CAENels
Gear For Science

Regul8OR
CONTROLLED

TDK·Lambda™
POWERED

Your **DIGITAL POWER ELECTRONICS** Partner.

CPS SERIES

- **In collaboration with TDK-Lambda, CAEN ELS Power Systems ("CPS") are comprised of turnkey systems for high power, high performance magnet current sourcing**
- **The systems are controlled via the Regul8OR controller, bringing flexibility and customization in system voltage/current outputs for room temperature and superconducting magnets alike**
- **Obtain outstanding long-term stability, accuracy, low temperature coefficient, excellent load and line regulation - the system may not need to be calibrated for years depending on the requirements**

FEATURES

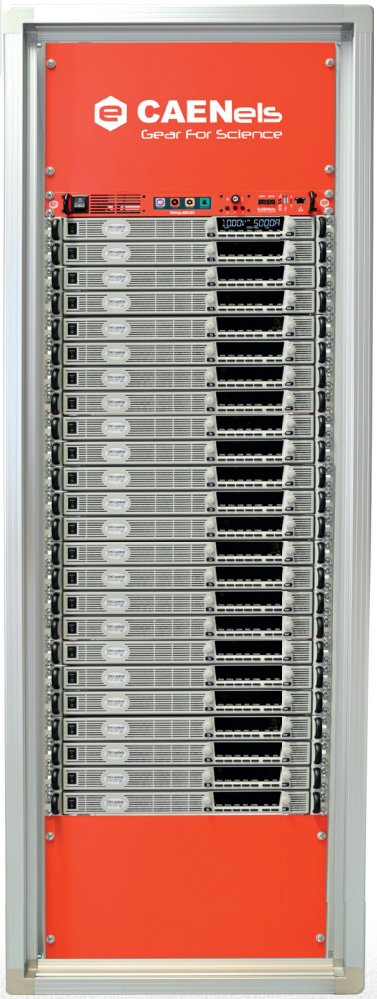
- **Unipolar or Bidirectional**
- **Configurable digital control loop on SoC/FPGA**
- **Constant Current (CC) and Constant Voltage (CV) regulation**
- **Pre-cabled racks available**
- **Water cooling on racks available**
- **<0.0005 %/K temperature dependence**
- **<0.001 % long-term stability (8h)**
- **Embedded Waveform Generation**
- **Embedded 4-channel Oscilloscope**
- **Embedded Web-Server**
- **Embedded EPICS IOC**
- **External Interlocks and Status Signals**
- **Local Display and Controls**
- **10/100/1000 Mbps Ethernet TCP-IP/UDP**

CPS. Combining the Regul8OR controller with custom-made G+ programmable power supplies from TDK-Lambda, CAEN ELS offers state-of-the-art high-power **turnkey systems** with all necessary hardware and built-in **web-server**, **waveform generation** and **oscilloscope** functions. The current loop is closed through a DCCT in order to achieve the most accurate and precise reading through direct current transducer technology.

Current and voltage values are monitored and stabilized by the internal configurable digital control

	CPS Equivalent	G+20-375 standard	Outcome	Improvement
Long-term stability (8 hrs)	< 0.001 %	0.01 %	✓	> 10 x
Temperature coefficient	< 0.0006 %/K	0.01 %/K	✓	> 15 x
Line regulation	< 0.0006 %	0.05 %	✓	> 80 x
Load regulation	< 0.0005 %	0.08 %	✓	> 150 x
Warm-up drift (30 mins)	< 0.008 %/FS	0.25 %/FS	✓	> 30 x
Ripple (5 Hz - 1 MHz)	< 350 mA_{RMS}	< 900 mA_{RMS}	✓	> 2.5 x
Repeatability (after full-cycling)	< 0.001 %/FS	n.a.	-	-

20 V/375 CPS system vs. G+20-375 standard power supply



CPS cabinet installation

loop (on a **SoC** / **FPGA**) present on the Regul8OR so that any load conditions (i.e. up to 250 H inductance) can be easily fit in order to obtain the desired response. The resulting power system is brought to a **ppm-level stability** power unit, with negligible line and load regulation values and with extreme accuracy.

The **10/100/1000 Mbps Ethernet** connection over TCP-IP or UDP allows for controlling the power system in a very simple and reliable manner, via the embedded web-server and GUI. Run waveforms at 10 ksps while monitoring several KPIs simultaneously. The CPS systems can be configured for three-phase input voltages of 208 V_{AC}, 400 V_{AC} or 480 V_{AC} along with the output voltages into the hundreds of V and currents in the kA range.

Technical Specifications	**CPS Series**
Output Current Range	up to 5.000 A
Output Voltage Range	up to 500 V
Maximum Power	up to 200 kW per rack
Regulation Type	Constant Current (CC) or Constant Voltage (CV)
Current Setting/Readback Resolution	24 bit
Voltage Setting/Readback Resolution	24 bit
Output Readout Resolution	24 bit
Line Regulation	< 0.0005 %/FS in CC mode
Load Regulation	< 0.0005 %/FS in CC mode
Temperature Coefficient (TC)	< 0.0005 %/K in CC mode < 0.005 %/K in CV mode
Long-Term Stability (8 h)	< 0.001 %/FS in CC mode < 0.001 %/FS in CV mode
Overall Accuracy	< 0.01 %/FS in CC mode < 0.01 %/FS in CV mode
External Interlocks	• 8 x inputs accepting dry-contacts
External Hardware Interfaces	• 2 x output magnetic relay[1] • 2 x output solid state relay • 2 x output isolated TTL (0 - 5 V) signals
External Signals	• 1 x 5-V or 20-mA configurable power output available *e.g. to supply an Hall probe* • 2 x External Temperature sensor Input • 1 x isolated Trigger Input • 1 x Sync IN and 1 x Sync OUT signals *i.e. to synchronize multiple controllers*
Connectivity	• 1 x Ethernet 10/100/1000 Mbit TCP-IP or UDP • 2 x SFP+ (6.25 Gbps)
Extra Features	• Embedded Web-Server • 4-channel Embedded Oscilloscope Function at 100 ksps • Embedded Waveform Generator • Embedded EPICS IOC • Firmware Remote Update • Synchronization of Multiple Units
Local Indicators	• LCD display • LEDs
AC Input Ratings	Three-phase 208 V_{AC}, 400 V_{AC} or 480 V_{AC}

1 NO, NC and CENTER TAP are all three available on the connector

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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.

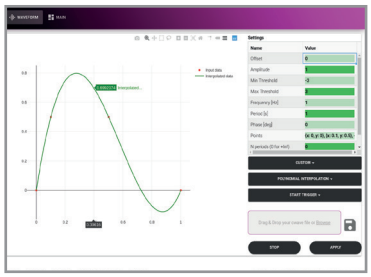
- Power Supply Systems
- Precision Current Measurements
- Beamline Electronics Instrumentation
- FMC and MicroTCA

CAEN ELS s.r.l.
SS14 km 163.5 in Area Science Park
34149 - loc. Basovizza - Trieste (TS)
Italy

Registered Office:
via Vetraia 11
55049 - Viareggio (LU)
Italy

info@caenels.com
www.caenels.com

Embedded 4-channel OSCILLOSCOPE



Embedded WAVEFORM GENERATOR

Waveform Generation

Linux OS

Embedded EPICS IOC

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