MITSUBISHI ELECTRIC

Energy Measuring Unit Extension Model for Pulse Input
Energy Measuring Unit Extension Model for Analog Input
MODEL

EMU4-PX4
EMU4-AX4

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.

Thank you for purchasing the Energy Measuring Unit.

· This manual describes setup and usage for the Energy Measuring Unit. Before using the product, please read this manual carefully to ensure correct use. Especially, in the case of where this unit is to be installed, please read "1. Precautions for Use" to ensure correct use.
· Make sure that the end users read this manual and then keep the manual in a safe place for future reference.
· Make sure to deliver this manual to the end-user.
· If you are considering using this unit for special purpose such as nuclear power plants, aerospace, medical care or passenger vehicles please refer to our sales representative.(For details, please see at the end of this manual.)


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

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

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

or

Energy Measuring Unit×1
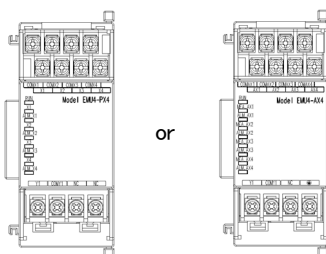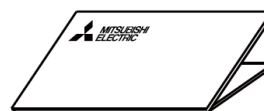
User's Manual (Digest) x1

■Related materials
Refer to the following documents as necessary. You can download them from the Mitsubishi FA Global site.

Title	Ref. No.
Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification	LSPY-9025
Energy Measuring Unit Programming Manual (CC-Link) For ver.1 remote device station	LEN160305
Energy Measuring Unit Programming Manual (CC-Link) For ver.2 remote device station	LEN160316
Energy Measuring Unit Programming Manual (CC-Link IE Field Network Basic) (SLMP)	LEN180123

■Trademark
· MODBUS is a trademark of Schneider Electric USA Inc.
· Other company and product names herein are trademarks or registered trademarks of their respective owners.
· In the text, trademark symbols such as "TM" and "®" may not be written.

(1) Pulse Input Unit
●This unit is the option device of Energy Measuring Unit (EcoMonitorPlus).
●Extension this unit is capable to measure maximum of four pulse/contact input.
●When data exceeded the established upper limit value, indication of LEDs and contact output are performed.

(2) Analog Input Unit
●This unit is the option device of Energy Measuring Unit (EcoMonitorPlus).
●Extension this unit is capable to measure maximum of four analog inputs.
●When data exceeded the set upper limit value, indication of LEDs and contact output are performed.

Table of Content

1. Precautions for Use

1.1 Precautions for Operating Environment and Conditions

This unit is premised on being used in pollution degree 2 (Note 1) environment. When used in higher pollution degree, protect this unit from pollution on another device side to be incorporated.

This unit is used in combination energy measuring unit (EMU4-BM1-MB, EMU4-HM1-MB, EMU4-LG1-MB, or EMU4-CNT-MB), energy measuring unit expansion product for electric energy monitoring (EMU4-A2 or EMU4-VA2). Over voltage category of measuring circuit in combination unit is CAT III (Note 1).

Do not use this product in the places listed below. Failure to follow the instruction may cause malfunctions and a life decrease of product.

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

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

1.2 Matters concerning the precaution before use

- Use the unit in the specified usage environment and conditions.
- To set this unit, dedicated energy measuring unit (EMU4-BM1-MB, EMU4-HM1-MB, EMU4-LG1-MB, or EMU4-CNT-MB) is necessary. For the setting method, refer to User's manual (Details) of the energy measuring unit.
- To set this unit, dedicated small-size display unit (EMU4-D65) is necessary. For the setting method, refer to User's manual (Details) of the display unit.

1.3 Installation and Wiring Precautions

⚠Danger	・**Shut off the external power supply for the unit in all phases before installing or wiring. Failure to do so may cause an electric shock or damage of this unit.** ・**Work under the electric outage condition when installing and wiring. Failure to do so may cause electric shock, a failure of the unit, a fire etc.**
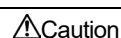
⚠Caution

<Precautions for Electric work>
- Any person who is involved in the installation and the wiring of this unit should be fully competent to do this work.
- Keep the space around this product (all directions except the back) is 30 mm or more (100 mm or more for UL standard compliance).
- When tapping or wiring, take care not to entering any foreign objects such as chips and wire pieces into this unit.
- Check the connection diagram when wiring. Wrong wiring may cause failure of the unit, a fire or electric shock.
- This equipment is class A as per EN 55011. This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.
- For protection against noise, **transmission lines and input/output lines shall not be placed close to or bound together with the power lines and high-voltage lines**.
- The wires to be connected to this unit shall be placed in a duct or fixed together by cramping. If the electric wires are not placed in the duct or cramped together, loosen wires or their movement or careless stretch may cause a breakage of the unit or wire or a malfunction due to poor contact of electric wires.
- If transmission lines and input/output lines are placed close to or bound together with the power lines and high-voltage lines, keep distance as below between them.(Except for the input side of terminal block)   If there is concern about the influence of noise even if the distance is as follows, we recommend using a shielded cable.

Condition	Distance
Power lines of 600 V or less	300 mm or more
Other power lines	600 mm or more

<Connection of terminal block>
・ Strip the wires with proper length. Overlong stripping length may cause short to next wire. Shorter stripping length may cause contact failure.
・ Take care not to short to next terminal by a filament. (Do not plate the wires with solder.)
・ Do not connect three or more wires to one terminal of a terminal block for preventing loose contact and wires dropout.
・ Use appropriate size of electric wires. If inappropriate size of electric wire is used, it may cause a fire due to generated heat.
・ Tighten the screw within the specified torque. Under tightening can cause drop of the screw, short circuit, or malfunction. Over tightening can damage the screw and/or unit, resulting in drop, short circuit, or malfunction.
・ After tightening the screws, be sure to check all the screws tightened. Loose screw may cause malfunction of the unit, a fire or electric shock.
・ Be sure to attach the terminal cover to prevent electric shock.
・ Use the crimp-type terminal appropriated for the size of electric wires. If inappropriate crimp-type terminal is used, a wire breakage or a contact failure may occur, which may cause a device malfunction, a failure, a burnout, or a fire.
・ Frame GND terminal must be grounded according to the D-type ground (ground resistance is not exceed 100Ω).
・ Do not directly touch any conductive part of the unit. Doing so can cause electric shock, failure, or malfunction of the unit.
・ Do not input voltage and current at NC terminals. Doing so can cause failure or malfunction of the unit.

<Connection with the current sensor>
・ When using this product, make sure to use it in combination with current sensor (EMU-CT**, EMU-CT**-A. EMU2-CT5 and EMU2-CT5-4W). **This product cannot connect with the secondary side (5A) of current transformer.** Please not to exceed the rating of this product for input of current sensor. For further details, please refer to current sensor manual to maintain the functionality and the accuracy of this product.
・ The dedicated current sensor (EMU-CT**, EMU-CT**-A) is used only for low voltage circuit. It cannot be used for a high voltage circuit. EMU2-CT5 and CT5-4W should be used with the secondary side (5A) of transformer transfixed. If it is connected with a high-voltage circuit by mistake, it may cause a burnout of the device and a fire. It is critically dangerous. For the allowable maximum voltage of current sensor, refer to instruction manual (detail) of Energy Measuring Unit (EMU-BM1-MB, EMU4-HM1-MB)
・ The dedicated current sensor has a polarity (directionality). Be careful about it when installing the unit.
・ If the wires connected to this unit are strongly pulled off, it may cause a malfunction or a breakage to the unit or the wire.
<Connection of frame GND terminal>
・ Do not exceed the specified voltage when doing an insulation resistance test and a commercial frequency withstand voltage test.
・ Frame FG terminal must be grounded according to the D-type ground.
・ To prevent persons with little knowledge about electric equipment from electric shock, panel must be taken either following measure.
  Lock the panel so that only those who get an education about electric equipment and have sufficient knowledge can unlock, or shut off power supply automatically by opening the panel.
  Cover the dangerous part of this unit.

1.4 Precautions for Use

- Before operating the product, check that active bare wire and so on does not exist around the product. If any bare wire exists, stop the operation immediately, and take an appropriate action such as isolation protection.
- In the event of a power outage during the setting by Display unit / Communication line, the Energy Measuring unit is not set correctly. Please set again after power recovery.
- When use Energy Measuring Unit Analog Input Model (Model：EMU4-AX4)/ Energy Measuring Unit Pulse Input Model (Model：EMU4-PX4) with Option units(Model：EMU4-CM-C, EMU4-LM), number of connectable show in the tables below.

①How to check the version

19R004
316 A 0066o
↓ Version
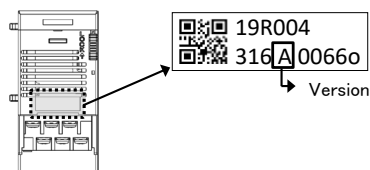
②Number of connectable

Version	Number of connectable		
	non-connected	EMU4-CM-C	EMU4-LM
A	3 units	2 units	3 units
later B	3 units	3 units	3 units

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

1.5 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 LCD indicators
        - (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.

1.6 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 to +60°C.
    - Places the average daily temperature exceeds +35°C.
    - Places the Relative humidity exceeds the range 30 to 85% or places with dewfall.
    - Vibration and impact exceed the specifications.
    - Dust, corrosive gas, saline, and oil smoke exist.
    - Places metal fragments or conductive substances are flying.
    - Places exposed to rain or water drop.

1.7 Disposal Precautions

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

1.8 About packaging materials and this manual

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

2. Disclaimer

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

3. Name and function of each part

3.1 Name of each part

(1)EMU4-PX4

External input terminals （X1 to X4, COMX1 to COMX4）
Connect to pulse / contact input.

LED
Operation mode is displayed.
(Please reference to 3.2 Indication and function of LEDs)

Connector (male)
Connect to the energy measuring unit.

Model EMU4-PX4

External output terminals （Y1, COMY1）
Connect to external output.

(2)EMU4-AX4

Analog input terminals （AX1 to AX4, COMAX1 to COMAX4）
Connect to analog input.

LED
Operation mode is displayed.
(Please reference to 3.2 Indication and function of LEDs)

Connector (male)
Connect to the energy measuring unit.

Frame GND（FG） ⊕
Connect to ground (D type ground)

Model EMU4-AX4

External output terminals （Y1, COMY1）
Connect to external output.

(3)Back view and side view

Back view

IEC rail fixture

Right side

Connector (female)
Connect to extension units.

Connection stop
This is used to connect the extension unit.

3.2 Indication and function of LEDs

The names and operations of LEDs are as follows.
(1) EMU4-PX4

Name	Color	Function	Status
RUN LED	Red	Indicate operating status of this unit.	ON: Normal operation OFF: Power off or hardware failure [*1]
X1 LED	Red	Indicate measuring status of this circuit X1.	ON: Contact state is ON Blink: In the middle of measuring the pulse OFF: Other
ALM X1 LED	Red	Indicate occurrence status of upper limit alert of the circuit X1.	ON: An error occurs [*1] Blink [*2]: Upper limit alert is issued OFF: No alert
X2 LED	Red	Indicate measuring status of this circuit X2.	ON: Contact state is ON Blink: In the middle of measuring the pulse OFF: Other
ALM X2 LED	Red	Indicate occurrence status of upper limit alert of the circuit X2.	ON: An error occurs [*1] Blink [*2]: Upper limit alert is issued OFF: No alert
X3 LED	Red	Indicate measuring status of this circuit X3.	ON: Contact state is ON Blink: In the middle of measuring the pulse OFF: Other
ALM X3 LED	Red	Indicate occurrence status of upper limit alert of the circuit X3.	ON: An error occurs [*1] Blink [*2]: Upper limit alert is issued OFF: No alert
X4 LED	Red	Indicate measuring status of this circuit X4.	ON: Contact state is ON Blink: In the middle of measuring the pulse OFF: Other
ALM X4 LED	Red	Indicate occurrence status of upper limit alert of the circuit X4.	ON: An error occurs [*1] Blink [*2]: Upper limit alert is issued OFF: No alert

(2) EMU4-AX4

Name	Color	Function	Status
RUN LED	Red	Indicate operating status of this unit.	ON: Normal operation OFF: Power off or hardware failure [*1]
MEA. AX1 LED	Red	Indicate measuring status of this circuit AX1.	ON: In the middle of measuring OFF: Other
ALM. AX1 LED	Red	Indicate occurrence status of upper limit alert of the circuit AX1.	ON: An error occurs [*1] Blink [*2]: Upper/lower limit alert is issued OFF: No alert
MEA. AX2 LED	Red	Indicate measuring status of this circuit AX2.	ON: In the middle of measuring OFF: Other
ALM. AX2 LED	Red	Indicate occurrence status of upper limit alert of the circuit AX2.	ON: An error occurs [*1] Blink [*2]: Upper/lower limit alert is issued OFF: No alert
MEA. AX3 LED	Red	Indicate measuring status of this circuit AX3.	ON: In the middle of measuring OFF: Other
ALM. AX3 LED	Red	Indicate occurrence status of upper limit alert of the circuit AX3.	ON: An error occurs [*1] Blink [*2]: Upper/lower limit alert is issued OFF: No alert
MEA. AX4 LED	Red	Indicate measuring status of this circuit AX4.	ON: In the middle of measuring OFF: Other
ALM. AX4 LED	Red	Indicate occurrence status of upper limit alert of the circuit AX4.	ON: An error occurs [*1] Blink [*2]: Upper/lower limit alert is issued OFF: No alert

*1：Reference to ☞"9.1 In case you think the unit is in failure".

*2：Repeat 500msec lighting and 500msec extinction.

4. Attaching and removing the unit

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

4.1 How extension to measure unit

① Peel off the label pasted right part of measure unit.

② Plug connector (male) to connector (female) of measure unit for brought into close contact.

③ Rock the measure unit to slide consolidated claws (green).
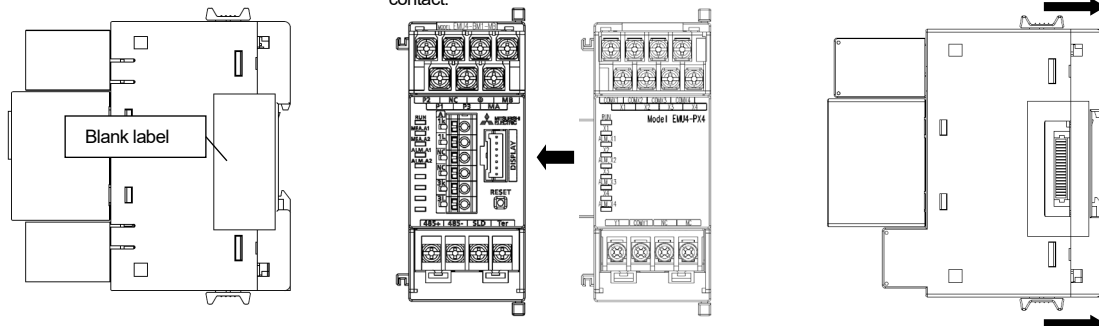
※EMU4-BM1-MB, EMU4-HM1-MB, EMU4-LG1-MB, EMU4-CNT-MB are the connectable unit.

※**The number of extension units that can be connected to one base unit depends on the connection the product version and the CC-Link communication unit of the base unit.(☞ 1.4 Precautions for Use)**

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

4.2 Mounting on IEC rail

・Applicable IEC rail (35mm)

・Mounting

(1) Pull IEC rail fixture downward

(2) Catch

IEC rail

(3) Push in

(4) Push the IEC rail fixture upward

・Removing

(2) Pull the unit

(1) Hold the unit and pull IEC rail fixture downward
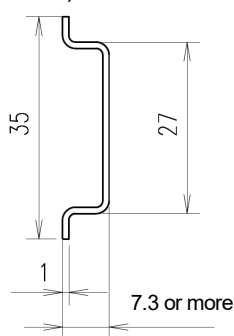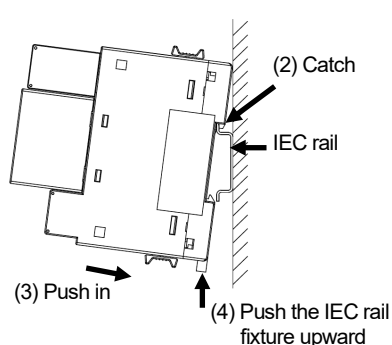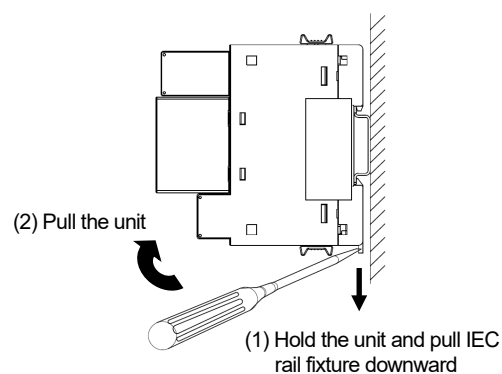
4.3 Mounting on JIS agreement type attachment

・JIS agreement type attachment

Hook

Attachment panel

Spring fitting
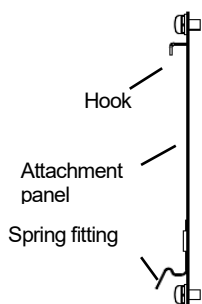
・Mounting

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

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

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

・Removing

(2) Lift the lower part of module slowly and remove in reverse order of Attaching.

(1) Push down the spring fitting.

8
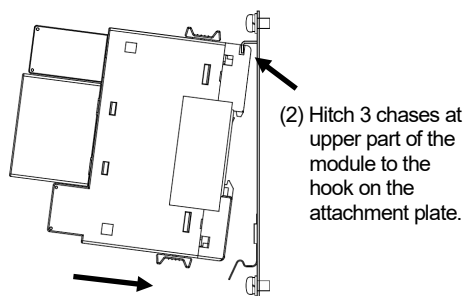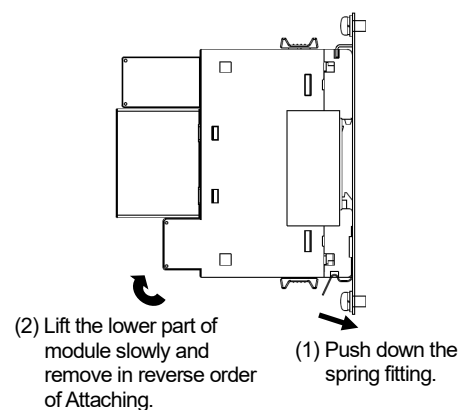
5. Procedure for wiring

Follow the wiring example for external connections of this unit.

5.1 Wiring for EMU4-PX4
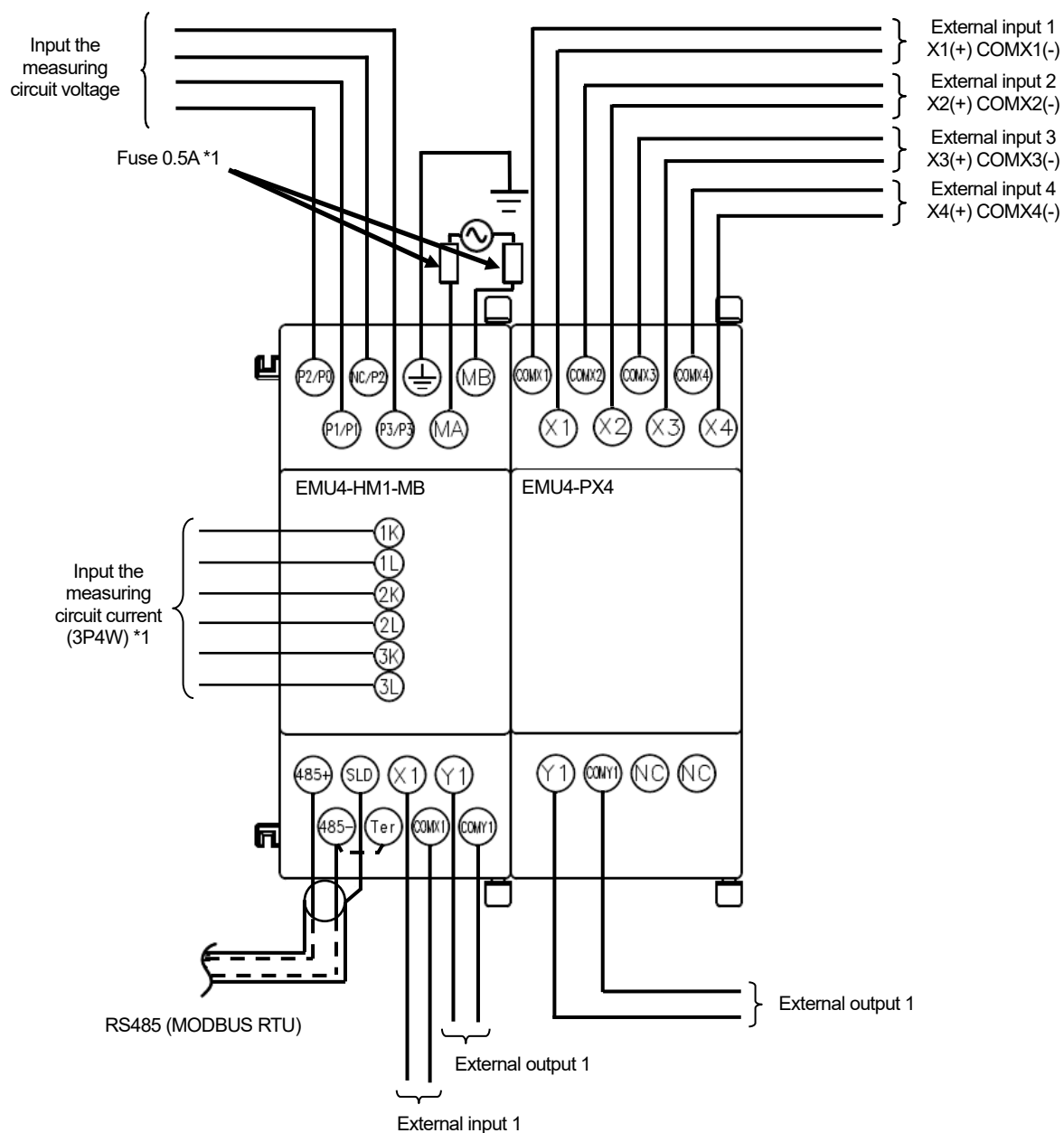
*1: Connect the k and l terminals on the secondary side of current sensor to the 1k and 1l (2k,2l,3k,3l) terminals of the measuring unit.

Structure	Unit	Model
Measure unit	Energy Measuring High Performance Model	EMU4-HM1-MB
Extension unit 1	Extension Model for Pulse Input	EMU4-PX4
Extension unit 2	-	-
Extension unit 3	-	-

Input the measuring circuit voltage

Fuse 0.5A

Input the measure circuit current (1P2W) *1

Input the measure circuit current

Analog input 1
AX1(+) COMAX1(-)

Analog input 2
AX2(+) COMAX2(-)

Analog input 3
AX3(+) COMAX3(-)

Analog input 4
AX4(+) COMAX4(-)

(P2) (NC) (⏚) (MB)
(P1) (P3) (MA)

(P2/P0) (NC/P2) (NC) (NC)
(P1/P1) (P3/P3) (NC)

(COMAX1) (COMAX2) (COMAX3) (COMAX4)
(AX1) (AX2) (AX3) (AX4)

(1K)
(1L)
(NC)
(NC)
(3K)
(3L)

(1K)
(1L)
(2K)
(2L)
(3K)
(3L)

(1K)
(1L)
(2K)
(2L)
(3K)
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(1K)
(1L)
(2K)
(2L)
(3K)
(3L)

(1K)
(1L)
(2K)
(2L)
(3K)
(3L)

Input the measure circuit current (1P3W, 3P3W) *1

EMU4-BM1-MB

EMU4-A2

EMU4-VA2

EMU4-AX4

(485+) (485-) (SLD) (Ter)

(Y1) (COMY1) (Y2) (COMY2)

(Y1) (COMY1) (Y2) (COMY2)

(Y1) (COMY1) (NC) (⏚)

Input the measure circuit current (1P2W) *1

RS485(MODBUS RTU)

External output 1

External output 2

External output 1

External output 2

External output 1

*1: Connect the k and l terminals on the secondary side of current sensor to the 1k and 1l (2k,2l,3k,3l) terminals of the measuring unit.

Structure	Unit	Model
Measure unit	Energy Measuring High Performance Model	EMU4-BM1-MB
Extension unit 1	Extension Model for Same Voltage System	EMU4-A2
Extension unit 2	Extension Model for Different Voltage System	EMU4-VA2
Extension unit 3	Extension Model for Analog Input	EMU4-AX4

5.3 Precautions for the connection wire

⚠Cautions	• For protection against noise, transmission lines and input/output lines shall not be placed close to or bound together with the power lines and high-voltage lines. Keep distance as below between them. (except for the terminal block) If there is concern about the influence of noise even if the distance is as follows, we recommend using a shielded cable.

Condition	Distance
Power lines of 600 V or less	300 mm or more
Other power lines	600 mm or more

• For the actual usage, connect the FG terminal to ground. (D-type ground: Type 3) Connect it directly to the ground terminal.
• Do not connect to FG terminal during the insulation resistance test and pressure test. Refer to "User's manual (Details)" Chapter 11 "Specifications" for the applying place.

• For MODBUS communication wiring, recommended to have the extra length wires about 200mm (When extended to B / NET transmission from MODBUS communication, use of MODBUS communication wiring is possible).
• External input / Analog input terminals have polarity. Please do not mistake the connection. Xn/AXn terminals is anode, and COMXn/COMAXn is cathode. (n = 1 to 4)
• In unused channels, if the circuit between two terminals is kept open, an undefined digital value may be output.

To prevent this phenomenon, set the AD conversion enable or disable setting (AD CONV.) in the unused channel to disable. The default of setting is enable. Refer to "User's manual (Details)" Chapter 6.1 "Setting data".

5.3.1 How to connect wire
<External input/output terminals>
• Use appropriate crimp-type terminal. Applicable crimp-type terminal is shown in the tables below.
• Use electric wires as below, and tighten the terminal screws by the torque as below.

【EMU4-PX4/EMU4-AX4】

	Applicable wire	Tightening torque	Applicable crimp-type terminal
External input terminals	Stranded wire: AWG22 to 16 ($0.3mm^2$ to $1.3mm^2$)	0.5 to 0.6 N·m	For M3 screw of external diameter below 6.1mm
Analog input terminals	Single wire: AWG22 to 16 (φ0.65mm to φ1.25mm)		

	Applicable wire	Tightening torque	Applicable crimp-type terminal
Contact output terminals	Stranded wire: AWG26 to 18 ($0.12mm^2$ to $0.8mm^2$)	0.5 to 0.6 N·m	For M3 screw of external diameter below 6.1mm
FG terminals (EMU4-AX4 only)	Single wire: AWG26 to 18 (φ0.4mm to φ1.0mm)		

5.3.2 Connection of external output
In case using external output, refer to the following.

External output: For the case of contact output
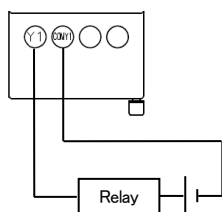
No-voltage a-contact
35V DC 75mA or,
24V AC 75mA (power factor: 1)

• Wiring length of pulse input (Reference value)
The wire length for each wire diameter is below. Please refer to wiring.
※Polyethylene insulating vinyl sheath cable FCPEV wire.

Wire diameter [mm]	Resistivity[Ω/km]	Wiring length[m]
0.5	94	300
0.65	56.8	400
0.9	29.2	750
1.2	16.5	1000

6.1 Setting data

> To set this unit, dedicated small-size display unit (EMU4-D65) is necessary.
> For the setting method, refer to User's manual (Details) of the display unit.

The data can be setup is shown below.
The underline means the default of setting.

Setting item	Setting value	Details	Correspondence of models	
			EMU4-PX4	EMU4-AX4
Input	Non, Contact, **Pulse**	Set the measurement type of external input. It can be set for each CH.	●	-
CONV.Rate	0.001 to 10000 (**1.000**)	Set the conversion rate per pulse for conversion from pulse to other units, when input setting value is Pulse. It can be set for each CH.	●	-
Unit	**Non**, Wh, kWh, MWh, J, m^2, m^3, L, kL, sec, min, hour, piece, set, g, kg, t, ¥, $	Set the unit of pulse conversion, when input setting value is Pulse. It can be set for each CH.	●	-
Input Reset Mode	**Auto**, Hold	Set the reset method of contact state, when input setting value is contact. It can be set for each CH. (For details, refer to 8.1.3 Contact state.)	●	-
OP.Time	**Off**, On	Set the enable or disable the measuring operation time, when input setting value is contact. It can be set for each CH.	●	-
MEA.Mode	**50ms SAMP.** 1ms SAMP.	Set the measuring interval.	-	●
AD CONV.	Off, **On**	Set the enable or disable the AD conversion. If AD converted is off, do not measuring AD conversion value and scaling value. It can be set for each CH.	-	●
Range	**Current**, Voltage	Set the analog input range to current input or voltage input, when AD CONV. setting value is on. It can be set for each CH.	-	●
Moving average	001 to 100(**1**)	Set the number of times to perform the moving average of AD conversion, when AD CONV. setting value is on. It can be set for each CH. (For details, refer to 8.2.3 Number of times exceeding the Limit.)	-	●
Scaling Upp.	-32767 to 32767 (**04095**)	Set the upper range of scaling value. It can be set for each CH, when AD CONV. setting value is on. Example 1：In the case of Range=Current, Analog input=20mA, Scaling Upp / Low=4095/0 Scaling value=-4095	-	●
Scaling Low.	-32767 to 32767 (**0**)	Example 2：In the case of Range=Current, Analog Input=20mA, Scaling Upp / Low=0/4095 Scaling value=0	-	●

Setting item	Setting value	Details	Correspondence of models	
			EMU4-PX4	EMU4-AX4
Scaling Unit	**Non**, A, mA, kA, V, kV, W, kW, MW, Hz, N, kN, Pa, kPa, MPa, C, deg, %	Set the unit of scaling value, when AD CONV. setting value is on. It can be set for each CH.	-	●
Limit	Scaling Low. to Scaling Upp. (**Scaling Low.** [*1])	Set the any value to measuring the number of times exceeding the limit. Number of times exceeding the limit is measuring the number of times scaling value exceeding the any value. (For details, refer to 8.2.3 Number of times exceeding the Limit.)	-	●
Factor	**x1**, x10, x100, x1000	Set the monitoring factor for number of times exceeding the limit. It can be set for each CH.	-	●
Output	**Non**, Alarm, Contact	To set the output type of contact output terminals. Alarm：Contact is output when an alarm occurs. Contact：It is possible to control the contact in communications.	●	●
Alarm	EMU4-PX4: **Off**, On EMU4-AX4: **Non**, Upp., Low., Upp. & Low.	Set the enable or disable the alarm. If the unit is EMU4-PX4, monitoring type is only upper limit. It can be set for each CH. (For details, refer to 7.2 Upper/lower limit monitoring function.)	●	●
Alarm target CH	**Non**, CH1, CH2, CH3, CH4	Set the CH to output the alarm state from contact output terminals.	●	●
PLS.Upp.	0.001 to 999999000 (**100000**)	Set the upper limit alarm value of pulse conversion. It can be set for each CH.	●	-
Scaling alarm value Upp.	Scaling Low. to Scaling Upp. (**Scaling Upp.** [*2])	Set the upper limit alarm value of scaling value. It can be set for each CH. Cannot set a value less than Scaling alarm value Low.	-	●
Scaling alarm value Low.	Scaling Low. to Scaling Upp. (**Scaling Low.** [*1])	Set the lower limit alarm value of scaling value. It can be set for each CH. Cannot set a value larger than Scaling alarm value Upp.	-	●
Delay	**0sec**, 5sec, 10sec, 20sec, 30sec, 40sec, 50sec, 1min, 2min, 3min, 4min, 5min	Set the time to detect the alarm. It can be set for each CH. (For details, refer to 7.2 Upper/lower limit monitoring function.)	-	●
Alarm Reset Mode	**Auto**, Hold	Set the reset method of alarm state. It can be set for each CH. (For details, refer to 7.2 Upper/lower limit monitoring function.)	-	●

*1：If you set Scaling Upp. < Scaling Low., the default is Scaling Upp..

*2：If you set Scaling Upp. < Scaling Low., the default is Scaling Low..

6.2 Initialization of related item by changing the setup

Setup value and measured data is initialized after change the setup value according to table 6.2.1, 6.2.2, 6.2.3 and 6.2.4.
Please setup again.

Table 6.2.1 List of initialization when changing setup value (setup data) (EMU4-PX4)

Setup items		Setup value to be changed								
		Input	CONV.Rate	Unit	Input Reset Mode	OP.Time	Output	Alarm	PLS.Upp	Alarm target CH
Setup value(initialized)	Input									
	CONV.Rate									
	Unit									
	Input Reset Mode									
	OP.Time									
	Output									
	Alarm	○	○							
	PLS.Upp	○	○							
	Alarm target CH									

○… Initializes the settings of CH that have changed the settings.

Table 6.2.2 List of initialization when changing setup value (Measured data and operating data) (EMU4-PX4)

Setup items			Setup value to be changed								
			Input	CONV.Rate	Unit	Input Reset Mode	OP.Time	Output	Alarm	PLS.Upp	Alarm target CH
Measured value (initialized)	Integral value	Pulse count	○								
		Pulse convertion	○								
		Operating time									

○… Initializes the settings of CH that have changed the settings.

Table 6.2.3 List of initialization when changing setup value (setup data) (EMU4-AX4)

	Setup items	Setup value to be changed																		
		MEA.Mode	AD CONV.	Range	Moving average	Scaling Upp	Scaling Low	Scaling Unit	Output	Alarm	Scaling alarm value Upp	Scaling alarm value Low	Delay	Alarm Reset Mode	Alarm target CH	Limit A	Limit B	Limit C	Limit D	Factor
Setup value(initialized)	MEA.Mode																			
	AD CONV.																			
	Range																			
	Moving average																			
	Scaling Upp			O																
	Scaling Low			O																
	Scaling Unit			O																
	Output																			
	Alarm			O		O	O													
	Scaling alarm value Upp			O		O	O													
	Scaling alarm value Low			O		O	O													
	Delay																			
	Alarm Reset Mode																			
	Alarm target CH																			
	Limit A			O		O	O													
	Limit B			O		O	O													
	Limit C			O		O	O													
	Limit D			O		O	O													
	Factor																			

O… Initializes the settings of CH that have changed the settings.

Table 6.2.4 List of initialization when changing setup value
(Measured data and number of times exceeding the limit data) (EMU4-AX4)

		Setup items	Setup value to be changed																		
			MEA.Mode	AD CONV.	Range	Moving average	Scaling Upp	Scaling Low	Scaling Unit	Output	Alarm	Scaling alarm value Upp	Scaling alarm value Low	Delay	Alarm Reset Mode	Alarm target CH	Limit A	Limit B	Limit C	Limit D	Factor
Measured value(initialized)	Max	AD conversion level		O	O	O															
		Scaling level		O	O	O	O	O													
	Min	AD conversion level		O	O	O															
		Scaling level		O	O	O	O	O													
	Number of times exceeding the Limit	Limit A		O	O	O	O	O									O				
		Limit B		O	O	O	O	O										O			
		Limit C		O	O	O	O	O											O		
		Limit D		O	O	O	O	O												O	

O… Initializes the settings of CH that have changed the settings.

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7. Operation

7.1 Measurement

Measurement elements are showed below table in each unit.

Please setting below for measurement.

● … Measured elements

Measuring elements	Setup items	EMU4-PX4	EMU4-AX4
Pulse count	Input	●	-
Pulse conversion	Input, CONV.Rate	●	-
Contact state	Input, Input Reset Mode	●	-
Operating time	Input, OP.Time	●	-
AD conversion value [*1]	AD CONV., Range	-	●
Scaling value	AD CONV., Range, Scaling Upp, Scaling Low	-	●
Number of times exceeding the Limit	Limit [*2]	-	●

*1：Cannot be displayed in display unit can get in communication.

*2：Please set only the items necessary in LevelA to LevelD.

The measurement elements that can be monitored by the display unit, some communication and logging units are shown below.

In the case displaying in Display unit.

Displayed items		EMU4-PX4	EMU4-AX4
Pulse count	Present	●	—
Pulse converted	Present	●	—
Operating time	Present	●	—
Contact input state	Present	●	—
AD converted value	Present	—	—
	Max, Min		
Scaling value	Present	—	●
	Max, Min		
Number of times exceeding the Limit	Present	—	●
Time	Present	●[※1]	●[※1]
Error	–	●	●

● … Measured data

— … Not measured data

※1 The time is displayed only when EMU4-LM is connected.

In the case monitoring with various communications

The supported communications are as follows.
- CC-Link communication
- CC-Link IE Field Network Basic communication
- SLMP communication
- MODBUS communication

Monitored items		EMU4-PX4	EMU4-AX4
Pulse count	Present	●	—
Pulse converted	Present	●	—
Operating time	Present	●	—
Contact input state	Present	●	—
AD converted value	Present	—	●
	Max, Min		○
Scaling value	Present	—	●
	Max, Min		○
Number of times exceeding the Limit	Present	—	●
Time	Present	—	—
Error	–	●	●

● ··· Monitorable data

○ ··· Monitorable data only MODBUS

— ··· Not monitorable data

In the case logging using EMU4-LM

Monitored items		EMU4-PX4	EMU4-AX4
Pulse count	Present	●	—
Pulse converted	Present	●	—
Operating time	Present	—	—
Contact input state	Present	●	—
AD converted value	Present	—	●
	Max, Min		—
Scaling value	Present	—	●
	Max, Min		—
Number of times exceeding the Limit	Present	—	●

● ··· Loggable data

— ··· Not loggable data

7.2.1 How to use upper/lower limit alarm function

This device can set the upper/lower limit alarm value for each measured value individually.

< Monitoring items >

	EMU4-PX4	EMU4-AX4
Upper limit item	Pulse conversion	Scaling value
Lower limit item	-	Scaling value

< Alarm setting >
EMU4-PX4 and EMU4-AX4
・Upper limit value…….. Set the upper limit of measured value. For setting value and setting range,
☞ 6.1.12 Setup for upper and lower limit alarm

EMU4-AX4 only
・Lower limit value.......... Set the lower limit of measured value. For setting value and setting range,
☞ 6.1.12 Setup for upper and lower limit alarm
・Delay............................ Set the value in case you want to remove the inrush current of the load, etc. from the objects of monitoring. Alarm does not occur when the measured value goes below the upper limit or goes over the lower limit within the configured time. For setting value and setting range.
☞ 6.1.12 Setup for upper and lower limit alarm
・Alarm Reset Mode ...... Alarm recovery operation is different according to the alarm reset mode.
In the case of EMU4-PX4, alarm reset method is Auto-reset.

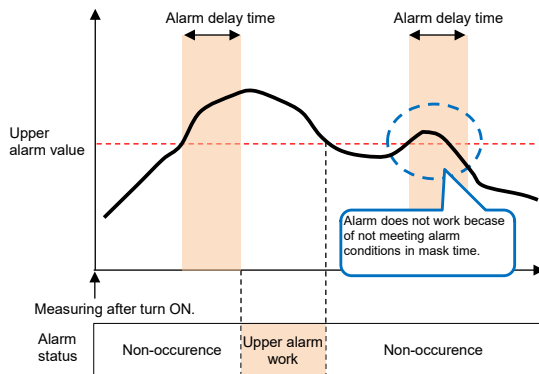| Reset Mode	Alarm recovery operation
Auto-reset (Auto)	Reset the alarm automatically if the measured value goes below the upper limit or goes over the lower limit.
Self-retention (Hold)	The alarm is held after the measured value goes below the upper limit or goes over the lower limit. Alarm is cleared by alarm reset.

For setting ☞ 6.1.12 Setup for upper and lower limit alarm.
For alarm reset operation, refer to manual (Detail) of Display Unit (EMU4-D65).

< Alarm occurrence / recovery condition >

Alarm Reset Mode	Alarm status		Alarm occurrence / recovery condition
Auto-reset (Auto)	Upper limit alarm	Occurrence	Measured value > configured upper limit (Alarm delay time is available)
		Recovery	Measured value < configured upper limit
	Lower limit alarm	Occurrence	Measured value < configured lower limit (Alarm delay time is available)
		Recovery	Measured value ≥ configured lower limit
Self-retention (Hold)	Upper limit monitoring	Occurrence	Measured value > configured upper limit (Alarm delay time is available)
		Retention	Until alarm reset, after alarm occurrence
		Recovery	Measured value < configured upper limit AND Alarm reset
	Lower limit monitoring	Occurrence	Measured value < configured lower limit (Alarm delay time is available)
		Retention	Until alarm reset, after alarm occurrence
		Recovery	Measured value > configured lower limit AND Alarm reset

（1）Upper limit alarm

Alarm Reset Mode ＝ Auto

Alarm delay time

Alarm delay time

Upper alarm value

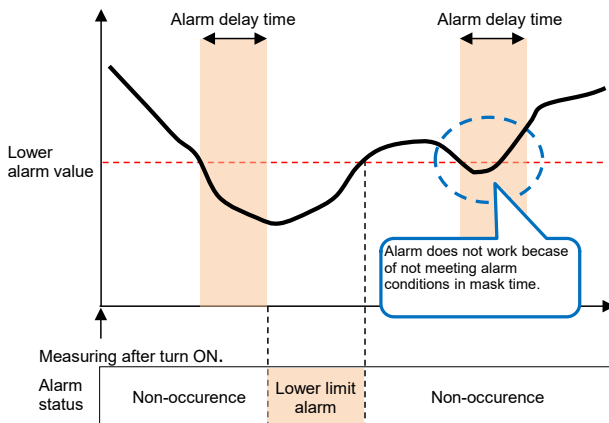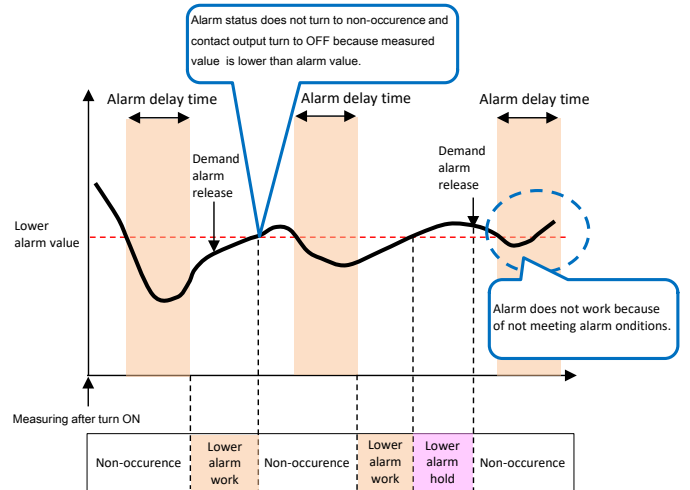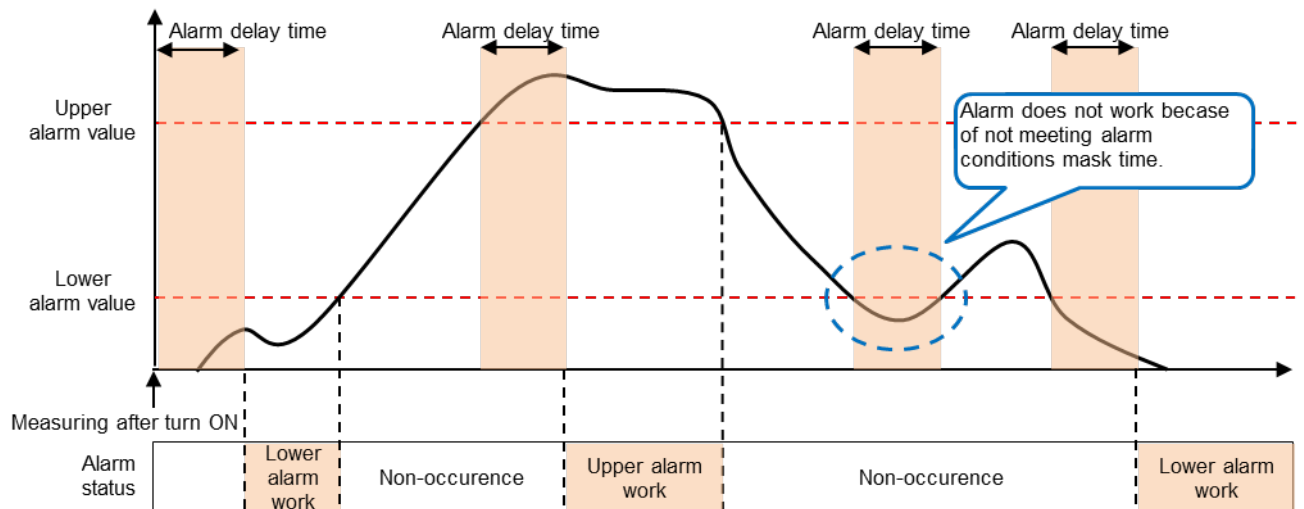Alarm does not work becase of not meeting alarm conditions in mask time.

Measuring after turn ON.

Alarm status	Non-occurence	Upper alarm work	Non-occurence

Alarm Reset Mode ＝ Hold

Alarm status does not tuen to non-Occurance and contact output turn to OFF because of exces upper alarm.

Alarm delay time

Demand alarm release

Alarm delay time

Demand alarm release

Alarm delay time

Upper alarm value

Alarm does not work because of not meeting alarm conditions

Measuring after turn ON

Alarm status	Non-occurence	Upper alarm work	Non-occurence	Upper alarm work	Upper alarm hold	Non-occurence

（2）Lower limit alarm

Alarm Reset Mode ＝ Auto

Alarm delay time

Alarm delay time

Lower alarm value

Alarm does not work becase of not meeting alarm conditions in mask time.

Measuring after turn ON.

Alarm status	Non-occurrence	Lower limit alarm	Non-occurence

Alarm Reset Mode ＝ Hold

Alarm status does not turn to non-occurence and contact output turn to OFF because measured value is lower than alarm value.

Alarm delay time

Demand alarm release

Alarm delay time

Demand alarm release

Alarm delay time

Lower alarm value

Alarm does not work because of not meeting alarm onditions.

Measuring after turn ON

Alarm status	Non-occurence	Lower alarm work	Non-occurence	Lower alarm work	Lower alarm hold	Non-occurence

（3）Upper and Lower limit alarm

Alarm Reset Mode ＝ Auto

Alarm delay time

Alarm delay time

Alarm delay time

Alarm delay time

Upper alarm value

Alarm does not work becase of not meeting alarm conditions mask time.

Lower alarm value

Measuring after turn ON

Alarm status	Lower alarm work	Non-occurence	Upper alarm work	Non-occurence	Lower alarm work

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Alarm Reset Mode ＝ Hold

8.1 Pulse Input Unit(EMU4-PX4)

8.1.1   Pulse count

Measure the input pulse.

Measure the output pulse of equipment by connecting it.

Measurement Range	Unit
0 to 999999	pulse

8.1.2   Pulse conversion

Measure the value computed by multiplying Pulse count by CONV.Rate.

The resolution of pulse conversion is determined as follows according to the CONV.Rate.

By connecting other measuring unit and setting the CONV.Rate, you can capture the measuring data of other to EMU4-PX4.

Measurement Range	Setting value of CONV.Rate	Resolution	Unit
0.000 to 999,999,000	0.001 or more and less than 0.01	3 decimal places	Refer to 6.1 Setting data
	0.01 or more and less than 0.1	2 decimal places	
	0.1 or more and less than 1	1 decimal places	
	1 or more and less than 10	Integer	
	10 or more and less than 100	×10	
	100 or more and less than 1000	×100	
	1000 or more	×1000	

Example: In the case of Pulse count = 61, CONV.Rate = 4.0

Pulse conversion = [Pulse count] × [CONV.Rate]

= 61 × 4.0 = 244 (displayed value is 24.4 × 10)

8.1.3   Contact state

Measuring the contact input state.

By connecting other equipment, you can capture the contact output on it such as alarm to EMU4-PX4.

Contact state
ON, OFF

Contact state operation is different according to the input reset mode.

<Input Reset Mode>

If external input is contact input, you should set the contact state operation (ON → OFF).

Reset Mode	Contact state ON → OFF operation
Auto-reset (Auto)	Reset the alarm automatically if the measured value goes below the upper limit or goes over the lower limit.
Self-retention (Hold)	The alarm is held after the measured value goes below the upper limit or goes over the lower limit. Alarm is cleared by contact input reset.

For contact input reset operation, refer to manual (Detail) of Display Unit (EMU4-D65).

8.1.4   Operating time

Measuring the time during contact input is ON.

You can measure another equipment operating time by connecting it.

Measurement Range	Unit
0 to 999999	Hour

8.2.1 AD conversion value

Input analog value converted to digital value.
AD conversion is obtained by divided by set value of Moving average from sum of measured value.
* In the case, measured value means the AD converted value from the input analog value.
You can measure analog output of other equipment.

Measurement Range	Unit
0 to 4095	digit

* If AD converted value is less than 40, it will be 0.

Example: In the case of Moving average = 4

	5 cycles ago	4 cycles ago	3 cycles ago	2 cycles ago	1 cycle ago	Now
Measured value	2009	2000	2106	2122	2119	2141
AD conversion value	2001	2004	2032	2059	2087	2122

AD conversion value = (The sum of the measured values (Range of the number of moving average)) / Moving average
= (2141 + 2119 + 2122 + 2106) / 4
= 8488 / 4
= 2122

8.2.2 Scaling value

AD conversion value converted to another scale value.
You can measure analog output of other equipment as any value.
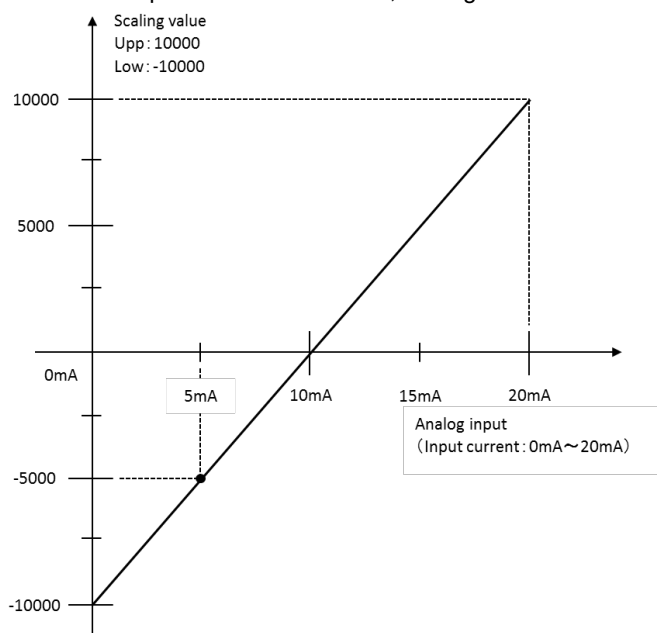You can set any scale.

Measurement Range (setting value of scale)
-32767 to 32767

* If AD converted value is less than 40, it will be 0.

Example: In the case of Scaling Upp = 10000, Scaling Low = -10000
If input current value = 5mA, Scaling value = -5000

⚠Caution	If you collect the 1ms logging data, perform the following settings and collect data by MODBUS communication. [MEA.Mode] … 1ms SAMP. [AD CONV.] …. CH1: On, CH2 to 4: Off (For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F specification.)

8.2.3 Number of times exceeding the Limit

Measure the number of times that scaling value exceeds any value (limit).
For example, you can monitoring the Equipment state by connecting the thermometer.
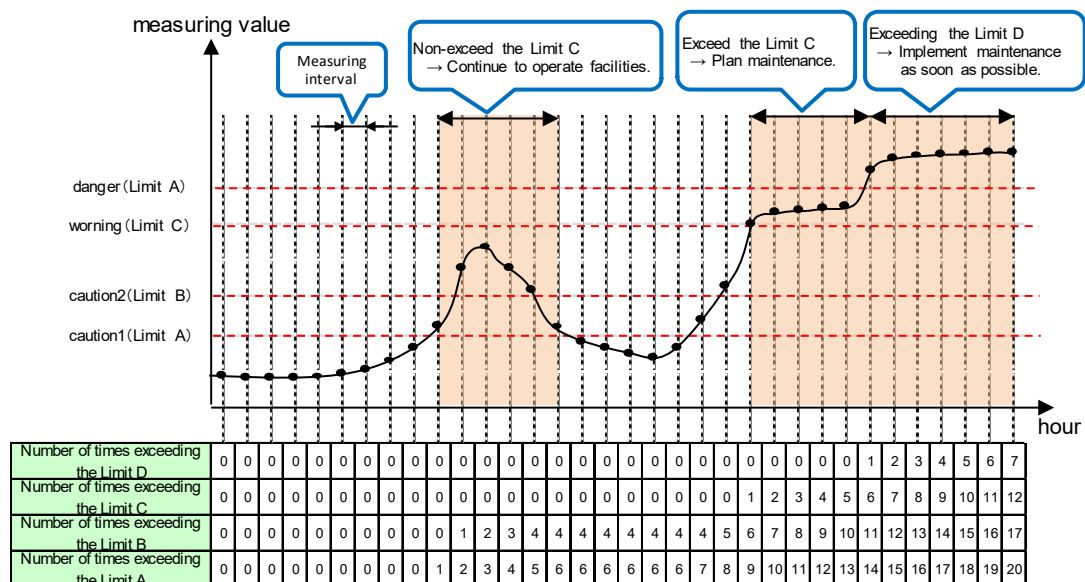
Measurement Range	Unit
0 to 999,999,999	times

If displayed on monitoring unit, display the value included factor.
Example: In the case of Number of times exceeding the Limit A = 15 times, Factor = x10
Number of times exceeding the Limit A(on monitoring unit) = 15 x10

Please reference to example of use.

measuring value

Measuring interval

Non-exceed the Limit C → Continue to operate facilities.

Exceed the Limit C → Plan maintenance.

Exceeding the Limit D → Implement maintenance as soon as possible.

danger（Limit A）

worning（Limit C）

caution2（Limit B）

caution1（Limit A）

hour

Number of times exceeding the Limit D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	4	5	6	7
Number of times exceeding the Limit C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	4	5	6	7	8	9	10	11	12
Number of times exceeding the Limit B	0	0	0	0	0	0	0	0	0	0	1	2	3	4	4	4	4	4	4	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Number of times exceeding the Limit A	0	0	0	0	0	0	0	0	0	1	2	3	4	5	6	6	6	6	6	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

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

9.1 In case you think the unit is in failure

If an abnormal sound, bad-smelling smoke, fever break out from this unit, switch it off promptly and don't use it. If you think the unit is in failure, check the following before sending for repair.

9.1.1   Pulse Input Unit (EMU4-PX4)

Extinction RUN LED

Please turn OFF/ON the measuring unit. Unit may be in failure if RUN LED extinction happens again.

Contact our sales representative near you.

Not counting the input pulse

Please check the X1 LED, X2 LED, X3 LED, X4 LED are blinking. If LEDs are not blinking, the main body is not wired or is wired incorrectly. Check whether the short circuit or disconnection is present.

Lighting ALM X1，ALM X2，ALM X3，ALM X4

Error is occurred. Please check the error number in display unit.

About error, refer to User's manual (Details) of the display unit.

9.1.2   Analog Input Unit (EMU4-AX4)

Extinction RUN LED

Please turn OFF/ON the measuring unit. Unit may be in failure if RUN LED extinction happens again.

Contact our sales representative near you.

Scaling value is not change from 0.

Please check the X1 LED, X2 LED, X3 LED, X4 LED are on. If LEDs are not on, the main body is not wired or is wired incorrectly. Check whether the short circuit or disconnection is present.

Lighting ALM AX1，ALM AX2，ALM AX3，ALM AX4

Error is occurred. Please check the error number in display unit.

About error, refer to User's manual (Details) of the display unit.

9.2 After-sales service

If you have any questions or the product is broken down, contact our sales representative near you. (For details, refer to the end of this manual.)
- Gratis warranty is effective until the earlier of 1 year after the date of your purchase or 18 months after manufacturing.
- The gratis warranty shall apply if the product fails even though it is being used properly in the conditions, with the methods and under the environments in accordance with the terms and precautions described in the catalogs, the instruction manual, caution label on the product, etc.
- Repair shall be charged for the following cases even during the gratis warranty period.
  - Failures occurring due to your improper storage or handling, carelessness, or fault.
  - Failures due to faulty workmanship
  - Failures due to faults in use and undue modification
  - Failures due to accidental force such as a fire, abnormal voltage, etc. and force majeure such as an earthquake, wind, flood, etc.
  - Failures due to matters unpredictable based on the level of science technology at the time of product.
- Our company shall not be liable to compensate for any loss arising from events not attributable to our company, opportunity loss and lost earning of the customer due to failure of the product, and loss, secondary loss, accident compensation, damage to other products besides our products and other operations caused by a special reason regardless of our company's predictability

■EMU4-PX4, EMU4-AX4

Q	Is the setting required?
A	Please set to match the circuit to be connected. To set this unit, dedicated small-size display unit (EMU4-D65) is necessary.

Q	If you enter the wrong setting, does it cause a breakdown?
A	It does not cause breakdown. However, measurement values will be totally incorrect.

■EMU4-AX4 only

Q	To what degree is the unit durable against overvoltage and over current?
A	Up to 1.1 times as high as rated voltage and rated current.

Q	What does "Measurement accuracy" mean?
A	It means tolerance for the rated input. For a current, tolerance is ±0.1mA because rated current is 20mA.

Q	Is error of the external input device included?
A	Accuracy of the external input device is not included in accuracy of unit. A maximum value of tolerance is obtained by summing tolerance of the unit and that of the external input device.

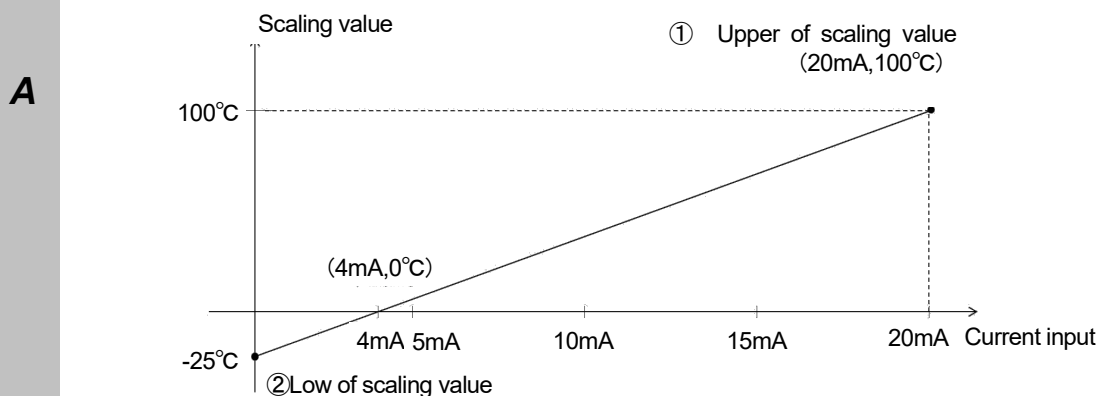| Q	Is it possible to connect with sensor that analogue output is 4 to 20mA?

A	It is possible to connect.
	Please setup upper of scaling value and lower of scaling value according to below procedure.
	Example. Setup measurement temperature from 0 to 100℃ and current output is from 4 to 20mA.
	① Please setup max value of measured value of sensor is max of scaling value.
	  In the case of example, please setup upper scaling value is 100 and scaling unit is ℃.
	② Please setup lower of scaling value when 0mA as the line connecting upper of scaling value and lower of scaling value passes over the (min value of analogue output, min value of scaling value)
	  In the case of example, please setup lower scaling value to -25 and setup scaling unit to ℃.
	
	Example of upper of scaling value and lower of scaling value
	
	Scaling value
	① Upper of scaling value
	(20mA,100℃)
	100℃
	(4mA,0℃)
	4mA 5mA 10mA 15mA 20mA Current input
	-25℃
	②Low of scaling value

10. Requirement for the compliance with EMC Directives EMC

EMC Directives prescribe both "Emission (electromagnetic interference): Do not radiate strong electromagnetic waves outside" and "Immunity (electromagnetic susceptibility): Do not be influenced by electromagnetic waves from outside".
This section compiles the precautions for the compliance of the system incorporating the energy measuring unit (target model: EMU4-PX4 and EMU4-AX4) with the EMC Directives. The following description is based on the requirement of the regulations and the standards we understand, but we do not guarantee to comply with the directives above for the whole system built in accordance with this description. The manufacturer of the system finally needs to evaluate the way of the compliance with EMC Directives and whether the system complies with them or not.

(1) Harmonized standard for EMC Directives: EN61326-1:2013
    (a)Compatibility condition for harmonized standard
        The energy measuring unit is the open type device (i.e. the device incorporated in other device), and needs to be installed in the conductive control panel. The unit is tested with installed in the control panel for the emission and the immunity out of the test items for the standard.

(2) Recommended condition for installation in the control panel
    (a)Control panel
- Control panel needs to have conducting property.
- When bolting the top panel, bottom panel etc. of the control panel, mask the grounding part of the panel so as not to be painted.
- In inner panel, keep the conductivity in as large area as possible by masking the bolting part to the main panel to keep the electric contact to main panel.
- Ground the main panel by the thick wire so as to keep high impedance even for high-frequency wave.

    (b)Installation of power line and ground line
- Set up the ground point to the control panel near the energy measuring unit, and ground the frame GND terminal of the unit to the ground terminal of the control panel (PE) by as thick and short wires as possible. (Wire length is 300 mm or shorter)

(3) Cable
    (a)Auxiliary power, Input voltage, CC-Link cable, MODBUS cable, Small display unit cable
        When it is necessary to comply with the EMC Directive (EN-61326-1), attach ferrite cores to each cable. Ferrite cores used in our testing is below.
- Auxiliary power
  KITAGAWA INDUSTRIES CO.,LTD., RFC series
  KITAGAWA INDUSTRIES CO.,LTD. ,TRM series
- Input voltage
  KITAGAWA INDUSTRIES CO., LTD. ,RFC series
- CC-Link cable, MODBUS cable
  KITAGAWA INDUSTRIES CO., LTD. ,RFC series
- Small display unit cable
  KITAGAWA INDUSTRIES CO.,LTD. ,RFC series

    (b)External input signal line, External output signal line
        Wiring of each connection wire should satisfy the following conditions.
- For wiring inside buildings, the wiring length should not exceed 30 m.
- Do not route wiring from the inside of the building to the outside of the building.

Item			Specifications	
Model			EMU4-PX4	EMU4-AX4
External input	Number		4 inputs	
	Signaling system		No voltage a-contact or open collector	differential input (0 to +5V, 0 to 20mA)
	Isolation system		Photo coupler isolation [*4]	
	Rated input voltage/current		6.5V DC 10mA (Supplied from the unit)	Voltage : 0 to +5V(input resistor 1MΩ) Current : 0 to 20mA(input resistor 250Ω) * Input range (voltage / current) can be switched. (Can be switched for each channel by the setting.)
	Input pulse conditions		Pulse ON time : more than 30ms OFF time : more than 30ms Chattering time : less than 3ms	-
	Measurement item		Pulse input : pulse conversion, pulse count Contact input : operating time, contact state * External input (pulse input / contact input) can be switched. (Can be switched for each channel by the setting.)	AD conversion values, scaling values, number of times exceeding limit
	Range of measured values		Pulse count : 0 to 999999 Pulse conversion : 0.000 to 999,999,000	AD conversion value : 0 to 4095 scaling value : -32,767 to 32,767 (* If AD converted value is less than 40, it will be 0.)
	Measurement accuracy		-	AD conversion value : ±1.0% of the input rating (23℃±10℃)
	Data update interval		-	1ms × number of CH[*2] 50ms × number of CH[*2]
External output	Output signal		No voltage a-contact 1 output	
	Function	Alarm elements	Upper limit monitoring of pulse conversion	Upper and lower limit monitoring of scaling value, Upper limit monitoring of scaling value, Lower limit monitoring of scaling value
		Alarm reset mode	Auto-reset	Selectable from either auto-reset or self-retention
	Rated switching voltage and current		35V DC, 75mA 24V AC, 75mA (power factor = 1)	
	Isolation		By semiconductor relay	
Usage environment	Operating temperature		-5 to +55°C (Daily average temperature is +35°C or lower)	
	Operating humidity		30 to 85%RH (No condensation)	
	Storage temperature		-10 to +60°C	
	Operating altitude		2000m or below	
Commercial frequency withstand voltage			Between all terminals (current input, voltage input / auxiliary power) in base unit or extension unit*3 and all terminals (external input, external output, frame GND terminal) in analog input unit or pulse input unit*3 :2200V AC, 1min	
Consumption VA (standalone)			At 110V AC : 2.0VA At 220V AC : 2.5VA	
Mass			0.2kg	
External dimensions (unit: mm)			37.5(W)×90(H)×92.9(D) (except for the protruding portions) （Maximum dimension including the protruding portions::41.5(W)×99(H)×92.9(D)）	
Applicable wire	External input terminals		Stranded wire AWG22 to 16 (0.3mm^2 to 1.3mm^2) Single wire AWG22 to 16 (φ0.65mm to φ1.25mm)	-
	Analog input terminals		-	Stranded wire AWG22 to 16 (0.3mm^2 to 1.3mm^2) Single wire AWG22 to 16 (φ0.65mm to φ1.25mm)
	Contact output terminals		Stranded wire AWG26 to 18 (0.12mm^2 to 0.8mm^2) Single wire AWG26 to 18 (φ0.4mm to φ1.0mm)	
	FG terminals		-	Stranded wire AWG26 to 18 (0.12mm^2 to 0.8mm^2) Single wire AWG26 to 18 (φ0.4mm to φ1.0mm)
Tightening torque	External input terminals		0.5 to 0.6 N·m	-
	Analog input terminals		-	0.5 to 0.6 N·m
	Contact output terminals		0.5 to 0.6 N·m	
	FG terminals		-	0.5 to 0.6 N·m
Compensation for power failure	Stored items		Setting values, pulse count, pulse converted (Stored in the nonvolatile memory)	Setting values, max value, min value (Stored in the nonvolatile memory)
Standard [*1]			CE Marking (EMC: EN-61326-1: 2013, Safety: EN-61010-1:2010) UL: UL61010-1	
The number of insert and remove between the units			100 times	

*1:When combine it with a B/NET Communication Unit (Model : EMU4-CM-B), it becomes out of a conformity standard.
*2: Data update interval is changed by setting value of AD CONV. Show in the table below.

Number of AD setting value which is On		1	2	3	4
MEA.Mode	1ms	1ms	2ms	3ms	4ms
	50ms	50ms	100ms	150ms	200ms

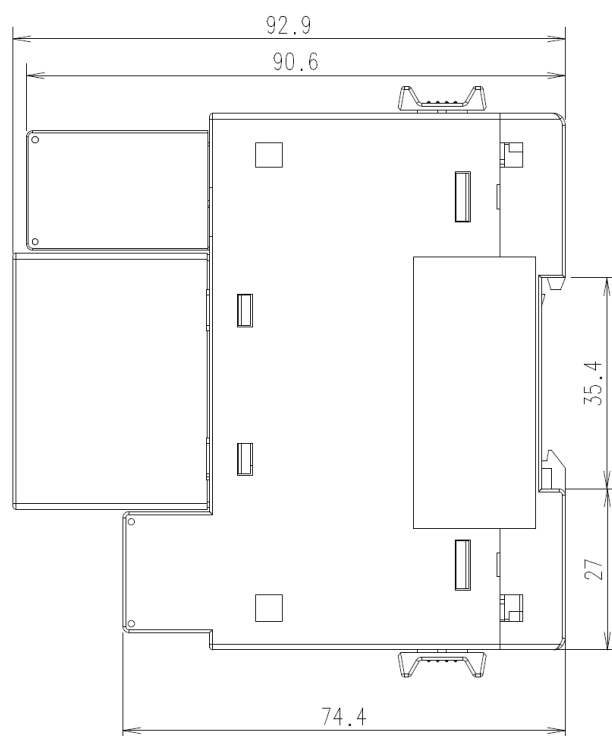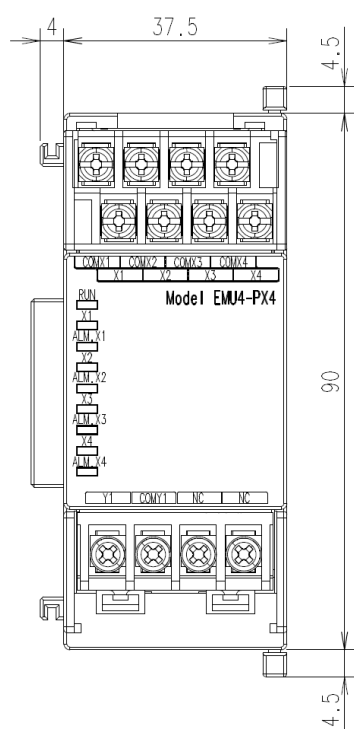*3: When two or more extension units are connected, it means one of the units.
*4: Refer to "Commercial frequency withstand voltage" for the applying place.
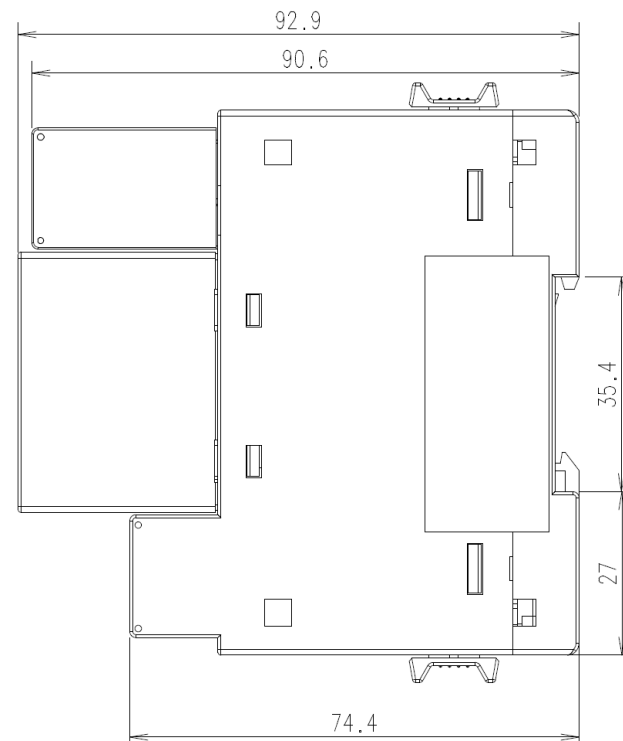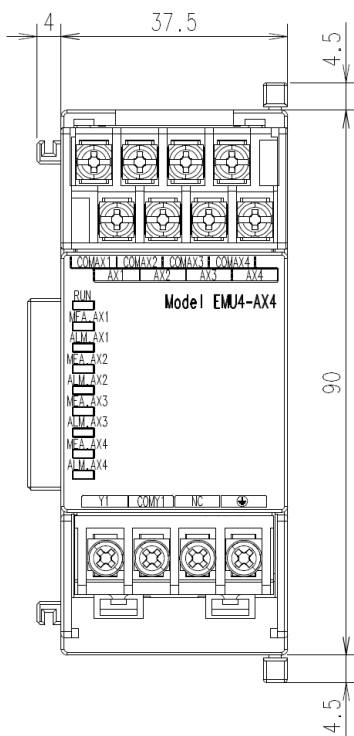   Between analog input channels for EMU4-AX4 and between external input channels for EMU4-PX4 are no isolation.

Unit: mm

■ Model EMU4-PX4

■ Model EMU4-AX4

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Energy Measuring Unit Extension Model for Pulse Input
Energy Measuring Unit Extension Model for Analog Input

Please refer to our website for service network.
Our website address: https://www.mitsubishielectric.com/fa/

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