



MAK has been developing and manufacturing Aircraft Ground support equipment and special equipments for defence projects since over 4 decades with a product line of GPUs, ASUs , ACUs and Apron tractors., Power Supply Units, Liquid to refrigerant cooling systems , High temperature test chambers and executed many other special projects over time.

We have product presence in 36+ countries and our equipments are being operated by major airlines and ground handling companies at airports across the globe. We provide technical support vide email , phone 24 x 7 and have regional offices at strategic locations in the world to provide timely support for our customers.

MAK's SFCs are designed with power factor correction to guarantee a perfect sinusoidal input current from 25% to 250% load and low THDi (<3%) ensuring high quality, maximum efficiency and secure electrical power supplies

Salient 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 < 3 %)
- **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 (Optional)
- **Green Standby Function** (20W power consumption when GSF is activated)
- **Low noise emission** (<65dBA@ 1m)

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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 @ 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 95% - 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:

- Enclosure Protection class up to IP 55
- No break power transfer compatibility (NBPT)
- Over/under voltage at output
- Overload capability designed for:
 - Power stage 150% - Continuous
 - Magnetics 120% - Continuous
- Overload protections set at:
 - 125% for 60seconds
 - 150% for 5 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

INTERFACE AND COMMUNICATIONS:

- MODBUS TC/IP
- RS232

OPTIONAL FEATURES

OUTPUT

- 28 VDC, 600 A output | 2000 A Crank (DC and AC simultaneous output)
- Dual output (400Hz)

COMMUNICATIONS

- Monitoring by Web and SNMP (optional)
- MODBUS RS485
- Remote control box
- Billing System

MILITARY INTERLOCK

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

NORMS AND STANDARDS:

- DFS400 Specification for 400 Hz aircraft power
- ISO 6858 Aircraft ground support electric supplies
- BS 2G 219 General requirements for ground support equipment
- MIL-STD-704 Aircraft electric power characteristics
- SAE ARP 5015 Ground equipment 400 Hz ground power performance requirement
- EN62040-1-1 General & safety requirement
- EN61558-2-6 General & safety requirement
- EN61000-6-4 Electromagnetic compatibility – Generic emission standard
- EN61000-6-2 Electromagnetic compatibility – Generic immunity standard



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Specifications

Input

3 phase 400V/415V AC ± 15%*
 45Hz up to 65Hz..... ± 5%*
 Input current harmonics..... <3% @ 100% load

Output:

3 phase 200V AC -400Hz ± 1%*
 Overall Efficiency 87%-95%
 Max. Crest Factor 1.4:1

Rectifier:

4 Quadrant Operation
 AC Voltage Range..... - 25% +10%
 Efficiency..... 93%-97%
 Input Frequency Deviation..... ±5%
 Overload Capacity..... 150% Continuous
 Inrush Current..... None
 Overall current limit..... 120% Continuous

Inverter:

Static Regulation 0 - 100% load..... ± 1%
 Dynamic regulation 100%.....5%,recovering to 1%
 within 40 ms
 Total harmonic distortion..... < 2% (Linear Load)
 Electronic Limit Overload..... 120% @60s;
 150% @5s;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

Environmental Conditions:

Temperature range
 sea level:..... -40°C to +55 °C(@100% Load)
 Above 2000m:..... 35 °C (@100% Load)
 Relative Humidity 10%-100%
 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



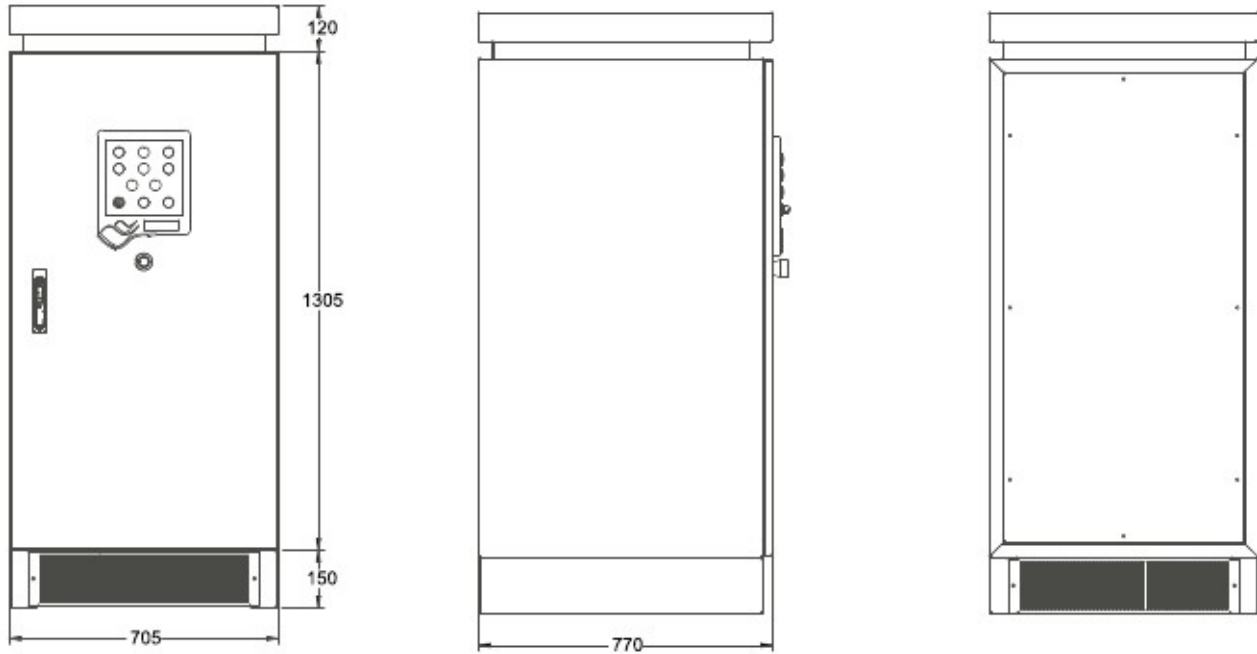
MAKSFC 90

10 to 120kW SOLID STATE 400HZ GROUND POWER UNIT

(ISO 9001 : 2008

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INDOOR/OUTDOOR/AERONAUTICAL APPLICATION



Note: Due to continuous development, the dimensions, layout, configuration and specifications are subject to change without notice.