TELEDYNE LECROY
Everywhereyoulook™

HVP120

High Voltage Passive Probe

User Manual

HVP120 High Voltage Passive Probe User Manual

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Contents

Warranty

THE WARRANTY BELOW REPLACES ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS, OR ADEQUACY FOR ANY PARTICULAR PURPOSE OR USE. TELEDYNE LECROY SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER IN CONTRACT OR OTHERWISE. THE CUSTOMER IS 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 TRANSPORT PREPAID.

The product is warranted for normal use and operation, within specifications, for a period of one year from shipment. Teledyne LeCroy will either repair or, at our option, replace any product returned to one of our authorized service centers within this period. However, in order to do this we must first examine the product and find that it is defective due to workmanship or materials and not due to misuse, neglect, accident, or abnormal conditions or operation.

Teledyne LeCroy shall not be responsible for any defect, damage, or failure caused by any of the following: a) attempted repairs or installations by personnel other than Teledyne LeCroy representatives or b) improper connection to incompatible equipment, or c) for any damage or malfunction caused by the use of non-Teledyne LeCroy supplies. Furthermore, Teledyne LeCroy shall not be obligated to service a product that has been modified or integrated where the modification or integration increases the task duration or difficulty of servicing the oscilloscope. Spare and replacement parts, and repairs, all have a 90-day warranty.

Products not made by Teledyne LeCroy are covered solely by the warranty of the original equipment manufacturer.

Safety Information

IEC Safety Symbols

The following symbols may appear on the product or in this instruction manual:

Caution, risk of danger. Refer to manual.

Caution, risk of electric shock.

Earth (ground) TERMINAL.

Safety Precautions

Comply with the following safety precautions to avoid personal injury or damage to your equipment.

Use only as specified. The probe is intended to be used only with the 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 ratings. To avoid electric shock or fire, do not apply any potential that exceeds the maximum rating of the probe and/or the probe accessory, whichever is less. Observe all terminal ratings.

Connect and disconnect properly. Always make the connections from the probe input leads to the probe accessory that you intend to use before making any connections to a voltage source. Do not connect accessories to (or disconnect from) a voltage source unless they are first connected to the probe input leads. Avoid damaging cables through excessive bending.

Use only accessories compatible with the probe. Use only accessories that are rated for the application. Substituting other accessories (except those specified in this manual) may create a shock or burn hazard. Ensure the connections between probe input leads and probe accessories are secure before connecting them to a voltage source.

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

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

Do not remove the probe's casing. Touching exposed connections may result in electric shock.

Keep product surfaces clean and dry.

Handle with care. Probe accessory tips are sharp. They can puncture skin or cause other bodily injury if not handled properly.

Keep fingers behind the finger guard of the probe accessories.

Do not operate with suspected failures. Before each use, inspect the probe and accessories for any 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.

About the HVP120 Probe

The HVP120 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 very sharp probe tip is spring loaded and minimizes the pressure to the DUT (device under test). It also prevents the probe from slipping on the board surface, especially when probing at an angle. The probe tips are changeable. Replacement tips are provided within the accessory pack. Refer to the maintenance section to learn how to change the probe tip.

Operating the Probe Safely

The HVP120 is rated for 1000V AC rms or DC CAT II.

Note that the max. input voltage rating of the probe decreases as the frequency of the applied signal increases (see Derating section).

Refer to the relevant section of this instructions manual for the maximum input voltages and derating information.

Grounding the Probe

Connect the probe to the oscilloscope input and 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 centre-conductors.

The HVP120 is designed for ground-referenced measurements only.

Specifications

Specifications that are not defined to be guaranteed are typical and are published as general information to the user. The instrument should have warmed-up for at least 20 minutes and the environmental conditions do not exceed the probe's specified limits.

Electrical Specifications

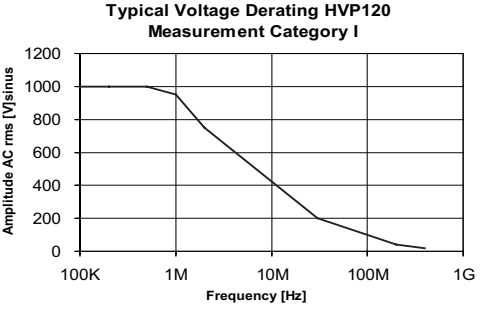
Attenuation Ratio	100:1	± 2 % at DC	
Voltage Coefficient	0.00025	%/V at DC	(typical)
System Bandwidth [1]	400 MHz		
Probe Risetime	900 ps	(10 % - 90 %)	(typical)
Maximum Rated Input Voltage			
Measurement Category I: [2] *measurements performed on circuits not directly connected to mains.*	1000 V rms 4000 V transient overvoltage		
Measurement Category II: *measurements performed on circuits directly connected to the low-voltage installation.*	1000 V rms		

Pollution Degree 2: *operating environment where normally only dry non-conductive pollution occurs. Conductivity caused by temporary condensation should be expected.*

1. Specified bandwidth is for oscilloscopes with ≥ 500 MHz bandwidth.
2. As defined in IEC 61010-031:

Voltage Derating

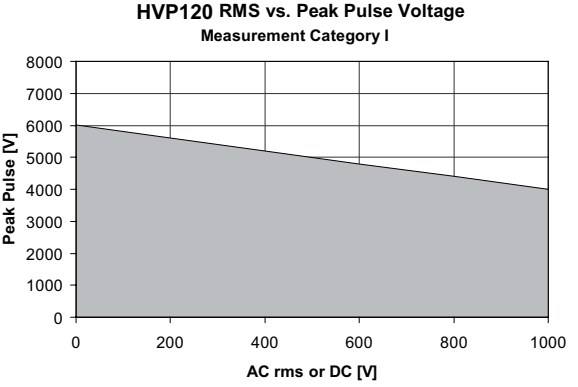
Note that the max. input voltage rating of the probe decreases as the frequency of the applied signal increases.

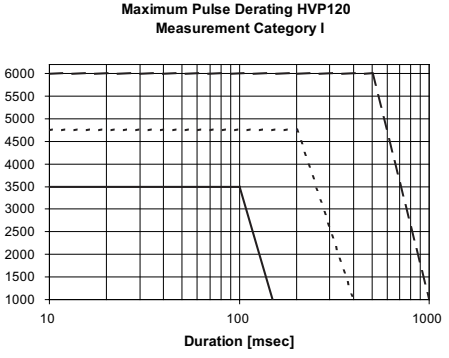


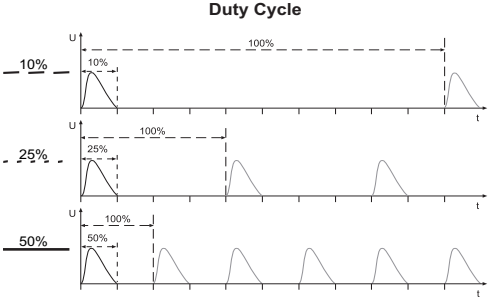
Specifications

Maximum Pulse Ratings

For pulse measurments make sure to comply with the ratings as shown on this page.







* Values at 10 ms also apply to all Pulse Durations smaller than 10 ms.

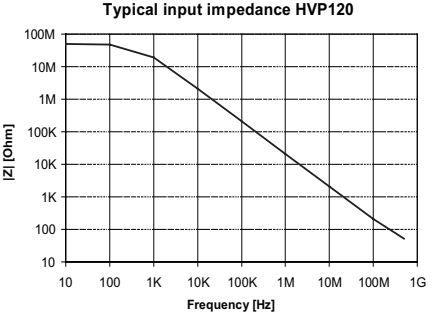
Specifications

Electrical Characteristics

Input Resistance (System)	50 MΩ ± 1 %	
Input Capacitance (System)	7.5 pF	(typical)
Compensation Range	10 pF - 50 pF	(typical)
Input Coupling of the Measuring Instrument	1 MΩ AC / DC	

Input Impedance

Note that the input impedance of the probe decreases as the frequency of the applied signal increases.



Mechanical Characteristics

Weight (probe)	67 g
Cable Length	2 m
Probe Tip Diameter	5 mm

Environmental Specifications

Altitude	operating	up to 2000 m
	non-operating	up to 15000 m
Temperature Range	operating	0° C to +50° C
	non-operating	-40° C to +71° C
Maximum Relative Humidity, operating	80 % relative humidity for temperatures up to +31° C, decreasing linearly to 40 % at +50° C	

Handling

Handle with care especially when fitted with the extra thin and sharp spring contact tip to avoid any injury. Note that the probe cable is a sensitive part of the probe. Do not damage through excessive bending or pulling. Avoid mechanical shock to this product in general to guarantee accurate performance and protection.

Maintenance

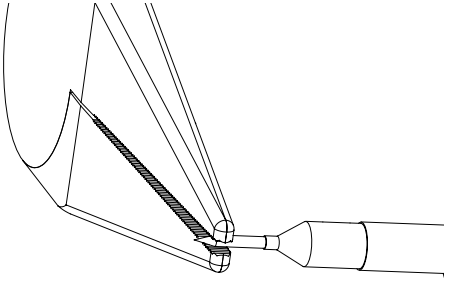
Cleaning

To clean the exterior of the probe use a soft cloth moistened with either distillated water or isopropyl alcohol. Before use allow the probe to dry completely.

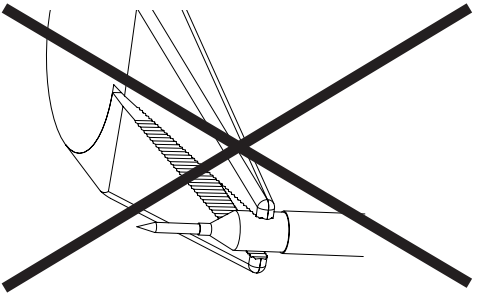
Changing the Probe Tip

To change the probe tip use pliers to grip and pull it carefully straight out of its contact socket, along the axis of the probe. Do not grip the white plastic insulator or the housing with pliers, because the tip could be squeezed and cannot be removed and respectively the probe could be damaged.

If the probe tip is removed, the new tip can be inserted with pliers into the contact socket, along the axis of the probe. In order to insert the probe tip completely into the housing, press the probe tip against a hard surface carefully.



Use pliers to grip and pull the probe tip carefully out of its contact socket.



Do not grip the white plastic insulator or the probe housing with pliers.

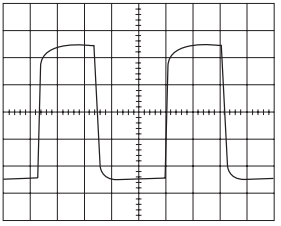
Adjustment Procedures

The probe can be adjusted for low frequency (LF) compensation and for high frequency (HF) compensation and DC dividing ratio.

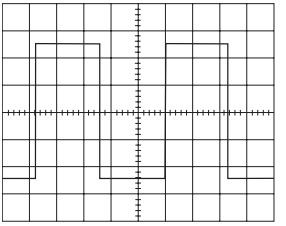
LF Compensation

LF needs to be adjusted when the probe is connected to the oscilloscope input the first time. LF compensation matches the probes cable capacitance to the oscilloscope input capacitance. This matching assures good amplitude accuracy from DC to upper bandwidth limit frequencies. A poorly compensated probe clearly influences the overall system performance (probe + scope) and introduces measurement errors resulting in inaccurate readings and distorted waveforms.

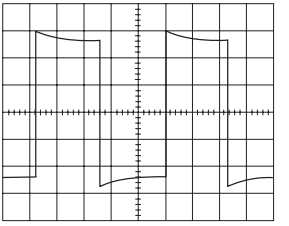
LF compensation is performed by connecting the probe to the CAL – output on the oscilloscope front panel and adjusting the LF compensation trimmer to optimum square wave response. For clarification see below figures.



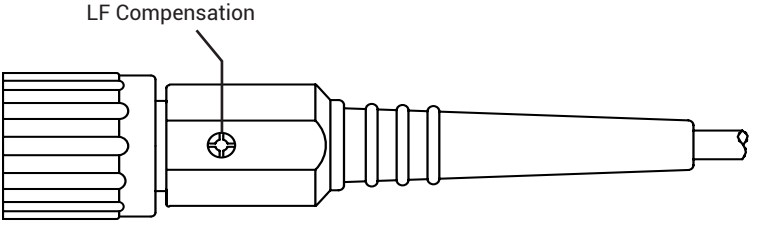
undercompensated



optimum



overcompensated

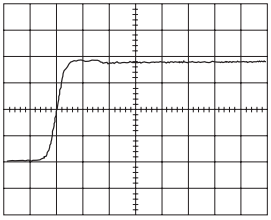


Adjustment Procedures

HF Compensation

HF needs to be adjusted when the probe is connected to the scope input the first time.

HF adjustment is performed by connecting the probe to the rectangular wave generator with a fast rise time. Adjust trimmers for optimum square wave response.

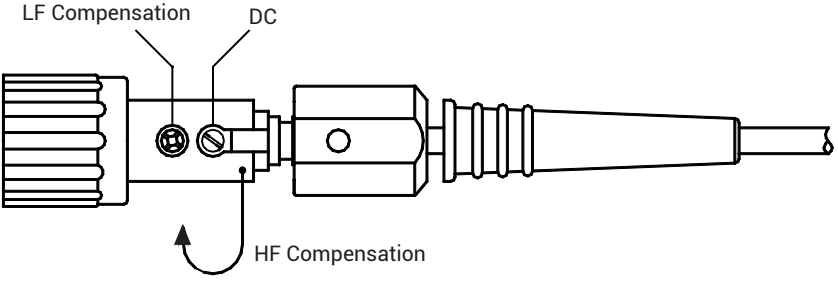


optimum

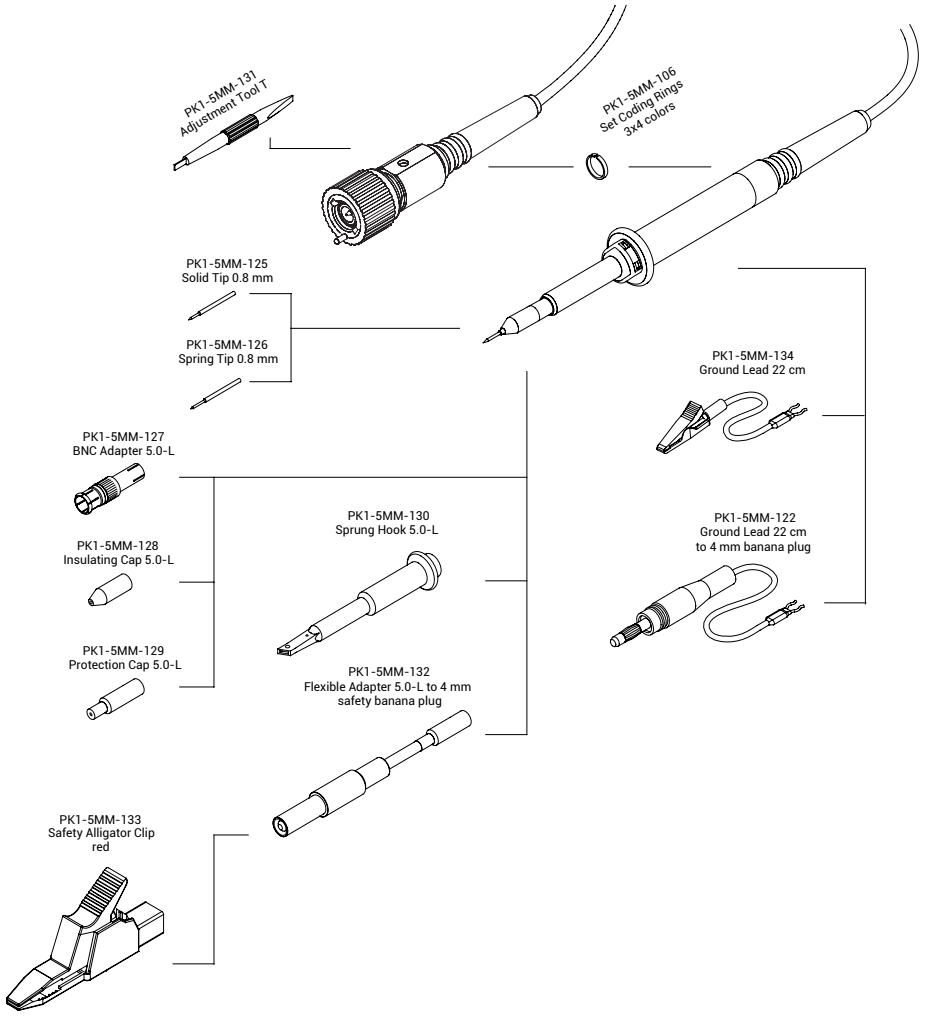
DC Adjustment

In order to provide highest accuracy over the voltage range this probe's dividing ratio is factory adjusted using 500 VDC source and a measuring device with a precision input impedance of 1MΩ ± 0.01 %.

Factory calibration traceable to DAkkS is available on request.



Probe Accessories



Items Delivered

The following items are delivered with the HVP120 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 individually or as part of probe kit PK-HV-002. Contact your regional service center for individual parts or your local sales office for probe kits.

Item	Part Number	Qty
Probe		1
Coding Rings (set) 3x4 Colors	PK1-5MM-106	1
Solid Tip 0.8 mm	PK1-5MM-125	1
Spring Tip 0.8 mm[1]	PK1-5MM-126	1
BNC Adapter 5.0-L	PK1-5MM-127	1
Insulating Cap 5.0-L	PK1-5MM-128	1
Protection Cap 5.0-L[2]	PK1-5MM-129	1
Sprung Hook 5.0-L	PK1-5MM-130	1
Ground Lead 22 cm	PK1-5MM-134	1
Adjustment Tool T	PK1-5MM-131	1
Ground Lead 22 cm to 4 mm Banana plug	PK1-5MM-122	1
Flexible Adapter 5.0-L	PK1-5MM-132	1
Safety Alligator Clip red	PK1-5MM-133	1

1. 1 installed in probe at delivery.
2. 1 installed on probe tip at delivery.

Use ground lead only for connections to earth ground.

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

EC Declaration of Conformity

The product is marked with this symbol to indicate that it complies with the applicable European Union requirements of the Low Voltage Directive (LVD) 2014/35/EU. As of the date of publication, 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 hand-held probe assemblies for electrical mea-surement and test.

For current certifications, see the EC Declaration of Conformity shipped with your product.

WEEE / RoHS Directives

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 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.

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.

Contact Us

Live Support

Registered users can contact their local Teledyne LeCroy service center at the number listed on our website. You can also request Technical Support via the website at:

teledynelecroy.com/support/techhelp

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