

## California Instruments Asterion AC 3kVA Series

High Performance Programmable AC / DC Power Source

500 VA - 18000 VA  
200 / 400 Vac  
250 / 500 Vdc

### Advanced Features

- High power density in 1U/ 2U chassis up to 3kVA
- Intuitive touch panel control
- Innovative iX2™ current doubling technology
- Multi-language display for global operation
- Auto paralleling for higher power
- Single phase 1U models and 1 or 3 phase selectable 2U models
- Complete avionic test suites (optional)
- ATE version available in both 1U and 2U



### 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 and DC 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 a 1U/2U 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 AC 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 Programming 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.

**Applications**

The Asterion AC 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:

- Commercial and military avionics test
- AC power simulation
- Manufacturing and process control
- Frequency & voltage conversion
- IEC standards testing
- ATE applications

**iX2™ Constant-Power Mode Output Characteristic**

The iX2™ Constant-Power mode has an output characteristic where full rated output power is available from 50% of full-scale output voltage to 100% of full-scale output voltage, as depicted in the graphs of Figure 1 1 and Figure 1 2. The output current versus output voltage follows a constant-power relation where the output current would be 200% of the full-scale value when the output voltage is 50% of full scale. The current ratings are also a function of output frequency, as shown in Figure 1 1 for the AST 751, AST 1501, AST 2253, and AST 3003 models above 500 Hz, and in Figure 1 2 for the AST 501 and AST 1503 models above 1 kHz.

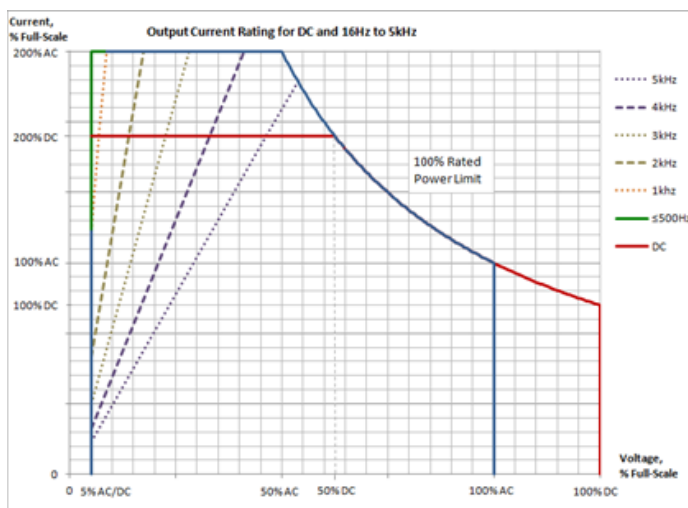


Figure 1 1. iX2™ Constant-Power: Output Current Versus Voltage, AST 751, AST 1501, AST 2253, AST 3003 (1-Phase)

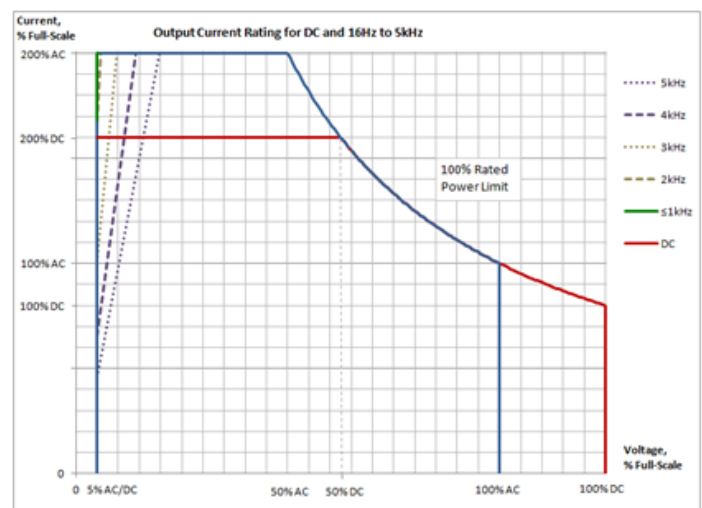


Figure 1 2. iX2™ Constant-Power: Output Current Versus Voltage, AST 501, AST 1503, AST 3003 (3-Phase)

## 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 for the Asterion ATE model without front panel display.

The screenshot displays the Asterion AC Virtual Panels GUI, which is organized into several functional areas:

- Settings:** Includes sections for Output Mode (AC, DC, AC+DC), Voltage Range (200.0, 400.0), Phase Mode (1-phase), Overload Mode (Constant, Constant), Sense lines (Internal), and ALD.
- Waveform Generation:** Features Frequency (Hz) set to 400.00, Phase A Amplitude (V) set to 115.00, and Phase A set to 115. It also includes Remote Inhibit Level (HIGH, LOW) and Remote Inhibit Mode (LATC).
- Measurements Analysis:** Shows a WaveForm Display with Waveform and Report tabs, and an Acquisition Control panel with Offset (Mili Second) set to 2.00, Trigger Phase set to 0, and Sampling (Micro Second) set to 46.88. It also has a Continuous Mode section.
- IEC Tests:** A row of buttons for various test standards: 411, 413, 414, 417, 428, 429, 160, 704, A8D, 350, AMD, 787.
- Avionics Tests:** A row of buttons for avionics-related tests: 411, 413, 414, 417, 428, 429, 160, 704, A8D, 350, AMD, 787.
- Simulation Mode:** The main interface shows 'Simulation Mode' with Serial No: 12345, Firmware version: 1.0, and Software Version: 1.0 (Beta 6.1). It includes a Hardware Interface - Simulation section.
- Navigation and Control:** A top navigation bar includes 'Steady State', 'Device Interface', 'Standard Measurements', 'Arbitrary Waveform Generator', 'Harmonic Waveform Generator', and 'Output Sequencer'. A bottom navigation bar includes 'Steady State', 'Device Interface', 'Transient List Editor', and 'WaveForm Display'. A 'Back Monitor' button is visible on the right side.
- Transient List Editor:** A detailed view of the transient list editor showing Phase Selection (Volt A, Volt B, Volt C), Type (VoltageStep, VoltageDrop, VoltageSurgeOrSag, FrequencySweep, FrequencyStep, VoltageFrequencyStep, Delay), and Execution Mode (Run: 1 Times).
- Waveform Display:** A detailed view of the waveform display showing 'Voltage for phase A @ 400 Hz' with a graph of Voltage vs Time (ms). The graph shows a sine wave with a peak current of 4.36 and a peak voltage of 350.98. A data table at the bottom provides summary statistics: V rms: 115, V THD: 2.3, I THD: 2.3, I rms: 4.36, I CF: 2.2, Power: 350.98, PF: 0.7.

## Specifications

| AC/DC Output Specifications                        |  |   |  |
|--|--|---|--|
| Model  | AST 501  | AST 751   | AST 1501   |
| Enclosure  | 1U   | 1U  | 1U   |
| Output Phase                                       | 1-Phase  | 1-Phase   | 1-Phase  |
| Output Power                                       | 500 VA/ 500 W  | 750 VA/ 750 W   | 1,500 VA/ 1,500 W;<br>derate output power from 1,500 W at 103.5 VAC to 1,300 W at 90 VAC   |
| AC and AC+DC Output Current, Full-Scale            | Low-Range:<br>2.5 A (RMS) at 200 VAC.<br>High-Range:<br>1.25 A (RMS) at 400 VAC.                                     | Low-Range:<br>3.75 A (RMS) at 200 VAC.<br>High-Range:<br>1.88 A (RMS) at 400 VAC.                                 | Low-Range:<br>7.5 A (RMS) at 200 VAC.<br>High-Range:<br>3.75A (RMS) at 400 VAC.  |
| DC Output Current, Full-Scale                      | Low-Range:<br>2.0 ADC at 250 VDC.<br>High-Range:<br>1.0 ADC at 500 VDC.  | Low-Range:<br>3.0 ADC at 250 VDC.<br>High-Range:<br>1.5 ADC at 500 VDC.   | Low-Range:<br>6.0 ADC at 250 VDC.<br>High-Range:<br>3.0 ADC at 500 VDC.  |
| Model  | AST 1503   | AST 2253  | AST 3003   |
| Enclosure  | 2U   | 2U  | 2U   |
| Output Phase                                       | 1-Phase/3-Phase  | 1-Phase/3-Phase   | 1-Phase/3-Phase  |
| Output Power                                       | 1,500 VA/1,500 W;<br>500 W, maximum per phase;<br>derate output power from 1,500 W at 103.5 VAC to 1,300W at 90 VAC. | 2,250 VA/2,250 W;<br>750W, maximum per phase;<br>derate output power from 1,900 W at 132 VAC to 1,300W at 90 VAC. | 3,000 VA/ 3,000 W;<br>1,000 W, maximum per phase;<br>derate output power from 3,000 W at 207 VAC to 2,600W at 180 VAC, and 1,900 W at 132 VAC to 1,300W at 90 VAC. |
| AC and AC+DC Output Current, Full-Scale, per phase | Low-Range:<br>2.5 A (RMS) at 200 VAC.<br>High-Range:<br>1.25 A (RMS) at 400 VAC.<br>1-Phase mode: X3.                | Low-Range:<br>3.75 A (RMS) at 200 VAC.<br>High-Range:<br>1.88 A (RMS) at 400 VAC.<br>1-Phase mode: X3.            | Low-Range:<br>5 A (RMS) at 200 VAC.<br>High-Range:<br>2.5A (RMS) at 400 VAC.<br>1-Phase mode: X3.  |
| DC Output Current, Full-Scale, per phase           | Low-Range:<br>2.0 ADC at 250 VDC.<br>High-Range:<br>1.0 ADC at 500 VDC.<br>1-Phase mode: X3.                         | Low-Range:<br>3.0 ADC at 250 VDC.<br>High-Range:<br>1.5 ADC at 500 VDC.<br>1-Phase mode: X3.                      | Low-Range:<br>4.0 ADC at 250 VDC.<br>High-Range:<br>2.0 ADC at 500 VDC.<br>1-Phase mode: X3.   |

| AC/DC Output Specifications Continued    |  |
|--|--|
| Model                                    | All Models   |
| Maximum RMS Output Current               | 200% of the full-scale RMS current at $\leq 50\%$ of full-scale voltage. Refer to Figure 1-1 and Figure 1-2 for graphs of current rating as a function of output frequency.  |
| iX2™ Constant-Power Mode                 | Constant-Power output capability in each output voltage range with full rated output power from 50% of full-scale output voltage to 100% of full-scale; the output current increases to 200% of rated current at 50% full-scale output voltage from 100% rated current at 100% of full-scale voltage. Refer to Figure 1-1 and Figure 1-2 for graphs of current rating as a function of output frequency. |
| AC and AC+DC Output Voltage, Full-Scale  | Low-Range: 0 to 200 V(RMS); High-Range: 0 to 400 V(RMS)  |
| DC Output Voltage, Full-Scale            | Low-Range: 0 to 250 VDC; High-Range: 0 to 500 VDC  |
| DC Offset Voltage, Typical               | $\pm 20$ mVDC, $\geq 40$ Hz  |
| Output Float Voltage                     | 566 V(PK), maximum from either output terminal to chassis  |
| Voltage Programming Accuracy             | $\pm(0.1\%$ of actual + $0.2\%$ of full-scale) for DC, and AC 16 Hz to 1 kHz; $>1$ kHz, add $\pm 0.2\%$ of full-scale/kHz; add $\pm 0.1\%$ of full scale for AC+DC mode. Valid from 5% of full-scale to 200 VAC(RMS)/250 VDC in low-range and 400 VAC(RMS)/500 VDC in high-range; with sense leads connected.  |
| Voltage Resolution                       | $\leq 0.02$ V, AC, DC, and AC+DC mode  |
| Voltage Temperature Coefficient, Typical | $\leq 100$ ppm/ $^{\circ}$ C of full-scale   |
| Voltage Stability, Typical               | $\pm 0.1\%$ of full-scale over 8 hours; with constant line, load, and temperature; with sense leads connected  |
| Voltage Distortion                       | 0.25% maximum, 16 Hz to 100 Hz; 0.5% maximum, $>100$ Hz to 500 Hz; and 1% maximum, $>500$ Hz to 1 kHz, plus 1%/kHz to 5 kHz; with full linear load or no load  |
| Voltage Slew Rate, Typical               | $\geq 10$ V/ $\mu$ s with full-scale programmed voltage step   |
| Current Programming Range                | Programmable from zero to 200% of full-scale rating in each output range. Refer to Figure 1-1 and Figure 1-2 for graphs of current rating as a function of output frequency.   |
| Current Programming Accuracy             | $\pm(0.3\%$ of actual + $0.5\%$ of full-scale) for DC, and AC 16 Hz to 1 kHz; $>1$ kHz, add $\pm 0.3\%$ of full-scale/kHz; add $\pm 0.1\%$ of full-scale for AC+DC mode. Valid from 5% of full-scale to 100% of full-scale.  |
| Line Regulation                          | $\pm 0.015\%$ of full-scale voltage, for a $\pm 10\%$ input line change; DC, or 40 Hz to 5 kHz.  |
| Load Regulation                          | $\pm 0.025\%$ of full-scale voltage, for 100% of rated resistive load change; DC, or 40 Hz to 1 kHz, above 1 kHz, add $\pm 0.015\%$ of full-scale/kHz  |

| AC/DC Output Specifications Continued              |  |
|--|--|
| Model  | All Models   |
| Voltage and Current Programming Overrange, Typical | 1% of full-scale   |
| Noise Level, Typical                               | AC output: 450 mV(RMS), low-range; 750 mV(RMS), high-range;<br>at $\geq 40$ Hz output frequency; bandwidth, 20 kHz to 1 MHz;<br>DC output: 400 mV(RMS), low-range; 700 mV(RMS), high-range;<br>bandwidth, 20 Hz to 1 MHz.  |
| Remote Sense                                       | 5 V(RMS), maximum total output lead drop   |
| Crest Factor                                       | AST 751, AST 1501, AST 2253: 5:1 of full-scale current in each output range (ratio of peak output current to RMS full-scale output current).<br>AST 501, AST 1503, AST 3303: 7:1 of full-scale current in each output range (ratio of peak output current to RMS full-scale output current). |
| Power Factor                                       | 0, lagging to 0, leading   |
| Frequency Range                                    | Standard models: DC, and 16 Hz to 1.3 kHz;<br>LF option: DC, and 16 Hz to 550 Hz;<br>HF option: DC, and 16 Hz to 5.5 kHz   |
| Frequency Accuracy                                 | Standard models: $\pm(0.01\%$ of actual + frequency resolution/2);<br>FC option: $\pm 0.25\%$ .  |
| Frequency Resolution                               | 0.01 Hz resolution, 16-81.91 Hz;<br>0.1 Hz resolution, 82-819.1 Hz;<br>1 Hz resolution, 820-5000 Hz;<br>with LKM/LKS option: 1 Hz resolution, 16-5500 Hz.  |
| Frequency Temperature Coefficient, Typical         | 10 ppm/ $^{\circ}$ C of full-scale in each range   |
| Phase Programming Range                            | 0.0 $^{\circ}$ to 360.0 $^{\circ}$ , relative to external synchronization signal; in multi-phase group, Auxiliary unit output voltage is relative to the Master unit output voltage, with the Master unit as reference 0 $^{\circ}$ .  |
| Phase Accuracy                                     | $\pm 1^{\circ}$ , 16 Hz to 100 Hz; $\pm 2^{\circ}$ >100 Hz to 1 kHz, plus $\pm 1^{\circ}$ /kHz above 1 kHz   |
| Phase Programming Resolution                       | $\pm 0.4^{\circ}$  |

| <b>AC Input Specifications</b>                   |   |   |   |
|--|---|---|---|
| <b>Model</b>                                     | <b>AST 501</b>  | <b>AST 751</b>  | <b>AST 1501</b>   |
| <b>Enclosure</b>                                 | 1U  | 1U  | 1U  |
| <b>Input Voltage, Nominal Rating</b>             | 100VAC-120VAC/<br>200-240 VAC;<br>1-Phase and 3-Phase, line-neutral or line-line .                          | 100VAC-120VAC/<br>200-240 VAC;<br>1-Phase and 3-Phase, line-neutral or line-line.                           | 100VAC-120VAC/<br>200-240 VAC;<br>1-Phase and 3-Phase,<br>line-neutral or line-line.                        |
| <b>Input Voltage, Operating Range</b>            | 90-132 VAC/<br>180VAC-264VAC  | 90-132 VAC/<br>180VAC-264VAC  | 90-132 VAC/<br>180VAC-264VAC;<br>refer to output power section for derating as a function of input voltage. |
| <b>Input Current, Maximum with 1-Phase Input</b> | 7.6 A(RMS) at 90 VAC  | 11 A(RMS) at 90 VAC   | 20 A(RMS) at<br>90 VAC to 103.5 VAC   |
| <b>Input Current, Maximum with 3-Phase Input</b> | 4.4 A(RMS) at 90 VAC  | 6.5 A(RMS) at 90 VAC  | 13 A(RMS) at 90 VAC   |
| <b>Model</b>                                     | <b>AST 1503</b>   | <b>AST 2253</b>   | <b>AST 3003</b>   |
| <b>Enclosure</b>                                 | 2U  | 2U  | 2U  |
| <b>Input Voltage, Nominal Rating</b>             | 100VAC-120VAC/<br>200-240 VAC;<br>1-Phase and 3-Phase, line-neutral or line-line .                          | 100VAC-120VAC/<br>200-240 VAC;<br>1-Phase and 3-Phase, line-neutral or line-line.                           | 100VAC-120VAC/<br>200-240 VAC;<br>1-Phase and 3-Phase, line-neutral or line-line.                           |
| <b>Input Voltage, Operating Range</b>            | 90-132 VAC/<br>180VAC-264VAC;<br>refer to output power section for derating as a function of input voltage. | 90-132 VAC/<br>180VAC-264VAC;<br>refer to output power section for derating as a function of input voltage. | 90-132 VAC/<br>180VAC-264VAC;<br>refer to output power section for derating as a function of input voltage. |
| <b>Input Current, Maximum with 1-Phase Input</b> | 20 A(RMS) at<br>90 VAC to 103.5 VAC;  | 20 A(RMS) at<br>90 VAC to 132 VAC;<br>15 A(RMS) at 180 VAC.   | 20 A(RMS) at<br>90 VAC to 132 VAC;<br>20 A(RMS) at<br>180 VAC to 207 VAC.                                   |
| <b>Input Current, Maximum with 3-Phase Input</b> | 13 A(RMS) at<br>90 VAC to 103.5 VAC,<br>line-to line  | 10 A(RMS) at 180 VAC,<br>line-to line   | 13 A(RMS) at 180 VAC,<br>line-to line   |

| AC Input Specifications Continued  |   |
|--|---|
| Model  | All Models  |
| Input Frequency, Nominal Rating  | 50 Hz, 60 Hz, 400 Hz                                  |
| Input Frequency Range  | 47-440 Hz   |
| Inrush Current, typical  | 30 A (PK) at 264 VAC                                  |
| Efficiency <sup>1</sup> , typical  | 75%   |
| Power Factor <sup>2</sup> , typical  | 0.98; active PFC                                      |
| Hold-Up Time <sup>3</sup> , typical  | ≥10 ms  |
| Isolation Voltage  | 2200 VAC, input to output; 1350 VAC, input to chassis |
| <sup>1</sup> At full load and DC or 16 Hz to 1 kHz output frequency, with AC input voltage of 115 V(RMS) or 230 V(RMS), and 50/60 Hz input frequency |   |
| <sup>2</sup> At full load, with 1-phase AC input voltage of 115 V(RMS) or 230 V(RMS), and 50/60 Hz input frequency                                   |   |
| <sup>3</sup> At full load and with AC input voltage of 115 V(RMS) or 230 V(RMS)  |   |

| AC Output Measurement          |   |
|--------------------------------|---|
| Parameter                      | Specification <sup>1</sup>  |
| Voltage Range, Full-Scale      | AC and AC+DC output: 0-500 V(RMS)   |
| Voltage Accuracy               | ±(0.1% of actual + 0.2% of full-scale) for AC 16 Hz to 1 kHz; >1 kHz, add ±0.2% of full-scale/kHz; add ±0.1% of full-scale for AC+DC mode. Valid from 5% of full-scale to 200 VAC(RMS) in low-range and 400 VAC(RMS) in high-range; with sense leads connected. |
| Voltage Resolution             | 20 mV   |
| Current Range, Maximum         | AST 501, AST 751, AST 1503, AST 2253: 7.5 A(RMS) per phase;<br>AST 1501, AST 3003: 15 A(RMS) per phase;<br>AST 2253 (1-Phase): 22.5 A(RMS);<br>AST 3003 (1-Phase): 30 A(RMS);<br>1-phase mode in 3-phase models: X3   |
| Current Accuracy               | ±(0.3% of actual + 0.5% of maximum) for AC 16 Hz to 1 kHz; >1 kHz, add ±0.3% of maximum/kHz; add ±0.1% of maximum for AC+DC mode. Valid from 5% of full-scale to 100% of full-scale.  |
| Current Resolution             | 2 mA; 1-phase mode in 3-phase models: 6 mA.   |
| Peak Current Range, Full-Scale | AST 501, AST 751, AST 1503, AST 2253: ± 0-37.5 A(PK) per phase;<br>AST 1501, AST 3003: ± 0-75 A(PK) per phase;<br>AST 2253 (1-Phase): 112.5 A(PK);<br>AST 3003 (1-Phase): 150 A(PK);<br>1-phase mode in 3-phase models: X3.                                     |
| Peak Current Accuracy          | ±(0.5% of actual + 0.5% of maximum) for AC 16 Hz to 1 kHz; >1 kHz, add ±0.3% of maximum/kHz; add ±0.1% of maximum for AC+DC mode. Valid from 5% of full-scale to 100% of full-scale.  |



| AC Output Measurement Continued   |   |
|---|---|
| Parameter   | Specification <sup>1</sup>  |
| Peak Current Resolution   | 5 mA; 1-phase mode in 3-phase models: 15 mA.  |
| Frequency Range   | 16 Hz to 5.0 kHz  |
| Frequency Accuracy  | $\pm(0.01\%$ of actual + frequency resolution/2)  |
| Frequency Resolution  | 0.01 Hz: 16-81.91 Hz; 0.1 Hz: 82.0-819.1 Hz; 1 Hz: 820-5.0 kHz  |
| Phase Range   | 0-360°  |
| Phase Accuracy  | $\pm 1^\circ$ , 16 Hz to 100 Hz; $\pm 2^\circ$ , >100 Hz to 1 kHz; $\pm 5^\circ$ , >1 kHz   |
| Phase Resolution  | 0.1°, 16-100 Hz; 1°, >100 Hz to 5 kHz   |
| Real Power Range, Full-Scale  | 0-1.5 kW; 1-phase mode in 3-phase models: 4.5 kW.   |
| Real Power Accuracy   | $\pm(0.4\%$ of actual + 0.7% of full-scale) for AC 16 Hz to 1 kHz; >1 kHz, add $\pm 0.4\%$ of full-scale/kHz; add $\pm 0.2\%$ of full-scale for AC+DC mode. |
| Real Power Resolution   | 1 W; 1-phase mode in 3-phase models: 3 W.   |
| Apparent Power, Full-Scale  | 0-1.5 kVA; 1-phase mode in 3-phase models: 4.5 kVA.   |
| Apparent Power Accuracy   | $\pm(0.4\%$ of actual + 0.7% of full-scale) for AC 16 Hz to 1 kHz; >1 kHz, add $\pm 0.4\%$ of full-scale/kHz; add $\pm 0.2\%$ of full-scale for AC+DC mode. |
| Apparent Power Resolution   | 1 VA; 1-phase mode in 3-phase models: 3 VA.   |
| Power Factor Range  | 0-1   |
| Power Factor Accuracy   | $\pm 2\%$ of full-scale   |
| Power Factor Resolution   | 0.01  |
| <sup>1</sup> Accuracy specifications apply above 100 counts of resolution; for multi-chassis configurations, multiply the output current and power, and their accuracy specifications, by the number of chassis; power factor accuracy applies for PF > 0.5 and output apparent power > 50% of maximum rating; frequency measurement specifications valid for output voltage >5% of full-scale. |   |

| DC Output Measurement  |  |
|--|--|
| Parameter  | Specification <sup>1</sup>   |
| Voltage Range, Full-Scale  | ±500 VDC   |
| Voltage Accuracy   | ±(0.1% of actual + 0.2% of full-scale); valid from 5% of full-scale to 250 VDC and 500 VDC in high-range; with sense leads connected.  |
| Voltage Resolution   | 25 mV  |
| Current Range, Maximum   | AST 501, AST 751, AST 1503, AST 2253: 0-7.5 ADC per phase;<br>AST 1501, AST 3003: 0-15 ADC per phase;<br>AST 2253 (1-Phase): 22.5 ADC;<br>AST 3003 (1-Phase): 30 ADC;<br>1-phase mode in 3-phase models: X3.                 |
| Current Accuracy   | ±(0.3% of actual + 0.5% of full-scale); valid from 5% of full-scale to 100% of full-scale.   |
| Current Resolution   | 2 mA; 1-phase mode in 3-phase models: 6 mA.  |
| Peak Current Range, Full-Scale   | AST 501, AST 751, AST 1503, AST 2253: ± 0-37.5 A(PK) per phase;<br>AST 1501, AST 3003:: ± 0-75 A(PK) per phase;<br>AST 2253 (1-Phase): 112.5 A(PK);<br>AST 3003 (1-Phase): 150 A(PK);<br>1-phase mode in 3-phase models: X3. |
| Peak Current Accuracy  | ±(0.5% of actual + 0.5% of maximum); valid from 5% of full-scale to 100% of full-scale.  |
| Peak Current Resolution  | 5 mA; 1-phase mode in 3-phase models: 15 mA.   |
| Power Range, Full-Scale  | 0-1.5 kW; 1-phase mode in 3-phase models: 4.5 kW..   |
| Power Accuracy   | ±(0.4% of actual + 0.7% of full-scale)   |
| Power Resolution   | 1 W  |
| <sup>1</sup> Accuracy specifications apply above 100 counts of resolution; for multi-chassis configurations, multiply the output current and power, and their accuracy specifications, by the number of chassis. |  |

| Harmonic Measurement             |   |
|----------------------------------|---|
| 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     | $\pm(0.2\%$ of actual + 0.3% of full-scale) for 16 Hz to 960 Hz..     |
| Fundamental Voltage Resolution   | 20 mV   |
| Harmonic Voltage Accuracy        | $\pm(0.2\%$ of actual + 0.3% of full-scale + 0.3% of full-scale/kHz). |
| Harmonic Voltage Resolution      | 20 mV   |
| Fundamental Current Accuracy     | $\pm(0.4\%$ of actual + 0.4% 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        | $\pm(0.4\%$ 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.                           |

| Protection Functions                |   |
|-------------------------------------|---|
| Output Overvoltage Protection (OVP) | Programmable to 115% of full-scale output voltage;<br>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;<br>in constant-current mode, output current is regulated to setpoint;<br>in current limit mode, exceeding current-limit setpoint results in shutdown of output;<br>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   |

| Environmental            |  |
|--------------------------|--|
| 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         |  |
|--------------------|--|
| Parameter          | Specification  |
| 1U Dimensions      | H, 1.75" (44.45 mm); W (front panel), 19.0" (483 mm); D, 23.0" (584 mm);<br>H, 1.75" (44.45 mm); W (chassis), 16.9" (429 mm); D, 23.0" (584 mm).   |
| 2U Dimensions      | H, 3.47" (88.1 mm); W (front panel), 18.9" (480 mm); D, 23.0" (584 mm);<br>H, 3.47" (88.1 mm); W (chassis), 16.9" (429 mm); D, 23.0" (584 mm).   |
| 1U Unit Weight     | AST 501/751: 19 lb / 8.6 kg;<br>AST 1501: 22 lb / 10 kg.   |
| 2U Unit Weight     | AST 1503/2253: xx lb / x.x kg;<br>AST 3003: xx lb / xx kg.   |
| 1U Shipping Weight | AST 501/751: 29 lb / 63.8kg;<br>AST 1501: 32 lb / 70.4 kg.   |
| 2U Shipping Weight | AST 1503/2253: xx lb / xxkg;<br>AST 3003: 54 lb / 24.5 kg.   |
| Chassis Material   | Steel with plastic front panel   |
| Chassis Finish     | Galvanized Zinc, G90   |
| Installation       | Protective covers are provided for AC input and AC/DC output;<br>bench-top: removable feet for the chassis;<br>rack-mount: per ANSI-EIA-310-D, with front panel mounting flanges and chassis provisions for mounting rack slides; slides option available. |
| Cooling            | Force-air cooling; linear, variable fan speed control; air intake at front/sides and exhaust at rear.  |
| Acoustic Noise     | 1U Models: 65 dBA, maximum; measured at 1 m with A-weighting;<br>2U Models: xx dBA, maximum; measured at 1 m with A-weighting.   |

| Regulatory Compliance  |   |
|------------------------|---|
| Parameter              | Specification   |
| EMC                    | CE marked for EMC Directive 89/336/EEC 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 CAN/CSA-C22.2 No. 61010-1-12, UL 61010-1 Third Edition. CE marked for LVD compliance 2006/95/EC 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 EU Directive 2011/65/EU for Restriction of Hazardous Substances in Electrical and Electronic Equipment.   |

| Operational Characteristics   |  |
|-------------------------------|--|
| Parameter                     | Characteristic   |
| Parallel Operation            | Multi-chassis configurations could be formed with up to six units paralleled in 1-phase or multi-phase groups, using one master unit and up to five units operating as auxiliary units. Setup of the multi-chassis configuration is automatically accomplished when the chassis are interconnected with the interface cables, and require no user setup, except to wire the outputs. |
| Output Relays                 | Isolation and range relays are provided internally to automatically configure the outputs, turn the output on/off, and disconnect the load from the output amplifier when in the off state.  |
| Non-Volatile Memory           | 16 complete instrument setups and transient lists, 100 events per list.  |
| Transient Generator           | Output could be controlled to produce transient events with 500 $\mu$ s programming resolution:<br>Voltage: drop, step, sag, surge, sweep;<br>Frequency: step, sag, surge, sweep;<br>Voltage and Frequency: step, sweep.   |
| Reliability                   | MTBF: AST 501, AST 751, AST 1501, > 110,000 hr;<br>calculation method: Telecordia SR-332, Issue 3; method: Method I (Parts Count), Case 2 (Temp 40°C, Stress 50%, Burn-in 4 hr); ambient temperature: 40°C; temperature variation: 10°C; environment: Ground, Fixed, Controlled; duty cycle: 100%; stress factor: 50%; quality level: 1; upper confidence level: 90%                 |
| Calibration                   | Calibration interval is 1 year; calibration is firmware-based through the digital interface or Virtual Panels.   |
| Fault Identification          | On-board diagnostics identify when an assembly has experienced a fault.  |
| XLOAD Output Characteristic   | User-selectable XLOAD mode provides revised regulation characteristics for additional stability margins when driving large capacitive loads.   |
| Automatic Level Control (ALC) | User-selectable ALC operation enables a digitally implemented feedback control loop to provide precise regulation of the RMS value of the output voltage.  |
| LF, option                    | Low frequency option: output frequency range of 16 Hz to 550 Hz.   |
| HF, option                    | High frequency option: output frequency range of 16 Hz to 5.5 kHz.   |
| FC, option                    | Reduced frequency control option: $\pm$ 0.25% accuracy of output frequency; deletes external waveform programming signal.  |

|   |  |
|---|--|
| <b>LKM , option<br/>(Clock and Lock Mode)</b> | Clock and Lock interface option for master unit;<br>multi-phase configurations could be formed with up to six units using the Clock and Lock signal interface. One unit acts as the master and provides the reference signals to the other slave units.<br>Clock and Lock interface option, master unit. |
| <b>LKS , option<br/>(Clock and Lock Mode)</b> | Clock and Lock interface option for auxiliary unit;<br>multi-phase configurations could be formed with up to six units using the Clock and Lock signal interface. One unit acts as the master and provides the reference signals to the other slave units.   |
| <b>MB, option</b>                             | Upgrades all chassis to Enhanced models in a multi-chassis configuration.  |

| Front Panel Options |  |
|---------------------|--|
| Option              | Description  |
| <b>Enhanced</b>     | <p>Touch-Panel, TFT color LCD display with menu-based control;<br/>rotary encoder for menu navigation and parameter adjustment and entry, with integrated selection switch.</p> <p>POWER switch: turns unit on/off.</p> <p>OUTPUT switch: turns output of the unit on/off.</p> <p>OUTPUT LED: integrated into the OUTPUT switch; indicates that the output of the unit has been turned on.</p> <p>CC LED: indicates that the unit is in constant-current mode and the output current is being regulated.</p> <p>CV LED; indicates that the unit is in constant-voltage mode and the output voltage is being regulated.</p> <p>HI RNG LED: indicates that the high-voltage output range has been selected;</p> <p>FAULT LED: indicates that an internal fault has been detected and the output has been shut down.</p> <p>REM LED: AST 501, AST 751, AST 1501, indicates that the unit is under control of the remote digital interface, and LXI status annunciation.</p> <p>AST 1503, AST 2253, AST 3003: indicates that the unit is under control of the remote digital interface.</p> <p>LXI LED: AST 1503, AST 2253, AST 3003, LXI status annunciation.</p> |
| <b>ATE</b>          | <p>No front-panel display; only status indicators.</p> <p>POWER switch: turns unit on/off.</p> <p>UPDATE switch: enables bootloader for firmware upgrade.</p> <p>POWER LED: indicates that the POWER switch has turned the unit on.</p> <p>OUTPUT LED: indicates that the output of the unit has been turned on.</p> <p>CC LED: indicates that the unit is in constant-current mode and the output current is being regulated.</p> <p>CV LED; indicates that the unit is in constant-voltage mode and the output voltage is being regulated.</p> <p>HI RNG LED: indicates that the high-voltage output range has been selected.</p> <p>FAULT LED: indicates that an internal fault has been detected and the output has been shut down.</p> <p>REM/LAN LED: indicates that the unit is under control of the remote digital interface, and LXI status annunciation.</p>   |

| Firmware / Software Options  |   |
|--|---|
| Option <sup>1</sup>  | Description   |
| <b>B787, (MC)</b>  | Avionics Electrical Power Quality Test Software; Boeing 787B3-0147 A/B/C (B787).  |
| <b>AMD, (MC)</b>   | Avionics Electrical Power Quality Test Software; Airbus AMD24 C (A400M).  |
| <b>B787 &amp; AMD, (MC)</b>  | Includes both B787 and AMD options.   |
| <b>AVSTD, (MC)</b>   | Avionics Electrical Power Quality Test Software Package; includes 160 (RTCA/DO160 E/F/G), 704 (MIL-STD 704 A/B/C/D/E/F), ABD (Airbus ADB100.1.8 D/E), A350 (Airbus ADB100.1.8.1 B/C). |
| <b>AVALL, (MC)</b>   | Avionics Electrical Power Quality Test Software Package; includes AVSTD, B787, AMD.   |
| <b>411, (MC)</b>   | IEC 61000-4-11 voltage dips and interruptions EMC test software.  |
| <b>413, (MC)</b>   | IEC 61000-4-13 harmonics and Inter-harmonics EMC test hardware and software.  |
| <b>411 &amp; 413, (MC)</b>   | Includes both 411 and 413 options.  |
| <b>MC</b>  | Options are installed in all chassis of a multi-chassis (MC) configuration.   |
| <sup>1</sup> For Avionics options, reference the Avionics Software Manual (P/N 4994-971) for test details. All options require the use of the provided Asterion Virtual Panels, graphical user interface Windows application software (reference CD ROM CIC496). |   |

| Remote Control Digital Interface Characteristics |  |
|--|--|
| Interface  | Characteristics  |
| <b>LAN</b>                                       | Ethernet 10BASE-T and 100BASE-T over twisted-pair cables compliant with IEEE 802.3;<br>Connector: 8P8C modular jack.   |
| <b>USB</b>                                       | Serial interface compliant to USB 2.0;<br>Connector: Type-B receptacle.  |
| <b>RS-232C</b>                                   | Serial interface compliant to RS-232C;<br>Protocol: data bits, 7 with parity and 8 without parity; stop bits, 2; baud rate, 9600 to 115200;<br>handshake, CTS and RTS;<br>Connector: Subminiature-D, 9-contact receptacle. |
| <b>IEEE-488 (Option)</b>                         | Parallel interface complies with IEEE-488.1, IEEE-488.2, and the SCPI command specification;<br>command execution response time, 10 ms, typical;<br>connector: IEEE-488.1 compliant.                                       |
| <b>Firmware Upgrade</b>                          | Firmware could be upgraded through the USB or RS-232 interfaces. Upgrade through LAN or IEEE-488 is not supported.   |

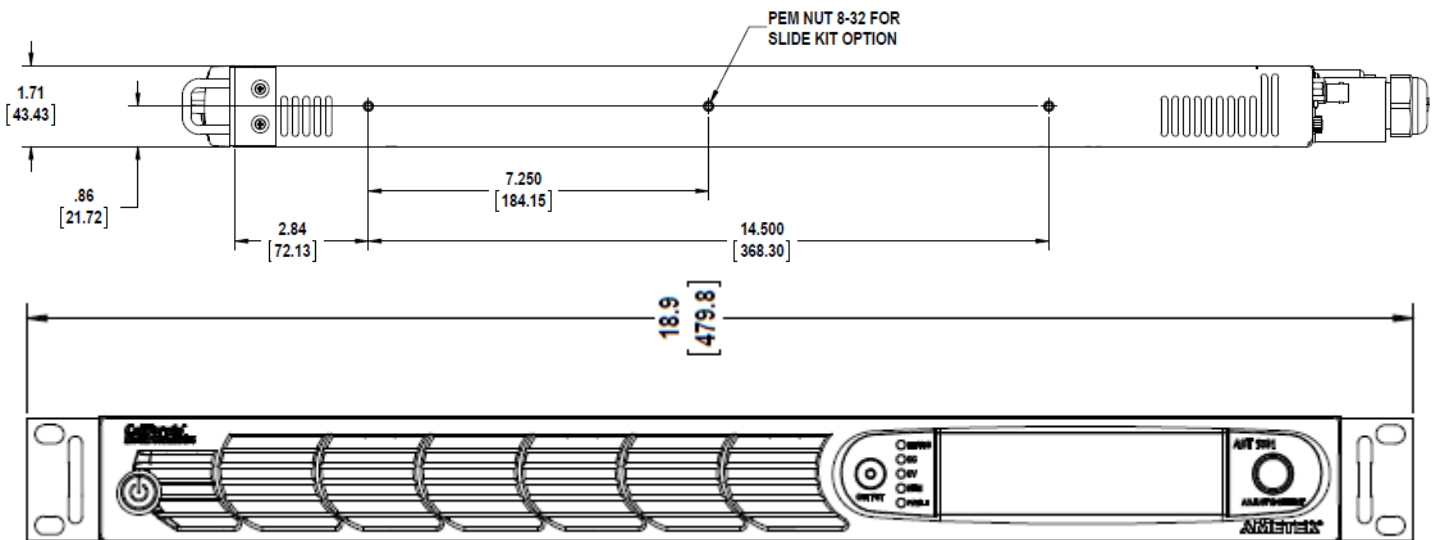
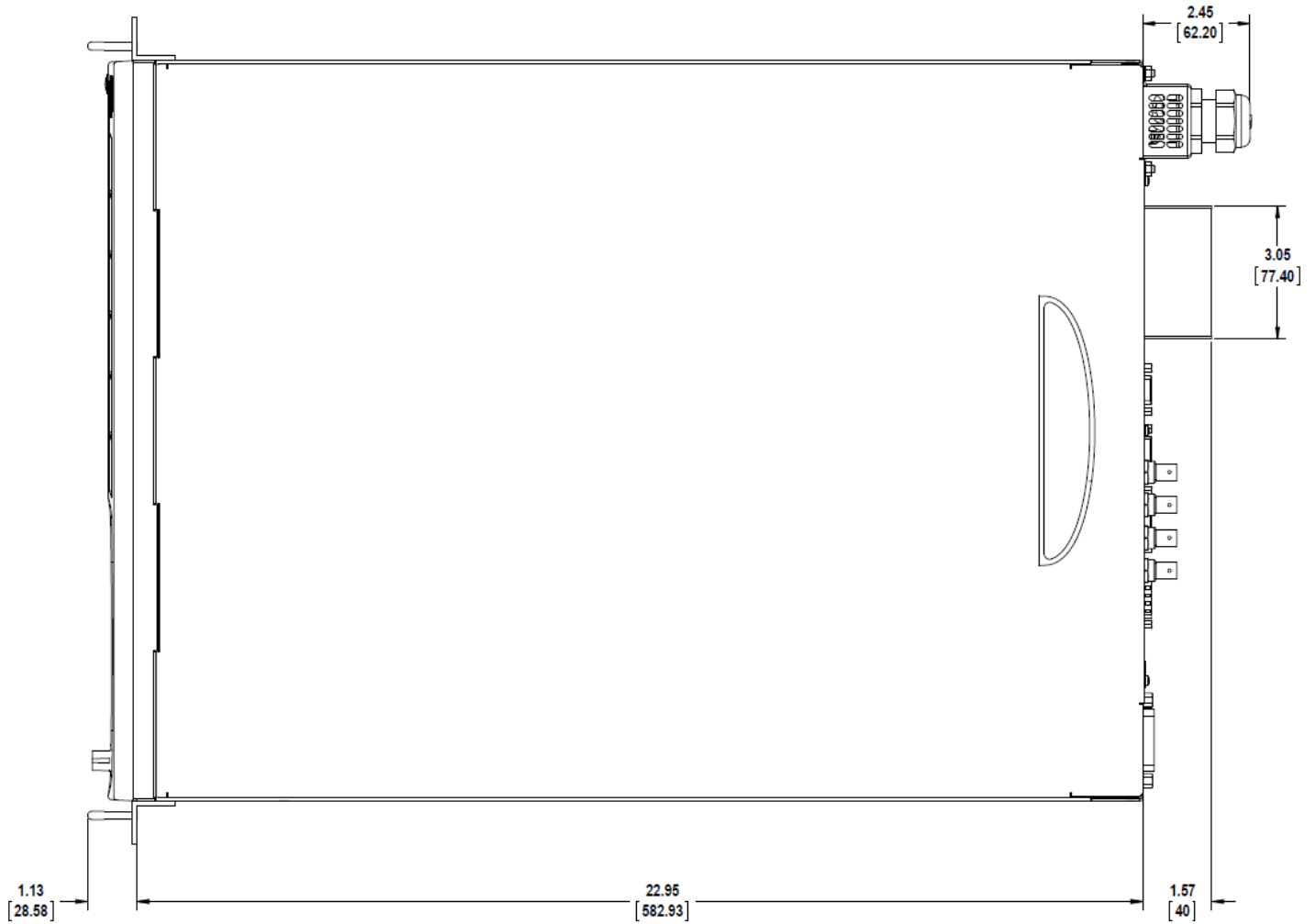
| Remote Control Analog/Digital Signal Characteristics           |   |
|--|---|
| Function   | Characteristics   |
| <b>External Analog Programming of Output Voltage Waveform</b>  | <p>Signal input for output voltage waveform programming by external analog reference;</p> <p>user-selectable signal ranges: 0-1.77 V(RMS)/0-3.54 V(RMS)/0-7.07 V(RMS) for zero to full-scale RMS output voltage, with AC input waveform at 16Hz to 5.5 kHz;</p> <p>programming accuracy, <math>\pm 2\%</math> of full-scale output;</p> <p>individual inputs provided for each output phase; input impedance, 40 k<math>\Omega</math>, typical;</p> <p>safety isolation SELV-rated, referenced to chassis;</p> <p>user-selectable function with the same input signal connection as External Analog Output Voltage Amplitude Programming.</p> |
| <b>External Analog Programming of Output Voltage Amplitude</b> | <p>Signal input for output voltage amplitude programming of waveform that is set by internal controller reference;</p> <p>user-selectable signal ranges: 0-2.5 VDC/0-5 VDC/0-10 VDC for zero to full-scale RMS of internally programmed output voltage;</p> <p>programming accuracy, <math>\pm 2\%</math> of full-scale output;</p> <p>individual inputs provided for each output phase; input impedance, 40 k<math>\Omega</math>, typical;</p> <p>safety isolation SELV-rated, referenced to chassis;</p> <p>user-selectable function with the same input signal connection as External Analog Output Voltage Waveform Programming.</p>      |
| <b>External Analog Modulation of Output Voltage</b>            | <p>Signal input for output voltage modulation of waveform set by internal controller reference;</p> <p>0-5 V(RMS) signal range for 0-20% of full-scale output voltage amplitude modulation;</p> <p>programming accuracy, <math>\pm 2\%</math> of full-scale output;</p> <p>individual inputs provided for each output phase; input impedance, 40 k<math>\Omega</math>, typical;</p> <p>safety isolation SELV-rated, referenced to chassis.</p>  |
| <b>Trigger Output</b>  | <p>Signal output with dual function: user-selectable as either function trigger or list trigger;</p> <p>function trigger provides a pulse for any programmable change in output voltage or frequency; list trigger provides a pulse if programmed as part of list transients;</p> <p>pulse logic level, user-selectable as active-high or active-low; pulse duration, 400 <math>\mu</math>s;</p> <p>rear panel BNC connector; safety isolation SELV-rated, referenced to chassis.</p>   |
| <b>Output Voltage Monitor Outputs</b>                          | <p>Signal outputs for each output phase for monitoring the waveform of the command signal of the output amplifier;</p> <p>0 -5 V(RMS) signal range for zero to full-scale output voltage;</p> <p>rear panel BNC connector; safety isolation SELV-rated, referenced to chassis.</p>  |
| <b>Trigger Input</b>   | <p>Signal input for external trigger for execution of programmed value;</p> <p>logic level, TTL-compatible;</p> <p>signal return common to signals, Synchronization Clock and Remote Inhibit;</p> <p>safety isolation SELV-rated.</p>   |
| <b>Synchronization Signal (SYNC) Input</b>                     | <p>Signal input for external square wave clock to control the output frequency and phase of the waveform generated by the internal generator;</p> <p>logic level, TTL-compatible;</p> <p>signal return common to signals, Trigger Input and Remote Inhibit;</p> <p>safety isolation SELV-rated.</p>   |

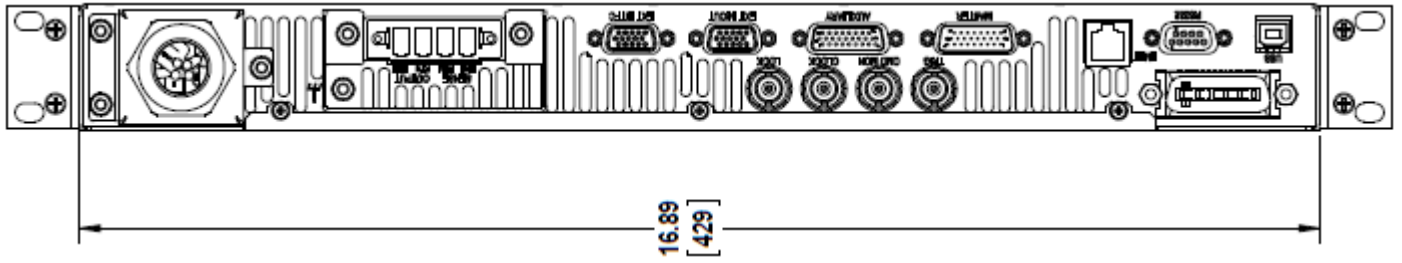


| Remote Control Analog/Digital Signal Characteristics Continued |  |
|--|--|
| Function   | Characteristics  |
| <b>Remote Inhibit Input</b>                                    | Signal input to turn the output on/off;<br>logic level, TTL-compatible; user-selectable as active-high or active-low;<br>signal return common to signals, Trigger Input and Synchronization Clock;<br>safety isolation SELV-rated.   |
| <b>Summary Fault Output</b>                                    | Signal output indicating that a fault condition is present;<br>solid-state, normally-closed ac/dc switch;<br>logic level, active-low (open-circuit when fault is not present);<br>switch ratings: 50V, maximum peak voltage; 0.1A, maximum current; 2.5Ω, maximum resistance; 1μA, maximum off-state leakage current;<br>isolated from all other signals; safety isolation SELV-rated. |
| <b>LKM (Option)</b>  | Signal outputs for Master Clock and Logic signals used in synchronizing two or more AC sources;<br>logic level, TTL-compatible;<br>rear panel BNC connectors for each signal;<br>safety isolation SELV-rated, referenced to chassis.   |
| <b>LKS (Option)</b>  | Signal inputs for Auxiliary Clock and Logic signals used in synchronizing two or more AC sources;<br>logic level, TTL-compatible;<br>rear panel BNC connectors for each signal;<br>safety isolation SELV-rated, referenced to chassis.   |

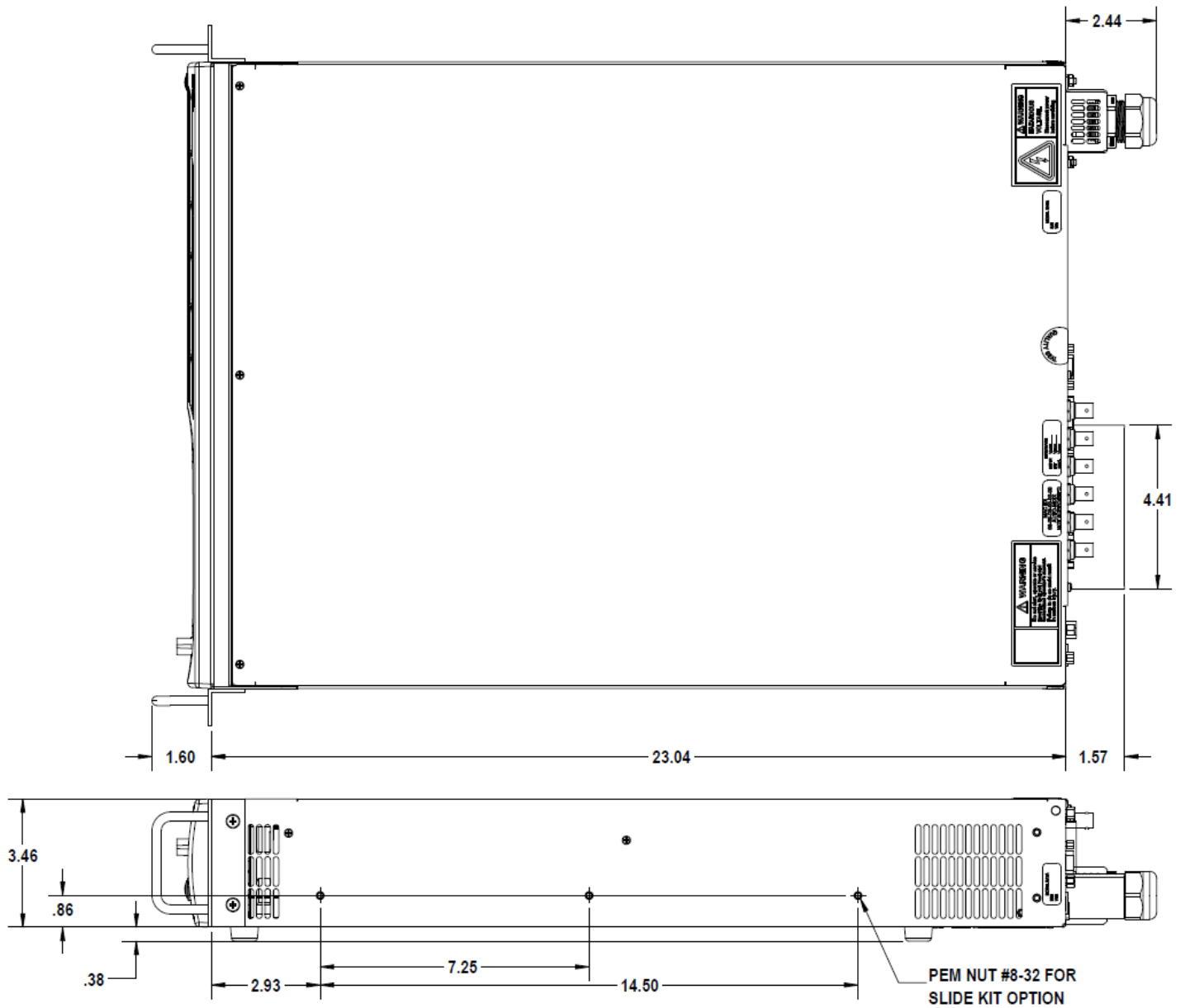
| Rear Panel Connectors                |  |
|--------------------------------------|--|
| Connector                            | Description  |
| AC Input                             | 1-Phase AC input: L1 and L2; 3-Phase AC input: L1, L2, and L3;<br>connector: compression terminals, Phoenix P/N 1703050.   |
| Safety-Ground                        | M4 X 0.7 chassis stud  |
| AC/DC Output                         | 1U Models: Line and Return (RTN) connections; connector: X2 compression terminals, Phoenix P/N 1720819.<br>2U Models: Phase-A/B/C Line and Return (RTN) connections; connector: X4 compression terminals, Phoenix P/N 1720819.           |
| AC/DC Output Remote Sense            | 1U Models: Line and Return (RTN) connections; part of AC output connector, X2 compression terminals, Phoenix P/N 1720819.<br>2U Models: Phase-A/B/C Line and Return (RTN) connections;<br>X4 compression terminals, Phoenix P/N 1703034. |
| Functional-Ground                    | M4 X 0.7 chassis stud  |
| External Interface                   | Control signal interface to external chassis;<br>connector: high-density, 15-contact, female Subminiature-D.   |
| External Input/Output Control        | Control analog/digital signal interface for user remote control;<br>safety isolation SELV-rated; connector: high-density, 15-contact, female Subminiature-D.   |
| Auxiliary Interface                  | Control signal interface on Auxiliary unit coming from Master unit for multi-chassis operation;<br>connector, high-density, 26-contact, female Subminiature-D.   |
| Master Interface                     | Control signal interface on Master unit going to Auxiliary unit for multi-chassis operation;<br>Connector: high-density, 26-contact, female Subminiature-D.  |
| Clock and Lock (LKM and LKS options) | Signal control interfaces for synchronization of multiple units;<br>signal outputs on Master unit, and signal inputs on Slave units;<br>safety isolation SELV-rated; connectors: individual BNC.   |
| Command Monitor Outputs              | Signal outputs of each output phase for monitoring waveform of command signal to internal output amplifier; safety isolation SELV-rated;<br>connector: individual BNC.   |
| Trigger Output                       | Signal output with dual function, either function trigger or list trigger; safety isolation SELV-rated;<br>connector: BNC.   |
| LAN Interface                        | Ethernet 10BASE-T and 100BASE-T; safety isolation SELV-rated, referenced to chassis;<br>connector: 8P8C modular jack.  |
| RS-232 Interface                     | Serial interface to RS-232C; safety isolation SELV-rated, referenced to chassis;<br>connector: Subminiature-D, 9-contact receptacle.   |
| USB Interface                        | Serial interface to USB 2.0; safety isolation SELV-rated, referenced to chassis;<br>connector: Type-B.   |
| IEEE-488 Interface                   | Parallel interface to IEEE-488.1, IEEE-488.2, and SCPI; safety isolation SELV-rated, referenced to chassis;<br>connector: IEEE-488.1 compliant.  |

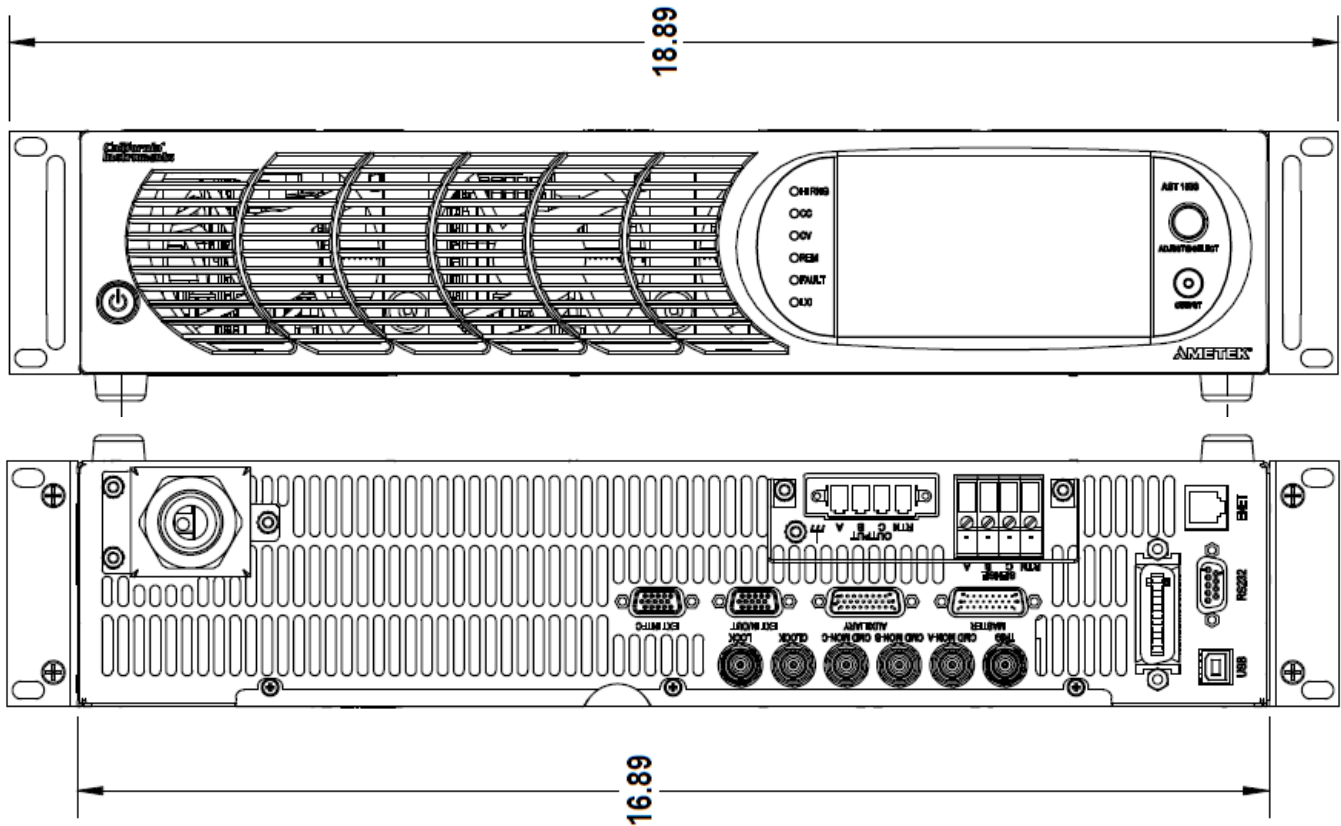
Chassis Dimension Drawings (1U)



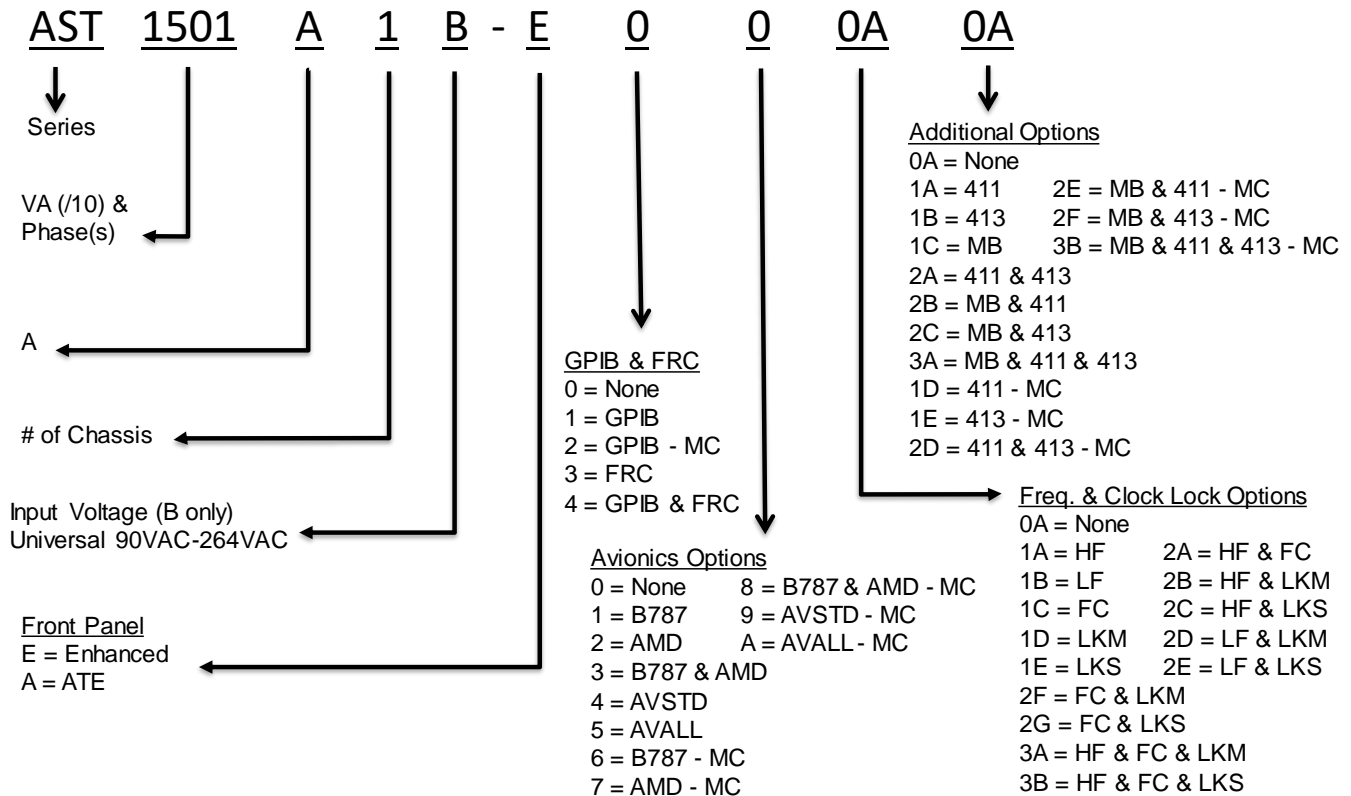


Chassis Dimension Drawings (2U)





Options & Order Information



Options and model descriptions:

| Base Models                 | # of chassis | Phase(s) Out | Description   | Size |
|-----------------------------|--------------|--------------|---|------|
| AST0501A1                   | 1            | 1            | Programmable 500VA, 1 Phase, Dual Voltage Range                     | 1U   |
| AST0751A1                   | 1            | 1            | Programmable 750VA, 1 Phase, Dual Voltage Range                     | 1U   |
| AST1501A1                   | 1            | 1            | Programmable 1500VA, 1 Phase, Dual Voltage Range                    | 1U   |
| AST1503A1                   | 1            | 1 or 3       | Programmable 1500VA, 1/3 Phase, Dual Voltage Range                  | 2U   |
| AST2253A1                   | 1            | 1 or 3       | Programmable 2250VA, 1/3 Phase, Dual Voltage Range                  | 2U   |
| AST3003A1                   | 1            | 1 or 3       | Programmable 3000VA, 1/3 Phase, Dual Voltage Range                  | 2U   |
| Multi-Chassis (MC) Packages | # of chassis | Phase(s) Out | Description   | Size |
| AST1001A2 <sup>1,2</sup>    | 2            | 1            | Programmable 1000VA, 1 Phase (includes two AST0501A1)               | 2U   |
| AST3001A2 <sup>1,2</sup>    | 2            | 1            | Programmable 3000VA, 1 Phase (includes two AST1501A1)               | 2U   |
| AST4501A3 <sup>1,2</sup>    | 3            | 1            | Programmable 4500VA, 1 Phase (includes three AST1501A1)             | 3U   |
| AST1002A2 <sup>3,4</sup>    | 2            | 2            | Programmable 1000VA, 2 Phase (Split-Phase) (includes two AST0501A1) | 2U   |
| AST1502A2 <sup>3,4</sup>    | 2            | 2            | Programmable 1500VA, 2 (Split-Phase) (includes two AST0751A1)       | 2U   |
| AST3002A2 <sup>3,4</sup>    | 2            | 2            | Programmable 3000VA, 2 Phase (Split-Phase) (includes two AST1501A1) | 2U   |
| AST4503A2 <sup>1,2</sup>    | 2            | 1 or 3       | Programmable 4500VA, 1/3 Phase (includes two AST2253A1)             | 4U   |
| AST6003A2 <sup>1,2</sup>    | 2            | 1 or 3       | Programmable 6000VA, 1/3 Phase (includes two AST3003A1)             | 4U   |
| AST9003A3 <sup>1,2</sup>    | 3            | 1 or 3       | Programmable 9000VA, 1/3 Phase (includes three AST3003A1)           | 6U   |

**Consult Factory for higher power and/or additional phase configurations**

<sup>1</sup> ATE version Multi-Chassis Packages include all ATE version chassis. Any chassis can be the master. One Parallel Communication System Interface Cable (PN: 890-010-26) is included for each non-master chassis.

<sup>2</sup> Enhanced Version Multi-Chassis Packages include one Enhanced version chassis as the master. The remaining chassis are ATE version. For all Enhanced version chassis see "MB" option. One Parallel Communication System Interface Cable (PN: 890-010-26) is included for each non-master chassis.

<sup>3</sup> ATE version Two Phase Multi-Chassis Packages include all ATE version chassis with LKM option on the master unit and LKS option on the remaining chassis. Required Clock & Lock BNC cables and BNC Tees are included. NOTE: Requires direct programming over individual LAN (LXI) or GPIB connection for each chassis/phase. This configuration is not supported in Virtual Panels Software.

<sup>4</sup> Enhanced version Two Phase Multi-Chassis Packages include all Enhanced version chassis with LKM option on the master chassis and LKS option on the remaining chassis. Required Clock & Lock BNC cables and BNC Tees are included. NOTE: Requires direct programming from individual front panel or over individual LAN (LXI) or GPIB connection for each chassis/phase. This configuration is not supported in Virtual Panels Software.

**Asterion - Options**

| Option                | NOTES | Description   |
|-----------------------|-------|---|
| <b>GPIB &amp; FRC</b> |       |   |
| NONE                  |       |   |
| GPIB                  | 4     | GPIB Interface  |
| GPIB - MC             |       | Install option(s) on all chassis in (MC) Packages. Price = option price(s) (above) * # chassis  |
| FRC                   | 3, 4  | Fast Range Change Option (With FRC Range Change Function will execute in < 6mS) Consult Factory for Availability  |
| GPIB & FRC            | 3, 4  | Consult Factory for Availability  |
| <b>AVIONICS</b>       |       |   |
| NONE                  |       |   |
| B787                  | 1     | Avionics Electrical Power Quality Test Software - Boeing 787B3-0147 A/B/C (B787)  |
| AMD                   | 1     | Avionics Electrical Power Quality Test Software - Airbus AMD24 C (A400M)  |
| B787 & AMD            |       | Avionics Electrical Power Quality Test Software - B787 & AMD  |
| AVSTD                 | 1     | Avionics Electrical Power Quality Test Software Package - includes 160 (RTCA/DO160 E/F/G), 704 (MIL-STD 704 A/B/C/D/E/F), ABD (Airbus ADB100.1.8 D/E), A350 (Airbus ADB100.1.8.1 B/C) |
| AVALL                 | 1     | Avionics Electrical Power Quality Test Software Package - includes AVSTD, B787, AMD   |
| B787 - MC             | 1     | Install option(s) on all chassis in (MC) Packages. Price = option price(s) (above) * # chassis  |
| AMD - MC              | 1     | Install option(s) on all chassis in (MC) Packages. Price = option price(s) (above) * # chassis  |
| B787 & AMD - MC       | 1     | Install option(s) on all chassis in (MC) Packages. Price = option price(s) (above) * # chassis  |
| AVSTD - MC            | 1     | Install option(s) on all chassis in (MC) Packages. Price = option price(s) (above) * # chassis  |
| AVALL - MC            | 1     | Install option(s) on all chassis in (MC) Packages. Price = option price(s) (above) * # chassis  |

| Frequency / Clock Lock Options   | NOTES |  |
|--|-------|--|
| NONE   |       |  |
| HF*  | 3, 4  | High Frequency up to 5,500Hz<br>Consult Factory for Availability                     |
| LF*  | 3, 4  | Limits Output Frequency to 500Hz   |
| FC   | 3, 4  | Limits Output Frequency Control to 0.25%   |
| LKM**  | 3, 4  | Clock / Lock Master<br>Required Clock & Lock BNC cables and BNC Tees are included    |
| LKS**  | 3, 4  | Clock / Lock Auxiliary<br>Required Clock & Lock BNC cables and BNC Tees are included |
| HF & FC  | 3, 4  | Consult Factory for Availability   |
| HF & LKM   | 3, 4  | Consult Factory for Availability   |
| HF & LKS   | 3, 4  | Consult Factory for Availability   |
| LF & LKM   | 3, 4  |  |
| LF & LKS   | 3, 4  |  |
| FC & LKM   | 3, 4  |  |
| FC & LKS   | 3, 4  |  |
| HF & FC & LKM  | 3, 4  |  |
| HF & FC & LKS  | 3, 4  |  |
| * = Mutually Exclusive   |       |  |
| ** = Mutually Exclusive (Only Use LKM/LKS to create multi-phase configurations. <b>Do not</b> connect LKM/LKS chassis outputs together to increase output current) |       |  |

| Additional Options  | NOTES | Consult Factory for availability   |
|---------------------|-------|--|
| NONE                |       |  |
| 411                 | 1     | IEC61000-4-11 Voltage Dips and Interruptions   |
| 413                 | 1, 4  | IEC61000-4-13 Interharmonics Generator   |
| MB                  | 2, 4  | Upgrades ATE version chassis in a Multi-Chassis configuration to Enhanced version chassis Price = option price * # chassis   |
| 411 & 413           | 1, 4  |  |
| MB & 411            | 1     | Install MB on all chassis, 411 on master only in (MC) Packages. Price = MB price (above) * # chassis + 411 Price             |
| MB & 413            | 1, 4  | Install MB on all chassis, 413 on master only in (MC) Packages. Price = MB price (above) * # chassis + 413 Price             |
| MB & 411 & 413      | 1, 4  | Install MB on all chassis, 411 & 413 on master only in (MC) Packages. Price = MB price (above) * # chassis + 411 & 413 Price |
| 411 - MC            | 1     | Install option(s) on all chassis in (MC) Packages. Price = option price(s) (above) * # chassis                               |
| 413 - MC            | 1, 4  | Install option(s) on all chassis in (MC) Packages. Price = option price(s) (above) * # chassis                               |
| 411 & 413 - MC      | 1, 4  | Install option(s) on all chassis in (MC) Packages. Price = option price(s) (above) * # chassis                               |
| MB & 411 - MC       | 1     | Install option(s) on all chassis in (MC) Packages. Price = option price(s) (above) * # chassis                               |
| MB & 413 - MC       | 1, 4  | Install option(s) on all chassis in (MC) Packages. Price = option price(s) (above) * # chassis                               |
| MB & 411 & 413 - MC | 1, 4  | Install option(s) on all chassis in (MC) Packages. Price = option price(s) (above) * # chassis                               |

| ACCESSORIES  | NOTES  |
|--|--|
| 5330201-01R  | <sup>3</sup> Rack Slides (1 pair)  |
| 890-010-26   | Parallel Communication System Interface Cable (60")<br>One required for each auxiliary chassis in a parallel configuration |
| 250562   | Clock/Lock System Multi-Phase Cable (36") & BNC Tee<br>Two supplied with each chassis with LKM/LKS option                  |
| VPEss  | Virtual Panels Essentials (Windows GUI software)<br>Download from Web Site   |
| VPAdv  | Virtual Panels Advanced (Windows GUI software)<br>Activation key to upgrade VPEss to VPAdv                                 |
| AST-Z540   | ANSI Z540 Certified Calibration  |
| AST-17025  | ISO 17025 Certified Calibration  |
| NOTES:   |  |
| <sup>1</sup> Not available on split-phase packages (AST1002A2, AST1502A2, and AST3002A2) |  |
| <sup>2</sup> Per ATE chassis in Multi-Chassis (MC) Packages                              |  |
| <sup>3</sup> Per Chassis   |  |
| <sup>4</sup> Not retrofittable. Must be specified at time of original order              |  |

**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). Asterion AC comes with a one (1) year warranty. Extended warranties available.