



**TELEDYNE LECROY**  
Everywhere you look™

PP008-1

PP008-2



# Operator's Manual

PP008

Passive Probe





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## **Warranty**

Teledyne LeCroy warrants this oscilloscope accessory for normal use and operation within specification for a period of one year from the date of shipment. Spare parts, replacement parts and repairs are warranted for 90 days.

In exercising its warranty, Teledyne LeCroy, at its option, will either repair or replace any assembly returned within its warranty period to the Customer Service Department or an authorized service center. However, this will be done only if the product is determined by Teledyne LeCroy's examination to be defective due to workmanship or materials, and the defect is not caused by misuse, neglect, accident, abnormal conditions of operation, or damage resulting from attempted repair or modifications by a non-authorized service facility.

The customer will be responsible for the transportation and insurance charges for the return of products to the service facility. Teledyne LeCroy will return all products under warranty with transportation charges prepaid.

This warranty replaces all other warranties, expressed or implied, including but not limited to any implied warranty of merchantability, fitness or adequacy for any particular purposes or use. Teledyne LeCroy shall not be liable for any special, incidental, or consequential damages, whether in contract or otherwise.

## Safety Instructions

This section contains instructions that must be observed to keep this oscilloscope accessory operating in a correct and safe condition. You are required to follow generally accepted safety procedures in addition to the precautions specified in this section. **The overall safety of any system incorporating this accessory is the responsibility of the assembler of the system.**

### Symbols

These terms and symbols may appear on the probe body or in this manual to alert you to important safety considerations.



High Voltage, risk of electric shock.



**CAUTION** of potential damage to equipment, or **WARNING** of potential for bodily injury. Attend to the accompanying information/product manual to protect against personal injury or damage. Do not proceed until conditions are fully understood and met.



DOUBLE INSULATION



PROTECTIVE (EARTH) TERMINAL

### Precautions

To avoid personal injury or damage to property, review and comply with the following safety precautions. **Use product only as specified.**

**Connect only to grounded instruments.** Use only with compatible Teledyne LeCroy oscilloscopes that have their BNC input connected to an earth ground. Do not connect the probe reference lead to any point which is at a potential other than earth ground.

**Connect and disconnect properly.** Connect probe to the oscilloscope before connecting the probe to the test circuit. Disconnect the probe input and reference lead from the test circuit before disconnecting the probe from the oscilloscope. To avoid injury or death due to electric shock, do not connect or disconnect probes or probe accessories while they are connected to a voltage source.

**Do not overload.** To avoid electric shock or fire, do not apply any potential to the probe leads that exceeds the maximum rating of the probe.

**Comply with voltage derating curve.** When measuring higher frequency signals, comply with the Voltage vs. Frequency Derating Curve.

**Observe all terminal ratings.** To avoid electric shock or fire, observe all markings on the oscilloscope before connecting. Consult the respective oscilloscope product manual for further ratings information.

**Do not remove probe casing.** Removing the probe's case or touching exposed connections may result in electric shock.

**Use only within operational environment listed.** Do not use in wet or explosive atmospheres. Keep product surfaces clean and dry.

**Use only accessories compatible with the probe.**

**Handle with care.** The probe tip is extremely sharp and may puncture skin or cause other bodily injury if not handled properly.

**Keep fingers behind the finger guard of probe body and accessories.**

**Do not operate with suspected failures.** Before each use, inspect the probe and accessories for any potential damage such as tears or other defects in the probe body, cable jacket, accessories, etc. If any part is damaged, cease operation immediately and sequester the probe from inadvertent use.

## Operating Environment

The accessory is intended for indoor use and should be operated in a clean, dry environment. Before using this product, ensure that its operating environment is maintained within these parameters:

**Temperature:** Operating, 0° to 50° C; Non-operating, - 40° to 71° C

**Humidity:** 5% to 85% relative humidity (%RH) up to +30° C  
5% to 65% RH above +30° C to 40° C  
5% to 45% RH above 40° C

**Altitude:** Up to 2000 m (6540 ft)

## Introduction

The PP008 is a miniature high impedance passive probe. Its high input resistance and low capacitance make it ideal for general purpose probing of signals with frequency content from DC through several hundred MHz. The PP008 has a large selection of connection accessories, supplied standard with the probe and available from Teledyne LeCroy as optional accessories.

The PP008 is designed for use with 600 MHz and lower Teledyne LeCroy WaveRunner Xi series oscilloscopes.

## Specifications

### Electrical Characteristics

|                    |                              |
|--------------------|------------------------------|
| Attenuation        | $\pm 10 \pm 1\%$             |
| Input Resistance   | $10 \text{ M}\Omega \pm 1\%$ |
| Input Capacitance  | 9.5 pF                       |
| Input Impedance    | (see plot on next page)      |
| Compensation Range | 10 – 20 pF                   |
| Bandwidth          | 500 MHz (-3 dB)              |

### Electrical Ratings\*



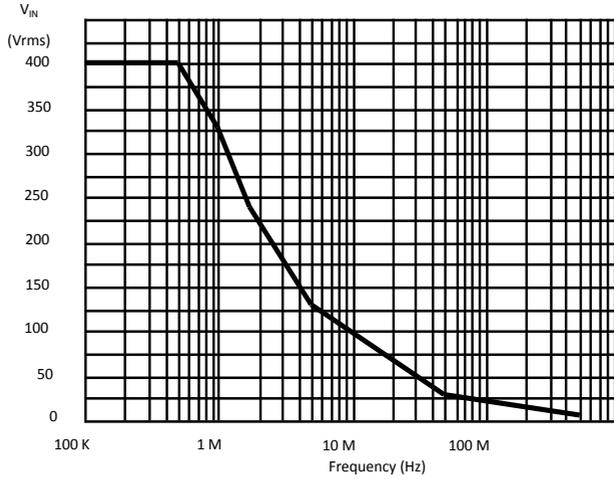
|                       |  |
|-----------------------|--|
| Maximum Input Voltage | Measurement category I: 400 V rms,<br>1250 V transient overvoltage<br>(see voltage derating curve on next page)<br>Measurement category II: 300 V rms CAT II |
| Pollution Degree      | 2  |

\* See Certifications for an explanation of ratings.

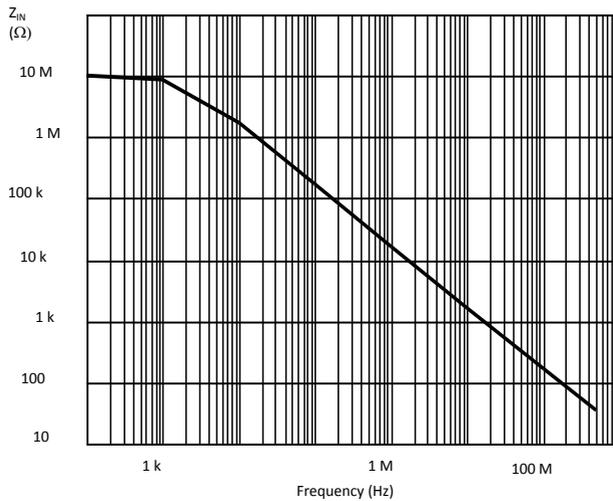
### General Characteristics

|                       |   |
|-----------------------|---|
| Operating Temperature | 0° to +50° C                            |
| Storage Temperature   | -40° to +71° C                          |
| Altitude, Operating   | up to 2000 m (6560 ft)                  |
| Humidity              | 5% to 85% relative humidity (%RH) up to |
| +30° C                | 5% to 65% RH above +30° C to 40° C      |
|                       | 5% to 45% RH above 40° C                |
| Cable Length          | 1.3 m (4.3 ft)                          |
| Weight (probe only)   | 46 g                                    |

### Max. $V_{IN}$ versus Frequency, Measurement Category I



### Typical Input Impedance

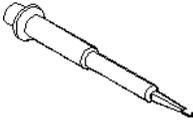


## Connectivity Accessories

Teledyne LeCroy provides over 30 individual accessories for the PP008 probe, which enable reliable connections to any physical configuration. In addition to those provided with the standard probe, several optional varieties are available either individually, or grouped in sets related to specific application needs.

The PK007 series of connectivity accessories is compatible with any Teledyne LeCroy 2.5 mm PP008 series probe. Accessories are shown with the Teledyne LeCroy part number followed by the description.

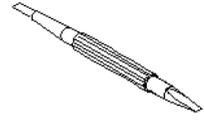
## Standard Accessories



1  
PK007-001  
Sprung Hook



2  
PK007-002  
Standard Ground Lead



3  
PK007-003  
Adjustment Tool



4, 5  
PK007-004 Rigid Tip, 0.5mm  
PK007-005 Spring Tip, 0.5 mm



6  
PK007-007  
Insulating Cap



7, 8, 9, 10, 11  
PK007-008 IC Cap, 0.5 mm pitch, (green)  
PK007-009 IC Cap, 0.65 mm pitch, (blue)  
PK007-010 IC Cap, 0.8 mm pitch, (gray)  
PK007-011 IC Cap, 1.0 mm pitch, (brown)  
PK007-012 IC Cap, 1.27 mm pitch, (black)



12  
PK007-006  
Color Coding Rings (set)



13  
PK007-013  
Ground Blade



14  
PK007-016  
Ground Spring



15  
PK007-014  
Copper Pad



16  
PK007-015  
PCB Adapter

(Not shown)

Instruction Manual

## Optional Accessories

### INPUT ADAPTERS AND CLIPS



17

PK007-017

Single Lead Adapter



18

PK007-018

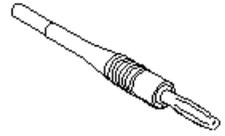
Dual Lead Adapter



19

PK007-022

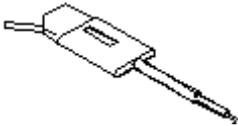
Adapter, 2 mm plug



20

PK007-023

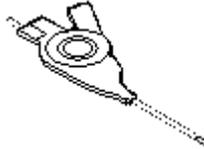
Adapter, 4 mm plug



21

PK007-019

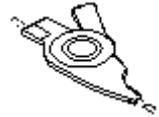
Pico Hook™



22

PK007-020

Micro Clip, Long



23

PK007-021

Micro Clip, Short



24

PK007-031

BNC Adapter

(For low voltage use only  $\leq 42$  V pk AC + DC)

## GROUND LEADS



25

PK007-024

Probe Tip Ground Lead w 0.8 mm Socket



26

PK007-025

Probe Tip Ground Lead with Alligator Clip



28

PK007-026

Ground Lead with mini clip



29

PK007-027

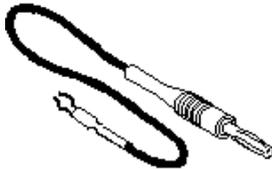
Ground Lead with 8 mm socket



30

PK007-028

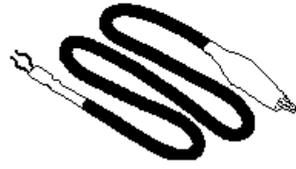
Ground Lead with 2 mm plug



31

PK007-029

Ground lead with 4 mm plug



32

PK007-030

High Frequency Compensated Ground Lead

\*The PK007-030 High Frequency compensated ground lead allows operation with long ground lead with minimum signal distortion.

**PROBE CONNECTIVITY KITS**

The following kits containing an assortment of probe connection accessories can be ordered directly from Teledyne Lecroy. Refer to the illustrations on pages 4-7 for identification.

**PK701 Basic Adapter Kit** replaces the common standard accessories, with 2 each of designators 1, 2, 4, 5 and 14; plus one adjustment tool (designator 3).

**PK702 Advanced Adapter Kit** contains a large assortment of accessories: 1 each of the designators 1, 2, 3, 5, 7, 8, 9, 10, 11, 13, 14, 15, 18, 21, 25, 29, 32; 2 each of designators 4,12, 22, 23, 24; and 5 each PCB adapter 16.

**PK703 SMD Adapter Kit** contains an assortment useful for attaching to surface mounted ICs and components: 1 each of designators 14, 17, 18, 22, 23, 25, 28, 29, 32; and 2 each of designators 5, 6, 7, 8, 9, 10, 11, 13, 15.

**PK704 Micro Clip Kit** adapts the probe for use with 0.5 mm IC lead clips. It contains 1 each of designators 16,17, 18; and two of each micro clip, designators 22 and 23.

## Use and Maintenance

This probe is a high quality, precision instrument. To maintain accuracy and signal fidelity, mechanical shock should be avoided, as well as damage to the cable through excessive bending.

To achieve the small 2.5 mm tip size, the input tip diameter is narrower than those in larger probes. Avoid placing excessive force sideways on the tip.

Should the tip become damaged, it may be replaced by the user using the procedure listed on the last page.

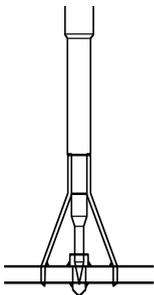
Other maintenance and component replacement should be referred to qualified personnel.

## Cleaning

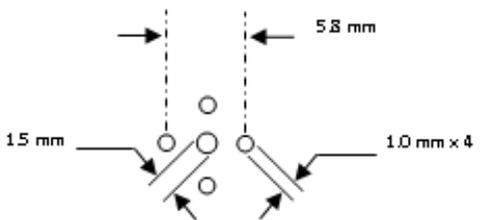
The outside of the probe should be cleaned with a soft cloth dampened with either deionized / distilled water or isopropyl alcohol. Allow the surface to dry completely before returning the probe to service. Never immerse the probe in any liquid.

## Use of PCB Adapter

The PCB adapter (Teledyne Lecroy P/N PK007-015) is intended to be designed into and permanently installed in circuit boards to provide a reliable, high frequency test point which eliminates the need to hand hold the probe.



*Probe connected using PCB Adapter*

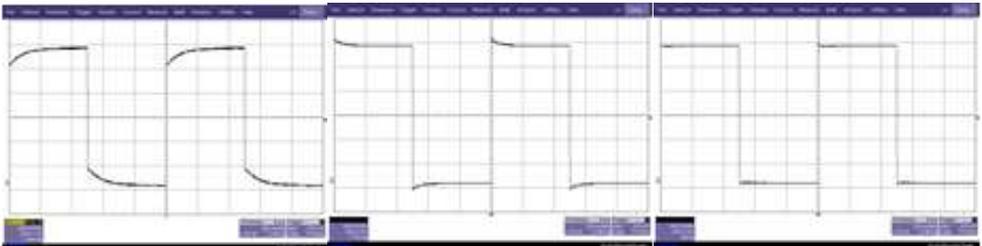


*PC Board hole size and pattern*

## Probe Compensation

Proper compensation of the probe is required to assure good amplitude accuracy in the dynamic portions of the waveform being measured. LF compensation matches the probe to differences in oscilloscope input capacitance. The LF compensation should always be checked and adjusted as needed when first connecting a passive probe to the oscilloscope input. HF compensation matches time constants within the probe to compensate for normal component tolerances. It is typically not necessary to adjust HF compensation unless the probe is being used with an oscilloscope with large differences in input characteristics than the oscilloscope model it was designed for.

LF compensation is performed by connecting the input of the probe to a low frequency square wave, such as the oscilloscope calibrator signal set to 1 kHz. The compensation is adjusted by rotating the adjustment accessible through the small hole in the center of the housing near the BNC connector. Use the tool supplied with the probe for this adjustment.

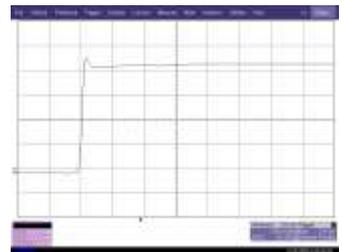


*Undershoot*

*Overshoot*

*Correct adjustment*

Should HF compensation be required, access the adjustments by sliding the black plastic cover off the compensation housing near the BNC connector. A pulse generator with low overshoot and a 300 ps risetime is the required signal source, along with a set of attenuators. The probe must be connected to a terminated probe tip to BNC adapter.



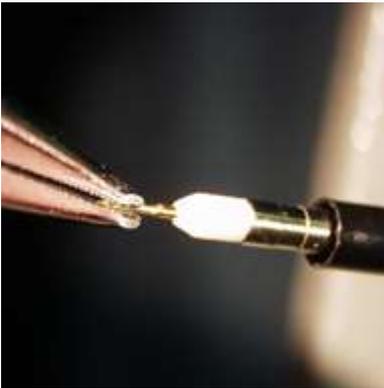
*Typical optimum HF adjustment*

Some overshoot and ring will be present at some settings of V/Div. Adjust both trimmers for the overall best response on all ranges.

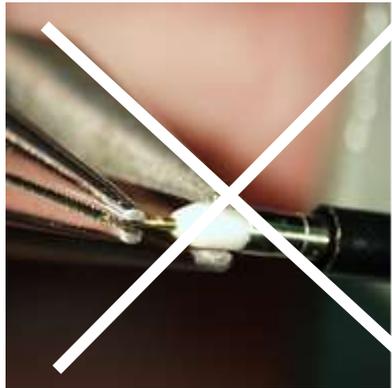
## Tip Selection and Replacement

The PP008 probe is supplied with two tip styles. The spring tip, which is installed when the probe is shipped, has a sharp point and an on-axis requirement. It provides reliable connection under a wide range of physical interconnect situations. A rigid tip is also supplied. Lacking the on-axis requirement of the spring tip, the rigid tip has a larger diameter and is more robust when exposed to physical stress at the tip. Select the proper tip for your application needs.

To replace the tip, carefully grip the outermost portion of tip and pull straight out along the axis of the probe, using needle nose pliers. Do not grip the plastic insulator with pliers; this will squeeze the tip, making it difficult or impossible to remove. Do not grip the outer gold plated tube that the tip slides into. With the tip removed, align the replacement tip with the hole and begin the insertion with the pliers. The tip can be fully seated by placing the tip against a hard surface and gently applying downward pressure.



*To remove tip, grip the spring-loaded portion of the tip beyond the outer sleeve and pull straight out.*



*Do not apply pliers to the plastic insulator.*

## Certifications

This section certifies the probe's Safety and Environmental compliance.

### EC Declaration of Conformity - Safety

The probe meets intent of EC Directive 2006/95/EC for Product Safety.

Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:

EN 61010-031/A1:2008 Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 031: Safety requirements for hand-held probe assemblies for electrical measurement and test.

- Measurement Category I (CAT I), measurement performed on circuits not directly connected to a mains supply.
- Measurement Category II (CAT II), measurements performed on circuits directly connected to the low-voltage installation.
- Pollution Degree 2, operating environment where normally only dry non-conductive pollution occurs. Conductivity caused by temporary condensation should be expected.

## Environmental Compliance

### END-OF-LIFE HANDLING



The probe is marked with this symbol to indicate that it complies with the applicable European Union requirements to Directives 2002/96/EC and 2006/66/EC on Waste Electrical and Electronic Equipment (WEEE) and Batteries.

The probe is subject to disposal and recycling regulations that vary by country and region. Many countries prohibit the disposal of waste electronic equipment in standard waste receptacles. For more information about proper disposal and recycling of your

Teledyne LeCroy product, please visit [teledynelecroy.com/recycle](http://teledynelecroy.com/recycle).

### RESTRICTION OF HAZARDOUS SUBSTANCES (ROHS)

This probe has been classified as Industrial Monitoring and Control Equipment and is outside the scope of the 2011/65/EU RoHS Directive until 22 July 2017 (per Article 4, Paragraph 3).

# Contact Teledyne LeCroy

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