TELEDYNE LECROY
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User Manual

PPE6KV-A
High Voltage
Passive Probe

PPE6KV-A High-voltage Passive Probe User Manual

933979-00 Rev A
ppe6kv-a-user-manual_01oct21.pdf
October, 2021

Contents

Safety Instructions

Follow generally accepted safety procedures in addition to the precautions listed here. **The overall safety of any system incorporating this product is the responsibility of the assembler of the system.**

IEC Safety Symbols

These terms and symbols may appear on the probe body or in this manual.

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

DANGER, High Voltage, risk of electric shock or burn.

EARTH (GROUND) TERMINAL

Safety Precautions

Use only as specified. The probe is intended to be used only with compatible Teledyne LeCroy instruments. Use of the probe and/or the equipment it is connected to in a manner other than specified may impair the protection mechanisms.

Do not overload; observe all terminal ratings. To avoid electric shock or fire, do not apply any potential that exceeds the maximum rating of the probe and/or probe accessories, whichever is less. Observe all terminal ratings.

Comply with the Voltage vs. Frequency Derating curve. When measuring higher frequency signals, keep input voltages under the maximum limits shown in the Voltage vs. Frequency Derating curve.

Use only accessories compatible with the probe and rated for the application. Substituting other accessories than those specified in this manual may create a shock or burn hazard.

Connect and Disconnect properly. Always make the connections from the probe input leads to the probe accessories that you intend to use before making any connections to a voltage source. Ensure connections between probe input leads and accessories are secure before connecting to a voltage source. Do not connect/disconnect accessories from a voltage source unless they are first connected to the probe input leads.

Do not excessively bend cables.

Use only within operational environment listed. Do not use in wet or explosive atmospheres.

Keep product surfaces clean and dry.

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

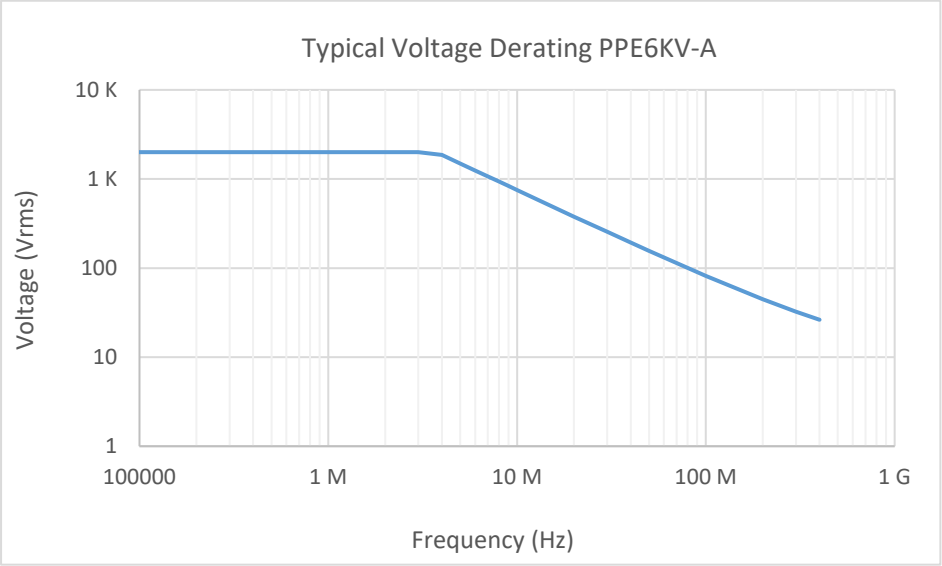
Do not remove the probe casing. Removing the probe's case or touching exposed connections may result in electric shock. Refer all repair and maintenance to qualified service personnel.

Handle with care. Probe tips are 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.

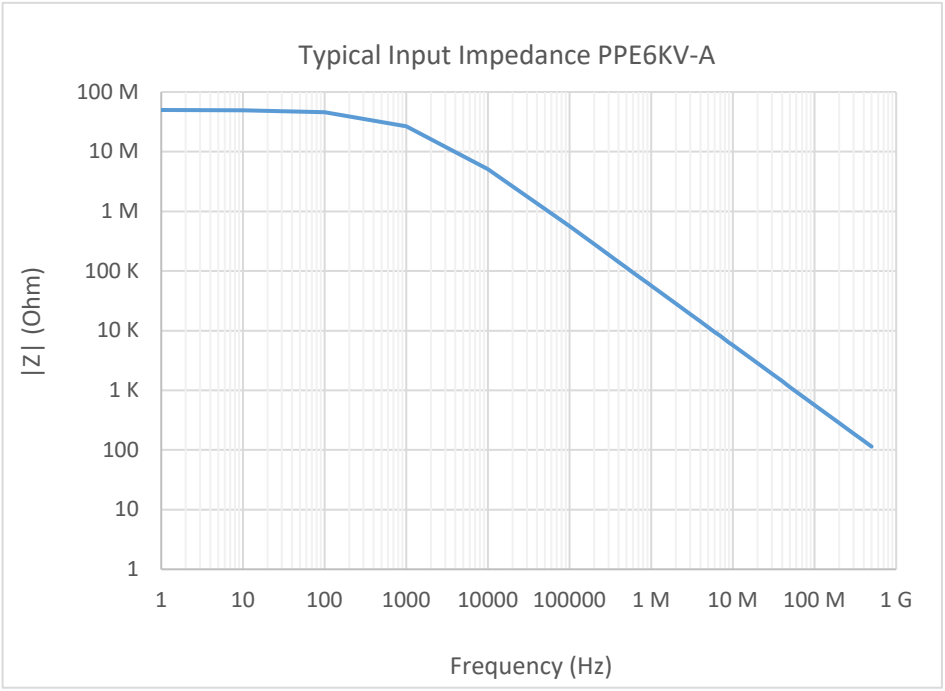
Do not operate with suspected failures. Before each use, inspect the probe, leads and accessories for damage such as tears or other defects. If any part is damaged, cease operation immediately and sequester the probe from inadvertent use.

Voltage vs. Frequency Derating Curve



WARNING: The maximum input voltage rating of the probe decreases as the frequency of the applied signal increases.

Input Impedance vs. Frequency Derating Curve



Specifications

Electrical Characteristics

Bandwidth	500 MHz
Rise Time (10-90%)	800 ps (typical)
Maximum Input Voltage (as defined in IEC 61010-031)	
CAT II[1]	1000 Vrms or 1500 VDC
CAT I[2, 3] or No Measurement Category	2000 Vrms 4000 V transient overvoltage 6 kV (DC + peak AC)
Input Resistance (system)	50 MOhms ±1%
Input Capacitance (system)	2.8 pF (typical)
Input Coupling	1 MOhm DC/AC
Compensation Range	10 to 30 pF (typical)
Attenuation Ratio	100:1
Voltage Coefficient (at DC)	0.00025%/V (typical)

1 Measurements performed on circuits directly connected to the low-voltage installation.
2 Measurements performed on circuits not directly connected to mains.
3 CAT I per IEC 61010-031:2008, No Measurement Category per IEC 61010-031:2015.

Environmental Characteristics

Operating Temperature	0° to 50° C
Non-operating Temperature	-40° to 70° C
Operating Humidity	90% max relative humidity up to +31° C, decreasing linearly to 50% at +50° C
Operating Altitude	2000 m
Non-operating Altitude	15000 m
Pollution Degree	2, operating environment where normally only dry, non-conductive pollution occurs. Temporary conductivity caused by condensation is expected.

Physical Characteristics

Cable Length	2 m (6.56 ft)
Probe Tip Diameter	8.6 mm (0.34 in)
Probe Weight	80 g (0.18 lb)

Overview

The PPE6KV-A is a general purpose, high voltage probe with a 100:1 attenuation. Its fast rise time and accurate frequency response make it suitable for a variety of measurement applications.

The following items are delivered with the PPE6KV-A probe. Please check the delivery for completeness. If any item is missing, send a message to our service department and we will send you the missing item immediately.

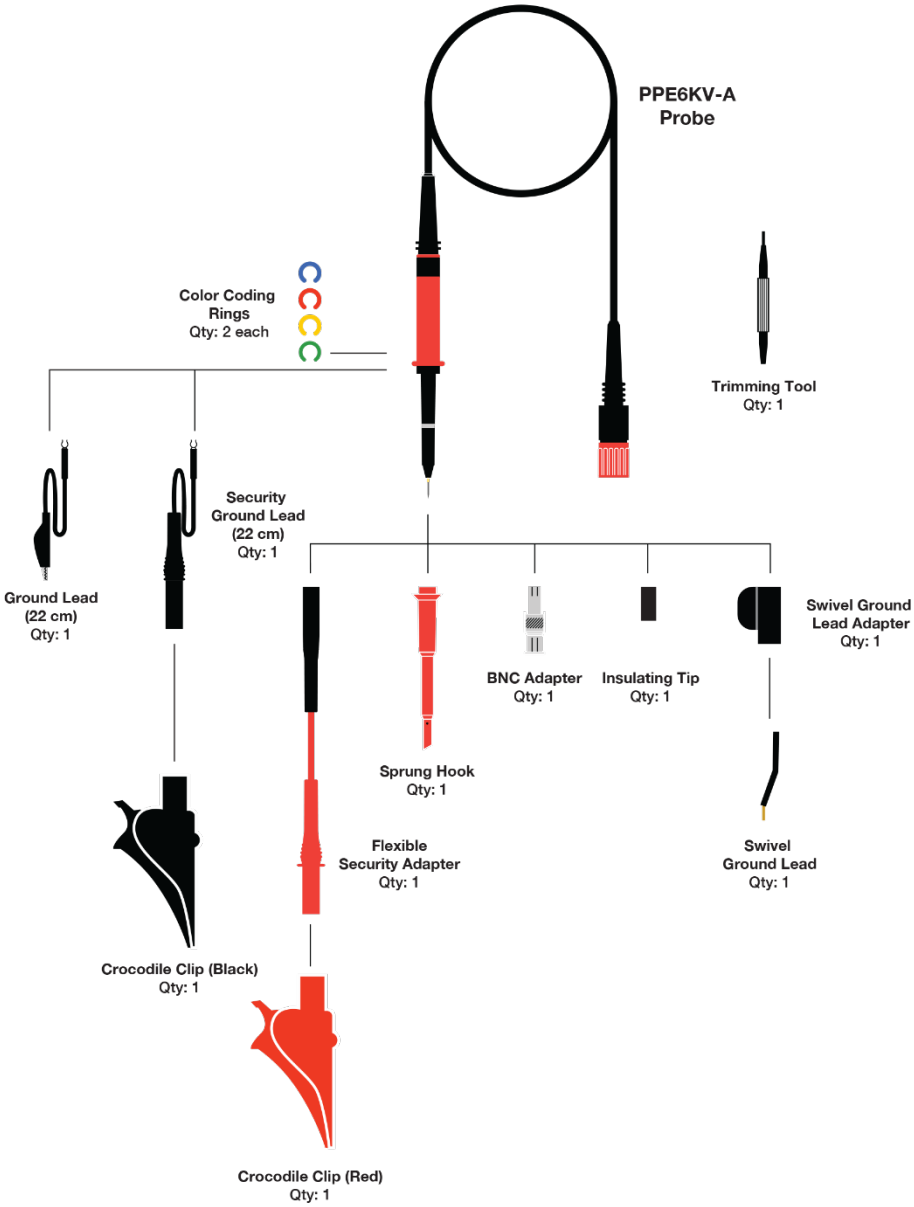
Replacement accessories may be purchased with probe kit PK-112. Contact your local sales office for probe kits.

See the Voltage Derating for Accessories on p.8.

WARNING: Use the ground lead only for connections to earth ground.

CAUTION: The accessories provided with the probe have been safety tested. Do not use any other accessories than those originally provided.

PPE6KV-A Accessories



Voltage Derating for Accessories

Accessory	Accessory Voltage Rating	Derated Max. Input Voltage for Combined Probe & Accessory
BNC Adapter	100 V No Measurement Category[1]	100 V No Measurement Category
Sprung Hook	1000 V CAT II [2]	1000 V CAT II
Crocodile Clip	1000 V CAT III [3]	1000 Vrms CAT II 1500 VDC CAT II
Flexible Security Adapter	1000 V CAT III	1000 Vrms CAT II 1500 VDC CAT II

IEC/EN 61010-031:2015 Definitions.

1. No Rated Measurement Category applies to other circuits that are not directly connected to the mains supply
2. Measurement Category II (CAT II) applies to test and measuring circuits connected directly to utilization points (socket outlets and similar points) of the low-voltage mains installation
3. Measurement Category III (CAT III) applies to test and measuring circuits connected to the distribution part of the building's low-voltage mains installation.

WARNING. Each accessory has a different measurement category (CAT) rating. The voltage and CAT rating of the probe must be derated to the values in the table above when used with the corresponding accessory.

WARNING. To avoid risk of shock or fire, do not exceed either the voltage rating or category ratings of the probe or the probe accessory, whichever is the lesser of the two. Use only the accessories provided with the probe.

WARNING. To avoid risk of shock or fire, keep the probe body and output cable away from the circuits being measured. Keep your fingers behind the finger guard of the probe.

Operation

The PPE6KV-A is rated for 1000 Vrms or 1500 VDC CAT II.

CAUTION: The maximum input voltage decreases as frequency increases. Observe the Voltage vs. Frequency derating curve on p.3 and the Voltage Rating for Accessories table on p.8.

To meet all specifications, warm the probe and instrument at least 20 minutes before use, and always operate within the safe environmental conditions.

Grounding the Probe

Connect the probe to the oscilloscope input, then connect the ground lead to earth ground before performing any measurements. Note that all accessible metal parts are connected to the BNC instrument connector (GND), except for the probe tip and the BNC center conductors.

CAUTION: The PPE6KV-A probe is designed for ground-referenced measurements only.

Handling the Probe

To avoid any injury, handle the probe with care, especially the sharp contact tip.

Note that the probe cable is a sensitive part of the probe. Do not damage the cable through excessive bending or pulling.

Avoid mechanical shock to this product in general to guarantee accurate performance and protection.

Adjustment Procedures

The probe can be compensated for low frequency (LF) and high frequency (HF). Proper compensation of the probe is required to assure amplitude accuracy of the waveform being measured. Compensation matches the probe's cable capacitance to the oscilloscope's input capacitance. This matching assures good amplitude accuracy from DC to upper bandwidth limit frequencies.

LF and HF compensation should be adjusted when the probe is first connected to the oscilloscope, or transferred between oscilloscopes.

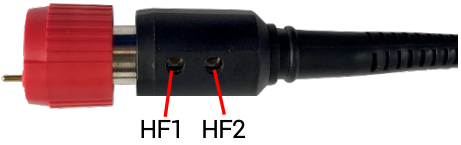
LF Compensation

1. Apply a 1 kHz square wave to the probe. You can use the CAL output on the oscilloscope front panel.
2. Using the supplied trimmer tool, adjust the LF trimmer on the BNC compensation box until you achieve an optimum, flat-topped square wave.

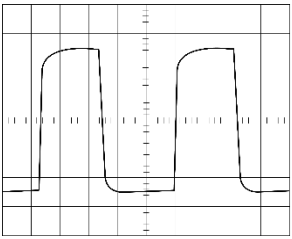
LF trimmer

HF Compensation

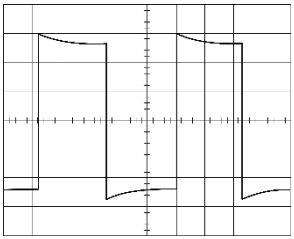
1. Remove the plastic caps from the HF trimmers on the BNC compensation box.
2. Using the supplied trimmer tool, adjust first HF1 then HF2 until you achieve an optimum square-wave response.



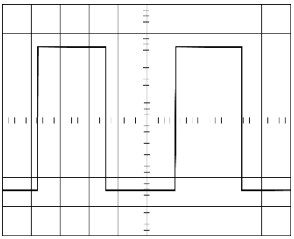
HF1 HF2



Under Compensated



Over Compensated



Optimum Compensation

Maintenance

Cleaning

Clean the exterior of the probe using a soft cloth moistened with distilled water or isopropyl alcohol solution. Do not use abrasive agents, strong detergents or other solvents that may damage the probe. Dry the probe thoroughly before using. Clear receptacles on accessories of debris before connecting to the probe.

CAUTION. The probe case is not sealed. Do not immersed it in liquid or allow moisture to penetrate it. Keep probe body and all accessories clean and dry.

Service

Defective Probes

Return defective probes to a Teledyne LeCroy service facility for diagnosis and exchange. Defective probes must be returned in order to receive credit for the probe core.

A defective probe under warranty will be either repaired or replaced with a factory refurbished probe. A defective probe not under warranty can be exchanged for a factory refurbished probe. A modest fee is charged for this service.

Returning a Probe

Contact your local Teledyne LeCroy service center for calibration or other service. If the product cannot be serviced on location, the service center will give you a Return Material Authorization (RMA) code and instruct you where to ship the product. All products returned to the factory must have an RMA.

Return shipments must be prepaid. Teledyne LeCroy cannot accept COD or Collect shipments. We recommend air-freighting. Insure the item you're returning for at least the replacement cost.

1. Remove all accessories from the probe.
2. Pack the probe in its case. If possible, include all tips, but not the manual.
3. Pack the case in its original shipping box, or an equivalent carton with adequate padding to avoid damage in transit.
4. Mark the outside of the box with the shipping address given to you by Teledyne LeCroy. Be sure to add the following:
    - ATTN:<*RMA code assigned by Teledyne LeCroy*>
    - FRAGILE
5. If returning a probe to a different country: contact Teledyne LeCroy Service for instructions on completing your import/export documents.

Service Centers

For a complete list of offices by country, including our sales and distribution partners, visit: teledynelecroy.com/support/contact

Teledyne LeCroy
700 Chestnut Ridge Road
Chestnut Ridge, NY, 10977, USA

US Support and Service:
Ph: 800-553-2769 / 845-425-2000
FAX: 845-578-5985
customersupport@teledynelecroy.com

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.

Certifications

Teledyne LeCroy certifies compliance to the following standards as of the date of publication. See the EC Declaration of Conformity shipped with the product for current certifications.

EC Declaration of Conformity - Safety

The product meets the intent of EC Directive 2014/35/EU for Product Safety. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:

IEC/EN 61010-031:2015 Safety requirements for electrical equipment for measurement, control and laboratory use – Part 031: Safety requirements for handheld probe assemblies for electrical measurement and test.

Environmental Compliance

End-of-Life Handling

The product is marked with this symbol to indicate that it complies with the applicable European Union requirements to Directives 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE).

The product 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, visit teledynelecroy.com/recycle.

Restriction of Hazardous Substances (RoHS)

Unless otherwise specified, all materials and processes are compliant with RoHS Directive 2011/65/EU in its entirety, inclusive of any further amendments or modifications of said Directive.

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