

TPP0250 and TPP0500B 250 MHz and 500 MHz 10X Passive Probes

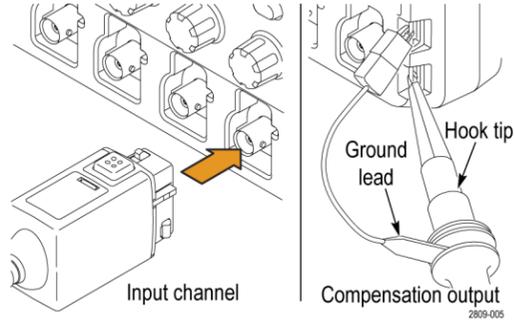
Instructions

071-3164-04 October 2024

Operating information

The TPP0250 and TPP0500B 10X Passive Probes are high impedance probes with 10X attenuation that are designed for use with Tektronix MDO3000, MDO/MSO/DPO4000B and MSO/DPO5000 series ground-referenced oscilloscopes.

Connect the probe as shown in the illustrations below.



Compensating the probe

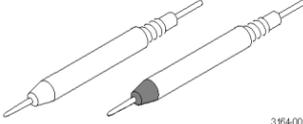
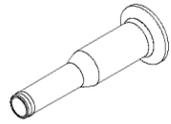
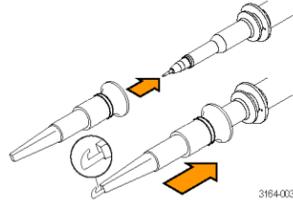
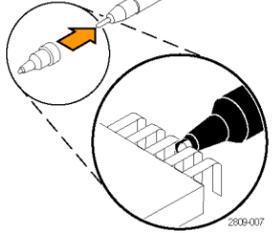
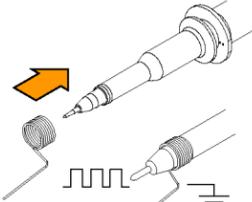
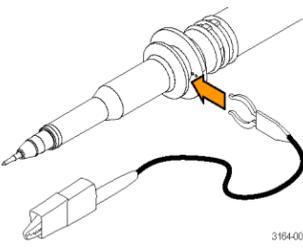
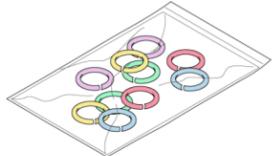
You should compensate the probe after you attach it to an oscilloscope for the first time, or after you have changed the probe tip cartridge.

1. Connect the probe to an oscilloscope channel.
2. On MSO/DPO5000 instruments:
 - a. Connect the probe to the probe compensation output terminals on the oscilloscope front panel.
 - b. Select Vertical > Probe Cal....
 - c. Select the channel number tab of the channel that you connected the probe to.
 - d. In the Calibration section, click Calibrate Probe.
3. On MDO3000 and MDO/MSO/DPO4000B instruments:
 - a. Press the Channel Menu front panel button for the channel that you connected the probe to.
 - b. Push the More button until Probe Setup is selected.
 - c. Push the Calibrate Probe button and follow the on-screen instructions.

If the probe compensation fails, verify that the signal and ground connections are secure at the Probe Comp connections on the oscilloscope. Also check that the ground connection is secure at the probe head, the rigid or pogo tip is secured tightly in the probe head, and the hook tip is securely connected to the tip.

Standard accessories

WARNING: To avoid electric shock when using the probe or accessories, keep fingers behind the finger guard of probe body and accessories.

Item	Description
	Probe tips: The rigid tip (gray tip) is pre-installed on the TPP0250 probe. The pogo tip (white tip) is pre-installed on the TPP0500B probe, and is spring-loaded for compliant testing of circuit boards. Reorder numbers below: 206-0649-XX (rigid tip) 206-0650-XX (pogo tip)
	Insulator sleeve: Remove this sleeve to replace the probe tips. Reorder Tektronix part number: 204-1226-XX
	Hook tip: Press the hook tip onto the probe tip and then clamp the hook onto the circuit. Rating: 300 V CAT II Reorder Tektronix part number: 013-0362-XX
	Universal IC cap: Use this cap to prevent shorting the probe tip between IC pins. Snap the cap onto the probe tip, and then spin the cap to expose the probe tip toward the IC lead. Reorder Tektronix part number: 013-0366-XX
	Ground springs: To limit aberrations on high frequency signals caused by ground path inductance, bend the spring to reach nearby ground connections (<0.75 in, long; <0.25 in, short). Reorder Tektronix part numbers: 016-2028-XX (long, 2 ea.) 016-2034-XX (short, 2 ea.)
	Ground lead, with alligator clip: Secure the lead to the probe head ground and then to your circuit ground. Reorder Tektronix part number 196-3521-XX
	Color bands: Use these bands to identify the oscilloscope channel at the probe head. Reorder Tektronix part number 016-0633-XX (5 pairs)

Optional accessories

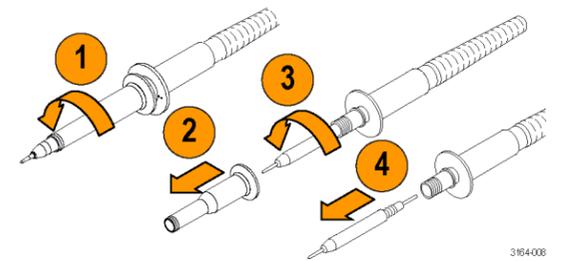
The accessories shown below are available for the probes and are rated ≤30 V unless indicated otherwise.

Description	Part number
Micro hook tip, rating 300 V CAT II	013-0363-XX
MicroCKT test tip	206-0569-XX
BNC to tip adapter, unterminated	013-0367-XX
Circuit board test point/PCB adapter	016-2016-XX
Chassis-mount probe test jack	131-8831-XX
6" clip-on ground lead	196-3198-XX
12" alligator ground lead	196-3512-XX
Wire, spool, 32 AWG	020-3045-XX

Interchanging the probe tip

For optimal performance, do a probe compensation after the tip has been replaced.

WARNING: To reduce the risk of shock, disconnect the probe before changing the probe tips.

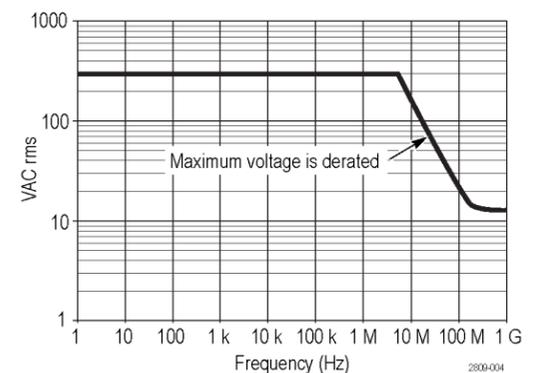
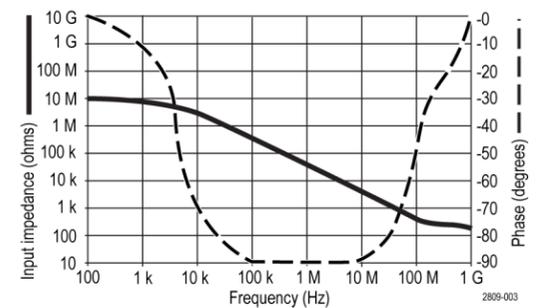


Specifications

Table 1: Electrical and mechanical specifications

Characteristic	TPP0250	TPP0500B
Bandwidth (-3 dB)	250 MHz	500 MHz
System rise time (typical)	<1.4 ns	<700 ps
System input capacitance	Rigid tip: 3.9 pF ±0.3 pF Pogo pin tip: 5.1 pF ±0.5 pF	
System attenuation accuracy	10:1 ±2.2%	
Probe series resistance @DC	9.75 MΩ ±0.5%	
System input resistance @DC	10 MΩ ±2%	
Propagation delay	~5.67 ns	
Maximum input voltage	300 V _{RMS} CAT II	
Cable length	1.3 m ±3 cm	

Performance graphs



Environmental specifications

Characteristic	Description
Temperature	Operating: -15 °C to +65 °C (+5 °F to +149 °F) Non operating: -62 °C to +85 °C (-80 °F to +185 °F)
Humidity	Operating: 5% to 95% relative humidity (%RH) up to +30 °C, 5% to 75% RH above +30 °C up to +65 °C. Non condensing Non operating: 5% to 45% RH above +65 °C up to +85 °C. Non condensing
Altitude	Operating: 3.0 km (9,842 ft) maximum Non operating: 12.2 km (40,000 ft) maximum

Safety compliance

This section lists the safety standards with which the product complies and other safety compliance information.

EU declaration of conformity – low voltage

Compliance was demonstrated to the following specification as listed in the Official Journal of the European Union:

Low Voltage Directive 2014/35/EU.

- EN 61010-031. Particular requirements for handheld probe assemblies for electrical measurement and test equipment

U.S. nationally recognized testing laboratory listing

- UL 61010-031. Particular requirements for handheld probe assemblies for electrical measurement and test equipment

Canadian certification

- CAN/CSA-C22.2 No. 61010-031. Particular requirements for handheld probe assemblies for electrical measurement and test equipment

Additional compliances

- IEC 61010-031. Particular requirements for handheld probe assemblies for electrical measurement and test equipment
- IEC 61010-2-032. Particular requirements for handheld current clamps for electrical measurement and test equipment

Pollution degree rating

Pollution Degree 2. Do not operate in environments where conductive pollutants may be present (as defined in IEC 61010-1). Rated for indoor use only.

Measurement and overvoltage category descriptions

Measurement terminals on this product may be rated for measuring mains voltages from one or more of the following categories (see specific ratings marked on the product and in the manual).

- Overvoltage Category I. For equipment intended to be connected to a mains supply in which means have been taken to substantially and reliably reduce transient overvoltages to a level where they cannot cause a hazard.
- Measurement Category II. For measurements performed on circuits directly connected to the low-voltage installation.
- Measurement Category III. For measurements performed in the building installation.
- Measurement Category IV. For measurements performed at the source of low-voltage installation.

 **Note:** Only mains power supply circuits have an overvoltage category rating. Only measurement circuits have a measurement category rating. Other circuits within the product do not have either rating.

Environmental compliance

This section provides information about the environmental impact of the product.

Product end-of-life handling

Observe the following guidelines when recycling an instrument or component:

Equipment recycling Production of this equipment required the extraction and use of natural resources. The equipment may contain substances that could be harmful to the environment or human health if improperly handled at the product's end of life. To avoid release of such substances into the environment and to reduce the use of natural resources, we encourage you to recycle this product in an appropriate system that will ensure that most of the materials are reused or recycled appropriately.

 This symbol indicates that this product complies with the applicable European Union requirements according to Directives 2012/19/EU and 2006/66/EC on waste electrical and electronic equipment (WEEE) and batteries. For information about recycling options, check the Tektronix Web site (www.tek.com/productrecycling).

General safety summary

Use the product only as specified. Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. Carefully read all instructions. Retain these instructions for future reference.

This product shall be used in accordance with local and national codes.

For correct and safe operation of the product, it is essential that you follow generally accepted safety procedures in addition to the safety precautions specified in this manual.

The product is designed to be used by trained personnel only.

Only qualified personnel who are aware of the hazards involved should remove the cover for repair, maintenance, or adjustment.

Before use, always check the product with a known source to be sure it is operating correctly.

This product is not intended for detection of hazardous voltages.

Use personal protective equipment to prevent shock and arc blast injury where hazardous live conductors are exposed.

While using this product, you may need to access other parts of a larger system. Read the safety sections of the other component manuals for warnings and cautions related to operating the system.

When incorporating this equipment into a system, the safety of that system is the responsibility of the assembler of the system.

To avoid fire or personal injury

Connect and disconnect properly

Do not connect or disconnect probes or test leads while they are connected to a voltage source.

Use only insulated voltage probes, test leads, and adapters supplied with the product, or indicated by Tektronix to be suitable for the product.

Connect the probe output to the measurement instrument before connecting the probe to the circuit under test. Connect the probe reference lead to the circuit under test before connecting the probe input. Disconnect the probe input and the probe reference lead from the circuit under test before disconnecting the probe from the measurement instrument.

Observe all terminal ratings

To avoid fire or shock hazard, observe all rating and markings on the product. Consult the product manual for further ratings information before making connections to the product.

Do not exceed the Measurement Category (CAT) rating and voltage or current rating of the lowest rated individual component of a product, probe, or accessory. Use caution when using 1:1 test leads because the probe tip voltage is directly transmitted to the product.

Do not apply a potential to any terminal, including the common terminal, that exceeds the maximum rating of that terminal.

Do not float the common terminal above the rated voltage for that terminal.

The measurement terminals on this product are not rated for connection to Category III or IV circuits.

Do not operate without covers

Do not operate this product with covers or panels removed, or with the case open. Hazardous voltage exposure is possible.

Avoid exposed circuitry

Do not touch exposed connections and components when power is present.

Do not operate with suspected failures

If you suspect that there is damage to this product, have it inspected by qualified service personnel.

Disable the product if it is damaged. Do not use the product if it is damaged or operates incorrectly. If in doubt about safety of the product, turn it off and disconnect the power cord. Clearly mark the product to prevent its further operation.

Before use, inspect voltage probes, test leads, and accessories for mechanical damage and replace when damaged. Do not use probes or test leads if they are damaged, if there is exposed metal, or if a wear indicator shows.

Examine the exterior of the product before you use it. Look for cracks or missing pieces.

Use only specified replacement parts.

Do not operate in wet/damp conditions

Be aware that condensation may occur if a unit is moved from a cold to a warm environment.

Do not operate in an explosive atmosphere

Keep product surfaces clean and dry

Remove the input signals before you clean the product.

Probes and test leads

Before connecting probes or test leads, connect the power cord from the power connector to a properly grounded power outlet.

Keep fingers behind the protective barrier, protective finger guard, or tactile indicator on the probes. Remove all probes, test leads and accessories that are not in use.

Use only correct Measurement Category (CAT), voltage, temperature, altitude, and amperage rated probes, test leads, and adapters for any measurement.



WARNING: To avoid electric shock, keep the probe wire as far from the tip and high voltage circuits as possible. The probe wire voltage rating is less than the probe tip voltage rating. Therefore the probe wire may not provide adequate protection.



WARNING: To avoid electric shock, do not use the probe if the wear indicator on the cable becomes visible. Contact Tektronix at tek.com for a replacement.

Beware of high voltages

Understand the voltage ratings for the probe you are using and do not exceed those ratings. Two ratings are important to know and understand:

- The maximum measurement voltage from the probe tip to the probe reference lead.
- The maximum floating voltage from the probe reference lead to earth ground.

These two voltage ratings depend on the probe and your application. Refer to the Specifications section of the manual for more information.



WARNING: To prevent electrical shock, do not exceed the maximum measurement or maximum floating voltage for the oscilloscope input BNC connector, probe tip, or probe reference lead.

Connect and disconnect properly.

Connect the probe output to the measurement product before connecting the probe to the circuit under test. Connect the probe reference lead to the circuit under test before connecting the probe input. Disconnect the probe input and the probe reference lead from the circuit under test before disconnecting the probe from the measurement product.

Connect the probe reference lead to earth ground only.

Inspect the probe and accessories

Before each use, inspect probe and accessories for damage (cuts, tears, or defects in the probe body, accessories, or cable jacket). Do not use if damaged.

Ground-referenced oscilloscope use

Do not float the reference lead of this probe when using with ground-referenced oscilloscopes. The reference lead must be connected to earth potential (0 V).

Floating measurement use

Do not float the reference lead of this probe above the rated float voltage.

Service the probe and accessories

Go to tek.com/support to find information on contacting Tektronix Service Support.

Terms in this manual and on the product

These terms may appear in this manual:



WARNING: Warning statements identify conditions or practices that could result in injury or loss of life.



CAUTION: Caution statements identify conditions or practices that could result in damage to this product or other property.

These terms may appear on the product:

- DANGER indicates an injury hazard immediately accessible as you read the marking.
- WARNING indicates an injury hazard not immediately accessible as you read the marking.
- CAUTION indicates a hazard to property including the product.

Symbols on the product



When this symbol is marked on the product, be sure to consult the manual to find out the nature of the potential hazards and any actions which have to be taken to avoid them. (This symbol may also be used to refer the user to ratings in the manual.)

The following symbol(s) may appear on the product.



CAUTION: Refer to Manual

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