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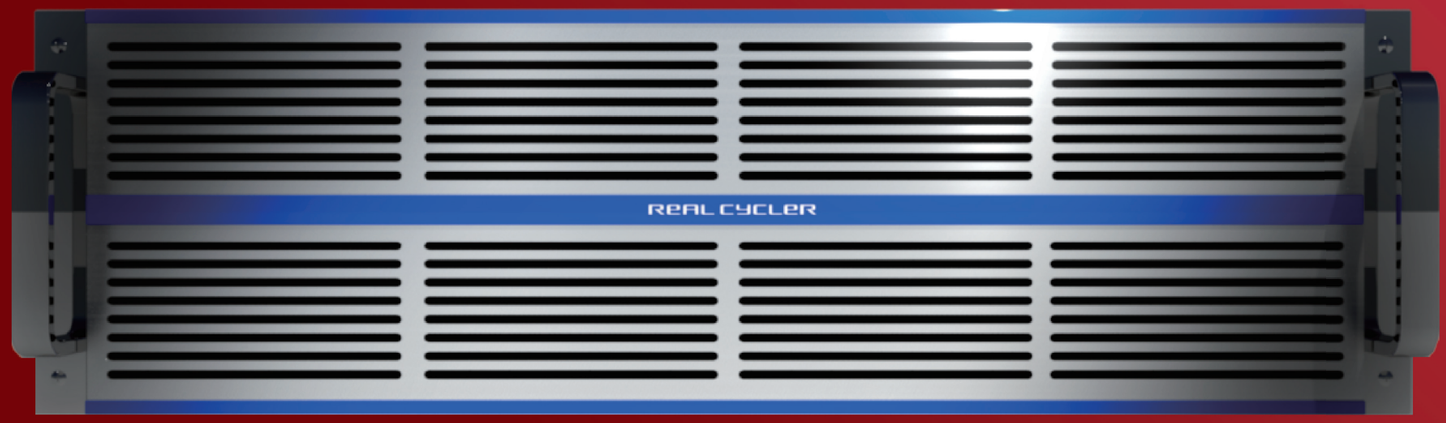
SoftEnergy Controls Inc.

REAL CYCLER

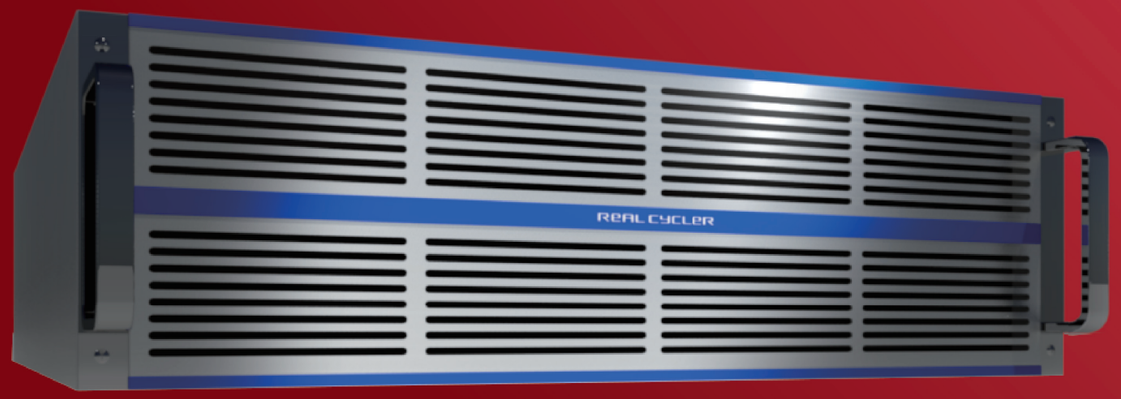
Real Cycler | Sophisticated and Multifunctional Charge-discharge Power Supply System |

Accuracy: +/- 0.05%, Response Speed: 5 msec or less, Data Sampling: 5 msec
Advanced Battery Cycle Tester



Actual preseantation may be different from the above picture.

Stable, Efficient and Quality Outputs by Using High-speed and High-frequency Switching Power Supplies Measuring Ripple Current Superposition, Pulse Outputs and Dynamic AC/IR with Optional Accessories



Actual presentation may differ from the above picture.

Real Cycler is our sophisticated and multi-functional formation power supply system.

Real Cycler, our sophisticated and accurate bidirectional DC power supplies, can be used for charge-discharge cycle tests for various types of batteries, capacitors and fuel cells. In general, ripple superposition units, pulse output units and dynamic AC-IR units can control waveform freely and widely. By combining that feature of those units with Real Cycler, you can analyze any complicated characteristics of batteries. In addition, Real Cycler tests “utility interaction” by functioning as an integral system for distributed generators such as solar generators, wind generators and fuel batteries. Ultimately, thanks to Real Cycler, you can establish a simulation system through communication between Real Cycler and load equipment or batteries.

Main Features of Real Cycler

1. 4 types of testers are availabe depending on test contents. Real Cycler, our battery tester, can also be used as an inverter simulator or a motor simulator because of its various test functions.
2. Wide variety of formation test modes not only for high-performance secondary batteries including li-ion batteries but for lead-acid batteires, capacitors and fuel cells.
3. Output tests for solar panels, wind power generation and micro hydro power genetation
4. Output tests for pure EVs, plug-in hybrid EVs and fuel-cell vehicles
5. Wide variety of formation test setting, monitor and analysis functions.
6. 3-layer file management system (Management of test condition setting and test result file)
7. Overdischarge test (0V discharge)
8. Parallel grouping function (Master/slave)
9. Ultra accurate control (current monitor output accuracy: +/- 0.05% or less)
10. Ultra high-speed response (Rise/drop: 5 msec or less)
11. Data sampling at 5 msec
12. SOC constant test mode for lifetime tests
13. Power factor of 99% thanks to using bidirectional PFC circuits
14. Mounting bidirectional PFC circuits that regenerates AC efficiently.

*Specificatons vary depending on the types of Real Cycler.

Complete Cover Range from DC5V to 650, from 6A to 1000A

Formation power supply	Outline			
5V HF/SA Series	5VDC	12A to 1000A	Multi-functional formation power supply	AC regeneration function
5V NF/SA Series	5VDC	3A to 1000A	General-purpose formation power supply	AC regeneration function
5V NF Series	5VDC	10mA to 1A	General-purpose formation power supply	N/A
50V HF/SA Series	50VDC	30A to 1000A	Multi-functional formation power supply	AC regeneration function
60V HF/SA Series	60VDC	30A to 1000A	Multi-functional formation power supply	AC regeneration function
120V HF/SA Series	120VDC	30A to 1000A	Multi-functional formation power supply	AC regeneration function
250V HF/SA Series	250VDC	6A to 1000A	Multi-functional formation power supply	AC regeneration function
500V HF/SA Series	500VDC	6A to 1000A	Multi-functional formation power supply	AC regeneration function
650V HF/SA Series	600VDC	6A to 1000A	Multi-functional formation power supply	AC regeneration function

*Custom model is available per your spec requirement.

Main application	
■ R&D	Cell analysis, evaluation (chatacteristic, capacity, lifetime, etc)
■ QA Inspection Line	Battery capacity check IR check Auto inspection system
■ Production Line	Formation inspection Auto test system
■ User Support	Capacity evaluation Error replication

Standard Features of Formation Management System

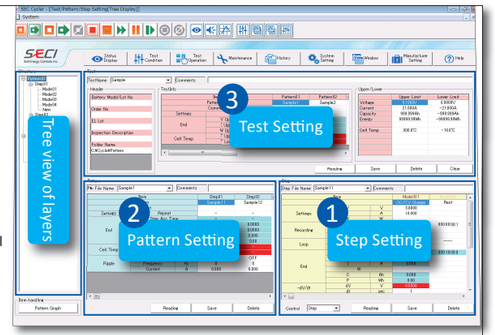
Test Status Display	Displaying the test status, temperature monitor and etc. of each block and group.
Test Condition Settings	Setting, registering and reading conditions to start a test.
Test Operation	Selecting a group and test condition, then determining a formation test operation.
Alarm History Display	Recording errors occurred at each channel in an Alarm History file.
System Settings	Registering settings for data conversion. *e.g. converting monitor data to a CSV file. Registering the battery model info and the other info including person in charge, which will be placed in the header.
Data Collection	Recording test results under the sampling conditions set at Test Condition. 2 types of text data: 1. characteristic data recorded under a sampling condition 2. Cycle data recorded when each mode ended. 1. Formation characterictic data: Record items: Accumulated time, Run time, Voltage, Current, Power, Capacity, Energy, Run mode and etc.; Record cycle: 0.1 seconds to 99 hours 59 minutes 59 seconds; Record method: Time, delta V and delta I 2. Cycle data: Record items: Accumulated time, Run time, Voltage, Current, Power, Capacity, Energy, Run mode and etc.; Record timing: When every mode ends.
Other Features	1. Loop control: Any two repetition (loop) points can be set in a step. * Double-loop is not available. 2. Label control: Junmping to any mode in a Step once reaching to a mode end condtion (or a step end condition) can be set.

Three layers of test conditions can be set and managed simultaneously in one screen.

■ Test conditions can be set in 3 layers.

1 Step Setting	Enable to set up to 99 modes per step.
2 Pattern Setting	Enable to set up to 99 steps per pattern. Enable to set the number of step repetitions up to 9999 times.
3 Test Setting	Enable to set up to 5 paterns per test Enable to set the number of pattern repetitions up to 9999 times.

End items can be set a specified number of times under one mode.
The mode ends once any of the set condition is reached “or” condition.
*Constant power control is controlled by software on the basis of calculation control at every control cycle.



■ Test Force Quit (abnormal stop)

One setting per test condition can be selected.
*Common setting condition for Charge, Rest, and Discharge

Voltage Upper Limit Error
Voltage Lower Limit Error
Current Upper Limit Error
Current Lower Limit Error (Max. during discharge)
Capacity Upper Limit Error
Capacity Lower Limit Error (Max. during discharge)
Energy Upper Limit Error
Energy Lower Limit Error (Max. during discharge)

If any error is detected, the ongoing test is stopped with an alarm notification (both sound and display) by the system, and that error is recorded in Alarm History.

Formation Mode

■ Charge Mode

	CC charge mode	CC-CV charge mode	CP charge mode
Run	V/I, V, I, Time	V/I, V, I, Time	V/I, V, I, Time
Set Items	• Set current • Sampling setting (Time, ΔV, ΔI)	• Set voltage • Set current • Sampling setting (Time, ΔV, ΔI)	• Set power • Sampling setting (Time, ΔV, ΔI)
End Items	• Time • Voltage (Upper limit) • Capacity • Electric energy	• Time • Current (Lower limit) • Capacity • Electric energy	• Time • Voltage (Upper limit) • Capacity • Electric Energy

■ Discharge Mode

	CC charge mode	CC-CV charge mode	CP charge mode
Run	V/I, V, I, Time	V/I, V, I, Time	V/I, V, I, Time
Set Items	• Set current • Sampling setting (Time, ΔV, ΔI)	• Set voltage • Set current • Sampling setting (Time, ΔV, ΔI)	• Set power • Sampling setting (Time, ΔV, ΔI)
End Items	• Time • Voltage (Lower limit) • Capacity • Electric energy	• Time • Voltage (Lower limit) • Capacity • Electric energy	• Time • Voltage (Lower limit) • Capacity • Electric energy

■ Rest Mode

	Rest mode 1	Rest mode 2	Long-term uncontrolled mode
Run	Main circuit OFF Monitor circuit ON	Main circuit ON Monitor circuit ON	Main circuit OFF Monitor circuit OFF
Set Items	• Sampling setting (Time, ΔV, ΔI)	• Sampling setting (Time, ΔV, ΔI)	• Sampling setting (Time, ΔV, ΔI)
End Items	• Time • Voltage • Temperature	• Time • Voltage • Temperature	• Time • Voltage • Temperature