

SD023-PLZ-5W Wavy for PLZ-5W (hereafter referred to as Wavy) is a software application used to create and execute sequences for Kikusui PLZ-5W series DC electronic loads.

- · You can use a mouse to easily create and edit sequences.
- · During sequence execution, the software displays the point of execution.
- · You can monitor the voltage and current, and save the monitored values to files.
- · The software displays a monitor graph of real-time monitored data.

This setup guide is included in the Wavy package. For the operating procedures of Wavy, see the help file or the PDF. You can view the PDF file (on the CD-ROM) using Adobe Reader.

#### Product versions that this guide covers

This manual applies to Wavy version 5.x. To check the Wavy version, on the Help menu, click About Wavy.

#### **Related information**

Wavy applies to PLZ-5W series with the following firmware versions.

· Ver. 1.0x and later

To view the firmware version, on the PLZ-5W, press SYSTEM an then Information. The version is displayed next to Firmware Version on the displayed screen.

#### **Related manuals**

For details about the PLZ-5W series DC electronic loads, see the PLZ-5W series manuals

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#### Installation

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

#### Installing the VISA library

To use Wavy, a VISA library must be installed in your PC.

VISA (Virtual Instrument Software Architecture) was developed by the VXIplug&play Systems Alliance. It is the standard specification for measurement instrument connection software. You need one of the following VISA libraries.

- NI-VISA by National Instruments Corporation (Ver. 4.0 or later)
- · Keysight VISA by Keysight Technologies (formerly, Agilent Technologies) (Keysight IO Libraries Suite 14.2 or later)
- KI-VISA version 5.1.2 or later

KI-VISA is an original VISA library developed by Kikusui Electronics Corporation that supports the IVI VISA 5.0 specifications. You can download the most recent version of this library from the Kikusui Electronics Corporation website (http://www.kikusui.co.jp/en/ download/).

If NI-VISA or Keysight VISA is already installed on your PC, you do not need to install KI-VISA.



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PC

# **1** Load the CD-ROM into the CD-ROM drive.

A setup start window appears. If a setup start window does not appear, double-click the AutoRun.exe file on the CD-ROM.

#### Click Install (x64) or Install (x86) under "1. The installation of the VISA library."

Click Install (x64) for 64-bit OS and Install (x86) for 32-bit OS.

already been installed, the installed VISA library and its version are displayed. Do not install multiple VISA libraries on the same



# **Safety Precautions**

Before you use Wavy, read the operation manual of the DC electronic load that you intend to use Wavy to control, and be sure to make connections and handle the device properly. Improper connections or handling can lead to serious accidents, injury, and fire

# **System Requirements**

- · PC with Core2 or later
- Windows 10 or Windows 7
- · 2 GB RAM minimum
- · 10 GB or more of free hard-disk space
- A display that supports a resolution of 1024×768 or higher (DPI: 96)
- · CD-ROM drive
- Mouse
- · RS232C, USB, LAN, or GPIB (depending on the interface that you want to use)
- · GPIB interface by National Instruments, Keysight, or Contec (32 bit only) to use GPIB

Install more RAM if you intend to perform long tests. We recommend at least 4 GB of RAM.

A VISA library must be installed in your PC.

Disable the Windows power-saving mode and screen saver.

Also, avoid using other applications with Wavy.

If you are using a PC that has advanced power management (APM) or sleep mode, disable these features.

When you change the DPI setting, the display may not appear properly depending on the resolution.

224-0023. Japan

# **Installing Wavy**

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#### Load the CD-ROM into the CD-ROM drive.

A setup start window appears. If a setup start window does not appear, double-click the AutoRun.exe file on the CD-ROM.



#### Click Install under "2. The Installation of WAVY."

Kikusui Sequence Creation Software "WAVY"	×		
Sequence Creation Software "WAVY"			
1. The installation of the VISA library			
Install a VISA library. USB drivers are included in VISA libraries.			
You do not need to perform this installation if a VISA library provided by another company is already installed.			
Install (x64) Install (x86)			
2. The installation of WAVY			
Install the "WAVY" sequence creation software.			
Install			
	Close		



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Proceed with the installation according to the instructions on the screen.

**Click Close** 

# Uninstallation

You need to log on as an administrator to uninstall the software.

# Uninstalling Wavy

If you no longer need Wavy, you can uninstall it by following the procedure below.

From Control Panel, open Programs and then Programs and Features, and remove Kikusui SD023-PLZ-5W Wavy for PLZ-5W.

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# Connecting the PC to the PLZ-5W

For details on connecting the PLZ-5W to your PC, see the PLZ-5W series user's manual and "Interface Setup" in the Communication Interface Manual. Cables are not included.

RS232C	Use a D-sub, 9-pin, female-to-female AT RS232C cross- over cable. The RS232C port on the PLZ-5W is D-sub 9-pin.
GPIB	Use the GPIB interface and Kikusui GPIB converter (PIA5100 firmware version 1.01 or later) to make the connection. For details, see the GPIB converter manual contained in the CD-ROM included with the PLZ-5W.
USB	Use a standard USB cable.
LAN	Use a standard LAN cable (straight) to connect the PLZ-5W to a network hub or router. Use a crossover cable when making a direct connection.

# Configuring the PLZ-5W (only when RS232C is used)

This procedure is not necessary if you are using USB or LAN. 1 Turn the load off on the PLZ-5W. 2 Press SYSTEM and then Interface. The Interface screen appears. 3 Press Modify, use the rotary knob to select Bitrate, and then press Edit. ig[ m 4 ig] Use the rotary knob to select the bit rate, and then press ENTER. **5** Use the rotary knob to select Flow Control, and then press Edit.  $ig[ m{6} ig]$  Use the rotary knob to select CTS-RTS, and then press ENTER. 7 Press Apply, use the rotary knob to select OK, and then press ENTER.

The settings are applied.

# **Starting Wavy**

To start Wavy, on the taskbar, click Start, All Programs, Kikusui, SD023-PLZ-5W, and then Wavy for PLZ-5W.



# **Configuring the Interface**

After you start Wavy, first configure the interface.

On the Se	equence menu, click Interf
Interface	
	Instrument: PLZ205W
RS232C	Port: COM1 -
	Baud rate: 19200 🔹
GPIB	Address: 1
O USB	Seciel Muselsen
	Serial Number:
○ LAN	
CHIN	IP address:
	Test
	OK Cancel

**2** In the Instrument list, click the model name of the PLZ-5W to connect to.

**3** Select any of the connection methods (RS232C, GPIB, USB, or LAN), and configure it as follows:

RS232C	Port	Select the port number that the PLZ-5W is using.
	Baud rate	Set the same value as the Bitrate setting of the PLZ-5W.
GPIB	Address	Select the GPIB address that you set with the GPIB converter.
USB	Serial Number	Specify the serial number of the PLZ-5W.
LAN	IP address	Select the IP address of the PLZ-5W.

If the IP address is not displayed in the LAN settings, search for the device connected through LAN using the VISA library. The search procedure using KI-VISA is as follows:

Using KI-VISA Instrument Explorer, click KI-VISA IO Config, select the "Enable dynamic search for active instruments" check box on the LAN tab, and click OK.

I LINE I ANI TO SHOW ON A		Search Methods
Enable dynamic search for a	ctive instruments	VXI-11 Discovery
		DNS-SD (Bonjour)
Resource Name	Protocol	County Instruments New
		Search Instruments Nov
		Search timeout[ms] for each method
		Manual Add
		Protocol VXI-11
		Devname inst
		Port
	-	

# 4 Click Test.

The software will check that communication is possible with the PLZ-5W.

# **Feature Introduction**

#### Sequence function

Sequence is a function that executes a sequence of operations set in advance. It consists of programs and steps. A program is a collection of steps. Steps are executed in order one at a time, starting from step 1.

Upon completion of the last step of a program, execution of that program has been completed once.



Up 10000 steps total can be used in all programs.

#### The main features are as follows:

Program configuration			
Operation mode	Operation mode for executing sequences.		
Slew rate	Default step slew rate.		
Response speed	Response speed in constant resistance (CR) mode and constant voltage (CV) mode.		
Current/voltage	Current range and voltage range for executing		
range	sequences.		
Repetition count	Number of times that the program will repeat.		
+CV option	Voltage for the CV mode addition (+CV).		
Protection	Values for activating overcurrent protection		
functions	(OCP), overpower protection (OPP), and under-		
	voltage protection (UVP).		

Step configuration	
Load settings	Load values of each operation mode. The values that can be set depend on the operation mode.
Interval	Step execution time.
Transition	Load value transition method.
Trigger Wait	Trigger signal input on/off.
Trigger Out	Trigger signal output on/off.
Load	Load on/off control.
Slew rate	Slew rate during step execution.

# **Specifications**

Operation mode: Constant Current (CC), Constant Resistance (CR), and Constant Power (CP), arbitrary IV characteristics (ARB) Operating range of ARB mode: Three to 100 points of current values can be specified for the input voltage. Monitor function: Current, voltage, power, elapsed time Monitor interval<sup>1</sup>: 200 ms to 600000 ms (0.2 s to 600 s) Number of programs: 30

Number of steps: 10000

#### **Direct control**

You can use Wavy to set the PLZ-5W's voltage and current, turn the output on and off, and monitor values.

note Control Panel				
Model: PL2	21205W	CC CR	CV CP	
Mode	Current Range			
00 00	L - 2.4A	Current Setting	Voltage Setts	ne
O CR	🗇 M - 24A	Max: 10 [A]	Mac: 150	[V]
⊙ ¢V	H - 240A			
O CP		Step	Setting	Step Setting
© CC+CV	Voltage Range	Current(C)	Up	Voltage(V)
OR+CV	🗇 L - 15V	0 🔶 [A]		8 🛧 M
O ARB	H - 150V			
Bernonne CV	Persona CP	Set Step	(1)	Set Step(Z):
(D) Nerral	(ii) Neural	. 1	▲[A]	10 🗠 EVI
Fart	Fart	Min: 0 [A]	Mir: 0	M
Slew Rate	Read			
1	[A/us] Set	Barnit		
Cutput	Monitor	0.0 Mar 10 [0]	Mus Iro Dut	
	Mat. 10	0 EA1 MISC 10 EA1	PHIC: 100 [94]	
Status: OF	FF			Status: OFF
				Elapsed Time:
ON	OFF	Vonage:	r ower	
		M -	[A]	DWJ Run Stop
* When I remove al	larm, Click. it.		Energy:	Setting
	_			[Wh] Interval(M): 1010 🔄 [ms]
Ciesr				Save File Folder
	Mrs U	LVJ Min: U LAJ	Min: U IWG	
				Clore
				Olise

#### **Command control**

You can send PLZ-5W series commands from Wavy.

ommand Control	
Send command	
1	- Run
	Clear
Result:	
	Close

#### Step execution time (interval) setting range<sup>1</sup>

nit	Value	Resolution
ns (milliseconds)	0.025 ms to 9999999.999 ms	0.001 ms
(seconds)	0.001 s to 99999.999 s	0.001 s
nin (minutes)	0.1 min to 999.9 min	0.1 min
(hours)	0.1 h to 1000.0 h	0.1 h