User's Manual

Power Meter Calibration Software

Preface

This user's manual explains the handling precautions, features, and operating procedures of the calibration software. To ensure correct use, please read this manual thoroughly before operation.

Keep this manual in a safe place for quick reference in the event that a question arises.

For details on the handling precautions, features, and operating procedures of the LS3300, 2560A, and power meters and the handling and operating procedures of Windows, please refer to the appropriate manual.

Notes

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the software's performance and functions. The figures given in this manual may differ from those that actually appear on your screen.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA dealer.
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Revisions

- 1st Edition: July 2018
- 2nd Edition: September 2018
- 3rd Edition: April 2021
- 4th Edition: June 2021
- 5th Edition: July 2022

Safety Precautions

For correct use, be sure to read the corresponding manual thoroughly before connecting a device used with this software.
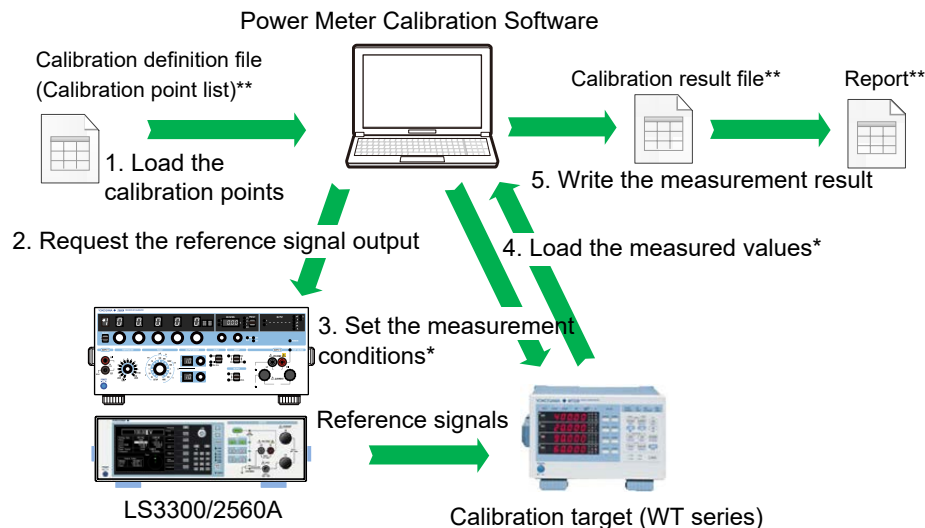
Contents

1. Overview of This Software

This software automatically calibrates a power meter (WT series) using YOKOGAWA's AC Power Calibrator LS3300 or Precision DC Calibrator 2560A.

Load a CSV format file describing calibration points in advance to control the LS3300 or 2560A so that reference signals are output according to the calibration points. For the following instruments that can be controlled with this software, set the range of the calibration target instrument remotely for each calibration point to read the measured values automatically. You can also save a measurement result in a report (CSV format file) as a calibration result.

Power Meter Calibration Software

Calibration definition file
(Calibration point list)**

1. Load the calibration points

2. Request the reference signal output

3. Set the measurement conditions*

Reference signals

LS3300/2560A

Calibration result file**   Report**

5. Write the measurement result

4. Load the measured values*

Calibration target (WT series)

*:   For a calibration target other than WT100, WT200, WT300, and WT300E series, you cannot automatically set the measurement conditions and load the measured values.
**: CSV format file (comma-separated)

Calibration Target Instruments

Instruments That Can Be Controlled with This Software

WT310E, WT310EH, WT332E, WT333E
WT310, WT310HC, WT332, WT333
WT200(253421)[*2], WT210(760401)[*2], WT230(760502, 760503)[*2]
WT110(253401)[*1, *2], WT110E(253451)[*2], WT130(253502, 253503)[*1, *2]

*1:   Models with the firmware version 1.11 or later
*2:   Can be controlled in the mode compatible with the IEEE488.2 1987 standard (488.2 mode)

Calibration automatically changes the measurement conditions, including the measurement range, so the settings for the calibration target instrument are different between before and after calibration. To revert to the original settings, you can back up the settings before calibration and reset them after calibration.

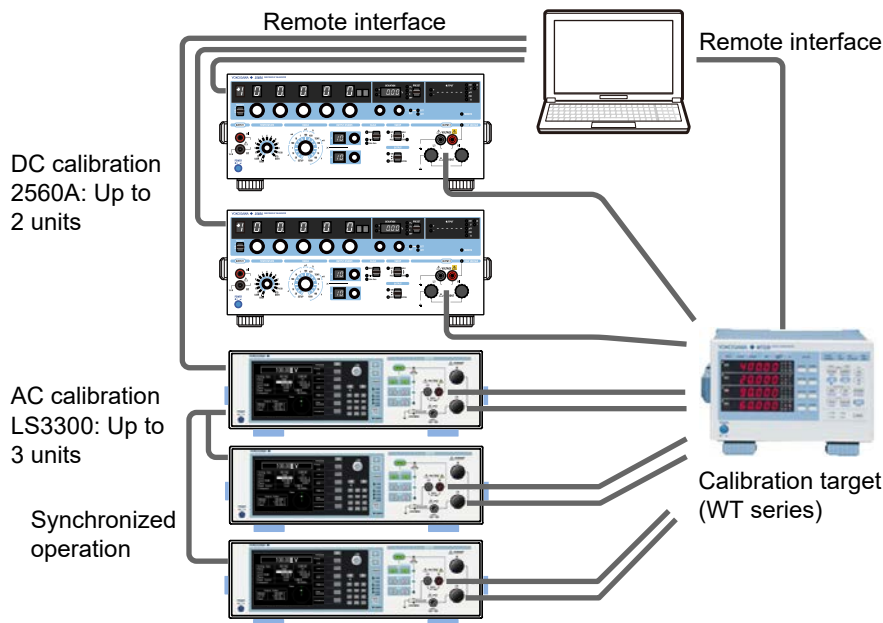### Instruments That Cannot Be Controlled with This Software

- YOKOGAWA power meters other than the above
- Non-YOKOGAWA power meters

You need to manually set the measurement conditions and read the measured values for the calibration target instrument.

Instrument Configuration

The instrument configuration varies depending on the calibration details.

Calibration details		2560A	LS3300
DC	Voltage	1 unit	
	Current	1 unit	
	Power	2 units	
AC	Voltage		1 unit
	Current (60 A or less)		1 unit
	Current (120 A or less)		2 units
	Current (180 A or less)		3 units
	Power (1P2W), (60 A or less)		1 unit
	Power (1P2W), (120 A or less)		2 units
	Power (1P2W), (180 A or less)		3 units
	Power (3P3W)		2 units
	Power (3P4W)		3 units

Remote interface

Remote interface

DC calibration
2560A: Up to
2 units

AC calibration
LS3300: Up to
3 units

Synchronized
operation

Calibration target
(WT series)

System Operating Environment

OS (operating system)

- Windows 8.1 Update (32-bit/64-bit) Japanese/English
- Windows 10 (32-bit/64-bit) Japanese/English
- Windows 11 Japanese/English

The latest patch was installed.

.NET Framework

.NET Framework 4.8 (supplied with this software)

CPU

1 GHz or higher processor

Memory

512 MB or more

Storage

HDD available space: 4.6 GB or more

Communication Interface

A communication interface corresponding to the device to connect.

When use GP-IB: Environment in which National Instruments GPIB interface driver runs.

Set the GPIB interface ID of the GPIB device on the PC side to GPIB0.

2. Installation Procedure

Installing USBDriver

Check if YKMUSB, a USB driver for YOKOGAWA products, is installed on your PC.

- Windows 8.1, Windows 10 (Device Guard disabled):   YKMUSB (version 1.0.4.2)
- Windows 10 (Device Guard enabled), Windows 11:   YKMUSB (version 2.0.0.0 and later)

If the driver is not installed, install the appropriate version. If a different version is installed, uninstall it first, and then install the appropriate version.

YKMUSB is contained in the file YKMUSBxxxx.zip (where xxxx is the version number) in the folder extracted from the compressed file you downloaded.

You can also download the driver from the following web page:

https://tmi.yokogawa.com/library/

(In the case of Windows 10 (Device Guard enabled), search under Windows 11.

Installing This Software

1. Run **setup.exe** in the folder extracted from the compressed file you downloaded.

    The installation wizard window appears.

2. Click **[Next]**.
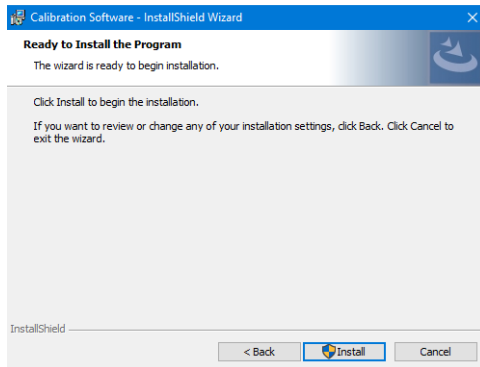
    The license agreement appears.

    Read the license agreement and check **[I accept the terms in the license agreement]**.

    Otherwise, check **[I do not accept the terms in the license agreement]**.

    If you do not accept the terms, the installation is canceled.

3. **Click [Next]**. The installation confirmation window appears.

4. If there is no problem with the installation settings, click **[Install]**.

   The software is installed.

   If you click **[Back]**, you will return to the previous screen to change the installation settings.
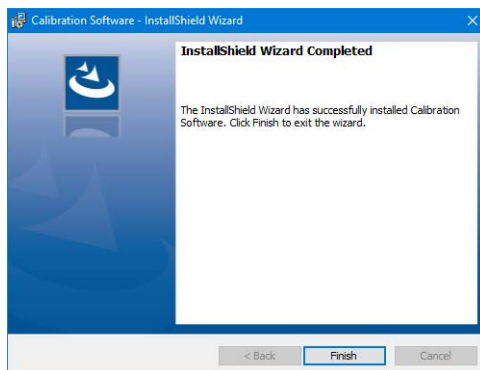
   If you click **[Cancel]**, the installation will be canceled.

   The **"User Account Control"** window appears in the middle of the installation process. Click **[Yes]**.

   The installation continues.

5. When the installation is completed, the completion window appears.

   Click **[Close]**. This is the end of installation.
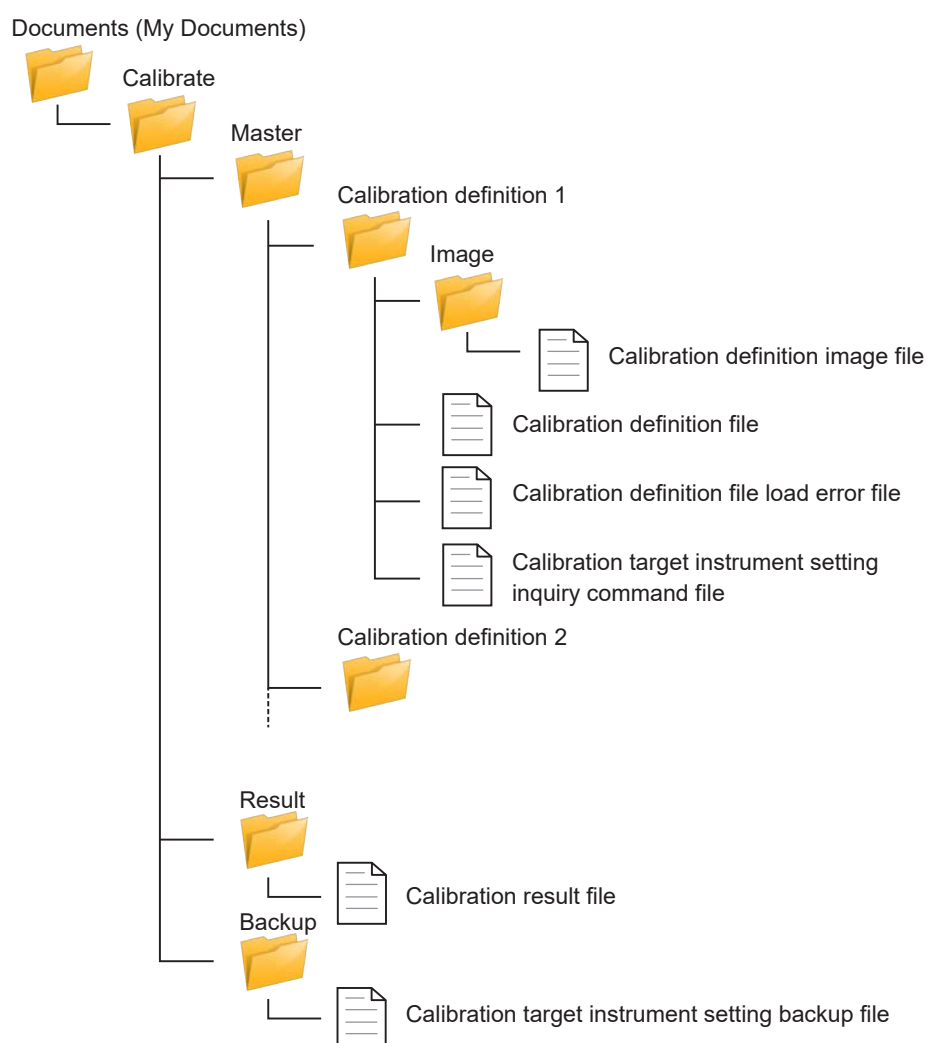
Uninstallation Procedure

1. Select [**Control Panel**] on the start window.
2. Double-click [**Programs and Features**].
3. Click [**Calibration Software**].
4. Click [**Uninstall**].
5. When the confirmation message appears, click [**Yes**].

File Structure

This software is installed in the Calibration Software folder in Program Files.
Calibration definition files and calibration result files are stored in the folders as shown below.
Separate calibration definition folders are necessary for each calibration definition file.

Documents (My Documents)

Calibrate

Master

Calibration definition 1

Image

Calibration definition image file

Calibration definition file

Calibration definition file load error file

Calibration target instrument setting inquiry command file

Calibration definition 2

Result

Calibration result file

Backup

Calibration target instrument setting backup file

3.   Operation Flow

The following describes the operation flow.

The operation pattern is also shown on the screen of this software, so follow the instructions.

```
                    ┌─────────────┐
                    │    Start    │
                    └──────┬──────┘
                           ▼
          ┌────────────────────────────────────┐
          │   Select a calibration definition file │
          └────────────────┬───────────────────┘
                           ▼
          ┌────────────────────────────────────┐
          │    Connect between the PC and the   │
          │         reference instrument        │
          └────────────────┬───────────────────┘
                           ▼
          ┌────────────────────────────────────┐
          │    Connect between the PC and the   │
          │     calibration target instrument   │
          └────────────────┬───────────────────┘
                           ▼
          ┌────────────────────────────────────┐
          │  Wire between the reference devices and the │
          │      calibration target instrument  │
          └────────────────┬───────────────────┘
                           ▼
          ┌────────────────────────────────────┐
          │         Execute calibration*        │
          └────────────────┬───────────────────┘
                           ▼
                 ◇ Is all the calibration finished? ◇ ──No──►
                           │ Yes
                           ▼                    ◇ Is rewiring required at the next calibration point? ◇ ──Yes──►
          ┌────────────────────────────────────┐
          │    Disconnect the calibration target │
          │  (Revert to the settings before calibration) │
          └────────────────┬───────────────────┘
                           ▼
          ◇ Is the same calibration definition repeated? ◇ ──Yes──►
                           │ No
                           ▼
          ┌────────────────────────────────────┐
          │      Disconnect the reference devices │
          └────────────────┬───────────────────┘
                           ▼
                    ┌─────────────┐
                    │     End     │
                    └─────────────┘
```

*: When calibration is executed, the output of the reference instruments is turned on.
This software starts loading the measured values for the calibration target instrument when the output of the reference instruments becomes stable and then a time of update count x update interval specified in the calibration definition file passes.

Before executing calibration, warm up the calibration target instrument and reference instruments.
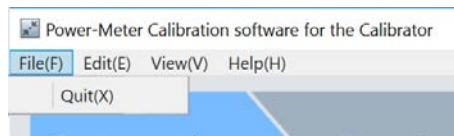
4. Starting This Software

Double-click the Calibration Software icon on the desktop or click Calibration Software from the start menu.
The list of calibration definition files supplied with this software is displayed.
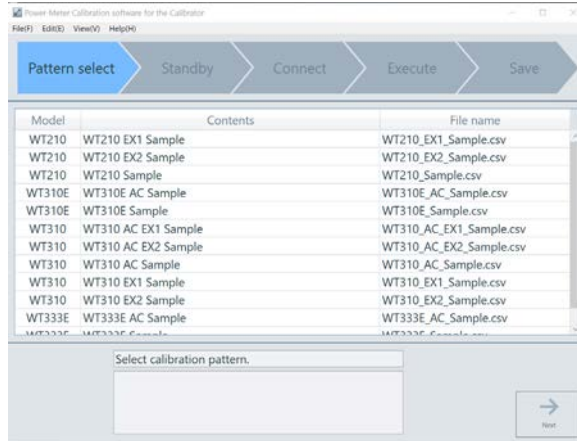
Exiting This Software

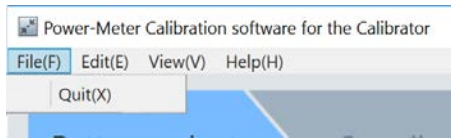From the **File** menu in the menu bar, select **Quit**.

5.   Menu Bar

The menu bar of this software has the file, edit, option, and help functions.

File

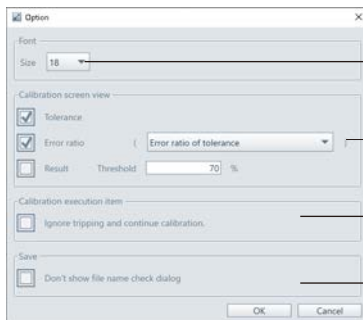This menu is used to exit the software.

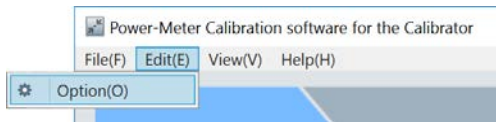From the **File** menu in the menu bar, select **Quit**.

Edit

This menu is used to set the text size or items displayed in the calibration point list.

From the **Edit** menu in the menu bar, select **Option**.

The option dialog box appears.

Set the displayed text size

Select the item to display during calibration

Select whether to continue or stop calibration when the calibrator trips

Select whether to show a file name check dialog box when saving a calibration result

Tolerance

Tolerance obtained from ErrorStyle, ErrorParameter1, ErrorParameter2, and ErrorParameter3 specified in the calibration definition file

Error ratio

Displays one of the following error ratios:

   Ratio of error to generated value:

      ((Measured value - Generated value) / Generated value) x 100 %

   Ratio of error to generated value:

      When the measured value is greater than generated value:

         ((Measured value - Generated value) / (Maximum tolerance - Generated value)) x 100 %

      When the measured value is smaller than generated value:

         ((Measured value - Generated value) / (Generated value - Minimum tolerance)) x 100 %

   Specify the tolerance in the calibration definition file.

Result

Displays the calibration result.

   Blank: The error ratio is not exceeding the threshold.

   Fail: The measured value is out of the tolerance range.

   Warning: The ratio of error to tolerance is exceeding the threshold.

File Name Check Dialog Box

The serial number of the calibration target instrument is used in the file names of calibration results, but if the serial number contains characters that cannot be used in file names, the number cannot be used as-is. As such, a file name check dialog box can be shown when you save a calibration result allowing you to select how the forbidden characters are to be removed.
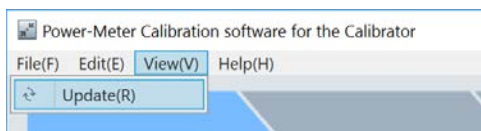

If you click Yes, Save dialog boxes will be shown with the forbidden characters removed from the file names.

If you click No, Save dialog boxes will be shown without removing the forbidden characters. When a Save dialog box appears, correct the file name in the dialog box.

View

This menu is used to refresh the screen.

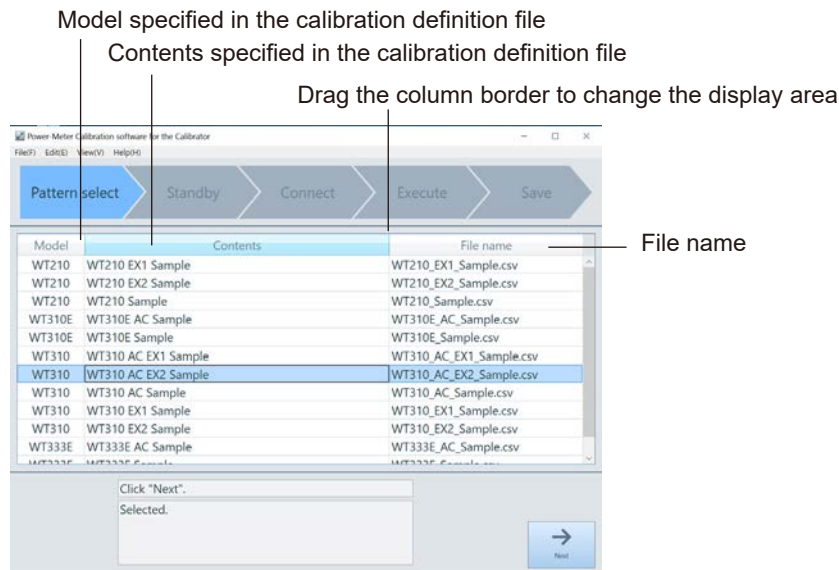From the **View** menu in the menu bar, select **Update**.

Help

This menu is used to display the version information of this software.

6.   Calibration for WT100, WT200, WT300, and WT300E Series

Loading Calibration Definition File

This software contains calibration definition files for the WT100, WT200, WT300, and WT300E series.

To create a unique calibration definition file, refer to "7. Creating Calibration Definition File".

1. Start this software.

2. From the displayed calibration definition files, select one suitable for the calibration target instrument and click **Next**.

Model specified in the calibration definition file

Contents specified in the calibration definition file

Drag the column border to change the display area

File name

Instruments and cables required for calibration are displayed. Check if any items are missing.

Click **Next**.
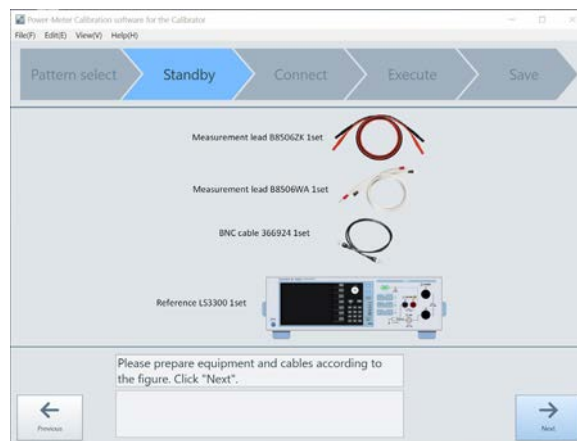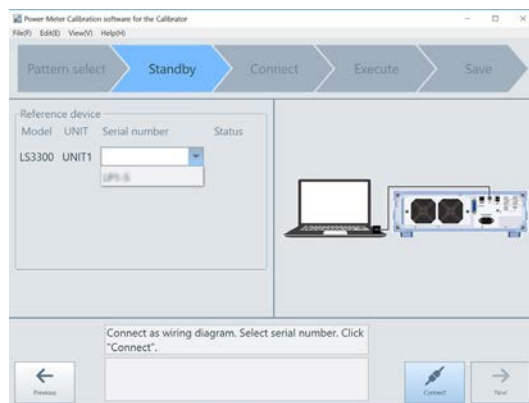
Connecting Reference Instruments

3. Confirm that the output of the reference instrument is turned off and connect between the PC and the reference instrument.

4. **When the PC and the reference instrument are connected via USB**

From the Serial number pull-down menu, select the serial number of the instrument to be used.

It may take a while before the serial number is shown in the pull-down menu.

For the LS3300 UNIT 2 or 3, the serial number of the connected instrument is set.

If the serial number is not shown, check if the connection is correct or the reference instrument is turned on.

**When the PC and reference instrument are connected via non-USB**

Connect the PC to the reference instrument with the address specified in the calibration definition file. When it is successfully connected to the reference instrument, the serial number is shown.

Note

If the serial number is specified in the calibration definition file, that serial number is set.

5. Click **Connect**.

If the instrument is connected correctly, the Status column shows "Matched".
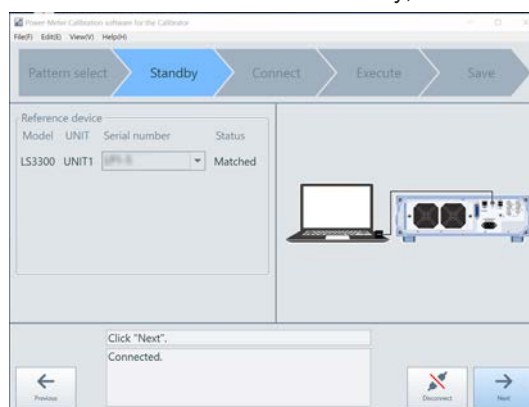
One of the following statuses is shown according to the connection condition.

Matched: The model of the connected reference instrument matches the model in the calibration definition file.

It also matches the serial number if the number is specified in the calibration definition file.

Unmatched: It does not match the model or serial number in the calibration definition file.

Missing: The PC and the reference instrument cannot be connected to each other.

6. Click **Next**.

   When both the 2560A and LS3300 are used, the 2560A or LS3300 connection window appears. Repeat steps 3 to 6.

   When all the reference instruments are successfully connected, the calibration target instrument connection window appears.

Connecting Calibration Target Instrument

7. Connect between the PC and the calibration target instrument.

8. From the Remote interface pull-down menu, select the remote interface to be used.

9. The setting items vary depending on the remote interface. Set each item according to the table below.

Remote interface	Item	Description
USB*	Serial number	The USB serial number of the connected instrument is shown in the pull-down menu.
GPIB	Address	Set the GPIB address.
ETHERNET*	IP address	Set the IP address.
RS-232	Port number	Select a positive integer between 1 and 255.
	Baud rate	Select 1200bps, 2400bps, 4800bps, 9600bps, 19200bps, 38400bps, 57600bps, or 115200bps.
	Format	8Bit,NoParity,1StopBit 7Bit,EvenParity,1StopBit 7Bit,OddParity,1StopBit
	Handshake	Select NONE, XON/XOFF, or CTS-RTS.
	Terminator	Select CR+LF, or LF.
None	-	-

*: The WT100 and WT200 series do not support USB and ETHERNET.

Note

- When Remote interface is set to "None", the PC does not communicate with the calibration target instrument. Before executing calibration, manually change the settings for the calibration target instrument.
  The settings cannot be reverted to the ones before calibration because setting data for the calibration target instrument cannot be backed up.
- The USB serial number for the WT100, WT200, WT300, and WT300E series is the same as the corresponding product serial number.
- Use "LF" for the GP-IB terminator for the WT100, WT200, WT300, and WT300E series.
- The instrument may not operate properly if the instrument is connected to the PC through converters (such as a GPIB to USB converter or RS-232 to USB converter). For more details, contact your nearest YOKOGAWA dealer.
- During calibration, insert and remove the communication cable according to the instructions on the screen.
  If you do not follow the instructions, the instrument may not be detected or may operate improperly.

Window when Remote interface is set to USB
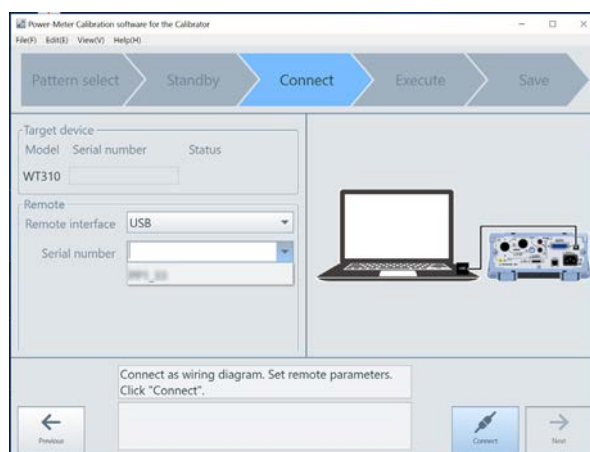
10. When Remote interface is set to other than "None", click **Connect**. The Connect button changes to the Disconnect button.

    If the instrument is connected correctly, the Status column shows "Matched".
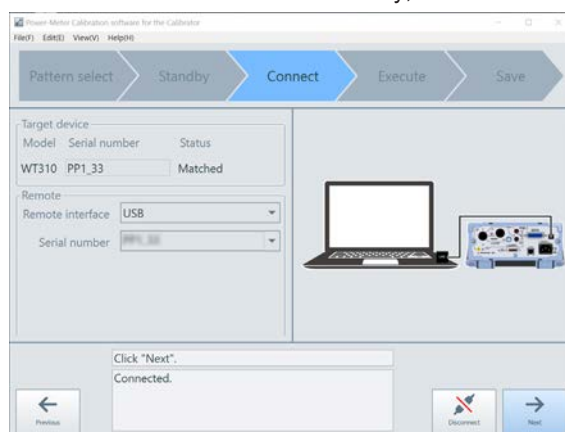
    One of the following statuses is shown according to the connection condition.

    Matched: It matches the model of the connected instrument and is equipped with necessary options.

    Unmatched: It does not match the model of the connected instrument.

    Missing: It cannot connect to the instrument.

11. Enter the serial number of the calibration target instrument. When the PC is communicating with the calibration target instrument, the serial number is automatically entered.

    If Remote interface is set to "None", manually enter the serial number.

    For the WT100 and WT200 series, you can manually enter the serial number even when the PC is communicating with the calibration target instrument.

12. Click **Next**.

    The setup for the device to be calibrated is backed up according to the query command in the setup backup query command file.

Note

The setup backup query command file is stored in the Documents > Calibrate > Master > Calibration definition folder.

A backup file of the setup for the device to be calibrated is saved in the Documents > Calibrate > Backup folder. The file is named as "the model of the device to be calibrated-serial number-date.txt."

The setup backup file for the device to be calibrated is used after a calibration to return the setup of the device to what it was before the calibration.

Executing Calibration

13. The list of calibration points specified in the calibration definition file is displayed.

Select calibration points to execute. To automatically execute calibration for the selected points continuously, select the **Continuous** checkbox. To execute calibration for each point, deselect the **Continuous** checkbox.

Select calibration points to execute   Drag the column border to change the display area

Items selected in Edit > Option in the menu bar

Select to execute calibration for the selected points continuously

14. Click **Execute**.

The wiring diagram between the reference instrument and the calibration target instrument appears.

Confirm that the output of the reference instrument is turned off and connect wiring between the reference instrument and the calibration target instrument.

When Remote interface is set to other than "None", go to the next page.

When Remote interface is set to "None", go to page 17.

When Remote Interface Is Set to Other Than None

15. Click **OK**.

Calibration starts.

Error ratio

Measured value   Judgment result
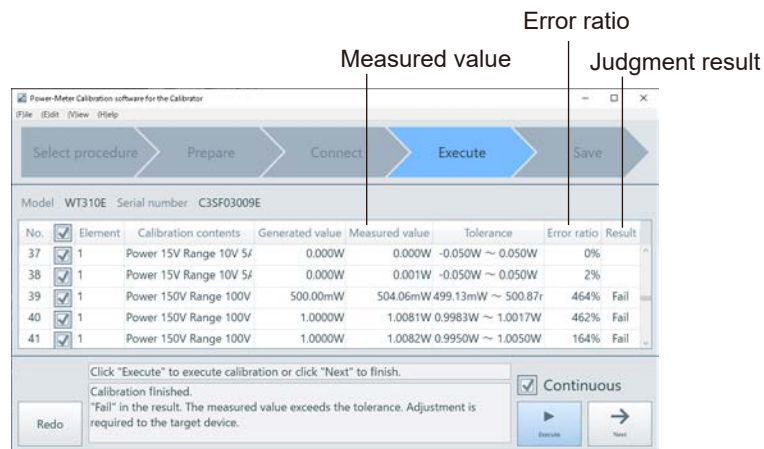
One of the following judgment results is displayed.

Fail: The measured value is out of the tolerance range.

Warning: The ratio of error to tolerance is exceeding the threshold set in the Edit menu in the menu bar.

To cancel the calibration, click **Abort**. When the confirmation message appears, click **OK**. If the calibration is canceled, the calibration data collected so far will be lost.

16. At calibration points where the wiring needs to be changed, the calibration is halted, and a window prompting you to change the wiring appears. At this time, the output of the reference instrument is automatically turned off.

Change the wiring for the calibration point and click **OK**.
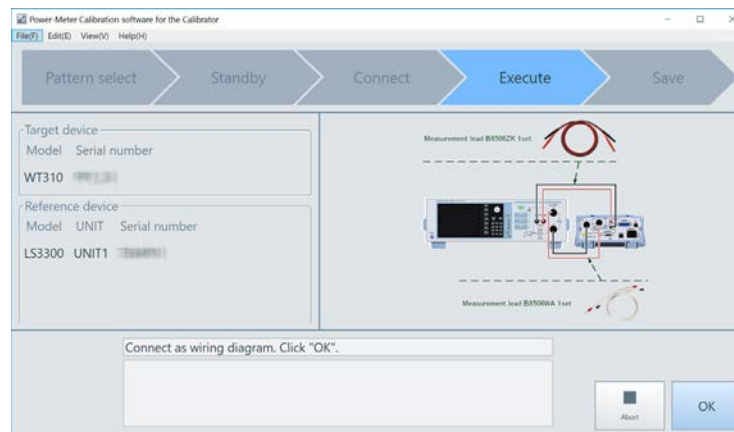
17. After the calibration of all selected calibration points is completed, clicking **Next** will open a comment input screen.

Enter a comment and click **Save**.

The calibration result is saved in a CSV file.

The file location is My Documents > Calibrate > Result folder.

The file name is "Calibration target instrument model-Serial number-Calibration date (Year/Month/Day/Hour/Minute/Second).csv".

Name of the saved file
Enter a comment

Redo the calibration   Save the file
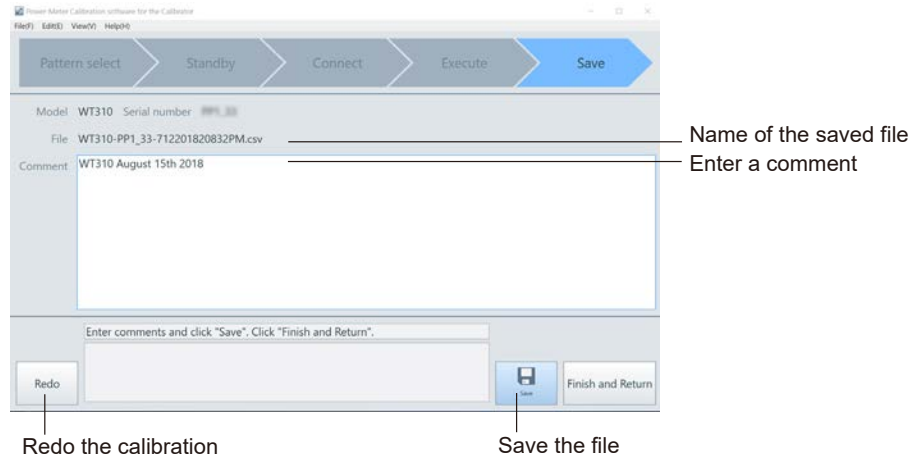
18. To exit the calibration, click **Finish and Return**.

A message dialog box appears for you to check if you execute the same calibration as the previous one for the same model.

19. If you click **Yes**, you will return to the calibration target instrument connection window.

If you click No, you will return to the calibration definition file list window.

Note

- If the calibration point is less than 1.000 mV AC and less than 0.3000 mA AC, this is outside the guaranteed accuracy range of the reference instrument LS330, and therefore, proper calibration cannot be performed.
- Clicking **Finish and Return** causes the setup of the device to be calibrated to what it was before the calibration according to the setup command in the setup backup file.
  The setup backup file for the device to be calibrated is in the Documents > Calibrate > Backup folder.

When Remote Interface Is Set to None

15. Click **OK**.

A window appears for you to set the calibration target instrument for each calibration point.
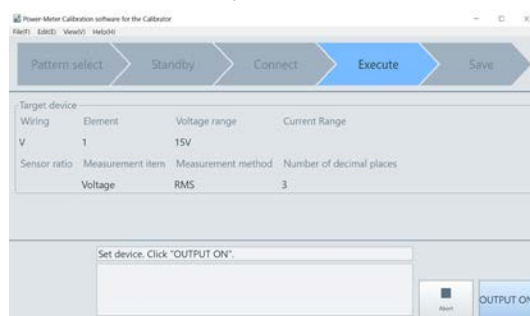
Set the calibration target instrument manually for the calibration point.

16. Click **OUTPUT ON**.

The list of calibration points is displayed, and the output of the reference instruments is turned on.
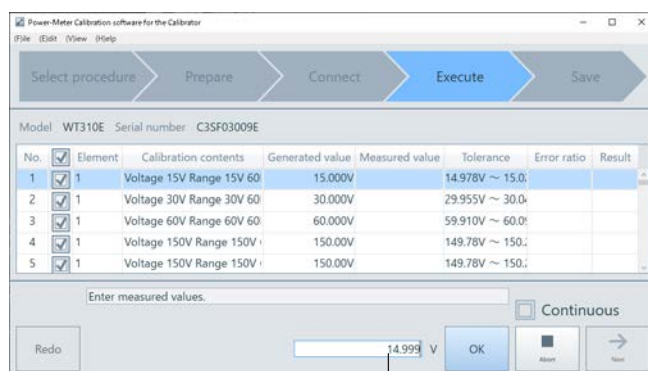
Enter the measured value of the calibration target instrument

17. Enter the measured value of the calibration target instrument and click **OK**.

A window appears for you to set the calibration target instrument for the next calibration point.

18. Perform the above step for each calibration point.

The entered measured value is displayed
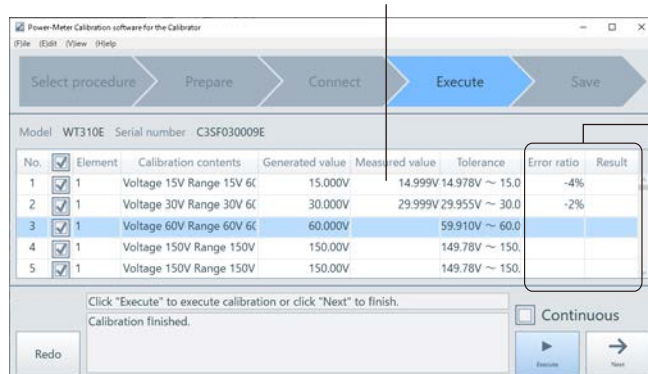
The error ratio and judgment of the measurement result are displayed

**19.** After the calibration of all selected calibration points is completed, clicking **Next** will open a comment input screen.

Perform step 17 and subsequent steps in "When Remote Interface Is Set to Other Than None".

Usage method of calibration result file (creation of test certificate)

Since the calibration result file is CSV format data, it can be imported into various application software. In addition, you can also use the macro file to use the measurement result file variously.

This software comes with a sample of Excel macros that create a test certificate using the calibration result data.

1. Open the Excel file "CertificateMaker.xlsm" in the Calibrate folder.

Clear the Result sheet

Create a test certificate

Sheet where the test certificate is created
Sheet to which the calibration result is copied
Sheet written in English

2. Click the **Clear** button.

3. Open the calibration result file saved in Documents > Calibrate > Result folder.

4. Copy all the cells in the calibration result file to the **Result** sheet in CertificateMaker.xlsm.
Start copying from A1 cell.

5. **Click the Make** button in the Manual sheet.
The test certificate is created in the **Certificate** sheet.

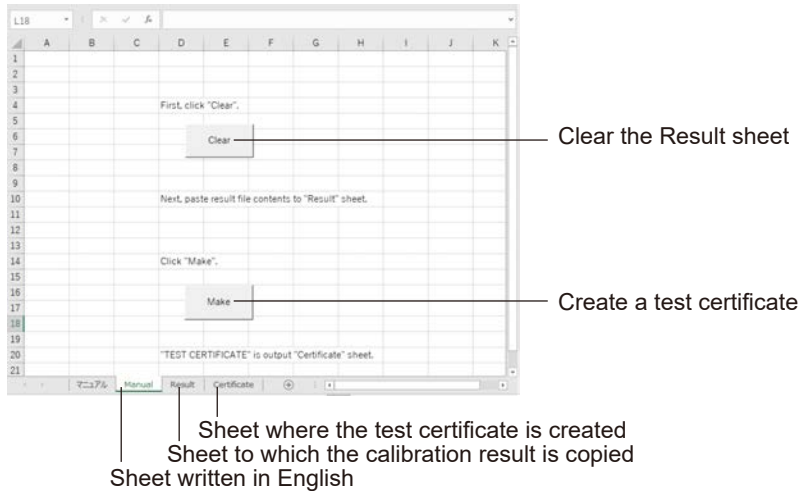|										
				成　　績　　表						
				TEST CERTIFICATE						
日付										
DATE	2018/06/14 12:13:57									
モデル					シリアル番号					
MODEL	WT310				SERIAL NO.					
VOLTAGE		CURRENT				GENERATED			MEASURED	
RANGE	LEVEL	RANGE	LEVEL	FREQUENCY	PF	VALUE	TOLERANCE		VALUE	RESULT
15V	15V			60Hz		15.000V	14.970V ～ 15.030V		15.006V	
30V	30V			60Hz		30.000V	29.940V ～ 30.060V		30.012V	
60V	60V			60Hz		60.000V	59.880V ～ 60.120V		59.970V	
150V	150V			60Hz		150.00V	149.70V ～ 150.30V		149.93V	
150V	150V			60Hz		150.00V	149.70V ～ 150.30V		149.93V	
150V	100V			1kHz		100.00V	99.60V ～ 100.40V		99.94V	
300V	300V			60Hz		300.00V	299.40V ～ 300.60V		299.86V	
600V	60V			60Hz		60.00V	59.34V ～ 60.66V		59.97V	
600V	100V			60Hz		100.00V	99.30V ～ 100.70V		99.95V	
600V	300V			60Hz		300.00V	299.10V ～ 300.90V		299.87V	
600V	600V			60Hz		600.00V	598.80V ～ 601.20V		599.77V	
		5mA	5mA	60Hz		0.0050mA	0.0050mA ～ 0.0050mA		0.0050mA	
		10mA	10mA	60Hz		0.010mA	0.010mA ～ 0.010mA		0.010mA	
		10mA	10mA	1kHz		0.010mA	0.010mA ～ 0.010mA		0.010mA	
		20mA	20mA	60Hz		0.020mA	0.020mA ～ 0.020mA		0.020mA	Warning
		100mA	100mA	60Hz		0.10mA	0.10mA ～ 0.10mA		0.10mA	
		0.5A	500mA	60Hz		0.50mA	0.50mA ～ 0.50mA		0.50mA	
		1A	0.1A	60Hz		0.1000A	0.0989A ～ 0.1011A		0.1000A	

7.   Creating Calibration Definition File

A calibration definition file is a CSV format file that describes the calibration target instrument information, calibrator information, calibration point information, and judgment criteria. You can also set that a calibration result is automatically written to the file.

When this software is installed, a sample file for each calibration target instrument is installed.

Description of Calibration Definition File

Item		Setting value	Specified in calibration definition file	Added to the calibration result file
Format (format definition)				
Version	Version	Format version of the calibration definition file. 0 or a positive integer. Current version: 0	✓	–
Target Instrument (calibration target instrument definition)			✓	–
Model name	Model	Specify the calibration target model name.	✓	–
Optional feature	Option	Specify the option code required for the calibration target instrument. Leave it blank to specify no value. EX1, EX2(WT series)	✓	–
Summary	Contents	Describe the contents of calibration displayed in the calibration pattern selection window.	✓	–
Update interval	SampleRate	Specify the measurement update interval. For the WT100 and WT200 (excluding WT210 and WT230) series, this is fixed to 0.25 s. 0.1, 0.25, 0.5, 1, 2, 5	✓	–
Update count	SampleCount	Specify the update count from when the output of the reference instruments becomes stable to when the measured data is imported. Integer greater than or equal to 1.	✓	–
Prepared image	ImagePath	Enter the relative path (path based on the calibration definition file) of a instrument image required for calibration, which is displayed on the screen of this software.	✓	–
Serial number	SerialNumber	This is automatically entered as a calibration result.	–	✓
Calibration date	Date	This is automatically entered as a calibration result.	–	✓
Reference Instruments (reference instrument definition)				
Model name	Model	Specify the calibrator model name. This is optional.	✓	–
Output function	Function	For the 2560A, specify the output function. V and A can be selected once each. VA indicates that both V and A are defined. For the LS3300, this column is ignored. V, A, VA	✓	–
Serial number	SerialNo	Enter the serial number of the calibrator to be used. For the LS3300, a blank indicates that the serial number is not specified, and IGNORE indicates that the calibrator is not used. The serial number must not be duplicated.	✓	✓
Remote interface	RemoteInterface	Specify the connection method. USB, GPIB, Ethernet	✓	–
Address	Address	Enter the GPIB address or IP address. For the GPIB address, specify a value between 0 and 30.	✓	–
Points (calibration point definition)				
AC, DC	ACDC	Select AC or DC. This is required. AC: Alternating current, DC: Direct current	✓	–

Item			Setting value	Specified in calibration definition file	Added to the calibration result file
Function	Function		Select the function each for the calibrator and the calibration target instrument. This is required. V: Voltage A: Current 1P2W: Single-phase power 1P3WT: Multi-phase power, Single-phase three-wire system (UNIT2 preferred) 1P3WS: Multi-phase power, Single-phase three-wire system (UNIT3 preferred) 3P3WT: Multi-phase power, Three-phase three-wire system (UNIT2 preferred) 3P3WS: Multi-phase power, Three-phase three-wire system (UNIT3 preferred) 3P4W: Three-phase four-wire system	✓	–
Element	Element		Specify the element number of the calibration target instrument. The value must be a positive integer or "SIGMA".	✓	–
Voltage	Range	VoltageRange	Select the voltage range of the calibration target instrument.	✓	–
	Level	VoltageLevel	Specify the calibration voltage level of the calibration target instrument. Can be set within the ratings of both the reference instrument and the calibration target instrument. Floating point number.	✓	–
Current	Range	CurrentRange	Select the current range of the calibration target instrument. To specify a current sensor, put EXT at the beginning. 1A, 500mA, EXT5V	✓	–
	Level	CurrentLevel	Specify the calibration current level of the calibration target instrument. Can be set within the ratings of both the reference instrument and the calibration target instrument. Floating point number. 1A, 500mA, 5V	✓	–
Sensor ratio or scaling constant	SensorRatio		Specify the sensor ratio or scaling constant of the calibration target instrument. Ignored when the current sensor will not be calibrated. When the unit is mV/A, it is treated as the sensor ratio. When the unit is A, it is treated as the scaling constant, calculating the sensor ratio from the EXT range.	✓	–
Frequency	Frequency		Specify the AC frequency of the reference instrument. For the DC output, this is ignored. Floating point number.	✓	–
Phase lead or lag	LeadLag		Specify the lead or lag of the current phase. This is enabled for AC. LEAD, LAG, none(LAG)	✓	–
Power factor	PowerFactor		Specify the power factor. Floating point number between -1.0 and 1.0. This is enabled for AC.	✓	–
Measurement resolution	Resolution		Specify the number of decimal places of the calibration result as resolution. Integer greater than or equal to 0.	✓	–
Auxiliary unit	SiPrefix		Auxiliary unit of the calibration result. Select ' ' (none), k, m, or u.	✓	–
Measurement unit	Unit		Measurement unit of the calibration result. Select ' ' V, A, W, var, or VA.	✓	–
Measurement method	Item		Specify the measurement method for the calibration target instrument. Select RMS, MEAN, or DC.	✓	–
Tolerance format*	ErrorStyle		Specify the tolerance format. If this is blank, the description in the tolerance field is ignored and not judged. ABSOLUTE, RELATIVE, PERCENT	✓	–
Tolerance field 1*	ErrorParameter1		Specify a description according to the tolerance format.	✓	–
Tolerance field 2*	ErrorParameter2		Specify a description according to the tolerance format.	✓	–
Tolerance field 3*	ErrorParameter3		Specify a description according to the tolerance format.	✓	–

Item		Setting value	Specified in calibration definition file	Added to the calibration result file
Wiring diagram	Image Path	Specify the path of an image file displayed as a wiring diagram. Character string of the bitmap/jpg/pdf file name. This is optional.	✓	–
Generated value	GeneratedValue	The generated value is entered.	–	✓
Measured value	MeasuredValue	The measured value of the calibration target instrument or the value eye-measured by the user is entered.	–	✓
Absolute tolerance (lower limit)	MinTorerance	The lower limit of the tolerance is entered.		
Absolute tolerance (upper limit)	MaxTorerance	The upper limit of the tolerance is entered.		
Ratio of error to generated value	ErrorRatio1	With the maximum and minimum tolerance ±100 %, the error ratio of the measured value is entered.	–	✓
Ratio of error to generated value	ErrorRatio2	The error ratio is entered. ((Measured value - Generated value) / Generated value) x 100 %	–	✓
Judgment	Result	The judgment result is entered based on the accuracy and the measured result.	–	✓
Comments(user comment display field)			–	✓

*Specify the appropriate description according to the table below.

Definition description	ErrorStyle	ErrorParameter1	ErrorParameter2	ErrorParameter3
Define tolerance with an absolute value	ABSOLUTE	Minimum tolerance (absolute value)	Maximum tolerance (absolute value)	Blank (ignored)
Define tolerance with a relative value	RELATIVE	± relative value	Blank (ignored)	Blank (ignored)
Define tolerance with accuracy	PERCENT	% of Reading(%RS)	% of Range(%FS)	% of VA

Description Method

Calibration target instrument definition header, reference instrument definition header, calibration point definition header

Put "#" at the beginning and the end. This is required.

\# Format #

\# Target Instrument #

\# Reference Instruments #

\# Points #

\# Comments #

You cannot modify a single-byte space between # and a word and between words.

Format definition

Enter <Version> as the item name header.

Put the file version in the row under the header.

Calibration target instrument definition

Enter <Model>, <Option>, <Contents>, <SampleRate>, <SampleCount>, <ImagePath>, <SerialNumber>, and <Date> as the item name headers.

Put the information in the row under each header.

<SerialNumber>and <Date> are automatically filled out as a calibration result.

Reference instrument definition

Enter <Model>, <Function>, <SerialNo>, <Remote I/F>, and <Address> as the item name headers.

Put the information in the row under each header. This is required for each of the connected reference instruments.

- When multiple LS3300 units are connected, specify them in the order of units with the serial numbers separated by ";". Set "IGNORE" for the serial number of a unit not used. If UNIT 1 is IGNORE, UNIT 2 and 3 are also set to IGNORE.
- If you put "#" at the beginning of Model like "#LS3300", the description of this reference instrument is ignored. This is used to temporarily comment out.

Calibration point definition

Enter <ACDC>, <Function>, <Element>, <VoltageRange>, <VoltageLevel>, <CurrentRange>, <CurrentLevel>,<SensorRatio>,<Frequency>,<LeadLag>,<PowerFactor>,<Resolution>,<SiPrefix>, <Unit>, <Item>, <ErrorStyle>, <ErrorParameter1>, <ErrorParameter2>, <ErrorParameter3>, <Image>,<GeneratedValue>,<MeasuredValue>,<MinTolerance>,<MaxTolerance>,<ErrorRatio1>, <ErrorRatio2>, and <Result> as the item name headers.

Put the information in the row under each header. This is required for each calibration point.

At least one calibration point must to be defined.

<GeneratedValue>, <MeasuredValue>, <MinTolerance>, <MaxTolerance>, <ErrorRatio1>, <ErrorRatio2>, and <Result> are automatically filled out as a calibration result.

See the description example shown on the last page of this manual.

To change the settings for the calibration target instrument before executing calibration at a calibration point, insert a row above the calibration point and enter the command line following "#" at the left end. This is used to manually change the range of the calibration target instrument.

Destination Folder of Calibration Definition File

Save the calibration definition file in Documents >Calibrate > Master > Calibration Definition folder.

If it is saved in a folder other than the above, it is not displayed on the calibration definition file load window.

Name the calibration definition file as "calibration definition folder name".csv. For example, if the calibration definition folder name is "calib123," save the file as "calib123.csv."

If you want to create several calibration definition files, save them in separate calibration definition folders.

Setup Backup Query Command File

The setup backup query command file is used before a calibration to save setup information that will be changed by a calibration definition file. It is a text file containing setup query commands.

The results of the query made by the setup backup query command file are saved in the Backup folder. The saved file is used after a calibration to return the setup of the device to what it was before the calibration.

When you install this software, a sample file is installed for each device to be calibrated.

If you create a new file, save it in the Documents > Calibrate > Master > Calibration definition folder. The file name is calibration definition folder_Backup.txt. Add "_Backup.txt" after the calibration definition folder name.

For details on commands, see the manual for the device to be calibrated.

File Names

The names of various files are as follows:

Documents (My Documents)
└─ Calibrate
   ├─ Master
   │ ├─ Calibration definition 1
   │ │ Folder name 1: User-defined string
   │ │   ├─ Image
   │ │   ├─ Calibration definition file
   │ │   │ File name: <calibration definition folder name 1>.csv
   │ │   ├─ Calibration definition file load error file
   │ │   │ File name: <calibration definition folder name 1>_Error.txt
   │ │   └─ Calibration target instrument setting inquiry command file
   │ │   File name: <calibration definition folder name 1>_Backup.txt
   │ ├─ Calibration definition 2
   │ │ Folder name 2: User-defined string
   │   ├─ Calibration definition file
   │   │ File name: <calibration definition folder name 2>.csv
   │   ├─ Calibration definition file load error file
   │   │ File name: <calibration definition folder name 2>_Error.txt
   │   └─ Calibration target instrument setting inquiry command file
   │   File name: <calibration definition folder name 1>_Backup.txt
   ├─ Result
   │ └─ Calibration result file
   │   File name: the model of the device to be calibrated-serial number-calibration date.csv.
   └─ Backup
      └─ Calibration target instrument setting backup file
        File name: the model of the device to be calibrated-serial number-calibration date.txt

8.   Calibration for Power Meters Other Than WT100, WT200, WT300, and WT300E Series

To execute calibration for power meters other than WT100, WT200, WT300, and WT300E series, create a calibration definition file appropriate for the calibration target instrument according to "6. Creating Calibration Definition File".

You cannot configure the settings for the calibration target instrument remotely from this software. Set the calibration target instrument for each calibration point.

Loading Calibration Definition File

Load the calibration definition file according to "6. Calibration for WT100, WT200, WT300, and WT300E Series".

Connecting Reference Instruments

Connect between the PC and the reference instruments according to "6. Calibration for WT100, WT200, WT300, and WT300E Series".

Connecting Calibration Target Instrument

1. Connect between the PC and the calibration target instrument and turn on the calibration target instrument.

2. From the Remote interface pull-down menu, select the remote interface to be used.
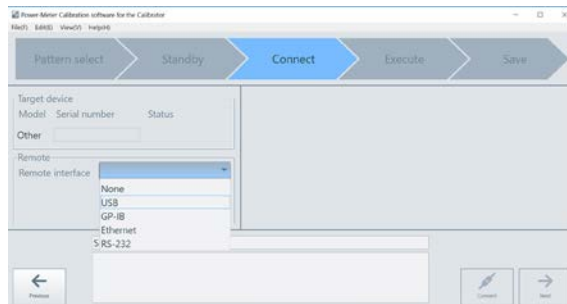
3. The setting items vary depending on the remote interface. Set each item according to the table below.

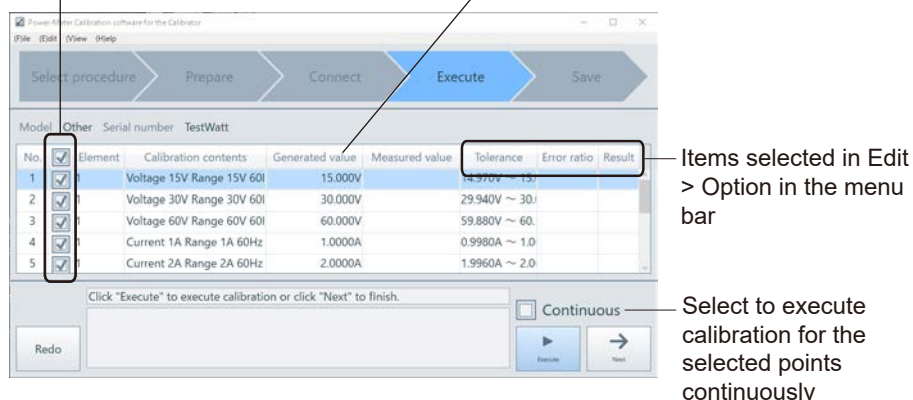| Remote interface	Item	Description
USB	Serial number	Enter the USB serial number of the connected instrument.
GPIB	Address	Set the GPIB address.
	Terminator	Select CR+EOI, LF+EOI, CR, LF, or EOI.
ETHERNET	IP address	Set the IP address.
RS-232	Port number	Select a positive integer between 1 and 255.
	Baud rate	Select 1200bps, 2400bps, 4800bps, 9600bps, 19200bps, 38400bps, 57600bps, or 115200bps.
	Format	8Bit,NoParity,1StopBit 7Bit,EvenParity,1StopBit 7Bit,OddParity,1StopBit 8Bit,OddParity,1StopBit 7Bit, NoParity, 1.5StopBit 8Bit, NoParity, 2StopBit.
	Handshake	Select NONE, XON/XOFF, or CTS-RTS.
	Terminator	Select CR+LF, CR, or LF.
None	-	-

4. Enter the serial number of the calibration target instrument manually.

Note

Depending on the settings specified in chapter 5, "Menu Bar," a file name check dialog box may appear when you save the calibration result. When a Save dialog box appears, correct the file name in the dialog box.

5. Click **Next**.

6. The list of calibration points specified in the calibration definition file is displayed.

   Select calibration points to execute. To automatically execute calibration for the selected points continuously, select the **Continuous** checkbox. To execute calibration for each point, deselect the **Continuous** checkbox.

Select calibration points to execute   Drag the column border to change the display area

Items selected in Edit > Option in the menu bar

Select to execute calibration for the selected points continuously

7. Click **Execute**.

   The wiring diagram between the reference instrument and the calibration target instrument appears.

   Confirm that the output of the reference instrument is turned off and connect wiring between the reference instrument and the calibration target instrument.

8. Click **OK**.

   A window appears for you to set the calibration target instrument for each calibration point.

   Set the calibration target instrument manually for the calibration point.

9. Click **OUTPUT ON**.

The list of calibration points is displayed, and the output of the reference instruments is turned on.
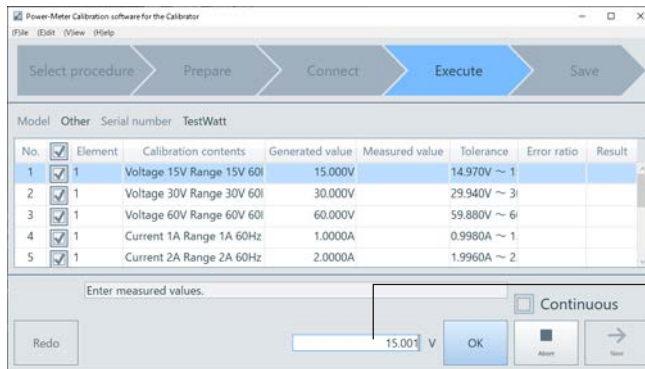
Enter the measured value of the measurement target device

10. Enter the measured value of the calibration target instrument and click **OK**.

A window appears for you to set the calibration target instrument for the next calibration point.

11. Perform the above step for each calibration point.

The entered measured value is displayed
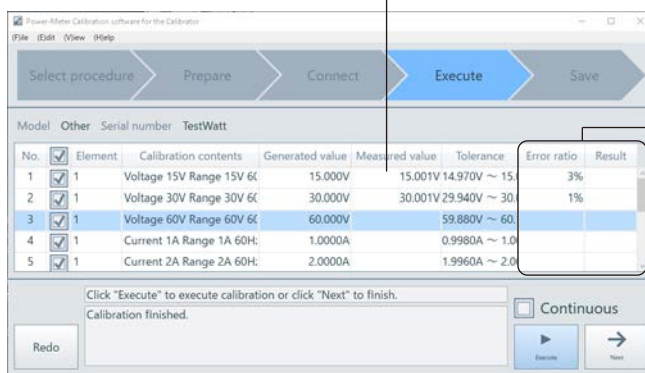
The error ratio and judgment of the measurement result are displayed

12. After the calibration of all selected calibration points is completed, clicking **Next** will open a comment input screen.

Save the calibration result according to "6. Calibration for WT100, WT200, WT300, and WT300E Series".

Enter a comment and click **Save**.

The calibration result is saved in a CSV file.

The file location is Documents > Calibrate > Result folder.

The file name is "Calibration target instrument model-Serial number-Calibration date (Year/Month/Day/Hour/Minute/Second).csv".
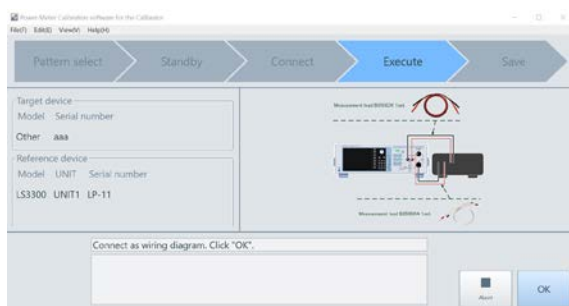
Note

Depending on the settings specified in chapter 5, "Menu Bar," a file name check dialog box may appear when you save the calibration result. When a Save dialog box appears, correct the file name in the dialog box. For details, see chapter 5, "Menu Bar."

If you select the Do not show this message again check box, the file name check dialog box will no longer be displayed and the behavior selected at the time the dialog box is closed (the behavior corresponding to Yes or No) will be retained. The corresponding setting in chapter 5, "Menu Bar," will also be changed.

13. To exit the calibration, click **Finish and Return**.

You will return to the calibration definition file list window.

Like the WT100, WT200, WT300, and WT300E series, you can create a test certificate using a calibration result file.

9.   Specifications

Item			Description	
Calibration function			Outputs single-phase/three-phase power by specifying the voltage/current level and phase.	
DC	Voltage		Range	Automatically selected according to the level (Refer to the separate table)
			Level	-1200.0 to 1200.0 V (2560A)
	Current		Range	Automatically selected according to the level (Refer to the separate table)
			Level	-12.0 to 36.0 A (2560A)
	Power		Range	Automatically selected according to the level
			Voltage level	-1200.0to 1200.0 V (2560A)
			Current level	-12.0 to 36.0 A (2560A)
AC	Voltage		Range	Automatically selected according to the level (Refer to the separate table)
			Level	0.0 to 1200.0 V(LS3300)
			Frequency	40.0 to 1200.0 Hz (LS3300)
	Current		Range	Automatically selected according to the level (Refer to the separate table)
			Level	0.0 to 180.0 A (LS3300)
			Frequency	40.0 to 1200.0 Hz (LS3300)
			EXT	0.0 to 6.0000 V(LS3300)
	Power		Range	Automatically selected according to the level
			Voltage level	0.0 to 1200.0 V (LS3300)
			Current level	0.0 to 60.0 A (LS3300)
			Phase	-180.000 to +359.999 °
			Power factor	Delay/advance -1.0 to 1.0
			Frequency	40.0 to 1200.0 Hz (LS3300)
Reference instrument				
DC	Voltage/current		2560A	1 unit
	Power		2560A	2 units
AC	Voltage/current		LS3300	1 unit
				2 units (up to 120 A)
				3 units (up to 180 A)
	Power		LS3300	1 unit (single-phase)
				2 units (up to single-phase 120 A)
				3 units (up to single-phase 180 A)
				2 units (single-phase three-wire system or three-phase three-wire system)
				3 units (three-phase four-wire system)
Calibration Target Instruments			WT310E, WT310EH, WT332E, WT333E, WT310, WT310HC, WT332, WT333, 760401 (WT210), 760502 (WT230), 760503 (WT230), 253401 (WT110), 25345 (WT110E), 253421 (WT200), 253502 (WT130), 253503 (WT130)	
Remote communication interface/protocol				
Reference instrument			GPIB, USB/USB-TMC, ETHERNET/VXI-11	
Calibration target instrument			GPIB, USB/USB-TMC, ETHERNET/VXI-11, RS-232C	
Other functions				
Calibration target instrument setup save/restore			Saves and restores calibration target settings	
Calibration point script management			Lists, overviews, and selects calibration points	
Calibration result management			Lists and overview of the calibration results	
Directory creation			Creates a directory each for calibration target instrument setup, calibration point script management, and calibration result management	
Multiple launch prevention			Prevents multiple calibration software programs from starting	
Operating environment				
OS			Windows 8.1, Windows 10, Windows 11	
Language			English, Japanese	
.NET Framework			4.8 (included with this software)	
YKMUSB driver			Windows 8.1, Windows 10 (Device Guard disabled): 1.0.4.2 Windows 10 (Device Guard enabled), Windows 11: 2.0.0.0 and later	
TMCTL library			7.0.0.0	
File format				
Calibration definition file			CSV format file (comma-separated)	
Calibration result file			CSV format file (comma-separated)	

AC Voltage level and Selected voltage range(LS3300)

Setting level	Selected range
0.00000 V to 1.20000 V	1 V
1.2001 V to 12.0000 V	10 V
12.0001 V to 36.0000 V	30 V
36.001 V to 120.000 V	100 V
120.001 V to 360.000 V	300 V
360.01 V to 1200.00 V	1000 V

AC Current level and supported current range (LS3300)

Setting level	Selected range
0.00000 mA to 36.0000 mA	30 mA
36.001 mA to 120.000 mA	100 mA
0.12001 A to 1.20000 A	1 A
1.2001 A to 12.0000 A	10 A
12.0001 A to 60.0000 A	50 A
60.001 A to 120.000 A	100 A
120.001 A to 180.000 A	150 A

Current sensor level and supported current sensor range for LS3300

Setting level	Selected range
0.00 mV to 600.00 mV	500 mV
0.6001 V to 6.0000 V	5 V

DC Voltage level and supported voltage range (2560A)

Setting level	Selected range
−120.000 mV to −0.000 mV 0.000 mV to 120.000 mV	100 mV
−1.20000 V to −0.12001 V 0.12001 V to 1.20000 V	1 V
−12.0000 V to −1.2001 V 1.2001 V to 12.0000 V	10 V
−120.000 V to −12.001 V 12.001 V to 120.000 V	100 V
−1200.00 V to −120.01 V 120.01 V to 1200.00 V	1000 V

DC Current level and supported current range (2560A)

Setting level	Selected range
−120.000 µA to −0.000 µA 0.000 µA to 120.000 µA	100 µA
−1.20000 mA to −0.12001 mA 0.12001 mA to 1.20000 mA	1 mA
−12.0000 mA to −1.2001 mA 1.2001 mA to 12.0000 mA	10 mA
−120.000 A to −12.001 mA 12.001 mA to 120.000 A	100 mA
−1.20000 A to −0.12001 A 0.12001 A to 1.20000 A	1 A
−12.0000 A to −1.2001 A 1.2001 A to 12.0000 A	10 A
−36.0000 A to −12.0001 A 12.0001 A to 36.0000 A	30 A

Sample of Calibration Definition File

# Format #		Format definition header
<Version>		Format definition
0		

Target Instrument # — Calibration target device definition header

<Model>	<Option>	<Contents>	<Rate>	<Count>	<ImagePath>	<SerialNumber>	<Date>
WT310	EX1	WT310 EX1 Sample	0.25	2	Image/Preparation_AC_DC_EX.png		

Calibration target device definition

Reference Instruments # — Calibrator definition header

<Model>	<Function>	<SerialNumber>	<RemoteInterface>	<Address>
LS3300			USB	
2560A	V		USB	
2560A	A		USB	

Calibrator definition

Points # — Calibration point definition header

Calibration point definition

<ACDC>	<Function>	<Element>	<VoltageRange>	<VoltageLevel>	<CurrentRange>	<CurrentLevel>	<SensorRatio>	<Frequency>	<PowerFactorDirection>	<PowerFactorValue>	<Resolution>	<SiPrefix>	<Unit>	<Item>	<ErrorStyle>	<ErrorParameter1>	<ErrorParameter2>	<ImagePath>	<GeneratedValue>	<MeasuredValue>	<MinTolerance>	<MaxTolerance>	<ErrorRatio1>	<ErrorRatio2>	<Result>
AC	V	1	15V	15V				60Hz			3		V	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	V	1	30V	30V				60Hz			3		V	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	V	1	60V	60V				60Hz			3		V	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	V	1	150V	150V				60Hz			2		V	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	V	1	150V	150V				60Hz			2		V	MEAN	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	V	1	150V	100V				1kHz			2		V	RMS	%RS%FS	0.10%	0.20%	Image/WT310_VCX_LS3300_VCX.png							
AC	V	1	300V	300V				60Hz			2		V	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	V	1	600V	60V				60Hz			2		V	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	V	1	600V	100V				60Hz			2		V	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	V	1	600V	300V				60Hz			2		V	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	V	1	600V	600V				60Hz			2		V	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	A	1			5mA	5mA		60Hz			4	m	A	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	A	1			10mA	10mA		60Hz			3	m	A	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	A	1			10mA	10mA		1kHz			3	m	A	RMS	%RS%FS	0.10%	0.20%	Image/WT310_VCX_LS3300_VCX.png							
AC	A	1			20mA	20mA		60Hz			3	m	A	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	A	1			100mA	100mA		60Hz			2	m	A	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	A	1			0.5A	500mA		60Hz			2	m	A	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	A	1			1A	0.1A		60Hz			4		A	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	A	1			1A	0.2A		60Hz			4		A	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	A	1			1A	0.6A		60Hz			4		A	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	A	1			1A	1A		60Hz			4		A	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	A	1			1A	1A		1kHz			4		A	RMS	%RS%FS	0.10%	0.20%	Image/WT310_VCX_LS3300_VCX.png							
AC	A	1			2A	2A		60Hz			4		A	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	A	1			5A	5A		60Hz			4		A	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	A	1			5A	5A		1kHz			4		A	RMS	%RS%FS	0.10%	0.20%	Image/WT310_VCX_LS3300_VCX.png							
AC	A	1			10A	10A		60Hz			3		A	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	A	1			20A	20A		60Hz			3		A	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	A	1			EXT2.5V	2V	10mV/A	60Hz			2		A	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	1P2W	1	15V	15V	1A	1A		60Hz		1	3		W	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	1P2W	1	30V	30V	1A	1A		60Hz		1	3		W	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	1P2W	1	60V	60V	1A	1A		60Hz		1	3		W	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	1P2W	1	150V	150V	1A	1A		60Hz		1	2		W	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	1P2W	1	150V	100V	1A	1A		1kHz		1	2		W	RMS	%RS%FS	0.10%	0.20%	Image/WT310_VCX_LS3300_VCX.png							
AC	1P2W	1	300V	300V	1A	1A		60Hz		1	2		W	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	1P2W	1	600V	60V	1A	1A		60Hz		1	2		W	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	1P2W	1	600V	100V	1A	1A		60Hz		1	2		W	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	1P2W	1	600V	600V	1A	1A		60Hz		1	2		W	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	1P2W	1	15V	10V	5A	5A		60Hz	LEAD	0	3		W	RMS	%VA	0.20%		Image/WT310_VCX_LS3300_VCX.png							
AC	1P2W	1	15V	10V	5A	5A		60Hz	LAG	0	3		W	RMS	%VA	0.20%		Image/WT310_VCX_LS3300_VCX.png							
AC	1P2W	1	150V	100V	5mA	5mA		60Hz		1	2	m	W	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							
AC	1P2W	1	150V	100V	10mA	10mA		60Hz		1	4		W	RMS	%RS%FS	0.10%	0.10%	Image/WT310_VCX_LS3300_VCX.png							