

Introduction (Test Executive)

This operation guide explains how to use the Test Executive to run tests.

The Test Executive is a program that executes charge/discharge tests in accordance with the test conditions that you created using the Test Condition Editor.

■Product Version Covered

This guide covers Test Executive version 1.x. You can check the version by clicking About SD007-BPC Test Executive on the Help menu.

■Notations used in this manual

- In the interest of brevity, the PFX2512 Charge/Discharge System Controller shall be hereafter referred to as the “PFX2512 Series”.
- The term “PC” is used to refer generally to both personal computers and workstations.

Starting the Test Executive

Before starting the Test Executive, configure the hardware using the IO Config.

When synchronizing with the temperature chamber

Turn on all protocol converters RS485-to-RS232C adapters, and temperature chambers before starting the Test Executive.

Starting the Test Executive

To start the Test Executive, on the taskbar, click Start, All Programs, Kikusui BPChecker3000, and Test Executive.

Before the Test Executive starts, a system and temperature chamber configuration window opens.

You can also configure the settings that you set in this window while the Text Executive is running. To do so, on the select menu, click I/O Configuration.

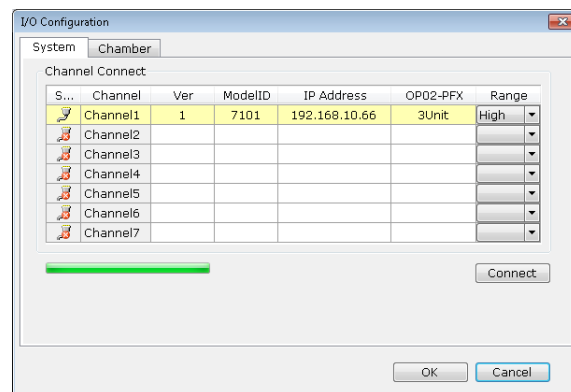
Click OK to start the Test Executive.

System

The present connection status appears.

Set the range.

If the status is not displayed correctly, the connection may be incorrect, or there may be overlapping channels. Connect the PFX2512s correctly, and click Connect. Check that all channels are displayed.

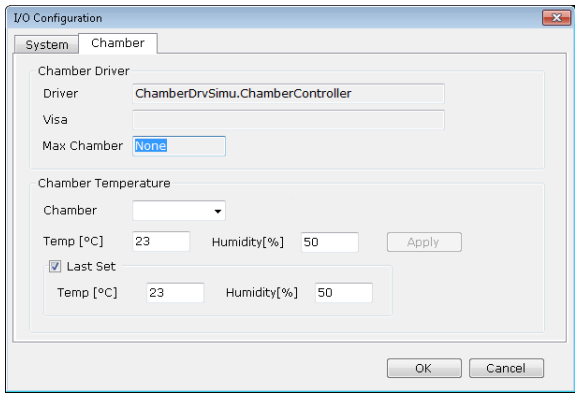


Chamber

The VISA, driver, and maximum chamber settings are displayed (the IO Config is used to configure these settings).

The temperature chamber temperatures are set automatically in accordance with the test conditions. On the Chamber tab, you can manually set the temperature and humidity.

If you enter a temperature chamber temperature, you will be able to manually specify the temperature at the start of a test or while a test is paused.



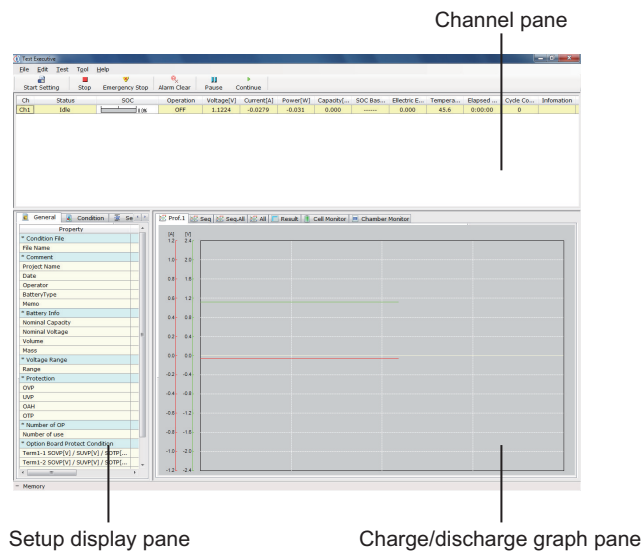
■Chamber Temperature

When you finish configuring the settings, click OK.

| Item | Description |
|----------|---|
| Chamber | Select the temperature chamber that you want to configure. |
| Temp | Set the temperature chamber temperature. |
| Humidity | Set the temperature chamber humidity. |
| Last Set | <p>If you select this check box, the temperature and humidity settings that are applied at the end of the test or when the test is paused are enabled.</p> <p>Set the last temperature and humidity.</p> <ul style="list-style-type: none">• TempSet the temperature for when all the tests are finished.• HumiditySet the humidity for when all the tests are finished. |

Parts of the Screen

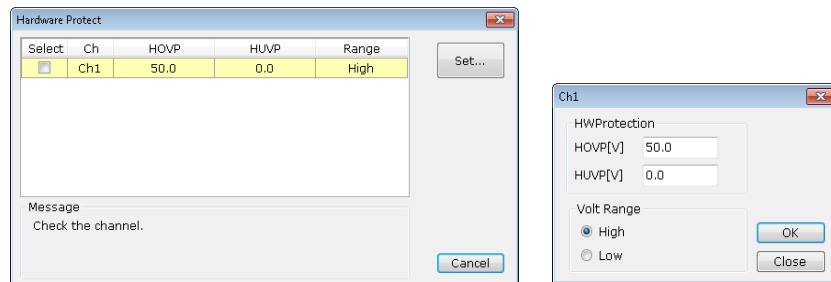
The Test Executive consists of three panes.



| Pane | Description |
|-----------------------------|---|
| Channel pane | Displays all channels and the execution status. |
| Setup display pane | Displays the settings that you have configured using the Test Condition Editor. |
| Charge/discharge graph pane | Displays graphs of measured current and voltage. |

Starting Tests

Configuring hardware protection




The PFX2512 is equipped with circuitry for protecting batteries from overcharging and overdischarging. These protection functions are called HOVP (hardware OVP) and HUVP (hardware UVP) and are separate from the protection settings (OVP and UVP) on BPChecker3000.

A comparator is used at the detection section and the circuit is independent from the internal microcomputer control. The detecting speed is 10 ms (TYP value).

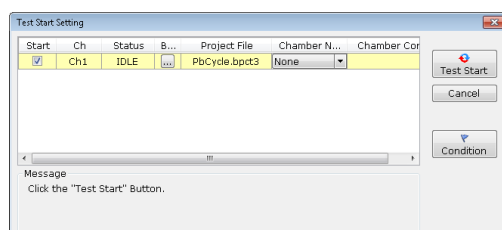
- 1 On the Test menu, click HW Protect.**
- 2 Select the channel that want to set HOVP or HUVP on.**
The input dialog box appears.
- 3 Set the HOVP, HUVP, and Volt Range.**
To cancel, click Close.
- 4 Click OK.**
The internal variable resistors are automatically adjusted.
The HOVP and HUVP settings in the Hardware Protect dialog box display the PFX2512 hardware settings. Check that the settings are correct.


HOVP and HUVP protect the DUT (battery) from overcharging and overdischarging at all times, even when tests are not being executed with BPChecker3000. Set a HOVP that is higher than S_OVP to prevent erroneous operation due to noise and by taking the detection accuracy (± 300 mV) into consideration. Set a HUVP that is lower than S_UVP.

Assigning test conditions

Before starting a test, assign test conditions. Click  Start Setting. Or on the Test menu, click Start Setting to open the Test Start Setting dialog box. Test conditions are assigned at the channel level. You can execute completely different tests on each channel.

■If you are not using temperature chambers

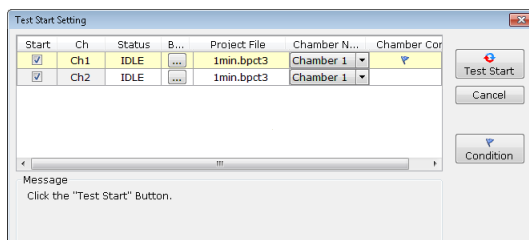


- 1** Select the check boxes for channels that you want to execute tests.
- 2** Click  of a channel that you want to assign test conditions to, and select a test condition file (.BPCT3 extension) that you saved with the Test Condition Editor.
- 3** Check that Chamber Name is set to None.
If not, set it to None. You can now start the test.

■If you are using temperature chambers

To use temperature chambers, specify the Chamber Name.

If you are using a temperature chamber to test multiple channels, select which channel's conditions to use to control the chamber by raising a flag in the Chamber Cond column.



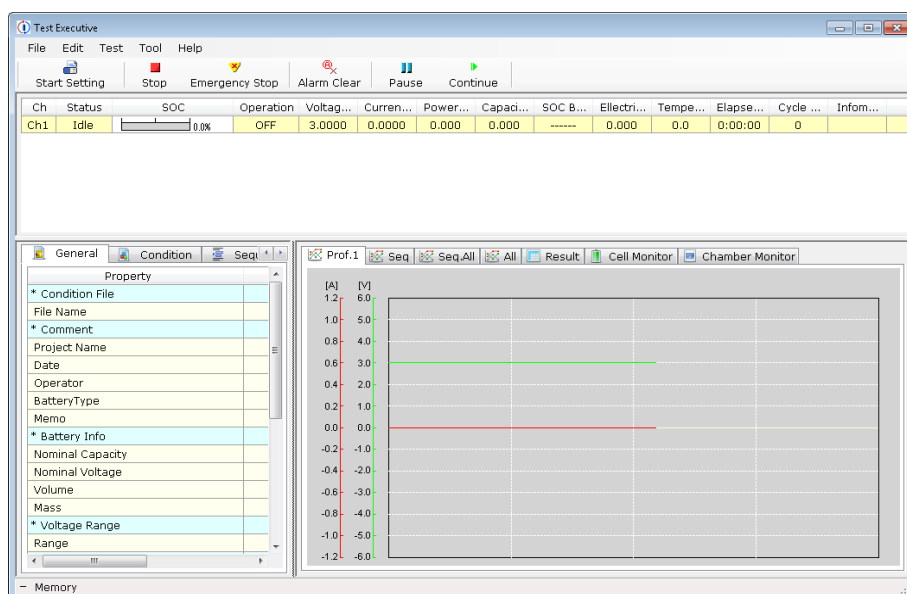
- 1** From the list, select the Chamber Name for testing the channel.
- 2** Click the channel whose temperature chamber conditions will be used, and click Condition.
A flag is raised in the Chamber Cond cell. You can now start the test.

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You can change the temperature chamber conditions during a test.

Starting a test

When you finish assigning test conditions, Test Start becomes available. Click it to start the test.



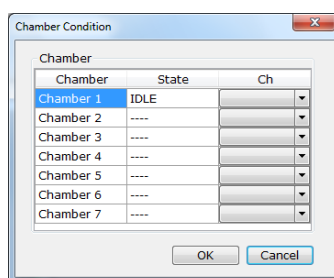
When all the scheduled tests in the project are complete, the test is complete. You can pause and abort a test.

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Changing temperature chamber conditions

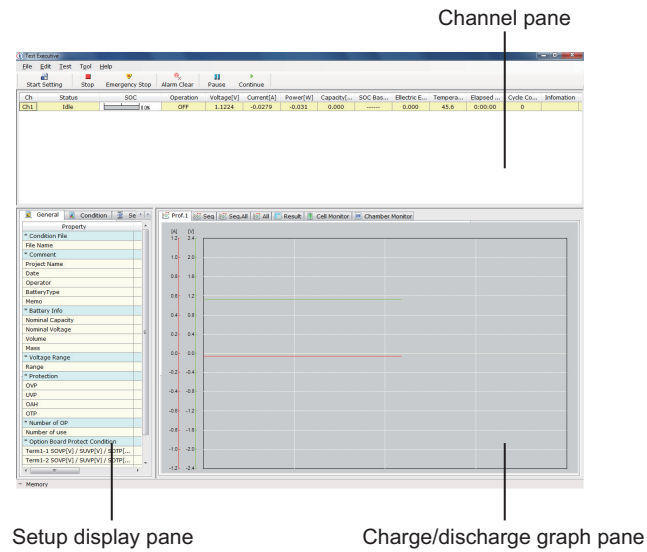
If you are using temperature chambers, you can change the channel whose temperature chamber conditions are being used. When the test of the channel whose temperature chamber conditions are being used finishes before other channels, change the assigned channel.

- 1 On the Test menu, click Chamber.**
The ChangeCondition dialog box opens.



- 2 Select the channel for the temperature chamber that you want to specify.**
- 3 Click OK.**
The temperature chamber condition will be changed.

Screen display



Channel pane

Displays all channels and the execution status. If multiple channels are being tested, the information of the channel selected in the channel pane is displayed in the setup display pane and charge/discharge graph pane.

| Displayed item | Description |
|----------------|---|
| Ch | Displays the channel number. |
| Status | Displays the channel status. |
| SOC | Displays the SOC status. |
| Operation | Displays the present electrical operation (charging, etc.) |
| Voltage | Displays the present voltage measurement. |
| Current | Displays the present current measurement. |
| Power | Displays the present power value. |
| Capacity | Displays the present current capacity measurement. |
| SOC Base | Displays the SOC reference capacity. |
| Electric Enegy | Displays the present electric energy measurement. |
| Temperature | Displays the present DUT (battery) temperature measurement. |
| Elapsed Time | Displays the elapsed time since the test started. During charging, the time since the charging started is displayed. During discharging, the time since the discharging started is displayed. The elapsed time includes the pauses. The display is not reset when test switches to pause mode. This is not the total elapsed time since the start of the first cycle. |
| Cycle Count | Displays the number of cycles since the start of the test. |
| Information | Displays a log of test execution. |

■Selecting a channel

Click a channel that you want to display. The selected channel turns yellow, and the channel settings are displayed in the setup display pane and charge/discharge graph pane.

Setup display pane

Displays the test settings of the channel that is selected in the Channel Pane. This pane consists of four tabs.

| Tab | Description |
|-----------|--|
| General | Displays project settings. |
| Condition | Displays profile settings. Right-click to view settings of other profiles. |
| Sequence | Displays sequence configuration as well as the sequence and profile that are being executed. |
| Link Jump | Displays link and jump configurations. Displays the profile that is being executed with a red frame. |

Charge/discharge graph pane

The charge/discharge graph pane displays graphs of measured current and voltage.

Depending on the test progress, the graph is simplified through data decimation. Use the Graph Viewer to view detailed graphs.

Voltage and current are displayed. This pane consists of seven tabs.

To save graphs, on the Edit menu, click Save Graph.

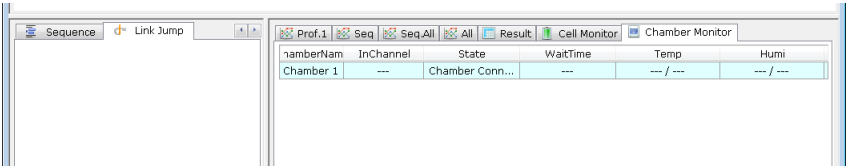
To configure drawing style settings such as the graph's color, line type, and scale, on the Tool menu, click Option, and then click the Graph tab.

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| Tab | Description |
|-----------------|---|
| Prof.1 | Displays a real-time graph of a single profile. You can select scroll display. |
| Seq | Displays a real-time graph of a sequence. It does not include repetitions. If the number of profiles is one, this graph will be the same as the real-time graph of the profile. |
| Seq.All | Displays a real-time graph of all sequences including repetitions. If the number of profile loops is one, this graph will be the same as the sequence real-time graph. |
| All | Displays a real-time graph of the entire project. |
| Result | Displays a summary of charge and discharge results. |
| Cell Monitor | Displays monitored cell voltages and cell temperatures. |
| Chamber Monitor | Displays temperature chamber states. |

■Chamber Monitor

The Chamber Monitor tab displays temperature chamber states.



| Item | Description | | | | | | | | |
|--------------------------|---|------|---|--------------|---|------|--|--------------------------|--|
| Chamber Name | Displays the temperature chamber name. | | | | | | | | |
| InChannel | Displays the channel number. | | | | | | | | |
| State | Displays the temperature chamber state. <table><tr><td>IDLE</td><td>A state in which the temperature chamber has been recognized. The chamber is in this state also during charging and discharging and during a pause.</td></tr><tr><td>TEMP SETTING</td><td>A state from when the temperature is set until the monitored chamber temperature enters within the specified margin. The time it takes for the monitored chamber temperature to enter within the specified margin depends on the chamber performance.</td></tr><tr><td>SYNC</td><td>A state in which the chamber temperature is stable at the specified temperature but the DUT has not yet acclimatized to the temperature. After the wait time elapses, the chamber will transition to the IDLE state.</td></tr><tr><td>Chamber Connection Error</td><td>A state in which the Test Executive cannot communicate with the temperature chamber.</td></tr></table> | IDLE | A state in which the temperature chamber has been recognized. The chamber is in this state also during charging and discharging and during a pause. | TEMP SETTING | A state from when the temperature is set until the monitored chamber temperature enters within the specified margin. The time it takes for the monitored chamber temperature to enter within the specified margin depends on the chamber performance. | SYNC | A state in which the chamber temperature is stable at the specified temperature but the DUT has not yet acclimatized to the temperature. After the wait time elapses, the chamber will transition to the IDLE state. | Chamber Connection Error | A state in which the Test Executive cannot communicate with the temperature chamber. |
| IDLE | A state in which the temperature chamber has been recognized. The chamber is in this state also during charging and discharging and during a pause. | | | | | | | | |
| TEMP SETTING | A state from when the temperature is set until the monitored chamber temperature enters within the specified margin. The time it takes for the monitored chamber temperature to enter within the specified margin depends on the chamber performance. | | | | | | | | |
| SYNC | A state in which the chamber temperature is stable at the specified temperature but the DUT has not yet acclimatized to the temperature. After the wait time elapses, the chamber will transition to the IDLE state. | | | | | | | | |
| Chamber Connection Error | A state in which the Test Executive cannot communicate with the temperature chamber. | | | | | | | | |
| ???Step X | Displays the step number in execution. | | | | | | | | |
| WaitTime | When the chamber state is SYNC, a countdown starts from the specified wait time. | | | | | | | | |
| Temp | Displays the monitored chamber temperature and the specified temperature. | | | | | | | | |
| Humi | Displays the monitored chamber humidity and the specified humidity. | | | | | | | | |


Stopping Tests and Clearing Alarms

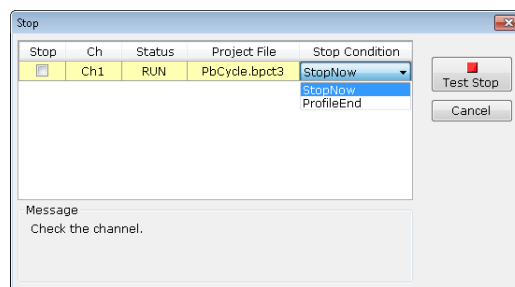
Stopping a test

You can stop a test before all the scheduled tests in the project are complete.
There are three ways to stop a test: stop, pause, or emergency stop.

| Item | Description |
|----------------|---|
| Stop | Stops the test after displaying a stop confirmation dialog box. You can select the channels to stop and the timing. |
| Pause | Pauses the test. You can resume the test from the paused position. |
| Emergency Stop | Immediately stops all charge and discharge operations of all channels. |

Stopping a test

To stop a test in execution, click  Stop. Or on the Test menu, click Stop.
A Stop dialog box appears. Select which channels to stop and when to stop.

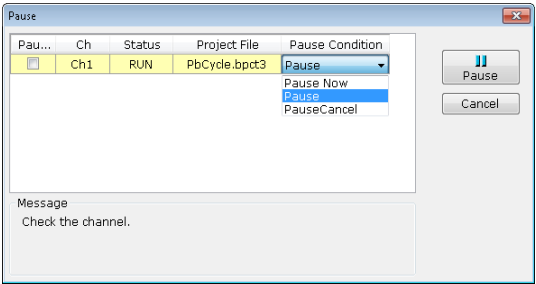


| Stop Condition | Description |
|----------------|--|
| StopNow | Immediately stop the test. |
| ProfileEnd | Stop the test after the profile is complete. |

- 1 Select the check boxes of the channels that you want to stop.**
- 2 Select the Stop Condition for the channels.**
- 3 Click Test Stop.**
The test stops at the specified time.

Pausing a test


To pause a test in execution, click  . Or on the Test menu, click Pause.

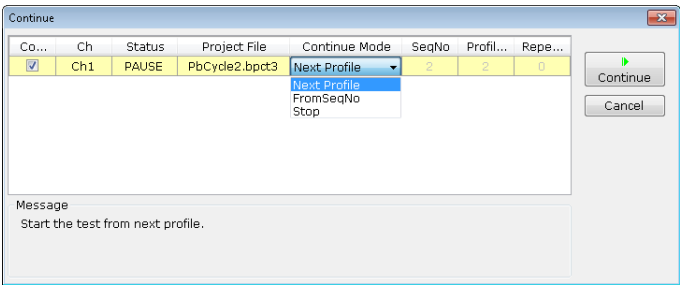


| Pause Condition | Description |
|-----------------|--|
| Pause Now | Immediately pauses the test. |
| Pause | Pauses the test after the profile is complete. |
| PauseCancel | Cancels a pause. |

- 1** Select the check boxes of the channels that you want to pause.
- 2** Select the Pause Condition for the channels.
- 3** Click Pause.
The test pauses at the specified time.

■Resuming a test


To resume tests, click  . Or on the Test menu, click Continue.
You can set resume conditions.



| Continue Mode | Description |
|---------------|---|
| Next Profile | Resumes from the next profile. |
| FromSeqNo | Resumes from the specified profile number, sequence number, and repeat count. |
| Stop | Aborts tests. |

- 1** Select the check boxes of the channels that you want to resume.
- 2** Select the Continue Mode of the channel.
- 3** Click Continue.
The test resumes at the specified time.


Immediately stopping a test (emergency stop)

In an emergency, you can immediately stop all charge and discharge operations. Click  Emergency Stop. Or on the Test menu, click Emergency Stop. The charge and discharge operations of all channels are stopped without a confirmation screen.

Clearing alarms

When alarms occur during a test, relevant channels are automatically stopped on the charge/discharge power supply side.

You can view the channels on which alarms occurred in the channel pane.

Click  Alarm Clear to clear the alarms of all channels. Or on the Test menu, click Alarm Clear.

If you do not eliminate the root causes of the alarms, the alarms will reoccur when you restart the test.

Data Files That Are Saved

BPChecker3000 creates a folder with the same name as the test condition file in the same folder as the test condition file.

In this folder, BPChecker3000 creates CHxx_date folders for each channel on which a test was executed. In the CHxx_date folders, the following files will be created.

- Life graph data file (test condition file name.BPCL3)
- Life graph temporary file (B3k.index)
- C/D graph display data files
(CYCLEx_CHG.BPCG3, CYCLEx_DIS.BPCG3, CYCLEx_PAT.BPCG3, CYCLEx_I_V.BPCG3)
- C/D graph data files
(CYCLEx_CHG.txt, CYCLEx_DIS.txt, CYCLEx_PAT.txt, CYCLEx_I_V.txt)
- C/D graph high-speed sampling data
(CYCLEx_CHGhs.txt, CYCLEx_DIShs.txt, CYCLEx_PATHs.txt, CYCLEx_I_Vhs.txt)
- Life graph internal data (PRO_x_x.PROALL, SEQ_x.SEQALL)
- Result data file (Resultx.mdb)

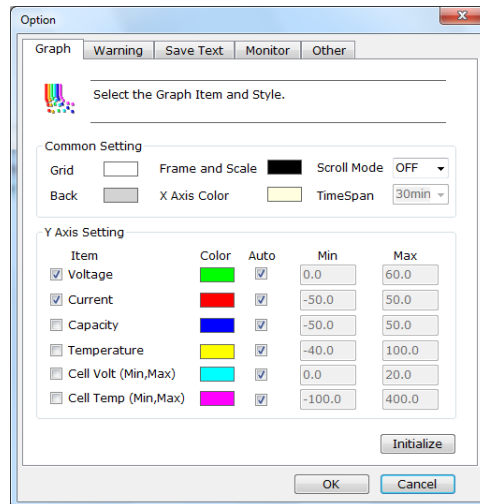
Other Settings

Option settings

Set the graph color, how the temperature chambers respond when alarms occur, text save options, and maximum channel number. On the Tool menu, click Option.

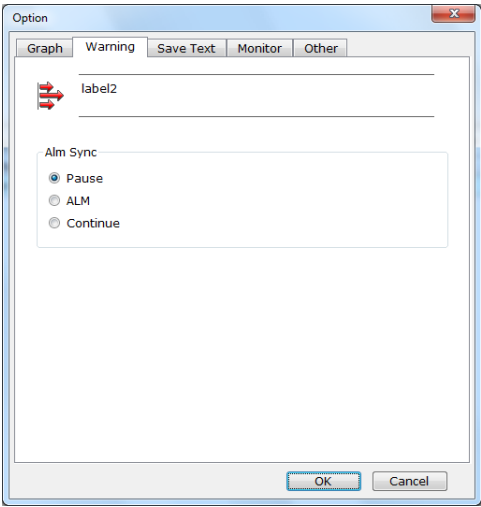
■ Graph tab

Set the graph items to display and drawing style. The settings apply to all channels.



■Warning tab

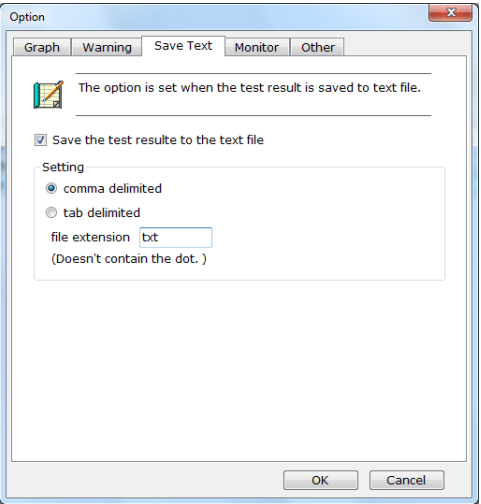
When an alarm occurs in a test that uses temperature chambers, set how the other channels in the same chamber will respond to the alarm.



| Alm Sync | Description |
|----------|---|
| Pause | When an alarm occurs, the tests of other channels in the same temperature chamber will stop immediately. |
| ALM | When an alarm occurs, the tests of other channels in the same temperature chamber will stop after finishing the profile in execution. |
| Continue | When an alarm occurs, the tests of other channels in the same temperature chamber will continue with their tests. When the channel in which the alarm occurred is assigned to be the priority channel of a chamber, the priority must be changed. |

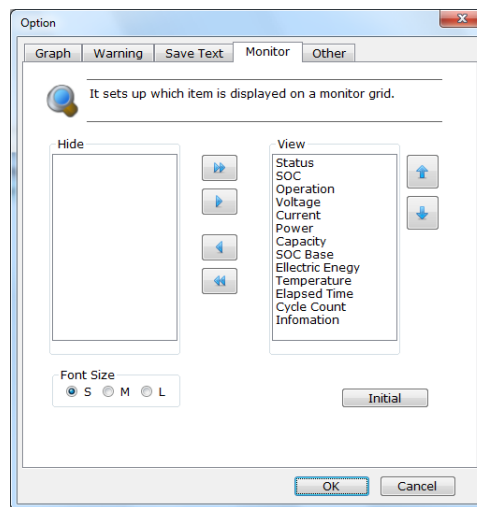
■Save Text tab

Set the options for saving C/D graph data to text files.



■ Monitor tab

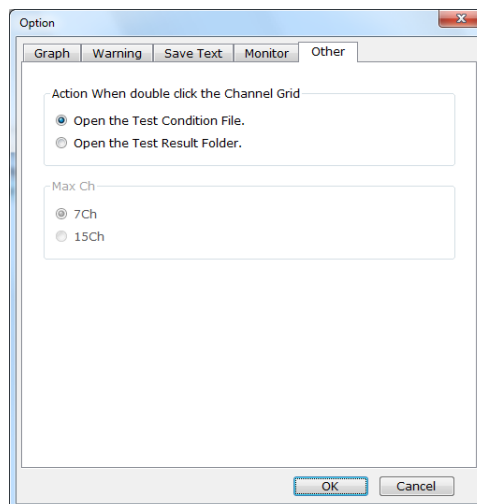
Set the items to display in the channel pane. You can set the font size.



■ Other tab

Set the response when the channel grid is double-clicked.

The Max Ch setting is a custom order feature. It is not available with this product.

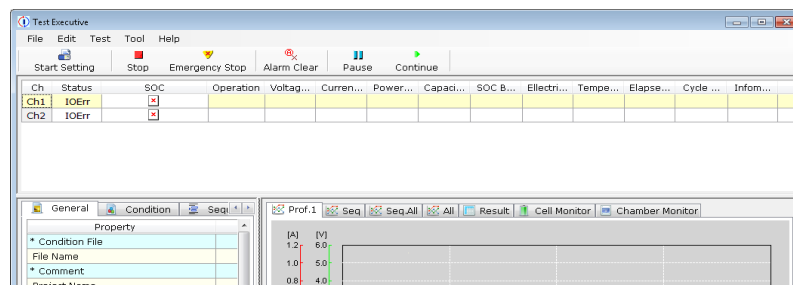


Recovery after Power Failures

Describes the behavior of the charge/discharge test system when a power failure occurs while using the system. The followings are described for each section of the system, the Host PC, the Control Unit, and other Charge/Discharge Units.

When a Power Failure Occurs on the Charge/Discharge Unit

If a power failure occurs on the charge/discharge unit while the host PC is running normally, the behavior of the Test Executive varies depending on the operation status of the charge/discharge unit. The operation status of the charge/discharge unit is indicated on the Channel Pane.



When a power failure occurs on a charge/discharge unit in RUN status

If a power failure occurs on a channel, the Test Executive will detect a communication error within approximately 10 s. The Status corresponding to the channel changes to an IOErr. (This is the same if the power failure recovers within 10 s.)

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1 After the power failure recovers (or after turning on the power), reset the alarm.

After the alarm is reset, the status of the corresponding channel changes to an IDLE.

2 Restart the test.

The test is executed from the start of the profile that was being executed when the power failure was detected.

When a power failure occurs on a charge/discharge unit in IDLE or Finish status

The Status corresponding to the channel changes to an IOErr.

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After the power failure recovers (or after turning on the power), on the Tool menu, click I/O Configuration. Then, click Connect. The relevant channel will return to IDLE status.

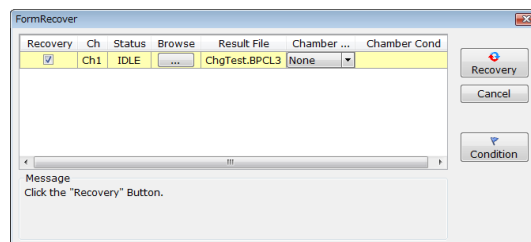
When a Power Failure Occurs on the Host PC

If a charge/discharge unit executing a test exists when the power failure occurs

The unit executing the test continues the test until the phase (charge or discharge) that was running at the time of the power failure is finished. If the unit is charging, the test continues until the end of charge rest.

1 Restart the PC and restart the Test Executive

The FormRecover dialog box appears.



2 Select the channel that you want to recover.

The selected channel will switch to PAUSE status.

3 Click Recovery.

4 Restart the test.

The test starts from the beginning of the next profile (the profile that was being tested when the power failure occurred) or the specified profile.

If a charge/discharge unit that is not executing a test exists when the power failure occurs

All units recover to the status that they were in when the power failure occurred.

When a Power Failure Occurs on Both the Charge/Discharge Unit and PC

Immediately after the power to the hardware recovers, all charge/discharge power supply units enter the STANDBY status.

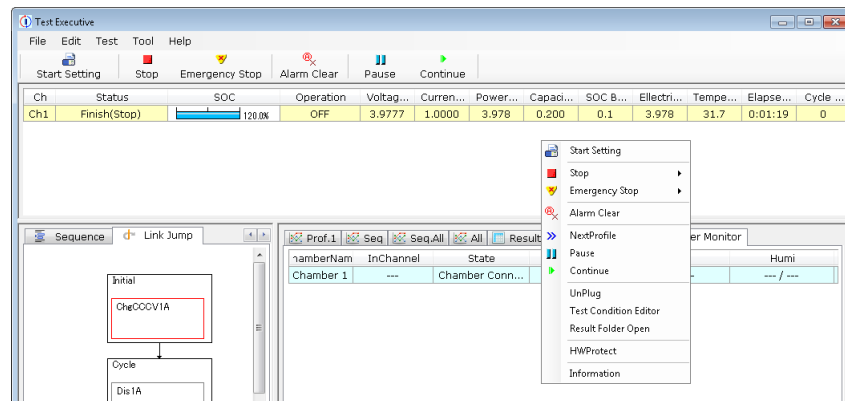
When you start the Test Executive, the Test Executive recovers the charge/discharge power supply units to the status that they were in when the power failure occurred.

Closing the Test Executive

When all the scheduled tests in accordance with the test conditions are complete, the test is complete.

Release all connected channels before closing the Test Executive.

- 1 Right-click the channel pane, and click Unplug.**
All connected channels will be released.



- 2 On the File menu, click Exit to close the Test Executive.**

Menu Reference

| Menu | | Description |
|------|--------------------------------|---|
| File | Exit | Closes the Test Executive. |
| Edit | Save Graph | Saves graphs to files. |
| Test | Start Setting | Starts tests. |
| | Stop | Stops tests. |
| | Emergency Stop | Immediately stops tests (emergency stop). |
| | Alarm Clear | Clears alarms. |
| | Pause | Pauses tests. |
| | Continue | Resumes paused tests. |
| | Chamber | Change the chamber priority channel. |
| | HW Protect | Configure hardware protection. |
| Tool | Option | Set options. |
| | Recovery | Recovers from a power failure. |
| | I/O Configuration | Configure system and temperature chamber settings. |
| | CAN configuration | Not available on this product (custom order feature). |
| Help | About SD007-BPC Test Executive | Displays the Test Executive information. |
| | Help | Displays a help file. |