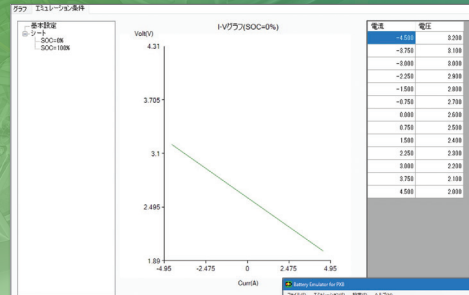


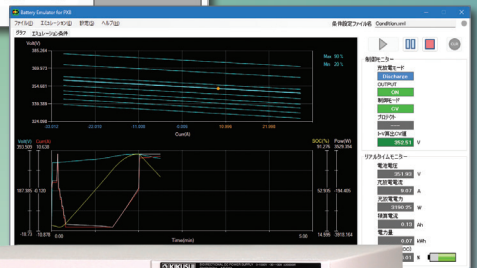
Battery Emulator System

Easy-to-use battery emulator combining the PXB series and application software!

The battery emulator system combines the PXB series of bidirectional DC power supplies with the SD036-PXB application software. It can simulate battery charging and discharging using pre-set I-V characteristic data. By dynamically adjusting the voltage in real time according to the SOC (State of Charge) and current values, the system replicates behavior that closely mirrors real batteries. This enables repeated testing under specific conditions that are difficult to achieve with physical batteries.



Application Software SD036-PXB



Bidirectional High-Capacity DC Power Supplies PXB Series

Features:

- Battery emulation based on CV mode
- Auto-completion of missing I-V characteristic data
- Battery characteristics correspond to the I-V data (3D IV table) of each SOC.
- SOC and capacity can be defined at the start of operation.
- The SOC range can be set as a stop condition.
- The I-V curve graph is displayed for each SOC.
- Measured values and graphs are displayed in real time.

System Configuration

Connect via LAN or USB. LAN connections through a hub are also supported.



System Requirements:

- PC with Core i5 or higher
- Windows 10 or 11
- At least 8 GB of RAM
- Hard disk with at least 10 GB of free space
- Display with a resolution of at least 1366 × 768 (FWXGA)
- Mouse
- USB *1 or LAN (depending on the interface used)
- KI-VISA Library 5.5.0 or higher
- USB dongle key

*1. One port is required to connect the USB dongle key.

Lineup

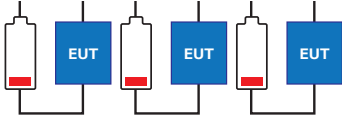
Specifications Model Name	Standard Price		Output			Power Supply Input/Other	
	Excluding Tax	Including Tax	CV V	CC A	Rated Power kW	Input Current AC (200V Three-Phase/400V Three-Phase) A	Weight (Approx.) kg
BATTERY EMULATOR SYSTEM PXB20K-50	Contact us		50	±800	±20	80/40	41
BATTERY EMULATOR SYSTEM PXB20K-250			250	±200	±20	80/40	39
BATTERY EMULATOR SYSTEM PXB20K-500			500	±120	±20	80/40	38
BATTERY EMULATOR SYSTEM PXB20K-1000			1000	±60	±20	80/40	37
BATTERY EMULATOR SYSTEM PXB20K-1500			1500	±30	±20	80/40	37

Applications

● Conducting an operating margin test when the battery is degraded or low.

Issues

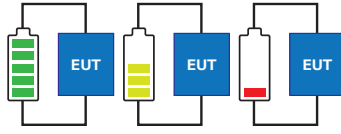
- ▶ It's necessary to prepare multiple batteries with low charge levels (SOC).
- ▶ Even if batteries with the same SOC are prepared, it is not possible to achieve identical characteristics.



● Assessing the effectiveness of power management design improvements

Issues

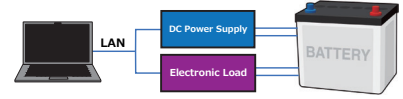
- ▶ It is difficult to prepare batteries for each state of charge (SOC).
- ▶ Ambient temperature and other factors affect battery characteristics, making it difficult to replicate identical test results.



● Simulating batteries using a power supply and an electronic load

Issues

- ▶ When switching between battery charging and discharging, the test must be stopped to switch between modes.
- ▶ The system is large and takes up lots of space.



With a battery emulator system:

- ▶ Battery SOC can be easily reproduced.
- ▶ Since the system operates according to the I-V characteristics of each SOC, the same test can be repeated as many times as necessary.
- ▶ Even if the ambient temperature changes, the system outputs specified values.
- ▶ Using I-V table data, allows for emulating batteries with various characteristics.



Test Preparations & Procedures

Battery emulator requires a base I-V file (CSV format) that serves as the basis for emulation. By configuring the settings to reproduce specific battery states and behaviors, it is possible to repeatedly conduct tests under conditions that would be difficult to achieve with real batteries.

Requirements

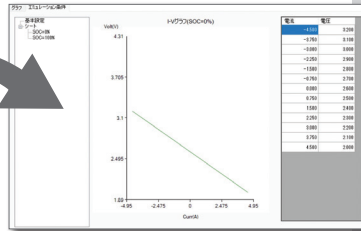
Curr.	Volt.
-1.501	385.490
-3.004	385.500
-4.508	387.120

Base I-V file (CSV format)

● Creating a base I-V file (Example)

SOC	0%	100%
File name:	0.csv	100.csv
Data:	-10.000,350.000	-30.000,400.000
	-25.000,399.000	-20.000,398.000
	-20.000,398.000	-15.000,397.000
	-10.000,350.000	-10.000,350.000
	-5.000,355.000	-5.000,395.000

● I-V table sheet

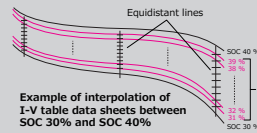


Import base I-V files for each SOC.

Each sheet can contain between 10 and up to 1,000 current and voltage data points.

Interpolation function ② SOC value

When the initial numerical values (SOC values) in the base I-V file are more than 1% apart, interpolation I-V files are generated at 1% intervals by evenly dividing the difference into 1% increments.



UP TO 100 SHEETS CAN BE LOADED

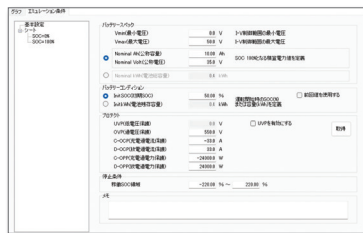
Interpolation function

① Current value

If the current values in the base I-V file are more than 0.1A apart, the data between those two points is filled in by linear interpolation, and current and voltage value data are generated every 0.1A.

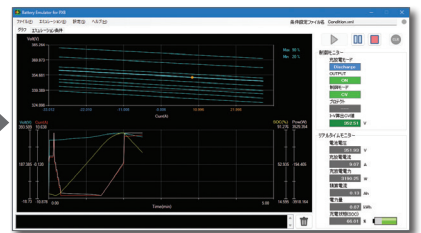
Base I-V file	Interpolated I-V file
-45.33	-4.3266
	-4.3233
-42.32	-4.232

● Emulation condition setting screen



Set battery specifications and conditions.

● Test execution screen



When the operation starts, the simulated interpolation I-V file is selected, and control operating points are plotted in orange.



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