

EA-EL 9000 B 2Q 600 W - 2400 W



Programmable Electronic DC loads



EA-EL 9500-30 B 2Q 2U



- Wide AC supply voltage range: 90...264 V, with active PFC
- Input power ratings: 0...600 W up to 0...2400 W
- Input voltages: 0...80 V up to 0...750 V
- Input currents: up to 170 A per unit
- FPGA based control circuit
- Control panel with status LEDs
- Adjustable protections: OVP, OCP, OPP
- Operation modes: CV, CC, CP, CR
- Galvanically isolated interfaces (analog and USB)
- Master-slave bus for parallel connection
- Slot for a wide selection of industrial interface modules
- SCPI command set and ModBus RTU support
- LabView VIs and remote control software (Windows)

General

The series EA-EL 9000 B 2Q offers electronic loads which are primarily designed for the so-called "two-quadrants operation", also called source-sink principle, which is a combination of a load and a power supply. In this system, the electronic loads care for an improved dynamics regarding output voltage changes of the power supplies.

By default the devices are configured to run with full power and current and minimal voltage, stand-alone or in master-slave. Other parameters can be configured via remote control, for example with the software EA Power Control (also see page 118).

Two-quadrants operation

There is a wide application spectrum for the two-quadrants operation (2Q, 2Q0). For example, the regenerated energy of a decelerating motor could be consumed. This protects the motor as well as the source powering the motor against overvoltage. Another example is the end tests of various types of batteries or other kinds of energy storage devices or simulation of their characteristics. A battery can be charged and discharged with a system using 2Q.

When running the loads in parallel to a power supply it can achieve very short voltage fall times. This is done by the loads discharging the typical output capacities of power supplies, resulting in a dynamic voltage progression.

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Power ratings, voltages, currents

The available voltage range portfolio offers five different voltages from 0...80 V DC up to 0...750 V DC. Input currents up to 170 A with only one unit are available. These ratings are compatible to other series and enable flexible combinations of device from this series with power supplies from series EA-PS 9000 or EA-PSI 9000.

Construction

All models are built in 19" wide rack enclosures with 2U of height and approx. 460 mm (18.1") depth, which makes them ideal for use in 19" cabinets of various sizes (42U etc.) and for the design of systems with very high total power.

It's furthermore possible to assemble cabinet systems with mixed equipment, i.e. electronic loads and power supplies, in order to achieve the source-sink principle with high power ratings.

Control panel

The devices of this series are primarily controlled via the Share bus from a power supply. For special applications the optional available interfaces offer to set up all parameters.

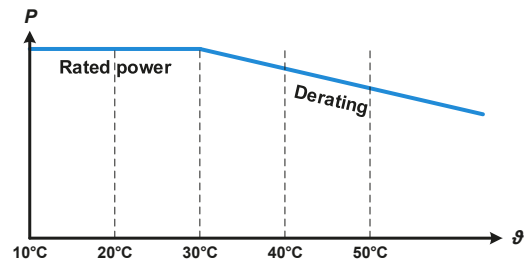
The device status is indicated with several colored LEDs. The front USB port is used for quick access to all DC input related parameters, such as set values (current / power etc.), as well as protections (OCP, OPP etc.).

Share Bus

The „Share Bus“ is an analog connection at the rear of the devices and is used to build a two-quadrants system in connection with compatible power supplies of series EA-PSI 9000 or EA-PS 9000. Such a system is ideal for all testing purposes requiring the source-sink principle. This Share bus is furthermore used to balance the current across multiple identical load units in parallel connection to gain power uprating.

Power derating

Same as with series EA-EL 9000 B HP, where the abbreviation "HP" in the series name stands for "High Power", this series achieves its rated power up to an ambient temperature of 30°C. Above that point, all models of this series will reduce the input power based upon a thermal derating which depends on the ambient temperature.

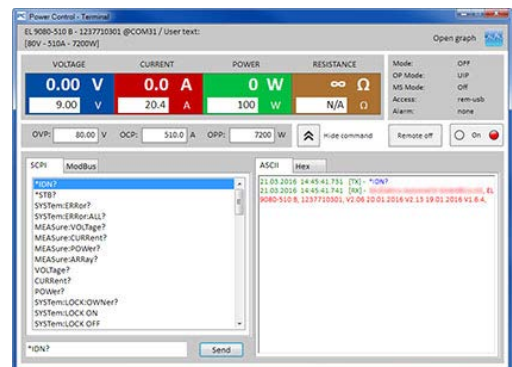


Remote control & connectivity

Monitoring, control and configuration of these load devices can either be done using the built-in USB interface or via one of various optional digital interfaces (see page 118). There is furthermore a standard analog interface for control and monitoring. All interfaces are galvanically isolated from the DC input.

For the implementation into the LabView IDE we offer ready-to-use components (VIs) to be used with the interface types USB, RS23 and Ethernet. Other IDEs and interfaces are supported by documentation about the communication protocol.

Windows users can profit from the free software "EA Power Control". It offers a feature called "Sequencing", where the device is controlled through a table in CSV format to achieve automatic test runs. This table represents simple to complex test procedure and can be created and edited in MS Excel or other CSV editors and then imported into the software tool. This software also allows for the control of up to 20 units at once with an optional feature called "Multi Control" (licensed, not free of charge). See page 118 for more information.



Options

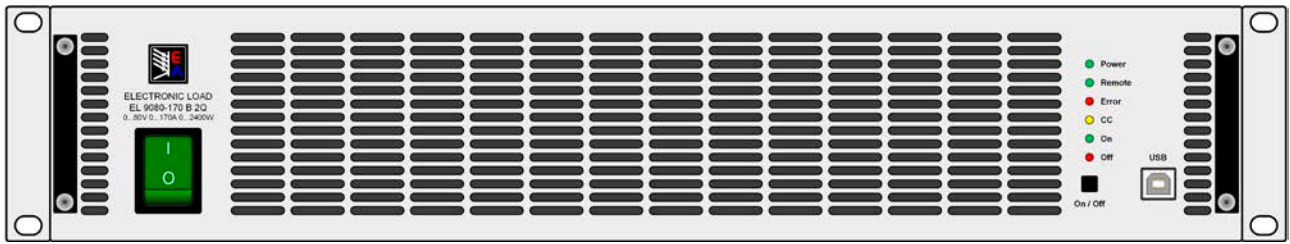
- Pluggable and retrofittable, digital interface modules for CAN, CANopen, Ethernet, Profibus, ProfiNet I/O, RS232, EtherCAT or ModBus TCP. See page 118.



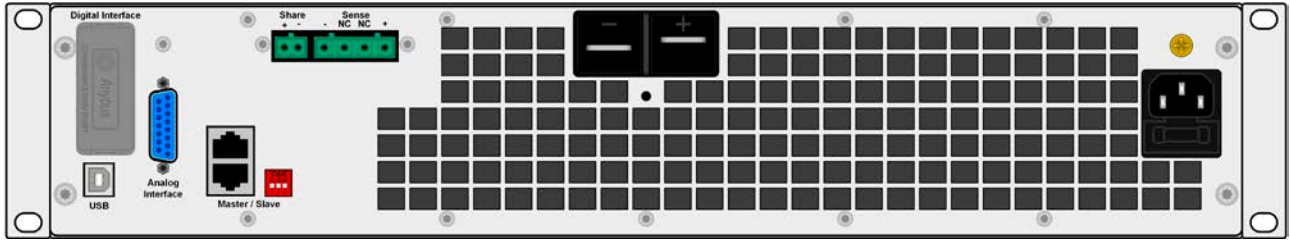
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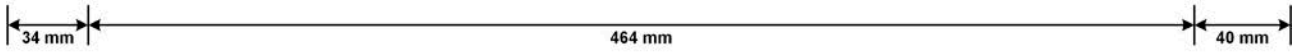
Product views



Front view



Rear view



Side view

- A
- B
- C
- D
- E
- F

EA-EL 9000 B 2Q 600 W - 2400 W

Technical Data	Series EA-EL 9000 B 2Q
AC: Supply	
- Voltage	90...264 V
- Frequency	45...66 Hz
- Power consumption	max. 80 W
DC: Voltage	
- Accuracy	<0.1% of rated value
DC: Current	
- Accuracy	<0.2% of rated value
- Load regulation 1-100% ΔU_{DC}	<0.1% of rated value
- Rise time 10-90%	<50 μ s
DC: Power	
- Accuracy	<0.5% of rated value
DC: Resistance	
- Accuracy	$\leq 1\%$ of max. resistance + 0.3% of rated current
Display / control panel	Status LEDs and pushbutton
Digital interfaces	2x USB type B for communication
- Slot	1x for retrofittable plug-in modules
Analog interface	Built in, 15 pole D-Sub (female), galvanically isolated
- Signal range	0...5 V or 0...10 V (switchable)
- Inputs	U, I, P, R, remote control on-off, DC input on-off, resistance mode on-off
- Outputs	U, I, overvoltage, alarms, reference voltage
- Accuracy U / I / P / R	0...10 V: <0.2% 0...5 V: <0.4%
2Q compatible power supply series	EA-PSI 9000 2U, EA-PSI 9000 3U, EA-PS 9000 1U, EA-PS 9000 2U, EA-PS 9000 3U, EA-PSB 9000, EA-PSI 9000 WR
Cooling	Temperature-controlled fans
Ambient temperature	0...50 °C
Storage temperature	-20...70 °C
Operation altitude	<2000 m (1.242 mi)
Terminals on rear	
- DC input	Screw terminal
- Share Bus & Sense	Plug connector 2 pole & 4 pole
- Analog interface	Sub-D connector 15 pole
- Digital interfaces	Module socket Master-Slave (2x RJ45), USB
Dimensions ⁽¹⁾ (W x H x D)	19" x 2U x 464 mm (18.3")

(1) Enclosure only

Model	Power	Power @ 40°C	Voltage	Current	Resistance	Weight	Ordering number
EA-EL 9080-85 B 2Q	0...1200 W	0...1000 W	0...80 V	0...85 A	0.08...30 Ω	≈ 9 kg (19.8 lb)	33200710
EA-EL 9200-35 B 2Q	0...1000 W	0...1000 W	0...200 V	0...35 A	0.44...200 Ω	≈ 9 kg (19.8 lb)	33200711
EA-EL 9360-20 B 2Q	0...900 W	0...900 W	0...360 V	0...20 A	1.4...600 Ω	≈ 9 kg (19.8 lb)	33200712
EA-EL 9500-15 B 2Q	0...600 W	0...600 W	0...500 V	0...15 A	2.5...1200 Ω	≈ 9 kg (19.8 lb)	33200713
EA-EL 9750-10 B 2Q	0...600 W	0...600 W	0...750 V	0...10 A	6...2500 Ω	≈ 9 kg (19.8 lb)	33200714
EA-EL 9080-170 B 2Q	0...2400 W	0...2000 W	0...80 V	0...170 A	0.04...15 Ω	≈ 13 kg (28.7 lb)	33200715
EA-EL 9200-70 B 2Q	0...2000 W	0...2000 W	0...200 V	0...70 A	0.22...100 Ω	≈ 13 kg (28.7 lb)	33200716
EA-EL 9360-40 B 2Q	0...1800 W	0...1800 W	0...360 V	0...40 A	0.7...300 Ω	≈ 13 kg (28.7 lb)	33200717
EA-EL 9500-30 B 2Q	0...1200 W	0...1200 W	0...500 V	0...30 A	1.25...600 Ω	≈ 13 kg (28.7 lb)	33200718
EA-EL 9750-20 B 2Q	0...1200 W	0...1200 W	0...750 V	0...20 A	3...1250 Ω	≈ 13 kg (28.7 lb)	33200719

