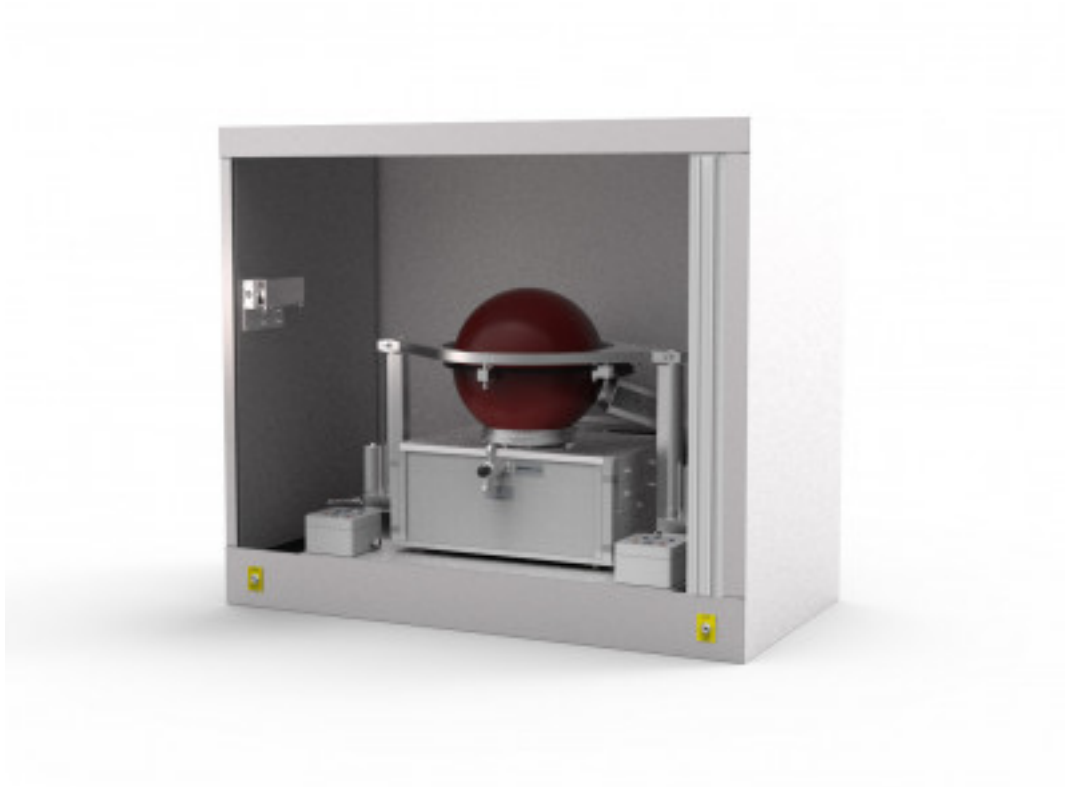


# TPI21-TH

<https://www.gigahertz-optik.com/en-us/product/tpi21-th/>

**Product tags: VIS**



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## Description

The photometric specifications of LEDs must meet very high tolerance requirements regardless of whether they are to be used in general, automotive or other specialist lighting applications. This is often a problem since the manufacturing tolerances of LEDs can be higher than those permitted in the end-use applications. Also, LED binning by LED manufacturers in order to classify LEDs based on their tolerances is performed with flash mode testing using pulsed current flow. However, end-use applications of the LEDs often operate in constant current mode and with significant thermal effects. The sophisticated LED processing industry therefore requires measurement devices that can be used for both manufacturer-compliant pulsed mode, as well as constant current operation mode. When the LEDs are run in constant current mode, the junction temperature has significant influence on the performance and lifetime of the LED. Therefore, test systems should be able to test the LEDs at specific junction temperatures.

## The TPI21-TH and its function groups

The TPI21-TH from Gigahertz-Optik GmbH is a high-quality LED testing system that supports a fully automated testing process. The only thing that has to be done manually is the attachment of the devices under test. The system's design conforms to the latest norms and regulations (such as CIE S025, LM-79-08, DIN 5032 Part 9). It comprises five main function groups:

- Light meter for the luminous flux, spectrum, color, and color rendering index
- Thermoelectric LED attachment for electrical contact, heating, and cooling
- Supply and measurement electronic system for pulsed and constant current modes
- Software for fully-automated measurement sequences with conclusive light evaluation
- Light-tight housing

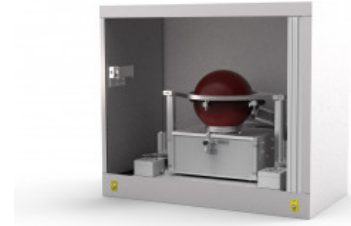
## Light meter

The light meter consists of the [BTS2048-VL-TEC](#) spectroradiometer and a 21 cm diameter integrating sphere with a 70 mm measurement port. One unique feature that differentiates it from conventional devices is that the spectroradiometer and integrating sphere are rigidly coupled without a light guide resulting in a robust, monolithic module that is fully calibrated. This is made possible by the extremely compact and lightweight design of the BTS2048-VL-TEC. This makes it possible to place the light meter above the sample and to automate lowering it over the device under test. Sample handling is extremely easy and contamination of the sphere's measurement port is minimized. The BTS2048-VL-TEC conforms to all the requirements of CIE S025, LM-79-08, and DIN 5032 Part 9 in terms of the spectral resolution, stray light characteristics, linearity, signal to noise ratio, and responsivity. This is enabled by the high-quality TE-cooled CCD based spectroradiometer in combination with the photometric Si photodiode of the BiTec light sensor. The zero setting function (electronic shutter) of the CCD allows for precise, short-term measurement within a light pulse without the need to perform any dark measurement in advance. The BTS2048-VL-TEC has a trigger interface to enable time-synchronized measurements. More information on the [BTS2048-VL-TEC](#) can be found on its datasheet. The integrating sphere also conforms to CIE S025, LM-79-08, and DIN 5032 Part 9 and is therefore equipped with an auxiliary lamp and a temperature sensor. The dome-shaped protection window at the measurement port prevents contamination of the sphere's inner surface.

## Thermoelectric LED test socket

A good LED test socket must provide a reliable electrical connection to the test LEDs, facilitate attachment of the test LEDs to the heat sink, and be able to control the junction temperature through cooling and heating.

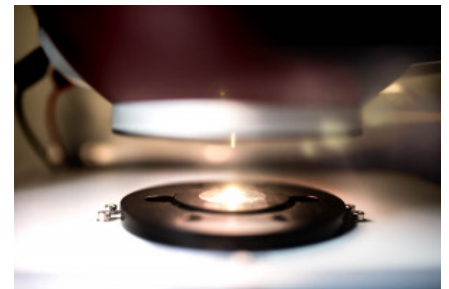
The LEDA-7-TEC LED test socket of the TPI21-TH LED measurement system has 250 W Peltier element with a powerful heat exchanger for rapid regulation of the LEDs' junction temperature. This makes it possible to also operate large PCBs (up to 70 mm diameter) in the entire temperature range between +25°C to +85°C +/-1°K. A PT100 temperature sensor is integrated in the heat sink. LED adapters are additionally offered for both standard SMD LEDs and onboard LEDs. All the LED adapters support separate current supply and voltage measurement of the test LED via four-pole contacts. The attachment to the heat sink is done



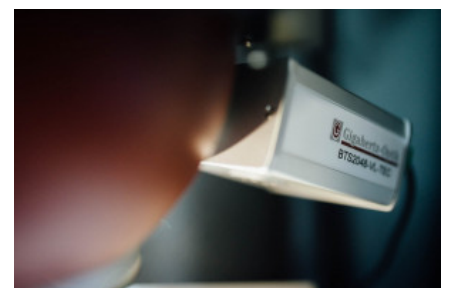
*TPI21-TH for measurement of the luminous flux, spectrum, color, and color rendering index without dark box*



*TPI21-TH, LED mounting adapters*



*The integrating sphere moves motor driven in the measurement position*

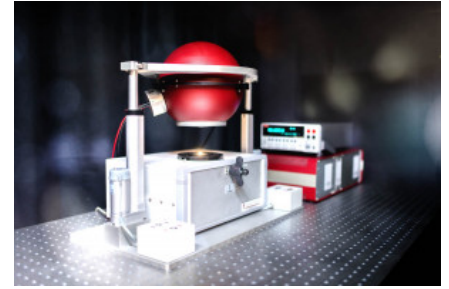


through a metal adapter that is specifically designed for the respective LED. The LEDA-7-TEC LED socket is fully remote controlled.

*high precision BTS2048-VL-TEC spectral radiometer*

## Electronic supply and measurement system

Power supplies from the Keithley 2400 series are used to supply test LEDs in pulsed and constant current modes (max. 60 V, 3A, and 60W). Their source meter function allows for simultaneous measurement of electrical parameters according to DIN 5032-9, LM-79-08, and CIE S025. As for the pulsed mode, the light meter and source meter are connected to an extra trigger line for time-synchronization. Current supply and voltage measurement are performed on separate supply lines. Operation of the auxiliary lamp is performed by a separate power supply. Both power supplies are fully integrated in the user software.



*TPI21-TH measurement system without casing*

## Software

The measurement system is operated using intuitive software. It controls the measurement device, thermoelectric socket, the Keithley source meter, and the height setting of the light meter. Evaluation of the measurement results can be customized using configurable parameters and user scripts. For instance, measurement intervals can be defined for automated tests. The completion of a measurement is signaled graphically and/or with an acoustic signal. The software supports the function of the auxiliary lamp (self-absorption correction) and recalibrations by the user.

## Light-tight housing

A light-tight box is also supplied for the TPI21-TH LED measurement system. This allows for operation in bright ambient areas (e.g. goods-in quality control areas). The perfectly designed access to the measurement socket makes for ease of use. A door latch is added for safety reasons during the measurement and while the test LED is still hot.

## Calibration

One essential quality feature of photometric devices is their precise and traceable calibration. The TP121-TH is calibrated by Gigahertz-Optik's calibration laboratory that is accredited by DAkkS (D-K-15047-01-00) for the *spectral responsivity* and *spectral irradiance* according to ISO/IEC 17025. In order to facilitate its use in measurement of LEDs with 2Pi radiation characteristics, the calibration is performed using a [BN-LHSE-2P-20](#) calibration lamp that provides simultaneous 2Pi irradiation to the test LEDs.

## Specifications



### General

Short description	LED testing system for the luminous flux, spectrum, color, and color Rendering index of SMD LEDs and onboard LEDs
Main features	High-Quality light meter made of a combination of a spectroradiometer and integrating sphere. Thermoelectric LED socket for LED junction temperature control. Automated measurement process. Conforms to CIE S025, LM-79-08, and DIN 5032 Part 9
Measurement range	Luminous flux from 0.5 mlm to 200,000 lm, spectral range 350 nm to 1050 nm, Bandwidth 2 nm with optical bandwidth correction according to CIE 214
Typical applications	Inspection of incoming products (SMD-LEDs), testing corresponding to manufacturer's pulsed mode binning, quality assurance in production processes, design
Calibration	For LEDs with diffuse and regular illumination characteristics. Factory calibration. Traceable to international standards

### Product

LEDA-7-TEC	<ul style="list-style-type: none"> <li>Adjustable range from +25 °C to +85 °C +/-1 °C</li> <li>PT100 sensor integrated in the heat conducting block for precise temperature measurement close to the DUT</li> <li>Peltier element with 250W for heating and cooling</li> <li>Extensive heat exchanger with silent fans for rapid heating and cooling</li> <li>Separate current supply and voltage measurement of the test LED through quadripole contact technique</li> <li>Optional measurement adapter for onboard LEDs up to 70 mm Ø</li> <li>Optional measurement adapter for SMD single LEDs</li> <li>Measurement of thermal measurement parameters in accordance with DIN 5032-9, LM-79-08 and CIE S025</li> </ul>
Housing	<ul style="list-style-type: none"> <li>Dimensions: 800 mm x 430 mm x 700 mm</li> <li>Weight: approx. 20 kg (when empty)</li> <li>Color: light grey or black</li> <li>The measurement system is as well available without the cabinet in smaller dimensions.</li> </ul>
Power Supply	<ul style="list-style-type: none"> <li>Source-meter model 2420 (KEITHLEY) <ul style="list-style-type: none"> <li>Max. 60V, 3A, 60W</li> <li>CW and pulsed operation</li> <li>Trigger for timed synchronization of the light meter in pulsed operation</li> </ul> </li> <li>Measurement of electrical measurement parameters in accordance with DIN 5032-9, LM-79-08 and CIE S025</li> </ul>
Sensor	Model <a href="#">BTS2048-VL-TEC</a> Specifications can be found in the separate datasheet
Integrating sphere	UMBB-210-103221: <ul style="list-style-type: none"> <li>Diameter 215 mm</li> <li>BaSO4 coating</li> <li>75 mm measurement port</li> <li>Transparent dome for dust protection</li> <li>Measurement geometry in accordance with LM-79-08 and CIE S025</li> <li>Quartz-halogen auxiliary lamp</li> </ul>

## Configurable with

Product Name	Product Image	Description	Go to product
BTS2048-VL		Versatile superb Speed and high Quality LED Spectroradiometer	<a href="https://www.gigahertz-optik.com/en-us/product/bts2048-vl/">https://www.gigahertz-optik.com/en-us/product/bts2048-vl/</a>
BTS2048-VL-TEC		Versatile Temperature Controlled High Speed and High Quality LED Spectroradiometer	<a href="https://www.gigahertz-optik.com/en-us/product/bts2048-vl-tec/">https://www.gigahertz-optik.com/en-us/product/bts2048-vl-tec/</a>

## Purchasing information

Article-Nr	Modell	Description
<b>Product</b>		
15306372	TPI21-TH	LED measurement system for LEDs with $2\pi$ radiation characteristics
<b>Options</b>		
15298757	LEDA-7-TEC-SMD-01	DUT LED adapter for SMD LED type Oslon Square, Osram. For use with LEDA-7-TEC.
15298758	LEDA-7-TEC-SMD-02	DUT LED adapter for SMD LED type XP-G2, CREE. For use with LEDA-7-TEC.
15298759	LEDA-7-TEC-SMD-03	DUT LED adapter for SMD LED type Luxeon TX, Lumileds. For use with LEDA-7-TEC.
15298783	LEDA-7-TEC-SMD-04	DUT LED adapter for SMD LED type XM-L EasyWhite, CREE. For use with LEDA-7-TEC.
15298751	LEDA-7-TEC-STAR	DUT four-pole contact LED adapter for STAR type LED board. For use with LEDA-7-TEC.