

High voltage power supplies, high power Series HCH from 650 V to 200 kV / to 50 kW



Features:

- Efficiency up to 90%
- Short-circuit & flashover proof
- In units up to 20kV nominal voltage the HV-components are isolated in air. From 35kV on the isolation is with oil.
- Unlimited operation with rated current in a short-circuit condition
- Unlimited operation with rated power
- Voltage and current regulation with automatic sharp transition, indicated by LEDs
- Limitation of inrush current on switching on
- Voltage and current setting by means of 10-turn potentiometers with precision scale; the adjusting knob can be locked
- Interlock loop to monitor the external load and internal loop as a standard

Function:

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.

Design:

Depending on Voltage and Power the units are built as single or double 19" cabinets, or as a oil- filled HV container with the power electronics on the top or in a separate rack.

Design example

HCH 50000 - 20000
20kV / 2,5 A

Output:

- Output isolation:
The required output polarity must be stated with the order. The requested output polarity will then be available at the HV connector and the "0V" terminal will be firmly connected to earth. If required, the "0V" terminal can be made floating against earth up to $\pm 50V$. A polarity reversal switch is optionally available.
- Output terminals:
All output terminals are located at the rear side of the cabinet or at the top of the HV container. High voltage connectors with the appropriate dielectric strength are delivered with the power supply. For nominal voltage of 65kV and higher the HV-plug will be delivered ready mounted to 10m cable.

Technical Data:

- Mains connection:
up to 1400W nominal power:
230V $\pm 10\%$ 47Hz to 63Hz
for 2800W and higher:
400V $\pm 10\%$ 47Hz to 63Hz,
three-phase
- Ambient temperature:
0°C to +40°C

The following data applies for voltage and current regulation, and refers to the rated value (unless otherwise stated):
(For explanations please refer to Definitions and Terms on page 61.)

- Setting range:
from approx. 0,1% to 100%
- Setting resolution:
 $\pm 1 \times 10^{-4}$
- Residual ripple:
 $< 2 \times 10^{-3} \text{pp} + 50 \text{mVpp}$
- Recovery time:
Voltage control:
 $< 1 \text{ms}$ for load changes from 10% to 100% or from 100% to 10%
- Current control:
 $< 10 \text{ms}$ for load changes causing an output change of less than 10% of the rated voltage
- Setting time at nominal load:
 $< 100 \text{ms}$ for changes of the output voltage from 10% to 90% or 90% to 10%
- Discharging time constant for output without load:
approx. 1sec. to 10sec., depending on type
- Deviation:
for $\pm 10\%$ mains voltage variation:
 $< \pm 1 \times 10^{-4}$
for no load / full load:
 $< 5 \times 10^{-4}$
over 8 h under constant conditions:
 $< \pm 2 \times 10^{-4}$
within the temperature range:
 $< \pm 1,5 \times 10^{-4} / K$

Possible Options:

- Analogue programming (see page 52)
- Analogue programming, floating (see page 52)
- Computer interface - IEEE 488, RS 232, RS 422, Profibus DP (more on request) (see page 52)
- Polarity reversal switch. Please specify the output polarity, when ordering without polarity reversal switch. (see page 56)
- Lower ripple (see page 56)
- Higher stability (see page 56)
- Shorter setting time (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

HCH 350 - 200000
200kV / 1,5 mA

| Type | Voltage | Current | Width | Height | Depth | Weight |
|---------------------|------------|------------|--------------|----------------|--------|--------|
| HCH 10000 - 650 3) | 0 - 650 V | 0 - 15 A | 19" / 600 mm | 20 U / 1100 mm | 600 mm | 120 kg |
| HCH 15000 - 650 3) | 0 - 650 V | 0 - 22,5 A | 19" / 600 mm | 29 U / 1500 mm | 600 mm | 170 kg |
| HCH 20000 - 650 3) | 0 - 650 V | 0 - 30 A | 19" / 600 mm | 29 U / 1500 mm | 600 mm | 240 kg |
| HCH 30000 - 650 3) | 0 - 650 V | 0 - 45 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 300 kg |
| HCH 40000 - 650 3) | 0 - 650 V | 0 - 60 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 360 kg |
| HCH 50000 - 650 3) | 0 - 650 V | 0 - 75 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 420 kg |
| | | | | | | |
| HCH 10000 - 1250 3) | 0 - 1250 V | 0 - 8 A | 19" / 600 mm | 20 U / 1100 mm | 600 mm | 120 kg |
| HCH 15000 - 1250 3) | 0 - 1250 V | 0 - 12 A | 19" / 600 mm | 29 U / 1500 mm | 600 mm | 170 kg |
| HCH 20000 - 1250 3) | 0 - 1250 V | 0 - 16 A | 19" / 600 mm | 29 U / 1500 mm | 600 mm | 240 kg |
| HCH 30000 - 1250 3) | 0 - 1250 V | 0 - 24 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 300 kg |
| HCH 40000 - 1250 3) | 0 - 1250 V | 0 - 32 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 360 kg |
| HCH 50000 - 1250 3) | 0 - 1250 V | 0 - 40 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 420 kg |
| | | | | | | |
| HCH 10000 - 2000 3) | 0 - 2000 V | 0 - 5 A | 19" / 600 mm | 20 U / 1100 mm | 600 mm | 120 kg |
| HCH 15000 - 2000 3) | 0 - 2000 V | 0 - 7,5 A | 19" / 600 mm | 29 U / 1500 mm | 600 mm | 170 kg |
| HCH 20000 - 2000 3) | 0 - 2000 V | 0 - 10 A | 19" / 600 mm | 29 U / 1500 mm | 600 mm | 240 kg |
| HCH 30000 - 2000 3) | 0 - 2000 V | 0 - 15 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 300 kg |
| HCH 40000 - 2000 3) | 0 - 2000 V | 0 - 20 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 360 kg |
| HCH 50000 - 2000 3) | 0 - 2000 V | 0 - 25 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 420 kg |
| | | | | | | |
| HCH 10000 - 3500 3) | 0 - 3500 V | 0 - 3 A | 19" / 600 mm | 20 U / 1100 mm | 600 mm | 120 kg |
| HCH 15000 - 3500 3) | 0 - 3500 V | 0 - 4 A | 19" / 600 mm | 29 U / 1500 mm | 600 mm | 170 kg |
| HCH 20000 - 3500 3) | 0 - 3500 V | 0 - 6 A | 19" / 600 mm | 29 U / 1500 mm | 600 mm | 240 kg |
| HCH 30000 - 3500 3) | 0 - 3500 V | 0 - 8 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 300 kg |
| HCH 40000 - 3500 3) | 0 - 3500 V | 0 - 12 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 360 kg |
| HCH 50000 - 3500 3) | 0 - 3500 V | 0 - 15 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 420 kg |

3) Three phase mains connection

Mating high voltage connectors for units with up to 10A output current are included in the scope of delivery. Mating high voltage cables you'll find beginning with page 59.

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

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Series HCH from 650 V to 200 kV / to 50 kW



Design example

HCH 4200 - 65000
65kV / 60 mA

| Type | Voltage | Current | Width | Height | Depth | Weight |
|----------------------|-------------|------------|-----------------|----------------|--------|--------|
| HCH 10000 - 6500 3) | 0 - 6500 V | 0 - 1,5 A | 19" / 600 mm | 20 U / 1100 mm | 600 mm | 120 kg |
| HCH 15000 - 6500 3) | 0 - 6500 V | 0 - 2 A | 19" / 600 mm | 29 U / 1500 mm | 600 mm | 170 kg |
| HCH 20000 - 6500 3) | 0 - 6500 V | 0 - 3 A | 19" / 600 mm | 29 U / 1500 mm | 600 mm | 240 kg |
| HCH 30000 - 6500 3) | 0 - 6500 V | 0 - 4 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 300 kg |
| HCH 40000 - 6500 3) | 0 - 6500 V | 0 - 6 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 360 kg |
| HCH 50000 - 6500 3) | 0 - 6500 V | 0 - 7,5 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 420 kg |
| HCH 10000 - 12500 3) | 0 - 12500 V | 0 - 0,8 A | 19" / 600 mm | 20 U / 1100 mm | 600 mm | 120 kg |
| HCH 15000 - 12500 3) | 0 - 12500 V | 0 - 1,2 A | 19" / 600 mm | 29 U / 1500 mm | 600 mm | 170 kg |
| HCH 20000 - 12500 3) | 0 - 12500 V | 0 - 1,6 A | 19" / 600 mm | 29 U / 1500 mm | 600 mm | 240 kg |
| HCH 30000 - 12500 3) | 0 - 12500 V | 0 - 2,4 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 300 kg |
| HCH 40000 - 12500 3) | 0 - 12500 V | 0 - 3,2 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 360 kg |
| HCH 50000 - 12500 3) | 0 - 12500 V | 0 - 4 A | 2x19" / 1200 mm | 38 U / 2000 mm | 800 mm | 480 kg |
| HCH 10000 - 20000 3) | 0 - 20000 V | 0 - 0,5 A | 19" / 600 mm | 29 U / 1500 mm | 600 mm | 120 kg |
| HCH 15000 - 20000 3) | 0 - 20000 V | 0 - 0,75 A | 19" / 600 mm | 29 U / 1500 mm | 600 mm | 170 kg |
| HCH 20000 - 20000 3) | 0 - 20000 V | 0 - 1 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 240 kg |
| HCH 30000 - 20000 3) | 0 - 20000 V | 0 - 1,5 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 300 kg |
| HCH 40000 - 20000 3) | 0 - 20000 V | 0 - 2 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 360 kg |
| HCH 50000 - 20000 3) | 0 - 20000 V | 0 - 2,5 A | 2x19" / 1200 mm | 38 U / 2000 mm | 800 mm | 480 kg |
| HCH 10000 - 35000 3) | 0 - 35000 V | 0 - 0,3 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 390 kg |
| HCH 15000 - 35000 3) | 0 - 35000 V | 0 - 0,4 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 420 kg |
| HCH 20000 - 35000 3) | 0 - 35000 V | 0 - 0,6 A | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 450 kg |
| HCH 30000 - 35000 3) | 0 - 35000 V | 0 - 0,8 A | 2x19" / 1200 mm | 38 U / 2000 mm | 800 mm | 640 kg |
| HCH 40000 - 35000 3) | 0 - 35000 V | 0 - 1,2 A | 2x19" / 1200 mm | 38 U / 2000 mm | 800 mm | 720 kg |
| HCH 50000 - 35000 3) | 0 - 35000 V | 0 - 1,5 A | 2x19" / 1200 mm | 38 U / 2000 mm | 800 mm | 790 kg |

3) Three phase mains connection

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

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| Type | Voltage | Current | Width | Height | Depth | Weight |
|-----------------------|--------------|------------|--------------|----------------|----------|------------|
| HCH 4200 - 65000 3) | 0 - 65000 V | 0 - 60 mA | 700 mm* | 750 mm* | 630 mm* | 240 kg |
| HCH 10000 - 65000 3) | 0 - 65000 V | 0 - 150 mA | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 460 kg |
| HCH 15000 - 65000 3) | 0 - 65000 V | 0 - 200 mA | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 480 kg |
| HCH 20000 - 65000 3) | 0 - 65000 V | 0 - 300 mA | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 500 kg |
| HCH 30000 - 65000 3) | 0 - 65000 V | 0 - 400 mA | 19" / 600 mm | 29 U / 1500 mm | 600 mm** | 170/430 kg |
| HCH 40000 - 65000 3) | 0 - 65000 V | 0 - 600 mA | 19" / 600 mm | 29 U / 1500 mm | 600 mm** | 200/470 kg |
| HCH 50000 - 65000 3) | 0 - 65000 V | 0 - 750 mA | 19" / 600 mm | 38 U / 2000 mm | 800 mm** | 250/500 kg |
| | | | | | | |
| HCH 2800 - 100000 3) | 0 - 100000 V | 0 - 25 mA | 800 mm* | 1200 mm* | 760 mm* | 550 kg |
| HCH 4200 - 100000 3) | 0 - 100000 V | 0 - 40 mA | 800 mm* | 1200 mm* | 760 mm* | 550 kg |
| HCH 10000 - 100000 3) | 0 - 100000 V | 0 - 100 mA | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 500 kg |
| HCH 15000 - 100000 3) | 0 - 100000 V | 0 - 150 mA | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 520 kg |
| HCH 20000 - 100000 3) | 0 - 100000 V | 0 - 200 mA | 19" / 600 mm | 38 U / 2000 mm | 800 mm | 545 kg |
| HCH 30000 - 100000 3) | 0 - 100000 V | 0 - 300 mA | 19" / 600 mm | 29 U / 1500 mm | 600 mm** | 170/500 kg |
| HCH 40000 - 100000 3) | 0 - 100000 V | 0 - 400 mA | 19" / 600 mm | 31 U / 2000 mm | 600 mm** | 200/550 kg |
| HCH 50000 - 100000 3) | 0 - 100000 V | 0 - 500 mA | 19" / 600 mm | 38 U / 1700 mm | 800 mm** | 250/600 kg |
| | | | | | | |
| HCH 1400 - 150000 | 0 - 150000 V | 0 - 8 mA | 800 mm* | 1400 mm* | 760 mm* | 760 kg |
| HCH 2800 - 150000 3) | 0 - 150000 V | 0 - 15 mA | 800 mm* | 1400 mm* | 760 mm* | 760 kg |
| HCH 4200 - 150000 3) | 0 - 150000 V | 0 - 25 mA | 800 mm* | 1400 mm* | 760 mm* | 760 kg |
| HCH 10000 - 150000 3) | 0 - 150000 V | 0 - 60 mA | 19" / 600 mm | 20 U / 1100 mm | 600 mm** | 100/600 kg |
| HCH 15000 - 150000 3) | 0 - 150000 V | 0 - 100 mA | 19" / 600 mm | 20 U / 1100 mm | 600 mm** | 115/600 kg |
| HCH 20000 - 150000 3) | 0 - 150000 V | 0 - 130 mA | 19" / 600 mm | 29 U / 1500 mm | 600 mm** | 150/680 kg |
| HCH 30000 - 150000 3) | 0 - 150000 V | 0 - 200 mA | 19" / 600 mm | 29 U / 1500 mm | 600 mm** | 170/680 kg |
| HCH 40000 - 150000 3) | 0 - 150000 V | 0 - 250 mA | 19" / 600 mm | 29 U / 1500 mm | 800 mm** | 200/680 kg |
| HCH 50000 - 150000 3) | 0 - 150000 V | 0 - 300 mA | 19" / 600 mm | 38 U / 2000 mm | 800 mm** | 250/680 kg |
| | | | | | | |
| HCH 350 - 200000 | 0 - 200000 V | 0 - 1,5 mA | 950 mm* | 1700 mm* | 700 mm* | 910 kg |
| HCH 700 - 200000 | 0 - 200000 V | 0 - 3 mA | 955 mm* | 1650 mm* | 760 mm* | 910 kg |
| HCH 1400 - 200000 | 0 - 200000 V | 0 - 6 mA | 955 mm* | 1650 mm* | 850 mm* | 960 kg |
| HCH 2800 - 200000 3) | 0 - 200000 V | 0 - 12 mA | 955 mm* | 1650 mm* | 850 mm* | 960 kg |
| HCH 4200 - 200000 3) | 0 - 200000 V | 0 - 20 mA | 955 mm* | 1830 mm* | 850 mm* | 1000 kg |
| HCH 10000 - 200000 3) | 0 - 200000 V | 0 - 50 mA | 19" / 600 mm | 20 U / 1100 mm | 600 mm** | 100/650 kg |
| HCH 15000 - 200000 3) | 0 - 200000 V | 0 - 75 mA | 19" / 600 mm | 20 U / 1100 mm | 600 mm** | 115/650 kg |
| HCH 20000 - 200000 3) | 0 - 200000 V | 0 - 100 mA | 19" / 600 mm | 29 U / 1500 mm | 600 mm** | 150/750 kg |
| HCH 30000 - 200000 3) | 0 - 200000 V | 0 - 150 mA | 19" / 600 mm | 29 U / 1500 mm | 600 mm** | 170/750 kg |
| HCH 40000 - 200000 3) | 0 - 200000 V | 0 - 200 mA | 19" / 600 mm | 29 U / 1500 mm | 600 mm** | 200/850 kg |
| HCH 50000 - 200000 3) | 0 - 200000 V | 0 - 250 mA | 19" / 600 mm | 38 U / 2000 mm | 800 mm** | 250/850 kg |

3) Three phase mains connection

Mating high voltage connectors for units with up to 10A output current are included in the scope of delivery. Mating high voltage cables you'll find beginning with page 59.

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

*) The dimensions are valid for the high voltage part with power part on top. They are non-binding guidelines.

***) 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