

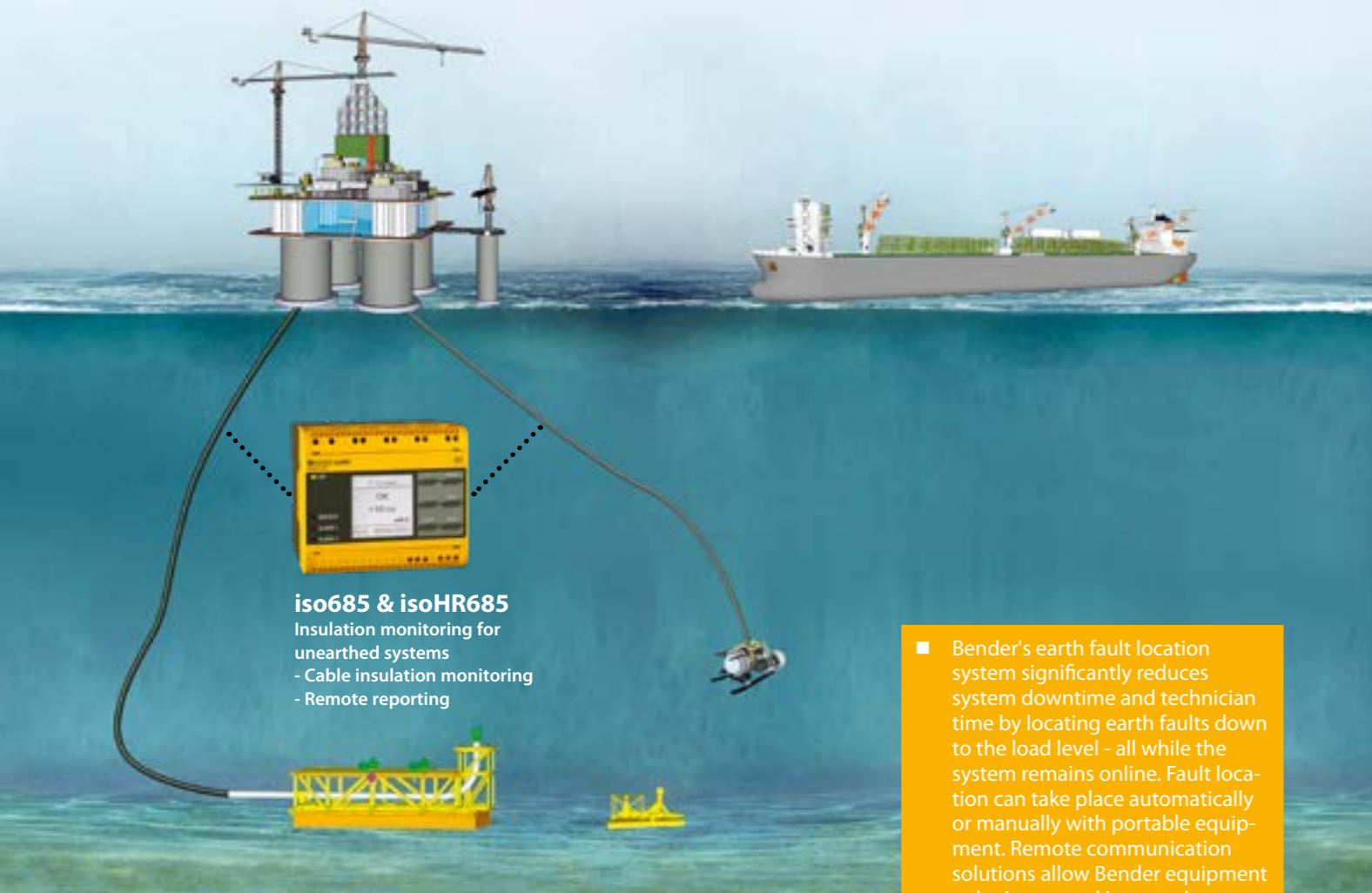
# Earth fault protection of umbilicals

For offshore and subsea production facilities

The world  
market leader and  
known expert  
in Electrical Safety



## Avoiding costly downtime in offshore facilities



**iso685 & isoHR685**  
Insulation monitoring for unearthed systems  
- Cable insulation monitoring  
- Remote reporting

- Bender's earth fault location system significantly reduces system downtime and technician time by locating earth faults down to the load level - all while the system remains online. Fault location can take place automatically or manually with portable equipment. Remote communication solutions allow Bender equipment to be integrated into modern communication systems, such as Modbus TCP.
- Products for virtually any offshore application - platforms, umbilicals, ROVs, and FPSO vessels.
- Advanced warning in case of ground faults and insulation failure with 10 G $\Omega$  measuring range using the latest in earth fault monitoring technology for AC, DC & AC/DC systems and systems with variable speed drives.
- Monitoring of cables up to 1000  $\mu$ F leakage capacitance and up to 100 parallel capacitively coupled cables while limiting cross-cable disturbance of power or data cables.
- Monitoring power cables up to AC 1000 V 2ph, AC 690 V 3ph and DC 1300 V and frequencies up to 460 Hz.
- Communication solutions allow for remote notification of technicians or integration into modern industrial communication networks.

Non-Productive Time (NPT) is a well-known acronym throughout the oil & gas industry and subsea environment which causes substantial time and turnover losses, e.g. in petroleum production. NPT is estimated to cost upwards of \$100 to \$500 million annually. Equipment such as blow-out preventers (BOPs) and top drives can account for 51 % - 75 % of all equipment-related NPT.

With over 70 years of experience in on-board electrical safety, Bender is a worldwide leading provider of electrical safety equipment for the oil & gas and subsea industry. Bender's advanced earth fault protection equipment continuously monitors system integrity and provides advanced warning of potential earth faults and system insulation failure.

The "worldwide unique" effective measuring range of 10 G $\Omega$  makes it possible to monitor and test the system already during the installation of the subsea equipment and the connection of the individual cables. This allows potential faults to be detected and eliminated at an early stage before expensive NPT occurs. Through continuous and reliable measurement in the giga-ohm range, the first interferences and damage can be detected at an early stage in operation and the safe and standard-compliant operation can be ensured by gaining valuable lead time for time-consuming procurement and installation.

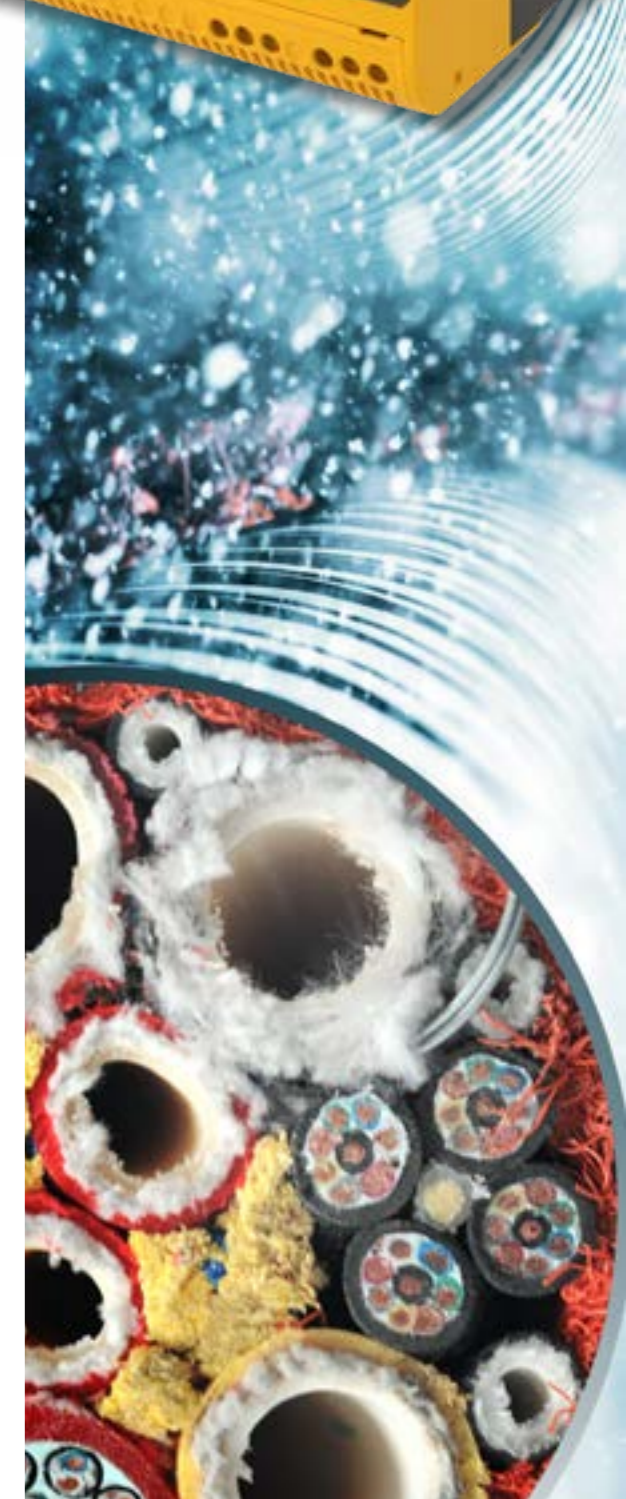
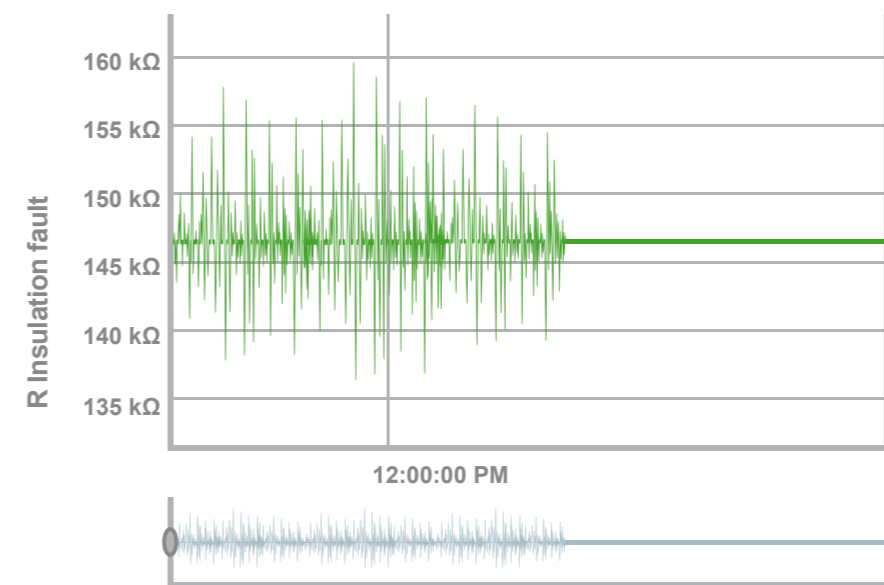
Thanks to the enhanced measurement method, cables with high leakage capacitances and parallel cables with capacitive coupling in the umbilical can be monitored simultaneously without the measurements affecting each other. Coupling devices extend the range of monitorable voltage levels up to AC 12 kV and DC 1760 V and the systems can be designed cost-effectively.

## Insulation monitoring with isoHR685

- Early detection enhances operational safety and maintenance planning possibilities
- 10 G $\Omega$  measuring range allows preventive monitoring already during installation phase
- Synchronisation feature ensures precise measurement in parallel cables
- Universally applicable in AC, 3(N)AC, AC/DC and DC systems



**Synchronising activated**





**Bender UK Ltd.**

Low Mill Business Park, Ulverston, Cumbria, LA12 9EE

Tel: 44(0) 1229 589940 Fax: 44(0) 1229 480345

enquiries@bender-uk.com • www.bender-uk.com

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