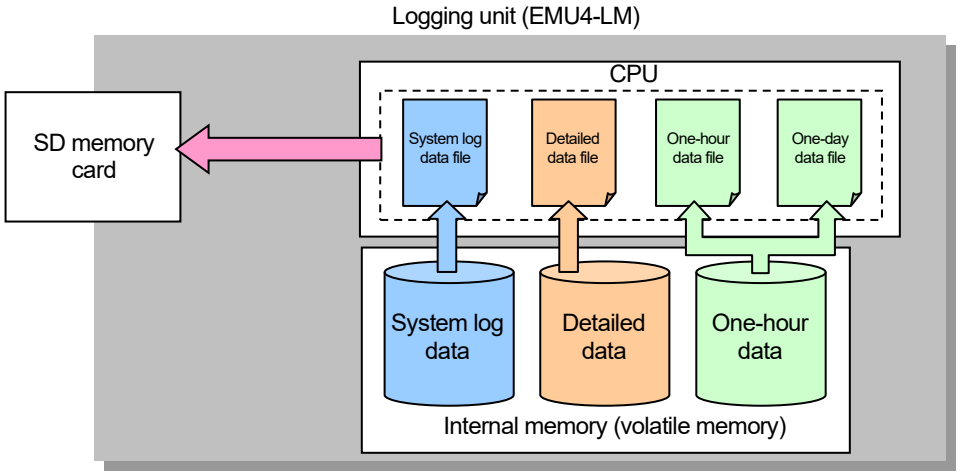
One-hour data logging operation is stopped, current time has passed the maximum logging period for One-hour data.

Logging data output

This unit outputs logging data and system log data memorized in the internal memory to the SD memory card in CSV format as follows.

(1) Type of output data file

This unit outputs logging data files and system log data files to the SD memory card.
For the detailed specifications of each data file, refer to “CSV file specifications”. (☛Page 18)



Type of data file		Features
Logging data file		—
	Detailed data file	・This file is made based on detailed data. ・Every file acquires data in every specified “Detailed data logging cycle” for the following period. Detailed data logging cycle: 1 second → Data acquiring period per file: 1 hour Detailed data logging cycle: 1, 5, 10, 15 and 30 minute(s) → Data acquiring period per file: 1 day ・Integrated value is output as difference value between data acquired in every specified “Detailed data logging cycle”.
	One-hour data file	・This file is made based on One-hour data. ・Every file acquires data in one hour cycle (every hour) for one day. ・Integrated value is output as difference value between data acquired every hour. ・Data of every hour is output as instantaneous data.
	One-day data file	・This file is made based on One-hour data. ・Every file acquires data in one day cycle (every 12:00 a.m.) for one month. ・Integrated value is output as difference value between data acquired every 12:00 a.m. ・Data of every 12:00 a.m. is output as instantaneous data.
System log data file		・Events occurred in this unit are output as system log data file. ・The unit outputs the events up to past 3600 records.

(2) Data file name and storage location

Logging data file and system log data file are output to the SD memory card with the following filenames.

Type of data file	Storage location			File name [Note 2]
	Logging ID folder [Note 1]	Type of data file folder	Year and month folder [Note 2]	
Logging data file	—	—	—	—
Detailed data file	—	—	—	—
One-second data	LOG***	1SEC	YYMM	SDDhh.CSV
One-minute data		1MIN	YYMM	01MDD.CSV
Five-minute data		5MIN	YYMM	05MDD.CSV
10-minute data		10MIN	YYMM	10MDD.CSV
15-minute data		15MIN	YYMM	15MDD.CSV
30-minute data		30MIN	YYMM	30MDD.CSV
One-hour data file		1HOUR		HYYMMDD.CSV
One-day data file		1DAY		DYYMM.CSV
System log data file				SYS_LOG.CSV
Setting data file				SET.CSV

[Note 1] For detailed data files, data acquired in specified "Detailed data logging cycle" is only output.
[Note 2] "***" indicates the logging ID (001 to 255) specified in this unit.
"YY" indicates the last two digits of the year CE (00 to 99).
"MM" indicates the month (01 to 12).
"DD" indicates the day (01 to 31).
"hh" indicates the hour (00 to 23).
[Note 3] Setting data file is not a data outputted from this unit. When you set the logging conditions, please save the setting data file in the above-mentioned position of the SD memory card.

(3) Output time of the data file

This unit outputs data files to the SD memory card in the following time.

Output time	Range of output data	
	Logging data file	System log data file
[1] When the SD memory card is inserted during operation	<If there are no logging data files in the SD memory card> ・The unit outputs all logging data in itself.	・The unit outputs all system log data in itself. If there is system log data file in the SD memory card, it is overwritten.
[2] When power turns on with the SD memory card inserted	<If there are some logging data files in the SD memory card> ・The unit outputs data after the latest of detailed data file, One-hour data file and One-day data file in the SD memory card. (Data of the latest data file is overwritten.) All logging data is output if the Logging Unit does not memorize data to write to the latest data file.	
[3] Every hour during operation with the SD memory card inserted	・The unit outputs data from next to previous output data to the present time.	

⚠**Caution**	・For above [1] and [2], if there is the logging data file with the same logging ID in the SD memory card, it is overwritten. Logging ID should be set if you acquire data of multiple Logging Units with one SD memory card. ・Make sure to use the SD memory card manufactured by Mitsubishi Electric Corporation (Model EMU4-SD2GB). Using the other types of the SD memory card may cause the trouble such as data destruction of the memory card or system failure. ・Format an SD memory card in the way specified in this manual. (Page 34) ・The write-protect switch of the SD memory card should be turned OFF to connect to the unit. If the write protect switch is "ON", the logging unit does not communicate with an SD memory card.

CSV file specifications

(1) CSV file format

The file format of logging data file and system log data file is as follows:

Item	Code
Delimiter	Comma (,)
Linefeed code	CR+LF (0x0D、0x0A)
Character code	ASCII

(2) Logging data file specifications

Specifications of logging data file which this unit outputs are as follows:

	Column	Column	Column 3	Column 4	Column 5	Column 6		Column 20	
File information row	[LOGGING]	YM_1	2	3	4	CR+LF			
Data type information row	DATETIME[YYYY/MM/DD hh:mm:ss]	INDEX	DOUBLE[DEC.0]	DOUBLE[DEC.1]	DOUBLE[DEC.2]	DOUBLE[DEC.1]	····	DOUBLE[DEC.1]	CR+LF
Data name row	TIME	INDEX	CH1 WH[kWh]	CH1 I[A]	CH1 V[V]	CH1 W[kW]	····	CH1 W[kW]	CR+LF
Data row (Head)	2012/11/22 01:00:00	1	999999	100.0	220.00	22000.0	····	22000.0	CR+LF
	2012/11/22 02:00:00	2	999999	100.5	220.01	22000.0	····	22000.0	CR+LF
	2012/11/22 03:00:00	3	999999	100.2	220.02	22000.0	····	22000.0	CR+LF
	2012/11/22 04:00:00	4	999999	100.1	220.03	22000.0	····	22000.0	CR+LF
	2012/11/22 05:00:00	5	999999	100.0	220.10	22000.0	····	22000.0	CR+LF
	2012/11/22 06:00:00	6	999999	100.0	220.50	22000.0	····	22000.0	CR+LF
	····	····	····	····	····	····	····	····	CR+LF
	2012/11/22 23:00:00	23	999999	100.2	220.00	22000.0	····	22000.0	CR+LF
(End)	2012/11/23 00:00:00	24	999999	100.0	220.62	22000.0	····	22000.0	CR+LF

(a) File information row

	Column name	Content of output	Size [Byte]
Column 1	File type	Output “[LOGGING]”.	9
Column 2	File version	Output “YM_1”.	4
Column 3	Number of “Data type information row”	Output “2”. This indicates what row “Data type information row” is.	1
Column 4	Number of “Data name row”	Output “3”. This indicates what row “Data name row” is.	1
Column 5	Number of “Data start row”	Output “4”. This indicates what row “Data start rows” start from.	1

(b) Data information row

	Column name	Content of output	Size [Byte]
Column 1	Date	Output “DATETIME[YYYY/MM/DD hh:mm:ss]”.	29
Column 2	Index	Output “INDEX”.	5
Column 3 ⋮ Column N	Data	Output “DOUBLE[DEC.digits*]”. *: “Digits” indicates the number of decimal places.	13

(c) Data name row

	Column name	Content of output	Size [Byte]
Column 1	Date	Output “TIME”.	4
Column 2	Index	Output “INDEX”.	5
Column 3 ⋮ Column N	Data	Output “CH1 Item*[Unit*]”. *: “Item” and “Unit” depend on the specified “Logging item”. Refer to “List of logging items”. (☛Page 45) *: For the correspondence between the connected unit and ch *, refer to "6. Model to be connected and number of logging circuits". (☛Page 12)	8 to14

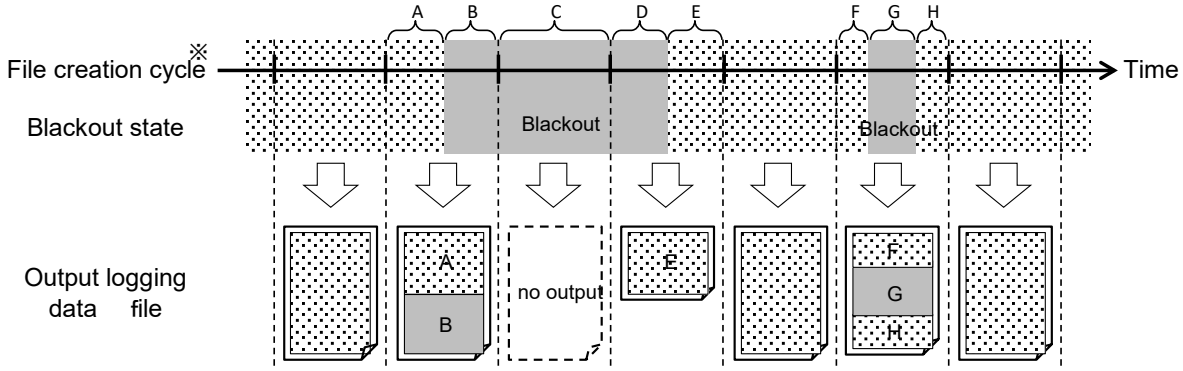
(d) Data row

	Column name	Content of output				Size [Byte]
Column 1	Date	Output the date. The output format of the date is “YYYY/MM/DD hh:mm:ss”. The number of rows is as follows:				21
		File type	Logging cycle	Data acquiring period per file	The maximum number of rows	
		Detailed data file	1 second	1 hour <Example> For the file of two o'clock. From 02:00:01 to 03:00:00	3600 rows	
			1 minute	1 day <Example> For the file of March 4 From Mar 4 00:01:00 to Mar 5 00:00:00	1440 rows	
			5 minutes	1 day <Example> For the file of March 4 From Mar 4 00:05:00 to Mar 5 00:00:00	288 rows	
			10 minutes	1 day <Example> For the file of March 4 From Mar 4 00:10:00 to Mar 5 00:00:00	144 rows	
			15 minutes	1 day <Example> For the file of March 4 From Mar 4 00:15:00 to Mar 5 00:00:00	96 rows	
			30 minutes	1 day <Example> For the file of March 4 From Mar 4 00:30:00 to Mar 5 00:00:00	48 rows	
		One-hour data file	1 hour	1 day <Example> For the file of March 4 From Mar 4 01:00:00 to Mar 5 00:00:00	24 rows	
		One-day data file	1 day	1 month <Example> For the file of December From Dec 1 to Dec 31	Between 28 and 31 rows (Depend on days in a month)	
Column 2	Index	Output the numerical value counted up from 1 in every file. Output “1” if there are losses of data, and count up from 1 for the following rows again.				1 to 4
Column 3 ⋮ Column N	Data	Output measured data. For integrated values, output data is as follows: ・Detailed data and One-hour data: Difference value between the value at the time indicated in the date column and the previous one ・One-day data: Difference value between the value at the time indicated in the date column and the next one If there are losses of data caused by power outage etc., columns for the data become blanks.				0 to 9

<Logging data file output contents at the time of the blackout outbreak>

Show below logging data file (detailed data file /1 hour data file /1 day data file) output contents at the time of the blackout outbreak.

(a) Logging data file output composition (detailed data file / 1 hour data file /1 day data file common)



* The data period of one file is shown. A file creation cycle changes with classification of a logging data file. Refer to the "Type of output data flie" for a file creation cycle.(☛ Page.16)

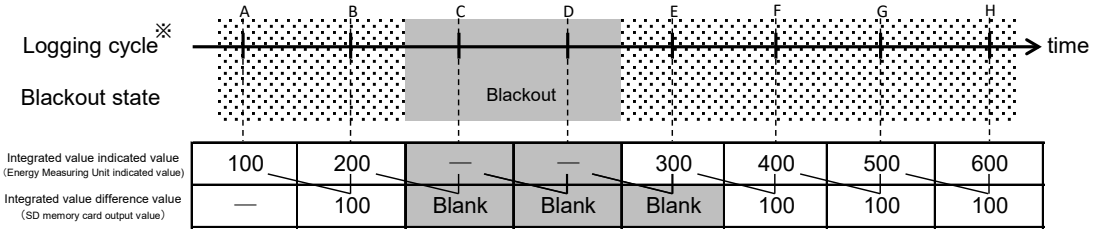
The contents of an output of PeriodA ~ H are shown below.

《Output constitution》

Period A・・・・All the time of a data line, the indexes, and data are outputted.
Period B・・・・Data becomes blank although the time and the index of a data line are outputted.
Period C・・・・A logging data file is not outputted.
Period D・・・・All the time of a data line, the indexes, and data are not outputted.
Period E・・・・All the time of a data line, the indexes, and data are outputted.
Period F・・・・All the time of a data line, the indexes, and data are outputted.
Period G・・・・Data becomes blank although the time and the index of a data line are outputted.
Period H・・・・All the time of a data line, the indexes, and data are outputted.

(b) The contents of an output of an integrated value

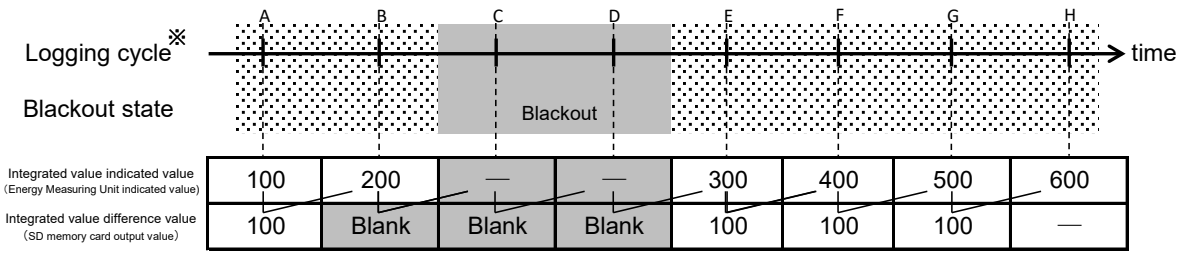
【Detailed data file / 1-hour data file】



* The logging cycle of detailed data differs with set-up "detailed data-logging cycles." The logging cycle of 1 hour data serves as fixation for 1 hour.

The integrated value of a detailed data file and a 1-hour data file turns into a difference value with a value the data which the time of a data line shows, and last value.Therefore, the data of the timing C, D, and E which cannot take difference becomes blank.

【One day data file】

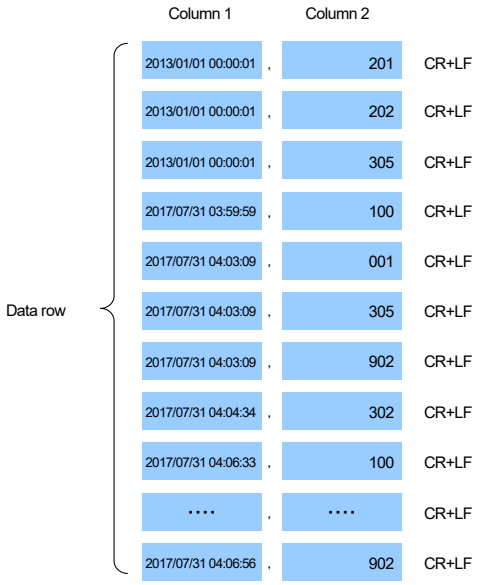


* The logging cycle of one day data will be fixation on the one day .

The integrated value of an one-day data file turns into a difference value with a value the data which the time of a data line shows, and next value. Therefore, the data of the timing B, C, and D which cannot take difference becomes blank.

(3) System log data file specifications

Specifications of system log data file which this unit outputs are as follows:



(a) Content of output

	Column name	Content of output	Size [Byte]
Column 1	Date	Output the time of event occurrence. The output format of the date is "YYYY/MM/DD hh:mm:ss". The number of rows is up to 3600.	21
Column 2	Data	Output a three-digit system log code. For system log codes, refer to "List of system log codes". (☛Page 55)	3

(4) Setting data file specifications

Specifications of setting data file used for setting logging conditions are as follows:

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7					
Basic setting row	00	2012	12	20	16	12	01	CR+LF				
Spare row 1 Logging row	0701	0501	0101	0D01	8001	····	0000	0000	····	0000	CR+LF	
Spare row 2 Logging row	0701	0501	0101	0D01	8001	····	0000	0000	····	0000	CR+LF	
Spare row 3 Logging row	0701	0501	0101	0D01	8001	····	0000	0000	····	0000	CR+LF	
Spare row 4 Logging row	0701	0501	0101	0D01	8001	····	0000	0000	····	0000	CR+LF	
Spare row 5 Logging row	0701	0501	0101	0D01	8001	····	0000	0000	····	0000	CR+LF	
Spare row 6 Logging row	0701	0501	0101	0D01	8001	····	0000	0000	····	0000	CR+LF	
Spare row 7 Logging row	0701	0501	0101	0D01	8001	····	0000	0000	····	0000	CR+LF	
	Column 1	Column 2	Column 3	Column 4	Column 5	····	Column 10	Column 11	....	Column 20		

(a) Basic setting row (row 1)

<table>
<tr><th></th><th>Column name</th><th>Content</th><th>Size [Byte]</th></tr>
<tr><td>Column 1</td><td>Logging mode</td><td>This indicates a logging mode.
The input value for each logging mode is as follows:<table><tr><th>Logging mode</th><th>Input value</th></tr><tr><td>Auto updating</td><td>00</td></tr><tr><td>Date nomination</td><td>01</td></tr></table></td><td>2</td></tr>
<tr><td>Column 2</td><td>Logging start time (Year)</td><td>This indicates the year of logging start time. This is invalid when the logging mode is “Auto updating (00)”.
Data range is from 2013 to 2099.</td><td>4</td></tr>
<tr><td>Column 3</td><td>Logging start time (Month)</td><td>This indicates the month of logging start time. This is invalid when the logging mode is “Auto updating (00)”.
Data range is from “01” to “12”.</td><td>2</td></tr>
<tr><td>Column 4</td><td>Logging start time (Day)</td><td>This indicates the day of logging start time. This is invalid when the logging mode is “Auto updating (00)”.
Data range is from “01” to “31”.</td><td>2</td></tr>
<tr><td>Column 5</td><td>Logging start time (Hour)</td><td>This indicates the hour of logging start time. This is invalid when the logging mode is “Auto updating (00)”.
Data range is from “00” to “23”.</td><td>2</td></tr>
<tr><td>Column 6</td><td>Logging start time (Minute)</td><td>This indicates the minute of logging start time. This is invalid when the logging mode is “Auto updating (00)”.
Data range is from “00” to “59”.</td><td>2</td></tr>
<tr><td>Column 7</td><td>Detailed data logging cycle</td><td>This indicates a detailed data logging cycle.
Input value for each detailed data logging cycle is as follows:<table><tr><th>Detailed data logging cycle</th><th>Input value</th></tr><tr><td>1 second</td><td>00</td></tr><tr><td>1 minute</td><td>01</td></tr><tr><td>5 minutes</td><td>02</td></tr><tr><td>10 minutes</td><td>03</td></tr><tr><td>15 minutes</td><td>04</td></tr><tr><td>30 minutes</td><td>05</td></tr></table></td><td>2</td></tr>
</table>

(b) Logging item row (Row 2 to 8)

<table>
<tr><th></th><th>Column name</th><th>Content</th><th>Size [Byte]</th></tr>
<tr><td>Column 1
⋮
Column 10</td><td>Detailed data logging items 1 to 10</td><td>These indicate group number and channel number of detailed data logging items. Refer to "List of logging items" for the group channel number of a logging items.(☛ Page 45)
《Example》 In the case of the electric power current price
Electric power current price Group number: 07,channel number:01
→input value:0701
Settable logging items depend on the connected Energy Measuring Unit. Refer to “List of logging items”. (☛Page 45)
Detailed data logging items 5 to 10 are invalid if the detailed data logging cycle is set to 1 second.
Please input 0000 (null) in all row of circuits that not used.</td><td>4</td></tr>
<tr><td>Column 11
⋮
Column 20</td><td>One-hour data logging items 1 to 10</td><td>These indicate group number and channel number of One-hour data logging items. Refer to " List of logging items " for the group channel number of a logging items.(☛ Page 45)
《Example》 In the case of consumption electric power
Consumption electric power Group number: 80,channel number:01
→input value:8001
Settable logging items depend on the connected Energy Measuring Unit. Refer to “List of logging items”. (☛Page 45)
Please input 0000 (null) in all row of circuits that not used.</td><td>4</td></tr>
</table>

8. Directions

Procedure for operation

Procedure for operation of this unit is as follows:

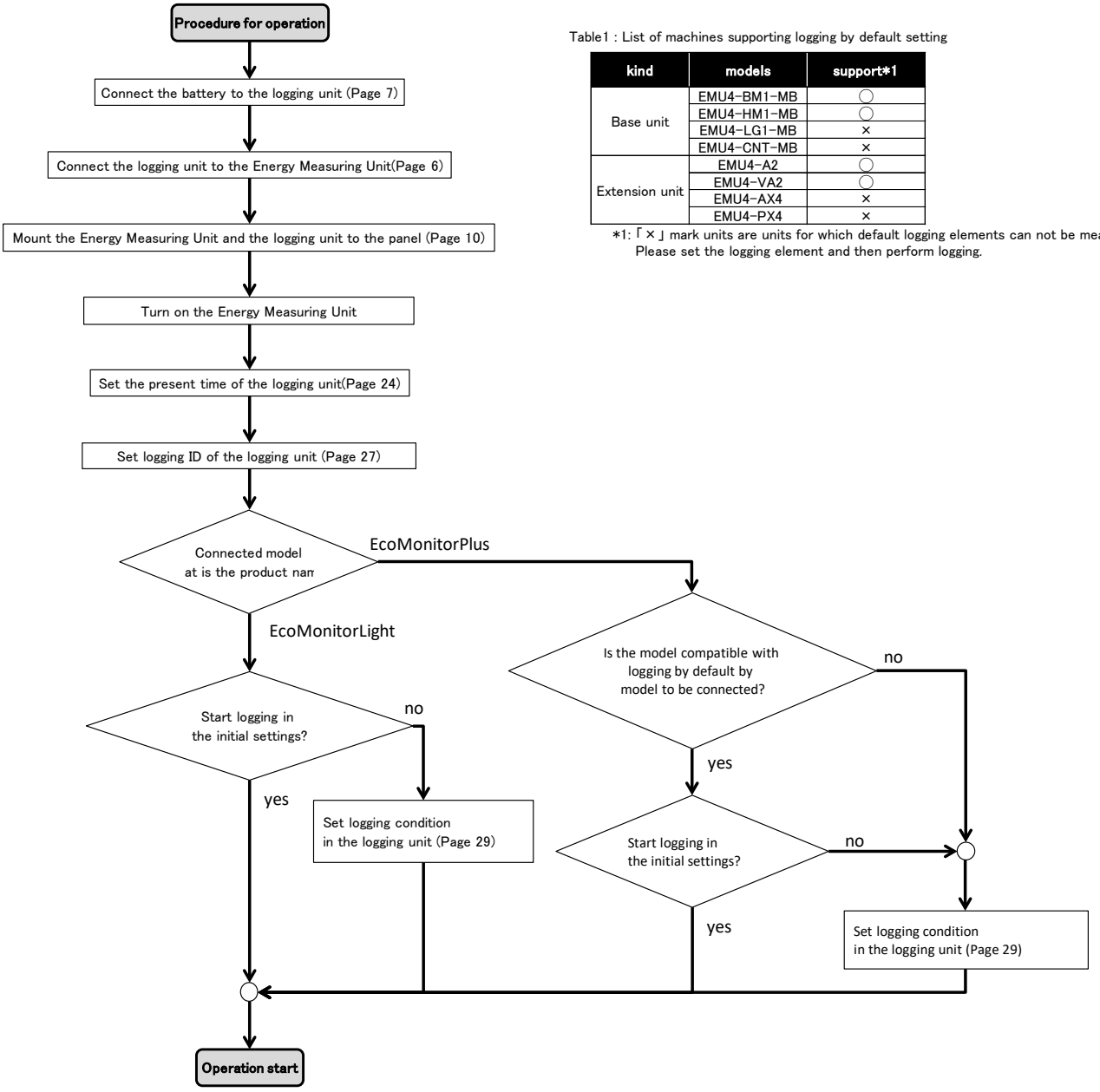


Table1 : List of machines supporting logging by default setting

kind	models	support*1
Base unit	EMU4-BM1-MB	○
	EMU4-HM1-MB	○
	EMU4-LG1-MB	×
	EMU4-CNT-MB	×
Extension unit	EMU4-A2	○
	EMU4-VA2	○
	EMU4-AX4	×
	EMU4-PX4	×

*1: 「×」mark units are units for which default logging elements can not be measur
Please set the logging element and then perform logging.

⚠Caution	・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.

Set the present time

You need to operate the Energy Measuring Unit to set the present time.

<For EMU4-BD1-MB , EMU4-HD1-MB and EMU4-FD1-MB>
Please setup by using Energy Measuring Unit. In Operating mode the following operations can be possible.

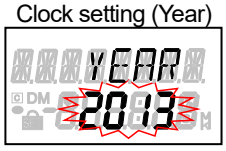
Date indication

push the DISP select the Date indication

*Caution: The date is not indicated in operating mode when the logging unit is not connected.

Press both + / PHASE and - / RESET at the same time for more than 2sec

Clock setting (Year)

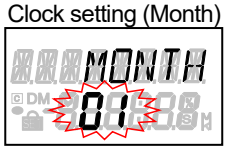


Set “Year”.

Setting range: 2000 to 2099

SET DISP

Clock setting (Month)

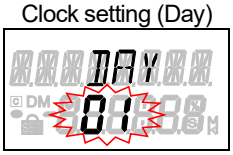


Set “Month”.

Setting range: 01 (January) to 12 (December)

SET DISP

Clock setting (Day)



Set “Day”.

Setting range: 01 to 31

SET DISP

Clock setting (Hour)

Set “Hour”.

Setting range: 00 to 23

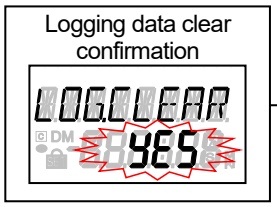
SET DISP

Clock setting (Minute)

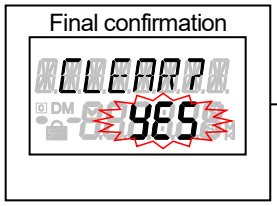
Set “Minute”.

Setting range: 00 to 59

SET DISP



SET DISP



Confirm logging data clear.

"no" ⟷ "YES"
(Do not clear data) (Clear data)

- If you do not clear logging data, choose "no" and press SET to enter date indication (operating mode).
- If you clear logging data, choose "yES" and press SET to transition to below setting.

Caution: If you choose "no" (i.e. do not clear data), the clock setting is not changed.

Confirm logging data clear finally.

"no" ⟷ "YES"
(Do not clear data) (Clear data)

- If you do not clear logging data, choose "no" and press SET to enter date indication (operating mode).
- If you clear logging data, choose "yES" and press SET to transition to below setting.

Caution: If you choose "no" (i.e. do not clear data), the clock setting is not changed.
If you choose "yES" (i.e. clear data) here, logging data is cleared, and at the same time, clock setting is changed.

[Note] In case the present time is changed during data output to the SD memory card, data output is stopped and logging data is cleared.

⚠**Caution**	After the present time is changed, logging data is initialized. Before changing setting, output the data to the SD memory card and check the output data in the PC whether the data is memorized properly.

< EcoMonitorPlus（EMU4-BM1-MB、EMU4-HM1-MB、EMU4-LG1-MB） >
Please setup by using Display unit. In Operating mode the following operations can be possible.

1 Transition to the setup mode		
Screen	Operation	Note
1-1. [Setup] 3 COM. 4 Logging 5 Clock ▲▼	(1) Push the ↵/PHASE key. (2) 1-1 will be displayed.	
	(1) Confirm that the cursor forcuses the “5 Clock”, push the ↵/PHASE key. (2) 2-1 sill be displayed.	

2 Clock Setup		
Screen	Operation	Note
2-1. [Clock] 2013/01/01 00:00 OK Cancel 2-2. Logging data will be cleared. OK Cancel	(1) In 2-1,Push the ▲ or ▼ key, and move the cursor to the “Year”. (2) Push the + or − key. Change the set value. (3) Push the ▼ key, and move the cursor to the “Month”. (4) Push the + or − key. Change the set value. (5) In a similar way, change the “Day”,“Hour”,“Minute”.Note 1[Note1] (6) After setting all of the items, push the ▲ or ▼ key, and move the cursor to the ”OK”. (7) Push the ↵/PHASE key, and clock setting changed.[Note2] (8) 2-2 will be displayed. (9) When to exit the clock setup, push the + or − key, and move the cursor to the ”OK”, and push the ↵/PHASE key. （If select the ”Cancel”, return to 1-1） (10) After completing the settings saving, and 1-1 will be displayed.	[Year]:**13**⇔14⇔15⇔**16**⇔17⇔…⇔99⇔ [Month]:**01**⇔02⇔03⇔04⇔…⇔12⇔ [Day]:**01**⇔02⇔…⇔29⇔30⇔31⇔ [Hour]:**00**⇔01⇔…⇔12⇔13⇔…23⇔ [Minute]:**00**⇔01⇔…⇔59⇔ Note 1 : The setting range of the day changes with setting in the year and the month. Note 2 : It becomes “00” second when the timing of pushing the ↵/PHASE key at the clock setup screen. Note 3 : The logging data stored in EMU4-LMis deleted if clock setting is changed. Measured data stored in SD card is not deleted.

*If you change a settings, please push the ↵/PHASE key and be sure to determine changes. If without determine, the changes will be discarded.
*The underline means the default of setting. After you have been set, even if a power failure occurs does not disappear setting.
*Setup value is stored in Logging unit (EMU4-LM).

*** If Time is changed in outputting to SD memory card. Stop the outputting data and clear the logging data.**

⚠**Caution**	Logging data is initialized when change the Time. Please change the setup after output to SD card and confirm logging data is stored correctly.

Set logging ID

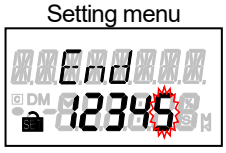
You need to operate the Energy Measuring Unit to set logging ID.

<For EMU4-BD1-MB , EMU4-HD1-MB and EMU4-FD1-MB>

From User 's Manual of Energy Measuring Unit in"Setting menu 5:Setting related to Logging Unit" set logging ID and clear logging data.

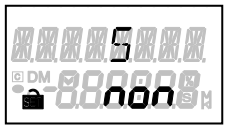
In operating mode, press both [SET] and [- / RESET] at the same time for more than two seconds to transition to setting mode and enable the following operations.

Setting menu



Choose the setting menu 5
(As shown in the left figure.)

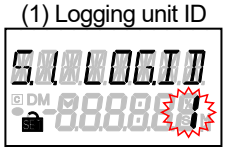
Caution: When the logging module is not connected, the display indicates "non" (as shown in the right figure) and go back to setting menu



("non" indication)

SET DISP

(1) Logging unit ID



Set the ID number of logging unit.

・Available ID: 1 to 255

SET DISP

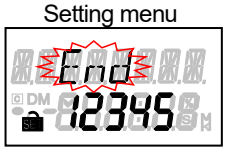
(2) Logging data clear confirmation

Clear the logging data.

No ⟷ YES
(Do not clear data) (Clear data)

SET DISP

Setting menu



Complete the setting .

For procedures for setting, "Energy Measuring Unit(ModelEMU4-BD1-MB , EMU4-HD1-MB , EMU4-FD1-MB)User's Manual (Details) "☛page 18

⚠Caution	・When set Setting menu 1-4, perform the end (choose "END" twice and shift to a operating mode) of a setting mode once, and, please go to the setting mode in a procedure to set Setting menu 5 after a shift again. (Set point of setting menu 5 cannot cool reflection definitely when do not set setting menu 5 in individual treatment.) ・In case there is the data with the same logging ID in the SD memory card, it may be overwritten. Logging ID should be set if you acquire data of multiple Logging Units with one SD memory card.

<For EcoMonitorPlus（EMU4-BM1-MB, EMU4-HM1-MB, EMU4-LG1-MB）>
Please setup by using Display unit. In Operating mode the following operations can be possible.

1 Transition to the setup mode.		
Screen	Operation	Note
1-1. [Setup] 2 I/O 3 COM 4 Logging	(1) Push the SETUP key in operation mode. (2) 1-1 will be displayed.	
	(1) Confirm that the cursor focuses the "4 Logging", and push the ↵/PHASE key. (2) 2-1 will be displayed.	

2 Setup the logging unit ID		
Screen	Operation	Note
2-1. [Logging] 1 ID 2 Data clear 0 Back	(1) In 2-1, Push the ▲ or ▼ key, and move the cursor to the "1 ID". (2) Push the ↵/PHASE key. (3) 2-2 will be displayed.	[ID]:**001**～255
2-2. [ID] 001	(1) Push the ▲ ▼ + − key , and change the logging unit ID. (2) Push the ↵/PHASE key. Confirm the setting value. (3) 2-1 will be displayed.	

3 Delete the logging data		
Screen	Operation	Note
3-1. [Logging] 1 ID 2 Data clear 0 Back	(1) In 3-1, push the ▲ or ▼ key, and move the cursor to the "2 Data clear" (2) Push the ↵/PHASE key. (3) 3-2 will be displayed.	
3-2. [Clear Logging data] OK Cancel	(1) Push the ▲ or ▼ key, and move the cursor toe the "OK". (2) Push the ↵/PHASE key, and confirm the setup value. (3) 3-1 will be displayed.	

4Save the settings		
Screen	Operation	Note
4-1. Quit Setup 1 Save 2 Not Save 3 Cancel	(1) After setting all of the items, push the SETUP key. (2) 3-1 will be displayed. (3) When save the settings, push the ▲ or ▼ key, move the cursor to the "1 Save", and Push the ↵/PHASE key. (4) After completing the settings saving, "Completed" message will be displayed. Push the ↵/PHASE key. (5) Return to the operation mode, and it will be displayed electric energy screen.	1 Save → Save settings and return to the operation mode. 2 Not Save → Discard the changes and return to the operation mode. 3 Cancel → Continue the setup.

*If you change a settings, please push the ↵/PHASE key and be sure to determine changes. If without determine, the changes will be discarded.
*The underline means the default of setting. After you have been set, even if a power failure occurs does not disappear setting.

⚠Caution	Logging data may be overwited when there area same ID in SD memory card. Please setup Logging ID in the case that logging multi data in a SD memory card.

Clear the Logging data

You need to operate the Energy Measuring Unit to clear logging data in the Logging Unit. For the operation, refer to "Set logging ID" (☛Page 27)

[Note]In case logging data is cleared during data output to the SD memory card, data output is stopped and logging data is cleared.

⚠Caution	If you need logging data in the Logging Unit, output the data to SD memory card and check the output data in the PC whether the data is memorized properly before clearing the data.

Set logging condition

There are two ways to set the logging condition as follows. Create a setting data file by either procedure and store the setting value in this product.

(1) When creating a setting data file using the logging unit utility

You can create setting data file by selecting setting values of logging elements etc in pull down menu.
For details of the setting method, refer to the owner's manual of the logging unit utility.
(Logging unit utility can be downloaded free from our web site

* The logging unit utility does not support The control unit (model name: EMU4-CNT-MB).

When logging the control unit data, create the setting data file by the method (2).

<Setting procedure for logging condition>

Step 1: Make a setting data file in the PC

Step 2: Save the setting data file on SD memory card in the PC

Step 3: Insert the SD memory card in the Logging Unit

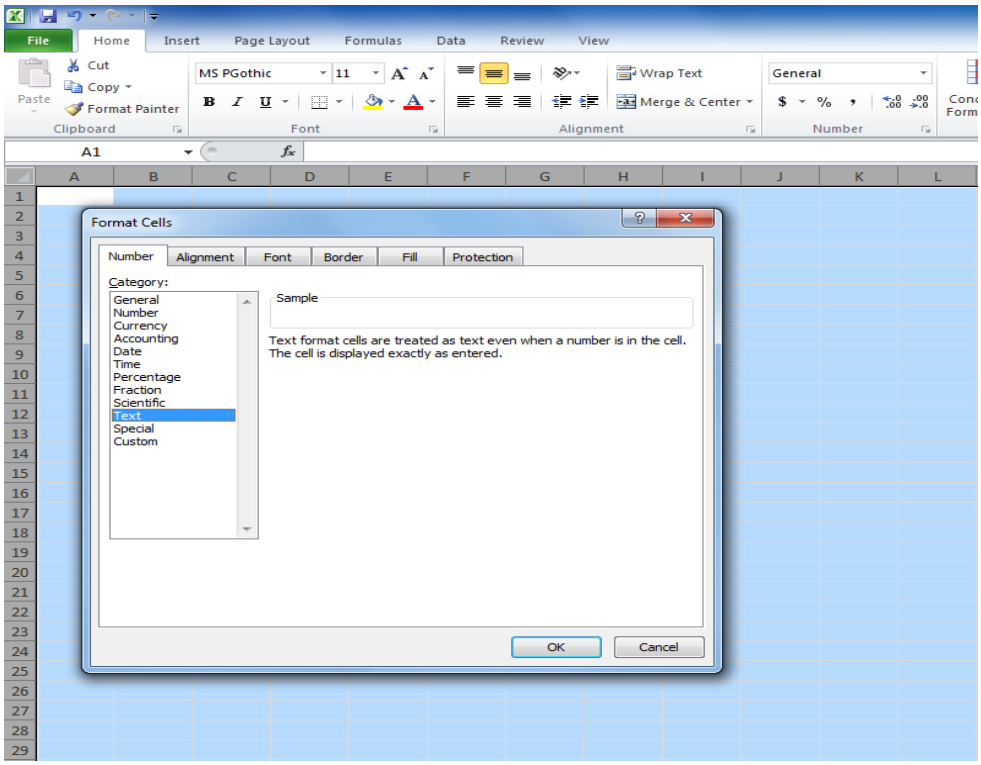
(2) When creating a setup data file using Microsoft Excel

Step 1: Make a setting data file in the PC

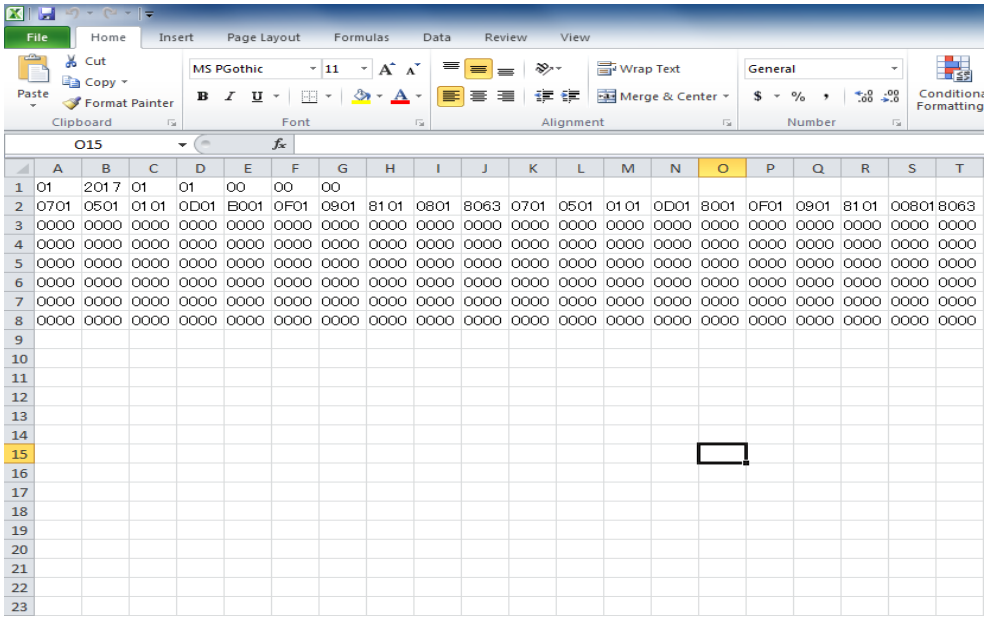
This manual explains how to make a setting data file by Microsoft Excel.

(a) Start up Microsoft Excel.

Select all cells, right-click to select [Format Cells...] or click [Format(O)] on the menu bar to select [Cell(E)]. In pop-up window, click [Number] tab to select “Text”.



(b) Input setting values according to setting data file specifications (☛Page 21).

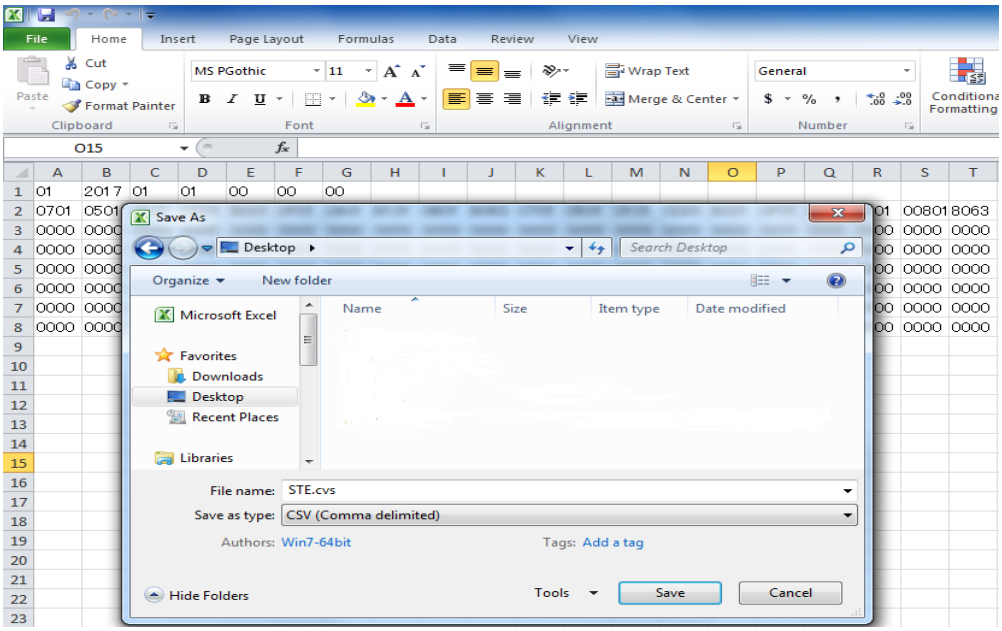


	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	01	2017	01	01	00	00	00													
2	0701	0501	0101	0D01	B001	0F01	0901	8101	0801	8063	0701	0501	0101	0D01	8001	0F01	0901	8101	00801	8063
3	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
4	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
5	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
6	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
7	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
8	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
9																				
10																				
11																				
12																				
13																				
14																				
15																				
16																				
17																				
18																				
19																				
20																				
21																				
22																				
23																				

The setting contents shown in the above figure are as follows:

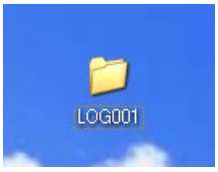
Setting item		Cell position		Setting value
		Row	Column	
Logging mode		Row 1	Column 1	Date nomination (01)
Logging start time	Year		Column 2	2017 (2017)
	Month		Column 3	January (01)
	Day		Column 4	1st (01)
	Hour		Column 5	0 (00)
	Minute		Column 6	0 (00)
Detailed data logging cycle			Column 7	1 miniute (01)
Circuit 1	Detailed data logging item 1	Row 2	Column 1	Present electric power (0701)
Circuit 1	Detailed data logging item 2		Column 2	Average voltage (Line voltage) (0501)
Circuit 1	Detailed data logging item 3		Column 3	Average current (0101)
Circuit 1	Detailed data logging item 4		Column 4	Present power factor (0D01)
Circuit 1	Detailed data logging item 5		Column 5	Consumed electric energy (8001)
Circuit 1	Detailed data logging item 6		Column 6	Frequency (0F01)
Circuit 1	Detailed data logging item 7		Column 7	Present reactive power (0901)
Circuit 1	Detailed data logging item 8		Column 8	Reactive energy (Consumption lag) (8101)
Circuit 1	Detailed data logging item 9		Column 9	Power demand (0801)
Circuit 1	Detailed data logging item 10		Column 10	Regenerated electric energy (8063)
Circuit 1	One-hour data logging item 1		Column 11	Present electric power (0701)
Circuit 1	One-hour data logging item 2		Column 12	Average voltage (Line voltage) (0501)
Circuit 1	One-hour data logging item 3		Column 13	Average current (0101)
Circuit 1	One-hour data logging item 4		Column 14	Present power factor (0D01)
Circuit 1	One-hour data logging item 5		Column 15	Consumed electric energy (8001)
Circuit 1	One-hour data logging item 6		Column 16	Frequency (0F01)
Circuit 1	One-hour data logging item 7		Column 17	Present reactive power (0901)
Circuit 1	One-hour data logging item 8		Column 18	Reactive energy (Consumption lag) (8101)
Circuit 1	One-hour data logging item 9		Column 19	Power demand (0801)
Circuit 1	One-hour data logging item 10		Column 20	Regenerated electric energy (8063)
Spare		Rows 3 to 8	Columns 1 to 20	Same setup value in upper

(c) Save data in the following format.
File name: **SET.CSV** (Note) Both capitals and lower-case letters are available for alphabet.
File format: **CSV (comma-delimited)**



Step 2: Save the setting data file on SD memory card in the PC

(a) Make a logging ID folder
Name of the logging ID folder is as follows:
Folder name: **LOG***** (***: Logging ID set to Logging Unit Range: 001 to 255)
[Note 1] Both capitals and lower-case letters are available for alphabet.
[Note 2] If the folder name is different from the logging ID set to the Logging Unit, the setting values are not read in to the unit.
<Example> When the logging ID is “1”, the folder should be named “LOG001”.



(b) Save the setting data file in logging ID folder.

(c) Save the logging ID folder with setting data file on the SD memory card.

Step 3: Insert the SD memory card in the Logging Unit

Insert the SD memory card described in Step 2 in the Logging Unit.
For inserting, refer to “How to insert and eject the SD memory card”. (☛Page 9)

For this operation, LOG.LED works as follows. When you change settings, make sure to check LOG.LED to confirm whether the settings are changed properly.

<If the settings are changed properly>
LOG.LED blinks slowly for 5 seconds (repetition of 0.5-second on and 0.5-second off).

<If the setting change is failed>
LOG.LED blinks quickly for 30 seconds (repetition of 0.25-second on and 0.25-second off).
Refer to “Error display and measures”. (☛Page 35)

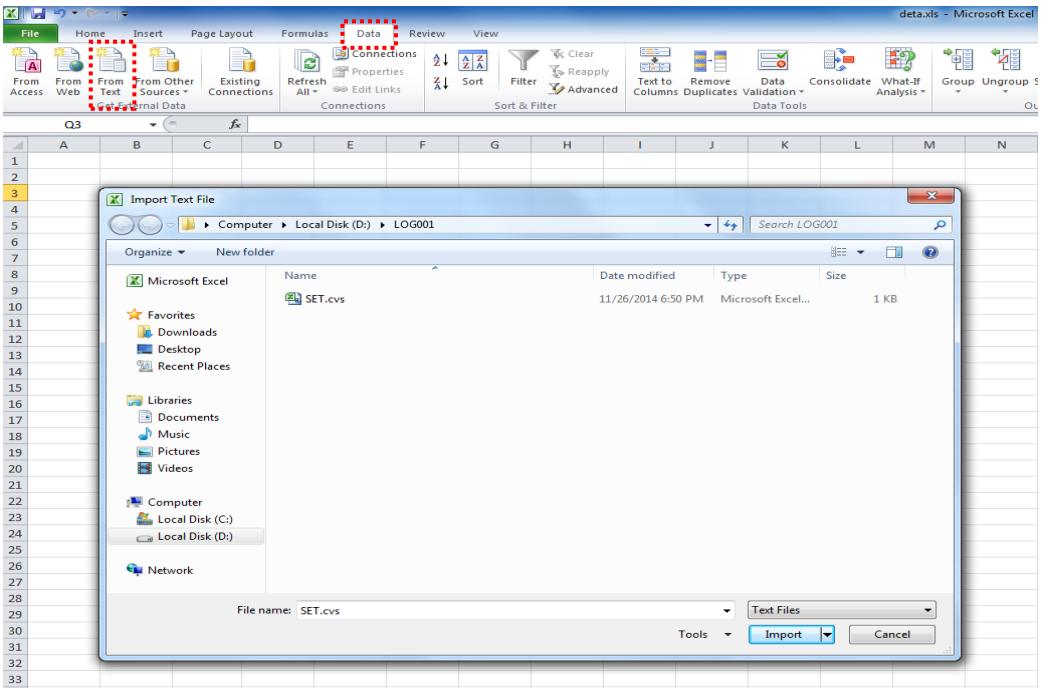
<If LOG.LED does not blink>
The same as the settings of the current situation, or the filename (SET), the file format (CSV) or storage location of the setting data file on the SD memory card may be wrong. Set again according to “Set the logging condition” (☛Page 29).

⚠Caution	・Format an SD memory card in the way specified in this manual. (☛Page 34) ・After logging condition is changed, logging data is initialized. Before changing settings, output logging data to the SD memory card and check the output data in the PC whether the data is memorized properly. ・After settings for the Energy Measuring Unit are changed, logging data is initialized. Before changing settings, output logging data to the SD memory card and check the output data in the PC whether the data is memorized properly.

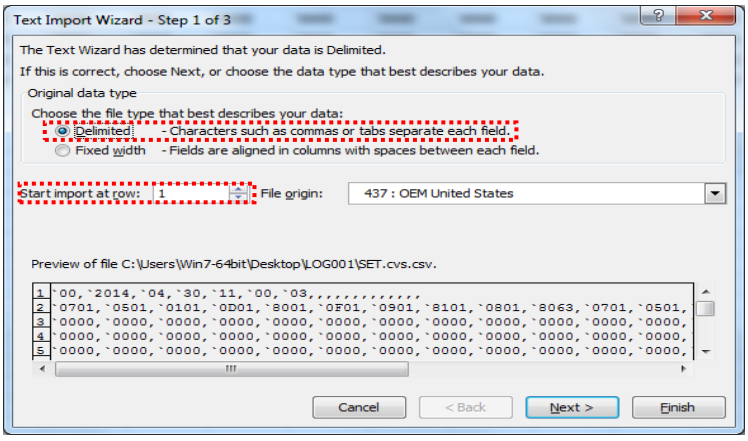
Open the configured data file which I made by Microsoft Excel again

Again, when opening the setting data file created once by Microsoft Excel, the following procedures perform it.

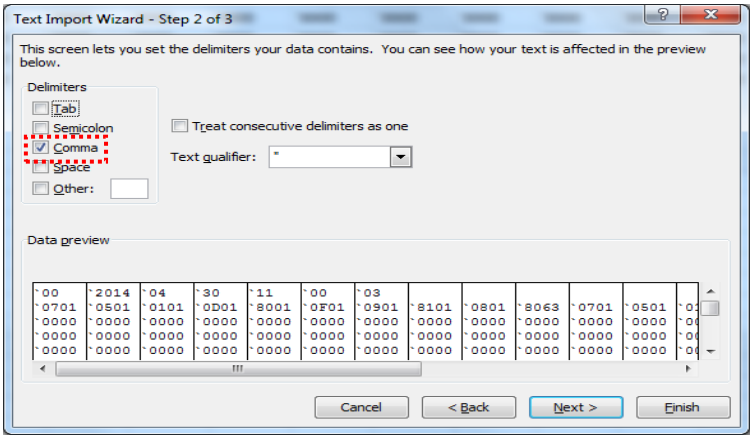
(a) Start up Microsoft Excel.
(b) [Data] choose[Text Files] among a tab.
(c) The created setting data file [SET.CSV] is chosen, push [import].



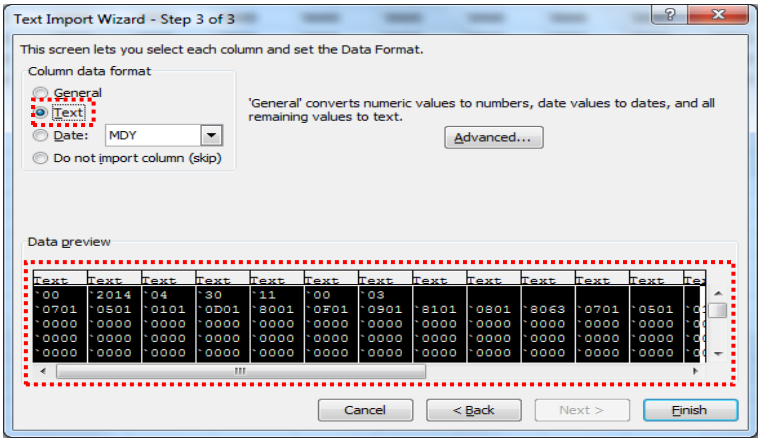
(d)Perform the following setting [Text Inpot Wizard - Step1or3]. push [Next].
- [Original data type]:[Delimited] chooses.
- [Start import at row]: It is set as [1].



(e)Perform the following setting [Text Inpot Wizard - Step2or3]. push [Next].
- [Delimiters]:check is put into [Comma] only.



(f)Perform the following setting [Text Inpot Wizard - Step3or3]. push [Finish].
- [Data preview]:choose all the sequences (shift+ sequence is chosen).
- [Column data format]:Check is put into [Text]. (Preview of data changes to [Taxt].)



Format the SD memory card

You should use the formatter designated by SD Association to format the SD memory card for this unit.
Download the SD formatter from the website of SD Association to format the SD memory card.

■ SD Association website
https://www.sdcard.org/jp/downloads/

⚠**Caution**	-Make sure to use the SD memory card manufactured by Mitsubishi Electric Corporation (Model EMU4-SD2GB). Using the other types of the SD memory card may cause the trouble such as data destruction of the memory card or system failure. -Format is done already as of the purchase, so a SD memory card made by Mitsubishi Electric Corporation (Model EMU4-SD2GB) has use just as it is, and is no problem.

Output logging data and system log data to the SD memory card

After inserting the SD memory card in this unit, the unit outputs logging data and system log data to the memory card automatically.
For inserting the SD memory card, refer to "How to insert and eject the SD memory card". (☛Page 9)
For details of output operation, refer to "Logging data output (3) Output time of data file". (☛Page 17)

<When inserting the SD memory card>
Data after the latest file in SD memory card is output.
If there is no data in the SD memory card, all logging data in the Logging Unit is output.

[Note 1] It takes about one hour to output data if the storage area of the Logging Unit is full of logging data.
Outputting logging data on a regular basis is recommended.
[Note 2] Output data size is up to 10MB if the storage area of Logging Unit is full of logging data.

<If the SD memory card is always inserted>
Logging data is output every hour.

[Note 1] If output data exceeds maximum capacity of the SD memory card, output operation is stopped automatically.
When output operation is stopped, SD C.LED blinks quickly (repetition of 0.25-second on and 0.25-second off).
Before the SD memory card is out of space, back up data in the memory card and format it.
[Note 2] Output file size of logging data file depends on specified "Detailed data logging cycle".
Maximum output file size for each detailed data logging cycle is as follows:

Number of circuit	Output file size						
	1 circuit	2 circuits	3 circuits	4 circuits	5 circuits	6 circuits	7 circuits
logging cycle:1s	6.5 MB/日	10 MB/日	13MB/日	17MB/日	20MB/日	23MB/日	27MB/日
logging cycle:1min	160 KB/日	320 KB/日	470KB/日	630KB/日	760KB/日	940KB/日	1.1MB/日
logging cycle:5min	35 KB/日	100KB/日	190KB/日	230KB/日	305KB/日	360KB/日	420KB/日
logging cycle:10min	20 KB/日	60KB/日	110KB/日	130KB/日	174KB/日	205KB/日	239KB/日
logging cycle:15min	15 KB/日	45KB/日	81KB/日	100KB/日	131KB/日	155KB/日	180KB/日
logging cycle:30min	10 KB/日	30KB/日	54KB/日	65KB/日	87KB/日	105KB/日	120KB/日

⚠**Caution**	・Make sure to use the SD memory card manufactured by Mitsubishi Electric Corporation (Model EMU4-SD2GB). Using the other types of the SD memory card may cause the trouble such as data destruction of the memory card or system failure. ・Format an SD memory card in the way specified in this manual. (☛Page 34) ・The write-protect switch of the SD memory card should be turned OFF to connect to the unit. If the write protect switch is "ON", the logging unit does not communicate with an SD memory card. ・During communication with the SD memory card, the operations such as power-off, reset and ejection of the memory card may cause data corruption of the memory card or failure of this unit or the memory card. Power off or reset the unit, or eject the SD memory card after checking that SD C.LED turns off.

9. Reference

This chapter explains the ways of dealing when you think the unit is in failure etc.

In case you think the unit is in failure

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

Error display and coping process

Errors of the Logging Unit are indicated in the following way.

<Indication ways of errors>
(a) Error display of the Energy Measuring Unit (EcoMonitorLight)
(b) Error display of the Display Unit(EMU4-D65) for Energy Measuring Unit (EcoMonitorPlus)
(c) System log codes of the system log data file
(d) LEDs of the Logging Unit

In case error is indicated, adopt measures indicated in the table below.
If the unit does not resume after measures, it may be in failure. Contact our sales representative near you.

*: When you logging the elements of the EcoMonitorPlus expansion unit (EMU4-A2, EMU4-VA2, EMU4-AX4, EMU4-PX4) unless set a logging elements, an error will be displayed (ALM A1(B1), ALM A2(B2) LED is turned ON, Error :00009 is displayed in small display unit).

Display of the Energy Measuring Unit or Display Unit	System log data file	LED of the Logging Unit	Kind of error	Measures
009	—	—	Communication module error Error is displayed on the measuring unit.（ALM A1(B1),ALM A2(B2) LED is turn on）	Please setup logging item. Some units are not setting logging items
901	941	SD C.LED blinks quickly	The write protect switch of the SD memory card is “ON”.	Turn the write protect switch if the SD memory card to “OFF” position. If the write protect switch is ON, the Logging Unit does not communicate with the SD memory card.
	942 to 951	—	SD memory card communication error	The SD memory card may be out of space or be formatted wrong. Format the SD memory card in the way specified in this manual.(☛ Page 34) * The following models do not support logging with the default setting, so this error will occur if you connect without setting. EcoMonitorPlus ・models:EMU4-LG1-MB ・models:EMU4-AX4 ・models:EMU4-PX4
902	902	—	Measured items which the Energy Measuring Unit cannot measure are set as logging item.	Reconfigure logging condition. Measured items which the Energy Measuring Unit cannot measure are set as logging item.
903	903	LOG. LED blinks quickly	FRAM error	Turn on the auxiliary power again.
904	—	LOG. LED blinks quickly	SRAM error	
905	905	LOG. LED blinks quickly	RTC error	Turn on the auxiliary power again. Then reconfigure the present time in the Energy Measuring Unit.
906	906			
907	907	LOG. LED blinks quickly (for 30 sec.)	Failure of logging setting	Specifications of the setting data file may be incorrect or data may be out of range specified in this manual. Check the contents of the setting data file again.
912	912	LOG. LED blinks quickly	Communication error between units	Turn on the auxiliary power again.

After-sales service

If you have any questions or the product is broken down, contact our sales representative near you. (For details, please see at the end of this manual.)

- Gratis 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.
- Repair shall be charged for the following cases even during the gratis warranty period.
  - Failures occurring due to your improper storage or handling, carelessness or fault
  - Failures due to faulty workmanship
  - Failures due to faults in use and undue modification
  - Failures due to accidental force such as a fire, abnormal voltage, etc. and force majeure such as an earthquake, wind, flood, etc.
  - Failures due to matters unpredictable based on the level of science technology at the time of product
- 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.

10. Requirement for the compliance with EMC Directives

EMC Directives prescribe both “Emission (electromagnetic interference): Do not radiate strong electromagnetic waves outside” and “Immunity (electromagnetic susceptibility): Do not be influenced by electromagnetic waves from outside”.
This section compiles the precautions for the compliance of the system incorporating the Logging Unit (EMU4-LM), the Energy Measuring Unit (target model: EMU4-BD1-MB , EMU4-HD1-MB , EMU4-FD1-MB , EMU4-BM1-MB , EMU4-HM1-MB , EMU4-LG1-MB, EMU4-CNT-MB, EMU4-A2,EMU4-VA2) and SD memory card (EMU4-SD2GB) with the EMC Directives. The following description is based on the requirement of the regulations and the standards we understand, but we do not guarantee to comply with the directives above for the whole system built in accordance with this description.
The manufacturer of the system finally needs to evaluate the way of the compliance with EMC Directives and whether the system complies with them or not.

(1) Harmonized standard for EMC Directives: EN61326-1:2006
  (a) Compatibility condition for harmonized standard
    The Energy Measuring Unit is the open type device (i.e. the device incorporated in other device), and needs to be installed in the conductive control panel.
    The unit is tested with installed in the control panel for the emission and the immunity out of the test items for the standard.

(2) Recommended condition for installation in the control panel
  (a) Control panel
    - Control panel needs to have conducting property.
    - When bolting the top panel, bottom panel etc. of the control panel, mask the grounding part of the panel so as not to be painted.
    - In inner panel, keep the conductivity in as large area as possible by masking the bolting part to the main panel to keep the electric contact to main panel.
    - Ground the main panel by the thick wire so as to keep high impedance even for high-frequency wave.
  (b) Installation of power line and ground line
    - Set up the ground point to the control panel near the power unit, and ground the Frame GND terminal of the unit to the ground terminal of the control panel (PE) by as thick and short wires as possible (wire length is 30cm or shorter).

(3) SD memory card
  The SD memory card is complied with EN61326-1:2006 if it is manufactured by Mitsubishi Electric corporation (Model EMU4-SD2GB).

11. Specifications

<Basic specifications>

Item			Specifications
Model			EMU4-LM
Rating			DC6.4V (powered by the Energy Measuring Unit)
Compensation for power failure			Battery (EMU4-BT) Total time of compensation is 1 year (average daily temperature is not more than +35°C). It is recommended that the battery is changed every 3 years.
	Setting values		Memorized in FRAM (nonvolatile memory) The data is not erased during power failure.
	Logging data System log data		Memorized in SRAM (volatile memory) Data is erased if power failure occurs under low battery voltage condition (BAT.LED turns on).
	Timing		Timing is stopped if power failure occurs under low battery voltage condition (BAT.LED turns on). After power recovery, timing is started from Jan 1, 2013 00:00:00.
Clock accuracy			1 minute per month
Memory media for data output [Note 1]			SD memory card (SD, SDHC)
Accommodating model			Energy Measuring Unit EcoMonitorLight (Model: EMU4-BD1-MB, EMU4-HD1-MB, EMU4-FD1-MB) EcoMonitorPlus (Model: EMU4-BM1-MB, EMU4-HM1-MB, EMU4-LG1-MB, EMU4-CNT-MB, EMU4-A2, EMU4-VA2, EMU4-PX4, EMU4-AX4)
Standard			EMC: EN-61326-1: 2006
Usage environment		Operating temperature	-5°C to +55°C (average daily temperature is not more than+ 35°C)
		Operating humidity	30% to 85%RH (No condensation)
		Storage temperature	-10°C to +60°C
		Operating altitude	2000m or lower
Mass			0.1kg (Mass of the Logging Unit only)
External dimensions (Unit: mm)			25(W) x 99(H) x 60(D) (Dimension of the Logging Unit only) (Maximum dimension including the protruding portions: 31.6 (W) x 99 (H) x 60 (D)) *Please secure a space under the logging unit to replace the battery.
Optional part			SD memory card (EMU4-SD2GB) [Note 1] [Note 2]
Optional supplies			Battery (EMU4-BT) [Note 2]

[Note 1] Make sure to use the SD memory card manufactured by Mitsubishi Electric Corporation (Model EMU4-SD2GB). Using the other types of the SD memory card may cause the trouble such as data destruction of the memory card or system failure. For the SD memory card on the market, please refer to the Sales and Service No.YAMA192 from our site. However, at the time of use, please verify sufficient by the customer that there is no problem.

[Note 2] For purchase of optional parts or supplies, contact the shop you bought this product.

<Logging specifications>

<table>
<tr><th colspan="2">Item</th><th>Specifications</th></tr>
<tr><td rowspan="2">Logging mode</td><td>Auto updating</td><td>Auto overwriting updating</td></tr>
<tr><td>Date nomination</td><td>Auto start and stop by start time setting</td></tr>
<tr><td rowspan="2">Type of logging data</td><td>Detailed data</td><td>Memorize measured data in the specified “Detailed data logging cycle” (1 second, 1 minute, 5 minutes, 10 minutes, 15 minutes or 30 minutes).
Data is output as detailed data file.</td></tr>
<tr><td>One-hour data</td><td>Memorize measured data in one-hour cycle.
Data is output as One-hour data file and One-day data file.</td></tr>
<tr><td rowspan="2">The number of logging items</td><td>Detailed data</td><td>If the detailed data logging cycle is “1 second”: Up to 4 items
If the detailed data logging cycle is not “1 second”: Up to 10 items</td></tr>
<tr><td>One-hour data</td><td>Up to 10 items</td></tr>
<tr><td rowspan="2">Internal memory logging period</td><td>Detailed data</td><td>
<table>
<tr><th colspan="8">Maximum logging period</th></tr>
<tr><th>Number of expansion</th><th>1 Circuit</th><th>2 Circuit</th><th>3 Circuit</th><th>4 Circuit</th><th>5 Circuit</th><th>6 Circuit</th><th>7 Circuit</th></tr>
<tr><td>Logging cycle: 1 sec</td><td>20hour</td><td colspan="2">6hour</td><td colspan="2">3hour</td><td colspan="2">2hour</td></tr>
<tr><td>Logging cycle: 1 min</td><td>20days</td><td colspan="2">6days</td><td colspan="2">3days</td><td colspan="2">2days</td></tr>
<tr><td>Logging cycle: 5 min</td><td>100days</td><td colspan="2">30days</td><td colspan="2">15days</td><td colspan="2">10days</td></tr>
<tr><td>Logging cycle: 10 min</td><td>200days</td><td colspan="2">60days</td><td colspan="2">30days</td><td colspan="2">20days</td></tr>
<tr><td>Logging cycle: 15 min</td><td>300days</td><td colspan="2">90days</td><td colspan="2">45days</td><td colspan="2">30days</td></tr>
<tr><td>Logging cycle: 30 min</td><td>600days</td><td colspan="2">180days</td><td colspan="2">90days</td><td colspan="2">60days</td></tr>
</table>
</td></tr>
<tr><td>One-hour data</td><td>
<table>
<tr><th colspan="8">Maximum logging period</th></tr>
<tr><th>Number of expansion</th><th>1 Circuit</th><th>2 Circuit</th><th>3 Circuit</th><th>4 Circuit</th><th>5 Circuit</th><th>6 Circuit</th><th>7 Circuit</th></tr>
<tr><td></td><td>620days</td><td colspan="2">186days</td><td colspan="2">93days</td><td colspan="2">62days</td></tr>
</table>
</td></tr>
<tr><td rowspan="2">SD memory card (2GB)</td><td>Logging period [Note 3]</td><td>
<table>
<tr><th>Number of expansion</th><th>1 Circuit</th><th>2 Circuit</th><th>3 Circuit</th><th>4 Circuit</th><th>5 Circuit</th><th>6 Circuit</th><th>7 Circuit</th></tr>
<tr><td>Logging cycle : 1sec</td><td>about 10month</td><td>about 6month</td><td>about 5month</td><td>about 4month</td><td>about 3month</td><td>about 2month</td><td>about 2month</td></tr>
<tr><td>Logging cycle : 1min</td><td>over 10years</td><td>over 10years</td><td>over 10years</td><td>about 8years</td><td>about 6years</td><td>about 5years</td><td>about 4years</td></tr>
<tr><td colspan="8">Logging cycle : 5,10,15,30min → over 10 years</td></tr>
</table>
</td></tr>
<tr><td>Control number</td><td>Up to 255.
By using a SD memory card, multiple data can be saved on the SD memory card[Note 4]</td></tr>
<tr><td colspan="2">System log data</td><td>3600 records</td></tr>
<tr><td colspan="2">Output format of logging data and system log data</td><td>CSV format (ASCII)</td></tr>
</table>

[Note 3] It is the period until capacity of 2GB SD memory card is filled in always-on connection. Data amount depends on the number of characters. It is the logging period when data is output in maximum volume.

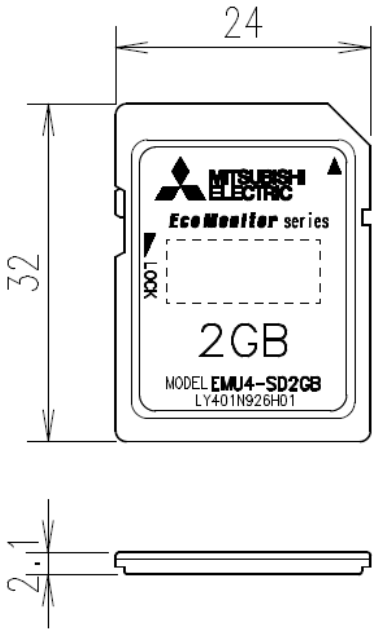
[Note 4] If there is the logging data file with the same logging ID in the SD memory card, it is overwritten. Logging ID should be set if you acquire data of multiple Logging Units with one SD memory card.

12. Optional part (Available part)

■ SD memory card

Item	Specifications
Model	EMU4-SD2GB
Amount of memory	2GB
Mass	2g

[Note] Unit: mm

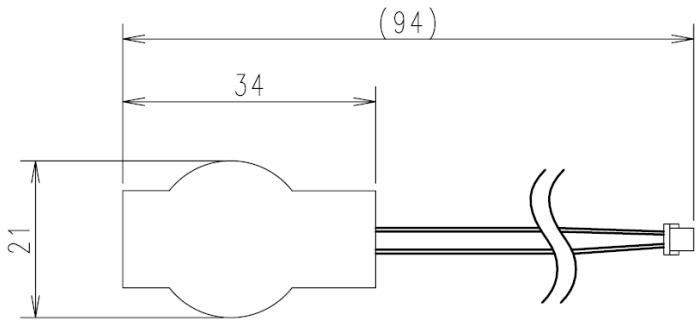


13. Optional part (Available supplies)

■ Battery

Item	Specifications
Model	EMU4-BT
Type	Manganese dioxide lithium battery
Normal voltage	3V
Capacity	220mAh
Mass	3.8g

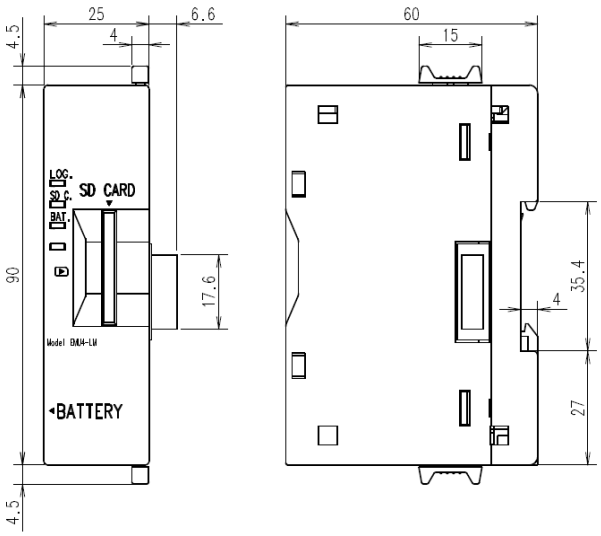
[Note] Unit: mm



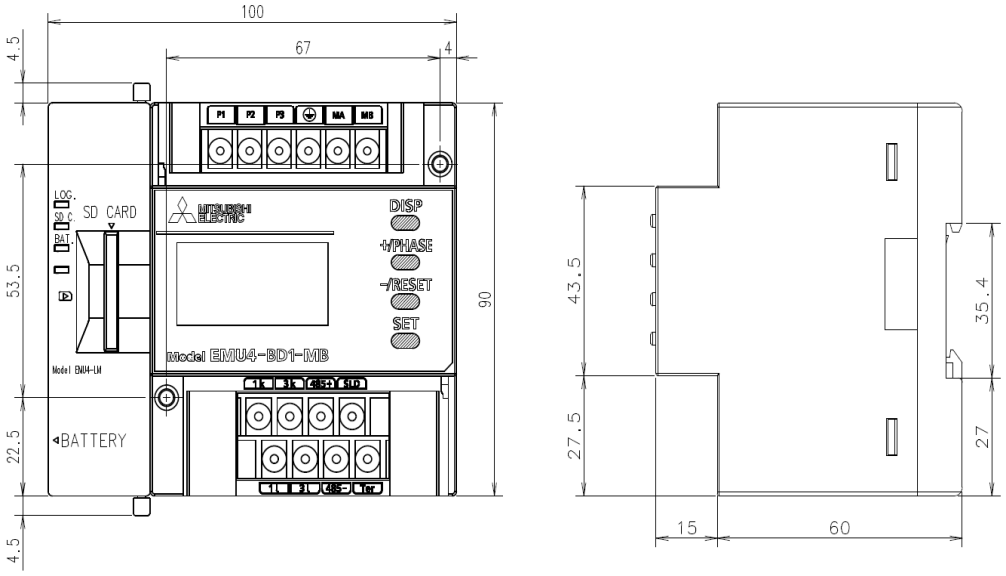
14. External dimensions

[Note] Unit: mm

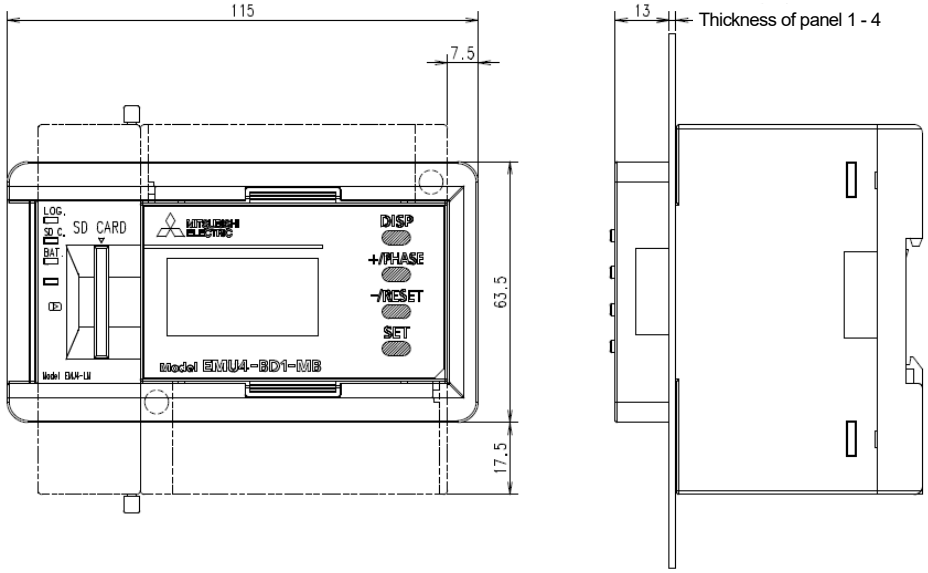
◆EMU4-LM



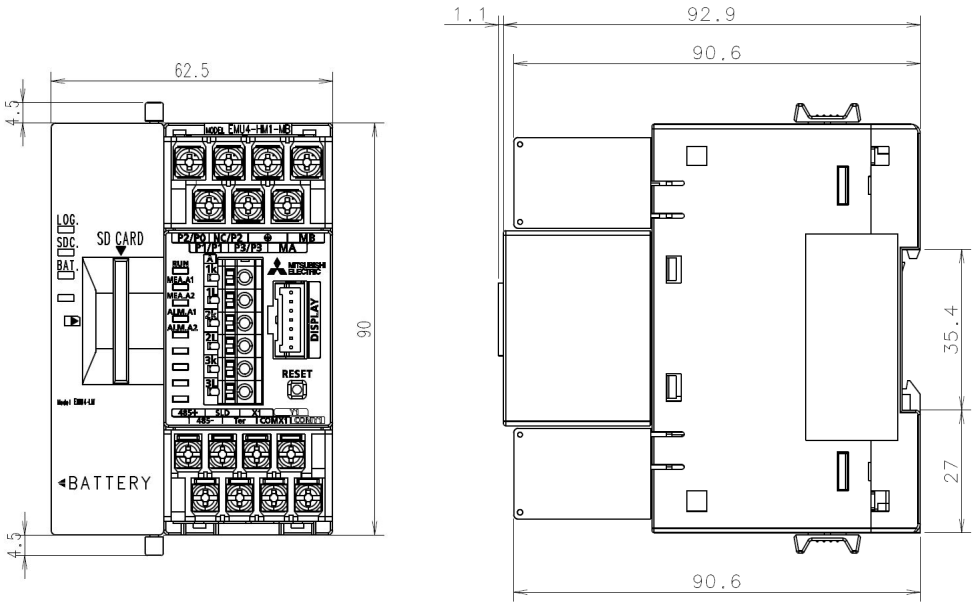
◆When combined with EcoMonitorLight (EMU4-BD1-MB , EMU4-HD1-MB or EMU4-FD1-MB)



◆When installing attachment for panel mounting (common to EMU4-BD1-MB , EMU4-HD1-MB and EMU4-FD1-MB)



◆When combined with EcoMonitorPlus (EMU4-BM1-MB or EMU4-HM1-MB)



15. Index

List of setting items

Setting item		Setting range	Initial value*
Logging ID		1 to 255	1
Present time		Jan 1, 2013 00:00:00 to Dec 31, 2099 23:59:59	Jan 1, 2013 00:00:00
Logging condition	Logging mode	Auto updating (00) Date nomination (01)	Auto updating (00)
	Logging start time	Jan 1, 2013 00:00:00 to Dec 31, 2099 23:59:59	Jan 1, 2013 00:00:00 *It is invalid because the logging mode is set to "Auto updating".
	Detailed data logging cycle	1 second (00), 1 minute (01), 5 minutes (02), 10 minutes (03), 15 minutes (04) and 30 minutes (05)	1 minute (01)
	Detailed data logging item 1 (Logging item row of circuit 1 to 7)	These depend on the connected Energy Measuring Unit or setting of it. Refer to "List of logging items" (☛Page 45).	Present electric power (0701)
	Detailed data logging item 2 (Logging item row of circuit 1 to 7)		Average voltage (Line voltage) (0501)
	Detailed data logging item 3 (Logging item row of circuit 1 to 7)		Average current (0101)
	Detailed data logging item 4 (Logging item row of circuit 1 to 7)		Present power factor (0D01)
	Detailed data logging item 5 (Logging item row of circuit 1 to 7)		Consumed electric energy (8001)
	Detailed data logging item 6 (Logging item row of circuit 1 to 7)		Frequency (0F01)
	Detailed data logging item 7 (Logging item row of circuit 1 to 7)		Present reactive power (0901)
	Detailed data logging item 8 (Logging item row of circuit 1 to 7)		Reactive energy (Consumption lag) (8101)
	Detailed data logging item 9 (Logging item row of circuit 1 to 7)		Null (0000)
	Detailed data logging item 10 (Logging item row of circuit 1 to 7)		Null (0000)
	One-hour data logging item 1 (Logging item row of circuit 1 to 7)		Present electric power (0701)
	One-hour data logging item 2 (Logging item row of circuit 1 to 7)		Average voltage (Line voltage) (0501)
	One-hour data logging item 3 (Logging item row of circuit 1 to 7)		Average current (0101)
	One-hour data logging item 4 (Logging item row of circuit 1 to 7)		Present power factor (0D01)
	One-hour data logging item 5 (Logging item row of circuit 1 to 7)		Consumed electric energy (8001)
	One-hour data logging item 6 (Logging item row of circuit 1 to 7)		Frequency (0F01)
	One-hour data logging item 7 (Logging item row of circuit 1 to 7)		Present reactive power (0901)
	One-hour data logging item 8 (Logging item row of circuit 1 to 7)		Reactive energy (Consumption lag) (8101)
	One-hour data logging item 9 (Logging item row of circuit 1 to 7)		Null (0000)
	One-hour data logging item 10 (Logging item row of circuit 1 to 7)		Null (0000)

* When I do not set a logging condition, I work with an initial value.
* The following models do not support logging with the default setting, so please setup the logging condition.

EcoMonitorPlus

- ・Energy Measuring Unit Insulation Monitoring Model (models:EMU4-LG1-MB)
- ・Energy Measuring Unit Extension Model for Analog Input (models:EMU4-AX4)
- ・Energy Measuring Unit Extension Model for Pulse Input (models:EMU4-PX4)

List of logging items

(1) In the case of that target units of Logging is EcoMonitorLight (EMU4-BD1-MB, EMU4-HD1-MB, EMU4-FD1-MB).

Logging item			Logging kind [Note3]	Group number	Channel number	Data name	Unit	Model that logging is enable						
								EMU4-BD1-MB			EMU4-HD1-MB EMU4-FD1-MB			
								1P2W	1P3W	3P3W	1P2W	1P3W	3P3W	3P4W
Current	Average		Present	01	01	A	[A]	●	●	●	●	●	●	●
	phase 1		Present		21	1_A	[A]	●	●	●	●	●	●	●
	phase 2		Present		41	2_A	[A]	—	●	●	—	●	●	●
	phase 3		Present		61	3_A	[A]	—	●	●	—	●	●	●
	phase N		Present		81	N_A	[A]	—	—	—	—	—	—	●
Current demand	phase 1		Present	02	21	1_DA	[A]	●	●	●	●	●	●	●
	phase 2		Present		41	2_DA	[A]	—	●	●	—	●	●	●
	phase 3		Present		61	3_DA	[A]	—	●	●	—	●	●	●
	phase N		Present		81	N_DA	[A]	—	—	—	—	—	—	●
Voltage	phase 1N		Present	03	21	1N_V	[V]	—	—	—	—	—	—	●
	phase 2N		Present		41	2N_V	[V]	—	—	—	—	—	—	●
	phase 3N		Present		61	3N_V	[V]	—	—	—	—	—	—	●
	Average (Line voltage)		Present	05	01	V	[V]	●	●	●	●	●	●	●
	phase 12		Present		21	12_V	[V]	●	●	●	●	●	●	●
	phase 23		Present		41	23_V	[V]	—	●	●	—	●	●	●
	phase 31		Present		61	31_V	[V]	—	●	●	—	●	●	●
Present electric power			Present	07	01	W	[kW]	●	●	●	●	●	●	●
Power demand			Present	08	01	DW	[kW]	●	●	●	●	●	●	●
Present reactive power			Present	09	01	VAR	[kvar]	●	●	●	●	●	●	●
Present apparent power			Present	0B	01	VA	[kVA]	—	—	—	—	—	—	●
Present power factor			Present	0D	01	PF	[%]	●	●	●	●	●	●	●
Frequency			Present	0F	01	Hz	[Hz]	●	●	●	●	●	●	●
RMS value of harmonic current	Fundamental	phase 1	Present	29	21	1_1HA	[A]	—	—	—	●	●	●	●
		phase 2	Present		41	2_1HA	[A]	—	—	—	—	—	—	●
		phase 3	Present		61	3_1HA	[A]	—	—	—	—	●	●	●
		phase N	Present		81	N_1HA	[A]	—	—	—	—	—	—	●
	3rd, 5th, 7th, 9th, 11th, 13th order	phase 1	Present	2B,2D,2F, 31,33,35	21	1_3HA	[A]	—	—	—	●	●	●	●
		phase 2	Present		41	2_3HA	[A]	—	—	—	—	—	—	●
		phase 3	Present		61	3_3HA	[A]	—	—	—	—	●	●	●
		phase N	Present		81	N_3HA	[A]	—	—	—	—	—	—	●
	15th order	phase 1	Present	37	21	3721	—	—	—	—	▲	▲	▲	▲
		phase 2	Present		41	3741	—	—	—	—	—	—	—	▲
		phase 3	Present		61	3761	—	—	—	—	—	▲	▲	▲
		phase N	Present		81	3781	—	—	—	—	—	—	—	▲
	Average	phase 1	Present	3F	21	1_HA	[A]	—	—	—	●	●	●	●
		phase 2	Present		41	2_HA	[A]	—	—	—	—	—	—	●
		phase 3	Present		61	3_HA	[A]	—	—	—	—	●	●	●
		phase N	Present		81	N_HA	[A]	—	—	—	—	—	—	●
RMS value of harmonic voltage	Fundamental	phase 1N	Present	41	21	1N_1HV	[V]	—	—	—	—	—	—	●
		phase 2N	Present		41	2N_1HV	[V]	—	—	—	—	—	—	●
		phase 3N	Present		61	3N_1HV	[V]	—	—	—	—	—	—	●
	3rd, 5th, 7th, 9th, 11th, 13th order	phase 1N	Present	43,45,47, 49,4B,4D	21	1N_3HV	[V]	—	—	—	—	—	—	●
		phase 2N	Present		41	2N_3HV	[V]	—	—	—	—	—	—	●
		phase 3N	Present		61	3N_3HV	[V]	—	—	—	—	—	—	●
	15^{th} order	phase 1N	Present	4F	21	4F21	—	—	—	—	—	—	—	▲
		phase 2N	Present		41	4F41	—	—	—	—	—	—	—	▲
		phase 3N	Present		61	4F61	—	—	—	—	—	—	—	▲

Logging item			Logging kind [Note3]	Group number	Channel number	Data name	Unit	Model that logging is enable						
								EMU4-BD1-MB			EMU4-HD1-MB EMU4-FD1-MB			
								1P2W	1P3W	3P3W	1P2W	1P3W	3P3W	3P4W
RMS value of harmonic voltage	Average	phase 1N	Present	57	21	1N_HV	[V]	—	—	—	—	—	—	●
		phase 2N	Present		41	2N_HV	[V]	—	—	—	—	—	—	●
		phase 3N	Present		61	3N_HV	[V]	—	—	—	—	—	—	●
	Fundamental	phase 12	Present	59	21	12_1HV	[V]	—	—	—	●	●	●	—
		phase 23	Present		41	23_1HV	[V]	—	—	—	—	●	●	—
	3rd, 5th, 7th, 9th, 11th, 13th order	phase 12	Present	5B,5D,5F, 61,63,65	21	12_3HV	[V]	—	—	—	●	●	●	—
		phase 23	Present		41	23_3HV	[V]	—	—	—	—	●	●	—
	15th order	phase 12	Present	67	21	6721	—	—	—	—	▲	▲	▲	—
		phase 23	Present		41	6741	—	—	—	—	—	▲	▲	—
	Average	phase 12	Present	6F	21	12_HV	[V]	—	—	—	●	●	●	—
		phase 23	Present		41	23_HV	[V]	—	—	—	—	●	●	—
Content rate of harmonic current	3rd order	phase 1	Present	71	73	1_3HA	[%]	—	—	—	●	●	●	●
	5th order		Present		75	1_5HA	[%]	—	—	—	●	●	●	●
	7th order		Present		77	1_7HA	[%]	—	—	—	●	●	●	●
	9th order		Present		79	1_9HA	[%]	—	—	—	●	●	●	●
	11th order		Present		7B	1_11HA	[%]	—	—	—	●	●	●	●
	13th order		Present		7D	1_13HA	[%]	—	—	—	●	●	●	●
	15th order		Present		7F	717F	—	—	—	—	▲	▲	▲	▲
	Average		Present		86	1_HA	[%]	—	—	—	●	●	●	●
	3rd order	phase 2	Present		89	2_3HA	[%]	—	—	—	—	—	—	●
	5th order		Present		8B	2_5HA	[%]	—	—	—	—	—	—	●
	7th order		Present		8D	2_7HA	[%]	—	—	—	—	—	—	●
	9th order		Present		8F	2_9HA	[%]	—	—	—	—	—	—	●
	11th order		Present		91	2_11HA	[%]	—	—	—	—	—	—	●
	13th order		Present		93	2_13HA	[%]	—	—	—	—	—	—	●
	15th order		Present		95	7195	—	—	—	—	—	—	—	▲
	Average		Present		9C	2_HA	[%]	—	—	—	—	—	—	●
	3rd order	phase 3	Present		9F	3_3HA	[%]	—	—	—	—	●	●	●
	5th order		Present		A1	3_5HA	[%]	—	—	—	—	●	●	●
	7th order		Present		A3	3_7HA	[%]	—	—	—	—	●	●	●
	9th order		Present		A5	3_9HA	[%]	—	—	—	—	●	●	●
	11th order		Present		A7	3_11HA	[%]	—	—	—	—	●	●	●
	13th order		Present		A9	3_13HA	[%]	—	—	—	—	●	●	●
	15th order		Present		AB	71AB	—	—	—	—	—	▲	▲	▲
	Average		Present		B2	3_HA	[%]	—	—	—	—	●	●	●
	3rd order	phase N	Present		B5	N_3HA	[%]	—	—	—	—	—	—	●
	5th order		Present		B7	N_5HA	[%]	—	—	—	—	—	—	●
	7th order		Present		B9	N_7HA	[%]	—	—	—	—	—	—	●
	9th order		Present		BB	N_9HA	[%]	—	—	—	—	—	—	●
	11th order		Present		BD	N_11HA	[%]	—	—	—	—	—	—	●
	13th order		Present		BF	N_13HA	[%]	—	—	—	—	—	—	●
	15th order		Present		C1	71C1	—	—	—	—	—	—	—	▲
	Average		Present		C8	N_HA	[%]	—	—	—	—	—	—	●

Logging item			Logging kind [Note3]	Group number	Channel number	Data name	Unit	Model that logging is enable						
								EMU4-BD1-MB			EMU4-HD1-MB EMU4-FD1-MB			
								1P2W	1P3W	3P3W	1P2W	1P3W	3P3W	3P4W
Content rate of harmonic voltage	3rd order	phase 12	Present	72	73	12_3HV	[%]	—	—	—	●	●	●	—
	5th order		Present		75	12_5HV	[%]	—	—	—	●	●	●	—
	7th order		Present		77	12_7HV	[%]	—	—	—	●	●	●	—
	9th order		Present		79	12_9HV	[%]	—	—	—	●	●	●	—
	11th order		Present		7B	12_11HV	[%]	—	—	—	●	●	●	—
	13th order		Present		7D	12_13HV	[%]	—	—	—	●	●	●	—
	15th order		Present		7F	727F	—	—	—	—	▲	▲	▲	—
	Average		Present		86	12_HV	[%]	—	—	—	●	●	●	—
	3rd order	phase 23	Present		89	23_3HV	[%]	—	—	—	—	●	●	—
	5th order		Present		8B	23_5HV	[%]	—	—	—	—	●	●	—
	7th order		Present		8D	23_7HV	[%]	—	—	—	—	●	●	—
	9th order		Present		8F	23_9HV	[%]	—	—	—	—	●	●	—
	11th order		Present		91	23_11HV	[%]	—	—	—	—	●	●	—
	13th order		Present		93	23_13HV	[%]	—	—	—	—	●	●	—
	15th order		Present		95	7295	—	—	—	—	—	▲	▲	—
	Average		Present		9C	23_HV	[%]	—	—	—	—	●	●	—
	3rd order	phase 1N	Present	73	73	1N_3HV	[%]	—	—	—	—	—	—	●
	5th order		Present		75	1N_5HV	[%]	—	—	—	—	—	—	●
	7th order		Present		77	1N_7HV	[%]	—	—	—	—	—	—	●
	9th order		Present		79	1N_9HV	[%]	—	—	—	—	—	—	●
	11th order		Present		7B	1N_11HV	[%]	—	—	—	—	—	—	●
	13th order		Present		7D	1N_13HV	[%]	—	—	—	—	—	—	●
	15th order		Present		7F	737F	—	—	—	—	—	—	—	▲
	Average		Present		86	1N_HV	[%]	—	—	—	—	—	—	●
	3rd order	phase 2N	Present		89	2N_3HV	[%]	—	—	—	—	—	—	●
	5th order		Present		8B	2N_5HV	[%]	—	—	—	—	—	—	●
	7th order		Present		8D	2N_7HV	[%]	—	—	—	—	—	—	●
	9th order		Present		8F	2N_9HV	[%]	—	—	—	—	—	—	●
	11th order		Present		91	2N_11HV	[%]	—	—	—	—	—	—	●
	13th order		Present		93	2N_13HV	[%]	—	—	—	—	—	—	●
	15th order		Present		95	7395	—	—	—	—	—	—	—	▲
	Average		Present		9C	2N_HV	[%]	—	—	—	—	—	—	●
	3rd order	phase 3N	Present		9F	3N_3HV	[%]	—	—	—	—	—	—	●
	5th order		Present		A1	3N_5HV	[%]	—	—	—	—	—	—	●
	7th order		Present		A3	3N_7HV	[%]	—	—	—	—	—	—	●
	9th order		Present		A5	3N_9HV	[%]	—	—	—	—	—	—	●
	11th order		Present		A7	3N_11HV	[%]	—	—	—	—	—	—	●
	13th order		Present		A9	3N_13HV	[%]	—	—	—	—	—	—	●
	15th order		Present		AB	73AB	—	—	—	—	—	—	—	▲
	Average		Present		B2	3N_HV	[%]	—	—	—	—	—	—	●
Electric energy	Consumption		difference	80	01	Wh	[kWh]	●	●	●	●	●	●	●
	Regeneration		difference		63	RWh	[kWh]	●	●	●	●	●	●	●
Reactive energy	Consumption lag		difference	81	01	VARh	[kvarh]	●	●	●	●	●	●	●
Pulse input [Note 1]			difference	83	01	PI1	N/A	—	—	—	●	●	●	●
Periodic electric energy [Note 2]			difference	8B	01	PWh	[kWh]	—	—	—	●	●	●	●
Null			—	00	00	—	—	●	●	●	●	●	●	●

[Note 1] Pulse input is unavailable if the external input is set to contact input.
[Note 2] Periodic electric energy is unavailable if the external input is set to Pulse input.
[Note 3] 3 Instantaneous value is logged for measured value of collection timing.
For the difference value, the differential value between the weighing value of this collection timing and the weighing value of the previous collection timing is logged.
Weighing value at collecting timing is logged for integrated value.

(2) In the case of that target units of Logging is EcoMonitorLight (EMU4-BM1-MB, EMU4-HM1-MB).

Logging item			Logging kind [Note5]	Group number	Channel number	Data name	Unit	Model that logging is enable						
								EMU4-BM1-MB			EMU4-HM1-MB			
								1P2W	1P3W	3P3W	1P2W	1P3W	3P3W	3P4W
Current	Average		Present	01	01	A	[A]	●	●	●	●	●	●	●
	phase 1		Present		21	1_A	[A]	●	●	●	●	●	●	●
	phase 2		Present		41	2_A	[A]	—	●	●	—	●	●	●
	phase 3		Present		61	3_A	[A]	●[Note1]	●	●	●[Note1]	●	●	●
	phase N		Present		81	N_A	[A]	—	—	—	—	—	—	●
Current demand	phase 1		Present	02	21	1_DA	[A]	●	●	●	●	●	●	●
	phase 2		Present		41	2_DA	[A]	—	●	●	—	●	●	●
	phase 3		Present		61	3_DA	[A]	●[Note1]	●	●	●[Note1]	●	●	●
	phase N		Present		81	N_DA	[A]	—	—	—	—	—	—	●
Voltage	phase 1N		Present	03	21	1N_V	[V]	—	—	—	—	—	—	●
	phase 2N		Present		41	2N_V	[V]	—	—	—	—	—	—	●
	phase 3N		Present		61	3N_V	[V]	—	—	—	—	—	—	●
	Average (Line voltage)		Present	05	01	V	[V]	●	●	●	●	●	●	●
	phase 12		Present		21	12_V	[V]	●	●	●	●	●	●	●
	phase 23		Present		41	23_V	[V]	●[Note1]	●	●	●[Note1]	●	●	●
	phase 31		Present		61	31_V	[V]	—	●	●	—	●	●	●
Present electric power	[1] ※2		Present	07	01	W	[kW]	●	●	●	●	●	●	●
	[2] ※2		Present	07	61	0761	-	●	—	—	●	—	—	—
Power demand	[1] ※2		Present	08	01	DW	[kW]	●	●	●	●	●	●	●
	[2] ※2		Present	08	61	0861	-	●	—	—	●	—	—	—
Present reactive power	[1] ※2		Present	09	01	VAR	[kvar]	●	●	●	●	●	●	●
	[2] ※2		Present	09	61	0961	-	●	—	—	●	—	—	—
Present apparent power			Present	0B	01	VA	[kVA]	—	—	—	—	—	—	●
Present power factor	[1] ※2		Present	0D	01	PF	[%]	●	●	●	●	●	●	●
	[2] ※2		Present	0D	61	0D61	-	●	—	—	●	—	—	—
Frequency			Present	0F	01	Hz	[Hz]	●	●	●	●	●	●	●
Current unbalance rate			Present	01	1E	011E	-	●	●	●	●	●	●	●
Voltage unbalance rate			Present	03	1E	031E	-	●	●	●	●	●	●	●
RMS value of harmonic current	Fundamental	phase 1	Present	29	21	1_1HA	[A]	—	—	—	●	●	●	●
		phase 2	Present		41	2_1HA	[A]	—	—	—	—	—	—	●
		phase 3	Present		61	3_1HA	[A]	—	—	—	●[Note1]	●	●	●
		phase N	Present		81	N_1HA	[A]	—	—	—	—	—	—	●
	3rd order	phase 1	Present	2B	21	1_3HA	[A]	—	—	—	●	●	●	●
		phase 2	Present		41	2_3HA	[A]	—	—	—	—	—	—	●
		phase 3	Present		61	3_3HA	[A]	—	—	—	●[Note1]	●	●	●
		phase N	Present		81	N_3HA	[A]	—	—	—	—	—	—	●
	5th order	phase 1	Present	2D	21	1_5HA	[A]	—	—	—	●	●	●	●
		phase 2	Present		41	2_5HA	[A]	—	—	—	—	—	—	●
		phase 3	Present		61	3_5HA	[A]	—	—	—	●[Note1]	●	●	●
		phase N	Present		81	N_5HA	[A]	—	—	—	—	—	—	●
	7th order	phase 1	Present	2F	21	1_7HA	[A]	—	—	—	●	●	●	●
		phase 2	Present		41	2_7HA	[A]	—	—	—	—	—	—	●
		phase 3	Present		61	3_7HA	[A]	—	—	—	●[Note1]	●	●	●
		phase N	Present		81	N_7HA	[A]	—	—	—	—	—	—	●
	7th order	phase 1	Present	31	21	1_9HA	[A]	—	—	—	●	●	●	●
		phase 2	Present		41	2_9HA	[A]	—	—	—	—	—	—	●
		phase 3	Present		61	3_9HA	[A]	—	—	—	●[Note1]	●	●	●
		phase N	Present		81	N_9HA	[A]	—	—	—	—	—	—	●
	11th order	phase 1	Present	33	21	1_11HA	[A]	—	—	—	●	●	●	●
		phase 2	Present		41	2_11HA	[A]	—	—	—	—	—	—	●
		phase 3	Present		61	3_11HA	[A]	—	—	—	●[Note1]	●	●	●
		phase N	Present		81	N_11HA	[A]	—	—	—	—	—	—	●

Logging item			Logging kind [Note5]	Group number	Channel number	Data name	Unit	Model that logging is enable						
								EMU4-BM1-MB			EMU4-HM1-MB			
								1P2W	1P3W	3P3W	1P2W	1P3W	3P3W	3P4W
	13th order	phase 1	Present	35	21	1_13HA	[A]	—	—	—	●	●	●	●
		phase 2	Present		41	2_13HA	[A]	—	—	—	—	—	—	●
		phase 3	Present		61	3_13HA	[A]	—	—	—	●[Note1]	●	●	●
		phase N	Present		81	N_13HA	[A]	—	—	—	—	—	—	●
	Average	phase 1	Present	3F	21	1_HA	[A]	—	—	—	●	●	●	●
		phase 2	Present		41	2_HA	[A]	—	—	—	—	—	—	●
		phase 3	Present		61	3_HA	[A]	—	—	—	●[Note1]	●	●	●
		phase N	Present		81	N_HA	[A]	—	—	—	—	—	—	●
	Fundamental	phase 1N	Present	41	21	1N_1HV	[V]	—	—	—	—	—	—	●
		phase 2N	Present		41	2N_1HV	[V]	—	—	—	—	—	—	●
		phase 3N	Present		61	3N_1HV	[V]	—	—	—	—	—	—	●
	43	phase 1N	Present		21	1N_3HV	[V]	—	—	—	—	—	—	●
		phase 2N	Present		41	2N_3HV	[V]	—	—	—	—	—	—	●
		phase 3N	Present		61	3N_3HV	[V]	—	—	—	—	—	—	●
	5th order	phase 1N	Present	45	21	1N_5HV	[V]	—	—	—	—	—	—	●
		phase 2N	Present		41	2N_5HV	[V]	—	—	—	—	—	—	●
		phase 3N	Present		61	3N_5HV	[V]	—	—	—	—	—	—	●
	7th order	phase 1N	Present	47	21	1N_7HV	[V]	—	—	—	—	—	—	●
		phase 2N	Present		41	2N_7HV	[V]	—	—	—	—	—	—	●
		phase 3N	Present		61	3N_7HV	[V]	—	—	—	—	—	—	●
	9th order	phase 1N	Present	49	21	1N_9HV	[V]	—	—	—	—	—	—	●
		phase 2N	Present		41	2N_9HV	[V]	—	—	—	—	—	—	●
		phase 3N	Present		61	3N_9HV	[V]	—	—	—	—	—	—	●
	11th order	phase 1N	Present	4B	21	1N_11HV	[V]	—	—	—	—	—	—	●
		phase 2N	Present		41	2N_11HV	[V]	—	—	—	—	—	—	●
		phase 3N	Present		61	3N_11HV	[V]	—	—	—	—	—	—	●
	13th order	phase 1N	Present	4D	21	1N_13HV	[V]	—	—	—	—	—	—	●
		phase 2N	Present		41	2N_13HV	[V]	—	—	—	—	—	—	●
		phase 3N	Present		61	3N_13HV	[V]	—	—	—	—	—	—	●
	Average	phase 1N	Present	57	21	1N_HV	[V]	—	—	—	—	—	—	●
		phase 2N	Present		41	2N_HV	[V]	—	—	—	—	—	—	●
		phase 3N	Present		61	3N_HV	[V]	—	—	—	—	—	—	●
	Fundamental	phase 12	Present	59	21	12_1HV	[V]	—	—	—	●	●	●	—
		phase 23	Present		41	23_1HV	[V]	—	—	—	●[Note1]	●	●	—
	3rd order	phase 12	Present	5B	21	12_3HV	[V]	—	—	—	●	●	●	—
		phase 23	Present		41	23_3HV	[V]	—	—	—	●[Note1]	●	●	—
	5th order	phase 12	Present	5D	21	12_5HV	[V]	—	—	—	●	●	●	—
		phase 23	Present		41	23_5HV	[V]	—	—	—	●[Note1]	●	●	—
	7th order	phase 12	Present	5F	21	12_7HV	[V]	—	—	—	●	●	●	—
		phase 23	Present		41	23_7HV	[V]	—	—	—	●[Note1]	●	●	—
	9th order	phase 12	Present	61	21	12_9HV	[V]	—	—	—	●	●	●	—
		phase 23	Present		41	23_9HV	[V]	—	—	—	●[Note1]	●	●	—
	11th order	phase 12	Present	63	21	12_11HV	[V]	—	—	—	●	●	●	—
		phase 23	Present		41	23_11HV	[V]	—	—	—	●[Note1]	●	●	—
	13th order	phase 12	Present	65	21	12_13HV	[V]	—	—	—	●	●	●	—
		phase 23	Present		41	23_13HV	[V]	—	—	—	●[Note1]	●	●	—
	Average	phase 12	Present	6F	21	12_HV	[V]	—	—	—	●	●	●	—
		phase 23	Present		41	23_HV	[V]	—	—	—	●[Note1]	●	●	—
Content rate of harmonic current	3th order	phase 1	Present	71	73	1_3HA	[%]	—	—	—	●	●	●	●
	5th order		Present		75	1_5HA	[%]	—	—	—	●	●	●	●
	7th order		Present		77	1_7HA	[%]	—	—	—	●	●	●	●
	9th order		Present		79	1_9HA	[%]	—	—	—	●	●	●	●
	11th order		Present		7B	1_11HA	[%]	—	—	—	●	●	●	●
	13th order		Present		7D	1_13HA	[%]	—	—	—	●	●	●	●
	Average		Present		86	1_HA	[%]	—	—	—	●	●	●	●

Logging item			Logging kind [Note5]	Group number	Channel number	Data name	Unit	Model that logging is enable						
								EMU4-BM1-MB			EMU4-HM1-MB			
								1P2W	1P3W	3P3W	1P2W	1P3W	3P3W	3P4W
Content rate of harmonic current	3rd order	phase 2	Present		89	2_3HA	[%]	—	—	—	—	—	—	●
	5th order		Present		8B	2_5HA	[%]	—	—	—	—	—	—	●
	7th order		Present		8D	2_7HA	[%]	—	—	—	—	—	—	●
	9th order		Present		8F	2_9HA	[%]	—	—	—	—	—	—	●
	11th order		Present		91	2_11HA	[%]	—	—	—	—	—	—	●
	13th order		Present		93	2_13HA	[%]	—	—	—	—	—	—	●
	Average		Present		9C	2_HA	[%]	—	—	—	—	—	—	●
	3rd order	phase 3	Present		9F	3_3HA	[%]	—	—	—	●[Note1]	●	●	●
	5th order		Present		A1	3_5HA	[%]	—	—	—	●[Note1]	●	●	●
	7th order		Present		A3	3_7HA	[%]	—	—	—	●[Note1]	●	●	●
	9th order		Present	71	A5	3_9HA	[%]	—	—	—	●[Note1]	●	●	●
	11th order		Present		A7	3_11HA	[%]	—	—	—	●[Note1]	●	●	●
	13th order		Present		A9	3_13HA	[%]	—	—	—	●[Note1]	●	●	●
	Average		Present		B2	3_HA	[%]	—	—	—	●[Note1]	●	●	●
	3rd order	phase N	Present		B5	N_3HA	[%]	—	—	—	—	—	—	●
	5th order		Present		B7	N_5HA	[%]	—	—	—	—	—	—	●
	7th order		Present		B9	N_7HA	[%]	—	—	—	—	—	—	●
	9th order		Present		BB	N_9HA	[%]	—	—	—	—	—	—	●
	11th order		Present		BD	N_11HA	[%]	—	—	—	—	—	—	●
	13th order		Present		BF	N_13HA	[%]	—	—	—	—	—	—	●
	Average		Present		C8	N_HA	[%]	—	—	—	—	—	—	●

Logging item			Logging kind [Note5]	Group number	Channel number	Data name	Unit	Model that logging is enable						
								EMU4-BM1-MB			EMU4-HM1-MB			
								1P2W	1P3W	3P3W	1P2W	1P3W	3P3W	3P4W
Content rate of harmonic voltage	3rd order	phase 12	Present	72	73	12_3HV	[%]	—	—	—	●	●	●	—
	5th order		Present		75	12_5HV	[%]	—	—	—	●	●	●	—
	7th order		Present		77	12_7HV	[%]	—	—	—	●	●	●	—
	9th order		Present		79	12_9HV	[%]	—	—	—	●	●	●	—
	11th order		Present		7B	12_11HV	[%]	—	—	—	●	●	●	—
	13th order		Present		7D	12_13HV	[%]	—	—	—	●	●	●	—
	Average		Present		86	12_HV	[%]	—	—	—	●	●	●	—
	3rd order	phase 23	Present		89h	23_3HV	[%]	—	—	—	●[Note1]	●	●	—
	5th order		Present		8Bh	23_5HV	[%]	—	—	—	●[Note1]	●	●	—
	7th order		Present		8Dh	23_7HV	[%]	—	—	—	●[Note1]	●	●	—
	9th order		Present		8Fh	23_9HV	[%]	—	—	—	●[Note1]	●	●	—
	11th order		Present		91h	23_11HV	[%]	—	—	—	●[Note1]	●	●	—
	13th order		Present		93h	23_13HV	[%]	—	—	—	●[Note1]	●	●	—
	Average		Present		9Ch	23_HV	[%]	—	—	—	●[Note1]	●	●	—
	3rd order	phase 1N	Present	73	73	1N_3HV	[%]	—	—	—	—	—	—	●
	5th order		Present		75	1N_5HV	[%]	—	—	—	—	—	—	●
	7th order		Present		77	1N_7HV	[%]	—	—	—	—	—	—	●
	9th order		Present		79	1N_9HV	[%]	—	—	—	—	—	—	●
	11th order		Present		7B	1N_11HV	[%]	—	—	—	—	—	—	●
	13th order		Present		7D	1N_13HV	[%]	—	—	—	—	—	—	●
	Average		Present		86	1N_HV	[%]	—	—	—	—	—	—	●
	3rd order	phase 2N	Present		89	2N_3HV	[%]	—	—	—	—	—	—	●
	5th order		Present		8B	2N_5HV	[%]	—	—	—	—	—	—	●
	7th order		Present		8D	2N_7HV	[%]	—	—	—	—	—	—	●
	9th order		Present		8F	2N_9HV	[%]	—	—	—	—	—	—	●
	11th order		Present		91	2N_11HV	[%]	—	—	—	—	—	—	●
	13th order		Present		93	2N_13HV	[%]	—	—	—	—	—	—	●
	Average		Present		9C	2N_HV	[%]	—	—	—	—	—	—	●
	3 order	phase 3N	Present		9F	3N_3HV	[%]	—	—	—	—	—	—	●
	5 order		Present		A1	3N_5HV	[%]	—	—	—	—	—	—	●
	7 order		Present		A3	3N_7HV	[%]	—	—	—	—	—	—	●
	9 order		Present		A5	3N_9HV	[%]	—	—	—	—	—	—	●
	11 order		Present		A7	3N_11HV	[%]	—	—	—	—	—	—	●
	13order		Present		A9	3N_13HV	[%]	—	—	—	—	—	—	●
	Average		Present		B2	3N_HV	[%]	—	—	—	—	—	—	●
Electric power	Consumption	[1][Note2]	difference	80	01	Wh	[kWh]	●	●	●	●	●	●	●
		[2][Note2]	difference	8A	01	8A01	-	●	—	—	●	—	—	—
	Regenerated	[1][Note2]	difference	80	63	RWh	[kWh]	●	●	●	●	●	●	●
		[2][Note2]	difference	8A	63	8A63	-	●	—	—	●	—	—	—
Reactive energy	Consumption lag		difference	81	01	VARh	[kvarh]	●	●	●	●	●	●	●
Pulse input[Note3]			difference	83	01	PI1	Null	—	—	—	●	●	●	●
Pulse Convertion value[Note3]			difference	83	6A	836A	Null	—	—	—	●	●	●	●
Periodic electric energy[Note4]			difference	8B	01	PWh	[kWh]	—	—	—	●	●	●	●
Null			—	00	00	—	—	●	●	●	●	●	●	●

[Note 1] Second circuit (3 side circuit) is displayed in 2 circuits measuring in 1P2W.

[Note 2] [1] is showd first circuit in 2 circuits measuring in 1P2W. [1] is also used in not setup 2 circuits measuring in 1P2W and setup 1P3W, 3P3W and 3P4W. [2] is showd second circuit in 2 circuits measuring in 1P2W.

[Note 3] Pulse inputs and Pulse convertion is unavailable if the exernal input is set to contact input.

[Note 4] Periodic power is unavailable if the external input is set to pulse input.

[Note 5] 3 Instantaneous value is logged for measured value of collection timing.
For the difference value, the differential value between the weighing value of this collection timing and the weighing value of the previous collection timing is logged.
Weighing value at collecting timing is logged for integrated value.

(3) In the case of that target units of Logging is EcoMonitorPlus (EMU4-A2, EMU4-VA2).

Logging item			Logging kind [Note4]	Group number	Channel number	Data name	Unit	Model that logging is enable			
								EMU4-A2／EMU4-VA2			
								1P2W	1P3W	3P3W	3P4W
Current	Average		Present	01	01	A	[A]	●	●	●	●
	phase 1		Present		21	1_A	[A]	●	●	●	●
	phase 2		Present		41	2_A	[A]	—	●	●	●
	phase 3		Present		61	3_A	[A]	●[Note1]	●	●	●
	phase N		Present		81	N_A	[A]	—	—	—	●
Current demand	phase 1		Present	02	21	1_DA	[A]	●	●	●	●
	phase 2		Present		41	2_DA	[A]	—	●	●	●
	phase 3		Present		61	3_DA	[A]	●[Note1]	●	●	●
	phase N		Present		81	N_DA	[A]	—	—	—	●
Voltage	phase 1N		Present	03	21	1N_V	[V]	—	—	—	●
	phase 2N		Present		41	2N_V	[V]	—	—	—	●
	phase 3N		Present		61	3N_V	[V]	—	—	—	●
	Average (Line voltage)		Present	05	01	V	[V]	●	●	●	●
	phase 12		Present		21	12_V	[V]	●	●	●	●
	phase 23		Present		41	23_V	[V]	●[Note1]	●	●	●
	phase 31		Present		61	31_V	[V]	—	●	●	●
Present electric power	[1][Note2]		Present	07	01	W	[kW]	●	●	●	●
	[2][Note2]		Present	07	61	0761	-	●	—	—	—
Power demand	[1][Note2]		Present	08	01	DW	[kW]	●	●	●	●
	[2][Note2]		Present	08	61	0861	-	●	—	—	—
Present reactive power	[1][Note2]		Present	09	01	VAR	[kvar]	●	●	●	●
	[2][Note2]		Present	09	61	0961	-	●	—	—	—
Present apparent power			Present	0B	01	VA	[kVA]	—	—	—	●
Present power factor	[1][Note2]		Present	0D	01	PF	[%]	●	●	●	●
	[2][Note2]		Present	0D	61	0D61	-	●	—	—	—
Frequency			Present	0F	01	Hz	[Hz]	●	●	●	●
Current unbalance rate			Present	01	1E	011E	-	●	●	●	●
Voltage unbalance rate			Present	03	1E	031E	-ل	●	●	●	●
RMS value of harmonic current	Fundamental	phase 1	Present	29	21	1_1HA	[A]	●	●	●	●
		phase 2	Present		41	2_1HA	[A]	—	—	—	●
		phase 3	Present		61	3_1HA	[A]	●[Note1]	●	●	●
		phase N	Present		81	N_1HA	[A]	—	—	—	●
	3rd order	phase 1	Present	2B	21	1_3HA	[A]	●	●	●	●
		phase 2	Present		41	2_3HA	[A]	—	—	—	●
		phase 3	Present		61	3_3HA	[A]	●[Note1]	●	●	●
		phase N	Present		81	N_3HA	[A]	—	—	—	●
	5th order	phase 1	Present	2D	21	1_5HA	[A]	●	●	●	●
		phase 2	Present		41	2_5HA	[A]	—	—	—	●
		phase 3	Present		61	3_5HA	[A]	●[Note1]	●	●	●
		phase N	Present		81	N_5HA	[A]	—	—	—	●
	7th order	phase 1	Present	2F	21	1_7HA	[A]	●	●	●	●
		phase 2	Present		41	2_7HA	[A]	—	—	—	●
		phase 3	Present		61	3_7HA	[A]	●[Note1]	●	●	●
		phase N	Present		81	N_7HA	[A]	—	—	—	●
	9th order	phase 1	Present	31	21	1_9HA	[A]	●	●	●	●
		phase 2	Present		41	2_9HA	[A]	—	—	—	●
		phase 3	Present		61	3_9HA	[A]	●[Note1]	●	●	●
		phase N	Present		81	N_9HA	[A]	—	—	—	●
	11th order	phase 1	Present	33	21	1_11HA	[A]	●	●	●	●
		phase 2	Present		41	2_11HA	[A]	—	—	—	●
		phase 3	Present		61	3_11HA	[A]	●[Note1]	●	●	●
		phase N	Present		81	N_11HA	[A]	—	—	—	●

Logging item			Logging kind [Note4]	Group number	Channel number	Data name	Unit	Model that logging is enable			
								EMU4-A2／EMU4-VA2			
								1P2W	1P3W	3P3W	3P4W
	13th order	phase 1	Present	35	21	1_13HA	[A]	●	●	●	●
		phase 2	Present		41	2_13HA	[A]	—	—	—	●
		phase 3	Present		61	3_13HA	[A]	●[Note1]	●	●	●
		phase N	Present		81	N_13HA	[A]	—	—	—	●
	Average	phase 1	Present	3F	21	1_HA	[A]	●	●	●	●
		phase 2	Present		41	2_HA	[A]	—	—	—	●
		phase 3	Present		61	3_HA	[A]	●[Note1]	●	●	●
		phase N	Present		81	N_HA	[A]	—	—	—	•

Logging item			Logging kind [Note4]	Group number	Channel number	Data name	Unit	Model that logging is enable			
								EMU4-A2／EMU4-VA2			
								1P2W	1P3W	3P3W	3P4W
RMS value of harmonic voltage	Fundamental	phase 1N	Present	41	21	1N_1HV	[V]	—	—	—	●
		phase 2N	Present		41	2N_1HV	[V]	—	—	—	●
		phase 3N	Present		61	3N_1HV	[V]	—	—	—	●
	3rd order	phase 1N	Present	43	21	1N_3HV	[V]	—	—	—	●
		phase 2N	Present		41	2N_3HV	[V]	—	—	—	●
		phase 3N	Present		61	3N_3HV	[V]	—	—	—	●
	5th order	phase 1N	Present	45	21	1N_5HV	[V]	—	—	—	●
		phase 2N	Present		41	2N_5HV	[V]	—	—	—	●
		phase 3N	Present		61	3N_5HV	[V]	—	—	—	●
	7th order	phase 1N	Present	47	21	1N_7HV	[V]	—	—	—	●
		phase 2N	Present		41	2N_7HV	[V]	—	—	—	●
		phase 3N	Present		61	3N_7HV	[V]	—	—	—	●
	9th order	phase 1N	Present	49	21	1N_9HV	[V]	—	—	—	●
		phase 2N	Present		41	2N_9HV	[V]	—	—	—	●
		phase 3N	Present		61	3N_9HV	[V]	—	—	—	●
	11th order	phase 1N	Present	4B	21	1N_11HV	[V]	—	—	—	●
		phase 2N	Present		41	2N_11HV	[V]	—	—	—	●
		phase 3N	Present		61	3N_11HV	[V]	—	—	—	●
	13th order	phase 1N	Present	4D	21	1N_13HV	[V]	—	—	—	●
		phase 2N	Present		41	2N_13HV	[V]	—	—	—	●
		phase 3N	Present		61	3N_13HV	[V]	—	—	—	●
	Average	phase 1N	Present	57	21	1N_HV	[V]	—	—	—	●
		phase 2N	Present		41	2N_HV	[V]	—	—	—	●
		phase 3N	Present		61	3N_HV	[V]	—	—	—	●
	Fundamental	phase 12	Present	59	21	12_1HV	[V]	●	●	●	—
		phase 23	Present		41	23_1HV	[V]	● [Note1]	●	●	—
	3rd	phase 12	Present	5B	21	12_3HV	[V]	●	●	●	—
		phase 23	Present		41	23_3HV	[V]	● [Note1]	●	●	—
	5th order	phase 12	Present	5D	21	12_5HV	[V]	●	●	●	—
		phase 23	Present		41	23_5HV	[V]	● [Note1]	●	●	—
	7th order	phase 12	Present	5F	21	12_7HV	[V]	●	●	●	—
		phase 23	Present		41	23_7HV	[V]	● [Note1]	●	●	—
	9th order	phase 12	Present	61	21	12_9HV	[V]	●	●	●	—
		phase 23	Present		41	23_9HV	[V]	● [Note1]	●	●	—
	11th order	phase 12	Present	63	21	12_11HV	[V]	●	●	●	—
		phase 23	Present		41	23_11HV	[V]	● [Note1]	●	●	—
	13th order	phase 12	Present	65	21	12_13HV	[V]	●	●	●	—
		phase 23	Present		41	23_13HV	[V]	● [Note1]	●	●	—
	Average	phase 12	Present	6F	21	12_HV	[V]	●	●	●	—
		phase 23	Present		41	23_HV	[V]	● [Note1]	●	●	—
Content rate of harmonic current	3rd order	phase 1	Present	71	73	1_3HA	[%]	●	●	●	●
	5th order		Present		75	1_5HA	[%]	●	●	●	●
	7th order		Present		77	1_7HA	[%]	●	●	●	●
	9th order		Present		79	1_9HA	[%]	●	●	●	●
	11th order		Present		7B	1_11HA	[%]	●	●	●	●
	13th order		Present		7D	1_13HA	[%]	●	●	●	●
	Average		Present		86	1_HA	[%]	●	●	●	●

Logging item			Logging kind [Note4]	Group number	Channel number	Data name	Unit	Model that logging is enable			
								EMU4-A2／EMU4-VA2			
								1P2 W	1P3 W	3P3 W	3P4 W
	3rd order	phase 2	Present		89	2_3HA	[%]	—	—	—	●
	5th order		Present		8B	2_5HA	[%]	—	—	—	●
	7th order		Present		8D	2_7HA	[%]	—	—	—	●
	9th order		Present		8F	2_9HA	[%]	—	—	—	●
	11th order		Present		91	2_11HA	[%]	—	—	—	●
	13th order		Present		93	2_13HA	[%]	—	—	—	●
	Average		Present		9C	2_HA	[%]	—	—	—	●
	3rd order	phase 3	Present		9F	3_3HA	[%]	●[Note1	●	●	●
	5th order		Present		A1	3_5HA	[%]	●[Note1	●	●	●
	7th order		Present		A3	3_7HA	[%]	●[Note1	●	●	●
	9th order		Present		A5	3_9HA	[%]	●[Note1	●	●	●
	11th order		Present		A7	3_11HA	[%]	●[Note1	●	●	●
	13th order		Present		A9	3_13HA	[%]	●[Note1	●	●	●
	Average		Present		B2	3_HA	[%]	●[Note1	●	●	●

Logging item			Logging kind [Note4]	Group number	Channel number	Data name	Unit	Model that logging is enable			
								EMU4-A2／EMU4-VA2			
								1P2W	1P3W	3P3W	3P4W
Content rate of harmonic current	3rd order	phase N	Present		B5	N_3HA	[%]	—	—	—	●
	5th order		Present		B7	N_5HA	[%]	—	—	—	●
	7th order		Present		B9	N_7HA	[%]	—	—	—	●
	9th order		Present		BB	N_9HA	[%]	—	—	—	●
	11th order		Present		BD	N_11HA	[%]	—	—	—	●
	13th order		Present		BF	N_13HA	[%]	—	—	—	●
	Average		Present		C8	N_HA	[%]	—	—	—	●
Content rate of harmonic voltage	3rd order	phase 12	Present		73	12_3HV	[%]	●	●	●	—
	5th order		Present		75	12_5HV	[%]	●	●	●	—
	7th order		Present		77	12_7HV	[%]	●	●	●	—
	9th order		Present		79	12_9HV	[%]	●	●	●	—
	11th order		Present		7B	12_11HV	[%]	●	●	●	—
	13th order		Present		7D	12_13HV	[%]	●	●	●	—
	Average		Present		86	12_HV	[%]	●	●	●	—
	3rd order	phase 23	Present	72	89h	23_3HV	[%]	● [Note1]	●	●	—
	5th order		Present		8Bh	23_5HV	[%]	● [Note1]	● [Note1]	●	—
	7th order		Present		8Dh	23_7HV	[%]	● [Note1]	●	●	—
	9th order		Present		8Fh	23_9HV	[%]	● [Note1]	●	●	—
	11th order		Present		91h	23_11HV	[%]	● [Note1]	●	●	—
	13th order		Present		93h	23_13HV	[%]	● [Note1]	●	●	—
	Average		Present		9Ch	23_HV	[%]	● [Note1]	●	●	—
	3rd order	phase 1N	Present	73	73	1N_3HV	[%]	—	—	—	●
	5th order		Present		75	1N_5HV	[%]	—	—	—	●
	7th order		Present		77	1N_7HV	[%]	—	—	—	●
	9th order		Present		79	1N_9HV	[%]	—	—	—	●
	11th order		Present		7B	1N_11HV	[%]	—	—	—	●
	13th order		Present		7D	1N_13HV	[%]	—	—	—	●
	Average		Present		86	1N_HV	[%]	—	—	—	●
	3rd order	phase 2N	Present		89	2N_3HV	[%]	—	—	—	●
	5th order		Present		8B	2N_5HV	[%]	—	—	—	●
	7th order		Present		8D	2N_7HV	[%]	—	—	—	●
	9th order		Present		8F	2N_9HV	[%]	—	—	—	●
	11th order		Present		91	2N_11HV	[%]	—	—	—	●
	13th order		Present		93	2N_13HV	[%]	—	—	—	●
	Average		Present		9C	2N_HV	[%]	—	—	—	●

Logging item			Logging kind [Note4]	Group number	Channel number	Data name	Unit	Model that logging is enable			
								EMU4-A2／EMU4-VA2			
								1P2W	1P3W	3P3W	3P4W
	3rd order	phase 3N	Present		9F	3N_3HV	[%]	—	—	—	●
	5th order		Present		A1	3N_5HV	[%]	—	—	—	●
	7th order		Present		A3	3N_7HV	[%]	—	—	—	●
	9th order		Present		A5	3N_9HV	[%]	—	—	—	●
	11th order		Present		A7	3N_11HV	[%]	—	—	—	●
	13th order		Present		A9	3N_13HV	[%]	—	—	—	●
	Average		Present		B2	3N_HV	[%]	—	—	—	●
Electric energy	Consumption	[1] [Note2]	difference	80	01	Wh	[kWh]	●	●	●	●
		[2] [Note2]	difference	8A	01	8A01	-	●	—	—	—
	Regenration	[1] [Note2]	difference	80	63	RWh	[kWh]	●	●	●	●
		[2] [Note2]	difference	8A	63	8A63	-	●	—	—	—
Reactive energy	Consumption lag		difference	81	01	VARh	[kvarh]	●	●	●	●
Periodic electric energy [Note3]			difference	8B	01	PWh	[kWh]	●	●	●	●
Null			—	00	00	—	—	●	●	●	●

[Note 1] Second circuit (3 side circuit) is displayed in 2 circuits measuring in 1P2W.
[Note 2] [1] is showd first circuit in 2 circuits measuring in 1P2W. [1] is also used in not setup 2 circuits measuring in 1P2W and setup 1P3W, 3P3W and 3P4W. [2] is showd second circuit in 2 circuits measuring in 1P2W.
[Note 3] Periodic power is unavailable if the external input is set to pulse input.
[Note 4] 3 Instantaneous value is logged for measured value of collection timing.
For the difference value, the differential value between the weighing value of this collection timing and the weighing value of the previous collection timing is logged.
Weighing value at collecting timing is logged for integrated value.

(4) In the case of that target units of Logging is EcoMonitorPlus (EMU4-LG1-MB).

Logging item	Logging kind [Note1]	Group number	Channel number	Data name	Unit	Model that logging is enable			
						EMU4-LG1-MB			
						1P2W	1P3W	3P3W	3P4W
Leak current	Present	11	01	I0	[mA]	●	●	●	●
Demand leak current	Present	12	01	DI0	[mA]	●	●	●	●
Leak current for resistence	Present	7A	01	I0r	[mA]	●	●	●	—
Demand leak current for resistence	Present	7B	01	7B01	—	●	●	●	—
Differential conversion leak current for resistence	Present	7A	82	7A82	—	●	●	●	—
Null	—	00	00	—	—	●	●	●	●

[Note 1] 3 Instantaneous value is logged for measured value of collection timing.
For the difference value, the differential value between the weighing value of this collection timing and the weighing value of the previous collection timing is logged.
Weighing value at collecting timing is logged for integrated value.

(5) In the case of that target units of Logging is EcoMonitorPlus (EMU4-CNT-MB).

（1/2）

Logging item	Logging kind [Note1]	Group number	Channel number	Data name	Unit	Data
Contact output status(Terminal ID＝1)	Present	A0	30	A030	－	The logged data represents the following states: 00H(0000) : All contact outputs are OFF 01H(0001) : Contact output 1 is ON, Contact output 2 and 3 are OFF 02H(0010) : Contact output 2 is ON, Contact output 1 and 3 are OFF 03H(0011) : Contact output 1 and 2 are ON, Contact output 3 is OFF 04H(0100) : Contact output 3 is ON, Contact output 1 and 2 are OFF 05H(0101) : Contact output 1 and 3 are ON, Contact output 2 is OFF 06H(0110) : Contact output 2 and 3 are ON, Contact output 1 is OFF 07H(0111) : All contact outputs are ON
Contact output status(Terminal ID＝2)	Present	A2	02	A202	－	
Contact output status(Terminal ID＝3)	Present		03	A203	－	
Contact output status(Terminal ID＝4)	Present		04	A204	－	
Contact output status(Terminal ID＝5)	Present		05	A205	－	
Contact output status(Terminal ID＝6)	Present		06	A206	－	
Contact output status(Terminal ID＝7)	Present		07	A207	－	
Contact output status(Terminal ID＝8)	Present		08	A208	－	
Contact output status(Terminal ID＝9)	Present		09	A209	－	
Contact output status(Terminal ID＝10)	Present		0A	A20A	－	
Contact output status(Terminal ID＝11)	Present		0B	A20B	－	
Contact output status(Terminal ID＝12)	Present		0C	A20C	－	
Contact output status(Terminal ID＝13)	Present		0D	A20D	－	
Contact output status(Terminal ID＝14)	Present		0E	A20E	－	
Contact output status(Terminal ID＝15)	Present		0F	A20F	－	
Contact output status(Terminal ID＝16)	Present		10	A210	－	
Contact output status(Terminal ID＝17)	Present		11	A211	－	
Contact output status(Terminal ID＝18)	Present		12	A212	－	
Contact output status(Terminal ID＝19)	Present		13	A213	－	
Contact output status(Terminal ID＝20)	Present		14	A214	－	
Contact output status(Terminal ID＝21)	Present		15	A215	－	
Contact output status(Terminal ID＝22)	Present		16	A216	－	
Contact output status(Terminal ID＝23)	Present		17	A217	－	
Contact output status(Terminal ID＝24)	Present		18	A218	－	
Contact output status(Terminal ID＝25)	Present		19	A219	－	
Contact output status(Terminal ID＝26)	Present		1A	A21A	－	
Contact output status(Terminal ID＝27)	Present		1B	A21B	－	
Contact output status(Terminal ID＝28)	Present		1C	A21C	－	
Contact output status(Terminal ID＝29)	Present		1D	A21D	－	
Contact output status(Terminal ID＝30)	Present		1E	A21E	－	
Contact output status(Terminal ID＝31)	Present		1F	A21F	－	
Contact output status(Terminal ID＝32)	Present		20	A220	－	
Analog output specification(Terminal ID＝1)	Present	E0	B1	E0B1	－	1：Voltage output 2：Current output
Analog output specification(Terminal ID＝2)	Present		B2	E0B2	－	
Analog output specification(Terminal ID＝3)	Present		B3	E0B3	－	
Analog output specification(Terminal ID＝4)	Present		B4	E0B4	－	
Analog output specification(Terminal ID＝5)	Present		B5	E0B5	－	
Analog output specification(Terminal ID＝6)	Present		B6	E0B6	－	
Analog output specification(Terminal ID＝7)	Present		B7	E0B7	－	
Analog output specification(Terminal ID＝8)	Present		B8	E0B8	－	
Analog output specification(Terminal ID＝9)	Present		B9	E0B9	－	

(2/2)

Logging item	Logging kind [Note1]	Group number	Channel number	Data name	Unit	Data
Analog output specification(Terminal ID＝10)	Present	E0	BA	E0BA	－	The logged data represents the following states: 1：Voltage 2：Current
Analog output specification(Terminal ID＝11)	Present		BB	E0BB	－	
Analog output specification(Terminal ID＝12)	Present		BC	E0BC	－	
Analog output specification(Terminal ID＝13)	Present		BD	E0BD	－	
Analog output specification(Terminal ID＝14)	Present		BE	E0BE	－	
Analog output specification(Terminal ID＝15)	Present		BF	E0BE	－	
Analog output specification(Terminal ID＝16)	Present		C0	E0C0	－	
Analog output specification(Terminal ID＝17)	Present		C1	E0C1	－	
Analog output specification(Terminal ID＝18)	Present		C2	E0C2	－	
Analog output specification(Terminal ID＝19)	Present		C3	E0C3	－	
Analog output specification(Terminal ID＝20)	Present		C4	E0C4	－	
Analog output specification(Terminal ID＝21)	Present		C5	E0C5	－	
Analog output specification(Terminal ID＝22)	Present		C6	E0C6	－	
Analog output specification(Terminal ID＝23)	Present		C7	E0C7	－	
Analog output specification(Terminal ID＝24)	Present		C8	E0C8	－	
Analog output specification(Terminal ID＝25)	Present		C9	E0C9	－	
Analog output specification(Terminal ID＝26)	Present		CA	E0CA	－	
Analog output specification(Terminal ID＝27)	Present		CB	E0CB	－	
Analog output specification(Terminal ID＝28)	Present		CC	E0CC	－	
Analog output specification(Terminal ID＝29)	Present		CD	E0CD	－	
Analog output specification(Terminal ID＝30)	Present		CE	E0CE	－	
Analog output specification(Terminal ID＝31)	Present		CF	E0CF	－	
Analog output specification(Terminal ID＝32)	Present		D0	E0D0	－	
Analog output value(Terminal ID＝1)	Present		D1	E0D1	－	The logged data represents the following states: The data range depends on the Analog output specification. ・In the case of current output Data：4000～20000 Output：4.000～20.000mA ・In the case of voltage output Data：0000～5000 Output：0.000～5.000V
Analog output value(Terminal ID＝2)	Present		D2	E0D2	－	
Analog output value(Terminal ID＝3)	Present		D3	E0D3	－	
Analog output value(Terminal ID＝4)	Present		D4	E0D4	－	
Analog output value(Terminal ID＝5)	Present		D5	E0D5	－	
Analog output value(Terminal ID＝6)	Present		D6	E0D6	－	
Analog output value(Terminal ID＝7)	Present		D7	E0D7	－	
Analog output value(Terminal ID＝8)	Present		D8	E0D8	－	
Analog output value(Terminal ID＝9)	Present		D9	E0D9	－	
Analog output value(Terminal ID＝10)	Present		DA	E0DA	－	
Analog output value(Terminal ID＝11)	Present		DB	E0DB	－	
Analog output value(Terminal ID＝12)	Present		DC	E0DC	－	
Analog output value(Terminal ID＝13)	Present		DD	E0DD	－	
Analog output value(Terminal ID＝14)	Present		DE	E0DE	－	
Analog output value(Terminal ID＝15)	Present		DF	E0DF	－	
Analog output value(Terminal ID＝16)	Present		E1	E0E1	－	
Analog output value(Terminal ID＝17)	Present		E2	E0E2	－	
Analog output value(Terminal ID＝18)	Present		E3	E0E3	－	
Analog output value(Terminal ID＝19)	Present		E4	E0E4	－	
Analog output value(Terminal ID＝20)	Present		E5	E0E5	－	
Analog output value(Terminal ID＝21)	Present		E6	E0E6	－	
Analog output value(Terminal ID＝22)	Present		E7	E0E7	－	
Analog output value(Terminal ID＝23)	Present		E8	E0E8	－	
Analog output value(Terminal ID＝24)	Present		E9	E0E9	－	
Analog output value(Terminal ID＝25)	Present		EA	E0EA	－	
Analog output value(Terminal ID＝26)	Present		EB	E0EB	－	
Analog output value(Terminal ID＝27)	Present		EC	E0EC	－	
Analog output value(Terminal ID＝28)	Present		ED	E0ED	－	
Analog output value(Terminal ID＝29)	Present		EE	E0EE	－	
Analog output value(Terminal ID＝30)	Present		EF	E0EF	－	
Analog output value(Terminal ID＝31)	Present		F0	E0F0	－	
Analog output value(Terminal ID＝32)	Present		F1	E0F1	－	
Control status(RUN／STOP)	Present		F2	E0F2	－	0：STOP 1：RUN
Contact output 1 status	Present		F3	E0F3	－	0：ON 1： OFF
Contact output 2 status	Present		F4	E0F4	－	
Contact output 3 status	Present		F5	E0F5	－	

(6) In the case of that target units of Logging is EcoMonitorPlus (EMU4-PX4).

Logging item		Logging kind [Note1]	Group number	Channel number	Data name	Unit	Model that logging is enable
							EMU4-PX4
Pluse count	CH1	difference	83	01	PI1	—	●
Pluse count	CH2	difference	84	01	PI2	—	●
Pluse count	CH3	difference	85	01	PI3	—	●
Pluse count	CH4	difference	86	01	PI4	—	●
Pulse convertion	CH1	difference	83	6A	836A	—	●
Pulse convertion	CH2	difference	84	6A	846A	—	●
Pulse convertion	CH3	difference	85	6A	856A	—	●
Pulse convertion	CH4	difference	86	6A	866A	—	●
Contact state	CH1	difference	A0	00	A000	—	●
Contact state	CH2	difference	A0	01	A001	—	●
Contact state	CH3	difference	A0	02	A002	—	●
Contact state	CH4	difference	A0	03	A003	—	●
Null		—	00	00	—	—	●

[Note 1] 3 Instantaneous value is logged for measured value of collection timing.
For the difference value, the differential value between the weighing value of this collection timing and the weighing value of the previous collection timing is logged.
Weighing value at collecting timing is logged for integrated value.

(7) In the case of that target units of Logging is EcoMonitorPlus (EMU4-AX4).

Logging item		Logging kind [Note1]	Group number	Channel number	Data name	Unit	Model that logging is enable
							EMU4-PX4
AD conversion value	CH1	Present	19	01	An1	—	●
AD conversion value	CH2	Present	1B	01	An2	—	●
AD conversion value	CH3	Present	1D	01	An3	—	●
AD conversion value	CH4	Present	1F	01	An4	—	●
Scaling value	CH1	Present	19	21	1921	—	●
Scaling value	CH2	Present	1B	21	1B21	—	●
Scaling value	CH3	Present	1D	21	1D21	—	●
Scaling value	CH4	Present	1F	21	1F21	—	●
Number of times exceeding the Limit A	CH1	Present	91	00	9100	—	●
Number of times exceeding the Limit B	CH1	Present	91	01	9101	—	●
Number of times exceeding the Limit C	CH1	Present	91	02	9102	—	●
Number of times exceeding the Limit D	CH1	Present	91	03	9103	—	●
Number of times exceeding the Limit A	CH2	Integral	91	10	9110	—	●
Number of times exceeding the Limit B	CH2	Integral	91	11	9111	—	●
Number of times exceeding the Limit C	CH2	Integral	91	12	9112	—	●
Number of times exceeding the Limit D	CH2	Integral	91	13	9113	—	●
Number of times exceeding the Limit A	CH	Integral	91	20	9120	—	●
Number of times exceeding the Limit B	CH	Integral	91	21	9121	—	●
Number of times exceeding the Limit C	CH	Integral	91	22	9122	—	●
Number of times exceeding the Limit D	CH	Integral	91	23	9123	—	●
Number of times exceeding the Limit A	CH	Integral	91	30	9130	—	●
Number of times exceeding the Limit B	CH	Integral	91	31	9131	—	●
Number of times exceeding the Limit C	CH	Integral	91	32	9132	—	●
Number of times exceeding the Limit D	CH	Integral	91	33	9133	—	●
Null		—	00	00	—	—	●

[Note 1] 3 Instantaneous value is logged for measured value of collection timing.
For the difference value, the differential value between the weighing value of this collection timing and the weighing value of the previous collection timing is logged.
Weighing value at collecting timing is logged for integrated value.

List of system log codes

System log code	Meaning
001	The Logging Unit was booted.
100	Power failure occurred.
150	Power failure occurred during communication with the SD memory card. Data in the memory card may be broken, so format the memory card in the way specified in this manual. (☛Page 34)
201	The present time data was reset due to power-off with battery voltage low.
202	Logging data and system log data were erased due to power-off with battery voltage low.
203	The Energy Measuring Unit was replaced to the other. All logging data is erased.
301	Logging condition was changed. All logging data is erased.
302	Logging ID was changed.
303	The present time setting was changed. All logging data is erased.
304	Logging data was cleared.
305	Either “Phase wire system”, “Primary voltage (Use or non-use of VT , Direct Voltage , Primary voltage with VT , Special primary voltage)”, “Primary current (Direct sensor , 5A sensor , Special primary current) ” or “Sensor type” was changed. All logging data is erased.
907	Change of logging condition was failed.
801	Fall of battery voltage was detected.
902	Logging setting error occurred. Refer to “Error display and measures” (☛Page 35).
912	Communication error between units occurred. Refer to “Error display and measures” (☛Page 35).
903	FRAM error occurred. Refer to “Error display and measures” (☛Page 35).
905, 906	RTC error occurred. Refer to “Error display and measures” (☛Page 35).
941	The SD memory card was connected with the write protect switch “ON”. Turn the write protect switch to “OFF” position.
942 to 951	SD memory card error occurred. Refer to “Error display and measures” (☛Page 35).

Logging Unit for Energy Measuring Unit

■Service Network

Country/Region	Corporation Name	Address	Telephone
Australia	Mitsubishi Electric Australia Pty. Ltd.	348 Victoria Road, Rydalmere, N.S.W. 2116, Australia	+61-2-9684-7777
Algeria	Mec Casa	Rue i N 125 Hay-Es-Salem, 02000, W-Chlef, Algeria	+213-27798069
Bangladesh	PROGRESSIVE TRADING CORPORATION	HAQUE TOWER,2ND FLOOR,610/11,JUBILEE ROAD, CHITTAGONG, BANGLADESH	+880-31-624307
	ELECTRO MECH AUTOMATION& ENGINEERING LTD.	SHATABDI CENTER, 12TH FLOOR, SUITES：12-B, 292, INNER CIRCULAR ROAD, FAKIRA POOL, MOTIJHEEL, DHAKA-1000, BANGLADESH	+88-02-7192826
Belarus	Tehnikon	Oktyabrskaya 19, Off. 705, BY-220030 Minsk, Belarus	+375 (0)17 / 210 46 26
Belgium	Koning & Hartman B.V.	Woluwelaan 31, BE-1800 Vilvoorde, Belgium	+32 (0)2 / 2570240
Brazil	Mitsubishi Electric do Brasil Comércio e Serviços Ltda.	Avenida Adelino Cardana, 293 – 21º Andar, Bethaville, Barueri, SP, Brasil, CEP 06401-147	+55-11-4689-3000
Cambodia	DHINIMEX CO.,LTD	#245, St. Tep Phan, Phnom Penh, Cambodia	+855-23-997-725
Central America	Automation International LLC	7050 W. Palmetto Park Road Suite #15 PMB #555, Boca Raton, FL 33433	+1-561-237-5228
Chile	Rhona S.A. (Main office)	Vte. Agua Santa 4211 Casilla 30-D (P.O. Box) Vina del Mar, Chile	+56-32-2-320-600
China	Mitsubishi Electric Automation (China) Ltd.	Mitsubishi Electric Automation Building, No.1386 Hongqiao Road, Shanghai, China 200336	+86-21-2322-3030
	Mitsubishi Electric Automation (China) Ltd. BeiJing	5/F,ONE INDIGO,20 Jiuxianqiao Road Chaoyang District,Beijing, China 100016	+86-10-6518-8830
	Mitsubishi Electric Automation (China) Ltd. ShenZhen	Level 8, Galaxy World Tower B, 1 Yabao Road, Longgang District, Shenzhen, China 518129	+86-755-2399-8272
	Mitsubishi Electric Automation (China) Ltd. GuangZhou	Rm.1006, A1 Times E-Park, No.276-282, Hanxi Road East, Zhongcun Street, Panyu Distric, Guangzhou, China 510030	+86-20-8923-6730
	Mitsubishi Electric Automation (China) Ltd. ChengDu	1501-1503,15F, Guang-hua Centre Building-C, No.98 North Guang Hua 3th Rd Chengdu, China 610000	+86-28-8446-8030
	Mitsubishi Electric Automation (Hong Kong) Ltd.	20/F., Cityplaza One, 1111 king's Road, Taikoo shing, Hong Kong	+852-2510-0555
Colombia	Proelectrico Representaciones S.A.	Carrera 42 Nº 75 – 367 Bodega 109, Itagüi, Medellín, Antioquia, Colombia	+57-4-4441284
Czech Republic	AUTOCONT CONTROL SYSTEMS S.R.O	Technologická 374/6, CZ-708 00 Ostrava - Pustkovec	+420 595 691 150
Denmark	BEIJER ELECTRONICS A/S	LYKKEGARDSVEJ 17, DK-4000 ROSKILDE, Denmark	+45 (0)46/ 75 76 66
Egypt	Cairo Electrical Group	9, Rostoum St. Garden City P.O. Box 165-11516 Maglis El-Shaab,Cairo - Egypt	+20-2-27961337
France	Mitsubishi Electric Europe B.V. French Branch	FR-92741 Nanterre Cedex	+33 (0)1 55 68 57 01
Germany	Mitsubishi Electric Europe B.V.	Mitsubishi-Electric-Platz 1, 40882 Ratingen, Germany	+49 (0) 2102 4860
Greece	KALAMARAKIS - SAPOUNAS S.A.	IONIAS & NEROMILOU STR., CHAMOMILOS ACHARNES, ATHENS, 13678 Greece	+30-2102 406000
	UTECO	5, MAVROGENOUS STR., 18542 PIRAEUS, Greece	+30-211-1206-900
Hungary	Meltrade Ltd.	Fertö utca 14. HU-1107 Budapest, Hungary	+36 (0)1-431-9726
India	Mitsubishi Electric India Private Limited	2nd Floor, Tower A&B, Cyber Greens, DLF Cyber City, DLF Phase-III, Gurgaon - 122 022 Haryana, India	+91-124-4630300
	Mitsubishi Electric India Private Limited Pune Sales Office	ICC-Devi Gaurav Technology Park, Unit no. 402, Fourth Floor, Survey no. 191-192 (P), Opp. Vallabh Nagar Bus Depot, Pune – 411018, Maharashtra, India	+91-20-68192100
	Mitsubishi Electric India Private Limited FA Center	204-209, 2nd Floor, 31FIVE, Corporate Road, Prahladnagar, Ahmedabad 380015,Gujarat. India	+91-79677-77888
Indonesia	PT.Mitsubishi Electric Indonesia	Gedung Jaya 8th floor, JL.MH. Thamrin No.12 Jakarta Pusat 10340, Indonesia	+62-21-3192-6461
	P.T. Sahabat Indonesia	P.O.Box 5045 Kawasan Industri Pergudangan, Jakarta, Indonesia	+62-(0)21-6610651-9
Ireland	Mitsubishi Electric Europe B.V.	Westgate Business Park, Ballymount, IRL-Dublin 24, Ireland	+353 (0)1-4198800
Israel	Gino Industries Ltd.	26, Ophir Street IL-32235 Haifa, Israel	+972 (0)4-867-0656
Italy	Mitsubishi Electric Europe B.V.	Viale Colleoni 7, I-20041 Agrate Brianza (MI), Italy	+39 039-60531
Kazakhstan	Kazpromavtomatika	Ul. Zhambyla 28, KAZ - 100017 Karaganda	+7-7212-501000
Korea	Mitsubishi Electric Automation Korea Co., Ltd	9F Gangseo Hangang xi-tower A, 401 Yangcheon-ro, Gangseo-gu, Seoul 07528 Korea	+82-2-3660-9573
Laos	AROUNKIT CORPORATION IMPORT-EXPORT SOLE CO.,LTD	SAPHANMO VILLAGE. SAYSETHA DISTRICT, VIENTIANE CAPITAL, LAOS	+856-20-415899
Lebanon	Comptoir d'Electricite Generale-Liban	Cebaco Center - Block A Autostrade Dora, P.O. Box 11-2597 Beirut - Lebanon	+961-1-240445
Lithuania	Rifas UAB	Tinklu 29A, LT-5300 Panevezys, Lithuania	+370 (0)45-582-728
Malaysia	Mittric Sdn Bhd	No. 5 Jalan Pemberita U1/49, Temasya Industrial Park, Glenmarie 40150 Shah Alam,Selangor, Malaysia	+603-5569-3748
	Flexible Automation System Sdn Bhd	60, Jalan USJ 10/1B,UEP Subang Jaya,47620 Selangor Darul Ehsan,Malaysia	+603-5633-1280
Malta	ALFATRADE LTD	99 PAOLA HILL, PAOLA PLA 1702, Malta	+356 (0)21-697-816
Maroco	SCHIELE MAROC	KM 7,2 NOUVELLE ROUTE DE RABAT AIN SEBAA, 20600 Casablanca, Maroco	+212 661 45 15 96
Myanmar	Peace Myanmar Electric Co.,Ltd.	NO137/139 Botahtaung Pagoda Road, Botahtaung Town Ship 11161,Yangon,Myanmar	+95-(0)1-202589
Nepal	Watt&Volt House	KHA 2-65,Volt House Dillibazar Post Box:2108,Kathmandu,Nepal	+977-1-4411330
Netherlands	Imtech Marine & Offshore B.V.	Sluisjesdijk 155, NL-3087 AG Rotterdam, Netherlands	+31 (0)10-487-19 11
North America	Mitsubishi Electric Automation, Inc.	500 Corporate Woods Parkway, Vernon Hills, IL 60061 USA	+847-478-2100
Norway	Scanelec AS	Leirvikasen 43B, NO-5179 Godvik, Norway	+47 (0)55-506000
Mexico	Mitsubishi Electric Automation, Inc. Mexico Branch	Blvd. Miguel de Cervantes Saavedra 301, Torre Norte Piso 5, Col. Ampliación Granada, Miguel Hidalgo, Ciudad de México, CP 11520, México	+52-55-3067-7511
Middle East Arab Countries & Cyprus	Comptoir d'Electricite Generale-International-S.A.L.	Cebaco Center - Block A Autostrade Dora P.O. Box 11-1314 Beirut - Lebanon	+961-1-240430
Pakistan	Prince Electric Co.	2-P GULBERG II, LAHORE, 54600, PAKISTAN	+92-42-575232, 5753373
Peru	Rhona S.A. (Branch office)	Avenida Argentina 2201, Cercado de Lima	+51-1-464-4459
Philippines	MELCO Factory Automation Philippines Inc.	128, Lopez Rizal St., Brgy. Highway Hills, Mandaluyong City, Metro Manila, Phillippines	+63-(0)2-256-8042
	Edison Electric Integrated, Inc.	24th Fl. Galleria Corporate Center, Edsa Cr. Ortigas Ave., Quezon City Metro Manila, Philippines	+63-(0)2-634-8691
Poland	Mitsubishi Electric Europe B.V. Polish Branch	Krakowska 48, 32-083 Balice, Poland	+48 12 347 65 00
Republic of Moldova	Intehsis SRL	bld. Traian 23/1, MD-2060 Kishinev, Moldova	+373 (0)22-66-4242
Romania	Sirius Trading & Services SRL	RO-060841 Bucuresti, Sector 6 Aleea Lacul Morii Nr. 3	+40-(0)21-430-40-06
Russia	Mitsubishi Electric (Russia) LLC	2 bld.1, Letnikovskaya street, Moscow, 115114, Russia	+7 495 721-2070
Saudi Arabia	Center of Electrical Goods	Al-Shuwayer St. Side way of Salahuddin Al-Ayoubi St. P.O. Box 15955 Riyadh 11454 - Saudi Arabia	+966-1-4770149
Singapore	Mitsubishi Electric Asia Pte. Ltd.	307 Alexandra Road, Mitsubishi Electric Building, Singapore 159943	+65-6473-2308
Slovakia	PROCONT, Presov	Kupelna 1/, SK - 08001 Presov, Slovakia	+421 (0)51 - 7580 611
	SIMAP	Jana Derku 1671, SK - 91101 Trencin, Slovakia	+421 (0)32 743 04 72
Slovenia	Inea RBT d.o.o.	Stegne 11, SI-1000 Ljubljana, Slovenia	+386 (0)1-513-8116
South Africa	CBI-electric: low voltage	Private Bag 2016, ZA-1600 Isando Gauteng, South Africa	+27-(0)11-9282000
Spain	Mitsubishi Electric Europe B.V. Spanish Branch	Carretera de Rubí 76-80, E-08190 Sant Cugat del Vallés (Barcelona), Spain	+34 (0)93-565-3131
Sweden	Mitsubishi Electric Europe B.V. (Scandinavia)	Hedvig Möllers gata 6, 223 55 Lund, Sweden	+46 (0)8-625-10-00
	Euro Energy Components AB	Järnvägsgatan 36, S-434 24 Kungsbacka, Sweden	+46 (0)300-690040
Switzerland	TriElec AG	Muehlentalstrasse 136, CH-8201 Schaffhausen, Switzerland	+41-(0)52-6258425
Taiwan	Setsuyo Enterprise Co., Ltd	5th Fl., No.105, Wu Kung 3rd, Wu-Ku Hsiang, Taipei, Taiwan, R.O.C.	+886-(0)2-2298-8889
Thailand	United Trading & Import Co., Ltd.	77/12 Bamrungmuang Road,Klong Mahanak Pomprab Bangkok Thailand	+66-223-4220-3
	MITSUBISHI ELECTRIC FACTORY AUTOMATION (THAILAND) CO.,LTD	101, True Digital Park Office, 5th Floor, Sukhumvit Road, Bangchak, Phara Khanong, Bangkok, 10260 Thailand	+662-092-8600
Tunisia	MOTRA Electric	3, Résidence Imen, Avenue des Martyrs Mourouj III, 2074 - El Mourouj III Ben Arous, Tunisia	+216-71 474 599
Turkey	Mitsubishi Electric Turkey A.Ş.	Şerifali Mahallesi Kale Sokak No: 41, 34775 Ümraniye, İstanbul, Turkey	+90-216-969-2666
United Kingdom	Mitsubishi Electric Europe B.V.	Travellers Lane, UK-Hatfield, Herts. AL10 8XB, United Kingdom	+44 (0)1707-276100
Uruguay	Fierro Vignoli S.A.	Avda. Uruguay 1274 Montevideo Uruguay	+598-2-902-0808
Vietnam	Mitsubishi Electric Vietnam Co.,Ltd. Head Office	11th & 12th Floor, Viettel Tower B, 285 Cach Mang Thang 8 Street, Ward 12, District 10, Ho Chi Minh City, Vietnam	+84-28-3910-5945
	Mitsubishi Electric Vietnam Co.,Ltd. Hanoi Branch	24th Floor, Handico Tower, Pham Hung Road, khu do thi moi Me Tri Ha, Nam Tu Liem District, Hanoi City, Vietnam	+84-24-3937-8075

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

IB63780-G 20 12

New publication effective Dec.2020