PARK GCU-01

Airborne Generator Control Unit

PARK GCU-01 is an airborne generator control unit which controls the regulation of 28V DC power generators for onboard military aircrafts. The unit complies with MIL-STD-704D requirements of 28V power supply regulation for on board military aircrafts. It regulates the generator such that the 28V power generated at the feeder point of the generator, complies with MIL-STD-704D specifications over the full range of Engine RPM and the powersupply load conditions.

The regulation is performed by PWM control of the field current of the generator. In addition to the regulation of the generated voltage, the unit detects a variety of fault conditions and provides protection mechanisms against the faults.

The control algorithm calculates the required field current for regulation based on the generator characteristics (parameters such as B-H curve of the field winding, Field resistance, armature resistance, no load and load characteristics of the generator) along with the current RPM, rate of change of RPM, current load and rate of change of load to provide optimum regulation performance, that is within the MIL-STD-704D limits.

While the control algorithm is dependent on generator parameters, a non-volatile memory is provided in the GCU to store the generator parameters depending on the type of generator, facilitating easy reconfiguring of the GCU to support different kinds of generators.

Specifications:

1. Salient Features:

- Terminal voltage at the feeder : As per MIL-STD-704D
- Ripple amplitude : As per MIL-STD-704D
- Distortion factor : As per MIL-STD-704D
- Distortion spectrum : As per MIL-STD-704D
- Transients : As per MIL-STD-704D
- Extensive PBIT, CBIT, IBIT
- System fault and fault code indications for pilot
- Logging of BIT results and fault codes with sortie identification in internal NVRAM
- Facility to download logged BIT information to an external PC
- Extensive diagnostic facilities through an external PC

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2. Fault Detection:

- Under voltage fault
- Over voltage fault
- Over current fault
- Under speed fault
- Feeder fault/Differential current fault
- Reverse current fault
- Interrupted POR sensing
- Rotating diode fault

3. Protection relay controls:

- Main line contactor
- Generator control relay

4. Power supply requirements:

- Minimum power up battery voltage : 16V
- PMG voltage range : 18V peak to 90V peak (Three Phase)
- GCU self power consumption : 10 Watts maximum

5. Field Excitation Modes:

- External excitation from PMG
- Autonomous excitation from feeder voltage
- Maximum field current : 8A

6. Operating Temperature :

-40°C to +75°C

7. Qualification Tests:

- Electromagnetic compatibility : MIL-STD-461E CE102, CS101, CS114, CS115, CS116, RE102,RS103
- ESD : IEC61000-4-2 Human body model (20KV discharge from 150Pf through 330Ohms)
- Vibration : MIL-STD-810F 514.5 (Fig.514.5C-14) (Jet Aircraft, External store)
- Shock : MIL-STD-810F 516.5 Procedure I (Functional Test for Flight equipment)
- Acceleration : MIL-STD-810F 513.5 Procedure I (Structural test, Aircraft store carried on wing)
- Thermal shock : MIL-STD-810F 503.4 Procedure I
- CATH : MIL-STD-810F 520.2 Procedure III

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