POWER CABLE MONITORING

The LIOS EN.SURE product family of fiber optic sensing systems offers superior temperature, strain and acoustic sensing resolution and accuracy in comparison to other technologies.

The system has a true industrial design, is completely passive cooled, and maintenance free. The sensor is immune to electro-magnetic disturbances, thus perfectly suited for high voltage applications. The sensing unit has a MTBF of more than 40 years, ensuring reliable operation in the toughest environments.
LIOS EN.SURE

Optical fiber-based system
LIOS EN.SURE OTS3 is a robust, optical linear temperature, strain, and monitoring system.

An industry-leading 30 km range
Based on our Raman OFDR technology, EN.SURE offers fast, accurate, and highly reliable temperature and strain monitoring optimized for underground, overhead, and submarine power cables over lengths of up to industry-leading 30 km.

Real-Time Thermal Rating
Data from EN.SURE is used to calculate real-time cable conductor temperature and predict cable load, allowing the operator to run the cable above nominal capacity for peak emergency situations. and lower the maintenance and operating costs.

Customized turnkey solution
All EN.SURE systems are fitted seamlessly into our customers’ systems and supports integration of third party sensors. Our software creates easy configuration, longterm data storage and enhanced visualization. Data from all EN.SURE controllers and other sensors are easily combined in the database to enable an efficient monitoring of complex power cable installations.

Key Features
- Real time condition monitoring
- Stand-alone system
- Maintenance-free
- Passive cooled housing
- Wide operating temperature range

System components
Charon is a user-friendly and easy-to-learn software platform for operation, storage and visualization of data from all NKTP systems

RTTR
Real-Time Thermal Rating software for load forecasting, load management and monitoring of conductor temperature.

DOB
Continuously monitoring of buried depth of subsea cables without ROV inspection.

GPS visualization
Enhanced visualization (GPS maps) gives a complete overview of your grid. See temperatures, strain, or acoustic signals and alarms.
**SPECIFICATIONS**

**DTS models**

- **EN.SURE OTS3 50**: 50µm MM (GI 50). Monitoring ranges per channel of up to 30km
- **EN.SURE OTS3 09**: 9 µm SM fibre, (ITU-T G.652, G655, G657). Monitoring ranges per channel of up to 30km

**Optical Data**

- **Optical channels (internal)**: 1, 2, 3, 4, 6, 8, 9, 12, 16 (options)
- **Fibre configuration**: No loop or termination recommended
- **Optical connector(s)**: E2000 / APC
- **Fibre types**: 50µm MM and 9µm SM
- **Laser classification**: Class 1M (IEC60825-1), eye-safe wavelength
- **Operational wavelength**: 1550 nm

**Measurement Performance**

- **Sampling interval**: Down to 0.1m
- **Spatial Resolution, minimum**: ≤ 1m
- **Temperature resolution, minimum**: <0.1°C
- **Temperature accuracy**: <2°C
- **Typical measurement time**: 5 to 20 minutes

**Communication / SCADA interfaces**

- **Programmable inputs/outputs(potential free)**: 4/10 (optional up to 40/106)
- **Analogue outputs**: 4 – 20mA (external, optional)
- **Communication interfaces**: Ethernet TCP/IP (2x), RS232, USB
- **Communication protocols**: MODBUS TCP, DNP3, IEC60870, IEC61850 (options)
- **External sensor inputs**: PT100(2x), Current0-20mA(2x), Voltage0-10V(2x) (option)

**Mechanical data**

- **Dimensions**: 19” Rack / 3 rack HU (13.1 x 48.3 x 33.8 cm)
- **Weight**: 13kg
- **Color**: Aluminium

**Electrical data**

- **Operating voltage (DC Controller)**: DC nom. 12 ... 48 V (max. 10 ... 60 V DC)
- **Mains voltage (AC Controller)**: AC 100 ... 240 V or DC 110 ... 220 V
- **Power consumption (DC Controller)**: <25W (max. 45 W/60°C)

**Optical data**

- **Optical connector**: E2000 / APC
- **Laser classification**: Class 1M (EN60825-1)

**Environmental Conditions**

- **Storage temperature**: -35 ... +75 °C
- **Operating temperature**: -10 ... +60 °C (option outdoor enclosure: -40°C to +60°C)
- **Humidity (non condensing)**: ≤95 % rel.
- **Protection class (IEC 60529)**: IP51 (option outdoor enclosure up to IP66)

**Conformity to standards**

- TÜV Rheinland (Germany) and VdT Schadenverhütung GmbH
- Electrical safety IEC/EN/UL 61010-1, IEC 61140 EMC EN61326-1, EN61000-6-2, EN61000-6-3, EN 50130-4, EN 55011, FCC 47 CFR Ch.1 Part15

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