Supercapacitor Power Supply Units (PSUs)

Model WE-PSU-16KA-2MW · High-Current Pulsed Power Supply for Electromagnet Applications · 16 kA @ 288V Maximum

PRODUCTION READY · 2 MW total output power · 36 MJ minimum energy storage · 18-second pulse duration · Thermal-compensated current regulation · Programmable pulse profiles · I²t monitoring and protection · 3 mΩ to 3.8 mΩ load range compatible

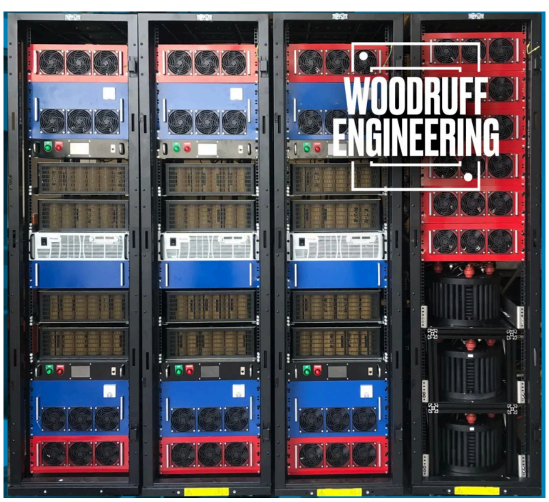
WOODRUFF ENGINEERING

Doc Ref: WE-PSU-16KA-2MW · Rev 01 · 2026-03-16

High-Current Pulsed Power Delivery for Megawatt-Scale Electromagnets

Woodruff Engineering's High-Current DC Power Supply System delivers 16 kA pulsed current output for driving 20-turn electromagnet coils generating 3 kGauss (0.3 Tesla) magnetic fields in fusion research, particle accelerator, and pulsed magnet applications requiring precisely controlled high-field pulses. Designed to supply 320 kA·turns total magnetomotive force during 18-second pulse operations, the system provides 2 MW total output power at 288 volts maximum to energize coil loads ranging from 3 mΩ (cold) to 3.8 mΩ (hot operating temperature), delivering 60.8 volts per coil at full current and maximum resistance. The robust power delivery architecture handles the demanding I²t thermal specification of 4608 kA²·seconds, managing megajoule-scale energy deposition into the electromagnet windings while maintaining precise current regulation throughout the pulse duration.

Energy Storage and Thermal-Compensated Pulse Control



The power supply incorporates 36 megajoules minimum energy storage—sufficient to sustain 2 MW continuous power delivery for the full 18-second pulse duration—implemented through high-capacitance DC link capacitor banks or active converter architectures that maintain voltage regulation as coil resistance increases from 3 mΩ (ambient) to 3.8 mΩ (80°C operating temperature). This active thermal compensation prevents current droop as the 1800 mm² copper conductor cross-section heats under the sustained 16 kA load, adjusting output voltage from 48 volts (cold coils, minimum system resistance 0.5 mΩ) to 60.8 volts per coil (hot coils, maximum load resistance 3.8 mΩ) while the total system accommodates up to 288 volts across series-connected coils and distribution cabling with combined PSU internal resistance of 0.76 mΩ maximum. Integrated pulse shaping controls provide programmable current ramps, flat-top regulation during the 18-second pulse, and controlled discharge sequences that manage the 4608 kA²·second thermal load without exceeding safe conductor temperatures or inducing mechanical shock from rapid field collapse.

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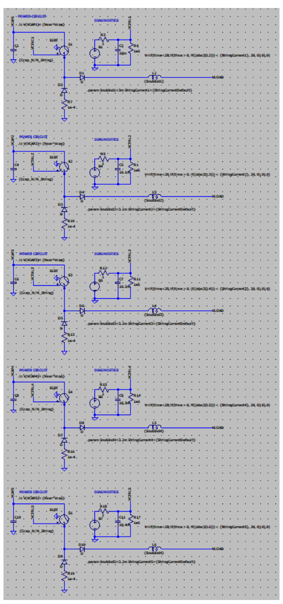
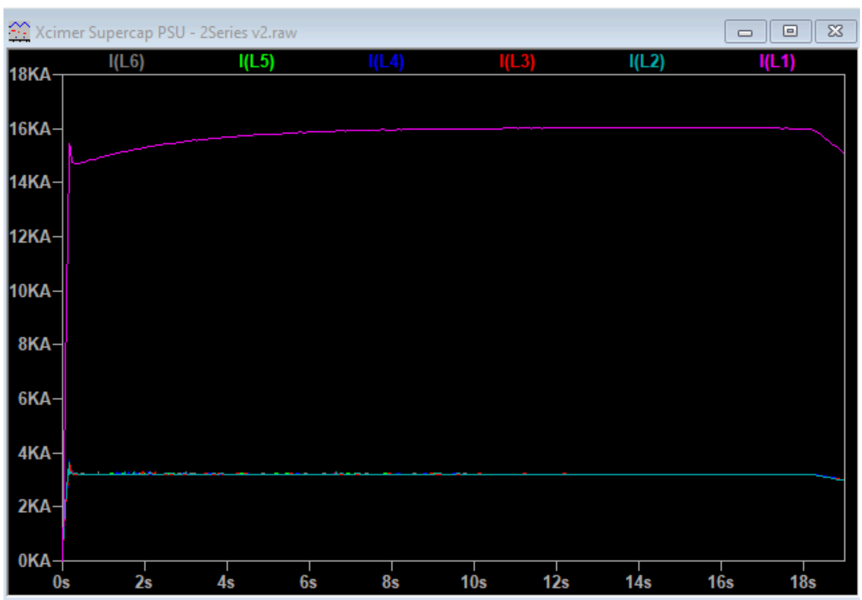
Industrial-Grade Pulsed Power Architecture with Energy Recovery

Built around a high-power DC converter topology with active current control and energy storage management, the system features water-cooled power semiconductors rated for repetitive megawatt pulses, precision current shunts for ±0.1% regulation accuracy, and comprehensive fault protection including overcurrent, overvoltage, thermal interlocks, and I^2t limit monitoring. The 36 MJ energy storage subsystem enables either pure capacitive discharge for maximum reliability or active converter-based architectures with optional energy recovery that recaptures stored magnetic energy during pulse termination, reducing facility power demand for repetitive pulsed operation cycles. Control interfaces include programmable pulse profiles (ramp rate, flat-top duration, decay characteristics), analog/digital setpoint control (0-10V, Modbus/Ethernet), and emergency fast discharge with crowbar protection, making the system suitable for fusion plasma heating systems, pulsed electromagnet research facilities, and industrial materials processing applications requiring megawatt-scale pulsed magnetic field generation with the precision, energy efficiency, and cycle-life reliability demanded by high-duty-factor pulsed power operations.

SPICE simulations of multiple coil array

- IGBT Regulation with 3.6kA Circuits - 5 Units in Parallel with output series diode required.





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ELECTRICAL OUTPUT SPECIFICATIONS

Maximum Output Current	16,000 A (16 kA) *Continuous for 18-second pulse duration*
Minimum Output Current	0 A (fully adjustable) *Programmable from 0 to maximum*
Maximum Output Voltage	288 V DC *At maximum current with hot load (3.8 mΩ)*
Minimum Output Voltage	48 V DC *At maximum current with cold load (3 mΩ)*
Maximum Output Power	2.0 MW (2000 kW) *16 kA × 125V average operating voltage*
Current Regulation Accuracy	±0.1% of setpoint *During flat-top phase of pulse*
Voltage Regulation Range	48 – 288 V DC *Automatic thermal compensation for load resistance increase*
Load Resistance Range	3.0 – 3.8 mΩ *Cold (20°C) to hot (80°C) load resistance*
Load Inductance Range	10 – 500 µH *Typical for electromagnet coil loads*
Internal PSU Resistance	0.5 – 0.76 mΩ *Bus bars, cables, semiconductors, shunts (cold to hot)*

POWER SEMICONDUCTOR ARCHITECTURE

Semiconductor Type	IGBT (Insulated Gate Bipolar Transistor)

	High-power switching devices for current regulation
IGBT Module Configuration	5 parallel circuits × 3.6 kA each *Total capacity: 18 kA (16 kA operating + 12.5% margin)*
IGBT Voltage Rating	1200 V minimum *Per module, sufficient for 288V output + switching margin*
IGBT Current Rating	3600 A per circuit *Parallel connection for 16 kA total output*
Switching Frequency	1 – 10 kHz *PWM current regulation during pulse*
Output Series Diode	Required per circuit *Prevents reverse current, ensures unidirectional flow*
Gate Drive System	Isolated fiber-optic *Individual control per IGBT circuit*
Cooling Method (IGBTs)	Water-cooled cold plates *Direct liquid cooling of IGBT modules*
Thermal Management	Active monitoring with shutdown *RTD sensors on each IGBT module*

ENERGY STORAGE SYSTEM (SUPERCAPACITORS)

Total Energy Storage	36 MJ minimum *Sufficient for 2 MW × 18 seconds*
Capacitor Technology	Supercapacitor (EDLC) banks *Electric Double-Layer Capacitors for high energy density*
Capacitor Voltage Rating	600 – 800 V DC

	Per bank, series/parallel configuration
Total Capacitance	~300 – 400 F *At operating voltage (calculated from $E = \frac{1}{2}CV^2$)*
Number of Capacitor Banks	3 banks (shown in images) *Modular configuration for redundancy and serviceability*
Charge Time	5 – 15 minutes *From grid supply to full voltage (application dependent)*
Discharge Time	18 seconds (pulse duration) *Regulated discharge through IGBT control*
Voltage Droop During Pulse	Compensated by IGBT control *Thermal compensation maintains constant current output*
Cycle Life	>100,000 charge/discharge cycles *Supercapacitor technology rated for high cycle count*
Self-Discharge Rate	<5% per day *Minimal energy loss when not in use*

PULSE SPECIFICATIONS

Pulse Duration	18 seconds (standard) *Programmable from 1 to 60 seconds*
I^2t Rating	4608 $kA^2 \cdot s$ *16^2 kA × 18 sec = thermal load capability*
Pulse Profile	Programmable ramp/flat/ramp *Ramp-up, flat-top, ramp-down configurable*
Ramp-Up Time	0.5 – 10 seconds

	Programmable current rise time
Flat-Top Duration	1 – 18 seconds *Constant current phase at full output*
Ramp-Down Time	0.5 – 10 seconds *Controlled current decay to zero*
Repetition Rate	1 – 10 pulses per hour *Depends on capacitor recharge time and thermal management*
Duty Cycle	≤50% typical *Ratio of pulse time to total cycle time*
Inter-Pulse Delay	5 – 60 minutes *Time between pulses for capacitor recharge and cooling*

CONTROL & REGULATION SYSTEM

Control Architecture	PLC-based multi-channel controller *Industrial programmable logic controller*
Current Measurement	Precision current shunts *Hall effect or resistive shunts, isolated feedback*
Voltage Measurement	Isolated voltage transducers *Real-time output voltage monitoring*
Control Loop Type	Closed-loop PID regulation *Maintains constant current despite load resistance changes*
Setpoint Input	Analog (0-10V) or Digital *External current setpoint from facility control system*
Communication Interface	Ethernet / Modbus TCP

	Remote monitoring and control capability
Optional EPICS Support	Available *For fusion facility / accelerator integration*
Local HMI	7-10 inch touchscreen *Local operator interface with pulse programming*
Data Logging	Internal storage *Current, voltage, temperature, fault events*
Thermal Compensation	Active voltage adjustment *Maintains 16 kA as load heats from 3 mΩ to 3.8 mΩ*

PROTECTION & SAFETY SYSTEMS

Overcurrent Protection	Hardware limit at 18 kA *Immediate shutdown above 112.5% of rated current*
Overvoltage Protection	320 V maximum *Prevents damage to semiconductors and load*
I^2t Monitoring	Real-time accumulator *Automatic pulse termination at 5000 $kA^2 \cdot s$ limit*
IGBT Overtemperature	Shutdown at 85°C junction temp *Individual monitoring per module*
Capacitor Bank Monitoring	Voltage & temperature per bank *Fault detection and isolation*
Ground Fault Detection	Isolated output monitoring *Detects leakage current to ground*
Emergency Crowbar	Fast discharge circuit

	Dumps capacitor energy in fault condition
External Interlocks	Dry contact inputs *Facility-provided safety interlocks*
Water Flow Interlock	Cooling system monitoring *Shutdown on low flow or high temperature*
Arc Detection	Optional *High-speed shutdown on load arcing*

COOLING SYSTEM (POWER SUPPLY UNIT)

Cooling Method	Recirculating water cooling *Closed-loop or facility chilled water connection*
Cooled Components	IGBT modules, bus bars, shunts *All high-current power components*
Total Water Flow Required	40 – 80 L/min *Depends on duty cycle and ambient temperature*
Inlet Water Temperature	15 – 25°C *Facility chilled water supply*
Maximum Temperature Rise	15°C ΔT *Across cooling circuit at 2 MW output*
Water Pressure Required	40 – 80 PSI (2.7 – 5.5 bar) *Sufficient for flow through cold plates*
Water Quality	Filtered, <100 μS/cm conductivity *Deionized or distilled water preferred*
Flow Monitoring	Flow switches on each circuit

	Automatic shutdown on low flow
Coolant Connections	Quick-disconnect fittings *Industrial standard (Stäubli or Hansen)*
Heat Rejection	~100 kW average *PSU losses at 95% efficiency during pulse*

INPUT POWER REQUIREMENTS

Input Voltage	208 or 480 VAC, 3-phase *Factory configurable for site voltage*
Input Frequency	50 or 60 Hz *Auto-sensing*
Charging Power	50 – 200 kW *To recharge 36 MJ in 5-15 minutes*
Power Factor	>0.95 *Active PFC during capacitor charging*
Input Current (480 VAC)	~150 A during charge cycle *At 200 kW charging power*
Recommended Circuit Breaker	200 A, 3-pole *480 VAC service*
Harmonic Distortion (THD)	<5% *IEEE 519 compliant*

MECHANICAL SPECIFICATIONS (POWER SUPPLY UNIT)

Configuration	4-rack modular system

	3 capacitor racks + 1 control/power rack (as shown in images)
Overall Dimensions	~2400mm (W) × 800mm (D) × 2000mm (H) *Four 19-inch equipment racks side-by-side*
Individual Rack Size	600mm (W) × 800mm (D) × 2000mm (H) *Standard 19-inch rack dimensions*
Total Weight	~2000 – 2500 kg *Including capacitors, IGBTs, cooling, and control systems*
Rack Construction	Welded steel frame *Powder-coated finish*
Mounting	Floor-standing *Requires level concrete floor*
Floor Loading	~400 kg/m² *Distributed load on standard industrial floor*
Access Requirements	Front & rear access *Minimum 1 meter clearance for service*
Output Terminals	Water-cooled bus bars *M12 bolted connections for load cables*
Lifting Points	Integrated on each rack *For forklift or overhead crane installation*

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	10 – 35°C ambient *Climate-controlled indoor installation*
Storage Temperature	-10 – 50°C

	Non-condensing
Humidity	20 – 80% RH non-condensing *Indoor installation required*
Altitude	≤2000 meters *Derate 1% per 100m above 2000m*
Pollution Degree	Pollution Degree 2 (IEC 60664) *Typical indoor industrial environment*
Cooling Water Ambient	15 – 25°C inlet *Facility chilled water preferred*
Installation Location	Indoor only *Protected from weather and direct sunlight*
Noise Level	<75 dB(A) @ 1 meter *During pulse operation (IGBT switching, fans)*

PERFORMANCE & EFFICIENCY

Round-Trip Efficiency	90 – 95% *Grid input to load output (including charge/discharge losses)*
IGBT Switching Losses	~2 – 3% *Per pulse at 2 MW output*
Conduction Losses	~2 – 3% *Bus bars, cables, shunts, contacts*
Capacitor ESR Losses	~1 – 2% *Equivalent Series Resistance during discharge*
Current Ripple	<2% RMS

	PWM switching ripple at output
Output Rise Time	<1 second to 90% current *Limited by L/R time constant and control ramp*
Output Fall Time	<1 second to 10% current *Controlled ramp-down or fast dump*
Regulation Response Time	<10 milliseconds *Closed-loop PID response to load changes*

KEY FEATURES

Supercapacitor Energy Storage: 36 MJ stored in high-energy-density electric double-layer capacitor (EDLC) banks provides 18 seconds of 2 MW pulse delivery without requiring continuous grid connection during pulse. Eliminates need for motor-generator sets or utility-scale grid connections for pulsed operation.

Parallel IGBT Architecture: Five parallel 3.6 kA IGBT circuits with series output diodes provide 16 kA regulated output with 12.5% current margin and N-1 redundancy capability. Modular design allows individual circuit servicing without complete system shutdown.

Thermal Compensation: Active voltage regulation automatically adjusts from 48V (cold load, 3 mΩ) to 288V (hot load, 3.8 mΩ) to maintain constant 16 kA current throughout 18-second pulse as electromagnet coil resistance increases from 20°C to 80°C operating temperature.

Programmable Pulse Shaping: Configurable ramp-up, flat-top, and ramp-down profiles minimize mechanical shock on electromagnet structures during field energization and de-energization. Prevents acoustic noise and structural fatigue from rapid current changes.

I^2t Monitoring and Protection: Real-time accumulation of thermal load (I^2t = 4608 $kA^2 \cdot s$ rating) with automatic pulse termination prevents conductor overheating and insulation damage. Ensures safe operation within electromagnet thermal limits across varying duty cycles.

Modular Four-Rack Configuration: Three capacitor banks plus one integrated control/IGBT rack simplifies installation, allows phased deployment, and enables individual rack servicing. Standard 19-inch rack format fits existing facility infrastructure and simplifies transport.

HIGH-CURRENT PULSED POWER SUPPLIES — Product Variants

Megawatt to Gigawatt-Scale Electromagnet Power Delivery • 18-Second Pulse Architecture • Thermal-Compensated Current Regulation

MODEL	MAX CURRENT	MAX VOLTAGE	MAX POWER	ENERGY STORAGE	PULSE DURATION	I²t RATING	TYPICAL APPLICATIONS	LEADTIME
WE-PSU-008KA-0.5MW	8 kA	144 V	0.5 MW	9 MJ	18 sec	1.15 MA²·s	Lab electromagnets Small research magnets Benchtop systems	12 wks
WE-PSU-016KA-2MW ⭐	16 kA	288 V	2 MW	36 MJ	18 sec	4.61 MA²·s	Fusion diagnostics0.3T field generation Particle accelerators	14 wks
WE-PSU-025KA-5MW	25 kA	450 V	5 MW	90 MJ	18 sec	11.25 MA²·s	Mid-scale tokamak coils Material processing Pulsed field research	16 wks
WE-PSU-032KA-8MW	32 kA	576 V	8 MW	144 MJ	18 sec	18.43 MA²·s	Large research magnets NBI power systems Fusion auxiliary heating	18 wks
WE-PSU-050KA-20MW	50 kA	900 V	20 MW	360 MJ	18 sec	45 MA²·s	Tokamak poloidal field Magnet quench protection Pulsed field facilities	20 wks
WE-PSU-080KA-50MW	80 kA	1440 V	50 MW	900 MJ	18 sec	115 MA²·s	PF systems Large magnet facilities Fusion plasma control	24 wks
WE-PSU-100KA-80MW	100 kA	1800 V	80 MW	1.44 GJ	18 sec	180 MA²·s	Major tokamak coils Pulsed superconductors High-field research	28 wks
WE-PSU-150KA-180MW	150 kA	2700 V	180 MW	3.24 GJ	18 sec	405 MA²·s	ITER-class PF coils Central solenoid drivers Major facility upgrades	32 wks
WE-PSU-200KA-320MW	200 kA	3600 V	320 MW	5.76 GJ	18 sec	720 MA²·s	ITER central solenoidMega-ampere facilitiesFusion pilot plants	36 wks
WE-PSU-250KA-500MW	250 kA	4500 V	500 MW	9.0 GJ	18 sec	1.13 GA²·s	Commercial tokamak PFExtreme pulsed magnetsNational lab facilities	40 wks

⭐ *WE-PSU-016KA-2MW: Reference design — 16 kA validated architecture, 36 MJ energy storage*

Scaling Architecture Principles:

• Current Scaling: 8 kA (0.5 MW benchtop) to 1 MA (8 GW commercial fusion reactor scale)• Power Scaling: Power ∝ I² assuming similar load resistance across variants (P = I² × R_load)• Voltage Scaling: Voltage ∝ I for constant resistance loads (V = I × R_total)• Energy Storage: E = P × t, scales with I² for 18-second pulse duration• I²t Rating: Thermal load metric for conductor and insulation design, scales as I² × 18 seconds• Load Resistance Range: All variants designed for 3-3.8 mΩ typical coil loads (cold to hot)• Pulse Duration: 18 seconds standard; custom pulse profiles available (1-60 seconds)• Thermal Compensation: All variants include active voltage adjustment for load resistance increase during pulse

Common Features Across All Variants:

• Thermal-Compensated Current Regulation: Active voltage adjustment maintains constant current as load heats (3 mΩ → 3.8 mΩ)• Programmable Pulse Profiles: Configurable ramp-up, flat-top, and ramp-down sequences• I²t Monitoring and Protection: Real-time thermal load tracking with automatic pulse termination on limit• Energy Storage Management: Capacitor banks (small systems) or active converters with grid tie (large systems)• Precision Current Regulation: ±0.1% stability during flat-top phase of 18-second pulse• Water-Cooled Power Semiconductors: IGBTs or thyristors rated for repetitive megawatt pulses• Fault Protection: Overcurrent, overvoltage, overtemperature, ground fault, emergency crowbar• Control Interfaces: Analog setpoint (0-10V), digital control (Modbus/Ethernet), EPICS-compatible• Optional Energy Recovery: Regenerative discharge captures magnetic energy for multi-pulse efficiency• Modular Architecture: Parallel converter modules for redundancy and scalability

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Application Segmentation by Scale:

SMALL-SCALE SYSTEMS (8-32 kA): Research Laboratory Applications

Power range 0.5-8 MW suitable for university research magnets, diagnostic systems, and benchtop pulsed field facilities. Compact energy storage (9-144 MJ) enables building-integrated installations without dedicated power substations. Lead times 12-18 weeks reflect component-level assembly from catalog semiconductors and capacitor banks.

MID-SCALE SYSTEMS (50-100 kA): Tokamak Poloidal Field and Research Facilities

Power range 20-80 MW designed for DIII-D-class poloidal field coils, pulsed superconducting magnet facilities, and fusion plasma control systems. Energy storage (360 MJ - 1.44 GJ) requires dedicated converter buildings or outdoor capacitor yards. Active converter architectures with grid synchronization become cost-effective at this scale.

LARGE-SCALE SYSTEMS (150-300 kA): ITER-Class Central Solenoid and Major Facilities

Power range 180-720 MW for ITER central solenoid, DEMO program tokamaks, and fusion pilot plant startup systems. Energy storage (3.24-13 GJ) requires utility-scale grid connections (69-138 kV) with dedicated substations. Lead times 32-48 weeks include extensive factory acceptance testing, grid impact studies, and staged commissioning.

Energy Storage Architecture by Scale:

• Small Systems (<50 MW): Capacitor banks (DC link or thyristor-switched), self-contained installations• Mid Systems (50-200 MW): Hybrid capacitor/active converter, 13-69 kV grid connection, building-integrated• Large Systems (200-800 MW): Grid-tied active converters, 138-230 kV utility connection, outdoor switchyard• Mega Systems (0.8-3 GW): Distributed converter farms, flywheel-generator sets, multi-point grid tie• Ultra Systems (5-8 GW): National-scale infrastructure, dedicated substations, regulatory coordinationEnergy recovery (regenerative discharge) recommended for systems >100 MW with repetitive pulse requirements.

Grid Impact and Facility Requirements:

• <20 MW: Standard industrial service (480-4160 VAC), building-integrated• 20-100 MW: Dedicated feeder (13.8 kV), power factor correction, harmonic filtering• 100-500 MW: Utility substation (69-138 kV), grid impact study, utility coordination agreement• 500 MW-2 GW: Transmission-level connection (138-230 kV), NERC compliance, spinning reserve coordination• 2-8 GW: Regional transmission tie, ISO coordination, multi-year planning and approval processAll systems >100 MW include power quality management (active/reactive compensation, voltage sag mitigation).

HIGH-CURRENT PULSED POWER SUPPLIES

Technical Specification Form

Please complete all sections below. This information will be used to prepare a detailed quotation and ensure the system meets your requirements. If you have questions about any specification, contact us at **sales@woodruffeng.com**

CUSTOMER INFORMATION

Organization / Institution	
Contact Name	
Email Address	
Phone Number	
Shipping Address	

CURRENT AND POWER REQUIREMENTS

Maximum Output Current		*kA*	*(Typical range: 8 kA to 1000 kA)*
Maximum Output Voltage		*V or kV*	
Maximum Output Power		*MW or GW*	*(Power = Current × Voltage)*

Current Regulation Accuracy Required

- ☐ ±0.1% (standard)
- ☐ ±0.05% (high precision)
- ☐ ±0.5% (relaxed)
- ☐ Other: _______%

PULSE SPECIFICATIONS

Pulse Duration		*seconds (Standard: 18 seconds, range: 1-60 seconds)*
I²t Rating Required		*MA²·s or GA²·s (I²t = Current² × Duration)*
Duty Cycle		*% (% time energized over complete cycle)*
Pulse Repetition Rate		*pulses per hour (For repetitive pulsed operation)*

Pulse Profile Requirements

☐ Simple ramp up / flat-top / ramp down

☐ Programmable arbitrary waveform

☐ Multi-step profile (specify below)

Ramp-up time: ___________ sec Flat-top duration: ___________ sec Ramp-down time: ___________ sec

LOAD CHARACTERISTICS

Load Type		*(e.g., electromagnet coil, tokamak PF, central solenoid)*
Load Resistance (Cold)		*mΩ or Ω (Resistance at room temperature)*
Load Resistance (Hot)		*mΩ or Ω (Resistance at operating temperature)*
Load Inductance (if known)		*mH or H*
Number of Coils in Series		*(For multi-coil loads)*

Thermal Compensation Required

☐ Yes — maintain constant current as load resistance increases

☐ No — constant voltage operation acceptable

ENERGY STORAGE ARCHITECTURE

Total Energy Storage Required ____________ *MJ (Energy = Power × Pulse Duration)*

Energy Storage Type Preference

☐ Capacitor banks (for smaller systems <100 MW)

☐ Active converters with grid tie (for larger systems)

☐ Flywheel-generator sets

☐ Hybrid approach (capacitor + active converter)

☐ Woodruff Engineering recommendation

Energy Recovery

☐ Not required (single-shot or low repetition rate)

☐ Required — regenerative discharge to grid or storage

☐ Optional — quote both configurations

COOLING REQUIREMENTS

Cooling Method

☐ Air-cooled (for smaller systems <5 MW)

☐ Water-cooled (standard for >5 MW)

☐ Facility chilled water connection available

If water-cooled: Available flow rate: __________ L/min Inlet temperature: __________ °C
Pressure: __________ PSI

FACILITY POWER AND GRID CONNECTION

Available Input Voltage		*V or kV (e.g., 480 VAC, 13.8 kV, 138 kV)*
Available Input Power		*MW or GW (Continuous available from grid)*
Utility Connection Point		*(e.g., building service, dedicated feeder, substation)*

Grid Impact Considerations

☐ Voltage sag mitigation required

☐ Power factor correction required

☐ Harmonic filtering required

☐ Utility coordination required (>100 MW systems)

CONTROL AND MONITORING

Control Interface

☐ Analog setpoint (0-10 V or 4-20 mA)

☐ Digital control (Modbus/Ethernet)

☐ EPICS-compatible (for fusion/accelerator facilities)

☐ Custom SCADA integration

Monitoring and Data Logging

☐ Real-time current/voltage/power display

☐ I^2t accumulator with automatic shutdown

☐ Temperature monitoring (semiconductors, bus bars)

☐ Event logging and fault diagnostics

☐ Remote monitoring via web interface

Safety Interlocks and Protection

☐ Overcurrent protection

☐ Overvoltage protection

☐ Overtemperature shutdown

☐ Ground fault detection

☐ Emergency crowbar discharge

☐ External interlock inputs (facility-provided)

INSTALLATION AND ENVIRONMENTAL

Installation Location

☐ Indoor (climate-controlled building)

☐ Outdoor (weather-protected enclosure required)

☐ Outdoor switchyard (utility-grade equipment)

Available Floor Space		*m²*	*(For converter/capacitor layout)*
Floor Loading Capacity		*kg/m²*	*(For heavy equipment installation)*
Ambient Temperature Range		*°C to ________ °C*	

Cable Run from PSU to Load

Distance from PSU to load		*meters*	*(Affects cable sizing and voltage drop)*

SCHEDULE AND BUDGET

Target Delivery Date		*(Typical lead times: 12–96 weeks depending on scale)*
Target Commissioning Date		*(Installation + testing + commissioning)*
Budget Range (optional)		*$ ________ to $ ________*

Project Funding Status

☐ Funded — ready to proceed ☐ Budget estimate needed for funding approval ☐ Exploring feasibility

SPECIAL REQUIREMENTS AND NOTES

Testing and Documentation

☐ Factory Acceptance Testing (FAT) required

☐ Site Acceptance Testing (SAT) required

☐ Full test reports and certification required

☐ As-built drawings and operation manuals required

Installation and Commissioning Support

☐ Woodruff Engineering installation supervision required

☐ Woodruff Engineering commissioning support required

☐ Operator training required

☐ Customer self-installation (documentation only)

Additional Requirements or Notes:

SUBMISSION

Please email this completed form to: sales@woodruffeng.com We will review your specifications and provide a detailed quotation within 5–10 business days.