

High voltage power supplies, high power

Series HCH from 650 V to 300 kV / to 50 kW



Design example

HCH 50000 - 20000 20kV / 2,5A

- Recovery time:
Voltage control:
<1ms for load changes from 10% to 100% or from 100% to 10%
Current control:
<10ms for load changes causing an output change of less than 10% of the rated voltage
- Setting time at nominal load:
<500ms for changes of the output voltage from 10% to 90% or 90% to 10%
- Discharge 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:
< 5×10^{-4}
Over 8 hours under constant conditions:
< $\pm 2 \times 10^{-4}$
Within the temperature range:
< $\pm 1,5 \times 10^{-4}/K$
- 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 units with output current up to 10A. For units with higher output currents, the output will be carried out according to your wishes so that your load can be optimally connected.

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 54.)

- Setting range:
from approx. 0,1% to 100%
- Setting resolution:
 $\pm 1 \times 10^{-4}$
- Residual ripple (0 - 10 MHz):
< 2×10^{-3} pp + 50mVpp

Possible Options:

- Analog programming (see page 44)
- Analog programming, floating (see page 44)
- Computer interfaces - IEEE 488, RS 232, RS 422, Profibus DP, USB, LAN (more on request) (see page 44)
- Polarity reversal switch. Please specify the output polarity, when ordering without polarity reversal switch. (see page 48)
- Lower ripple (see page 48)
- Higher stability (see page 48)
- Shorter setting time (see page 48)
- 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.

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, control modes 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.

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.

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Type	Voltage	Current	Width	Height	Depth	Weight
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 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 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 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
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 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	2x 19" / 1200 mm	38 U / 2000 mm	800 mm	480 kg
HCH 10000 - 20000 3)	0 - 20000 V	0 - 500 mA	19" / 600 mm	29 U / 1500 mm	600 mm	120 kg
HCH 15000 - 20000 3)	0 - 20000 V	0 - 750 mA	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	2x 19" / 1200 mm	38 U / 2000 mm	800 mm	480 kg
HCH 10000 - 35000 3)	0 - 35000 V	0 - 300 mA	19" / 600 mm	38 U / 2000 mm	800 mm	390 kg
HCH 15000 - 35000 3)	0 - 35000 V	0 - 400 mA	19" / 600 mm	38 U / 2000 mm	800 mm	420 kg
HCH 20000 - 35000 3)	0 - 35000 V	0 - 600 mA	19" / 600 mm	38 U / 2000 mm	800 mm	450 kg
HCH 30000 - 35000 3)	0 - 35000 V	0 - 800 mA	2x 19" / 1200 mm	38 U / 2000 mm	800 mm	640 kg
HCH 40000 - 35000 3)	0 - 35000 V	0 - 1,2 A	2x 19" / 1200 mm	38 U / 2000 mm	800 mm	720 kg
HCH 50000 - 35000 3)	0 - 35000 V	0 - 1,5 A	2x 19" / 1200 mm	38 U / 2000 mm	800 mm	790 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 51. For units with higher output currents, the output will be carried out according to your wishes so that your load can be optimally connected.

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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 / 2000 mm	800 mm**	250/600 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 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
HCH 2800 - 300000 3)	0 - 300000 V	0 - 8 mA	1500 mm*	1000 mm*	1500 mm*	1700 kg
HCH 4200 - 300000 3)	0 - 300000 V	0 - 12 mA	1500 mm*	1000 mm*	1500 mm*	1700 kg
HCH 10000 - 300000 3)	0 - 300000 V	0 - 30 mA	Dimensions and weight on request			
HCH 15000 - 300000 3)	0 - 300000 V	0 - 50 mA	Dimensions and weight on request			
HCH 20000 - 300000 3)	0 - 300000 V	0 - 65 mA	Dimensions and weight on request			
HCH 30000 - 300000 3)	0 - 300000 V	0 - 100 mA	Dimensions and weight on request			
HCH 40000 - 300000 3)	0 - 300000 V	0 - 130 mA	Dimensions and weight on request			
HCH 50000 - 300000 3)	0 - 300000 V	0 - 160 mA	Dimensions and weight on request			

Mating high voltage connectors for these units are in scope of delivery. Mating high voltage cables you'll find beginning with page 51. For units with higher output currents, the output will be carried out according to your wishes so that your load can be optimally connected. HCH power supplies, over 65kV, are provided along with 10m output cable.

*) 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