HCP2K8 Series

AC-HVDC POWER SUPPLIES

2.8kW BENCH MOUNT

The HCP2K8 series power supplies are highly stable switch-mode power supplies with low ripple. Due to the high switching frequency the power supply has a low residual ripple in the generated output voltage with high stability, good regulation dynamics, and at the same time only a low amount of stored energy.

The HV output's polarity is positive or negative; a reverse polarity switch is optionally available. The power supplies can be operated in the local, analog (optional) and digital (optional) operating modes.

Dimensions

See mechanical details table

Features

- 0-3.5kV to 0-65kV output models
- 3 phase AC input
- Continuous operation at full rated power
- Multi-function control panel with user friendly interface
- Digital, LAN and USB interface option
- Analog programming/interface option
- Manual voltage and current control with digital display
- Set-point display via a button
- Set-point adjustment possible with disabled output
- Push-button switch for output voltage
- Adjustable overvoltage limit
- Low ripple
- CE marked, EN61010-1 safety compliant
- Short circuit & arc protection
- 2 year warranty

Benefits

- Provides maximum device control & flexibility.
- Safe operation ensures maximum protection to the power supply
- High voltage release included for safe operation at high voltage output
- User friendly controls combined with bespoke terminal software gives greater flexibility
- Lighter than the leading brand products & easier to maintain
- Low cost of ownership

Applications

- Capacitor / Insulation testing
- Electrostatics
- Gas discharge / Plasma
- High voltage test stands
- Ion sources
- Laboratory power
- Nuclear fusion research
- Particle accelerators
- Photomultiplier / Secondary electron multiplier
- Sputtering

Models & Ratings

Model Number	Polarity	Output Voltage	Output Current	Input Voltage	Frequency
HCP3.5P800	Positive	0 to +3.5kV	0 to 800mA	400VAC, ±10%, 3 phase	47 to 63Hz
HCP3.5N800	Negative	0 to -3.5kV			
HCP3.5R800	Reversible	0 to 3.5kV			
HCP6.5P400	Positive	0 to +6.5kV	0 to 400mA	400VAC, ±10%, 3 phase	47 to 63Hz
HCP6.5N400	Negative	0 to -6.5kV			
HCP6.5R400	Reversible	0 to 6.5kV			
HCP012P200	Positive	0 to +12.5kV	0 to 200mA	400VAC, ±10%, 3 phase	47 to 63Hz
HCP012N200	Negative	0 to -12.5kV			
HCP012R200	Reversible	0 to 12.5kV			
HCP020P120	Positive	0 to +20kV	0 to 120mA	400VAC, ±10%, 3 phase	47 to 63Hz
HCP020N120	Negative	0 to -20kV			
HCP020R120	Reversible	0 to 20kV			
HCP035P080	Positive	0 to +35kV	0 to 80mA	400VAC, ±10%, 3 phase	47 to 63Hz
HCP035N080	Negative	0 to -35kV			
HCP035R080	Reversible	0 to 35kV			
HCP065P040	Positive	0 to +65kV	0 to 40mA	400VAC, ±10%, 3 phase	47 to 63Hz
HCP065N040	Negative	0 to -65kV			
HCP065R040	Reversible	0 to 65kV			

Options

- Coarse/fine-potentiometers (99%/1%) for more accurate adjustment of voltage and / or current
- Analog programming/interface
- Analog programming/interface, floating
- Computer interfaces -IEEE 488, RS 232, RS 422, RS485, Profi-bus DP, USB, LAN (more on request)
- Electronically controlled polarity reversal switch (up to 65kV remotely controllable when ordered with a programming or interface, for higher voltages, please contact us).
- Lower ripple: <1 x 10^{-5} + 100mVpp (peak to peak)
- Higher stability: Stability, over 8 hours under constant conditions <±1 x 10^{-5}
  Temperature coefficient <±1 x 10^{-5}/K within the specified temperature range
- Lower stored energy
- Power limitation
- Supply voltages other than that shown in the models & ratings table may be specified

Please consult XP Power Sales

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage					See models and ratings table
Efficiency		90		%	
Overvoltage Category		II			
Protection Class		I			

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage Range	3.5		65	kV	See models and ratings table
Output Current Range	40		800	mA	See models and ratings table
Output Control	Continuous adjustment from 0 to rated voltage/current by front panel mounted potentiometers				
Output Polarity	See models and ratings table				
Output Isolation	"0V" terminal is connected to the PE (EARTH), Current return preferably takes place via the screen of the output cable				
HV Output Connection	Mating HV connector and 3m cable supplied				
Voltage Control	<1ms with load changes from 10% to 100% or 100% to 10%, respectively				
Voltage Setting Range	Using the VOLTAGE potentiometer, approx. 0.1% to 100% of the rated value				
Current Control	<10ms with load changes that effect a change of less than 10% in the output voltage				
Current Setting Range	Using the CURRENT potentiometer, approx. 0.1% to 100% of the rated value				
Setting Time at Rated Load	<100ms to 500ms, depending on type, for changes in the output voltage from 10% to 90% or 90 to 10%, respectively				
Set Point Resolution	<±1 x 10^{-3} of rated value with potentiometer on front panel <±1 x 10^{-5} of rated value with fine potentiometer 1 x 10^{-4} of rated value with option interface				
Discharge Time Constant	With output free of load, max. 10s				
Accuracy	Voltage:<±0.2% of the nominal value Current: within the range of >5mA up to <200A: ±0.2% of the nominal value Outside the above mentioned range: <±0.5% of the nominal value Additional digital display error <±2 digits				
Residual Ripple	<1 x 10-^{4}pp +50mVpp (peak to peak), typ. 5 x 10-^{5}pp of rated value (measuring band width 30Hz to 10MHz) <3 x 10-^{5}, typ. <1.5 x 10-^{5} of rated value RMS				
Control Deviation	±10% mains voltage variation: <±1 x 10^{-5} of the rated value Open circuit / full load: 2 x $10^{-:4}$ of the rated value Over 8 hours: <±1 x 10^{-4} of the rated value Temperature deviations <±1.5 x 10^{-4}/K of the rated value				
Short Circuit Protection	The power supply is short circuit and arc proof. The maximum current can be drawn at any output voltage, even in the event of a short circuit.				

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Temperature Operation	0		+40	˚C	
Storage Temperature	-20		+50	˚C	
Ambient Temperature	0		+40	°C	Operating
	0		+60	°C	Storage
Humidity	0		+80	%	Up to +31°C, decreasing linearly down to 50% RH at 40°C
Cooling	Heat generated in the power supply unit is dissipated by convection or, in the case of high-power units, by forced ventilation				
Operating Altitude			2000	m	Above sea level
Pollution Degree		1			
Protection	IP20				
Operation Location	Only for use in dry indoor areas				

Signals & Controls

	Function
Front panel	Voltage and current potentiometer, power switch, HV ON/OFF switch, digital display for current and voltage, voltage limit potentiometer. Display of the output voltage and current set points is possible with the SET VALUES push-button.
Operating Modes	The HV output's polarity is positive, negative; or reversible (see models & ratings table). The power supplies can be operated in the LOCAL, ANALOG (optional) and DIGITAL (optional) operating modes.

EMC: Emissions

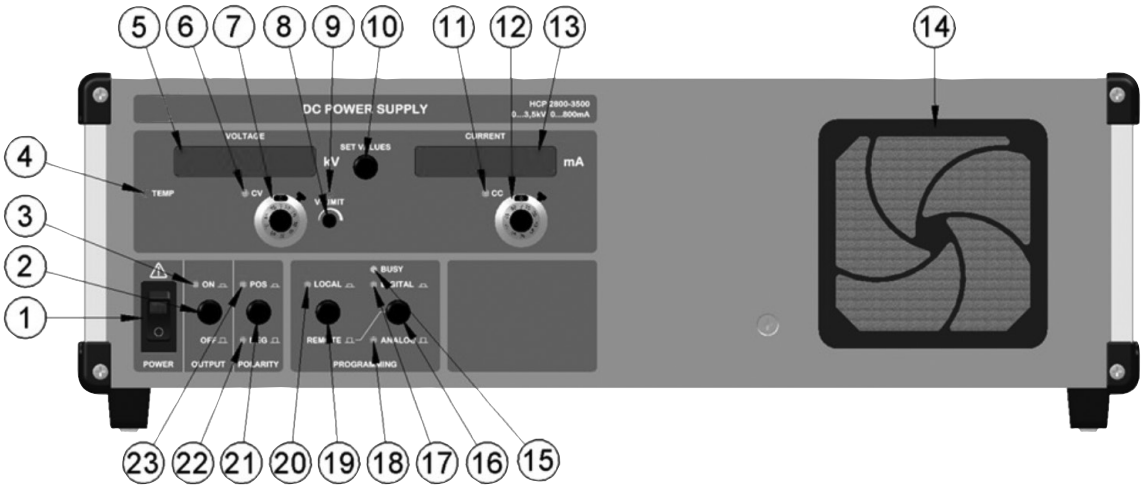
Phenomenon	Standard	Notes & Conditions
Harmonic Currents	EN61000-6-2	
Voltage Flicker	EN61000-6-3	

Safety Approvals

Safety Agency	Safety Standard	Notes & Conditions
EN	EN61010-1	
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

Mechanical Details

Front view with controls

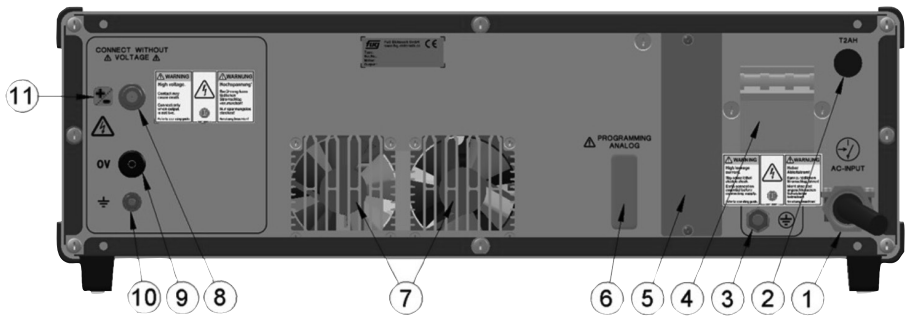


Front panel shown for illustrative purposes only, dimensions and layout differ by power rating - see mechanical details table.

Number	Function	Number	Function
1	AC power switch with indicator light Disconnects the power supply from the mains, two-pole switching	13	Current display, Flashing: Set point, continuous: Actual value
2	DC output ON (OUTPUT) There is no mains disconnection	14	Air inlet (depending on device type)
3	DC output ON LED Lights up green when the controller and therefore the power stage is operating (OUTPUT ON)	15	LED BUSY displays data traffic on the digital interface (Optional)
4	Over-temperature LED: Internal device temperature too high, fan failed or contaminated. (Use is type-dependent)	16	Switching the operation mode between REMOTE/ANALOG and REMOTE/DIGITAL (Optional)
5	Voltage display, flashing: Set point; not flashing: Actual value	17	LED indicating digital programming active (Optional)
6	LED for constant voltage control mode (Constant Voltage)	18	LED indicating Analog programming/interface active (Optional)
7	Lockable ten-turn potentiometer for voltage adjustment	19	Switching the operation mode setting between LOCAL and REMOTE (Optional)
8	Set-point limit adjustment for voltage V-LIMIT (can only be operated with a tool)	20	LED indicating local control mode active (Optional)
9	LED for active voltage set-point limit	21	Local output polarity adjustment (Optional) Without polarity reversal, polarity labelled using coloured stickers: RED: POSITIVE; BLUE: NEGATIVE
10	SET VALUES Switch displays between Set-point and Actual output mode, displays flash when in set-point mode.	22	LED set for negative output voltage (Optional reverse polarity switch)
11	LED for constant current control mode (Constant Current)	23	Optional reverse polarity switch) LED set for positive output voltage
12	Lockable ten-turn potentiometer for current adjustment		

Mechanical Details

Rear view with three phase AC input



Rear panel shown for illustrative purposes only, dimensions and layout differ by power rating - see mechanical details table.

Number	Function	Number	Function
1	Mains input with fixed installed cable, for 3 phase mains	7	Air outlet (depending on device type)
2	Fuse holder for internal electronics fuse	8	HV output (dedicated for screened HV- cable with grounded screen, which can be used for current return)
3	Earthing bolt (only for power supplies with 3 phase mains input). These power supplies have to be properly connected to earth via this earthing bolt with 10mm2	9	0V load connection, internally connected to the 0V of the electronics. This 0V connection is permanently connected to the protective conductor (PE).
4	Automatic circuit breaker, fuse holder	10	Earth bolt (is permanently connected to the protective conductor (PE): This connection must be connected to the ground of the load!
5	Option port for digital interface (e.g., IEEE 488, RS232, USB, LAN)	11	Polarity indication: RED: POSITIVE, BLUE: NEGATIVE RED/BLUE: OPTIONAL POLARITY REVERSAL SWITCH
6	(Option) 15pol Sub-D Connection for Analog programming/inteface		

Mechanical Details

Model Number	Mounting	Width		Height		Depth	Weight
HCP3.5P800	Bench mount(1)	19”	443mm	3U	133mm	550mm(3)	25kg
HCP3.5N800	Bench mount(1)	19”	443mm	3U	133mm	550mm(3)	25kg
HCP3.5R800	Bench mount(1)	19”	443mm	3U	133mm	650mm	27kg
HCP6.5P400	Bench mount(1)	19”	443mm	3U	133mm	650mm	27kg
HCP6.5N400	Bench mount(1)	19”	443mm	3U	133mm	650mm	27kg
HCP6.5R400	Bench mount(1)	19”	443mm	3U	133mm	650mm	27kg
HCP012P200	Bench mount(1)	19”	443mm	6U	266mm	650mm	40kg
HCP012N200	Bench mount(1)	19”	443mm	6U	266mm	650mm	40kg
HCP012R200	Bench mount(1)	19”	443mm	6U	266mm	650mm	40kg
HCP020P120	Bench mount(1)	19”	443mm	6U	266mm	650mm	48kg
HCP020N120	Bench mount(1)	19”	443mm	6U	266mm	650mm	48kg
HCP020R120	Bench mount(1)	19”	443mm	6U	266mm	650mm	48kg
HCP035P080	Bench mount(1)	19”	443mm	6U	266mm	650mm	60kg
HCP035N080	Bench mount(1)	19”	443mm	6U	266mm	650mm	60kg
HCP035R080	Bench mount(1)	19”	443mm	6U	266mm	650mm	60kg
HCP065P040	Bench mount(1)	19”	443mm	8U	355mm(2)	650mm	80kg
HCP065N040	Bench mount(1)	19”	443mm	8U	355mm(2)	650mm	80kg
HCP065R040	Bench mount(1)	19”	443mm	10U	433mm	650mm	90kg

Notes:

1. Rack mount option
2. With polarity reversal switch these units will be 2U higher.
3. With polarity reversal switch these units will be 100mm deeper.

Cables

Mains input cable
3 phase mains: open end

Mating connectors
For control inputs and outputs, connectors are not included (digital interface cables are commercially available).

Screened HV output cable
3m long with mating connector fitted one end only. Delivered short circuited for safety reasons.