# Battery Tester
# PFX2000 Series Basic Package

Best suited for the evaluation on secondary batteries
5V/5A, 25 W×2 channels(PFX2011 Basic Package)
20V/10A, 200 W×1 channel(PFX2021 Basic Package)

KIKUSUI

Point 1

## All-in-one package!

This all-in-one package includes the necessary and convenient application software, load cable with alligator clips for connecting to the test material and everything you need to begin.

Point 2

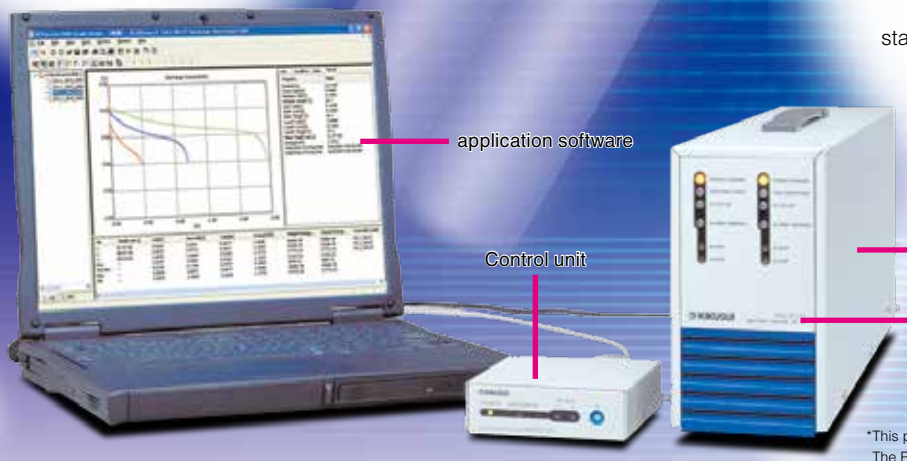
## Dependable safety!

Equips various protections such as OVP, UVP, OHP, OTP, etc to prevent the batteries from being damaged by a system mulfunction or operation mistake.

Point 3

## High cost - performance!

Realizes high-accuracy and high-stability testing for 1ch and 2ch battery tests at an affordable price.




*This photo shows an example of the PFX2011 package. The PC is not included.

# Battery Tester Basic Package
# PFX2000 SERIES
# Basic Package

<Lineup>
- PFX2011 Basic Package [5V-5A/2ch]
- PFX2021 Basic Package [20V-10A/1ch]

<Package contents>

■ Charging/discharging power unit (PFX2011 or 2021) ■ Control unit ■ Unique single-unit frame ■ Unique application software ■ Load cable for test material connection (with alligator clips)

*PC is not included. The specifications of the unique application software that is provided with this product (BPChecker2000 BASIC Edition) are limited to 2-channel operation. The impedance measurement unit cannot be connected. The other specifications are all the same as the BPChecker2000 FULL Edition application software (SD002).

**Examples of applications**

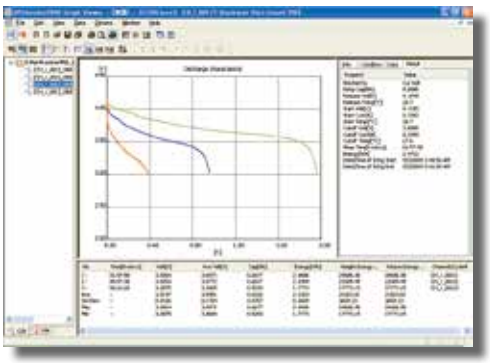

With the PFX2000 Series Basic Package and a Windows PC, you can begin battery testing including PASS/NG tests, lifetime diagnosis (deterioration tests) and comparison tests. The PFX2000 Series is a high-performance battery testing system that is used by battery manufacturers.
This package is all that is needed to perform high-accuracy, high-stability testing that meets the strict needs of battery manufacturers.
PFX2011 is suitable for characteristic evaluation for single cell batteries and mobile phones.
PFX2021 is ideal for characteristic evaluation for laptop PC, digital cameras, etc.

## Application Software

Application software, BPChecker2000 provides centralized management including setting of test conditions, test execution and analysis of results.

It also allows external control of a thermostatic chamber (product of Espec Corp.) via GPIB or RS232C communications, and it is capable of synchronized test with the chamber temperature.

Recommended operating environment : CPU: Pentium IV 1 GHz or higher / Memory: Minimum 512 MB / Windows 2000 (SP4 + Update Rollup1), XP (SP2 or later, x86), Vista (x86, x64) / USB interface (For thermostatic chamber control, GPIB or RS232C is also required.)



▲ Example of screen display: The charging (discharging, charging + discharging) curve can be overlaid on the display. The average, standard deviation, maximum value and minimum value for the overlaid data can also be calculated for data analysis.

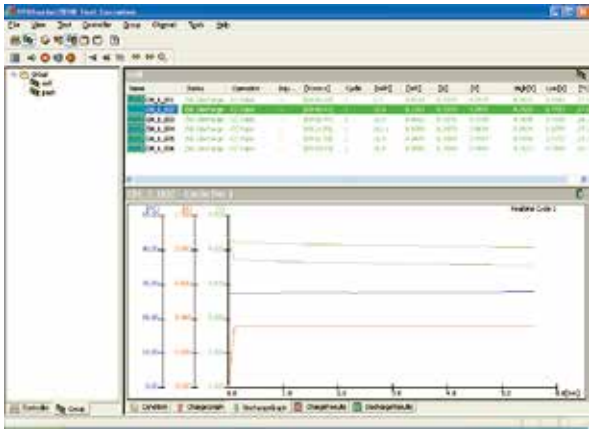
# The entire operation can be managed by the application software (standard accessory)


The “BPChecker 2000 Basic Edition”, a standard accessory, can manage the entire operation from the setting of the test conditions, the execution of the test, and analyzing the test result files. This software can controll the thermostatic chambers (manufactured by ESPEC) and also applies to the synchronized test with the thermostatic chambers.

The recommended operating environment : CPU: Pentium IV 1GHz or higher / Memory 512 MB or more / Windows 2000 Professional (SP4 + Update Roll up1), Windows XP (SP2 or later with Intel x86) or Windows Vista (Intel x86,x64) / USB interface (GPIB or RS232C interface is required for controlling the thermostatic chamber)

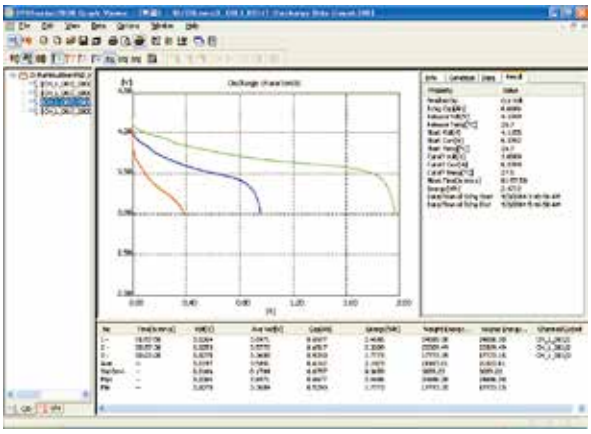
## Test Executive

This application controls the execution of the test. It starts and stops the test and monitors the test execution. It provides a real-time graphical representation of the per-channel charging/discharging trends.



## Graph Viewer

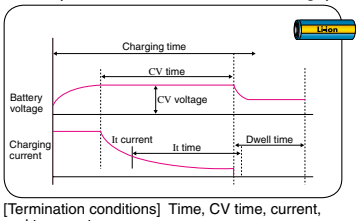
This application offers graphical representations of the charging/discharging data for each cycle. It can display up to 99 sets of data overlaid one another in a single graph and perform statistical processing.



▲ The figure shows the overlapped graph of charging curve (discharge, charge + discharge), it is also capable of calculating the average, standard deviation, max or min value, and the data analysis.

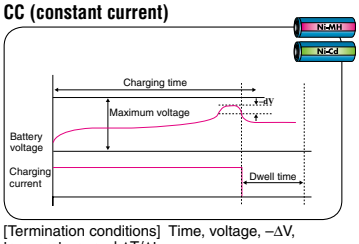
## Conceptual Diagrams of Charging Mode Operation

### CC-CV (constant current-constant voltage)



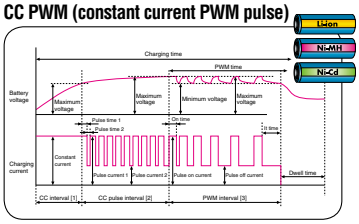

[Termination conditions] Time, CV time, current, and temperature

### CC (constant current)




[Termination conditions] Time, voltage, –ΔV, temperature, and ΔT/Δt

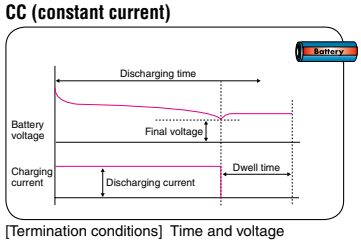
### CC PWM (constant current PWM pulse)




[Termination conditions] Time and off time

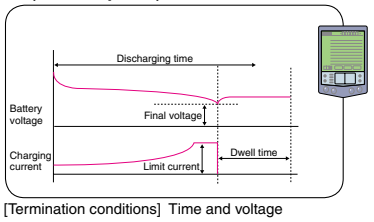
## Conceptual Diagrams of Discharging Mode Operation

### CC (constant current)



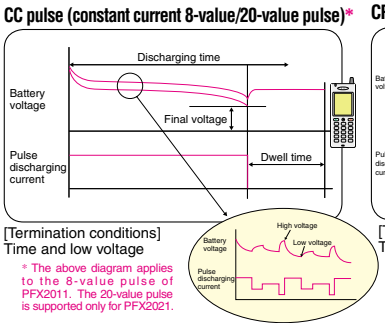

[Termination conditions] Time and voltage

### CP (constant power)




[Termination conditions] Time and voltage

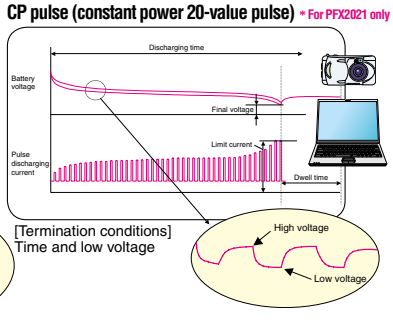
### CC pulse (constant current 8-value/20-value pulse)*




[Termination conditions] Time and low voltage

* The above diagram applies to the 8-value pulse of PFX2011. The 20-value pulse is supported only for PFX2021.

### CP pulse (constant power 20-value pulse) * For PFX2021 only




[Termination conditions] Time and low voltage

# Function specifications

| | PFX2011 | PFX2021 |
|---|---|---|
| **Charging functions** | | |
| Static | Constant current - constant voltage (CC-CV), constant current (CC) | |
| Pulse | PWMpulse (CC-PWM) | |
| **Discharge functions** | | |
| Static | Constant current (CC), constant power (CP) | |
| Pulse | Constant current pulse (CC Pulse) | |
| | – | Constant power pulse (CP Pulse) |

| | PFX2011 | PFX2021 |
|---|---|---|
| **Measurement functions** | | |
| Static | Battery voltage, charging/discharging current, battery temp., capacity, time | |
| Pulse | Battery voltage, pulse battery voltage (Peak Point, Multi Point), pulse charging/discharging current, battery temp., capacity, time | |
| **Protection functions** | | |
| | Overvoltage (overcharge) protection: Software OVP, hardware OVP | |
| | Undervoltage (overdischarge) protection: Software UVP, hardware UVP | |
| | Overcharge capacity protection (OAH) | |
| | Test material overheat protection (OTP) | |
| | Test material (battery) connection error | |
| | Watchdog timer | |

# Electrical specifications

| | | PFX2011 | PFX2021 |
|---|---|---|---|
| **Rated output** | | | |
| No. of outputs | | 2 | 1 |
| Charging current range | | 0.0mA to 5000.0mA (High range)<br>0.00mA to 500.00mA (Low range) | 0mA to 10000mA |
| Charging voltage range | | 0.0001 to 5.0000V | 0.000 to 20.000V |
| Discharging current range | | 0.0mA to 5000.0mA (High range)<br>0.00mA to 500.00mA (Low range) | 0mA to 10000mA |
| Discharging voltage range | | -0.5000V to 5.0000V | -2.000V to 20.000V |
| Maximum charging/ discharging power | | 25W | 200W |
| **Accuracy of settings** | | | |
| Constant current charging/ discharging | Range | 0.0mA to 5000.0mA (High range)<br>0.0mA to 500.00mA (Low range) | 0mA to 10000mA |
| | Accuracy*1 | ± (0.05% +1.0mA) (High range)<br>± (0.05% + 0.10mA) (Low range) | ± (0.15% + 2.0mA) |
| | Resolution | 0.1mA (High range),<br>0.01mA (Low range) | 1mA |
| | Ripple*2 | 1mArms (High/low range) | 3mArms |
| Constant voltage charging | Range | 0.0000mV to 5000.0mV | 0.000V to 20.000V |
| | Accuracy*3 | ± (0.03% + 1.0mV) | ± (0.10% + 3.0mV) |
| | Resolution | 0.1mV | 1mV |
| | Ripple*2 | 2mVrms | 5mVrms |
| Constant power discharging | Range | 0.01W to 25.00W (High range)<br>0.001W to 2.500W (Low range) | 0.02W to 200.00W |
| | Accuracy*4 | ± (0.10% + 10.0mW) (High range)<br>± (0.10% + 2.0mW) (Low range) | ± (0.50% + 20.0mW) |
| | Resolution*5 | 10mW (High range)<br>1mW (Low range) | 10mW |
| Pulse | Range | 0.0mA to 5000.0mA (High range)<br>0.0mA to 500.00mA (Low range) | 0mA to 10000mA |
| Constant current discharging | Resolution | 0.1mA (High range)<br>0.01mA (Low range) | 1mA |
| | Accuracy*1 | ± (0.07% + 1.0mA) (High range)<br>± (0.07% + 0.10mA) (Low range) | ± (0.15% + 3mA) |
| | No. of settings | 8-value | 20-value |
| | Response *6 | 50µs (TYP) | 70µs (TYP) |
| Pulse time interval | Range*7 | 0.50ms to 65000.00msec | |
| | Resolution | 10µs | |
| | Accuracy | ± (0.05% + 0.05ms) | |

| | | PFX2011 | PFX2021 |
|---|---|---|---|
| **Measurement accuracy** | | | |
| Current measurement | Range | 0.0mA to 5000.0mA (High range)<br>0.00mA to 500.00mA (Low range) | 0.0mA to 10000.0mA |
| | Accuracy*8 | ± (0.04% + 0.8mA) (High range)<br>± (0.04% + 0.08mA) (Low range) | ± (0.15% + 1.5mA) |
| | Resolution | 0.1mA (High range)<br>0.01mA (Low range) | 0.1mA |
| Voltage measurement | Range | -0.5000V to 5.0000V | -2.0000V to 20.0000V |
| | Accuracy*8 | ± (0.02% + 1.0mV) | ± (0.10% + 2.0mV) |
| | Resolution | 0.1mV | |
| Pulse charging/ discharging current | Measured value*9 | Average current | |
| | Range | 0.0mA to 5000.0mA (High range)<br>0.00mA to 500.00mA (Low range) | 0.0mA to 10000.0mA |
| | Accuracy | ± (0.10% + 1.0mA) (High range)<br>± (0.10% + 0.10mA) (Low range) | ± (0.20% + 3.0mA) |
| | Resolution | 0.1mA (High range)<br>0.01mA (Low range) | 0.1mA |
| Pulse battery voltage | Measurement points | High/low, any point | |
| | Range | -0.5000V to 5.0000V | -2.0000V to 20.0000V |
| | Accuracy | ± (0.05% + 1.0mV) | ± (0.15% + 2.0mV) |
| **General** | | | |
| Input power | | AC100V 50/60Hz | |
| Power consumption (per unit) | At rated output | 300VA MAX | 800VA MAX |
| | With no load | 60VA MAX | 50VA MAX |
| External dimensions (largest part) | | 85.5W x 177H x 523 (560) Dmm | |
| Weight | | Approx. 4kg | Approx. 4.5 kg |

*1: Relative to the current setting, within the rated range
*2: Maximum value, at 10 Hz to 500 kHz
*3: Relative to set voltage, within rated range
*4: Relative to set voltage,at battery voltage 0.5V or higher (PFX2011) or 2V or higher (PFX2021)
*5: Voltage operation range (guaranteed values) for constant power discharge = 0.5V to 5V (PFX2011) or 2V to 20V (PFX2021)
*6: At 10% to 90% of the pulse current waveform when a rated current is set.Short-circuited at the end of a 7 m load cable.
*7: The pulse time interval is measured from the half-value of the pulse.
*8: Relative to the measured value, within the rated range
*9: Measures the average current for each 500 ms.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Printed in Japan

Issue:Feb.2011 201102pdf EC21