

SINE33GPU+DC GROUND POWER UNIT



SINE33GPU+DC 120, 150 & 180 KVA SOLID STATE 400HZ GROUND POWER UNIT

Sinepower has been developing and manufacturing 400Hz solid state Frequency Converters for more than a decade now.

Our policy, has always been, to offer the best designed products that are environmentally friendly, simple to use, easy to maintain and exceptionally well manufactured thus meeting our clients requirements as well as complying with all standards and legislation.

Sinepower's GPU&DC units were designed with Power factor correction to guarantee a perfect sinusoidal input current from 25% to 150% load and a low THDi (<1.5%).

The 28VDC offers a solid-state Ground Power Supplies that range from 300 A continuous – 1200 A Peak load and 600 A continuous – 2400 A Peak load.

Sinepower ensure high quality, efficient and secure electrical power supplies.



As result of our constant development efforts we have launched our latest GPU&DC units, that are an extension of our 400hz solid state frequency converter range and are the safest and most reliable solution for your aircraft power supply.

The 28 VDC GPUs are continuous DC power supply units that supply DC power to aircrafts that are on the ground to start the engine and the APU (Auxiliary Power Unit) of the aircraft as well as for the on-board power supply.

Our design team have focused there efforts on developing a highly efficient and fully compliant GPU unit with many features:



- **CE Mark Certified** - EN61000-6-4 Electromagnetic compatibility - Generic emission standard; EN61000-6-2 Electromagnetic compatibility - Generic immunity standard; Low Voltage Directive (LVD) 2006/95/EC
- **State of the art semiconductor technology** (IGBT) guarantee **Unity Power Factor** and **Low Input Harmonics** (THDi < 1.5%)
- **High Efficiency** (up to 95% efficiency)
- **Voltage compensation** (Load Dependent or via Remote Feedback)
- **No Break Power Transfer compatibility** (NBPT)
- **User friendly control panel**
- **Data logging**
- **IP54 enclosures** for outdoor use in extreme environmental conditions
- **28 VDC, 600 A output | 2000 A Crank** with DC and AC output working simultaneously
- **Green Standby Function** (20W power consumption when GSF is activated)
- **Low noise emission** (<65dBA@1m)

INPUT

- State of the art semiconductor technology (IGBT) Rectifier
- Power Factor Correction (PF=1)
- 95% efficiency
- 4 Quadrant Operation (better response of the system and safer operation for NBPT)
- Low input harmonics (<1.5% THDi), to comply with the strictest regulations @ any load.

OUTPUT

- Voltage compensation (Load Dependent or via Remote Feedback – Real PLUG & PLAY connect GPU to aircraft and voltage compensation is done automatically, no user adjustment required or additional accessories)
- 4 Quadrant Operation (better response of the system and safer operation for NBPT)
- Vector control Inverter for better response and higher efficiency.

EFFICIENCY

- Up to 94% - 30KVA to 90kVA @ load PF=0.8 to 1.0
- 90% - < 30 kVA @ load PF=0.8 to 1.0
- Green Standby Function - losses: 20 W
- No load losses: <1.5 kW.

PROTECTION AND SAFETY (GPU)

- Enclosure Protection class up to IP55
- No break power transfer compatibility (NBPT)
- Over/under voltage at output
- Overload capability designed for:
 - Power stage 150% - Continuous
 - Magnetics 120% - Continuous
- Regulator Overload protections set at:
 - 120% for 600seconds
 - 150% for 60 seconds
 - 200% for 2 seconds
- Variable fan speed for internal temperature control
- Over temperature protection
- Short circuit proof by electric current limiting and shutdown
- 90% switch interlock

OPTIONAL

- Neutral voltage supervision
- Broken neutral supervision
- Leakage current supervision.

PROTECTION AND SAFETY (DC)

- Over/under voltage at input
 - Under voltage <20V (4 sec)
 - Over voltage >34V (4 sec)
 - Short Circuit <5V (4 sec)
- Overload capability designed for:
 - Power stage 150% - Continuous
 - Magnetics 120% - Continuous
- Overload protections set at:
 - 125% for 600seconds
 - 150% for 60 seconds
 - 400% for 5 seconds
- Over temperature protection.

INTERFACE AND COMMUNICATIONS

- RS232

MISCELLANEOUS

- MTTR: 20 minutes

OPTIONAL FEATURES (DC)

- Output
 - 28 VDC, 600 A output | 2000 A Crank (DC and AC simultaneous output)
 - Dual output (400Hz)
- Communications
 - Monitoring by Web and SNMP
 - MODBUS Rs485
 - MODBUS TC/IP
 - Remote control box
 - Billing System
- Military Interlock

NORMS AND STANDARDS

- **ISO 6858-1982** Aircraft - Ground support. electrical supplies - General requirements.
- **ISO 6858-1982** Aircraft - Ground support. electrical supplies - General requirements.
- **BS 2G 219:1983** Specification for general requirements for ground support electrical supplies for aircraft.
- **MIL-STD-704F:2004** Aircraft Electric Power Characteristic.
- **SAE ARP 5015A:2003** Ground Equipment - 400 Hertz Ground Power Performance Requirements.
- **IEC 62040-1:2008** Uninterruptible power systems (UPS). Part 1: General and safety requirements for UPS.
- **IEC 61558-2-6:2009** Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1100 V. Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers.
- **IEC 61000-6-4:2006 +AMD1:2010** Electromagnetic compatibility (EMC). Part 6-4: Generic standards- Emission standard for industrial environments.
- **IEC 61000-6-2:2016** Electromagnetic compatibility (EMC). Part 6-2: Generic standards - Immunity for industrial environments.

SPECIFICATIONS



GPU

INPUT

3 phase 400V/415V AC	± 15%*
45Hz up to 65Hz	
Input current harmonics	<2% @ 100% load

OUTPUT

3 phase 200V AC -400Hz	± 1%*
Overall Efficiency	90%-95%
Max. Crest Factor	1.4:1

RECTIFIER

4 Quadrant Operation	
AC Voltage Range	-25% + 10%
Efficiency	%95%-97%
Overload Capacity	120% Continuous
Inrush Current	None
Overall current limit	150%

INVERTER

Static Regulation 0 - 100% load	± 1%
Dynamic regulation 100%	5%, recovering to 1% within 20ms
Total harmonic distortion	Better than 3% (Linear Load)
Electronic Limit Overload	120% @ 600s; 150% @ 60s; 200% @ 5s*
Overload Capacity (IGBTs)	150% Continuous
Frequency stability	± 0.01% Crystal Controlled
Load power factor	0-1
Efficiency	95%-98%
Short circuit proof by electric current limiting and shutdown	

DC

INPUT

3 phase 3 wire	
3 phase 400V/415V AC	± 10%*
150Hz or 60Hz	± 5% (frequency independent)
Input current harmonics	<1.5% @ nominal current

OUTPUT

Output 28.5VDC	
Continuous current capability (@28.5VDC)	300A/600A
Maximum Current Limit (@28VDC)	1200/2000A for up to 5sec
Current Limit adjusting steps (from 600A)	300A
Voltage regulation up to 600A	± 0.5%
Efficiency (@600A)	90%
Ripple	<0.5%
Dynamic Recovery to 90% VDC	<40ms
Voltage Compensation	0-4V up to 600A (remote feedback)
Galvanic Isolation	800Hz Transformer
IGBT + DIODE Rectifier	<0.5%

ENVIRONMENTAL CONDITIONS

Temperature range	
Sea Level	-40°C to +50 °C (@100% Load)
Above 2000m	30 °C (@100% Load)
Relative Humidity	0%-90% without condensation
Noise Level	<65 dBA @ 1 meter
Altitude	up to 2500 m without de-rating

* Other voltages and frequencies available on request. | * Other Electronic Overload limits available on request



TECHNICAL DRAWINGS

