KIKUSUI

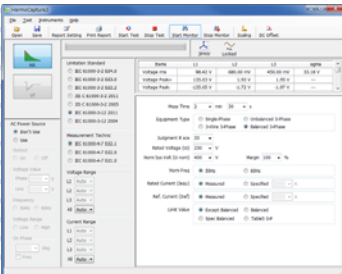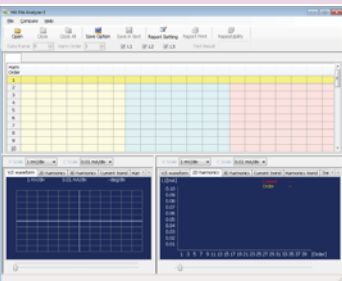# Setup Guide

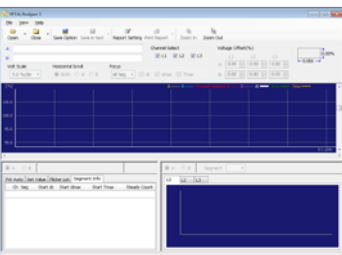## Application Software

SD006-KHA Harmonics Analyzing Suite
Ver. 2.5

HarmoCapture3

HA File Analyzer 3

Vf File Analyzer 3

Thank you for purchasing the Harmonics Analyzing Suite.

About This Guide

This guide is intended for first-time users of the Harmonics Analyzing Suite. It gives an overview of the product, explains how to install the software, provides notes on the usage, explains how to start the software, and so on.

After reading this guide, keep it in a safe place for quick reference. If you find any misplaced or missing pages in this guide, it will be replaced.

If you lose or damage this guide, you can purchase a new copy. In either case, please contact a Kikusui distributor or agent, and indicate the "Part No." given on the cover.

Every effort has been made to create this guide. However, if you have questions or find errors in this guide, please contact a Kikusui distributor or agent.

■ Product Version that This Guide Covers

This guide applies to the Harmonics Analyzing Suite with version 2.5.

■ Related Equipment Versions

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

- KHA3000 Harmonic/Flicker Analyzer
Firmware version 3.40 or later
- PCR-LE or PCR-LE2 Series AC power supply
Firmware version 3.20 or later
- PCR-LA Series AC power supply
Firmware version other than 3.32 or 3.33

■ How to Read This Guide

This guide is designed to be read from beginning to end. We recommend that you read the guide thoroughly from the beginning before using this product for the first time.

■ Who Should Read This Guide?

This guide is intended for those using the KHA3000 to control a harmonic current and voltage fluctuation test system and those teaching operators how to use it.

■ Trademark Acknowledgements

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Other company names and product names that appear in this guide are trademarks or registered trademarks of the respective companies.

■ Copyrights

⚠ For Safe Use

Before executing a test using the Harmonics Analyzing Suite, carefully read the operation manuals (especially the hardware explanations) for the products given below and pay careful attention when making connections and performing operations. Improper handling may cause serious accidents such as injuries or fire.

- KHA3000 Harmonic/flicker analyzer
- PCR-LE, PCR-LE2 or PCR-LA Series AC power supply
- LIN3020JF, LIN1020JF or LIN40MA-PCR-L Line impedance network

Notations Used in This Guide

- In this guide, the KHA3000 Harmonic/flicker analyzer is also called "KHA3000", the PCR-LE, PCR-LE2 or PCR-LA Series AC power supply is also called "AC power supply", and the LIN3020JF, LIN1020JF or LIN40MA-PCR-L Line impedance network is also called "Line impedance network".
- "Personal computer" and "PC" are generic terms for personal computers and workstations.
- The following symbols are used with the explanations in this guide.

⚠ CAUTION	Indicates a potentially hazardous situation that, if ignored, may result in damage to the product or other property.
NOTE	Indicates information that you should know.
See	Indicates reference to detailed information.

General Description

The Harmonics Analyzing Suite can remotely control the KHA3000 Harmonic/Flicker Analyzer from a PC.

By using this application in combination with the AC Power Supply Series and the Line Impedance Network, you can perform tests that comply with IEC and JIS standards.

The Harmonics Analyzing Suite displays measured values in various ways in real time. It can evaluate, analyze, and make pass/fail judgments based on standard compliance tests.

Harmonics Analyzing Suite structure

Harmonics Analyzing Suite is made up of three application software below.

- HarmoCapture3
- HA File Analyzer 3
- Vf File Analyzer 3

Conformance Standards

The Harmonics Analyzing Suite conforms to the standards listed in below.

Classification	Standards for limits and measurement techniques	Standard number and edition for limits[1]
Harmonic current	Standards for limits	IEC 61000-3-2 Ed4.0(2013) EN 61000-3-2 (2013)
		IEC 61000-3-2 Ed3.0(2005) EN 61000-3-2 (2006)
		IEC 61000-3-2 Ed3.0(2005)/A2(2009) EN 61000-3-2 (2006)/A2(2009)
		IEC 61000-3-2 Ed2.2(2004) EN 61000-3-2 (2000)/A2(2005)
		JIS C 61000-3-2 (2005)
		JIS C 61000-3-2 (2011)
		IEC 61000-3-12 Ed1.0(2004)
		IEC 61000-3-12 Ed2.0(2011)
	Standards for measurement techniques	IEC 61000-4-7 Ed2.1(2009) EN 61000-4-7 (2002)
		IEC 61000-4-7 Ed2.0(2002)[2] EN 61000-4-7 (2002)/A1(2009)
		IEC 61000-4-7 Ed1.0(1991)[3] EN 61000-4-7 (1993)
Flicker voltage fluctuation	Standards for limits	IEC 61000-3-3 Ed3.0(2013) EN 61000-3-3 (2013)
		IEC 61000-3-3 Ed2.0(2008) EN 61000-3-3 (2008)
		IEC 61000-3-11 Ed1.0(2000)
	Standards for measurement techniques	IEC 61000-4-15 Ed1.1 (1997)/A1(2003) EN 61000-4-15 (1998)/A1(2003)
		IEC 61000-4-15 Ed2.0(2010) EN 61000-4-15 (2011)

[1]. When the report is printed, the EN standard number also is written.
[2]. The window width for measuring is 0.2 seconds. This corresponds to 10 cycles and 12 cycles for the fundamental frequencies of 50 Hz and 60 Hz, respectively. Interharmonics are measured at 5-Hz intervals. Harmonic groups are measured.
[3]. The window width for measuring is 16 cycles at the fundamental frequency. This corresponds to 0.32 seconds and 0.266 seconds for the fundamental frequencies of 50 Hz and 60 Hz, respectively. Interharmonics are not measured. Only harmonics are measured.

SD006-KHA

Main Features

HarmoCapture3 can be used to:

- Remotely control the KHA3000 and the AC power supply from a PC.
- Test a single-phase/three-phase equipment that the KHA3000 with 3-channel input supports.
- Configure and save test conditions.
- Start and stop tests.
- Display test results (pass/fail judgment.)
- Create and save test result files.
- Monitor measured values (rms current and voltage, positive and negative current and voltage peaks, active power, apparent power, reactive power, power factor, THC, POHC, and frequency.)
- Print reports (comments, test conditions, data lists, and 2D harmonics.)

HA File Analyzer 3 can be used to:

- Load the harmonic current test results file acquired by the KHA3000 or HarmoCapture3.
- Display test results lists (pass/fail judgment.)
- Display graphs (V/I waveform, 2D harmonics, 3D harmonics, current trend, harmonics trend, THC trend, and vector.)
- Check AC power source.
- Check repeatability.
- Save test results files as text.
- Print reports (comments, test conditions, results lists, and various waveform graphs.)

Vf File Analyzer 3 can be used to:

- Load the voltage fluctuation test results file acquired by the KHA3000 or HarmoCapture3.
- Display test results lists (pass/fail judgment, and segment information lists.)
- Display graphs (the maximum dc, the maximum dmax, and waveform with the longest time where Tmax (or d(t)>3.3%)
- Save test results files as text.
- Print reports (comments, test conditions, results lists, and various waveform graphs.)

System Requirements

Below are the hardware and software requirements for using the Harmonics Analyzing Suite.

● Personal computer with Microsoft Windows 10 or 7 (32-bit or 64-bit)

● At least 2 GB of memory (4 GB or more recommended)

● 1024 x 768 dots or higher resolution

● 20 GB or more free hard disk space (more space required for saving data)

● CD-ROM drive

● Mouse or other pointing device

● VISA library
NI-VISA 4.1 or later; Keysight IO Libraries Suite 14.1 or later; or KI-VISA 4.2.2 or later

● USB cable (when using USB)

● GPIB card and IEEE488 cable (when using GPIB)

● Cross serial cable (when controlling AC power supply via RS232C)

● CompactFlash Type I (CFA), up to 512 MB (when using KHA3000 files)

In addition, an interface cable and an AC power supply option board are required depending on how the PC and the power supply are to be connected. For details, see System Configuration.

VISA Driver

You must install a VISA driver to use the Harmonics Analyzing Suite.

⚠️ **CAUTION** Do not install multiple different VISA drivers, because they may not operate properly.

NOTE
- VISA
  VISA (Virtual Instrument Software Architecture) is a standard developed by the VXIplug&play Systems Alliance that defines software specifications for communicating with instruments from a PC.
- VISA driver
  A VISA-compliant driver software.
- KI-VISA
  Kikusui original VISA driver compatible with VXIplug&play VISA.

The VISA driver that is required varies depending on the I/O interface that you will be using. See below to select the appropriate VISA driver.

VISA driver	Version and how to obtain the driver
KI-VISA	KI-VISA Ver 4.2.2 or later From the software CD-ROM or from the KIKUSUI Website
NI-VISA	Ver 4.1 or later From the CD-ROM provided with the GPIB card or from the National Instruments Website
Keysight IO Libraries	Suite 14.1 or later From the CD-ROM provided with the GPIB card or from the Keysight Technologies Website

- If you are using USB, any VISA driver can be used. However, for details on licensing, refer to the license terms of the respective VISA driver.
- If you are using GPIB, you must use the appropriate VISA driver; otherwise, it will not work.
- KI-VISA supports the following GPIB models.

CONTEC CO., LTD.	GP-IB(PCI)L, GP-IB(PM), GP-IB(PCI)F, GP-IB(CB)F. API-GPIB driver VER4.01 or later recommended. When using GPIB cards by Contec Co., Ltd, use the ordinary API-GPIB driver, not the API-GPLV driver (LabVIEW compatible and NI-488.2M API compatible).
Interface Corporation	PCI-4301 LabVIEW compatible version (GPC-4301N driver version 1.21 or later recommended) When using GPIB cards by Interface Corporation, use the GPC-4301N driver (LabVIEW compatible and NI-488.2M API compatible), not the ordinary GPC-4301 driver.
National Instruments Corporation	GPIB-ENET/100, GPIB-USB-B, GPIB-USB-HS, or PCI-GPIB (NI-488.2M version 2.73)
Keysight Technologies	82350 (PCI-GPIB) (When using IO Libraries Suite 15.5, Agilent 488 option)

Package Contents

The Harmonics Analyzing Suite package contains the following items.

Name	Quantity
Program CD-ROM	1
Harmonics Analyzing Suite Setup Guide	1

Available Manuals

The Harmonics Analyzing Suite comes with the following manual in addition to this Setup Guide.

- Operation Guide (electronic manual)

The operation guide details the Harmonics Analyzing Suite operation. There are two types of HTML help and PDF. For instructions on how to view the Operation Guide, see Viewing the Operation Guide."

Notes on use

The Harmonics Analyzing Suite is used to retrieve KHA3000 test data to your PC. To ensure that test data is retrieved, disable the following features on your PC during testing.

- Windows power save mode
- Screen saver
- Memory-resident programs

Do not run other software applications during testing.

Setup

Before Installation

- You need to log on as an administrator to install the software applications.

- Close all software applications running on your PC. The software may not be installed properly if virus protection software is running. Disable virus protection software until the installation is complete.

Inserting the CD-ROM

1 **Insert the program CD-ROM in the drive.**
After a short time, AutoPlay window opens.

2 **Click Open folder to view files.**

3 **Double-click indexE.htm.**
The menu program will start. If you double-click indexJ.htm, the Japanese menu program will start.

Installation

Install the following programs exactly in the order listed; otherwise, the software may not start. Be sure to install them according to the instructions.

- IVI Shared Components[*1]
- VISA driver
- Harmonics Analyzing Suite
- CONTEC Digital I/O Driver[*2]

*1 IVI Shared Components are installed at the same time when you install KI-VISA. There is no need to separately install them. They are also installed at the same time if you install some of the other VISA drivers.

*2 This is only required when you use the LIN1020JF Line impedance network.

Installing KI-VISA

To use an NI-VISA or Keysight Technologies VISA driver, refer to the manual of the respective product. If you are not installing KI-VISA, proceed to Step 4 .

⚠ **CAUTION** Do not install multiple different VISA drivers, because they may not operate properly.

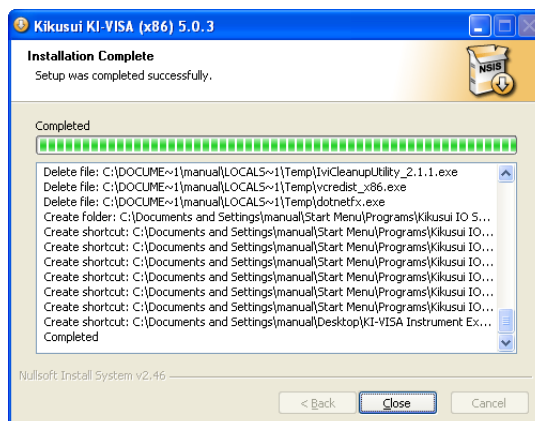**1** **On the menu program window, click KI-VISA x.x.x.**

The Kivisa_x_x_x.exe file on the CD-ROM appears in the window. x_x_x is version number.

Install the KI-VISA_x_x_x_(x86) to 32-bit OS or the KI-VISA_x_x_x_(x64) to 64-bit OS.
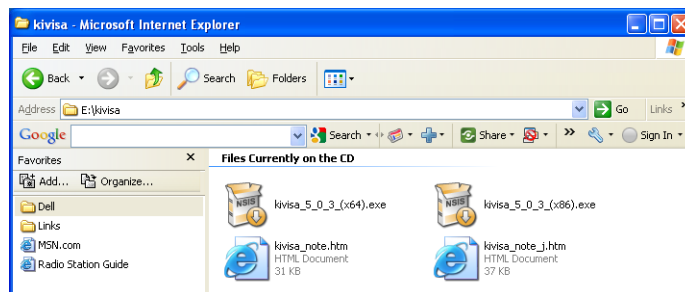
2 **Double-click Kivisa_x_x_x.exe.**
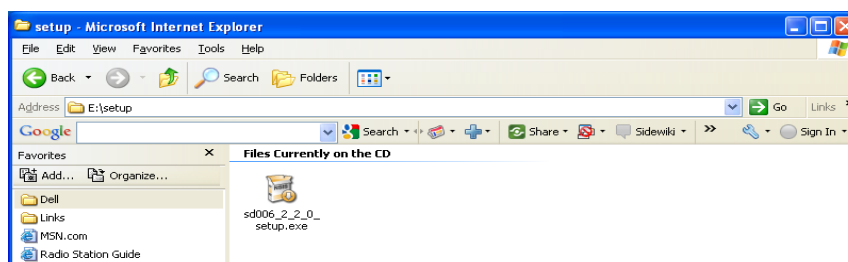
Then, follow the instructions on the screen.

When the installation is complete, the following dialog box opens.

3 Click **Close** and return to the menu program window.

Proceed to the Kikusui Harmonics Analyzing Suite for KHA3000 installation.

Installing Harmonics Analyzing Suite

4 On the menu program window, click Kikusui Harmonics Analyzing Suite for KHA3000.

The Sd006_X_X_X.exe file on the CD-ROM appears in the window.

5 Double-click Sd006_X_X_X.exe.

Then, follow the instructions on the screen.

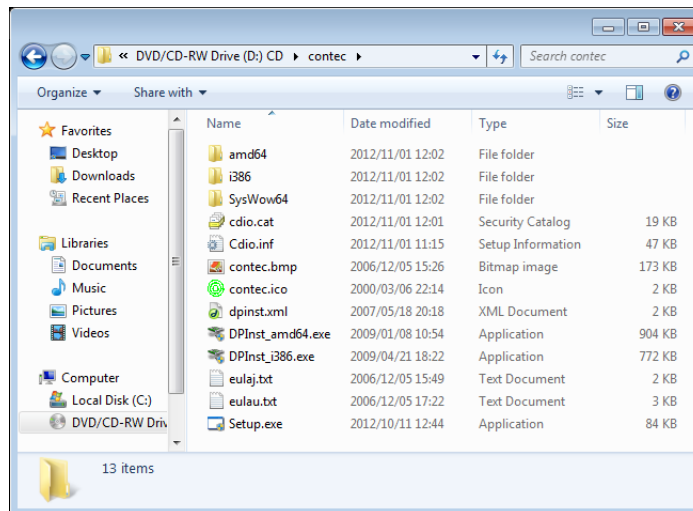When the installation is complete, the following window appears.
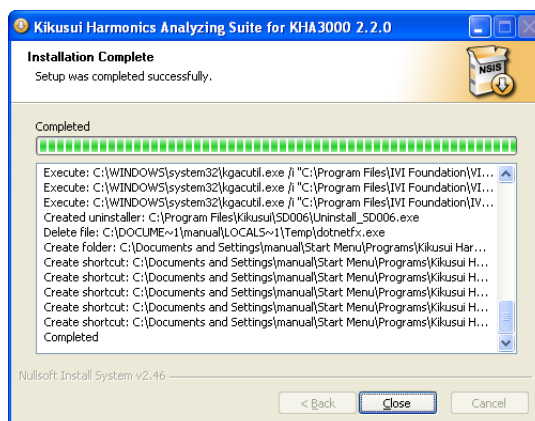
6 Click **Close**.

Installing CONTEC Digital I/O Driver

To use the LIN3020JF or LIN1020JF Line Impedance Network, install the CONTEC digital I/O driver. You can set the impedance from HarmoCapture3.

1 **Connect the USB port of the LIN3020JF or LIN1020JF to the PC using a USB cable.**

2 **Turn on the Line impedance network.**

3 **On the menu program window, click CONTEC Digital I/O Driver API-DIO(WDM).**
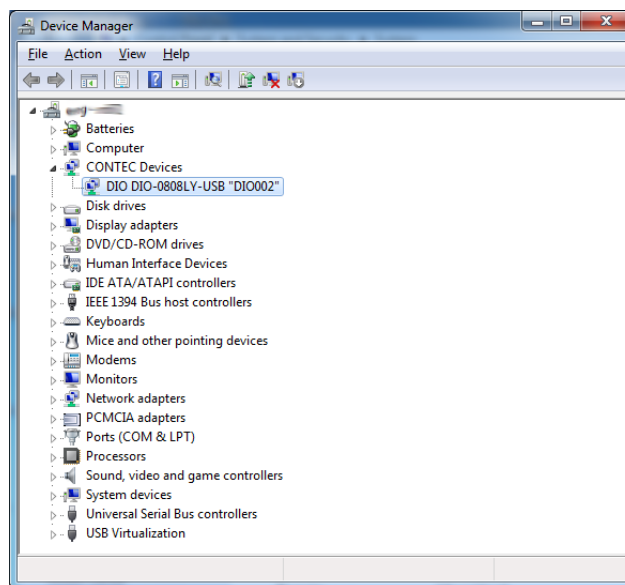The Setup.exe file on the CD-ROM appears in the window.

4 **Double-click Setup.exe.**
Then, follow the instructions on the screen.
When the installation is complete, the following window appears.

5 **Click Finish.**

6 **On your PC, choose Computer, Properties, and then Device Manager.**
"CONTEC Devices" appears in the Device Manager window.

7 **Right-click CONTEC Devices-DIO DIO-0808LY-USB, and then click Properties.**
DIO DIO-0808LY-USB "DIO000" Properties appear.

8 **On the Common Settings tab, change Device Name to any name.**
You can use the default device name if you like. You can also change this later. The device name you specify here will appear when you select LIN3020JF or LIN1020JF from HarmoCapture3.
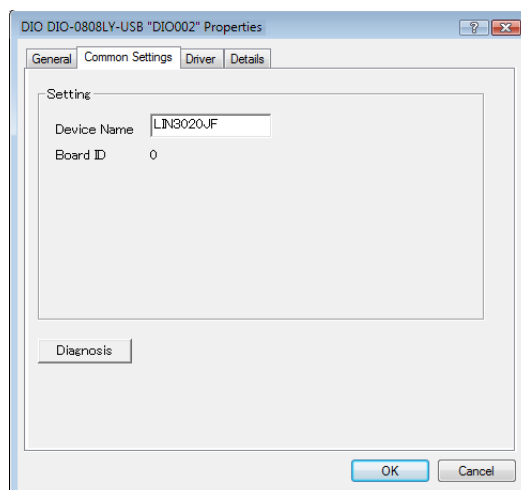
Installing Adobe Reader

If an application used to view PDF files is not installed on your PC, proceed with the following steps to install Adobe Reader.

1 **Click Back in the browser window.**

2 **On the installation window, click Adobe Reader x.x.**

3 **Double-click AdbeRdrxx_en_US.exe.**

xx described after AdbeRd is version number.

Then, follow the instructions on the screen.

Interface Configuration

System Configuration

The block diagram of the harmonic current and voltage fluctuation test system is shown in the following. Before making the settings explained later, connect the devices.

When you use the LIN3020JF or LIN1020JF Line impedance network, you can set the impedance remotely from HarmoCapture3. The LIN3020JF or LIN1020JF line impedance network can be combined with the PCR-LE or PCR-LE2 series AC power supply only.
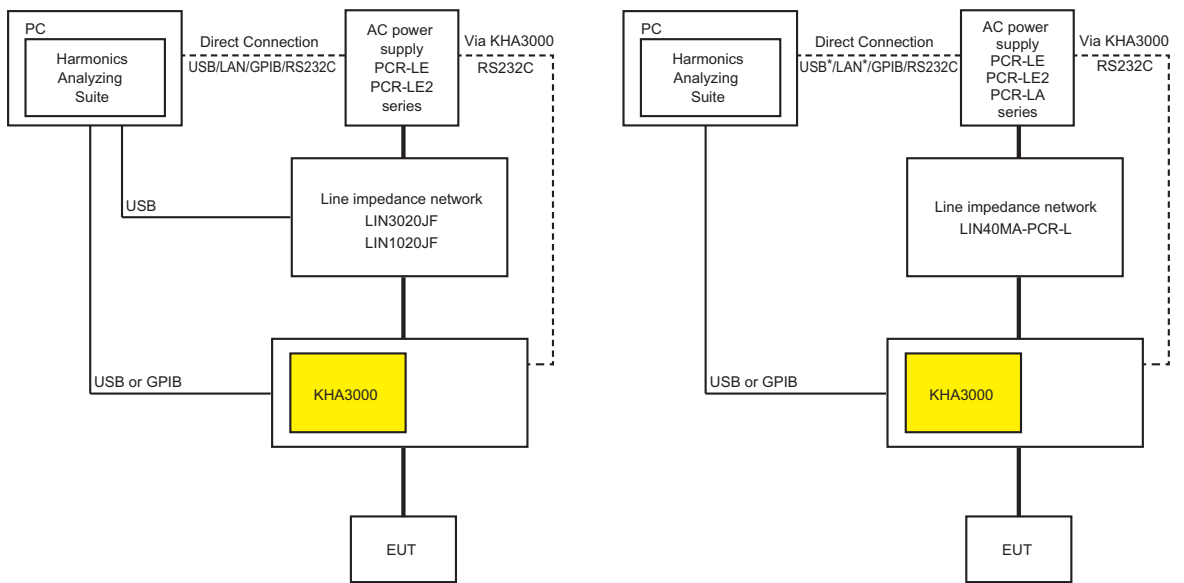
Harmonic current and fluctuation voltage test system

There are two methods for connecting the PC and the AC power supply: **Direct Connection** and **Via KHA3000**. When the connection is through the KHA3000, only the RS232C interface can be used. But, when the connection is direct, you can select USB (PCR-LE/LE2 only), LAN (PCR-LE/LE2 only), GPIB, or RS232C. For interfaces other than RS232C, an option board is required.

Option board required for direct connection

Interface	PCR-LE/LE2 Series	PCR-LA series
USB	US05-PCR-LE	None
LAN	LN05-PCR-LE	None
GPIB	IB05-PCR-LE	IB03-PCR-LA

NOTE   On system that also use SD009-PCR-LE Quick Immunity Sequencer 2 (QIS2), use Direct Connection. In this situation, if you are connecting through RS232C, set the baudrate to 19200 bps. This will allow simultaneous use with QIS2. However, QIS2 and HarmoCapture3 cannot run simultaneously. If QIS2 is running, close QIS2, and then run HarmoCapture3.

KHA3000 Setup

In the KHA3000 system setup window, proceed with the following setup. For details, see the KHA3000 manual.

1   **Press SYSTEM on the panel.**

2   **From the I/F Select list, select the communication interface.**
USB: Select this to connect the KHA3000 to the PC using USB (recommended).
GPIB: Select this to connect the KHA3000 to the PC using GPIB. If you select GPIB, select an appropriate GPIB address from 1 to 30.

3   **Turn off the KHA3000 POWER switch, and then turn it back on again.**

AC Power Supply Setup

■ PCR-LE/PCR-LE2 Series

1 **Press CONFIG (SHIFT+OPR MODE) on the panel.**

2 **Press COM-I/F (F1).**
TYPE is selected on the screen.

3 **Use the function keys to select the interface type.**
Continue with the settings according to the selected interface.

4 **Restart the AC power supply.**
The settings are applied.

Settings required for each interface

- RS232C

Baudrate	9600 bps / 19200 bps (Direct Connection only)
Data	8 bit
Stop	1 bit
Parity	Fixed to none
Flow Ctrl	OFF

- GPIB

Select an appropriate GPIB address from 1 to 30. Make sure that the address does not overlap with the KHA3000 address.

- USB

Simply select USB. There are no other settings that are required.

- LAN

Normally, you should set DHCP and AUTO IP to ON to set the IP address automatically.

For P2P (Peer to Peer) connections, set DHCP to OFF and AUTO IP to ON and set the IP address automatically.

For details, see the PCR-LE/PCR-LE2 Series manual.

■ **PCR-LA Series**

1 **Press the ESC key to select the Home Position.**

2 **Press the GPIB (SHIFT, F) key.**
Set the RS232C parameters or GPIB address using the numbers displayed in the frequency display area.
If the option board IB03-PCR-LA is installed in the PCR-LA, GPIB takes precedence, and the GPIB address setting is shown.

3 **Use the numeric keypad to enter the communication parameters or GPIB address.**

4 **Press the ENT key to confirm the entry, and then press the ESC key to complete setting.**

5 **Restart the AC power supply.**
The settings are applied.

Settings required for each interface

• RS232C

Set the 4 digit number shown in the frequency display area in the following manner.

```
0 8 1 X
        └── Baudrate      1: 9600 bps,  2: 19200 bps (Direct Connection only)
      └──── Stop bit       1: 1 bit
    └────── Data length   8: 8 bit
  └──────── Parity         0: None
```

• GPIB

From the GPIB addresses 1 to 30 shown in the frequency display area, select the appropriate number. Make sure that the address does not overlap with the KHA3000 address.

For details, see the PCR-LA Series manual.

Harmonics Analyzing Suite Startup

Starting HarmoCapture3

1 **To start HarmoCapture3, click All Programs > Kikusui Harmonics Analyzing Suite, and then click HarmoCapture3.**

If the communication with the KHA3000 fails immediately after HarmoCapture3 starts, the I/O Configuration dialog box will open. If the communication is successful, the following steps up to Step 2 are automatically executed.
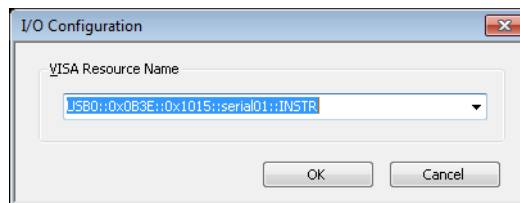
■ **If the software is able to retrieve the device ID string**

Select the ID appears in the list and click OK.

For USB and GPIB, the ID string that was retrieved appears with the word "USB" or "GPIB".
Example: USB0::0x0B3E::0x1015::12345678::INSTR

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

Check the I/F cable, VISA settings, or KHA3000 system settings, and then start over from Step 1 .

2 **HarmoCapture3 starts in the current KHA3000 test mode.**

HarmoCapture3 starts in accordance with the KHA3000 test mode. The following screen is an example of the startup window when the KHA3000 is in the harmonic current test mode.
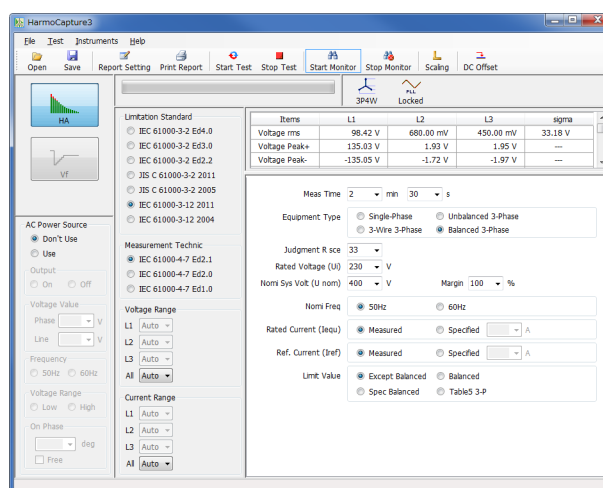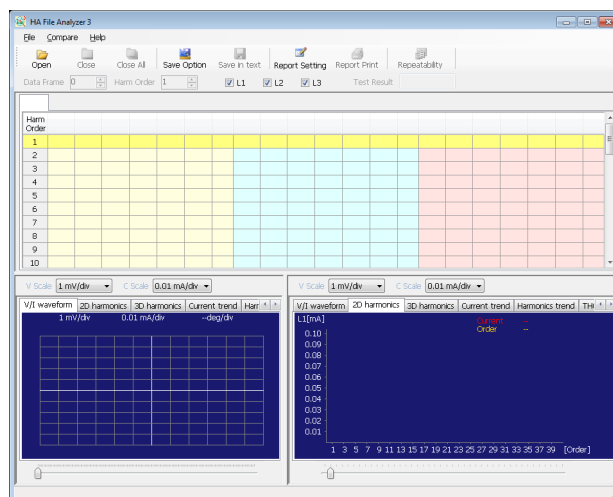

NOTE If you start HarmoCapture3 when the KHA3000 is executing a test, the test will be stopped.

Starting HA File Analyzer 3

HA File Analyzer 3 operates without being connected to the KHA3000.

1 **To start HA File Analyzer 3, click All Programs > Kikusui Harmonics Analyzing Suite, and then click HA File Analyzer 3.**

Starting Vf File Analyzer 3

Vf File Analyzer 3 operates without being connected to the KHA3000.

1 **To start Vf File Analyzer 3, click All Programs > Kikusui Harmonics Analyzing Suite, and then click Vf File Analyzer 3.**
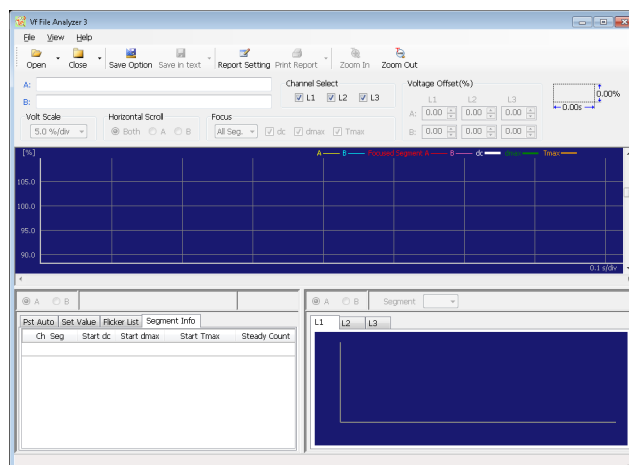
Viewing the Operation Guide

The Operation Guide details the instructions on how to use each application software.

On each application software, choose **User's manual (English)** from the **Help** menu.