

TekSea®

TEKPOWER

Catálogo Técnico

Rectifier / Charger TPS 48 Switching

Peace of mind in critical missions.

- Anatel Certification
- High-frequency switching rectification
- Advanced solution for critical industrial applications
- Low input harmonic content
- High-power-density rectifier modules
- Easy integration with Lithium Batteries.



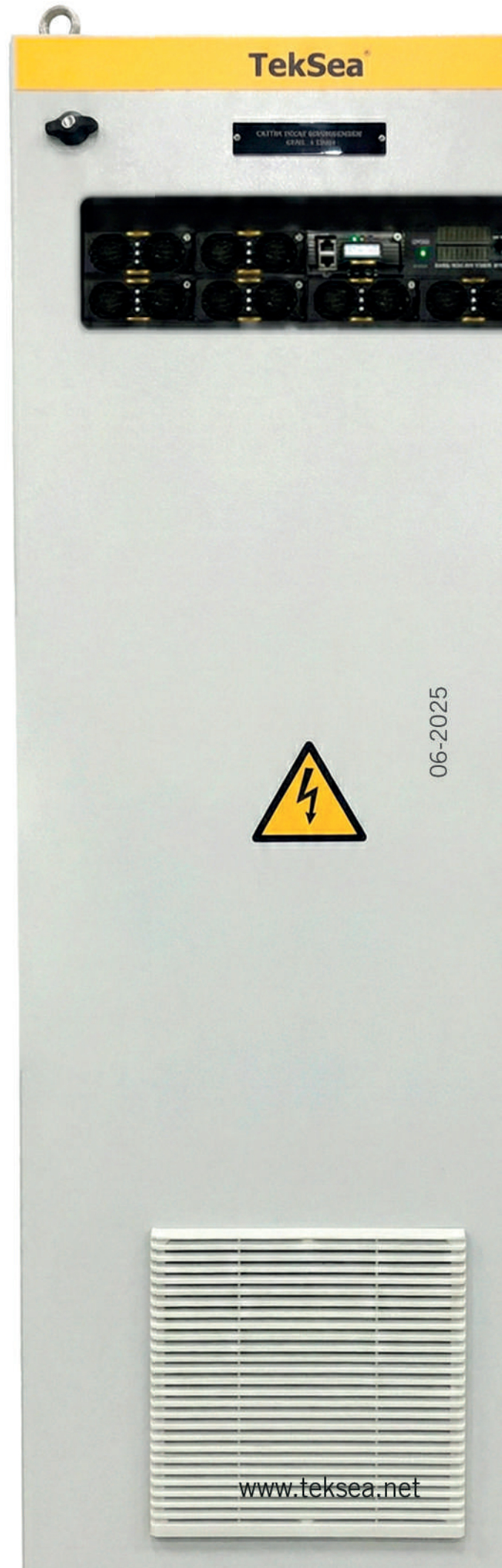
Purpose and Applications

The Tekpower TPS48 Battery Rectifier Charger from TekSea is a high-frequency switching system designed with a modular architecture. Its main function is the controlled charging of electrical battery banks, ensuring high energy efficiency and continuous DC power supply.

With hot-swappable rectifier units, the **TPS48** 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 power supply even in the event of AC grid failures. The equipment features high-precision static regulation, low ripple, and efficiency of up to 96%.

Designed to withstand severe power grid conditions, the **TPS48** combines high power density with advanced protection and redundancy features, ensuring stable and reliable performance in mission-critical applications.



Features

The Tekpower TPS48 combines a high-frequency modular architecture with proven reliability, delivering superior performance in critical power applications.

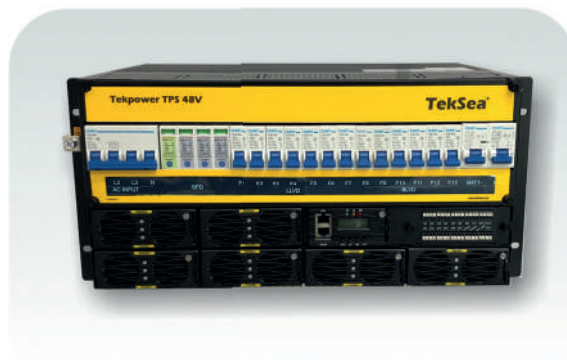
- Hot-swappable rectifier modules, ensuring maintenance without interruptions
- Scalable expansion of up to 40 modules in parallel, increasing capacity according to demand
- High efficiency (up to 96%) and low ripple (<1%), ensuring clean and stable power
- User-configurable alarms
- Closed-loop digital battery current limiting
- Comprehensive protection against short circuits, input and output undervoltage/overvoltage, phase loss, and overtemperature
- Integrated battery testing, with options for scheduled, quick, or constant-current tests.
- 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 in unstable grids and generator sets
- Compatibility with various communication protocols (DNP3, MODBUS TCP, IEC61850, etc.) via gateway
- Gradual startup and dynamic compensation for power supply frequency fluctuations: Compatibility with small generators
- Fast dynamic response to load steps.

06-2025

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.

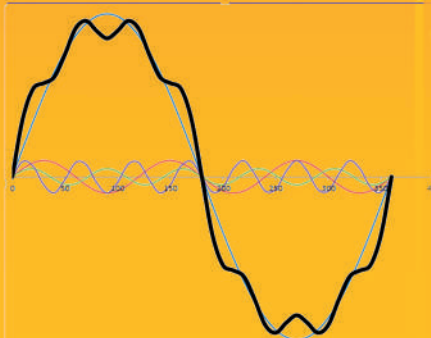


Technological Differentiators



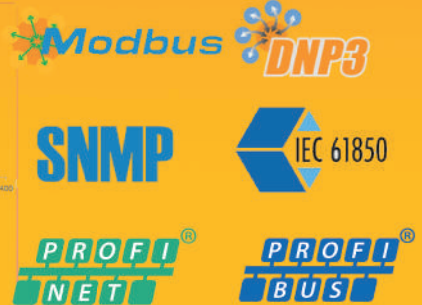
Short-Circuit Protection

Thanks to its high-frequency modular architecture combined with advanced digital control, the Tekpower **TPS48** 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.



Support for High Levels of Harmonic Distortion

The **Tekpower TPS48** is designed to operate stably even on grids with high levels of harmonic distortion, without compromising the system's service life or reliability. This robustness makes the equipment ideal 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 battery systems, 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 full 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 and professionals with master's and doctoral degrees. This commitment strengthens innovation and drives the technological development of the Brazilian industry.

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TSU4850 – Rectifier Unit of the TPS48 System



The **TSU4850** is the rectifier module that makes up the **TPS48 Rectifier/Charger**. Designed for high-frequency operation, it offers superior reliability and performance for critical applications.

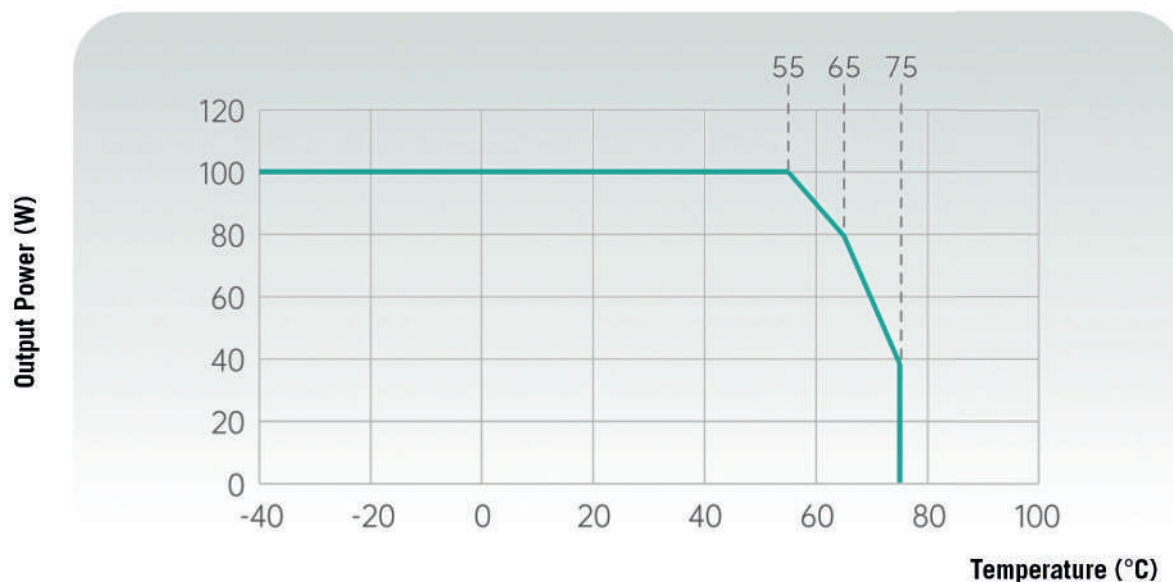
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Main Highlights:

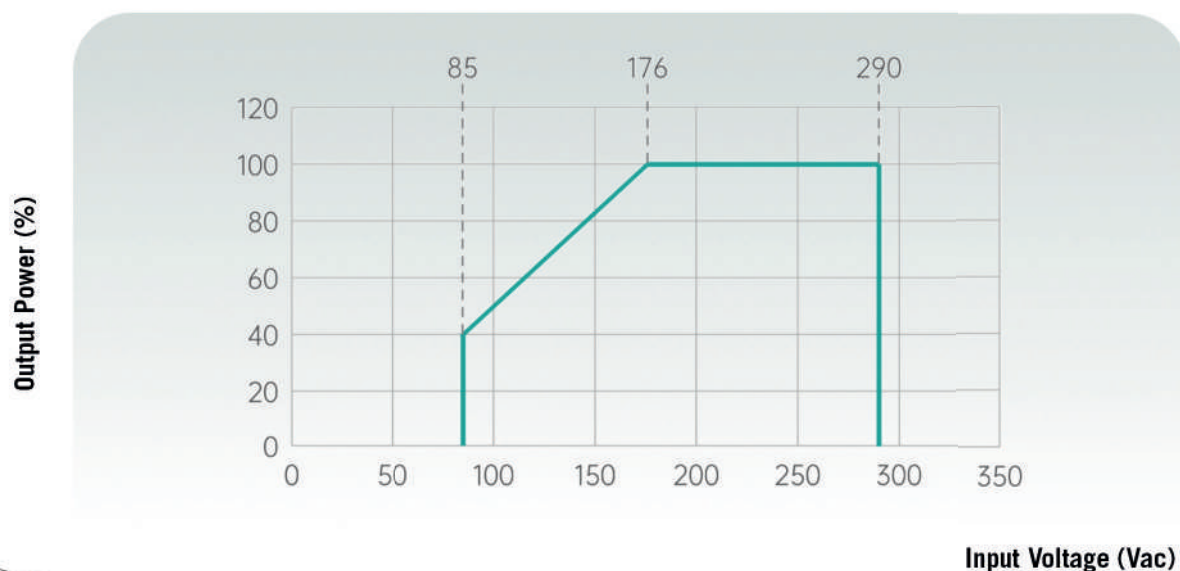
- ✓ Rated power of 3 kW and output current of 55.5 A
- ✓ Hot-swappable architecture, allowing replacement without shutting down the system
- ✓ Closed-loop digital control, ensuring voltage and current accuracy
- ✓ Parallel operation of up to 40 modules, ensuring scalability and n+1 redundancy

The **TSU4850** integrates electronic protection, automatic current sharing between modules, high efficiency, and ripple < 1%. Even under severe conditions, it maintains stable operation thanks to thermal derating and the hot-swappable concept, ensuring high system availability.

Output Power vs. Temperature

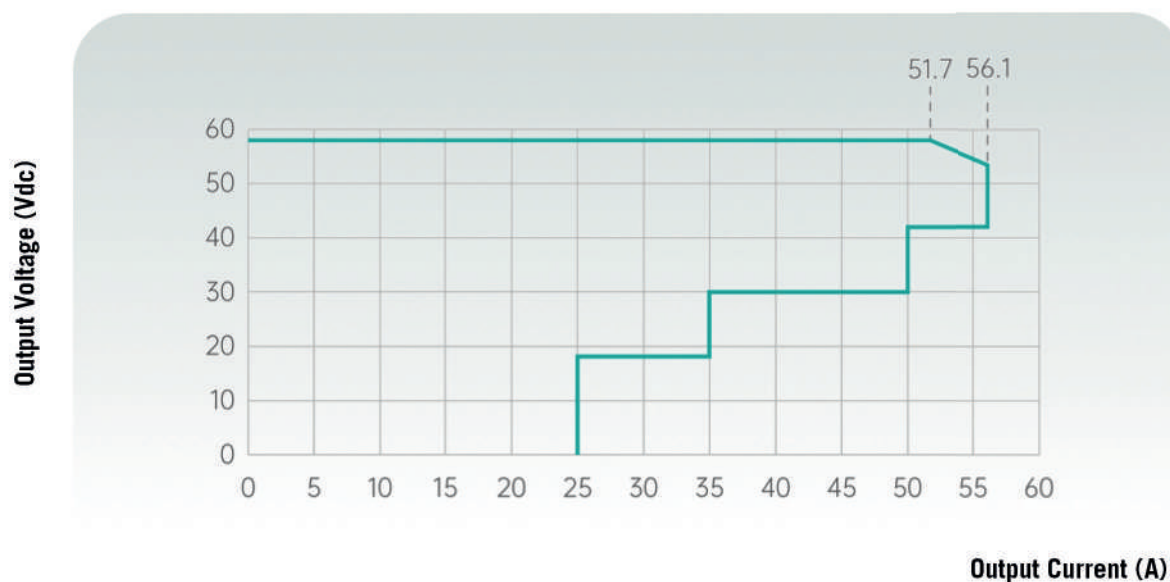


Potência de Saída x Tensão de Entrada

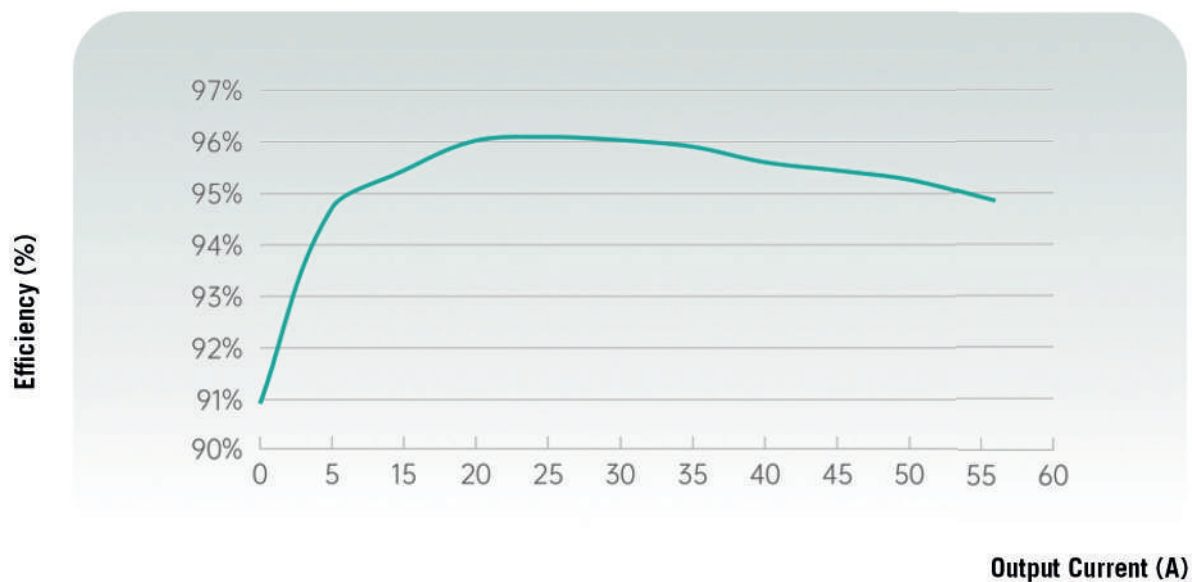


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Output Voltage vs. Output Current



Efficiency Curve



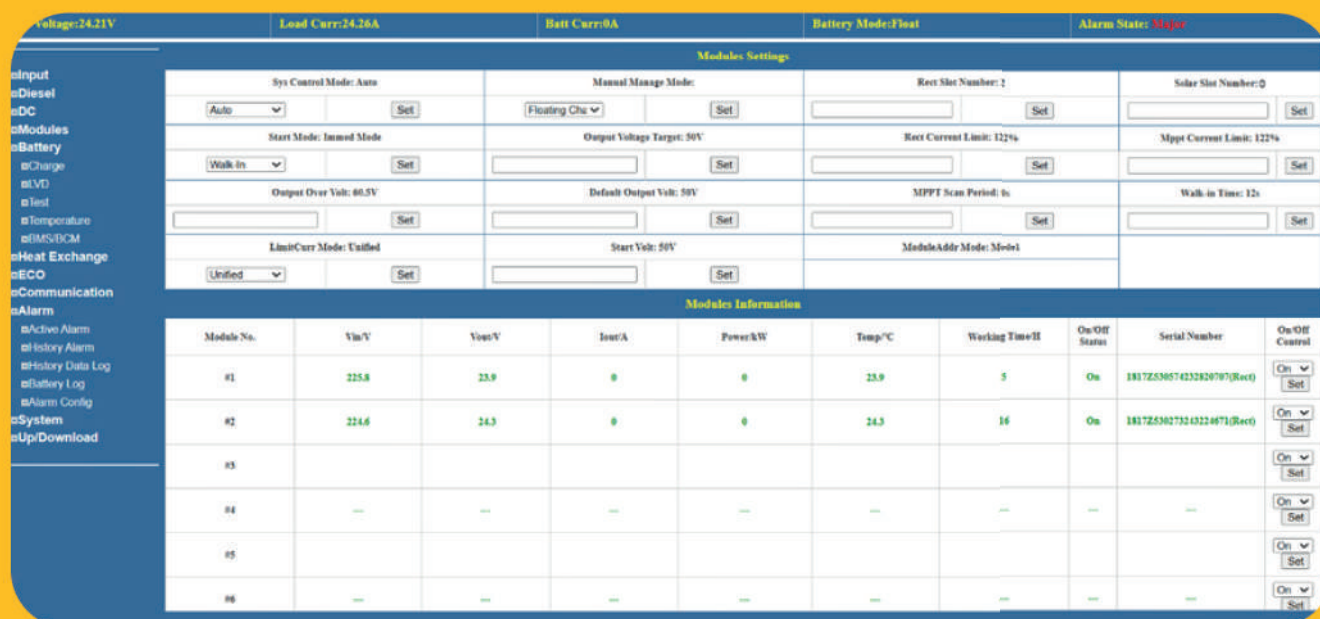
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Advanced Features of the Tekpower TPS

INTEGRATED WEB INTERFACE

The integrated web interface of the **Tekpower TPS48** provides complete control and visualization of the system directly through a web browser, eliminating the need for external software. Through the interface, users can fully configure operating parameters, set alarm limits, and manage the monitoring of batteries and rectifiers 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.



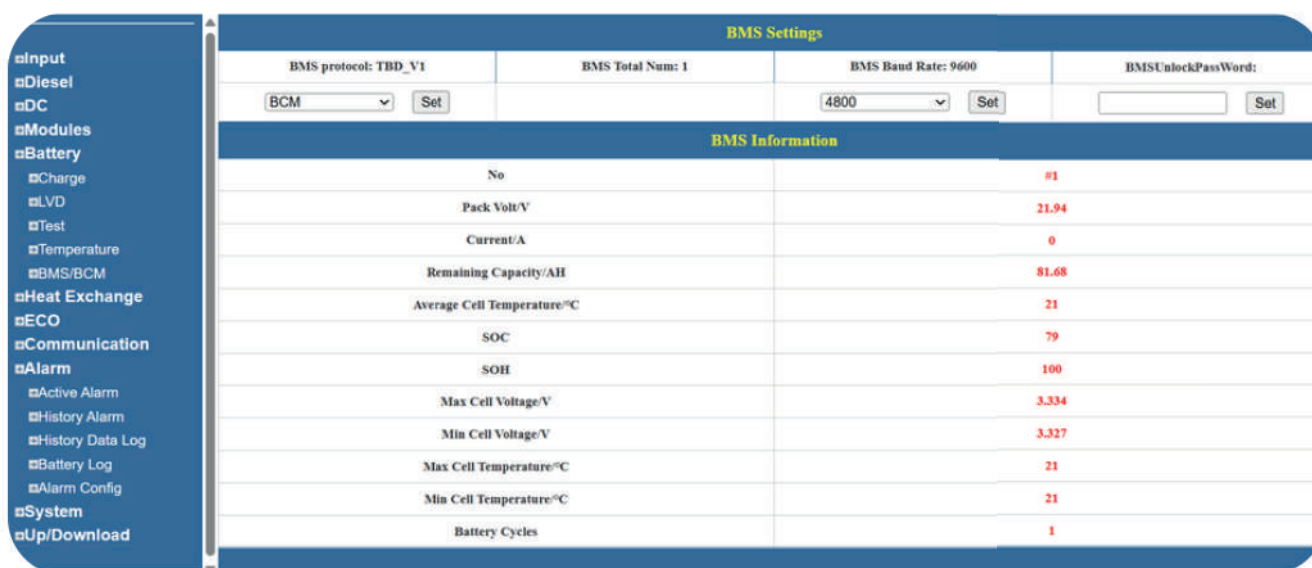
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Advanced Features of the Tekpower TPS

LITHIUM BATTERY BANK MONITORING (BMS)

The **Tekpower TPS48** features a dedicated interface for intelligent monitoring of lithium batteries, allowing direct communication with the battery BMS through the RS485 port. This function enables 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, making it flexible for integration with different LiFePO₄ battery manufacturers. In addition, it enables BMS event storage and diagnostics, providing traceability and greater reliability to the power system.



BMS Settings	
BMS protocol: TBD_V1	BMS Total Num: 1
BMS Baud Rate: 9600	BMSUnlockPassWord:
BCM Set	4800 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 Features of the Tekpower TPS

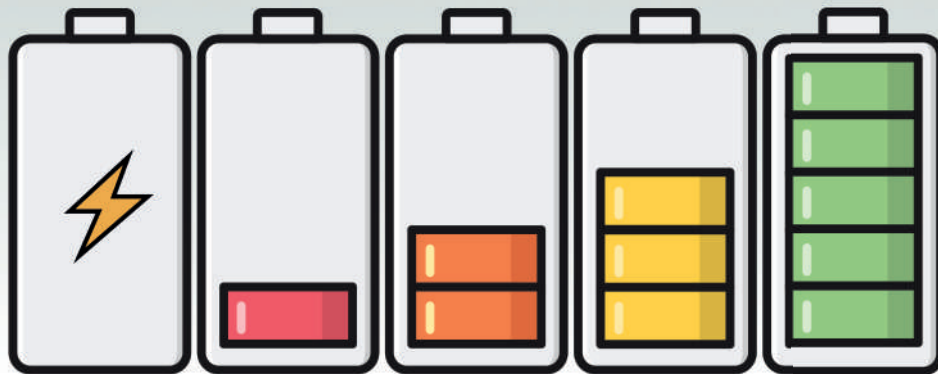
INTEGRATED BATTERY TESTING

The **Tekpower TPS48** incorporates an exclusive battery testing function that enables accurate assessment of the battery bank's health and autonomy, reducing operational risks and ensuring reliability in emergency situations.

The **Tekpower TPS48** performs programmable tests (quick, complete, or scheduled), monitoring voltage, current, and temperature in real time to determine the batteries' actual autonomy and state of health.

- ✓ Automatic and periodic testing
- ✓ Early detection of battery bank element degradation or failures
- ✓ Complete monitoring during the test, with logging and history available through the web interface
- ✓ Automatic protection against undervoltage, overcurrent, and overtemperature.

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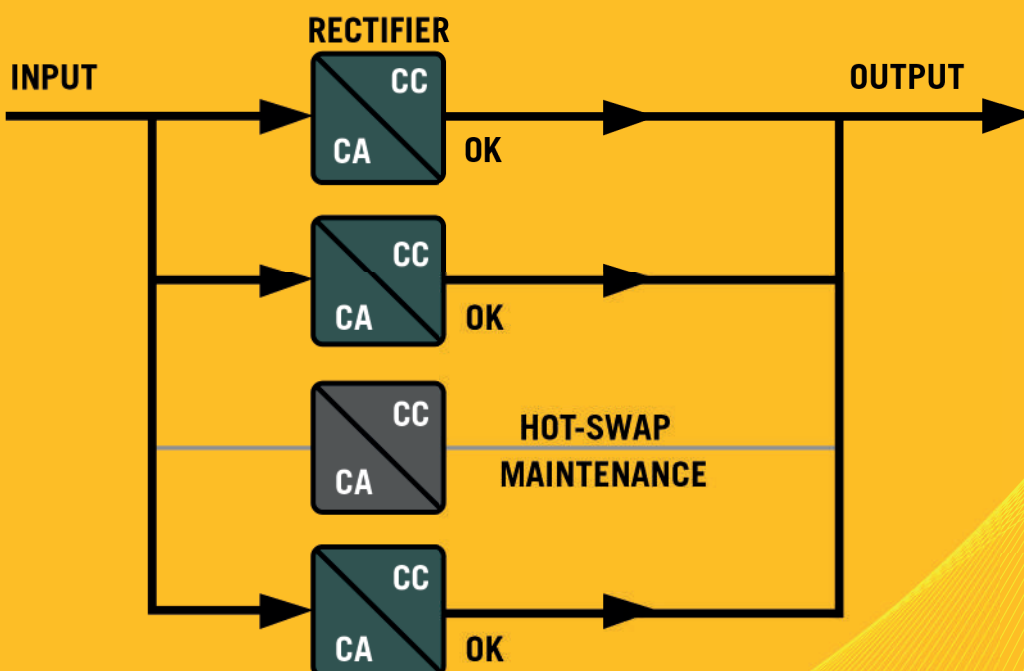
Advanced Features of the Tekpower TPS

HOT-SWAPPABLE ARCHITECTURE

The TPS48 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 supply to the loads. All modules operate actively in parallel, ensuring better utilization of the installed power capacity and n+1 redundancy.

Main Hot-Swap Features of the TPS48:

- ✓ **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 synchronizes with the DC bus and begins sharing the load
- ✓ **Reduction in operating costs:**
maintenance without prolonged scheduled shutdowns
- ✓ **Scalability:**
capacity can be expanded simply by adding new modules.



Advanced Features of the Tekpower TPS

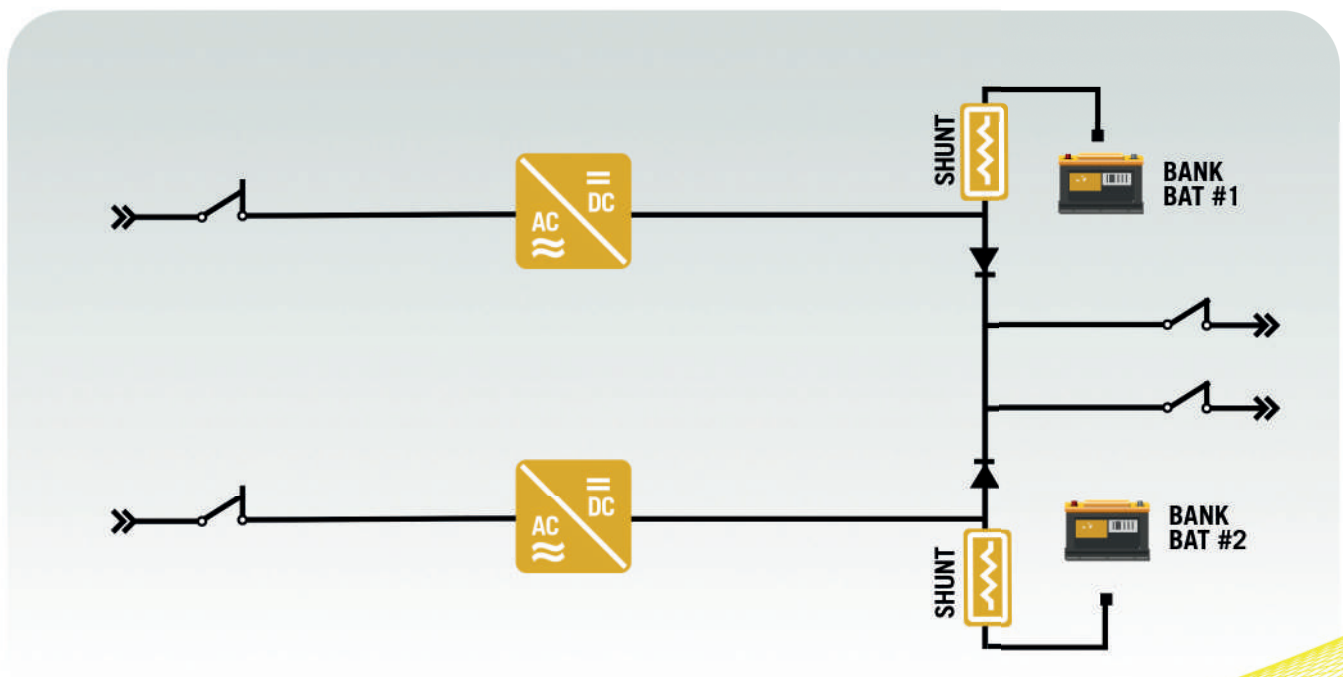
PARALLEL CONFIGURATION

The **Tekpower TPS48** was designed 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 the rectifiers
- ✓ **Balanced sharing of load currents**, preserving equipment service life and ensuring stability on the DC bus.
- ✓ **Additional safety in critical applications**, preventing current backflow in the event of a rectifier failure.

Parallel operation enables everything from simple capacity expansion to the implementation of redundant architectures, making the **Tekpower TPS48** a robust and scalable solution for mission-critical DC power systems.



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Technical Catalog

Rectifier / Charger TPS 48 Switching

TECHNICAL SPECIFICATIONS

General Data	Power Range	Up to 120kW
	Topology	High-Frequency Switching
	Technology	Modular
	Isolation	Complete
AC Input	System	1P / 2P / 3P / 3P + 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	42 ~ 58.5 Vdc
	Nominal Current	Up to 2220 A
	Voltage Ripple	< 1% Vrms
	Efficiency	96%
	Static Regulation	± 1%
	Dynamic Regulation	± 5% (Stabilization time < 50 ms)
Rectifiers TSU2480	Input Voltage	176 ~ 290Vac (3000W) / 85 ~ 176Vac (linear derating 1250 ~ 3000W) 200 ~ 400Vdc (3000W) / 120 ~ 200Vdc (linear derating 1800 ~ 3000W)
	Efficiency	96%
	Power Factor	0.99
	THDi	< 5%
	Rated Power	3000W
	Maximum Current	56.1A@53.5V / 55.5A@54V
	Operating Temperature	-40°C to +55°C (3000W) 55°C ~ 65°C (linear derating 3000W ~ 2400W) 65°C ~ 75°C (linear derating 2400W ~ 1200W)
	Dimensions (HxWxD)	41.5 mm x 106.5 mm x 286 mm (1U)
	Weight	< 2 kg
	Ventilation	Forced Ventilation
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 IEC61850
	Additional Features	Battery Output Current Limitation Battery Testing Function Communication with Lithium Batteries Web Supervisory System Access
	Optional Features	Battery Temperature Sensor Battery Disconnection by Contactor Load Disconnection by Contactor Additional HMI with 7" touchscreen display

06-2025

Technical Catalog

Rectifier / Charger TPS 48 Switching

TECHNICAL SPECIFICATIONS

Environmental Conditions	Operating Temperature	-40°C to +75°C
	Humidity	0% to 95% (Non-Condensing)
	Altitude	< 3000 m
Certificações	Compliant with:	Anatel Act 930 (Rectifier Units)
		Anatel Act 931 (Rectifier Systems)
		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 (EFD - 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)

*Other options available upon request.

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Discover other solutions in our portfolio



Energy

Thyristor Rectifier Chargers
(with and without battery banks)

Industrial and Commercial UPS
Systems (Modular).

BMS - Battery Monitoring System

DC/AC Inverters with Static
Switch



Integração

Electrical Panels for Auxiliary
Services

Monitoring and Automation
Systems.



Serviços

Maintenance contracts and
specialized technical support

Supply of spare parts

Retrofit and modernization
services

24/7 hotline support

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**Contact us to learn how to integrate
these solutions into your project.**

Need more information?



www.teksea.net

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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