MODEL 17020E

KEY FEATURES

- Charge/discharge modes (CC, CV, CP)
  - Power Range: 10kW/20kW/30kW/40kW/ 50kW/60kW/70kW/80kW per channel
  - Voltage Range: 60V/100V/200V
  - Current Range: 100A/200A/300A/400A/ 500A/600A/700A/800A per channel
- Regenerative battery energy discharge with 85% efficiency
- Paralleled channels for higher currents
- Driving cycle simulation
- High precision measurements
- Fast current conversion without interruption
- Smooth current transition without over shoot when switching between CC-CV-CP modes
- Test data analysis function
- Data recovery protection (after power failure)
- Independent protection for each channel

FIELDS OF APPLICATION

- EV battery module
- Electric scooter
- Electric bike
- UPS
- Energy storage battery
- Power tools
- Car battery
- Lead-acid battery

REGENERATIVE BATTERY PACK TEST SYSTEM   MODEL 17020E

Chroma's 17020E is a high precision system specifically designed for secondary battery module and pack testing. Highly accurate sources and measurements ensure that the test quality is suitable for performing repetitive and reliable tests crucial for battery modules/ packs, incoming and outgoing inspections, as well as performance, production, and qualification testing.

Three safety features are designed for battery testing: software for DUT communication protection, firmware for over voltage and over current protection, and multiple hardware protection circuits to ensure test procedures are performed safely.

The Chroma 17020E system is equipped with 2/4 independent channels to support dedicated charge/discharge tests on multiple battery modules/packs, each with discrete test characteristics to achieve a high utilization rate of the equipment.

The Chroma 17020E system has flexible programming functions and may be operated with Chroma's powerful "Battery Pro"

software. The software can create cycling tests that range from basic charge or discharge to complex drive cycle testing for each channel or channel groups. In the unlikely event of power or computer communication loss, the data is securely stored in the system's non-volatile memory, protecting against potential data loss and allowing for continuous flow after restart.

The Chroma 17020E, with its high precision output and measurement specifications, insures consistent test quality. A seamless transition function between charge and discharge allows programming a dynamic driving curve that can simulate the actual use of the battery pack on an electric vehicle.

The Chroma 17020E has a regenerative energy feature that recycles the electrical energy sourced by a battery module during discharge either back into the channels in the system that are performing a charging test or to the utility mains.

Ethernet

Chroma

Security - Reinforce Risk Management
■ Ability to directly input test, cut-off, and protection criteria to a charging/discharging device to achieve multi-layer protection through internal software and hardware
■ Ability to integrate external hardware to get real-time monitoring parameters from a Battery Management System Data Communication Unit (BMS), Data Logger, Thermal Chamber, and I/O signals to execute warning/cut-off/ power off protection
■ Ability to monitor various voltage and temperature values of battery packs through readings from BMS and measurements on a Data Logger; also able to make fast decisions and trigger protection based on set values
■ Built-in multiple warning and protection modes : OVP, UVP, OTP, WIR_LOSS, CAL_ERR, POW_ERR, RMT_RVS

Precision - Improve Product Quality
■ High frequency sampling measurement technology: Max. sampling rate 50kHz to ensure dynamic measurement accuracy
■ Voltage accuracy: ±(0.02% of rdg. ± 0.02% of F.S.)
■ Current accuracy: ±(0.1% rdg.+ 0.05% rng.)
■ Quick response test technology: 50ms (-90% to 90%) current slew rate applicable for various test applications
■ Supports dynamic driving profile simulation (waveform), which simulates the current and power state of real driving conditions to comply with the NEDC, FUDS and HPPC standards

Precision

Efficiency

Security

Regenerative Battery Pack Test System

High Frequency Sampling Measurement Technology
Generally, battery chargers/dischargers use software to read current values for calculating power; however, limited data sampling rates could result in large errors when calculating the dynamic current capacity. By increasing the V/I sampling rate and using a double integration method, Chroma is able to provide a capacity calculation with much higher accuracy. When the current changes, the data is not lost and the transmission speed is not affected.
■ V/I sampling rate: 50KHz (per 20μs)
■ Integration calculus: I for capacity; V x I for energy

Sampling Rate

Other tester

General charger/discharger sampling rate

Sampling Rate
↓ Catch the V/I per 20us
↑ Feedback the V/I per 10ms
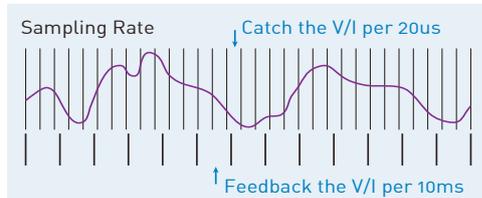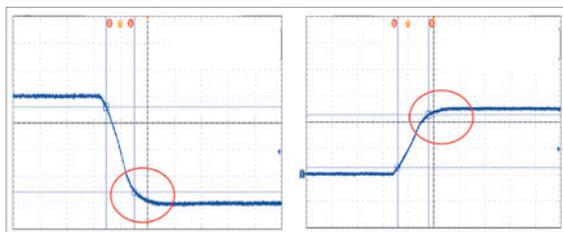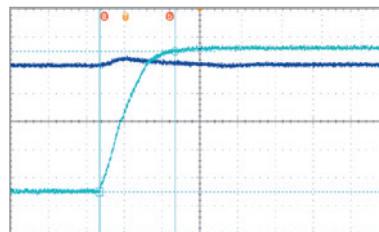
Chroma charger/discharger sampling rate

Quick Response Test Technology
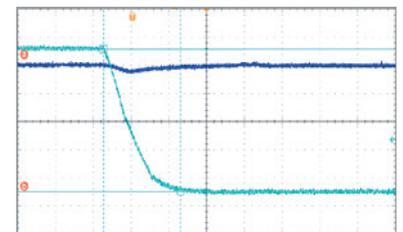Smooth current change between charge and discharge without overshoot to avoid damaging the battery
■ Current ripple noise <1%, Overshoot <1%

Overshoot <1%

Current slew rate 50ms (-90% to 90%)

Dynamic Driving Profile Simulation
Battery packs are used under fast and irregular current conditions. The 17020E system simulates real conditions on the battery pack via the working condition simulator
■ Dynamic charge/discharge power or current waveforms simulate the drive cycle or any real world application. In the dynamic current mode (waveform), the current transition time from maximum discharge to maximum charge is only 10ms
■ Ability to import stored current/power waveforms from an Excel file
■ 720,000 points of driving profile memory are available to save the waveform profile in each channel
■ Interval for profile condition changes: 10ms
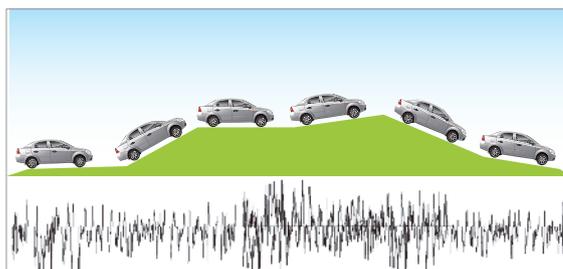
Driving profile simulation
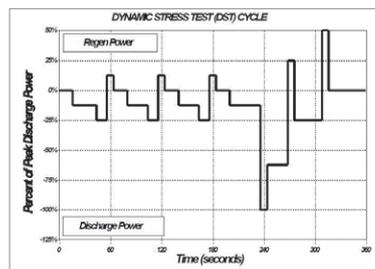
Regulatory compliance testing standards
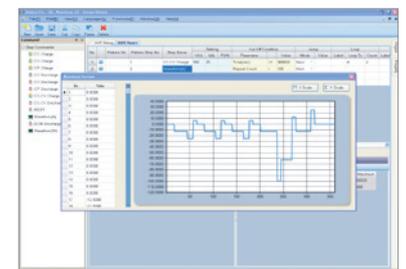
Profile simulation data loading equipment
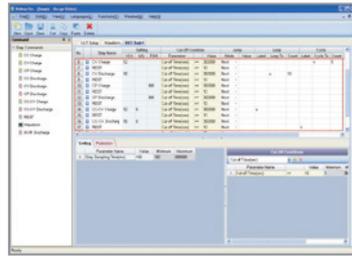
The 17020E test system is specifically designed to meet the diversified requirements for testing secondary battery packs with a high degree of safety and stability. Charge and discharge protection will abort tests when abnormal conditions are detected. Data loss, storage and recovery are protected against power failure.
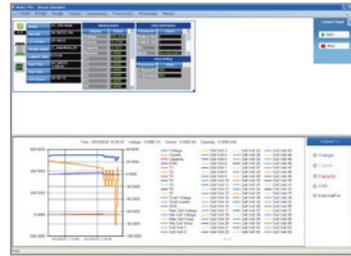
- Language support: Traditional Chinese / Simplified Chinese / English
- Displays Real-time multi-channel battery pack status
- Icon manager: the test status of each channel is displayed using different icons that are easy to read and understand
- Security management: sets user access for secure operation
- Fault record tracking: independently records any abnormal state for each channel
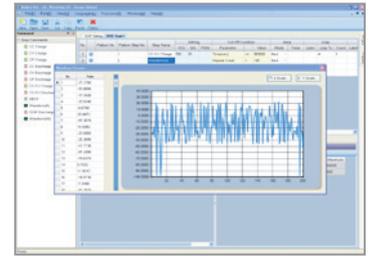

| Battery Pro main panel | Charge/Discharge test program editor | Real time monitoring | Waveform current test editor |

Recipe Editor
- 255 charge/discharge conditions
- Sets dual layer loops (cycle & loop) with 9999 loops per layer
- Ability to edit dynamic charge/discharge waveform with 10ms current switching speed
- Testing step: CV / CC / CP / CC-CV / Waveform current / DCIR)
- Cut-off conditions (time, current, capacity, cut-off voltage, cut-off current, etc.)
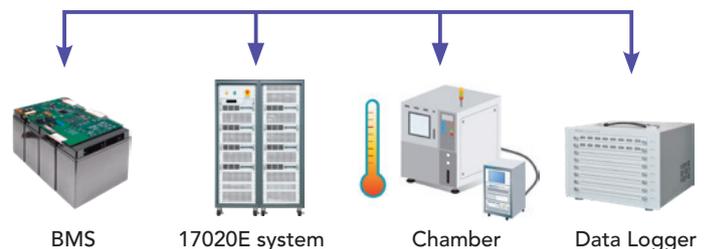- Next Step: Next / End / Jump / Rest
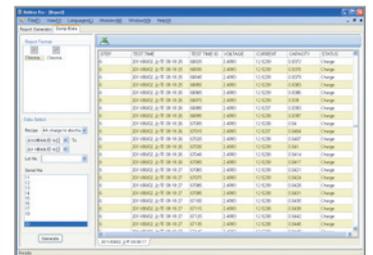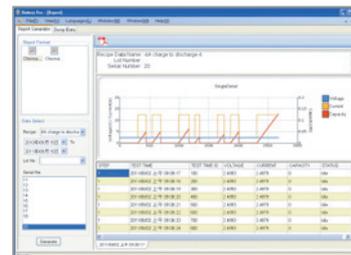
Statistical Reports
- Customized report formatting and exporting of test reports to PDF, CSV and XLS
- Graphical report and analysis functions
- Report analysis function: allows creation of customized reports such as life-cycle reports, Q-V reports, V/I/T-time reports, etc., through the user-defined X and Y axis parameters

Cycle Life Testing

Capacity Measurement
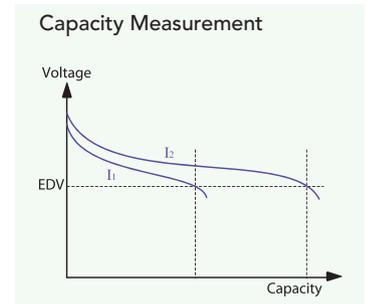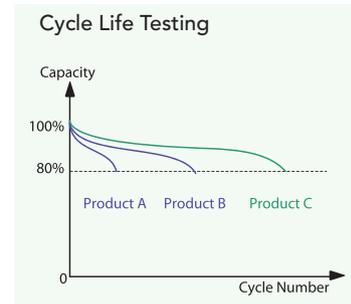
Software Integration
- Thermal chamber: Synchronizes temperature control with the charge/discharge profile
- Data logger: records temperature or voltage data that can be used for setting cut-off and protection conditions
- BMS data record: Software setting to read data from a BMS data communication unit (A692000/A692001) that supports RS485 and CAN bus. The data can be used for setting cut-off and protection conditions

| BMS | 17020E system | Chamber | Data Logger |

SPECIFICATIONS

Model	17020E						
Channel	2	4	2	2	4	2	4
Max. Power/parallel	20kW	40kW	40kW	20kW	40kW	20kW	40kW
Voltage	60V	60V	60V	100V	100V	200V	200V
Max Current	720A (Parallelable)	720A (Parallelable)	720A (Parallelable)	400A (Parallelable)	400A (Parallelable)	200A (Parallelable)	400A (Parallelable)
Charge/Discharge Mode per channel							
Voltage Range	0V~60Vdc	0V~60Vdc	0V~60Vdc	0V~100Vdc	0V~100Vdc	0V~200Vdc	0V~200Vdc
Maximum Current	180A	180A	360A	100A	100A	100A	100A
Max Power	10kW	10kW	20kW	10kW	10kW	10kW	10kW
CC mode accuracy	0.1% stg.+0.05%F.S.						
Current Resolution	10mA	10mA	10mA	5mA	5mA	15mA	15mA
CV mode accuracy	0.1% stg.+0.05% F.S.						
Voltage Resolution	2mV	2mV	2mV	3mV	3mV	3mV	3mV
CP mode accuracy	0.2% stg.+0.1% F.S.						
Power Resolution	0.3W	0.3W	0.3W	0.5W	0.5W	1.5W	1.5W
Measurement							
Voltage range	0V~60Vdc	0V~60Vdc	0V~60Vdc	0V~100Vdc	0V~100Vdc	0V~200Vdc	0V~200Vdc
Voltage accuracy	0.02% rdg.+0.02% rng.						
Voltage resolution	2mV	2mV	2mV	3mV	3mV	3mV	3mV
Current range	72A/180A	72A/180A	144A/360A	36A/100A	36A/100A	36A/100A	36A/100A
Current accuracy	0.05% rdg.+0.05% rng.						
Current resolution	10mA	10mA	10mA	5mA	5mA	3mA	3mA
Power range	10,000W	10,000W	20,000W	10,000W	10,000W	10,000W	10,000W
Power accuracy	0.07% rdg.+0.07% rng.						
Power resolution	0.3W	0.3W	0.3W	0.3W	0.3W	0.3W	0.3W
Temperature Coefficient							
Voltage/Current	50ppm/℃						
Other							
Protection	OVP, UVP, OCP, OQP, OTP, ODVP, UDVP, ODCP, UDCP						
Efficiency (Typical)	85%						
Interface	Ethernet						
Operating Temperature	0℃~40℃ & 0~90RH%						
Humidity	-40℃~85℃ (Storage)						
AC input	3Φ 200~220Vac ± 10% VLL/3Φ 380~400Vac ± 10% VLL/ 47~63Hz for input AC power						
Safety & EMC	N/A						
Dimension	1826mm x 600mm x 1000mm (H x W x D)						
Weight (master/slave)	260/250 kg	390/380 kg	260/250 kg	260/250 kg	390/380 kg	260/250 kg	390/380 kg

* All specifications are subject to change without notice.

ORDERING INFORMATION

Model	Power and Channel combinations
17020E	Regenerative Battery Pack Test System 60V/180A/10kW/2CH/20kW
17020E	Regenerative Battery Pack Test System 60V/180A/10kW/4CH/40kW
17020E	Regenerative Battery Pack Test System 60V/180A/10kW/6CH/60kW
17020E	Regenerative Battery Pack Test System 60V/180A/10kW/8CH/80kW
17020E	Regenerative Battery Pack Test System 60V/360A/20kW/2CH/40kW
17020E	Regenerative Battery Pack Test System 60V/360A/20kW/4CH/80kW
17020E	Regenerative Battery Pack Test System 100V/100A/10kW/2CH/20kW
17020E	Regenerative Battery Pack Test System 100V/100A/10kW/4CH/40kW
17020E	Regenerative Battery Pack Test System 100V/100A/10kW/6CH/60kW
17020E	Regenerative Battery Pack Test System 100V/100A/10kW/8CH/80kW
17020E	Regenerative Battery Pack Test System 200V/100A/10kW/2CH/20kW
17020E	Regenerative Battery Pack Test System 200V/100A/10kW/4CH/40kW
17020E	Regenerative Battery Pack Test System 200V/100A/10kW/6CH/60kW
17020E	Regenerative Battery Pack Test System 200V/100A/10kW/8CH/80kW
17020E	Regenerative Battery Pack Test System 60V/100V/200V More power or channel combinations

A170201	IPC for battery test system
A692000	BMS data communication unit, 4 Channels
A692001	BMS data communication unit, 8 Channels
A692009	Parallel block (60V/100V/200V)
A692010	Parallel cable (500A)
A692011	Parallel output fixture (60V/100V/200V)
A692012	Parallel block on bottom side (60V/100V/200V)
A692003	Thermal sensor with cable (for OTP)
HIOKI 8423/8948	Data Logger Measurement Unit
HIOKI 9683	Connection cable caption for HIOKI 8423

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