



# SY3634

## Bipolar Power Supply Heterogeneous System

High efficiency, low cost, high stability, easiness of configuration and maintenance are the key features of this new power supply (PS) system.

Especially designed to operate in particle accelerator facilities, i.e. Synchrotrons and FELs.

The system houses up to 4 independent current-controlled bipolar power supply modules.

Different combinations of up to 4 modules (chosen among 5A, 10A, 20A or 30A) can be easily installed in the same rack.

Extremely versatile and easy to “tune” to any load/magnet condition.

### Features

- Digital feedback current control loop
- Graphic color display OLED and an encoder per channel for local control
- Up to 95% DC/DC power conversion efficiency
- True bipolar zero-crossing operation
- Ethernet connectivity
- 8 (eight) independent external interlocks user-selectable
- On-module speed-regulated fans
- Internal temperature monitor circuits
- MS Windows, Linux and MAC OS
- Epics- and Tango-compatible

### Applications

- Magnet Power Supplies
- Current Waveform Generation
- Accelerator Machine Power Supplies
- Beamline Magnetic Experiments
- Nuclear Magnetic Resonance (NMR)

High efficiency, low cost, high stability, easiness of configuration and maintenance are the key features of this new power supply (PS) system, especially designed to operate in particle accelerator facilities like Synchrotrons and FELs.

The system houses up to 4 independent current-controlled bipolar power supply modules, ranging from 5A to 30A, in a single 19-inch 3U standard crate (SY3634). Different combinations of modules (chosen among a catalogue including 5A, 10A, 20A or 30A channels) can easily be installed in the same rack.

An auxiliary AC/DC converter module, the A3636 - SY3634, powers the control circuits. Each module implements a completely digital feedback control loop with a proprietary PWM generation technique: this makes the system extremely versatile and easy to “tune” to any load/magnet condition.

Modules are composed by a Control Board (CB) and a Power Board (PB) that are mechanically connected: communication between boards is almost exclusively performed by digital signals that avoid possible analog signal corruption and undesired noise pick-up.

The CB is mainly composed by a DSP that performs current control and an FPGA that supervises all processes like communications, diagnostic operations and interlocks handling.

Remote communication is guaranteed by means of an Ethernet 10/100 auto-sensing socket present on each module front panel. The PS can also be locally monitored/controlled via an encoder and a graphic color display featuring user-friendly menus.

An external DC bulk power supply feeds the PB power section and its ancillary parts. Cooling is performed

### About CAENels

CAENels is a dynamic company that provides power supplies and state-of-the-art dedicated electronic systems to the particle accelerator community - e.g. synchrotron light sources and Free Electron Laser (FEL) facilities.

- Magnet Power Supply Systems
- Beamline Electronic Instrumentation
- Precision Current Transducers
- High-Voltage Dedicated Systems

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by embedded fans, directly controlled by an output current-related hysteretic algorithm.

Software and drivers are available for different operating systems like MS Windows, Linux and Mac OS; these devices are also Epics- and Tango-compatible.

Commercially available 5A - 20V (A3605BS), 10A - 20V (A3610BS), 20A - 20V (A3620BS), 30A - 20V (A3630BS) DC/DC modules, system crate (SY3634), auxiliary power supply (A3636 - SY3634).

Technical Specifications	A3605BS	A3610BS	A3620BS	A3630BS
Output Current Range	± 5 A	± 10 A	± 20 A	± 30 A
Output Voltage Range	± 20 V	± 20 V	± 20 V	± 20 V
Maximum Output Power	100 W	200 W	400 W	600 W
Current setting Resolution	160 µA	320 µA	640 µA	950 µA
Output Current Read-Back	20 bit			
Output Voltage Read-Back	20 bit			
Output current ripple	30 ppm / FS			
Output current stability	50 ppm / FS			
DC/DC efficiency	90%	92%	94%	95%
Switching Frequency	104 kHz			
Closed Loop Bandwidth	1.5 kHz			
Accuracy	0.05%			
External Interlocks/States	8 Inputs: user-configurable "dry" contacts 3 Outputs: relay-type (2 magnetic + 1 solid-state)			
Internal Interlocks	DC Link Under-Voltage MOSFETs Over-Temperature Shunt Over-Temperature Over-Current Over-Voltage Earth Fault Current Regulation Fault / Excessive Current Ripple			
Hardware protections	Input Fuses Earth Fuse Over-Voltage			
Auxiliary ADC Read-Backs (16 bit resolution)	DC Link Voltage Ground Leakage Current MOSFETs Temperature Shunt Temperature			
Cooling	On-Module Self-Regulated Fans			
Drivers	EPICS / TANGO			
Connection	Ethernet 10/100 Mbps			
Extra-Features	Hot-Swap Point-by-Point Current Waveform Loading User-definable interlock thresholds, active levels and timings DSP and FPGA Firmware Remote Updates			
Dimensions	19" wide – 3U high Euro-mechanics rack			
Input Voltage	90/260 V(AC) (47-63 Hz) and 24 V(DC)			
Local Control / Monitor	Graphic Color Display and Encoder 6 LEDs			

### Ordering options

WSY3634XAAAA	SY3634 - Crate
WA3605BSXAAA	A3605BS - LV Digital Bipolar Current Power Supply ( 5A 20V; 100W max)
WA3610BSXAAA	A3610BS - LV Digital Bipolar Current Power Supply (10A 20V; 200W max)
WA3620BSXAAA	A3620BS - LV Digital Bipolar Current Power Supply (20A 20V; 400W max)
WA3630BSXAAA	A3630BS - LV Digital Bipolar Current Power Supply (30A 20V; 600W max)
WA3631XAAAAA	A3631 - SY3634 Bulk PS Power Cable
WA3632XAAAAA	A3632 - SY3634 SHK (Sentinel Hardware Key)
WA3633XAAAAA	A3633 - SY3634 CH & Interlock Connector
WA3636XAAAAA	A3636 - SY3634 Auxiliary Supply