60 Watts ECP Series



- Low Profile Design
- Compact Size, 4"x 2"
- IT & Medical Approvals
- Single, Dual and Triple Output
- <0.5 W No Load Input Power
- Peak Load Capability
- 3 Year Warranty

General

GREEN 🔀 POWER **Specification**

Input

Input Voltage • 85-264 VAC, derate from 100% load at 90 VAC to 90% load at 85 VAC Efficiency • 88% typical at 230 VAC and full load 4000VAC Input to Ground 500 VDC Output to Ground 500 VHz variable Output Output Voltage Output Voltage This Start Up Delay Start Up Delay Start Up Delay Fitted to USDS version, computs of multi output models Start Up Delay Start Up Res Time Hold Up Time Transient Response • See table • 13 s max • 13 s max • 13 s max • 13 s max • 14 monic Currents Voltput 2: 2% from 20% load to 100% load Output 2: 3% from 20% load to 100% load Output 2: 3% from 20% load to 100% load Output 3: 5% from 20% load to 100% load Output 4: 20 MHz Abandwidth O				
Input Frequency Input Current47-63 Hz1500 VAC Input to Ground 500 VDC Output 12 500 VDC Output 200 ND Coutput to Ground 500 VDC Output 12 115 ms typicalIndense Hold Up Time Hold Up Time Transient Response115 fars from 20% load to 100% load Output 3: 5% from 10% load to 100% load Output 2: 5% from 20% load to 100% load Output	Input Voltage		•	
Inrush Current Power Factor100 A max at 230 VAC, cold start at 25 °C EN61000-3-2, class ASwitching Frequency MTBF30-130 kHz variableNo Load Input Power Earth Leakage Current Input Protection: EN61000-3-2, class ASwitching Frequency MTBF: 30-130 kHz variableOutput Portection: e250 µA at 264 VAC, 60 Hz 	Input Frequency	• 47-63 Hz	loolation	
Initial Galesia EN4100.0-2.2 class A Power Factor EN4100.0-2.2 class A No Load Input Power = 0.8 V00.001.001.001.001.001.001.001.001.001.	Input Current	• 0.85 A max at 115 VAC		500 VDC Output to Ground
No Load input Power Earth Leakage Current input Protection <0.5 W <0.0 W	Inrush Current	• 100 A max at 230 VAC, cold start at 25 °C	Switching Frequency	
No Load input Power • 20.5 W Earth Leakage Current Input Protection • 250 µ At 264 VAC, 60 Hz Internal T2 A/250 V fuse in both line and neutral • Operating Temperature • -20 °C to +70 °C, derate from 100% load at 50 °C to 50% load at 70 °C Output • 10% on V1 only, output 2 on multi output models will track by the same percentage output s of multi output models • Derating Altitude Storage Temperature • -30 °C to +70 °C, derate from 100% load at 50 °C to 50% load at 70 °C Minimum Load • 10% minimum load required on all output s of multi output models • 10% minimum load required on all output s of multi output models • 50 to 95% RH, non condensing Start Up Delay • 1.3 s max • 15 ms typical • 300 g pk, half sine, 6 axes Hold Up Time • 16 ms min at full load at 115 VAC • Output 1: 2% from 0% load to 100% load Output 3: 5% from 10% load to 100% load Output 3: 5% from 10% load to 100% load Output 3: 5% from 10% load to 100% load charge at 1 A/µs • ENS5011/22, level B conducted & level A radiated Ripple & Noise • Fitted to US50 version, compensates for 0.5 V drop • Transient Response • 4% max deviation, recovering to less than radiated Immunity • ENS1000-4-3, 3 W/m, Perf Criteria A Ripple & Noise • 1% pk-pk (2% for US05 version), measured with 20 MHz bandwidth • Conducted Immunity • ENS1000-4-4, IV a) • ENS1000-4-5, S 0 Perf Criteria A <td< td=""><td>Power Factor</td><td>• EN61000-3-2, class A</td><td>MTBF</td><td></td></td<>	Power Factor	• EN61000-3-2, class A	MTBF	
Input Protection Internal T2 A/250 V fuse in both line and neutral Environmental Output Operating Temperature 0-20 °C to +70 °C, derate from 100% load at 70 °C Output Voltage • 56e table • Cooling • Natural convection Output Voltage Trim • 10% minimum load required on all outputs of multi output models • Operating Humidity • 58 to 95% RH, non condensing Minimum Load • 10% minimum load required on all outputs of multi output models • 13 s max • 40 °C to +85 °C Start Up Delay • 13 s max • 15 ms typical • 16 ms min at full load at 115 VAC • Sock Total Regulation • Output 1: 2% from 0% load to 100% load • ENS5011/22, level B conducted & level A radiated Minimum Sources • Fitted to US05 version, compensates for 0.5 V drop • ENG 1000-4-2, ±4 kV indirect contact, per Criteria A Remote Sense • 1% pk-pk (2% for US05 version), measured with 20 MHz bandwidth • ENG 1000-4-3, sl/m, Perf Criteria A Overvoltage Protection • 180-160% of nominal output voltage on V1 only, recycle input to reset • 20.02%/°C max Overtoad Protection • 120-160% of nominal ower • 20.02%/°C max Start Up Pite at Protection • 13 s for S0% step load change on V1 only, recycle input to reset • EN61000-4-5, installation class 3, Pe	No Load Input Power	• <0.5 W		at 25 °C, GB
Input Protection • Internal 12 A/250 V fuse in both line and neutral Output Voltage Trim • See table Output Voltage Trim • ±10% on V1 only, output 2 on multi output models will track by the same percentage outputs of multi output models • 00% minimum load required on all outputs of multi output models • 00% nulti output models • 3000 m max Start Up Delay • 1.3 s max • 15 ms typical • 16 ms min at full load at 115 VAC • 30 g pk, half sine, 6 axes Total Regulation • 0utput 2: 5% from 00% load to 100% load Output 2: 5% from 00% load to 100% load Output 2: 5% from 00% load to 100% load Output 2: 5% from 00% load to 100% load Output 3: 5% from 00% load to 100% load Output 3: 5% from 00% load to 100% load Output 3: 5% from 00% load to 100% load Output 3: 5% from 00% load to 100% load Output 3: 5% from 00% load to 100% load Output 3: 5% from 00% load to 100% load Output 3: 5% from 00% load to 100% load Cutput 3: 5% from 00% load to 100% load Cutput 3: 5% from 00% load to 100% load Strate 00.5 V drop • EN65011/22, level B conducted & level A radiated Transient Response • Fitted to US05 version, measured with 20 MHz bandwidth Overvoltage Protection • 4% max deviation, recovering to less than 1% within 500 ups for 50% step load on V1 only, recycle input to reset • Conducted Immunity • EN61000-4-4, 3.0Vm, Perf Criteria A Ripple & Noise • 1% pk-pk (2% for US05 version), measured with 20 MHz bandwidth • Conducted Immunity • EN61000-4-4, 3.0Vm, Perf Criteria A Overolad Protection </td <td>Earth Leakage Current</td> <td>• <250 µA at 264 VAC, 60 Hz</td> <td>Environmentel</td> <td></td>	Earth Leakage Current	• <250 µA at 264 VAC, 60 Hz	Environmentel	
Output See table See table Cooling Operating Altitude 5% to 95% RH, non condensing Output Voltage Trim • 10% minimum load required on all outputs of multi output models Operating Altitude 5% to 95% RH, non condensing Minimum Load • 10% minimum load required on all outputs of multi output models Operating Altitude 5% to 95% RH, non condensing Start Up Delay • 1.3 s max • 15 ms typical • 40 °C to +85 °C 300 g pk, half sine, 6 axes Hold Up Time • 16 ms min at full load at 115 VAC • Output 1: 2% from 0% load to 100% load • EN55011/22, level B conducted & level A radiated Cutput 3: 5% from 10% load to 100% load • 010% to 100% load to 100% load • EN61000-3-2, class A • EN61000-3-2, class A Remote Sense • Fitted to US05 version, compensates for 0.5V drop • 4% max deviation, recovering to less than 1% within 500 us for 50% step load change at 1 A/us • Radiated Immunity • EN61000-4-2, 3, 4/W indirect contact, Perf Criteria A Ripple & Noise • 1% pk-pk (2% for US05 version), measured with 20 MHz bandwidth • Conducted Immunity • EN61000-4-4, 3, 0/M, Perf Criteria A Overvoltage Protection • 120-160% of nominal output voltage on V1 only, recycle input to reset • Conducted Immunity • EN61000-4-6, 3V Perf Criteria A Shote Circuit Protection	Input Protection	 Internal T2 A/250 V fuse in both 		
Output Voltage Output Voltage TrimSee tableOperating Humidity Operating ALtitude Storage Temperature Shock5% to 95% RH, non condensing 3000 m maxMinimum Load• 10% minimum load required on all outputs of multi output models• 10% minimum load required on all outputs of multi output models• 00% printing ALtitude Storage Temperature Shock• 30 g pk, half sine, 6 axes • 30 g pk, half sine, 6 axesStart Up Delay• 1.3 s max• 15 ms typical• 16 ms min at full load at 115 VAC • 0utput 1: 2% from 0% load to 100% load Output 2: 5% from 20% load to 100% load Output 2: 5% from 10% load to 100% load Output 2: 5% from 20% load to 100% load Output 2: 5% from 20% load to 100% load Output 2: 5% from 20% load to 100% load Cutput 3: 5% from 10% load to 100% load Cutput 4: 5% from 20% load to 100% load Cutput 2: 5% from 20% load to 100% load Cutput 3: 5% from 10% load to 100% load Cutput 3: 5% from 10% load to 100% load Cutput 4: 5% from 0% load to 100% load Cutput 3: 5% from 10% load to 100% load Cutput 4: 5% from 10% load to 100% load Cutput 4: 5% from 10% load		line and neutral	Operating Temperature	
Output Voltage Trim± 10% on V1 only, output 2 on multi output models will track by the same percentage 10% minimum load required on all outputs of multi output modelsOperating Altitude Storage Temperature3000 m maxMinimum Load10% minimum load required on all outputs of multi output models10% minimum load required on all outputs of multi output models300 p.k. half sine, 6 axes30 g.k. half sine, 6 axesStart Up Delay1.3 s max15 ms typicalWiration2 g rms, 5 Hz to 500 Hz, 3 axesHold Up Time16 ms min at full load at 115 VACEMC & SafetyTotal RegulationOutput 1: 2% from 0% load to 100% load Output 3: 5% from 10% load to 100% load Coutput 3: 5% from 10% load to 100% load Change at 1 A/µsENC & SafetyRipple & Noise11% pk-pk (2% for US05 version), measured with 20 MHz bandwidthSafety ApprovalsEN61000-4-4; level 3 Perf Criteria A EN61000-4-4; avel 3 Perf Criteria AOverload Protection115-140% of nominal output voltage on V1 only, recycle input to resetConducted Immunity Dips & InterruptionsEN61000-4-4; 3 V Perf Criteria A EN61000-4-4; 3 V Perf Criteria A EN61000-4-5; 3 V Perf Criteria A, B	Output		Cooling	
Output Voltage Trim+ ±10% on V1 only, output 2 on multi output models will track by the same percentageOperating Altitude Storage Temperature: 3000 m maxMinimum Load: 10% minimum load required on all outputs of multi output models: 0.00 m max: 40 °C to +85 °CStart Up Delay: 1.3 s max: 1.3 s max: 2 g rms, 5 Hz to 500 Hz, 3 axesStart Up Rise Time: 15 ms typical: 16 ms min at full load at 115 VAC: ENS5011/22, level B conducted & level A radiatedHold Up Time: 16 ms min at full load at 115 VACEmissions: ENS5011/22, level B conducted & level A radiatedTotal Regulation: Output 1: 2% from 00% load to 100% load Output 2: 5% from 10% load to 100% load Output 2: 5% from 10% load to 100% load Output 2: 5% from 10% load to 100% load Output 3: 5% from 10% load to 100% load output 1: 2% from 00% load to 100% load output 3: 5% from 10% load to 100% load change at 1 A/µs: ENC & SafetyRipple & Noise: 115-140% of nominal output voltage on V1 only, recycle input to reset 0.02%/°C maxConducted Immunity Dips & Interruptions: EN61000-4-6, 3V Perf Criteria A EN6100-4-1, 30% 10 ms, 60% 100 ms, 100% 5000 ms, Perf Criteria A, A, B EN60601-1, 2, 30% 500 ms, 60% 100 ms, 100% 5000 ms, Perf Criteria A, B, B EN60601-1, 2, 30% 500 ms, 60% 100 ms, 100% 5000 ms, Perf Criteria A, A, A, BOverload Protect	Output Voltage	See table	Operating Humidity	 5% to 95% RH, non condensing
Minimum Loadmodels will track by the same percentage 10% minimum load required on all outputs of multi output modelsStorage Temperature Shock-40 °C to +85 °CMinimum Load10% minimum load required on all outputs of multi output models30 g pk, half sine, 6 axes30 g pk, half sine, 6 axesStart Up Delay1.3 s max15 ms typical2 g rms, 5 Hz to 500 Hz, 3 axesHold Up Time16 ms min at full load at 115 VACEMC & SafetyTotal RegulationOutput 1: 2% from 0% load to 100% load Output 2: 5% from 10% load to 100% load Output 2: 5% from 10% load to 100% load Output 3: 5% from 10% load to 100% load CotypeHarmonic Currents Voltage FlickerEN61000-3-2, class ARemote SenseFitted to US05 version, compensates for 0.5V dropFitted to US05 version), measured with 200 MHz bandwidthRadiated Immunity EFT / BurstEN61000-4-5, installation class 3, Perf Criteria ARipple & Noise11% pk-pk (2% for US05 version), measured with 20 MHz bandwidthConducted Immunity Dips & InterruptionsEN61000-4-6, installation class 3, Perf Criteria AOverload Protection115-140% of nominal output voltage on V1 only, recycle input to resetConducted Immunity Dips & InterruptionsEN61000-4-6, installation class 3, Perf Criteria A, B, B EN60601-1-1-2, 30% 5000 ms, 60% 100 ms, 100% 10 ms, 100% 5000 ms, Perf Criteria A, A, BEN60950-1, IEC60950-1, EN60601-1, ANSI/AAMI ES60601-1, CN6050-1, CN2A2.2 No.60601-1, CN2A2.2 No.60601-1, CN6050-1, CN2A2.2 No.60601-1, CN2A2.2 No.60601-1, CN60601-1, CN		• ±10% on V1 only. output 2 on multi output	Operating Altitude	• 3000 m max
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 Hold Up Time 16 ms min at full load at 115 VAC Output 1: 2% from 0% load to 100% load Output 2: 5% from 20% load to 100% load Output 2: 5% from 10% load to 100% load Output 3: 5% from 10% load to 100% load Remote Sense Fitted to US05 version, compensates for 0.5 V drop Transient Response 4% max deviation, recovering to less than 1% within 500 µs for 50% step load change at 1 A/µs Ripple & Noise 1% pk-pk (2% for US05 version), measured with 20 MHz bandwidth Overvoltage Protection 120-160% of nominal output voltage on V1 only, recycle input to reset 120-160% of nominal power Short Circuit Protection Temperature Coefficient ±0.02%/°C max Emissions Emissions Emissions Emissions Emissions Emissions Emissions Emissions Emissions EN61000-3-2, class A EN61000-4-2, ±4 kV indirect contact, Perf Criteria A EN61000-4-3, 3 V/m, Perf Criteria A EN61000-4-4, level 3 Perf Criteria A EN61000-4-4, level 3 Perf Criteria A EN61000-4-6, 3 V Perf Criteria A EN61000-4-6, 3 V Perf Criteria A EN61000-4-11, 30% 10 ms, 60% 100 ms, 100% 5000 ms, Perf Criteria A, B, B EN60601-1, 2, 30% 500 ms, 60% 100 ms, 100% 10 ms, 100% 5000 ms, Perf Criteria A, A, B 		• 1.3 s max		
Total Regulation • Output 1: 2% from 0% load to 100% load Output 2: 5% from 20% load to 100% load Output 3: 5% from 10% load to 100% load Output 4: 2, forture 14 EN61000-4-2, class A Ripple & Noise 1 % pk-pk (2% for US05 version), measured with 20 MHz bandwidth Radiated Immunity EFT / Burst EN61000-4-3, 3 V/m, Perf Criteria A Overload Protection 115-140% of nominal output voltage on V1 only, recycle input to reset Conducted Immunity Dips & Interruptions EN61000-4-11, 30% 10 ms, 60% 100 ms, 100% 5000 ms, Perf Criteria A, B EN60601-1-2, 30% 500 ms, 60% 100 ms, 100% 10 ms, 100% 5000 ms, Perf Criteria A, A, A, B Temperature Coefficient ±0.02%/°C max Safety Approvals EN60950-1, cUL60950-1, IEC60950-1, EN606061-1, ANSI/AAMI ES60601-1, CSA22.2 No.60601-1 Inc	•	51	EMC & Safety	
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Output 3: 5% from 10% load to 100% loadNation 6 datorsEntities of a line	Total Regulation	•		
Remote SenseFitted to US05 version, compensates for 0.5 V dropVoltage FlickerEN61000-3-3Transient Response4% max deviation, recovering to less than 1% within 500 µs for 50% step load change at 1 A/µsRadiated ImmunityEN61000-4-2, ±4 kV indirect contact, Perf Criteria ARipple & Noise1% pk-pk (2% for US05 version), measured with 20 MHz bandwidthRadiated ImmunityEFT / BurstEN61000-4-4, level 3 Perf Criteria AOvervoltage Protection115-140% of nominal output voltage on V1 only, recycle input to resetConducted ImmunityEN61000-4-6, 3 V Perf Criteria AOverload Protection120-160% of nominal powerConducted ImmunityEN61000-4-11, 30% 10 ms, 60% 100 ms, 100% 5000 ms, Perf Criteria A, B, B EN66001-1-2, 30% 5000 ms, 60% 100 ms, 100% 10 ms, 100% 5000 ms, 00% 10 ms, 100% 5000 ms, Perf Criteria A, A, BTemperature Coefficient• ±0.02%/°C maxSafety ApprovalsEN60950-1, cUL60950-1, IEC60950-1, EN60601-1, ANSI/AAMI ES60601-1, CSA22.2 No.60601-1 Including Risk				
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Overload Protection Short Circuit Protection120-160% of nominal power120-160% of nominal power100% 5000 ms, Perf Criteria A, B, B EN60601-1-2, 30% 5000 ms, 60% 100 ms, 100% 10 ms, 100% 5000 ms, Perf Criteria A, A, A, BTemperature Coefficient±0.02%/°C maxSafety ApprovalsEN60950-1, cUL60950-1, IEC60950-1, EN60601-1, ANSI/AAMI ES60601-1, CSA22.2 No.60601-1 Including Risk	Overvoltage Protection		,	
Overload Protection • 120-160% of nominal power Short Circuit Protection • Trip and restart (hiccup mode) • ±0.02%/°C max • ±0.02%/°C max Coefficient Safety Approvals EN60601-1.2, 30% 500 ms, 60% 100 ms, 100% 5000 ms, Perf Criteria A, A, A, B • EN60950-1, cUL60950-1, IEC60950-1, EN60601-1, ANSI/AAMI ES60601-1, CSA22.2 No.60601-1 Including Risk	C C		Dips & Interruptions	
Short Circuit Protection • Trip and restart (hiccup mode) 100% 10 ms, 100% 5000 ms, Temperature • ±0.02%/°C max Perf Criteria A, A, A, B Coefficient Safety Approvals • EN60950-1, cUL60950-1, IEC60950-1, EN60601-1, ANSI/AAMI ES60601-1, CSA22.2 No.60601-1 Including Risk	Overload Protection	 120-160% of nominal power 		
Coefficient Safety Approvals • EN60950-1, cUL60950-1, IEC60950-1, EN60601-1, ANSI/AAMI ES60601-1, CSA22.2 No.60601-1 Including Risk	Short Circuit Protection	 Trip and restart (hiccup mode) 		
EN60601-1, ANSI/AAMI ES60601-1, CSA22.2 No.60601-1 Including Risk		• ±0.02%/°C max		
	Coefficient		Safety Approvals	EN60601-1, ANSI/AAMI ES60601-1, CSA22.2 No.60601-1 Including Risk



Models and Ratings

Output	Output Output 1		Output 2		Output 3		Model Number		
Power	Voltage	Current	Peak ⁽¹⁾	Voltage	Current	Peak ^(t)	Voltage	Current	Model Number
55 W	+5.0 VDC	11.0 A	14.3 A						ECP60US05
60 W	+5.0 VDC	7.0 A	9.1 A	+12.0 VDC	3.0 A	3.90 A			ECP60UD01
60 W	+5.0 VDC	7.0 A	9.1 A	+15.0 VDC	2.0 A	2.60 A			ECP60UD02
60 W	+5.0 VDC	7.0 A	9.1 A	+24.0 VDC	1.5 A	1.95 A			ECP60UD03
60 W	+5.0 VDC	7.0 A	9.1 A	+12.0 VDC	3.0 A	3.90 A	-12.0 V	0.30 A	ECP60UT01
60 W	+5.0 VDC	7.0 A	9.1 A	+15.0 VDC	2.0 A	2.60 A	-15.0 V	0.30 A	ECP60UT02
60 W	+5.0 VDC	7.0 A	9.1 A	+24.0 VDC	1.5 A	1.95 A	+12.0 V	0.30 A	ECP60UT03
60 W	+5.0 VDC	7.0 A	9.1 A	+24.0 VDC	1.5 A	1.95 A	-12.0 V	0.30 A	ECP60UT04

Notes

1. Peak load lasting <30 s with a maximum duty cycle of 10%, average output power not to exceed nominal.

Mechanical Details

CN1 - Input Connector		
Pin 1	Neutral	
Pin 2	Not Fitted	
Pin 3	Line	

Mates with JST housing VHR-3N and JST Series SVH-21T-P1.1 crimp terminals

Mounting holes marked with $(\underline{=})$ must be connected to safety earth

CN2 Output Connector				
	UD/UT	US05		
Pin 1	V2	+5V		
Pin 2	V1	+5V		
Pin 3	V1	+5V		
Pin 4	RTN	RTN		
Pin 5	RTN	RTN		
Pin 6	V3	RTN		

Mates with JST housing VHR-6N and JST Series SVH-21T-P1.1 crimp terminals

CN3 Sense Connector	
Pin 1	-Sense
Pin 2	+Sense

Fitted to ECP60US05 only. Mates with Molex Housing 22-01-1022 and 2759 crimp terminals

Notes

1. All dimensions are in inches (mm).

2. Weight: 0.34 lbs (155 g) approx.

Derating Curve





3. Tolerance: ±0.02 (±0.5) unless stated



