

Elgar

Advanced Solar Power Simulator

High Performance Solar Array Simulation Power Supply

2-Channels x 600W

1-Channel x 1200W

40 V to 220 V

2.72A to 20A

ASPS

Advanced Features

- 2 independent, isolated 600W channels or 1 1200W channel in 1U
- 2µsecond shunt switching recovery
- Peak Power Tracking
- Primary and secondary over voltage and over current
- Output electronic circuit breaker
- Built in fault data recorder
- Power On Self-Test
- Active power factor correction (PFC)
- Color touch panel monitoring
- Standard LAN interface
- Full remote control via AMETEK SAS software or SCPI commands



Performance. Reliance. Brilliance.

The Elgar™ Advanced Solar Power Simulator is the first addition to the NEXSIM family of space power simulation related products. The new ASPS features either two independent, isolated 600W channels or a single 1200W channel. Industry leading 2µsecond shunt switching recovery time provides the best power transfer for fast PWM shunt switching satellite PCDU's.

Maximize rack space utilization with leading SAS power density in a 1U chassis.

Fastest shunt switching recovery time on the market.

Quickly see the channels state and readbacks with intuitive color touchscreen.

Control via AMETEK SAS software or SCPI commands over Ethernet.

The ASPS is Digital Signal Processor (DSP) controlled and can be operated using SCPI commands via the Ethernet control interface or using the AMETEK SAS software.

Front Panel Touchscreen provides intuitive readback.

The channels can also be monitored from the intuitive, easy-to-use front panel touchscreen. The touchscreen includes a Monitor Mode, Output Programming Parameters, Output relay monitoring, Fault messaging, Configuration, and System Settings. The Monitor Mode provides readback voltage, current and relay state. It also shows the state of the channel by changing the background color of the tile; gray for idle state, green for conducting state, blue for shunted state and red for fault state.

Applications

The ASPS Series is designed for testing today's complex satellites, from small sats to geo synchronous, with any type of regulation topology. The ASPS works with S3R, S4R, Direct connection, and Peak Power Trackers.

ECLIPSE Simulation: Store up to 32 IV curves and up to 32 segments. An Eclipse simulation can be setup for any scenario with up to 4.66 hours per segment. During simulations virtual IV curves are interpolated and executed up to 100 times a second for smooth transitions.

SAFETY

Satellites are expensive and you want a solar array simulator that has great performance but more importantly the safety features to keep people and your satellite safe. The ASPS includes many safety features, from its primary and secondary SAS overvoltage and overcurrent protection to a third level of overvoltage and overcurrent protection on the bulk power supplies. The ASPS also features an extremely fast (10 μ S) electronic circuit breaker (ECB) which offers another layer of overcurrent protection. The ECB is tripped when any of the SAS OV or OC protections are tripped to quickly disconnect the output.

Specifications

DC Output Specifications		
Rated Output Voltage Voc 600W channel	V	40 – 220 (5V increments)
Rated Output Voltage Voc 1200W channel	V	60 – 220 (5V increments)
Rated Output Current Isc 600W channel	A	2.72 – 15.0
Rated Output Current Isc 1200W channel		5.45 – 20.0
Rated Output Power	W	600 or 1200
Line Regulation	V	+/- 0.01% of rated voltage
	A	+/- 0.1mA +/- 0.05% of rated current
Voltage Ripple RMS ¹ (20Hz-300kHz)	mV	\leq 0.02% of Vocmax
Voltage noise p-p ² (20Hz-20MHz)	mV	\leq 0.2% of Vocmax
Current Ripple RMS ³ (20Hz-300kHz)	mA	\leq 0.04% of Iscmax
Current noise p-p ⁴ (20Hz-20MHz)	mA	\leq 0.4% of Iscmax
Remote sense compensation	V	5

¹) Voltage ripple RMS is measured directly across the output terminals (ungrounded, or either terminal grounded) with 100nF in parallel with the meter and nominal AC input line voltage.

²) Voltage noise PK-PK is measured directly across the output terminals (ungrounded, or either terminal grounded) with 100nF in parallel with the oscilloscope probe and nominal AC input line voltage.

³) Current ripple RMS is measured using a 3 Ω non inductive load resistor with output terminals ungrounded, or either terminal grounded and nominal AC input line voltage.

⁴) Current noise PK-PK is measured using a 3 Ω non inductive load resistor with output terminals ungrounded, or either terminal grounded and nominal AC input line voltage.

Programming & Readback (Front Panel or Remote Digital Interface)	
Voltage Output Programming Accuracy	+/- 0.05% +0.05% of Vocmax
Current Output Programming Accuracy	+/- 0.08% + 0.08% of Iscmax
Overvoltage Programming Accuracy	\pm 0.25% of Vocmax
Overcurrent Programming Accuracy	\pm 0.25% of Iscmax
Voltage Output Programming Resolution	0.012% of Vocmax
Current Output Programming Resolution	0.012% of Iscmax
Overvoltage Programming Resolution	0.012% of Vocmax

Programming & Readback (Front Panel or Remote Digital Interface)		
Overcurrent Programming Resolution	0.012% of Iscmax	
Voltage Output Readback Accuracy	+/- 0.1% + 0.1% of Vocmax	
Current Output Readback Accuracy	+/- 0.2% + 0.2% of Iscmax	
Voltage Output Readback Resolution	0.012% of Vocmax	
Current Output Readback Resolution	0.012% of Iscmax	
Overvoltage Response Time	$t = 420 \mu\text{s} * \ln \left(\frac{V_P - V_O}{V_P - V_{LIM}} \right)$	V _{LIM} = voltage limit V _O = initial voltage V _P = final voltage
Overcurrent Response Time	$t = 420 \mu\text{s} * \ln \left(\frac{I_P - I_O}{I_P - I_{LIM}} \right)$	I _{LIM} = current limit I _O = initial current I _P = final current

Output Transient Specifications		
MODEL	Rated Voltage (V)	
	600W	1200W
Shunt Switching Recovery time ⁽⁵⁾	≤2.0μS	≤2.5μS
Series Switching Recovery time ⁽⁶⁾	≤100μS	≤100μS
MPPT tracking speed ⁽⁷⁾	200Hz	200Hz

⁵⁾ Output recovery to within 10% of Isc when shunting and within 10% of operating current when releasing the shunt into the load.
⁶⁾ 10V or 10% voltage overshoot whichever is greater
⁷⁾ Sweep amplitude 3% of Isc, triangle wave.

Remote Control Digital Interface	
LAN	Ethernet 10BASE-T and 100BASE-T over twisted-pair cables compliant with IEEE 802.3; Connector: 8P8C modular jack.
Firmware Upgrade	Firmware can be upgraded through the LAN interface.

Unit Protection	
Electronic Circuit Breaker (ECB)	Trips if any of the protections are exceeded.
Primary SAS Output Overvoltage Protection (OVP)	User Programmable to 110% of Voc. Direct analog control to trip ECB.
Redundant SAS Output Overvoltage Protection (ROVP)	User Programmable to 110% of Voc. Independent output voltage measurement, DSP trips ECB.
Bulk Power Supply Overvoltage Protection (BPOVP)	Automatically Set to 112% of programmed Voc. Bulk Power supply will shut down if level is exceeded and trip the ECB
Primary SAS Output Overcurrent Protection (OCP)	User Programmable to 105% of Isc. Direct analog control to trip ECB.
Redundant SAS Output Overcurrent Protection (ROCP)	User Programmable to 105% of Isc. Independent output current measurement, DSP trips ECB.
Bulk Power Supply Overcurrent Protection (BPOCP)	Automatically set to 110% of programmed Isc. Bulk Power supply will shut down if level is exceeded and trip the ECB
AC Input Overcurrent Protection	Internal fuses for fault isolation; not user replaceable.
AC Input Undervoltage Protection	Automatic shutdown for insufficient AC input voltage.
AC Input Transient Protection	Protection to withstand EN61326-1, Class-A surge levels.
Overtemperature Protection (OTP)	Internal temperature monitors cause shutdown of output if temperature thresholds are exceeded.

Output Isolation	
Output terminal Positive (+Ve) and Negative (-Ve)	±600 VRMS, maximum, with respect to chassis ground.

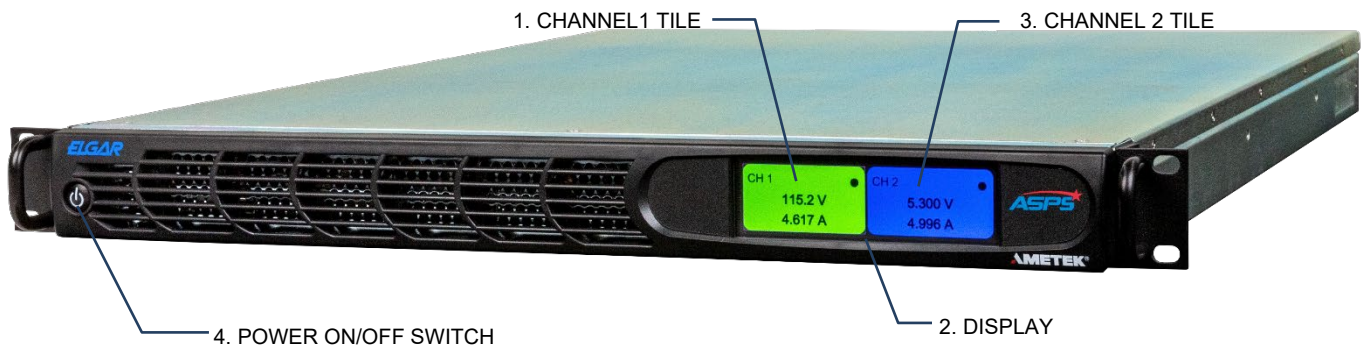
AC Input Specifications 2X 600 W per Channel, or 1X 1200 W per channel. Total 1200 W in a Chassis.	
Input Voltage, Nominal Rating	Nominal Rating for 1 phase, 2 wire+ Gnd, Nominal Range: 100 – 240 VAC.
Input Voltage, Operating Range	1 phase, 2 wire + Gnd, Operating Range 90V-264 VAC.
Input Current, Maximum RMS	1 phase, 2 wire + Gnd, Low line: 8.4 A at 180 VAC. 1 phase, 2 wire + Gnd, Low line: 16.7 A at 90 VAC.
Efficiency	80%
Inrush Current, typical	1 phase, 2 wire + Gnd, High line: ≤50A Peak @ 264 V L-N
Input Frequency, Nominal Rating	50 Hz, 60 Hz
Input Frequency Range	47 Hz - 63 Hz
Power Factor, typical	0.99; active PFC
Hold-Up Time, typical	≥ 10 ms
Isolation Voltage	1500 VAC Input to Ground, 3000 VAC Input to Hazardous Secondary, 3000 VAC Input to Isolated SELV barriers

Environmental Specifications	
Operating Temp	0° to +32° C (+32° to +90° F)
Storage Temp	-25° to +65° C (-13° to +149° F)
Operating Humidity	20-90 %, non-condensing
Storage Humidity	10-95 %, non-condensing
Altitude	1829 m (6,000 ft)
Cooling	Force-air cooling; linear, variable fan speed control; air intake at front/sides and exhaust at rear
Vibration	MIL-PRF-28800F, Class 3; 5-500 Hz per Paragraph 4.5.5.3.1
Shock	MIL-PRF-28800F, Class 3; 30G half-sine with 11ms duration per Paragraph 4.5.5.4.1
Transportation Integrity	ISTA Test Procedure 1A

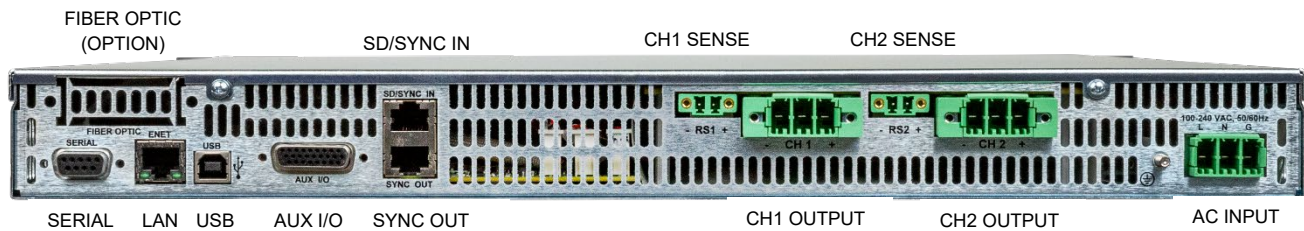
Regulatory Agency Compliance	
EMC	CE marked for EMC Directive 2014/30/EU per EN61326-1:2013, Class-A for emissions and immunity as required for the EU CE mark
Safety	CSA NRTL certified for US and Canada to AN/CSA-C22.2 No. 61010-1-12, UL 61010-1 Third Edition. CE marked for LVD compliance 2014/35/EU to EN 61010-1 Third Edition as required for the EU CE mark.
CE Mark LVD Categories	Installation Overvoltage Category: II; Pollution Degree: 2; Class II equipment; indoor use only
RoHS	CE marked for compliance with RoHS3 EU Directive 2015/863/EU for Restriction of Hazardous Substances in Electrical and Electronic Equipment

Front Panel Controls and Indicators

Enhanced Front Panel	
1	POWER ON/OFF Switch: Turns unit on/off.
2	CHANNEL 1 TILE: Provides status and readback of channel 1.
3	CHANNEL 2 TILE: Provides status and readback of channel 2.
4	Display: Touch-Panel, TFT color LCD display for status and readback. Size: 3.9" diagonal.



Rear Panel Connectors



Rear Panel Connectors	
AC Input	1-Phase AC input: connector terminals L, N and G Unit side connector: Phoenix P/N 1720479 Mating Connector: Phoenix P/N 1778078
Safety-Ground	M4 x 0.7 chassis stud
CH1 DC Output CH2 DC Output	Unit side connector: Phoenix P/N 1721025 Mating Connector: Phoenix P/N 177846
RS1 Remote Sense Channel 1 RS2 Remote Sense Channel 2	Unit side connector: Phoenix P/N 1847466 Mating Connector: Phoenix P/N 1847356
LAN Interface	Ethernet 10BASE-T and 100BASE-T; safety isolation SELV-rated, referenced to chassis; connector: 8P8C modular jack.
SD/SYNC IN	RJ-45 Proprietary cabling; safety isolation SELV-rated, referenced to chassis; connector: 8P8C modular jack.
SYNC OUT	RJ-45 Proprietary cabling; safety isolation SELV-rated, referenced to chassis; connector: 8P8C modular jack.
SERIAL	Reserved
USB	Reserved
AUX I/O	Reserved
FIBER OPTIC	Reserved for future legacy fiber optic interface

Mechanical Specifications	
Dimensions	H, 1.75" (44.45 mm); W (front panel), 19.0" (483 mm); D, 24.0" (609.6 mm) H, 1.75" (44.45 mm); W (chassis), 16.9" (429 mm); D, 23.0" (584 mm)
Unit Weight	28 lbs. (12.7 kg)
Shipping Weight	34 lbs. (15.4 kg)
Chassis Material	Steel with plastic front panel
Chassis Finish	Galvanized Zinc, G90
Installation	Rackmount as per ANSI-EIA-310-D, with front panel mounting flange brackets and chassis provisions for mounting rack slides.

Options & Order Information:

ASPS X - XXX - XXX - 0 X 0

SERIES

ASPS – Advanced Solar Power Simulator

NUMBER OF CHANNELS

1 = One 1200W channel
2 = Two 600W channels

CHANNEL-1 VOLTAGE

Enter 3 Digit Voltage Code, Select from table below.

CHANNEL-2 VOLTAGE

Enter 3 Digit Voltage Code, Select from table below. For single channel enter 000

COMMUNICATION OPTIONS

0 = None (Standard Ethernet)

HARDWARE OPTIONS

0 = Series and Shunt Diode installed (standard)
1 = Series Diode only
2 = Shunt Diode only
3 = No Diodes

FIRMWARE/SOFTWARE OPTIONS

0 = None

ASPS Series Voltage Channel Codes								
Voc	600W	1200W	Voc	600W	1200W	Voc	600W	1200W
040	40VDC, 15A	NA	105	105VDC, 5.71A	105VDC, 11.43A	170	170VDC, 3.53A	170VDC, 7.06A
045	45VDC, 13.33A	NA	110	110VDC, 5.45A	110VDC, 10.91A	175	175VDC, 3.43A	175VDC, 6.86A
050	50VDC, 12A	NA	115	115VDC, 5.22A	115VDC, 10.43A	180	180VDC, 3.33A	180VDC, 6.67A
055	55VDC, 10.91A	NA	120	120VDC, 5A	120VDC, 10A	185	185VDC, 3.24A	185VDC, 6.49A
060	60VDC, 10A	60VDC, 20A	125	125VDC, 4.8A	125VDC, 9.6A	190	190VDC, 3.16A	190VDC, 6.32A
065	65VDC, 9.23A	65VDC, 18.46A	130	130VDC, 4.62A	130VDC, 9.23A	195	195VDC, 3.08A	195VDC, 6.15A
070	70VDC, 8.57A	70VDC, 17.14A	135	135VDC, 4.44A	135VDC, 8.89A	200	200VDC, 3A	200VDC, 6A
075	75VDC, 8A	75VDC, 16A	140	140VDC, 4.29A	140VDC, 8.57A	205	205VDC, 2.93A	205VDC, 5.85A
080	80VDC, 7.5A	80VDC, 15A	145	145VDC, 4.14A	145VDC, 8.28A	210	210VDC, 2.86A	210VDC, 5.71A
085	85VDC, 7.06A	85VDC, 14.12A	150	150VDC, 4A	150VDC, 8A	215	215VDC, 2.79A	215VDC, 5.58A
090	90VDC, 6.67A	90VDC, 13.33A	155	155VDC, 3.87A	155VDC, 7.74A	220	220VDC, 2.73A	220VDC, 5.45A
095	95VDC, 6.32A	95VDC, 12.63A	160	160VDC, 3.75A	160VDC, 7.5A			
100	100VDC, 6A	110VDC, 12A	165	165VDC, 3.64A	165VDC, 7.27A			

Warranty Statement:

AMETEK Programmable Power Inc. warrants its products to be free from defects in material and workmanship. The warranty period is from the date of original shipment of the product to the original purchaser (see website for warranty periods by product). ASPS comes with a **TWO (2)** year warranty. Extended warranties available.

Note: All specifications subject to change without notice.



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