Programmable DC Power Supplies
3.3kW in 2U
Built in RS-232 & RS-485 Interface
Advanced Parallel Operation
Optional Interface:
Compliant LAN
IEEE488.2 SCPI (GPIB) Multi-Drop
Isolated Analog Programming

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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 3.3kW in 2U
- Wide Range of popular worldwide AC inputs, 1ø (230VAC) & 3ø (208VAC, 400VAC)
- Active Power Factor Correction (Single-Phase & Three-Phase AC Input)
- Output Voltage up to 600V, Current up to 400A
- 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
  - LXI Compliant LAN
- LabView® and LabWindows® drivers
- Five Year Warranty

Worldwide Safety Agency Approvals; CE Mark for LVD and EMC Regulation

**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 3.3kW 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.
7. Function/Status LEDs:
   - Alarm
   - Foldback Mode
   - Fine Control
   - Remote Mode
   - Preview Settings
   - 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-Re-Start/Safe-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.
6. Output Connections: Rugged busbars (shown) for up to 100V Output; wire clamp connector for Outputs >100V.
7. Exit air assures reliable operation when zero stacked.
8. Input: 230VAC Single Phase (shown), 208 & 400VAC Three Phase, 50/60 Hz
   AC Input Connector: PHOENIX CONTACT Power Combicon PC 6/... Series with strain relief.
9. Optional Interface Position for IEEE 488.2 SCPI (shown) or Isolated Analog Interface or LAN Interface.
### Genesys™ 3.3kW Specifications

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<tr>
<th>Genesys ™ 3.3kW Specifications</th>
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</table>

1. **Output Under Voltage Limit**
   - Preset by front panel or communication port. Prevents from adjusting Vout below limit.

2. **Max. load regulation**
   - 0.015% of rated Vo + 5mV (max) (mA)

3. **Readback Voltage**
   - Resolution (0.002% of Vo Rated) mV
   - Accuracy (0.05% of Vo Rated) mV
   - Accuracy (0.2% of Vo Rated) mA

4. **Iout Resistor Programming**
   - 0~100%, 0~5/10Kohm full scale, user-select.
   - Accuracy and linearity: ±1.5% of rated Iout.

5. **Vout Resistor Programming**
   - 0~100%, 0~5/10Kohm full scale, user-select.
   - Accuracy and linearity: ±1% of rated Vout.

6. **OVP trip point**
   - 0.5~10V, 0.5~12V, 1~18V, 1~24V, 2~36V, 2~44V, 5~66V, 5~88V, 5~110V, 5~165V, 5~220V, 5~330V, 5~660V

7. **Ripple and noise p-p**
   - 20MHz (mV)

8. **Accuracy (0.2% of Io Rated+0.1% of Io Actual Output)**
   - mA

9. **Up-prog. response time**
   - 0~Vo Rated (mS)

10. **Down-prog. response time**
    - (mS)

11. **Remote sense compensation/wire (V)**

12. **No-load (10%)**

13. **Full-load (90%)**

14. **Accuracy of Zero Voltage (1%)**

15. **Accuracy of 0% of Rated Io (1%)**

16. **Accuracy of 0% of Rated Vo (1%)**

17. **Accuracy of 0.003% of Io Rated (%)**

18. **Accuracy of 0.004% of Io Rated (%)**

19. **Accuracy of 0.005% of Io Rated (%)**

20. **Accuracy of 0.007% of Io Rated (%)**

21. **Accuracy of 0.01% of Io Rated (%)**

22. **Accuracy of 0.02% of Io Rated (%)**

23. **Accuracy of 0.03% of Io Rated (%)**

24. **Accuracy of 0.04% of Io Rated (%)**

25. **Accuracy of 0.05% of Io Rated (%)**

26. **Accuracy of 0.06% of Io Rated (%)**

27. **Accuracy of 0.07% of Io Rated (%)**

28. **Accuracy of 0.08% of Io Rated (%)**

29. **Accuracy of 0.09% of Io Rated (%)**

30. **Accuracy of 0.1% of Io Rated (%)**

31. **Accuracy of 0.15% of Io Rated (%)**

32. **Accuracy of 0.2% of Io Rated (%)**

33. **Accuracy of 0.25% of Io Rated (%)**

34. **Accuracy of 0.3% of Io Rated (%)**

35. **Accuracy of 0.5% of Io Rated (%)**

36. **Accuracy of 1% of Io Rated (%)**

37. **Accuracy of 2% of Io Rated (%)**

38. **Accuracy of 5% of Io Rated (%)**

39. **Accuracy of 10% of Io Rated (%)**

40. **Accuracy of 20% of Io Rated (%)**

41. **Accuracy of 50% of Io Rated (%)**

42. **Accuracy of 100% of Io Rated (%)**

43. **Accuracy of 0% of Vo Rated (%)**

44. **Accuracy of 1% of Vo Rated (%)**

45. **Accuracy of 2% of Vo Rated (%)**

46. **Accuracy of 5% of Vo Rated (%)**

47. **Accuracy of 10% of Vo Rated (%)**

48. **Accuracy of 20% of Vo Rated (%)**

49. **Accuracy of 50% of Vo Rated (%)**

50. **Accuracy of 100% of Vo Rated (%)**

51. **Control functions**
   - Volt/ Iout manual adjust by separate encoders (coarse and fine adjustment selectable).

52. **OPV/UVL manual adjust by Volt. Adjust encoder.**

53. **Overshoot and Undershoot (Off)**

54. **Overshoot and Undershoot (On)**

55. **Overshoot and Undershoot (Off)**

56. **Ripple r.m.s 5Hz~1MHz (mV)**

57. **Specifications in blue are improved**

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1. **Minimum voltage is guaranteed to maximum 0.2% of rated output voltage.**
2. **Minimum current is guaranteed to maximum 6.4% of rated output current.**
3. **For cases where conformance to various safety standards such as UL, IEC, etc. is required, to be described as 190-240Vac (50/60Hz) for single phase and 3-Phase 208V models, and 380~415Vac (50/60Hz) for 3-Phase 400V models.**
4. **Single-Phase and 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. **For 8V~300V models: Measured with JEITA RC-9113A (1:1) probe. For 600V models: Measured with 10:1 probe.**
7. **For load voltage change, equal to the unit voltage rating, constant input voltage.**
8. **Measured by the ripple is measured from 2V to rated output voltage and rated output current.**
9. **The Constant Current programming readback and monitoring accuracy does not include the warm-up and Load regulation thermal drift.**
10. **Measured at the sensing point.**
11. **Not including EMI filter inrush current, less than 0.2mSec.**
12. **For 8V~300V models: Measured with JEITA RC-9113A (1:1) probe. For 600V models: Measured with 10:1 probe.**
13. **For load voltage change, equal to the unit voltage rating, constant input voltage.**
14. **Measured at the sensing point.**
2.1 INPUT CHARACTERISTICS

1. Input voltage/freq. (*3) VAC
   - Single Phase, 230V models: 170~265Vac, 47~63Hz
   - 3-Phase, 208V models: 170~265Vac, 47~63Hz
   - 3-Phase, 400V models: 342~460Vac, 47~63Hz

2. Maximum input current at 100% load
   - 3-Phase, 208V models: 14.5, 14.5, 14.5, 14, 14.5, 13.6, 14, 13.7, 13.7, 13.8, 13.9
   - 3-Phase, 400V models: 7.2, 7.2, 7.2, 7.2, 7.0, 7.2, 6.6, 7.0, 6.8, 6.8, 6.9, 7.0

3. Power Factor (Typ) Single Phase models: 0.99@230Vac, rated output power. 3-Phase models: 0.94@208/380Vac, rated output power.


5. Inrush Current (*5) A Single-Phase and 3-Phase 208V models: Less than 50A
   - 3-Phase 400V models: Less than 20A

6. Hold-up time (Typ) mS 10mSec for Single-Phase and 3-phase 208V models, 6mSec for 3-Phase 400V models. Rated output power.

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:
   - IEC1000-4-2, Air-disch.-8KV, contact disch.-4KV
   - IEC1000-4-4, 2KV
   - IEC1000-4-5, 1KV line to line, 2KV line to ground
   - IEC1000-4-6, 3V
   - IEC1000-4-1, 1mV
   - EN50022A, FCC part 15-A, VCCI-A.
   - EN50022A, FCC part 15-A, VCCI-A.

2.5 SAFETY

1. Applicable standards:
   - UL 60950-1, CSA 22.2 No. 60950-1, JEC 60950-1, EN 60950-1
   - UL 60950-1, CSA 22.2 No. 60950-1, JEC 60950-1, EN 60950-1
   - UL 60950-1, CSA 22.2 No. 60950-1, JEC 60950-1, EN 60950-1

2. Interface classification
   - Models with Vout 50V: Output is SELV, all communication/control interfaces (RS232/485, IEEE, Isolated Analog, LAN, Sense, Remote Programming and Monitoring) are SELV.
   - Models with 60V Vout 400V: Output is Hazardous, communication/control interfaces: RS232/485, IEEE, Isolated Analog, LAN, Remote Programming and Monitoring (pins 1-3, pins14-16) are SELV, Sense, Remote Programming and Monitoring (pins 8-13, pins21-25) are Hazardous.
   - Models with 400V<Vout 600V: Output is Hazardous, all communication/control interfaces (RS232/485, IEEE, Isolated Analog, LAN, Sense, Remote Programming and Monitoring) are Hazardous.

3. Withstand voltage
   - Vout 50V models: Input-Output (SELV): 4242VDC 1min, Input-communication/control (SELV): 4242VDC 1min, Input-Ground: 2828VDC 1min,
   - 60V>Vout 100V models: Input-Output (Hazardous): 2600VDC 1min, Input-communication/control (SELV): 4242VDC 1min, Input-Ground (Hazardous): 1900VDC 1min, Input-Ground (SELV): 2828VDC 1min,
   - 100V>Vout 600V models: Input-Output/Hazardous: 3550VDC 1min, Input-communication/control (SELV): 4242VDC 1min, Input-Output (SELV): 2670VDC 1min, Input-Ground (Hazardous): 2828VDC 1min.

4. Insulation resistance More than 100Mohm at 25°C, 70% RH.

2.6 MECHANICAL CONSTRUCTION

1. Cooling Forced air flow: from front to rear. No ventilation holes at the top or bottom of the chassis; Variable fan speed.

2. Dimensions (WxHxD) W: 423mm, H: 88mm, D: 442.5mm (excluding connectors, encoders, handles, etc.)

3. Weight 13 kg.

4. AC Input connector (with Protective Cover)
   - Single Phase, 230V models, Power Combicon PC 6-16/3-GF-10,16 series, with Strain relief.
   - 3-Phase, 208V & 400V models, Power Combicon PC 6-16/4-GF-10,16 series, with Strain relief.

5. Output connectors 8V to 100V models: Bus-bars (hole Ø 10.5mm), 150V to 600V models: wire clamp connector, Phoenix P/N: FRONT-4-H-7.62

2.7 RELIABILITY SPECS

1. Warranty 5 years.

All specifications subject to change without notice.
**Genesys™ Power Parallel and Series Configurations**

**Parallel operation - Master/Slave:**
Active current sharing allows up to four identical units to be connected in an auto-parallel configuration for four times the output power.
In Advanced Parallel Master/Slave Mode, total current is programmed and reported by the Master. Up to four supplies act as one.

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

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

**Programming Options (Factory installed)**

**Digital Programming via IEEE Multi-Drop Interface**
- Allows IEEE Master to control up to 30 slaves over RS-485 daisy-chain
- Only the Master needs to be equipped with IEEE Interface
- IEEE 488.2 SCPI Compliant
- Program Voltage
- Measure Voltage
- Over Voltage setting and shutdown
- Error and Status Messages

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

**LAN Interface**
- 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
Power Supply Identification / Accessories How to order

<table>
<thead>
<tr>
<th>GEN</th>
<th>8</th>
<th>400</th>
<th>Factory Options:</th>
<th>Factory AC Input Options:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
<td>Output Voltage</td>
<td>Output Current</td>
<td>Option: IEEE</td>
<td>1P230 (Single Phase 170~265VAC)</td>
</tr>
<tr>
<td>Name</td>
<td>(0~8V)</td>
<td>(0~400A)</td>
<td>IS510</td>
<td>3P208 (Three Phase 170~265VAC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IS420</td>
<td>3P400 (Three Phase 342~460VAC)</td>
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</tbody>
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Models 3.3kW

<table>
<thead>
<tr>
<th>Model</th>
<th>Output Voltage</th>
<th>Output Current</th>
<th>Output Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEN 8-400</td>
<td>0~8V</td>
<td>0~400</td>
<td>3200</td>
</tr>
<tr>
<td>GEN 10-330</td>
<td>0~10V</td>
<td>0~330</td>
<td>3300</td>
</tr>
<tr>
<td>GEN 15-220</td>
<td>0~15V</td>
<td>0~220</td>
<td>3300</td>
</tr>
<tr>
<td>GEN 20-165</td>
<td>0~20V</td>
<td>0~165</td>
<td>3300</td>
</tr>
<tr>
<td>GEN 30-110</td>
<td>0~30V</td>
<td>0~110</td>
<td>3300</td>
</tr>
<tr>
<td>GEN 40-85</td>
<td>0~40V</td>
<td>0~85</td>
<td>3400</td>
</tr>
</tbody>
</table>

Factory option P/N

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

Accessories

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

<table>
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<tr>
<th>Mode</th>
<th>Power Supply Connector</th>
<th>Communication Cable</th>
<th>P/N</th>
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<tbody>
<tr>
<td>RS-232</td>
<td>DB-9F Shield Ground L=2m EIA/TIA-568A (RJ-45)</td>
<td>Shield Ground L=50cm</td>
<td>GEN/RJ45</td>
</tr>
<tr>
<td>RS-485</td>
<td>DB-9F Shield Ground L=2m EIA/TIA-568A (RJ-45)</td>
<td>Shield Ground L=50cm</td>
<td>GEN/RJ45</td>
</tr>
<tr>
<td>RS-232</td>
<td>DB-25F Shield Ground L=2m EIA/TIA-568A (RJ-45)</td>
<td>Shield Ground L=50cm</td>
<td>GEN/RJ45</td>
</tr>
</tbody>
</table>

2. Serial link cable*
Daisy-chain up to 31 Genesys™ power supplies.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Power Supply Connector</th>
<th>Communication Cable</th>
<th>P/N</th>
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</thead>
<tbody>
<tr>
<td>RS-485</td>
<td>EIA/TIA-568A (RJ-45)</td>
<td>Shield Ground L=50cm</td>
<td>GEN/RJ45</td>
</tr>
</tbody>
</table>

* Included with power supply

Also available, Genesys™
1U Half Rack 750W
1U full Rack 750W/1500W/2400W
2U full Rack 5000W
Outline Drawing Genesys™ 3.3kW Units

3 Phase Input Connector

NOTE 1

NOTE 2
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