Regenerative Battery Pack Test System

Model 17030

Key Features

- Supports high power battery certification : IEC, SAE, GB…etc.
- Regenerative battery discharge, Saves energy, environment-friendly and provides low heat dissipation
- Driving cycle simulator
- Industry Leading Accuracy
- 10ms Data acquisition
- Charge / discharge mode
  - Constant Current
  - Constant Voltage
  - Constant Power
- Customized rating power
  - Voltage range ： 10~1200V
  - Current range ： 0~1000A
  - Power range ： 90~500kW
- System Integration:
  - Chamber Control
  - Multi-channels voltage/ temperature measurement (Max 256CH)
  - BMS Communication

Chroma

REGENERATIVE BATTERY PACK TEST SYSTEM MODEL 17030

Chroma's 17030 is an automated regenerative test system specifically designed for high power battery pack tests. Accurate power sources and measurements ensure test quality suitable for repetitive and reliable testing of crucial battery packs. Applications include incoming inspections capacity validation, production and certification testing.

Chroma's 17030 system architecture offers regenerative discharging designed to recycle the electric energy sourced by the battery pack. This feature saves electricity, reduces the facilities costs, reduces the thermal foot print and provides a green solution by reducing the environmental impact to the planet.

Chroma's 17030 system include a driving cycle simulation function. Since automotive battery packs are used at quick and irregular intervals, the 17030 incudes the capability to create seamless transitions between maximum charge and maximum discharge (or maximum discharge and maximum charge) with a rapid 50 ms conversion. This feature allows for charge/discharge mode simulations of real world driving scenarios. The system simulates the real conditions on the battery pack in its working condition.

Chroma's 17030 system has flexible programming functions and includes Chroma's powerful Battery Pro software. Battery Pro is a user friendly software environment allowing for the creation of a wide range of test scenarios from basic charge and discharge to complex drive cycle testing. Battery Pro's features allows quick and intuitive test development to eliminate the need for tedious scripting or programming by a software developer.

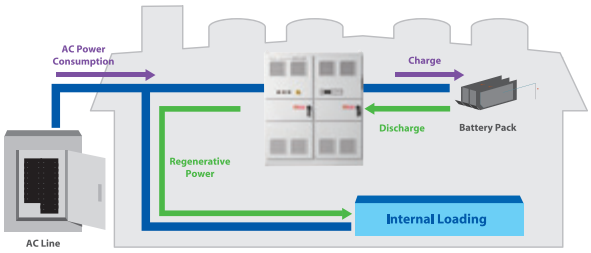
There are multiple safety features built into the 17030 including battery polarity checks, overvoltage protection, overcurrent protection and over temperature protection. In the unlikely event of a power or computer communication loss, the data is securely stored within the system in non-volatile memory thereby protecting against potential data loss and allowing for continuous flow after restart.

Ethernet CE

KEY SYSTEM FEATURES

Regenerative Energy

- Regenerate power to grid, Low heat dissipation, reduce air-conditioner loads and facility power consumption
- THD under 5% at rated power
- The PF over 0.9 at rated power
- Efficiency above 85% when operated above 20% of rated power

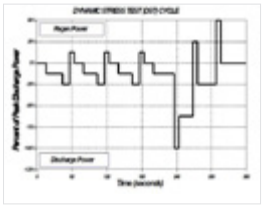


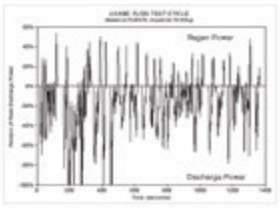
Regenerate the energy to AC line

Driving Cycle Simulation (Power/ Current Waveform mode)

Simulate real automotive working conditions by defining quick and irregular charging and discharging conditions.

- Import dynamic charge/discharge waveforms to simulate the DRIVE CYCLE or other actual applications via .xls file formats
- Supports 720,000 points within driving profile memory for saving profiles of each channel
- Minimum transition time (△t) = 10ms

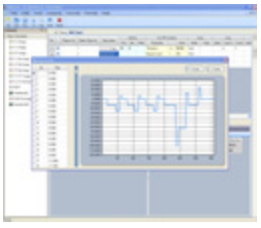

DST Power Profile

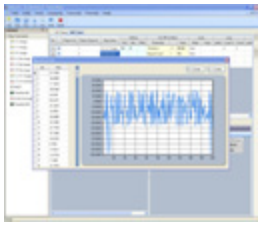

Support FUDS test

Customized rated power

17030 design allows for customized power levels.

- Channels are easily paralleled with same model to support higher current requirements. This feature provides ultimate flexibility between high channel count and high current testing. (Supports a maximum of 2 units)
- Dual output in one system, independent control

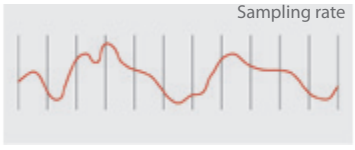

Loading DST waveform current


Loading FUDS waveform current

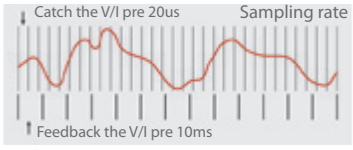
High accuracy capacity calculation

Voltage/current sampling rate of 50kHz used for calculations of capacity ratings in current waveform mode.

- V/I sampling rate : 50KHz
- Minimum data acquisition : 50ms
- Integrate calculus : For I : Capacity, - For V x I : Energy



Other Cycler



Double Integrating Method

System Function

Charge / discharge mode

- Constant Current/Constant current- limited Voltage/Constant Power
- Waveform current mode
- DCIR mode (IEC61960-2004)
- Rest mode

Cut-off condition

- Time/ Capacity/ Voltage/ Current/ Temperature
- Data Acquisition from data logger (option)
- Data Acquisition from BMS (option)

Protection

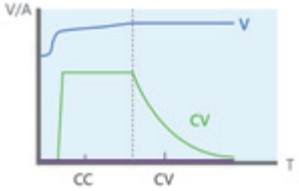
- OVP/UVP/OCP/OTP/OQP
- Data Acquisition from data logger (option)
- Data Acquisition from BMS (option)
- Turn the main loop off for safety issues of AC line
- △V protection / △I protection for internal short of battery pack
- △V period protection / △I period protection
- CC-CV transition time

Testing Data

- Generate the detailed report and step report
- Customized report format

Continuous transition

- Continuous charge and discharge transition: No time delay to transit from charge to discharge
- Continuous CC-CV transition: No overshoot current or voltage which may damage the battery when transiting modes



Response time

- The trip time between maximum charge and maximum discharge current in static modes is 50ms. (10mS in waveform mode)
- Smooth current profiling without overshoot to avoid damage the battery

Data Recovery Function

- 60 min of temporary data storage when sampling time is 1 sec
- Automatic data recording in non-volatile memory allows for resumption of testing following power interruption

Temperature Measurement

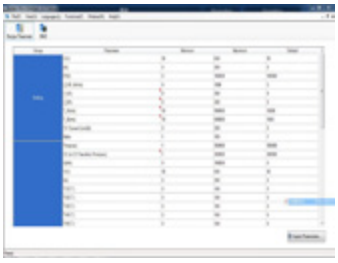
- Temperature measured for each channel within the range of 0~90˚C ±2˚C
- Maximum 4 thermal sensors can be connected in series for measuring 4 independent battery points
- Data Acquisition for temperature protection

SOFTWARE FUNCTION

The 17030 Test system is specifically designed to meet the various requirements for testing secondary battery packs with high safety and stability. Charge and discharge protection aborts tests when abnormal conditions are detected. Data loss, storage and recovery are protected against power failure.

- Real-time battery pack status browse
- Icon Manager: Test status of each channel is managed through different icons, easy to read and understand
- Authority management: Allows for multiple user authority
- Fault record tracking: Records abnormal states of each channel independently

Battery Pro Main Page (English)



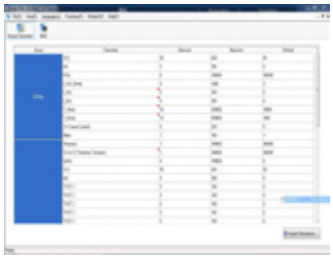
UUT Specifications

Status browser (1)

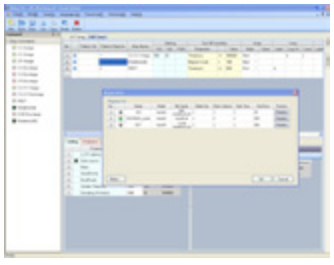
Status browser (2)

Recipe editor

- 3000 charge/discharge conditions
- Sets dual layer loops (cycle & loop) with 9999 loops per layer
- Ability to edit dynamic charge/discharge waveform
- 10ms current switching speed in waveform current mode
- Testing modes: CV / CC / CP / CC-CV / Waveform current / DCIR)
- Cut-off conditions (time, current, capacity, cut-off voltage, cut-off current, etc.)

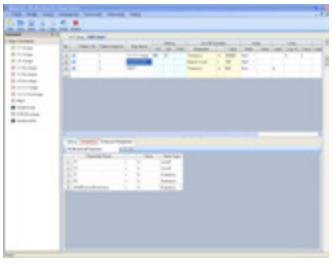


Status browse in DST test



Loading DST waveform

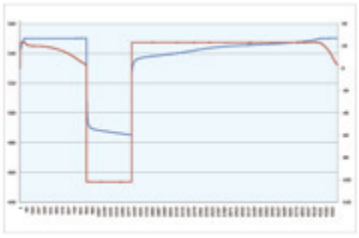
Status browse in DST test



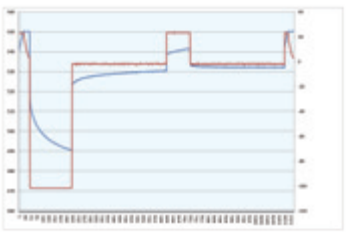
Loading multi-Waveform

Testing Data

- Generate the detailed report and step report
- Customized report format
- Exports test reports in PDF, CSV and XLS
- Graphical report function
- Report analysis Function: Users can create customized reports such as life-cycle report, Q (AH)-V(V) report, V(V)/I(A)/T(˚C)-time report…etc through the user-defined X and Y axis parameters
- Real-time browsing test reports of each channel
- Diversified reports & charts: Real-time report, Cut-off report, X-Y scatter chart report



Learning Test



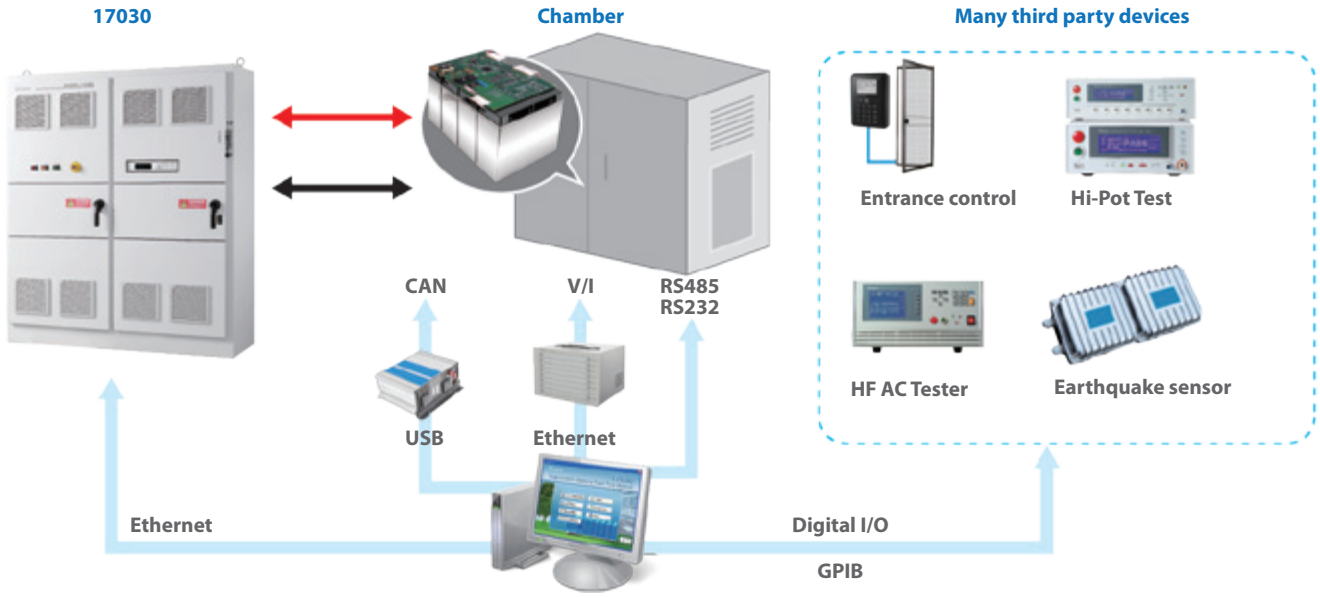
DCIR Test

Cycle Life Test

Capacity Measurement

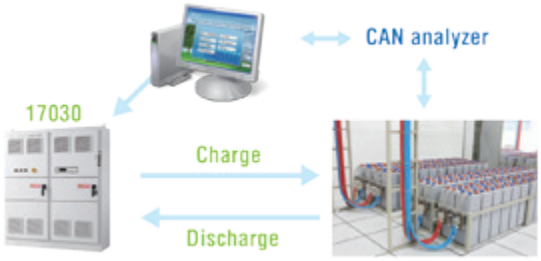
SOFTWARE INTEGRATION (OPTION)

- Battery Pro can communicate to most thermal chambers for life and temperature testing .
- Many third party devices can be integrated into the 17030 via standard interface protocols (discrete I/O interface, GPIB, etc).



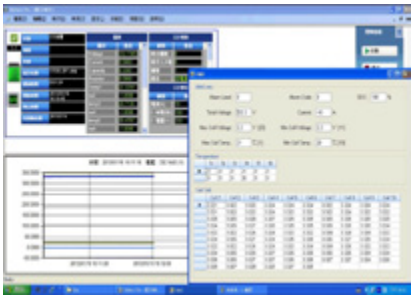
System configuration

- **BMS communication interface: Collect Battery Management System data automatically during testing.**
  -User types in the CAN massage
  -Convert DBC to Battery Cycler by Software Tools



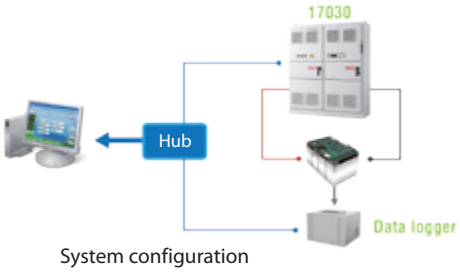
System configuration

CANbus messaging dialog box



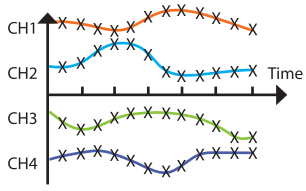
BMS Status browse

- **Data logger: Data logger integration allows for detailed collection of voltage, current and temperature data during charge/ discharge profiling.**
  -Support B, E, J, K, N, R, S, and T type thermal couples with ITS-90 defined temperature range
  -Individual channel cold junction compensation with < ±0.3˚C accuracy
  -Temperature resolution up to 0.01˚C,error down to (0.01% of reading+0.3˚C)
  -Voltage full range ±10VDC;resolution 10uV; error down to 0.015% of reading+100uV
  -No matter how many channels are active, the data rate can be as fast as 5 samples per second per channel.



System configuration

Chroma's 64 channel data looger
Model 51101-64



Sample rate per channel = constant

Data logger Status browse

PROTECTION FUNCTION AND DATA RECOVERY

Safety Protection

- Channel monitoring icon: empty, contact checking, contact check failed, reverse polarity, standby, running, pause, finish, communication error, etc
- Save testing data when PC is down or disconnected
- Save the test settings to resume after the power failure is recovered

SPECIFICATIONS-1

Model		**17030 ***				
Channel		1	2	1	1	1
Max Power *1		90kW	180kW	180kW	250kW	210kW
Max Power /Per channel		90kW	90kW	180kW	250kW	210kW
Max Voltage		450V	450V	700V	700V	900V
Max Current / Per channel		200A	200A	300A	500A	500A
Constant Voltage Mode						
Voltage Range *2		15-450Vdc	15-450Vdc	15-700Vdc	15-700Vdc	19-900 Vdc
Voltage accuracy		0.1%F.S.	0.1%F.S.	0.1%F.S.	0.1%F.S.	0.1%F.S.
Voltage resolution		10mV	10mV	15mV	15mV	20mV
Constant Current Mode						
Maximum Current		200A	200A	300A	500A	500A
Current accuracy		0.1%F.S.	0.1%F.S.	0.1%F.S.	0.1%F.S.	0.1%F.S.
Current resolution		10mA	10mA	15mA	20mA	20mA
Constant Power Mode						
Max Power / Per channel		90kW	90kW	180kW	250kW	210kW
Power accuracy		0.2%F.S.	0.2%F.S.	0.2%F.S.	0.2%F.S.	0.2%F.S.
Power resolution		5W	5W	10W	20W	20W
Current Rising Time (10% to 90% Load)		10ms with 0.2Ω Resistive load	10ms with 0.2Ω Resistive load	10ms with 0.2Ω Resistive load	10ms with 0.2Ω Resistive load	10ms with 0.2Ω Resistive load
Ripple Noise (DC Current)		<1%F.S.	<1%F.S.	<1%F.S.	<1%F.S.	<1%F.S.
Overshoot		<1%F.S.	<1%F.S.	<1%F.S.	<1%F.S.	<1%F.S.
Measurement *3						
Voltage Read Back						
range		0~450V	0~450V	0~700V	0~700V	0~900V
accuracy		0.05% rdg.+0.05% F.S.	0.05% rdg.+0.05% F.S.	0.05% rdg.+0.05% F.S.	0.05% rdg.+0.05% F.S.	0.05% rdg.+0.05% F.S.
resolution		10mV	10mV	15mV	15mV	20mV
Current Read Back						
High range		0~200A	0~200A	0~300A	0~500A	0~500A
accuracy		0.1%F.S.	0.1%F.S.	0.1%F.S.	0.1%F.S.	0.1%F.S.
Low range		0~50A	0~50A	0~75A	0~125A	0~125A
accuracy		0.2%F.S.	0.2%F.S.	0.2%F.S.	0.2%F.S.	0.2%F.S.
resolution		10mA	10mA	15mA	20mA	20mA
Power Read Back						
Power range		90kW	90kW	180kW	250kW	210kW
Power accuracy		0.2% F.S.	0.2% F.S.	0.2% F.S.	0.2% F.S.	0.2% F.S.
Power resolution		5W	5W	10W	20W	20W
Thermal Sensor						
range		0˚C ~90˚C	0˚C ~90˚C	0˚C ~90˚C	0˚C ~90˚C	0˚C ~90˚C
accuracy		±0.2˚C	±0.2˚C	±0.2˚C	±0.2˚C	±0.2˚C
resolution		0.1˚C	0.1˚C	0.1˚C	0.1˚C	0.1˚C
AC Input						
Line voltage / Frequency *4		3Ø 200V/220V/380V/440V/480V ±5%, 47~63Hz				
Others						
Audible noise level (in 1m distance)		Under 80dB				
Efficiency (Typical)		85%				
Interface *5		Ethernet				
Operation Temperature		0 ˚C ~ 40 ˚C				
Dimension (H x W x D) *6	Transformer	1111 x 813 x 686mm / 43.75 x 32 x 27 inch	1257 x 1041 x 813mm / 49.5 x 41 x 32 inch	1257 x 1041 x 813mm / 49.5 x 41 x 32 inch	1257 x 1041 x 813mm / 49.5 x 41 x 32 inch	1257 x 1041 x 813mm / 49.5 x 41 x 32 inch
	Power Enclosure	1982 x 1982 x 915mm / 78 x 78 x 36 inch	1982 x 1982 x 915mm / 78 x 78 x 36 inch	1982 x 1982 x 915mm / 78 x 78 x 36 inch	1982 x 1982 x 915mm / 78 x 78 x 36 inch	1982 x 1982 x 915mm / 78 x 78 x 36 inch
Weight *7	Transformer	approx. 465 kg / approx. 1025 lbs	approx. 710 kg / approx. 1560 lbs	approx. 640 kg / approx. 1400 lbs	approx. 710 kg / approx. 1560 lbs	approx. 710 kg / approx. 1560 lbs
	Power Enclosure	approx. 1140 kg / approx. 2500 lbs	approx. 1600 kg / approx. 3500 lbs	approx. 1140 kg / approx. 2500 lbs	approx. 1140 kg / approx. 2500 lbs	approx. 1270 kg / approx. 2800 lbs

* All specications are subject to change without notice. Please visit our website for the most up to date specications.

SPECIFICATIONS-2

Model		17030 *			
Channel		1	2	1	1
Max Power *1		250kW	280kW	300kW	500kW
Max Power / Per channel		250kW	140kW	300kW	500kW
Max Voltage		900V	700V	700V	1200V
Max Current / Per channel		500A	200A	1000A	700A
Constant Voltage Mode					
Voltage Range *2		19-900 Vdc	15-700Vdc	15-700Vdc	30-1200Vdc
Voltage accuracy		0.1%F.S.	0.1%F.S.	0.1%F.S.	0.1%F.S.
Voltage resolution		20mV	15mV	15mV	30mV
Constant Current Mode					
Maximum Current		500A	200A	1000A	700A
Current accuracy		0.1%F.S.	0.1%F.S.	0.1%F.S.	0.1%F.S.
Current resolution		20mA	10mA	40mA	30mA
Constant Power Mode					
Max Power / Per channel		250kW	140kW	300kW	500kW
Power accuracy		0.2%F.S.	0.2%F.S.	0.2%F.S.	0.2%F.S.
Power resolution		20W	10W	20W	40W
Current Rising Time (10% to 90% Load)		10ms with 0.2Ω Resistive load	10ms with 0.2Ω Resistive load	10ms with 0.2Ω Resistive load	10ms with 0.2Ω Resistive load
Ripple Noise (DC Current)		<1%F.S.	<1%F.S.	<1%F.S.	<1%F.S.
Overshoot		<1%F.S.	<1%F.S.	<1%F.S.	<1%F.S.
Measurement *3					
Voltage Read Back					
Range		0~900V	0~700V	0~700V	0~1200V
Accuracy		0.05% rdg.+0.05% F.S.	0.05% rdg.+0.05% F.S.	0.05% rdg.+0.05% F.S.	0.05% rdg.+0.05% F.S.
Resolution		20mV	15mV	15mV	30mV
Current Read Back					
High range		0~500A	0~200A	0~1000A	0~700A
Accuracy		0.1% F.S.	0.1%F.S.	0.1%F.S.	0.2%F.S.
Low range		0~125A	0~50A	0~250A	0~175A
Accuracy		0.2% F.S.	0.2%F.S.	0.2%F.S.	0.2%F.S.
Resolution		20mA	10mA	40mA	30mA
Power Read Back					
Power range		250kW	140kW	300kW	500kW
Power accuracy		0.2% F.S.	0.2% F.S.	0.2% F.S.	0.2% F.S.
Power resolution		20W	10W	20W	40W
Thermal Sensor					
Range		0˚C ~90˚C	0˚C ~90˚C	0˚C ~90˚C	0˚C ~90˚C
Accuracy		±0.2˚C	±0.2˚C	±0.2˚C	±0.2˚C
Resolution		0.1˚C	0.1˚C	0.1˚C	0.1˚C
AC Input					
Line voltage / Frequency *4		3Ø 200V/220V/380V/440V/480V ±5%, 47~63Hz			
Others					
Audible noise level (in distance)		Under 80dB			
Efficiency (Typical)		85%			
Interface *5		Ethernet			
Operation Temperature		0 ˚C~ 40 ˚C			
Dimension (H x W x D) *6	Transformer	1257 x 1041 x 813mm / 49.5 x 41 x 32 inch	1257 x 1041 x 813mm / 49.5 x 41 x 32 inch	1257 x 1041 x 813mm / 49.5 x 41 x 32 inch	1257 x 1041 x 813mm / 49.5 x 41 x 32 inch
	Power Enclosure	1982 x 1982 x 915mm / 78 x 78 x 36 inch	1982 x 1982 x 915mm / 78 x 78 x 36 inch	1982 x 1982 x 915mm / 78 x 78 x 36 inch	2286 x 5030 x 609mm / 90 x 198 x 24 inch
Weight *7	Transformer	approx. 710 kg / approx. 1560 lbs	approx. 710 kg / approx. 1560 lbs	approx. 710 kg / approx. 1560 lbs	approx. 1420 kg / approx. 3120 lbs
	Power Enclosure	approx. 1270 kg / approx. 2800 lbs	approx. 1270 kg / approx. 2800 lbs	approx. 1650 kg / approx. 3640 lbs	approx. 2270 kg / approx. 5000 lbs

Note*1 : Customized rated power : Voltage 10~1200V; max Current 1000A ; Power 90~500kW

Note*2 : The output range of voltage is referred by the cabling. The connection between the device and battery is 3 meters long as standard accessory.

Note*3 : 20us sampling rate for calculating battery capacity and energy

Note*4 : The transformer is for isolation and to accommodate various facility voltages

Note*5 : The interface from PC to 17030 is through Ethernet

Note*6 : The dimension is for reference. The dimensions are subject to change base on real condition

Note*7 : The weight is for reference. The weight are subject to change base on real condition

ORDERING INFORMATION

17030 : Regenerative Battery Pack Test System 90kW / 450V / 200A / 1CH
17030 : Regenerative Battery Pack Test System 180kW / 450V / 200A / 2CH
17030 : Regenerative Battery Pack Test System 180kW / 700V / 300A / 1CH
17030 : Regenerative Battery Pack Test System 210kW / 900V / 500A / 1CH
17030 : Regenerative Battery Pack Test System 250kW / 700V / 500A / 1CH
17030 : Regenerative Battery Pack Test System 250kW / 900V / 500A / 1CH
17030 : Regenerative Battery Pack Test System 280kW / 700V / 200A / 2CH
17030 : Regenerative Battery Pack Test System 300kW / 700V / 1000A / 1CH
17030 : Regenerative Battery Pack Test System 500kW / 1200V / 700A / 1CH
A170201: IPC for battery test system
A692003: Thermal sensor(0~90˚C) , sensor cable (30cm)
51101-64: Data logger - 64 channel (option)

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