BENDER®

The Power in Electrical Safety

Electrical Safety Solutions for Healthcare Facilities and Critical Care Areas
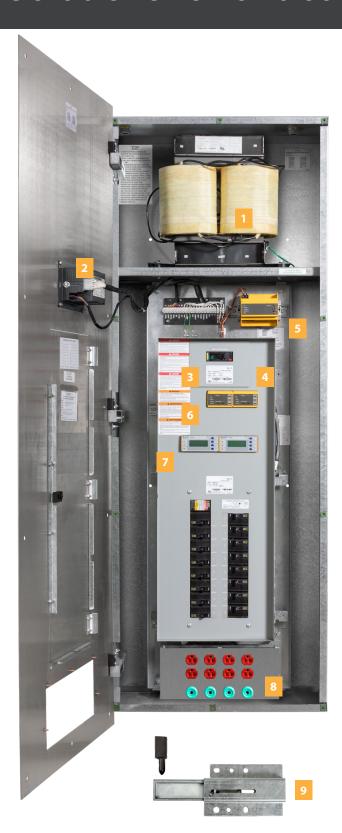
PROTECT PATIENTS AND STAFF

With isolated power solutions from the leader in electrical safety.

Standards such as NFPA 99 and CSA Z32 require isolated power systems in all areas deemed "wet procedure locations" in healthcare facilities. Isolated power systems offer an invaluable advantage - early detection of ground faults allows for critical systems to remain online in a single fault condition.

Bender isolated power panels provide isolated power to electrical systems in operating rooms and other critical care areas. Utilizing the latest in technology, Bender equipment ensures that electrical ground faults are detected and located fast and automatically, in compliance with the latest standards and code requirements.

Bender provides advanced electrical safety technology to the healthcare industry, including:

- The latest in line isolation monitoring technology, providing advanced warning of faults to help reduce downtime and increase operational efficiencies
- Supplimental alarms including transformer load, temperature, and voltage to mitigate risk of electrical shock and fire
- Branch location of ground faults, fast and automatically - locate faulty equipment while the system remains online
- Fast notification to facility staff with modern digital remotes and communication gateways to connect to Ethernet and Modbus networks
- Complete, modular panel solutions for ease of customization and installation
- Equipment designed in strict compliance with many electrical codes and standards, including NFPA 99, NFPA 70, CSA Z32, UL 1047, and more

Isolated power panels
Solutions for critical care areas

1 Isolation transformer
Hospital grade isolation transformer

2 Line isolation monitor (LIM)
Measures the total hazard current (THC) in an isolated power system

3 Circuit breaker kit
Modular system allowing for easy future system upgrading; adjustable electronic trip options available for achieving 0.1s system coordination

4 System load monitoring*
STW series current transformer, measures the total load current of the isolated power system with alarms when reaching system capacity

5 Communication gateway*
Provides integrated web server for viewing status and changing settings; provides Modbus RTU and TCP gateway for BMS integration

6 Fault location system*
Locate ground faults quickly and automatically for individual branch circuits while the system remains energized (no opening breakers required)

7 Branch circuit load monitoring*
Monitors load current of each branch circuit; individually adjustable alarm levels available

8 Receptacle and ground jack section*
Provides hospital grade power receptacles and ground jacks directly at panel front

9 New lift-off barrel hinge
Completely conceals hinge when closed, allowing for easy cleaning and prevention of small debris accumulation; mechanism allows the knuckle of the hinge system to easily slide in and out of backbox.

* Optional add-on features

Isolated power panels
Solutions for critical care areas

Isolated power panels (receptacle add-on shown)

Standard features

- Single-phase, low-leakage isolation transformer, with primary and secondary voltages configured at factory and rated to system requirements
- Primary circuit breaker
- Up to 16 branch circuit breakers (maximum allowed by UL)
- LIM2010 line isolation monitor, featuring self-calibration, a wide variety of alarms, including total hazard current (THC, configurable for 2 mA or 5 mA), voltage, overload, and more
- Reference ground bus

Integratable options

- Built-in power receptacles and ground jacks
- Onboard ground fault location system
- Integrated web server and Modbus communication
- Transformer load and temperature monitoring

Standards and requirements

- Listed to UL 1047 (standard for isolated power systems equipment)
- Meets requirements for NFPA 99 / CSA Z32 for isolated power systems
- LIM2010 listed to UL 1022 (standard for line isolation monitors)

Supported accessories

- MK2000 series remote indicators
- GPM series power / ground modules
- EDS series ground fault location equipment
- Bender remote communication system
- Connection to Bender remote stations, including the MK2430 and MK800

Isolated power panels
Solutions for critical care areas

Dual voltage isolated power panels

Dual system isolated power panels

Standard features

- Single-phase, low-leakage isolation transformer, with primary and secondary voltages configured at factory and rated to system requirements
- Primary circuit breaker
- Up to 16 branch circuit breakers (maximum allowed by UL)
- One secondary main circuit breaker for high voltage side
- LIM2010 line isolation monitor, featuring self-calibration, a wide variety of alarms, including total hazard current (THC, configurable for 2 mA or 5 mA), voltage, overload, and more
- Reference ground bus
- Section for hospital grade power receptacles and/or ground jacks

Integratable options

- Transformer load and temperature monitoring
- Onboard ground fault location system
- Integrated web server and Modbus communication
- Transformer load and temperature monitoring

Features of each system

- Single-phase, low-leakage isolation transformer, with primary and secondary voltages configured at factory and rated to system requirements
- Primary circuit breaker
- Up to 16 branch circuit breakers (maximum allowed by UL)
- LIM2010 line isolation monitor, featuring self-calibration, a wide variety of alarms, including total hazard current (THC, configurable for 2 mA or 5 mA), voltage, overload, and more
- Reference ground bus

Integratable options

- Built-in power receptacles and ground jacks
- Onboard ground fault location system
- Integrated web server and Modbus communication
- Transformer load and temperature monitoring

Isolated power panels
Solutions for critical care areas

Isolated power panels with circuit control

XRM series laser receptacle modules

Features

- Single-phase, low-leakage isolation transformer, with primary and secondary voltages configured at factory and rated to system requirements
- Primary circuit breaker
- Up to 16 branch circuit breakers (maximum allowed by UL)
- LIM2010 line isolation monitor, featuring self-calibration, a wide variety of alarms, including total hazard current (THC, configurable for 2 mA or 5 mA), voltage, overload, and more
- Reference ground bus
- Configured for x-ray and laser equipment at intervals up to 60 A (panel power rating permitting), up to 12 circuits
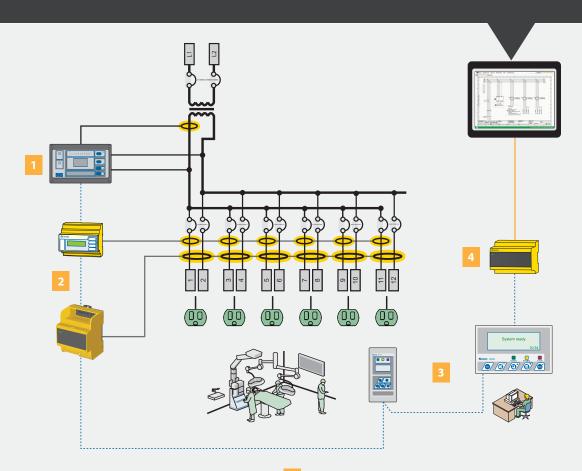- PLC-controlled receptacle control / lockout

Integratable options

- PLC-controlled receptacle control, configured per system requirements
- Limit switch to lock out power to other receptacles
- Transformer load and temperature monitoring

Supported accessories

- XRM series receptacle modules, configured with in-use lamps and MK2000 series remote indicator
- GPM series power / ground modules
- EDS series ground fault location equipment
- Bender remote communication system
- MK2430 / MK800 series remote stations
- Connection to Bender remote stations, including the MK2430 and MK800

Online, automatic fault location

- Fast, automatic location of ground faults while the system remains online with the EDS441 ground-fault module

- Reduce time and maintenance costs

- Indication of faulty circuit shown on EDS441, connected remotes, and communication gateways

- Available integrated into panel, or available separately to retrofit into existing installations

- Modular design allows for individual ratings specifications per branch / channel

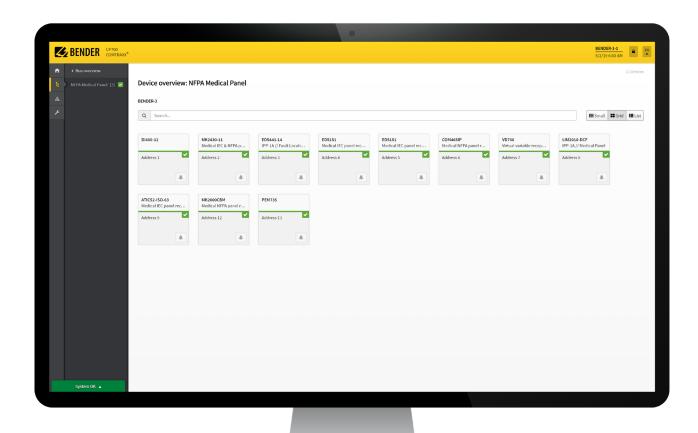- Installation kit includes easy-to-install current transformer assemblies

1 LIM2010 line isolation monitor
- Controls line isolation monitoring, main load monitoring, and fault location

2 Ground fault location and branch load modules
- EDS441: Automated branch ground-fault location
- CMS460: Individual branch load monitoring

3 Remote indicators / remote indicating stations
- MK2000 series: Provides status for a single isolated power system; options for remote test
- MK2430 / MK800 series: Provides status for multiple isolated power systems with customizable messages

4 Communication gateways
- COM465IP: Provides web-based interface for remote panel status, visualizations; Modbus TCP gateway

Fast notifications to hospital staff

- Easy to use, web browser interface with the COM465IP gateway module

- Unified status screen for connected devices across multiple communication protocols, including Bender RS-485 bus, Bender Ethernet bus, and Modbus

- Drill-down for each device shows detailed readings, including values and alarms for all single- and multi-channel devices

- Modern user experience, compatible with web browsers on mouse- and touch-based devices

- Create visualizations of facilities showing real-time device information

- Integrate third party devices over Modbus/TCP

- Virtual setpoints - create custom conditional or mathematical alarms for one or more devices to tailor alarms to specific locations or applications

Remote indicators and stations
Isolated power systems equipment

LIM2010 line isolation monitor

Features

- No interference with electrical equipment
- Works on both 50 Hz and 60 Hz systems (100 -240 VAC)
- Total hazard current (THC) adjustable, 2 mA / 5 mA per local requirements
- Additional alarms including transformer overload and overtemperature, overvoltage and undervoltage, ground connection, and more
- Measures both system resistance and impedance
- Audible and visual alarm indication
- Two programmable voltage-free SPDT contacts
- Colored bar graph display
- Automatic self-calibration and self-check
- UL 1022 listed (standard for line isolation monitors)

Supported accessories

- Remote indicators
- EDS series ground fault location equipment
- Bender remote communication system
- Remote stations, including MK2430 and MK800

Remote indicators and stations
Isolated power systems equipment

MK2000 (left) and MK2000CBM (right) series

MK2430 (left) and MK800-RS (right) series

Features

- Visual and audible indication of line isolation monitor (LIM) status
- Green SAFE LED and red HAZARD LED
- Audible alarm with mute button and amber LED
- LED display for long life
- Uses low voltage 12 V wiring
- Mounts to standard electrical gang box
- Easy-to-clean Lexan front foil
- Amber LED for transformer overload (optional on MK2000, included with MK2000CBM)
- Remote test button (optional with MK2000, included with MK2000CBM)

Additional MK2000CBM Features

- Digital display showing total hazard curernt (THC) in real-time
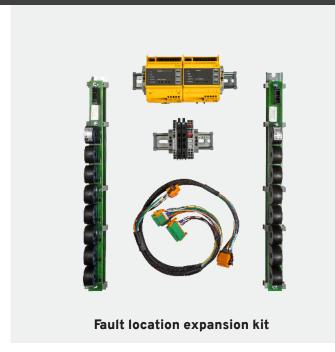- Digital display showing transformer load percentage in real-time
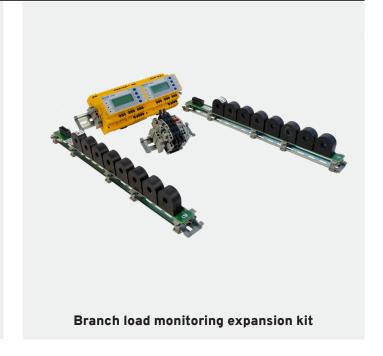
Features

- Centralized remote station for Bender equipment
- Full-featured remote indicating station for operating status, warnings, and customized alarm messages
- Compatible with both LIM2010 line isolation monitor and EDS fault location systems
- Connects to Bender equipment via RS-485
- Internal and external RS-485 network connections: Internal bus connects up to 150 Bender devices; up to 99 internal buses can connect to the external bus
- Large, backlit LCD display
- Up to 200 (MK2430) or 1000 (MK800) customizable alarm messages
- Memory with real-time clock to store up to 250 (MK2430) or 1000 (MK800) timestamped alarm messages
- Configurable with PC software
- Flush and surface mounted models

Options

- Sixteen (16) digital inputs
- Pre-built assembly wih stainless steel front trim, backbox and power supply, assembled at factory

Fault location and load monitoring
Isolated power systems equipment

Fault location expansion kit

Branch load monitoring expansion kit

Features

- Quickly and automatically locate ground faults in the corresponding branch while the system remains online
- Works with LIM2010 line isolation monitor
- Up to 12 branches monitored in parallel by one module
- Connects to external current transformers for measurement
- Connects to Bender equipment via RS-485
- Works with Bender remote indicating stations and communication gateways

Included

- (2) EDS441-LNA fault location modules
- (2) CTAC10/99 current transformer assemblies
- (1) Wiring harness
- Mounting and connection hardware

Features

- Monitor load current for all individual circuits in an isolated power system
- Connects to external current transformers for measurement
- Individual values available on digital display
- Connects to Bender equipment via RS-485
- Works with Bender remote indicating stations and communication gateways

Included

- (2) CMS460-D-2 branch load monitoring modules
- (2) CTAC10/99 current transformer assemblies
- (1) Wiring harness
- Mounting and connection hardware

Communication gateways
Isolated power systems equipment

COM465IP communication gateway

Communication expansion kit

Features

- Modular, expandable gateway between Bender equipment and modern communication networks
- Connects to standard Ethernet networks and provides easy-to-use, browser-based GUI showing status of Bender equipment
- Mobile interface accessable via connected smartphones/tablets
- Supports DHCP addressing for simple connection to networks
- Virtual setpoints - create custom alarms using conditional and mathematical operations, multiple devices, channels, and more

Key additional options

- Uniquely identify systems and channels with custom names
- Integrate Bender equipment into Modbus/TCP networks
- Timestamped data logging of events
- E-mail notifications
- Remote administration of connected Bender equipment
- Site visualization with importing of system schematics, drawings and plans with Bender equipment overview; no programming knowledge required

Digital clocks and timers
Isolated power systems equipment

ZT1590 (left) and MK1550 (right)

Features

- Dual display for 12/24 hour clock and elapsed timer
- Elapsed time in minutes/ seconds, automatically carried over to hours/ minutes
- All device features and setup carried out via onboard push buttons or connected MK1550 clock remote

- Plugable connectors for simple installation
- Utilizes external Class 2 power supply
- Integrated power outage backup for at least 24 hours, no batteries required
- Available as complete assembly with clock and power supply, preinstalled at factory in front trim with backbox (ZT1590RS)

ZT1591 digital clock/timer

Features

- Single, large display, switchable between clock and elapsed timer
- 12/24 hour time
- Elapsed time in minutes/ seconds, automatically carried over to hours/ minutes
- All device features and setup carried out by externally connected MK1550 clock remote

- Plugable connectors for simple installation
- Utilizes external Class 2 power supply
- Integrated power outage backup for at least 24 hours, no batteries required
- Transformer overload LED
- Available as complete assembly with clock and power supply, preinstalled at factory in front trim

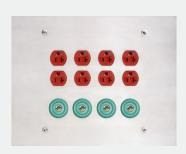**ZT1594** surgical chronometer

Features

- Single clock and three separate elapsed timers
- 12/24 hour time
- Elapsed time in minutes/ seconds, automatically carried over to hours/ minutes
- All device features and setup carried out by externally connected MK1554 chronometer remote

- Plugable connectors for simple installation
- Utilizes external Class 2 power supply
- Integrated power outage backup for at least 24 hours, no batteries required
- Available as complete assembly with clocks and power supply, preinstalled at factory in front trim with backbox (ZT1594RS)

Remote indicators
Isolated power systems equipment

GPM series ground/power module

Features

- Hospital grade outlet devices for power supply and grounding of portable equipment
- Configurable to contain combination of hospital grade power receptacles, hospital grade ground jacks, and/or aluminum or copper ground buses

- Available with ground bus only to serve as a collection point for room grounding conductors
- Customizable quantity of hospital grade power receptacles and/or ground jacks
- Available on standard size wall plate or built into stainless steel front trim with backbox

HGC / HGJ series ground cords/jacks

Features

- Hospital grade ground cords and ground jacks
- Various length cables available
- Highly flexible wire
- Available with either heavy duty clip or lug on one end, plug on other end

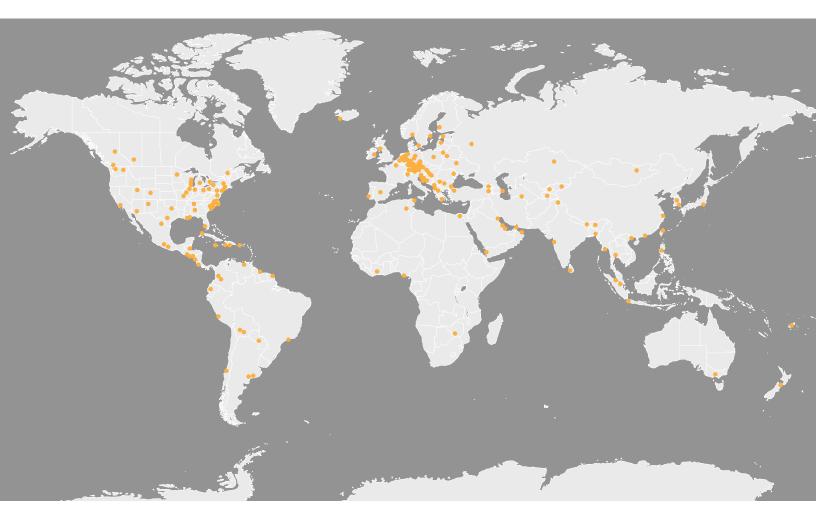### Options

- Varying cable lengths
- Heavy duty clip or lug

XRM series laser receptacle module

Features

- Hospital grade outlet for supply of power to x-ray and laser equipment
- Includes NEMA rated plug matched to configuration of equipment
- Option for built-in MK2000 series remote indicator for line isolation monitor
- Door contact with limit switch

- Designed for use with Bender isolated power panels with PLC
- Flush- or surface-mounted backbox
- Integrated LIM remote indicator
- In-use indicating light

Bender is located in over 70 countries around the world