M0009015B

SANUPS

PV Monitor

USER GUIDE



SANYO DENKI

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(4) Before using this product, be sure you have read this instruction manual thoroughly and understand how to operate this product. SANYO DENKI will not be liable for any consequences resulting from the improper use of this product.

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1. Introduction

1.1 Overview

The SANUPS PV Monitor then monitors the state and measurements of the PV inverter. It detects changes in the state of the PV inverter.

If the SANUPS PV Monitor is connected to a network, you can use a Web browser or similar tool to check, the state and measurements of a PV inverter, as well as the SANUPS PV Monitor settings via the network.

There are two communication systems in the SANUPS PV Monitor depending on the communication protocol.

The communication system can be switched with a DIP switch on the SANUPS PV Monitor.

Refer to the PV inverter specifications to check which communication system to use.

(1) System using SANYO DENKI original communication protocol (referred to below as **SANUPS PV communication protocol**)
In this system, you connect the SANUPS PV Monitor to a SANYO DENKI PV inverter with an RS-485 communication cable.

(2) System using Modbus/JBUScommunication protocol (*1) (referred to below as **Modbus/JBUS communication protocol**)
In this system, you connect the SANUPS PV Monitor to devices which are compatible with Modbus/JBUS communication protocol (SANYO DENKI PV inverter and measuring instruments available on the market) with an RS-485 communication cable.

(*1) When you use Modbus/JBUS communication protocol, the SANUPS PV Monitor will be a master and collect data from the connected device by polling processing.

1.2 Conventions Used in This Manual

The factory default setting of the SANUPS PV Monitor is indicated as **default**.

Internet Explorer is indicated as a **browser** or **Web browser**.

A solar power system inverter is indicated as a **PV inverter**.

A unit which is connected to the SANUPS PV Monitor with RS-485 communication cable is indicated as a **connected equipment**.

If you use Modbus/JBUS communication protocol and encounter a word PV inverter in the text below, read it as a connected equipment.

1.3 Main Functions of the SANUPS PV Monitor

(3) Remote administration

You can use a Web browser or a Telnet/SSH client to manage the SANUPS PV Monitor from a computer on the network.

For security, the SANUPS PV Monitor authenticates **user name** and **password** when it is accessd from the network. Also, if an SSH client is used, data travelling on the network is encrypted so that unauthorized access can be prevented.

(4) PV inverter state/measurement monitoring

This function monitors the state/measurements of a PV inverter. You can check the state of the solar power system by looking at the power generation diagram, trend graph, and state/measurements display.

(5) Email monitoring

This function can notify you by email of any changes in the state of a PV inverter, such as a PV inverter malfunction.

Also, by requesting via email, you can get information about PV inverter state/measurements, SANUPS PV Monitor settings, and event logs.

(6) SNMP agent support

The SANUPS PV Monitor supports SNMP agent (SANYO DENKI private MIB). This means you can use the SNMP Manager to monitor PV inverters.

(7) FTP server support

The SANUPS PV Monitor provides 10-minute averages and 1-hour averages from main measurements that are monitored. A maximum of 42 days of the data summary can be kept, which can be obtained from an FTP client.

(8) Recording PV inverter operation

The SANUPS PV Monitor records changes in the states of PV inverters, such as start, stop, and malfunction. It also records other information such as access to the SANUPS PV Monitor. You can check this information from a remote computer.

(9) Downloading/uploading of SANUPS PV Monitor settings

You can download the SANUPS PV Monitor settings to a file. You can then upload the file to a backup SANUPS PV Monitor so that it can run using the same settings.

(10) Automatic clock adjustment in response to NTP (Network Time Protocol)

The clock in the SANUPS PV Monitor ca be set automatically with an NTP server.

(11) Automatic identification of transfer speed (100Mbps/10Mbps)

1.4 SANUPS PV Monitor Restriction

When the SANUPS PV Monitor starts monitoring PV inverters, it saves the state/measurements of the last 10 minutes obtained from a PV inverter to the volatile memory (RAM). If you turn off the SANUPS PV Monitor or reset it, this information will be lost.
This data is used to create data summary at 10-minute intervals (on the hour and every ten minutes afterwards), and is sent as an attachment to an email when a PV inverter malfunction occurs. However, the 10-minute data summaries created are saved to the nonvolatile memory (ROM) and so will not be lost when you turn off the SANUPS PV Monitor or reset it.

1.5 Required Software Programs

Use the following software programs to change the SANUPS PV Monitor settings.

[Web browser supporting Java]

To manage the SANUPS PV Monitor from a Web browser, you need to use Java applets.

Operation of the following OS, Web browser, and JavaVM are guaranteed.

OS	**: Windows 7**
Web browser	**: Internet Explorer 8.0**
JavaVM	**: Sun Microsystems JRE 1.6.0_21**

* For details on how to set the JavaVM, see "Appendix B Read This Information When Using a Web Browser".

Use OS, Web browsers, and JavaVM other than the ones listed above at your own risk.

[Terminal program]

You can run a terminal program from a computer connected to the SANUPS PV Monitor's "Setting Connector" using an RS232C cable (*1).

For PC, you can use HyperTerminal, etc.

(*1) Use an RS232C cross cable (9-pin), available commercially.

[Telnet client]

You can connect a Telnet client to the SANUPS PV Monitor and then use its terminal function to manage the SANUPS PV Monitor.

[SSH client]

You can connect SSH to the SANUPS PV Monitor and then use its terminal function to manage the SANUPS PV Monitor.

SSH-compliant version: SSH 2.0

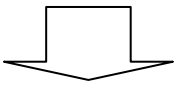
2. Preparation Before Monitoring

To monitor PV inverter, you need to set up the monitor. Also, you need to set the clock in the SANUPS PV Monitor to the correct time.

Follow the produre below.

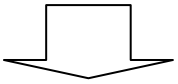
Step 1: Install and wire devices

For information on installation and connection of the SANUPS PV Monitor and PV inverters, refer to "7 Installing and Wiring the Unit" in the supplied "SANUPS PV Monitor Instruction Manual".



Step 2: Set IP address for the SANUPS PV Monitor

For information on how to set an IP address for the SANUPS PV Monitor, refer to "8 Setting up the SANUPS PV Monitor" in the accompanying "SANUPS PV Monitor Instruction Manual".



Step 3: Set the monitor and clock

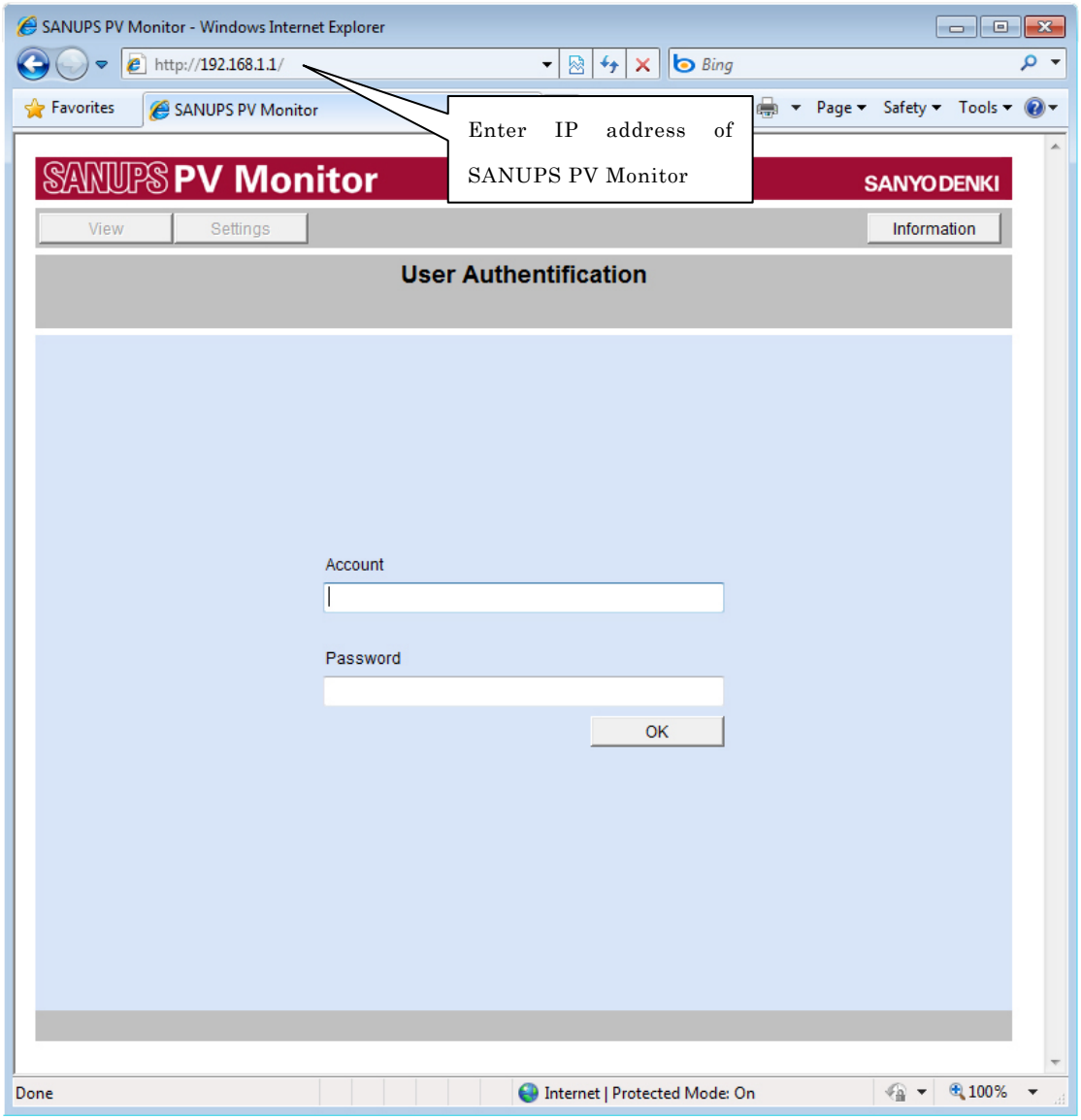
For information on how to set the monitor and clock, refer to "2.1 Accessing the SANUPS PV Monitor from the Browser", and "2.3 Setting the Clock in the SANUPS PV Monitor".
For the monitoring conditions, a screen to be displayed is different depending on the communication system. Refer to “2.2 Setting the Monitor (SANUPS PV communication protocol)” or “2.3 Setting the Monitor (Modbus/JBUS communication protocol)” to set up, depending on the protocol.

2.1 Accessing the SANUPS PV Monitor from the Browser

[1] Open the Web browser.

[2] Enter the IP address of the SANUPS PV Monitor in the address bar of the Web browser.

The user authentication screen appears in the Web browser.



[3] Enter the account information of the SANUPS PV Monitor.

You can log in using either of the following accounts.

Administrator: This account enables you to change and view all information.

Limited User : This account disables you to show and update the setting information of the PV Monitor.

Administrator account's default values:

Account name : **PvAdmin**

Password : **PvAdmin** (Input is case-sensitive.)

(Use single-byte characters in the input.)

Limited User account's default values:

Account name : **User**

Password : **User** (Input is case-sensitive.)

(Use single-byte characters in the input.)

When you enter the account information and click "OK", the SANUPS PV Monitor authenticates the user.

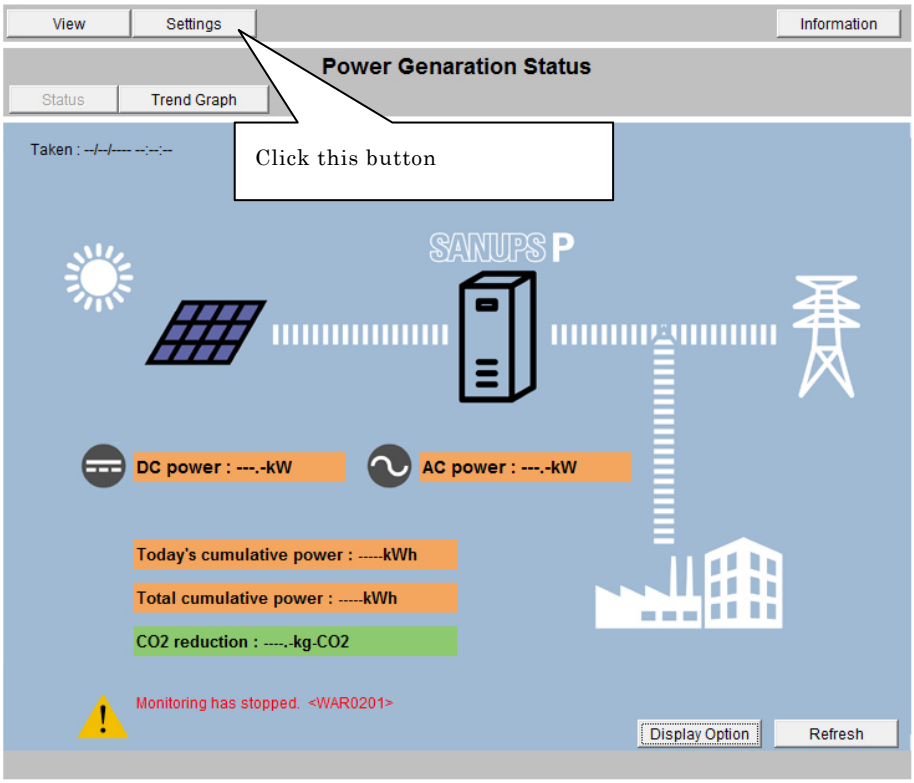
Once the user is authenticated, the main screen (Power Generation Status screen) appears and you can change the SANUPS PV Monitor settings.

<Note>

This account information can be changed. Refer to "3.7 Changing the Login Account of the SANUPS PV Monitor" and then change the account information.

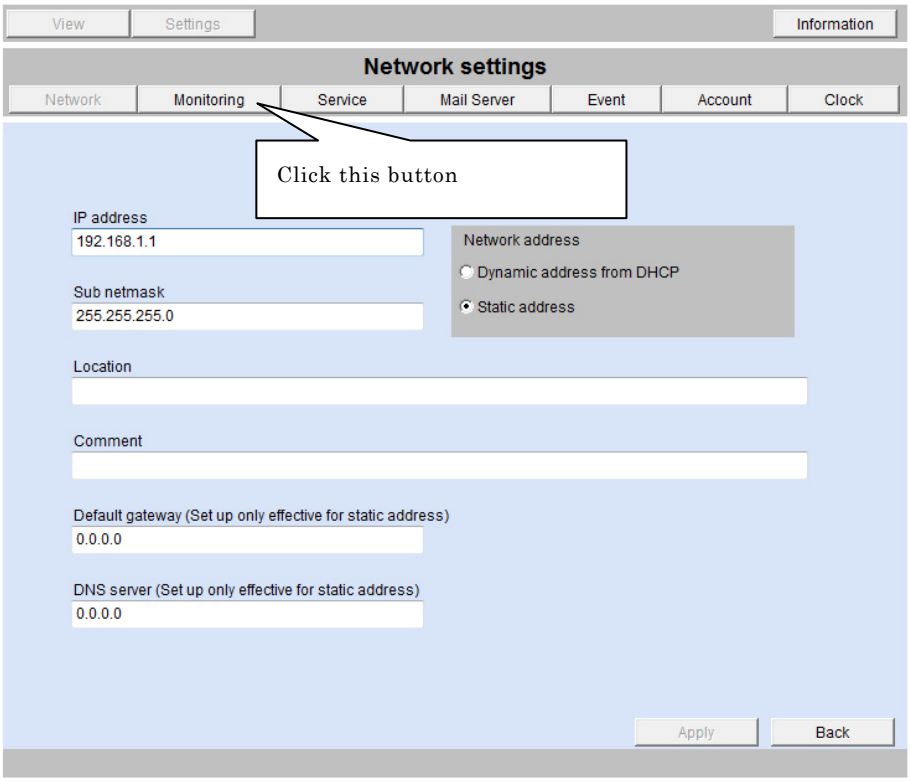
2.2 Setting the Monitor（SANUPS　PV Communication Protocol）

[1] Click “Settings” on the Power Generation Status screen.



[2] The Network Settings screen appears.

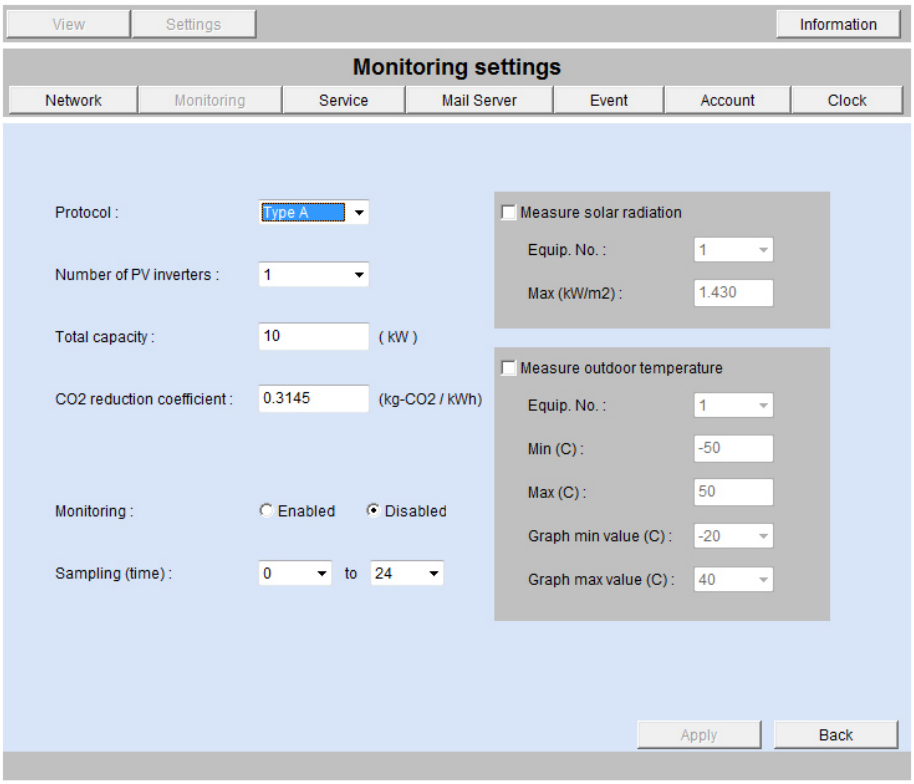
Click "Monitoring" on the Network Settings screen.



[3] The Monitoring Settings screen appears.

The default setting of the monitoring function of the SANUPS PV Monitor is “Disabled”.

After setting each parameter on this page, select the radio button “Enabled” (under “Monitoring”) and then click "Apply".



This screen enables you to specify how to obtain the states and measurements of PV inverters.

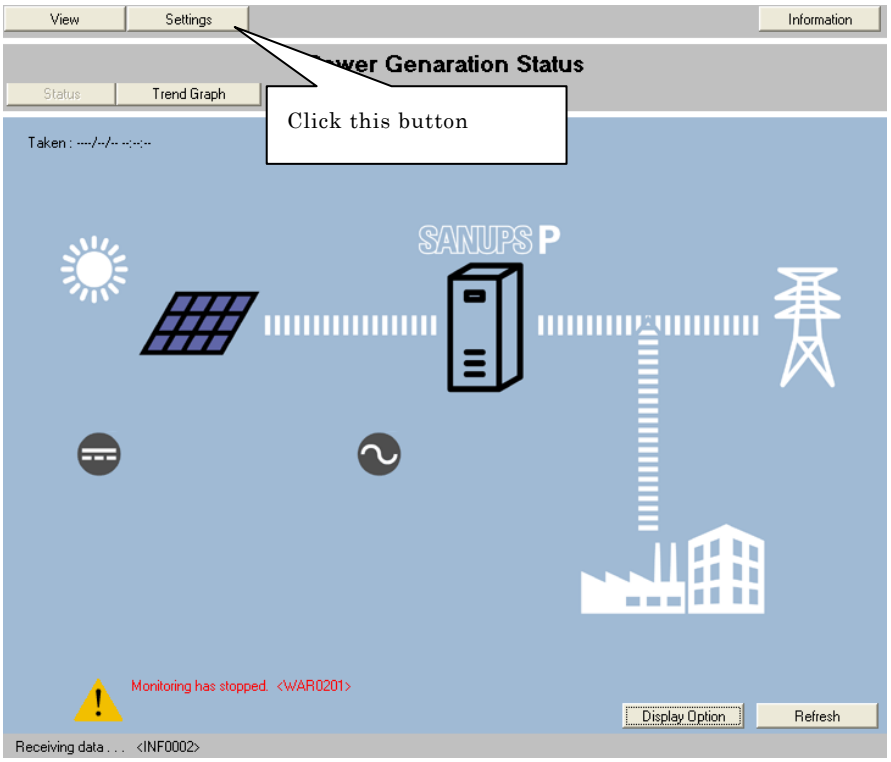
[Screen description]

Setting	Description	Default value
Protocol	Usually, select Type A. If normal communication is not possible when Type A is used, contact SANYO DENKI for assistance.	Type A
The number of PV inverters	Specify the number of the PV inverters that actually exist and are connected by the RS485 cable.	1
Total Capacity	Specify the total capacity of PV inverters that actually exist and are connected by the RS485 cable. For information on how to set the total capacity of PV inverters, read "Appendix F PV Inverter Device Capacity List".	10
CO2 reduction coefficien	Specify the amount of CO2 emitted from the solar battery when 1kWh electricity is generated. If you are not sure, keep it default setting.	0.3145

Setting	Description	Default value
Monitoring	Specify whether you want to enable or disable monitoring of PV inverters. If this setting is disabled, the states of PV inverters will not be monitored, and data summary will not be created either.	Disabled
Sampling(time)	Specify a duration for sampling, which will be used in creating a data summary. For example, if you specify the duration as being from 4:00 to 21:00, then sampling of measurements will start at the 4:00 and end at the 21:00; 10-minute averages and 1-hour averages of solar radiation, outdoor temperature, and AC power are collected and the data is saved in the SANUPS PV Monitor.	0:00 to 24:00
Solar radiation measurement conditions (Measure solar radiation, Equip. No, Max)	When measuring solar radiation, specify the device number of the PV inverter taking measurements and the maximum range of the actinometer.	Disabled
Outdoor temperature measurement conditions (Measure outdoor temperature, Equip. No, Min, Max, Graph min value, Graph max value)	When measuring outdoor temperature, specify the device number of the PV inverter taking measurements and the range (minimum and maximum values) of the thermometer. Also, specify the default scale of the trend graph.	Disabled

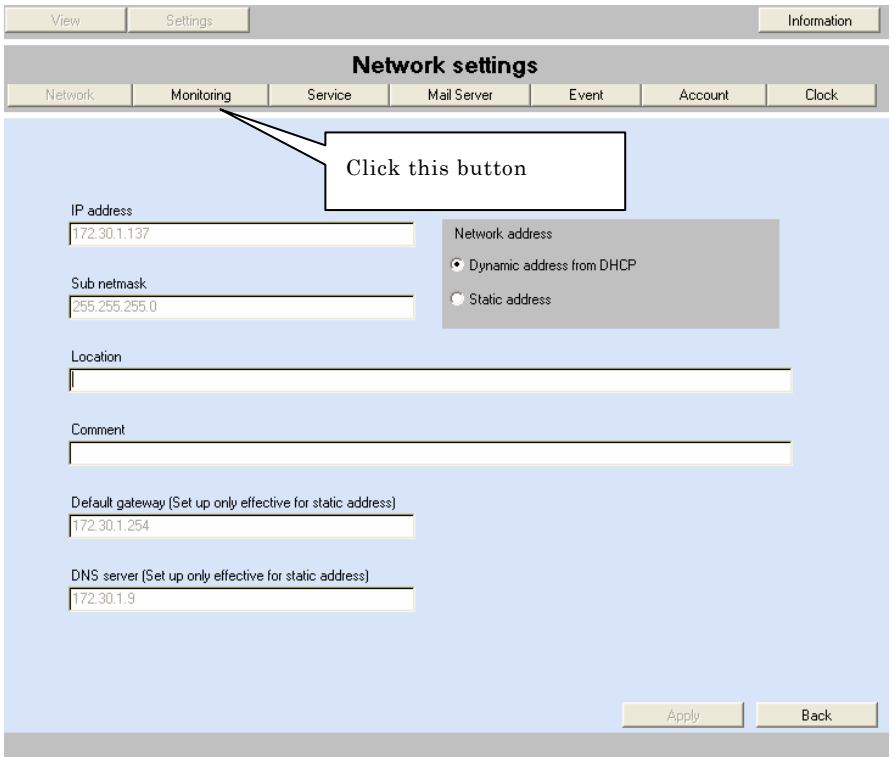
2.3 Setting the Monitor （Modbus/JBUS Communication Protocol）

[1] Click “Settings” on the Power Generation Status screen.



[2] The Network Settings screen appears.

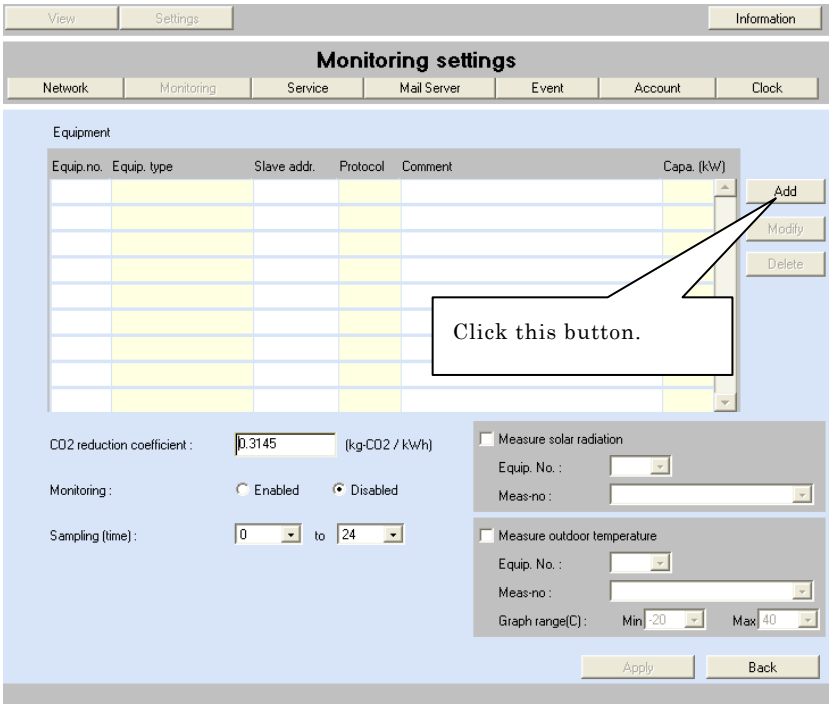
Click "Monitoring" on the Network Settings screen.



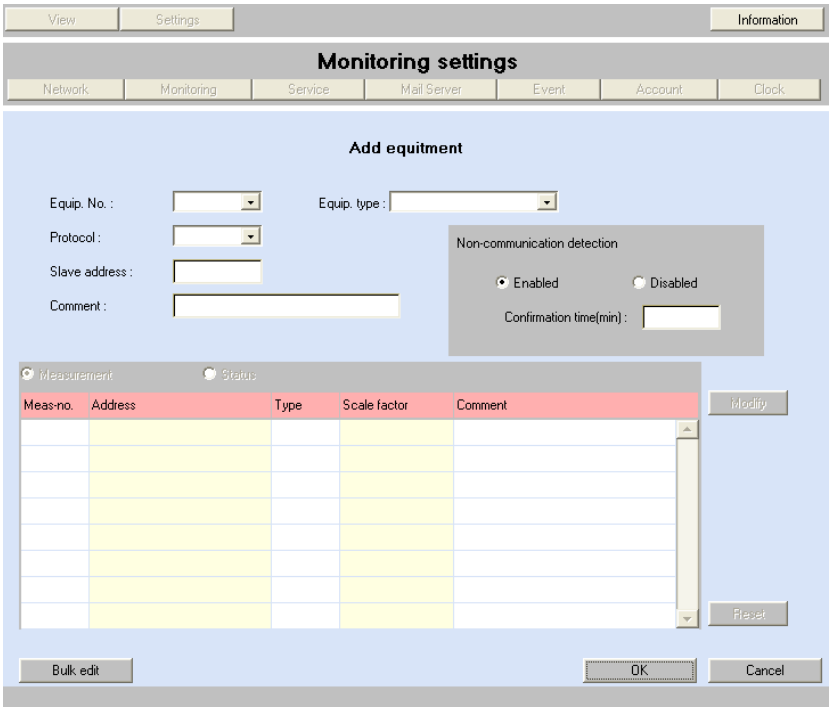
[3] The Monitoring Settings screen appears.

There is no connected equipment in the default setting when Modbus/JBUS communication protocol is used. First of all, you need to add connected equipment.

Click "Add" on the Monitoring Settings screen.



[4] The Add Equipment screen appears.

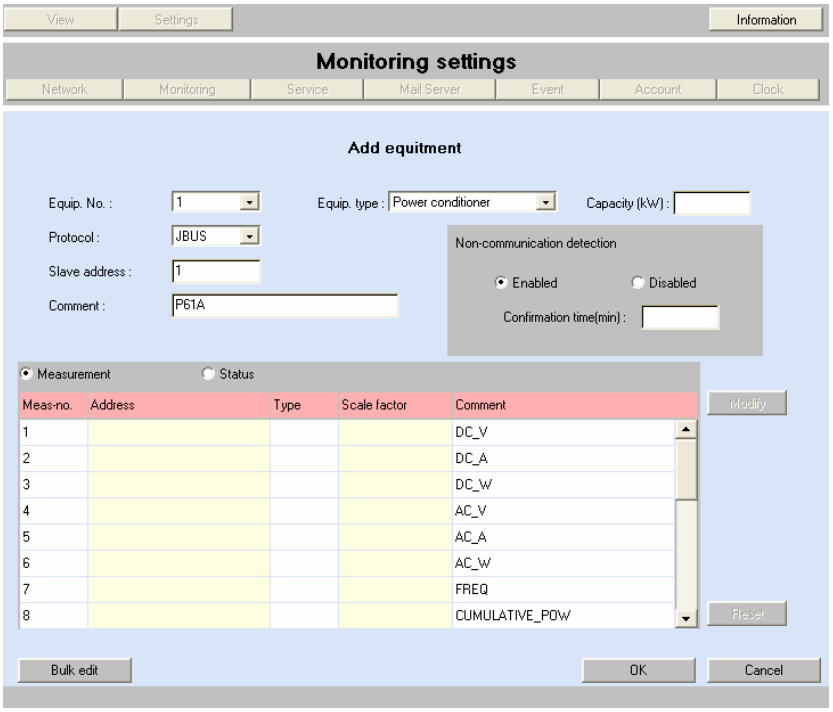


Specify communication conditions, measurement and status information of the connected equipment on this screen.

[Screen description]

Item	Description	Default value
Equip. No.	Specify the equipment no. of connected equipment. This is the number for the SANUPS PV Monitor to identify the equipment. Available number: 1－27	None
Equip. type	Specify the equipment type. You can select either PV inverter or measuring instrument.	None
Capacity(kW)	Specify the generation capacity by the PV inverter. This is indicated only when the equipment type is PV inverter. Available setting range: 1－999 (integer).	None
Protocol	Specify the communication protocol. You can select either Modbus or JBUS.	None
Slave address	Specify the slave address. Available setting range: 1－247	None
Comment	Specify any text to identify the equipment to be added (20 bytes maximum). The comment specified here is indicated in the equipment list on the Monitoring Seettings screen.	None
Non-communication detection (Enabled or disabled, confirmation time (min))	Specify whether to monitor with non-communication or not, and if yes, specify the confirmation time. Available setting range: 1－65535 (integer)	Enabled or disabled: Enabled Confirmation time : None

The screen below shows an example selecting “PV inverter” in the equip type.



[5] Setting measurement and status information

There are two ways to set up the measurement and status information.

(1) Using a template ※See (A) on page P13

(2) Setting each measurement and status information one by one

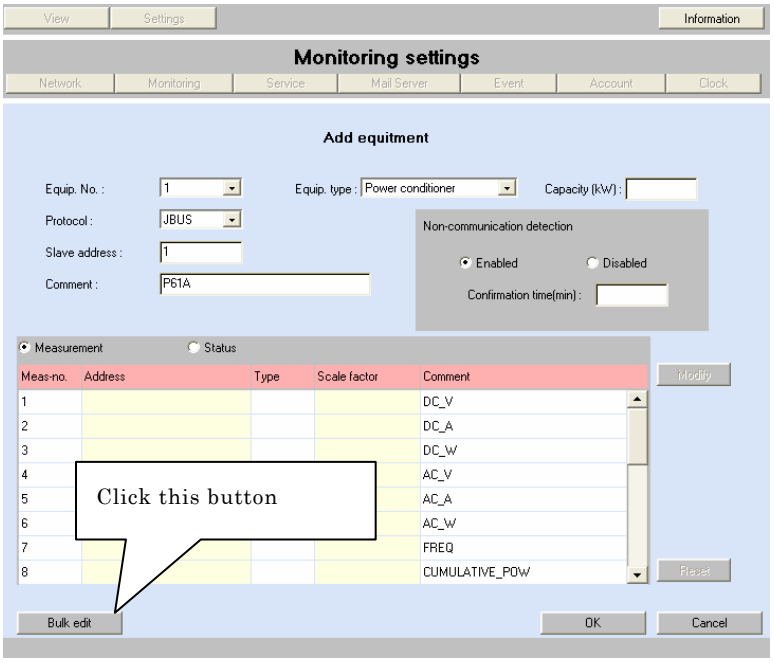
※See (B) on page P16

We are planning to place a template on our website. Contact us for details.

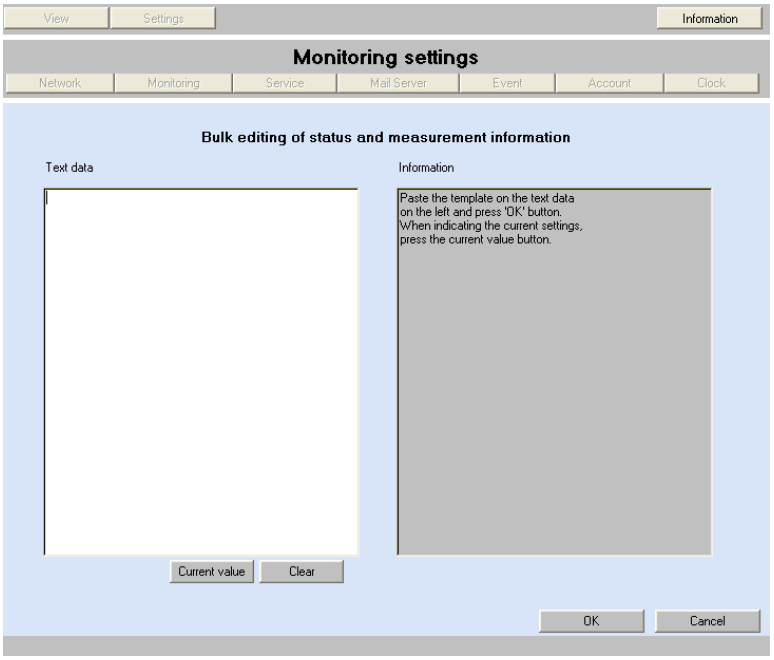
Application of measurement and status is defined in each number. Refer to "Appendix G Measurement and status information when using Modbus/JBUS communication protocol" for details.

(A) Using a template

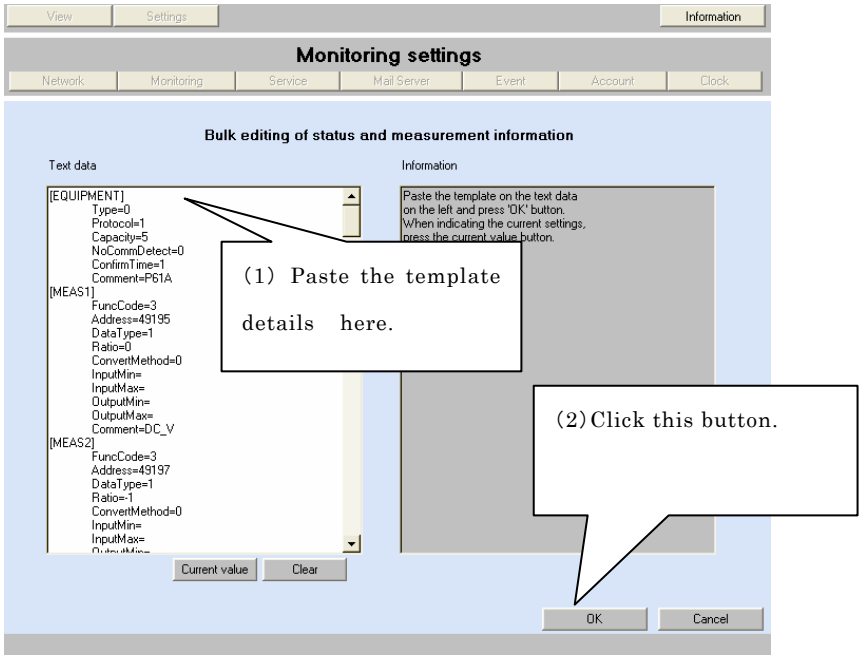
(a) Click "Bulk edit".



(b) The Bulk Editing of Status and Measurement Information screen appears.

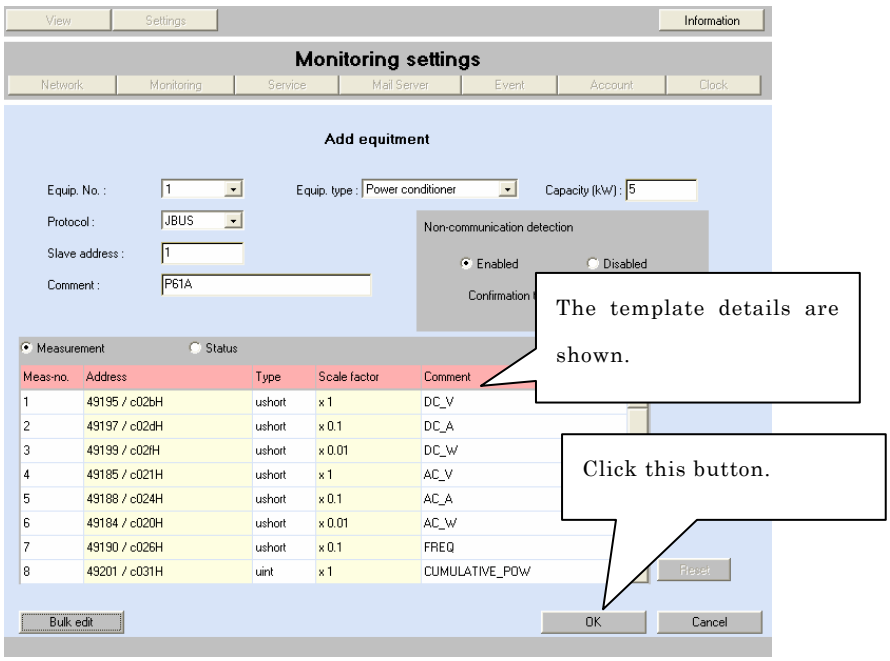


(c) Open the template with the text editor and copy the template, and paste it to the text data area. Click the text data area, and then press “Ctrl” and ”P” on the keyboard at a time to paste. Then, click “OK”.



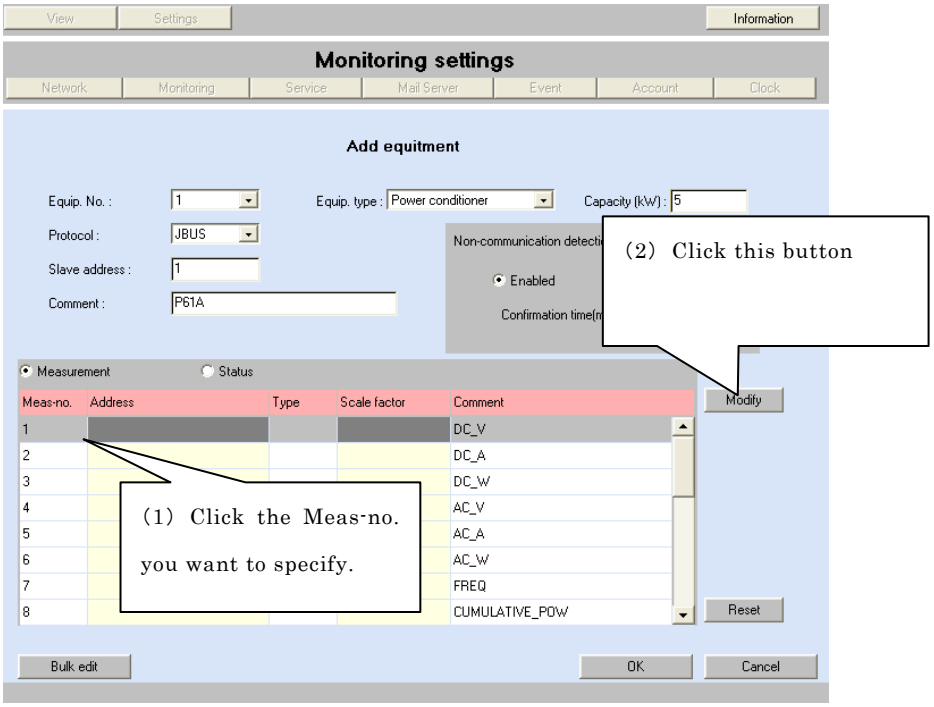
※The “Current value” button displays the current setting details of the measurement and status information just before shifting to “Bulk editing” screen, on the text data area.

(d) The Add Equipment screen appears with the template details showed. Click “OK” to return to the Monitoring Setting screen.

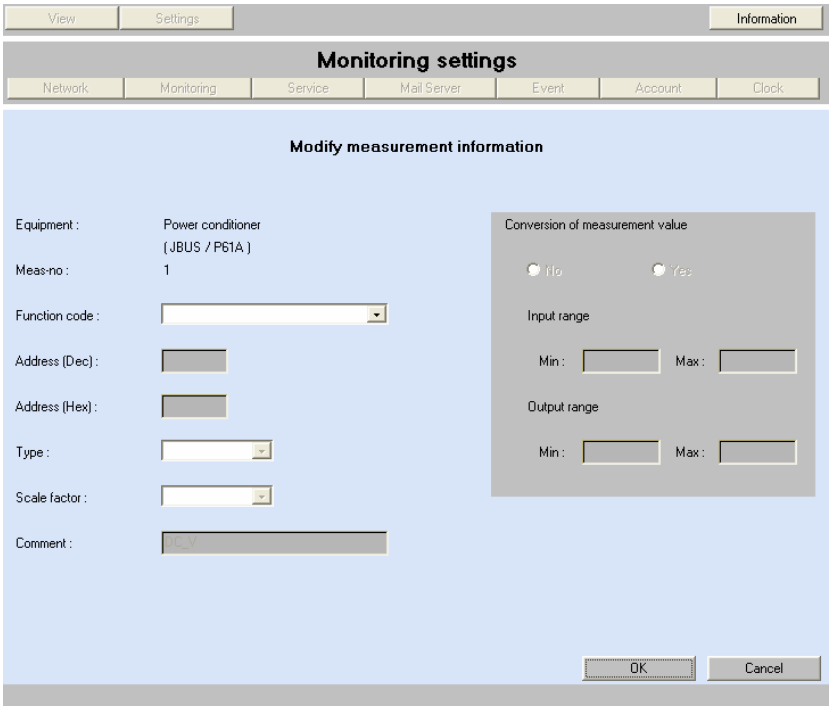


(B) Setting each measurement and status information one by one

(a) Click the Meas-no you want to set on the list, and click the “Modify”.



(b) The Modify Measurement Information screen appears.



[Screen description]

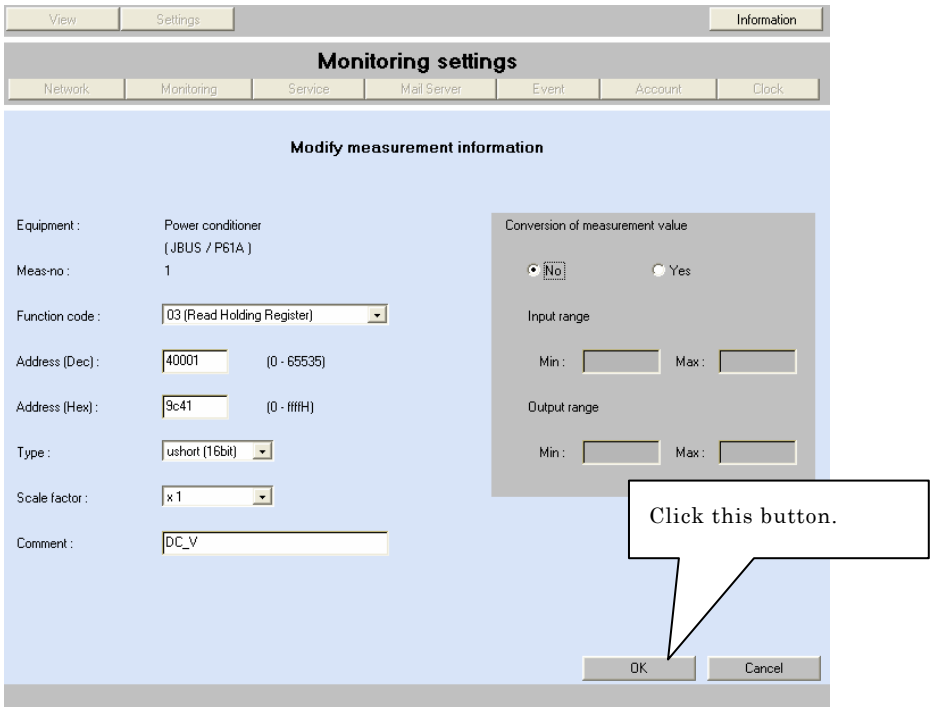
Setting	Description	Default value
Function code	Specify the function code. You can select from the following four options: 「01 (Read Coil Status)」 「02 (Read Input Status)」 「03 (Read Holding Register)」 「04 (Read Input Register)」 When no function code is selected, you cannot specify the following items.	None
Address(Dec) or address(Hex) [Only for JBUS]	Specify the data address to be collected by the JBUS communication protocol. Decimal or hexadecimal number can be used, and if you change either of the input values, another value will be automatically changed. Input range: 0 to 65535 (in decimal), 0 to ffffH (in hexadecimal)	0 (Specify 0 when selecting the other option in a condition where no function code is selected.)
Address(Dec) or function address(Hex) [Only for Modbus]	Specify the data address to be collected by the Modbus communication protocol. Decimal address (absolute address) or hexadecimal function address (offset address) can be used, and if you change either of the input values, another value will be automatically changed. The input range is different depending on the selected function code. Function code=01: 1 to 9999 in decimal Function code =02: 10001 to 19999 in decimal Function code =03: 40001 to 65535 in decimal Function code =04: 30001 to 39999 in decimal	Beginning address of selected function code
Type	Specify the data type. You can select from the following five options: 「ushort (16bit)」 : 0 to 65,535 「short (16bit)」 : -32,768 to 32,767 「uint(32bit)」 : 0 to 4,294,967,295 「int(32bit) : -2147483648 to 2147483647 「float」 :floating point	None
Scale factor	Specify the scale factor. You have nine options; “x 0.0001” to “x 10000”. Collected data × Scale factor = Actual value	None

[Screen description]

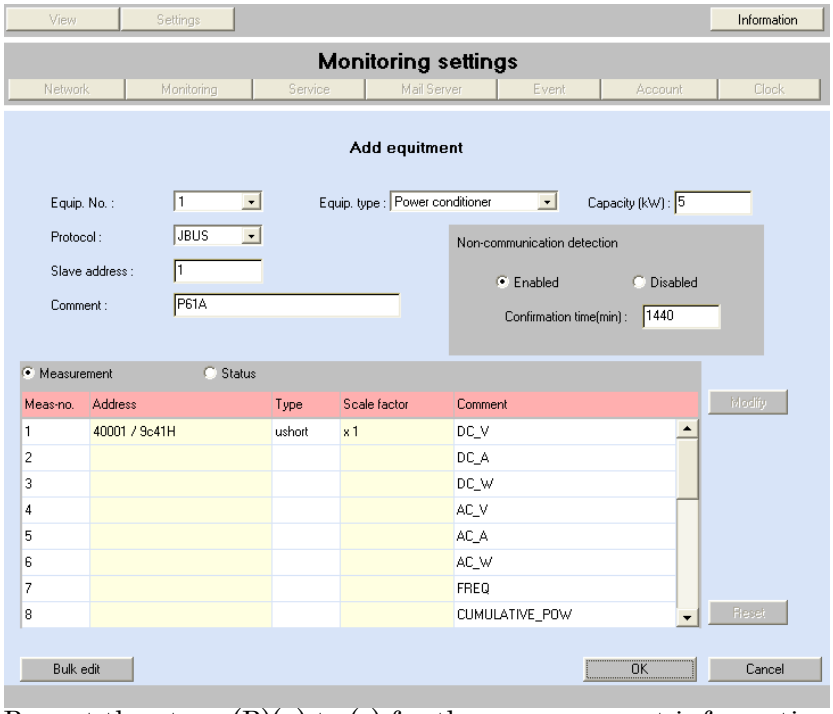
Setting	Description	Default value
Comment	Specify any text of the meas-no to be set (20 bytes maximum). A comment specified here will be shown in the measurement information list on the Add and Modify Equipment screens.	Specify a system-fixed default comment. Refer to "Appendix G Measurement and status information when using Modbus/JBUS communication protocol" for details.
Conversion of measurement value (No/Yes, Input range (Min, Max), Output range(Min, Max)	In the case of analog input, select "Yes" in "Conversion of measurement value", and specify the input range (analog input range) and output range (range after the scale conversion). Input range: 0 to 9999 (integer), output range: -9999.999 to 9999.999. In the case of not analog input, select "No" in "Conversion of measurement value.	None

(c) Specify the measurement information, and click "OK".

The screen below shows an example of measurement information.

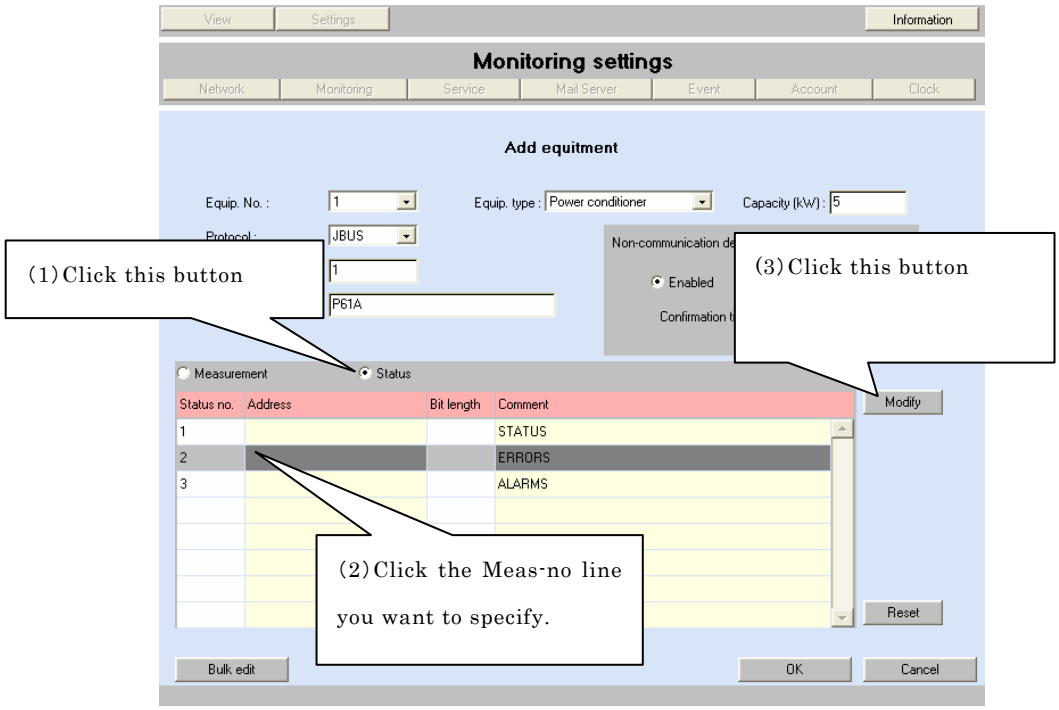


(d) The Add Equipment screen appears with the measurement information updated.

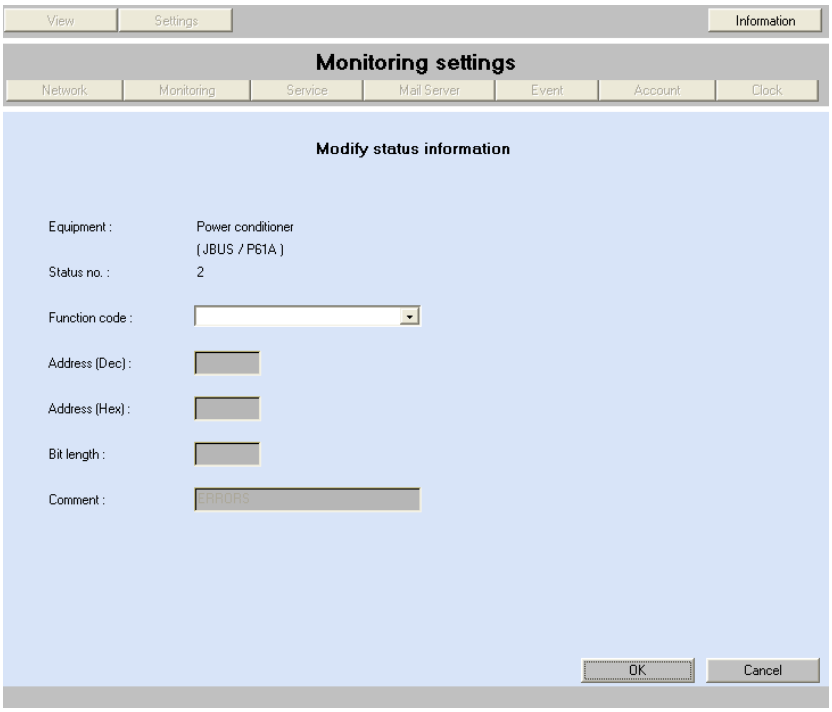


Repeat the steps (B)(a) to (c) for the measurement information you want to collect. If you want to reset details of any Meas-no., click the desired Meas-no line, and click “Reset”.

(e) Next, specify the status information. In order to specify the status information, click ”status information” to show a list of the status information, and click a Status no. line you want to specify, and then, click “Modify”.



(f) The Modify Status Information screen appears.



[Screen description]

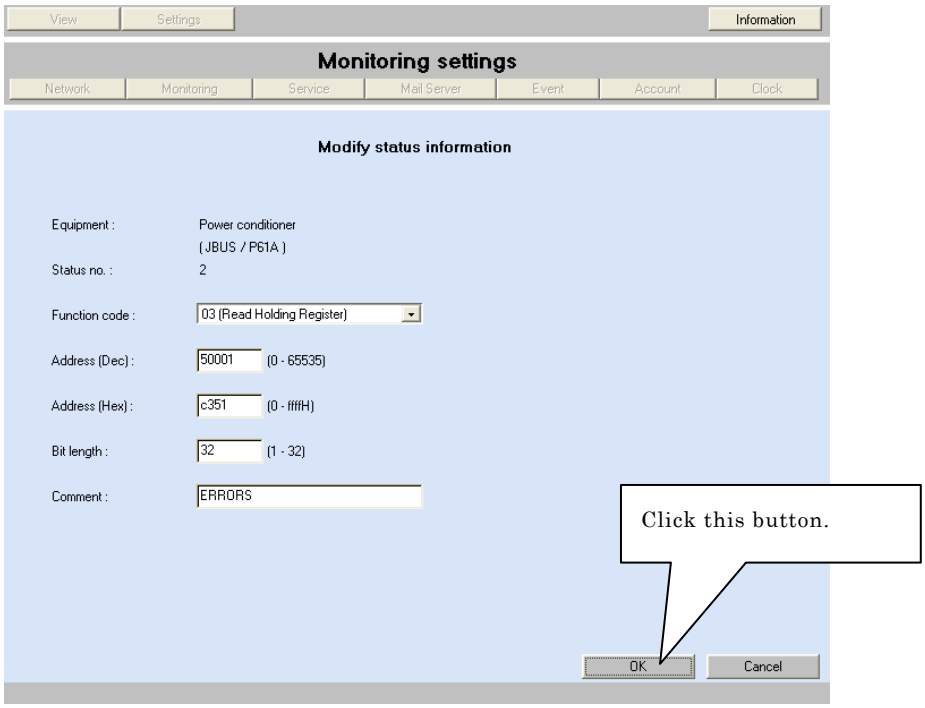
Setting	Description	Default value
Function code	Specify the function code. You can select from the following four options: 「01 (Read Coil Status)」 「02 (Read Input Status)」 「03 (Read Holding Register)」 「04 (Read Input Register)」 When no function code is selected, you cannot specify the following items.	None
Address(Dec) or address(Hex) [Only for JBUS]	Specify the data address to be collected by the JBUS communication protocol. Decimal or hexadecimal number can be used, and if you change either of the input values, another value is automatically changed. Input range: 0 to 65535 (in decimal), 0 to ffffH (in hexadecimal)	0 (Specify 0 when selecting the other option in a condition where no function code is selected.)

[Screen description]

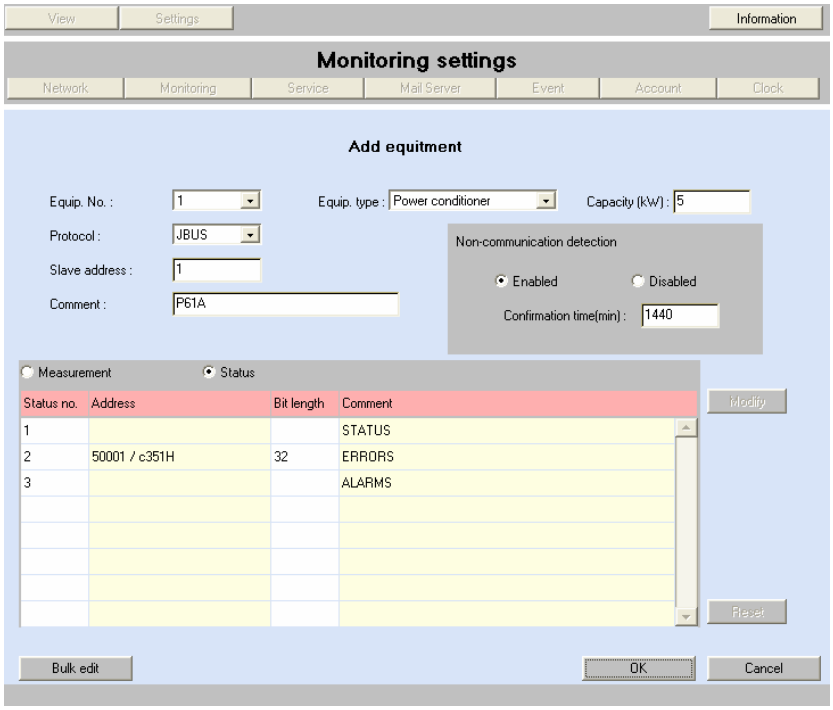
Setting	Description	Default value
Address(Dec) or function address(Hex) [Only for Modbus]	Specify the data address to be collected by the Modbus communication protocol. Decimal address (absolute address) or hexadecimal function address (offset address) can be used, and if you change either of the input values, another value is also automatically changed. The input range is different depending on the selected function code. Function code=01 : 1 to 9999 in decimal Function code =02 : 10001 to 19999 in decimal Function code =03 : 40001 to 65535 in decimal Function code =04 : 30001 to 39999 in decimal	Beginning address of selected function code
Bit length	Specify the bit length of data in the range of 1 to 32. For the status No.1, specify it in the range of 1 to 8.	None
Comment	Specify any text of the status-no to be set (20 bytes maximum). A comment specified here will be shown in the measurement information list on the Add and Modify Equipment screens.	Specify a system-fixed default comment. Refer to "Appendix G Measurement and status information when using Modbus/JBUS communication protocol" for details.

(g) Specify the status information, and click “OK”.

The screen below shows an example of status information.

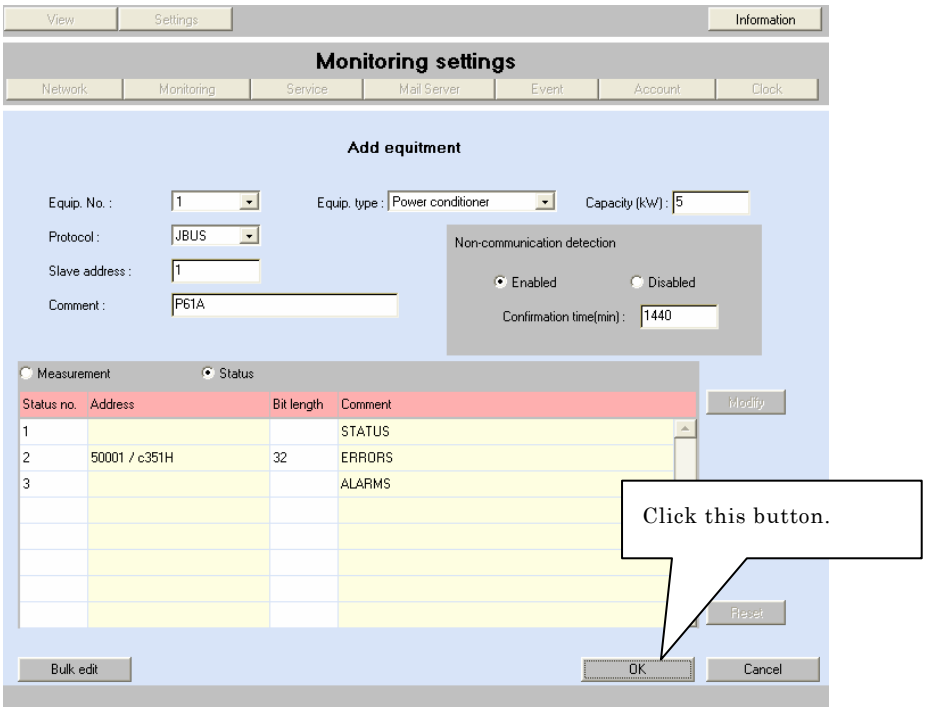


(h) The Add Equipment screen appears with the status information updated.

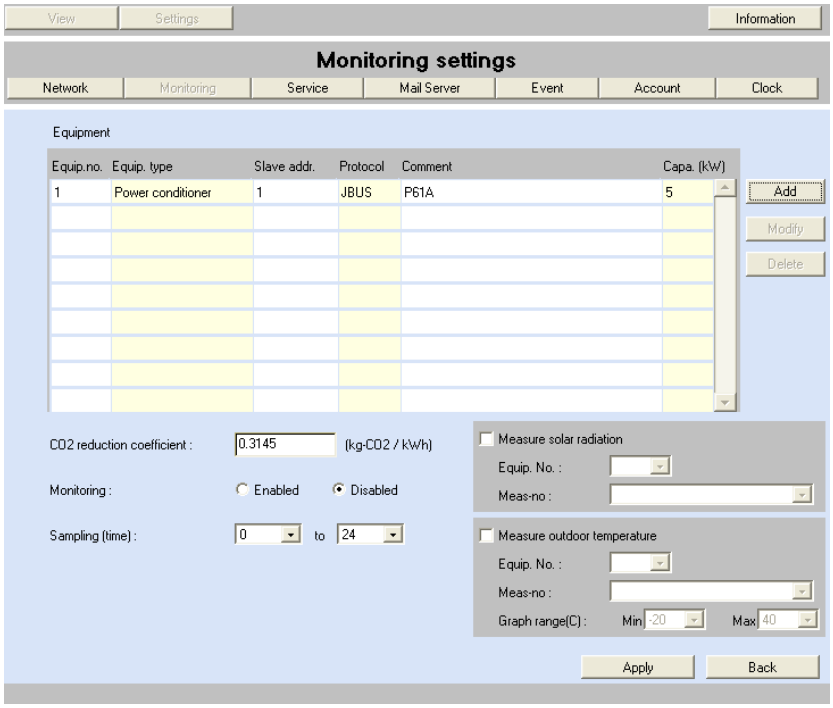


Repeat the steps (B)(e) to (g) for the status information. If you want to reset details, click the desired Status-no line, and click “Reset”.

(i) Once all the settings of measurement information and status information are completed, click “OK”.



[6] The Monitoring Settings screen appears with the details of the added equipment updated.

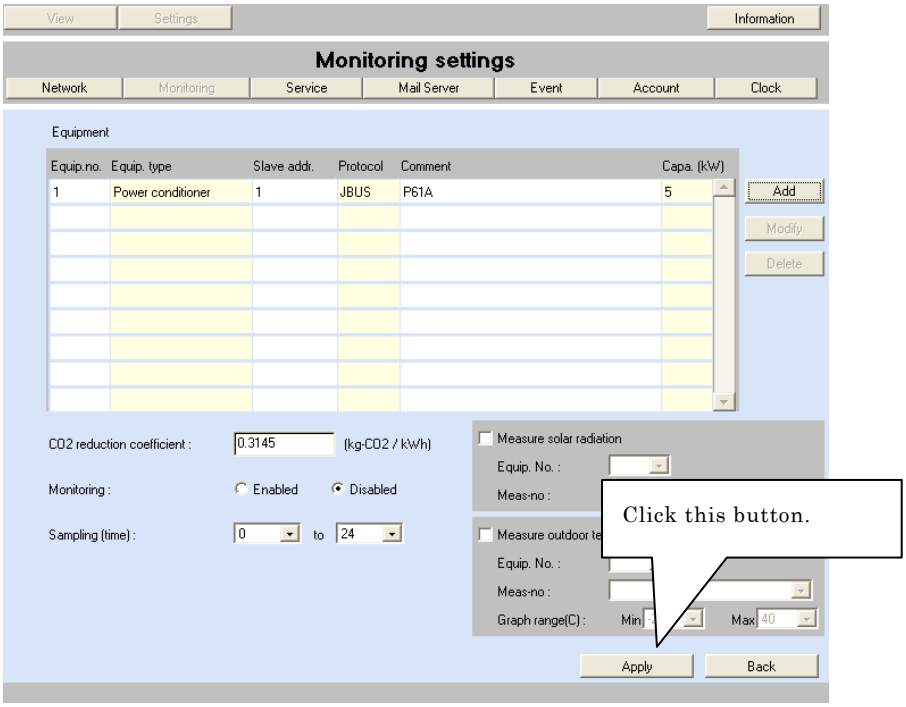


Repeat the steps [2] to [5] above for the equipment you want to add. If you want to modify or delete details of any equipment, click the desired Equip no. line, and click “Modify” or “Delete”.

[7] Once you add all the equipment, specify the monitoring conditions on the "Monitoring Settings" screen, and click "Apply".

This button will update the information in the SANUPS PV Monitor.

Be sure to check the collected details on the state/value display to see if the accurate data has been collected based on the specified measurement and status information. Refer to "3.14 Displaying PV Inverter State/Measurements and Event Logs" for state/value display function.



[Screen description]

Setting	Description	Default value
Monitoring	Specify whether you want to enable or disable monitoring of connected equipment. If this setting is disabled, the states of connected equipment will not be monitored, or data summary will not be created either.	Disabled
Sampling (time)	Specify a duration of sampling, which will be used in creating a data summary. For example, if you specify the duration as being from 4:00 to 21:00, then sampling of measurements will start at 4:00 and end at 21:00; 10-minute averages and 1-hour averages of solar radiation, outdoor temperature, and AC power are collected and the data is saved in the SANUPS PV	0:00 to 24:00

	Monitor.	
Solar radiation measurement conditions (Measure solar radiation, Equip. No, Meas-no)	If you measure solar radiation, specify the device number of the connected equipment taking measurements, and measurement number.	Disabled
Outdoor temperature measurement conditions (Measure outdoor temperature, Equip. No, Meas- no, Graph min value, Graph max value)	If you measure outdoor temperature, specify the device number of the connected equipment taking measurements, and measurement number. Also, specify the default scale of the trend graph (minimum and maximum values).	Disabled

2.4 Setting the Clock in the SANUPS PV Monitor

The clock in the SANUPS PV Monitor has been set when shipped. However, we recommend that you set the clock again in the enviornment where the SANUPS PV Monitor is used.

Click "Clock" and then set the clock.

(Refer to “3.10 Setting the Clock in the SANUPS PV Monitor".)

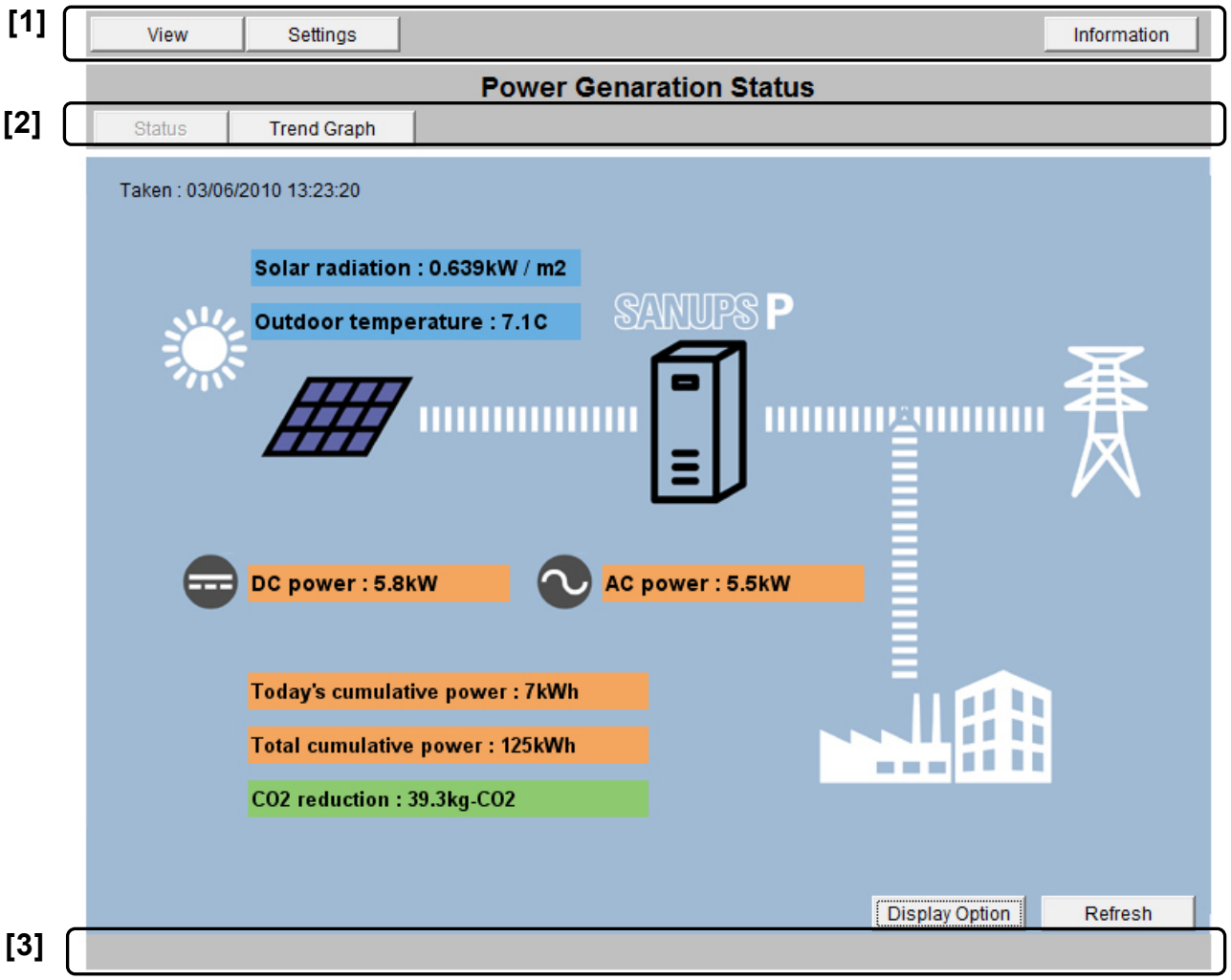
3. Using the Web Administrative Tool

Open your Web browser. In its address bar, enter the IP address of the SANUPS PV Monitor. The SANUPS PV Monitor's Web Administrative Tool starts. You can use the Web Administrative Tool to change the SANUPS PV Monitor settings and check states.
The following table describes functions of the Web Administrative Tool. It gives you an overview of each function. Jump to the specific section for details on a function.

Section	Description
3.1 Using Web Administrative Tool's Main Screen	This section describes the layout of the main screen as well as the functions.
3.2 Displaying the Power Generation Status Screen	This section describes how you can check the power generation state of the entire solar power system.
3.3 Displaying the Trend Graph Screen	This section describes how to display, in graph form the 10-minute averages of solar radiation, outdoor temperature, and AC power.
3.4 Changing the Network Settings	This section describes how to change the network settings of the SANUPS PV Monitor.
3.5 Specifying the Monitoring Conditions	This section describes how to get the states and measurements of PV inverters.
3.6 Changing the Service Settings	This section describes how to change the HTTP, FTP, remote login (Telnet/SSH), and SNMP settings.
3.7 Changing the Login Account of the SANUPS PV Monitor	This section describes how to change the account information for remote access of the SANUPS PV Monitor.
3.8 Email Functions	This section gives an overview of the email functons of the SANUPS PV Monitor.
3.9 Setting up the Email Function	This section describes how to use the email functions.
3.10 Setting the Clock in the SANUPS PV Monitor	This section describes how to set the clock in the SANUPS PV Monitor.
3.11 Event Settings	This section gives an overview of the event settings.
3.12 Specifying the Event Logging Conditions	This section describes how to specify event log's recording conditions.
3.13 Using Email to Send Notification	This section describes how to use email notification when an event occurs.
3.14 Displaying PV Inverter State/Measurements and Event Logs	This section describes how to display PV inverter state/measurements and event logs recorded in the SANUPS PV Monitor.
3.15 Checking the SANUPS PV Monitor Version Information	This section describes how to display the version information.

3.1 Using Web Administrative Tool's Main Screen

The following figure shows the Web Administrative Tool main screen. (The main screen can either be the Power Generation Status screen or the Trend Graph screen, which can be selected by using their respective sub-function buttons.)



Screen layout

Number	Description
[1]	This area displays function buttons. The "Settings" button enables you to change settings, while the "View" button enables you to view functions. Also, the "Information" button displays program version information.
[2]	This area displays sub-function buttons. For example, you can use the "Status" button and "Trend Graph" button on the main screen to display the Power Generation Status screen or the Trend Graph screen respectively.
[3]	This is the message display area. Different messages appear in this area.

Function and sub-function buttons

When you click a function or sub-function button, you can switch to a different SANUPS PV Monitor function.

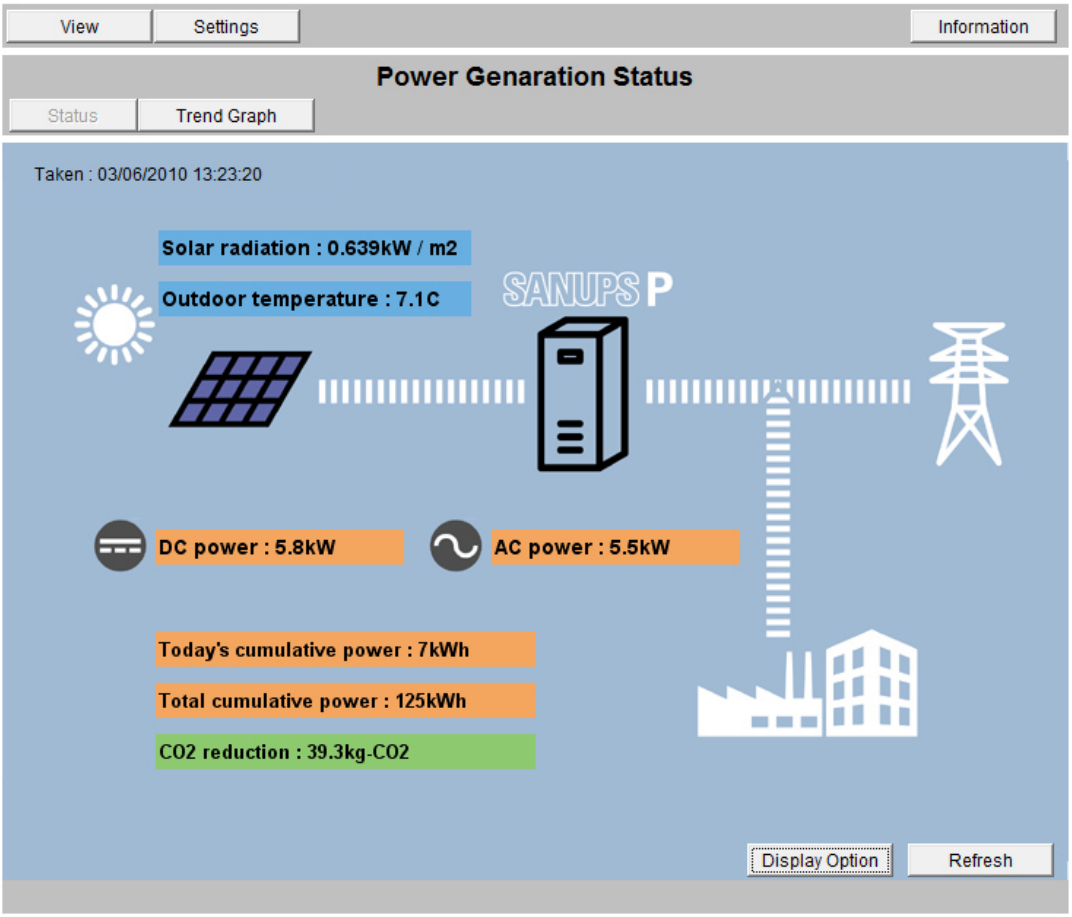
The buttons and their functions are listed below.

Button operation	Function	Brief description
Settings - Network	Network settings	Specify network information such as IP address.
Settings - Monitoring	Monitoring settings	Specify conditions for monitoring PV inverters.
Settings - Service	Service settings	Specify operating conditions of SNMP, Telnet/SSH, etc.
Settings - Mail Server	E-mail server settings	Specify the conditions for accessing the mail server required for sending or receiving email.
Settings - Event	Event settings	Specify whether to log each event, and set up email notification conditions.
Settings - Account	Account settings	Change the account settings for use in logging in to the SANUPS PV Monitor.
Settings - Clock	Clock settings	Set the SANUPS PV Monitor's clock.
View - State/Value	State/Value	View the state/measurements of a PV inverter.
View - Event Log	Event-Log View	View event logs recorded on the SANUPS PV Monitor.
Information	Version Information	View inforamtion about the SANUPS PV Monitor, such as ROM version.
Power Generation Status	Power Generation Status	Display the power generation state of the solar power system.
Trend Graph	Trend Graph	Display in graph form the 10-minute averages of solar radiation, outdoor temperature, and AC power of the solar power system.

3.2 Displaying the Power Generation Status Screen

[Operation]

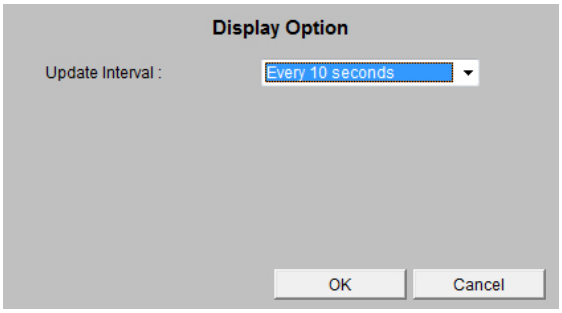
After you start the Web Administrative Tool and then perform user authentification, the main screen appears. (The main screen may be the Power Generation Status screen or the Trend Graph screen. You can use the sub-function buttons to toggle between these two screens.)



By default, the information on this screen is updated every 10 seconds.

[Changing the display option]

If you want to change the update interval, click "Display Option". The Display Option screen appears. After changing the display options, click "OK".



Select one from the following update intervals: No automatic update, Every 5 seconds, Every 10 seconds, Every 30 seconds, and Every 60 seconds. Note that any changes made in the display options will be lost when you exit the Web Administrative Tool.

[Screen description]

Item	Description	Notes
Taken	Indicates the date and time the latest data is obtained.	*1
Solar radiation	Indicates the latest solar radiation.	*1, *2
Outdoor temperature	Indicates the latest outdoor temperature.	*1, *3
DC power	Indicates the total power generated by the entire solar battery.	*1
AC power	Indicates the AC power converted from the DC power.	*1
Today's cumulative power	Indicates the power generated today.	*1
Total cumulative power	Indicates the cumulative power generated since PV inverters are installed.	*1
CO2 reduction	Indicates the CO2 reduction calculated from the total cumulative power generated.	*1

*1 If no measurement has been taken from PV inverters since you turned on the SANUPS PV Monitor, the sampling date/time as well as all measurements appear as a dash (-). Also, if the latest measurement cannot be obtained, you'll see a dash (-) in the item.

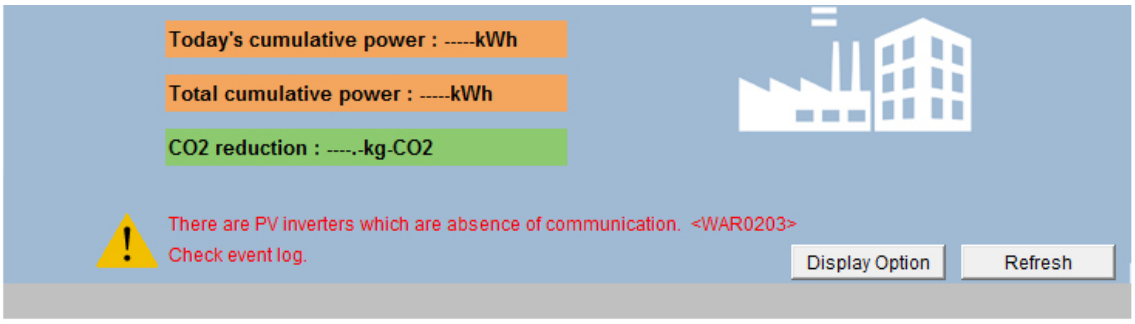
*2 If solar radiation is not measured, it appears as a dash (-).

*3 If outdoor temperature is not measured, it appears as a dash (-).

[Displaying special notification message]

If there is a PV inverter which is malfunctioning or has no communication, or monitoring is disabled, a warning icon appears at the bottom of the screen and a warning message appears in the message display area.

You can use the event log to pinpoint the inverter which is malfunctioning or has no communication.

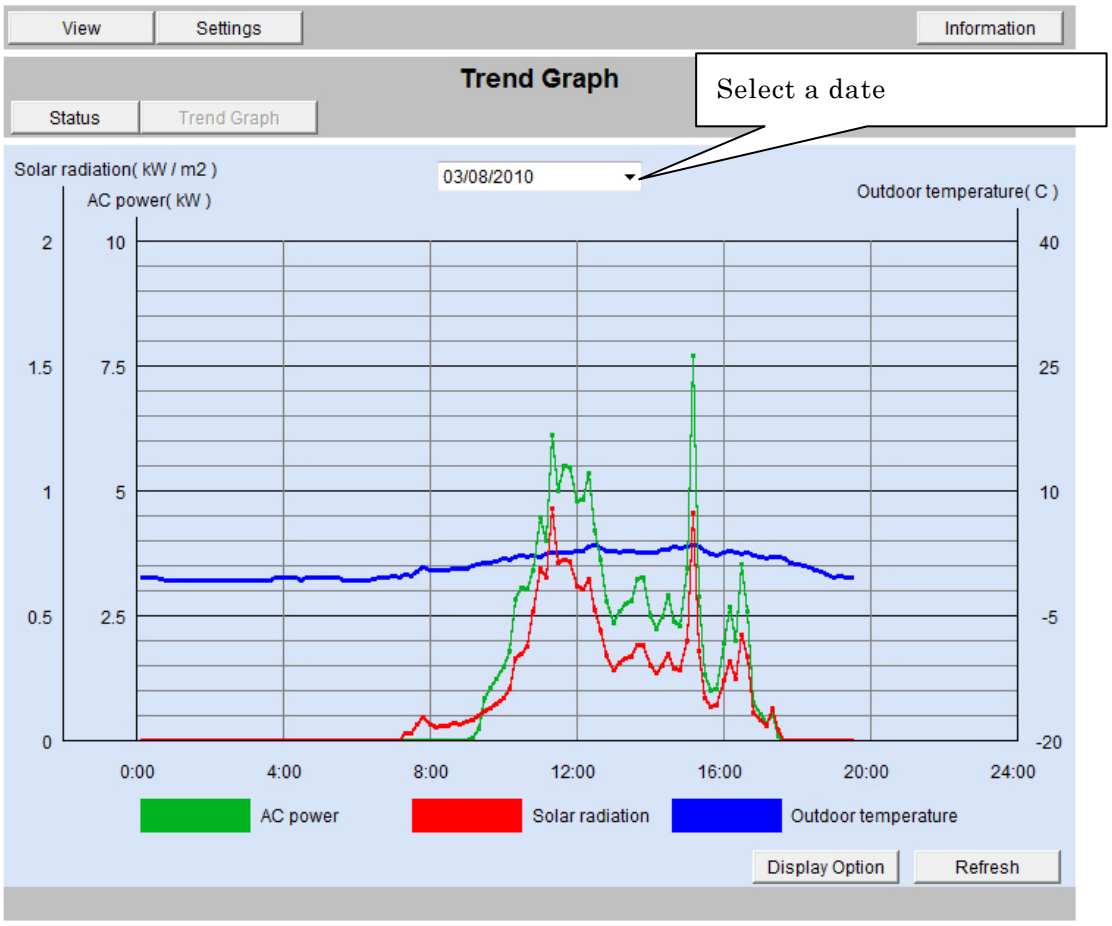


(In this case, the screen indicates that a PV inverter has no communication.)

3.3 Displaying the Trend Graph Screen

[Operation]

After you start the Web Administrative Tool and then perform user authentification, the main screen appears. (The main screen may be the Power Generation Status screen or the Trend Graph screen. You can use the sub-function buttons to toggle between these two screens.)



This screen shows data of the day by default, and the information is updated every 10 minutes. If you want to view past data, select a desired date.

[Screen description]

Item	Description	Notes
AC power	Indicates in graph form the 10-minute average of AC power converted from DC power.	*1
Solar radiation	Indicates in graph form the 10-minute average of solar radiation.	*2
Outdoor temperature	Indicates in graph form the 10-minute average of outdoor temperature.	*3

*1 No line graph appears for the time period when AC power cannot be obtained.

*2 No line graph appears for the time period when solar radiation is not measured or cannot be obtained.

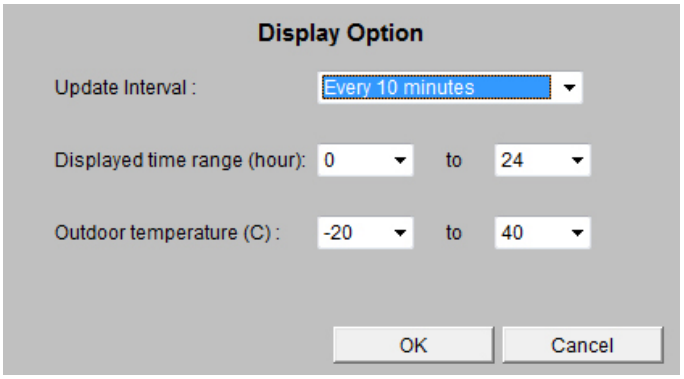
*3 No line graph appears for the time period when outdoor temperature is not measured or cannot be obtained.

[Displaying special notification message]

If there is no 10-minute data summary for the target date, a warning error appears in the message display area to indicate that the desired data does not exist.

[Changing the display option]

If you want to change the update interval, display time range, or outdoor temperature scale, click "Display Option". The Display Option screen appears. After changing the options, click "OK".



Select one from the following update intervals: No automatic update, Every 5 minutes, Every 10 minutes, Every 30 minutes, and Every 60 minutes. Note that any changes made in the display options will be lost when you exit the Web Administrative Tool.

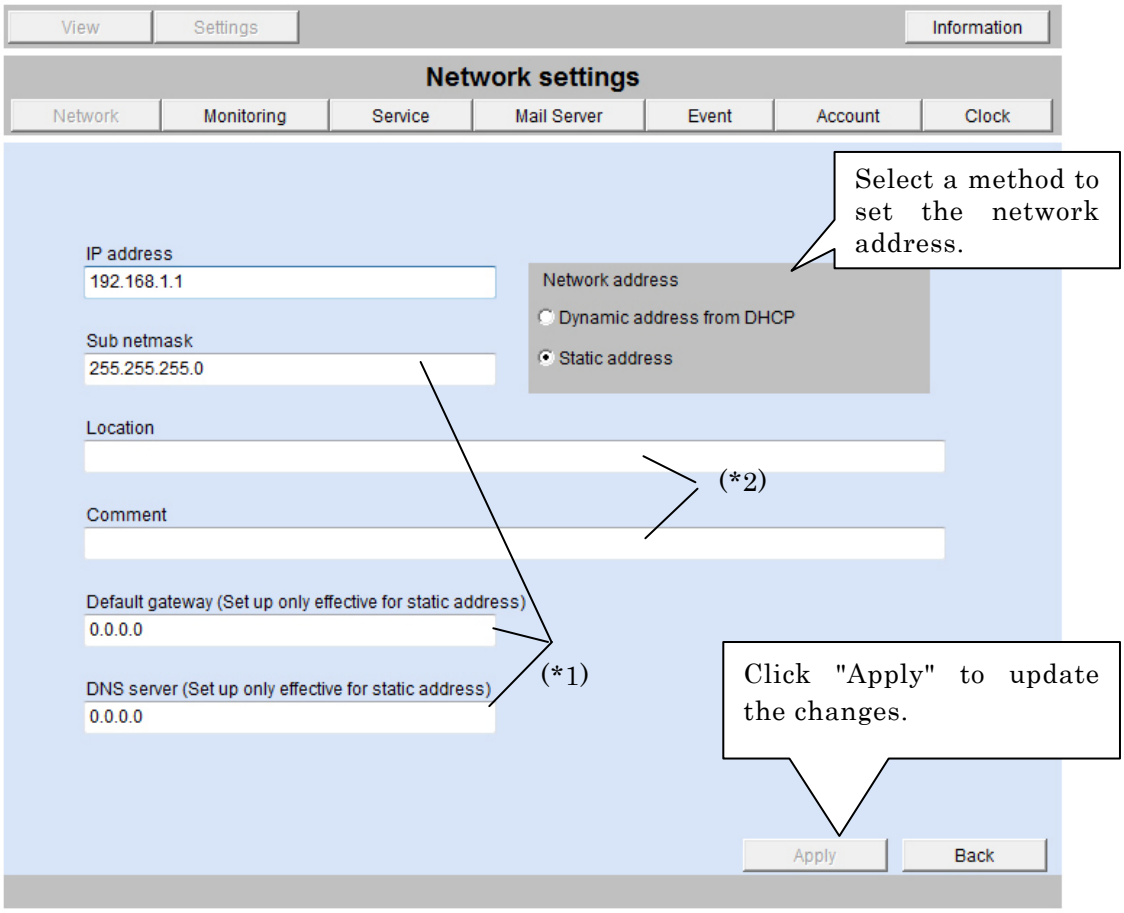
<Note>
Because data displayed in the trend graph is stored on the SANUPS PV Monitor, you can use an FTP client to retrieve the data. For details, read "6. Using FTP to Get Data Summary".
Also, a maximum of 42 days of data can be stored on the SANUPS PV Monitor.

3.4 Changing the Network Settings

[Operation]

Click "Settings" on the main screen.

The following screen appears.



This screen allows you to specify the SANUPS PV Monitor's network information. You can change the IP address of the SANUPS PV Monitor on this screen.

*1 Enter information about the network you are using, into the following fields: Sub netmask, Default gateway, and DNS Server.

*2 If you change the content in the Location field or the Comment field, the changes will be seen when you click "Information" in the Web Administrative Tool. (Use of double-byte characters in the Location and Comment fields is allowed only in the Japanese version of the SANUPS PV Monitor.)

<Important>
If you change the IP address, Sub netmask, Default gateway, or DNS Server, the SANUPS PV Monitor restarts. When you continue to use the Web Administrative Tool, reload it from the Web browser.

3.5 Specifying the Monitoring Conditions

Items to be set are different depending on the communication system. Refer to “2.2 Setting the Monitor (SANUPS PV communication protocol)” or “2.3 Setting the Monitor (Modbus/JBUS communication protocol)” to set up, depending on the protocol.

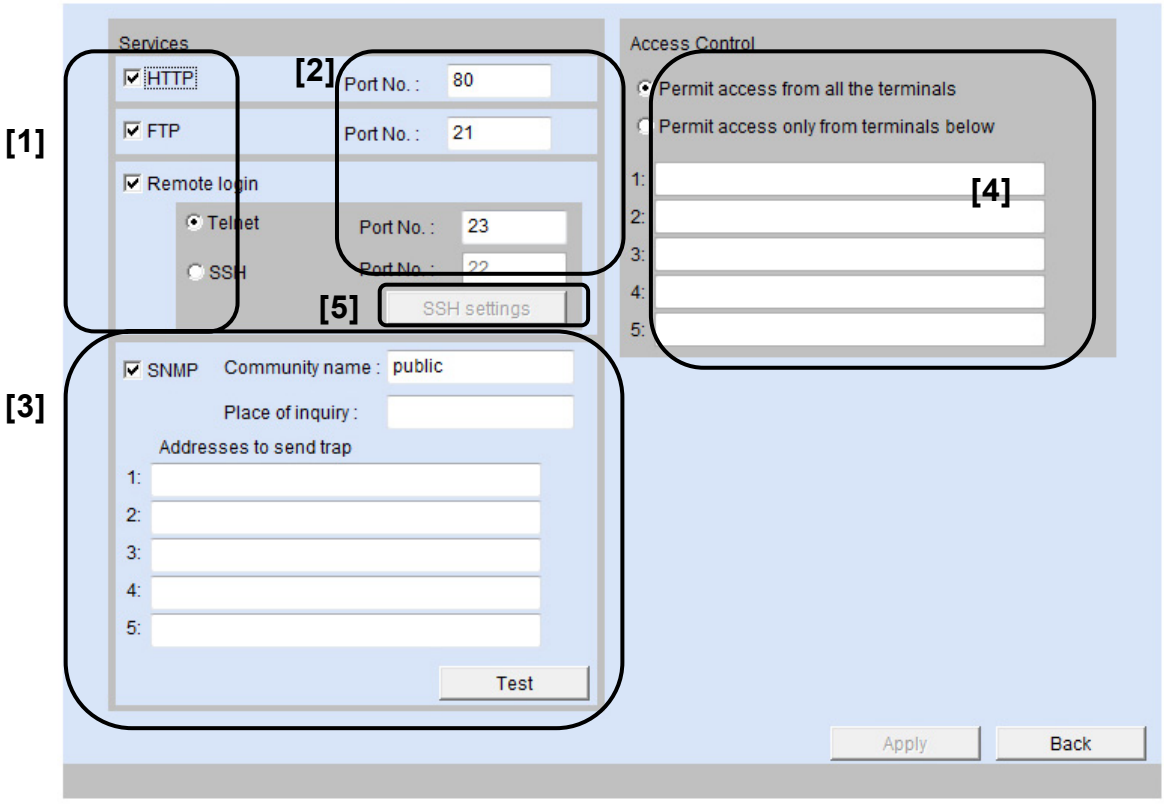
3.6 Changing the Service Settings

This section describes how to enable or disable HTTP, FTP, remote login (Telnet/SSH), and SNMP. You can also change port numbers and apply access control.

[Operation]

Click "Settings" on the main screen. When the Network Settings screen appears, click "Service".

The following screen appears.



Screen layout

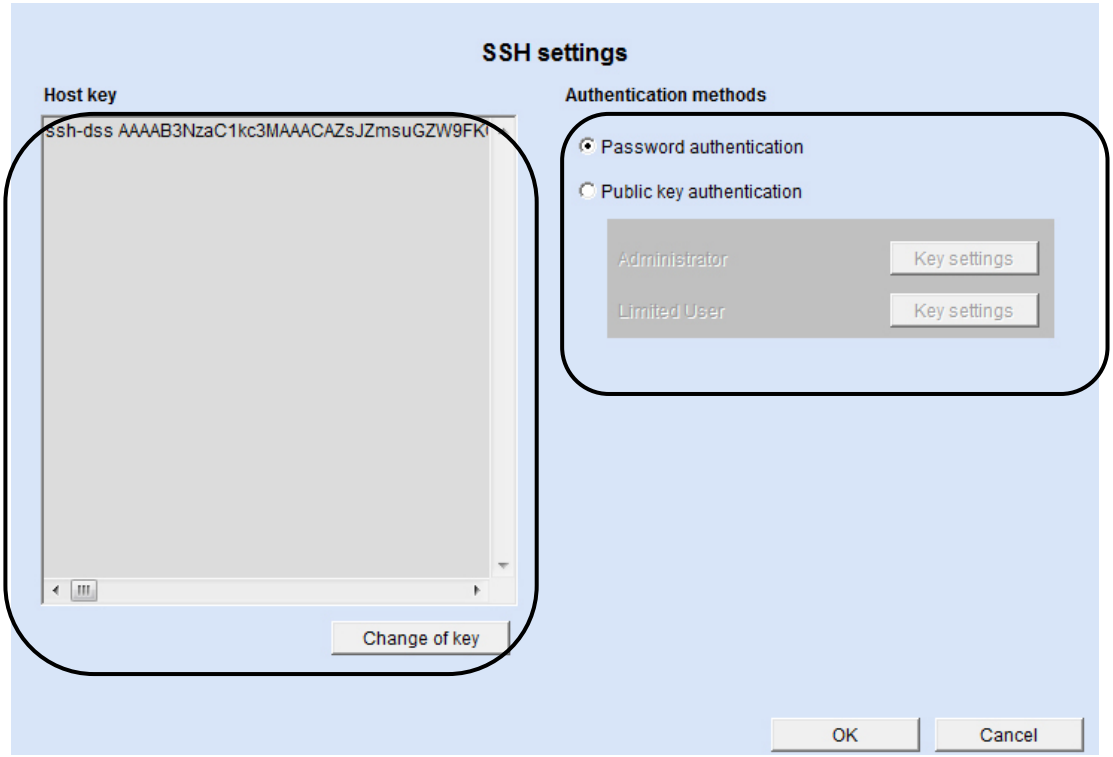
Number	Description
[1]	You can enable or disable each of the services.
[2]	You can change the port number for each of the services. (However, the port number for SNMP cannot be changed.)
[3]	Specify the SNMP's basic settings. Also, you can test the trap transmission.
[4]	You can set up access control that is common to all of the services. (Specify IP address.)
[5]	If access using SSH connection is enabled, use this button to specify SSH's detailed settings.

[Screen description]

Setting	Description	Default value
HTTP	Specify whether to enable or disable access from the Web.	Enabled
FTP	Specify whether to enable or disable the function to upload/download SANUPS PV Monitor settings by using FTP.	Enabled
Remote login	Specify whether to enable or disable access using Telnet/SSH connection.	Enabled
Telnet	Use Telnet connection for the access.	Enabled
SSH	Use SSH connection for the access.	Disabled
SSH settings	If access using SSH connection is enabled, use this button to specify SSH's detailed settings.	
SNMP	Specify whether to enable or disable the SNMP function.	Enabled
Port No.	You can change the port number for each of the services.	Well-known Port Number
Community name	Enter SNMP's community name.	public
Place of inquiry	Specify where to query SNMP.	- (None)
Addresses to send trap	If you want to send traps, specify the network address of the recipient. (Up to five addresses can be specified.)	- (None)
Test	Click this button to test whether traps can be sent.	
Access control	Apply restriction to access of the services from outside. If you want to grant access to a terminal, enter its network address here. Then, access from that terminal will be permitted. (You can enter up to five network addresses.)	- (None)

SSH settings

After you click "SSH Settings", you can specify a host key as well as a user authentication method for the SANUPS PV Monitor to use in SSH connection.



[1] [2]

Screen layout

Number	Description
[1]	You can set a host key for the SANUPS PV Monitor.
[2]	You can select a user authentication method to use.

[Screen description]

Setting	Description	Default value
Host key	Indicates the public, host key (1024-bit DSA key) of the SANUPS PV Monitor.	Factory default setting
Change of key	Click this button if you want to change the host key.	
Password authentification	Select password authentication as the user authentication method to use when logging in to the SANUPS PV Monitor. The account and password are the ones set in "3.7 Changing the Login Account of the SANUPS PV Monitor".	Enabled

Setting	Description	Default value
Public key authentification	Select public key authentication as the user authentication method to use when logging in to the SANUPS PV Monitor. To set the public key on the "Change of key" screen, enter the user authentication's public key created on the SSH client.	Disabled
Key settings	Specify user authentication's public key.	

<Important>

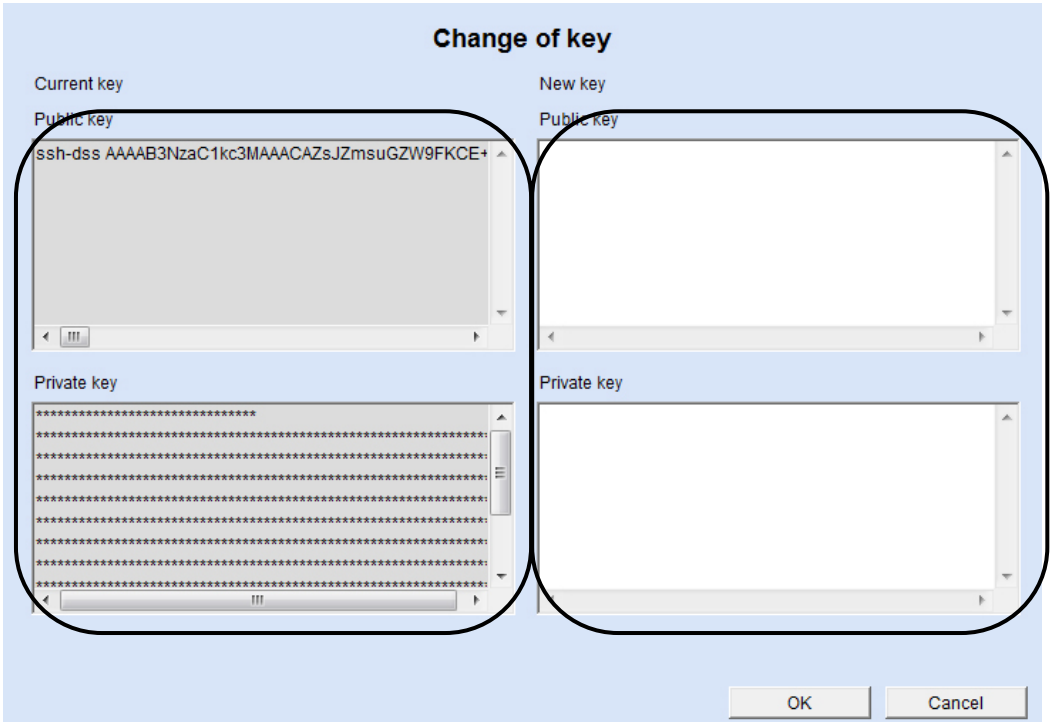
If you click "OK" on the SSH setting screen, the changes are saved and the Service settings screen returns. Clicking "Apply" on the Service settings screen updates the SSH settings.

Remember, in other words, clicking "OK" on the SSH settings screen does not update the SSH settings.

Also, all settings on subsequent screens below the SSH settings screen are updated when you click "Apply" on the Service settings screen.

When you click "Change of key" in the Host key section, you can then change the host key of the SANUPS PV Monitor. This is where you can set up a new public key and a new private (secret) key.

[1]



[2]

Screen layout

Number	Description
[1]	Indicates the current public and private keys for host authentication of the SANUPS PV Monitor (read-only).
[2]	If you want to change the host key of the SANUPS PV Monitor, paste the texts of the new keys into these fields.

[Screen description]

Setting		Description	Default value
Current key		Indicates the current keys in use.	
	Public key	Indicates the public, host key (1024-bit DSA key) of the SANUPS PV Monitor.	Factory default setting
	Private key	Indicates the private (secret) key (1024-bit DSA key) of the SANUPS PV Monitor. For security reason, the key appears as a series of asterisks.	Factory default setting
New key		Use this section to change the keys.	
	Public key	Paste the text of a new public key into this field (PEM format). See the notes below on conditions of supported keys.	- (None)
	Private key	Paste the text of a new private (secret) key into this field (PEM format). See the notes below on conditions of supported keys.	- (None)

(Note) Conditions of supported keys

Supported version	:	SSH2.0	* SSH1.0 is not supported.
Key format	:	OpenSSH format	* Commercial SSH format is not supported.
Public key cryptography	:	DSA, RSA	
Passphrase	:	None	* Key with passphrase is not supported.
Key comment	:	None	* Please delete key comment.
Number of bits	:	1024	

<Please Note>

You cannot create new key on the unit.

To change a key, use the ssh-keygen command of OpenSSH or a key generation function of a SSH-related tool to create a key, and then paste the text of the key (in PEM format) to this screen.

However, keys that can be used are restricted by the conditions described above in "**(Note) Conditions of supported keys**". Therefore, be aware of the conditions when generating new keys.

(Reference) The following example shows how to use OpenSSH to generate a new key.

ssh-keygen –t rsa –b 1024 –N ””

-t: Key type (rsa/dsa)
-b: Number of bits (fixed at 1024)
-N: Passphrase (None:””)

<Reference>

When you connect to the SANUPS PV Monitor for the **first time** (*1), if OpenSSH is used, the following confirmation message appears. (Note: The confirmation message is different depending on the SSH client.)

The authenticity of host '□□□□□□□□□□□□□ (□□□□□□□□□□□□□)' can't be established.

DSA key fingerprint is 70:4c:06:6c:b7:da:6f:80:c7:db:90:d5:d6:16:a8:c9

Are you sure you want to continue connecting (yes/no)?

This means "Do you want to locally save the public key sent by the SANUPS PV Monitor, and then continue the connection operation?" Usually, check the displayed fingerprint to make sure it is genuine, and then continue the connection operation.

The factory default setting of the host key fingerprint of the SANUPS PV Monitor is shown below.

70:4c:06:6c:b7:da:6f:80:c7:db:90:d5:d6:16:a8:c9

In the next connection, the above message will not appear.

When changing the host key of the SANUPS PV Monitor, we recommend that you write down the fingerprint displayed during creation by the ssh-keygen command etc.

Date	Fingerprint

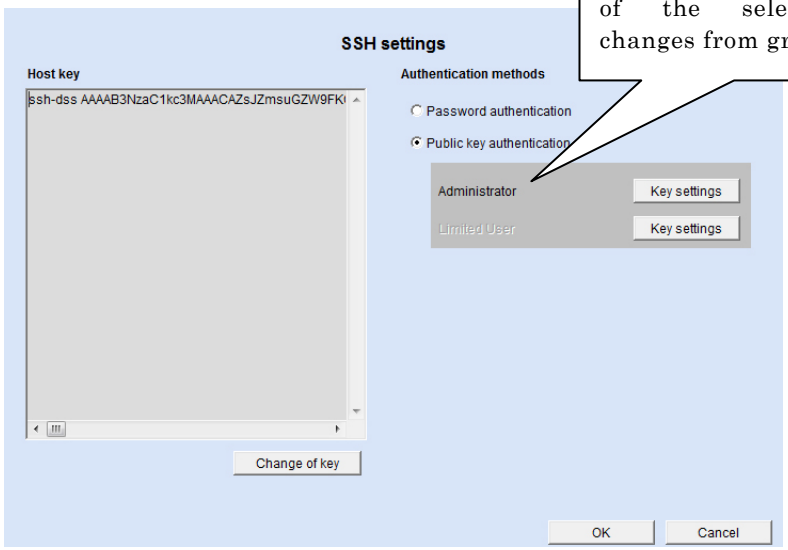
*1 The above message also appears when the key information, IP address, or port number is changed, or when the host key is not saved locally.

In the Authentication methods section, you can click "Key settings" for Administrator or Limited User to specify a respective public key for user authentication.



<Note>
When public key is used in user authentication, if the public keys of Administrator and Limited User are blank (not input), SSH connection to the SANUPS PV Monitor is not possible at all.

Enter a public key for user authentication, and then click "OK".



Screen layout

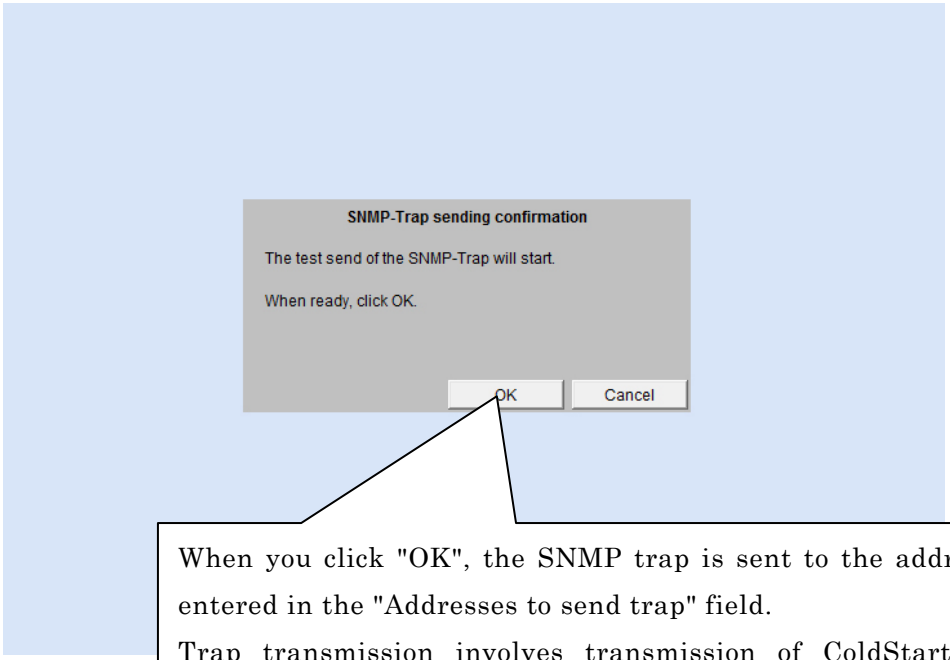
Number	Description
[1]	Paste the public key for user authentification created on SSH client.

[Screen description]

Setting	Description	Default value
Public key	Paste the text (PEM format) of the public key of the new user key here. The conditions for supported key are the same as for host key. If the SSH client is OpenSSH, generally, use the text recorded in the following files. (1) ~/.ssh/id_dsa.pub (2) ~/.ssh/id_rsa.pub	- (None)

Trap transmission test

You can click "Test" to test trap transmission.



When you click "OK", the SNMP trap is sent to the address entered in the "Addresses to send trap" field.
Trap transmission involves transmission of ColdStart of standard MIB.

3.7 Changing the Login Account of the SANUPS PV Monitor

The login account must be changed by the Administrator. It cannot be changed by a Limited User.

You can use this function to change the default account information. (Enter single-byte characters.)

Administrator

Account name: **PvAdmin**

Password: **PvAdmin** (Input is case-sensitive.)

Limited User

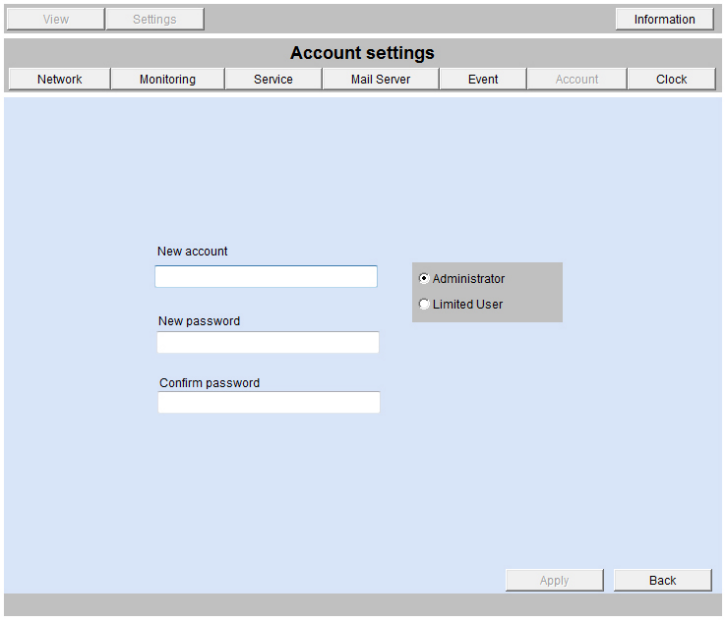
Account name: **User**

Password: **User** (Input is case-sensitive.)

[Operation]

Log in as Administrator. Click "Settings" on the main screen and then "Account".

The following screen appears.



[Screen description]

Setting	Description	Notes
Administrator	Select it when you want to change the account or password of Administrator.	
Limited User	Select it when you want to change the account or password of Limited User.	

Setting	Description	Notes
New account	Enter a new account name.	Between 1 and 20 characters, in single-byte letters or numbers
New password	Enter a new password.	Within 20 characters, in single-byte letters or numbers.
Confirm password	Reenter the new password.	Within 20 characters, in single-byte letters or numbers.

* The password is case-sensitive.

3.8 Email Functions

The SANUPS PV Monitor provides the following email functions.

[1] When the state of a PV inverter changes (e.g. malfunction), the SANUPS PV Monitor sends an email notification of the event to a specified email address.

[2] You can use email to query PV inverter state/measurements.
You can use the email function of your mobile phone or a mailer program on your PC/WS to send an email to the SANUPS PV Monitor to request for the information.
When the SANUPS PV Monitor receives a request by email, it sends an email back to the requester with information of PV inverter state/measurements.

<When sending a request by email from mobile phone or PC to the SANUPS PV Monitor>

Enter a recipient address and one of the following subject.
For the email address of the SANUPS PV Monitor, use the "SANUPS PV Monitor E-mail address" field in "3.9 Setting up the Email Function" .
For the subject line, use one of the following titles.
(Enter using single-byte characters. Also, note that the input is not case-sensitive.)

PV Cond Request	*** * * Request for power generation state of all PV inverters**
PV Status Request	*** * * Request for information regarding PV inverter's state/measurements of PV inverter**
Setting Request	*** * * Request for information regarding SANUPS PV Monitor settings**
Log Request	*** * * Request for event logs (latest 10 logs)**
Log Request All	*** * * Request for all event logs (all logs)**

Do not include any body text in the email.

For a list of response emails, read "Appendix C Email Messages".

3.9 Setting up the Email Function

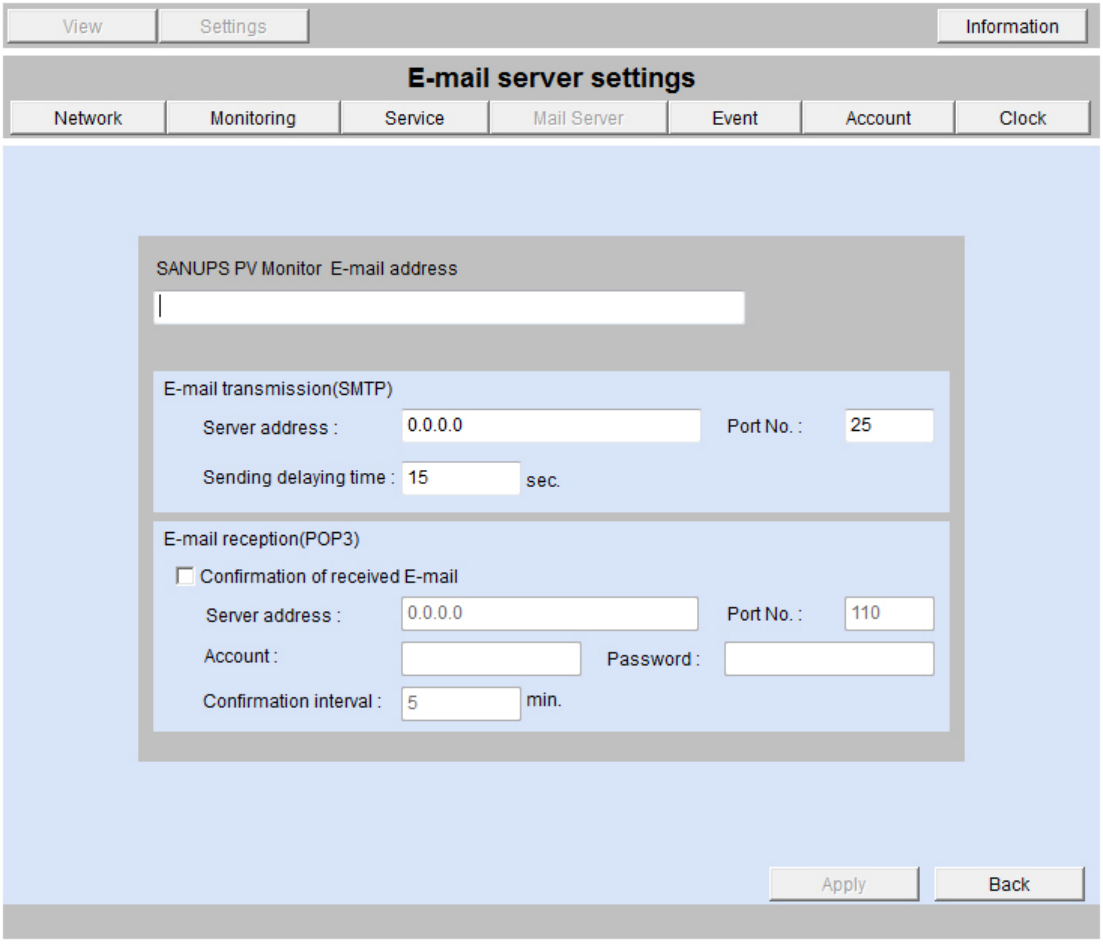
In this section, you set up a mail server (SMTP server) so that when a malfunction or other events occur on a PV inverter, an email notification will be sent to the specified email address.

You also set up a mail server (POP3 server) that enables you to query the SANUPS PV Monitor for state/measurements and then receive the information as an email.

[Operation]

Click "Settings" and then click "Mail Server".

The following screen appears.



[Item description]

[SANUPS PV Monitor E-mail address]

It serves as the sender's email address when an email is sent from the SANUPS PV Monitor.

(Enter an email address including the @ mark.)

[E-mail transmission (SMTP)]

This is the mail server (SMTP server) to use when the SANUPS PV Monitor sends out emails.

Setting	Description
Server address	Specify the IP address of the SMTP server.
Port No.	Specify the port number of the SMTP server. (The default port is 25.)
Sending delaying time	Specify the delay time to use (in seconds) when sending out emails to the SMTP server.

For the recipient address to use when an event occurs, read "3.13 Using Email to Send Notification" and then set up the email address for the recipient.

[E-mail reception (POP3)]

To receive information regarding state/measurements from the SANUPS PV Monitor, use a mailer program etc. to send an request by email to the SANUPS PV Monitor.
Here, you set up the mail server (POP3 server) for the SANUPS PV Monitor to receive such emails.

Setting	Description
Confirmation of received E-mail	Specify whether to check for email arrival at the POP3 server. If the check box is cleared, email arrival at the POP3 server will not be checked.
Server address	Specify the IP address of the POP3 server.
Port No.	Specify the port number of the POP3 server. (The default port is 110.)
Account	Specify an account name for authentification at the POP3 server.
Password	Specify a password for authentification at the POP3 server.
Confirmation interval	Specify a time interval to use to check for email arrival at the POP3 server.

Once the SANUPS PV Monitor retrieves emails from the POP3 server, the emails are then deleted from the POP3 server.

3.10 Setting the Clock in the SANUPS PV Monitor

The SANUPS PV Monitor comes with a built-in clock. This clock provides the standard time for use in creating data summary. Also, it is used for recording the time when the state of a PV inverter changes.

Use this function to set the clock regularly. You can use the following two methods to set the clock.

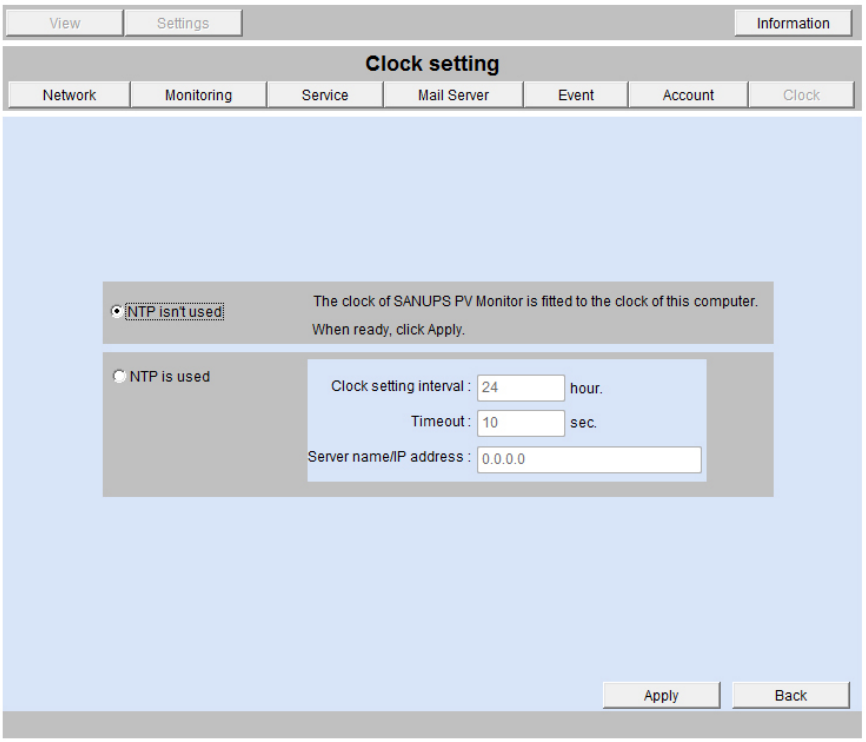
[1] Use the time of the computer running the Web browser as the time of the PV Monitor Box.

[2] Get the time information from an NTP server.

[Operation]

Click "Settings" on the main screen and then click "Clock".

The following screen appears.



[How to set the clock]

Select one of the following two methods to set the clock.

Clicking "Apply" sets the clock.

[1] Select "NTP isn't used" to set the clock.

In this case, just click "Apply".

The clock in the SANUPS PV Monitor is updated using the time of the computer running the Web browser.

[2] Select "NTP is used" to set the clock.

You can use this function if there is an NTP server on the network.

Setting	Description
Clock setting interval	Specify an interval to get clock information from the NTP server. The clock in the SANUPS PV Monitor will be set according to this interval. Specify the interval in by the hours.
Timeout	Specify the time to wait for response from the NTP server when getting the clock information. If there is no response during this period, an error is logged in the event log. (*1) If the error occurs often, increase this value.
Server name/IP address	Enter the address of the NTP server on the network.

*1 "**Clock Setting failure**" is recorded in the event log. (However, the "Clock Setting failure" event log recording function must be enabled.)

[To check whether the clock has been set by NTP]

If you want to know whether the clock has been set by the NTP server, click "View" and then "Event Log".

When the clock is set, a "**Clock setting change**" event is recorded.

(However, this requires that the "Clock Setting change" event log recording function is enabled.)

3.11 Event Settings

The SANUPS PV Monitor manages, as events, changes in PV inverter state such as malfunction/recovery as well as changes in SANUPS PV Monitor settings.

For each event, you can specify the following:

Whether to log the event

Whether to send an email

Event log

An event log can store the following information.

Change of state, such as the time a PV inverter malfunction occurs

Which device is used to change the SANUPS PV Monitor settings

For each event, you can specify whether to log the event or not.

Email transmission

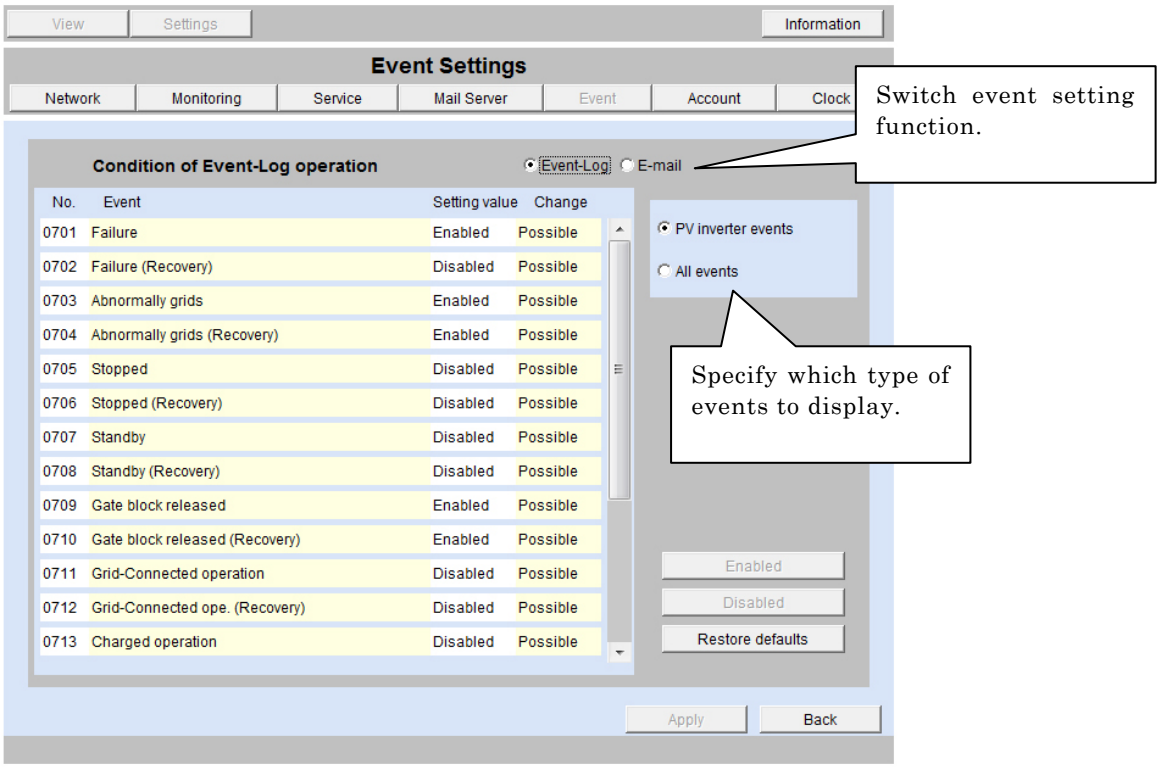
When an event occurs, you can send an email notification to the specified email address to indicate that an event has occurred.

3.12 Specifying the Event Logging Conditions

[Operation]

Click "Settings" on the main screen and then click "Event".

The following screen appears.



Event setting options

Name	Description
Event Log	Switch to event log setting.
E-mail	Switch to email transmission setting.

Buttons for settings

Button name	Description
Enabled	**Enable** the selected event. If the event was "**Disabled**", the setting is changed to "**Enabled**". In this setting, the event will be logged.
Disabled	**Disable** the selected event. If the event was "**Enabled**", the setting is changed to "**Disabled**". In this setting, the event will not be logged.
Restore defaults	Return the selected event to its default value.
Apply	Update the SANUPS PV Monitor with the changes made here.
Back	Return to the main screen. If the changes have not been updated to the SANUPS PV Monitor, no update will be performed.

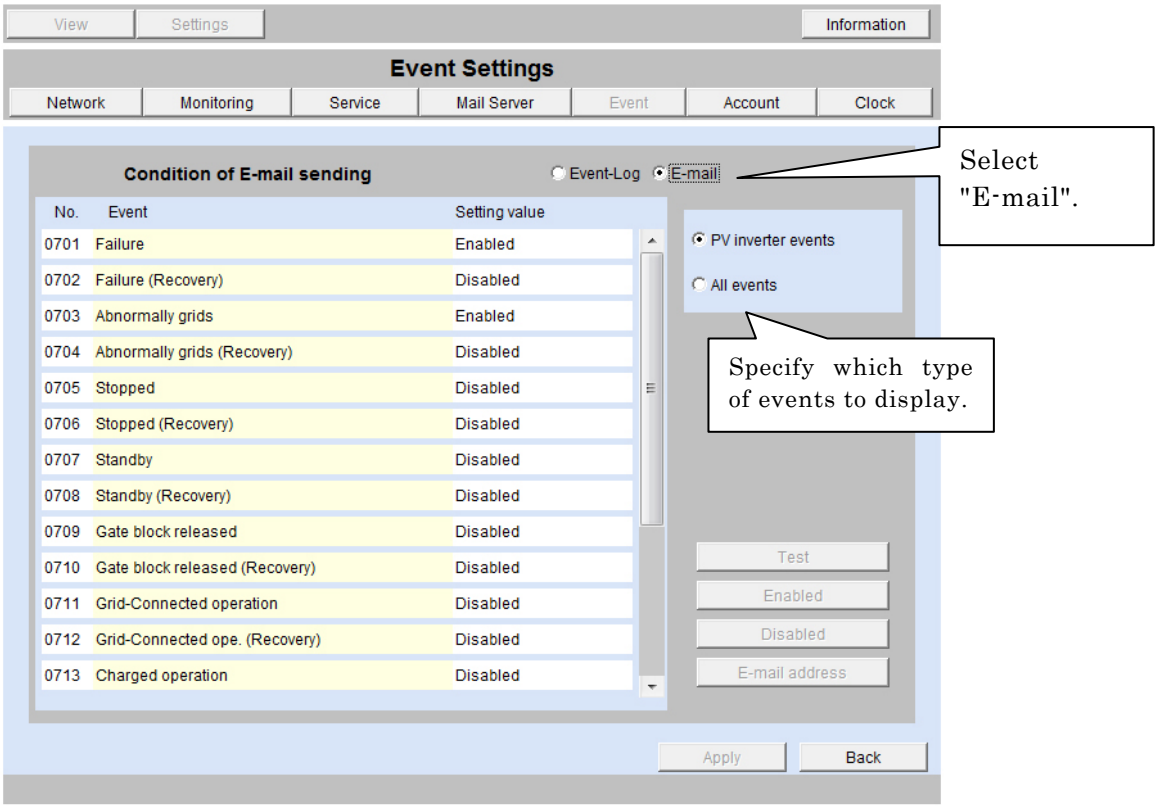
3.13 Using Email to Send Notification

From the list of events, you can select any event and then set an email address for this particular event. When the selected event occurs, the SANUPS PV Monitor will send an email notification to this address.

[Operation]

Click "Settings" on the main screen and then click "Event". Select “E-mail” on the Event Settings screen.

The following screen appears.



Buttons for settings

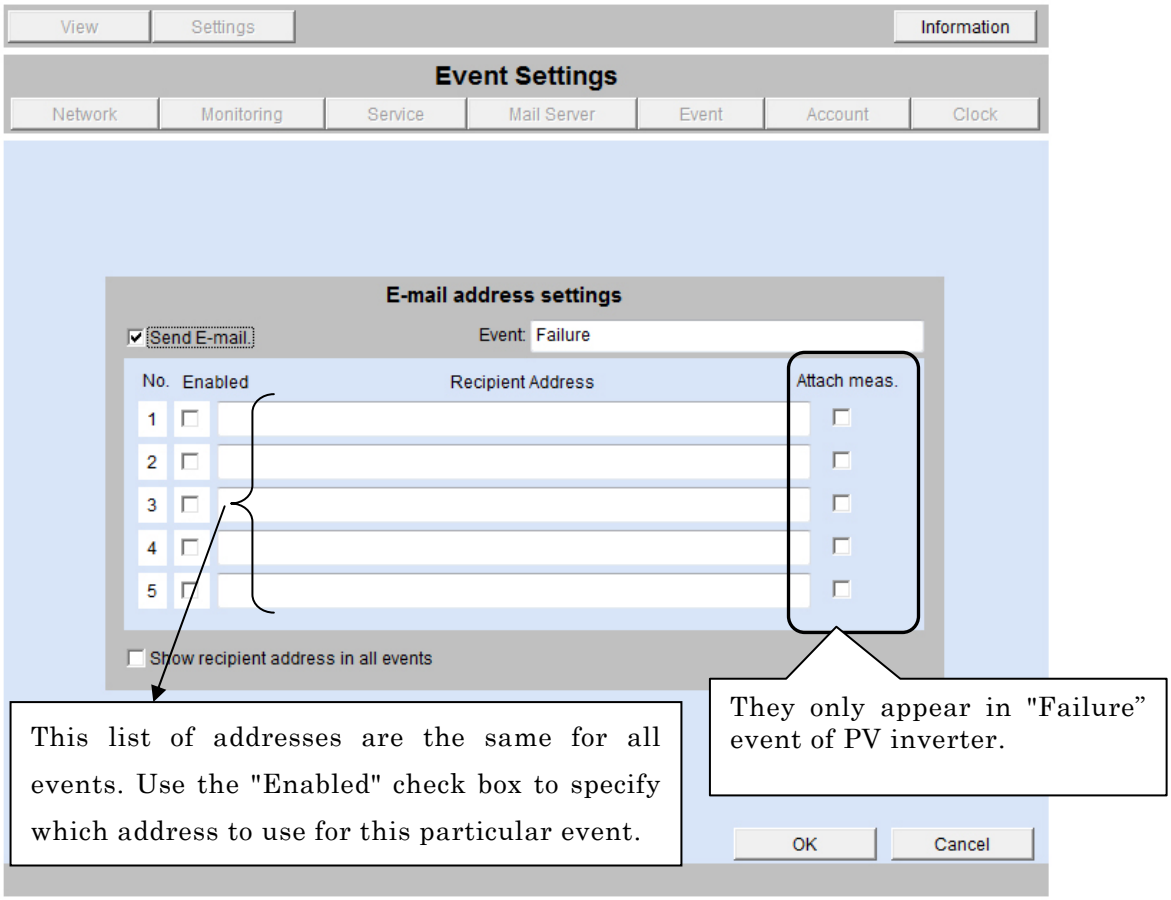
Button name	Description
Test	Send an email notification to the email address specified in the selected event for a test.
Enabled	**Enable** email transmission of the selected event. If the setting was "**Disabled**", it is changed to "**Enabled**". In this setting, an email notification will be sent when the selected event occurs.
Disabled	**Disable** email notification of the selected event. If the setting was "**Enabled**", it is changed to "**Disabled**". In this setting, no email notification will be sent when the selected event occurs.
E-mail address	Specify an email address to send the notification to when the selected event occurs.

Setting up recipients for email notification

[1] Select an event from the event list to set up email notification.

[2] Click "E-mail address".

The following screen appears.



The above figure shows the E-mail address settings screen for the "Failure" event.

For the "Failure" event, you can attach a history of measurements obtained during the one minute before the malfunction occurs to the email.

Button description

Button name	Description
Send E-mail	Select this check box if you want to send an email notification when the selected event occurs.
Enable	Select this check box for the respective email address if you want to send the email notification to the address when the selected event occurs.
Recipient Address	Specify a list of email addresses as recipients here. Up to 5 addresses can be registered.
Show recipient address in all events	Select this check box if you want to show these email address settings in all events.

3.14 Displaying PV Inverter State/Measurements and Event Logs

By using the view function, you can check the last state/measurements of a PV inverter obtained. Also, you can check the event logs.

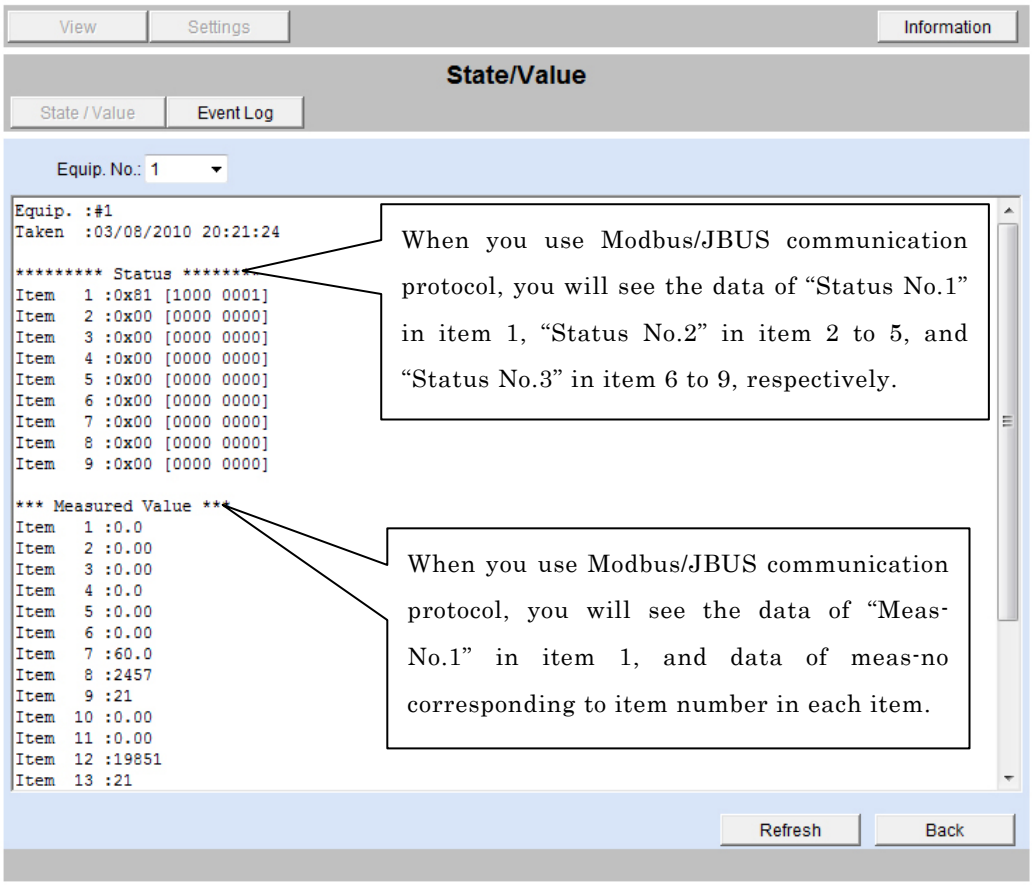
[Operation]

Click "View" on the main screen.

The following screen appears. Use the "Equip. No." combo box to select a PV inverter, by specifying its equipment number.

This screen is intended to supply information to the device maker when threr is a problem.

Unlike the Power Generation Status screen, state/measurements obtained normally from the PV inverter at the end are displayed, together with the date and time the data was obtained.

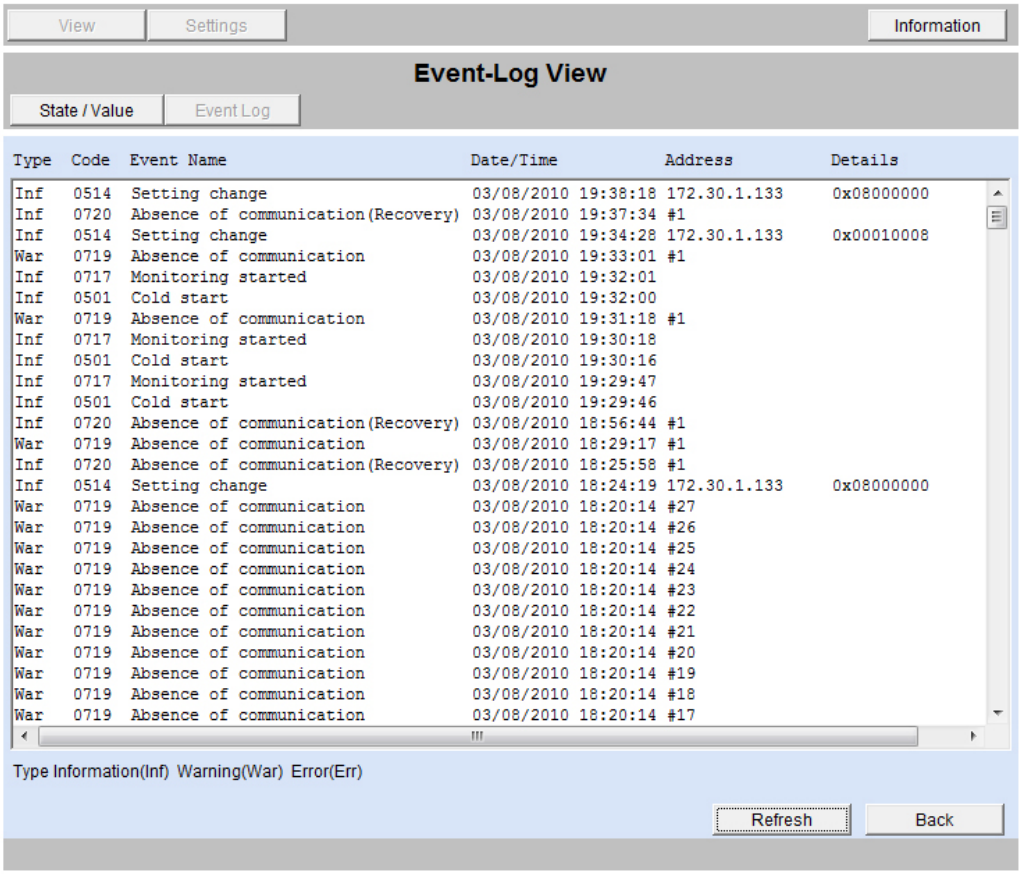


[Screen description]

Setting	Description
State/Value	Switch to the State/Value screen (this screen).
Event Log	Switch to the Event-Log View screen.

Event log

When you click "Event Log", you can check event logs recorded on the SANUPS PV Monitor. The SANUPS PV Monitor can store a maximum of 500 events.



[Screen description]

Setting	Description
Type	Indicates the type of an event.
Code	Indicates the code of an event.
Event Name	Indicates the name of an event.
Date/Time	Indicates the date and time an event occurs.
Address	Indicates an IP address if access is from outside. For a PV inverter event, the equipment number of the PV inverter appears, preceded by the # mark.
Details	Indicates details about an event.

3.15 Checking the SANUPS PV Monitor Version Information

You can check the following information about the SANUPS PV Monitor.

ROM version (firmware version)

WEB version (Web applet version)

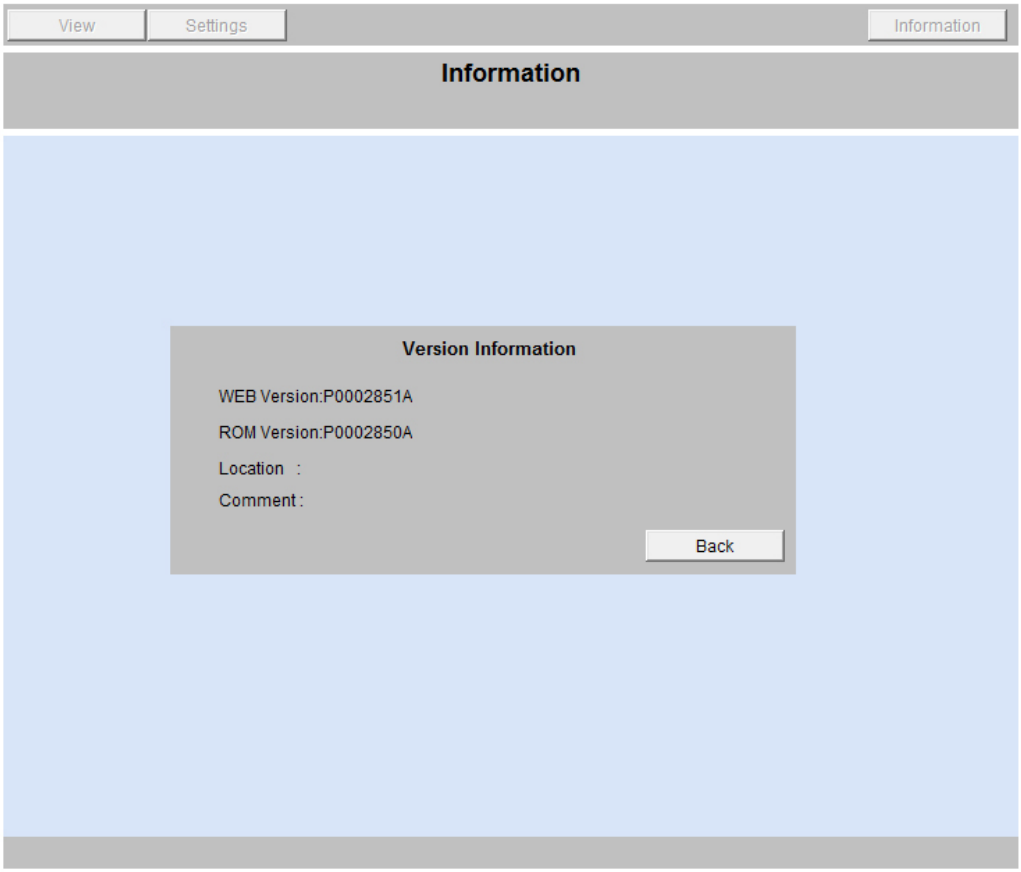
Location (installation location specified as network information)

Comment (comment specified as network information)

[Operation]

Click "Information".

The following screen appears.



4. Using a Terminal Program

You can use an RS232C cable to connect the "Setting Connector" on the SANUPS PV Monitor to a computer and then run a terminal program (such as Windows HyperTerminal) from the computer. You can also connect a Telnet/SSH client to the SANUPS PV Monitor via the network.

However, **it is not possible to connect multiple terminal programs to the SANUPS PV Monitor.**

4.1 Connecting to the SANUPS PV Monitor Serially

If your forget the account information of Administrator of the SANUPS PV Monitor, or if network communication is not possible due to some network problems, you can run a terminal program (such as Windows HyperTerminal) to set the SANUPS PV Monitor. In this case, connect the computer to the SANUPS PV Monitor with a commercially available RS232C cable (9-pin cross cable).

Use the following information to set up the terminal program.

(1) Serial communication settings

Bits per second : 9600
Data bits : 8
Parity : None
Stop bits : 1
Flow Control : None

(2) Character conversion

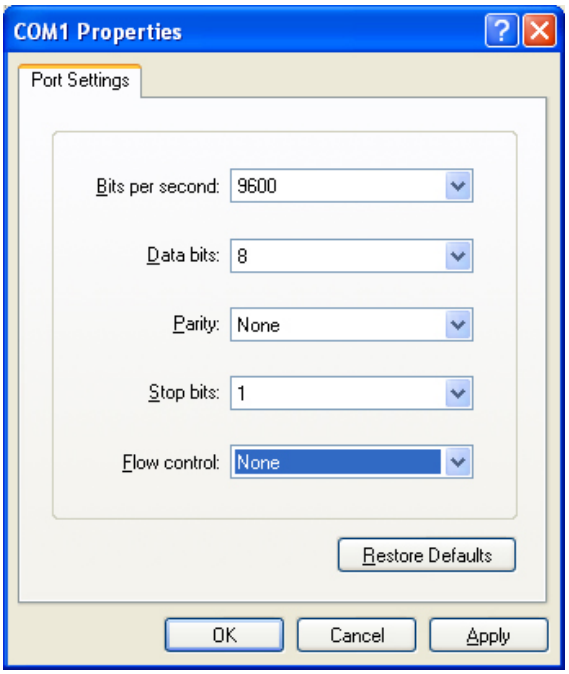
(A) ASCII Sending

Send line ends with line feed : OFF
Echo typed characters locally : OFF

(B) ASCII Receiving

Append line feeds to incoming line ends : OFF

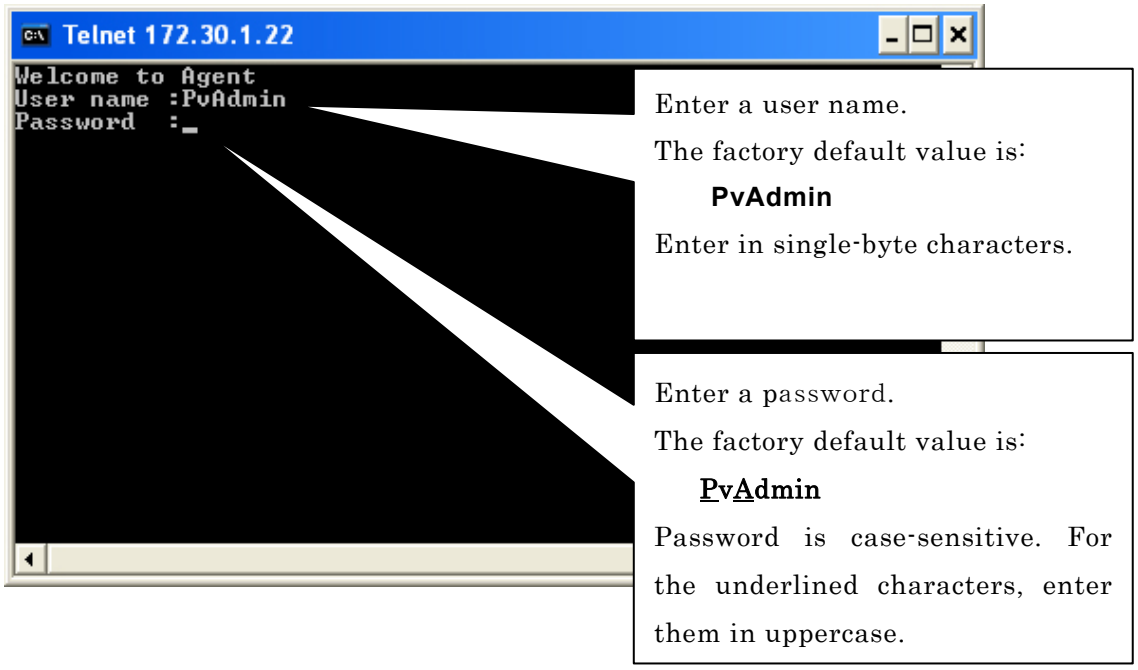
The following figure is an example of using HyperTerminal to specify communication settings.



4.2 Using Telnet Client

Telnet functions are the same ones as in serial connection to the SANUPS PV Monitor described earlier.

Run a Telnet client from a computer that can connect to the SANUPS PV Monitor via the network and log in.



Once the user name and password are authenticated, the Main Menu appears.

4.3 Using SSH Client

SSH functions are the same ones as in serial connection to the SANUPS PV Monitor described earlier.

Run an SSH client from a computer that can connect to the SANUPS PV Monitor via the network and log in using the authentication method specified in the "SSH settings" section of "3.6 Changing the Service Settings".

Once SSH is authenticated, the Main Menu appears.

<Note>
When you run the SSH client and then log in using the Administrator or Limited User account, note that both the account name and password are case-sensitive.

Also, when you log in from the SSH client, note that the account name must not exceed 16 characters. (The password must not exceed 20 characters.)
If the name of the Administrator or Limited User account has more than 16 characters, change the name so that it does not exceed 16 characters.

<Note>
In the SSH2.0 protocol, the session key is exchanged in a certain period.

However, because the SANUPS PV Monitor does not support session key exchange, when the time comes for session key exchange, the connection is cut off.

In the SSH client setting, if session key exchange option can be changed, you can extend the exchange period.

(Example) Client configuration file of OpenSSH (ssh_config)
    RekeyLimit 4G

4.4 Main Menu

When you use a serial connection with a terminal program, or a Telnet/SSH client to connect to the SANUPS PV Monitor, the Main Menu appears as follows:

```
   Main Menu
1.Configuration
2.Display
3.Locale
4.Event
5. Ping
6.Download/Upload
7.Exit
Agent>
```

Here is an outline of the Main Menu options.

Menu option	Description
1.Configuration	Configure the SANUPS PV Monitor operation. This includes configuring the network and specifying the monitoring conditions. Adding, modifying, and deleting equipment or specifying measurement and status information is not available with Modbus/JBUS communication protocol. In that case, use the WEB tool.
2.Display	Display PV inverter state/measurements, SANUPS PV Monitor-specific information, and event logs.
3.Locale	Set the SANUPS PV Monitor time, date/time display format, time zone, and language.
4.Event	Perform event settings.
5.Ping	Run the Ping command to check the network connection.
6.Download/Upload	Download or upload SANUPS PV Monitor settings.
7.Exit	Exit this program.

The following sections describe the frequently used functions among those available to terminal programs that cannot be performed by the Web Administrative Tool.
For functions not covered here, refer to "Appendix D Menu Functions Accessible from Terminal Programs".

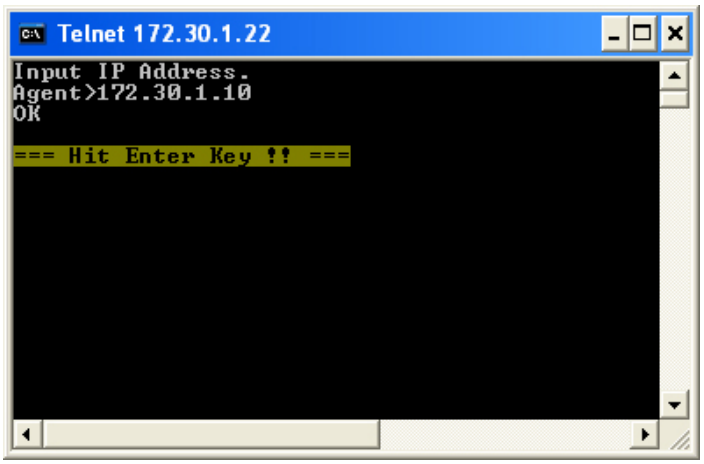
Section	Overview
4.5 Checking the Network Connection (Ping)	This section describes how to use the Ping command to check the connection between the SANUPS PV Monitor and a specified device.
4.6 Downloaidng/Uploading the SANUPS PV Monitor Settings	This section describes how to download or upload the SANUPS PV Monitor settings.

(Information)
If you have changed the IP address of the SANUPS PV Monitor, exit the Main Menu. After you exit the Main Menu, the IP address will be updated.

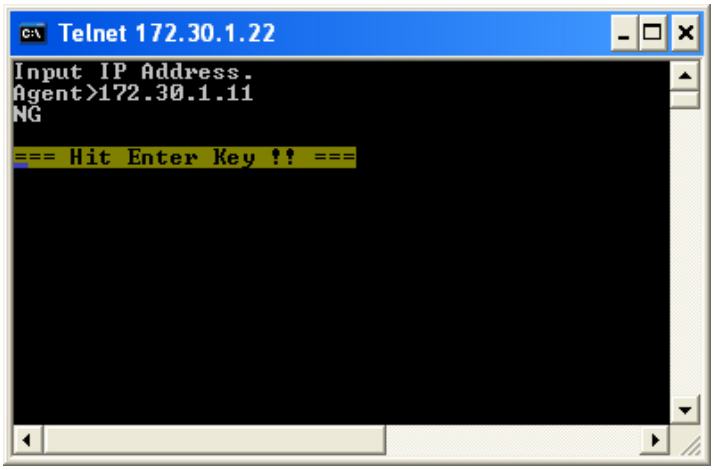
4.5 Checking the Network Connection (Ping)

You can ping the IP address of a specific device from the SANUPS PV Monitor to check the connectoin between the SANUPS PV Monitor and the device.

By entering the IP address of the other device, you can check the communication between them.



As shown in the figure, if communication with 172.30.1.10 is possible, OK appears.



If communication with 172.30.1.11 is not possible, NG appears.

<Important>
Host name cannot be used as input. If you enter a host name here, NG will appear.

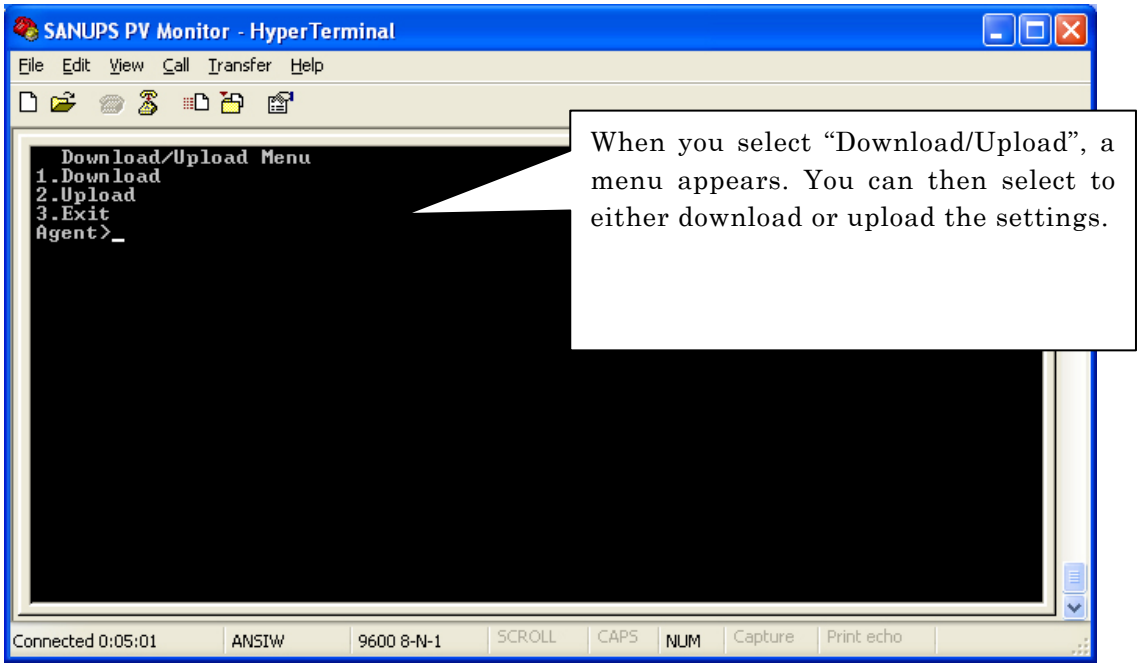
4.6 Downloaidng/Uploading the SANUPS PV Monitor Settings

You can save the settings of the SANUPS PV Monitor to a file. When you replace the SANUPS PV Monitor, you can load the settings from the file into the new SANUPS PV Monitor.
This function enables fast recovery from SANUPS PV Monitor malfunction, etc.

<Important>
This function cannot be used from a Telnet client.
Use an RS232C cable (cross cable) to connect the "Setting Connector" on the SANUPS PV Monitor to the computer, and then perform the settings from the terminal program.
Because data transfer makes use of the Xmodem protocol, the terminal program must be able to support the Xmodem protocol.

Furthermore, because the SANUPS PV Monitor does not support the CRC option in the Xmodem protocol, when the terminal program uses CRC option to perform upload, after three times of packet timeouts, the operation moves to checksum approach of Xmodem protocol and then start transmission.

In the following explanation, HyperTerminal is used as a terminal program.



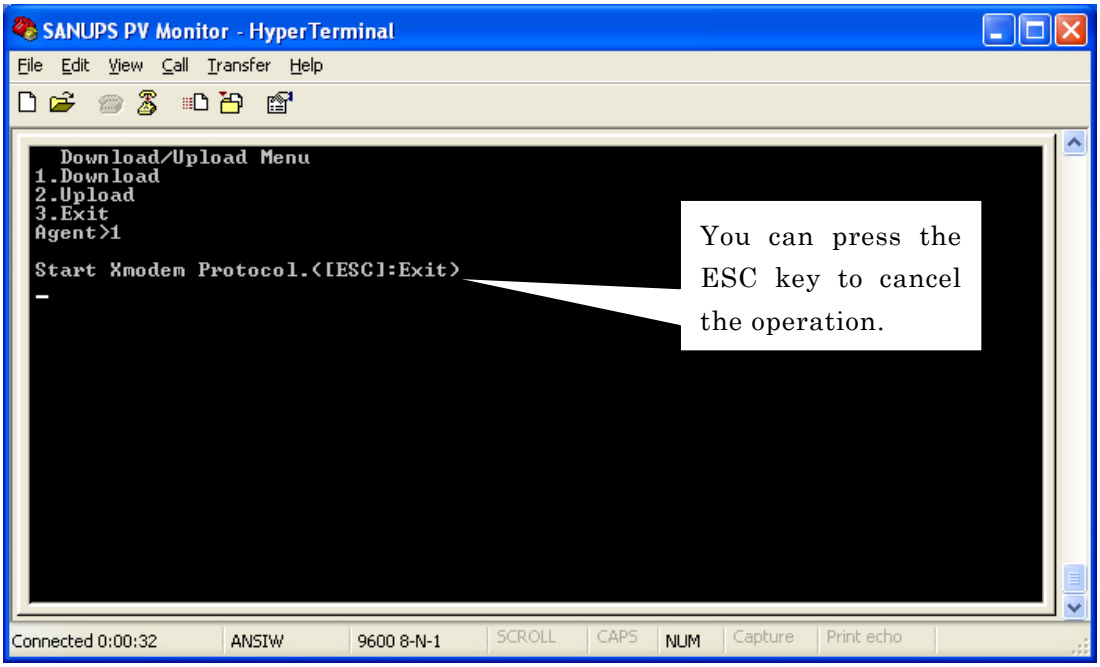
The size of the downloaded file is about 11 Kbytes. (The download time is about one minute.)

Download and upload methods

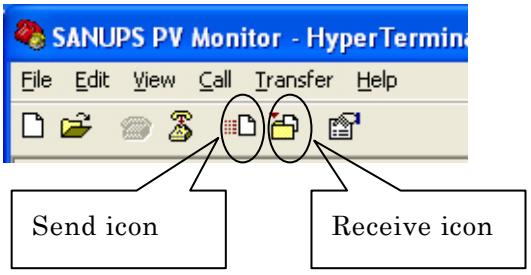
(The explanation here uses HyperTerminal.)

[1] From the menu, select Download (or Upload).

(In the following figure, "1.Download" is selected.)



[2] From HyperTerminal, click the receive (or send) icon.



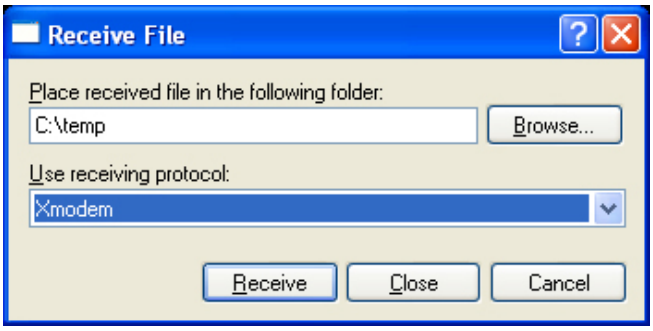
To download information, click the receive icon.

To upload information, click the send icon.

<Important>

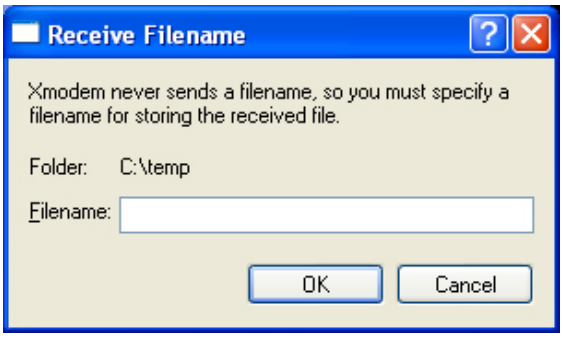
Before uploading the settings, change the monitoring function to "Disable".

[3] Receive (or send) the information.



From the "Use receiving protocol" list, select Xmodem. Then, click "Receive".

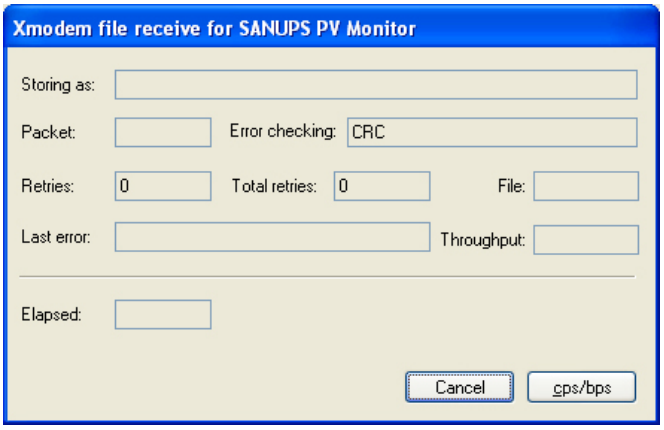
Enter the name of a file to save the information.



Click "OK". The following screen appears.

In a short while after this screen appears, data transfer starts.

When data transfer is finished, this screen goes away.



The procedure to upload a file is the same as the procedure described above.

4.7 Other Menu Functions Accessible from Terminal Programs

For details on other menu functions accessible from terminal programs, read "Appendix D Menu Functions Accessible from Terminal Programs" and "Appendix E Commands Accessible from Terminal Programs".

5. Using SNMP Manager to Manage the SANUPS PV Monitor

5.1 Overview

The SANUPS PV Monitor supports SNMP agent (private MIB).
By default, it accepts access from all SNMP Managers. Therefore, without modifying any setting, you can use an SNMP Manager to monitor the state of PV inverter and get measurements. To specify a trap or to set up a community, you can do so from the Web Administrative Tool or a terminal program.

To strengthen the security of the SANUPS PV Monitor, you can restrict access from the SNMP Manager. This allows you to restrict access from unauthorized computers.

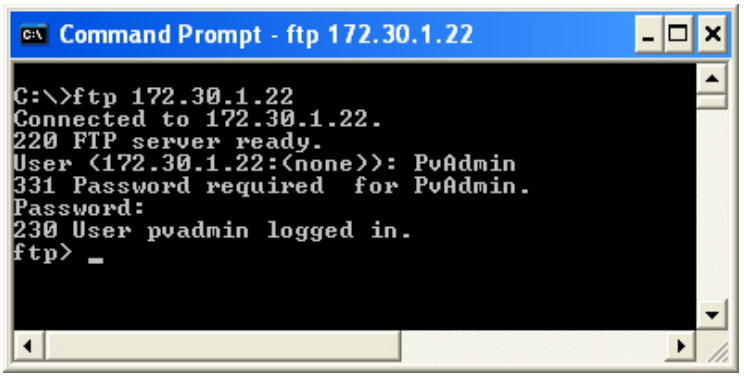
5.2 Monitoring PV Inverter State

You can use the SNMP Manager to get PV inverter's state/measurements. Also, by monitoring SNMP trap that is sent when there is a change in the PV inverter's state, you can monitor the PV inverter's state.

6. Using FTP to Get Data Summary

From an FTP client, you can access the SANUPS PV Monitor and then get the SANUPS PV Monitor settings, event logs, and data summary.
Also, you can re-enter the SANUPS PV Monitor settings in the SANUPS PV Monitor. (To retrieve SANUPS PV Monitor settings, follow the "Download" procedure in "4.6 Downloading/Uploading the SANUPS PV Monitor Settings".)

Access the SANUPS PV Monitor from the FTP client, and then use the SANUPS PV Monitor's account to log in.



Access SANUPS PV Monitor from an FTP client

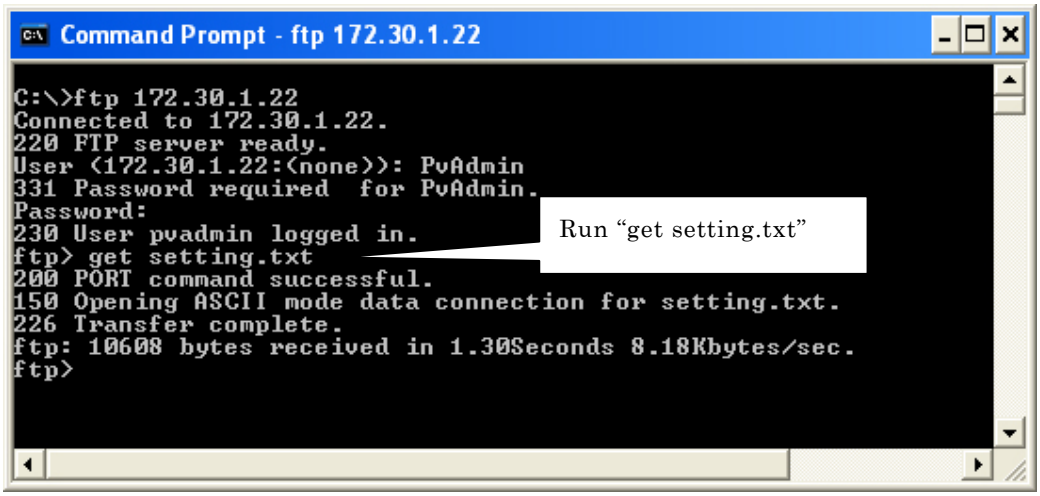
Use SANUPS PV Monitor's account and password to log in.

The "**get**", "**put**", "**ls**", and "**quit**" commands can be used.

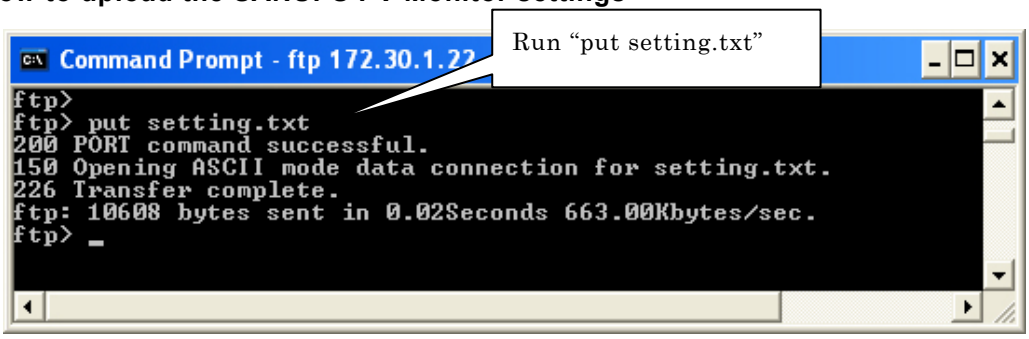
SANUPS PV Monitor settings	: **setting.txt**
SANUPS PV Monitor event log	: **evlog.txt** (support get only)
PV inverter's state/measurements	: **measure.txt** (support get only)
10-minute data summary	: **10min_YYMMDD.csv** (support get only)
	*For all data: **10min_all.csv** (support get only)
1-hour data summary	: **hour_YYMMDD.csv** (support get only)
	*For all data: **hour_all.csv** (support get only)

You can operate the above five types of files.

How to download the SANUPS PV Monitor settings



How to upload the SANUPS PV Monitor settings



<Important>

Before uploading the SANUPS PV Monitor settings, change the monitoring function to "Disabled".

Appendix A Event List

The following table lists the default values of event logging and email notification settings. For any necessary event, change its logging or email notification setting.
(However, if an event in the event list on the Event Settings screen cannot be modified, then you cannot change the settings.)

<PV inverter events>

Event No.	Event name	Logging	Email notification
0701	Failure	Enabled	Enabled
0702	Failure (Recovery)	Enabled	Disabled
0703	Abnormally grids	Enabled	Enabled
0704	Abnormally grids (Recovery)	Enabled	Disabled
0705	Stopped	Disabled	Disabled
0706	Stopped (Recovery)	Disabled	Disabled
0707	Standby	Disabled	Disabled
0708	Standby (Recovery)	Disabled	Disabled
0709	Gate block released	Disabled	Disabled
0710	Gate block released (Recovery)	Disabled	Disabled
0711	Grid-Connected operation	Disabled	Disabled
0712	Grid-Connected ope. (Recovery)	Disabled	Disabled
0713	Charged operation	Disabled	Disabled
0714	Charged operation (Recovery)	Disabled	Disabled
0715	Isolated operation	Disabled	Disabled
0716	Isolated operation (Recovery)	Disabled	Disabled
0717	Monitoring started	Enabled	Disabled
0718	Monitoring stopped	Enabled	Disabled
0719	Absence of communication	Enabled	Disabled
0720	Absence of communication(Recovery)	Enabled	Disabled
0721	Exception Response	Enabled	Disabled

Note: Event No.0721 is logged when you use Modbus/JBUS communication protocol and an exception response is received from the connected equipment.

<Events other than PV inverter events>

Event No.	Event name	Logging	Email notification
0203	LAN communication trouble	Disabled	Disabled
0204	LAN com. trouble recovered	Disabled	Disabled
0205	Address conversion failure	Enabled	Disabled
0307	Rec. Program update request	Enabled	Disabled
0308	Session confirmed	Disabled	Disabled
0309	Rec. session releasing req.	Disabled	Disabled
0310	Illegal access	Enabled	Disabled
0311	Requested protocol error	Disabled	Disabled
0320	Functional Test req. reception	Enabled	Disabled
0321	Status request E-Mail receiving	Disabled	Disabled
0322	E-Mail reception failure	Enabled	Disabled
0401	Finished sending E-Mail	Disabled	Disabled
0402	Failed to send E-Mail	Enabled	Disabled
0403	Finished sending SNMP-Trap	Disabled	Disabled
0404	Failed to send SNMP-Trap	Enabled	Disabled
0413	Session releasing notice	Disabled	Disabled
0501	Cold start	Enabled	Disabled
0513	Clock setting change	Disabled	Disabled
0514	Setting change	Enabled	Disabled
0520	Setting Info. update complete	Enabled	Disabled
0521	Setting Info. update failure	Enabled	Disabled
0522	Clock Setting failure	Enabled	Disabled

Appendix B　Read This Information When Using a Web Browser

When you use a Web browser to run the Web Administrative Tool, make sure your Web browser supports Java applets.
Make sure your Web browser has been set up to run Java applets.

If Internet Explorer 8 is used

For JavaVM (Java runtime environment), both Microsoft and Sun Microsystems supply their version of JavaVM. However, be sure to always use the JavaVM from Sun Microsystems.
Because Internet Explorer 8 does not come with JavaVM, you must install JavaVM from Sun Microsystems into the Web browser before you can run the Web Administrative Tool in the browser. (*1)

*1 JavaVM from Sun Microsystems can be downloaded from the following URL.
http://www.java.com/en/download/manual.jsp
This URL is the download page of the latest JavaVM as of August, 2010.
For details on how to install JavaVM from Sun Microsystems, refer to the installation procedure available from the download page.

Appendix C Email Messages

(A) Power generation status information

Email request	
Subject	**PV Cond Request**

(Note) Each word is not case-sensitive. Also, insert a single-byte space character between words.

Email response	
Subject	**Re:PV Cond Request**
Body text	[Taken] Time data is taken (MMDDYYYY HH:MM:SS) [DC Power] DC power (kW) [AC Power] AC power (kW) [Solar Radiation] Solar radiation (kW/m2) [Outdoor Temperature] Outdoor temperature (C) [All Power] Total cumulative power (kWh) [Today's Power] Today's cumulative power (kWh) [CO2 Reduction] CO2 amount reduced (kg-CO2) (Example) [Taken] 01/12/2010 13:52:31 [DC Power] 5.8 kW [AC Power] 5.5 kW [Solar Radiation] 0.639 kW/m2 [Outdoor Temperature] 7.1 C [All Power] 125 kWh [Today's Power] 7 kWh [CO2 Reduction] 82.5 kg-CO2

(B) PV inverter state/measurements

Email request	
Subject	**PV Status Request**

(Note) Each word is not case-sensitive. Also, insert a single-byte space character between words.

Email response	
Subject	**Re:PV Status Request**
Body text	Device number Time data is taken State (repeated for the number of information) Measurements (repeated for the number of information) (repeated for the number of device) The format is the same as the state/measurements screen on the Web. (Example) Equip. :#1 Taken : 12/21/2009 16:53:52 ******* Status ******* Item 1 :0x81 [1000 0001] Item 2 :0x00 [0000 0000] Item 3 :0x00 [0000 0000] Item 4 :0x00 [0000 0000] Item 5 :0x00 [0000 0000] Item 6 :0x00 [0000 0000] Item 7 :0x00 [0000 0000] Item 8 :0x00 [0000 0000] Item 9 :0x00 [0000 0000] *** Measured Value *** : : Equip. :#2 Taken :2009/12/21 16:53:52 ******* Status ******* Item 1 :0x81 [1000 0001] Item 2 :0x00 [0000 0000] :

(C) SANUPS PV Monitor settings information

Email request	
Subject	**Setting Request**

(Note) Each word is not case-sensitive. Also, insert a single-byte space character between words.

Email response	
Subject	**Re:Setting Request**
Body text	[IP Address] IP address (XXX.XXX.XXX.XXX) [MAC Address] MAC address (XX-XX-XX-XX-XX-XX) [Program Ver.] ROM program version (P000XXXX) [Web Program Ver.] Web applet program version (P000XXXX) [Protocol] Serial communication protocol type (Type A/Type B) [Number of PV Inverters] Number of units [Total Capacity] Total capacity (kW) [Monitoring] Monitoring (Enabled)/(Disabled)) [Sampling Summary Start Time] Sampling start time (H) [Sampling Summary Stop Time] Sampling stop time (H) [Measure Solar Radiation] Solar radiation measurement (No measurement (None)/Measurement device number (N)) [Measure Outdoor Temperature] Outdoor temperature measurement (No measurement (None)/ Measurement device number(N)) [DipSW] DipSW state bitmap(XXXX) → States of bits 1 to 4 (0=OFF/1=ON) (Example)1010 → bits 1 and 3 are ON (Example) [IP Address] 172.30.1.128 [MAC Address] XX-XX-XX-XX-XX-XX [Program Ver.] P0002850A [Web Program Ver.] P0002851A [Protocol] Type A [PV Inverters] 1 [Total Capacity] 10 kW :

(D) Event log information (latest 10 logs)

Email request	
Subject	**Log Request**

(Note) Each word is not case-sensitive. Also, insert a single-byte space character between words.

Email response	
Subject	**Re:Log Request**
Body text	[Number. Type Event number Time of event Related address Details] : (Latest 10 logs in descending order) (Example) [1. Inf <0514> <2003/11/06 20:32:14> <172. 30. 1.128> <0x00000002>] [2. Inf <0514> <2003/11/06 20:30:10> <172. 30. 1.128> <0x00000002>] : [10. Inf <0514> <2003/11/06 20:00:20> <172. 30. 1.128> <0x00000002>]

(E) Event log information (all)

Email request	
Subject	**Log Request All**

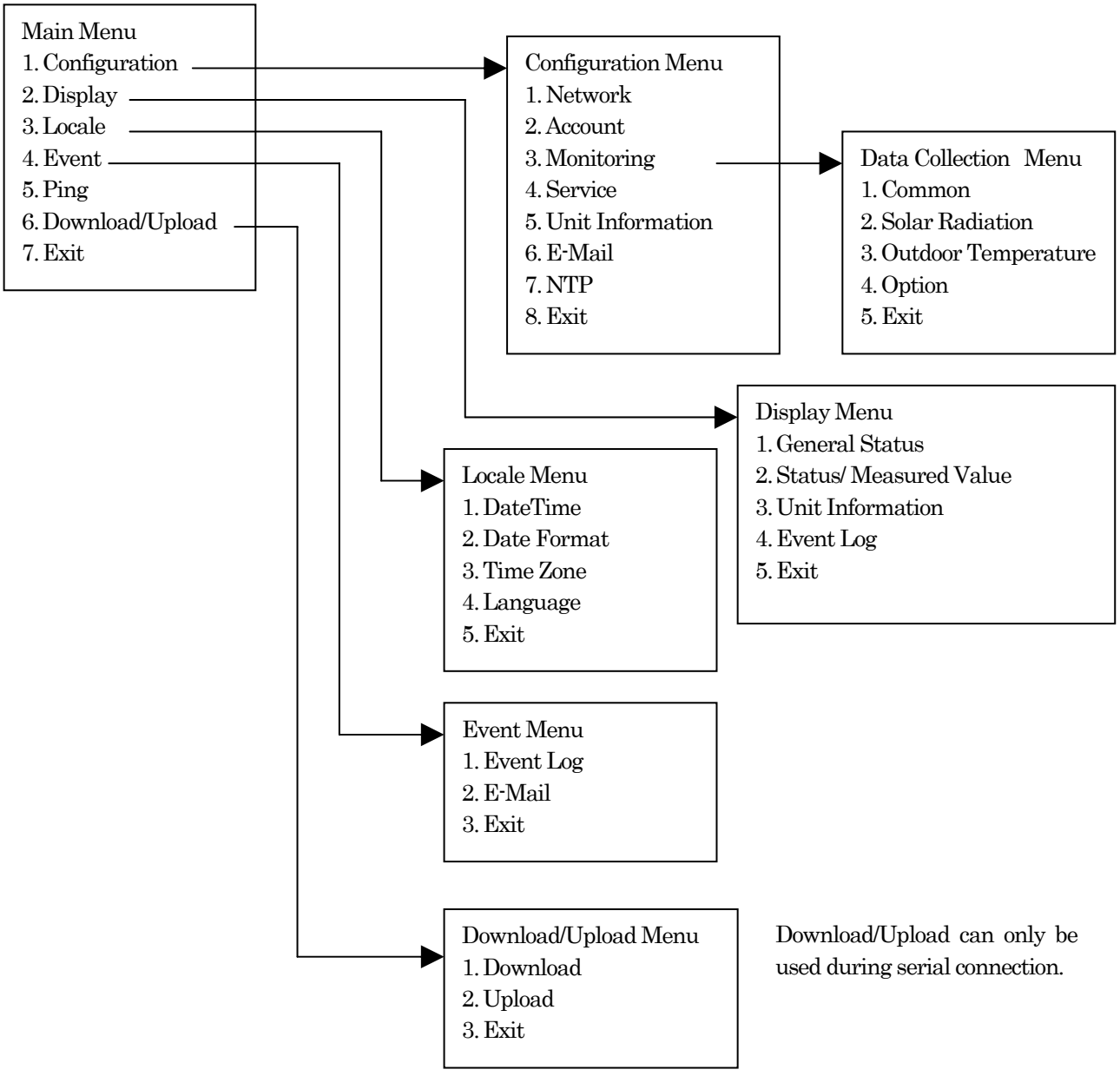
(Note) Each word is not case-sensitive. Also, insert a single-byte space character between words.

Email response	
Subject	**Re:Log Request All**
Body text	[Number. Type Event number Time of event Related address Details] : (All) (Example) [1. Inf <0711> <2003/11/06 20:32:14> <#2> <0x8100000000000000>] [2. Inf <0514> <2003/11/06 20:30:10> <172. 30. 1.128> <0x00000002>] : [640. Inf <0514> <2003/11/06 20:00:20> <172. 30. 1.128> <0x00000002>]

Appendix D Menu Functions Accessible from Terminal Programs

The following figure shows the menu of the Terminal Programs.structure and functions of the Main Menu.
In the terminal program, you can press the ESC key to cancel the current input and then return to the previous screen.

(A) Menu structure



Download/Upload can only be used during serial connection.

(B)Menus and function overview

[Main Menu]

Menu	Function overview	Related function in Web Administrative Tool
"5. Ping"	From the SANUPS PV Monitor, you can **ping** the IP address of a specific device to check the connection between the SANUPS PV Monitor and the device.	None
"6. Download/Upload"	Upload or download all information about the SANUPS PV Monitor settings.	None

[Configration Menu]

Menu	Function overview	Related function in Web Administrative Tool
"1. Network"	Specify the SANUPS PV Monitor's network information.	Network setting function
"2. Account"	Specify account information.	Account setting function
"3. Monitoring"	Specify monitoring conditions.	Monitoring setting function※1
"4. Service"	Specify service information.	Service setting function
"5. Unit Information"	Specify installation location and comments.	Network setting function
"6. E-Mail"	Specify the mail server information.	E-mail server setting function
"7. NTP"	Specify NTP server information.	Clock setting function

※1 : When you use SANUPS PV communication protocol, no-communication monitoring conditions (whether to monitor with no-communication , confirmation interval) cannot be specified by the WEB Administrative Tool. If you want to specify the no-communication monitoring conditions, select "1.Configration Menu" on the Main Menu, select "3. Monitoring", and select "4.Option", and then specify the conditions in the terminal program.

[Display Menu]

Menu	Function overview	Related function in Web Administrative Tool
"2. Status/ Measured Value"	Display PV inverter state/measurements.	State/value display function
"3. Unit Information"	Display the SANUPS PV Monitor's software version, serial number, and MAC address.	Similar to the information display function, but you can check much more specific information of the SANUPS PV Monitor.
"4. Event Log"	Display the event log information.	Event log display function

[Locale Menu]

Menu	Function overview	Related function in Web Administrative Tool
"1. DateTime"	Set the clock in the SANUPS PV Monitor to any time. This function cannot be used when "NTP isn't use" is selected.	Clock setting function
"2. Date Format"	Specify date/time format for use by the Web Administrative Tool and terminal programs, and in email notification.	None
"3. Time Zone"	Specify the time correction for email transmission time (time difference measured from GMT).	None
"4. Language"	Specify a language used in the display on the Web Administrative Tool.	None

Appendix E　Commands Accessible from Terminal Programs

When the Main Menu appears in a terminal program, you can use the following commands.
The functions equivalent to these commands are not available in the Web Administrative Tool.
Note that the commands must be entered in lower case.

Command list

Command	Function overview	Notes
reset	Peform a software reset on the SANUPS PV Monitor. The CPU is reset 30 seconds after this command is executed.	
init	Initialize the SANUPS PV Monitor settings, data summary, etc, and return them to their factory default settings.	
sgport	Change the TCP/IP communication port used for communicating with the Web Administrative Tool. This port is a listening port on the SANUPS PV Monitor. After you use this command to change the port, execute the reset command.	Default COMBI : 30001(reserved) WebTool :30002
encode [ON/OFF]	Specify whether to encode data used in the TCP/IP communication with the Web Administrative Tool. For PC with IP masquerade set up, when you use the Web Administrative Tool, set encode to OFF.	Default: ON
dipsw	Display the DIP switch state.	
rtu	Specify the communication speed if RTU is connected.	Default: 9600bps

Appendix F　PV Inverter Device Capacity List

The device capacities of PV inverters are listed below.

List of device capacities

Model Name	Capacity	Notes
SANUPS PMC	The capacity is unit capacity (10kW) x number of units.	
SANUPS P73D103	10kW	
SANUPS P73E103	The capacity is unit capacity (10kW) x number of units.	
SANUPS P73F103	The capacity is unit capacity (10kW) x number of units.	
SANUPS P83B104R	100kW	
SANUPS P83B104S	100kW	
SANUPS P83B104C	100kW	

Appendix G Measurement and status information when using Modbus/JBUS communication protocol

This section describes measurement and status information when using Modbus/JBUS communication protocol.

(A) Measurement information

Available Meas-No. is different depending on the type of device (PV inverter / other measuring instruments).
Meas-No.1 to No.22 is available in the PV inverter, but you should specify a system- fixed measurement value for No.1 to No. 20.
For the measuring instruments, Meas-No.1 to No.7 is available. However, as for Meas-No.1 to No.6, averages are stored in creating data summary at 10-minute intervals, but as for Meas-No.7, data collected last in 10 minutes is stored.
The following table shows the measurement no., applications, and default comments of each type of device.

Meas-No	PV inverter		Measuring instrument	
	Application	Default	Application	Default
1	DC voltage (V)	DC_V	Option	None
2	DC current (A)	DC_A	Option	None
3	DC power (kW)	DC_W	Option	None
4	AC voltage (V)	AC_V	Option	None
5	AC current (A)	AC_A	Option	None
6	AC power (kW)	AC_W	Option	None
7	Frequency (Hz)	FREQ	Option (cumulative value, etc.)	(special meas.)
8	Cumulative power generated by one unit (kW·h)	CUMULATIVE_POW		
9	Cumulative power charged by one unit (kW·h)	CUMULATIVE_CHG		
10	Total AC power(+) (kW)	TOTAL_AC_W+		
11	Total AC power(-) (kW)	TOTAL_AC_W-		
12	Cumulative total power generated (kW·h)	TOTAL_CUMULATIVE_POW		
13	Cumulative total power charged (kW·h)	TOTAL_CUMULATIVE_CHG		
14	Battery voltage (V)	BATT_V		
15	Battery charge current (A)	CHG_A		
16	Battery discharge current (A)	BATT_A		
17	Solar radiation (kW/m2) Input 1 to 5(V)	SOLAR_RADIATION1_5		
18	Outdoor temperature (℃) Input 1 to 5(V)	OUTDOOR_TEMP1_5		
19	Solar radiation (kW/m2)	SOLAR_RADIATION		
20	Outdoor temperature (℃)	OUTDOOR_TEMP		
21	Option	SPARE1		
22	Option	SPARE2		