CAENels
Gear For Science

Product Overview
Preliminary

Linux OS

Embedded WEB-SERVER

Waveform Generation

Embedded Oscilloscope



1.5-kW Bipolar Bidirectional and Regenerative Power Supply Series

FAST-BI-1K5

Your **DIGITAL POWER ELECTRONICS** Partner.

- **Full Four-Quadrant, Bidirectional & Regenerative Power Supply Series with high-stability and fast response, ideal for battery testing and superconducting magnet operation**
- **Stand-alone unit with Local, 10/100/1000 Mbit/s Ethernet, SFP+ and Analog Control modes**
- **Digital control loop to adapt the power supply to any load condition in Constant Current (CC), Constant Voltage (CV), Constant Power (CP) and Constant Resistance (CR) modes**
- **Embedded Web-Server with Integrated Waveform Generation and Oscilloscope**

FEATURES

- **19"-2U stand-alone crate**
- **Bipolar, Regenerative and Bidirectional**
- **Models up to ±150 A and up to ±100 V**
- **Configurable digital control loop**
- **Current (CC), Voltage (CV), Power (CP) and Resistance (CR) regulation**
- **<0.0002 %/K temperature dependence**
- **<0.001 % long-term stability (8h)**
- **Optional Analog Control Input, Trigger Input, Auxiliary ADC Input and K-type thermocouple readout**
- **Fast SFP+ interface (100-kHz update)**
- **Waveform Generation at 100 kHz**
- **Embedded 4-channel Oscilloscope**
- **Embedded Web-Server**
- **Embedded EPICS IOC**
- **External Interlocks and Status Signals**
- **Local Display and Controls**
- **10/100/1000 Mbit Ethernet TCP-IP or UDP**
- **Paralleling up to 4 units (6 kW)**

APPLICATIONS

- **Battery Testing**
- **Superconducting Magnets**
- **Magnet Power Supply**
- **PV Cell Testing**
- **Configurable Active Load**

FAST-Bi-1K5. The FAST-Bi-1K5 series is the new generation of **bidirectional** and **regenerative** power supplies by CAEN ELS. These outstanding power sources are designed to **safely return the excess energy to the grid** while having state-of-the-art performances both in current, voltage, power and resistance control modes. Models **up to ±150 A** and **up to ±100 V** are available in order to satisfy any need.

Features like a 4-channel oscilloscope and a waveform generator can be easily accessed via the **Web Interface GUI** and be used for control and monitoring, without the need of having external physical devices - e.g. oscilloscope and waveform generator units.

The **10/100/1000 Mbit Ethernet** connection over TCP-IP or UDP and the two SFP+ slots allow controlling the power converter in different modes. The control loop, as for all CAEN ELS' power supplies, is digital in order to obtain the maximum flexibility and easiness of configuration to any connected load – and a **PID Auto Tuning** feature is also available, allowing to automatically tailor the power supply output behaviour to the specific load.

Up to 4 units of the same type can be paralleled, enabling to supply up to **±600 A / ±10 V** or **±80 A / ±100 V** (6 kW maximum). The paralleling is performed via the optical SFP+ links on the front panel of the devices.

Internal protections – e.g. over-voltage, over-current, earth current leakage – are implemented as well as several configurable external interlocks are present. Triggers and I/O pheripherals are also provided for maximum flexibility.

The units can be also locally controlled via a high-definition colour display and a local interface in order to set and monitor the main parameters and the status of the power supply.

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About Us

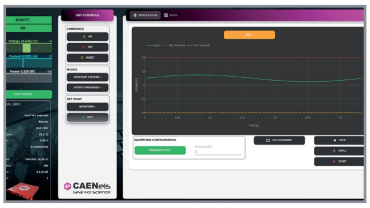
CAEN ELS is a leading company in the design of power supplies and state-of-the-art complete electronic systems for the Physics research world, having its main focus on dedicated solutions for the particle accelerator community and high-end industrial applications.

- Power Supply Systems
- Precision Current Measurements
- Beamline Electronics Instrumentation
- FMC and MicroTCA

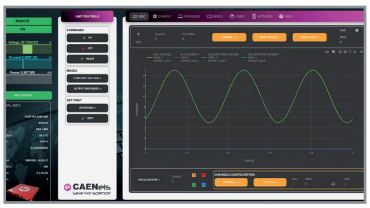
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Embedded WAVEFORM GENERATOR



Embedded 4-channel OSCILLOSCOPE

Technical Specifications — **FAST-Bi-1K5**

		"15010"	"10020"	"5040"	"3050"	"20100"
Output Current Range		±150 A	±100 A	±50 A	±30 A	±20 A
Output Voltage Range		±10 V	±20 V	±40 V	±50 V	±100 V
Rated Output Power		1.500 W	1.500 W	1.500 W	1.500 W	1.500 W
Output Topology		Full 4-Quadrant				
Regulation Type		Constant Current (CC), Constant Voltage (CV), Constant Power (CP), Constant Resistance (CR)				
Current Setting/Readback		24 bit				
Voltage Setting/Readback		24 bit				
Equiv. Switching Frequency		400 kHz	400 kHz	200 kHz	200 kHz	200 kHz
Efficiency	**AC/DC**	> 83 %	> 86 %	> 86 %	> 86 %	> 87 %
	DC/AC	> 83 %	> 86 %	> 86 %	> 86 %	> 87 %
Rise Time 10-90%		< 70 µs	< 70 µs	< 70 µs	< 70 µs	< 70 µs
Closed Loop Bandwidth (-3 dB)		5 kHz				
Output Accuracy		< 0.01 %				
Temperature Stability		< 2 ppm/K				
Long-Term Stability (8 h)		< 0.001 %/FS				
Cooling		Forced air convection				
Input Ratings		180 - 264 V_{AC} / 47 - 63 Hz				
Communication Interfaces		10/100/1000 Mbit Ethernet TCP-IP and UDP 2 x Fast SFP ports				
External Signals		4 x External Interlock Inputs (configurable dry contacts) 1 x Status Output relay (magnetic) 1 x Output Relay (solid state) 1 x Persistent Switch Heater output 1 x Trigger Input (LVTTL, TTL) - *optional* 1 x Analog Control Input (±10 V) - *optional* 1 x 16-bit 100-ksps ADC input for readout of external values/sensors - *optional* 1 x K-type thermocouple Input				
Internal Interlocks		DC-Link Undervoltage Over-Temperature Over-Current and Over-Voltage Earth Fault Current Regulation Fault				
Hardware Protections		Input Fuses Crowbar (Over-Voltage)				
Auxiliary Readbacks (12-bit)		DC-Link Voltage Ground Leakage Current Temperature				
Operating Ambient Temperature		0 ... 50 °C				
Mechanical Dimensions		19" x 2U x 587 mm (including connectors)				
Weight		15 kg				

Ordering Code	Acronym	Description
FB1K5150010X	FAST-Bi-1K5 150-10	FAST-Bi-1K5 - 1.5-kW Bipolar Bidirectional and Regenerative Digital Power Supply ±150 A@±10 V
FB1K5100020X	FAST-Bi-1K5 100-20	FAST-Bi-1K5 - 1.5-kW Bipolar Bidirectional and Regenerative Digital Power Supply ±100 A@±20 V
FB1K5050040X	FAST-Bi-1K5 50-40	FAST-Bi-1K5 - 1.5-kW Bipolar Bidirectional and Regenerative Digital Power Supply ±50 A@±40 V
FB1K5030050X	FAST-Bi-1K5 30-50	FAST-Bi-1K5 - 1.5-kW Bipolar Bidirectional and Regenerative Digital Power Supply ±30 A@±50 V
FB1K5020100X	FAST-Bi-1K5 20-100	FAST-Bi-1K5 - 1.5-kW Bipolar Bidirectional and Regenerative Digital Power Supply ±20 A@±100 V
Options		
FB1K5OPT0001	ANALOG, AUX, TRIGGER, K-TYPE	Analog Control, Auxiliary ADC, Trigger and K-type thermocouple Inputs add-ons - *optional for FAST-Bi-1K5*
FB1K5OPT0002	HIGH-BANDWIDTH	High-Bandwidth - *optional for FAST-Bi-1K5*

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