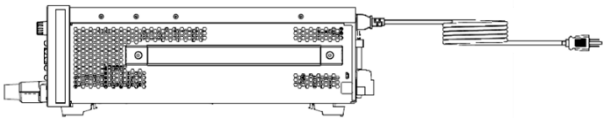
E36731A Battery Emulator

Quick Start Guide

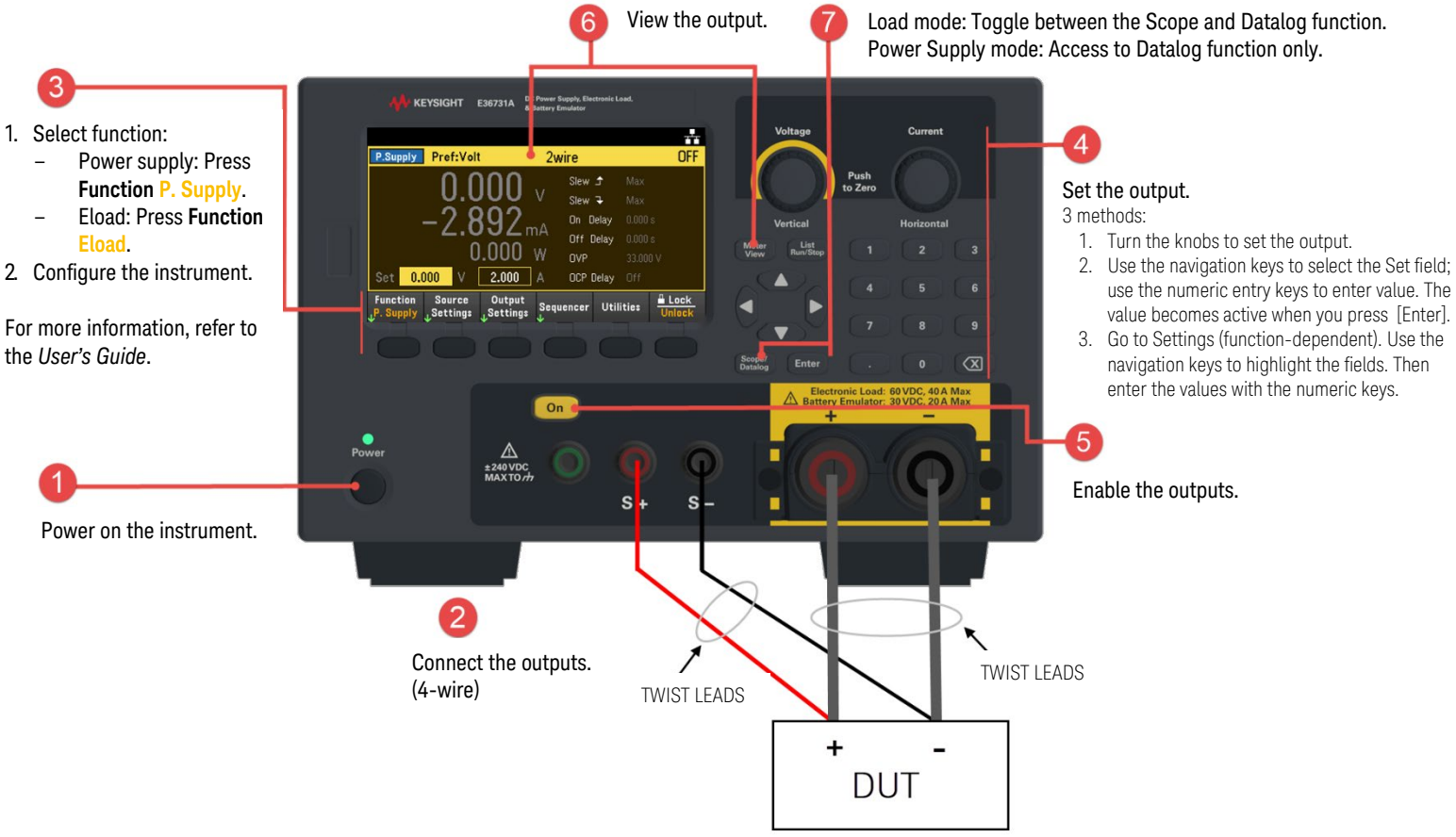
Setup the Instrument

Place the instrument's feet on a flat, smooth horizontal surface. Connect output to the front panel, being careful not to short the leads together. Attach the power cable to the rear panel, then plug it into main power. Connect GPIB, LAN or USB cables as desired.



Using the Power Supply and Eload Function

NOTE: When E36731A is used as an electronic load, the input terminals are referred to as "outputs" throughout this document.



Menu at a Glance

Menu heading	Description
Function	Switches the instrument function to Power Supply mode (**P.Supply**) or Load mode (**Load**).
When function is set to Power Supply mode:	Function: P. Supply | Source Settings | Output Settings | Sequencer | Utilities | Lock: Unlock
Source Settings >	
Sense	Configures the output sense to 2-wire or 4-wire.
Out Pref	Configures the preferred mode for output on/off transitions.
Protection >	Configures the protection settings for the output.
Voltage Slew >	Configures the voltage slew rate.
When function is set to Load mode:	Function: Load | Load Settings | Input Settings | Sequencer | Utilities | Lock: Unlock
Load Settings >	
Mode >	Configures the operating mode to CC, CV, CR, or CP.
Sense	Configures the input sense to 2-wire or 4-wire.
Protection >	Configures the protection setting for the load input.
Range >	Configures the measurement range for the load input.
Short	Enable or disable the input short.
Common menu for both Power Supply and Load mode	
Output Settings > or **Input Settings >**	
On/Off Coupling >	Enables or disables the output coupling or synchronization between multiple input/output channels.
Output Inhibit >	Configures the inhibit input mode and Digital IO Pin 3.
Utilities >	
Store/Recall >	Saves and recalls instrument states.
I/O Config >	Displays and configures the I/O parameters for remote operations over the USB, LAN, GPIB, or digital IO interface.
Test/Setup >	Accesses the self-test, calibration, and help function as well as configures the user preferences, and sets date and time.
Error >	Displays the instrument's error queue. Errors will be cleared after viewing or instrument reset.
Manage Files >	Creates, copies, deletes, and renames files and folders on the USB drive attached to the front panel. Also allows you to capture the current screen to either a bitmap (*.bmp) or portable network graphics (*.png) file.
Unlock | Lock	Locks and unlocks the display.

Software Control and Visualization

You can monitor and control the instrument from a Web browser by using the instrument's Web interface. To connect, simply enter the instrument's IP address or hostname in your browser's address bar and press Enter.

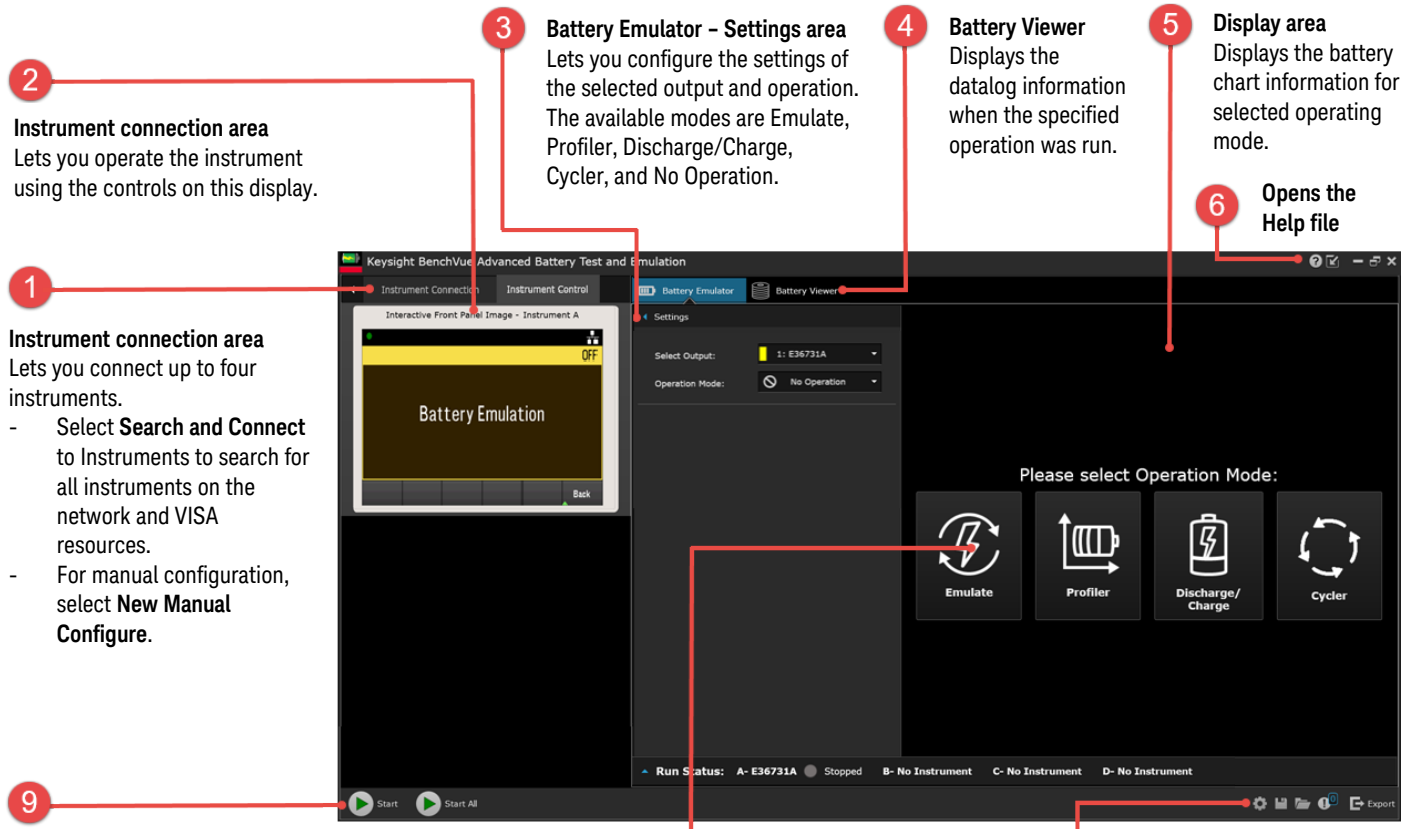
To remotely control the instrument, click the Control Instrument tab and enter the password (default is *keysight*).

For detailed operating information, refer to the *E36731A User's Guide*.

The E36731A works with Keysight BV9211B Pathwave BenchVue Advanced Battery Test and Emulation application software. This software allows you to easily run battery tests, generate battery models and perform battery emulation.

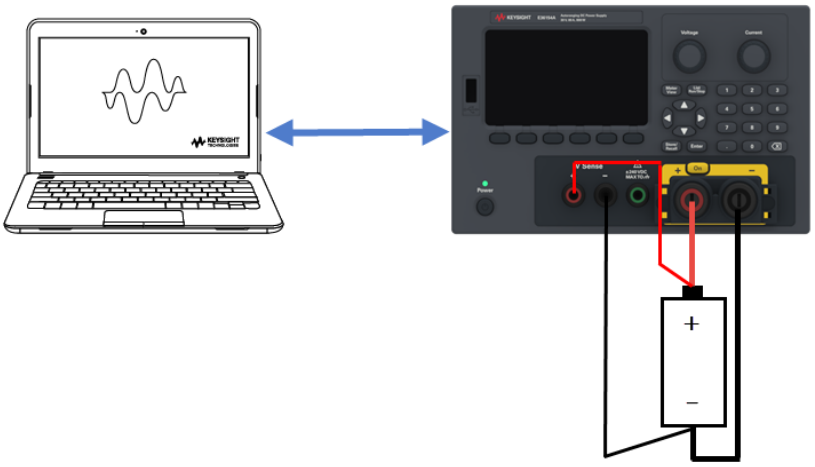
Download the BV9211B at: www.keysight.com/find/BV9211B.

Overview of BV9211B application software



NOTE: Before running the BenchVue Advanced Battery Test and Emulation application, you must have installed and connected the Keysight E36731A to a computer with the appropriate interface cable.

Instrument setup

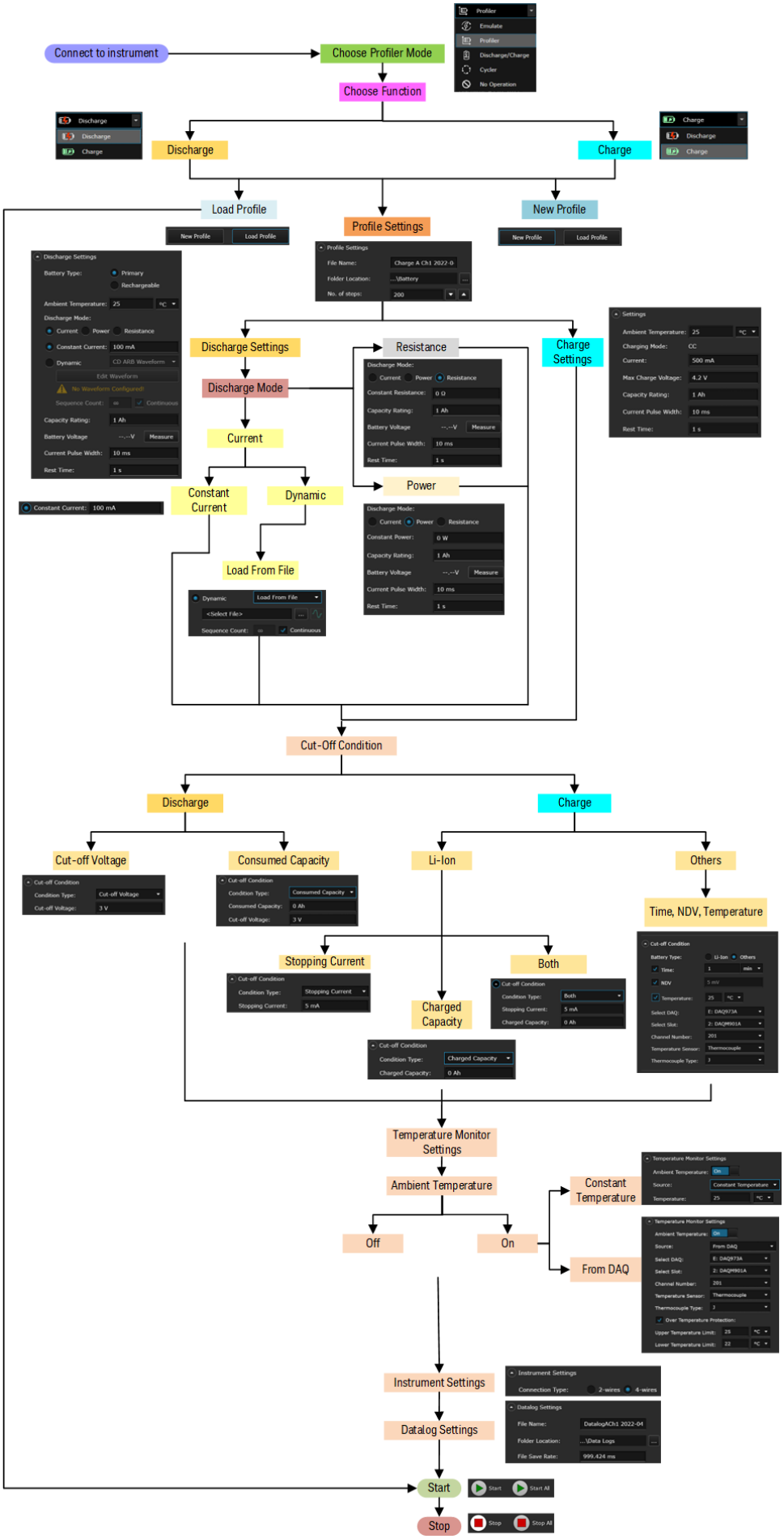


Refer to the help file for more information on how to use the Keysight BV9211B Pathwave BenchVue Advanced Battery Test and Emulation application software.

Generate battery profile

Generating a battery profile ensures that you are getting the most accurate models for battery life emulations used in your devices and working scenarios. The Pathwave BenchVue Advanced Battery Test and Emulation application creates the battery profile by discharging or charging a physical battery with either a static current condition or a previously created dynamic loading profile. The battery that you want to emulate must be new or fully charged.

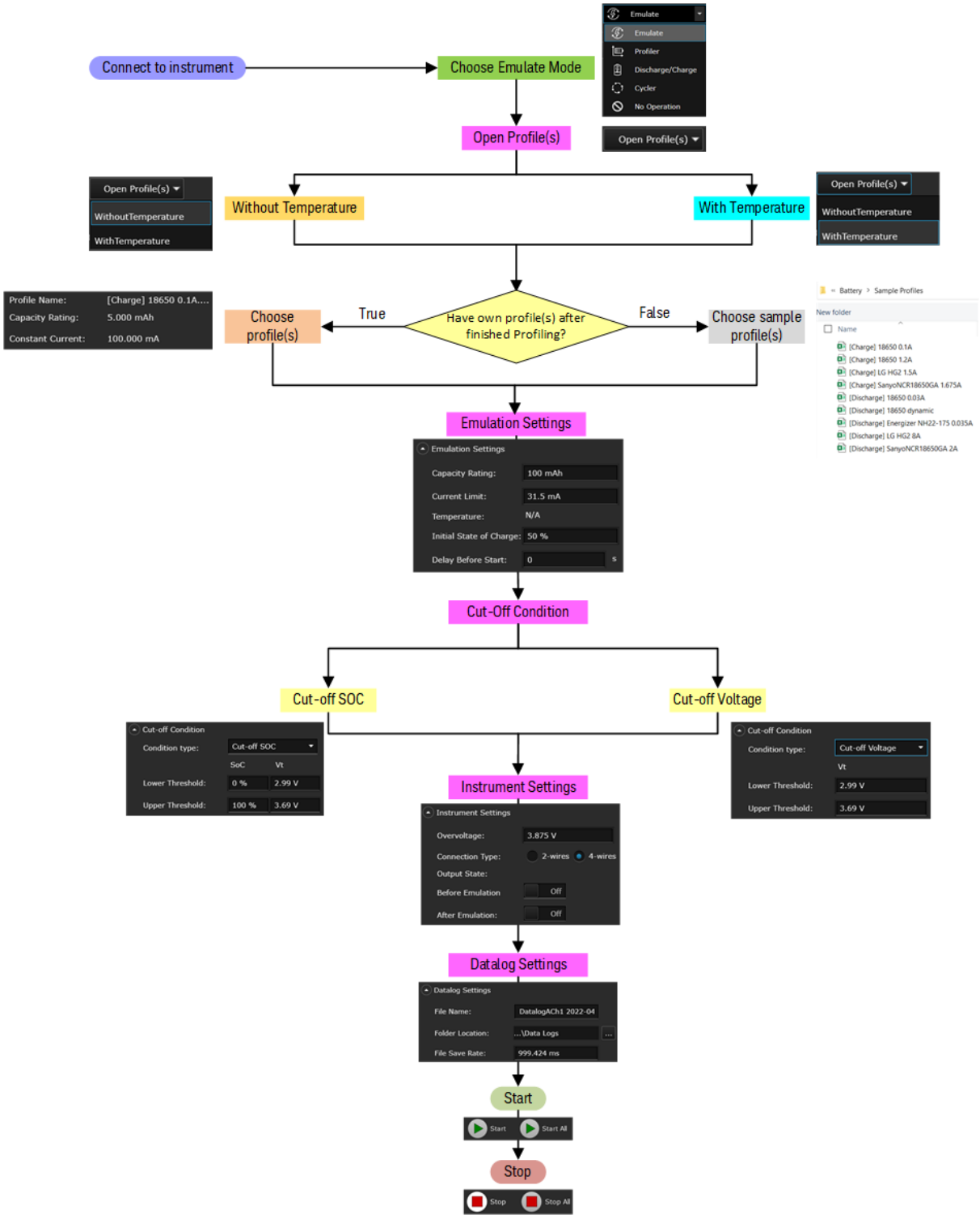
As shown in the following flowchart, there are several steps required to generate a profile.


Connect to instrument
Choose Profiler Mode
Profiler
Emulate
Profiler
Discharge/Charge
Cycler
No Operation
Choose Function
Discharge
Charge
Load Profile
Profile Settings
New Profile
New Profile
Load Profile
Discharge Settings
Charge Settings
Discharge Mode
Resistance
Current
Power
Constant Current
Dynamic
Load From File
Cut-Off Condition
Discharge
Charge
Cut-off Voltage
Consumed Capacity
Li-Ion
Others
Time, NDV, Temperature
Stopping Current
Both
Charged Capacity
Temperature Monitor Settings
Ambient Temperature
Constant Temperature
Off
On
From DAQ
Instrument Settings
Datalog Settings
Start
Stop

Perform battery emulation

The Pathwave BenchVue Advanced Battery Test and Emulation application follows the battery model in real-time and emulates the battery behavior. Two methods are available for battery emulation – open profiles generated by the software, or importing previously created external battery models. For simplicity, you will only need to enter four parameters to emulate a battery – capacity rating, current limit, initial SoC, and a cut-off condition.

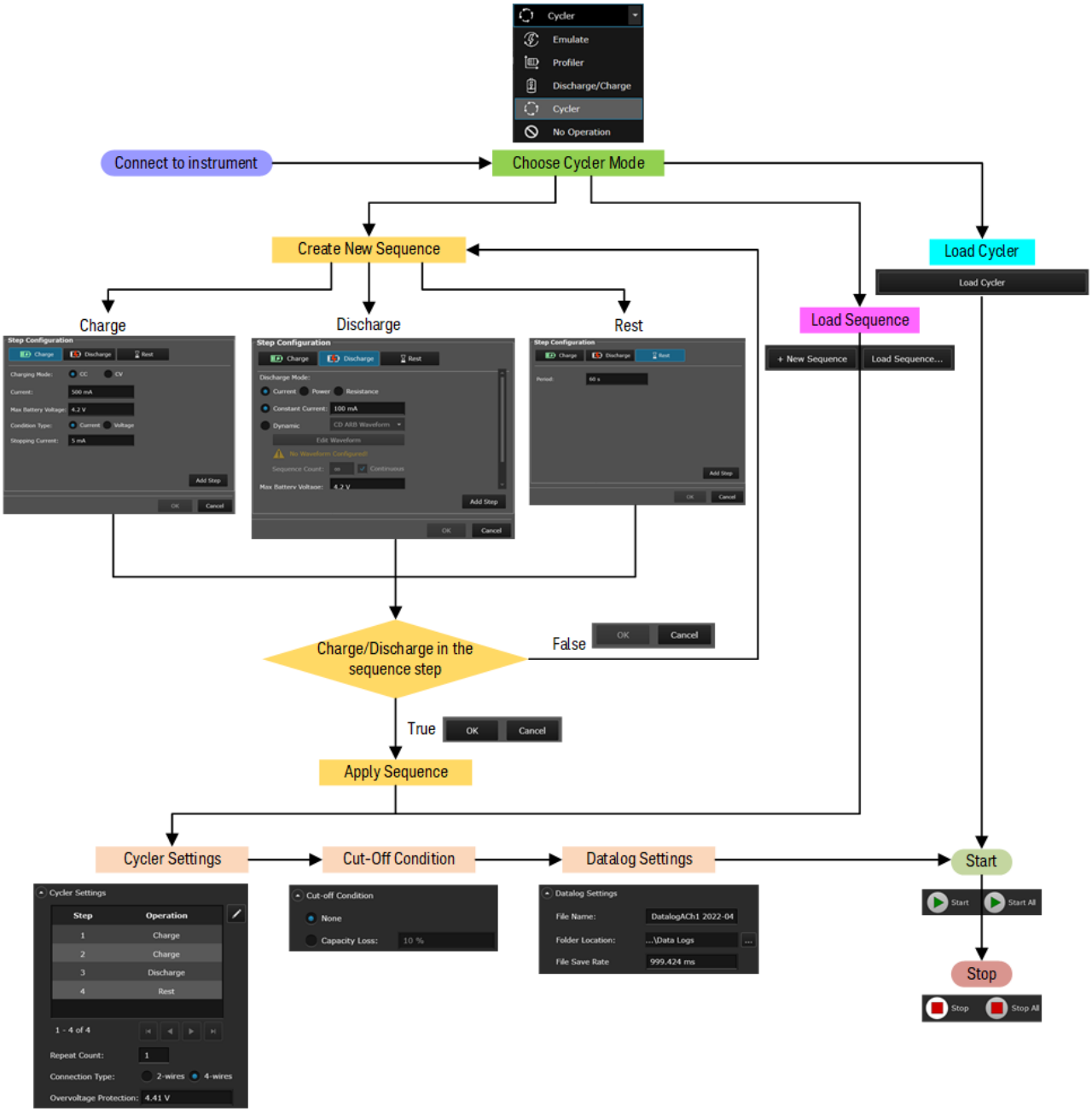
As shown in the following flowchart, there are several steps required to emulate a battery.


Connect to instrument
Choose Emulate Mode
Emulate
Emulate
Profiler
Discharge/Charge
Cycler
No Operation
Open Profile(s)
Open Profile(s)
Open Profile(s)
WithoutTemperature
WithTemperature
Without Temperature
With Temperature
Open Profile(s)
WithoutTemperature
WithTemperature
Profile Name: [Charge] 18650 0.1A....
Capacity Rating: 5.000 mAh
Constant Current: 100.000 mA
Choose profile(s)
True
Have own profile(s) after finished Profiling?
False
Choose sample profile(s)
Battery > Sample Profiles
New folder
Name
[Charge] 18650 0.1A
[Charge] 18650 1.2A
[Charge] LG HG2 1.5A
[Charge] SanyoNCR18650GA 1.675A
[Discharge] 18650 0.03A
[Discharge] 18650 dynamic
[Discharge] Energizer NH22-175 0.035A
[Discharge] LG HG2 8A
[Discharge] SanyoNCR18650GA 2A
Emulation Settings
Emulation Settings
Capacity Rating: 100 mAh
Current Limit: 31.5 mA
Temperature: N/A
Initial State of Charge: 50 %
Delay Before Start: 0 s
Cut-Off Condition
Cut-off SOC
Cut-off Voltage
Cut-off Condition
Condition type: Cut-off SOC
SoC Vt
Lower Threshold: 0 % 2.99 V
Upper Threshold: 100 % 3.69 V
Cut-off Condition
Condition type: Cut-off Voltage
Vt
Lower Threshold: 2.99 V
Upper Threshold: 3.69 V
Instrument Settings
Instrument Settings
Overvoltage: 3.875 V
Connection Type: 2-wires 4-wires
Output State:
Before Emulation Off
After Emulation: Off
Datalog Settings
Datalog Settings
File Name: DatalogACh1 2022-04
Folder Location: ...\Data Logs
File Save Rate: 999.424 ms
Start
Start
Start All
Stop
Stop
Stop All

Perform battery cycler

The Pathwave BenchVue Advanced Battery Test and Emulation application's cycler function lets you create a custom sequence of charging, resting, and discharging a battery at various test conditions. The applicatioin allows up to 1000 cycle operations on the battery to determine the battery's age effect and reliability under sequence test conditions.

As shown in the following flowchart, there are several steps required to cycle a battery.



Product Safety

For important safety information, see the For Your Safety leaflet that comes with the instrument and the Keysight E36731A User's Guide.

Latest Information

To get the latest firmware, software, manuals, and support information, go to www.keysight.com/find/E36731A.

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