

35W BENCH MOUNT

AC-HVDC POWER SUPPLIES

The HCB35 series are highly stable and low ripple bipolar switch-mode power supplies. The HCB series consist of two primary switch-mode power supplies with pulse width modulation that are operated inversely and are connected to each other at the output. This allows the output to be operated in continuous zero crossing mode. The high switching frequency ensures an output voltage with low residual ripple, high stability, good control dynamics, and a low amount of stored energy in the output stage.



## Dimensions

See mechanical details table

## Features

- 0 to  $\pm 3.5$ kV bipolar output
- 4 quadrant operation with active load
- Constant voltage control and current limitation with automatic transfer and control mode display with LED's
- Single phase AC input
- Continuous operation at full rated power
- Digital, LAN and USB interface option
- Analog programming/interface option
- Manual voltage control via 10 turn potentiometer
- Digital display for current and voltage
- Set-point display via a button
- Set-point adjustment possible with disabled output
- Push-button switch for output voltage
- 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
- 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
HCB35-3500	Bipolar	0 to $\pm 3.5$ kV	$\pm 10$ mA	230VAC, $\pm 10\%$	47 to 63Hz

## Options

- Coarse/fine-potentiometers (99% / 1%) for more accurate adjustment of voltage
- Additional potentiometer for adjustment of current limitation
- Analog programming / interface
- Analog programming / interface, floating
- Computer interfaces -IEEE 488, RS 232, RS 422, RS485, Profi-bus DP, USB, LAN (more on request)
- Signal output voltage < 50V
- Higher stability: Stability, over 8 hours under constant conditions  $< \pm 1 \times 10^{-5}$   
Temperature coefficient  $< \pm 1 \times 10^{-5}/K$  within the specified temperature range
- Lower stored energy
- Supply voltages other than that shown in the models & ratings table may be specified

## Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage					See models and ratings table
Efficiency		90		%	
Overvoltage Category		II			
Protection Class		I			
Input Connector	IEC60320 C20 receptacle				

## Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage Range	0		±3.5	kV	See models and ratings table
Output Current Range	0		±10	mA	See models and ratings table
Output Control	Continuous adjustment from 0 to rated voltage by front panel mounted potentiometer.				
Output Polarity	Bipolar, continuous zero crossing				
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 90% or 90% to 10%, respectively				
Voltage Setting Range	Using the VOLTAGE potentiometer, approx. -100% to 100% of the rated value				
Current Setting Range	The output current is limited and fixed to the maximum value				
Setting Time at Rated Load	<100ms to 500ms, depending on type, for changes in the output voltage from -100% to 100%				
Setting Resolution	$< \pm 2 \times 10^{-3}$ of rated value with potentiometer on front panel $< \pm 2 \times 10^{-5}$ of rated value with fine potentiometer $1 \times 10^{-4}$ of rated value with option interface				
Discharge Time Constant	With output free of load, 1s to 10s, depending on type				
Accuracy	Voltage: $< \pm 0.2\%$ of rated value Current: $< \pm 0.2\%$ of rated value for current ranging between $> 5\text{mA}$ to $< 200\text{A}$ Current: $< \pm 0.5\%$ of rated value for current ranges $< 5\text{mA}$ or $> 200\text{A}$ Additional digital display error $< \pm 2$ digits				
Residual Ripple	$< 3 \times 10^{-4}$ of the rated value + 50mVpp, typ. $2 \times 10^{-4}$ pp of the rated value (30Hz - 10MHz), $< 1 \times 10^{-4}$ of the rated value + 20mV, typical $6 \times 10^{-5}$ of the rated value RMS				
Control Deviation	$\pm 10\%$ mains voltage variation: $< \pm 2 \times 10^{-5}$ of the rated value Open circuit / full load: $2 \times 10^{-4}$ of the rated value Over 8 hours: $< \pm 2 \times 10^{-4}$ of the rated value Temperature deviations $< \pm 2 \times 10^3/\text{K}$ 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
	-20		+50	°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				
Storage	Dust free and dry				

## Signals & Controls

	Function
Front panel	Voltage potentiometer, power switch, HV ON/OFF switch, digital display for current and voltage, current limit potentiometer (optional). Display of the output voltage set point is possible with the VIEW SET push-button.
Operating Modes	The HV output's polarity is bipolar. The power supplies can be operated in the LOCAL, ANALOG (optional) and DIGITAL (optional) operating modes.

## EMC: Emissions

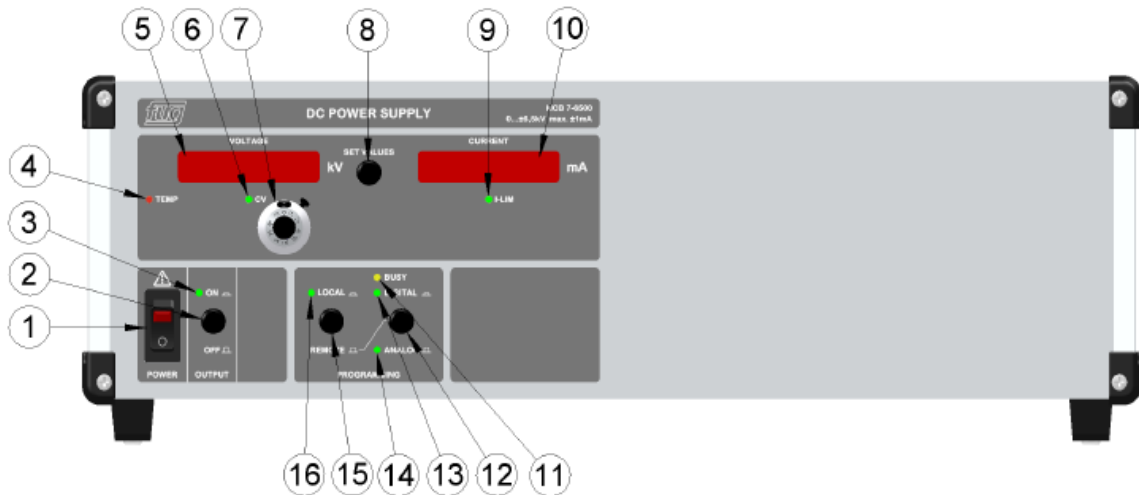
Phenomenon	Standard	Notes & Conditions
Harmonic Currents	EN61000-6-2	
Voltage Flicker	EN61000-6-3	

## 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

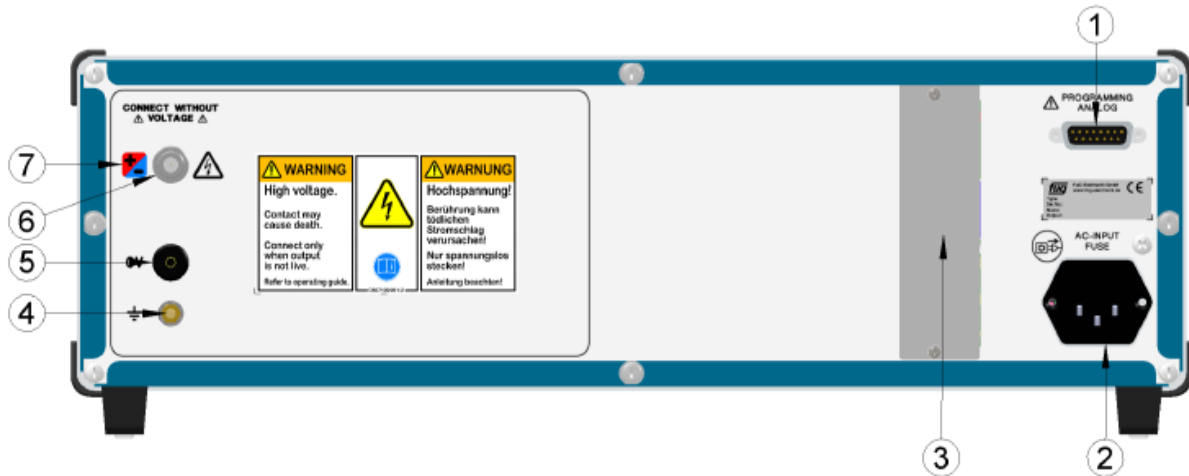


Front panel shown for illustrative purposes only, dimensions and layout differ by power rating - see mechanical details table.

Number	Function	Number	Function
1	AC power switch with indicator light Disconnects the power supply from the mains, two-pole switching	9	I-LIM LED for active current set-point limit
2	DC output ON (OUTPUT) There is no mains disconnection	10	Current display actual value Current display dark when SET VALUES switch is pushed
3	DC output ON LED Lights up green when the controller and therefore the power stage is operating (OUTPUT ON)	11	LED BUSY displays data traffic on the digital interface (optional)
4	Over-temperature LED: Internal device temperature too high, fan failed or reduced flow. (Use is type-dependent)	12	Switching the operation mode between REMOTE/ANALOG and REMOTE/DIGITAL (optional)
5	Voltage display, flashing: Set point; not flashing: Actual value	13	LED indicating digital programming active (optional)
6	LED for constant voltage control mode (Constant Voltage)	14	LED indicating Analog programming/interface/interface active (optional)
7	Lockable ten-turn potentiometer for voltage adjustment	15	Switching the operation mode between LOCAL and REMOTE (optional)
8	SETVALUES Switch displays between Set-point mode and Actual output mode, displays flash when in set point mode	16	LED indicating LOCAL control mode active (optional)

Mechanical Details

Rear view with single 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	15-pin Sub-D connector for analog programming/interface (Optional)	5	0V load connection, internally connected to the 0V of the electronics. This 0V connection is permanently connected to the protective conductor (PE)
2	AC input with mains fuses IEC connector (as shown) with integrated fuse	6	HV output (dedicated for screened HV- cable with grounded screen, which can be used for current return)
3	Slot for digital interface (e.g.: IEEE-488, RS232, USB, LAN, ...) (Optional)	7	Polarity indication
4	Earth bolt: This connection must be connected to the ground of the load. This earth bolt is permanently connected to the protective conductor (PE)		

## Mechanical Details

Model Number	Mounting	Width		Height		Depth	Weight
HCB35-3500	Bench mount <sup>(1)</sup>	19"	443mm	3U	133mm	450mm	12kg

### Notes:

1. Rack mount option

### Cables

#### Mains input cable

Single phase mains: with CEE-7/7

#### 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.