

4-QUADRANT MAGNET POWER SUPPLIES

AREA OF EXPERTISE

- Power Electronics

IP STATUS

- Owned by CERN

TECHNOLOGY READINESS LEVEL

- Production level, widely used.

CERN has developed a family of 4-quadrant Magnet Power Supplies with very stringent specifications for the needs of particle accelerators such as linacs, synchrotrons, cyclotrons and particles sources.

These power supplies are controlled using the FGC control system (Function Generator Controller) developed at CERN. CERN has developed a software layer to ease FGC integration with the EPICS and TANGO frameworks. In addition, software tools for remote monitoring and performance analysis are available.

Complete manufacturing folders are available for the following five types of power supplies. They can be licensed to interested industrial partners.

- *CUTE 4-quadrant power supply rated 200W DC, $\pm 12.5A / \pm 15V$;*
- *MACAO 4-quadrant power supply rated 500W DC, up to 1.5kW in pulsed operation, $\pm 12.5A / \pm 150V$.*
- *CANCUN 4-quadrant power supply rated 1.5kW DC, up to 3kW in pulsed operation. Flexible DC output from 20A to 100A and from 30V to 75V.*
- *COMET 4-quadrant power supply rated from 30kW to 120kW. Flexible DC output from 250A to 1000A and from 120V to 240V.*
- *SIRIUS 4-quadrant power supply rated from 20kW to 80kW. For pulsed operation with energy recovery. Flexible DC output from 450A to 1800A and from 450V to 900V.*

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technology

Knowledge Transfer
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FEATURES

- Sophisticated and flexible controls using FGC controllers.
- Seamless integration with the most commonly used controls frameworks (EPICS, TANGO).
- Programmable current profile with 100 μ s resolution.
- Powerful software tools allowing remote configuration, software updates and handling of one or more power supplies.
- Designs used and maintained at CERN for a period of 20 years or more. Both hardware and software components of the controls framework are regularly upgraded and improved.
- Reliable and proven designs operating for over ten years under the demanding conditions of the CERN accelerators, including the LHC.

APPLICATIONS

- Powering any kind of conventional or superconducting magnet.

LIMITATIONS

A central timing system is needed at the level of the front-end to synchronize all power supplies with the other elements of the machine.

