

The HVF0108 probe is a high-voltage, fiber-optically isolated probe designed to measure small signals floating on an HV bus in power electronics designs, or for EMC, EFT, ESD, and RF immunity testing.

For the complete manual, visit:  
[teledynelecroy.com/probes/high-voltage-fiber-optically-isolated-probes](http://teledynelecroy.com/probes/high-voltage-fiber-optically-isolated-probes)

### Compatibility

Use only with compatible Teledyne LeCroy instruments running Windows 10 and 64-bit MAUI firmware, v.9.2.x.x or higher. For a current list of compatible instruments, visit:  
[teledynelecroy.com/probes/high-voltage-fiber-optically-isolated-probes](http://teledynelecroy.com/probes/high-voltage-fiber-optically-isolated-probes)



## HVFO108 High-Voltage Fiber Optic Probe

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934202-00 Rev A

### Probe Assembly and Connection

1. Remove protective covers from the fiber optic cable.
2. Connect the fiber optic cable to the receiver and transmitter. You will hear a "click" when properly inserted.
3. Connect the tip to the transmitter USB Micro-B port.
4. Press the demodulating receiver box onto the oscilloscope ProBus interface.

**CAUTION:** Once a tip is connected, the transmitter will begin to consume battery power. Do not leave tips connected unless the probe is in use.

### Connecting Tips

For accurate measurements, connect all three input leads to the test circuit.

1. Connect the blue Signal lead to voltage (Vs).
2. Connect the green Reference and black Shield leads to the floating board reference (Vcm).

Tip lead sockets fit well onto 22AWG wires or 0.100" pitch pin headers. Micro-grippers provide two connections, so Reference and Shield can be connected to one micro-gripper.

**CAUTION:** Reference and Shield wires are electrically connected inside the tip. Failure to connect them to the same potential may damage the DUT and/or probe.



Proper connection using stubs.



Proper connection using micro-grippers.

### Standard Parts

#### Amplifier/Modulating Transmitter

Battery-powered, frequency modulating optical transmitter transmits signal and data across a fiber optic cable. ~6 hours of use.

#### De-modulating Receiver

Receiver de-modulates optical signal into an electrical output to the oscilloscope with correct voltage scaling. ProBus connector.

#### VersaLink (V-pin) 400/420 Fiber Optic Cable

1 m fiber optic cable connects transmitter and receiver.

#### EZ Micro-Grippers

1 set of 3 micro-grippers for connecting to IC legs, pins, etc.

#### Battery Charging Cable

USB micro-B-to-A cable for recharging the transmitter.

#### Soft Storage Case

Soft case with custom foam insert.

### Cable Status and Battery

When the probe is connected to an oscilloscope, the CHnHVFO108 Probe dialog is displayed behind the channel setup dialog.

**Cable Status** indicates general quality of the fiber optic cable. If "Poor," the cable is near end of life and should be replaced.

**Battery** indicates remaining battery life. 100% is about 6 hrs. of operation. LEDs on the transmitter and receiver body also indicate when the battery requires recharging.



### Recharging the Battery

Ambient temperature during charging should be 0° to 40° C.

**CAUTION:** Recharge temperature range is lower than the operating range of the probe.

1. Remove the tip.
2. Insert the charging cable into the Micro-B port on the transmitter.
3. Connect the charging cable to a USB port on the oscilloscope or PC, or else to a USB charger.

**CAUTION:** Make sure the source is powered on or the battery will continue discharging.

An LED will light while the battery is recharging.

Recharge time is approximately 5 hours if connected to an oscilloscope (or PC), or 2.5 hours if using a USB charger.



### Battery Safety

The probe amplifier/transmitter contains a Lithium polymer battery. To avoid personal injury or property damage due to electrical bursts, smoke, fire or explosions, follow UL1642 safety requirements, especially those listed here:

Do not disassemble or modify the probe or the internal battery.

Do not attempt to replace the battery. Return the probe to Teledyne LeCroy Service if the battery needs to be replaced.

Do not heat/incinerate the probe, use it near heat sources or in excessively hot environments, or solder near the battery.

Do not place the probe in a microwave or high-pressure container when handling or using it.

### Optional Accessories

#### Attenuating Tips



HVFO100-1X-TIP-U  
HVFO100-5X-TIP-U  
HVFO100-10X-TIP-U  
HVFO100-20X-TIP-U  
HVFO100-40X-TIP-U

At least one 1x, 5x, 10x, 20x or 40x optional attenuating tip is required for operation. Tips have a noise immune coaxial cable to connect to voltage, with separate connections for reference and ground.

#### Safety Derating for Accessories

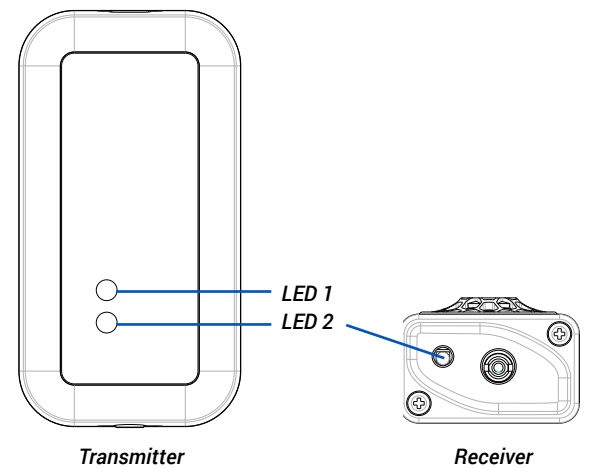
The measurement terminals of the probe as well as all accessories are to be used only for measurements on circuits not directly connected to the mains.

**WARNING:** The probe and accessories are not rated for measurements within Measurement Categories (CAT) II, III or IV. The Measurement Category is the lower of the Measurement Categories of the probe or accessory. **Do not exceed the CAT, voltage or current rating of the lowest rated individual component.**

**!** Maximum input voltage is derated according to the following table when using the probe with the corresponding tip.

HVFO100-1X-TIP-U	±1 V (DC + Peak AC) (5 V maximum non-destruct)
HVFO100-5X-TIP-U	±5 V (DC + Peak AC) (25 V maximum non-destruct)
HVFO100-10X-TIP-U	±10 V (DC + Peak AC) (50 V maximum non-destruct)
HVFO100-20X-TIP-U	±20 V (DC + Peak AC) (100 V maximum non-destruct)
HVFO100-40X-TIP-U	±40 V (DC + Peak AC) (100 V maximum non-destruct)

### LED Indicators



LED 1	Indicates
Steady Amber	Battery Charging
LED 2	Indicates
Steady or flashing: Green Amber Red	Operational/Battery Status See the CHnHVFO108 Probe dialog for battery status and operational state.

Do not expose the probe to static electricity, excessive voltage or direct ultrasonic wave power.

Do not throw, hit, hammer or step on the probe, or otherwise cause excessive impact or mechanical stress.

Do not reverse-charge or otherwise reverse the battery polarity.





Do not charge the battery from a wall socket or cigarette charger. Charge the battery only as instructed.

Do not use the probe if it is leaking or if you smell foul odors.

Read the manual before using the probe; read the charging instructions before recharging the battery.

## Safety Symbols

These symbols appear on the probe or in documentation.

	<b>HIGH VOLTAGE WARNING.</b> Risk of electric shock or burn.
	<b>CAUTION</b> of damage to equipment, or <b>WARNING</b> of hazard to health. Refer to the accompanying information in the product manual to protect against personal injury or damage. Do not proceed until conditions are fully understood and met.
	<b>ESD CAUTION.</b> Risk of Electrostatic Discharge (ESD) that can damage equipment if anti-static measures are not taken.
	Laser Safety <b>WARNING.</b>

## Terms

The terms *isolated* and *electrically floating* are used in documentation to indicate measurements where there is no direct conduction path to earth ground.

## Compliance

The HVF0108 conforms to the following standards:

IEC/EN 61010-1:2010 - Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use Part 1: General Requirements

IEC/EN 60825-1 - Safety of Laser Products Part 1: Equipment Classification and Requirements - Edition 3 (2014)

US 21CFR Part 1010 - Performance Standards for Electronic Products: General

US 21CFR Part 1040 - Performance Standards for Light-Emitting Products



The HVF0108 complies with the applicable European Union requirements to Directives 2012/19/EU and 2006/66/EC on Waste Electrical and Electronic Equipment (WEEE) and Batteries. For information about proper disposal and recycling of your Teledyne LeCroy product,

visit: [teledynelecroy.com/recycle](http://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.

## Electrical Specifications

Bandwidth (probe + oscilloscope)	150 MHz typical
Input Dynamic Range	
1x tip	± 1 V
5x tip	± 5 V
10x tip	± 10 V
20x tip	± 20 V
40x tip	± 40 V
Max. Common Mode Voltage (either input to ground)	± 35 kV (DC + peak AC)
Max. Input Voltage to Earth (either input to ground)	± 35 kV (DC + peak AC)
Max. Safe Input Voltage	30 VRMS / 60 VDC (hand-held)
Max. Non-destruct Voltage	Lower of 5X dynamic range or 100 V

## Environmental Specifications

Temperature, Operating	10 °C - 40 °C
Temperature, Charging	0 °C - 40 °C
Temperature, Storage	20 °C - 70 °C
Relative Humidity, Operating	5% - 80% RH (non-condensing) to 30 °C decreasing linearly to 45% RH at 50 °C
Relative Humidity, Storage	5% - 95% RH (non-condensing) 80% RH above 30 °C 45% RH above 50 °C
Altitude, Operating	3000 m (9842 ft.) maximum
Altitude, Storage	10,000 m (32,807 ft.) maximum
Usage	Indoor Use Only
Pollution Degree	2. Per IEC/EN 61010-1:2010, this is an operating environment where normally only dry, non-conductive pollution occurs. Conductivity caused by temporary condensation should be expected.


## Battery Specifications

Charging Interface	USB Micro-B
Typical Life	> 6 hours
Recharge Time	
Oscilloscope USB port	5 hours
USB charger	2.5 hours
Cycle Life	> 500 cycles*


\* For battery life > 5.5 hours.

## Cleaning

Clean only the exterior surfaces of the probe using a soft cloth dampened with water or 75% isopropyl alcohol solution. Do not use harsh chemicals or abrasive cleansers. Dry the probe and accessories thoroughly before making voltage measurements.

 **CAUTION:** The probe casing is not waterproof. Under no circumstances submerge the probe in liquid or allow moisture to penetrate it.

Clean fiber optic ports with low pressure dry air.

 **CAUTION:** Do not apply solvent to the ports or insert anything into them other than the fiber optic cable.

Clean the fiber optic cable connectors only with wipes/swabs or solvents appropriate for optical fiber, such as Sticklers Fiber Optic Cleaner or similar.

## Calibration

The recommended calibration interval is one year. For calibration or other service, contact Teledyne LeCroy.

## Warranty

For warranty information, see our website at: [teledynelecroy.com/support/service.aspx](http://teledynelecroy.com/support/service.aspx)

## Contact

For assistance in the US, contact Technical Support at:

Ph: 800-553-2769 / 845-425-2000

Fax: 845-578-5985

support@teledynelecroy.com

A complete list of regional offices is available from: [teledynelecroy.com/support/contact](http://teledynelecroy.com/support/contact).



## General Safety Precautions

The overall safety of any system incorporating this probe is the responsibility of the system owner.

**For use only by trained personnel. Not for use in households or by children.**

**Use only as specified.** Using the probe and/or the equipment it is connected to in a manner other than specified may impair the protection mechanisms.

**Before use, test the probe with a known source** to ensure it is operating correctly.

**Do not overload; observe all terminal ratings.** Do not connect the probe to any circuit that exceeds the CAT, voltage or current ratings of the oscilloscope terminal, probe, or probe-accessory combination.

**Use only accessories compatible with the probe.** Use only accessories that are rated for the application. Using accessories other than those shipped with the probe may create an electrical hazard.

**Connect and disconnect properly.** Connect the probe to the oscilloscope before connecting to the circuit being measured.

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

**Do not excessively bend cables.** Avoid tight radius bends, crushing, crimping, twisting or otherwise stressing.

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

**Do not disassemble the probe body or remove inside parts.** Refer all service to Teledyne LeCroy personnel.

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

**Keep product surfaces clean and dry.**

**Do not use damaged cables.** Before each use, check cables for damage to the protective insulation.

**Do not operate with suspected failures.** Before each use, inspect the probe and accessories. If any part is damaged, cease operation immediately and sequester the probe from inadvertent use.



## High Voltage Safety

**Not rated for hand-held use above 60 Vdc/30 Vrms.**

Do not handle probe tips, leads or any part of the transmitter at any time if there is any possibility >60 Vdc is present in the circuit. The plastic case of the transmitter and tip cable do not provide safe isolation.

**Do not connect tip leads to an energized circuit.**

Always de-energize the circuit-under-test before installing or removing tip leads.

**Beware when using with high-voltage or high-frequency signals.** Read the manual thoroughly before use to understand how the probe and accessories are derated depending on use.



## Laser Safety

**LASER RADIATION**  
**DO NOT EXPOSE USERS OF TELESCOPIC OPTICS**

CLASS 1M LASER PRODUCT

**WARNING: The HVF0108 probe contains laser sources, exposing which may cause laser burns.**

**Do not remove any covers from the transmitter or receiver, or otherwise attempt to disassemble the probe.**

**Using controls, adjustments or procedures other than those specified in the product manual may result in hazardous radiation exposure.**

The probe uses optical fibers within a single cable between the transmitter and receiver. Therefore, standard optical fiber handling practices are required. **Avoid tight radius bends, crushing, crimping, twisting or otherwise stressing the fiber-optic cable.**

Minimum cable radius bend is 65 mm; avoid making loops smaller than 4 in (10.2 cm).

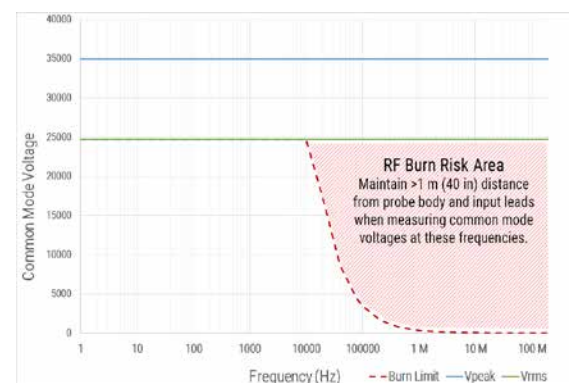
**Before each use, inspect the cable for damage such as tears and other defects.**



## Clearance Requirements

The unique common mode voltage range of the probe system allows it to be used in the presence of high-frequency/high-voltage common mode signals, but it is important to observe all precautions while using it.

**WARNING: RF burns or electric shock can occur when using the HVF0108. The plastic case of the probe head and tip shields do not provide safe isolation from hazardous common mode voltages. Do not access the probe while measuring signals in the RF burn risk area.**



Maximum safe handling limits for common mode voltages between the probe body and tip leads with respect to earth ground.

**WARNING: Maintain 1m (~40 in) safe clearance of the probe transmitter and tip in all directions when connected to an energized circuit. Place the oscilloscope and any equipment you need to access at least 1m away from the circuit and transmitter.**

