IVI Instrument Drivers Programming Guide Setup Edition

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IVI Instrument Driver Overview

IVI instrument drivers are middleware defined by the IVI Foundation to control measuring instruments. They do not run independently but provide I/O control functions to applications for measuring instruments.

The IVI instrument drivers are provided as Windows DLLs. They are provided individually for each product series or model of measuring instruments. They usually include their specific installers in addition to DLLs and documentation such as online help.

Types of IVI Instrument drivers

The IVI specifications define the following three types of instrument drivers.

Driver	Description
IVI-C	Extends the conventional VXI plug&play instrument driver specification. Suitable for use in LabWindows/CVI or LabVIEW.
IVI-COM	Uses Microsoft COM (Component Object Model). Suitable for use with Microsoft Office VBA, Visual Basic 6, C++, or .NET languages through the interop assemblies.
IVI.NET	Dedicated assembly for .NET languages. Not supported by our IVI instrument drivers.

Instrument interchangeability

If your automated measurement system uses an IVI instrument driver, you can easily control the system using interchangeability provided by the driver without making any changes to the system applications, even though any of the system instruments has been replaced. There is no need to rebuild the applications.

To use interchangeability, the IVI instrument drivers for both instruments before and after the replacement must be of the same class.

The instrument classes are defined based on only the functions common to the measuring instruments of similar functionality.

For example, our KikusuiPwr IVI instrument driver (for the Kikusui PWR-01 Series DC power supply) and the AgilentE36xx IVI instrument driver (for the Agilent Technologies E3600 Series DC power supply) both belong to the “IviDCPwr class.” Therefore, if an application is designed with consideration given to interchangeability, there is no need to rebuild the application even though the power supply that uses it has been changed from the Kikusui PWR Series to the Agilent Technologies E3600 Series.

Memo

- If interchangeability is enabled, an instrument cannot use its specific functions other than those common to the instrument class it belongs to. To enable interchangeability in an application, do not use instrument-specific drivers directly. It is necessary to use the instrument drivers indirectly through the class interface for IVI-COM/IVI. NET or the class driver for IVI-C.
- You can use instrument-specific functions if necessary, even though interchangeability is enabled in the application. However, it is necessary to ensure that the new instrument after replacement supports the same functions as those the ex-instrument supported.
- With a Passthrough function provided by IVI instrument drivers, you can send/receive commands regardless of the functions defined in an instrument class. This allows applications to use instrument-specific functions.

Instrument Interoperability

The IVI specifications define generic API styles that must be adhered to regardless of instrument class. For example, styles for starting a connection, resetting, and querying an error are common to the instrument drivers. Therefore, interoperability for fundamental functions is enabled, even if the IVI instrument driver classes are different.

Once you have learned how to use an IVI instrument driver, you can easily use other IVI instrument drivers for instruments of different models or manufacturers. In this way, the IVI instrument drivers are designed with consideration given to interoperability.

Improvement of operational performance

IVI instrument drivers provide functions that can improve applications in speed and performance and simplify debugging. The following explains Cache and QueryInsterStatus, both of which are particularly effective in improving operational performance.

Cache can accelerate processing times for applications by omitting unnecessary I/O communications with an IVI instrument driver. When Cache is set to TRUE, despite a voltage value that has already been set, if the value is sent again, the communication for sending the value is omitted.

QueryInsterStatus provides a function to check whether a measuring instrument has accepted a value by querying the instrument for the error register status each time a change is made to the instrument settings.

Setting QueryInsterStatus to TRUE in debugging an application allows you to identify a problem in the setting procedure. Setting it to FALSE after completing an application eliminates the need for querying the instrument, improving the application performance.

Besides, IVI instrument drivers are multithread safe. IVI instrument drivers make the most of their capabilities in processing applications that use multi-threads in addition to those that use a single thread.

Setup

The following explains the VISA library that IVI instrument drivers require and how to set up an IVI instrument driver.

Installing a VISA Library

To use IVI instrument drivers, you need to have the VISA library installed on your PC. VISA (Virtual Instrument Software Architecture) library was created by the VXI plug&play Systems Alliance and is standard specifications for measurement instrument communication software.

Kikusui original KI-VISA that supports version 5.0 of the IVI VISA specification is available. You can download KI-VISA from the Download Service on the Kikusui Electronics Corporation website (https://www.kikusui.co.jp/download/).

- KI-VISA (Ver. 5.5 or later)

In addition to KI-VISA, you can use the VISA libraries listed below. Before installing any of the libraries, be sure to confirm the license terms for the VISA library you will install. Do not install multiple VISA libraries on the same PC.

- NI-VISA by National Instruments Corporation (Ver. 19.0 or later)
- Keysight VISA (Keysight IO Libraries Suite 18.1 or later) by Keysight Technologies

When you install a VISA library, Microsoft .NET Framework 2.0, IVI Shared Components 2.x, VISA Shared Components, and the USBTMC device driver are also installed automatically.

Installing an IVI instrument driver

The following explains how to use an IVI instrument driver using an example of the KikusuiPwr IVI Instrument Driver (Kikusui PWR-01 Series DC power supply). You can use other IVI instrument drivers of different models or manufacturers in almost the same steps. IVI instrument drivers are provided individually for each product model or series of measuring instruments.

The following installers are available according to the Windows specifications. These installers install the components necessary for the development and implementation of applications.

- x86 SETUP: Installer for 32-bit Windows
- x64 SETUP: Installer for 64-bit Windows

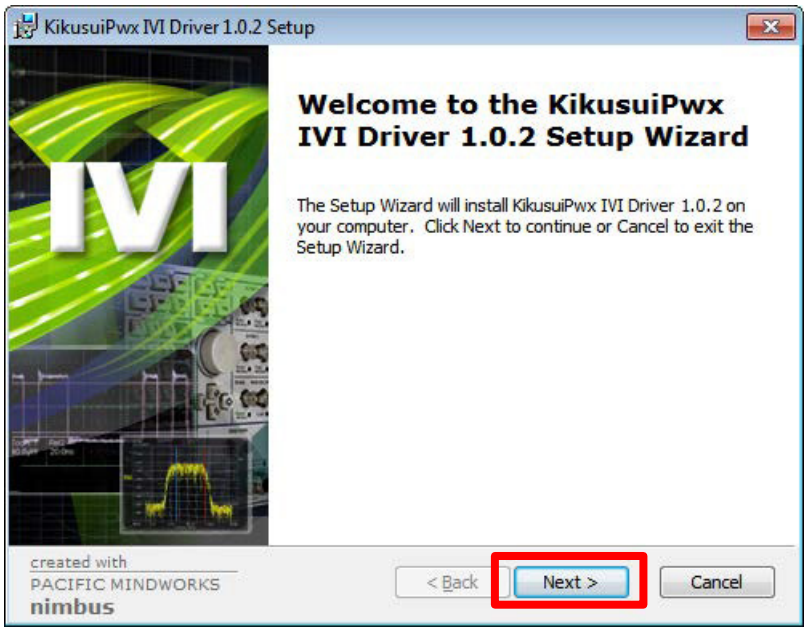
The installers downloaded from our website have a file name shown below "KikusuiXXX_1_0_0_0_(x64).msi". The numbers vary depending on the software version.

1 Launch the installer.

The welcome screen appears.

If you are prompted to elevate to administrator, follow the instructions that appear on the screen.

2 Click Next.

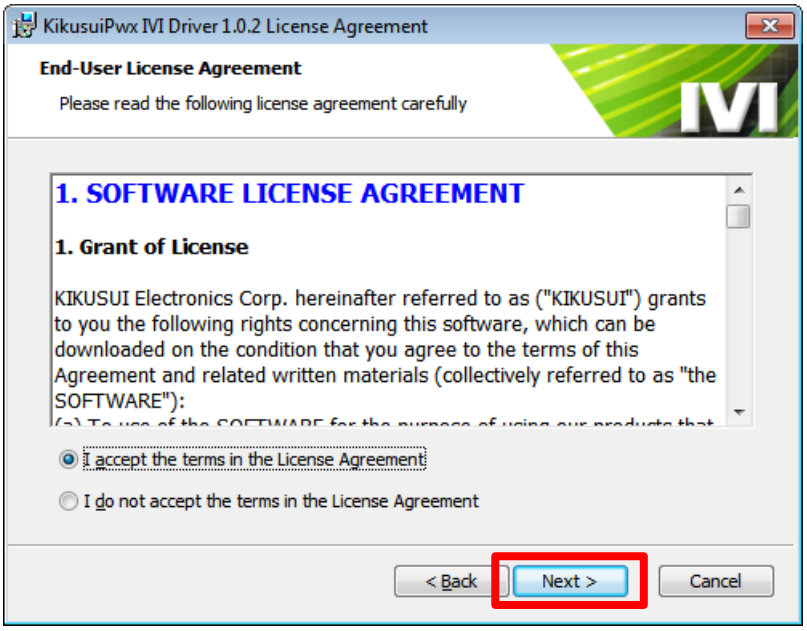


Be sure to read and understand the License Agreement and click on the Accept button.

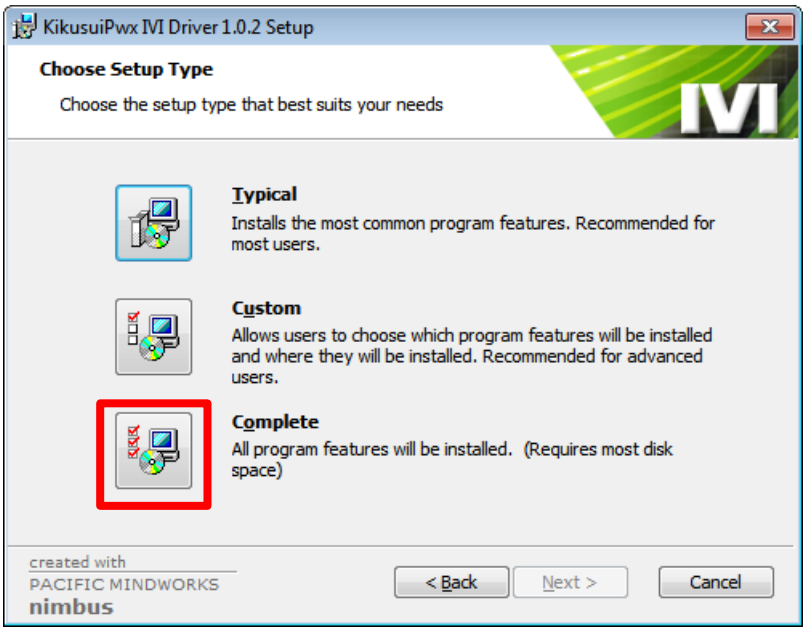
Under the License Agreement, Kikusui grant you the right to install our IVI instrument drivers on the unlimited number of PCs.

3 Click Next.

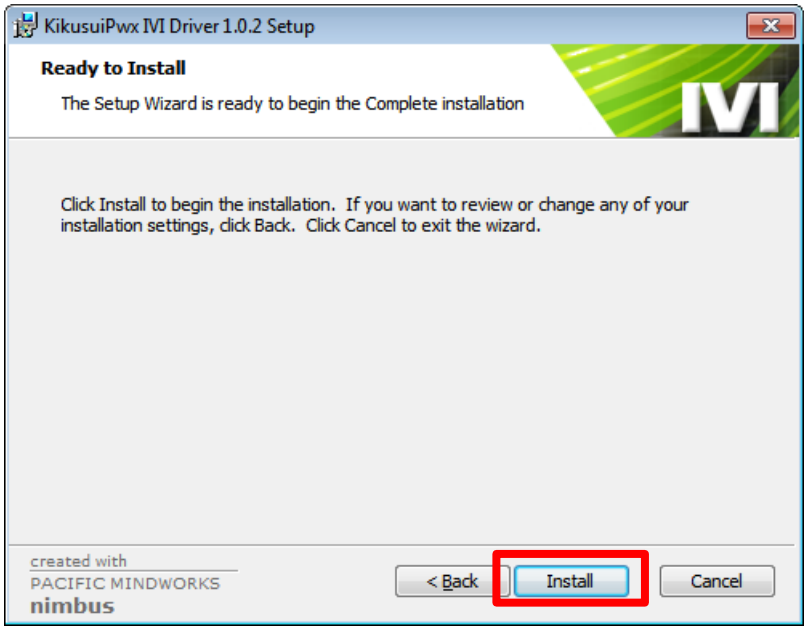
The Choose Setup Type screen appears.



4 Click the Complete icon.



5 Click Install.



The installation begins.

When the installation is complete, a shortcut menu has been created on the Windows start menu. From the Windows start menu, you can access the Readme file and the Online Help by selecting **All Programs** > **Kikusui** > **KikusuiPwr**.