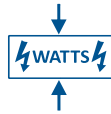


Introducing the AGX Series

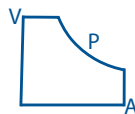
The Industry's Most Flexible, High Performing, and Intelligent All-in-1 Regenerative AC/DC Power Source



Regenerative



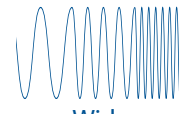
Power Density



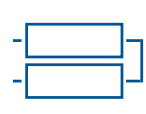
Constant Power



High Current



Wide Frequency Range



Scalable Power

Key Features

- All-in-1 AC/DC Power Source, Current Source & Load
 - » 4-Quadrant AC & DC Power Source
 - » AC/DC Electronic Load Option
- High Power Density – Up to 21kW in 4U; Parallel up to 168kVA/kW per Cabinet, or Multiple Cabinets up to 252kW
- AC, DC and AC+DC Output Capability
- Single, Split, Three-Phase; Multi-Channel Mode
 - » Isolated Neutrals Available (Option W)
- Constant Power Voltage Range: 350Vac L-N/606Vac L-L or $\pm 500Vdc$
- High Frequency Range:
 - » DC, 15Hz - 1200Hz
 - » Extended Frequency Range 1Hz - 3000Hz
- Galvanic Isolation from Facility AC Input to Output and Between Output Phases / Channels
- Silicon Carbide (SiC) Based Technology
- Exceptionally High AC Current
- Waveform capture and Scope display
- **SmartSource Suite:** Web Interface & Control
- IEC61000-4-13 Inter-Harmonics Test Option

AGX Series

All-in-1 Regenerative AC/DC Power Source

The AGX Series is a fully regenerative 4-quadrant AC and DC power source that can function as an AC power source, DC power supply, current source, and AC/DC load. The AGX's high-power density provides 6kVA/kW up to 21kVA/kW in a 4U chassis and can parallel up to 168kVA/kW in a single 19" cabinet. Multiple Cabinets can parallel up to 252kVA/kW.

The best-in-class AGX is modular by design and scalable in power. It has highly versatile channel outputs for different dynamic applications, and advanced control and programming capabilities.

The wide selection of power, frequency, and phase angle modes allow you to test a wide range of grid-tied products in the renewable energy, electric vehicle charging, aerospace, and industrial markets. Easily test the UUT to regulatory compliance standards.

Application Examples:

- Aerospace & Defense Power and Compliance Testing
- EV Charging, On Board Chargers (OBC), V2G, V2H and V2X
- Solar PV/Grid-Tied Inverters
- Energy Storage Systems (ESS), Home ESS
- Smart-Grid Simulation
- EMC Compliance Testing



Flexible Control



ES France - Département Tests & Mesures
127 rue de Buzenval BP 26 - 92380 Garches



Tél. 01 47 95 99 45
Fax. 01 47 01 16 22

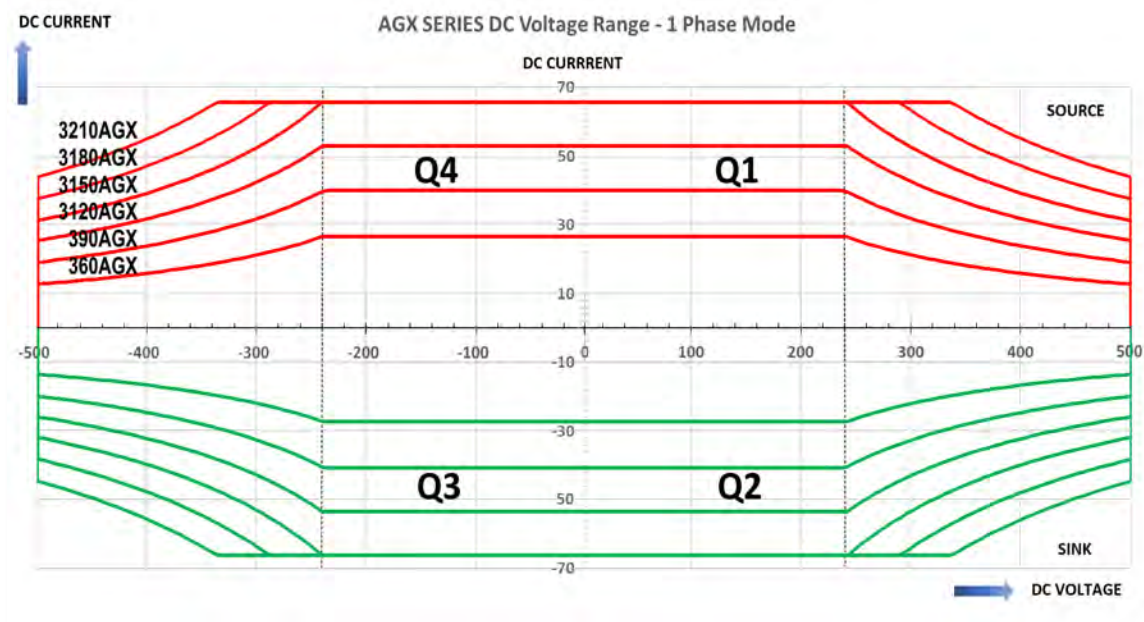
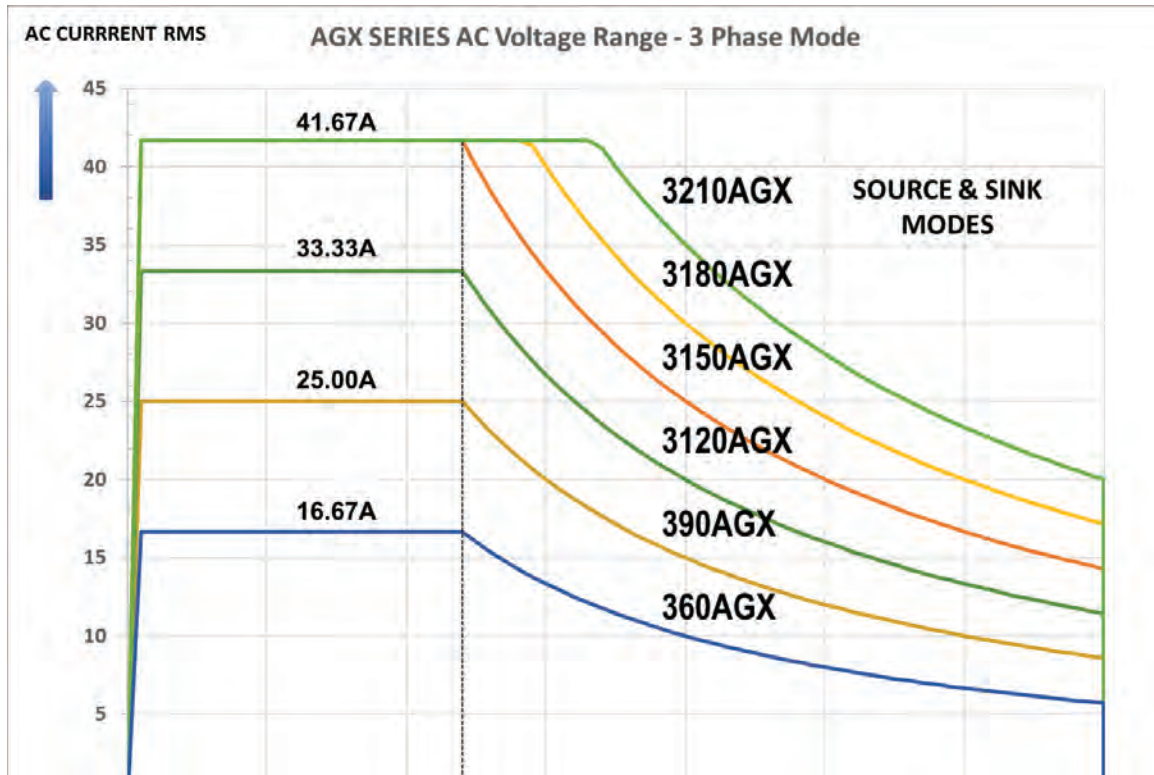


e-mail : tem@es-france.com
Site Web : www.es-france.com

Constant Power Voltage Range

The AGX Series uses a single, constant power voltage range for both higher current at lower voltage and higher voltages at lower currents eliminating the need to switch between voltage ranges.

Typical dual range systems cause temporary output power loss when switching between ranges interrupting power to the unit under test. The AGX's constant power voltage range allows for testing a broad range of conditions and test requirements without interruption of output power.



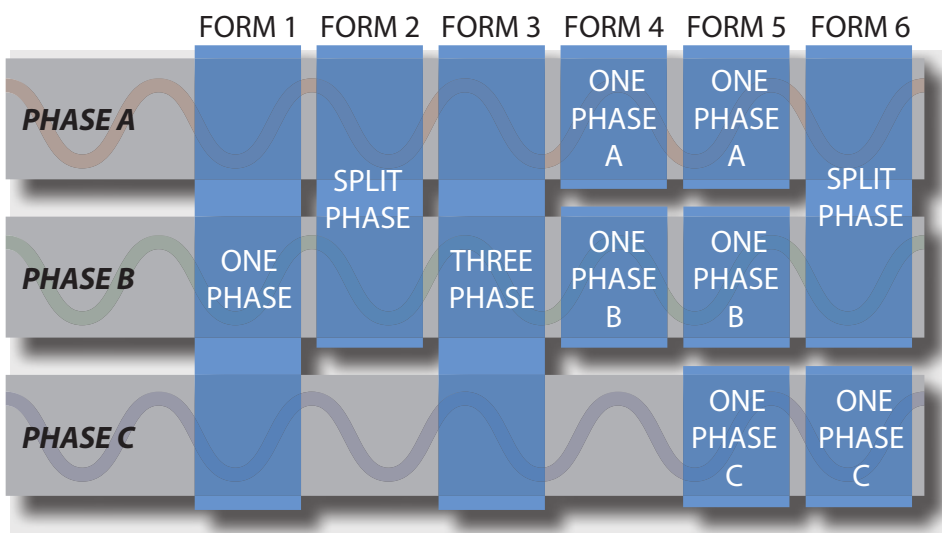
More Current at Low Voltage

The AGX provides a broader range of current eliminating the risk of over or under sizing the power source. This reduces the need for additional capital investment. The diagram to the right illustrates the AGX's capability to provide 20% more current from 120V to 200V when compared to a typical unit that maxes out at 35A/phase.



Ultimate Flexibility With Six Output Configurations

Simultaneous AC & DC Operation on Single Phases and Automatic Switching of Operation Modes



Note: Mixed Source / Load mode combinations available in Forms 4, 5 and 6.

Flexibly test a wide range of grid-tied conditions and EUTs with six different output configurations in either source or load mode. Isolated neutrals give capability to operate in each phase as a different function: voltage source, current source, or load (option).

Forms 1 through 3 are common for three-phase AC sources or loads and single, split or three-phase AC connections. Forms 4 through 6 allow for two or three EUTs' to be tested with the same AGX source or load. This means that three independent single-phase 7 kW EUT's could be tested simultaneously using a single 21kW AGX unit. Form 5 supports different frequencies on each phase simultaneously.



Regenerative Power Saves Significant Energy and Costs

Regenerative AC & DC power sources provide energy efficiency and significant cost savings by returning energy back to the facility or the grid. The AGX produces less heat, ensures a stable testing environment for reliability reducing the need for additional cooling systems. Regenerative bidirectional power flows are critical for simulating real-world conditions in transportation and renewable energy systems.



Wide Frequency Range

Unlike traditional grid simulators, the AGX has a wide output frequency range which provides more flexibility. Standard range from 15Hz to 1200Hz. This is ideal for avionics and defense applications that require both 400Hz steady state frequency as well as 360Hz to 800Hz wild frequency ranges. The AGX also offers extended frequency range from 1Hz to 3000Hz.

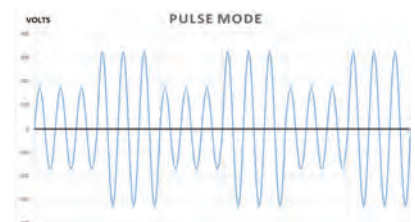
Powerful Waveform & Measurement Tools

The AGX has a built-in waveform digitizer with fast transient capabilities at 200µsec time resolution supporting LIST, PULSE and STEP modes. Waveform generation includes ten Standard, Sine, Square, Triangle, Clipped and Harmonic generation. Inter-harmonics can be added with Option C.

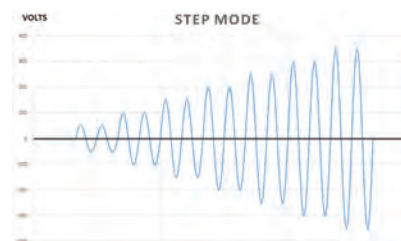
The waveform digitizer is complemented by a digital measurement system with scope function. Capture advanced measurements and waveforms.



List Mode



Pulse Mode



Step Mode



User Friendly Control Options

Multiple integrated control options include:

- Intuitive Touch Screen LCD Display with Soft Key driven Menus
- SmartSource Suite Web Interface
- LAN, GPIB, RS232 & USB Interfaces, and ModBus (optional)
- Supports external touch screen monitor via Video Output Interface



Simplify Test Automation with SmartSource Suite Remote Control Platform

Easily monitor, control, and manage testing with the AGX's SmartSource Suite remote control platform. Use the embedded, web browser interface with real-time control. Access control panels and test sequences on-premises or on any mobile device (laptop, phone, tablet) via secure client access.

- Full control and measurement capability
- Program settings and measurement read back including digital scope and harmonics data
- Extensive safety protection settings
- Waveform selection, preview and edit modes
- Execution of user's custom test sequences
- Transient data entry and execution screen using a spreadsheet layout

Built-in Galvanic Isolation Reduces Safety Risks

The AGX provides both facility-to-output isolation, and phase to phase or channel to channel isolation. Galvanic isolation provides complete separation between the input and output so there is no electron flow between channels. Channel to channel isolation provides flexibility to use each phase as its own independent power source with full frequency and voltage control. The AGX's fully isolated design reduces safety risks for the operator and prevents unexpected UUT damage by preventing unwanted current or ground loops. This built-in capability doesn't require a transformer which saves significant costs and space.



Fully Test AC Power with 4-Quadrant Load (Option L)

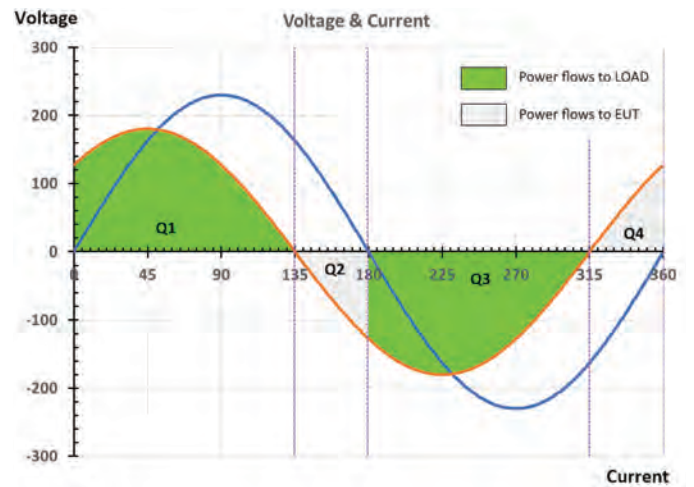
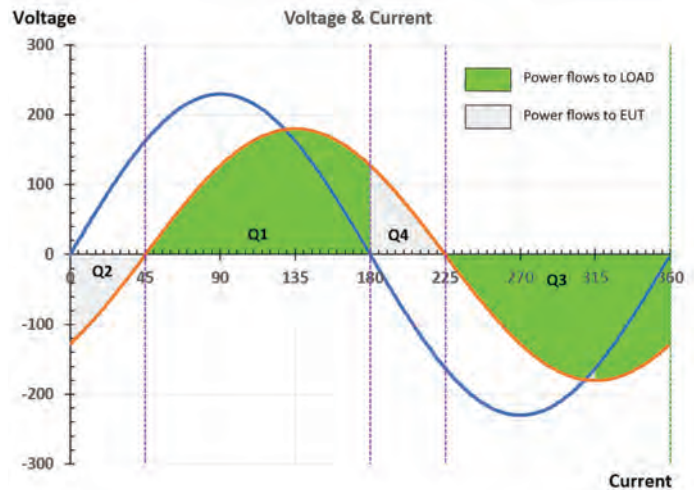
Optional load feature also supports testing PV inverters, V2G, EV Chargers, EVSE, batteries, UPS, and AC/DC power supplies. A key advantage of the AGX Regenerative Load Option is its ability to operate in all four quadrants using programmable phase shift in CC or CS modes.

Compared to 2-Quadrant non-regenerative AC loads, the AGX allows simulation of inductive and capacitive loads to fully test AC power sources, as shown in the leading and lagging power factor examples.

The "L" Option adds Regenerative Electronic Load capability providing several AC and DC operating modes to push the boundaries of test environment. Simulate linear and non-linear loads (rectified), inductive and capacitive loads.

AC Modes: Constant Current, Constant Power & Apparent Power, Constant Resistance, Constant Voltage, CC+CR, CC / CS Rectifier Mode 1 ϕ & 3 ϕ

DC Modes: Constant Current, Constant Power, Constant Resistance, Constant Voltage, CR+CC



Current Source Mode



The AGX Series supports Current Source mode. In this mode, AC or DC current is precisely controlled. Current and compliance voltage ranges are identical to this in source or load mode. Transient programming and user defined arbitrary current waveforms are available in this operating mode as well.

Current source mode is useful for testing of protection devices like fuses, switches, transformers or circuit breakers. Maximum current range is available in single phase mode.

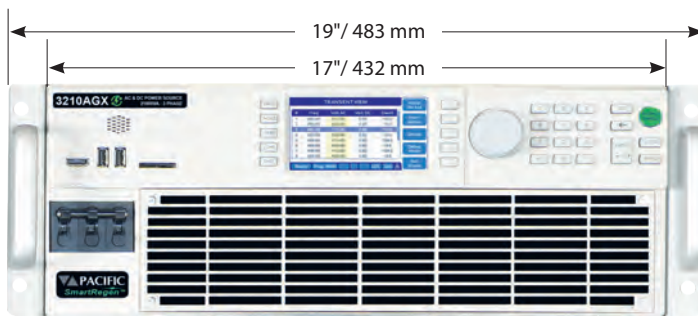
Rack Mount / Bench AGX Models

MODEL	Phase Mode	Rated Power ¹ AC / DC mode	Voltage Ranges ² Vac L-N / Vdc	Max. AC/DC Current per Phase in 3 & 2 Phase Mode	Max. AC/DC Current 1 Phase Mode	Form Factor
360AGX-4	1, 2 & 3 Phase	6 kVA, kW / 6 kW	0-350 Vac / 0-500 Vdc	16.7 Arms / 8.3 Adc	50 Arms / 25.0 Adc	4U Chassis
390AGX-4	1, 2 & 3 Phase	9 kVA, kW / 9 kW	0-350 Vac / 0-500 Vdc	25.0 Arms / 12.6 Adc	75 Arms / 37.8 Adc	4U Chassis
3120AGX-4	1, 2 & 3 Phase	12 kVA, kW / 12 kW	0-350 Vac / 0-500 Vdc	33.3 Arms / 16.7 Adc	100 Arms / 50.0 Adc	4U Chassis
3150AGX-4	1, 2 & 3 Phase	15 kVA, kW / 15 kW	0-350 Vac / 0-500 Vdc	41.7 Arms / 21.0 Adc	125 Arms / 62.5 Adc	4U Chassis
3180AGX-4	1, 2 & 3 Phase	18 kVA, kW / 18 kW	0-350 Vac / 0-500 Vdc	41.7 Arms / 21.0 Adc	125 Arms / 62.5 Adc	4U Chassis
3210AGX-4	1, 2 & 3 Phase	21 kVA, kW / 21 kW	0-350 Vac / 0-500 Vdc	41.7 Arms / 21.0 Adc	125 Arms / 62.5 Adc	4U Chassis

Note 1: Rated power shown is for Three Phase or Single Phase mode operation. For Split Phase mode, rated power is 2/3.

Note 2: For Voltage ranges above 333Vac some frequency and Vthd restrictions apply.

AGX Dimensions & Accessories



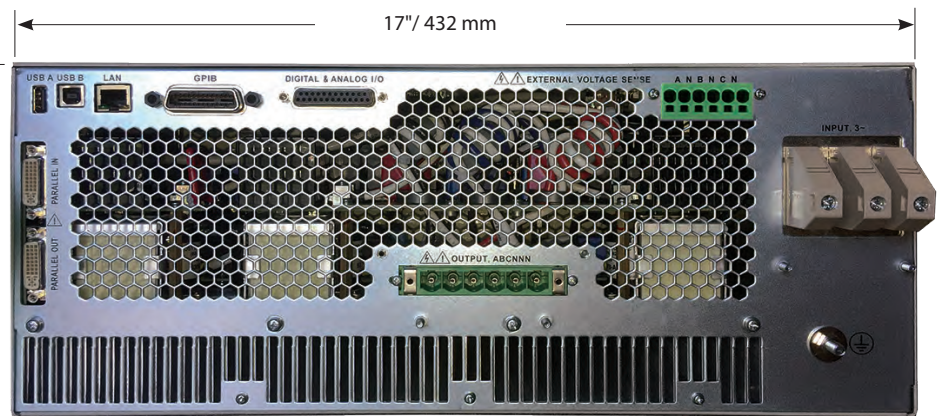
The AGX is designed for bench top or 19" equipment rack operation. Product is shown with included rack mount handles.

Depth of chassis is only 25.0 inch / 635mm.

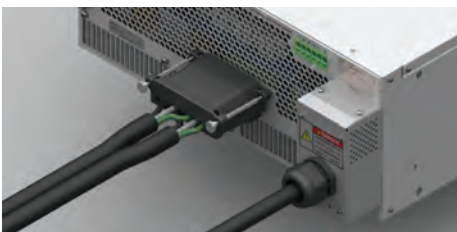
Note: Units can be zero-stacked in 19" EIA cabinet when using optional rack-slides. When using L-brackets, allow 1U space between units.

The AGX Rear Panel provides connections for AC Input, AC or DC Output, External Sense, Aux I/O and remote control interfaces. Product is shown with standard GPIB Interface.

7" /
178 mm
(4U)



Safety Cover & Strain Relief Kit Option



This optional kit includes covers for AC input and AC & DC Output connections. Both covers include wire strain relief to prevent accidental release of input or output wiring.

Note: AC input and AC output wiring is NOT included.



Modular Power up to 168kW/333A per Cabinet

The AGX Series provides modular and scalable power to meet changing test requirements. Easily parallel multiple chassis to reach up to 168kW with 333Amps per cabinet. Cabinets can be paralleled up to 252kW. The ease of reconfiguration allows for flexible test set ups and reduces downtime for repairs or maintenance. The units' shallower depth also allows it to fit into typical 31.5-inch / 800.1mm depth cabinets with ample room for air-flow and wiring.

Parallel Systems Installed in 19" EIA Rack Cabinet

MODE	Rated Power ¹ AC / DC mode	Voltage Ranges ² Vac L-N / Vdc	Max. AC/DC Current per phase in 3 & 2 Phase Mode	Rack Space
3240AGX-4	24 kVA, kW / 24 kW	0-350 Vac / 0-500 Vdc	66.7 Arms / 33.3 Adc	15U
3300AGX-4	30 kVA, kW / 30 kW	0-350 Vac / 0-500 Vdc	83.3 Arms / 42.0 Adc	15U
3360AGX-4	36 kVA, kW / 36 kW	0-350 Vac / 0-500 Vdc	83.3 Arms / 42.0 Adc	15U
3420AGX-4	42 kVA, kW / 42 kW	0-350 Vac / 0-500 Vdc	83.3 Arms / 42.0 Adc	15U
3630AGX-4	63 kVA, kW / 63 kW	0-350 Vac / 0-500 Vdc	125.0 Arms / 62.5 Adc	15U
3840AGX-4	84 kVA, kW / 84 kW	0-350 Vac / 0-500 Vdc	166.7 Arms / 83.3 Adc	28U
31050AGX-4	105 kVA, kW / 105 kW	0-350 Vac / 0-500 Vdc	208.3 Arms / 104.0 Adc	28U
31260AGX-4	126 kVA, kW / 126 kW	0-350 Vac / 0-500 Vdc	249.9 Arms / 125.0 Adc	28U
31470AGX-4	147 kVA, kW / 147 kW	0-350 Vac / 0-500 Vdc	291.6 Arms / 146.0 Adc	40U
31680AGX-4	168 kVA, kW / 168 kW	0-350 Vac / 0-500 Vdc	333.3 Arms / 167.0 Adc	40U

Note 1: For Split Phase mode, rated power is 2/3.

Note 2: For Voltage ranges above 333Vac some frequency and Vthd restrictions apply.

Contact factory for cabinet output wiring modifications to support single phase AC mode on cabinets above 84kVA.



3420AGX-4 Cabinet 42kVA/42kW

3630AGX-4 Cabinet 63kVA/63kW

3840AGX-4 Cabinet 84kVA/84kW

31050AGX-4 Cabinet 105kVA/105kW

31680AGX-4 Cabinet 168kVA/168kW



Technical Specifications

MODEL:	360AGX-4	390AGX-4	3120AGX-4	3150AGX-4	3180AGX-4	3210AGX-4
Modes of Operation						
Grid Simulator, AC and/or DC Power Source, AC and/or DC Current Source. Electronic Load optional.						
AC Output						
Phase Modes (Form)	1, 2 or 3	1, 2 or 3	1, 2 or 3	1, 2 or 3	1, 2 or 3	1, 2 or 3
Maximum Power (Total)	6 kW/kVA	9 kW/kVA	12 kW/kVA	15 kW/kVA	18 kW/kVA ¹	21 kW/kVA ¹
Per Phase	2 kW/kVA	3 kW/kVA	4 kW/kVA	5 kW/kVA	6 kW/kVA	7 kW/kVA
Voltage						
Range	0 - 350 V _{LN} / 0 - 606 V _{LL}					
Resolution	0.01					
Accuracy	± 0.25% F.S					
Harmonic Distortion (V _{thd}) R Load	< 100 Hz < 0.3% 100 Hz to 500Hz < 0.5% 500 to 1000 Hz < 1.0% > 1000 Hz < 1.5%					
Line Regulation	< 0.1% for 10% Line Change					
Load Regulation	± 0.02% (CSC Mode)					
Phase Angle - Range - Phase B, C	0 - 359.9°					
Phase Angle Resolution	0.1°					
Maximum RMS Current						
3 & 2 Phase modes	16.67 A	25.00 A	33.33 A	41.67 A	41.67 A	41.67 A
1 Phase mode	50.00 A	75.00 A	100.00 A	125.00 A	125.00 A	125.00 A
Current Crest Factor	6.3 : 1	4.2 : 1	3.1 : 1	2.5 : 1	2.5 : 1	2.5 : 1
Frequency ₂						
Range	15.00 – 1200.0 Hz					
Extended Range	1.00 - 3000.0 Hz					
Resolution / Accuracy	0.01 Hz / ± 0.01%					
DC Output						
Phase Modes (Channels)	1, 2 or 3	1, 2 or 3	1, 2 or 3	1, 2 or 3	1, 2 or 3	1, 2 or 3
Maximum Power (Total)	6 kW	9 kW	12 kW	15 kW	18 kW	21 kW
Per Channel	2 kW	3 kW	4 kW	5 kW	6 kW	7 kW
Voltage						
Range	0 - ±500 V _{DC}					
Resolution	0.01					
Accuracy	± 0.25% F.S					
Maximum DC Current						
3 & 2 Phase modes	8.3 A _{DC}	12.6 A _{DC}	16.7 A _{DC}	21.0 A _{DC}	21.0 A _{DC}	21.0 A _{DC}
1 Phase mode	25.0 A _{DC}	37.8 A _{DC}	50.0 A _{DC}	62.5 A _{DC}	62.5 A _{DC}	62.5 A _{DC}
AC Input						
Input Voltage Range	380Vac – 480Vac ± 10%, 4 Wire, L1, L2, L3 and PE					
Frequency	47 - 63 Hz					
Nominal Phase Current @ 400Vac	10 Arms	14 Arms	19 Arms	24 Arms	29 Arms	34 Arms
Nominal Phase Current @ 480Vac	8 Arms	12 Arms	16 Arms	20 Arms	24 Arms	28 Arms
Input Power Factor	>0.99	>0.99	>0.99	>0.99	>0.99	>0.99
Efficiency					>0.90	>0.90
Measurements						
Voltage RMS Range / Accuracy	0 – 350 V _{LN} / 0-606 V _{LL} / ± 0.25% F.S.					
Current RMS Range / Accuracy	17.0 A / ± 0.5% F.S.	25.0 A / ± 0.5% F.S.	34.0 A / ± 0.5% F.S.	42.0 A / ± 0.5% F.S.	42.0 A / ± 0.5% F.S.	42.0 A / ± 0.5% F.S.
Power Range / Accuracy	2 kW / ± 1.5 % F.S.	3 kW / ± 1.5 % F.S.	4 kW / ± 1.5 % F.S.	5 kW / ± 1.5 % F.S.	6 kW / ± 1.5 % F.S.	7 kW / ± 1.5 % F.S.
Transient Functions						
Programming	200 Steps / 400 Segments, LIST, PULSE & STEP Modes, Frequency, Volt AC, Volt DC, Waveform, Ramp Time, Dwell Time. Time range: 0.1 - 10000000.0 ms, Time resolution 0.2 ms					
Execution	Run from step # to step #, Run, Step, Restart, Stop					

Technical Specifications

PARAMETERS / FUNCTIONS		SPECIFICATIONS		
Remote Control Interfaces				
Standard Interfaces	USB Type B, LAN, GPIB / IEEE488, RS232, all on rear panel			
LAN / Ethernet Interface	LXI compliant, Ethernet, RJ45, TCP/IP Protocol, Telnet Protocol Command Line			
GPIB Functions	IEEE488.1, IEEE488.2 (2003 incl., NI HS488) IEC 60488-1, IEC 60488-2 (2004) Functions: SH1, AH1, T6, L3, SR1, RL1, DC1, DT1			
WIFI (Optional)	Optional external USB connected WIFI adapter available.			
ModBus TCP (Optional)	Uses Power Source’s LAN interface to connect to CANopen Fieldbus			
CAN/CAN-FD (Optional)	Uses USB to CAN-FD adapter to connect to CAN network			
Analog I/O (DB25 Connector Rear Panel)				
Analog Inputs (4)	AI1, AI2, AI3:	Voltage A, B, C	AI4:	Frequency
Range, Accuracy, Impedance	0 - 10Vdc for 0 - F.S.	± 0.1% F.S.	10 kOhm	
Analog Outputs (4)	AO1, AO2, AO3:	Vmeas A, B, C	AO4:	Pmeas All Phases sum
Range, Accuracy, Impedance	0 - 10Vdc for 0 - F.S.	± 0.1% F.S. into 5kW	5 kOhm	
Digital I/O (DB25 Connector Rear Panel)				
Digital Inputs - Fixed (3)	Remote Inhibit, Transient Trigger, Phase Sync			
Digital Inputs - User (3)	DI1, DI2, DI3, Functions are user defined			
Digital Outputs - Open Collector (2)	External Relay Control to change output FORM, Relay Control for T Option			
Digital Outputs - TTL, Fixed (2)	Output Relay / Transient / Function Strobe / Phase Sync			
Digital Outputs - TTL, User (2)	DO1, DO2			
Output Voltage Levels	Low < 0.4V, High > 4.6V			
Environmental				
Cooling	Variable speed fan cooled, front intake, rear exhaust			
Energy Saving Modes	Standby Mode:	Output Stages OFF	Sleep Mode:	All power stages OFF
Temperature	Operating:	0 to 40 °C 32 to 104 °F	Storage:	-20 to 70 °C -4 to 158 °F
Humidity & Altitude	< 80%, non-condensing		2000 m / 6500 feet	
Miscellaneous System Features				
Front Panel Display	Full Color, Touch LCD Display, 4.3” Diagonal size, 480 x 272 Pixels resolution			
USB Ports	2 on Front Panel, 1 on Rear Panel, All Type A			
SD Card	32 GB max. Capacity			
Video Output	Monitor Out, Front Panel			
Dimensions & Weights				
Chassis Size H x W x D	7.0” x 17.0” x 25.0” / 178 x 432 x 635 mm		Shipping: 20” x 27” x 38” / 508 x 686 x 965 mm	
Weight Single 4U Height Unit	Net:	111.2 lbs. / 50.4 kg	Shipping:	151 lbs / 68.5 kg
Regulatory Compliance				
Safety	IEC 61010-1:2010 (Edition 3)			
EMC - Emissions / Immunity	EN 55011:2009+A1:2010 / EN 61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8 and EN 61000-4 -11			
Product Category	EN 61326-1:2013 (Measurement, Laboratory and Control Equipment)			
Agency Approvals	CE Mark			
RoHS (DIRECTIVE 2011/65/EU)	Product Category EN50581:2012			

Ordering Information

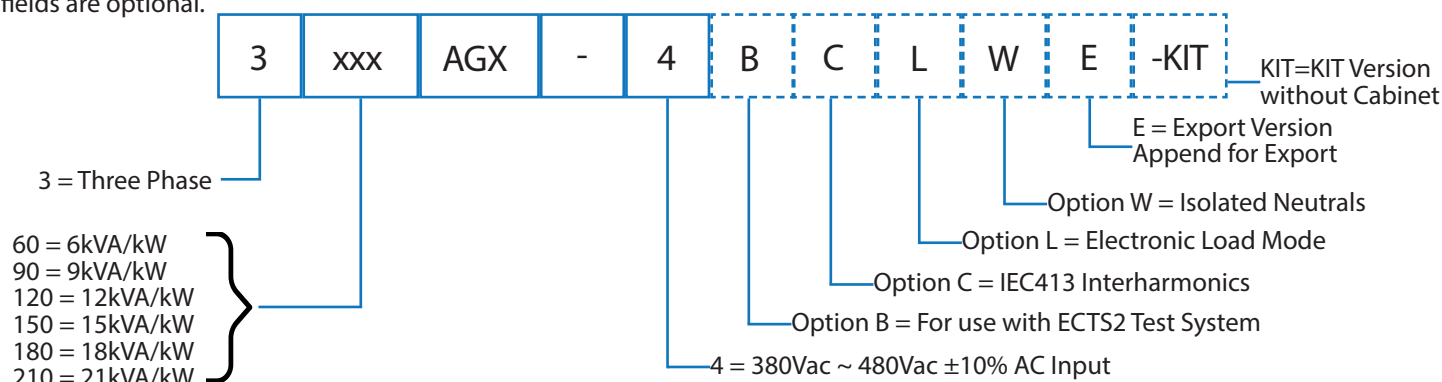
AGX Series Models

Single Unit Models (Bench or 19" Rack)		Parallel System Kits		Options
360AGX-4	3150AGX-4	3240AGX-4-KIT	3840AGX-4-KIT	B-For use with ECTS2 Systems
390AGX-4	3180AGX-4	3300AGX-4-KIT	31050AGX-4-KIT	C-IEC 61000-4-13 Option
3120AGX-4	3210AGX-4	3360AGX-4-KIT	31260AGX-4-KIT	L-Electronic Load Option
		3420AGX-4-KIT	31470AGX-4-KIT	W-Wiring Isolated Output Neutrals
		3630AGX-4-KIT	31680AGX-4-KIT	E-Export Version

Auxiliary Models (No Controller)

AGX Series Model Number Encoder:

Note: Solid outlined fields must be specified. Dashed outlined fields are optional.



Order Example

3210AGX-4CLW

- Bench Model, 21 kVA, 3-Phase, AC & DC Regenerative Power Source with USB, RS232, LAN, GPIB & AUX I/O

Typical Delivery Items

- Power Source
- Rack Mount Handles
- Certificate of Compliance

Available Accessories

- Output shorting adapter for single phase output mode use. P/N 160086 (not for W)
- Paralleling Cable, 1 Ft. (Included with Aux NC models). P/N 778036
- Rack slides. P/N 703251

Software Options

Test Sequences

- IEC Test Suite - Includes IEC 61000-4-11p, IEC 61000-4-14, IEC 61000-4-17, IEC 61000-4-27p, IEC 61000-4-28, IEC 61000-4-29p and IEC 61000-4-34
- IEC 61000-4-13 (Option C)
- MIL-STD 1399-300B & -300-1 - US
- DoD, Shipboard Power, AC Power Groups
- IEEE 1547.1-2020
- Semi-F47-0706
- KS C 9610-4-11, KS C 9610-4-29

Test Sequences - Avionics

- ABD0100.1.8 - Airbus A380, AC & DC Power Groups
- ABD0100.1.8.1 - Airbus A350, AC & DC Power Groups
- AMD24C - Airbus A400M, AC & DC Power Groups
- Boeing 787B3-0147 - B787, AC & DC Power Groups
- MIL-STD704 - US DoD, AC & DC Power Groups
- RTCA-DO160 Section 16, AC & DC Power Groups

Test Sequence Options require use of the standard SmartSource Suite via LAN or USB, or PPSC Test Manager Windows Software. Contact factory for details.

Service & Support

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CHINA

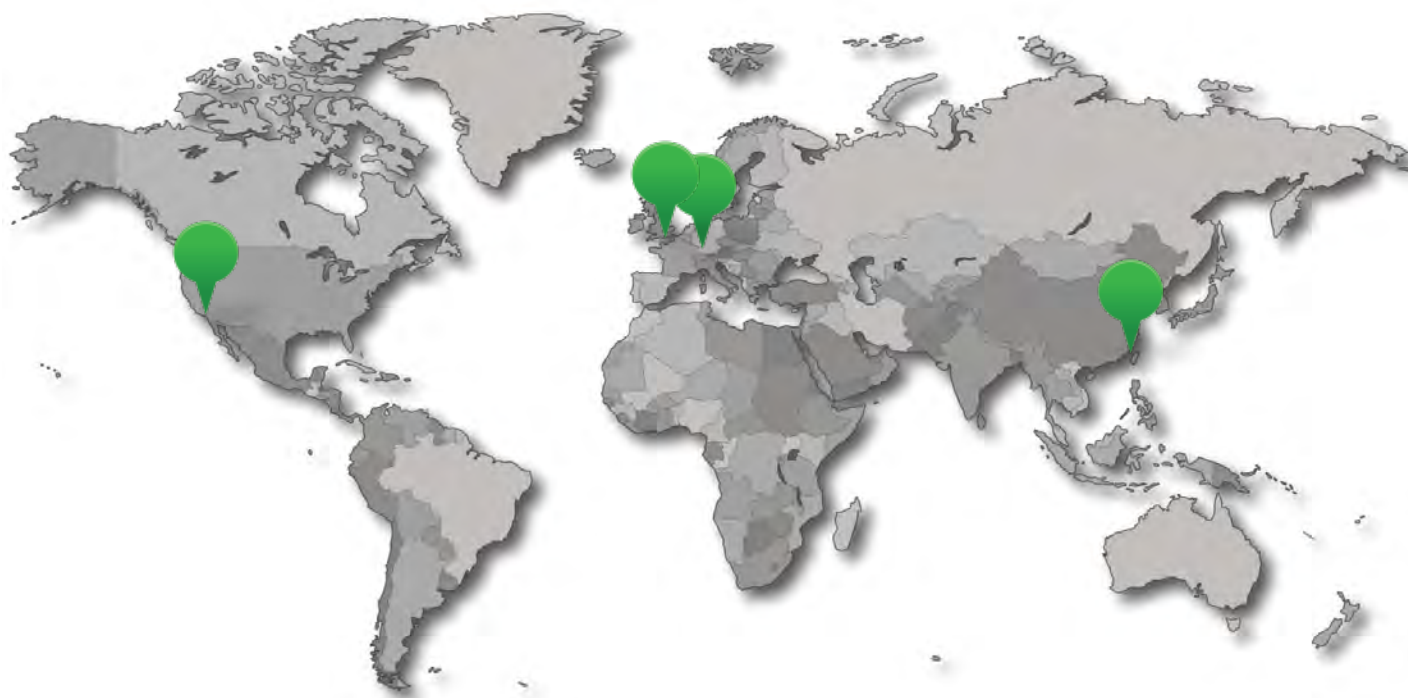
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