ENGINEER’S OF THE INDUSTRY’S FINEST
STARTER-GENERATORS AND GENERATOR CONTROL UNITS
TRUSTED BY PROFESSIONALS, POWERED BY APC
For over forty years, APC has been committed to being the leader and industry standard in the design and manufacture of aircraft electrical systems. Today this goal and pledge has not changed, neither has our commitment to serving our customers, the quality of our products, or company ownership. In fact, while most other manufacturers are changing hands, consolidating and changing their manufacturing location, APC has continued to operate under the same name, ownership and manufacturing base.

Far more advances in generator control unit design and performance are being made every day. Even while industry practices and standards are rapidly changing, APC has welcomed these challenges and continuously evolves along with industry trends in today’s market. With the most up-to-date technologies and product knowledge close at hand, APC has stepped into the forefront of GCU design. APC’s product line of Generator Control Units covers all industry requirements.

APC designs and manufactures generator control units that are far superior in architecture and performance. Our GCU’s are designed for high reliability while the price to our customers is extremely competitive. Adding to that, APC technical support engineers are always readily available to assist our customers.

APC has long been recognized for its outstanding product achievements in the aircraft industry. The successful performance of our generator control units in the field is the culmination of our many tried and true design attributes, and advanced manufacturing techniques. Our GCU’s are manufactured at our ISO9001 certified facility and assembled with only the highest quality components. The workmanship that goes into our products is second to none.

The generator control unit incorporates all the control and protective functions required for a single or multi-engine powered aircrafts 28 volt DC electric power system. APC generator control units are compact, lightweight and are designed to operate with our 28V D.C. starter-generators and other compatible machines manufactured to the requirements of MIL-G-6162.

Our generator control units can operate at ambient temperatures of between -55°C to +71°C and at altitudes of up to 70,000 feet. APC’s generator control units also contain many desirable features such as: self-cooling, lightweight, no scheduled maintenance or vibration isolation is required. APC’s patented “Torque Limiting” system can be integrated as an optional addition to our high quality generator control units. Custom features can also be added to
our generator control units, if any customization is requested. APC Generator Control Units feature a robust electronic and mechanical design to provide optimum functionality in the most demanding aircraft application environments.

Complementing our extensive product line of Generator Control Units is the recent introduction of our Digital Generator Control Units (DGCU); the GCSG 550 series. APC’s Digital GCU uses a highly integrated, state-of-the-art microcontroller to implement the control and protective functions for improved reliability, reduced parts count and lower manufacturing costs. Its design also makes use of benchmark components for increased drive capability for field excitation, and contactors control with lower power dissipation and operating temperatures for improved component reliability. The digital GCU’s also feature an automatic Built-in-Test with fault isolation to the LRU level for ease of maintenance of the electrical power system.

At APC our motto is, "the Customer is the Focus of Everything We Do", and every effort is made to place the customer’s needs in the forefront. We continuously strive to meet and exceed our customer’s expectations. We do this through the most technologically-advanced product designs for superior performing products, practicing lean manufacturing techniques to keep costs down and passing on the savings to our customers. Our customer service staff is number one in the business, and combined with the entire staff at APC, our business goals have been achieved overall in terms of Quality, Price and Delivery. If you haven’t already, call us toll-free at 1-877-4APCMFG, (1-877-427-2634), or visit us on the web at www.apcmfg.com and discover first hand why APC continues to be the most trusted OEM for aircraft electrical systems in the industry today.
### APC GENERATOR CONTROL UNITS: SUMMARY CHARACTERISTICS

#### ELECTRICAL

<table>
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<tr>
<th>Feature</th>
<th>Specification</th>
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<tr>
<td>Regulated Voltage</td>
<td>28.5 V DC Nominal</td>
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<tr>
<td>Voltage Regulation</td>
<td>+0.3/-0.7V, all conditions of environment, generator load and speed rating.</td>
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<tr>
<td>Generator Voltage Adjustment Range</td>
<td>26 to 30 VDC</td>
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<tr>
<td>Recovery Time</td>
<td>30 msec max., full load to no load and no load to full load.</td>
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<td>Field Current</td>
<td>15 amps maximum</td>
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<td>Paralleling Control</td>
<td>Load equalization within 10% of Gen. Rating</td>
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<tr>
<td>Generator Line Contactor Control</td>
<td>5 amps maximum</td>
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<tr>
<td>Start Contactor Control</td>
<td>5 amps maximum</td>
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<tr>
<td>Overvoltage Protection</td>
<td>MIL-STD-704/DO-160</td>
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<tr>
<td>Reverse Current Protection</td>
<td>10% of generator rating opens line contactor.</td>
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<td>Self Test</td>
<td>Protective functions</td>
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<tr>
<td>Dielectric Strength</td>
<td>600 Vrms, 60 Hz.</td>
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#### MECHANICAL

- **Weight**: 1.2 lbs to 2.7 lbs (0.54 kg to 1.22 kg)
- **Dimensions**: As per outline Drawing
- **Connector**: Military Standard
- **Cooling**: Self Cooled.
- **Installation**: Solid Mounting; Capable of operation in any position

#### ENVIRONMENTAL

- **Operating Temp. Range**: -55°C to +71°C
- **Vibration**: MIL-STD-810C, Method 514.2
- **Shock**: MIL-STD-810C, Method 516.2
- **Acceleration**: MIL-STD-810C, Method 513.1
- **Altitude**: Sea Level to 70,000 Ft.

**NO SCHEDULED MAINTENANCE REQUIRED.**

**ALL APC GENERATOR CONTROL UNITS ARE DESIGNED TO MEET THE REQUIREMENTS OF MIL-R-23761B (AS)**
THE GCSG501 SERIES GCU's ARE DESIGNED FOR OPERATION WITH SERIES-TYPE STARTER-GENERATORS AND INCLUDE OVERLOAD PROTECTION.

MODEL SERIES GCSG501

TYPICAL AIRCRAFT INSTALLATIONS:

- SIKORSKY: S76 SERIES HELICOPTERS

DESIGN FEATURES AND FUNCTIONS:

CONTROL FUNCTIONS:
- VOLTAGE REGULATOR WITH VOLTAGE ADJUSTMENT
- LINE CONTACTOR CONTROL
- DIFFERENTIAL VOLTAGE SENSING
- REMOTE ELECTRICAL RESET
- REMOTE ELECTRICAL TRIP

PROTECTION FUNCTIONS:
- OVERVOLTAGE PROTECTION
- OVERLOAD PROTECTION
- UNDERVOLTAGE PROTECTION
- REVERSE CURRENT PROTECTION
- REVERSE POLARITY BUILDUP PROTECTION
- OPEN GROUND PROTECTION
- ANTI CYCLE PROTECTION

FEATURES:
- REMOTE OVERVOLTAGE AND OVERLOAD SELF TEST
- INTERNAL FIELD RELAY AND FLASH START RELAY
THE GCSG502 AND 503 SERIES GCU’s ARE DESIGNED FOR OPERATION WITH SERIES-TYPE STARTER-GENERATORS AND INCLUDE GENERATOR PARALLELING CONTROL.

MODEL SERIES GCSG502/GCSG503

TYPICAL AIRCRAFT INSTALLATIONS: GCU MODEL GCSG502:

- DEHAVILLAND: DASH 7 APU
- BELL: 206L AUX. SYSTEM
- MYASISHCHEV: M101T
- AERO VODOCHODY: AE270
- CESSNA P210 TURBO CONVERSION

TYPICAL AIRCRAFT INSTALLATIONS: GCU MODEL GCSG503:

- SCHWEIZER: 330T
- DORNIER: D0-228
- U.S. ARMY: "LITTLE BIRD" HELICOPTER
- NORTHROP GRUMMAN: UAV-FIRE SCOUT
- NEW PIPER MALIBU CONVERSION
- PZL: SW3
- PAC: CRESCO 750

DESIGN FEATURES AND FUNCTIONS:

CONTROL FUNCTIONS:
- VOLTAGE REGULATOR WITH VOLTAGE ADJUSTMENT
- GENERATOR CURRENT LIMIT
- AUTOMATIC PARALLELING CONTROL
- LINE CONTACTOR CONTROL
- DIFFERENTIAL VOLTAGE SENSING
- REMOTE ELECTRICAL RESET
- REMOTE ELECTRICAL TRIP

FEATURES:
- REMOTE OVERVOLTAGE SELF TEST
- INTERNAL FIELD RELAY, FLASH START RELAY
- AND EQUALIZER RELAY

PROTECTION FUNCTIONS:
- OVERVOLTAGE PROTECTION
- OVER EXCITATION PROTECTION
- REVERSE CURRENT PROTECTION
- OPEN GROUND PROTECTION
- REVERSE POLARITY BUILDUP PROTECTION
- ANTI CYCLE PROTECTION
- LINE CONTACTOR CONTROL OUTPUT PROTECTION
THE GC5G504 SERIES GCU’s ARE DESIGNED FOR OPERATION WITH SERIES-TYPE STARTER-GENERATORS AND INCORPORATE GROUND FAULT PROTECTION.

MODEL SERIES GC5G504

TYPICAL AIRCRAFT INSTALLATIONS:
- FAIRCHILD: METER SERIES II, III, IV
- MARSH AVIATION: S2 TRACKER, OY10A
- GENERAL ATOMICS: UAV-PREDATOR B
- HAFEI: Y12 IV

DESIGN FEATURES AND FUNCTIONS:

CONTROL FUNCTIONS:
- VOLTAGE REGULATOR WITH LOCAL OR REMOTE VOLTAGE ADJUSTMENT
- GENERATOR CURRENT LIMIT
- AUTOMATIC PARALLELING CONTROL
- GENERATOR LINE CONTACTOR CONTROL
- DIFFERENTIAL VOLTAGE SENSING
- REMOTE ELECTRICAL RESET
- REMOTE ELECTRICAL TRIP
- REMOTE INDICATOR CONTROL

PROTECTION FUNCTIONS:
- OVERVOLTAGE PROTECTION
- OVEREXCITATION PROTECTION
- REVERSE CURRENT PROTECTION
- OPEN GROUND PROTECTION
- GROUND FAULT PROTECTION
- ANTI-CYCLE PROTECTION
- LINE CONTACTOR CONTROL OUTPUT PROTECTION

FEATURES:
- REMOTE OVERVOLTAGE AND GROUND FAULT SELF TEST
- INTERNAL FIELD, FLASH START AND EQUALIZER RELAY
THE GCSG505 SERIES ARE FIELD WEAKENING GCU’S DESIGNED FOR OPERATION WITH SHUNT-TYPE STARTER-GENERATORS. THESE UNITS INCORPORATE THE START CONTROL FUNCTIONS, OVERLOAD AND GROUND FAULT PROTECTION.

MODEL SERIES GCSG505

**TYPICAL AIRCRAFT INSTALLATIONS:**
- BOMBARDIER CANADAIR: CL-415, CL-215 T
- AGUSTA: A109 SERIES HELICOPTERS
- CCADD: SARAS

**DESIGN FEATURES AND FUNCTIONS:**

**CONTROL FUNCTIONS:**
- VOLTAGE REGULATOR WITH VOLTAGE ADJUSTMENT
- AUTOMATIC PARALLELING CONTROL
- GENERATOR CURRENT LIMIT
- GENERATOR LINE CONTACTOR CONTROL
- DIFFERENTIAL VOLTAGE SENSING
- START CONTACTOR CONTROL
- 48 V START CONTROL
- STARTER FIELD CURRENT CONTROL (FIELD WEAKENING)
- AUTOMATIC STARTER CUT-OFF
- TORQUE LIMITING, START CYCLE - [PATENTED]
- BUS TIE CONTROL
- REMOTE ELECTRICAL RESET
- REMOTE ELECTRICAL TRIP

**PROTECTION FUNCTIONS:**
- OVERVOLTAGE PROTECTION
- OVEREXCITATION PROTECTION
- REVERSE CURRENT PROTECTION
- GROUND FAULT PROTECTION
- OVERLOAD PROTECTION
- UNDervoltage PROTECTION
- OVERSPEED PROTECTION
- ANTI- CYCLE PROTECTION
- START/LINE CONTACTOR CONTROL OUTPUT PROTECTION
- OPEN GROUND PROTECTION

**FEATURES:**
- REMOTE OVERVOLTAGE, UNDervoltage,
  GROUND FAULT AND OVERLOAD SELF TEST
- INTERNAL FIELD RELAY, FLASH START RELAY AND
  EQUALIZER RELAY

For Reference Only
THE GCSG505 SERIES ARE FIELD WEAKENING GCU’S DESIGNED FOR OPERATION WITH SHUNT-TYPE STARTER-GENERATORS. THESE UNITS INCORPORATE START CONTROL FUNCTIONS.

MODEL SERIES GCSG505

TYPICAL AIRCRAFT INSTALLATIONS:
- BOMBARDIER: LEARJET 60
- BELL: 412 AUX. SYSTEM
- DEHAVILLAND: DASH 7 AGES APU
- AERMACCHI: 521 TRAINER
- BASLER: TURBO DC-3 TURBINE CONVERSION
- PAC: CRESCO 750 XL
- BRITTEN NORMAN: DEFENDER & ISLANDER
- VALMET: L-90TP
- PZL: KANIA, SW4
- DASSAULT: FALCON 20 APU
- GROB: G140
- EXTRA FLUGZ: EA500

DESIGN FEATURES AND FUNCTIONS:

CONTROL FUNCTIONS:
- VOLTAGE REGULATOR WITH VOLTAGE ADJUSTMENT
- AUTOMATIC PARALLELING CONTROL
- GENERATOR CURRENT LIMIT (CROSS START)
- GENERATOR LINE CONTACTOR CONTROL
- DIFFERENTIAL VOLTAGE SENSING
- START CONTACTOR CONTROL
- 48 V START CONTROL
- STARTER FIELD CURRENT CONTROL: (FIELD WEAKENING)
- AUTOMATIC STARTER CUT-OFF
- TORQUE LIMITING, START CYCLE: (PATENTERED)
- REMOTE ELECTRICAL RESET
- REMOTE ELECTRICAL TRIP

PROTECTION FUNCTIONS:
- OVERVOLTAGE PROTECTION
- OVEREXCITATION PROTECTION
- REVERSE CURRENT PROTECTION
- GROUND FAULT PROTECTION
- OVERSPEED PROTECTION
- START LINE CONTACTOR CONTROL-OUTPUT PROTECTION
- OPEN GROUND PROTECTION
- ANTI CYCLE PROTECTION

FEATURES:
- REMOTE OVERVOLTAGE, AND GROUND FAULT SELF TEST
- INTERNAL FIELD RELAY, FLASH START RELAY AND EQUALIZER RELAY
**MODEL GCSG550 DIGITAL GCU**

**FEATURES:**
- Automatic Bit & Monitoring
- Fault Diagnostics Indication
- Threshold Selection
- Serial Communication
- Integral Field Relay
- Flash Start Relay
- Equalizer Relay

**CONTROL FUNCTIONS:**
- Voltage Regulator with Voltage Adjustment
- Automatic Paralleling Control
- Generator Current Limit
- Start/Line Contact Control
- Differential Voltage Sensing
- Field Weakening Control
- Torque Limiting, Start Cycle
- Automatic Starter Cut-Off
- Remote Electrical Reset
- Remote Electrical Trip

**PROTECTION FUNCTIONS:**
- Overvoltage Protection
- Overexcitation Protection
- Reverse Current Protection
- Ground Fault Protection
- Overload Protection
- Open Shunt Protection
- Undervoltage Protection
- Open Ground Protection
- Contactors Output Protection
- Open P.O.R.
- Shunt Field Circuit Monitoring
- Reverse Polarity Protection
- Anti Cycle Protection

**DESIGN FEATURES AND FUNCTIONS:**

**TEMPERATURE RANGE:** -40°C to +71°C

**ENVIRONMENTAL - EMI:** DO-160 D

**SOFTWARE CERTIFICATION:** DO-178B

**CONNECTOR:** MIL-C-38999 SERIES III

**WEIGHT:** 2.0 LBS.

**LENGTH:** 5.75 IN.

**WIDTH:** 3.50 IN.

**HEIGHT:** 4.15 IN.

**CERTIFICATION PENDING**
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<td>United States</td>
<td>Perkins Aerospace Supply</td>
<td>P.O. Box 517</td>
<td>Glen Oaks, NY 11004</td>
<td>516-437-4110</td>
<td>516-437-3930</td>
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<td></td>
<td>Flite Components</td>
<td>2734 Burbank Street</td>
<td>Dallas, TX 75235-2603</td>
<td>800-527-5179</td>
<td>214-350-2849</td>
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<td>Petroleum Helicopters</td>
<td>P.O. Box 90808</td>
<td>Lafayette, LA 70509</td>
<td>337-235-2452</td>
<td>337-232-6537</td>
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<td>Precision Heliparts</td>
<td>495 Lake Mirror Rd. #8000</td>
<td>Atlanta, GA 30349</td>
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<td>Seattle Aero</td>
<td>12410 S.E. 32nd Street</td>
<td>Bellevue, WA 98005</td>
<td>425-643-2420</td>
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<td>AAR Distribution</td>
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<td>Wood Dale, IL 60191</td>
<td>630-227-2000</td>
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<td>Aircraft Component Services</td>
<td>330 S. E. 15th Street</td>
<td>Pompano Beach, FL 33060</td>
<td>954-781-0398</td>
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<td>AviAll</td>
<td>P.O. Box 619048</td>
<td>Dallas, TX 75261-9048</td>
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<td>2750 Regent Blvd.</td>
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<td>CANADA -</td>
<td>170 George Craig Blvd. N.E.</td>
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<td>CONSAV</td>
<td>PO Box 226</td>
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<td>OSIRIS Aviation</td>
<td>1799 NE 164th St., Unit 105</td>
<td>North Miami Beach, FL 33162</td>
<td>305-949-4644</td>
<td>305-949-9906</td>
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<td>Aviall</td>
<td>604 New Bright Building</td>
<td>Sheung Yuet Road, Hong Kong</td>
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Auckland, New Zealand
Tel: 64-9-275-0571
Fax: 64-9-275-6569

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CENTRAL AMERICAN AVIATION SERVICES
Hangar K5, Avenida Hincapie
18-05 Zona 13, Guatemela City
Guatemela, 01013, C.A.
Tel: 011-502-332-6041
Fax: 011-502-332-6045

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AIRCRAFT COMPONENT SERVICES/AAR-LONDON
35 Willow Lane
Mitchem, Surrey CR4 4UQ
United Kingdom
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Fax: 44-2086-859-247

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Oxford Airport, Kidlington
Oxford OX5 1RA, England
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Fax: 44-1865-379-123

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Oxford OX5 1RA, England
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Fax: 44-1865-379-123

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6ADS SOGERMA SERVICES
Aeropost de Bordeaux-Merignac
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33701 Méignac CEDEX
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Fax: 33 5 56 55 28 37

AIRCRAFT COMPONENT SERVICES/AAR-AMSTERDAM
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2130 AB Hoofddorp
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Fax: 31-20-653-47-77

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Fax: 41 71 988 36 81

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Fax: 46-8-593-787-95

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Caracas, Venezuela
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Fax: (58-2-12)-959-51-13/34-86
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For non-APC customers, please contact Cookie Hodgkiss-Daly at 631-289-0077, Ext. 128, or e-mail Cookie at chodgkiss-daly@apcmfg.com for more information or to request a quote on APC products.
OUR PASSION FOR QUALITY COMES STANDARD.