

## TPP0502 500 MHz 2X Passive Probe

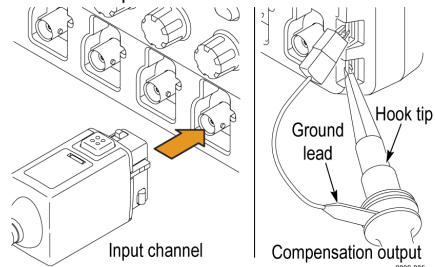
### Instructions

071-2883-05 December 2024

### Operating information

The TPP0502 2X Passive Probe is a high impedance probe with 2X attenuation that is designed for use with Tektronix FlexChannel™ and MDO3000, MDO/MSO/DPO4000B, 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. Connect the probe tip and ground to the probe compensation terminals on the oscilloscope.

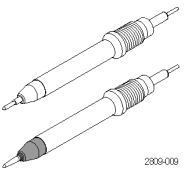

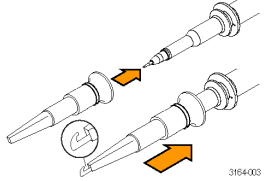
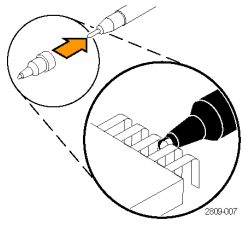
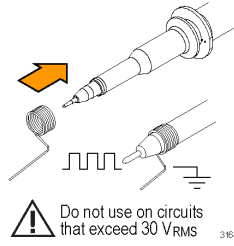
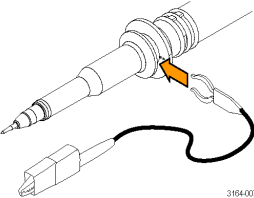
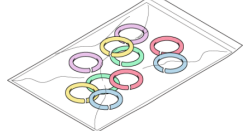
When using the MMCX tip (206-0666-xx), the following part numbers are required to connect the tip to the Probe Comp connections: 131-9717-xx (1), 196-3434-xx (1), and 206-0569-xx (2). See Connecting the MMCX tip to the oscilloscope Probe Comp.

3. On FlexChannel™ instruments:
  - a. Double tap the Channel Badge for the connected probe.
  - b. Select the Probe Setup.
  - c. Select Compensate Probe.
  - d. Select Compensate Probe in the pop-up window.
4. On MSO/DPO5000 instruments:
  - a. Select Vertical > Probe Cal....
  - b. Select the tab of the channel for the connected probe.
  - c. In the Calibration section, click Calibrate Probe.
5. 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, MMCX, 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
	<b>Probe tips – pogo (white) and rigid (gray):</b> The white pogo tip is pre-installed on the probe, and is spring-loaded for compliant testing of circuit boards. Reorder Tektronix part numbers below: 206-0641-XX (rigid tip) 206-0642-XX (pogo tip)
	<b>Insulator sleeve:</b> Remove this sleeve to replace the probe tips. Reorder Tektronix part number: 342-1194-XX
	<b>Hook tip:</b> 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
	<b>Universal IC cap:</b> 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
	<b>Ground springs:</b> 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.) <b>Do not use on circuits that exceed 30 V<sub>RMS</sub></b>
	<b>Ground lead, with alligator clip:</b> Secure the lead to the probe head ground and then to your circuit ground. Reorder Tektronix part number 196-3521-XX
	<b>Color bands:</b> 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
MMCX probe tip (gold)	206-0666-XX
MMCX to 0.1-inch (2.54 mm) square pin adapter (blue), 0.025-inch (0.635 mm) sq. pins	131-9717-XX
MMCX to 0.062 inch (1.57 mm) square pin adapter (white), 0.016 - 0.018 inch (0.4 - 0.46 mm) sq. pins	131-9677-XX
Micro hook tip, rating 300 V CAT II	013-0363-XX
Electrical Y-Lead	196-3434-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	131-4210-XX
6" clip-on ground lead	196-3198-XX
12" alligator ground lead	196-3512-XX
Wire, spool, 32 AWG	020-3045-XX

Table continued...

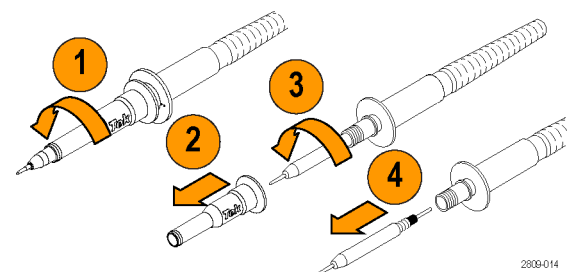
Description	Part number
DUT Interface pin kit with (qty. 20) 0.018 inch (0.46 mm) round solder-in pins	020-3169-XX
Probe tip tripod support with living hinge, 2 each (pictured with the probe tip and adapter attached)	352-1170-XX
Solder aid for 0.062-inch (1.57 mm) pitch square pins, 0.016 - 0.018-inch (0.4 - 0.46 mm) sq. pins	003-1946-XX

### Interchanging the probe tip

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

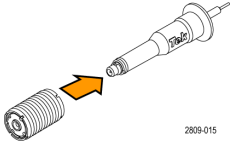
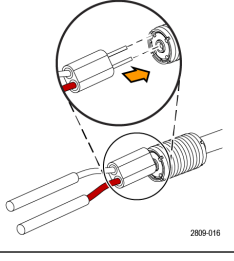
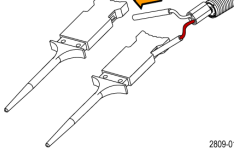
Only use tips with the light red-colored tail section for the TPP0502 probe; other tips will degrade performance.

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

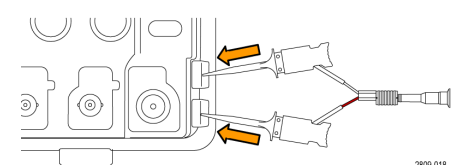


### Connecting the MMCX tip to the Probe Comp

**WARNING:** To avoid electric shock, disconnect the probe before connecting accessories.

Item	Description
	<b>Connect the MMCX tip to adapter:</b> The MMCX adapter (131-9717-xx) snaps onto the MMCX tip.
	<b>Connect the Y-lead to MMCX adapter:</b> Push the Y-lead (196-3434-xx) adapter into the MMCX adapter until it is seated. The signal input (red) connects to the center of the MMCX adapter.
	<b>Connect the MicroCKT test tips to Y-lead:</b> Push the Y-lead into the handles of the MicroCKT test tips (206-0569-xx).

**Connect the MicroCKT test tips to Probe Comp terminals:** Attach the two MicroCKT test tips to the Probe Comp terminals on the oscilloscope front panel.

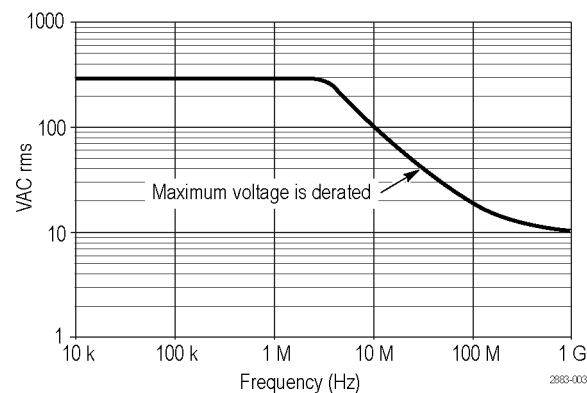
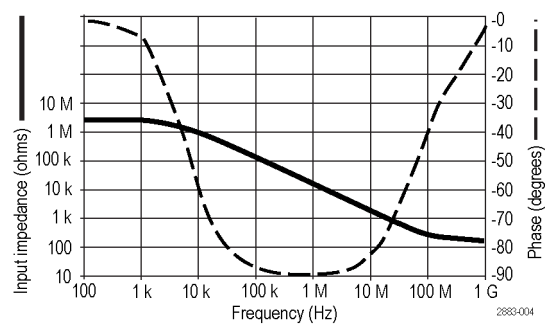


MMCX tip, adapter, and Y-lead is limited to 30 V<sub>rms</sub>, 42 V<sub>pk</sub>, 60 V<sub>DC</sub>, and OVT <500 V<sub>pk</sub>.

### Specifications

Characteristic	Description
Bandwidth (–3 dB)	500 MHz
System rise time (typical)	<700 ps
System input capacitance	Rigid tip: 12.7 pF Pogo pin tip: 13.6 pF MMCX tip: 13.0 pF
System attenuation accuracy	2:1 ±2.2%
System input resistance @DC	2 MΩ ±2%
Propagation delay	~5.7 ns
Maximum input voltage	300 V <sub>RMS</sub> CAT II
Cable length	1.3 m
Weight (includes accessories and packaging)	<454 gm (1.0 lb)
MMCX tip, adapter, and Y-lead is limited to 30 V <sub>rms</sub> , 42 V <sub>pk</sub> , 60 V <sub>DC</sub> , and OVT <500 V <sub>pk</sub> .	

## 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.



**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](http://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.

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

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.

### 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](http://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.

## 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](http://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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