Chroma's 17030 is an automated regenerative test system specifically designed for high power battery pack tests. Accurate power sources and measurements ensure test quality suitable for repetitive and reliable testing of crucial battery packs. Applications include incoming inspections, capacity validation, production and certification testing.

Chroma's 17030 system architecture offers regenerative discharging designed to recycle the electric energy sourced by the battery pack. This feature saves electricity, reduces the facilities costs, reduces the thermal footprint and provides a green solution by reducing the environmental impact to the planet.

Chroma's 17030 system include a driving cycle simulation function. Since automotive battery packs are used at quick and irregular intervals, the 17030 includes the capability to create seamless transitions between maximum charge and maximum discharge (or maximum discharge and maximum charge) with a rapid 50 ms conversion.

Chroma's 17030 system has flexible programming functions and includes Chroma's powerful Battery Pro software. Battery Pro is a user friendly software environment allowing for the creation of a wide range of test scenarios from basic charge and discharge to complex drive cycle testing. Battery Pro's features allows quick and intuitive test development to eliminate the need for tedious scripting or programming by a software developer.

There are multiple safety features built into the 17030 including battery polarity checks, overvoltage protection, overcurrent protection and over temperature protection. In the unlikely event of a power or computer communication loss, the data is securely stored within the system in non-volatile memory thereby protecting against potential data loss and allowing for continuous flow after restart.

Key Features
- Supports high power battery certification: IEC, SAE, GB... etc.
- Regenerative battery discharge, Saves energy, environment-friendly and provides low heat dissipation
- Driving cycle simulator
- Industry Leading Accuracy
- 10ms Data acquisition
- Charge / discharge mode
  - Constant Current
  - Constant Voltage
  - Constant Power
- Customized rating power
  - Voltage range: 10~1200V
  - Current range: 0~1000A
  - Power range: 90~500kW
- System Integration:
  - Chamber Control
  - Multi-channels voltage/temperature measurement (Max 256CH)
  - BMS Communication
KEY SYSTEM FEATURES

Regenerative Energy
- Regenerate power to grid, Low heat dissipation, reduce air-conditioner loads and facility power consumption
- THD under 5% at rated power
- The PF over 0.9 at rated power
- Efficiency above 85% when operated above 20% of rated power

Driving Cycle Simulation (Power/Current Waveform mode)
Simulate real automotive working conditions by defining quick and irregular charging and discharging conditions.
- Import dynamic charge/discharge waveforms to simulate the DRIVE CYCLE or other actual applications via .xls file formats
- Supports 720,000 points within driving profile memory for saving profiles of each channel
- Minimum transition time (Δt) = 10ms

Customized rated power
17030 design allows for customized power levels.
- Channels are easily paralleled with same model to support higher current requirements. This feature provides ultimate flexibility between high channel count and high current testing. (Supports a maximum of 2 units)
- Dual output in one system, independent control

High accuracy capacity calculation
Voltage/current sampling rate of 50kHz used for calculations of capacity ratings in current waveform mode.
- V/I sampling rate : 50kHz
- Minimum data acquisition : 50ms
- Integrate calculus : For I : Capacity. - For V x I : Energy

System Function
Charge / discharge mode
- Constant Current/Constant current-limited Voltage/Constant Power
- Waveform current mode
- DCIR mode (IEC61960-2004)
- Rest mode

Cut-off condition
- Time/ Capacity/ Voltage/ Current/ Temperature
- Data Acquisition from data logger (option)
- Data Acquisition from BMS (option)

Protection
- OVP/UVP/OCP/OTP/OQP
- Data Acquisition from data logger (option)
- Data Acquisition from BMS (option)
- Turn the main loop off for safety issues of AC line
- ΔV protection / Δt protection for internal short of battery pack
- ΔV period protection / Δt period protection
- CC-CV transition time

Testing Data
- Generate the detailed report and step report
- Customized report format

Continuous transition
- Continuous charge and discharge transition: No time delay to transit from charge to discharge
- Continuous CC-CV transition: No overshoot current or voltage which may damage the battery when transiting modes

Response time
- The trip time between maximum charge and maximum discharge current in static modes is 50ms. (10mS in waveform mode)
- Smooth current profiling without overshoot to avoid damage the battery

Data Recovery Function
- 60 min of temporary data storage when sampling time is 1 sec
- Automatic data recording in non-volatile memory allows for resumption of testing following power interruption

Temperature Measurement
- Temperature measured for each channel within the range of 0~90°C ± 2°C
- Maximum 4 thermal sensors can be connected in series for measuring 4 independent battery points
- Data Acquisition for temperature protection
The 17030 Test system is specifically designed to meet the various requirements for testing secondary battery packs with high safety and stability. Charge and discharge protection aborts tests when abnormal conditions are detected. Data loss, storage and recovery are protected against power failure.

- Real-time battery pack status browse
- Icon Manager: Test status of each channel is managed through different icons, easy to read and understand
- Authority management: Allows for multiple user authority
- Fault record tracking: Records abnormal states of each channel independently

Recipe editor
- 3000 charge/discharge conditions
- Sets dual layer loops (cycle & loop) with 9999 loops per layer
- Ability to edit dynamic charge/discharge waveform
- 10ms current switching speed in waveform current mode
- Testing modes: CV / CC / CP / CC-CV / Waveform current / DCIR
- Cut-off conditions (time, current, capacity, cut-off voltage, cut-off current, etc.)

Testing Data
- Generate the detailed report and step report
- Customized report format
- Exports test reports in PDF, CSV and XLS
- Graphical report function
- Report analysis Function: Users can create customized reports such as life-cycle report, Q (AH)-V(V) report, V(V)/I(A)/Ti(°C)-time report...etc through the user-defined X and Y axis parameters
- Real-time browsing test reports of each channel
- Diversified reports & charts: Real-time report, Cut-off report, X-Y scatter chart report
SOFTWARE INTEGRATION (OPTION)

- Battery Pro can communicate to most thermal chambers for life and temperature testing.
- Many third party devices can be integrated into the 17030 via standard interface protocols (discrete I/O interface, GPIB, etc).

**BMS communication interface:** Collect Battery Management System data automatically during testing.
- User types in the CAN massage
- Convert DBC to Battery Cycler by Software Tools

**Data logger:** Data logger integration allows for detailed collection of voltage, current and temperature data during charge/discharge profiling.
- Support B, E, J, K, N, R, S, and T type thermal couples with ITS-90 defined temperature range
- Individual channel cold junction compensation with \(< \pm 0.3^\circ C\) accuracy
- Temperature resolution up to 0.01˚C, error down to (0.01% of reading + 0.3˚C)
- Voltage full range ±10VDC, resolution 10uV, error down to 0.015% of reading + 100uV
- No matter how many channels are active, the data rate can be as fast as 5 samples per second per channel.
# PROTECTION FUNCTION AND DATA RECOVERY

## Safety Protection
- Channel monitoring icon: empty, contact checking, contact check failed, reverse polarity, standby, running, pause, finish, communication error, etc
- Save testing data when PC is down or disconnected
- Save the test settings to resume after the power failure is recovered

## SPECIFICATIONS-1

### Model 17030 *

<table>
<thead>
<tr>
<th>Channel</th>
<th>1</th>
<th>2</th>
<th>1</th>
<th>1</th>
<th>1</th>
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<tbody>
<tr>
<td>Max Power</td>
<td>90kW</td>
<td>180kW</td>
<td>180kW</td>
<td>250kW</td>
<td>210kW</td>
</tr>
<tr>
<td>Max Power / Per channel</td>
<td>90kW</td>
<td>90kW</td>
<td>180kW</td>
<td>250kW</td>
<td>210kW</td>
</tr>
<tr>
<td>Max Voltage</td>
<td>450V</td>
<td>450V</td>
<td>700V</td>
<td>700V</td>
<td>900V</td>
</tr>
<tr>
<td>Max Current / Per channel</td>
<td>200A</td>
<td>200A / 300A</td>
<td>500A</td>
<td>500A</td>
<td></td>
</tr>
</tbody>
</table>

### Constant Voltage Mode
- Voltage accuracy: 0.1%F.S., 0.1%F.S., 0.1%F.S., 0.1%F.S., 0.1%F.S.
- Voltage resolution: 10mV, 10mV, 15mV, 15mV, 20mV

### Constant Current Mode
- Max Current: 200A, 200A, 300A, 500A, 500A
- Current accuracy: 0.1%F.S., 0.1%F.S., 0.1%F.S., 0.1%F.S., 0.1%F.S.
- Current resolution: 10mA, 10mA, 15mA, 20mA, 20mA

### Constant Power Mode
- Max Power / Per channel: 90kW, 90kW, 180kW, 250kW, 210kW
- Power accuracy: 0.2%F.S., 0.2%F.S., 0.2%F.S., 0.2%F.S., 0.2%F.S.
- Power resolution: 5W, 5W, 10W, 20W, 20W

### Current Rising Time
- 10ms with 0.2Ω Resistive load

### Ripple Noise (DC Current)
- <1%F.S.

### Measurement
- Voltage Read Back range: 0~450V, 0~450V, 0~700V, 0~700V, 0~900V
- Voltage accuracy: 0.05% rdg.+0.05% F.S., 0.05% rdg.+0.05% F.S., 0.05% rdg.+0.05% F.S., 0.05% rdg.+0.05% F.S., 0.05% rdg.+0.05% F.S.
- Voltage resolution: 10mV, 10mV, 15mV, 15mV, 20mV

### AC Input
- Line voltage / Frequency: 3Ø 200V/220V/380V/440V/480V ± 5%, 47~63Hz

### Others
- Audible noise level (in 1m distance): Under 80dB
- Efficiency (Typical): 85%
- Interface: Ethernet
- Operation Temperature: 0°C ~ 40°C

### Dimension (H x W x D)
- Transformer: 1111 x 813 x 686mm / 43.75 x 32 x 27 inch
- Power Enclosure: 1982 x 1982 x 915mm / 78 x 78 x 36 inch

### Weight
- Transformer: approx. 465 kg / approx. 1025 lbs
- Power Enclosure: approx. 1140 kg / approx. 2500 lbs

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*All specifications are subject to change without notice. Please visit our website for the most up to date specifications.*
<table>
<thead>
<tr>
<th>Model</th>
<th>17030 *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel</td>
<td>1</td>
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<tr>
<td>Max Power</td>
<td>250kW</td>
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<tr>
<td>Max Power / Per channel</td>
<td>250kW</td>
</tr>
<tr>
<td>Max Voltage</td>
<td>900V</td>
</tr>
<tr>
<td>Max Current / Per channel</td>
<td>500A</td>
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<tr>
<td>Constant Voltage Mode</td>
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</tr>
<tr>
<td>Voltage Range</td>
<td>19-900 Vdc</td>
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<tr>
<td>Voltage accuracy</td>
<td>0.1% F.S.</td>
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<tr>
<td>Voltage resolution</td>
<td>20 mV</td>
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<tr>
<td>Constant Current Mode</td>
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<td>Voltage Range</td>
<td>15-700 Vdc</td>
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<td>Voltage accuracy</td>
<td>0.1% F.S.</td>
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<td>Voltage resolution</td>
<td>15 mV</td>
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<tr>
<td>Constant Power Mode</td>
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<tr>
<td>Max Power / Per channel</td>
<td>250kW</td>
</tr>
<tr>
<td>Power accuracy</td>
<td>0.2% F.S.</td>
</tr>
<tr>
<td>Power resolution</td>
<td>20 W</td>
</tr>
<tr>
<td>Current Rising Time</td>
<td>10 ms</td>
</tr>
<tr>
<td>Ripple Noise (DC Current)</td>
<td>&lt;1% F.S.</td>
</tr>
<tr>
<td>Overshoot</td>
<td>&lt;1% F.S.</td>
</tr>
<tr>
<td>Measurement *3</td>
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</tr>
<tr>
<td>Voltage Read Back</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>0~900V</td>
</tr>
<tr>
<td>Accuracy</td>
<td>0.05% rdg. +0.05% F.S.</td>
</tr>
<tr>
<td>Resolution</td>
<td>20 mV</td>
</tr>
<tr>
<td>Current Read Back</td>
<td></td>
</tr>
<tr>
<td>High range</td>
<td>0~500A</td>
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<tr>
<td>Accuracy</td>
<td>0.1% F.S.</td>
</tr>
<tr>
<td>Low range</td>
<td>0~125A</td>
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<tr>
<td>Accuracy</td>
<td>0.2% F.S.</td>
</tr>
<tr>
<td>Resolution</td>
<td>20 mA</td>
</tr>
<tr>
<td>Power Read Back</td>
<td></td>
</tr>
<tr>
<td>Power range</td>
<td>250kW</td>
</tr>
<tr>
<td>Power accuracy</td>
<td>0.2% F.S.</td>
</tr>
<tr>
<td>Power resolution</td>
<td>20 W</td>
</tr>
<tr>
<td>Thermal Sensor</td>
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<tr>
<td>Range</td>
<td>0°C ~ 90°C</td>
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<tr>
<td>Accuracy</td>
<td>±0.2°C</td>
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<tr>
<td>Resolution</td>
<td>0.1°C</td>
</tr>
</tbody>
</table>

Note 1: Customized rated power: Voltage 10~1200V; max Current 1000A; Power 90~500kW
Note 2: The output range of voltage is referred by the cabling. The connection between the device and battery is 3 meters long as standard accessory.
Note 3: 20us sampling rate for calculating battery capacity and energy

### Ordering Information

**17030**:
- Regenerative Battery Pack Test System 90kW / 450V / 200A / 1CH
- Regenerative Battery Pack Test System 180kW / 450V / 200A / 2CH
- Regenerative Battery Pack Test System 280kW / 700V / 200A / 2CH
- Regenerative Battery Pack Test System 250kW / 900V / 500A / 1CH
- Regenerative Battery Pack Test System 300kW / 700V / 1000A / 1CH

**17030**:
- Regenerative Battery Pack Test System 90kW / 450V / 200A / 1CH
- Regenerative Battery Pack Test System 180kW / 450V / 200A / 2CH
- Regenerative Battery Pack Test System 280kW / 700V / 200A / 2CH
- Regenerative Battery Pack Test System 250kW / 900V / 500A / 1CH

**17030**:
- Regenerative Battery Pack Test System 500kW / 1200V / 700A / 1CH

**A170201**:
- IPC for battery test system

**A692003**:
- Thermal sensor (90°C) - sensor cable (30cm)

**S1101-64**: Data logger - 64 channel (option)