



# T-Ray 5000

## Terahertz Control Unit



**How does it work?** The T-Ray 5000 Control Unit delivers precisely controlled optical signals to the T-Gauge Sensor Heads enabling them to generate and receive terahertz signals. The processed waveforms enable multiple measurements to be made simultaneously with a single sensor head.

**Why is it the best choice for Terahertz gauging and imaging?** The newest generation of T-Ray 5000 is characterized by high precision, short measurement time, and robust construction. Measured signals are processed at a rate of up to 1,000 times per second making T-Ray 5000 the fastest industrial terahertz system available.

KEY FEATURES AND BENEFITS	EXTENSIONS	APPLICATION EXAMPLES
<ul style="list-style-type: none"> <li>Ultra high speed measurements of moving samples for online process monitoring</li> </ul>	<ul style="list-style-type: none"> <li>Powerful and user-friendly application oriented software platform</li> </ul>	<ul style="list-style-type: none"> <li>Thickness measurement during coating application processes</li> </ul>
<ul style="list-style-type: none"> <li>High precision thickness measurements of single and multi-layer material structures</li> </ul>	<ul style="list-style-type: none"> <li>Abundance of communication protocols and I/O options</li> </ul>	<ul style="list-style-type: none"> <li>Multi-point measurements of extruded tubing and shapes (ie OD, ID, concentricity, ovality, etc)</li> </ul>
<ul style="list-style-type: none"> <li>Dual parallel optical channels for multiple simultaneous measurements in either reflection or transmission</li> </ul>	<ul style="list-style-type: none"> <li>Provides measurement data in engineering units</li> </ul>	<ul style="list-style-type: none"> <li>Top and bottom balance of steel and textile cord tire ply</li> </ul>
<ul style="list-style-type: none"> <li>Simple user interface with independent measurement recipes</li> </ul>	<ul style="list-style-type: none"> <li>Easy integration with industrial automation and robotics</li> </ul>	<ul style="list-style-type: none"> <li>Density and basis weight measurements for multiple materials</li> </ul>

## TECHNICAL SPECIFICATIONS

Measurement Performance	TCU5610	TCU5611	TCU5612	TCU5613
Bandwidth	1.5 GHz to 5 THz (depends on sensor type and measurement time)			
Dynamic Range	90 dB (varies by sensor type)			
Delay	320 ps	80 ps	160 ps	700 ps
Spot Diameter	Nominal 2 mm			
Working Distance	1, 3, and 6 inches			
Measurement Range	50 mm	12 mm	25 mm	100 mm
Measurement Precision	< 1 $\mu$ m			
Measurement Rate	Up to 100 Hz	Up to 1,000 Hz	Up to 1,000 Hz	Up to 100 Hz
Minimum Thickness	15 $\mu$ m (depends on sensor type and measurement time)			



### Data Storage / Communication Interfaces

Communication Interfaces	2 x Ethernet TCP/IP, 4 x USB
Communication Protocols	XML over Ethernet , TCP / IP
Programmable Inputs / Outputs	Digital I/O, 24 V
External Inputs	6 Encoder Inputs [A/B/Z or Step and Direction]
Storage	128 GB Internal SSD, Optional External HD

### Mechanical Data

Dimension (H x W x D)	17.5 x 21.5 x 7.5 inches / 44.5 x 54.6 x 19 cm
Weight	40 lbs /18.2 kg

### Electrical Data

Power Consumption	400 Watts
Input Voltage	110/120 VAC; 50/60 Hz

### Environmental Data

Storage Temperature	0-40°C
Operating Temperature	0-40°C
Relative Humidity	20-90% non-condensing

### Conformance to Standards

Safety	UL 61010-1 / CE; IEC 6825 Laser Class 3R
Electromagnetic Compatibility	FCC Part 18; RSS-210/RSS Gen-210; EN 61326-1; EN 305 550-2
Hazardous Substances	RoHS directive 2011/65/EC, WEEE directive 2002/96/EC
FCC	Designed to conform with Part 18

**Notes:**

1. Bandwidth, dynamic range, and minimum thickness measurements taken with EPG sensor type over 60 second measurement time.
2. Optional external hard drive may be purchased separately and connected via designated communications interface

## RELATED PRODUCTS

SENSORS AND GAUGES	ACCESSORIES	SOFTWARE
<ul style="list-style-type: none"> <li>Individual Tx / Rx gauges</li> </ul>	<ul style="list-style-type: none"> <li>Umbilical Cable (10 or 30 meter)</li> </ul>	<ul style="list-style-type: none"> <li>T-Ray Basic</li> </ul>
<ul style="list-style-type: none"> <li>Industrial Colinear Transceivers (VRS option)</li> </ul>	<ul style="list-style-type: none"> <li>Lens options (1", 3", or 6" focal length)</li> </ul>	<ul style="list-style-type: none"> <li>T-Ray Server</li> </ul>
<ul style="list-style-type: none"> <li>Online EPG Sensor</li> </ul>	<ul style="list-style-type: none"> <li>Wall, shelf, or rack mount brackets</li> </ul>	<ul style="list-style-type: none"> <li>T-Ray Imaging</li> </ul>
<ul style="list-style-type: none"> <li>Line Scan Gauge</li> </ul>	<ul style="list-style-type: none"> <li>Spectroscopy Rail</li> </ul>	<ul style="list-style-type: none"> <li>T-Ray Security</li> </ul>
<ul style="list-style-type: none"> <li>Single Point Gauge</li> </ul>	<ul style="list-style-type: none"> <li>T-image Platform</li> </ul>	<ul style="list-style-type: none"> <li>T-Ray Server Emulator</li> </ul>
<ul style="list-style-type: none"> <li>Class 1 Div 1 / Class 1 Div 2 Sensor Kits</li> </ul>		

### Industry Leading Regulatory Compliance

The T-Ray® 5000 intelligent TCU has been certified by Underwriters Laboratories has received the CE mark, is fully compliant with FDA CDRH laser safety regulations, and has been tested to meet FCC part 18 regulations.



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