

Manufactured by:

MAKELSAN
Uninterruptible Power Supplies

BOXER SERIES

ONLINE UPS

10-600kVA



- True On Line-Double Conversion Technology (Class VFI-SS-111)
- IGBT PWM Rectifier & Inverter Technology
- DSP Control
- Low Input Current THD (<3%)
- High Input Power Factor (>0.99)
- High Efficiency up to 93%
- Optional Dual Input
- Wide Input Voltage Range
- Advanced Battery Management
- Short Circuit and Overload Protection
- Unlimited Number of Parallelable Modules
- Selectable Number of Batteries
- 500 Real Time Event Log with Detailed Parameters
- Static & Manual Bypass Operation
- Overload and Short Circuit Protection
- Small Footprint and Easy Maintenance
- Advanced Communication Capabilities
- Perfect Generator Compatibility
- Customized as Frequency Converter

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The Boxer Series An Advanced UPS Technology

Boxer Series is a true Online Double Conversion, new generation fully digital controlled UPS. Its highly flexible design meets high efficiency and high availability power needs of a wide variety of critical applications and delivers an advanced power solution with low cost of ownership.

High Performance Power Protection Designed for Maximum Efficiency and Flexibility

Equipped with its new IGBT rectifier Boxer series keeps your critical loads while its space-saving compact design and front access for maintenance successfully reduce mean time to repair (MTTR).

Thanks to the wide variety of accessories and options Boxer Series presents maximum flexibility advantage to users and optimizes total cost of ownership.

- **DSP Power Factor Corrected IGBT Rectifier**

IGBT based power factor correction technology provides Input Power Factor close to 1 (≥ 0.99) and keeps Input Current Total Harmonic Distortion (THDi) less than 3%, that helps to avoid the disturbance.

- **Low Input Current THD**

(THDi) less than 3% avoids the disturbance to connected loads.

- **Digital Control System**

All of the control functions for Boxer Series UPS including power-on, start-up control, input stage power factor control, battery charging and boosting control, output stage ac voltage regulation and shut-down control, can be realized by using a single DSP control board.

- **High Input Factor**

0.99 Input power factor ensures clean and sinusoidal input current. The high input power leads to reduced electricity pay-out, minimizes cable, switchboard, fuse and generator requirements, thus reducing investment cost.

- **High Efficiency & Low Total Cost of Ownership**

With its high efficiency up to 93% Boxer Series UPS consumes less energy to supply the loads. Thanks to its high efficiency rate, the percentage of energy that is produced as heat is reduced to a minimum. As a result of decreased heat emission users can reduce their electricity usage and air conditioning requirements.

- **Static & Manual (Maintenance) Bypass**

Boxer Series includes standard static and manual bypass. Static bypass provides safe failure to mains if the UPS is overloaded or develops a fault condition. Where EMI filters are used to help neutralize spikes and electrical noise, the load may be routed through bypass to provide further protection. Manual bypass is used to power down the UPS without interrupting the power to the load. With this feature it is completely safe for the personnel to work on the faulty UPS.

- **Flexibility**

Boxer is compatible with wide range of application. Flexibility achieved through many choices, including type of battery, single or multi-unit configuration, accessories and options.

- Frequency converter mode
- Optional temperature sensor for external battery cabinets (to assist the recharge voltage compensation)
- Additional battery chargers to optimize charge time
- Optional separated bypass
- Isolation transformers to vary neutral connectivity in the event of separate power sources or for galvanic isolation between input and output.
- Battery cabinets of different sizes and capabilities, for providing extended runtimes.



	THD	Power Factor
Boxer with IGBT Rectifier	<3%	<0.99
Traditional UPS with Input Filter	<10%	<0.95
UPS without Input Filter	<25%	<0.85

- **Auto Restart**

When the main and bypass sources fail, the UPS draws power from the battery system to supply the load until the batteries are depleted. When the UPS will reach its end of discharge, it will shut down.

The UPS will automatically restart and enable output power:

- After utility power is restored
- After the "Auto Start Delay Time" is expired (the default delay is 5 minutes).

- **Perfect Generator Compatibility**

Boxer Series is perfectly compatible with diverse sources, especially with generators. When generator power is used, thanks to its robust IGBT rectifier, it ensures clean, uninterrupted power to protected equipment.

With high input power factor performance of Boxer Ups series it is enough to choose generator with power only 20% higher rated than the UPS.

Boxer Series has the ability to adjust power walk-in from 5 to 15 seconds, along with reduced input current distortion.

- **EPO (Emergency Power Off)**

EPO function is designed to switch off the UPS in emergency conditions (fire, flood, etc.). The system will turn off the rectifier, inverter and will stop powering the load immediately (including the inverter and bypass) also the battery stops charging or discharging.

- **Reverse Energy Tolerance for Regenerative Loads**

The Boxer UPS can be used with regenerative loads, such as synchronous motors. The regenerative loads pump the energy back to mains. traditional Ups systems burn this feedback energy this causes lower efficiency. Boxer Series Ups with IGBT rectifier are able to absorb intermittent load generated power. Additionally, this reverse power tolerance permits execution of important system operations like closed transition transfers of the UPS load directly to an engine generator source.

- **Advanced User Interface**

Boxer Series UPS has large and user-friendly 320x240 LCD display that provides operating information in four different languages. Thanks to this advanced LCD display all parameters of working device can be monitored and controlled. UPS is capable of recording up to 500 events.

- **Advanced Battery Management**

Boxer Series guarantees enhanced battery life and maximizes battery performance, life span and reliability through intelligent precision charging. Temperature Compensated Battery Charging monitors performing measurement to external and internal battery temperature and adjusting the charge current rate accordingly. Advanced battery management provides real-time information about battery capacity and back up time, this information can be seen on LCD panel. The Ups tests the batteries at adjustable periods without switching off the system, the test periods can be set by users.

- **Parallel Operation**

Boxer Series features easy and simple scalability and redundancy. It is ready to grow with your business demands. Different power rated units and any number of UPS can be connected in parallel. **Power increase:** The UPS's can be connected in parallel to increase total capacity of the system. If one of the devices goes out of order, the critical loads are transferred to by-pass.

Parallel Operation Features:

- Internal standard parallel microprocessor for all models.
- Up to 16 units parallelable
- Parallel connection with ring cable
- Autosensing disconnected parallel cable
- Equal current share with DSP control
- Easy power upgrade without any interruption
- All parallel systems can be controlled from the front parallel of one unit
- Full synchronization of parallel units
- Isolated parallel operation card
- Static by-pass for all units



MODEL																
Capacity	10kVA	15kVA	20kVA	30kVA	40kVA	60kVA	80kVA	100kVA	120kVA	160kVA	200kVA	250kVA	300kVA	400kVA	500kVA	600kVA
Power Watt	8kW	12kW	16kW	24kW	32kW	48kW	64kW	96kW	120kW	120kW	160kW	200kW	240kW	320kW	400kW	480kW
INPUT																
Input Voltage Range	220/380VAC - 15% + 18% 3P+N+PE Optional 220/380VAC -37% +22% 3P+N+PE															
Input Power Factor	At Full Load >.099															
Input Frequency Range	45 - 65 Hz (Selectable)															
Rectifier	IGBT															
Total Harmonic Distortion (THDi)	<3%															
OUTPUT																
Output Voltage Range	220 / 380VAC, 230 / 400VAC and 240 / 415VAC 3 Phase + N ± 1%															
Recovery	0% - 100% - 0% Load, Maximum Output Tolerance 5%, 1% Back to Band <40ms															
Efficiency	Up to 93%, Eco Mode 98%															
Output Frequency Range	60Hz ± 0.5% Synchronous With the Network / 60Hz ± 0.01% Battery Mode															
THD (THDv)	Lineer Load <2% Non-Lineer Load <5%															
Crest Factor (CF)	3:1															
Overload Capacity*	At 125% Load 10min, at 150% Load 1min															
BATTERY																
Quantity (12V DC VRLA)	2x31															
Charge Value (C)	Nominal 0,1,C, Adjustable															
Battery Power	25% of the Device Power															
Internal Battery	62 x 7Ah or 9Ah								Not Available							
COMMUNICATION																
Communication Port	RS232 Standard, RS485 and SNMP Adapter Option															
Dry Contact	Optional															
Protocol	SEC, TELNET															
STANDARDS																
Quality	ISO 9001 - ISO 14001 - ISO 18001															
Performance	EN62040-3 (VFI-SS-111)															
EMC/LVD	EN62040-2 / EN62040-1 EN60950															
GENERAL																
Running Temperature	For UPS 0°C ~ 40°C For Battery 0°C ~ 25°C															
Storage Temperature	For UPS 15°C ~ 45°C For Batteries -10°C ~ 60°C															
Protection Class	IP20															
Chassis	Anti-Static Paint Protection															
Humidity	0-95%															
Altitude	<1000m, Correction Factor 1.<2000m, Correction Factor >0.92, <3000m; Correction Factor >0.84															
Alerts	500 Event Log															
Parallel Operation	Parallel Power Increase up to 16pcs.															
EPO (Emergency Power Off)	Standard															
Isolation Transformer	Optional															
Net Weight (kg)	100	100	110	120	125	125	285	305	310	475	485	650	700	850	1350	1400
Dimensions (WxDxH) (mm)	460 x 805 x 1190						880 x 770 x 1660			1055 x 815 x 1905			1250 x 815 x 1905		1830 x 850 x 2010	
*under certain conditions																
3 Phase in / 1 Phase Out Version is Available. (10 to 30kVA)																