

Technical Catalog

BKI – Industrial Inverter System DC/AC with Static Switch



- High performance, robustness and reliability
- Full compliance with international standards
- Operation with linear and non-linear loads
- User-friendly and intuitive Human-Machine Interface
- 100% technology developed in Brazil

FEATURES

- **Performance classification:** VFI-SS-111 according to IEC 62040-3
- **Power technology:** IGBT inverter with discontinuous space vector modulation (D-SVM)
- **Output configurations:** Available in single-phase or three-phase versions
- **DC link options:** 110 Vdc, 120 Vdc, 220 Vdc and 240 Vdc
- **Galvanic isolation:** Full isolation between DC input and AC output
- **Scalability:** Nominal power expandable up to 120 kVA
- **Power quality:** Low harmonic distortion levels at the output
- **Load compatibility:** Operation with linear and non-linear industrial loads, supporting high overload levels
- **Input source compatibility:** Reliable operation with generator sets (gensets)
- **Active protection:** Active current control in case of output short circuit
- **Priority source selection:** Preferred operation via inverter or bypass
- **Automatic transfer:** Static switch for fast and safe switching between sources
- **Maintenance bypass:** Make-before-break transfer with interlocked circuit breakers, ensuring load continuity during maintenance operations
- **Human-Machine Interface:** User-friendly HMI with graphical display, alphanumeric keypad and mimic diagram
- **Industrial communication:** Support for Modbus RTU, Modbus TCP, DNP3, SNMP and MMS IEC 61850
- **Standards compliance:** Designed in accordance with national and international standards

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Special Features

Integrated Power Analyzer

Complete monitoring of energy from sources, converters and loads, with detection of up to 16 anomalies in the bypass network, ensuring safe operation in Economic mode (supply via bypass).

Emergency Bypass

Automatic transfer of loads to the bypass network in case of total UPS failure.

Static Switch Sensitivity

Adjustment of response to voltage transients, according to IEC 62040-3 curves (High, Medium or Low).

Static Switch Transfer Modes

Optimized for inductive and rotating loads, ensuring safe switching.

Maintenance Bypass with Interlocking

Allows testing and maintenance without interrupting the load and without unintended paralleling with the grid.

Priority Source Selection

Configuration of priority source for operation (Inverter or Bypass).

External Commands

Integration via digital inputs or communication protocols.

Digital Alarm Interface

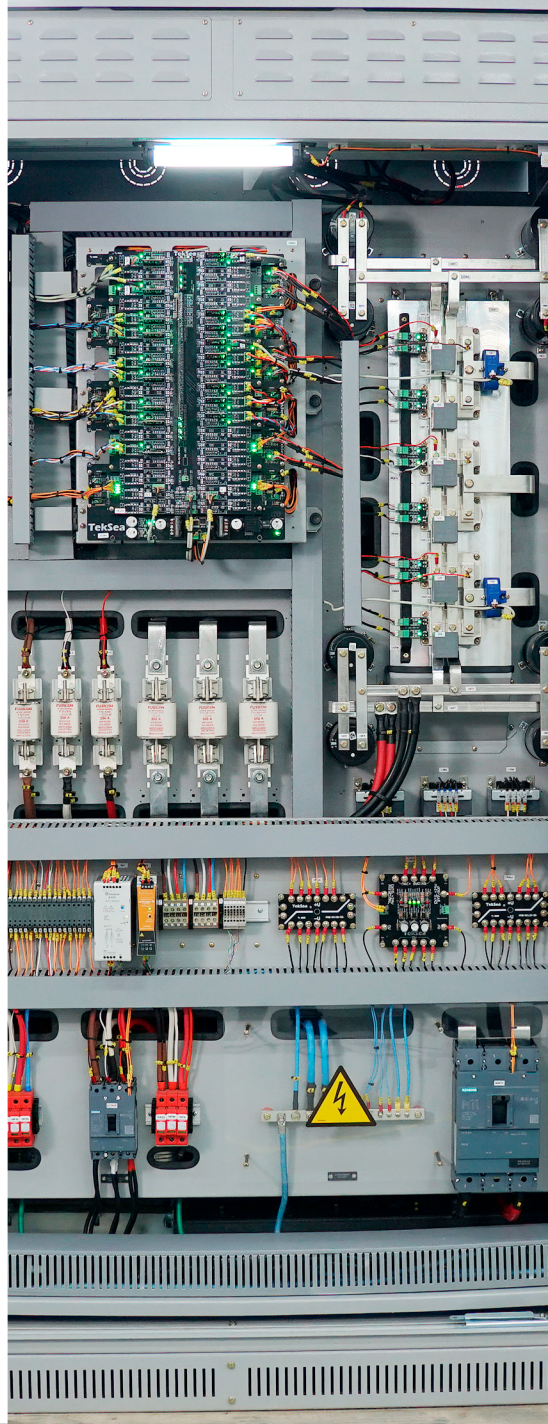
Configurable relay outputs for integration with supervision systems.

Hour Meter and Counters

Measurement of operating time and counting of source interruptions and load events for preventive maintenance management.

Advanced Fault Diagnostics

Monitoring of alarms and faults, with reduced MTTR, increased MTBF, fewer unplanned shutdowns and higher operational reliability.



Technological Differentials



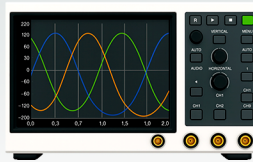
HMI – Human-Machine Interface

Complete and user-friendly management

128 x 64 pixel graphical display

Operational mimic diagram

Alarm and event log



Very Low Harmonic Distortion Levels

AC Output:

THDv: < 1% for linear loads

THDv: < 5% for non-linear loads



Generator Profile

Alternative configuration for generator operation, with features such as:

Increased tolerance of bypass source voltage or total branch inhibition

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Integration with supervision systems

Available protocols:

Modbus RTU, Modbus TCP, DNP3, SNMP (v1, v2c and v3), MMS IEC 61850, among others

Technological Differentials



High-Performance IGBT Modules

The use of high-frequency switched IGBT modules provides the system with higher efficiency, better performance, and lower acoustic noise levels.

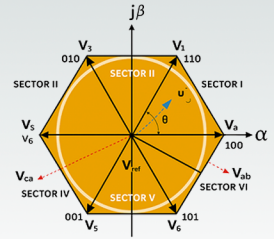
Unity power factor is ensured, with the possibility of controlling displacement factor and active power to adapt to grid conditions.



Proprietary Active Damping Technique

This solution ensures stability of current control under critical grid conditions, eliminating the need for dissipative components.

As it is fully implemented in software, it reduces thermal dissipation and increases system efficiency.



Discontinuous Space Vector Modulation (D-SVM)

This strategy optimizes the operation of IGBTs in order to reduce switching losses, providing an increase in efficiency.

Technological Differentials



Multi-Resonant Output Voltage Control

This technique reduces harmonic distortions caused by non-linear loads, providing high power quality for distortion-sensitive loads.

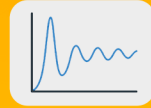


VFI-SS-111 Classification (IEC 62040-3)

The TekSea Industrial DC/AC Inverter System is classified under the most stringent category of IEC 62040-3 and complies with N2760 (Petrobras) and NBR 15014 standards.

It features full isolation from the grid through double conversion topology, precise voltage and frequency regulation, and dynamic performance according to the most restrictive limits of the standard.

It maintains low harmonic distortion levels, even with non-linear loads.

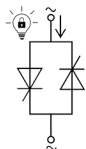


Total Short-Circuit Protection

Active control system to limit short-circuit currents, with fault clearing capability, ensuring equipment reliability and continuity of operation.

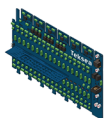
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Technological Differentials



Proprietary Conduction Detection Technology

With hardware interlocking, this technology enables fast and safe switching in the static switch thyristors, preventing momentary short circuits between concurrent sources and minimizing voltage interruptions at the load during the process.



Digital Control on Proprietary Platform

Control is fully implemented in DSP (Digital Signal Processor), using a proprietary platform that allows high precision, flexibility, and future expansions.



Complete Isolation

Fully isolated between the system ports (DC input and AC output), ensuring greater safety and protection against failures.



100% National Technology

TekSea invests in national technology as a strategic pillar, with solutions developed by a technical team composed of engineers, masters, and PhDs.

Advanced Features

CASCADE APPLICATION (OPTIONAL)

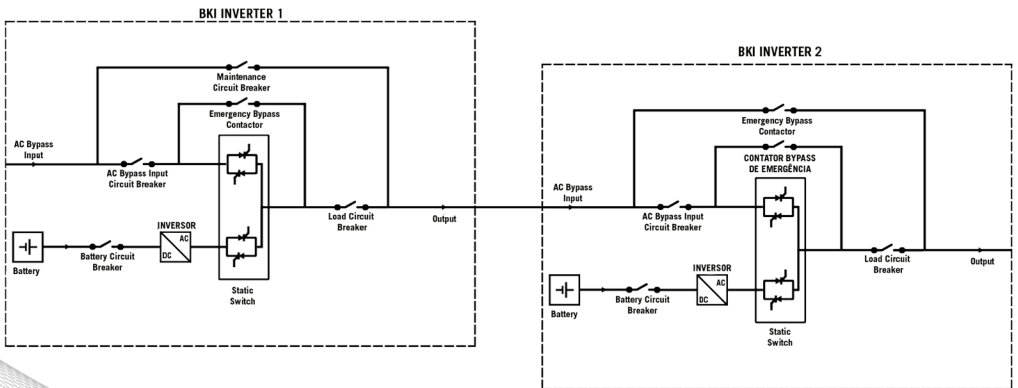
The Tekpower BKI Industrial Inverter can be supplied in a cascade topology, allowing the operation of multiple inverters connected in sequence within the same system. This architecture is recommended for critical industrial applications that require high levels of reliability and availability.

Main benefits of cascade application:

- **Fault isolation:** a failure in one inverter does not affect the others, preventing fault propagation throughout the system and increasing installation robustness
- **Maintenance flexibility:** allows intervention in one unit without impacting the operation of the others
- **True redundancy:** even with one unit unavailable, the others continue operating without sharing faults or overloads, ensuring continuous availability

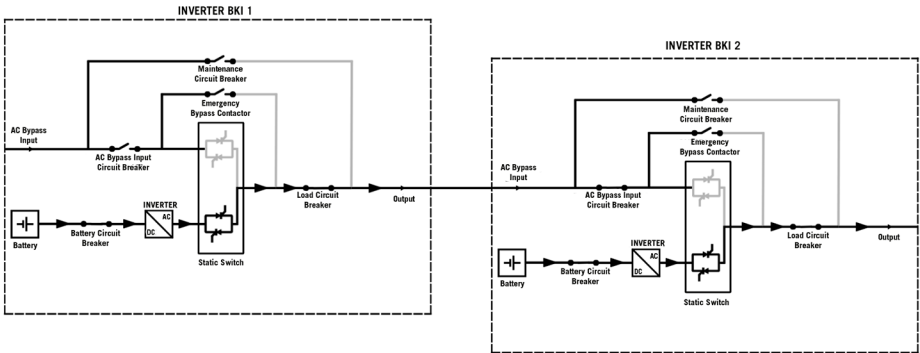
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Architecture



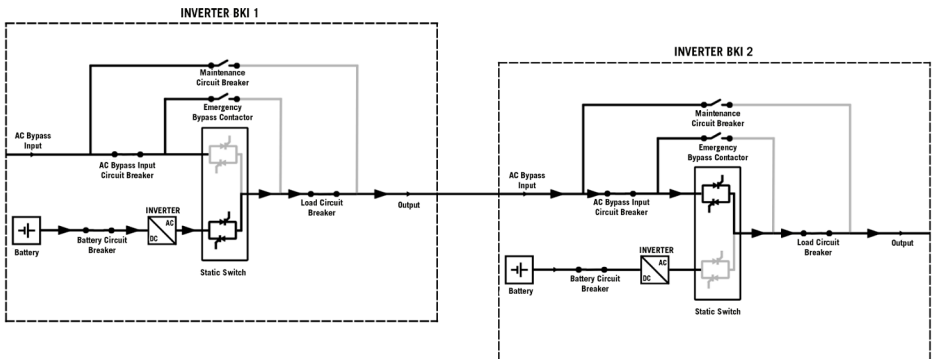
Recursos Avançados

1st Operating Mode: Critical loads are supplied through DC/AC conversion by the downstream inverter (BKI Inverter 2).



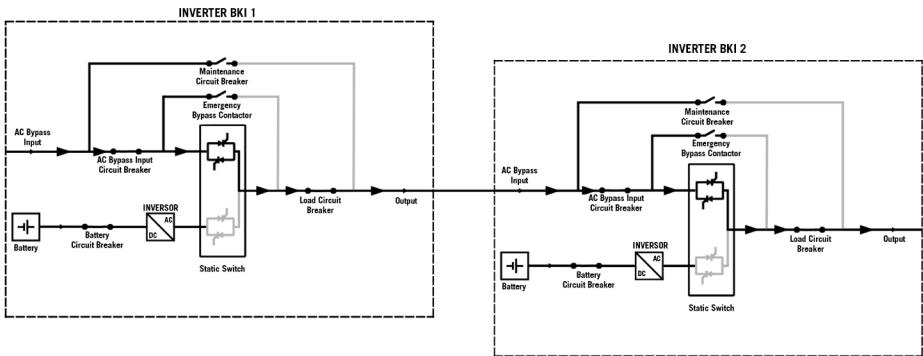
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2nd Operating Mode: Critical loads are supplied through DC/AC conversion by the upstream inverter (BKI Inverter 1).

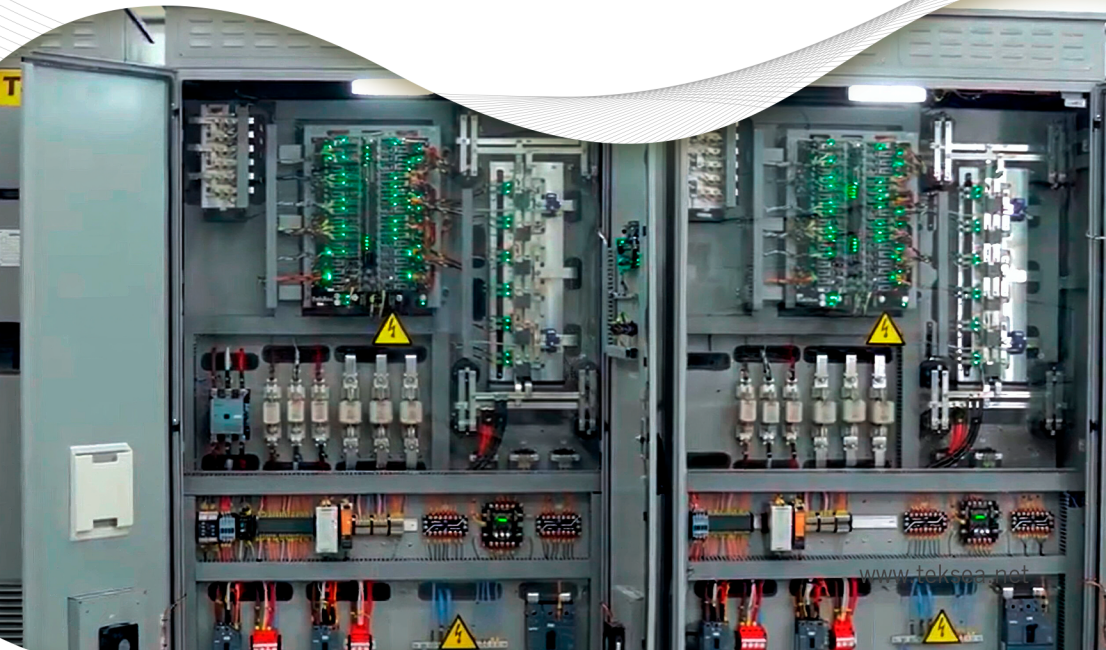


Advanced Features

3rd Operating Mode: Critical loads are supplied through the AC Bypass Input.



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Advanced Features

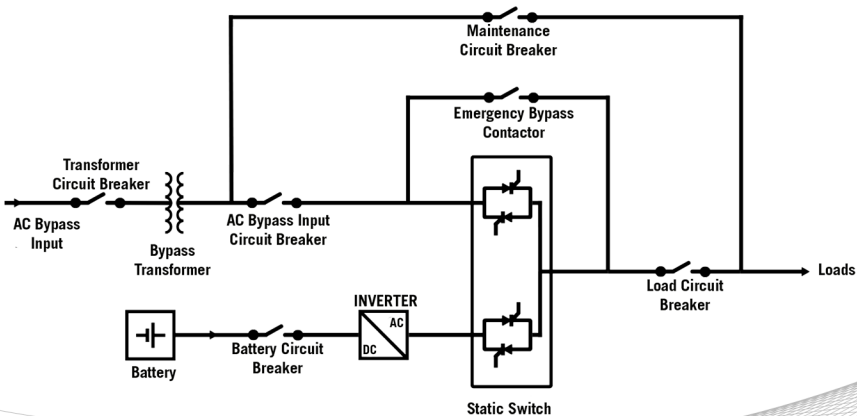
BKI INVERTER WITH BYPASS TRANSFORMER (OPTIONAL)

The Tekpower BKI Industrial Inverter can be supplied with a transformer at the bypass input. This optional feature ensures galvanic isolation between the AC grid and the load, as well as allowing voltage level adaptation according to application requirements.

In this way, system safety and flexibility are enhanced in critical industrial environments.

Main benefits of the transformer at the bypass input:

- Galvanic isolation between the AC Bypass Input and the inverter output
- Input and output voltage adaptation according to project requirements
- Additional protection against grid disturbances and interference
- Greater operational reliability in harsh industrial applications



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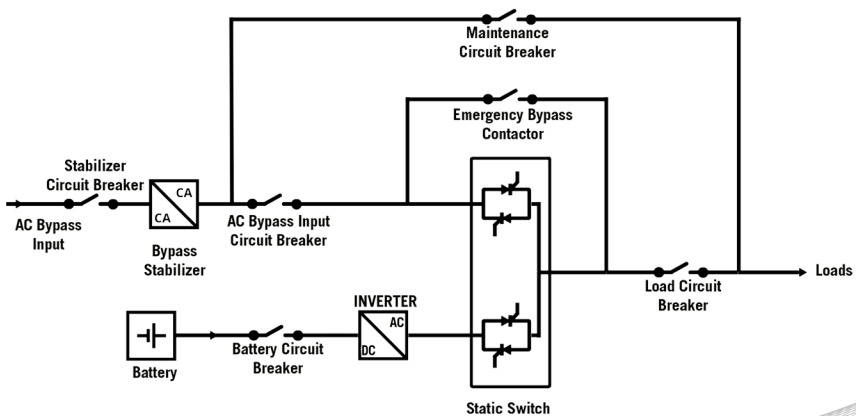
Advanced Features

BKI INVERTER WITH BUILT-IN BYPASS VOLTAGE STABILIZER (OPTIONAL)

The Tekpower BKI Industrial Inverter can be supplied with an integrated stabilizer, ensuring continuous regulation of the AC bypass supply. This optional feature maintains power quality even under adverse grid conditions, protecting critical loads and increasing system reliability.

Main benefits of the built-in stabilizer:

- Stable regulation of the AC Bypass Input voltage under grid variation conditions
- Additional protection for sensitive loads in critical processes
- Increased service life of powered equipment by reducing electrical stress
- Integrated solution, eliminating the need for external stabilizers



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Special Features

SMART ECO MODE WITH INTEGRATED POWER ANALYZER

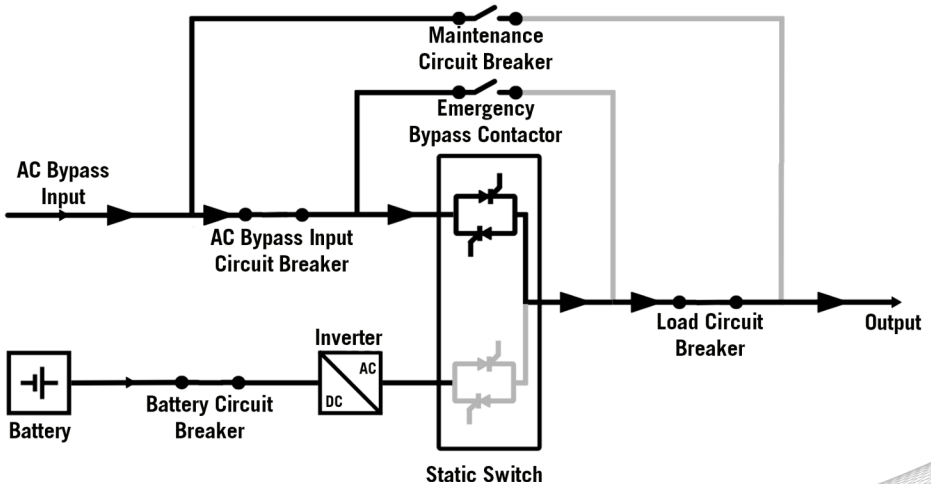
The Tekpower BKI Industrial Inverter incorporates an intelligent ECO function, which allows loads to be supplied primarily via bypass with efficiency of up to 99.5%, without compromising safety.

To achieve this, it features an integrated power analyzer capable of detecting up to 16 types of grid anomalies, ensuring that operation in economic mode only occurs under safe conditions.

Main benefits of Smart ECO:

- Continuous monitoring of power quality at the AC Bypass Input
- Fast and safe transfer to the inverter, in accordance with IEC 62040-3 (VFI-SS-111)
- Reduction of operating costs and extended equipment service life

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Special Features

TRADITIONAL ECO MODE vs TEKPOWER BKI SMART ECO MODE

In conventional inverters, ECO mode seeks efficiency by directing the load to the bypass. However, without an accurate analysis of power quality, this operation may expose critical loads to grid disturbances, resulting in risks of failure and operational losses.

Tekpower BKI enhances this concept with Smart ECO Mode, which incorporates an integrated Power Analyzer capable of monitoring up to 16 types of anomalies in real time. This ensures economical operation with efficiency of up to 99.5%, but only when power quality meets safe standards—preserving reliability and extending the service life of connected equipment.

Aspects	Traditional ECO	Tekpower BKI ECO
Load Safety	High efficiency (98%), but without guarantees regarding power quality	Superior (99.5%), with continuous grid supervision
	Subject to bypass disturbances (overvoltage, harmonics)	ECO mode operation only when the grid is stable
Anomaly Monitoring	Non-existent or limited to undervoltage/overvoltage and under/overfrequency	Integrated power analyzer; up to 16 monitored anomalies
Load Service Life	Reduced due to recurring electrical stress	Extended due to disturbance and anomaly blocking
Reliability	Fully dependent on grid quality	Ensured by intelligent logic and continuous supervision
Market Differentiation	Common feature in similar equipment	Exclusive Teksea solution, unique in the segment

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Special Features

COMPLIANCE WITH VFI-SS-111 (IEC 62040-3)

The Tekpower BKI Industrial Inverter complies with the VFI-SS-111 classification, according to the international standard IEC 62040-3. This classification ensures that the equipment output maintains fully stable voltage, frequency, and waveform, even under input grid disturbances. It represents the highest performance level defined by the standard, ensuring superior reliability for critical applications.

Key Characteristics of VFI-SS-111 Classification:

- Output voltage and frequency fully independent from the utility grid
- Pure sine wave output under all load conditions
- Extremely high power quality supplied to loads, even under grid deviations or fluctuations
- Ultra-fast transfer times between sources, imperceptible to connected loads
- Highest level of power quality defined by IEC 62040-3

COMPLIANCE WITH VFI-SS-111 (IEC 62040-3)

Being classified as VFI-SS-111 means that the Tekpower BKI meets the highest excellence standards established by the norm, providing users with confidence that the equipment follows a globally recognized and accepted standard.

The control system allows configuration of dynamic transfer sensitivity according to Curves 1, 2, or 3 of IEC 62040-3 (dynamic voltage vs. time tolerances). This enables the BKI to adapt its behavior to the type of load and operating environment (grid or generator), while maintaining performance compliance according to the selected curve.

The curves presented are based on the international standard IEC 62040-3, which defines the performance classification of uninterruptible power supply systems (UPS/Inverters).

Special Features

When to use each curve?

• Curve 1 (standard – maximum immunity/quality):

Recommended for highly sensitive loads to short-duration sags/oscillations (critical IT, protection relays/IEDs, PLCs, precision instrumentation). It minimizes dynamic deviations and recovery times, reducing the risk of resets or loss of synchronization. This is the natural choice for mission-critical applications requiring VFI-SS-111 performance.

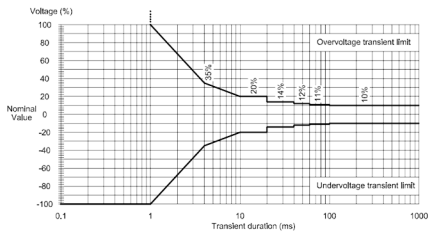
• Curve 2 (moderate tolerance – operational robustness):

Recommended for moderately sensitive loads and environments with unstable power sources (e.g., generator operation or fluctuating utility grid). A slightly wider dynamic window avoids unnecessary transfers and can reduce thermal and switching stress on the power stage in noisy scenarios.

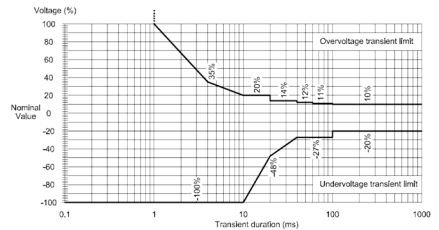
• Curve 3 (extended tolerance – harsh environments/mixed loads):

Suitable when priority is continuity under large load steps or non-linear components (transformer magnetization, high inrush loads, industrial lighting, drives with 6-pulse rectifiers at the input). Lower sensitivity prevents frequent transfers to the bypass line.

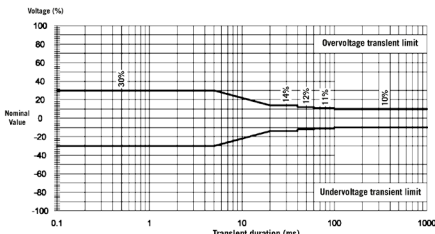
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Curve 2 - Dynamic output performance classification 2



Curve 3 - Dynamic output performance classification 3



Curve 1 - Dynamic output performance classification 1

TECHNICAL SPECIFICATIONS

General Data	Compliance with	IEC 62040-3, N2760, NBR 15014
	Power Range	Up to 120 kVA
	Batteries*	110 Vdc / 120 Vdc / 220 Vdc / 240 Vdc
	Technology	Industrial IGBT
Bypass Input	Isolation	Galvanic, via transformer (DC input and AC output)
	System	1F + N + PE / 3F + N + PE
	Nominal Voltage	115 / 120 / 127 / 200 / 208 / 220 / 380 / 400 / 415 / 440 / 460 / 480 V
	Voltage Variation*	-20% / +15%
	Nominal Frequency	50 / 60 Hz (as specified by the customer)
	Frequency Variation	±10%
Inverter	Static Switch Overload	125%: Continuous operation 200%: 30 seconds
	Waveform	Sine wave
	Nominal Voltage	115 / 120 / 127 / 200 / 208 / 220 / 380 / 400 / 415 / 440 / 460 / 480 V
	Nominal Frequency	50 / 60 Hz (as specified by the customer)
	Frequency Regulation	0.1% (with internal crystal oscillator)
	Synchronization Range	Standard: ±5% Adjustable: ±10%
	Synchronization Speed	Standard: 1.0 Hz/s (50 Hz) / 1.2 Hz/s (60 Hz) Adjustable: 0.1 – 10 Hz/s (50 Hz) / 0.12 – 12 Hz/s (60 Hz)
	Output Voltage Adjustment	Up to ±5%
	Rated Power Factor	0,80
	Static Regulation	± 1%
	Dynamic Regulation	VFI-SS-111 (Class 1, according to IEC 62040-3)
	Output THDv	according to IEC 62040-3: <1% (linear load) <5% (non-linear load)
	Overload Capability	110%: 60 minutes 125%: 10 minutes 150%: 1 minute
Short-Circuit Performance	Active short-circuit current limiting Phase-to-neutral: ~3 × In for 3 s Phase-to-phase: ~1.7 × In for 3 s	
System	Display	Graphical HMI 128 × 64 pixels
	Standard Communication Protocols	Modbus RTU – RS485 Dry Contact
	Ethernet Communication Protocols (optional)*	Modbus TCP DNP3 SNMP v1, v2c, v3 MMS IEC 61850
	Additional Features	Automatic DC pre-charge Battery reverse polarity protection Automatic emergency bypass
	Optional	Voltage stabilizer at bypass input Isolation transformer at bypass input External maintenance bypass panel
Environmental Conditions	Operating Temperature	0 ~ 40°C
	Humidity	0 ~ 95%

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Energy

Thyristor and Switched Rectifier
Chargers (with and without
battery bank)
Industrial and Commercial UPS
(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
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services
24/7 hotline support

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**Get in touch and 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.

TekSea Energy Systems Ltd.

Brazil – Santa Catarina

Rua Adele Wruck, 59 – Itoupavazinha
ZIP Code 89066-354 – Blumenau
Phone: +55 47 3339-8179

Brazil – São Paulo

Av. Antônio Artioli, 570
Sala Zug 62 – Swiss Park Office
ZIP Code 13049-253 – Campinas
Phone: +55 19 3278-3022