LANHE

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LANHE

PROFESSIONAL BATTERY TEST EQUIPMENT SUPPLIER

WUHAN LAND ELECTRONIC CO., LTD.

Battery test equipment,we only produce quality products.

People-Oriented
Teamwork
Customer First
Pioneerring And Innovative

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# CONTENT

# 01 ABOUT LANHE



## COMPANY PROFILE

Wuhan LAND Electronics Co., Ltd. is located in the national development area,Wuhan East-lake High-tech Development Zone.It is a high-tech company specialized in software and hardware developing, manufacturing and distribution for battery testing systems and accessories.

The LANHE(the former “LAND”) series battery testing system have been developed and improved independently by company since 1998 and is well known with its high technology, high precision and excellent reliability in the battery testing field.After years of development, the company has always focused on battery testing system, adhere to the management strategy to build boutique in the industry , invest enormous human and material resources in the development of newproducts, and constantly upgrade to improve our products.

Our company has passed ISO9001:2015 quality system certification,CE certification and achieved a number of national patents.The LANHE Product Series can support most of applications in battery testing field , including test of materials research,battery formation and grading, super-capacitor batteries, covering lithium-ion batteries, Ni-MH battery, Ni-Cd battery,pouchcell, super-capacitors and so on.Higher quality products and better after-service provided by LANHE will bring you a good experience.Partnership with LANHE will accompany you witness a successful future for you and your company.

## CULTURE

| | |
|---|---|
| Aim | Enhance brand effect,<br>integrity for development,<br>stick to making high-quality product |
| Development | Innovation, down-to-earth, self-surpassing |
| Technology | Take the lead in an industry full of change |
| Recruitment | Moral and capable, enable partner competent |
| Values | Reasonable, open-mind, diligent, honest |
| Service | Honest, efficient, first-rate |

## COMPANY HISTORY

**1998年**
We founded in 1998,
and the first generation of testing system launched.

**2007年**
We Incorporated as Wuhan LAND Electronic Co., Ltd. in 2007.

**2011年**
We acquired ISO9001 quality system certificate, meanwhile we’ re certified as National high-tech company.

**2013年**
We Incorporated as stock corporation.

**2014年**
We were listed on the New Third Board.

**2016年**
Registered capital was increased to 30 million,
and came up with development blue print.

**2017年**
We shifted to a new building based in East Lake high tech development zone which covers an area of 7000 square meters.

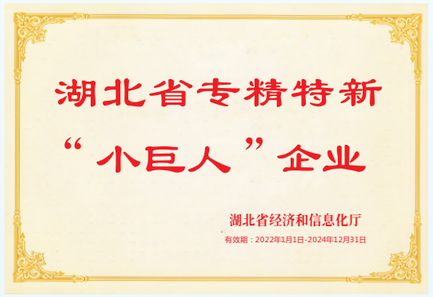
**2018年**
We were certified and acquired software certificate. CT3000 series and CT5000 series were launched.

**2019年**
We became a member of Ministry of Industry and Information Technology Lithium-ion Battery Safety Standards Working Group.

**2020年**
We accepted IPO pre-listing tutoring.

**2023年**
We listed on Beijing Stock Exchange.

## HONOR













# 02 PRODUCT PRESENTATION

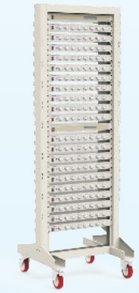
## CT3000 SERIES

Micro-current cell testing system

### Product Features

1.It is designed for testing of coin cell and super-capacitor.
2.Modular design, 8 independent channels per module. You can put 20 modules on a rack at most.
3.You can execute constant current charge and discharge, constant voltage charge and discharge, constant power charge and discharge, C-rate charge and discharge, constant resistance discharge, DCIR, rest etc on channels.
4.Channels won’t interfere each other, and they can have different processes simultaneously, totally independent.
5.It has multiple complete protective mechanism from software and hardware.
6.It has independent hardware of constant current source and constant voltage source.
7.Power-off protective mechanism.
8.You can calibrate it during test.


CT3004A



### Specifications

| Model | CT3004A |
|---|---|
| Current Range | Type 1: 1mA/5mA/10mA/20mA Type 2: 5mA/20mA/50mA/100mA Type 3: 20mA/100mA/200mA/500mA |
| Voltage Range | 5V |
| Working Mode | Constant current charge & discharge, Constant voltage charge & discharge, Constant power charge & discharge, Constant resistance discharge, C-Rate charge & discharge, DCIR, Rest |
| End Condition | Time, Voltage, Current, Capacity, Energy, C-Rate, Coulombic efficiency, Capacity retention, Aux termperature, Aux voltage, almost 20 kinds |
| Safety Mode | Overvoltage, Undervoltage, Overcurrent, Undercurrent, Over charge capacity, Over discharge capacity, Wrongreversed connection, Trends etc |
| Programmable Steps | Infinite |
| Number of Channels | 8 |
| Input Impedence | ≥1GΩ |
| Output | Four electrodes (Support tri-electrde test) |
| Voltage Tolerance | ≤±0.05%FS |
| Current Tolerance | ≤±0.05%FS |
| Power/Resistance Tolerance | ≤±0.1%FS |
| System Time Tolerance | ±1 Second (No accumulated error) |
| Voltage Resolution | 5 digits (Automatic) |
| Current Resolution | 5 digits (Automatic) |
| Power Supply | AC220V 50Hz/AC110V 60Hz |
| Rated Power | 40W |
| Dimension | 440mm(L)*215mm(W)*44.5mm(H) |

Note: This model can be upgraded to CT3004AP (voltage and current tolerance ≤±0.02%FS)

# CT3000 SERIES

## Small-current cell testing system

### Product Features

1.It is designed for testing of cylindrical cell, small pouch cell and super-capacitor.
2.Modular design, 8 independent channels per module. You can put 20 modules on a rack at most.
3.You can execute constant current charge and discharge, constant voltage charge and discharge, constant power charge and discharge, C-rate charge and discharge, constant resistance discharge, DCIR, rest etc on channels.
4.Channels won't interfere each other, and they can have different processes simultaneously, totally independent.
5.It has multiple complete protective mechanism from software and hardware.
6.It has independent hardware of constant current source and constant voltage source.
7.Power-off protective mechanism.
8.You can calibrate it during test.

CT3004A

CT3004C

### Specifications

| Model | CT3004A/CT3004C |
|---|---|
| Current Range | Type 1: 2A Type 2: 3A Type 3: 5A |
| Voltage Range | 5V |
| Working Mode | Constant current charge & discharge, Constant voltage charge & discharge, Constant power charge & discharge, Constant resistance discharge, C-Rate charge & discharge, DCIR, Rest |
| End Condition | Time, Voltage, Current, Capacity, Energy, C-Rate, Coulombic efficiency, Capacity retention, Aux termperature, Aux voltage, almost 20 kinds |
| Safety Mode | Overvoltage, Undervoltage, Overcurrent, Undercurrent, Over charge capacity, Over discharge capacity, Wrongreversed connection, Trends etc |
| Programmable Steps | Infinite |
| Number of Channels | 8 |
| Input Impedence | ≥1GΩ |
| Output | Four electrodes (Support tri-electrde test) |
| Voltage Tolerance | ≤±0.05%FS |
| Current Tolerance | ≤±0.05%FS |
| Power/Resistance Tolerance | ≤±0.1%FS |
| System Time Tolerance | ±1 Second (No accumulated error) |
| Voltage Resolution | 5 digits (Automatic) |
| Current Resolution | 5 digits (Automatic) |
| Power Supply | AC220V 50Hz/AC110V 60Hz |
| Rated Power | 400W |
| Dimension | CT3004A 454mm(L)*332mm(W)*100mm(H) CT3004C 454mm(L)*397mm(W)*154mm(H) |





# CT3000 SERIES

## 3C cell testing system

### Product Features

1.It is designed for testing of cylindrical cell, pouch cell and 3C cell.
2.Modular design, 8 independent channels per module. You can put 20 modules on a rack at most.
3.You can execute constant current charge and discharge, constant voltage charge and discharge, constant power charge and discharge, C-rate charge and discharge, constant resistance discharge, DCIR, rest etc on channels.
4.Channels won't interfere each other, and they can have different processes simultaneously, totally independent.
5.It has multiple complete protective mechanism from software and hardware.
6.It has independent hardware of constant current source and constant voltage source.
7.Power-off protective mechanism.
8.You can calibrate it during test.

CT3004K

### Specifications

| Model | CT3004K/CT3004KC |
|---|---|
| Current Range | Type 1: 100mA/500mA/3A/6A Type 2: 100mA/1A/6A/12A |
| Voltage Range | 5V |
| Working Mode | Constant current charge & discharge, Constant voltage charge & discharge, Constant power charge & discharge, Constant resistance discharge, C-Rate charge & discharge, DCIR, Rest |
| End Condition | Time, Voltage, Current, Capacity, Energy, C-Rate, Coulombic efficiency, Capacity retention, Aux termperature, Aux voltage, almost 20 kinds |
| Safety Mode | Overvoltage, Undervoltage, Overcurrent, Undercurrent, Over charge capacity, Over discharge capacity, Wrongreversed connection, Trends etc |
| Programmable Steps | Infinite |
| Number of Channels | 8 |
| Input Impedence | ≥1GΩ |
| Output | Four electrodes (Support tri-electrde test) |
| Voltage Tolerance | ≤±0.05%FS |
| Current Tolerance | ≤±0.05%FS |
| Power/Resistance Tolerance | ≤±0.1%FS |
| System Time Tolerance | ±1 Second (No accumulated error) |
| Voltage Resolution | 5 digits (Automatic) |
| Current Resolution | 5 digits (Automatic) |
| Power Supply | AC220V 50Hz/AC110V 60Hz |
| Rated Power | 800W |
| Dimension | 440mm(L)*446mm(W)*104mm(H) |

Note: This model can be upgraded to CT3004KP (voltage and current tolerance ≤±0.02%FS)

# CT3000 SERIES

Large-current battery testing system

## Product Features

1.It is designed for formation, grading and testing of dynamic battery and module.
2.Modular design, 8 independent channels per module. You can put 20 modules on a rack at most.
3.You can execute constant current charge and discharge, constant voltage charge and discharge, constant power charge and discharge, C-rate charge and discharge, constant resistance discharge, DCIR, rest etc on channels.
4.Channels won't interfere each other, and they can have different processes simultaneously, totally independent.
5.It has multiple complete protective mechanism from software and hardware.
6.It has independent hardware of constant current source and constant voltage source.
7.Power-off protective mechanism.
8.You can calibrate it during test.

CT3004N

CT3004D

## Specifications

| Model | CT3004N/CT3004D |
|---|---|
| Current Range | Type 1: 10A Type 2: 20A Type 3: 40A Type 4: 100A |
| Voltage Range | 5V/10V/20V/60V |
| Working Mode | Constant current charge & discharge, Constant voltage charge & discharge, Constant power charge & discharge, Constant resistance discharge, C-Rate charge & discharge, DCIR, Rest |
| End Condition | Time, Voltage, Current, Capacity, Energy, C-Rate, Coulombic efficiency, Capacity retention, Aux termperature, Aux voltage, almost 20 kinds |
| Safety Mode | Overvoltage, Undervoltage, Overcurrent, Undercurrent, Over charge capacity, Over discharge capacity, Wrongreversed connection, Trends etc |
| Programmable Steps | Infinite |
| Number of Channels | 1/2/4/8 |
| Input Impedence | ≥1GΩ |
| Output | Four electrodes (Support tri-electrde test) |
| Voltage Tolerance | ≤±0.05%FS |
| Current Tolerance | ≤±0.05%FS |
| Power/Resistance Tolerance | ≤±0.1%FS |
| System Time Tolerance | ±1 Second (No accumulated error) |
| Voltage Resolution | 5 digits (Automatic) |
| Current Resolution | 5 digits (Automatic) |
| Power Supply | AC220V 50Hz/AC110V 60Hz |
| Rated Power | 1600W/3000W |
| Dimension | CT3004N 576mm(L)*505mm(W)*146mm(H) CT3004D 600mm(L)*642mm(W)*250mm(H) |





# M340A

High precision model

## Product Features

1.Support battery, capacitor material research, half cell, three-electrode, button cell, small capacity cell and other research tests, -5V~5V full range controllable.
2.Support precision research and testing with ≤±0.01%FS voltage and current tolerance.
3.Support high-rate fast charge research, 30C with ≤±0.01%FS capacity tolerance, 100C with ≤±0.1%FS capacity tolerance.
4.Support self-defined pulse test with a minimum pulse width of 2mS.
5.Full coverage of the measurement records of the voltage, current, capacity, energy, efficiency, internal resistance and other parameters required for research.
6.The device comes with analogue UPS and storage to effectively prevent data loss and damage caused by crush, sudden power failure, network failure etc.
7.Support variety of performance tests such as CLTC/NEDC/WLTC, and simulate actual scenarios of working.

M340A

## Specifications

| ITEM | | INSTRUMENT PERFORMANCE | | |
|---|---|---|---|---|
| RANGE | GEAR | RANGE | ACCURACY(SET,READ) | RESOLUTION(SET,READ) |
| | Voltage1 | 5V (DC to -5V)*1 | ±0.01%RD±0.01%FS | ≤50uV, ≤10uV |
| | Current1 | 100uA | ±0.01%RD±0.01%FS | ≤1nA, ≤200pA |
| | Current 2 | 1mA | ±0.01%RD±0.01%FS | ≤10nA, ≤2nA |
| | Current 3 | 10mA | ±0.01%RD±0.01%FS | ≤100nA, ≤20nA |
| | Current 4 | 100mA | ±0.01%RD±0.01%FS | ≤1uA, ≤200nA |
| | Current set range | 10nA ~ 100mA | | |
| No. of CHANNELs | | | 8Chl | |
| No. of STEPs | | 4096 | | |
| TIME | Accuracy | ≤±5uS/S (Equipment autonomous control, no communication and other time delay errors) | | |
| | Min Step Time | 10ms | | |
| | Min Pulse Time | 2ms | | |
| | Sampling Interval | ≤10mS*2 | | |
| INPUT IMPEDENCE | | ≥10GΩ ( INPUT BASE CURRENT < 0.5nA ) | | |
| TEMPERATURE DRIFT | | ≤20ppm/℃ | | |
| RESPONSE TIME | | Current 0~90% ≤1mS; Current -90~90% ≤3mS | | |
| DATA RECORD | Sampling Rate | 100Hz（Sampling interval 10mS）*2 | | |
| | Setting Method | Interval time, Sampling rate, Interval current, Interval capacity, Interval voltage, Interval energy | | |
| PROCESS CONTROL | Work Mode | HOLD / CC / CV / CCCV / CRATE / CP / CR / CPULSE / CSLOPE / DC / DV / DCDV DRATE / DP / DR / DPULSE / DSLOPE | | |
| | End Conditions | TIME / VOLTAGE / CURRENT / POWER / CAPACITY / ENERGY / LOOPS / PHASE CYCLE | | |
| | Protective Function | Interval time, Sampling rate, Interval current, Interval capacity, Interval voltage, Interval energy | | |
| | Others | Correlate with auxiliary device. Variables. Pause by conditions. | | |
| FUNTION | | DCIR、Capacitance capacity calculation、Step pluse、Three-electrode test（Reference test）、DQ/DV | | |
| OUTPUT | | Four electrodes (support reference electrode test) | | |
| COMMUNICATION | | 10/100M Ethernet(RJ45)、USB(Console) | | |
| OPERATING ENVIRONMENT | Temperature | 0~40℃(23±2℃Optimum accuracy) | | |
| | Humidity | ≤70% No condensation | | |
| POWER SUPPLY | | AC220V~±10% 50Hz / AC110V~±10% 60Hz, 40 W *3 | | |
| EQUIPMENT SIZE | | 1U W*H*L:430*300*43.5(mm) | | |

Note: 1. Voltage range can be customized to 10V.
2. Sampling rate is adjustable, from 1Hz to 1000Hz.
3. Tolerance can reach 0.001%FS with low sampling rate. It adapts to coulombic efficiency test and other special scenarios.
4. It can be equipped with auxiliary to monitor temperature, additional voltage and pressure.
5. Channels can be combined by any number, and this will improve current accuracy without other effects.
6. It can be authorized to get cyclic voltammetry function, and only adapts to battery material research. Scanning rate is limited to lower than 20mV/S. Other application scenarios haven't been well testified.
7. In order to reach optimum test performance, please make sure to have good grounding state, and please power on and wait for 30 minutes before test.

# G340A

High precision series

## Product Features

1.Support battery, capacitor material research, half cell, three-electrode, button cell, small capacity cell and other research tests, -5V~5V full range controllable.

2.Support precision research and testing with ≤±0.01%FS voltage and current tolerance.

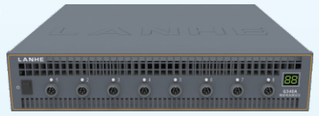
3.Support high-rate fast charge research, 30C with ≤±0.01%FS capacity tolerance, 100C with ≤±0.1%FS capacity tolerance.

4.Support self-defined pulse test with a minimum pulse width of 2mS.

5.Full coverage of the measurement records of the voltage, current, capacity, energy, efficiency, internal resistance and other parameters required for research.

6.The device comes with analogue UPS and storage to effectively prevent data loss and damage caused by crush, sudden power failure, network failure etc.

7.Support variety of performance tests such as CLTC/NEDC/WLTC, and simulate actual scenarios of working.



G340A

## Specifications

| ITEM | | INSTRUMENT PERFORMANCE | | |
|---|---|---|---|---|
| RANGE | GEAR | RANGE | ACCURACY(SET,READ) | RESOLUTION(SET,READ) |
| | Voltage1 | 5V (DC to -5V)*1 | ±0.01%RD±0.01%FS | ≤50uV, ≤10uV |
| | Current1 | 150uA | ±0.01%RD±0.01%FS | ≤1.5nA, ≤300pA |
| | Current 2 | 5mA | ±0.01%RD±0.01%FS | ≤50nA, ≤10nA |
| | Current 3 | 150mA | ±0.01%RD±0.01%FS | ≤150nA, ≤300nA |
| | Current 4 | 5A | ±0.01%RD±0.01%FS | ≤50uA, ≤10uA |
| | Current set range | 150nA~5A | | |
| No. of CHANNELs | | 8Chl | | |
| No. of STEPs | | 4096 | | |
| TIME | Accuracy | ≤±5uS/S (Equipment autonomous control, no communication and other time delay errors) | | |
| | Min Step Time | 10ms | | |
| | Min Pulse Time | 2ms | | |
| | Sampling Interval | ≤10mS*2 | | |
| INPUT IMPEDENCE | | ≥10GΩ ( INPUT BASE CURRENT < 0.5nA ) | | |
| TEMPERATURE DRIFT | | ≤20ppm/℃ | | |
| RESPONSE TIME | | Current 0~90% ≤1mS; Current -90~90% ≤3mS | | |
| DATA RECORD | Sampling Rate | 100Hz（Sampling interval 10mS）*2 | | |
| | Setting Method | Interval time, Sampling rate, Interval current, Interval capacity, Interval voltage, Interval energy | | |
| PROCESS CONTROL | Work Mode | HOLD / CC / CV / CCCV / CRATE / CP / CR / CPULSE / CSLOPE / DC / DV / DCDV DRATE / DP / DR / DPULSE / DSLOPE | | |
| | End Conditions | TIME / VOLTAGE / CURRENT / POWER / CAPACITY / ENERGY / LOOPS / PHASE CYCLE | | |
| | Protective Function | Power-off data protection, Net break protection User-defined safety: Over voltage, Under voltage, Over current, Over rate, Over capacity. | | |
| | Others | Correlate with auxiliary device. Variables. Pause by conditions. | | |
| FUNTION | | DCIR、Capacitance capacity calculation、Step pluse、Three-electrode test（Reference test）、DQ/DV | | |
| OUTPUT | | Four electrodes (support reference electrode test) | | |
| COMMUNICATION | | 10/100M Ethernet(RJ45)、USB(Console) | | |
| OPERATING ENVIRONMENT | Temperature | 0~40℃(23±2℃Optimum accuracy) | | |
| | Humidity | ≤70% No condensation | | |
| POWER SUPPLY | | AC220V~±10% 50Hz / AC110V~±10% 60Hz, 400W | | |
| EQUIPMENT SIZE | | 2U W*H*L:430*300*87(mm) | | |

Note: 1. Voltage range can be customized to 10V.
2. Sampling rate is adjustable, from 1Hz to 1000Hz.
3. Tolerance can reach 0.001%FS with low sampling rate. It adapts to coulombic efficiency test and other special scenarios.
4. It can be equipped with auxiliary to monitor temperature, additional voltage and pressure.
5. Channels can be combined by any number, and this will improve current accuracy without other effects.
6. It can be authorized to get cyclic voltammetry function, and only adapts to battery material research. Scanning rate is limited to lower than 20mV/S. Other application scenarios haven't been well testified.
7. In order to reach optimum test performance, please make sure to have good grounding state, and please power on and wait for 30 minutes before test.



PROFESSIONAL BATTERY TEST EQUIPMENT SUPPLIER

# D340A

High precision series

## Product Features

1.Support battery, capacitor material research, half cell, three-electrode, button cell, small capacity cell and other research tests, -5V~5V full range controllable.

2.Support precision research and testing with ≤±0.01%FS voltage and current tolerance.

3.Support high-rate fast charge research, 30C with ≤±0.01%FS capacity tolerance, 100C with ≤±0.1%FS capacity tolerance.

4.Support self-defined pulse test with a minimum pulse width of 2mS.

5.Full coverage of the measurement records of the voltage, current, capacity, energy, efficiency, internal resistance and other parameters required for research.

6.The device comes with analogue UPS and storage to effectively prevent data loss and damage caused by crush, sudden power failure, network failure etc.

7.Support variety of performance tests such as CLTC/NEDC/WLTC, and simulate actual scenarios of working.

D340A

## Specifications

| ITEM | | INSTRUMENT PERFORMANCE | | |
|---|---|---|---|---|
| RANGE | GEAR | RANGE | ACCURACY(SET,READ) | RESOLUTION(SET,READ) |
| | Voltage1 | 5V (DC to -5V)*1 | ±0.01%RD±0.01%FS | ≤50uV, ≤10uV |
| | Current1 | 10mA | ±0.01%RD±0.01%FS | ≤100nA, ≤20nA |
| | Current 2 | 100mA | ±0.01%RD±0.01%FS | ≤1uA, ≤200nA |
| | Current 3 | 1A | ±0.01%RD±0.01%FS | ≤10uA, ≤2uA |
| | Current 4 | 10A | ±0.01%RD±0.01%FS | ≤100uA, ≤20uA |
| | Current set range | 1uA~10A each channel, up to 80A when parallel connection | | |
| No. of CHANNELs | | 8Chl | | |
| No. of STEPs | | 4096 | | |
| TIME | Accuracy | ≤±5uS/S (Equipment autonomous control, no communication and other time delay errors) | | |
| | Min Step Time | 10ms | | |
| | Min Pulse Time | 2ms | | |
| | Sampling Interval | ≤10mS*2 | | |
| INPUT IMPEDENCE | | ≥10GΩ ( INPUT BASE CURRENT < 0.5nA ) | | |
| TEMPERATURE DRIFT | | ≤20ppm/℃ | | |
| RESPONSE TIME | | Current 0~90% ≤1mS; Current -90~90% ≤3mS | | |
| DATA RECORD | Sampling Rate | 100Hz（Sampling interval 10mS）*2 | | |
| | Setting Method | Interval time, Sampling rate, Interval current, Interval capacity, Interval voltage, Interval energy | | |
| PROCESS CONTROL | Work Mode | HOLD / CC / CV / CCCV / CRATE / CP / CR / CPULSE / CSLOPE / DC / DV / DCDV DRATE / DP / DR / DPULSE / DSLOPE | | |
| | End Conditions | TIME / VOLTAGE / CURRENT / POWER / CAPACITY / ENERGY / LOOPS / PHASE CYCLE | | |
| | Protective Function | Power-off data protection, Net break protection User-defined safety: Over voltage, Under voltage, Over current, Over rate, Over capacity. | | |
| | Others | Correlate with auxiliary device. Variables. Pause by conditions. | | |
| FUNTION | | DCIR、Capacitance capacity calculation、Step pluse、Three-electrode test（Reference test）、DQ/DV | | |
| OUTPUT | | Four electrodes (support reference electrode test) | | |
| COMMUNICATION | | 10/100M Ethernet(RJ45)、USB(Console) | | |
| OPERATING ENVIRONMENT | Temperature | 0~40℃(23±2℃Optimum accuracy) | | |
| | Humidity | ≤70% No condensation | | |
| POWER SUPPLY | | AC220V~±10% 50Hz / AC110V~±10% 60Hz, 800W | | |
| EQUIPMENT SIZE | | 4U W*H*L:430*540*178(mm) 20KG | | |

Note: 1.Voltage range can be customized to 10V.
2.Sampling rate is adjustable, from 1Hz to 1000Hz.
3.Tolerance can reach 0.001%FS with low sampling rate. It adapts to coulombic efficiency test and other special scenarios.
4. It can be equipped with auxiliary to monitor temperature, additional voltage and pressure.
5. Channels can be combined by any number, and this will improve current accuracy without other effects.
6. It can be authorized to get cyclic voltammetry function, and only adapts to battery material research. Scanning rate is limited to lower than 20mV/S. Other application scenarios haven't been well testified.
7. In order to reach optimum test performance, please make sure to have good grounding state, and please power on and wait for 30 minutes before test.

# D350A

## High precision series

## Product Features

1.It has three types, D350A-20A, D350A-30A and D350A-40A.

2.Support battery, capacitor material research, half cell, three-electrode, button cell, small capacity cell and other research tests, -5V~5V full range controllable.

3.Support precision research and testing with ≤±0.01%FS voltage and current tolerance.

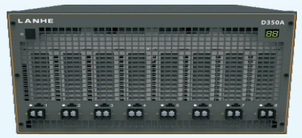
4.Support high-rate fast charge research, 30C with ≤±0.01%FS capacity tolerance, 100C with ≤±0.1%FS capacity tolerance.

5.Support self-defined pulse test with a minimum pulse width of 2mS.

6.Full coverage of the measurement records of the voltage, current, capacity, energy, efficiency, internal resistance and other parameters required for research.

7.The device comes with analogue UPS and storage to effectively prevent data loss and damage caused by crush, sudden power failure, network failure etc.

8.Support variety of performance tests such as CLTC/NEDC/WLTC, and simulate actual scenarios of working.




D350A

## Specifications

| ITEM | | INSTRUMENT PERFORMANCE | | |
|---|---|---|---|---|
| | GEAR | RANGE | ACCURACY(SET,READ) | RESOLUTION(SET,READ) |
| RANGE | Voltage1 | 5V (DC to -5V)*1 | ±0.01%FS | ≤50uV, ≤10uV |
| | Current1 | 10mA | ±0.01%FS | ≤100nA, ≤20nA |
| | Current 2 | 100mA | ±0.01%FS | ≤1uA, ≤200nA |
| | Current 3 | 1A | ±0.01%FS | ≤10uA, ≤2uA |
| | Current 4 | 10A/10A/12A | ±0.01%FS | ≤100uA/100uA/120uA, ≤20uA/20uA/24uA |
| | Current 5 | 20A/30A/40A | ±0.01%FS | ≤200uA/300uA/400uA, ≤40uA/60uA/80uA |
| | Current set range | 1uA~20A (Max. 80A in combined mode)<br>1uA~30A (Max. 120A in combined mode)<br>1uA~40A (Max. 160A in combined mode) | | |
| No. of CHANNELs | | 8Chl | | |
| No. of STEPs | | 4096 | | |
| TIME | Accuracy | ≤±5uS/S (Equipment autonomous control, no communication and other time delay errors) | | |
| | Min Step Time | 10ms | | |
| | Min Pulse Time | 2ms | | |
| | Sampling Interval | ≤10mS*2 | | |
| INPUT IMPEDENCE | | ≥10GΩ ( INPUT BASE CURRENT < 0.5nA ) | | |
| TEMPERATURE DRIFT | | ≤20ppm/℃ | | |
| RESPONSE TIME | | Current 0~90% ≤1mS; Current -90~90% ≤3mS | | |
| DATA RECORD | Sampling Rate | 100Hz（Sampling interval 10mS）*2 | | |
| | Setting Method | Interval time, Sampling rate, Interval current, Interval capacity, Interval voltage, Interval energy | | |
| PROCESS CONTROL | Work Mode | HOLD / CC / CV / CCCV / CRATE / CP / CR / CPULSE / CSLOPE / DC / DV / DCDV<br>DRATE / DP / DR / DPULSE / DSLOPE | | |
| | End Conditions | TIME / VOLTAGE / CURRENT / POWER / CAPACITY / ENERGY / LOOPS / PHASE CYCLE | | |
| | Protective Function | Power-off data protection, Net break protection<br>User-defined safety: Over voltage, Under voltage, Over current, Over rate, Over capacity. | | |
| | Others | Correlate with auxiliary device. Variables. Pause by conditions. | | |
| FUNTION | | DCIR、Capacitance capacity calculation、Step pluse、Three-electrode test（Reference test）、DQ/DV | | |
| OUTPUT | | Four electrodes (support reference electrode test) | | |
| COMMUNICATION | | 10/100M Ethernet(RJ45)、USB(Console) | | |
| OPERATING ENVIRONMENT | Temperature | 0~40℃(23±2℃Optimum accuracy) | | |
| | Humidity | ≤70% No condensation | | |
| POWER SUPPLY | | AC220V~±10% 50Hz / AC110V~±10% 60Hz, 1500W/2200W/2600W | | |
| EQUIPMENT SIZE | 4U W*H*L:430*540*178(mm) 22KG 6U W*H*L:430*540*267(mm) 32KG 6U W*H*L:430*540*267(mm) 32KG | | | |

Note: 1. Voltage range can be customized to 10V.
2. Sampling rate is adjustable, from 1Hz to 1000Hz.
3. Tolerance can reach 0.001%FS with low sampling rate. It adapts to coulombic efficiency test and other special scenarios.
4. It can be equipped with auxiliary to monitor temperature, additional voltage and pressure.
5. Channels can be combined by any number, and this will improve current accuracy without other effects.
6. It can be authorized to get cyclic voltammetry function, and only adapts to battery material research. Scanning rate is limited to lower than 20mV/S. Other application scenarios haven't been well testified.
7. In order to reach optimum test performance, please make sure to have good grounding state, and please power on and wait for 30 minutes before test.





# A300M

## High precision auxiliary

## Product Features

1.The precision auxiliary measuring instrument adopts a modular design, the host and the function module are independent, and each host provides 4 module slots, which can be flexibly selected with different function modules.

2.Precision auxiliary measuring instrument is divided into A300M measuring instrument host, A300V voltage acquisition module, A300T temperature acquisition module, etc.

3.The module is hot-swappable and can be flexibly replaced.

4.The module permanently stores the module function information and calibration parameters, which is easy to use.

5.Precision auxiliary measuring instrument host sampling network communication, convenient for on-site layout, and data use.


A300M

## Specifications

| | ITEM | INSTRUMENTAL INDICATORS |
|---|---|---|
| Slot | Quantity | 4（There is no restriction on module types） |
| | Maximum number of channels | 16 |
| | Optional modules | A300V_V5T8、A300T_T200HxxxT16 |
| Data rate | Slot | 100Hz*1 |
| Communication | | 10/100M Ethernet(RJ45)、USB(Console) |
| Environmental requirements | Temperature range | 0~60℃ |
| | Humidity range | ≤70% No condensation |
| Working power supply | | AC220V~±10% 50Hz / AC110V~±10% 60Hz, 20 W *2 |
| Chassis size | | 1U W*H*L:430*210*43.5(mm) 2.7KG |

Note: 1. The actual working rate of the host is limited by the working rate and usage configuration of the module.
2. The power supply is the maximum design power consumption of the host, and the actual use is less than 20W.

# A300V_V5T8

Voltage auxiliary


A300V

## Specifications

| ITEM | | INSTRUMENTAL INDICATORS |
|---|---|---|
| Functional parameters | Quantum | -5.000~5.000V |
| | Precision | ±0.01%FS （±0.5mV） |
| | Resolution | ≤10uV |
| | Number of channels | 8 |
| | Input impedance | ≥10GΩ（INPUT BASE CURRENT <1nA） |
| | Temperature drift | ≤20ppm/℃ |
| | Sample rate | 10Hz |
| Special properties | | Channel Isolation (Isolation Voltage DC100V),it can collect the voltage of the series single battery;*1 |
| Environmental requirements | Temperature range | 0~40℃（23±2℃Optimum accuracy） |
| | Humidity range | ≤70% No condensation |
| Power | | 3W |
| Mechanical dimensions | | W*H*L: 87*30*146.5 (mm) 140G |

Note: 1. When the voltage of the measured object exceeds 36V, it is necessary to ensure that the equipment is well grounded to avoid the danger of electric shock.

# A300T_T200HXXXT16

Temperature auxiliary


A300T

## Specifications

| ITEM | | INSTRUMENTAL INDICATORS |
|---|---|---|
| Functional parameters | Quantum | -60.0~200.0℃ |
| | Precision | ±0.5℃ |
| | Resolution | ≤0.001℃ |
| | Number of channels | 16 |
| | Sample rate | 5Hz |
| Special properties | | Channel Isolation (Isolation Voltage DC300V/AC250V),<br>The electrode temperature of the series battery can be measured;*1 |
| Environmental requirements | Temperature range | 0~50℃ |
| | Humidity range | ≤70% No condensation |
| Power | | 3W |
| Mechanical dimensions | | W*H*L: 87*30*146.5 (mm) 150G |

Note: 1. When the voltage of the measured object exceeds 36V, it is necessary to ensure that the equipment is well grounded to avoid the danger of electric shock.



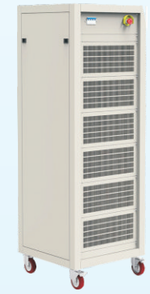


# CT5000 SERIES

Dynamic battery testing system

## Product Features

1.It is designed for testing of prismatic cell, cylindrical cell, fuel cell and other high-power battery.
2.Modular design, 16 independent channels per module.
3.You can execute constant current charge and discharge, constant voltage charge and discharge, constant power charge and discharge, C-rate charge and discharge, constant resistance discharge, DCIR, rest etc on channels.
4.Channels won't interfere each other, and they can have different processes simultaneously, totally independent.
5.It has multiple complete protective mechanism from software and hardware.
6.It is dual AC/DC designed to improve energy efficiency. Energy returns to grid while discharging.
7.It has control unit to realize off-line working for couple of hours.



## Specifications

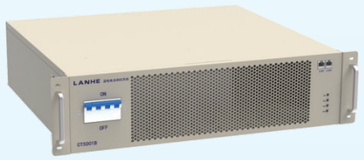
| Model | CT5004KQ/CT5002A/CT5002AK/CT5002AQ |
|---|---|
| Current Range | 20A/30A/40A/50A/60A/75A/80A/100A |
| Voltage Range | 5V |
| Working Mode | Constant current charge & discharge, Constant voltage charge & discharge, Constant power charge & discharge, Constant resistance discharge, C-Rate charge & discharge, DCIR, Rest |
| End Condition | Time, Voltage, Current, Capacity, Energy, C-Rate, Coulombic efficiency, Capacity retention, Aux termperature, Aux voltage, almost 20 kinds |
| Safety Mode | Overvoltage, Undervoltage, Overcurrent, Undercurrent, Over charge capacity, Over discharge capacity, Wrongreversed connection, Trends etc |
| Programmable Steps | Infinite |
| Number of Channels | 16 (Combinable) |
| Input Impedence | ≥1MΩ |
| Output | Four electrodes (Support tri-electrde test) |
| Voltage Tolerance | ≤±0.05%FS |
| Current Tolerance | ≤±0.05%FS |
| Power/Resistance Tolerance | ≤±0.1%FS |
| System Time Tolerance | ±1 Second (No accumulated error) |
| Voltage Resolution | 5 digits (Automatic) |
| Current Resolution | 5 digits (Automatic) |
| Power Supply | AC380V 50Hz |
| Rated Power | 6000W |
| Charge Efficiency | 80%(max) |
| Discharge Efficiency | 70%(max) |
| Dimension | 700mm(L)*600mm(W)*1314mm(H) |

# CT5000 SERIES

Dynamic battery testing system

## Product Features

1.It is designed for testing of prismatic cell, cylindrical cell, fuel cell and other high-power battery.
2.Modular design, 4 independent channels per module.
3.You can execute constant current charge and discharge, constant voltage charge and discharge, constant power charge and discharge, C-rate charge and discharge, constant resistance discharge, DCIR, rest etc on channels.
4.Channels won't interfere each other, and they can have different processes simultaneously, totally independent.
5.It has multiple complete protective mechanism from software and hardware.
6.It is dual AC/DC designed to improve energy efficiency. Energy returns to grid while discharging.
7.It has control unit to realize off-line working for couple of hours.




## Specifications

| Model | CT5001B/CT5001BQ |
|---|---|
| Current Range | 50A/100A/200A, 40A/80A/160A/320A/640A |
| Voltage Range | 60V/72V,30V |
| Working Mode | Constant current charge & discharge, Constant voltage charge & discharge, Constant power charge & discharge, Constant resistance discharge, C-Rate charge & discharge, DCIR, Rest |
| End Condition | Time, Voltage, Current, Capacity, Energy, C-Rate, Coulombic efficiency, Capacity retention, Aux termperature, Aux voltage, almost 20 kinds |
| Safety Mode | Overvoltage, Undervoltage, Overcurrent, Undercurrent, Over charge capacity, Over discharge capacity, Wrongreversed connection, Trends etc |
| Programmable Steps | Infinite |
| Number of Channels | 4 (Combinable) |
| Input Impedence | ≥1MΩ |
| Output | Four electrodes (Support tri-electrde test) |
| Voltage Tolerance | ≤±0.05%FS |
| Current Tolerance | ≤±0.05%FS |
| Power/Resistance Tolerance | ≤±0.1%FS |
| System Time Tolerance | ±1 Second (No accumulated error) |
| Voltage Resolution | 5 digits (Automatic) |
| Current Resolution | 5 digits (Automatic) |
| Power Supply | AC380V 50Hz |
| Rated Power | 16000W, 26000W |
| Charge Efficiency | 80%(max) |
| Discharge Efficiency | 70%(max) |
| Dimension | 640mm(L)*536mm(W)*161mm(H) |





# AUXILIARY

Temperature auxiliary


## Specifications

| Model | TEMPERATURE AUXILIARY |
|---|---|
| Input Power Source | AC 220V±10%/50HZ (AC 110V customizable) |
| Max. Input Power | ≤5W |
| Input Impedence | ≥1MΩ |
| Test Range | -50℃-200℃ |
| Accuracy | ±1℃ |
| Resolution | 0.01℃ |
| Sensor Type | T-type thermocouple |
| Data Record | Along with correlated tester |
| Sampling Time | 960mS |
| Number of Channel | 16/32, Independent |
| Purpose | Co-work with tester to sample temperature |
| Characteristic | Cold-junction compensation patented technology to make the sampling temperature more accurate. 24 bits high precision ADC chip. T-type thermocouple sensor. The electric relay, communication and power of each channel is isolated with each other. Touch with 0-80V battery lug directly. |
| Noise | ≤50dB |
| Communication Mode | RS422 |
| Data Format | EXCEL、TXT、CSV |
| Environment | Temperature: -10℃-50℃ (Best 23±2℃)<br>Humidity: ≤95% |

# AUXILIARY

## Voltage auxiliary


## Specifications

| Model | TEMPERATURE AUXILIARY |
|---|---|
| Input Power Source | AC 220V±10%/50HZ (AC 110V customizable) |
| Max. Input Power | ≤5W |
| Input Impedence | ≥100MΩ |
| Test Range | 1.5mV-5V |
| Accuracy | 0.03%FS |
| Resolution | 0.0001V |
| Data Record | Along with correlated tester |
| Time of each channel routing inspection | 3mS |
| Number of Channel | 16/32, Independent |
| Purpose | Co-work with tester to sample cell voltage |
| Characteristic | Opto-isolator ensures that sampling of each channel is independent. 16 to 1 analog switch ensures that only one channel is connected per unit time. Overvoltage protection is upto 1000V. It can do voltage inspection on 16 channels simultaneously. It has high-accuracy ADC chips with resolution of 24 digits. |
| Noise | ≤50dB |
| Communication Mode | RS422 |
| Environment | Temperature: -10℃-50℃ (Best 23±2℃)<br>Humidity: ≤95% |





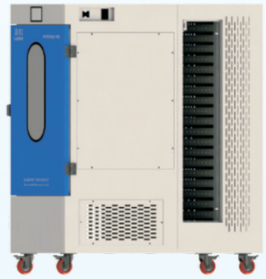
# AUXILIARY

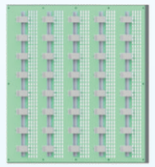
## Pressure auxiliary


## Specifications

| Model | TEMPERATURE AUXILIARY |
|---|---|
| Input Power Source | AC 220V±10%/50HZ (AC 110V customizable) |
| Max. Input Power | ≤5W |
| Input Impedence | ≥1MΩ |
| Test Range | 0-3000kgf |
| Accuracy | 0.1%FS-0.03%FS |
| Resolution | 0.1kgf |
| Consistence | 0.1%FS-0.05%FS |
| Tare | 2%FS |
| Channel | 8, Independent |
| Overload Safety | 120%FS |
| Sensitivity | 1mV/V |
| Characteristic | It co-works with wheel typed pressure sensor. It can do pressure inspection on 8 channels simultaneously. It has high-accuracy ADC chips with resolution of 24 digits. |
| Noise | ≤30dB |
| Communication | RS422 |
| Environment | Temperature: -10℃-50℃ (Best 23±2℃)<br>Humidity: ≤95% |

# LH-TCS-300L Temperature Chamber





## Specifications

| Model | Temperature Chamber |
|---|---|
| Input Power Source | AC 220V±10%/50HZ (AC 110V customizable) |
| Rated Power Consumption | 2.2KW |
| Standard Volume | 266L |
| Max. Accommodation | 160 channels for coin cell test |
| Inner Size | 435*860*712mm |
| External Size | 666*1600*1643mm |
| Structure | Shell and inner chamber material, stainless steel<br>Thermal insulation material, aluminum silicate cotton<br>5 slidable supporting trays, 1 for each floor<br>Visible window in front door<br>Inner illumination<br>5 inlets for test cables on back of inner chamber<br>Integrated with 22 floors of bracket for cyclers in rear chamber |
| Net Weight | 240KG |
| Temperature Range | 0℃-60℃ |
| Temperature Fluctuation | ≤ ±0.5℃ |
| Temperature Uniformity | ≤2℃ |
| Error | ≤ ±1℃ |
| Rising Rate | 3℃/Min (25℃-60℃) |
| Cooling Rate | 1℃/Min (25℃-0℃) |
| Time Cost to Stability | 30Min |
| Conditioning Mechanism | PID algorithm, control temperature by floors |
| Number of Temperature | 7 |
| Circulating Fan | Axial flow ventilator, 1 for each floor |
| Cooling System | Inverting series NVT70FSC |
| Coolant | R290 (Flame prohibited) |
| Heating System | Stainless steel finned heater, rated power 1800W |
| Control Panel | 5 inches touchable screen, support English/Chinese |
| Safety Facility | PTC autonomous constant temperature. Protect from abnormal overheating and abnormal overcooling. Protect test chamber from current leakage and short circuit. Protect frequency convertor from overcharging. Equipped alarming LED and buzzer. |
| Advantages | Stable, silent, environment friendly, power saving, durable |
| Communication Mode | RJ45 |
| Environment | Temperature: 5℃-35℃<br>Humidity: 80% |





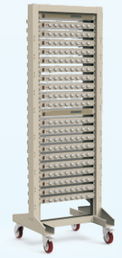
# RACK & ACCESSARIES Rack, clip, clamp and jig

## Rack

Dimension 593mm(L)*540mm(W)*1750mm(H)
Suitable for CT3004A/CT3004C model

Dimension 600mm(L)*620mm(W)*1750mm(H)
Suitable for CT3004K model

Dimension 593mm(L)*540mm(W)*1750mm(H)
Suitable for CT3004A model (Micro-current)



Dimension 710mm(L)*650mm(W)*1750mm(H)
Suitable for CT5002A model

## Clip, clamp and jig

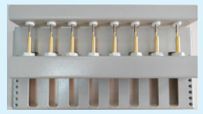
Coin cell holder

Coin cell holder

Pouch cell clip

Alligator clip

Coin cell jig



OT connector

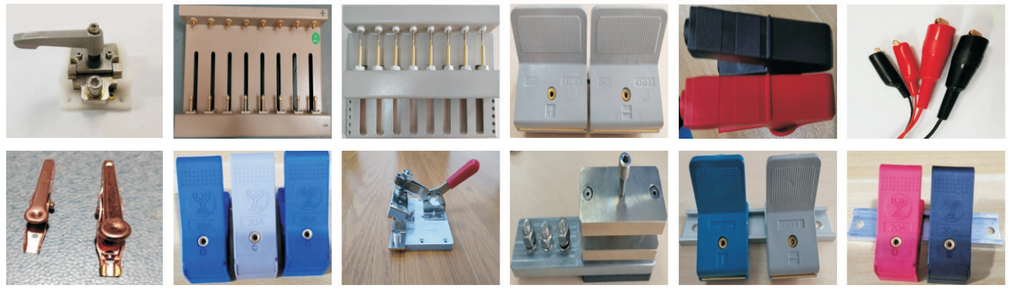
Pouch cell clamp

Pouch cell clamp

# RACK & ACCESSARIES

Rack, clip, clamp and jig

## Types of clip, clamp and jig



## Customized jig

## View on-site



# 03 SOFTWARE INTRODUCTION

Software Features

## Testing steps editor

1. Gathering all relevant functions of test steps to form a single editing software
   (1) It uses a flowchart, support drag and drop objects, free combination, arbitrary construction of test steps, it is more intuitive and convenient.
   (2) Support editing software commonly used copy/paste, undo/redo, zoom and print functions.
   (3) Support for Excel/TXT import and export (i.e. editing test steps via Excel).
2. The number of testing steps shall not be less than 800
   (1) Testing steps conditions can be arbitrarily combined with multiple conditions of “logic and”, “logic or”.
   (2) Support each testing step to set up independent security protection. Enhance the function of “multiple charge and discharge”.
   (3) Easy loop and loop nested programming (nested up to 5 levels).
3. Added new control conditions, cycle retention rate and efficiency.

## Data file search

Data files can be searched based on test information, such as time, battery number, and so on.
Support customization of specific functions
1. Bind the barcode of battery in batches according to the specific production process of users.
2. Output data and connect with user’s database according to user’s specific test requirements.
(The advantage of using customization is that there is only one set of general-purpose main software, which has been repeatedly verified to be very stable and reliable. At the same time, all customers can share continuous software upgrades.)

## Other Improvements

1. Use a timing system with higher precision. Also, there is no need to switch to “time high resolution mode”.
2. The monitoring interface, flow chart and data curve support <Ctrl> and mouse wheel to arbitrarily scale the display size.
3. Support the package storage/retrieval unpacking of the test (thus, emergency testing of other batteries can beinterleaved in the middle of the test). Support single data file “regeneration start”, continue testing.
4. Improve calibration report function of the calibration software (support multiple calibration of a device).
5. Greatly enhanced data export function. Currently supported data export channels include:
   (1) Open data directly, in the data area, copy/paste
   (2) Open data directly, in the graphics area, copy the data source/paste
   (3) Main menu of “tools”, data export and data summary
   (4) “Loop curve comparison” panel, data export (with summary ability)
   (5) Data secondary development interface, landcex.dll. Programmable implementation via a key to realize the function ofautomatically or arbitrarily export data.
6. Better support for Win7/Win10/Win11 and improved display experience with high DPI and large screen.

# 04 CUSTOMERS ALL OVER THE WORLD

## Colleges&Universities

The University of Texas at Austin
Massachusetts Institute of Technology
Columbia University in the City of New York
Stanford University
Dartmouth College
Cornell University
University of California, San Diego
Georgia Institute of Technology
Worcester Polytechnic Institute
Northwestern University
Johns Hopkins University
Tulane University
University of Michigan
University of Pennsylvania
West Virginia University
Rice University
Indiana University-Purdue University Indianapolis
University of Wisconsin-Madison
State University of New York at Binghamton
University at Buffalo, the State University of New York
Imperial College London
The University of Manchester
University of East Anglia
University of Southampton
University of Glasgow
National University of Singapore
Nanyang Technological University
Leibniz Universitat Hannover
Humboldt-Universitat zu Berlin
Technische Universitat Dresden
Universitat Ulm
Technische Universitat Ilmenau
Universitat Byreuth
Ruhr-Universitat Bochum
The University of Hong Kong
The Chinese University of Hong Kong

The Hong Kong Polytechnic University
City University of Hong Kong
The Hong Kong University of Science and Technology
National Sun Yat-sen University
National Yang Ming Chiao Tung University
National Tsing Hua University
Australian National University
The University of New South Wales
The University of Adelaide
The University of Queensland
The University of Sydney
Queensland University of Technology
Curtin University
Flinders University
Griffith University
The University of Auckland
Technische Universiteit Delft
University of Groningen
Aalto University
Aalborg University
University of South-Eastern Norway
University of Alberta
Bar-Ilan University
Kyushu Institute of Technology
Tohoku University
Gachon University
Korea University
Yonsei University
Pusan National University
Hanyang University
Soonchunhyang University
Dongguk University



## Battery/Materials Enterprises

ATL
CATL
BYD
A123 Systems,LLC
Gerneral Motors LLC
Ford Motor Company
II-VI Incorporated
Paraclete Energy, Inc.
Zeta Energy Corp.
Anthro Energy, Inc.
AM Batteries, Inc.
Enpower Greentech Inc.
Li Industries, Inc.
Storagenergy Technologies, Inc.
Calion Technologies, Inc.
NanoHydroChem LLC
UNIGRID INC.
GruEnergy Lab, Inc.
Chemtronergy, LLC
Printed Energy Pty Ltd
ATE Denmark ApS
Kuttner GmbH & Co. KG
Theion GmbH
LeydenJar Technologies B.V.
Delft IMP B.V.
HyET Lithium B.V.
Hivisq Science and Technology SL
Luquos Energy Limited
SUPREME ELECTRONICS CO., LTD
SolidEdge Solution Inc
SYNergy Science Tech Corp.
Sivantos Pte. Ltd.
CarbonScape Ltd.
Solvionic
Tiamat Energy
NAWAtechnologies
AdvEn Industries, Inc.
NanoXplore Inc.
Altech Batteries Limited
Materials Innovation Tsukuba Inc.

## Research Institutes

SLAC National Accelerator Laboratory
Pacific Northwest National Laboratory
Argonne National Laboratory
Brookhaven National Laboratory
EMPA
ICMAB-CSIC
IFW Dresden
Centre for Advances in Reliability and Safety Limited
Hong Kong Productivity Council
Hong Kong Quantum AI Lab Limited
A*STAR
INRS