HIOKI

Instruction Manual

HIOKI Standby Power Measurement Software

- ✓ This manual explains the free software (HIOKI Standby Power Measurement Software) for the HIOKI Power Meter series only.
- ✓ Please refer to the Instruction Manual for your Power Meter for details regarding communication settings.
- ✓ Although all reasonable care has been taken in the production of this manual, should you find any points which are unclear or in error, please contact your local distributor or the HIOKI International Sales & Marketing Division at os-com@hioki.co.jp.
- ✓ In the interest of product development, the contents of this manual may be subject to revision without notice.
- ✓
- ✓ Be sure to review the Instruction Manual for your Power Meter before using the software.

Contents

1. Introduction

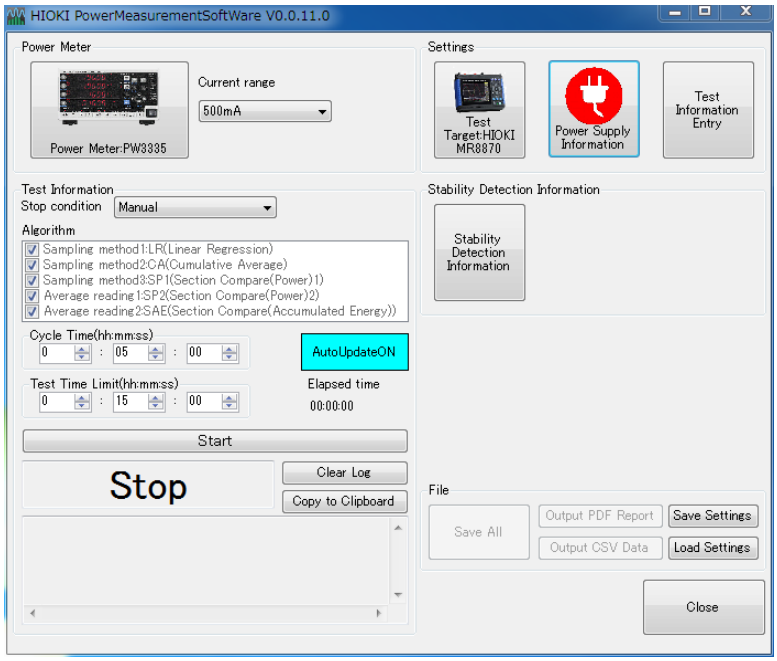
“HIOKI Standby Power Measurement Software” is application software exclusively used for the HIOKI Power Meter series.
This software allows you to view the measurement data and also save them in the CSV format through communication with up to eight Power Meters via a LAN, GP-IB, or RS-232C(COM port).

Supported Models and Communication Interfaces

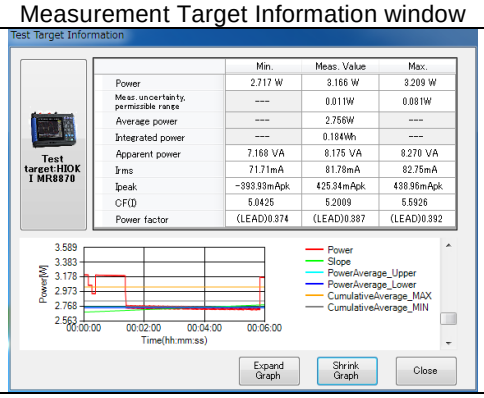
Power Meter	Power Meter’s Communication interface		
	LAN	GP-IB	RS-232C
PW3335, -02,-03	○	-	○
PW3335-01	○	○	-
PW3335-04	○	○	○

Hereafter in this manual, the Power Meter may also be referred to as the “instrument”, and “HIOKI Standby Power Measurement Software” as the “software”.

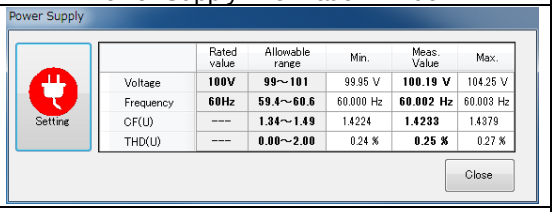
Main screen



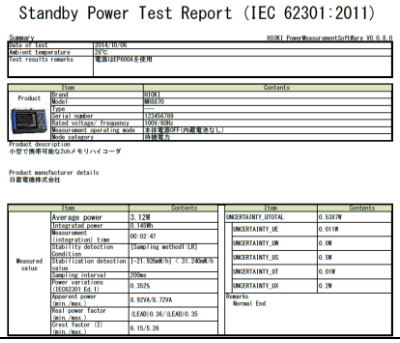
Measurement Target Information window



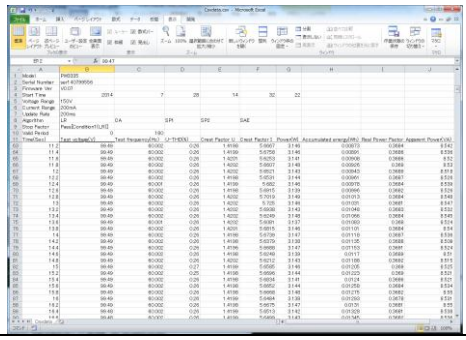
Power Supply Information window



PDF report output



CSV output



1.1. Operating Precautions Including Reproduction and Copyright

- Copyright
  All rights, including copyrights of the execution file and documents of this program, belong to HIOKI E.E. Corporation.
- Conditions of use
  Any sales of this software bundled with for-profit software or printed books without permission of the owner of the copyright are prohibited. In addition, reverse engineering and modification of the software without permission of the owner of the copyright are also prohibited.
- User's responsibility
  This is free software. It can be used for any purpose under the user's own responsibility.
  We do not assume any responsibility for any damage caused by this software.
  We also do not assume any responsibility for any software failures or adverse effects of this software.
  We do not accept any inquiries or requests concerning this software.
  This software is subject to change without prior notice.

Note: Windows and Microsoft .NET Framework are trademarks or registered trademarks of Microsoft Co., Ltd. in the U.S.

1.2. System Configuration Requirements

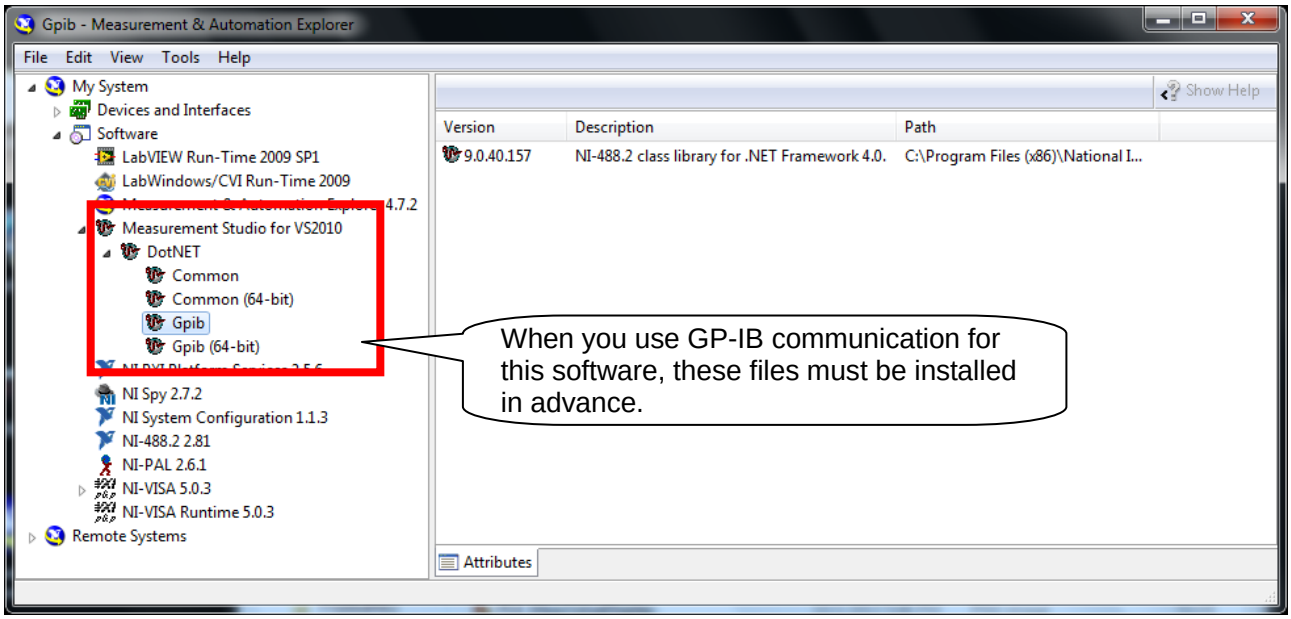
The following systems must be installed on your computer to use PW Communicator.

Computer	PC/AT compatible machine (DOS/V machine)
Operating system	
	· Windows XP SP3 or above (32-bit edition)
	· Windows Vista SP2 or above (32-bit edition)
	· Windows 7 SP1 or above (32-/64-bit edition)
	· Windows 8 (32-/64-bit edition)
	Microsoft .NET Framework4 must be installed in the above operating systems in advance.
	(In a non-English environment, language pack according to the environment is necessary)
CPU	1.0 GHz or above (2.0 GHz or above is recommended)
Memory	1.0 GB or above (2.0 GB or above is recommended)
	Note: 2.0 GB or above for Windows 7 64-bit edition and Windows 8 64-bit edition
Hard disk	Free space of 128 MB or more (at the time of startup)
Display	Resolution of 1,024×768 dots or above, 65,536 colors or more
Communication interface (one or more of the following)	
LAN	10BASE-T/100BASE-TX
GP-IB	Only the products manufactured by National Instruments Corporation are acceptable (The GP-IB driver manufactured by National Instruments (class library compatible with .NET4.0, ni-488.2 3.1.2 later) must be installed in advance)
RS-232C	9,600/38,400 bps

For the connection procedure between the instrument and computer, refer to Chapter 4 "Connection to a PC" of the Instruction Manual for the instrument.

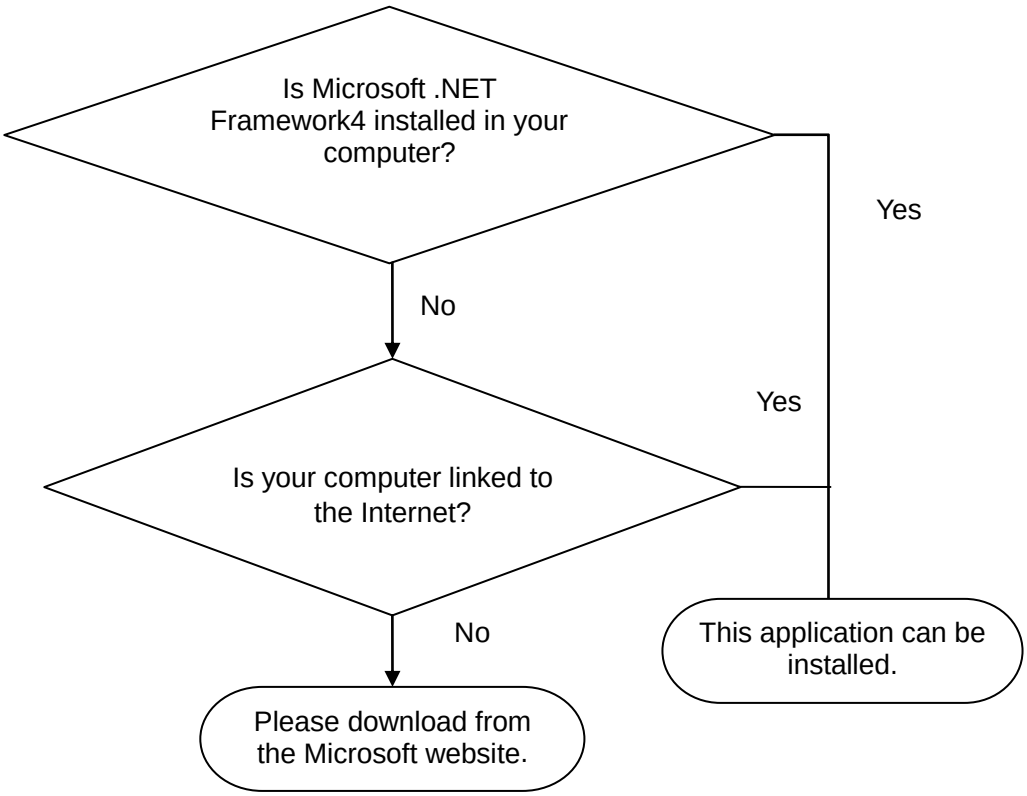
NOTE

When you use GP-IB communication, the GP-IB driver (class library compatible with .NET4.0) manufactured by National Instruments must be installed in advance. You can check this on “Measurement & Automation Explorer”, which is installed when you use a product manufactured by National Instruments.



2. Installation

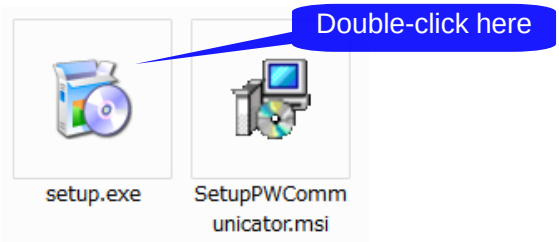
Before installing this software, it is required that Microsoft .NET Framework4 be installed in advance.
If it is not installed, it can automatically be installed before the installation of this software, as long as your computer is currently linked to the Internet.
If it is not installed and your computer is not linked to the Internet, this software cannot be installed.
It can be downloaded from the Microsoft website.



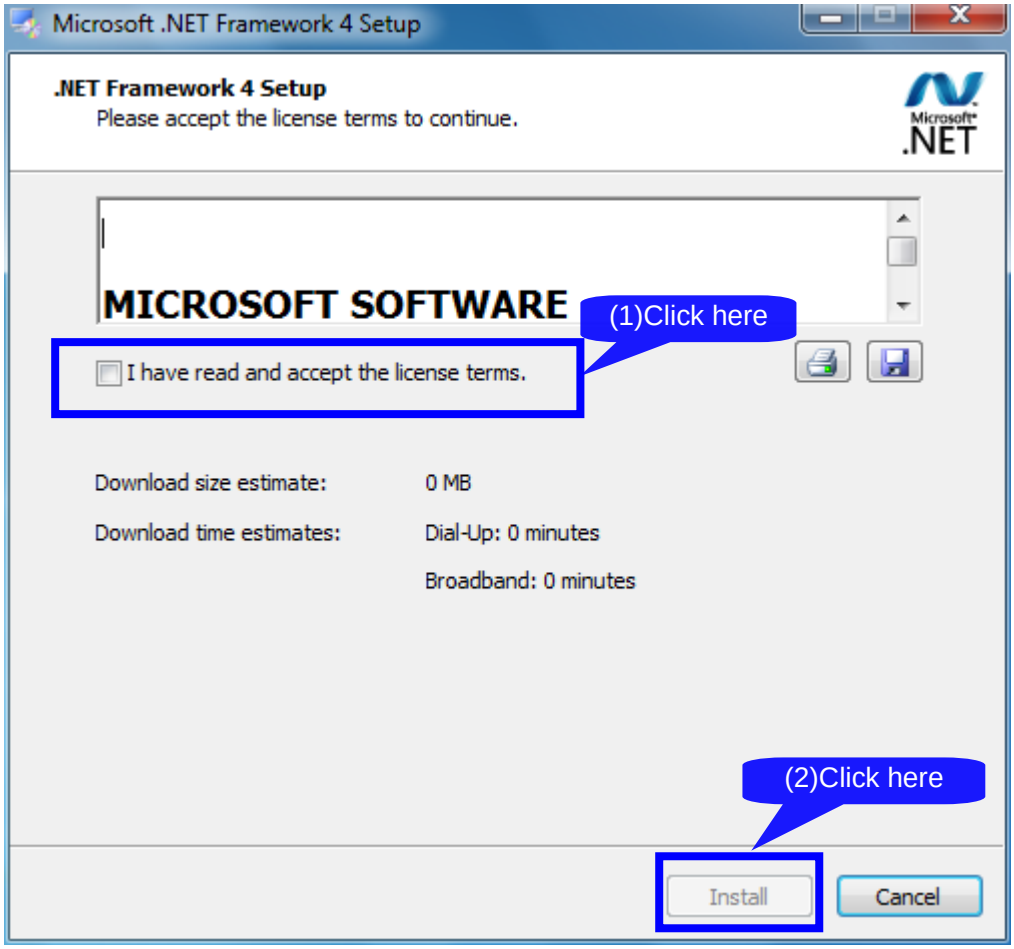
Note

- Install the software with the Administrator privilege.
- Installation may not be possible if other applications are currently running. Before installation, exit all other applications, if possible. Especially when antivirus software is currently running, installation may be prohibited even if the software is not affected by a virus. In such a case, change the settings of the antivirus software to permit installation.

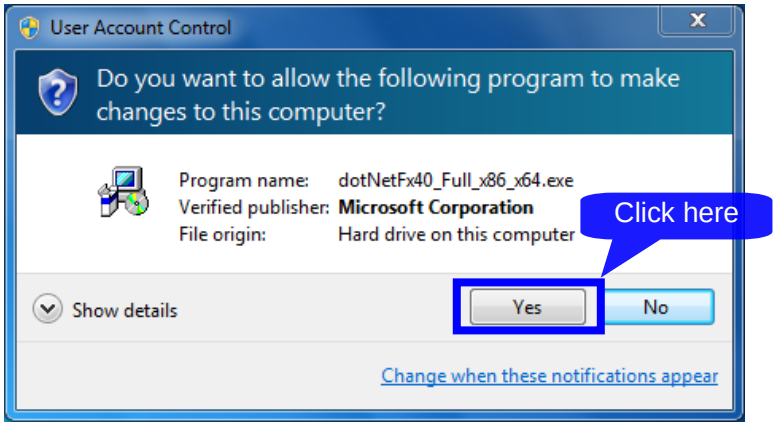
Example: When installing the software on Windows7
Note: A different message may appear, depending on the operating system.
1 Exit all the applications currently running.
2 Double-click [setup.exe] (setup file) (the extension may not be displayed depending on the setting of your computer). Double-clicking it starts up the installer.



3 If Microsoft .NET Framework4 is not installed on your computer
If Microsoft .NET Framework4 is not installed on your computer, the following screen appears. Check your computer is linked to the Internet and then install the software.

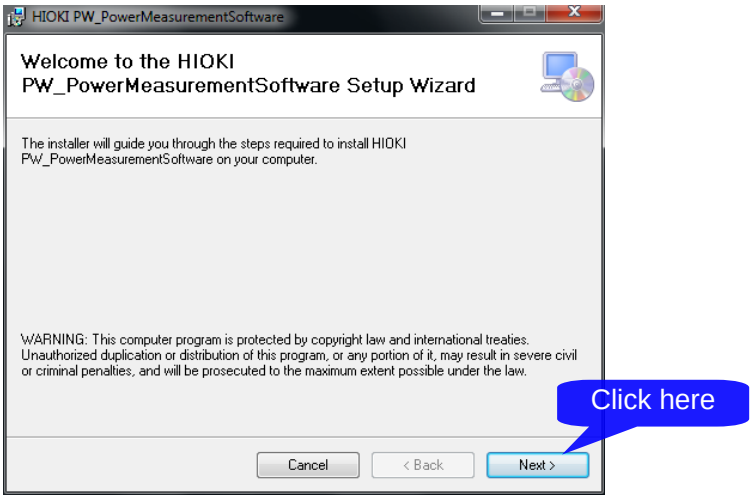


When a dialog box requiring you to permit the continued program installation appears, click [Yes] to proceed to the next step.



When a message prompting you to restart the system appears, click [Yes] to restart the system. After the system has restarted, the installation will automatically be continued.

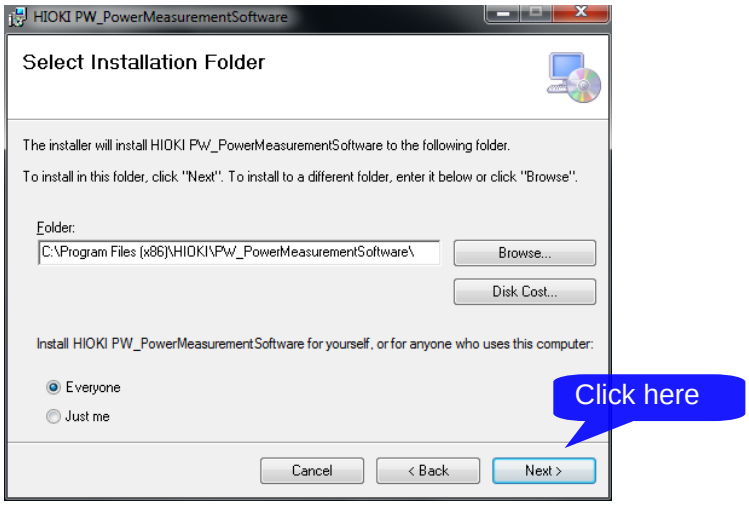
4 When the “PW Communicator” setup wizard appears, click [Next>] and check the installation destination.



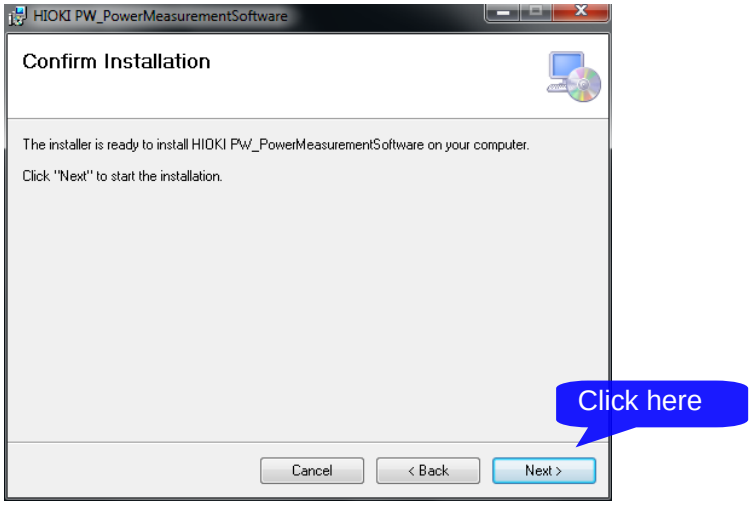
4 Specify the installation destination.

If you wish to change the installation destination, click［Browse…], and then change to the relevant folder. Normally, it is not necessary to change it.

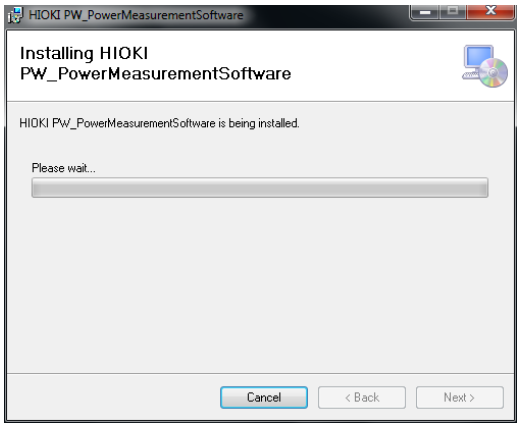
If it is not necessary to change the installation destination, click [Next>].



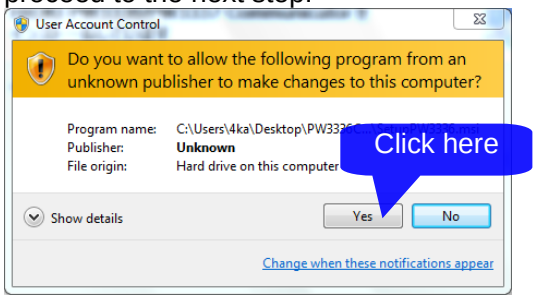
Click [Next].



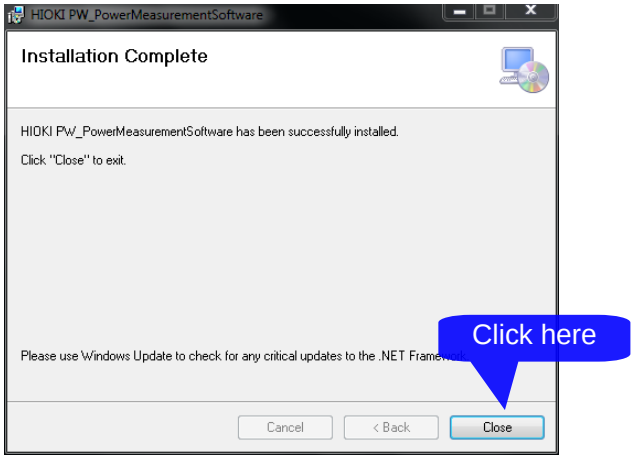
5 Installation starts.



When a dialog box requiring you to permit the continued program installation appears, click [Yes] to proceed to the next step.



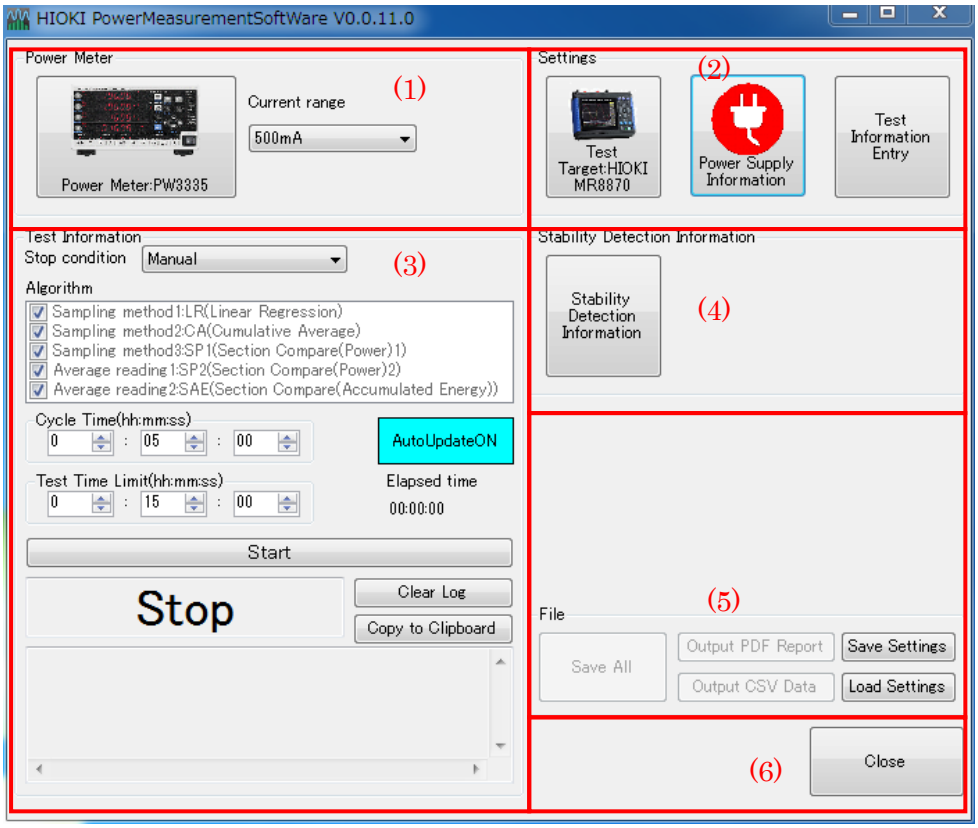
6 Once the installation is completed, click [Close].



3. Basic Usage

3.1. Startup Procedure

From the [START] menu, select [Program] - [HIOKI] - [Standby Power Measurement Software] - [Standby Power Measurement Software] to start up the application. The main screen will be displayed.



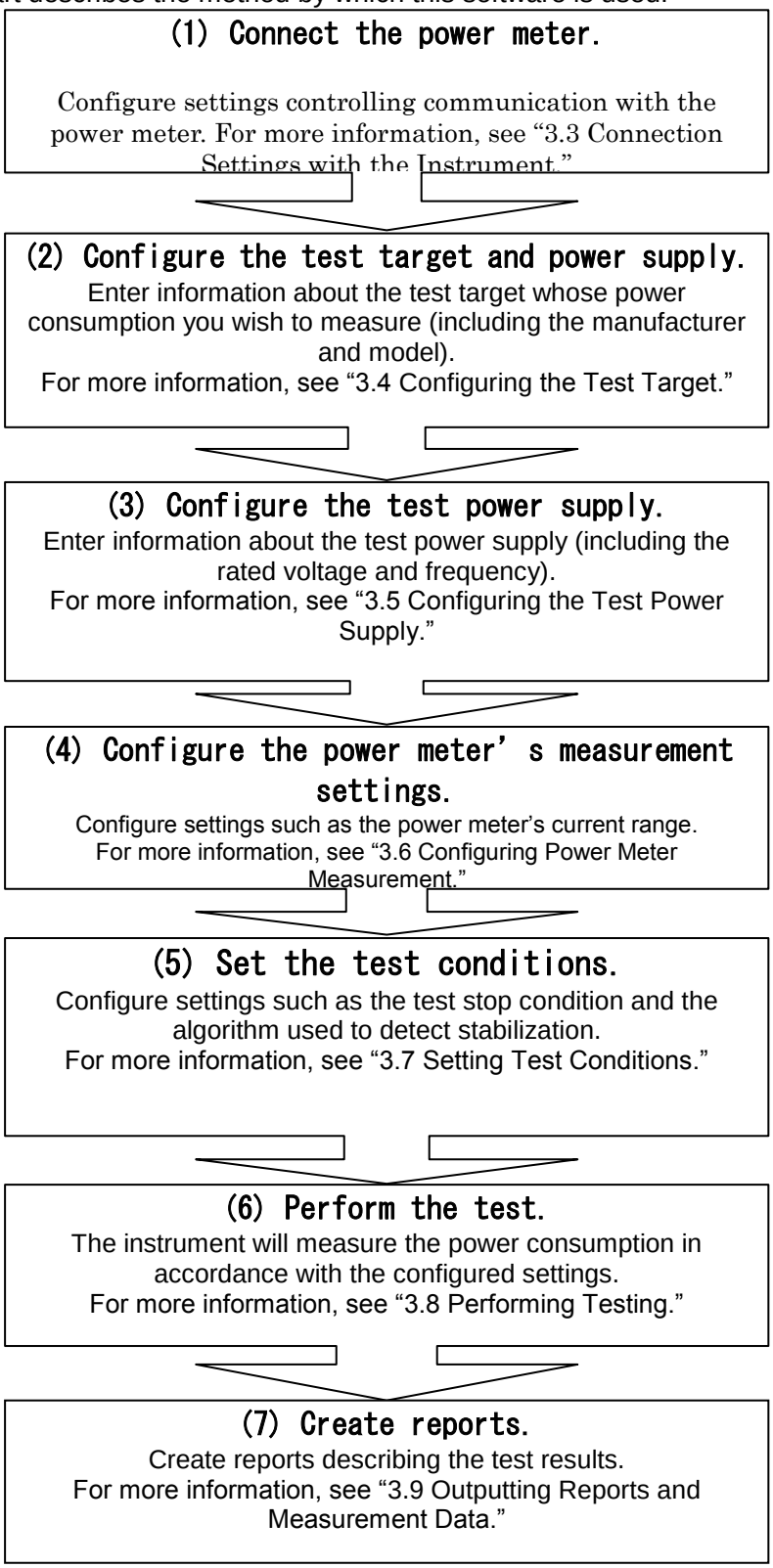
Main screen

The Main screen consists of the following interface elements:

(1)	Power meter area	Displays information about, and allows you to control, the power meter.
(2)	Settings area	Displays information about the measurement target and power supply and allows you to configure associated settings and edit PDF output parameters.
(3)	Test information area	Displays information about, and allows you to control, testing, for example the stop condition, algorithm used to detect stabilization, and test time.
(4)	Stop detection condition area	Displays detailed information about stabilization condition detection.
(5)	Test operation area	Allows you to control test operation.
(6)	File manipulation area	Allows you to output test results and save and load test settings.

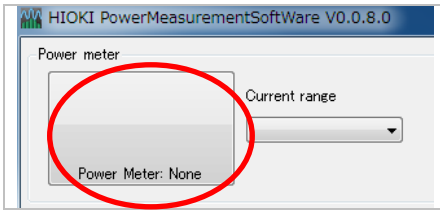
3.2. Standby Power Consumption Measurement Process

The following flowchart describes the method by which this software is used:



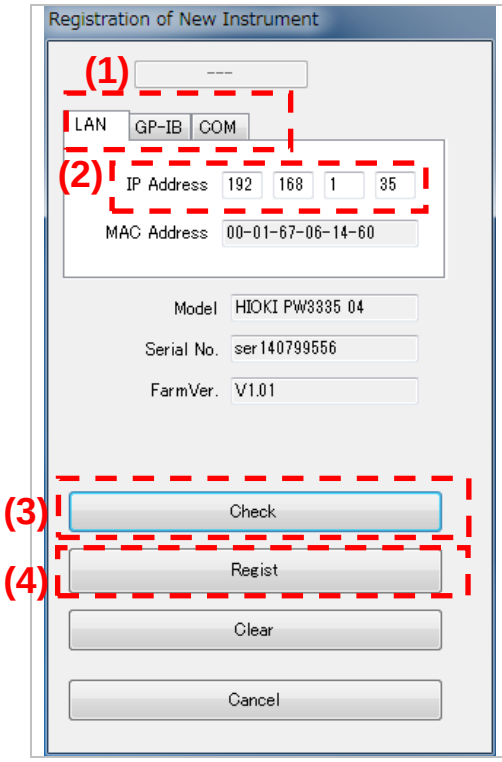
3.3. Connection Settings with the Instrument

First, connect the communication line between the Instruments and computer.



Click the [Power Meter] button on the Main screen to display the connection/confirmation dialog box.

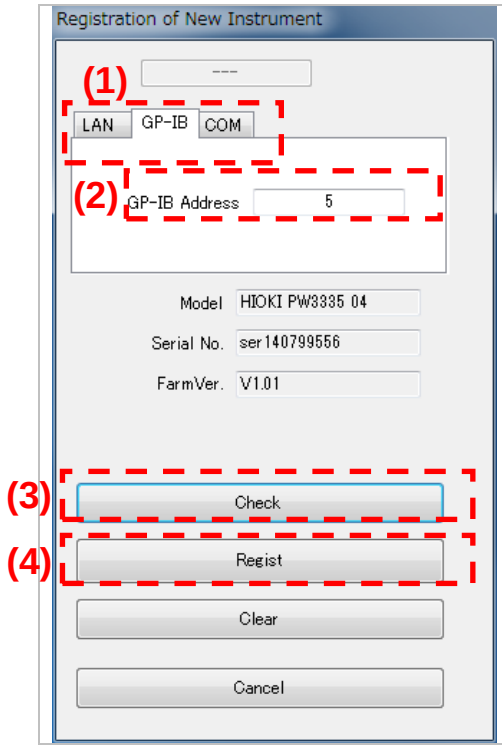
- When connecting using a LAN interface
  When connecting to a computer using a LAN interface, specify the IP address of the Instrument.



(1) Select the [LAN] tab in the [Regist New Instrument] dialog box.
(2) Enter the IP address of the Instrument to be connected in the [IP Address] fields.
(3) When you press [Check], communication will be performed with the specified computer. When communication is performed successfully, the MAC address, model number, serial number, and firmware version are displayed.
(4) When you press [Regist], the confirmation dialog box will be closed and the connected computer will then be registered on the main screen.

Note: For how to check the IP address of the instrument, refer to Chapter 4 “Connection to a PC” of the Instruction Manual for the instrument.

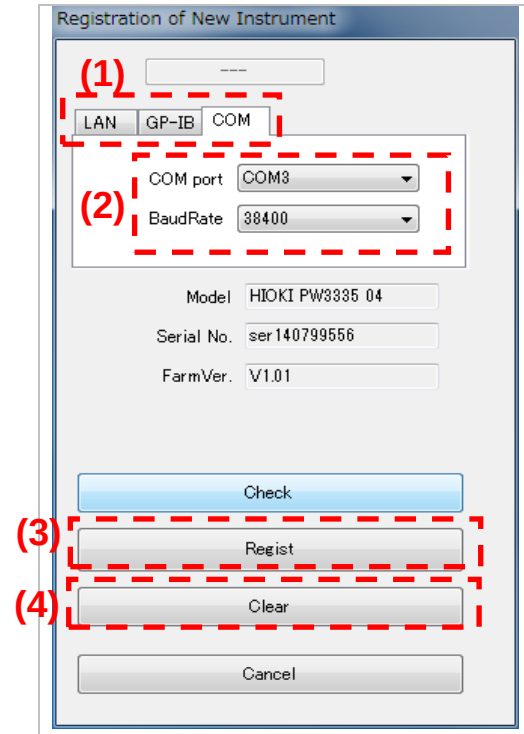
- When connecting using a GP-IB interface
  When connecting to a computer using a GP-IB interface, specify the GP-IB address of the Instrument.



(1) Select the [GP-IB] tab in the [Regist New Instrument] dialog box.
(2) Enter the GP-IB address of the Instrument to be connected in the [GP-IB Address] field.
(3) When you press [Check], communication will be performed with the specified computer. When communication is performed successfully, the model number, serial number, and firmware version are displayed.
(4) When you press [Regist], the confirmation dialog box will be closed and the connected computer will then be registered on the main screen.

Note: For how to check the GP-IB address of the instrument, refer to Chapter 4 “Connection to a PC” of the Instruction Manual for the instrument.

- When connecting using a RS-232C interface (COM port)
  When connecting to a computer using the RS-232C (COM port) interface, specify the COM port address and baud rate of the Instrument.

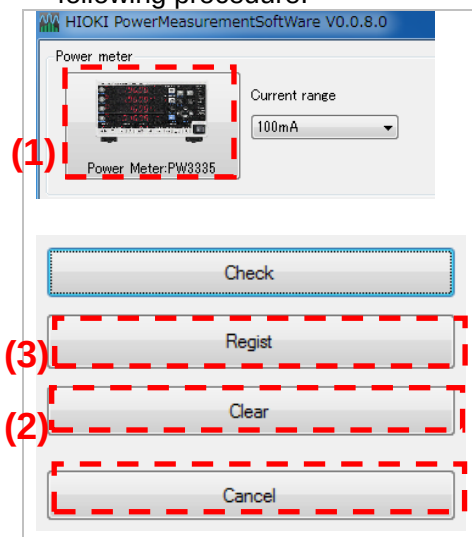


(1) Select the [COM] tab in the [Regist New Instrument] dialog box.
(2) Select the number*1 and baud rate*2 settings of the COM port to be connected with the Instrument in the [COM port] and [BaudRate] fields.
(3) When you press [Check], communication will be performed with the specified computer. When communication is performed successfully, the model number, serial number, and firmware version are displayed.
(4) When you press [Regist], the confirmation dialog box will be closed and the connected computer will then be registered on the main screen.

*1: The COM port list displays all the available COM ports when the [Regist New Instrument] dialog box opens. If the COM port you wish to use is not in the list, close the [Regist New Instrument] dialog box, and then open it again.

*2: Be sure that the baud rate setting conforms to that of the instrument. For how to check the baud rate setting of the instrument, refer to the Instruction Manual for the instrument.

■ To delete previously registered data
A destination computer previously registered on the main screen can be deleted according to the following procedure.



(1) Click the [Power Meter] button on the Main screen to display the connection/confirmation dialog box
(2) Pressing [Clear] clears all the communication settings in the dialog box.
(3) When you press [Regist], the [Regist New Instrument] dialog box will be closed and the information of the destination computer on the main screen will be cleared.

If you press [Cancel], the confirmation dialog box will be closed without changing the information of the connection destination on the main screen.

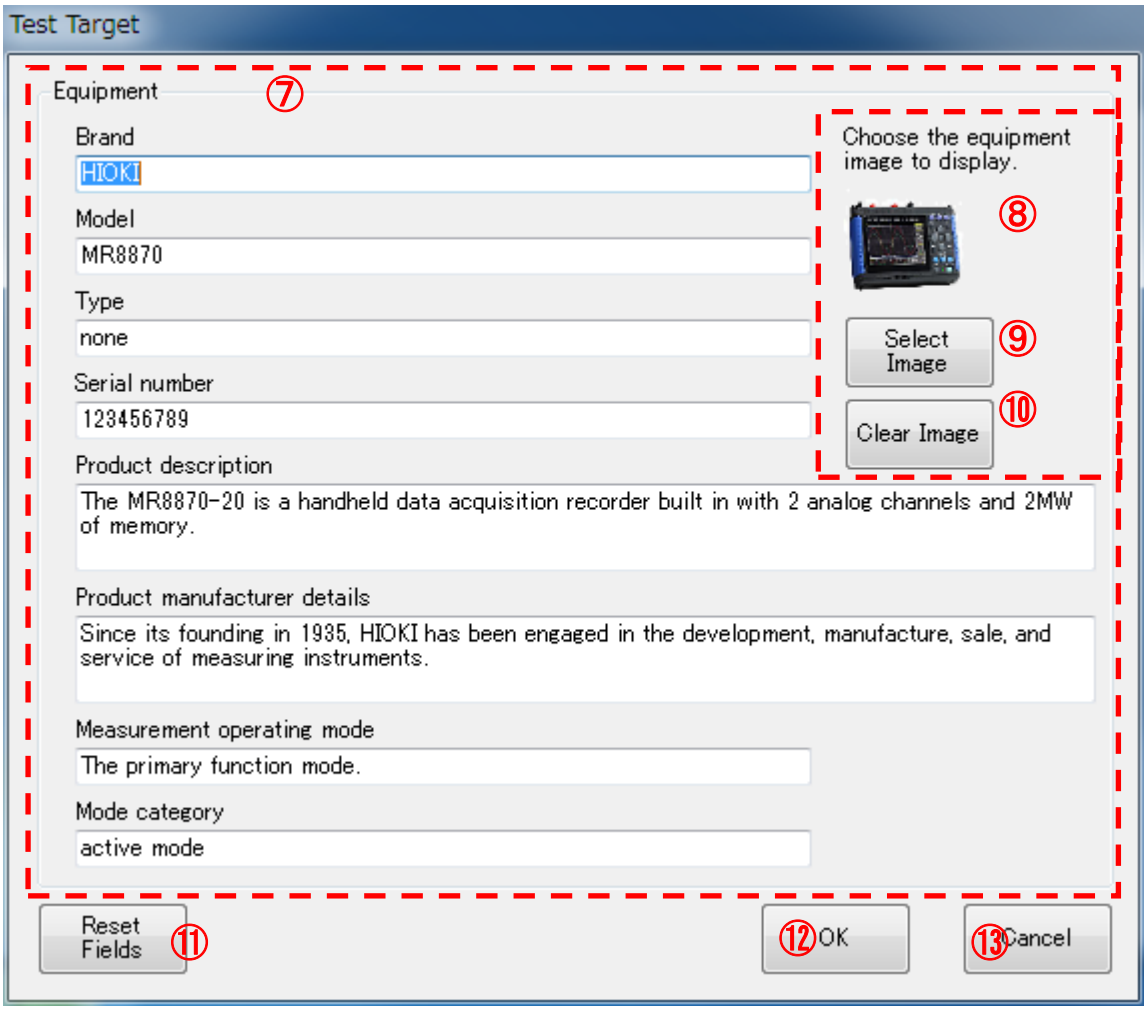
NOTE

- If connection fails, refer to the Instruction Manual for the instrument and check the cable connection and address settings.
- Measured value and related display screens cannot be displayed if the connection fails.
- Do not turn off the power to the instrument or disconnect cables while the screen displaying the measurement values is displayed or file saving is in progress. Otherwise, the application or instrument operation may become unstable.
- Do not connect multiple computers to the same instrument. Otherwise, the application or instrument operation may become unstable.
- If connected via the LAN or GP-IB interface, the measured value will be acquired from the power meter every 200 ms. If connected via the RS-232C interface (COM port), data will be acquired every 1 s since the communications speed cannot support faster acquisition. Consequently, stability detection may differ compared to when connected via the LAN or GP-IB interface.

3.4. Configuring the Test Target

- Configuring the test target

  Click the [Test Target Settings] button to display the Test Target Settings window.



Test Target Settings Window

The Test Target Settings window provides the settings listed below. The entered information will be reflected in PDF reports.

(7) Test target information entry area	Enter information about the test target as desired. Information that is not required may be left blank.
(8) Test target image area (9) [Select Test Target Image] button (10) [Clear Image] button	Select or clear the test target image.
(11) [Initialize] button	Initializes all entered settings.
(12) [OK] button	Applies the configured settings and closes the Test Target Settings window.
(13) [Cancel] button	Discards all configured settings and closes the Test Target Settings window.

- Measured value display area

	Min.	Meas. Value	Max.
Power	2.717 W	3.166 W	3.209 W
Meas. uncertainty, permissible range	---	0.011W	0.081W
Average power	---	2.756W	---
Integrated power	---	0.184Wh	---
Apparent power	7.168 VA	8.175 VA	8.270 VA
Irms	71.71mA	81.78mA	82.75mA
Ipeak	-393.93mApk	425.34mApk	438.96mApk
CF(I)	5.0425	5.2009	5.5926
Power factor	(LEAD)0.374	(LEAD)0.387	(LEAD)0.392

The following information is shown:

Power value	Displays the power consumption value.
Meas. uncertainty, Permissible range	[Meas. value] column: Displays the measurement uncertainty caused by the power meter. [Max.] column: Displays the permissible value for the measurement uncertainty. If the measured value uncertainty exceeds the permissible value, select an appropriate current range. (See p. 21.)
Average power	Displays the average power value from the end of the testing warm-up period to the completion of testing.
Integrated power	Displays the integrated power value from the end of the testing warm-up period to the completion of testing. This value will not be shown until testing is complete.
Apparent power	Displays the apparent power value.
Irms	Displays the current consumption RMS value. Testing will stop if the range is exceeded during testing.
Ipeak	Displays the current consumption waveform peak value. Testing will stop if the peak is exceeded during testing.
CF(I)	Displays the current crest factor (= crest value / RMS value).
Power factor	Displays the power factor. “LAG”(A positive value in csv) indicates that the current is lagging relative to the voltage. “LEAD”(A negative value in csv) indicates that the current is leading the voltage.

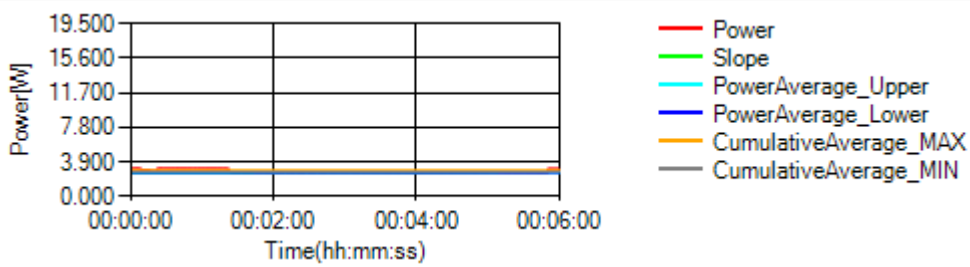
The left column of measured values consists of instantaneous values. The middle and right columns indicate the maximum and minimum values since the start of testing (from the beginning of the test). Values prior to the start of testing depend on the power meter’s specifications. Maximum and minimum values are not shown for average and integrated power.

Automatic updates are forcibly disabled at the completion of testing. Updates will resume if you select the [Automatic updates] checkbox on the Main screen.

- Test target image area and [Select Test Target Image] button

Click the [Select Test Target Image] button to select the desired image for the test target. In addition to being shown in the test target image area, the selected image will be output on PDF reports.
You can clear the image by clicking the [Clear Image] button.

- Measured value graph



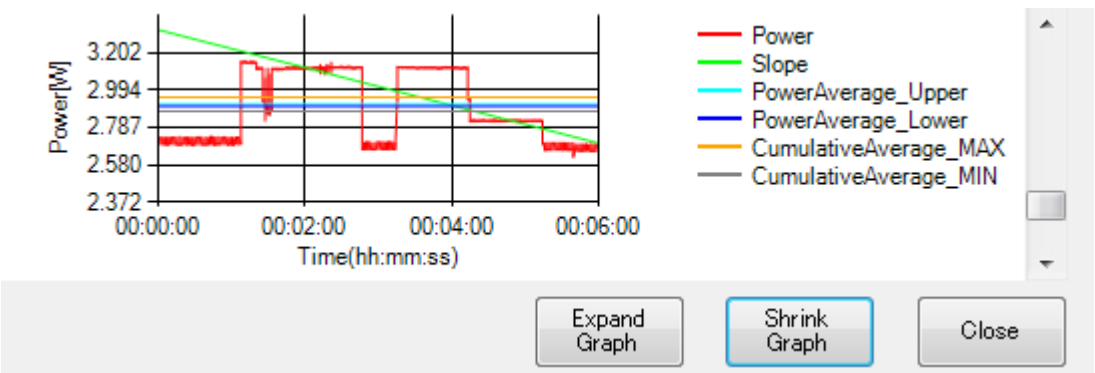
The measured value graph provides a time-series graph of power values and other data that has been acquired since the start of testing.

The following information is shown.
The information shown in the graph varies with the stop condition and algorithm settings.

Power	Displays the power consumption value.
Slope	Used to detect stability when using detection condition (sampling method 1).
CumulaiveAverage_MAX CumulaiveAverage_MIN	Used to detect stability when using detection condition (sampling method 2).
PowerAverage_Upper PowerAverage_Lower	Used to detect stability when using detection condition (sampling method 2).

- Expanding and shrinking the waveform

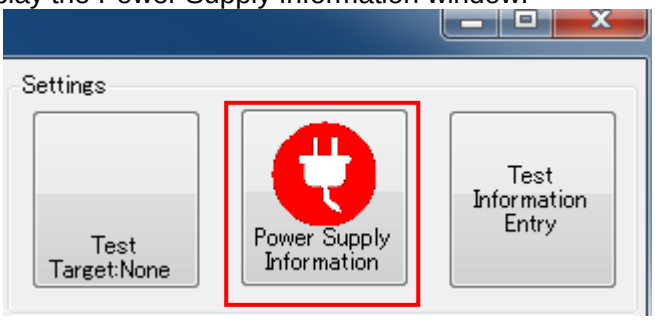
The [Expand Graph] and [Shrink Graph] buttons can be used to expand or shrink the graph's vertical axis. When viewing an expanded graph, scroll bars are shown for the vertical axis. These scroll bars can be used to scroll in the desired direction without changing the selected zoom factor.



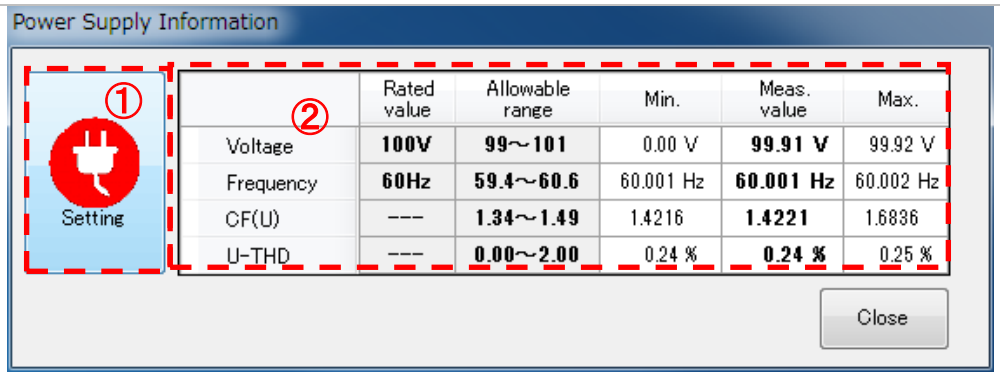
Waveform after Expansion

3.5. Configuring the Test Power Supply

This section describes how to configure information about the test power supply that you will use to operate the test target. Click the [Power Supply information] button in the test information area on the Main window to display the Power Supply Information window.



Test Information Area on the Main Screen

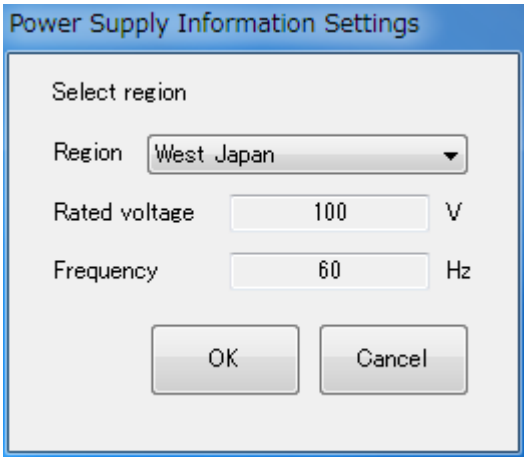


Test Power Supply Information Window

①	**[Test Power Supply Settings] button**	Displays a window that allows you to configure information about the test power supply.
②	**Measured value display area**	Displays measurements related to the test power supply.
③	**[Close] button**	Closes the Test Power Supply Information window.

Configuring the test power supply

Click the [Test Power Supply Settings] button to display the Test Power Supply Settings window.



Test Power Supply Information Settings Window

The following settings can be entered on the Test Power Supply Settings window. The entered information is applied to power meter settings and PDF reports.

Supply voltage and frequency area	The voltage and frequency will be set automatically once a region has been selected. You can also set the voltage and frequency as desired by selecting [Custom] for the region.

Measured value display area

	Rated value	Allowable range	Min.	Meas. value	Max.
Voltage	**100V**	**99～101**	0.00 V	**99.93 V**	99.93 V
Frequency	**60Hz**	**59.4～60.6**	60.001 Hz	**60.002 Hz**	60.002 Hz
CF(U)	---	**1.34～1.49**	1.4209	**1.4221**	1.6836
U-THD	---	**0.00～2.00**	0.24 %	**0.25 %**	0.25 %

The following information is shown:

Voltage	Displays the voltage value. Under IEC 62301:2011, voltage fluctuations are required to fall within ±1.0% of the rated value.
Frequency	Displays the average power value from the end of the testing warm-up period to the completion of testing. This value will not be shown until testing is complete. Under IEC 62301:2011, fluctuations are required to fall within ±1.0% of the rated value.
CF (U)	Displays the voltage crest factor (= crest value / RMS value). Under IEC 62301:2011, the voltage crest factor is required to fall within the range of 1.34 to 1.49.
THD(U)	Displays total harmonic distortion (THD), which expresses the harmonic component as a percentage of the voltage waveform. Under IEC 62301:2011, a test environment with a THD of within 2.0% is required.

Values shown on the horizontal axis have the following meanings:

Rated value	Displays the predetermined values for voltage and frequency.
Allowable range	Displays the predetermined measured value range based on the rated value and specifications. The background will turn red if the measured value falls outside this range.
Maximum value/ Minimum value	Displays the maximum and minimum values for each measured value during the test interval. These values will differ from the maximum and minimum values output on PDF reports since the target intervals over which they are calculated differ.
Measured value	Displays the instantaneous value.

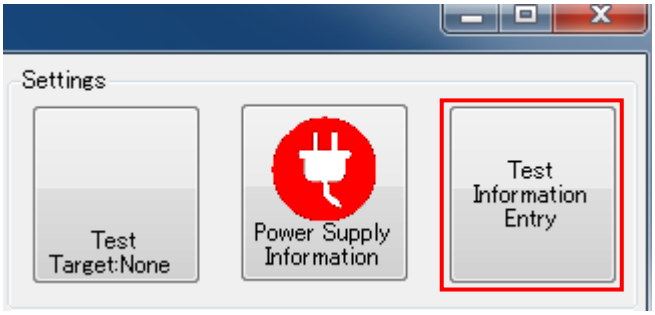
Automatic updates are forcibly disabled at the completion of testing. Updates will resume if you select the [Automatic updates] checkbox on the Main window.

NOTE

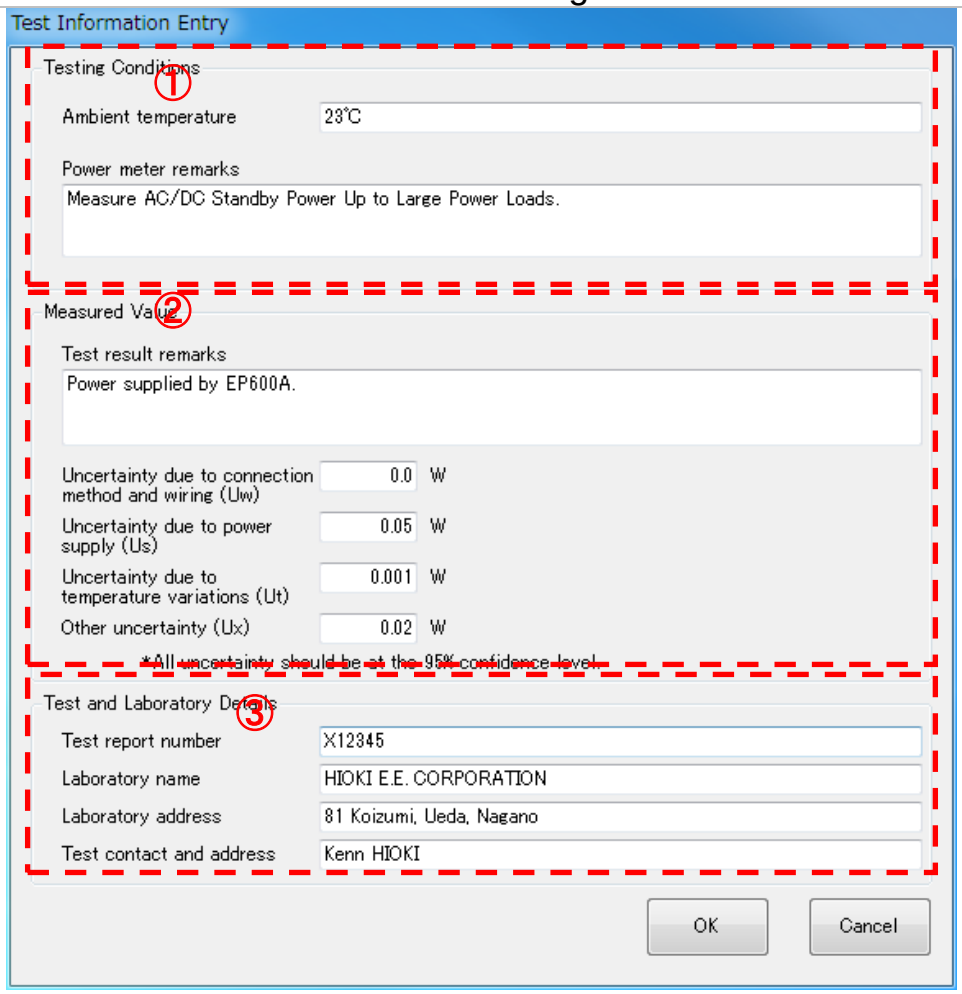
- Measured value display windows may not be displayed if a communications error occurs or if the test power supply and measurement target settings have not been configured.
- This software places the instrument in the HOLD state when acquiring measurement data. (The HOLD state is canceled after the data has been acquired.)
- Since the instrument with which the software is communicating will be placed in the remote state, you will not be able to operate it using its control panel. To operate the instrument using its control panel, exit this software and then cancel the remote state by pressing the instrument's SHIFT key.

3.6. Setting Comments for Inclusion in PDFs

Clicking the [Test Information Entry] button in the settings area of the Main screen will display the Settings screen. The entered comments will be output in PDF reports. For more information about the output format for PDF reports, see “3.9 Outputting Reports and Measurement Data.”



Main screen settings area

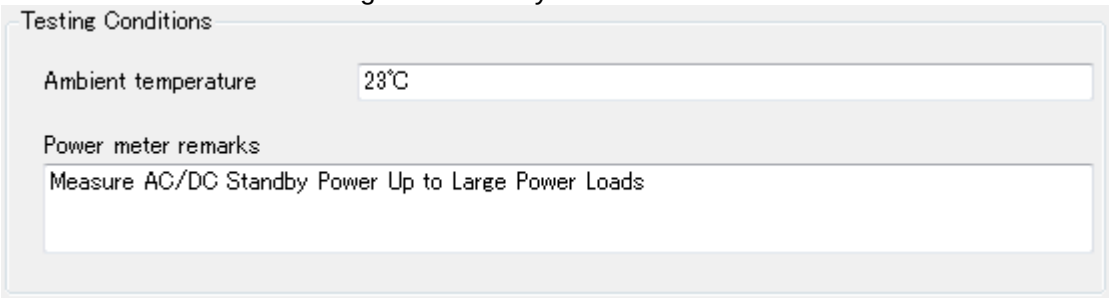


Test Information Entry screen

①	**Testing conditions**	Enter the information you wish to include in PDF reports. Fields that you do not wish to include may be left blank.
②	**Measured value**	
③	**Test and laboratory details**	

Testing conditions

Enter information related to testing as necessary.

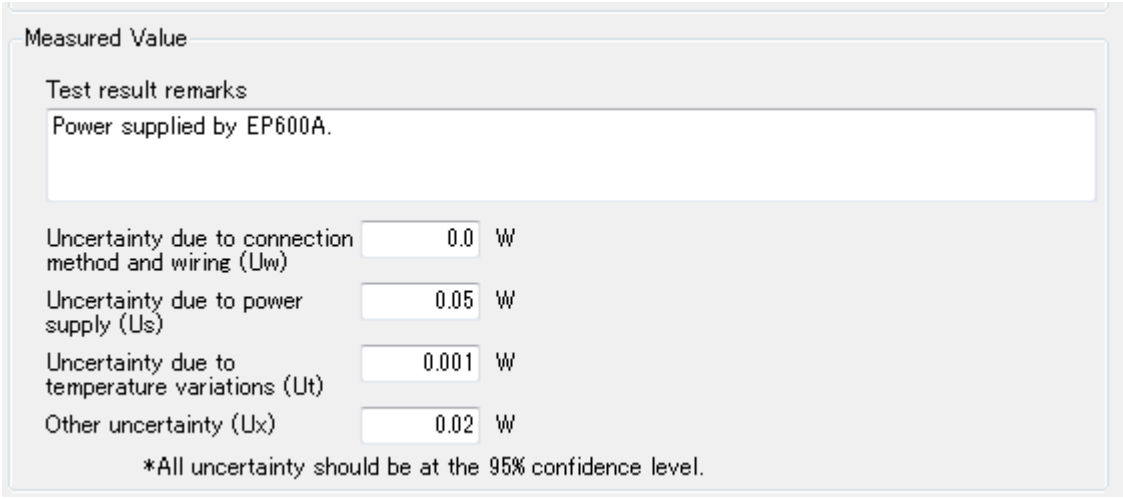


Testing environment

Ambient temperature	Enter the ambient temperature at the time of the test.
Power meter remarks	Enter any remarks about the power meter that you wish to include.

Measured data

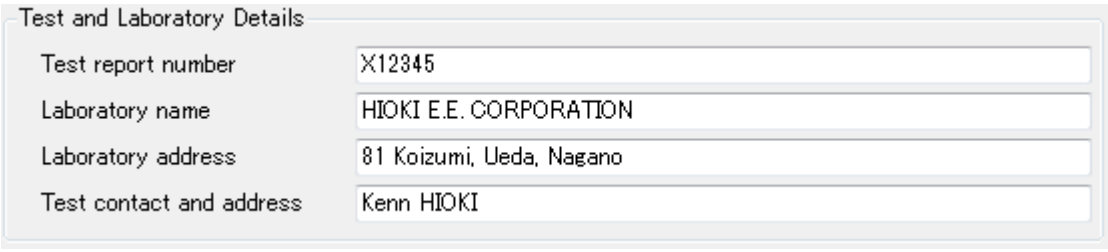
Enter information about measured values.



Measured data

Test result remarks	Enter any remarks about the test results that you wish to include.
Uncertainty due to connection method and wiring(Uw) Uncertainty due to power supply(Us) Uncertainty due to temperature variations(Ut) Other uncertainty(Ux)	The total measurement uncertainty (Utotal) is calculated as follows: $Utotal = \sqrt{Ue^2 + Uw^2 + Us^2 + Ut^2 + Ux^2}$ The uncertainty (Ue) for the measuring instrument is calculated automatically based on the specifications of the power meter used to perform the test and the measurement range, based on the testing condition of 23°C±5°C that is a contributing factor to the stated measurement accuracy and effect of power factor. The values entered here are used for the remaining items. The total uncertainty (Utotal) calculated using the above formula is also included in PDF reports. All uncertainty should be at the confidence level of 95%.

- Test and laboratory details
  Enter information related to the test.

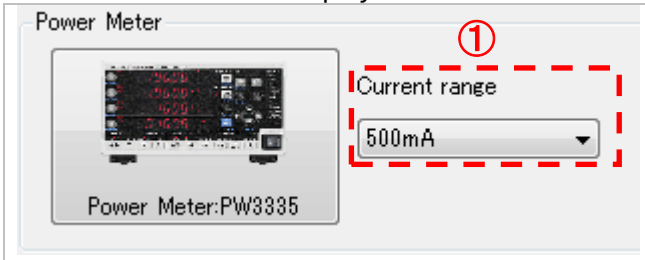


Test and laboratory details

Test report number Laboratory name Laboratory address Test contact and address	Enter each item.

3.7. Configuring Power Meter Measurement

The Measured Value Display window consists of the following interface elements:



Power meter area (sample)

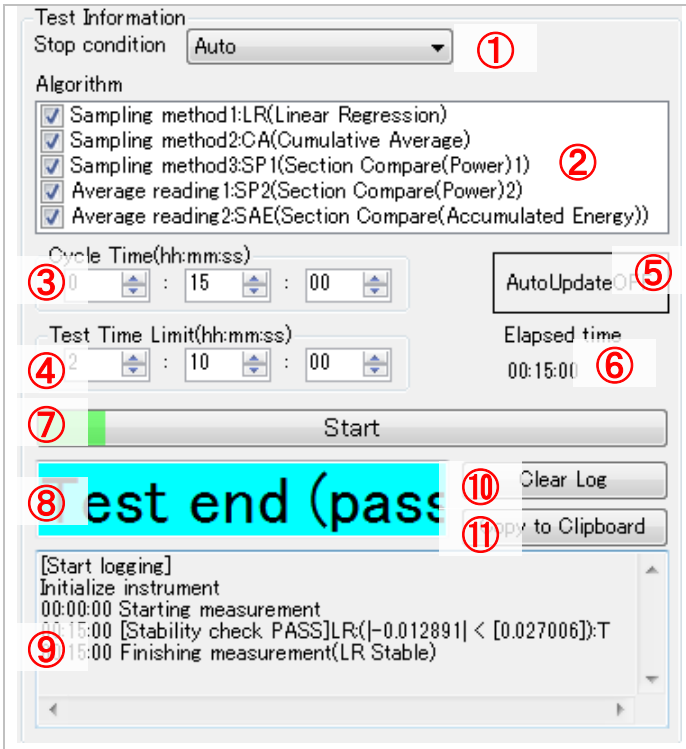
①	**Current range selection area** Select an appropriate range based on the test target's current consumption. The background of this area will turn red in the event the range or peak is exceeded. In this case, change the normal range to a higher range. Auto-range operation is not available.

NOTE

- The drop-down menu may not contain any selectable items if no power meter is connected, or if a communications error has occurred.

3.8. Setting Test Conditions

The test information area consists of the following interface elements:



Test Information Area

①	**Stop condition drop-down menu** Allows you to select the condition used to stop testing.
②	**Stabilization detection algorithm selection area** Allows you to select a stop condition if the stop condition field is set to [Auto].
③ ④	**Cycle time setting area** **Test time limit setting area** Allows you to configure test time settings.
⑤	**[Auto Update] button** Allows you to control automatic updating of the measured value display.
⑥	**Elapsed time** Displays the amount of time that has elapsed since the test was started.
⑦	**[Start] / [Cancel] button (Test progress bar)** Allows you to start and cancel testing. During testing, test progress is shown.
⑧	**Test status display area** Displays the status (for example any errors) during testing.
⑨	**Test log** Displays information about the status of testing.
⑩	**[Clear Log] button** Clears the test log.
⑪	**[Copy to Clipboard] button** Copies the contents of the test log to the clipboard. The test log's contents can then be copied to Notepad or another application.

■ Selecting the stop condition

Selecting [Auto] or [Manual] in the test condition drop-down menu results in the following operation:

○Auto

The software will determine that measurement data has stabilized and stop the test when any of the conditions enabled in the stabilization detection algorithm selection area is satisfied. Once the test time has surpassed the test time limit setting, testing will stop, even if stabilization has not been verified.

○Manual

Testing will complete when the elapsed time reaches the test time limit setting or 10 times the cycle time, whichever comes first. Stabilization detection is not performed.

- Stabilization detection algorithm
  This setting can be configured when the stop condition is set to [Auto]. For more information, see the Appendix (p.29).

- Cycle time
  The cycle time can be set in 10 sec. increments within the valid setting range of 1 min. to 6 hr. 0 min. 0 sec. This setting is used when the stop condition is set to [Manual] or when the stop condition is set to [Auto] and sampling method 3 (SP1) has been enabled as the detection condition. It cannot be set for conditions in which it is not used. For more information, see the description of sampling method 3 (SP1) in the Appendix (p.29).

- Test time limit
  Different stop condition settings result in the following operation:

Stop condition	Description
Auto	Once the time set here has elapsed, testing will be stopped as soon as any of the stabilization detection algorithms is satisfied. The set time includes the duration of initial operation (5 to 30 min.) performed in order to stabilize measured values. The test time limit can be set in 1 sec. increments within the valid setting range of 15 min. to 3 hr .00 min. 00 sec.
Manual	Testing will complete when the elapsed time reaches the time set here or 10 times the cycle time, whichever comes first. The set time does not include the duration of initial operation performed in order to stabilize measured values. The test time limit can be set in 1 sec. increments within the valid setting range of 15 min. to 50 hr. 59 min. 50 sec.

- [Auto Update] button
  When this feature is enabled, the measured value displays on the Test Target Information window and Test Power Supply window will be updated continuously. When it is disabled, updating of the measured value displays is halted.

- [Start Test] / [Cancel] button
  Click the [Start Test] button to start the test. During testing, the button will change to the [Cancel] button. In addition, during testing the elapsed time relative to the set test time upper limit is displayed.

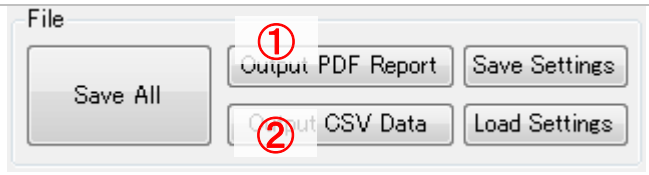
NOTE

・Testing may stop if the computer on which this software is running enters energy-saving mode while testing is in progress. When performing testing over an extended period of time, it is recommended to disable energy-saving mode on the computer.

・If connected via the LAN or GP-IB interface, the measured value will be acquired from the power meter every 200 ms. If connected via the RS-232C interface (COM port), data will be acquired every 1 s since the communications speed cannot support faster acquisition. Consequently, stability detection may differ compared to when connected via the LAN or GP-IB interface.

3.9. Outputting Reports and Measurement Data

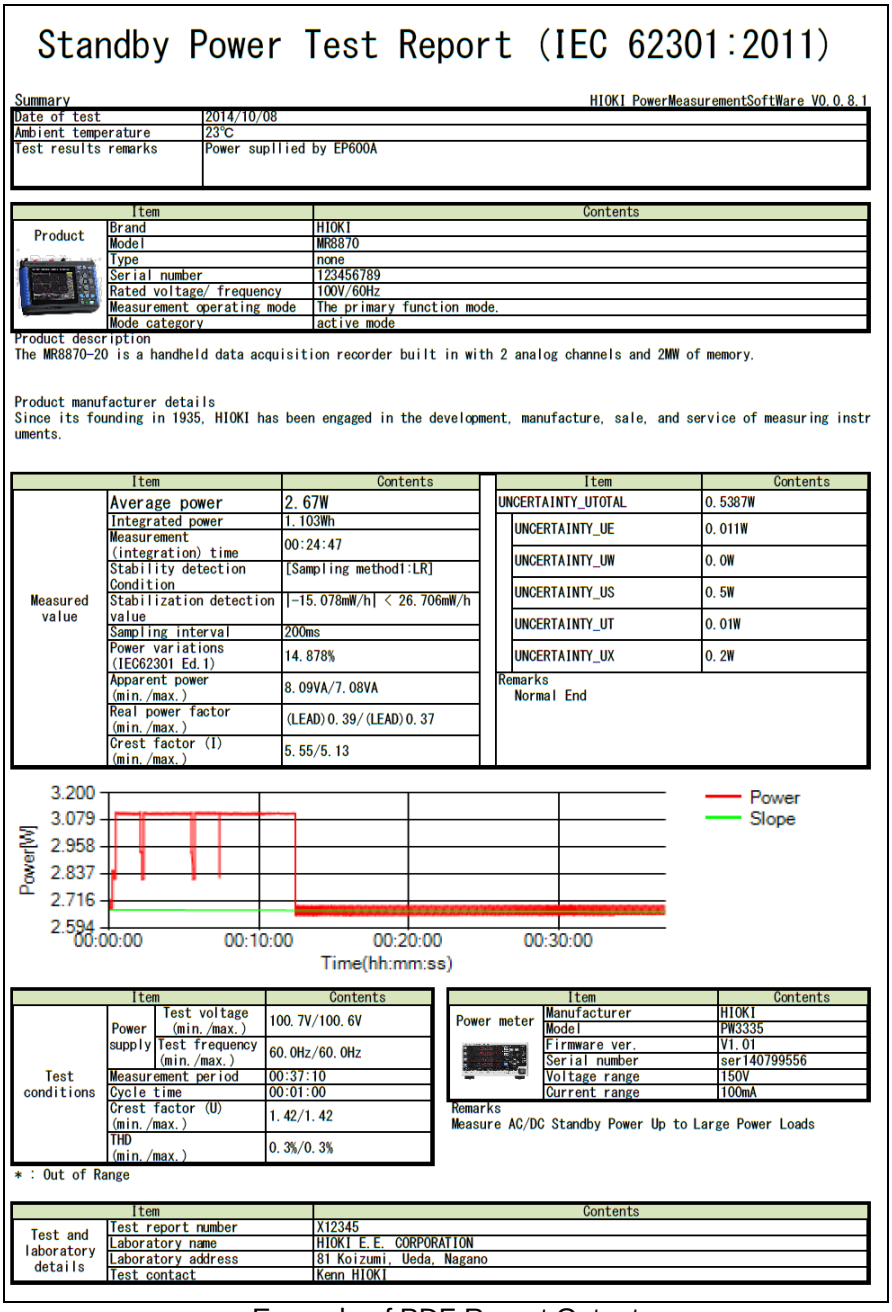
The following buttons, which are found in the file operations area, allow you to output PDF reports and CSV data.



File Operations Area

① **[Output PDF Report] button**
Outputs a PDF report.

② **[Output CSV Data] button**
Outputs measurement data in CSV format.



Standby Power Test Report (IEC 62301:2011)

Summary — HIOKI PowerMeasurementSoftWare V0.0.8.1

Date of test	2014/10/08
Ambient temperature	23℃
Test results remarks	Power supllied by EP600A

Item		Contents
Product	Brand	HIOKI
	Model	MR8870
	Type	none
	Serial number	123456789
	Rated voltage/ frequency	100V/60Hz
	Measurement operating mode	The primary function mode.
	Mode category	active mode

Product description
The MR8870-20 is a handheld data acquisition recorder built in with 2 analog channels and 2MW of memory.

Product manufacturer details
Since its founding in 1935, HIOKI has been engaged in the development, manufacture, sale, and service of measuring instruments.

Item		Contents
Measured value	Average power	2.67W
	Integrated power	1.103Wh
	Measurement (integration) time	00:24:47
	Stability detection Condition	[Sampling method1:LR]
	Stabilization detection value	|-15.078mW/h| < 26.706mW/h
	Sampling interval	200ms
	Power variations (IEC62301 Ed.1)	14.878%
	Apparent power (min./max.)	8.09VA/7.08VA
	Real power factor (min./max.)	(LEAD)0.39/(LEAD)0.37
	Crest factor (I) (min./max.)	5.55/5.13

Item	Contents
UNCERTAINTY_UTOTAL	0.5387W
UNCERTAINTY_UE	0.011W
UNCERTAINTY_UW	0.0W
UNCERTAINTY_US	0.5W
UNCERTAINTY_UT	0.01W
UNCERTAINTY_UX	0.2W

Remarks
Normal End

Item			Contents
Test conditions	Power supply	Test voltage (min./max.)	100.7V/100.6V
		Test frequency (min./max.)	60.0Hz/60.0Hz
	Measurement period		00:37:10
	Cycle time		00:01:00
	Crest factor (U) (min./max.)		1.42/1.42
	THD (min./max.)		0.3%/0.3%

＊ : Out of Range

Item		Contents
Power meter	Manufacturer	HIOKI
	Model	PW3335
	Firmware ver.	V1.01
	Serial number	ser140799556
	Voltage range	150V
	Current range	100mA

Remarks
Measure AC/DC Standby Power Up to Large Power Loads

Item		Contents
Test and laboratory details	Test report number	X12345
	Laboratory name	HIOKI E.E. CORPORATION
	Laboratory address	81 Koizumi, Ueda, Nagano
	Test contact	Kenn HIOKI

Example of PDF Report Output

Model	PW3335								
Serial Number	ser140799556								
Firmware Ver	V0.07								
Start Time	2014	7	28	14	32	22			
Voltage Range	150V								
Current Range	200mA								
Update Rate	200ms								
Algorithm	LR	CA	SP1	SP2	SAE				
Stop Factor	Pass[Condition1(LR)]								
Valid Period	0	180							
Time(Sec)	Test voltage(V)	Test frequency(Hz)	U-THD(%)	Crest Factor U	Crest Factor I	Power(W)	Accumulated energy(Wh)	Real Power Factor	Apparent Power(VA)
14.8	99.49	60.002	0.26	1.4202	5.6212	3.143	0.01188	0.3692	8.515
15	99.49	60.002	0.27	1.4199	5.6585	3.146	0.01205	0.369	8.525
15.2	99.49	60.002	0.25	1.4198	5.6696	3.144	0.01223	0.369	8.521
15.4	99.49	60.002	0.26	1.4198	5.6834	3.141	0.0124	0.3686	8.521
15.6	99.49	60.002	0.26	1.4198	5.6652	3.144	0.01258	0.3684	8.534
15.8	99.49	60.002	0.26	1.4198	5.6668	3.148	0.01275	0.3682	8.55
16	99.49	60.002	0.26	1.4199	5.6484	3.138	0.01293	0.3678	8.531
16.2	99.49	60.002	0.26	1.4198	5.6675	3.147	0.0131	0.3681	8.55
16.4	99.48	60.002	0.26	1.4199	5.6513	3.142	0.01328	0.3681	8.538
16.6	99.48	60.002	0.26	1.4199	5.6499	3.143	0.01345	0.3682	8.536
16.8	99.48	60.001	0.26	1.4203	5.646	3.147	0.01362	0.3684	8.541
17	99.48	60.002	0.26	1.42	5.6558	3.142	0.0138	0.3685	8.528
17.2	99.48	60.002	0.26	1.4203	5.6835	3.144	0.01397	0.3685	8.532
17.4	99.48	60.002	0.26	1.42	5.6767	3.145	0.01415	0.3685	8.533
17.6	99.48	60.002	0.26	1.42	5.6635	3.142	0.01432	0.3684	8.528
17.8	99.48	60.002	0.26	1.42	5.6876	3.144	0.0145	0.3685	8.533
18	99.48	60.002	0.26	1.42	5.6908	3.146	0.01467	0.3686	8.534
18.2	99.48	60.001	0.26	1.42	5.6485	3.139	0.01485	0.3685	8.518
18.4	99.48	60.002	0.26	1.4203	5.6602	3.147	0.01502	0.3687	8.536
18.6	99.48	60.002	0.26	1.4203	5.6583	3.137	0.0152	0.3684	8.515
18.8	99.48	60.002	0.26	1.42	5.6597	3.147	0.01537	0.3687	8.537
19	99.48	60.002	0.26	1.42	5.6525	3.149	0.01555	0.3687	8.54
19.2	99.48	60.001	0.26	1.4201	5.6614	3.14	0.01572	0.3685	8.522
19.4	99.48	60.002	0.27	1.42	5.6725	3.147	0.0159	0.3687	8.535
19.6	99.48	60.002	0.26	1.42	5.6564	3.146	0.01607	0.3686	8.535
19.8	99.47	60.002	0.26	1.4201	5.6447	3.141	0.01624	0.3685	8.522
20	99.48	60.002	0.26	1.42	5.6489	3.148	0.01642	0.3688	8.537

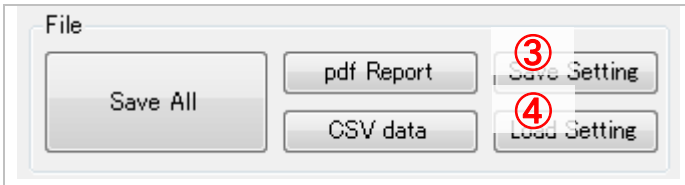
Example of CSV Data Output

NOTE

- Information set on the Test Target Settings window (brand, product, operating mode, serial number, etc.) is used to generate filenames for PDF reports and CSV data. If those settings contain characters that cannot be used in filenames, the offending characters will be replaced with characters whose use is acceptable in filenames.

3.10. Saving and Loading Test Conditions

The following buttons, which are found in the file operations area, allow you to save and load settings files. Settings files contain power meter connection settings and information about the test target and test power supply. Loading a settings file reverts the application settings to the settings that were in effect at the time the file was saved.



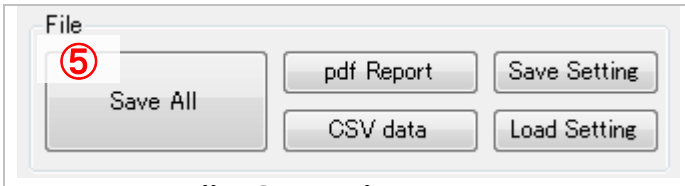
File Operations Area

③ **[Save Settings] button**
Outputs a settings file.

④ **[Load Settings] button**
Loads a settings file.

3.11. Outputting All Files

The following buttons, which are found in the file operations area, allow you to save a PDF report, CSV data, detailed information about stabilization condition detection, and settings file at the same time.



File Operations Area

⑤ **[Save All] button**
Saves a PDF report, CSV data, and settings file at the same time.

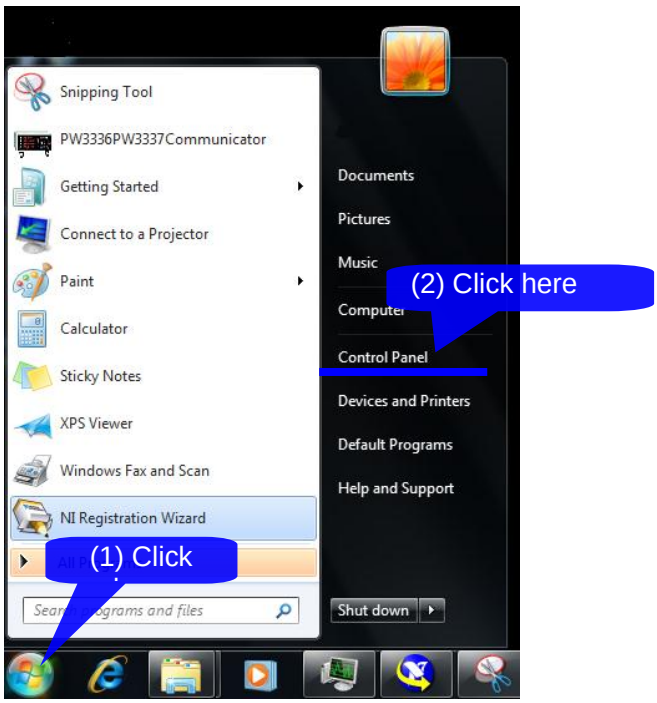
4. Uninstallation

4.1. Uninstalling HIOKI Standby Power Measurement Software

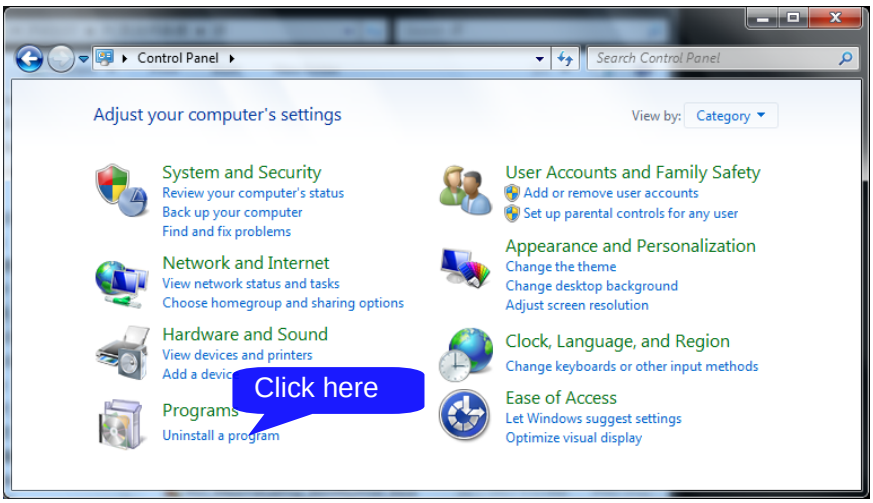
If this software is no longer necessary, uninstall it according to the following procedure.

■ For Windows 7

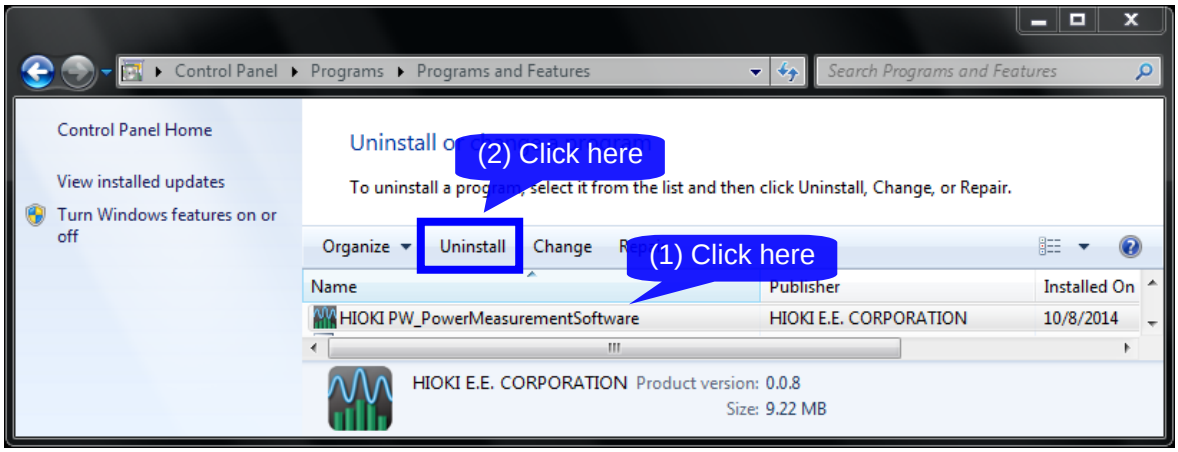
1 From the [Start] menu of Windows, click [Control Panel].



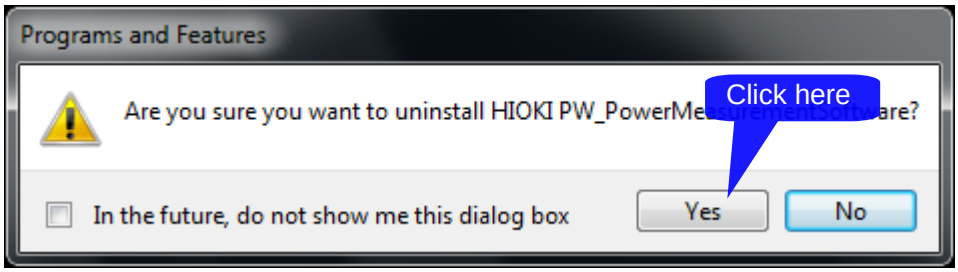
2 Click [Uninstall a program].



3 Select [HIOKI Standby Power Measurement Software] from the list of the currently installed programs, and then click [Uninstall].

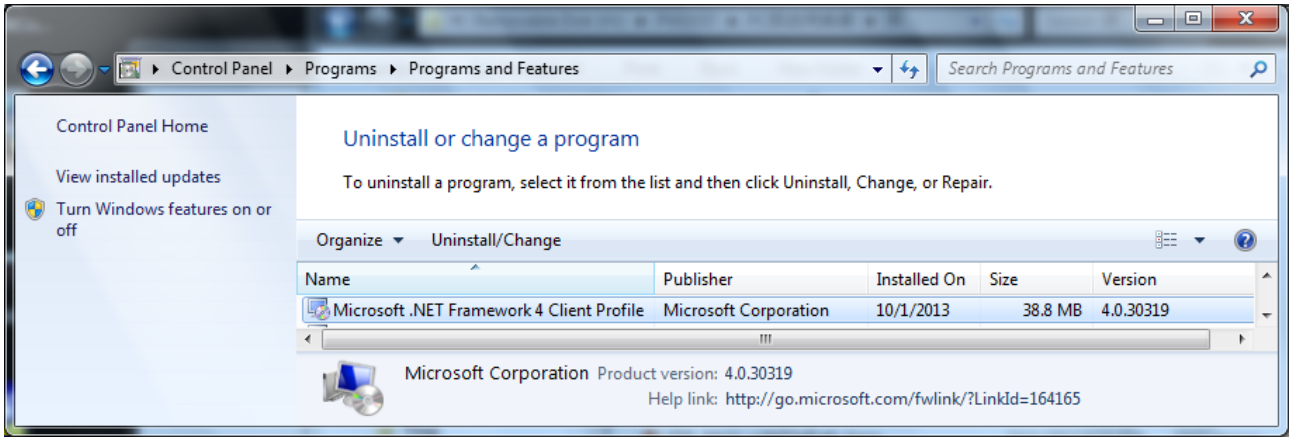


When a dialog box that requires you to permit the continued program uninstallation appears, click [Yes] to proceed to the next step.



- Uninstalling Microsoft .NET Framework4

  In the same manner as “Uninstalling HIOKI Standby Power Measurement Software”, select [Microsoft .NET Framework4] and uninstall it.



The .NET Framework is also used by other applications. It should only be uninstalled if you are certain that it is not needed by any other software.

5. Specifications

5.1. General Specifications

Applicable model	PW3335 Power Meter	
Operation environment	Personal computer compatible with the following conditions	
	Computer	PC/AT compatible machine (DOS/V machine)
	Operating system	・ Windows XP SP3 or above (32-bit edition) ・ Windows Vista SP2 or above (32-bit edition) ・ Windows 7 SP1 or above (32-/64-bit edition) ・ Windows 8 (32-/64-bit edition) Microsoft .NET Framework4 must be installed in the above operating systems in advance.
	CPU	1.0 GHz or higher (2.0 GHz or above is recommended)
	Memory	1.0 GB or higher (2.0 GB or above is recommended)
		Note: 2.0 GB or higher for Windows 7 64-bit edition and Windows 8 64-bit edition
	Hard disk	Free space of 128 MB or more (at the time of startup)
	Display	Resolution of 1,024×768 dots or above, 65,536 colors or more
	Communication interface	Any one or more of the following must be available: Ethernet (TPC/IP), GP-IB, and RS-232C(COM Port). Only the GP-IB interface manufactured by National Instruments Corporation is acceptable. The GP-IB driver of .NET4.0 or above must be installed in advance.(NI-488.2 3.1.2 or later)
Number of systems that can be connected concurrently		1

・ The libHaru library is used to generate PDF files.
http://libharu.sourceforge.net/
We are deeply grateful to the developers of libHaru.

5.2. Functional Specifications

This software aids in measuring standby power consumption in a manner that complies with with IEC 62301 Ed. 2 (2011).

Test condition configuration functionality	
Overview	Allows the user to configure settings and conditions necessary for the measurement of standby power consumption and report compilation, including test voltage, frequency, measurement time, stabilization detection method, power meter measurement settings, and report output items.

Standby power consumption measurement functionality	
Overview	Connects to and communicates with a power meter to measure standby power consumption. Displays test progress and measured values for monitoring purposes.

Report output functionality	
Overview	Outputs test results (reports) in PDF format. Outputs measurement data in CSV format.

Test condition save/load functionality	
Overview	Saves test conditions as a settings file. Loads previously saved settings files and restores associated test conditions.

6. Appendix

6.1. Stabilization Algorithms

○Sampling method 1 (linear regression [LR])

→Measurement start	Measurement stop→
Total test time (power-on time: 15 min. or more)	
Initial warm-up period (first one-third) Not used to detect stabilization.	Average power calculation period (remaining two-thirds)

Average power	Stabilization condition
1 W or less	The linear regression for all power values measured during the average power calculation period must have a slope of less than 10 mW/h.
Greater than 1 W	The linear regression for all power values measured values during the average power calculation period must be less than 1% of the measured input power per hour.

Detection is repeated every 10 sec. starting 15 min. after the start of testing until the above stabilization condition is satisfied. (The total time increases by 10 sec. at a time as a result.)

○Sampling method 2 (cumulative average [CA])

→Measurement start	Measurement stop→
Total time (power-on time: 60 min. or more)	
Cumulative average calculate period	
Initial warm-up period (first one-third) Not used to detect stabilization.	Average power calculation period (remaining two-thirds)

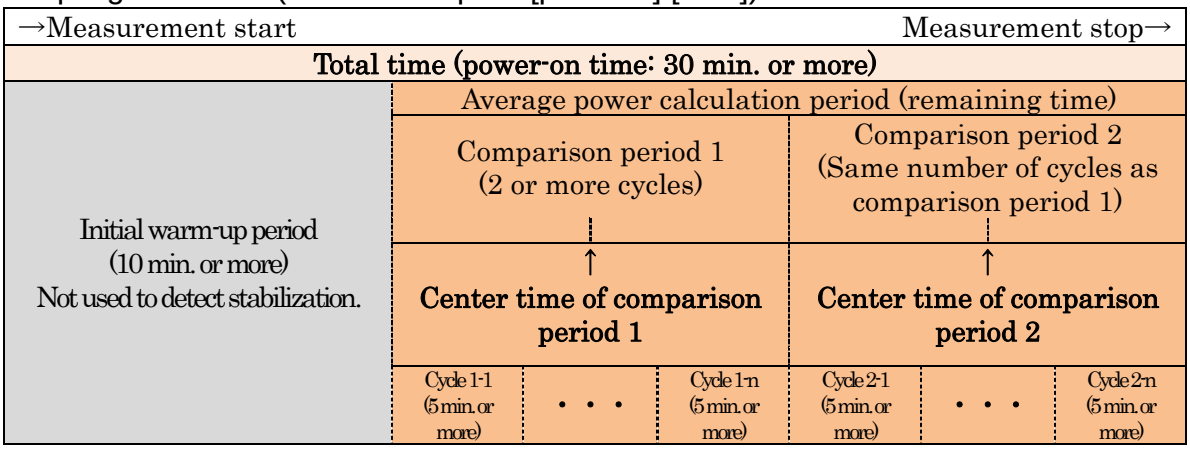
Average power	Stabilization condition
-	Fluctuations in the cumulative average of power values measured during the average power calculation period must be within ±0.2% of the power value measured during the cumulative average calculation period. →The upper limit of the cumulative average of power values measured during the average power calculation period must be no greater than 100.2% of the power value measured during the cumulative average calculation period, and the lower limit value of the cumulative average of power values measured during the average power calculation period must be no less than 99.8% of the power value measured during the cumulative average calculation period. Example: If the cumulative average during the cumulative average calculation period is 1 W, stabilization will be considered to have occurred when the maximum value of the cumulative average during the average power calculation period is 1.02 W or less and the minimum value of the same period is 0.998 W or greater.

Cumulative average	The cumulative average is calculated by adding each successive measured value while continuously acquiring the measured value xi and calculating the arithmetic average at each stage of measurement. These arithmetic mean calculation results are

	known as “cumulative average No. 1,” “cumulative average No. 2,” “cumulative average No. 3,” etc. They can be expressed as x1, (x1 + x2)/2, (x1 + x2 + x3)/3, etc.

Detection is repeated every 10 sec. starting 60 min. after the start of testing until the above stabilization condition is satisfied. (The total time increases by 10 sec. at a time as a result.)

○Sampling method 3 (section compare [power 1] [SP1])



Average power	Stabilization condition
1 W or less	The power rate of change must be less than 10 mW/h.
Greater than 1 W	The power rate of change must be less than 1% of the measured input power per hour.

Power rate of change
= ((Average power during period 2) - (Average power during period 1)) / ((Center time of comparison period 2) - (Center time of comparison period 1))

Detection is repeated by adding a certain number of cycles (n) starting 30 min. after the start of testing until the above stabilization condition is satisfied. (The total time increases by twice the cycle time as a result.) Power consumption is given by the average of all measured values during comparison periods 1 and 2.

The cycle time can be set in the test condition area.

○Average reading method 4 (section compare [power] 2 [SP2])
○Average reading method 5 (section compare [accumulated energy] [SAE])

<table>
<tr><td colspan="3">→Measurement start　　Measurement stop→</td></tr>
<tr><td colspan="3">Total time (power-on time: 50 min. or more)</td></tr>
<tr><td rowspan="3">Initial warm-up period (30 min. or more)
Not used to detect stabilization.</td><td colspan="2">Average power calculation period (remaining time)</td></tr>
<tr><td>Comparison period 1
(10 min. or more)</td><td>Comparison period 2
(Same duration as comparison period 1)</td></tr>
<tr><td>↑
Center time of comparison period 1</td><td>↑
Center time of comparison period 2</td></tr>
</table>

Average power	Stabilization condition
1 W or less	The power rate of change must be less than 10 mW/h.
Greater than 1 W	The power rate of change must be less than 1% of the measured input power per hour.

Power rate of change (SP2 power averaging method)
=((Average power during period 2) - (Average power during period 1)) / ((Center time of comparison period 2) - (Center time of comparison period 1))

Power rate of change (SAE accumulated energy method)
=((Integrated power during period 2) - (Integrated power during period 1)) / ((Center time of period 2) - (Center time of period 1))

Detection is repeated while extending the comparison period by 10 sec. at a time (so that the total time increases by 20 sec. at a time) starting 50 min. after the start of testing until the above stabilization condition is satisfied.

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