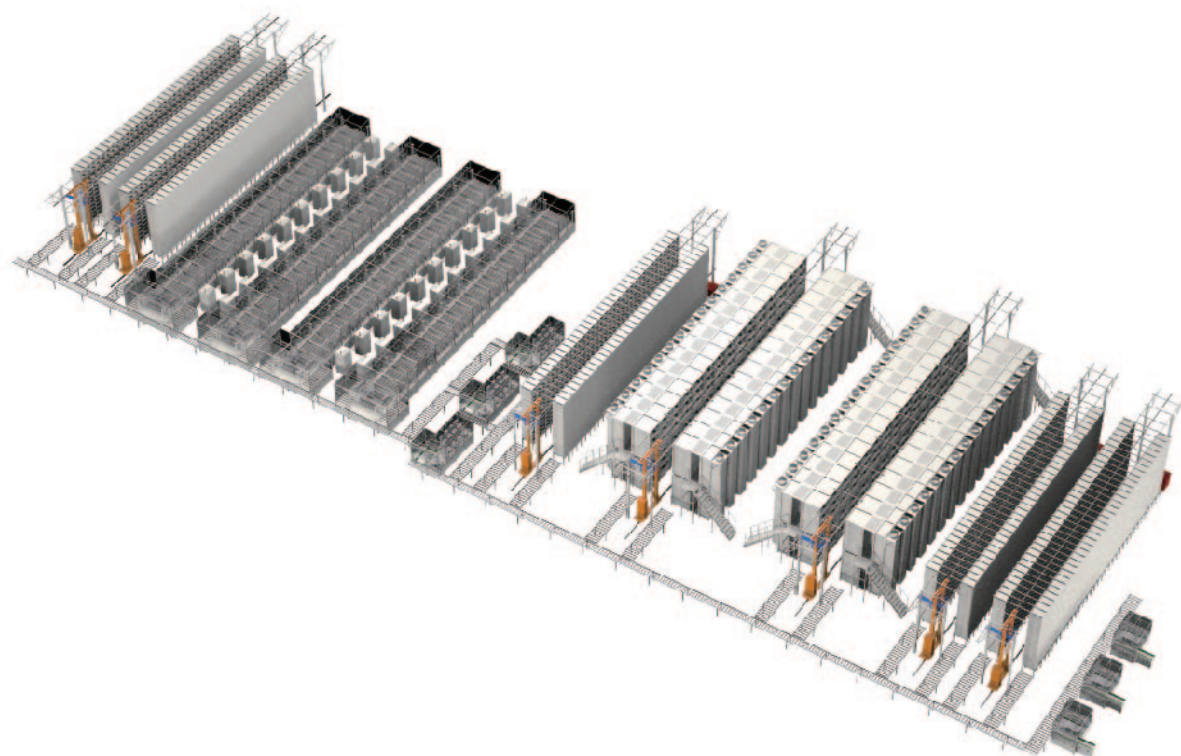


Solution of Pouch Cell



Since 1998

Service

Service Hotline: 83128100
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+86-755 83128900

Office Hours: Mon-Fri (GMT+8) 8:00AM - 6:00PM

NEWARE TECHNOLOGY LIMITED



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CE-7000 For EV & PACK

CT-9000
For Materials Research

CT/CTE-4000
For Research and Production

+86-755-83108866

www.neware.com.cn

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Test Equipment

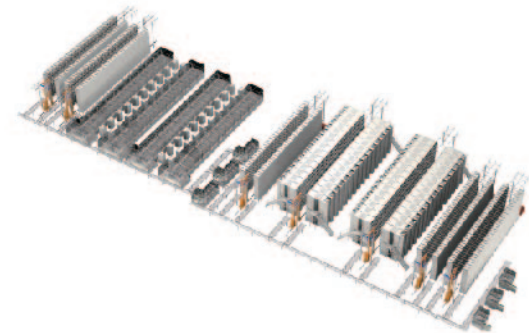


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- 06 CT-4000 Battery Testing System (5V6A&5V12A)
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Products Sheet

		≤18kW	≤18kW	≤10kW	≤1000kW
Category	Application and Specification	CT-4000	CT-8000	CT-9000	CE-7000
Formation and Grading	Cell	√		√	
	Super Capacitor	√		√	
Capacity、Power、Energy、SOC Testing、Cycle	Battery (Cell、Module、Pack)	√	√	√	√
	Super Capacitor	√	√	√	√
	BMS CANbus Supported				√
	UPS	√	√	√	
Simulation	Battery (Cell、Module、Pack)		√	√	
	Super Capacitor		√	√	
	Power Supply		√	√	
DCIR	Battery (Cell、Module、Pack)	√	√	√	√
Pulse and HPPC Testing	Battery (Cell、Module、Pack)	√	√	√	
Sampling Frequency (Max.)	1Hz				√
	10Hz	√			√
	100Hz		√		
	1000Hz			√	
Response Time (10% ~ 90% Range)	20ms	√	√		
	10ms				√
	1ms	√			
	100μs			√	
Voltage Range	5V	√	√	√	
	10V/20V	√	√	√	
	48V/60V	√	√	√	
	100V/200V/500V/800V				√
Current Range	5μA/150μA			√	
	1mA/10mA/20mA/50mA/5A/6A	√		√	
	10A/20A/50A/100A/200A	√	√		√
	300A/500A/1000A	√	√		√
	3000A	√			
Channel Quantity per Cabinet	1CH/2CH/4CH	√	√	√	√
	8CH/16CH/32CH	√		√	
	64CH/80CH/128CH	√			

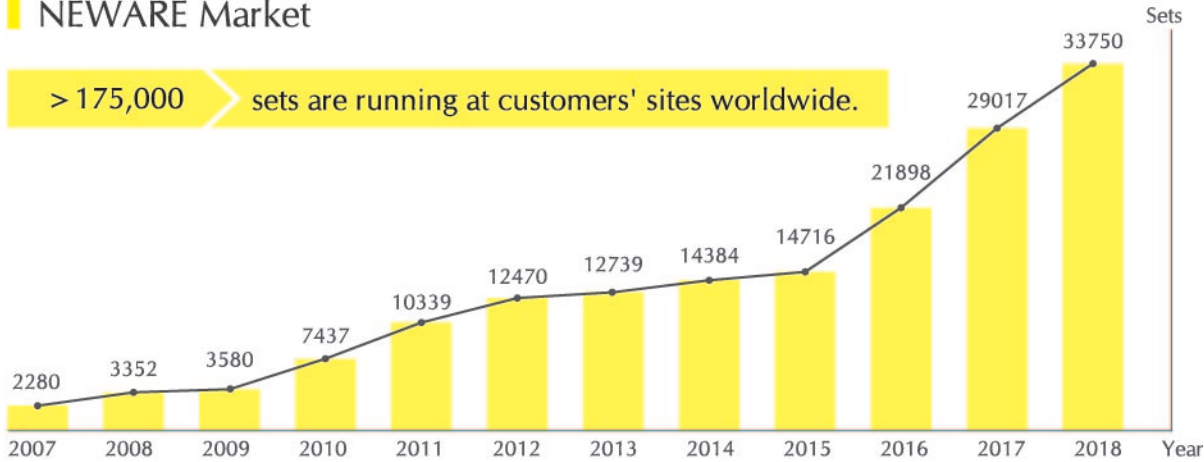
About NEWARE

Founded in 1998, Neware has been committed to providing reliable battery testing systems. Thus far, Neware has provided flexible, high accuracy battery testing equipment to more than 26,000 customers worldwide ranging from battery manufacturers to R&D institutes. Customers state they love the stable, cost-effective battery testing equipment, along with the great service of Neware.

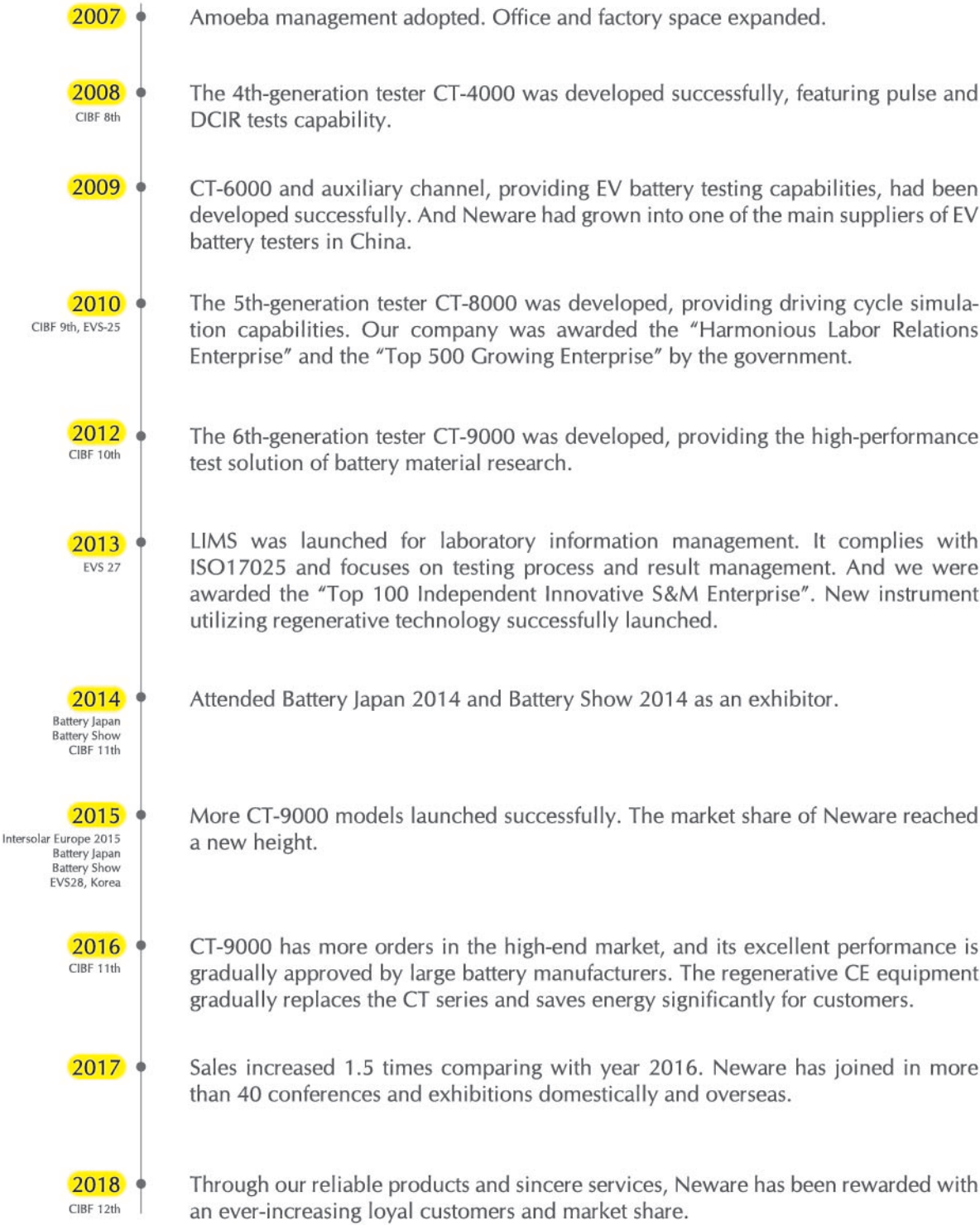
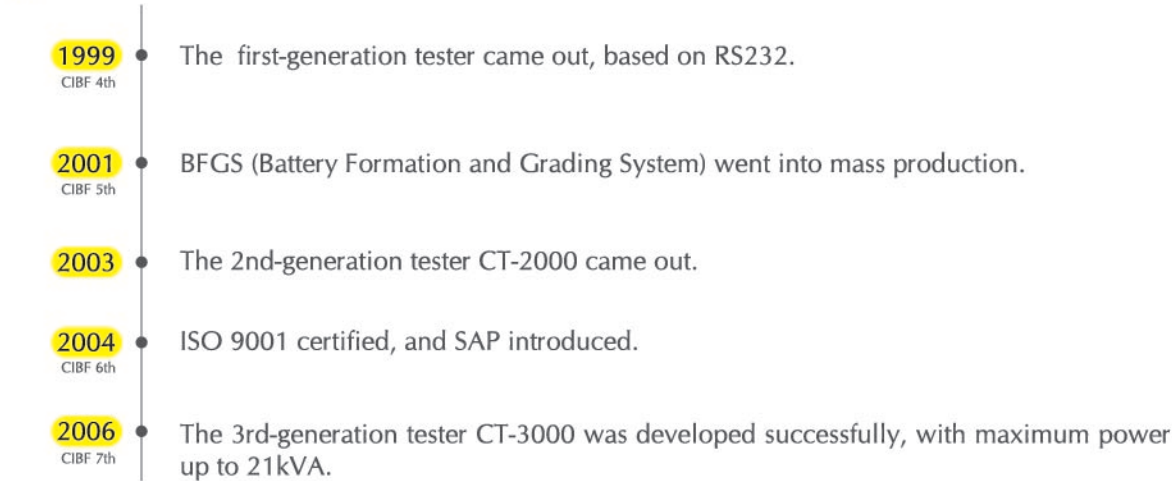
NEWARE Profile



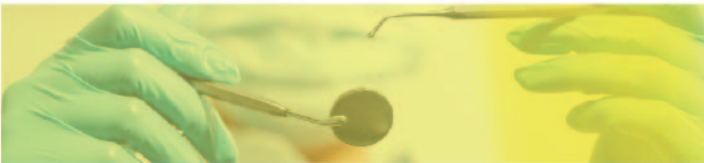
NEWARE Market



Milestones



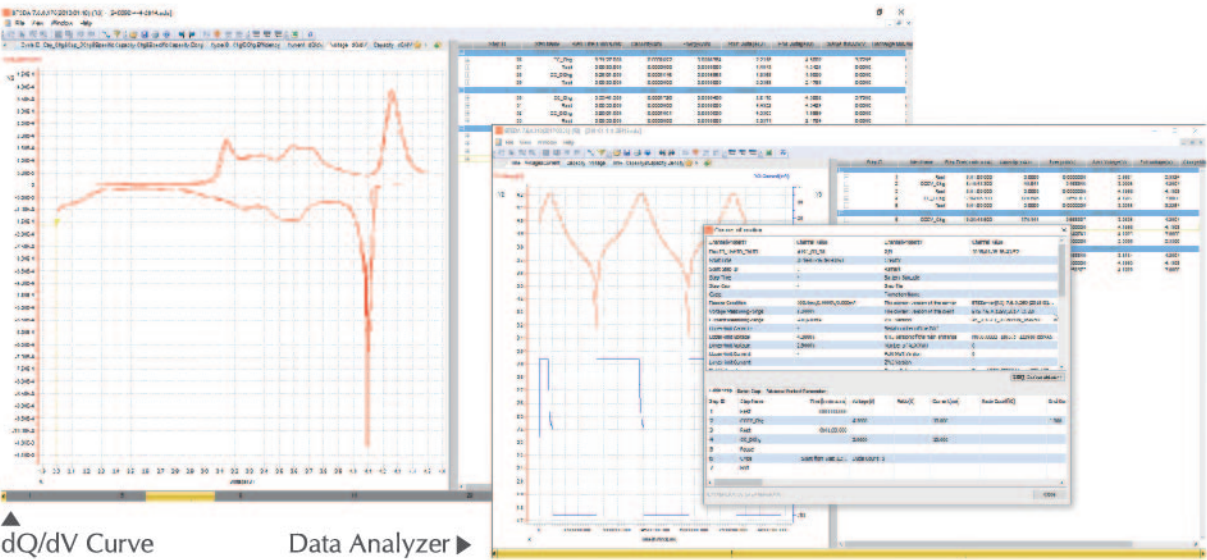
CT-4000 Battery Testing System (mA)



CT-4000 (Dual Range)	
5V10mA	5μA ~ 1mA; 1mA ~ 10mA
5V20mA	10μA ~ 2mA; 2mA ~ 20mA
5V50mA	25μA ~ 5mA; 5mA ~ 50mA

CT-4000 entered into market in the year of 2008. Now it is one of the most successful and most popular battery testing system in China. Thousands of battery manufacturers, battery research institutes and laboratories use it as their primary testing partner for their various testing activities.

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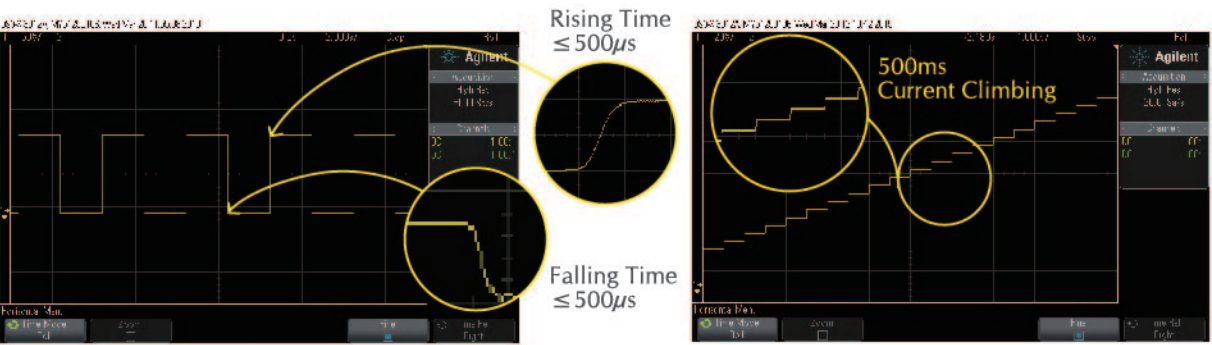
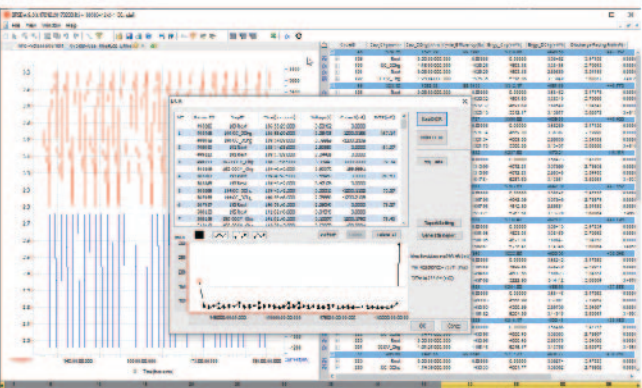
CT-4000 Battery Testing System (5V6A&5V12A)

CT-4000 (Dual Range)	
5V6A	0.5mA ~ 100mA; 100mA ~ 6A
5V12A	5mA ~ 1A; 1A ~ 12A



Due to the rapid data acquisition frequency, CT-4000 could be applied to super capacitor or EDLC (Electronic Double Layer Capacitor) tests. Through our advanced software, the capacitance, DCIR (Direct Current Internal Resistance) and LC (Leakage Current) could be easily calculated.

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$$DCIR = \frac{\Delta V}{\Delta I} = \frac{V_{t1} - V_{t0}}{I_{t1} - I_{t0}}$$

CT-4000 Battery Testing System (High Power)

CT-4000 entered into market in year 2008. It supports EV battery pulse charge/discharge, DCIR (Direct Current Internal Resistance), cycle life and c-rate tests.

CT-4000 mainly applies for institutions, colleges, universities and EV battery manufacturers.



Accuracy
0.1% FS



Data Acquisition Frequency
10Hz



Response Time
≤ 10ms



Min. Pulse Width
500ms



DCIR



Simulation



EDLC



HPPC

Used for formation, capacity grading & cycle life test of EV/HEV battery. Significantly improving the energy utilization, and decreasing the energy and heat emission during the tests.

Targeting battery manufacturers and EV/HEV manufacturers.



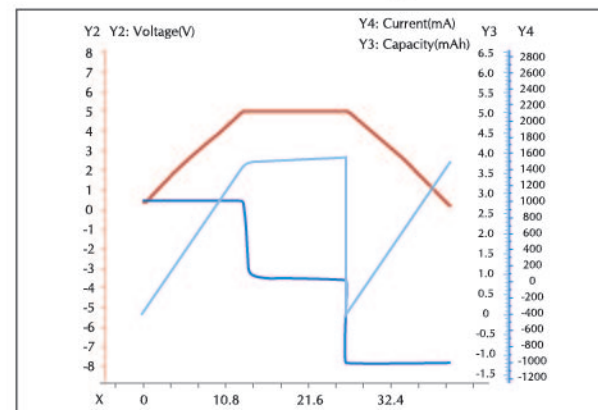
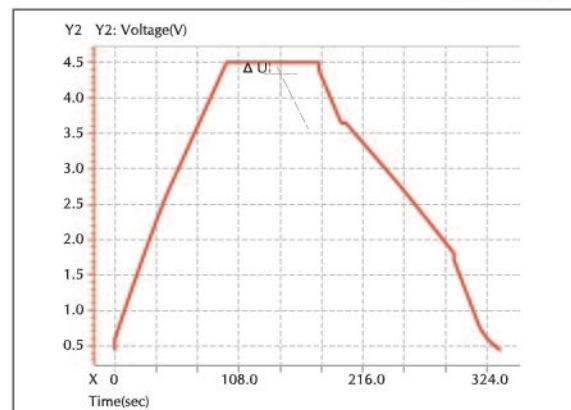
CT-4000

5V20A	5V30A	5V50A	5V60A	5V100A
5V200A	5V300A	5V500A	5V1000A	5V3000A
60V20A	60V40A	60V60A	60V100A	60V200A

Voltage range from 10V to 100V customizable.

$$\text{DCIR(Direct Current Internal Resistance): } R = \frac{\Delta V}{\Delta I} = \frac{V_{t1} - V_{t0}}{I_{t1} - I_{t0}}$$

$$\text{Capacitance : } C = \frac{\partial Q}{\partial U}$$

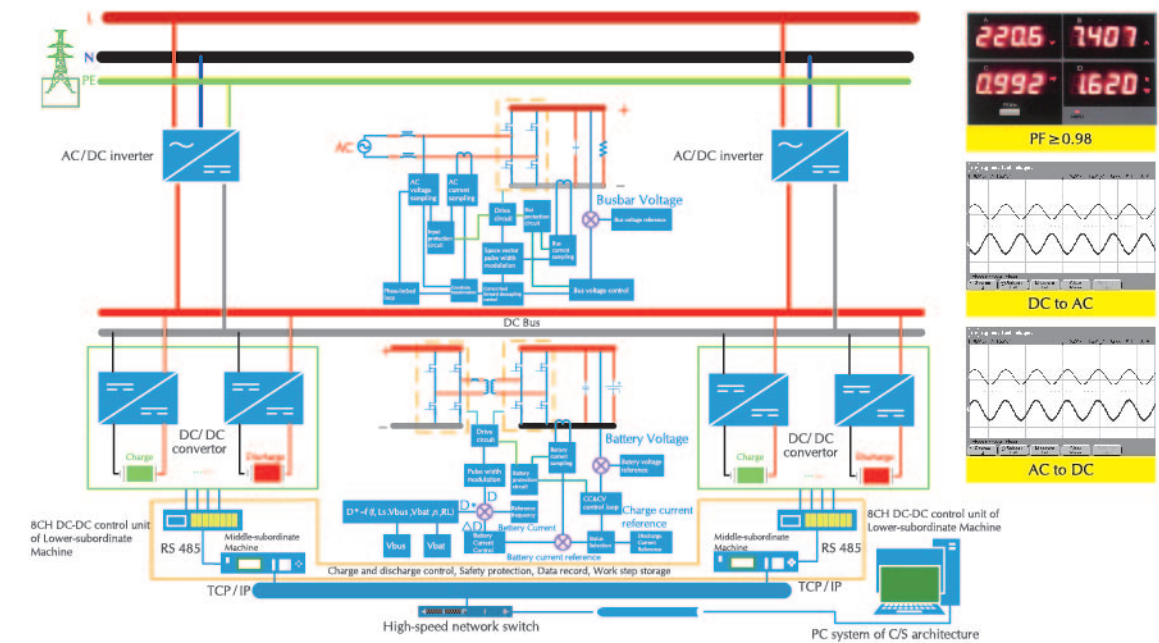


CTE-4000 Battery Testing System (Regenerative)



CTE-4000 (Regenerative)

5V30A	5V60A	5V120A	5V240A	5V480A
5V960A	60V60A	60V120A	60V240A	60V480A

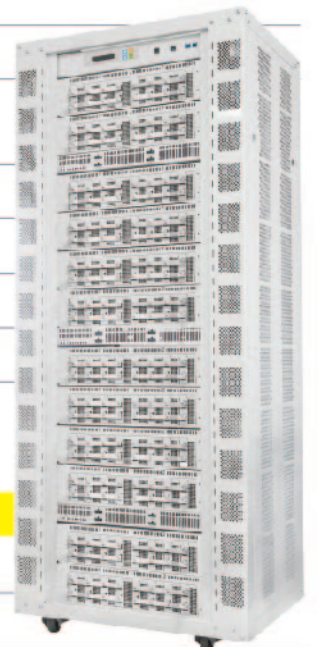


Features

Resolution:	AD: 16bit; DA: 16bit;
Accuracy:	0.05% FS;
Response Time:	≤ 20ms (Current in the range 10% ~ 90% FS);
Max. Output Power:	10kVA (User-definable);
Data Acquisition Frequency:	10Hz;
THD(Total Harmonic Distortion):	5%;
PF:	≥ 0.98.

Applications


Bulk Testing / Mass Production Testing;
C-Rate, Static Capacity, Cycle Life, etc.




CT-8000 Driving Cycle Simulation

CT-8000		
5V100A	5V200A	5V300A
5V400A	5V500A	5V1000A


CT-8000 is an upgraded version of CT-4000 which is focusing on EV battery test, electrical tool battery test, super capacitor test and engine starting battery test. It is famous for its driving cycle simulation function, moreover, by supporting all these international schedules, such as DDS from EPA, such as IM240, UDDS, FTP, HWFET, NYCC, etc., CT-8000 Testing System has gradually become one of the most popular choices by numerous Labs, businesses and manufactures worldwide!




Accuracy
0.05% FS




Data Acquisition Frequency
100Hz




Response Time
≤ 20ms




Minimum Pulse Width
200ms




Cycle Life




Static Capacity

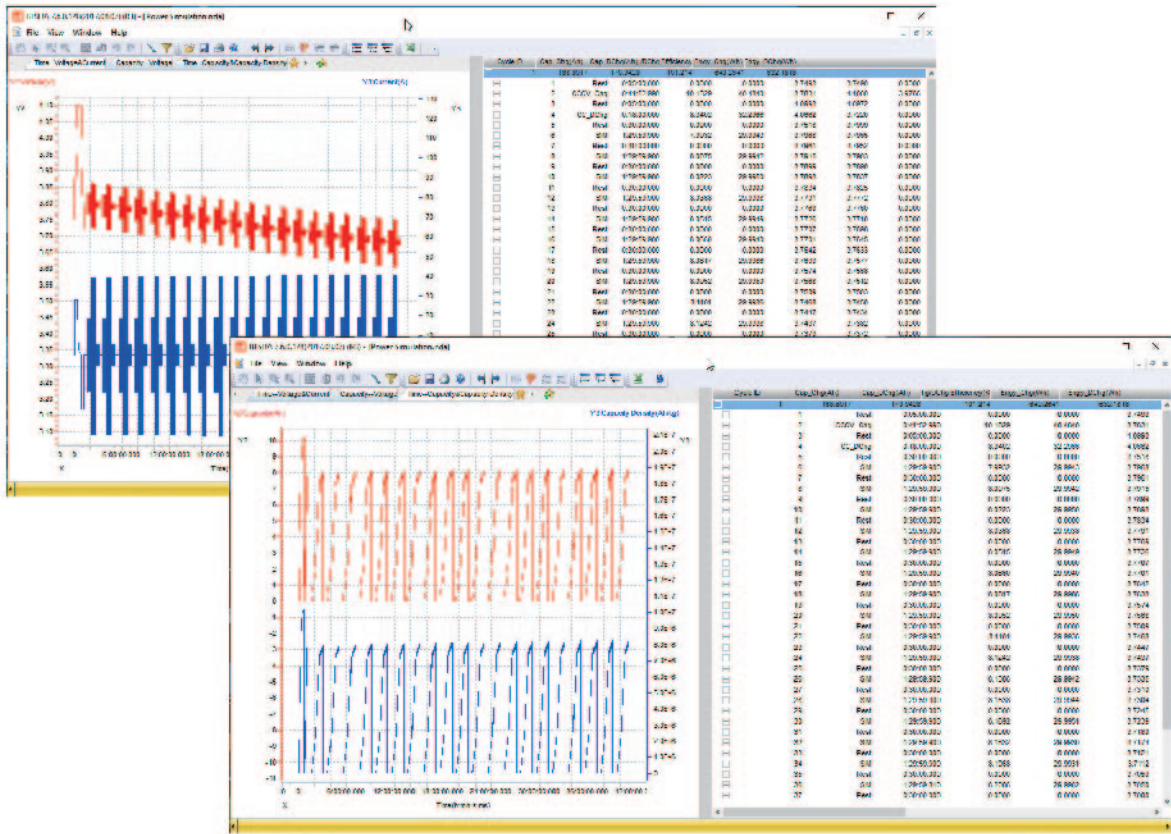
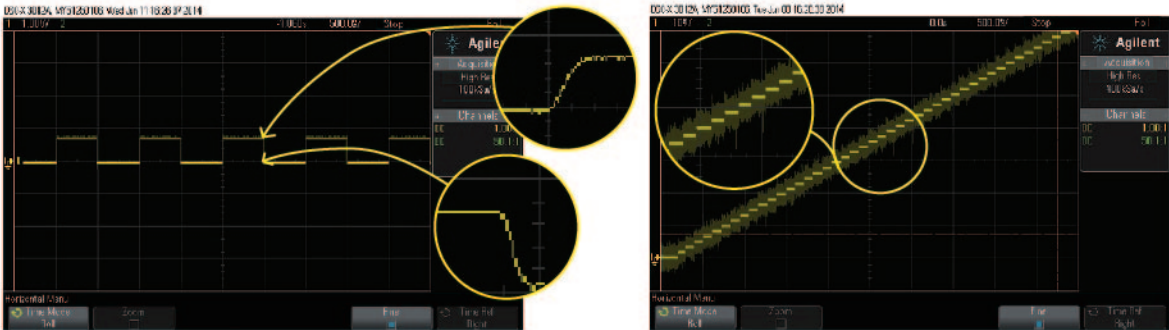
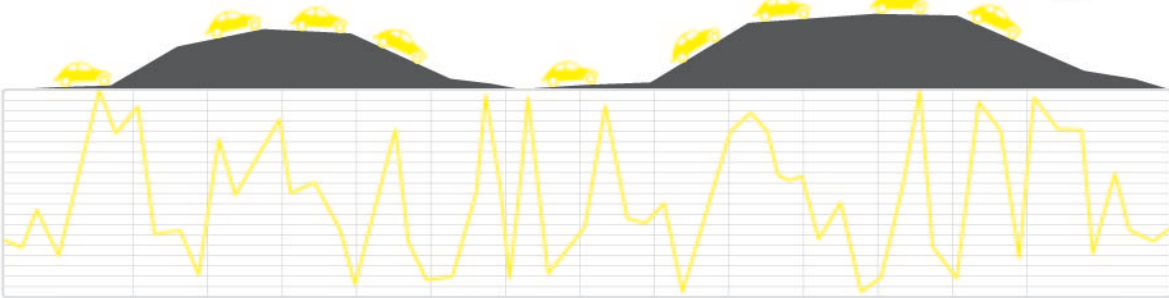


4 Ranges



HPPC





Applications

- Driving Cycle Simulation;
- Pulse Test / HPPC;
- C-Rate, Static Capacity, Cycle Life, etc.

Features


Resolution:	AD: 16bit; DA: 16bit;
Accuracy:	0.05% FS;
Response Time:	≤ 20ms (Current in the range 10% ~ 90% FS);
Max. Output Power:	21kVA;
Data Acquisition Frequency:	100Hz;
Current Ranges:	Max.4 current ranges;
Minimum Pulse Width:	200ms.

CE-7000 EV Battery Testing System




CE-7000 (IGBT)				
Power	75kVA	150kVA	300kVA	600kVA
Voltage	60V ~ 1000V			
Current	100A ~ 1000A			


CE-7000, as the new generation testing system with high voltage and high power output capability, is designed for the tests of battery pack.
CE-7000 utilizes IGBT (Insulated Gate Bipolar Transistor) technology which is much different from traditional power devices and control methods. Stable and reliable testing control performance makes CE-7000 the best testing system for EV battery and energy storage battery.




Accuracy
0.1% FS




Data Acquisition Frequency
10Hz




Response Time
≤ 10ms



Minimum Pulse Width
500ms



CANBus



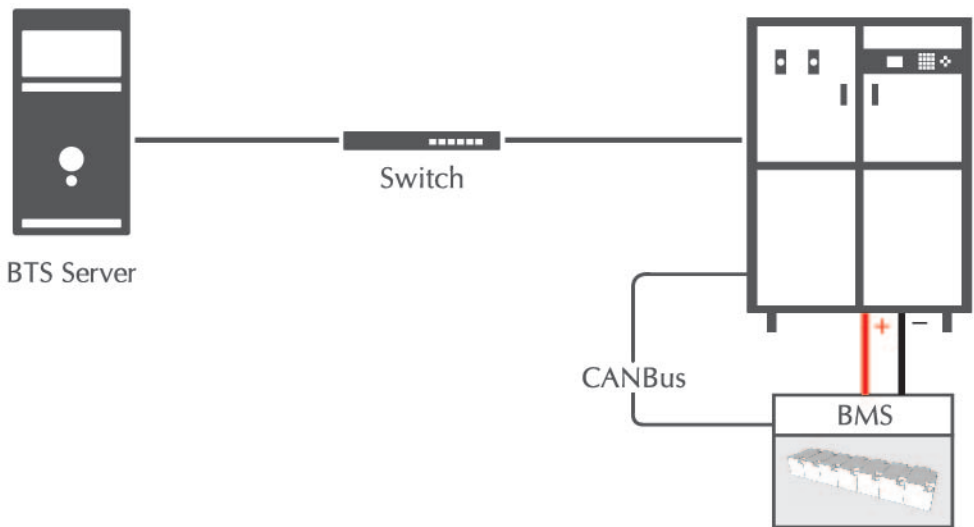
Simulation



The key control circuit of IGBT system uses digital signal processor (DSP) as key digital circuit. Based on TI's C2000 platform, its abundant peripheral resources and high-speed digital computing capabilities enable it to meet the needs of data processing and system control.



For some battery packs without BMS, our auxiliary voltage and temperature sensors will help you to detect the voltage and temperature of every single cell in battery packs.



Applications

- DCIR / Pulse Test / HPPC;
- C-Rate, Static Capacity, Cycle Life, etc.

Features

Resolution:	AD: 16bit; DA: 16bit;
Accuracy:	0.1% FS;
Response Time:	≤ 10ms (Current in the range 10% ~ 90% FS);
Max. Output Power:	1000kVA;
Data Acquisition Frequency:	10Hz;
Parallel Channel:	Up to 2 channels;
Minimum Pulse Width:	500ms.

CT-9000

Cutting-edge Technology for Battery Material Research



CT-9000 (Multi Range)		
Range1	0.1μA ~ 150μA	± 30nA
Range2	150μA ~ 5mA	± 1μA
Range3	5mA ~ 150mA	± 30μA
Range4	150mA ~ 5A	± 1mA

CT-9000, as our latest battery testing system, brings you up-to-date, sophisticated hardware technology and brand-new software experience. It's characterized with a maximum data acquisition frequency of 1000Hz, 4 automated-switch output ranges, 0.02% accuracy and a minimum pulse width of 400μs.



Accuracy
0.02% FS



Data Acquisition Frequency
1000Hz



Response Time
≤ 100μs



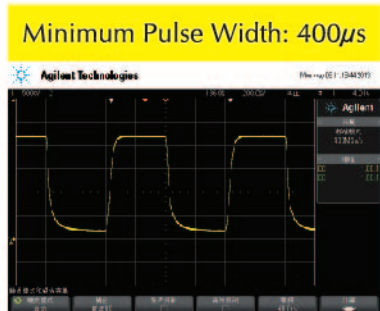
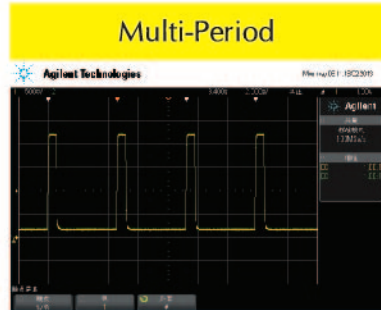
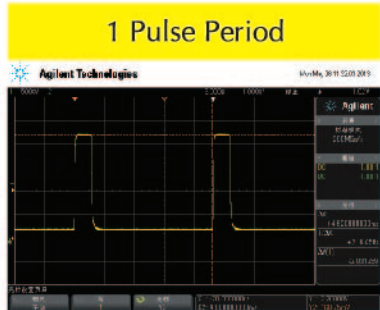
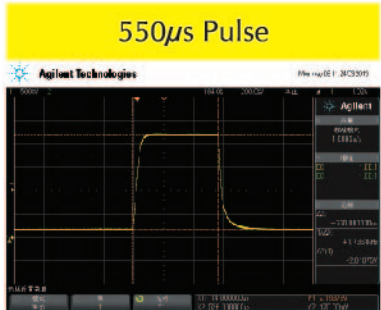
Min. Pulse Width
400μs



GSM
CDMA



GSM Curves Output by CT-9000,
Captured by Agilent Oscilloscope



Applications

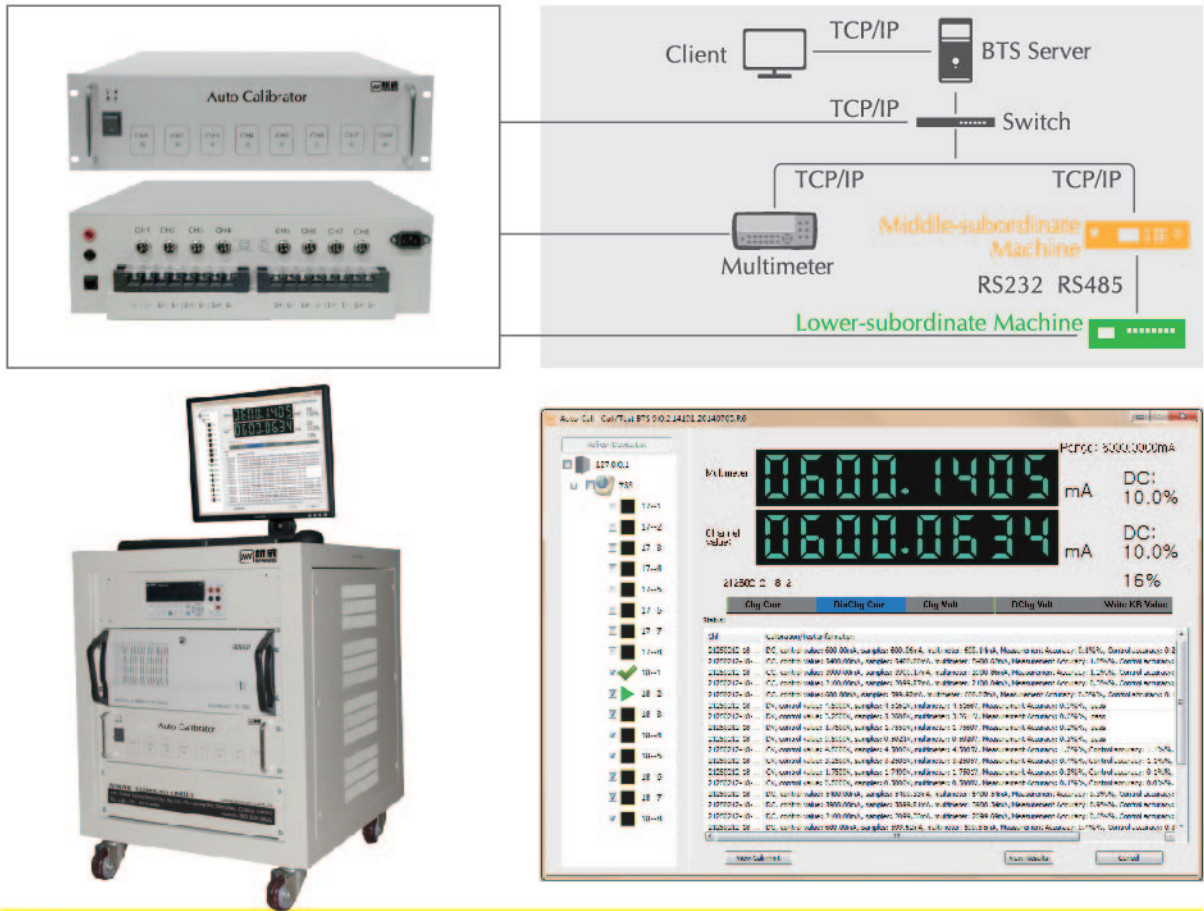
GSM / CDMA / GPRS and other pulses tests;
C-Rate, Static Capacity, Cycle Life, etc.

Features

Resolution :	AD: 16bit; DA: 16bit;
Accuracy:	0.02% FS;
Response Time:	≤ 100μs (Current in the range 10% ~ 90% FS);
Minimum Pulse Width:	400μs;
Data Acquisition Frequency:	1000Hz;
Voltage Range:	5V;

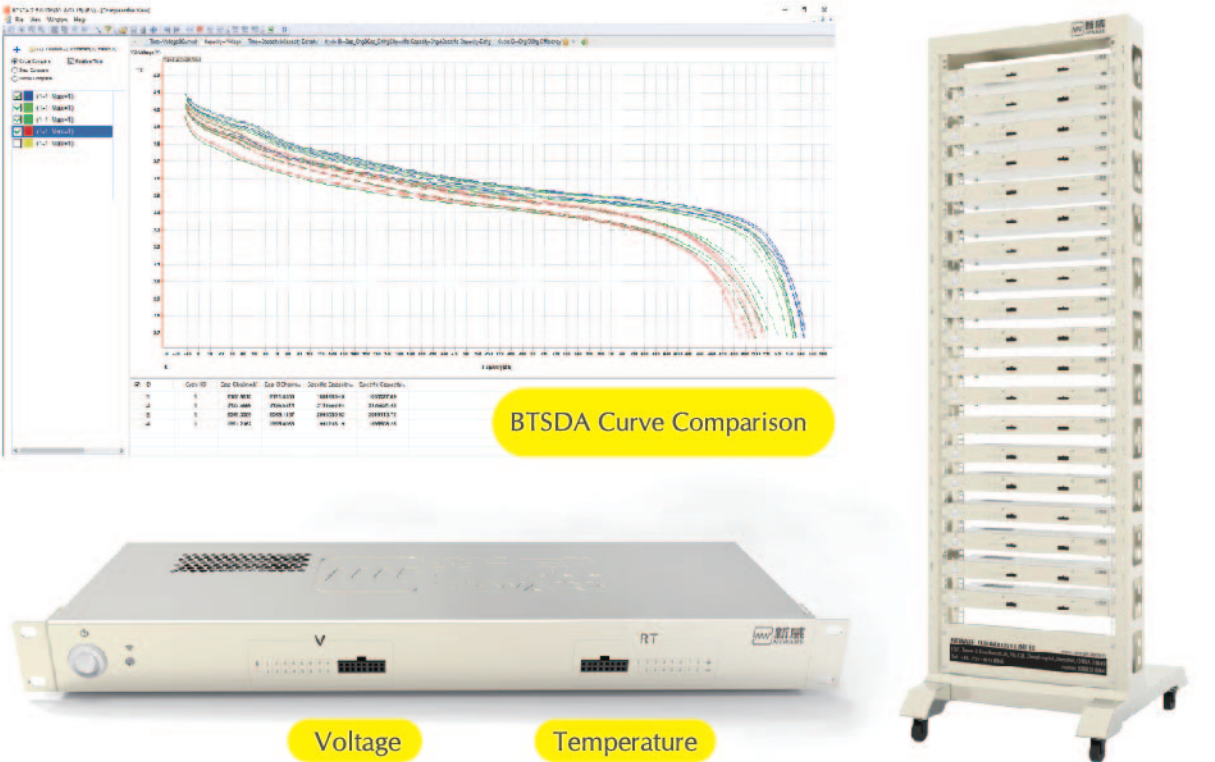
Auto Calibrator

Schematic diagram of calibration system connection



Features	
Communication Interface:	Ethernet 100M
Communication Protocol:	TCP/IP
Calibration Range:	Voltage: 0-10V; Current: 1mA-500A
Output Range:	5V50mA, 5V6A, 5V12A, 5V60A, 5V120A (can be customized)
Calibration Segments:	3 segments of current/voltage
Time of Calibration and Verification for each Channel:	Lower current channel: 60s, Higher current channel: 240s, Aux channel: 30s
Data Export:	PDF, EXCEL, TXT
Multimeter Model:	Agilent 34410A or 34461A
Dimensions (W*D*H):	443*510*127mm
Operation Environment Temperature:	25°C ± 10°C
Storage Environment Temperature:	-10°C ~ 50°C
Operation Environment Humidity:	≤ 70% RH

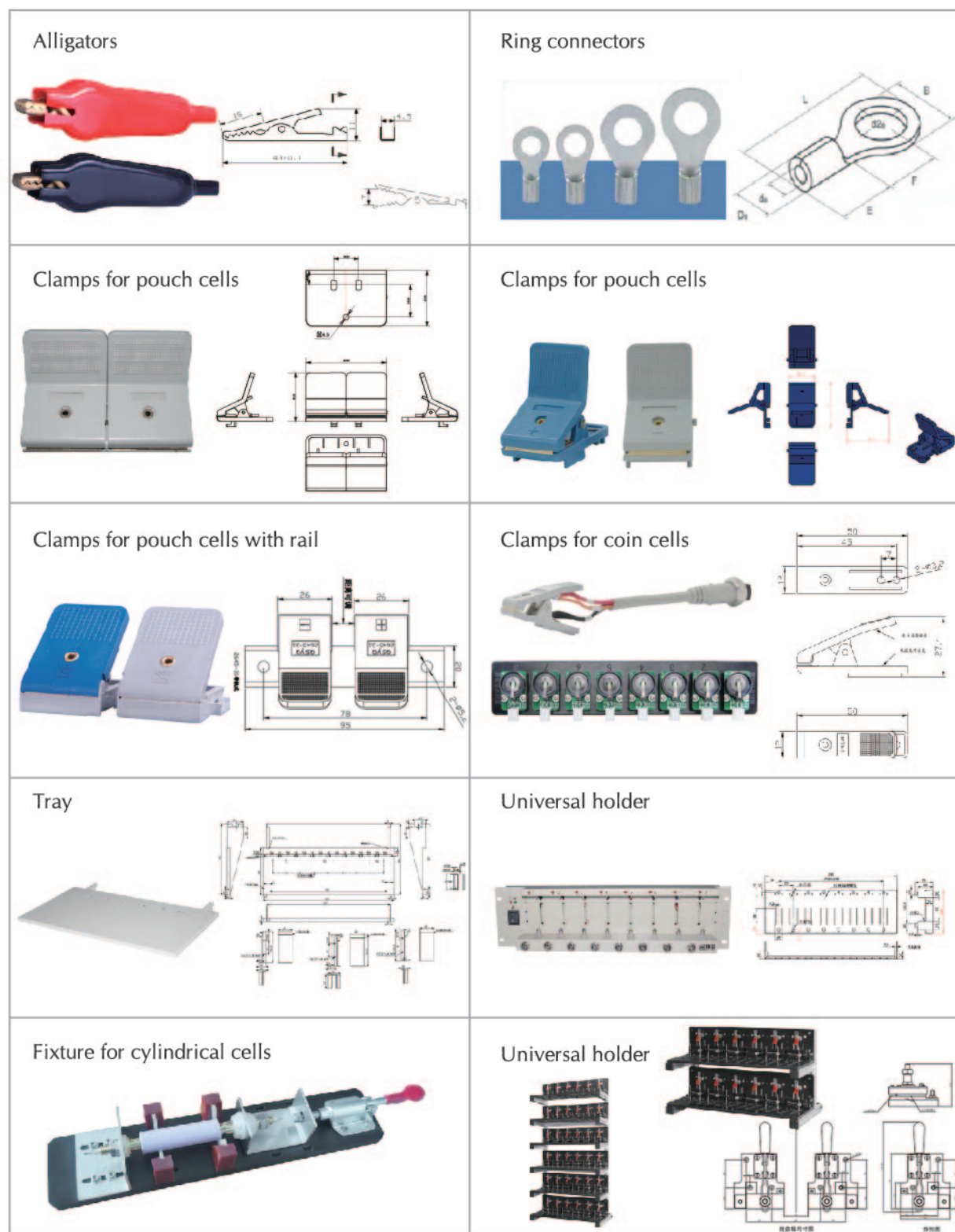
Aux Channel For Temperature and Cell Voltage Monitoring



Our auxiliary single voltage sensors will help you capture the voltages of every single cell in series. This will largely increase the testing safety. You can have advanced control based on the captured values.

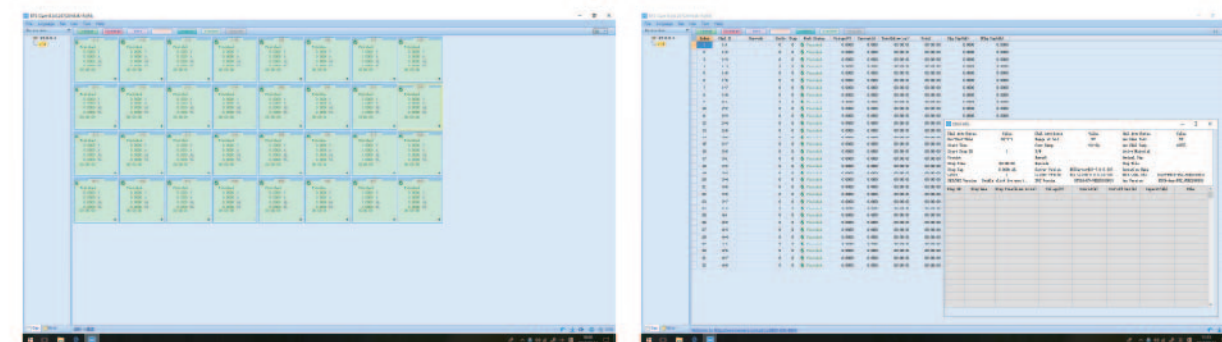
Features	
Channels Type:	Temperature, Voltage
Sensors:	Customized thermocouple (Type K/Type T available)
Temperature Range:	Thermistor: -35°C ~ 110°C; Thermocouple: -200 ~ 350°C (T); -200 ~ 1250°C (K)
Temperature Accuracy:	± 1°C
Temperature Resolution:	0.1°C
Voltage Range:	± 5V
Voltage Accuracy:	± 0.1 % of FS
Export Formats:	EXCEL、TXT
Communication Interface:	RS485
Channels Mapping:	Connect with BTS and CE-7000 through the software
Software Protection:	By working with the main channel, AUX channel can realize the protection of the sudden voltage drop caused by current loop circuit; the individual cell voltage limits protection, temperature protection.
AUX channels per Main Channel:	1 - 248 optional

Accessories

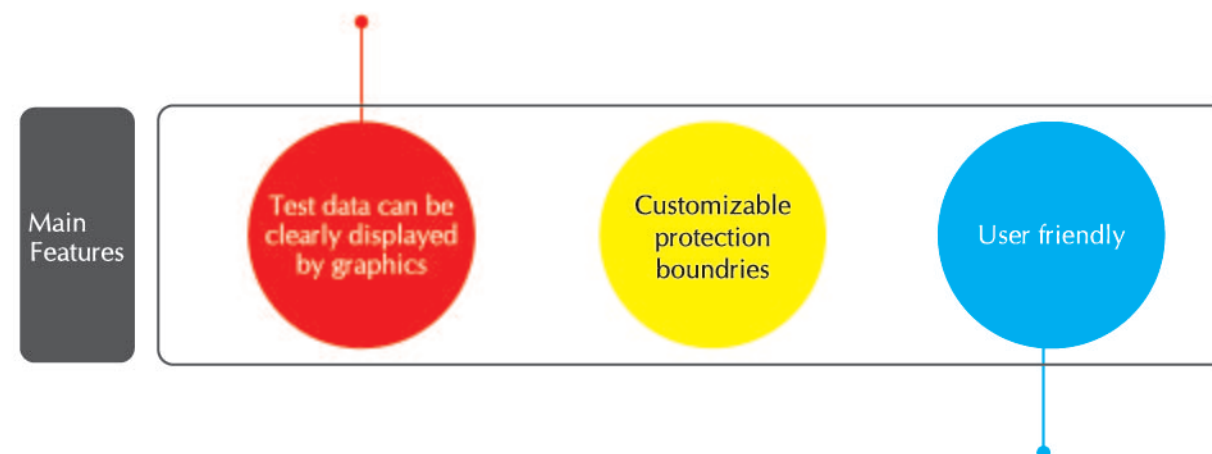


Software

The brand-new BTS software 8.0 version is a whole new different system comparing with the old software. it's much more powerful, flexible and intuitive, it's designed to meet the requirements of both research and large-scale production. For customers who have used Neware before, BTS8.0 looks similar and the improvements make it more efficient for you to do the same tasks as before. For new customers, BTS8.0 helps you to get more out of Neware hardware quickly and easily.

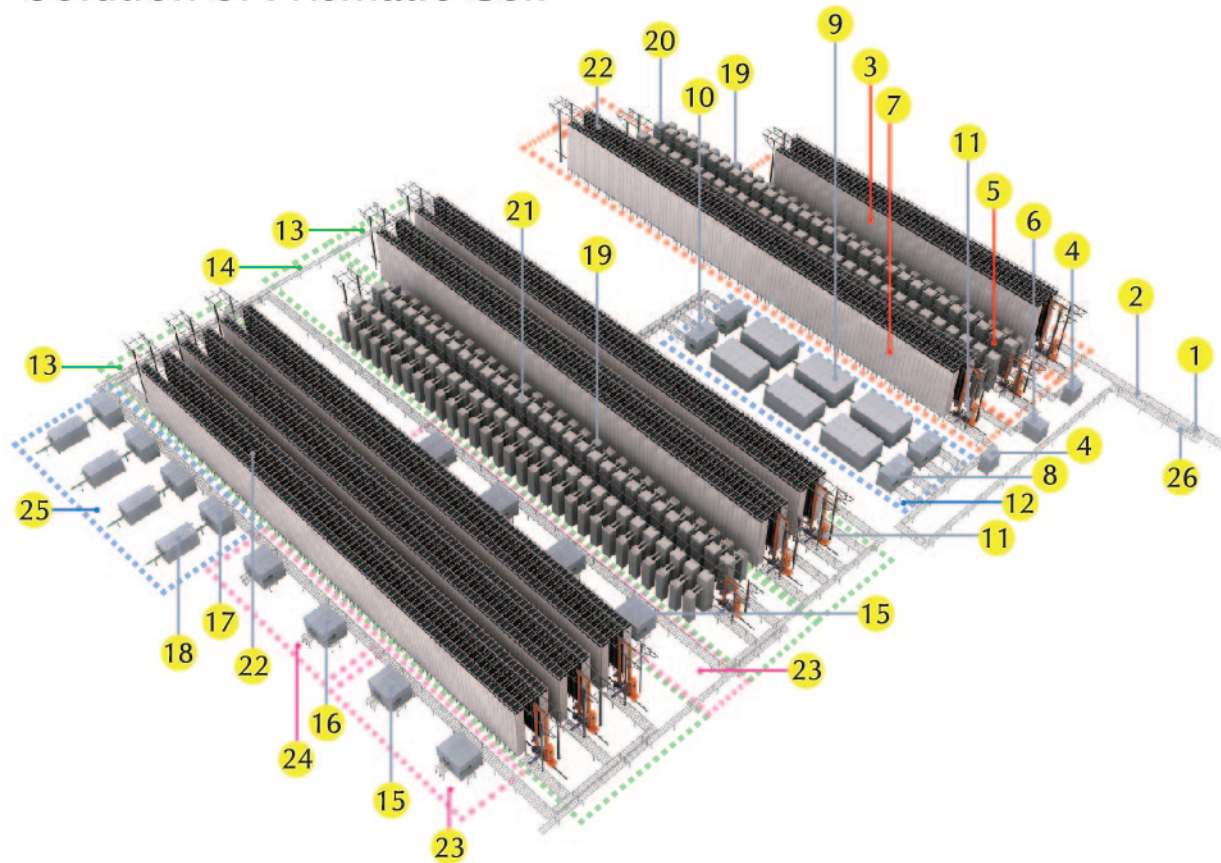


Test data can be clearly displayed both in graphics and detailed records;
 BTSDA powers you process and summerize data quickly;
 Data fields are now optional;
 Standard API included, 3rd party equipment integration can be easily made.



User-friendly interface, users can customize outlook of the software;
More powerful data analyzer software for flexible data display and reports/plots generation;
Standard API included, especially for 3rd party equipment integration and large-scale production.

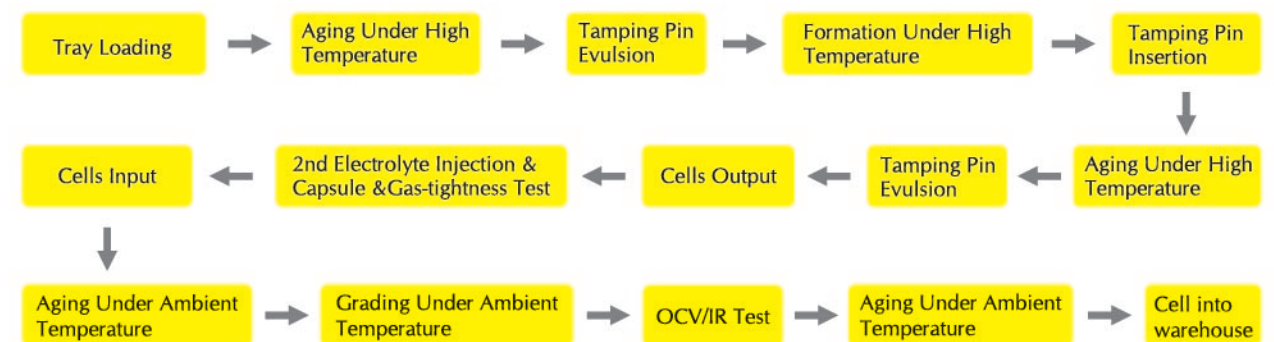
Solution of Prismatic Cell



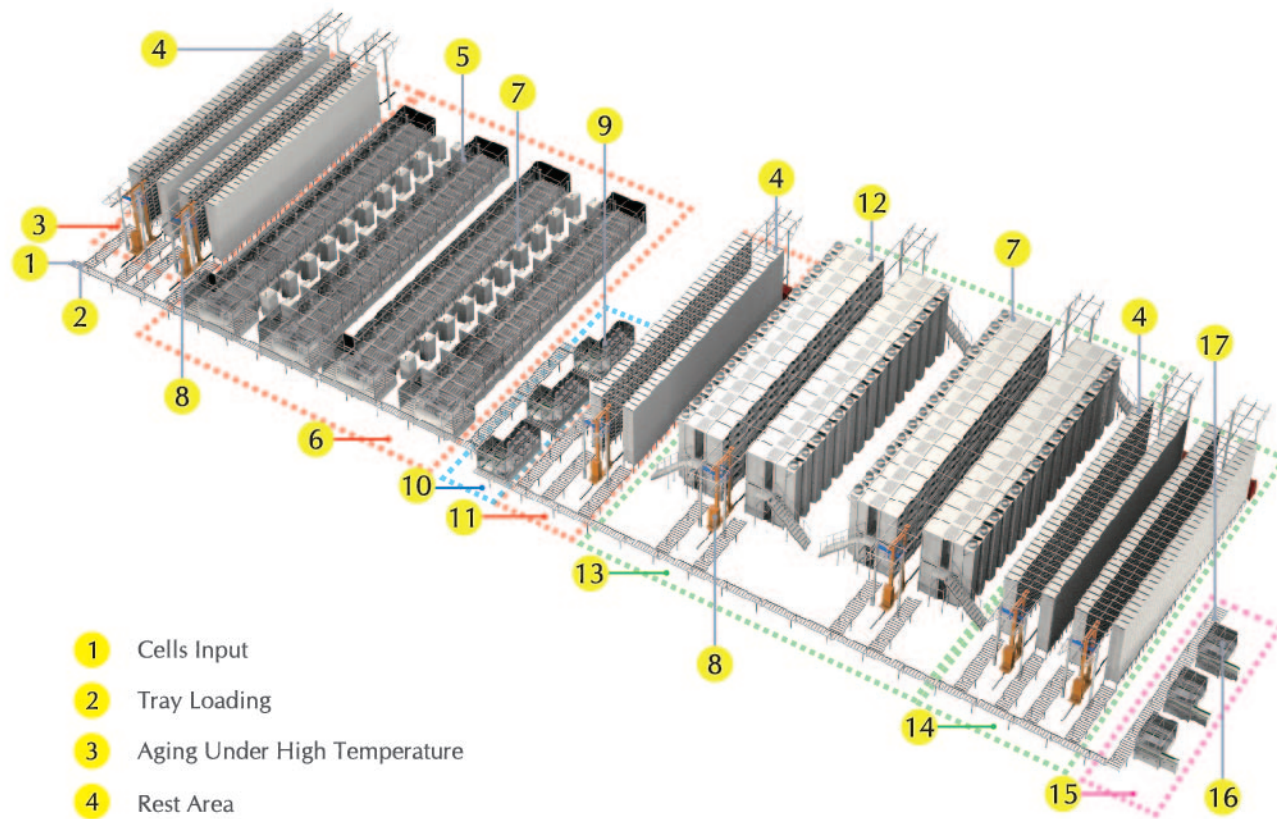
- | | |
|--|-------------------------|
| 1 Cells Input | 15 OCV/IR |
| 2 Tray Loading | 16 DCIR |
| 3 Aging Under High Temperature | 17 Grading Machine |
| 4 Tamping Pin Capsule Filling | 18 Cell Wrapping |
| 5 Formation Under High Temperature | 19 Battery Tester |
| 6 Tamping pin Removing | 20 Formation Machine |
| 7 Aging Under High Temperature | 21 Battery Tester |
| 8 Cells unloading from Tray | 22 Aging Area |
| 9 2nd Electrolyte Injection & Capsule & Gas-tightness Test | 23 OCV / IR Test Area |
| 10 Tray Loading | 24 DCIR Test Area |
| 11 RGV | 25 Cell Wrapping Area |
| 12 2nd Electrolyte Injection Area | 26 Tray Loading Machine |
| 13 Aging Under Ambient Temperature | |
| 14 Capacity Check Under Ambient Temperature | |

Features of production line system

- Compatible with different types of cells.
- Bi-directional DCDC & DCAC Inverter.
- Air cooling system.
- Additional smoke sensors.
- Additional temperature protection.
- Automatic calibration system.
- Independent heating and pressure system.
- Independent channel control.
- Automatic cells loading/unloading.
- Additional temperature protection.
- Planning system integration.

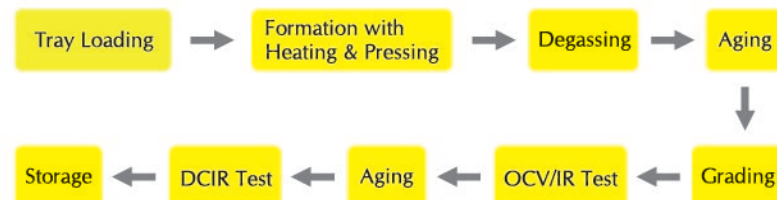


Solution of Pouch Cell



- | | |
|--|---|
| 1 Cells Input | 12 Battery Tester |
| 2 Tray Loading | 13 Capacity Check Under Ambient Temperature |
| 3 Aging Under High Temperature | 14 Aging Under Ambient Temperature |
| 4 Rest Area | 15 OCV / IR Test Area |
| 5 High Pressure and High Temperature Formation Machine | 16 OCV / IR Test Machine |
| 6 Formation Area | 17 Cells Output |
| 7 Battery Formation Tester | |
| 8 RGV | |
| 9 Degassing | |
| 10 Degassing area | |
| 11 High Temperature Aging Area | |

Process Flow



Features of Formation Area

- Automatic cells loading/unloading.
- Independent heating and pressure system.
- Bi-directional DCDC & DCAC Inverter.
- Automatic calibration system.
- Compatible with different types of cells.
- Additional temperature protection.
- Planning system integration.
- Continuous data protection.

Features of Grading Area

- Data real-time backup.
- Compatible with multiple cells.
- Air cooling system.
- Adopting DCAC regenerative power supply: automatical calibration.
- Independent scheduling system and database system.
- Loading and unloading cells by RGV automatically.
- Configured temperature sensor to monitor the cell in real time.
- Additional smoke sensors.