

California Instruments Asterion AC Series

High Performance Programmable AC / DC Power Source

500 VA - 36000 VA
200 / 400 Vac
250 / 500 Vdc

Advanced Features

- High power density in 1U / 2U / 4U / 14U chassis up to 18kVA
- 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 / 4U / 14U models
- Complete avionic test suites (optional)
- ATE version available in 1U, 2U and 4U models
- Standard LXI LAN, USB and RS232, optional GPIB
- Legacy CSW5550 Emulation on the AST6003A1 Model



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 1U/2U/4U chassis.

Employ full output power over widest voltage range with iX2™ technology.

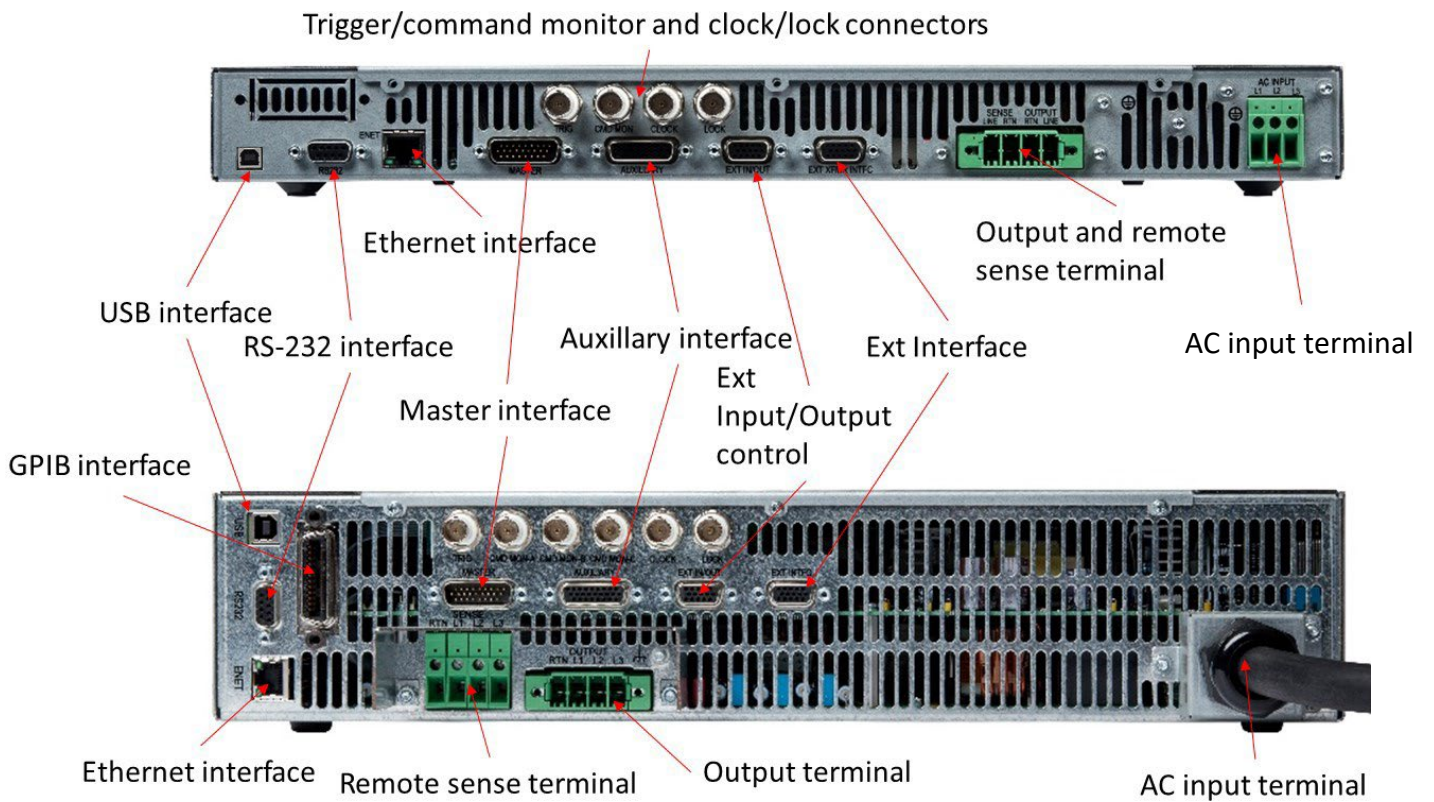
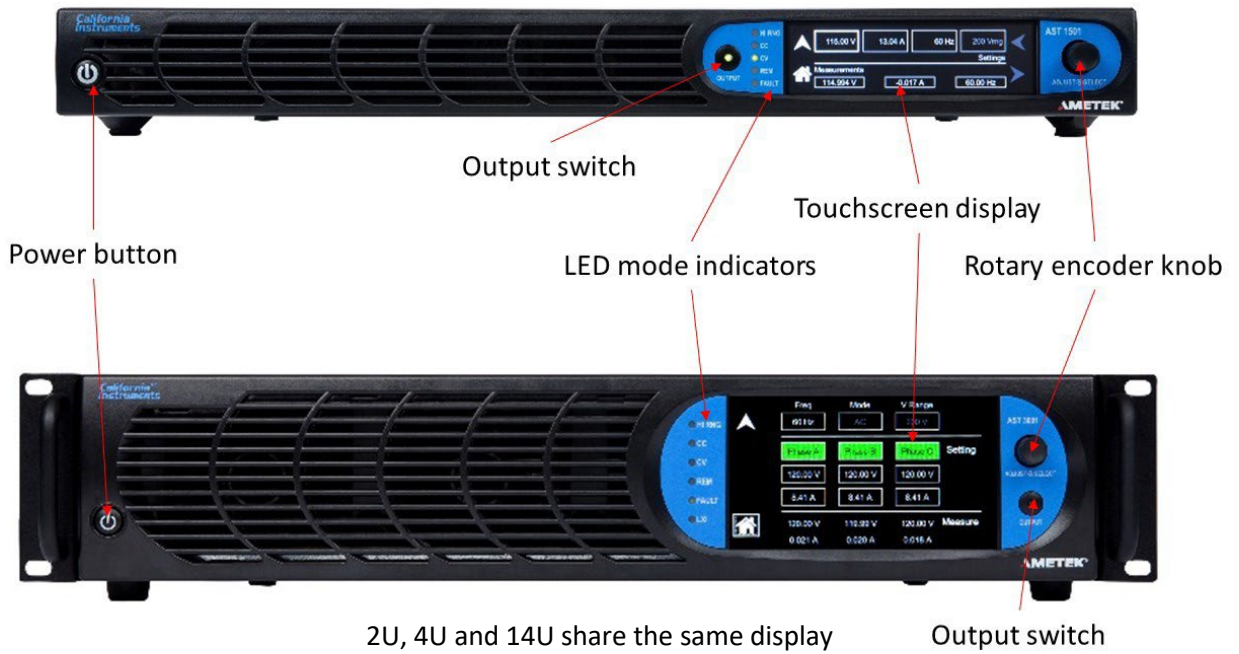
Quickly and expertly control the AC source with intuitive touchscreen.

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

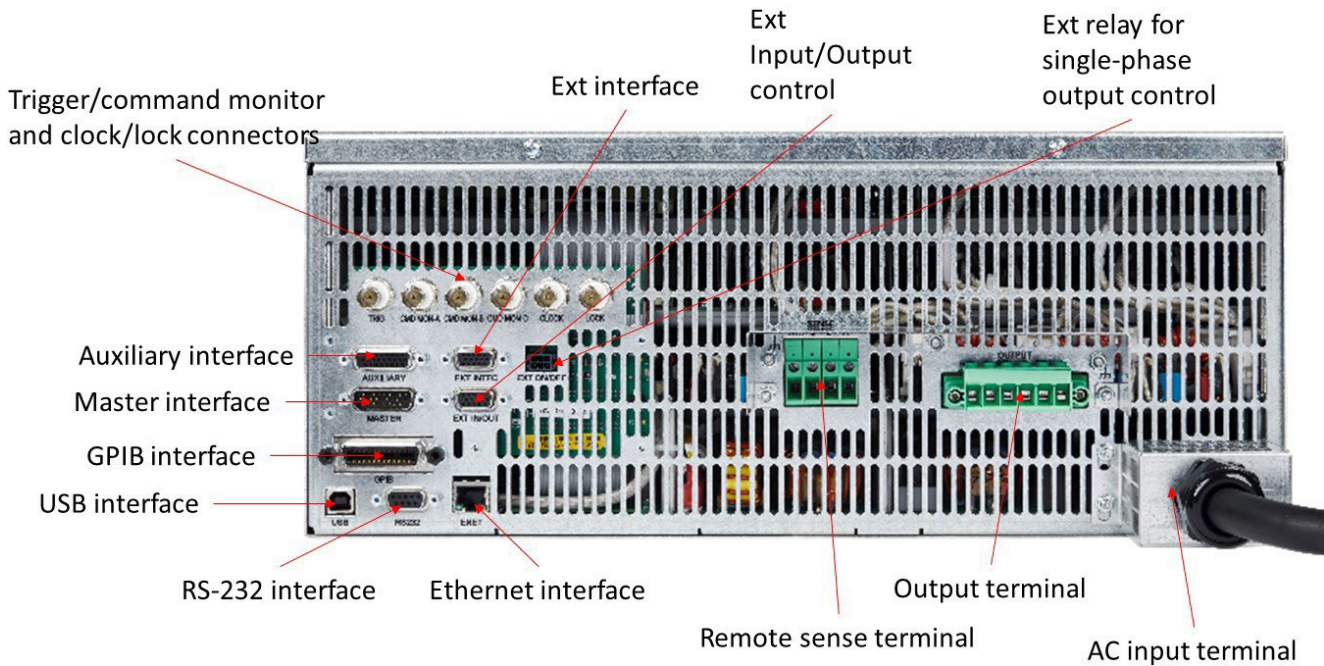
The Asterion AC Series is Digital Signal Processor (DSP) controlled and can be operated from the intuitive, easy to use front panel touchscreen or the Ethernet LXI, USB and RS232 standard control interfaces, as well as through the optional GPIB control interface.

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.

Product Controls and Interfaces



Product Controls and Interfaces (continued)



14U rear panel



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, AST4503, AST6003, AST12K3, AST18K3 and AST 3001 (1-Phase) models above 500 Hz, and in Figure 1-2 for the AST 501, AST 1503, and AST 3003 (3-Phase) models above 1.2 kHz.

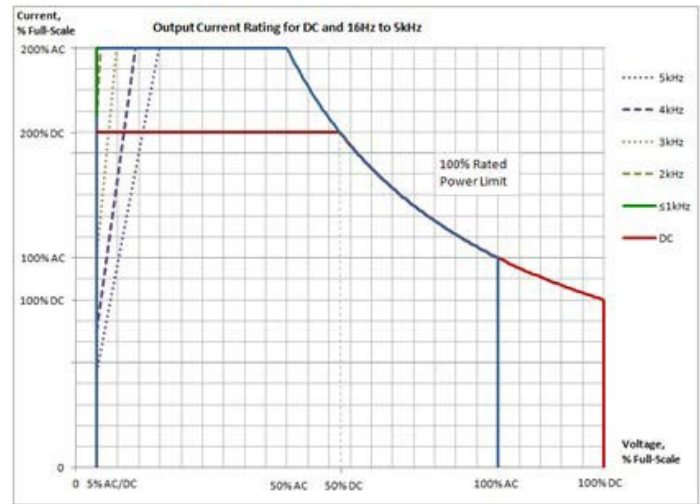
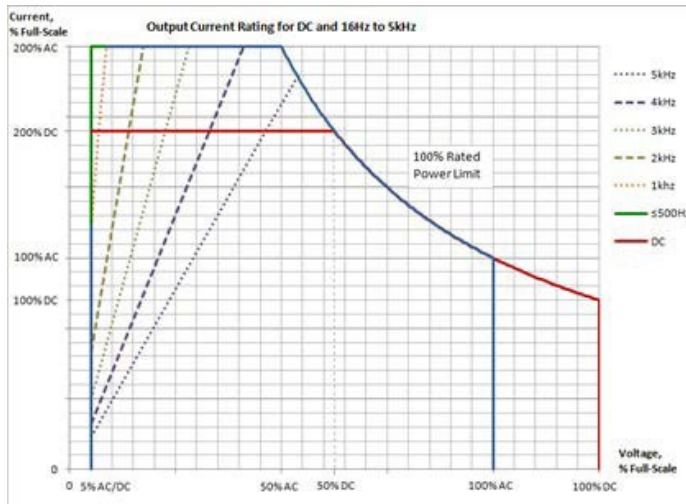
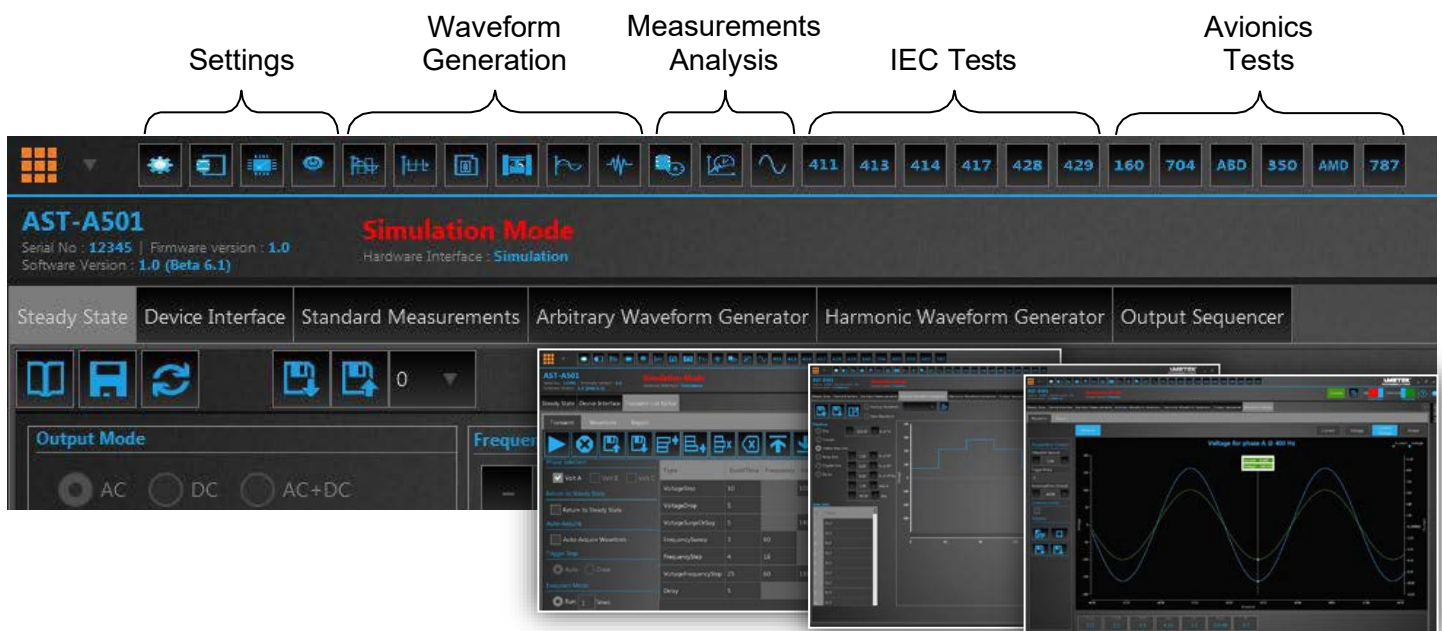


Figure 1-1. iX2™ Constant-Power: Output Current Versus Voltage, AST 751, AST 1501, AST 2253, AST 3003, AST 4503, AST 6003, AST12K3, AST18K3 (1-ph)

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

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.



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; 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: 2.5 A (RMS) at 200 VAC. 5 A ⁽¹⁾ (RMS) at 100 VAC High-Range: 1.25 A (RMS) at 400 VAC. 2.5 A ⁽¹⁾ (RMS) at 200 VAC. | Low-Range: 3.75 A (RMS) at 200 VAC. 7.5 A ⁽¹⁾ (RMS) at 100 VAC. High-Range: 1.88 A (RMS) at 400 VAC. 3.75 A ⁽¹⁾ (RMS) at 200 VAC. | Low-Range: 7.5 A (RMS) at 200 VAC. 15.0 A ⁽¹⁾ (RMS) at 100 VAC. High-Range: 3.75A (RMS) at 400 VAC. 7.5 A ⁽¹⁾ (RMS) at 200 VAC. |
| DC Output Current, Full-Scale | Low-Range: 2.0 ADC at 250 VDC. 4.0 ADC ⁽¹⁾ at 125 VDC. High-Range: 1.0 ADC at 500 VDC. 2.0 ADC ⁽¹⁾ at 250 VDC. | Low-Range: 3.0 ADC at 250 VDC. 6.0 ADC ⁽¹⁾ at 125 VDC High-Range: 1.5 ADC at 500 VDC. 3.0 ADC ⁽¹⁾ at 250 VDC. | Low-Range: 6.0 ADC at 250 VDC. 12.0 ADC ⁽¹⁾ at 125 VDC High-Range: 3.0 ADC at 500 VDC. 6.0 ADC ⁽¹⁾ at 250 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; 500 W, maximum per phase; derate output power from 1,500 W at 103.5 VAC to 1,300W at 90 VAC. | 2,250 VA/2,250 W; 750W, maximum per phase; derate output power from 1,900 W at 132 VAC to 1,300W at 90 VAC. | 3,000 VA/ 3,000 W; 1,000 W, maximum per phase; 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: 2.5 A (RMS) at 200 VAC. 5.0 A ⁽¹⁾ (RMS) at 100 VAC High-Range: 1.25 A (RMS) at 400 VAC. 2.5 A ⁽¹⁾ (RMS) at 200 VAC 1-Phase mode: X3. | Low-Range: 3.75 A (RMS) at 200 VAC. 7.5 A ⁽¹⁾ (RMS) at 100 VAC High-Range: 1.88 A (RMS) at 400 VAC. 3.75 A ⁽¹⁾ (RMS) at 200 VAC 1-Phase mode: X3. | Low-Range: 5 A (RMS) at 200 VAC. 10.0 A ⁽¹⁾ (RMS) at 100 VAC High-Range: 2.5A (RMS) at 400 VAC. 5 A ⁽¹⁾ (RMS) at 200 VAC 1-Phase mode: X3. |
| DC Output Current, Full-Scale, per phase | Low-Range: 2.0 ADC at 250 VDC. 4.0 ADC ⁽¹⁾ at 125 VDC High-Range: 1.0 ADC at 500 VDC. 2.0 ADC ⁽¹⁾ at 250 VDC 1-Phase mode: X3. | Low-Range: 3.0 ADC at 250 VDC. 6.0 ADC ⁽¹⁾ at 125 VDC High-Range: 1.5 ADC at 500 VDC. 3.0 ADC ⁽¹⁾ at 250 VDC 1-Phase mode: X3. | Low-Range: 4.0 ADC at 250 VDC. 8.0 ADC ⁽¹⁾ at 125 VDC High-Range: 2.0 ADC at 500 VDC. 4.0 ADC ⁽¹⁾ at 250 VDC 1-Phase mode: X3. |

| Model | AST 4503 | AST 6003 | AST12K3 |
|--|--|---|--|
| Enclosure | 4U | 4U | 14U |
| Output Phase | 1-Phase/3-Phase | 1-Phase/3-Phase | 1-Phase/3-Phase |
| Output Power | 4,500 VA/4,500 W; 1500 W, maximum per phase; | 6,000 VA/6,000 W; 2,000 W, maximum per phase; | 12,000 VA/12,000 W; 4,000 W, maximum per phase; |
| AC and AC+DC Output Current, Full-Scale, per phase | Low-Range: 7.5 A (RMS) at 200 VAC. 15 A ⁽¹⁾ (RMS) at 100 VAC High-Range: 3.75 A (RMS) at 400 VAC. 7.5 A ⁽¹⁾ (RMS) at 200 VAC 1-Phase mode: X3. | Low-Range: 10 A (RMS) at 200 VAC. 20 A ⁽¹⁾ (RMS) at 100 VAC High-Range: 5 (RMS) at 400 VAC. 10 A ⁽¹⁾ (RMS) at 200 VAC 1-Phase mode: X3. | Low-Range: 20 A (RMS) at 200 VAC. 40 A ⁽¹⁾ (RMS) at 100 VAC High-Range: 10 (RMS) at 400 VAC. 20 A ⁽¹⁾ (RMS) at 200 VAC 1-Phase mode: X3. |
| DC Output Current, Full-Scale, per phase | Low-Range: 6 ADC at 250 VDC. 12 ADC ⁽¹⁾ at 125 VDC High-Range: 3 ADC at 500 VDC. 6 ADC ⁽¹⁾ at 250 VDC 1-Phase mode: X3. | Low-Range: 8 ADC at 250 VDC. 16 ADC ⁽¹⁾ at 125 VDC High-Range: 4 ADC at 500 VDC. 8 ADC ⁽¹⁾ at 250 VDC 1-Phase mode: X3. | Low-Range: 16 ADC at 250 VDC. 32 ADC ⁽¹⁾ at 125 VDC High-Range: 8 ADC at 500 VDC. 16 ADC ⁽¹⁾ at 250 VDC 1-Phase mode: X3. |

| Model | AST18K3 | | |
|--|--|--|--|
| Enclosure | 14U | | |
| Output Phase | 1-Phase/3-Phase | | |
| Output Power | 18,000 VA/18,000 W; 6000 W, maximum per phase; | | |
| AC and AC+DC Output Current, Full-Scale, per phase | Low-Range: 30 A (RMS) at 200 VAC. 60 A ⁽¹⁾ (RMS) at 100 VAC High-Range: 15 A (RMS) at 400 VAC. 30 A ⁽¹⁾ (RMS) at 200 VAC 1-Phase mode: X3. | | |
| DC Output Current, Full-Scale, per phase | Low-Range: 24 ADC at 250 VDC. 48 ADC ⁽¹⁾ at 125 VDC High-Range: 12 ADC at 500 VDC. 24 ADC ⁽¹⁾ at 250 VDC 1-Phase mode: X3. | | |

⁽¹⁾ Refer to "iX2™ Constant-Power Mode Output Characteristic" on Section 1.1.2.

| 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 | ± 20 mVDC, ≥ 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 | ≤ 0.02 V, AC, DC, and AC+DC mode |
| Voltage Temperature Coefficient, Typical | ≤ 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 | ≥ 10 V/ μ 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 1.2 kHz; add $\pm 0.1\%$ of full-scale for AC+DC mode. Valid from 5% of full scale to 100% of full-scale. 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. |
| 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; at ≥ 40 Hz output frequency; bandwidth, 20 kHz to 1 MHz; DC output: 400 mV(RMS), low-range; 700 mV(RMS), high-range; bandwidth, 20 Hz to 1 MHz. |
| Remote Sense | 5 V(RMS), maximum total output lead drop |
| Crest Factor | AST 751, AST 1501, AST 3001, AST 2253, AST 4503, AST 6003, AST12K3, AST18K3: 5:1 of full-scale current in each output range (ratio of peak output current to RMS full scale output current). AST 501, AST 1503, AST 3003: 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 1.2 kHz; LF option: DC, and 16 Hz to 550 Hz; HF option: DC, and 16 Hz to 5 kHz |
| Frequency Accuracy | Standard models: $\pm(0.01\%$ of actual + frequency resolution/2); FC option: $\pm 0.25\%$. |
| Frequency Resolution | 0.01 Hz resolution, 16-81.91 Hz; 0.1 Hz resolution, 82-819.1 Hz; 1 Hz resolution, 820-5000 Hz; with LKM/LKS option: 1 Hz resolution, 16-5000 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 Leader unit output voltage, with the Leader unit as reference 0 $^{\circ}$. |
| Phase Accuracy | $\pm 1^{\circ}$, 16 Hz to 100 Hz; $\pm 2^{\circ}$ >100 Hz to 1.2 kHz, plus $\pm 1^{\circ}$ /kHz above 1.2 kHz |
| Phase Programming Resolution | $\pm 0.4^{\circ}$ |

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

| AC Input Specifications Continued | | | |
|--|--|--|--|
| Model | AST 1503 | AST 2253 | AST 3003 |
| Enclosure | 2U | 2U | 2U |
| Input Voltage, Nominal Rating | 100VAC-120VAC/ 200-240 VAC; 1-Phase and 3-Phase, line-neutral or line-line . | 100VAC-120VAC/ 200-240 VAC; 1-Phase and 3-Phase, line-neutral or line-line. | 100VAC-120VAC/ 200-240 VAC; 1-Phase and 3-Phase, line-neutral or line-line. |
| Input Voltage, Operating Range | 90-132 VAC/ 180VAC-264VAC; refer to output power section for derating as a function of input voltage. | 90-132 VAC/ 180VAC-264VAC; refer to output power section for derating as a function of input voltage. | 90-132 VAC/ 180VAC-264VAC; refer to output power section for derating as a function of input voltage. |
| Input Current, Maximum with 1-Phase Input | 20 A(RMS) at 90 VAC to 103.5 VAC; | 20 A(RMS) at 90 VAC to 132 VAC; 15 A(RMS) at 180 VAC. | 20 A(RMS) at 90 VAC to 132 VAC; 20 A(RMS) at 180 VAC to 207 VAC. |
| Input Current, Maximum with 3-Phase Input | 13 A(RMS) at 90 VAC to 103.5 VAC, line-to line | 10 A(RMS) at 180 VAC, line-to line | 13 A(RMS) at 180 VAC, line-to line |
| Model | AST 4503 | AST 6003 | AST 12K3 |
| Enclosure | 4U | 4U | 14U |
| Input voltage type (Only factory configurable) | 3 Phase, 3 Wire + Ground (or) 3 Phase + Neutral (4 wire + Ground) | 3 Phase, 3 Wire + Ground (or) 3 Phase + Neutral (4 wire + Ground) | 3 Phase, 3 Wire + Ground (or) 3 Phase + Neutral, 4 wire + Ground |
| Input Voltage, Nominal Rating for 3-phase, 3 Wire + Ground input | 200/208/240 VAC, 3 Phase, Line - Line | 200/208/240 VAC, 3 Phase, Line - Line | 200/208/240 VAC, 3 Phase, Line - Line |
| Input Voltage, Operating range for 3-phase, 3 Wire + Ground input | 180 - 264 VAC, 3 Phase, Line - Line | 180 - 264 VAC, 3 Phase, Line - Line | 180 - 264 VAC, 3 Phase, Line - Line |
| Input Voltage, Nominal Rating for 3-phase + Neutral, 4 Wire + Ground input | 380 VAC/ 400 VAC/ 415 VAC, 3 Phase, Line-Line) (220 VAC/ 230 VAC/240 V AC, 3 Phase, Line – Neutral) | 380 VAC/ 400 VAC/ 415 VAC, 3 Phase, Line-Line) (220 VAC/ 230 VAC/240 V AC, 3 Phase, Line – Neutral) | 380 VAC/ 400 VAC/ 415 VAC, 3 Phase, Line-Line) (220 VAC/ 230 VAC/240 V AC, 3 Phase, Line – Neutral) |
| Input Voltage, Operating range for 3-phase + Neutral, 4 Wire + Ground input | 342 V AC to 457 VAC Line- Line (198 VAC – 264 V AC, 3 Phase, Line – Neutral) | 342 V AC to 457 VAC Line- Line (198 VAC – 264 V AC, 3 Phase, Line – Neutral) | 342 V AC to 457 VAC Line- Line (198 VAC – 264 V AC, 3 Phase, Line – Neutral) |
| Input Current, Maximum with 3-Phase Input, 3 Wire+ ground | 20 A (RMS) at 180 VAC | 28 A (RMS) at 180 VAC | 56 A (RMS) at 180 VAC |
| Input Current, Maximum with 3-Phase + Neutral Input, 3 Wire + Ground | 11 A (RMS) at 342 VAC to 457 VAC; | 14 A (RMS) at 342 VAC to 457 VAC | 28 A (RMS) at 342 VAC to 457 VAC |

| AC Input Specifications Continued | | | |
|---|--|--|--|
| Model | AST 18K3 | | |
| Enclosure | 14U | | |
| Input voltage type (Only factory configurable) | 3 Phase, 3 Wire + Ground (or) 3 Phase + Neutral, 4 wire + Ground | | |
| Input Voltage, Nominal Rating for 3-phase, 3 Wire + Ground input | 200/208/240 VAC, 3 Phase, Line - Line | | |
| Input Voltage, Operating range for 3-phase, 3 Wire + Ground input | 180 - 264 VAC, 3 Phase, Line - Line | | |
| Input Voltage, Nominal Rating for 3-phase + Neutral, 4 Wire + Ground input | 380 VAC/ 400 VAC/ 415 VAC, 3 Phase, Line-Line) (220 VAC/ 230 VAC/240 V AC, 3 Phase, Line – Neutral) | | |
| Input Voltage, Operating range for 3-phase + Neutral, 4 Wire + Ground input | 342 V AC to 457 VAC Line-Line (198 VAC – 264 V AC, 3 Phase, Line – Neutral) | | |
| Input Current, Maximum with 3-Phase Input, 3 Wire+ ground | 64 A (RMS) at 180 VAC | | |
| Input Current, Maximum with 3-Phase + Neutral Input, 3 Wire + Ground | 42 A (RMS) at 342 VAC to 457 VAC; | | |

| AC Input Specifications Continued | |
|--|--|
| Model | All Models |
| Input Frequency, Nominal Rating | a) 50 Hz, 60 Hz, 400 Hz for 1U, 2U and 4U Models 50 Hz, 60 Hz for 14U models |
| Input Frequency Range | a) 47-440 Hz for 1U, 2U and 4U Models 47- 63 Hz for 14U Models |
| Inrush Current, typical | a) 30 A (PK) at 264 VAC Line-Line for 1U and 2U Models b) 55 A (PK) at 264 V AC Line-Line for 3-Phase, 3 wire + Ground input 4U Models c) 55 A (PK) at 457 V AC Line-Line for 3-Phase, 4 wire + Ground input 4U Models d) 165 A (PK) at 264 V AC Line-Line for 3-Phase, 3 wire + Ground input 14U Models e) 165 A (PK) at 264 V AC Line-Line for 3-Phase, 4 wire + Ground input 14U Models |
| Efficiency ¹ , typical | 75% |
| Power Factor ² , typical | a) 1-Ph: 0.98; active PFC; 3-Ph: 0.95, active PFC for 1U and 2U Models b) 3-Ph: 0.95, active PFC for 4U and 14U Models |
| Hold-Up Time ³ , typical | ≥10 ms |
| Isolation Voltage | 2200 VAC, input to output; 1350 VAC, input to chassis |
| ¹ a) At full load and DC or 16 Hz to 1.2 kHz output frequency, with AC input voltage of 115 V(RMS) or 230 V(RMS), and 50/60 Hz input frequency for 1U and 2U Models b) At full load and DC or 16 Hz to 1.2 kHz output frequency, with AC input voltage of 208 V(RMS) and 50/60 Hz input frequency for 4U and 14U 3 phase, 3 wire + Ground input type Models c) At full load and DC or 16 Hz to 1.2 kHz output frequency, with AC input voltage of 400 V(RMS) and 50/60 Hz input frequency for 4U and 14U 3 phase + Neutral, 3 wire + Neutral + Ground input type Models | |
| ² a) At full load, with AC input voltage of 115 V(RMS) or 230 V(RMS), and 50/60 Hz input frequency for 1U and 2U Models b) At full load and with AC input voltage of 208 V(RMS) and 50/60 Hz input frequency for 4U and 14U 3 phase, 3 wire + Ground input type Models c) At full load and with AC input voltage of 208 V(RMS) and 50/60 Hz input frequency for 4U and 14U 3 phase + Neutral, 3 wire + Neutral + Ground input type Models | |
| ³ a) At full load, with AC input voltage of 115 V(RMS) or 230 V(RMS), and 50/60 Hz input frequency for 1U and 2U Models b) At full load and with AC input voltage of 208 V(RMS) and 50/60 Hz input frequency for 4U and 14U 3 phase, 3 wire + Ground input type Models c) At full load and with AC input voltage of 400 V(RMS) and 50/60 Hz input frequency for 4U and 14U 3 phase + Neutral, 3 wire + Neutral + Ground input type Models | |

| Output Measurements | |
|------------------------------|---|
| Parameter | Specification ¹ |
| Voltage Range, Full-Scale | AC, DC and AC+DC output: 0-500 V |
| Voltage Accuracy | $\pm(0.1\%$ of actual + 0.2% of full-scale), add $\pm 0.2\%$ of full-scale/kHz for AC 16 Hz to 1 kHz; >1 kHz; add $\pm 0.1\%$ of full-scale for AC+DC mode. Valid from 5% to 100% of full-scale with sense leads connected. |
| Voltage Resolution | 20 mV; 25 mV (DC) |
| Current Range, Maximum | AST 501, AST 751: $\pm 0-7.5$ A(RMS); AST 1501: $\pm 0-15$ A(RMS); AST 1503, AST 2253: $\pm 0-7.5$ A(RMS) per phase; AST 3003, AST 4503: $\pm 0-15$ A(RMS) per phase; AST 3001: $\pm 0-30$ A(RMS); AST 6003: $\pm 0-22.5$ A(RMS) per phase AST 12K3: $\pm 0-45$ A(RMS) per phase AST 18K3: $\pm 0-67.5$ A(RMS) per phase 1 Phase Output Mode in 3 Phase Modes: Rating times 3 |
| Current Accuracy | $\pm(0.3\%$ of actual + 0.5% of maximum) add $\pm 0.3\%$ of maximum/kHz for AC 16 Hz to 1 kHz; >1 kHz; add $\pm 0.1\%$ 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, Maximum | AST 501, AST 751: $\pm 0-37.5$ A(PK); AST 1501: $\pm 0-75$ A(PK); AST 1503, AST 2253: $\pm 0-37.5$ A(PK) per phase; AST 3003, AST 4503: $\pm 0-75$ A(PK) per phase; AST 3001: $\pm 0-150$ A(PK); AST 6003: $\pm 0-112.5$ A(PK) per phase AST 12K3: $\pm 0-225$ A(PK) per phase AST 18K3: $\pm 0-337.5$ A(PK) per phase 1 Phase Output Mode in 3 Phase Modes: Rating times 3 |
| Peak Current Accuracy | $\pm(0.5\%$ of actual + 0.5% of maximum), add $\pm 0.3\%$ of maximum/kHz for AC 16 Hz to 1 kHz; >1 kHz; add $\pm 0.1\%$ of maximum for AC+DC mode. 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. |
| 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), add $\pm 0.4\%$ of full-scale/kHz for AC 16 Hz to 1 kHz; >1 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 |

¹Accuracy 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.

| 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; 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 current limit 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 |

| 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" (482.6 mm); D, 23.0" (584.2 mm); 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); H, 3.47" (88.1 mm); W (chassis), 16.9" (429.3 mm); D, 23.0" (584 mm). |
| 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) |
| 1U Unit Weight | AST 501/751: 19 lb / 8.6 kg; AST 1501: 22 lb / 10 kg. |
| 2U Unit Weight | AST 1503/2253: 39 lb / 17.7 kg; AST 3003: 48 lb / 21.8 kg. |
| 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; |
| 1U Shipping Weight | AST 501/751: 29 lb / 13.2 kg; AST 1501: 32 lb / 14.6 kg. |
| 2U Shipping Weight | AST 1503, 43 lb / 19.5 kg; AST 2253: 45 lb / 20.5 kg; AST 3001: 48 lb / 21.8 kg; AST 3003: 54 lb / 24.5 kg. |
| 4U Shipping Weight | AST 6003, 104 lb / 47.2 kg; AST 4503, 93 lb / 42.2 kg; |
| | |

| 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. |

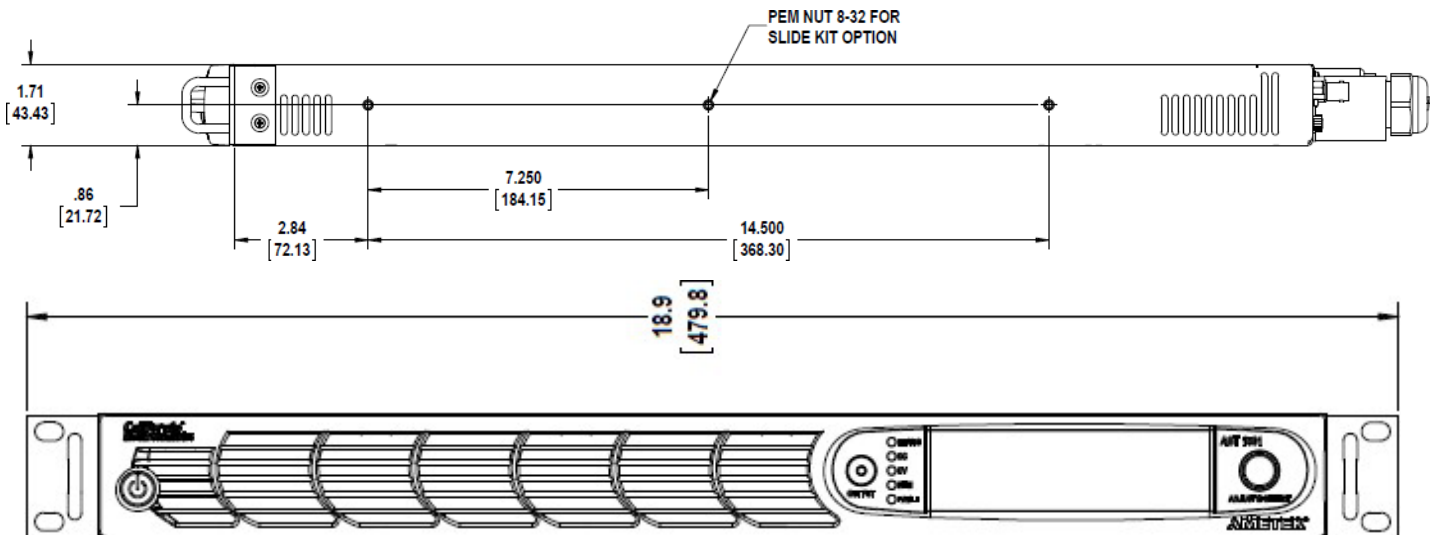
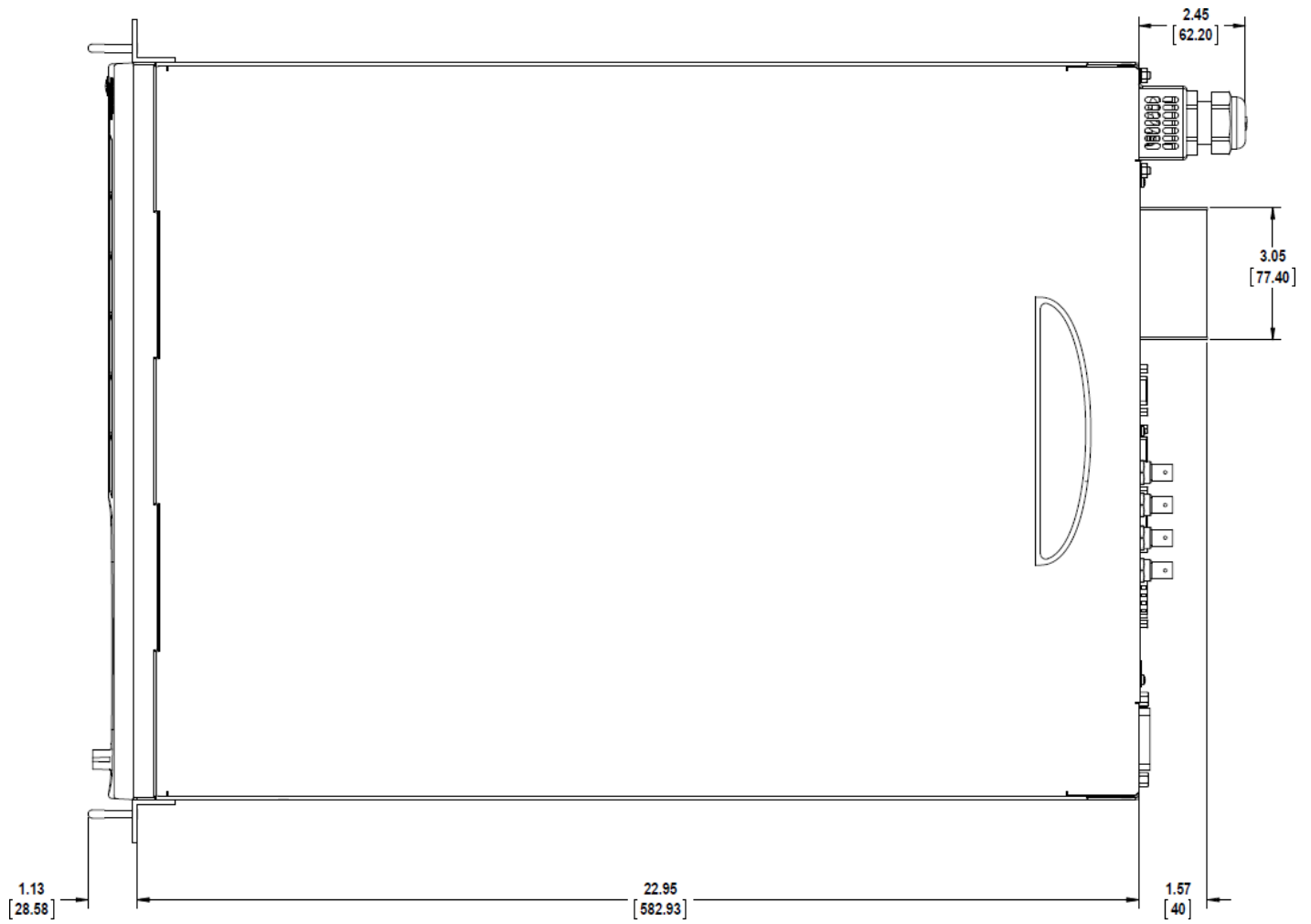
* CSA NRTL certification on all models except AST12K3A1 and AST18K3A1 (14U).

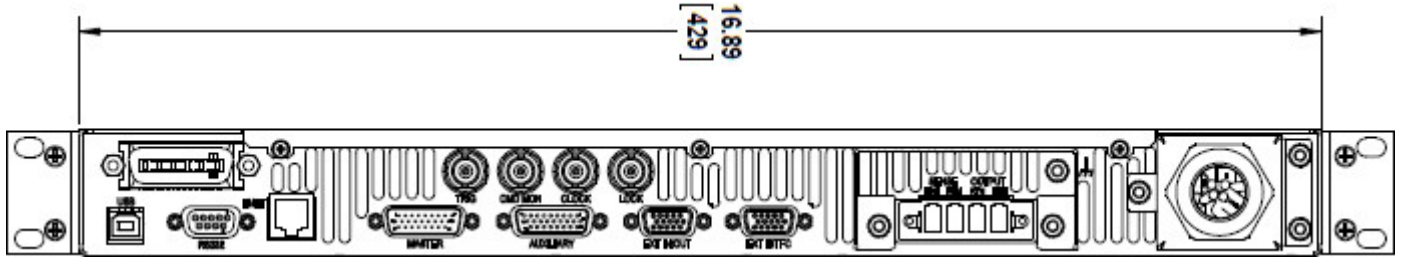
| Firmware / Software Options | |
|--|---|
| Option ¹ | Description |
| B787 | Avionics Electrical Power Quality Test Software; Boeing 787B3-0147 A/B/C (B787). |
| AMD | Avionics Electrical Power Quality Test Software; Airbus AMD24 C (A400M). |
| B787 & AMD | Includes both B787 and AMD options. |
| AVSTD | 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 | Avionics Electrical Power Quality Test Software Package; includes AVSTD, B787, AMD. |
| 1399 | MIL-STD-1399-300B shipboard power test software. |
| 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. |
| 411 & 413 | Includes both 411 and 413 options. |
| MC | Options are installed in all chassis of a multi-chassis (MC) configuration. |
| ¹ 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). | |

Warranty Statement:

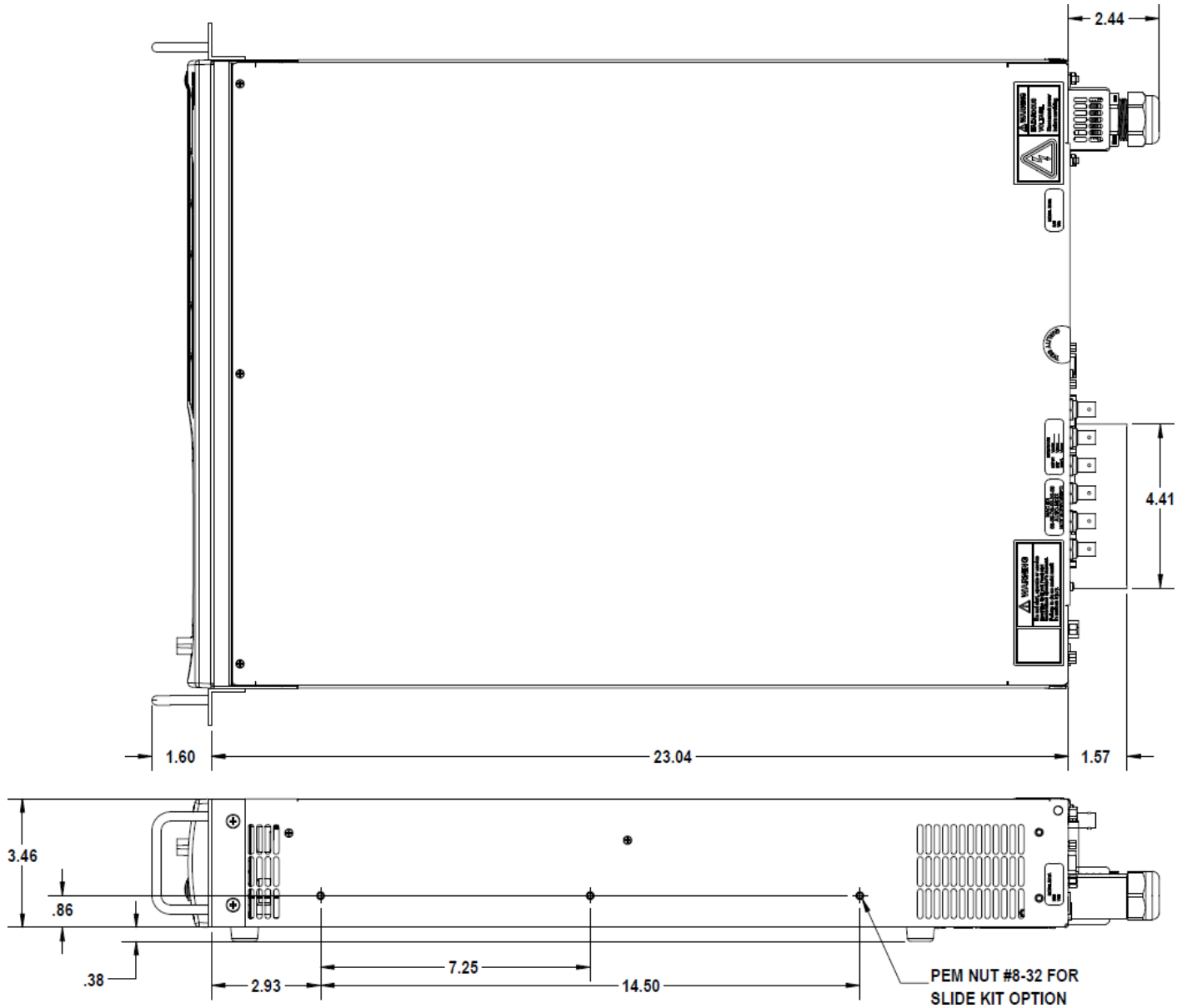
AMETEK Programmable Power Inc. warrants its products to be free from defects in material and workmanship. The warranty period is from the date of original shipment of the product to the original purchaser (see website for warranty periods by product). As of 10/1/19, all Asterion AC units come with an 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.

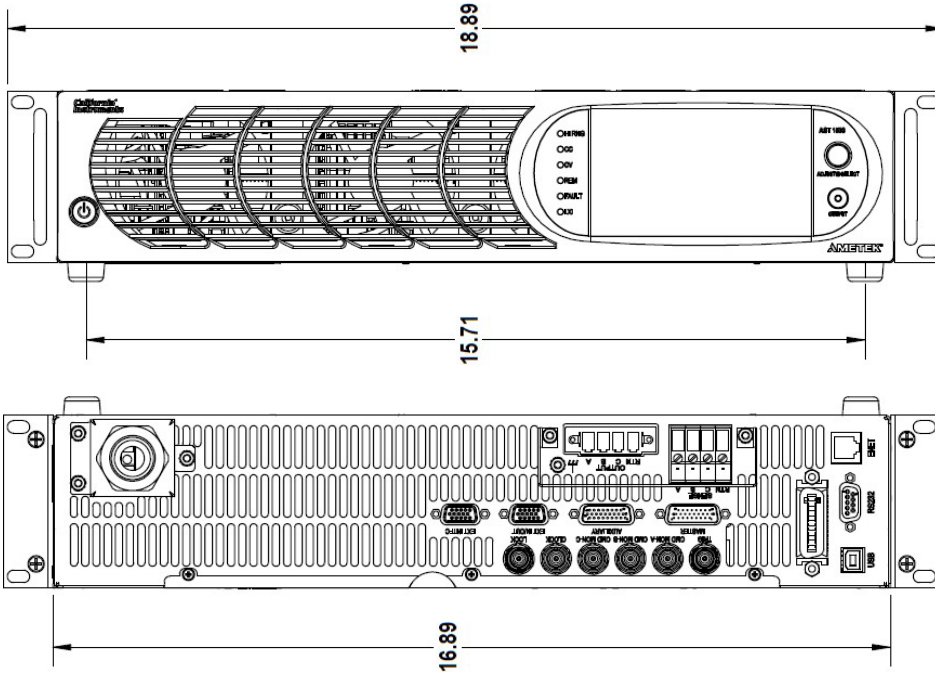
Chassis Dimension Drawings (1U)



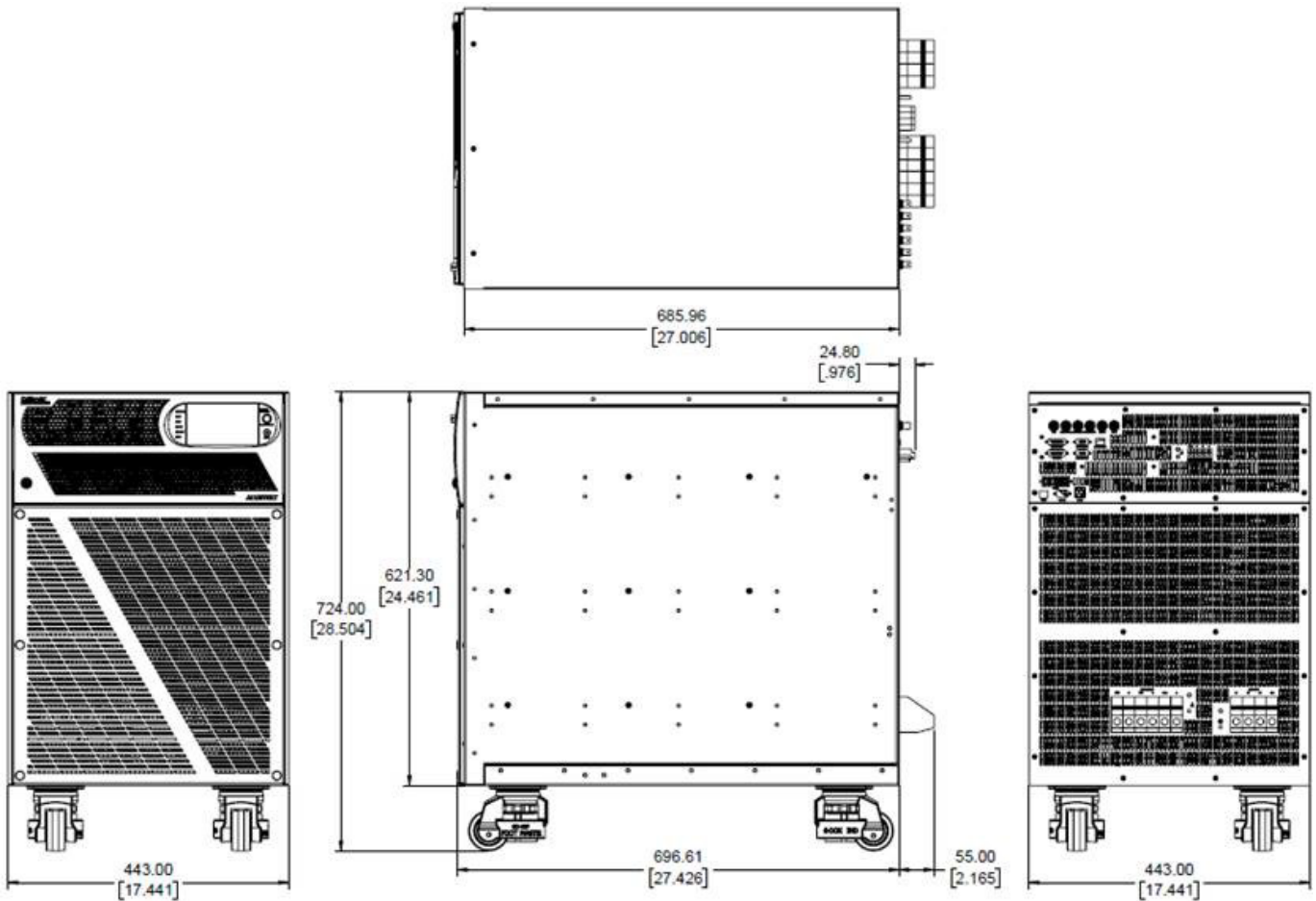


Chassis Dimension Drawings (2U)

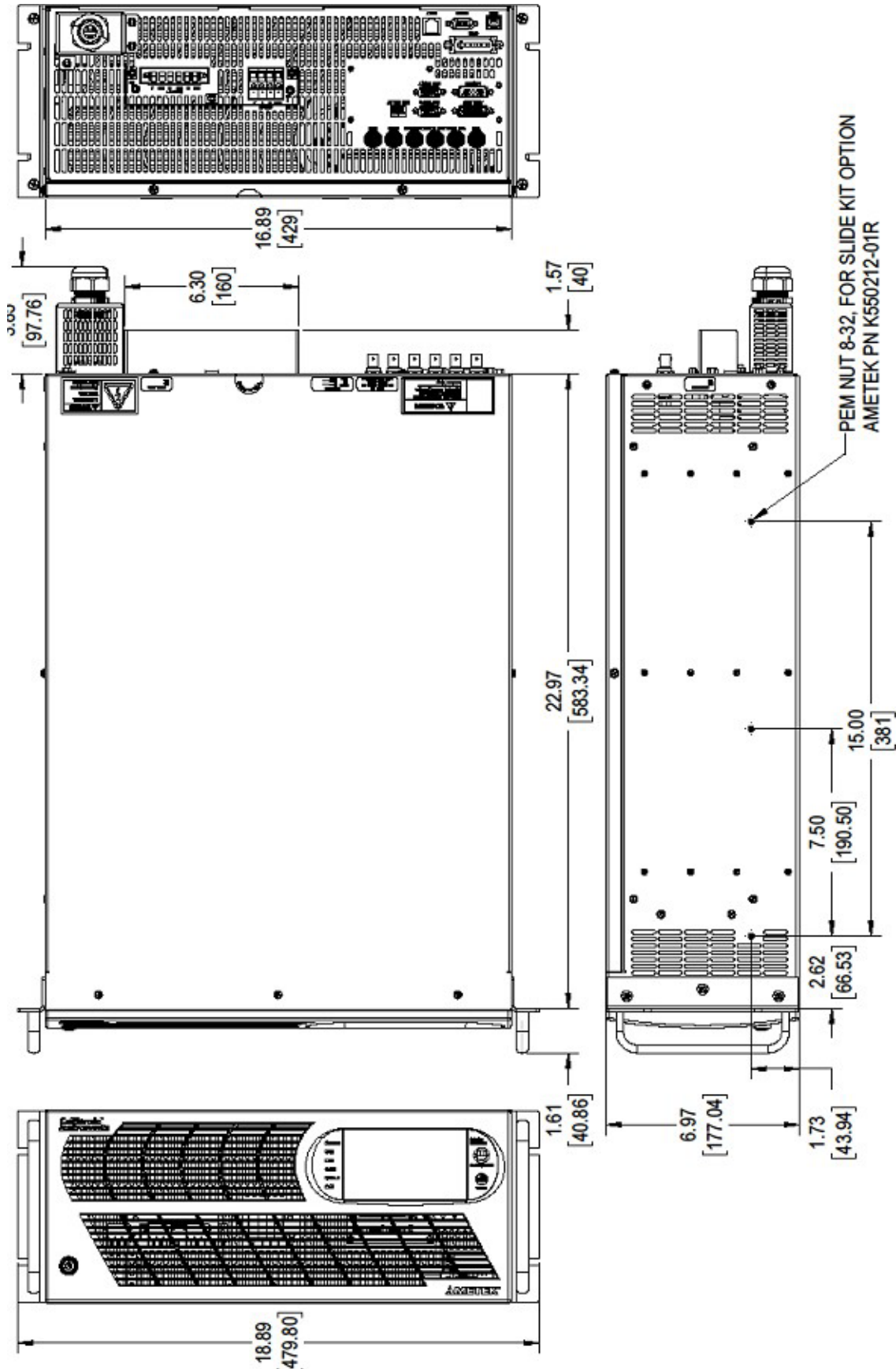




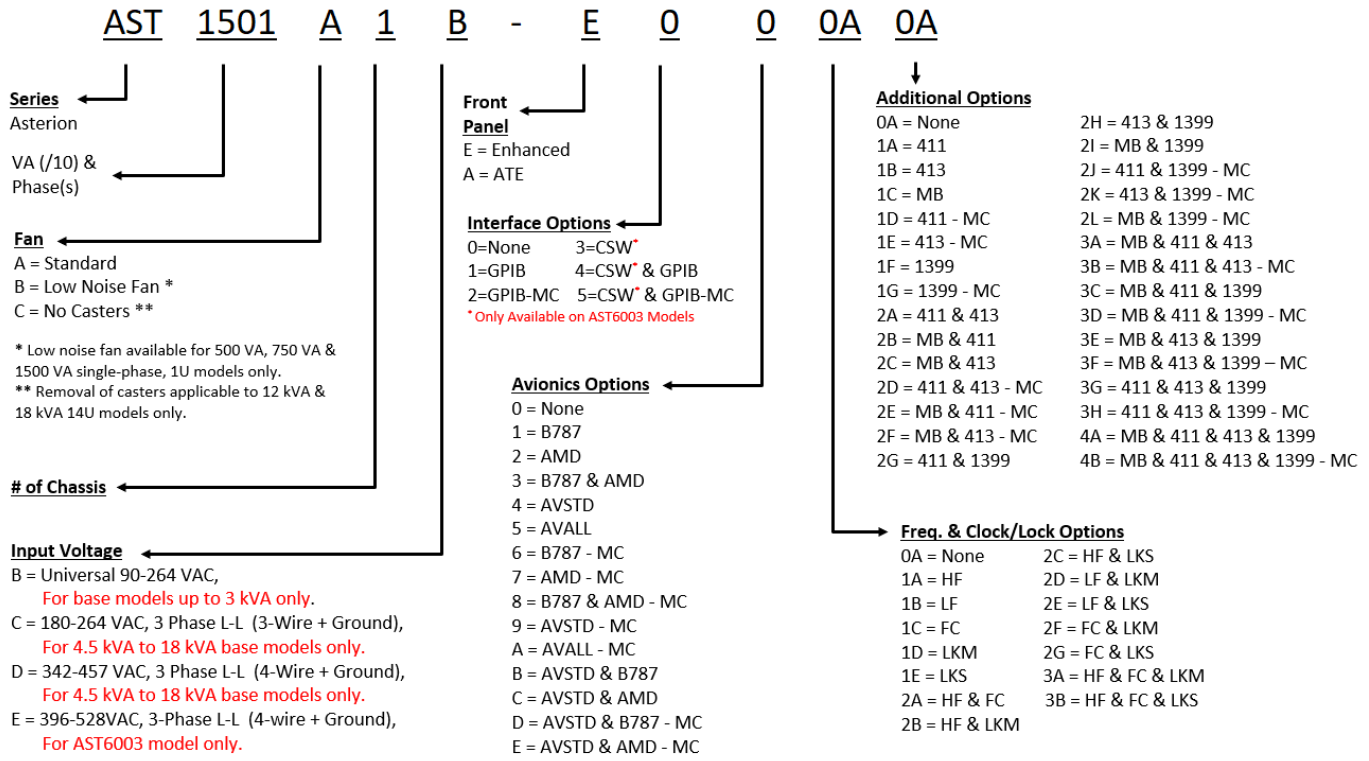
Chassis Dimension Drawings (14U)



Chassis Dimension Drawings (4U)



Options & Order Information (non-ASC versions)



Options and model descriptions:

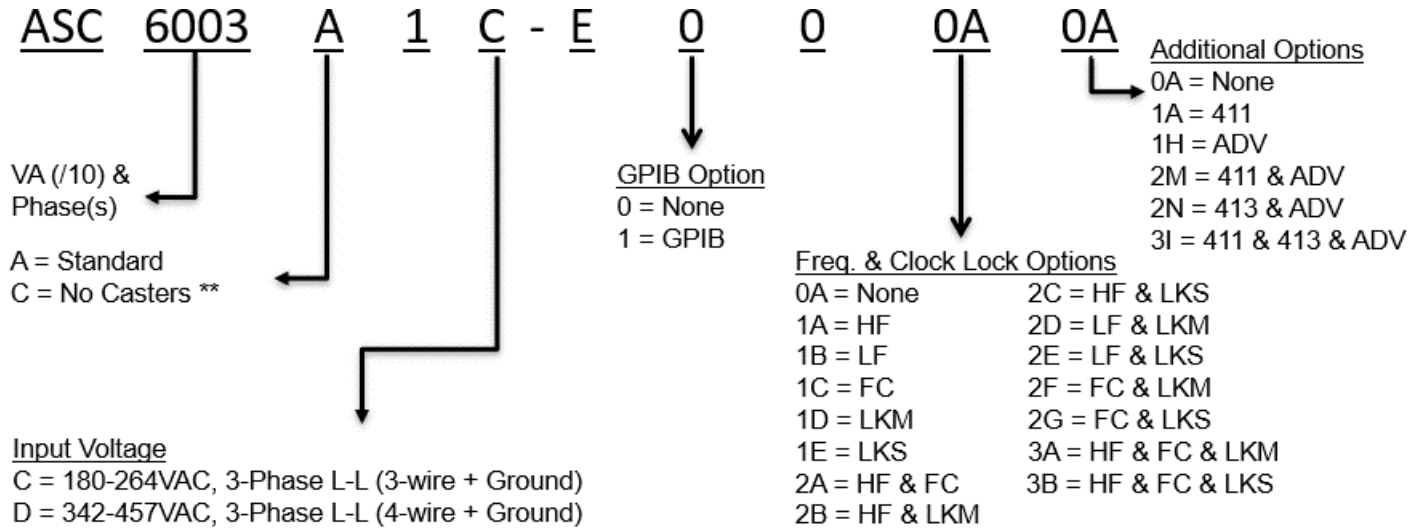
| Base Models | # of chassis | Phase(s) Out | Description | Size |
|-----------------------------|--------------|--------------|--|------|
| AST0501A1 | 1 | 1 | Programmable 500VA, 1 Phase, Dual Voltage Range | 1U |
| AST0751A1 | 1 | 1 | Programmable 750VA, 1 Phase, Dual Voltage Range | 1U |
| AST1501A1 | 1 | 1 | Programmable 1500VA, 1 Phase, Dual Voltage Range | 1U |
| AST3001A1 | 1 | 1 | Programmable 3000VA, 1 Phase, Dual Voltage Range | 2U |
| 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 |
| AST4503A1 | 1 | 1 or 3 | Programmable 4500VA, 1/3 Phase, Dual Voltage Range | 4U |
| AST6003A1 | 1 | 1 or 3 | Programmable 6000VA, 1/3 Phase, Dual Voltage Range | 4U |
| AST12K3A1 | 1 | 1 or 3 | Programmable 12000VA, 1/3 Phase, Dual Voltage Range | 14U |
| AST18K3A1 | 1 | 1 or 3 | Programmable 18000VA, 1/3 Phase, Dual Voltage Range | 14U |
| Multi-Chassis (MC) Packages | # of chassis | Phase(s) Out | Description | |
| AST1001A2 ^{1,2} | 2 | 1 | Programmable 1000VA, 1 Phase (includes two AST0501A1) | |
| AST4501A3 ^{1,2} | 3 | 1 | Programmable 4500VA, 1 Phase (includes three AST1501A1) | |
| AST9003A2 ^{1,2} | 2 | 1 or 3 | Programmable 9000VA, 1/3 Phase (includes two AST4503A1) | |
| AST12K3A2 ^{1,2} | 2 | 1 or 3 | Programmable 12000VA, 1/3 Phase (includes two AST6003A1) | |
| AST18K3A3 ^{1,2} | 3 | 1 or 3 | Programmable 18000VA, 1/3 Phase (includes three AST6003A1) | |

Consult factory for higher power and/or additional phase configurations

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

² Enhanced Version Multi-Chassis Packages include one Enhanced version chassis as the Leader. 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 Follower chassis.

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



** Removal of casters applicable to 12 kVA and 18 kVA 14U models only.

Options and model descriptions:

| Base Models | # of chassis | Phase(s) Out | Description | Size |
|--|--------------|--------------|---|------|
| ASC4503A1 | 1 | 1 or 3 | Programmable 4500VA, 1/3 Phase, 312 V Dual Voltage Range, AC Output Only | 4U |
| ASC6003A1 | 1 | 1 or 3 | Programmable 6000VA, 1/3 Phase, 312 V Dual Voltage Range, AC Output Only | 4U |
| ASC12K3A1 | 1 | 1 or 3 | Programmable 12000VA, 1/3 Phase, 312 V Dual Voltage Range, AC Output Only | 14U |
| ASC18K3A1 | 1 | 1 or 3 | Programmable 18000VA, 1/3 Phase, 312 V Dual Voltage Range, AC Output Only | 14U |
| ASC Model Notes: | | | | |
| - No DC output for ASC models. Voltage range up to 312 VAC. | | | | |
| - Harmonic measurements with arbitrary waveform generator are an optional feature (-ADV) on Asterion ASC models. | | | | |
| - Avionics test options and MIL-STD 1399 are not available on ASC models. | | | | |
| - Multi-chassis systems could be configured manually by customer. However, for multiple units, it is advised to sell the Asterion AST packages for best value. | | | | |

Addendum: Asterion ASC Specifications – AC Output Only

| Model | ASC 4503 | ASC 6003 | ASC 12K3 |
|---|---|--|---|
| Enclosure | 4U | 4U | 14U |
| Output Phase | 3-Phase | 3-Phase | 3-Phase |
| Output Power | 4500 VA/ 4500 W | 6000 VA/ 6000 W | 12000VA/ 12000W |
| AC Output Current, Full-Scale | Low-Range: 9.6 A (RMS) at 156 VAC. 15.0 A ⁽¹⁾ (RMS) at 100 VAC for 3-Phase (3 Wire + GND) Model. 19.2 A ⁽¹⁾ (RMS) at 78 VAC for 3-Phase + Neutral (4 Wire + GND) Model. High-Range: 4.8 A (RMS) at 312 VAC. 7.5 A ⁽¹⁾ (RMS) at 200 VAC for 3-Phase (3 Wire + GND) Model. 9.6 A ⁽¹⁾ (RMS) at 156 VAC for 3-Phase + Neutral (4 Wire + GND) Model. 1 phase output mode: rating times 3 | Low-Range: 12.8 A (RMS) at 156 VAC. 22.4 A (1) (RMS) at 89 VAC. High-Range: 6.4 A (RMS) at 312 VAC. 11.2 A (1) (RMS) at 178 VAC. 1 phase output mode: rating times 3 | Low-Range: 25.6 A (RMS) at 156 VAC. 44.4 A (1) (RMS) at 89 VAC. High-Range: 12.8 A (RMS) at 312 VAC. 22.4 A (1) (RMS) at 178 VAC. 1 phase output mode: rating times 3 |
| Model | ASC 18K3 | | |
| Enclosure | 14U | | |
| Output Phase | 3-Phase | | |
| Output Power | 18000 VA/ 18000 W | | |
| AC Output Current, Full-Scale | Low-Range: 38.4 A (RMS) at 156 VAC. 67.2 A ⁽¹⁾ (RMS) at 89 VAC. High-Range: 19.2 A (RMS) at 312 VAC. 33.6 A (RMS) at 178 VAC. 1 phase output mode: rating times 3 | | |
| <i>⁽¹⁾ See Constant-Power Mode Output Characteristic" on 1.1.2 for more information.</i> | | | |
| Model | All Models | | |
| Maximum RMS Output Current | For ASC6003, ASC12K3 and ASC18K3 Models: 175% of the full-scale RMS current at ≤57% of full-scale voltage. Refer to Figure 1-1 for graphs of current rating as a function of output frequency. For ASC4503 3-Phase (3 Wire + GND) AC input Model: 156% of the full-scale RMS current at ≤64% of full-scale voltage. Refer to Figure 1-2 for graphs of current rating as a function of output frequency. For ASC4503 3-Phase + Neutral (4 Wire + GND) AC input Model: 200% of the full-scale RMS current at ≤50% of full-scale voltage. Refer to Figure 1-3 for graphs of current rating as a function of output frequency | | |

| | |
|---|--|
| Constant-Power Mode Output Characteristics | <p>For ASC6003, ASC12K3 and ASC18K3 Models: Constant-Power output capability in each output voltage range with full rated output power from 57% of full-scale output voltage to 100% of full-scale; the output current increases to 175% of rated current at 57% full-scale output voltage from 100% rated current at 100% of full-scale voltage. Refer to Figure 1-1 graphs for current rating as a function of output frequency.</p> <p>For ASC4503, 3-Phase (3 Wire + GND) Model AC input Model: Constant-Power output capability in each output voltage range with full rated output power from 64% of full-scale output voltage to 100% of full-scale; the output current increases to 156% of rated current at 64% full-scale output voltage from 100% rated current at 100% of full-scale voltage. Refer Figure 1-2 for graphs of current rating as a function of output frequency.</p> <p>For ASC4503, 3-Phase + Neutral (4 Wire + GND) AC input Model: 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 Figure 1-3 for graphs of current rating as a function of output frequency.</p> |
| AC Voltage, Full-Scale | Low-Range: 0 to 156 V(RMS); High-Range: 0 to 312 V(RMS) |
| 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 AC 16 Hz to 1.2 kHz; > 1.2 kHz, add $\pm 0.2\%$ of full-scale/kHz; Valid from 5% of full-scale to 156 VAC(RMS) in low-range and 312 VAC(RMS) in high-range; with sense leads connected. |
| Voltage Resolution | ≤ 0.02 V, AC. |
| Voltage Temperature Coefficient, Typical | ≤ 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, >100Hz to 500 Hz; and 1% maximum, >500 Hz to 1.2 kHz, plus 1%/kHz to 5 kHz; with full linear load or no load |
| Voltage Slew Rate, Typical | ≥ 10 V/ μ 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, Figure 1-2 and Figure 1-3 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 AC 16 Hz to 1.2 kHz; Valid from 5% of full-scale to 100% of full-scale. 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 156% of full-scale. |
| Line Regulation | $\pm 0.015\%$ of full-scale voltage, for a $\pm 10\%$ input line change; 40 Hz to 5 kHz. |
| Load Regulation | $\pm 0.025\%$ of full-scale voltage, for 100% of rated resistive load change; 40 Hz to 1.2 kHz, above 1.2 kHz, add $\pm 0.015\%$ of full-scale/kHz |
| 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; at ≥ 40 Hz output frequency; bandwidth, 20 kHz to 1 MHz |
| Remote Sense | 5 V(RMS), maximum total output lead drop |
| Crest Factor | <p>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).</p> <p>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).</p> <p>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).</p> |

| | |
|---|---|
| Power Factor | 0, lagging to 0, leading |
| Frequency Range | Standard models: 16 Hz to 1.2 kHz; LF option: 16 Hz to 550 Hz; HF option: 16 Hz to 5 kHz. |
| Frequency Accuracy | Standard models: $\pm(0.01\%$ of actual + frequency resolution/2); FC option: $\pm 0.25\%$. |
| Frequency Resolution | 0.01 Hz resolution, 16-81.91 Hz; 0.1 Hz resolution, 82-819.1 Hz; 1 Hz resolution, 820-5000 Hz; with LKM/LKS option: 1 Hz resolution, 16-5000 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 Leader unit output voltage, with the Leader unit as reference 0 $^{\circ}$. |
| Phase Accuracy | $\pm 1^{\circ}$, 16 Hz to 100 Hz; $\pm 2^{\circ}$ >100 Hz to 1.2 kHz, plus $\pm 1^{\circ}$ /kHz above 1.2 kHz |
| Phase Programming Resolution | $\pm 0.4^{\circ}$ |

Constant-Power Mode Output Characteristic

- The Constant-Power mode for the ASC6003, ASC12K3, ASC18K3 has an output characteristic where full rated output power is available from 57% of full-scale output voltage to 100% of full-scale output voltage, as depicted in the graphs of Figure 1-1. The output current versus output voltage follows a constant-power relation where the output current would be 175% of the full-scale value when the output voltage is 57% of full-scale. The current ratings are also a function of output frequency above 1 kHz as shown in Figure 1-1.

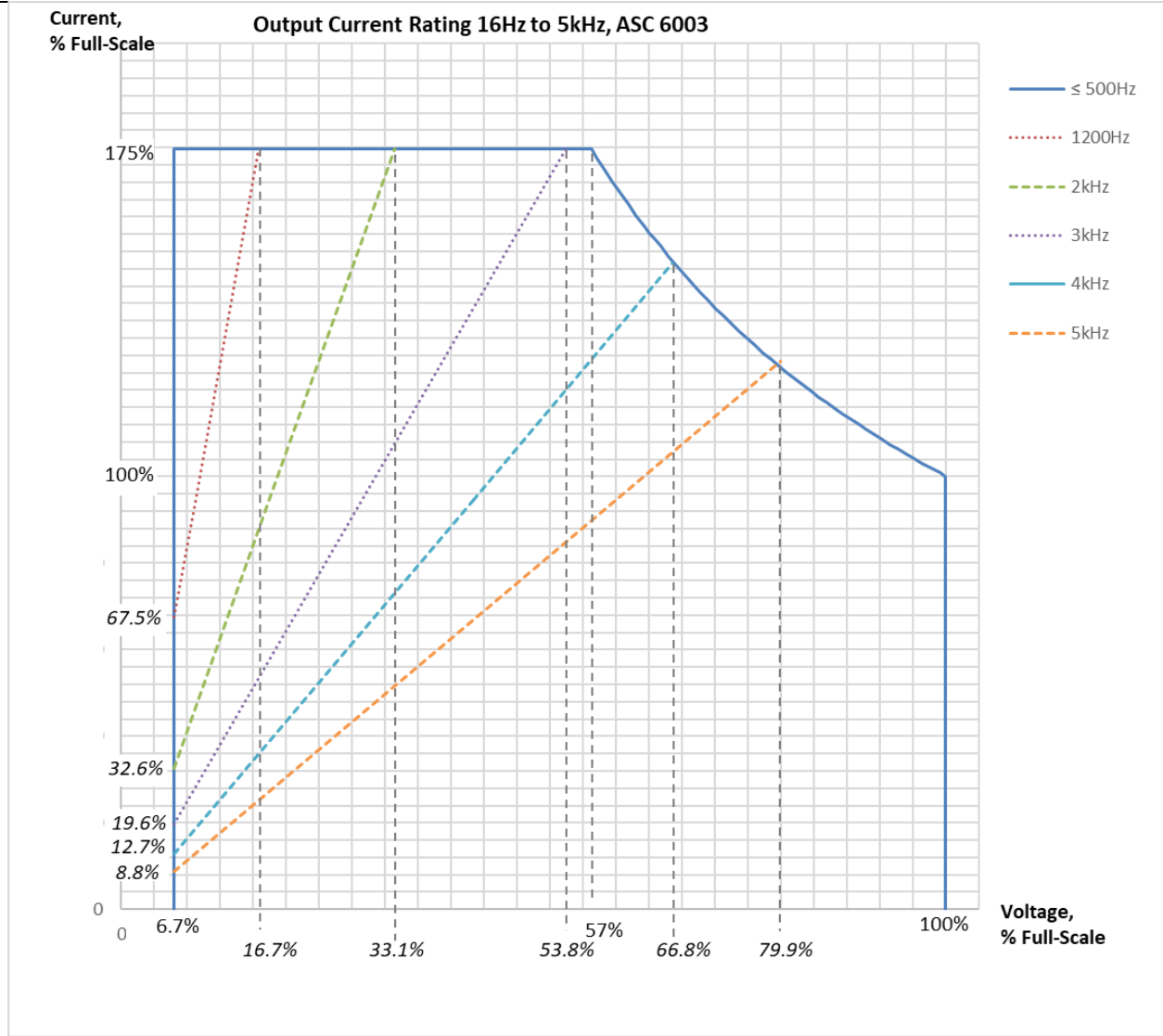


Figure 1-1. Constant-Power: Output Current Versus Voltage, ASC 6003, ASC12K3, ASC18K3

- The Constant-Power mode for 4503, 3-Phase (3 Wire + GND) has an output characteristic where full rated output power is available from 64% of full-scale output voltage to 100% of full-scale output voltage, as depicted in the graphs of Figure 1-2. The output current versus output voltage follows a constant-power relation where the output current would be 156% of the full-scale value when the output voltage is 64% of full-scale. The current ratings are also a function of output frequency, as shown in Figure 1-2 for the ASC4503 above 1 kHz.

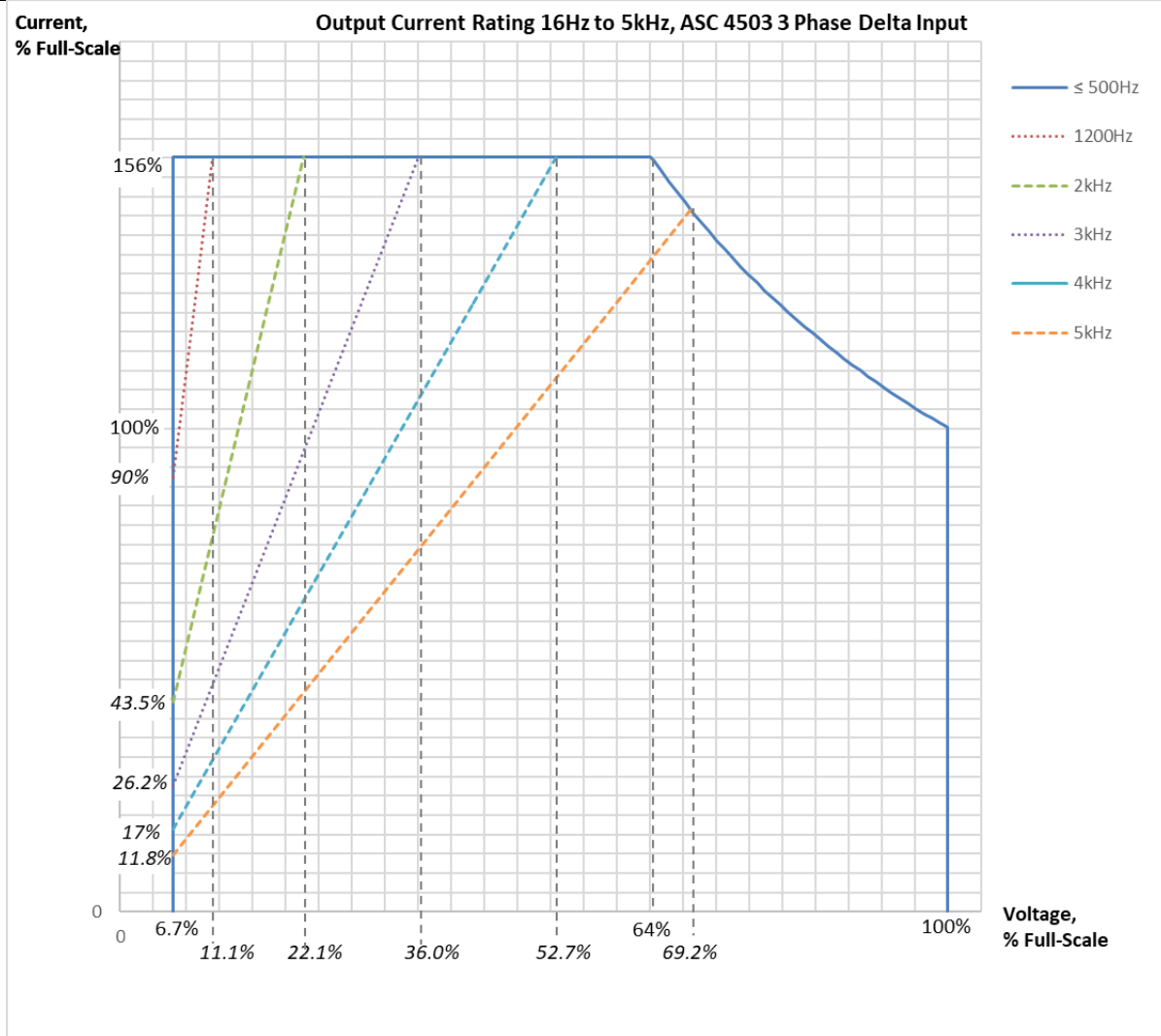


Figure 1-2. Constant-Power: Output Current Versus Voltage, ASC4503 3-Phase (3 Wire + GND) AC input type.

- The Constant-Power mode for 4503, 3-Phase + Neutral (4 Wire + GND) 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 graph of Figure 1-3 . 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 1-3 for the ASC4503 above 1 kHz.

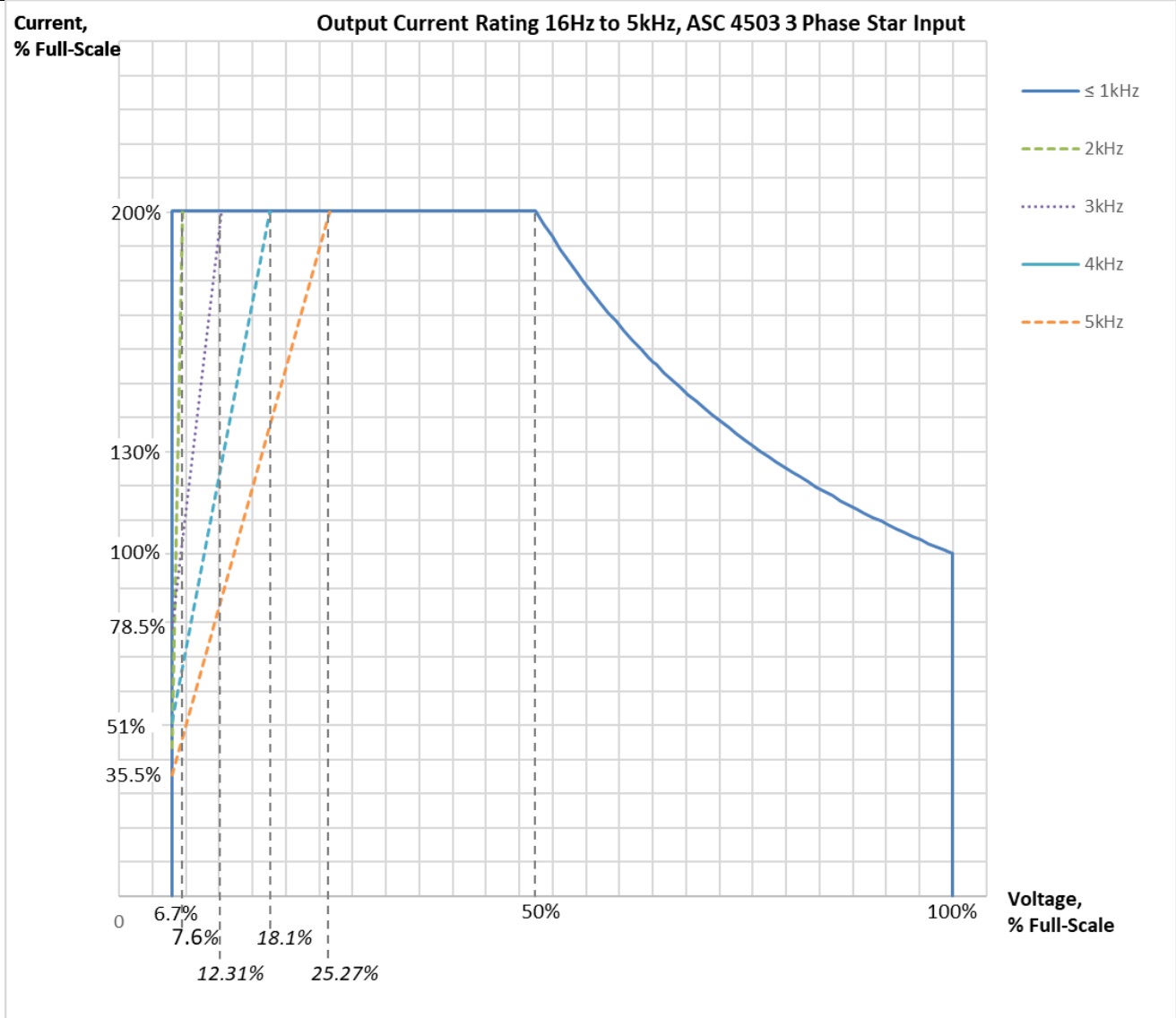


Figure 1-3. Constant-Power: Output Current Versus Voltage, ASC4503 3-Phase + Neutral (4 Wire + GND) AC input type.

AC Input Specifications

| Model | ASC 4503 | ASC 6003 | ASC12K3 |
|---|---|--|--|
| Enclosure | 4U | 4U | 14U |
| Input voltage type (Only factory configurable) | 3 Phase, 3 Wire + Ground (or) 3 Phase + Neutral (4 wire + Ground) | 3 Phase, 3 Wire + Ground (or) 3 Phase + Neutral, (4 wire + Ground) | 3 Phase, 3 Wire + Ground (or) 3 Phase + Neutral, 4 wire + Ground |
| Input Voltage, Nominal Rating for 3-phase, 3 Wire + Ground input | 200/208/240 VAC, 3 Phase, Line - Line | 200/208/240 VAC, 3 Phase, Line - Line | 200/208/240 VAC, 3 Phase, Line - Line |

| Model | ASC 4503 | ASC 6003 | ASC12K3 |
|--|--|--|--|
| Input Voltage, Operating range for 3-phase, 3 Wire + Ground input | 180 - 264 VAC, 3 Phase, Line - Line | 180 - 264 VAC, 3 Phase, Line - Line | 180 - 264 VAC, 3 Phase, Line - Line |
| Input Voltage, Nominal Rating for 3-phase + Neutral, 4 Wire + Ground input | 380 VAC/ 400 VAC/ 415 VAC, 3 Phase, Line-Line) (220 VAC/ 230 VAC/240 V AC, 3 Phase, Line – Neutral) | 380 VAC/ 400 VAC/ 415 VAC, 3 Phase, Line-Line) (220 VAC/ 230 VAC/240 V AC, 3 Phase, Line – Neutral) | 380 VAC/ 400 VAC/ 415 VAC, 3 Phase, Line-Line) (220 VAC/ 230 VAC/240 V AC, 3 Phase, Line – Neutral) |
| Input Voltage, Operating range for 3-phase + Neutral, 4 Wire + Ground input | 342 V AC to 457 VAC Line- Line (198 VAC – 264 V AC, 3 Phase, Line – Neutral) | 342 V AC to 457 VAC Line- Line (198 VAC – 264 V AC, 3 Phase, Line – Neutral) | 342 V AC to 457 VAC Line-Line (198 VAC – 264 V AC, 3 Phase, Line – Neutral) |
| Input Current, Maximum with 3-Phase Input, 3 Wire+ ground | 20 A (RMS) at 180 VAC | 28 A (RMS) at 180 VAC | 56 A (RMS) at 180 VAC |
| Input Current, Maximum with 3-Phase + Neutral Input, 3 Wire + Ground | 11 A (RMS) at 342 VAC to 457 VAC; | 14 A (RMS) at 342 VAC to 457 VAC | 28 A (RMS) at 342 VAC to 457 VAC |
| Model | ASC 18K3 | | |
| Enclosure | 14U | | |
| Input voltage type (Only factory configurable) | 3 Phase, 3 Wire + Ground (or) 3 Phase + Neutral, 4 wire + Ground | | |
| Input Voltage, Nominal Rating for 3-phase, 3 Wire + Ground input | 200/208/240 VAC, 3 Phase, Line - Line | | |
| Input Voltage, Operating range for 3-phase, 3 Wire + Ground input | 180 - 264 VAC, 3 Phase, Line - Line | | |
| Input Voltage, Nominal Rating for 3-phase + Neutral, 4 Wire + Ground input | 380 VAC/ 400 VAC/ 415 VAC, 3 Phase, Line-Line) (220 VAC/ 230 VAC/240 V AC, 3 Phase, Line – Neutral) | | |
| Input Voltage, Operating range for 3-phase + Neutral, 4 Wire + Ground input | 342 V AC to 457 VAC Line- Line (198 VAC – 264 V AC, 3 Phase, Line – Neutral) | | |

| Model | ASC 4503 | ASC 6003 | ASC12K3 |
|---|-----------------------------------|----------|---------|
| Input Current, Maximum with 3-Phase Input, 3 Wire+ground | 64 A (RMS) at 180 VAC | | |
| Input Current, Maximum with 3-Phase + Neutral Input, 3 Wire + Ground | 42 A (RMS) at 342 VAC to 457 VAC; | | |

| Model | All Models |
|---|--|
| Input Frequency, Nominal Rating | a) 50 Hz, 60 Hz, 400 Hz for 4U Models b) 50 Hz, 60 Hz for 14U Models |
| Input Frequency Range | a) 47-440 Hz for 4U Models b) 47- 63 Hz for 14U Models |
| Inrush Current, typical | a) 55 A (PK) at 264 V AC Line-Line for 3-Phase, 3 wire + Ground input 4U Models b) 55 A (PK) at 457 V AC Line-Line for 3-Phase, 4 wire + Ground input 4U Models d) 165 A (PK) at 264 V AC Line-Line for 3-Phase, 3 wire + Ground input 14U Models e) 165 A (PK) at 264 V AC Line-Line for 3-Phase, 4 wire + Ground input 14U Models |
| Efficiency¹, typical | 75% |
| Power Factor², typical | b) 3-Ph: 0.95, active PFC for 4U |
| Hold-Up Time³, typical | ≥10 ms |
| Isolation Voltage | 2200 VAC, input to output; 1350 VAC, input to chassis |
| ¹ a) At full load and 16 Hz to 1.2 kHz output frequency, with AC input voltage of 208 V(RMS) and 50/60 Hz input frequency for 4U and 14U 3 phase, 3 wire + Ground input type Models b) At full load and 16 Hz to 1.2 kHz output frequency, with AC input voltage of 400 V(RMS) and 50/60 Hz input frequency for 4U 3 phase + Neutral, 3 wire + Neutral + Ground input type Models | |
| ² a) At full load and with AC input voltage of 208 V(RMS) and 50/60 Hz input frequency for 4U and 14U 3 phase, 3 wire + Ground input type Models b) At full load and with AC input voltage of 208 V(RMS) and 50/60 Hz input frequency for 4U and 14U 3 phase + Neutral, 3 wire + Neutral + Ground input type Models | |
| ³ a) At full load and with AC input voltage of 208 V(RMS) and 50/60 Hz input frequency for 4U 3 phase, 3 wire + Ground input type Models b) At full load and with AC input voltage of 400 V(RMS) and 50/60 Hz input frequency for 4U 3 phase + Neutral, 3 wire + Neutral + Ground input type Models | |

AC Output Measurements

| Parameter | Specification ¹ |
|----------------------------------|--|
| Voltage Range, Full-Scale | AC: 0-312 V(RMS) |
| Voltage Accuracy | ± (0.1% of actual + 0.2% of full-scale) for AC 16 Hz to 1.2 kHz; >1.2 kHz, add ±0.2% of full-scale/kHz; Valid from 5% of full-scale to 156 VAC(RMS) in low-range and 312 VAC(RMS) in high-range; with sense leads connected. |
| Voltage Resolution | 20 mV |
| Current Range, Maximum | ASC 4503: ± 0-9.6 A(RMS) per phase |

| Parameter | Specification ¹ |
|---|--|
| | ASC 6003: $\pm 0-12.8$ A(RMS) per phase ASC 12K3: $\pm 0-25.6$ A(RMS) per phase ASC 18K3: $\pm 0-38.4$ A(RMS) per phase 1 Phase Output Mode in 3 Phase Modes: Rating times 3 |
| Current Accuracy | $\pm (0.3\%$ of actual + 0.5% of maximum) for AC 16 Hz to 1.2 kHz; add $\pm 0.3\%$ of maximum/kHz; 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, Maximum | ASC 4503: $\pm 0-48$ A(PK) per phase ASC 6003: $\pm 0-64$ A(PK) per phase ASC 12K3: $\pm 0-128$ A(PK) per phase ASC 18K3: $\pm 0-192$ A(PK) per phase 1 Phase Output Mode in 3 Phase Modes: Rating times 3 |
| Peak Current Accuracy | $\pm(0.5\%$ of actual + 0.7% of maximum) for AC 16 Hz to 1.2 kHz; Valid from 5% of full-scale to 100% of full-scale. 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. |
| 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 1.2 kHz; $\pm 5^\circ$, >1.2 kHz |
| Phase Resolution | 0.1°, 16-100 Hz; 1°, >100 Hz to 5 kHz |
| Real Power Range, Full-Scale | Output power rating of model. |
| Real Power Accuracy | $\pm (0.4\%$ of actual + 0.7% of full-scale) for AC 16 Hz to 1.2 kHz; >1.2 kHz, add $\pm 0.4\%$ of full-scale/kHz; |
| Real Power Resolution | 1 W; 1-phase mode in 3-phase models: 3 W. |
| Apparent Power, Full-Scale | Output power rating of model. |
| Apparent Power Accuracy | $\pm (0.4\%$ of actual + 0.7% of full-scale) for AC 16 Hz to 1.2 kHz; >1.2 kHz, add $\pm 0.4\%$ of full-scale/kHz. |
| 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 |
| ¹ 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. | |

Harmonics Measurements

- This will be applicable only when ADV option is enabled.

| 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; 2 nd to 50 th 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. |

Protection Function Characteristics

| Function | Characteristic |
|-------------------------------------|--|
| Output Overvoltage Protection (OVP) | Programmable to 115% of full-scale output voltage for each phase; 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 current limit 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 |

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 mm); W (front panel), 18.9" (480 mm); D, 23.0" (584 mm); H, 6.97" (177 mm); W (chassis), 16.9" (429 mm); D, 23.0" (584 mm). |
| 14U Dimensions | Rackmount: H, 24.5" (622 mm); W, 17.44" (443 mm); D, 29.6" (752 mm) Standalone (with casters): H, 28.5" (724 mm); W, 17.44" (443 mm); D, 29.6" (752 mm) |
| 4U Unit Weight | ASC 6003, 98 lb. / 44.5 kg; ASC 4503, 87 lb. / 39.5 kg; |
| 14U Unit weight | AST 12K3, 305 lb. / 138.4 kg; AST 18K3, 401 lb. / 181.9 kg; |
| 4U Shipping Weight | ASC 6003, 104 lb. / 47.2 kg; ASC 4503, 93 lb. / 42.2 kg; |
| 14U Shipping Weight | AST 12K3, 448 lb. / 203.2 kg; AST 18K3, 544 lb. / 246.7 kg; |
| Chassis Material | Steel with plastic front panel |
| Chassis Finish | Galvanized Zinc, G90 for 4U Models Black power-coat chassis with galvanized-zinc (G90) panels for 14U Models |
| Installation | Protective covers are provided for AC input and AC output; bench-top: removable feet for the chassis; 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 | 4U Models: 62 dBA, maximum; measured at 1 m with A-weighting. 14U Models: xx dBA, maximum; measured at 1m with A-weighting. |

Regulatory Agency 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. |

* CSA NRTL certification on all models except ASC12K3A1 and ASC18K3A1 (14U).

Firmware/Software Options

| Option ¹ | Description |
|--------------------------------|--|
| ADV | This indicates the presence of advanced capabilities for waveform generation and measurement analysis. |
| 411 | IEC 61000-4-11 voltage dips and interruptions EMC test software. |
| 411 & ADV | Includes both 411 and ADV |
| 413 & ADV | IEC 61000-4-13 harmonics and Inter-harmonics EMC test hardware and software and ADV |
| 411 & 413 & ADV | Includes 411, 413 & ADV options |

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.