

## Programming tool for battery charge and discharge evaluation system

### ☑ Intuitive understanding of whole program !

#### Easy to understand the program structure

- By displaying three layers in one screen, the hierarchical structure is easy to see.
- Each hierarchical level can be displayed/hidden. Only necessary hierarchical levels can be displayed.

#### Easy to grasp the program flow

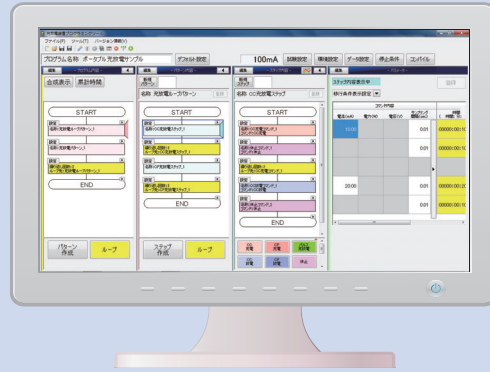
- A program is displayed as a flow, that makes easy to grasp.
- Easy to operate because users can drag & drop commands.

#### Easy to understand various conditions

- Branching destination shown with an arrow is easy to check and reduces errors.
- Setting values are displayed on the horizontal axis of the flow; therefore, a flow and settings can be checked simultaneously.

#### Simple CAN settings

- Load a DBC file that can be displayed.
- By the setting tool, CAN data can be defined.



### ☑ Comprehensive view of a test can be grasped !

#### The progress state of whole program can be visualized

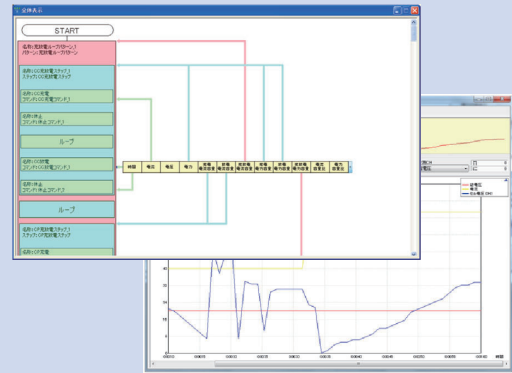
- Since the display is the same flow format as program view, the comprehensive progress state can be viewed.

#### Learn the change tendency of charge and discharge

- The display is like an oscilloscope, and changes in tendency of charge and discharge are easy to view.

#### Visualize a wide variety types of data

- Besides voltage/current, able to display a wide variety types of data such as CAN data from ECU, ambient environment data, etc.



### ☑ Easy to see results !

#### Only necessary results can be viewed

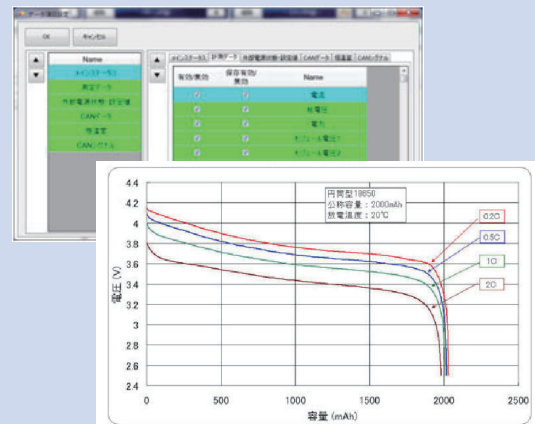
- Users can save items they wish to save.
- Various data are classified and saved.

#### Causes of an error are easy to see

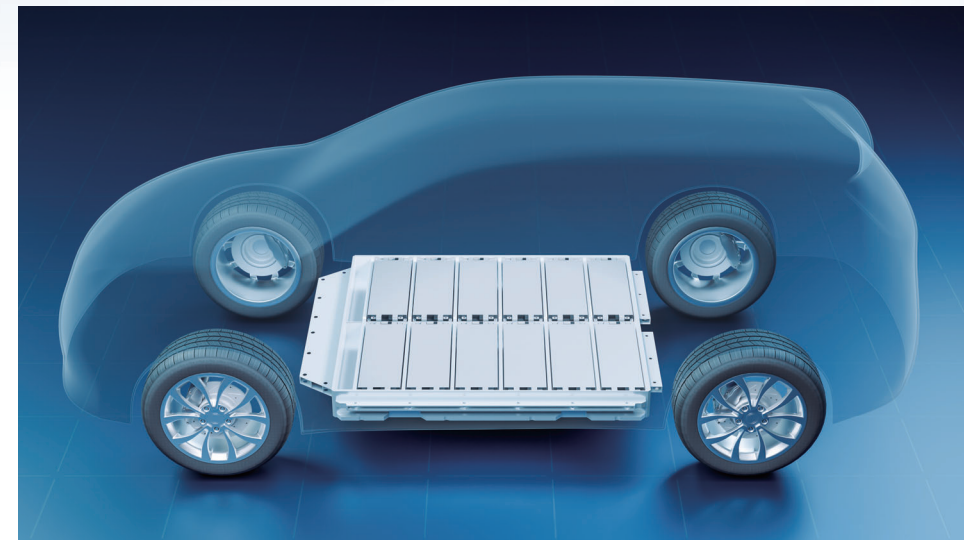
- Causes of an error are saved simultaneously with the measurement data, which makes easy to troubleshoot.

#### Simple conversion of characteristics data

- Just one click to convert from measurement data to various characteristics data (input/output properties, SOC characteristic, etc.).



## Battery Charge and Discharge Evaluation System, and Programming Tool



- ☑ Meet a wide variety of needs from research purposes to mass production facilities.
- ☑ Support various types of evaluation methods with many know-hows and actual results that gained from battery charge and discharge evaluation.
- ☑ Able to conduct interlocking operation with BMU (Battery Management Unit). Through CAN communication, the state monitoring and flag control of BMU can be interlocked with the charge and discharge control.
- ☑ Propose the programming tool that can be understood just by looking, and easy to operate.

< Development / Manufacturing >

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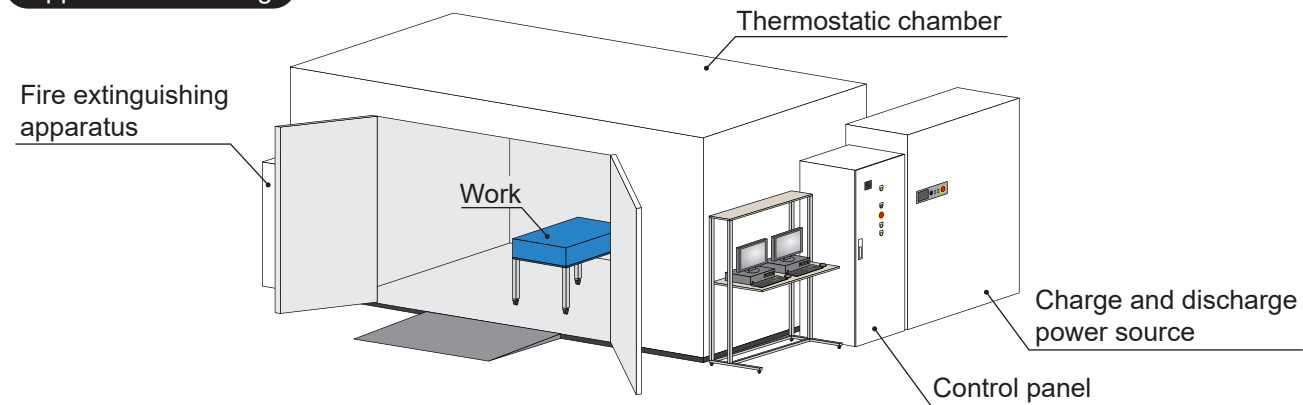
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# Battery Evaluation System for Research and Development

In addition to batteries, BMU (Battery Management Unit) can be evaluated by this system. Creation, control and management of charge and discharge test patterns by a computer are possible.

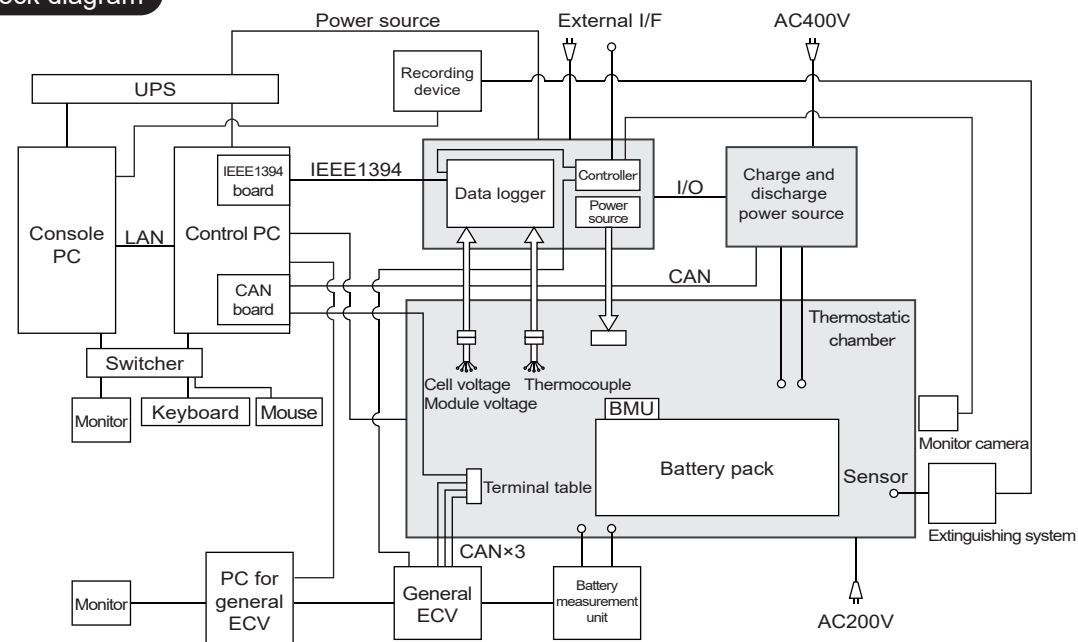
## Appearance drawing



## Specification example

Item	Content
Voltage	0~750V
Current	±800A
Charge and discharge mode	CC charge and discharge, CC-CV charge and discharge, CP charge and discharge, CP-CV charge and discharge, cell CC-CV charge and discharge, cell CP-CV charge and discharge, pulse charge and discharge, map charge and discharge, etc.
Voltage precision	±0.1% of F.S.
Current precision	±0.1% of F.S.
Current responsive performance	5ms or less (depending on internal resistance of batteries)
External CAN control	Limit control is possible from externally via CAN communication
Measurement function	Cell 256ch, module 50ch, temperature 256ch, CAN data, net voltage, current, etc.
Thermostatic chamber	Temperature range: -50°C to +150°C Inside chamber dimensions: W3,000mm x D3,000mm x H2,000mm Equipped with monitor camera
Thermostatic chamber	CO <sub>2</sub> extinguisher Gas detection function (CO <sub>2</sub> , CO, and H <sub>2</sub> ) Thermal detection function
Evaluation pattern programming function	Flow method Charge and discharge mode, external power source control CAN control, thermostatic chamber control Conditional moving setting, etc.
Other functions	Reading a DBC file, setting function Interlocking function with Micro Auto Box of dSPACE Co.

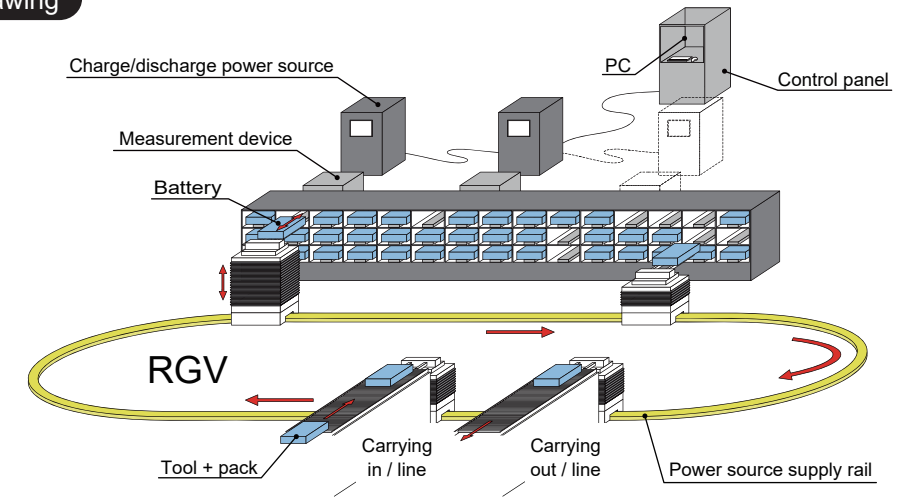
## System block diagram



# Full Automatic Battery Test System for Mass Production Facility

Charge/discharge test of a battery (cell, module, and pack) is possible. Auto-transfer with AGV, RGV, robot, etc., and charge and discharge test is performed at the charge and discharge station. By interlocking with the traceability system, test data are managed.

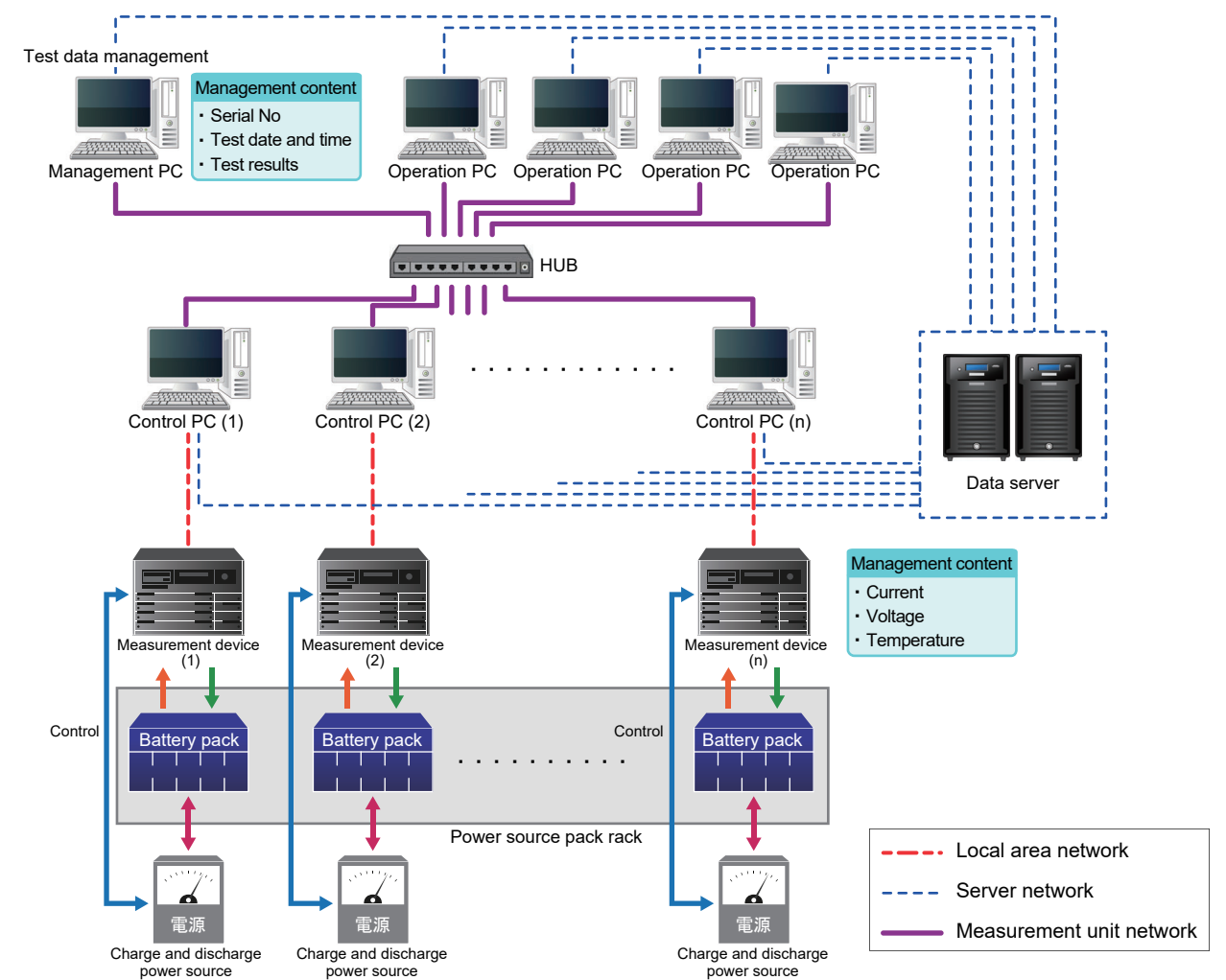
## Appearance drawing



## Specification example

Item	Content
Voltage	0 to 5V, 0 to 20V, 0 to 500V, etc.
Current	±50A, ±200A, ±500A, etc.
Measurement function	Cell voltage, module voltage, pack total voltage, temperature, etc.
Test item	Top alignment charge, capacity check, AC-IR, DC-IR, auxiliary charge, etc.

## Traceability system



- - - Local area network  
- - - Server network  
- - - Measurement unit network