



**KIKUSUI**

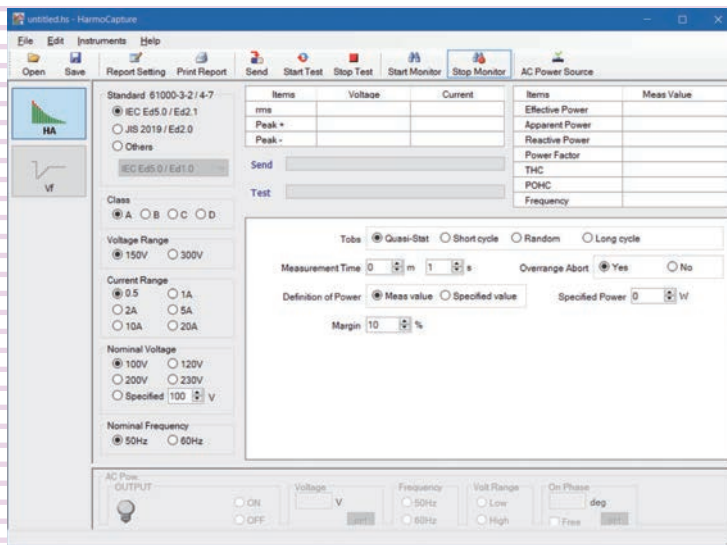
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Oct 2021

# Operation Guide

Application Software

## HarmoCapture

Ver. 3.9x



## Contents

<b>Introduction .....</b>	<b>3</b>	Test .....	25
<b>What is HarmoCapture? .....</b>	<b>5</b>	Printing a Report by Selecting a Test Result File	26
Conformance Standards.....	6	<b>Configuring the Report Format .....</b>	<b>27</b>
<b>Window Configuration .....</b>	<b>7</b>	Entering Comments and Test Information .....	27
<b>Using a Test Condition File .....</b>	<b>8</b>	PDF Overwrite Message.....	28
Creating a Test Condition File .....	8	<b>Setting I/O Configuration.....</b>	<b>29</b>
Using a Test Condition File that You Saved on the KHA1000.....	8	<b>Menu Reference .....</b>	<b>30</b>
Opening an Existing Test Condition File .....	9		
Saving a Test Condition File.....	9		
Saving a Test Condition File with a New Name ...	9		
<b>Controlling the AC Power Supply .....</b>	<b>10</b>		
<b>Setting the Line Impedance Network.....</b>	<b>11</b>		
<b>Starting the Monitoring Operation.....</b>	<b>12</b>		
Measured Value Monitor Pane .....	12		
<b>Setting Test Conditions for Harmonic Current Test .....</b>	<b>13</b>		
Selecting the Testing Mode .....	13		
Selecting a Test Standard.....	13		
When IEC Standard is Selected .....	14		
When JIS 2019 or JIS 2005 Standard is Selected	15		
When JIS 2003/Ed1.0 Standard is Selected.....	16		
<b>Executing a Harmonic Current Test .....</b>	<b>17</b>		
Performing a Test Based on IEC, JIS 2019 or JIS 2005 Standards .....	17		
Performing a Test Based on JIS Standard.....	18		
<b>Setting Test Conditions for Voltage Fluctuation Test .....</b>	<b>20</b>		
Selecting the Testing Mode .....	20		
Selecting a Test Standard.....	20		
Setting Test Conditions .....	21		
<b>Executing a Voltage Fluctuation Test.....</b>	<b>22</b>		
<b>Aborting the Test .....</b>	<b>23</b>		
<b>Stopping the Test System.....</b>	<b>23</b>		
<b>Saving a Test Result File .....</b>	<b>24</b>		
<b>Printing a Report .....</b>	<b>25</b>		
Printing a Report after the Completion of Each			



# Introduction

This operation guide explains how to:

- Perform standard conformance testing for harmonic currents and voltage fluctuations with HarmoCapture, and
- Print reports of test result files.

## ■ Product versions that this guide covers

This operation guide applies to HarmoCapture with version 3.9x.

You can check the version from the help menu **About HarmoCapture**.

## ■ Required versions for related equipment

The version appears on the display when each equipment is turned on.

Product name or Series name	Firmware version
KHA1000 Harmonic/Flicker Analyzer	2.00 or later
PCR-WEA or PCR-WEA2 series AC power supply (including the PCR-WEA2R, a model with a regeneration function)	3.10 or later
PCR-WE or PCR-WE2 series AC power supply (including the PCR-WE2R, a model with a regeneration function)	1.32 or later
PCR-LE or PCR-LE2 Series AC power supply	3.20 or later
PCR-LA Series AC power supply	3.10 or later
PCR-L Series AC power supply* <sup>1</sup>	2.04 or later

\*1. Harmonics Explorer can also be used for the conventional AC Power Supply PCR-L Series.  
In this case, read "PCR-LA" as "PCR-L."

## ■ Who should read this operation guide?

The intended audience of this operation guide is anyone using the KHA1000 to control a harmonic current and voltage fluctuation test system or anyone teaching operators how to use such a system.

Explanations are given under the presumption that the reader has electrical knowledge related to harmonic current and voltage fluctuation tests.

## ■ Notations used in this guide

- In this guide, the KHA1000 Harmonic/Flicker Analyzer is also called "KHA1000."
- In this guide, the LIN1020JF and LIN40MA-PCR-L Line impedance network is also called "Line impedance network."
- In this guide, the PCR-WE series and PCR-WE2 series (including the PCR-WE2R, a model with a regeneration function) AC power supplies, in addition, the PCR-WEA series and PCR-WEA2 series (including the PCR-WEA2R, a model with a regeneration function) AC power supplies are also referred to as the "PCR-WE."
- In this guide, the PCR-LE series and PCR-LE2 series AC power supplies are also referred to as the "PCR-LE."
- In this guide, the PCR-LA series is also referred to as the "PCR-LA."
- **In this guide, all the above AC power supply series may be referred to collectively as the "AC power supply."**
- "PC" in this guide is generic term for personal computers and workstations.
- "PDF Viewer" in this guide is a general term for software that can view PDF.
- The following symbols are used with the explanations in this guide.



**CAUTION**

This symbol indicates a potentially hazardous situation. Ignoring the symbol may result in damage to the product or other property.



Indicates information that you should know.

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# What is HarmoCapture?

HarmoCapture is a software application for creating test conditions for harmonic current and voltage fluctuation tests. It can also be used to execute tests and to carry out other related operations.

HarmoCapture can be used to:

- Configure and save test conditions.
- Start and stop tests.
- Display test results.
- Create and save test result files.
- Monitoring the actual and  $\pm$  peak values of current and voltage, active/apparent/reactive power, power factor, THC, POHC, and frequency
- Comment input in reports (Company, Test Engineer, Operating Mode, Climatic Conditions, Supply Source, and Reference Impedance)

## Conformance Standards

HarmoCapture conforms to the following standards. The “Standard name notations” in the table are the symbols used in this product, and indicate the relevant standards for limit values and measuring techniques.

Classification	Standard name notation (used for HarmoCapture)	Standard number and edition for limit value*1	Standard number and edition for measuring technique*1, *2
Harmonic current test	IEC Ed2.2/Ed2.0	IEC 61000-3-2:Ed2.2(2004) EN 61000-3-2(2000)/A2(2005)	IEC 61000-4-7:Ed2.0(2002) EN 61000-4-7(2002)
	JIS 2019/Ed2.0	JIS C61000-3-2(2019)	JIS C61000-4-7(2007)
	JIS 2005/Ed2.0	JIS C61000-3-2(2005)	IEC 61000-4-7:Ed2.0(2002)
	JIS 2003/Ed1.0	JIS C61000-3-2(2003)	JIS C61000-4-7(1997)
	IEC Ed2.2/Ed1.0	IEC 61000-3-2:Ed2.2(2004) EN 61000-3-2(2000)/A2(2005)	IEC 61000-4-7(1991) EN 61000-4-7(1993)
	JIS 2019/Ed1.0	JIS C61000-3-2(2019)	JIS C61000-4-7(1997)
	JIS 2005/Ed1.0	JIS C61000-3-2(2005)	JIS C61000-4-7(1997)
	IEC Ed3.0/Ed2.0	IEC 61000-3-2:Ed3.0(2005) EN 61000-3-2(2006)	IEC 61000-4-7:Ed2.0(2002) EN 61000-4-7(2002)
	IEC Ed3.0/Ed1.0	IEC 61000-3-2:Ed3.0(2005) EN 61000-3-2(2006)	IEC 61000-4-7(1991) EN 61000-4-7(1993)
	IEC Ed5.0/Ed2.1	IEC 61000-3-2:Ed5.0(2018) EN IEC 61000-3-2(2019)	IEC 61000-4-7:Ed2.1(2009) EN 61000-4-7(2002)/A1(2009)
IEC Ed5.0/Ed1.0	IEC 61000-3-2:Ed5.0(2018) EN IEC 61000-3-2(2019)	IEC 61000-4-7(1991) EN 61000-4-7(1993)	
Voltage fluctuation test	IEC 61000-3-3	IEC 61000-3-3:Ed2.0(2008)	IEC 61000-4-15:Ed1.1(2003)
	IEC 61000-4-15Ed1.1	EN 61000-3-3(2008)	EN 61000-4-15(1998)/A1(2003)
	IEC 61000-3-3	IEC 61000-3-3:Ed3.1(2017)	IEC 61000-4-15:Ed2.0(2010)
	IEC 61000-4-15Ed2.0	EN 61000-3-3(2013)/A1(2019)	EN 61000-4-15(2011)

\*1 EN standard names are also included in report printouts.

\*2 Measuring technique standard that corresponds to limit value standard

IEC 61000-4-7:Ed2.0(2002)、 IEC 61000-4-7:Ed2.1(2009)

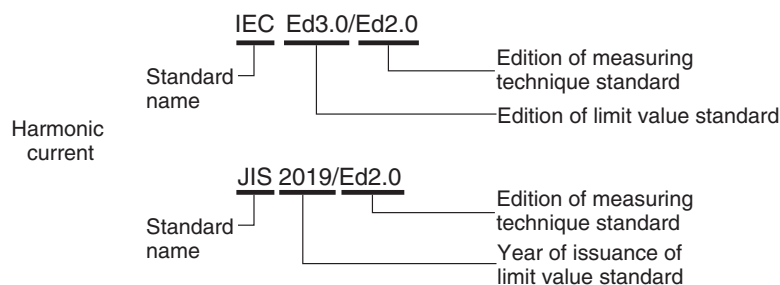
The window width in measuring technique standards is 0.2 second. It is 10 cycles at a basic frequency of 50 Hz and 12 cycles at a basic frequency of 60 Hz. Harmonic groups are measured out of harmonic waves and interharmonic waves.

IEC 61000-4-7(1991)

The window width in measuring technique standards is 0.32 second at a basic frequency of 50 Hz and 0.266 second at a basic frequency of 60 Hz (either is a basic frequency of 16 cycles). Harmonic groups are not measured.

JIS C61000-4-7(1997)

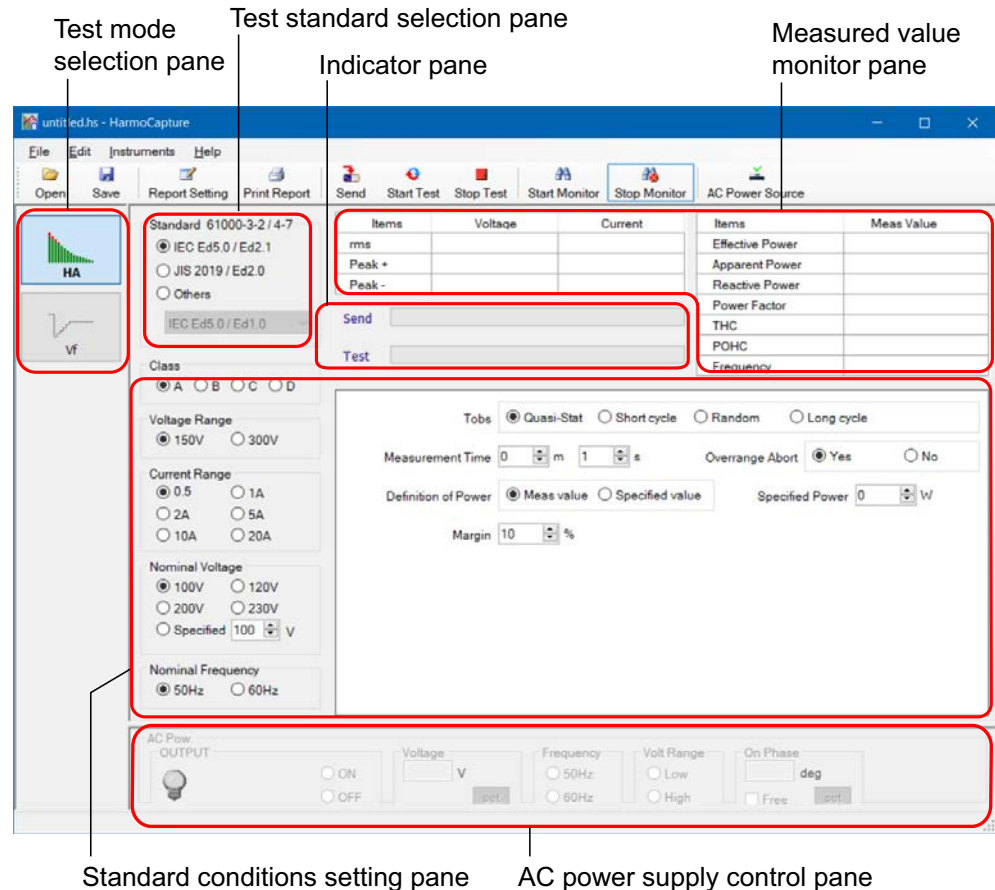
The window width in measuring technique standards is 0.32 second at a basic frequency of 50 Hz and 0.266 second at a basic frequency of 60 Hz (either is a basic frequency of 16 cycles). Interharmonic waves and harmonic groups are not measured.



Rules for standard name notations

# Window Configuration

The harmonic current test window and the voltage fluctuation test window both consist of six panes.



Item	Description
Test mode selection pane	Click HA (harmonic current test) or Vf (voltage fluctuation test) to select the test.
Test standard selection pane	Select the test standard.
Indicator pane	The send progress bar displays the progress of sending test conditions to the KHA1000. The test progress bar displays the progress of the current test.
Measured value monitor pane	Constantly monitors and displays the following measured values in a list when a test is not being executed: Rms current and voltage, positive and negative current and voltage peaks, active power, apparent power, reactive power, power factor, $THC^{*1}$ , $POHC^{*1}$ , and frequency.
Standard conditions setting pane	Select the class and set test conditions. The items that appear vary depending on the selected standard and class.
AC Pow. control pane	Makes it possible to turn on/off the AC power supply output and to set the voltage, frequency, voltage range, and on phase.

\*1 When HA (harmonic current test) is selected.

# Using a Test Condition File

There are two types of test condition files.

- Test condition files that you create using HarmoCapture
- Test condition files that you save on the KHA1000

## NOTE

Even if you don't create a test condition file, you can perform tests.

## Creating a Test Condition File

- 1 In the Test mode selection pane, select HA (harmonic current test) or Vf (voltage fluctuation test).**
- 2 Edit or create a test condition file used to perform the standard conformance test.**  
For details on conformance standards, see [Conformance Standards](#).
  - [Setting Test Conditions for Harmonic Current Test](#)
  - [Setting Test Conditions for Voltage Fluctuation Test](#)
  - [Using a Test Condition File that You Saved on the KHA1000](#)
  - [Opening an Existing Test Condition File](#)
- 3 Save the test conditions file.**

See p. 6

See p. 13

See p. 20

## Using a Test Condition File that You Saved on the KHA1000

Follow the procedure below to load a test condition file that was saved on the KHA1000 to the PC and open it with HarmoCapture.

- 1 Remove the CompactFlash card that contains the test conditions from the KHA1000.**
- 2 Connect the CompactFlash card to the PC.**
- 3 Load the test condition file from the CompactFlash card to the PC.**
- 4 In the Test mode selection pane, select HA (harmonic current test) or Vf (voltage fluctuation test).**
- 5 Click **Open** on the toolbar.**  
The HA(Vf) Condition file Open dialog box appears.
- 6 Select the file that you want to open.**  
The test condition file name extension for harmonic current tests is .HS.  
The test condition file name extension for voltage fluctuation tests is .VS.



## Opening an Existing Test Condition File

Follow the procedure below to open a test condition file that you created using HarmoCapture.

- 1 In the Test mode selection pane, select HA (harmonic current test) or Vf (voltage fluctuation test).**
- 2 Click **Open** on the toolbar.**  
The HA(Vf) Condition file Open dialog box appears.
- 3 Select the file that you want to open.**  
The test condition file name extension for harmonic current tests is .hs.  
The test condition file name extension for voltage fluctuation tests is .vs.

## Saving a Test Condition File

- 1 Click **Save** on the toolbar.**  
The test condition file that you are currently editing is saved.  
If you are saving the test conditions for the first time, the **Save As** dialog box appears.
- 2 Specify the save destination and file name.**  
The test condition file name extension for harmonic current tests is .hs.  
The test condition file name extension for voltage fluctuation tests is .vs.  
Click **Save**.

## Saving a Test Condition File with a New Name

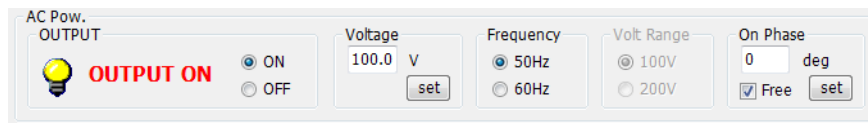
- 1 To save a test condition file with a new name, choose **Save As** from the **File** menu.**  
The **Save As** dialog box appears.
- 2 Specify the save destination and file name.**  
The test condition file name extension for harmonic current tests is .hs.  
The test condition file name extension for voltage fluctuation tests is .vs.  
Click **Save**.

# Controlling the AC Power Supply

You can use the HarmoCapture AC power supply control pane to control the AC power supply.

**CAUTION** Set the AC power supply output voltage and frequency according to the EUT's power rating.

- NOTE**
- Set the voltage range first. You cannot enter a voltage that exceeds the voltage range that you selected.
  - You can change the voltage range when the output is turned off.



Item	Description																				
OUTPUT ON	Turn the AC power supply output on or off by selecting the <b>On</b> or <b>Off</b> option.																				
Voltage	Set the AC power supply output voltage. Enter the appropriate value according to the EUT power rating and the voltage range that you selected.																				
Frequency	Select the AC power supply frequency.																				
Voltage Range	Select the AC power supply voltage range.																				
	<table border="1"> <thead> <tr> <th rowspan="2">Voltage range</th> <th rowspan="2">AC power supply</th> <th colspan="2">Output voltage range</th> </tr> <tr> <th>Phase voltage</th> <th>Line voltage</th> </tr> </thead> <tbody> <tr> <td rowspan="2">100V</td> <td>PCR-WE</td> <td>0 V to 161.0 V (0 V to 157.5 V) *1</td> <td>0 V to 278.8 V (0 V to 272.7 V) *1</td> </tr> <tr> <td>PCR-LE PCR-LA</td> <td>0 V to 152.5 V</td> <td>0 V to 264.1 V</td> </tr> <tr> <td rowspan="2">200V</td> <td>PCR-WE</td> <td>0 V to 322.0 V (0 V to 315.0 V) *1</td> <td>0 V to 557.6 V (0 V to 545.5 V) *1</td> </tr> <tr> <td>PCR-LE PCR-LA</td> <td>0 V to 304.8 V</td> <td>0 V to 527.9 V</td> </tr> </tbody> </table>	Voltage range	AC power supply	Output voltage range		Phase voltage	Line voltage	100V	PCR-WE	0 V to 161.0 V (0 V to 157.5 V) *1	0 V to 278.8 V (0 V to 272.7 V) *1	PCR-LE PCR-LA	0 V to 152.5 V	0 V to 264.1 V	200V	PCR-WE	0 V to 322.0 V (0 V to 315.0 V) *1	0 V to 557.6 V (0 V to 545.5 V) *1	PCR-LE PCR-LA	0 V to 304.8 V	0 V to 527.9 V
Voltage range	AC power supply			Output voltage range																	
		Phase voltage	Line voltage																		
100V	PCR-WE	0 V to 161.0 V (0 V to 157.5 V) *1	0 V to 278.8 V (0 V to 272.7 V) *1																		
	PCR-LE PCR-LA	0 V to 152.5 V	0 V to 264.1 V																		
200V	PCR-WE	0 V to 322.0 V (0 V to 315.0 V) *1	0 V to 557.6 V (0 V to 545.5 V) *1																		
	PCR-LE PCR-LA	0 V to 304.8 V	0 V to 527.9 V																		
On-Phase	You can set the initial voltage phase angle that is generated when the output is turned on. You can set the phase in the range of 0° to 360°. To disable the on-phase feature, select the <b>Free</b> check box.																				

\*1 The output voltage range for AC power supply PCR-WE/PCR-WE2 series (firmware Ver. 1.32 to under 2.00) is shown in parentheses.

# Setting the Line Impedance Network

The Line Impedance Network can be used in the conformance testing of the following three standards.

When you use the LIN1020JF Line impedance network, you can set the impedance remotely from HarmoCapture.

Standard	Line Impedance Network configuration
IEC 61000-3-2	Bypass <sup>*1,*2</sup>
JIS C61000-3-2	Bypass <sup>*2</sup> or Z1 (0.4 $\Omega$ + 0.37 mH): Nominal voltage 100 V (single phase) Z2 (0.38 $\Omega$ + 0.46 mH): Nominal voltage 200 V (single phase) The standard contains a description that states that line impedance may be used if measurement results cannot be reproduced (Annex A).
IEC 61000-3-3	Z3 (0.40 $\Omega$ + jn 0.25 $\Omega$ ) (single phase)

\*1 In IEC 61000-3-2 testing, we recommend that you connect the AC power supply directly to the KHA1000 rather than using the Line Impedance Network. The internal circuit of the Line Impedance Network and the wiring of the instruments have impedance. You must pay attention to the IEC 61000-4-7 requirements concerning the voltage drop due to wiring impedance.

\*2 Bypass for the LIN1020JF Line Impedance Network  
When you use the LIN40MA-PCR-L, set the impedance to OUT (THRU) by manual.

## NOTE

PCR-WE cannot be combined with a standard line impedance network. For the line impedance network for PCR-WE, contact your Kikusui distributor or agent.

# Starting the Monitoring Operation

When you start monitoring, you can view the EUT's current, voltage, power, and other values on the [Measured value monitor pane](#) until you start testing.



## ■ Starting the monitoring of measured values

Click **Start Monitor** on the toolbar. You cannot operate the KHA1000 from the front panel while it is being monitored by HarmoCapture.

## ■ Stopping the monitoring of measured values

Click **Stop Monitor** on the toolbar and press the LOCAL key on the front panel of the KHA1000. You can now operate the KHA1000 from the panel.

### NOTE

Do not change the settings in the AC power supply control pane while monitoring is stopped. If you do, a communication error may occur.

## Measured Value Monitor Pane

HarmoCapture monitors the following values.

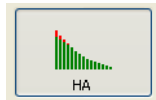
Values that HarmoCapture can monitor	
Harmonic current test	<ul style="list-style-type: none"><li>• Rms current and voltage</li><li>• Positive and negative current and voltage peaks</li><li>• Active power, apparent power, and reactive power</li><li>• Power factor</li><li>• THC and POHC</li><li>• Frequency</li></ul>
Voltage fluctuation test	<ul style="list-style-type: none"><li>• Rms current and voltage</li><li>• Positive and negative current and voltage peaks</li><li>• Active power, apparent power, and reactive power</li><li>• Power factor</li><li>• Frequency</li></ul>

# Setting Test Conditions for Harmonic Current Test

For details on the items in the harmonic current test, refer to the KHA1000 Operation Manual.

## Selecting the Testing Mode

In the Test mode selection pane, select **HA** (harmonic current test).



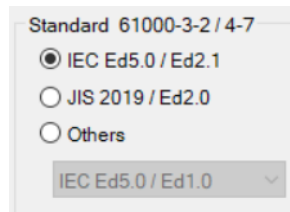
## Selecting a Test Standard

In the Test standard selection pane, select the limitation standard and the standard for measurement techniques. If you want to select a standard other than IEC Ed5.0/Ed2.1 or JIS 2019/Ed2.0, select "Others," and then select the standard from the box.

See p. 6

For further information about Standard name notations, see [Conformance Standards](#).

To measure harmonic groups out of harmonic waves and interharmonic waves, select IEC Ed5.0/Ed2.1, IEC Ed3.0/Ed2.0, IEC Ed2.2/Ed2.0, JIS 2019/Ed2.0 or JIS 2005/Ed2.0; otherwise, select IEC Ed5.0/Ed1.0, IEC Ed3.0/Ed1.0, IEC Ed2.2/Ed1.0, JIS 2019/Ed1.0, JIS 2005/Ed1.0 or JIS 2003/Ed1.0.



## When IEC Standard is Selected

The following items can be set when you select IEC Ed5.0/Ed2.1, IEC Ed5.0/Ed1.0, IEC Ed3.0/Ed2.0, IEC Ed2.2/Ed2.0, IEC Ed3.0/Ed1.0, or IEC Ed2.2/Ed1.0.

Item	Description
Class	Select the class according to the EUT. The limit value that is used as the reference for standard conformance judgment is determined by the class.
Voltage Range	150 V, 300 V
Current Range	0.5 A, 1 A, 2 A, 5 A, 10 A, 20 A
Nominal Voltage	100 V, 120 V, 200 V, 230 V, Specified value <sup>*1</sup>
Nominal Frequency	50 Hz, 60 Hz
Tobs (Test observation period)	Quasi-Stat, Short cycle, Random, and Long cycle
Measurement Time	1 second to 160 minutes <sup>*2</sup>
Overrange Abort	Yes/No
Definition of Power	Meas value and Specified value
Specified Power	0 W to 4000 W
Margin	10 % to 100 % (level setting to indicate WARNING for standard limit values)
PF & Fund Curr (When Class C is selected.)	Meas value and Specified value
Specified PF (When Class C is selected.)	0.00 to 1.00
Specified Fund Curr (When Class C is selected.)	0.0 A to 20.0 A
Limit value (When Class C is selected.)	Normal, Class A, Class D, 3rd/5th/Current Wave <sup>*3</sup> , and THD Limit <sup>*3</sup>

\*1. The input range is from 100 V to 400 V.

\*2. If you set the standard to IEC Ed5.0/Ed2.1 or IEC Ed5.0/Ed1.0, select Class C, and set the limit values to 3rd/5th/Current Wave, the measurement time will be 0.2 seconds. The Measurement Time setting will be disabled.

\*3. This is enabled when you select the IEC Ed5.0/Ed2.1 standard or the IEC Ed5.0/Ed1.0 standard.

## When JIS 2019 or JIS 2005 Standard is Selected

Item	Description
Class	Select the class according to the EUT. The limit value that is used as the reference for standard conformance judgment is determined by the class.
Voltage Range	150 V, 300 V
Current Range	0.5 A, 1 A, 2 A, 5 A, 10 A, 20 A
Nominal Voltage	100 V, 120 V, 200 V, 230 V
Nominal Frequency	50 Hz, 60 Hz
Tobs (Test observation period)	Quasi-Stat, Short cycle, Random, and Long cycle
Measurement Time	1 second to 160 minutes <sup>*1</sup>
Overrange Abort	Yes/No
Definition of Power	Meas value and Specified value
Specified Power	0 W to 4000 W
Margin	10 % to 100 % (level setting to indicate WARNING for standard limit values)
Reference impedance	Control Manual, Remote <sup>*2</sup> Impedance Value Z1, Z2, Z3, Un-use (Bypass)
600 W Air-conditioner (When Class A is selected.)	Yes/No
PF & Fund Curr (When Class C is selected.)	Meas value and Specified value
Specified PF (When Class C is selected.)	0.00 to 1.00
Specified Fund Curr (When Class C is selected.)	0.0 A to 20.0 A
Limit value (When Class C is selected.)	Normal, Class A, Class D, 3rd/5th/Current Wave <sup>*3</sup> , and THD Limit <sup>*3</sup>

\*1. If you set the standard to JIS 2019/Ed2.0 or JIS 2019/Ed1.0, select Class C, and set the limit values to 3rd/5th/Current Wave, the measurement time will be 0.2 seconds. The Measurement Time setting will be disabled.

\*2. Selectable only when you are using a LIN1020JF Line Impedance Network and the CONTEC digital I/O driver is installed in the PC. From the **Remote** drop-down list, select the DIO DIO-0808LY-USB device name that you specified with Device Manager on your PC. For details on setting the device name, see "Installing CONTEC Digital I/O Driver" in the Setup Guide.  
For other conditions, set Control to **Manual**.

\*3. This is enabled when you select the JIS 2019/Ed2.0 or JIS 2019/Ed1.0 standard.

## When JIS 2003/Ed1.0 Standard is Selected

Item	Description
Class	Select the class according to the EUT. The limit value that is used as the reference for standard conformance judgment is determined by the class.
Voltage Range	150 V, 300 V
Current Range	0.5 A, 1 A, 2 A, 5 A, 10 A, 20 A
Nominal Voltage	100 V, 120 V, 200 V, 230 V
Nominal Frequency	50 Hz, 60 Hz
Measurement Time	1 second to 2 minutes and 30 seconds
Overrange Abort	Yes/No
Ignore > 19th gentle fall	Ignore, Don't Ignore
Smoothing	Disable, 1.5 s, and 4 averages
Ignore ≤ 5 mA, 0.6 %	Ignore, Don't Ignore
Margin	10 % to 100 % (level setting to indicate WARNING for standard limit values)
600 W Air-conditioner (When Class A is selected.)	Yes/No
PF & Fund Curr (When Class C is selected.)	Meas value and Specified value
Specified PF (When Class C is selected.)	0.00 to 1.00
Specified Fund Curr (When Class C is selected.)	0.0 A to 20.0 A
Limit value (35 W or less) (When Class C is selected.)	Normal, Class D and Ignore
Definition of Power (When Class D is selected.)	Every window, average and specified value
Specified Power (When Class D is selected.)	0 W to 4000 W
Ignore ≤ 75 W (When Class D is selected.)	Ignore, Don't Ignore



# Executing a Harmonic Current Test

This section explains the testing procedure for the following two tests separately.

See p. 18

- Performing a Test Based on IEC, JIS 2019 or JIS 2005 Standards
- Performing a Test Based on JIS Standard

## Performing a Test Based on IEC, JIS 2019 or JIS 2005 Standards

This section explains the testing procedure for the cases when you have selected one of the following standards.

See p. 15

- IEC Ed5.0/Ed2.1, IEC Ed5.0/Ed1.0, IEC Ed3.0/Ed2.0, IEC Ed2.2/Ed2.0, IEC Ed3.0/Ed1.0, or IEC Ed2.2/Ed1.0
- When you have selected the JIS 2011/Ed2.0, JIS 2005/Ed2.0 or JIS 2005/Ed1.0 standard and set **Reference impedance** to "Un-use (Bypass)."

### NOTE

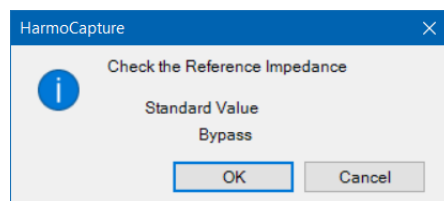
- When test conditions on the KHA1000 are set to the test conditions for the JIS 2019/Ed2.0, JIS 2005/Ed2.0 or JIS 2005/Ed1.0 standard, the **AC Power Source** button is displayed on the toolbar. If you are using one of the standards listed above and you have set Reference impedance to "Z1," "Z2" or "Z3" before you perform the test, you have to turn the EUT power source of and check the performance of the AC power test source. Use the **AC Power Source** button to perform this check. If you have set Reference impedance to "Un-use (Bypass)," the checking procedure of the AC power source is the same as the procedure for the IEC standards, so you do not need to use the **AC Power Source** button.
- When test conditions on the KHA1000 are set to the test conditions for an IEC standard, the **AC Power Source** button is not displayed on the toolbar. Because the IEC standards do not require that the EUT power source be turned off to check the AC power test source, HarmoCapture continues to check the AC power supply while a test is in progress.

### 1 To send the test conditions set, click the **Send** button on the toolbar.

The test conditions are set in the KHA1000.

### 2 Click **Start Test** on the toolbar.

A line impedance setup confirmation dialog box appears.



### 3 If the **line impedance network** is set correctly, click **OK**.

If you click **Cancel**, the test is not executed.

After the test starts, the test progress bar indicates the progress.

See p. 23

You can **abort the test** in the middle of a test.

See p. 24

**4** When the test is complete, a judgment result dialog box appears. To save the test results, click **Yes**.

To print reports, you must save the test result file.

See p. 23

**5** Stop the test.

## Performing a Test Based on JIS Standard

This section explains the testing procedure for the cases when you have selected one of the following standards.

See p. 15

- When you have selected the JIS 2019/Ed2.0, JIS 2005/Ed2.0 or JIS 2005/Ed1.0 standard and set Reference impedance to "Z1," "Z2" or "Z3."
- JIS 2003/Ed1.0

### NOTE

- When test conditions on the KHA1000 are set to the test conditions for the JIS 2019/Ed2.0, JIS 2005/Ed2.0 or JIS 2005/Ed1.0 standard, the **AC Power Source** button is displayed on the toolbar. If you are using one of the standards listed above and you have set Reference impedance to "Z1," "Z2" or "Z3" before you perform the test, you have to turn the EUT power source of and check the performance of the AC power test source. Use the **AC Power Source** button to perform this check. If you have set Reference impedance to "Un-use (Bypass)," the checking procedure of the AC power source is the same as the procedure for the IEC standards, so you do not need to use the **AC Power Source** button.
- When test conditions on the KHA1000 are set to the test conditions for an IEC standard, the **AC Power Source** button is not displayed on the toolbar. Because the IEC standards do not require that the EUT power source be turned off to check the AC power test source, HarmoCapture continues to check the AC power supply while a test is in progress.

**1** To send the test conditions set, click the **Send** button on the toolbar.

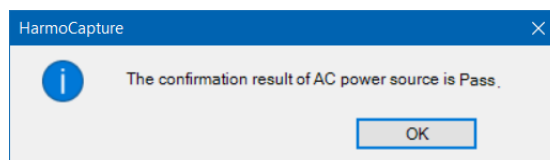
The test conditions are set in the KHA1000, and the AC Power Source button is displayed on the toolbar.



**2** Turn the EUT off.

**3** Click the **AC Power Source** button on the toolbar.

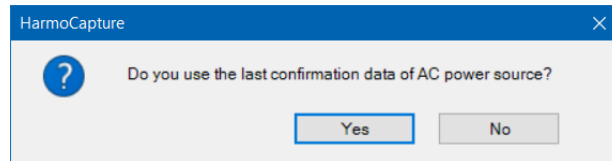
A dialog box that shows the results of the check is displayed.



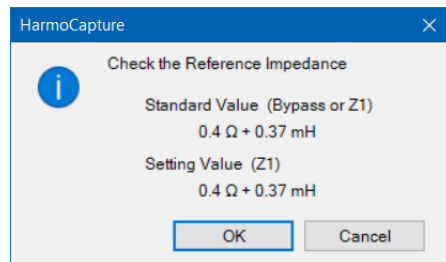
**4** Click **OK**.

**5 Click Start Test on the toolbar.**

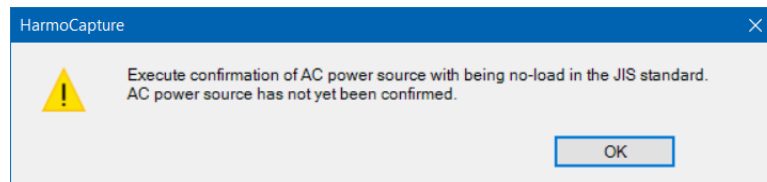
A dialog box asking whether you want to use the data that was received from the check of the AC power source that was performed in [Step 3](#) is displayed.



Next, a line impedance setup confirmation dialog box appears.



If you did not check the AC power source in [Step 3](#), the following dialog box is displayed.



Click OK, and return to [Step 2](#).

After you perform the check of the AC power source once, this dialog box will not be displayed again until you restart HarmoCapture.

**6 If the line impedance network is set correctly, click OK.**

If you click **Cancel**, the test is not executed.

After the test starts, the test progress bar indicates the progress.

You can [abort the test](#) in the middle of a test.

 [p. 23](#)

 [p. 24](#)

 [p. 23](#)

**7 When the test is complete, a judgment result dialog box appears. To save the test results, click Yes.**

To print reports, you must save the test result file.

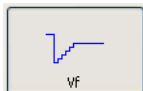
**8 Stop the test.**

# Setting Test Conditions for Voltage Fluctuation Test

For details on the items in the voltage fluctuation test, refer to the KHA1000 Operation Manual.

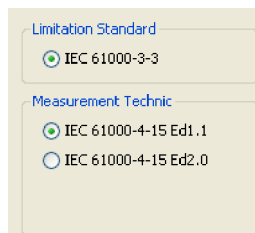
## Selecting the Testing Mode

In the Test mode selection pane, select **Vf** (voltage fluctuation test).



## Selecting a Test Standard

In the Test standard selection pane, select the limitation standard. The measurement technique is fixed at IEC 61000-3-3 Ed2.0.



## Setting Test Conditions

Item	Description
Voltage Range	150 V, 300 V
Current Range	0.5 A, 1 A, 2 A, 5 A, 10 A, 20 A
Nominal Voltage	100 V, 120 V, 200 V, 230 V
Nominal Frequency	50 Hz, 60 Hz
d Measurement Method	Pst Auto, Manual
Pst/d Measurement Time	Select Pst Auto in the d Measurement Method. Pst Measurement Time: 30 seconds to 15 minutes
	Select Manual in the d Measurement Method. d Measurement Time: 30 seconds to 3 minutes
Pst/d Measurement Count	Select Pst Auto in the d Measurement Method. Pst Measurement Count: 1 to 12
	Select Manual in the d Measurement Method. d Measurement Count: 3 to 24
Overrange Abort	Yes/No
dmax Limit Value	4 %, 6 %, and 7 %
Flicker Margin	10 % to 100 % (level setting to indicate WARNING for standard limit values)
d Margin	10 % to 100 % (level setting to indicate WARNING for standard limit values)
Judgement Material	Select the Juge factor items (Pst, Plt, dc, dmax, Tmax (or d(t)>3.3%)). When the several factor items are selected, it test with the several limit values for each factor item.
Reference impedance	Control Manual, Remote* <sup>1</sup> Impedance Value Z1, Z2, Z3, Un-use (Bypass)

- \*1. Selectable only when you are using a LIN1020JF Line Impedance Network and the CONTEC digital I/O driver is installed in the PC. From the **Remote** drop-down list, select the DIO DIO-0808LY-USB device name that you specified with Device Manager on your PC. For details on setting the device name, see "Installing CONTEC Digital I/O Driver" in the Setup Guide.  
For other conditions, set Control to **Manual**.

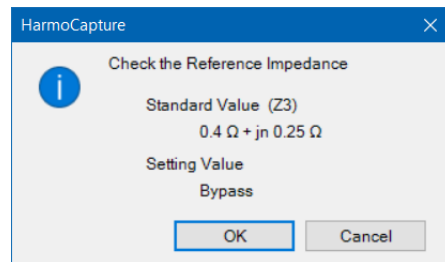
# Executing a Voltage Fluctuation Test

Follow the Voltage Fluctuation test procedure below.

**1** To send the test conditions set, click the **Send** button on the toolbar.

**2** Click **Start Test** on the toolbar.

A line impedance setup confirmation dialog box appears.



**3** If the **line impedance network** is set correctly, click **OK**.

If you click **Cancel**, the test is not executed.

After the test starts, the test progress bar indicates the progress.

You can **abort the test** in the middle of a test.

**4** When the test is complete, a judgment result dialog box appears. To save the test results, click **Yes**.

To print reports, you must save the test result file.

**5** Stop the test.

See p. 23

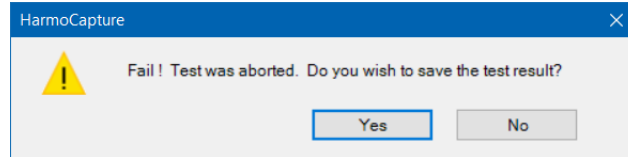
See p. 24

See p. 23

# Aborting the Test

## 1 Click **Stop Test** on the toolbar.

When the test is complete, a dialog box appears asking whether you want to save the test results.



## 2 To save the test results, click **Yes**. Otherwise, click **No**.

The **Save As** dialog box appears.

## 3 Specify the save destination and file name.

The test result file name extension for harmonic current tests is **.hr**.

The test result file name extension for voltage fluctuation tests is **.vr**.

## 4 Click **Save**.

# Stopping the Test System

## When using the AC power supply

### 1 Turn the EUT off.

### 2 Click **Off** under **OUTPUT ON** in the AC power supply control pane.

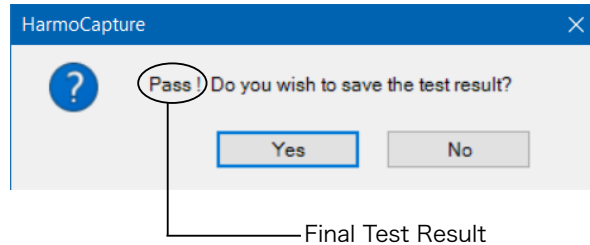
## When using another AC power supply

### 1 Turn the EUT off.

### 2 Turn the AC power supply output off.

# Saving a Test Result File

When the test is complete, a judgment result dialog box appears. The judgment result can take on any of the following values.



- Pass: Less than or equal to the set margin
- Warn: Greater than the set margin but less than the limit
- Fail: Greater than the limit

## 1 To save the test results, click **Yes**.

If you do not wish to save the test results, exit by clicking the No button.

## 2 In the **Save as** (HA(Vf) result file) dialog box, specify the save destination and file name.

The test result file name extension for harmonic current tests is .hr.

The test result file name extension for voltage fluctuation tests is .vr.

## 3 Click **Save**.



# Printing a Report

Reports are printable PDF files of test result files. You can include comments in reports, such as the company name and test environment.

Reports are automatically saved in the same folder as test result files using the same file name as the test result file that they are converted from and a .pdf extension.

There are two ways to print reports.

- [Printing a Report after the Completion of Each Test](#)
- [Printing a Report by Selecting a Test Result File](#)

 p. 26

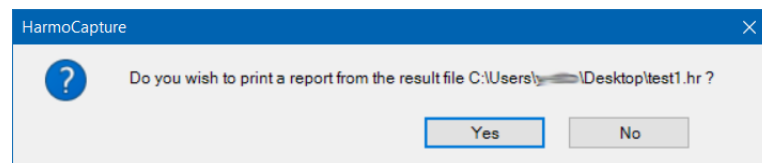
## Printing a Report after the Completion of Each Test

 p. 27

**1** Open the **Report Setting** dialog box, enter necessary comments and test information.

**2** Click **Print Report** on the toolbar.

A Print confirmation dialog box appears.

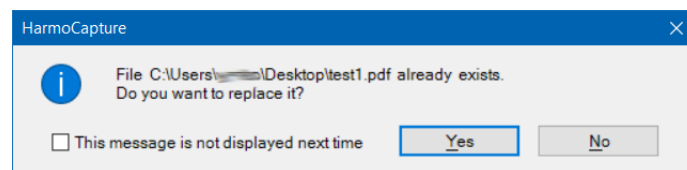


If HarmoCapture does not have the previous test result file information, a message appears. Select a test result file to print.

**3** Click **Yes**.

PDF Viewer opens the report.

If you already printed this report and there is a PDF file with the same name, a message appears.



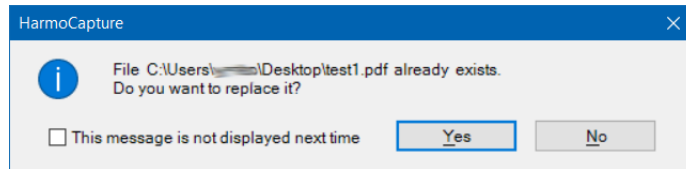
If you select the **This message is not displayed next time** check box, the message will not appear the next time. You can clear this check box in the **Report Setting** dialog box.

**4** Print the report.

## Printing a Report by Selecting a Test Result File

See p. 27

- 1 In the Test mode selection pane, select the appropriate test mode.**  
If you want to print a harmonic current test report, select **HA**. If you want to print a voltage fluctuation test report, select **Vf**.
- 2 Open the Report Setting dialog box, enter necessary comments and test information.**
- 3 From the File menu, choose Select file and Print Report.**  
The Open HA(Vf) result file dialog box appears.
- 4 Select the test result file that you want to print a report of, and click Open.**  
PDF Viewer opens the report.  
If you already printed this report and there is a PDF file with the same name, a message appears.



If you select the **This message is not displayed next time** check box, the message will not appear the next time. You can clear this check box in the **Report Setting** dialog box.

- 5 Print the report.**

# Configuring the Report Format

In the Report Setting dialog box, you can:

- Entering comments and test information.
- Selecting footer option.
- Enable or disable the PDF file overwrite message.

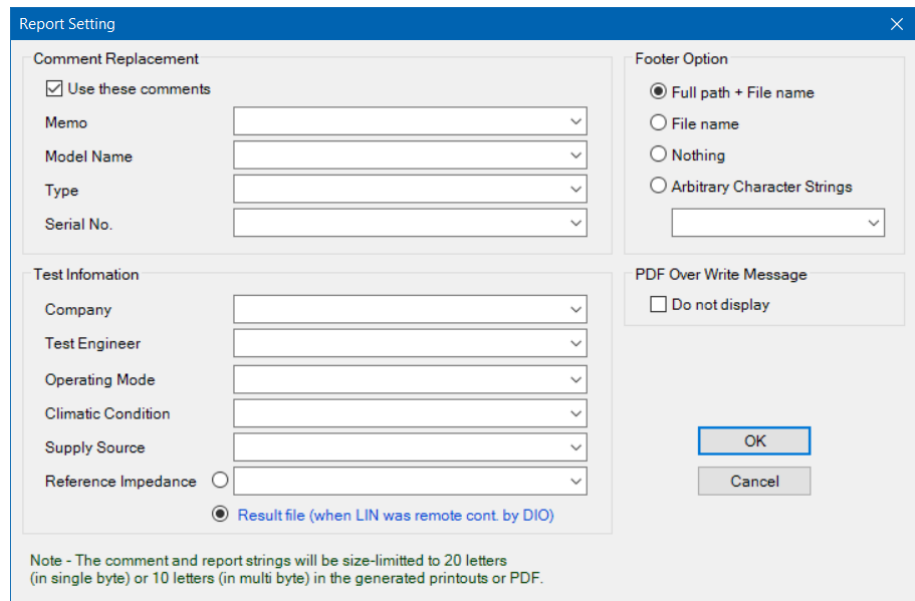
## Entering Comments and Test Information

In the **Report Setting** dialog box, you can enter comments and test information that are printed on the first report page.

The comments are used for the report printing. To input comments, click the **Report Setting** button on the toolbar.

### 1 On the toolbar, click the **Report Setting** button.

The Report Setting dialog box appears.



The comment input items include **Comment Replacement** that can be input by the KHA1000 and **Test Information** that can be input only by HarmoCapture or the HA File Analyzer.

The **Use these comments** check box for comments is used to print a report of the contents input by the KHA1000. To print a report of the contents input by the KHA1000, uncheck the **Use these comments** check box. The comments input by the KHA1000 are displayed on the report.

■ **Comments**

Item	Description
Use these comments	If you select this check box, the comments in the boxes listed under this check box will be printed in the report.
Memo	
Model Name	The name of the EUT
Type	The model number of the EUT
Serial No.	The serial number of the EUT

■ **Test information**

Item	Description
Company	
Test Engineer	
Operating Mode	
Climatic Condition	
Supply Source	
Reference Impedance	

■ **Footer option**

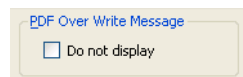
Adds a footer to a report.

You can select any one of **Full path + File name**, **File name**, **Nothing**, or **Arbitrary Character Strings**.

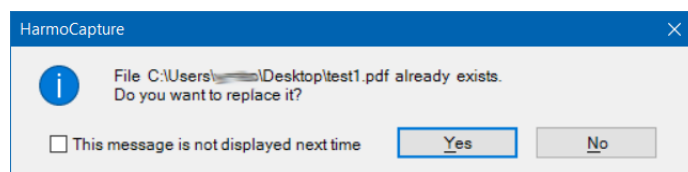
The character strings that you enter in the **Arbitrary Character Strings** combo box are stored, when you click the **OK**. Up to eight of the most recent characters are stored.

## PDF Overwrite Message

If you select a test result file that you have printed before, a PDF file overwrite message appears. The **Do not display** check box is used to enable or disable this message.



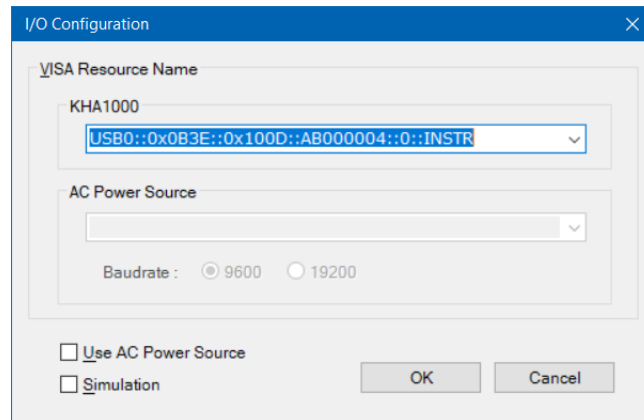
If you select the **This message is not displayed next time** check box in the PDF file overwrite dialog box, the **Do not display** check box in the **Report Setting** dialog box is also selected. If you clear the **Do not display** check box, the PDF file overwrite message is enabled.



# Setting I/O Configuration

To select the interface between the PC and the KHA1000 and between the PC and the AC power supply, choose **I/O Configuration** from the **Instruments** menu.

- Select **Use AC Power Source** to enable the **AC Power Source** dropdown list.
- If you select **Simulation** and click **OK**, you can start HarmoCapture in simulation mode even if the KHA1000 is not connected.  
In simulation mode, the KHA1000 and AC power source are not controlled.  
To exit simulation mode, restart HarmoCapture.



## ■ If the software is able to retrieve the device ID string

Select the ID appears in the list and click OK.

The USB or GPIB is displayed as USB or GPIB with the acquired character string. The RS232C is displayed by a port number.

- Example: KHA1000, GPIB0::1::INSTR  
The KHA1000 and PC are connected using the GPIB, and the GPIB address is indicated as 1. The GPIB address is from 1 to 30.
- Example: AC Pow., ASRL1  
The AC power supply and PC are connected using the RS232C, and the port number indicated is 1.

## ■ If the ID does not appear in the list

Check the I/F cable, VISA settings, or KHA1000 system settings.

If you are connecting the AC power supply to a PC through RS232C, select the same baud rate (data rate 9600 or 19200) you set on the AC power supply. Communication will not work if the setting is incorrect.

# Menu Reference

Menu	Description
<b>File</b>	
Open... <sup>*1</sup>	Opens HarmoCapture or KHA1000 test conditions file.
Save <sup>*1</sup>	Saves the test conditions that you are currently editing to a file. (The file is saved with an .hs or .vs extension.)
SaveAs...	Saves the test conditions that you are editing to a file with the name that you specify. (The file is saved with an .hs or .vs extension.)
Print Report <sup>*1</sup>	Prints a report of the last test result file that was saved since you started HarmoCapture.
Select File and Print Report...	Prints a report of a test result file you saved on the KHA1000 or a test result file you saved using HarmoCapture.
Exit	Exit from HarmoCapture.
<b>Edit</b>	
Report Setting... <sup>*1</sup>	You can enter the comments and test information that are printed in reports.
<b>Instruments</b>	
Send <sup>*1</sup>	Sends the test conditions set by HarmoCapture to the KHA1000.
Start Test <sup>*1</sup>	Executes a test under the test conditions currently being displayed.
Stop Test <sup>*1</sup>	Stops the test currently being executed.
Start Monitor <sup>*1</sup>	Starts the real-time monitoring of values that the KHA1000 is measuring.
Stop Monitor <sup>*1</sup>	Stops the real-time monitoring of values that the KHA1000 is measuring.
Output ON of AC Pow.	Turns on the AC power supply output to be supplied to equipment under test.
Output OFF of AC Pow.	Turns off the AC power supply output to be supplied to equipment under test.
AC Power Source <sup>*1</sup>	Checks the performance of the AC power supply for a test.
I/O Configuration...	Specifies the name of the VISA resource and whether or not to use the AC power supply.
<b>Help</b>	
User's Manual (Japanese)	Opens the HarmoCapture Japanese Operation Guide.
User's Manual (English)	Opens the HarmoCapture English Operation Guide.
About HarmoCapture...	Displays the version of HarmoCapture.

\*1 The toolbar provides buttons.



If you find any misplaced or missing pages in the manuals, they will be replaced. If the manual gets lost or soiled, a new copy can be provided for a fee. In either case, please contact your Kikusui agent or distributor. At that time, inform your agent or distributor of the "Part No." written on the front cover of this manual.

Every effort has been made to ensure the accuracy of this manual. However, if you have any questions or find any errors or omissions, please contact your Kikusui agent or distributor.

After you have finished reading this manual, store it so that you can use it for reference at any time.

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