Asterion

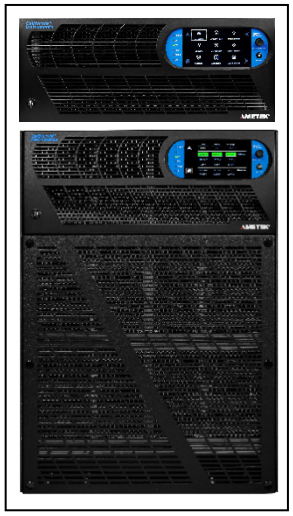
5 Year Warranty

California Instruments Asterion ASC Series

4500 VA - 36000 VA
156 / 312 Vac

High Performance Programmable AC Power Source

Cal Power
Via Acquanera, 29 22100 COMO
tel. 031.526.566 (r.a.) fax 031.507.984
info@calpower.it www.calpower.it



Advanced Features

- High power density in 4U / 14U chassis up to 18kVA
- Intuitive touch panel control
- Transient programming
- Built-in measurements
- Multi-language display for global operation
- 1 and 3 phase selectable 4U / 14U models
- Standard LXI LAN, USB and RS232, optional GPIB

Performance. Reliance. Brilliance.

Inspired by the enduring power of a brilliant star, the California Instruments Asterion line of AC power sources by AMETEK Programmable Power combines intelligence and flexibility to create an advanced platform of AC solutions. This easy-to-configure design features sophisticated technology for delivering high performance, programmable AC power. Its sleek design packs maximum power density into a low-profile form factor with an intuitive touch screen interface placing that power at your fingertips. Centralized control and unparalleled modularity make Asterion the most adaptable platform on the market. Its groundbreaking capabilities set the standard for affordable, precision power sources.

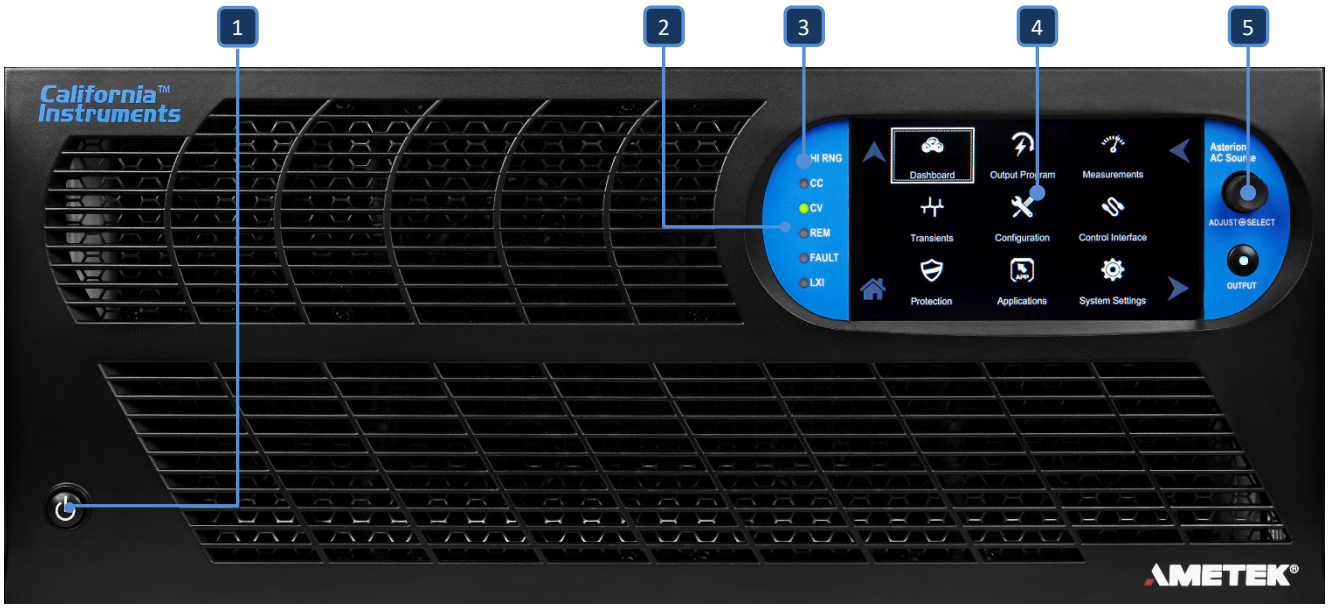
Maximize rack space utilization with leading AC power density in 4U and 14U chassis. Employ full output power over widest voltage range with iX2™ technology. Quickly and expertly control the AC source with intuitive touchscreen.

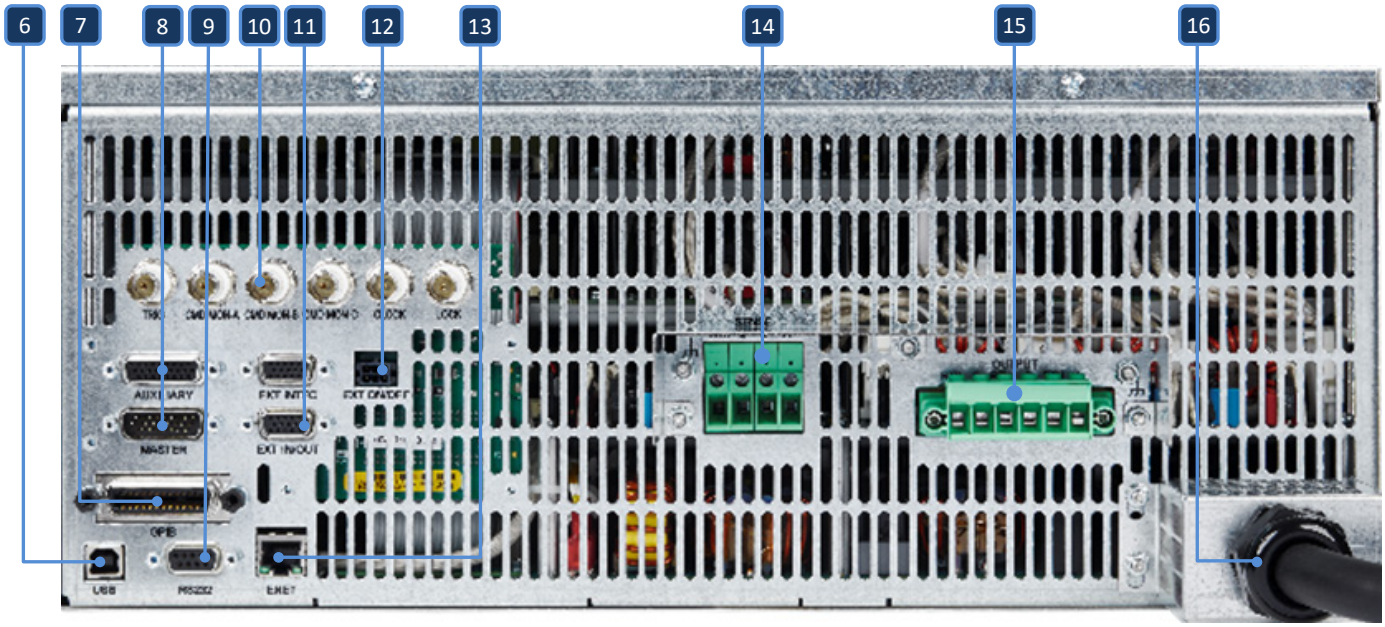
Control via Front Panel Touchscreen & Encoder or available digital control interfaces.

The Asterion ASC Series is Digital Signal Processor (DSP) controlled and can be operated from the intuitive, easy to use front panel touchscreen or the Ethernet LXI, USB and RS232 standard control interfaces, as well as through the optional GPIB control interface.

The touchscreen function group icons include a Dashboard, Output Programing Parameters, Measurements, Sequencing, Configuration, Control Interfaces, Applications, and System Settings. Function selection and parameter entry can be achieved either by direct selection from the touchscreen or by using the encoder selector button. The control resolution is adjusted by a dynamic rate change algorithm that combines the benefits of precise control over small parameter changes with quick sweeps through the entire range.

Product Controls and Interfaces





1. Power ON/OFF Switch
2. Status LEDs
   Indicates Range, OCP Mode, Remote state, and Fault status
3. Output Enable Button
   Press to enable the output. Blue LED glows to indicate the output is on.
4. Color Touch Display
   Front panel interface to control the AC source, including measurements, transient sequencing, and waveform generation.
5. Multi-function rotary/select switch
   Rotate to cycle through menus and set values. Press to select.
6. USB interface connector
7. GPIB interface connector (optional)
8. Master/Auxilliary system interface connector
   Plug n' play system expansion control signals
9. RS-232C interface connector
10. Command Monitor, Trigger Output, & Clock/Lock BNC connectors
    Isolated oscilloscope monitoring and trigger signals
11. External I/O connector (D-Sub 15)
    Analog control and monitoring signals
12. External Relay connector
    Isolated relay control interface for single phase mode of operation
13. Ethernet (LAN) interface connector
14. Remote Sense connector
15. Output connector
16. AC input

Applications

The Asterion ASC Series is designed for testing today's complex electronics, including avionics, telecommunications and commercial electronics requiring low profile, light weight power sources with high power density. Other applications include:

- Testing for real world power conditions using different waveforms on all three phases
- Load susceptibility testing with sequence or event programming and multiple voltage harmonics
- Power line disturbance testing
- Power supply testing for AC-DC, converters and Uninterruptable Power Supplies
- IEC testing with source compliance to IEC 61000-4-7 and 4-15, and AC immunity testing per IEC 61000-4-11, 4-13, 4-14, and 4-28
- AC power simulation and manufacturing and process control
- Frequency & voltage conversion
- ATE applications

Asterion Series Transient Generation

The Asterion Series controller has a powerful AC transient generation system that allows complex sequences of voltage and frequency to be generated. Accurate phase angle control and synchronized transient list execution provide unparalleled accuracy in positioning AC output events. Transient generation is controlled independently yet time synchronized during three phase operation.

Transient programming is easily accomplished from the touch screen display, where intuitive menus guide the user through the transient definition process. These menus provide a convenient listing of the programmed transient sequence and allow for transient execution, Start, Stop, Abort, and Resume operations. User defined transient sequences can be saved to non-volatile memory for instant recall and execution later. The included Virtual Panels software interface program supports transient list generation and editing using a spreadsheet-like data entry grid. A library of frequently used transient programs can be stored to disk using this software suite.

Harmonic Analysis (-ADV Option)

The ASC Series with the -ADV option provides detailed amplitude and phase information on up to 50 harmonics of the fundamental voltage and current (up to 16kHz). Harmonic content can be displayed in both tabular and graphical formats on the color touch display for immediate feedback to the operator. Alternatively, the included Virtual Panels software can be used to display, print, and save harmonic measurement data. Total harmonic distortion of both voltage and current is calculated from the harmonic data.

High Crest Factor

With a crest factor of up to 7:1, the Asterion Series AC source can drive difficult nonlinear loads with ease. Since many modern products include switching power supplies, they tend to pull high repetitive peak currents. An ASC4503A1D can deliver up to 52.5Apk (156V range) per phase.

ASC Series Constant-Power Mode

The Constant Power Mode for the ASC4503 provides for full rated power from 57% of full scale (for 3-phase, 3 wire + GND input) or 64% of full scale (for 3-phase, 4-wire + GND) to 100% of full scale output voltage.

The Constant Power Mode for the ASC6003, ASC12K3, ASC18K3 provides for full rated power from 57% to 100% of full-scale output voltage.

The output voltage follows a constant power relationship where the available current increases as the programmed voltage decreases. Current ratings are a function of frequency as shown in figures 1-3.

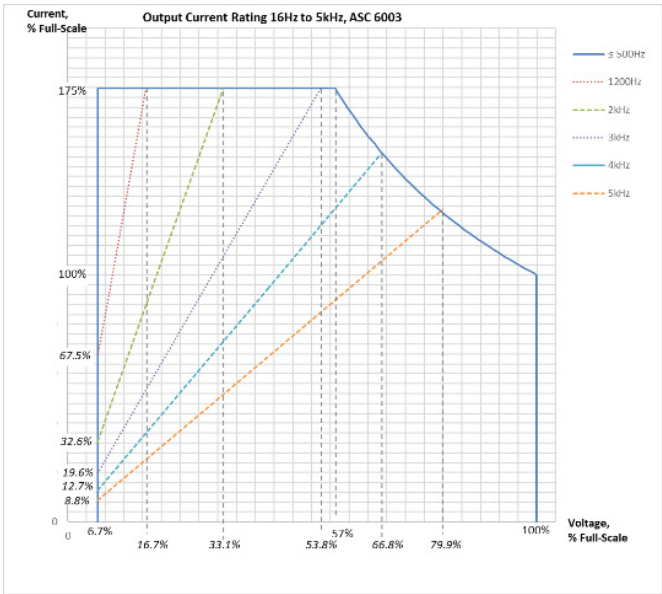


Figure 1: Constant-Power: Output Current Versus Voltage, ASC 6003, ASC12K3, ASC18K3

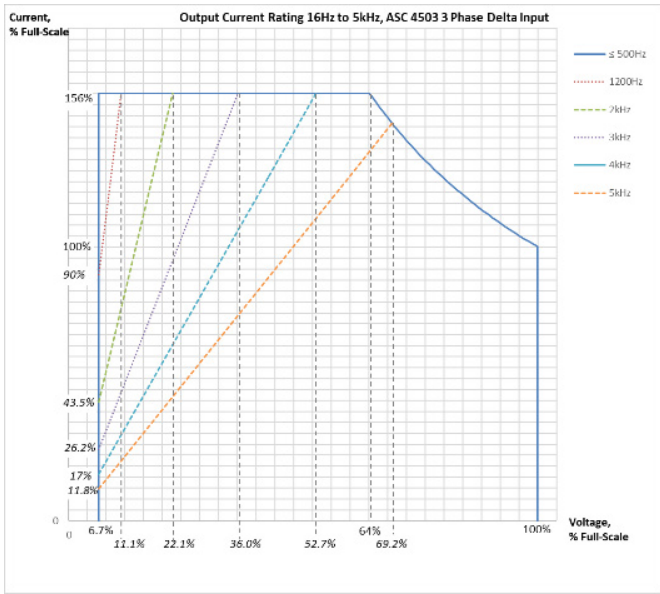
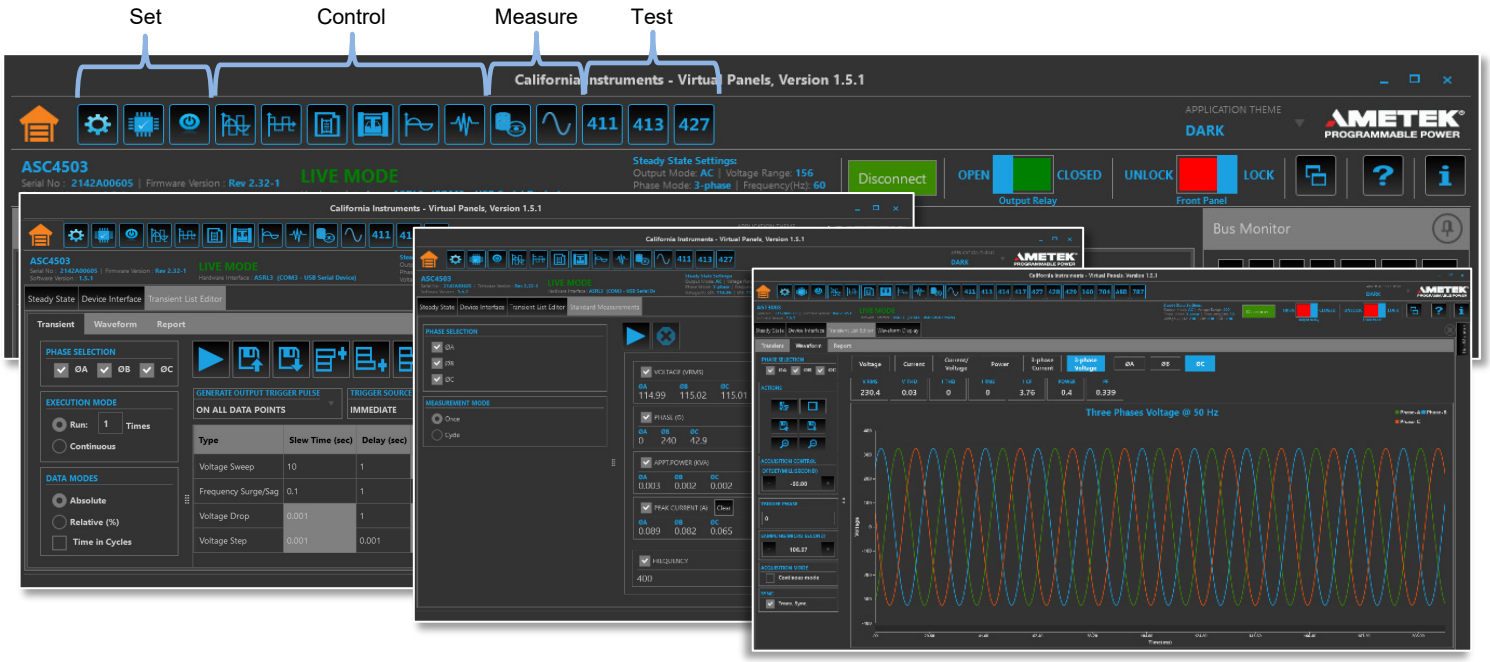


Figure 2: Constant-Power: Output Current Versus Voltage, ASC4503

Asterion AC Virtual Panels (Graphical User Interface)

Virtual Panels allow remote control of the Asterion AC power source as well as programming communication and monitoring.



Models and Configurations

Model	Input	Enclosure	Output Form	Rated Power	Arms (max) per Φ [1]
ASC4503A1C	208V	4U	1 or 3 phase	4500VA	15.0/7.5
AST6003A1C		4U	1 or 3 phase	6000VA	22.4.0/11.2
AST12K3A1C		14U	1 or 3 phase	12KVA	44.4/22.2
AST18K3A1C		14U	1 or 3 phase	18KVA	67.2/33.6
ASC4503A1D	400V	4U	1 or 3 phase	4500VA	19.2/9.6
AST6003A1D		4U	1 or 3 phase	6000VA	22.4.0/11.2
AST12K3A1D		14U	1 or 3 phase	12KVA	44.4/22.2
AST18K3A1D		14U	1 or 3 phase	18KVA	67.2/33.6
ASC4503A1E	480V	4U	1 or 3 phase	4500VA	15.0/7.5
AST6003A1E		4U	1 or 3 phase	6000VA	22.4.0/11.2
AST12K3A1E		14U	1 or 3 phase	12KVA	44.4/22.2
AST18K3A1E		14U	1 or 3 phase	18KVA	67.2/33.6

[1] *Refer to the ASC Constant-Power Mode Output characteristics on page 4*

AC Output Specifications

Parameter	Specification Detail
Voltage Range – AC	Low-Range: 0 to 156 Vrms L-N High-Range: 0 to 312 Vrms L-N
Maximum RMS Output Current	Model dependent. Refer to the table above and the description of the Constant Power Mode on page 4.
Voltage Programming Accuracy	±0.1% + 0.2% FS up to 1kHz; >1kHz, add ±0.2% of full-scale/kHz. Valid from 5% of full-scale to 156 Vrms in low- range and 312 Vrms in high-range; with sense leads connected.
Voltage Resolution	≤0.02V, AC
Voltage Stability (typ)	±0.1% FS over 8 hours; with constant line, load, and temperature; with sense leads connected
Voltage Distortion (max)	≤100 Hz: 0.25%; 100Hz to 500Hz: 0.5%; 500Hz to 1kHz: 1%; >1kHz:1% + 1%/kHz to 5 kHz; with resistive load
Voltage Slew Rate, Typical	≥10V/µs with full-scale programmed voltage step
Current Limit Program Accuracy	± (0.3% + 0.5% FS) 16 Hz to 1.2 kHz. Valid from 5% of full scale up to 200% of full-scale, depending upon the configuration. HF option: for High-Range, add 1.2% of maximum/kHz; for Low Range, add 0.1% of maximum/kHz; Valid from 20% of full-scale to 200% of full-scale.
Frequency Range	16 – 1.2kHz HF Option: 16Hz to 5kHz LF Option: 16-550Hz
Frequency Program Accuracy	±0.01 +frequency resolution/2 -FC: 0.3%
Frequency Program Resolution	≤81.91Hz: 0.01Hz 82-819.1Hz: 0.1Hz ≥820Hz: 1Hz
Line Regulation	±0.015% of full-scale voltage, for a ±10% input line change; 40 Hz to 5 kHz.
Load Regulation	±0.025% FS, for 100% load change; 40 Hz to 1 kHz, >1 kHz, add ±0.015% FS/kHz
Noise, (typ)	450 mV(RMS), low-range; 750 mV(RMS), high-range; at ≥40 Hz; 20 kHz to 1 MHz;
Crest Factor	ASC 6003, ASC12K3, ASC18K3: 5:1 of full-scale current in each output range (ratio of peak output current to RMS full-scale output current). ASC 4503 with 3-Phase + Neutral (4 Wire + GND) AC input Model: 7:1 of full-scale current in each output range (ratio of peak output current to RMS full-scale output current). ASC 4503 with 3-Phase (3 Wire + GND) AC input Model: 5:1 of full-scale current in each output range (ratio of peak output current to RMS full-scale output current).

Parameter	Specification Detail
Phase Programming Range	0.0 º to 360.0 º, relative to external synchronization signal; in multi-phase group, Auxiliary unit output voltage is relative to the Leader unit output voltage, with the Leader unit as reference 0°.
Phase Accuracy	±1º, 16 Hz to 100 Hz; ±2º >100 Hz to 1.2 kHz, plus ±1º/kHz above 1.2 kHz
Phase Programming Resolution	±0.4º

AC Input Specifications

Option	Phase	Voltage	Operating Range	Frequency	Form
C	3	208 V L-L	180 – 264 V L-L	47-440 Hz	3 wire + GND
D	3	400 V L-L	342 – 457 V L-L	47-63 Hz	4 wire + GND
E	3	480 V L-L	432 – 528 V L-L	47-63 Hz	3 wire + GND

Parameter	Specification Detail
Input Current	Model Dependent
Efficiency [1], typical	75%
Power Factor [1], typical	0.95
Hold-Up Time [1], typical	≥10 ms
Isolation Voltage	2200 VAC, input to output; 1350 VAC, input to chassis

[1] At full load,16 Hz to 1.2 kHz output frequency, nominal AC input

Measurements

Parameter		Range (per Φ)	Accuracy	Resolution
Voltage		0-312 Vrms	± 0.1% + 0.2% FS,16 Hz to 1.2 kHz. HF Option: for High-Range, add 0.2% maximum/kHz; for Low-Range, add 0.1% maximum/kHz. Valid from 20% to 200% FS.	20 mV
RMS Current	ASC 4503	0-9.6 Arms	± 0.3% + 0.5% FS,16 Hz to 1.2 kHz. HF Option: for High-Range, add 0.1% maximum/kHz; for Low-Range, add 0.1% maximum/kHz. Valid from 20% to 200% FS.	2 mA
	ASC 6003	0-12.8 Arms		
	ASC 12K3	0-25.6 Arms		
	ASC 18K3	0-38.4 Arms		
Peak Current	ASC 4503	0-48 Apk	± 0.5% + 0.7% FS,16 Hz to 1.2 kHz. HF Option: for High-Range, add 1.2% maximum/kHz; for Low-Range, add 0.1% maximum/kHz. Valid from 20% to 200% FS.	5mA
	ASC 6003	0-64 Apk		
	ASC 12K3	0-128 Apk		
	ASC 18K3	0-192 Apk		
Frequency		16 Hz to 5.0 kHz	±0.01% of actual + resolution/2	≤81.91 Hz: 0.01 Hz; 82.0-819.1 Hz: 0.1 Hz; ≥820: 1 Hz
Phase		0-360°	±1°, 16 Hz to 100 Hz; ±2°, >100 Hz to 1 kHz; ±5°, >1 kHz	0.1°, 16-100 Hz; 1°, >100 Hz
Real Power		Model dependent	16-1.2kHz: ±0.4% + 0.7% FS; >1 kHz, add ±0.4% of full-scale/kHz.	1 W
Apparent Power		Model dependent	16-1.2kHz: ±0.4% + 0.7% FS; >1 kHz, add ±0.4% of full-scale/kHz..	1 VA
Power Factor		0-1	±2% of full-scale	0.01

Protection

Parameter	Specification
Output Overvoltage Protection (OVP)	Programmable to 115% of full-scale output voltage; exceeding OVP threshold results in shutdown of output.
Output Current Limit Protection	User-selectable constant-current mode or current-limit mode, with programmable current setpoint; in Constant-Current mode, output current is regulated to setpoint; in Constant Voltage mode, exceeding current-limit setpoint results in shutdown of output; Current limit delay: programmable from 100 ms to 10s.
Output Short-Circuit Protection	Instantaneous and RMS current limit
AC Input Overcurrent Protection	Internal fuses in each phase 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

Regulatory Compliance

Parameter	Specification
EMC	CE marked for EMC Directive 89/336/EEC per EN61326-1:2013, Class-A for emissions and immunity asrequired for the EU CE Mark.
Safety	CE Marked for LVD compliance 2014/35/EU to EN 61010-1, Edition 3.1
CE Mark LVD Categories	Installation Overvoltage Category: II; Pollution Degree: 2; Class II equipment; indoor use only.
RoHS	CE marked for compliance with EU Directive 2011/65/EU for Restriction of Hazardous Substances in Electrical and Electronic Equipment.

Environmental Specifications

Parameter	Specification
Operating Temperature	0°C to 40°C (32° F to 104° F)
Storage Temperature	-40°C to 85°C (-40°F to 185° F)
Altitude	2000 m (6,562 ft)
Relative Humidity	5-95 %, non-condensing
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

Mechanical Specifications

Parameter	Specification	
4U Dimensions	H, 6.97” (177.04 mm); W (front panel), 18.9” (480 mm); D, 23.0” (584 mm); H, 6.97” (177.04 mm); W (chassis), 16.9” (429 mm); D, 23.0” (584 mm).	
14U Dimensions	H, 24.5” (622 mm); W (front panel), 19.5” (495.3 mm); D, 29.6” (752 mm).	
14U Dimensions (With castor wheels)	H, 28.5” (724 mm); W (front panel), 19.5” (495.3 mm); D, 29.6” (752 mm).	
4U Unit Weight	AST 6003: 104 lb / 47.2 kg;	AST 4503: 87 lb / 39.5 kg.
14U Unit weight	AST 12K3: 270 lb / 123 kg;	AST 18K3, 400 lb / 182 kg.
4U Shipping Weight	AST 6003, 104 lb / 47.2 kg	AST 4503, 93 lb / 42.2 kg.
14U Shipping Weight	AST12K3: 460 lb / 208.7 kg	AST18K3: 556 lb / 252.2 kg.

Options

Option	Description
ADV	Advanced Feature Set. Adds arbitrary waveform generation and harmonic analysis of voltage and current.
411	IEC 61000-4-11 voltage dips and interruptions EMC test software.
413	IEC 61000-4-13 harmonics and Inter-harmonics EMC test hardware and software.
GPIB	Adds the IEEE-488.2 interface communication bus.
HF	Increases the maximum output frequency range to 5kHz.
LF	Limits the maximum output frequency to 550Hz for export compliance.
FC	Limits the frequency accuracy to 0.3% for export compliance.
LKM	Clock/Lock Leader. Used with one or more chassis with the LKS option for output sync.
LKS	Clock/Lock Follower. Used with a chassis with the LKM option for output sync.

Harmonics Measurements (with -ADV option)

Parameter	Specification
Frequency, Fundamental	16-81.91 Hz, 82.0-819.1 Hz, 820-960 Hz
Fundamental Frequency Resolution	0.01 Hz: 16-81.91 Hz; 0.1 Hz: 82.0-819.1 Hz; 1 Hz: 820-960 Hz
Harmonic Frequency	32 Hz to 48 kHz; 2nd to 50th harmonic
Fundamental Voltage Accuracy	± (0.2% of actual + 0.3% of full-scale) for 16 Hz to 960 Hz.
Fundamental Voltage Resolution	20 mV
Harmonic Voltage Accuracy	± (0.2% of actual + 0.3% of full-scale + 0.3% of full-scale/kHz).
Harmonic Voltage Resolution	20 mV
Fundamental Current Accuracy	± (0.4% of actual + 0.6% of full-scale) for 16 Hz to 960 Hz.
Fundamental Current Resolution	2 mA; 1-phase mode in 3-phase models: 6 mA.
Harmonic Current Accuracy	± (0.4% of actual + 0.6% of full-scale + 0.4% of maximum/kHz).
Harmonic Current Resolution	2 mA; 1-phase mode in 3-phase models: 6 mA.

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). As of 10/1/19, all Asterion AC units come with an industry-leading five (5) year warranty. Extended warranties available and an enhanced Warranty+ option on new purchases is also available. Consult with your local sales representative to learn more.

Options & Order Information (ASC versions; AC Output Only)

ASC 6003 A 1 C - E 0 0 0A 0A

Power
VA/10, & Phase(s)

Configuration
A = Standard
C = No Casters [1]

Input Voltage
C = 180-264 VAC, 3 Phase L-L (3-Wire + GND)
D = 342-457 VAC, 3 Phase L-L (4-Wire + GND)
E = 432-528VAC, 3-Phase L-L (3-wire + GND)

Interface Options
0=None
1=GPIB

Freq. & Clock/Lock Options
0A = None
1A = HF
1B = LF
1C = FC
1D = LKM
1E = LKS
2A = HF & FC
2B = HF & LKM
2C = HF & LKS
2D = LF & LKM
2E = LF & LKS
2F = FC & LKM
2G = FC & LKS
3A = HF & FC & LKM
3B = HF & FC & LKS

Additional Options
0A = None
1A = 411
1H = ADV
2M = ADV + 411
2N = ADV + 413

Notes
[1] Applicable to 14U models only

Cal Power
Via Acquanera, 29 22100 COMO
tel. 031.526.566 (r.a.) fax 031.507.984
info@calpower.it www.calpower.it