App.by Kikuchi | 07・22・'08 | Rev.by Kobayashi | 07・22・'08

Operation Manual

Sequence Creation Software

Wavy for PAS&PWR Ver. 5.0

SPEC70452

Version 5.0 Prepared: July 22, 2008

KIKUSUI ELECTRONICS CORPORATION

– Note –

Before contacting us to request repair, inspection, or adjustment, please re-read the Operation Manual and conduct a recheck. If you have any uncertainties or find any abnormalities, contact your Kikusui distributor or agent.

– Safety Precautions –

Before a test using this application software, carefully read the PWR or PAS Series operation manual for the specific hardware descriptions found therein to avoid improper connections or incorrect handling. Incorrect connection or handling of any equipment/device in the following configuration may result in serious accidents involving EUT damage or fire.

Product specifications and manual contents are subject to change without notice.

This manual applies to Wavy for PAS & PWR Version 5.0x.

Contents

1 Preface

1.1 Summary of the Product

The sequence-creation software “Wavy” is application software supporting the sequence function incorporated in the PAX, PBX, PCR-LA, PLZ-U and PLZ-4W series from Kikusui Electronics.
In the PAS and PWR series, PLZ-U series sequences are directly run from the software.
“Wavy” allows you to easily create and edit sequence function data using a mouse. Furthermore, the processing status of a sequence can be visually indicated during processing of the sequence, and voltage, current, and other data can be monitored and saved to file. The utility also supports real-time monitor graphs. This “Wavy” is PAS and PWR series only.

1.2 System Requirements

● Personal computer

CPU	Pentium 4HT or better
OS	Windows Vista, Windows XP SP2, Windows 2000 SP4 (English 32bit version)
CD-ROM	Required to install Wavy
Mouse	Required
Display	1024 x 768 or higher (96 dpi display)
Memory	Windows Vista:1.5GB or more (2GB or larger is recommended) Windows XP SP2/Windows 2000 SP4:1GB or more
Hard disk capacity	Enough free disk space to save files must be available

Table 1-1

* Set up the PC so that it does not operate the following during test execution: OS power saving mode, Screen saver mode, Resident program.
* If advanced power management (APM) and suspend functions are available in your PC environment, turn them OFF. If left ON, proper operation may be hindered by periodic interrupts called SMIs to the CPU.
* When the DPI setting is changed, it may not be displayed depends on the resolution.
* When the long term test is applied, extend the size of memory (recommended 2 GB or more for Vista, 1 GB or more for XP and 2000).

● Interface

- USB or RS-232C or GPIB
- For GPIB, any of the interfaces for which a GPIB driver provided by the relevant manufacturer has been installed and is operable

National Instruments	NI-488.2 driver
CONTEC	GPIB communications driver API-GPIB (98/PC) W95, NT Ver. 3.50 or later
Interface	GPF-4301 for Windows Ver. 1.13-05 or later
Agilent 82357B USB/GPIB	Agilent IO Libraries Suite Version 15.0

Table 1-2

* **To activate the software on Windows Vista, the latest GPIB driver is required to be installed. Please download the latest driver from the web site respectively.**

* For installation of a GPIB driver, see the operation manual of the relevant manufacturer.
* **For RS232C, use the cross cable**.
* For USB, it is necessary to install the USB driver (the CD-ROM for PIA4850)
* When using a USB serial converter for connecting RS232C, it may not be functioned properly.
* For connection, the PIA4800 series are required.

1.3 Software Specifications

● Sequence Modes

Table 1-3 shows the time setting range.

mode	Seconds	0.5 to 999.5 [s]	(minimum unit: 0.5)
	Minutes	0.1 to 999.9 [min]	
	Hours	0.1 to 999.9 [h]	

Table 1-3

* **If you set Wavy so that the sequence is entered in unit of seconds for a ramp transition, the value settings for the ramp are set every 0.5 second. If you set Wavy so that the sequence is entered in unit of minutes or hours, the value settings for the ramp are set every second.**

* The maximum number of steps is 1024.
* The accuracy of setting time for the step depends on the PC environment in use.

● Operation Modes

There are two operation modes: constant current and constant voltage.
The ranges of the number of significant digits for decimal fractions for these modes are indicated below:

Voltage value	3 digits	(x.xxx)
Current value	3 digits	(x.xxx)

Table 1-4

* The actual number of significant digits for a decimal fraction varies depending on differences in the instrument series or instrument's setting range.

● Monitor

The read backing of the output current value, the output voltage value, and the output power value can be done.
The monitoring interval range is 500 to 600,000 [ms] (0.5 to 600 [s]).

*The accuracy of setting time for the monitoring step depends on the PC environment in use.

2 Setup

The Wavy for PAS&PWR package contains the following items.

Item	Quantity
CD-ROM	1
Operation Manual	1

* **When installing the software, make sure that your user accounts setting is set to the computer administrator, if your computer is set to the limited user, contact your network administrator.**
* **When using a PIA4850 for connecting USB, install the USB driver first by the CD-ROM for PIA4850 before installing the Wavy software.**

(1) Insert the provided CD-ROM into the CD-ROM drive of the personal computer.

(2) The Setup Start screen, shown in Fig 2-1, should appear automatically after a few moments. If it does not appear, run the “Setup.exe” file on the CD-ROM.

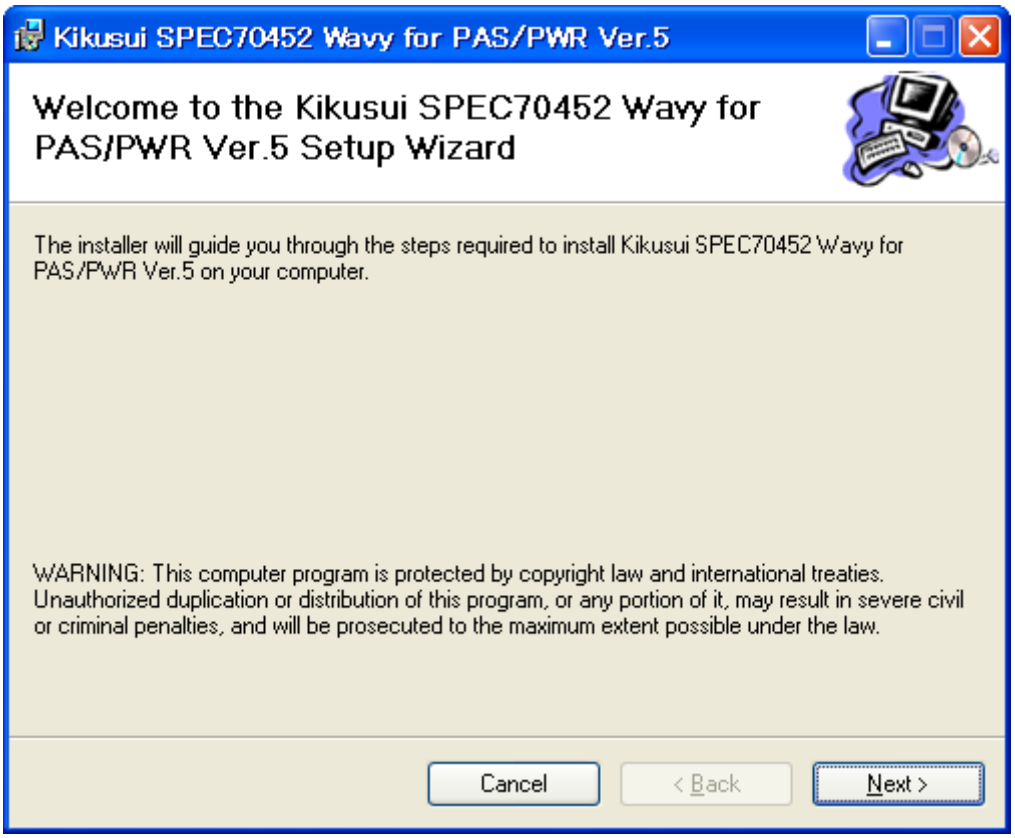


Fig. 2-1 Setup Start Screen

Follow the prompts displayed onscreen to complete the installation.

To uninstall Wavy, from the [Start] menu at the lower left of the Windows screen, select [Settings], click [Control Panel], and double click on [Add/Remove Programs]. From the displayed list, click on “ Kikusui SPEC70452 Wavy for PAS/PWR Ver.5 ” and click the [Remove] button. Follow the prompts displayed onscreen to complete the uninstallation.

3 Starting up Wavy

From the [Start] menu at the lower left of the Windows screen, click [Program], [Kikusui], “SPEC70452 Wavy,” and the Wavy for PAS&PWR. The Startup screen shown in Fig. 3-1 should appear.

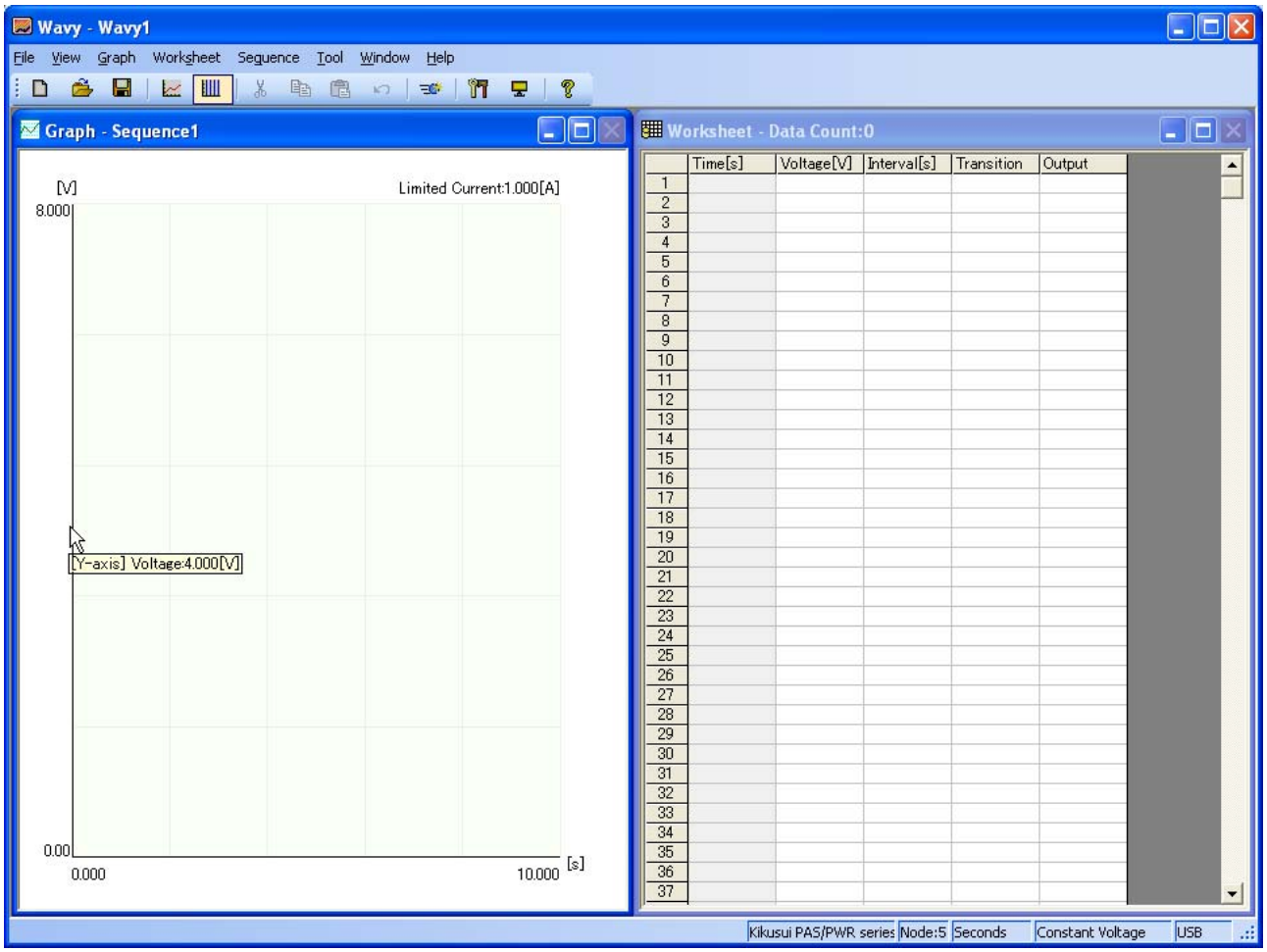


Fig. 3-1 Startup Screen

The Wavy operation procedure is:

(1) Select the sequence mode and operation mode.

(2) Create sequence data.

(3) Execute the sequence data that you created.

* Before executing the sequence, be sure to set the interface and node.

Fig. 3-2 shows the screen displayed when the “TestData.wvy” file has been loaded into Wavy. “TestData.wvy” is located in the folder in which Wavy has been installed (*1).

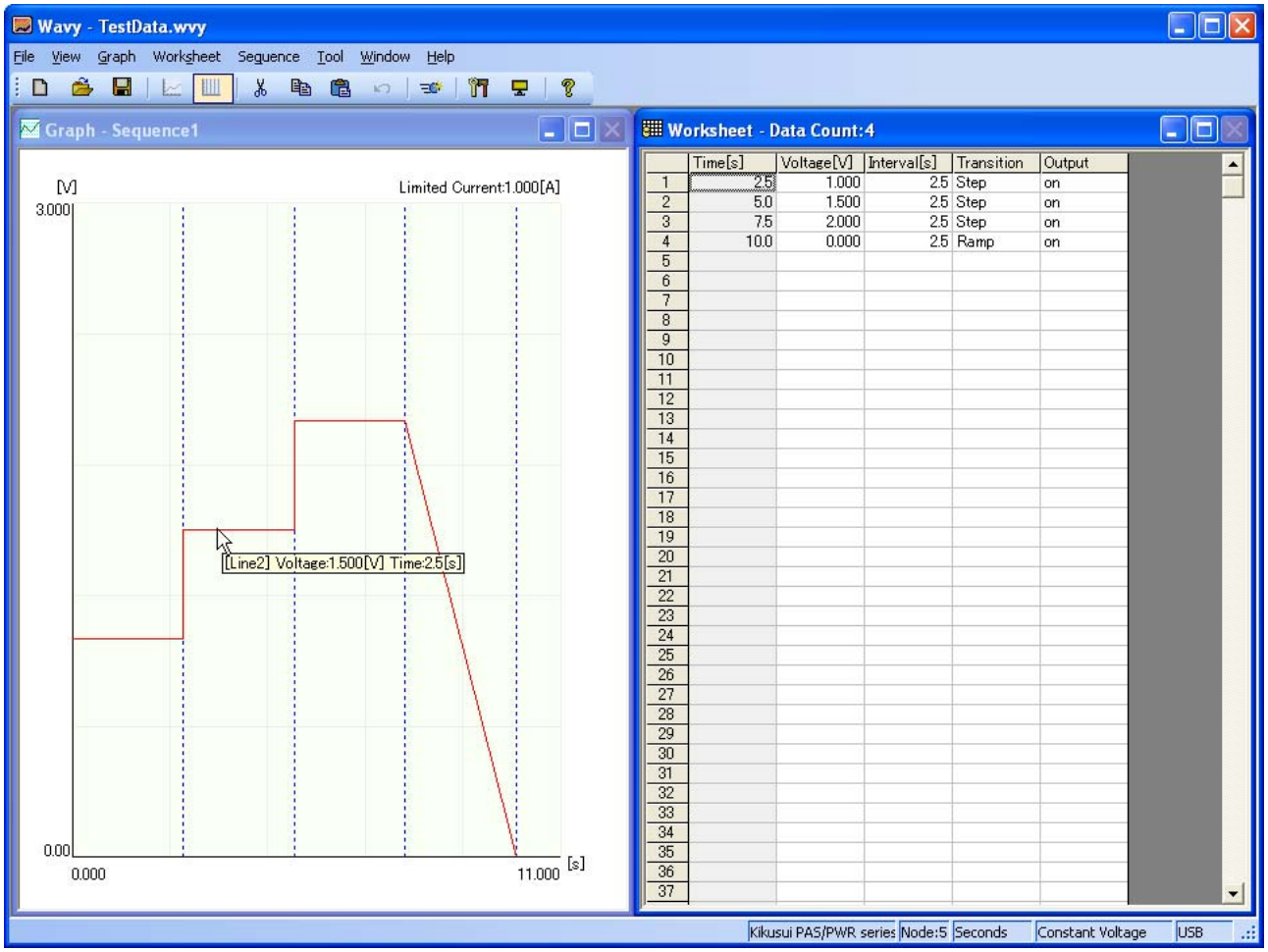


Fig. 3-2 Test Data Screen

(*1) In Windows Vista, the "WavyPwr" folder is made for " Users/Public/Documents".

4 Setting up the Interface

Select [Interface] from the [Sequence] menu. The [Interface] dialog appears (Fig. 4-1).

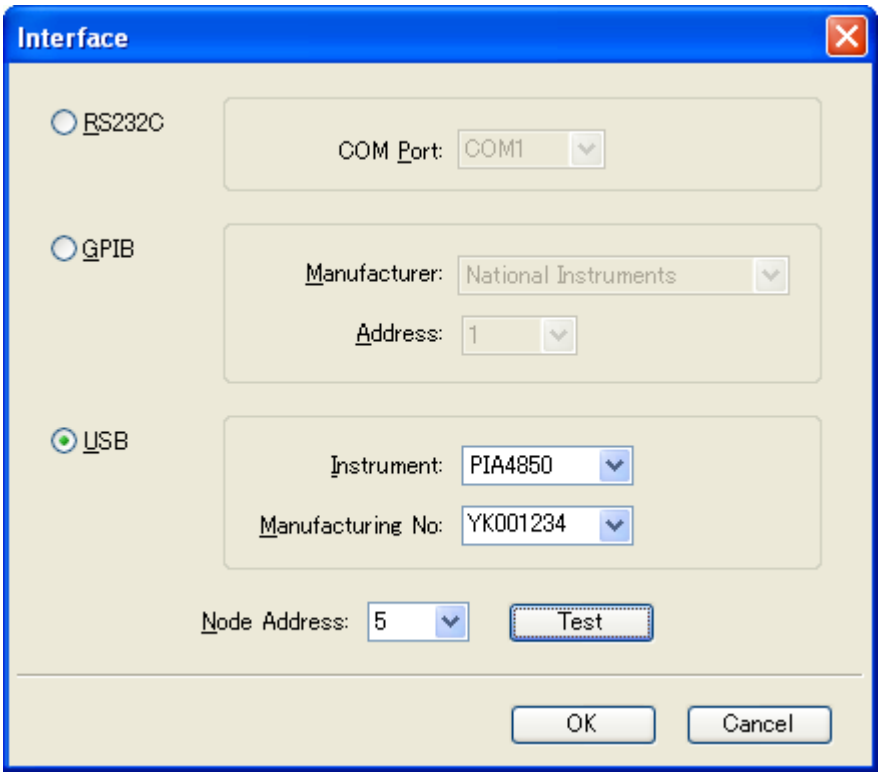


Fig. 4-1 Setting up the Interface

Conduct the interface setting for connecting the PIA4800 series.
Agree the setting note address with the unit of either PAS or PWR.
After the setting is completed, click the button [Test] to confirm the status whether communication with the equipment properly.
If it works properly, the model name and the serial number will be displayed in the message box.

*__Be sure to set the TERMN settings correctly on the instrument. If the settings are not correct, the communication will be unstable resulting in erroneous operation.__

- When connecting to RS232C, set the dip switches on the rear panel of the PIA4800 series. Set the address setting switch 1 and 2 to the position of “ON”. Also turn on the TERMN switch. For details, please refer to the operation manual of the PIA4800 series.

PIA4830 series	Transfer rate	19,200 bps
	Data bit length	8 bits
	Stop bit length	1 bits
	Parity bits	None

Table 4-1

To conduct a connection test, execute “IDN?” using the “Hyper Terminal” communication software provided as standard in Windows.
* **For RS232C, use the cross cable.**
* When using a USB serial converter for connecting RS232C, it may not be functioned properly.

- When connecting to GPIB, set the address number by the address setting switch on the rear panel of the PIA4800 series. Also turn on the TERMN switch. For details, please refer to the operation manual of the PIA4800 series.
  Select the used name of manufacture and agree the setting GPIB address.
  As for operating conditions, check that the GPIB driver provided by the relevant manufacturer has been installed and is operable. For this, conduct a connection test by executing “IDN?” using the utility provided by the relevant manufacturer.

National Instruments	NI-488.2 driver
CONTEC	GPIB communications driver API-GPIB (98/PC) W95, NT Ver. 3.50 or later
Interface	GPF-4301 for Windows Ver. 1.13-05 or later
Agilent 82357B USB/GPIB	Agilent IO Libraries Suite Version 15.0

Table 4-2

* For setup of a GPIB driver, see the operation manual of the relevant manufacturer.
* **To activate the software on Windows Vista, the latest GPIB driver is required to be installed. Please download the latest driver from the web site respectively.**

- For USB connection, enter the serial number of the PIA4850.
  As for operating conditions, check that the USB driver has been installed and that the instrument in use is identified.

* From the [Start] menu at the lower left of the Windows screen, select [Settings], click on [Control Panel], and double click on [System]. Then click on the [Hardware] tab and click the [Device Manager] button. The “USB Test and Measurement Devices” item is indicated in the displayed dialog if the USB driver has been properly installed.

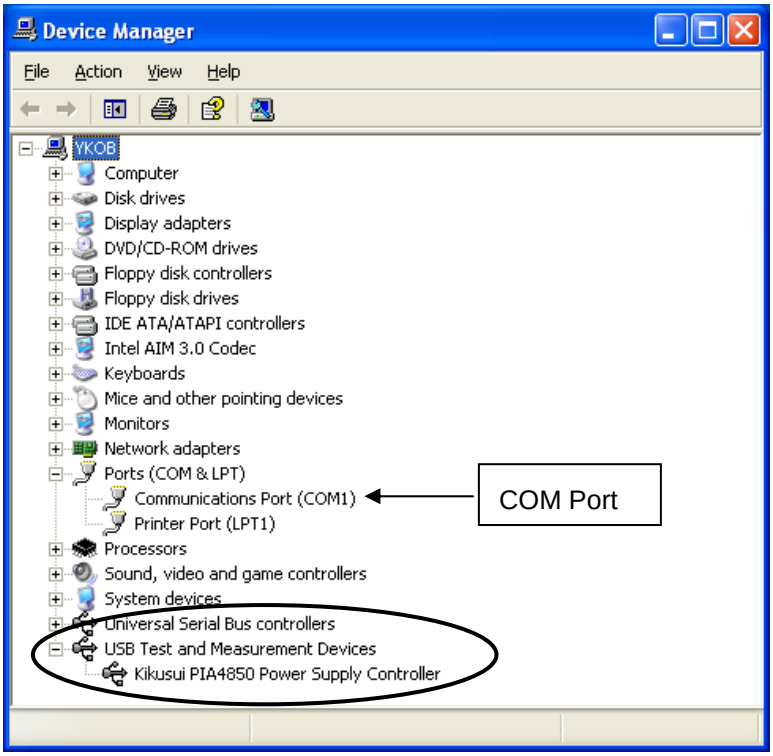


Fig. 4-2 Device Manager

5 Setting the Mode

Select [Mode] from the [Sequence] menu. The [Mode] dialog appears (Fig. 5-1).

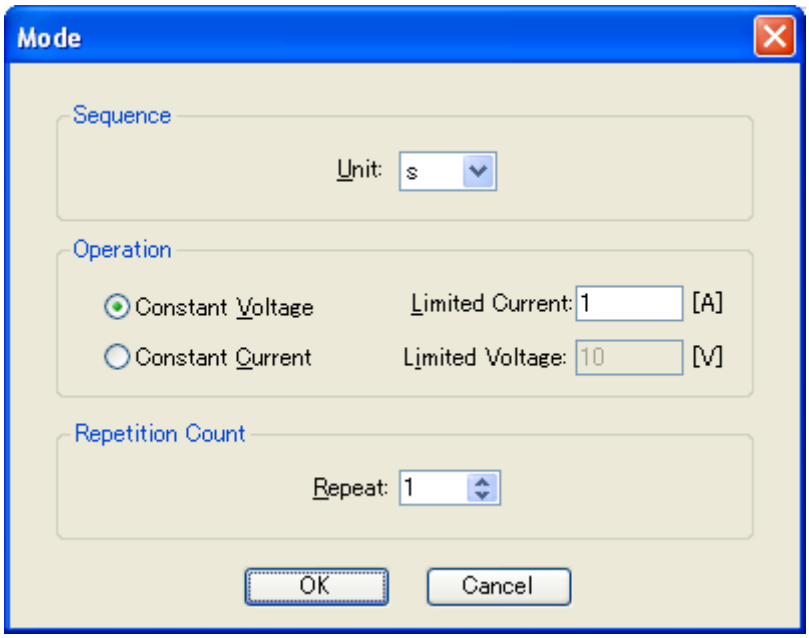


Fig. 5-1 Setting the Mode

The time ranges in the sequence modes are as shown below:

Mode	Seconds	0.5 to 999.5 [s]	(minimum unit: 0.5)
	Minutes	0.1 to 999.9 [min]	
	Hours	0.1 to 999.9 [h]	

Table 5-1 Data Range

The setting interval of the ramp transition is 0.5 s for Second Mode and 1 s for Minute and Hour Modes.

The operation mode is either Constant Voltage or Constant Current.

Constant Voltage value	3 digits	(x.xxx)
Constant Current value	3 digits	(x.xxx)

Table 5-2

*The actual number of significant digits for a decimal fraction varies depending on differences in the instrument series or instrument's setting range.

The range of the repeat count is 1 to 9999.

6 Protection Setup

Select [Protection Setup] from the [Sequence] menu. The [Protection Setup] dialog appears (Fig. 6-1).

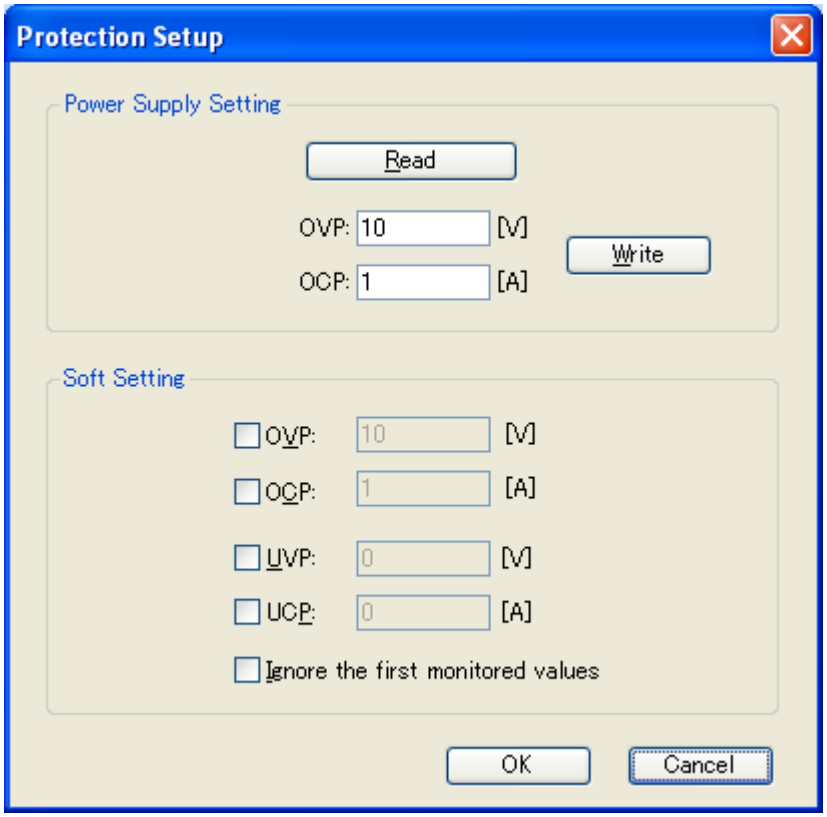


Fig. 6-1 Protection Setup

● Power Supply Setting

Click the [Read] button to load the overvoltage and overcurrent protection values that are set on the instrument. Click the [Write] button to set the overvoltage and overcurrent protection values on the instrument.

● Soft Setting

If the [Overvoltage protection] or [Overcurrent protection] or the [Undervoltage protection] or [Undercurrent protection] check box is selected and the monitored value becomes less than or equal to the specified value, the execution stops. This function is activated only when monitoring is enabled.

If the [Ignore the first monitored values] check box is selected, the execution does not stop even when the first monitored values are less than the undervoltage or undercurrent protection values.

7 Creating and Editing Sequence Data

(1) Move the mouse pointer to the Y-axis. This causes the pointer to change to a crosshair (Fig. 7-1).
At that location, hold down the left mouse button and drag the mouse with the crosshair (Fig. 7-2).
Release the left button at any location to establish that data point (Fig. 7-3).

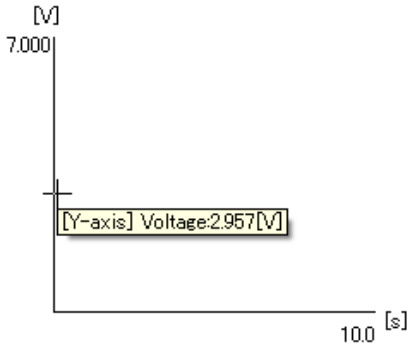


Fig. 7-1 Start Point of the Mouse

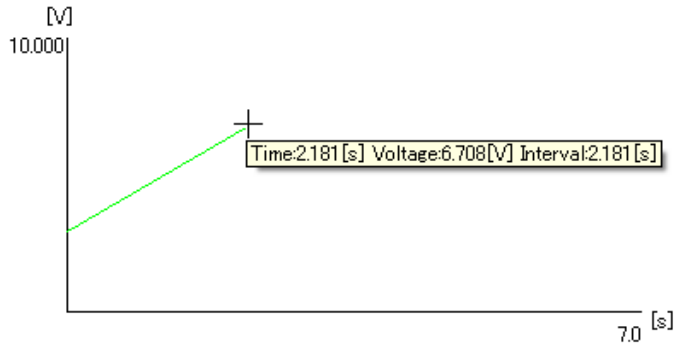


Fig. 7-2 Moving the Mouse

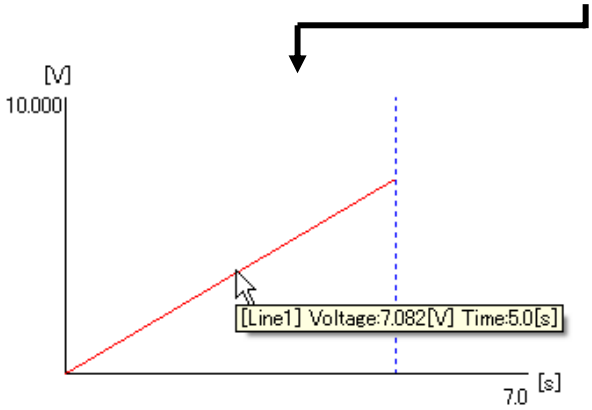


Fig. 7-3 End Point of the Mouse

(2) The data that has just been created with the mouse is indicated as shown below:

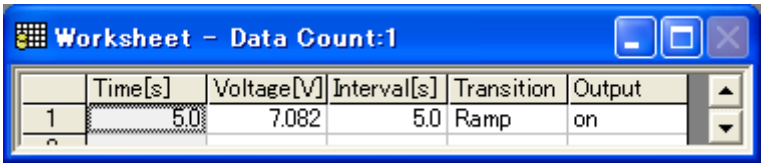


Fig. 7-4 Display of Data in Cells

Data can also be created by directly entering it into the worksheet. In such a case, directly type data in the cell in which you wish to enter data, or select a cell and press the [Enter] key or double click on it to make it available for input. To cancel data entry during input, press the [**Esc**] key. Note that because the time is automatically calculated when the interval is entered, you cannot enter data into the time cell.

(3) To edit data, simply select the cell to be modified. This will allow you to edit the cell (Fig. 7-5). After editing, press the [Enter] key to confirm the change.

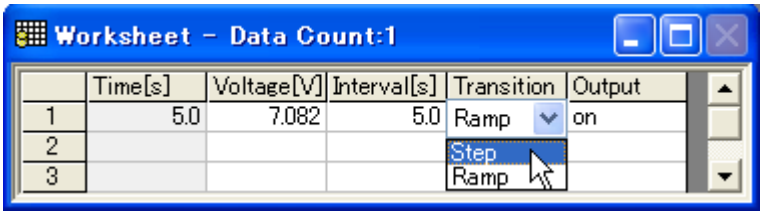


Fig. 7-5 Editing Data in a Cell

(4) To edit data from a graph, double click on the line to be modified.
This will cause the end point of the line to change to a black point (Fig 7-6).
Move the mouse pointer over the black point, and, when the pointer changes to an arrow (Fig. 7-7), hold down the left mouse button to select that point and drag the mouse up or down (Fig. 7-8). Release the left button at any location to establish that data point.

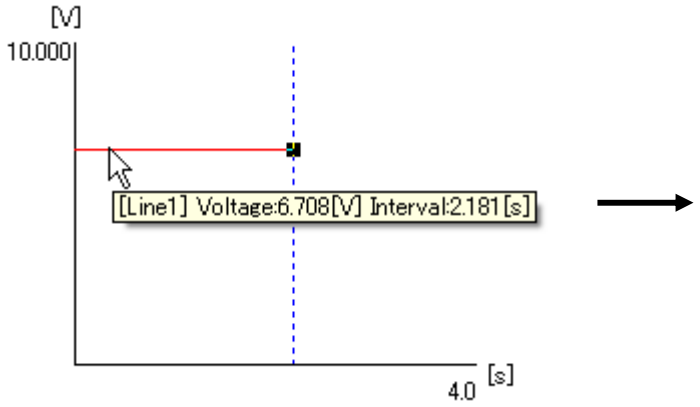


Fig. 7-6 Selecting the Line to be Changed

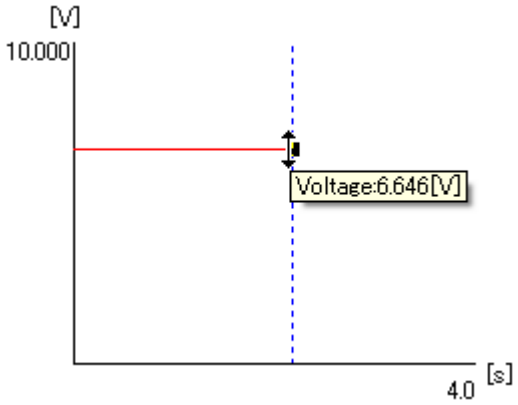


Fig. 7-7 Start Changing the Data

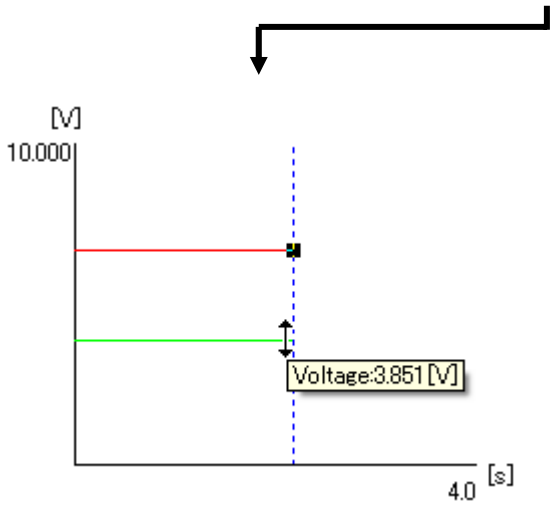


Fig. 7-8 Moving to the Desired Position

* To edit the time interval, double click on the blue dotted line (vertical line).
  The operating procedure is the same as the one noted above.

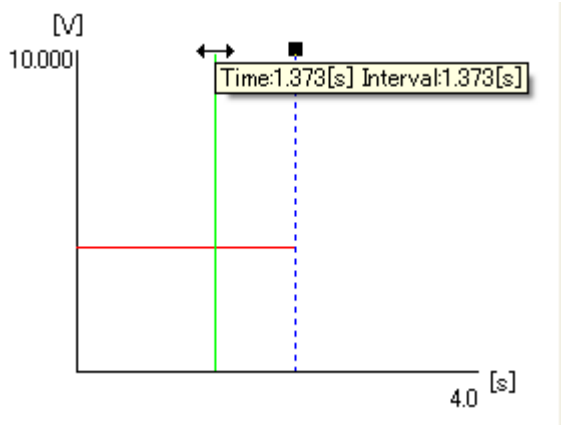


Fig. 7-9 Moving to the Desired Position (Time)

* Transition data can be changed from the graph.
  Double click on the line you wish to change. This will cause the end of the line to change to a black point (Fig. 7-10).
  At this stage, press the right mouse button (Fig. 7-10).

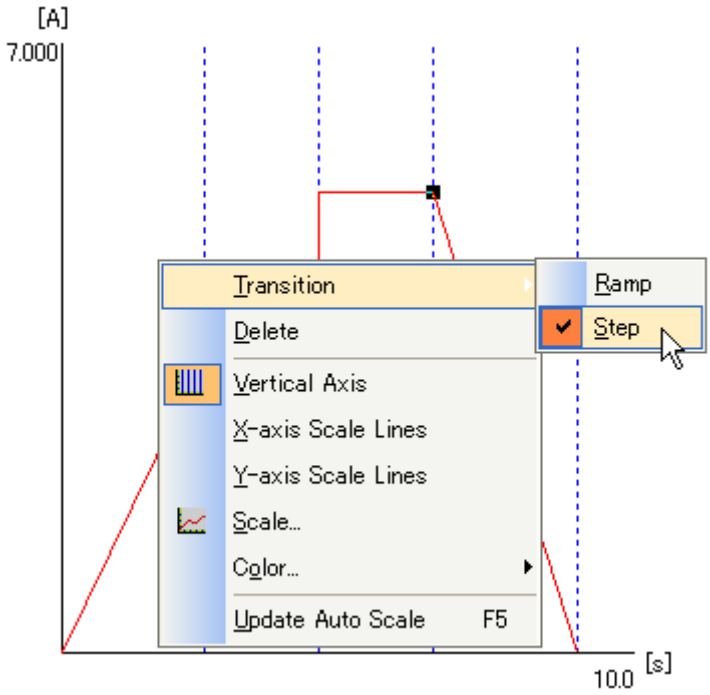


Fig. 7-10 Transition Change

* You can also delete, copy, or insert multiple lines. To perform these actions, press the right mouse button (Fig. 7-11).

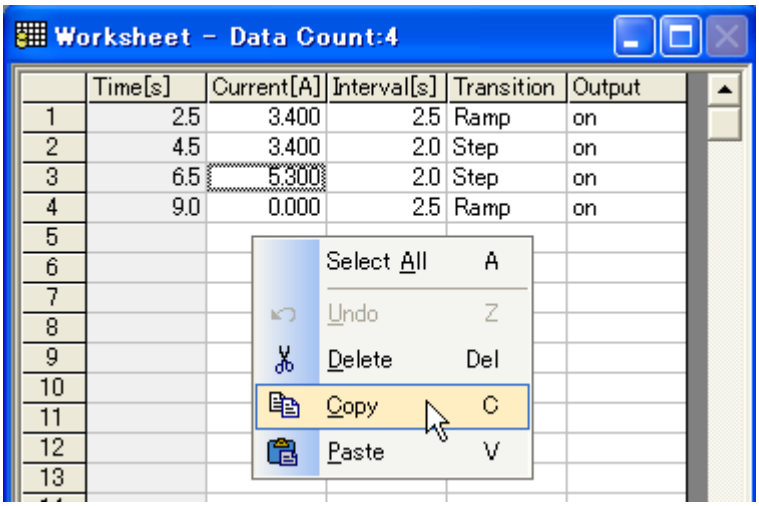
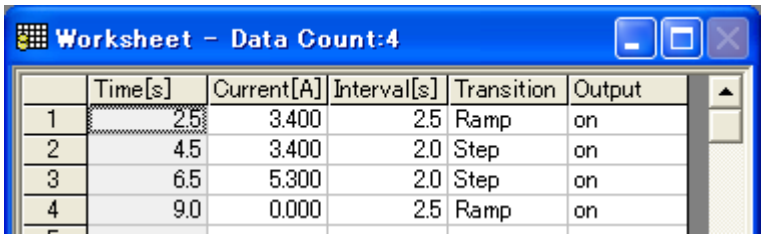


Fig. 7-11 Delete, Copy, and Paste

* When entering the data directly on the sheet, enter the data in order from the first line.
You can only enter the data of the second line (step 2) after you have entered the data of the first line (step 1).
Note that you cannot enter time values, as they are automatically calculated when you enter the interval.

8 Saving Sequence Data as a File

(1) Create sequence data as shown in Fig. 8-1 and save it as a file. After creating the data, select [Save] from the [File] menu. When the [Save As] dialog appears, save the data under the file name “Wavy1.wvy.”



	Time[s]	Current[A]	Interval[s]	Transition	Output
1	2.5	3.400	2.5	Ramp	on
2	4.5	3.400	2.0	Step	on
3	6.5	5.300	2.0	Step	on
4	9.0	0.000	2.5	Ramp	on

Fig. 8-1 Data in Cells

(2) Open the “Wavy1.wvy” file in Notepad (Fig. 8-2).

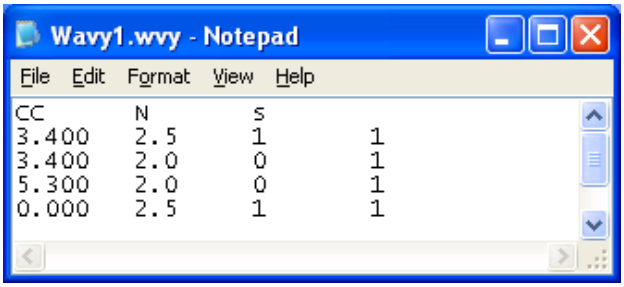


Fig. 8-2 Opening the File in Notepad

The first line shows the data conditions. The contents are as shown below:

1st item	CV CC	Constant voltage mode Constant current mode
2nd item	N	Always specify N
3rd item	s min h	In seconds In minutes In hours

Table 8-1 File Formats

The 2nd and 5th lines are sequence data. The contents are as shown below:

1st data	Voltage [V], current [A]
2nd data	Time interval. The units are [s], [min], or [h].
3rd data	Transition. “0” represents step, while “1” denotes ramp.
4th data	Output. “0” represents off, while “1” denotes on.

Table 8-2 File Format

*Pieces of data are **separated by tabs**. Note that they are not separated by spaces. Tab separation can be changed to comma separation (see 12 Environment Setup).

9 Processing Sequence Data

9.1 Processing

To process the sequence data input, select [Run] from the [Sequence] menu. The [Run] dialog will appear (Fig. 9-1).

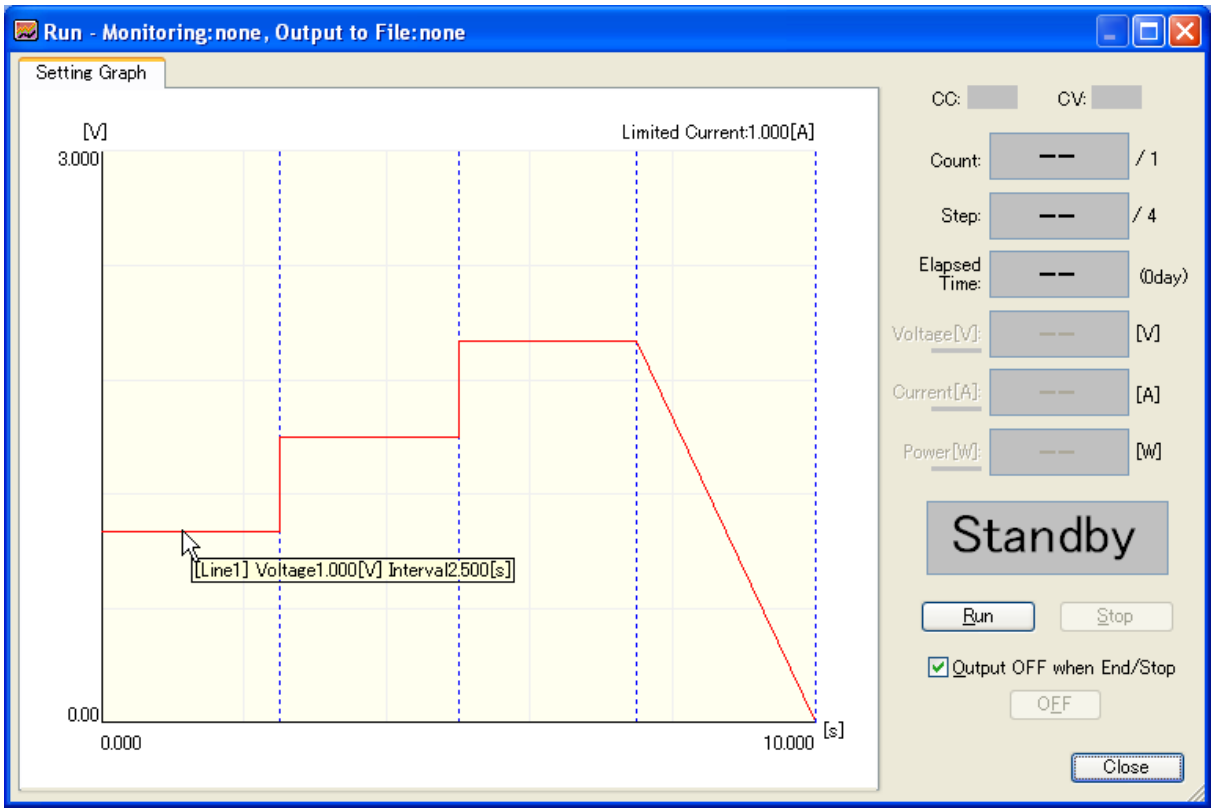


Fig. 9-1 Processing

Click the [Run] button to process the sequence data that has just been written to the instrument. To stop processing before completion, click the [Stop] button.

The status indications that appear onscreen are as below:

Standby	Gray	Sequence processing is on standby
End	Gray	Sequence processing has been completed.
Running	Green	The [Run] button was pressed, and a sequence is being processed.
Stop	Yellow	The [Stop] button has been pressed.
Error	Red	A communication error or file storage error has occurred. Confirm that the interface settings are correct and that the path to the destination folder is specified correctly.
OVP,OCP, UVP,UCP	Orange	Overvoltage, overcurrent, undervoltage, or undercurrent protection was activated.

Table 9-1 Status

If the [Output OFF when End/Stop] checkbox has been selected (checked), Output is turned OFF when Sequence operation is completed or is stopped during processing.

Fig. 9-2 shows the screen displayed during processing of a sequence.

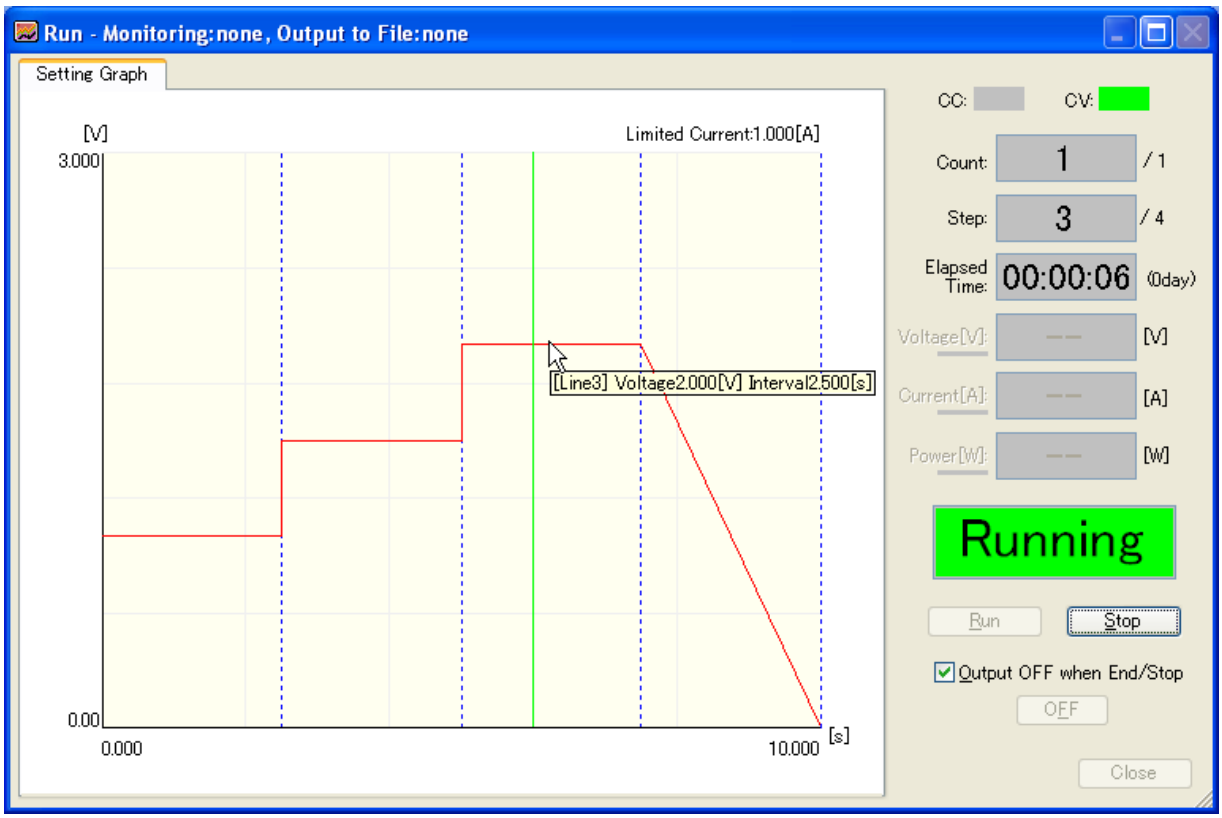


Fig. 9-2 Sequence Being Processed

The screen shows the number of repetitions (counts), step position, and elapsed time.
If current, voltage, and/or power is selected in the monitoring settings, an output current value, output voltage value, and/or output power value will be displayed.
For monitoring setting, see “10 Monitoring Setup.”

* The title of the dialog indicates monitoring and file information.
* The position line (green vertical line in Fig. 9-2) indicates the approximate position of the sequence being processed.

[CAUTION] Data created using Wavy is not checked for validity of values (values exceeding the instrument’s limit) when the sequence data is written to the instrument. As such, there may be cases where erroneous data is recorded by the instrument. In such a case, the sequence data will be insufficient. Do not to set a voltage or current value exceeding the specifications of the instrument.

If current and voltage are selected in the monitoring setting, the screen will display the following:

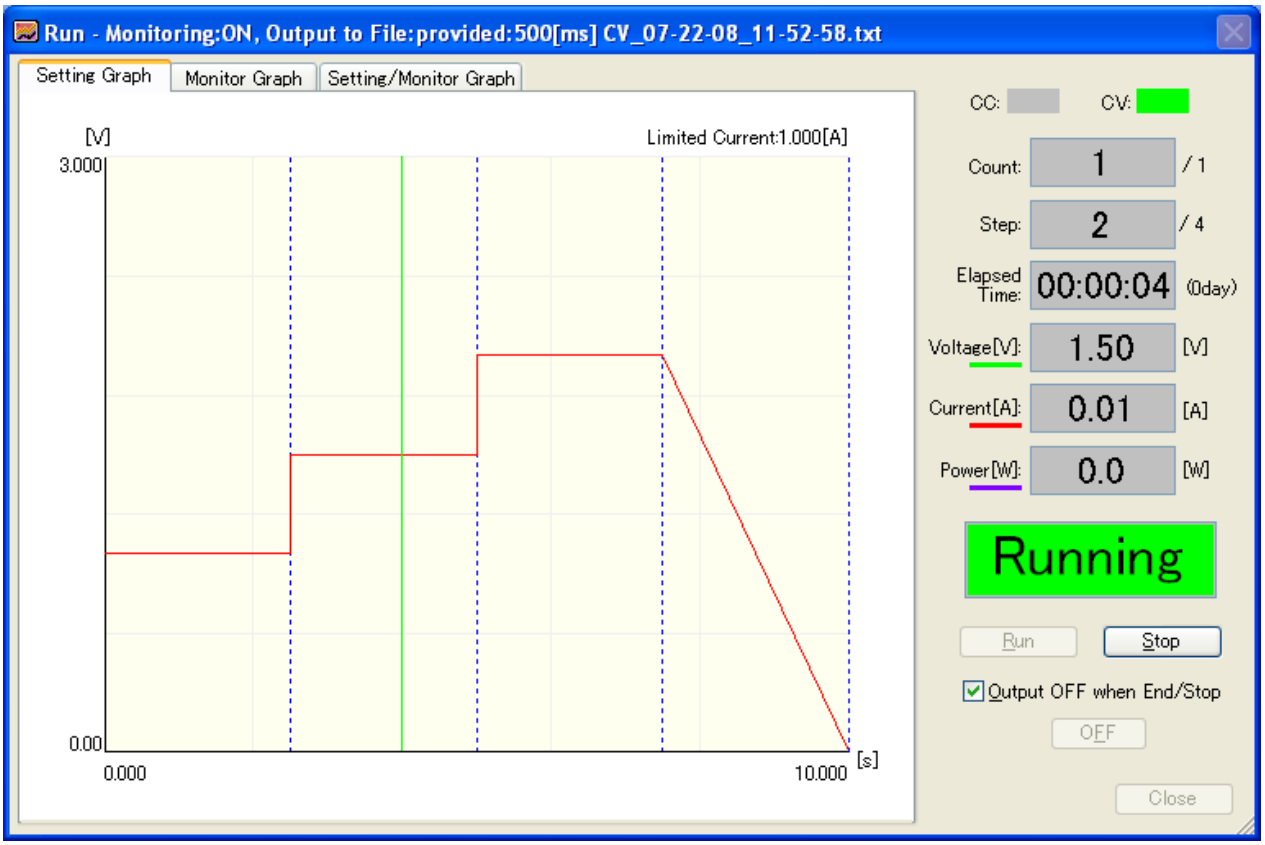


Fig. 9-3 Sequence is being Processed (with Monitoring Activated)

* A power value is supported only for the PWR series.

Right-click on the execution graph (Fig. 9-4) to change the display settings of the execution graph.

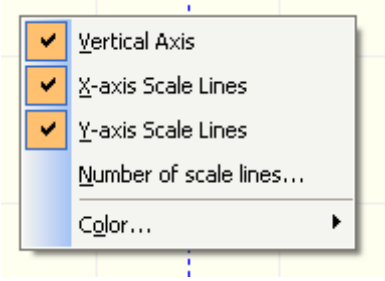


Fig. 9-4 Display settings of the execution graph

9.2 Real-time Monitor Graph

If you click the Monitor Graph tab in the upper left of the screen shown in Fig. 9-3, the monitored values are shown on a graph (Fig. 9-5).

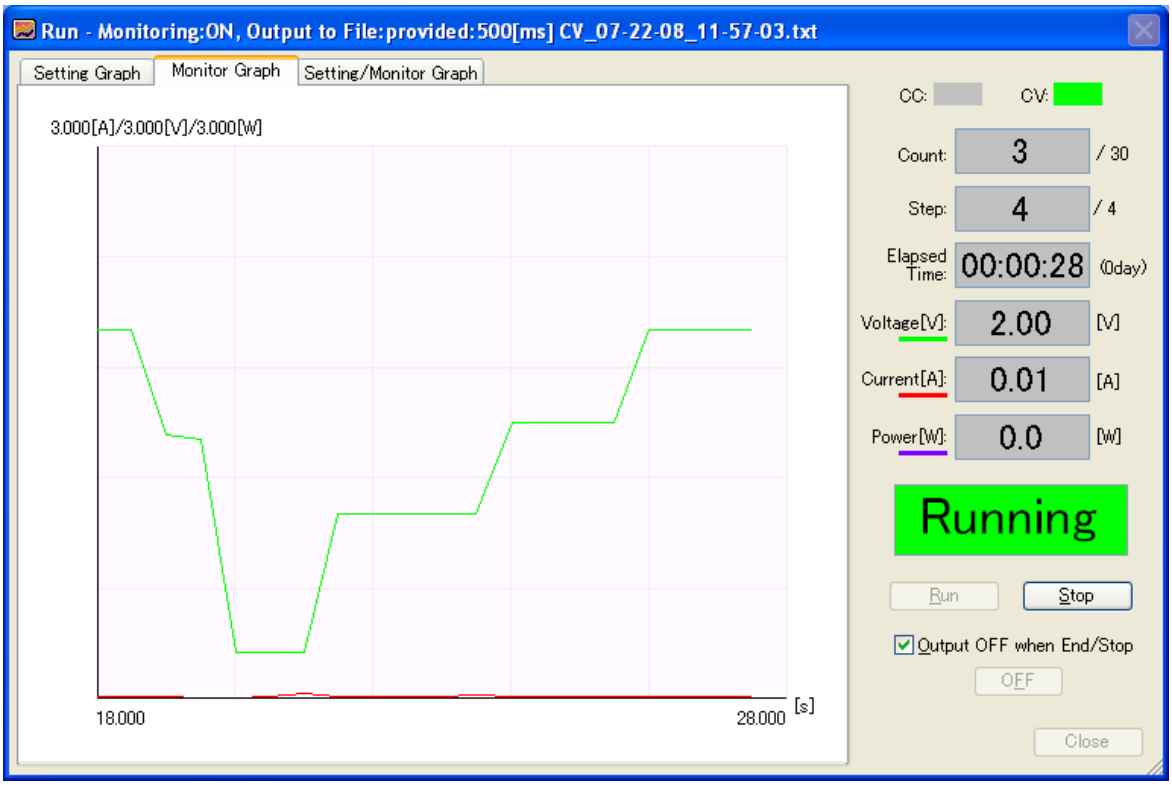


Fig. 9-5 Monitor Graph

Right-click on the monitor graph (Fig. 9-6).
You can change the monitor graph settings.
Select Current, Voltage, or Power in the Line Color submenu to change its line color.

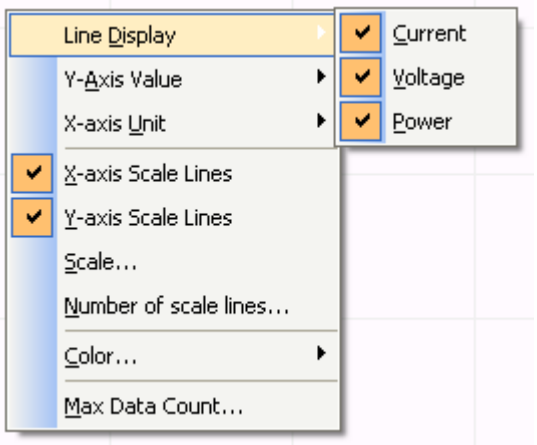


Fig. 9-6 Monitor graph settings

If you click on the tab [Setting/Monitor graph] above on the left of window, it shows both the setting graph and the real time monitor graph on the display. (Fig.9-7)

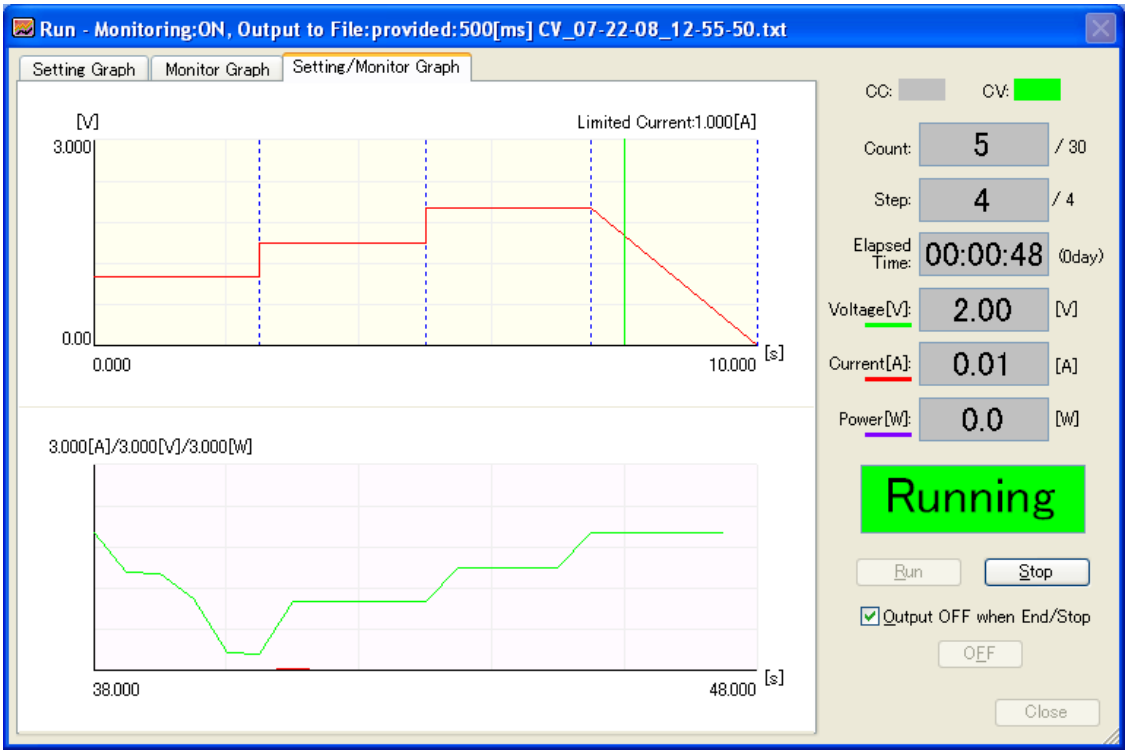


Fig. 9-7 Setting Graph and Monitor Graph (Roll mode)

The time axis (X axis) of the monitor graph (Fig. 9-7) is roll mode. It is like an image of oscilloscope. The time axis (X axis) of the monitor graph (Fig. 9-8) is normal mode. The starting point is fixed.

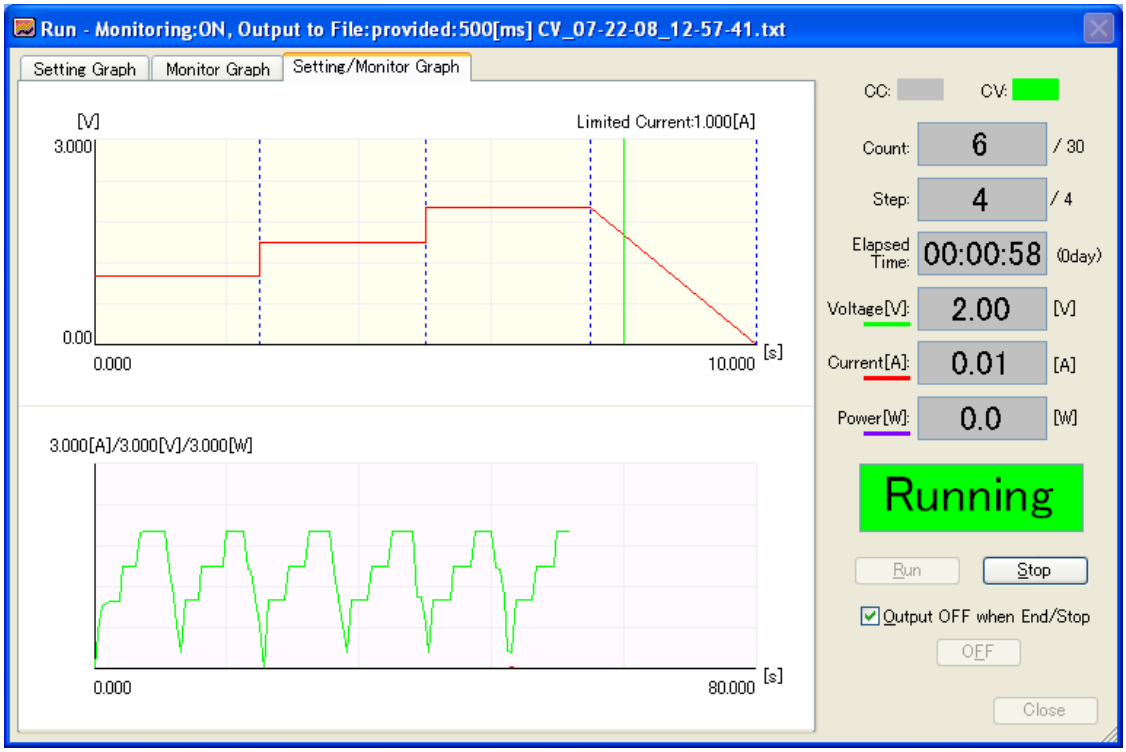


Fig. 9-8 Setting Graph and Monitor Graph (Normal mode)

When [Scale] is selected in Fig. 9-6, the Fig.9-9 will be displayed.

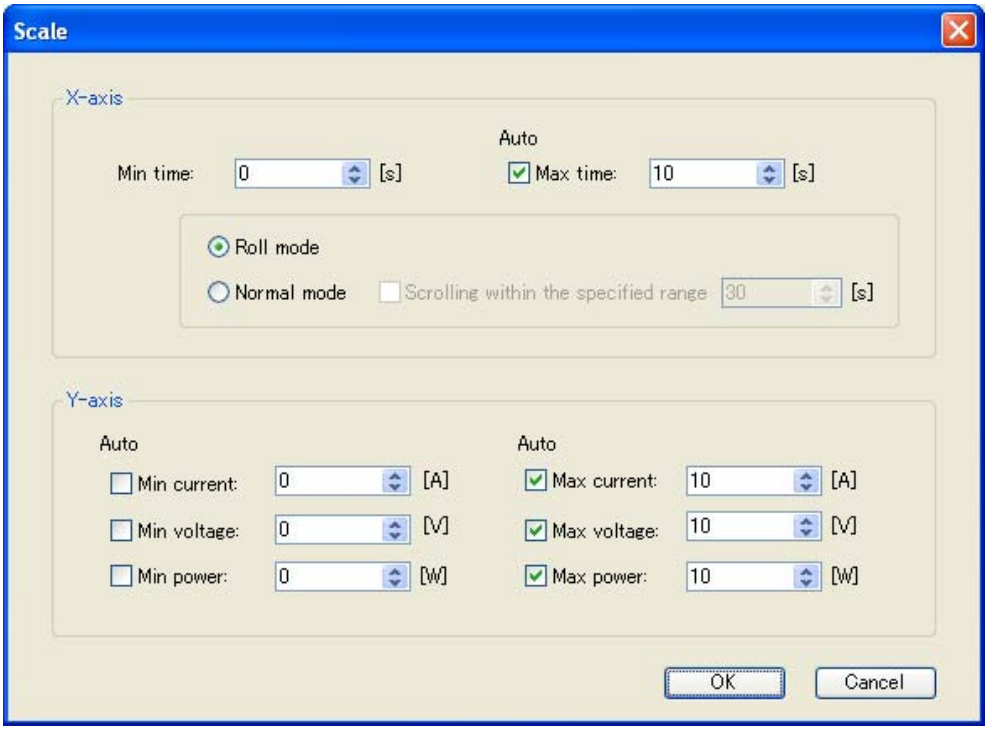


Fig. 9-9 Monitor graph scale settings

In case the [AUTO] is selected(Checked in the box), the value will be automatically changed to the most reasonable value when the maximum value exceeds the monitor value. (Auto scale function) It works the same for the minimum value.
If you wish not to change the setting value, remove the check mark from its check box.
In such case, pay attention that it may not be displayed in the graph if the monitor value is out of specified range.
The auto scale function on the X axis has two types of modes, they are roll mode and normal mode.
The roll mode is to scroll the minimum and the maximum of the X axis at the same time. (Fig.9-7)
The roll range is the width of between "the maximum time to the minimum time".
The normal mode is fixed at the minimum value of the X axis, and only the maximum value can be changed. (Fig.9-8)
Furthermore, when the [scrolling within the specified range] is selected in the normal mode, the data of setting time (data just prior the auto scale function is activated) will be displayed and scrolled. (It is like an image of a pre-trigger data)

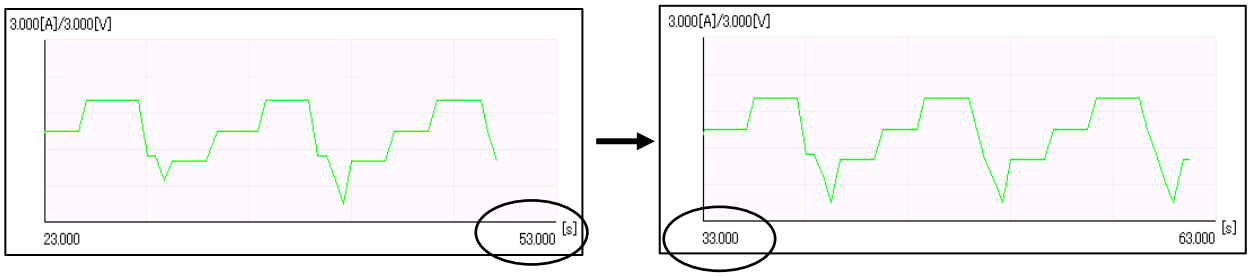


Fig. 9-10 example of scrolling specified area

Fig. 9-10 shows an example for setting the specified area at 20[s].
When the data exceeds the maximum value of X axis, the minimum value of X axis is 53-20=33[s].

By specifying [X axis unit display] on the Fig 9-6, the unit display of X axis on the monitor graph can display the unit of either “[s]” or “[h:m:s]”.

If the [Maximum number of data] on the Fig.9-6 is selected, the Fig. 9-11 will be displayed.

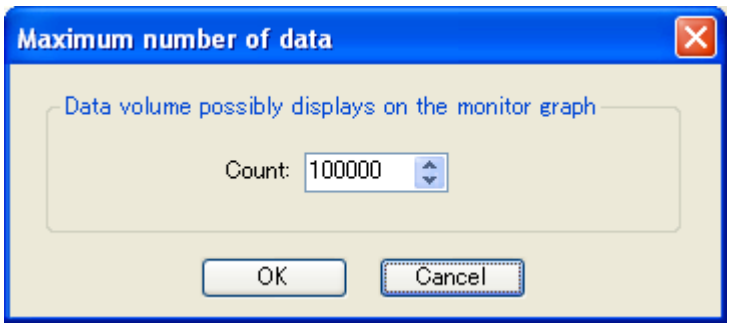


Fig. 9-11 Maximum number of data

When the test is conducted for long term period of time, the data volume of monitor graph will be increased and it reflects to suppress the memory capacity.
Once the memory capacity becomes insufficient, considerable amount of load will apply to the PC and it may lead to possible malfunction of the operation.
At this stage, set the maximum number of data that displays on the monitor graph.
The setting range of the number of data is between 10,000 to 1,000,000. The default setting is 100,000.
If the monitor graph data exceeds the setting number of data, it will delete from the oldest monitor data.

*It is roughly estimate that the one monitor data will consume approximately 200 byte. (It depends on the PC environment)
If the monitor data is acquired every one second, it will be 86,400 units in 24 hours.

86,400 unit × 200B = Approx.16.5MB

Please adjust to the most reasonable setting value according to the capacity of physical memory. (It depends on the PC environment)

*The setting for the maximum number of data does not affect to the generated monitor data file.
*The managing process for drawing the monitor graph on the display depends on the data volume and the display range will cause the load to the PC.
*If the long term test is conducted, it is recommended to monitor the status of physical memory using such the “Windows Task Manager”.

10 Monitoring Setup

Select [Monitoring Setup] from the [Sequence] menu. Then the [Monitoring Setup] dialog appears (Fig. 10-1).

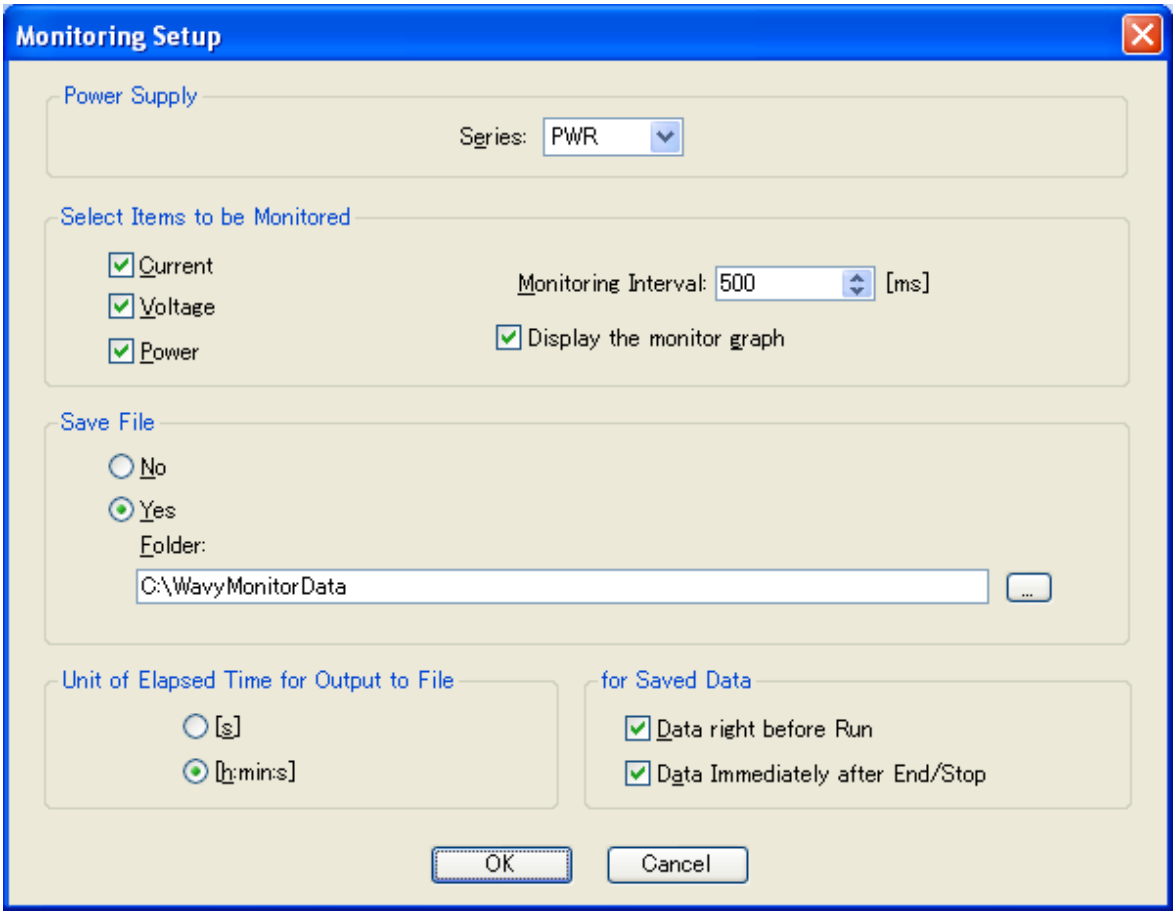


Fig. 10-1 Monitoring Setup

The power supply used is selected from PAS or PWR.

If the Current checkbox has been checked, the “output current value” will be displayed during processing of the sequence.
If the Voltage checkbox has been checked, the “output voltage value” will be displayed during processing of the sequence.
If the Power checkbox has been checked, the “output power value” will be displayed during processing of the sequence.

The monitoring interval range is 500 to 600,000 [ms] (0.5 to 600 [s]).

If the “Save” checkbox has been checked in the Save File section, monitored data will be output to a file in the folder specified.Fig. 10-2 shows a monitored-data output file.

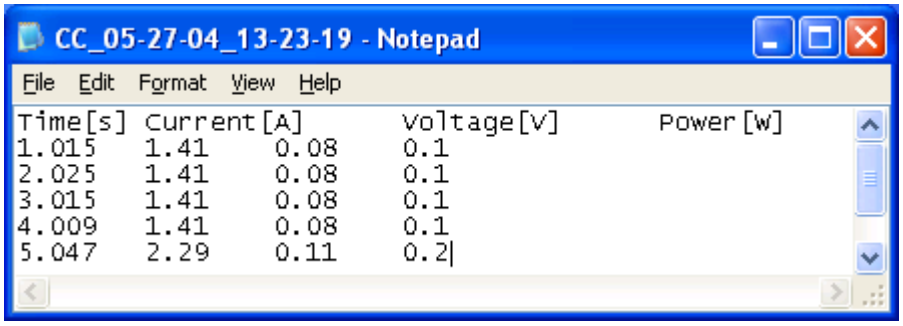


Fig. 10-2 Monitored-data Output File

In the example in Fig. 10-2, the monitored data file name is as shown below (Table 10-1).

CC_05-27-04_13-23-19. txt

(1) (2)

(1) CV: Constant Voltage mode, CC: Constant Current mode
(2) Date and time of the start of sequence processing

Table 10-1 File Name Format

The time interval for output of monitored data to file may be selected using either the [second] or [hour: minute: second] format.

* The accuracy of time measurement (for the monitoring interval) depends on the PC environment in use.
* Pieces of data are **separated by tabs**. Note that they are not separated by spaces. Tab separation can be changed to comma separation (see 12 Environment Setup).

If the [Data right before Run] checkbox has been checked, the monitored values applied immediately before load is activated (that is, during OFF status) are output to file as 0 [s].
If the [Data Immediately after End/Stop] checkbox has been checked, the monitored values obtained immediately after processing is completed or stopped (that is, during OFF status) are output to file at that time (actual data acquisition is done within a range of 0 to 2 seconds).

The monitor graph is displayed only when the [Display the monitor graph] check box is selected.

* The performance of the monitor graph is affected by your PC environment. If adverse effects occur, clear the check box.

11 Setting the Graph Scale

Select [Scale] from the [Graph] menu. The [Scale] dialog will appear (Fig. 11-1).

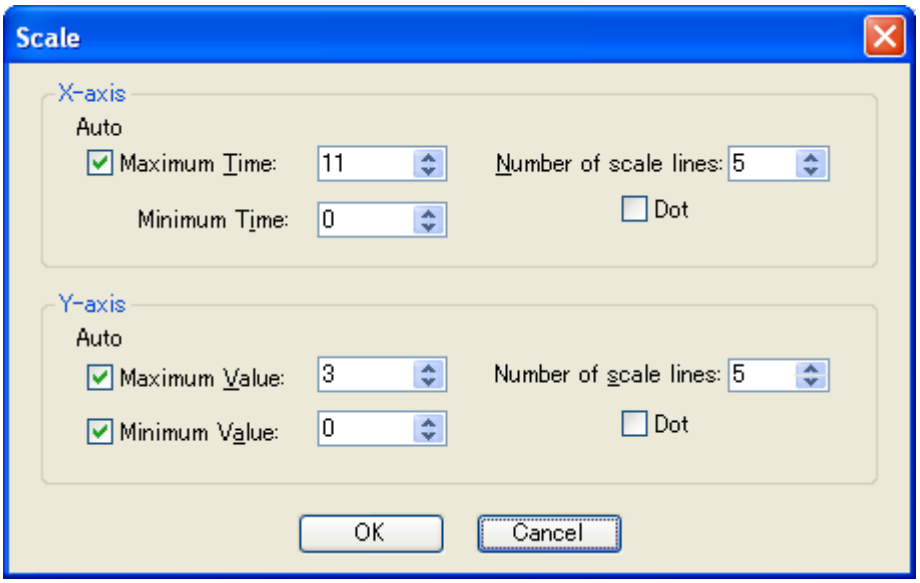


Fig. 11-1 Setting the Graph Scale

If the Auto checkbox has been selected (checked), the scale will change automatically.
Whenever a file is loaded into Wavy or sequence data is entered, the maximum or minimum value of the X- or Y-axis of a graph will automatically be changed to an optimum value.

If you do not wish to have the value changed automatically, uncheck the Auto checkbox.
Note that if you uncheck the Auto checkbox, nothing will be displayed on the graph if one of the data values is out of range.

The number of scale lines under X-axis and Y-axis is the number of grid lines that are shown in the background of the graph.
If this value is set to 1, only the frame line is displayed.
If you wish to hide the scale lines on the graph, choose [X-axis Scale Lines] or [Y-axis Scale Lines] from the [Graph] menu to remove the check mark.

12 Environment Setup

Select [Environment Setup] from the [Sequence] menu. The [Environment Setup] dialog will appear (Fig. 12-1).

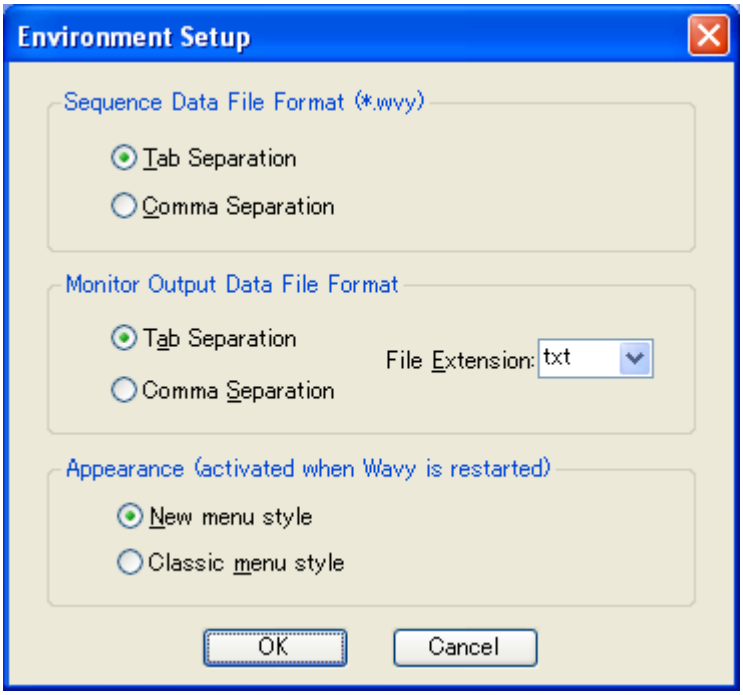


Fig. 12-1 Environment Setup

By default, the Sequence Data File Formatting is set at **Tab Separation** for separating data. When Comma Separation is selected, data will be **separated by commas**.

The Monitoring Output Data File Format section functions the same way as the Sequence Data File Format section. The File Extension can be set by the user.

* For sequence data files, see “5 Sequence Data File.”
* For monitoring output data files, see “9 Monitoring Setup.”

The Appearance settings change the appearance of the menu bar and tool bar.
The settings are applied when you restart Wavy.

13 Other Settings

The colors of graph items such as the background color can be changed (Fig. 13-1).

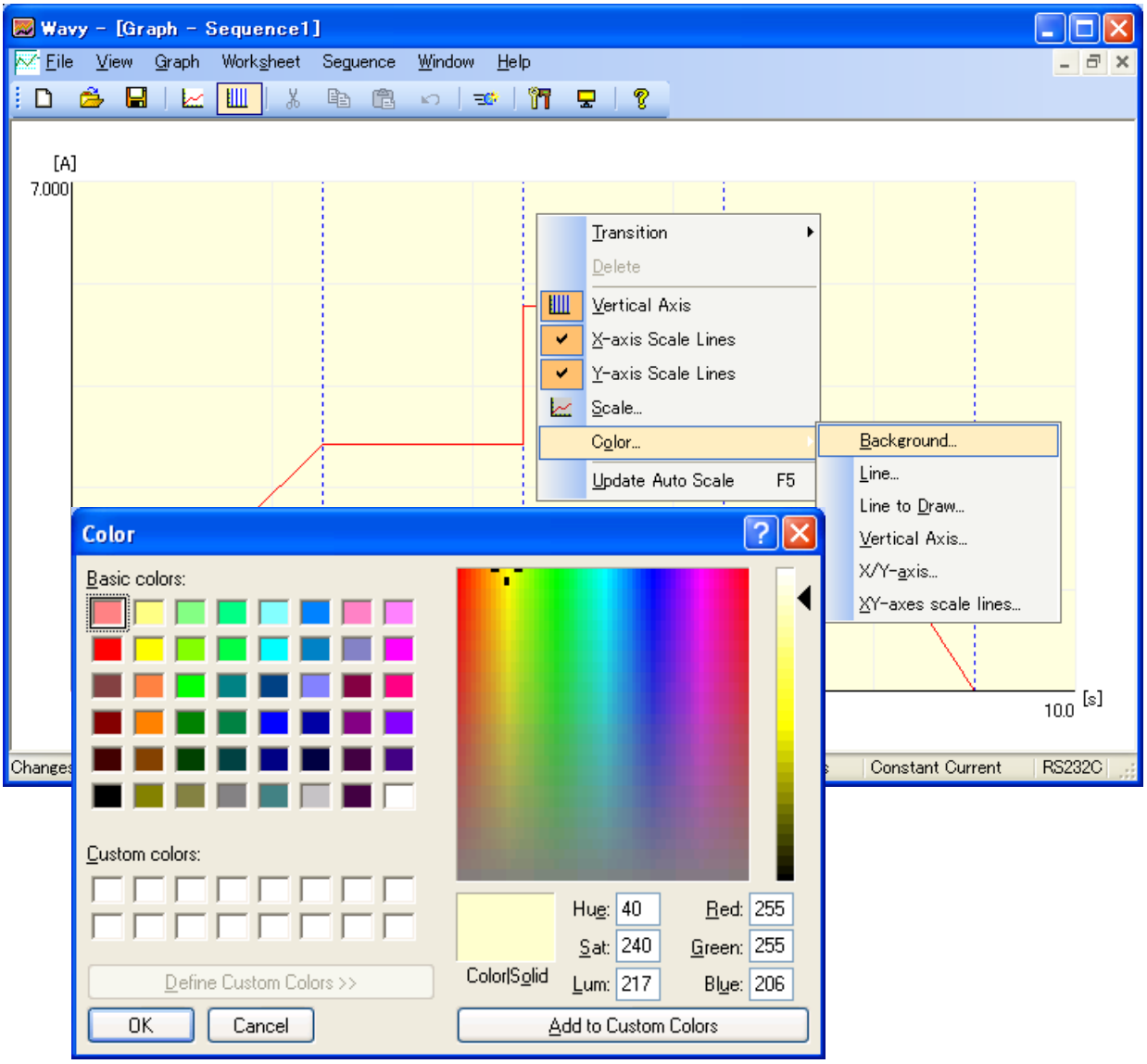


Fig. 13-1 Changing the Colors of a Graph

* [Line to Draw] applies to both the line color of mouse movement (Fig. 4-2) when a graph is drawn and the color of the line showing processing status (Fig. 6-3) when a sequence is processed.

14 Remote Control Panel

Select [Remote Control Panel] from the [Tool] menu. The following window will be displayed. (Fig. 14-1)

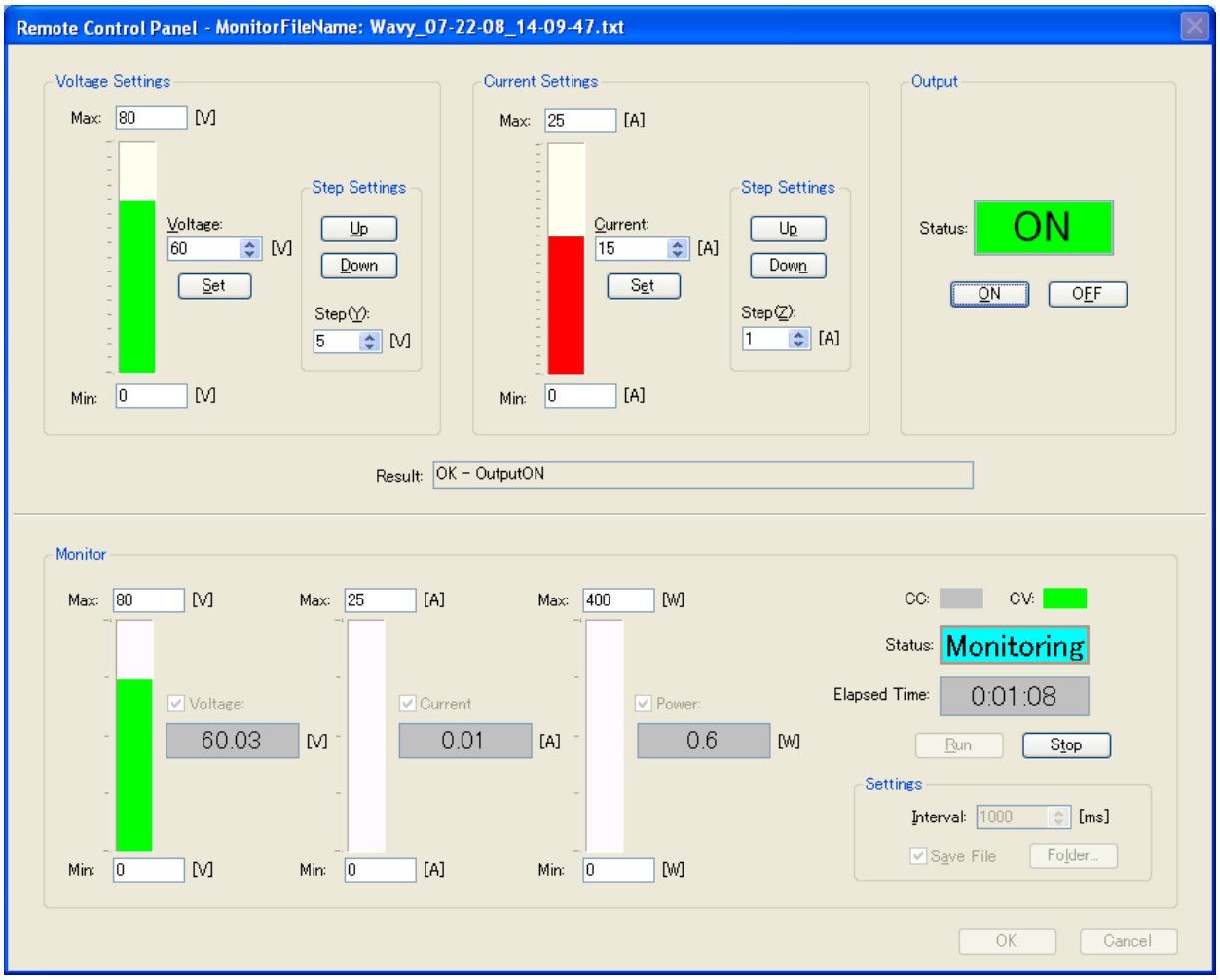


Fig. 14-1 Contrl Panel

This function is to conduct independently besides the sequence function for setting the voltage, current, output ON/OFF, and the monitor (read back).
At first, set all of the maximum and the minimum value in accordance with the specification of the used model of either the PAS or the PWR series.

Enter the value in the box of each voltage and current and press “Enter” key to set.
The “Step setting” can be set by clicking arrows of [Up] or [Down] for which setting value consists of the setting value with “±” of step value.
If the setting is specified as shown in Fig. 14-1, then clicking the arrow “Up” of the step value in the voltage setting, it is set for the total of 65 V, the setting voltage of 60 V plus the step value of 5 V (60 V + 5 V = 65 V).

The scale of the bar graph is synchronized to be set with the step value.
When “Save to file” is selected by the check box, the monitor will be saved to the file.
In this case, select the [Folder] button to assign the folder to be saved.
The file name will be “Wavy_07-22-08_14-09-47.txt”.
*The file format and the extensions are subject to depend on “12. Environment Setup”.

15 Command Control

Select [Command Control] from the [Tool] menu. The following window will be displayed. (Fig. 15-1)

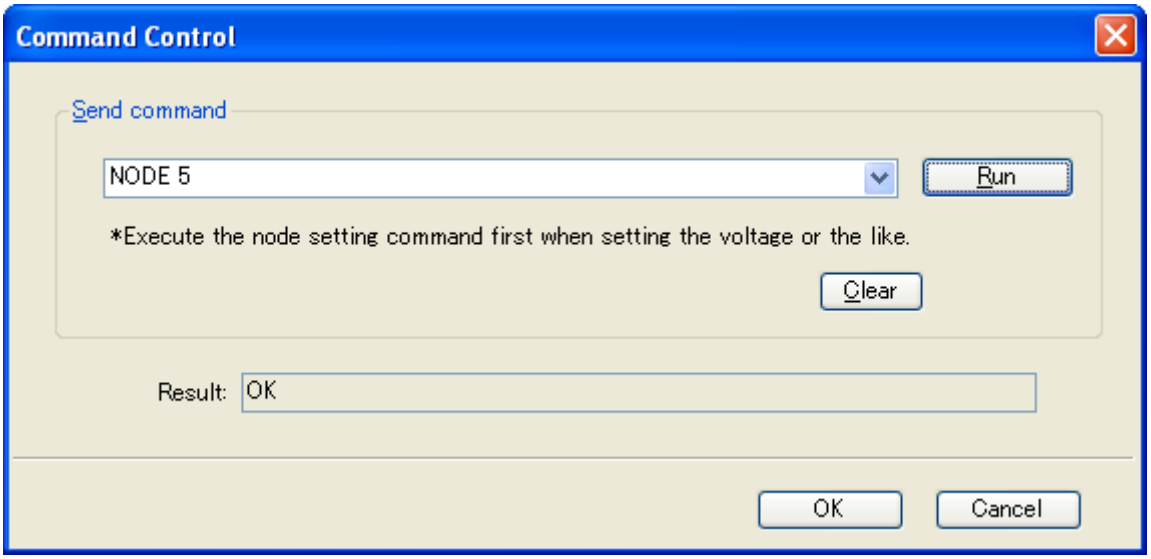


Fig. 15-1 Command Control

This function is to conduct independently besides the sequence function for command execution..

When the commands transmit/receive is conducted properly, it will be registered in the “drop down list” (maximum 10 records).
To clear the history of the “drop down list”, select the [Clear] button.

*Does not support for the coupling command.
*For details of commands, refer to the operation manual of the used equipment.

16 Menu Items

16.1 File

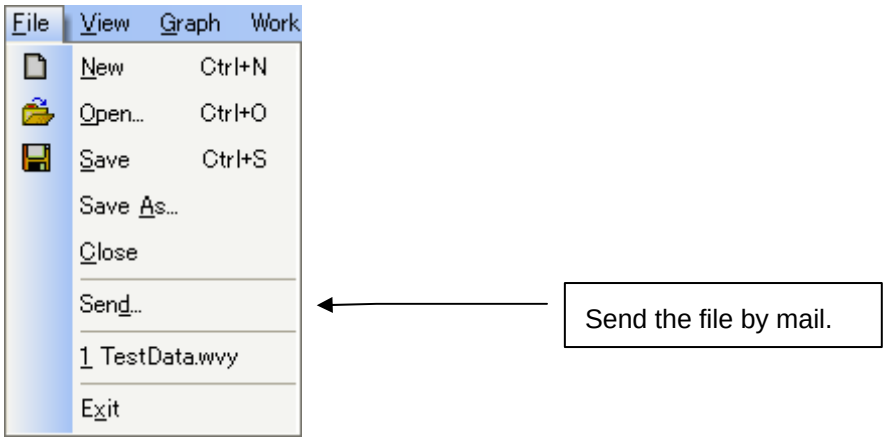


Fig 16-1

16.2 View

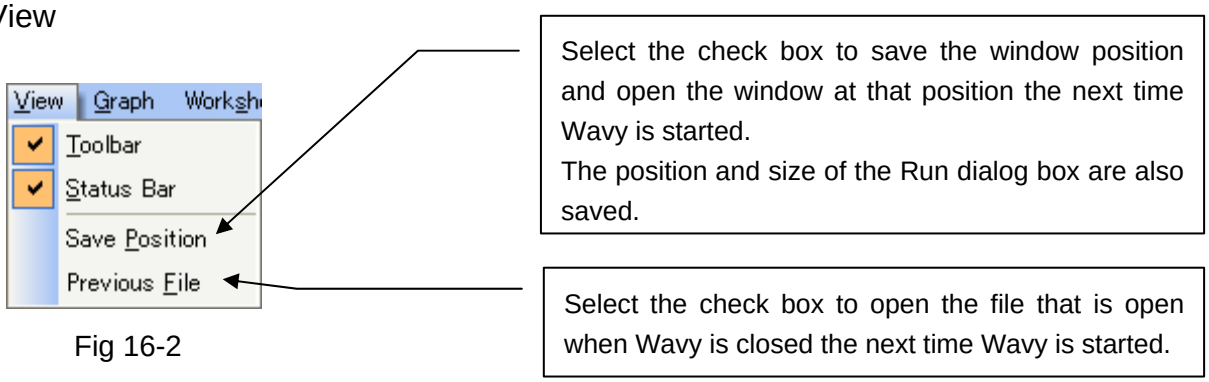


Fig 16-2

16.3 Graphs

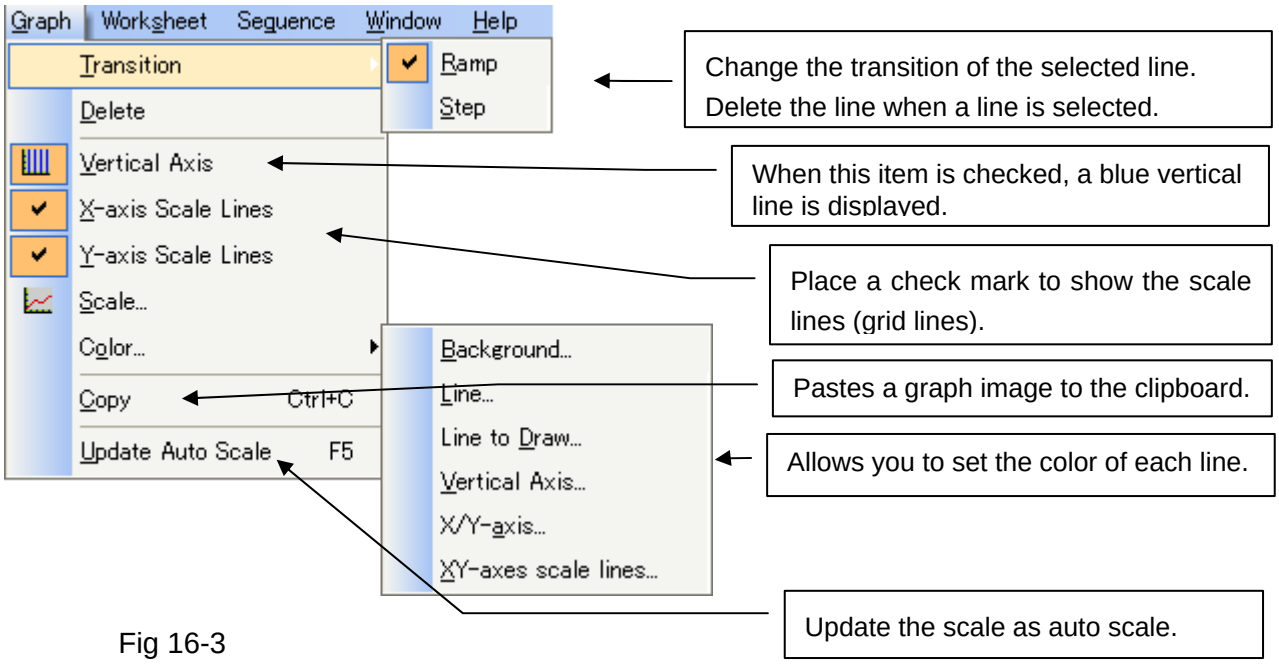
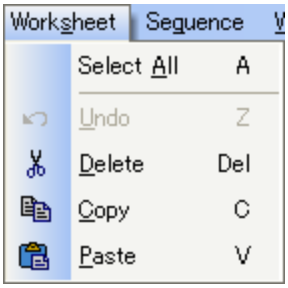


Fig 16-3

16.4 Worksheet



Copy, paste, or delete multiple lines of sequence data (step data) that is entered on the

Fig 16-4

16.5 Sequence

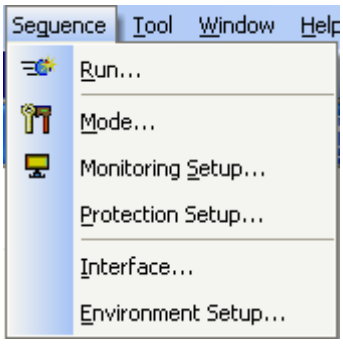


Fig 16-5

16.6 Tool

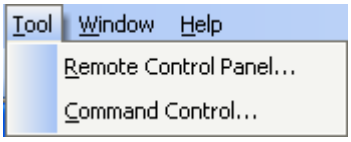


Fig 16-6

16.7 Windows

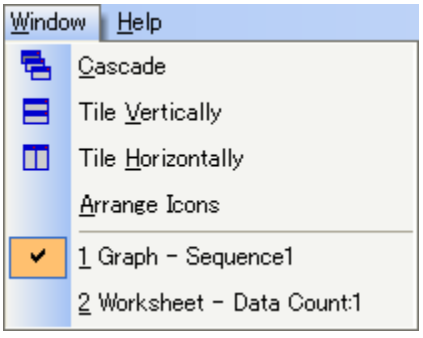


Fig 16-7

17 Toolbar and Status Bar

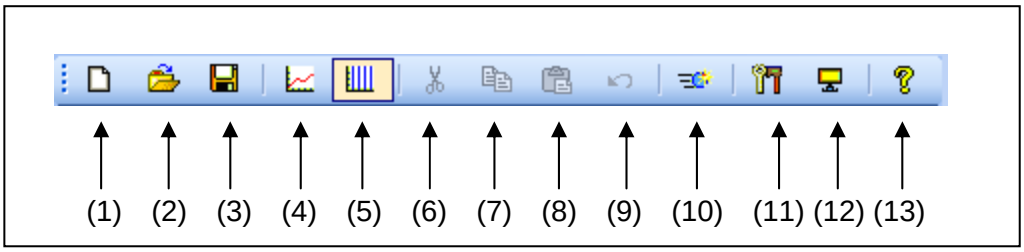


Fig. 17-1 Toolbar

(1) New (Ctrl + N)
(2) Open (Ctrl + O)
(3) Save (Ctrl + S)
(4) Scale
(5) Switch Vertical Line Display
(6) Delete
(7) Copy (C)
(8) Insert (V)
(9) Return (Z)
(10) Run
(11) Mode
(12) Monitoring Setup
(13) About Wavy

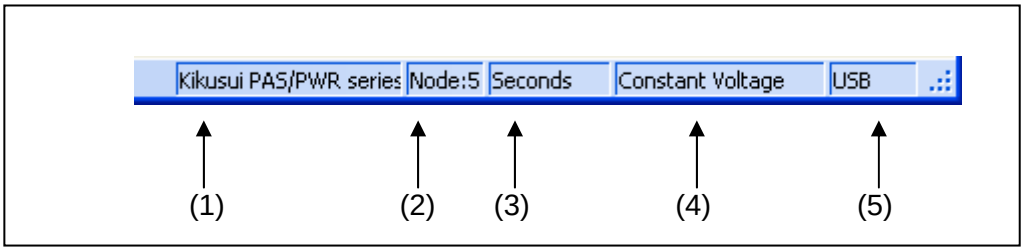


Fig. 17-2 Status Bar

(1) Instrument name
(2) Node address
(3) Time units seconds, minutes, or hours
(4) Operation mode Constant Voltage or Constant Current
(5) Interface RS-232C or GPIB or USB