HCE350 Series

XP Power

AC-HVDC POWER SUPPLIES

350W EUROCASSETTE

The HCE350 series power supplies are highly stable switch-mode power supplies with low ripple.

Due to the high switching frequency a low residual ripple is achieved in the generated output voltage, with high stability, good regulation dynamics, and at the same time only a low amount of stored energy.

The compact light weight eurocasette design provides ease of integrationg via a 3U (for 7W & 35W modules) or 6U (for 140W & 350W modules) subrack (19" mounting).

Dimensions

See mechanical details table

Features

- 0-125V to 0-35kV output models
- Single phase AC input
- Continuous operation at full rated power
- Screwdriver operated multi-turn potentiometer for voltage setting
- Screwdriver operated multi-turn potentiometer for current limit setting
- Control mode display with LED's
- Constant voltage (CV) or constant current (CC) operation with automatic transfer
- Analog programming/interface with set point inputs
- HV on/off
- Front panel output sockets for voltage & current monitors
- 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
- High voltage test stands
- Ion sources
- Laboratory power
- Photomultiplier / Secondary electron multiplier

HCE350 Series

Models & Ratings

Model Number	Polarity	Output Voltage	Output Current	Input Voltage	Frequency
HCE350-125P	Positive	0 to +125V	0 to 2.5A	230VAC, ±10%	47 to 63Hz
HCE350-125N	Negative	0 to -125V			
HCE350-200P	Positive	0 to +200V	0 to 1.5A	230VAC, ±10%	47 to 63Hz
HCE350-200N	Negative	0 to -200V			
HCE350-350P	Positive	0 to +350V	0 to 1A	230VAC, ±10%	47 to 63Hz
HCE350-350N	Negative	0 to -350V			
HCE350-650P	Positive	0 to +650V	0 to 500mA	230VAC, ±10%	47 to 63Hz
HCE350-650N	Negative	0 to -650V			
HCE350-1250P	Positive	0 to +1.25kV	0 to 250mA	230VAC, ±10%	47 to 63Hz
HCE350-1250N	Negative	0 to -1.25kV			
HCE350-2000P	Positive	0 to +2kV	0 to 150mA	230VAC, ±10%	47 to 63Hz
HCE350-2000N	Negative	0 to -2kV			
HCE350-3500P	Positive	0 to +3.5kV	0 to 100mA	230VAC, ±10%	47 to 63Hz
HCE350-3500N	Negative	0 to -3.5kV			
HCE350-6500P	Positive	0 to +6.5kV	0 to 50mA	230VAC, ±10%	47 to 63Hz
HCE350-6500N	Negative	0 to -6.5kV			
HCE350-12500P	Positive	0 to +12.5kV	0 to 25mA	230VAC, ±10%	47 to 63Hz
HCE350-12500N	Negative	0 to -12.5kV			
HCE350-20000P	Positive	0 to +20kV	0 to 15mA	230VAC, ±10%	47 to 63Hz
HCE350-20000N	Negative	0 to -20kV			
HCE350-35000P	Positive	0 to +35kV	0 to 10mA	230VAC, ±10%	47 to 63Hz
HCE350-35000N	Negative	0 to -35kV			

Options

- Lockable 10-turn potentiometers for voltage adjustment

Please consult XP Power Sales

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage					See models and ratings table
Power Factor		>0.95			At full load at nominal AC line
Efficiency		90		%	
Overvoltage Category		II			
Protection Class		I			
Input Connector	IEC60320 C20 receptacle				

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage Range	See models and ratings table				
Output Current Range	See models and ratings table				
Output Control	Continuous adjustment from 0 to rated voltage/current by front panel mounted encoders with coarse and fine adjustment settings				
Output Polarity	The power supply has a fixed output polarity. The polarity is set by the factory and is indicated by a sticker on the front and rear panel. (Positive - red; negative - blue).				
Output Isolation	The output connector centre pole carries the high voltage, the "0V" terminal is connected to the PE (Ground). Current return preferably takes place via the screen of the output cable.				
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 Limitation	<10ms with load changes that effect a change of less than 10% in the output voltage				
Current Limit Setting Range	Using the CURRENT potentiometer, approx. 0.1% to 100% of the rated value				
Setting Time at Rated Load	<200ms type, for changes in the output voltage from 10 to 90% or 90 to 10%, respectively				
Setting Resolution	$\pm 1 \times 10^{-4}$ of rated value with analog programming/interface				
Discharge Time Constant	With output free of load, max. 10s				
Reproducibility	$\pm 1 \times 10^{-4}$ of rated value with analog programming/interface				
Residual Ripple Voltage	$<1 \times 10^{-4}$pp, +50mV of the rated value, typ. $<5 \times 10^{-5}$pp (measuring band width 30Hz to 10MHz) RMS $<3 \times 10^{-5}$, +20mV of the rated value, typ. $<1.5 \times 10^{-5}$				
Residual Ripple Current	$<5 \times 10^{-4}$pp, +50mV of the rated value (measuring band width 30Hz to 10MHz)				
Control Deviation	±10% mains change: $<\pm 1 \times 10^{-5}$ of the rated value Open circuit / full load: 2×10^{-4} of the rated value Over 8 hours: $<\pm 1 \times 10^{-4}$ of the rated value Temperature deviations $<\pm 1.5 \times 10^{-4}$/K of the rated value				
Short Circuit Protection	The power supply is short-circuit and flash-over proof. The maximum current can be drawn at any output voltage, even in the event of a short-circuit.				

Signals & Controls

	Function
Front panel	LED's for status messages
Operating Modes	The HV output's polarity is positive or negative (see models & ratings table). The power supplies can be operated in internal & external operating modes.

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Temperature Operation	0		+40	˚C	
Storage Temperature	-20		+50	˚C	Dust free and dry
Temperature Coefficient		±0.1		˚C	
Ambient Temperature	0		+40	°C	Operating
	0		+60	°C	Storage
Humidity	0		+80	%	Up to +31°C, decreasing linearly down to 50% relative humidity at +40°C
Cooling	Heat generated in the power supply unit is dissipated by convection.				
Operating Altitude			2000	m	Above sea level
Pollution Degree		1			
Protection	IP20				
Operation Location	Only for use in dry indoor areas				

EMC: Emissions

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

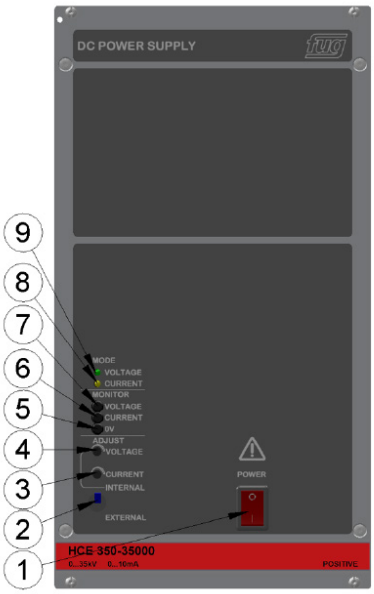
Safety Approvals

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

Mechanical Details

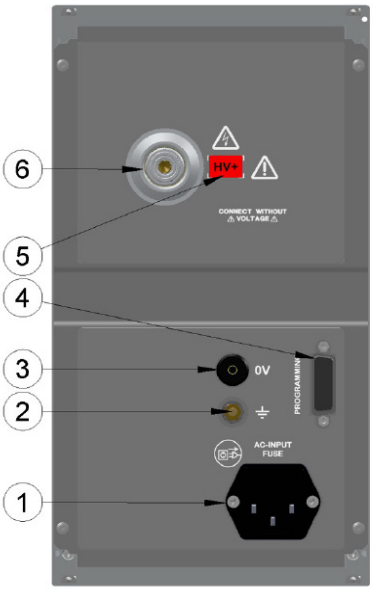
Front view with controls of the 140W or 350W versions

Number	Function
1	AC power switch is illuminated when Power ON Disconnects the power supply from the mains, two-pole switching
2	INTERNAL / EXTERNAL toggle switch (programming switch) between internal and external operation
3	CURRENT setting with a screwdriver
4	VOLTAGE setting with a screwdriver
5	0V voltage reference of the monitors, must not be under current load
6	V Measuring value of the current output voltage 0…+10VDC corresponds to 0...U_{Rated} Internal resistance approx. 10kΩ
7	I Measuring value of the current output current 0…+10VDC corresponds to 0...I_{Rated} Internal resistance approx. 10kΩ
8	CC Constant Current LED yellow for Current limitation mode
9	CV Constant Voltage LED green for Constant Voltage control mode



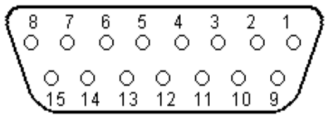
Rear view with single phase AC input 140W or 350W versions

Number	Function
1	AC input IEC connector (as illustrated)
2	Earth bolt: This connection is provided for connecting to the ground of the load.
3	0V load connection, internally connected to the 0V of the electronics. This 0V connection is permanently connected to the protective conductor (PE).
4	15-pin Sub-D connector for analog programming, active with EXTERNAL switch position ` (front panel)
5	Polarity indication: RED: POSITIVE, BLue: NEGATIVE
6	For power supplies with 1250VDC or higher output voltage: HV output (designated for screened output cable with grounded screen) For power supplies up to 650VDC output voltage: HV-output with laboratory safety socket



Mechanical Details

Overview of the analog programming/interface



Number	Idenification	Type	Function
1	CC	Digital output	Supplies approx. +15V, if device is in constant current control corresponds to LED CC Ri approx. 10kΩ
2	CV	Digital output	Supplies approx. +15V, if device is in constant voltage control corresponds to LED CV Ri approx. 10kΩ
3	I-MON	Analog output	Monitor voltage of the output current 0…10V corresponds to 0…I_{Rated} Ri approx. 10kΩ
4	VPS	Analog output	Slave drive of the voltage potentiometer on the front panel 0…+10V for 0…U_{Rated} Ri approx. 10kΩ
5	IPS	Analog output	Slave drive of the current potentiometer on the front panel 0…+10V for 0…I_{Rated} Ri approx. 10kΩ
6	0VD	D-GND	Digital ground, may be under current load
7	Not connected	Not connected	Not connected
8	V-SET	Analog input	0…+10V corresponds to 0…U_{Rated} Ri toward 0V approx. 10MΩ
9	0V	A-GND	Reference for analog signals, must not be under current load
10	+10VREF	Analog output	+10V reference voltage, can tolerate loads up to max. 3mA
11	V-MON	Analog output	Measuring value of the current output voltage Analog output, 0…+10V corresponds to 0…U_{Rated} Ri approx. 10kΩ
12	OUTPUT ON	Digital input	Pin (12) open OUTPUT = OFF, Pin (12) connected to 0VD Pin (6) = OUTPUT ON
13	Not connected	Not connected	Not connected
14	Not connected	Not connected	Not connected
15	I-SET	Analog input	0…+10V corresponds to 0…I_{Rated} Ri toward 0V approx. 10MΩ

Mechanical Details

Model Number	Mounting	Width		Height		Depth	Weight
HCE350-125P	19" Subrack mount	21HP	107mm	6U	262mm	230mm	4kg
HCE350-125N	19" Subrack mount	21HP	107mm	6U	262mm	230mm	4kg
HCE350-200P	19" Subrack mount	21HP	107mm	6U	262mm	230mm	4kg
HCE350-200N	19" Subrack mount	21HP	107mm	6U	262mm	230mm	4kg
HCE350-350P	19" Subrack mount	21HP	107mm	6U	262mm	230mm	4kg
HCE350-350N	19" Subrack mount	21HP	107mm	6U	262mm	230mm	4kg
HCE350-650P	19" Subrack mount	21HP	107mm	6U	262mm	230mm	4kg
HCE350-650N	19" Subrack mount	21HP	107mm	6U	262mm	230mm	4kg
HCE350-1250P	19" Subrack mount	21HP	107mm	6U	262mm	230mm	4kg
HCE350-1250N	19" Subrack mount	21HP	107mm	6U	262mm	230mm	4kg
HCE350-2000P	19" Subrack mount	21HP	107mm	6U	262mm	230mm	4kg
HCE350-2000N	19" Subrack mount	21HP	107mm	6U	262mm	230mm	4kg
HCE350-3500P	19" Subrack mount	28HP	142mm	6U	262mm	230mm	4kg
HCE350-3500N	19" Subrack mount	28HP	142mm	6U	262mm	230mm	4kg
HCE350-6500P	19" Subrack mount	28HP	142mm	6U	262mm	230mm	6kg
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HCE350-35000P	19" Subrack mount	28HP	142mm	6U	262mm	230mm	6kg
HCE350-35000N	19" Subrack mount	28HP	142mm	6U	262mm	230mm	6kg

Cables

Mains input cable
Single phase mains: with CEE-7/7

Mating connectors
15 pole D-SUB for analog programming / interface without cable

Screened HV output cable (For units with output voltage 1250V and higher)
3m long, with mating connector assembled on one end, other end open