

State-of-the-art programmable power supplies and electronic loads

EA-10000 Series | EA-10000 Industrial Series EA-BT 20000 Series | EA-BTS 10300 Series

Leading-edge power electronics made by EA

Wide application spectrum. Technological excellence. Global customer reach.



The EA Elektro-Automatik Group is Europe's leading supplier in the area of power electronics for R & D and industrial applications. At the headquarters in Germany in the industrial center of North Rhine-Westphalia, 450 qualified associates, in a facility of 19000 m², research, develop and manufacture high-tech devices such as programmable power supplies, high-power supplies and electronic loads with and without mains feedback.

Development partner in forward looking sectors

With high performance criteria and a broad application spectrum, EA has established itself as the development partner in forward looking industries. Thus, EA equipment is being used in battery and fuel cell technology. It is used in wind and solar energy, electrochemicals, process technology, telecommunications, automobile industry and many more future-orientated sectors.

Global customer reach, value sharing

As a globally active company, EA maintains close contact with national and international customers and partners. The sales network includes branches in China, USA and Singapore, a sales office in Spain and an extensive service and partner network. EA continues to expand and, as a mid-size employer, takes full responsibility for development and production in Germany. Value based joint working is characterised by mutual respect and open communication.

Automated quality assurance

Results and experience from decades of R & D flow continually into new solutions. Automatic test systems with specially developed soft- and hardware assure consistently high product quality. Flexible production processes support fast reaction to changing customer requirements.

Technological excellence is driving innovation of tomorrow

The foundation of the company in 1974 was based on innovation, a tradition which is maintained today. What started with the development of simple mains adaptors is continued today in the overall concept of technology leadership. With highly specialised power supply systems for a multitude of applications, EA is driving the future of power electronics – technologically excellent for high performance and designed for resource protection and energy saving.



EA-10000 Series

The most versatile range of programmable laboratory power supplies (PS, PSI), electronic loads (ELR) and bidirectional power supplies (PSB, PSBE) with regenerative mains feed-back with common fittings and operation.



EA-10000 4U Series

The flagship unit, 10000 4U is, in this form and performance range, the market leader. With 30 kW power all models are available either air or water cooled. Thus, they are available for operation in hostile conditions. With a factor of 3.83 our 920 V 125 A model, which was specially developed for automotive applications (800 V powertrain), offers the widest autoranging range. Thus, with a single device, multiple applications can be covered, saving costs. With the best efficiency in the market no energy is wasted in unnecessary heat generation and hence contributes to CO_2 reduction.

Power Supply	EA-PS 10000 4U
Power Supply	EA-PSI 10000 4U
Power Supply Bidirectional	EA-PSBE 10000 4U
Power Supply Bidirectional	EA-PSB 10000 4U
Electronic Load Regenerative	EA-ELR 10000 4U

Model	Voltage	Current	Power
10010-1000*	0 – 10 V	0 – 1000 A	0 - 10000 W
10060-1000	0 - 60 V	0 – 1000 A	0 - 30000 W
10080-1000	0 - 80 V	0 – 1000 A	0 – 30000 W
10200-420	0 – 200 V	0 – 420 A	0 – 30000 W
10360-240	0 - 360 V	0 – 240 A	0 – 30000 W
10500-180	0 - 500 V	0 – 180 A	0 – 30000 W
10750-120	0 – 750 V	0 – 120 A	0 – 30000 W
10920-125	0 - 920 V	0 – 125 A	0 – 30000 W
11000-80	0 – 1000 V	0 – 80 A	0 – 30000 W
11500-60	0 – 1500 V	0 - 60 A	0 – 30000 W
12000-40	0 – 2000 V	0 – 40 A	0 - 30000 W

* Only available as a bidirectional device (EA-PSB 10000 & EA-PSBE 10000)

- Uniform device series across all power classes
- Nominal power 10000 4U with 30 kW
- AC mains input with extended range (208 V - 480 V, 3 ph AC)
- DC input / output with autoranging
- Digital (FPGA) controlled DC input / output U - I - P - R
- Colour 5" TFT touchscreen display
- Common intuitive user interface
- Built-in interfaces: Ethernet, USB, Analog
- Optional interfaces: CAN, CANopen, RS232, Profibus, Profinet, Modbus, Ethercat, Ethernet
- USB-Host for LUT, logging, sequencing
- Galvanically isolated Share-Bus for all power classes
- Master-auxiliary bus for up to 64 participating devices of Series 10000
- Integrated function generator with predefined curves
- Predefined functions for LV123, LV124 and LV148
- Battery test mode, battery and fuel cell simulation
- PV test mode, MPPT tracking, EN50530
- Command languages: SCPI and ModBus
- VI driver, IVI driver, control software for Windows
- Optional stainless steel water cooling

EA-10000 Series



EA-10000 3U Series

Our series 10000 3U offers the established devices with 5 kW, 10 kW and 15 kW power in a new dimension. The AC variable input range of 3 phase 208 V to 480 V for global use is achieved with the latest SiC technology. Efficiency of over 96% make these devices highly economic. These devices

can be expanded with a 2000 V DC variant for applications in e.g., the PV industry. Thanks to the new intelligent master-auxiliary bus all power classes with the same output voltage can be combined (2U, 3U and 4U). Thus, a system can be exactly configured to meet your performance needs.

Power Supply	EA-PS 10000 3U
Power Supply	EA-PSI 10000 3U
Power Supply Bidirectional	EA-PSBE 10000 3U
Power Supply Bidirectional	EA-PSB 10000 3U
Electronic Load Regenerative	EA-ELR 10000 3U

Model	Voltage	Current	Power
10010-510*	0 – 10 V	0 – 510 A	0 – 5100 W
10060-510	0 - 60 V	0 – 510 A	0 – 15000 W
10080-510	0 - 80 V	0 – 510 A	0 – 15000 W
10200-210	0 – 200 V	0 – 210 A	0 – 15000 W
10360-120	0 - 360 V	0 – 120 A	0 – 15000 W
10500-90	0 - 500 V	0 – 90 A	0 – 15000 W
10750-60	0 – 750 V	0 – 60 A	0 – 15000 W
11000-40	0 - 1000 V	0 – 40 A	0 – 15000 W
11500-30	0 – 1500 V	0 – 30 A	0 – 15000 W
12000-20	0 – 2000 V	0 – 20 A	0 – 15000 W

* Only available as a bidirectional device (EA-PSB 10000 & EA-PSBE 10000)

The table shows the 15 kW models. 5 kW and 10 kW models are also available, please see series datasheets.

- Uniform device series across all power classes
- Nominal power 10000 3U with 5 kW, 10 kW and 15 kW
- AC mains input with extended range (208 V – 480 V, 3 ph AC)
- DC input / output with autoranging
- Digital (FPGA) controlled DC input / output U - I - P - R
- Colour 5" TFT touchscreen display
- Common intuitive user interface
- Built-in interfaces: Ethernet, USB, Analog
- Optional interfaces: CAN, CANopen, RS232, Profibus, Profinet, Modbus, Ethercat, Ethernet
- USB-Host for LUT, logging, sequencing
- Galvanically isolated Share-Bus for all power classes
- Master-auxiliary bus for up to 64 participating devices of Series 10000
- Integrated function generator with predefined curves
- Predefined functions for LV123, LV124 and LV148
- Battery test mode, battery and fuel cell simulation
- PV test mode, MPPT tracking, EN50530
- Command languages: SCPI and ModBus
- VI driver, IVI driver, control software for Windows

EA-10000 Series



EA-10000 2U Series

With the series 10000 2U has expanded its product portfolio for applications needing less power but still high flexibility. Starting with 3 kW uni- and bidirectional devices are available, as laboratory power supply, electronic load with power feedback and as a bidirectional power supply.

Power Supply	EA-PS 10000 2U
Power Supply	EA-PSI 10000 2U
Power Supply Bidirectional	EA-PSB 10000 2U
Electronic Load Regenerative	EA-ELR 10000 2U

Model	Voltage	Current	Power
10010-60*	0 – 10 V	0 – 60 A	0 - 600 W
10060-60	0 - 60 V	0 – 60 A	0 – 1500 W
10080-60	0 - 80 V	0 – 60 A	0 – 1500 W
10200-25	0 – 200 V	0 – 25 A	0 – 1500 W
10360-15	0 - 360 V	0 – 15 A	0 – 1500 W
10500-10	0 – 500 V	0 – 10 A	0 – 1500 W
10750-06	0 – 750 V	0 – 6 A	0 – 1500 W
10010-120*	0 – 10 V	0 – 120 A	0 – 1200 W
10060-120	0 - 60 V	0 – 120 A	0 – 3000 W
10080-120	0 - 80 V	0 – 120 A	0 – 3000 W
10200-50	0 – 200 V	0 – 50 A	0 – 3000 W
10360-30	0 - 360 V	0 – 30 A	0 – 3000 W
10500-20	0 – 500 V	0 – 20 A	0 – 3000 W
10750-12	0 – 750 V	0 – 12 A	0 – 3000 W
11000-10	0 – 1000 V	0 – 10 A	0 – 3000 W
11500-06	0 – 1500 V	0 – 6 A	0 – 3000 W

All devices are programmable via analogue and digital interfaces as well as via the 5" TFT touch display. They offer the same configuration and functionality as those in this series with higher power.

Features

- Uniform device series across all power classes
- Nominal power 10000 2U with 1.5 kW and 3 kW
- AC mains input with extended range (110 V - 240 V AC)
- DC input / output with autoranging
- Digital (FPGA) controlled DC input / output U - I - P - R
- Colour 5" TFT touchscreen display
- Common intuitive user interface
- Built-in interfaces: Ethernet, USB, Analog
- Optional interfaces: CAN, CANopen, RS232, Profibus, Profinet, Modbus, Ethercat, Ethernet
- USB-Host for LUT, logging, sequencing
- Galvanically isolated Share-Bus for all power classes
- Master-auxiliary bus for up to 64 participating devices of Series 10000
- Integrated function generator with predefined curves
- Predefined functions for LV123, LV124 and LV148
- Battery test mode, battery and fuel cell simulation
- PV test mode, MPPT tracking, EN50530
- Command languages: SCPI and ModBus
- VI driver, IVI driver, control software for Windows

* Only available as a bidirectional device (EA-PSB 10000)

EA-10000 Industrial Series

With the new EA-10000 Industrial series, EA Elektro-Automatik (EA) has achieved a breakthrough in power density. The motto: **Pure & Powerful!** Powerful performance with 60 kW in 60, 30 kW in 40 and up to 300 kW in a single rack, combined with pure design without manual display on the front.

EA-10000 Industrial Series 6U Power

Large product variety

The product variety includes a total of 50 models with the device types EA-PU 10000 programmable DC power supplies, EA-PUB 10000 programmable bidirectional power supplies and EA-PUL 10000 DC regenerative electronic loads.

High safety, low operating costs

The new Industrial series combines high safety with low operating costs. All models feature overcurrent, overvoltage, overpower and overtemperature protection functions. The bidirectional power supplies and regenerative electronic loads have power factor correction of 0.99 and return up to over 96% of the absorbed power to the grid.

Power Unit	EA-PU 10000 6U
Power Unit Bidirectional	EA-PUB 10000 6U
Power Unit Load	EA-PUL 10000 6U

Model	Voltage	Current	Power
10360-480	0 - 360 V	0 – 480 A	0 - 60000 W
10500-360	0 - 500 V	0 – 360 A	0 - 60000 W
10750-240	0 – 750 V	0 – 240 A	0 – 60000 W
10920-250	0 - 920 V	0 – 250 A	0 - 60000 W
11000-160	0 - 1000 V	0 – 160 A	0 - 60000 W
11500-120	0 – 1500 V	0 – 120 A	0 - 60000 W
12000-80	0 - 2000 V	0 - 80 A	0 - 60000 W

Efficiency in development and testing

All devices work with the same firmware and have similar input and output characteristics. The common programming and user interface saves time when developing and setting up test and control systems that require multiple power units.

- DC input/output with autoranging
- Digitally (FPGA) controlled DC input/output U - I - P - R
- Latest SiC technology
- LEDs in the front to indicate the device status
- Optional stainless steel water cooling system
- AC mains input with extended range (380 V - 480 V, 3ph AC)
- Built-in interfaces: Ethernet, USB, Analog
- Optional interfaces: CAN, CANopen, EtherCAT, RS232, Profibus, Profinet, Modbus, Ethernet
- Communication with PCs and PLCs
- SCPI or ModBus programming modes
- Galvanically isolated Share-Bus
- Master-auxiliary bus up to 64 participants of the EA-10000 series
- Optional: Function generator

EA-10000 Industrial Series



EA-10000 Industrial Series 4U Power

Power Unit	EA-PU 10000 4U
Power Unit Bidirectional	EA-PUB 10000 4U
Power Unit Load	EA-PUL 10000 4U

Model	Voltage	Current	Power
10060-1000	0 - 60 V	0 – 1000 A	0 – 30000 W
10080-1000	0 - 80 V	0 – 1000 A	0 – 30000 W
10200-420	0 – 200 V	0 – 420 A	0 – 30000 W
10360-240	0 - 360 V	0 – 240 A	0 – 30000 W
10500-180	0 – 500 V	0 – 180 A	0 – 30000 W
10750-120	0 – 750 V	0 – 120 A	0 – 30000 W
10920-125	0 - 920 V	0 – 125 A	0 – 30000 W
11000-80	0 – 1000 V	0 - 80 A	0 – 30000 W
11500-60	0 – 1500 V	0 - 60 A	0 – 30000 W
12000-40	0 – 2000 V	0 – 40 A	0 – 30000 W

For Industrial Applications

- For use in ATE systems and automated process control systems
- For testing batteries and fuel cells
- For simulations of batteries and solar systems
- For the complete discharge of batteries for recycling
- Reliable power supply for electrolysis plants
- As sustainable power electronics for aviation application

High-Power Racks

Save equipment costs and rack space

Increased performance can reduce the number of power supplies needed for a high-performance system. This saves significant capital and operating costs as well as important rack space. Power is provided in a smaller footprint. In addition, the electronic loads operate regeneratively, with efficiencies up to over 96 %.

Powerful rack performance

- A 19" rack with 42 U for a system with 300 kW
- One system with up to 13 racks with 64 units of 60 kW each
- For high power applications up to 3.84 MW
- Emergency stop (machine standard EN60204-1)

Optionally available:

- Mains monitoring (ENS)
- Insulation monitor
- Copper busbar for DC output





EA-BT 20000 Series

The EA-BT 20000 Series consists of 28 powerful models with a particularly wide range of voltage and current. In contrast to conventional battery test devices, all users with the triple version have three channels with 600 A or one single channel with 1800 A available.

EA-BT 20000 4U Triple

Most powerful battery tester

With the new EA-BT 20000 Battery Testers, EA Elektro-Automatik (EA) presents the only device series with three channels and the highest output voltage or current for a wider range of cell, module and pack tests.

High current

The new series of battery testers can test up to three battery cells, modules or packs with an output of 4 kW/ channel, 6 kW/channel or 10 kW/channel at the same time. Battery packs with 12 kW, 18 kW and 30 kW can be tested when connected in parallel.

High precision

With their high precision, the EA-BT 20000 battery testers are ideal for use in basic research and industry, including automotive and aerospace and renewable energy systems for the consumer market. Voltage and current are measured with high accuracy. In addition, the devices have a high level of control accuracy.

High speed

The EA-BT 20000 Battery Testers processes and reads commands with a transmission speed of 1 ms. Used together with the latest interface versions EtherCAT, CAN FD and Gbit Ethernet further optimize the devices throughput.

The triple high performance application

Testing and simulating batteries

The scope covers the entire life cycle of a battery. As a complete solution the EA-BT 20000 models are suitable for testing, simulating and recycling processes for current and future battery technologies and battery capacities. The battery testers can be used flexibly – from material research to battery development and production to incoming inspection and second-life recycling.

Capacity up to 1.92 MW for large systems

The EA-BT 20000 series has sufficient capacity also for large battery systems: up to 64 battery testers of 30 kW output can be paralleled for a total of 1.92 MW. In a different configuration, tests of high-voltage batteries with voltages of up to 2000 V are also possible.

Highlight: EA-BT 20000 Triple

The highlight of the EA-BT 20000 series is the 4U TRIPLE models with triple output – three channels to test three batteries at the same time. This is highly efficient, reduces test and investment costs and maximizes throughput.

EA-BT 20000 Series

EA-BT 20000 4U

- Wide range of supply voltages: 208 V 480 V, +10%, 3ph AC
- Active power factor correction, typical 0.99
- Battery tester, 2-quadrant for charging and discharging
- In discharge mode regenerative with energy recovery back to the grid
- Very high efficiency of up to over 96%
- Voltage from 0 10 V to 0 2000 V
- Voltage from 0 10 V to 0 920 V (Triple)
- Current up to 1000 A
- Current up to 600 A per channel or 1800 A connected in parallel (Triple)
- Power up to 30 kW

- Full output power over a wide range of current and voltage (autoranging)
- Control modes CV, CC, CP, CR with fast transition Digital control, high resolution with 18bit ADCs and DACs, control speed selection: Normal, Fast, Slow
- Galvanically isolated share bus for parallel operation
- Master-auxiliary bus for parallel operation
- Built-in interfaces with 1 ms communication speed
- Typical battery tester functionality integrated
- Battery test mode and battery simulation via EA Power Control Software
- Command languages and drivers: SCPI and ModBus, LabVIEW, IVI



EA-BT 20000 Series



EA-BT 20000 3U

EA-BT 20000 3U

EA-BT 20000 4U

Model	Voltage	Current	Power	Model	Voltage	Current	Power
BT 20010-600	0 – 10 V	0 – 600 A	0 - 6000 W	BT 20010-1000	0 - 10 V	1000 A	10000 V
BT 20060-500	0 - 60 V	0 – 500 A	0 – 15000 W	BT 20060-1000	0 - 60 V	1000 A	30000 V
BT 20080-500	0 - 80 V	0 – 500 A	0 – 15000 W	BT 20080-1000	0 - 80 V	1000 A	30000 V
BT 20200-210	0 – 200 V	0 – 210 A	0 – 15000 W	BT 20200-420	0 – 200 V	420 A	30000 V
BT 20360-120	0 – 360 V	0 – 120 A	0 – 15000 W	BT 20360-240	0 - 360 V	240 A	30000 V
BT 20500-90	0 – 500 V	0 – 90 A	0 – 15000 W	BT 20500-180	0 - 500 V	180 A	30000 V
BT 20920-60	0 - 920 V	0 – 60 A	0 – 15000 W	BT 20920-120	0 - 920 V	120 A	30000 V
BT 21000-40	0 – 1000 V	0 – 40 A	0 – 15000 W	BT 21000-80	0 - 1000 V	80 A	30000 V
BT 21500-30	0 – 1500 V	0 – 30 A	0 – 15000 W	BT 21500-60	0 – 1500 V	60 A	30000 V
BT 22000-20	0 – 2000 V	0 – 20 A	0 – 15000 W	BT 22000-40	0 – 2000 V	40 A	30000 V

EA-BT 20000 Triple 4U

Model	Voltage	Current	Power
BT 20010-400 Triple	0 – 10 V	400 A per channel	4000 W per channel
BT 20010-600 Triple	0 – 10 V	600 A per channel	6000 W per channel
BT 20060-340 Triple	0 - 60 V	340 A per channel	10000 W per channel
BT 20080-340 Triple	0 - 80 V	340 A per channel	10000 W per channel
BT 20200-140 Triple	0 – 200 V	140 A per channel	10000 W per channel
BT 20360-80 Triple	0 - 360 V	80 A per channel	10000 W per channel
BT 20500-60 Triple	0 - 500 V	60 A per channel	10000 W per channel
BT 20920-40 Triple	0-920 V	40 A per channel	10000 W per channel

The EA-BTS 10300 provides a complete solution for battery cycling and testing. The system can control an environmental chamber and interface to the battery management system through the CAN bus interface. The widget-based system software enables quick and easy test setup and execution.

Advanced capabilities

- 0-1500 VDC (2000 VDC option) capacity for testing high voltage battery packs and modules
- 300 kW in a 42U high rack (parallel racks for up to 3.84 MW)
- Up to 2,400 A per rack and 30,720 A total capacity
- One 300 kW rack consumes only 6.5 sq ft of floor space
- System slew rates are as low as 500 µs for fast voltage transitions
- System data acquisition rates up to 1.6 kHz
- Systems return absorbed power to the grid with up to 96.5% efficiency

Battery test made easy

- Program test parameters, test sequences, output displays and data files without coding
- Performs all standard drive cycle simulations including FUDS, SFUDS, GSFUDS, DST, and ECE-ISL
- Performs DC insulation resistance
- Battery pack temperature monitoring
- Pre-charge and reverse polarity protection
- Air-cooled or optional water-cooled system thermal management
- Modular design allows for easy module switchout in less than an hour. The system can run at lower power for constant operation



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1.2 MW setup with PCMC additional equipment cost





System components

EA-BTS 10300 system software

EA-BTS battery test software controls all battery cycling and battery test operations and enables:

- Defining the tests to be performed
- Entering parameters for the tests
- Defining the order in which tests are performed
- Defining the data to be monitored and exported
- Defining the layout of the display screen

The software uses a widget-based approach to allow a user-configurable display. Set up and test execution is simple and fast and allows complete tests on a battery or another power source, such as a fuel cell.



Test setup display allows entry of parameters and sequence of execution.



Results display screen showing voltage, current, and the results of a capacity simulation test.

Model	Voltage	Current	Power	AC Mains Connection
103000-01	0-360	0-480	60	Single
103000-02	0-360	0-720	90	Single
103000-03	0-360	0-960	120	Single
103000-04	0-500	0-360	60	Single
103000-05	0-500	0-540	90	Single
103000-06	0-500	0-720	120	Single
103000-07	0-500	0-900	150	Two
103000-08	0-750	0-240	60	Single
103000-09	0-750	0-360	90	Single
103000-10	0-750	0-480	120	Single
103000-11	0-750	0-600	150	Two
103000-12	0-750	0-720	180	Two
103000-13	0-750	0-840	210	Two
103000-14	0-750	0-960	240	Two
103000-15	0-1000	0-160	60	Single
103000-16	0-1000	0-240	90	Single
103000-17	0-1000	0-320	120	Single
103000-18	0-1000	0-400	150	Two
103000-19	0-1000	0-480	180	Two
103000-20	0-1000	0-560	210	Two
103000-21	0-1000	0-640	240	Two
103000-22	0-1000	0-800	300	Two
103000-23	0-1500	0-120	60	Single
103000-24	0-1500	0-180	90	Single
103000-25	0-1500	0-240	120	Single
103000-26	0-1500	0-300	150	Two
103000-27	0-1500	0-360	180	Two
103000-28	0-1500	0-420	210	Two
103000-29	0-1500	0-480	240	Two
103000-30	0-1500	0-560	300	Two

Power sourcing and sinking

EA Bidirectional Power Supplies source and sink to minimize system complexity and size

EA bidirectional power supplies comprise the core of the EA-BTS Battery Cycler and Test System. These instruments operate in two quadrants to combine a power supply and an electronic load. With power capacities from 5 kW to 60 kW in a single instrument, the bidirectional power supplies can assemble into systems as large as 3.84 MW.

True autoranging for fast, continuous battery cycling

EA bidirectional power supplies have a true autoranging output characteristic for both sourcing and sinking. Not only does this allow a wider range of voltage and current compared with a conventional rectangular output power supply, but these instruments can deliver or absorb full-rated power down to 1/3 of the maximum rated voltage. Unlike a system with instruments that do not have true autoranging, a cycling test does not require interruption to allow the instrument to change range as the battery pack voltage ramps up or down.



SiC design technology allows the highest power density saving test system space

Using SiC high-power transistors, EA power supplies have higher switching frequencies allowing increased operating efficiency. In addition, the higher switching frequency enables reduced heatsink, cooling fan, and magnetic component sizes. The reduced size of magnetic components and fewer power transistors per 5 kW allow EA to offer a bidirectional supply with 30 kW in a 4U enclosure and 60 kW capacity in a 6U high, full rack enclosure. These high-density power supplies allow one test rack to have as much as 300 kW of power in only 6.5 square feet of space. An EA system substantially saves manufacturing floor space.

Master-Auxiliary Bus and Share-Bus safely expand system capacity

Up to 64 EA bidirectional power supplies can connect in parallel with the Master-Auxiliary Bus in which one power supply can control 63 additional supplies. This ability to parallel allows the EA-BTS Battery Cycler and Test System to have a capacity of up to 3.84 MW. The Share-Bus interface between each power supply protects the supplies by ensuring each supply supports an equal share of the load. The combination of the two buses provides simplified and reliable management of up to 30 kA.

Regenerative energy with 96.5% efficiency reduces operating costs

Along with active power factor correction and a highfrequency switching power supply topology which yields over 90% sourcing efficiency, the EA bidirectional power supplies return absorbed power to the AC power grid with up to 96.5% efficiency. This allows the supply to run at a lower temperature, reducing cooling infrastructure requirements and enhancing reliability. Furthermore, the high efficiency offers substantial savings on system utility costs.

Power control and measurement module

The Power Control and Measurement Module (PCMM) monitors the battery pack and executes additional tests. The PCMM:

- Monitors battery voltage and current with a 1.6 kHz data acquisition rate, 16-bit resolution (optional 24-bit), and <0.02% of FS accuracy
- Provides system voltage matching and reverses polarity safety checks
- Performs insulation resistance testing
- Monitors battery pack temperature
- Controls an environmental chamber and a chiller
- Additional I/O can be added
- BMS interaction over CanBus

Specifications

Power configurations

30 kW, 60 kW, 90 kW, 100 kW, 120 kW, 180 kW, 200 kW, 240 kW, 300 kW

Tests

Can be user defined such as capacity, four seasons, pulse, and imported drive cycling

Battery cycling

- Voltage range: 0-1500 VDC (0-2000 VDC optional)
- Current range: ± 30,720 Amps (single Cabinet ± 2,400 Amps)
- Power range: 0-3.84 MW (single rack up to 300 kW)

Drive cycle simulations

FUDS, SFUDS, GSFUDS, DST and ECE-ISL

Battery monitoring

- Parameters: voltage, current, power
- Sampling rate 1.5 kHz
- BMS signals
- Input from battery for limitations from BMS to cycler

Interface to battery management system CAN bus

Chiller and environmental chamber control

Interface to temperature controllers

Safety features

- Battery pack temperature monitoring:
 - Sensor: Thermocouple Type K standard, system can be build with other types
 - Temperature range: Depending on thermocouple chosen
 - Accuracy: Depending on thermocouple chosen
- Pre-charge voltage accuracy: <= 1% battery voltage</p>
- Polarity reversal check:
 - E-Stop
 - Configurable emergency shutdown sequence

Software

- Export data format: CSV and TDMS (NI structured binary format; can be read in MATLAB), HDF5
- Widget-based display control

System input power requirements

380 V / 400 V / 480 V ±10%, 3ph AC (Wide range AC input)

Test system cooling requirements Forced air (Water cooling optional)

Power delivery and absorption performance 96.5% regeneration to the grid



Tektronix and EA Elektro-Automatik now offer expanded power portfolio for engineers who are electrifying our world

Now part of the Tektronix family of test solutions, EA Elektro-Automatik can bring its customers an expanded range of powerful measurement instrumentation, leveraging Tektronix's industry-leading oscilloscopes and isolated probes, EA's high-efficiency power supplies and electronic loads and Keithley's high-precision source meters and instrumentation. Combined, the Tektronix portfolio offers a unique set of capabilities for energy storage and power electronics design needs, from ultra-low to ultra-high power. With the addition of EA, Tektronix is better equipped than ever to serve engineers who are electrifying our world.



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Oscilloscopes

Tektronix oscilloscopes are versatile, reliable and feature-rich tools widely used across various industries and applications.



Digital Multimeters (DMM)

Keithley offers the widest range of system and benchtop digital multimeters to meet any measurement need requirement.



Signal Generator

Tektronix signal generators cover a wide range of applications from replicating sensor signals to creating high-speed serial data or RF signals with digital modulation applied.





Expanded Network of repair and calibration services. 104 global points of service.

EA Elektro-Automatik products are available through an expanded network global service, calibration and sales centers.