

Underground Temperature Measurement Optical Cable Technology



AI Overview

Optical fiber-based systems, such as Distributed Temperature Sensing (DTS), enable continuous, real-time monitoring of underground power cable temperatures, enhancing safety, reliability, and predictive maintenance.

Overview of Optical Temperature Monitoring

Underground power cables are critical infrastructure, and their temperature directly affects ampacity, ageing, and operational safety. Optical fiber-based monitoring systems embed or attach optical fibers along the cable to measure temperature continuously over long distances. These systems provide a distributed temperature profile, allowing operators to detect hotspots, thermal bottlenecks, and abnormal conditions in real time .

Key Technologies

- Distributed Temperature Sensing (DTS) DTS uses optical fibers to measure temperature along the entire cable length. It can detect hotspots with high spatial resolution and monitor distances up to 40-70 km per system. DTS systems, such as the Luna EN.SURE, provide real-time thermal ratings to optimize cable load and prevent overheating .
- Fiber Bragg Grating (FBG) Sensors FBG sensors are point-based optical sensors that can measure temperature, strain, and other parameters at multiple locations along a cable. They are often used in multi-parameter monitoring systems to track conductor temperature, external temperature, and transformer conditions

Article Content

Jan 11, 2026

Conductor temperature monitoring system in underground power ...

A conductor temperature monitoring system using the current method was developed to estimate conductor temperatures at joints of

Oct 29, 2025

Temperature monitoring techniques of power cable joints in underground ...

Therefore, it is of utmost importance to protect UUTs from disasters. Power cable accidents in UUT internal facilities

Oct 10, 2025

Fiber-optic distributed temperature sensing: A new tool for

Fiber-optic distributed temperature sensing (FO DTS) is an emerging technology for characterizing and monitoring a

Sep 14, 2025

Temperature sensing in underground facilities by Raman optical ...

2 Temperature sensing method The techniques used in this study are based on the method of distributed temperature sensing

Jul 24, 2026

(PDF) Development and Improvement of an Intelligent

This paper presents the development and improvement of an intelligent cable monitoring

Feb 13, 2026

Advances in fibre optic based geotechnical monitoring systems for ...

The conventional geotechnical monitoring instruments are discussed in Section 2. This is followed by an overview of

Feb 14, 2026

Distributed Temperature Sensing and Real Time Thermal Rating for ...

Abstract: This paper presents the distributed temperature sensing (DTS) technology and its application mainly on underground

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(PDF) Temperature Sensing in Underground Facilities by

High-resolution temperature sensing with Raman-OFDR using fiber-optical communication cables shows great

Oct 06, 2025

Multi-Parameter Optical Monitoring Solution Applied to Underground ...

This work presents a multi-parameter optical fiber monitoring solution applied to an underground power distribution

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(PDF) Fibre optic temperature sensing: Application for ...

The fibre-optic temperature-sensing technique allows temperature measurements to be made even in refilled

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Distributed temperature measurements using optical fibre technology

This article experimentally examines the applicability of a temperature measuring and monitoring system using

Jan 15, 2026

Distributed Fibre-optic Temperature Sensing Technique (DTS) for ...

Fibre-optic temperature sensing is a low-cost diagnostic tool and therefore of great benefit when operating and

Mar 29, 2026

A Sensor for Multi-Point Temperature Monitoring in Underground Power Cables

Current temperature measurement methods, including fiber-optic-based systems (DTS and LTS), involve high costs

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Development and Improvement of an Intelligent Cable

At the same time, many underground distribution line faults can be corrected by on-line

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Guide for the Application of Distributed Fiber Optic Temperature

This report summarizes distributed fiber optic-based temperature measurement technologies and how this type of technology can be

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Prevent Cable Failures w. Underground Cable

Our underground cable monitoring solution provides enhanced reliability, cost efficiency, and improved

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A Sensor for Multi-Point Temperature Monitoring in Underground

This study introduces an alternative system for monitoring the temperature of underground cables using NTC

Dec 16, 2025

Considerations for advanced temperature monitoring of underground power ...

Temperature monitoring using fiber optic sensors to get a distributed temperature profile along an underground cable

Jan 31, 2026

Temperature sensing in underground facilities by Raman optical ...

High-resolution temperature sensing with Raman optical frequency domain reflectometry (OFDR) using optical communication fiber

Apr 28, 2026

(PDF) Distributed Temperature Sensing: Review of Technology and ...

Distributed temperature sensors (DTS) measure temperatures by means of optical fibers. Those optoelectronic devices

Jan 31, 2026

Distributed Temperature Sensing (DTS) | AP Sensing

Distributed Temperature Sensing (DTS) systems provide temperature information for accurate thermal monitoring, fire detection, and

May 07, 2026

(PDF) Distributed temperature measurements using optical fibre ...

Distributed measurement of conductor temperatures in mine trailing cables using fibre-optic technology. IEEE Transactions on

Mar 01, 2026

Temperature Sensing in Underground Facilities by Raman-OFDR

High-resolution temperature sensing with Raman-OFDR using optical communication fiber cables shows great potential as it allows

Jun 06, 2026

Development and Improvement of an Intelligent Cable Monitoring

In the case of the optical fiber composite power cable (OFCPC), which is a power cable embedded with optical cables, electrical

Feb 20, 2026

Fiber Optic Distributed Temperature Sensing | US EPA

. Abstract: Fiber-optic distributed temperature sensing (FODTS) provides sub-minute temporal and meter-scale spatial

Sep 09, 2025

A distributed optical fiber sensor for temperature detection in power ...

The temperature profile obtained from measurements performed with optical fiber DTS method on a 126 m long 154

Mar 02, 2026

Distributed Temperature Sensing

A Distributed Temperature Sensing (DTS) system monitors temperature over long distances or across large surfaces, it could be

Dec 22, 2025

Temperature monitoring techniques of power cable joints in

We placed the proposed FBG on an energized cable joint of the power distribution grid and measured the temperature.

Jul 01, 2026

Distributed temperature sensing

Distributed temperature sensing systems (DTS) are optoelectronic devices which measure temperatures by means of optical fibres

Nov 03, 2025

Prevent Cable Failures w. Underground Cable

Underground cable monitoring is crucial for maintaining reliability and preventing failures caused by

Dec 24, 2025

EN RE Power Cable DTS System

The Luna EN RE power cable DTS system is an optical fiber-based temperature measurement system

May 24, 2026

USGS OGW BG: Fiber-Optic Temperature Monitoring Technology ...

About Fiber Optic Distributed Temperature Sensing FO-DTS measurements involve sending laser light along a fiber

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