



The power behind competitiveness

Delta Power Monitor

Installation Manual

R4E (for energy storage system.)

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Precautions for Your Safety

■ Notations for safe use of the product and their meanings

This Instruction Manual provides precautions with the following notations and symbols for safe use of the Power Monitor Set (for energy storage system.) (Power Monitor: R4E; Power Meter: P1E / P3E; Wireless Communication Unit: N1E; Wireless Communication Unit for Inverter: N2E; and USB Wireless Module).

The expression “Product” refers to the Power Monitor, Power Meter, Wireless Communication Unit, and Wireless Communication Unit for Inverter and USB Wireless Module. Precautions described herein contain important aspects of safety.

Please observe and follow these descriptions.

Notations and symbols are described below:



Warning





Failing to handle the Product properly may result in the described danger leading to slight or intermediate level injuries and in some cases may also result in serious injury or death.



Caution

Failing to handle the Product properly may result in the described danger leading to slight or intermediate level injuries or property damages in some instances.

■ Explanation of graphic symbols

	<ul style="list-style-type: none"> • Electric Shock Precaution <p>Notifications pertaining to precautions for potential electric shock, under specific conditions</p>
	<ul style="list-style-type: none"> • General <p>Unspecified general notifications pertaining to prohibited actions.</p>
	<ul style="list-style-type: none"> • Disassembly prohibited <p>Notifications pertaining to prohibition of equipment disassembly, when doing so can potentially lead to injuries such as electric shock.</p>
	<ul style="list-style-type: none"> • General <p>Unspecified general notifications pertaining to instructions for users</p>

Warning

Install the power meter out of the reach of children.
Although small, there is a risk of electric shock.



Do not allow any fire producing objects to be near the Product, or apply any spray, including combustible gases, to the Product. The Product may ignite or explode in the unlikely event such an occurrence takes place.



Do not touch the Product with wet hands.
The Product may cause injury due to electric shock or equipment malfunction may occur in the unlikely event such an occurrence takes place.



Do not disassemble or modify the Product.
The Product may cause injury or fire due to electric shock in the unlikely event such an occurrence takes place.



When wiring the power meter, make sure to turn OFF the breakers connected to the power meter. Although small, there is a risk of electric shock.



When installing the inverter wireless communications unit, make sure to turn OFF all solar generator breakers and direct current switches for the inverter.
Although small, there is a risk of electric shock.



Do not conceal the wiring of the AC adapter, through such means as embedding the cable inside a wall.
Furthermore, do not place any heavy objects such as a furniture on top of the cable and avoid damaging the cable by rolling wheels, such as castors, over the cable.
The Product may ignite or explode in the unlikely event such an occurrence takes place.



Caution

Do not install the Product in a place that is subject to significant effects of vibration and impact. There is danger of injury from the Product falling in some rare cases.



When installing the Power Monitor on a wall made of materials that are not wood, be sure to acquire plastic anchors available on the market to secure the Wall Surface/Desktop Mounting Plate on the wall surface. There is danger of injury from the Product falling in some rare cases.



When installing the DIN Rail on a wall made of materials that are not wood, be sure to acquire plastic anchors available on the market to secure the Wall Surface Mounting Plate on the wall surface. There is danger of injury from the Product falling in some rare cases.



! Caution

Securely tighten the screws using a torque of 0.98 N.m.
 Although small, there is a risk of burns due to defective connections.
 Do not tighten the wiring using electric tools (drills), whose main purpose is to open holes, such as impact drivers, etc.



Do not install the Product in the following types of locations:

There is danger of burnout in some rare cases.

- Locations that are exposed to rain water, such as outdoors or under eaves and the like.
- Locations that are exposed to steam or where the moisture level is 30 to 85% RH, such as lavatories, changing rooms, work sites, kitchens and the like.



Make sure to connect the power meter power supply to the solar generator breakers on the fuse box. Although small, there is a risk of burns.



Essential Points for Safety

Items described below must be followed as they are necessary to secure safety.

1. Do not connect anything other than the dedicated AC adapter on the power source terminal of the Power Monitor.
2. Request a specialist to dispose of the Product.
3. Pull the AC adapter off the power outlet when any abnormality is detected with the Product, such as emission of smoke, heat or the like.
4. Turn OFF the power breaker, to which the Meter is connected when any abnormality is detected with the Meter.
5. Do not install the Product in any place that is prevented from having air flow, such as inside closets or under stairs.
6. Install the Product with the "DELTA" logo facing up when installing the Power Monitor on a wall. When not installed on a wall, set the Product on the Wall Surface/Desktop Mounting Plate when using the Product.
7. Take care to ensure no water or other liquid gets on the Power Monitor or the Meter.
8. The Product is not for outdoor use.

Precautions for Use

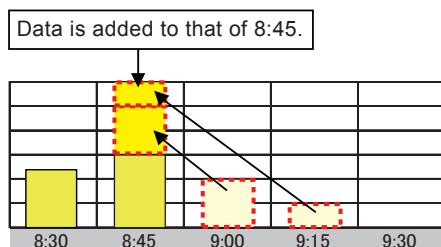
1. The Product is not a specified measuring instrument that passed any certification criteria of any designated accreditation organization as prescribed by the Measurement Act. The Product may only be used to provide a rough indication on the amount of power.
2. A touch panel type liquid crystal display has been adopted for the Product. Do not press or hit hard on the surface of the display.
3. The Product may malfunction or may be damaged by static electricity. Be sure to remove any static electricity on the body, through such means as touching a metal object nearby, prior to coming into contact with the Product.
4. Do not connect a telephone line or household LAN cable to the LAN terminal on the Power Monitor and the Wireless Communication Unit. There is danger of the Product malfunctioning.
5. Reverting the date and time by at least a 15 minute interval into the past will result in the loss of performance data. Set the date and time correctly.

Example : [A case where performance data is lost]

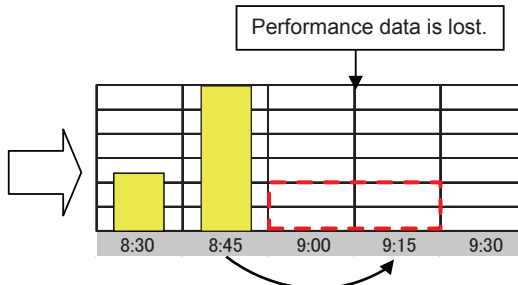
The time is inadvertently changed from 9:15 to 8:45 and then reverted to 9:15.

The performance data starting from 8:45 onwards are added to the performance data from 8:45 and the performance data for the period since 8:45 is lost. Lost data cannot be restored.

- Time is changed from 9:15 to 8:45.



- Time is changed from 8:45 to 9:15.

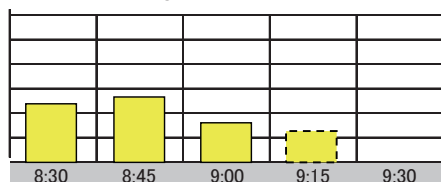


Example : [A case where performance data is not lost]

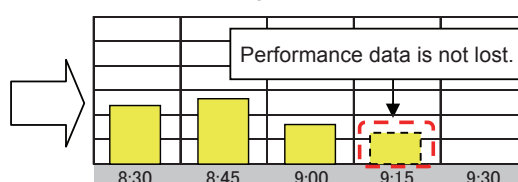
The time is inadvertently changed from 9:28 to 9:18 and then reverted to 9:28.

The performance data from 9:15 is fixed as of 9:30 and as such, the performance data is not lost, as long as the time change does not extend to at least a 15 minute interval.

- Time is changed from 9:28 to 9:18.



- Time is changed from 9:18 to 9:28.






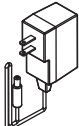



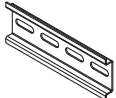



6. Do not install the Product in following types of locations:
 - a) A location with severe fluctuation of temperature.
 - b) A location that is exposed to sea breeze (excluding the Wireless Communication Unit for Inverter).
 - c) A location that is exposed to volatile, combustible, corroding or toxic gases.
 - d) A location exposed to direct sun light.
 - e) A location exceeding the operating temperature range (-20 to +50°C) (5 to 35°C for the USB Wireless Module).
 - f) A location with altitude of 2,000 meters or higher.
 - g) A location with a large amount of dust (powder dust, sand dust, cotton dust, metal dust, saw dust, straw dust and the like).
 - h) A location covered by metals or metal fittings, metals installed on walls, on top of a metal desk, between metal products or near telephone unit, facsimile unit, personal computer, personal computer peripheral device, television set, microwave oven or induction heating (IH) product.
7. Store the Product in a location with the temperature ranging between -20 and +60°C, with the humidity ranging from 30 to 85% RH.
8. The Product communicates wirelessly.
Install the Product as far away as possible from devices that emit strong radio waves, such as a civil band radio equipment.
9. The communication performance varies depending on the peripheral environment. Verify in advance that the Product is communicating normally when installing the Power Monitor on a wall.
10. Avoid installing the Power Monitor near iron plate or steel reinforcements and try to install the Product with as much clear space as possible.
11. Incorrect orientation or installation site of the current sensor, and incomplete locking, will prevent accurate measurements. Further, dropping or applying shock to the unit will also prevent accurate measurements.
12. The current sensor has polarity. Install so that the power company side of the current sensor is on the systems side, and the indoor side is the master short circuit breaker side.
13. Check that the connected current sensor and the current sensor cable connector are connected correctly.
14. The Product is not compatible with the Total Amount Purchasing System of the Feed-in Tariff Scheme for Reusable Energy.
15. This product can monitor maximum 3 inverters at one time.
16. Do not pull out the USB Wireless Module while the power is turned on. Communication with the personal computer and the Meter will no longer be possible.
17. Turn OFF the power breaker for the solar power generation on the power distribution board, remove the AC adapter of the Power Monitor from the power outlet, and contact the retailer where the Product was purchased when any instance of radio frequency interference occurs with the Product.
18. Do not use any USB Wireless Module other than the one that was bundled with the Product.
19. Make sure that the construction is such that abnormal rated current (100A) does not flow to the current sensor that has been installed.

1.Preparation before construction


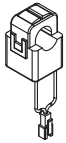
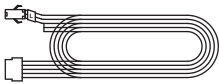

1.1.Scope of Delivery

Verify that following items are available for use prior to using this feature.




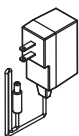
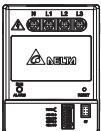


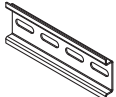


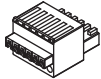
■ Wired Set (S4E_1P)

No	Product name	Shape	Qty	Remarks
1	Power Monitor		1 unit	
2	Wall Surface / Desktop Mounting Plate		1 pc	This is a plate used to install the Product on a wall or on a desk.
3	Wood screws (+) for Wall Surface / Desktop Mounting Plate (dia. 4 x 20 mm)		2 pcs	These are wood screws for the Wall Surface / Desktop Mounting Plate.
4	AC Adapter		1 unit	This is the power supply for the Power Monitor.
5	Power Meter		1 unit	
6	End Crimp Terminals		2 pcs ※(1)	For power meter.
7	Isolation Cap (Red)		2 pcs ※(1)	
8	DIN Rail		1 pc	For power meter and N1.
9	Wooden Screws for the Enclosed DIN Rail		2 pcs	Wooden Screws
10	Stopper		2 pcs	The stopper for power meter and N1.
11	Enclosed Measuring Unit Connector		1 pc	The RS-485 connector for power meter.


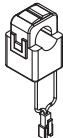
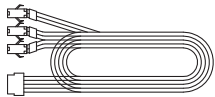

※ () is amount of spare parts.

No	Product name	Shape	Qty	Remarks
12	6 pin connector		1 pc	Connect to the main unit.
13	CT sensor ($\Phi 16$)		1 pc	
14	CT sensor cable (2 m)		1 pc	
15	Quick installation guide		1 copy	

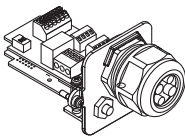
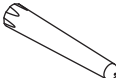
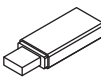



■ Wired Set (S4E_3P)

No	Product name	Shape	Qty	Remarks
1	Power Monitor		1 unit	
2	Wall Surface / Desktop Mounting Plate		1 pc	This is a plate used to install the Product on a wall or on a desk.
3	Wood screws (+) for Wall Surface / Desktop Mounting Plate (dia. 4 x 20 mm)		2 pcs	These are wood screws for the Wall Surface / Desktop Mounting Plate.
4	AC Adapter		1 unit	This is the power supply for the Power Monitor.
5	Power Meter		1 unit	
6	End Crimp Terminals		4 pcs ※(1)	For power meter.
7	Isolation Cap (Red)		4 pcs ※(1)	
8	DIN Rail		1 pc	For power meter and N1.
9	Wooden Screws for the Enclosed DIN Rail		2 pcs ※(1)	Wooden Screws
10	Stopper		2 pcs	The stopper for power meter and N1.
11	Enclosed Measuring Unit Connector		1 pc	The RS-485 connector for power meter.

※ () is amount of spare parts.

No	Product name	Shape	Qty	Remarks
12	6 pin connector		1 pc	Connect to the main unit.
13	CT sensor ($\Phi 16$)		3 pcs	
14	CT sensor cable (2 m)		1 pc	
15	Quick installation guide		1 copy	

■ Wireless Set (S4E_WiFi)

No	Product name	Shape	Qty	Remarks
17	Wireless Communication Unit for Inverter		1 unit	The unit converts the Inverter into a wireless communication system.
18	Wireless Communication Unit Antenna for Inverter		1 pc	This is an antenna that is mounted on the Wireless Communication Unit for Inverter.
19	USB Wireless Module		1 pc	The unit converts the Power Monitor into a wireless communication system.
20	Wireless Communication Unit		1 unit	
21	Wooden Screws for Wireless Communication Unit		2 pcs	To combine power meter and N1.
22	Quick installation guide		1 copy	

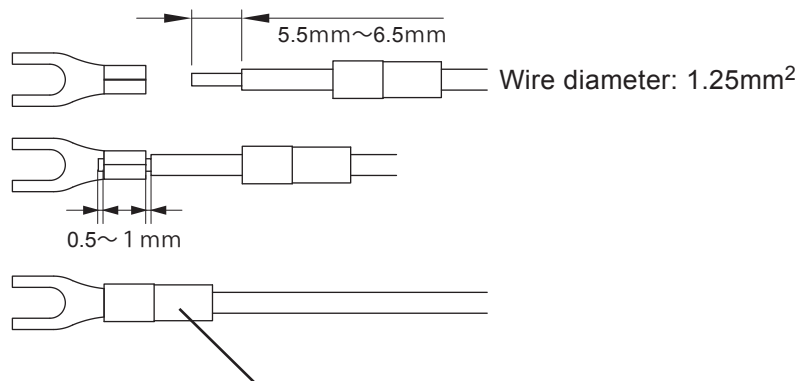
※Prepare VCTF cables (cable diameter 1.25mm², 3 cores) for Power meter.

1.2.Creating Voltage Detection Cables

This section explains the creation of voltage detection cables.

■ Creation Method

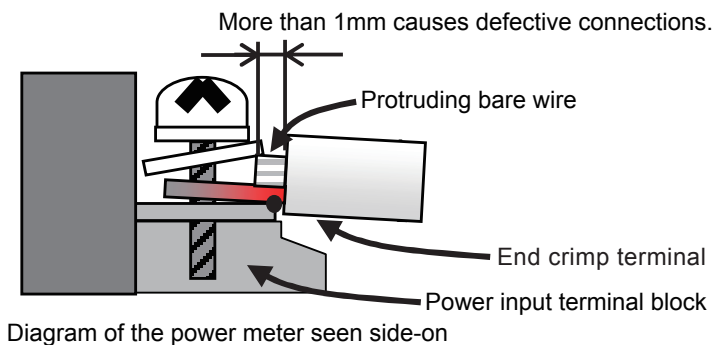
1. Prepare VCTF cables (cable diameter 1.25mm^2).
2. Process the cable so that its bare exposed length before machining is 5.5mm to 5.6mm.
(See diagram below.)
3. Crimp the cables for the end crimp terminals in the box as described below.



Pass the isolation cap through the cable before crimping; after crimping, mount so that the calking of the end crimp terminal is concealed.

4. Crimp the crimping terminal to align to the solar generator breakers that have been mounted.

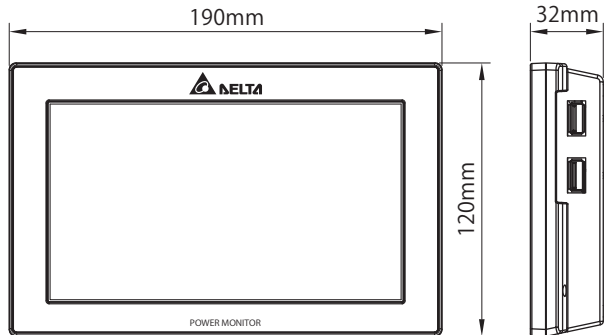
When crimping, be careful, as it may not be possible to tighten the screws correctly if the bare wires protrude more than 1mm from the calking.



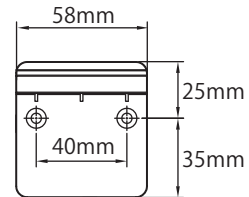
Using as is in the condition shown above creates loose screws and a gap between the end crimp terminal and power input terminal block due to insufficient screw tightening, which causes a defective connection.

1.3.Dimension

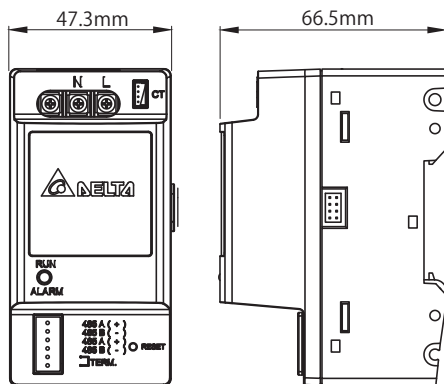
■ 7-inch Power Monitor



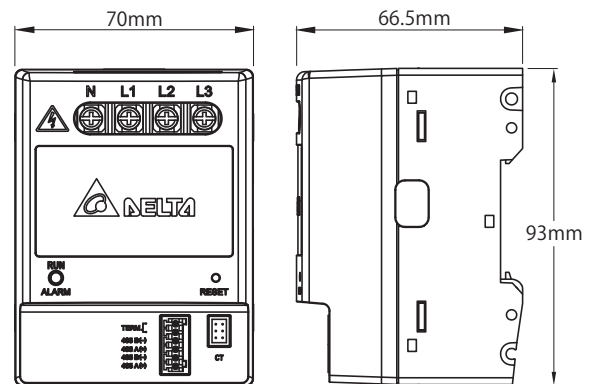
■ Wall Surface / Desktop Mounting Plate



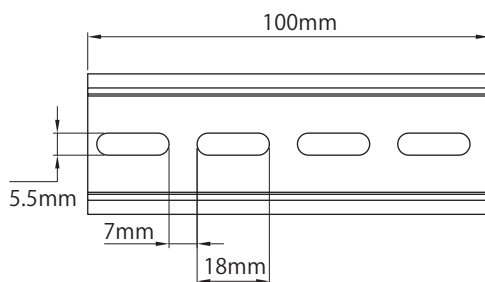
■ Power Meter (P1E)



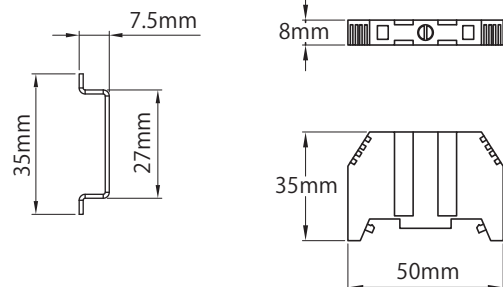
■ Power Meter (P3E)



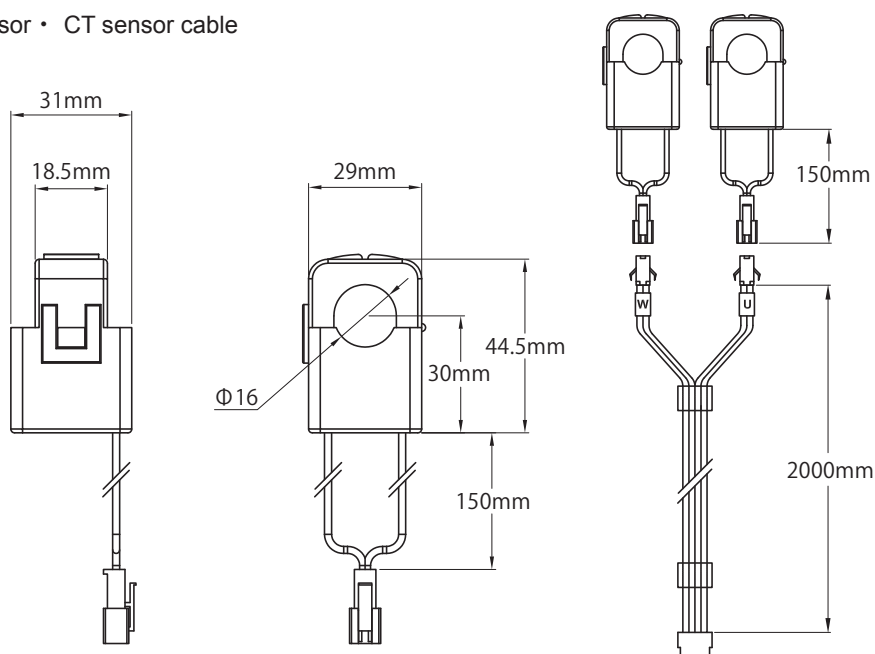
■ DIN Rail



■ Stopper

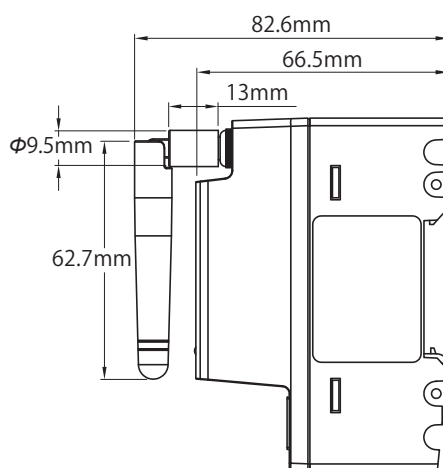
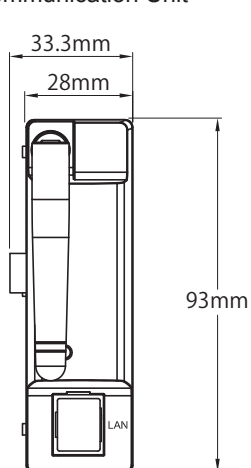


■ CT sensor • CT sensor cable

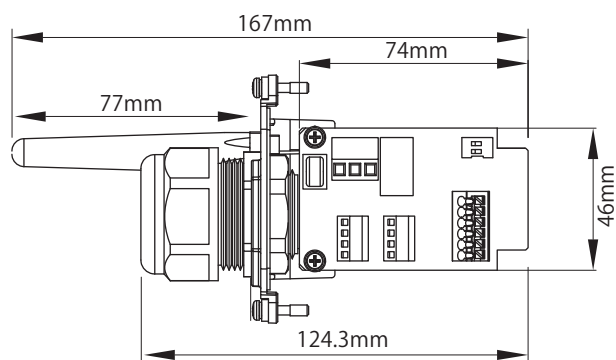
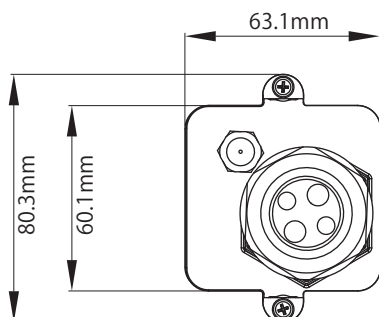


● Wireless Set

■ Wireless Communication Unit



■ Wireless Communication Unit for Inverter

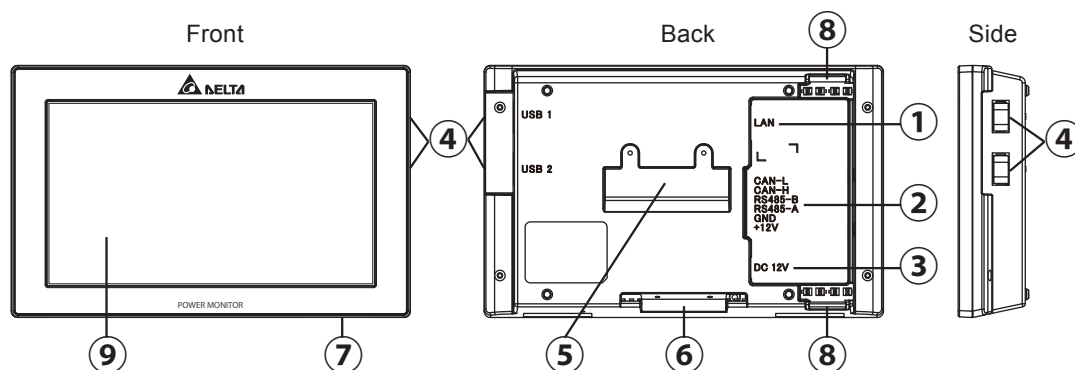


1.4. Descriptions and Functions of Parts and Components

Important

Do not connect a telephone line or household LAN cable to the LAN terminal.

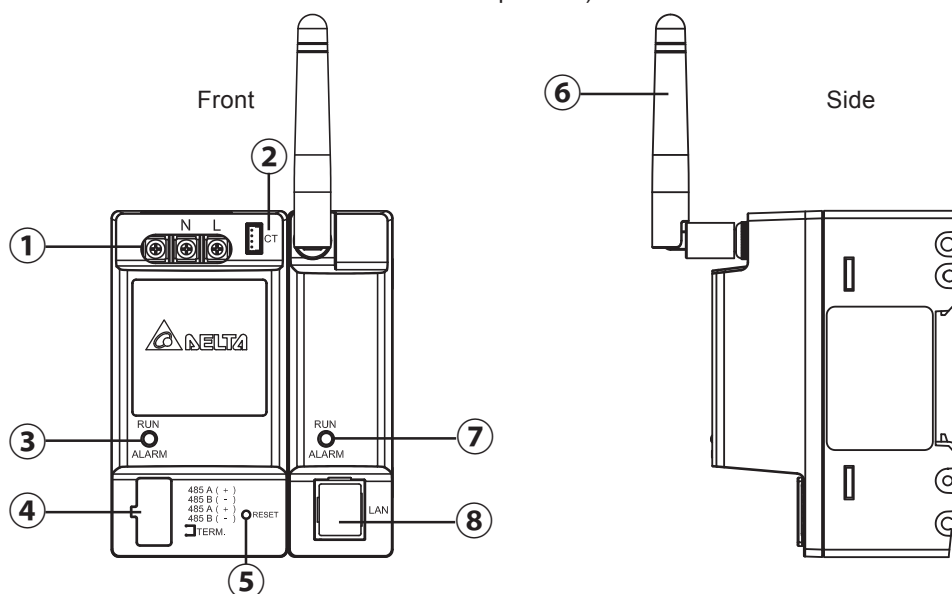
■ Power Monitor



- ① LAN terminal (RJ-45 terminal) (fitted with a protective cover)
This is the terminal that is used to connect the system to an internet line. (A setup is required.)
- ② RS-485 (a 6-pin terminal)
This is the terminal that is used to connect a 6-pin connector provided, to link the supply of power and signals from the Inverter.
- ③ Power Supply terminal
This is the terminal that is used to connect the AC Adapter provided.
- ④ USB Terminal (for USB 1 and USB 2) (fitted with a protective cover)
Downloading of various data and upgrading of software versions can be performed.
Furthermore, the monitor and the Inverter, as well as the Meter can be converted into a wireless communication system by connecting the USB Wireless Module provided with the Wireless Set.
* Customers are requested to procure their own USB memory and USB cable.
- ⑤ Insertion slot for anchoring the Wall Surface Mounting Plate.
This is the insertion slot used to install the Wall Surface / Desktop Mounting Plate when installing the Product on the wall.
- ⑥ Insertion slot for anchoring the Desktop Mounting Plate
This is the insertion slot used to install the Wall Surface/ Desktop Mounting Plate when installing the Product on desktop.
- ⑦ Reset button
Restart the Power Monitor. The settings and records will not be deleted.
- ⑧ Wiring access
According to the prescribed wiring method, remove the tab on the wiring access, and guide the cable through.
- ⑨ Touch Panel section
Displays are switched and various settings are performed by performing touch panel operations.

■ Power Meter & Wireless Communication Unit (P1E & N1E)

(The figure depicts a situation where the Meter and the Wireless Communication Unit have been connected and the Antenna has been oriented upwards.)



- ① Power Supply Input terminal (fitted with a protective cover)
This is the terminal for connecting the voltage detection cable.
- ② Current Sensor Connection terminal
This is the terminal for connecting the current sensor cable.
- ③ Operation LED lamp
Green light turned on: Normal operation
Green light blinking: Standby or connection standby
Red light turned on: Hardware malfunction
Red light blinking: Communication interrupted
- ④ Communication Signal Input terminal (fitted with a protective cover)
This is the terminal for connecting the RS-485 cable.
- ⑤ Reset button
This is the Reset button for the Wireless Communication Unit. Pressing this button restarts the Wireless Communication Unit. Holding this button down for five or more seconds reverts the Wireless Communication Unit to the default setting. Caution is required.
- ⑥ Wireless Communication Unit Antenna
This is the antenna used to perform wireless communication with the Power Monitor. The antenna can be detached from the main unit. (Do not remove the antenna.)
- ⑦ Operation LED lamp
Green light turned on: Normal operation
Green light blinking: Standby or connection not established
Red light turned on: Hardware malfunction
Red light blinking: Communication malfunction
- ⑧ LAN terminal (fitted with a protective cover)
This is intended for use in maintenance work carried out by the manufacturer. Do not use this. (Do not remove the protective cover.)

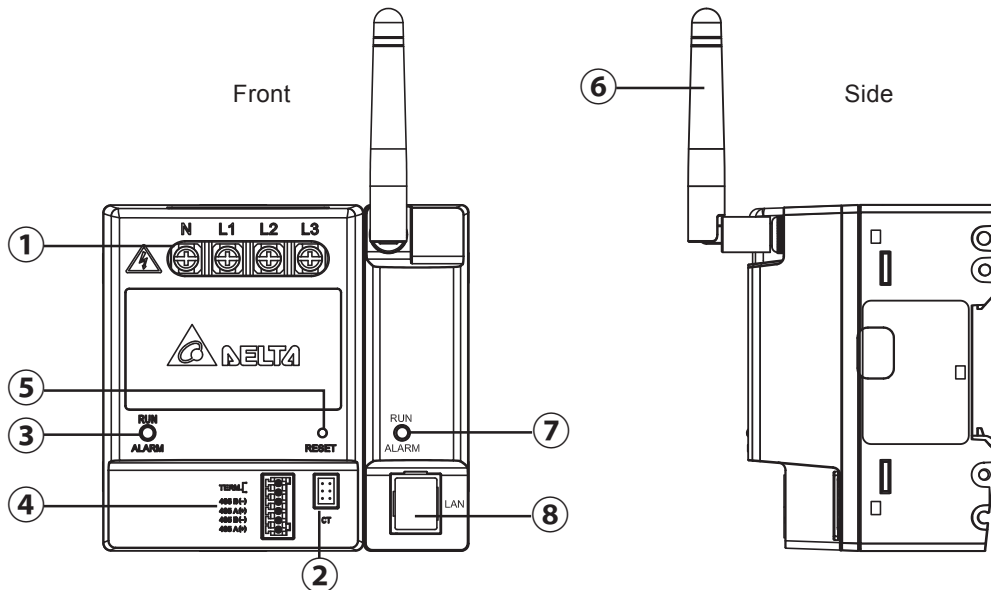
Warning

Do not open the protective cover or touch the internal parts and components with your hand. The Product may cause injury due to electric shock in the unlikely event such an action is taken.



■ Power Meter & Wireless Communication Unit (P3E & N1E)

(The figure depicts a situation where the Meter and the Wireless Communication Unit have been connected and the Antenna has been oriented upwards.)



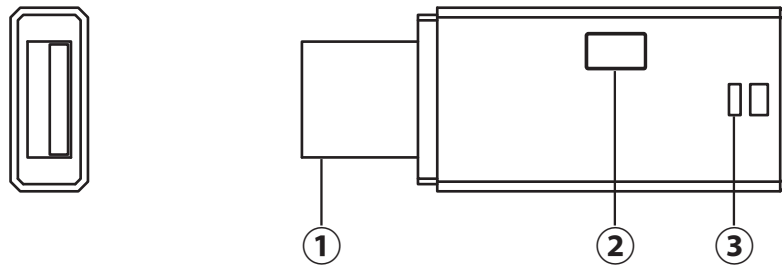
- ① Power Supply Input terminal (fitted with a protective cover)
This is the terminal for connecting the voltage detection cable.
- ② Current Sensor Connection terminal
This is the terminal for connecting the current sensor cable.
- ③ Operation LED lamp
Green light turned on: Normal operation
Green light blinking: Standby or connection standby
Red light turned on: Hardware malfunction
Red light blinking: Communication interrupted
- ④ Communication Signal Input terminal (fitted with a protective cover)
This is the terminal for connecting the RS-485 cable.
- ⑤ Reset button
This is the Reset button for the Wireless Communication Unit. Pressing this button restarts the Wireless Communication Unit. Holding this button down for five or more seconds reverts the Wireless Communication Unit to the default setting. Caution is required.
- ⑥ Wireless Communication Unit Antenna
This is the antenna used to perform wireless communication with the Power Monitor. The antenna can be detached from the main unit. (Do not remove the antenna.)
- ⑦ Operation LED lamp
Green light turned on: Normal operation
Green light blinking: Standby or connection not established
Red light turned on: Hardware malfunction
Red light blinking: Communication malfunction
- ⑧ LAN terminal (fitted with a protective cover)
This is intended for use in maintenance work carried out by the manufacturer. Do not use this. (Do not remove the protective cover.)

Warning

Do not open the protective cover or touch the internal parts and components with your hand. The Product may cause injury due to electric shock in the unlikely event such an action is taken.



■ USB Wireless Module (Wireless Set)



① USB insertion slot

This is installed on the USB terminal of the Power Monitor.

② Button Not used.

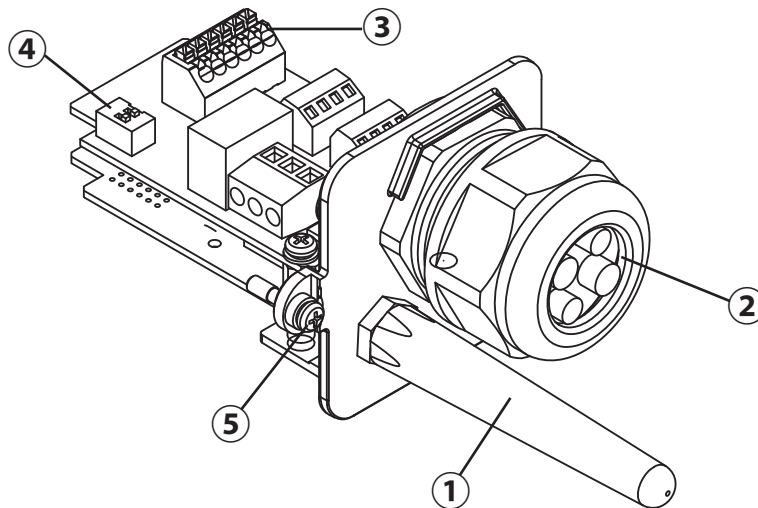
③ Operation LED lamp

Blue light blinking : Standby

Blue light on : Normal operation

■ Wireless Communication Unit for Inverter

(The figure depicts a situation where the antenna has been installed.) (Wireless Set)



① Wireless Communication Unit Antenna for Inverter

This is the antenna used to perform wireless communication with the Power Monitor.
The antenna can be detached from the main unit.

(Do not remove the antenna.)

② Communication cable insertion slot

Not used.

③ RS485 terminal

Not used.

④ Terminal switch

Not used. (Default setting : ON)

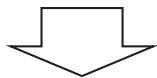
⑤ Inverter anchoring screw

This is the screw used to secure the Inverter onto the main unit.

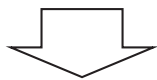
2.Installation (Wired)

2.1.Installation order

「Mounting the Installation Unit, Wireless Communications Unit,
and DIN Rail」



「Setting Power Monitor and Cable」



「Default Settings」

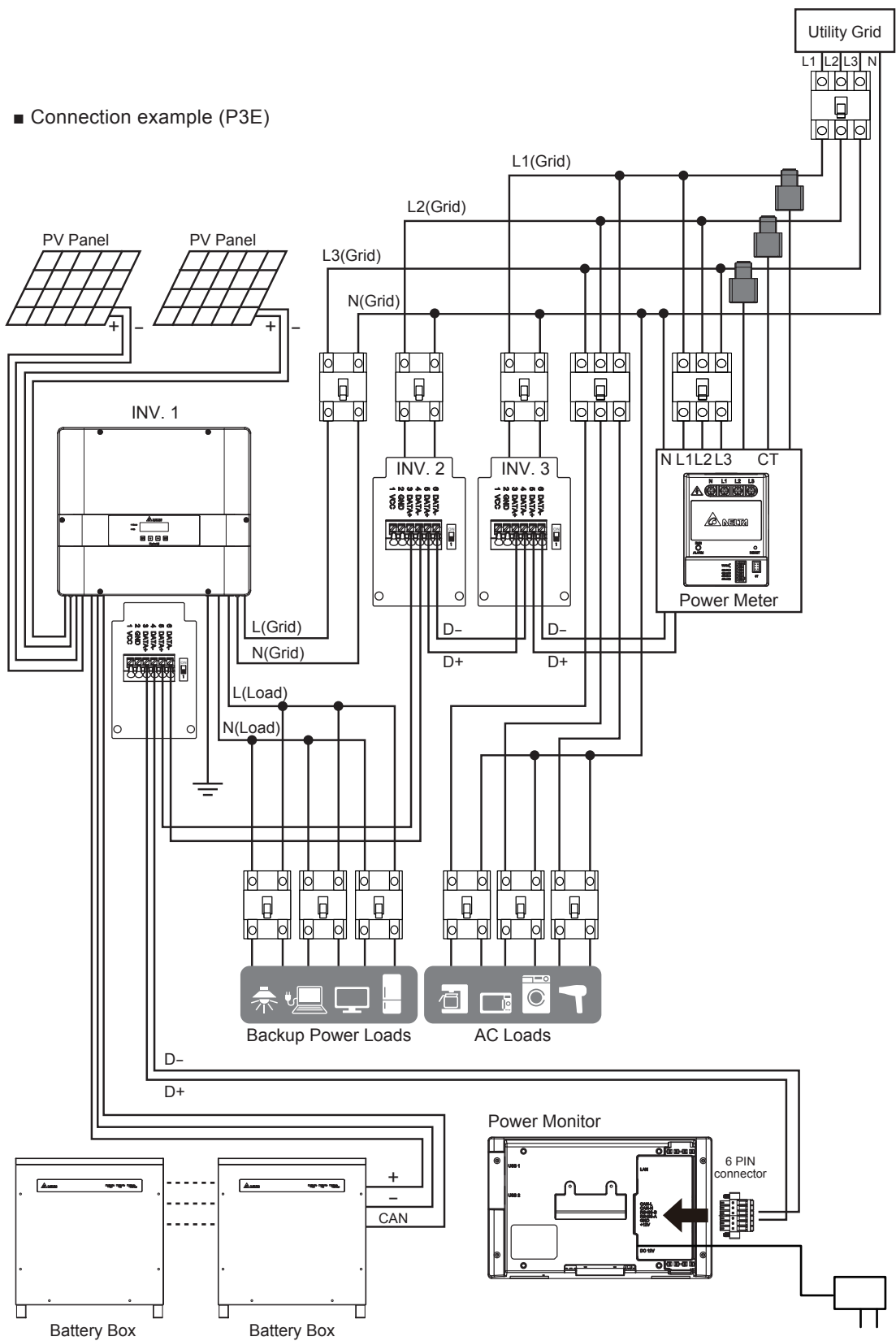
One Point

- Please set connection ID before connect to the Inverters.
The ID of inverters must be different.
- The ID range is 1~3.

■ Connection example (P1E)

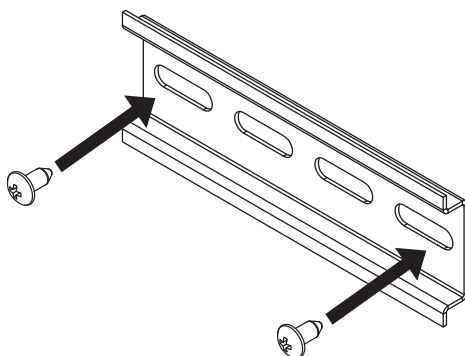
The diagram illustrates a three-phase power system configuration. At the top right, the 'Utility Grid' is connected to a three-phase distribution block. The main power lines are labeled L(Grid), N(Grid), and L(Grid). These lines pass through a 'Power Meter' which has N, L, and CT terminals. The system includes three inverters: INV. 1, INV. 2, and INV. 3. INV. 1 is connected to two 'PV Panel's. INV. 2 and INV. 3 are connected to the L(Grid) and N(Grid) lines. The inverters have multiple output terminals labeled D+, D-, and N. These outputs are connected to 'Backup Power Loads' and 'AC Loads'. A 'Power Monitor' is shown at the bottom right, connected to the system via a 6 PIN connector. At the bottom left, two 'Battery Box's are connected to the system, with a CAN bus connection indicated. The diagram shows a complex network of wires connecting all components, including a ground connection for the N(Grid) line.

■ Connection example (P3E)

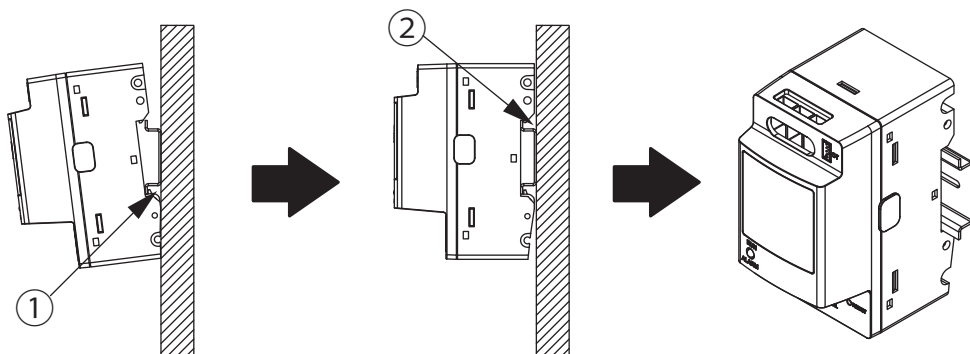


2.3.Mounting the Installation Unit, Wireless Communications Unit, and DIN Rail

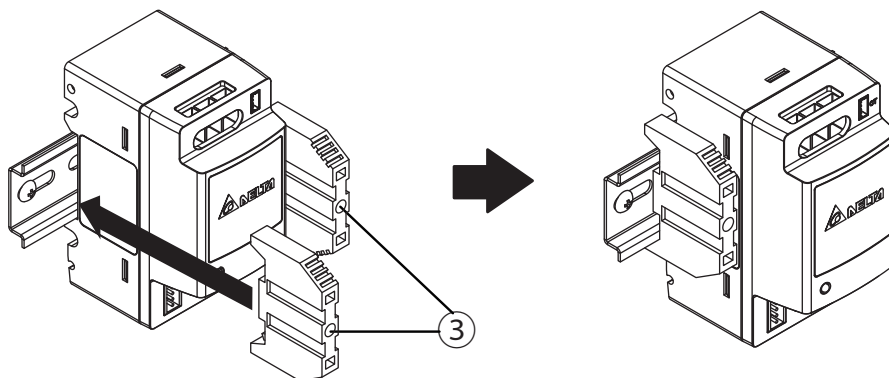
- (1) Remove the protective cover from the power input terminal block on the power meter.
- (2) Use wooden screws for the enclosed DIN rail to mount the DIN rail horizontally to the perpendicular site.



- (3) Hang the hooks ① on the lower back of the power meter and the wireless communications unit at the bottom of the DIN rail.
- (4) Hang the hooks on the top of the power meter ② on the DIN rail to secure.



- (5) Finally, mount the stoppers to both ends of the power meter and the wireless communications unit.
 - Press the stoppers into the DIN rail and use a flat screwdriver to rotate the screws on the stopper ③ as shown in the diagram below to finish the mounting.



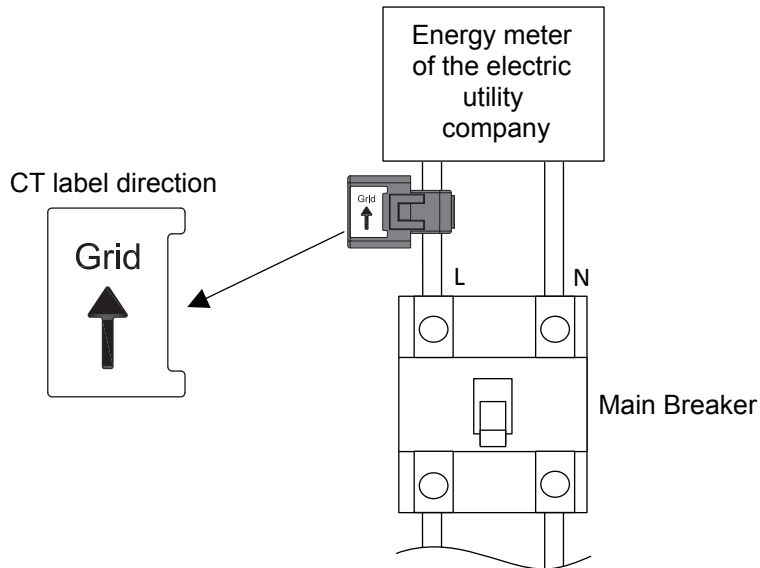
- (6) Check that the stopper hooks have bitten into the DIN rail.

※ The installation of P3E is same.

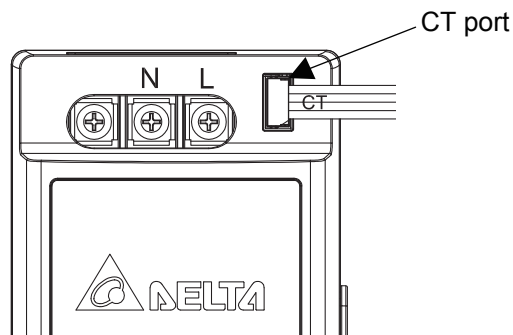
2.4.Current Transformer installation (DANGER)

■ P1E

1. The CT can be opened.
2. Take the CT clip on the Line conductor wire.
3. Take note of the direction of CT installation. Arrow symbol means utility grid.

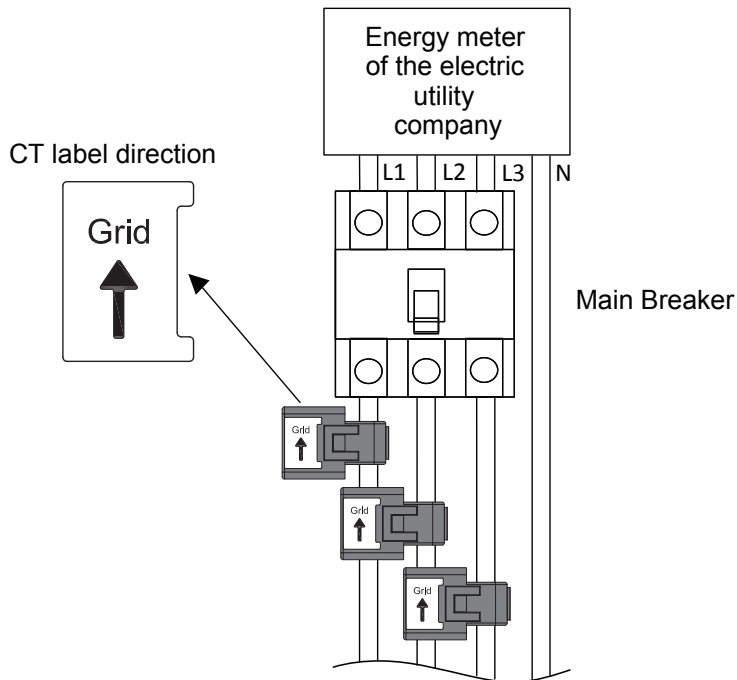


4. Connect the CT wires to the device.
5. Put in the CT wire into the CT port.

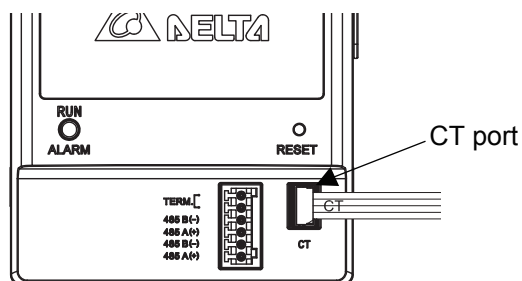


■ P3E

1. The CT can be opened.
2. Take the CT clip on the Line conductor wire.
3. Be care the CT label direction, arrow symbol means utility grid.



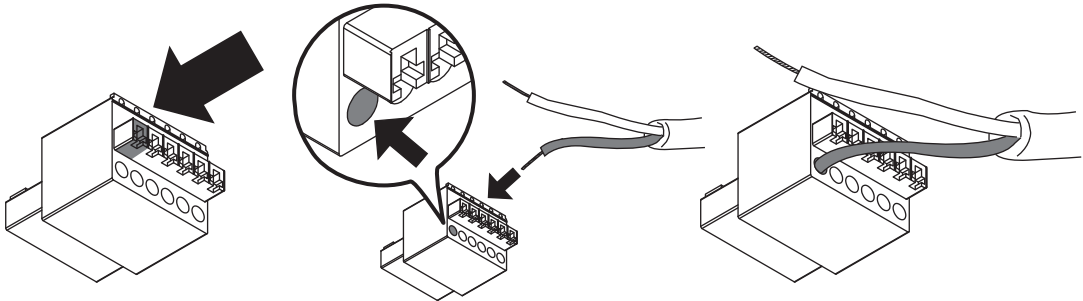
4. The CT connect combine the CT wire.
5. Put in the CT wire into the CT port.



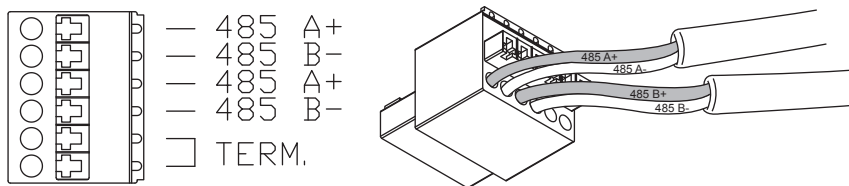
- All breakers must be OFF before start construction .
- Check voltage of inside Mainbreaker is ZERO.
- When start construction, must be wear isolate equipment.
EX: the isolate gloves, the isolate shoes.
- The installer's body must be dry.

2.5.Data communication setup

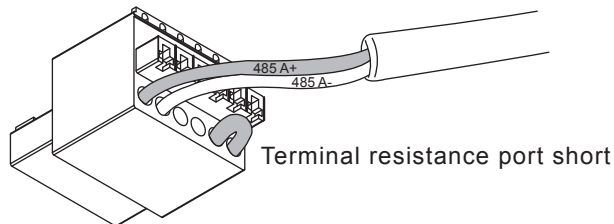
1. Put the signal wires of the monitor (or the inverter) into RS-485 connector.
(The wire diameter is AWG20 ~ AWG24)



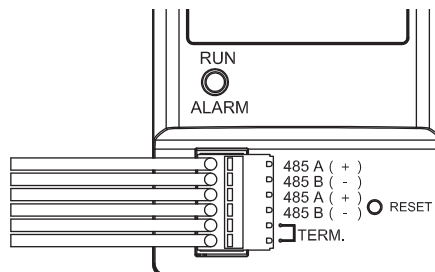
2. According to mark of the meter , put into the signal wires of the monitor. (or the inverter)



3. Add the termination resistor (short the terminals) if this is the last device in the RS-485 chain.



4. Connect the RS-485 to the meter port.

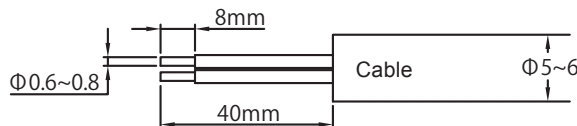


5. You can now use the Delta monitor to access and display the data.
Please refer to the Default Settings (page 32) or connection setting (page 59) for more information.

2.6.Setting the Communications Unit

■ Cable

- Make sure to use RS-485 cable.
Prepare 0.3 to 0.5mm² x single wire, 2 cores (twin wires rather than 1 pair) shielded cable (rated temperature: 80°C to 85°C).
- Read the inverter installation and maintenance manuals while working.
- If connecting multiple inverters, complete the settings so that there are no duplicate IDs.
- Process the cables before use.



■ Using 1 inverter

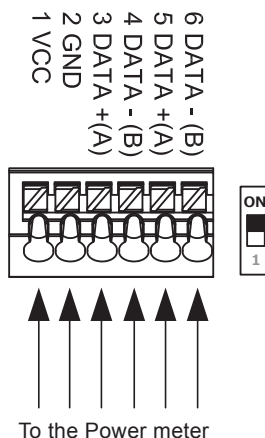
- (1) Remove the communications connectors from the inverter, and thread the cables through the waterproof gasket.

※If the removal method is unclear, see the inverter installation and maintenance manuals.

※When removing the communications connectors, make sure to turn OFF beforehand the DC switches, operations switches, and solar generator breakers.

- (2) Hold down the top of the terminal block on the communications connectors, and insert the cables as follows: 1 VCC, 2 GND, 3 DATA+, 4 Data-, 5 DATA+(A), 6 DATA-(B).

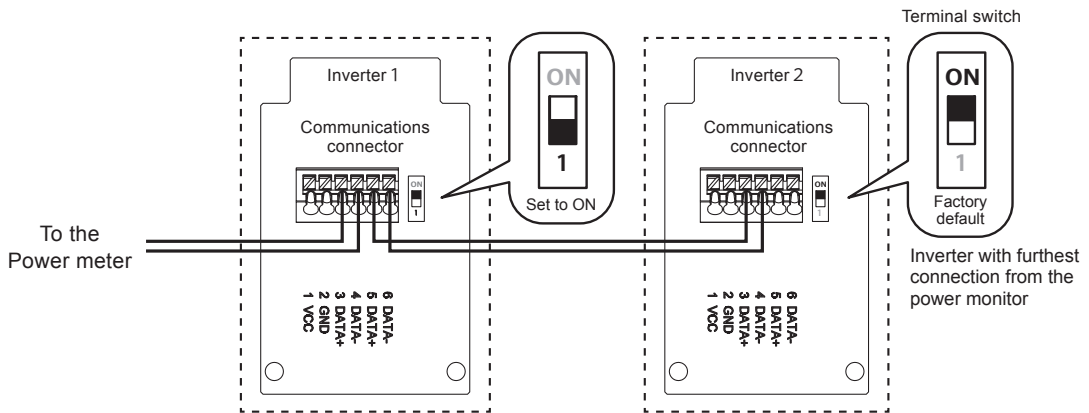
Check that the cables have been inserted securely.



- (3) Turn ON the DIP switch on the communications director.

■ Using 2 or more inverters

- (1) Remove the communications connectors from the inverter, and thread the cables through the waterproof gasket.
 - (2) Hold down the top of the terminal block on the communications connectors, and insert the cables connected to the power monitor as follows: 3 DATA+, 4 Data-.
 - (3) Next, insert the cables into the adjacent inverter as follows: 5 Data+, 6 Data-.
- Check that the cables have been inserted securely.
- (4) Next, insert the aforementioned cables into the adjacent inverter as follows: 3 Data+, 4 Data-.



- (5) After completing the connection, turn ON the terminal switch for only the inverter that is farthest from the monitor, and set all the other inverters to 1 (OFF).

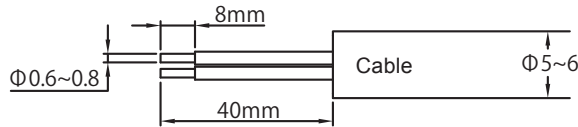
If need power supply from inverter, connect all VCC to VCC, and all GND to GND.

Make sure that the voltage between VCC and GND is in operating voltage range, and connect to VCC and GND of Power Monitor.

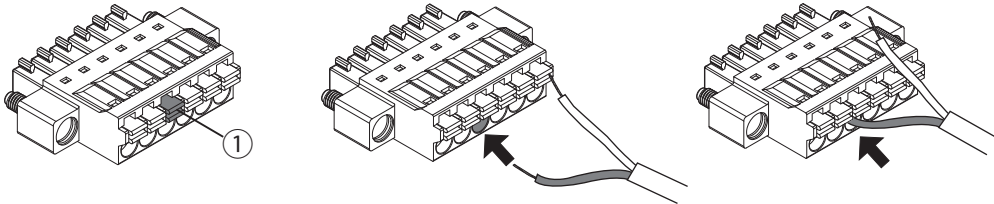
Operating voltage range of Power Monitor is 10Vdc ~ 16Vdc, and rated operating voltage is 12Vdc.

2.7.Setting Power Monitor and Cable

- Process the cable before use.

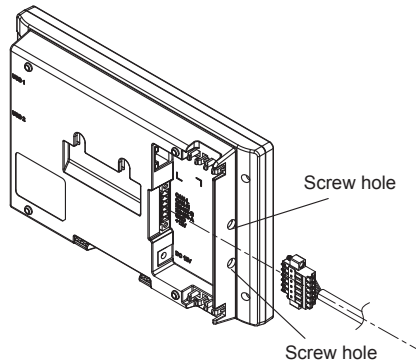


- Creating 6-pin connectors
Hold down the enclosed 6-pin connector ①, and insert the cable.

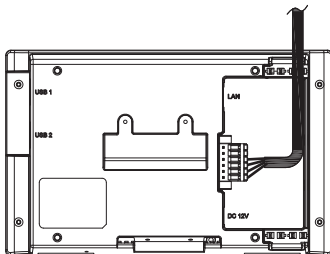


When the connectors are complete, connect to the main unit.

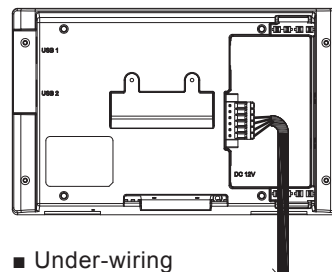
- Connecting the main unit and the 6-pin connectors
(1) Insert the 6-pin connector into the main unit.



- (2) Pass a screwdriver through the screw hole, and tighten the two screws for the 6-pin connector.



■ Over-wiring

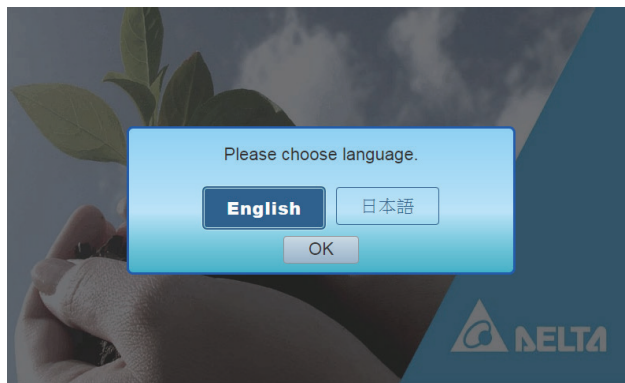


■ Under-wiring

- (3) When all the wiring is complete, install the power monitor in its installation site.

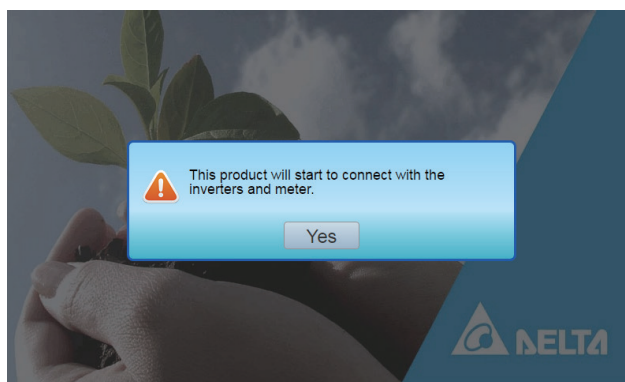
2.8.Default Settings

- (1) Insert the 6-pin connector into the Power Monitor.
- (2) After startup, the language selection screen will be displayed, so select the language to be used.



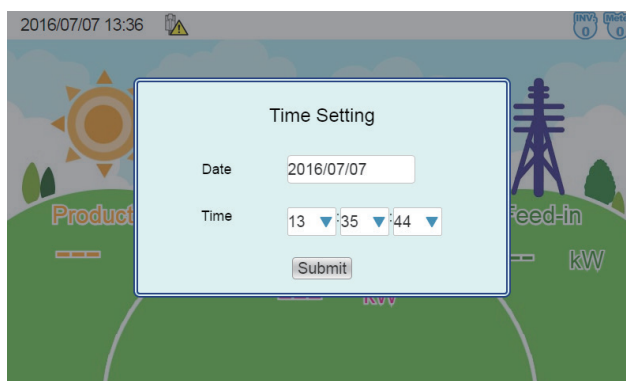
Language selection screen

- (3) The connection setting start screen will be displayed, so touch the [Yes] button.



Connection setting start screen

- (4) The time settings screen will be displayed, so make the time settings.

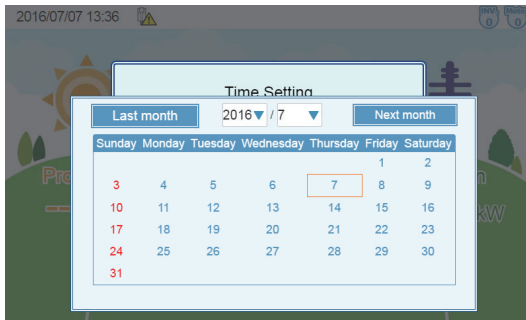


Time settings screen (Date and time shown are examples.)

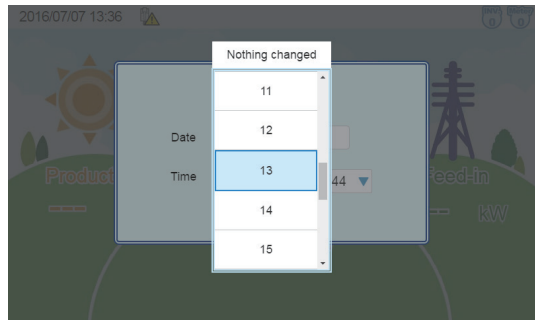
Select the date frame. The date selection screen will be displayed.

Select the date that you want to set.

Touch the time frame for the time. The time selection screen will be displayed. Select the time that you want to set.



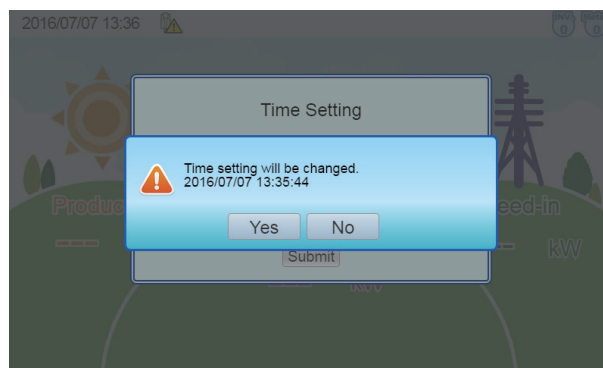
Date selection screen



Time selection screen

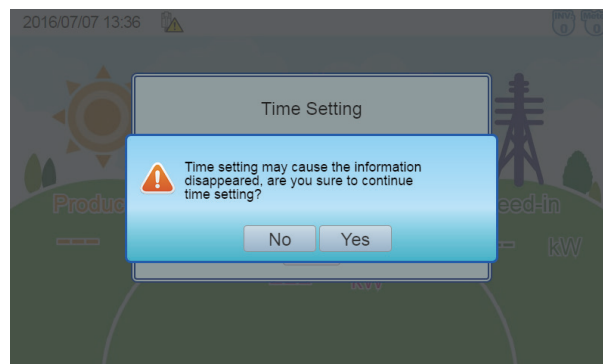
Touch the [Set] button on the time selection screen.

The time change dialog box will be displayed. Check the time, and touch the [Yes] button.



Time change dialog box

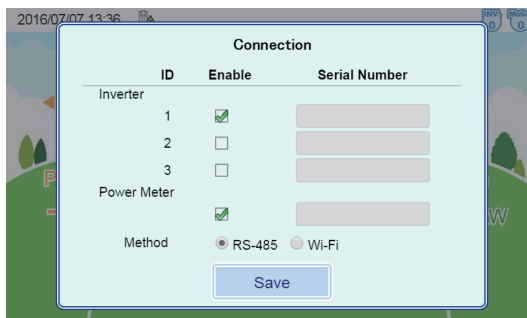
The time change dialog box will disappear, and the time change confirmation dialog box will be displayed. Touch the [Yes] button once again.



Time change confirmation dialog box

(5) When the time settings are finished, the connection setting will be displayed, so make the connection setting.

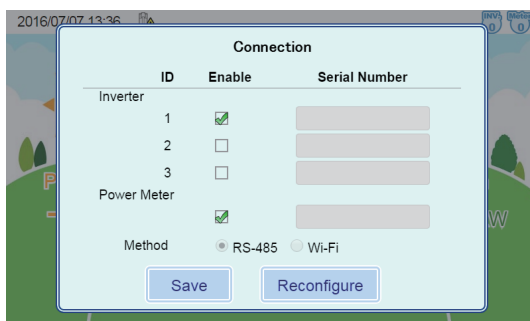
If using wires, select **RS-485** as the connection method, and then enable the No. field of the power meter and the No. field of the ID number set on the inverter, and press the [Save] button.



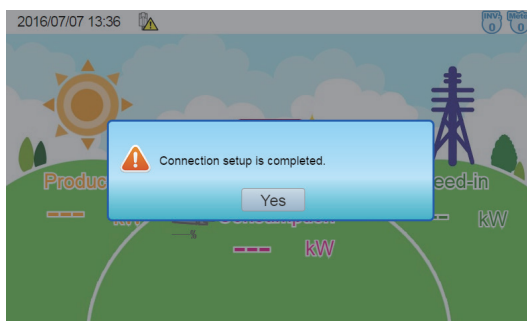
connection setting screen (enabled)
(Example shows inverter ID 1 enabled)

(6) The reconfirm screen will be displayed, so when the settings are finished, press the [Save] button.

The "Connection setting complete" dialog box will be displayed. Press the [Yes] button to display the home screen. To change the settings, touch the [Reconfigure] button.



Reconfirmation screen



Connection setting complete screen

(7) When the settings are complete, the "Home screen" will be displayed.

As processing is implemented immediately after the settings are made, a "✗" icon is displayed, so check the following details 1 to 3 mins later.

- Check that the "✗" icon is not displayed on the home screen.
- Check that the values for the power production icon have changed.
- Check the connection setting and connection log.

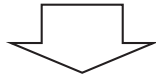
※If making the connection setting again, switch to service mode.

For service mode, see "6. Service Mode" (page 58).

3.Installation (Wireless)

3.1.Installation order

「Mounting the Installation Unit, Wireless Communications Unit,
and DIN Rail」



「Setting the Inverter Wireless Communications Unit」



「Default Settings」

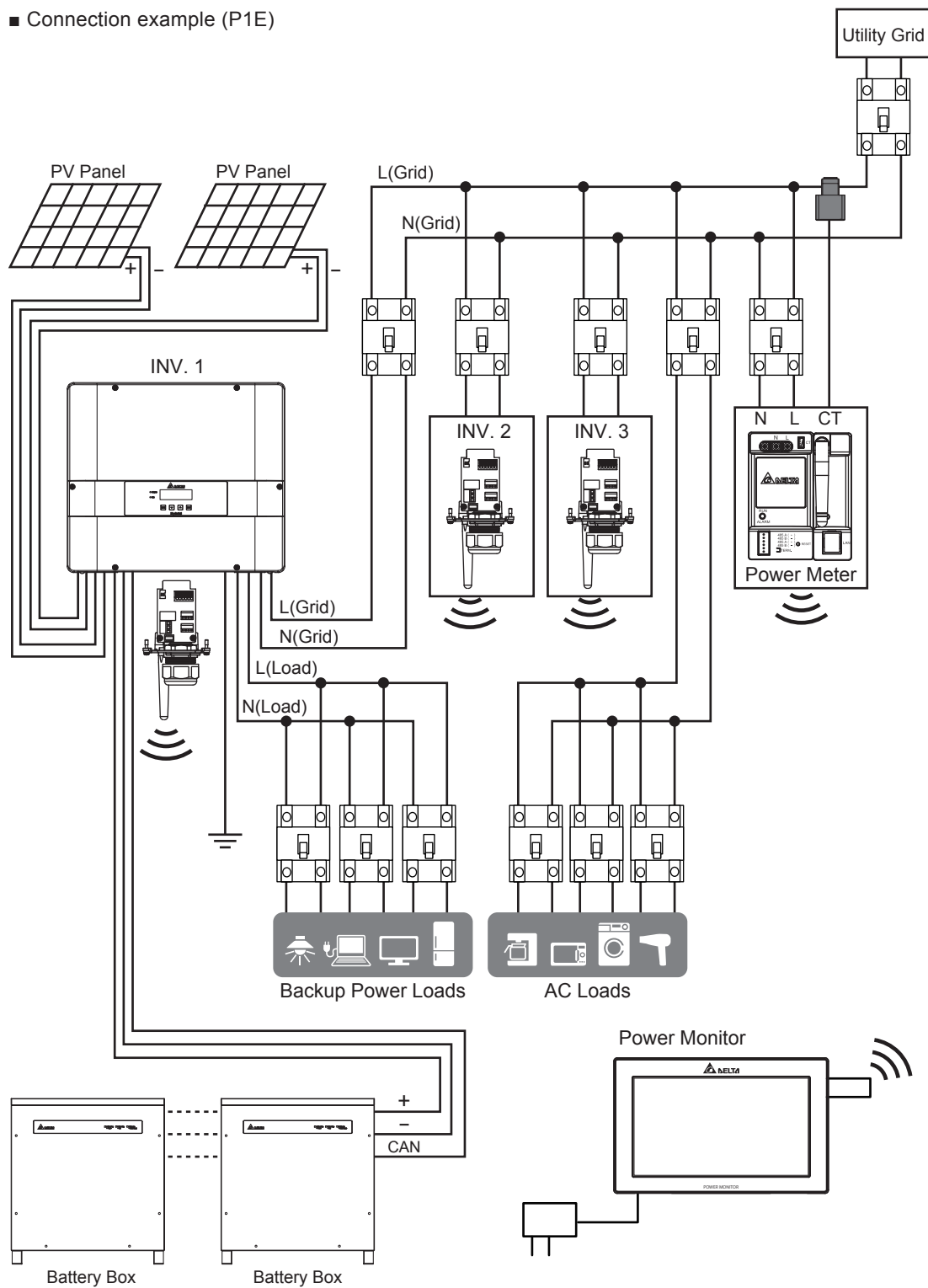
Warning

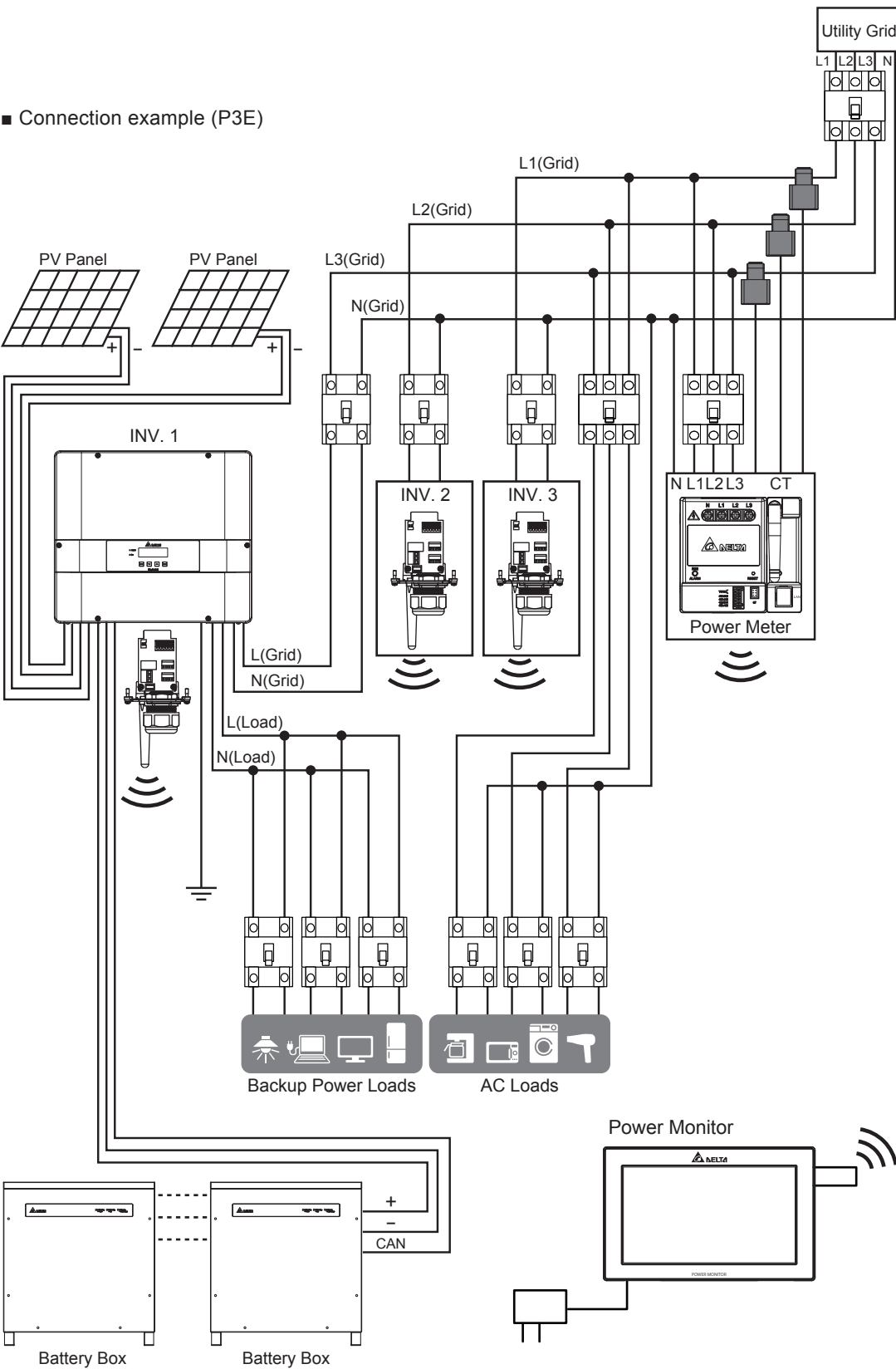


Before starting work, make sure to turn OFF all DC switches, operations switches, and solar generator breakers. Although small, there is a risk of injury due to electric shock.

3.2. System Diagram

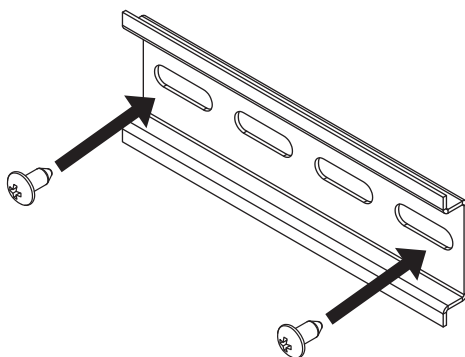
■ Connection example (P1E)



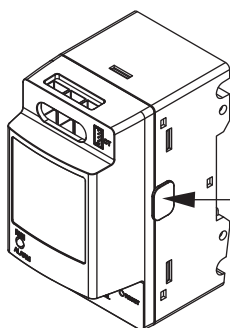


3.3.Mounting the Installation Unit, Wireless Communications Unit, and DIN Rail

- (1) Remove the protective cover from the power input terminal block on the power meter.
- (2) Use wooden screws for the enclosed DIN rail to mount the DIN rail horizontally to the perpendicular site.

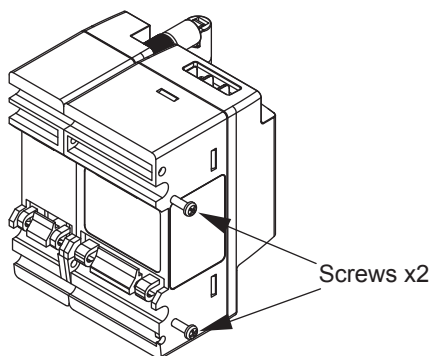
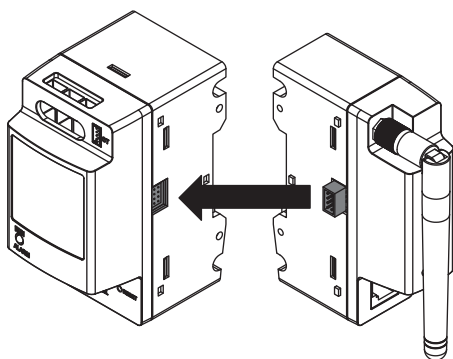


- (3) Remove the cover for the power meter connections terminal.



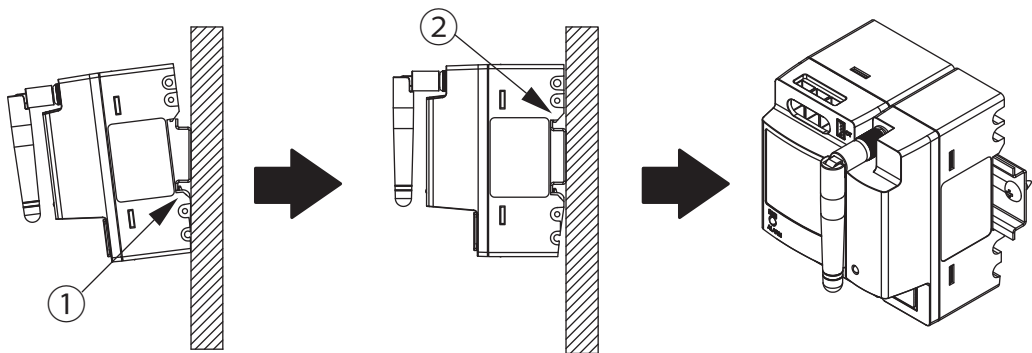
Cover for the power meter connections terminal

- (4) Align the power meter and wireless communications unit, and secure using the two screws.

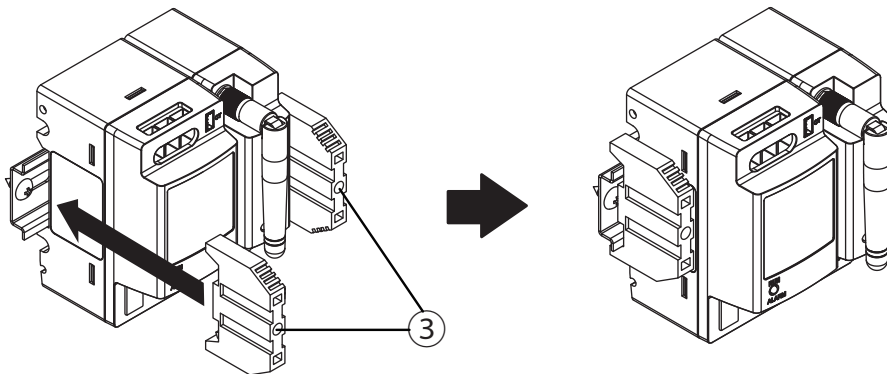


Screws x2

- (5) Hang the hooks ① on the lower back of the power meter and the wireless communications unit at the bottom of the DIN rail.
- (6) Hang the hooks on the top of the power meter ② on the DIN rail to secure.



- (7) Finally, mount the stoppers to both ends of the power meter and the wireless communications unit.
- Press the stoppers into the DIN rail and use a flat screwdriver to rotate the screws on the stopper ③ as shown in the diagram below to finish the mounting.

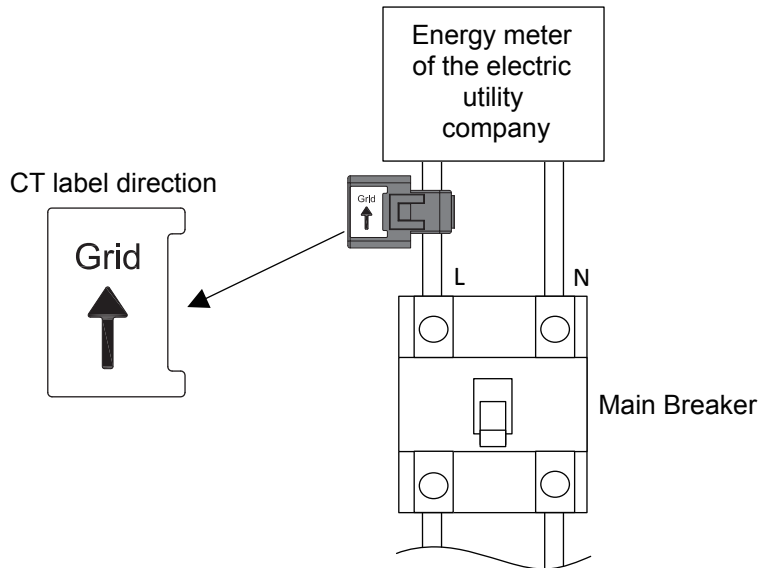


- (8) Check that the stopper hooks have bitten into the DIN rail.

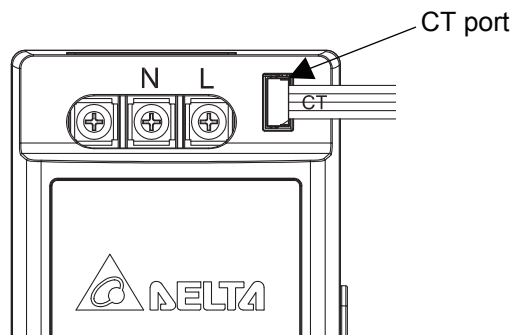
3.4.Current Transformer installation (DANGER)

■ P1E

1. The CT can be opened.
2. Take the CT clip on the Line conductor wire.
3. Take note of the direction of CT installation. Arrow symbol means utility grid.

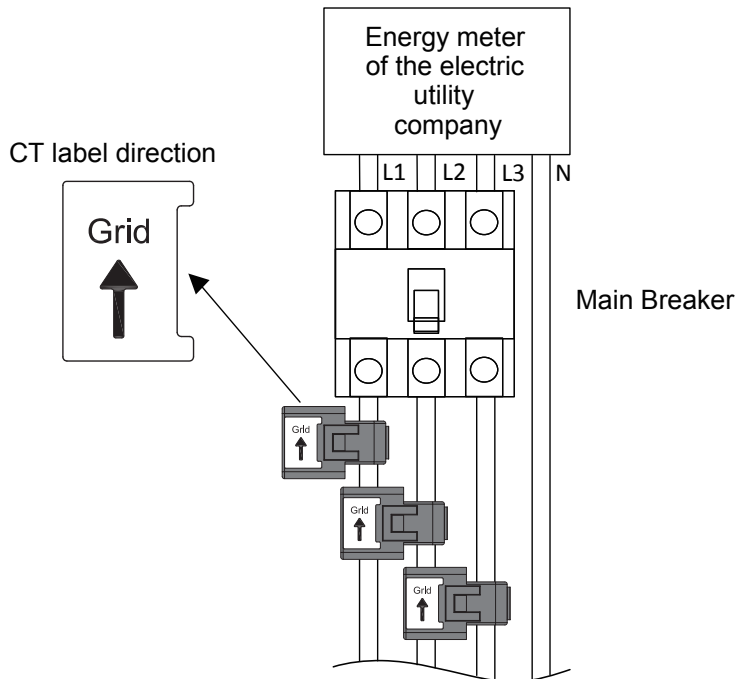


4. Connect the CT wires to the device.
5. Put in the CT wire into the CT port.

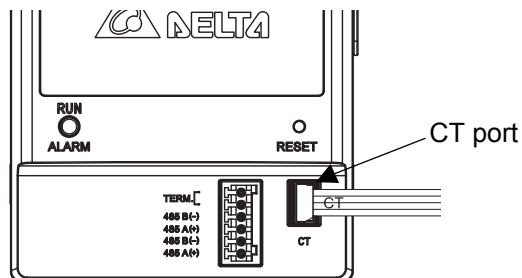


■ P3E

1. The CT can be opened.
2. Take the CT clip on the Line conductor wire.
3. Be care the CT label direction, arrow symbol means utility grid.



4. The CT connect combine the CT wire.
5. Put in the CT wire into the CT port.



- All breakers must be OFF before start construction .
- Check voltage of inside Mainbreaker is ZERO.
- When start construction, must be wear isolate equipment.
EX: the isolate gloves, the isolate shoes.
- The installer's body must be dry.

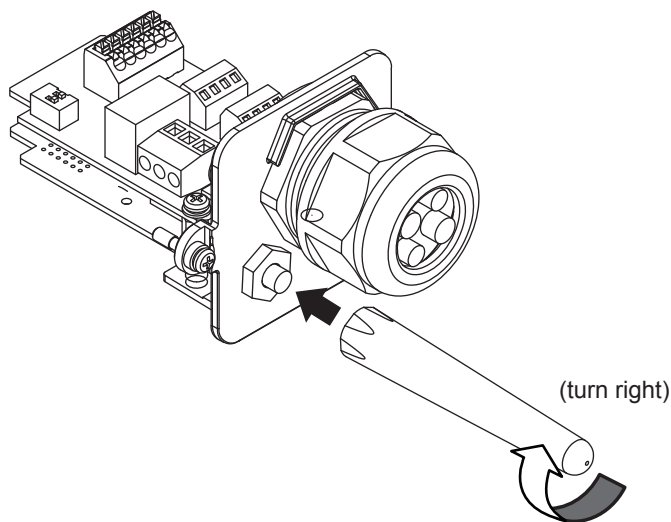
3.5.Setting the inverter Wireless Communications Unit

(1) Mount the inverter wireless communications unit antenna

Mount the inverter wireless communications unit antenna to the enclosed inverter wireless communications unit by rotating in the direction of the arrow.

※Rotate until there is no gap between the inverter wireless communications unit antenna and the inverter wireless communications unit.

※A gap between the inverter wireless communications unit antenna and the inverter wireless communications unit may cause waterproofing to be lost.

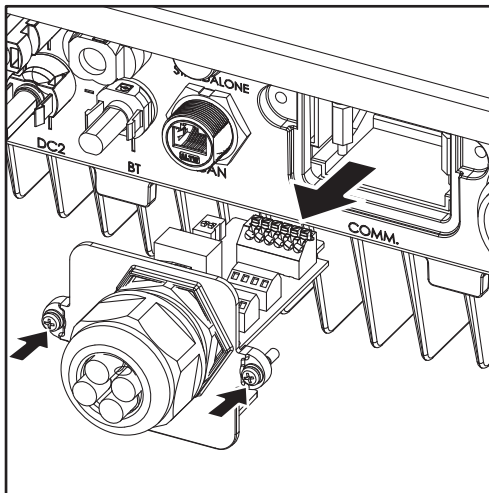
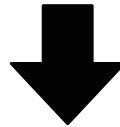
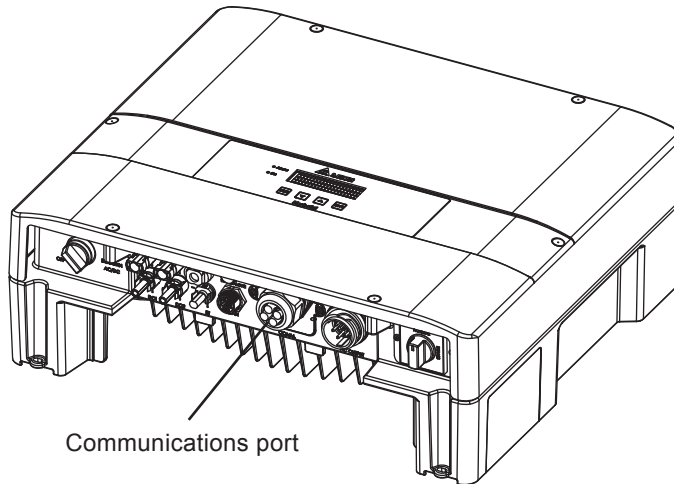


(2) Replace the inverter communications port with the enclosed inverter wireless communications unit.

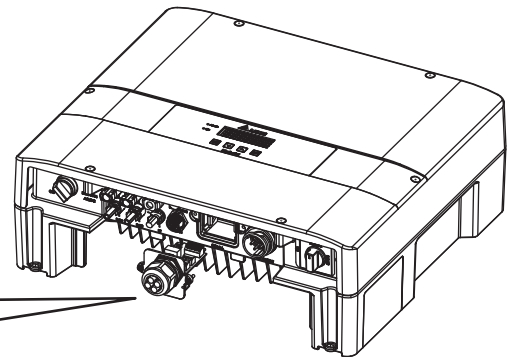
① Loosen the two screws on the inverter communications port, and pull out.

※ Be careful not to touch the PCB.

※ Be careful not to lose the screws.



Removing the communications port

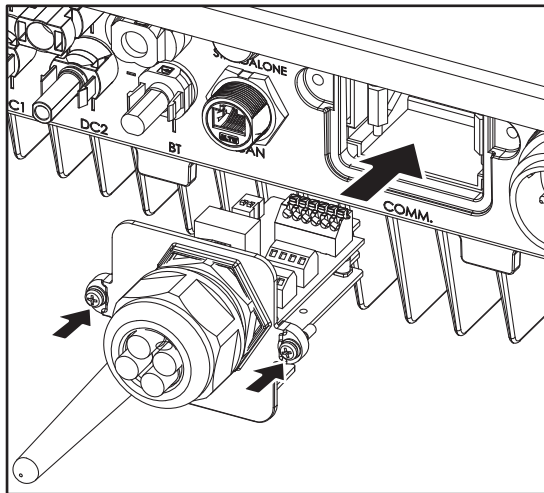


**Do not remove while
operations are still
underway**

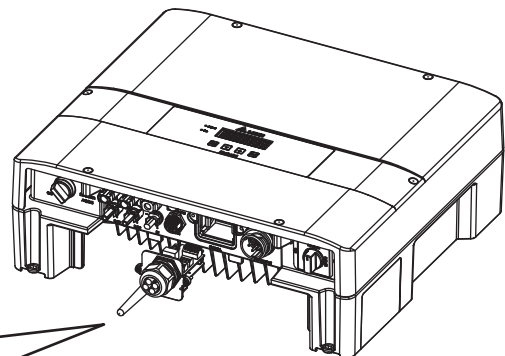
※ Place the communications port that has been removed in the bag for the inverter wireless communications unit, and hand it to the customer.

- ② Insert N2, and use 2 screws to fix N2.

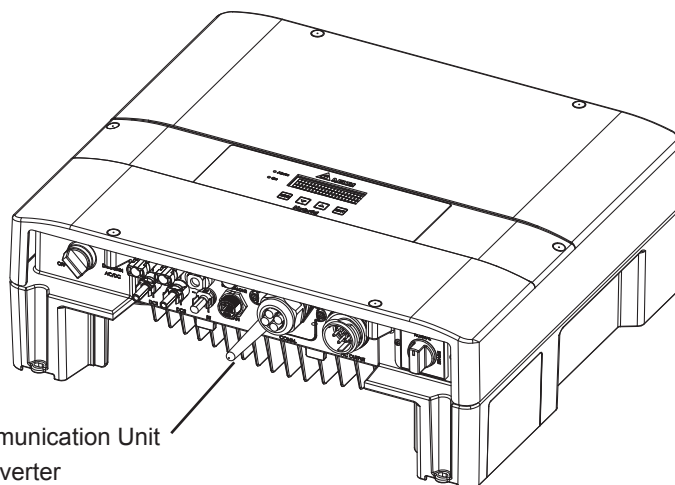
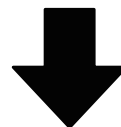
※Please do not collision



Installation method for N2.



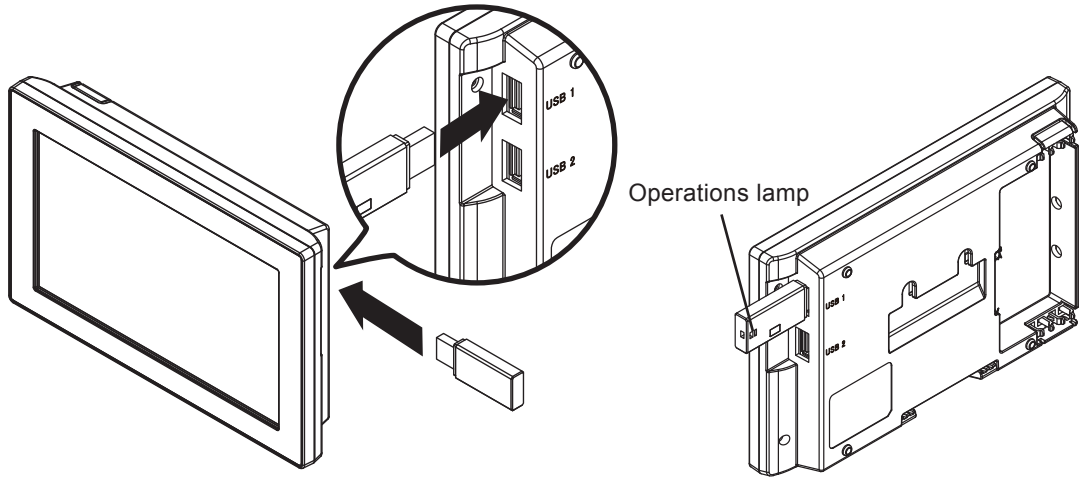
**Do not remove while
operations are still
underway**



Wireless Communication Unit
for Inverter

3.6.Setting the USB Wireless Module

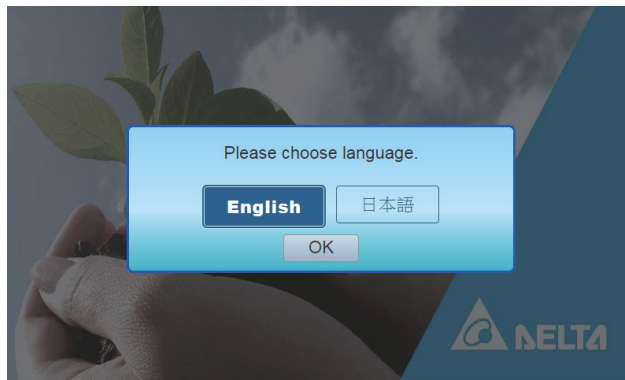
- (1) Remove the protective cover from the (upper) USB1 unit.
- (2) Mount the USB wireless module for the power monitor to the (upper) USB1 terminal.



- (3) Connect the AC adapter for the power monitor.
- (4) When the power monitor starts, the operations lamp on the USB wireless module flashes blue.

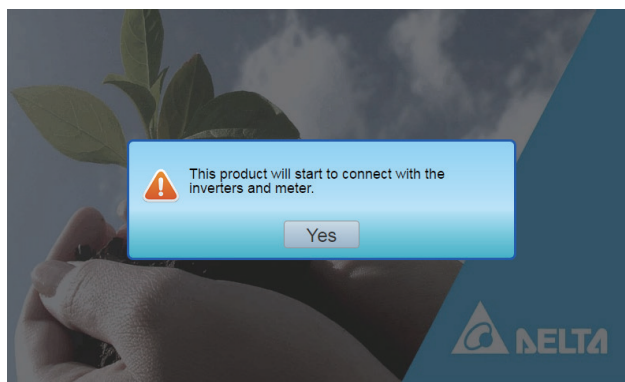
3.7.Default Settings

(1) After startup, the language selection screen will be displayed, so select the language to be used.



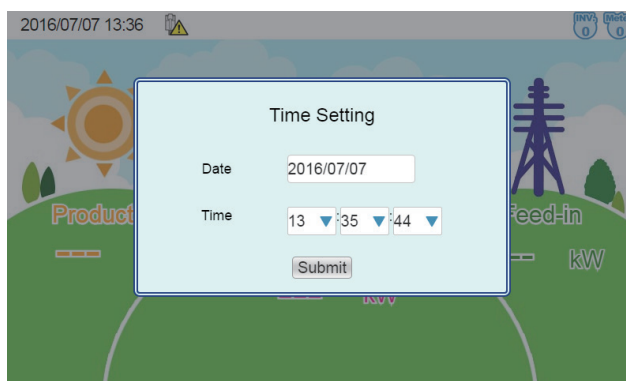
Language selection screen

(2) The connection setting start screen will be displayed, so touch the [Yes] button.



connection setting start screen

(3) The time settings screen will be displayed, so make the time settings.

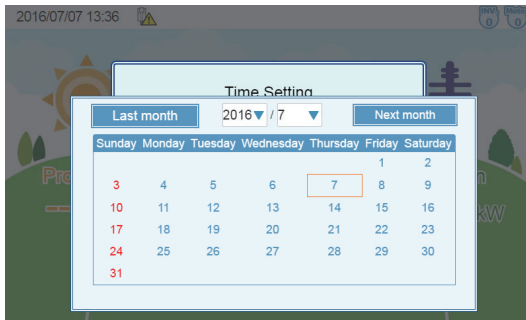


Time settings screen (Date and time shown are examples.)

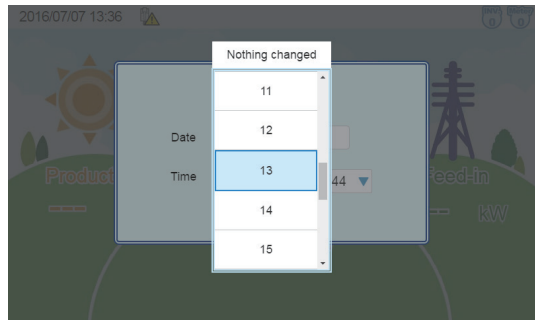
Select the date frame. The date selection screen will be displayed.

Select the date that you want to set.

Touch the time frame for the time. The time selection screen will be displayed. Select the time that you want to set.



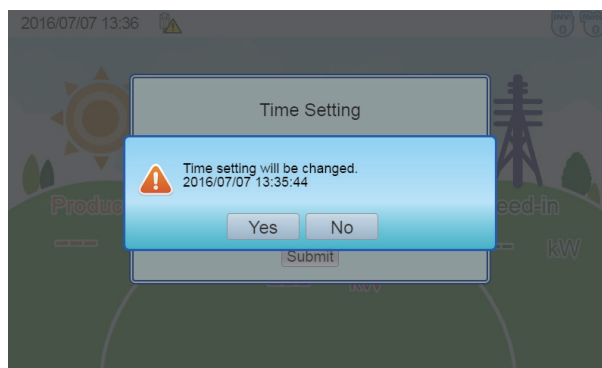
Date selection screen



Time selection screen

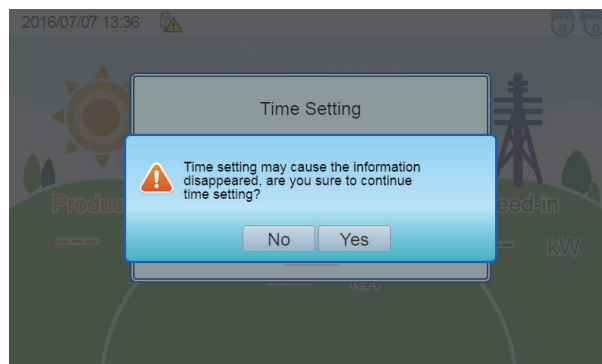
Touch the [Set] button on the time selection screen.

The time change dialog box will be displayed. Check the time, and touch the [Yes] button.



Time change dialog box

The time change dialog box will disappear, and the time change confirmation dialog box will be displayed. Touch the [Yes] button once again.

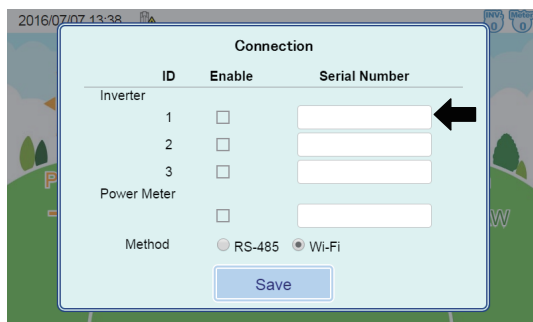


Time change confirmation dialog box

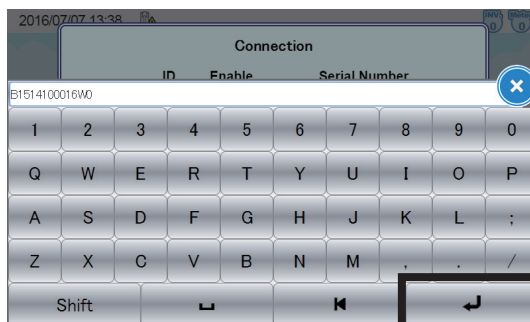
- (4) When the time settings are finished, the connection setting will be displayed, so make the connection setting. If using a wireless configuration, select **Wi-Fi** as the connection method, and touch the inverter serial number frame. The keyboard will be displayed.

Enter the inverter serial number. After entering, touch the  button.

※ Use alphanumeric characters to enter the serial number. Not case sensitive.




connection setting screen



Inverter input screen

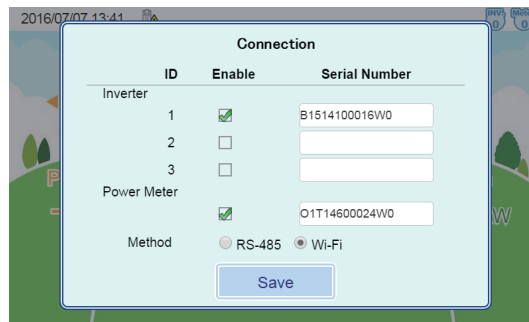
[Confirm]
button

- (5) When you have finished setting the inverter serial number, touch the frame for the power meter serial number in the same way. The keyboard will be displayed. Enter the power meter serial number. After entering, touch the  button.

※ Use alphanumeric characters to enter the serial number. Not case sensitive.

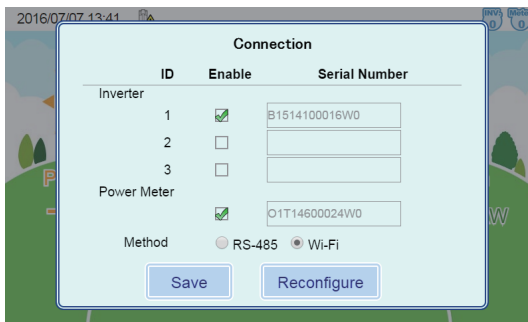
※ Check the labels affixed to the product packaging for the serial numbers.

- (6) Touch the number for the connected inverter and the enabled power meter checkboxes, enable the checkboxes, and touch the [Save] button.

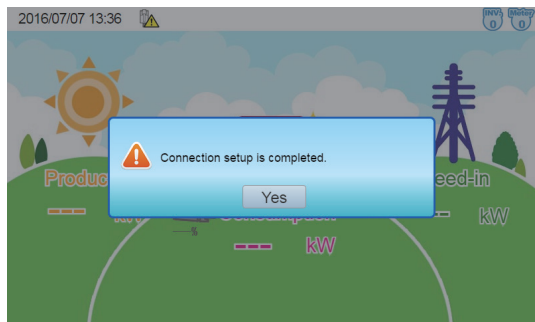


Connection setting screen (enabled)

- (7) The reconfirm screen will be displayed, so when the settings are finished, click the [Save] button. The "connection setting complete" dialog box will be displayed. Press the [Yes] button to display the home screen. To change the settings, touch the [Reconfigure] button.



Reconfirmation screen



connection setting complete screen

- (8) When the settings are complete, the "Home screen" will be displayed.

As processing is implemented immediately after the settings are made, a "X" icon is displayed, so check the following details 1 to 3 mins later.

- Check that the "X" icon is not displayed on the home screen.
- Check that the values for the generator power, power consumption, and feed-in/purchased electricity power icons have changed.

※ If making the connection setting again, switch to service mode.

For service mode, see "6. Service Mode" (page 58).

4. Installation Method

The Power Monitor may be mounted on a desktop or on a wall surface for use.

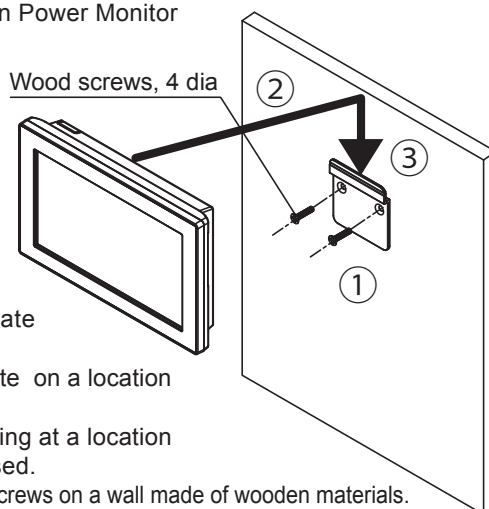
“Wall Installation”, “Desktop Installation” and “Guiding the AC Adapter Cable” are respectively explained in this chapter.

* Communication status between the Inverter and the Meter must be verified prior to installation, in order to use wireless communication for the Power Monitor.

* Consult the retailer where you purchased the Power Monitor when relocating your Power Monitor.

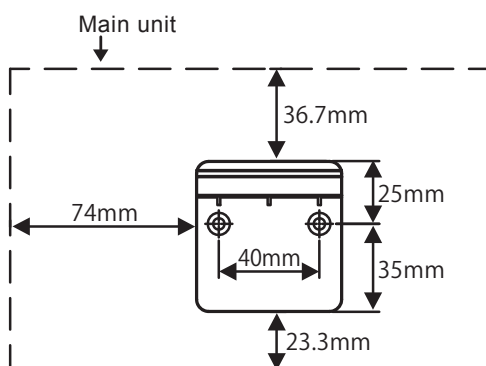
4.1. Wall Installation

■ Installing Wall Surface / Desktop Mounting Plate on Power Monitor

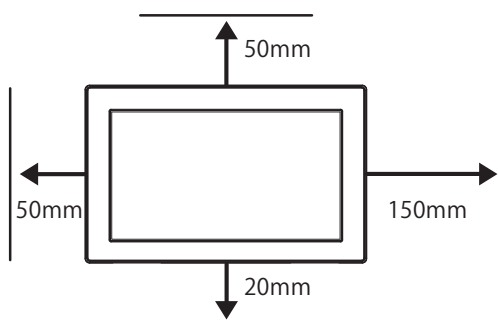


● Installation on wall

- ① Install the Wall Surface / Desktop Mounting Plate on the wall, using the wood screws provided.
 - Install the Wall Surface / Desktop Mounting Plate on a location that can withstand the weight of the main unit.
 - Use countersunk screws of 4 dia., when installing at a location where the provided wood screws cannot be used.
 - Apply torque of 1.5 to 2.0 Nm when installing wood screws on a wall made of wooden materials.
 - Install on a flat wall surface.
- ② Verify the hooking portion of the Wall Surface / Desktop Mounting Plate and the Wall Mounting Plate and the insertion slot for anchoring the Wall Surface Mounting Plate on the reverse surface of the main unit, then press on the main unit until the insertion slot for anchoring is positioned above the upper section of the Wall Surface / Desktop Mounting Plate.
- ③ Slide the main unit lower in that position and securely engage the hooking portion.
 - Hook on the insertion slot for anchoring the Wall Surface Mounting Plate on the reverse surface of the main unit on the Wall Surface / Desktop Mounting Plate and shift down by approximately 1 centimeter.

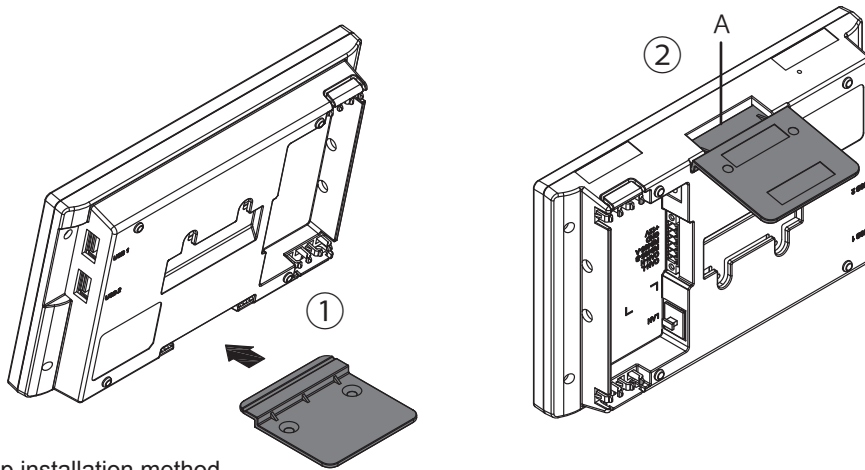


■ Dimensions of Wall Surface / Desktop Mounting Plate and the main unit



■ Separation distance from respective surfaces of main unit

4.2. Desktop Installation



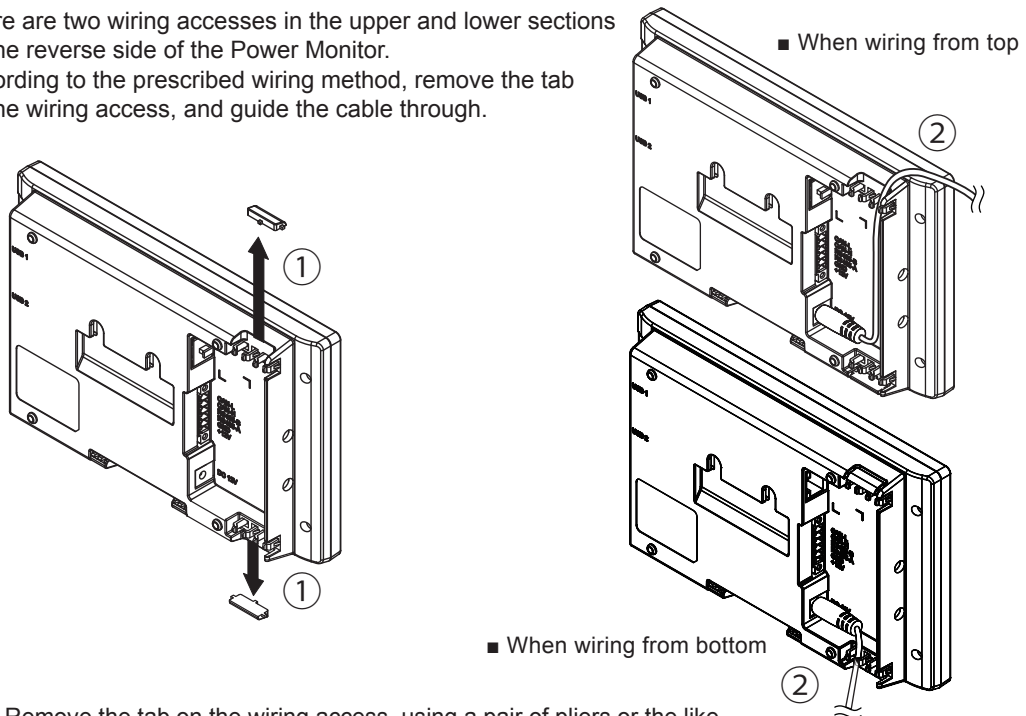
- Desktop installation method

- ① Insert the Wall Surface / Desktop Mounting Plate in the insertion slot for anchoring the Desktop Mounting Plate at the lower section of the main unit, being careful about the direction the plate is facing.
- ② Verify to ensure that there is no gap between the Wall Surface / Desktop Mounting Plate and Part A at the bottom of the main unit, as shown in the figure to the right.

4.3. Guiding the AC Adapter Cable

There are two wiring accesses in the upper and lower sections on the reverse side of the Power Monitor.

According to the prescribed wiring method, remove the tab on the wiring access, and guide the cable through.

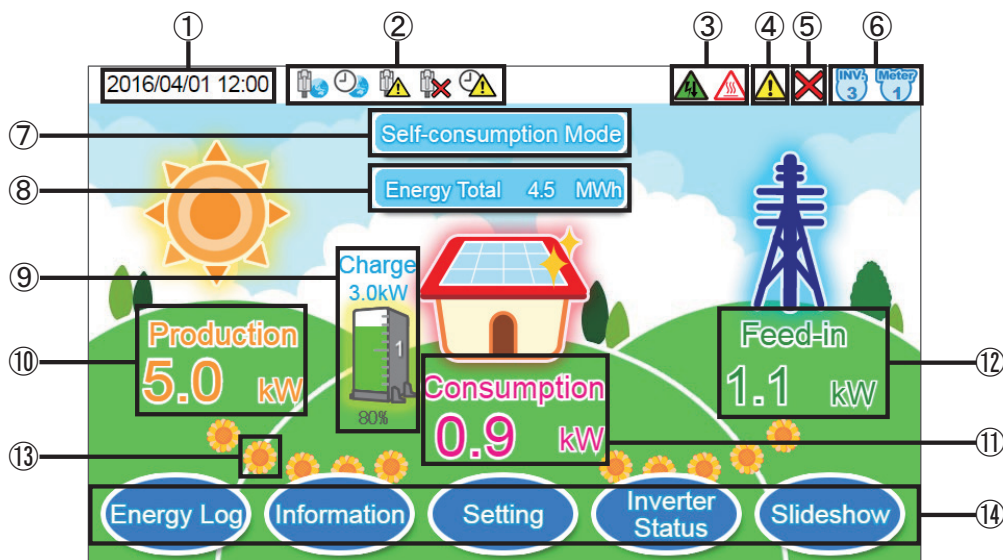


- ① Remove the tab on the wiring access, using a pair of pliers or the like.
(Remove burr with a pair of pliers to ensure that the cables are not scratched.)
- ② Guide through the cables.

5.Description of the screen display

5.1.Home Screen

This is the Home screen of the monitor. Illustrations and icons displayed on this screen are explained.



① Date / Time

The current date and time are displayed.

②



Not connect to the LAN or internet.



It's able to connect to LAN, but not able to connect to external internet



Internet is working normally



Internet time synchronization is not successful



Internet time synchronization is successful

③ Suppression icon

A Suppression icon is displayed when there is suppression on the operation of the Inverter.

Icon	Operating mode	Description
	Temperature elevation suppression	The internal temperature of the Inverter has reached a high level. The output of the Inverter is being suppressed.
	Voltage elevation suppression	The voltage of the commercial power system has reached a high level while the Inverter was in operation. The output of the Inverter is being suppressed.


④ Error icon

An error icon is displayed to indicate that one or more errors are occurring.

The Error icon is ordinarily not displayed, and is displayed when one or more errors occur. Refer to “7. Something Seems Wrong (Troubleshooting)” (Page 85) for details.

⑤ Communication Malfunction icon

This icon is displayed when communication with the Inverter or the Meter is not available.

Icon	Operating mode	Description
	Communication malfunction	Communication with the Inverter or the Meter is malfunctioning.

⑥ Number of Connected Inverters and Meters icon

The number of Inverters and Meters that have been checked off in the Connection setting.

This feature cannot be used to verify erroneous wiring, since the actual wiring is irrelevant to this indication.

⑦ Operation mode

Shows the charge and discharge model of battery.

⑧ Energy total

Indicates the total amount of power generated from the day on which power generation started to the present time.

⑨ Battery's Icon and value

Shows charge and discharge wattage and power percentage.

In the main page, the electricity numbers are all for system except battery status. It only shows 1 battery status. Therefore, if connect to more than one Inverter and battery, some parts of batteries will be hidden, so user must click on the battery Icon to switch to another page to get battery information.

⑩ Power Generation icon and numerical value

The icon and the numerical value indicate the current status of power generation.

⑪ Power Consumption icon and numerical value

The icon and the numerical value indicate the current status of power consumption.


⑫ Power feed-in and Power Purchase icon and numerical value

The icon and the numerical value indicate the current status of power feed-ins and purchases.


The color and text of the icon will change depending on the power feed-in and purchase status.

The color of the text is “green” when the power is being sold and “red” when the power is being purchased.


⑬ Flow of electricity

Power generating: The “” symbol flows from left to right between power generation and consumption.



Power selling: The “” symbol flows from left to right between consumption and power feed-in.



Power purchasing: The “” symbol flows from right to left between consumption and power purchase.








⑭ Menu buttons

The names of the Menu buttons are displayed.


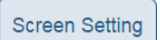
Menu buttons have different names and roles for each screen that is being displayed.

Refer to the descriptions of respective functions for details of the Menu buttons.

	Power log is displayed.
	Status of the Inverter and the error log are displayed.
	Setting for the Inverter and monitor.
	Display the status of Inverters.
	This is a slideshow feature.

• Display of tabs

The selected tab is displayed in white. The non-displaying tabs are displayed in light blue.

	Selected tab	Non-displaying tab
Tab		

One Point

- Numerical values that are displayed on the screens are all displayed as values that have been rounded up or off.
For instance in case where a value is “3.14 kWh”, this is displayed as “3.1 kWh”, whereas if the value is “3.15 kWh”, then it is displayed as “3.2 kWh”.
Thus the numerical values that are displayed do not necessarily completely match with the true value in some cases, as described above.
- Refer to “7. When Something Seems Wrong (Troubleshooting)” (Page 85) for details when the Suppression and Communication Malfunction icons are displayed frequently.

5.2.Operation Screens

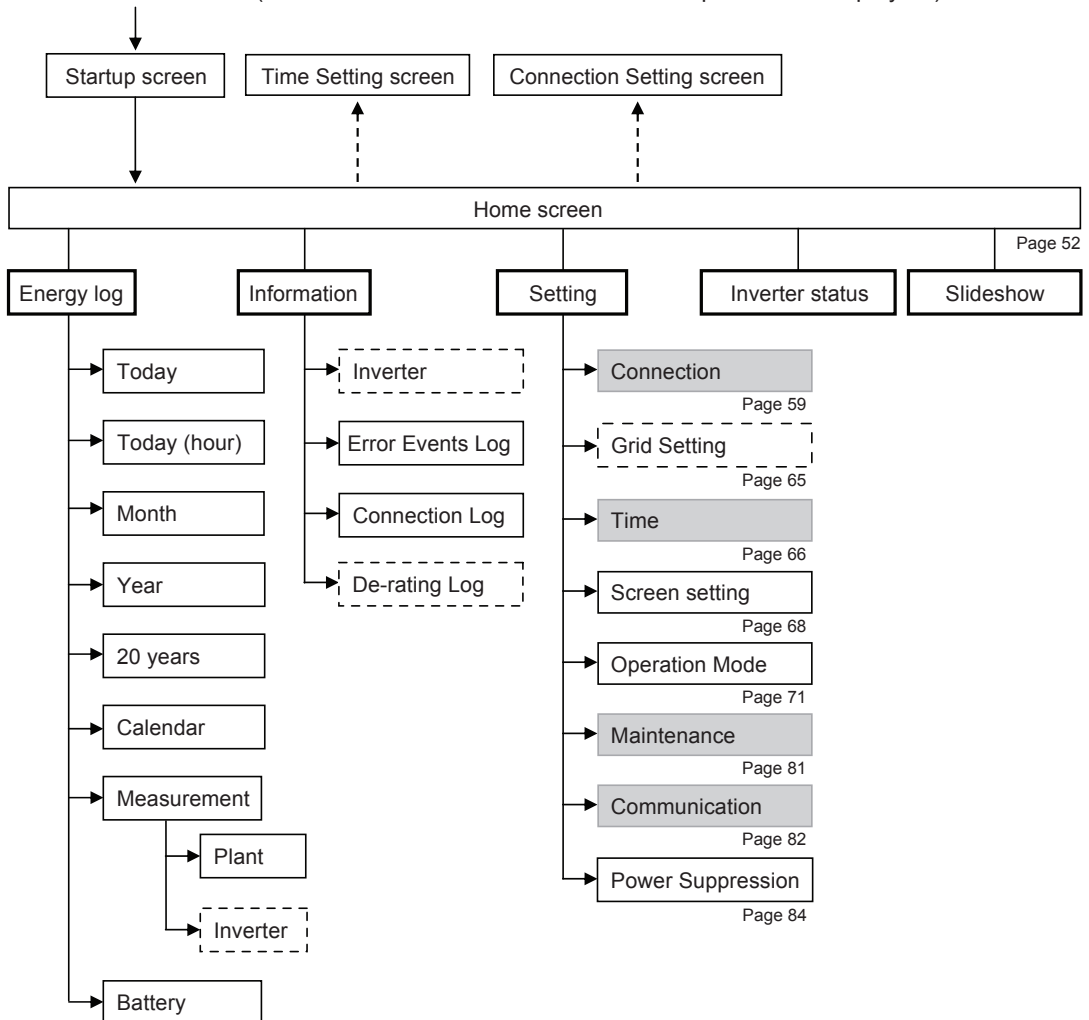
The display screen of the Power Monitor changes in the following manner, according to touch panel operations and connection setting. Display details and operations of respective screen are described in the “Display Functions” section.

One Point

- The screens indicated by dotted arrow lines are displayed when a specific condition (such as date/time not entered, connection setting and the like) is satisfied.
- The screens surrounded by a frame of dotted line are not displayed when the Power Monitor and the Inverter are unable to communicate with each other.
- Screens indicated with solid lines are displayed for ordinary operations.
- The screens in gray are displayed when operating in service mode.

■ List of Operation Screens

Power turned on (it takes about 10 seconds until the Startup screen is displayed)



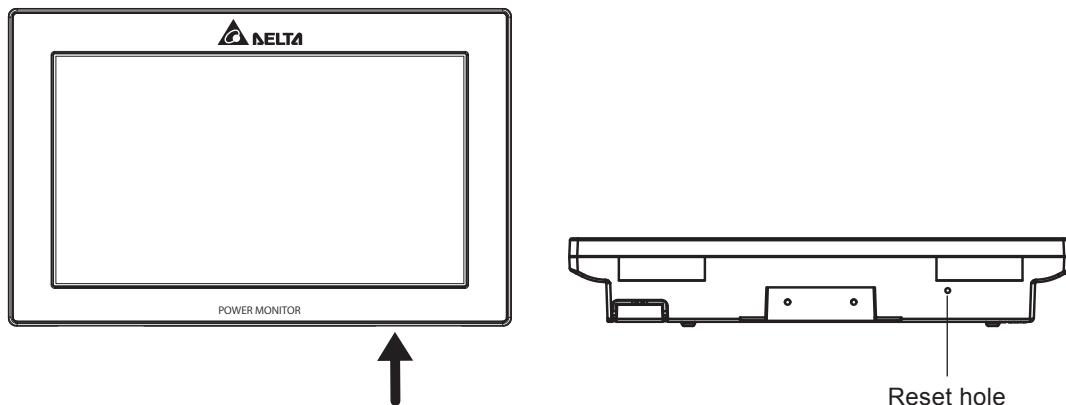
5.3.Reset Method

■ Reset the power monitor

Insert an electrically-isolated rod-shaped object with a slender tip into the reset hole on the base of the unit to push the reset button.

The device will be reset.

※ Restart the power monitor. The settings and records will not be deleted.



■ Resetting the wireless communications unit

This is the reset button for the wireless communication unit.

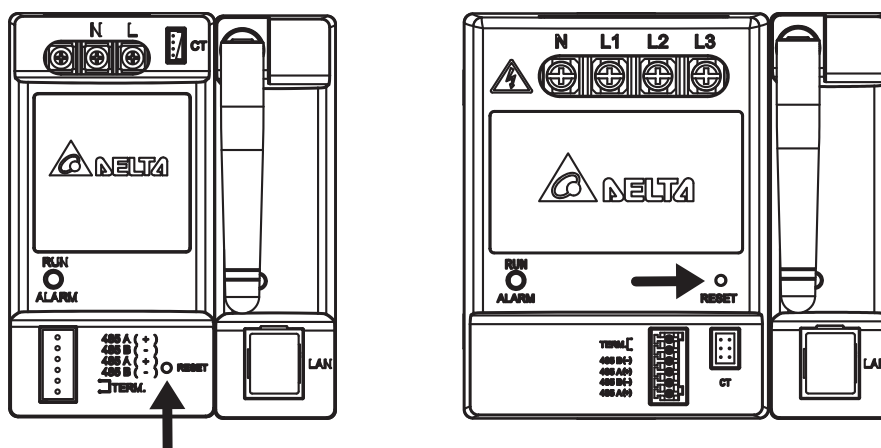
Insert an electrically-isolated rod-shaped object with a slender tip into the reset hole on the front of the power meter to push the reset button.

※ The settings and records will not be deleted.

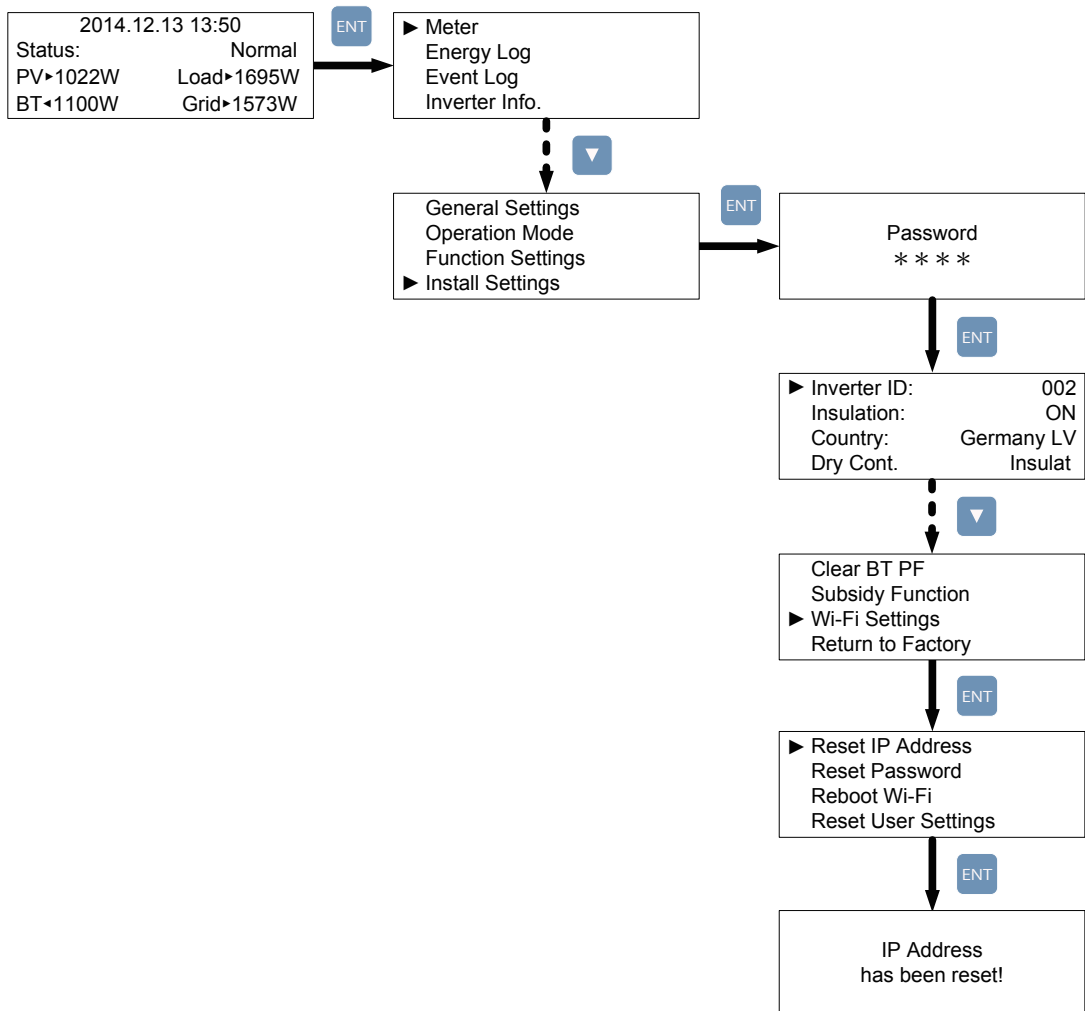
Short push (less than 5s): Release the button. The operations LED lamp will flash green 3 times repeatedly at 0.5s intervals, and the wireless communications will restart.

※ The settings and records will not be deleted.

Long push (until the flashing starts): Press and hold the button for 5s min. The operations LED lamp will flash green 10 times repeatedly at 0.5s intervals, and the wireless communications unit will return to its default settings. Be careful. (Restores factory settings.)



■ The reset method for N2.



6. Service Mode

6.1. Entering or Exiting Service Mode

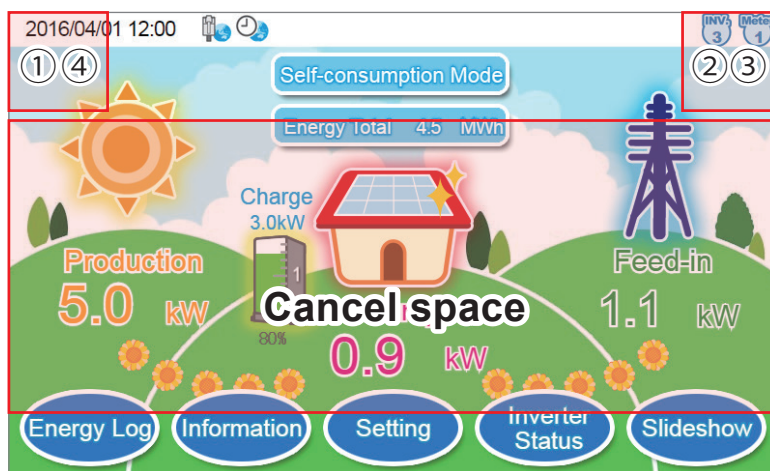
Touch the home screen in the following order to enter service mode.

Procedure: Touch top left once→Touch top right twice→Touch top left once

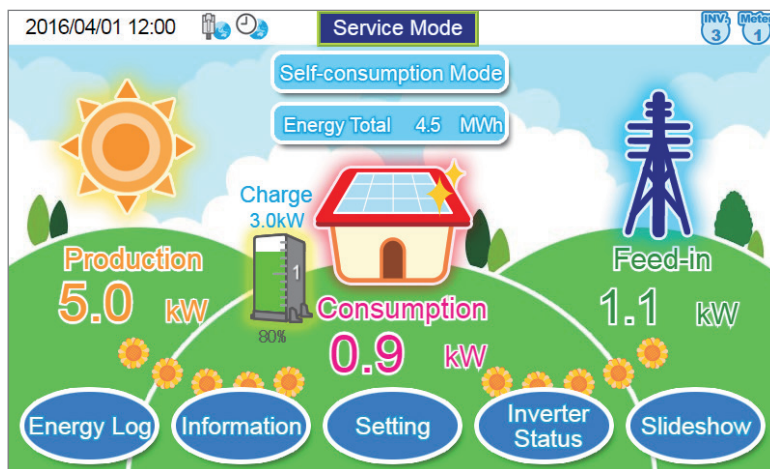
(Make sure to complete the operation within 5s.)

※ If you make a mistake during the touch operation, touch the center of the screen once to cancel.

Perform the operation again from the start.



Upon entering service mode, [Service Mode] will be displayed at the top center of the screen.



■ Exiting service mode

Touch the top of the screen once again using the same procedure to return to normal mode.

6.2.Exclusive Service Mode Functions

Service mode provides setting functions such as inverter connection, grid values, time, maintenance, etc.

■ Connection setting (wired models)

Use service mode to make the connection setting.

※ During initial monitor startup, the connection setting screen is displayed automatically, but from the second time onwards, it is necessary to switch to service mode to make the connection settings. The connection setting page is not displayed in normal mode.

[Expanding the Inverters]

If expanding the solar generator system and adding inverters, make the following settings.

The amount of power generated by the additional inverters cannot be measured unless the following settings are made.

(1) Enable the checkbox for the number set for the additional inverter, and touch the [Save] button.

(2) The settings complete dialog box will be displayed, so touch the [Yes] button.

- (3) Check the connection status and connection log page under "Inverter status" and "Information".
- (4) When the settings are complete, return to normal mode using "■Exiting service mode" (page 58).

[Replacing the Inverters]

Make the settings as described below if replacing a malfunctioning inverter.

The amount of power generated by the additional inverters cannot be measured unless the following settings are made.

- (1) Reset and clear all the inverter data. (See the inverter installation and maintenance manual.)
- (2) Set the number of the replacement inverter before connecting to the power monitor.
- (3) Connect the replacement inverter to the power monitor.
- (4) Check the connection status and connection log page under "Inverter status" and "Information".
- (5) When the settings are complete, return to normal mode using "Exiting service mode" (page 58).

Operating method:

- Touch  and then  on the home screen.

■ Connection setting (wireless models)

Make the connection setting if expanding or replacing inverters, or if replacing the power meter or wireless communications unit.

※ During initial power monitor startup, the connection setting start screen is displayed automatically, but from the second time onwards, it is necessary to switch to service mode to make the connection settings. The connection setting page is not displayed in normal mode.

[Expanding the Inverters]

If expanding the solar generator system and adding inverters, make the following settings.

The amount of power generated by the additional inverters cannot be measured unless the following settings are made.

(1) Touch the frame for the serial number of the inverter. The keyboard will be displayed.

Enter the inverter serial number. After entering, touch the button.

※ Use alphanumeric characters to enter the serial number. Not case sensitive.

connection setting screen

Input screen

[Confirm] button

(2) Touch the number for the expansion inverter and the enabled power meter checkboxes, enable the checkboxes, and touch the [Save] button.

The settings complete dialog box will be displayed, and touch the [Yes] button.

connection setting screen

Settings complete dialog box

(3) When the settings are complete, the "Home screen" will be displayed.

As processing is implemented immediately after the settings are made, a "✗" icon is displayed, so check the following details 1 to 3 mins later.

- Check that the "✗" icon is not displayed on the home screen.
- Check that the values for the generator power, power consumption, and feed-in/purchased electricity power icons have changed.

(4) When the settings are complete, return to normal mode using "■Exiting service mode" (page 58).

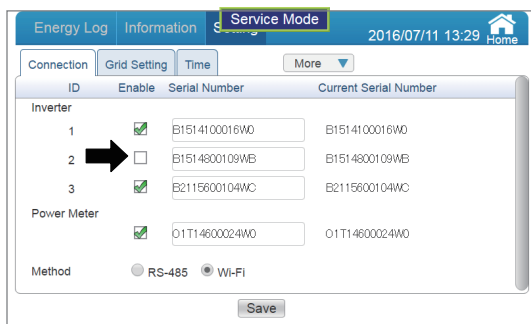
[Replacing Inverters, or Initializing or Replacing inverter Wireless Communications Units]

If replacing a malfunctioning inverter or inverter wireless communications unit, or if initializing a inverter wireless communications unit, make the settings as described below.

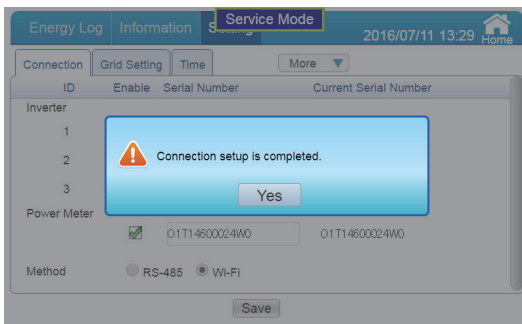
The amount of power generated by the additional inverters cannot be measured unless the following settings are made.

(1) Touch the check box enabled with the number of the inverter to be replaced or the inverter to which the inverter wireless communications unit to be initialized is mounted.

Disable the check box, and press the [Save] button.



connection setting screen



Settings complete dialog box

(2) Remove the inverter wireless communications unit, and swap with the replacement inverter.

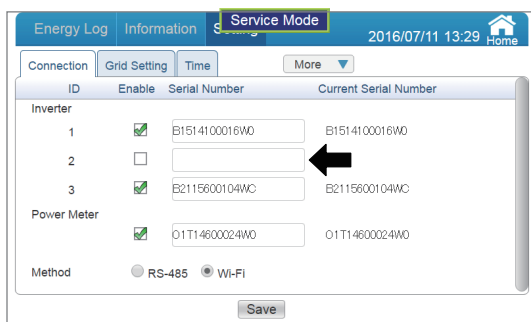
※ If only initializing the inverter wireless communications unit, it is not necessary to remove the inverter wireless communications unit from the inverter.

(3) Initialize the inverter wireless communications unit (page 57).

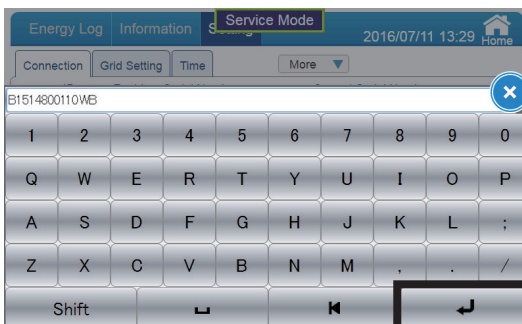
(4) Touch the frame for the serial number of the inverter. The keyboard will be displayed.

Enter the inverter serial number. After entering, touch the  button.

※ Use alphanumeric characters to enter the serial number. Not case sensitive.



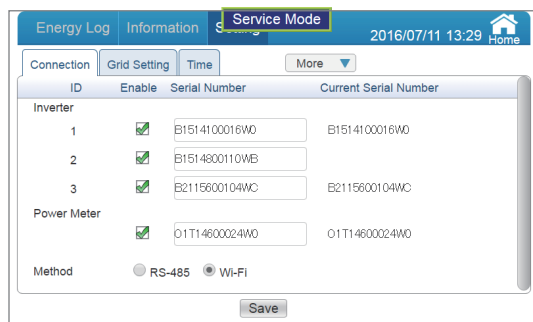
connection setting screen



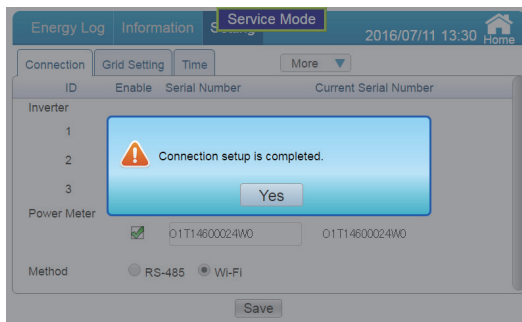
Input screen

[Confirm] button

- (5) Touch the number for the inverter to be replaced and the enabled power meter checkboxes, enable the checkboxes, and touch the [Save] button.
- (6) The settings complete dialog box will be displayed, so touch the [Yes] button.



connection setting screen



Settings complete dialog box

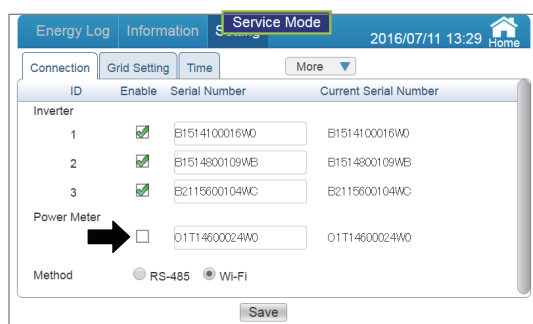
- (7) When the settings are complete, the "Home screen" will be displayed. As processing is implemented immediately after the settings are made, a "✗" icon is displayed, so check the following details 1 to 3 mins later.
- Check that the "✗" icon is not displayed on the home screen.
 - Check that the values for the generator power, power consumption, and feed-in/purchased electricity power icons have changed.
- (8) When the settings are complete, return to normal mode using "■Exiting service mode" (page 58).

[Initializing or Replacing the Power meter and the Wireless Communications Unit]

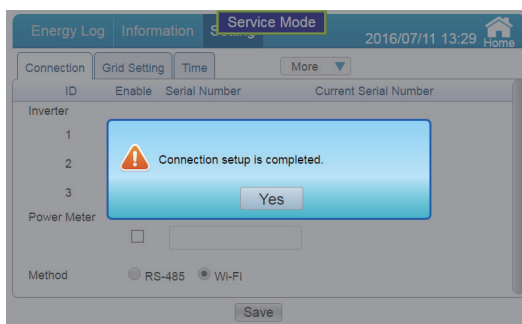
Make the settings as described below if replacing or initializing a malfunctioning wireless communications unit.

Unless you make the following settings, the power meter and wireless communications unit will not operate.

- (1) Turn OFF the breakers for the solar generator connected to the power meter.
- (2) Touch the number for the enabled power meter checkboxes, disable the checkboxes, and touch the [Save] button.



connection setting screen



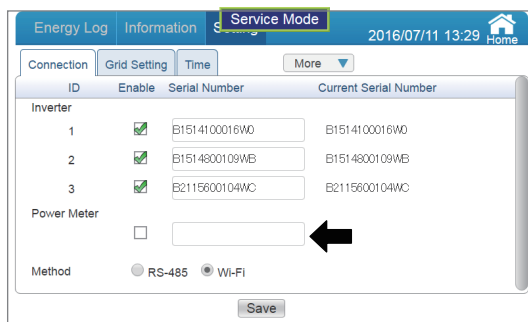
Settings complete dialog box

- (3) Initialize if replacing only the power meter. (Press and hold on page 56.)
- ※ If replacing both the power meter and wireless communications unit or the wireless communications unit only, initialization is unnecessary.

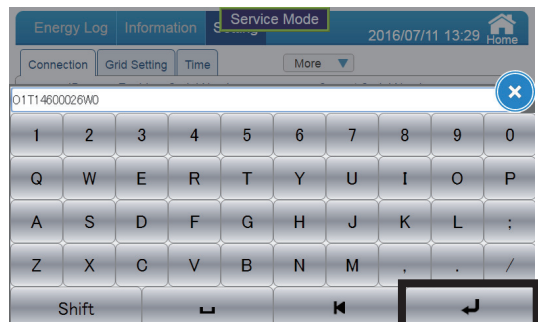
(4) Touch the frame for the serial number of the power meter. The keyboard will be displayed.

Enter the power meter serial number. After entering, touch the  button.

※ Use alphanumeric characters to enter the serial number. Not case sensitive.

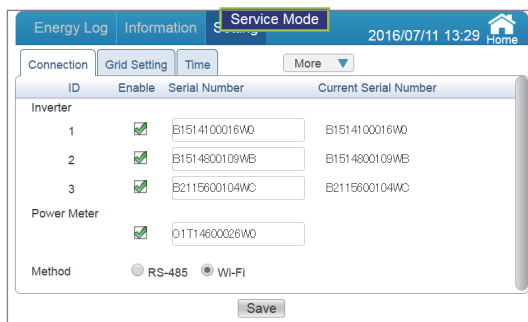


connection setting screen

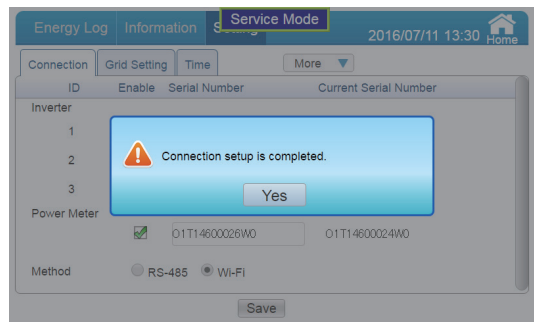


Input screen [Confirm] button

(5) Touch the checkbox for the replacement power meter to enable the checkbox, and touch the [Save] button. The settings complete dialog box will be displayed, so touch the [Yes] button.



connection setting screen



Settings complete dialog box

(6) When the settings are complete, the "Home screen" will be displayed.

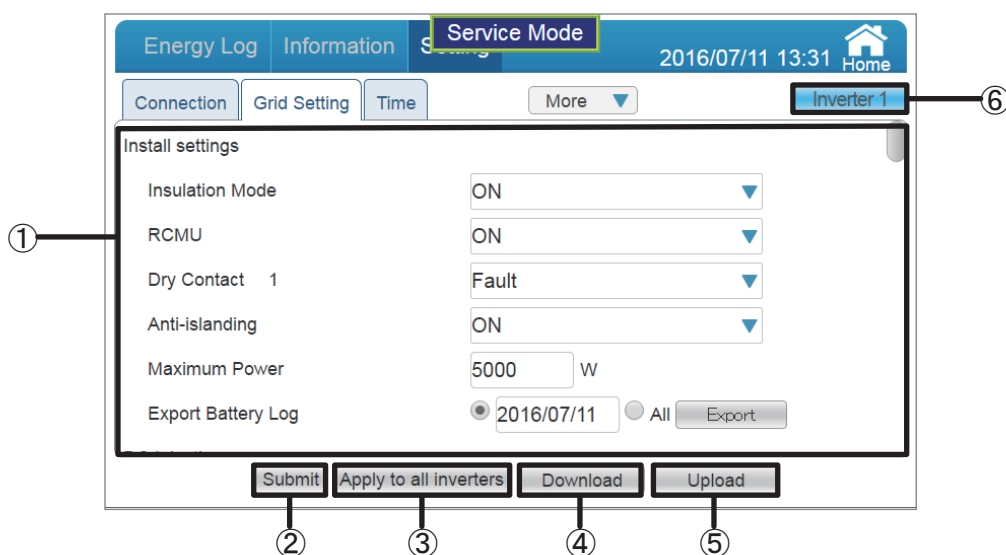
As processing is implemented immediately after the settings are made, a "❌" icon is displayed, so check the following details 1 to 3 minutes later.

- Check that the "❌" icon is not displayed on the home screen.
- Check that the values for the generator power, power consumption, and feed-in/purchased electricity power icons have changed.

(7) When the settings are complete, return to normal mode using "Exiting service mode" (page 58).

(8) After the replacement is finished, turn ON the solar generator breakers.

■ Grid Setting



① Use service mode to set grid values.

For the details of grid values, see the inverter Operation and Installation Manual.
The grid setting page cannot be set in normal mode.

② **Submit**

Updates the settings for the selected inverter.

③ **Apply to all inverters**

Updates the settings for all the inverters.

④ **Download**

You can download the setting values for the selected inverter.

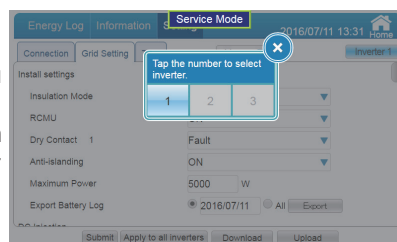
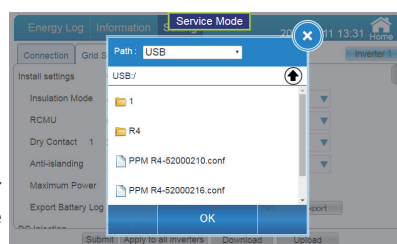
⑤ **Upload**

You can upload a file of the downloaded setting values.
※ If uploading, it is necessary to touch "Submit" or "Apply to all inverters" button at the end, or the changes will not be set to inverters.

⑥ **Inverter 1**

Displays the screen to select the inverter that you want to view.

Touch the button to display the inverter selection dialog box, and then touch the number of the inverter that you want to view.



● Operating method

- Touch **Setting** and then **Grid Setting** on the home screen.

■ Time

Energy Log Information **Service Mode** 2016/04/01 12:00 Home

Connection Grid Setting **Time** More ▾

Date 2016/04/01

Time 12 ▾ :00 ▾ :00 ▾

Time Synchronous

Enable ☐

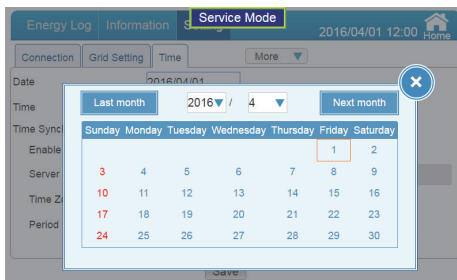
Server POOL.NTP.ORG

Time Zone GMT+8

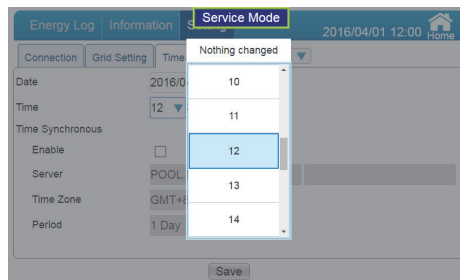
Period 1 Day

Save

- (1) Select the date frame. The date selection screen will be displayed.
Select the date that you want to set.
- (2) Touch the ▾ : ▾ : ▾ time frame for the time.
The time selection screen will be displayed. Select the time that you want to set.

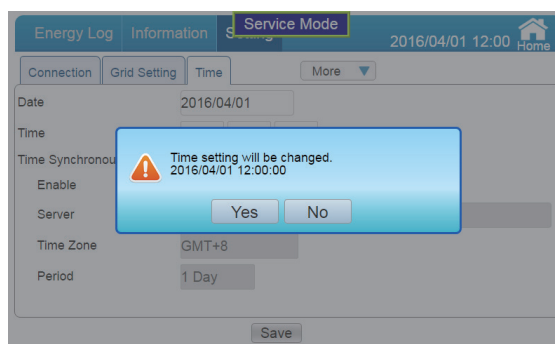


Date selection screen



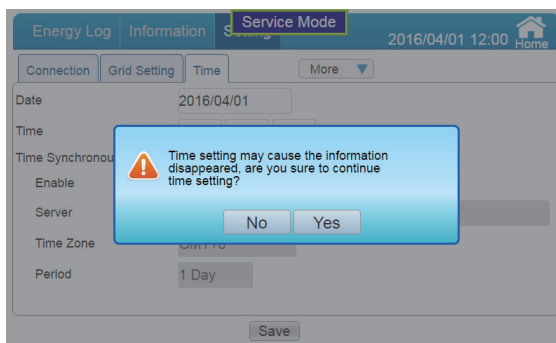
Time selection screen

- (3) Touch the button on the time selection screen.
The time change dialog box will be displayed.
Check the time, and touch the [Yes] button.



Time change dialog box

- (4) The time change dialog box will disappear, and the time change confirmation dialog box will be displayed.
Touch the [Yes] button once again.



Time change confirmation dialog box

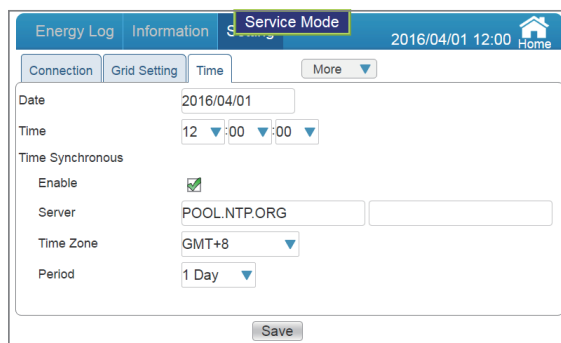
■ Time (Time Synchronous)

Enable : Click to enable time synchronization

Server : Fill in sever IP or URL which is going to perform time synchronization

Time Zone : Choose time zone

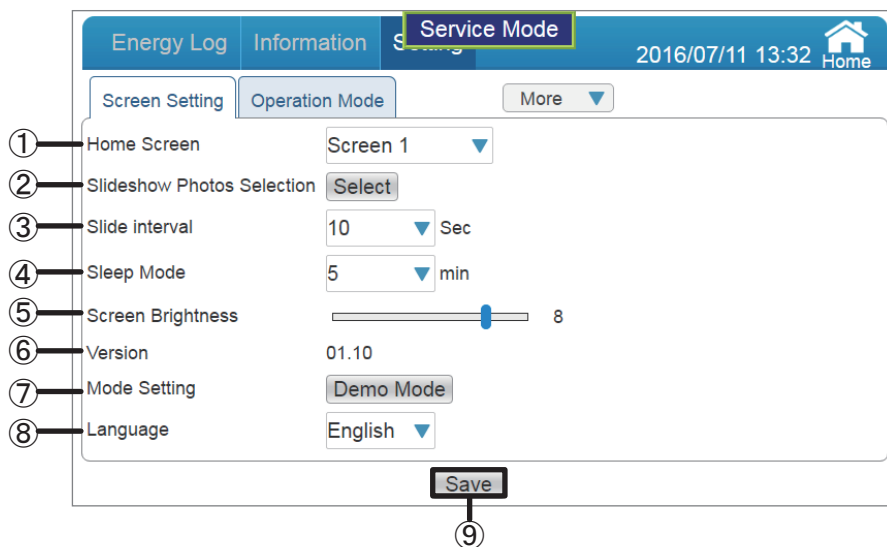
Period : Choose interval between each time synchronization



● Operating method

- Touch **Setting** and then **Time** on the home screen.

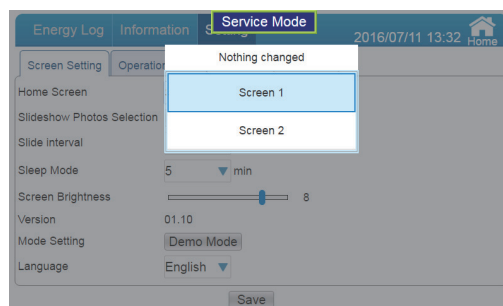
■ Screen setting



① Home screen

Touch the frame of the Home screen to select the Home screen.

Setting range: Screen 1 and Screen 2 (default setting is "Screen 1").



Home screen selection

② Slideshow photo selection

Files can be saved from USB memory onto the monitor.

Touch the frame of the Slideshow Photo Selection to display the Slideshow Photo Selection screen.

[Target selection]: Select the monitor or USB memory.

Contents: A directory of the file is displayed.

Maximum of 30 characters can be displayed as character display for the contents. Once the number of characters exceeds 30, the portion leading up to the valid characters is replaced by "...".

The directory of the file is displayed with maximum of 30 characters.

Once the number of characters exceeds 30, the portions following the valid characters are replaced by "...".

* It may take some time to display larger files.

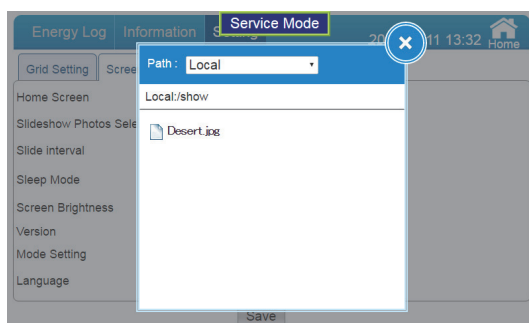
(The recommended image size is 800 x 480 pixels.)

* File names must be assigned in alphanumeric characters and the file formats must be JPG, JPEG, GIF or PNG.

Press the [Replace] button to select USB memory.

Select a folder and touch this button to store the file in the "show" folder in the monitor.

[x]: Touching this closes the dialog window.



Folder Selection screen

③ Slide interval

The screen switching time of the slideshow can be set (5, 10, 20 and 30 seconds).

The default setting is 10 seconds.

* It may take some time to display larger files.

(The recommended image size is 800 x 480 pixels.)

Touching the screen while a slideshow is being played will terminate the slideshow and change the display to the Home screen.

If an error occurs, the slideshow terminates and Change the display to the Home screen.

④ Sleep mode

The duration of time with no operation until the liquid crystal display on the monitor is turned off can be set.

Setting range: 1, 2, 3, 4, 5, 10, 15, 20, 25 and 30 minutes

The default setting is 5 minutes.

Touching the screen while in the sleep mode will trigger the display of the screen.

Furthermore, when an error code is displayed, the screen is turned on and the display reverts to the Home screen.

⑤ Screen Brightness

The brightness of the screen can be selected in ten levels.

Setting range: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

The default setting is 8.

⑥ Version

The firmware version of the Power Monitor is displayed.

⑦ Demo Mode

This button is for demo mode. Do not click when actual use.

⑧ Language


The language of the Power Monitor can be selected.

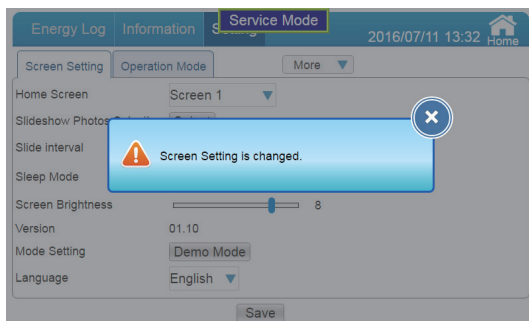
Setting range: English and Japanese.

⑨ **Save**

A change is confirmed.

* None of the settings will change until the “Save” button is touched at the end. Caution is required.

Touch  to turn off the dialog box.

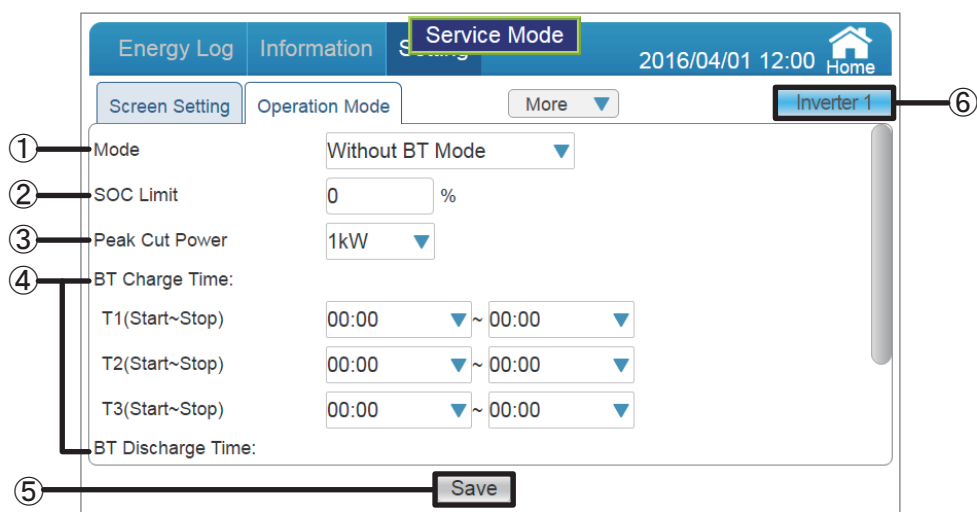


Screen Change dialog box

● Operating method

- In the Home screen, touch  →  .

■ Operation Mode



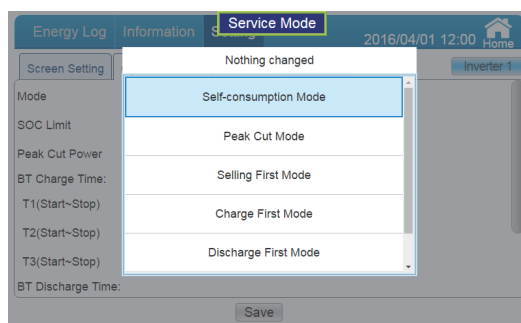
① Mode

Hybrid inverter has 6 normal operation modes for users to choose.

Each mode has different behavior between PV, battery, grid, and home load.

The following are the description of these modes.

In some area, the detail behavior of each operation mode may be different due to the local electricity regulations.



Mode selection

Self-consumption mode

Self-consumption mode is standard hybrid inverter mode.

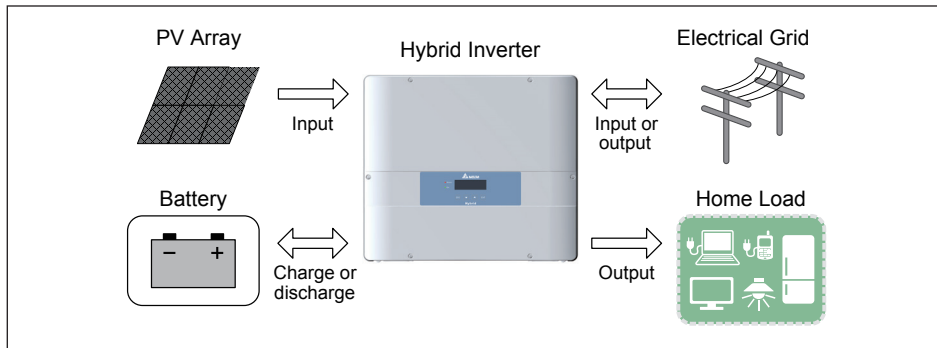
In this mode, PV power is supplied in following priority :

1. Supply for home load.
2. Charge the battery until it is full.
3. Feed-in the remaining power to grid.

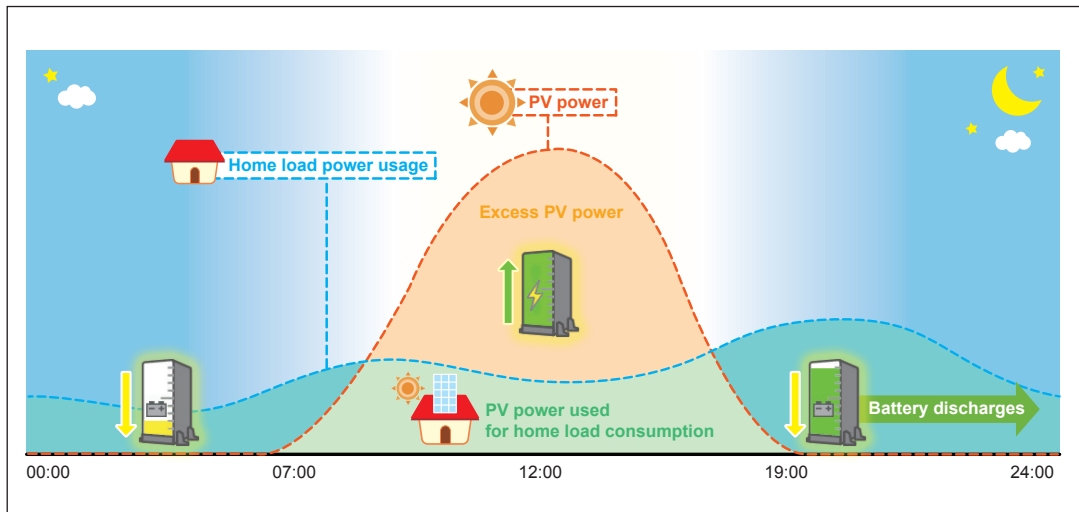
When there is no PV power, battery starts to discharge and supply home load until it's empty.

If you had set the time settings, the behavior of hybrid inverter will change.

We will explain it in Page 80.



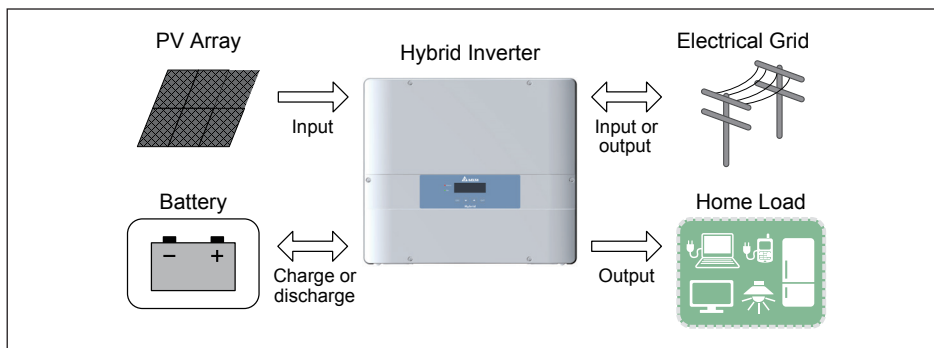
Self-consumption mode current flows



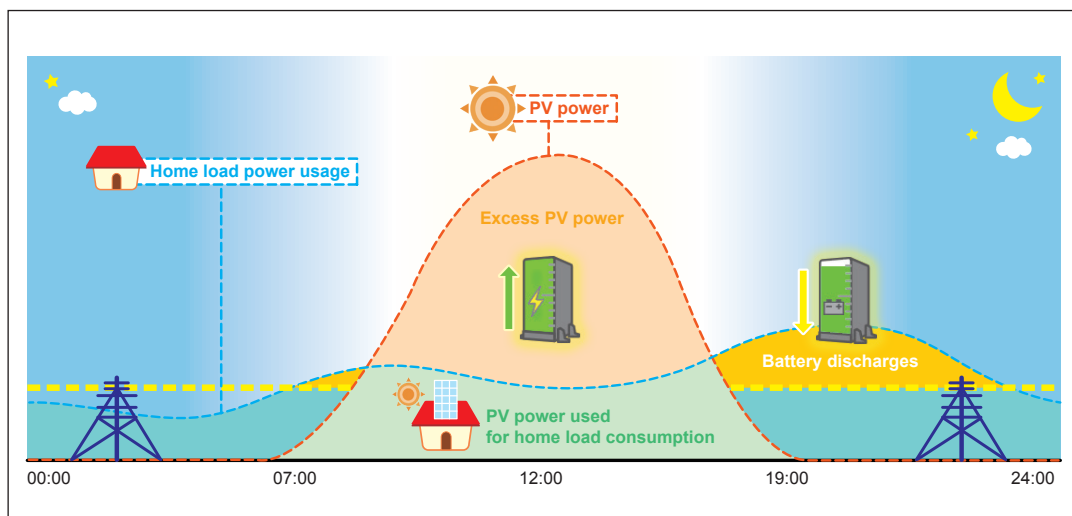
Self-consumption mode behavior

Peak cut mode

When home load consumption exceeds the Peak Cut Power you set in Function Setting page, battery will discharge to assist the power usage.



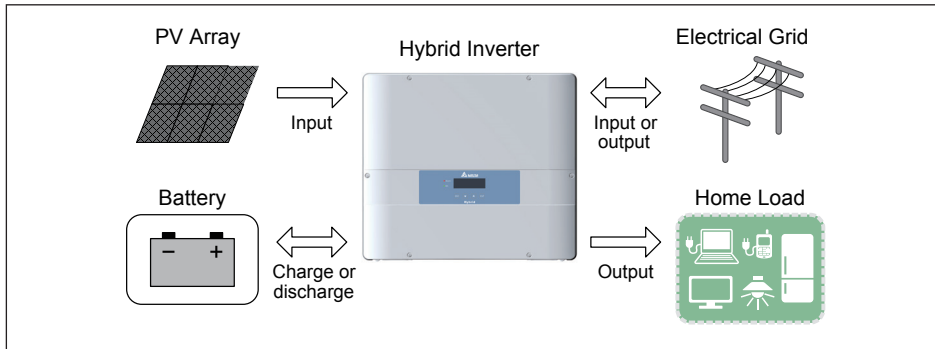
Peak cut mode current flows



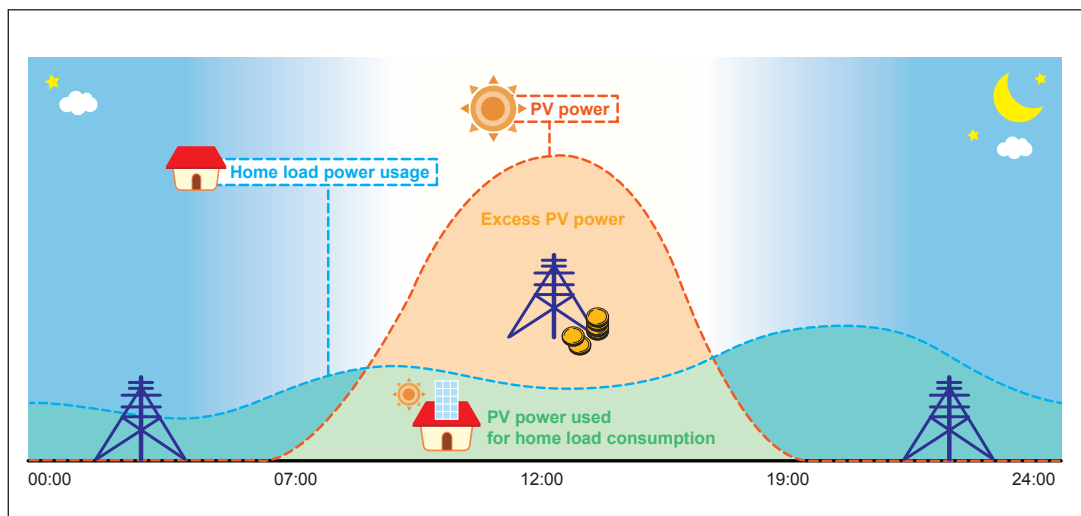
Peak cut mode behavior

Selling First mode

Selling first mode is a standard PV inverter mode combining with 6 time settings. In normal operation, power generated by PV array will all feed-in to home load and grid. If users have set the time settings, inverter will change behavior in these time intervals. Please refer to page 80 chapter for more detail about time settings.



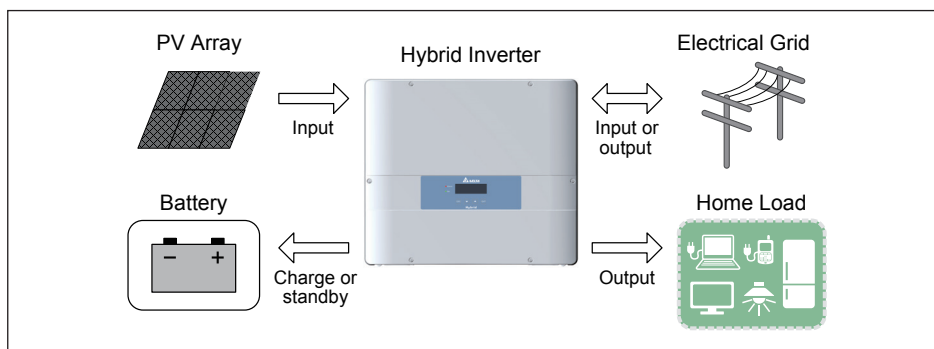
Selling first mode current flows



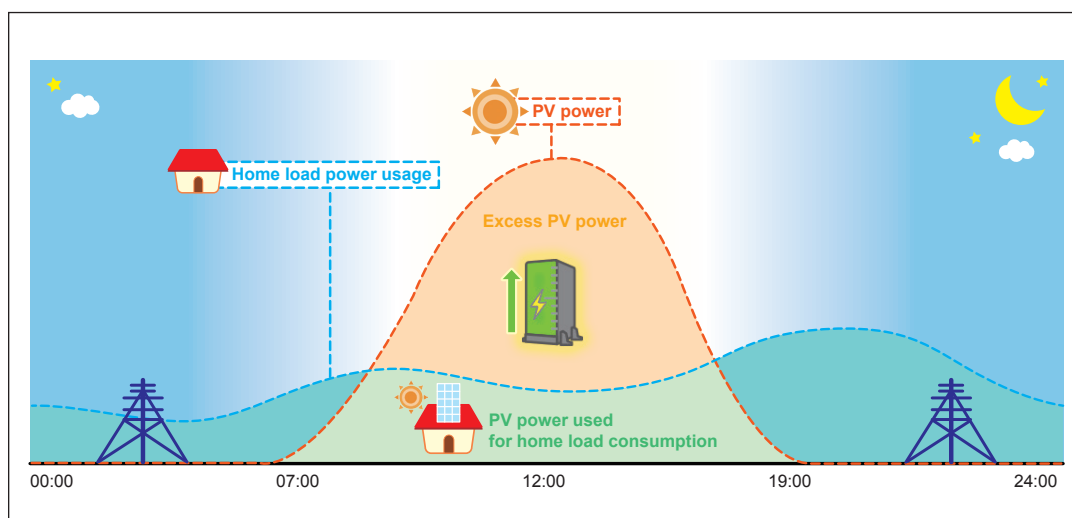
Selling first mode behavior

Charge first mode

In this mode, PV power is supplied for battery charging first. After battery is fully charged, the remaining PV power then feed-in to home load and grid. Battery will not discharge in this mode even if there is no PV power.



Charge first mode current flows

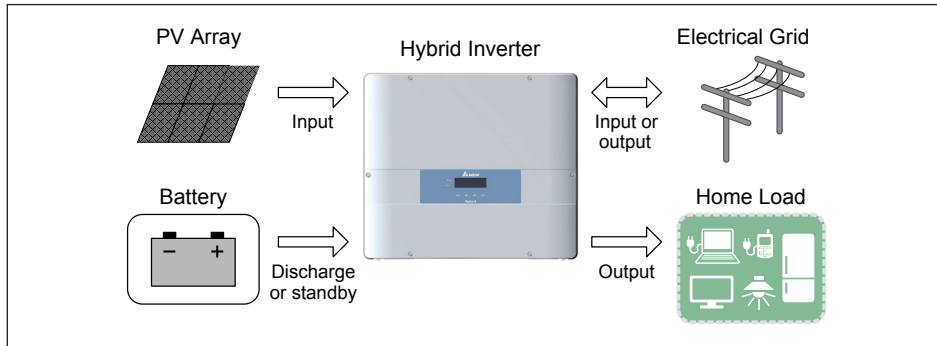


Charge first mode behavior

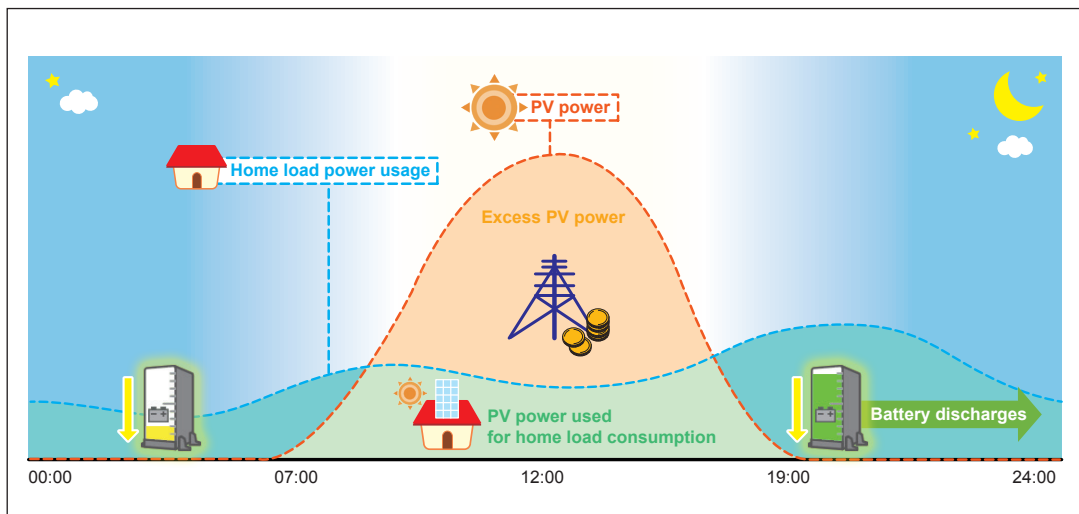
Discharge First mode

In this mode, battery will not be charged any more.

All the PV power is feed-in to home load and grid. Battery keeps discharging when there is no PV power until it is empty.



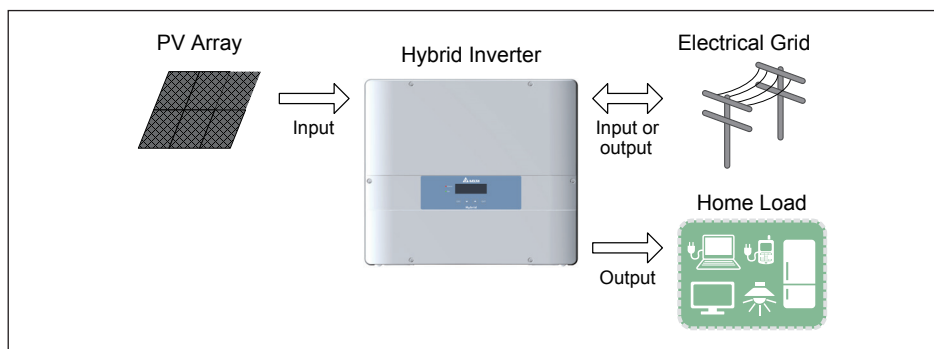
Discharge first mode current flows



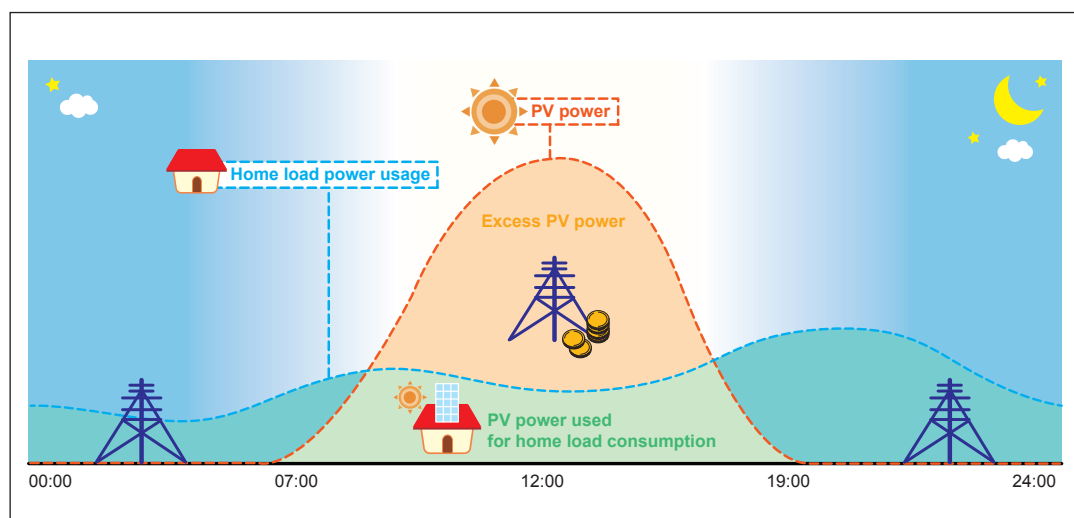
Discharge first mode behavior

Without BT mode

If your battery was damaged for some reason, you can disconnect the battery wiring and choose without BT mode. In this mode, hybrid inverter acts like a basic grid-tie PV inverter.



Without BT mode current flows



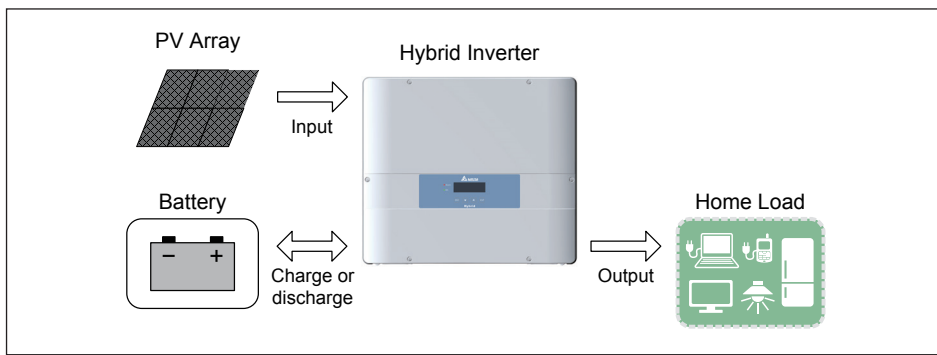
Without BT mode behavior

Special Modes

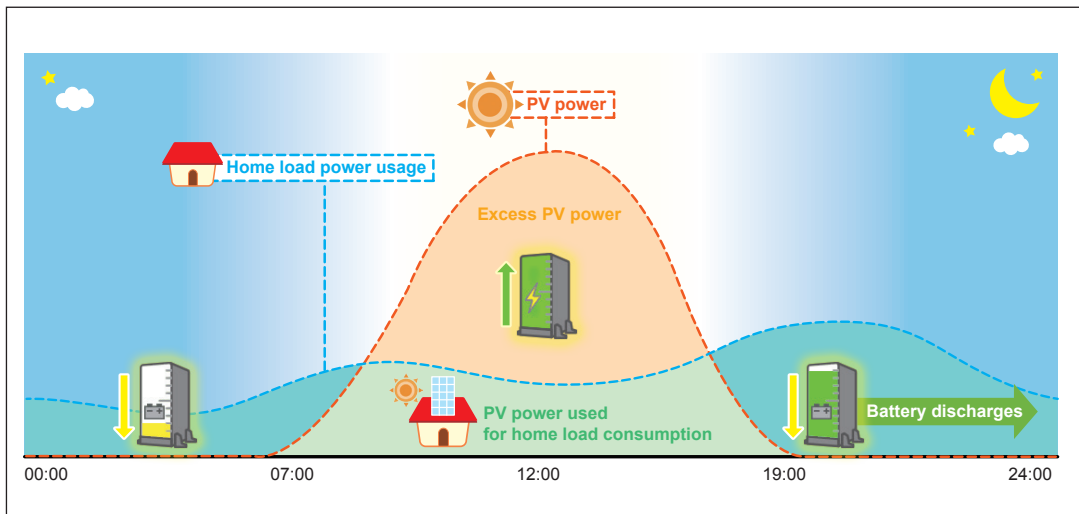
In addition to the 5 modes above, hybrid inverter still have 3 special modes. These modes cannot be enabled by user but will be enabled automatically by inverter in some special condition.

- Standalone mode

Hybrid inverter changes to standalone mode automatically during a power outage occur. At this time, grid side is disconnected by inverter and home load are supported by PV and battery power as much as possible. If the battery is not connected, only when there has sufficient PV power can inverter enter standalone mode.



Standalone mode current flows

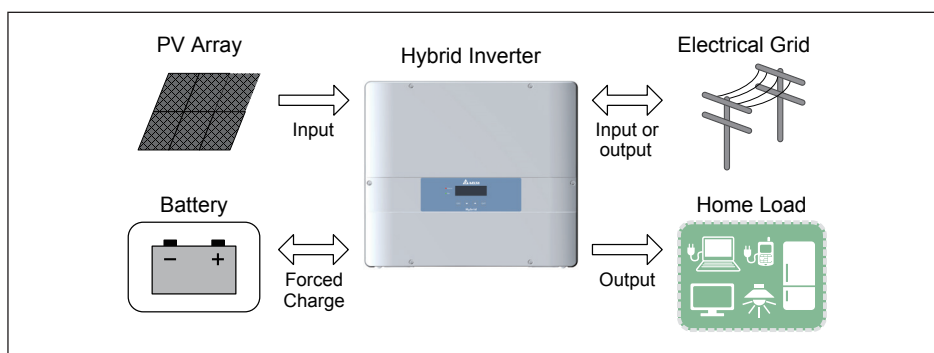


Standalone mode behavior

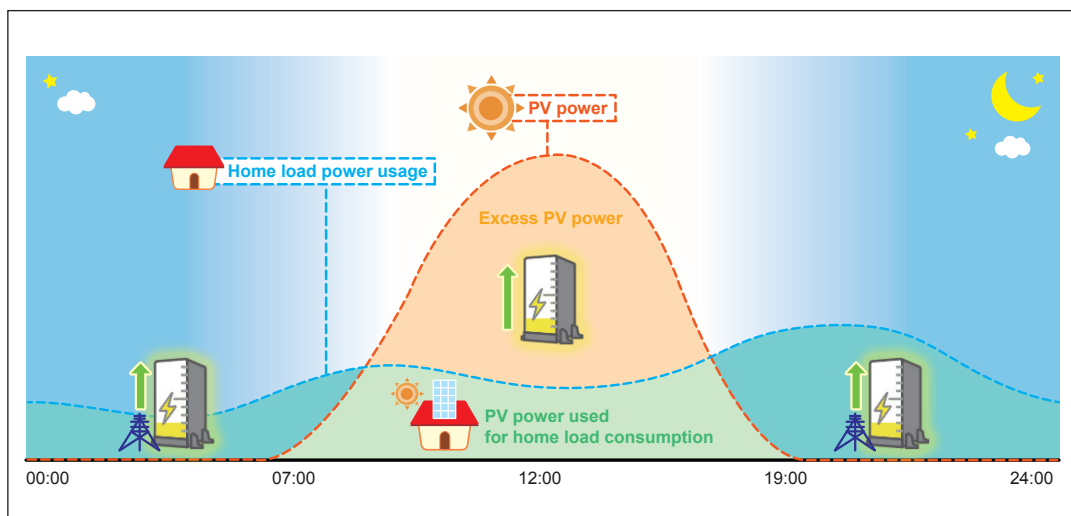
- Forced charge mode

Although battery stops any action when SOC (state of charge) reach 0%, the self-discharge phenomenon may still causing SOC lower than 0%.

At this time, hybrid inverter will force battery charging from PV power and grid power until the battery SOC reaching 30%. Only in this special condition will battery be charged by grid power. In normal operation mode, inverter only charges the battery by PV power.



Forced charge mode current flows



Forced charge mode behavior

② SOC Limit

You can assign the lower limit of battery SOC. Battery will stop discharging when its SOC reach this limit.

③ Peak Cut Power

Peak cut power is used in peak cut mode. You can assign the peak power of home load usage from grid. When the home load consumption exceeds this value, battery will discharge to supply remaining power.


④ Time Settings

Time settings can be separated into BT charge time and BT discharge time. Each setting can set 3 time intervals. These 6 time intervals cannot overlap with each other. When the inverter operation mode set to self-consumption or selling first mode, time settings is enabled. Hybrid inverter will automatically change the mode to charge first / discharge first in the time intervals you set and return to self-consumption / selling first mode outside the intervals.

⑤ Save

A change is confirmed.

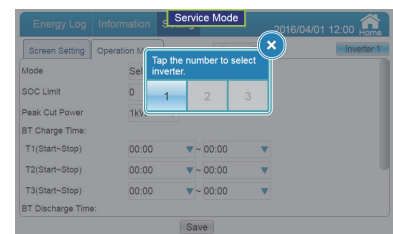
* None of the settings will change until the "Save" button is touched at the end. Caution is required.

Touch  to turn off the dialog box.

⑥ Inverter 1

A screen in which the desired Inverter can be selected is displayed.

Touch the button to display the Inverter Selection dialog box. Touch the No. of the desired Inverter.



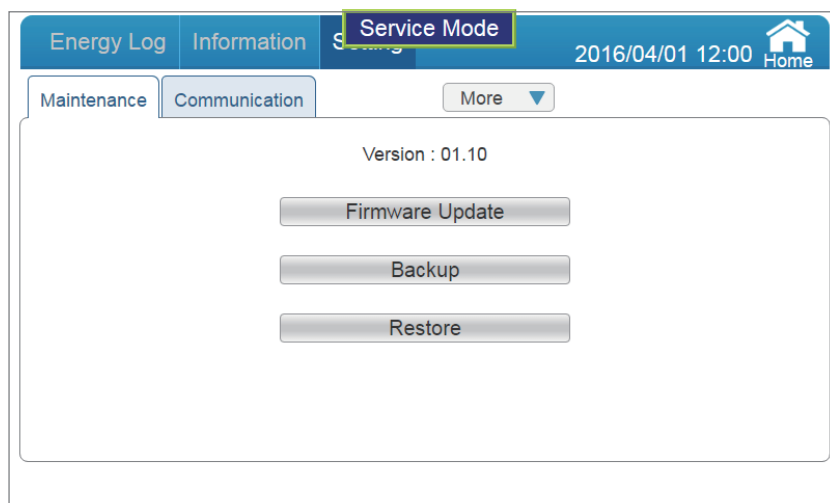
● Operating method

- In the Home screen, touch  → .

■ Maintenance

You can back up and restore data to the Power Monitor.

Not displayed in normal mode.



Firmware Update

For maintenance by Delta.

Backup

You can back up the data of the Power Monitor to USB.

Restore

Restores the backup data from USB to the Power Monitor.

■ Communication

Communication page is unnecessary to set. It is used to connect other devices by Ethernet.

The screenshot shows a web interface for 'Service Mode'. The top navigation bar includes 'Energy Log', 'Information', and 'Service Mode' (which is highlighted with a yellow box). The date and time '2016/04/01 12:00' and a 'Home' icon are on the right. Below the navigation bar, there are tabs for 'Maintenance' and 'Communication'. Under the 'Communication' tab, there are sub-tabs for 'SNMP', 'NMS', 'SNMPv3 USM', and 'Network Setting'. The 'SNMP' sub-tab is selected, showing a form with the following fields: 'SNMP' (set to 'Enable' via a dropdown), 'SNMP Port' (set to '161'), and 'Context Name' (an empty text box). A 'Save' button is located at the bottom of the form.

SNMP / NMS / SNMPv3 USM are protocols for other industry to use.

Network Setting Internet setting for the Power Monitor.
Need some knowledge of network management to setting.

■ Communication → Network Setting

① DHCP Client ☐ Enable ☒ Disable

② IP Address 192.168.180.31

③ Subnet Mask 255.255.252.0

④ Gateway IP 192.168.180.1

⑤ DNS 192.168.172.1 / 192.168.4.1

⑥ Search Domain DELTA

⑦ Host Name DELTA

⑧ Save

① DHCP Client

If connecting to the internet, this protocol automatically allocates the necessary information such as IP address, etc.

Select "Enable" to connect using suitable settings immediately without setting the network settings manually.

Select "Disable" to enable the following settings to be made.

② IP Address

Set the IP Address for the Power Monitor.

③ Subnet mask

The 32-bit value that defines the number of bits is used in the network address from the IP address header.

④ Gateway IP

Set gateway device IP to access internet.

⑤ DNS

Domain Name Server, which manages the corresponding relationships between the domain name, host name, and IP address.

⑥ Search Domain



The supplementary domain name when a suitable domain name is specified.

⑦ Host Name

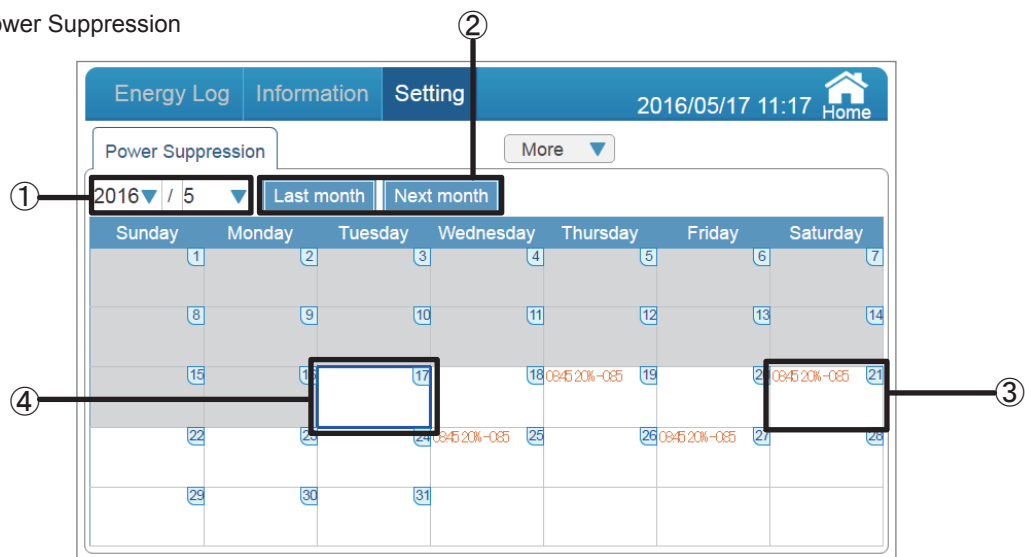
You can assign a suitable Power Monitor name.

The default value is DELTA. No particular settings are required.

⑧ Save

Touch the  button to save setting and display the dialog box, and then touch the  button.

■ Power Suppression

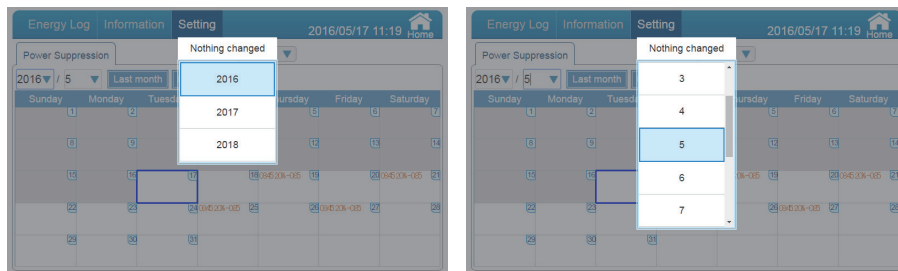


① Date

Year: Year is displayed according to the Gregorian calendar. The year can be changed with a touch.

Month: Month is displayed. The month can be changed with a touch.

Touching the “Nothing Changed” button will return to the Power Suppression screen.



② Last month

Change the display to the previous month.


Next month

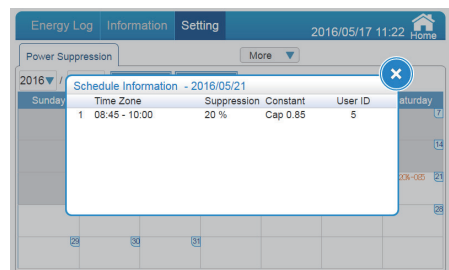
Change the display to the next month.

③ Suppression record

That displays the set of suppression details.

Touch on the desired date to display the Schedule Information for that day.

Touch  to revert to the Power Suppression screen.



④ Current day display

The current day is indicated by a blue frame. Past days are displayed in gray.

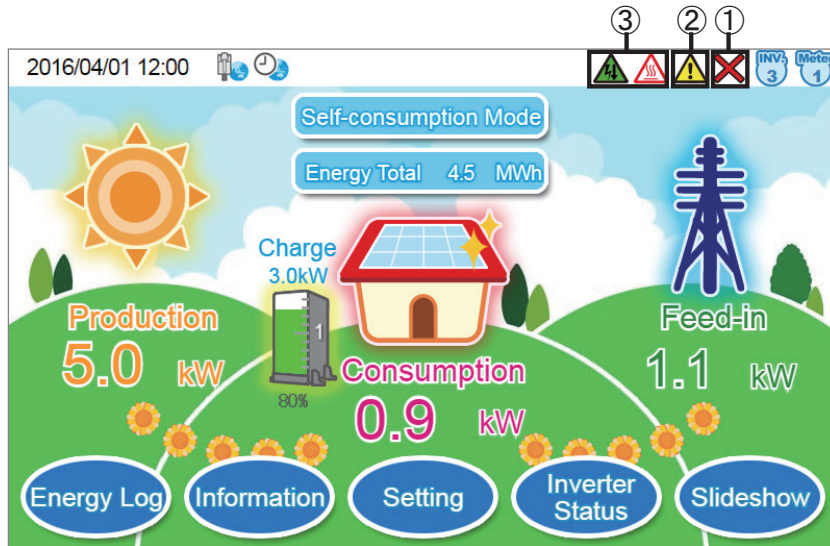
● Operating method

- Touch  and then  on the home screen.

7 .When Something Seems Wrong (Troubleshooting)

7.1.Error Displays

- Icons are displayed on the Home screen when an error, malfunction or suppression occurs.



① Communication Malfunction icon

This icon is displayed when the communication with the Inverter or the Meter is not available.

Icon	Operating mode	Description
	Communication malfunction	Communication with the Inverter or the Meter is malfunctioning.

② Error icon

An error icon is displayed to indicate that one or more errors are occurring.

The Error icon is ordinarily not displayed, and displayed when one or more errors occur.

Details can be verified in the “Error Events Log” and “Inverter Status” pages.

Refer to the Installation and Maintenance Manual of the Inverter for details on the error codes.

Energy Log Information Setting 2016/04/02 11:00 Home				
Inverter		Error Events Log		
Date	Inverter	Type	Code	Description
2016/03/31 10:18:37	1	Fault	GF60	PV1 Current Over Rating
2016/03/31 10:18:36	2	Fault	GF61	PV2 Current Over Rating
2016/03/31 09:22:35	3	Fault	GF62	PV3 Current Over Rating
2016/03/31 09:22:34	1	Fault	GF63	PV4 Current Over Rating
2016/03/31 09:22:33	2	Error	GE01	Over Frequency Range
2016/03/31 09:22:33	3	Error	GE02	Under Frequency Range
2016/03/31 09:22:32	1	Error	GE03	Anti_Passive
2016/03/31 09:22:31	2	Error	GE04	Anti_OFPR
2016/03/31 09:22:30	3	Error	GE05	Anti_UFR
2016/03/31 09:22:29	1	Error	GE10	Under Voltage Range (R Phase)
2016/03/31 09:22:28	2	Error	GE11	Over Voltage Range (R Phase)
2016/03/31 09:22:27	3	Error	GE14	LN_OVR



2016/04/01 12:00 Status of inverter			
No Grid Lock Grid Lock			
Id	Connection	Operation	Status
1	Successful	Connected	
2	Successful	Connected	GE5/GE10
3	Successful	Connected	

● Operating method

- In the Home screen, touch **Information** → **Error Events Log** and **Inverter Status**.
- Touch **Error Events Log** **All Inverters** and select the desired Inverter (**1** / **2** / **3** / **All Inverters**) to switch status screens of respective Inverters.

③ Suppression icon

Displayed when the Inverter is being suppressed.

Icon	Operating mode	Description
	Temperature elevation suppression	The internal temperature of the Inverter has reached a high level. The output of the Inverter is being suppressed.
	Voltage elevation suppression	The voltage of the commercial power system has reached a high level while the Inverter was in operation. The output of the Inverter is being suppressed.

The temperature elevation suppression and voltage elevation suppression are not due to malfunctions.

These are features available to ensure the safe operation of the system.

There is no malfunction with the system if the frequency is low or when they occur for brief intervals.

Consult your retailer if the frequency is high or when the system is not restored for a long period of time.

7.2.Troubleshooting


- Responsive actions that should be taken in cases where the following symptoms occur are described.

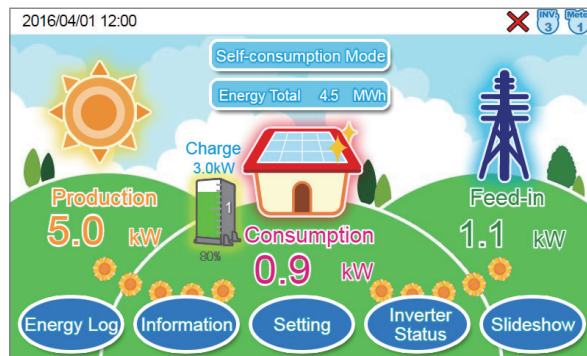
Symptom	Verification details	Responsive action
"Battery Under Voltage" appears in Error Events Log.	Since reversed wiring may cause battery voltage lower	Please check if wiring to the battery is reversed. If the issue cannot be cleared, please contact with local representative.
"Battery Communication Fail" appears in Error Events Log.	It means there is no communication between inverter and battery.	Please check communication status between inverter and battery. If there is no communication, check if communication wiring is reversed or unusual. If the issue cannot be cleared, please contact with local representative.
Nothing is displayed on the screen.	Is the backlight turned off?	Touching the screen will trigger the display of the screen. The duration of time the screen remains turned on can be changed in the Screen Setting. ⇒ "Screen Setting" (Page 68).
Nothing is displayed even when the screen is touched.	Has the AC Adapter come off the power outlet or the Power Monitor?	Connect the AC Adapter properly to the power outlet and to the Power Monitor. Contact your retailer if the symptom persists even after a proper connection has been established.
The screen is turned on when not in operation.	Is any error icon being displayed?	The screen is turned on and the error message is displayed automatically when a malfunction occurs. Verify the displayed error message. ⇒ Refer to the Installation and Maintenance Manual of the Inverter.
	Has any power failure occurred?	The Power Monitor restarts and the screen remains turned on for the duration of the set sleep time when the system is restored from a power failure condition after a power failure occurs.
AC Adapter is hot	How hot is it getting?	Heating does occur under normal circumstances while the system is in use. If the AC Adapter is so hot that you cannot touch it by hand, pull it off the power outlet and consult your retailer.
Total accumulated power of Inverter and the total accumulated amount of power on the Power Monitor vary.	Have you replaced the Inverter?	It is normal in the following case: The accumulated amount of power is accumulated for each Inverter and Power Monitor, respectively. Therefore, the values for the accumulated amount of power may be different on a Inverter and those displayed on a Power Monitor.
Voltage elevation suppression and temperature elevation suppression are displayed.	Verify the frequency and duration of occurrence.	The Voltage Elevation Suppression function and the Temperature Elevation Suppression function are functions that are triggered to ensure safe operation of the system. There is no malfunction with the system if the frequency is low or when they occur for brief intervals. Consult your retailer if the frequency is high or when the system is not restored for a long period of time.
Performance data is lost. Alternatively, the content of the performance data has changed.	Has the time been advanced or reverted by 15 minutes or more? Has there been any power failure?	The past performance data may be affected in instances where date/time settings are performed or when a power failure occurs.

Symptom	Verification details	Responsive action
The power display values appear to be incorrect. Alternatively, the values for the power generated, power consumption and power feed-in and purchase are not in the following relationship: Power consumed = (power generated - power sold) or Power consumed = (power generated + Power purchased)	Verify that the displayed power values are in accordance with the equations described to the left.	There are instances that the values do not necessarily match up with the values that can be derived with these equations, due to effects from the fluctuations that occur with the power generated or rounding up or off of the values and in such instances there is no malfunction with the Product. If the displayed power values are clearly wrong, there may be a system malfunction. Consult your retailer in such cases. There are some variances in measurement values.
The value of the power consumed displayed on the Home screen sometimes increases or decreases, even when the amount of electricity used remains constant.	Has the value of the power generated changed?	The value displayed as power consumption may be greater (or smaller) than the actual value when there is fluctuation with sunshine or the like. This arises from the difference in the timing of data acquisition for the power generation and the power purchase and is not due to a malfunction of the Product.
The amounts of power sold and purchased differ from those described in the statement of the power company.	Verify the amount of power being displayed.	There may be discrepancy between the amount described in the statement of the power company and the amount of power displayed due to following types of errors. If the discrepancy is significant, consult your retailer. (1) Error in measurement: The error arising from the fact that the instrument used by the power company for the purpose of calculating the amount of power purchased is not a specified measuring instrument but instead it is another equipment. (2) Errors in calculation: The error arising from rounding up or rounding off of figures in the calculation and display process of the Power Monitor.
Display (time and amount of power generated) does not change.	Verify the radio wave status of the Power Monitor.	Install the Power Monitor in a location with good communication conditions when the Communication Malfunction icon is displayed.
Communication Malfunction icon is displayed. Wireless communication is not available.	Is there any obstruction in the surrounding area or is the installed location far away?	The communication between the Power Monitor and a Inverter or a Meter is in an abnormal condition when the Communication Malfunction icon is displayed. Consult your retailer.
The Operation LED lamp does not turn on when the USB Wireless Module is inserted in the Power Monitor.	Has the AC Adapter come off the power outlet or the Power Monitor?	Connect the AC Adapter properly to the power outlet and to the Power Monitor. Contact your retailer if the symptom persists even after a proper connection has been established.
The Wireless Setting lamp of the Meter is illuminated red.	Is there an icon, such as an Error icon displayed on the Power Monitor?	Install the Power Monitor in a location with good communication conditions when the Communication Malfunction icon is displayed.
The Wireless Setting lamp of the Meter is blinking green.	Is there an icon, such as an Error icon displayed on the Power Monitor?	Install the Power Monitor in a location with good communication conditions when the Communication Malfunction icon is displayed. Verify the connection if the Communication Malfunction icon is not displayed.

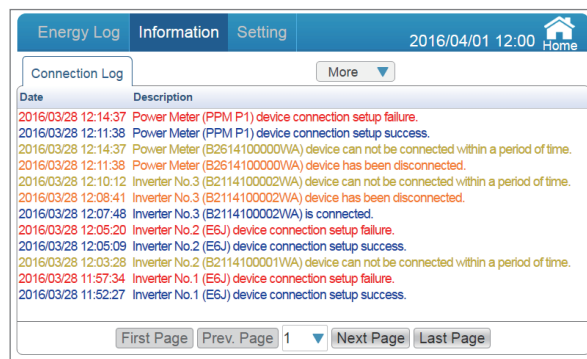
7.3. Wireless Communications Problems

Normally, if wireless communications are disabled for some reason, repeat connections are remade automatically, but if no connection is made even after a long time has elapsed, respond as described below.

- If the communications error icon [] is displayed on the home screen, a communications error between the inverter and the Power meter will be displayed.



- Touch the  button and then the  button on the home screen to check the device connection statuses.



■ If "XXXXXXX device connection setting failed" is displayed in the connections log explanation

● If "Power meter (model/serial number) connection setting failed" is displayed

No.	Cause	Measures
1	The communications status icon is not displayed on the power monitor	Check that the USB wireless module has not been disconnected. If unplugging and reinserting the cable does not resolve the error, contact your dealer.
2	Has the wireless communications unit antenna been disconnected?	Check that the wireless communications unit antenna is mounted correctly. Move the power monitor to a site where signals from the wireless communications unit and inverter wireless communications unit can reach.
3	Is the Power meter operations LED lamp flashing red, or the wireless communications unit operation LED lamp OFF?	Check that the Power meter and wireless communications unit are installed correctly.
4	Is the wireless communications unit operations LED lamp flashing red or lit red?	Reset the wireless communications unit as described in 5.3. Reset Method (page 56).
5	Was the incorrect serial number entered into the power monitor?	Check the serial number, and reenter correctly.
6	Is the device installation site too far away?	Check that the wireless communications unit antenna is mounted correctly. Move the power monitor to a site where signals from the wireless communications unit can reach.
7	Are there any obstacles between the devices?	Check that the wireless communications unit antenna is mounted correctly. Check that the wireless communications unit antenna is mounted correctly. Move the power monitor to a site where signals from the wireless communications unit can reach without obstacles.

- If "Inverter (model/serial number) connection setting failed" is displayed

No.	Cause	Measures
1	The communications status icon is not displayed on the power monitor.	Check that the USB wireless module has not been disconnected. If unplugging and reinserting the cable does not resolve the error, contact your dealer.
2	Has the inverter wireless communications unit antenna been disconnected?	Check that the inverter wireless communications unit antenna is mounted correctly. Move the power monitor to a site where signals from the wireless communications unit and inverter wireless communications unit can reach.
3	Defective connection between the power conditioner and inverter wireless communications unit.	Check that the inverter wireless communications unit is installed correctly. Turn OFF the inverter's DC switches and solar generator breakers, turn OFF the operations switch, wait a little while, and then turn ON the DC switches and solar generator breakers, and restart the power converter.
4	Was the incorrect serial number entered into the power monitor?	Check the serial number, and reenter correctly.
5	Is the device installation site too far away?	Check that the inverter wireless communications unit antenna is mounted correctly. Move the power monitor to a site where signals from the inverter wireless communications unit can reach.
6	Are there any obstacles between the devices?	Check that the inverter wireless communications unit antenna is mounted correctly. Move the power monitor to a site where signals from the inverter wireless communications unit can reach without obstacles.

- If "Disconnected from XXXXXXXX device" or "XXXXXXX device unable to connect within set time" is displayed in the connections log explanation.

- If "Power meter (model/serial number" is disconnected" or "Power meter (model/serial number) unable to connect within set time" is displayed.

No.	Measures
1	Move the power monitor to a site where signals from the wireless communications unit can reach.
2	Check that the wireless communications unit antenna is mounted correctly. Move the power monitor to a site where signals from the wireless communications unit can reach.
3	Check whether the operations LED lamp on the wireless communications unit is ON. If it is OFF, reset the wireless communications unit as described in 5.3. Reset Method (page 56).
4	Turn OFF and ON again the power meter power supply.

- If "Inverter (model/serial number" is disconnected" or "Inverter (model/serial number) unable to connect within set time" is displayed.

No.	Measures
1	Move the power monitor to a site where signals from the inverter wireless communications unit can reach.
2	Check that the inverter wireless communications unit antenna is mounted correctly. Move the power monitor to a site where signals from the inverter wireless communications unit can reach.
3	Check the IP address using the method for checking the inverter IP address. Or, if the IP address is incorrect, initialize the inverter wireless communications unit.
4	Turn OFF the inverter's DC switches and solar generator breakers, turn OFF the operations switch, wait a little while, then turn ON the DC switches and solar generator breakers, and restart the power converter.

