



## TIA-3000 Optical/Electrical Converter



## Operating Instructions

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## Introduction

The TIA-3000 Optical to Electrical Converter is a convenient high bandwidth detection system for fiber optic applications. With a typical bandwidth of 30 KHz to 10 GHz, it accurately provides an electrical replica of the optical signal presented to it. It is intended to drive a 50 ohm cable terminated in its characteristic impedance.

The unit is equipped with an InGaAs/InP detector that is responsive in the wavelength range of 900 - 1700 nm. The TIA-3000 is provided with an FC fiber optic receptacle. Other fiber optic connectors can be provided on request. The output signal is presented to a type K SMA female connector.

Each unit is powered by an external 9 V wall-mount power supply.

***Calibration - This is a qualitative measurement device. No calibration is required or necessary.***

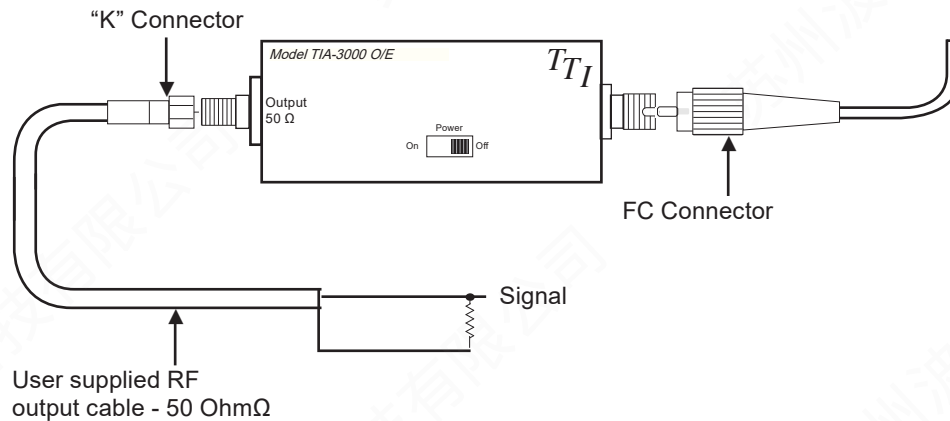
## Unpacking and Inspection

Prior to shipment this instrument was inspected and found to be free of mechanical and electrical defects. Upon acceptance by the carrier he assumes responsibility for its safe arrival. After unpacking, examine the unit for any evidence of shipping damage. Should you receive this instrument in a damaged condition, apparent or concealed, it must be noted on the freight bill or express receipt and signed by the carrier's agent. Failure to do so could result in the carrier refusing to honor the claim. Upon filing a claim TTI should be notified.

## Power Supply

Each unit comes equipped with a 9V regulated power supply that provides power to the unit. Simply plug the power supply output cable into the receptacle located beneath the FC fiber optic connector. ***It is recommended that the user never attempt substitution of this unit with any other power supply. Reverse polarity or voltages other than 9 Volts may irreparably damage the unit.***

# Typical Setup of the TIA-3000



## Warning!

*No voltage should be present at user interface or damage to the unit may occur.*

## Operating Considerations

### Operating Sequence

#### Turn on sequence:

1. Ground via SMA
2. Turn on the TIA-3000
3. Connect optical power

#### Turn off sequence:

1. Remove optical power
2. Turn off TIA-3000
3. Disconnect ground through SMA

**Failure to operate the TIA-3000 as directed will void the warranty**

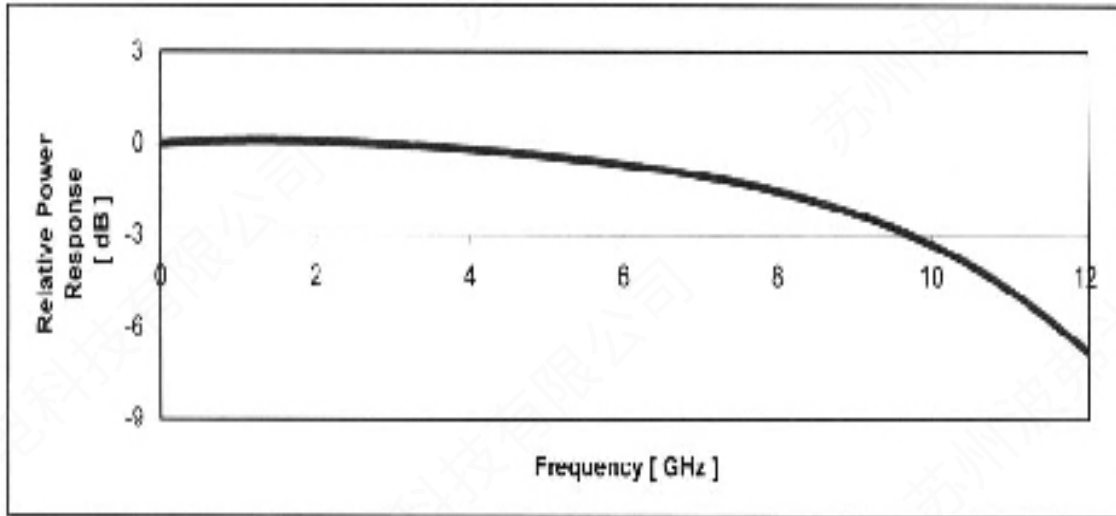
The TIA-3000 is comprised of a fiber coupled InGaAs detector coupled with a reverse bias voltage network and fast transimpedance amplifier. The output of the unit brought out to a type K female SMA connector. Light falling on the detector generates a positive-going proportional current. This current, multiplied by the transimpedance produces a voltage that is proportional to the light incident on the detector surface.

Normally the unit is used to drive a coaxial cable, this cable should have a 50 ohm characteristic impedance and be terminated with a 50 ohm load at the oscilloscope or other measuring device to be used.

The active area of the TIA-3000 is 50 microns in diameter. Standard coupling fiber is 9 $\mu$ m. Special orders with 50 $\mu$ m coupling fiber for use with multimode systems are available.

The TIA-3000 is normally equipped with FC/UPC connectors. Optionally the unit may be ordered with FC/APC connectors but return loss will be dominated by reflections from the detector.

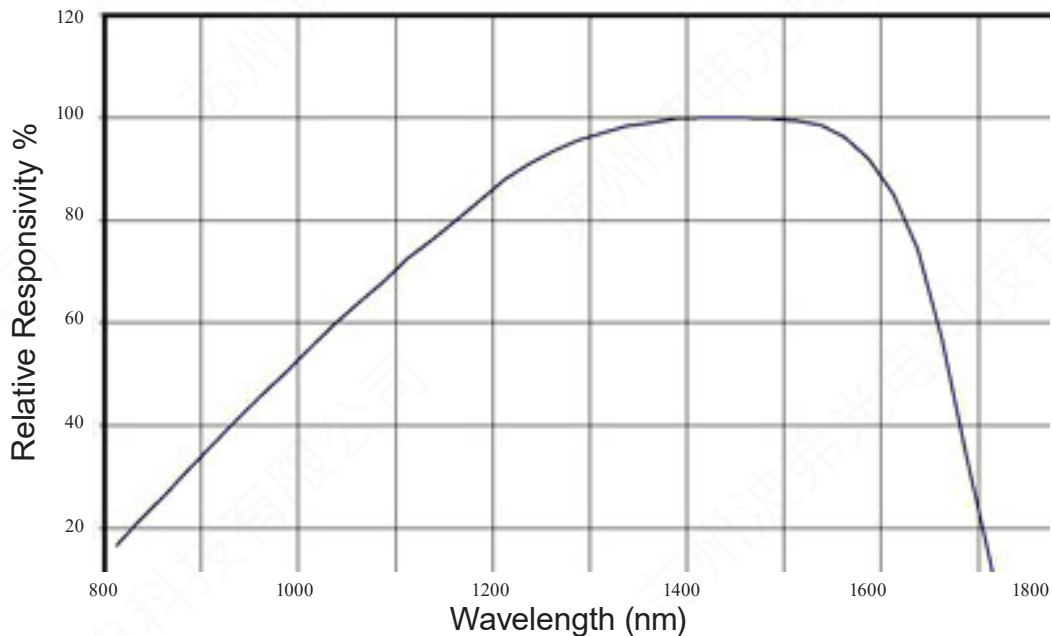
## Typical frequency Response Curve



The bandwidth of the TIA-3000 is from 30 KHz to typically 10 GHz (-3 dB ). Refer to the following Bode plot.

## Spectral Response

The approximate relative response curves of the detectors employed is as shown below. Note that these are representative curves and do not necessarily correspond to the exact response of the particular detector in use



## TIA-3000 Specifications

Detector Type	InGaAs/InP (900nm-1700nm)
Current Responsivity	0.8 A/W @ 1550nm Typical
Transimpedance	400 Min. 50 Typ.
Maximum Linear Input Power	1.25mW
Maximum Input Power w/o Damage	6.25mW Peak, 2.5mW Avg.
Bandwidth@1550nm Typ.	10 GHz typ. (8 GHz min.)
Output Impedance	50 Ohms
Output Connector	Type K SMA Female
Fiber Optic Input Connector	FC/UPC
Input Numerical Aperture	0.11
Sensitivity	-20dBm @ 10 <sup>-10</sup> BER
Detector ORL @1550nm Typ.	30dB
Power Requirement	120 VAC, 60 Hz
Dimensions	1.2"W x 2.5"L x 1.3"H ( 30.5mm x 63mm x 33mm)
Weight	5.6 oz (0.16 Kg)
LED Annunciators Provided	Power On
Operating Temperature Range	0 - 40 C
Standard Warranty	Two Years, Component and Workmanship, 30 Day Satisfaction Guarantee
Accessories Supplied	Transit/Storage Case, Operating Manual on CD, Universal Power Supply

# LIMITED WARRANTY

TERAHERTZ TECHNOLOGIES INC. (“TTI”) WARRANTS THAT TO THE FIRST PURCHASER, FOR A PERIOD OF TWO YEARS FROM THE DATE OF RECEIPT, THAT THIS PRODUCT (“THE PRODUCT”) WILL BE FREE FROM DEFECTS IN MATERIALS AND MANUFACTURING. THE FOREGOING WARRANTY IS THE ONLY WARRANTY, EXPRESS OR IMPLIED, GIVEN BY TTI, I.E., THERE IS NO WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. TTI HEREBY DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY OTHER THAN THE WARRANTY IN THE FIRST SENTENCE TO THE FULLEST EXTENT PERMITTED BY LAW. THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY IS REPAIR OR REPLACEMENT AT TTI’S OPTION OF ANY PRODUCT THAT PROVES TO BE DEFECTIVE IN MATERIALS OR MANUFACTURING WITHIN TWO YEARS OF RECEIPT OF THE PRODUCT. NOTE: THIS WARRANTY DOES NOT APPLY TO ANY PRODUCT WHICH HAS BEEN SUBJECT TO MISHANDLING, MISUSE, OR SERVICE BY UNAUTHORIZED PERSONNEL OR TO ANY PRODUCT WHICH HAS BEEN DAMAGED, MODIFIED, ALTERED OR TAMPERED WITH.

TO THE FULLEST EXTENT OF THE LAW, TTI DISCLAIMS ALL LIABILITY FOR ANY OTHER DIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ALLEGED TO BE CAUSED BY A DEFECTIVE PRODUCT, I.E., TTI WILL NOT BE RESPONSIBLE FOR ANY PERSONAL INJURY, PROPERTY DAMAGE OTHER THAN THE COST OF REPLACING THE PRODUCT OR ANY OTHER MONETARY DAMAGE SUCH AS LOST WAGES OR PROFITS CAUSED BY ANY USE, ATTEMPTED USE OR INABILITY TO USE THE PRODUCT. NOTE: BY USING THE PRODUCT, YOU AGREE THAT REPAIR OR REPLACEMENT AT TTI’S OPTION WILL FULLY SATISFY TTI’S WARRANTY OBLIGATION TO YOU, WHETHER IN CONTRACT, TORT, NEGLIGENCE, STRICT LIABILITY OR OTHER APPLICABLE LAW.

## Warranty And Repair Information

### REPAIR INFORMATION

Products manufactured by Terahertz Technologies Inc. are designed and fabricated to provide reliable performance. However, in the event that service is required, both telephone technical assistance and factory repair services are available. Call (855) TTI-TEAM (884-8326) for information.

For IN-WARRANTY REPAIRS, call us to obtain a Returned Material Authorization number, (RMA Number). All products are to be returned to TTI with freight charges pre-paid. Those products sent under warranty will be returned to our customers pre-paid. We cannot be responsible for returned products that do not reference the TTI RMA number.

For OUT-OF-WARRANTY repairs, services are billable for both time and materials.

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