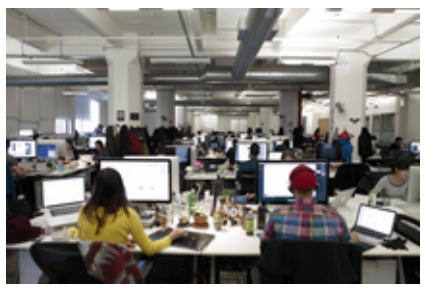
UPS-MAK Knight & Custos Series UPS Solutions

2 kVA / 1600 Watt and 1800 Watt UPS Solution

MAK POWER SYSTEMS
www.mak-powersis.de

- 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 Paralleled Modules
- Selectable Number of Batteries
- 100 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
- Customizable as Frequency Converter
- Industrial Application, Data Centers, Military Usage and Customized

Marine Applications



Office Computers

Hospital Solutions

2 kVA 1600 Watt & 1800 Watt / Rack and Tower Model

UPS-MAK Knight 2 kVA 1600 Watt

UPS-MAK Custos 2 kVA 1800 Watt

Technical Advantages of UPS-MAK Knight & Custos Series

The UPS-MAK Knight & Custos Series An Advanced UPS Technology

Knight & Custos Series is a true Online Double Conversion, new generation fully digital controlled UPS. Its highly flexible design meets high efficiency and high availibility 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 Marine PL series keeps your critical loads protected 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 knight 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 PL Marine 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 Power 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.

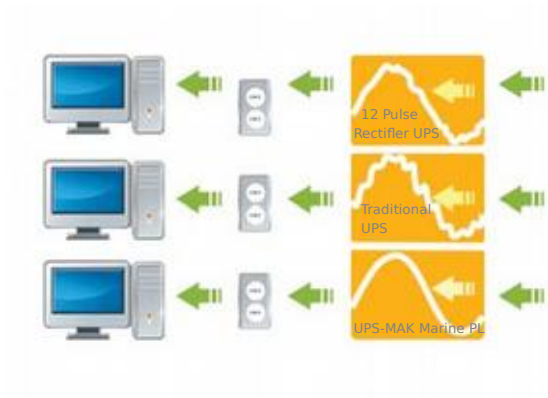
◎ High Efficiency & Low Total Cost of Ownership

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

◎ Flexibility

UPS-MAK knight 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 capacities, for providing extended runtimes.



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

◎ Static & Manual (Maintenance) Bypass

Knight & Cutos 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 to neutralize spikes and electrical noise, the load may be routed through bypass to provide further protection. Manual bypass function is intended only for maintenance work, this bypass supply is incorporated into the Knight & Custos UPS design. 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 technical personnel to work on the faulty UPS.

Technical Advantages of UPS-MAK Knight & Custos Series

◎ 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 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

Knight 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 PL Ups series it is enough to choose generator with power only %20 higher rated than the UPS.

PL 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 knight series 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 and this causes lower efficiency. PL Marine 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

Knight 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

Knight Series guarantees enhanced battery life and maximizes battery performance, life span and reliability through intelligent precision charging. Temperature Compensated Battery Charging monitors performing measurement of 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

Kniht 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 panel of one unit
- ◎ Full synchronization of parallel units
- ◎ Isolated parallel operation card
- ◎ Static by-pass for all units

Model & Technical Details of UPS-MAK Knight & Custos Series

Capacity	2 kVA Single Phase / Pure Sinus Wave	
Power Watt	1600 Watt	1800 Watt
INPUT		
Input Voltage Range	Selectable From Screen: 220V or 230V L1 / N+PE “@%50 Load = 110VAC – 300VAC & @%100 Load = 176VAC - 300VAC”	
Input Power Factor	At Full Load >0.99	
Input Frequency Range	46 – 54Hz or 56Hz or 64Hz	
Rectifier	IGBT	
Total Harmonic Distortion (THDi)	>%2 With Linear and >%4 With Non Linear Load	
OUTPUT		
Output Voltage Range	Selectable From Screen: 220V or 230V or 240V AC & 50Hz or 60Hz / %1 Output Tolerance	
Recovery & Transfer Time	0% - 100% - 0% Load, Maximum Output Tolerance 1%, 1% Back to Band <0ms & 0 Milisecond, Online Mode	
Efficiency	“Online Mode Up to 89%” , “Battery Mode 88%”	
Output Frequency Range	50Hz or 60 Hz ±0.5% Synchronous With the Network / 50Hz ±0.01% Battery Mode	
THD (THDv)	Lineer Load <3%	
	Non-Lineer Load <6%	
Crest Factor (CF)	3:1	
Overload Capacity*	At 110% - 130% Load 30seconds then by-pass mode, <%130 Shots Down Immediately at Battery mode or Bypass on Utility mode	
BATTERY		
Quantity (12V DC VRLA)	1600Watt UPS 6 x 12 V AGM or GEL	1800 Watt UPS 4 x 12 V AGM or GEL
Charge Value (C)	Nominal 0,1 C, Adjustable	
Battery Power	1600Watt UPS Charger 1A or 2A or 4A or 6A or Higher	1800Watt UPS Charger 4A or 8A o Higher
Internal Battery	@ Full Load 1600 Watt with 72Vx9Ah Battery = 6.5 Minutes	1800 Watt with 48V 9Ah Battery = 4.5 Minutes
COMMUNICATION		
Communication Port	RS232 Standart,Optional RS485, SNMP Adapter Option & Dry Contact Card	
Dry Contact	Optional	
Protocol	SEC, TELNET...etc Optional	
STANDARDS		
Quality	ISO 9001 - ISO 14001 - ISO 18001	
By Pass	Static and Manual	
EMC/LVD	EN62040 - 2 / EN62040 -1 EN60950 EN62040 -3 (VFI-SS-111)	
GENERAL		
Running Temperature	For UPS 0°C~40°C	
Storage Temperature	For UPS 15°C ~45°C For Batteries 0°C~45°C	
Protection Class	Standard IP20	
Chassis & Humidity	Anti-Static Paint Protection &0-100%	
Screen	Standard 320mm x 240mm,	
Altitude	<1000Meter @35°C & <1500Meter @30°C & after 1500Meter for Each Meter %1 Loss	
Alerts	100 Event Logs & 50Parameters for Each Log “As Excel Sheet”	
Parallel Operation	Optional Parallel Power Increase up to 2pcs. And Customized Solutions As Well	
EPO (Emergency Power Off)	Standard EPO / <40°C =Correction Factor 1. & <45°C Correction Factor >0.90 & <50°C Correction Factor >0.60	
Isolation Transformer	Optional: Output Isolation Transformer	
Net Weight (kg)	1600Watt UPS 26kg Packed: 30kg / Batt Cab: 26kg Packed: 30kg	1800Watt UPS 15kg Packed: 18kg / Batt Cab: 21kg Packed: 26kg
Dimensions (WxDxH) (mm)	1600Watt UPS: W119 x D419 x H318 Packed: Batt Cabinet Same	1800Watt UPS: W438 x D480 x H88 Packed: Batt Cabinet Same
*under certain conditions	**We can Adjust the UPS and Battery Cabinet, Pleas Let Us Know If You Have a Special Dimensions**	

* 3 Phase in / 1 Phase Out Version is Available. (10 to 30kVA)

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