MITSUBISHI ELECTRIC

Display unit

for Energy Measuring Unit (EcoMonitorPro)

MODEL

EMU2-D65-M

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.

## Contents

1. Introduction

1.1 Feature

- Displaying The measurement data of EcoMonitorPro.
- Setting up conditions of operation to EcoMonitorPro.
- Data logging function: Memorizing The data for 131 days (maximum) in an internal memory.
   - Memorizing independently at intervals of a 1-second, a 1-minute, and 1 hour.
   - The memorized data is collectable in a personal computer by EMU2-PK3 (option).
   - and can be saved as a CSV file.
- Dot-matrix liquid-crystal-display.
   - With the brightness adjustment function.
   - With the contrast adjustment function.
- Attachment to an IEC rail, and attachment to the face of a board.

1.2 Check for Packaged Items

The following items are packaged in the packing case. Please check up all the items.
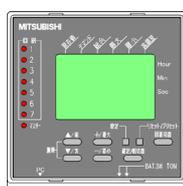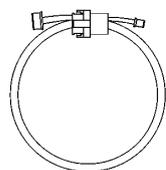
| Main body x1 | Connection cable x1 | Instruction Manual (simplified) x1 | Instruction Manual (detailed) x1 | screw (for attachment) x2 |

1.3 Precautions concerning working environment and conditions

1.3.1 The matter about the environment or an operating condition
Avoid using the equipment in the locations under the following conditions.It may result in malfunction or deterioration of service life.
- Ambient temperature exceeds the specified range (-5 – +55°C)
- Humidity exceeds the specified range (30 – 80%RH), or condensation occurs.
- There is a substantial amount of dust, corrosive gas, salinity, or lampblack.
- There is a strong magnetic field or a substantial amount of external noise.
- Metal pieces and inductive materials are released.
- Daily average temperature exceeds +35 °C.
- There is severe vibration or impact.
- Exposed to direct sunlight.
- Exposed to rain and water droplets.

1.3.2 Precautions concerning installation and connection
- Before installing or connecting the equipment, be sure to read this instruction manual.
- For safety reasons, assign the personnel with expertise such as electric work to carry out installation and connections.

⚠ CAUTION

- When executing thread processing or wiring work, exercise added care to prevent chips and fragments of wires from entering the equipment.
- Check the wiring diagram thoroughly and make connections. Inappropriate connections cause failures of the equipment, fire, or electric shock.

1.3.3 Items concerning preparations before using the equipment
- An installation place should keep the environment and an operating condition.
- The following screens are displayed when using EMU2-D65-M for the first time.Please turn ON a battery switch and set up a clock.

(1) [↵/phase] key is pressed after checking that a battery switch is ON.

```
Please turn
"ON" BAT.SW.

OK
```

(2) Please set up a clock.

```
[Clock]
2003/01/01
12:00
OK
```

1.3.4 Items concerning usage

⚠ CAUTION

- Do not disassemble or modify the equipment. It causes failures, electric shock, or fire.
- EMU2-D65-M is equipment only for EcoMonitorPro.It cannot be used for other uses.

1.4 Items concerning maintenance and inspection

- If the surface is dirty, wipe it off with soft dry cloth. Do not allow a contact with a chemical duster and the like for a long period of time. Do not wipe the equipment off with benzene or thinner.
- In order to use the equipment properly for a long period of time, carry out inspections of the following items:
    1) Check for damage in the equipment.
    2) Check for abnormality in LED and LCD displays.
    3) Check for abnormal noise, odor, and heat.
    4) Check for looseness in installation, attachment of the terminal block, and connectors (please completely shut the main power off for this inspection).

1.5 Items concerning storage

- To store the equipment, turn off the power, disconnect the wiring, and put it in a plastic bag or the like.
- When the power is going to be turned off for a long period of time, set the battery switch (BAT.SW) to OFF. (The total guarantee time for power supply of the battery is 1/2 year.)
- When storing the equipment for a long period of time, avoid locations under the following conditions. It may result in failures or deterioration of service life.
  - Ambient temperature exceeds the specified range (-10 –+ 60°C)
  - Humidity exceeds the specified range (30 – 80%RH) or condensation occurs.
  - There is a substantial amount of dust, corrosive gas, salinity, or lampblack.
  - Metal pieces and inductive materials are released.
  - Daily average temperature exceeds +35 °C.
  - There is severe vibration or impact.
  - Exposed to rain and water droplets.

1.6 The matter about abandonment

Dispose of the equipment as general industrial waste.

⚠ CAUTION
In throwing away a lithium battery, be careful about the mentioned below.
● The lithium battery is soldered. Be careful of removal.
● Electric capacity may remain in the removed battery. Since other metal is contacted and there are generation of heat and a burst, and a possibility of igniting, please be sure to cover a terminal (+, -) with adhesive insulating tape etc.

LIMITED WARRANTY

- Although this book and this equipment are shipped through a severe quality control and product inspection, when the defect by the cause on manufacture is in this equipment or a instruction manual, I should do correspondence of substitute exchange. Please contact me to the store of a purchase. However, about failure by the natural disaster or the mistaken usage, damage, etc., it is not set as the object of a guarantee.
- Please understand beforehand that our company does not take any responsibility of the about the failure produced during the trouble on the system by the visitor or the third person, the problem on law, the use error of this equipment, or use, and the damage which it was able to suffer from other faults.
- the gratis term of a guarantee of a product -- your company -- after supplying after purchase or the appointed place -- the inside within after [less than one year or our company factory shipments] 18 months (it measures from manufacture years) -- either -- I will consider as the shorter one
- I use the gratis term of a guarantee of a repair article is not updated.
- A part or all of the contents of this book is refused to our company, there is nothing and reproducing or reproducing in any forms refuses firmly.
- Although it is trying to follow revision of software and hardware hard, the written contents of this book are produced also when it cannot synchronize reluctantly.

2.   The name and function of each part

Front view

Circuit

Master

▲. ▼

+, -

Display

Setup

Reset/Set

Circuit

↩/phase

Rear view

Reserved

IN 1

Installation fastener for the IEC rail

Bottom view

PC

BAT.SW

Table 2.1

Items		Function	
		Operation mode	Setting mode
LCD	**Display**	The data which EcoMonitorPro measured is displayed.	
LED	**Circuit**	The circuit currently displayed on LCD is interlocked with and the light is switched on. It blinks at the time of alarm generating. When the circuit present on display is alarm occurring, it blinks in a cycle of 100ms. When the circuit which is not displayed is alarm occurring, it blinks in a cycle of 200ms.	
	Master	The light is switched on during operation.	
Key	**▲, ▼**	Measurement data is changed. By pushing [▲] and [▼] key simultaneously, it shifts to an alarm mode.	A menu is chosen.
	+, -	Maximum and the minimum value are changed and displayed.	A setting value is changed.
	Setup	It goes into setting mode.	It return to operation mode.
	Reset/Set	resets measurement data. sets Wh/varh to arbitrary values.	Don't use
	Circuit	A circuit will be changed and displayed if it connects with EcoMonitorPro which can measure two or more circuits to one set of inside.	
	↩/phase	the phase is changed and displayed in the circuit of 3 or 4 wire.	It decides, when a setting value is changed.
Conn.	**IN1**	It is used when connecting with EcoMonitorPro.	
	PC	It is used when collecting to PC the data memorized into EMU2-D65-M.	
Switch	**BAT.SW**	When backing up the data and the clock which were measured, it turns ON both of switches.	

3. How "to cling"

■ **IEC Rail**

Application IEC rail (35mm)   Attachment   Removal

(1) Hook.

IEC rail

(2)Push in.

(2) Pull Up.

(3) Push in IEC Rail Attachment
     Upwards.

(1) Pull Stop Implement for
    IEC Rail Attachment Below.
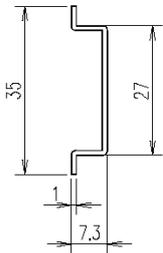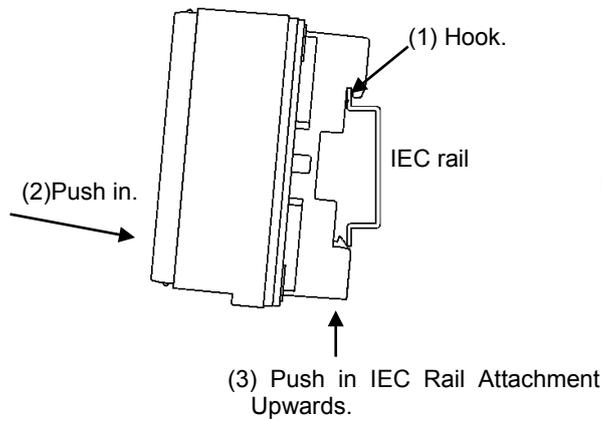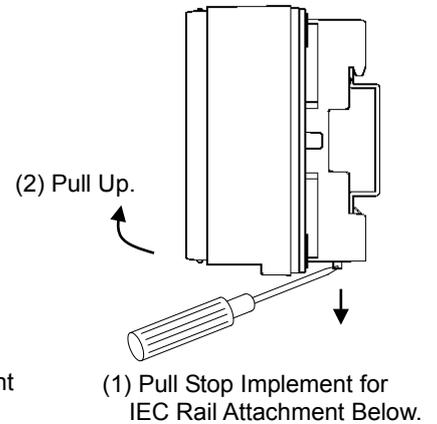
- Please bind attachment of an IEC rail tight every 25-100mm with M4 or M5 screw.
- When you remove from an IEC rail and you attach again, please attach the stop implement for IEC rail
  attachment in the state where it pushed in upwards.

* The change method of the IEC rail attachment direction

Removal of an IEC rail attachment   Attachment of an IEC rail attachment

(2) Insert and Topple Minus Driver.

(1) Hook Attachment Nail.

(1) Remove
    Attachment Screw.

(2) Push in.

(3) Tighten Attachment Screw (Bolting Torque: 0.5 N-m).

■ Face-of-a-board attachment

2−φ 4   53

53   φ60
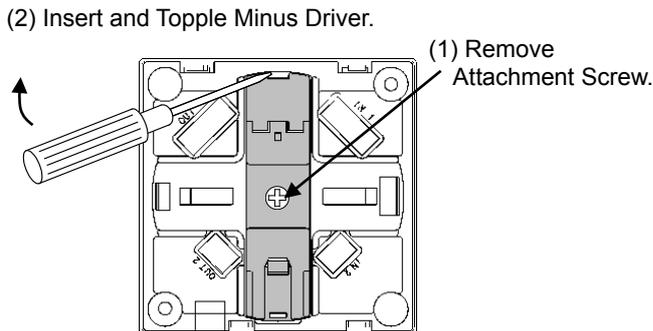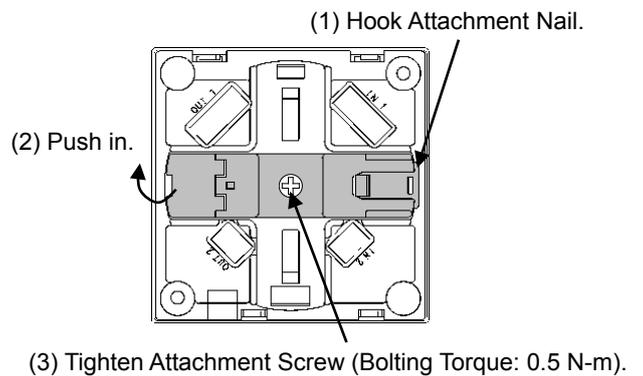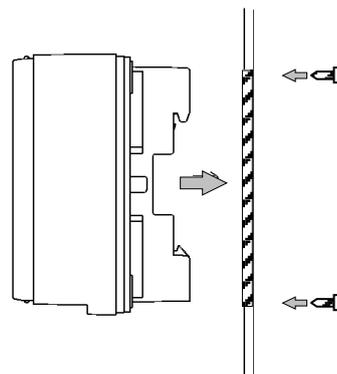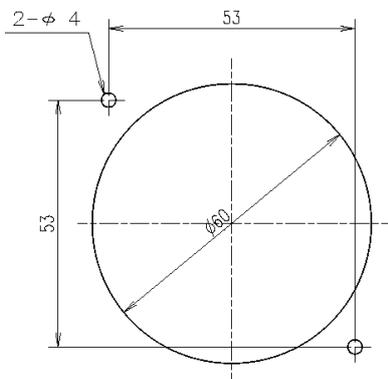
It equips with a display unit from the panel front,
and a screw bundle is performed from the back.

4.   The connection method

EMU2-D65-M   EcoMonitorPro

IN 1   DISPLAY

Display unit
connection cable
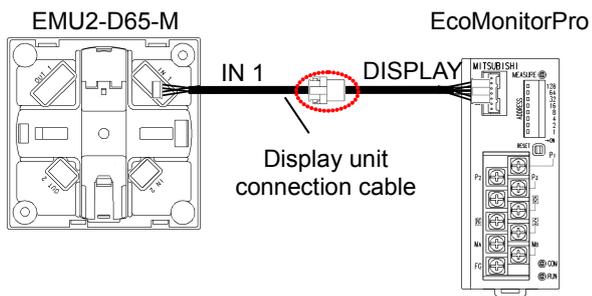
How to Extension
   By connecting a cable to the part as for which the above figure carried out marking ⬭ , it is extensible by a maximum of 10m.

(1) The connector in the middle of a cable   (2)   A cable is inserted.
    is removed.

It removes depressing a lock.
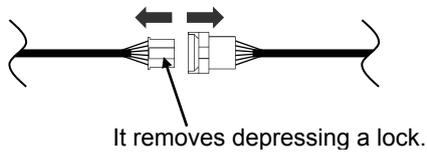
   Note1 : Extension of a cable uses EMU2-CB-T1M, EMU2-CB-T5M, and EMU2-CB-T10M.
   Note2 : The sum total of cable extension should not exceed 10m.

5. Usage

5.1 Mode of operation

There are the following modes of operation in EMU2-D65-M.

Operation mode ---------------------- The data which EcoMonitorPro measured is displayed.
Alarm mode -------------------------- Alarm information is displayed.
Basic setting mode ----------------- The conditions of EcoMonitorPro of operation, a clock, a back light, and contrast are set up.
Alarm setting mode ---------------- Surveillance conditions are set up.
Reset, set mode -------------------- Maximum, the minimum value, and Wh are cleared.
Wh is set to arbitrary values.

5.2 Displaying the measurement data.

Present value
Demand(A.W)
Average data
Maximum data
Minimum data
Harmonics data

▲ — It indicates the classification of measurement data.

11539.8
● x10³ [kWh]

the value of measurement data is displayed.

The unit of the measurement data currently displayed on the present screen is shown.

monitor mark. It displays during measurement(only Wh).

► Hour
► Min
► Sec
.8 kWh

When logging starts, the "►" mark is displayed on the right end of LCD. A stop of logging vanishes this sign automatically.

the measurement data which can be displayed depends on the following two conditions.
- The kind of connected EcoMonitorPro.
- The kind of measurement element chosen in display mode.
Measurement elements are changed and displayed by pressing the ▲/▼ key. The measurement elements to display is shown below.

Table 5.2

Element		Model					
		EMU2-BM1-B	EMU2-HM1-B,C	EMU2-PM1-P	EMU2-VS1-P	EMU2-RD□-△	
		—	—	—	—	Wh+A+4 *6	Harmonics
(1) Active Energy		●	●	●	●	●	●
(2) Amp	R, S, T, Average *1	●	●	●	●	●	●
(3) Amp Demand	R, S, T *1	●	●	●	●	●	●
	Maximum,Minimum	●	●	—	—	●	—
	Time of day	—	●	—	—	●	—
(4) Voltage	R-S, S-T, T-R, Average *2	—	●	●	●	①	●
	Maximum,Minimum	—	●	—	—		—
	Time of day	—	●	—	—		—
(5) Active Watt(Power)		—	●	—	●	②	●
(6) Watt Demand	Present	—	●	—	●		●
	Maximum,Minimum	—	●	—	—		—
	Time of day	—	●	—	—		—
(7) Reactive Watt(Power)		—	—	—	—	③	●
(8) Power Factor	Present	—	●	—	●	④	●
	Maximum,Minimum	—	●	—	—		—
	Time of day	—	●	—	—		—
(9) Frequency		—	—	—	—	⑤	●
(10) Sag Voltage	R-S, S-T, T-R *2	—	—	—	●	—	—
(11),(12) Total harmonic Amp RMS value / Distortion *5	R, T *3	—	—	—	—	⑥	●
(13),(14) Total harmonic voltage RMS value / Distortion *5	R-S, S-T *4	—	—	—	—	⑦	●
(15),(16)Fundamental to 13th Harmonic (1,3,5,7,9,11,13) RMS value / Distortion *5	R, T *3	—	—	—	—	—	●
(17),(18)Fundamental to 13th Harmonic (1,3,5,7,9,11,13) RMS value / Distortion *5	R-S, S-T *4	—	—	—	—	—	●
(19) Simplified Demand		—	●	—	—	⑧	—
(20) Clock		●	●	●	●	●	●
(21) Error Information		●	●	●	●	●	●
(22) Reactive Energy		—	—	—	—	⑨	—

*1 : It does not display phase-S and T in single phase 2 wire system.
*2 : It does not display S-T and T-R in single phase 2 wire system.
*3 : It does not display phase-T in single phase 2 wire system.
*4 : It does not display T-R in single phase 2 wire system.
*5 : RMS and Distortion cannot display both simultaneously.
*6 : EMU2-D65-M displays six elements(In addition to Wh and Amp, four elements can be chosen arbitrarily from ① out of ⑨).

Table 5.3 Display of a LCD screen

(1) Active Energy	(8) Power Factor	(15) 1 to 13 Harmonic Amp:RMS
▲ **11539.8** ● x10³ kWh	▲ READ**0.998** cosΦ	▲　　　　▲ **21.1** R　　　A
(2) Amp	(9) Frequency	(16) 3 to 13 Harmonic Amp:Distortion
▲ **101.4** R　　　A	▲ **60.1** Hz	▲　　　　▲ **26.9** R　　　A %
(3) Amp Demand	(10) Sag Voltage	(17) 1 to 13 Harmonic Voltage:RMS
▲ **100.2** T　　　A	▲ **219.7** R-S　sagV	▲　　　　▲ **11.9** S-T　　V
(4) Voltage	(11) Total Harmonic Amp:RMS	(18) 3 to 13 Harmonic Voltage:Distortion
▲ **219.7** R-S　　V	▲　▲　　▲ **21.1** R　　　A	▲　　　　▲ **26.9** S-T　　V %
(5) Active Watt	(12) Total Harmonic Amp:Distortion	(19) Simplified Demand
▲ **1094** x10² kW	▲　▲　　▲ **26.9** R　　　A %	▲▲ **1094** x10²　30ᵐⁱⁿkW
(6) Watt Demand	(13) Total Harmonic Voltage:RMS	(20) Clock
▲ **1088** x10² kW	▲　▲　　▲ **11.9** S-T　　V	2003/04/01 **12:01**
(7) Reactive Watt	(14) Total Harmonic Voltage:Distortion	(22) Reactive Energy
▲ READ　**34** x10² kvar	▲　▲　　▲ **26.9** S-T　　V %	▲ **39.8** x10³　kvarh
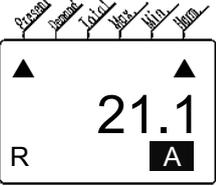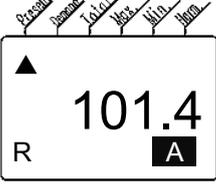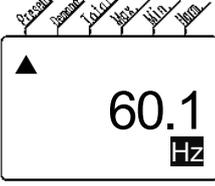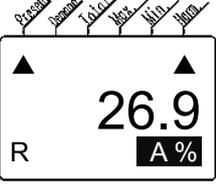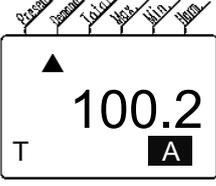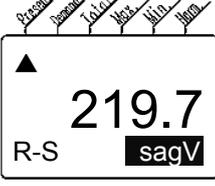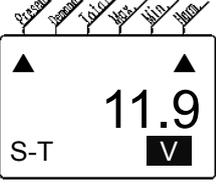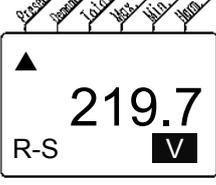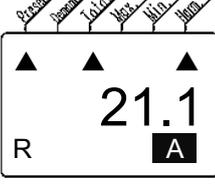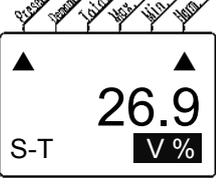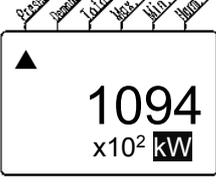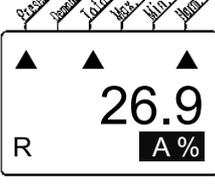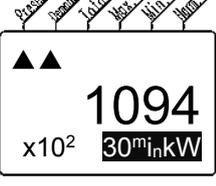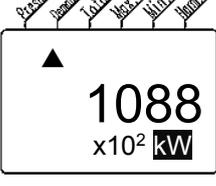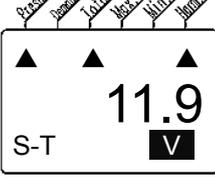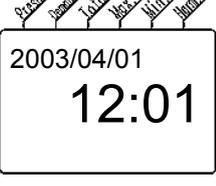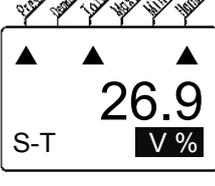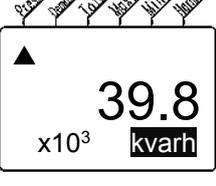
Please refer to ☞29 about the Error information Screen.

5.2.1 Significant digits

■Amp, Amp Demand, Harmonic Amp
With the setting value of primary current, it is as follows.

primary current	5A～30A	40A～300A	400A～3000A	4000A～30000A
significant digits	**.** (A)	***.* (A)	**** (A)	****0 (A)

■Voltage, Harmonic Voltage
With the setting value of primary voltage, it is as follows.

primary voltage	110V, 220V	440V～2200V	3300V～77000V	110000V
significant digits	***.* (V)	**** (V)	****0(V)	*****0(V) (kV)

■Active/Reactive Watt, Watt Demand, Simplified Demand
With the full load, it is as follows.

Full load	<12kW	12kW≦ <120kW	120kW≦ <1200kW	1200kW≦ <12000kW	12000kW≦ <120000kW	120000kW≦
significant digits	**.*** (kW)	***.** (kW)	****.* (kW)	***** (kW)	***** $\times 10^1$(kW)	***** $\times 10^2$(kW)

> Full load = (primary voltage) x (primary current) x (phase coefficient) / 1000[kW]

*phase coefficient : 1P2W→1,1P3W→2,3P3W→1.73

■Active/Reactive Energy
With the full load, it is as follows.

Full load	<12kW	12kW≦ <120kW	120kW≦ <1200kW	1200kW≦ <12000kW	12000kW≦ <120000kW	120000kW≦
significant digits	****.** (kWh)	*****.* (kWh)	*****.* $\times 10^1$(kWh)	*****.* $\times 10^2$(kWh)	*****.* $\times 10^3$(kWh)	*****.* $\times 10^4$(kWh)

■Frequency
**.* (Hz)

■Power Factor
*.*** (cos ϕ)

■Harmonic Distortion
Harmonic Amp   : ***.* (%A)
Harmonic Voltage   : ***.* (%V)

5.2.2 Displaying each phase
At the following screens, the measurement data of each phase is changed and displayed by pressing the [↵phase] key.
Amp, Amp Demand, Voltage, Harmonic Amp, Harmonic Voltage
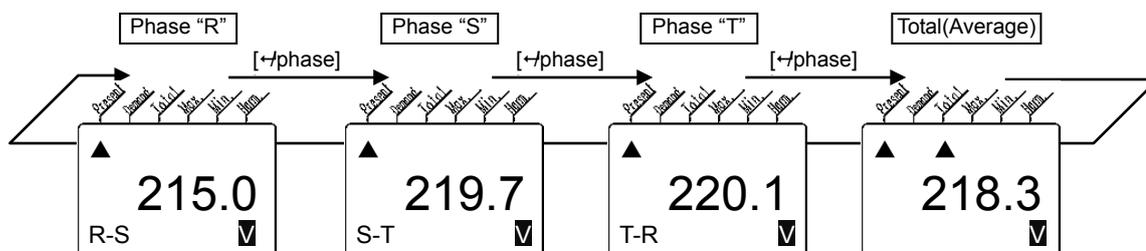
5.2.3 Displaying maximum/minimum value
At the following screens, displaying the maximum value by pressing the + key, and the minimum value by pressing the -.
Amp Demand, Voltage, Watt Demand, Power Factor

By Pressing the [+][-] key, the maximum value and the date and time of the occurrence are displayed.

Month/day hour/minitue
The value at the time of generation point
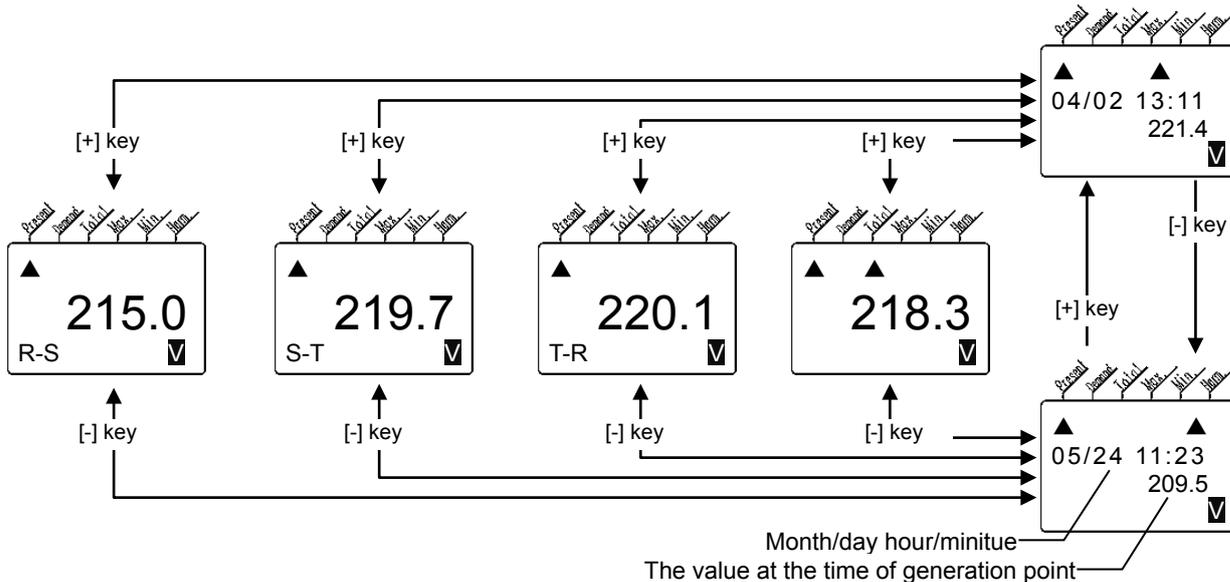
5.2.4 Displaying harmonic value(1,3,5,7,9,11)
The harmonic(fundamental to 13th) is changed and displayed by pressing the [+]/[-] key.
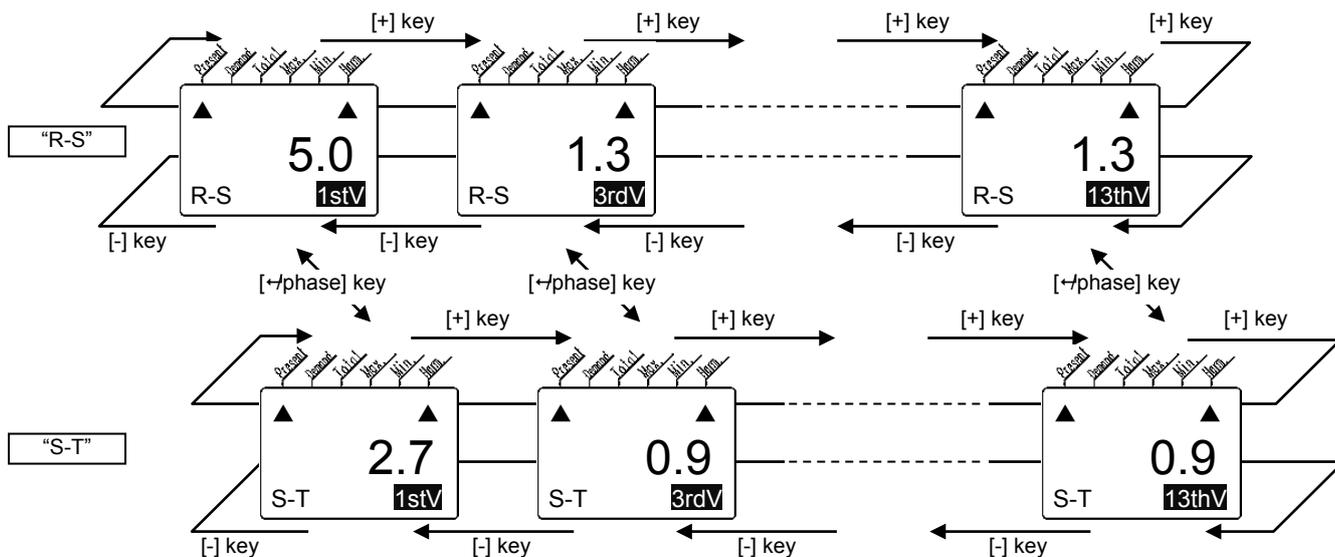
5.2.5 Displaying Another circuit.
EcoMonitorPro which can measure two or more circuits, it can change and display on other circuits by pressing the [Circuit] key.
E.g. connecting with EMU2-RD7-C.
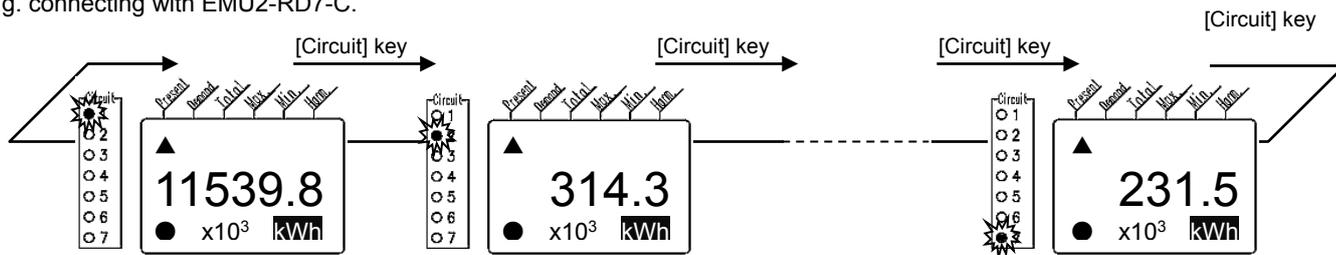
The circuit currently displayed on LCD is interlocked with and the light is switched on.

5.3 Checking the state of an alarm.

5.3.1 Upper/Lower Limit Alarm

By pushing [▲] and [▼] key simultaneously, it shifts to an alarm mode.
The detailed contents of alarm information are expressed as an alarm screen one after another by Pressing [▲] or [▼] key.
In order to return to operation mode, [▲] and [▼] are pushed simultaneously again.
In the case of the model of EMU2-BM1-B without alarm function, it does not shift to this alarm screen.
In the case of the model of EMU2-VS1-P, Please refer to ☞5.3.2(Voltage Sag Alarm).
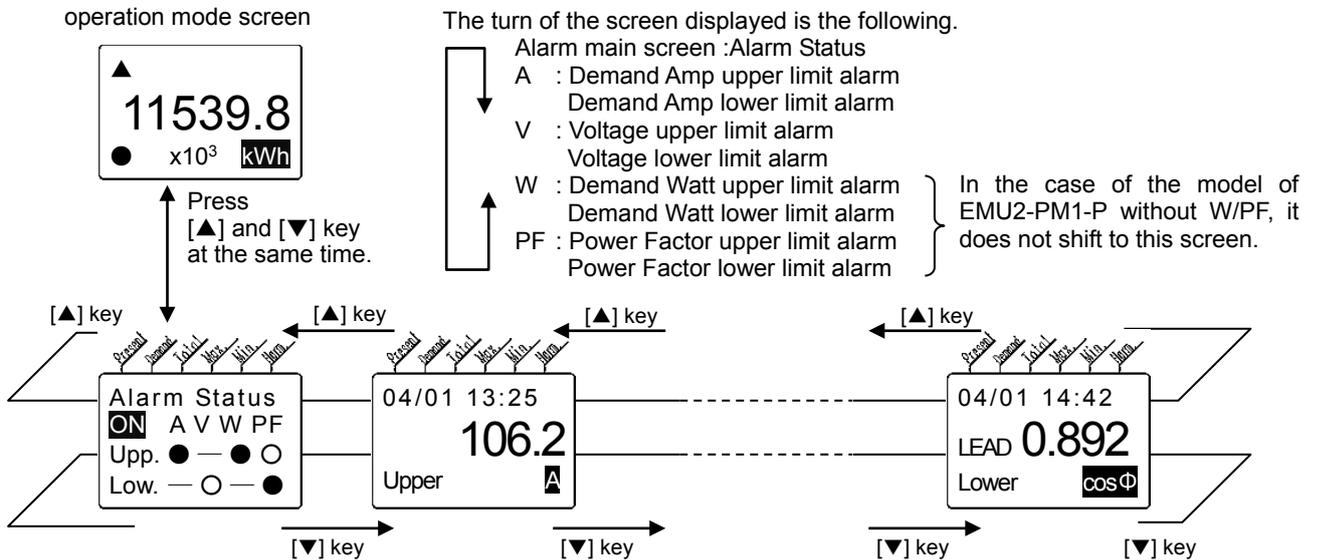
operation mode screen

▲
11539.8
● x10³ kWh

Press
[▲] and [▼] key
at the same time.

The turn of the screen displayed is the following.
Alarm main screen :Alarm Status
A : Demand Amp upper limit alarm
     Demand Amp lower limit alarm
V : Voltage upper limit alarm
     Voltage lower limit alarm
W : Demand Watt upper limit alarm
     Demand Watt lower limit alarm
PF : Power Factor upper limit alarm
     Power Factor lower limit alarm

In the case of the model of
EMU2-PM1-P without W/PF, it
does not shift to this screen.

[▲] key   [▲] key   [▲] key   [▲] key

Alarm Status
ON   A V W PF
Upp. ● — ● ○
Low. — ○ — ●

04/01 13:25
106.2
Upper   A

04/01 14:42
LEAD 0.892
Lower   cosΦ

[▼] key   [▼] key   [▼] key   [▼] key

➤ It does not display about the item set up for "not supervising" in alarm setting mode
   (the screen is skipped automatically).
➤ Also by the item to supervise, when the alarm has not occurred, the right screens
   are displayed.
   Alarm generating time is displayed as "-" Moreover, a measurement value is
   displayed as "0" (in power factor, displayed as LAG1.000).
➤ EcoMonitorPro which can measure two or more circuits, it can change and display
   on other circuits by pressing the [Circuit] key, like an operation mode screen.

In the case of no alarm.

- -/- - - -:- -
              0
Upper   A
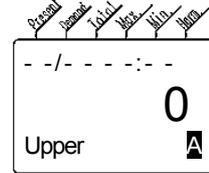
Details of screen

In the case of the model of
EMU2-PM1-P with relay, a contact
state is displayed.
ON   : contact ON
OFF   : contact OFF
In the case of other models, it does
not display.

Alarm Status
ON   A V W PF
Upp. ● — ● ○
Low. — ○ — ●
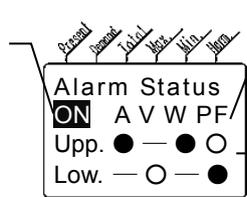
A   : Demand Amp
V   : Voltage
W   : Demand Watt
PF   : Power Factor

Upp. : display the state of upper limit alarm.
Low. : display the state of Lower limit alarm.
  ○   : it is a candidate for surveillance, bat no alarm
  ●   : it is a candidate for surveillance, alarm generating
  —   : It is set up with "not supervising"

Alarm generating time is displayed
as "MM/DD HH:MM"

The classification of Upper or Lower
Limit is shown.

04/01 13:25
106.2
Upper   A
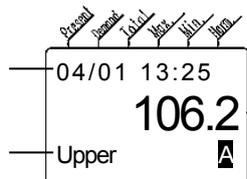
A value when an alarm occurs is shown.

5.3.2 Voltage Sag Alarm

By pushing [▲] and [▼] key simultaneously, it shifts to an alarm mode.
The detailed contents of alarm information are expressed as an alarm screen one after another by Pressing [▲] or [▼] key.
In order to return to operation mode, [▲] and [▼] are pushed simultaneously again.
This function is model of EMU2-VS1-P only.
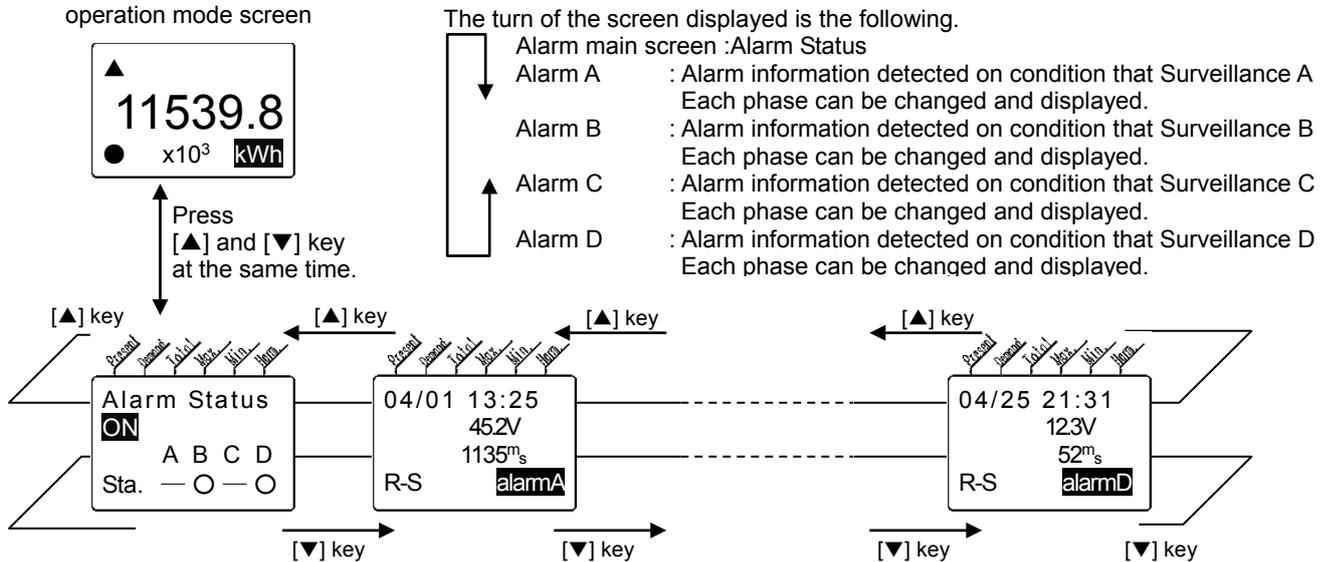
operation mode screen

The turn of the screen displayed is the following.

Alarm main screen : Alarm Status

Alarm A	: Alarm information detected on condition that Surveillance A Each phase can be changed and displayed.
Alarm B	: Alarm information detected on condition that Surveillance B Each phase can be changed and displayed.
Alarm C	: Alarm information detected on condition that Surveillance C Each phase can be changed and displayed.
Alarm D	: Alarm information detected on condition that Surveillance D Each phase can be changed and displayed.

Press [▲] and [▼] key at the same time.

- ➢ It does not display about the item set up for "not supervising" in alarm setting mode (the screen is skipped automatically).
- ➢ Also by the item to supervise, when the alarm has not occurred, the right screens are displayed.
  Alarm generating time is displayed as "-" Moreover, a measurement value is displayed as "0".
- ➢ Alarm status of each phase is changed and displayed by pressing the [↵/phase] key.

In the case of no alarm.

Details of screen

A contact state is displayed.
ON : contact ON
OFF : contact OFF

A	: Surveillance A
B	: Surveillance B
C	: Surveillance C
D	: Surveillance D
O	: it is a candidate for surveillance, bat no alarm
●	: it is a candidate for surveillance, alarm generating
—	: It is set up with "not supervising"

Alarm generating time is displayed as "MM/DD HH:MM"

Phase.

A value when an alarm occurs is shown.
- ➢ When continuation time is longer than the value set up, it is fixed with the value which added 1001ms to the setting value, and on a screen, this value adds "over" and is displayed.

5.3.3 Turning OFF a point of contact.

In the case of the model of EMU2-PM1-P,EMU2-VS1-P with relay, A point of contact can be compulsorily turned OFF by this equipment.

operation mode screen

▲

11539.8

● x10³ kWh
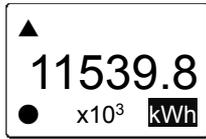
Press
[▲] and [▼] key
at the same time.

➤ When a point of contact is turned OFF compulsorily, a point of contact does not turn on until all alarm generating states are lost and an alarm next occurs.
➤ Even when a point of contact is turned OFF compulsorily, information, such as a generating value and generating time, is not cleared.
Please refer to ☛5.3.4 about the method of clearing information, such as a generating value and generating time.

EMU2-PM1-P

Alarm Status
ON A V W PF
Upp. ● — ● ○
Low. — ○ — ●

[Reset/Set] key ⇒

Alarm Status
OFF A V W PF
Upp. ● — ● ○
Low. — ○ — ●

EMU2-VS1-P

Alarm Status
ON
A B C D
Sta. — ○ — ●

[Reset/Set] key ⇒

Alarm Status
OFF
A B C D
Sta. — ○ — ●
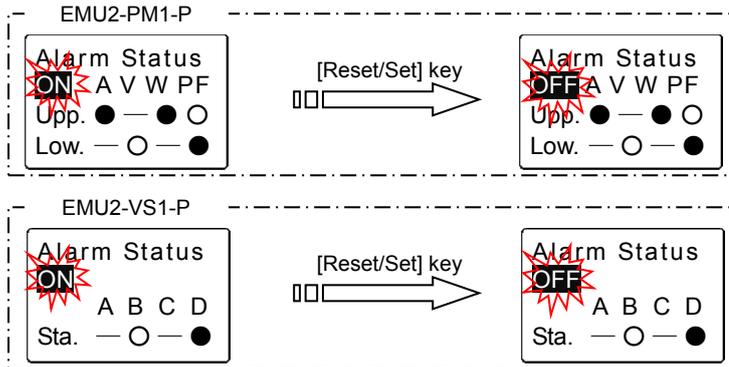
5.3.4 Clearing the information on an alarm.

Upper/Lower Limit Alarm

operation mode screen

▲

11539.8

● x10³ kWh

[Reset/Set] key ⇒

[Reset/Set]
1 Reset
2 Set

Select "1 Reset"

[↵/phase] key ⇒

[Reset]
☐ Max·Min
☑ AL(Limit)
☐ AL(Vsag)

1) Please push [▼] key and it moves to "AL(Limit)".
2) Please push [+] or [-] key and a check is put in.

[↵/phase] key

[↵/phase] key

Completed

OK

⇐ [↵/phase] key

Now Executing.

Do you really execute?
OK Cancel

1) Please push [▲] or [▼] key and it moves to "OK". If "Cancel" is selected, it will return to back.

Voltage Sag Alarm

operation mode screen

▲

11539.8

● x10³ kWh

[Reset/Set] key ⇒

[Reset/Set]
1 Reset
2 Set

Select "1 Reset"

[↵/phase] key ⇒

[Reset]
☐ Max·Min
☐ AL(Limit)
☑ AL(Vsag)

1) Please push [▼] key and it moves to "AL(Vsag)".
2) Please push [+] or [-] key and a check is put in.

[↵/phase] key

[↵/phase] key

Completed

OK

⇐ [↵/phase] key

Now Executing.

Do you really execute?
OK Cancel

1) Please push [▲] or [▼] key and it moves to "OK". If "Cancel" is selected, it will return to back.

5.4 Setting an Active/Reactive Energy as arbitrary values

Active Energy

operation mode screen

[▼] key is pushed and
Select "2 Set"

Select "1 Wh"

▲
11539.8
● x10³ kWh

[Reset/Set] key

[Reset/Set]
1 Reset
2 Set

[↵/phase] key

[Set]
1 Wh
2 varh

[↵/phase] key

[↵/phase] key

[Wh]
99999.9
x10³kWh

Please change a value.

Completed

OK

[↵/phase] key

Now Executing.

Do you
really
execute?
OK Cancel

[↵/phase] key

Please push [▲] or [▼] key
and it moves to "OK".
If "Cancel" is selected, it will
return to operation mode
screen.

1) A position is moved by pushing the [▲]
or [▼] key.
2) The value of each position is changed
by pushing the [+] or [-] key.

Reactive Energy

operation mode screen

[▼] key is pushed and
Select "2 Set"

Select "2 varh"

▲
11539.8
● x10³ kWh

[Reset/Set] key

[Reset/Set]
1 Reset
2 Set

[↵/phase] key

[Set]
1 Wh
2 varh

[↵/phase] key

[↵/phase] key

[varh]
99999.9
x10³kvarh

Please change a value.

Completed

OK

[↵/phase] key

Now Executing.

Do you
really
execute?
OK Cancel

[↵/phase] key

Please push [▲] or [▼] key
and it moves to "OK".
If "Cancel" is selected, it will
return to operation mode
screen.

1) A position is moved by pushing the [▲]
or [▼] key.
2) The value of each position is changed
by pushing the [+] or [-] key.

5.5 Setup of operation conditions

5.5.1 Rating of EcoMonitorPro

The rating of EcoMonitorPro is set up in the following procedures.
1) A position is moved by pushing the [▲] or [▼] key.
2) The value of each position is changed by pushing the [+] or [-] key.
3) Pushing [↵/phase] key.
The items set up by the model name differ. It is as follows about the flow of a setup.
➢ A value cannot be changed about the item which cannot be set up.

Operation mode Screen

[Setup] key

[Setup]
1 Measure
2 Logging
3 Clock

EMU2-BM1-B	EMU2-HM1-△	EMU2-PM1-P	EMU2-VS1-P	EMU2-RD□-△
Phase & Wire	Phase & Wire	Phase & Wire	Phase & Wire	Phase & Wire
Primary Voltage	Primary Voltage	Primary Voltage	Primary Voltage	Primary Voltage
Sensor Type & Primary Current	Sensor Type & Primary Current	Sensor Type & Primary Current	Sensor Type & Primary Current	Sensor Type & Primary Current
Demmand Amp Time	Demmand Amp Time Watt Time	Demmand Amp Time	Demmand Amp Time Watt Time	Demmand Amp Time Watt Time
		Pulse Unit	Pulse Unit	

[Measure]
1 Wiring
2 V rate
3 A rate
[↵/phase] ⇒ [Wiring] 3P3W

[Measure]
1 Wiring
2 V rate
3 A rate
[↵/phase] ⇒ [V rate] 220V Direct

[Measure]
2 V rate
3 A rate
4 Mode
[↵/phase] ⇒ [Sensor] 5A [A rate] 100A

[Measure]
4 Mode
5 Demand
6 Pulse
[↵/phase] ⇒ [Demand] A: 2 min W: 2 min

[Measure]
5 Demand
6 Pulse
0 Back
[↵/phase] ⇒ [Pulse] 0.001 kWh/pulse

Downloading to EcoMonitorPro

↓ [Setup] key

[Quit Setup]
1 Save
2 Not Save
3 Cancel

[↵/phase] key

operation mode screen

▲
11539.8
● x10³ kWh

[↵/phase] key

Now Executing.

Logging data Will be Cleared.
OK   Cancel

Select "OK" and [↵/phase] key

If "2 Not Save" is selected, the contents of change are canceled and return to an operation mode screen.
If "3 Cancel" is selected, it will return to back.

The range of the data in each item which can be set up.

Table 5.5.1

Phase & Wire	**1P2W** : Single phase 2 wire **1P3W** : Single phase 3 wire **3P3W** : Three phase 3 wire

Primary Voltage	Model EMU2-BM1-B, EMU2-HM1-*, EMU2-VS1-P
	   110V, 220V, 440V
	others
	   110V direct, 220V direct, 440V, 690V, 1100V, and 2200V, 3300V, 6600V, 11000V, 13200V, 13800V, 15000V, 16500V, 22000V, 24000V, 33000V, 66000V, 77000V, 110000V
	Note:
	   A wiring should use it by primary voltage setting value 110V in the circuit of a single phase 3 wire type.

Sensor Type
&
Primary Current
	In the case of "EMU-CT50/100/250/400/600"
	   [Sensor]:**Direct**
	   [A rate]: **50A, 100A, 250A, 400A, 600A**
	In the case of "EMU2-CT5"
	   [Sensor]:**5A**
	   [A rate]:**5A, 6A, 7.5A, 8A, 10A, 12A, 15A, 20A, 25A, 30A, 40A, 50A, 60A, 75A, 80A, 100A, 120A, 150A, 200A, 250A, 300A, 400A, 500A, 600A, 750A, 800A, 1000A, 1200A, 1500A, 1600A, 2000A, 2500A, 3000A, 4000A, 5000A, 6000A, 7500A, 8000A, 10000A, 12000A, 20000A, 25000A, 30000A**
	Note:
	   In use of EMU2-CT5, please set up the rating of CT(Current Transformer) by the side of primary.

Demand Time	Demand Amp time and Demand Watt Time can be set up individually. **0sec, 10sec, 20sec, 30sec, 40sec, 50sec, 1min, 2min, 3min, 4min, 5min, 6min, 7min, 8min, 9min, 10min, 11min, 12min, 13min, 14min, 15min, 20min, 25min, 30min**
Pulse Unit	With the full load, it is as follows.

Full load (kW)	The pulse unit which can be set up (kWh/pulse)			
Less than 12	**1**	**0.1**	**0.01**	**0.001**
Less than [12 or more] 120	**10**	**1**	**0.1**	**0.01**
Less than [120 or more] 1200	**100**	**10**	**1**	**0.1**
Less than [1200 or more] 12000	**1000**	**100**	**10**	**1**
Less than [12000 or more] 120000	**10000**	**1000**	**100**	**10**
120000 or more	**100000**	**10000**	**1000**	**100**

Note:
   Full load=(primary voltage)x(primary current)x(phase coefficient)/1000[kW]
   *phase coefficient : 1P2W→1,1P3W→2,3P3W→1.73

➢ A setup that Primary Voltage x Primary Current exceeds "88,665kW" cannot be performed.
   For example: If primary current is set as 30000A when primary voltage is 110000V, the value of primary voltage will be automatically reset as 220V.

5.5.2 The selection display of a measurement element

EMU2-D65-M chooses and displays some out of the data which EcoMonitorPro, model EMU2-RD* measured. Moreover, in the Logging function, data is further chosen and memorized out of the measurement data chosen and displayed. In other words, it is necessary to surely choose data to memorize in this mode. There is no function which chooses a display in EcoMonitorPro of other model names.

operation mode screen
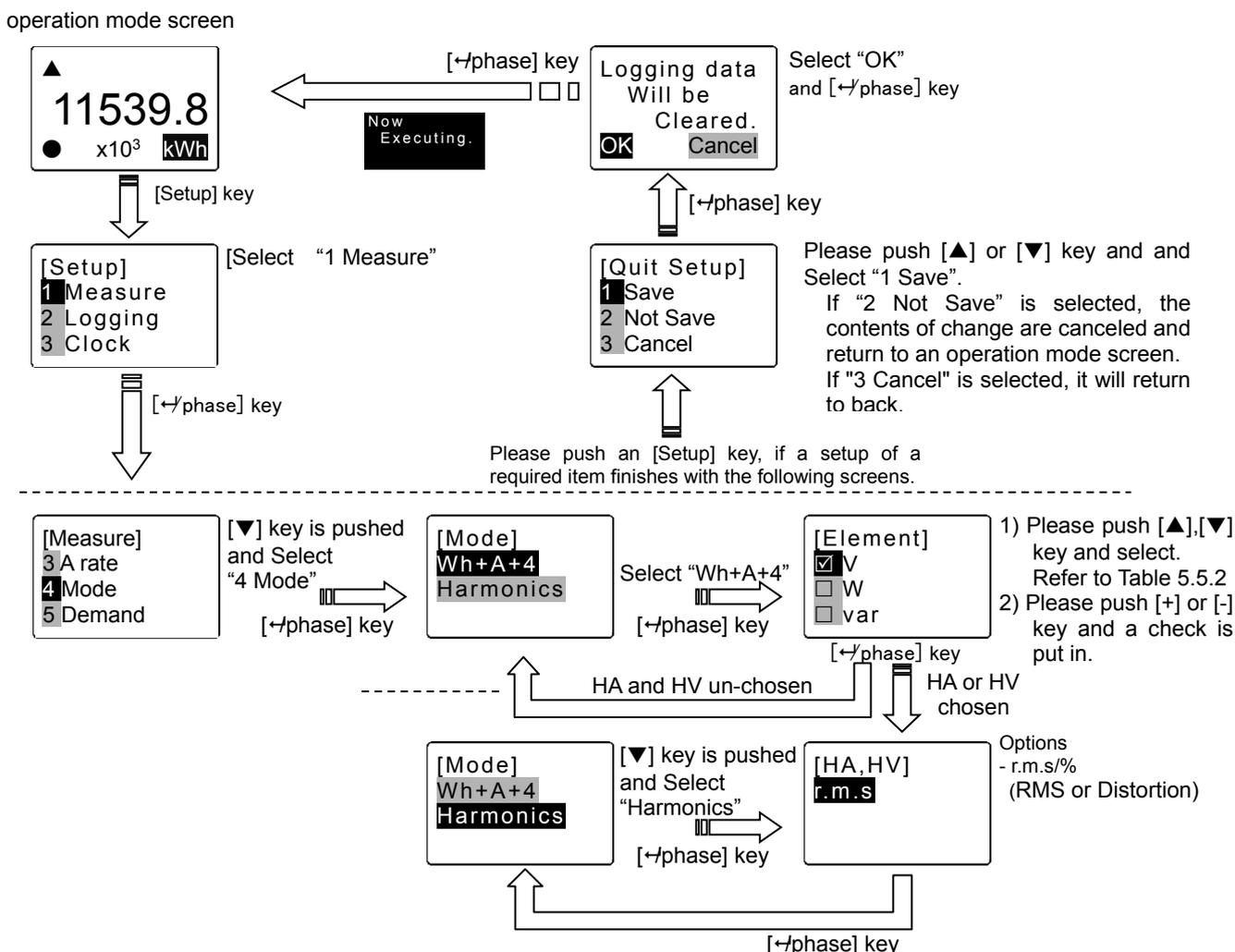
Table 5.5.2   List of elements

☐ V---------	Voltage
☐ W--------	Active Watt, Demand Watt
☐ var ------	Reactive Watt
☐ PF-------	Power Factor
☐ Hz-------	Frequency
☐ varh-----	Reactive Energy
☐ HA ------	Harmonic Amp (RMS / Distortion)
☐ HV ------	Harmonic Voltage (RMS / Distortion)

➤ About a mode

Table 5.5.3

Mode	details
WH+A+4	Please choose this mode to check maximum/minimum, such as voltage and demand amp. In this mode, the element which can be chosen is to four.
Harmonics	It is used to see the degree of harmonics in detail.

➤ RMS and Distortion cannot display both simultaneously.

5.6 Setup of supervision conditions

5.6.1 Upper/Lower Limit Alarm

In the case of the model of EMU2-BM1-B without alarm function, it does not shift to this alarm screen.
In the case of the model of EMU2-VS1-P, Please refer to ☞5.6.2 (Vsag Alarm).

```
Alarm Status
ON  A V W PF
Upp. ● — ● ○
Low. — ○ — ●
```
↓[Setup]

```
[Alarm Set]
1  Limit
2  Vsag
```
↓[↵/phase]

By putting a check into a check box, it is set as the candidate for surveillance and a maximum or minimum value can be set up.
1) Please push [▲],[▼] key and select.
   Refer to Table 5.6.1
2) Please push [+] or [-] key and a check is put in.

EMU2-HM1-△	EMU2-PM1-P	EMU2-RD□-△

↓ ↓ ↓

| Demand Amp Upper/Lower Limit | Demand Amp Upper/Lower Limit | Demand Amp Upper/Lower Limit |

· ·
```
[Limit]
1 A Limit
2 V Limit
3 W Limit
```
[↵/phase]
⇔
```
☑ A Upper
  30000 A
□ A Lower
  00300 A
```

1) A position is moved by pushing the [▲] or [▼] key.
2) The value of each position is changed by pushing the [+] or [-] key.

| Voltage Upper/Lower Limit | Voltage Upper/Lower Limit | Voltage Upper/Lower Limit |

· ·
```
[Limit]
1 A Limit
2 V Limit
3 W Limit
```
[↵/phase]
⇔
```
□ V Upper
  16500 V
☑ V Lower
  11210 V
```

| Demand Watt Upper/Lower Limit | | Demand Watt Upper/Lower Limit |

· ·
```
[Limit]
2 V Limit
3 W Limit
4 PF Limit
```
[↵/phase]
⇔
```
☑ W Upper
  11410 x10²kW
□ W Lower
  00210 x10²kW
```

| Power Factor Upper/Lower Limit | | Power Factor Upper/Lower Limit |

· ·
```
[Limit]
3 W Limit
4 PF Limit
5 Delay
```
[↵/phase]
⇔
```
☑ PF Upper
  0.850
☑ PF Lower
  -0.900
```

| Time Delay | Time Delay | Time Delay |

· ·
```
[Limit]
4 PF Limit
5 Delay
0 Back
```
[↵/phase]
⇔
```
[Delay]
10sec
```

A setup of "Time Delay" is common about each surveillance item.

↓[Setup] key

| Downloading to EcoMonitorPro |

```
[Quit Setup]
1 Save
2 Not Save
3 Cancel
```

If "2 Not Save" is selected, the contents of change are canceled and return to an operation mode screen.
If "3 Cancel" is selected, it will return to back.

[↵/phase] key

Alarm mode screen

```
Alarm Status
ON  A V W PF
Upp. ● — ● ○
Low. — ○ — ●
```
← [↵/phase] key
```
Now
Executing.
```
□ □
```
Logging data
Will be
Cleared.
OK    Cancel
```

Select "OK" and [↵/phase] key

The range of the data in each item which can be set up.

<div align="center">Table 5.6.1</div>

Demand AmpUpper/Lower Limit

Primary Current	Minimum	Step	Maximum
5A～30A	0.00A	0.01A	Primary Current Value
40A～300A	0.0A	0.1A	
400A～3000A	0A	1A	
4000A～30000A	0A	10A	

Voltage Upper/Lower Limit

Primary Voltage	Minimum	Step	Maximum
110V～220V	0.0V	0.1V	Primary Voltage Value
440V～2200V	0V	1V	×(15/11)
3300V～110000V	0V	10V	

Demand Watt Upper/Lower Limit

Full load （kW）	Minimum	Step	Maximum
Less than 12	0.000kW	0.001kW	Full load
Less than [12 or more] 120	0.00kW	0.01kW	
Less than [120 or more] 1200	0.0kW	0.1kW	
Less than [1200 or more] 12000	0kW	1kW	
Less than [12000 or more] 120000	0kW	10kW	
120000 or more	0kW	100kW	

Note:
Full load=(primary voltage)x(primary current)x(phase coefficient)/1000[kW]

*phase coefficient : 1P2W→1,1P3W→2,3P3W→1.73

Power Factor Upper/Lower Limit

Minimum	Step	Maximum
LEAD 0.50	0.05	LAG 0.50

Time Delay
0sec, 5sec, 10sec, 20sec, 30sec, 40sec, 50sec, 1min, 2min, 3min, 4min, 5min

5.6.2 Vsag Alarm

This function is model of EMU2-VS1-P only.

```
Alarm Status
ON
        A B C D
Sta. — O — ●
```
↓ [Setup]

```
[Alarm Set]
1  Limit
2  Vsag
```
↓ [↵/phase]

By putting a check into a check box, it is set as the candidate for surveillance and a maximum or minimum value can be set up.
1) Please push [▲],[▼] key and select.
   Refer to Table 5.6.2
2) Please push [+] or [-] key and a check is put in.

Surveillance A	..	[Vsag]
		1 Alarm A
		2 Alarm B
		3 Alarm C
			[↵/phase]
			⇔
				Sag Rate:
				    20 %
				Duration:
				    01000ms
					1) A position is moved by pushing the [▲] or [▼] key.
					2) The value of each position is changed by pushing the [+] or [-] key.

Surveillance B	..	[Vsag]
		1 Alarm A
		2 Alarm B
		3 Alarm C
			[↵/phase]
			⇔
				Sag Rate:
				    20 %
				Duration:
				    01000ms	

Surveillance C	..	[Vsag]
		2 Alarm B
		3 Alarm C
		4 Alarm D
			[↵/phase]
			⇔
				Sag Rate:
				    20 %
				Duration:
				    01000ms	

Surveillance D	..	[Vsag]
		3 Alarm C
		4 Alarm D
		5 Default
			[↵/phase]
			⇔
				Sag Rate:
				    20 %
				Duration:
				    01000ms	

Return to initial value	..	[Vsag] 4 Alarm D 5 Default 0 Back	[↵/phase] ⇔	A 20% 1000^m_s B 30% 500^m_s C 50% 200^m_s D 100% 20^m_s	

↓ [Setup]

Downloading to EcoMonitorPro	[Quit Setup] 1 Save 2 Not Save 3 Cancel	If "2 Not Save" is selected, the contents of change are canceled and return to an operation mode screen. If "3 Cancel" is selected, it will return to back.

[↵/phase] key

Alarm mode screen

```
Alarm Status
ON
        A B C D
Sta. — O — ●
```
← [↵/phase] key

```
Now
Executing.
```

```
Logging data
Will be
Cleared.
OK      Cancel
```
Select "OK"
and [↵/phase] key

➢ If Default is chosen, the old contents of a setting will be canceled and will set up an initial value.

The range of the data in each item which can be set up.
  Four kinds of alarm levels to A-D can be set up individually.

Table 5.6.2

Surveillance	Voltage Sag		duration (of voltate sags)	
A	0% - 100% : 1% unit	(Initial value 20%)	20 - 10000ms : 10ms unit	(Initial value 1000ms)
B	0% - 100% : 1% unit	(Initial value 30%)	20 - 10000ms : 10ms unit	(Initial value 500ms)
C	0% - 100% : 1% unit	(Initial value 50%)	20 - 10000ms : 10ms unit	(Initial value 200ms)
D	0% - 100% : 1% unit	(Initial value 100%)	20 - 10000ms : 10ms unit	(Initial value 20ms)

5.7 Adjustment of a LCD screen

The following two functions can adjust the LCD screen in the state of having been suitable for use environment.
- Adjustment of a LCD contrast
- Lighting conditions of a back light

operation mode screen

[↵/phase] key

▲
11539.8
● x10³ kWh

Now Executing.

[Quit Setup]
1 Save
2 Not Save
3 Cancel

Please push [▲] or [▼] key and and Select "1 Save".
   If "2 Not Save" is selected, the contents of change are canceled and return to an operation mode screen.
   If "3 Cancel" is selected, it will return to back.

[Setup] key

[Setup]
2 Logging
3 Clock
4 Display

[▼] key is pushed and Select "4 Display"

[↵/phase] key

[Display]
1 Contrast
2 Backlight
0 Back

[Setup] key

[↵/phase] key

[Display]
1 Contrast
2 Backlight
0 Back

[▼] key is pushed and Select "1 Contrast"

[↵/phase] key

[Contrast]

Please push [+] or [-] key.

[Display]
1 Contrast
2 Backlight
0 Back

If "0 Back" is selected, it will return to back.

[▼] key is pushed and Select "2 Backlight"

[↵/phase] key

[Backlight]
Auto OFF
Always ON

Please phsh [▲] or [▼] key and Select either

➢ "Auto OFF" : If there is no key operation for 5 minutes, a back light will put out the light automatically.
➢ "Always ON" : Except for the following conditions, it is always in a lighting state.
   - After carrying out a power supply injection.
   - After a setup about Logging, clock, and wiring type.
   - After clearing Logging data
  However, the light is automatically re-turned on after several seconds.

5.8 Validation and setup of a clock

5.8.1 Setup of Clock

There are the following two methods in a setup of a clock.
- The clock of EMU2-D65-M is set **by** the value of the clock of EcoMonitorPro.
- The clock of EMU2-D65-M is set **to** the value of the clock of EcoMonitorPro.

operation mode screen

```
        [↵/phase] key                    [Quit Setup]      Please push [▲] or [▼] key and and
▲                                        1 Save            Select "2 Not Save".
11539.8         ⇐          □ □           2 Not Save           If "1 Save" is selected, the items
●   x10³  kWh                            3 Cancel          except the clock are saved and
                                                           return to an operation mode screen.
     ⇓ [Setup] key                             ⇑ [Setup] key    If "3 Cancel" is selected, it will return
                                                           to back.

[Setup]          [▼] key is pushed       [Setup]
1 Measure        and Select  "3 Clock"   1 Measure
2 Logging                                2 Logging
3 Clock                                  3 Clock
                                                                      Now Saving.
     ⇓ [↵/phase] key
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

[Clock]          [▼] key is pushed       [Download]       1) A position is moved by pushing
1 Download       and Select              2003/04/01          the [▲] or [▼] key.
2 Upload         "1 Download"    ⇒       13:42            2) The value of each position is
0 Back           [↵/phase] key           OK    Cancel        changed by pushing the [+] or
                                                             [-] key.

                                         Select "OK"  ||
                                         and push the [↵/phase] key
- - - - - - - - - - - - - - - - - - - - - - - - - - - - -
[Clock]          [▼] key is pushed                               Logging data        Select "OK"
1 Download       and Select              [↵/phase] key           Will be
2 Upload         "2 Upload"    □ □                               Cleared.           [↵/phase] key
0 Back                                                           OK    Cancel

If "0 Back" is selected,
it will return to back.
```

> A setup of a clock is " yy/mm/dd hh:mm." 0 second is set up in "Download" mode.
> When the clock is changed, logging data stored in the equipment is reset. Upload the data using the EMU2-PK3(option) as necessary.
> When the clock is changed, a back light will put out the light, but be automatically re-turned on after several seconds

5.8.2 Validation of Clock

The value of the clock built in EMU2-D65-M is displayed by pressing the ▲/▼ key at the Operation mode.

```
2003/04/01  ——— yyyy/mm/dd
13:42       ——— hh:mm
```

5.9 Data logging function.

5.9.1 Introduction

EMU2-D65-M choose four elements(In addition to Wh, three elements can be chosen arbitrarily) among the measurement data currently displayed, and memorize them in the memory inside equipment. The memorized data is taken in to PC using EMU2-PK3, and is saved as a file of csv form.
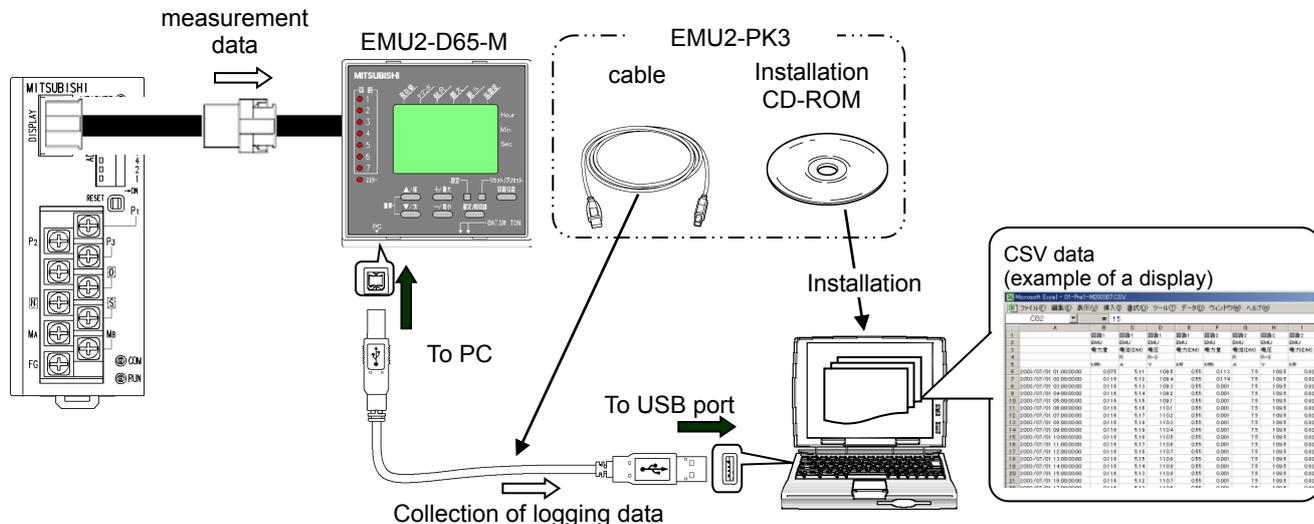
- EMU2-D65-M can memorize simultaneously the measurement element chosen beforehand at intervals of 1 second, 1 minute, and 1 hour, respectively.
- The memorizable maximum period (the maximum memory period) is shown below.

Table 5.9.1

EcoMonitorPro (model)	1-second interval data	1-minute interval data	1-hour interval data
EMU2-BM1-B EMU2-HM1-B, C EMU2-RD1-B, C, L EMU2-PM1-P EMU2-VS1-P	48 hours	10 days	131 days
EMU2-RD3-B, C, L, F	12 hours		
EMU2-RD5-B, C, F	4 hours		
EMU2-RD7-B, C, F	2 hours		

- It is not dependent on the numerousness of the kinds of measurement data to memorize, and the maximum memory period is fixed.
- The maximum memory period of data memorizable at intervals of 1 second changes with model names of EcoMonitorPro.

- When memorizing the measurement data of EcoMonitorPro which can measure two or more circuits, the data to memorize can be chosen for every circuit, respectively.
- However, in the same circuit, the kind of memory data of 1 second, 1 minute, and 1 hour operates on the same conditions, and a setup of a different kind cannot be performed.

The data memory image inside EMU2-D65-M: Example of measured by EMU2-RD7-Δ
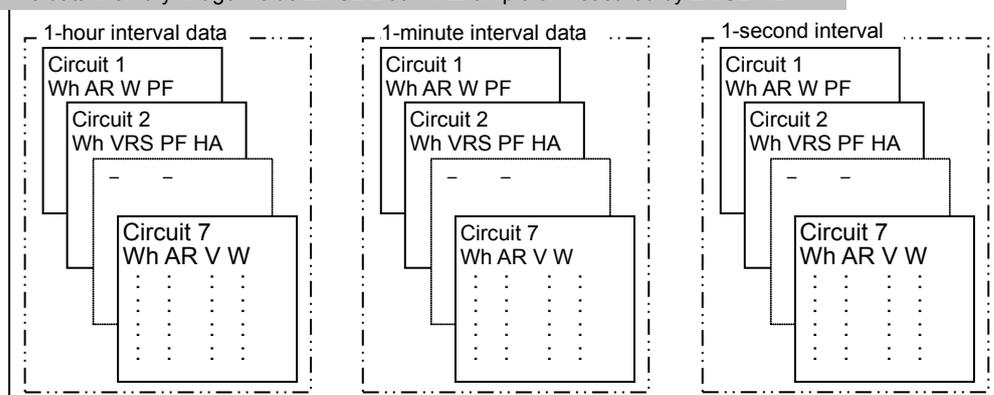
Mode of logging

logging of the interval of 1-second and 1-minute has the following two modes of operation.
- Mode1 : The newest Logging data is added overwriting the oldest logging data. Logging operation does not stop.
- Mode2 : If Logging is started in the time specified beforehand and the data is reached for the maximum memory, logging will be stopped automatically.

It is the following for details.

Mode1:
➢ After performing a setup about logging, logging operation starts immediately and data is memorized till the maximum memory period.
➢ After reaching during the maximum memory, with progress of time, it is eliminated from the oldest data and new data is added.
➢ By using EMU2-PK3, the data of the past for the maximum memory period is collectable from the newest data.

Logging start
new data
maximum memory period
new data
new data
oldest data
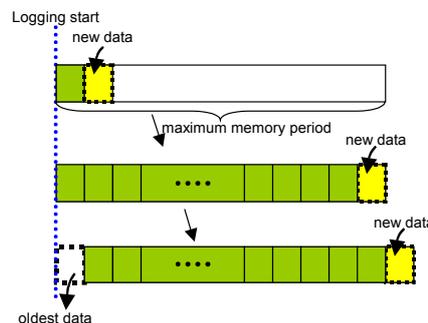
Mode2:
➢ After setting up logging, logging is started according to the following conditions.
  1) When the time of a logging opening day is set up with future from the clock of EMU2-D65-M, logging operation will be started if the time of a logging opening day becomes equal to the clock of EMU2-D65-M.

  2) When the time of a logging opening day is set up more in the past than the clock of EMU2-D65-M,
    a) When the period from the time of a logging opening day to the present time of EMU2-D65-M is shorter than the maximum memory period, it starts logging operation immediately.
    b) Logging operation is not started when the period from the time of a logging opening day to the present time of EMU2-D65-M is over the maximum memory period.
➢ If it reaches during the maximum memory, logging operation will stop automatically.
➢ When logging starts, the "▶" mark is displayed on the right end of LCD. A stop of logging vanishes this sign automatically.

Logging start
New data
maximum memory period
New data
New data
maximum memory period
logging operation will stop automatically

```
 ▲                ▶  Hour ───── It is shown that logging of a 1-hour interval
11539.8▶ Min ───── It is shown that logging of a 1-minute interval
        ▶  Sec ───── It is shown that logging of a 1-second interval
 ●    x10³ kWh
```
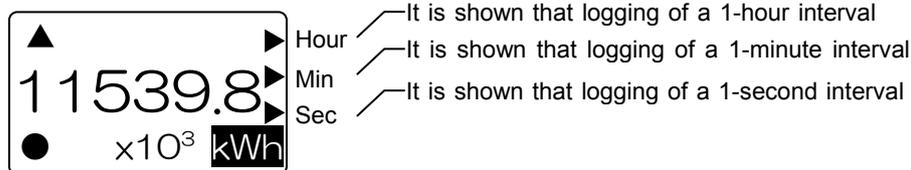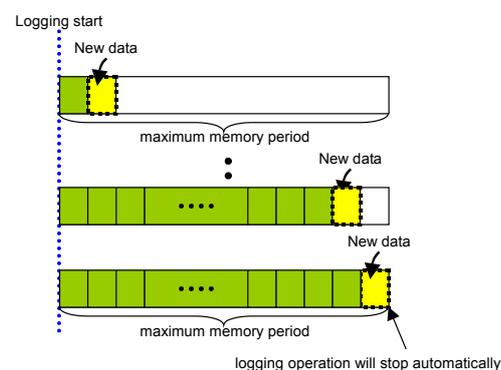
5.9.2 Selection of logging elements

This apparatus chooses and displays some out of the data which EcoMonitorPro measured. Moreover, data is further chosen and memorized out of the measurement data chosen and displayed. In other words, it is necessary to surely choose data to memorize in the Operation Setting mode. Please refer to ☞5.5.2 about the selection method of a display.

> Simplified Demand cannot be chosen as a logging element.

operation mode screen

▲
11539.8
● x10³ kWh

[↵/phase] key

Now Executing.

Logging data
Will be
Cleared.
OK   Cancel

Select "OK"
and [↵/phase] key

[Setup] key

[Setup]
1 Measure
2 Logging
3 Clock

[▼] key is pushed
and Select "2 Logging"

[↵/phase] key

[Quit Setup]
1 Save
2 Not Save
3 Cancel

[↵/phase] key

Please push [▲] or [▼] key and and Select "1 Save".
  If "2 Not Save" is selected, the contents of change are canceled and return to an operation mode screen.
  If "3 Cancel" is selected, it will return to back.

[Logging]
1 Log data
2 Log mode
0 Back

[▼] key is pushed
and Select "1 Log data"

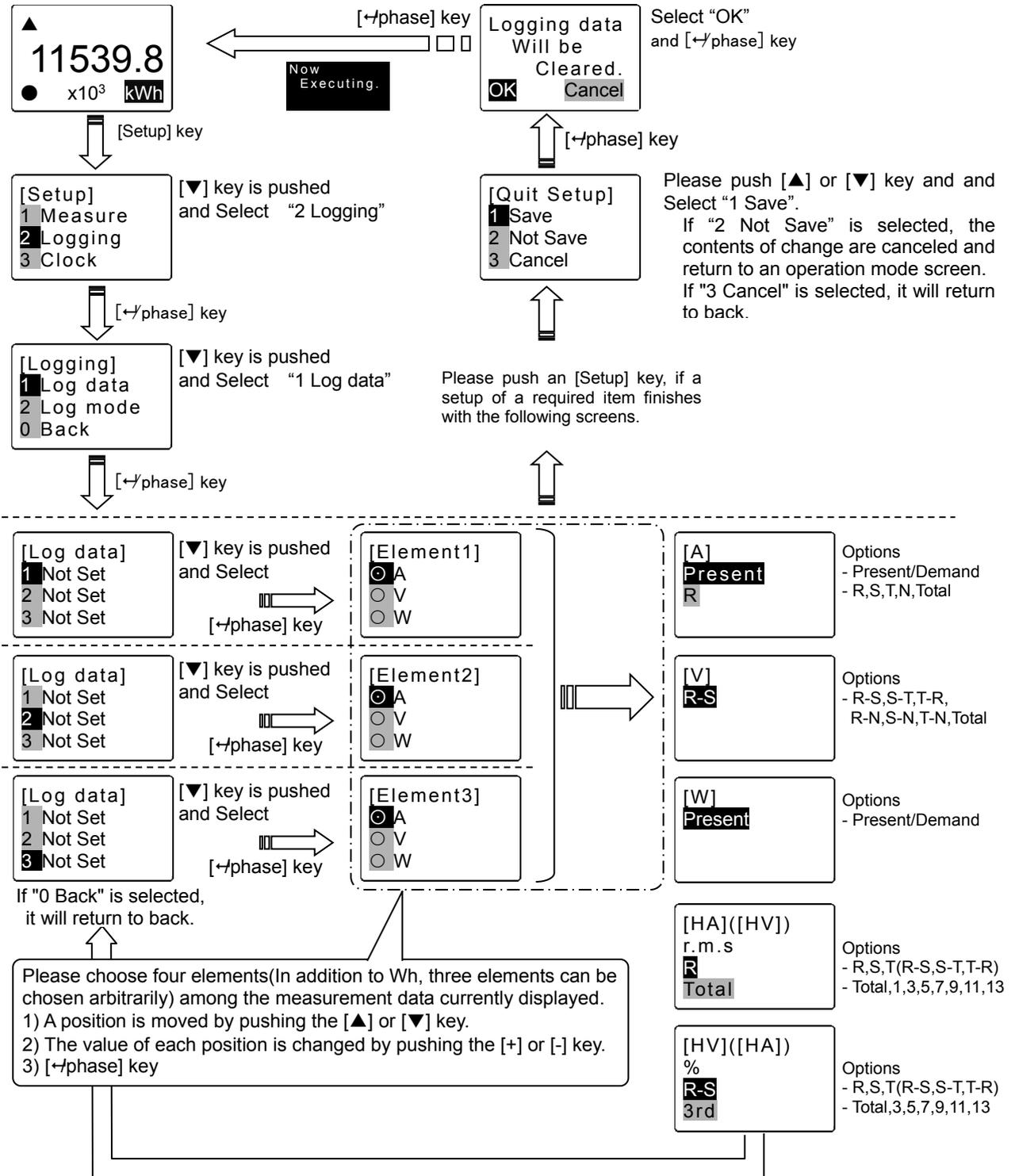Please push an [Setup] key, if a setup of a required item finishes with the following screens.

[↵/phase] key

[Log data]
1 Not Set
2 Not Set
3 Not Set

[▼] key is pushed
and Select

[↵/phase] key

[Element1]
◉ A
○ V
○ W

[A]
Present
R

Options
- Present/Demand
- R,S,T,N,Total

[Log data]
1 Not Set
2 Not Set
3 Not Set

[▼] key is pushed
and Select

[↵/phase] key

[Element2]
◉ A
○ V
○ W

[V]
R-S

Options
- R-S,S-T,T-R,
  R-N,S-N,T-N,Total

[Log data]
1 Not Set
2 Not Set
3 Not Set

[▼] key is pushed
and Select

[↵/phase] key

[Element3]
◉ A
○ V
○ W

[W]
Present

Options
- Present/Demand

If "0 Back" is selected, it will return to back.

Please choose four elements(In addition to Wh, three elements can be chosen arbitrarily) among the measurement data currently displayed.
1) A position is moved by pushing the [▲] or [▼] key.
2) The value of each position is changed by pushing the [+] or [-] key.
3) [↵/phase] key

[HA]([HV])
r.m.s
R
Total

Options
- R,S,T(R-S,S-T,T-R)
- Total,1,3,5,7,9,11,13

[HV]([HA])
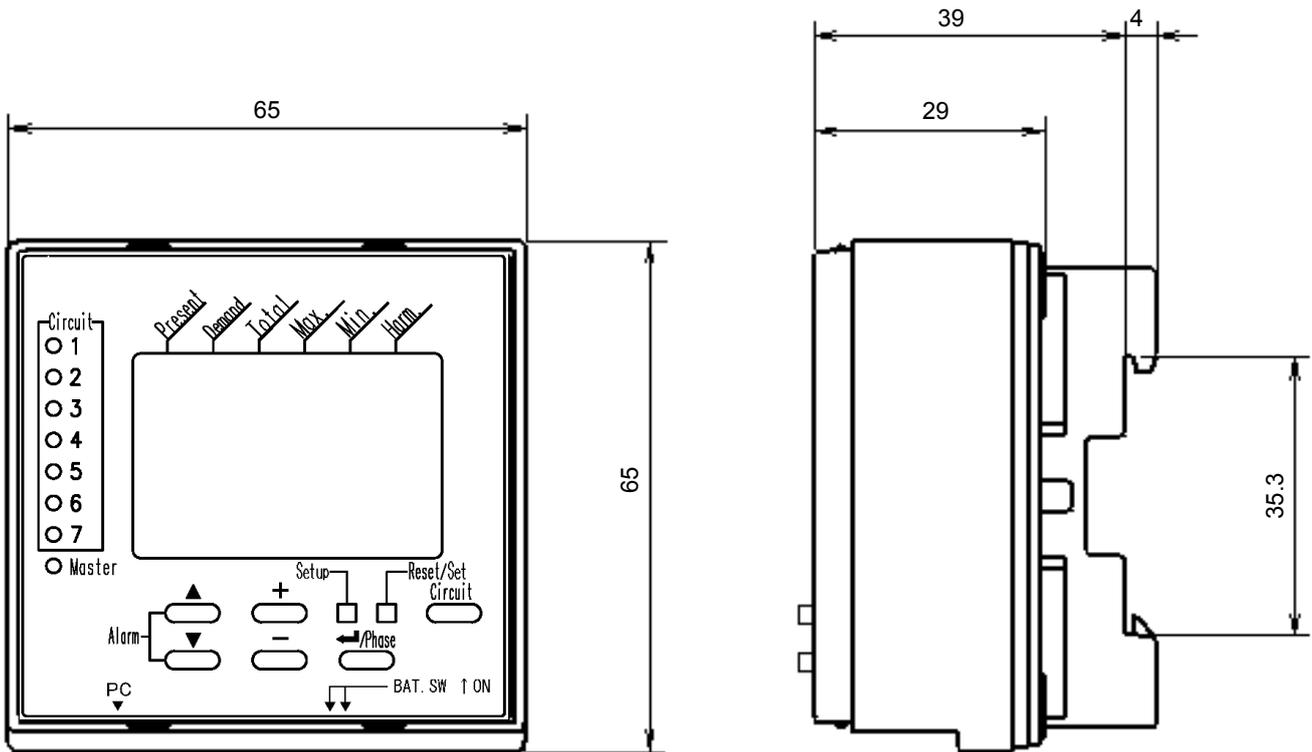%
R-S
3rd

Options
- R,S,T(R-S,S-T,T-R)
- Total,3,5,7,9,11,13

1) A position is moved by pushing the [▲] or [▼] key.
2) The value of each position is changed by pushing the [+] or [-] key.
3) [↵/phase] key.

5.9.3 Setting of logging operation conditions(mode of logging)

operation mode screen

```
   ▲
  11539.8
  ●    x10³  kWh
```

[↵/phase] key

Now Executing.

```
Logging data
Will be
  Cleared.
OK    Cancel
```

Select "OK"
and [↵/phase] key

[Setup] key

```
[Setup]
1 Measure
2 Logging
3 Clock
```

[▼] key is pushed
and Select "2 Logging"

[↵/phase] key

```
[Quit Setup]
1 Save
2 Not Save
3 Cancel
```

Please push [▲] or [▼] key and and
Select "1 Save".
　If "2 Not Save" is selected, the
contents of change are canceled and
return to an operation mode screen.
If "3 Cancel" is selected, it will return
to back.

[↵/phase] key

```
[Logging]
1 Log data
2 Log mode
0 Back
```

[▼] key is pushed
and Select "2 Log mode"

Please push an [Setup] key, if a
setup of a required item finishes
with the following screens.

[↵/phase] key

```
[Log mode]
1 1sec data
2 1min data
0 Back
```

[▼] key is pushed
and Select
"1 1sec data"

[↵/phase] key

```
[1sec data]
1 mode1
2 mode2
```

Please phsh [▲]
or [▼] key
and Select either
"mode2"
and [↵/phase] key

```
[Start]
2003/04/01
13:42
OK
```

1) A position is moved by
   pushing the [▲][▼].
2) The value of each
   position is changed
   by pushing the [+][-].

"mode1" and
[↵/phase] key

Select "OK"
and [↵/phase] key

```
[Log mode]
1 1sec data
2 1min data
0 Back
```

[▼] key is pushed
and Select
"2 1min data"

[↵/phase] key

```
[1min data]
1 mode1
2 mode2
```

Please phsh [▲]
or [▼] key
and Select either
"mode2"
and [↵/phase] key

```
[Start]
2003/04/01
13:42
OK
```

1) A position is moved by
   pushing the [▲][▼].
2) The value of each
   position is changed
   by pushing the [+][-].

"mode1" and
[↵/phase] key

Select "OK"
and [↵/phase] key

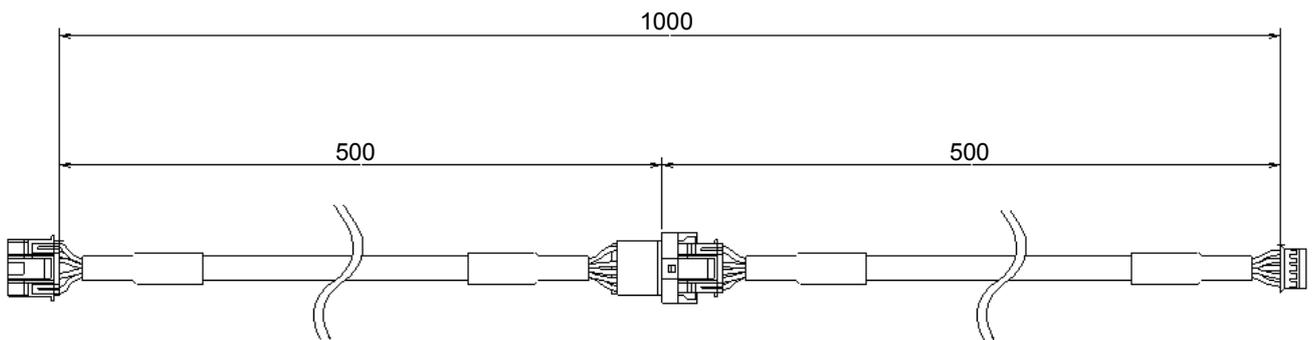If "0 Back" is selected, it will return to back.

6.   Outline dimensions

■ EMU2-D65-M

Notes: The unit of a number is mm.

■ Cable

7. Reference

7.1 In case a failure is suspected

If abnormal noise, odor, smoke, or heat generation was observed from EcoMonitorPro, turn off the power immediately.
If a failure is suspected, before sending the equipment for a repair, check the following:

Table 7.1

Symptom		Check point
Nothing is displayed. "------" is displayed on a measurement value.		Please check whether a cable be separating. Please check whether the power supply of EcoMonitorPro is turned OFF.
A message like the right is displayed.	Error: Check connection	
	Processing. Please wait.	Power failure processing of Logging data is performed. It is displayed after cutting [the electric current] off and returning during Logging operation. After power failure processing finishes, it shifts to an operation mode screen automatically.
	※ Error ※ ErrorNo:01	It may be displayed, when a setup to EcoMonitorPro is continued at a short interval and performed. Please perform setting operation once again.
	※ Error ※ Invalid value	It is displayed when the value besides the range is set up. Please change into the right value and perform setting operation once again.
	※ Error ※ Duration is invalid	
	Error: No.=00404	The equipment is broken.Contact the nearest Mitsubishi Electric Service Network or distributor. (Inform them of the error no.)
A back light puts out the light.		A back light puts out the light on condition that the following. - After carrying out a power supply injection. - After a setup about Logging, clock, and wiring type. - After clearing Logging data However, the light is automatically re-turned on after several seconds.

7.2 Verification of Error

The error which EMU2-D65-M detected is displayed by pressing the ▲/▼ key at the Operation mode.

Error:
No.= - - - - - ——— Even when the error has not occurred at all, Error No. is
displayed by "- - - - -".

8. Specification

Table 8.1

Item		Specification			
Model		EMU2-D65-M			
Display		Dot-matrix liquid-crystal-display.			
Rating		DC9V			
Weight		105g			
Renewal cycle of a display		500ms			
Power failure compensation	1) The screen displayed. (only Operation Mode screen) 2) Setting value (only about LCD)	Stored in EEPROM (non-volatile memory).			
	3) Clock	Clock IC backed up by battery. total power failure time about six months (at +25 °C).			
The maximum extension distance		10m (Sum total of the length of the cable for extension)			
Working temperature range		5 – +55°C (Daily average temperature +35°C or less)			
Working humidity range		30 – 80%Rh (No condensation allowed.)			
Storage temperature range		-20 – +60°C			
How "to cling"		Installation on IEC rail Face-of-a-board attachment			
Logging	Logging period	EcoMonitorPro (model)	1-second interval data	1-minute interval data	1-hour interval data
		EMU2-BM1-B EMU2-HM1-B, C EMU2-RD1-B, C, L EMU2-PM1-P EMU2-VS1-P	48 hours	10 days	131 days
		EMU2-RD3-B, C, L, F	12 hours		
		EMU2-RD5-B, C, F	4 hours		
		EMU2-RD7-B, C, F	2 hours		
	Power failure compensation	If BAT.SW is ON even if a power failure occurs, Logging data will be held for a minimum of six months. Logging data will be eliminated once it turns OFF BAT.SW during a power failure.			

9. Peripheral equipment

Table 9.1

Product	Model		Remark
The cable for extension	EMU2-CB-T1M	1m	It is used when extending between EcoMonitorPro and EMU2-D65-M.
	EMU2-CB-T5M	5m	
	EMU2-CB-T10M	10m	

Display unit
for Energy Measuring Unit (EcoMonitorPro)

■Service Network

Country / Region	Company	Address	Telephone
Australia	Mitsubishi Electric Australia Pty. Ltd.	348 Victoria Road, Rydalmere, N.S.W. 2116, Australia	+ 61-2-9684-7777
USA	Mitsubishi Electric Automation Inc.	500 Corporate Woods Parkway Vernon Hills, IL 60061, USA	+ 1-847-478-2100
Brazil	MELCO-TEC Rep. Com. e Assessoria Tecnica Ltda.	Av. Paulista, 1439-Cj.72, Cerqueira Cesar CEP 01311-200, Sao Paulo, SP, CEP:01311-200, Brazil	+ 55-11-3146-2200
Chile	Rhona S.A.	Agua Santa 4211 P.O. Box 30-D Vina del Mar, Chile	+ 56-32-2-320-600
China	Mitsubishi Electric Automation (CHINA) Ltd.	No. 1386 Hongqiao Road, Mitsubishi Electric Automation Center Shanghai China, 200336	+ 86-21-2322-3030
China	Mitsubishi Electric Automation (HongKong) Ltd.	10/F., Manulife Tower, 169 Electric Road, North Point, Hong Kong	+ 852-2887-8810
Colombia	Proelectrico Representaciones S.A.	Carrera 53 No 29C-73 - Medellin, Colombia	+ 57-4-235-30-38
Egypt	Cairo Electrical Group	9, Rostoum St. Garden City P.O. Box 165-11516 Maglis El-Shaab, Cairo - Egypt	+ 20-2-27961337
Europe	Mitsubishi Electric Europe B.V.	Gothaer Strasse 8, D-40880 Ratingen, Germany	+ 49-(0)2102-486-0
India	Mitlite Electric Company Pvt Ltd	Plot No-32, Sector-6, IMT Maneser,	+ 91-124-4695300
Indonesia	P. T. Sahabat Indonesia	P.O.Box 5045 Kawasan Industri Pergudangan, Jakarta, Indonesia	+ 62-(0)21-6610651-9
Korea	Mitsubishi Electric Automation Korea Co., Ltd	1480-6, Gayang-Dong, Gangseo-Gu, Seoul, Korea	+ 82-2-3660-9572
Laos	Societe Lao Import Co., Ltd.	43-47 Lane Xang Road P.O. BOX 2789 VT Vientiane Laos	+ 856-21-215043
Lebanon	Comptoir d'Electricite Generale-Liban	Cebaco Center - Block A Autostrade Dora, P.O. Box 11-2597 Beirut - Lebanon	+ 961-1-240445
Malaysia	Mittric Sdn Bhd	5 Jalan Pemberita U1/49, Temasya Industrial Park, Glenmarie 40150 Shah Alam, Selangor, Malaysia	+ 603-5569-3748
Myanmar	Peace Myanmar Electric Co.,Ltd.	NO137/139 Botataung Pagoda Road, Botataung 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
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.	1&16 Brandreth Road, Lahore-54000, Pakistan	+ 92-(0)42-7654342
Philippines	Edison Electric Integrated, Inc.	24th Fl. Galleria Corporate Center, Edsa Cr. Ortigas Ave., Quezon City Metro Manila, Philippines	+ 63-(0)2-634-8691
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, #05-01/02 Mitsubishi Electric Building, Singapore 159943	+ 65-6473-2308
South Africa	CBI-electric: low voltage	Private Bag 2016, Isando, 1600, South Africa	+ 27-(0)11-9282000
Taiwan	Setsuyo Enterprise Co., Ltd	6th 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
Uruguay	Fierro Vignoli S.A.	Avda. Uruguay 1274, Montevideo, Uruguay	+ 598-2-902-0808
Venezuela	Adesco S.A.	Calle 7 La Urbina Edificio Los Robles Locales C y D Planta Baja, Caracas - Venezuela	+ 58-212-241-9952
Vietnam	CTY TNHH-TM SA GIANG	10th Floor, Room 1006-1007, 255 Tran Hung Dao St., Co Giang Ward, Dist 1, Ho Chi Minh City, Vietnam	+ 84-8-8386727/28/29

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