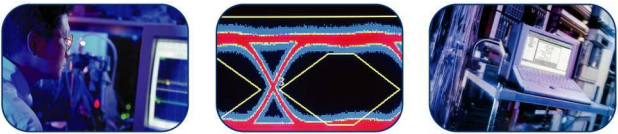


P2221
200 MHz 1X/10X Passive Probe

Instructions



P2221 1X/10X Probe

The P2221 200 MHz 1X/10X Passive Probe is a compact passive probe with selectable 1X/10X attenuation.

The P2221 Probe has a compensation range of 10 to 25 pF, and is designed for use with Tektronix DPO/MSO2000 Series oscilloscopes.

The probe has no user- or Tektronix-serviceable parts.

WARNING. Do not float the probes when used with TDS1000/2000 Series Oscilloscopes.

NOTE. The P2221 Probe is not recommended for use with the TPS2000 Series Oscilloscopes. Instead, use the P2220 1X/10X probe.

Connecting the Probe to the Oscilloscope

Connect the probe as shown in the illustration below.



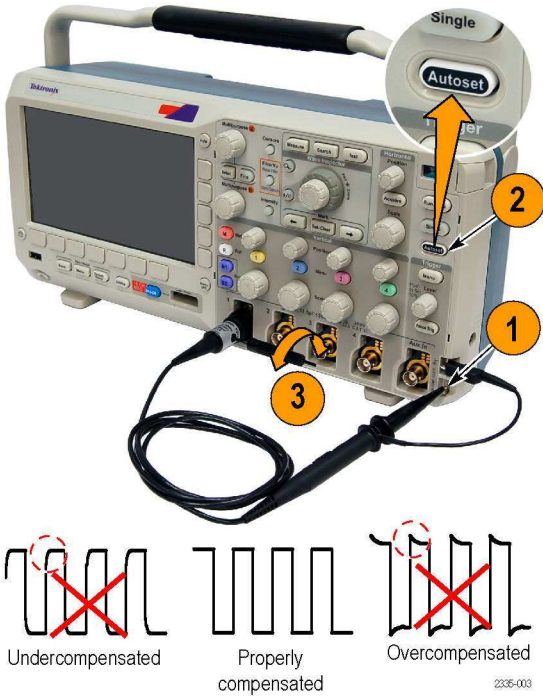
WARNING. To avoid electric shock when using the probe, keep fingers behind the guard on the probe body.

Probe Compensation

Due to variations in oscilloscope input characteristics, the low-frequency compensation of the probe may need adjustment (in 10X attenuation only) after moving the probe from one oscilloscope channel to another.

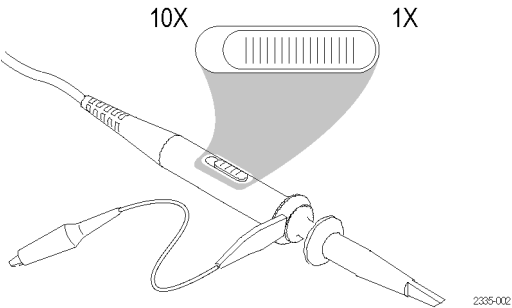
If a 1 kHz calibrated square wave displayed at 1 ms/division shows significant differences between the leading and trailing edges, perform the following steps to optimize low-frequency compensation:

1. Connect the probe to the calibration signal on the oscilloscope front panel.
- WARNING.** To avoid electric shock, only connect to the Probe Comp signal on the oscilloscope when making this adjustment.
2. Press AUTOSET or otherwise adjust your digitizing oscilloscope to display a stable waveform.
 3. Adjust the trimmer in the probe until you see a perfectly flat-top square wave on the display. (See illustration.)
- WARNING.** To avoid electric shock, only use the insulated adjustment tool when making compensation adjustments.



Attenuation Select Switch

This switch selects the attenuation factor of the probe.



Connecting the Probe to the Circuit

Refer to the back of these instructions for connection methods using the accessories included with the probe.

Specifications

Table 1: Electrical and mechanical specifications

Characteristic	10X position	1X position
Bandwidth	DC to 200 MHz (–3 dB)	DC to 6 MHz (–3 dB)
System Attenuation Accuracy	10:1 ±2%	1:1 ±2%
Compensation Range	10 pF-25 pF	NA
System Input Resistance	10 MΩ ±3% at DC	1 MΩ ±3% at DC
System Input Capacitance	17.0 pF	110 pF
System Rise time (typical)	≤2.2 ns	≤50 ns
Maximum input voltage between tip (signal) and earth ground	10X position: 300 V CAT II 420 V _{peak} , <50% Duty factor, <1 s PW 1X position: 150 V _{rms} CAT II or 150 V _{DC} CAT II 210 V _{peak} , <50% Duty factor, <1 s PW	
Cable length	1.5 m	-

Performance Graphs

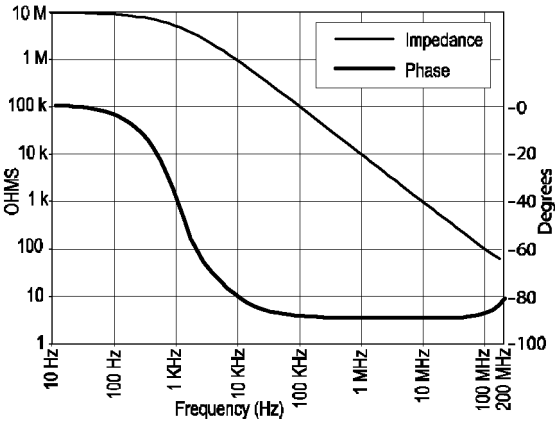
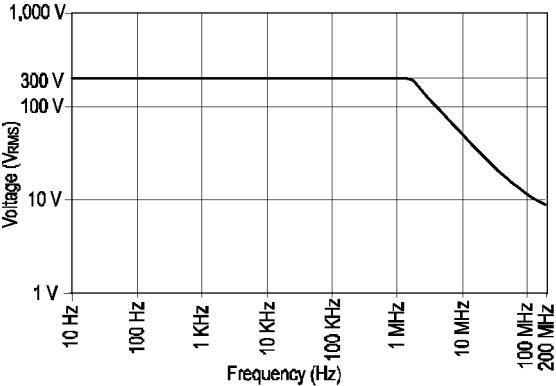


Table 2: Environmental specifications

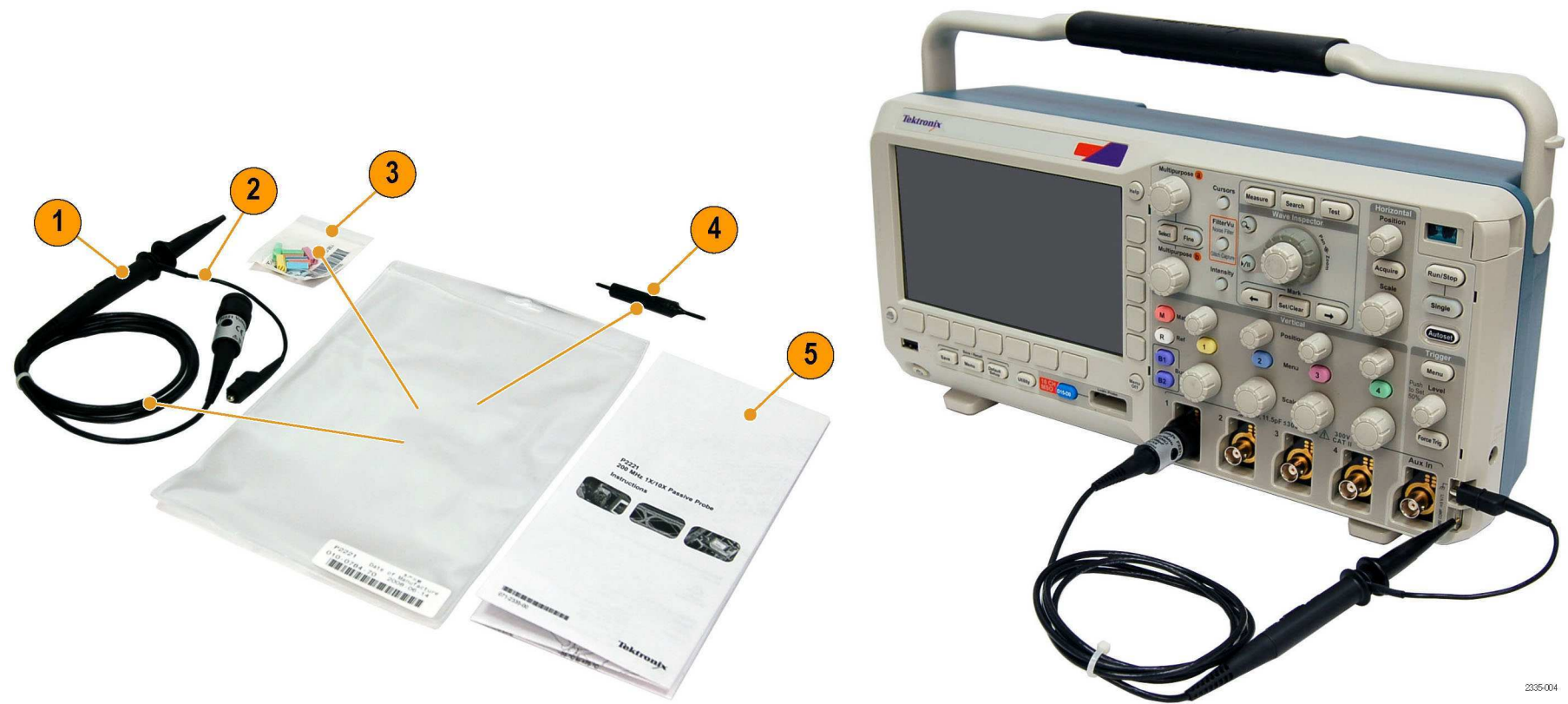
Characteristics	Description
Temperature	
Maximum operating	+50 °C (+122 °F)
Minimum operating	0 °C (+32 °F)
Nonoperating	–55 °C to +75 °C (–67 °F to +167 °F)
Humidity	10 to 95% relative humidity
Altitude	
Operating	3.0 km (10,000 ft) maximum
Nonoperating	15 km (50,000 ft) maximum
Electrostatic Immunity	The probe is not static sensitive



Equipment Recycling. This product complies with the European Union's requirements according to Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). For more information about recycling options, check the Support/Service section of the Tektronix Web site (www.tektronix.com).

Table 3: Certifications and compliances

Characteristics	Description								
EC Declaration of Conformity	Compliance was demonstrated to the following specification as listed in the Official Journal of the European Communities: Low Voltage Directive 2006/95/EC: EN61010-031: 2002								
Measurement Category Descriptions	<table><tr><th>Category</th><th>Examples of Products in this Category</th></tr><tr><td>CAT III</td><td>Distribution-level mains, fixed installation</td></tr><tr><td>CAT II</td><td>Local-level mains, appliances, portable equipment</td></tr><tr><td>CAT I</td><td>Local-level mains, appliances, portable equipment</td></tr></table>	Category	Examples of Products in this Category	CAT III	Distribution-level mains, fixed installation	CAT II	Local-level mains, appliances, portable equipment	CAT I	Local-level mains, appliances, portable equipment
Category	Examples of Products in this Category								
CAT III	Distribution-level mains, fixed installation								
CAT II	Local-level mains, appliances, portable equipment								
CAT I	Local-level mains, appliances, portable equipment								
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.								
Additional Safety Standards	UL61010B-1, First Edition & UL61010B-2-031, First Edition. CAN/CSA-C22.2 No. 1010.1-92, & CAN/CSA-C22.2 No. 1010.2-031-94 IEC61010-031:2002 Pollution Degree 2								



Standard Accessories

The following standard accessories ship with the probe and are shown in the illustration above. The accessory quantities may differ when multiple probes are shipped with an oscilloscope/probe system.

Item number	Description	Quantity	Part number
1	Hook tip	1 ea	013-0107-XX
2	Reference lead	1 ea	196-3466-XX
3	Color marker bands	1 set of 10 (5 pairs)	016-1315-XX
4	Adjustment tool	1 ea	003-1433-XX
5	Instructions	1 ea	071-2335-XX

Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use this product only as specified.

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

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

Observe All Terminal Ratings. To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product. Connect the probe reference lead to earth ground only.

To avoid electric shock when using probe accessories, never exceed the lowest rating of the probe or its accessory, whichever is less, including the measurement category and voltage rating.

Do not Operate Without Covers. Do not touch exposed connections and components when power is present.

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

Do Not Operate With Suspected Failures. If you suspect there is damage to this product, have it inspected by qualified service personnel.

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in an Explosive Atmosphere.

Keep Product Surfaces Clean and Dry.

Safety Terms and Symbols Terms in This Manual.

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.

Symbols on the Product. These symbols may appear on the product:



Contacting Tektronix

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Warranty Information

For warranty information, go to www.tektronix.com/warranty