# Technical Data

## Technical Characteristics

### Output Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output power</td>
<td>20kW</td>
</tr>
<tr>
<td>Output voltage</td>
<td>0V to -1200V (voltage for nominal pulse and DC-mode)</td>
</tr>
<tr>
<td>Output Current</td>
<td>2000A (pulse peak) maximum. 50A average current for &lt;500V.</td>
</tr>
<tr>
<td>Pulse frequency</td>
<td>1kHz at 1000/1200V, 2000A, with lower energy pulses the frequency can be increased (10kW max at 2kHz), (can be extended optional).</td>
</tr>
<tr>
<td>Regulation</td>
<td>Voltage / Power / Current</td>
</tr>
<tr>
<td>Pulse width</td>
<td>5μs to 1000μs or DC (can be extended up to 5ms, optional)</td>
</tr>
<tr>
<td>Duty cycle</td>
<td>&lt;50% or DC 100%.</td>
</tr>
<tr>
<td>Arc detection / handling</td>
<td>&lt;3us.</td>
</tr>
<tr>
<td>Current arc trip level (absolute)</td>
<td>Adjustable 10A to 2200A.</td>
</tr>
<tr>
<td>dI/dt arc trip level (Delta in %)</td>
<td>5% (less restrictive) to 95% (more restrictive).</td>
</tr>
<tr>
<td>Voltage stability</td>
<td>±2.5%.</td>
</tr>
<tr>
<td>Voltage ripple</td>
<td>&lt;5% rms.</td>
</tr>
</tbody>
</table>

### Output Average Characteristic

![HiPIMS 20kW average characteristic](image-url)
20KW HiPIMS-Power Supply hiP-V

**Technical Data**

**Projected Applications**

HiPIMS, Uni-Polar / Bi-Polar (optional)
DC magnetron sputtering
DC-pulse magnetron sputtering
DC Bias
DC-pulse Bias
HiPIMS Bias- DC
HiPIMS Bias DC-pulse Uni-Polar / Bi-Polar (optional)
hiPlus (variable Positive Voltage Reversal, optional)
Master/Slave and Bias synchronization operations possible

**Input Line**

Nominal voltage : 400Vac 3ph ±10% (no neutral required)
Input nominal current : <40A
Dielectric strength : 2500V, 50Hz, 1 minute

**Adjustable positive Voltage**

Pulse voltage : 50V to 400V regulated, or no pulse -> Upp
Pulse current : 50Amp max
Pulse length : 5us to 50us -> ton
Delay: 5us to 50us (from end of negative pulse to start positive pulse)
Power : 1kw at 1kHz,

**Cooling Data (Air & Water)**

Force ventilated air cooling : Front - air inlet, rear - air outlet
Water cooling : 15 litres/minute
Interface Data

USB connection : Standard USB cable type B
Profibus : Optional
EtherCAT : Optional
Ethernet : Optional

Output Connection Data

Power connection M6 screws.
Cable type Triax cable recommended, coaxial, or twisted screen cable.

Input Connection Data

Input connection : 3-phase wires 10mm² cross-section
Protection earth: 10mm² cross-section
connection type
Internal main : 40A circuit breaker
Interlock : 24Vdc (required for operation)

Environmental Conditions

Ambient temperature: : 0°C to 40°C
Temperature inside the box : 0°C to 70°C
Humidity: : up to 90% (the equipment is designed with creepagedistances as per EN-61010-1)
Maximum Height: : 1200m
Protection : IP20

Not protected for water ingress. Protected against ingress of parts bigger than 12mm.
It is intended for indoor use.
Acoustic Noise

The equipment will produce an acoustic noise lower than 60dBA measured at 1 meter distance.

Case

The unit is contained in a 19” rack module, 742mm deep and 10U high (444mm approx.)

The weight is 96kg.

The protection is IP20. It is not protected for water ingress; it is protected against ingress of parts bigger than 12mm. It is intended for indoor use in a laboratory.

The case is forced ventilated; the air ingress is done by the front side and the exhaust by the rear side.

The semiconductors are water-cooled.

See DRW. P-004706.

Adjustable positive Voltage (not yet released, exp. July 20)

- Pulse voltage: 50V to 400V regulated, or no pulse -> Upp
- Pulse current: 50Amp max
- Pulse length: 5us to 50us -> ton
- Delay: 5us to 50us (from end of negative pulse to start positive pulse)
- Power: 1kw at 1kHz
REFERENCE STANDARDS

The 20kW pulsed power supply described in this document is fully compliant, but not only, with the following railway standards:

EN 61000-3-12-2006 Electromagnetic compatibility (EMC) part 3-12: limits for harmonic currents produced by equipment connected to public low-voltage systems with input current greater than 16 a and equal to or less than 75 a per phase

EN 61010-1:2002 Safety requirements for electrical equipment for measurement, control, and laboratory use -- Part 1: General requirements

MIL STD 217 Reliability Prediction of Electronic Equipment

EN 61204-3-2002 Low voltage power supplies, d.c. output -- Part 3: Electromagnetic compatibility (EMC).

EN 61000-6-3-2006 Electromagnetic compatibility (EMC). Generic standards. Emission standard for residential, commercial and light industrial Environments

EN 61000-6-2-2006 Electromagnetic compatibility (EMC) -- Part 6-2: Generic standards - Immunity for industrial environments