

**Improved  
Specifications**

# **Genesys™**

**Programmable DC Power Supplies  
5kW in 2U**

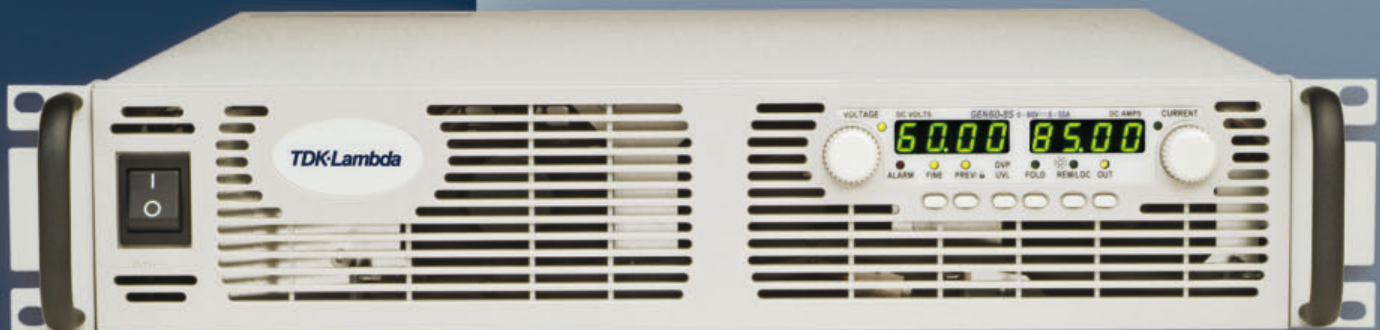
**Built in RS-232 & RS-485 Interface  
Advanced Parallel Operation**

**Optional Interface:**

**LXI Compliant LAN**

**IEEE488.2 SCPI (GPIB) Multi-drop**

**Isolated Analog Programming**



**Genesys™ Family**

**GENH 750W Half Rack**

**GEN1U 750/1500/2400W Full Rack**

**GEN2U 3.3/5kW**

## **TDK-Lambda**

The Genesys™ family of programmable power supplies sets a new standard for flexible, reliable, AC/DC power systems in OEM, Industrial and Laboratory applications.

## Features include:

- High Power Density 5kW in 2U
  - Wide Range of popular worldwide AC inputs, 3ø (208VAC, 400VAC)
  - Active Power Factor Correction (Three-Phase AC Input)
  - Output Voltage up to 600V, Current up to 600A
  - Built-in RS-232/RS-485 Interface Standard
  - Global Commands for Serial RS-232/RS-485 Interface
  - Auto-Re-Start / Safe-Start: user selectable
  - Last-Setting Memory
  - High Resolution 16 bit ADCs & DACs
  - Low Ripple & Noise
  - Front Panel Lock selectable from Front Panel or Software
  - Reliable Encoders for Voltage and Current Adjustment
  - Constant Voltage/Constant Current auto-crossover
  - Parallel Operation with Active Current Sharing; up to four identical units.
  - Advanced Parallel Master / Slave. Total Current is Programmed and Measured via the Master.
  - Independent Remote ON/OFF and Remote Enable/Disable
  - External Analog Programming and Monitoring (user selectable 0-5V & 0-10V)
  - Reliable Modular and SMT Design
  - 19" Rack Mount capability for ATE and OEM applications
  - Optional Interfaces
    - Isolated Analog Programming and Monitoring Interface (0-5V/0-10V & 4-20mA)
    - IEEE 488.2 SCPI (GPIB) Multi-Drop
    -  Compliant LAN
  - LabView® and LabWindows® drivers
  - Five Year Warranty
- Worldwide Safety Agency Approvals;  LISTED   

## Applications

Genesys™ power supplies have been designed to meet the demands of a wide variety of applications.

### Test & Measurement systems, Component Device Testing.

**Semiconductor Processing & Burn-In, Aerospace & Satellite Testing, Medical Imaging, Green Technology.** System Designers will appreciate new, standard, remote programming features such as Global commands. Also, new high-speed status monitoring is available for the RS-485 bus.

**Test Systems** using the IEEE-488 bus may achieve significant cost savings by incorporating the Optional IEEE Multi-Drop Interface for a Master and up to 30 RS-485 Multi-Drop Slaves.

**Higher power systems** can be configured with up to four 5kW modules. Each module is 2U with zero space between them (zero stack).

Flexible configuration is provided by the complete Genesys™ Family: 1U 750W Half-Rack, 1U 750W, 1500W and 2400W Full-Rack. All are identical in Front Panel, Rear Panel Analog, and all Digital Interface Commands.

**OEM Designers** have a wide variety of Inputs and Outputs from which to select depending on application and location.

## 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.

| 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                                                                                       |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |        |        |        |        |       |       |        |        |        |        |        |        |         |                                     |  |  |  |  |  |  |  |  |  |
| 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 J)(*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                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |        |        |        |        |       |       |        |        |        |        | 65     |        | 80      | 100                                 |  |  |  |  |  |  |  |  |  |
| 10.Down-prog response                                                                                           | mS            | 15                                                                                                                                                                                                                                                                                                                                                                                                                                               | 50     |        |        |        | 80     |       |       |        | 100    |        |        |        | 135    | 170     | 200                                 |  |  |  |  |  |  |  |  |  |
| time                                                                                                            | No-load (*10) | mS                                                                                                                                                                                                                                                                                                                                                                                                                                               | 400    | 500    | 600    | 700    | 800    | 900   | 1000  | 1200   | 1500   | 2000   | 2000   | 2500   | 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                                                                                       |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |        |        |        |        |       |       |        |        |        |        |        |        |         |                                     |  |  |  |  |  |  |  |  |  |
| 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     | 30     | 20     | 15     | 10     | 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.<br>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).<br>OVP/UVL manual adjust by Volt. Adjust encoder.<br>On/Off, Output on/off, Re-start modes (auto, safe), Foldback control (CV to CC), Go to local control.<br>Address selection by Voltage (or current) adjust encoder. Number of addresses:31.<br>Re-start modes (automatic restart, safe mode).<br>Baud rate selection: 1200,2400,4800,9600 and 19,200. |        |        |        |        |        |       |       |        |        |        |        |        |        |         |                                     |  |  |  |  |  |  |  |  |  |
| 2.Display                                                                                                       |               | Voltage: 4 digits , Accuracy: 0.05% of rated output Voltage ±1 count.<br>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<br>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<br>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.<br>Models with 60V Vout 400V: Output is Hazardous, communication/control interfaces: RS232/485, IEEE, Isolated Analog, LAN, Remote Programming and Monitoring (pins 1-3, pins14-16) are SELV, Sense, Remote Programming and Monitoring (pins 8-13, pins 21-25) are Hazardous.<br>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,<br>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.<br>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.<br>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

- 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
- Measure Voltage
- Over Voltage setting and shutdown
- Error and Status Messages
- Program Current
- Measure Current
- Current Foldback shutdown

P/N: IEEE

#### 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.  
Power supply Voltage and Current Programming Accuracy  $\pm 1\%$   
Power supply Voltage and Current Monitoring Accuracy  $\pm 1.5\%$
- Current Programming with 4-20mA signal.  
Power supply Voltage and Current Programming Accuracy  $\pm 1\%$   
Power supply Voltage and Current Monitoring Accuracy  $\pm 1.5\%$

P/N: IS510

P/N: IS420

#### LAN Interface Compliant to Class C

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

P/N: LAN

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

**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        | -     |
| GPIO Interface                                   | IEEE  |
| Voltage Programming Isolated Analog Interface    | IS510 |
| Current Programming Isolated Analog Interface    | IS420 |
| LAN Interface (Complies with <b>LXI</b> 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           | DB-9F                | DB-9F                | DB-25F               |
| Communication Cable    | Shield Ground L=2m   | Shield Ground L=2m   | Shield Ground L=2m   |
| Power Supply Connector | EIA/TIA-568A (RJ-45) | EIA/TIA-568A (RJ-45) | 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.

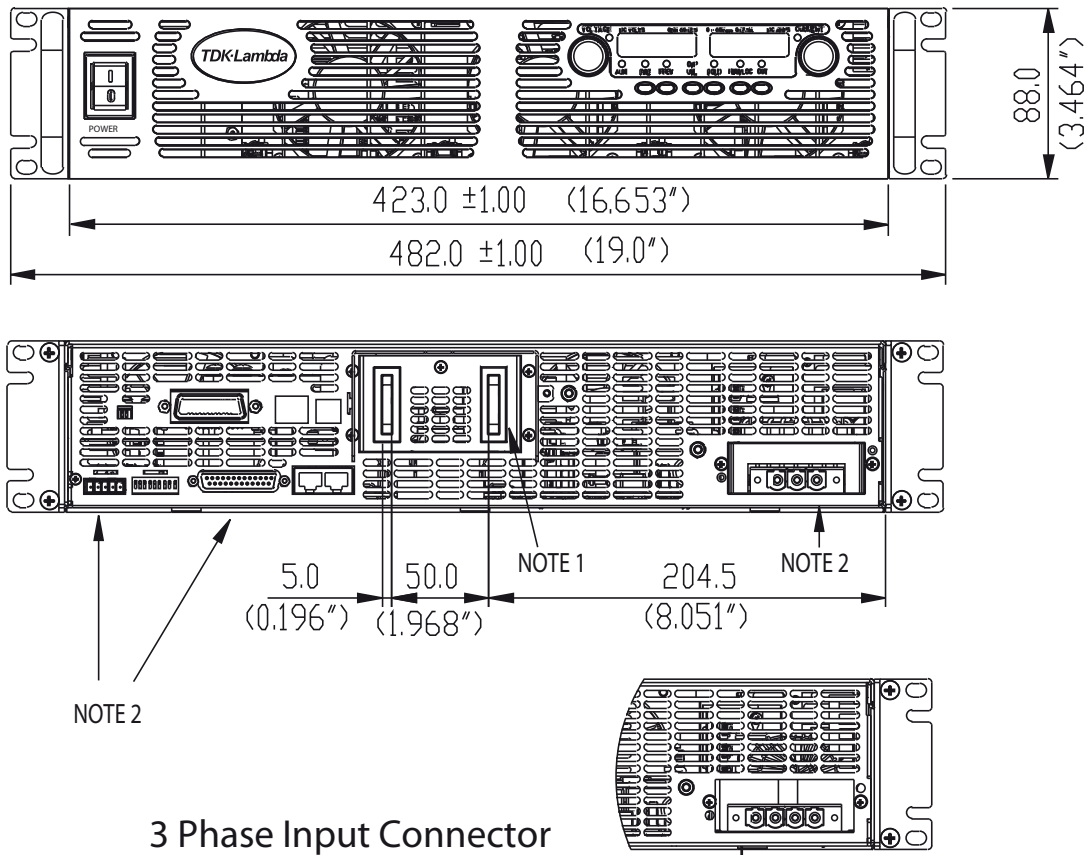
| Mode   | Power Supply Connector | Communication Cable  | P/N      |
|--------|------------------------|----------------------|----------|
| RS-485 | EIA/TIA-568A (RJ-45)   | Shield Ground L=50cm | GEN/RJ45 |

\* Included with power supply

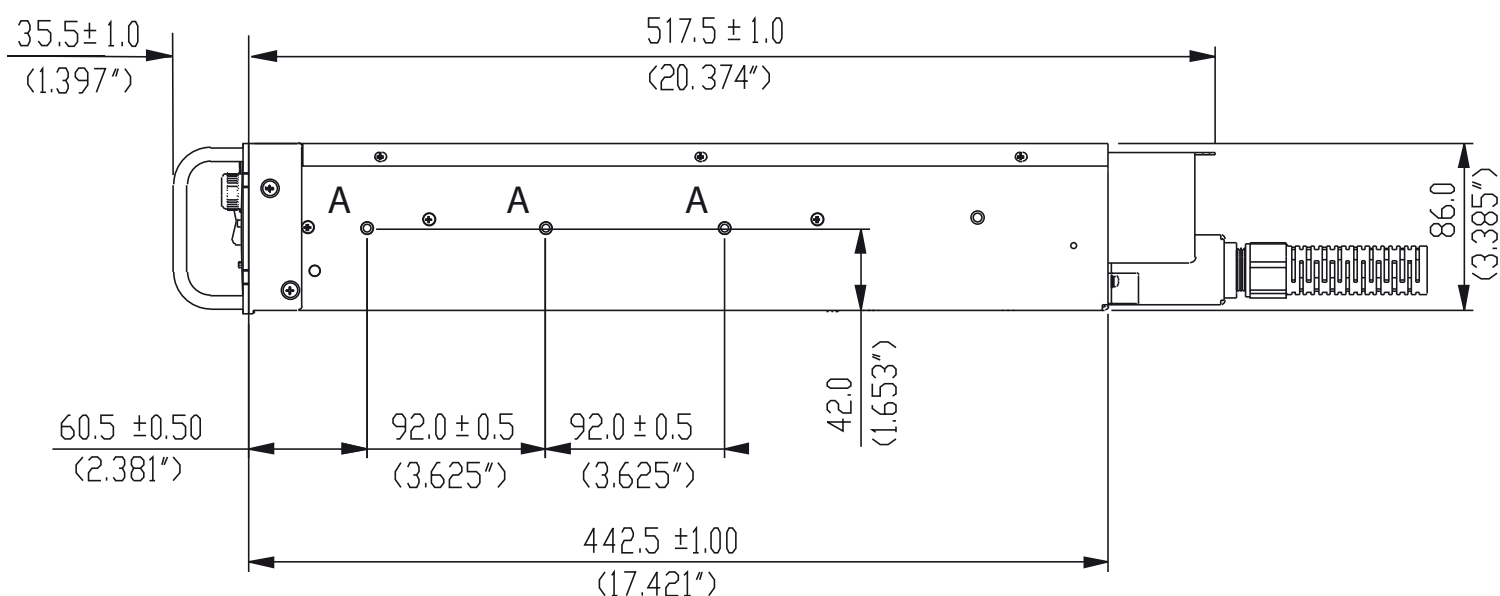


**Also available, Genesys™**  
**1U Half Rack 750W**  
**1U full Rack 750W/1500W/2400W**  
**2U full Rack 3300W**

Outline Drawing Genesys™ 5kW Units







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

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