ELECTRONIC TEST & POWER SYSTEMS

RUG-HP-E

RUGGED DC POWER SUPPLIES

POSITIVE PROBLEM SOLVING

The RUG-HP-E provides up to 21kW of power in just a 3U high case. Each unit is provided with protections against shock, vibration and humidity.

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, LAN 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 and USB interfaces can be specified.

- Protections Against Shock, Vibration & Humidity
- Constant Voltage and Current Modes
- High Power Models on Request
- Simple Front Panel Operation
- Worldwide Input Options
- Efficiency up to 94%

SELECTION TABLE

	OUTPUT CURRENT					
OUTPUT VOLTAGE	**3kW Models**	**4kW Models**	**5kW Models**	**7kW Models**	**10kW Models**	**15kW Models**
0 - 15V	0 - 250A	0 - 500A	0 - 500A	0 - 500A	0 - 750A	0 - 1000A
0 - 20V	0 - 250A	0 - 250A	0 - 250A	0 - 500A	0 - 500A	0 - 750A
0 - 25V	0 - 240A	0 - 240A	0 - 240A	0 - 480A	0 - 480A	0 - 600A
0 - 30V	0 - 234A	0 - 234A	0 - 234A	0 - 234A	0 - 400A	0 - 500A
0 - 35V	0 - 200A	0 - 200A	0 - 200A	0 - 200A	0 - 400A	0 - 430A
0 - 40V	0 - 175A	0 - 175A	0 - 175A	0 - 175A	0 - 350A	0 - 375A
0 - 45V	0 - 156A	0 - 156A	0 - 156A	0 - 156A	0 - 320A	0 - 340A
0 - 50V	0 - 140A	0 - 140A	0 - 140A	0 - 140A	0 - 280A	0 - 300A
0 - 60V	0 - 117A	0 - 117A	0 - 117A	0 - 117A	0 - 170A	0 - 250A
0 - 70V	0 - 100A	0 - 100A	0 - 100A	0 - 100A	0 - 150A	0 - 220A
0 - 80V	0 - 88A	0 - 88A	0 - 88A	0 - 88A	0 - 125A	0 - 190A
0 - 100V	0 - 70A	0 - 70A	0 - 70A	0 - 70A	0 - 100A	0 - 150A
0 - 150V	0 - 47A	0 - 47A	0 - 47A	0 - 47A	0 - 70A	0 - 100A
0 - 300V	0 - 24A	0 - 24A	0 - 24A	0 - 24A	0 - 35A	0 - 50A
0 - 600V	0 - 12A	0 - 12A	0 - 12A	0 - 12A	0 - 17A	0 - 25A
0 - 800V	0 - 9A	0 - 9A	0 - 9A	0 - 9A	0 - 13A	0 - 19A
0 - 1000V	0 - 7A	0 - 7A	0 - 7A	0 - 7A	0 - 10A	0 - 15A
0 - 1200V	0 - 5.8A	0 - 5.8A	0 - 5.8A	0 - 5.8A	0 - 9A	0 - 13A
0 - 1500V	0 - 4.7A	0 - 4.7A	0 - 4.7A	0 - 4.7A	0 - 7A	0 - 10A

	OUTPUT CURRENT						
OUTPUT VOLTAGE	**21kW Models**	**30kW Models**	**35kW Models**	**45kW Models**	**49kW Models**	**56kW Models**	**63kW Models**
0 - 20V	0 - 1250A	0 - 1500A	0 - 1750A	0 - 2250A	N/A	N/A	N/A
0 - 25V	0 - 1000A	0 - 1250A	0 - 1500A	0 - 1800A	0 - 2000A	0 - 2250A	N/A
0 - 30V	0 - 700A	0 - 1000A	0 - 1200A	0 - 1500A	0 - 1650A	0 - 1900A	0 - 2100A
0 - 35V	0 - 600A	0 - 857A	0 - 1000A	0 - 1285A	0 - 1400A	0 - 1600A	0 - 1800A
0 - 40V	0 - 525A	0 - 750A	0 - 900A	0 - 1125A	0 - 1240A	0 - 1400A	0 - 1575A
0 - 45V	0 - 470A	0 - 666A	0 - 800A	0 - 1000A	0 - 1100A	0 - 1250A	0 - 1400A
0 - 50V	0 - 420A	0 - 600A	0 - 700A	0 - 900A	0 - 1000A	0 - 1150A	0 - 1260A
0 - 60V	0 - 350A	0 - 500A	0 - 600A	0 - 750A	0 - 840A	0 - 950A	0 - 1050A
0 - 70V	0 - 300A	0 - 425A	0 - 500A	0 - 640A	0 - 700A	0 - 800A	0 - 900A
0 - 80V	0 - 270A	0 - 375A	0 - 450A	0 - 560A	0 - 620A	0 - 700A	0 - 800A
0 - 100V	0 - 210A	0 - 300A	0 - 350A	0 - 450A	0 - 500A	0 - 560A	0 - 640A
0 - 150V	0 - 140A	0 - 200A	0 - 240A	0 - 300A	0 - 330A	0 - 380A	0 - 420A
0 - 300V	0 - 70A	0 - 100A	0 - 120A	0 - 150A	0 - 170A	0 - 190A	0 - 210A
0 - 600V	0 - 35A	0 - 50A	0 - 60A	0 - 75A	0 - 85A	0 - 95A	0 - 105A
0 - 800V	0 - 27A	0 - 37A	0 - 44A	0 - 56A	0 - 62A	0 - 70A	0 - 80A
0 - 1000V	0 - 21A	0 - 30A	0 - 35A	0 - 45A	0 - 49A	0 - 56A	0 - 63A
0 - 1200V	0 - 18A	0 - 25A	0 - 30A	0 - 37A	0 - 41A	0 - 47A	0 - 53A
0 - 1500V	0 - 14A	0 - 20A	0 - 24A	0 - 30A	0 - 33A	0 - 38A	0 - 42A

CUSTOM OUTPUT MODIFICATIONS

You can specify your own nominal output voltage and current ranges outside of the selection table above. So if you needed to power a device which needs exactly 850V at 15kW, we can provide a new unit with exactly those output ranges.

MODEL PART NUMBERS

To request a specific model is simple. The RUG-HP-E product family name precedes the requested nominal output power, followed by the nominal voltage. The example below shows how to create the part number for a 30kW/1500V unit.

NOMINAL POWER

RUG-HP-E 301500

NOMINAL VOLTAGE

OPTIONS TABLE

OPTIONS

CODE	DESCRIPTION
	OPERATING RANGES AND FEATURES
/2000V	Unit built with 2000V output
/HS	High speed model - secondary rise and fall time shortened by a factor of 10
/PR	Reversible output polarity (only in standby mode)
	OPERATING MODES
/HP	Advanced model with constant power, master/slave operation and redundancy
	INPUT
/1P	Input voltage is 230VAC ± 10% (for models with outputs of 3kW to 5kW only)
/3P200	3 Phase input of 3 × 200VAC (180 - 220VAC), 50/60Hz
/3P208	3 Phase input of 3 × 208VAC (187 - 229VAC), 50/60Hz
/3P440	3 Phase input of 3 × 440VAC (396 - 484VAC), 50/60Hz
/3P480	3 Phase input of 3 × 480VAC (432 - 528VAC), 50/60Hz
/400HZ	400Hz input frequency
/DC	Any nominal in the input range 250 - 750VDC ± 10% (eg. 500VDC ± 10% = 450 - 550VDC input)
	INTERFACES AND CONTROL
/ATE	No front panel control or display
/IEEE488	IEEE 488.2 (GPIB) remote control interface on rear panel
/RS485	RS-485 remote control interface on rear panel
/USB	USB remote control interface on rear panel
	SAFETY AND PROTECTION
/DDS	Decoupling diode
/FD	Freewheeling diode
/LOCK-AC	Interlock for mains input
/LOCK-DC	Interlock for DC output
/POP	Passive overvoltage protection
/SC	Metal cover set with cable glands for input and output terminals
	ISOLATION
/IIO	Models up to 300V_{NOM} built with increased 2000VDC isolation between DC-output and earth
	FORM FACTOR AND ENCLOSURES
/LR	Integration into a static enclosure
/FC	Integration into a flightcase
	GENERAL SPECIFICATIONS
/3Y	3 year warranty
/5Y	5 year warranty

CUSTOM OPTIONS

Around a third of our units are custom builds or modified in some way. So if you require a custom modification or option please let us know.

OPERATING RANGES AND FEATURES

STANDARD FEATURES

TECHNICAL DATA										
	0 - 15V	16 - 35V	36 - 70V	71 - 120V	121 - 350V	351 - 700V	701 - 900V	901 - 1150V	1151 - 1400V	1401 - 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. ±20mV									
Load Regulation Current	±0.05 % F.S. ±20mA									
Dynamic Response (10%-90%)	Typically <3ms assuming an ohmic load									
Typical Voltage Ripple (p-p) 20MHz	40mV	80mV	140mV	140mV	900mV	350mV	350mV	400mV	850mV	900mV
Typical Voltage Ripple (p-p) 300kHz	15mV	35mV	60mV	60mV	400mV	250mV	250mV	300mV	500mV	550mV
Typical Voltage Ripple (rms) 20MHz	15mV	35mV	60mV	60mV	400mV	150mV	150mV	150mV	150mV	200mV
Typical Voltage Ripple (rms) 300kHz	10mV	25mV	40mV	40mV	300mV	100mV	100mV	100mV	100mV	150mV
Current Ripple (p-p)	<0.5 % of F.S. of I_{MAX}									
Current Ripple (rms)	600mA	380mA	260mA	220mA	60mA	30mA	25mA	15mA	12mA	12mA
Rise Time (Full Load)	6ms	6ms	12ms	20ms	20ms	20ms	40ms	40ms	40ms	6ms
Rise Time (No Load)	5ms	5ms	10ms	10ms	10ms	10ms	10ms	20ms	20ms	5ms
Fall Time (Full Load)	15ms	15ms	20ms	20ms	40ms	50ms	60ms	80ms	100ms	25ms
Fall Time (No Load)	tf <5s at Va <60V				10s				15s	1s
Voltage Set-Value Accuracy	± 0.1% V_{MAX}									
Current Set-Value Accuracy	±0.2% I_{MAX}									
Relative Voltage Sense Accuracy	±0.5% V_{MAX} (relative accuracy for worst case sense operation)									

OPTIONS

CODE	DESCRIPTION
/2000V	Unit built with 2000V output
/HS	High speed model - secondary rise and fall time shortened by a factor of 10
/PR	Reversible output polarity (only in standby mode)

OPERATING MODES

STANDARD FEATURES

TECHNICAL DATA	
VI Mode	Voltage and current operation mode: voltage and current limit are programmable

OPTIONS

CODE	DESCRIPTION
/HP	Advanced model with constant power, master/slave operation and redundancy

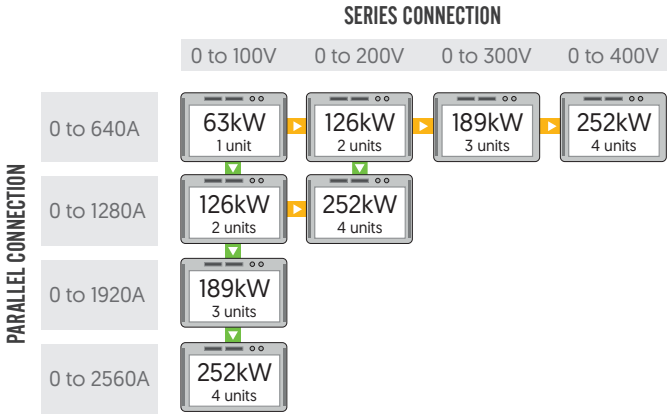
HIGHLIGHTED OPTION

ADVANCED MODELS (/HP)

Advanced RUG-HP models are available which feature selection of additional features discussed below. Please note, advanced RUG-HP models are not available with a front panel HMI.

MASTER/SLAVE OPERATION

Each advanced RUG-HP unit is built with a systems interface as standard for master/slave operation. Up to 8 units can be arranged in parallel, series or matrix configurations to achieve higher output voltages/currents. Each power system is able to operate independently, so that systems can be reconfigured, expanded or broken up as needs dictate. The diagram shows all the possible configurations with four 100V/63kW systems.



CONSTANT POWER MODE

Each unit has a constant power mode, which is particularly useful for replicating the standard discharge curve of a battery pack. An adjustable resistance mode is also provided.

SOFT INTERLOCK

A soft interlock circuit is provided with all advanced RUG-HP models. This allows users to connect the unit to an external safety device such as an emergency stop. This feature requires a high signal (+10V) to be present between two pins, otherwise the output will be shutdown.

REDUNDANCY

To ensure minimal disruption, redundancy is provided when operating multiple RUG-HP units in master/slave. Values set on the master unit are multiplied by number of units in series or parallel (e.g. if you have three units in parallel and set 10A on the master unit, each unit will provide 10A for a combined 30A total). If a unit device fails, the remaining units continue to provide their pre-assigned output (e.g. in the example above each unit will would provide 10A for a combined 20A total should one unit fail).

PV SIMULATION

If you need to test PV inverters in the field, the RUG-HP units are built with a PV simulation mode as standard which enables a photovoltaic generator's MPP tracking to be simulated. The MPP is available in both voltage and current modes. A specialised PV simulation software package is also provided which contains many pre-loaded solar panels from different manufacturers.

INPUT

STANDARD FEATURES

TECHNICAL DATA						
	3kW	**4kW**	**5kW**	**7kW**	**10kW**	**15kW**
Connection	3 wire (P+N+PE)	5 wire (3P+N+PE)				
Maximum Allowed Non-Symmetry	<3%					
Standard Input Voltage	230VAC ±10%	3 × 400VAC ±10%				
Standard Input Frequency	47 - 63Hz					
Standard Input Current[1]	22A$_{eff}$	9.3A$_{eff}$	11.6A$_{eff}$	16.6A$_{eff}$	23.2A$_{eff}$	34.7A$_{eff}$
Recommended Supply Breaker Value and Curve (3 × 400VAC Input)	16A type D/K (Op. /3P400)	16A type D/K	16A type D/K	32A type D/K	32A type D/K	63A type D/K
Input Voltage (Option /1P)	Standard	230VAC ±10%	230VAC ±10%	N/A		
Input Current (Option /1P)[1]	Standard	28A$_{eff}$	33A$_{eff}$	N/A		
Input Voltage (Option /3P200)	3 × 200VAC ±10%					
Input Current (Option /3P200)[1]	13.9A$_{eff}$	18.5A$_{eff}$	23.2A$_{eff}$	32.5A$_{eff}$	46.3A$_{eff}$	69.4A$_{eff}$
Input Voltage (Option /3P208)	3 × 208VAC ±10%					
Input Current (Option /3P208)[1]	13.4A$_{eff}$	17.8A$_{eff}$	22.3A$_{eff}$	31.2A$_{eff}$	44.5A$_{eff}$	66.7A$_{eff}$
Input Voltage (Option /3P400)	3 × 400VAC ±10%	Standard				
Input Current (Option /3P400)[1]	7A$_{eff}$	Standard				
Input Voltage (Option /3P440)	3 × 440VAC ±10%					
Input Current (Option /3P440)[1]	6.4A$_{eff}$	8.5A$_{eff}$	10.6A$_{eff}$	14.8A$_{eff}$	21.1A$_{eff}$	31.6A$_{eff}$
Input Voltage (Option /3P480)	3 × 480VAC ±10%					
Input Current (Option /3P480)[1]	5.8A$_{eff}$	7.8A$_{eff}$	9.7A$_{eff}$	13.6A$_{eff}$	19.3A$_{eff}$	28.9A$_{eff}$
Inrush Transient Current[2]	<25A	<25A	<25A	<25A	<51A	<51A
Leakage Current	<35mA					
Cos Phi	>0.7					
Harmonic Content[2]	50Hz = 72 % | 100Hz = 2 % | 150Hz = 0.9 % | 200Hz = 0.1 % | 250Hz = 11 % | 350Hz = 0.6 %					
Efficiency	Up to 94%					

	21kW	**30kW**	**35kW**	**45kW**	**49kW**	**56kW**	**63kW**
Connection	5 wire (3P+N+PE)						
Maximum Allowed Non-Symmetry	<3%						
Standard Input Voltage	3 × 400VAC ±10%						
Standard Input Current[1]	48.6A$_{eff}$	69.4A$_{eff}$	80.9A$_{eff}$	104A$_{eff}$	113.3A$_{eff}$	129.5A$_{eff}$	145.6A$_{eff}$
Recommended Supply Breaker Value and Curve	63A type D/K	80A type D/K	120A type D/K	120A type D/K	150A type D/K	150A type D/K	180A type D/K
Input Voltage (Option /3P200)	3 × 200VAC ±10%						
Input Current (Option /3P208)[1]	97.1A$_{eff}$	138.7A$_{eff}$	161.8A$_{eff}$	208A$_{eff}$	226.5A$_{eff}$	258.9A$_{eff}$	291.2A$_{eff}$
Input Voltage (Option /3P208)	3 × 208VAC ±10%						
Input Current (Option /3P208)[1]	93.4A$_{eff}$	133.4A$_{eff}$	155.6A$_{eff}$	200A$_{eff}$	217.8A$_{eff}$	248.9A$_{eff}$	280A$_{eff}$
Input Voltage (Option /3P440)	3 × 440VAC ±10%						
Input Current (Option /3P440)[1]	44.2A$_{eff}$	63.1A$_{eff}$	73.6A$_{eff}$	94.6A$_{eff}$	103A$_{eff}$	117.7A$_{eff}$	132.4A$_{eff}$
Input Voltage (Option /3P480)	3 × 480VAC ±10%						
Input Current (Option /3P480)[1]	40.5A$_{eff}$	57.8A$_{eff}$	67.4A$_{eff}$	86.7A$_{eff}$	94.4A$_{eff}$	107.9A$_{eff}$	121.4A$_{eff}$
Inrush Transient Current[2]	<76A	<102A	<127A	<153A	<178A	<203A	<229A
Leakage Current	<35mA						
Cos Phi	>0.7						
Harmonic Content[2]	50Hz = 72 % | 100Hz = 2 % | 150Hz = 0.9 % | 200Hz = 0.1 % | 250Hz = 11 % | 350Hz = 0.6 %						
Efficiency	Up to 94%						

[1] At nominal input voltage. [2] At nominal input voltage, the inrush current only occurs at switch-on.

INPUT OPTIONS

CODE	DESCRIPTION
/1P	Input voltage is 230VAC ± 10% (for models with outputs of 3kW to 5kW only)
/3P200	3 Phase input of 3 × 200VAC (180 - 220VAC), 50/60Hz
/3P208	3 Phase Input of 3 × 208VAC (187 - 229VAC), 50/60Hz
/3P440	3 Phase Input of 3 × 440VAC (396 - 484VAC), 50/60Hz
/3P480	3 Phase Input of 3 × 480VAC (432 - 528VAC), 50/60Hz
/400HZ	400Hz input frequency
/DC	Any nominal in the input range 250 - 750VDC ± 10% (eg. 500VDC ± 10% = 450 - 550VDC input)

INTERFACES AND CONTROL

TECHNICAL INFORMATION

ANALOGUE INTERFACE (STANDARD)	
Digital Outputs (CV, Standby, Error)	Output type: Open collector with pull-up resistor 10kΩ after +5 V $I_{SINKMAX}$: 50 mA
Digital Inputs (Ext. Control, Standby)	Input resistance: 47kΩ Maximum input voltage: 50V High level: V_{IN} >2V Low level: V_{IN} <0.8V
Analogue Outputs (Xmon)	Output resistance: 100Ω Minimum permissible load resistance: 2kΩ Minimum load resistance for ±0.1 % accuracy: 100kΩ
Analogue Inputs (Xset)	Input resistance: 1MΩ Maximum permissible input voltage: 25V
Reference Voltage	Reference voltage V_{REF}: 10V ±10 mV Output resistance: <10 Ω Maximum output current: 10 mA (not short-circuit-proof)
5 V – Supply Voltage	Output voltage: 5V ± 300mV Maximum output current: 50 mA (not short-circuit-proof)
Set Value Accuracy (V/A) When Using Internal Ref.	±0.5%
Programming Response Time	<10ms
RS-232 INTERFACE (STANDARD)	
Signal Inputs (RxD, CTS)	Maximum input voltage: ±25V Input resistance: 5 kΩ (Type) Switching thresholds: VH < -3V, VL > +3V
Signal outputs (TxD, RTS)	Output voltage (at RL >3kΩ): min ± 5V, Type ± 9V, max ± 10V Output resistance: <300Ω; Short circuit current: Type ± 10mA
RS-485 INTERFACE (OPTIONAL)	
Maximum Input Voltage	± 5V
Input Resistance	>12kΩ
Output Current	±60mA Max
High Level	Vd >0.2V
Low Level	Vd <-0.2V

INTERFACE AND CONTROL OPTIONS

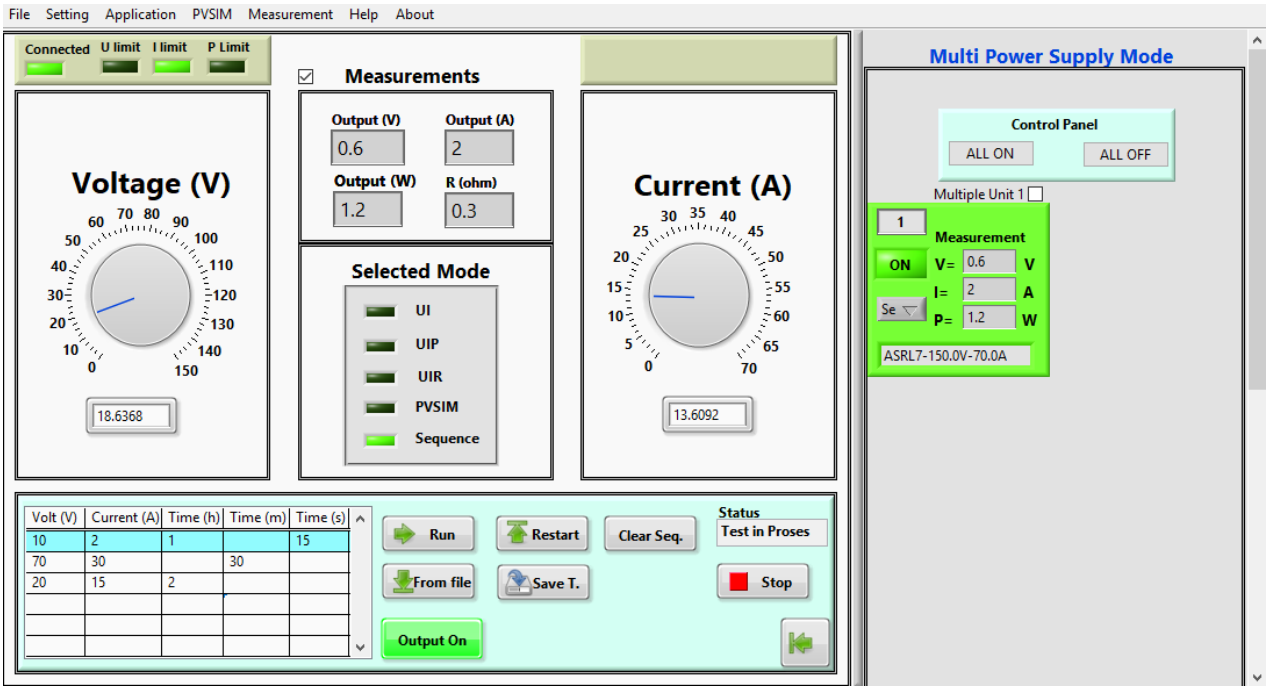
CODE	DESCRIPTION
/ATE	No front panel control or display
/IEEE488	IEEE 488.2 (GPIB) remote control interface on rear panel
/RS485	RS-485 remote control interface on rear panel
/USB	USB remote control interface on rear panel

SOFTWARE/SOFT TOOLS

STANDARD SOFTWARE

All new RUG-HP-E units are provided with free operating software. Live values of the power systems can be be viewed remotely in a simple and intuitive way. This is particularly useful when operating the power supply in a location that is remote to the DUT.

Voltage and current values can be controlled through the GUI. A test sequence function allows for more complex DC waveforms to be implemented directly through the software.



MECHANICAL

STANDARD FEATURES

AMBIENT CONDITIONS	
Cooling	Forced air, front to back
Operating Temperature	0 to 50°C
Storage Temperature	-20°C to 70°C
Operating Altitude	<2000m
Fan Noise	42 – 43 dB

SAFETY AND PROTECTION

STANDARD FEATURES

TECHNICAL DATA	
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
Under Voltage Lock Out	If the set limit is reached then the device will automatically shut down

OPTIONS

CODE	DESCRIPTION
/DDS	Decoupling diode
/FD	Freewheeling diode
/LOCK-AC	Interlock for mains input
/LOCK-DC	Interlock for DC output
/POP	Passive overvoltage protection
/SC	Metal cover set with cable glands for input and output terminals

ISOLATION

STANDARD FEATURES

TECHNICAL DATA	
Isolation (Between Primary and Secondary)	3000VAC
Isolation (Between DC-Output and Earth)	500VDC (0-300V models) | 2000VDC (301-1500V models)
Isolation (Between Primary and Earth)	2150VDC

OPTIONS

CODE	DESCRIPTION
/IIO	Models up to 300V_{NOM} built with increased 2000VDC isolation between DC-output and earth

FORM FACTOR AND ENCLOSURES

STANDARD FEATURES

WEIGHTS AND DIMENSIONS	
3kW-7kW Models	19" × 2U × 440mm (W × H × D), 14kg
10kW Models	19" × 2U × 600mm (W × H × D), 26kg
15kW Models	19" × 3U × 620mm (W × H × D), 26kg
21kW Models	19" × 3U × 620mm (W × H × D), 37kg
30kW Models	19" × 6U × 620mm (W × H × D), 52kg
35kW Models	19" × 6U × 620mm (W × H × D), 59kg
45kW Models	19" × 6U × 620mm (W × H × D), 73kg
49kW Models	19" × 9U × 620mm (W × H × D), 85kg
56kW Models	19" × 9U × 620mm (W × H × D), 92kg
63kW Models	19" × 9U × 620mm (W × H × D), 99kg

DESKTOP UNITS

On request, your choice of RUG-HP-E can be built without rackmounting flanges for no extra cost. This allows the unit to be used on a desktop or bench.

OPTIONAL ENCLOSURES

Units can be treated to integration into a flightcase or static enclosure. Having a programmable power system mounted into a flight case on castors is often advantageous, especially when several sites need to share the same equipment.

Multiple power systems can be fitted into the same flight case. Door hangers are fitted for convenience. Existing ETPS systems can also be retrospectively integrated into new flight cases where requested.

CODE	DESCRIPTION
/LR	Integration into a static enclosure
/FC	Integration into a flightcase

GENERAL SPECIFICATIONS

STANDARD FEATURES

EMC AND SAFETY STANDARDS	
Safety	EN 61010-1:2010+A1;2019
EMC	EN 61326-1:2013
RoHS	EN IEC 63000:2018
Standard Warranty	1 year

OPTIONS

CODE	DESCRIPTION
/3Y	3 year warranty
/5Y	5 year warranty

“WE ARE POSITIVE PEOPLE”

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.

ETPS
ELECTRONIC TEST & POWER SYSTEMS

Tel: +44 (0) 1246 452909
Sales: 0800 612 95 75
sales@etps.co.uk
www.etps.co.uk

ETPS Ltd
Unit 14, The Bridge
Beresford Way, Chesterfield
S41 9FG

POSITIVE PROBLEM SOLVING