

# RBC8000/28M 30, 45, 60 & 90 KVA SOLID STATE 400HZ GROUND POWER UNIT

## FREQUENCY CONVERTERS

### PRODUCT DESCRIPTION

Red Box and its partners have 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.

Our RBC8000/28M Mobile Ground Power Units deliver an output of 200V phase 400Hz and 28V DC to the aircraft through a SINGLE or DUAL OUTPUT contactor and can be connected to a standard 380V to 415V 3 phase 50Hz mains or other.

RBC8000/28M Mobile - Ground Power Units use High frequency IGBT Technology (Rectifier and inverter) to guarantee a sinewave input with low THDi (THDi<1.5%) and unit power factor (PF=1), perfect for civil airports and military applications as we guarantee a minimum impact on the mains or other power sources upstream.



### Models

- **RBC8030/28/1200M** 30KVA and 28 V DC 300A  
Continuous and 1200A peak
- **RBC8030/28/2400M** 30KVA and 28 V DC 600A Continuous and 2400A peak
- **RBC8045/28/1200M** 45KVA and 28 V DC 300A Continuous and 1200A peak
- **RBC8045/28/2400M** 45KVA and 28 V DC 600A Continuous and 2400A peak
- **RBC8060/28/1200M** 60KVA and 28 V DC 300A Continuous and 1200A peak
- **RBC8060/28/2400M** 60KVA and 28 V DC 600A Continuous and 2400A peak
- **RBC8090/28/1200M** 90KVA and 28 V DC 300A Continuous and 1200A peak
- **RBC8090/28/2400M** 90KVA and 28 V DC 600A Continuous and 2400A peak

### Highly Efficient and Fully Compliant GPU

- CE Mark Certified (IEC 61000-6-4:2006+AMD2010 - Electromagnetic compatibility (EMC). Part 6-2: Generic standards - immunity for industrial environments; Low Voltage Directive (LVD) 2014/35/EU
- 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
- Green standby function (20W power consumption when GSF is activated)
- Low noise emission (<65dBA@1m)

### Power Quality 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 at any load.

### Output

- Voltage compensation (Load dependent or via remote).  
Feedback - Real plug and 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 at load PF= 0.8 to 1.0
- 90% < 30kVA at load PF= 0.8 to 1.0
- Green standby function - losses: 20W
- No load losses <1.5 kW

### Protection and Safety

- Enclosure Protection class up to Ip55
- No break power transfer compatibility (NBPT)
- Over/under voltage at output
- Overload designed for:
  - Power stage 150% - Continuous
  - Magnetics 120% - Continuous
  - Regulator overload protections set at:
    - 120% for 600 seconds
    - 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
- Neutral voltage supervision
- Broken neutral supervision
- Leakage current supervision

### Norms and Standards

- DFS400- Specification for 400Hz aircraft power.
- ISO 6858-1982 - Aircraft - Ground Support electrical supplies -General requirements
- MIL-STD-704F:2004

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## FREQUENCY CONVERTERS

- BS 2 G 219:1983 - Specification for general requirements for ground support electrical supplies for aircraft
- 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 equipment for UPS
- IEC 61558-26:2009 - Safety of transformers, reactors, power supply voltages up to 1100V. Part 2-6 - Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers
  - IEC61000-6-4:2006 + 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

### Interface and Communications

- Rs232

### Miscellaneous

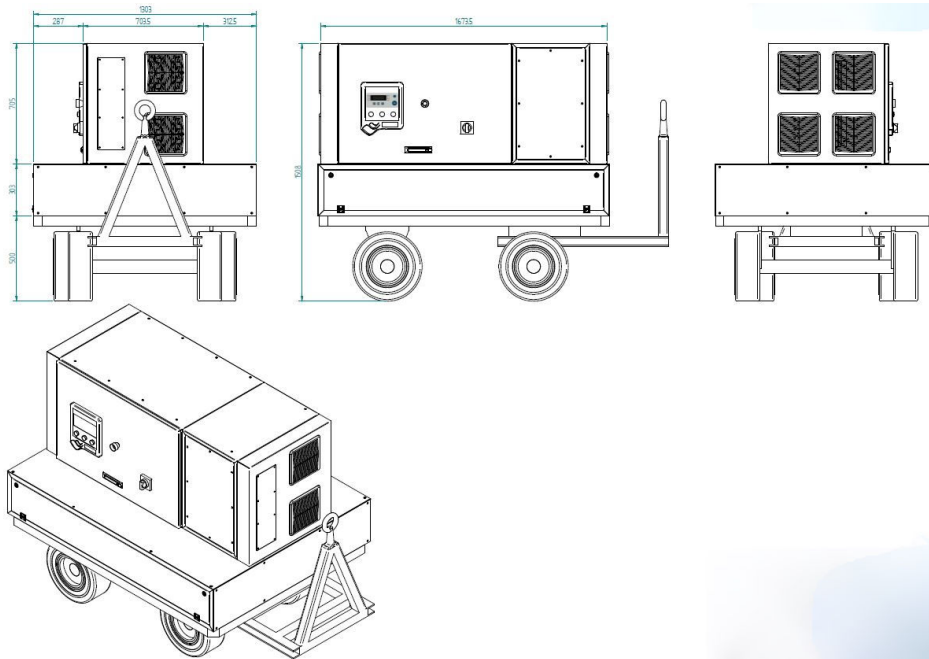
- MTTR: 20 minutes

### Optional Features

- Communications
  - Monitoring by web and SNMP
  - MODBUS Rs485
  - MODBUS TC/IP
  - Remote control box
  - Billing System
- Military Interlock

## Specifications

- DFS400 - Specification for 400 Hz aircraft power.
- ISO 6858-1982 - Aircraft - Ground support electrical supplies - General requirements.
- BS 2 G 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 safety requirements for UPS.
- IEC 61558-2-6:2009 - Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1100V. Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers.
- IEC 6100-6-4:2006+AMD1:2010 - Electromagnetic compatibility (EMC). Part 6-4: Generic standards - Emission standard for industrial environments.
- IEC 6100-6-2:2016 - 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 ..... <1.5% @100 load

#### Output

3 phase 200V AC -400Hz..... +1%\*  
Overall efficiency.....87%-94%  
MAX. Crest Factor.....1.4:1

### Rectifier

4 Quadrant Operation  
AC Voltage Range.....-25% +10%  
Efficiency..... 93%-95%  
Overload Capacity.....150% Continuous  
Inrush current.....None  
Overall current limit.....120% Continuous

### Inverter

Static regulation 0-100% load.....5%, recovering to  
1% within 20ms  
Total harmonic distortion.....<2% (Linear Load)  
Electronic Limit Overload.....120% @ 600s,  
150% @ 60s, 200% @ 2s\*  
Overload Capacity (IGBTs).....150%  
Continuous  
Frequency stability.....+ 0.01% Crystal Controlled  
Load Power factor.....0-1  
Efficiency..... 93%-98%  
Short circuit proof by electric current limiting and  
shutdown

### DC

#### Input

3 phase 3 wire  
3 phase 400V/415V AC..... +10%\*  
50Hz or 60Hz..... +5% (frequency independent)  
Input current harmonics..... <1.5% at nominal  
current (sinusoidal)

#### Output

Output 28.5VDC  
Continuous current capability (at 28.5VDC).....300A/600A  
Maximum Current Limit (at 28VDC).....1200/2000A for up to 5 sec  
Current limit adjusting steps (from 600A).....300A  
Voltage regulation up to 600A.....+0.5%  
Efficiency (at 600A).....90%  
Ripple.....<0.5%  
Dynamic recovery to 90% VDC  
Voltage Compensation.....0-4V up to 600A (remote feedback)  
Galvanic Isolation.....80Hz Transformer  
IGBT + DIODE Rectifier.

### Environmental Conditions (GPU & DC)

Temperature range  
Sea level.....-40°C to +50°C (@100% Load)  
Above 2000m...35°C (@100% Load)  
Relative Humidity....0%-90% without condensation  
Noise level..... <65 dBA@1 meter  
Altitude.....up to 2500m without de-rating