EA-EL 9000 DT 400 W - 1200 W

Programmable Electronic DC loads

EA-EL 9080-60 DT

U I P R OVP OCP OPP OTP USB LAN

- **Wide AC input range: 90...264 V, with active PFC**
- **Input power ratings: 0...400 W up to 0...1200 W**
- **Input voltages: 0...80 V up to 0...750 V**
- **Input currents: 0...5 A up to 0...60 A**
- **Multilingual color touch panel**
- **User profiles, true function generator**
- **Adjustable protections: OVP, OCP, OPP**
- **Operation modes: CV, CC, CP, CR**
- **Galvanically-isolated Ethernet, analog and USB port as standard**
- **Carrying handle with tilt stand**
- **SCPI & ModBus RTU supported**
- **Control software (Windows)**
- **LabView VIs**

General

The new series of compact electronic DC loads, called EA-EL 9000 DT, extends series EA-EL 9000 T by 10 models in a desktop enclosure to round up the portfolio of electronic loads. It offers new voltage, current and power ratings for a multitude of applications for daily use in laboratories, schools or workshops.

All models support the four regulation modes constant voltage (CV), constant current (CC), constant power (CP) and constant resistance (CR). The core of the control circuit is a fast microprocessor which provides interesting features, such as a true function generator with common functions like sine wave, rectangle or triangle, but also an arbitrary function.
The color TFT touch panel offers an intuitive kind of manual operation, like it is prolific with smart phones or tablet computers.

Response times during the control of the devices via analog or digital interface have been improved by an ARM processor controlled hardware, compared to older electronic load series.

Digital interfaces, such as USB and Ethernet are standard with this series, as well as an analog one. All interfaces are galvanically isolated.
Remote control and implementation into custom applications for every purpose is simplified by the common protocols SCPI and ModBus RTU, as well as by ready-to-use LabView components.

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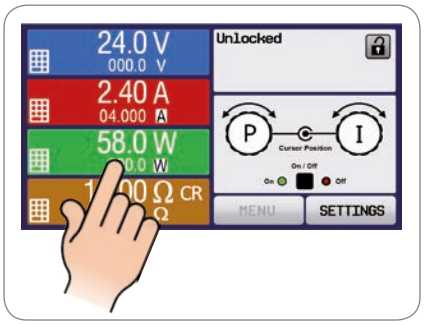
Power ratings, voltages, currents

The voltage range portfolio goes from models with 0...80 V DC up to models with 0...750 V DC. Input currents with 0...5 A up to 0...60 A per unit are available. The series offers two power classes with 600 W or 1200 W peak power.

Handling (HMI)

Manual operation is done with a TFT touch panel, 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 the configuration of functions (square, triangle, sine) etc. The display is multilingual (German, English, Russian, Chinese).



Function generator

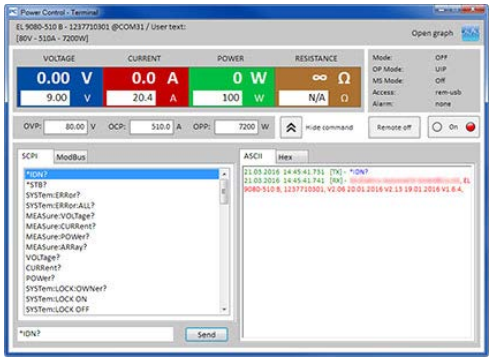
All models within this series include a function generator which can generate typical functions, as displayed in the figures below, and apply them to either the input voltage or the input current. The generator can be completely configured and controlled by using the touch panel on the front of the device, or by remote control via one of the digital interfaces.
The predefined functions offer all necessary parameters to the user, such as Y offset, time / frequency or amplitude, for full configuration ability. Additionally to the standard functions, which are all based upon a so-called arbitrary generator, this base generator is accessible for the creation and execution of complex sets of functions, separated into up to 99 sequences. These can be used for testing purposes in development and production. The sequences can be loaded from and saved to a standard USB stick via the USB port on the front panel, making it easy to change between different test sequences.

Battery test & MPP tracking

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. It counts values for elapsed testing time and consumed capacity (Ah) and energy (Wh).
Data recorded by the PC during tests with EA Power Control can be exported as Excel table in CSV format and analyzed later in MS Excel or similar tools and even visualized 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.
For photovoltaics related tests there is another function included as standard: MPP tracking. Four modes allow for simulation of the typical characteristics of solar inverters being connected to solar modules or panels. The function is used to determine typical operation parameters, such as the so-called Maximum Power Point and the related values U_{MPP}, I_{MPP} and P_{MPP}. One of the modes even offers particular analysis with different irradiation values in form of a table with 100 points.

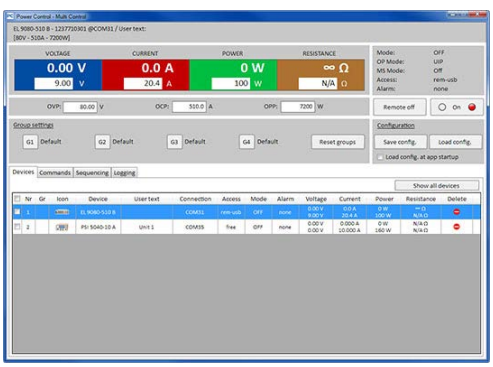
Power derating

The devices of the EA-EL 9000 DT 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 nominal intake power before the derating starts is defined at 25°C ambient temperature.



Remote control & connectivity

For remote control, there are USB, Ethernet and analog ports available as standard on the rear of the devices. Another USB port, located on the front side, is intended for USB sticks in order to load and save functions and user profiles.
Windows users can profit from the free software “EA Power Control”. It offers a feature called “Sequencing”, where the device is controlled through a semi-automatic table in CSV format. This table represents a simple 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 110 for more information.



Options

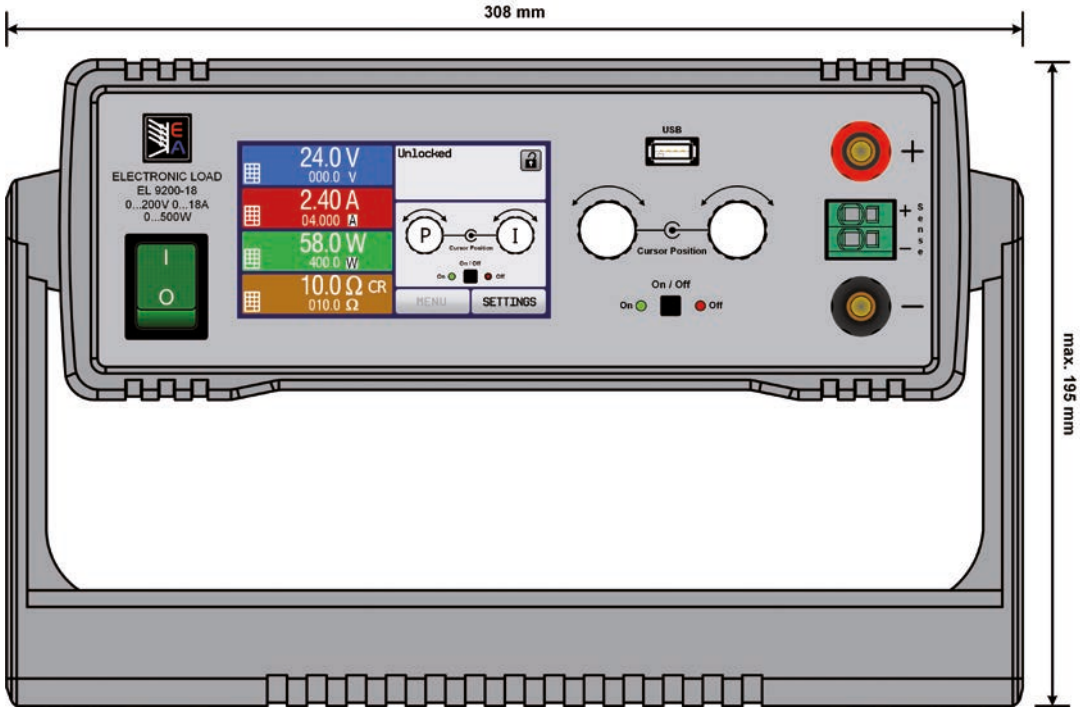
- Mounting frame (2U) for 19” systems

EA-EL 9000 DT 400 W - 1200 W

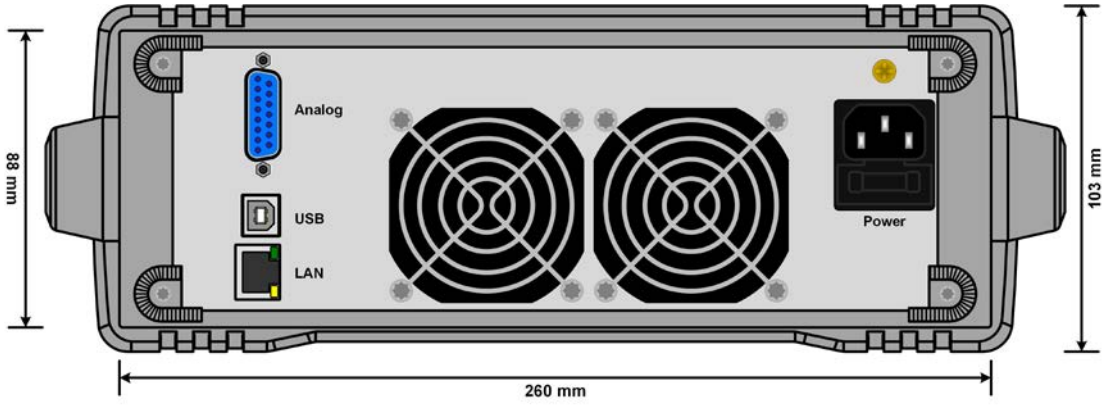
Model	Power @ 25°C	Power @ 40°C	Voltage	Current	Resistance	U_{Min} for I_{Max} (1	Ordering number
EA-EL 9080-45 DT	0...600 W	0...500 W	0...80 V	0...45 A	0.09...30 Ω	≈ 2.2 V	33210501
EA-EL 9200-18 DT	0...500 W	0...500 W	0...200 V	0...18 A	0.5...170 Ω	≈ 2 V	33210502
EA-EL 9360-10 DT	0...450 W	0...450 W	0...360 V	0...10 A	1.6...540 Ω	≈ 2 V	33210503
EA-EL 9500-08 DT	0...400 W	0...400 W	0...500 V	0...8 A	3...1000 Ω	≈ 6.5 V	33210504
EA-EL 9750-05 DT	0...400 W	0...400 W	0...750 V	0...5 A	7...2200 Ω	≈ 5.5 V	33210505
EA-EL 9080-60 DT	0...1200 W	0...800 W	0...80 V	0...60 A	0.09...30 Ω	≈ 2.2 V	33210506
EA-EL 9200-36 DT	0...1000 W	0...800 W	0...200 V	0...36 A	0.5...170 Ω	≈ 2 V	33210507
EA-EL 9360-20 DT	0...900 W	0...800 W	0...360 V	0...20 A	1.6...540 Ω	≈ 2 V	33210508
EA-EL 9500-16 DT	0...600 W	0...600 W	0...500 V	0...16 A	3...1000 Ω	≈ 6.5 V	33210509
EA-EL 9750-10 DT	0...600 W	0...600 W	0...750 V	0...10 A	7...2200 Ω	≈ 5.5 V	33210510

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

Product views



Front view with tilt stand in vertical position



Rear view

EA-EL 9000 DT 400 W - 1200 W

Technical Data	Series EA-EL 9000 DT	
AC: Supply		
- Voltage	90...264 V	
- Frequency	45...66 Hz	
- Power consumption	max. 40 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 µs	
DC: Power		
- Accuracy	<0.5% of rated value	
DC: Resistance		
- Accuracy	≤1% of max. resistance + 0.3% of rated current	
Display / control panel	Graphics display with TFT touch panel	
Digital interfaces	1x USB type B (for communication) / 1x USB type A (for storage device) / 1x Ethernet	
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%
Cooling	Temperature controlled fan(s)	
Operation temperature	0...50 °C	
Storage temperature	-20...70 °C	
Mechanics		
- Dimensions (W x H x D) (1	308 x 103 x 415 mm (12.1" x 4" x 16.3")	
- Weight	600 W: ≈ 6.5 kg (14.3 lb)	1200 W: ≈ 7.5 kg (16.5 lb)

(1 Body only