



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

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.



## 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.



## NORMS AND STANDARDS

- AVIATION**
- DFS400 - Specification for 400 Hz aircraft power
  - ISO 6858 - Aircraft ground support electric supplies
  - SAE ARP 5015 - Ground equipment 400 Hz ground power performance requirement

- MILITAR**
- MIL-STD-704 - Aircraft electric power characteristics

- EMC**
- EN61000-6-4 - Electromagnetic compatibility - Generic emission standard
  - EN61000-6-2 - Generic immunity standard

- SAFETY**
- IEC 60529 - Degrees of protection provided by enclosures (IP Code)
  - IEC 62477-1 - Safety requirements for power electronic converter systems and equipment

- ENVIRONMENTAL**
- Dry heat test (steady state) IEC 60068-2-2:2007 subclause 5.3
  - Damp heat test IEC 60068-2-78:2012 subclause 6
  - Vibration test IEC 60068-2-6:2007 subclause 6
  - Salt mist test IEC 60068-2-52:1996 subclause 6
  - Dust and sand test Test Lc1 of IEC 60068-2-68



## 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.



## TECHNOLOGY (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



## TECHNOLOGY (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.

# SPECIFICATIONS

## GPU

### INPUT

- 3 phase 400V/415V AC |  $\pm 10\%^*$
- 50/60Hz |  $\pm 10\%$
- Input current harmonics |  $< 2\%$  @ Full Load

### OUTPUT

- 3 phase 200V AC -400Hz |  $\pm 1\%^*$
- Overall Efficiency | 90%-95%
- Max. Crest Factor | 1.4:1

### RECTIFIER

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

### INVERTER

- Static Regulation 0 - 100% load |  $\pm 1\%$
- Dynamic regulation 100% | 10%, 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 |  $\pm 0.01\%$  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 |  $\pm 10\%^*$
- 50Hz or 60Hz |  $\pm 5\%$  (frequency independent)
- Input current harmonics |  $< 1.5\%$  @ nominal current

### OUTPUT

- Output 28.5VDC
- Continuous current capability (@28.5VDC) | 300A/600A/800A
- Maximum Current Limit (@28VDC) | 1200/2000A for up to 5sec
- Current Limit adjusting steps (from 800A) | 300A
- Voltage regulation up to 600A |  $\pm 0.5\%$
- Efficiency (@600A/800A) | 80%-90%
- Ripple |  $< 0.5\%$
- Dynamic Recovery to 90% VDC |  $< 40\text{ms}$
- Voltage Compensation | 0-4V up to 600A (remote feedback)
- Galvanic Isolation | 800Hz Transformer
- IGBT + DIODE Rectifier |  $< 0.5\%$

### ENVIRONMENTAL CONDITIONS

- Coolant temperature (max) | Forced air up to 40°C
- Ambient temperature (min/max) | -40°C to +40°C
- Relative humidity (min/max) | 0% to 90% without condensation
- Pollution degree | 2
- OVC (Overvoltage Category) | 3
- Altitude | Up to 2000m

\* Other voltages and frequencies available on request

\* Other Electronic Overload limits available on request

# TECHNICAL DRAWING

