



REGENERATIVE BATTERY PACK TEST SYSTEM MODEL 17040

Chroma 17040 Regenerative Battery Pack Test System is a high-precision system specifically designed for secondary battery module and pack tests. The energy regenerative function greatly reduces power consumption during discharge, and ensures a stable power grid without generating harmonic pollution on other devices - even under dynamic charge and discharge conditions. Where traditional equipment discharges waste energy in the form of heat, Chroma 17040 can recycle the electric energy discharged by the battery module back to the grid, thus reducing waste energy and alleviating HVAC requirements.

Chroma 17040 has built-in parallel channels and dynamic profile simulation functions. The parallel capability maximizes the charge and discharge current and power, thus increasing the efficiency and flexibility of equipment utilization. The dynamic profile simulation allows users to load a battery waveform of a given drive profile in either current or power mode to meet the NEDC/FUDS requirements. Its bidirectional architecture assures

uninterrupted current during the charge and discharge transient state so that the driving conditions can be accurately simulated in line with the ISO, IEC, UL, and GB/T international test standards.

Equipped with Chroma's powerful Battery Pro software, the test system offers flexible test editing functions to perform independent channel tests, and conforms to various requirements for testing secondary battery packs with high safety and stability.

Chroma 17040 ensures protected charge/discharge testing through multiple safety features including Over Voltage Protection, Over Current Protection, Over Temperature Protection, and external parameter detection. The recovery functions prevent that test data is interrupted or lost in the case of power failure.



MODEL 17040

KEY FEATURES

- Meets international standards for battery testing: IEC, ISO, UL, and GB/T, etc.
- Regenerative battery energy discharge (Eff. >90%, PF >0.95, I_{THD} <5%)
- Auto-ranges with multiple voltage and current ranges for optimal resolution
- High accuracy current/voltage measurement
 $\pm(0.05\% \text{ of reading} + 0.05\% \text{ of full scale})$ /
 $\pm(0.02\% \text{ of reading} + 0.02\% \text{ of full scale})$
- Current slew rate (10%-90%)
 1ms (< 300kW)
 10ms (300-600kW)
- Dynamic (current/power) driving profile simulation tests for NEDC, FUDS, HPPC
- Test channel parallel function
- Test data analysis function
- Data recovery protection (after power failure)
- Automatic protection for abnormalities
- Battery simulator (option)
- High power test equipment
 Voltage range: 60-1000V
 Current range: 0-1500A
 Power range: 0-600kW
- Customized integration functions
 - Integrated temperature chamber
 - BMS data analysis
 - Multi-channel voltage/temp. recording

FIELDS OF APPLICATION

- Power battery module
- Energy storage system
- Motor driver
- Power control system



Chroma
Advancing Excellence



The auto voltage/current range function switches between multiple ranges

■ Voltage accuracy: $\pm(0.03\%$ of reading $\pm 0.03\%$ of full scale)

- Current accuracy: $\pm(0.05\%$ of reading $\pm 0.05\%$ of range)

The high-frequency sampling measurement technology reaches a 50kHz sampling

■ V/I sampling rate: 50kHz (per 20µs)

- V/I sampling rate: 50kHz (per 20μs)

Chroma 17040 supports dynamic driving profile simulation (waveform) which

■ Current slow rate: 2ms (90% to 90%)



Current slew rate < 1ms (10% to 90%) Current slew rate < 1ms (-10% to -90%)

Battery packs are used under quick and irregular current conditions.



Auto current ranges



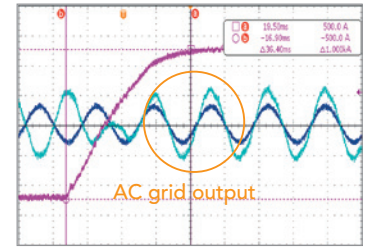
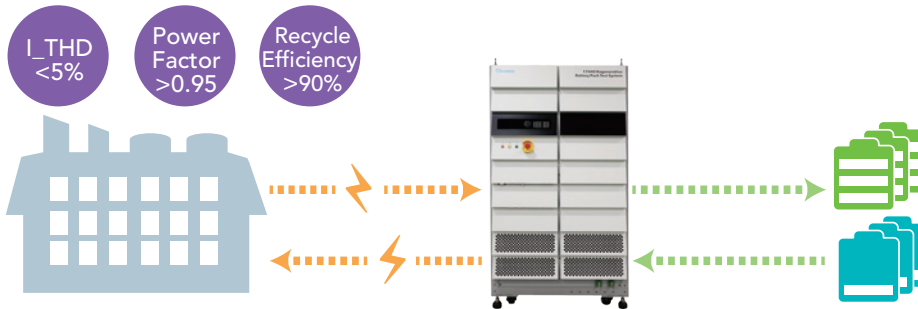


Safety

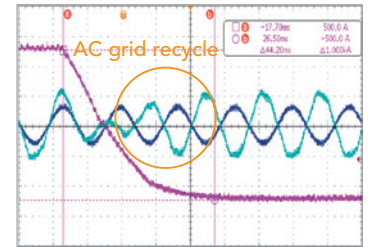
Bidirectional Circuit for Power Supply Protection

The bidirectional circuit architecture allows highly efficient recycling of the discharge energy. Chroma 17040 accurately controls reverse current changes, the AC current waveforms are smooth and show changes in real time, and the design meets the grid requirements without contaminating other equipment on the grid. When any abnormalities on the power grid are detected, the test system will swiftly cut off the main circuit power supply to protect its safety.

- Regenerative discharge efficiency > 90%
- Total Harmonic Distortion (THD) < 5%
- Power Factor (PF) > 0.95



Transition from discharging to charging



Transition from charging to discharging

Energy Recovery Design for Personnel Safety (Option)

VDE test requirements, in short, are the main items to consider when the generator is connected to a low-voltage distribution network on the grid. Even when using multiple devices, they can maintain the safe and reliable operation of the grid in accordance with the German Energy Industry Law and with the voltage limits in the DIN EN 50160 regulations. The optional equipment meets the VDE-4105-AE test requirements with the following protection functions:

- Voltage protection: $V < 0.8U_n$, $< 0.2s$ / $V > 1.1U_n$, $< 0.2s$ / $V > 1.15U_n$, $< 0.2s$
- Frequency protection: $f < 47.5Hz$, $< 0.2s$ / $f > 1.5Hz$, $< 0.2s$
- Islanding detection: < 5 sec

Multiple Output Protections for Battery Test Risk Control

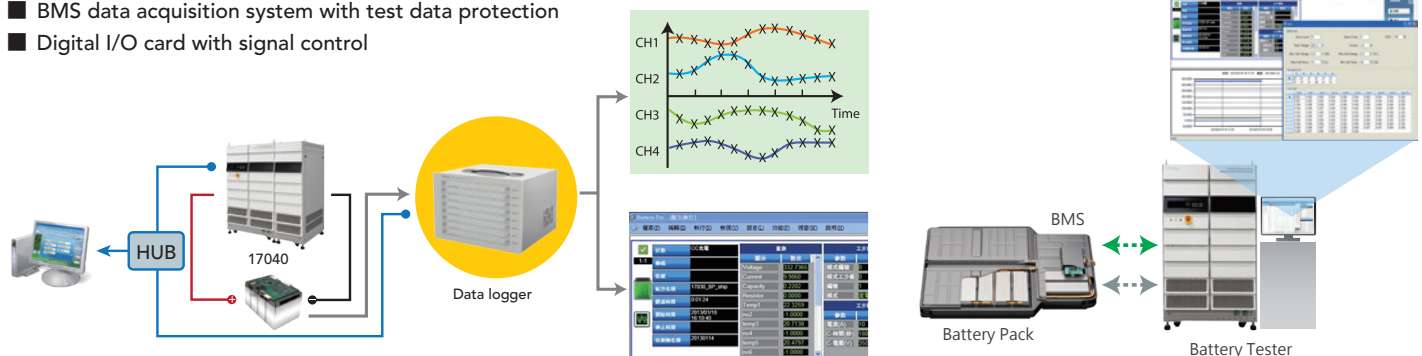
Chroma 17040 meets the test requirements for secondary battery packs and offers a high degree of stability and safety. The charge/discharge protection will stop the test when it detects any abnormal test status. The internal firmware and hardware provide multi-layered protection. Protection parameters of the test procedure are loaded directly to provide various alarm and protection modes.

- Voltage protection: over charge / over discharge / delta voltage change
- Current protection: over current / over capacity / delta current change
- Other protections: over temperature / wire loss / over power / CC-CV transition time

Software and Hardware Protections for Battery Cells (Option)

The Chroma BatteryPro software can integrate third-party hardware with charge/discharge protections that will stop the test when detecting any abnormal conditions. A designated datalogger can read the charge/discharge voltage and temperature of multiple cells and use the measured data to set the protection conditions. Similarly, a designated battery management system (BMS) data acquisition system can read multiple sets of BMS data through CAN bus and RS-485 interfaces, and then convert the data for protection conditions. Additionally, with a Chroma-specified digital I/O data acquisition card, the system can execute high-side/low-side drive signal activation and shutdown control, supporting five action types: digital output (DO), digital input (DI), safety channel output, safety input from external devices, and digital I/O signal control for alarm, cut-off, and power-off behaviors.

- Data logger with test data protection
- BMS data acquisition system with test data protection
- Digital I/O card with signal control



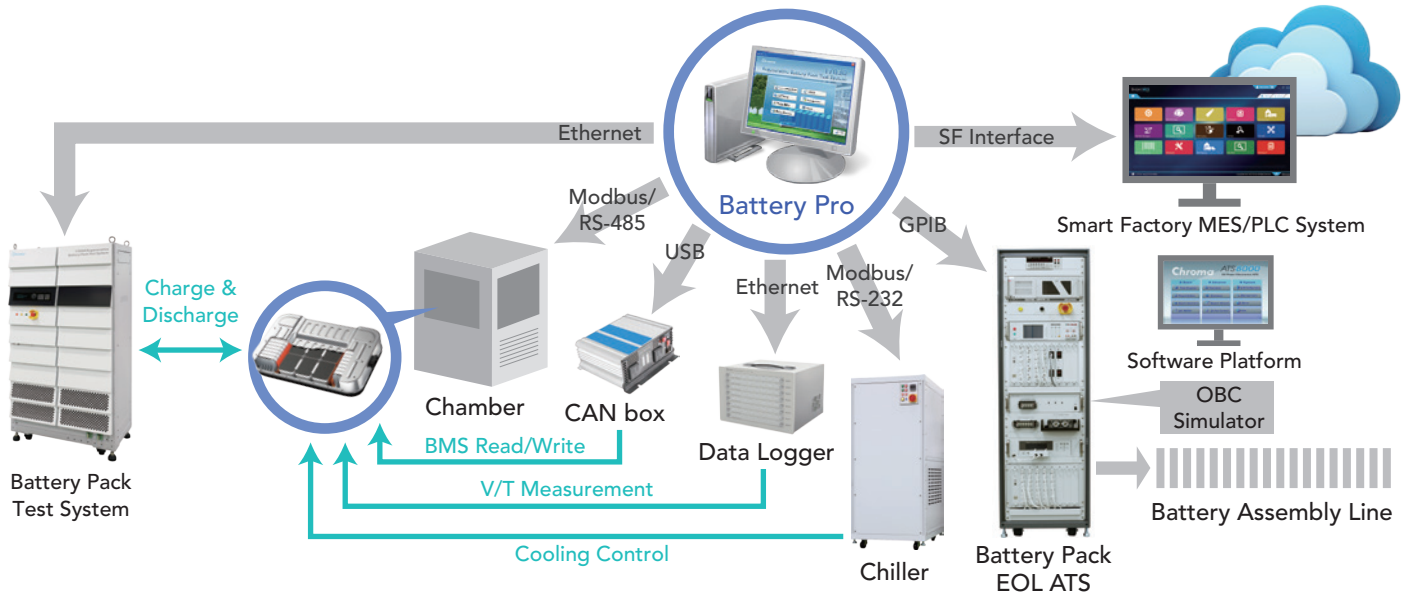


Efficiency

Flexible Integration for Complete Test Solution

The Chroma BatteryPro software integrates third-party software and hardware, such as BMS communication devices, data loggers, and thermostats; and uses their data to control the test programs and create complete test solutions.

- Thermostat: temperature and humidity control combined with charge/discharge procedures
- Data logger: temperature and voltage status of single battery cells or modules
- BMS data recorder: reading BMS data



Multiple Control Commands for Test System Expansion

Users can apply languages such as SCPI and CAN bus commands as well as LabVIEW and LabWindow driver programs to tailor the application software for operating Chroma 17040. The powerful, versatile architecture allows users to customize and integrate into the automated battery pack test system. The system offers multiple external signal interfaces (CANbus, Ethernet, Analog I/O) and supports Hardware-in-the-Loop (HIL) test platforms.



17040 Battery Simulator



Battery Pack Testbed

Automated Battery Validation

The Chroma 17040 can simulate Vehicle Control Unit (VCU) behavior combining UDS and BMS communication. The test system can send diagnostic service IDs to control the battery pack relay and read data and diagnostic trouble codes (DTCs) from the Battery Management System (BMS) during charging and discharging processes.

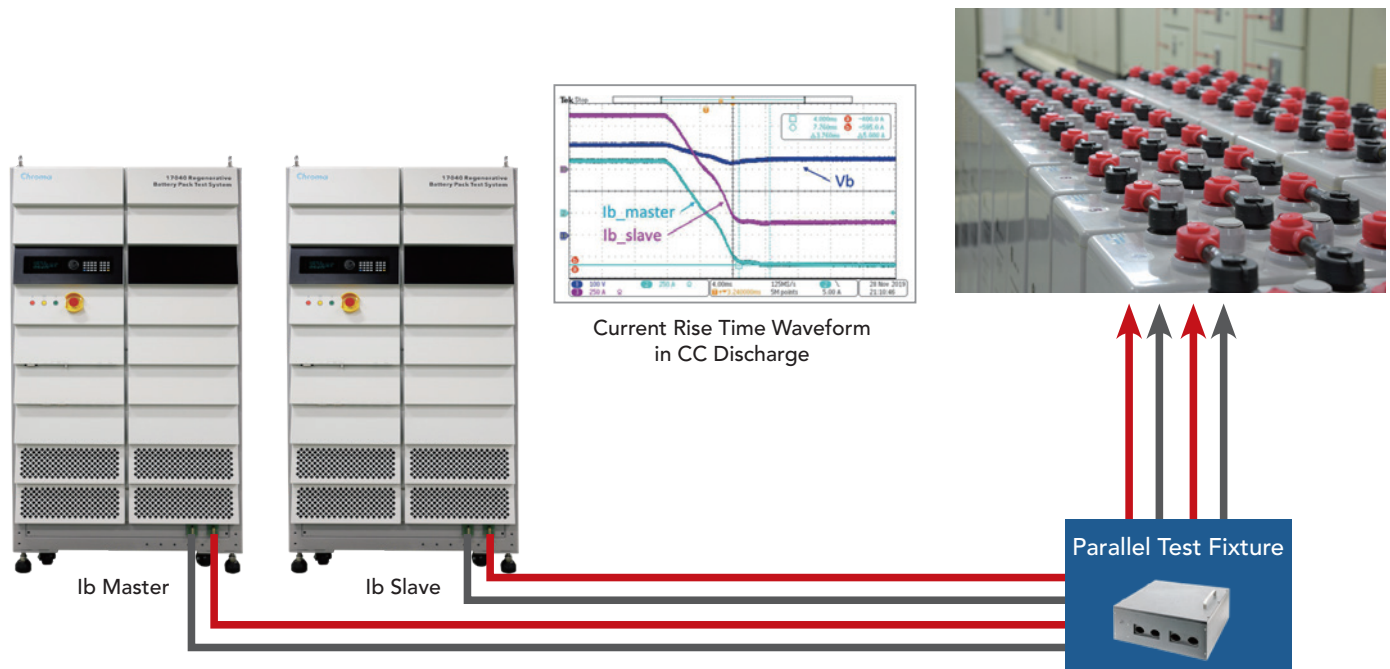
- Wake up: Tester present
- Unlock: Session control, Security access (seedkey)
- BMS reading: Read DTC information, Read data by identifier



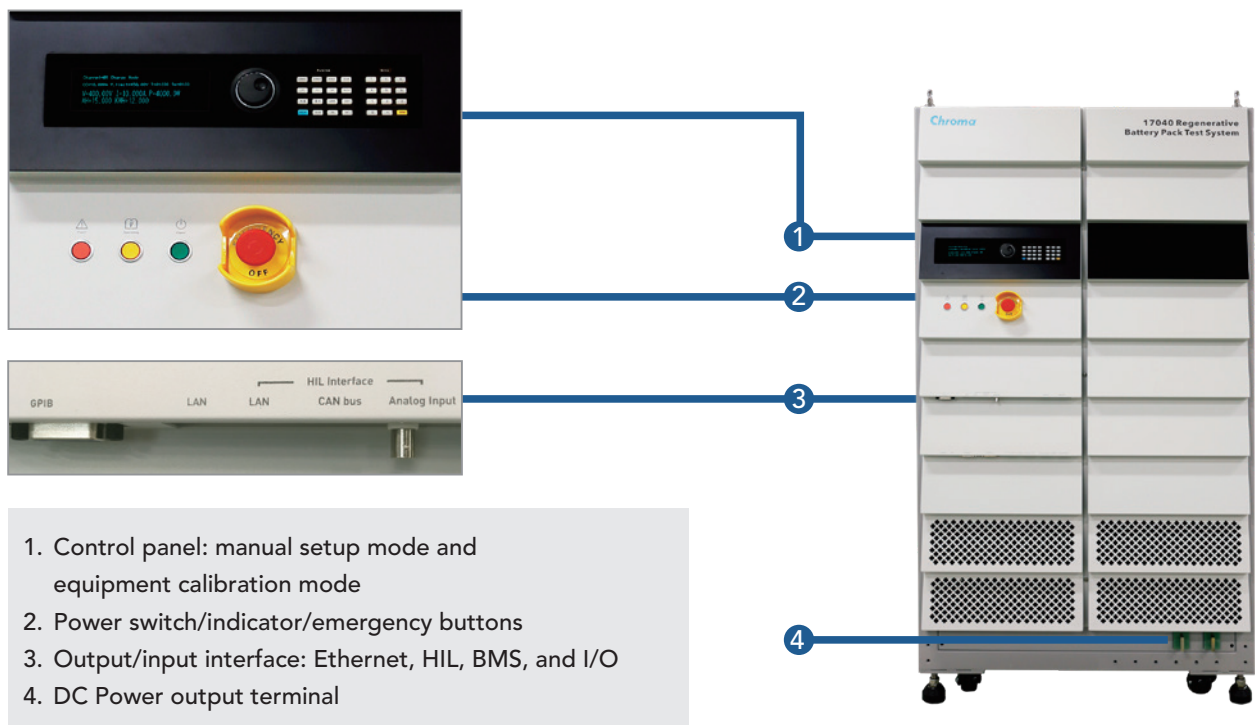
Parallel Synchronization for High Power Charging (HPC)

Chroma 17040 uses parallel synchronization to perform high-power testing with instant current slew synchronization. There is no delay in the slew time between the main channel and the auxiliary channel, which prevents current staircase waveforms from being generated. Users can connect up to two devices of the same model in parallel, and can operate the channels independently or in parallel. The test system provides customizable fixtures and allows parallel running of the output channels.

- Max. power 600kW; max. current 1,500A
- In dynamic current mode (waveform), under rated power 60-300kW, current rise time is 1ms (10%-90%)
- In dynamic current mode (waveform), under rated power 360-600kW, current rise time is 10ms (10%-90%)



HARDWARE CONFIGURATION



SYSTEM CONFIGURATION



60kW x 1CH
Supports two cabinets in parallel

H190 x W100 x D50cm
900kg



120kW: 60kW x 2CH
Supports two channels in parallel

120kW x 1CH
Supports two cabinets in parallel
H190 x W100 x D100cm
1800kg



180kW x 1CH
Supports two cabinets in parallel

H190 x W150 x D100cm
2700kg



250kW: 125kW x 2CH
Supports two channels in parallel

250kW x 1CH
Supports two cabinets in parallel
H190 x W200 x D100cm
3600kg



300kW x 1CH
Supports two cabinets in parallel
H190 x W250 x D100cm
4500kg



360kW
Two 180kW x 1CH devices connected in parallel
H190 x W300 x D100cm
5400kg



500kW
Two 250kW x 1CH devices connected in parallel
H190 x W400 x D100cm
7200kg

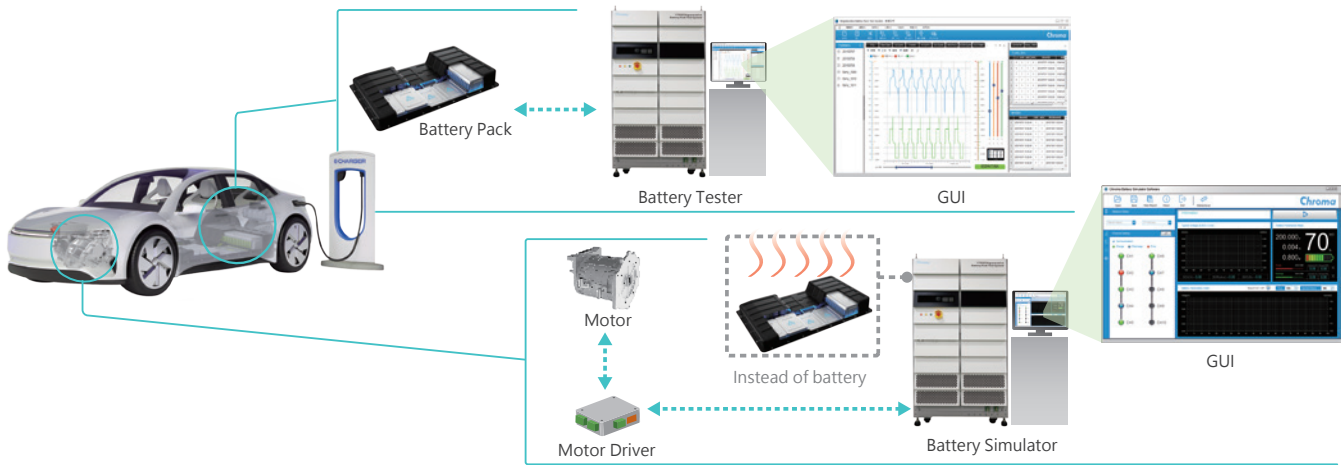


600kW
Two 300kW x 1CH devices connected in parallel
H190 x W600 x D100cm
9600kg

DUAL MODE APPLICATION

Chroma 17040 is equipped with a battery charge/discharge tester and a battery simulator, which can test battery packs and their connected products.

- Charger/discharger mode: applicable to battery pack testing via Battery Pro user interface
- Battery simulator mode: applicable to motor driver and charger via Battery Simulator user interface



BATTERY CHARGE/DISCHARGE SOFTWARE - BATTERY PRO

Our Battery Pro software platform is specifically designed for secondary battery pack testing. It offers exceptional stability and security, including a power-off data recovery feature to prevent any data loss. Real-time monitoring capabilities allow for easy visualization of test status through various icons, including operation and fault record tracking with independent abnormality display for each channel.

- Multilingual interface: English and Chinese (Mandarin)
- User permission setup: easy management of user operation authorities

Step Editing

- 255 editable charge and discharge conditions
- Dual layer loops (cycle & loop) with 9,999 per layer
- Editable dynamic charge and discharge waveforms
- Editable charge/discharge conditions incl. CV, CC, CP, CV, with current limit, waveform current, DCIR
- Cut-off conditions: time, power, voltage, current, temperature
- Step completed: next, end, jump, rest

Report Wizard

- Customized report formats, exports in PDF, CSV, and XLS
- Users can determine the X- and Y-axis parameters for report drawing and analysis, and directly produce the necessary test reports
- Reports generated: channel, cut-off, life-cycle, Q-V, V/I/T, etc.

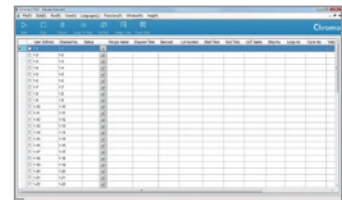


BatteryPro main window



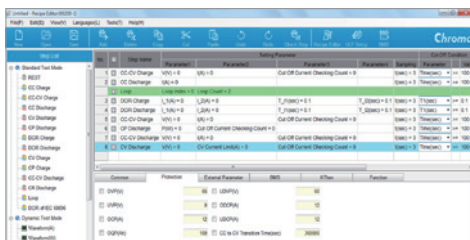
Recipe Executor

- ✓ Data display updates automatically in real time
- ✓ Flexible graphic and toolbar display based on the number of channels



Data Analyzer

- ✓ Draw test charts at one click
- ✓ Define chart and favorite functions
- ✓ Compare multiple test objects



Recipe Editor

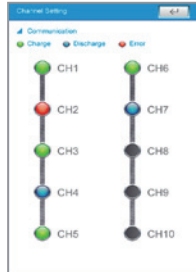
- ✓ ISO 12405, GB/T 31467, GB/T 31484, IEC 61960 DCIR and other test curves
- ✓ Interface for setting BMS data control charge/discharge equipment
- ✓ Variable editing functions, external parameters, if-then judgment functions

DUAL MODE APPLICATION

Chroma 17040 contains both a battery charger/discharger and a battery simulator to test battery packs and their connected products. When a product is still under development and the supplier's battery is not available, the test system can simulate the battery to verify whether the system is functioning normally. Additionally, it supports programmable battery state-of-charge (SOC) conditions and allows downloading of various battery curves to test charge and discharge states. This enables early testing and evaluation of product and battery compatibility. Applications include testing motor drivers for automotive start-stop systems, controllers for light electric vehicles, on-board chargers, and more.

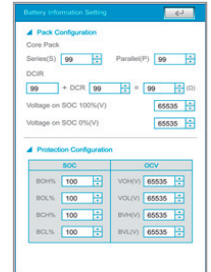
Battery Pack Simulation Functions

- Multi-channel battery pack characteristics simulation
- Battery pack charging/discharging simulation
- Battery characteristics curve setting
- Starting voltage and capacity initializing
- Battery pack total capacity setting
- Charge and discharge efficiency setting
- Battery DCR simulation
- Battery pack initialization cycle simulation
- Single channel bidirectional power supply



Battery Pack Protection Functions

- Over current protection
- Over voltage protection
- Battery high voltage/power warning
- Battery low voltage/power warning
- Battery over voltage/power protection
- Battery low voltage/power protection



Single Channel Bidirectional Power Supply

- Voltage/current/power display
- Voltage/current setting
- Pre-charge function: set the time required to generate specified voltage

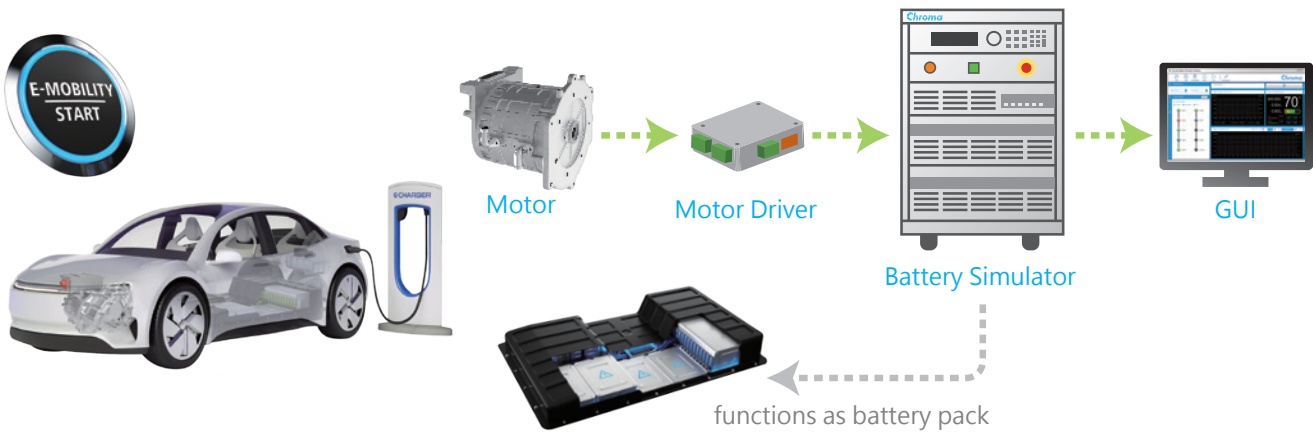


Real-time Test Data Display

- Voltage/current/power display
- Voltage/current/power graphic display
- Battery pack charge/discharge curve display
- Test report output



Motor Driver Testing for Vehicle 48V Start-stop System

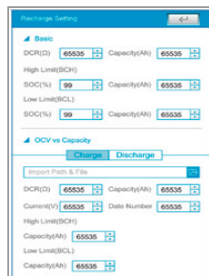


Battery Pro - Operation Interface of Battery Simulator

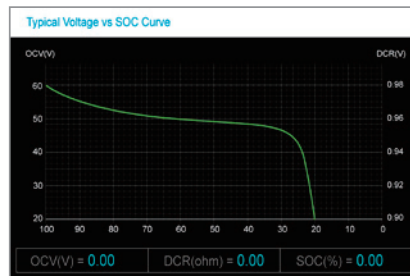
With the optional battery simulator, Chroma 17040 can charge and discharge bidirectional power supplies. Via the included Battery Pro software, it can also set the battery capacity, DCR, and V-SOC curve for charger, inverter, and motor driver testing.



Battery Simulator Main Window



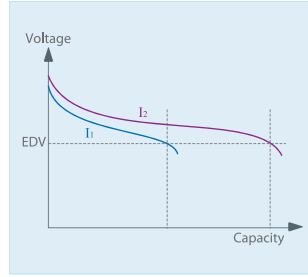
DCR Setup



Battery Characteristics V-SOC Curve Setup

CAPACITY TEST

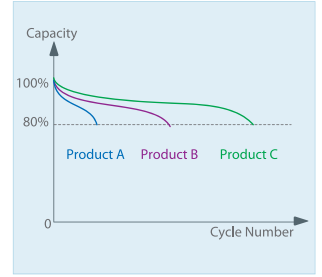
The capacity can be obtained as the integral of the discharge current versus time, which requires test equipment with high current accuracy. Although each battery comes with specifications indicated by the manufacturer, these often use capacity testing at low charge/discharge rates, whereas power battery applications are usually charged and discharged at high rates, thus leaving a gap between the specification and the actual capacity. Chroma 17040 refers to the final charge/discharge rates of the power battery and gives a more accurate battery capacity.



Capacity Test

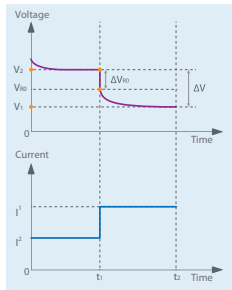
CYCLE LIFE TEST

Cycle life is a highly important test item for batteries. Chroma 17040 uses user-defined charging and discharging conditions as a cycle and tests the same battery repeatedly until the capacity reaches the cut-off power condition. The larger the number of successful cycles, the longer the cycle life of the battery. Testing under the same test conditions is useful to evaluate the performance of different battery products or define the applicable conditions of use.

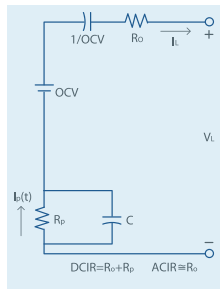


Cycle Life Test

BATTERY DCIR TEST



DCIR Test



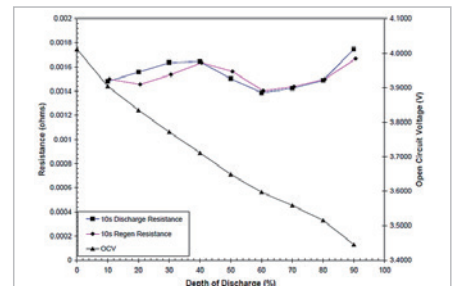
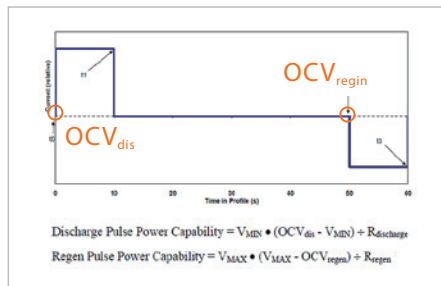
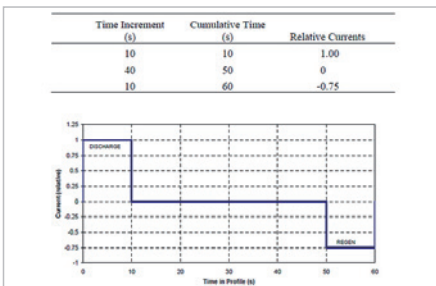
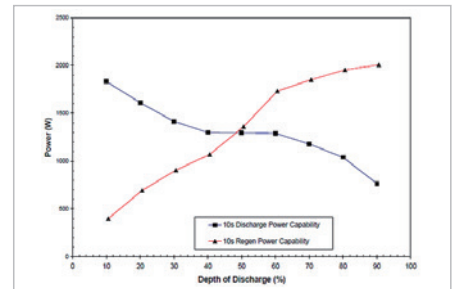
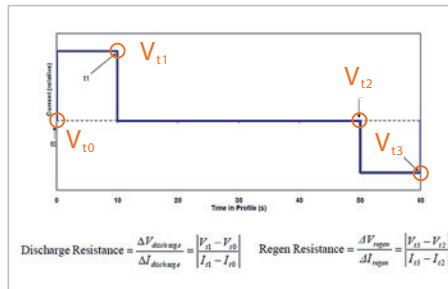
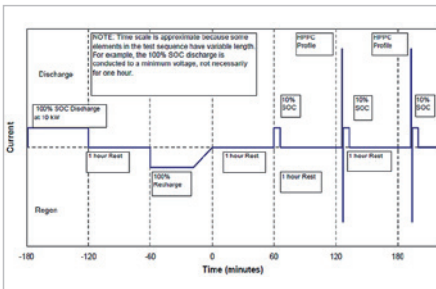
Li-ion battery Equivalent Circuit Model

$$DCIR = R_0 + R_p = \frac{\Delta V}{\Delta I} = \frac{V_E - V_{E1}}{I_2 - I_1}$$

The internal resistance value is related to the charge/discharge ratio of a battery. The larger the internal resistance value, the lower the efficiency when temperature rises. According to the lithium-ion battery equivalent circuit model, traditional ACIR measurement of 1kHz LCR meters can only evaluate the battery's conductive resistance (R_0) that affects the instantaneous power output, but is unable to evaluate the polarization resistance (R_p) produced during electrochemical reaction. DCIR evaluation includes the ACIR, and is closer to the actual polarization effect of batteries under continuous power application. Chroma 17040 calculates the DCIR value using the voltage difference caused by the two-step current change, without any manual calculation, and automatically obtains the test results compliant with IEC 61960.

HPPC TEST

HPPC is a test program created by the US Department of Energy to test the battery power performance of hybrid and electric vehicles. Its main purpose is to establish the relationship between the depth of discharge and power within the battery's operation voltage range. The secondary test purpose is to establish the depth of discharge, conductive resistance, and polarization resistance within the battery voltage range, through the voltage response curve from discharging, standing, and charging. Chroma 17040 evaluates the power recession of the following life test and develops the equivalent circuit model of the power battery. Users can automatically obtain the test results compliant with the HPPC standards without any manual calculation.



* The content and diagrams of the HPPC refer to the U.S. Department of Energy Vehicle Technologies Program INL/EXT-07-12536

SPECIFICATIONS -1

Model		17040				
Max. Power		60kW	120kW	120kW	180kW	250kW
Max. Power per channel		60kW	60kW	120kW	180kW	125kW
Max. Voltage per channel		1,000V	1,000V	1,000V	1,000V	1,000V
Max. Current per channel		150A	150A	300A	450A	300A
Channel		1	2	1	1	2
Constant Voltage Mode						
Voltage Range ^{*2}		60-1000V	60-1000V	60-1000V	60-1000V	60-1000V
Voltage Accuracy (% of full scale)		0.1%	0.1%	0.1%	0.1%	0.1%
Voltage Resolution (16 bits)		20mV	20mV	20mV	20mV	20mV
Constant Current Mode						
Max. Current per channel ^{*3}		150A	150A	300A	450A	300A
Current Accuracy (% of full scale)		0.1%	0.1%	0.1%	0.1%	0.1%
Current Resolution (16 bits)		10mA	10mA	20mA	30mA	20mA
Max. Current per system		150A	150A	300A	450A	300A
Constant Power Mode						
Max. Power per channel		60kW	60kW	120kW	180kW	125kW
Current Accuracy (% of full scale)		0.2%	0.2%	0.2%	0.2%	0.2%
Power Resolution		100mW	100mW	100mW	100mW	100mW
Measurement						
Voltage Range (3 scales as full scale)	1	60-1000V	60-1000V	60-1000V	60-1000V	60-1000V
	2	700V	700V	700V	700V	700V
	3	450V	450V	450V	450V	450V
Voltage Accuracy $\pm$ (% of reading + % of full scale)		0.02% + 0.02%				
Current Range (4 scales as full scale)	1	150A	150A	300A	450A	300A
	2	75A	75A	150A	225A	150A
	3	30A	30A	60A	90A	60A
	4	10A	10A	10A	30A	10A
Current Accuracy $\pm$ (% of reading + % of full scale)		0.05% + 0.05%				
Power Accuracy $\pm$ (% of full scale)		0.15%	0.15%	0.15%	0.15%	0.15%

Model		17040				
Max. Power		250kW	300kW	360kW	500kW	600kW ^{*1}
Max. Power per channel		250kW	300kW	180kW	500kW	300kW ^{*1}
Max. Voltage per channel		1,000V	1,000V	1,000V	1,000V	1,000V
Max. Current per channel		600A	750A	450A	600A	750A
Channel		1	1	2	2	2
Constant Voltage Mode						
Voltage Range ^{*2}		60-1000V	60-1000V	60-1000V	60-1000V	60-1000V
Voltage Accuracy (% of full scale)		0.1%	0.1%	0.1%	0.1%	0.1%
Voltage Resolution (16 bits)		20mV	20mV	20mV	20mV	20mV
Constant Current Mode						
Max. Current per channel ^{*3}		600A	750A	450A	600A	750A
Current Accuracy (% of full scale)		0.1%	0.1%	0.1%	0.1%	0.1%
Current Resolution (16 bits)		20mV	20mV	20mV	20mV	20mV
Max. Current per system		600A	750A	900A	1,200A	1,500A
Constant Power Mode						
Max. Power per channel		250kW	300kW	180kW	250kW	300kW
Current Accuracy (% of full scale)		0.2%	0.2%	0.2%	0.2%	0.2%
Power Resolution		1W	1W	100mW	1W	1W
Measurement						
Voltage Range (3 scales as full scale)	1	60-1,000V	60-1000V	60-1000V	60-1000V	60-1000V
	2	700V	700V	700V	700V	700V
	3	450V	450V	450V	450V	450V
Voltage Accuracy $\pm$ (% of reading + % of full scale)		0.02% + 0.02%				
Current Range (4 scales as full scale)	1	600A	750A	450A	600A	750A
	2	300A	375A	225A	300A	375A
	3	120A	150A	90A	120A	150A
	4	40A	50A	30A	40A	50A
Current Accuracy $\pm$ (% of reading + % of full scale)		0.05% + 0.05%				
Power Accuracy $\pm$ (% of full scale)		0.15%	0.15%	0.15%	0.15%	0.15%

GENERAL SPECIFICATIONS

Battery Charge & Discharge Test System		17040	
Operating Mode	Charge	CC, CV, CP, Waveform Power, Waveform Current, DCIR	
	Discharge	CC, CV, CP, CR, Waveform Power, Waveform Current, DCIR	
Current Rising/ Falling Time	Power Rating	Max. power 60-300kW	Max. power 360-600kW
	>50% Full Load	1 ms (10% to 90%)	10ms (10% to 90%)
Current Switching Time	Power Rating	Max. power 60-300kW	Max. power 360-600kW
	>50% Full Load	2 ms (-90% to 90%)	20ms (-90% to 90%)
Current Ripple (% of full scale)		< 0.5%	
Overshoot (% of full scale)		< 1%	
Temperature Coefficient (Voltage/Current)		< 50 ppm/°C	
Battery Simulator, CV Source			
Internal Resistance Setting		0.01-0.2 Ω	
Output Noise		0-20MHz	
Voltage Ripple (P-P) (% of full scale)		< 2%	
Voltage Ripple (rms) (% of full scale)		< 1%	
Transient Response Time ^{*4}		15 ms	
Bi-directional Transient Response Time ^{*5}		30 ms	
Load Regulation (Current Sink with Transient Response Time)		< 10V	
Program Time ^{*6}		5V / ms	
AC Input			
Line Voltage/Frequency (3 phase/4 wire with earth ground)		Input 200-220V _{ac} ± 10% V _{LL} , 47-63Hz ; Input 380-400V _{ac} ± 10% V _{LL} , 47-63Hz	
Power Factor		> 0.95 (at rated power)	
I.T.H.D		< 5% (at rated power)	
Others			
Efficiency		> 88-90% (at rated power)	
Communication Interface ^{*7}		Ethernet/CANbus	
Operating Temperature		0°C-40°C	
Protection		UVP, OCP, OPP, OTP, FAN, Short	
Regenerative Certification (option)		VDE-AR-N 4105 Annex F.4 (NS protection)	
Safety & EMC		CE	
Noise Level		< 70dB	
Analog programming Interface ^{*8}			
Analog Output (measurement Volt. & Current)		2 ports (2 wires)	
Voltage and Current monitor/ Programming (Resolution/ Voltage Range/ Response time/ Input Impedance)		16 bit / ± 10V / < 3ms / 10 MΩ	
Analog Input (Current control)		1 port (2 wires)	
Analog Input (Voltage control)		1 port (2 wires)	
Digital Input/ Output Interface for Safety ^{*8}			
Isolated Digital I/O		8 ports input pin ; 8 ports output pin	
Isolated Digital Input		Logic 0 (VIL): 0-0.8V ; Logic 1 (VIH): 2.5 Vmin (max. 24V)	
Isolated Digital Output		Output Type: Dry Contact (Open: high ; Close: Low) ; Output Voltage: 5-24 VDC Sink Current: 1A max.	
Dimension and Weight ^{*9}			
	Cabinet (H x W x D) / Weight	Front / Rear / Right side for heat dissipation	Front / Rear / Right side for maintenance
60kW	190cm x 100cm x 50cm / 900 kg	30cm / -- / --	60cm / -- / --
120kW (60kW x 2CH)	190cm x 100cm x 100cm / 1800 kg	30cm / 30cm / --	60cm / 60cm / --
120kW	190cm x 100cm x 100cm / 1800 kg	30cm / 30cm / --	60cm / 60cm / --
180kW	190cm x 150cm x 100cm / 2700 kg	30cm / 30cm / 30cm	60cm / 60cm / 60cm
250kW (125kW x 2CH)	190cm x 200cm x 100cm / 3600 kg	30cm / 30cm / --	60cm / 60cm / --
250kW	190cm x 200cm x 100cm / 3600 kg	30cm / 30cm / --	60cm / 60cm / --
300kW	190cm x 250cm x 100cm / 4500 kg	30cm / 30cm / 30cm	60cm / 60cm / 60cm
360kW (180kW x 2CH)	190cm x 300cm x 100cm / 5400 kg	30cm / 30cm / 30cm	60cm / 60cm / 60cm
500kW (250kW x 2CH)	190cm x 400cm x 100cm / 7200 kg	30cm / 30cm / --	60cm / 60cm / --
600kW (300kW x 2CH)	190cm x 500cm x 100cm / 9000 kg	30cm / 30cm / 30cm	60cm / 60cm / 60cm

*1: All specifications are subject to change without notice.

*2: The output range of voltage is referred by the cabling.

*3: The connection between the device and battery is a standard provided cable of 10m long.

*4: The voltage specification can be guaranteed when the external load transitions from 10% to 90% and the transition time required is greater than the specification.

*5: The voltage specification can be guaranteed when the external load transitions from -90% to 90% and the transition time required is greater than the specification.

*6: The spending time from zero to the maximum voltage is at no-load condition.

*7: The interface between BatteryPro (IPC) to 17040 is through Ethernet.

*8: Used for specific applications, please contact Chroma's sales representative.

*9: Please reserve additional space for maintenance when planning equipment placement.

ORDER INFORMATION

Regenerative Battery Pack Test System Model 17040				
Power Range	Voltage	Current per CH / Max.Current per System	Channels	AC Input
60kW	1,000V	150A / 150A	1	Input 200-220V _{ac} / Input 380-400V _{ac} / Input 440-480V _{ac}
120kW (60kW x 2CH)	1,000V	150A / 300A	2	Input 200-220V _{ac} / Input 380-400V _{ac} / Input 440-480V _{ac}
120kW	1,000V	300A / 300A	1	Input 200-220V _{ac} / Input 380-400V _{ac} / Input 440-480V _{ac}
180kW	1,000V	450A / 450A	1	Input 380-400V _{ac} / Input 440-480V _{ac}
250kW (125kW x 2CH)	1,000V	300A / 600A	2	Input 380-400V _{ac} / Input 440-480V _{ac}
250kW	1,000V	600A / 600A	1	Input 380-400V _{ac} / Input 440-480V _{ac}
300kW	1,000V	750A / 750A	1	Input 380-400V _{ac} / Input 440-480V _{ac}
360kW (180kW x 2CH)	1,000V	450A / 900A	2	Input 380-400V _{ac} / Input 440-480V _{ac}
500kW (250kW x 2CH)	1,000V	600A / 1,200A	2	Input 380-400V _{ac} / Input 440-480V _{ac}
600kW (300kW x 2CH) *	1,000V	750A / 1,500A	2	Input 380-400V _{ac} / Input 440-480V _{ac}

* 600kW is a customized product. Please call for availability.

Options	
A170201	IPC for Battery Test System
A170202	Battery Simulator Soft Panel
A170400	Battery Pro Software
Vector VN1630/VN1640	CAN Bus Interface Card

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