E-PROPULSION TEST SYSTEM
MODEL 1210

Chroma 1210, a newly designed electric propulsion test system offers a fully integrated test and simulation environment for testing various electric and electrified vehicles such as hydrogen fuel cell vehicles. Chroma 1210 test system can ultimately be used to validate the electrified propulsion sub-systems including motors, motor controllers, and gear reduction box and electric drive systems, etc.

Chroma 1210 E-propulsion Test System suits performance calibration and verification of vehicle power systems. The versatile software operations are capable of loading the high-fidelity vehicle dynamic model for the specified electrical and mechanical components' simulation & verification. The manual and automatic operating interface offer the users the flexibility and convenience to synchronously record the essential system parameters such as voltage, current, power, rotational speed, torque, temperature as to calculate the efficiency of the motor and controller and generate the torque curve graph. The electricity generated during the test cycle is fed back to the grid through the regenerative Chroma 17040. Moreover, the 17040 battery simulation function can simulate the reaction characteristics of the battery while the vehicle is operating, and reliability of the verification is significantly increased.

With four-quadrant operation capability, the E-propulsion Test System can keep constant torque load below the rated speed (zero speed or even reverse rotation) and with a constant power above the rated speed. The test bench frame has been developed especially for the requirements of dynamic applications. The modularized mounting bracket for the fixtures makes it easily to fit onto the motors of various sizes.

E-Propulsion Test System has several protection features, including Over-Current, Over-Voltage, Under-Voltage pr, Short-Circuit, Missed Phase Identification, System Temperature Monitoring, and other ample protection mechanisms and overload warning functions. The system control software can accept the DBC file, linked DBC file, manual control, and monitoring data. The test interface displays instantaneous test data (voltage, current, rotational speed, torque, input power, output power, efficiency, temperature) in real time and can also be set to collect data at a specific time. Already during testing, the system can draw the curve and output the report containing graphs of the test process.

The open architecture for the system software can be quickly integrated into the customer's laboratories testing and safety monitoring equipment. Its vibration monitor unit simultaneously monitors the running status of the bench and test parts so as to completely integrate and manage the laboratory.
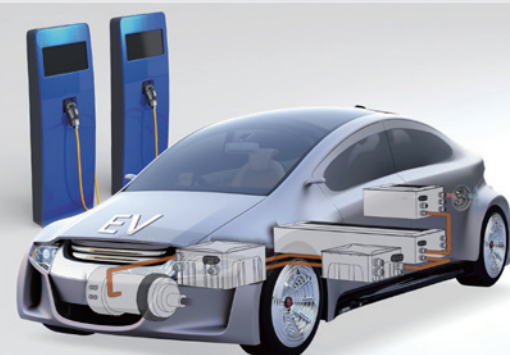
MODEL 1210

KEY FEATURES

- Performs Power HIL tests on dynamo-meters, incl. e-motor, motor control unit, gear reduction box, e-drive system
- Power up to 500 kW
- Rotational speed up to 18,000 rpm
- Various motor mounting options
- System security integration
- Supports Altair Activate vehicle model and Model-Based real-time mathematical model
- Supports identification of motor vibration characteristics
- Supports test part bus systems CAN, CAN FD, EtherCAT
- Cooling methods IC06 (self-ventilation)/ IC86W (heat exchanger)
- IP23 (self-ventilation)/IP54 (heat exchanger) protected
- Additional high/low temperature environmental chamber (option)
- Follows standards:
  - GB/T 18488.1-2015
  - GB/T 18488.2-2015
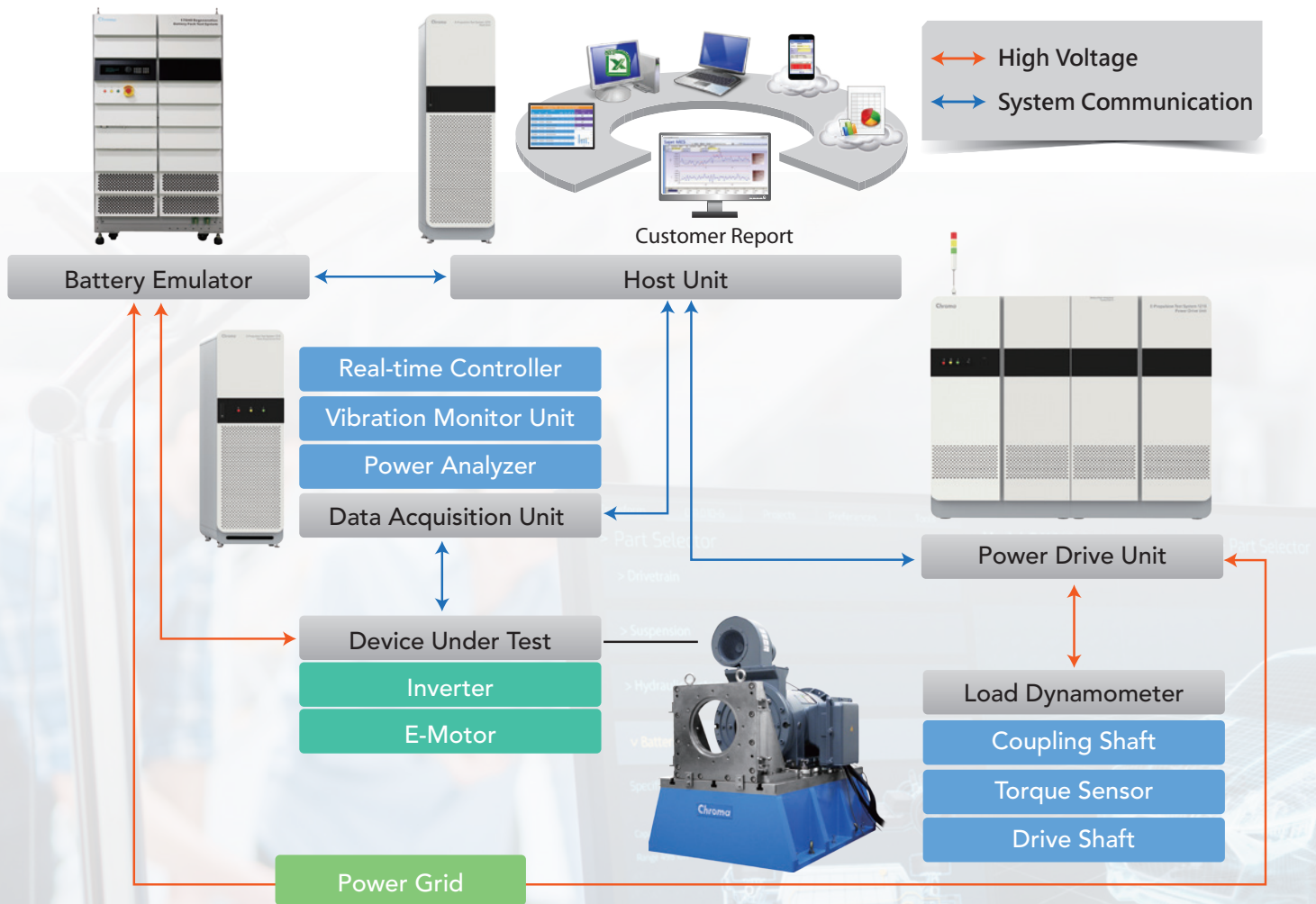 - Industry-developed test standards

APPLICATIONS

- Electric drive system calibration and verification
- System reliability and durability testing
- Dynamic vehicle conditions simulation testing
- System integration testing

Chroma

High Voltage

System Communication

Customer Report

Battery Emulator ⟷ Host Unit

Real-time Controller

Vibration Monitor Unit

Power Analyzer

Data Acquisition Unit

Power Drive Unit

Device Under Test

Inverter

E-Motor

Load Dynamometer

Coupling Shaft

Torque Sensor

Drive Shaft

Power Grid

- **LOAD DYNAMOMETER**
  Measures torque, speed or power, including AC-Motor, torque sensor, test bench, coupler, safety cover, e-motor mounting fixture
- **POWER DRIVE UNIT**
  Controls the high-performance power drive unit of the AC-Motor on the test bench
- **DATA ACQUISITION UNIT**
  Records data of various physical quantities and provides you with DIO / AIO / CAN / CAN FD / EtherCAT interfaces
- **HOST UNIT**
  Executes the control software E-Propulsion Test Software, with functions including system control, data monitoring, and security alarm
- **BATTERY EMULATOR**
  Simulates the dynamic charging/discharging behavior of vehicle batteries, with an energy regenerative function to greatly reduce its power consumption during charge or discharge and to ensure a stable power grid without generating harmonic pollution to other devices - even in dynamic charge and discharge conditions.

VIBRATION MONITOR UNIT

The VMU real-time data collection function accumulates the data and automatically creates analyses, statistics, and judgments based on its algorithms. You can easily ascertain the operation status of test parts and even predict any dynamic mechanical failure characteristics in advance so as to help avoid machine damage occurring without a warning. The system offers the following five vibration characteristics of the motor rotor:
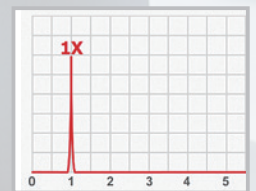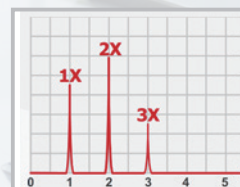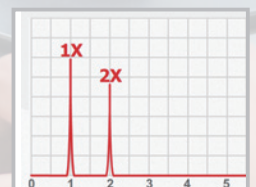
Unbalance
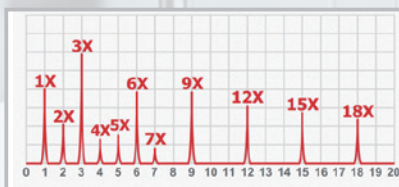
Damaged Rolling
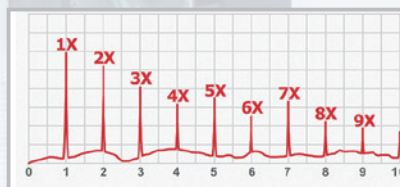
Looseness

Misalignment

Bent Shaft

E-PROPULSION TEST SOFTWARE

Chroma's complimentary E-Propulsion Test Software has a real-time control system that is able to synchronously control the motor driver and support different bus systems such as CAN/CAN FD/EtherCAT. The data control screen can provide additional customized functions. For simulating dynamic vehicle conditions, the software uses the Altair Activate vehicle model, through which you can import international test conditions such as NEDC and WLTP to verify the working condition and the powertrain system. Moreover, the software simulates the vehicle's power battery function and uses the actual mechanical kinetic energy consumption and recharge in order to verify the battery management system and to calculate the complete vehicle's endurance.


System Control Interface

Data Monitor Interface

E-Propulsion Test can measure various motors and motor controllers and synchronize all the collected data. It so can comprehensively analyze various types of electric drive systems (e.g. single e-motor, motor and generator, 2-4 wheel drive motor, fuel cell hybrid power system) and at the same time review other loads (e.g. heating, air conditioning, 24V, 12V). A typical EV test will be based on different driving conditions and the motor controller will work at different switching frequencies to improve efficiency. Additionally, there are many factors in the actual environment that will affect the energy consumption of electric vehicles. Such environmental factors include the temperature, weather, road quality, driving conditions (uphill, downhill, urban roads, long-distance mountain roads or mixed roads), as well as differing driving habits between drivers. E-Propulsion Test is able to simultaneously measure and analyze all the above parameters while testing.
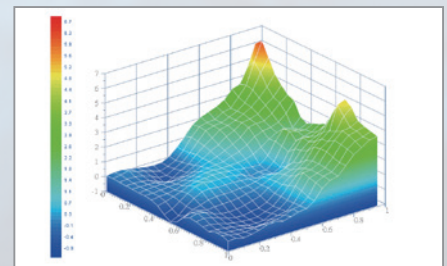
Test Report Output
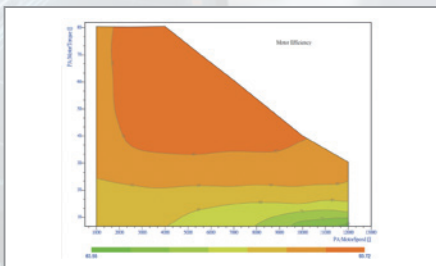
System Efficiency Graph
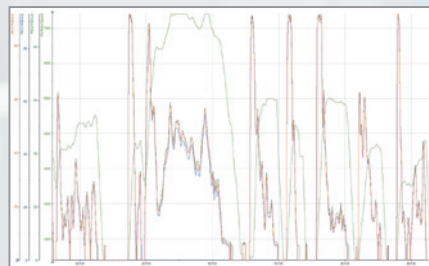
FTP-75 Test Result

4D Report Output

SYSTEM FEATURES

System security protection - extending equipment life
- Protection mechanisms and overload response warnings include overcurrent, overvoltage, undervoltage, short circuit, power phase loss identification, and internal temperature monitoring.
- The dual loop mode protection mechanism for system control effectively creates a safe operating environment.
- The real-time Vibration Monitor Unit can simultaneously monitor the running status of the E-Propulsion Test System and of the test parts, perform real-time data collection, and conduct spectrum overall value (SOA) through data algorithms. When the system shows any abnormalities, it will give immediate feedback to the control terminal and execute an alarm or shutdown.
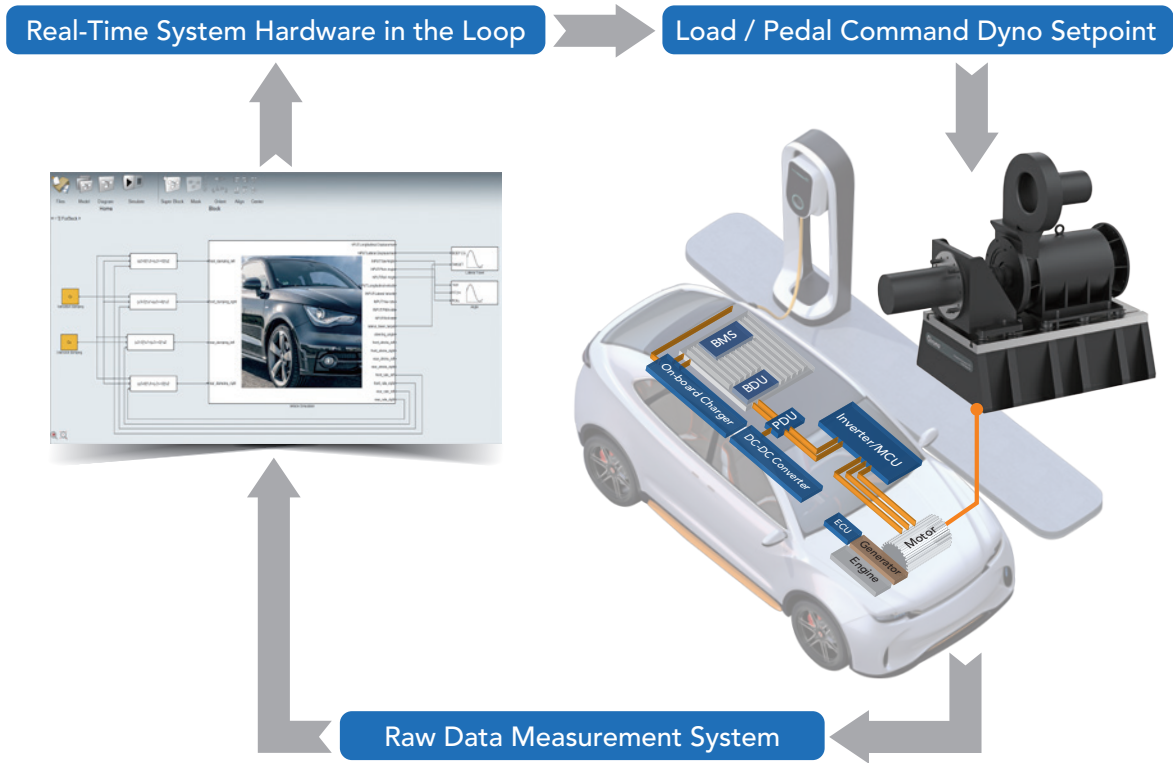
Simultaneous data measurement - improving experiment reliability
- The data monitoring interface displays the instantaneous test values in real time, including voltage, current, rotational speed, torque, input power, output power, efficiency, temperature, etc.
- The system can collect data synchronously and adjust the sampling frequency according to different test needs.
- Choose to simultaneously collect CAN / CAN FD or other physical signals.

Test part vibration analysis - reducing motor abnormalities
- Real-time detection – offering reliable automated fault diagnosis
- Test quality assurance - continuously monitoring test parts and shortening the test time spent on products with abnormalities
- Deep learning – intelligently learning the mechanical behavior of the rotor and detecting vibration characteristics, such as imbalance, misalignment, axis bending, axis friction, and mechanical looseness.

PHIL VEHICLE MODEL SIMULATION ON THE TEST BENCH

Real-Time System Hardware in the Loop ➡ Load / Pedal Command Dyno Setpoint

Raw Data Measurement System

SPECIFICATIONS

Model	1210
System	
Max. Power Output	500 kW
Max. Rotation Output	18,000 rpm
Communication Interface	CAN、CAN FD、EtherCAT
Interface	A121000 E-Propulsion Test Software
Operating System	Windows 7 or higher edition
Ambient Conditions	
AC Input	3-phase 400 VAC, 50/60Hz
Temperature Range	10℃~40℃
Humidity Range	10 to 70% uncondensed

* All specifications are subject to change without notice.

ORDERING INFORMATION

1210 : E-propulsion Test System
17020 : Battery Pack Simulator
17040 : Battery Pack Simulator
51101 : Thermal/Multi-function Data Logger
A121000 : E-Propulsion Test Software
HBM GEN Series : Power Analyzer (option)
HIOKI PW Series : Power Analyzer (option)
YOKOGAWA WT Series : Power Analyzer (option)

Get more product & global distributor information in Chroma ATE APP

iOS   Android

Search Keyword

1210