MAKELSAN®

Uninterruptible Power Supplies/Diesel Generators

POWER FOR LIFE

www.makelsan.com.tr

PRODUCT CATALOGUE

Index

COMMITMENT TO POWER QUALITY AND INNOVATION

AT MAKELSAN, WE ARE COMMITTED TO PROVIDE COMPLETE ENERGY SOLUTIONS THAT GUARANTEE POWER QUALITY FOR ALL CRITICAL APPLICATIONS. THE FIRST CLASS MANUFACTURING FACILITY HEADQUARTERED IN ISTANBUL, WHERE EUROPE AND ASIA MEET, IS ONE OF THE FASTEST-GROWING METROPOLITAN ECONOMIES IN THE WORLD, WE ARE PROUD TO KEEP INVESTING IN TECHNOLOGY AND PRODUCTION AND WE PROVIDE HIGH QUALITY WITH FAST DELIVERY TO OUR WORLDWIDE CLIENTS.

Headquarter Office

A SPECIALIST IN POWER ELECTRONIC

Complete Energy Solutions Provider

LEADING MANUFACTURER OF UNINTERRUPTIBLE POWER SUPPLIES SINCE 1976

Makelsan was founded in 1976 with the aim of designing electrical power systems. Today Makelsan is a leading European brand which manufactures a wide range of high technology Uninterruptible Power Supplies and power quality products from 650VA up to 8MVA.

Headquarted in Istanbul, Turkey, Makelsan combines R&D, manufacturing, global sales and aftersale service processes with more than 300 qualified professionals in a fully modernized 25.000 sqm factory equipped with state-of-art machinery.

Makelsan product range varies from Static & Dynamic Uninterruptible Power Supplies, Servo & Static Voltage Regulators to Renewable Energy Products, DC Power Supply, Telecom Equipments, Battery Chargers, Inverters and Datacenter Solutions.

With more than 25 area sales and service offices, 300 resellers in Turkey, over 100 global distributors worldwide and over 44 years experience in design, manufacturing and distribution in the power supply industry, Makelsan is committed to provide complete energy solutions that guarantee power quality for all kinds of critical applications.

Istanbul Headquarter & Factory

Largest Uninterruptible Power Supply Production Facility

Makelsan products are manufactured in Istanbul factory which is the largest UPS production facility of the region and all production process is monitored and developed according to ISO 9001 Quality Control System.

KEY FIGURES

44

years in the power industry

80

countries across the 6 continents

25.000

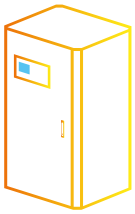
sqm production facility

10%

of turnover invested in R&D

300

certified support engineers through global service network



5000

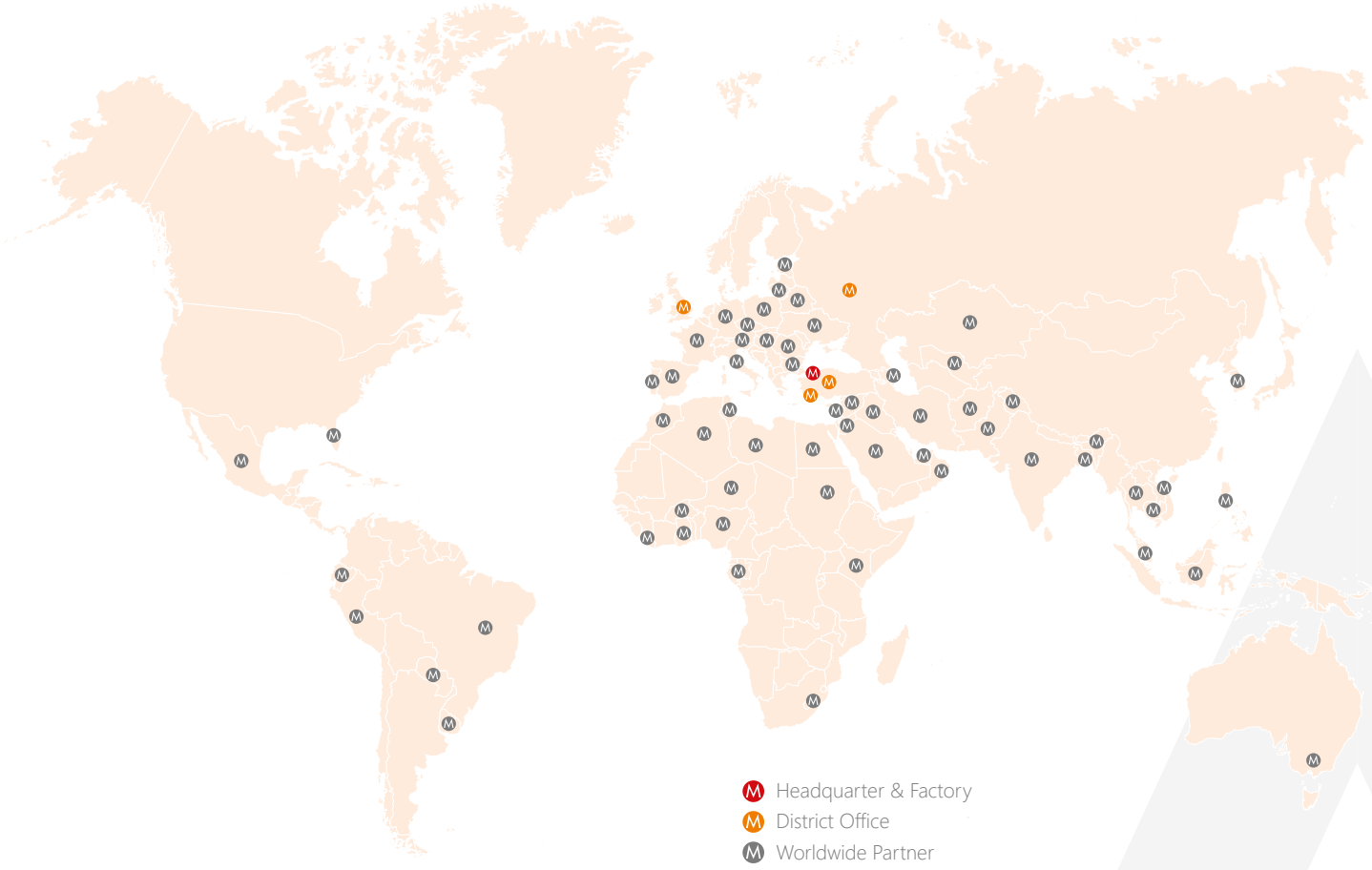
units of 3 phase Ups per year

Advanced Manufacturing

- 44 years experience in power electronic
- More than 300 employees, first-class manufacturing facilities equipped with state of art machinery and skilled staff.
- 5000 units of 3 phase ups production per year.
- Family owned, sole proprietor company allows to have full control of decisions on the processes.

Innovation & Flexibility

- Committed to develop leading technologies to make sure the customers get innovative and efficient products.
- Continuous investment in R&D (10% of turnover).
- Flexibility of customizing solutions, which makes the product easy to adapt to the customer requirements.



Global Sales & Distribution Network

- Export to more than 80 countries across the 6 continents.
- 4 subsidiaries in Europe.
- More than 100 global distributors.
- Over 300 certified support engineers and technicians from our global service network are available to make sure that you have the help you need for your power requirements.

International Standards

All Makelsan UPS sytems complies with EU directives concerning performance, safety, radio frequency emissions, electromagnetic compatibility (EMC), voltage peaks, over voltage and static charges.
EN 62040-1:2008.

R&D Test Laboratory

Factory Production Plant

OUR VALUES

Innovation and Continuous Improvement

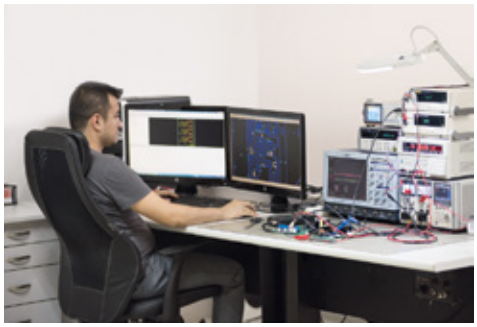
WORLD-CLASS R&D TO DEVELOP LEADING TECHNOLOGIES

Thanks to its world-class research and development center, Makelsan constantly innovates its product portfolio and ensure the customer's benefit through development and improvement of leading technologies.

Makelsan R&D is committed to meet global standards for technology and focuses on designing products that:

- Secures high quality power supply for any critical application.
- Are environment-friendly.
- Ensure comfort and customer satisfaction.
- Are affordable and comply with standards of the future.

> INNOVATION, QUALITY AND ECO-FRIENDLY PRODUCTS ARE THE FOUNDATION OF OUR BUSINESS APPROACH



R&D Center

Designers of Award Winning Power Protection Products

R&D Center in Istanbul is equipped with advance laboratories with sophisticated measuring equipments and real load test rooms. Makelsan R&D was awarded the "Innovation" prize by Turkish Electronics Industry Association (TESİD) in 2014, 2015, 2016 and 2017.

ADVANCED MANUFACTURING

Makelsan keeps investing in production system and improves productivity through the constant control of all processes and development of new technologies in order to achieve its commitment to provide complete energy solutions that guarantee power quality for all kinds of critical applications.

PCB Assembly Facility

Makelsan is equipped with the latest model SMD (Surface Mount Devices) placement machines which are capable of placing a wide variety of parts. SMT components are placed directly on the surface of a PCB instead of being soldered to a wire lead.

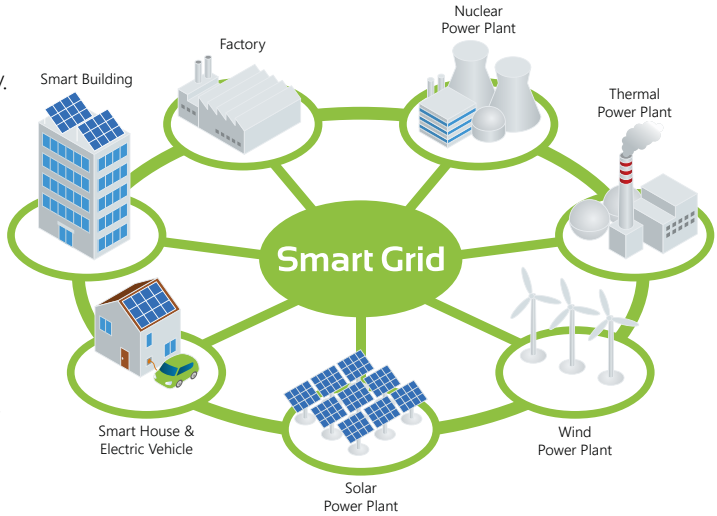
Environment Friendly Solutions

SMART GRID READY UPS SYSTEMS

Makelsan carries out to a policy of protection of its employees, the environment, natural resources, fauna and flora in all of its business activities and operations.
The environmental management system that Makelsan applies, is ISO14001 certified.

Makelsan focuses on R&D efforts that impacts in many aspects the environment:

- Developing new technologies for clean and renewable energy.
- Reducing energy consumption by highest possible operation efficiencies ensuring.
- Better performances than EU Code of Conduct on Energy Efficiency.
- Compatible UPS systems with today's Smart Grids which is an electricity distribution system that uses digital technology to eliminate waste, improve reliability and optimizes efficiency of the electric grid.



Heat Sink Manufacturing Facility

Makelsan's in-house CNC/VMC machining facility can produce the heat sink profiles to specifically fit its needs to lower the temperature of the electronic devices by dissipating heat into the surrounding air.

Transformer Manufacturing Facility

Makelsan designs and manufactures all kinds of choke coil transformers and wide range of single phase and three phase isolation transformers in house. Low Voltage and High Voltage windings are designed with Copper are Aluminium conductors.

Quality

INTERNATIONAL STANDARDS

Makelsan is committed to produce excellent products which are fully compliant with international standards and provide best level of service in both pre-sales and after sales periods to achieve highest level of customer satisfaction.

Makelsan is proud to have achieved the very highest of international standards in Quality Management, Environment Management in Occupational Health & Safety, Production, Local Compliances and continues to implement these practices for the benefit of employees, customers, suppliers and communities the company operate in.

MANAGEMENT

nqa. ISO 9001 Registered
nqa. ISO 45001 Registered
nqa. ISO 14001 Registered
TSE-HYB

PRODUCTS

BUREAU VERITAS Certification
TSE
CE
UL

LOCAL APPLIANCE

PG
SONCAP CERTIFIED

ENVIRONMENT

Higher Level of Efficiency than the EU CoC for AC Ups

LEVELUPS
SERIES

10-1000 kVA 3:3 PHASE

10-30 kVA 3:1 PHASE

ONLINE UPS

DATA CENTER · MEDICAL · TRANSPORT · INDUSTRY · EMERGENCY

Three LEVEL 3 UPS

kW=kVA

96% Efficiency

VFI TYPE — UPS ONLINE

TOWER

PF= 1.0 — POWER FACTOR

Service — SERVICE

HIGHLIGHTS

- True Three Level Rectifier and Inverter Technology
- Ultra High Energy Efficiency
- Full Rated Power Factor kW=kVA

Innovative 3 Level Technology

• LEVELUPS Series with Innovative 3 Level Technology is a true on-line double conversion, three-phase UPS system that provides one of the highest level energy efficiencies in the industry.

• Three level inverter & rectifier design LEVELUPS Series brings the newest power conversion technology and delivers efficiency up to 96% at 50-75% load operation which is the most common operating range.

CERTIFICATES

Higher Level of Efficiency than the EU CoC for AC Ups

BUREAU VERITAS Certification

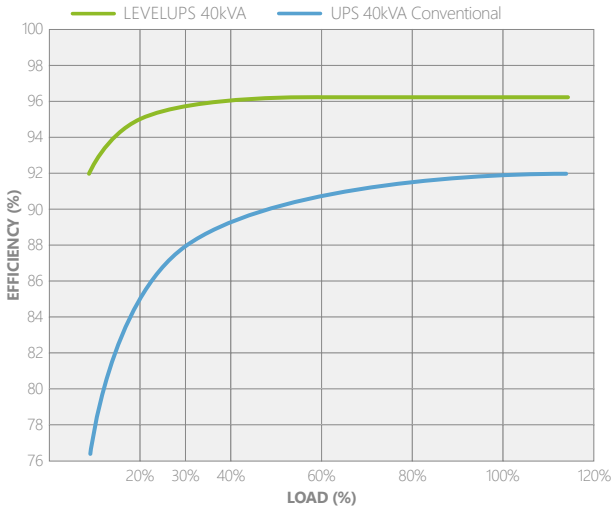
The LEVELUPS Series is attested by Bureau Veritas with regard to performance (EN 62040-3)

nqa ISO 9001 QUALITY MANAGEMENT · nqa ISO 45001 HEALTH & SAFETY MANAGEMENT · nqa ISO 14001 ENVIRONMENTAL MANAGEMENT

CE · TSE · TSE-HYB

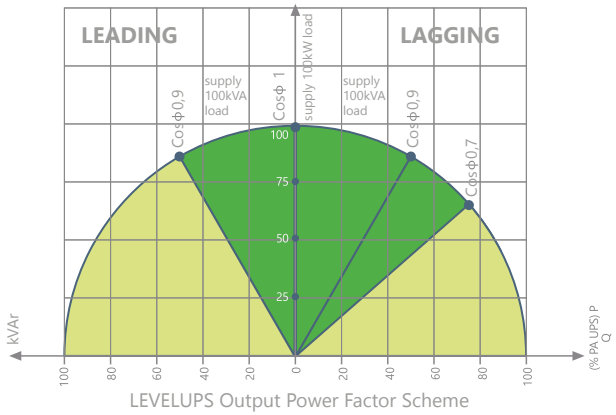
High Efficiency & Low Total Cost of Ownership

- Less energy consumption to supply the loads thanks to high efficiency up to 96%.
- Reduced energy loss.
- Reduced electricity usage and air conditioning requirements.
- Reduction in operating cost of UPS.
- IGBT based power factor correction technology provides input power factor close to 1 (≥ 0,99). The high input power leads to reduced electricity pay-out, minimizes cable, switchboard, fuse and generator requirements, thus reducing investment cost.
- Low input current total harmonic distortion (THDi) less than 3% helps to avoid the disturbance and expensive harmonic filters.
- Small footprint and easy maintenance.



High Output Power Factor 1

- Output power factor of 1 (kVA=kW) rate provides up to 25% more active power than a traditional UPS.
- Suitable for modern power supply application with unit or capacitive power factor (e.g. new servers generation).
- No reduction in active power from 0,9 leading to 0,9 lagging.



LEVELUPS Output Power Factor Scheme

Maximum Availability

- Parallel configuration up to 8 units per redundancy (N+1) and power increase.
- Loop connection helps the UPS system to continue the operation when the connection cable is inturrupted.

Standard Electrical Features

- Parallel-Redundant (N+X) Systems
- Co-Aging
- Dual Input
- Common Battery
- Backfeed Protection
- Cold Start (Optional)
- Advanced Battery Management
- Short Circuit and Overload Protection
- Parallel Ready
- Redundant Power Supply
- Power Walk-in for Progressive Rectifier Start-up when the Mains is Restored
- Battery Temperature Sensor
- Static and Manual Bypass Operation

Advanced Communication Features

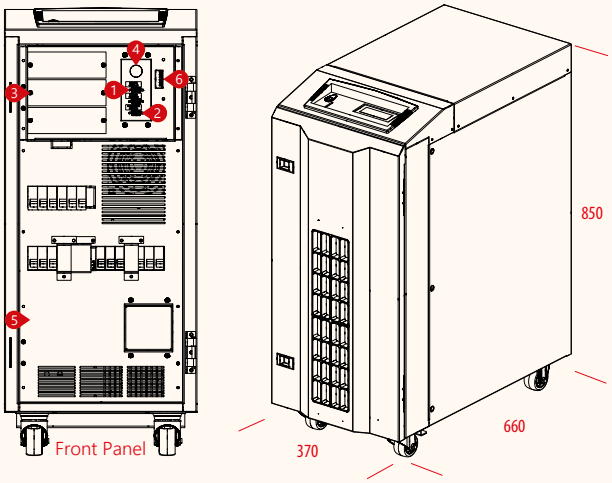
- 1500 Real Time Event Log with Detailed Parameters
- User Friendly Multilingual 320x240 Graphic Display Provides Operation Information
- Monitoring and Shutdown Software
- RS232 Serial and RS485 Ports
- 2 Communication Slots
- ModBUS RTU / ModBUS TCP (Optional)
- Remote Emergency Power Off (Optional)
- Remote Display Panel (Optional)
- Dry Contact (Optional)
- SNMP (Optional)
- ProfiBUS (Optional)

Flexibility

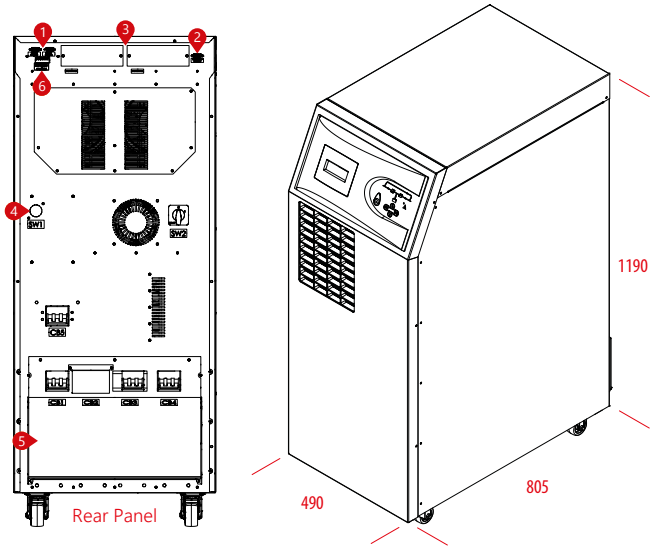
- Temperature sensor for external battery cabinets for extended runtimes.
- External battery cabinets for different sizes of batteries to provide extended runtimes.
- Different sizes of 10-40kVA cabinets for larger capacity of internal batteries when long autonomy times are required.
- 3/1 Phase version is available for 10-30kVA power ratings
- Frequency converter mode.
- Isolation transformers to vary neutral connectivity in the event of separate power sources or for galvanic isolation between input and output.
- Compatible version with EN 50171 for supplying power to emergency lighting systems.

DETAILS

MiniLEVELUPS SERIES 10-15-20 kVA

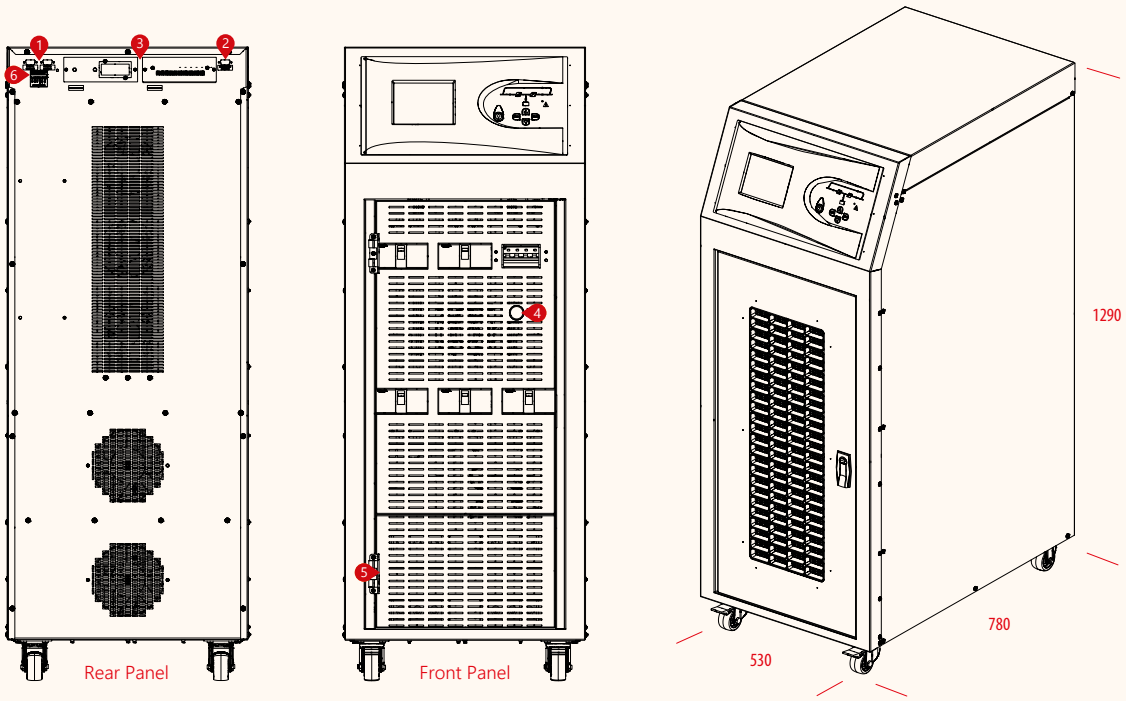


LEVELUPS SERIES 10-15-20-30-40-60 kVA



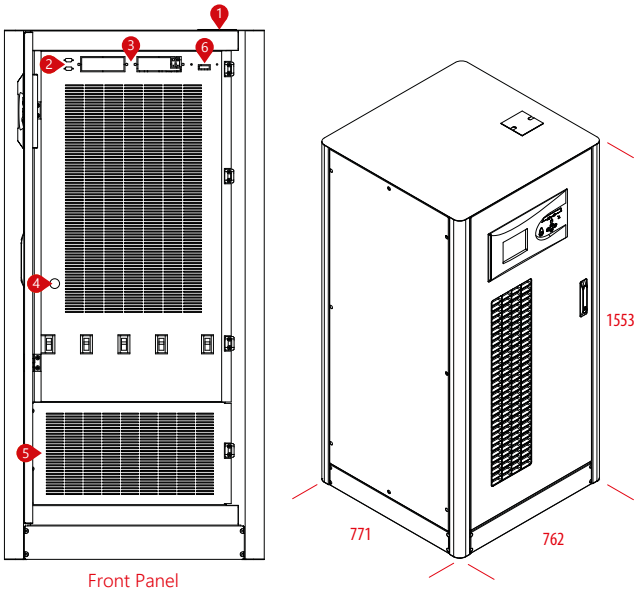
1. Parallel Port Terminal
2. RS232 Terminal
3. Optional Card Slots
4. DC Bus Ramping Up Button
5. Connection Terminal
6. External Battery Temperature Sensor Terminal

LEVELUPS SERIES 80-100-120 kVA



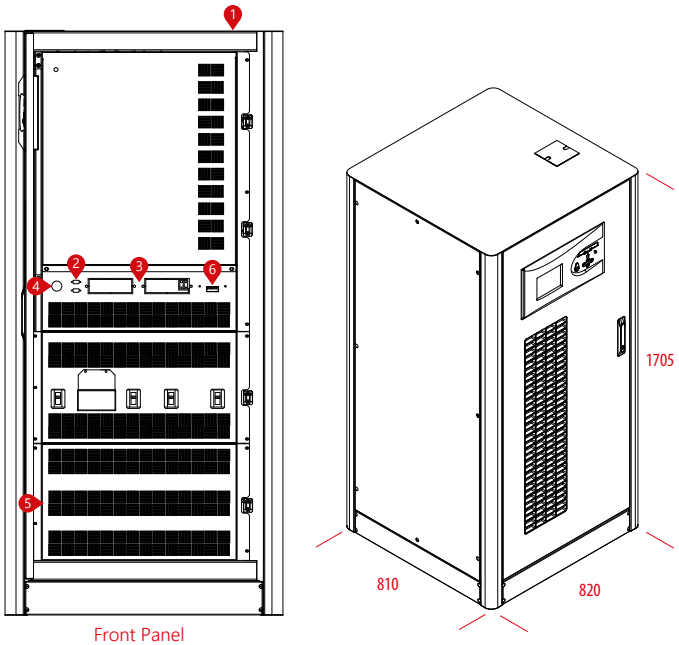
DETAILS

LEVELUPS SERIES 80 kVA



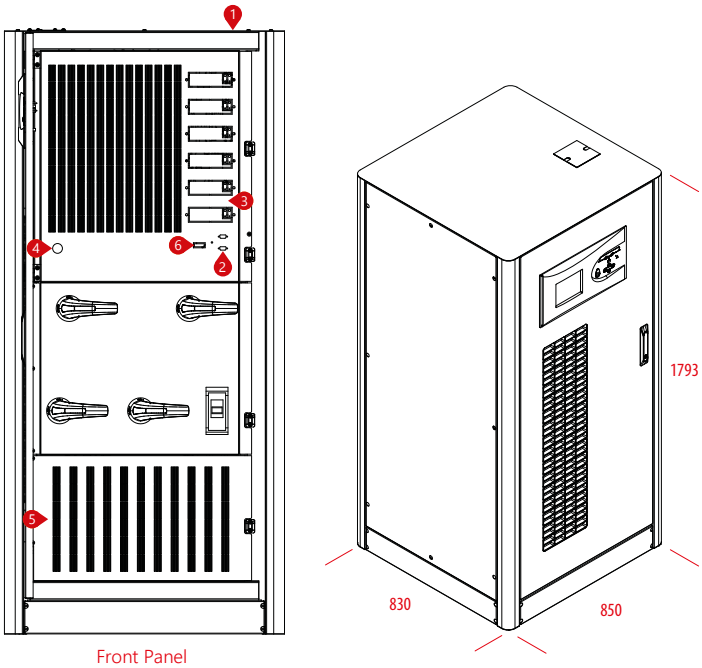
Front Panel

LEVELUPS SERIES 100-120 kVA



Front Panel

LEVELUPS SERIES 160-200-250 kVA

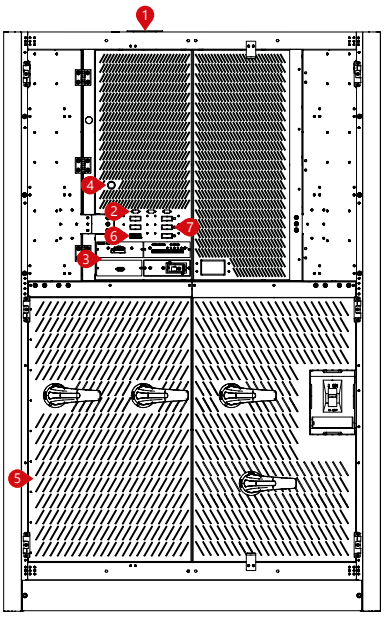


Front Panel

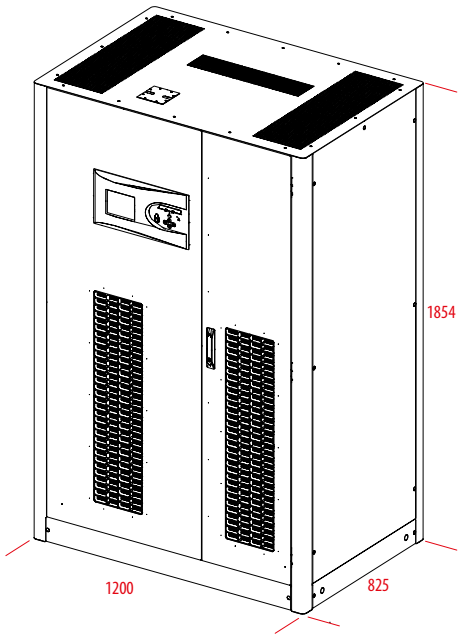
1. Parallel Port Terminal
2. RS232 Terminal
3. Optional Card Slots
4. DC Bus Ramping Up Button
5. Connection Terminal
6. External Battery Temperature Sensor Terminal

DETAILS

LEVELUPS SERIES 300-400-500 kVA

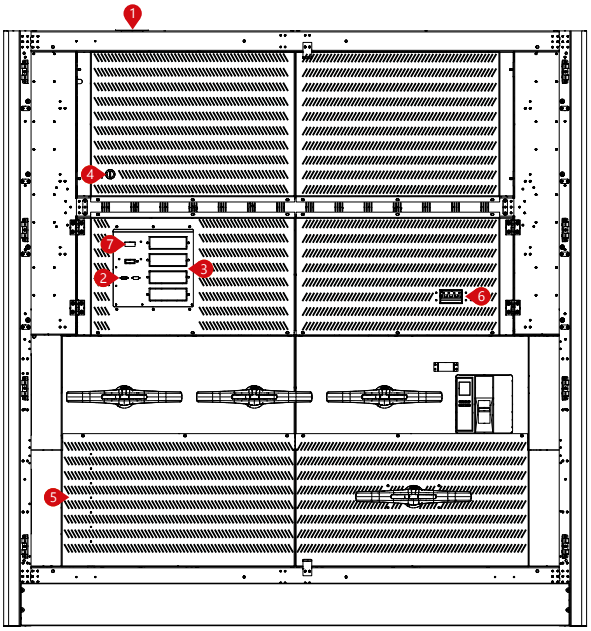


Front Panel

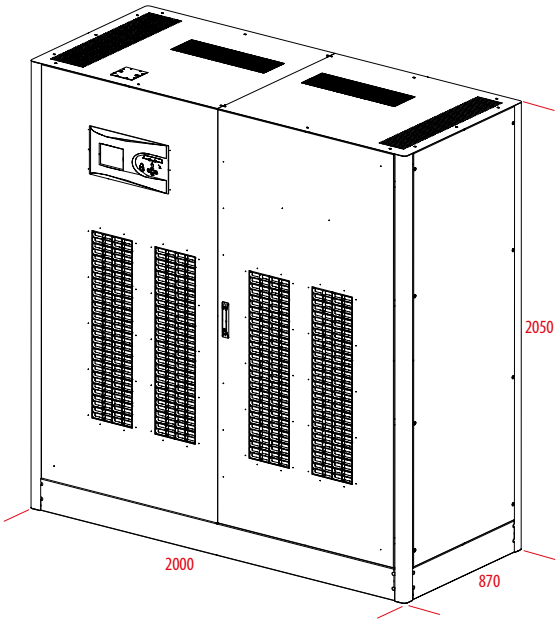


1. Parallel Port Terminal
2. RS232 Terminal
3. Optional Card Slots
4. DC Bus Ramping Up Button
5. Connection Terminal
6. External Battery Temperature Sensor Terminal
7. Optional Slot

LEVELUPS SERIES 600-800-1000 kVA



Front Panel



MODEL		MiniLEVELUPS														
Capacity		10kVA	15kVA	20kVA	10kVA	15kVA	20kVA	30kVA	40kVA	60kVA	80kVA	100kVA	120kVA	80kVA	100kVA	120kVA
Power Watt		9kW	13.5kW	18kW	9kW	13.5kW	18kW	27kW	36kW	54kW	72kW	90kW	108kW	72kW	90kW	108kW
INPUT																
Nominal Voltage		380/400/415 VAC 3 P+N (Optional 220/380 VAC -37% +22% 3 P+N+PE)														
Voltage Tolerance		-20% +15%														
Frequency Tolerance		50 / 60 Hz ±10% (Selectable)														
Power Factor		>0.99														
Total Harmonic Distortion (THDi)		<3%														
OUTPUT																
Power Factor		0.9 (1 Optional)														
Nominal Voltage		380/400/415 VAC 3 P+N														
Voltage Tolerance		Statik ±1, Dynamic ±3														
Frequency Tolerance		50 / 60 Hz ±0,01% (Battery Mode)														
Output THD		Linear Load <1% / Non-Linear Load <3%														
Crest Factor		3:1														
Overload Capacity*		At 125% Load 10min, At 150% Load 1min														
Efficiency (Online Mode)		96%														
Efficiency (Eco Mode)		99%														
BYPASS																
Nominal Voltage		380/400/415 VAC 3 P+N														
Voltage Tolerance		%15 (Configurable from 10% to 30%)														
Frequency Tolerance		±5 (Selectable)														
BATTERY																
Type		VRLA / GEL														
Quantity (12V DC VRLA)		60														
Charge Capacity		12,5% of Active Power (Nominal 0,1 C10, Adjustable)														
Recharge Time		6-8 hours														
Internal Battery		62 x 7Ah or 9Ah			60 x 7Ah or 9Ah			External Battery			External Battery			External Battery		
ENVIRONMENTAL																
Operating Temperature		For UPS 0°C/+40°C For Battery +15°C/+25°C														
Storage Temperature		For UPS -15°C/+45°C For Battery 0°C/+30°C														
Protection Class		IP20														
Humidity		0-95% (Without Condensation)														
Altitude		<1000m: Correction Factor 1, <2000m: Correction Factor >0.92, <3000m: Correction Factor >0.84														
Noise Level		<53dBA			<53dBA		<55dBA		<60dBA		<65dBA			<65dBA		
COMMUNICATION																
Communication Port		RS232 Standart, RS485 and SNMP Adapter Option														
STANDARDS																
Quality		ISO 9001, ISO 14001, ISO 45001, ISO 10002, CE, TSE, TSE-HYB														
Performance		EN62040-3 (VFI-SS-111, Bureau Veritas Certified)														
EMC/LVD		EN62040-2, EN62040-1, TS EN ISO/IEC 17025 Acredited Test Report														
DIMENSIONS & WEIGHT																
Cabinet Dimensions (mm)	Width	370			490						530			763	810	
	Depth	660			805						780			771	820	
	Height	850			1190						1290			1555	1705	
Net Weight (kg)		85	85	85	125	126	131	145	173	323				331	353	368
Packaging Dimensions (mm)	Width	500			600						650			900	900	
	Depth	760			900						900			970	970	
	Height	1000			1400						1400			2040	2040	
Gross Weight (kg)		105	105	105	145	146	151	166	193	353				361	383	398

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

MODEL										
Capacity		160kVA	200kVA	250kVA	300kVA	400kVA	500kVA	600kVA	800kVA	1000kVA
Power Watt		144kW	180kW	225kW	270kW	360kW	450kW	540kW	720kW	900kW
INPUT										
Nominal Voltage		380/400/415 VAC 3 P+N (Optional 220/380 VAC -37% +22% 3 P+N+PE)								
Voltage Tolerance		-20% +15%								
Frequency Tolerance		50 / 60 Hz ±10% (Selectable)								
Power Factor		>0.99								
Total Harmonic Distortion (THDi)		<3%								
OUTPUT										
Power Factor		0.9 (1 Optional)								
Nominal Voltage		380/400/415 VAC 3 P+N								
Voltage Tolerance		Statik ±1, Dynamic ±3								
Frequency Tolerance		50 / 60 Hz ±0,01% (Battery Mode)								
Output THD		Linear Load <1% / Non-Linear Load <3%								
Crest Factor		3:1								
Overload Capacity*		At 125% Load 10min, At 150% Load 1min								
Efficiency (Online Mode)		96%								
Efficiency (Eco Mode)		99%								
BYPASS										
Nominal Voltage		380/400/415 VAC 3 P+N								
Voltage Tolerance		15% (Configurable from 10% to 30%)								
Frequency Tolerance		±5 (Selectable)								
BATTERY										
Type		VRLA / GEL								
Quantity (12V DC VRLA)		60								
Charge Capacity		12,5% of Active Power (Nominal 0,1 C10, Adjustable)								
Recharge Time		6-8 hours								
Internal Battery		External Battery								
ENVIRONMENTAL										
Operating Temperature		For UPS 0°C/+40°C For Battery +15°C/+25°C								
Storage Temperature		For UPS -15°C/+45°C For Battery 0°C/+30°C								
Protection Class		IP20								
Humidity		0-95% (Without Condensation)								
Altitude		<1000m: Correction Factor 1, <2000m: Correction Factor >0.92, <3000m: Correction Factor >0.84								
Noise Level		<72dBA					<74dBA			<75dBA
COMMUNICATION										
Communication Port		RS232 Standart, RS485 and SNMP Adapter Option								
STANDARDS										
Quality		ISO 9001, ISO 14001, ISO 45001, ISO 10002, CE, TSE, TSE-HYB								
Performance		EN62040-3 (VFI-SS-111, Bureau Veritas Certified)								
EMC/LVD		EN62040-2, EN62040-1, TS EN ISO/IEC 17025 Acredited Test Report								
DIMENSIONS & WEIGHT										
Cabinet Dimensions (mm)	Width	830			1200			2000		
	Depth	870			825			870		
	Height	1800			1854			2050		
Net Weight (kg)		475	490	553	830	840	850	1510	1510	1510
Packaging Dimensions (mm)	Width	900			1370			2100		
	Depth	970			845			950		
	Height	2040			2040			2250		
Gross Weight (kg)		505	520	583	870	880	890	1590	1590	1590

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


POWER
FORLIFE

LEVELUPS T3

SERIES

10-60 kVA

ONLINE UPS

3:3 PHASE

DATA CENTER | MEDICAL | TRANSPORT | INDUSTRY | EMERGENCY

Three LEVEL 3 UPS

kW=kVA

VFI TYPE — UPS ONLINE

TOWER

PF= 1.0 — POWER FACTOR

Service — SERVICE

HIGHLIGHTS

- True Three Level Rectifier and Inverter Technology
- Ultra High Output Galvanic Isolation Transformer Embedded
- Robust and Reliable Design

Highest Reliability with Embedded Isolation Transformer

- LevelUps T3 series is a true VFI on-line double conversion, three-phase UPS system with innovative 3 level technology and engineered to provide high level of energy efficiency and reliable and robust protection for most demanding industrial and medical environments.
- Three level inverter and rectifier technology and with embedded isolation transformer makes LevelUps T3 series one of the most reliable systems for data security and other critical applications.

CERTIFICATES

BUREAU VERITAS Certification

The LEVELUPS Series is attested by Bureau Veritas with regard to performance (EN 62040-3)

nqa ISO 9001 QUALITY MANAGEMENT | nqa ISO 45001 HEALTH & SAFETY MANAGEMENT | nqa ISO 14001 ENVIRONMENTAL MANAGEMENT

CE TSE TSE-HYB

Compact Design

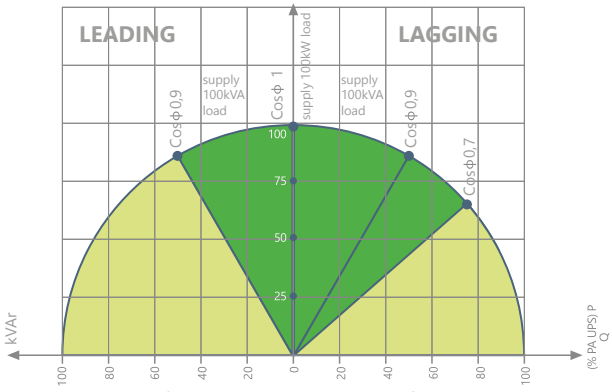
- Designed with an Integrated transformer ensuring galvanic isolation on the output for ultimate safe installation.
- Easy to install and service and can be integrated into harsh commercial and industrial environments.
- Compact footprint and matching battery cabinets.

Low Total Cost of Ownership

- Less energy consumption to supply the loads thanks to high efficiency.
- Reduced energy loss.
- Reduced electricity usage and air conditioning requirements.
- Reduction in operating cost of UPS.
- IGBT based power factor correction technology provides input power factor close to 1 (≥ 0,99). The high input power leads to reduced electricity pay-out, minimizes cable, switchboard, fuse and generator requirements, thus reducing investment cost.
- Low input current total harmonic distortion (THDi) less than%3 helps to avoid the disturbance and expensive harmonic filters.
- Small footprint and easy maintenance

High Output Power Factor 1

- Output power factor of 1 (kVA=kW) rate provides up to 25% more active power than a traditional UPS.
- Suitable for modern power supply application with unit or capacitive power factor (e.g. new servers generation).
- No reduction in active power from 0,9 leading to 0,9 lagging.



LevelUps Output Power Factor Scheme

Maximum Availability

- Parallel configuration up to 8 units per redundancy (N+1) and power increase.
- Loop connection helps the UPS system to continue the operation when the connection cable is inturrupted.

Standard Electrical Features

- Parallel-Redundant (N+X) Systems
- Co-Aging
- Output Galvanic Isolation Transformer Embedded
- Dual Input
- Common Battery
- Frontal Access for Input/Output Cabling
- Backfeed Protection
- Cold Start (Optional)
- Advanced Battery Management
- Short Circuit and Overload Protection
- Parallel Ready
  Redundant Power Supply
- Power Walk-in for Progressive Rectifier Start-up when the
- Mains is Restored
  Battery Temperature Sensor
  Static & Manual Bypass Operation

Advanced Communication Features

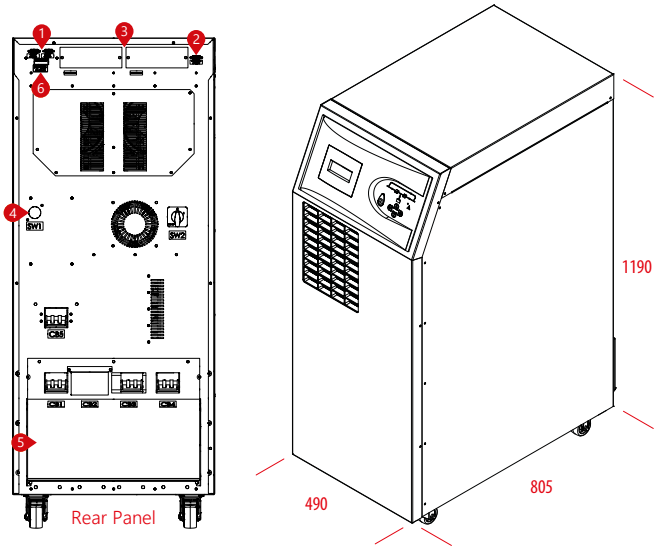
- 1500 Real Time Event Log with Detailed Parameters
- User Friendly Multilingual 320x240 Graphic Display Provides Operation Information
- Monitoring and Shutdown Software
- RS232 Serial and RS485 Ports
- 2 Communication Slots
- ModBUS RTU / ModBUS TCP (Optional)
- Remote Emergency Power Off (Optional)
- Remote Display Panel (Optional)
- Dry Contact (Optional)
- SNMP (Optional)
- Profibus (Optional)

Flexibility

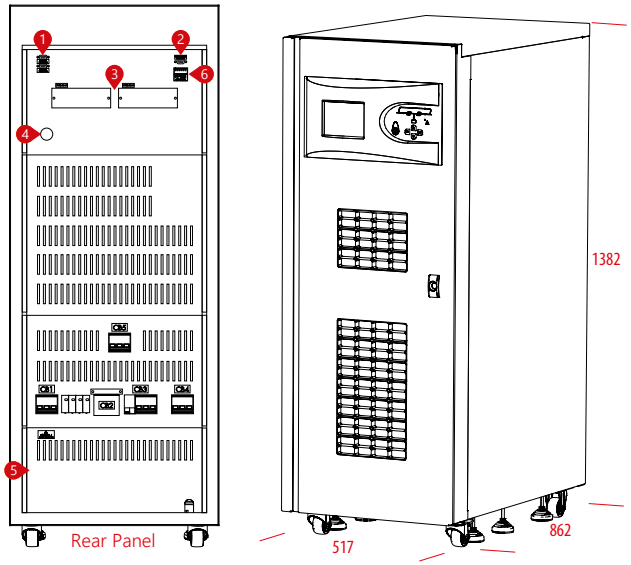
- Optional IP31, IP41, Protection degree for harsh environments.
- Optional tropicalization and anti-corrosion protection for electronic boards.
- Optional temperature sensor for external battery cabinets for extended runtimes.
- External battery cabinets for different sizes of batteries to provide extended runtimes.
- Adaptability to the mains without neutral.

DETAILS

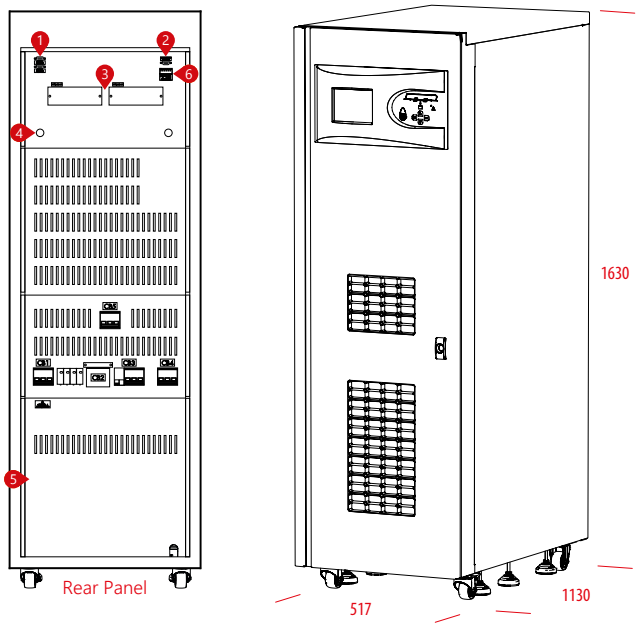
LEVELUPS T3 SERIES 10-15 kVA



LEVELUPS T3 SERIES 20 kVA



LEVELUPS T3 SERIES 30-40-60 kVA



1. Parallel Port Terminal
2. RS232 Terminal
3. Optional Card Slots
4. DC Bus Ramping Up Button
5. Connection Terminal
6. External Battery Temperature Sensor Terminal

MODEL							
Capacity		10kVA	15kVA	20kVA	30kVA	40kVA	60kVA
Power Watt		10kW	15kW	20kW	30kW	40kW	60kW
INPUT							
Voltage Range		380/400/415 VAC 3 Phase +N (Optional 220/380 VAC -37% +22% 3P+N+PE)					
Power Factor		At Full Load >0.99					
Frequency Range		45 - 65 Hz (Selectable)					
Total Harmonic Distortion (THDi)		<3%					
OUTPUT							
Voltage Range		380/400/415 VAC 3 Phase + N					
Voltage Tolerance		Static ±1, Dynamic ±3					
Efficiency		94.5%					
Frequency Tolerance		50Hz / 60Hz ±0,01% (Battery Mode)					
THD (THDv)		Linear Load <2%					
		Non-Linear Load <5%					
Crest Factor (CF)		3:1					
Overload Capacity*		At 125% Load 10min, at 150% Load 1min					
BATTERY							
Quantity (12V DC VRLA)		60					
Charge Capacity		12,5% of Active Power (Nominal 0,1 C10, Adjustable)					
ENVIRONMENTAL							
Operating Temperature		For UPS 0°C/+40°C For Battery +15°C/+25°C					
Storage Temperature		For UPS -15°C/+45°C For Battery 0°C/+30°C					
Protection Class		IP20					
Humidity		0-95% Without Condensation					
Altitude		<1000m, Correction Factor 1. <2000m, Correction Factor >0.92, <3000m; Correction Factor >0.84					
Noise Level		<53 dBA		<55 dBA		<60 dBA	
COMMUNICATION							
Communication Port		RS232 Standart, RS485 and SNMP Adapter Option					
STANDARDS							
Quality		ISO 9001, ISO 14001, ISO 45001, ISO 10002, CE, TSE, TSE-HYB					
Performance		EN62040-3 (VFI-SS-111, Bureau Veritas Certified)					
EMC/LVD		EN62040-2, EN62040-1, TS EN ISO/IEC 17025 Acredited Test Report					
DIMENSIONS & WEIGHT							
Cabinet Dimensions (mm)	Width	490		517	517		
	Depth	805		862	1130		
	Height	1190		1382	1630		
Net Weight (kg)		235	260	350	343	452	785
Packaging Dimensions (mm)	Width	600		670	620		
	Depth	900		900	1180		
	Height	1400		1630	1830		
Gross Weight (kg)		260	285	375	403	512	855

* under certain conditions.

LEVELUPS T4

SERIES

80-200 kVA 3:3 PHASE

ONLINE UPS

DATA CENTER | MEDICAL | TRANSPORT | INDUSTRY | EMERGENCY

VFI TYPE — UPS ONLINE

TOWER

PF= 0.9 — POWER FACTOR

Service — SERVICE

HIGHLIGHTS

- Built In Inverter Transformer for DC-AC Galvanic Protection
- DSP Vector Control at Input and Output
- Innovative Smart IGBT Control
- Programmable Input Power
- Entire Efficiency Control System

Highest Reliability and Robust Protection for Industrial Loads

• LEVELUPS T4 Series is a true VFI on-line double conversion, three-phase UPS system and engineered to provide high level of energy efficiency and reliable and robust protection for most demanding industrial and medical environments.

• DSP Vector Control Technology and Inverter Transformer makes LEVELUPS T4 Series one of the most reliable systems for data security and other critical applications.

CERTIFICATES

BUREAU VERITAS Certification

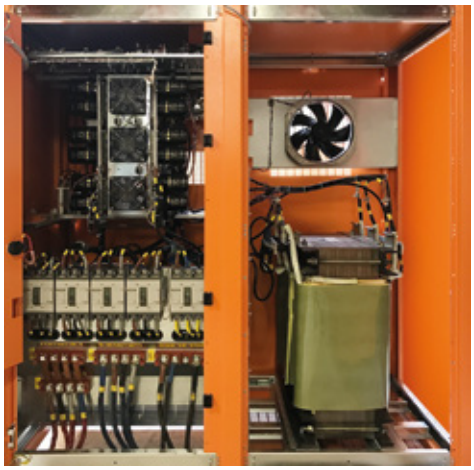
The LEVELUPS Series is attested by Bureau Veritas with regard to performance (EN 62040-3)

nqa ISO 9001 QUALITY MANAGEMENT | nqa ISO 45001 HEALTH & SAFETY MANAGEMENT | nqa ISO 14001 ENVIRONMENTAL MANAGEMENT

CE TSE TSE-HYB

Compact Design

- Designed with an Integrated transformer on the inverter output ensuring galvanic isolation on the output for ultimate safe installation.
- Easy to install and service and can be integrated into harsh commercial and industrial environments.
- Compact footprint and matching battery cabinets.



Low Total Cost of Ownership

- Less energy consumption to supply the loads thanks to high efficiency.
- Reduced energy loss.
- Reduced electricity usage and air conditioning requirements.
- Reduction in operating cost of UPS.
- IGBT based power factor correction technology provides input power factor close to 1 (≥ 0,99). The high input power leads to reduced electricity pay-out, minimizes cable, switchboard, fuse and generator requirements, thus reducing investment cost.
- Low input current total harmonic distortion (THDi) less than%3 helps to avoid the disturbance and expensive harmonic filters.
- Small footprint and easy maintenance

High Output Power Factor 0.9

- Output power factor of 0.9 rate.
- Suitable for modern power supply application with unit or capacitive power factor (e.g. new servers generation).
- No reduction in active power from 0,9 leading to 0,9 lagging.

Maximum Availability

- Intelligent parallel operation up to 8 units per redundancy (N+X) and power increase.

Standard Electrical Features

- Parallel-Redundant (N+X) Systems
- Co-Aging
- Transformer Based Technology
- Dual Input
- Common Battery
- Frontal Access for Input/Output Cabling
- Backfeed Protection
- Cold Start (Optional)
- Advanced Battery Management
- Short Circuit and Overload Protection
- Parallel Ready
  Redundant Power Supply (Optional)
- Power Walk-in for Progressive Rectifier Start-up when the
- Mains is Restored
  Battery Temperature Sensor
  Static & Manual Bypass Operation

Advanced Communication Features

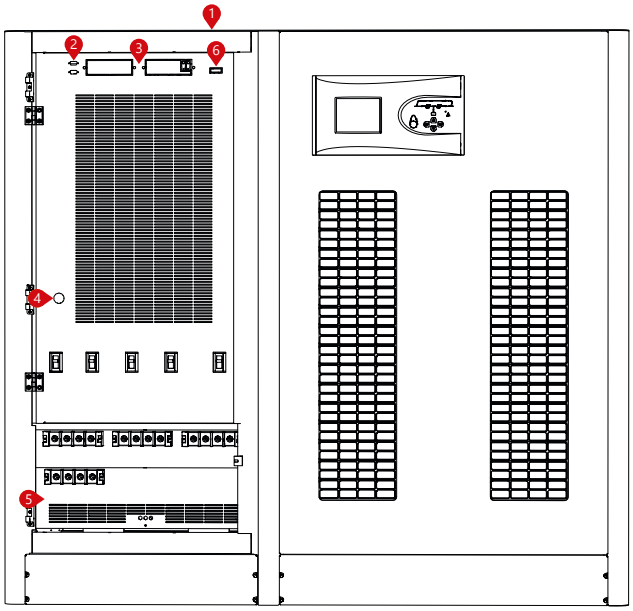
- 1500 Real Time Event Log with Detailed Parameters
- User Friendly Multilingual 320x240 Graphic Display Provides Operation Information
- Monitoring and Shutdown Software
- RS232 Serial and RS485 Ports
- 2 Communication Slots
- ModBUS RTU / ModBUS TCP (Optional)
- Remote Emergency Power Off (Optional)
- Remote Display Panel (Optional)
- Dry Contact (Optional)
- SNMP (Optional)
- Profibus (Optional)

Flexibility

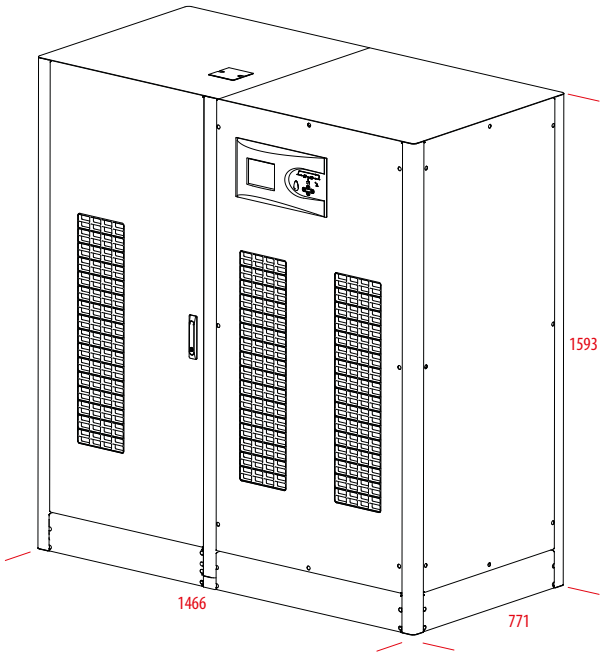
- Optional IP31, IP41, Protection degree for harsh environments.
- Optional tropicalization and anti-corrosion protection for electronic boards.
- Optional temperature sensor for external battery cabinets for extended runtimes.
- External battery cabinets for different sizes of batteries to provide extended runtimes.
- Adaptability to the mains without neutral.

DETAILS

LEVELUPS T4 SERIES 80 kVA

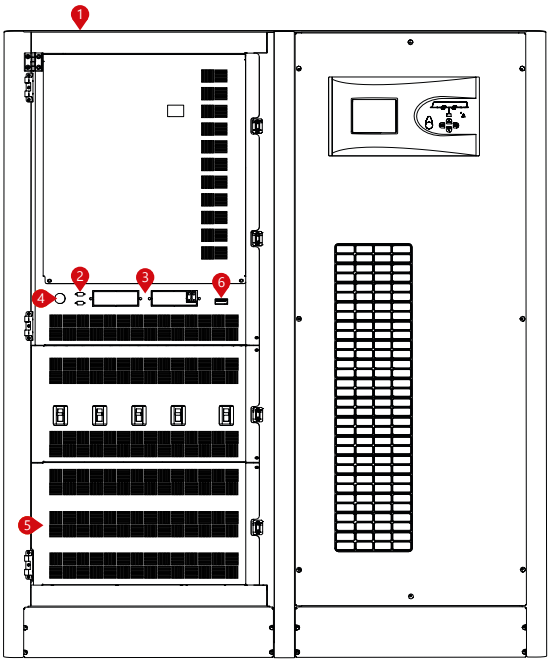


Front Panel

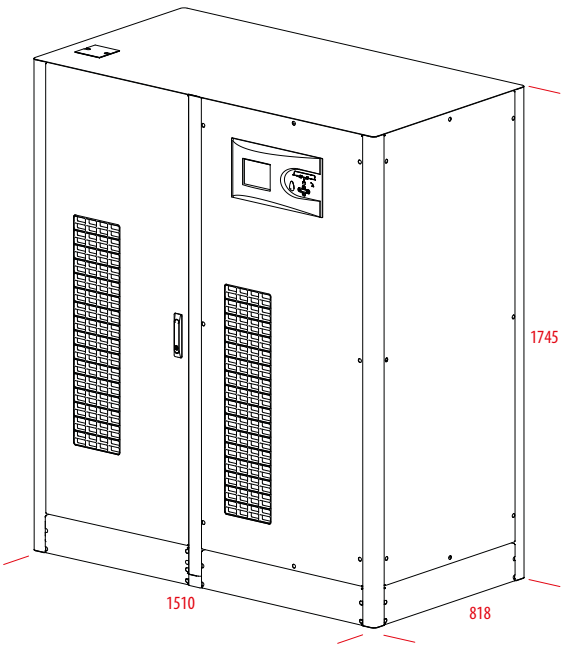


1. Parallel Port Terminal
2. RS232 Terminal
3. Optional Card Slots
4. DC Bus Ramping Up Button
5. Connection Terminal
6. External Battery Temperature Sensor Terminal

LEVELUPS T4 SERIES 100-120 kVA

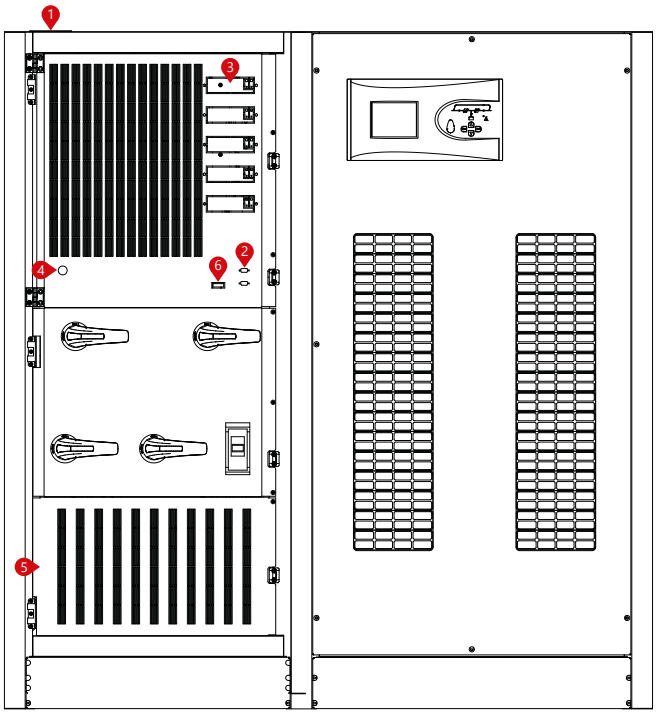


Front Panel

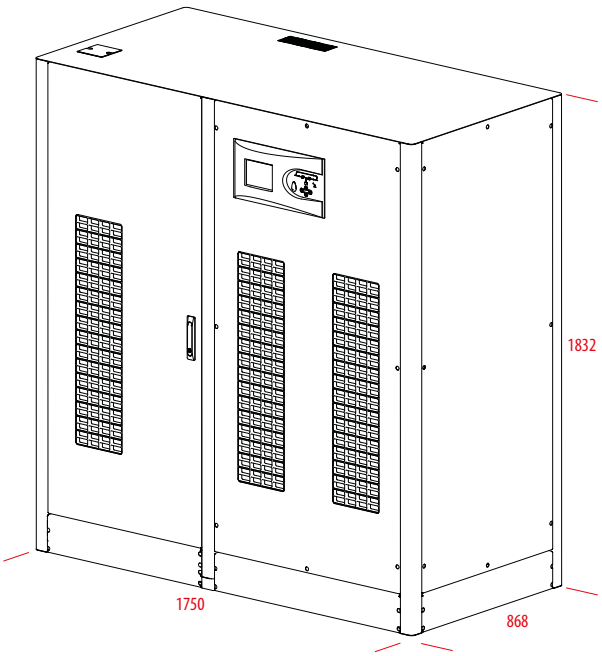


DETAILS

LEVELUPS T4 SERIES 160-200 kVA



Front Panel



1. Parallel Port Terminal
2. RS232 Terminal
3. Optional Card Slots
4. DC Bus Ramping Up Button
5. Connection Terminal
6. External Battery Temperature Sensor Terminal

MODEL						
Capacity		80kVA	100kVA	120kVA	160kVA	200kVA
Power Watt		72kW	90kW	108kW	144kW	180kW
INPUT						
Voltage Range		380/400/415 VAC 3 Phase (Optional 220/380 VAC -37% +22% 3P+PE)				
Power Factor		At Full Load >0.99				
Frequency Range		45 - 65 Hz				
Total Harmonic Distortion (THDi)		<3%				
OUTPUT						
Voltage Range		380/400/415 VAC 3 Phase + N				
Voltage Tolerance		Static ±1, Dynamic ±3				
Efficiency		92%				
Frequency Tolerance		50Hz / 60Hz ±0,01% (Battery Mode)				
THD (THDv)		Linear Load <2%				
		Non-Linear Load <5%				
Crest Factor (CF)		3:1				
Overload Capacity*		At 125% Load 10min, at 150% Load 1min				
BATTERY						
Quantity (12V DC VRLA)		50				
Charge Capacity		12,5% of Active Power (Nominal 0,1 C10, Adjustable)				
ENVIRONMENTAL						
Operating Temperature		For UPS 0°C/+40°C For Battery +15°C/+25°C				
Storage Temperature		For UPS -15°C/+45°C For Battery 0°C/+30°C				
Protection Class		IP20				
Humidity		0-95% Without Condensation				
Altitude		<1000m, Correction Factor 1. <2000m, Correction Factor >0.92, <3000m; Correction Factor >0.84				
Noise Level		<65 dBA			<72 dBA	
COMMUNICATION						
Communication Port		RS232 Standart, RS485 and SNMP Adapter Option				
STANDARDS						
Quality		ISO 9001, ISO 14001, ISO 45001, ISO 10002, CE, TSE, TSE-HYB				
Performance		EN62040-3 (VFI-SS-111, Bureau Veritas Certified)				
EMC/LVD		EN62040-2, EN62040-1, TS EN ISO/IEC 17025 Acredited Test Report				
DIMENSIONS & WEIGHT						
Cabinet Dimensions (mm)	Width	1466	1510		1750	
	Depth	771	818		868	
	Height	1593	1745		1832	
Net Weight (kg)		860	935	996	1189	1258
Packaging Dimensions (mm)	Width	1580	1580		1930	
	Depth	870	870		970	
	Height	1980	1980		2120	
Gross Weight (kg)		930	1005	1066	1269	1338

* under certain conditions.


POWER
FORLIFE

BOXER
SERIES

10-120 kVA 3:3 PHASE

10-30 kVA 3:1 PHASE

ONLINE UPS

DATA CENTER | MEDICAL | TRANSPORT | INDUSTRY | EMERGENCY

VFI TYPE — UPS ONLINE | TOWER | PF= 0.9 — POWER FACTOR | Service — SERVICE

HIGHLIGHTS

- IGBT PWM Rectifier & Inverter Technology
- Low Input Current THD (<3%)
- High Input Power Factor (>0.99)

DSP Power Factor Corrected IGBT Rectifier

- Equipped with its new IGBT rectifier BOXER 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 BOXER Series presents maximum flexibility advantage to users and optimizes total cost of ownership.

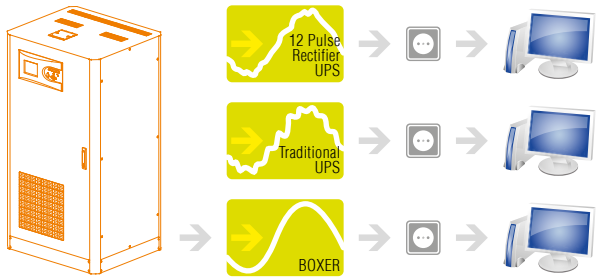
SERTİFİKALAR

BUREAU VERITAS Certification — The BOXER Series is attested by Bureau Veritas with regard to performance (EN 62040-3)

nqa ISO 9001 QUALITY MANAGEMENT | nqa ISO 45001 HEALTH & SAFETY MANAGEMENT | nqa ISO 14001 ENVIRONMENTAL MANAGEMENT | CE | TSE | TSE-HYB

High Performance & Low Total Cost of Ownership

- IGBT based power factor correction technology provides input power factor close to 1 (≥ 0,99). The high input power leads to reduced electricity pay-out, minimizes cable, switchboard, fuse and generator requirements, thus reducing investment cost.
- Low input current total harmonic distortion (THDi) less than 3% helps to avoid the disturbance and expensive harmonic filters.
- Small footprint and easy maintenance.



	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

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.

Maximum Availability

- Parallel configuration up to 8 units per redundancy (N+1) and power increase.
- Loop connection helps the UPS system to continue the operation when the connection cable is inturrupted.

Standard Electrical Features

- Backfeed Protection
- Cold Start (Optional)
- Advanced Battery Management
- Short Circuit and Overload Protection
- Parallel Ready
- Redundant Power Supply
- Power Walk-in for Progressive Rectifier Start-up when the Mains is Restored.
- Battery Temperature Sensor
- Static & Manual Bypass Operation

Advanced Communication Features

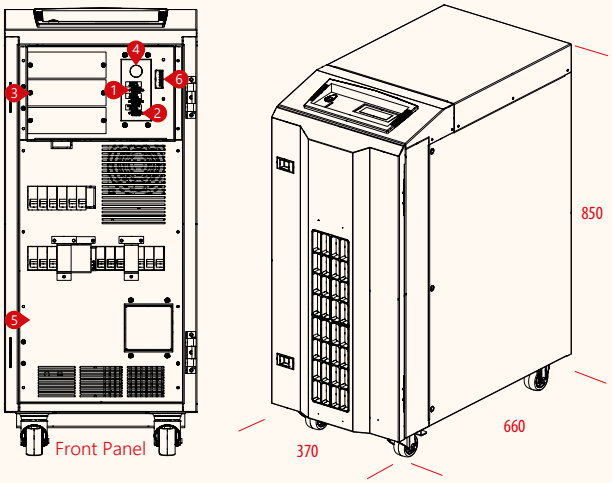
- 1500 Real Time Event Log with Detailed Parameters
- User Friendly Multilingual 320x240 Graphic Display Provides Operation Information
- Monitoring and Shutdown Software
- RS232 Serial and RS485 Ports
- 2 Communication Slots
- ModBUS RTU / ModBUS TCP (Optional)
- Remote Emergency Power Off (Optional)
- Remote Display Panel (Optional)
- Dry Contact (Optional)
- SNMP (Optional)
- ProfiBUS (Optional)

Flexibility

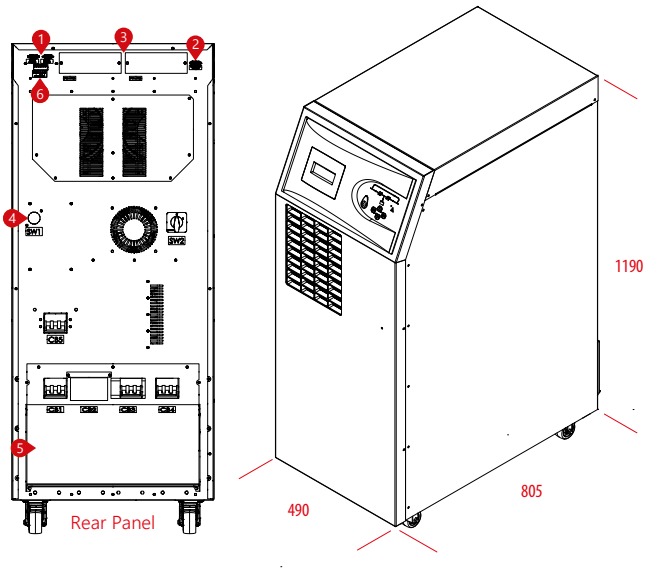
- Temperature sensor for external battery cabinets for extended runtimes.
- External battery cabinets for different sizes of batteries to provide extended runtimes.
- Different sizes of 10-40kVA cabinets for larger capacity of internal batteries when long autonomy times are required.
- 3/1 Phase version is available for 10-30kVA power ratings
- Frequency converter mode.
- Isolation transformers to vary neutral connectivity in the event of separate power sources or for galvanic isolation between input and output.
- Compatible version with EN 50171 for supplying power to emergency lighting systems.

DETAILS

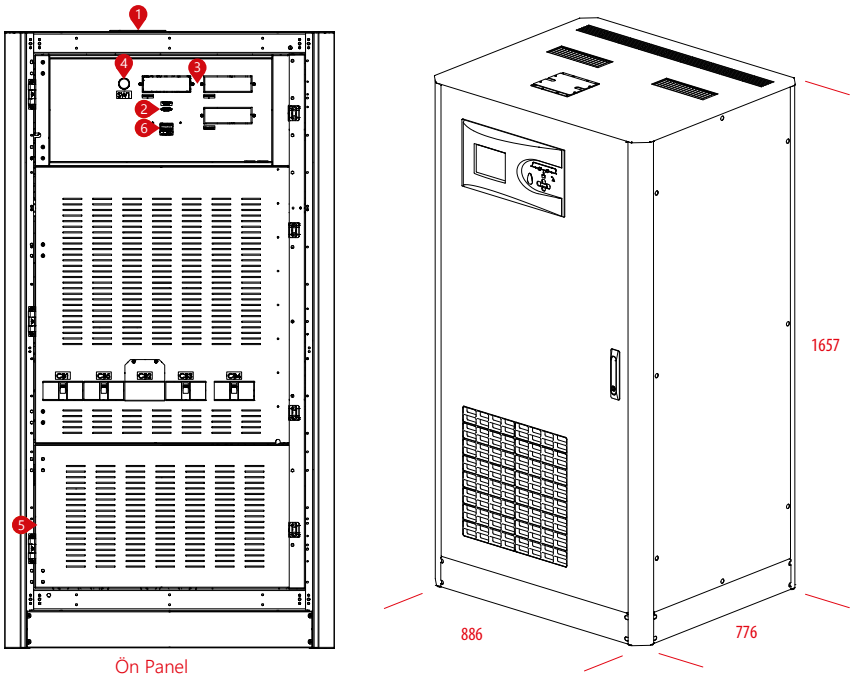
MiniBOXER SERIES 10-15-20 kVA



BOXER SERIES 10-15-20-30-40-60 kVA



BOXER SERIES 80-100-120 kVA



1. Parallel Port Terminal
2. RS232 Terminal
3. Optional Card Slots
4. DC Bus Ramping Up Button
5. Connection Terminal
6. External Battery Temperature Sensor Terminal

MODEL		MiniBOXER											
Capacity		10kVA	15kVA	20kVA	10kVA	15kVA	20kVA	30kVA	40kVA	60kVA	80kVA	100kVA	120kVA
Power Watt		9kW	13.5kW	18kW	9kW	13.5kW	18kW	27kW	36kW	54kW	72kW	90kW	108kW
INPUT													
Nominal Voltage		380/400/415 VAC 3P+N (Optional 220/380 VAC -37% +22% 3P+N+PE)											
Voltage Tolerance		-20% +15%											
Frequency Tolerance		50-60 Hz ± 10% (Selectable)											
Power Factor		>0.99											
Total Harmonic Distortion		THDi <%3											
OUTPUT													
Power Factor		0.9											
Nominal Voltage		380/400/415 VAC 3P+N											
Voltage Tolerance		Static ±1, Dynamic ±3											
Frequency Tolerance		50-60 Hz ±0,01% (Battery Mode)											
Output THD		Linear Load <1% / Non Linear Load <3%											
Crest Factor		3:1											
Overload Capacity*		At 125% Load 10min, At 150% Load 1min											
Efficiency (Online Mode)		Up to 93%											
Efficiency (Eco Mode)		Up to 99%											
BYPASS													
Nominal Voltage		380/400/415 VAC 3P+N											
Voltage Tolerance		15% (Configurable from 10% to 30%)											
Frequency Tolerance		±5 (Selectable)											
BATTERY													
Type		VRLA / GEL											
Quantity (12V DC VRLA)		62											
Charge Capacity		25% of Active Power (Nominal 0,1 C10, Adjustable)											
Recharge Time		6-8 hours											
Internal Battery		62 x 7Ah or 9Ah			62 x 7Ah or 9Ah		External Battery Pack						
ENVIRONMENTAL													
Operating Temperature		For UPS 0°C/+40°C For Battery +15°C/+25°C											
Storage Temperature		For UPS -15°C/+45°C For Battery 0°C/+30°C											
Protection Class		IP20											
Humidity		0-95% Without Condensation											
Altitude		<1000m Correction Factor 1, <2000m Correction Factor >0.92, <3000m Correction Factor >0.84											
Noise Level		<53dBA	<55dBA	<60dBA	<53dBA	<55dBA	<60dBA	<65dBA	<72dBA			<74dBA	<75dBA
COMMUNICATION													
Communication Port		RS232 Standart, RS485 and SNMP Adapter Option											
STANDARDS													
Quality		ISO 9001, ISO 14001, ISO 45001, ISO 10002, CE, TSE, TSE-HYB											
Performance		EN62040-3 (VFI-SS-111, Bureau Veritas Certified)											
EMC/LVD		EN62040-2, EN62040-1, TS EN ISO/IEC 17025 Accredited Test Report											
DIMENSIONS & WEIGHT													
Cabinet Dimensions (mm)	Width	370			490						886		
	Depth	660			805						776		
	Hight	850			1190						1657		
Net Weight (kg)		85	85	85	122	123	127	146	167	177	322	351	360
Packaging Dimensions (mm)	Width	500			600						970		
	Depth	760			900						900		
	Hight	1000			1400						2040		
Gross Weight (kg)		105	105	105	140	141	145	164	185	195	357	376	395

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

PM
SERIES

10-2080 kVA 3:3 PHASE

MODULAR ONLINE UPS

DATA CENTER | MEDICAL | TRANSPORT | INDUSTRY | EMERGENCY

kW=kVA

96% Efficiency

VFI TYPE — UPS ONLINE

MODULAR SYSTEM

PF= 1.0 — POWER FACTOR

Service — SERVICE

HIGHLIGHTS

- High Performance, Modular 3-Phase Power Protection
- Scalable up to 2080kVA, with 96% High Efficiency

Modular UPS Design for High Density Data Centers

- PM Series is a scalable, redundant Modular UPS system designed to cost effectively provide high level availability for high density data centers and critical applications.
- True Online Double Conversion and advanced DSP control technology.
- Modular Architecture can scale power and runtime as demand grows or as higher levels of availability required.
- Combines the modular design with the N+X parallel redundancy technology.
- The maximum capacity of a single cabinet is 520kVA. Cabinets can operate in parallel configuration to build a system of up to 2080kVA.

CERTIFICATES

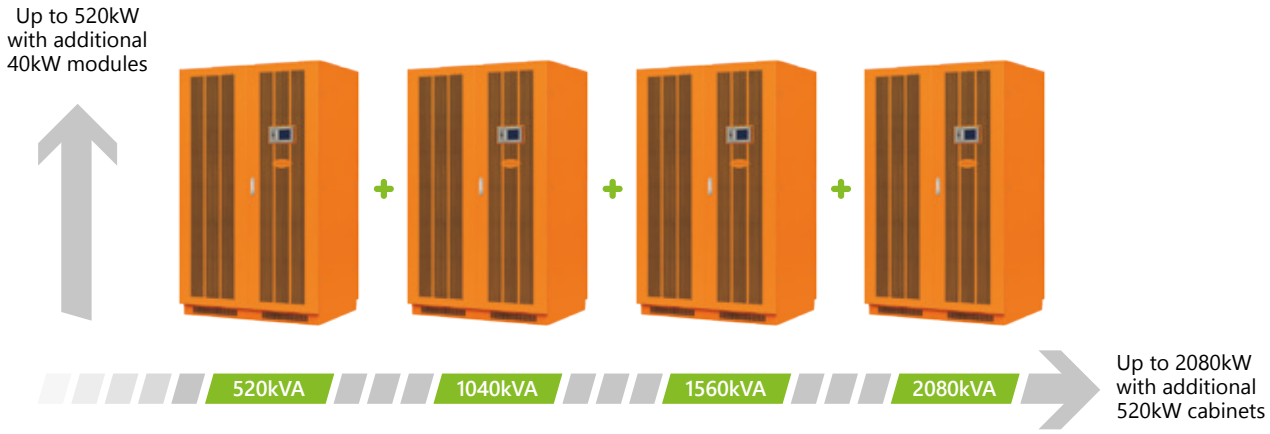
CE TSE TSE-HYB Higher Level of Efficiency than the EU CoC for AC Ups

Scalable Modular Architecture

Scalable up to the highest active power rating available through two dimensional modularity: Vertical and Horizontal.

- Capacity of single power module is 10-15-20-25-30-40-50kVA
- The height of single hot swappable power module is 3U
- Standard 1.4m cabinet can hold up to 5 of power modules
- Standard 2m cabinet can hold up to 13 of power modules
- The single UPS cabinet capacity can reach 520KVA and UPS cabinets can operate in parallel configuration to build a system of up to 2080kVA

Modules	Output Power	Dimensions (WxHxD)	Weight
PM 3310-RM	10kVA 3/3 Module	443x131x580mm 3U	26kg
PM 3315-RM	15kVA 3/3 Module	443x131x580mm 3U	30kg
PM 3320-RM	20kVA 3/3 Module	443x131x580mm 3U	31kg
PM 3325-RM	25kVA 3/3 Module	443x131x580mm 3U	31kg
PM 3330-RM	30kVA 3/3 Module	443x131x580mm 3U	32kg
PM 3340-RM	40kVA 3/3 Module	443x131x580mm 3U	33kg
PM 3350-RM	50kVA 3/3 Module	443x131x625mm 3U	34kg



"Size What You Need Now and Pay as You Grow"

Standart Electrical Features

- Output Power Factor: 0.9 (Optional 1.0)
- Hot Swappable Maintenance (UPS & Battery)
- Separated Bypass
- Maintenance Bypass
- Parallelable up to 4 Cabinets
- Common Battery
- Control of On/Off State of each Module
- Freely Set the Charge Current
- Intelligent Charging
- Mid or Small Power Distributing System
- Selectable Battery Voltage 3 Input 3 Output ±216VDC/±228VDC/±240VDC (32/34/36/38/40pcs)

Advanced Communication Features

- RS232 (USB)
- RS485 Communication Interface
- SNMP Card (Optional)
- Relay Card (Optional)
- Centralized Monitor Module that is Hot Swappable
- Single Module LCD Display
- Control Monitoring with 5" Color LCD Graphic Display

UPS Cabinet Control Panel

Module Control Panel

Hot Swappable Battery Modules

Plug and play battery modules ensures uninterrupted power to protected equipment while batteries are being replaced. Allows quick and easy battery replacement.

- Each Battery Module Consists of 18 pcs 7Ah/9Ah
- Only 3U Height
- Simply Plug into UPS System

3 U Battery Box Optional

19"Matching Battery Cabinets (Optional)

N+X Parallel Redundancy

PM series UPS adopts N+X parallel redundancy design, users can set different redundancy according to the importance of the load. While the number of redundancy modules are more than two, the availability of UPS system will achieve 99.999% and the MTBF will be more than 15,000,000 hours which can satisfying the reliability requirement of critical load. The UPS redundancy degree can be set through the LCD, when the load exceeds the set value, the UPS will alarm in time.

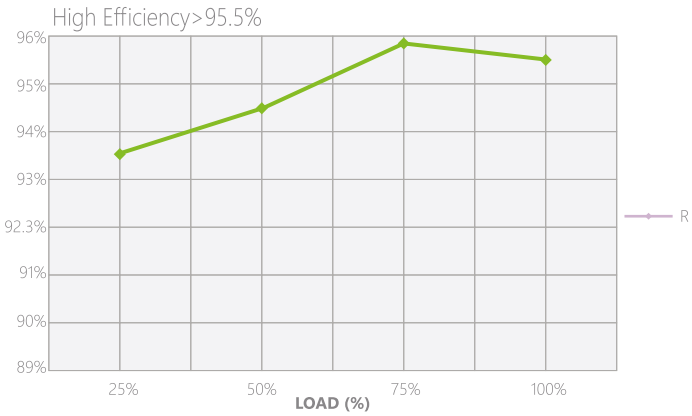
Independent Control System

Every power module is equipped independent control system, and control itself independently according to the sharing message, and the fault module separates from the system automatically.

High Efficiency and Low Total Cost of Ownership

PM Designed for highly economical energy consumption and is a perfect fit in your data center and server room. Offering efficiency of up to 96%, THDi of 2% and unity Input Power Factor without harmonic filters PM delivers:

- Significant energy savings
- Lower cooling costs
- Smaller generator sizing



- High input power factor (>0.99) and low input Total Harmonic Distortion (THDi<2%) minimizes installation costs by enabling the use of smaller generators and cabling.
- Fully-rated power kVA equals kW feature option reduces cost by eliminating the need for an oversized UPS for Power Factor Corrected (PFC) loads.

10kVA/15kVA/20kVA/25kVA/ 30kVA 3:3 phase

40kVA 3:3 phase

MODEL													
CAPACITY													
UPS Cabinet		10~100 kVA	20~100 kVA	20~200 kVA	25~250 kVA	30~150 kVA	30~300 kVA	40~200 kVA	40~320 kVA	40~520 kVA	40~800 kVA	40~1040 kVA	40~1560 kVA
Paralleling		Up to 6 Frame	Up to 6 Frame	Up to 6 Frame	Up to 6 Frame	Up to 6 Frame	Up to 6 Frame	Up to 6 Frame	Up to 6 Frame	Up to 4 Frame	Up to 2 Frame	Up to 2 Frame	Up to 1 Frame
PM Module		10kVA/10kW, 15kVA/15kW, 20kVA/20kW, 25kVA/25kW, 30kVA/30kW, 40kVA/40kW, 50kVA/50kW											
INPUT													
Phase		3 Phase 4 Wires and Ground											
Rated Voltage		380/400/415 VAC											
Voltage Range		208~478 VAC or 120 VAC~276 VAC											
Frequency Range (Hz)		40~70 Hz											
Power Factor		>0.99											
Bypass Voltage Range		Max. Voltage: +15% (Optional +5%, +10%, +25%) Min. Voltage: -45% (Optional -20%, -30%)											
		Frequency Protection Range: ±10%											
Current Harmonic		<2% (100% Non-Linear Load)											
Generator Input		Support											
OUTPUT													
Phase		3 Phase 4 Wires and Ground											
Rated Voltage		220/240 VAC 380/400/415 VAC											
Power Factor		1											
Voltage Precision		±1%											
Output Frequceny		±1%, ±2%, ±4%, ±5%, ±10% of the Rated Frequency (Optional) (50/60±0.2) Hz											
Crest Factor		3:1											
THD		≤1% With Linear Load ≤4% With Non-Linear Load											
Efficiency		96%											
COMMUNICATION													
UPS Cabinet		RS232, RS485, Intelligent Slot x 2 (SNMP Card, Relay Card, Dry Contact Optional)											
INTERFACE													
PM Series UPS Module		RS232											
BATTERY													
Voltage		±192V / ±204V / ±216V / ±228V / ±240V DC; Battery Quantity (Optional)											
Charge Current (A)	UPS Cabinet	60A Max	30A Max	60A Max	60A Max	50A Max	100A Max	50A Max	80A Max	130A Max	200A Max	260A Max	390A Max
	Module	6A/10A/(20A Optional) Max (Charge Current can be Set According to Battery Capacity Installed)											
Crest Factor Backup Time		Depends on the Capacity of External Batteries											
THD Transfer Time		Utilty to Battery : 0ms; Utily to Bypass: 0ms											
PROTECTION													
Overload	Normal Mode	Load ≤110%: Last 60min, ≤125%: Last 10min, ≤150%: Last 1min, ≥150% Shut Down UPS Immediately											
	Battery Mode	Load ≤110%: Last 10min, ≤125%: Last 1min, ≤150%: Last 1s ≥150% Shut Down UPS Immediately											
ENVIRONMENTAL													
Operating Temperature		0°C ~ 40°C											
Storage Temperature		-25°C ~ 55°C											
Humidity		0 ~ 95% Non-Condensing											
Noise	Number of Modules ≤5	<55 dBA (1m)											
	Number of Modules >5	<65 dBA (1m)											
Altitude		<1500m											
DIMENSIONS & WEIGHT													
Unit Dimensions WxDxH (mm)	UPS Cabinet	600x840 x1400	600x840 x1400	600x1100 x2000	600x1100 x2000	600x840 x1400	600x1100 x2000	860x600 x2000	860x600 x2000	860x1200 x2000	860x1800 x2000	860x3000 x2000	1100x4800 x2000
	Module	443 x 580 x 131 (3U)											
Weight (kg)	UPS Cabinet	170	170	270	275	152	280	205	310	514	1600	1810	2800
	Module	10kVA: 26kg; 15kVA: 30kg; 20kVA: 31kg; 25kVA: 31kg; 30kVA: 32kg; 40kVA: 33kg											
INDUSTRY STANDARD		CE, IEC 62040-2, IEC 62040-1, IEC 62040-3, IEC61000-4, IEC60950-1											

LION
SERIES

650-2200 VA
LINE INTERACTIVE UPS

HOME/OFFICE

VI TYPE — UPS LINE INTERACTIVE

TOWER

PLUG & PLAY

USB

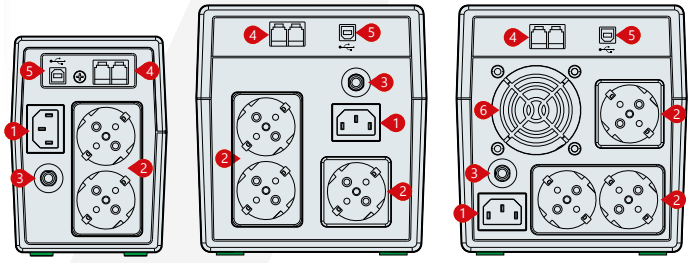
LCD — LCD DISPLAY (1200-1500-2200VA)

FEATURES

- LED Display (650-850)
- LCD Display (1200-1500-2200)
- Voltage Range, Operation Mode, Battery Charge and Load Quantity Monitoring via LCD Display (1200-1500-2200)
- Microprocessor-Based Digital Control
- Automatic Voltage Stabilization
- Automatic Breaker
- Frequency Adaptive
- User Friendly Alarm System
- Cold Start
- Auto Restart while AC is Recovering
- Simulated Sine Wave Output
- Intelligent Battery Management
- Short Circuit and Over Discharged Protection
- Automatically Charging Battery at UPS Off Mode
- USB Communication Port
- RJ11/RJ45 Protection

DETAILS

1. AC Input
2. Outlet
3. Breaker
4. RJ11/RJ45
5. USB
6. Fan



Rear Panel 650-850 VA

Rear Panel 1200-1500 VA

Rear Panel 2200 VA

CERTIFICATES

CE TSE TSE-HYB

MODEL					
Capacity	650VA / 390W	850VA / 510W	1200VA / 720W	1500VA / 900W	2200VA / 1320W
INPUT					
Related Voltage	230 VAC				
Voltage Range	170-280 VAC (±%5)				
Frequency	50 Hz (±%10)				
OUTPUT					
Voltage Range	220 VAC				
Voltage Precision	±10% (Battery Mode)				
Frequency	50 Hz ±%1 (Akü Modu)				
Transfer Time	2-6ms Typical, 10ms max.				
Waveform	Modified Sine Wave (Battery Mode)				
EFFICIENCY					
Line Mode	Normal Mode: >95%, AVR Mode: >88%				
Battery Mode	>60%				
BATTERY					
Battery Configuration	1 x 12V/7Ah	1 x 12V/9Ah	2 x 12V/7Ah	2 x 12V/9Ah	2 x 12V/9Ah
Charge Current	1A				
Recharge/Charging Time	6-8 hours for Recharging up to 90% Capacity				
Backup Time	~16 min.	~20 min.	~30 min.	~50 min.	~50 min.
PROTECTION					
Full Protection	Overload, Short Circuit, Battery Charge-Discharge Protection				
INDICATION					
Display	LED		LCD		
ALARM					
Battery Mode	Sounding every 10 seconds				
Low Battery	Sounding every 1 seconds				
Overload	Sounding every 0.5 seconds				
Fault	Continuously Sounding				
ENVIRONMENTAL					
Operating Temperature	0 ~ 40ºC				
Storage Temperature	-20ºC ~ 55ºC				
Relative Humidity	0 - 95ºC (Non Condensing)				
Audible Noise (at 1m)	≤40 dB				
COMMUNICATION					
Communication Port	USB				
Software	Windows Family / Linux / Mac				
DIMENSIONS & WEIGHT					
Dimensions WxDxH (mm)	101 x 298 x 142		150 x 353 x 162		
Packaging Dimensions WxDxH (mm)	142 x 332 x 213		192 x 405 x 235		

LION X
SERIES

650-2200 VA
LINE INTERACTIVE UPS

HOME/OFFICE

VI TYPE — UPS LINE INTERACTIVE

TOWER

PLUG & PLAY

USB

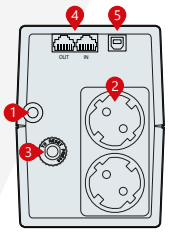
LCD — LCD DISPLAY (1200-1500-2200VA)

FEATURES

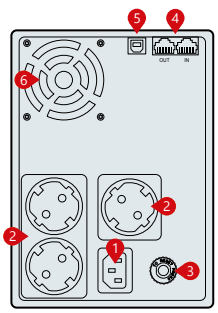
- LED Display (650-850)
- LCD Display (1200-1500-2200)
- Microprocessor-Based Digital Control
- Automatic Voltage Stabilization
- Automatic Breaker
- Frequency Adaptive
- User Friendly Alarm System
- Cold Start
- Auto Restart while AC is Recovering
- Simulated Sine Wave Output
- Intelligent Battery Management
- Short Circuit and Over Discharged Protection
- Automatically Charging Battery at UPS Off Mode
- Shut Down when No Load Connected at Battery Mode
- USB Communication Port
- RJ11/RJ45 Protection

DETAILS

1. AC Input
2. Outlet
3. Breaker
4. RJ11/RJ45
5. USB
6. Fan



Rear Panel
650-850 VA



Rear Panel
1200-2200 VA

CERTIFICATES

CE TSE TSE-HYB

MODEL						
Capacity		**650**VA / **390**W	**850**VA / **510**W	**1200**VA / **720**W	**1500**VA / **900**W	**2200**VA / **1320**W
INPUT						
Related Voltage		220 VAC				
Voltage Range		162-290 VAC				
Frequency		50-60 Hz (Auto Sensing)				
OUTPUT						
Voltage Range		220 VAC				
Voltage Precision		±10% (Battery Mode)				
Frequency		50 / 60 Hz ±1% (Battery Mode)				
Transfer Time		4ms Typical				
Waveform		Modified Sine Wave (Battery Mode)				
Overload	AC Mode	>(110% ±10%) After 1min Alarm go to Fault Mode >(120% ±10%) Immediately go to Fault Mode				
	Battery Mode	>(110% ±10%) After 1min Alarm go to Fault Mode >(120% ±10%) Immediately go to Fault Mode				
EFFICIENCY						
Inverter Mode		Line Mode: >95%, AVR Mode: >88%				
Battery Mode		>60%				
BATTERY						
Battery Configuration		12V/7Ah*1	12V/9Ah*1	12V/7Ah*2	12V/9Ah*2	12V/9Ah*2
Charge Current		1A				
Recharge/Charging Time		8 hours for recharging up to 90% capacity				
Backup Time		~16 min.	~20 min.	~30 min.	~50 min.	~50 min.
PROTECTION						
Full Protection		Overload, Short Circuit, Battery Charge-Discharge Protection				
INDICATION						
Display		LED		LCD		
ALARM						
Battery Mode		Sounding every 30 seconds				
Low Battery		Sounding every 2 seconds				
Overload		Sounding every 0.5 seconds				
Fault		Continuously Sounding				
ENVIRONMENTAL						
Operating Temperature		0 ~ 40ºC				
Storage Temperature		-20ºC ~ 55ºC				
Relative Humidity		0 - 90ºC				
Audible Noise (at 1m)		≤40 dB		≤45 dB		
COMMUNICATION						
Communication Port		USB				
Software		Windows Family / Linux / Mac				
DIMENSIONS & WEIGHT						
Dimensions WxDxH (mm)		96 x 286 x 138		148x 298x 178		
Packaging Dimensions WxDxH (mm)		146 x 323 x 202		193 x 335 x 247		
Net Weight (kg)		4,3	4,5	8,7	9,1	10,8
Gross Weight (kg)		4,5	4,7	9,6	10,1	12

POWERPACK PLUS SERIES

1/2/3 kVA 1:1 PHASE

ONLINE UPS

HOME/OFFICE EMERGENCY MEDICAL INDUSTRY

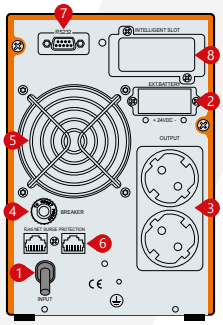
VFI TYPE — UPS ONLINE
TOWER
PF= 0.9 — POWER FACTOR
PLUG & PLAY

FEATURES

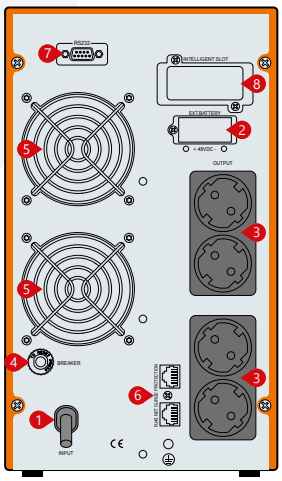
- High Frequency and True Double-Conversion
- Microprocessor Control Optimizes Reliability
- Active Power Factor Correction (PFC)
- Wide Input Voltage Range (110~300V)
- Output Power Factor 0.9
- Cold Start
- Auto Sensing Frequency
- ECO Mode Operation for Energy Saving
- Selectable Output Voltage via LCD
- Output Bypass Settable via LCD
- Power-On Self Test
- Advanced Battery Management (ABM)
- Short Circuit and Overload Protection
- Automatic Charging in Off Mode
- Auto Control Fan Speed when Loads Varies
- Generator Compatible
- Standard RS232 Communication Port and RJ45 Protection
- SNMP Communication Port *(Optional)*
- Extension Battery Bank *(Optional)*
- Built-In Isolation Transformer *(Optional)*

DETAILS

1. AC Input
2. DC Input
3. Outlet
4. Breaker
5. Fan
6. Modem/Tel/Fax
7. RS232
8. SNMP/AS400 *(Optional)*



Rear Panel 1kVA



Rear Panel 2-3kVA

CERTIFICATES

CE TSE TSE-HYB

MODEL				
Capacity		**1**kVA / **900**W	**2**kVA / **1800**W	**3**kVA / **2700**W
INPUT				
Nominal Voltage		200V / 208V / 220V / 230V / 240 VAC		
Voltage Range		110 ~ 300 VAC ±5% at 50% load		
Frequency		160 ~ 300 VAC ±5% at 100% load		
Power Factor		> 0.99 @ Nominal Voltage (100% load)		
THDi		<=10%		
OUTPUT				
Voltage Range		200V / 208V / 220V / 230V / 240 VAC		
Voltage Regulation		±1%		
Frequency (Synchronized Range)		45 ~ 55 Hz / 55 ~ 64 Hz		
Frequency (Batt. Mode)		50 Hz ±0.1 Hz or 60 Hz ±0.1 Hz		
Crest Factor		3:1 (Max)		
Harmonic Distortion		<2% THD (Linear Load); <=5% THD (Non-Linear Load)		
Transfer Time	AC to DC	Zero		
	Inverter to Bypass	4ms (Typical)		
Waveform		Pure Sinewave		
EFFICIENCY				
Mains Mode		Up to 90% @ Battery Full Charged	Up to 91% @ Battery Full Charged	
ECO Mode		94% @ Battery Full Charged		
BATTERIES				
DC Voltage		24V I 36 V	48V I 72V	72V I 96V
Inbuilt Battery		2 x 7Ah I External	4 x 9Ah I External	6 x 9Ah I External
Charging Current (Max.)		1A I 6A	1A I 6A	1A I 6A
Recharge Time		8 hour		
INDICATORS				
LCD		Load Level, Battery Level, AC Mode, Battery Mode, Bypass Mode and Fault Indicators		
ALARMS				
Battery Mode		Sounding Every 4sec		
Low Battery		Sounding Every 1sec		
Overload		Sounding Twice Every 1sec		
UPS Fault		Continously Sounding		
ENVIRONMENTAL				
Operating Temperature		0 ~ 40ºC		
Relative Humidity		0 ~ 90% (Non-Condensing)		
Noise Level		≤50 dB (1m)		
COMMUNICATION				
RS232 (Standard)		Supports Windows® 2000/2003/XP/Vista/2008/Windows® 7/8/10, Linux, Free BSD and Mac		
SNMP (Optional)		Power Management from SNMP Manager and Web Browser		
DIMENSIONS & WEIGHT				
Dimension WxDxH (mm)		144 x 400 x 215	191 x 468 x 340	
Net Weight (kg)		7.3 I 5.1	18.1 I 8.8	24.4 I 10.1
Gross Weight (kg)		8.5 I 6.1	19.5 I 9.8	25.8 I 11.1

POWERPACK PLUS SERIES

6/10 kVA 1:1 PHASE

ONLINE UPS

DATA CENTER | EMERGENCY | MEDICAL | INDUSTRY | TRANSPORT

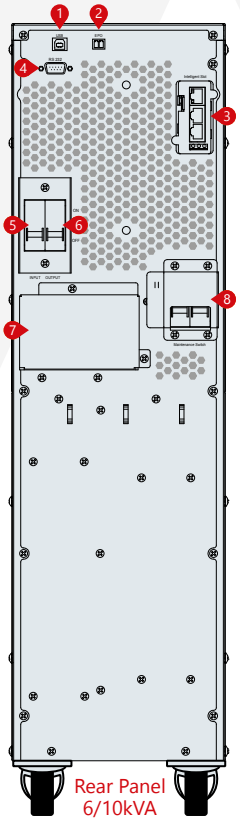
VFI TYPE — UPS ONLINE
TOWER
PF= 0.9 — POWER FACTOR
Service — SERVICE

FEATURES

- Online Double Conversion with DSP Control
- Input Current Harmonic: <3%
- Output Power Factor 0.9
- Wide Input Voltage Range: 110-300VAC
- Wide Input Frequency Range
- Support Generator Input
- ECO Mode Operation for Energy Saving
- Self-Testing when UPS Startup
- Cold Start
- Emergency Power Off (EPO)
- Standard RS232/USB Communication Port
- SNMP Card/Relay Card *(Optional)*

DETAILS

1. USB Port
2. EPO Port
3. Intelligent Slot *(Optional)*
4. RS232
5. Input Breaker
6. Output Breaker
7. Terminal
8. Maintenance Bypass Switch



Rear Panel 6/10kVA

CERTIFICATES

CE TSE TSE-HYB

MODEL			
Capacity		**6**kVA / **5400**W	**10**kVA / **9000**W
INPUT			
Nominal Voltage		220 / 230 / 240 VAC	
Operating Voltage Range		110 - 300 VAC	
Frequency		50 Hz: 45-55 Hz; 60 Hz: 54-66 Hz (Auto Sensing)	
Power Factor		≥0,99	
Bypass Voltage Range		Max. Voltage: 220V: +25% (Optional +10%, +15%, +20%), 230V: +20% (Optional +10%, +15%) 240V: +15% (Optional +10%), Min. Voltage: -45% (Optional -20%, -30%)	
Bypass Frequency Range		Frequency Protection Range: ±10%	
ECO Range		Same as the Bypass	
Harmonic Distortion (THDi)		<3% (100% Linear Load)	
Generator		Compatible	
OUTPUT			
Voltage Range		220 / 230 / 240 VAC	
Power Factor		1	
Voltage Regulation		±1%	
Frequency	AC Mode	±1%, ±2% , ±4%, ±5%, ±10% of the Rated Frequency (Optional)	
	Battery Mode	50-60 ± 0.1 Hz	
Crest Factor		3:1	
Harmonic Distortion		≤2% (Linear Load)	
		≤5% (Non-Linear Load)	
Efficiency		>92%	>93%
BATTERY			
Battery Voltage		±96 / 108 / 120 VDC (Optional)	
Capacity (Standar Unit)		12V-7Ah / 9Ah	
Typical Recharging Time		6-8 Hours (to 90% of Full Capacity)	
Charging Current		1A	
SYSTEM FEATURES			
Transfer Time		Main to Battery: 0ms; Mains to Bypass: 0ms	
Overload	AC Mode	Load ≤110%: last 10 min, ≤130%: last 10 min, >130%: turn to Bypass Mode Immediately	
	Battery Mode	40A (Breaker)	80A (Breaker)
Short Circuit		Hold Whole System	
Overheat		Line Mode: Turn to Bypass; Bat. Mode: Shut Down UPS Immediately	
Battery Low		Alarm and Switch Off	
Self-Diagnostics		Upon Power on and Software Control	
Battery		Advanced Battery Management	
Audible & Visual Alarms		Line Failure, Battery Low, Overload, System Fault	
LED&LCD Display		Line Mode, Battery Mode, Eco Mode, Bypass Mode, Battery Low, Overload & UPS Fault	
LCD Display		Input Voltage, Input Frequency, Output Voltage, Output Frequency, Load Percentage, Battery Voltage Inner Temperature & Remaining Battery Backup Time	
Communication Interface		RS232, USB, SNMP Card (Optional), Relay Card (Optional)	
ENVIRONMENTAL			
Operation Temperature		0°C~40°C	
Storage Temperature		-25°C~55°C	
Humidity		0%~90% (Non-Condensing)	
Altitude		<1500 m	
Noise Level		<55 dB	
STANDARDS			
Safety		IEC/EN62040-1, IEC/EN60950-1	
EMC		IEC/EN62040-2, IEC61000-4-2, IEC61000-4-3, IEC61000-4-4, IEC61000-4-5, IEC61000-4-6, IEC61000-4-8	
DIMENSIONS & WEIGHT			
Dimensions WxDxH (mm)		191 x 460 x 720	
Net Weight (kg)		60	61

POWERPACK SE SERIES

1/2/3 kVA 1:1 PHASE

ONLINE UPS

HOME/OFFICE · EMERGENCY · MEDICAL · INDUSTRY

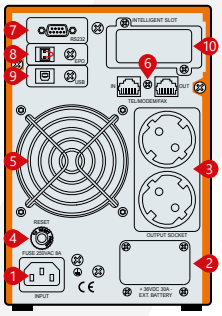
VFI TYPE — UPS ONLINE · TOWER · PF= 0.9 — POWER FACTOR · PLUG & PLAY

FEATURES

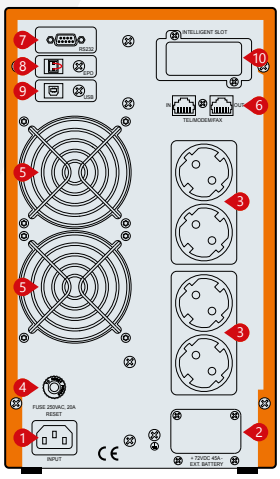
- High Frequency and True Double-Conversion
- DSP (Digital Signal Processors) Technology
- Input Power Factor Correction (PFC)
- Wide Input Voltage Range (110~300V)
- Output Power Factor 0.9
- Cold Start
- Auto Sensing Frequency
- ECO Mode Operation for Energy Saving
- Selectable Output Voltage via LCD
- Output Bypass Settable via LCD
- Power-On Self Test
- Advanced Battery Management (ABM)
- Short Circuit and Overload Protection
- Automatic Charging in Off Mode
- Auto Control Fan Speed when Loads Varies
- Generator Compatible
- Standard RS232 Communication Port and RJ45 Protection
- USB/SNMP Communication Port *(Optional)*
- Emergency Power Off (EPO) *(Optional)*
- Extension Battery Bank *(Optional)*
- Built-In Isolation Transformer *(Optional)*

DETAILS

1. AC Input
2. DC Input
3. Outlet
4. Breaker
5. Fan
6. Modem/Tel/Fax
7. RS232
8. USB *(Optional)*
9. EPO *(Optional)*
10. SNMP/AS400 *(Optional)*



Rear Panel 1kVA



Rear Panel 2/3kVA

CERTIFICATES

CE · TSE · TSE-HYB

MODEL									
Capacity	**1**kVA / **900**W			**2**kVA / **1800**W			**3**kVA / **2700**W		
INPUT									
Related Voltage	208V / 220V / 230V / 240 VAC								
Voltage Range	110 ~ 176 VAC (Linear Derating Between 50% and 100% load); 176 ~ 280 VAC (No Derating); 280 ~ 300 VAC (Derating 50%)								
Frequency	40 ~ 70 Hz (Auto Sensing)								
Power Factor	≥ 0.99								
Bypass Voltage Range	-25% ~ +15% (Settable)								
OUTPUT									
Voltage Range	208V / 220V / 230V / 240 VAC (Settable via LCD)								
Voltage Regulation	±1%								
Frequency	45 ~ 55 Hz or 55 ~ 65 Hz (Synchronized Range); 50 / 60 Hz ±0.1 Hz (Battery Mode)								
Waveform	Sinusoidal								
Crest Factor	3:1								
Harmonic Distortion	≤2% (Linear Load); ≤5% (Non-Linear Load)								
Nominal Voltage	Mains Mode to Battery Mode: 0ms Inverter Mode to Bypass Mode: 4ms (Typical)								
Overload Capability	105% ~ 125%: Transfer to Bypass in 1min 125% ~ 150%: Transfer to Bypass in 30s >150%: Transfer to Bypass in 300ms								
EFFICIENCY									
Mains Mode	≥90%			≥91%			≥92%		
ECO Mode	≥95%			≥96%			≥97%		
BATTERIES									
DC Voltage	24 V	36 V	36 V	48 V	72 V	72 V	72 V	96 V	96 V
Inbuilt Battery	2 x 7Ah	3 x 7Ah	External	4 x 7Ah	6 x 7Ah	External	6 x 7Ah	8 x 7Ah	External
Charging Current (Max.)	1A		6A	1A		6A	1A		6A
Recharge Time	8 hour								
ALARMS									
Utility Failure	Beep / 4sec								
Low Battery	Beep / 1sec								
Overload	Beep Twice / 1sec								
UPS Fault	Long Beep								
ENVIRONMENTAL									
Operating Temperature	0 ~ 40ºC								
Relative Humidity	0 ~ 90% (Non-Condensing)								
Noise Level	≤45 dB (1m)								
COMMUNICATION									
RS232 (Standard) / USB (Optional)	Supports Windows® 98/2000/2003/XP/Vista/2008/Windows® 7/8/10								
SNMP (Optional)	Power Management from SNMP Manager and Web Browser								
DIMENSIONS & WEIGHT									
Dimension WxDxH (mm)	144 x 336 x 214	144 x 414 x 214	144 x 336 x 214	191 x 418 x 335				191 x 464 x 335	191 x 418 x 335
Packaging Dimensions WxDxH (mm)	232 x 417 x 318	231 x 492 x 316	232 x 417 x 318	318 x 533 x 471				320 x 573 x 471	318 x 533 x 471
Net Weight (kg)	9.5	13	6	18	25.7	10.5	27.2	32	11
Gross Weight (kg)	10.5	14.2	7	19.5	27.4	12	29	34	12.5

POWERPACK SE SERIES

6/10 kVA 1:1 PHASE

ONLINE UPS

HOME/OFFICE · EMERGENCY · MEDICAL · INDUSTRY · DATA CENTER · TRANSPORT

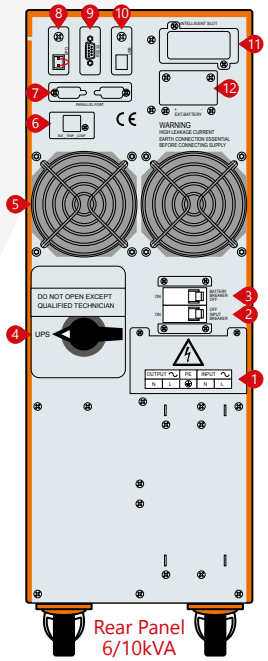
VFI TYPE — UPS ONLINE
TOWER
PF= 0.9 — POWER FACTOR
Service — SERVICE

FEATURES

- High Frequency and True Double-Conversion
- DSP (Digital Signal Processors) Technology
- Input Power Factor Correction (PFC)
- Wide Input Voltage Range (110~300V)
- Output Power Factor 0.9
- Cold Start
- Auto Sensing Frequency
- ECO Mode Operation for Energy Saving
- Selectable Output Voltage via LCD
- 50Hz/60Hz Frequency Converter Mode Available
- Selectable Battery Low Voltage via LCD
- Power-On Self Test
- Advanced Battery Management (ABM)
- Short Circuit and Overload Protection
- Automatically Charging Battery at UPS Off Mode
- Fan Speed Auto Control when Load Varies
- Generator Compatible
- Standard RS232 Communication Port
- USB/SNMP Communication Port *(Optional)*
- Emergency Power Off (EPO) *(Optional)*
- Extension Battery Bank *(Optional)*
- Manual Bypass
- N+X Redundancy Parallel *(Optional)*

DETAILS

1. Input-Output Terminal
2. Input Breaker
3. Battery Breaker
4. Maintenance Switch
5. Fan
6. Battery Temperature Sensor
7. Parallel Card *(Optional)*
8. EPO
9. RS232
10. USB *(Optional)*
11. SNMP/AS400 *(Optional)*
12. BAT_NTC *(Optional)*



Rear Panel 6/10kVA

CERTIFICATES

CE · TSE · TSE-HYB

MODEL			
Power Watt		**6**kVA / **5400**W	**10**kVA / **9000**W
INPUT			
Related Voltage		208V / 220V / 230V / 240 VAC	
Voltage Range		Half Load (110-300) ±5 VAC, Full Load (160-300) ±5 VAC	
Frequency		40 ~ 70 Hz (Auto Sensing)	
Power Factor		≥0.99	
Bypass Voltage Range		160V - Rated Output Voltage +32V	
OUTPUT			
Voltage Range		208V / 220V / 230V / 240 VAC (Setting Available via LCD)	
Voltage Regulation		±1%	
Frequency		45 ~ 55 Hz or 55 ~ 65 Hz (Synchronized Range); 50 / 60 Hz ±0.1 Hz (Battery Mode)	
Waveform		Pure Sine Wave	
Crest Factor		3:1	
Harmonic Distortion		≤2% (Linear Load); ≤5% (Non-Linear Load)	
Transfer Time		AC Mode to Battery Mode: 0ms Inverter Mode to Bypass Mode: 0ms	
Overload Capability		105% ~ 125%: Transfer to Bypass after 3min 125% ~ 150%: Transfer to Bypass after 30sec >150%: Transfer to Bypass after 100ms	
EFFICIENCY			
AC Mode		≥92%	
ECO Mode		≥98%	
BATTERIES			
DC Voltage		192V-240V	
Inbuilt Battery		16-20 x 7-9Ah	
Charge Current	Standard Model	3.5A	
	Long Time Model	1A / 3.5A / 7A	
Typical Recharge Time		8 hours Recover to 90% Capacity	
ALARMS			
Utility Failure		Beep / 4sec	
Low Battery		Beep / 1sec	
Overload		Beep Twice / 1sec	
UPS Fault		Long Beep	
ENVIRONMENTAL			
Humidity		20-90% RH @ 0-40ºC (Non-Condensing)	
Noise Level		≤50 dB (1m)	
COMMUNICATION			
RS232 (Standard) / USB (Optional)		Supports Windows® 98/2000/2003/XP/Vista/2008/Windows® 7/8/10	
SNMP (Optional)		Power Management from SNMP Manager and Web Browser	
DIMENSIONS & WEIGHT			
Dimensions WxDxH (mm)		262 x 650 x 735	
Packaging Dimensions WxDxH (mm)		440 x 720 x 940	
Net Weight (kg)		64.1	70.8
Gross Weight (kg)		72.2	78.9

POWERPACK SE SERIES

10/15/20 kVA 3:1 PHASE

ONLINE UPS

HOME/OFFICE · EMERGENCY · MEDICAL · INDUSTRY · DATA CENTER · TRANSPORT

VFI TYPE — UPS ONLINE
TOWER
PF= 0.9 — POWER FACTOR
Service — SERVICE

FEATURES

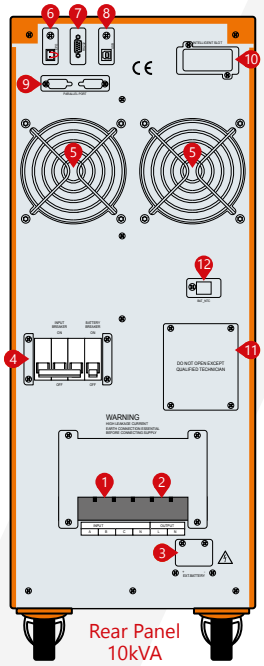
- High Frequency and True Double-Conversion
- DSP (Digital Signal Processors) Technology
- Input Power Factor Correction (PFC)
- Wide Input Voltage Range (110~300V)
- Output Power Factor 0.9
- Optimized Battery Configuration: 192V / 240V
- Cold Start
- Auto Sensing Frequency
- ECO Mode Operation for Energy Saving
- 50Hz/60Hhz Frequency Conversion Mode
- Selectable Output Voltage via LCD
- Selectable Battery Shutdown Voltage (Eod) via LCD
- Selectable Input Mode via LCD (3:1 or 1:1)
- Power-On Self Test
- Advanced Battery Management (ABM)
- Short Circuit and Overload Protection
- Automatically Charging in Off Mode
- Fan Speed Auto Control when Load Temperature Varies
- Generator Compatible
- Standard RS232/USB Communication Port
- Standard Emergency Power Off (EPO)
- RS485/SNMP/AS400 Communication Port *(Optional)*
- Extension Battery Bank *(Optional)*
- Manual Bypass
- N+X Redundancy Parallel *(Optional)*

CERTIFICATES

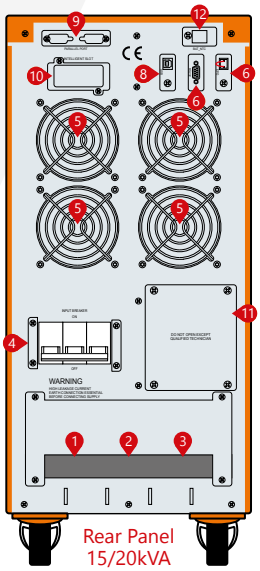
CE TSE TSE-HYB

DETAILS

1. AC Input
2. Output
3. Ext. Battery
4. Breaker
5. Fan
6. EPO
7. RS232
8. USB
9. Parallel Card *(Optional)*
10. SNMP/AS400 *(Optional)*
11. Manual Bypass
12. BAT_NTC *(Optional)*



Rear Panel 10kVA



Rear Panel 15/20kVA

MODEL				
Power Watt		**10**kVA / **9**kW	**15**kVA / **13.5**kW	**20**kVA / **18**kW
INPUT				
Related Voltage		3 : 1 : 360V / 380V / 400V / 415 VAC 1 : 1 : 208V / 220V / 230V / 240 VAC (Settable via LCD)		
Voltage Range		3 : 1 : Half Load (190 ~ 520) ±5 VAC, Full Load (277 ~ 520) ±5 VAC		
Frequency		40 ~ 70 Hz (Auto Sensing)		
Power Factor		3 : 1 ≥ 0.95; 1 : 1 ≥ 0.99		
BYPASS				
Voltage Range		160V Rated Output Voltage +32V		
Frequency		50 / 60 Hz ±5 Hz		
OUTPUT				
Voltage Range		208V / 220V / 230V / 240 VAC (Settable via LCD)		
Voltage Regulation		±1%		
Frequency		Synchronized with Utility in Mains Mode; 50 / 60 ±0.2 Hz in Battery Mode		
Waveform		Sinusoidal		
Crest Factor		3:1		
Harmonic Distortion		≤2% (Linear Load); ≤5% (Non-Linear Load)		
Transfer Time		0 ms		
Overload Capability		105% ~ 125%: Transfer to Bypass in 3min 125% ~ 150%: Transfer to Bypass in 30sec >150%: Transfer to Bypass in 1sec		
EFFICIENCY				
Mains Mode		≥92%		
Battery Mode		≥91%		
ECO Mode			≥98%	
BATTERIES				
DC Voltage		192 VDC / 240 VDC		
Inbuilt Battery		20 x 7Ah (16 Opt.)	-	-
Charge Current	Standard Model	3.5A	-	-
	Long Time Model	1A / 3.5A / 7A		
Recharge Time		8 hour		
ALARMS				
Utility Failure		Beep / 4sec		
Low Battery		Beep / 1sec		
Overload		Beep Twice / 1sec		
UPS Fault		Long Beep		
ENVIRONMENTAL				
Humidity		20-90% RH @ 0-40ºC (Non-Condensing)		
Noise Level		≤55 dB (1m)	≤60 dB (1m)	
COMMUNICATION				
RS232 (Standard) / USB (Optional)		Supports Windows® 98/2000/2003/XP/Vista/2008/Windows® 7/8/10		
SNMP (Optional)		Power Management from SNMP Manager and Web Browser		
DIMENSIONS & WEIGHT				
Dimensions WxDxH (mm)		262 x 580 x 732 (S)	262 x 580 x 628 (H)	
Packaging Dimensions WxDxH (mm)		359 x 687 x 937 (S)	359 x 687 x 832 (H)	
Net Weight (kg)		25.5 (H), 74.0 (S)	38.5 (H)	39.0 (H)
Gross Weight (kg)		29.0 (H), 83.5 (S)	47.0 (H)	47.5 (H)

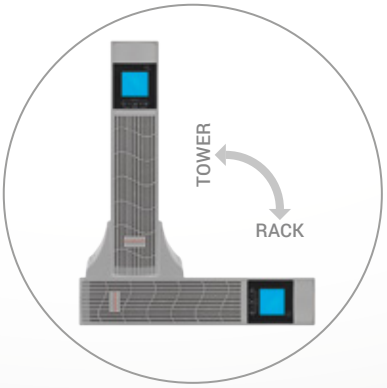
• (S) means standard model, (H) means long time model.

POWERPACK SE RT SERIES

1/2/3 kVA 1:1 PHASE

ONLINE UPS

HOME/OFFICE · EMERGENCY · MEDICAL · INDUSTRY · DATA CENTER · TRANSPORT



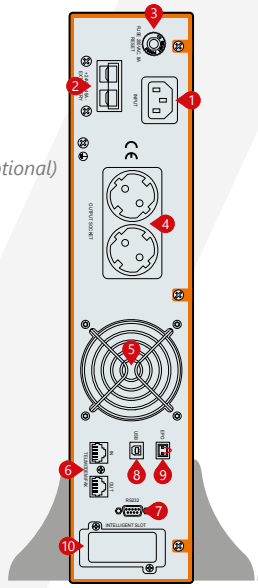
VFI TYPE — UPS ONLINE
RACK/TOWER
PF= 0.9 — POWER FACTOR
PLUG & LAY — PLUG & PLAY

FEATURES

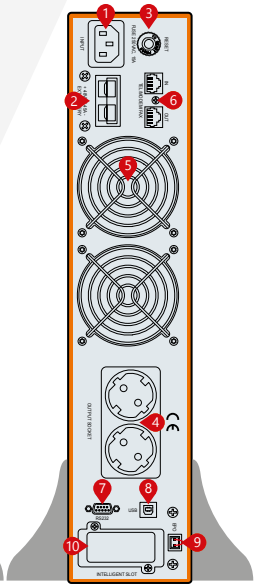
- High Frequency and True Double-Conversion
- DSP (Digital Signal Processors) Technology
- Input Power Factor Correction (PFC)
- Wide Input Voltage Range (110~300V)
- Output Power Factor 0.9
- Cold Start
- Auto Sensing Frequency
- ECO Mode Operation for Energy Saving
- Selectable Output Voltage via LCD
- Output Bypass Settable via LCD
- Power-On Self Test
- Advanced Battery Management (ABM)
- Short Circuit and Overload Protection
- Automatic Charging in Off Mode
- Auto Control Fan Speed when Loads Varies
- Generator Compatible
- Standard RS232 Communication Port And RJ45 Protection
- USB/SNMP Communication Port *(Optional)*
- Emergency Power Off (EPO) *(Optional)*
- Extension Battery Bank *(Optional)*
- Built-In Isolation Transformer *(Optional)*

DETAILS

1. AC Input
2. DC Input
3. Breaker
4. Outlet
5. Fan
6. Modem/Tel/Fax
7. RS232
8. USB *(Optional)*
9. EPO *(Optional)*
10. SNMP/AS400 *(Optional)*



Rear Panel 1kVA



Rear Panel 2-3kVA

CERTIFICATES

CE · TSE · TSE-HYB

POWERPACK SE RT SERIES

1/2/3 kVA 1:1 PHASE

ONLINE UPS

MODEL									
Capacity	**1**kVA / **900**W			**2**kVA / **1800**W			**3**kVA / **2700**W		
INPUT									
Rated Voltage	208V / 220V / 230V / 240 VAC								
Voltage Range	110~176 VAC (Linear Derating Between 50% and 100% Load); 176~280 VAC (No Derating); 280~300 VAC (Derating 50%)								
Frequency Range	45 ~ 70 Hz (Auto Sensing)								
Power Factor	≥0.99								
Bypass Voltage Range	-25% ~ +15% (Settable)								
OUTPUT									
Voltage Range	208V / 220V / 230V / 240 VAC (Settable via LCD)								
Voltage Regulation	±1%								
Frequency Range	45 ~ 55 Hz or 55 ~ 65 Hz (Synchronized Range); 50 / 60 Hz ± 0.1 Hz (Battery Mode)								
Waveform	Sinusoidal								
Crest Factor	3:1								
Harmonic Distortion	≤2% (Linear Load); ≤5% (Non-Linear Load)								
Transfer Time	Mains Mode to Battery Mode: 0ms Inverter Mode to Bypass Mode: 4ms (Typical)								
Overload Capability	105% ~ 125%: Transfer to Bypass in 1min; 125% ~ 150%: Transfer to Bypass in 30s; >150%: Transfer to Bypass in 300ms								
EFFICIENCY									
Mains Mode	≥90%			≥91%			≥92%		
Battery Mode	≥85%			≥86%			≥87%		
ECO Mode	≥95%			≥96%			≥97%		
BATTERY									
DC Voltage	24V	36V	36V	48V		72V	72V	96V	96V
Inbuilt Battery	2 x 7Ah	3 x 7Ah	External	4 x 7Ah		External	6 x 7Ah	8 x 7Ah	External
Charging Current (Max.)	1A		6A	1A		6A	1A		6A
Recharge Time	8h								
ALARMS									
Utility Failure	4s Per Beep								
Low Battery	1s Per Beep								
Overload	1s Twice Beep								
UPS Fault	Long Beep								
ENVIRONMENTAL									
Operating Temperature	0 ~ 40°C								
Relative Humidity	0 ~ 90% (Non-Condensing)								
Noise Level	≤50 dB (1m)								
COMMUNICATIONS									
RS232 (Standard) / USB (Optional)	Supports Windows® 98/2000/2003/XP/Vista/2008/Windows® 7/8/10								
SNMP (Optional)	Power Management from SNMP Manager and Web Browser								
DIMENSIONS & WEIGHT									
Dimensions WxDxH (mm)	440x468x88			440x658x88		440x468 x88	440x658 x88	440x468x88 (UPS) 440x440x88 (BAT)	440x468 x88
Packaging Dimensions WxDxH (mm)	545x592x198			545x782x198		545x592 x198	545x782 x198	545x592x198 (UPS) 590x580x200 (BAT)	545x592 x198
Net Weight (kg)	12.26	13.78	7.58	22.73	25.86	9.66	29.26	9.45 (UPS) 27.2 (BAT)	10.04
Gross Weight (kg)	15.78	17.3	11.1	26.63	29.76	13.18	33.16	12.97 (UPS) 30.2 (BAT)	13.56

POWERPACK SE RT SERIES

6/10 kVA 1:1 PHASE

ONLINE UPS

HOME/OFFICE · EMERGENCY · MEDICAL · INDUSTRY · DATA CENTER · TRANSPORT

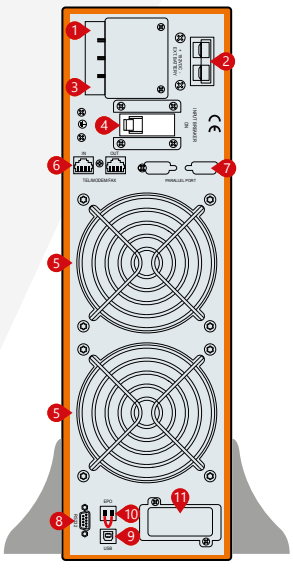
VFI TYPE — UPS ONLINE · RACK/TOWER · PF= 0.9 — POWER FACTOR · Service — SERVICE

FEATURES

- High Frequency and True Double-Conversion
- DSP (Digital Signal Processors) Technology
- Input Power Factor Correction (PFC)
- Wide Input Voltage Range (110~300V)
- Output Power Factor 0.9
- Cold Start
- Auto Sensing Frequency
- ECO Mode Operation for Energy Saving
- Selectable Output Voltage via LCD
- Output Bypass Settable via LCD
- Power-On Self Test
- Advanced Battery Management (ABM)
- Short Circuit and Overload Protection
- Automatic Charging in Off Mode
- Auto Control Fan Speed when Loads Varies
- Generator Compatible
- Standard RS232 Communication Port and RJ45 Protection
- USB/SNMP Communication Port *(Optional)*
- Emergency Power Off (EPO)
- Extension Battery Bank *(Optional)*
- Built-In Isolation Transformer *(Optional)*

DETAILS

1. AC Input
2. DC Input
3. Outlet
4. Breaker
5. Fan
6. Modem/Tel/Fax
7. Parallel Card *(Optional)*
8. RS232
9. USB *(Optional)*
10. EPO
11. SNMP/AS400 *(Optional)*



Rear Panel
6-10kVA

CERTIFICATES

CE · TSE · TSE-HYB

MODEL			
Capacity		**6**kVA / **5400**W	**10**kVA / **9000**W
INPUT			
Related Voltage		208V / 220V / 230V / 240 VAC	
Voltage Range		Half Load (115-295) ±5 VAC, Full Load (165-295) ±5 VAC	
Frequency		40 ~ 70 Hz (Auto Sensing)	
Power Factor		≥0.99	
Bypass Voltage Range		160V - Rated Output Voltage +32V	
OUTPUT			
Voltage Range		208V / 220V / 230V / 240 VAC Setting Available via LCD	
Voltage Regulation		±1%	
Frequency		Synchronized with Utility in Mains Mode: 50 / 60 Hz ±0.2 Hz (Battery Mode)	
Waveform		Sinusoidal	
Crest Factor		3:1	
Harmonic Distortion		≤2% (Linear Load); ≤5% (Non-Linear Load)	
Transfer Time		Mains Mode to Battery Mode: 0ms Inverter Mode to Bypass Mode: 0ms	
Overload Capability		105% ~ 125% for 3min 125% ~ 150% for 30s >150% for 1s	
EFFICIENCY			
AC Mode		≥92%	
Battery Mode		≥91%	
ECO Mode		≥98%	
BATTERIES			
DC Voltage		192V	
Inbuilt Battery		16 x 7Ah	16 x 9Ah
Charge Current	Standard Model	3,5A	
	Long Time Model	1A / 3A / 5A / 8A	
Recharge Time		8h	
ALARMS			
Utility Failure		Beep / 4s	
Low Battery		Beep / 1s	
Overload		Beep Twice / 1s	
UPS Fault		Long Beep	
ENVIRONMENTAL			
Humidity		20-90% RH @ 0-40ºC (Non-Condensing)	
Noise Level		≤55 dB (1m)	
COMMUNICATION			
RS232 (Standard) / USB (Optional)		Supports Windows® 98/2000/2003/XP/Vista/2008/Windows® 7/8/10	
SNMP (Optional)		Power Management from SNMP Manager and Web Browser	
DIMENSIONS & WEIGHT			
Long Time Model			
Dimensions WxDxH (mm)		440 x 555 x 132	
Packaging Dimensions WxDxH (mm)		535 x 660 x 215	
Net Weight / Gross Weight (kg)		16.4 / 20.7	17.1 / 21.4
Standard Model			
Dimensions WxDxH (mm)		440 x 555 x 132 (UPS), 440 x 555 x 132 (BAT)	
Packaging Dimensions WxDxH (mm)		535 x 660 x 215 (UPS), 540 x 685 x 235 (BAT)	
Net Weight / Gross Weight (kg)		16.4 / 20.7 (UPS), 43.6 / 47.1 (BAT)	17.1 / 21.4 (UPS), 49.6 / 53.1 (BAT)

POWERPACK 3300 SERIES

10/15/20 kVA 3:3 PHASE

ONLINE UPS

DATA CENTER | EMERGENCY | MEDICAL | INDUSTRY | TRANSPORT

VFI TYPE — UPS ONLINE

TOWER

PF= 0.9 — POWER FACTOR

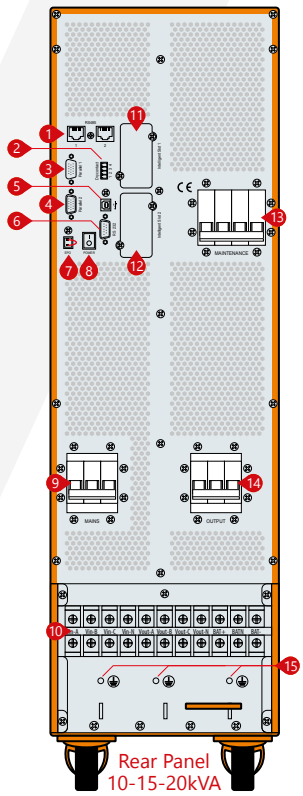
Service — SERVICE

FEATURES

- High Frequency and True Double-Conversion
- DSP (Digital Signal Processors) Technology
- Input Power Factor Correction (PFC)
- Wide Input Voltage Range (110~300V)
- Output Power Factor 0.9
- Cold Start
- Auto Sensing Frequency
- ECO Mode Operation for Energy Saving
- Selectable Output Voltage via LCD
- 50Hz/60Hz Frequency Converter Mode Available
- Selectable Battery Low Voltage via LCD
- Power-On Self Test
- Advanced Battery Management (ABM)
- Short Circuit and Overload Protection
- Automatically Charging Battery at UPS Off Mode
- Fan Speed Auto Control when Load Varies
- Generator Compatible
- Emergency Power Off (EPO)
- Standard RS232 Communication Port
- USB/SNMP Communication Port *(Optional)*
- Extension Battery Bank *(Optional)*
- Built-In Isolation Transformer *(Optional)*
- Manual Bypass *(Optional)*
- N+X Redundancy Parallel *(Optional)*

DETAILS

1. RS 485 Port
2. Dry Contact Port *(Optional)*
3. Parallel Port 1
4. Parallel Port 2
5. USB Port
6. RS232
7. EPO Port
8. Power Switch
9. Input Switch
10. Terminal Block
11. Intelligent Slot 1 (SNMP Card / Relay Card)
12. Intelligent Slot 2 (SNMP Card / Relay Card)
13. Maintenance Switch
14. Output Switch
15. Ground



CERTIFICATES

CE TSE TSE-HYB

MODEL				
Capacity		**10**kVA / **9**kW	**15**kVA / **13,5**kW	**20**kVA / **18**kW
INPUT				
Related Voltage		380 / 400 / 415 VAC, (3Ph+N+PE) -20% +15%		
Voltage Range		208 - 478 VAC		
Frequency		50 Hz: 45-55 Hz; 60 Hz: 54-66 Hz (Auto Sensing)		
Power Factor		≥0,99		
Bypass Frequency Range		50-60 Hz ±10%		
Harmonic Distortion		≤3% (100% Non-Linear Load)		
ECO Range		Max. Voltage: 220V: +25% (Optional +10%, +15%, +20%), 230V: +20% (Optional +10%, +15%), 240V: +15% (Optional +10%)		
		Min. Voltage: -45% (Optional -20%, -30%)		
Generator		Compatible		
OUTPUT				
Voltage Range		380V / 400V / 415 VAC (3Ph+N+PE)		
Power Factor		0.9		
Voltage Regulation		±1%		
Frequency	AC Mode	±1%, ±2% , ±4%, ±5%, ±10% (Optional)		
	Battery Mode	50-60 ± 0.1 Hz		
Waveform		Pure Sinewave		
Crest Factor		3:1		
Harmonic Distortion		≤2% (Linear Load) ≤5% (Non-Linear Load)		
Transfer Time		Battery Mode to Inverter Mode 0ms, Inverter to Bypass Mode 0ms		
Output Dynamic Tolerance		At 100% Load ±5%		
Overload Capability	AC Mode	≤110%: 60min.; ≤125%: 10min.; ≤150%: 1min. ≥150% turn to Bypass Mode Immediately		
	Battery Mode	>150% Bypass Mode		
Parallel Operation		Optional		
EFFICIENCY				
AC Mode		93,5%	94,5%	
Battery Mode		92,5%	93,5%	
ECO Mode		98%		
BATTERY				
DC Voltage	Standard Model	±120 VDC	±120 VDC	
	Optional	±120 VDC		
Standard Model Inbuilt Battery		40 x 12V 7/9Ah		
Charge Current	Standard Model	1,35 / 2,7 / 4,05A		
	Long Time Model	20A		
Typical Recharge Time		8 hour		
PROTECTION				
Full Protection		Overload, Short Circuit ve Battery Charge-Discharge Protection, RFI/EMI Filtre, IP20		
SYSTEM FEATURES				
Charge Current		Smart Charging System		
Over-temperature		Line Mode: Turn to Bypass; Backup Mode: Shut Down UPS Immediately		
Intelligent Alarm System		Line Failure, Low Battery, Overload, System Failure		
LED&LCD Monitor		Line Mode, Battery Mode, Bypass Mode, Battery Low, Overload & UPS Fault		
ALARM				
Utility Failure		Line Mode, Low Battery, Overload, System Fault		
Battery Low		Alarm and Shut Down		
Overload		Overload		
UPS Fault		System Fault		
ENVIRONMENTAL				
Operation Temperature		0°C~40°C		
Storage Temperature		-25°C~55°C		
Humidity		0%~90%		
Altitude		<1500 m		
Noise Level		<50 dB		
COMMUNICATION				
Communication Interface		USB, RS232, RS485, Parallel Port, Dry Contact, Smart Port, SNMP Card (Optional), Relay Card (Optional)		
Software		Muser4000, Sofeware		
Emergency Power Off		Dry Contact (Optional)		
STANDARDS				
Safety		IEC/EN62040-1, IEC/EN60950-1		
EMC		IEC/EN62040-2, IEC61000-4-2, IEC61000-4-3, IEC61000-4-4, IEC61000-4-5, IEC61000-4-6, IEC61000-4-8		
DIMENSIONS & WEIGHT				
Dimensions WxDxH (mm)		828 x 250 x 868		
Packaging Dimensions WxDxH (mm)		935 x 365 x 1055		
Net Weight (kg)		115	170	171
Gross Weight (kg)		143	198	199

POWERPACK 3300 SE SERIES

10/15/20 kVA 3:3 PHASE

ONLINE UPS

DATA CENTER · EMERGENCY · MEDICAL · INDUSTRY · TRANSPORT

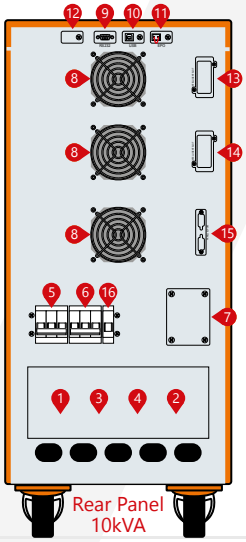
VFI TYPE — UPS ONLINE
TOWER
PF= 0.9 — POWER FACTOR
Service — SERVICE

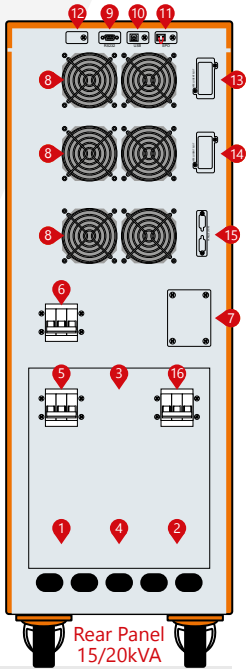
FEATURES

- DSP Digital Control Technology
- Active Power Factor Correction (APFC)
- Input Power Factor up to 0.99
- Output Power Factor 0.9
- Cold Start
- Dual Input
- Wide Input Voltage Range (190V-485V)
- Auto Sensing Frequency
- 50Hz/60Hz Frequency Conversion Mode
- Work Efficiency up to 98% in ECO Mode
- Auto Control Fan Speed when Load Varies
- Auto Power ON/OFF According to the Loads Capacity
- Compact Internal Layout, Miniaturized the Complete Unit for Small Footprint
- LCD+LED Display, Multifunctional Keys Operation, Friendly Human-Machine Interface
- Powerful Background Software for Parameters Configuration and Online Updating
- Doubling the Battery Charging Speed, 90% Capacity Restored in 4 Hours (Standard Model UPS)
- Advanced Battery Management (ABM), Automatic Floating / Equalizing Charge Control, Charger Dormancy Control
- Emergency Power Off (EPO)
- Maintenance ByPass
- RS232/USB Communication Port

DETAILS

1. Mains Input
2. DC Input
3. Bypass Input
4. Output
5. Mains Input Breaker
6. Bypass Input Breaker
7. Maintenance Bypass
8. Fan
9. RS232
10. USB
11. EPO
12. Battery Temperature Compensation *(Optional)*
13. Intelligent Slot 1 (SNMP/AS400/RS485) *(Optional)*
14. Intelligent Slot 2 *(Optional)*
15. Parallel Card *(Optional)*
16. Battery Breaker





CERTIFICATES

CE · TSE · TSE-HYB

MODEL				
Capacity		**10**kVA / **9**kW	**15**kVA / **13,5**kW	**20**kVA / **18**kW
INPUT				
Related Voltage		360 / 380 / 400 / 415 VAC		
Voltage Range		277~485 VAC (No Derating), 190~277 VAC (Linear Derating Between 50% and 100% Load)		
Rated Frequency		50 / 60 Hz (Auto Sensing)		
Power Factor		≥0,99		
Frequency Range		40~70 Hz		
Bypass Voltage Range		-40%~+15% (Settable)		
Total Harmonic Distortion (THDi)		≤5%		
OUTPUT				
Rated Voltage		360 / 380 / 400 / 415 VAC (Settable)		
Voltage Regulation		±1%		
Frequency		45~55 Hz or 55~65 Hz (Synchronized Range); 50/60 Hz ±0.1Hz (Battery Mode)		
Waveform		Sinusoidal		
Power Factor		0.9		
Crest Factor		3:1		
Total Harmonic Distortion		≤2% (Linear Load) ≤5% (Non-Linear Load)		
Transfer Time		Battery Mode to Inverter Mode 0ms, Inverter to Bypass Mode 0ms		
Overload	Inverter	102%~125% for 10min, 125%~150% for 1min, >150% for 0.5s		
	ByPass	102%~125% for 20min, 125%~150% for 2min, >150% for 1s		
BATTERY				
DC Voltage		240 VDC		
Inbuilt Battery of Standard Model		20 x 7Ah	40 x 7Ah	40 x 9Ah
Charging Current		1A, 2A, 3,5A Settable		
Recharge Time		90% Capacity Restored in 4 Hours		
SYSTEM				
Efficiency		≥93%, ECO Mode 98%		
Transfer Time		0ms		
Max. Number of Parallel Connections		6		
Protections		Short Circuit, Overload, Overtemperature, Battery Low-Voltage, Overvoltage, Undervoltage and Fan Failure		
Communications		USB, RS232, RS485, Dry Contact, SNMP Card (Optional)		
Display		LED&LCD		
Standards		EN 62040-1, EN 62040-2, EN 61000-3-12, EN 61000-3-2, EN61000-3-11, IEC 61000-4-2, IEC61000-4-3, IEC 61000-4-4, IEC61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, IEC 61000-2-2		
ENVIRONMENTAL				
Operation Temperature		0°C~40°C		
Storage Temperature		-25°C~55°C (Without Batteries)		
Relative Humidity		0%~95% (Non-Condensing)		
Altitude		≤1000m, Derating 1% for Each Additional 100m		
Noise Level		<60 dB	<65 dB	
DIMENSIONS & WEIGHT				
Dimensions WxDxH (mm)		350 x 785 x 858	350 x 785 x 1078	
Packaging Dimensions WxDxH (mm)		472 x 910 x 1050	472 x 910 x 1260	
Net Weight (kg)		110	155	175
Gross Weight (kg)		125	170	190

MST
SERIES

10-2000 kVA 3:3 PHASE

1-30 kVA 1:1 PHASE

STATIC VOLTAGE STABILIZER

INDUSTRY TRANSPORT MEDICAL

TOWER PF= 0.8 POWER FACTOR Service SERVICE

HIGHLIGHTS

- Microprocessor Controlled Voltage Stabilisation
- Precise Output Voltage Accuracy
- True Static-Modular Design with Thyristor Technology
- High Voltage Regulation Speed
- Maintenance Free

Highly Reliable and Endurable Static Design

- Microprocessor controlled Static design stabilizers automatically regulate and protect the loads against dangerous voltage changes.

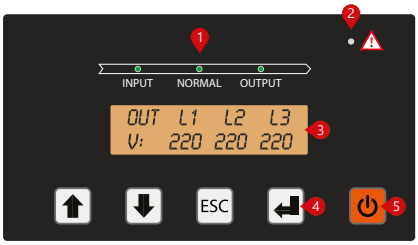
- Compatible with all load types and offering independent phase control, they deliver ultra-fast response times in correcting under / over voltages, sags and surges - making them ideal for highly sensitive / mission critical loads and applications.

CERTIFICATES

CE TSE TSE-HYB

Standart Electrical Features

- Wide Input Voltage Range
- Precise Output Voltage Accuracy ±1% to ±5%
- Ultra Fast Voltage Regulation (500V/s)
- True 32-bit Microcontroller Controlled
- High Efficiency >97%
- Independent Phase Regulation to Correct Voltage aand Load Imbalance
- Electronic Protection Against to Over Load, Low Voltage, High Voltage, Over Temperature, Over Current and Short Circuit
- Overload Protection up to 150%
- Fast Responsive to Voltage Surges
- User Friendly, Easy and Comprehensive LCD Display and Mimic Diagram



1. Input Led
   Bypass Led
   Normal Led
   Output Led
2. Alarm/Warning Led
3. LCD Display
4. Menu Keys
5. On/Off Button

- Advanced Alarm Menu
- Manual Bypass
- Auto Restart when Mains Available
- Full Electronic Static Structure with No Moving Parts, Delivering a 'Maintenance Free' Voltage Regulation Solution
- Compact Design with High Quality Material and Minimum Malfunction Hazard
- Designed, Manufactured and Supplied to Comply with
- Fully CE Compliant and Labelled

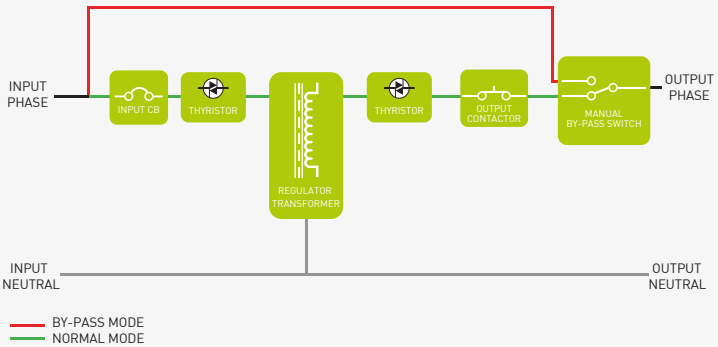
Flexibility

- Available at any required input voltage value and range.
- Available at any required output voltage value and tolerance from ±1% to ±5%.
- Output voltage can be adjusted by the LCD panel.
- Functionable with 50Hz and 60Hz.
- Optional MCCB can be added to the output to provide additonal protection.
- Isolation transformer or voltage changing auto-transformer can be added for both input and output.
- Indoor and outdoor special cabinets with various IP protection classes can be provided.
- Optional EMC-filters at both input and output.
- Optional high-voltage protection and surge arrester.
- Optional Modbus.

MICROPROCESSOR CONTROLLED THYRISTOR TECHNOLOGY

Based on high speed semiconductor (Thyristor) technology and all digital microprocessor control, MST Series Static Voltage Stabilizers continuously monitor the incoming supply. Should the incoming voltage rise or drop, the stabilizers will automatically control the output to ensure the voltage reaching the load equipment always remains constant at the requisite voltage.

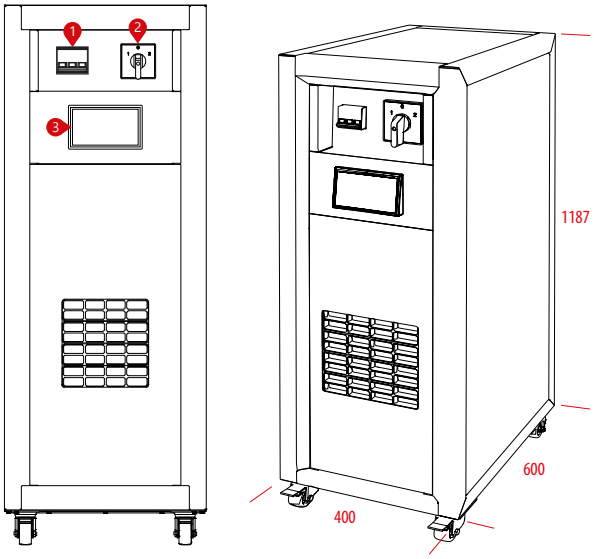
Inbuilt spike protection ensures the load is continuosly protected against harmful mains born high energy spikes and surges.



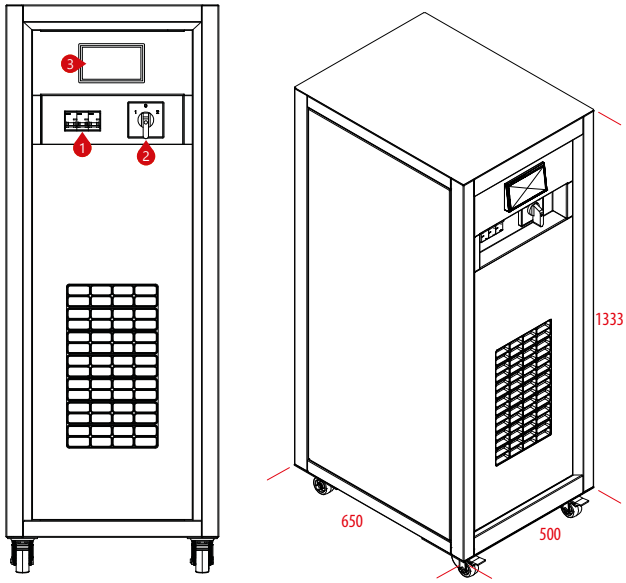
Static Voltage Stabilizer Single Line Diagram

DETAILS

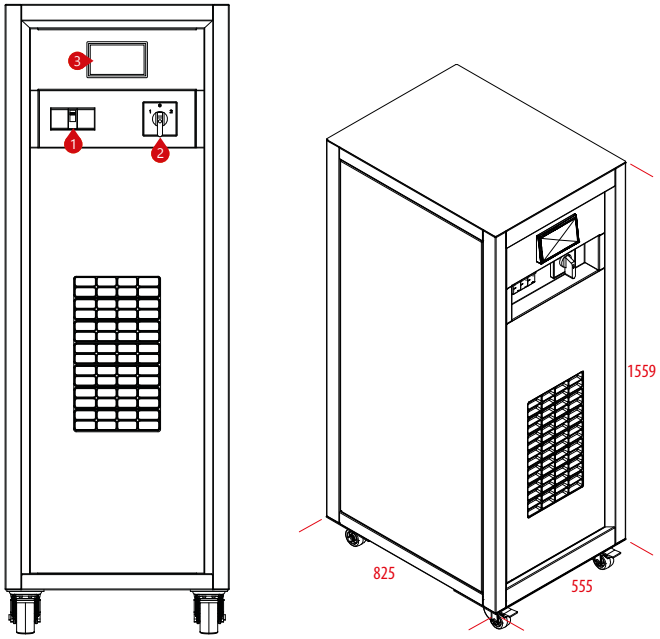
MST SERIES 10-30 kVA



MST SERIES 40-60-75 kVA



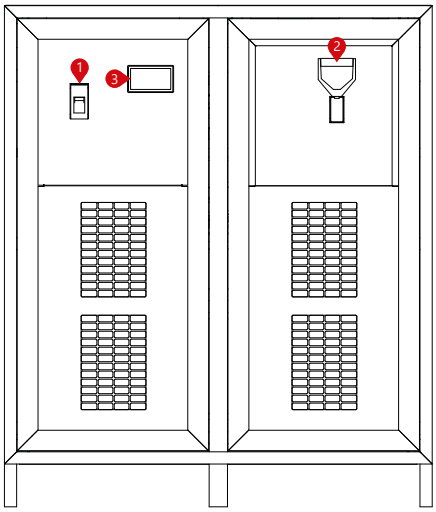
MST SERIES 100-120-150 kVA

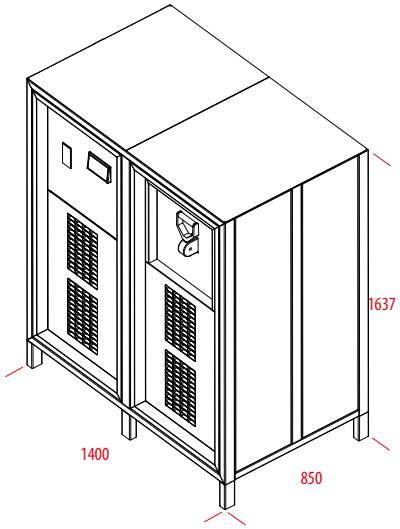


1. Input Switch
2. Bypass Switch
3. LCD Display
4. Optional Card Slot
5. Connection Terminal (Rear Panel)

DETAILS

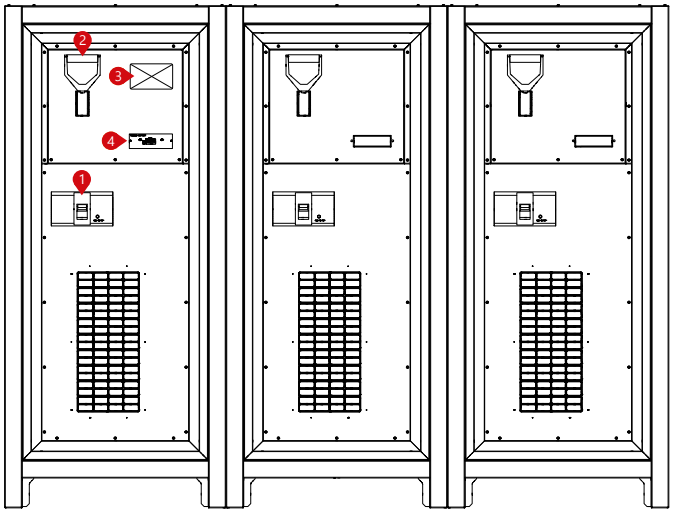
MST SERIES 200-300-400-500 kVA

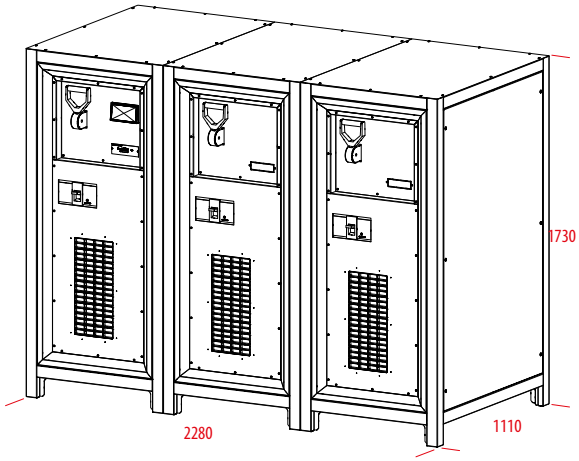




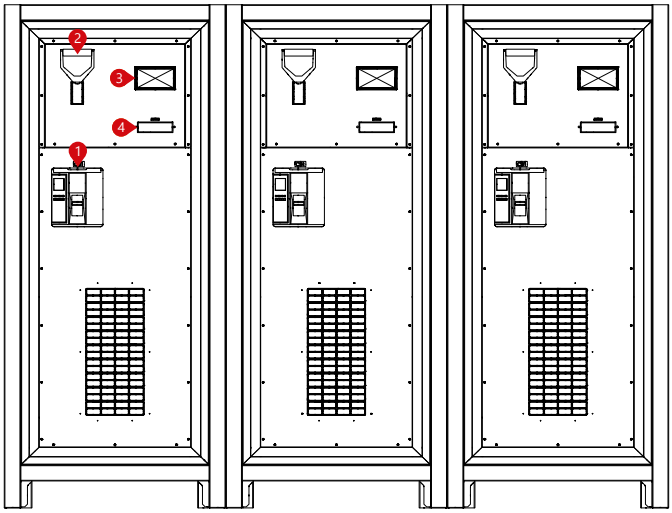
1. Input Switch
2. Bypass Switch
3. LCD Display
4. Optional Card Slot
5. Connection Terminal (Rear Panel)

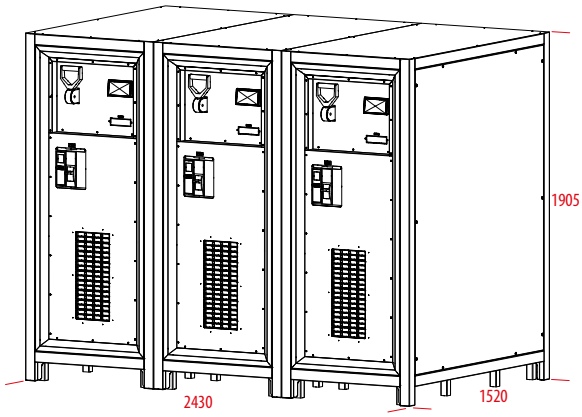
MST SERIES 600-800-1000-1250 kVA





MST SERIES 1600-2000 kVA





MODEL																					
Capacity (kVA)		10	15	22,5	30	45	60	75	100	120	150	200	300	400	500	600	800	1000	1250	1600	2000
INPUT																					
In. Vol. Correct. Interval		275~450 VAC (Optional: 190V~485V)																			
Operation Frequency		50~60 Hz (±10%)																			
Line Input Protection		Overcurrent Thermic Fuse																			
OUTPUT																					
Output Voltage		380 VAC RMS ±3% (Std.)				380 VAC RMS ±5% (Optional 1% to 5%)															
Overloading		10min 125% Load, 1min 150% Load, 10sec 200% Load, 20ms 500% Load																			
Correction Speed		500 Volt/sec																			
Upturn Period		20ms																			
Output Protection		Short Circuit, Overload, Overtemperature, Over and Low Voltage Protections																			
WORKING PRINCIPLE		Microprocessor Controlled, Full Automatic, Static, Semi Conductor Electronic Structure Maintenance Free																			
CONTROL PANEL																					
Display and Buttons		Load Level, Input-Output Voltage																			
Alert Message		Input Low/High, Output Low/High, Overtemperature																			
GENERAL																					
Efficiency		>97% (Full Load)																			
Mechanical Bypass		"Manually Controlled Line - PAKO SWITCH Selects Voltage Regulator" Switch Turn On/Off																			
Protection Level		IP20																			
Standard		TS EN 61000-6-2:2006, TS EN 61000-6-3:2007 (EMC), IEC60204-1+A1:2008 (LVD)																			
ENVIRONMENTAL																					
Operating Temperature		-10ºC~50ºC																			
Storage Temperature		-25ºC~60ºC																			
Relative Humidity		<90%, DIN (40040)																			
Altitude		<2000m																			
Noise Level		<50 dB				<55 dB			<58 dB			<58 dB		<63 dB							
DIMENSIONS & WEIGHT																					
Cabinet Dimensions (mm)	Width	400				500			555			1400				2280				2430	
	Depth	600				650			825			850				1110				1520	
	Height	1187				1333			1559			1637				1730				1905	
Weight (Kg)		80	95	112	120	175	203	233	277	320	369	639	775	857	930	1670	1800	1890	2110	2820	3150

MODEL									
Capacity (kVA)		1	2	3	7,5	10	15	20	30
INPUT									
In. Vol. Correct. Interval		120~230 / 145~245 / 160~250 VAC							
Operation Frequency		50~60 Hz (±10%)							
Line Input Protection		Overcurrent Thermic Fuse							
OUTPUT									
Output Voltage		380 VAC RMS ±3% (Std.)	380 VAC RMS ±5% (Optional 1% to 5%)						
Overloading		10min 125% Load, 1min 150% Load, 10sec 200% Load, 20ms 500% Load							
Correction Speed		500 Volt/sec							
Upturn Period		20ms							
Output Protection		Short Circuit, Overload, Overtemperature, Over and Low Voltage Protections							
WORKING PRINCIPLE		Microprocessor Controlled, Full Automatic, Static, Semi Conductor Electronic Structure Maintenance Free							
CONTROL PANEL									
Display and Buttons		Load Level, Input-Output Voltage							
Alert Message		Input Low/High, Output Low/High, Overtemperature							
GENERAL									
Efficiency		>97% (Full Load)							
Mechanical Bypass		"Manually Controlled Line - PAKO SWITCH Selects Voltage Regulator" Switch Turn On/Off							
Protection Level		IP20							
Standard		TS EN 61000-6-2:2006, TS EN 61000-6-3:2007 (EMC), IEC60204-1+A1:2008 (LVD)							
ENVIRONMENT									
Operating Temperature		-10ºC~50ºC							
Storage Temperature		-25ºC~60ºC							
Relative Humidity		<90%, DIN (40040)							
Altitude		<2000m							
Noise Level		<50 dB							
DIMENSIONS & WEIGHT									
Dimensions (mm)	Width	192		260			430		
	Depth	361		453			596		
	Height	352		416			777		

MSR
SERIES

6-2000 kVA
3:3 PHASE

1-50 kVA
1:1 PHASE

SERVO VOLTAGE STABILIZER

IP20, IP21, IP31, IP44, IP54,
Versions Available

INDUSTRY TRANSPORT MEDICAL

TOWER PF= 0.8 POWER FACTOR Service SERVICE

HIGHLIGHTS

- Servo Motor
- Microcontroller Controlled Voltage Regulation
- Precision Output Voltage Control
- Full Automatic

Reliable Solution for All Electrical Devices Requiring Precise and Fast Adjustment

- Makelsan Servo Voltage Stabilizer comprise of variac, transformer, servo motor and microprocessor control circuit.

- Measuring the mains voltage with microprocessor electronic card, can arrange the position of servo motor and provide the output voltage 220/230/240/380/400 or 415VAC.

- It can be used initially in military and industrial, especially in main machines that require precise and fast adjustment, lifts and facilities with inrush current problems.

CERTIFICATES

CE TSE TSE-HYB

Standart Electrical Features

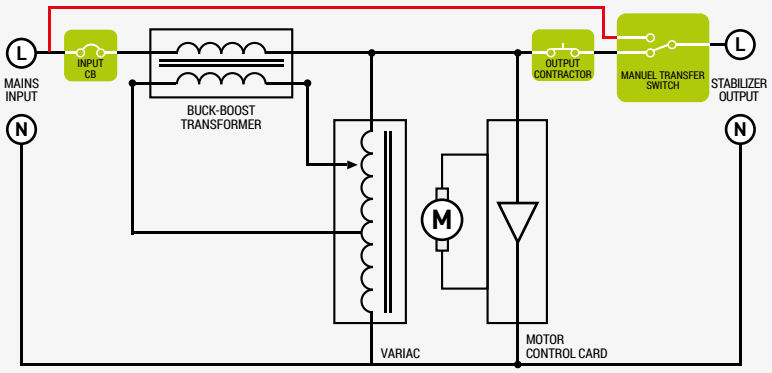
- Microprocessor Controlled
- Precise Output Voltage Correction Accuracy ±1%
- High Efficiency >96%
- Overcurrent, High Temperature, High-Low Voltage and Short Circuit Protection
- At 100%-125% Load 1min, At Above 125% Load 10sec
- Input Voltage, Output Voltage-Current, % Load and Transformer Temperature via User Friendly Panel
- Advanced Alarm Menu
- Manual Bypass
- Unaffected Chassis Technology by Dust, Moisture, Vibration
- Fan Cooling System
- Compact Design with High Quality Materials
- Minimum Fault Risk
- User Friendly LCD Display and Mimic Diagram
- CE Certified

Flexibility

- Available at any required input voltage value and range.
- Available at any required output voltage value and tolerance from ±1% to ±5%.
- Output voltage can be adjusted by the LCD panel.
- Functionable with 50Hz and 60Hz.
- Optional CB can be added to the output to provide additonal protection.
- Isolation transformer can be added for both input and output.
- Indoor and outdoor special cabinets with various IP protection classes can be provided.
- High voltage or lightning protection to input or output units can be added.

MICROPROCESSOR CONTROLLED SERVO TECHNOLOGY

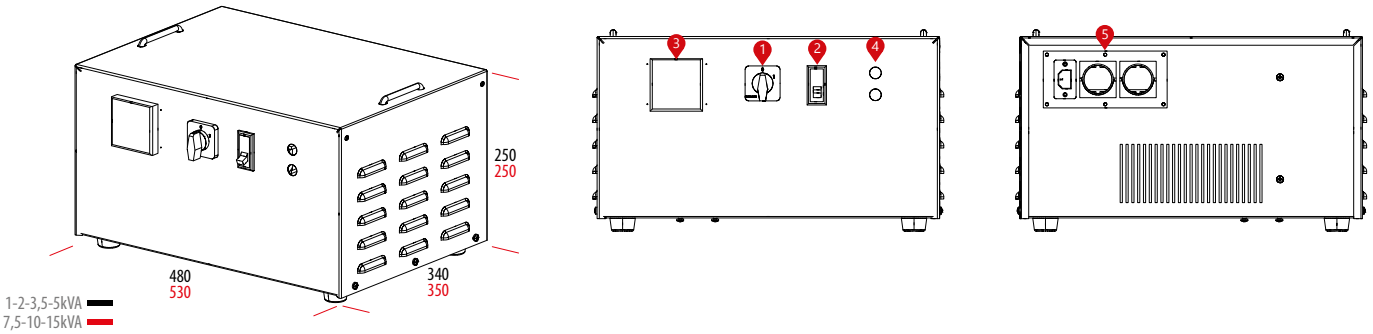
The MSR Series Servo Voltage Regulator transfers the electrical energy received from the grid to the output and continuously monitors the output voltage magnitude. If there is a deterioration in the output voltage according to the desired output voltage values, the microcontroller control unit immediately changes the position of the variac with the help of the motor and ensures that the output voltage remains within the appropriate values. Thus, the Servo Voltage Regulator (Servo) obtains a voltage magnitude between the desired values at the output by adding (or subtracting) the voltage magnitude of the appropriate additional energy generated by the electrical energy it receives from the network to the voltage magnitude of the grid.



Servo Voltage Stabilizer Block Diagram

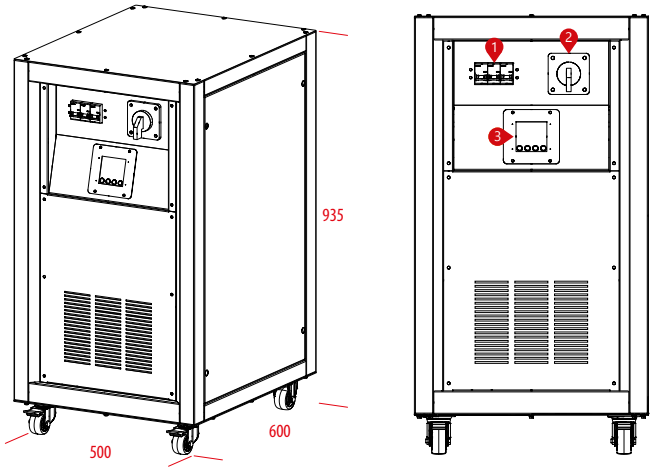
DETAILS

MSR SERIES 1-2-3,5-5-7,5-10-15 kVA 1:1F

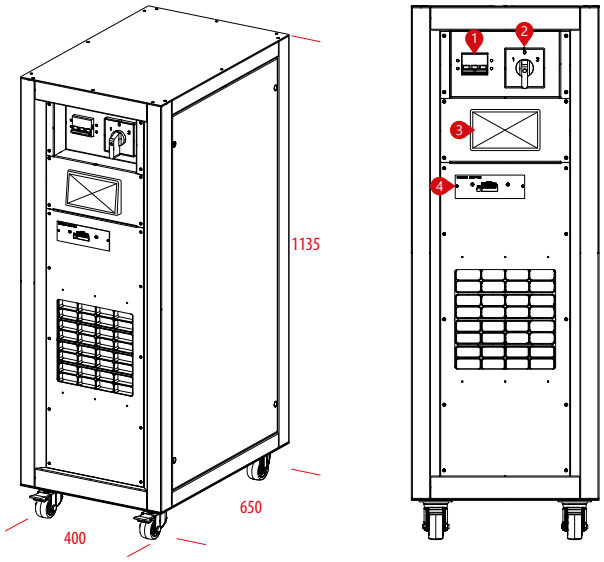


MSR SERIES 20-25-30-40-50 kVA 1:1F

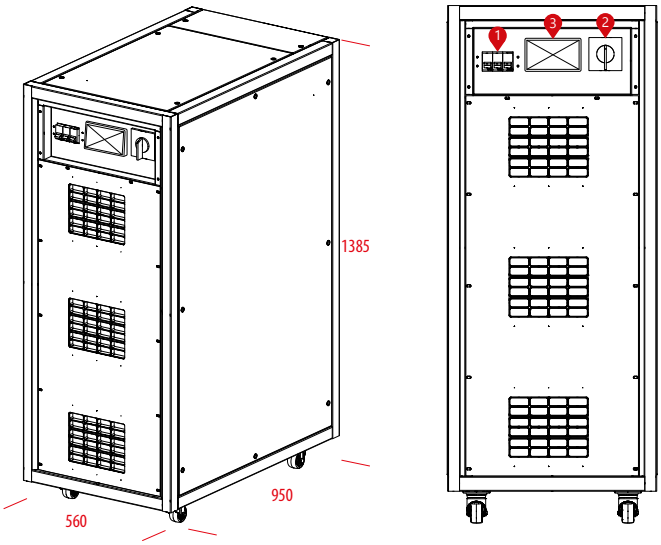
1. Input Switch
2. Bypass Switch
3. User Panel
4. Optional Card Slot
5. Connection Terminal (Rear Panel)



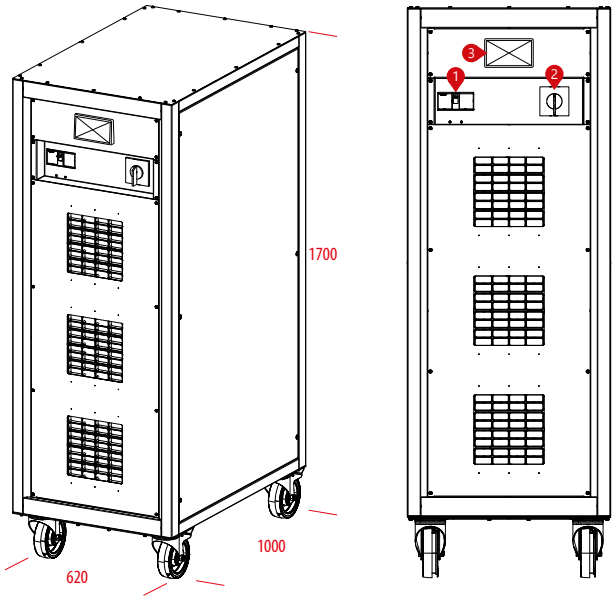
MSR SERIES 6-10,5-15-22,5-30-45 kVA 3:3F



MSR SERIES 60-75-100 kVA 3:3F

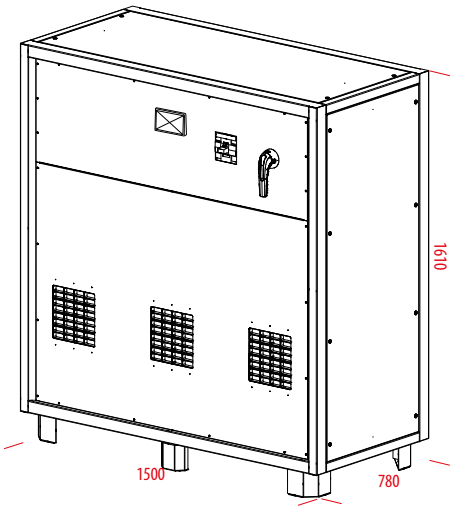


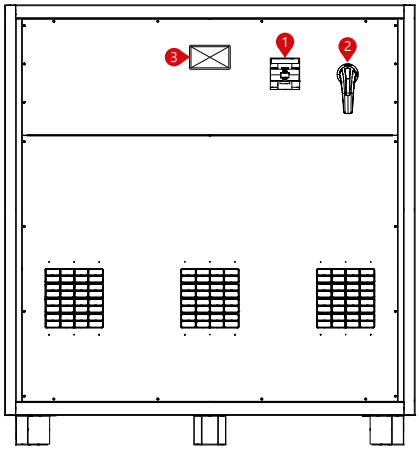
MSR SERIES 120-150 kVA 3:3F



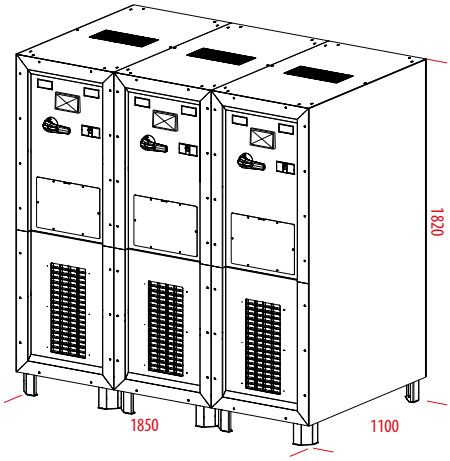
DETAILS

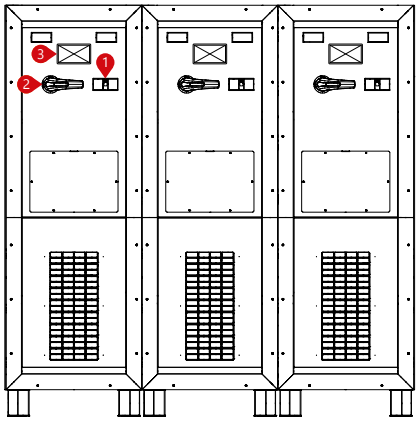
MSR SERIES 200-250-300 kVA 3:3F



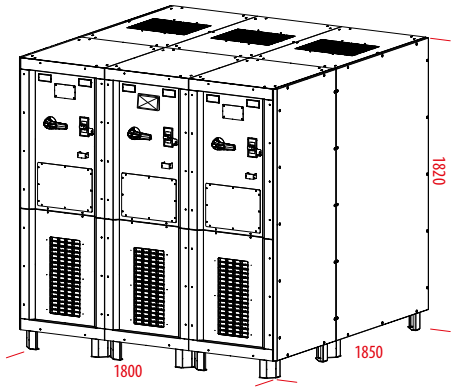


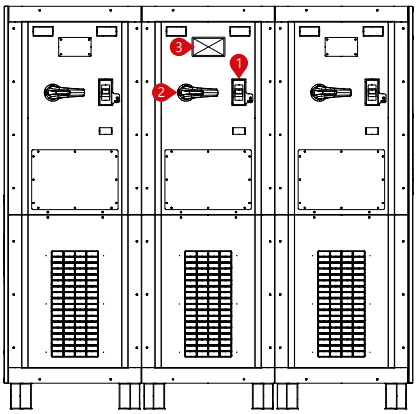
MSR SERIES 400-500-600 kVA 3:3F



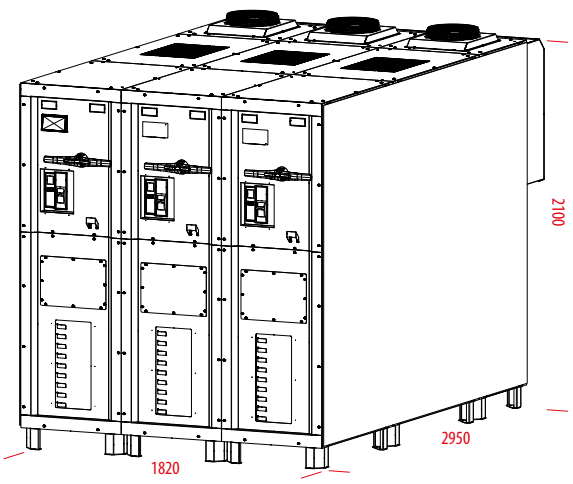


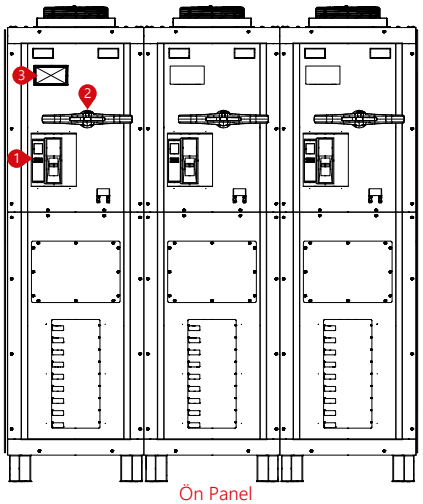
MSR SERIES 800-1000-1250 kVA 3:3F





MSR SERIES 1600-2000 kVA 3:3F





Ön Panel

1. Input Switch
2. Bypass Switch
3. User Panel
4. Optional Card Slot
5. Connection Terminal (Rear Panel)

MODEL (3:3 Phase)																							
Capacity (kVA)		6	10,5	15	22,5	30	45	60	75	100	120	150	200	250	300	400	500	600	800	1000	1250	1600	2000
DIMENSIONS & WEIGHT																							
Cabinet Dimensions (mm)	Width	400						560			620		1500			1850			1800			610	
	Depth	650						950			1000		780			1100			1850			2890	
	Height	1135						1385			1700		1610			1820			1820			2080	
Net Weight (Kg)		65	120	135	154	183	237	330	356	456	545	565	1050	1150	1250	1500	2000	2500	2750	3500	3750	4500	5500
Noise Level		<50 dB																					

MODEL (1:1 Phase)													
Capacity (kVA)		1	2	3,5	5	7,5	10	15	20	25	30	40	50
BOYUTLAR & AĞIRLIK													
Cabinet Dimensions (mm)	Width	480				530			500				
	Depth	340				350			600				
	Height	250				250			935				
Net Weight (Kg)		15	20	29	40	47	55	75	90	110	130	165	185
Noise Level		<50 dB						<54 dB					

INPUT	
In. Vol. Correction Interval	**1:1 Phase:** 160~260 VAC • **3:3 Phase:** 275~450 VAC (Standard), 215~415 VAC (Optional)
Operation Frequency	47~65 Hz
Line Input Protection	Overcurrent, Low and High Voltage Protection (Optional)
OUTPUT	
Output Voltage	**1:1 Phase:** 220 VAC RMS ±2% • **3:3 Phase:** 380 VAC RMS ±1%
Overloading	At 100%-125% Load 1min, At Above 125% Load 10sec
Correction Speed	~90 Volt/sec
Upturn Period	~90 Volt/sec (160 VAC~250 VAC)
Output Protection	Short Circuit - Overcurrent Protection, Overvoltage Protection (Optional)
WORKING PRINCIPLE	Servo Motor, Microprocessor Controlled, Full Automatic
GENERAL	
Cooling	Smart Fan System
Measured Value Monitor	Monitoring Input Voltage, Output Voltage-Current,% Load and Transformer Temperature Values via MSR Panel
Total Efficiency	**1:1 Faz:** >96% • **3:3 Faz:** >96%
Mechanical Bypass	"Manually Controlled Line - PAKO SWITCH Selects Voltage Regulator" Switch Turn On/Off
Protection Level	IP 20
ENVIRONMENTAL	
Operating Temperature	-10°C~50°C
Storage Temperature	-25°C~60°C
Relative Humidity	<90%, DIN (40040)
Altitude	<2000m

CUSTOMIZED
POWER SOLUTIONS

OUTDOOR TRANSPORT INDUSTRY EMERGENCY

A full range of custom and rugged AC&DC Power Solutions to meet with your specific requirements and where a standard UPS will not be suitable.

SOLUTIONS

- Containerised Power Systems
- Outdoor AC&DC Power Systems
- Marine/Offshore AC&DC Power Systems
- Defence Power Systems
- Custom DC Systems/Chargers
- Standalone or Modular Design Tailored to the Requirements

CONTAINERISED POWER SYSTEMS

• Makelsan's containerised solutions integrates Makelsan UPS and Generator together where the UPS supports critical loads without interruption until the generator kicks in. With the "True no break power solution", business continuity without costly downtime is ensured.

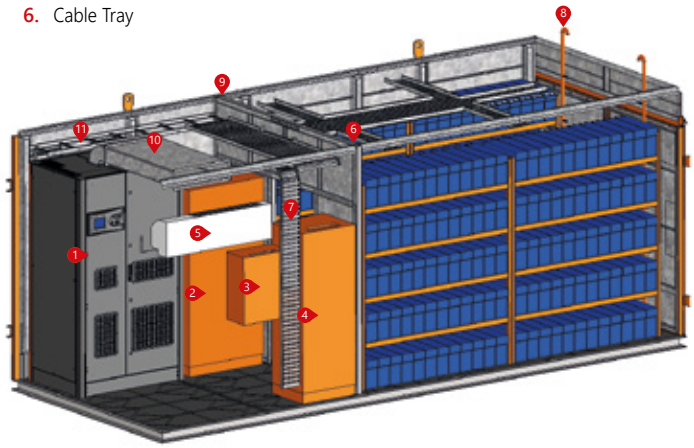
• Cost effective and energy saving - all in one solution. It features high reliability and security, Fast deployment, best mobility, energy saving and is suitable for a wide variety of applications and also applicable to special mobile scenarios.

Telecom Marine ITS Traffic Military/Defence Power Distribution Oil and Gas Railway Alternative Power

Features

- Complete containerised UPS system up to 1000kVA 3Phase
- Up to 96% efficiency
- Integrated transfer and bypass switches
- Fully bunded ISO container
- Personnel and maintenance access doors
- Digital controls for UPS and switchgear
- Fire detection and protection
- Air conditioned UPS and battery compartments
- Environment control system.

1. Active Power Unit: UPS/ Power Converter/Freq. Converter etc.
2. Main AC In/Out Electrical Panel
3. Internal AC Distribution Electrical Panel
4. Battery Breaker Panel
5. AC Aircon
6. Cable Tray
7. Cable Tray
8. Hyrdojen Gas Release
9. Active Power Unit/ Battery Compartments Seperation
10. Air Baffle
11. Cables Conduit



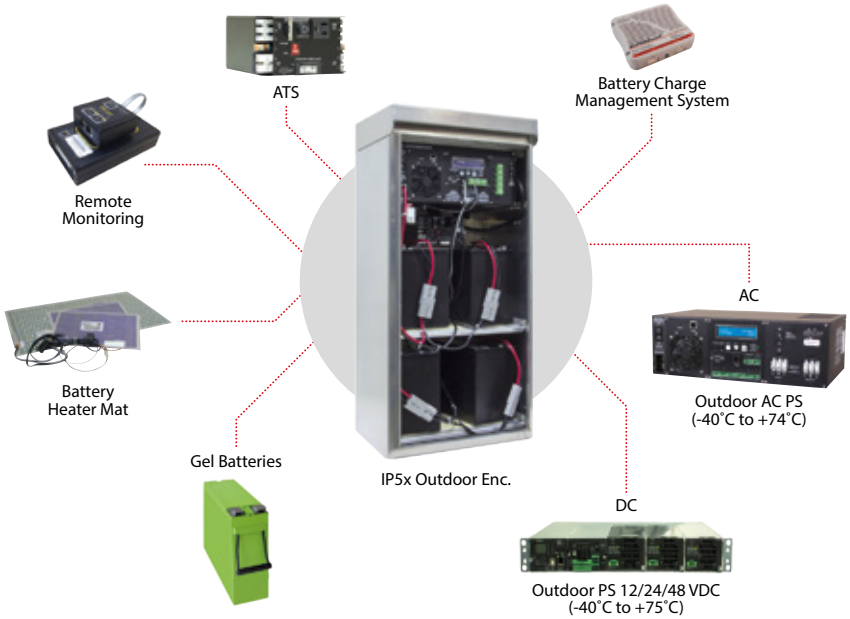
OUTDOOR AC&DC POWER SYSTEMS

Features

- Designed to operate under extreme temperature conditions (-40C to +74C)
- Made of rugged electric and electronic components
- Due to fact that the UPS is designed for extreme conditions, the elements that maket he UPS are also designed for extreme conditions
- Conformal coated PCB's protect against exposure to moisture and high humidity environment
- Thermostatically controlled battery heater mats available
- Temperature compensation utilized to effectively manage the battery charge voltage based on temperature
- Remote monitoring via SNMP web based communication
- Built in AVR (Automatic Voltage Regulation) allows for a wider input voltage range for World-wide use
- Enhanced surge protection capability (TVSS- Transient
- Voltage Surge Suppressor, LAP (Lighting Arrestor Protection)
- Enclosures meet specific ingress protection (IPXX) standard for extreme environments (Zone 4 earthquake, rain test, dust, impact test, etc)

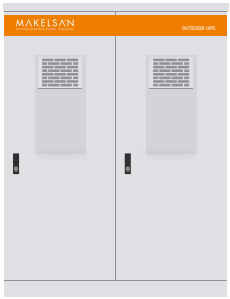
Applications

- Intelligent Transportation Systems
- Security Applications (Sea/Land/Airport)
- Telecom Applications
- Defence/Military Backup Systems
- Railway Applications
- Marine/Offshore Applications
- Industrial Applications



Outdoor AC&DC UPS Systems for Intelligent Transportation/Traffic/Security Sytems

Customized Railway UPS System can take Inputs from both a 25kV Overhead Line as well as a 400VAC Mains Supply. Available in Single Phase and Three Phase



IP 65 AC Standalone UPS Systems 1-20kVA with Built-in Batteries

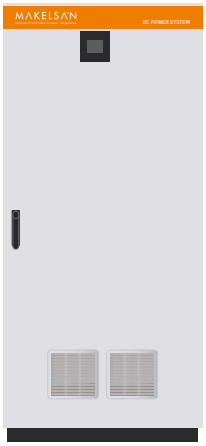
IP 31-41 High Reliable and Robust 3 Phase AC Standalone Makelsan UPS Designed for Most Harsh Industrial Processes

CUSTOM DC SYSTEM/CHARGERS

Makelsan offers a comprehensive range of DC power protection products available in standalone or 19" rack, modular configurations.

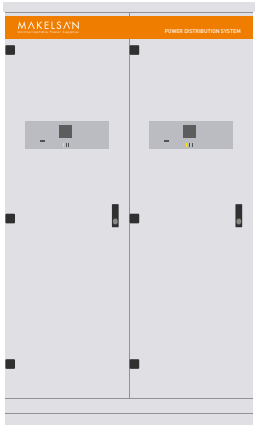
- Chargers - Single or Three Phase. 12/24/48/110/220VDC
- Power Supplies 12/24/48/110/220VDC
- DC UPS - 12-220VDC / 10A-10000A
- DC Rectifiers
- DC-AC Industrial Single/Three Phase Modular Inverters
- DC Load Distribution Panels

110VDC/200A, Hotswappable/Upgradable DC System in IP41 Cabinet with 2 Groups of 12V FT Batteries and Remote Access



110VDC/40-10000A DC Power System

8X2V3000Ah Battery Change Over System Easy Change Over of 2V 1000-3000Ah Telco Batteries for Test/Maintenance Purposes



48VDC Power Distribution Panel with Remote Monitoring of DC Voltage and Currents

PRECISION COOLING
SYSTEMS

DATA CENTER

FLEXAIR SERİSİ
25-150 kW

SMOOTHAIR SERİSİ
5-20 kW

INTENSEAIR SERİSİ
25-65 kW

HIGHLIGHTS

- Precisely Control Temperature and Humidity
- High Air Volume for Circulation
- Designed for 7×24 Running High Availability
- Powerful Monitoring Access

Highly Reliable and Efficient Cooling Solutions

• Precision cooling is an air conditioning or cooling technique that is specifically designed for use in IT equipment and environments and is implemented in devices that directly cool electronic and IT equipment. It has better air filtration capabilities, higher air flow and advanced humidity control mechanisms than standard cooling techniques.

• Makelsan offers Precision Cooling solutions in order to provide optimized and efficieny methods for data center cooling.

CERTIFICATES

CE TSE TSE-HYB

FLEXAIR SERIES
25-150 kW

A perfect Precision Air Conditioner Solution that Combines Efficiency, Reliability, Environment Protection, Flexibility

7 Kinds of Cooling Types

FlexAir is available with 7 kinds of cooling types: air cooled, water cooled, chilled water, glycol cooled, air dual cooled, water dual cooled and dual chilled water systems. The dual cooling system of FlexAir Series precision air conditioner is better in the aspect of redundancy, and stronger fault strain ability.

Wide Cooling Capacity Range

The cooling capacity of FlexAir is from 25kW to 150kW and is extendable to 200kW above, to overcome the mega data center capacity challenges.

SMOOTHAIR SERIES
5-20 kW

A perfect Precision Air Conditioner A Solution for Small and Medium-sized Data Center

Green and Energy-Saving

High EER: Dictated matching of refrigeration system to ensure high energy efficiency ratio. High Sensible Heat Ratio: Designed with large air volume and small enthalpy difference to ensure the high sensible heat ratio. Green Refrigerant: R410a.

Designed to Operate 7x24

- Makelsan Precision air conditioners are designed to operate for 365day x 24hours non-stop in high efficiency and reliable status.
- The unit is designed to work under extreme weather condition, temperature down to -40°C when configured with the Low Temperature Kit.
- Step less speed regulating outdoor fan system. Unit adaptable to all different outdoor condition.
- Thermal expansion valve ensures, which ensures system be quick response to the changing working condition.

INTENSEAIR SERIES
25-65 kW

A perfect Inrow Precision Air Conditioner A Solution for High Heat Density Data Center

Precise and Measurable Cooling

Matching to the heat source, the IntenseAir series inrow precision air conditioner directly cools the high temperature hot air from the servers, shortens the air flow path, prevents the energy waste of cold and hot air mix. Through the real-time monitoring of the heat source load, it accurately regulates the cooling output and the air flow output, make the cooling capacity and air volume accurate and predictable, realizes the targeted and accurate cooling, perfectly solves the high heat density problems of data centers.

MSW
SERIES

1 PHASE

12/24VDC: 10A-300A

SWITCH MODE (HF) BATTERY CHARGER

Usage Areas:
- Vessels and Yachts
- Shipyards
- Rail Systems
- Hydroelectric Power Plants
- Solar Power Plants
- Automobile Services
- Electrical Devices

HIGHLIGHTS

- Switch Mode Technology
- Voltage Controlled Automatic Charging
- Can Be Used as DC Power Supply
- 1 Phase & 3 Phase Wide Power Range
- High Efficiency and Reliability
- Electronic Protections
- Up to 30% Energy Saving

New Generation Switch Mode Charging Rectifiers

- Makelsan Switch Mode Charging Rectifiers are designed with the state of the art technology for charging batteries and DC energy needs of devices supplied by direct current.

- Batteries would be charged much safer with the improved software and special charging program. Non-complex structure, easy maintenance properties, user friendly program and other superior features will meet all requirements.

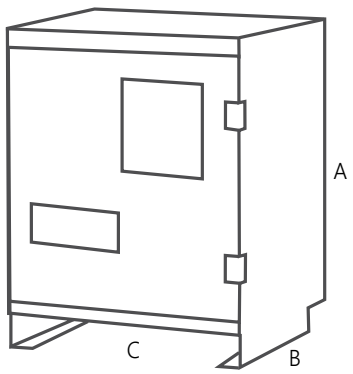
- The most important feature of the device is it can be used as supply source as well as a battery charger. Besides low ripple factor increases the battery life. It's an ideal solution for where device weight and dimensions are problem.

CERTIFICATES

CE TSE TSE-HYB

MSW SERIES
12/24VDC: 10A-300A 1 PHASE
SWITCH MODE (HF) BATTERY CHARGER

MODEL	
INPUT	
Input Phase	1 Phase - 2 Phase - 3 Phase (Special Design)
Input Voltage Tolerance	±10%
Input Frequency	50 - 60 Hz
Power Factor	0.98
THDi	<%10
OUTPUT	
Output Current	10A - 300A
Output Voltage	12V - 24V
Ripple	≤1 Ripple
GENERAL	
Cooling	Air Cooling
Isolation Voltage	1500 VAC Input / Chassis Bridge, 500 VAC Output / Chassis Bridge, 500 VAC Between Input and Output
Insulation Class	IP 20 - RAL 7032 (Special Design)
Efficiency	90%
Operating Temperature	-20/50°C
Operating	Ability to set Charge Mode for all Battery Types
Input / Output Connections	Serial Connector - W Otomation
PROTECTION	
Heat Protection	Input / Output Overtemperature Protection
Measure	Output Overcurrent Protection - DC High Low - DC Leakage - Mains Failure
TECHNOLOGY	
IGBT	Switch Mode Technology
Standard	ISO 9001 - LVD - EN 62040 -1 - EMC
INDICATORS	
LCD Panel	2 x 16 - 4 x 16 Line
PLC	S71200 - S7300
Otomation	Modbus / Profibus / ProfiNET / RS 232 / RS 485



DIMENSIONS

CODE	A (mm)	B (mm)	C (mm)
MKL 1	340	240	150
MKL 2	340	240	200
MKL 3	290	260	370
MKL 4	340	280	400
MKL 5	400	320	450
MKL 6	580	390	500

OPTIONS

- DC +/- Ground Leakage Protection
- Modbus RTU Communication
- Individual Outputs for Battery and Load
- Deep Discharge Protection (LVD)
- Output Dropper Diode
- Additional Battery Fuse
- Temperature Comp. Battery Charge Voltage
- Power Fault Detection Dry Contact
- Battery Management, Test
- Rackmounted Chassis/Integrated Battery Racks / (IP31/IP42/IP54/IP65)
- Input Isolation Transformer / 6 Pulse Structure

MTT
SERIES

3 PHASE 12VDC: 50A-200A, 24VDC: 30A-300A
48VDC: 30A-150A, 110/220VDC: 30A-200A

1 PHASE 12/24VDC: 10A-300A, 36/48VDC: 10A-150A
110VDC: 10A-200A, 220VDC: 10A-100A

THYRISTOR CONTROLLED BATTERY CHARGER

Usage Areas:

- Transformer Centers
- Vessels and Yachts
- Shipyards
- Rail Systems
- Solar Power Plants
- Automobile Services
- Hospitals
- Electrical Devices
- Energy Generation
- Transmission and Distribution Centers
- Petroleum and Natural Gas Industry
- Mining Industry

HIGHLIGHTS

- Thyristor Controlled, Full Automatic System with Isolation Transformer
- Available for Using as DC Current Supply
- All Operating Values Adjustable
- Excess/Low Voltage, Over Current, Short Circuit Protection

Thyristor Controlled Transformer Battery Charging Rectifier

- Transformer battery charging devices are AC/DC rectifiers with automatic constant voltage and constant current properties. The isolation transformer and the load and batteries are completely isolated from the grid system.

- Thyristor control ensures fast regulation and voltage distortions in the mains do not affect the batteries and loads. With the L-C filters on the output, the AC output fluctuation on the DC is less than 1%, helping to maximize the life of the charged battery pack.

CERTIFICATES

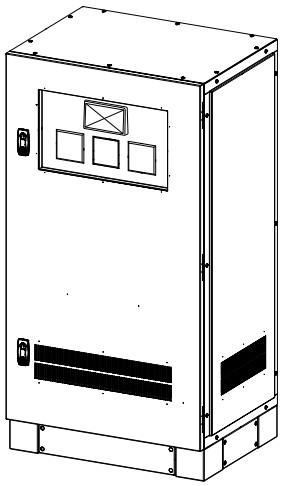
CE TSE TSE-HYB

MTT SERIES

12VDC: 50A-200A, 24VDC: 30A-300A, 48VDC: 30A-150A, 110/220VDC: 30A-200A 3 PHASE
12V/24VDC: 10A-300A, 36/48VDC: 10A-150A, 110VDC: 10A-200A, 220VDC: 10A-100A 1 PHASE

THYRISTOR CONTROLLED BATTERY CHARGER

MODEL		
INPUT		
Phase	3 Phase	1 Phase
Voltage	380 V, 400 V, 415 V	220 V, 230 V, 240 V
Voltage Tolerance	±20%	
Frequency	50/60Hz (±5%)	
Power Factor	>0.8	
THDi	<30%	
OUTPUT		
Voltage	12 / 24 / 48 / 110 / 220 VDC	
Voltage Tolerance	±1%	
Current	Up to 300A	
Fast Charging (Boost) Voltage	Up to 120% of the Float Voltage	
Ripple	±1% RMS AC	
Dynamic Response	±2%	
Output Protection	Electronic Short Circuit / Over Voltage / Over Temperature / Over Current	
	Reverse Voltage (Reverse Connection) Protection	
INDICATOR/COMMUNICATIONS		
LCD Indicator	Voltage, Current, Temperature and Status Information	
LED Indicator	Mains, Normal, Output, Fault	
Alarm	Mains Out of Limit, Fault (Adjustable)	
Communication	RS485 / Modbus Communication Feature	
NTC Input	Battery Temperature Compensation	
Parallel	Redundant Operation with Active or Passive Load Sharing Option	
Programmed Operation	Special Process is Applied for Each Process	
Input / Output Connection	Thermic Magnetic Switch / Copper Bus Bar	
GENERAL		
Topology	Isolation Transformer, Thyristor Phase Angle Controlled	
Electrical Standards	EN60146-1-1, EN60335-1 / EN60335-2-29/A2(LVD)	
	EN61000-6-2 / EN61000-6-4 (EMC)	
Cooling	Forced (Fan)	
Isolation Voltage	2500VAC Output/Chassis Bridge	
Efficiency	>85%	
Operating Temperature	0-50°C	
Humidity	5%-90%	
Protection Class	IP20	
Altitude	Max. 2000m	



OPTIONS

- Individual Outputs for Battery and Load
- Additional LVD Contactor Separating Load and Battery from each other
- Battery Racks Integrated into the Rectifier
- Chassises with Different Protection Class (IP31/IP42/IP54/IP65)
- DC +/- Ground Leakage Protection
- Redundant Operation with Active or Passive Load Sharing Option
- Battery Monitoring / Management System (BMS)
- Analog Hand Measuring Instruments
- Battery Charge Temperature Compensation
- ModBUS Communication

ISOLATION TRANSFORMERS

SERIES

5-1200 kVA 3 PHASE

1-25 kVA 1 PHASE

MEDICAL INDUSTRY TRANSPORT

HIGHLIGHTS

- Reliable, Electrical Isolation
- Suppresses Electrical Noise
- Ensures Complete Safety of Equipment

Excellent Protection & High Level of Isolation

- An isolation transformer is the best way to establish a new neutral-ground bond, in order to correct common mode and other grounding problems.
- Isolation transformer provides excellent protection from all types of N-G disturbances (impulses, RMS voltage, and high frequency noise).
- Makelsan isolation transformers can be used reliably in following areas:

Medical Devices, CNC Machines, UPS Systems, Ships and Boats, Shipyards, Metal Processing Plants, Rectifier and Battery Chargers, Industrial Machines Power Supply Units

CERTIFICATES

CE TSE TSE-HYB

ISOLATION TRANSFORMERS SERIES

5-1200 kVA 3 PHASE **1-25 kVA** 1 PHASE

FEATURES

- Input Voltage : 230 VAC Ph+N / 400 VAC Ph-Ph (Three Phase)*
  220 VAC Ph+N (Single Phase)*
- Output Voltage : 230 VAC Ph+N / 400 VAC Ph-Ph (Three Phase)*
  110 VAC Ph+N (Single Phase)*
- Frequency : 50 - 60 Hz
- Windings : Aluminum or Copper
- Connections : Star, Delta, Zig-Zag
- Protection Class : Standard**
- Isolation Class : Standard***
  Varnish Under Vacuum According to Isolation Class
- Cooling : Natural**
- Ambient Temparature : -10°C+40°C
- Storage Conditions : -20°C+70°C
- Connections : As Per to Customer Requirements:
  All Types of Terminals and Lugs

* It can be produced in different voltages and powers as requested.
** Can be changed upon request.
*** Can be produced in H (180°C) class upon request.

3 PHASE ISOLATION TRANSFORMERS				
Power	Chassis Dims. (WxHxD)	Chassis Weight	Connection	Wire
5kVA	630 x 715 x 332	70	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
10kVA	805 x 700 x 665	110	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
15kVA	650 x 459 x 564	120	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
20kVA	800 x 800 x 647	200	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
30kVA	800 x 800 x 647	240	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
40kVA	800 x 800 x 647	285	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
60kVA	905 x 1000 x 780	355	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
72kVA	905 x 1000 x 780	385	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
80kVA	905 x 1000 x 780	410	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
100kVA	905 x 1000 x 780	430	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
120kVA	905 x 1000 x 780	470	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
150kVA	905 x 1000 x 780	550	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
200kVA	1120 x 1000 x 842	690	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
250kVA	1120 x 1000 x 842	790	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
300kVA	1200 x 1100 x 800	900	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
450kVA	1200 x 1100 x 800	1100	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
500kVA	1200 x 1100 x 800	1280	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
720kVA	1285 x 1505 x 1070	1850	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
800kVA	1510 x 1690 x 1380	2100	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
1000kVA	1510 x 1690 x 1380	2500	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM
1200kVA	1510 x 1690 x 1380	2750	Y-Y/Δ-Y/Y-Δ/Δ-Δ	COPPER/ALUMINIUM

1 PHASE ISOLATION TRANSFORMERS				
1kVA	306 x 290 x 340	20	1 Phase	COPPER/ALUMINIUM
2kVA	306 x 290 x 340	24	1 Phase	COPPER/ALUMINIUM
5kVA	625 x 800 x 495	75	1 Phase	COPPER/ALUMINIUM
10kVA	625 x 800 x 495	105	1 Phase	COPPER/ALUMINIUM
15kVA	625 x 800 x 495	120	1 Phase	COPPER/ALUMINIUM
25kVA	600 x 700 x 638	180	1 Phase	COPPER/ALUMINIUM

ROTABLOC® RBT
SERIES

400-2000 kVA
DYNAMIC UPS

DATA CENTER · MEDICAL · TRANSPORT · INDUSTRY · EMERGENCY

97% Efficiency

UPS ROTARY TYPE · PF= 0.8 POWER FACTOR · Service SERVICE

HIGHLIGHTS

- Total Power Failure Protection
- Outstanding Voltage Conditioning
- Unrivaled Lowest Total Cost of Ownership
- Electrical Coupling with Existing or New Genset

Robust Rotary Technology

- The RBT system consists of a standard synchronous generator with no special windings and a simple steel flywheel. The low speed shaft extends bearing life and reduces maintenance.
- The ROTABLOC® machine is very robust as critical functions do not use fragile components such as power electronics, power capacitors, electro-chemical batteries, active magnetic bearings, electro-mechanical or mechanical friction clutches.

CERTIFICATES

CE UL

Standard Features

- Input / Output Power Measurement
- Fully Automatic Operation
- Voltage-free Interface Signals
- Automatic By-pass

Options

- Automatic Lubrication System
- Plug & Run Parallel Working
- Supervision Software
- Containerized Solution
- Bearing Monitoring
- Customized Switchgear (Form 4, NEMA)
- Soundproof Enclosure
- Tropical Conditions

Green Technology

Our highly efficient UPS supports your aims to minimize your environmental impact and mitigate the efects of rising energy costs in the future. Our ROTABLOC® design, almost all steel and copper, ensures that it is over 99.97% recyclable.

- No batteries - no need for expensive replacement cycle / no costly disposal of hazardous materials.
- No air conditioning required - providing a/c for battery rooms is a significant cost and impacts the environment.
- Dynamic Autonomy Control (DAC): Automatic speed adaptation for optimum eciency at partial load with FULL critical load protection.
- 91% of all voltage interruptions last less than 1 second (European urban locations) the RBT protects the load without generator starts*.

*This is configurable to maximize RBT power output or compensate for short interruptions.

ROTABLOC® RBT Range			
TYPE		**POWER**	
50 Hz or 60 Hz		kVA	kW
RBT-400	50/60	400	320
RBT-500	50/60	500	400
RBT-500 HP (PF:1)	50/60	500	500
RBT-630	50/60	630	504
RBT-800	50/60	800	640
RBT-1000	50/60	1000	800
RBT-1250 TW	50/60	1250	1000
RBT-1600 TW	50/60	1600	1280
RBT-1750 TW	50/60	1750	1400
RBT-2000 TW	50/60	2000	1600

Normal Operation

- In normal operation the RBT protects the electrical load from power quality problems eliminating harmonics, flicker, voltage spikes and sags. This power quality protection prevents wear on your facilities infrastructure – including damage to motors and pumps, and reduces the maintenance downtime necessary to repair or replace such assets. These issues can be over 95% of power problems faced by your facility each year.

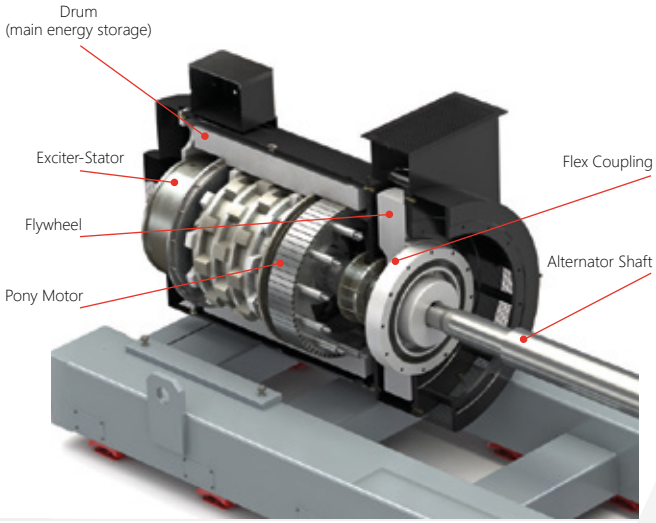
Mains Failure

- During mains failure the RBT protects the load and maintains the power supply at the precise voltage and frequency by supplying energy to the alternator from the Accumulator without need for electronic power conversion.
- Whilst these 'blackout' events are fewer in number, for organizations where power is always required during operation, interruption of mains electricity leading to loss of production (including restart time), wastage of part processed materials and a dented reputation could be very costly.

Extended Mains Failure

- Under extended mains failure, the load is automatically transferred to your chosen back-up energy source, usually a diesel genset. Once a stable mains supply returns the RBT will safely transfer the load back and be ready to act again.

Twin Rotabloc 1600kW



Simply Reliable Solutions to Power Quality Issues

Data Centres, Banking, Telecommunications, Airports, Healthcare, Industrial, Manufacturing, Government, Defense, Water, Treatment, Alternative Energy, Stadiums, Research, in fact all installations where continuous running is required, demand a filtered, continuous and sustainable power supply solution.

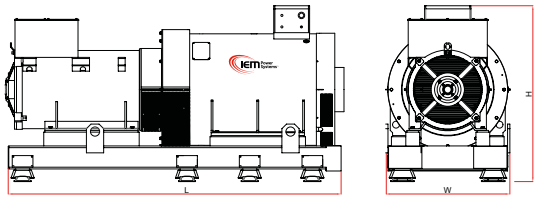
Features	Benefits
Outstanding voltage conditioning	• Protects equipment against mains voltage fluctuations, sags and microcuts • Naturally compensates power factor without need for PFC equipment • Filters load harmonics and voltage harmonics from mains • Eliminates flicker
Total power failure protection	• Sustainable continuous power supply • Ride-through mode covers 90% of mains failures without genset start • Flexible DRUPS solution when configured with standard genset
Robust rotary technology	• Conventional electrical / mechanical machine • High reliability • Low cost maintenance
High efficiency	• Energy saving • Unrivaled low Total Cost of Ownership (TCO) • Green technology
High short-circuit power	• Fast fault-clearing capacity ensuring protections selectivity • Suitable for high peak currents (motors and mechanical loads) • Suitable for high crest factors (non-linear loads)
Modular and resilient “Plug & Run” paralleling	• Flexibility from day one • Scalability for future extension • High resilience thanks to full redundancy without single point of failure • Ideal for Tier III / Tier IV applications (Uptime Institute)
Easy interfacing	• User-friendly digital display (HMI) • Basic interface via simple contacts • Powerful communication features : - SCADA / BMS interface via MODBUS RTU/TCP - Internet access - PC supervision - Remote monitoring, alarming and paging features
Low maintenance	• Simple maintenance operations • Unaffected up-time: no need to stop UPS during maintenance • Automatic Lubrication System for maximum reliability and lowest TCO

Medium Voltage

- Recognition of the advantages of Medium Voltage (MV) systems in facilities with high power requirements is growing. The benefits include: ease of power distribution, lower TCO, improved safety, reduced maintenance / greater reliability, enhanced flexibility in current and future power infrastructure and improved green credentials with lower embodied energy and lower energy usage.
- Makelsan can provide DRUPS systems that will support MV in your facility, delivering high quality, continuous MV power to your operation.
  We are experts in Medium Voltage and can utilize Vesta-AR arc-resistant metal-clad switchgear, is the leading MV solution for distributing power safely and eciently throughout your building.

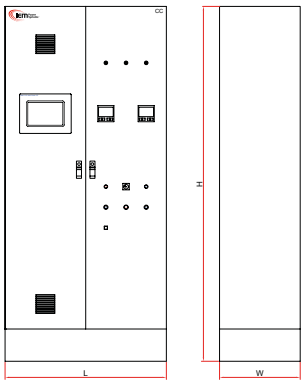
DETAILS

ROTABLOC® RBT SERIES 400 kVA



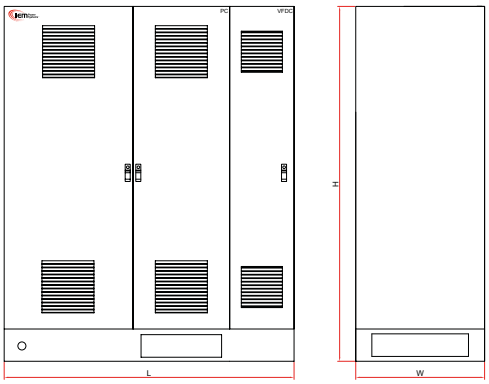
L x W x H 2895 x 1080 x 1529 mm
Net weight 7850 kg
Protection IP23

Control Cabinet



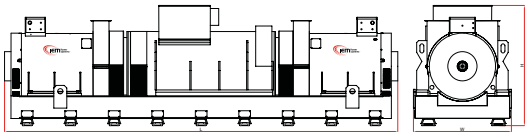
L x W x H 1000 x 500 x 2200 mm
Net weight 305 kg
Protection IP43

Power Cabinet



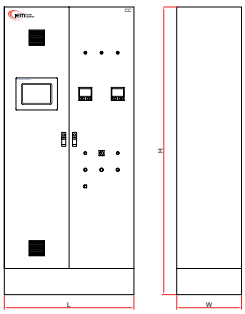
L x W x H 1800 x 800 x 2200 mm
Net weight 1575 kg
Protection IP43

ROTABLOC® RBT SERIES 2000 kVA



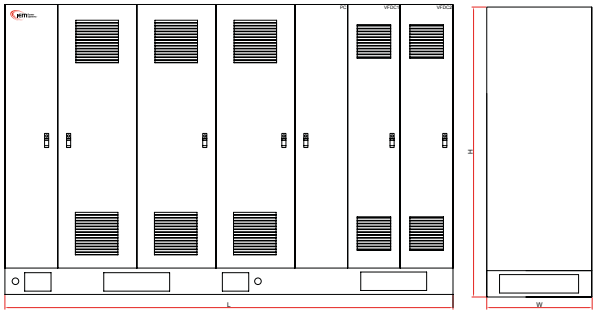
L x W x H 6058 x 1510 x 1852 mm
Net weight 22340 kg
Protection IP23

Control Cabinet



L x W x H 1000 x 500 x 2200 mm
Net weight 305 kg
Protection IP43

Power Cabinet



L x W x H 4200 x 800 x 2200 mm
Net weight 4590 kg
Protection IP43

Performances and Characterisitics

MODEL	RBT-400	RBT-500	RBT-500HP	RBT-630	RBT-800	RBT-1000	RBT-1250TW	RBT-1600TW	RBT-1750TW	RBT-2000TW
Voltage	3 x 400 / 480 V									
Frequency	50 / 60 Hz									
Nominal Phase Current	577 A	722 A	722 A	909 A	1155 A	1443 A	1804 A	2309 A	2526 A	2887 A
Protection by Upstream Breaker	630 A	800 A	1000 A	1000 A	1250 A	1600 A	2000 A	2500 A	3200 A	3200 A
Nominal Apparent Power	400 kVA	500 kVA	500 kVA	630 kVA	800 kVA	1000 kVA	1250 kVA	1600 kVA	1750 kVA	2000 kVA
Nominal Active Power	320 kW	400 kW	500 kW	504 kW	640 kW	800 kW	1000 kW	1280 kW	1400 kW	1600 kW
Nominal cos	0.9 Leading to 0.8 Lagging									
Efficiency at Nominal Load	95.3%	95.8%	96.5%	95.5%	96.4%	96.8%	95.5%	96%	95.5%	96%
Autonomy (Adjustable)	12s				11.3s	10s	12s	11.3s	11.4s	10s
Maximum Energy Storage	7.2 MJ					8.0 MJ	14.4 MJ	14.4 MJ	16 MJ	
Ambient Temperature	0-40°C / 32-104°C									
Max Power Dissipation for Ventilation Design	25 kW	30 kW	30 kW	35 kW	40 kW	50 kW	70 kW	80 kW	90 kW	100 kW
Altitude (Without de-rating)	≤1000 m / 3280 ft									
Humidity	≤90%									

6-FM
SERIES

12V 7Ah-200Ah
AGM VRLA BATTERY

FEATURES

- AGM-VRLA (Valve Regulated Lead Acid) 12V
- Ease of Shipment
- Maintenance Free Operation
- Cycle or Float Service
- Heavy Duty Grids
- Compact Design
- Low Self Discharge
- Wide Operating Temperature
- High Impact Case
- 10 yrs Design Life
- EUROBAT (Optional)

APPLICATIONS

- Uninterruptible Power Supplies
- Emergency Lighting Systems
- Test and Measuring Instruments
- Telephone Switchboards
- Cable Televisions
- Communications Equipment
- Fire Alarm Systems
- Railways
- Vessels and Traffic
- Electronic Cash Register
- Telecommunications Systems
- Electronic Devices
- Electric Toys and Wheelchairs
- ATM Machines
- Maritime Equipment
- Solar Energy Systems
- Wind Energy Systems

Model	Nominal Voltage	Capacity
6-FM-7	12	7Ah
6-FM-9	12	9Ah
6-FM-10	12	10Ah
6-FM-12	12	12Ah
6-FM-17	12	17Ah
6-FM-18	12	18Ah
6-FM-24	12	24Ah
6-FM-38	12	38Ah
6-FM-50	12	50Ah
6-FM-65	12	65Ah
6-FM-80	12	80Ah
6-FM-100	12	100Ah
6-FM-120	12	120Ah
6-FM-150	12	150Ah
6-FM-200	12	200Ah

CERTIFICATES

CE TSE TSE-HYB

ACCESSORIES

ADVANCED COMMUNICATION CAPABILITIES

Makelsan UPS's wide range of advanced remote communication options. Remote control management of the UPS is provided over the Network and enables centralized management via the MAKNet Software.

MakNET UPS Management Software

MakNET UPS-Management Software is a collection of client/server modules for networks and local workstations for monitoring the status of system resources and managing operations in response to changing conditions. When MakNET begins, it collects the messages sent from the UPS and analyses received messages to notify the administrator/operator. Grafically all the MakNET actions can be monitored.

If MakNET detects voltage variations, power loss or any other UPS condition, it can respond with a wide variety of actions to each different event, which for example may shutdown the server or send warnings and emails to connected users.

The user can alter the configuration in respects to network messaging, sending of email or SMS, RCCMD (Remote Console Command) shutdown, etc.

- Every MakNET includes an RCCMD Server (Remote Console Command) to provide a simultaneous and secure shutdown of several servers and/or workstations on almost any platform.
- More than 12 languages are supported.
- MakNET for Windows XP/VISTA Business/2000//2003 Server/2008 Server/Windows 7, Novell NetWare and UNIX have an SNMP proxy agent, which translates all UPS data into SNMP format.
- Every MakNET comes with its own web-server, that allows the monitoring or configuration from remote using any standard web-browser.
- MakNET runs also on less widely spread platforms like DEC VMS/Compaq and APPLE MAC X - and of course, inside the CS121 Web Adapter.

MakNET SNMP Card

MakNET SNMP Card was developed to integrate the UPS into networks. It allows control and monitoring of multiple UPS's using the TCP/IP, HTTP and SNMP.

- Compatible with MakNET software.
- Events log and data management
- Management of environmental sensors
- Warning notifications via audible alarm, email and SMS.

Dry Contact Card

A "dry" contact is a contact that is not initially connected to a voltage source and provides isolated, dry contact signals that can indicate any failure of UPS. Relay contacts are totally isolated from UPS and Ground. All isolated contacts can operate between 3.3VDC - 24VDC.
UPS can be controlled remotely with help of the isolated contacts and via other devices.

External Battery Temperature Sensor

R336-R01A module is mounted on battery cabinet. Altogether with information about the temperature of the batteries inside the cabin, it also forwards the information about the position of the key on the cabin.
A single card of this type is needed for each cabin.

RS232, RS485 Serial Port

UPS input-output parameters can be observed and controlled with RS232 and 485 communication port and MAKNet software. MAKnet software reports all changes in UPS status by email; also all operating systems can be safely turned off through the network.

Data Expansion Card

R326-R01A module is directly connected to one of two expanding slots of UPS. The main duty of this module is to collect information from other battery cabins. Here, in physical intercommunication environment CAN works with MAKBUS protocol.

Remote Panel

The UPS Remote Panel is intended to help the user to observe the operational status of the UPS from a distant place. The user can be informed about status of all operations, events and parameters of the working UPS through the LCD screen of remote panel.

ModBUS

It provides data exchange between UPS and Automation Systems that support the ModBUS RTU protocol. Connection possibility using RS485 or RS232. Provides real-time UPS status information.

UPS suitable for
home-small office applications

UPS suitable for
data centre applications

UPS suitable for
electro-medical applications

UPS suitable for
industrial applications

UPS suitable for
transport applications
(railways, airports, naval)

UPS suitable for
emergency applications

Containerised Power Systems
suitable for Outdoor/Marine/Offshore
AC&DC Power Systems

1 PHASE — Single-phase input or output

3 PHASE — Three-phase input or output

1:1 PHASE — Single-phase input and output

3:1 PHASE — Three-phase input,
single-phase output

3:3 PHASE — Three-phase input and output

VFD TYPE — UPS VFD
(Voltage Frequency Dependent)

VI TYPE — UPS Line Interactive
(Voltage Independent)

VFI TYPE — UPS Online
(Voltage Frequency Independent)

UPS Rotary Type

Tower

Rack

Reversible (Rack/Tower)

Modular System

PLUG & LAY — Plug and play. The UPS can be
installed without the need for
qualified personnel

Service — Installation and initial start up
should be carried out by qualified
personnel

PF= 0.9 — PF=0.9
High Output Power Factor

PF= 1.0 — PF=1.0
High Output Power Factor

Three LEVEL UPS — UPS with three level rectifier
and inverter technology

kW=kVA — Output power factor
of 1 (kVA=kW)

96% Efficiency — High efficiency up to 96%

97% Efficiency — High efficiency up to 97%

FORLIFE

MAKELSAN®

Uninterruptible Power Supplies/Diesel Generators

HEADQUARTER & FACTORY

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