

TekSea®

TEKPOWER

Technical Catalog

TPS 24 Switched-Mode Rectifier / Battery Charger



Peace of mind in mission-critical applications.

- High-Frequency Switched-Mode Rectification
- Hot-Swappable Modular Architecture for High Availability
- High Power Factor and Low Harmonic Distortion
- User-Friendly and Intuitive Human-Machine Interface
- Easy Integration with Lithium Batteries

Purposes and Applications

The TekSea Tekpower TPS24 Battery Rectifier/Charger is a high-frequency switched-mode system designed with a modular architecture. Its main function is the controlled charging of electrical storage batteries, ensuring high energy efficiency and continuous direct-current power supply.

With hot-swappable rectifier units, the TPS24 allows scalable expansion and maintenance without interruption. In addition to charging the batteries, it can simultaneously supply DC loads, ensuring operation in critical applications.

When supplied together with a battery bank, it operates as an Uninterruptible DC Power Supply System (DC UPS), maintaining the power supply even in the event of AC grid failures. The equipment features high-precision static regulation, low ripple, and efficiency of up to 94%.

Designed to withstand severe power-grid conditions, the TPS24 combines high power density with advanced protection and redundancy features, ensuring stable and reliable performance in mission-critical applications.



FEATURES

The Tekpower TPS24 combines a high-frequency modular architecture with proven reliability, delivering superior performance in critical power applications.

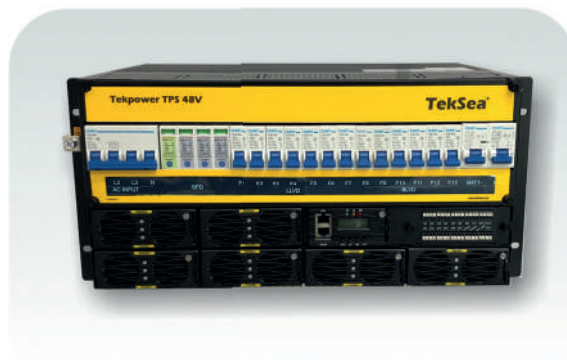
- Hot-swappable rectifier modules, ensuring maintenance without interruptions
- Scalable expansion of up to 40 modules in parallel, increasing capacity according to demand
- High efficiency (up to 94%) and low ripple (<1%), ensuring clean and stable power
- User-configurable alarms;
- Digital closed-loop battery current limiting
- Comprehensive protection against short circuits, input and output undervoltage/overvoltage, phase loss, and overtemperature
- Integrated battery testing, with scheduled, quick, or constant-current test options
- Automatic voltage compensation according to temperature
- Automatic and manual charging modes (float and equalization)
- Active power factor correction (PF > 0.99), reducing reactive currents and ensuring efficiency at full load
- Wide AC input range, reliable on unstable power grids and generator sets
- Compatibility with various communication protocols (DNP3, MODBUS TCP, IEC 61850, etc.) via gateway
- Gradual startup and dynamic compensation for power-supply frequency fluctuations: Compatibility with small generators
- Fast dynamic response to load steps

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Technological Differentiators

ANATEL Certification

- The TPS48 is ANATEL certified, fully complying with the electrical safety, electromagnetic compatibility, and technical performance requirements established for telecommunications equipment.



Performance and Reliability

- High-frequency modular architecture, ensuring low ripple and excellent static and dynamic regulation.
- Reliable operation even in low-quality power grids, tolerating high harmonic distortion and severe voltage and frequency variations, including critical conditions with generator sets.



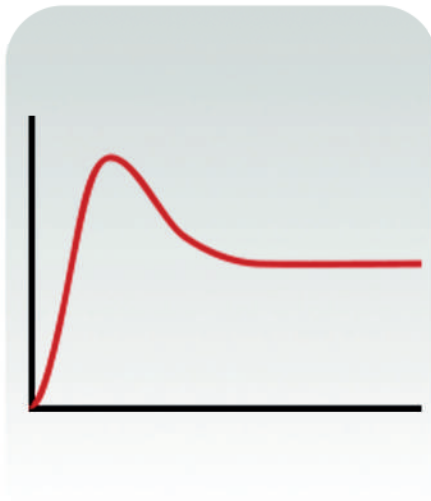
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Controller HMI

- Intelligent HMI with a 128×32-pixel LCD display, local interface for configuration and diagnostics with LEDs (green, yellow, and red).
- Storage of up to 1,000 alarms and 1,000 events (FIFO).
- Based on an ARM Cortex-M4 CPU with an RTOS system, it ensures robust, fast, and user-friendly operation.

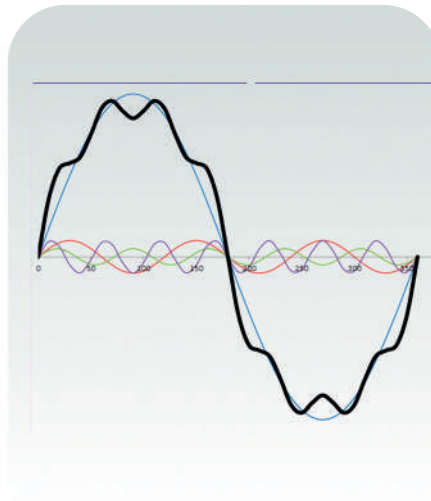


Technological Differentiators



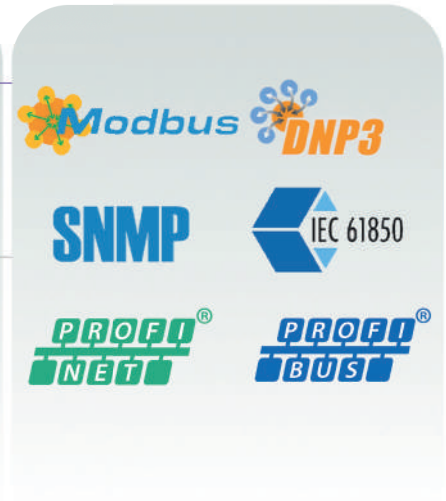
Short-Circuit Protection

Thanks to its high-frequency modular architecture combined with advanced digital control, the Tekpower TPS24 withstands short circuits both at the load output and at the battery output. This feature ensures operator safety and prevents equipment damage even under extreme conditions.



High Harmonic Distortion Support

The Tekpower TPS24 is designed to operate stably even on power grids with high levels of harmonic distortion, without compromising system service life or reliability. This robustness makes the equipment suitable for substations and industrial plants operating under severe grid conditions or with generator sets.



Integration with Supervisory Systems

Available protocols:

- ✓ Modbus RTU
- ✓ Modbus TCP
- ✓ DNP3
- ✓ SNMP (v1, v2c and v3)
- ✓ MMS IEC 61850
- ✓ Profibus
- ✓ Profinet, among others.

Technological Differentiators



Compatibility with Multiple Battery Technologies

- ✓ Flexibility to operate with different types of batteries, including vented lead-acid, VRLA, Ni-Cd, and lithium batteries.
- ✓ Allows adaptation to different projects and customer requirements, ensuring greater versatility in industrial and mission-critical applications.



Electrical Protection and Full Isolation

The rectifier modules feature complete isolation between their internal stages, ensured by the unit topology, providing greater reliability, protection against grid disturbances, and continuity of operation.



100% Brazilian Technology

TekSea invests in Brazilian technology as a strategic pillar, with solutions developed by a technical team composed of engineers, master's degree holders, and PhDs. This commitment strengthens innovation and drives the technological development of Brazilian industry.

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TSU2480 – Rectifier Unit of the TPS24 System



The TSU2480 is the rectifier module that makes up the TPS24 Rectifier/Charger. Designed for high-frequency operation, it provides superior reliability and performance for critical applications.

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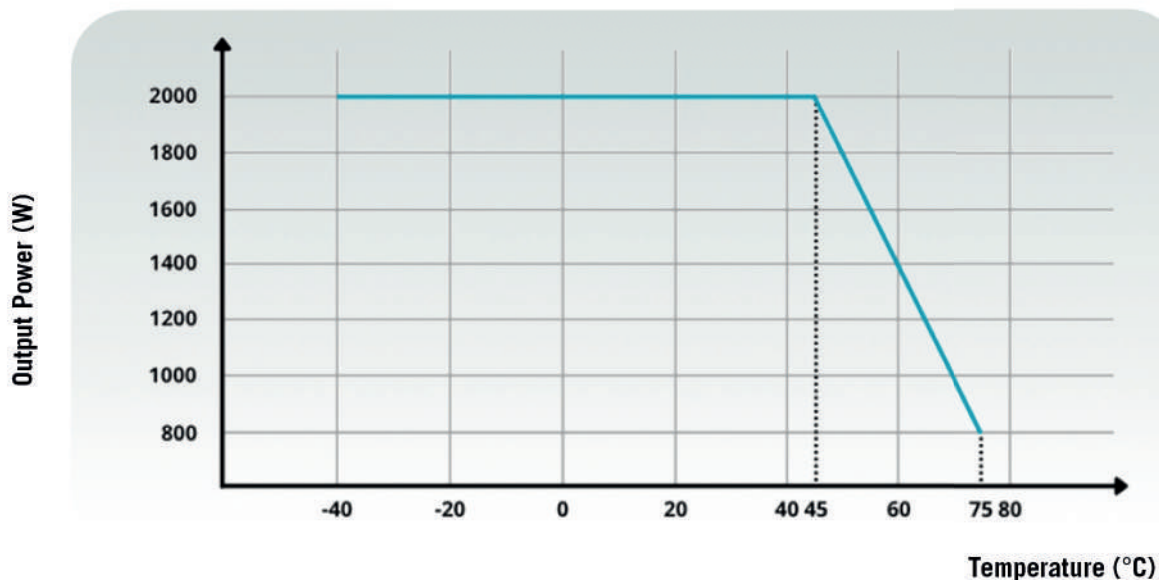
Key Highlights:

- ✓ Rated power of 2 kW and output current of 80 A
- ✓ Hot-swappable architecture, allowing replacement without shutting down the system
- ✓ Closed-loop digital control, ensuring voltage and current accuracy
- ✓ Parallel operation of up to 40 modules, ensuring scalability and N+1 redundancy

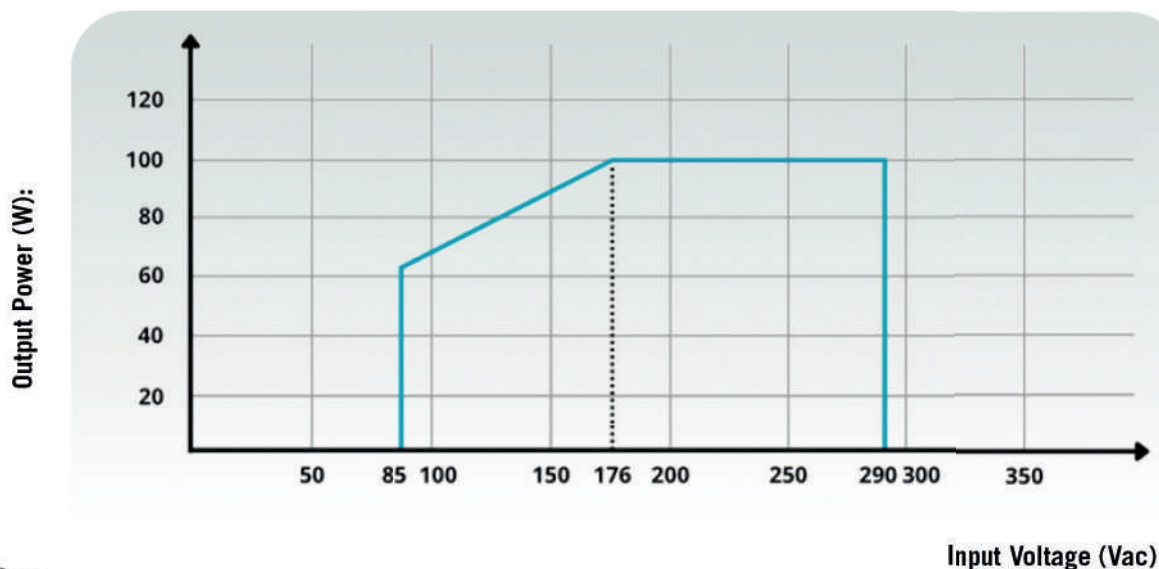
The **TSU2480** integrates electronic protection, automatic current sharing between modules, high efficiency, and ripple < 1%. Even under severe conditions, it maintains stable operation through thermal derating and its hot-swappable design, ensuring high system availability.

Output Power vs. Temperature

$176 \text{ Vac} \leq \text{Input Voltage} \leq 290 \text{ Vac}$

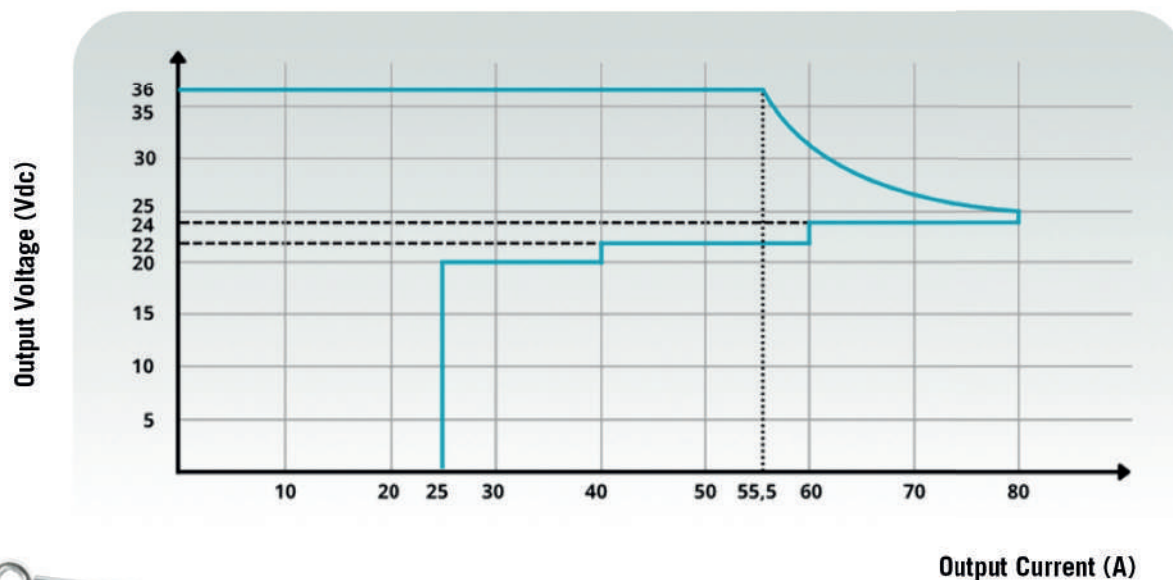


Output Power vs. Input Voltage



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Output Voltage vs. Output Current



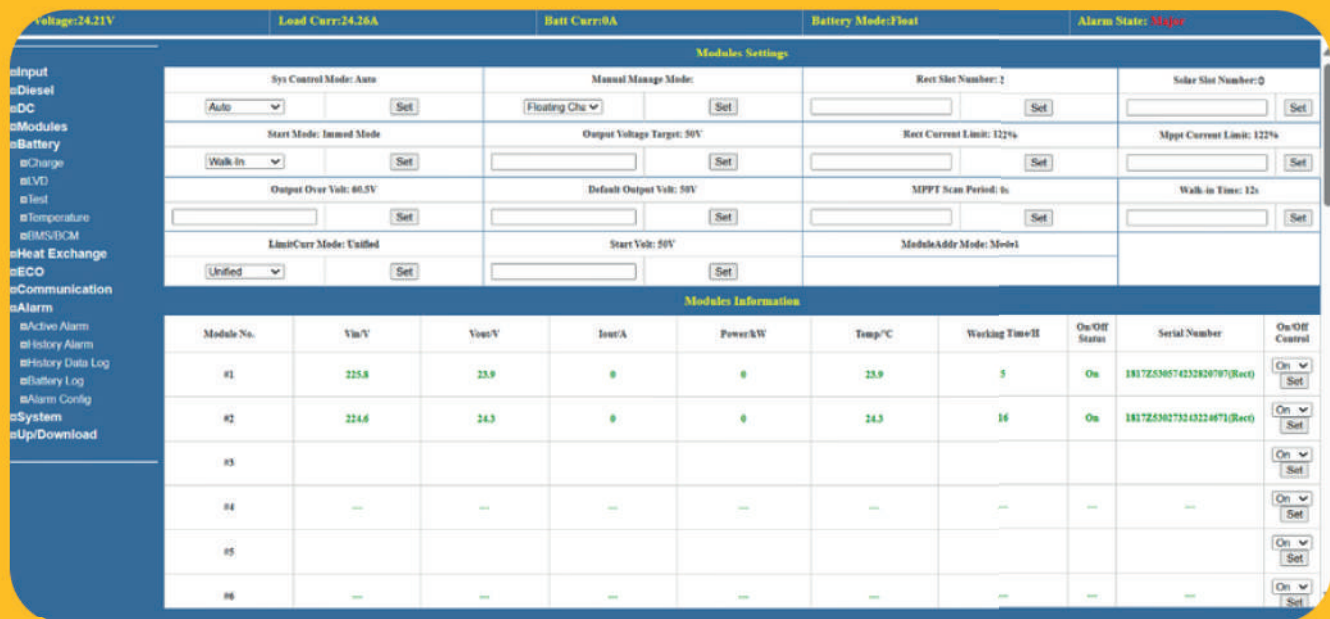
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Advanced Tekpower TPS Features

INTEGRATED WEB INTERFACE

The **Tekpower TPS24** integrated web interface provides full control and visualization of the system directly through a web browser, eliminating the need for external software. Through the interface, it is possible to fully configure operating parameters, set alarm limits, and manage battery and rectifier monitoring in an intuitive and secure manner.

In addition to configuration, the interface provides advanced monitoring and logging features, displaying voltages, currents, operating states, and alarms in real time. All events and measurements are stored in detailed logs, enabling historical analysis, remote diagnostics, and traceability of system conditions, ensuring greater reliability and efficiency in operation and maintenance.



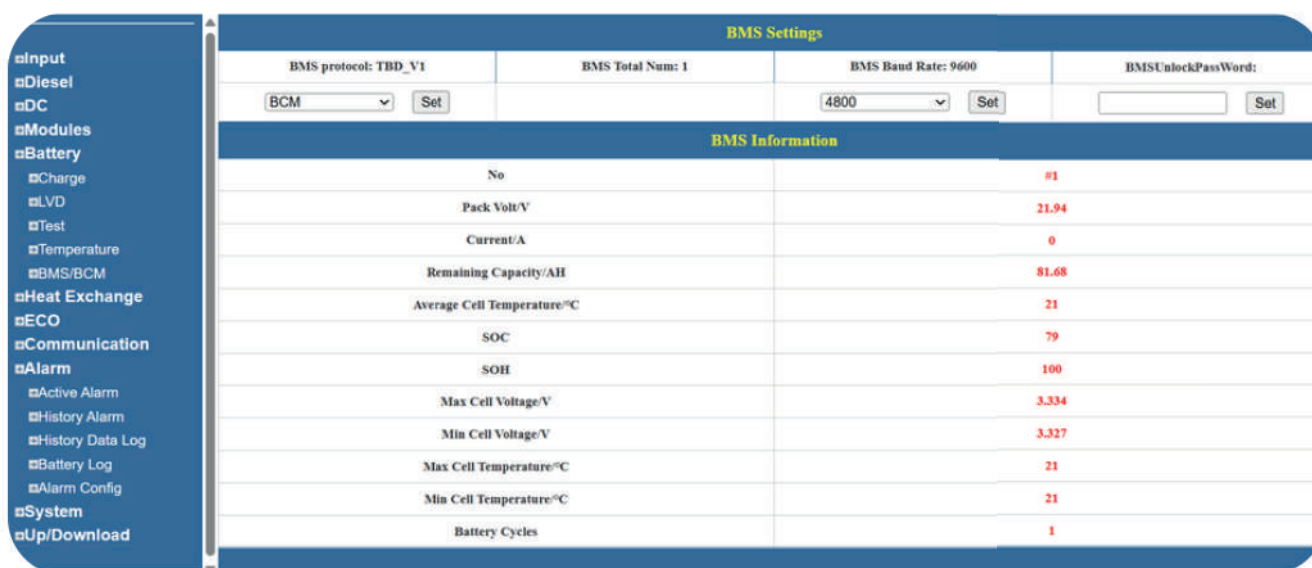
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Advanced Tekpower TPS Features

LITHIUM BATTERY BANK MONITORING (BMS)

The **Tekpower TPS24** features a dedicated interface for intelligent lithium battery monitoring, enabling direct communication with the batteries' BMS through the RS485 port. This function allows real-time reading and monitoring of individual module voltages, currents, temperatures, and alarms, ensuring safe and balanced operation of the battery bank.

The system is compatible with various batteries through the Modbus RTU protocol and allows the configuration of new batteries via the web interface, providing flexibility for integration with different LiFePO₄ battery manufacturers. In addition, it enables the storage and diagnosis of BMS events, providing traceability and greater reliability to the power system.



BMS Settings			
BMS protocol: TBD_V1		BMS Total Num: 1	BMS Baud Rate: 9600
BCM Set		4800 Set	Set
BMS Information			
No			#1
Pack Volt/V			21.94
Current/A			0
Remaining Capacity/Ah			81.68
Average Cell Temperature/°C			21
SOC			79
SOH			100
Max Cell Voltage/V			3.334
Min Cell Voltage/V			3.327
Max Cell Temperature/°C			21
Min Cell Temperature/°C			21
Battery Cycles			1

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Advanced Tekpower TPS Features

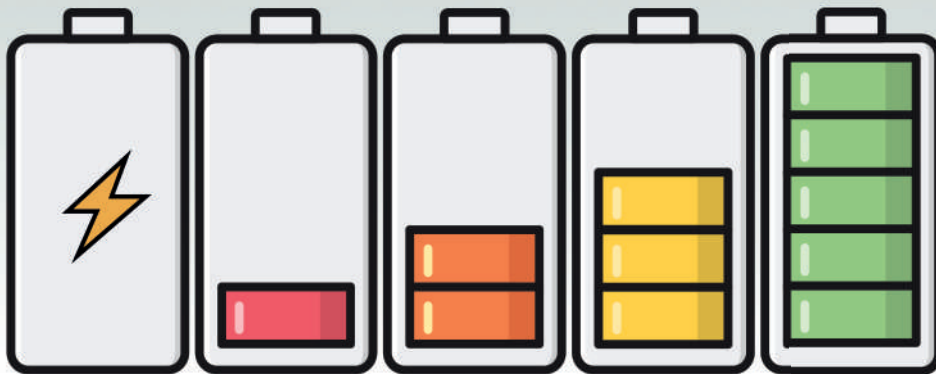
INTEGRATED BATTERY TESTING

The **Tekpower TPS24** incorporates an exclusive battery-testing function that allows accurate assessment of the condition and autonomy of the battery bank, reducing operational risks and ensuring reliability in emergency situations.

The **Tekpower TPS24** performs programmable tests (quick, complete, or scheduled), monitoring voltage, current, and temperature in real time to determine the actual autonomy and state of health of the batteries.

- ✓ Automatic and periodic tests
- ✓ Early detection of degradation or failures in battery-bank elements
- ✓ Complete monitoring during the test, with recording and historical data available through the web interface
- ✓ Automatic protection against undervoltage, overcurrent, and overtemperature

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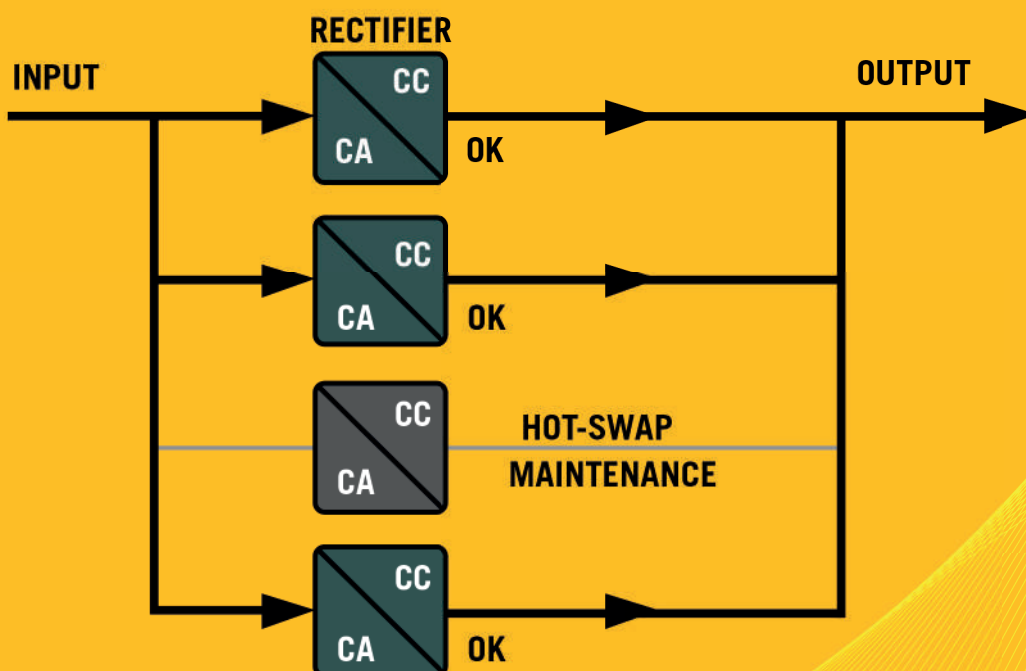
Advanced Tekpower TPS Features

HOT-SWAPPABLE ARCHITECTURE

The TPS24 system was designed to maintain operational continuity in mission-critical environments. Each rectifier module is hot-swappable, allowing it to be replaced or inserted while the system is energized, without the need to shut down the equipment or interrupt power to the loads. All modules operate actively in parallel, maximizing the utilization of installed power and providing N+1 redundancy.

Key Hot-Swap Features of the TPS24:

- ✓ **Safe replacement:**
each module has its own circuit breaker and individual protections, ensuring electrical isolation during removal
- ✓ **Guaranteed continuity:**
the remaining modules automatically take over the current share of the removed module
- ✓ **Automatic reinsertion:**
when a new module is inserted, it is synchronized with the DC bus and begins sharing the load
- ✓ **Reduced operating costs:**
maintenance without prolonged scheduled shutdowns
- ✓ **Scalability:**
capacity can be expanded simply by adding new modules.



Advanced Tekpower TPS Features

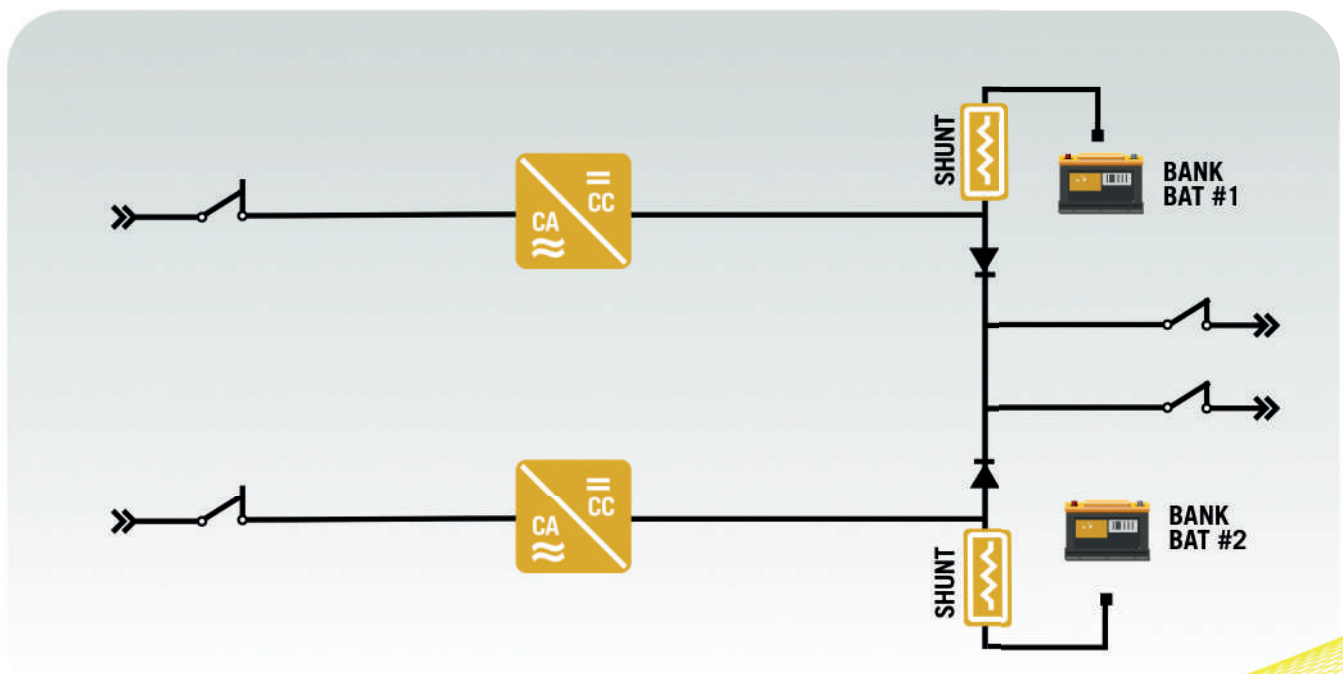
CONFIGURAÇÃO PARALELO

The **Tekpower TPS24** was developed to operate reliably in parallel with other rectifiers, increasing current capacity and providing greater flexibility for system expansion.

This configuration can be supplied with a blocking diode, which ensures:

- ✓ **Proper charging of the battery bank**, preventing unwanted current circulation between rectifiers
- ✓ **Balanced sharing of load currents**, preserving equipment service life and ensuring stability on the DC bus
- ✓ **Additional safety in critical applications**, preventing reverse current in the event of a rectifier failure.

Parallel operation enables everything from simple capacity expansion to the implementation of redundant architectures, making the Tekpower TPS24 a robust and scalable solution for mission-critical DC power systems.



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TPS 24 Switched-Mode Rectifier / Battery Charger

TECHNICAL SPECIFICATIONS

General Data	Power Range	Up to 80 kW
	Topology	High-Frequency Switched-Mode
	Technology	Modular
	Isolation	Full
AC Input	System	1Ph / 2Ph / 3Ph / 3Ph + N
	Nominal Voltage	According to customer request
	Nominal Frequency	50 / 60 Hz
	Frequency Variation	45 to 66 Hz
	Power Factor	> 0.99
	THDi	< 5%
DC Output	Nominal Voltage	20 ~ 36 Vdc
	Rated Current	Up to 3,200 A
	Voltage Ripple	< 1% Vrms
	Efficiency	94%
	Static Regulation	± 1%
	Dynamic Regulation	± 5% (Settling time < 50 ms)
TSU2480 Rectifiers	Input Voltage	176 ~ 290 Vac (2,000 W) / 85 ~ 176 Vac (linear derating from 1,250 to 2,000 W)
	Efficiency	94%
	Power Factor	> 0.99
	THDi	< 5%
	Rated Power	2,000 W
	Maximum Current	80 A
	Operating Temperature	-40°C to +45°C (2,000 W) 45°C ~ 75°C (linear derating from 2,000 W to 800 W)
	Dimensions (HxWxD)	41.5 mm x 106.5 mm x 286 mm (1U)
	Weight	< 2 kg
	Ventilation	Forced Air Cooling
System	Display	128 x 32-pixel LCD HMI
	Standard Communication Protocols	Modbus RTU - RS485 SNMP v2c Dry Contact
	Ethernet Communication Protocols (optional)*	Modbus TCP DNP3 SNMP v3 MMS IEC 61850
	Additional Features	Battery Output Current Limiting Battery Test Function Communication with Lithium Batteries Web Supervisory Access
	Options	Battery Temperature Sensor Battery Disconnection by Contactor Load Disconnection by Contactor Additional HMI with 7-inch touchscreen display

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TECHNICAL SPECIFICATIONS

Environmental Conditions	Operating Temperature	-40°C to +75°C
	Humidity	5% to 95% (Non-Condensing)
	Altitude	< 3,000 m
Certificações	Compliant with:	IEC CISPR 22 (Conducted and Radiated EMI)
		IEC-61000-4-2 (ESD - Electrostatic Discharge Immunity)
		IEC-61000-4-6 (Conducted Immunity)
		IEC-61000-4-3 (Radiated Immunity)
		IEC-61000-4-4 (EFT - Electrical Fast Transients)
		IEC-61000-4-5 (SURGE - Surge Immunity)
		IEC-61000-4-11 (DIP - Voltage Interruption Immunity)
		IEC-61000-3-2 (Current Harmonics)
		IEC-61000-3-3 (Voltage Fluctuations & Flicker)
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* Other options available upon request.

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Also explore other solutions in our portfolio



Power

Thyristor Rectifier/Chargers
(with and without battery bank)

Industrial and Commercial UPS
Systems (Modular).

BMS - Battery Monitoring
System

DC/AC Inverters with Static
Switch



Integration

Electrical Panels for Auxiliary
Services

Monitoring and Automation
Systems



Services

Maintenance Contracts and
Specialized Technical Support

Spare Parts Supply

Retrofit and Modernization
Services

24/7 Hotline Support

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**Get in touch and learn how to integrate
these solutions into your project.**

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The information contained in this document consists of general descriptions of the available technical solutions and is provided for reference purposes only.

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