

Setup Guide

Application Software

SD006-KHA Harmonics Analyzing Suite Ver. 2.6x

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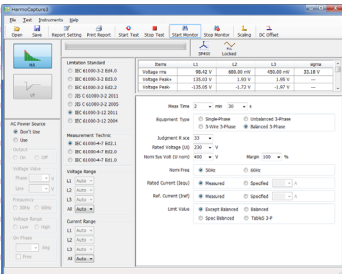
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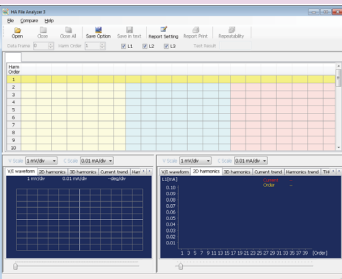
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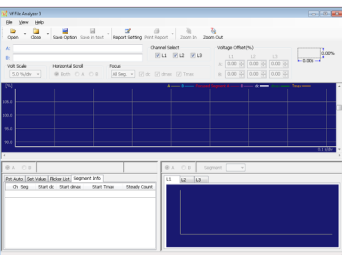
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HarmoCapture3



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 2.6x.

■ 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-WEA or PCR-WEA2 series AC power supply
(including the PCR-WEA2R, a model with a regeneration function)

Firmware version 3.10 or later

- PCR-WE or PCR-WE2 series AC power supply (including the PCR-WE2R, a model with a regeneration function)

Firmware version 1.32 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

■ 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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For Safe Use

Before using Harmonics Analyzing Suite to perform tests, thoroughly read the manuals of the hardware you will be using, and be sure to connect and operate the product correctly. Improper connections or handling can lead to serious accidents, injury, and fire.

Notations Used in This Guide

- In this guide, the KHA3000 Harmonic/flicker analyzer is also called "KHA3000."
- In this guide, the LIN3020JF, 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."**
- "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.

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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)
	Standards for measurement techniques	IEC 61000-3-12 Ed1.0(2004) IEC 61000-3-12 Ed2.0(2011)
		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.

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 T_{max} (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)

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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-GLV 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
The operation guide details the Harmonics Analyzing Suite operation. For instructions on how to view the Operation Guide, see [Viewing the Operation Guide.](#)

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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.

About Windows 10 updates

Unlike the older versions of Windows, Windows 10 is provided as Windows as a Service (WaaS) in order to continuously update the OS. It is said that updating privileges would be lost unless it is used in an Internet connected environment and Windows Update is periodically executed (currently 18 months).

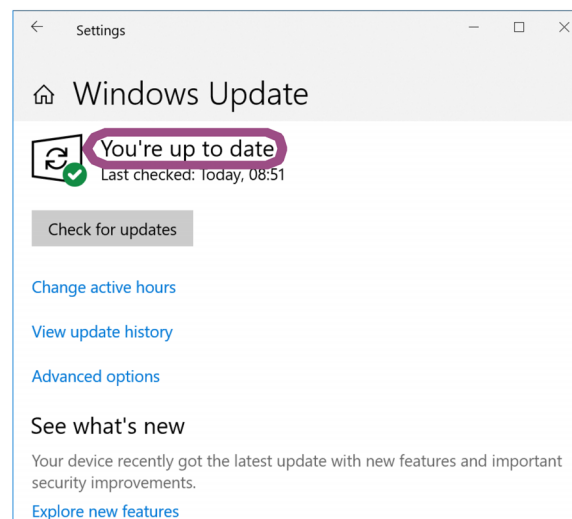
If you want to stably run a test using this software over an extended period, you need to be careful about the auto update function of Window 10.

Familiarize yourself with the matter explained below, and construct the most stable OS environment possible before running a sequence.

■ Running Windows Update

Run Windows Update to update the OS to the latest condition (in which “You’re up to date” is shown).

When the downloading of the update file is complete, Windows will be in an installation-wait state or restart-wait state after installation. If you run a sequence in this state, Windows may restart automatically even when the PC is not connected to the Internet. Be sure to select Install Now or Restart Now to complete the installation of the update program.



■ Windows Update settings

With the default Windows Update settings, when connected to the Internet, Windows 10 automatically runs Windows Update and restarts the PC using the update program. If this software is running, Windows will automatically restart while a test is running, and this will result in the cancellation of the test.

When executing a long-term test using this software, we recommend that, in the Windows Update settings, you postpone the update program installation until an appropriate time.

Setup

- 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.

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.

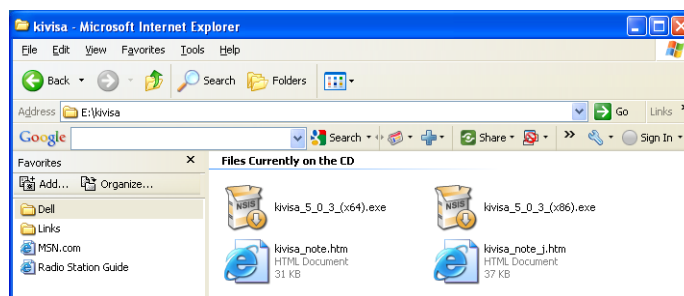
Installing KI-VISA

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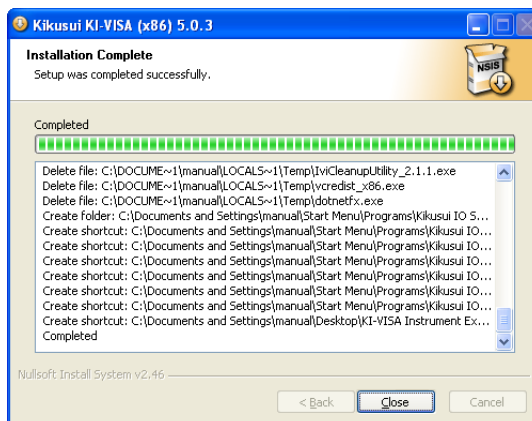
To use an NI-VISA or Keysight Technologies VISA driver, refer to the manual of the respective product. If you are not installing KI-VISA, proceed to [Step 4](#).

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

1 Open the kivisa folder in the CD-ROM.



- 2** Double-click `kivisa_x_x_x.exe`.
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.
 Then, follow the instructions on the screen.
 When the installation is complete, the following window opens.



Installation complete window of KI-VISA_x_x_x_(x86) for 32-bit OS

NOTE

`kivisa_x_x_x(x64).exe` for 64-bit OS contains two software packages, KI-VISA (x64) and KI-VISA (WOW64). When KI-VISA (x64) has been successfully installed, the installation of KI-VISA (WOW64) begins. Be sure to confirm that the installation of KI-VISA (WOW64) has finished successfully.

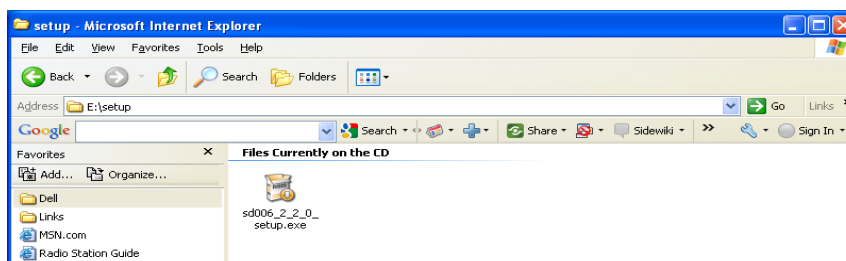
 Kikusui KI-VISA (WOW64) 5.5.0.275

Installation Complete
 Setup was completed successfully.

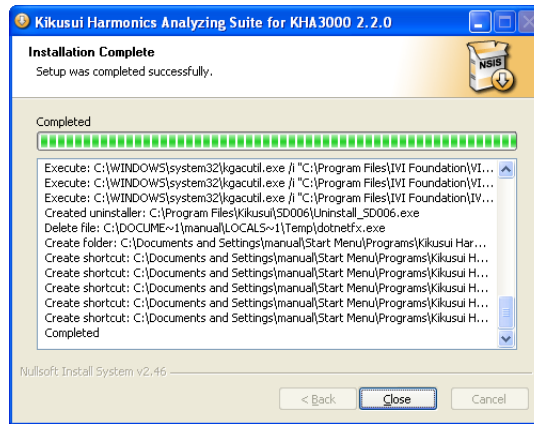
- 3** Click **Close**.
 Proceed to the Kikusui Harmonics Analyzing Suite for KHA3000 installation.

Installing Harmonics Analyzing Suite

- 4** Open the setup folder in the CD-ROM.



- 5 Double-click `sd006_X_X_X_setup.exe`.
Then, follow the instructions on the screen.
When the installation is complete, the following window appears.

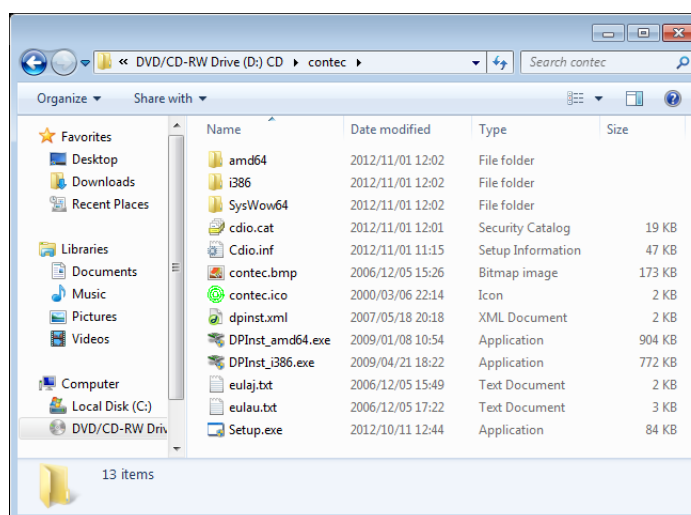


- 6 Click **Close**.

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 Open the contec folder in the CD-ROM.

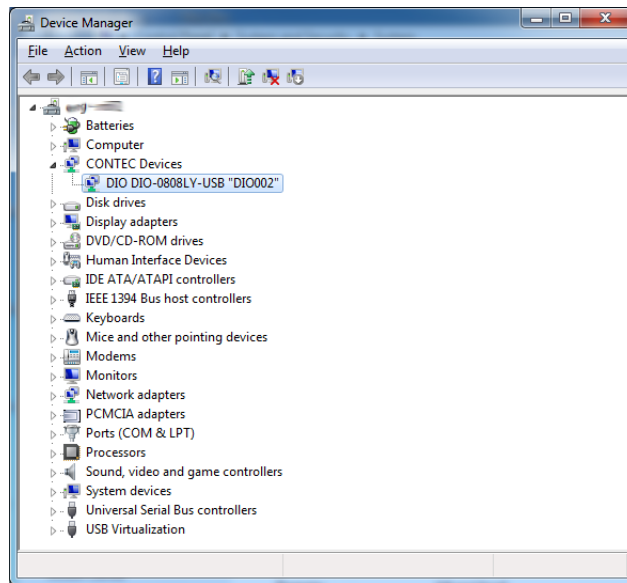


- 4 Double-click Setup.exe. Then, follow the instructions on the screen. When the installation is complete, the following window appears.



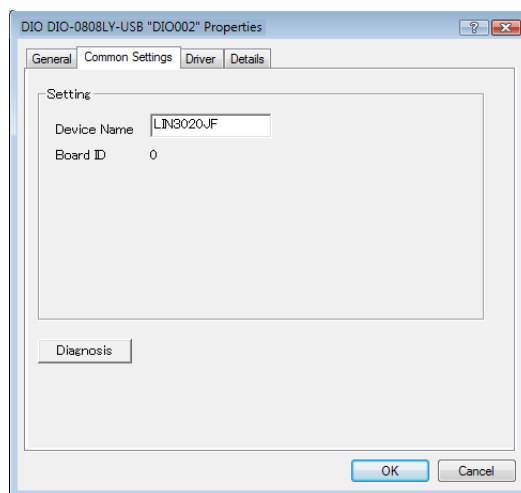
- 5 Click **Finish**.

- 6 On the Windows Control Panel, click 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.

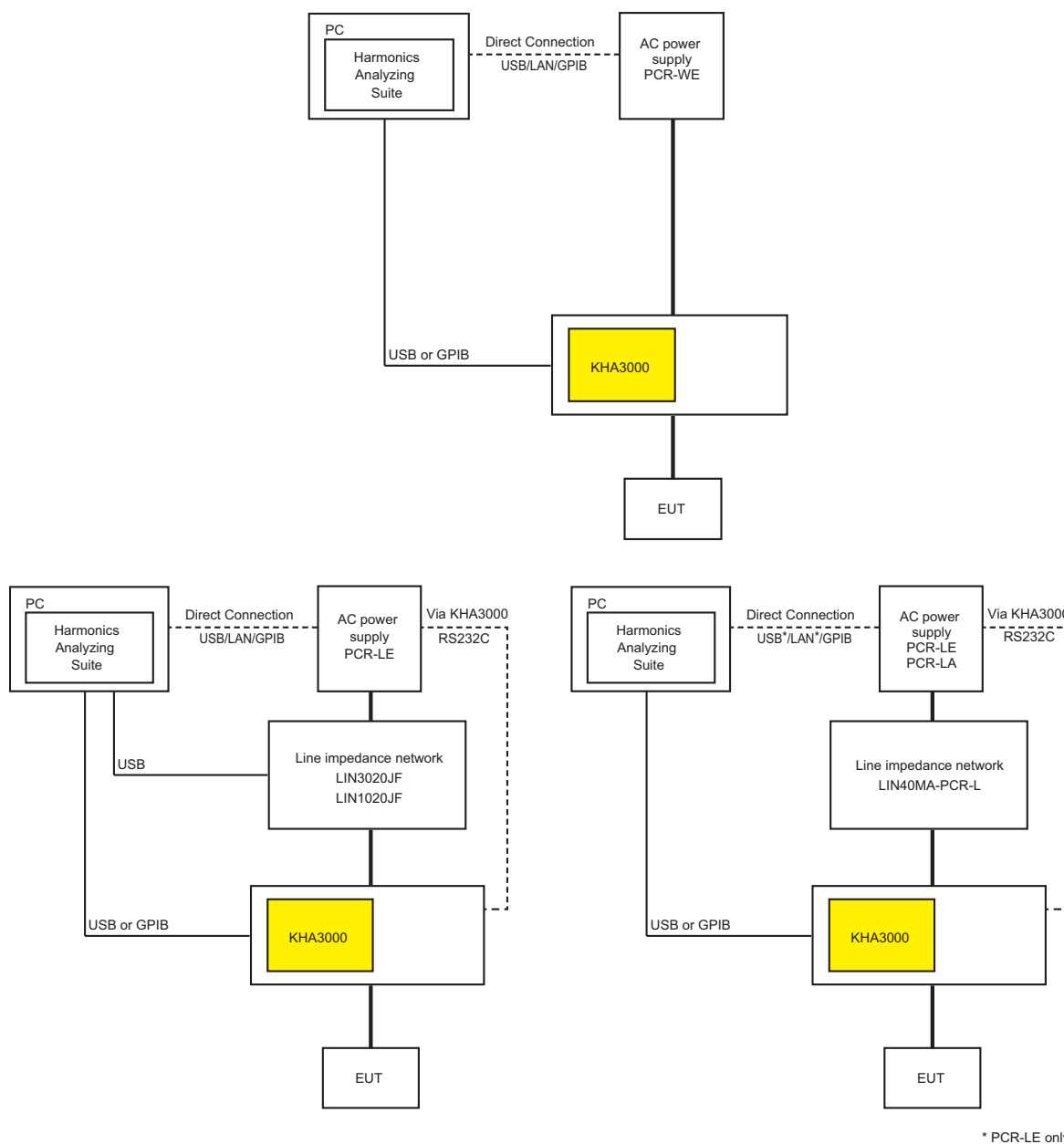
- 8 On the **Common Settings** tab, change **Device Name** to any name.
You can use the default device name if you like. You can also change this later. The device name you specify here will appear when you select LIN3020JF or LIN1020JF from HarmoCapture3.



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.



Harmonic current and fluctuation voltage test system

When you use the LIN3020JF or LIN1020JF Line impedance network, you can set the impedance remotely from HarmoCapture3.

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, Interfaces shown in the table below can be selected for direct connection between the PC and AC power supply. An option board is required depending on the AC power supply used.

Option board required for direct connection

Interface	PCR-WE	PCR-LE	PCR-LA
USB	Standard equipment	(US05-PCR-LE)	None
LAN	Standard equipment	(LN05-PCR-LE)	None
GPIB	(IB07-PCR-WE)	(IB05-PCR-LE)	(IB03-PCR-LA)

*1 The model name of the required option board is shown in parentheses.

NOTE

On system that also use SD009-PCR-LE/WE Quick Immunity Sequencer 2 (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

After selecting the interface to use, set the parameters. For details, see the AC power supply manual.

- RS232C

- PCR-WE, PCR-LE

Baudrate	9600 bps
Data	8 bit
Stop	1 bit
Parity	Fixed to none
Flow Ctrl	OFF

- PCR-LA

0	8	1	1	Baudrate	1: 9600 bps
				Stop bit	1: 1 bit
				Data length	8: 8 bit
				Parity	0: None

- GPIB

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

- USB (PCR-WE, PCR-LE)

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

- LAN (PCR-WE, PCR-LE)

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

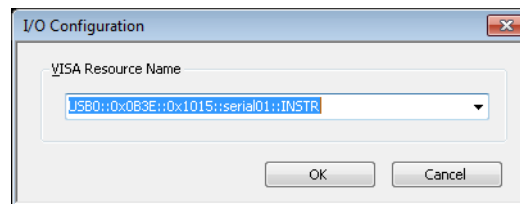
For P2P (Peer to Peer) connections, set DHCP to OFF and AUTO IP to ON and set the IP address automatically.

Harmonics Analyzing Suite Startup

Starting HarmoCapture3

- 1 Click the Windows Start > 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.

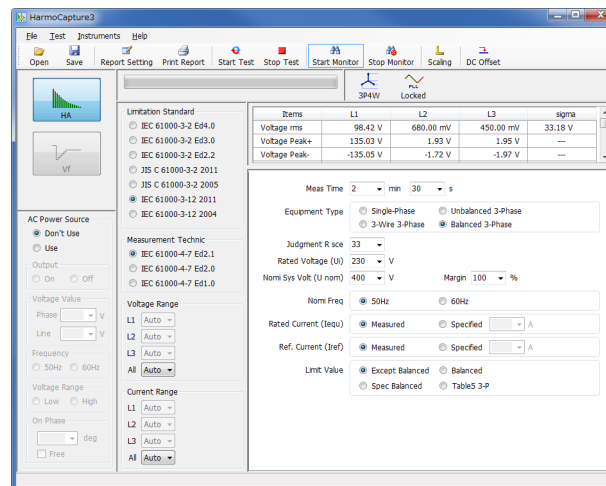
For USB and GPIB, the ID string that was retrieved appears with the word “USB” or “GPIB”.
Example: USB0::0x0B3E::0x1015::12345678::INSTR

- 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.



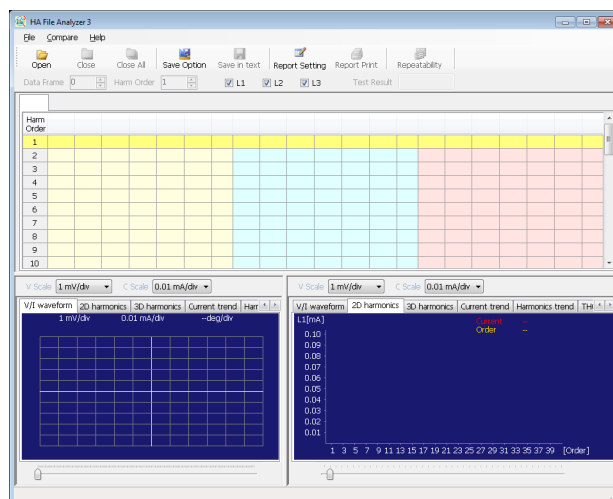
NOTE

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.

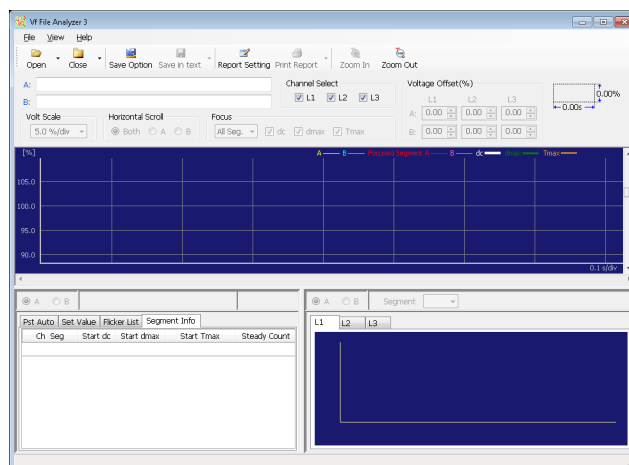
- 1 Click the Windows Start > Kikusui Harmonics Analyzing Suite, and then click HA File Analyzer 3.



Starting Vf File Analyzer 3

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

- 1 Click the Windows Start > 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.