GEN5KW SERIES
Laboratory Power Supplies: 5KW

Features

- High Power Density 5KW in 2U
- 3 phase input 208VAC or 415VAC
- Power Factor Correction
- Output voltage up to 600V, current up to 600A
- Built-in RS232 / RS-485 Interface Standard
- Last Setting Memory: Front Panel Lockout
- Parallel Operation / Master Slave with up to four units
- Reliable Encoders for Voltage & Current adjustment
- Independent Remote ON/OFF and Remote Enable / Disable
- External Analog programming & Monitoring (0-5V or 0-10V)
- Auto Re-Start / Safe-Start: user selectable
- Optional Interfaces :

> LXI Compliant LAN
> Isolated Analog Programming & Monitoring Interface
> IEEE Multi-Drop –SCPI, USB interface
> Labview & LabWindows drivers

Model Table Selection:

Model	Output		Power
	V	A	W
GEN8-600	0 – 8V	0 – 600A	4800W
GEN10-500	0 – 10V	0 – 500A	5000W
GEN16-310	0 – 16V	0 – 310A	5000W
GEN20-250	0 – 20V	0 – 250A	5000W
GEN30-170	0 – 30V	0 – 170A	5000W
GEN40-125	0 – 40V	0 – 125A	5000W
GEN60-85	0 – 60V	0 – 85A	5100W

Model	Output		Power
	V	A	W
GEN80-65	0 – 80V	0 – 65A	5200W
GEN100-50	0 – 100V	0 – 50A	5000W
GEN150-34	0 – 150V	0 – 34A	5100W
GEN200-25	0 – 200V	0 – 25A	5000W
GEN300-17	0 – 300V	0 – 17A	5100W
GEN400-13	0 – 400V	0 – 13A	5200W
GEN500-10	0 – 500V	0 – 10A	5000W
GEN600-8.5	0 – 600V	0 – 8.5A	5100W

How to order:

GEN   8   600 -   IEE -   3P4000

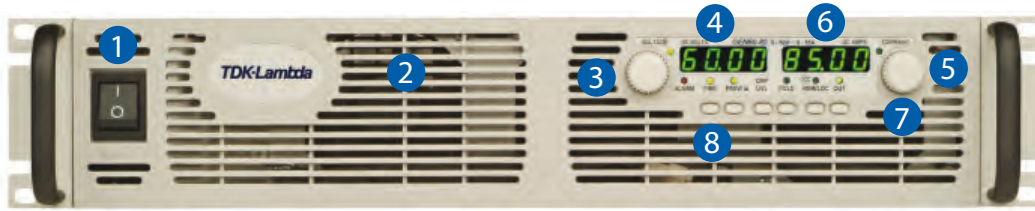| Series Name	Output Voltage	Output Current	Options	AC Input Options
			IEEE	3P208 (170-265V)
			IS510	3P400 (342-460V)
			IS420	
			LAN	

Options:

3phase 208VAC) - **3P208**
3phase 400VAC) (Australian Standard) -**3P400**

RS232 / RS-485 Interface built-in (Standard)
GPIB (Multi-Drop Master Interface) – **IEEE**
Voltage Programming Isolated Analaog Interface – **IS510**
Current Programming Isolated Analog Interface - **IS420**
LAN Interface (complies with LXI Class C)   - **LAN**

Front Panel Description

1. ON/OFF Switch
2. Air Intake allows zero stacking for maximum system flexibility and power density.
3. Reliable encoder controls Output Voltage, Address, OVP and UVL settings.
4. Volt Display shows Output Voltage and directly displays OVP, UVL and Address settings.
5. Reliable encoder controls Output Current, sets baudrate and Advanced Parallel mode.
6. Current Display shows Output Current and displays Baud rate.
   Displays total current in Parallel Master/Slave Mode
7. Function/Status LEDs:

   - Alarm   - Fine Control   - Preview Settings
   - Foldback Mode   - Remote Mode   - Output On

8. Pushbuttons allow flexible user configuration
   - Coarse and Fine adjustment of Output Voltage/Current and Advanced Parallel Master or Slave
   - Preview settings and set Voltage/Current with Output OFF, Front Panel Lock
   - Parallel Master/Slave
   - Set OVP and UVL Limits
   - Set Current Foldback Protection
   - Go to Local Mode and select Address and Baud rate
   - Output ON/OFF and Auto/Safe Re-Start Mode

Rear Panel Description

1. Remote/Local Output Voltage Sense Connections.
2. DIP Switches select 0-5V or 0-10V Programming and other functions.
3. DB25 (Female) connector allows (Non-isolated) Analog Program and Monitor and other functions.
4. RS-485 OUT to other Genesys™ Power Supplies.
5. RS-232/RS-485 IN Remote Serial Programming.
6. Output Connections: Rugged busbars (shown) for up to 100V Output; wire clamp connector for Outputs >100V.
7. Exit air assures reliable operation when zero stacked.
8. Input: 230VAC Single Phase (shown), 208 & 400VAC Three Phase, 50/60 Hz
   AC Input Connector: PHOENIX CONTACT Power Combicon PC 6/... Series with strain relief.
9. Optional Interface Position for IEEE 488.2 SCPI (shown) or Isolated Analog Interface or LAN Interface.

Genesys ™ 5kW Specifications

1.0 MODEL — Specifications in Blue are improved

MODEL	GEN	8-600	10-500	16-310	20-250	30-170	40-125	60-85	80-65	100-50	150-34	200-25	300-17	400-13	500-10	600-8.5
1.Rated output voltage(*1)	V	8	10	16	20	30	40	60	80	100	150	200	300	400	500	600
2.Rated Output Current(*2)	A	600	500	310	250	170	125	85	65	50	34	25	17	13	10	8.5
3.Rated Output Power	W	4800	5000	4960	5000	5100	5000	5100	5200	5000	5100	5000	5100	5200	5000	5100

1.1 CONSTANT VOLTAGE MODE

		8-600	10-500	16-310	20-250	30-170	40-125	60-85	80-65	100-50	150-34	200-25	300-17	400-13	500-10	600-8.5
1.Max.line regulation (0.01% of rated Vo)(*6)	mV	0.8	1.0	1.6	2	3	4	6	8	10	15	20	30	40	50	60
2.Max.load regulation (0.015% of rated Vo+5mV)(*7)	mV	6.2	6.5	7.4	8	9.5	11	14	17.7	20	27.5	35	50	65	80	95
3.Ripple and noise p-p 20MHz (*8)	mV	75	75	70	75	70	70	70	80	90	120	200	200	350	300	450
4.Ripple r.m.s 5Hz~1MHz	mV	8	8	10	10	10	8	8	15	15	20	45	60	70	70	100
5.Remote sense compensation/wire	V	2	2	2	2	5	5	5	5	5	5	5	5	5	5	5
6.Temp. coefficient	PPM/°C	50PPM/°C of rated output voltage, following 30 minutes warm-up														
7.Temp. stability		0.01% of rated Vout over 8hrs interval following 30 minutes warm-up. Constant line, load & temp.														
8.Warm-up drift		Less than 0.05% of rated output voltage+2mV over 30 minutes following power On.														
9.Up-prog.response time, 0~Vo Rated (*9)	mS	30								50				65	80	100
10.Down-prog response time / Full-load (*9)	mS	15	50			80				100				135	170	200
10.Down-prog response time / No-load (*10)	mS	400	500	600	700	800	900	1000	1200	1500	2000	2000	2500	3000	3000	3000
11.Transient response time	mS	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. Less than 1mSec for models up to and including 100V. 2msec for models above 100V														

1.2 CONSTANT CURRENT MODE

		8-600	10-500	16-310	20-250	30-170	40-125	60-85	80-65	100-50	150-34	200-25	300-17	400-13	500-10	600-8.5
1.Max.line regulation (0.05% of rated Io)(*6)	mA	300	250	155	125	85	62.5	42.5	32.5	25	17	12.5	8.5	6.5	5	4.25
2.Max.load regulation (0.1% of rated Io)(*11)	mA	600	500	310	250	170	125	85	65	50	34	25	17	13	10	8.5
3.Ripple r.m.s 5Hz~1MHz . (*12)	mA	1700	1600	1000	700	350	180	120	80	50	50	50	20	15	10	10
4.Load regulation thermal drift		Less than 0.1% of rated output current over 30 minutes following load change.														
5.Temp. coefficient	PPM/°C	70PPM/°C from rated output current, following 30 minutes warm-up.														
6.Temp. stability		0.01% of rated Iout over 8hrs. interval following 30minutes warm-up. Constant line, load & temperature.														
7.Warm-up drift		8V~16V models: Less than ±0.5% of rated output current over 30 minutes following power On. 20V~600V models: Less than ±0.25% of rated output current over 30 minutes following power On.														

1.3 PROTECTIVE FUNCTIONS

1. OCP	0~105% Constant Current
2. OCP Foldback	Output shut down when power supply change from CV to CC. User selectable.
3. OVP type	Inverter shut-down, manual reset by AC input recycle or by OUT button or by communication port command.
4. OVP trip point	0.5~10V 0.5~12V 1~19V 1~24V 2~36V 2~44V 5~66V 5~88V 5~110V 5~165V 5~220V 5~330V 5~440V 5~550V 5~660V
5. Output Under Voltage Limit	Preset by front panel or communication port. Prevents from adjusting Vout below limit.
6. Over Temp. Protection	User selectable , latched or non-latched.

1.4 ANALOG PROGRAMMING AND MONITORING

1.Vout Voltage Programming	0~100%, 0~5V or 0~10V, user select. Accuracy and linearity:±0.5% of rated Vout.
2.Iout Voltage Programming (*13)	0~100%, 0~5V or 0~10V, user select. Accuracy and linearity:±1% of rated Iout.
3.Vout Resistor Programming	0~100%, 0~5/10Kohm full scale,user select.,Accuracy and linearity: ±1% of rated Vout.
4.Iout Resistor Programming (*13)	0~100%, 0~5/10Kohm full scale,user select. Accuracy and linearity:±1.5% of rated Iout.
5.On/Off control (rear panel)	By electrical. Voltage: 0~0.6V/2~15V,or dry contact ,user selectable logic.
6.Output Current monitor (*13)	0~5V or 0~10V , Accuracy:±1% , user selectable.
7.Output Voltage monitor	0~5V or 0~10V ,Accuracy:±1% ,user selectable.
8.Power Supply OK signal	TTL high (4~5V) -OK, 0V-Fail 500ohm series resistance.
9. CV/CC Indicator	Open collector, CC mode: On, CV mode: Off, Maximum voltage: 30V, maximum sink current: 10mA
10. Enable/Disable	Dry contact. Open:off , Short: on. Max. voltage at Enable/Disable in: 6V.
11. Local/Remote analog control	By electrical signal or Open/Short: 0~0.6V or short: Remote, 2~15V or open: Local.
12. Local/Remote analog control Indicator	Open collector, Local: Off, Remote: On. Maximum voltage: 30V, maximum sink current: 10mA.

1.5 FRONT PANEL

1.Control functions	Vout/ Iout manual adjust by separate encoders (coarse and fine adjustment selectable). OVP/UVL manual adjust by Volt. Adjust encoder. On/Off, Output on/off, Re-start modes (auto, safe), Foldback control (CV to CC), Go to local control. Address selection by Voltage (or current) adjust encoder. Number of addresses:31. Re-start modes (automatic restart, safe mode). Baud rate selection: 1200,2400,4800,9600 and 19,200.
2.Display	Voltage: 4 digits , Accuracy: 0.05% of rated output Voltage ±1 count. Current: 4 digits, Accuracy: 0.2% of rated output current ±1 count
3.Indications	Voltage, Current, Alarm, Fine, Preview, Foldback, Local, Output On, Front Panel Lock, CVCC.

1.6 Interface Specifications for the GENESYS Series with RS-232/RS-485 Or Optional GPIB/LAN Interface Installed

1. Remote Voltage Programming (16 bit)	V	8	10	16	20	30	40	60	80	100	150	200	300	400	500	600
Resolution (0.002% of Vo Rated)	mV	0.16	0.20	0.32	0.40	0.60	0.80	1.20	1.60	2.0	3.0	4.0	6.0	8.0	10.0	12.0
Accuracy (0.05% of Vo Rated) (*14)	mV	4	5	8	10	15	20	30	40	50	75	100	150	200	250	300
2. Remote Current Programming (16 bit)																
Resolution (0.002% of Io Rated)	mA	12	10	6.20	5.00	3.40	2.50	1.70	1.30	1.00	0.68	0.50	0.34	0.26	0.20	0.17
Accuracy (0.3% of Io Rated+0.1% of Io Actual Output) (*13)	mA	2400	2000	1240	1000	680	500	340	260	200	136	100	68	52	40	34
3. Readback Voltage																
Resolution (% of Vo Rated)	%	0.002	0.011	0.007	0.006	0.004	0.003	0.002	0.002	0.011	0.007	0.006	0.004	0.003	0.003	0.002
Resolution (Readback Voltage)	mV	0.16	1.10	1.12	1.20	1.20	1.20	1.20	1.60	11.00	10.50	12.00	12.00	12.00	15.00	12.00
Accuracy (0.05%Vo Rated)	mV	4	5	8	10	15	20	30	40	50	75	100	150	200	250	300
4. Readback Current																
Resolution (% of Io Rated)	%	0.002	0.003	0.004	0.005	0.006	0.009	0.002	0.002	0.003	0.004	0.005	0.006	0.008	0.011	0.002
Resolution (Readback Current)	mA	12.00	15.00	12.40	12.50	10.20	11.25	1.70	1.30	1.50	1.36	1.25	1.02	1.04	40	34
Accuracy (0.3% of Io Rated) (*13)	mA	1800	1500	930	750	510	375	255	195	150	102	75	51	39	30	25.5
5. OVP/UVL Programming																
Resolution (0.1% of Vo Rated)	mV	8	10	16	20	30	40	60	80	100	150	200	300	400	500	600
Accuracy (1% of Vo Rated)	mV	80	100	160	200	300	400	600	800	1000	1500	2000	3000	4000	5000	6000

*1: Minimum voltage is guaranteed to maximum 0.2% of rated output voltage.
*2: Minimum current is guaranteed to maximum 0.4% of rated output current.
*3: For cases where conformance to various safety standards (UL, IEC, etc) is required, to be described as 190-240Vac (50/60Hz) for 3-Phase 208V models, and 380~415Vac (50/60Hz) for 3-Phase 400V models.
*4: 3-Phase 208V models: At 208Vac input voltage, 3-Phase 400V: At 380Vac input voltage. With rated output power.
*5: Not including EMI filter inrush current, less than 0.2mSec.
*6: 3-Phase 208V models: 170~265Vac, constant load. 3-Phase 400V models: 342~460Vac, constant load.
*7: From No-Load to Full-Load, constant input voltage. Maximum drop in Remote Sense.

*8: For 8V~300V models: Measured with JEITA RC-9131A (1:1) probe. For 600V model: Measured with 10:1 probe.
*9: From 10% to 90% or 90% to 10% of Rated Output Voltage, with rated, resistive load.
*10:From 90% to 10% of Rated Output Voltage.
*11: For load voltage change, equal to the unit voltage rating, constant input voltage.
*12: For 8V~16V models the ripple is measured from 2V to rated output voltage and rated output current. For other models, the ripple is measured at 10~100% of rated output voltage and rated output current.
*13: The Constant Current programming readback and monitoring accuracy does not include the warm-up and Load regulation thermal drift.
*14: Measured at the sense point.

General Specifications Genesys™ 5kW

2.1 INPUT CHARACTERISTICS		GEN	8-600	10-500	16-310	20-250	30-170	40-125	60-85	80-65	100-50	150-34	200-25	300-17	400-13	500-10	600-8.5
1. Input voltage/freq. (*3)		VAC	3-Phase, 208V models: 170~265Vac, 47~63Hz														
			3-Phase, 400V models: 342~460Vac, 47~63Hz														
2. Maximum Input current at 100% load	3-Phase, 208V models:	A	21	22	22	22	22	22	22	22	22	22	22	22	22	22	22
	3-Phase, 400V models:		10.5	11	11	12	11	11	11	11	11	11	11	11	11	11	11
3. Power Factor (Typ)			3-Phase models: 0.94@208/380Vac, rated output power.														
4. Efficiency (*4)		%	83	84	84	86	86	88	88	88	88	88	88	88	88	88	88
5. Inrush Current (*5)		A	3-Phase 208V models: Less than 50A														
			3-Phase 400V models: Less than 20A														

2.2 POWER SUPPLY CONFIGURATION	
1. Parallel Operation	Up to 4 identical units in master/slave mode
2. Series Operation	Up to 2 identical units. with external diodes. 600V Max to Chassis ground

2.3 ENVIRONMENTAL CONDITIONS	
1. Operating temp	0~50°C, 100% load.
2. Storage temp	-20~85°C
3. Operating humidity	20~90% RH (non-condensing).
4. Storage humidity	10~95% RH (non-condensing).
5. Vibration	MIL-810F, method 514.5 , The EUT is fixed to the vibrating surface.
6. Shock	Less than 20G , half sine , 11mSec. Unit is unpacked.
7. Altitude	Operating: 10000ft (3000m), Derate output current by 2%/100m above 2000m, Alternatively, derate maximum ambient temp. by 1°C/100m above 2000m. Non operating: 40000ft (12000m).
8. RoHS Compliance	Complies with the requirements of RoHS directive.

2.4 EMC	
1.Applicable Standards:	
2.ESD	IEC1000-4-2. Air-disch.-8KV, contact disch.-4KV
3.Fast transients	IEC1000-4-4. 2KV
4.Surge immunity	IEC1000-4-5. 1KV line to line, 2KV line to ground
5.Conducted immunity	IEC1000-4-6, 3V
6.Radiated immunity	IEC1000-4-3, 3V/m
7.Magnetic field immunity	EN61000-4-8, 1A/m
8.Voltage dips	EN61000-4-11
9.Conducted emission	EN55022A, FCC part 15-A, VCCI-A.
10. Radiated emission	EN55022A, FCC part 15-A, VCCI-A.

2.5 SAFETY	
1.Applicable standards:	UL 60950-1, CSA 22.2 No. 60950-1,IEC 60950-1, EN 60950-1
2.Interface classification	Models with Vout 50V: Output is SELV, all communication/control interfaces (RS232/485, IEEE, Isolated Analog, LAN, Sense, Remote Programming and Monitoring) are SELV.
	Models with 60V Vout 400V: Output is Hazardous, communication/control interfaces: RS232/485, IEEE, Isolated Analog, LAN, Remote Programing and Monitoring (pins 1-3, pins14-16) are SELV, Sense, Remote Programming and Monitoring (pins 8-13, pins 21-25) are Hazardous.
	Models with 400V<Vout 600V: Output is Hazardous, all communication/control interfaces (RS232/485, IEEE, Isolated Analog, LAN, Sense, Remote Programming and Monitoring) are Hazardous.
3.Withstand voltage	Vout 50V models : Input-Output (SELV): 4242VDC 1min, Input-communication/control (SELV): 4242VDC 1min, Input-Ground: 2828VDC 1min,
	60V<Vout 100V models: Input-Output (Hazardous): 2600VDC 1min, Input-communication/control (SELV): 4242VDC 1min, Output(Hazardous)-SELV: 1900VDC 1min, Output(Hazardous)-Ground: 1200VDC 1min, Input-Ground: 2828VDC 1min.
	100V< Vout 600V models: Input-Output(Hazardous): 3550VDC 1min, Input-communication/control (SELV): 4242VDC 1min, Hazardous. Output-communication/control(SELV): 4242VDC 1min, Output(Hazardous)-Ground: 2670VDC 1min, Input-Ground: 2828VDC 1min.
3.Insulation resistance	More than 100Mohm at 25°C , 70% RH.

2.6 MECHANICAL CONSTRUCTION	
1. Cooling	Forced air flow: from front to rear. No ventilation holes at the top or bottom of the chassis; Variable fan speed.
2. Dimensions (WxHxD)	W: 423mm, H: 88mm, D: 442.5mm (excluding connectors, encoders, handles, etc.)
3. Weight	13 kg.
4. AC Input connector (with Protective Cover)	Single Phase,230V models, Power Combicon PC 6-16/3-GF-10,16 series, with Strain relief.
	3-Phase, 208V & 400V models, Power Combicon PC 6-16/4-GF-10,16 series, with Strain relief.
5.Output connectors	8V to 100V models: Bus-bars (hole Ø 10.5mm). 150V to 600V models: wire clamp connector, Phoenix P/N: FRONT-4-H-7.62

2.7 RELIABILITY SPECS	
1. Warranty	5 years.

All specifications subject to change without notice.

Genesys™ Power Parallel and Series Configurations
Parallel operation - Master/Slave:

Active current sharing allows up to four identical units to be connected in an auto-parallel configuration for four times the output power.

In Advanced Parallel Master/Slave Mode, total current is programmed and reported by the Master, Up to four supplies act as one.

Series operation

Up to two units may be connected in series to increase the output voltage or to provide bipolar output. (Max 600V to Chassis Ground).

Remote Programming via RS-232 & RS-485 Interface
Standard Serial Interface allows daisy-chain control of up to 31 power supplies on the same communication bus with built-in RS-232 & RS-485 Interface.

Programming Options (Factory installed)
Digital Programming via IEEE Multi-Drop Interface   P/N: IEEE
- Allows IEEE Master to control up to 30 slaves over RS-485 daisy-chain
- Only the Master needs be equipped with IEEE Interface
- IEEE 488.2 SCPI Compliant
- Program Voltage   • Program Current
- Measure Voltage   • Measure Current
- Over Voltage setting and shutdown • Current Foldback shutdown
- Error and Status Messages

Isolated Analog Programming

Four Channels to Program and Monitor Voltage and Current.
Isolation allows operation with floating references in harsh electrical environments.
Choose between programming with Voltage or Current.
Connection via removable terminal block: Phoenix MC1,5/8-ST-3.81.
- Voltage Programming, user-selectable 0-5V or 0-10V signal.   P/N: IS510
  Power supply Voltage and Current Programming Accuracy ±1%
  Power supply Voltage and Current Monitoring Accuracy ±1.5%
- Current Programming with 4-20mA signal.   P/N: IS420
  Power supply Voltage and Current Programming Accuracy ±1%
  Power supply Voltage and Current Monitoring Accuracy ±1.5%

LAN Interface *LXI* Compliant to Class C   P/N: LAN
- Meets all LXI-C Requirements   • VISA & SCPI Compatible
- Address Viewable on Front Panel   • LAN Fault Indicators
- Fixed and Dynamic Addressing   • Auto-detects LAN Cross-over Cable
- Compatible with most standard Networks • Fast Startup
- TCP / UDP Socket Programming

Power Supply Identification / Accessories How to order

GEN	8	-	600	-		-	
					Factory Options:		Factory AC Input Options:
Series Name	Output Voltage (0~8V		Output Current (0~600A)		Option: IEEE IS510 IS420 LAN		3P208 (Three Phase 170~265VAC) 3P400 (Three Phase 342~460VAC)

Models 5kW

Model	Output Voltage VDC	Output Current (A)	Output Power (W)
GEN 8-600	0~8V	0~600	4800
GEN 10-500	0~10V	0~500	5000
GEN 16-310	0~16V	0~310	4960
GEN 20-250	0~20V	0~250	5000
GEN 30-170	0~30V	0~170	5100
GEN 40-125	0~40V	0~125	5000

Model	Output Voltage VDC	Output Current (A)	Output Power (W)
GEN 60-85	0~60V	0~85	5100
GEN 80-65	0~80V	0~65	5200
GEN 100-50	0~100V	0~50	5000
GEN 150-34	0~150V	0~34	5100
GEN 200-25	0~200V	0~25	5000
GEN 300-17	0~300V	0~17	5100
GEN 400-13	0~400V	0~13	5200
GEN 500-10	0~500V	0~10	5000
GEN 600-8.5	0~600V	0~8.5	5100

Factory option

	P/N
RS-232/RS-485 Interface built-in Standard	-
GPIB Interface	IEEE
Voltage Programming Isolated Analog Interface	IS510
Current Programming Isolated Analog Interface	IS420
LAN Interface (Complies with **LXI** Class C)	LAN

Accessories

1. Serial Communication cable

RS-232/RS-485 cable is used to connect the power supply to the Host PC.

Mode	RS-485	RS-232	RS-232
PC Connector Communication Cable Power Supply Connector	DB-9F Shield Ground L=2m EIA/TIA-568A (RJ-45)	DB-9F Shield Ground L=2m EIA/TIA-568A (RJ-45)	DB-25F Shield Ground L=2m EIA/TIA-568A (RJ-45)
P/N	GEN/485-9	GEN/232-9	GEN/232-25

2. Serial link cable*

Daisy-chain up to 31 Genesys™ power supplies.

Mode	Power Supply Connector	Communication Cable	P/N
RS-485	EIA/TIA-568A (RJ-45)	Shield Ground L=50cm	GEN/RJ45

* Included with power supply

Also available, Genesys™
1U Half Rack 750W
1U full Rack 750W/1500W/2400W
2U full Rack 3300W

Outline Drawing Genesys™ 5kW Units

Outline Drawing Genesys™ 5kW Units

NOTE
1. Bus bars for 8V to 100V models (shown)
Wire clamp connector for 150V to 600V models
2. Plug connectors included with the power supply
3. Chassis slides mounting holes #10-32 marked "A"
GENERAL DEVICES P/N: C-300-S-116 or equivalent