EN

PMK **Probing Solutions. Made in Germany.**

ENVI® Series

Passive High-Temperature Probes for Extreme Environmental Testing

300V CAT II, 1250 V pk, 500MHz

Instruction Manual

Manufacturer

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Warranty

PMK warrants this product for normal use and operation within specifications for a period of two years from date of shipment and will repair or replace any defective product which was not damaged by negligence, misuse, improper installation, accident or unauthorized repair or modification by the buyer. This warranty is applicable only to defects due to material or workmanship. PMK disclaim any other implied warranties of merchantability or fitness for a particular purpose. PMK will not be liable for any indirect, special, incidental, or consequential damages (including damages for loss of profits, loss of business, loss of use or data, interruption of business and the like), even if PMK has been advised of the possibility of such damages arising from any defect or error in this manual or product.

Declaration of Conformity

CE PMK declares the conformity of this product with the actual required safety standards in accordance with the Low Voltage Directive (LVD) 2014/35/EU:

CEI/IEC 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 measurement and test

WEEE/ RoHS Directives

This electronic product is classified within the WEEE/ RoHS category list as monitoring and control equipment (category 9) and is compliant to the following EC Directives.

EC Directives:

WEEE Directive 2012/19/EU

- Waste Electrical and Electronic Equipment

RoHS Directive 2011/65/EU

- Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment

Your help and efforts are required to protect and keep clean our environment. Therefore return this electronic product at the end of its life either to our Service Department or take care of separate WEEE collection and professional WEEE treatment yourself. Do not dispose as unsorted municipal waste.

Table of Contents

IEC Measurement Categories

Definitions and Examples

No Measurement Category not in CAT II, III or IV

Definition: Many types of test and measuring circuits are not intended not in CAT II, III or IV to be directly connected to the mains supply. Some of these measuring circuits are intended for very low energy applications, but others of these measuring circuits may experience very high amounts of available energy because of high short-circuit currents or high open-circuit voltages. There are no standard transient levels defined for these circuits. An analysis of the WORKING VOLTAGES, loop impedances, temporary overvoltages, and transient overvoltages in these circuits is necessary to determine the insulation requirements and short-circuit current requirements.

Examples: Thermocouple measuring circuits, high-frequency measuring circuits, automotive testers, and testers used to characterize the mains installation before the installation is connected to the mains supply.

Measurement Category II CAT II

Definition: MEASUREMENT CATEGORY II is applicable to test and measuring circuits connected directly to utilization points (socket outlets and similar points) of the low-voltage mains installation.

Examples: Measurements on MAINS CIRCUITS of household appliances, portable tools and similar equipment, and on the consumer side only of socket-outlets in the fixed installation.

Measurement Category III CAT III

Definition: MEASUREMENT CATEGORY III is applicable to test and measuring circuits connected to the distribution part of the building's low-voltage mains installation. To avoid risks caused by the HAZARDS arising from these higher short-circuit currents, additional insulation and other provisions are required.

Examples: Measurements on distribution boards (including secondary meters), photovoltaic panels, circuitbreakers, wiring, including cables, busbars, junction boxes, switches, socket-outlets in the fixed installation, and equipment for industrial use and some other equipment such as stationary motors with permanent connection to the fixed installation.

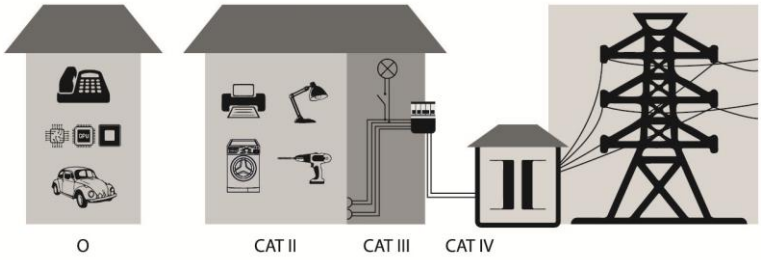
Measurement Category IV CAT IV

Definition: MEASUREMENT CATEGORY IV is applicable to test and measuring circuits connected at the source of the building's low-voltage mains installation. Due to these high short-circuit currents which can be followed by a high energy level, measurements made within these locations are extremely dangerous. Great precautions shall be made to avoid any chance of a short circuit.

Examples: Measurements on devices installed before the main fuse or circuit breaker in the building installation.

IEC Measurement Categories

Definitions and Examples:



Overview of measurement categories according to IEC 61010-01
O = No Measurement Category (Other circuits that are not directly connected to mains)

IEC Pollution Degree

Pollution Degree 1	No POLLUTION or only dry, nonconductive POLLUTION. NOTE: The POLLUTION has no influence.
Pollution Degree 2	Only- nonconductive POLLUTION. Occasionally, however, a temporary conductivity caused by condensation must be accepted.
Pollution Degree 3	Conductive POLLUTION occurs or dry, non-conductive POLLUTION occurs which becomes conductive due to condensation which is to be expected.

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 and Handling Information

Prevent personal injury, fire and product damage.
To avoid personal injury and to prevent fire or damage to this product or products connected to it, review and comply with the following safety precautions. Be aware that if you use this probe assembly in a manner not specified the protection this product provides may be impaired. Only qualified personnel should use this probe assembly.

Use only grounded instruments.
Do not connect the differential probe's ground input to a potential other than earth ground. Alwaysmake sure the probe and the measurement instrument are grounded properly.

Connect and disconnect properly.
Connect the probe output to the measurement instrument. Optionally connect the differential probe's ground input to earth ground before connecting the probe's differential inputs to the circuit under test. Disconnect the probe inputs and the probe ground connection from the circuit under test before disconnecting the probe from the measurement instrument.

Observe probe and probe accessory ratings.
Do not apply any electrical potential to the probe input which exceeds the maximum ratings of the probe or the accessories connected to it. In a combination always the lower rating / measurement category applies to both probe and accessories connected
to it.

Do not operate with suspected failures.
Refer to qualified service personnel.

Indoor use only.
Do not operate in wet or damp environment. Keep the product dry and clean.

Do not operate the product in an explosive atmosphere.

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.

Use ground lead only for connections to earth ground.

Observe temperature ranges and accessory rating.The accessories provided with the probe have been safety tested. Do not use any other accessories than those "originally" provided.

About ENVI® Series

The ENVI® P(U)HT series, ENVIronmental Probes for (Ultra) High Temperatures, from PMK sets a new benchmark in passive probing under extreme environmental conditions. Designed for also direct measurements inside climate chambers, these probes reliable operate from −55 °C up to +200 °C. At the same time, bandwidth capabilities have expanded to 500 MHz, allowing precise signal acquisition even under thermal stress.

What makes the ENVI® P(U)HT series unique is the combination of ultra-wide temperature range, high signal fidelity, and passive architecture, without compromising the measurement accuracy. These probes are ideally suited for a wide range of industries and applications:

- In the automotive industry, they support endurance and functional testing of ECUs, inverters, sensors, and battery management systems under extreme temperature cycles.
- In power electronics and industrial environments, they enable safe, accurate signal acquisition on components like power modules, gate drivers, or converters during thermal stress tests.
- In R&D laboratories, universities, and institutes, the probes are perfect for material studies or sensor development, where precise analog or fast digital signals must be captured during controlled environmental changes.
- In sectors like aerospace, railway, or energy systems, where reliability under tough conditions is critical, the ENVI® P(U)HT probes offer a robust solution that requires no active circuitry or thermal compensation.

Whether you're validating a powertrain component at +200 °C, testing a converter during cold start at −55 °C, or conducting high-speed measurements during thermal cycling, the ENVI® P(U)HT series gives you unmatched flexibility, robustness, and precision, built for engineers who measure where others can't.

All ENVI® P(U)HT models are designed with special components and a patented coaxial design for stable performance across the full temperature range. The BNC connector features automatic Read-Out (RO) detection, allowing oscilloscope scaling to adjust instantly to the probe’s dividing factor.

A wide range of standard and optional accessories ensures safe contact, even in difficult test setups with condensation or high humidity.

Specifications

Read the Instruction Manual before first use, and keep it for future reference. A digital copy of the latest Instruction Manual revision can be downloaded at www.pmk.de

This probe comes with 2 years warranty.

Electrical Specifications

Do not exceed the specifications. Specifications that are not marked with (*) as guaranteed are typical.

Order Number with Read-Out	835-312-U01 PUHT: *-55°C to 200°C*	835-312-Z01 PHT:*-55°C to 155°C*
Attenuation Ratio (± 2% at DC)(1)	10:1	10:1
Probe Bandwidth (- 3 dB)	500 MHz	500 MHz
Rise Time (10 % - 90 %)	600 ps	600 ps
Voltage Coefficient (at DC)	0.00025 % / V	0.00025 % / V
Input Resistance (System) (± 1 %)	4.5 MΩ	4.5 MΩ
Input Capacitance (System)	20 pF	20 pF
Compensation Range	10 pF - 25 pF	10 pF - 25 pF
Input Coupling of the Measuring Instrument	1 MΩ AC / DC	1 MΩ AC / DC

The following specifications are valid for all models:

Maximum Rated Input Voltages, CAT II (2):

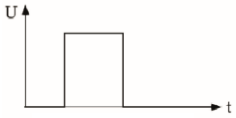
Pollution Degree	3
Measurement Category II	300 V CAT II

Maximum Rated Input Voltages, No Measurement Category, not in CAT II, III, IV (2)

Pollution Degree	3
No Measurement Category	400 V / 1250 V peak

Maximum Pulse Rating, No Measurement Category, not in CAT II, III, IV (2)

Upulse



Voltage pulse

Upulse (3): 1250 V
(Step 0 V to 1250 V)

Notes
(1) Connected to oscilloscope with an input impedance of 1 MΩ ±1 %.
(2) As defined in IEC 61010-031. See definitions explained on page 7.
(3) No overshoot permitted.

Mechanical Specifications

Weight (Probe only)	93 g
Cable Length	2 m
Probe Tip Diameter	5 mm

Environmental Specifications

Probe head and cable assembly

Altitude	operating	up to 2000 m
	non-operating	up to 15000 m
Temperature Range	operating (probe head & cable)	835-312-Z01: -55 °C to +155 °C, 835-312-U01: -55 °C to +200 °C
	operating (probe BNC output)	0 °C to +50 °C
	non-operating (probe head & cable)	835-312-Z01: -55 °C to +155 °C, 835-312-U01: -55 °C to +200 °C
	non-perating (probe BNC output)	40 °C to +71 °C
Maximum Relative Humidity	operating	98 % relative humidity

BNC connector and (*) marked accessories [1]

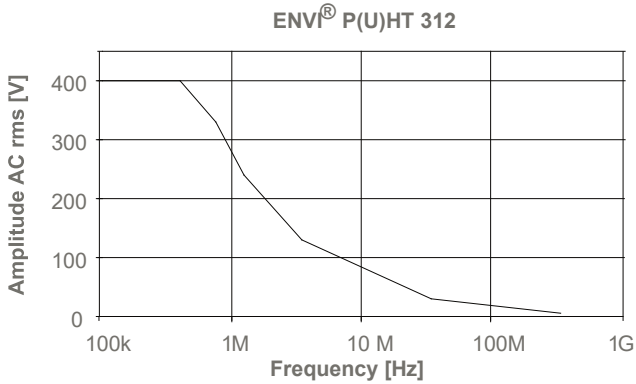
Altitude	operating	up to 2000 m
	non-operating	up to 15000 m
Temperature Range	operating	0 °C to +50 °C
	non-operating	-40 °C to +71 °C
Maximum Relative Humidity	operating	80 % relative humidity for temperatures up to +31 °C, decreasing linearly to 40 % at +50 °C

[1] See section Probe Accessories

Typical Voltage Derating

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

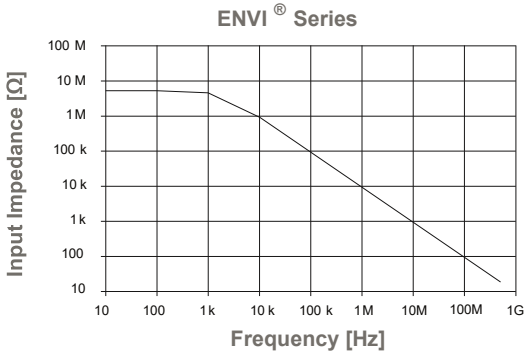
Valid for no measurement category, not in CAT II, III, IV [(1)]:



Typical Input Impedance

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

Valid for no measurement category, not in CAT II, III, IV [(1)]:



(1) As defined in IEC 61010-031. See definitions explained on page 7.

Rating Accessories

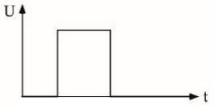
Do not exceed the probe's specifications.
The following accessories can be used with multiple probe series.

● **PCB Adapter 5,0-L (890-700-006)**

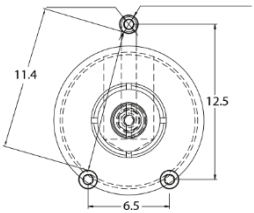
Maximum Rated Input Voltages, No Measurement Category, not in CAT II, III, IV [(1)]:
- Pollution Degree: 2
- No Measurement Category: 2000 V DC or AC peak

Maximum Pulse Rating, No Measurement Category, not in CAT II, III, IV [(1)]:

Upulse [(2)] = 6000 V (Step 0 V to 6000 V)



Voltage pulse



ø 0.8 Drilling ø 1.5 Soldering Pads

Drilling- / Soldering Template

The minimum distance between all solder pads of 11.4 mm (see adjacent template) must not be undercut under any circumstances. Undercutting this distance will void the rating.

(1) As defined in IEC 61010-031. See definitions explained on page 4.

Probe Accessories

The parts supplied are marked with x in the row for scope of delivery.

The accessories for this probe series have been safety tested.
Do not use any other accessories or power supplies than what is recommended.

Order No.	Item	Scope of Delivery	Picture
varying	Probe ENVI® P(U)HT series	x	
018-292-007	Adjustment Tool T*	x	
	Probe BNC-Connector *		
891-005-803	5x Spring Tip 0.8mm	x (2pcs)	
891-005-011	5x Solid Tip 0.8mm	x	
018-291-102	Ground Blade 5.0	x	
018-292-524	HT-Insulating Cap	x	
018-210-003	BNC Adapter 5.0-L	x	
890-700-006	PCB Adapter 5.0-L	x	
890-520-712	HT-Dual Lead Adapter to 0.8mm Sockets	x	
018-291-779	10x Solder-in Contact Pin 0.64mm	x	
890-500-141	HT-IC Clip-M to 0.64mm Pin		
890-500-142	HT-IC Clip-L to 0.64mm Pin		
890-321-025	HT-Sprung Hook 5.0	x	
890-400-022	HT-Ground Lead 10cm	x	
890-400-021	HT-Ground Lead 10cm to 4mm Banana Plug *Not for hand-hold use!*	x	
930122000	Alligator Clip V2A to 4mm Socket *Not for hand-held use!*	x	
890-808-105	2 Footer Positioner		
890-400-015	Ground lead 15cm	x	

(*) Not suitable for use in high temperatures: Tested at ambient temperatures between 0°C to +50 °C.

Maintenance

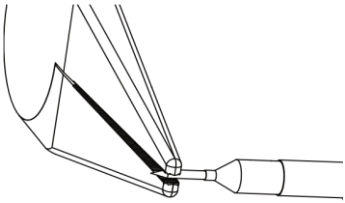
Cleaning

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.

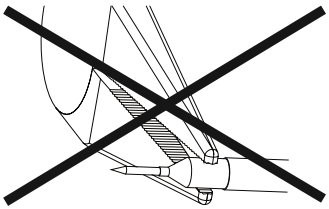
Changing the Probe Tip

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.

Most oscilloscopes provide a build-in function generator to verify the passive probe is compensated correctly. After changing the probe tip always use the build-in function generator or other stand-alone instrument to make sure the probe is safe to operate.



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 DC gain, low frequency (LF) compensation and for high frequency (HF) compensation. A factory calibration is possible at any time on request.

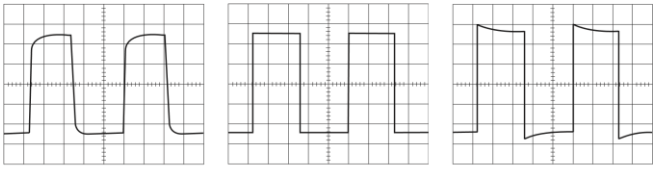
The trimmers are sensitive components.
Too much mechanical pressure during adjustment might damage the trimmers.

LF Compensation

When the probe is connected to the oscilloscope input the first time probes cable capacitance needs to be matched to the oscilloscope input capacitance. This matching assures good amplitude accuracy from DC to the probes bandwidth. A poorly compensated probe clearly influences the overall system performance (probe + scope) and causes 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

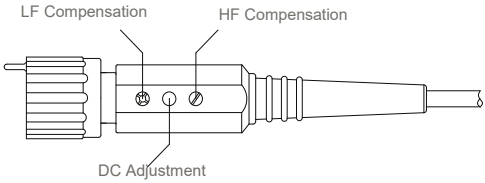
see below figures.



HF Compensation

Overshoot doesn't necessarily need to be adjusted when connecting the probe to your oscilloscope for the first time. We recommend to use the following equipment for proper HF compensation: Rectangular waveform generator with a rise time faster than 700 ps, 50 Ω feed through and probe BNC adapter. If you do not have the appropriate equipment we are pleased to help you. Simply send a message to our service department.

HF adjustment is performed by connecting the probe to the rectangular wave generator.



DC Adjustment (Factory calibrated)

DC compensation is executed while connected to the oscilloscope. Use a precision input resistance of 1 MΩ ±0.01 %.

Scope of Delivery

See chapter “Ordering Information” to review the selection of accessories.

- 1x ENVI® series probe
- 1x **018-292-007** Trimmer Adjustment Tool
- 2x Spring Tip 0.8mm
- 3x Solid Tip 0.8mm (¹)
- **018-291-102** Ground Blade 5.0
- **018-292-524** HT-Insulating Cap
- **018-210-003** BNC Adapter 5.0-L
- **890-700-006** PCB Adapter 5.0-L
- **890-520-712** HT-Dual Lead Adapter to 0.8mm Sockets
- **018-291-779** 10x Solder-in Contact Pin 0.64m

- **890-321-025** HT-Sprung Hook 5.0(²)
- **890-400-022** HT-Ground Lead 10cm
- **890-400-021** HT-Ground Lead 10cm to 4mm Banana Plug
  *For non-handheld use only **
- **930122000** Alligator Clip V2A to 4mm Socket
  *For non-handheld use only **
- **890-400-015** Ground lead 15cm
- 1x Instruction manual

(1) plugged on probe
(2) installed in probe

* 890-400-021 HT-Ground Lead 10cm to 4mm Banana Plug and 930122000 Aligator Clip V2A to 4mm Socket are not for hand-held use and can only be used in climatic chambers.

Ordering Information

Step 1: Select Base Probe

835-312-U01	Probe ENVI® PUHT, 500MHz, **-55°C** to **200°C**
835-312-Z01	Probe ENVI® PHT, 500MHz, **-55°C** to **155°C**

Step 2: Select Optional Accessories

890-500-141	HT-IC Clip-M to 0.64mm Pin **limited supply**
890-500-142	HT-IC Clip-L to 0.64mm Pin **limited supply**

Step 3: Select Optional Calibration Certificate

KAL-ENVI	facory calibration certificate
KAL-DAKKS-ENVI	ISO 17025 (re-)calibration certificate

Ihr Ansprechpartner /
Your Partner:

dataTec AG
E-Mail: info@datatec.eu
>>> www.datatec.eu

Mess- und Prüftechnik. Die Experten.

Information in this publication supersedes that in all previously published material.
Specifications are subject to change without notice.

Informationen in dieser Anleitung ersetzen die in allen bisher veröffentlichten Dokumenten.
Änderungen der Spezifikationen vorbehalten.