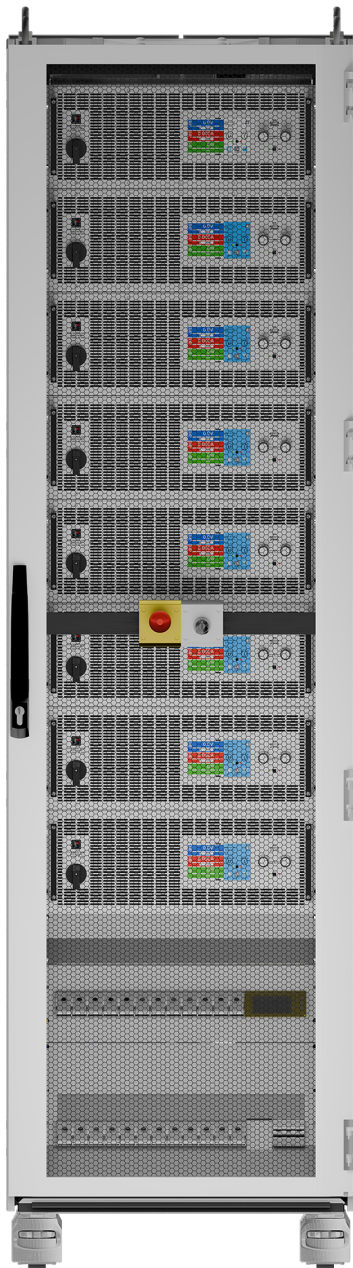


ELR 21000 Dynamic Test System

High Speed Regenerative Electronic Load

DATASHEET



Features

- High speed electronic load within a 42U rack
- System power of up to 1920 kW
- Voltage range of 0-1000 V
- Optimized for testing of 800 V systems
- Current range of 0-5120 A
- High current slew rate of up to 12 A/μs at 240 kW
- 125% short term overpower capability
- Modular and scalable in 30 kW steps
- Regenerative system
- Very high efficiency of up to 95%
- Regulation Modes CV, CC, CP with fast crossover
- AC input 3 phase, 380 V - 480 V, 50-60 Hz
- Rack equipped with a 2-channel emergency stop system

The ELR 21000 dynamic test system provides a high-speed solution for testing next-generation data center power supplies. The system operates as a regenerative electronic load, returning energy to the microgrid with efficiencies of up to 95%. With DC power of up to 1920 kW, a DC voltage range of 0 to 1000 V, and DC current capability of up to 5120 A, the system is designed for testing high-dynamic power shelves used in data center power infrastructure. It enables engineers to evaluate compliance with the requirements of emerging 800 V data center power architectures.

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The system delivers high power density in a compact 42U rack measuring only 600 mm wide and 1000 mm deep. The rack features a single AC input and is equipped with a two-channel emergency stop system for safe shutdown in emergency situations. The emergency stop button is located on the front door, while the rear door is secured with door contact switches. If the rear door is opened during operation, the emergency stop system is activated automatically. The system can also be equipped with Network and Supply (NS) protection to prevent islanding.

High Slew Rate and DC Output Dynamics

The ELR 21000 dynamic test system provides a fast, high-dynamic DC current output to meet the demands of data center power infrastructure. The DC output design enables current slew rates of up to 12 A/ μ s at 240 kW. This makes the ELR 21000 dynamic test system an ideal choice for 800 V data center power testing. The following table shows the achievable slew rates based on the number of devices connected in parallel, up to 240 kW.

Configuration	Total Power	Slew Rate (A/ μ s)
1 $\times$ 30 kW	30 kW	1.9
2 $\times$ 30 kW	60 kW	3.7
3 $\times$ 30 kW	90 kW	4.4
4 $\times$ 30 kW	120 kW	5.5
5 $\times$ 30 kW	150 kW	6.8
6 $\times$ 30 kW	180 kW	8.5
7 $\times$ 30 kW	210 kW	10.2
8 $\times$ 30 kW	240 kW	12

Overload Capability

Data center power supplies must provide short-term overload capability to meet sudden demand from installed CPUs and GPUs. The ELR 21000 dynamic test system provides a short-term overload capability of 125%, enabling validation of peak power demands without requiring a larger test system.

Built-in Interfaces

- CAN FD
- Ethernet
- EtherCAT
- Master-Auxiliary-bus
- Share-bus
- USB
- USB Host

Software

- EA-Power Control

Options

- Water cooling in stainless steel
- NS protection
- Isolation monitor

Power Density

The compact 30 kW, 4U design enables a high-power-density test system while minimizing floor space requirements. By integrating up to eight devices in a single rack, the system delivers up to 240 kW of power within a footprint of just 0.6 m². This efficient design helps maximize valuable space in the test environment.

Energy Recovery

In discharge mode, the system feeds energy back to the micro-grid with efficiencies of up to 95%. Unlike conventional electronic loads that dissipate absorbed energy as heat, the regenerative design helps reduce energy consumption and operating costs. The resulting reduction in heat output also lowers cooling demands, helping minimize air conditioning costs.

Function Generator

The system is equipped with an arbitrary function generator (AFG). This allows waveforms such as sine, triangle, rectangle or trapezoid to be simply called up and to applied either to the voltage or the current. The AFG allows voltage and current progression to be freely programmable. Test sequences for repeated tests can be saved and reloaded when needed, which saves time.

General Specifications

AC Input Rack

Voltage, Phases	380 - 480 V, $\pm 10\%$, 3ph AC
Frequency	45 - 65 Hz
Power Factor	0.99

Protective Functions

OVP	Overvoltage protection, adjustable 0 - 110% $U_{Nominal}$
OCF	Overcurrent protection, adjustable 0 - 110% I_{Nom}
OPP	Overpower protection, adjustable 0 - 125% $P_{Nominal}$
OT	Overtemperature protection (DC output shuts down in case of insufficient cooling)

Insulation

AC Input to DC Output	3750 Vrms (1 minute, creepage distance >8 mm)
AC Input to Case (PE)	2500 Vrms
DC Output to Case (PE)	Negative DC pole <-> PE : ± 1500 V DC ; Positive DC pole <-> PE : +2000 V DC
DC Output to Interfaces	1500 V DC

Communication Interfaces

Rear, Galvanically Isolated	USB, Ethernet, EtherCAT, CAN FD
Front, Galvanically Isolated	USB host, for data acquisition
Safety Protection Class	1
Ingress Protection	IP20

Environmental Conditions

Operating Temperature	0-35 °C (32-95 °F)
Storage Temperature	-20-70 °C (-4-158 °F)
Humidity	$\leq 80\%$ relative humidity, non-condensing
Altitude	≤ 2000 m ($\leq 6,600$ ft)
Pollution Degree	2

Mechanical Construction

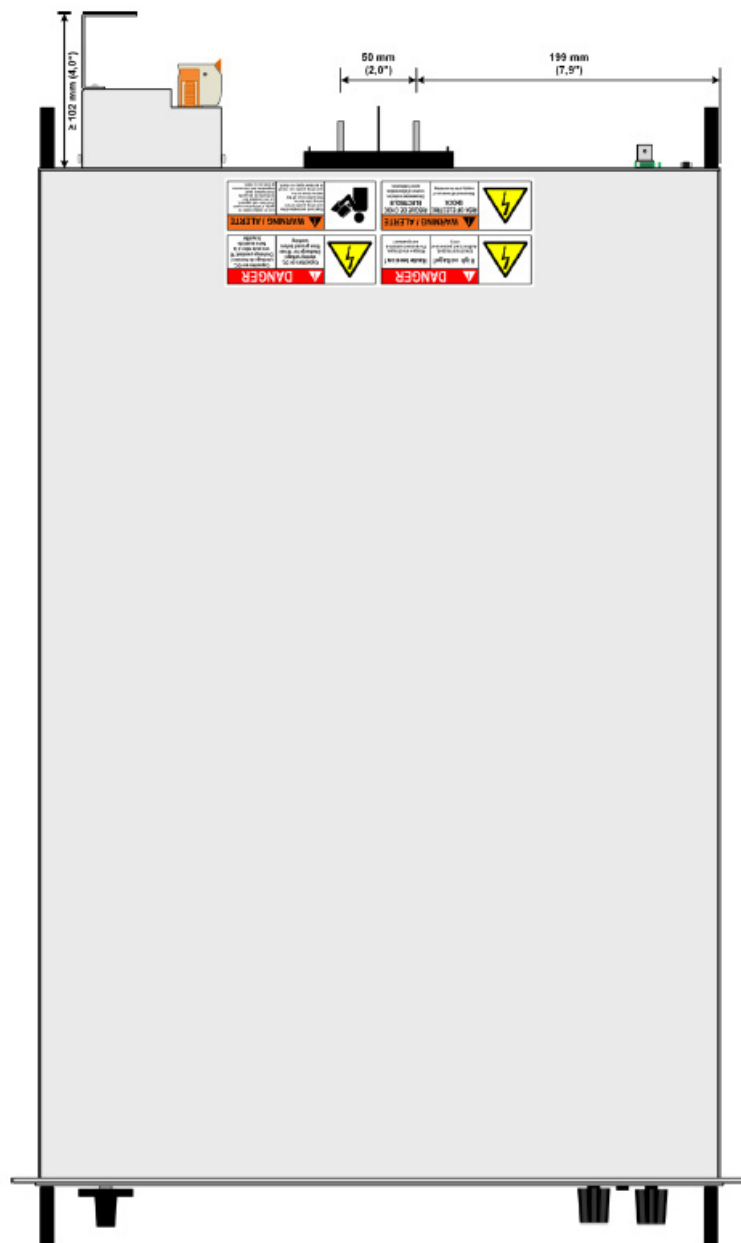
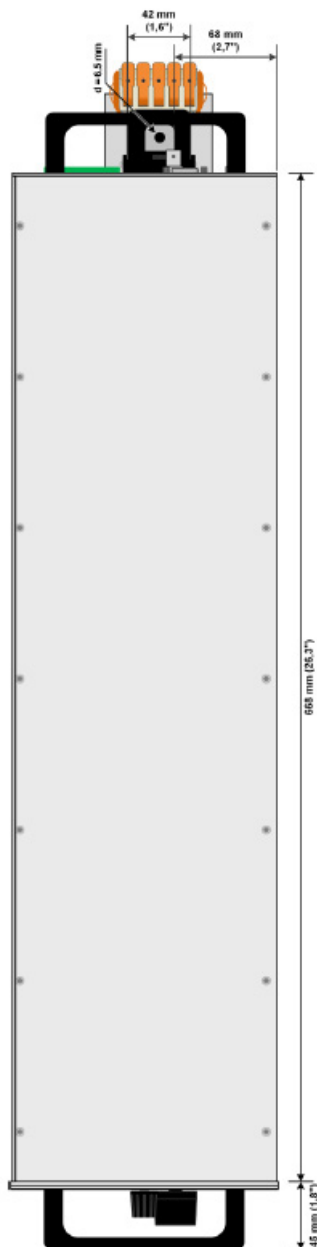
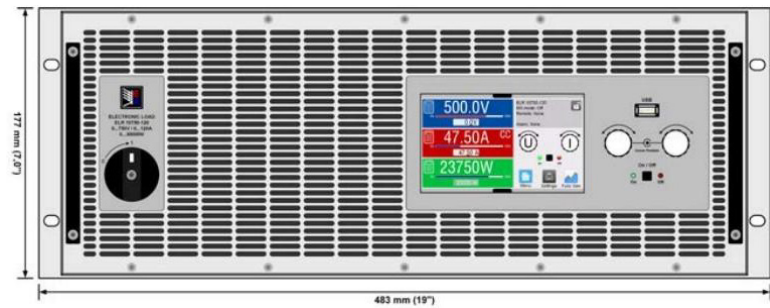
Cooling	Forced air flow from front to rear (temperature controlled fans), optional water cooling
Dimensions (W × H × D)	600 mm × 420 × 1000 mm
Weight	approx. 650 kg
Weight with Water Cooling	approx. 700 kg

DC Output

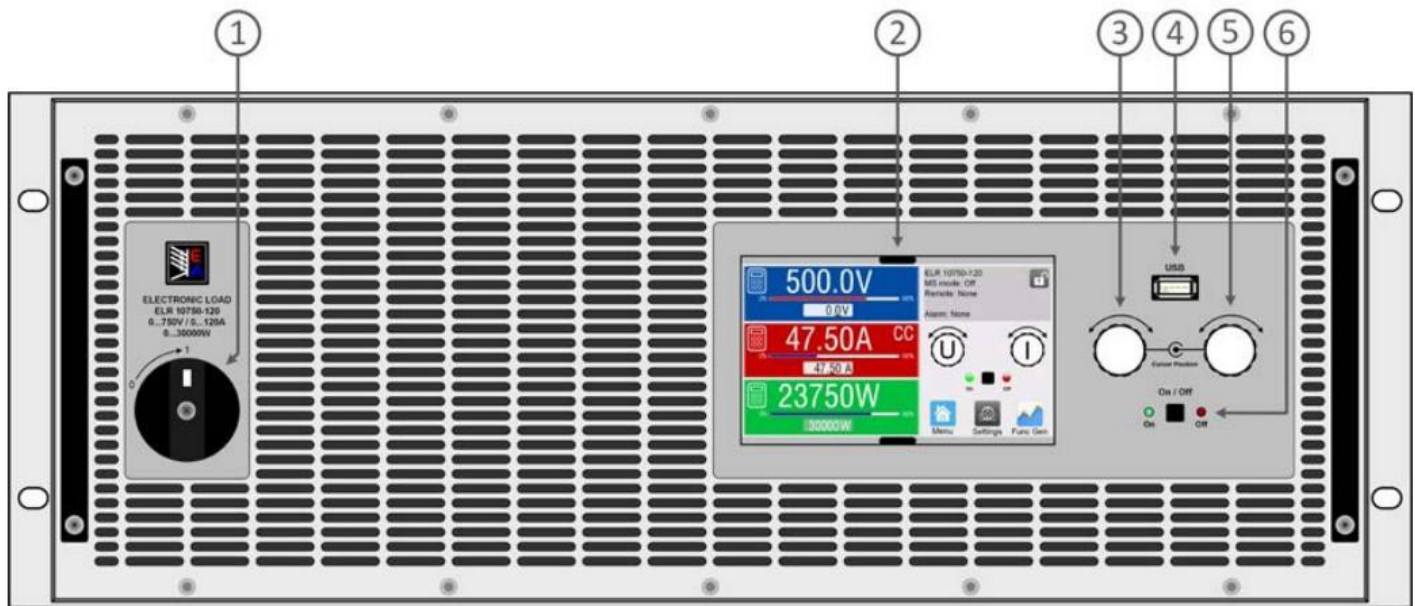
Voltage Range	0 - 1000 V
Current Range	0 - 5120 A
Power Range	0 - 1920 kW
Efficiency	Up to 95% ¹

1. At 100% power and 100% output

EA-ELR 21000-80 4U HS

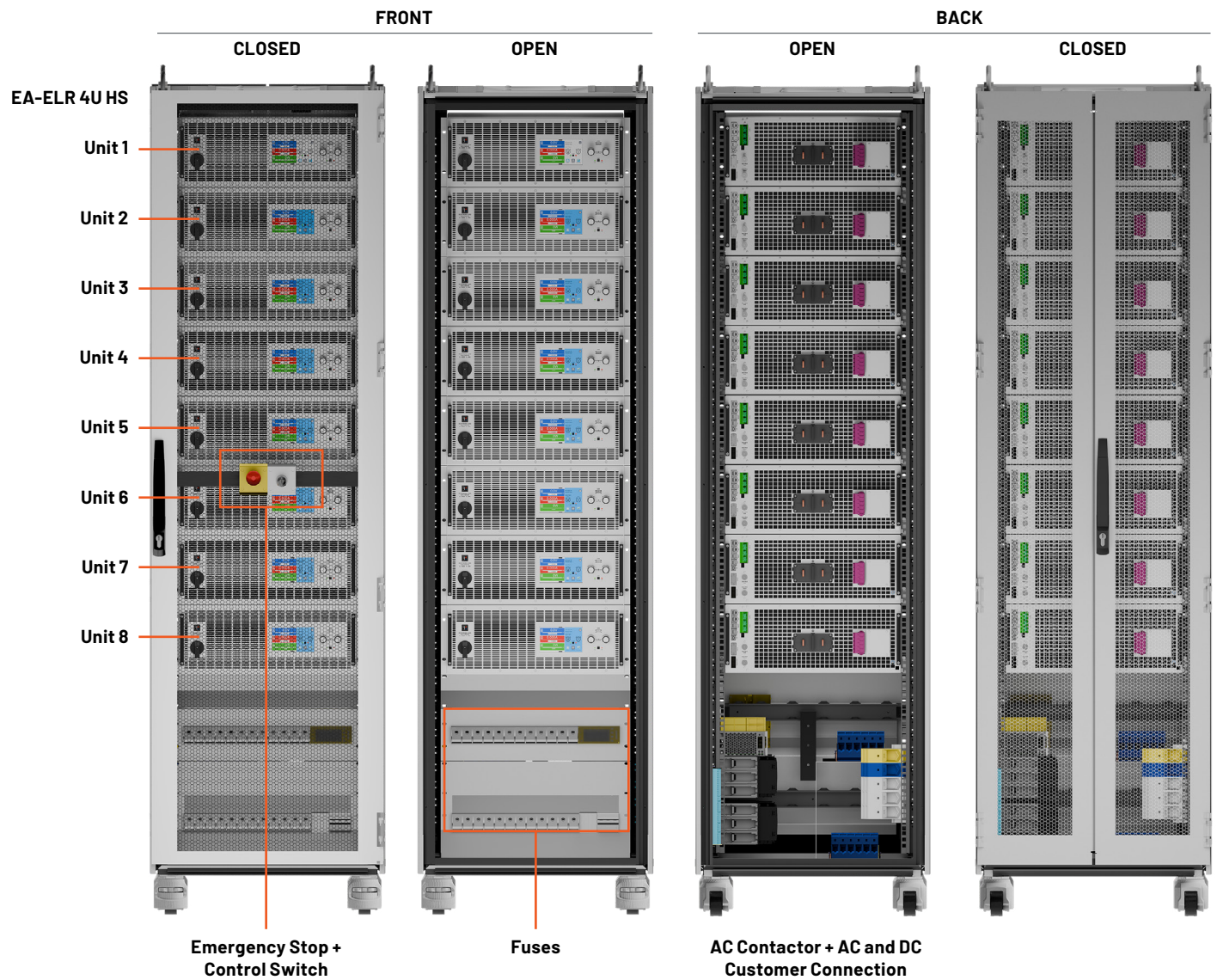


EA-ELR 21000-80 4U HS Front Panel



1. Power switch
2. TFT control interface, interactive operation and display
3. Rotary knob with push-button action, for settings and control
4. USB host, uses USB sticks for data logging and sequencing
5. Rotary knob with push-button action, for settings and control
6. On / Off push-button with LED status display

ELR 21000 Dynamic Test System



EA-ELR 21000 Dynamic Test System

Model Number	Maximum Voltage (V)	Target Application Voltage (V)	Maximum Current (A)	Maximum Power (kW)	Short Term Overpower Capability (125% at 800 V) (kW)	Maximum Slew Rate (A/μs)	Comment on Maximum Slew Rate (A/μs)
EA-ELR 21000 DTS-01	1000	800	80	30	38	1,9	Measured Value
EA-ELR 21000 DTS-02	1000	800	160	60	75	3,7	Measured Value
EA-ELR 21000 DTS-03	1000	800	240	90	113	4,4	Measured Value
EA-ELR 21000 DTS-04	1000	800	320	120	150	5,5	Measured Value
EA-ELR 21000 DTS-05	1000	800	400	150	188	6,8	Measured Value
EA-ELR 21000 DTS-06	1000	800	480	180	225	8,5	Measured Value
EA-ELR 21000 DTS-07	1000	800	560	210	263	10,2	Measured Value
EA-ELR 21000 DTS-08	1000	800	640	240	300	12	Measured Value
EA-ELR 21000 DTS-16	1000	800	1280	480	600	18	Calculated Value
EA-ELR 21000 DTS-24	1000	800	1920	720	900	24	Calculated Value
EA-ELR 21000 DTS-32	1000	800	2560	960	1200	31	Calculated Value
EA-ELR 21000 DTS-40	1000	800	3200	1200	1500	39	Calculated Value
EA-ELR 21000 DTS-48	1000	800	3840	1440	1800	46	Calculated Value
EA-ELR 21000 DTS-56	1000	800	4480	1680	2100	53	Calculated Value
EA-ELR 21000 DTS-64	1000	800	5120	1920	2400	61	Calculated Value

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Rev. 02.2022



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