MITSUBISHI ELECTRIC

DISPLAY UNIT for (Energy Measuring Unit)
Model: EMU4-D65
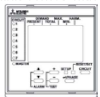Instruction manual (Simplified edition)

● Be sure to read this instruction manual and this equipment detail manual before use.
● After reading on, you keep it in a safe place where you can be seen at any time, please read when needed.
● Please send this instruction manual to the end user.

> This product is the optional dedicated product only for Mitsubishi Energy Measuring Unit (EcoMonitorPlus, EcoMonitorPro) and Mitsubishi Measuring Unit for MDU Breakers (MDU2). It can not be used for other purpose.

1. Feature

● The monitoring of measured data at Mitsubishi Energy Measuring Unit is possible.
● Easily viewable by backlight and dot matrix LCD display.
● Multiple circuit monitoring is possible using only one unit.
● It is possible to switch the display language (Japanese / English) in the setting.

2. Confirmation of contents of package

Each unit comes with the following accessories. Check for missing ones.
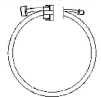
Main Body x1　　　Connection cable x1　　　Instruction manual (Simplified edition) x1　　　Switching board Installation screw x2

3. Precautions concerning working environment and conditions

3.1 Working environment and working conditions

This equipment, based on the assumption that it is used in the pollution degree 2 (Note 1) environment.If it is used in other degree of contamination, please do the protection on the device side to be incorporated.Measurement categories for measuring circuit for this equipment is CATⅢ (Note 1).
The overvoltage category of the auxiliary power supply circuit (MA, MB) is CATⅢ (Note 1).Do not use the unit in any of the following places. Doing so may cause malfunction or reduction in service life.

- Place where the ambient temperature exceeds the working temperature range(−5°C +55°C)
- Place with much dust, corrosive gas, salt or oily smoke
- Place where the humidity exceeds the humidity range (30% - 85%RH) or condensation occurs
- Place where the unit may be exposed to rain or drops of water
- Place where metallic particles or inductive substances are dispersed
- Place where the daily mean temperature exceeds 35°C
- Place with much vibration or impact
- Place exposed to direct sunlight
- Place with strong electromagnetic field or much foreign noise
- Place where the altitude is over 2000m

This equipment is the open type equipment. (Electric shock protection of the instrument was designed to perform housed in another apparatus equipment)
Please use are housed in a control panel etc. Always. For notes on when to adapt the equipment that you have configured in this equipment to the EMC Directive, please refer to the "user's manual (Details)".
Note 1 : For a definition of pollution degree and the measurement categories, please refer to the EN61010-1 / 2010.

3.2 Preparation before using

- An installation place should keep the working environment and working conditions.
- The protection sheet for the crack prevention is put on the display part. Before use this product, remove the protection sheet. It is not unusual, although a LCD display part may light up by generating of static electricity in case it removes. After a while, it disappears by natural electric discharge.
- Following setup is need before using EMU4-D65.
  The one always in one system is the Master set, Other display unit of, please to Slave configuration.
  (The wrong setting and it does not work)

Please use after removing the protection sheet.

3.3 Installation and connection

⚠Caution
- Before installing and connecting the unit, read the instruction manual without fail. For safety, the unit shall be installed and connected by experts in electrical work.
- When threading and wiring, take utmost care that cuttings and wire pieces do not enter the unit.
- Connect the wires carefully checking the wiring diagram. Improper wiring can cause unit failure, fire and electric shock.
- Perform wiring work in a dead state. Do not wire the unit in a live state. Doing so can cause electric shock, ground fault, unit failure and fire.

3.4 Precautions for Use

- This unit cannot be used for deal and proof of electric energy measurement stipulated in Measurement Act.
- EMU4-PX4 and EMU4-AX4 is supported with later version 2.00. For information about how to determine the version, please refer to "user's manual (Details)".

⚠Caution
- Use this unit within the ratings specified in this manual. If it is used outside the ratings, it may cause not only malfunction or failure but also fire burnout.
- Do not disassemble or modify this unit. It may cause failure, malfunction, injury or fire.
- Do not touch the live part such as connection terminal. It may cause electric shock, electric burn injury or burnout of the device. If any exposed conductor is found, stop the operation immediately; and take an appropriate action such as isolation protection.

3.5 Maintenance Precautions

- Use a soft dry cloth to clean off dirt of the unit surface. Do not let a chemical cloth remain on the surface for an extended period of time nor wipe the surface with thinner or benzene.
- Check for the following items to use this unit properly for long time.
  (1) Daily maintenance
  　　(a) No damage on this unit　　　　(b) No abnormality with LED　　　　(c) No abnormal noise, smell or heat
  (2) Periodical maintenance (Once every 6 months to 1 year)
  　　・No looseness with installation and wire connection

⚠Caution
Do periodical maintenance under the electric outage condition. Failure to do so may cause electric shock, failure of the unit or a fire. Tighten the terminal regularly to prevent a fire. In case a display unit is attached to a sensor unit, get off the display unit during maintaining or tightening terminals.

3.6 Storage Precautions

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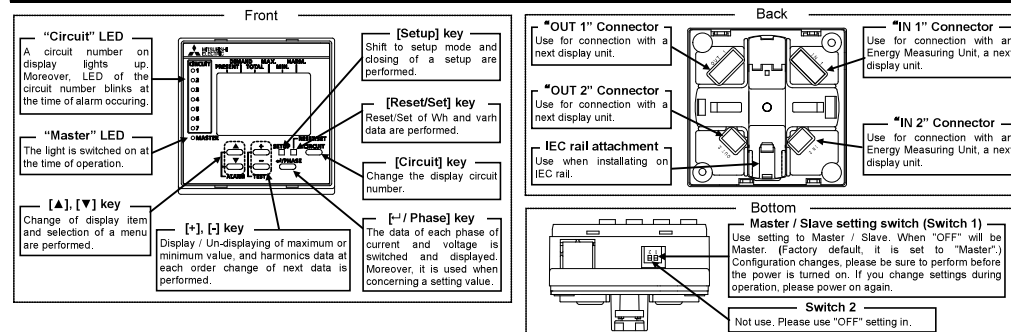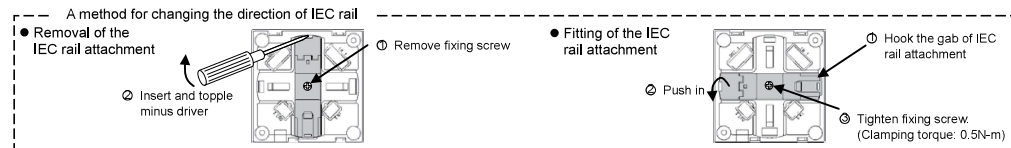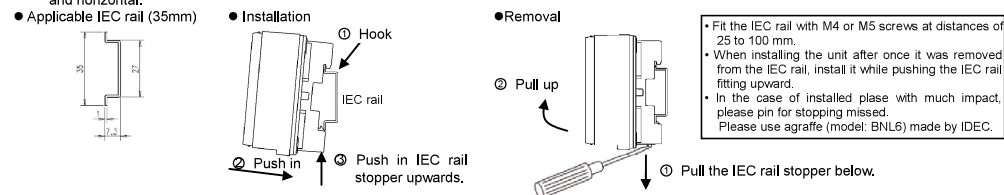
3.7 Disposal Precautions

When disposing of this unit, treat it as industrial waste.

3.8 About packaging materials and this manual

For reduction of environment load, packaging materials are produced with cardboard.

4. Part Names and Functions

Front

"Circuit" LED
A circuit number on display lights up. Moreover, LED of the circuit number blinks at the time of alarm occuring.

"Master" LED
The light is switched on at the time of operation.

[▲], [▼] key
Change of display item and selection of a menu are performed.

[+], [-] key
Display / Un-displaying of maximum or minimum value, and harmonics data at each order change of next data is performed.

[Setup] key
Shift to setup mode and closing of a setup are performed.

[Reset/Set] key
Reset/Set of Wh and varh data are performed.

[Circuit] key
Change the display circuit number.

[↵ / Phase] key
The data of each phase of current and voltage is switched and displayed. Moreover, it is used when concerning a setting value.

Back

"OUT 1" Connector
Use for connection with a next display unit.

"OUT 2" Connector
Use for connection with a next display unit.

IEC rail attachment
Use when installing on IEC rail.

"IN 1" Connector
Use for connection with an Energy Measuring Unit, a next display unit.

"IN 2" Connector
Use for connection with an Energy Measuring Unit, a next display unit.

Bottom

Master / Slave setting switch (Switch 1)
Use setting to Master / Slave. When "OFF" will be Master. (Factory default, it is set to "Master".) Configuration changes, please be sure to perform before the power is turned on. If you change settings during operation, please power on again.
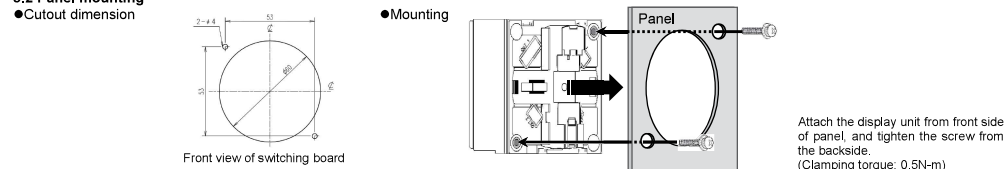
Switch 2
Not use. Please use "OFF" setting in.

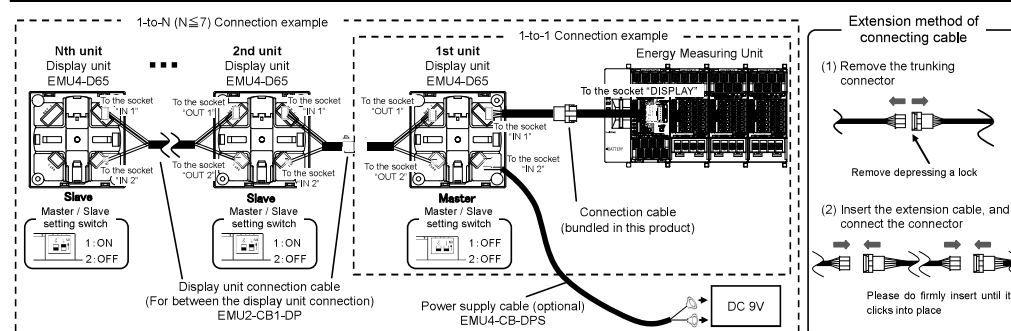## 5. Installation

5.1 IEC rail installation

Fix the display unit to IEC rail using IEC rail attachment on the back. Changing the direction of IEC rail attachment, it can attach in both direction of vertical and horizontal.

● Applicable IEC rail (35mm)　　● Installation　　●Removal

① Hook
② Push in ③ Push in IEC rail stopper upwards.
IEC rail
② Pull up
① Pull the IEC rail stopper below.

- Fit the IEC rail with M4 or M5 screws at distances of 25 to 100 mm.
- When installing the unit after once it was removed from the IEC rail, install it while pushing the IEC rail fitting upward.
- In the case of installed place with much impact, please pin for stopping missed.
  Please use agraffe (model: BNL6) made by IDEC.

A method for changing the direction of IEC rail

● Removal of the IEC rail attachment
① Remove fixing screw
② Insert and topple minus driver

● Fitting of the IEC rail attachment
① Hook the gab of IEC rail attachment
② Push in
③ Tighten fixing screw. (Clamping torque: 0.5N-m)

5.2 Panel mounting

●Cutout dimension

Front view of switching board

●Mounting

Panel

Attach the display unit from front side of panel, and tighten the screw from the backside.
(Clamping torque: 0.5N-m)

6. Connection method

1-to-N (N≦7) Connection example

Nth unit
Display unit
EMU4-D65
To the socket "IN 1"
To the socket "IN 2"
Slave
Master / Slave setting switch
1:ON
2:OFF

2nd unit
Display unit
EMU4-D65
To the socket "OUT 1"
To the socket "OUT 2"
To the socket "IN 1"
To the socket "IN 2"
Slave
Master / Slave setting switch
1:ON
2:OFF

Display unit connection cable
(For between the display unit connection)
EMU2-CB1-DP

1st unit
Display unit
EMU4-D65
To the socket "OUT 1"
To the socket "OUT 2"
To the socket "IN 1"
To the socket "IN 2"
Master
Master / Slave setting switch
1:OFF
2:OFF

1-to-1 Connection example

Energy Measuring Unit
To the socket "DISPLAY"

Connection cable
(bundled in this product)

Power supply cable (optional)
EMU4-CB-DPS
DC 9V

Extension method of connecting cable

(1) Remove the trunking connector

Remove depressing a lock

(2) Insert the extension cable, and connect the connector

Please do firmly insert until it clicks into place

* If the connection is two or more, you must have a power supply from commercial DC power supply (Model:PBA15F-9-N1, made in COSEL CO., LTD.). Also, the power supply cable (optional : EMU4-CB-DPS) on its connection is required.
* Extension cable (EMU2-CB-T * M), the sum of the length is less than 10m. The one always in one system is the Master set, Other display unit of, please to Slave configuration. (The wrong setting and it does not work)

7. Operations of Instrument (in the case of the model to connect the EMU4-**)
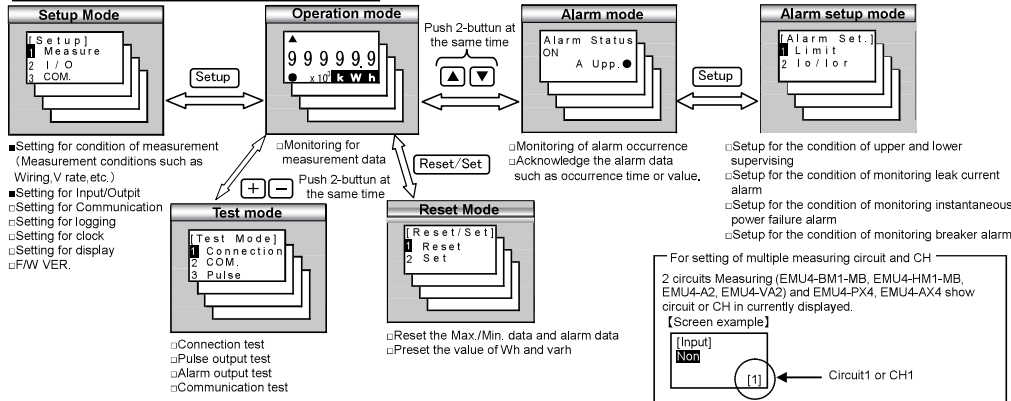
7.1 Operation mode

There are following modes of operation. This device is used to switch the operation mode depending on the application. Such as the following, View of measurement value, Setting for rating, display, clock, Setup for the condition of monitoring, Reset the Max./Min, Data and alarm data, Preset the value of Wh and varh. Immediately after the power is turned on, it will be the display of the operation mode.

* When connecting to EMU4-CNT-MB and using it, the fixed value is displayed on the operation screen, and EMU4-HM1-MB setting menu is displayed on the setting screen. Therefore, it is not possible to display the operation status of the control unit or set the control unit. Check the detailed instruction manual for this equipment for details of operation.

For operation in each screen, please refer to the following.
- ■ Section 7.2 in this manual   □: user's manual (Details)

Setup Mode
```
[Setup]
1 Measure
2 I/O
3 COM.
```

Operation mode
```
999999
● x10³ kWh
```
Push 2-button at the same time ▲▼

Alarm mode
```
Alarm Status
ON
A Upp.●
```

Alarm setup mode
```
[Alarm Set.]
1 Limit
2 Io/Ior
```

Setup → / Setup →

■Setting for condition of measurement
(Measurement conditions such as Wiring, V rate, etc.)
■Setting for Input/Output
□Setting for Communication
□Setting for logging
□Setting for clock
□Setting for display
□F/W VER.

□Monitoring for measurement data
Push 2-button at the same time + −

Reset/Set

Test mode
```
[Test Mode]
1 Connection
2 COM.
3 Pulse
```

Reset Mode
```
[Reset/Set]
1 Reset
2 Set
```

□Connection test
□Pulse output test
□Alarm output test
□Communication test

□Reset the Max./Min. data and alarm data
□Preset the value of Wh and varh

□Monitoring of alarm occurrence
□Acknowledge the alarm data such as occurrence time or value.

□Setup for the condition of upper and lower supervising
□Setup for the condition of monitoring leak current alarm
□Setup for the condition of monitoring instantaneous power failure alarm
□Setup for the condition of monitoring breaker alarm

For setting of multiple measuring circuit and CH
2 circuits Measuring (EMU4-BM1-MB, EMU4-HM1-MB, EMU4-A2, EMU4-VA2) and EMU4-PX4, EMU4-AX4 show circuit or CH in currently displayed.
【Screen example】
```
[Input]
Non
[1]
```
→ Circuit1 or CH1

7.2 Setup about rating and Input/Output. (Setup mode)
7.2.1 Measuring setup … Setup the measuring condition of the energy measurement unit that is connected. EMU4-PX4 is not set.
*EMU4-CNT-MB cannot be set.

Screen	Operation	Note
1 Transition to the setup mode		
1-1. [Setup] 1 Measure 2 I/O 3 COM.	(1) Push the [Setup] key in operation mode. (2) 1-1 will be displayed. (1) Confirm that the cursor focuses the "1 Measure", and push the [↵/Phase] key. (2) 2-1 will be displayed	
2 Setup the phase wire system (All models except for EMU4-PX4 and EMU4-AX4)		
2-1. [Measure] 1 Wiring 2 V rate 3 A rate	(1) In 2-1, push the [▲] or [▼] key, and move the cursor to the "1 Wiring" (2) Push the [↵/Phase] key. (3) 2-2 will be displayed.	
2-2. [Wiring] 3P3W	(1) Push the [+] or [−] key, and change the set value. (2) Push the [↵/Phase] key, and confirm the setting value. (3) 2-1 will be displayed.	[Wiring]:1P2W⇔1P3W⇔**3P3W**⇔3P4W⇔ *If the basic unit is EMU4-BM1-MB, [Wiring] will be 1P2W, 1P3W, 3P3W only. *The setting value is set in same voltage system after confirmed setting value.
2-3. [2 circuits MEA.] Off	(1) Push the [+] or [−] key, and change the set value. (2) Push the [↵/Phase] key, and confirm the setting value. (3) 2-1 will be displayed.	[2 circuits Measuring existence]:**No**⇔Yes⇔ *The setting value is set in same voltage system after confirmed setting value.
3 Setup the primary voltage (All models except for EMU4-LG1-MB, EMU4-PX4 and EMU4-AX4)		
3-1. [Measure] 1 Wiring 2 V rate 3 A rate	(1) In 3-1, push the [▲] or [▼] key, and move the cursor to the "2 V rate". (2) Push the [↵/Phase] key. (3) 3-2 will be displayed.	*The setting value is set in same voltage system after confirmed setting value. [VT]:**No**⇔Yes⇔ *1P3W is "No" fixed. 1P2W, 3P3W When [VT]: "No" setting [Direct V]:110V⇔**220V**⇔440V*
3-2. [VT] No	(1) Push the [+] or [−] key, and select the VT use or non-use. (2) Push the [↵/Phase] key. (3) Transition to the following screen by the selection of VT use or non-use [No] setting→ To 3-3 [YES] setting → To 3-4 (If Wiring is 3P4W, transition to 3-5)	*If the basic unit is EMU4-BM1-MB, [Direct V] will be 110V, 220V only. When [VT]: "Yes" setting [Primary V]:**440V**⇔690V⇔1100V⇔2200V⇔3300V⇔6600V⇔11000V⇔ 13200V⇔13800V⇔15000V⇔16500V⇔22000V⇔24000V⇔ 33000V⇔66000V⇔77000V⇔110000V⇔SP⇔
3-3. [Direct V] 220V	(1) Push the [+] or [−] key, and change the set value. (2) Push the [↵/Phase] key, confirm the setting value. (3) 3-1 will be displayed.	When [Primary V] setting and SP setting [SP.PRI.V]:1~110000V(**440V**) (1~99V:Can be set in the 1V step.) (100~110000V:Can be set in the 100V step.) [SP.2nd.V]:1~220V(**110V**) (Can be set in the 1V step.)
3-4. [Primary V] 440V	(1) Push the [+] or [−] key, and change the set value. (2) Push the [↵/Phase] key, and confirm the setting value. (3) transition to the following screen by the setting value of the primary voltage [SP] setting → To 3-5 Non-[SP] setting → To 3-1	1P3W ──────────── "No" fixed [Direct V]:**110V**⇔220V* *If the basic unit is EMU4-BM1-MB, [Direct V] will be 110V 3P4W ──────────── When [VT]:"Yes" setting [Direct V]:63.5V⇔100V⇔105V⇔110V⇔115V⇔120V⇔127V⇔200V⇔**220V**⇔230V⇔240V⇔242V⇔250V⇔254V⇔265V⇔277V⇔
3-5. [SP.PRI.V] 000440V	(1) Push the [▲] [▼] [+] [−] key, and change the set value. (2) Push the [↵/Phase] key, and confirm the setting value. (3) 3-6 will be displayed.	When [VT]:"Yes" setting [SP.PRI.V]:1~63500V(**440V**) (1~99V:Can be set in the 1V step.) (100~63500V:Can be set in the 100V step.) [SP.2nd.V]:1~220V(**64V**) (Can be set in the 1V step.)
3-6. [SP.2nd.V] 220V	(1) Push the [▲] [▼] [+] [−] key, and change the set value. (2) Push the [↵/Phase] key, and confirm the setting value. (3) 3-1 will be displayed.	

- 3 -

Screen	Operation	Note
4 Setup the primary current (All models except for EMU4-LG1-MB, EMU4-PX4 and EMU4-AX4)		
4-1. [Measure] 1 Wiring 2 V rate 3 A rate	(1) In 4-1, Push the [▲] or [▼] key, and move the cursor to the "3 A rate". (2) Push the [↵/Phase] key. (3) 4-2 will be displayed.	[Sensor]:**Direct**⇔5A⇔ When "Direct" setting [PRI A]:50A⇔**100A**⇔250A⇔400A⇔600A⇔ When "5A" setting
4-2. [Sensor] Direct [PRI A] 100A [1] 1P2W only	(1) Push the [▲] or [▼] key, and move the cursor to the "Sensor" side. (2) Push the [+] or [−] key, and select sensor type. (3) Push the [▲] or [▼] key, and move the cursor to the "PRI A" side. (4) Push the [+] or [−] key, and change the primary current value. (5) Push the [↵/Phase] key, and confirm the setting value. (6) Transition to the following screen by the setting wiring type and primary current value. [SP] setting → To 4-3 Non-[SP] setting → To 4-1	[PRI A]:5A⇔6A⇔7.5A⇔8A⇔10A⇔12A⇔15A⇔20A⇔25A⇔ 30A⇔40A⇔50A⇔60A⇔75A⇔80A⇔**100A**⇔120A⇔ 150A⇔200A⇔300A⇔400A⇔500A⇔600A⇔ 750A⇔800A⇔1000A⇔1200A⇔1250A⇔1500A⇔ 1600A⇔2000A⇔2500A⇔3000A⇔4000A⇔5000A⇔ 6000A⇔7500A⇔8000A⇔10000A⇔12000A⇔ 20000A⇔25000A⇔30000A⇔SP⇔
4-3. [SP.PRI.A] 001000A [1]	(1) Push the [▲] [▼] [+] [−] key, and change the set value. (2) Push the [↵/Phase] key, and confirm the setting value. (3) 4-1 will be displayed.	[SP.PRI.A]:5.0~30000A(**100A**) 10A less than, the upper two digits. 10A more is possible to set the upper three digits.
5 Setup the display mode (All models except for EMU4-LG1-MB, EMU4-PX4 and EMU4-AX4)		
5-1. [Measure] 2 V rate 3 A rate 4 DISP.Mode	(1) In 5-1, push the [▲] or [▼] key, and move the cursor to the "4 DISP.Mode". (2) Push the [↵/Phase] key. (3) 5-2 will be displayed.	Set the measurement elements to be displayed in the display unit.
5-2. [DISP.Mode] Wh+A+4 Harmonics	(1) Push the [▲] or [▼] key, and select the display mode. (2) Push the [↵/Phase] key. (3) Transition to the following screen by the selection of measurement mode. [Wh+A+4] setting → To 5-3 [Harmonics] setting → To 5-4	[DISP.Mode]:**Wh+A+4**⇔Harmonics *In case of the model EMU4-BM1-MB, the "Harmonics" not be displayed. Wh+A+4…In addition to the active energy and current, up to 4 items can be displayed by selection. (The harmonics data is only about total.) Harmonics…It can display about harmonic data at each order.
5-3. [Element] □V □W □var □VA □PF □Hz □CONV.Wh □PRD.Wh □OP.Time □REG.Wh □varh □PLS □UNB.A □UNB.V □HA □HV	(1) Push the [▲] or [▼] key, and move the cursor to target element. (In the actual display, it will be scrolling display of each three elements in one screen.) (2) Push the [+] or [−] key, and choose the selected or deselected. (3) When selecting the other measurement item, repeat the operation from (1) to (2). (4) Push the [↵/Phase] key, and determine the setting. (5) Transition to the following screen by the selection of measurement mode. Not check "HA" and "HV"→To 5-1 Check "HA" or "HV" → To 5-4 *Elements is showed follow. V:Voltage W:Electric power var:reactive power VA:apparent power PF:Power factor Hz:frequency Wh converted value:Electric energy (converted) Periodic Wh:Electric energy (regeneration) Regenerated Wh:Periodic electric energy varh:Reactive energy (consumption lag) PULSE:Pulse count value and pulse converted value UNB.A:Current unbalance rate UNB.V:Voltage unbalance rate HA:Harmonics current HV:Harmonics voltage	[Element]:V, W, var, VA, PF, Hz, CONV.Wh, PRD.Wh, OP.Time, REG.Wh, varh, CONV.PLS, UNB.V, HA, HV □(Deselected), ☑(Selected) *The selectable number of elements is up to 4. So, change the selection at the state that already 4 items are selected, deselect the items before changing. * Elements can't select in follow table.

Elements select table:

Element	In the case can not select
UNB.A UNB.V	In the case of setting simplicity measuring mode
Periodic Wh	In the case of EMU4-BM1-MB, EMU4-A2, EMU4-VA2. External input is not contact input.
Pulse	In the case EMU4-BM1-MB, EMU4-A2, EMU4-VA2. Pulse input is not contact input.
HA HV	In the case EMU4-BM1-MB.
VA	In the case EMU4-BM1-MB. Wiring is 1P2W,1P3W or 3P3W
Wh converted value	In the case EMU4-BM1-MB

Screen	Operation	Note
5-4. [HA,HV] r.m.s.	(1) Push the [▲] or [▼] key, and change the "HA,HV" value. (2) Push the [↵/Phase] key. (3) 5-1 will be displayed.	[HA,HV]:**r.m.s.**⇔% * In case of the model EMU4-BM1-MB, "HA,HV" can not be set. r.m.s.… to display the RMS value of harmonic current or harmonic voltage. (The "%" not be displayed.) %… to display the distortion rate and content rate of harmonic current or harmonic voltage. (The "r.m.s." not be displayed.)
6(1) Setup the measurement mode (EMU4-LG1-MB only)		
6(1)-1. [Measure] 3 A rate 4 DISP.Mode 5 MEA.Mode	(1) In 6(1)-1, push the [▲] or [▼] key, and move the cursor to the "5 MEA.Mode". (2) Push the [↵/Phase] key. (3) 6(1)-2 will be displayed.	Setup the measurement mode of "Io" or "Ior".
6(1)-2. [MEA.Mode] High SENS. Low SENS.	(1) Push the [▲] or [▼] key, and select the measurement mode. (2) Push the [↵/Phase] key. (3) 6(1)-1 will be displayed.	[MEA.Mode]:**High SENS.**⇔Low SENS.⇔ Low SENS.…0~1000mA 1mA step High SENS.…0.00~100mA 0.01mA step
6(2) Setup the measurement mode (EMU4-AX4 only)		
6(2)-1. [Measure] 3 A rate 4 DISP.Mode 5 MEA.Mode	(1) In 6(2)-1, push the [▲] or [▼] key, and move the cursor to the "5 MEA.Mode". (2) Push the [↵/Phase] key. (3) 6(2)-2 will be displayed.	Setup the measurement mode of AD converted.
6(2)-2. [MEA.Mode] 50ms SAMP. 1ms SAMP.	(1) Push the [▲] or [▼] key, and select the measurement mode. (2) Push the [↵/Phase] key. (3) 6(2)-1 will be displayed.	[MEA.Mode]:**50ms SAMP.**⇔1ms SAMP.⇔ 50ms SAMP.…AD converted in a cycle of 50ms. 1ms SAMP.…AD converted in a cycle of 1ms.

- 4 -

Page 5

Screen	Operation	Note
7(1) Setup the demand time（EMU4-BM1-MB、EMU4-HM1-MB、EMU4-A2、EMU4-VA2）		
7(1)-1. [Measure] 4 DISP.Mode 5 MEA.Mode **6** Demand	(1) In 7-1, push the ▲ or ▼ key, and move the cursor to the "6 Demand". (2) Push the ↵/Phase key. (3) 7(1)-2 will be displayed.	[Demand]:0sec⇔10sec⇔20sec⇔30sec⇔40sec⇔50sec⇔ 1min⇔**2min**⇔3min⇔4min⇔5min⇔6min⇔7min⇔ 8min⇔9min⇔10min⇔11min⇔12min⇔13min⇔ 14min⇔15min⇔20min⇔25min⇔30min⇔
7(1)-2. [Demand] A : **2min** W : 2min	(1) Push the ▲ or ▼ key, and move the cursor to the A（Current）. (2) Push the ＋ or － key, and change the demand time value. (3) Push the ▲ or ▼ key, and move the cursor to the W（Electric power）. (4) Push the ＋ or － key, and change the demand time value. (5) Push the ↵/Phase key , and confirm the setting value. (6) 7(1)-1 will be displayed.	
7(2) Setup the demand time（EMU4-LG1-MB）		
7(2)-1 [Measure] 4 DISP.Mode 5 MEA.Mode **6** Demand	(1) In 7(2)-1, push the ▲ or ▼ key, and move the cursor to the "6 Demand". (2) Push the ↵/Phase key and (3) 7(2)-2 will be displayed.	[Demand]:0sec⇔**5min**⇔6min⇔7min⇔8min⇔9min⇔10min⇔ 11min⇔12min⇔13min⇔14min⇔15min⇔20min⇔ 25min⇔30min⇔
7(2)-2 [Demand] Io/Ior: **5min**	(1) Push the ＋ or － key, and change the Io/Ior demand time value. (2) Push the ↵/Phase key, and confirm the setting value. (3) 7(2)-1 will be displayed.	
8 Setup the electric energy equivalent rate（All models except for EMU4-LG1-MB）		
8-1. [Measure] 5 MEA.Mode 6 Demand **7** CONV.Wh	(1) In 8-1, push the ▲ or ▼ key, and move the cursor to the "7 CONV.Wh" (2) Push the ↵/Phase key. (3) 8-2 will be displayed.	
8-2. [CONV.Rate] **1**.000 [Unit] Non [1]	(1) Push the ▲▼＋－ key, and change the "CONV.Rate" value and unit. (2) Push the ↵/Phase key , and confirm the setting value. (3) Transition to the following screen by the setting wiring type. 2 circuit measurement → To 8-3 non-2 circuit measurement → To 8-1	[CONV.Rate]:0.001〜10000（**1.000**） [Unit]:**Non**⇔Wh⇔kWh⇔MWh⇔J⇔m²⇔m³⇔L⇔kL⇔sec⇔ min⇔hour⇔piece⇔set⇔g⇔kg⇔t⇔¥⇔$⇔
8-3. [CONV.Rate] **1**.000 [Unit] Non [2]	(1) In a similar way as 8-2, change the "CONV.Rate" value and unit of the second circuit. (2) Push the ↵/Phase key, and confirm the setting value. (3) 8-1 will be displayed.	
9 Setup the the current cut-off rate（All models except for EMU4-LG1-MB, EMU4-PX4 and EMU4-AX4）		
9-1. [Measure] 6 Demand 7 CONV.Wh **8** A Cut-off	(1) In 9-1, push the ▲ or ▼ key , and move the cursor to the "8 A Cut-off". (2) Push the ↵/Phase key. (3) 9-2 will be displayed.	
9-2. [A Cut-off] **0**.05% [1]	(1) Push the ＋ or － key, and change the set value. (2) Push the ↵/Phase key , and confirm the setting value. (3) Transition to the following screen by the setting wiring type. 2 circuit measurement → To 9-3 non-2 circuit measurement → To 9-1	[A Cut-off]:0.1〜50.0%（**0.5**） A cut-off rate… represent as the ratio of cut-off current to rated current. ※Measured value is 0A if it is less than the cut-off current.
9-3. [A Cut-off] **0**.05% [2]	(1) In a similar way as 9-2, change the "A Cut-off" value of the second circuit. (2) Push the ↵/Phase key, and confirm the setting value. (3) 9-1 will be displayed.	
10 Setup the Simple measurement （All models except for EMU4-LG1-MB, EMU4-PX4 and EMU4-AX4）		
10-1. [Measure] 7 CONV.Wh 8 A Cut-off **9** SimpleMEA	(1) In 10-1, push the ▲ or ▼ key, and move the cursor to the "9 SimpleMEA". (2) Push the ↵/Phase key. (3) 10-2 will be displayed.	
10-2. [SimpleMEA] **Off**	(1) Push the ＋ or － key, and select SimpleMEA（[On]／[Off]）. (2) Push the ↵/Phase key, and confirm the setting value. (3) Transition to the following screen by the setting SimpleMEA（[On]／[Off]） [On] setting → To 10-3 [Off] setting → To 10-1	[SimpleMEA]:**Off**⇔On⇔ SimpleMEA…The value set in the electric power and the power factor as the fixed value. By measuring the current only, and calculating the values of the measurement elements.
10-3. [FP Set] **1**.000 [1]	(1) Push the ▲▼＋－ key, and change the power factor value in the SimpleMEA. (2) Push the ↵/Phase key,and confirm the setting value. (3) Transition to the following screen by the setting wiring type. 2 circuit measurement → To 10-4 non-2 circuit measurement → To 10-1	[FP Set]:-0.001〜**1.000**〜0.000
10-4. [FP Set] **1**.000 [2]	(1) In a similar way as 10-3, change the power factor value of the second circuit. (2) Push the ↵/Phase key, and confirm the setting value. (3) 10-1 will be displayed.	
11 Setup the Ior difference conversion （EMU4-LG1-MB only）		
11-1. [Measure] 8 A Cut-off 9 SimpleMEA **10** DIF.CONV	(1) In 11-1, push the ▲ or ▼ key , and move the cursor to the "10 DIF.CONV". (2) Push the ↵/Phase key. (3) 11-2 will be displayed.	[DIF.CONV]:**Off**⇔On⇔ DIF.CONV…To calculate the amount of change from the Ior difference converted value.
11-2. [DIF.CONV] **Off**	(1) Push the ＋ or － key, and select the Ior difference converted value（[On]／[Off]）. (2) Push the ↵/Phase key, and confirm the setting value. (3) Transition to the following screen by the setting DIF.CONV（[On]／[Off]）. [On] setting → To 11-3 [Off] setting → To 11-1	

- 5 -

Page 6

Screen	Operation	Note
11-3. [DIF.Ior] **0**.00 mA	(1) Push the ▲ ▼ ＋ － key, and change the Ior difference converted reference value. (2) Push the ↵/Phase key,and confirm the setting value. (3) 11-1 will be displayed.	High SENS mode [DIF.Ior]:**0.00**〜100.00mA Low SENS mode [DIF.Ior]:**0**〜1000mA
12 Setup the AD Converted （EMU4-AX4 only）		
12-1. [Measure] 9 SimpleMEA 10DIF.CONV. **11**AD CONV.	(1) In 12-1, push the ▲ or ▼ key, and move the cursor to the "11 AD CONV.". (2) Push the ↵/Phase key. (3) 12-2 will be displayed.	
12-2. [AD CONV.] [N]	(1) Push the ＋ or － key, and select the AD converted（[On]／[Off]）. (2) Push the ↵/Phase key, and confirm the setting value. (3) Transition to the following screen by the setting AD CONV.（[On]／[Off]） [On] setting → To 12-3 [Off] setting → To 12-2 (The [N] changes, and the screen changes to the next CH setting.) *In the case N=4 → To 12-1	[AD CONV.]: Off⇔**On**⇔ AD CONV.… The setting value is set in AD convert per CH. [Range]:**Current**⇔Voltage⇔ [Moving average]:001〜100(**001**)
12-3. [Range] **Current** [N]	(1) Push the ＋ or － key, and select the input range. (2) Push the ↵/Phase key, and confirm the setting value. (3) 12-4 will be displayed.	[Upp]:-32767〜32767(**4095**) [Low]:-32767〜32767(**0**)
12-4. [Moving average] **0**01 times [N]	(1) Push the ▲ ▼ ＋ － key, and change the number of moving average. (2) Push the ↵/Phase key, and confirm the setting value. (3) 12-5 will be displayed.	[Unit]:**Non**⇔A⇔mA⇔kA⇔V⇔kV⇔W⇔kW⇔MW⇔Hz⇔N⇔ kN⇔Pa⇔kPa⇔MPa⇔C⇔deg⇔%⇔ [N] at the bottom right of the screen represents CH. (N=1 to 4)
12-5. [Scaling] Upp.: **0**4095 Low.: 00000 Unit:Non [N]	(1) Push the ▲ ▼ ＋ － key, and change the upper limit, lower limit, and unit. (2) Push the ↵/Phase key, and confirm the setting value. (3) 12-2 will be displayed. (The [N] changes, and screen turned to setting of next CH.) *In the case N=4 → 12-1 will be displayed.	
13 Setup the Number Limit （EMU4-AX4 only）		
13-1. [Measure] 10DIF.CONV. 11AD CONV. **12**Num.Limit	(1) In 13-1, push the ▲ or ▼ key, and move the cursor to the "12 Num.Limit". (2) Push the ↵/Phase key. (3) 13.1-1 will be displayed.	Num.Limit…Set any limit. *If the scaling value over the limit, Number Limit countup.
13.1 Setup the Limit A, Limit B, Limit C, and Limit D （EMU4-AX4 only）		
13.1-1. [Num.Limit] **1** Limit A 2 Limit B 3 Limit C	(1) In 13.1-1, push the ▲ or ▼ key, and move the cursor to the "1 Limit A". (2) Push the ↵/Phase key. (3) 13.1-2 will be displayed. *Limit B, Limit C, and Limit D is done in the same way as the setting of Limit A.	Limit…Set any scaling value. You can configure the four different limits for limit A, limit B, limit C, and limit D. [Limit A]:**Scaling Low**〜Scaling Upp *If scaling setting value is set "Scaling Low > Scaling Upp", default setting is Scaling Upp.
13.1-2. [Limit A] **3**2767 [N]	(1) Push the ▲ ▼ ＋ － key, and change the set value. (2) Push the ↵/Phase key, and confirm the setting value. (3) The [N] changes, and screen turned to setting of next CH. In the case N=4 → 13.1-1 will be displayed.	[N] at the bottom right of the screen represents CH. (N=1 to 4)
13.2 Setup the multiplying factor （EMU4-AX4 only）		
13.2-1. [Num.Limit] 3 Limit C 4 Limit D **5** Factor	(1) In 13.2-1, push the ▲ or ▼ key, and move the cursor to the "5 Factor". (2) Push the ↵/Phase key. (3) 13.2-2 will be displayed.	
13.2-2. [Factor] **x1** [N]	(1) Push the ＋ or － key, and select the multiplying factor displayed. (2) Push the ↵/Phase key, and confirm the setting value. (3) The [N] changes, and screen turned to setting of next CH. In the case N=4 → 13.2-1 will be displayed.	[Factor]:**x1**⇔x10⇔x100⇔x1000⇔ Factor…Set up the multiplying factor displayed of Number Limit. [N] at the bottom right of the screen represents CH. (N=1 to 4)
14 Save the settings		
14-1. Quit Setup **1** Save 2 Not Save 3 Cancel	(1) After setting all of the items, and push the Setup key. (2) 14-1 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, 14-2 will be displayed. Push the ↵/Phase key. (5) Return to the operation mode.	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.
14-2. Completed **OK**		

*Setting for condition of the measurement mode can only configure in the display unit is set to master.
 (Setting for condition of the measurement mode can not configure in the display unit is set to slave.)
*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.
*If you want to set the other circuit, push the Circuit key on the "Setup" screen (1-1), select the circuit, make the setting.
*Same voltage system is same setting in wire system, primary voltage, 2 circuits Measuring existence, Simple measurement.

7.2.2 Input/Output setup—the settings for the external Input/Output. EMU4-LG1-MB is not set.
　　　*EMU4-CNT-MB cannnot be set.

Screen	Operation	Note
1 Transit to the Setup mode		
1-1. [Setup] 1 Measure **2** I/O 3 COM.	(1) Push the Setup key in operation mode. (2) 1-1 will be displayed. (1) Push the ▲ or ▼ key, and move the cursor to the "2 I/O". Push the ↵/Phase key. (2) 2-1 will be displayed.	

- 6 -

Left page (page 7)

Screen	Operation	Note
2 Setup input (EMU4-HM1-MB, EMU4-PX4)		
2-1. [I/O] **1** Input 2 OP.Time 3 Output	(1) In 2-1, Push the ▲ or ▼ key , and move the cursor to the "1 Input". (2) Push the ↵/Phase key. (3) 2-2 will be displayed.	
2-2. [Input] **Non** [N] EMU4-PX4 only	(1) Push the + or − key , and select the input method. (Non/ Contact /Pulse) (2) Push the ↵/Phase key. (3) Transition to the following screen by the model and setting input method. [Non] setting Model:EMU4-HM1-MB → To 2-1 Model:EMU4-PX4 → The [N] changes, and screen turned to setting of next CH. *In the case N=4 → To 2-1 [Pulse] setting → To 2-3 [Contact] setting → To 2-4	<EMU4-HM1-MB> [Input]:**Non**⇔Contact⇔Pulse⇔ <EMU4-PX4> [Input]:**Pulse**⇔Contact⇔Non⇔ [CONV.Rate]:0.001~10000(**1.000**) [Unit]:**Non**⇔Wh⇔kWh⇔MWh⇔J⇔m²⇔m³⇔L⇔kL⇔sec⇔ min⇔hour⇔piece⇔set⇔g⇔kg⇔t⇔¥⇔$⇔ [ResetMode]:**Auto**⇔Hold⇔ Auto…Contact input state is reset automaticaly when contact input is less. Hold…Contact input state is hold until contact input released even thought contact input is less. (For information about how to release of the contact input, please refer to the "user's manual (Details)") [N] at the bottom right of the screen represents CH. (N=1 to 4)
2-3. [CONV.Rate] **1.000** [Unit] **Non** [N] EMU4-PX4 only	(1) Push the ▲ ▼ + − key, and change the "CONV.Rate" value and unit. (2) Push the ↵/Phase key, and confirm the setting value. (3) Transition to the following screen by the model. Model:EMU4-HM1-MB → To 2-1 Model:EMU4-PX4 → To 2-2 (The [N] changes, and screen turned to setting of next CH.) *In the case N=4 → To 2-1	
2-4. [ResetMode] **Auto** [N] EMU4-PX4 only	(1) Push the + or − key, and select the reset mode. (2) Push the ↵/Phase key. (3) Transition to the following screen by the model. Model:EMU4-HM1-MB → To 2-1 Model:EMU4-PX4 → To 2-2 (The [N] changes, and screen turned to setting of next CH.) *In the case N=4 → To 2-1	
3 Setup the operation time measurement (All models except for EMU4-LG1-MB)		
3-1. [I/O] 1 Input **2** OP.Time 3 Output	(1) In 3-1, Push the ▲ or ▼ key, and move the cursor to the "2 OP.Time". (2) Push the ↵/Phase key. (3) 3-2 will be displayed.	[OP.Time]:**Off**⇔On⇔ EMU4-HM1-MB [OP.Time Mode]:**A**⇔x⇔ EMU4-BM1-MB, EMU4-A2, EMU4-VA2 [OP.Time Mode]:**A** EMU4-PX4 Input setting value is set contact, this CH is not displayed. Operating time is integrated time while the current measured value is higher than the rated current, Current cut-off rate when select A. Operating time is integration time while Contact input is ON when Contact input.
3-2. [OP.Time] **Off** [1] Model:EMU4-PX4 or 2 circuits measuring only	(1) Push the + or − key, and select the operation time measurement. (On/Off) (2) Push the ↵/Phase key. (3) Transition to the following screen by the model, and setting wiring type and existence of the operation time measurement. Model:EMU4-PX4 → To 3-4 Model:Other than EMU4-PX4 2 circuit measurement and [Off] setting → To 3-4 non-2 circuit measurement and [Off] setting → To 3-1 [On] setting → To 3-3	
3-3. [OP.Time Mode] **A** [1] 2 circuits measuring only	(1) Push the + or − key, and select the operation time measurement mode. (2) Push the ↵/Phase key. (3) Transition to the following screen by the setting wiring type. 2 circuit measurement → To 3-4 non-2 circuit measurement → To 3-1	
3-4. [OP.Time] **Off** [2]	(1) Push the + or − key, and select the operation time measurement. (2) Push the ↵/Phase key. (3) Transition to the following screen by the model, and setting existence of the operation time measurement. Model:EMU4-PX4 → To 3-6 Model:Other than EMU4-PX4 [Off] setting → To 3-1 [On] setting → To 3-5	
3-5. [OP.Time Mode] **A** [2]	(1) Push the + or − key, and select the operation time measurement mode. (2) Push the ↵/Phase key. (3) 3-1 will be displayed.	
3-6. [OP.Time] **Off** [3]	(1) Push the + or − key, and select the operation time measurement. (2) Push the ↵/Phase key. (3) 3-7 will be displayed.	
3-7. [OP.Time] **Off** [4]	(1) Push the + or − key, and select the operation time measurement. (2) Push the ↵/Phase key. (3) 3-1 will be displayed.	
4 Setup Output (EMU4-HM1-MB, EMU4-A2, EMU4-VA2, EMU4-PX4, EMU4-AX4)		
4-1. [I/O] 1 Input 2 OP.Time **3** Output	(1) In 4-1, Push the ▲ or ▼ key, and move the cursor to the "3 Output". (2) Push the ↵/Phase key. (3) 4-2 will be displayed.	

Right page (page 8)

Screen	Operation	Note
4-2. [Output] **Non**	(1) Push the + or − key, and select the output signal type. (2) Push the ↵/Phase key. (3) Transition to the following screen by the model, and setting wiring type and the output signal type. Model:EMU4-PX4 or EMU4-AX4 → To 4-1 Model:EMU4-HM1-MB, EMU4-A2 or EMU4-VA2 [Non] setting → To 4-1 2 circuit measurement and [Pulse] setting → To 4-3 non-2 circuit measurement and [Pulse] setting → To 4-4 2 circuit measurement and [Alarm] setting → To 4-3 non-2 circuit measurement and [Alarm] setting → To 4-1	EMU4-HM1-MB, EMU4-A2, EMU4-VA2 [Output]:**Non**⇔Pulse⇔Alarm⇔ EMU4-PX4, EMU4-AX4 [Output]:**Non**⇔Alarm⇔Contact⇔ The pulse output unit changes by the full load power. [Pulse]:
4-3. [Output] **1**	(1) Push the + or − key, and select the output target. (2) Push the ↵/Phase key. (3) Transition to the following screen by setting output signal type. [Pulse] setting → To 4-4 [Alarm] setting → To 4-1	
4-4. [Pulse] **0.01** kWh/Pulse	(1) Push the ▲ ▼ + − key, and change the pulse output unit. (2) Push the ↵/Phase key. Confirm the setting value. (3) 4-1 will be displayed.	

Full load power (kW)	Setting range
Wfull<12kW	**0.001**⇔0.01⇔0.1⇔1⇔
12kW ≤ Wfull < 120kW	**0.01**⇔0.1⇔1⇔10⇔
120kW ≤ Wfull < 1200kW	**0.1**⇔1⇔10⇔100⇔
1200kW ≤ Wfull < 12000kW	**1**⇔10⇔100⇔1000⇔
12000kW ≤ Wfull < 120000kW	**10**⇔100⇔1000⇔10000⇔
120000kW ≤ Wfull	**100**⇔1000⇔10000⇔100000⇔

[Output]:**1**⇔2⇔
* It is set which circuit it does external output, because it inputs 2 circuits per a terminal block for 1P2W.
 If the target of external output is 1K, 1L connection side circuit, Set "1".
 If the target of external output is 3K, 3L connection side circuit, Set "2".

Screen	Operation	Note
5 Save the settings		
5-1. Quit Setup **1** Save 2 Not Save 3 Cancel	(1) After setting all of the items, push the Setup key. (2) 5-1 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.	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.

*Full load is calculated by following formula. (Full load)=(Primary voltage) x (Primary current) x (Coefficient) / 1000[kW]
*1: In case 3P4W, apply the not phase voltage but line voltage as primary voltage.
*2: Coefficient is varies according to the phase wire system. 1P2W→1, 3P3W →1.73, 3P4W →3
*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.
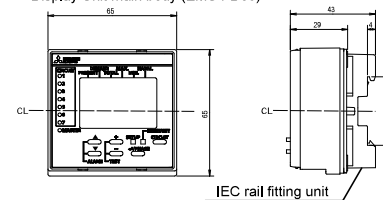* If you want to set the other circuit, push the Circuit key on the "Setup" screen (1-1), select the circuit, make the setting.

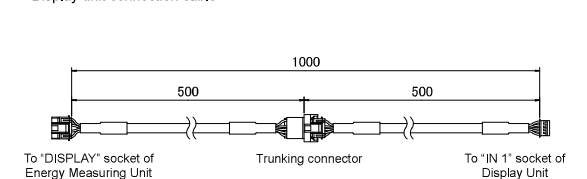## 8. Operations of Instrument (in the case of the model to connect the EMU2-** and MDU2-**)

For setting operation in the case of connect the EMU2-** and MDU2-**, please refer to the "user's manual (Details)".

9. Outline drawing

■ Display Unit main body (EMU4-D65)

IEC rail fitting unit

■ Display unit connection cable

To "DISPLAY" socket of Energy Measuring Unit   Trunking connector   To "IN 1" socket of Display Unit

10. Specifications

Product name	Display unit
Model name	EMU4-D65
Display part	Dot matrix Liquid Crystal Display (with backlight)
Rating	9V DC
Math	0.1g
Applicable model	Energy Measuring Unit (EcoMonitorPlus), Energy Measuring Unit (EcoMonitorPro), Mitsubishi Measuring Units for MDU Breakers (MDU2)
Connecting method	Connecting by dedicated cable (Bundled in this product. Length: 1m)
Number of connected	For a single Energy Measuring Unit until seven*
Maximum extension distance	10m (However, the sum of the length of the extension cable that was connected to a single unit)

*If the connection is two or more, you must have a power supply from commercial DC power supply (Model:PBA15F-9-N1, made in COSEL CO., LTD.), the power supply cable (optional : EMU4-CB-DPS) and display unit connection cable (for between the display unit connection) Model:EMU2-CB1-DP.

11. Warranty

If you have any questions or the product is broken down, contact our sales representative near you.
•The charge-free warranty is effective until the earlier of 1 year after the date of your purchase or 18 months after manufacturing. Repair shall be charged for the case failures occur due to your intent or fault even during the charge-free warranty period.
•If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
•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.

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

12. Customer Service

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

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