



Power Cable Tunnel Monitoring

Shanghai

The World Exposition 2010 Shanghai China (Shanghai Expo) was held at the waterfront area on both sides of Huangpu River in Shanghai from May to October, 2010.

AP Sensing, together with their regional partner, provided its leading Distributed Temperature Sensing (DTS) system, the “Linear Power Series”, to monitor and secure the first 500kV power cables in Shanghai installed in a power cable tunnel over a distance of 20km. These power cables supply the electric power to World Expo 2010 in Shanghai and to the same area afterwards.



The power cable monitoring solutions

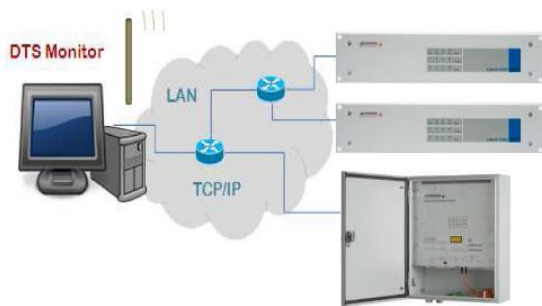
Two AP Sensing “Linear Power Series” DTS instruments are installed in the middle of a cable tunnel. Each DTS unit has two channels. The temperature data is transmitted to the management PC via a LAN interface.



500 kV high voltage power cable utility tunnel in Shanghai



Outdoor DTS instrument directly installed in utility tunnel



Concept of multi-DTS installations



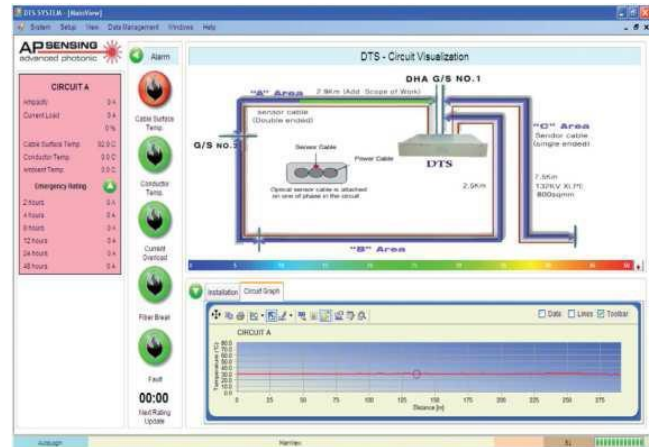
500kV joint with sensing fiber

System Advantages

- Cost-effective deployment, requires no climate-controlled room. Outdoor housing (IP66 / NEMA 4) with an operating temperature range of -10°C to 60°C (or extended from -40°C)
- Permits multiple circuits monitoring; integrated switch (up to 12 channels)
- Easy to integrate with network and SCADA solutions; uses standard interface
Industry leading quality, reliability and lifespan expectations
- Provides capability to transmit data directly to the office (cell phone or radio), allowing for remote configuration and troubleshooting; reduces service and support expenses

In one integrated package, the software suite combines:

- Distributed Temperature Monitoring
- Asset Visualization
- Alarm Management
- Central Database
- Reporting and Analysis Functions
- Real Time Thermal Rating



The software automatically detects hotspot locations, provides alarms if critical limits are exceeded, and produces a temperature profile report. All data is stored in a central database and is available for reporting and analysis. Bottlenecks are highlighted with the exact power cable position.

The system offers a quick and easy overview of the thermal status of the circuits with an easy-to-use graphical user interface. Circuit layouts are mapped and the various sections are colored according to the measured cable surface temperatures. Temperature graphs and hotspot tables are easily accessed.

The system constantly monitors each connected instrument and issues a warning message to the operator if a DTS, or the communication path to the DTS becomes unavailable, therefore ensuring the required system availability and reliability.