2019

When energy matters

socomec
Innovative Power Solutions

GENERAL CATALOGUE

UPS and Critical Power Solutions
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### Non-IT applications - Overview of Secure Power solutions

**Industrial and Manufacturing processes / Transport infrastructures / Medical equipment / Emergency systems**

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#### Architecture Product Page

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<th>Voltage (1DBSHjDQR)</th>
<th>Output (1/1)</th>
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<tr>
<td>24/48/120 V, 15 to 200 A</td>
<td>10 - 40 V/kW</td>
</tr>
<tr>
<td>1/1</td>
<td>3/3 &amp; 3/3 - up to 240 kW</td>
</tr>
<tr>
<td>1/1</td>
<td>3/3 - up to 480 kVA</td>
</tr>
<tr>
<td>10 - 20 kVA</td>
<td>3/3 - up to 1.2 MVA</td>
</tr>
<tr>
<td>10 - 200 kVA</td>
<td>3/3 - up to 5.4 MVA</td>
</tr>
<tr>
<td>10 - 600 V/hkW</td>
<td>3/3 - up to 240 kW</td>
</tr>
<tr>
<td>10 - 400 V/hkW</td>
<td>3/3 - up to 960 kW</td>
</tr>
<tr>
<td>10 - 800 V/hkW</td>
<td>3/3 - up to 4 MVA</td>
</tr>
<tr>
<td>25 - 650 V/hkW</td>
<td>3/3 - Fully modular solution</td>
</tr>
<tr>
<td>80 - 1600 V/hkW</td>
<td>3/3 - Rack-mounted modular UPS system</td>
</tr>
<tr>
<td>160 - 1000 V/hkW</td>
<td>3/3 - Real hot-scalable UPS system</td>
</tr>
</tbody>
</table>

**Complementary solutions**

- Back-up storage, Static Transfer Systems (STS), Communication and connectivity, Power Distribution Unit (PDU)
For the energy performance of your critical installations

The benefit of a specialist

3,500 m² of test platforms
One of the leading independent power testing labs in Europe

10% of turnover invested in R&D
Always at the cutting-edge of technology for innovative, high-quality products

105,000 on-site interventions per year
Nearly 400 experts in commissioning, technical audit, consultancy and maintenance

Your energy, our expertise

Power conversion
Ensuring the availability and storage of high quality power
With its wide range of continuously evolving products, solutions and services, Socomec are recognised experts in the cutting-edge technologies used for ensuring the highest availability of the electrical power supply to critical facilities and buildings, including:
- static uninterruptible power supplies (UPS) for high-quality power free of distortions and interruptions occurring on the primary power supply,
- changeover of static, high availability sources for transferring the supply to an operational back-up source,
- permanent monitoring of the electrical facilities to prevent failures and reduce operating losses,
- energy storage for ensuring the proper energy mix of buildings and for stabilisation of the power grid.

Power switching
Managing power and protecting persons and facilities
Active in the industrial switching market since its foundation in 1922, Socomec is today an undisputed leader in the field of low voltage switchinggear, providing expert solutions that ensure:
- isolation and on load breaking for the most demanding switching applications,
- continuity of the power supply to electrical facilities via manual remotely operated or automatic transfer switching equipment.
- protection of persons and assets via fuse-based and other specialist solutions.

Power monitoring
Managing the energy performance of buildings
Socomec solutions, from current sensors through to a wide choice of innovative scalable software packages are driven by experts in energy performance. They meet the critical requirements of facility managers and operators of commercial, industrial and local authority buildings for:
- measuring energy consumption, identifying sources of excess consumption and raising the awareness of occupants about their impact,
- limiting reactive energy and avoiding the associated tariff penalties,
- using the best available tariffs, checking utility bills and accurately distributing energy billing among consumer entities,
- monitoring and detecting insulation faults.

Expert Services
Enabling available, safe and efficient energy
Socomec is committed to delivering a wide range of value-added services to ensure the reliability and optimisation of end-users’ equipment:
- prevention and service operations to lower the risks and enhance the efficiency of operations,
- measurement and analysis of a wide range of electrical parameters leading to recommendations for improving the site’s power quality,
- optimisation of the total cost of ownership and support for a safe transition when migrating from an old to a new generation of equipment,
- consultancy, deployment and training from the project engineering stage through to final procurement,
- performance assessment of the electrical installation throughout the life cycle of the products via analysis of data transmitted by connected devices.
Adapted solutions
to meet your energy objectives

SMART BUILDINGS
Reducing your energy bill and energy dependency
- Smart Grid
- Energy conversion in environments with harsh restrictions
- NAVAL SHIPS
- NETYS RT-M UPS
- 6+$5<6,3UHFWLĺHU UPS and other customised products
- SMART BUILDINGS
- ENERGY MANAGEMENT software packages
- 81x481
- DIRIS Digiware AC & DC multi-circuit measurement system
- INOSYS LBS DC load break switches with tripping function
- MEDICAL FACILITIES
- Green Power 2.0 UPS
- DIRIS Digiware AC & DC multi-circuit measurement system

HEAVY INDUSTRY
Controlling and securing your energy
- Heavy Industry
- NETYS RT-M UPS
- 6+$5<6,3UHFWLĺHU UPS and other customised products
- SMART BUILDINGS
- ENERGY MANAGEMENT software packages
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RENEWABLE ENERGY
Guaranteeing the performance, security and durability of your photovoltaic facilities
- Renewable Energy
- DIRIS Digiware AC & DC multi-circuit measurement system
- SMART BUILDINGS
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- ENERGY MANAGEMENT software packages
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PUBLIC DISTRIBUTION AND SMART GRID
Helping you meet the challenge of energy demand and response
- Public Distribution and Smart Grid
- FRIGBAIP+ Rail UPS
- ATyS Bypass ‘zero outage’ solution
- SMART BUILDINGS
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- ENERGY MANAGEMENT software packages
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DATA CENTRES
Meeting the challenge of the availability and performance of your energy
- Data Centres
- NETYS RT-M UPS
- 6+$5<6,3UHFWLĺHU UPS and other customised products
- SMART BUILDINGS
- ENERGY MANAGEMENT software packages
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DEVICES
- SMART BUILDINGS
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INDUSTRY
- Industrial environments
- SMART BUILDINGS
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EXPERT SERVICES
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POWER PLANTS
- Candidates for high security installations and installations with seismic constraints
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WE OFFER A WIDE RANGE OF VALUE-ADDED SERVICES ENSURING THE RELIABILITY OF YOUR PRESENT AND FUTURE ASSETS.
SOCOMEC is committed to deliver a wide range of value-added services to ensure the availability of your critical installation, the safety of your site operations and the performance optimisation of your low voltage equipment during its life cycle. The expertise and proximity of our specialists are there to ensure the reliability and durability of your equipment.

Global presence

Nearly 400 Socomec experts supported by 200 engineers and technicians from our distributors, drive the solutions to your specific needs.

Our global presence includes:
• 10 branches in France,
• 12 European subsidiaries,
• 8 Asian subsidiaries,
• representatives in 70+ countries.

As specialist manufacturers in the field of low voltage electrical facilities for over 90 years, Socomec offers a wide range of value-added services, a major factor in ensuring the reliability of your equipment throughout its design life. Take advantage of personalised support throughout your project and reach your energy objectives with confidence!

On-site service management
• 65,000 service operations per year (mainly preventive visits).
• 98% Service Level Agreement compliance rate.

Technical hotline network
• 20+ languages spoken.
• 3 advanced technical support centres.
• 100,000+ incoming calls handled per year.

Certified expertise
• 5,000 hours of technical training deployed per year (product, methodology and safety).

To find out more
For more information about our complete offer for Expert Services, download the catalogue.
www.socomec.com/en/services-catalogue
For a high quality power supply
innovative power solutions

Critical equipment requires high quality energy and faultless continuity of the power supply. Our uninterruptible power systems (UPS), static transfer systems (STS), and DC/AC and AC/DC converters (inverters and rectifiers, respectively) comprise the most complete ranges in the world and cover a very wide range of applications for every sector of activity.

High availability
The availability of electrical energy is a strategic factor in industries as varied as telecommunications, data processing centres and industrial processes. It is vital for certain medical applications. In all these sectors, SOCOMEC offers you all the benefits of its 50 years of experience.

Product solutions that meet requirements
Undersigned by significant R&D resources, our product offer continually evolves as a consequence of our contact with customers. Our products have gained approval from the most demanding users: telecoms operators, naval industry, etc.

Customer-oriented service
Our extensive sales and after-sales network means we are always there for you. Our partner-customers recognise the quality of our products and their availability, as well as our flexibility and commitment to meeting requirements.

A certified organisation

Continuous innovation

4 performance levers
- The vision of a specialist
  > Solutions focused on customer applications
  > Listening to customers’ requirements
  > Experienced personnel
- The spirit of innovation
  > Cutting-edge technologies
  > Regular launch of new solutions
  > Products and solutions
- The know-how of a manufacturer
  > A commitment to quality
  > LEAN manufacturing
  > The largest UPS manufacturing plant in Europe
- The focus on service
  > Project consulting in design phases
  > CRM worldwide organisation
  > Audits & consulting

‘Best-in-class’ manufacturer

High availability

Products
- Uninterruptible power supply systems (UPS)
- Static transfer systems (STS)
- Backup storage systems
- Industrial rectifiers
- DC/AC converters (inverters)
- Communication and management software
- Maintenance & Professional Services

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Local compliance
- UL USA
- CE (Europe)
- GS (Germany)
- BIS (India)
- FCC (USA)
- C-Tick (Australia)
- VDE (Germany)

Environment
- Eco Pass Port
- Green Grid
- Green IT

Industrial sites
- IT (USA)
- JP (Japan)
- UK (UK)
- RS (Germany)

Continuous innovation

1968
1st UPS

1987
1st Static Transfer System (STS)

1988
Transistor technology (800 kVA)

1989
IGBT & microprocessor

1990
Distributed parallel architecture

1994
Transformerless technology

1996
IGBT up to 800 kVA

1998
Digital Signal Processor (DSP)

2001
1st modular UPS

2003
IGBT rectifiers up to 200 kVA

2004
New battery charging design

2006
Dynamic Energy Storage System (Flywheel)

2008
High efficiency UPS

2010
Most compact 900 kVA UPS

2012
High power 3-level technology

2014
“Forever Young” design for modular UPS

2015
Real hot-scalable high power UPS system

2017
Mastery’s 4th generation digital native UPS

‘Best-in-class’ manufacturer

2003
Customer Service Excellence

2004
Customer Service Excellence

2006
Product Innovation

2009
Energy & Power Systems Product Line Strategy

2011
Product Innovation

2013
Product Differentiation Excellence

2014
European UPS Company of the Year

2015
European UPS Technology Leadership Award
Green solution to reduce energy consumption and environmental impact

Better products for sustainable applications

The EU Code of Conduct for Data Centers provides a platform that brings together European stakeholders to discuss and agree voluntary actions aimed at improving energy efficiency. It proposes general principles and practical actions to be followed by all parties involved in data centres, operating in the EU aiming for more efficient and economic use of energy, without jeopardizing the reliability and operational continuity of the services provided by data centres.

Socomec as Endorser has committed to help raise user awareness of energy efficiency issues, to introduce or encourage use of high efficiency products and promote the best practices set out in the Code of Conduct. Socomec has also committed to support the Code and Participants through the development of products, information, services, education or other programme. It also uses the Code to develop products and solutions to enable data centre owners and operators to meet the expectations of the Code of Conduct.

The UPS Code of Conduct sets out the basic principles to be followed by all parties involved in Uninterruptible Power Systems, operating in the European Community in respect of energy-efficient equipment. It addresses manufacturers who agree to make all reasonable efforts to improve the efficiency of their UPS equipment.

Socomec is one of the first manufacturers to sign the voluntary agreement. In so doing, Socomec has committed to make significant investment in innovative technologies for designing high efficiency UPS. Today, we are proud to state that all our product ranges exceed the required levels, allowing us to offer our customers the highest levels of performance on the market.

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Critical Power solutions

IT APPLICATION SOLUTIONS

Desktop / Tower UPS

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19” Rack & Rack/Tower convertible UPS

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Single unit & 1+1 configuration UPS

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Single & parallel UPS systems

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Modular & scalable UPS systems

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NON-IT APPLICATION SOLUTIONS

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Transformer-based UPS

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Industrial modular DC power

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Centralized Power Supply for emergency systems

Emergency CPS ......................................... p. 80
NETYS PL
User-friendly multi-socket protection
600 and 800 VA

The solution for
- PC: LCD or CRT monitors, scanners, printers, etc.
- Cash registers
- Interactive terminals

Technology
- VFD “offline”

Certifications

An innovative solution and superior design
- Compact and practical pluggable power protection integrating a larger number of sockets adapted to computer and IT peripherals in small office and home office environments, facilitating connection and tidier cabling.
- Modern design suitable for positioning over/under the desk or floor installations.
- Complementary USB port on the top for recharging mobile devices (e.g. phones, MP3, etc.).

Adapted protection to meet all your needs
- 6 output sockets (British, French or German/Italian standards) for easy distribution directly to your applications:
  - 4 sockets protected against power cuts and overvoltages, aimed at your most sensitive applications (professional desk top systems, workstation and monitors).
  - 2 sockets protected against overvoltage alone for use with less critical applications and high absorption consumers (e.g. laser printers).

Easy to use
- Operating mode indicated by means of the smart LED indicator lights.
- Easy battery maintenance and replacement.
- Integrated mains input cable on the side, allowing all six sockets to be used.

Connections
1. Filtered output sockets
2. Inverter output sockets
3. LED
4. On/Off button
5. USB port to charge mobile devices
6. Fuse
7. USB serial port
8. Mains input cable

Technical data

<table>
<thead>
<tr>
<th>Component</th>
<th>NETYS PL 600 VA</th>
<th>NETYS PL 800 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>1/1</td>
<td>1/1</td>
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<tr>
<td>INPUT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>230 V ±3%</td>
<td>230 V ±3%</td>
</tr>
<tr>
<td>Rated frequency</td>
<td>50/60 Hz with automatic selection</td>
<td>50/60 Hz with automatic selection</td>
</tr>
<tr>
<td>OUTPUT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>230 V ±10%</td>
<td>230 V ±10%</td>
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<tr>
<td>Rated frequency</td>
<td>50/60 Hz ±7%</td>
<td>50/60 Hz ±7%</td>
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<tr>
<td>Wave form</td>
<td>Sine</td>
<td>Sine</td>
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<tr>
<td>Protection</td>
<td>Overload, significant discharge and short circuit</td>
<td>Overload, significant discharge and short circuit</td>
</tr>
<tr>
<td>Sockets</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>- Surge Protection</td>
<td>4</td>
<td>4</td>
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<tr>
<td>- Voltage Protection</td>
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<tr>
<td>Socket standard</td>
<td>British, French or German/Italian</td>
<td>British, French or German/Italian</td>
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<td>BATTERIES</td>
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<td></td>
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<tr>
<td>Type</td>
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<td>Sealed lead-acid maintenance free - expected life 3/5 years</td>
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<tr>
<td>Interface</td>
<td>USB</td>
<td>USB</td>
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<td>Serial communication software</td>
<td>Local area network</td>
<td>Local area network</td>
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<tr>
<td>UPS CABINET</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (W x D x H)</td>
<td>258 x 220 x 120 mm</td>
<td>258 x 220 x 120 mm</td>
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<tr>
<td>Weight</td>
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Standards
- EN62423-1, EN62423-11, EN62423-12
- IEC/EN 62423-1, IEC/EN 62423-2
- CE, NMB, ENEC
- RoHS Compliant

NETYS PL Single-phase UPS
600 and 800 VA

General Catalogue 2019
Ideal and cost-effective protection for SOHO or POS applications
- Adapted to protect IT applications in home, office and retail environments.
- A complete range of six models to adapt the power to the equipment’s consumption or to required back-up time.

Easy to use
- Control panel with graphical icons LCD/LEDs allowing the operating mode to be easily monitored.

A solution for network power cuts and voltage fluctuations
- The integrated AVR function (Automatic Voltage Regulation) stabilizes the output voltage and avoids the switching to Battery Mode operation, therefore saving the battery to support critical power cut events.

Simplified connection
- Several IEC sockets (IT standard) simplify the connectivity to computer and IT peripherals.

Protection for your data line
- Integrated NTP protection for LAN/ADSL connection against the risk of data line overvoltage.

The solution for
- CAD, graphic workstations
- Multimedia workstations and peripherals
- LCD screens and monitors
- POS (Points Of Sales)

Technology
- VI "line interactive" with AVR, step wave

Certifications
- Adapted to protect IT applications in home, office and retail environments.
- A complete range of six models to adapt the power to the equipment’s consumption or to required back-up time.

NETYS PE
Practical and cost-effective protection from 600 to 2000 VA

Control panel
- 1. Alarm
- 2. Operation with battery
- 3. Normal operation
- 4. On / Off
- 5. Load present
- 6. Load level (5 steps)
- 7. General Alarm
- 8. Battery fault / Replace the battery
- 9. Overload
- 10. Battery capacity
- 11. Normal mode / Battery mode (flashing)
- 12. Automatic Voltage / Regulation active

Connections
- 1. USB serial port
- 2. NTP data line suppressor
- 3. UPS output sockets
- 4. Input socket and fuse
- 5. Fan / air vents

Standard communication features
- LOCAL VIEW: ideal UPS monitoring and shutdown point-to-point solution for Windows®, Linux and Mac. OS X® operating systems.

Technical data
- Sn...Pn...Input/output
- INPUT
  - Rated voltage: 230 V
  - Voltage tolerance: 170 - 280 V
  - Rated frequency: 50/60 Hz with automatic selection
- OUTPUT
  - Automatic Voltage Regulation (AVR)
  - Rated output: 230 V ±5%
  - Rated frequency: 50/60 Hz ±1%
  - Wave form: Step wave
  - Protection: Overload, significant discharge and short circuit

Batteries
- 4 x IEC 320 (C13) 6 x IEC 320 (C13)

Batteries
- Type: EEBLEDLEAD
- Expected life: 3 years

 Dimensions: W x D x H
- 115 x 300 x 145 mm
- 45 x 140 x 35 mm
- 145 x 300 x 255 mm

Weight
- 5.0 kg
- 3.2 kg
- 0.9 kg
- 9.7 kg
- 11.2 kg
- 12.7 kg

Standards
- Safety: EN 62040-1, AS/NZS 4541.1, AS/NZS 4584.1.2
- EMC: EN 62040-2, AS/NZS 4584.2
- RoHS: EN 50581

Adapted to protect IT applications in home, office and retail environments.
NETYS PR
Space saving reliable protection from 1000 to 2000 VA - Mini Tower

The solution for
- Professional and IT equipment
- Servers and networking devices
- CAD / graphic workstations with monitors and peripherals
- Control systems

Technology
> VI “line interactive” with AVR, sine wave

Certifications
RoHS COMPLIANT

Professional line interactive UPS
- Ideal solution for protecting small servers and high performance CAD or graphic workstations.
- Assures service continuity to critical applications.
- Designed for professional applications: the sine wave inverter technology assures full compatibility with any kind of load and power supply.
- Minitower case to easily fit close to the IT load to be supplied and protected.

A solution for network power cuts and voltage fluctuations
- The integrated AVR function (Automatic Voltage Regulation) stabilizes the output voltage and avoids the switching to Battery Mode operation, therefore saving the battery to support critical power cut events.

Easy to use
- Control panel with graphical icons LCD allowing the operating mode to be easily monitored.

Simplified connection
- Several IEC 320 sockets (IT standard) simplify the connectivity to computer and IT peripherals.

Protection for your data line
- Integrated NTP protection for LAN/ADSL connection against the risk of data line overvoltage.

NETYS PR Mini Tower

<table>
<thead>
<tr>
<th>Rating</th>
<th>1000 VA</th>
<th>1500 VA</th>
<th>2000 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sn</td>
<td>300 W</td>
<td>500 W</td>
<td>700 W</td>
</tr>
<tr>
<td>Pn</td>
<td>700 W</td>
<td>1050 W</td>
<td>1400 W</td>
</tr>
</tbody>
</table>

Connections
- 1. USB serial port
- 2. NTP data line suppressor
- 3. UPS output sockets
- 4. Input socket and fuse
- 5. Fan / air vents

Standard communication features
- LOCAL VIEW: ideal UPS monitoring and shutdown point-to-point solution for Windows®, Linux and Mac OS X® operating systems.

Technical data

BATTERIES
- Type: Switched lead acid maintenance free - expected life 35 years
- End of life time: 45 min / 55 min / 60 min

COMMUNICATION
- Interface: USB
- Local communication software: Local View
- Data Line protection: NTP data line suppressor

UPS CABINET
- Dimensions (W x D x H): 145 x 345 x 115 mm / 145 x 380 x 205 mm
- Weight: 5.2 kg / 12.3 kg

STANDARDS
- Safety: EN62040-1, EN62040-11, AS / NZS / IEC 62040-2
- EMC: EN55022 / EN55024
- Product declaration: 13. ROM (23119)
**NETYS PR**

High performance protection on rack or tower
from 1700 to 3300 VA - Rack/Tower

The solution for
- Professional and IT equipment
- Servers and networking devices
- CAD / graphic workstations with monitors and peripherals
- Control systems

**Technology**
- VI “line interactive” with AVR, sine wave

**Certifications**
- RoHS

A secure and professional supply continuity
- Ideal solution for protecting small servers, networking devices and peripherals.
- Assures service continuity to critical applications.
- Designed for professional applications: the sinewave inverter technology ensures full compatibility with any kind of load and power supply.

Tailored to IT networking
- The space and time-saving tower/rack conversion option means it can be installed easily either in tower mode or inside standard 19” rack cabinets depending on the user’s needs.

Simple to install
- No configuration needed on first startup.
- Compact footprint (2U/89 mm) for installation in rack cabinets.
- Attractive design for visible installation in offices.
- Simplified maintenance and Battery ‘hot swap’, without closing down other applications.

Easy to use and to integrate
- Wide range of communication protocols available in options (including BUS, TCP/IP and SNMP) for integration into LAN networks or building management systems (BMS).
- Easy connections to the applications (depending on power) via 8 or 8+1 IEC 320 (IT standard) sockets.
- Load segmentation function to prioritize loads and manage critical situations.
- EPO (Emergency Power Off) emergency stop.
- 161 V ±4% (selecting wide mode) -276 V ±4% Rated voltage
- 4HE!62 INCREASES BOOST The output voltage by
- 4HE!62 DECREASES BUCKS The output voltage by

**Connections**

**Standard communication features**
- **LOCAL VIEW**: ideal UPS monitoring and shutdown point-to-point solution for Windows®, Linux and Mac OS X® operating systems.
- **HD**: UPS management based on Windows® and Mac OS X® embedded service - USB interface.
- **MODBUS RTU (RS232).**

**Battery extensions**

**Technical data**

- **Input socket**
  - Slot for optional communication boards
  - NTP protections (RJ45)
  - RS232 serial port
  - USB serial port
  - EPO Emergency Power Off
  - Fan / air vents

- **Output**
  - UPS full power output socket

- **Back-up time (1)**
  - 3 min
  - 6 min
  - 8 min
  - 43 min
  - 42 min

- **Input value**
  - 24 V

- **Communication**
  - **Standard communication interface**: NETVISION®/SNMP
  - **Network**: USB
  - **Network interface**: NETVISION®, SNMP®
  - **Network adapter**: SOCOMEC USB
  - **Software**: NO MODBUS RTU
  - **UPS cabinet**
    - Dimensions (W x D x H mm): 442 x 642 x 87
    - Weight: 28.7 kg
  - **Connectors**:

- **Power factor**

- **Power**

- **Protection**

- **Load level (5 steps)**

- **Load present**

- **On / Off**

**Connections**

1. Fan / air vents
2. EPO Emergency Power Off
3. USB serial port
4. RS232 serial port
5. Connector for external battery extension
6. UPS output sockets (2 segments)
7. NTP protections (N) 4x)
8. Slot for optional communication boards
9. Input socket
10. UPS full power output socket

**Control panel**

1. On / Off
2. Load present
3. Load level (5 steps)
4. General Alarm
5. Battery fault / Replace the battery
6. Overload
7. Battery capacity
8. Normal mode / Battery mode (flashing)
9. Automatic Voltage / Regulation active
10. Configuration
11. Programmable outlets
12. Input value
13. UPS test / Buzzer off
14. Navigator button
15. Enter

**Weight**

- **Dimensions (W x D x H mm):** 442 x 642 x 87
- **Weight:** 28.7 kg

**Standards**

- **EMC**
  - 10
  - 7

- **Product Declaration**
  - 3300 VA

**Battery**

- **Protection**
  - Automatic Voltage / Regulation active
  - Normal mode / Battery mode (flashing)
  - Battery capacity
  - Overload
  - Battery fault / Replace the battery
  - General Alarm
  - Load level (5 steps)
  - Load present
  - On / Off

**NETYS PR Rack/Tower**

- **1700 VA**
  - Back-up time (1)
  - 3 min
  - 8 min
  - Weight: 18 kg

- **2200 VA**
  - Back-up time (1)
  - 6 min
  - 15 min
  - Weight: 28.7 kg

- **3300 VA**
  - Back-up time (1)
  - 8 min
  - 33 min
  - Weight: 31.5 kg
A professional UPS

- Designed for professional environments, protection against power cuts and over voltage is ensured by Line Interactive technology with Automatic Voltage Regulation (AVR).

An installation adapted to the networking environment

- NETYS PR rack provides high power density (1U - 45 mm) which conserves valuable space in the rack for other equipment.
- Can be easily installed in 19" and 23" Rack cabinets, depending on the user’s needs. The UPS is provided with rails and mounting accessories.

Adapted connections

- Easy connections to the applications via 4 IEC 320 (IT standard) sockets.
- Data line protection
  - With RJ 45 connector.

Communication with the computer system

- RS232 or USB advanced connections for the management of the power supply and local / remote shutdown of applications.
- Advanced diagnostics and remote control via various protocols and user environments: J BUS, HID, SNMP, TCP/IP.

Battery Hot-swap

- Battery can be hot-swapped without having to shut down the connected equipment.
- Battery can be replaced from the front without removing and disconnecting the UPS.
- Battery check system and replacement indicator.

Technical data

<table>
<thead>
<tr>
<th>NETYS PR Rack 1U</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sn</td>
</tr>
<tr>
<td>Pn</td>
</tr>
<tr>
<td>INPUT</td>
</tr>
<tr>
<td>Rated voltage</td>
</tr>
<tr>
<td>Rated frequency</td>
</tr>
<tr>
<td>OUTPUT</td>
</tr>
<tr>
<td>Rated voltage</td>
</tr>
<tr>
<td>Rated frequency</td>
</tr>
<tr>
<td>sockets</td>
</tr>
<tr>
<td>Data line protection</td>
</tr>
<tr>
<td>BATTERIES</td>
</tr>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Back-up time (min)</td>
</tr>
<tr>
<td>COMMUNICATION</td>
</tr>
<tr>
<td>Wires</td>
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<td>UPS CABINET</td>
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<tr>
<td>Dimensions WxDxH</td>
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<tr>
<td>Weight</td>
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<tr>
<td>STANDARDS</td>
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<td>Safety</td>
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<td>IEC/EN 62040-2, AS 62440-2</td>
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<td>Product Declaration</td>
</tr>
<tr>
<td>(1)</td>
</tr>
</tbody>
</table>

CONTROL PANEL

- ON-OFF button
- Test / Alarm reset button
- Power ON
- Overload
- Battery mode
- Service
- Load segment 2
- Load segment 1

Included

- Mounting bracket for 19" rack
- Adjustable rails
- Rear Hold-down Bracket
- Rail assembly
- Assembly Wing Nuts
- Wing nut for Rear Hold-down bracket

Standard communication features

- LOCAL VIEW: ideal UPS monitoring and shutdown point-to-point solution for Windows®, Linux and Mac OS X® operating systems.
- HID: UPS management based on Windows® and Mac OS X® embedded service - USB interface.
- MODBUS RTU (RS232).

Communication options

- NET VISION: professional WEB/SNMP interface for UPS monitoring and shutdown management of several operating systems.
NETYS RT
Total protection on rack or tower from 1100 to 11000 VA

The solution for
- > Switching
- > Storage and networking devices
- > VoIP communication systems
- > Structured cabling systems
- > Control systems
- > Video surveillance systems

Technology
- VFI "online double conversion"

Certifications

Advantages

Standard electrical features
- Built in backfed protection.
- R11 connection for Emergency Power Off (EPO).
- Connection for battery extension modules.
- Port for parallel operation (5000-11000 VA).

Electrical options
- 1+1 parallel module (5000-11000 VA)
- Battery extension modules.
- Manual bypass without interruption (5000-11000 VA).
- Hot swap manual bypasses (1100-3300 VA).
- Portable multiple German standard outlets with cable and IEC 320-22 plug.

Standard communication features
- LOCAL VIEW: ideal UPS monitoring and shutdown point-to-point solution for Windows®, Linux and Mac OS X® operating systems.
- HID: UPS management based on Windows® and Mac OS X® embedded service - USB interface (1100-3300 VA).
- MODBUS RTU (RS232).
- RT-VISION: professional WEB/SNMP interface for UPS monitoring and shutdown management of several operating systems (1100-3300 VA).

Communication options
- RT-VISION: professional WEB/SNMP interface for UPS monitoring and shutdown management of several operating systems (1100-3300 VA).
- Dry-contact interface.
- Environmental Monitoring Device (EMD).

Technical data

NETYS RT

<table>
<thead>
<tr>
<th>Voltage</th>
<th>1100 VA</th>
<th>1700 VA</th>
<th>2200 VA</th>
<th>3300 VA</th>
<th>5000 VA</th>
<th>7000 VA</th>
<th>9000 VA</th>
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<tbody>
<tr>
<td>Power</td>
<td>600 W</td>
<td>1300 W</td>
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<td>online double conversion VFI</td>
<td>online double conversion VFI</td>
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<td>Parallel redundant function</td>
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<tr>
<td>Output</td>
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<td>230 V (3ph)</td>
<td>230 V (3ph)</td>
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<tr>
<td>Frequency (Hz)</td>
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<td>50/60 Hz</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
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<tr>
<td>Efficiency</td>
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<tr>
<td>Recharge time</td>
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<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>BATTERY</td>
<td>Standard autonomy</td>
<td>8 hours</td>
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<td>Voltage</td>
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<td>Recharge time</td>
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<td>Performance</td>
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<td>Product declaration</td>
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<td>&lt; 65 dB</td>
<td>&lt; 70 dB</td>
<td>&lt; 75 dB</td>
<td>&lt; 80 dB</td>
</tr>
<tr>
<td>UPS CABINET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UPS size (W x D x H)</td>
<td>2U</td>
<td>2U</td>
<td>2U</td>
<td>2U</td>
<td>2U</td>
<td>2U</td>
<td>3U</td>
<td>3U</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>13 kg</td>
<td>18 kg</td>
<td>18 kg</td>
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</tr>
<tr>
<td>EBM module (W x D x H)</td>
<td>2U</td>
<td>2U</td>
<td>2U</td>
<td>2U</td>
<td>2U</td>
<td>2U</td>
<td>2U</td>
<td>2U</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>18 kg</td>
<td>25 kg</td>
<td>25 kg</td>
<td>25 kg</td>
<td>25 kg</td>
<td>25 kg</td>
<td>25 kg</td>
<td>25 kg</td>
</tr>
</tbody>
</table>

High protection and availability
- Online double conversion technology with sinusoidal waveform, completely filters out all disturbances from the mains power supply and ensures maximum protection of the utility.
- Permanent regulation of output voltage and frequency.
- Wide tolerance of the input voltage reduces switchovers to battery mode, prolonging battery life.

Simple to install
- No configuration necessary on first startup.
- Space and time saving 'tower-to-rack' conversion mode.
- IEC input and output connections (1100-3300 VA) or terminal input and output connections with built-in magnetothermal input switch (5000-11000 VA).
- Compact footprint (tower mode).
- No configuration necessary on first startup.

Easy to use
- Clear and uncluttered LCD interface, with buzzers that immediately indicate the operating status of the UPS, even for less specialist users.
- Wide range of communication protocols for integration into LAN networks or Building Management Systems (BMS).
- Load segmentation function to prioritize loads and manage critical situations.
- EPO (Emergency Power Off).
- RS232 advanced connection for the connection for battery extension modules.

Meets practical needs
- Modular battery extension (EBM) to meet all back-up time requirements, even after installation.
- Possibility of 1+1 parallel redundant configuration to maximise the availability of critical utilities, even in the event of a module breakdown (5000-11000 VA).

Technical specifications:
- Voltage range: 230 V (1ph) selectable 200 / 208 / 220 / 240 V, 50 or 60 Hz ± 2% (± 0.05 Hz in battery mode).
- Power factor: 0.9 @ 200 VA, 0.9 @ 1100 VA, 0.9 @ 2200 VA, 0.9 @ 3300 VA, 0.9 @ 5000 VA, 0.9 @ 7000 VA, 0.9 @ 9000 VA, 0.9 @ 11000 VA.
- Efficiency: 93%.
- Recharge time: -.
- BATTERY: Standard autonomy: 8 hours.
- Voltage: 24 VDC.
- STANDARDS: EN 62040-3 (efficiency tested by an external independent body).
- Noise level (ISO 3744): < 45 dB.
- UPS CABINET: 2U.
- Weight: 13 kg.
- EBM module: 2U.
- Weight: 18 kg.

Certifications:
- CE, RCM (E2376).

Environmental Monitoring Device (EMD): RT-VISION.
- Professional WEB/SNMP interface for UPS monitoring and shutdown management of several operating systems (1100-3300 VA).
- Dry-contact interface.
- Environmental Monitoring Device (EMD).

Communication options:
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- No configuration necessary on first startup.
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- Compact footprint (tower mode).
- No configuration necessary on first startup.
**Connections**

1. Mains input socket (IEC 320)
2. Fan
3. Output socket (full power)
4. EPO (Emergency Power Off) input
5. RS232 interface (MODBUS protocol)
6. USB port
7. Input protection
8. Output sockets (IEC 320 - 10 A)

**Electrical options**

- Portable modules
- German standard sockets
- Manual bypasses (1100-3000 VA)
- Hot-swapping manual bypasses (1100-3000 VA)
- Battery extension connector
- Input switch
- Input terminals
- Output terminals
- Battery extension connector
- Parallel port connector
- RJ45 LAN ethernet connector
- Slot for optional communication boards
- Connector for external battery extension
- Emergency Power Off (EPO) input
- USB port
- Fan
- Mains input socket (IEC 320)

**NETYS RT**

**NETYS RT 1100-3300 VA - Battery extension**

- To achieve the highest level of availability and to power critical utilities, NETYS RT UPS modules above 3.3 kVA can be configured for parallel operation.

**Parallel redundant operation for business continuity**

- Redundant operation (1+1) means: the system incorporates one more UPS module than a needed to protect the load; in the event of a breakdown, it guarantees sufficient power supply capacity to the load by maintaining online protection.

**NETYS RT 5000-11000 VA - Battery extension**

- Parallel technology is based on the principle of load sharing, whereby both units are always kept active.

- In a redundant configuration, overall system availability is much higher than a conventional UPS system using similar technology.

- A 1+1 redundant configuration does not require additional circuits and can therefore be set up at a later date, simply by using two UPS modules and a collector/ manual bypass module which simplifies cabling and maintenance of the UPS installation.

**Control panel**

- Normal mode / Battery mode (flashing)
- Overload
- General alarm
- Battery fault / Replace the battery
- Load present
- Buzzer off
- Load status
- Programmable outlets
- Configuration
- Battery status
- Load level (5 steps)
- Battery fault / Replace the battery
- General alarm
- Overload
- Input value
- Normal mode / Battery mode (flashing)
High availability in marine environments

The marine industry calls for reliable equipment which is able to supply applications operating in harsh environments. In such a context, power outage cause extremely serious problems to critical equipment for the navigation system, and communication and engine controls, which leads to costs increasing. In line with the company’s commitment to develop innovative solutions to ensure availability, improve energy efficiency and reduce costs, SOCOMEC has introduced NETYS RT-M, high-performance UPS DNV GL standard certified.

Easy to use

- Easy configurable frequency converter operation 50 Hz, 60 Hz.
- No configuration necessary on first startup.
- Wide range of communication protocols (including TCP/IP and SNMP) for integration into LAN networks or building management systems (BMS).

Meets practical needs

- Online double conversion technology with sinusoidal waveform, to completely filter out all disturbances from / to the mains power supply and to ensure maximum protection of the equipment.
- Optional battery extension modules (EBM) to meet wide back-up time requirements, even after installation.
- Clear and uncluttered LCD interface, with buzzer that immediately indicate the operating status of the UPS, even for less specialist users.

The solution for

- Steering systems
- Bridge systems
- Radar systems
- Control systems
- Video surveillance systems

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Technical data

<table>
<thead>
<tr>
<th>NETYS RT-M</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sn</td>
<td>1100 VA</td>
</tr>
<tr>
<td>Sn</td>
<td>980 W</td>
</tr>
<tr>
<td>Architecture</td>
<td>on line double conversion VFI with input PFC and automatic bypass</td>
</tr>
<tr>
<td>INPUT</td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>230 V (1 Ph)</td>
</tr>
<tr>
<td>Voltage tolerance</td>
<td>± 20% above / below 230 ±10% (at 60 Hz)</td>
</tr>
<tr>
<td>Rated frequency</td>
<td>50 or 60 Hz</td>
</tr>
<tr>
<td>Frequency tolerance</td>
<td>± 10% (Multi Selectable)</td>
</tr>
<tr>
<td>Power factor / THD</td>
<td>&gt; 0.9 / &lt; 5%</td>
</tr>
<tr>
<td>OUTPUT</td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>230 V (1 Ph)</td>
</tr>
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</tr>
<tr>
<td>Frequency tolerance</td>
<td>± 10% (Multi Selectable)</td>
</tr>
<tr>
<td>Power factor / THD</td>
<td>&gt; 0.9 / &lt; 5%</td>
</tr>
<tr>
<td>Efficiency</td>
<td>up to 93% online mode</td>
</tr>
<tr>
<td>Overload capability</td>
<td>up to 110% continuously, 125% for 3 min, 150% for 10 s</td>
</tr>
<tr>
<td>Connections</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td></td>
</tr>
<tr>
<td>Standard communication</td>
<td></td>
</tr>
<tr>
<td>Options</td>
<td></td>
</tr>
<tr>
<td>Ethernet</td>
<td>Web / SNMP, Ethernet RJ45 (1 pc.) / (opt.)</td>
</tr>
<tr>
<td>COM2 ports</td>
<td>1 available as standard</td>
</tr>
<tr>
<td>Dry contact card</td>
<td>extra</td>
</tr>
<tr>
<td>EPO input</td>
<td>RJ11 port</td>
</tr>
</tbody>
</table>

Environmental

- Operating ambient temperature: from 0 °C to +45 °C (from 15% to 85% Humidity non-condensing) |
- Relative humidity: 95% non-condensing |
- Maximum altitude: 5 000 m without derating (max. 3000 m) |
- Noise level (ISO 3746): < 45 dB |
- Weight: 24 kg |
- Recharge time: < 6 hours to recover 90% capacity |

Certifications

- Standard electrical features
  - Built-in backfed protection.
  - Protection against atmospheric phenomena (NTP) for telephone/ADSL modems.
  - RJ11 connection for Emergency Power Off (EPO).
  - Connection for battery extension modules.

- Electrical options
  - Battery extension modules.

- Standard communication features
  - LOCAL VIEW: ideal UPS monitoring and shutdown point-to-point solution for Windows®, Linux and Mac OS X® operating systems.
  - HD: UPS management based on Windows® and Mac OS X® embedded service - USB interface.
  - MODBUS RTU.

- Communication options
  - RT-VISION: professional WEB/SNMP Interface for UPS monitoring and shutdown management of several operating systems.

Control panel

1. Load present
2. Buzzer off
3. Load level (5 steps)
4. Battery status
5. Load status
6. Overload
7. Input value
8. Normal mode / Battery mode (browning)
9. Configuration
10. Programmable outlets
11. Off button
12. ON / TEST and buzzer override button
13. Battery fault / Replace the battery
14. General alarm
15. Navigator button

GAMME 563 A
Reliable and versatile power protection from 1 to 10 kVA

The solution for

- Professional workstations
- Server and corporate networks
- Storage systems
- Industrial automation
- Security systems
- Telecom systems

Technology

- VFI “online double conversion”

Certifications

- RoHS

High protection and availability

- True online double conversion technology (VFI) assures high availability and total load protection.
- Constant output voltage and frequency regulation makes ITYS compatible with different applications, operating environments and generator sets.
- Automatic bypass supplies the loads in the event of overloads or faults.

Robust and versatile

- Compact tower UPS system saves space in the operating environment.
- No particular configuration on first startup.
- Easy connections via IEC 320 sockets or terminals.
- Wide input voltage tolerance limits the switchovers to battery mode prolonging the battery life.
- Manual bypass for periodic or emergency maintenance.

Wide battery configurability

- Flexible battery management available for all ITYS models to ensure power supply continuity in the event of an outage.
- Modular battery extension meets a wide variety of power back-up times according to the load to be supplied.
- Modular battery extension enables limitless increases in autonomy, even after installation.
- Powerful battery charger models guarantee constant and reliable operation using external high capacity batteries, therefore providing supply continuity during long outages.

Autonomy configurations (1U models)

- Flexible autonomy
  - UPS with internal batteries (standard model)
  - Modular battery extension with 1 or 2 strings
- Extendable autonomy
  - UPS without internal batteries and with powerful battery charger
  - No or 1 modular battery extension with 1 or 2 strings
- Long autonomy
  - UPS without internal batteries and with powerful battery charger
  - External battery cabinet

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  - External battery cabinet

Connections

- 1. USB serial port
- 2. RS232 serial port
- 3. EPO (Emergency Power Off)
- 4. Dry contact interface (DB9)
- 5. Slot for optional communication boards
- 6. Manual bypass

Technical data

<table>
<thead>
<tr>
<th>ITYS</th>
<th>UPS</th>
<th>UPS with internal batteries (standard model)</th>
<th>Modular battery extension with 1 or 2 strings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sn</td>
<td>1000 VA</td>
<td>2000 VA</td>
<td>3000 VA</td>
</tr>
<tr>
<td>Pn</td>
<td>800 W</td>
<td>1600 W</td>
<td>2400 W</td>
</tr>
<tr>
<td>Efficacy</td>
<td>0.98</td>
<td>0.99</td>
<td>0.98</td>
</tr>
</tbody>
</table>

Environmental

- Operating temperature: +5°C to +40°C ± 2°C (max. battery lifetime: 15°C to 25°C)
- Non-condensing humidity: < 95% non-condensing
- Maximum altitude: Without de-rating: Up to 1000 m
- Noise level at 1 m: ≤ 50 dBA
- Dimensions (W x D x H): 245 x 480 x 323 mm
- Weight (models with internal batteries): 14 kg
- Weight (models without internal batteries): 7 kg
- Crest factor: 3:1
- Power factor: 0.9
- Voltage: 208 / 220 / 230 / 240 V (± 2%)
- Rated voltage: 50/60 Hz (± 0.2 Hz in battery mode)
- Rated frequency: 50/60 Hz ±10% (Auto-Selectable)
- Overload: Up to 150% for 10 seconds, Up to 150% for 1 minute, Up to 150% for 10 minutes

Characteristics

- USB 2.0 / USB 3.0
- RS232 / USB
- Dry contact interface
- External high capacity batteries
- Unlimited increases in autonomy, even after installation
- Wide variety of power back-up times according to the load to be supplied
- Modular battery extension enables limitless increases in autonomy, even after installation
- Powerful battery charger models guarantee constant and reliable operation using external high capacity batteries, therefore providing supply continuity during long outages

Advanced communication

- Wide range of communication protocols available as options (including BUS, TCP/IP and SNMP) for integration into LAN networks or building management systems (BMS).
- RS232 advanced connection for the management of power supply and local/remote shutdown of the applications with Windows®, Linux and Mac OS X® systems.
- USB port for direct interfacing with Windows® and Mac OS X® systems.
- Clear and uncluttered LCD interface for easy UPS monitoring, even for less specialist users.

Local and IP network management solutions

- LOCAL VIEW: ideal point-to-point software for UPS monitoring and shutdown of Windows®, Linux and MAC OS X® operating systems (standard for all models).
- NET VISION: professional network adapter for monitoring and controlling UPS units from a remote location (option for all models).
The ITYS ES series is a range of compact NET VISION: professional WEB/SNMP increased level of equipment immunity Restarting the UPS from the battery to Battery efficiency can be tested via the LCD monitoring/control panel and a Dry contact interface. ITYS ES guarantees permanent regulation The UPS is shipped ready for connection easy maintenance and uninterrupted simplified installation: connection to the manual bypass option.

High protection and high availability
- The ITYS ES series is a range of compact UPS systems available in 1000, 2000 and 3000 VA models with on-line double conversion technology (VFI) with sinusoidal absorption.
- ITYS ES guarantees permanent regulation of the output voltage and frequency. This technology is compatible with all IT and industrial applications and operating environments, installations with generator sets included.
- Wide tolerance on input voltage ensures that switchovers to battery mode are infrequent, significantly prolonging battery lifetime.
- The automatic bypass device switches over in zero time in the event of overload or failure, guaranteeing uninterrupted services.

Straightforward to install and easy to use
- The UPS is shipped ready for connection with internal batteries connected and charged.
- ITYS ES, with the manual bypass option is easy to install without any special plant engineering preparation, as it is equipped with built-in thermal protection.
- The LCD monitoring/control panel and a buzzer make the equipment extremely easy and intuitive to use. The graphic indicating the power distribution path shows at a glance whether or not the system is working as it should.
- Battery efficiency can be tested via the control panel or using dedicated software.

Operating efficiency and versatility
- The versatility of these models makes them suitable for protecting critical devices in the industrial field.
- The standard equipment and communication accessories have been specially designed to satisfy the typical needs of installation or use in transformer cabinets (i.e. tropicalized boards).
- In situations where automatic power management procedures are required, the communication software can be used to programme scheduled start-up and shutdown times.
- Restoring the UPS from the battery to power the DG before closing the main isolator.

The required protection comprises:
- Main power cuts due to poor maintenance of the user’s system.
- Inappropriate tripping of the Medium Voltage Switch because of faults in the control circuits for the General Protection and Medium Voltage Switch.
- It is necessary to power the General Protection before closing the Medium Voltage Switch.

The CEI 016 STANDARD for auxiliary cabinet equipment requires an uninterrupted power supply to the control circuits for the General Protection and Medium Voltage Switch.

The solution for
- Control devices
- Electric lines
- VFI “online double conversion”

Certifications
- RoHS

Tech info
The CEI 016 STANDARD for auxiliary cabinet equipment requires an uninterrupted power supply to the control circuits for the General Protection and Medium Voltage Switch.

The technology for
- NET VISION: professional WEB/SNMP interface for UPS monitoring and shutdown management of several operating systems.
- Dry contact interface.

UPS - Technical data

<table>
<thead>
<tr>
<th>Sn [VA]</th>
<th>ITYS ES</th>
<th>1000</th>
<th>2000</th>
<th>3000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pn [W]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>230 V (208 V)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Rated frequency</td>
<td>50/60 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frame factor</td>
<td>0.98</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overload</td>
<td>up to 200% for 10 seconds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cool factor</td>
<td>3.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching time</td>
<td>6 ms max</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching positions</td>
<td>1: UPS - 2: MAINS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wire size</td>
<td>6 mm² max</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching points</td>
<td>1: UPS - 2: MAINS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wire size</td>
<td>6 mm² max</td>
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<tr>
<td>Type of terminals</td>
<td>IEC 60309-2</td>
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<tr>
<td>Type</td>
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<td>UPS protection</td>
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<tr>
<td>BYPASS</td>
<td>IEC 308-10 A</td>
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<td>LOAD OUTPUT</td>
<td>IEC 308-10 A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of terminals</td>
<td>IEC 60309-2</td>
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<td></td>
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</tr>
<tr>
<td>Wire size</td>
<td>6 mm² max</td>
<td></td>
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</tr>
<tr>
<td>Type of circuit breaker</td>
<td>100 A</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Battery test
- 115 minutes @ 50 W
- 154 minutes @ 100 W
- 216 minutes @ 150 W

Standard communication features
- LOCAL VIEW: ideal UPS monitoring and shutdown point-to-point solution for Windows®, Linux and Mac OS X® operating systems.
- MODBUS® (RTU Rs 232)

Communication options
- NET VISION: professional WEB/SNMP interface for UPS monitoring and shutdown management of several operating systems.
- Dry contact interface.

Manual bypass (option)
- Specially designed for ITYS ES, the manual bypass option enables:
  - simplified connection: connection to the system is made with industrial grade terminals, while connection to the UPS is via the pre-wired plug and socket supplied.
  - easy maintenance and uninterrupted operation: thanks to the manual bypass isolator it is possible to service or replace the UPS while maintaining the power supply to the devices downstream in complete safety for the operator. This operation has been specially devised to be simple to carry out, even in an emergency.
  - increased level of equipment immunity to surge voltages, typical for this type of application, thanks to suitable surge arrestors included in addition to standard UPS protection.

UPS protection.
- arrestors included in addition to standard surge arrestors included in addition to standard UPS protection.

Sizing for a back-up time of 1 hour, either by the UPS or by buffer batteries.

Back-up time(2) + switching back on

<table>
<thead>
<tr>
<th>Battery test</th>
<th>ITYS ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sn [VA]</td>
<td>1000</td>
</tr>
<tr>
<td>1 hour</td>
<td>50 W</td>
</tr>
<tr>
<td>100 W</td>
<td>0 W</td>
</tr>
</tbody>
</table>

Power distribution path shows at a glance whether or not the system is working as it should.

Automatic bypass device switches over in zero time in the event of overload or failure, guaranteeing uninterrupted services.

Manual bypass (option)
- Specially designed for ITYS ES, the manual bypass option enables:
  - simplified connection: connection to the system is made with industrial grade terminals, while connection to the UPS is via the pre-wired plug and socket supplied.
  - easy maintenance and uninterrupted operation: thanks to the manual bypass isolator it is possible to service or replace the UPS while maintaining the power supply to the devices downstream in complete safety for the operator. This operation has been specially devised to be simple to carry out, even in an emergency.
  - increased level of equipment immunity to surge voltages, typical for this type of application, thanks to suitable surge arrestors included in addition to standard UPS protection.
**MODULYS**

Scalable and flexible modular solution

from 1.5 to 24 kVA

The solution for

> e-business
> Server farms
> Telecommunications
> Medical
> Computer networks

Technology

> VFI "online double conversion""
**ITYS PRO**
Reliable cost-effective power protection from 10 to 20 kVA

**The solution for**
- Server rooms
- Service sector
- Infrastructure
- Healthcare sector
- Light industrial applications

**Technology**
- VFI "online double conversion"

**Advantages**
- Easy to order, install and operate.
- EBS (Expert Battery System) for battery backfeed protection: detection circuit.
- Designed to operate in challenging electrical environments.
- Local and IP network management solutions:
  - LOCAL VIEW: ideal point-to-point software for UPS monitoring and shutdown of Windows®, Linux and MAC OS X®
  - NET VISION: professional network adapter for monitoring and controlling UPS units from a remote location (option for all models).
- Remote monitoring service:
  - LINK-UPS, remote monitoring service that connects your UPS to your Critical Power specialist 24/7.

**Standard electrical features**
- Internal maintenance bypass.
- Backfeed protection: detection circuit.
- EBS (Expert Battery System) for battery backfeeding.

**Standard communication features**
- User-friendly multilingual interface with graphic display.
- Integrated LAN network monitoring via web browser.
- 2 slots for communication options.

**Communication options**
- Dry-contact interface.
- MODBUS interface.

**Certifications**
- RoHS

**Technical data**

<table>
<thead>
<tr>
<th>UPS - Type M</th>
<th>10</th>
<th>15</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>P [kW]</td>
<td>9</td>
<td>13.5</td>
<td>18</td>
</tr>
<tr>
<td>Pn [kVA]</td>
<td>9</td>
<td>13.5</td>
<td>18</td>
</tr>
<tr>
<td>INPUT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>230 V, 400 V</td>
<td>230 V, 400 V</td>
<td>230 V, 400 V</td>
</tr>
<tr>
<td>Voltage tolerance</td>
<td>± 3 % (up to 150 % of nominal load)</td>
<td>± 3 % (up to 150 % of nominal load)</td>
<td>± 3 % (up to 150 % of nominal load)</td>
</tr>
<tr>
<td>Rated frequency</td>
<td>50/60 Hz ± 2</td>
<td>50/60 Hz ± 2</td>
<td>50/60 Hz ± 2</td>
</tr>
<tr>
<td>Rated power factor</td>
<td>0.99</td>
<td>0.99</td>
<td>0.99</td>
</tr>
<tr>
<td>OUTPUT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>230 V, 400 V</td>
<td>230 V, 400 V</td>
<td>230 V, 400 V</td>
</tr>
<tr>
<td>Voltage tolerance</td>
<td>± 1 %</td>
<td>± 1 %</td>
<td>± 1 %</td>
</tr>
<tr>
<td>Rated frequency</td>
<td>50/60 Hz ± 2</td>
<td>50/60 Hz ± 2</td>
<td>50/60 Hz ± 2</td>
</tr>
<tr>
<td>Overload</td>
<td>Up to 150 % for 10 seconds</td>
<td>Up to 150 % for 10 seconds</td>
<td>Up to 150 % for 10 seconds</td>
</tr>
<tr>
<td>Crest factor</td>
<td>3 X</td>
<td>3 X</td>
<td>3 X</td>
</tr>
<tr>
<td>Connections (output)</td>
<td>Terminals</td>
<td>Terminals</td>
<td>Terminals</td>
</tr>
<tr>
<td>Bypasses</td>
<td>rated output voltage</td>
<td>rated output voltage</td>
<td>rated output voltage</td>
</tr>
<tr>
<td>Voltage tolerance</td>
<td>± 1 % (50/60 Hz ± 2 (up to 150 % with generator - selectable))</td>
<td>± 1 % (50/60 Hz ± 2 (up to 150 % with generator - selectable))</td>
<td>± 1 % (50/60 Hz ± 2 (up to 150 % with generator - selectable))</td>
</tr>
<tr>
<td>Rated frequency</td>
<td>50/60 Hz ± 2</td>
<td>50/60 Hz ± 2</td>
<td>50/60 Hz ± 2</td>
</tr>
<tr>
<td>Rated voltage</td>
<td>1P-N: 230 V</td>
<td>1P-N: 230 V</td>
<td>1P-N: 230 V</td>
</tr>
<tr>
<td>Voltage tolerance</td>
<td>± 15 % (50/60 Hz ± 2 (up to 150 % with generator - selectable))</td>
<td>± 15 % (50/60 Hz ± 2 (up to 150 % with generator - selectable))</td>
<td>± 15 % (50/60 Hz ± 2 (up to 150 % with generator - selectable))</td>
</tr>
<tr>
<td>Rated frequency</td>
<td>50/60 Hz ± 10 %</td>
<td>50/60 Hz ± 10 %</td>
<td>50/60 Hz ± 10 %</td>
</tr>
<tr>
<td>Rated voltage</td>
<td>3P-N: 400 V</td>
<td>3P-N: 400 V</td>
<td>3P-N: 400 V</td>
</tr>
<tr>
<td>Voltage tolerance</td>
<td>± 20 % (-40 % @ 70 % of nominal load)</td>
<td>± 20 % (-40 % @ 70 % of nominal load)</td>
<td>± 20 % (-40 % @ 70 % of nominal load)</td>
</tr>
<tr>
<td>Rated power factor</td>
<td>0.99</td>
<td>0.99</td>
<td>0.99</td>
</tr>
<tr>
<td>THDI</td>
<td>&lt; 2.5 %</td>
<td>&lt; 2.5 %</td>
<td>&lt; 2.5 %</td>
</tr>
</tbody>
</table>

**Rear view connections**
1. EPO (Emergency Power Off)
2. Ethernet port
3. RS232 serial port
4. Slot for optional communication boards
5. Mains, auxiliary mains, output and manual bypass protective devices
6. Input, output and external battery terminal board
7. Battery protection (M and T models)
8. Bypass with security lock

**Compacted, cost-effective protection**
- Easy to order, install and operate.
- State-of-the-art technology providing high levels of performance in a very compact unit.
- Online double conversion mode with an output power factor of 0.9 providing 12% more active power compared to UPS with a power factor of 0.8.
- Best-in-class online efficiency.
- Innovative battery management extending battery life (virtually ZERO ripple on batteries).
- Redundant bypass protection reducing the risk of power cuts.

**Tailored to your environment**
- Designed to operate in challenging electrical environments.
- Ideal for protecting sensitive IT and non-IT applications.
- Flexible battery configurability without changing the footprint.
- Internal isolation transformer (on request).
- Low electromagnetic emissions compliant for commercial installations.

**UPS configurations**
- UPS - Type S
  - With batteries
  - Without batteries
- UPS - Type M
  - With batteries
  - Without batteries

**Local and IP network management solutions**
- LOCAL VIEW: ideal point-to-point software for UPS monitoring and shutdown of Windows®, Linux and MAC OS X® operating systems.
- NET VISION: professional network adapter for monitoring and controlling UPS units from a remote location (option for all models).

**Communication options**
- Dry-contact interface.
- MODBUS interface.

**Specifications**
- Single-phase and three-phase UPS
- Reliable cost-effective power protection from 10 to 20 kVA
- Performance of UPS configurations:
  - UPS - Type M
  - With batteries
  - Without batteries
  - UPS - Type T
  - With batteries
  - Without batteries
  - UPS - Type S
  - With batteries
  - Without batteries

**Remote monitoring service**
- LINK-UPS, remote monitoring service that connects your UPS to your Critical Power specialist 24/7.

**Electrical features**
- Online double conversion mode.
- Input power factor of 0.9.
- Output power factor of 0.9 providing 12% more active power compared to UPS with a power factor of 0.8.
- Best-in-class online efficiency.
- Innovative battery management extending battery life (virtually ZERO ripple on batteries).
- Redundant bypass protection reducing the risk of power cuts.

**Features**
- Online double conversion mode.
- Input power factor of 0.9.
- Output power factor of 0.9 providing 12% more active power compared to UPS with a power factor of 0.8.
- Best-in-class online efficiency.
- Innovative battery management extending battery life (virtually ZERO ripple on batteries).
- Redundant bypass protection reducing the risk of power cuts.
A complete, cost-effective solution

- Online double conversion mode with an output power factor of 0.9 providing 12% more active power compare to UPS with a power factor of 0.8.
- Dual input mains allows you to manage independent power sources.
- Increased system availability placing two UPS in parallel for 1+1 redundancy.
- Internal manual bypass for easy maintenance without power interruption.
- Internal batteries providing more than 1 hour runtime.
- Multilanguage display.

Tailored to your environment

- Saves space with a reduced footprint and optimized cabinet size.
- Low noise level.
- Flexible battery solutions.
- Compact, lightweight and easy to install.
- Extended battery life and performance with exclusive EBS battery charging management for increased battery life.

Technical data

<table>
<thead>
<tr>
<th>Power (kV)</th>
<th>15</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>60</th>
<th>80</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPS In/Out</td>
<td>15 30</td>
<td>27 36</td>
<td>54 72</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parallel configuration</td>
<td>3A</td>
<td>3A</td>
<td>3A</td>
<td>3A</td>
<td>3A</td>
<td>3A</td>
</tr>
<tr>
<td>Rating voltage</td>
<td>480 V</td>
<td>50 Hz</td>
<td>10%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency tolerance</td>
<td>±2% (configurable from 1% to 8%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overload</td>
<td>150% for 10 minutes, 150% for 1 minute</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cool factor</td>
<td>3.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bypass</td>
<td>rated input voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Voltage tolerance | ±5% (configurable from 15% to 29%)
| Frequency tolerance | ±2% (configurable for sensor compatibility) |
| EFFICIENCY | 94.5% up to 30% of load |
| EMERGENCY | Operating ambient temperature | from 0 °C up to +45°C (from 15 °C to 25 °C for maximum battery life) |
| Relative humidity | 5% - 95% without condensation |
| Maximum altitude | 1000 m without cooling fan, 3000 m |
| Acoustic level | ≤32 dBA |
| UPS CABINET | Dimensions | 444 x 785 x 320/330/340 mm |
| Weight | 165 kg | 175 kg | 355 kg | 355 kg | 388 kg | 388 kg |
| Degree of protection | IP21 |
| Colours | RAL 7012 |
| STANDARDS | Safety | EN 62040-1, EN 62040-3, EN 62040-1.2 |
| EMC | EN 62040-3, AS/NZS 4630.1.2 |
| Performance | EN 62040-3, AS/NZS 4630.3 |
| Product declaration | CE, ROHS, ECO |

Remote monitoring service

- LINK-UPS, remote monitoring service that connects your UPS to your Critical Power specialist 24/7.

UPS and internal batteries

<table>
<thead>
<tr>
<th>UPS In/Out</th>
<th>15</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>60</th>
<th>80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back-up time (minutes) (1)</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>BC 115</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC 120</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC 155</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC 320</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC 350</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC 340</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC 340</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC 115</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC 120</td>
<td>15</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC 155</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC 320</td>
<td>15</td>
<td></td>
<td></td>
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<tr>
<td>BC 350</td>
<td>15</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>BC 340</td>
<td>15</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC 115</td>
<td>15</td>
<td></td>
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<tr>
<td>BC 120</td>
<td>15</td>
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<tr>
<td>BC 155</td>
<td>15</td>
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<td></td>
<td></td>
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<tr>
<td>BC 320</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC 350</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC 340</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cabinet type</td>
<td>“M”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cabinet type</td>
<td>“T”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cabinet type</td>
<td>“S”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The solution for

- Server rooms
- Service sector
- Infrastructure
- Healthcare sector
- Light industrial applications

Technology

- VFI “online double conversion”

Certifications

- TUV SUD

Our dedicated Expert Services for UPS

We offer services to ensure your UPS highest availability:

- Commissioning
- On-site intervention
- Preventive maintenance visits
- 24-hour call out and rapid on-site repairs
- Maintenance packages
- Training
**MASTERYS BC+**

4th generation digital native general purpose UPS from 100 to 160 kVA

### The solution for

- Commercial buildings
- Security control
- Payment systems
- Emergency services
- IT networking
- Building automation
- Smart manufacturing
- Process control systems
- Cloud service access

### Certifications

- **TUV SUD**
- **UL Listed**
- **CE Certified**

### Advantages

- Extremely reliable, robust and durable
- Completely designed and manufactured in Europe.
- Certified seismic resistance.
- Tailor-made - as standard
  - Easy configurable for retrofit in existing installations.
  - Catalogue base flexibility to meet specific needs.
  - Fast delivery time for a fully personalized solution.
- Native digital solution
  - Ready for integration in LAN and Industry 4.0 ecosystem.
  - IoT ready and remote cloud services.
  - Multiprocessor intelligent product architecture.
  - Product identification and configuration using standard QR codes.

### System features

- Dual input mains.
- Internal maintenance bypass switch.
- Input mains switch breaker.
- Output switch breaker.
- Auxiliary mains switch breaker.
- Backfeed protection: detection circuit.
- Power walk-in ramp for excellent compliance with generators.

### Standard communication features

- Graphical LCD multilingual display.
- 2 slots for communication options.
- USB port to download log file.
- Ethernet gateway for cloud services.
- Backfeed protection: detection circuit.

### Technical data

<table>
<thead>
<tr>
<th>Input [kVA]</th>
<th>100</th>
<th>120</th>
<th>160</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pn [kW]</td>
<td>90</td>
<td>108</td>
<td>144</td>
</tr>
</tbody>
</table>

- **Parallel configuration up to 6 units**
- **Rated voltage 400 V 3ph+N (2) zero input also available on demand)**
- **Frequency tolerance ±2%**
- **Rated frequency 50/60 Hz ±10%**
- **Rated voltage 3ph + N: 400 V (can be configured 380/415 V)**
- **Power factor 0.9 (according to IEC/EN 62040-3)**

#### Dimensions

<table>
<thead>
<tr>
<th>M</th>
<th>800 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>805 mm</td>
</tr>
<tr>
<td>H</td>
<td>1400 mm</td>
</tr>
</tbody>
</table>

**Weight:** 220 kg to 340 kg

**Degree of protection:** IP20

**Installation:** Metalized Chip E130H

**Standards**

- **Safety:** IEC 60413-1: 60413-1.1: IEC 60413-1.2
- **Performance:** IEC 62040-1:62040-1:1:62040-1.2
- **Environmental:** Compliant with the Seismic and Environment Regulations.

**Product declaration:** CE, CEMC (E2376)

### System options

- External battery cabinet with normal or long life VRLA batteries.
- High capacity battery charger.
- Alternative backup power technologies:
  - NIC D batteries
  - Li-Ion batteries
  - Li-Ion capacitors
- 3-phase input without neutral.
- Internal backfeed isolation device.
- Common mains coupling bars.
- TN-C grounding system.
- ACS synchronisation system.
- IP21 degree of protection.

### Communication options

- **Dry contact, RS232/485 interfaces.**
- **MODBUS RTU.**
- **MODBUS TCP.**
- **BACnet/IP interface.**
- **NET VISION: professional WEB/SNMP, ethernet interface for UPS monitoring and remote automatic shutdown.**
- **Ethernet gateway for cloud services.**

### Remote monitoring service

- **LINK-UPS, remote monitoring service which connects your UPS to your Critical Power specialist 24/7.**

### Our dedicated Expert Services for UPS

- We offer services to ensure your UPS highest availability:
  - Commissioning
  - On-site intervention
  - Preventive maintenance visits
  - 24-hour call out and rapid on-site repairs
  - Maintenance packages
  - Training

---

**General Catalogue 2019**

**General Catalogue 2019**
**DELPHYS BC**

Reliable, simple and ready-to-use power protection from 200 to 300 kVA

---

**The solution for**

- Server rooms
- Service sector
- Infrastructure
- Healthcare sector
- Light industrial applications

**Our dedicated Expert Services for UPS**

We offer services to ensure your UPS highest availability:

- Commissioning
- On-site intervention
- Preventive maintenance visits
- 24-hour call out and rapid on-site repairs
- Maintenance packages
- Training

---

**Standard electrical features**

- Dual input mains
- Integrated maintenance bypass
- Blacked protection: detection circuit
- EBS (Expert Battery System) for battery management

**Electrical options**

- External battery cabinet
- External temperature sensor
- Additional battery chargers
- Shared battery
- Galvanic isolation transformer
- Parallel kit
- ACS synchronization system

**Standard communication features**

- 2 slots for communication options

**Remote monitoring service**

- LINK-UPS, remote monitoring service that connects your UPS to your Critical Power specialist 24/7

---

**Tailored to your environment**

- Online double conversion mode with an output power factor of 0.9 providing 12% more active power compared to UPS with a power factor of 0.8
- Dual input mains allows you to manage independent power sources
- Increased system availability placing two UPS in parallel for 1+1 redundancy
- Internal manual bypass for easy maintenance without power interruption (1+1 configuration)
- Multilingual display

---

**Technical data**

<table>
<thead>
<tr>
<th></th>
<th>DELPHYS BC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input (kVA)</td>
<td>310</td>
</tr>
<tr>
<td>Input (kW)</td>
<td>180</td>
</tr>
<tr>
<td>Parallel configuration up to 6 units</td>
<td></td>
</tr>
<tr>
<td>Input voltage (V)</td>
<td>400 V 240 V</td>
</tr>
<tr>
<td>Frequency tolerance (Hz)</td>
<td>± 10 % 30±6 Hz</td>
</tr>
<tr>
<td>Output voltage (V)</td>
<td>400 V static load ±1% dynamic load in accordance with VFI-SS-111</td>
</tr>
<tr>
<td>Frequency tolerance (Hz)</td>
<td>± 2% (configurable from 1% to 8%)</td>
</tr>
<tr>
<td>Crest factor</td>
<td>3.1</td>
</tr>
<tr>
<td>BYPASS</td>
<td></td>
</tr>
<tr>
<td>Input voltage (V)</td>
<td>rated input voltage</td>
</tr>
<tr>
<td>Frequency tolerance (Hz)</td>
<td>±15% (configurable with from 10% to 20%)</td>
</tr>
<tr>
<td>Frequency tolerance (Hz)</td>
<td>± 2% (configurable for Gener set compatibility)</td>
</tr>
<tr>
<td>EFFICIENCY</td>
<td></td>
</tr>
<tr>
<td>Online mode @ 100% of load</td>
<td>up to 95%</td>
</tr>
<tr>
<td>Operating ambient temperature</td>
<td>from 0 °C up to +40°C (from 15 °C to 25 °C for maximum battery life)</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>8% - 95% without condensation</td>
</tr>
<tr>
<td>Maximum altitude</td>
<td>1500 m without derating (max. 3000 m)</td>
</tr>
<tr>
<td>Acoustic level at 1 m (ISO 3746)</td>
<td>&lt; 68 dBA</td>
</tr>
<tr>
<td>UPS Cabinet Dimensions</td>
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<td>Standards</td>
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<td>Safety</td>
<td>BDEN046-1, A02940-1.1, A02940.1.2</td>
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<tr>
<td>IEC</td>
<td>BDEN046-1, A02940-1.1, A02940.1.2</td>
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<td>Performance</td>
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<td>Product declaration</td>
<td>CE, RCM (C2274)</td>
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</table>

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**Conditions apply.**
Energy saving + Full rated power = reduced TCO

Energy Saving: high efficiency without compromise
- Offers the highest efficiency in the market using VF1 – Double Conversion Mode; the only UPS working mode that assures total load protection against all mains quality problems.
- Ultra high efficiency output independently tested and verified by an international certification organization in a wide range of load and voltage operating conditions, to have the value in the real site conditions.
- Ultra high efficiency in VF1 mode is provided by an innovative topology (3-Level technology) that has been developed for all the Green Power 2.0 UPS ranges.

Full-rated power: kW=kVA
- No power downgrading when supplying the latest generation of servers (leading or unity power factor).
- Real full power, according to IEC 62040: kW=kVA (unity power factor design) means 25% more active power available compared to legacy UPS.
- Suitable also for leading power factor loads down to 0.9 without apparent power derating.

Significant cost-saving (TCO)
- Maximum energy saving thanks to 96% efficiency in true double conversion mode: 50% saving on energy losses compared to legacy UPS gives significant savings in energy bills.
- UPS “self-paying” with energy saving.
- Energy Saver mode for global efficiency improvement on parallel systems.
- kW=kVA means maximum power available with the same UPS rating: no overdesign cost and therefore less kW=kVA.
- Upstream infrastructure cost optimization (sources and distribution), thanks to high performance IGBT rectifier.
- Battery configuration can be optimized, thanks to a very wide DC range.
- Extended battery life and performance: long life battery, very wide input voltage and frequency acceptance, without battery use.
- EBS (Expert Battery System) charging management improves battery service life.

Our dedicated Expert Services for UPS
We offer services to ensure your UPS highest availability:
- Commissioning
- On-site intervention
- Preventive maintenance visits 24/7
- On-line monitoring and repair
- Maintenance packages
- Training

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Standard electrical features
- Dual input mains.
- Internal maintenance bypass.
- Backfeed protection: detection circuit, EBS: Expert Battery System for battery management.
- Battery temperature sensor.
- PROFIbus, PROFIBUS.
- Backfeed protection: detection circuit.
- Embedded LAN interface
- Commissioning wizard.
- User-friendly multilingual interface with color graphic display.
- Additional battery chargers.
- MODBUS RTU.
- BACnet/IP interface.
- EBS (Expert Battery System) for battery management.
- Internal maintenance bypass.
- Dry-contact interface.
- Battery temperature sensor.
- LINK-UPS, remote monitoring service that connects your UPS to your Critical Power specialist 24/7.

Technical data

<table>
<thead>
<tr>
<th>Standard electrical features</th>
<th>Electrical options</th>
<th>Communication options</th>
<th>Remote monitoring service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual input mains.</td>
<td>External battery cabinet.</td>
<td>User-friendly multilingual interface with color graphic display.</td>
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<tr>
<td>Internal maintenance bypass.</td>
<td>Additional battery chargers.</td>
<td>Commissioning wizard.</td>
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<tr>
<td>Backfeed protection: detection circuit, EBS: Expert Battery System for battery management.</td>
<td>Galvanic isolation transformer.</td>
<td>2 slots for communication options.</td>
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<tr>
<td>Battery temperature sensor.</td>
<td>Parallel kit.</td>
<td>MODBUS RTU.</td>
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<tr>
<td>PROFIbus, PROFIBUS.</td>
<td>ACS-synchronization system.</td>
<td>Embedded LAN interface (web pages, email).</td>
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<td>LINK-UPS, remote monitoring service that connects your UPS to your Critical Power specialist 24/7.</td>
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</tbody>
</table>
Performance beyond all expectations
- Performance certified by an independent body.
- Designed to manage Lithium-ion backup storage.
- Modern ergonomics combined with ergonomics.
- Large 7" touch screen display facilitates system control and usage.

Energy Saving: high efficiency without compromise
- Offers the highest efficiency on the market using a VFI - Double Conversion Mode, the only UPS working mode to ensure a total load protection from any mains quality issues.
- Fast Return on Investment: UPS "self-paying" with energy saving.
- No overdesign cost thanks to its reduced €/kW ratio.

Full-rated power: kW=kVA
- No power downgrade when supplying the latest generation of servers (leading or unity power factor).
- True full active power, according to IEC 62040.
- Full performance up to 40 °C without derating.

 Extremely reliable, robust and durable
- Completely designed and manufactured in Europe.
- Best in class and officially attested:
  - MTBFbr = 300,000 hours.
  - MTBFbr & = 10,000,000 hours.
- Certified seismic resistance.
- Life extension service program doubles life expectancy.

Tailor-made - as standard
- Easy configurable for retrofit in existing installations.
- Catalogue base flexibility to meet specific needs.
- Fast delivery time for a fully personalized solution.

Native digital solution
- Ready for integration in LAN and Industry 4.0 ecosystem.
- IoT ready and remote cloud services.
- Multiprocessor intelligent product architecture.
- Product identification and configuration using standard QR codes.

Advantages
- Augmented Reality technology.
- Guided workflow on your smartphone.
- Verification and validation by the Socomec Service Center.

The solution for
- Mission Critical
- Small and medium data centres
- IT infrastructure
- E-Medical
- Medical devices
- Control rooms
- Smart manufacturing
- Edge computing
- IoT systems
- Cloud service access

A tutoring app for a simplified installation
- Integrates with phone applications
- Designed to guide your smartphone
- Verification and validation by the Socomec Service Center

System features
- Dual input masts.
- Internal maintenance bypass switch.
- Input mains switch breaker.
- Output switch breaker.
- Auxiliary mains switch breaker.
- Backfed protection: detection circuit.
- Power walk-in ramp for excellent compliance with generators.
- Common or shared battery for N+1 configuration.

Technical data
- Full-rated power: kW=kVA
- Input/output: 3/3
- Parallel configuration up to 6 units
- Input voltage: 380 V ± 15% (configurable from 10% to 20%)
- Frequency tolerance ± 2% (configurable for GenSet compatibility)
- Rated frequency 50/60 Hz ± 10%
- Voltage tolerance 240 V to 480 V
- Power factor 1 (according to IEC/EN 62040-3)
- Power factor 1 (according to IEC/EN 62040-3)
- Efficiency (VFI-SUD verified) ± 1% (configurable from 10% to 20%)
- Noise converter mode: up to 95.5%
- Always on mode: up to 99%
- Operating ambient temperature from 0 °C to +40 °C (from 15 °C to 25 °C for maximum battery life)
- Relative humidity 90% - 95% without condensation
- Maximum altitude 1,000 m (without derating max. 3,000 m)
- AC output level: 1 (iso 3661)
- UPS, CARSET
- Dimensions: W 680 mm, D 855 mm, H 1400 mm
- Weight: 174 kg, 180 kg, 228 kg, 240 kg, 350 kg
- Degree of protection IP30
- Colours: RAL 7016

Standards
- Safety: IEC 62040-1, IEC 62040-3, AS 62040.1.2
- Performance: IEC62040-3, AS 62040.3
- Environmental: full compliance with the RHi EN 897
- Seismic compliance: on demand, in accordance with the Uniform Building Code USA 907 Zone 4
- Product declaration: CE, RCM (E2376)
- Communication options:
  - Modbus RTU, MODBUS TCP
  - BACnet IP interface.
  - NETVISION: professional WEB/SNMP, ethernet interface for UPS monitoring and remote automatic shutdown.
  - Ethernet gateway for cloud services.

Remote monitoring service
- LINK-UPS, remote monitoring service which connects your UPS to your Critical Power specialist 24/7.

Our dedicated Expert Services for UPS
- We offer services to ensure your UPS highest availability:
  - Commissioning
  - On-site intervention
  - Preventive maintenance visits
  - 24-7 on-call and rapid on-site repairs
  - Maintenance packages
  - Training
Energy saving + Full rated power = reduced TCO

Energy saving: high efficiency without compromise

- Offers the highest efficiency in the market using VFI - Double Conversion Mode, the only UPS working mode that assures total load protection against all mains quality problems.
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Significant cost-saving (TCO)

- Maximum energy saving thanks to 96% efficiency in true double conversion mode: 50% saving on energy losses compared to legacy UPS gives significant savings in energy bill.
- Up to 99% efficiency with FAST ECOMODE.
- UPS “self-paying” with energy saving.
- Energy Saver mode for global efficiency improvement on parallel systems.
- kW = kVA means maximum power available with the same UPS rating; no oversize cost and therefore less C & W.
- Upstream infrastructure cost optimization (sources and distribution), thanks to high performance KIGT rectifier.
- Extended battery life and performance: - long life battery;
  - very wide input voltage and frequency acceptance, without battery use.
- EBS (Expert Battery System) charging management improves battery service life.
- BCR (Battery Capacity Re-injection) removes the constraints of using an additional load bank for the battery discharge test; it consists in re-injecting the energy stored in the batteries to other applications.

Our dedicated Expert Services for UPS

- We offer services to ensure your UPS highest availability:
  - Commissioning
  - On-site intervention
  - Preventive maintenance visits
  - 24-hour call out and rapid on-site repairs
  - Maintenance packages
  - Training

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Parallel systems

To fulfill the most demanding needs for power supply availability, flexibility and the installation to be upgraded.

- Modular parallel configurations up to 4 MW, development without constraint.
- Distributed or centralized bypass flexibility to ensure a perfect compatibility with the electrical infrastructure.
- Twin-channel architecture with Static Transfer Systems.
- Distributed or shared battery for energy storage optimization on parallel systems.

Standard electrical features

- Integrated maintenance bypass for single unit (and 1+1 system).
- Backfeed protection: detection circuit.
- EBS (Expert Battery System) for battery management.
- Redundant cooling.
- Battery temperature sensor.

Technical data

<table>
<thead>
<tr>
<th>Sn [kVA]</th>
<th>160</th>
<th>200</th>
<th>250</th>
<th>320</th>
<th>400</th>
<th>500</th>
<th>600</th>
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<tbody>
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<td>200</td>
<td>250</td>
<td>320</td>
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<td>400 V / Ph</td>
<td>400 V / Ph</td>
<td>400 V / Ph</td>
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</tr>
<tr>
<td>Voltage tolerance</td>
<td>±15% (configurable from 10% to 20%)</td>
<td>±15% (configurable from 10% to 20%)</td>
<td>±15% (configurable from 10% to 20%)</td>
<td>±15% (configurable from 10% to 20%)</td>
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<td>±15% (configurable from 10% to 20%)</td>
<td>±15% (configurable from 10% to 20%)</td>
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<tr>
<td>Frequency tolerance</td>
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<td>± 3 Hz</td>
<td>± 3 Hz</td>
<td>± 3 Hz</td>
<td>± 3 Hz</td>
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<td>± 3 Hz</td>
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<td>1 (according to IEC 62040-3)</td>
<td>1 (according to IEC 62040-3)</td>
<td>1 (according to IEC 62040-3)</td>
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<td>1 (according to IEC 62040-3)</td>
<td>1 (according to IEC 62040-3)</td>
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<td>Power factor / THDI</td>
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<td>≥ 0.9 / &lt; 2.5%</td>
<td>≥ 0.9 / &lt; 2.5%</td>
<td>≥ 0.9 / &lt; 2.5%</td>
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<td>≥ 0.9 / &lt; 2.5%</td>
<td>≥ 0.9 / &lt; 2.5%</td>
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<tr>
<td>Short-circuit current</td>
<td>3.4 x In</td>
<td>3.4 x In</td>
<td>3.4 x In</td>
<td>3.4 x In</td>
<td>3.4 x In</td>
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<tr>
<td>Frequency tolerance</td>
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<td>± 2% (configurable for GenSet compatibility)</td>
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<td>Total output voltage distortion</td>
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<td>THD &lt; 1.5%</td>
<td>THD &lt; 1.5%</td>
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<tr>
<td>Total output voltage distortion non-linear load IEC 61000-4-7</td>
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<td>THD &lt; 3%</td>
<td>THD &lt; 3%</td>
<td>THD &lt; 3%</td>
<td>THD &lt; 3%</td>
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<td>THD &lt; 3%</td>
<td>THD &lt; 3%</td>
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<tr>
<td>Short-circuit current</td>
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<td>up to 3.4 In</td>
<td>up to 3.4 In</td>
<td>up to 3.4 In</td>
<td>up to 3.4 In</td>
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<td>up to 3.4 In</td>
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<tr>
<td>INPUT</td>
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<td>± 15% (configurable from 10% to 20%)</td>
<td>± 15% (configurable from 10% to 20%)</td>
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<tr>
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<tr>
<td>Voltage tolerance</td>
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<tr>
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</table>

Electrical options

- Separated or common input mains.
- External maintenance bypass.
- Extended battery charger capability.
- Shared battery.
- Compatible with different battery technologies (e.g. Li-Ion, Ni-CD...).
- Galvanic isolation transformer.
- Backfeed isolation device.
- ACS (Centralized UPS).
- ECR (Battery Capacity Re-injection).
- FAST ECOMODE.

Communication options

- User-friendly multilingual interface with graphic display.
- 2 slots for communication options.
- Ethernet connection (WEB/SNMP/email).
- USB port for event log access.

Remote monitoring service

- LINK-UPS, remote monitoring service that connects your UPS to your Critical Power specialist 24/7.

DELPHYS Xtend GP
Real hot-scalable UPS system
Green Power 2.0 range up to 2.4 MVA/MW

DELPHYS XTEND GP combines all the benefits of the Green Power 2.0 technology and the flexibility of a modular system and provides easy adaptation to evolving requirements, without impacting the surrounding electrical infrastructure. DELPHYS XTEND GP is a real scalable UPS system designed to provide power scalability that can be built up with power blocks to extend the system according to the maximum power requirement.

Real hot-scalable solution
- Reliable power that can be increased when needed.
- Load fully protected in VFI mode during system extensions and maintenance.
- Prevented system providing quick and safe power scalability.

Total system adaptability
- Many disposition possibilities.
- Distributed or centralised static bypass.
- Shared or distributed batteries.
- AC and DC power connections flexibility.

Optimized capital employed
- Lower initial and operating costs.
- No modification to the star’s electrical infrastructure during power upgrading.
- Optimized maintenance expenditure.
- BCR (Battery Capacity Re-injection), innovative battery discharge test.

Full set of services
- Preventive maintenance.
- 24/7 Hot Line and remote monitoring.
- Quick response time to site and availability of new modules.
- Cabling & docking.
- OPEX-based costing models.

Energy performance
Based on DELPHYS GP 200 kW, the system has all the advantages of the Green Power 2.0:
- Minimized energy consumption and cooling costs in VFI mode.
- Uninterrupted power factor provides the best €/kW ratio.
- Performance attested by Bureau Veritas.

Flexible UPS architecture
- Scalable power and energy storage capability.
- Distributed or centralised static bypass.
- Common or separated rectifier and bypass mains.
- Can be connected to shared or distributed batteries for energy storage optimisation.
- Compatible with different energy storage technologies.
- Systems parallellisation up to 2.4 MW.

Standard electrical features
- Integrated maintenance bypass.
- Backfed protection: detection circuit.
- EBS (Expert Battery System) for battery management.
- Battery temperature sensor.

Electrical options
- Extended battery charger capability.
- Compatible with different battery technologies (e.g. Li-ion, Ni-Cd...).
- ACS synchronisation system.
- BCR (Battery Capacity Re-injection).
- FAST ECOMODE.

Remote monitoring service
- LINK-UPS, remote monitoring service that connects your UPS to your Critical Power specialist 24/7.

Standard communication features
- User-friendly multilingual interface with graphic display.
- 2 slots for communication options.
- Ethernet connection (Web/SNMP/email).
- USB port for event log access.

Communication options
- Advanced server shutdown options for stand-alone and virtual servers.
- AOC interface (configurable voltage free contacts).
- MODBUS TCP.
- MODBUS RTU.
- BACnet/IP interface.

Advantages

DELPHYS Xtend GP power scalability is provided by Xmodule power blocks docked onto prewired Xbay docks. The installation and the positioning are easy with secured cabling & docking. The connection onto prewired Xbay docks. The installation and positioning are easy with secured cabling & docking.

Xmodule - designed to save costs
- Optimized capital employed.
- Lower initial and operating costs.
- No modification to the star’s electrical infrastructure during power upgrading.
- Optimized maintenance expenditure.
- BCR (Battery Capacity Re-injection), innovative battery discharge test.

DELPHYS XTEND GP is a real scalable UPS system designed to provide power scalability that can be built up with power blocks to extend the system according to the maximum power requirement.

The solution for
- Large data centers.
- Telecommunications.
- Healthcare sector.
- Service sector.
- Infrastructure.
- Processes.
- Industrial applications.

The Xmodule is designed specifically for DELPHYS XTEND GP. It is compatible with different battery technologies.

Xmodule - Designed to Save Costs
- Optimized capital employed.
- Lower initial and operating costs.
- No modification to the star’s electrical infrastructure during power upgrading.
- Optimized maintenance expenditure.
- BCR (Battery Capacity Re-injection), innovative battery discharge test.

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- 24/7 Hot Line and remote monitoring.
- Quick response time to site and availability of new modules.
- Cabling & docking.
- OPEX-based costing models.

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- Scalable power and energy storage capability.
- Distributed or centralised static bypass.
- Common or separated rectifier and bypass mains.
- Can be connected to shared or distributed batteries for energy storage optimisation.
- Compatible with different energy storage technologies.
- Systems parallellisation up to 2.4 MW.

Standard electrical features
- Integrated maintenance bypass.
- Backfed protection: detection circuit.
- EBS (Expert Battery System) for battery management.
- Battery temperature sensor.

Electrical options
- Extended battery charger capability.
- Compatible with different battery technologies (e.g. Li-ion, Ni-Cd...).
- ACS synchronisation system.
- BCR (Battery Capacity Re-injection).
- FAST ECOMODE.

Remote monitoring service
- LINK-UPS, remote monitoring service that connects your UPS to your Critical Power specialist 24/7.

Standard communication features
- User-friendly multilingual interface with graphic display.
- 2 slots for communication options.
- Ethernet connection (Web/SNMP/email).
- USB port for event log access.

Communication options
- Advanced server shutdown options for stand-alone and virtual servers.
- AOC interface (configurable voltage free contacts).
- MODBUS TCP.
- MODBUS RTU.
- BACnet/IP interface.

Advantages

Real hot-scalable solution
- Reliable power that can be increased when needed.
- Load fully protected in VFI mode during system extensions and maintenance.
- Prevented system providing quick and safe power scalability.

Total system adaptability
- Many disposition possibilities.
- Distributed or centralised static bypass.
- Shared or distributed batteries.
- AC and DC power connections flexibility.

Optimized capital employed
- Lower initial and operating costs.
- No modification to the star’s electrical infrastructure during power upgrading.
- Optimized maintenance expenditure.
- BCR (Battery Capacity Re-injection), innovative battery discharge test.

Full set of services
- Preventive maintenance.
- 24/7 Hot Line and remote monitoring.
- Quick response time to site and availability of new modules.
- Cabling & docking.
- OPEX-based costing models.
An innovative way to provide scalability

**AC CABINET**
System input and output:
- General input(s) and output power connection.
- Centralised static bypass, if required.
- System input(s) and output power switches.
- Maintenance manual bypass switch(s).

**DC CABINET**
- Prewired coupling for energy storage.
- Energy storage power and control cable connections.
- Connection of up to 6 batteries per system, with dedicated coupling switches.

(1) Please consult us for systems above 1200 kVA/kW (systems in parallel).

**Xbay**
- Easy power block docking.
- Each Xbay dock is prewired to AC and DC cabinets.
- Ready for Xmodule power and control cables connection.
- Includes individual switches for Xmodule AC coupling.
- Hot-plug parallel bus connection.
- The number of Xbay docks depends on the final power required (up to 6 per system).

**Xmodule**
- Hot-scalable 200 kVA/kW power block.
- Power block ensuring load protection and battery management.
- Up to 6 Xmodule power blocks per system.
- Easy positioning.
- Dedicated switches for easy power block servicing.
- Secured installation both for operators and the application.

**Real hot-scalable solution**
- Quick and safe scalability to meet evolving demands for energy performance.
- Reliable power that can be increased when needed to rapidly meet changing capacity demands.
- Easy adaptation to site evolutions and constraints thanks to movable blocks.
- Prewired system for additional Xmodule connection and coupling within the system.
- Standard tools required to place and connect the power block.
- Online double conversion mode for load protection during system extensions or maintenance.

**A complete solution**
- Simplifies the In / Out switchboard. The system integrates localised coupling capability.
- Fast and cost-effective scalability as there is no need to connect the additional Xmodule power block(s) to any upstream or downstream panel.
- Keeps the critical applications protected in online double conversion mode during power extension.
- Possibility to parallele systems up to 2400 kVA/kW (12 Xmodules).

**Adaptable disposition**
The system disposition and physical connection is easily adapted to your plant:
- The number of Xbay docks can be 6 or fewer per system, depending on the rated power of the infrastructure.
- General input/output AC connections available for top or bottom entry.
- Back-up storage DC connection available for top or bottom entry.

**Innovative battery discharge test**
Delpheys Xtend GP allows a periodical complete and safe battery discharge test without using a resistive load for the back-up time or availability check.

Battery Capacity Re-injection allows significant cost savings and reduces the TCO:
- No need to rent or buy load banks.
- Simplified infrastructure, as there are not any dedicated test bus bars.
- No wasted energy because it is re-used to supply other UPS or applications.
- Less time needed to perform the test as it is easy to programme.

The test is performed at a constant rate of power (full power or partial load). Each individual Xmodule power block is tested separately and feeds back the energy stored in the battery. The energy to be fed back upstream through the rectifier will correspond to the difference between the discharged power and the load consumption.
MODULYS GP
Unique, fully modular and redundant solution
Green Power 2.0 range from 25 to 600 kVA/kW

The solution for
- Computer rooms
- Data centres
- Banks
- Healthcare facilities
- Insurance
- Telecom

Advantages
- Ensures absolute business continuity
- Aligns capacity to business demand
- Optimises costs over the full life cycle

With its flexible modularity providing seamless and risk-free power scalability up to 600 kW, the MODULYS GP range is the ideal solution for unscheduled site upgrades or incremental power evolutions. The installed power can be increased up to 600 kW by adding hot-swap plug-in power modules for incremental steps of 25 kW. Designed with no single point of failure, the MODULYS GP offers all the advantages of the Green Power 2.0 technology.

Fully modular system
- Plug-in power module.
- Plug-in battery module.
- Plug-in auxiliary mains bypass module.
- Top or bottom connection.
- Top-air exhaust module.

‘Forever Young’ concept
- Exclusively life cycle extension programme.
- Eliminates end-of-life critically.
- Based on an electronics-free cabinet + a set of plug-in parts.
- Module compatibility guaranteed for 20+ years.
- Allows for the implementation of future module technology.

Totally redundant design
- N+1, N+N redundancy level.
- Designed for no single point of failure.
- No centralised parallel control.
- Totally independent power modules.
- Redundant parallel bus connection (ring configuration).

Enhanced serviceability performance
- Power module automatic firmware alignment.
- Fast & safe maintenance based on hot-swap parts (power modules, auxiliary mains bypass, electronic boards).
- Battery can be hot-swapped without shutting down the connected equipment.
- Ready for concurrent maintenance.

Standard electrical features
- Dual input mains.
- Internal maintenance auxiliary mains bypass.
- Backfeed protection: detection circuit.
- EBS (Expert Battery System) for battery management.
- Battery temperature sensor.

Electrical options
- External battery cabinet.
- High capacity battery chargers.
- ACS synchronisation system.
- Internal backfeed isolation device.

Standard communication features
- User-friendly multilingual interface with colour graphic display.
- Commissioning wizard.
- 2 slots for communication options.

Communication options
- Dry contact, RS232/485 interfaces.
- MODBUS RTU.
- MODBUS TCP.
- BACnet/IP interface.
- NET VISION: professional WEB/SNMP interface for UPS monitoring and shutdown management of several operating systems.

Remote monitoring service
- LINK-UPS, remote monitoring service that connects your UPS to your Critical Power specialist 24/7.

Hybrid bypass architecture

<table>
<thead>
<tr>
<th>Technical data</th>
<th>MODULYS GP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power (Pn)</td>
<td>25 to 600 kW</td>
</tr>
<tr>
<td>Voltage</td>
<td>±15% (configurable with from 10% to 20%)</td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60 Hz ±10%</td>
</tr>
<tr>
<td>Power factor</td>
<td>&gt; 0.98 / &lt; 1.5%</td>
</tr>
<tr>
<td>Efficiency</td>
<td>&gt; 96%</td>
</tr>
<tr>
<td>Overload</td>
<td>125% for 10 minutes, 150% for 1 minute</td>
</tr>
<tr>
<td>Short-circuit current</td>
<td>up to 3 x In</td>
</tr>
<tr>
<td>Voltage distortion</td>
<td>&lt; 3% (non-linear load)</td>
</tr>
<tr>
<td>Voltage (rated output)</td>
<td>380/400/415V ±1%</td>
</tr>
<tr>
<td>Power factor (THD)</td>
<td>&lt; 1%</td>
</tr>
<tr>
<td>Input/output</td>
<td>3/3</td>
</tr>
<tr>
<td>Redundant configuration</td>
<td>N+x</td>
</tr>
<tr>
<td>Bypass</td>
<td>3/3</td>
</tr>
<tr>
<td>Weight (empty cabinet)</td>
<td>210 kg</td>
</tr>
<tr>
<td>Height</td>
<td>1975 mm</td>
</tr>
<tr>
<td>Depth</td>
<td>890 mm</td>
</tr>
<tr>
<td>Power modules</td>
<td>1 to 8</td>
</tr>
<tr>
<td>Number of power modules</td>
<td>1 to 24</td>
</tr>
<tr>
<td>Power (Sn)</td>
<td>25 to 600 kVA</td>
</tr>
<tr>
<td>Voltage</td>
<td>380/400/415 V ±1%</td>
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</tr>
<tr>
<td>Weight (empty cabinet)</td>
<td>3 x 210 kg</td>
</tr>
<tr>
<td>Height</td>
<td>2610 mm</td>
</tr>
<tr>
<td>Depth</td>
<td>780 kg</td>
</tr>
</tbody>
</table>

Green Power 2.0 MODULYS GP efficiency & performance
- Green Power 2.0 MODULYS GP is certified by TÜV SÜD
- Green Power 2.0 MODULYS GP aligns capacity to business demand
- Green Power 2.0 MODULYS GP optimises costs over the full life cycle
- Green Power 2.0 MODULYS GP enhances serviceability
- Green Power 2.0 MODULYS GP eliminates end-of-life criticality
- Green Power 2.0 MODULYS GP prepares for Li-Ion battery

Our dedicated Expert Services for UPS
We offer services to ensure your UPS highest availability:
- Commissioning
- On-site intervention
- Preventive maintenance visits
- 24-hour call out and rapid on-site repairs
- Maintenance packages
- Training

Image: Green Power 2.0 MODULYS GPrange is the ideal solution for unscheduled site upgrades or incremental power evolutions. The installed power can be increased up to 600 kW by adding hot-swap plug-in power modules for incremental steps of 25 kW. Designed with no single point of failure, the MODULYS GP offers all the advantages of the Green Power 2.0 technology.

Image: Totally redundant design of the MODULYS GP allows for plug-in power modules, plug-in battery modules, plug-in auxiliary mains bypass modules, top or bottom connection, and top-air exhaust module. Designed with no single point of failure, the MODULYS GP offers all the advantages of the Green Power 2.0 technology.

Image: Standard electrical features of the MODULYS GP include dual input mains, internal maintenance auxiliary mains bypass, backfeed protection, EBS (Expert Battery System) for battery management, and battery temperature sensor. Electrical options include external battery cabinet, high capacity battery chargers, ACS synchronisation system, and internal backfeed isolation device.

Image: Standard communication features of the MODULYS GP include a user-friendly multilingual interface with colour graphic display, commissioning wizard, and 2 slots for communication options. Communication options include dry contact, RS232/485 interfaces, MODBUS RTU, MODBUS TCP, BACnet/IP interface, and NET VISION: professional WEB/SNMP interface for UPS monitoring and shutdown management of several operating systems.

Image: Remote monitoring service of the MODULYS GP includes LINK-UPS, a remote monitoring service that connects your UPS to your Critical Power specialist 24/7.

Image: Hybrid bypass architecture of the MODULYS GP includes a ring configuration for maximum capacity utilisation (100%).
The benefit of a fully modular system

Pay as you need
- No prior expenditure for unpredictable future extensions in power and back-up time.
- Space-saving thanks to reduced footprint and front access.
- Eliminates installation rework costs when new capacity is required from IT physical infrastructure.
- No risk of design oversizing due to project data uncertainty.

Everything front-access
- Connections, switches, manual bypass, auxiliary mains static bypass, power modules and all the electric parts have front-access.
- Total footprint not increased as rear extra clearance for maintenance is not needed.
- Easy, quick, comfortable, safe and risk-free installation and maintenance.
- More reliable system.

The benefit of a totally redundant design

Total resilience
- Electronics-free (failure-free) cabinet.
- Totally independent and self-sufficient modules.
- Real module selective disconnection (automatic inverter bypass with galvanic separation).
- No centralised control for parallel and load sharing management.
- Totally segregated, fully sized and centralised auxiliary mains bypass.
- Configurable N+1 to N+x redundancy (power & battery).
- No single point of failure.
- Redundant parallel bus connection (ring configuration).

Optimum reliability
- Power module designed for superior robustness proved by an independent body (MTBF > 1,000,000 hr).
- Infrad bypass architecture with distributed module’s bypass and centralised mains bypass for ultimate reliability and robustness.
- Highly robust auxiliary mains bypass (MTBF > 10,000,000 hr).
- Acid leak-proof modular battery box.
- Maximum availability.
- Fast recovery of lost redundancy thanks to minimum MTTR (Mean Time To Repair).
- No risk of downtime during power upgrading and maintenance.
- No risk of failure propagation.

Cost-effective redundancy
- No need to duplicate the system hardware to get redundancy.
- Redundancy achievable simply by adding one more power and battery module.
- Redundancy can be easily combined with power scalability.

A flexible modular UPS system

Fully integrated solution
- Power system cabinets + coupling cabinet + base plates.
- It allows a complete, simple and very reliable installation, with unique IN/OUT and fully sized manual bypass.
- Innovative base plates simplify the installation and allow a tidy and segregated cabling for higher system reliability.

It allows the creation of a system when:
- an external coupling cabinet is already present (i.e. in case of replacement of an existing UPS).
- a coupling cabinet with a special configuration is required and it has to be developed specifically.
- the UPS system cabinets cannot be installed side-by-side.

Combining system
- Pre-engineered interconnection cables (option).
- Cabling mask (option).
- Hot-swap plug in power module.
- Simplified cable positioning and risk-free connections.

Fully integrated solution: easy and safe installation

1. Simplified cable positioning and risk-free connections.
2. Safe, reliable and time-saving cabling management.
3. Innovative base plates simplify the installation.
4. Easy cabling for a tidy and reliable solution.
5. Cabinets are easy to move (no pallet truck required), position and assemble.

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- Connections, switches, manual bypass, auxiliary mains static bypass, power modules and all the electric parts have front-access.
- Total footprint not increased as rear extra clearance for maintenance is not needed.
- Easy, quick, comfortable, safe and risk-free installation and maintenance.
- More reliable system.
MODULYS GP protects critical loads in all conditions, including power upgrading and maintenance procedures.

- No risk of human error and downtime.
- Long-Life batteries available as standard.
- It also keeps the system open for the implementation of future upgrades.
- When a new power module is plugged in, the system checks what firmware version is embedded and if it is different automatically aligns it to the correct version.
- It is also possible to upgrade the global firmware without switching to bypass to keep the load protected on inverter mode.
- MODULYS GP allows you to increase power scalability and redundancy while keeping the load protected on inverter mode simply by plugging in a new power module and waiting for its automatic self-configuration, without any human intervention.
- Designed for short back-up time.
- Designed for long back-up times.
- MODULYS GP excels not only in efficiency, flexibility, capacity management and sustainability; five aspects that are crucial for optimum performance.
- It employs an exclusive concept called ‘Forever Young’ which allows the life-cycle extension of MODULYS GP and eliminates the criticality of system end-of-life.
- It also keeps the system open for the implementation of future technology improvements without modifying the infrastructure.
- The ‘Forever Young’ concept:
  - It is based on electronics-free (failure-free) cabinets where the components that are subject to ageing are all plug-in and therefore can be replaced before they start ageing.
  - Allows life-cycle extension via periodic replacement of power modules and battery strings.
  - Assures power modules and spare part compatibility and availability for more than 20 years.

- Seamless and risk-free scalability & upgrading
- No need to modify the infrastructure.
- Reduces the total cost of ownership (TCO).
- MODULYS GP offers modular solutions to meet all your requirements for back-up times (whether a few minutes or several hours) without compromising flexibility and scalability.
- Internal hot swap battery
- Designed for short back-up time.
- Long-Life batteries available as standard.
- Compact solution with a small footprint.
- Modular hot-swap battery cabinets
- Designed for medium and long back-up times.
- Long-Life batteries available as standard.
- Vertical and horizontal modularity ensuring flexible back-up times.
- Modular battery cabinet
- Designed for long back-up times.
- Long-Life batteries available as standard.
- Horizontal modularity ensuring flexible back-up times.

**Power module automatic firmware alignment**
- Even the power module firmware alignment is totally risk-free.
- No need to modify the infrastructure.
- Reduces the total cost of ownership (TCO).
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  - Assures power modules and spare part compatibility and availability for more than 20 years.

**Independent Battery string switch and protection**
- Independent battery string switch and protection for each battery box.
- Automatic procedure for a risk-free firmware upgrade.
- Even the power module firmware alignment is totally risk-free.
MODULYS RM GP
Three-phase UPS
Green Power 2.0 range up to 4 x 25 kW

The benefit of a system designed for 19” rack integration

Easy to integrate
- Specifically designed for integration in 19” standard rack cabinets.
- Adjustable rails and mounting accessories.
- High power density (>6 kW/U).
- Low weight for easy integration.
- Pre-cabled system for simplified connections.
- Flexible cabling management for top, bottom and mixed top / bottom entry cable.
- Integrated cables organiser for tidy connections.
- Low power dissipation (<40 W per supplied kW).

No-risk integration
- Assured compatibility with any 19” standard rack cabinet.
- Pre-engineered and lab-tested parts assuring total system reliability.
- Automatic self-configuration power modules.
- No risk of design oversize due to project data uncertainty thanks to power module scalability.

Easy to customise
- Complete set of pre-engineered and pre-tested parts to meet any customer need:
  - modular Power Modules,
  - special power modules with extra battery charger for extremely long BUT,
  - plug-in J-BUS communication board for BMS integration,
  - plug-in SNMP board for UPS monitoring and shutdown management,
  - plug-in programmable dry-contact board,
  - environmental sensor,
  - blank panels (covers for empty slots),
  - rack-mounted battery modules,
  - external battery cabinet,
  - isolation transformer,
  - bypass redundant cooling.

Easy to manage
- Full documentation package including schematics, integration instructions, technical sheets, etc.
- Factory-set configurations for easy model selection.
- Full set of pre-engineered options for easy product customisation.

Overall cost optimisation
- Compact sub-rack enclosure saving valuable cabinet space.
- 2 sub-rack enclosure models for optimum sizing.
- Best-in-class 6.5 kW ratio thanks to high power density and PF=1.
- Cost-optimised solution for minimum initial investment.
- Plug & Play and self-configuration power modules for easy and time saving system set up.
- Pre-engineered and lab-tested parts for easy and time saving customisation.
- Repeatable and standardised architecture for time saving design and know-how capitalisation.

Simplified logistics
- Fewer standardised parts for easy ordering.
- Parts always in stock for fast procurement.
- Fewer parts covering a wide range of configurations, power, back-up time and options.
- Once integrated in the 19” rack cabinet, MODULYS RM GP can be safely shipped with the power modules plugged in.

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- Cost-optimised solution for minimum initial investment.
- Plug & Play and self-configuration power modules for easy and time saving system set up.
- Pre-engineered and lab-tested parts for easy and time saving customisation.
- Repeatable and standardised architecture for time saving design and know-how capitalisation.

Simplified logistics
- Fewer standardised parts for easy ordering.
- Parts always in stock for fast procurement.
- Fewer parts covering a wide range of configurations, power, back-up time and options.
- Once integrated in the 19” rack cabinet, MODULYS RM GP can be safely shipped with the power modules plugged in.

Example of integration (3 x 25 kW):
Only 15 U of rack space occupied: space-saving design leaving free space for other rack-mounted devices. One empty slot in the MODULYS RM GP sub-rack remains available for power upgrade or redundancy.
**MASTERYS IP+**

Robust, highly reliable protection for harsh environments from 10 to 80 kVA

**Certifications**
- Designed for the most demanding applications
  - Designed to protect industrial processes
  - A compact solution with isolation transformer and integrated batteries
  - Robust enclosure (2 mm thick heavy steel structure)
  - Floor anchoring (to prevent tilting)
  - Standard IEC 336 protection degree
  - Dust and water splash resistant enclosure (IP52) with easy replaceable dust filters (option).
  - Operation at temperature up to 50 °C.
  - Wide input voltage tolerance from -40 % up to +100 % non-linear loads.
- Easy integration into industrial networks
  - Input power factor > 0.99 and input current harmonic distortion < 3% thanks to IGBT rectifier.
  - Compatible with Open Vented Lead Acid, Valve Regulated Lead Acid (VRLA) and Ni-Cad batteries.
  - User-friendly multilingual interface with graphic display.
  - Flexible communication boards for every industrial communication need: dry contacts, MODBUS, PROFBUS, etc.
  - Fully compatible with generator sets.
  - K-rated galvanic isolation transformer embedded.
  - Adaptation to typical industrial voltages (input and output).

**Advantages**
- Designed for industrial processes
- Services
- Medical

**Technical data**
- **Masterys IP+ 15-30**
  - Rated capacity: 15 kVA - 30 kVA
  - Voltage tolerance: ±20% (remote control)
  - Frequency tolerance: ±10%

**For industrial loads**
- 100% non-linear loads.
- 100% unbalanced loads.
- 100% "6 pulse" loads (motor speed drivers, welding equipment, power supplies...).
- Motors, lamps, capacitive loads.

**Standard electrical features**
- Dual input mains.
- Internal maintenance bypass.
- Backfeed protection: detection circuit.
- EBS: Expert Battery System for battery management.

**Electrical options**
- Long-life batteries.
- Additional battery chargers.
- Additional transformer.
- Parallel kit.
- Cold start.
- ACS synchronization system.
- Neutral creation kit for mains without neutral.
- Tropicalization and anti-corrosion protection for electrical boards.

**UPS and Batteries**

<table>
<thead>
<tr>
<th>UPS</th>
<th>Input</th>
<th>Output</th>
<th>Back-up time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP+ 10</td>
<td>1/1</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>IP+ 30</td>
<td>1/1</td>
<td>30</td>
<td>3</td>
</tr>
<tr>
<td>IP+ 50</td>
<td>1/1</td>
<td>50</td>
<td>5</td>
</tr>
<tr>
<td>IP+ 100</td>
<td>1/1</td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>IP+ 150</td>
<td>1/1</td>
<td>150</td>
<td>15</td>
</tr>
<tr>
<td>IP+ 200</td>
<td>1/1</td>
<td>200</td>
<td>20</td>
</tr>
<tr>
<td>IP+ 300</td>
<td>1/1</td>
<td>300</td>
<td>30</td>
</tr>
<tr>
<td>IP+ 500</td>
<td>1/1</td>
<td>500</td>
<td>50</td>
</tr>
</tbody>
</table>

**For Media**
- WEBS: WEB/SNP interface.

**Communication options**
- PROFBUS.
- MODBUS TCP.
- NETVISION: professional WEB/SNMP interface for UPS monitoring and shutdown management of several operating systems.

**Remote monitoring service**
- LNk-UPS, remote monitoring service that connects your UPS to your Critical Power specialist 24/7.
DELPHYS MP Elite+
Resilient transformer-based power protection from 80 to 200 kVA

The solution for
- Industry
- Processes
- Infrastructure
- Healthcare
- Service sector
- Telecommunications

Advantages

DELPHYS MP Elite+
Three-phase UPS from 80 to 200 kVA

Dust filters.

Power factor (THD)

- 4 outputs (general alarm, back-up, bypass, preventive maintenance needs).

Parallel systems
- Distributed or centralized bypass. (up to 6 units)
- Redundant systems (1+1) and (n+1).
- "Z" architecture with Static Transfer Systems.

Standard electrical features
- 3 slots for communication cards.
- Standard interface:
  - 3 inputs (emergency stop, generating set, battery protection).
  - 4 outputs (general alarm, back-up, bypass, preventive maintenance needs).

Mechanical options
- Reinforced IP protection degree.
- Dust filters.
- Fan redundancy with failure detection.
- Top entry connection.
- Reinforced IP protection up to IP52.

Electrical options
- EBS Expert Battery System®.
- ACS synchronisation system for 2n architecture.
- Redundant electronic power supplies.
- Hot plug option (increase the power keeping the load supplied in double conversion).
- Long backup time rectifier.

Technical data

Sn [kVA] 80 100 120 160 200
Pn [kW] 72 90 120 144 180
Rated voltage 380 V - 400 V - 415 V
Voltage balance 342 ± 4ichter
Rated frequency 50/60 Hz
Flicker tolerance ± 8.2%
Total output voltage distortion - linear load ThdU <1%
Total output voltage distortion - non-linear load ThdU <4%
Sheet-circuit current in an inverter (mm)
Overload Up to 150 % in 1 minute, 125 % in 10 minutes
Circuit breakers
BYPASS
Rated voltage 380 V - 400 V - 415 V
Voltage balance ± 3% (selectable)
Rated frequency 50/60 Hz
Frequency tolerance ± 2% (configurable for Delta compatibility)
Sheet-circuit current in by-pass (20A) Up to 24 h

EFFICIENCY
 Efficiency Mode
- 93.5%
- Eco Mode
- 94%

EMISSION
Operating ambient temperature
- 0 °C to +40 °C (from 15 °C to 25 °C for maximum battery life).
Relative humidity
- 5% - 95% without condensation
Maximum altitude
1000 m without derating, max. 3000 m
Acoustic level at 1 m (ISO 3744)
- 65 dBA
- 67 dBA
UPS S-CAEIBET
- 1000 x 800 x 1500 mm
Weight
- 340 kg
- 320 kg
Degree of protection
- IEC 660 (IP21 option)
- IEC 60069
- IEC 60068
- CEI 06-634

Product declaration
- EC (2014/30/EU)

(1) Others on demand. (2) Conditions apply.

Cost-effective equipment
- The "clean" IGBT rectifier allows: - a high efficiency.
- a high and constant input power factor, - a low THD.
These characteristics help to limit the dimensions of upstream network infrastructure.
- Possibility to create new neutral system without additional losses (extra transformer required on by-pass line only).
- High short-circuit capability simplifies downstream protective devices.
- High power density: its small footprint saves space on your premises.
- Mains connection of the rectifier requires only 3 cables (no neutral).
- Battery connection to UPS requires only 2 cables.

High availability
- Field-proven technology.
- Fault tolerant architecture with redundancy of basic functions, such as the ventilation system.
- Easy maintainability reduces MTTR thanks to pull-out sub-assemblies and front access all components.
- Accurate diagnostics guarantee power supply to the load.
- Cascade failure prevention for parallel systems.
- Mechanical & electrical robustness for industrial environments.
- Soft start capability (ramp up) of the IGBT inverter allows a good operation even with a generator.
- Specifically designed to be adapted to different industrial environment: high IP protection options, high peak current capability, long back up time...

Our dedicated Expert Services for UPS
We offer services to ensure your UPS highest availability:
- Commissioning
- On-site intervention
- Preventive maintenance visits
- 24-hour call out and rapid on-site repairs
- Maintenance packages
- Training

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Communication options
- GTS Graphic Touch Screen.
- ADC interface (configurable voltage-free contacts).
- MODBUS RTU.
- MODBUS TCP.
- PROFINET / PROFINET.
- BACnet interface.
- NET VISION: professional WEB/SNMP interface for UPS monitoring and shutdown management of several operating systems.
- 3 extra slots for communication cards.

Remote monitoring service
- LINK-UPS, remote monitoring service that connects your UPS to your Critical Power specialist 24/7.

High quality power supply
- Permanent operation in VFI mode (online double conversion).
- Output voltage precision under all load conditions.
- High overload capability to withstand abnormal load conditions.
- A very high short-circuit current capacity which facilitates the selection of protective devices for selectivity in the downstream distribution.
- An isolation transformer installed on the inverter output to ensure complete galactic isolation between DC circuit and load output. This isolation also provides a separation between the two inputs when they are supplied by different sources.
- Sinusoidal/Th1D output voltage + 2 % with linear loads and <4 % with non-linear loads.

Delphiys Elite+ Three-phase UPS from 80 to 200 kVA

- Technical data
- Electrical options
- Communication options
- Remote monitoring service
- High availability
- User-friendly operation
- Electrical options
- Communication options
- Remote monitoring service
DELPHYS MX
Flexible transformer-based solution for resilient architectures from 250 to 900 kVA

Optimum load protection
- Permanent operation in VFI mode (online double conversion).
- Inverter isolation transformer provides galvanic separation both between the DC current and the load and between the two sources.
- Output voltage precision under all load conditions.
- Easy maintainability reduces MTTR thanks to the transformer isolation transformer provides.
- Dust filters.
- Output voltage precision under all load conditions.
- High short-circuit capacity simplifies the high and constant input power factor.
- The transformer based topology is adapted to all kinds of electrical installations.
- Dust filters.
- Output voltage precision under all load conditions.

Minimised Total Cost of Ownership
- High efficiency in VFI mode, including the transformer.
- High power density: its small footprint saves space on your premises.
- The high and constant input power factor helps limit the dimensions of your upstream network infrastructure.
- Mains connection of the rectifier requires only 3 cables (no neutral).
- High short-circuit capacity simplifies downstream protective devices.

Flexible and easily upgradable
- Robust and reliable paralleling mode.
- Distributed or centralized bypass ensures perfect compatibility with any electrical infrastructure.
- Hot-plug capability simplifies extension or on-site repairs.
- Maintenance packages.
- Training

Attestations and certifications

Advantages
- Parallel systems
  - Distributed or centralized bypass for parallel architecture up to 6 units.
  - Redundant systems (2 x “1+1” and “n+1”)
  - “2n” architecture with Static Transfer Systems.
- Standard electrical features
  - Slots for 3 communication cards.
  - Bus bar protection: detection circuit.
  - Standard interface.
  - 3 inputs (emergency stop, generating set, battery protection).
  - 4 outputs (general alarm, back-up, bypass, preventative maintenance needs).
- Mechanical options
  - Reinforced IP protection up to UPS2.
  - Dust filters.
  - Fan redundancy with failure detection.
  - Top entry connection.
- Communication options
  - GTS (Graphic Touch Screen).
  - MODBUS RTU.
  - MODBUS TCP.
  - PROFBUS / PROFIBUS.
  - BACnet/IP interface.
  - NET VISION: professional WEB/SNMP interface for UPS monitoring and shutdown management of several operating systems.
  - 3 extra slots for communication cards.
- Remote monitoring service
  - LINK-UPS, remote monitoring service that connects your UPS to your Critical Power specialist 24/7.

Parallel systems
- Distributed or centralized bypass
- Redundant systems (2 x “1+1” and “n+1”)
- “2n” architecture with Static Transfer Systems.

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- Slots for 3 communication cards.
- Bus bar protection: detection circuit.
- Standard interface.
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- Reinforced IP protection up to UPS2.
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- Fan redundancy with failure detection.
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- Communication options
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- MODBUS RTU.
- MODBUS TCP.
- PROFBUS / PROFIBUS.
- BACnet/IP interface.
- NET VISION: professional WEB/SNMP interface for UPS monitoring and shutdown management of several operating systems.
- 3 extra slots for communication cards.
- Remote monitoring service
- LINK-UPS, remote monitoring service that connects your UPS to your Critical Power specialist 24/7.

Technical data

<table>
<thead>
<tr>
<th>DELPHYS MX</th>
<th>250</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>800</th>
<th>900</th>
</tr>
</thead>
<tbody>
<tr>
<td>input output</td>
<td>3/1</td>
<td>3/1</td>
<td>3/1</td>
<td>3/1</td>
<td>3/1</td>
<td>3/1</td>
</tr>
<tr>
<td>Neutral configuration</td>
<td>up to 6 units</td>
<td>up to 6 units</td>
<td>up to 6 units</td>
<td>up to 6 units</td>
<td>up to 6 units</td>
<td>up to 6 units</td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Frequency tolerance</td>
<td>± 5 Hz</td>
<td>± 5 Hz</td>
<td>± 5 Hz</td>
<td>± 5 Hz</td>
<td>± 5 Hz</td>
<td>± 5 Hz</td>
</tr>
<tr>
<td>Total output voltage</td>
<td>340 to 440 V</td>
<td>340 to 440 V</td>
<td>340 to 440 V</td>
<td>340 to 440 V</td>
<td>340 to 440 V</td>
<td>340 to 440 V</td>
</tr>
<tr>
<td>Total output voltage distortion - linear load</td>
<td>0.8% &lt; 3.2%</td>
<td>0.8% &lt; 3.2%</td>
<td>0.8% &lt; 3.2%</td>
<td>0.8% &lt; 3.2%</td>
<td>0.8% &lt; 3.2%</td>
<td>0.8% &lt; 3.2%</td>
</tr>
<tr>
<td>Short-circuit current up to 4.4 kV</td>
<td>100% for 1 minute.100% for 10 milliseconds</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crest factor</td>
<td>3/1</td>
<td>3/1</td>
<td>3/1</td>
<td>3/1</td>
<td>3/1</td>
<td>3/1</td>
</tr>
<tr>
<td>Admissible power factor without derating</td>
<td>0.95</td>
<td>0.95</td>
<td>0.95</td>
<td>0.95</td>
<td>0.95</td>
<td>0.95</td>
</tr>
<tr>
<td>EFFICIENCY</td>
<td>85% - 95%</td>
<td>85% - 95%</td>
<td>85% - 95%</td>
<td>85% - 95%</td>
<td>85% - 95%</td>
<td>85% - 95%</td>
</tr>
<tr>
<td>ENVIRONMENT</td>
<td>up to 30°C</td>
<td>up to 30°C</td>
<td>up to 30°C</td>
<td>up to 30°C</td>
<td>up to 30°C</td>
<td>up to 30°C</td>
</tr>
<tr>
<td>Operating ambient temperature</td>
<td>-40°C to +55°C</td>
<td>-40°C to +55°C</td>
<td>-40°C to +55°C</td>
<td>-40°C to +55°C</td>
<td>-40°C to +55°C</td>
<td>-40°C to +55°C</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>0% - 95% without condensation</td>
<td>0% - 95% without condensation</td>
<td>0% - 95% without condensation</td>
<td>0% - 95% without condensation</td>
<td>0% - 95% without condensation</td>
<td>0% - 95% without condensation</td>
</tr>
<tr>
<td>Maximum altitude</td>
<td>2000 m without derating (max. 3000 m)</td>
<td>2000 m without derating (max. 3000 m)</td>
<td>2000 m without derating (max. 3000 m)</td>
<td>2000 m without derating (max. 3000 m)</td>
<td>2000 m without derating (max. 3000 m)</td>
<td>2000 m without derating (max. 3000 m)</td>
</tr>
<tr>
<td>UPS CABINET</td>
<td>- 1600 × 955 × 2210 mm</td>
<td>- 1600 × 955 × 2210 mm</td>
<td>- 1600 × 955 × 2210 mm</td>
<td>- 1600 × 955 × 2210 mm</td>
<td>- 1600 × 955 × 2210 mm</td>
<td>- 1600 × 955 × 2210 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>1500 kg</td>
<td>1500 kg</td>
<td>1500 kg</td>
<td>1500 kg</td>
<td>1500 kg</td>
<td>1500 kg</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP30</td>
<td>IP30</td>
<td>IP30</td>
<td>IP30</td>
<td>IP30</td>
<td>IP30</td>
</tr>
<tr>
<td>Safety</td>
<td>IEC 60364-1, AS 60364-1, 1. AS 60364-1.2</td>
<td>IEC 60364-1, AS 60364-1, 1. AS 60364-1.2</td>
<td>IEC 60364-1, AS 60364-1, 1. AS 60364-1.2</td>
<td>IEC 60364-1, AS 60364-1, 1. AS 60364-1.2</td>
<td>IEC 60364-1, AS 60364-1, 1. AS 60364-1.2</td>
<td>IEC 60364-1, AS 60364-1, 1. AS 60364-1.2</td>
</tr>
</tbody>
</table>

www.socomec.com/services
**SHARYS IP**

Rugged, reliable DC power solution
24/48/108/120 V from 15 to 200 A

---

**The solution for**

- Process industry
- Switchgear tripping
- Signaling
- Alarm systems
- Automatisms (PLC, relays, etc.)

---

**The SHARYS IP series have been designed with the objective of reliable DC supply, ideally suited for industrial applications. SHARYS IP combines telecom features like modularity, hot swap module replacements, redundancy N+1 and scalabilty along with a robustly designed frame creating an innovation mix. Flexible design and a wide range of customization possibilities complete the package and enable the use of SHARYS IP in a wide range of situations.**

**Total Costs of Ownership (TCO)**

- High efficiency up to 93%: low energy consumption, low heat dissipation.
- Sinusoidal current absorption with power factor close to one: low conductor heat dissipation and no plant oversize.
- Easy to install.
- Reduced maintenance costs.
- Process continuity with hot-swap capabilities: replacement of modules without any power interruption.

**Upgradeability**

- Expandable according to future requirements by adding additional rectifier modules.

**Reliability and robustness**

- Robust steel frame.
- Degree of protection IP30.
- PCB tropicalisation as standard.
- Metallized capacitor.
- Intelligent rectifier cooling.
- Battery safety thanks to the end of discharge protection option.
- Limited thermal stress and longer life of the components.

---

**Technical data**

**SHARYS IP - Rectifier Module**

<table>
<thead>
<tr>
<th>Model</th>
<th>ENCLOSURE ED</th>
<th>ENCLOSURE EX</th>
<th>SYSTEM 5</th>
<th>SYSTEM 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>DESCRIPTIVE</td>
<td>DESCRIPTIVE</td>
<td>DESCRIPTIVE</td>
<td>DESCRIPTIVE</td>
</tr>
<tr>
<td>Voltage</td>
<td>230 V 4-wire</td>
<td>The voltage is fixed at 230 V 4-wire.</td>
<td>230 V 4-wire</td>
<td>230 V 4-wire</td>
</tr>
<tr>
<td>Frequency</td>
<td>50 Hz 60 Hz</td>
<td>50 Hz 60 Hz</td>
<td>50 Hz 60 Hz</td>
<td>50 Hz 60 Hz</td>
</tr>
<tr>
<td>Power factor</td>
<td>0.70 0.70</td>
<td>0.80 0.80</td>
<td>0.80 0.80</td>
<td>0.80 0.80</td>
</tr>
<tr>
<td>Efficiency</td>
<td>94% 94%</td>
<td>94% 94%</td>
<td>94% 94%</td>
<td>94% 94%</td>
</tr>
</tbody>
</table>

**Standard electrical features**

- Polarity insulated or grounded.
- Internal battery protection.
- Fitting for output DC distribution.
- Battery temperature sensor.
- PCB tropicalisation.
- IP30 steel cabinet.
- Palette truck friendly base.

**Electrical options**

- BLVO battery line voltage disconnector.
- Output distribution.
- Double AC power supply.
- Double string battery protection.
- Emergency Power Off (EPO).
- Power Share.
- Coupling kit.
- Earth leakage control.
- Input surge suppressors.
- Battery cabinet.
- Enhanced protection degree.

**Certifications**

- CE, EN 62047-1.
- EN 62047-6-2.
- Performance.
- EN 62047-2.
- EN 62047-6-2.
- EN 62047-6-2.

**SHARYS Enclosure**

- IP30 steel cabinet.
- 50mm Nominal thickness.

---

**Standard communication features**

- NET VISION for DC systems: professional WEB/SNMP interface for DC system monitoring and shutdown management of several operating systems (1).

---

**Communication options**

- Standard communication:
  - MODBUS RTU.
  - 2 slots for communication options (2).

---

**Electrical options**

- Process control.
- Monitoring and shutdown manager of several operating systems (1).

---

**Technical data**

**Output Distribution.**

- BLVD battery low voltage disconnector.
- Internal battery protection.
- Polarity insulated or grounded.

---

**Specifications**

- SHARYS PLUS: advanced digital controller.
- MODBUS RTU.
- 2 slots for communication options (2).

---

**Weight (kg)-divider**

- With batteries.
- Without batteries.
Rectifier module

SHARYS RECTIFIER modules use double conversion switching technology. The combination of SMD technology, of digital microprocessor control and of IGBT components result in a highly reliable and efficient rectifier.

- Plug-in “hot-swap”.
- Microprocessor control with CAN-BUS protocol communication.
- Parallel connection with active load sharing and selective disconnection of a faulty module.
- PCB conformal coating (tropicalization) as standard.

Enclosure

Flexible modular design DC power supply system. Can include 2 rectifier modules max, suitable for full power application or redundant solution.

- Max 2 rectifier modules, redundancy 1+1 or full power
- Max 4 rectifier modules, redundancy N+1

System

Complete DC power supply system. This can include up to 4 rectifier modules(3), suitable for N+1 redundant solution. Useful in medium power applications such as automatic control equipment (PLC, relays, etc.) and process supply.

Typical configurations

- Single
- Redundant 1+1
- Extended full redundant

Full battery compatibility

SHARYS IP design is compatible with different battery technologies such as:
- Valve Regulated Lead Acid (VRLA)
- Open Vented Lead Acid,
- Nichel Cadmium.

Extended full redundant

System only.

Contact us for power extension or customization.

Full battery compatibility

The SHARYS PLUS advanced control and monitoring module is included as standard on all SHARYS IP SYSTEMS. A 32-digit LCD display provides easy and fast access to all information parameter settings.

- Microprocessor control with CAN-BUS protocol communication and RS232/485 port for external communication.
- Additional easy front panel LED indications.
- Plug-in “hot-swap” solution, easy to replace.

Microprocessor control with CAN-BUS protocol communication.

Mimic panel

Wide temperature and environment range 0 °C to 55 °C.

Built-in input output galvanic isolation.

Optimized efficiency design paint.

Unitary input power factor (PF) > 0.9 and low input THDI.

Constant output power.

Wide input voltage and frequency range. Protection against permanent input overvoltage (up to +40%) and against surges.

Full battery compatibility

Valve Regulated Lead Acid (VRLA),

Mimic panel

Hot swappable wireless modules with selective disconnection.

Built-in input output galvanic isolation.

Optimized efficiency design paint.

Speed controlled

Automatic self-test (temperature-load).

Can bus communication between modules.

Active load sharing among modules.

Power flow indication

Battery discharge status.

Selection button

Fault alarm

Status LED

Display

Mimic panel

Double conversion IGBT based topology

Unitary input power factor (PF) > 0.9 and low input THDI.

Wide input voltage and frequency range. Protection against permanent input overvoltage (up to +40%) and against surges.

Built-in input output galvanic isolation.

Double conversion IGBT based topology

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Speed controlled

Automatic self-test (temperature-load).

Can bus communication between modules.

Active load sharing among modules.

Power flow indication

Battery discharge status.

Selection button

Fault alarm

Status LED

Display
Secure power supply for emergency systems from 1.5 to 200 kVA

The solution for
- Airports
- Railways and bus stations
- Schools and universities
- Hospitals
- Shopping centers
- Cinemas and theatres
- Museums
- Public buildings
- Office buildings
- Hotels

EMergency CPSS
Secure power supply for emergency systems from 1.5 to 200 kVA

Compliance with standards
EM
EN 50171

Our dedicated Expert Services for UPS
We offer services to ensure your UPS highest availability:
- Commissioning
- On-site intervention
- Preventive maintenance visits
- 24-hour call out and rapid on-site repairs
- Maintenance packages
- Training

Technical data

<table>
<thead>
<tr>
<th>Sn [kVA]</th>
<th>MODULYS</th>
<th>MASTERYS</th>
<th>DELPHYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5</td>
<td>3</td>
<td>4.5</td>
<td>6</td>
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<tr>
<td>9</td>
<td>15</td>
<td>20</td>
<td>30</td>
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<tr>
<td>40</td>
<td>60</td>
<td>80</td>
<td>160</td>
</tr>
<tr>
<td>200</td>
<td>210</td>
<td>200</td>
<td></td>
</tr>
</tbody>
</table>

Voltage tolerance(1) ± 20 % 240 V to 480 V(2)
Frequency tolerance ± 10 %
Power factor / THDI > 0.99 / < 6 % 0.99 / < 3 %

OUTPUT
Rated voltage 230 V (1ph+N) 400 V (3ph+N) 400 V 3ph
Voltage tolerance ± 3 % static load ±1 % dynamic load in accordance with VFI-SS-111
Rated frequency 50 - 60 Hz
Frequency tolerance ± 0.1% ± 2 % (configurable from 1 % to 8 %)
Overload UPS designed @ Pn 110% for 5 min, 130% for 5 sec 125% for 10 min, 150% for 1 min
Crest factor ≤ 3:1

UPS CABINET
Dimensions W x D x H (mm) 444x795x1000 444x795x1400 700x800x1930
Maximum weight (kg) Embedded battery 145 220 275 380 515 - - - - - - - -
Without battery - - - - 120 124 127 138 158 201 211 480 500
Protection degree IP 20 (EN 50171)
Acoustic level (dBA) 1m (ISO 3756) < 52 < 62 < 68

BATTERY
Type: VRLA with 10-year life expectancy
Standard back-up time at the end of battery life 60/120 min(2)
Charging capability 80 % of back-up time in 12h
Embedded battery Max IT (Ah)(2) Load 25% 90 100 150 200 300
Max IT (Ah)(2) Load 100% 90 100 150 200 200

STANDARDS
CPSS EN 50171
Safety: EC/EN 62040-1
EMC: EC/EN 62040-2
Performance: EC/EN 62040-3
Product declaration CE

Options
- Transformer embedded in the UPS enclosure (contact us for further information).
- Connection to downstream IT earthing system.
- Eco mode to reach up to 98% efficiency.
- Other types of battery available.

Standard features
- IP20 metal enclosure compliant with EN60529 IP20
- Battery charging: 80% in 12 hours.
- Battery protection against the damage due to a polarity inversion.
- Battery protection against deep discharge.
- Long-life battery with 10-year life expectancy.
- Designed to withstand 120% of the nominal charge during the entire back-up period.
- Specific dry contacts & monitoring for EMergency system.

The EMergency CPSS range has been designed to answer your needs in terms of power supply for your safety system. All our EMergency products are compliant with standard EN 50171.

The wide range is suitable for all standard needs. For non-standard requests, our team of experts is on hand to adapt the products to your needs.

www.socomec.com/en/emes
Complementary solutions

Back-up storage
Back-up energy and power .............................................................. p. 84
Battery storage systems ............................................................... p. 85
Battery cabinets ................................................................. p. 86
W-BMS .................................................................................... p. 88
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Power Distribution Unit (PDU)
RACK PDU .............................................................................. p. 102
### Power and energy

When the main power supply is unavailable, the storage system provides the UPS with the necessary energy. This can take place in two ways depending on the specific application:

- **‘Power’ type applications** - the UPS is provided with a large quantity of power for a limited period of time e.g. power bridging applications, or where the main supply is affected by micro interruptions.
- **‘Energy’ type applications** - the UPS is provided with power for an extended period of time e.g. when the main supply is unavailable for longer than one minute.

#### Sizing and Total Cost of Ownership

Various factors must be taken into account when choosing an energy storage system in order to optimise the total cost of ownership and achieve the best technical solution. The differentiating factors to consider with back-up storage technologies include:

- Purchasing costs vs budget.
- Dimensions and weight.
- Expected equipment lifetime and number of charge/discharge cycles.
- Environmental conditions.
- Characteristics of the power supply network (frequency/duration of unavailability etc.).
- Safety to be guaranteed in the technical room.
- Maintenance requirements.

### Why have back-up energy?

The energy storage stage within a UPS system is a key element, as its purpose is to provide the load with immediate power when the main power supply is unavailable.

### Battery storage systems

#### Batteries

These are electrochemical devices that store energy chemically and convert it into electricity. Their use with UPS systems involves several batteries being connected in series (string) to reach the DC stage voltage required by the UPS. Strings are often connected in parallel to increase runtime in the event of a mains outage and/or for redundancy.

- Batteries can be installed within the UPS (normally for small UPS systems) or assembled in external cabinets or on shelving. The batteries available for use with UPS systems include:
  - Normal/long life VRLA batteries with flame-retardant containers.
  - Long life open-vented lead batteries with flame-retardant containers.
  - Long life nickel-cadmium (NiCd) batteries for special applications.
- Lithium-ion (Li-ion) batteries with integrated monitoring and equalisation system.

#### Nickel-Cadmium batteries

NiCd technology uses alkaline liquid electrolyte and is especially robust and reliable. These batteries are designed to operate in difficult environmental conditions and support demanding work cycles (frequent charging/discharging), and are usually installed in dedicated rooms on shelving that enables the electrolyte to be topped up. As Cadmium is toxic the use of this type of battery is limited. Furthermore, the requirement for regular complete discharge cycles restricts the number of possible applications with UPS systems.

#### VRLA batteries

VRLA (Valve Regulated Lead Acid) batteries are lead batteries with a sealed safety valve container for releasing excess gas in the event of internal overpressure.

- Their development was aimed at limiting the emission of hydrogen into the atmosphere and to avoid the use of liquid electrolyte. The liquid electrolyte is replaced by gel electrolyte (GEL technology) or absorbed inside the separators (AGM technology) to prevent acid leaking. Sealed batteries do not allow for water to be added to the electrolyte, therefore the evaporation of the water contained in the electrolyte, due for example to high room temperatures or internal heating as a result of charging/discharging cycles, decreases their lifetime.

#### Open-vented lead batteries

These batteries are made with lead-based electrodes and immersed in a liquid electrolyte comprising water and sulphuric acid. They have an expected lifetime of 15-20 years and statistically are very reliable until at least halfway through their lifetime. Subsequently, a cell short circuit may occur, causing a slight reduction in the runtime but this does not cause a critical situation. Using a liquid electrolyte has some disadvantages, such as shelf installation instead of cabinets to enable electrolyte top-ups and regular inspections, and requires a suitably ventilated dedicated room for reasons of safety.

#### Lithium-ion batteries

Recently introduced to batteries for UPS applications, lithium-ion technology clearly differs from conventional lead and nickel-cadmium batteries. The most significant features include the considerable reduction in weight and floor space for the same runtime, the possibility of recharging them quickly, and their long cyclic and calendar lifetime. However, their relatively brief history in high-power applications, and the need to introduce monitoring and equalisation electronics into batteries (which increases the initial cost), are still inhibiting on their widespread use.

#### Battery storage systems

<table>
<thead>
<tr>
<th>Battery Type</th>
<th>Degradation Temperature (°C)</th>
<th>Cycle life (h)</th>
<th>Charging time (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VRLA</td>
<td>50</td>
<td>1500</td>
<td>20</td>
</tr>
<tr>
<td>FLOODED</td>
<td>50</td>
<td>1200</td>
<td>10</td>
</tr>
<tr>
<td>Ni-Cd</td>
<td>50</td>
<td>1100</td>
<td>5</td>
</tr>
<tr>
<td>Li-Ion</td>
<td>50</td>
<td>1500</td>
<td>20</td>
</tr>
<tr>
<td>VRLA</td>
<td>50</td>
<td>1200</td>
<td>10</td>
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</table>

#### Electric characteristics

- **Power and quality**
- **Power bridging**
- **Load characteristics**
- **Quality of the power supply network**
- **Electrical infrastructure**
- **Maintenance requirements**
- **Environmental conditions**
- **Safety to be guaranteed in the technical room**
- **Dimensions and weight**

---

**Image:**
- Battery types and specifications.
- Graphs showing energy density, cycle life, and degradation temperature.

---

**Diagram:**
- UPS system diagram with components labeled.
- Battery types illustrated.

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**Table:**
- Comparison of battery types based on various metrics.
- Battery specifications listed.

---

**Footnotes:**
- Additional information on battery technologies and applications.
- References to specific battery models and their characteristics.

---

**Further Reading:**
- Detailed analysis of battery technologies and their applications.
- Recommendations for selecting the appropriate battery type for various use cases.

---

**Conclusion:**
- Summarization of key points and implications for selection.
- Implications for future developments in battery technology.
Battery cabinets
The value of your back-up time
from 10 to 900 kVA

Total protection during downtime
- Designed to satisfy and respect safety protection standards (EN 50272-2 and EN 62040-1).
- The right size of protection device tailored to your power rating.
- Robust cabinet.
- Normal and long life batteries.
- Compatible with different battery brands.
- Chemical safety means shelves protected against corrosion of H2SO4 that can cause risks of electric shock and short circuit (fire).
- Designed according to the specific UPS model for easy connections, correct recharge current and appropriate discharge rating to optimize battery life.
- Modular hot-swap battery cabinets with string protection and individual string disconnection.

Easy installation and maintenance
- Frontal switch/breaker protection.
- Frontal input output connections.
- Easy battery replacement.
- Suitable for rigid cables and cable-glands.
- Suitable for tripping coil contact (on request).
- Height aligned with UPS.

Electrical protection coordination for your safety
Battery protection is essential for safety. We perform tests in our laboratories under abnormal conditions (i.e. short-circuit) to guarantee the maximum safety for the installation.
As batteries can cause fire if the protection is not adequate, we test all battery protections in real operating conditions.
- Switch/Breaker with fuse.
- Magnetothermal MCCB.

The protective devices are sized according to the UPS and to the battery short-circuit current.

Technical data

- Standard degree of protection: IP20 (according to IEC 60529)
- Optional degree of protection: IP32
- Operating temperature: 0÷40 °C (+15 ÷ +25 °C recommended for long battery life (1))
- Ambient storage and transport temperature: -5 °C ÷ +40 °C max (reccomended: 25 °C)
- Relative humidity (condensation-free): up to 95%
- Conforms to standards: EN 50272-2, EN 62040-1

Dimensions (1)
- Small Masterys battery cabinet
- Masterys and Delphys battery cabinet
- Modular hot-swap battery cabinet - small capacity

Dimensions (1)
- Modular hot-swap battery cabinet - medium capacity
- Modular battery cabinet - large capacity
- Battery Rack

Complementary pages
- MASTERYS BC
- MASTERYS BC+
- DELPHYS BC
- MASTERYS GP
- MASTERYS GP4
- DELPHYS GP
- DELPHYS XTEND GP
- MODULYS GP
- MODULYS RM GP
- MASTERYS IP+
- DELPHYS MP Elite+
- DELPHYS MX
- CPSS Emergency

(1) Versions with a higher degree of protection and versions with a wider operating temperature range are available on request. Please contact SOCOMEC for specific battery brands and custom solutions.

(1) The dimensions specified refer to standard battery cabinets. Custom solutions are available on request. Please check with your local sales office.
Improving UPS uptime.
Reducing maintenance operations by 75%.
Anticipating battery malfunctions.
Maximizing battery return on investment.
Guaranteeing the safety of maintenance personnel.

This solution provides the opportunity to eliminate any unscheduled power cut due to battery failure.

The three W-BMS components

- CU (Control Unit):
  - Collects and stores the DAM and IDAM data.
  - Manages the communication with the PC.
  - Sends SMS/E-Mail notifications.
- DAM (Data Acquisition Module):
  - Measures the voltage, the temperature and the internal resistance of each battery.
  - Stores the most significant data.
- IDAM (Current Acquisition Module):
  - Measures the current of either a battery or a string of batteries.
  - Stores the most significant data.

Modular design and central monitoring

W-BMS is the only battery monitoring system that can monitor different voltage monoblocs or different types of batteries (for example, generator batteries) centrally.

W-BMS is the easiest battery monitoring system to install and maintain.

Scalable and simple

Whether you want to add a battery branch, a part or a building, the W-BMS system offers you a vital modular system to future-proof your system.

With only three main components, expanding your system is easy. No rewiring is required and the components can even be moved to cope with your new architecture. Similarly, you can extend your system to cover your auxiliary batteries (for generator batteries, for example). W-BMS can be adjusted to cope with any changes and is a flexible, permanent solution. Your return on investment is thus guaranteed.

W-BMS INTERACTIVE option, to optimize battery lifetime

Including all the features of the standard W-BMS, W-BMS INTERACTIVE operates directly with the UPS battery recharging system (BBS). It optimizes battery capacity and maximizes battery life and return on investment.

- Increase charger precision: the UPS charger is able to adapt the recharge parameters according to all the information collected by W-BMS INTERACTIVE. Such corrective actions aim to standardize cell behavior to improve battery lifetime and availability.
- Automatic battery testing: when required, W-BMS INTERACTIVE and the UPS perform an automatic battery test. The UPS calibrates slow, safe discharge while W-BMS INTERACTIVE collects data and analyses cell blocks.
- Proactive measures: when a block starts to weaken, W-BMS INTERACTIVE and the UPS perform an automatic procedure to recover the block before it is totally unusable, and to enhance global battery capacity.
Li-Ion Battery UPS
Compact innovative power protection solution

Maximum availability
- Very fast UPS battery recharge.
- Ensured scalability for power upgrades or redundancy.
- Reduced maintenance of battery components.

Cost-effective solution
- High power density in a reduced footprint.
- 15+ years’ expected service life.
- Higher cycling capacity: 10 times more than VRLA Battery UPS.
- Fewer maintenance requirements.

Extreme reliability
- Optimum performance in all critical operating conditions.
- Interactive UPS battery control.
- Embedded cell-to-cell monitoring.
- Wide operating temperature range (0 °C to +40 °C).

High sustainability
Socomec is committed to developing solutions that reduce the environmental impact from the design stage and throughout their entire lifecycle.

The Li-Ion Battery UPS energy system is the latest solution designed for helping environmental sustainability:
- No toxic materials
- REACH / RoHS compliant materials
- No gas emissions
- No risk of acid leakage.

The solution for
- Data centres
- IT infrastructures
- Applications requiring a back-up time up to 15 minutes

UPS interaction
The ultimate solution for fuller control over system availability. The Socomec Li-Ion Battery UPS solution includes an interactive control system to check and manage all the Li-Ion cells’ parameters (i.e. temperature, voltage, current, charging status, etc.) and to dynamically adapt how the UPS operates depending on the status of the Li-Ion battery.

The UPS interaction guarantees the most reliable performance and improves the system’s availability by:
- Ensuring a proper control of the Li-Ion battery
- Preventing any irreversible overcharge failure
- Performing automatic corrective actions in case of any critical conditions that can affect battery performance.

Li-Ion Battery UPS: footprint comparison with VRLA batteries

Li-Ion Battery UPS: footprint comparison vs. Lead-Acid batteries

Examples of configurations
- Power: 200 kVA
- Back-up time: 8 min
- Footprint: 0.95 m²
- Space saving: +51.6%

- Power: 500 kVA
- Back-up time: 9 min
- Footprint: 2.69 m²
- Space saving: +37.8%

- Power: 1.2 MVA
- Back-up time: 8 min
- Footprint: 7.87 m²
- Space saving: +43.6%

Other configurations: please contact us.
Li-Ion Capacitor UPS
Powerful and reliable solution for applications requiring short back-up times

Power outages lasting a few seconds to several minutes may cause damage, loss in production and cost increases to applications and processes sensitive to short duration downtime.

To ensure the optimum availability and a long-life cycle for batteries, the power supply has to be protected by a powerful UPS back-up storage solution with:
- Very short recharging time.
- Low maintenance.
- Constant monitoring.

LI-ION CAPACITOR UPS is the innovative UPS back-up storage solution specifically designed to protect:
- Applications requiring back-up times of a few seconds to several minutes.
- Processes sensitive to frequent micro interruptions.
- Applications working in critical environments where hazardous substances are not allowed.
- Applications with severe ambient conditions.

Lithium-ion capacitors:
- The activated carbon is a capacitor cathode
- The Li-doped carbon anode is a battery anode, undergoing Li doping during charge and de-doping during discharge
- Hybrid construction creates a capacitor which yields the best performance features of batteries and capacitors

High sustainability
Socomec is committed to developing solutions that reduce the environmental impact from the design stage and throughout their entire life cycle.

LI-ION CAPACITOR UPS is the latest solution designed for helping environmental sustainability:
- Safe, low-toxic materials
- REACH/ROHS compliant materials
- No gas emission
- No risk of acid leakage.

Maximum availability
- Ultra-fast recharge.
- Ensured scalability for capacity or redundancy.
- Fire-safe construction.

Extreme reliability
- Optimum performance in all critical operating conditions.
- Ageing-free in any frequent process micro interruption.
- Wide operating temperature range.
- Embedded cell-to-cell monitoring.

Cost-effective solution
- Ultra-high power density in a reduced footprint.
- 15+ years’ service life.
- Easy and extremely low maintenance.

STOCK 008 A GB
STOCK 007 A GB
STOCK 006 A GB
STATYS

Redundant design for power availability and site maintainability from 32 to 1800 A

The solution for
- Finance, banking and insurance
- Healthcare sector
- Telecommunications
- Industry
- Power generation plants
- Transport

Our dedicated Expert Services for STS
We offer services to ensure your STS highest availability:
- Commissioning
- On-site intervention
- Preventive maintenance visits
- 24-hour call out and rapid on-site repairs
- Maintenance packages
- Training

www.socomec.com/services

STATYS provides
- High reliability - internal redundant design to ensure service continuity.
- Flexibility and adaptability to various types of applications.
- Compact design: saves up to 40% of valuable space.
- Easy and secured maintenance.
- Operational security and ease of use. Remote data access in real-time from any location.
- Full support and service.

Static Transfer Switch: user benefits
- Supplied by two independent alternate sources, STATYS increases the overall electrical infrastructure availability during abnormal events and programmed maintenance.
- Provides redundant power supply to mission critical loads to increase global uptime of the supplied system.
- Increases the power supply availability by choosing the best power supply quality.
- Provides plant segmentation and prevents fault propagation.
- Allows easy extension and easy infrastructure design, ensuring high availability of the power supply to critical applications.
- Facilitates and secures the maintenance or the modifications of the overall electrical installation (source, distribution, switchboard) while the load is kept supplied.

STATYS also provides protection against:
- Main power source outage.
- Failures in the upstream power distribution system.
- Failures caused by faulty equipment supplied by the same source.
- Operator errors.

Flexibility
STATYS offers a wide range of three-phase systems that suit all types of applications and power supply systems.
- Dual or single cord servers, linear or non-linear loads, IT or electromechanics are just some of the load types that STATYS can supply. Whatever a smart power source is needed, whether for existing or new electrical plants, STATYS can be easily installed and efficiently supply the load.

It is available in:
- 2 wires and 2 poles switching, to be connected between phase/neutral or phase/phase.
- 3 wires arrangement without neutral, for reduced cable costs, for local zoning of the applications by using insulating transformers.
- 4 wires three-phase arrangement with neutral, with or without neutral pole switching.

STATYS offers:
- Flexible digital control capacity that can adapt to any operational or electrical environment conditions.
- Capability to manage synchronized and non-synchronized sources according to load specificity.
- Advanced Transformer Switching Management (ATSM). If the upstream network has no distributed neutral cable, two upstream transformers or one downstream transformer can be added to create a neutral reference point at the output. For the downstream solution, STATYS, thanks to ATSM, correctly manages the switching to limit inrush current and avoid the risk of spurious breakers.

High reliability - Internal redundant design
Main features:
- Redundant control system using double microprocessor control boards.
- Dual redundant power supplies for control boards.
- Individual control board with redundant power supply for each SCR path.
- Redundant cooling with fan failure monitoring.
- Real-time SCR fault sensing.
- Separation of main functions to prevent internal fault propagation.
- Robust internal field communication bus.
- Internal monitoring of sensors to ensure maximum system reliability.

Compact design
- Small footprint and compact units.
- Adjacent or back to back mounting.
- Integrable chassis version for optimal implementation into switchboards.
- Front access for easy maintenance.
- Compact Hot Swap 19” rack system.

Standard features
- Smart commutation system configurable according to the load.
- Synchronized and non-synchronized sources compatibility (configurable synchronization tolerance and switching management).
- Fuse-free or fuse-protected design.
- Output fault current sensing.
- Internal CAN Bus.
- Double maintenance bypasses.
- Neutral oversizing for non-linear loads compatibility.
- Embedded inputs, output and maintenance bypass switches (cabinet version).

Options
- Additional dry contacts interface board.
- MODBUS RTU.
- PROFIBUS interface.
- Automatic maintenance bypass interlock.
- Voltage adaptation.

Remote monitoring
- 24/7 real-time remote data access.
- Wide choice of communication protocols for remote monitoring and easy integration in your BMS / SCADA systems.
- LINK-UPS, remote monitoring service that connects your STS to your Critical Power specalists 24/7.

Standard communication features
- Ethernet network connection (WEB/SNMP/eMail/MODBUS TCP).
- Dry-contact interface.
- Flexible Com Stats.
- LCD or Graphic Mic Panel.
- Full digital configuration and setting.

Technical data

<table>
<thead>
<tr>
<th>STATYS</th>
<th>Single-phase or three-phase STS from 32 to 1800 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELECTRICAL SPECIFICATIONS</td>
<td></td>
</tr>
<tr>
<td>Voltage tolerance</td>
<td>± 10% (configurable)</td>
</tr>
<tr>
<td>Overload</td>
<td>150 % for 2 minutes - 110 % for 60 minutes</td>
</tr>
<tr>
<td>Safety</td>
<td>Fuse-free or fuse-protected design</td>
</tr>
<tr>
<td>Neutral oversizing for non-linear loads compatibility</td>
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</tr>
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<td>Neutral oversizing for non-linear loads compatibility</td>
<td></td>
</tr>
</tbody>
</table>

| Dimensions | | |
|-------------|-------------|
| Height (mm) | Width (mm) | Depth (mm) |
| 32-63 | 400 | 380 |
| 600 | 300-400 | 400 |
| 600 | 400-500 | 500 |
| 600 | 500-600 | 600 |
| 600 | 600-700 | 700 |
| 600 | 700-800 | 800 |
| 600 | 800-900 | 900 |
| 600 | 900-1000 | 1000 |
| 600 | 1000-1100 | 1100 |
| 600 | 1100-1200 | 1200 |
| 600 | 1200-1300 | 1300 |
| 600 | 1300-1400 | 1400 |
| 600 | 1400-1500 | 1500 |
| 600 | 1500-1600 | 1600 |
| 600 | 1600-1700 | 1700 |
| 600 | 1700-1800 | 1800 |

<table>
<thead>
<tr>
<th>Independent Chassis (KRM)</th>
<th>Cabinet</th>
</tr>
</thead>
<tbody>
<tr>
<td>63-100</td>
<td>300-400</td>
</tr>
<tr>
<td>400-500</td>
<td>600-800</td>
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<tr>
<td>800-1000</td>
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<tr>
<td>1000-1200</td>
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<td>1400</td>
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<tr>
<td>1400-1600</td>
<td>1600</td>
</tr>
<tr>
<td>1600-1800</td>
<td>1800</td>
</tr>
</tbody>
</table>

(1) Depth does not include handle (≈ +30 mm)
Enlarged power continuity
• Provides redundant power supply to single-corded IT equipment.
• Powered by two independent sources.
• A competitive alternative to redundant power supply (dual-corded) in the equipment cabinet in terms of price and features.
• Fast transfer time without source overlapping (ITI curve compliant).
• Maintenance-free equipment.

Easy rack integration
• Easy installation in 19” rack cabinets.
• Compact enclosure saving valuable cabinet rack space.
• Plug and Play devices pre-configured according to Socomec’s STS field experience.
• Easy and quick connection of the loads via multiple IEC 320 outlets.
• Integrated backfeed protection device for even easier electrical integration.

Flexibility and ease of use
• Front panel with LCD display for intuitive control and easy management.
• Source selection from the front panel without modifying the cabling.
• Automatic and manual transfer.
• Synchronised and non-synchronised sources management.
• LCD display of all input and output values.
• Configuration tool for easy customisation of rated voltage, monitoring parameters/tolerances, functionalities and operation.

Certifications
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The solution for
• Rack servers
• IT networking
• Hubs & routers

Advantages

Front view

Connections

Technical data

1. Source input sockets (2x IEC 320-C20)
2. 16 A output socket (IEC 320-C19)
3. 10 A output sockets (4x IEC 320-C13)
4. Slot for RS485 or SNMP board

STATYS XS
Reliable transfer system for redundant power supply
16 and 32 A - Rack mounted

16 and 32 A - Rack mounted

STATYS XS 16 A

STATYS XS 32 A

STATYS XS
Automatic Transfer System
16 and 32 A - Rack mounted

Front view

Connections

Technical data

1. Control and monitoring panel
2. Setup connection ports
3. Dry contacts port
4. Slot for RS485 or SNMP board

STATYS XS 16 A

STATYS XS 32 A

Technical data

Model

16 A

32 A

INPUT / OUTPUT
Rated current
16 A (configurable 10 A to 16 A)
32 A (configurable 20 A to 32 A)
Rated voltage
200 / 208 / 220 / 230 / 240 V
Rated frequency
50/60 Hz
Frequency tolerance
± 10% (configurable)
Transfer time
ITIC curve compliant
Admitted overload
125% for 1 minute, 150% for 30 seconds
CONNECTIONS
Input
2x IEC C20 (35 A)
1x IEC C20 (35 A), 1x IEC C32 (50 A)
Output
1x IEC C19 (32 A), 1x IEC C19 (32 A), 1x IEC C19 (32 A)
1x IEC C19 (32 A), 1x IEC C19 (32 A), 1x IEC C19 (32 A)
COMMUNICATION AND USER INTERFACES
Display
LCD display
Standard communication features
slot for optional communication board, 5 dry contacts (voltage-free, configurable), setup connection port for configuration tool
Communication options
SNMP card, RS485 card
ENVIRONMENT
Operating ambient temperature
up to +40 °C
Relative humidity
5% to 90% without condensation
Acoustic level at 1 m (ISO 3746)
< 25 dBA
MECHANICAL SPECIFICATIONS
Dimensions W x D x H
446 (17”) x 285 x 44 mm (1U)
446 (17”) x 360 x 88 mm (2U)
Weight
4 kg
6 kg
STANDARDS
Directives
2014/35/UE, 2014/30/UE
Standards
IEC 60950-1, CEI/EN 62310-2
Environmental
AIEEE, ROHS
Product declaration
CE
**IT SWITCH**
Seamless power transfer for reliable architectures from 16 to 20 A single-phase

The solution for
- Data centres
- Processes
- Telecommunications
- Air traffic control

Our dedicated Expert Services for STS
We offer services to ensure your STS highest availability:
- Commissioning
- On-site intervention
- Preventive maintenance visits
- 24-hour call out and rapid on-site repairs
- Maintenance packages
- Training

Continuity of service for critical applications
- Located as close as possible to the Transfer lock on downstream fault.
- Manual transfer.
- Command and control mimic panel.
- The communication software allows easy synchronized and non-synchronized source IT SWITCH is fitted with a control panel configurable synchronisation tolerance. It protects against:
- Automatic restart configurability.
- MODBUS RTU (only RS485 serial port).
- 19" rack.
- Easily adapts to match site specificity via Maintenance Bypass (model HA-E).
- Changeover without source overlap.
- Preferred source selection.
- Dry-contact interface.

Operating principle
IT SWITCH is an automatic transfer system between two sources. It is digitally controlled by microcontrollers to transfer the loads instantly, without disruption and without overlapping the sources.

Automatic transfer
The detection of a failure in the preferred source triggers the automatic and instantaneous transfer to the alternate source without disturbing the supply to the load. The "break before make" transfer is carried out without overlapping in order to prevent interference between the sources.

Manual control
The IT SWITCH manual control allows the operator to transfer the loads securely to one of the sources in order to carry out maintenance operations.

Choosing the preferred source
The operator chooses a preferred source for each IT SWITCH. The parameters of each source and of the supply to the loads are permanently monitored. Separating loads
The system inhibits the transfer in the event of a fault in the equipment supplied downstream. This discrimination avoids the faulty current being transferred onto the other source so as not to disturb other users.

"Hot Swap" power units
The extractable version of the IT SWITCH HA increases system availability. The hot swappable plug in unit means the control and power unit can be taken out without interrupting the supply to the applications.

Distributed redundancy

Installation and operation
IT SWITCH HA (High Availability) is especially suited to sensitive applications thanks to its advanced parameter control centers: source synchronisation, power quality adaptation, operating modes and downstream fault current.

IT-SWITCH HA-E swappable version (High Availability) offers an additional "hot swap" function which enables users to perform maintenance procedures without shutting down the loads.

Standard transfer features
- Preferred source selection.
- Automatic transfer.
- Manual transfer.
- Changeover without source overlap.
- Synchronized and non-synchronized source management (fully adaptable modes).
- Transfer lock on downstream fault.
- Configurable synchronisation tolerance.
- Lock on repetitive transfers automatic restart setting.
- Automatic restart configurability.

Standard mechanical features
- 19" rack.

Technical data

![Image](image-url)

<table>
<thead>
<tr>
<th>Model</th>
<th>IT SWITCH HA 19&quot; rack</th>
<th>IT SWITCH HA-E extractable rack</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELECTRICAL SPECIFICATIONS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of phases</td>
<td>Single-phase</td>
<td></td>
</tr>
<tr>
<td>Rated current</td>
<td>16 A</td>
<td>16 A</td>
</tr>
<tr>
<td>Rated voltage</td>
<td>230 V</td>
<td>230 V</td>
</tr>
<tr>
<td>Input voltage tolerance</td>
<td>adjustable 20%</td>
<td></td>
</tr>
<tr>
<td>Input frequency</td>
<td>50 or 60 Hz</td>
<td></td>
</tr>
<tr>
<td>Frequency tolerance</td>
<td>±10% adjustable</td>
<td></td>
</tr>
<tr>
<td>Short-circuit current</td>
<td>15 RMS</td>
<td></td>
</tr>
<tr>
<td>Over load factor</td>
<td>up to 4</td>
<td></td>
</tr>
<tr>
<td>MAINTENANCE BYPASS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changeover switch</td>
<td>Infrared phase switch</td>
<td></td>
</tr>
<tr>
<td>Transfer mode</td>
<td>Synchronous/synchronous &quot;break before make&quot;</td>
<td></td>
</tr>
<tr>
<td>CONNECTIONS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input and output at terminal blocks</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Input and output at IEC 603-8-9 sockets</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>ENVIRONMENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating ambient/temperature</td>
<td>0 to 40 °C</td>
<td></td>
</tr>
<tr>
<td>Casing</td>
<td>Metal</td>
<td></td>
</tr>
<tr>
<td>MECHANICAL SPECIFICATIONS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (W x D x H)</td>
<td>440 x 325 x 133 mm</td>
<td>440 x 400 x 133 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>8.5 kg</td>
<td>14 kg</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP21</td>
<td></td>
</tr>
</tbody>
</table>

Maintenance
- "Hot swap" pull out module (model HA-E).
- Maintenance Bypass (model HA-E).

Command and control mimic panel
- Dry contact interface.
- MODBUS RTU (only RS485 serial port).

1. Preferred source 1 (or 2).
2. Input voltage source 1 or 2 within tolerances.
3. Load on source 1 or 2.
4. Transfer not possible.
5. Transfer blocked.
6. Imminent stop.
7. Maintenance bypass (hot swap version).

652x113
### Communication and connectivity

The ideal solution for integrated system management and data integrity

#### LOCAL VIEW

- Local UPS monitoring software.
- USB or RS-232 serial port.
- Clear, immediate and detailed information on the status of the UPS.
- Automatic system shutdown in the event of a prolonged power cut.
- Protection from data loss and system damage.
- For Microsoft Windows, Linux and MacOS.
- Free download from www.socomec.com

#### NET VISION

- Ethernet interface for remote UPS monitoring and server-based workstations shutdown management via web browser.
- Specifically designed for business networks.
- Direct interface between the UPS and Ethernet network with no dependence on the server.
- Compatible with all networks and most operating systems.

#### JNC

- Software for controlled network server shutdown.
- Shutdown Client installed on the remote server:
  - warns user during shutdown procedure,
  - can execute specific script before shutting down the Operating System,
  - performs Operating System shutdown.
- For Microsoft Windows, Linux and MacOS operating systems.
- Free download from www.socomec.com

#### REMOTE VIEW PRO

- Supervision software dedicated to UPS or STS provided with Ethernet connection and SNMP protocol.
- Remote UPS and STS monitoring from any computer connected on the same network, LAN or WAN architecture via web browser.
- Compliant with all SOCOMEC UPS and STS and with almost all UPS manufacturers using RFO1628 MIB file.
- Compliant with Windows server with Internet Information Service.

#### COMMUNICATION INTERFACES

- Compatible with industrial PROFINET and PROFINET systems.
- Compatible with BACNET BMS monitoring.
- MODBUS TCP compliance for SCADA system.

#### Main features

- UPS and STS supervision.
- UPs and I2C syncronic display.
- Event and history log.
- Multi-user and Multi-site access.
- Picture or Google map background.
- Reports and email notification.
- License:
  - Free (up to 10 devices)
  - Silver (up to 200 devices)
  - Gold (more than 200 devices)

- MODBUS TCP and BACnet
  - Ethernet interface to communicate with BMS systems.
  - All UPS information can be remotely accessed.

### UPS range compatibility

- NETYS PL
- NETYS PE
- NETYS RT
- ITYS
- ITYS PRO
- MODULYS
- MODULYS GP
- DELPHYS
- MASTERSYS
- STATYS

### Main features

- Automatic UPS recognition.
- UPS, battery and load monitoring.
- Alarms notification on local screen.
- Battery test control.
- Local PC shutdown + test procedure.
- Measurements and UPS event logs.
- Email notification.
- Automatic updates via Internet.

### VIRTUAL JNC

- Software for controlled virtual machines and Hosts shutdown.
- Shutdown Client installed on a Windows Virtual Machine:
  - warns user during shutdown procedure,
  - stops Virtual Machines in specific order or time delay,
  - performs Host shutdown.
- For Microsoft Hyper-V, VMware and XenServer.
- Free download from www.socomec.com

### MODBUS TCP and BACnet

- Ethernet interface to communicate with BMS systems.
- All UPS information can be remotely accessed.

### PROFIBUS / RS485 MODBUS RTU

- Communicate with PLC or automation systems.
- All UPS information can be remotely accessed.

#### Main features

- NETYS PR
- NETYS RT
- ITYS
- ITYS PRO
- MODULYS GP
- MASTERSYS
- DELPHYS
- STATYS
# RACK PDU

Compact and reliable power distribution unit monitored and managed rack PDU

## The solution for
- Data center rack cabinet
- Networking infrastructure
- Computer rooms

## Power Management Solution

RACK PDU

Zero-U PDU

### Connections

#### Single-phase model

1. ON-OFF switch segment #1
2. ON-OFF switch segment #2
3. ON-OFF switch segment #3
4. Output connectors segment #1
5. Front panel
6. Output connectors segment #2
7. Output connectors segment #3

#### Three-phase model

1. ON-OFF switch segment #1
2. ON-OFF switch segment #2
3. ON-OFF switch segment #3
4. Output connectors segment #1
5. Front panel
6. Output connectors segment #2
7. Output connectors segment #3

### Technical data

#### Zero-U PDU

<table>
<thead>
<tr>
<th>Item code</th>
<th>NRT-OP-PDU1-28</th>
<th>NRT-OP-PDU3-36</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input/output</td>
<td>1/1</td>
<td>1/1</td>
</tr>
<tr>
<td>INPUT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>208-248 V (1ph)</td>
<td>346-415 V (3ph, Y+N)</td>
</tr>
<tr>
<td>Rated frequency</td>
<td>50Hz</td>
<td>50Hz</td>
</tr>
<tr>
<td>Rated current</td>
<td>63 A (1ph)</td>
<td>16 A (3ph)</td>
</tr>
<tr>
<td>Connector</td>
<td>IEC309-32 A</td>
<td>IEC309-16 A</td>
</tr>
<tr>
<td>OUTPUT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>208-248 V</td>
<td></td>
</tr>
<tr>
<td>Connectors</td>
<td>(24) IEC320-C13, (4) IEC320-C19</td>
<td>(36) IEC320-C13, (3) IEC320-C19</td>
</tr>
<tr>
<td>COMMUNICATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interfaces</td>
<td>RS232 - (WEB/SNMP optional)</td>
<td></td>
</tr>
<tr>
<td>Environmental sensor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENVIRONMENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating ambient temperature</td>
<td>0 to 45 °C</td>
<td>0 to 45 °C</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>3% to 95%</td>
<td>3% to 95%</td>
</tr>
<tr>
<td>Maximum altitude</td>
<td>operating up to 2000 m</td>
<td>operating up to 2000 m</td>
</tr>
<tr>
<td>RACK PDU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions W x D x H</td>
<td>48 x 1250 x 50 mm</td>
<td>48 x 1568 x 50 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>5.4 kg</td>
<td>6.0 kg</td>
</tr>
</tbody>
</table>

### Monitoring and supervision

The two-digit LED display allows an easy reading and monitoring of the current consumption.

### Communication options

PDU VISION, WEB/SNMP manager interface for the connection to the LAN network. The device - suitable for remote monitoring - can be integrated into the PDU.

### Ensuring efficient load development and power supply flexibility in server rooms

Ensuring efficient load development and power supply flexibility in server rooms is becoming increasingly important, which is why SOCOMEC offers a variety of PDUs for rack applications. SOCOMEC PDUs in 0 U configuration (single-phase or three-phase) with metered or monitored technology, and PDUs in 1U configuration (still single-phase but with single or dual power supply) with managed technology, allow IT managers to find the configuration best suited to their requirements.

### Metered or monitored Zero-U vertical PDU

With only one single-phase or three-phase input, these PDUs guarantee reliable power distribution for equipment with small and medium-scale energy requirements integrated into rack cabinets. The PDU does not require the installation of ‘U space’ due to its vertical position on the rear of the rack cabinet, and simplifies the electrical connection of many devices, saving time during fitting procedures and offering easy power supply configuration adjustment. The numerous output sockets and their positioning help this PDU fit perfectly into high density network solutions.

Using two PDUs in the same rack cabinet allows the development of a redundant architecture typical of critical applications which use dual cord electronic devices.
Technology

Power protection vs. UPS topology ......................................................... p. 106
Solutions to meet availability and flexibility performance .............. p. 108
Solutions to meet availability and energy saving performance ...... p. 110
UPS technologies .................................................................................. p. 112
Static Transfer Systems (STS) for high availability architecture ..... p. 113
Backup storage ....................................................................................... p. 115
Different backup storage for UPS systems ......................................... p. 116
Power protection vs. UPS topology

Power quality (PQ) is a significant challenge to those responsible for the management of electrical networks and Data Centre facilities. The widespread use of and increasing dependence upon electronic equipment - such as information technology equipment, power electronics including programmable logic controllers (PLC) and energy-efficient lighting - have led to a complete transformation in the nature of electrical loads. These loads are both the major root causes of - and the major casualties of - power quality problems. Due to their non-linearity, all these loads cause disturbances in the voltage waveform.

Along with advances in technology, the organisation of the worldwide economy has evolved towards globalisation and the profit margins of many activities have seen a tendency to decrease.

The increased sensitivity of the vast majority of processes (industrial, services and even residential) to PQ problems means that the availability of high quality electric power is a crucial factor in terms of developing competitive advantage across every market sector. It’s widely understood that mission-critical facilities must run continuously, and, of course, that any power interruption, even for a short time, can disrupt business operations and result in significant financial losses.

Although today’s Data Centres are all designed with a high level of inherent redundancy in order to minimise downtime, just as important as the mission-critical applications themselves, however, is the quality of the supplied power.

In order to achieve the delivery of consistent, high quality power, it is vital to understand the nature of PQ disturbances and their causes.

What affects the power quality?

The most common disturbances that adversely affect the power quality are:

- power sags or outages due to network faults,
- short voltage variations due to the connection of heavy loads or the presence of faults in the network,
- distortion of currents and voltages due to non-linear loads present in the system or in the systems of other utilities, etc.
- flicker due to large intermittent loads,
- asymmetry in the supply voltage system.

How to ensure the power quality: the UPS

Modern technology offers various solutions to ensure the power quality; static UPS systems are undoubtedly the most versatile and widely used and can be adopted for a very broad range of power ratings.

In response to the need to classify the various types of static UPS systems currently available on the market, the standard EN 62040-3 was developed. It distinguishes between three major topologies, according to the internal schemes adopted:

- **VFD “offline”**: Voltage and Frequency Independent - Utilities are normally powered by the mains supply. In the event of power loss the load is automatically switched over to a built-in battery to keep it supplied without interruptions.
- **VI “line interactive”**: Voltage Independent - The load is supplied by the mains power supply and protected against under and over voltages by an AVR (Automatic Voltage Regulator) voltage stabiliser. If the mains power is lost, the load is instantaneously powered by the battery.
- **VFI “online double conversion”**: Voltage and Frequency Independent - This is the only UPS working mode that assures total load protection against all possible mains quality problems. The power is converted twice (AC to DC through a rectifier then DC to AC through an inverter) to provide high quality voltage, stable frequency and protection against power grid disturbances. If the mains power is lost, the load is powered exclusively by the battery. The internal bypass supplies the utilities in case of inverter output voltage anomalies.

### Power protection vs. UPS topology

<table>
<thead>
<tr>
<th>Disturbance type</th>
<th>Wave form</th>
<th>Possible causes</th>
<th>Consequence</th>
<th>UPS topology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage interruption</td>
<td>[Diagram]</td>
<td>Mainly due to opening and automatic re-closure of protection devices to depressorize a faulty network section. The main fault causes are insulation failure, lighting and insulator flashover.</td>
<td>Toppling of protection devices, loss of information and malfunction of data processing equipment.</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>Voltage sag/dip</td>
<td>[Diagram]</td>
<td>Faults on the transmission, in-distribution network, or consumer’s installation. Start-up loads.</td>
<td>Malfunction of IT equipment, safety systems, or lighting. Loss of data. System shutdown.</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>Voltage fluctuation</td>
<td>[Diagram]</td>
<td>Transformer’s load-faulty equipment, ineffective grounding, proximity to EMI RI source.</td>
<td>May cause data loss and data loss. System shuts down.</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>Under voltage</td>
<td>[Diagram]</td>
<td>Increase of consumption, voltage reduction to below the consumption.</td>
<td>System halts, data loss. Stop or damage of sensitive equipment.</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>Voltage surge</td>
<td>[Diagram]</td>
<td>Atmospheric, surges are due to lightning. Transient, surges are due to insulation faults between phases and earth or rupture of neutral conductor.</td>
<td>Data loss. Fluctuating of lighting and screens, stop or damage of sensitive equipment.</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>Voltage spike/ transient</td>
<td>[Diagram]</td>
<td>Lighting, ESD, switching of lines or power factor correction; capacitor, safety load, clearing.</td>
<td>Disturbance of electronic components, data processing errors or data loss.</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>Harmonic distortion</td>
<td>[Diagram]</td>
<td>Modern sources like all non-linear loads such as power electronics equipment, including ASDs, switched mode power supplies, data processing equipment, high efficiency lighting.</td>
<td>Increased probability in occurrence of resonance, neutral overload in 3-phase systems, overheating of all cables and equipment, loss of efficiency in electric machines, electromagnetic interference with communication systems, errors in measurements when using average reading meters, nuisance tripping of thermal protections.</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>Noise</td>
<td>[Diagram]</td>
<td>Transient, load-faulty equipment, ineffective grounding, proximity to EMI RI source.</td>
<td>Outbursts on sensitive electronic equipment, usually not destructive. May cause data loss and data processing errors.</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>Frequency variation</td>
<td>[Diagram]</td>
<td>Unstable operating of the generator, unstable frequency of the utility power system.</td>
<td>System halts, data loss.</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>Notching</td>
<td>[Diagram]</td>
<td>Fast switching of power components (induction, SCR, etc.), rapid variation in the load current (welding machines, motors, lasers, capacitor banks, etc.).</td>
<td>System halts, data loss.</td>
<td>![Diagram]</td>
</tr>
</tbody>
</table>
Solution to meet availability and flexible performance

Different configurations make it possible to create architectures to meet the most stringent requirements for availability, flexibility and energy saving and to allow the following:

- **Easy operation**
  Given the criticality of applications supplied downstream from the UPS units, maintenance shutdowns are less and less feasible. Various different configurations have been studied specifically to deal with this operational constraint.

- **Power increases**
  The upgrading over time of the applications supplied often requires the possibility of increasing UPS power. The configurations offered allow for this requirement so that your initial investment is saved.

- **Increases in availability**
  To increase availability, the addition of a unit in parallel that is surplus to the power requirements of the applications (redundant) will ensure a continuous power supply if an inverter shuts down, without resorting to a bypass.

**Stand-alone UPS unit**

An upgradeable solution
This architecture is secured by an integrated automatic bypass, which constitutes a first level of redundancy guaranteed by the network. The maintenance bypass function allows maintenance to be carried out without shutting down applications. It can be the first stage of your investment, with the possibility to upgrade, as your requirements change, to a modular parallel architecture to increase power or availability (redundancy).

**Parallel UPS systems**

Development without constraint
This is the simplest solution to ensure power supply availability and flexibility in case of unscheduled installation upgrades, by means of the parallel configuration of the UPS units, each one incorporating its own bypass. This configuration enables power output to be increased and is suitable for N+1 redundancy. Upgrades can also be performed keeping the load supplied by the system.

For higher agility, parallel UPS systems are also available with a centralised bypass on the auxiliary power source: in this configuration, the static bypass is in parallel of the UPS modules and can be sized according to particular site constraints (short-circuit withstand, selectivity, etc.).

**Vertical and horizontal modular system**

Flexible and completely modular
This is a new, innovative UPS concept that can adapt to all types of growth. Power can be increased by successively adding modules. The increasing of availability (redundancy) is simply carried out by adding a module to the number required to meet the power requirements for the applications. All the modules are connectible (plug-in). Removal or adding of modules can be carried out with the system running (hot swap) without affecting the general operation of the installation.

**Scalable configuration**

**Scalable redundant configuration**

**Modular parallel UPS system with distributed bypass**

**Modular parallel UPS system with centralised bypass**

**Solution to meet availability and flexible performance**

**Vertical and horizontal modular system**

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**Scalable configuration**

**Scalable redundant configuration**

**Modular parallel UPS system with distributed bypass**

**Modular parallel UPS system with centralised bypass**
Solution to meet availability and energy saving performance

Green Power 2.0

Energy Saving: high efficiency without compromise.
- Offers the highest efficiency in the market using VFI - Double Conversion Mode, the only UPS working mode that assures total load protection against all mains quality problems.
- Ultra high efficiency output independently tested and verified by an international certification organization.
- Ultra high efficiency output tested and verified in a wide range of load and voltage operating conditions to have the value in the real site conditions.
- Ultra high efficiency in VFI mode is provided by an innovative topology (3 Level technology) that has been developed for all the Green Power 2.0 UPS ranges.

Full-rated power: kW=kVA
- No power downgrading when supplying the latest generation of servers (leading or unity power factor).
- Real full power, according to IEC 62040: kW=kVA (unity power factor design) means 25% more active power available compared to legacy UPS.
- Suitable also for leading power factor loads down to 0.9 without apparent power derating.

Significant cost-saving (TCO)
- Maximum energy saving thanks to 96% efficiency in true double conversion mode: 50% saving on energy losses compared to legacy UPS resulting in cheaper energy bills.
- UPS “self-paying” with energy saving.
- Energy Saver mode for global efficiency improvement on parallel systems.
- Batteries are permanently maintained under floating charging, maximizing battery lifetime and avoiding periodic restarts of the rectifier.

Advantages

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Energy Saver

- This function optimizes the efficiency ($\eta$) of your UPS in parallel when operating with a partial load.
- Only the UPS needed to supply the energy required by the applications are in operation.
- Redundancy can be ensured by maintaining an additional unit in operation.
- When the power consumed by the applications increases, the UPS units needed to meet the increased power requirements restart instantly.
- This type of operation is perfectly suited to applications subject to frequent variations in power.
- Energy Saver enables the increased efficiency of the whole system to be maintained.

Fast EcoMode

Available as an optional feature for the DELPHYS GP series, FAST EcoMode is an automatic operating mode that optimizes the efficiency depending on the quality of the input voltage (voltage, frequency, harmonic distortion). When the input voltage is within tolerances (value is settable), the load is supplied by the bypass (VFD mode) and the efficiency achieved is 99%. If the voltage becomes out of tolerances, the system instantaneously transfers the load to On-line mode until normal condition recovery.

Batteries are permanently maintained under floating charging, maximizing battery lifetime and avoiding periodic restarts of the rectifier.
### Transformer-based and transformerless technologies

The two main UPS technologies available on the market are:

- **Transformer-based**: useful when primary and secondary sources come from different mains with different neutral systems, transformers, which offer the advantage of high efficiencies combined with a low footprint.

- **Transformerless**: both of these technologies have their advantages and drawbacks. The challenge is to make the right compromise, taking into account on-site conditions with design constraints such as the footprint, neutral system, efficiency, short-circuit currents and so on. SOCOMEC can provide customers with either technology, depending on the requirement.

#### Transformer-based technologies

A "clean" IGBT rectifier

This eliminates any disturbance on the upstream network (power source and distribution).

- This rectifier technology guarantees the supply of current with an exceptionally low rate of harmonic distortion: THDI < 2.5 %.

A consistent rectifier

- The performance of the IGBT rectifier is independent of frequency variations that could be produced by the generator set.
- The power factor and THDI at the rectifier input are constant whatever the battery charge status (continuous voltage level) and the load rate of the UPS.

#### Transformerless technologies

**Economical IGBT rectifier**

- The power factor upstream of the rectifier is 0.99, reducing by 30% the used kVA compared with conventional technology.
- The reduction in input current results in a saving in terms of the size of sources, cables and protective devices.
- Rectifier capabilities:
  - low upstream THDI
  - gradual, timed starting
  - possibility of suspending battery recharge when operating with a generator set.
- This allows the impact caused when the generator set is engaged to be reduced, as well as the energy used and the footprint.

### Static Transfer Systems (STS) for high availability architecture

#### Static Transfer Systems (STS)

- **Static Transfer Systems (STS)** are intelligent units that transfer the load to an alternative source when the primary source is out of tolerance. This ensures “high availability” of the power supply for sensitive or critical installations.
- The purpose of STS devices is to:
  - ensure the redundancy of the power supply to critical installations by means of two independent power sources,
  - increase power supply reliability for sensitive installations,
  - facilitate the design and expansion of installations that guarantee a high availability power supply,
  - increase the overall site flexibility, allowing easy and safe maintenance or source replacement.

#### Static Transfer Systems: some examples of usage

- Normally, STS provide redundancy between 2 independent UPS systems. Each STS is sized according to the load or set of loads it protects.
- It is advisable to install the STS device as close as possible to the load, so as to ensure redundancy of the upstream distribution and to keep the single fault point (the conductor between STS and load) as short as possible.
- The use of several STS also provide electrical load segregation.
- STS can also protect against:
  - main power source failure,
  - spurious tripping of upstream protective devices,
  - mutual disturbances caused by faulty equipment (short-circuit) supplied by the same power source,
  - operating errors (circuit opening) occurring in the supply chain.

#### SVM, digital Space Vector Modulation

The SVM (digital Space Vector Modulation), along with the isolation transformer (or set of loads) it protects.

**DELPHYS MX** guarantees optimal compatibility with your low voltage electrical power supply system and, in particular, with your generator sets:

- sinusoidal current at rectifier THDi input:
  - < 4.5 % without filter
  - increased power factor upstream of the rectifier: 0.93 without filter, reducing the current consumed, and therefore the size of cables and protective devices,
- gradual, sequential start-up of the rectifiers in parallel, facilitating take up by the generating set,
- delayed battery recharge when running on generating set to reduce power consumption.

**HARMONICS**

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**STS systems incorporate reliable and proven solid-state switching technologies (SCR), enabling them to perform fast, totally safe automatic or manual switching without interrupting power to the supplied systems. The use of high-quality components, fault-tolerant architecture, the ability to determine the location of the fault, management of faults and loads with high inrush currents: these are just some of the characteristics that make STS systems the ideal solution for achieving maximum power availability.**

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Static Transfer Systems (STS)

Static Transfer Systems ensure high business availability and provide site maintenance agility.

The ‘2N + STS’ architecture ensures the load is always supplied by high power quality on each input, even if one power distribution is down due to critical fault or for long term maintenance (e.g. source replacement or failure of the electrical infrastructure).

The combination of a multi-source architecture and STS connecting the load to two independent sources ensures they are always supplied even if one of them is down. The critical facility therefore benefits from very high fault tolerance.

In both examples, the STS can be centralised (one high STS rating for each power distribution switchboard) or distributed (close to each server room, row, rack, etc.). The choice of either solution depends on the installation to be protected and on the expected availability or the requested level of maintainability.

Expert Battery System: protecting your battery investment

Expert Battery System (EBS) technology is a system which manages the battery charger.

It responds to the working temperature to preserve battery life and reduce operating costs by:

- charging according to an algorithm which adapts to the environment and the condition of the battery,
- eliminating overloading effects due to permanent floating voltage, which accelerates the corrosion of the positive plates and causes the separators to dry out,
- isolating the DC battery bus, (independent charger function). Premature ageing, caused by residual ripple from the inverter bridge is eliminated.

Tests carried out by SOCOMEC on several brands of batteries, together with years of experience, show that battery life can be enhanced by up to 30% with the use of EBS compared to a traditional battery management system.
The battery is an electrochemical energy storage system able to generate a power inverter that can provide an electric current circuit in a circuit until the energy is exhausted. Batteries can be divided into two categories:

- Primary batteries, which once exhausted, cannot be recharged and returned to their initial state of charge (non-rechargeable batteries).
- Secondary batteries, also known as accumulators, can be recharged and returned to their initial state of charge. They are recharged with a battery charger which should have suitable characteristics to charge the specific battery technology.

Battery parameters and definitions:

- **Capacity (C)** is the mean current expressed in Ah which the battery supplies in a complete discharge carried out over a specific period of time. For example, C indicates the current supplied by the battery in case of discharge in 1 hour, C/10 the current in case of discharge in 10 hours, C/5 in case of discharge in 5 hours, C/10 in case of discharge in 10 hours, etc.
- The rated capacity depends on the battery technology; for example, the rated capacity for lead-acid batteries is C/10, while for NiCd batteries is C/5.
- **Energy density:** the amount of energy (in Watts hour per Kg, Ah/Wh) stored per unit of volume or weight.
- **Internal impedance:** this is composed linked to the type of battery and also depends highly on temperature (when the temperature increases, the self-discharge percentage increases).
- **Depth of Discharge (DoD):** the fraction of the capacity of the battery that is discharged from the battery during the discharge phase. Expressed as a % of capacity, it is calculated using the following formula:
  \[ \text{DoD} = 1 - \frac{\text{State of Charge (SoC)}}{100} \]
- **Cycle Life:** the number of charge and discharge cycles at controlled temperature that the battery can withstand before the rated capacity is reduced to 80% of the initial value. The cycle life is very sensitive to temperature and to the depth of charge, to the extent that it is declared at a specific DoD value.
- **Actual Life:** the battery service life in real conditions of use. This depends on the Calendar life, the Cycle life, the ambient temperature and the type of charge and discharge.
- **Rated capacity:** the percentage of capacity not lost by the battery when not used (e.g., during storage in the warehouse) and linked to the type of battery and also depends highly on temperature (when the temperature increases, the self-discharge percentage increases).
- **Internal impedance:** this is composed of an inductive, a capacitive and a resistive part. It impedes the passage of current, increasing heat generation in the discharge phase. The most important part of the impedance to be monitored is the resistive part, as it indicates the state of health of the battery and on possible deterioration in progress. The internal resistance is influenced by various factors, the most important of which is temperature. The typical impedance value change according to the battery technology and capacity.

### Lead acid battery (LA)

Lead acid batteries are the most used battery solution for stationary applications. Expected life for this type of batteries is of 3 to 5 years according to Eurobat classification. Cycle life is usually poor even if certain of these batteries have good high levels of performances in cycling applications. Lead acid batteries offer a mature and well-researched technology at low cost. There are many types of lead acid batteries available, e.g., vented and sealed housing versions. Vented regulated lead acid batteries, VRLA, requiring less maintenance. VRLA batteries can be AGM (absorbed glass material, where the electrolyte is absorbed in a fiber glass or GEL, type (where the electrolyte is a gel used in higher temperature environments and in specific applications). One disadvantage of lead acid batteries is usable capacity decrease when high power is discharged. For example, if a battery is discharged in one hour, only about 50% to 70% of the rated capacity is available. Other drawbacks are lower energy density (lead has high specific weight) and the use of lead, a hazardous material prohibit or restricted in specific environments and applications. Advantages are a favorable cost/ performance ratio, easy recyclability and a simple charging technology.

### Nickel cadmium battery (NiCd)

Compared to lead acid batteries, NiCd batteries have a higher power density, a slightly greater energy density and the number of cycles is higher. NiCd batteries are relatively rugged, are the only batteries capable of performing well at low temperatures in the range from -20°C to -40°C, and their life expectancy is still good even at high temperatures, so they are used in warm countries and in applications where high temperature is a constraint. Large battery systems using vented NiCd batteries operate on a scale similar to lead-acid batteries. NiCd batteries are normally vented so they need be stacked vertically with good ventilation, and they cannot be transported in a charging condition (electrolyte is shipped separately).

### Lithium-ion battery (Li-ion)

Li-ion batteries have high gravimetric energy density, meaning that a Li-ion battery solution is lighter and needs less floor space compared to LA or NiCd batteries. For Li-ion batteries, the calendar life (over 10 years) and cycle life (thousands of cycles) are very good even at high temperatures. Gin the high efficiency is high and with no overcharging for short back-up time (typical for UPS applications), it can be seen that Li-ion technology has several technical advantages. Most of the metal oxide electrodes are thermally unstable and can decompose at elevated temperatures, releasing oxygen which can lead to a thermal runaway. To minimize this risk, Li-ion batteries connected in series to obtain a voltage compatible to the UPS range are equipped with a monitoring unit to avoid over-charging and even discharging. A charge balance circuit is also installed to monitor the voltage level of each individual cell and prevent voltage deviations among them.

### Supercapacitors / Ultracapacitors

There are a number of different technologies that fall under the name “supercapacitors” or “ultracapacitors.” The 2 main technologies are:

- **Symmetric Electrical Double Layer Capacitors (Symmetric EDLC), where activated carbon is used for both electrodes. The charge mechanism is purely electrostatic; no charge moves across the electrode/electrolyte interface.**
- **Asymmetric Electrical Double Layer Capacitors (Asymmetric EDLC) where a battery electrode is used for one of the electrodes. The battery electrode has a large capacity in comparison to the carbon electrode, so that its voltage does not change significantly with charge. This allows a higher overall cell voltage. Supercapacitors deliver quick bursts of energy during peak power demands, then quickly store energy; their extremely low internal resistance enables a fast discharge and recharge with unbeatable high round-trip efficiency. In addition, they usually do not use hazardous materials, and they have very low self-discharging so little current when in standby mode (which means less energy consumption for the UPS) and can go for longer periods without being recharged.

### Lithium-ion capacitors (LIC)

The capacity is a hybrid between a battery and a capacitor (asymmetric EDLC). The LIC capacitor comprises an activated carbon cathode (hence no safety risks due to thermal runaway), an anode of Li-doped carbon and electrolyte containing a Li salt, as a battery. This hybrid construction creates a capacitor which yields the best performance features of batteries and capacitors. The hybrid battery construction offers many advantages. These include high energy density and high voltage, the benefit being when connected in series, up to a 1.5x higher LC cell voltage compared to a conventional EDLC capacitor. Another advantage is the very low level of self-discharging: the LIC can hold 95% of its charge for 3 months. As it takes so little current when in Floating mode, the UPS requires less energy consumption and the LIC can go for longer periods without being recharged.

LIC technology also has the added benefits of higher safety levels (no risk of thermal runaway), a high power density and quick charging and discharging. It is also more reliable, with high cycling (its estimated life is 1 million charge/ discharge cycles) and resistance to a wide temperature range (-20°C to 70°C) that makes it ideal for use in difficult operating environments.

### Flywheel

Flywheels store energy in the form of momentum in a spinning mass. An electric motor opens the rotor to a high speed to charge the flywheel. During discharge, the motor acts in reverse to convert the rotational energy into electricity. The energy stored in a flywheel depends on the mass and on the velocity according to the following equation:

\[ E = \frac{1}{2} J \omega^2 \]

Where:  
- \( J \): the moment of inertia of the rotor (kgm²), and  
- \( \omega \): the angular velocity. Since the energy has a quadratic proportion with angular velocity it is very important that the flywheel runs at very high velocity (over 30,000 rpm), for these reasons modern flywheels use magnetic levitation to avoid friction losses and spins under a sealed vacuum. The flywheel does not suffer restrictions due to high temperature (no calendar life reduction), does not have any hydrogen emission during recharging as in the case of lead acid batteries), can be recharged in a very short time, has a high-cycling range without reducing its expected life, does not use any use of hazardous materials and can be stored where space for installation is limited. Flywheels have an output power measured in hundreds of kW and so are ideal to be used in high power UPS systems.

### Compressed air energy storage (CAES)

In compressed air energy storage, electrical power is used to compress air and store it in a dedicated structure. When power is required, the compressed air is immediately converted to electricity by driving through a screw expander in turn driving an electrical generator. The typical application is for power bridging to switch mains power to genset power (but not in case of frequent micro interruptions). CAES systems can be parallelized to increase back-up time or to add redundancy. CAES can also be used in harsh environments and their long calendar life is not affected by temperature. When the system is fully charged it does not require any significant energy consumption, increasing the overall efficiency of a traditional battery-based UPS system.

1. (1) Thermal runways: a situation under abnormal operating conditions where a battery generates heat at a higher rate than it can dissipate. Thermal runways can melt the plastic components of the batteries, releasing gas, smoke and acid that can damage adjacent equipment.
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