

# **ELECTRICAL SAFETY**

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**ONSHORE • OFFSHORE • SUBSEA**

**ASSET INTEGRITY & MANAGEMENT**

# Introduction

Established over seventy years, Bender is a trusted and world renowned designer and manufacturer of innovative electrical safety products.

Bender is an FPAL registered supplier and provides electrical safety products that contribute to an optimum of high operating safety and reliability in power supplies.

The innovative solutions we offer today are based on more than half a century of experience.

The products are developed for demanding applications in Oil & Gas, Industries, Hospitals, Mining, Commercial Buildings, Ships and many other sectors.

## Maintaining Onshore & Offshore Asset Integrity

The integrity of unearthed electrical distribution systems, umbilicals, cables and connectors, is vital when maintaining the operability of static platforms, FPSOs, subsea control equipment and ROVs.

Effective and continuous smart monitoring ensures power and control systems remain in service and experience fewer costly failures that slow or stop production. Locating faults at an early stage before they become critical enables planned routine and preventative maintenance.

Bender UK offers services including:

- ▶ Long term trending analysis of surface installations, umbilical and subsea electrical integrity
- ▶ Predictive electrical analysis to forecast system failures (loss of production capability and subsea controls operability)
- ▶ Assistance to help define minimum operational Insulation Resistance (IR) levels
- ▶ Assistance in planning operational changes to mitigate the impact of failing IR and hence extend life expectancy of the distribution equipment

## Applications:

### Platforms

- ▶ FPSO
- ▶ Umbilical
- ▶ ROV
- ▶ Oil Rig
- ▶ Subsea stations
- ▶ Processing plant

# Benefits

## Improved economic efficiency



- ▶ Expensive and unexpected interruptions to operation are avoided
- ▶ Time and costs for maintenance are reduced
- ▶ Weak points in the installation are recognised
- ▶ Investment management is supported

## Increased operating reliability



- ▶ No interruption to operation in the event of phase-to-earth fault
- ▶ No control malfunction in the event of insulation faults
- ▶ Electrical installations are kept at a high level of availability
- ▶ Off-line monitoring

## Optimised maintenance



- ▶ Insulation deteriorations are early recognised and signalled
- ▶ Automatic localisation of sections of the system with insulation faults
- ▶ Optimised planning of time and personnel resources
- ▶ Central information about the condition of the electrical installation
- ▶ Remote diagnosis via Internet/Ethernet

## Increased fire prevention



- ▶ Gradually developing insulation faults are detected at an early stage
- ▶ Areas subject to explosion and fire hazards can be separated from the rest of the system by means of isolating transformers and can be monitored

## Increased accident prevention



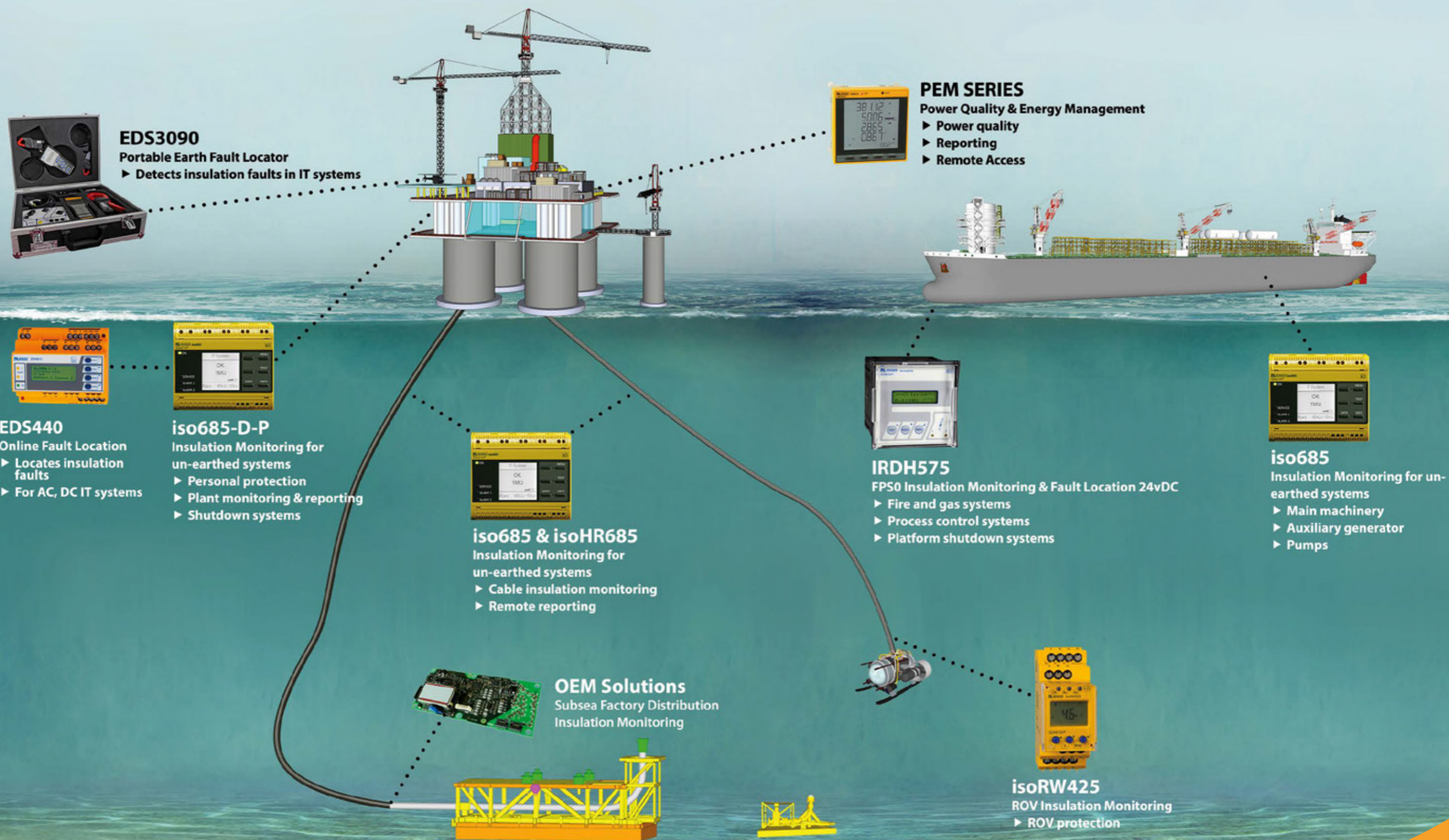
- ▶ Low touch currents in small and medium-sized installations
- ▶ No malfunctions in control circuits of equipment and machines

## Systems

- ▶ Power systems LV and MV
- ▶ Offline monitoring of fire extinguishers, winches & pumps

# ELECTRICAL SAFETY APPLICATIONS

## ONSHORE • OFFSHORE • SUBSEA



## Understanding how the electrical integrity of umbilicals, cables, connectors, and distribution equipment is an important factor when considering the operability of platform and subsea control equipment

Problems can arise at any time but industry experience suggests that they will manifest themselves as the equipment ages – many Oil and Gas installations still operate a wide range of older control equipment and electrical distribution networks. In harsh operating conditions when any downtime can be critical, this creates an environment where serious issues can quickly develop.

### Predictive maintenance to protect production

Normal fault finding by a process of elimination is expensive and time consuming; Bender UK systems are designed to intelligently monitor and manage the integrity of topside critical power and communications systems and subsea distribution networks, enabling intervention to be planned with minimum disruption to plant operations.

That creates a clear need for systems to monitor and manage the integrity of subsea electrical power and communications systems, which can be added to existing systems or provide protection through the life of the asset from design and installation to decommissioning.

Bender equipment intelligently links to analogue and digital data collection and management systems such as SCADA or DCS Systems.

Bender UK has an unparalleled technical foundation and extensive practical experience in predicting and preventing failures through its proven monitoring and fault location systems which can be an integral part of long-term Asset Integrity Management.

### Bespoke solutions for OEMs

Bender works with OEMs in high performance fields developing bespoke solutions for demanding environments where space and weight are crucial factors. This experience can assist OEMs producing control systems for platforms and subsea factories to provide protection through the life of the asset.

### Offline monitoring for emergency equipment

Offline monitoring of equipment used only in emergencies provides a particular challenge. Bender UK's offline unit is designed to monitor the insulation resistance of de-energised TN, TT and IT systems which may include platform emergency shutdown systems, fire extinguisher pumps, and standby generators. Effective early warning of insulation degradation before such equipment is urgently required, enables planned preventive maintenance.





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