

How to calibrate the current of an optical power meter

Article Overview

Calibration of an optical power meter requires comparing its readings to a NIST-traceable reference standard and adjusting for detector responsivity at specific wavelengths.

Understanding Calibration

An optical power meter measures light via a photodiode, converting the resulting current into a power reading in dBm or mW. The conversion depends on the detector's responsivity (amps per watt) at each wavelength, which is stored in the meter's internal calibration table. Over time, photodiodes drift due to aging, temperature cycling, humidity, and connector wear, which can cause deviations of 0.05-0.3 dB per year, making calibration essential for accurate measurements .

Laboratory Calibration Procedure

- o Reference Standards: True calibration requires a working standard calibrated against a national standard, such as NIST in the U.S., or other recognized metrology institutes internationally .
- o Measurement Comparison: The meter under test (DUT) is exposed to known optical power levels at multiple wavelengths. The DUT readings are compared to the reference standard.
- o Adjustment: If deviations exceed specifications, the meter's internal calibration tables are adjusted by the lab, and the meter is re-tested.
- o Certification: Once within tolerance, the lab issues a calibration certificate and marks the meter with the next calibration due date, typically every 12 months .

Field Verification and Practical Tips

While full calibration requires a lab, you can perform field-level verification:

- o Zeroing: Cover the sensor and press the zero or null button to ensure the meter reads zero when no light is present .
- o Wavelength Selection: Set the meter to the wavelength of the fiber system under test.
- o Reference Power Setting (REF): Use a known-good reference source to check the meter's readings and adjust the reference if necessary .
- o Connector Cleaning: Clean fiber connectors and the sensor surface to prevent contamination affecting current readings.
- o Cross-Check: Compare readings with another calibrated meter to detect drift or anomalies.

Key Considerations

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- o Annual Calibration: Standard practice is to send meters for calibration every 12 months, or sooner if heavily used or exposed to extreme conditions .
- o Detector Type: Calibration procedures may vary depending on whether the photodiode is Si, Ge, or InGaAs, as each has different spectral responsivity characteristics .
- o Traceability: Ensure the calibration is NIST-traceable or equivalent to maintain measurement credibility and compliance with ISO 9001 or TIA standards . By following these procedures, you ensure that the photodiode current accurately reflects optical power, maintaining reliable and traceable measurements for fiber optic testing and certification.

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How to Calibrate Optical Power Meter and Optical light Source Sets Orientek T25m

In this section we will assess the uncertainty for the optical fiber power measurement system. The uncertainty estimates for the NIST

Introduction An optical power meter measures the photon energy in the form of current or voltage from an optical detector such as a

Yokogawa hopes that its Power meters contribute to a world with cleaner and more efficient energy use. The below tutorial intends to

Many companies find it advantageous to have an in-house calibration verification system for fiber-optic power meters, light sources,

Optical Power Meter calibration is critical for accurate fiber optic testing. In this video, I

Tribler, you know it's a good optical power meter for all of your needs and specs. When you

Optical Power Meter Basics Although most people want to make measurement in units of dBm or Watts, an optical power meter is

Optical power meters are designed to measure optical power in a specified wavelength range as accurately as possible. Due to the

In Calibrating Fiber Optic Instruments, I discussed calibrating fiber optic power meters, which measure optical power. This article will

How to calibrate the current of an optical power meter

There are some things to be careful of when you calibrate optical power meters. One

Step-by-step guide to using a fiber optic power meter: connector cleaning, wavelength selection, reference

This application note demystifies how EXFO's IQS-12002 Optical Calibration System can guide you through the calibration of power

Calibration means that an instrument has been tested against a standard and set up to make measurements

An optical power meter is a professional testing device used to measure the power of optical signals accurately. It is

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