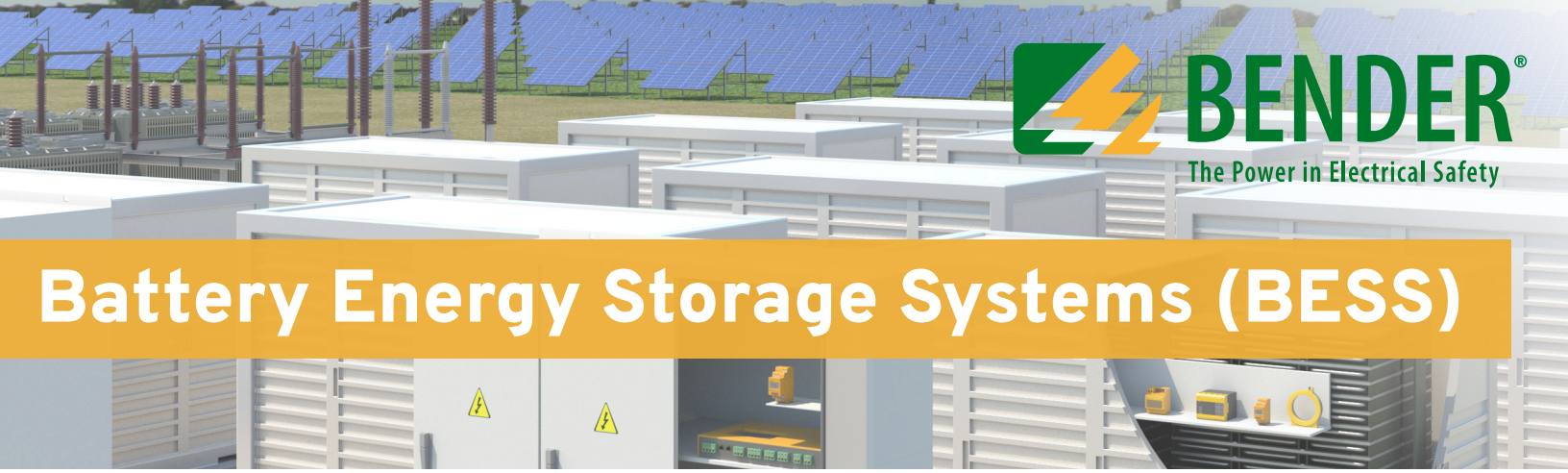

BENDER®
The Power in Electrical Safety

Battery Energy Storage Systems (BESS)

As power generation around the world evolves to meet demand, more smart grids require efficient, environmentally-friendly methods of generating and storing electricity. Advances in photovoltaics and battery storage systems bring new challenges in proper protection of personnel and equipment.

BESS most commonly operate as ungrounded systems, which means all line conductors are intentionally isolated from ground. Although these systems can continue to operate with a single ground fault, it is vital to indicate and clear the first fault as quickly as possible. If the fault is not cleared, a second fault will create a line-to-line short and a dangerous overcurrent situation.

Minimize downtime by immediately locating ground faults

Smart grids demand smart electrical safety. **Bender** monitoring equipment uses the latest technology to ensure accurate and quick readings on battery systems. With a range of communication options, Bender devices integrate easily into industrial networks – including Ethernet and Modbus.

Benefits

- **Ensures system remains uninterrupted/online**
  Electrical issues can be detected and located while keeping the installation fully energized.
- **Reduced maintenance costs**
  Significant decrease in maintenance costs due to the accuracy of detection and decreased need for human interaction with the system.
- **Automatically locate faults**
  Automatic fault location of AC and DC faults eliminates the need for shutting down an inverter during operation.
- **Increased Safety**
  Ground-fault location at packs and modules minimizes battery fire risk (with quick repair).

Ungrounded Systems

1 Insulation Condition Monitor
iso685

- Minimizes unplanned outages
- Detects symmetrical faults
- Ground-fault location pulsing
- Trending capabilities

2 Automatic Ground-Fault Locator
ISOSCAN® EDS440 Series

- Automatically locates faults when combined with ISO685-D-P and CTs
- Minimizes unplanned outages
- Eliminates the need to interrupt power to identify faulted circuits
- Enables multiple EDS modules to be interconnected to expand the quantity of branches scanned

3 Network Communications
COMTRAXX® COM465IP

- Complete system overview
- Allows simple and intuitive programming of all connected devices

4 Insulation Condition Monitor
ISOPV425

- Minimizes unplanned outages
- Detects symmetrical faults
- Compact solution

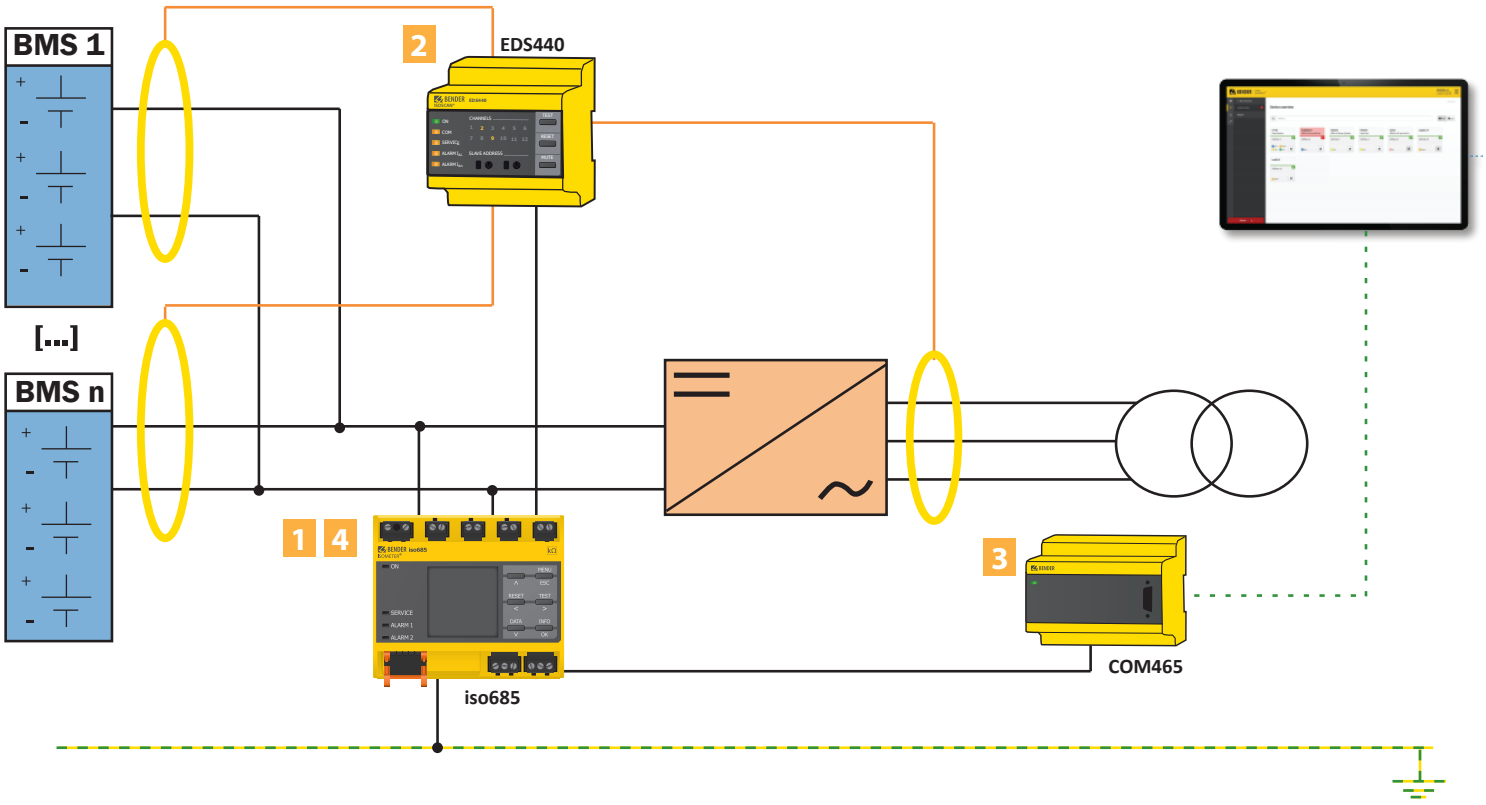

Figure 1: Ground-fault detection and location setup that provides localized detection to each battery bank and inverter on an ungrounded system.

Grounded Systems

1 12-Input Ground-Fault Relay
LINETRAXX® RCMS490-D

- Quickly and safely locate AC and DC faults
- Single device makes it more economical to monitor up to twelve circuits with individually adjustable alarm levels

2 Ground-Fault Monitor
LINETRAXX® RCMB301

- AC and DC sensitive residual current monitoring
- Ideal for pure DC applications and systems with inverters
- Communications output for remote data access
- Widely adjustable response range

3 Network Communications
COMTRAXX® COM465IP

- Complete system overview
- Allows simple and intuitive programming of all connected devices

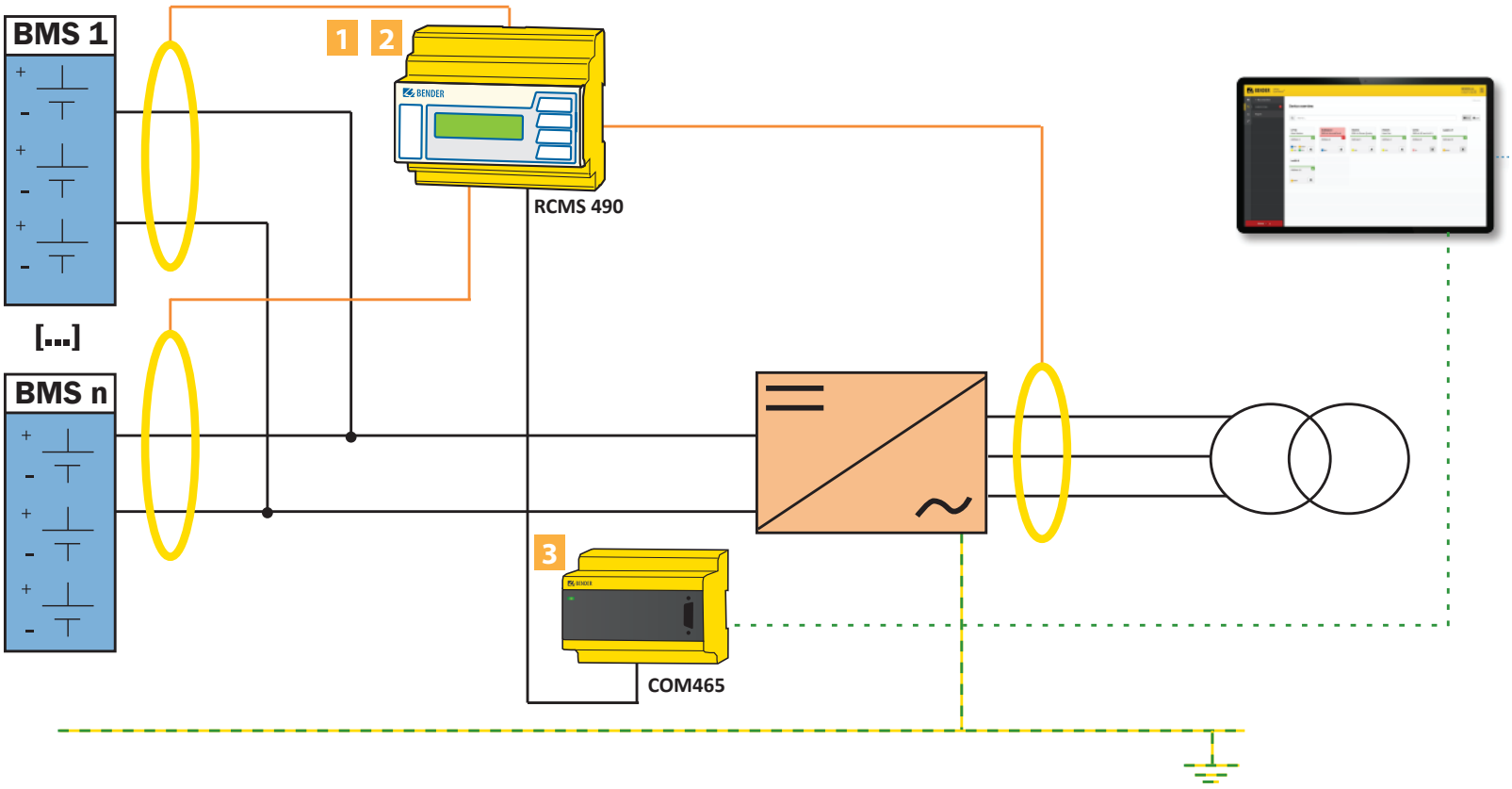

Figure 2: Ground-fault detection and location setup that provides localized indication of leakage current values at each battery bank and inverter on a grounded system.

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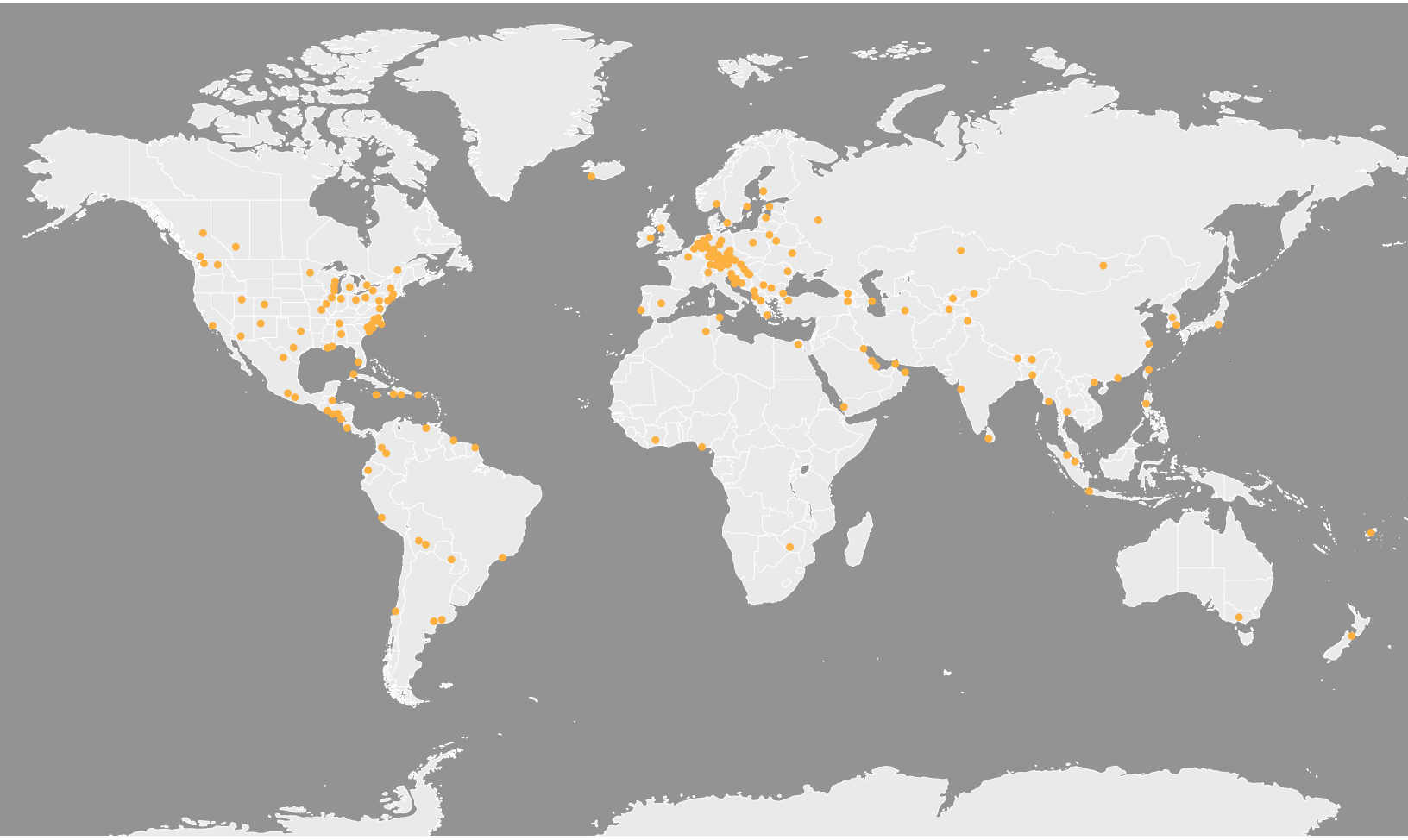
The Power in Electrical Safety

Bender is located in over 70 countries around the world



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