

EL 9000 B Series

1.2 kW to 7.2 kW



Electronic DC Loads

INTEPRO SYSTEMS

THE POWER TEST EXPERTS

EL 9000 B Series

1.2 kW to 7.2 kW



Product Overview



EL 9000 B

The new series of compact electronic DC loads, called EL 9000 B, offers new voltage, current and power ratings for a multitude of applications.

All models support the four common regulation modes constant voltage (CV), constant current (CC), constant power (CP) and constant resistance (CR). The FPGA based control circuit provides interesting features, such as a function generator with a table based function for the simulation of nonlinear internal resistances.

The relation between power consumption and height of the devices has been significantly increased. With only 3U height for all models and the capability of consuming DC power of up to 7.2 kW per unit the height has been reduced to half.

The large color TFT touch panel offers an intuitive kind of manual operation, such as it is prolific nowadays with smartphones or tablet computers.

Response times for the control via analog or digital interfaces have been improved by the DSP controlled hardware.

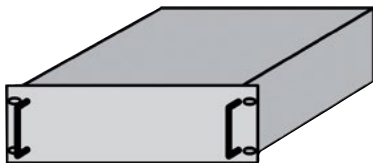
In parallel operation of multiple devices, a master-slave bus is used to link the units to a bigger system where the actual values are totalled and the set values distributed.

Featured Benefits

- *Input power ratings: 1.2 kW...7.2 kW
Expandable in cabinets up to 72 kW*
- *Input voltages: 0...80 V up to 0...750 V*
- *Input currents: up to 510 A per unit*
- *FPGA/DSP based control*
- *Multilingual color touch panel*
- *User profiles, true function generator*
- *Adjustable protections: OVP, OCP, OPP*
- *Operation modes: CV, CC, CP, CR*
- *Galvanically isolated interfaces (analog and USB)*
- *Master-slave bus for parallel connection*
- *Remote sensing*
- *Optional:*
 - *Digital, plug & play interfaces*
 - *SCPI & ModBus supported*

Power Ratings, Voltages & Currents

The available voltage range portfolio goes from models with 0...80 V DC up to models with 0...750 V DC. Input currents up to 510 A with only one unit are available. The series offers various power classes amongst the single models, which can be extended up to 72 kW in cabinets (see from page <?>) for a significantly higher total current.



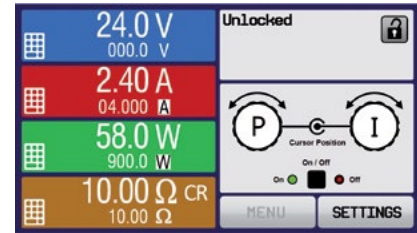
Enclosure

Construction

All models are built in 19" wide rack enclosures with 3U height and 460 mm depth, which makes them ideal for use in 19" cabinets of various sizes, for example 42U, and for the design of systems with very high power. It is furthermore possible to build cabinet systems with mixed equipment, i.e. electronic loads and power supplies, in order to achieve the source-sink principle with high power ratings.

Handling (HMI)

Manual operation is done with a TFT touchpanel, two rotary knobs and a pushbutton. The large color display shows all relevant set values and actual values at a glance. The whole setup is also done with the human-machine interface, as well as the configuration of functions (square, triangle, sine) etc.

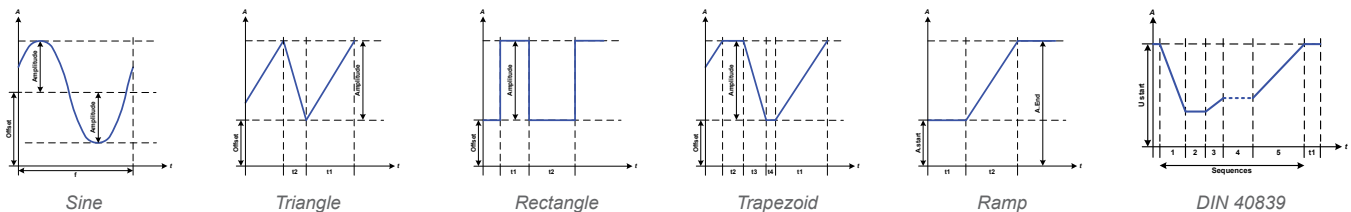


The display is multilingual (German, English, Russian, Chinese).

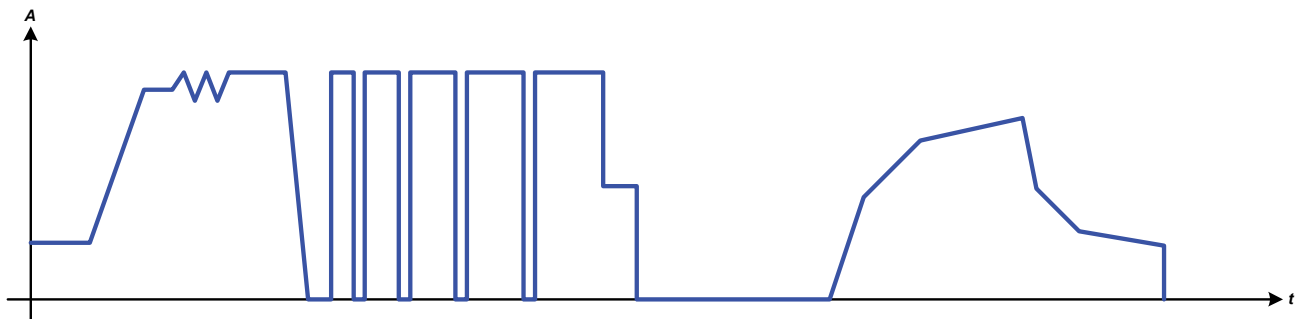
Function Generator and Table Control

A special feature is the comfortable, FPGA based, digital function and arbitrary generator. It enables controlling and running user-customisable load profiles and can generate sine, square, saw tooth and ramp functions in arbitrary order.

With a freely programmable digital value table of 3276 effective points, which is embedded in the control circuit, the devices can reproduce non-linear internal resistances, such as those of batteries or LED chains.



The figure below shows a fictional example of a complex function of 40 sequences, as it can be realized with the arbitrary generator. The function can be created on the device or externally and then loaded or saved:



There is furthermore a XY generator, which is used to generate other functions like UI or IU, which are defined by the user in form of tables (CSV file) and then loaded from USB drive.

Remote Control & Connectivity

For remote control, there are by default two interface ports (1x analog, 1x USB) available on the rear of the devices, which can also be extended by optional, pluggable and retrofittable, digital interface modules (dedicated slot).

Alternatively to the interface modules slot, all models can be equipped with a three-way interface (option 3W, see below), which then offers 1x GPIB/IEEE, 1x USB and 1x Analog on the rear side of the device.

For the implementation into the LabView IDE we offer ready-to-use components (VIs) to be used with the interface types USB, RS232, GPIB and Ethernet. Other IDEs and interfaces are supported by documentation about the communication protocol.

Share Bus

The so-called “Share Bus” is an analog connection at the rear of the devices and is used to balance current across multiple similar units in parallel connection, such as with loads of this series and series ELR 9000.

It can also be used to build a two-quadrants system in connection with power supplies of series PSI 9000 and PS 9000. This system is dedicated for testing purposes using the source-sink principle.

Power Derating

The devices of the EL 9000 B series are equipped with thermal derating in order to avoid overheating when operating in the maximum power range.

The lower the ambient temperature and the better the cooling, the higher the power that the load can take. The continuous intake power after derating is stable up to 50°C ambient temperature.

Battery Test

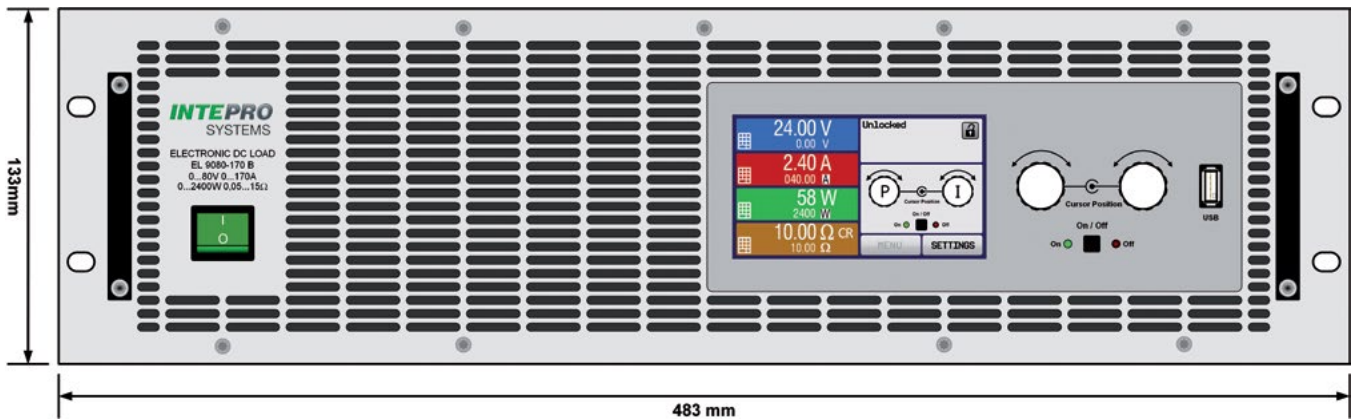
For purposes of testing all kinds of batteries, such as for example constant current or constant resistance discharging, the devices offer a battery test mode. This show extra values for elapsed testing time and consumed capacity (Ah).

Data recorded by the PC during tests with, for example, Power Control can be exported as Excel table in CSV format and analysed later in MS Excel or similar tools and even visualised as a discharge diagram.

For more detailed setup, there is also an adjustable threshold to stop the battery test on low battery voltage, as well an adjustable maximum test period.

Options

Pluggable and retrofittable, digital interface modules for CANopen, Ethernet (1 or 2 ports), Profibus, ProfiNet I/O (1 or 2 ports), RS232, DeviceNet and ModBus-TCP.



Model	Peak	Steady ²	Voltage	Current	Resistance	U _{Min} for I _{Max} ³	Weight
EL 9080-170 B	2400 W	1200 W	0...80 V	0...170 A	0.045...15 Ω	≈ 2.2 V	≈ 9 kg / 19.8lbs
EL 9200-70 B	2000 W	1200 W	0...200 V	0...70 A	0.25...85 Ω	≈ 2 V	≈ 9 kg / 19.8lbs
EL 9360-40 B	1800 W	1200 W	0...360 V	0...40 A	0.8...270 Ω	≈ 2 V	≈ 9 kg / 19.8lbs
EL 9500-30 B	1200 W	1200 W	0...500 V	0...30 A	1.5...500 Ω	≈ 6.5 V	≈ 9 kg / 19.8lbs
EL 9750-20 B	1200 W	1200 W	0...750 V	0...20 A	3.5...1100 Ω	≈ 5.5 V	≈ 9 kg / 19.8lbs
EL 9080-340 B	4800 W	2400 W	0...80 V	0...340 A	0.023...7.5 Ω	≈ 2.2 V	≈ 13 kg / 28.6lbs
EL 9200-140 B	4000 W	2400 W	0...200 V	0...140 A	0.13...43 Ω	≈ 2 V	≈ 13 kg / 28.6lbs
EL 9360-80 B	3600 W	2400 W	0...360 V	0...80 A	0.4...135 Ω	≈ 2 V	≈ 13 kg / 28.6lbs
EL 9500-60 B	2400 W	2400 W	0...500 V	0...60 A	0.75...250 Ω	≈ 6.5 V	≈ 13 kg / 28.6lbs
EL 9750-40 B	2400 W	2400 W	0...750 V	0...40 A	1.75...550 Ω	≈ 5.5 V	≈ 13 kg / 28.6lbs
EL 9080-510 B	7200 W	3600 W	0...80 V	0...510 A	0.015...5 Ω	≈ 2.2 V	≈ 17 kg / 37.4lbs
EL 9200-210 B	6000 W	3600 W	0...200 V	0...210 A	0.08...28 Ω	≈ 2 V	≈ 17 kg / 37.4lbs
EL 9360-120 B	5400 W	3600 W	0...360 V	0...120 A	0.27...90 Ω	≈ 2 V	≈ 17 kg / 37.4lbs
EL 9500-90 B	3600 W	3600 W	0...500 V	0...90 A	0.5...167 Ω	≈ 6.5 V	≈ 17 kg / 37.4lbs
EL 9750-60 B	3600 W	3600 W	0...750 V	0...60 A	1.2...360 Ω	≈ 5.5 V	≈ 17 kg / 37.4lbs

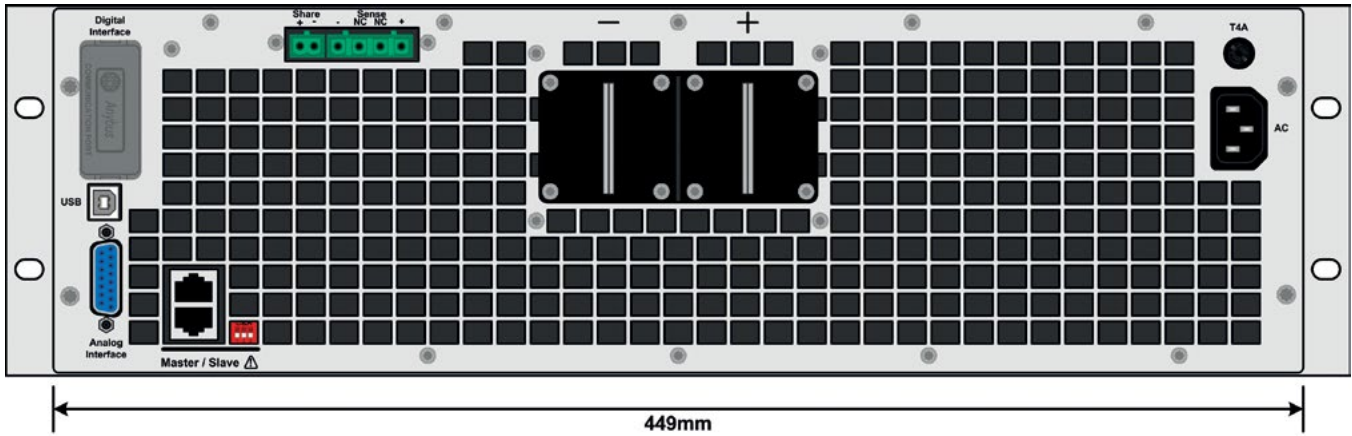
(1 Ordering number of the standard version, models with option 3W installed have different ordering numbers

(2 At 25°C ambient temperature

(3 Minimum DC input voltage to supply for the load to achieve the max. input current

Technical Data	EL 9000 B Series
AC input	
- Voltage / Frequency	90...264 V, 45...66 Hz
- Power factor correction (PFC)	>0.99
- Power consumption	max. 40 W
DC input: Current	
- Accuracy	<0.2%
- Load regulation 1-100% ΔU_{DC}	<0.1%
- Rise time 10-90% load step	<50 μ s
DC input: Voltage	
- Accuracy	<0.1%
- Load regulation 0-100% ΔI_{DC}	<0.05%
DC input: Power	
- Accuracy	<0.5%
DC input: Resistance	
- Accuracy	$\leq 1\% + 0.3\%$ of nominal current
Display and panel	
	Graphics display with TFT touch panel
Digital interfaces	
- Built-in	1x USB type B for communication 1x GPIB (optional with option 3W)
- Slot	1x for retrofittable plug-in modules (standard models only)
Analog interface	
- Setting inputs U / I / P / R	0...10 V / 0...5 V
- Monitoring outputs U / I	0...10 V / 0...5 V
- Control signals	Remote on-off, DC input on-off, resistance mode on-off
- Status signals	Overvoltage, Overtemperature
- Reference voltage	10 V / 5 V
Cooling	
- Operation temperature	0...50 °C
- Storage temperature	-20...70 °C
Terminals on rear panel	
- Load input	Screw terminal
- Share Bus & Sense	Plug connector 2 pole & 4 pole
- Analog interface	Sub-D connector 15 pole
- Digital interfaces	Module socket or GPIB 24pole Master-Slave (2x RJ45), USB
- Dimensions ⁽¹⁾ (W H D)	19" x 5.25" x 22.3" / 483 mm x 133 mm x 568mm

(1 Enclosure only)



Contact Us

United States

Intepro Systems America, LP
 14712-A Franklin Ave
 Tustin, CA 92780
 Tel: 1 714 953 2686
 sales@inteproate.com
 www.inteproate.com

United Kingdom

Intepro UK Ltd.
 9 Lakeside Business Park
 Swan Lane, Sandhurst Berkshire
 GU47 9DN / UK
 Tel: 44 012 5287 5600

China

Intepro Power Electronics
 (Shenzhen) Co., Ltd
 No. 828, Block 7,
 Fourth Industrial Area
 Nanyou, Nashan District
 Shenzhen, China 518052
 Tel: 0086 755 86500020