

Rigs are exposed to very harsh conditions. Cold, heat, moisture, salinity and vibrations can reach extreme limit values and push technology to its limits.

## Whether in the arctic or the desert: Safe conveying

### Stationary Insulation Fault Location System in Drill Rigs

>> Insulation fault location is therefore of utmost importance for as smooth an operation as possible. Because Bentec must shut down affected loads in the event of an insulation fault, they asked Bender to provide a technical solution for the selective shutdown of the frequency converter controlled main drives.

Bentec is a leading global manufacturer of rigs. The Bad Bentheim-based company was founded in 1994 and operates worldwide with subsidiaries in Russia, Central Asia, Middle East and the Caspian Sea. The head office in Bad Bentheim spans 110,000 sqm, whereby 13,000 sqm alone are assembly halls. This means that complete rigs can be manufactured at the plant and then be delivered ready for operation.





The rigs can withstand very harsh conditions, are reliable due to their low susceptibility to damage – even under Arctic and desert conditions – and are cost-effective to operate. Three different types of systems cover the various requirements. The EURO RIG product line was designed specifically for the European market. The compact measurements and particularly the modular design mean the rigs meet European traffic ways requirements: the individual system components can be transported by road or inland waterways without requiring special transporters. They therefore fulfil demands from numerous customers requiring systems that can be transported easily and quickly. Additionally, they also comply with European environmental standards for the operation of such systems.

### Selective shutdown

The main component of all rig variations is the electrically powered components: circular table, top drive, lifting equipment and mud pumps designed for a performance range from 600 to 2,000 kW. Electrical drives for the unearthed

690 V system (IT system) are mostly managed by frequency converters. Until now, the monitoring of insulation faults was done by IRDH275 insulation monitoring devices that fulfilled the high demand for reliability and robustness in extreme operation due to the AMPPlus measurement method. Bentec requested a solution to enable the selective shutdown of specific drives under fault conditions. Should insulation faults result in a shutdown, the majority of operation should be able to continue to run and only the faulty components are to be shut down.

The following components were installed in the mains supply, which was designed as a 3AC 690 V IT system and has a connected 6-pulse rectifier and a coupled frequency converter (VFD) with a common voltage link (DC bus), to test the suitability of an EDS system: the IRDH575B2 insulation monitoring device, the EDS490-D-2 insulation fault evaluator and the WS80x120S measuring current transformer. After successful practical tests

in 2008, Bentec integrated a stationary insulation fault location system into all rig types to achieve extensive control monitoring.

### Measure, signal, switch

The EDS490 insulation fault evaluator records the test current signals created by the IRDH575 insulation monitoring device via the measuring current transformer on the drive's supply cables and evaluates these accordingly. This allows a selective localisation of insulation faults. The alarm contacts available for each of the twelve measuring channels enable a fast and accurate reaction in the event of a fault, so that only the faulty drive is disconnected from the current and repairs can be undertaken immediately. Thanks to the redundant system assembly, operation can be maintained at all times. This reduces service interruptions and increases availability. A long-winded earth fault location is no longer required and the already very high safety standard is improved even more.

### Highly efficient

The IRDH575 insulation monitoring device precisely measures insulation faults and the EDS490 insulation fault evaluator reliably locates these faults – even under the most demanding environmental conditions. Bentec therefore decided to equip their rig and oil wells with both insulation monitoring devices and EDS systems to locate insulation faults. After all, it is the end customers operating the systems that benefit from the advantages of targeted shutdowns as opposed to complete shutdowns: conveyor downtime due to insulation faults is minimised; cost-efficiency increases. ■

