EA-EL 3000 B 400 W

可编程直流电子负载
Programmable Electronic DC loads

EA-EL 3500-10 B

U | I | P | R | OVP | OCP | OPP | OTP

Option: USB | LAN

- 输入功率：0...400 W
- 输入电压：0...80 V 至 0...500 V
- 输入电流：0...10 A 至 0...60 A
- 多语言彩色显示器
- 用户配置文档，真实的函数发生器
- 可调保护极限：OVP, OCP, OPP
- 操作模式有：CV, CC, CP, CR
- 带倾斜式支撑功能的手提
- 支持SCPI & ModBus RTU
- 控制软件 (Windows)
- LabView VIs
- 可选：USB，以太网或模拟

- **Input power rating: 0...400 W**
- **Input voltages: 0...80 V up to 0...500 V**
- **Input currents: 0...10 A up to 0...60 A**
- **Multilingual colour display**
- **User profiles, true function generator**
- **Adjustable protections: OVP, OCP, OPP**
- **Operation modes: CV, CC, CP, CR**
- **Carrying handle with tilt stand**
- **SCPI & ModBus RTU supported**
- **Control software (Windows)**
- **LabView VIs**
- **Optional: USB, Ethernet or Analog**

基本信息

2017新款紧凑型直流负载EA-EL 3000 B，是第二代小型桌面式负载，功率为400 W。配有新的电压与电流等级，适合实验室、学校或车间日常的多种用途。

所有型号都支持四种调节模式：恒压（CV），恒流（CC），恒功率（CP）与恒阻（CR）。其控制电路核心是一个快速微处理器，具有这些功能：带通用函数的真实函数发生器，如：矩形、三角形或阶跃形。彩色显示器与键盘，以及连个旋钮，使用户手操更灵活。

与旧系列的电子负载相比，经模拟或数字接口控制产品的响应时间，通过**ARM**处理器控制的硬件有了很大改善。

General

The 2017 series of compact electronic DC loads, called EA-EL 3000 B, is the second generation of small desktop loads with a power rating of 400 W. It offers new voltage and current 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 rectangle, triangle or ramp. The colour display, together with a keyboard and two rotary knobs, enables the user an intuitive kind of manual operation and better overview.

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.

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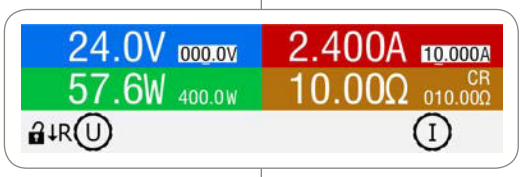
可选配件有多款数字接口，如：USB与以太网，还有一个模拟接口。所有接口都电隔离。
通过SCPI与ModBus RTU通用协议，以及即用LabView组件，大大简化了远程控制在客制应用下的使用。

功率等级、电压和电流

本系列有0...80 V DC，0...200 V DC与0...500 V DC这些等级的输出电压，单台机器的输入电流等级有0...10 A，0...25 A或0...60 A。功率等级为400 W稳定功率。

操作面板（HMI）



手动操作通过彩色显示屏、两个旋钮与六个按钮来完成。大的彩色显示器一次性显示所有设定与实际值。通过人机界面可完成整个设置，包括函数（方形，三角形等其它）的配置等。

还提供多语言显示（德文，英文，俄文，中文）。

函数发生器

所有型号都配有可生成典型函数的函数发生器，如下图所示，可以应用到输入电压或电流上。函数发生器可由前板的旋钮跟按钮完全配置和控制，或者经数字接口远程控制。

预设函数为用户提供完整配置的所有参数，比如：Y偏移值，时间或幅度。

Digital interfaces, such as USB and Ethernet, are available as optional accessory, 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.

Power ratings, voltages, currents

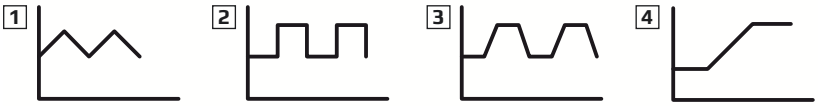
The voltage range portfolio offers models with 0...80 V DC, 0...200 V DC and 0...500 V DC. Input currents with 0...10 A, 0...25 A or 0...60 A per unit are available. The series offers a power class with 400 W steady power.

Handling (HMI)

Manual operation is done with a colour display, two rotary knobs and six pushbutton.s The large 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 and others) 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 knobs and buttons 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 or amplitude, for full configuration ability.



三角形 *Triangle*　矩形 *Rectangle*　梯形 *Trapezoid*　正弦 *Ramp*

电池测试

用恒流或恒阻放电来测试各类电池的这种测试，本产品也可以执行，它具有电池测试模式。它会显示累计的测试时间与消耗的容量 (Wh)。

EA Power Control测试期间，由电脑记录的数据，可以CSV格式导出Excel表，然后在MS Exce或类似工具下进行分析，甚至能创建可视化的放电图。
关于其它设置，还可设定一可调极限值，当电池电压低时停止测试，或者停止可调最大测试期。

MPP追踪

对于光伏相关的测试，本产品还有一项功能，且作为其标准功能。它有四种模式，可模拟连接到太阳能模块或面板的逆变器的典型特性。该功能可以确定典型操作的参数，例如所谓的最大功率点和相关值U_{MPP}，I_{MPP}和P_{MPP}。其中一种模式甚至含有不同辐射值的特定分析，该值由100个点组成并以表格形式存在。

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. 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 analysed later in MS Excel or similar tools and even visualised as a discharge diagram.
For more detailed setup, there is an adjustable threshold to stop the battery test on low battery voltage, as well an adjustable test period.

MPP tracking

For photovoltaics related tests there is another function included as standard. 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 value 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.

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远程控制 & 连接

本产品的远程控制可通过三种可选接口卡来完成，快速且简单：

- USB
- USB + 以太网
- USB + 模拟

利用数字接口（USB，以太网），Windows用户还可使用“EA Power Control”免费软件。它具有“排序”功能，通过CSV格式的半自动化表格控制产品。此表能代表简易的测试程序，可在MS Excel或其它CSV编辑器下创建与编写，然后导入软件工具内。

该软件利用“**多功能控制**”特性（需注册码，非免费），可一次性监控多达20台产品。更多信息见136页。

可选项

- 带USB、USB+以太网或USB+模拟端口的接口卡，都是即插即用型，且可更换。

Remote control & connectivity

For remote control, there are three types of interface cards optionally available which can be quickly and easily installed by user on location:

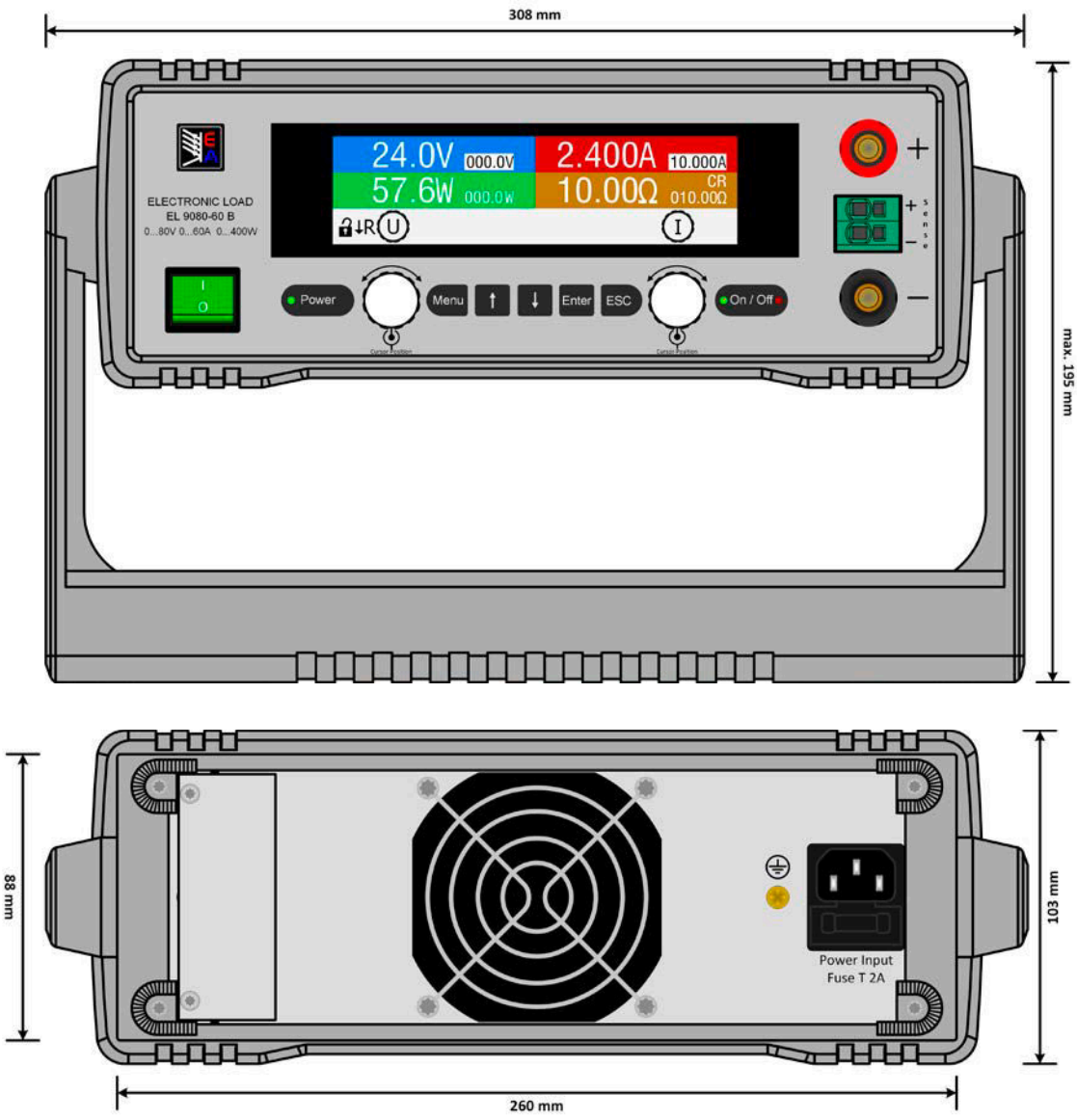
- USB
- USB + Ethernet
- USB + Analog

Using the digital interface (USB, Ethernet), 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 136 for more information.

Options

- Interface cards with either USB, USB+Ethernet or USB+Analog port, all plug ‘n play and retrofittable



标配版的后视图 /
Rear view of the standard configuration

EA-EL 3000 B 400 W

技术参数	Technical Data	Series EA-EL 3000 B 系列	
交流：供电	AC input		
- 电压	- Voltage	90...264 V	
- 频率	- Frequency	45...66 Hz	
- 功率损耗	- Power consumption	最大40 W	
直流：电压	DC: Voltage		
- 精确度	- Accuracy	<额定值的0.1% / <0.1% of rated value	
直流：电流	DC: Current		
- 精确度	- Accuracy	<额定值的0.2% / <0.2% of rated value	
- 负载调整率1-100% ΔU_{DC}	- Load regulation 1-100% ΔU_{DC}	<额定值的0.1% / <0.1% of rated value	
直流：功率	DC: Power		
- 精确度	- Accuracy	<额定值的0.5% / <0.5% of rated value	
直流：阻值	DC: Resistance		
- 精确度	- Accuracy	≤最大阻值的1% + 额定电流的0.3% / ≤1% of max. resistance + 0.3% of rated current	
显示器与控制面板	Display and control panel	TFT液晶显示器，按键条，旋钮 / TFT display, keystrip, rotary knobs	
数字接口（可选）	Digital interfaces (optional)		
- 可选	- Available	IF-KE5 USB: 1x USB Typ B IF-KE5 USBLAN: 1x USB Typ B + 1x Ethernet (RJ45)	
模拟接口（可选）	Analog interface (optional)	IF-KE5 USBANALOG: 1x Analog (D-Sub 15) + 1x USB Typ B	
- 信号范围	- Signal range	0...5 V 或 0...10 V (可转换) / 0...5 V or 0...10 V (switchable)	
- 输入脚	- Inputs	U / I / P / R, 远程开-关，直流输入开-关，内阻模式开-关 / U / I / P / R, Remote on-off, DC input on-off, resistance mode on-off	
- 输出脚	- Outputs	U / I, 过压，报警，参考电压 / U / I, Overvoltage, alarms, reference voltage	
- U / I / P / R精确度	- Accuracy U / I / P / R	0...10 V: <0.2%	0...5 V: <0.4%
制冷	Cooling	温控风扇 / Temperature controlled fan	
操作温度	Operation temperature	0...50 °C	
储存温度	Storage temperature	-20...70 °C	
机械结构	Mechanics		
- 尺寸 (W x H x D) (1	- Dimensions (W x H x D) (1	308 x 103 x 325 mm	
- 重量	- Weight	4 kg	

(1 仅为机身尺寸 / Body only

型号	稳定功率	电压	电流	内阻	U_{Min} 时 I_{Max} (1	订购编号
Model	Steady Power	Voltage	Current	Resistance	U_{Min} for I_{Max} (1	Ordering number
EA-EL 3080-60 B	0...400 W	0...80 V	0...60 A	0.12...40 Ω	~ 2.6 V	35320205
EA-EL 3200-25 B	0...400 W	0...200 V	0..25 A	1...340 Ω	~ 1,9 V	35320206
EA-EL 3500-10 B	0...400 W	0...500 V	0...10 A	6...2000 Ω	~ 4,7 V	35320207

(1 供给负载的最小直流输入电压，以达到最大输入电流 / Minimum DC input voltage to supply for the load to achieve the max. input current