

REC-HP-E

PROGRAMMABLE HIGH POWER RECTIFIER



POSITIVE PROBLEM SOLVING **+ =**

The REC-HP-E provides up to 15kW of power in just a 3U high case. A 10 turn digitally encoded potentiometer allows for straight forward front panel operation.

The front panel display indicates all relevant output quantities simultaneously. Output values can be preset and read prior to releasing the output. ATE options are offered for system integration. Each unit has an RS-232 and isolated analogue interface with user switchable ranges [0 - 5VDC / 0 - 10VDC] as standard. If computer control is required then any combination of integrated RS-485, GPIB, USB & LAN interfaces can be specified. An advanced model with constant power and master/slave operation is available on request.

- + Constant Voltage and Current Modes**
- + Fixed or Programmable Outputs**
- + High Power Models on Request**
- + Optional Computer Interfaces**
- + Simple Front Panel Operation**
- + Efficiency up to 94%**

REC-HP-E

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SELECTION TABLE

Part Number	Max Power	Output Voltage	Output Current
REC-HP-E 520	5kW	0 - 20V	0 - 250A
REC-HP-E 540	5kW	0 - 40V	0 - 125A
REC-HP-E 580	5kW	0 - 80V	0 - 65A
REC-HP-E 5100	5kW	0 - 100V	0 - 50A
REC-HP-E 5150	5kW	0 - 150V	0 - 35A
REC-HP-E 5300	5kW	0 - 300V	0 - 17A
REC-HP-E 5600	5kW	0 - 600V	0 - 8.5A
REC-HP-E 5800	5kW	0 - 800V	0 - 6.25A
REC-HP-E 51000	5kW	0 - 1000V	0 - 5A
REC-HP-E 51200	5kW	0 - 1200V	0 - 4A
REC-HP-E 51500	5kW	0 - 1500V	0 - 3.4A

REC-HP-E 1020	10kW	0 - 20V	0 - 500A
REC-HP-E 1040	10kW	0 - 40V	0 - 250A
REC-HP-E 1080	10kW	0 - 80V	0 - 130A
REC-HP-E 10100	10kW	0 - 100V	0 - 100A
REC-HP-E 10150	10kW	0 - 150V	0 - 70A
REC-HP-E 10300	10kW	0 - 300V	0 - 34A
REC-HP-E 10600	10kW	0 - 600V	0 - 17A
REC-HP-E 10800	10kW	0 - 800V	0 - 13A
REC-HP-E 101000	10kW	0 - 1000V	0 - 10A
REC-HP-E 101200	10kW	0 - 1200V	0 - 8A
REC-HP-E 101500	10kW	0 - 1500V	0 - 7A

REC-HP-E 1520	15kW	0 - 20V	0 - 750A
REC-HP-E 1540	15kW	0 - 40V	0 - 375A
REC-HP-E 1580	15kW	0 - 80V	0 - 195A
REC-HP-E 15100	15kW	0 - 100V	0 - 150A
REC-HP-E 15150	15kW	0 - 150V	0 - 100A
REC-HP-E 15300	15kW	0 - 300V	0 - 50A
REC-HP-E 15600	15kW	0 - 600V	0 - 25A
REC-HP-E 15800	15kW	0 - 800V	0 - 19A
REC-HP-E 151000	15kW	0 - 1000V	0 - 15A
REC-HP-E 151200	15kW	0 - 1200V	0 - 12A
REC-HP-E 151500	15kW	0 - 1500V	0 - 10A

REC-HP-E 2020	20kW	0 - 20V	0 - 1000A
REC-HP-E 2040	20kW	0 - 40V	0 - 500A
REC-HP-E 2080	20kW	0 - 80V	0 - 250A
REC-HP-E 20100	20kW	0 - 100V	0 - 200A
REC-HP-E 20150	20kW	0 - 150V	0 - 133A
REC-HP-E 20300	20kW	0 - 300V	0 - 66A
REC-HP-E 20600	20kW	0 - 600V	0 - 33A
REC-HP-E 20800	20kW	0 - 800V	0 - 26A
REC-HP-E 201000	20kW	0 - 1000V	0 - 20A
REC-HP-E 201200	20kW	0 - 1200V	0 - 16A
REC-HP-E 201500	20kW	0 - 1500V	0 - 14A

Part Number	Max Power	Output Voltage	Output Current
REC-HP-E 3020	30kW	0 - 20V	0 - 1500A
REC-HP-E 3040	30kW	0 - 40V	0 - 750A
REC-HP-E 3080	30kW	0 - 80V	0 - 375A
REC-HP-E 30100	30kW	0 - 100V	0 - 300A
REC-HP-E 30150	30kW	0 - 150V	0 - 200A
REC-HP-E 30300	30kW	0 - 300V	0 - 100A
REC-HP-E 30600	30kW	0 - 600V	0 - 50A
REC-HP-E 30800	30kW	0 - 800V	0 - 38A
REC-HP-E 301000	30kW	0 - 1000V	0 - 30A
REC-HP-E 301200	30kW	0 - 1200V	0 - 25A
REC-HP-E 301500	30kW	0 - 1500V	0 - 20A

REC-HP-E 4520	45kW	0 - 20V	0 - 2250A
REC-HP-E 4540	45kW	0 - 40V	0 - 1125A
REC-HP-E 4580	45kW	0 - 80V	0 - 562A
REC-HP-E 45100	45kW	0 - 100V	0 - 450A
REC-HP-E 45150	45kW	0 - 150V	0 - 300A
REC-HP-E 45300	45kW	0 - 300V	0 - 150A
REC-HP-E 45600	45kW	0 - 600V	0 - 75A
REC-HP-E 45800	45kW	0 - 800V	0 - 57A
REC-HP-E 451000	45kW	0 - 1000V	0 - 45A
REC-HP-E 451200	45kW	0 - 1200V	0 - 37A
REC-HP-E 451500	45kW	0 - 1500V	0 - 30A

REC-HP-E 6020	60kW	0 - 20V	0 - 3000A
REC-HP-E 6040	60kW	0 - 40V	0 - 1500A
REC-HP-E 6080	60kW	0 - 80V	0 - 750A
REC-HP-E 60100	60kW	0 - 100V	0 - 600A
REC-HP-E 60150	60kW	0 - 150V	0 - 400A
REC-HP-E 60300	60kW	0 - 300V	0 - 200A
REC-HP-E 60600	60kW	0 - 600V	0 - 100A
REC-HP-E 60800	60kW	0 - 800V	0 - 76A
REC-HP-E 601000	60kW	0 - 1000V	0 - 60A
REC-HP-E 601200	60kW	0 - 1200V	0 - 50A
REC-HP-E 601500	60kW	0 - 1500V	0 - 40A

REC-HP-E 9020	90kW	0 - 20V	0 - 4500A
REC-HP-E 9040	90kW	0 - 40V	0 - 2250A
REC-HP-E 9080	90kW	0 - 80V	0 - 1125A
REC-HP-E 90100	90kW	0 - 100V	0 - 900A
REC-HP-E 90150	90kW	0 - 150V	0 - 600A
REC-HP-E 90300	90kW	0 - 300V	0 - 300A
REC-HP-E 90600	90kW	0 - 600V	0 - 150A
REC-HP-E 90800	90kW	0 - 800V	0 - 112.5A
REC-HP-E 901000	90kW	0 - 1000V	0 - 90A
REC-HP-E 901200	90kW	0 - 1200V	0 - 75A
REC-HP-E 901500	90kW	0 - 1500V	0 - 60A

Models with different nominal output powers to those listed are available in 5kW graduations up to 100kW. High power rectifiers up to 250kW are also possible on request. Please contact ETPS to discuss your requirements.

HIGHLIGHTED FEATURE

FREE V/I MODIFICATIONS

The REC-HP-E is an incredibly flexible product platform. We don't just offer standard models. You can specify your own nominal voltage and current ranges often at no additional cost.

For example you might have a device that needs exactly 850V at 15kW. We can provide a new unit with exactly those output ranges without increasing the price or lead time.

TECHNICAL DATA

INPUT							
	5kW	10kW	15kW	20kW	30kW	45kW	60kW
Connection	5 wire [3P+N+E]						
Maximum Allowed Non-Symmetry	<3%						
Standard Input Voltage	3 × 400 VAC [360 – 440 VAC 47 – 63 Hz]						
Standard Input Current ^{1,2}	11.5A _{eff}	22.9A _{eff}	34.4A _{eff}	45.8A _{eff}	68.7A _{eff}	103.1A _{eff}	137.5A _{eff}
Standard Nominal Current Internal Fuse	15A	30A	45A	60A	90A	135A	180A
Recommended Supply Breaker Value and Curve	16A type D/K	32A type D/K	63A type D/K	63A type D/K	80A type D/K	120A type D/K	150A type D/K
Input Voltage [Option /3P208]	3 × 208 VAC [187 – 229 VAC 47 – 63 Hz]						
Input Current [Option /3P208] ^{1,2}	23A _{eff}	46A _{eff}	69A _{eff}	92A _{eff}	138A _{eff}	207A _{eff}	276A _{eff}
Input Voltage [Option /3P440]	3 × 440 VAC [396 – 484 VAC 47 – 63 Hz]						
Input Current [Option /3P440] ^{1,2}	11A _{eff}	21A _{eff}	32.5A _{eff}	42A _{eff}	63.5A _{eff}	95A _{eff}	127A _{eff}
Input Voltage [Option /3P480]	3 × 480 VAC [432 – 528 VAC 47 – 63 Hz]						
Input Current [Option /3P480] ^{1,2}	10A _{eff}	19.5A _{eff}	30A _{eff}	39A _{eff}	58A _{eff}	87A _{eff}	117A _{eff}
Inrush Transient Current ²	<25A	<51A	<76A	<102A	<153A	<229A	<305A
Leakage Current	<35mA						
Cos Phi	>0.7						
Harmonic Content ³	50Hz = 72 % 100Hz = 2 % 150Hz = 0.9 % 200Hz = 0.1 % 250Hz = 11 % 350Hz = 0.6 %						
Efficiency	Up to 94%						

DISPLAY				
Resolution Voltage Display	10V – 69.99V	70V – 99.9V	100V – 999V	1000V – 1500V
Voltage Setting Resolution	00.00	00.0	000	0000
Resolution Current Display	2A – 69.99A	70A – 99.9A	100A – 999A	1000A – 2000A
Current Setting Resolution	00.00	00.0	000	0000

EMC AND SAFETY STANDARDS	
Safety	EN60950
Emissions	EN61000-6-4:2007
Immunity	EN61000-6-2:2005
Measurement, Control and Laboratory Equipment	EN61000-1:2010

AMBIENT CONDITIONS	
Cooling	Forced air, front to back
Operating Temperature	0 to 50°C
Storage Temperature	-20°C to 70°C
Humidity	<80%
Operating Altitude	<2000m
Weight	19kg [5kW], 26kg [10kW], 33kg [15kW], 52kg [20kW], 66kg [30kW], 99kg [45kW], 132 kgs [60kW], 198kg [90kW]
Dimensions	19" × 3U × 620mm [5kW / 10kW / 15kW], 19" × 6U × 620mm [20kW / 30kW] 19" × 9U × 620mm [45kW], 19" × 12U × 620mm [60kW], 19" × 18U × 620mm [90kW]
Fan Noise	42 – 43 dB

¹ For nominal current and nominal voltage

² For nominal input voltage

³ Total harmonic distortion input current ([%]/lin)

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TECHNICAL DATA

	OUTPUT										
	20V	40V	80V	100V	150V	300V	600V	800V	1000V	1200V	1500V
Static Regulation	± 0.1 % of F.S.										
Line Regulation Voltage	± 0.02 % F.S.										
Line Regulation Current	± 0.02 % F.S.										
Load Regulation	± 0.05 % F.S. ± 2mV										
Load Regulation Current	± 0.05 % F.S. ± 20mA										
Dynamic Response (10%-90%)	Typically <3ms assuming an ohmic load										
Typical Voltage Ripple (p-p) 20MHz	80mV	140mV	140mV	140mV	900mV	900mV	900mV	1000mV	1200mV	2500mV	2500mV
Typical Voltage Ripple (p-p) 300kHz	35mV	60mV	60mV	60mV	400mV	400mV	400mV	700mV	800mV	1500mV	1500mV
Typical Voltage Ripple (rms) 20MHz	35mV	60mV	60mV	60mV	400mV	400mV	400mV	400mV	400mV	400mV	500mV
Typical Voltage Ripple (rms) 300kHz	25mV	40mV	40mV	40mV	300mV	300mV	300mV	300mV	300mV	300mV	400mV
Current Ripple (p-p)	<0.5 % of F.S.										
Current Ripple (rms)	<0.4 % of F.S.										
Isolation [Between Primary and Secondary]	3000VAC										
Isolation [Between DC-Output and Earth]	500VDC						2000VDC				
Isolation [Between Primary and Earth]	2150VDC										
Rise Time [Full Load]	6ms	12ms	20ms	20ms	20ms	20ms	20ms	40ms	40ms	40ms	6ms
Rise Time [No Load]	5ms	10ms	10ms	10ms	10ms	10ms	10ms	10ms	20ms	20ms	5ms
Fall Time [Full Load]	15ms	20ms	20ms	20ms	40ms	40ms	50ms	60ms	80ms	100ms	25ms
Fall Time [No Load]	5s ≤50V										
Relative Voltage Accuracy	± 0.25% V _{MAX}										
Relative Current Accuracy	± 0.4% I _{MAX}										
Maximum Sense Voltage [0 to V _{MAX}]	5% of F.S.							No sense function provided			
Maximum Sense Voltage [Operating Over V _{MAX}]	± 1% of F.S.							No sense function provided			
Relative Voltage Sense Accuracy	± 0.5% V _{MAX} (relative accuracy for worst case sense operation)										
Over Voltage Protection	Adjustable between 0 % and 120 % of full voltage range										
Over Current Protection	Limited by the current setpoint										
Over Temperature Protection	If the internal heat sink temperature rises above 90°C the device will automatically shut down										
VI Mode	Voltage and current operation mode: voltage and current limit are programmable										



INTERFACE INFORMATION

ANALOGUE INTERFACE (STANDARD)

Digital Outputs (CV, Standby, Error)	Output type: Open collector with pull-up resistor 10k Ω after +5 V $I_{SINKMAX}$: 50 mA
Digital Inputs (Ext. Control, Standby)	Input resistance: 47k Ω Maximum input voltage: 50V High level: $V_{IN} > 2V$ Low level: $V_{IN} < 0.8V$
Analog Outputs (Xmon)	Output resistance: 100 Ω Minimum permissible load resistance: 2k Ω Minimum load resistance for 0.1 % accuracy: 100k Ω
Analog Inputs (Xset)	Input resistance: 1M Ω Maximum permissible input voltage: 25V
Reference Voltage	Reference voltage V_{REF} : 10V \pm 10 mV Output resistance: <10 Ω Maximum output current: 10 mA (not short-circuit-proof)
5 V – Supply Voltage	Output voltage: 5V \pm 300mV Maximum output current: 50 mA (not short-circuit-proof)
Programming Response Time	<10ms

RS-232 INTERFACE (STANDARD)

Signal Inputs (RxD, CTS)	Maximum input voltage: \pm 25V Input resistance: 5 k Ω [Type] Switching thresholds: $V_H < -3V$, $V_L > +3V$
Signal outputs (TxD, RTS)	Output voltage (at $R_L > 3k\Omega$): min \pm 5V, Type \pm 9V, max \pm 10V Output resistance: <300 Ω ; Short circuit current: Type \pm 10mA

RS-485 INTERFACE (OPTIONAL)

Maximum Input Voltage	\pm 5V
Input Resistance	>12k Ω
Output Current	\pm 60mA Max
High Level	$V_d > 0.2V$
Low Level	$V_d < -0.2V$

OPTIONS

CODE	DESCRIPTION
/F	Built with a user specified fixed DC output between 20-1500V
/A	Advanced model with constant power mode and master/slave operation.
/1P	Input voltage is 230VAC \pm 10% [for models with outputs of 5kW or 10kW only]
/3P208	3 Phase Input of 3 \times 208 (187 - 229Vac), 50/60Hz
/3P440	3 Phase Input of 3 \times 440 (396 - 484Vac), 50/60Hz
/3P480	3 Phase Input of 3 \times 480 (432 - 528Vac), 50/60Hz
/400HZ	400Hz input frequency
/ATE	No front panel control or display, analogue interface provided as standard
/USB	USB interface
/LT	IEEE 488.2 (GPIB) interface
/LTRS485	RS-485 interface
/LAN	Ethernet interface
/KFZ12	Output follows a 12Vdc automotive cranking curve
/KFZ24	Output follows a 24Vdc automotive cranking curve
/KFZXX	Output follows a user specific curve
/SCS	Metal cover set with cable glands for input and output terminals

Every effort is made to ensure that the information provided within this technical summary is accurate. However, ETPS Ltd must reserve the right to make changes to the published specifications without prior notice. Where certain operating parameters are critical for your application we advise that they be confirmed at the time of order. ETPS Ltd specialises in modifying its proven platforms to suit your needs. Please contact our office if your requirement is non-standard. Please note that your actual unit may differ from those shown.



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**WE ARE
POSITIVE
PEOPLE**
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ETPS engineer electronic power supply and testing systems. Our problem solving skills provide the spark of innovation to some of the world's leading technology brands.



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