Capacitor charging power supplies
Series HCK from 2 kV to 65 kV / 100 J/s to 20 kJ/s

Features:
- Efficiency approx. 90%
- In units of 20kV and higher, the HV-components are moulded in (removable) silicon resin. From 35kV / 5000 J/s on, the HV-components are isolated in oil
- Continuous charging or triggered charging selectable (external trigger input via opto coupler for 12 - 24V)
- Charging with adjustable constant current (without overshoot)
- Voltage and current setting by 10-turn potentiometers with precision scale; the adjusting knob can be locked
- Suitable for capacitive loads with resistive elements
- The nominal current can be permanently supplied at maximum output voltage

Function:
The capacitor charging high voltage DC power supplies are designed specifically to the requirements of capacitor charging or capacitor conditioning, i.e. they have a more heavily designed output resistor to withstand a pulsed load and a regulating circuit, optimized for fast switching over between current and voltage regulation and vice versa.

In principle, the rectified line voltage drives a square wave generator of fixed frequency, whose AC voltage is transformed, rectified and filtered, producing the output voltage.

For regulation, the square wave voltage is pulse width modulated, via front panel LED and a potential-free interface for signalling to an external control system (opto coupler output).

The capacitors are charged in line with the rated voltage. For charging between "0" and the rated voltage, the partially charged capacitor is considerably higher charging power, up to the doubles, can be supplied.

Charging power:
The specified max. charging power (see table) will be supplied for charging between "0" and the rated voltage. For charging of a partially discharged capacitor a considerably higher charging power, up to the doubles, can be supplied.

Setting resolution:
±1 x 10^-4

Reproducibility of the charging voltage with respect to the rated value:
<±1 x 10^-4 over 6 hours under constant conditions;
<±1 x 10^-3 within the temperature range:
<±2 x 10^-4 /K for a repetition frequency of <10Hz;
<±1 x 10^-3 for a repetition frequency of >10Hz:
<±1 x 10^-2

Repetition frequency:
max. 100Hz

Residual ripple of the charging current:
approx. 10%pp (20kHz / 40 kHz)

Possible Options:
- Analogue programming (see page 52)
- Analogue programming, floating (see page 52)
- Computer interface - IEEE 488, RS 232, RS 422, Profibus DP, USB, LAN (more on request) (see page 54)
- Polarity reversal switch available up to 1600 J/s (by request for higher powers)

The polarity is positive or negative and has to be indicated with the order.

The "0V" - terminal of the output is connected to earth but may be disconnected as needed. When disconnected, the "0V" (earthy) terminal may float with respect to earth up to ±300V.

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Technical Data:
- Mains connection: 230V ±10% 47Hz to 63Hz; for nominal power 1600 J/s and higher: 400V ±10% 47Hz to 63Hz 3-phase
- Ambient temperature: 0°C to +40°C
- Setting range for the charging voltage: from approx. 1% to 100%
- Output isolation: The polarity is positive or negative and has to be indicated with the order.
- Output terminals: For all HCK units the output is on the rear side of the unit or on a separate HV-container. Mating HV-connectors are included, from 35kV on assembled with 3 m cable, from 65kV >5000 J/s on with 10 m cable.
- Polarity reversal switch available up to 1600 J/s (by request for higher powers)
- Please specify the output polarity, when ordering without polarity reversal switch. (see page 56)
- Dump switch for the output & the load
- Higher repetition frequency
- Built-in or external discharge circuit for pulse operation
- Higher stability and better reproducibility (see page 56)
- Roller blades for cabinet units

More options and special solutions on request. Some options may involve changes to the description of the unit - especially concerning the mechanical design.

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Design example

HCK 200 - 12500
12500V / 30 mA

Design
Up to 2500 J/s nominal power 19" table-top case, higher power in 19" cabinets (depending on type) with oil isolated external HV-container.
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3) Three phase mains connection
All units are available with polarity reversal switch. For orders without polarity switch please state the required output polarity.

Mating high voltage connectors (from 35kV complete with 3m cable, from 65kV >5000J/s with 10m cable) are included in the scope of delivery.
Mating high voltage cables you’ll find beginning with page 59.

Capacitor chargers with different from the type range voltage or power are available on request.
## Capacitor charging power supplies

**Series HCK from 2 kV to 65 kV / 100 J/s to 20 kJ/s**

### Design examples

- **HCK 150000M - 12000**
  - 12kV / to 35 A
  - customer specific design,
  - 4-fould 19" cabinet, cubical

- **HCK 6750M - 30000**
  - (Side cover removed)
  - 30kV / 450 mA
  - (650mA up to 15kV)

- **HCK 5000 - 12500**
  - 12.5kV / 800 mA

### Capacitor charging power supplies

#### Series HCK from 2 kV to 65 kV / 100 J/s to 20 kJ/s

<table>
<thead>
<tr>
<th>Type</th>
<th>Voltage</th>
<th>Current</th>
<th>Charg. pow.</th>
<th>Width</th>
<th>Height</th>
<th>Depth</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCK 100</td>
<td>20000 V</td>
<td>0 - 10 mA</td>
<td>100 J/s</td>
<td>19&quot; / 443 mm</td>
<td>3 U / 133 mm</td>
<td>350 mm</td>
<td>6 kg</td>
</tr>
<tr>
<td>HCK 200</td>
<td>20000 V</td>
<td>0 - 20 mA</td>
<td>200 J/s</td>
<td>19&quot; / 443 mm</td>
<td>3 U / 133 mm</td>
<td>350 mm</td>
<td>9 kg</td>
</tr>
<tr>
<td>HCK 400</td>
<td>20000 V</td>
<td>0 - 40 mA</td>
<td>400 J/s</td>
<td>19&quot; / 433 mm</td>
<td>4 U / 177 mm</td>
<td>550 mm</td>
<td>14 kg</td>
</tr>
<tr>
<td>HCK 800</td>
<td>20000 V</td>
<td>0 - 80 mA</td>
<td>800 J/s</td>
<td>19&quot; / 443 mm</td>
<td>5 U / 221 mm</td>
<td>550 mm</td>
<td>25 kg</td>
</tr>
<tr>
<td>HCK 1600</td>
<td>20000 V</td>
<td>0 - 160 mA</td>
<td>1600 J/s</td>
<td>19&quot; / 443 mm</td>
<td>5 U / 221 mm</td>
<td>550 mm</td>
<td>35 kg</td>
</tr>
<tr>
<td>HCK 2500</td>
<td>20000 V</td>
<td>0 - 250 mA</td>
<td>2500 J/s</td>
<td>19&quot; / 443 mm</td>
<td>7 U / 310 mm</td>
<td>550 mm</td>
<td>40 kg</td>
</tr>
<tr>
<td>HCK 5000</td>
<td>20000 V</td>
<td>0 - 500 mA</td>
<td>5000 J/s</td>
<td>19&quot; / 600 mm</td>
<td>29 U / 1500 mm</td>
<td>600 mm</td>
<td>120 kg</td>
</tr>
<tr>
<td>HCK 10000</td>
<td>20000 V</td>
<td>0 - 1 A</td>
<td>10000 J/s</td>
<td>19&quot; / 600 mm</td>
<td>38 U / 2000 mm</td>
<td>800 mm</td>
<td>240 kg</td>
</tr>
<tr>
<td>HCK 20000</td>
<td>20000 V</td>
<td>0 - 2 A</td>
<td>20000 J/s</td>
<td>19&quot; / 600 mm</td>
<td>38 U / 2000 mm</td>
<td>800 mm</td>
<td>240 kg</td>
</tr>
<tr>
<td>HCK 100</td>
<td>35000 V</td>
<td>0 - 5 mA</td>
<td>100 J/s</td>
<td>19&quot; / 443 mm</td>
<td>3 U / 133 mm</td>
<td>450 mm</td>
<td>12 kg</td>
</tr>
<tr>
<td>HCK 200</td>
<td>35000 V</td>
<td>0 - 10 mA</td>
<td>200 J/s</td>
<td>19&quot; / 443 mm</td>
<td>3 U / 133 mm</td>
<td>450 mm</td>
<td>12 kg</td>
</tr>
<tr>
<td>HCK 400</td>
<td>35000 V</td>
<td>0 - 20 mA</td>
<td>400 J/s</td>
<td>19&quot; / 433 mm</td>
<td>3 U / 133 mm</td>
<td>550 mm</td>
<td>30 kg</td>
</tr>
<tr>
<td>HCK 800</td>
<td>35000 V</td>
<td>0 - 40 mA</td>
<td>800 J/s</td>
<td>19&quot; / 443 mm</td>
<td>4 U / 177 mm</td>
<td>550 mm</td>
<td>50 kg</td>
</tr>
<tr>
<td>HCK 1600</td>
<td>35000 V</td>
<td>0 - 80 mA</td>
<td>1600 J/s</td>
<td>19&quot; / 443 mm</td>
<td>5 U / 221 mm</td>
<td>550 mm</td>
<td>50 kg</td>
</tr>
<tr>
<td>HCK 2500</td>
<td>35000 V</td>
<td>0 - 140 mA</td>
<td>2500 J/s</td>
<td>19&quot; / 443 mm</td>
<td>7 U / 310 mm</td>
<td>550 mm</td>
<td>50 kg</td>
</tr>
<tr>
<td>HCK 5000</td>
<td>35000 V</td>
<td>0 - 280 mA</td>
<td>5000 J/s</td>
<td>19&quot; / 600 mm</td>
<td>38 U / 2000 mm</td>
<td>800 mm</td>
<td>390 kg</td>
</tr>
<tr>
<td>HCK 10000</td>
<td>35000 V</td>
<td>0 - 570 mA</td>
<td>10000 J/s</td>
<td>19&quot; / 600 mm</td>
<td>38 U / 2000 mm</td>
<td>800 mm</td>
<td>450 kg</td>
</tr>
<tr>
<td>HCK 20000</td>
<td>35000 V</td>
<td>0 - 1,1 A</td>
<td>20000 J/s</td>
<td>19&quot; / 1200 mm</td>
<td>38 U / 2000 mm</td>
<td>800 mm</td>
<td>720 kg</td>
</tr>
</tbody>
</table>

- **HCK 100 - 65000**
  - 0 - 3 mA | 100 J/s    | 19" / 443 mm | 5 U / 221 mm | 450 mm | 45 kg   |
| HCK 200    | 65000 V | 0 - 6 mA | 200 J/s    | 19" / 443 mm | 5 U / 221 mm | 450 mm | 50 kg   |
| HCK 400    | 65000 V | 0 - 12 mA | 400 J/s    | 19" / 433 mm | 7 U / 310 mm | 550 mm | 55 kg   |
| HCK 800    | 65000 V | 0 - 25 mA | 800 J/s    | 19" / 443 mm | 7 U / 310 mm | 550 mm | 60 kg   |
| HCK 1600   | 65000 V | 0 - 50 mA | 1600 J/s   | 19" / 443 mm | 8 U / 355 mm | 550 mm | 80 kg   |
| HCK 2500   | 65000 V | 0 - 75 mA | 2500 J/s   | 19" / 443 mm | 10 U / 443 mm | 650 mm | 120 kg  |
| HCK 5000   | 65000 V | 0 - 150 mA | 5000 J/s | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 460 kg |
| HCK 10000  | 65000 V | 0 - 300 mA | 10000 J/s | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 500 kg |
| HCK 20000  | 65000 V | 0 - 600 mA | 20000 J/s | 19" / 600 mm | 29 U / 1500 mm | 600 mm | 720 kg |

3) Three phase mains connection

All units are available with polarity reversal switch. For orders without polarity switch please state the required output polarity.

*) With polarity reversal switch these units will be 2 units higher.

**) With polarity reversal switch these units will be 550 mm deep.

***) The dimensions are valid for the power part. The high voltage part is housed in a separate oil filled container. Weight is stated: Power part / High voltage container