

Isolated Power Systems Equipment

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 health-care 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
- Supplemental 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, RETIE, AEA 90364-7-710, UL 1047, and more

Isolated power panels

Complete solutions for critical care areas



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)
- 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:

- Onboard ground fault location system
- 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

Complete solutions for critical care areas



Isolated power panels with receptacles and ground jacks

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
- Section for hospital grade power receptacles and/or ground jacks

Integratable options:

- Customizable quantity of receptacles and/or ground jacks
- Transformer load and temperature monitoring

Supported accessories:

- HGC series hospital grade ground cords
- MK2000 series remote indicators
- EDS series ground fault location equipment
- Bender remote communication system
- Connection to Bender remote stations, including the MK2430 and MK800



Isolated power panels with circuit control

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 16 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

Isolated power panels

Complete solutions for critical care areas



Dual voltage isolated power panels

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
- Two reference ground buses
- Section for hospital grade power receptacles and/or ground jacks

Integratable options:

- Transformer load and temperature monitoring

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



Dual system isolated power panels

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:

- Onboard branch ground fault location system
- Transformer load and temperature monitoring

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

Line isolation monitor

Isolated power systems equipment

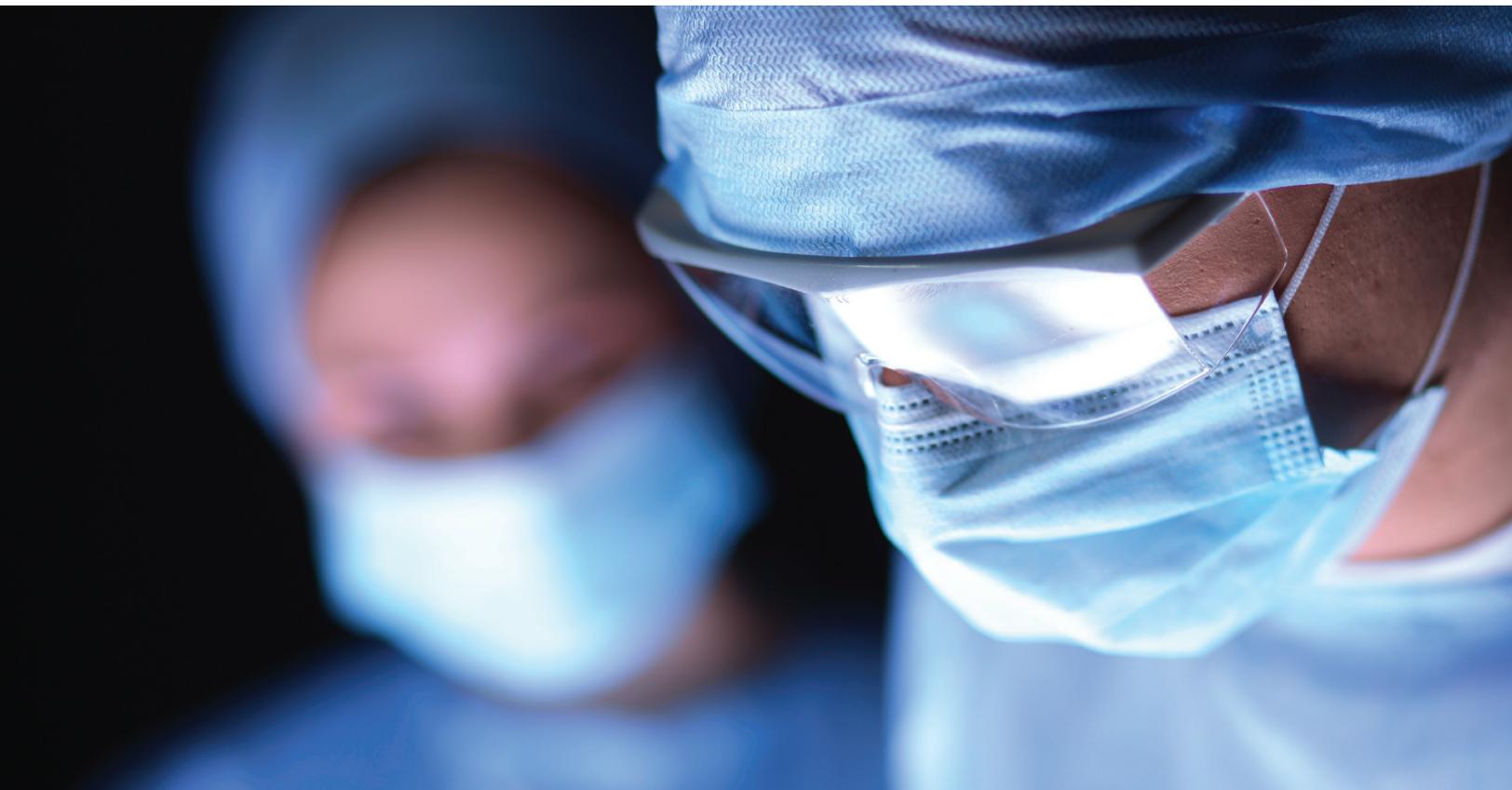


Features:

- 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)

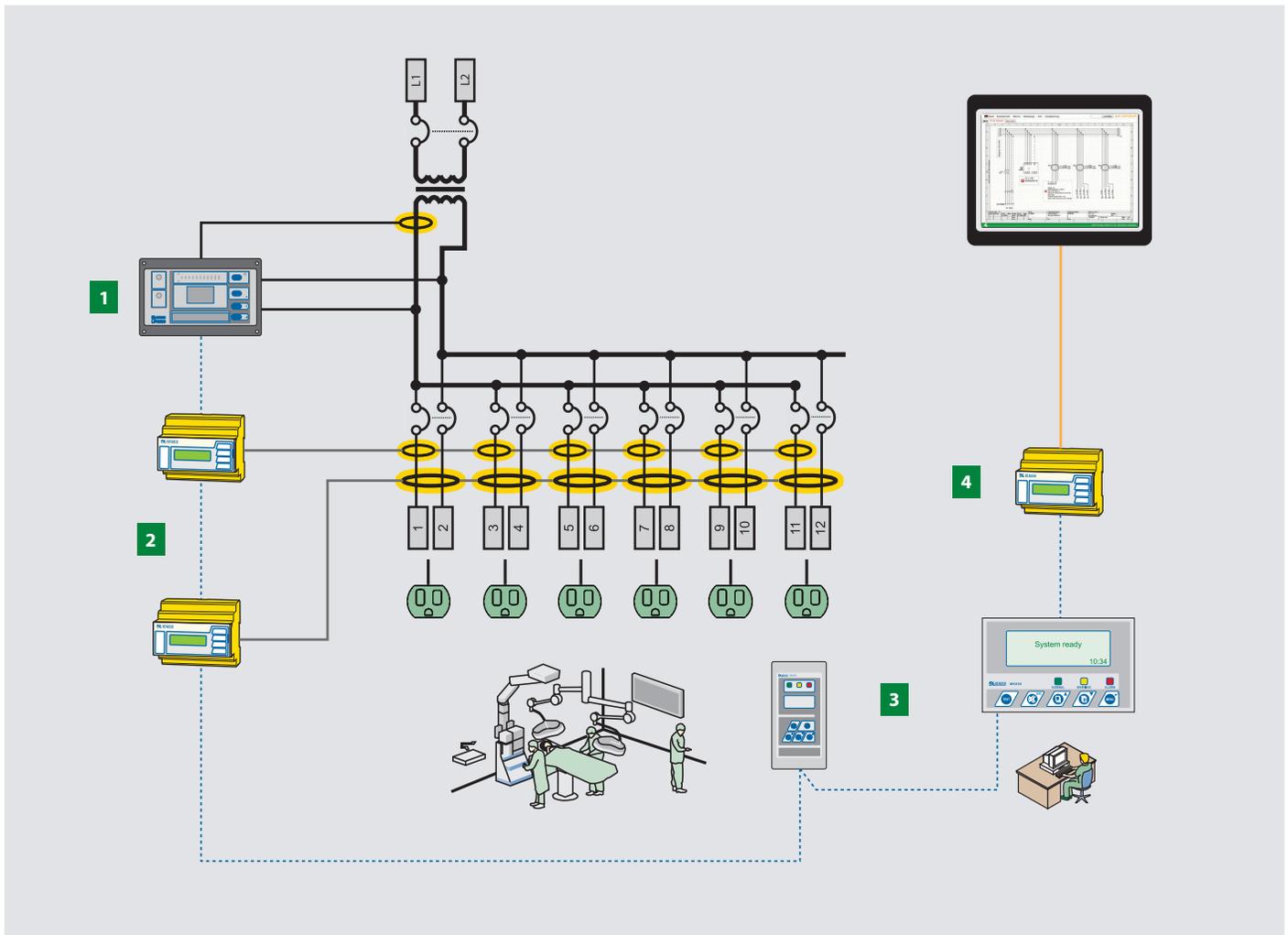
Supported accessories:

- MK2000 series remote indicators
- EDS series ground fault location equipment
- Bender remote communication system
- Remote stations, including MK2430 and MK800



The complete isolated power solution

Monitor, locate, and communicate system ground faults



Key system components

1 LIM2010 line isolation monitor

- Controls line isolation monitoring, main load monitoring, and fault location

2 Ground fault location and branch load modules

- EDS461: 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: Simple, modern GUI interface for remote panel status, visualizations, and Modbus/TCP gateway
- COM462RTU: Modbus/RTU gateway

Online, automatic ground fault location

Locate ground faults automatically with the EDS461 built into isolated power panels

- Fast, automated location of ground faults while the system remains online
- Reduce time and maintenance costs with fast fault location
- Indication of faulty circuit shown on EDS461, connected remotes, and communication gateways
- Available integrated into panel, or available separately to retrofit into existing panels
- Modular design allows for individual ratings specifications per branch / channel
- Current transformers integratable into panel as option - simple landing terminals for easy installation



Advanced, fast remote communication to hospital staff

- Fast notification of alarms to technicians and staff
- Multiple isolated power panels may be monitored at a single remote station (MK2430 / MK800) with customizable messages
- Connecting to the COM465IP allows for viewing status of isolated power system via a simple web-browser GUI
- COM series modules allow integration into existing Modbus networks, Modbus/TCP and Modbus/RTU both supported

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Subsystem 1 LIM2010-DCF ADDR. 4

Overview

Edit texts

Configure e-mail

Report

Menu

Alarms 3

LIM2010-DCF Alarm/meas.values System EIP-1A

#	Alarm	Test	Channel description	Measured value	
1	Alarm	--	Total Hazard Cur.	6.63 mA	i
2	--	--	Load	14 %	i
3	--	--	Voltage L1-L2	127 V	i
4	--	--	Voltage L1-G	10 V	i
5	--	--	Voltage L2-G	127 V	i
6	--	--	Insulation fault	20 kΩ	i
7	Alarm	--	Insulation fault	20 kΩ	i
8	--	--	Capacitance	0 F	i
10	Alarm	--	Ins. fault locat.	1	i

Advanced remote indicating stations

For line isolation monitors and isolated power panels



MK2430 series

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
- Works with up to 150 Bender devices
- LCD display
- Up to 200 customizable alarm messages
- Memory with real-time clock to store up to 250 timestamped alarm messages
- Configurable with PC software
- Flush and surface mounted models

Options:

- Sixteen (16) digital inputs
- Pre-built assembly with stainless steel front trim, backbox and power supply, assembled at factory (MK2430RS)

Supported equipment:

- LIM2010 line isolation monitor
- EDS461 / EDS151 series ground fault location modules



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

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 1000 customizable alarm messages
- Memory with real-time clock to store up to 1000 timestamped alarm messages
- Configurable with PC software
- Flush and surface mounted models

Options:

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

Supported equipment:

- LIM2010 line isolation monitor
- EDS461 / EDS151 series ground fault location modules

Remote indicators

For line isolation monitors and isolated power panels



MK2000CBM

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
- Remote test button
- Digital display showing total hazard current (THC) in real-time
- Digital display showing transformer load percentage in real-time



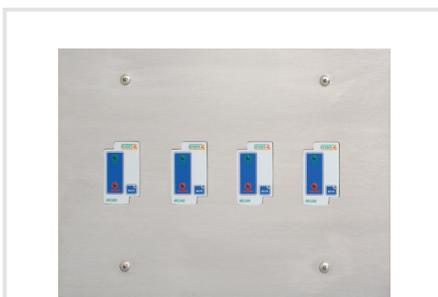
MK2000 Series

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

Options:

- Remote test button
- Transformer overload LED



RAS Series

Features:

- Visual and audible indication of line isolation monitor (LIM) status
- Contains multiple MK2000 series remote indicators for central monitoring of isolated power systems
- Each indicator contains all features of MK2000 series remote indicators
- Pre-built on front trim with backbox

Options:

- Customizable remote options (remote test, transformer overload, etc.)
- Quantity of remote indicators

Communication gateways

Connect Bender equipment to modern communication networks



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 accessible 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 / plans with Bender equipment overview, no programming knowledge required

Supported equipment and accessories:

- LIM2010 line isolation monitor
- EDS461 / EDS151 series ground fault location modules

Features:

- Gateway module for connecting Bender equipment to Modbus/RTU networks
- Interfaces with up to 150 Bender devices
- Read measured values and other information using external Modbus/RTU master
- Simple register mappings allow for quick integration into Modbus/RTU networks
- Ideal for retrofitting into systems with Modbus/RTU communication

Supported equipment and accessories:

- LIM2010 line isolation monitor
- EDS461 / EDS151 series ground fault location modules

Digital clocks and timers

Isolated power system accessories



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 either via onboard pushbuttons or connected MK1550 clock remote
- Pluggable connectors for simple installation

- Utilizes external Class 2 power supply
- Integrated power outage backup for at least 24 hours, no batteries required

Options:

- Available as complete assembly with clock and power supply, preinstalled at factory in front trim with backbox (ZT1590RS)



ZT1591 digital clock/timer

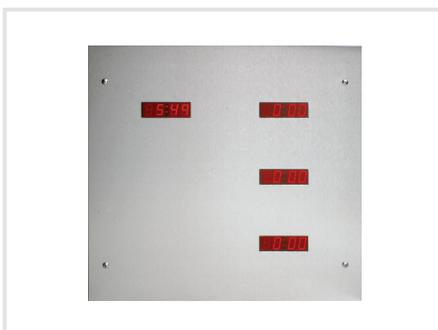
Features:

- 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

- Pluggable connectors for simple installation
- Utilizes external Class 2 power supply
- Integrated power outage backup for at least 24 hours, no batteries required

Options:

- Available as complete assembly with clock and power supply, preinstalled at factory in front trim with backbox (ZT1591RS)



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

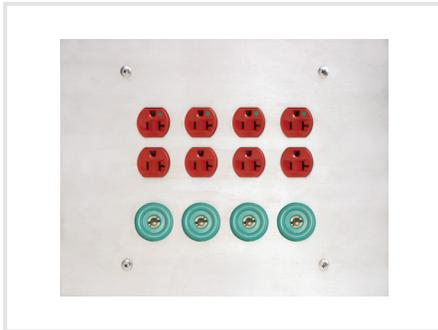
- Pluggable connectors for simple installation
- Utilizes external Class 2 power supply
- Integrated power outage backup for at least 24 hours, no batteries required

Options:

- Available as complete assembly with clocks and power supply, preinstalled at factory in front trim with backbox (ZT1594RS)

Power and ground equipment

Isolated power system accessories



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

Options:

- 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 x-ray 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 control

- Built on custom front trim with backbox

Options:

- Flush- or surface-mounted backbox
- Integrated LIM remote indicator
- In-use indicating light



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