BATTERY PACK INTEGRATED TESTBED MODEL 8610

Chroma ATE launches the 8610 Battery Pack Integrated Testbed for testing new energy vehicle battery systems and subparts, incl. battery module, battery management system, cooling/heating system, and other related components. Various hardware options are available for integration, such as a DC power supply, battery charger/discharge system, digital meter, insulation measurement equipment, and short-circuit and overvoltage protection devices.

8610 Battery Pack Integrated Testbed is designed for research and development of battery modules and packs. The open software architecture offers users powerful dynamics and flexibility while implementing various test items. Besides basic functions like vehicle driving cycle importing, CAN signal monitoring, fault injection, insulation measurement, and EVSE charging simulation, this testbed can execute the most important compound vehicle scenarios for real vehicle and composite operation scenarios with the highest risk of failure (e.g. physical and communication signal errors during cyclic discharge). Perform more in-depth tests on battery packs without the need to test a real car to greatly improve R&D efficiency.

8610 system integrates the Chroma 17040 Regenerative Battery Pack Test System used to simulate charging and discharging of the battery pack by the power system under various driving conditions for increased test reliability and testing on the whole vehicle. During testing, the 17040 system will also feed the power output from the battery pack back into the grid for increased energy efficiency and cost savings.

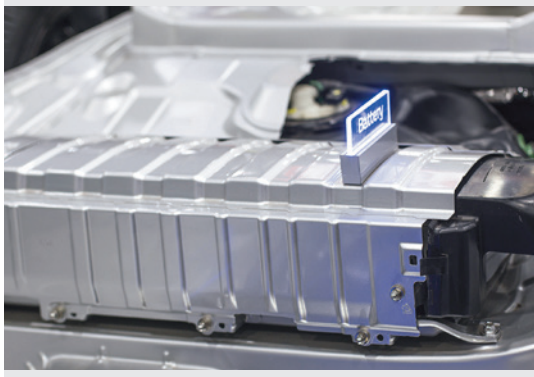
MODEL 8610

KEY FEATURES

- Supporting upper-level automated test software through ASAM XIL and ASAM XIL-MA
- Integrated AC/DC EVSE charge interfaces, incl. CAN Bus and PLC communication and related control signals, for GB/T, CHAdeMO, and CCS compatibility tests
- Real-time monitoring of timing sequences, incl. High power relay open/close, Initial power output, CAN signal
- Integrated Fault Injection Unit hardware, to arrange fault signal combinations and implement fault injection simulation
- Supporting Altair Activate and various Simulink-based real-time models import, to simulate on-road condition tests
- Integrated Hi-Pot safety analyzer, to measure and compare battery insulation and grounding status
- Supporting CAN, CAN FD, LIN communication interfaces
- Extensive modular hardware, to fulfill test accuracy and repeatability; can be expanded according to users' needs
- Independent PLC real-time monitoring, to ensure safety during battery pack charging and discharging tests

APPLICATIONS

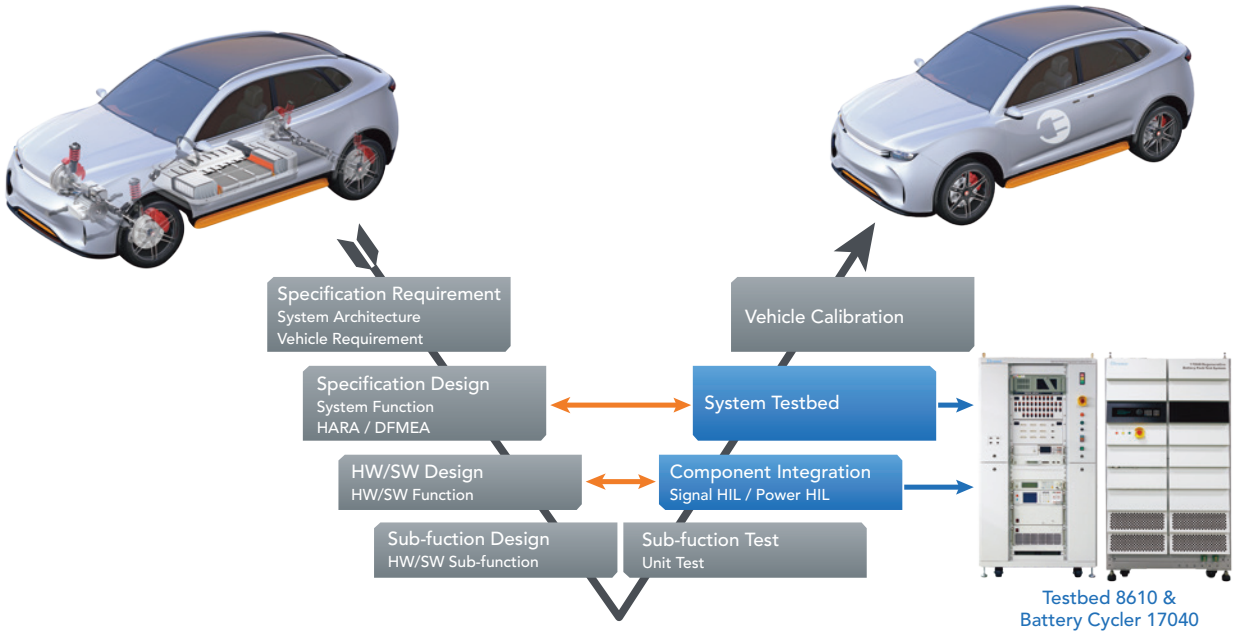
- Battery pack calibration and verification
- Reliability and durability testing
- Simulation of vehicle driving cycle conditions
- System integration testing



Chroma

Vehicle Development Procedures and Testing Requirements

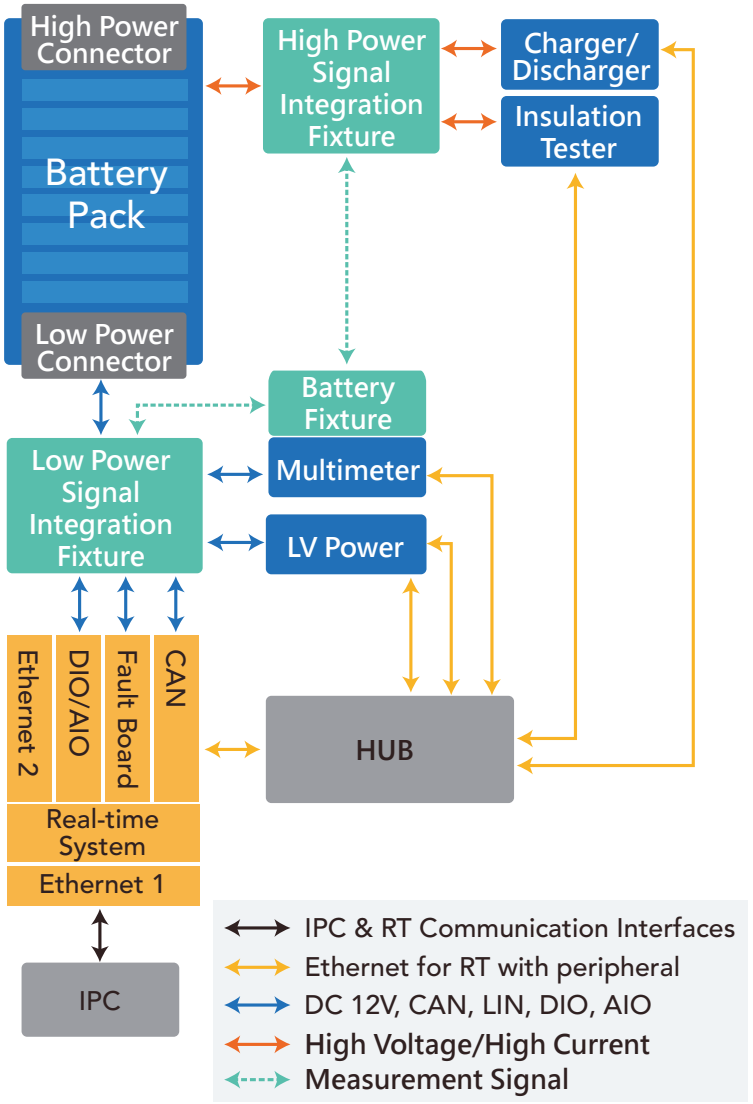
Chroma 8610 highly supports the testing requirements at the right side of the vehicle’s standard development V-shape process, from the integration of battery pack components to system-level functions. This testbed system can implement various composite and simulated vehicle scenarios in advance before entering real vehicle testing. Users can so discover and correct problems early to reduce development costs and improve test efficiency.



Chroma 8610 warning functions and protection mechanisms include overcurrent, overvoltage, undervoltage, shortcircuit, system temperature monitoring and others. The open software architecture can integrate real-time systems, power equipment, measurement modules and simulation models for real-time and highly dynamic testing of battery packs. Compared with other battery test systems that need to obtain the actual on-road charge/discharge records to load and replay in advance, the 8610 system integrates the driving cycle with the vehicle model to directly perform its dynamic battery pack test functions.

On the part of communication, the 8610 testbed supports the common CAN, CAN FD, and LIN interfaces and is capable of loading CAN communication DBC files. For manual testing, it has high flexibility to edit and modify the UI functions so that users can continuously optimize test items and procedures. For automated testing, it supports the upper-level testing software following ASAM XIL and after completion of test sequences, the system's monitoring parameters are recorded for subsequent analysis.

The test interface sets the data collection time as well as displays various parameter values in real time (vehicle speed, voltage, current, input power, output power, efficiency, temperature, operating mode, etc.). Users can draw graphs and reports for each parameter even during testing. Its independent PLC system monitors the system software and power equipment operation status in real time. If an error occurs, the power charging and discharging can be stopped immediately for instant protection of the product and equipment.



Highly flexible and intuitive User Interface

Central to the test system is the User Interface, directly influencing both the convenience of R&D testers and the efficiency of test execution. According to users' test plans, the Chroma 8610 testbed can customize various functions and integrate diverse equipment to establish a control and test program development environment where users are able to write and modify test sequences as well as to edit and modify the UI screens. The main functions include:

Display screen for equipment and DUT parameters:

Such as the battery charge/discharge status, voltage, current, SOC, protection alarm, insulation level, et cetera. Update the values in real time digitally, instrumentally, and through plotting.

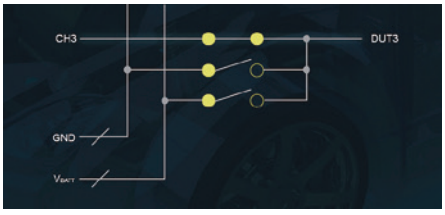
Control parameter screen for test project settings:

Such as the battery charge/discharge start and stop, charge/discharge voltage, current, and power settings, insulation measurement start, fault injection signal selection, test condition selection, et cetera. Control the values digitally and through dragging and switching.

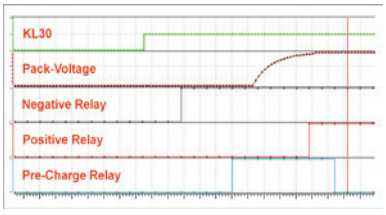
Compound Vehicle Scenarios

Test functions for the loading vehicle driving cycle are included, such as charging/discharging, signal measurement and control, fault injection, insulation measurement, and simulated EVSE charging. Users can arrange and combine all these test functions with high flexibility to achieve a variety of compound vehicle scenarios, for more thorough testing of battery packs. The example below illustrates charging and discharging after loading the real on-road profile as well as simulation of charging changes right after a fault injection.

(7) Load reduction command to change charge/discharge output



(5) Fault Injection

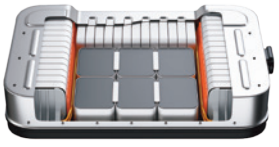


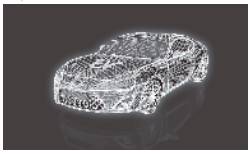
(4) Timing Control & Measurment

Integrated Testbed 8610

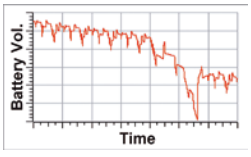
Battery Cycler 17040

(6) Alarm

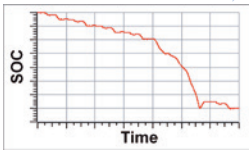




(2) EV model



SOC v.s. Time



Voltage v.s. Time

(1) Key-on

(3) Start Timing Detection

Diverse Test Items

Single Test Functions

(1) CC and CV charge/discharge tests
(2) Vehicle driving cycle discharge
(3) Arbitrary charge/discharge pattern reproduction
(4) Voltage measurement and voltage difference detection
(5) Current measurement and current difference detection
(6) High Power ON/OFF control logic and timing
(relay self-test mechanism confirmation)
(7) High voltage interlocking mechanism
(8) Battery protection function timing check
(9) Insulation resistance measurement
(10) AC/DC withstand voltage tests
(11) Dynamic leakage current
(12) GB/T, CHAdeMO, CCS AC/DC charging and interoperability tests

Compound Test Functions

(1) Checking insulation & withstand voltage status after fault injection while discharging with vehicle driving cycle importing
(2) Checking insulation & withstand voltage status after fault injection while arbitrary charge/discharge pattern reproduction
(3) Impact of fault injection on SOC calculation and protection functions
(4) Checking insulation & withstand voltage status after fault injection while AC and DC charging process
(5) Charging energy and strategy verification with different SOC, cell & total voltage and fault signals
(6) Fully charged calibration mechanism test

High Performance Equipment

1. Regenerative Battery Pack Test System : 17040 Series
2. Breaking-Out Box & Panel
3. Communication and I/O Signal Connecting Panel
4. Digital Multimeter
5. EVSE Emulator: 80619
6. DC Power Supply: 62000P Series
7. Electrical Safety Analyzer: 19032 Series
8. Low Voltage Signal Control Box: A870001
9. High Voltage Signal Control Box: A870003

Ordering Information

8610 : Battery Pack Integrated Testbed
17040 : Regenerative Battery Pack Test System
19032 : Electrical Safety Analyzer
62000P Series : DC Power Supply
80619: EVSE Emulator
A870001 : Low Voltage Signal Control Box
A870003 : High Voltage Signal Control Box
5004ATM : IPC

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8610

HEADQUARTERS
CHROMA ATE INC.
66 Huaya 1st Road,
Guishan, Taoyuan
33383, Taiwan
T +886-3-327-9999
F +886-3-327-8898
www.chromaate.com
info@chromaate.com

U.S.A.
CHROMA SYSTEMS SOLUTIONS, INC.
19772 Pauling,
Foothill Ranch,
CA 92610
T +1-949-600-6400
F +1-949-600-6401
www.chromausa.com
sales@chromausa.com

EUROPE
CHROMA ATE EUROPE B.V.
Morsestraat 32, 6716 AH
Ede, The Netherlands
T +31-318-648282
F +31-318-648288
www.chromaeu.com
salesde@chromaeu.com

CHROMA GERMANY GMBH
Südtiroler Str. 9, 86165,
Augsburg, Germany
T +49-821-790967-0
F +49-821-790967-600
www.chromaeu.com
salesnl@chromaeu.com

JAPAN
CHROMA JAPAN CORP.
888 Nippa-cho,
Kouhoku-ku,
Yokohama-shi,
Kanagawa,
223-0057 Japan
T +81-45-542-1118
F +81-45-542-1080
www.chroma.co.jp
info@chroma.co.jp

KOREA
CHROMA ATE KOREA BRANCH
3F Richtogether Center, 14,
Pangyoyeok-ro 192,
Bundang-gu,
Seongnam-si,
Gyeonggi-do
13524, Korea
T +82-31-781-1025
F +82-31-8017-6614
www.chromaate.co.kr
info@chromaate.com

CHINA
CHROMA ELECTRONICS (SHENZHEN) CO., LTD.
8F, No.4, Nanyou Tian An Industrial Estate,
Shenzhen, China
T +86-755-2664-4598
F +86-755-2641-9620
www.chroma.com.cn
info@chromaate.com

SOUTHEAST ASIA
QUANTEL PTE LTD.
(A company of Chroma Group)
25 Kallang Avenue #05-02
Singapore 339416
T +65-6745-3200
F +65-6745-9764
www.quantel-global.com
sales@quantel-global.com