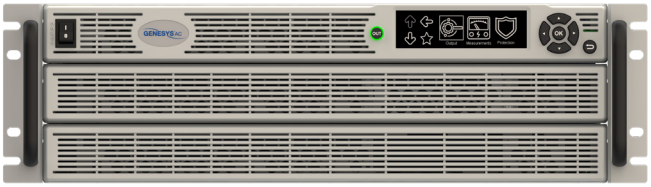
TDK·Lambda GENESYS™ AC Series

6kVA and 9kVA AC Programmable Power Sources

GENESYS™ AC

Medical Industrial Test COTS COMM **Marine**



Compact and easy to use, the Genesys AC programmable 3U AC Power Sources offer 6 and 9kVA in single, split, or three-phase user controlled configurations. Offering a wide, 0-350Vac single range output in all models and up to 606 Vac L-L in three phase configurations. The GAC-PRO models additionally include ±500Vdc capability, allowing AC, DC and AC+DC operation. Multiple remote programming interfaces built-in; LAN, USB, RS232 & RS485, with remote GUI, webpage, LabView and SCPI drivers included. Isolated analogue interfaces allow analog control and, analog output for monitoring, as well as a number of in/out triggers and relays. The GENESYS™ AC PRO models include real time analog control functionality necessary for more complex test scenarios such as PHIL. The Genesys AC series has a full colour LCD, multi-language, touch panel display for ease of use with intuitive menus, settings and data displays.

Features	Benefits
• 3U high	• Less Rack Space Used
• Full Colour Touch Panel Display	• Easy to Read and Program
• Built-in USB, LAN, RS-232 & RS-485 (plus others) Interfaces	• No Additional Cost
• Parallelable to 27kVA single and multi-phase	• Scalable for Larger Systems and Multiple Phase Operation
• Five Year Warranty	• Low Cost of Ownership

GAC-PRO - 03 B A 1 A - 00 A 00 A

Series Name
GAC
GAC-PRO

Front Panel Type/Color
A - Full Panel (Grey)
B - Full Panel (Black)
C - Blank Panel (Grey)
D - Blank Panel (Black)

Communication Interface
1 - Built-in RS232, RS485, USB, LAN

Frequency Limit
A - AC Mode, 1200Hz
B - AC + DC Mode, 1200Hz*
C - AC + DC Mode, 5000Hz*

Accessories
A - None

Additional Options
00 - None

Apparent Output Power
02 = 2kVA
03 = 3kVA
06 = 6kVA
09 = 9kVA

Input Voltage
A - 85-265Vac single phase **
B - 170-265Vac 3-phase
C - 342-528Vac 3-phase

** 2kVA, 3kVA only

Avionic Standards *(GAC-PRO Only)
00 - None
01 - RTCA/DO 160
02 - MIL-STD 704
03 - A350 (Airbus ABD100.1.8.1)
04 - RTCA/DO 160 & MIL-STD 704
05 - RTCA/DO 160 & A350 (Airbus ABD100.1.8.1)
06 - MIL-STD 704 & A350 (Airbus ABD100.1.8.1)
07 - RTCA/DO 160 & MIL-STD 704 & A350 (Airbus ABD100.1.8.1)

*(GAC-PRO Only)

IEC & Other Standards	
A - None	
B - IEC61000-4-11	GAC-PRO Only*
C - IEC61000-4-13	GAC-PRO Only*
D - MIL-STD-1399-300 PART 1	GAC-PRO Only*
E - IEC61000-4-11 & IEC61000-4-13	GAC-PRO Only*
F - IEC61000-4-11 & MIL-STD-1399-300 PART 1	GAC-PRO Only*
G - IEC61000-4-13 & MIL-STD-1399-300 PART 1	GAC-PRO Only*
H - IEC61000-4-11 & IEC61000-4-13 & MIL-STD-1399-300 PART 1	GAC-PRO Only*
I - Wave Generator & Harmonic Analysis	GAC ONLY
J - IEC61000-4-11 & Wave Generator & Harmonic Analysis	GAC ONLY
K - IEC61000-4-13 & Wave Generator & Harmonic Analysis	GAC ONLY
L - IEC61000-4-11 & IEC61000-4-13 & Wave Generator & Harmonic Analysis	GAC ONLY

Specification

Model			6kVA 1200Hz 6kVA 5000Hz	9kVA 1200Hz 9kVA 5000Hz	Notes
AC Input					
Nominal Input Voltage		Vac	3-Phase 200: 190 – 240 3-Phase 480: 380 – 480		
Input Voltage Range		Vac	3-Phase 200: 190 – 240 3-Phase 480: 380 – 480		
Maximum Input Current		A	3-Phase 200Vac: 22.4 at 200Vac 3-Phase 480Vac: 12 at 380Vac	3-Phase 200Vac: 33.6 at 200Vac 3-Phase 480Vac: 18 at 380Vac	
Input Frequency		Hz	Nominal: 50 – 60, Frequency range: 47 – 63		
Power Factor		%	3-Phase: 0.92	3-Phase: 0.94	Typical at rated output power, rated output current. DC mode or sine wave the load power factor is 1
Efficiency		%	3-Phase: 79	3-Phase: 82.5	Typical at rated output power, rated output current, DC mode or sine wave, load power factor is 1 3-Phase 200V models at 200Vac input, 3-Phase 480V at 380Vac input.
Hold Up Time (typ)		ms	≥10	≥10	Typical at rated output power, rated output current. DC mode or sine wave the load power factor is 1
Inrush Peak Current		A	<156	<156	Not including the EMI filter inrush current, less than 0.2ms.
Programming					
AC Output Voltage					Combined with AC and DC output, the peak voltage must be between -500V to +500V
Rated RMS Output Voltage		V	350 Line-Neutral		Minimum voltage is guaranteed to a maximum 0.1% of the rated output voltage (350Vac, 500Vdc)
Setting Range		V	0 – 350.2		Maximum RMS voltage setting range is associated with the output current setting. When the output current setting is above 5.714A per-phase & 17.4A for Paralleled for 6kVA, or 8.571A per-phase & 25.7A Parralled for 9kVA, the output voltage setting is limited to rated output power.
Programming Resolution		V	≤0.02		
Programming Accuracy		%	16 – 1200Hz: ≤0.2, 1200.1 – 5000Hz: ≤0.4		
AC Output Current					
Rated Output RMS current	One-Phase Three-Phase	A	60 20	90 30	
Peak Repetitive Current (Max Crest Factor)	Single-Phase Three-Phase	A peak (CF)	360 (6:1) 120 (6:1)	360 (4:1) 120 (4:1)	
Setting Range	One-Phase Three-Phase	A	3 – 60.6 1 – 20.2	4.5 – 90.6 1.5 – 30.2	Maximum RMS current setting range is associated with the output current setting. When the output current setting is above 4A per per channel for 6kW, 12A for Paralleled Channels, or 6Aper channel for 9kW, 18A for Paralleled, the output voltage setting is limited to rated output power. Refer to Figure 2 and Figure 4.
AC Output Power					
Rated Output Apparent Power		VA	6000	9000	
Load Power Factor		-	0 – 1 (leading or lagging)		
Frequency					
Range		Hz	Standard Models 16-1200, 5000Hz PRO models: 16 – 5000		
Programming Resolution		Hz	16 – 1200Hz: 0.01, 1200.1 – 5000Hz: 0.1		
Programming Accuracy		%	≤0.01		

Specification

Model			6kVA 1200Hz 6kVA 5000Hz	9kVA 1200Hz 9kVA 5000Hz	Notes
DC Output Voltage					
Rated Output DC Voltage		Vdc	±500		Minimum voltage is guaranteed to maximum 0.1% of rated output voltage (350Vac, 500Vdc)
DC Voltage Setting Range		Vdc	-500 to +500		Maximum DC voltage setting range is associated with the output current setting. When the output current setting is above 4A per per channel for 6kW, 12A for Paralleled Channels, or 6Aper channel for 9kW, 18A for Paralleled , the output voltage setting is limited to rated output power. Refer to Figure 2 and Figure 4.
Programming Resolution		Vdc	≤0.02		
Programming Accuracy		%	≤0.15		
DC Output Current					
Rated Output Current	Separate Channels Paralleled Channels	Adc	20 60	30 90	Minimum current is guaranteed to maximum 0.2% of rated output current.
Setting Range	Separate Channels Paralleled Channels	Adc	1 – 20.2 3 – 60.6	1.50 – 30.2 4.5 – 90.6	Maximum DC current setting range is associated with the output voltage setting. When the output voltage setting is above 100VDC, the output current setting is limited to rated output power.
DC Output Power					
Rated Output Power		W	6000	9000	

Specification

Model		6kVA 1200Hz 6kVA 5000Hz	9kVA 1200Hz 9kVA 5000Hz	Notes
Output Voltage				
AC Voltage Resolution	V	≤0.02		
AC Voltage Accuracy	%	16 – 1200Hz: ≤0.2, 1200.1 – 5000Hz: ≤0.4		
DC Voltage Resolution	Vdc	≤0.02		
DC Voltage Accuracy	%	≤0.02		
Output Current				
RMS Current Resolution	A	≤0.005		
RMS Current Accuracy	%	≤1	≤0.6	
DC Current Resolution	Adc	≤0.005		
DC Current Accuracy	%	≤1	≤0.6	
Peak Current Resolution	A (peak)	≤0.005		
Peak Current Accuracy	%	≤1.5		
Output Power				
Active (real) Power Resolution	W	≤0.2		
Active (real) Power Accuracy	%	AC: ≤2.25, DC: ≤4.5	AC: ≤1.5, DC: ≤3	
Apparent Power Resolution	W	≤0.2		
Apparent Power Accuracy	%	≤2.25	≤1.5	
Frequency				
Resolution	Hz	16 – 1200Hz: 0.01, 1200.1 – 5000Hz: 0.1		
Accuracy	%	≤0.1		Accuracy is guaranteed above 5% of rated output voltage.
Harmonics Measurement				
Fundamental Frequency	Hz	16 – 1000		
Harmonic Frequency / Harmonic #	Hz	32 – 50000 / 2 – 50		
Measurement Items	-	RMS Voltage, RMS current, phase angle and THD		

Specification

Model		6kVA 1200Hz 6kVA 5000Hz	9kVA 1200Hz 9kVA 5000Hz	Notes
Stability				
Line Regulation	%	≤0.02		
Load Regulation	%	≤0.03		Load power factor is 1.
Total Harmonic Distortion (THD)	%	16 – 500: ≤0.4, 500 – 1200: ≤0.7, 1200 – 5000: ≤1		Load power factor is 1.
Temperature Coefficient	ppm/°C	50		ppm/°C of rated output voltage, following 30 minutes warm-up.
Temperature Stability (voltage)	%	±0.05 of FS over 8 hours. Constant line, load, and temperature. Remote sense connected		
Warm-up Drift (voltage)	%	Less than 0.05% of rated output voltage over 30 minutes following power on		
Supplemental				
Crest Factor / Maximum peak current	-	6:1 (6 times the rated RMS output current) / 120A	4:1 (4 times the rated RMS output current) / 120A	
Ripple RMS	mVdc	≤500		
Transient Response Time	µs	≤40		Time for output voltage to recover within 0.5% of its rated output for a load change 10~90% of rated output current. Output set point: 10 – 100%, local sense, load power factor is 1.
Response Speed T(rise), T(fall)	µs	1200Hz models: ≤120; 5000Hz models: ≤40		At 10% to 90% of the output voltage.
Voltage Slew Rate (typical)	V/µs	1200Hz models: 4.4; 5000Hz models: 16.34		
DC Offset Voltage (typical)	mVdc	≤35		
Remote Sense Compensation	-	AC, AC+DC mode: 35Vrms, 50V (peak); DC Mode: 35Vdc		
Start-up Delay	seconds	<7		
Parallel Operation	-	Possible with GAC/P kit. Form 3-phase system or increase 1-phase output power		
Environmental				
Operating Temperature	°C / °F	0 – 40 / 32 – 104		
Storage Temperature	°C / °F	-30 – 85 / -22 – 185		
Operating Environment	-	Overvoltage category II, Indoor use		
Operating Humidity	%	20 – 90 RH (no condensation)		
Storage Humidity	%	10 – 95 RH (no condensation)		
Altitude	m / feet	Operating: 2000 / 6562, Non-operating: 12000 / 39370		
Protective Functions				
Foldback Protection	-	Output shutdown when power source changes mode from CV to CC mode or from CC to CV mode. User presetable		
Output Overvoltage Protection (OVP)	-	Output shutdown when overvoltage is sensed on the output. Programming range: 110%. Accuracy: ≤0.5%		
Output Overvoltage Protection (OVP) Type	-	RMS – Shutdown when RMS voltage exceeds OVP RMS setting. Peak – shut-down when peak voltage exceeds OVP Peak setting		
Overtemperature Protection (OTP)	-	Output shutdown when ambient temperature sensor or internal temperature sensors thresholds are exceeded		
Overcurrent Protection (OCP)	-	Output shutdown when peak overcurrent is sensed on the output. Programming range: Up to 120A.		
AC Input Protection	-	Fuse on each phase, two fuses in 1-Phase input, three fuses in 3-Phase input. Not user accessible		
Output Undervoltage Limit (UVL)	-	Prevents adjusting output voltage below limit		
Output Undervoltage Protection (UVP)	-	Output shutdown when undervoltage is sensed on the output		
Remote Control Interfaces (isolated from the output)				
USB	-	2.0, Full Speed, Virtual COM Port, Type B high retention connector		
RS232	-	Up to 921.6kbps with optional handshake (RTS/CTS), DB9 connector		
RS485	-	Up to 921.6kbps, full duplex (4-wire), DB9 connector (shared with RS232)		
LAN	-	10/100Mbps, Auto-MDIX, Auto-Negotiation, built-in web server		

Specification

Model		6kVA 1200Hz 6kVA 5000Hz	9kVA 1200Hz 9kVA 5000Hz	Notes
Signals and Controls (isolated from the output)				
Constant Voltage / Constant Current Monitor	-	Open collector. CC mode: On (0 – 0.6V). CV mode: Off. Maximum voltage: 30V. Maximum sink current: 10mA		
Power Supply OK #2 Monitor	-	Push pull. Output on: 4.5 – 5.5V. Output off: 0 – 0.6V. Maximum source / sink current: 10mA		
Power Supply OK #1 Monitor	-	Open collector. Output on: On (0 – 0.6V). Output off: Off. Maximum voltage: 30V. Maximum sink current: 10mA		
Trigger In Signals	-	Maximum low level input voltage: 0.8V. Minimum high level input voltage: 2.5V. Maximum high level input: 5V Positive edge trigger width: 10us minimum. Maximum Tr,Tf: 1us. Minimum delay between 2 pulses: 1ms		
Trigger Out Signals	-	Maximum low level output voltage: 0.6V. Minimum high level output voltage: 4.5V. Maximum high level output voltage: 5V Maximum source / sink current: 10mA. Minimum pulse width:100us		
Local / Remote Analog Programming Monitor	-	Open collector. Remote: On (0 – 0.6V). Local: Off. Maximum Voltage: 30V. Maximum sink current: 10mA		
Local / Remote Analog Programming Enable	-	Enable / Disable analog programming control by electrical signal or dry contact. Remote: On (0 – 0.6V) or short. Local: Off (2 – 30V) or open		
Enable / Disable (ENA) Power Source Output	-	Enable / Disable power source output by electrical signal or dry contact. Voltage levels: 0 – 0.6V or short, 2 – 30V or open User selectable output on / off logic		
Interlock (ILC) Inhibit Power Source Output	-	Enable / Disable power source output by electrical signal or dry contact. Output on: 0 – 0.6V or short. Output OFF: 2 – 30V or open		
Programmed Signals	-	Two open drain programmable signals. Maximum voltage: 25V. Maximum sink current: 100mA		
AC Input Voltage OK Monitor	-	Open collector. AC input voltage OK: 0 – 0.6V. AC input voltage not OK: Off. Maximum voltage: 30V. Maximum sink current: 10mA		
Alarm (Fault) Monitor	-	Open collector. No faults: 0 – 0.6V. power source fault: Off. Maximum voltage: 30V. Maximum sink current: 10mA		
Emergency Power Off (EPO)	-	Enable / Disable power source output by electrical signal or dry contact. Output on: 0 – 0.6V or short. Output OFF: 2 – 30V or open		
Analog programming and monitoring (isolated from the output)				
Output Voltage Programming	-	Full mode range: ±0 – 10V. RMS mode range: 0 – 10V. User selectable range: ±2.5 – 10V. Accuracy: 0.3%		RMS mode, programming and monitoring.
Output Voltage Monitoring	-	Full mode range: ±0 – 10V. RMS mode range: 0 – 10V. User selectable range: ±2.5 – 10V. Accuracy: 0.4%		RMS mode, programming and monitoring.
Output Current Monitoring	-	Full mode range: ±0 – 10V. RMS mode range: 0 – 10V. User selectable range: ±2.5 – 10V. Accuracy: 2kVA - ≤1.3%; 3kVA - ≤0.9%		RMS mode, programming and monitoring.

Specification

Model		6kVA 1200Hz 6kVA 5000Hz	9kVA 1200Hz 9kVA 5000Hz	Notes
Software / Firmware Test Sequences				
RTCA/DO 160	-	Environmental conditions and test procedures for airborne equipment		Available in Genesys AC Pro (must be acquired)
MIL-STD 704	-	Aircraft electric power characteristics		
A350 (Airbus ABD100.1.8.1)	-	Electric characteristics of A350 AC and DC equipment		
MIL-STD-1399-300 PART 1	-	Low voltage electric power, alternating current		
IEC61000-4-11	-	Voltage dips, short interruptions and voltage variations immunity		Available in Genesys AC and Genesys AC Pro (must be acquired)
IEC61000-4-13	-	Harmonics and interharmonics including mains signalling at a.c. power port		
IEC61000-4-14	-	Voltage fluctuation immunity test for equipment with input current not exceeding 16 A per phase		Available in Genesys AC and Genesys AC Pro. Wave Generator & Harmonic Analysis must be acquired acquired in Genesys AC.
IEC61000-4-17	-	Ripple on d.c. input power port immunity		
IEC61000-4-27	-	Unbalance, immunity test for equipment with input current not exceeding 16 A per phase		
IEC61000-4-28	-	Variation of power frequency, immunity test for equipment with input current not exceeding 16 A per phase		
IEC61000-4-29	-	Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests		
IEC61000-4-34	-	Voltage dips, short interruptions and voltage variations immunity tests for equipment with mains current more than 16 A per phase		

Output Characteristics

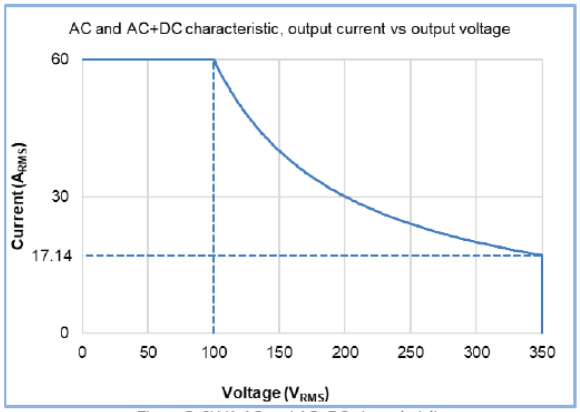


Figure 5: 6kVA AC and AC+DC characteristic

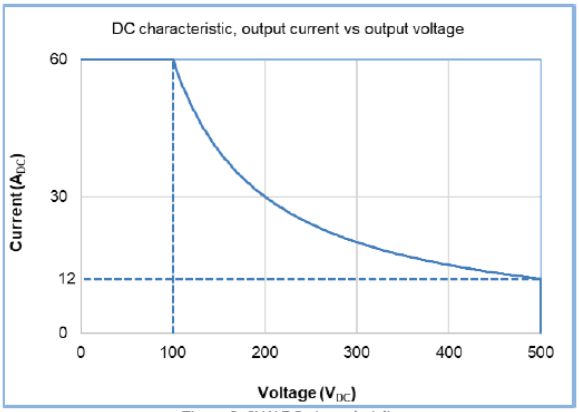


Figure 6: 6kW DC characteristic

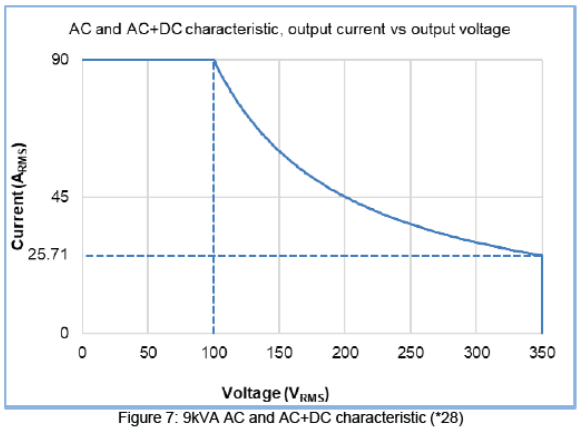


Figure 7: 9kVA AC and AC+DC characteristic (*28)

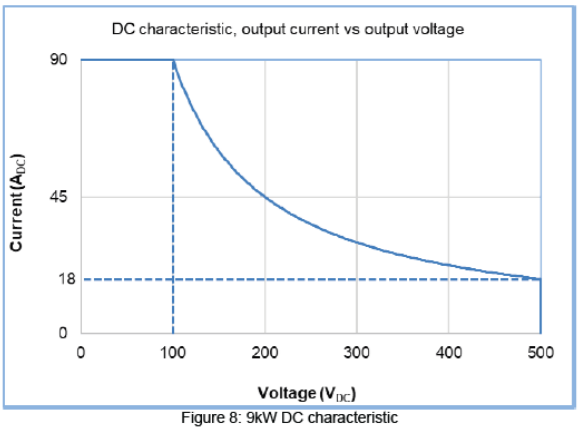


Figure 8: 9kW DC characteristic

Measurement

Model		6kVA 1200Hz 6kVA 5000Hz	9kVA 1200Hz 9kVA 5000Hz	Notes
Mechanical				
Cooling	-	Forced air cooling by internal fans. Airflow direction: From front panel to power supply rear		
Weight	kg	≤25		
Dimensions	mm	Without strain relief: W: 423, H: 132.5, D: 649.7, With strain relief: W: 423, H: 132.5, D: 755.5		
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 4.5.5.4.1		
Transportation Integrity	-	ISTA 1A		
Regulatory Compliance (safety / EMC)				
Safety	-	IEC/UL/EN 61010-1 Ed. 3 (cTUVus, T-Mark, CE/UKCA)		Class I; Pollution Degree 2.
Interface Classification	-	Input, output (including sense), J9 and J10 are hazardous; J1, J2, J3, J4, J5, J6, J7 and J8 are non-hazardous		
Withstand Voltage	Vdc 1min	Input – Output (including sense), J1, J2, J3, J4, J5, J6, J7, J8, J9 and J10: 4000 Output (including sense), J9 and J10 – J1, J2, J3, J4, J5, J6, J7 and J8: 3850 Output (including sense), J9 and J10 – Ground: 3060 Input – Ground: 2835		
Isolation resistance	MΩ	>100 at 25°C, 70%RH, output to ground 500Vdc		
Isolation to Ground	V	350Vac, 500Vdc		
EMC General	-	EN 61326-1:2021		
Immunity	-	EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11		
Conducted and Radiated Emissions	-	CISPR11 Class A		

Outline Drawing