

# High-voltage Differential Probes

TMDP0200 • THDP0200 • THDP0100 • P5200A • P5202A • P5205A • P5210A



## Features & Benefits

- Bandwidths up to 200 MHz
- Up to 6000 V Differential (DC + pk AC)
- Up to 2300 V Common (RMS)
- Overrange Indicator
- Safety Certified
- Switchable Attenuation
- Switchable Bandwidth Limit

## Applications

- Floating Measurements
- Switching Power Supply Design
- Motor Drive Design
- Electronic Ballast Design
- CRT Display Design
- Power Converter Design and Service
- Power Device Evaluation

## Safe High-voltage Probe Solutions

Tektronix offers a broad portfolio of high-voltage probing solutions that enable users to safely and accurately make floating measurements.

The **THDP0100** and **P5210A** have the largest differential dynamic range capability from Tektronix, allowing users to safely measure up to  $\pm 6000$  V. The THDP0100 supports bandwidths up to 100 MHz and slew rates up to 2500 V/ns at 1/1000 gain. These probes are supplied with two sizes of hook tips and have an overrange visual and audible indicator which warns the user when they are exceeding the linear range of the probe.

The **THDP0200** and **P5205A** are active differential probes that are capable of safely measuring differential voltages up to  $\pm 1500$  V. The probes are effective in making measurements in IGBT circuits such as motor drives and power converters. The THDP0200 supports bandwidths up to 200 MHz and slew rates up to 275 V/ns at 1/250 gain.

The **TMDP0200** and **P5202A** are designed for medium-voltage applications with differential requirements up to  $\pm 750$  V. These probes have lower attenuation ranges and offer better signal-to-noise ratio.

The **P5200A** can be used with any oscilloscope and enables users to **safely** make measurements of floating circuits with their oscilloscope grounded. The P5200A Active Differential Probe converts floating signals to low-voltage ground-referenced signals that can be displayed safely and easily on any ground-referenced oscilloscope.

**WARNING:** For safe operation, do not use the P5200A High-voltage Differential Probe with oscilloscopes that have floating inputs (isolated inputs), such as the Tektronix TPS2000 and THS3000 Series oscilloscopes. The P5200A High-voltage Differential Probe requires an oscilloscope or other measurement instrument with grounded inputs.

## Connectivity Options

The TMDP and THDP Series probes are equipped with the TekVPI® interface which allows smart communication between the oscilloscope and probe. Pushing the probe menu button will launch the probe control menu on the oscilloscope display providing access to all relevant probe settings and controls. These probes are designed to operate on TekVPI® oscilloscopes without requiring the TPA-BNC adapter.

The P52xxA Series probes are equipped with the Tektronix TekProbe® interface which communicates scale information to the oscilloscope. Direct connections can be made to oscilloscopes configured with the TekProbe® interface or to any oscilloscope when used with the 1103 TekProbe® Power Supply.

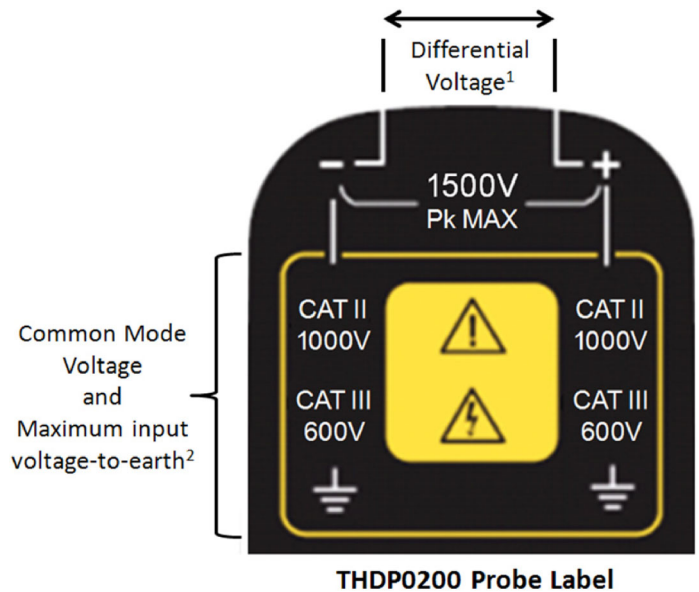
## Characteristics

### Probes with the TekVPI® Interface

| Characteristic                   | TMDP0200   | THDP0200   | THDP0100  |
|----------------------------------|--|--|---|
| Attenuation                      | 25X / 250X   | 50X / 500X   | 100X / 1000X  |
| Differential Voltage             | 250X: ±750 V<br>25X: ±75 V   | 500X: ±1500 V<br>50X: ±150 V   | 1000X: ±6000 V<br>100X: ±600 V  |
| Common Mode Voltage              | ±750 V   | ±1500 V  | ±6000 V   |
| Maximum Input Voltage-to-Earth   | 550 V CAT I<br>300 V CAT III   | 1000 V CAT II<br>600 V CAT III   | 2300 V CAT I<br>1000 V CAT III  |
| Bandwidth                        | 200 MHz  | 200 MHz  | 100 MHz   |
| Rise Time                        | <1.8 ns  | <1.8 ns  | <3.5 ns   |
| Slew Rate                        | <275 V/ns at<br>1/250 gain   | <650 V/ns at<br>1/500 gain   | <2500 V/ns at<br>1/1000 gain  |
| Input Impedance at the Probe Tip | 5 MΩ    <2 pF  | 10 MΩ    <2 pF   | 40 MΩ    <2.5 pF  |
| Typical CMRR                     | DC: > -80 dB<br>1 MHz: > -60 dB<br>3.2 MHz: > -30 dB<br>50 MHz: > -26 dB | DC: > -80 dB<br>1 MHz: > -60 dB<br>3.2 MHz: > -30 dB<br>50 MHz: > -26 dB | DC: > -80 dB<br>1 MHz: > -60 dB<br>3.2 MHz: > -30 dB<br>100 MHz: > -26 dB |
| Cable Length                     | 1.5 m  | 1.5 m  | 1.5 m   |

### Probes with the TekProbe® Interface

| Characteristic                                | P5200A   | P5202A                      | P5205A   | P5210A                         |
|---|--|-----------------------------|--|--------------------------------|
| Attenuation                                   | 50X / 500X   | 20X / 200X                  | 50X / 500X   | 100X / 1000X                   |
| Differential Voltage                          | 500X: ±1300 V<br>50X: ±130 V                                       | 200X: ±640 V<br>20X: ±64 V  | 500X: ±1300 V<br>50X: ±130 V                                       | 1000X: ±5600 V<br>100X: ±560 V |
| Common Mode Voltage                           | ±1300 V  | ±640 V                      | ±1300 V  | ±5600 V                        |
| Maximum Input Voltage-to-Earth                | 1000 V CAT II  | 450 V CAT I<br>300 V CAT II | 1000 V CAT II  | 2300 V CAT I<br>1000 V CAT III |
| Bandwidth                                     | 50 MHz   | 100 MHz                     | 100 MHz  | 50 MHz                         |
| Differential Input Impedance                  | 10 MΩ, 2 pF  | 5 MΩ, 2 pF                  | 10 MΩ, 2 pF  | 40 MΩ, 2.5 pF                  |
| Input Impedance between each Input and Ground | 5 MΩ, 4 pF   | 2.5 MΩ, 4 pF                | 5 MΩ, 4 pF   | 20 MΩ, 5 pF                    |
| Typical CMRR                                  | DC: >80 dB<br>100 kHz: >60 dB<br>3.2 MHz: >30 dB<br>50 MHz: >26 dB |                             | DC: >80 dB<br>100 kHz: >60 dB<br>3.2 MHz: >40 dB<br>50 MHz: >30 dB |                                |
| Cable Length                                  |  | 1.8 m                       |  |                                |



1. This is the maximum measurable range between the (+) and (-) input leads of the probe. Beyond these limits, the output could be clipped.
2. The maximum common mode voltage and maximum input voltage-to-earth (RMS) are the maximum voltages that each input lead (+/-) can be from ground.

## Ordering Information

### P5200A, P5202A, and P5205A

High-voltage Differential Probe.

**Includes:** 2 hook clips (AC280-FL), 2 pincer clips (AC283-FL), 2 alligator clips (AC285-FL), and 2 extension cables (196-3523-00).

**Note:** Please specify power cord option when ordering.

### Power Plug Options (P5200A only)

| Option   | Description       |
|----------|-------------------|
| Opt. A0  | US power          |
| Opt. A1  | Euro power        |
| Opt. A2  | UK power          |
| Opt. A3  | Australian power  |
| Opt. A5  | Switzerland power |
| Opt. A6  | Japanese power    |
| Opt. A10 | China power       |
| Opt. A11 | India power       |
| Opt. A12 | Brazil power      |

### TMDP0200 and THDP0200

High-voltage Differential Probes.

**Includes:** 2 hook clips (AC280-FL), 2 pincer clips (AC283-FL), 2 alligator clips (AC285-FL), 2 extension cables (196-3523-00), 2 test leads (TP175-FL), 1 high-voltage differential browser (THV-BROWSER), and 1 probe holder (TPH1000).

### THDP0100 and P5210A

High-voltage Differential Probes.

**Includes:** 2 probe tips, 2 large hook clips; 2 small hook clips; 2 probe heads (re-order kit number 020-3070-00).



196-3523-00: Extender Leads (1.5 m).



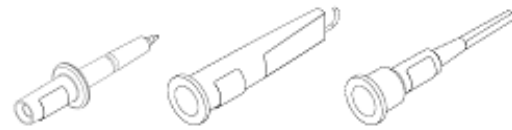
AC283-FL: Pincer Clips.



AC280-FL: Hook Clips.



AC285-FL: Alligator Clips.



020-3070-00: Hook Clip Kit.

**Service Options**

| Option  | Description                                    |
|---------|--|
| Opt. C3 | Calibration Service 3 Years                    |
| Opt. C5 | Calibration Service 5 Years                    |
| Opt. D1 | Calibration Data Report                        |
| Opt. D3 | Calibration Data Report 3 Years (with Opt. C3) |
| Opt. D5 | Calibration Data Report 5 Years (with Opt. C5) |
| Opt. R3 | Repair Service 3 Years                         |
| Opt. R5 | Repair Service 5 Years                         |

**Probe and Accessory Derating Table (Common Mode, relative to ground, when used with P52xxA Series probes)**

| Accessory   | Description                    | TMDP0200 / P5202A<br>450 V CAT I<br>300 V CAT II | THDP0200 / P5200A<br>/ P5205A<br>1000 V CAT II<br>600 V CAT III | THDP0100 / P5210A<br>2300 V CAT I<br>1000 V CAT III |
|-------------|--------------------------------|--|---|---|
| 196-3523-00 | 2x Extender Leads (1.5 m)      | Standard   | Standard  | Standard  |
|             | 2300 V CAT I<br>1000 V CAT III | 450 V CAT I<br>300 V CAT II                      | 1000 V CAT II<br>600 V CAT III                                  | 2300 V CAT I<br>1000 V CAT III                      |
| AC280-FL    | 2x Hook Clips                  | Standard   | Standard  | Optional  |
|             | 1000 V CAT III<br>600 V CAT IV | 450 V CAT I<br>300 V CAT II                      | 1000 V CAT II<br>600 V CAT III                                  | 1000 V CAT I<br>1000 V CAT III                      |
| AC283-FL    | 2x Pincer Clips                | Standard   | Standard  | Optional  |
|             | 1000 V CAT III<br>600 V CAT IV | 450 V CAT I<br>300 V CAT II                      | 1000 V CAT II<br>600 V CAT III                                  | 1000 V CAT I<br>1000 V CAT III                      |
| AC285-FL    | 2x Alligator Clips             | Standard   | Standard  | Optional  |
|             | 1000 V CAT III<br>600 V CAT IV | 450 V CAT I<br>300 V CAT II                      | 1000 V CAT II<br>600 V CAT III                                  | 1000 V CAT I<br>1000 V CAT III                      |
| 020-3070-00 | Hook Clip Kit                  | Optional   | Optional  | Standard  |
|             | 2300 V CAT I<br>1000 V CAT II  | 450 V CAT I<br>300 V CAT II                      | 1000 V CAT II<br>600 V CAT II                                   | 2300 V CAT I<br>1000 V CAT II                       |
| TP175-FL    | 2x Test Leads                  | Standard (TMDP0200)                              | Standard (THDP0200)   | Optional  |
|             | 1000 V CAT III<br>600 V CAT IV | 550 V CAT I<br>300 V CAT III                     | 1000 V CAT II<br>600 V CAT III                                  | 2300 V CAT I<br>1000 V CAT III                      |



The P52xxA Series probes provide high-voltage differential measurement solutions for any oscilloscope.



Tektronix is registered to ISO 9001 and ISO 14001 by SRI Quality System Registrar.

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**For Further Information.** Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit [www.tektronix.com](http://www.tektronix.com)



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