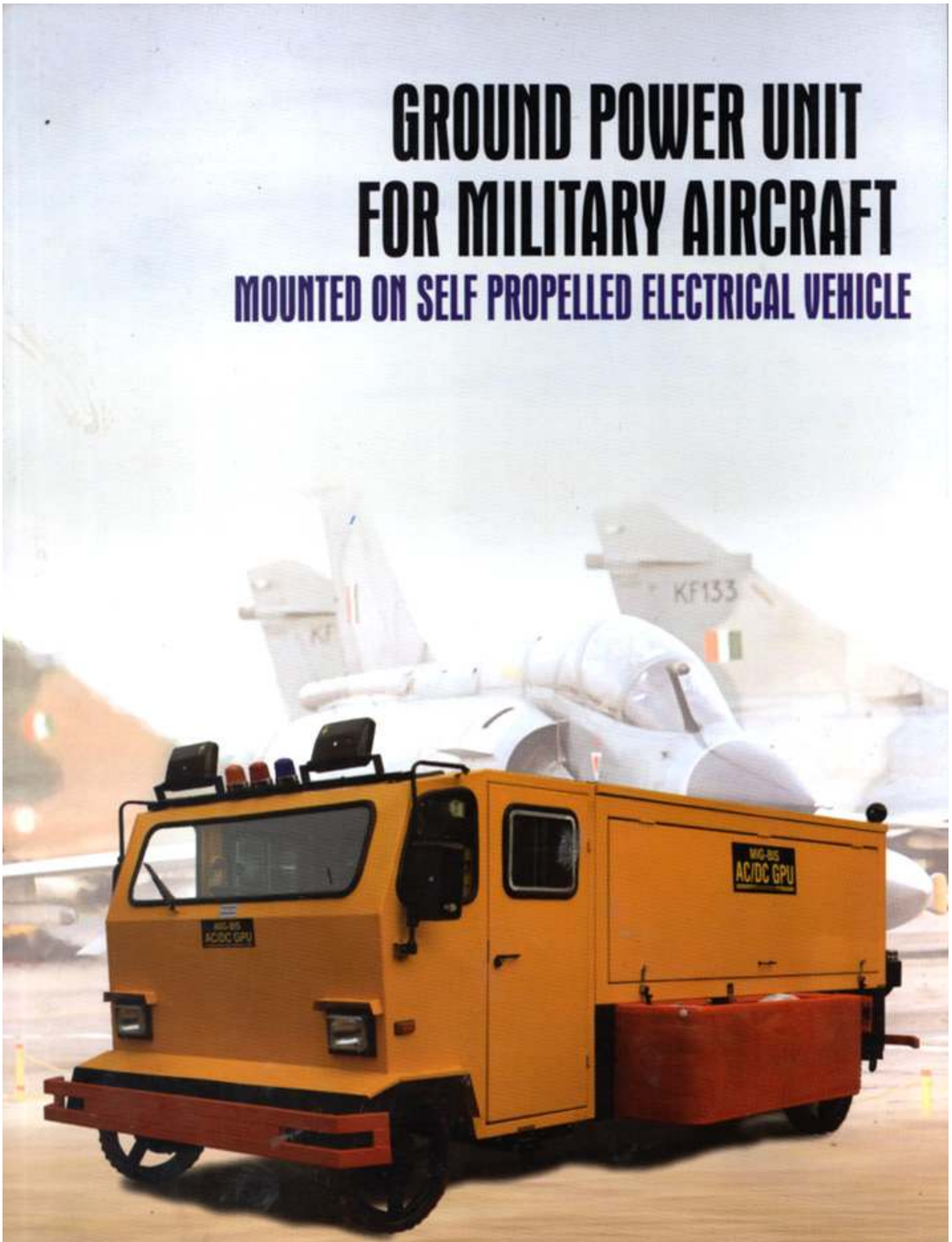
GROUND POWER UNIT FOR MILITARY AIRCRAFT

MOUNTED ON SELF PROPELLED ELECTRICAL VEHICLE



AVISH AVIATION EQUIPMENT PVT. LTD.

Various models of ground power unit operational in the Indian military market

Self Propelled 24/28V Dc Ground Power Unit

More than 150 units are in operation with the military and civil markets servicing and starting 10 (ten) different types of fixed wing aircraft and helicopters for the last 7 years. This unit uses a 40 kVA, 415 V, 3 phase, 50 Hz alternator coupled to an air-cooled 6 cylinder Kirloskar HA694TC turbo supercharged engine. The DC voltage output is selectable between 24 or 28 V DC and the DC current output is 300 A (continuous) and 1500 A (starting peak)

Self Propelled AC/DC Ground Power Unit

More than 30 units are in operation for the last 4 years. This unit is being currently used to service and start the Advanced Light Helicopter (ALH) operational with the Indian Air Force, Indian Navy and Coast Guard. This unit uses a 63 kVA, 415 V, 3 phase, 50 Hz alternator coupled with an air cooled 6 cylinder Kirloskar HA694TC turbo supercharged engine The AC output power from Static Frequency Converter is 40 kVA, 200 V, 3 phase, 400 Hz. The DC output power is 28 V DC, 400 A (continuous) and 1500 A (starting peak) The unit also provides 415 V, 3 phase, 50 Hz commercial power to power the Electrical Hydraulic Trolley and other test equipment.

Self Propelled AC/DC Ground Power Unit for MIG 21 (Bison)

50 units already in operation and 80 units under supply to the Indian Air Force. This unit is currently being used to service and start two MIG 21 - Bison Upgrade aircraft. The unit is fitted with twin KAPA boxes. This unit uses a 63 kVA to 75 kVA, 415 V, 3 phase, 60 Hz alternator coupled to an air cooled 6 cylinder Kirloskar HA694TC turbo supercharged engine operating at 1800 rpm. AC Output Power - Static Frequency Converter generating 40 kVA, 200 V, 3 phase, 400 Hz. DC output power - twin 24/48 V DC through KPA-6 boxes integrated into the GPU DC Output Power - 28 V DC, 300 A (continuous) /1500 A (starting peak)

Ground Support Equipment (GSE)

Currently under development by AVISH

- Self propelled AC/DC universal Ground Power Unit based on a 75 kVA genset with 40 kVA SFC and with twin independent TRU's for individual starting or combined for 1600 A starting current.
- Air Cycle Machine based Avionics Cooling Trolley –outlet temp. 0 to 5 deg. C / air flow - 400 cfm

Brief description of various modules used inthe Ground Power Unit

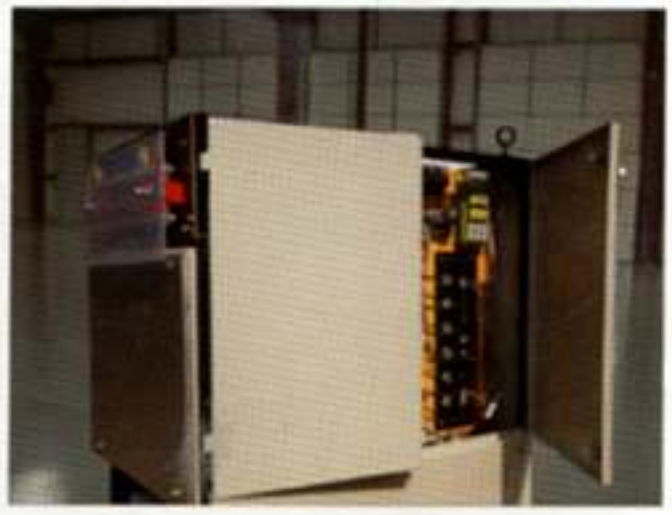
Prime Mover Diesel Engine

- Kirloskar oil engines - Air cooled HA 694TC 6 cylinder turbo supercharged.
- This is a lightweight, fuel efficient turbo supercharged air cooled engine manufactured by Kirloskar Oil Engines Ltd., Pune. the operation of this engine between 1500 to 1800 rpm ensures long operational life, low noise and long Mean Time Between Failures (MTBF).
- The engine delivers 108 hp (80 kW) at 1800 rpm (for GPU applications)

415 V, 3 phase, 50 Hz AC Alternator

- This alternator is manufactured by M/s Crompton Greaves under license from M/s Eurogen, Italy.
- It is aluminium body, brush less and single bearing with spring steel coupling discs.
- The ratings are chosen between 40 kVA to 100 kVA depending on the input power requirement of the Ground Power Unit.
- The alternator can be operated from 1500 to 1800rpm for 50/60 Hz power.

Static Frequency Converter - SFC



- This is based on solid state IGBT Digital Technology and has an output of 40 kVA, 200 V, 3 phase, 400Hz.
- The SFC is capable of 110 % load for 1 hour and 150% load for 5 Secs.
- The SFC has been tested and approved for operation as per JSS 55555 and tested at -30 deg. C, +55 deg. C, and 95 % RH test. The test involved soaking at these conditions for 16 hours and operation for 30 minutes after soaking.

Controls and Metering

- A microprocessor based control system is used complete with digital fault and parameter annunciation.
- The AC and DC outputs are protected for abnormal conditions of Voltage, Frequency, and Load etc.
- The engine is protected for abnormal conditions of oil pressure, cylinder temperature, belt breakage etc.
- Conventional needle type of gauges are used for engine oil pressure, temperature, fuel level etc.
- The panel also has all electrical vehicle controls, battery condition monitoring etc.
- Advanced line drop compensation circuit is incorporated in the system

Electrical Vehicle

- The Electrical Vehicle is based on a chassis fabricated from high strength welded tubular members into which various elements like front steering, differential gear box, and tandem brakes are integrated.
- The Electrical Vehicle is manufactured in load capacities from 2000 to 4000 kgs.
- The wheels used are of solid rubber, pneumatic or solid PU type.
- The rear suspension is leaf spring and front is based on torsion bar with shock dampers on both front and rear.
- Compact size for air transportability

Front Cabin and Rear Enclosure

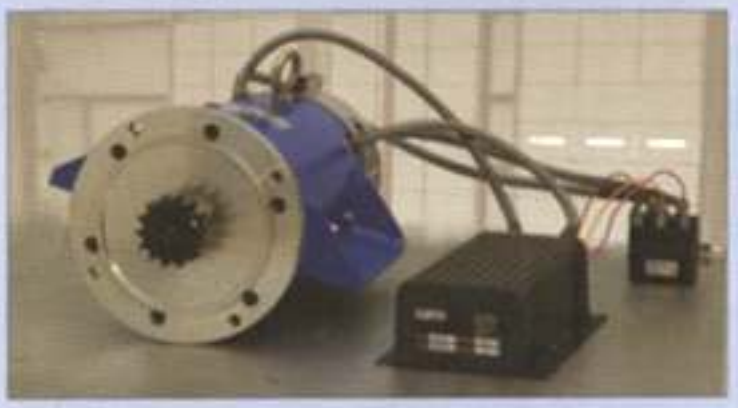
- The front cabin and rear enclosures are fabricated with sheet metal with square pipe reinforcement which is powder coated.
- The driver cabin houses the controls and operational switches
- The rear enclosure houses the generating set, SFC, TRU's etc. and is a sound attenuated & fully closed.

Traction Batteries and SMPS Battery Charger

- Long life tubular 2 V DC cells are used in the battery pack for vehicle traction
- The battery charger is intelligent and based on Switch Mode Power Supply (SMPS) with ripple free out put to enhance the life of the batteries.
- The Battery Charger is integrated into the Electrical Vehicle.

Transformer Rectifier Unit

- This is a high efficiency 3 phase air cooled transformer with a 6 pulse diode based rectification system providing a high degree of regulation and clean output with the help of LC filters on output.
- The AC ripple content as low as 300 mV



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