



# Electrical Safety Solutions for Marinas and Shore Power

# Complete electrical safety solutions for marinas - Stay on top of any potential water shock hazards

## Why does a marina need ground fault protection?

The combination of water and electricity can create a hazardous situation. Boats continuously connecting to and disconnecting from shore power, poor ground bonding, "hot" conductors touching ground, mechanical damage and corrosion can lead to the possibility of electric current flow into the water. This situation is hazardous for people who come into contact with the water, resulting in severe injury or death by electric shock drowning (ESD).

## Requirements for ground fault protection

There are several standards, code requirements, and state laws that require ground fault protection on marina shore power, including but not limited to:

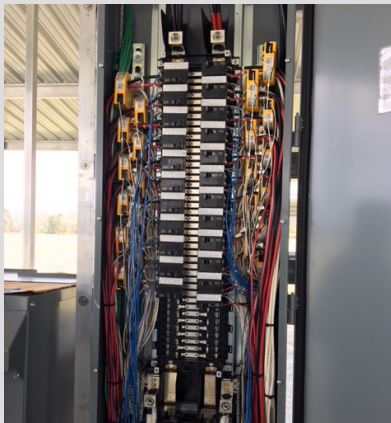
- National Electric Code (NFPA 70 / NEC), Article 555.35
- NFPA 303 (Fire Protection Standard for Marinas and Boatyards)
- Canadian Electrical Code (CSA C22.1), Rule 78-052

## Advanced ground fault monitoring systems by Bender

Bender provides advanced ground fault monitoring and protection systems to assist in the mitigation of ground faults and electric shock hazards for marinas. Alarms activate or the power supply is tripped when a ground fault is detected, including at the time a boat connects to shore power. Monitoring capabilities can be provided anywhere from the main feeder down to the individual pedestals and boats. Low-level ground fault current can be detected, even at the "let-go" current level and below. Continuous monitoring with digital metering inform staff and technicians of ground fault issues, assisting in predictive maintenance.

## Marina-ready ground fault protection at the dock

The NEC requires 5, 30, or 100-mA ground-fault protection (tripping) for all marina electrical installations. Bender's MarinaGuard® provides advanced, protection in an easy to install solution designed specifically for marina docks. The MarinaGuard provides ground fault monitoring and circuit interruption by shunt tripping main and branch feeder circuit breakers, ideal for both new construction and retrofit installations.



## Testimonial

Senegy installed a Bender Ground Fault Monitoring System at a new marina located in Winchester, TN.

"At Start-up and commissioning of the entire system, the Bender Support Staff was onsite to assist with this task, which went flawless. Bender Support Staff went through owner training showing us and the owner what the system was capable of performing and how to navigate through all screens. The electrical inspector was very pleased with the system and operations as were Senegy. We look forward to installing the Bender Ground Fault Monitoring System on future marinas."

-Doug Sullivan, Project Manager  
Senegy, LLC

# Main feeder and branch feeder protection

## A complete ground fault solution for marina power



MarinaGuard® series ground fault monitoring system



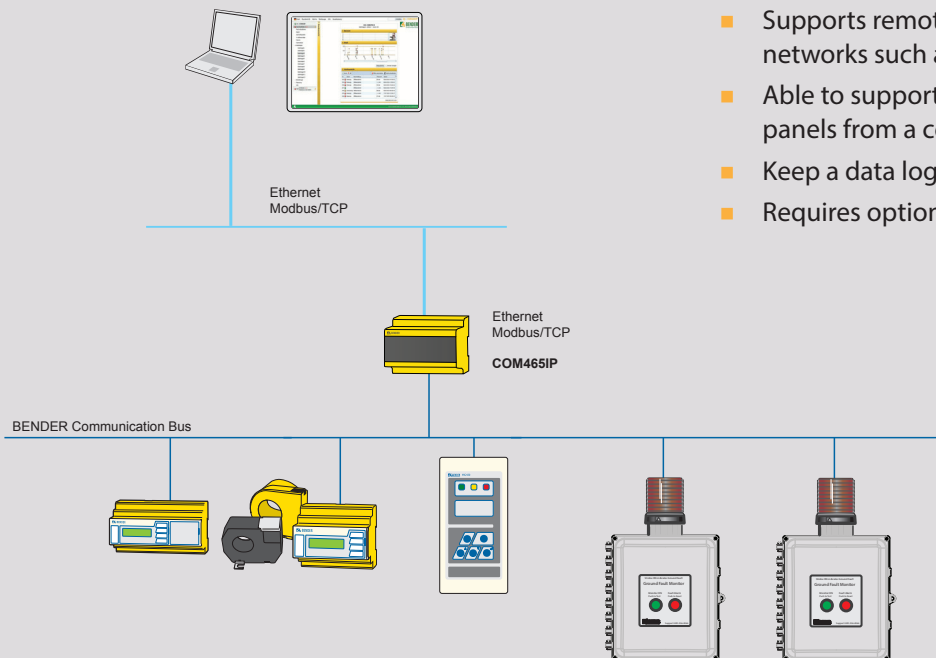
UL 1053 Listed

### Features:

- Fulfills requirements of various codes and laws, including NEC Article 555.35 Listed Ground-Fault Protection of Equipment (GFPE)
- UL 1053 Listed Ground-fault protection
- A complete ground fault monitoring solution for shore power feeders and branch circuits
- Units are factory set for 30 mA protection. They may be field adjusted to conform to local regulations
- Perfect for new installations and system retrofits to comply with new or updated regulations
- Strobe light for clear visual indication of alarm or trip status
- Options available for monitoring 1 or up to 12 feeders or branch circuits from one panel
- Time-coordinated protection to deenergize the faulted circuit without tripping the remaining system
- Self-test (without tripping) and manual test functions
- Lockable Type 4X enclosure conforming to NEC555 requirements for marina panelboards
- Tamper resistant enclosure and wiring methods to prevent unauthorized deactivation

## Communication and centralized branch monitoring with MarinaGuard®

Remotely monitor one or several MarinaGuards for ground fault alerts from a centralized location, for rapid maintenance response to electrical problems



- Supports remote digital communication - connect to networks such as Ethernet and Modbus/TCP
- Able to support remote stations to monitor multiple panels from a centralized location
- Keep a data log to indicate problem circuits or vessels
- Requires optional communications gateway module

# Bender ground fault protection relays inside

## Advanced ground fault monitoring for marina safety



RCM420 series ground fault monitor - MG-1.3

### Features:

- Single channel monitoring
- Digital display provides real-time readings. Unit information can be easily accessed by technicians
- Adjustable trip level from 10 mA to 10 A
- Two SPDT contact outputs
- Password protected to prevent unauthorized setting changes
- Compatible with a wide variety of circular and rectangular Bender current transformers (installed at the monitored feeder)
- UL 1053 Listed Ground-fault protection



CTAC series Current Transformers

### Features:

- Sensitive current transformers for use with Bender ground fault relays
- Wide variety of sizes allows for most installations



RCMS490 series ground fault monitor - MG-T.3

### Features:

- 12 channel monitoring
- Individual trip level settings for each channel / branch
- Digital display provides real-time readings. Unit information can be easily accessed by technicians
- Adjustable trip level from 6 mA to 20 A ; preconfigured for 30-mA protection
- Individual SPST contact outputs for each channel
- Password protected to prevent unauthorized setting changes
- Compatible with optional communications gateway modules
- Compatible with a wide variety of circular and rectangular Bender current transformers (installed at the monitored feeder)
- UL 1053 Listed Ground-fault protection