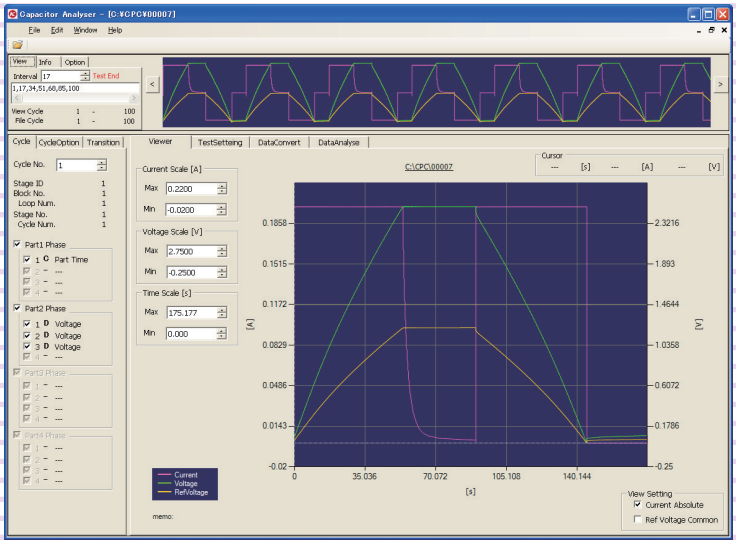
KIKUSUI

IX000503
Apr. 2012

Operation Guide

Application Software

CPChecker2400 Plus
Ver. 3.x



Introduction 3
What Is CPChecker2400 Plus? 4
Opening Files 4
Opening multiple files 5
Parts of the Screen 6
Viewing the Test Overview 7
Viewing a Graph in Units of Cycles 8
Overlaying Graphs on Top of Each Other 9
Analyzing Data 10
Recalculating the initial internal resistance and the internal resistance 10
Viewing transition graphs 12
Printing Graphs 13
Converting Acquired Data into Data in SI Units 14
Viewing Test Conditions 15
Displaying File Details and Configuring the Display Settings 15
Menu Reference 16

About This Manual

This manual is a PDF version of the Operation Guide that you can use to print the entire manual or a portion of it.

■Copyrights

Introduction

This operation guide explains how to analyze the data of a test results file that is acquired using CPChecker2400 (Capacitor Performance Checker for PFX2400).

■Product versions that this guide covers

This operation guide covers CPChecker2400 Plus version 3.x. To check the version, on the Help menu, click About.

■Intended readers of this operation guide

This operation guide is intended for users that will perform capacitor charge and discharge tests through the use of the PFX2400 series capacitor testers. The guide is also intended for instructors that will train such users.

It assumes that the reader has knowledge about the electrical aspects of capacitor charging and discharging.

■Notations used in this manual

- In this manual, the PFX2400 series capacitor testers are sometimes referred to as the "PFX2400 Series" or the "PFX2400."
- The term "PC" is used to refer generally to both personal computers and workstations.
- The following markings are used in the explanations in the text.

⚠CAUTION Indicates a potentially hazardous situation which, if ignored, may result in damage to the product and other property.

NOTE Indicates information that you should know.

What Is CPChecker2400 Plus?

CPChecker2400 Plus is a software application that can be used to convert test data created with CPChecker2400 to graph data. These graphs can be displayed on the screen and printed.

In addition to displaying test data graphs, CPChecker2400 Plus can also be used to display the values of test data, electrostatic capacity and other values calculated from test data,

and test conditions. This makes it possible to analyze data in a variety of ways.

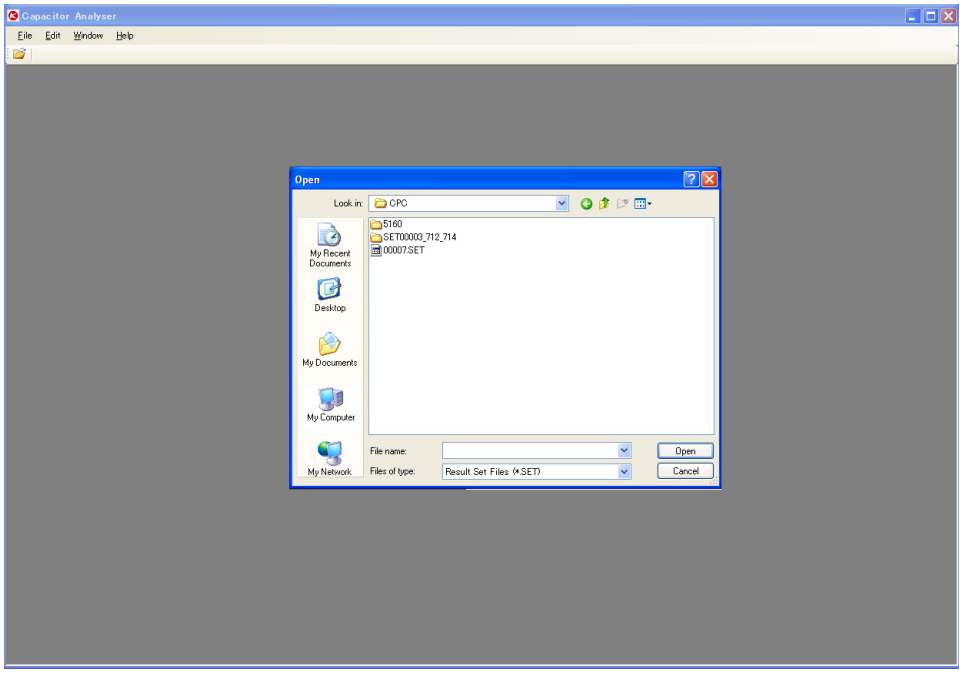
CPChecker2400 Plus can be used to:

- Display graphs of each test cycle and display graphs overlaid on top of each other.
- Display test data acquired by CPChecker2400.
- Display and print transition graphs of all cycles.
- Recalculate the initial internal resistance and internal resistance by changing the calculation conditions.

Opening Files

When you start CPChecker2400Plus, a dialog box for specifying the file that you want to open appears. Select a folder that has the same name as the relevant test condition and then a folder that has the same name as the relevant channel, and then open the file that you want to open.

NOTE Specify a test conditions file (the file extension is .SET), not a data file.

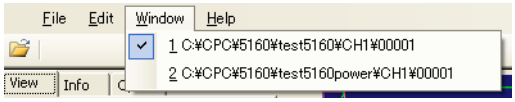


If you close the dialog box, on the File menu, click Open to display the dialog box. You can also click the  icon below the File menu to display the dialog box.

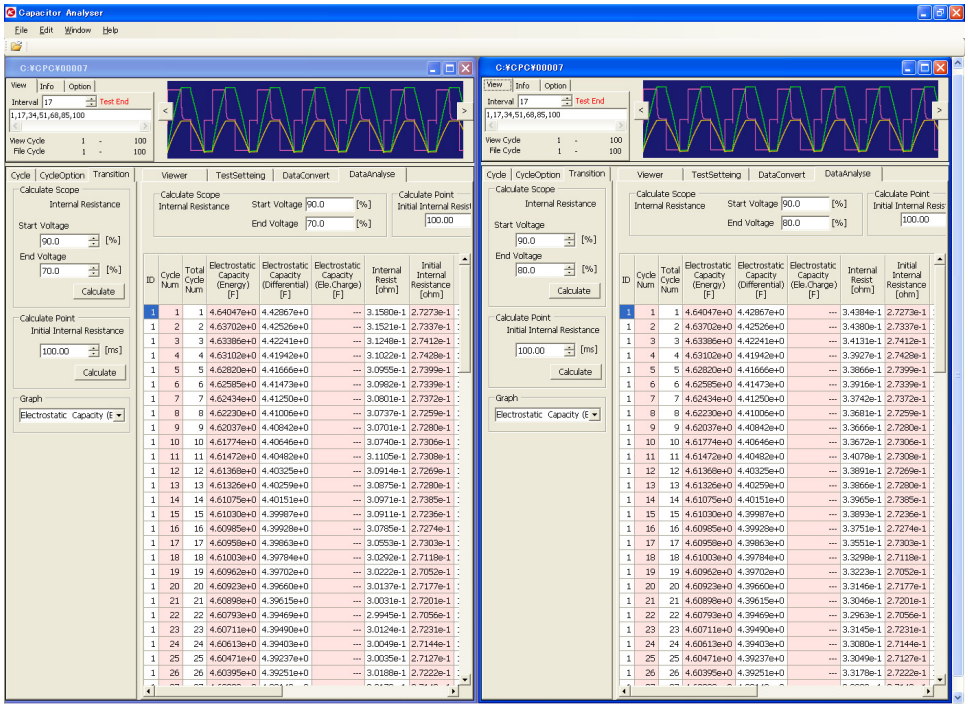
Opening multiple files

You can open multiple files at the same time on the CPChecker2400 Plus. With one or more files already open, on the File menu, click Open to specify the additional file that you want to open.

When multiple files are open, you can select the active window from the Window menu.



You can even open the same file in multiple windows. You can display windows side-by-side to compare the graphs and data of the same file.

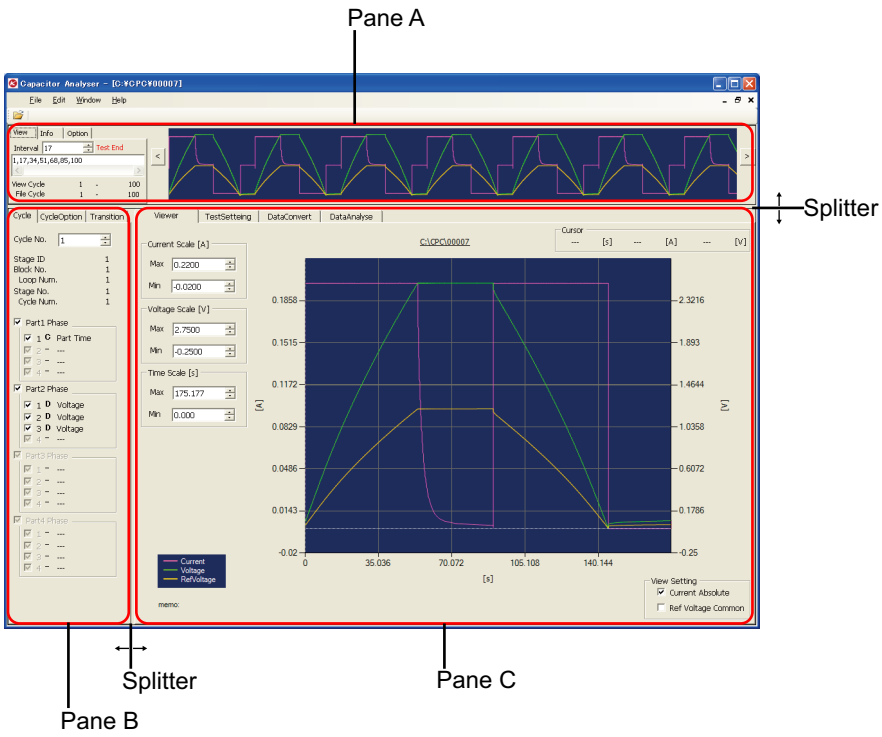


Parts of the Screen

CPChecker2400 Plus contains the following three panes.

Pane A has three tabs and one graph display area. Pane B has three tabs, and pane C has four tabs. CPChecker2400 Plus switches between the tabs in panes B and C according to the selected feature.

You can use the splitters to change the area allotted to each pane.



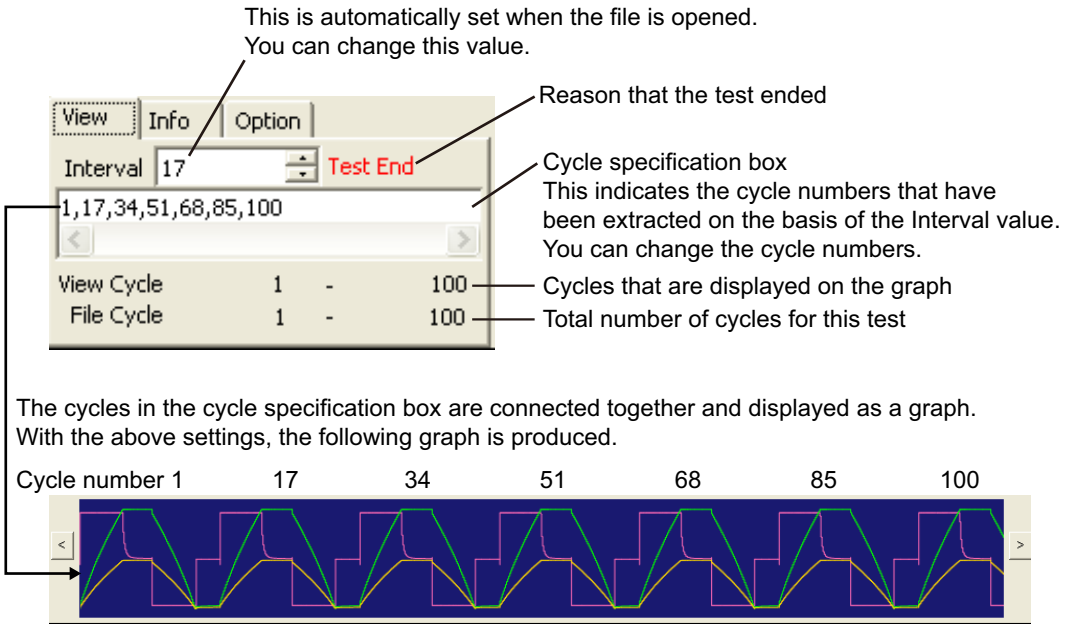
Viewing the Test Overview

The cycles are extracted according to the interval specified by Interval on the View tab in pane A, and then a graph of those cycles connected together is displayed.

When you open a file, CPChecker2400 Plus sets the value of Interval on the basis of the number of cycles in the file's test so that the displayed graph is easy to view.

You can change the default Interval value by entering the new value in the Interval box.

You can also enter the cycle numbers directly in the box that is used to indicate the cycles.

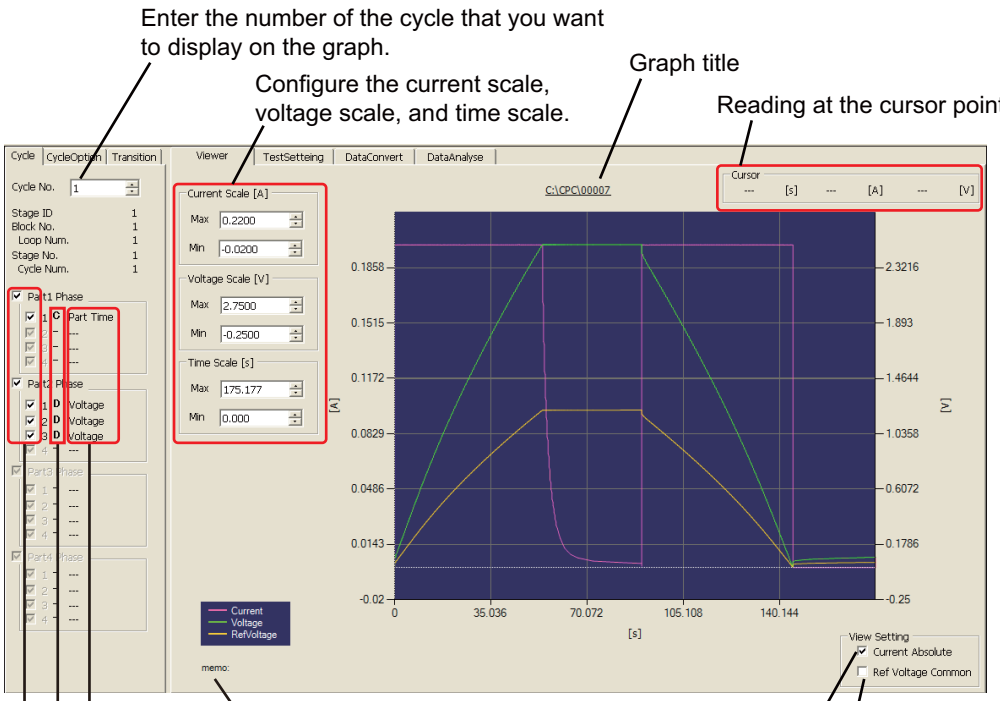


Viewing a Graph in Units of Cycles

To view the charge-discharge graph of a specific cycle, click the Cycle tab in pane B. If the graph is not displayed, click the Viewer tab in pane C.

Use the Cycle No. box to specify the cycle that you want to display.

You can use the Part check boxes to change the conditions that are used to display the graph. For example, you can display a specific part, display only charging, or display only discharging.



See p. 13

You can edit the graph's title and memo.

See p. 13

You can print graphs.

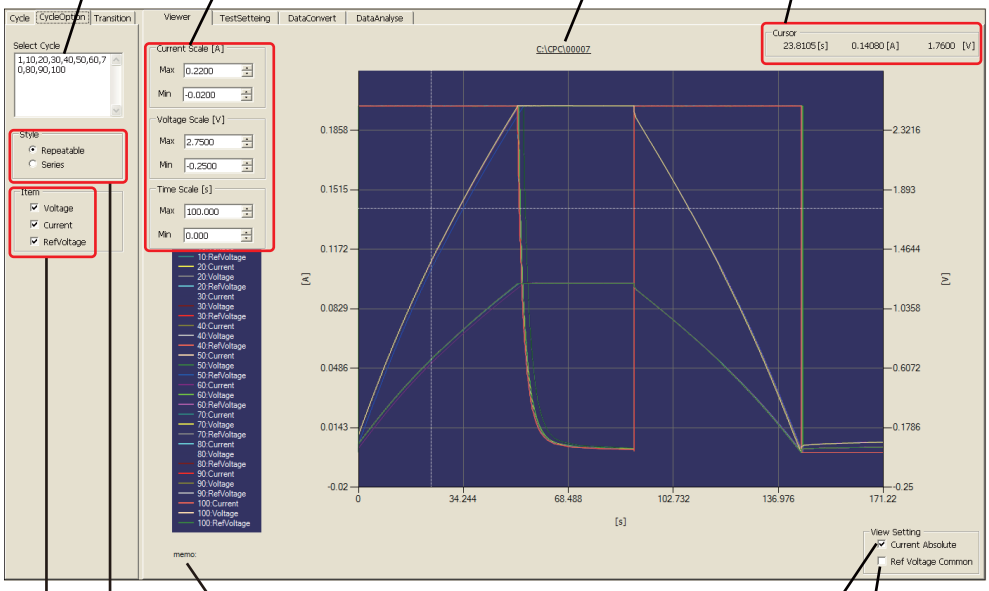
See p. 15

You can select the unit that current is displayed in.

Overlaying Graphs on Top of Each Other

Click the CycleOption tab in pane B.

Enter the cycle numbers that you want to display overlaid on top of each other in the Select Cycle box. By default, this box contains the cycle numbers that were in the cycle specification box in pane A when the file was opened.



You can edit the graph's title and memo.

See p. 13

You can print graphs.

See p. 13

You can select the unit that current is displayed in.

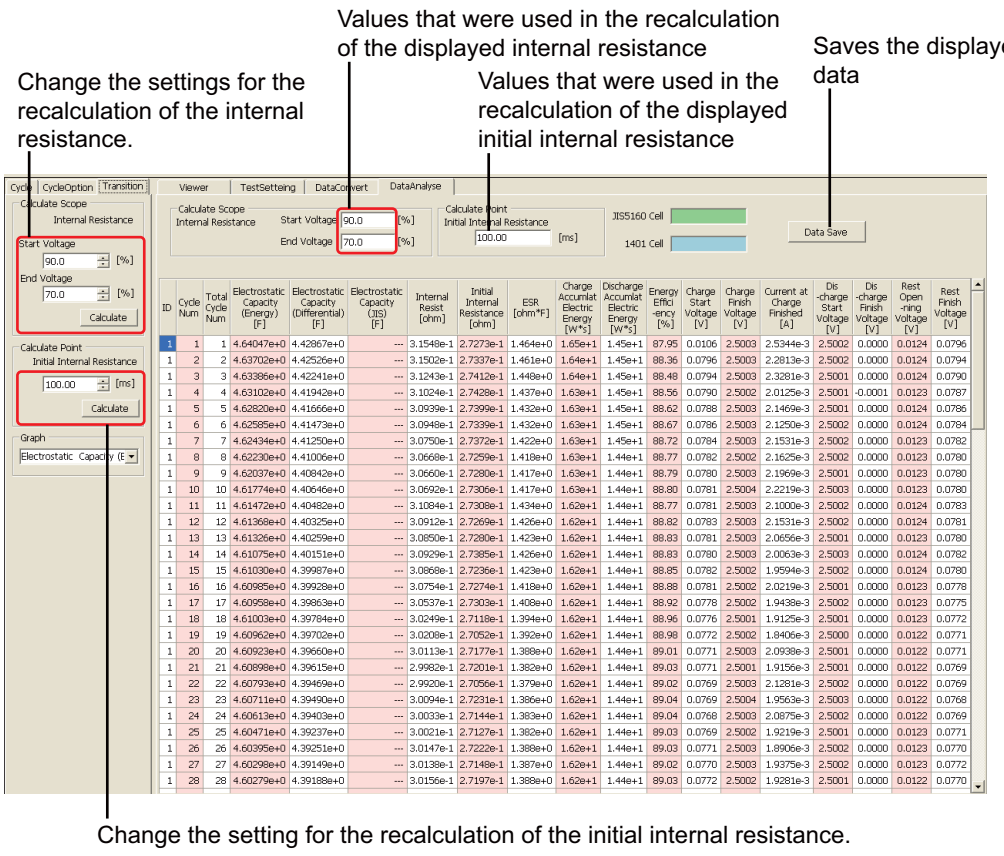
See p. 15

Recalculating the initial internal resistance and the internal resistance

You can use CPChecker2400 Plus to recalculate—from the data acquired by the CPChecker2400—the initial internal resistance and internal resistance by changing the calculation conditions. You can save the results of this recalculation to a file in CSV format.

Click the DataConvert tab in pane C. The Transition tab in pane B will be selected automatically.

NOTE The internal resistance read from the file are values that CPChecker2400 calculated based on setting values during the testing. On other hand, CPChecker2400 Plus calculates the internal resistance based on measured values.
Therefore, the recalculated internal resistance is different from the original values even if the range same as the test condition is specified.



List header
ID
Cycle Num
Total Cycle Num
Electrostatic Capacity (Energy)[1]
Electrostatic Capacity (Differential)[1]

List header
Electrostatic Capacity (JIS)
Internal Resist[1]
Initial Internal Resist[1]
ESR[1]
Charge Accumulated Electric Energy[1]
Discharge Accumulated Electric Energy[1]
Energy Efficiency[1]
Charge Start Voltage
Charge Finish Voltage
Current at Charge Finished
Discharge Start Voltage
Discharge Finish Voltage
Rest Opening Voltage
Rest Finish Voltage
Maintain Voltage Rate[1]
Leak Current[1]
Charge Internal Resistance[1]

[1] For details, refer to the Terminology on the CPChecker2400 Operation Guide.

■Recalculating the internal resistance

The internal resistance is calculated from the data in the specified range starting at the point when discharging begins. Under Calculate Scope in pane B, specify the Start Voltage and End Voltage values—which are used in the internal resistance calculation—as percentages of the discharge start voltage.

Click Calculate to display the result in pane C.

■Recalculating the initial internal resistance

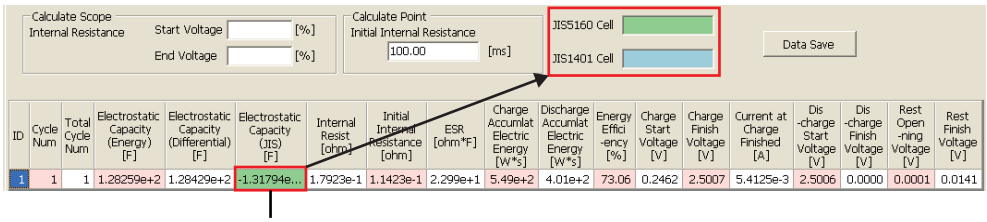
The initial internal resistance is calculated only for 1 ms sampling. The calculation point for the initial internal resistance on CPChecker2400 is fixed to 100 ms. The calculation point can be changed on CPChecker2400 Plus. Use the setting under Calculate Point in pane B to specify the number of calculation points for the initial internal resistance calculation.

Click Calculate to display the result in pane C.

■Data that has been acquired according to the JIS standard

For data that has been acquired according to JIS C 5160 or JIS D 1401, the electrostatic capacity is calculated according to the method described in the JIS standards. The calculated value is displayed under Electrostatic Capacity (JIS) in pane C.

For JIS C 5160 data, the value is displayed in a green cell. For JIS D 1401 data, the value is displayed in a blue cell.



The cell color indicates which JIS standard the data acquisition was based on.

Viewing transition graphs

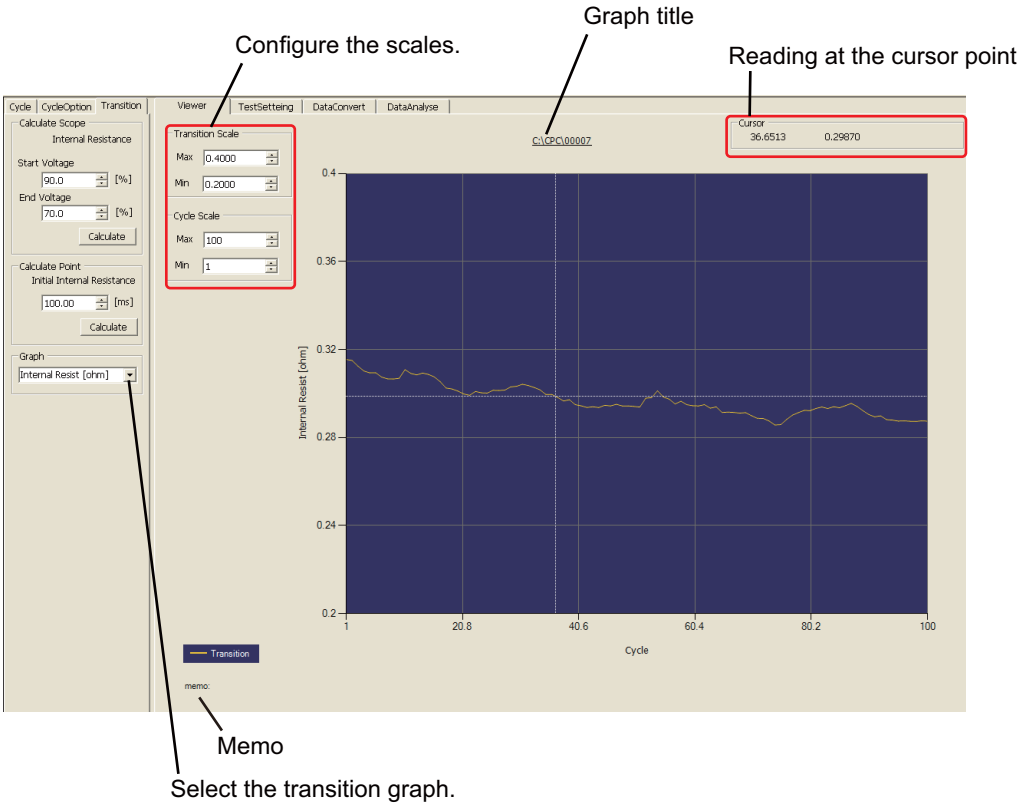
For the following items, you can display in a graph the changes over the range indicated by the specified cycles.

See p. 10

You can recalculate the internal resistance and initial internal resistance and then display these values in a graph.

Item
Electrostatic Capacity (Energy)
Electrostatic Capacity (Differential)
Electrostatic Capacity (JIS)
Internal Resist
Initial Internal Resist
ESR
Charge Accumulated Electric Energy
Discharge Accumulated Electric Energy
Energy Efficiency

Use the Graph list on the Transition tab in pane B to select the item that you want to display the graph of. The Viewer tab in pane C will be selected automatically.



See p. 13

You can edit the graph's title and memo.

See p. 13

You can print graphs.

Printing Graphs

You can print the graph that is displayed in pane C. You can edit the graph's title and memo.

Changing the graph's title

By default, the file path is used as the graph's title.

To change the title, with the graph displayed, on the Edit menu, click GraphTitle. The graph title changes to a text box. Edit the text, and then press Enter to apply the changes.

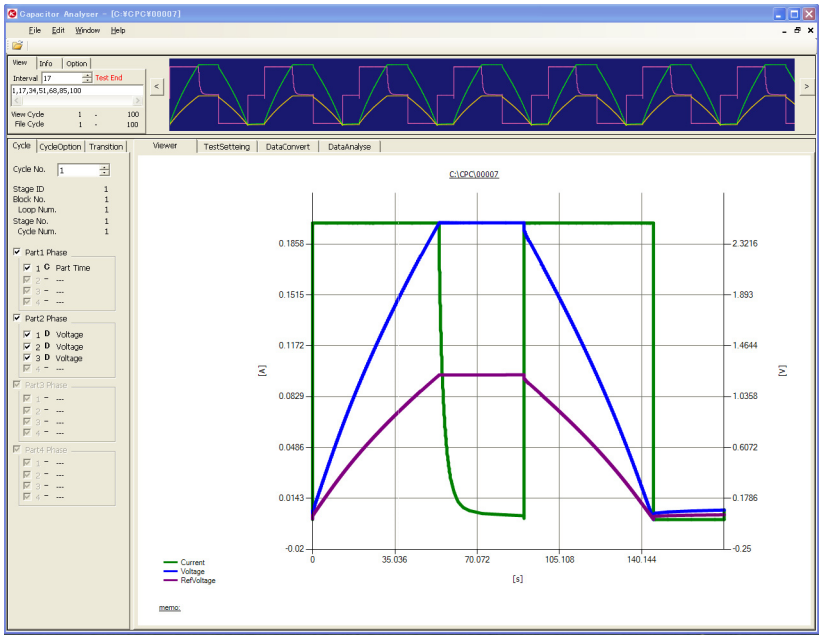
Adding a memo to the graph

You can add a memo to the graph. To add a memo, with the graph displayed, on the Edit menu, click GraphMemo. The graph memo changes to a text box. Edit the text, and then press Enter to apply the changes.

Printing the displayed graph

To print a graph, with the graph displayed, on the File menu, click Print. A print preview will be displayed in Pane C, and the print dialog box will appear. Select the printer, and then start printing.

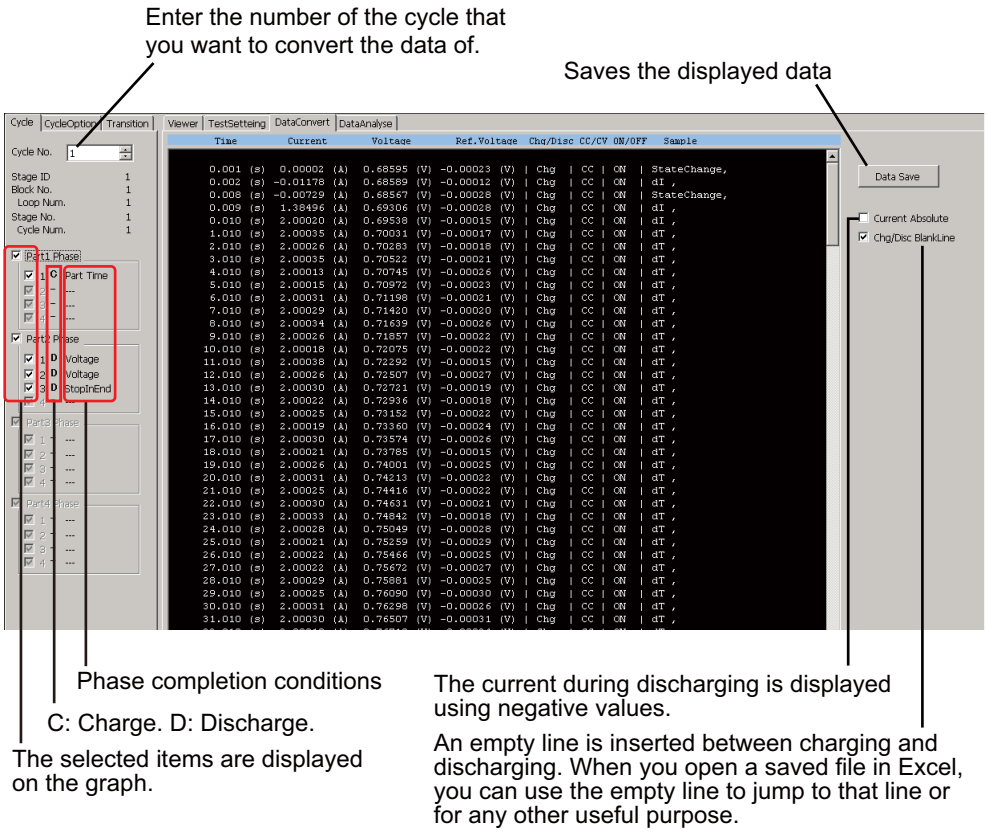
You can also print by clicking PrintPreview on the File menu.



Converting Acquired Data into Data in SI Units

The CPChecker2400 Plus converts graphing data that has been acquired by the CPChecker2400 (current and voltage values) to data in SI units by multiplying each value by a coefficient. You can use the CPChecker2400 Plus to perform this conversion and save the results to a file in CSV format.

Click the DataConvert tab in pane C.



Header	Description
Time	The amount of time that has elapsed since the test started.
Current	If this is a negative value, a negative sign is included.
Voltage	If this is a negative value, a negative sign is included.
Ref. Voltage	Reference electrode voltage. If this is a negative value, a negative sign is included.
Chg/Disc	Test state. Chg: Charging. Disc: Discharging.
CC/CV	Operating mode of the PFX2400. CC: Constant current. CV: Constant voltage.
ON/OFF	State of the connection between the PFX2400 and its load.
Sample	Status change. dV: The data acquisition trigger's ΔV setting has been met. dI: The data acquisition trigger's ΔI setting has been met. dT: The data acquisition trigger's ΔT setting has been met. StateChange: A state change or phase transition such as CC to CV or C to D (charge to discharge) has occurred.

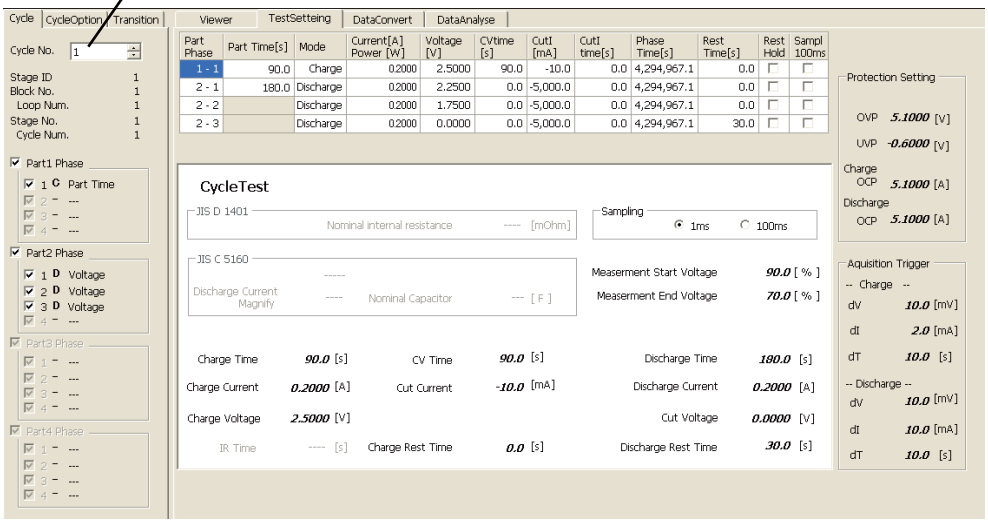
You can select the unit that current is displayed in.

See p. 15

Viewing Test Conditions

You can display the test conditions for the specified cycle. Click the TestSetting tab in pane C.

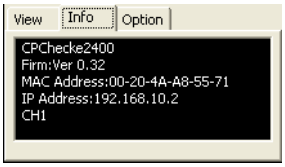
Enter the number of the cycle that you want to display the test conditions of.



Displaying File Details and Configuring the Display Settings

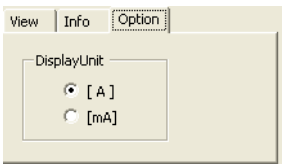
Displaying PFX2400 details

The details of the PFX2400 Series that acquired the data are displayed on the Info tab in pane A.



Selecting the unit that current is displayed in

You can use the Option tab in pane A to select the unit that current in pane C is displayed in.



Menu Reference

Menu		Description
File		
	Open	Opens a file.
	Print	Prints the graph.
	PrintPreview	Shows a preview of the graph that will be printed.
	Exit	Exits CPChecker2400 Plus.
Edit		
	GraphTitle	Edit the graph's title.
	GraphMemo	Edit the graph's memo.
Window		Switch between open windows.
Help		
	Contents J	Opens the CPChecker2400 Plus Japanese Operation Guide.
	Contents E	Opens the CPChecker2400 Plus English Operation Guide.
	About	Shows CPChecker2400 Plus version information.