

High voltage power supplies

Series HCP from 3,5 kV to 300 kV / 14 W to 15000 W



Design example

HCP 140 - 12500
12500V / 10mA

Features:

- Compact size and light weight
- Efficiency approx. 90%
- For units from 12.5kV nominal voltage on, all HV components are moulded in (removable) silicon
- Short-circuit & flashover proof
- 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
- Adjustable overvoltage protection (limitation of set value)
- 4½ digit DVM's for voltage and current for all models
- Voltage and current setting by means of 10-turn potentiometers with precision scale; the adjusting knob can be locked
- Indication of set point values by means of button for switch-over of the displays
- Set point adjustment possible with locked output, release of output voltage by means of "ON" / "OFF" switch
- Suitable also for inductive and capacitive loads
- Suitable for photomultipliers

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.

A low residual ripple of the output voltage, together with a high stability, high regulation speed and a low stored energy are all achieved by virtue of the high switching frequency.

Design:

- ½19" or 19" table-top case (depending on output voltage and power).
- 19" Rack-adapters for mounting into a 19" rack are available as accessory.

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 $\pm 300V$. A polarity reversal switch is optionally available.

Output terminals:

All output terminals are located at the rear side of the unit. 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 3m 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 - 10MHz):
 $< 1 \times 10^{-4} pp + 50mVpp$,
typ. $5 \times 10^{-5} pp$
- 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. 2sec. to 10sec., depending on type

Deviation:

For $\pm 10\%$ mains voltage variation:
 $< \pm 1 \times 10^{-5}$

For no load / full load:
 $< 2 \times 10^{-4}$

Over 8 hours under constant conditions:
 $< \pm 1 \times 10^{-4}$

Within the temperature range:
 $< \pm 1,5 \times 10^{-4}/K$

Possible Options:

- Coarse/fine-potentiometers (99% / 1%) for more accurate adjustment of voltage and / or current
- 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 46)
- Electronically controlled polarity reversal switch (Up to 35kV remotely controllable when ordered with a programming or interface, for higher voltages, please ask us). Please specify the output polarity, when ordering without polarity reversal switch. (see page 48)
- Lower ripple (see page 48)
- Higher stability (see page 48)
- Lower stored energy (see page 48)
- Power limitation (see page 48)

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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Type	Voltage	Current	Width	Height	Depth	Weight
HCP 14 - 3500	● 0 - 3500 V	0 - 4 mA	½19" / 222 mm	3 U / 133 mm	350 mm	3 kg
HCP 35 - 3500	● 0 - 3500 V	0 - 10 mA	½19" / 222 mm	3 U / 133 mm	350 mm	4 kg
HCP 140 - 3500	● 0 - 3500 V	0 - 40 mA	½19" / 222 mm	3 U / 133 mm	350 mm	6 kg
HCP 350 - 3500	● 0 - 3500 V	0 - 100 mA	½19" / 222 mm	3 U / 133 mm	450 mm	7 kg
HCP 700 - 3500	● 0 - 3500 V	0 - 200 mA	19" / 443 mm	3 U / 133 mm	350 mm	11 kg
HCP 1400 - 3500	● 0 - 3500 V	0 - 400 mA	19" / 443 mm	3 U / 133 mm	450 mm	13 kg
HCP 2800 - 3500 3)	0 - 3500 V	0 - 800 mA	19" / 443 mm	3 U / 133 mm*	550 mm**	25 kg
HCP 5000 - 3500 3)	0 - 3500 V	0 - 1,5 A	19" / 443 mm	6 U / 266 mm	650 mm	40 kg
HCP 10000 - 3500 3)	0 - 3500 V	0 - 3 A	19" / 443 mm	9 U / 399 mm	650 mm	75 kg
HCP 15000 - 3500 3)	0 - 3500 V	0 - 4,5 A	19" / 443 mm	12 U / 535 mm	650 mm	110 kg
HCP 14 - 6500	● 0 - 6500 V	0 - 2 mA	½19" / 222 mm	3 U / 133 mm	350 mm	3 kg
HCP 35 - 6500	● 0 - 6500 V	0 - 5 mA	½19" / 222 mm	3 U / 133 mm	350 mm	4 kg
HCP 140 - 6500	● 0 - 6500 V	0 - 20 mA	½19" / 222 mm	3 U / 133 mm	350 mm	6 kg
HCP 350 - 6500	● 0 - 6500 V	0 - 50 mA	½19" / 222 mm	3 U / 133 mm	450 mm	7 kg
HCP 700 - 6500	● 0 - 6500 V	0 - 100 mA	19" / 443 mm	3 U / 133 mm	350 mm	11 kg
HCP 1400 - 6500	● 0 - 6500 V	0 - 200 mA	19" / 443 mm	3 U / 133 mm	450 mm	13 kg
HCP 2800 - 6500 3)	0 - 6500 V	0 - 400 mA	19" / 443 mm	3 U / 133 mm*	650 mm	25 kg
HCP 5000 - 6500 3)	0 - 6500 V	0 - 750 mA	19" / 443 mm	6 U / 266 mm	650 mm	40 kg
HCP 10000 - 6500 3)	0 - 6500 V	0 - 1,5 A	19" / 443 mm	9 U / 399 mm	650 mm	75 kg
HCP 15000 - 6500 3)	0 - 6500 V	0 - 2,3 A	19" / 443 mm	12 U / 535 mm	650 mm	110 kg
HCP 14 - 12500	● 0 - 12500 V	0 - 1 mA	½19" / 222 mm	3 U / 133 mm	350 mm	4 kg
HCP 35 - 12500	● 0 - 12500 V	0 - 2,5 mA	½19" / 222 mm	3 U / 133 mm	350 mm	5 kg
HCP 140 - 12500	● 0 - 12500 V	0 - 10 mA	½19" / 222 mm	3 U / 133 mm	350 mm	7 kg
HCP 350 - 12500	● 0 - 12500 V	0 - 25 mA	19" / 443 mm	3 U / 133 mm	450 mm	11 kg
HCP 700 - 12500	● 0 - 12500 V	0 - 50 mA	19" / 443 mm	3 U / 133 mm	550 mm	16 kg
HCP 1400 - 12500	● 0 - 12500 V	0 - 100 mA	19" / 443 mm	3 U / 133 mm	650 mm	21 kg
HCP 2800 - 12500 3)	0 - 12500 V	0 - 200 mA	19" / 443 mm	6 U / 266 mm	550 mm	35 kg
HCP 5000 - 12500 3)	0 - 12500 V	0 - 400 mA	19" / 443 mm	6 U / 266 mm	650 mm	40 kg
HCP 10000 - 12500 3)	0 - 12500 V	0 - 800 mA	19" / 443 mm	9 U / 399 mm	650 mm	75 kg
HCP 15000 - 12500 3)	0 - 12500 V	0 - 1,2 A	19" / 443 mm	12 U / 535 mm	650 mm	110 kg
HCP 14 - 20000	● 0 - 20000 V	0 - 0,6 mA	½19" / 222 mm	3 U / 133 mm	350 mm	4 kg
HCP 35 - 20000	● 0 - 20000 V	0 - 1,5 mA	½19" / 222 mm	3 U / 133 mm	350 mm	5 kg
HCP 140 - 20000	● 0 - 20000 V	0 - 6 mA	½19" / 222 mm	3 U / 133 mm	350 mm	7 kg
HCP 350 - 20000	● 0 - 20000 V	0 - 15 mA	19" / 443 mm	3 U / 133 mm	450 mm	11 kg
HCP 700 - 20000	● 0 - 20000 V	0 - 30 mA	19" / 443 mm	3 U / 133 mm	550 mm	16 kg
HCP 1400 - 20000	0 - 20000 V	0 - 60 mA	19" / 443 mm	3 U / 133 mm	650 mm	21 kg
HCP 2800 - 20000 3)	0 - 20000 V	0 - 120 mA	19" / 443 mm	6 U / 266 mm	650 mm	35 kg
HCP 4200 - 20000 3)	0 - 20000 V	0 - 200 mA	19" / 443 mm	6 U / 266 mm	650 mm	45 kg

3) Three phase mains connection

● short term delivery (components on stock)

Mating high voltage connectors are included in the scope of delivery. Other mating high voltage cables you'll find beginning with page 51.

All units up to 35kV optionally available with electronically controlled polarity reversal switch and for 65kV with manually operated polarity reversal switch. For orders without polarity switch please state the required output polarity.



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Design example

HCP 15000 - 12500
12500V / 1,2A

Type	Voltage	Current	Width	Height	Depth	Weight
HCP 35 - 35000	0 - 35000 V	0 - 1 mA	19" / 443 mm	3 U / 133 mm	450 mm	10 kg
HCP 140 - 35000	0 - 35000 V	0 - 4 mA	19" / 443 mm	3 U / 133 mm	450 mm	12 kg
HCP 350 - 35000	0 - 35000 V	0 - 10 mA	19" / 443 mm	3 U / 133 mm	450 mm	17 kg
HCP 700 - 35000	0 - 35000 V	0 - 20 mA	19" / 443 mm	3 U / 133 mm	550 mm	20 kg
HCP 1400 - 35000	0 - 35000 V	0 - 40 mA	19" / 443 mm	3 U / 133 mm	650 mm	25 kg
HCP 2800 - 35000 3)	0 - 35000 V	0 - 80 mA	19" / 443 mm	6 U / 266 mm	650 mm	45 kg
HCP 4200 - 35000 3)	0 - 35000 V	0 - 120 mA	19" / 443 mm	7 U / 310 mm	650 mm	50 kg
HCP 35 - 65000	0 - 65000 V	0 - 0,5 mA	19" / 443 mm	3 U / 133 mm*	450 mm**	17 kg
HCP 140 - 65000	0 - 65000 V	0 - 2 mA	19" / 443 mm	3 U / 133 mm*	450 mm**	21 kg
HCP 350 - 65000	0 - 65000 V	0 - 5 mA	19" / 443 mm	6 U / 266 mm*	450 mm**	45 kg
HCP 700 - 65000	0 - 65000 V	0 - 10 mA	19" / 443 mm	8 U / 355 mm*	550 mm**	55 kg
HCP 1400 - 65000	0 - 65000 V	0 - 20 mA	19" / 443 mm	9 U / 399 mm*	550 mm**	70 kg
HCP 2800 - 65000 3)	0 - 65000 V	0 - 40 mA	19" / 443 mm	9 U / 399 mm*	550 mm**	80 kg
HCP 140 - 100000	0 - 100000 V	0 - 1 mA	19" / 443 mm	5 U / 221 mm	550 mm	50 kg
HCP 350 - 100000	0 - 100000 V	0 - 3 mA	19" / 443 mm	5 U / 221 mm	550 mm	55 kg
HCP 700 - 100000	0 - 100000 V	0 - 6 mA	19" / 443 mm	8 U / 355 mm	550 mm	73 kg
HCP 1400 - 100000	0 - 100000 V	0 - 12 mA	19" / 443 mm	9 U / 399 mm	550 mm	90 kg
HCP 140 - 150000	0 - 150000 V	0 - 0,5 mA	19" / 443 mm	10 U / 433 mm	750 mm	110 kg
HCP 350 - 150000	0 - 150000 V	0 - 2 mA	19" / 443 mm	10 U / 433 mm	750 mm	130 kg
HCP 700 - 150000	0 - 150000 V	0 - 4 mA	19" / 443 mm	10 U / 433 mm	750 mm	140 kg
HCP 1400 - 150000	0 - 150000 V	0 - 8 mA	19" / 443 mm	12 U / 535 mm	750 mm	160 kg
HCP 140 - 200000	0 - 200000 V	0 - 0,75 mA	19" / 443 mm	12 U / 535 mm	750 mm	160 kg
HCP 350 - 200000	0 - 200000 V	0 - 1,5 mA	19" / 600 mm	29 U / 1500 mm	600 mm	180 kg
HCP 700 - 200000	0 - 200000 V	0 - 3 mA	19" / 600 mm	38 U / 2000 mm	800 mm	200 kg
HCP 1400 - 200000	0 - 200000 V	0 - 6 mA	19" / 600 mm	38 U / 2000 mm	800 mm	220 kg
HCP 140 - 300000	0 - 300000 V	0 - 0,3 mA	19" / 600 mm	29 U / 1500 mm	750 mm	180 kg
HCP 350 - 300000	0 - 300000 V	0 - 1 mA	19" / 600 mm	38 U / 1500 mm	600 mm	200 kg
HCP 700 - 300000	0 - 300000 V	0 - 2 mA	19" / 600 mm	38 U / 2000 mm	800 mm	220 kg
HCP 1400 - 300000	0 - 300000 V	0 - 4 mA	19" / 600 mm	38 U / 2000 mm	800 mm	250 kg

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

**) With polarity reversal switch these units will be 100mm deeper.

