

T3HVD Voltage Probe Manual

High Voltage Differential Probes



Contents

Safety Terms and Symbols	1
Voltage vs. Frequency Derating and Burn Limit	3
Voltage Derating for combined Probe and Accessories	5
Product Overview	6
Key Features	6
Applications	6
Product Description	7
Operating Instructions	7
Adjusting The Probe Offset	8
Supplied Accessories	9
Specifications	10
Performance Verification	11
DC Accuracy Test	11
Rise Time Test	12
DC Common Mode Ratio Test	12
Test Record Form	13
Care and Maintenance	13
Reference	13
Certifications	14
Safety Compliance	15
Environmental Compliance	15
Warranty	17

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Safety

To maintain the probe in a correct and safe condition, observe generally accepted safety procedures in addition to the precautions specified in this section. **The overall safety of any system incorporating this product is the responsibility of the assembler of the system.**

Symbols

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

	WARNING, HIGH VOLTAGE. Risk of electric shock or burn.
	CAUTION of damage to probe or instrument, or WARNING of hazard to health. Attend to the accompanying information to protect against personal injury or damage. Do not proceed until conditions are fully understood and met.
	ESD CAUTION. Risk of Electrostatic Discharge (ESD) that can damage the probe or instrument if anti-static measures are not taken.

Precautions



WARNING. To avoid personal injury or damage due to electric shock or fire:

Do not overload; observe all terminal ratings. Do not apply any potential that exceeds the maximum rating of the probe and/or the probe accessory, whichever is less.

Comply with the Voltage vs. Frequency Derating curve when measuring higher frequency signals.

Connect and disconnect properly. Always connect the probe input lead to the probe accessories before connecting to a voltage source. Ensure the connections are secure before applying voltage. Do not disconnect leads or accessories from a live circuit.

Keep the probe body and output cable away from the circuits being measured. Only accessory tips are intended for contact with electrical sources.

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

Keep fingers behind the finger guard of the probe accessories.

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



CAUTION. To prevent damage to the equipment:

Use only as specified. 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 bend cables excessively.

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

Keep product surfaces clean and dry.

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.

Operating Environment

Temperature, Operating 0 C to 50 C

Temperature, Non-operating -30 C to 70 C

Relative Humidity, Operating ≤85% Relative Humidity

Relative Humidity, Storage ≤90% Relative Humidity

Altitude, Operating 3000 m

Altitude, Storage 12000 m

Usage Indoors

Voltage vs. Frequency Derating and Burn Limit

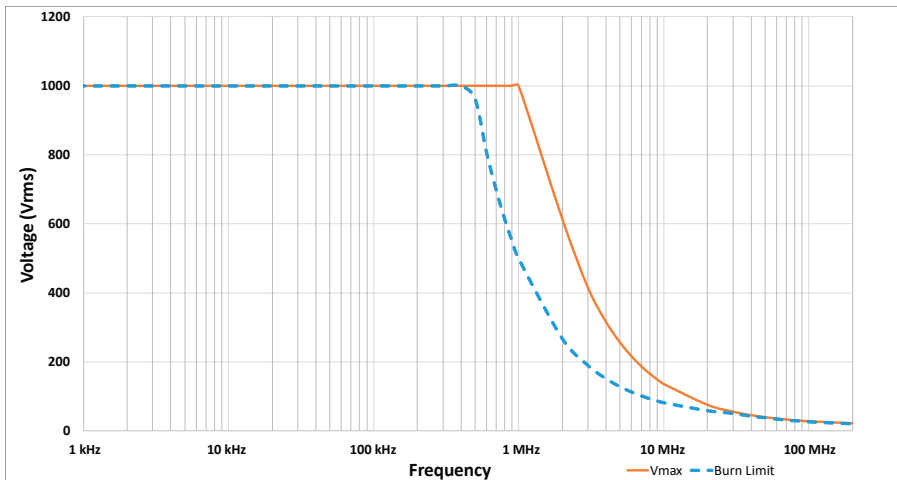
The maximum input voltage curve (solid line) shows the maximum voltage that can be applied to the probe inputs without risking damage to the probe.

The lower Burn Limit curve (dashed line) shows the maximum voltage that can be applied to the probe inputs while the operator is handling the inputs. Handling the inputs while connected to active signals above this burn limit could result in injury to the operator.

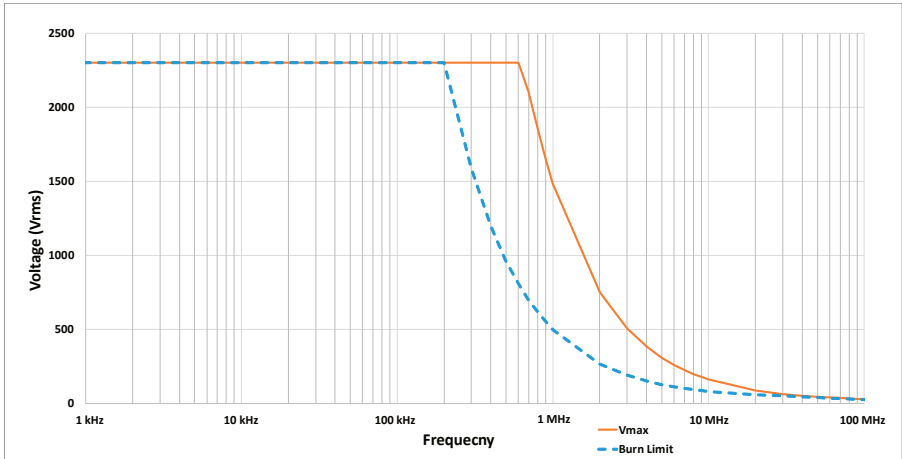


WARNING. To avoid risk of electric shock or fire, comply with the burn limit when measuring high-frequency signals with hand-held accessories. Do not exceed the voltage or category rating of the probe or accessories (whichever is less). Keep your fingers behind the finger guard of the probe. Keep the probe body and output cable away from the circuits being measured. Use only the specified accessories.

T3HVD1500-70 and T3HVD1500-200 Derating and Burn Limit



T3HVD7000-100 Derating and Burn Limit



Voltage Derating for combined Probe and Accessories

Derated Max. Input Voltage for combined Probe & Accessory (either input to ground)*			
Accessory	T3HVD1500-70	T3HVD1500-200	T3HVD7000-100
Alligator Clips**	CAT II 1000V / CAT III 600V		CAT III 1000V CAT IV 600V
Pincer Clips	CAT III 1000V		
Hook Clips	CAT III 1000V		
Extender Leads	CAT III 1000V		

* See "IEC/EN 61010-031 Definitions" on p.13.

** Alligator Clip type depends on probe model, see accessory diagrams on page 9.



CAUTION. The operating altitude of the probe is derated to 2000 m (6560 ft) when used with the above accessories.



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



WARNING. While all probes may be used with the T3HVD accessories (alligator clips, pincer clips, etc.), the voltage and CAT ratings of the probe are derated to the values in the table above when used with the corresponding accessory.



WARNING. To avoid risk of electric shock or fire, do not exceed either the voltage rating or category rating. Keep your fingers behind the finger guard of the probe. Keep the probe body and output cable away from the circuits being measured. Use only the specified accessories.

PRODUCT OVERVIEW

T3HVD1500-70: 1500 V peak, 70 MHz

T3HVD1500-200: 1500 V peak, 200 MHz

T3HVD7000-100: 7000 V peak, 100 MHz

Teddyne Test Tools new T3HVD range of high voltage differential probes are wide bandwidth active differential voltage probes, featuring models with bandwidths up to 200 MHz bandwidth, voltages up to $\pm 7000\text{V}$ (DC + Pk AC), fast and accurate waveform capture, measurement accuracy of $\pm 2\%$ and low test circuit loading.

These probes can be used with any oscilloscope having a $1\text{M}\Omega$ BNC input.

Key Features

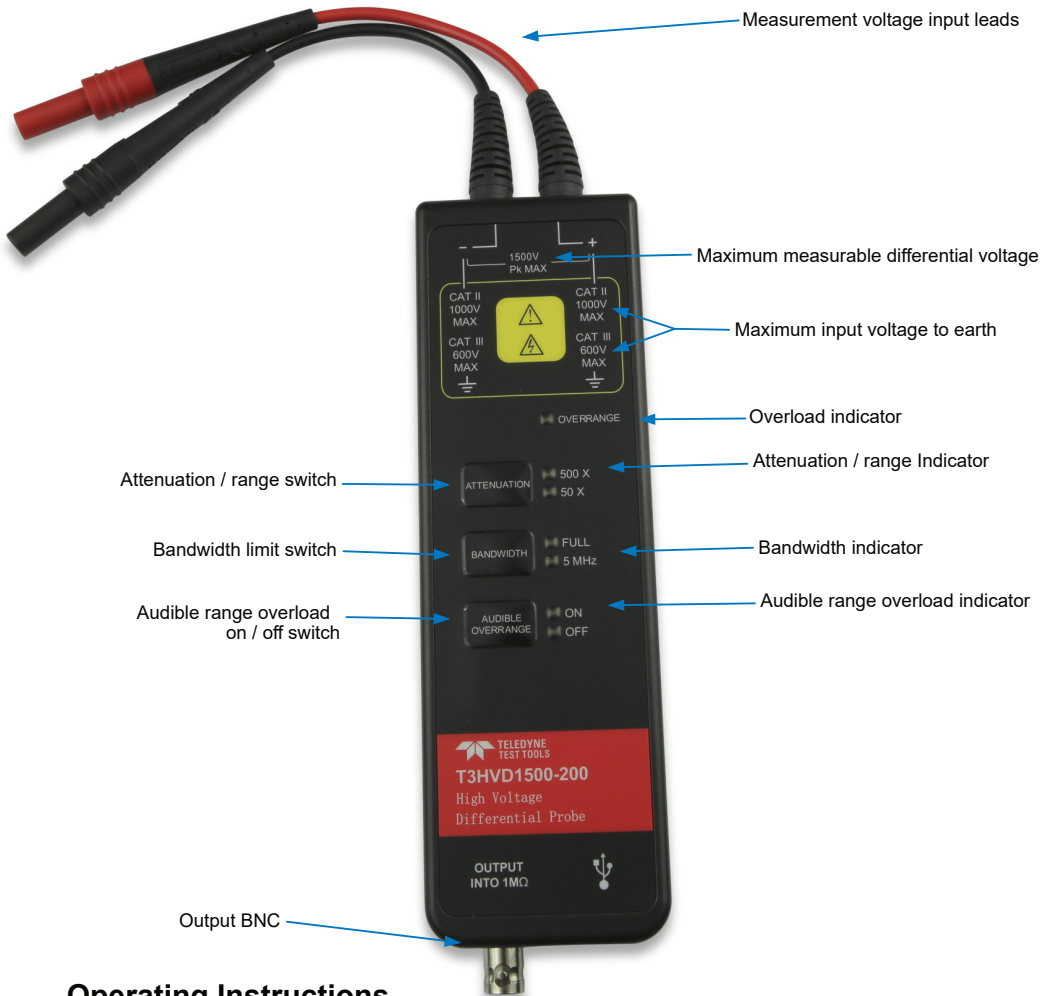
- Accurate and easy voltage measurements.
- Wide 200 MHz bandwidth.
- Differential signal input of up to $\pm 7000\text{V}$ (DC + Peak AC) depending on model.
- High differential input impedance of up to $40\text{ M}\Omega$ / $<2.5\text{pF}$ depending on model.
- Maximum common mode voltage of $\pm 7000\text{V}$.
- Combined single ended and differential measurement capability.
- Use with any scope with a $1\text{M}\Omega$ input and BNC connector.
- Over-Voltage alarm with dual indicators.
- Switchable bandwidth limit to reduce noise.

Applications

- Power electronics.
- Multi-phase motor drives (electric vehicles, etc).
- Inverters and power conversion.
- Domestic and industrial photo-voltaic (PV) system design.
- General vehicle electronics.
- Power supply design.
- Floating voltage measurements.
- Domestic appliances (washing machines, induction hobs, etc).
- Research and development.
- Universities, general electronics and education.

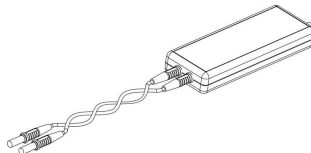


T3HVD Product Description



Operating Instructions

- DUT measurement input leads: The integral input test leads extend 26cm from the probe body. Connect the integral test leads directly to your DUT or use the extender leads and other accessories if necessary. For best measurement signal integrity it is better not to extend the integral input test leads if possible. If the extender leads are used then it is recommended to use the bandwidth limit.
- If possible it is good practice to wind the DUT measurement input leads together to improve noise immunity and give the best frequency response. If the extender leads are used then these should also be twisted together if possible.



- The Attenuation / Range Switch is used to select between the two voltage ranges supported by the probe, see the table below. The oscilloscope vertical range scale can be set to the range ratio below for correct oscilloscope vertical scaling. Note that the probe can be damaged if too high a voltage is applied to it, therefore always check the voltage range before connecting to a DUT.

Probe	Range	Voltage
T3HVD1500-70	50 x	± 150 V
	500 x	± 1500 V
T3HVD1500-200	50 x	± 150 V
	500 x	± 1500 V
T3HVD7000-100	100 x	± 700 V
	1000 x	± 7000 V

- The bandwidth selection button allows selection between the probes' default setting of Full bandwidth or 5 MHz. An alternative is to use a bandwidth limit setting within the measurement oscilloscope. Most oscilloscopes have a bandwidth limit capability. Limiting the bandwidth will reduce the noise in environments where the full bandwidth of the probe is not needed.
- The audible range overload switch will turn on or off a buzzer that indicates when the probe is being used beyond its maximum voltage. Immediately reduce the measurement voltage to avoid damage to the probe, or switch to the higher voltage range if the probe is being used on its lower voltage range.
- The probe output BNC connector can be connected to any oscilloscope with a BNC and 1M Ω input impedance using the supplied BNC to BNC cable. If the oscilloscope input impedance is set to 50 Ω then the measured oscilloscope voltage will be incorrect.
- Power for the T3HVD probes can be supplied from the included USB power supply or from a USB socket built into the oscilloscope. The probe has a standard USB type B interface.
- The probe default settings are: High voltage range, full bandwidth and audible over voltage alarm on. The probe will automatically save its state before power off.
- To setup the probe to make a measurement first connect it to the oscilloscope using the BNC to BNC cable. Attach the power to the probe. Select the correct voltage measurement range (low / high) depending on the DUT. Set the oscilloscope vertical scale attenuation ratio according to the probe voltage range selected, and set the oscilloscope measurement range. Connect the probe measurement cables to the DUT using the supplied accessories.
- After measuring remove the probe from the DUT and power off the probe by removing the USB power supply.

Adjusting the probe offset

If the output offset drifts from zero then it can be adjusted using the following method.

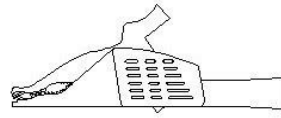
- Allow the probe 30 minutes to warm up. Connect the measurement probe tips together and check to see if the oscilloscope is showing the probe output on the zero volts line. Note when making the probe offset measurement that the oscilloscope should also be allowed time to warm up and that there should be NO vertical offset set on the oscilloscope.
- Momentarily power off the T3HVD probe. Hold down the ATTENUATION and BANDWIDTH buttons on the probe, and power the probe on.

- The probe will be in test mode when the power is reapplied. This is indicated by the overload indicator light being lit. Release the ATTENUATION and BANDWIDTH keys.
- The probe is now ready to have the high voltage range offset adjusted. Press the ATTENUATION key to increase the voltage offset value, and press the BANDWIDTH key to decrease the voltage offset value. Adjust the keys until the offset is at zero.
- Now switch the probe to the low voltage range by pressing the AUDIBLE OVERRANGE button. Press the ATTENUATION key to increase the voltage offset value, and press the BANDWIDTH key to decrease the voltage offset value. Adjust the keys until the offset is at zero.
- Pressing the AUDIBLE OVERRANGE button again will exit the voltage offset adjustment mode and return the probe to normal operating mode.

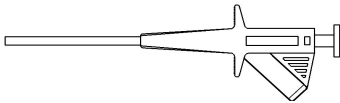
Supplied Accessories



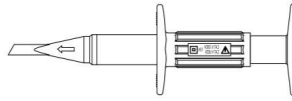
T3HVD1500-70 and T3HVD1500-200
Alligator Clips x 2



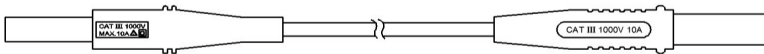
T3HVD7000-100 Alligator Clips x 2



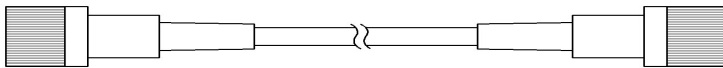
T3HVD Pincer Clips x 2



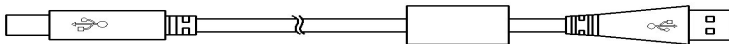
T3HVD Hook Clips x 2



1m T3HVD Extender Leads x 2



1m T3HVD BNC to BNC Cable x 1



1.5m T3HVD USB A to B Power Cable x 1

- The T3HVD probe kit also includes a USB power supply (not pictured) that the T3HVD USB A to B Power Cable can connect to.
- The T3HVD Extender Leads and the T3HVD BNC to BNC Cable are 1m long each
- The T3HVD USB A to B Power Cable is 1.5m long

Item	T3HVD1500-70	T3HVD1500-200	T3HVD7000-100
Alligator Clips ⁽¹⁾ x 2	CAT III 1000V / CAT IV 600V		
Pincer Clips x 2	CAT III 1000V		
Hook Clips x 2	CAT III 1000V		
Extender Leads x 2	1 m, CAT III 1000V		
BNC to BNC Cable x 1	1 m		
USB Power Cable x 1	1.5 m		
Power Adapter x 1	USB 5V / 1A		
Probe Dimensions	195mm x 65mm x 28mm		
Probe Weight	216g		
Input Lead Length	28cm	17cm	28cm

1) Alligator Clip type depends on probe model, see accessory diagrams on page 6.

Specifications

Specification		T3HVD1500-70 & T3HVD1500-200		T3HVD7000-100	
Bandwidth (-3dB)	T3HVD1500-70	70 MHz		100 MHz	
	T3HVD1500-200	200 MHz			
Rise Time	T3HVD1500-70	≤ 5 ns		≤ 3.5 ns	
	T3HVD1500-200	≤ 1.75 ns			
Accuracy	± 2 %		± 2 %		
Attenuation / Range Selection	50 x / 500 x		100 x / 1000 x		
Maximum Differential Voltage (DC + Peak AC)	50 x	± 150 V		100 x	± 700 V
	500 x	± 1500 V		1000 x	± 7000 V
Common Mode Voltage (DC + Peak AC)	± 1500 V		± 7000 V		
Maximum Input Voltage To Earth (V rms)	CAT II 1000 V / CAT III 600 V		CAT I* 2300 V / CAT III 1000 V		
Input Impedance	Single Ended To Ground	5MΩ, < 4pF		20MΩ, 5pF	
	Between Inputs	10MΩ, < 2pF		40MΩ, 2.5 pF	
CMRR	DC	> 80dB		> 80dB	
	100 kHz	> 60dB		> 60dB	
	1 MHz	> 50dB		> 50dB	
Noise (V rms)	50 x	< 50 mV		100 x	< 200 mV
	500 x	< 300 mV		1000 x	< 1.2 V
Differential Overvoltage Detection Level	50 x	≥ 150 V		100 x	≥ 700 V
	500 x	≥ 1500 V		1000 x	≥ 7000 V
Propagation Delay	Probe	Approximately 9 ns			
	1m BNC to BNC Cable	Approximately 5 ns			
Bandwidth Limit Filter	≥ -3dB at 5 MHz				
Probe Termination Load	≥ 100 kΩ				
Power Supply	USB 5V / 1A Wall Socket Adapter				
Safety Standard	IEC/EN 61010-031:2015 + AMD1:2018				
EMC Standard	EN61326-1: 2013				

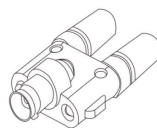
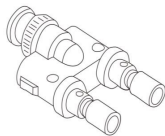
*CAT I per IEC/EN 61010-031/A1:2008. No Rated Measurements Category per IEC/EN 61010-031:2015 + AMD1:2018.

Environmental	T3HVD1500-70	T3HVD1500-200	T3HVD7000-100
Operating Temperature	0°C - 50°C		
Storage Temperature	-30°C - 70°C		
Operating Humidity	≤ 85% Relative Humidity		
Storage Humidity	≤ 90% Relative Humidity		
Operating Altitude	3000 m		
Storage Altitude	12000 m		
Pollution Degree	2, Indoor Use Only		

Performance Verification

The table below lists the test instruments required for the performance verification process.

Equipment	Minimum Requirements	Measurement
Oscilloscope	Accuracy ≤ 1.5%, e.g. Teledyne LeCroy WaveSurfer 4000HD or HDO4000A Series	Displays probe output
Signal Generator / Calibrator	Amplitude Accuracy ≤ 0.75%, Rise Time ≤ 3ns, e.g. Fluke / Wavetek 9100	Bandwidth, AC Accuracy, CMRR
Digital Multimeter	6.5 digits minimum, e.g. Teledyne LeCroy T3DMM6-5, Keithley 2000	DC Accuracy
Pincer Clips	Supplied in probe accessories	General Testing
BNC Adapters	BNC Male to BNC Female T Piece, BNC Male to Dual Binding Posts, BNC Female to Dual Binding Posts, BNC Male to 50Ω Termination	General Testing



- Connect power to the probe and allow 30 minutes warm up time.

DC Accuracy Test

- Connect the T3HVD probe BNC output to the Digital Multimeter input using the Male BNC to Binding Posts adapter. Connect the male BNC connector to the T3HVD female BNC output. Connect the Multimeter test leads to the binding posts.
- Connect the T3HVD input leads to the calibrator output directly or using the pincer clips.
- Set the probe sensitivity to the lower voltage range, apply the DC voltage from the calibrator according to the table below, and record the output voltage on the DMM. Repeat for the higher voltage range.

Probe	Attenuation Factor	Calibrator Output Voltage	Probe Expected Output Voltage	Probe Actual Output Voltage
T3HVD1500-70, T3HVD1500-200	50 x	5 V	100 mV ± 2 mV	
	500 x	50 V	100 mV ± 2 mV	
T3HVD7000-100	100 x	10 V	100 mV ± 2 mV	
	1000 x	100 V	100 mV ± 2 mV	

Rise Time Test

- Set the Calibrator output to give a fast rise time. Attach the BNC T piece to the calibrator output. Attach the 50Ω Termination to one arm of the T piece, attach the BNC Male to binding posts adapter to the other arm of the T piece. Plug the probe measurement leads into the binding posts.
- Set the Calibrator output voltage to a suitable level to make a measurement on the probe, but not high enough to damage the 50Ω Termination. Typically a 50Ω 1 Watt Termination should have no more than 7 Vrms applied.
- Connect the probe output to the oscilloscope and measure the rise time of each voltage range according to the measurement table. Note: An oscilloscope of sufficient bandwidth is required to make this measurement, see recommended oscilloscope bandwidth in the table below.
- After measuring remove the probe from the DUT and power off the probe by removing the USB power supply.

Probe	Attenuation Ratio	Recommended Oscilloscope Bandwidth	Expected Probe Rise Time	Actual Rise Time
T3HVD1500-70	50 x	≥ 350 MHz	≤ 5ns	
	500 x	≥ 350 MHz	≤ 5ns	
T3HVD1500-200	50 x	≥ 1 GHz	≤ 1.75ns	
	500 x	≥ 1 GHz	≤ 1.75ns	
T3HVD7000-100	100 x	≥ 500 MHz	≤ 3.5ns	
	1000 x	≥ 500 MHz	≤ 3.5ns	

DC Common Mode Ratio Test

- Set the T3HVD probe to its lower voltage range and connect the probe inputs to the DC voltage source or calibrator.
- Set the multimeter to DC Volts, connect the multimeter cables together, then auto-zero the multimeter.
- Connect the T3HVD probe output BNC to the multimeter using the BNC male to binding posts adapter and the multimeter cables.



- Set the DC voltage source or calibrator output to 500V DC. Enable the DC voltage source or calibrator output. Record the probe output voltage, as measured by the multimeter, in the table below.
- Disable the DC voltage source or calibrator output and remove the probe.

Probe	Attenuation Factor	Calibrator Output Voltage	Probe Expected Output Voltage	Probe Actual Output Voltage
T3HVD1500-70, T3HVD1500-200	50 x	500 V DC	≤ 1 mV	
T3HVD7000-100	100 x	500 V DC	≤ 1 mV	



- Note: High voltage 500 V DC is used during this test. Please pay attention to personal safety. Do not turn on the 500 V DC output until the completion of all test connections. Turn off the 500 V DC output before disconnecting the probe.

Test Record Form

T3HVD Probe Test Record Form					
Product Serial Number:			Test Temperature:		
Test Date:			Test Humidity:		
Test Model:			Lower Limit	Test result	Upper Limit
DC Accuracy	T3HVD1500-70	50 x	98 mV		102 mV
		500 x	98 mV		102 mV
	T3HVD1500-200	50 x	98 mV		102 mV
		500 x	98 mV		102 mV
	T3HVD7000-100	100 x	98 mV		102 mV
		1000 x	98 mV		102 mV
Rise Time	T3HVD1500-70	50 x	-		5 ns
		500 x	-		5 ns
	T3HVD1500-200	50 x	-		1.75 ns
		500 x	-		1.75 ns
	T3HVD7000-100	100 x	-		3.5 ns
		1000 x	-		3.5 ns
DC Common Mode Rejection Ratio	T3HVD1500-70	50 x	-		1 mV
	T3HVD1500-200	50 x	-		1 mV
	T3HVD7000-100	100 x	-		1 mV

Care and Maintenance

- Keep the probe clean and dry.
- To clean wipe with a soft dry cloth. Do not use chemicals or liquids.
- Keep the probe in the case provided when not in use. This will help to keep the probe clean.
- Do not drop the probe since this can cause shock and damage the probe.
- Do not use force, excessively twist, excessively bend or pull on the input cables. This can cause damage to the input cables and reduce the life of the probe.

Reference

IEC/EN 61010-031:2015 Definitions

Measurement Category III (CAT III) applies to test and measuring circuits connected to the distribution part of the building's low-voltage mains installation.

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.

No Rated Measurement Category applies to other circuits that are not directly connected to the mains supply.

Pollution Degree 2 refers to an operating environment where normally only dry nonconductive pollution occurs. Conductivity caused by temporary condensation should be expected.

Note: The 2015 version of the standard eliminates the Measurement Category I (CAT I) rating for test and measuring circuits that are not intended to be directly connected to the mains supply. However, this change in rating designation does not reduce the measurement capability or the level of protection offered by the new probe design when compared to the probes that were originally certified per the 2008 version of the standard.

Certifications

Teledyne LeCroy certifies compliance to the following standards as of the date of publication. As standards evolve, these may no longer be current. See the Declaration of Conformity shipped with your product for current certifications.

EMC Compliance

EC Declaration of Conformity - EMC

The probe meets the intent of EC Directive 2014/30/EU for Electromagnetic Compatibility. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:

EN 61326-1:2013, EMC requirements for electrical equipment for measurement, control, and laboratory use, 1, 2, 3

1. This product is intended for use in nonresidential areas only. Use in residential areas may cause EM interference.
2. Emissions exceeding the levels required by this standard may occur when product is connected to a test object.
3. To ensure compliance with the applicable EMC standards, use high quality shielded interface cables.

EUROPEAN CONTACT:*

Teledyne GmbH – LeCroy Division
Im Breitspiel 11c
D-69126 Heidelberg
Germany
Tel: (49) 6221 82700

Australia & New Zealand Declaration of Conformity - EMC

The probe complies with the EMC provision of the Radio Communications Act per the following standards, in accordance with requirements imposed by the Australian Communication and Media Authority (ACMA):

AS/NZS CISPR 11:2009/A1:2010, EN 55011:2009/A1:2010 Radiated and Conducted Emissions, Group 1, Class A.

AUSTRALIA / NEW ZEALAND CONTACTS:*

RS Components Pty Ltd.	RS Components Ltd.
Suite 326 The Parade West	Unit 30 & 31 Warehouse World
Kent Town, South Australia 5067	761 Great South Road
	Penrose, Auckland, New Zealand

* Visit teledynelecroy.com/support/contact for the latest contact information.

Safety Compliance

EC Declaration of Conformity – Low Voltage

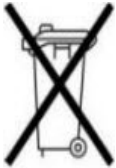
The probe meets the intent of EC Directive 2014/35/EU for Product Safety.

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 31: Safety requirements for hand-held probe assemblies for electrical measurement and test.

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 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE).

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, visit teledynelecroy.com/recycle.



Restriction of Hazardous Substances (RoHS)

The product and its accessories conform to the 2011/65/EU RoHS2 Directive inclusive of any further amendments or modifications of said Directive.

See package inserts for other environmental certifications.

CHINA RoHS 2

Unless otherwise specified, all the materials and processes are compliant with the latest requirements of China RoHS 2. The hazardous substances contained in the instrument are disclosed in accordance with the standards SJ/T 11364-2014 (Marking for the restricted use of hazardous substances in electronic and electrical products) and GB/T 26572-2011 (Requirements on concentration limits for certain restricted substances in electrical and electronic products). The instrument is marked with an appropriate Environmental Friendly Use Period (EFUP) symbol. The packaging materials include the appropriate recycling labels. The below substance disclosure tables (in Chinese and English languages) provide the required compliance information.

部件名称	有毒有害物质和元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
PCBAs	X	O	O	O	O	O
机械硬件	O	O	O	O	O	O
金属片	O	O	O	O	O	O
塑料部件	O	O	O	O	O	O
电缆组件	X	O	O	O	O	O
显示器	O	O	O	O	O	O
电源	O	O	O	O	O	O
风扇	O	O	O	O	O	O
电池	O	O	O	O	O	O
电源线	O	O	O	O	O	O
外部电源(如有)	X	O	O	O	O	O
探头(如有)	X	O	O	O	O	O
熔丝(如有)	O	O	O	O	O	O
产品外壳(如有)	O	O	O	O	O	O
适配器/模块(如有)	O	O	O	O	O	O
鼠标(如有)	O	O	O	O	O	O

O: 表明该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11364-2014标准规定的限量要求之下。

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11364-2014标准规定的限量要求。

EFUP (对环境友好的使用时间): 30年。

使用条件: 参阅用户手册“环境条件”部分的规定。

探头EFUP: 10年。

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr6+)	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
PCBAs	X	O	O	O	O	O
Mechanical Hardware	O	O	O	O	O	O
Sheet Metal	O	O	O	O	O	O
Plastic Parts	O	O	O	O	O	O
Cable Assemblies	X	O	O	O	O	O
Display	O	O	O	O	O	O
Power Supply	O	O	O	O	O	O
Fans	O	O	O	O	O	O
Batteries	O	O	O	O	O	O
Power Cord	O	O	O	O	O	O
Ext Power Supply (if present)	X	O	O	O	O	O
Probes (if present)	X	O	O	O	O	O
Fuse (if present)	O	O	O	O	O	O
Product Case (if present)	O	O	O	O	O	O
Adapters/Modules (if present)	O	O	O	O	O	O
Mouse (if present)	O	O	O	O	O	O
O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement specified in SJ/T11364-2014.						
X: Indicates that this toxic or hazardous substance contained in at least one of the homogenous materials used for this part is above the limit requirement specified in SJ/T11364-2014.						

EFUP (Environmental Friendly Use Period): 30 years.

Use Conditions: Refer to the environmental conditions stated in the User Manual.

EFUP for Probes: 10 years.

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.

ABOUT TELEDYNE TEST TOOLS



Company Profile

Teledyne LeCroy is a leading provider of oscilloscopes, protocol analyzers and related test and measurement solutions that enable companies across a wide range of industries to design and test electronic devices of all types. Since our founding in 1964, we have focused on creating products that improve productivity by helping engineers resolve design issues faster and more effectively. Oscilloscopes are tools used by designers and engineers to measure and analyze complex electronic signals in order to develop high-performance systems and to validate electronic designs in order to improve time to market.

The Teledyne Test Tools brand extends the Teledyne LeCroy product portfolio with a comprehensive range of test equipment solutions. This new range of products delivers a broad range of quality test solutions that enable engineers to rapidly validate product and design and reduce time-to-market. Designers, engineers and educators rely on Teledyne Test Tools solutions to meet their most challenging needs for testing, education and electronics validation.

Location and Facilities

Headquartered in Chestnut Ridge, New York, Teledyne Test Tools and Teledyne LeCroy has sales, service and development subsidiaries in the US and throughout Europe and Asia. Teledyne Test Tools and Teledyne LeCroy products are employed across a wide variety of industries, including semiconductor, computer, consumer electronics, education, military/aerospace, automotive/industrial, and telecommunications.

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