EN

PMK

Probing Solutions.
Made in Germany.

PHV X kV – Series

High Voltage Probes
for Precision Power Electronics Testing

4000 V, >600 MHz, < 3pF

PRELIMINARY

ES France - Département Tests & Mesures
127 rue de Buzenval BP 26 - 92380 Garches

Tél. 01 47 95 99 45
Fax. 01 47 01 16 22

e-mail : tem@es-france.com
Site Web : www.es-france.com

About PHVX Series Probes for Precision Power Electronics Testing

The PHVX high-voltage probe series establishes itself as a best-in-class solution for the evolving demands of modern power electronics design. With the launch of the first 4 kV model, the PHVX4kV, the series is ideal for applications such as low-side V_{DS} measurements during pulse testing of high-speed switching devices like SiC-based components, IGBTs, thyristors, fast-switching HV diodes, and more.

All PHVX models are engineered to deliver precise and consistent results, enabling designers to optimize the performance and efficiency of their power electronic systems with confidence.

- With ultra-low <3 pF input capacitance and a bandwidth exceeding 600 MHz, the PHVX series enables accurate, reliable measurements of fast-switching devices, making it an indispensable tool for engineers developing advanced designs in protected test environments.

- The PHVX series introduces a unique contacting concept that ensures high signal fidelity in high-voltage measurements across various applications. The rotatable 360° ground rings allow flexible, direct connection to 5.08 mm (2.5 kV) or 7.62 mm (4 kV) pitch square pin headers, without adding capacitive loading to the DUT. This enables precise acquisition even at hard-to-reach test points. A wide range of accessories, including soldering adapters, BNC connectors, and additional tools, ensures safe and easy connectivity to the DUT for this non-handheld probe.

All PHVX probes feature a universal BNC output connector and are compatible with any oscilloscope equipped with a 1 MΩ input impedance.

For safety reasons, PMK's PHVX probes are not intended for handheld use. They are designed for integration into semi- or fully automated test stations and are considered fixed voltage-measuring components of a test system.

Each voltage model is available in different cable lengths and configurations, optionally with or without intelligent read-out functionality and additional silicone insulation (S) for high-power measurements. The intelligent read-out (RO) enables automatic scaling and identification on the oscilloscope. Fully equipped models including both read-out and silicone insulation are denoted with the suffix –S–RO.

Please refer to the ordering information for a complete list of available models and accessories.

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.

Do not exceed the specifications. Allow the probe to warm up for 20 minutes. This probe comes with 1 year warranty. Each specification is determined at +23 °C ambient temperature. This probe series is not for hand-held use, and not rated for CAT II, III or IV.

Electrical Specifications

Electrical Specifications[1] that are not marked with (*) as guaranteed are typical.

Models [2]	**All PHVX4kV models**
Attenuation* (≤ ± 1 % guaranteed)	100:1
Maximum Rated Input Voltages [1]	
No Measurement Category	4000 V rms / 4000 V pk / 4000 V DC
CAT Rating	not applicable
Pollution Degree	2
DC Gain Accuracy [3]	± 0.5 % (preliminary)
Input Impedance	50 MΩ || < 3 pF
Compensation Range	10 pF – 25 pF
Input Coupling of the Measuring Instrument	1 MΩ

The electrical specifications are valid for use in a controlled environment, like a semi-conductor tester or test setup with protective cover.

Models	**PHVX4kV type**		
Article numbers [2]	PHVX4kV-2-0 PHVX4kV-2-0-RO PHVX4kV-2-S PHVX4kV-2-S-RO	PHVX4kV-3-0 PHVX4kV-3-0-RO PHVX4kV-3-S PHVX4kV-3-S-RO	PHVX4kV-5-0 PHVX4kV-5-0-RO PHVX4kV-5-S PHVX4kV-5-S-RO
Cable Length	2m	3m	5m
Bandwidth* (-3 dB) Small Signal (guaranteed)	> 600 MHz	> 600 MHz	TBD
Rise time (10 % - 90 %) Large Signal	< 800 ps	< 800 ps	TBD

Mechanical Specifications

Parameter	**Specification**
Weight (Probe only)	TBD
Length [4]	Model dependent
Probe Input	To position on 0.64mm (0.025") square pin header(s)
Output Connector [5]	BNC (Male)

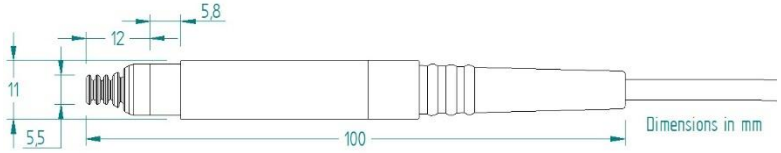
Notes:

[1] The rating is based on basic insulation in a controlled environment in accordance with IEC 61010-1. Also observe further definitions in the probe series' instruction manual, voltage derating graph and probe accessory ratings in the referring manual section.
[2] Each model is available with different cable lengths, w/o read-out, and w/o extra silicon cable insulation for measurements in high power applications. See "Ordering Information"
[3] Input voltage >25%
[4] Depending on model, available in different lengths
[5] Depending on model, available with or without read-out

Environmental Specifications

Parameter		Specification
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 +45 °C, non-condensing humidity
	Non-Operating	95 % relative humidity for temperatures up to +40 °C
Altitude	Operating	up to 2000 m
	Non-Operating	up to 15000 m

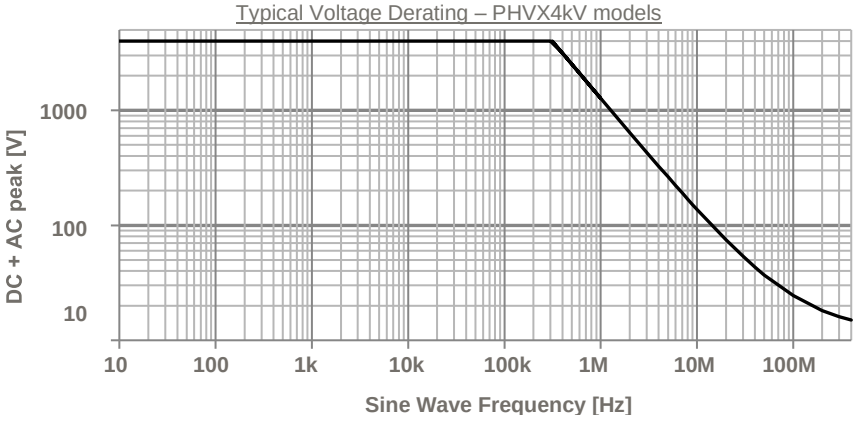
Dimensional Drawing



Typical Voltage Derating

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

The charts given here are valid for no measurement category, not in CAT II, III, IV (1).



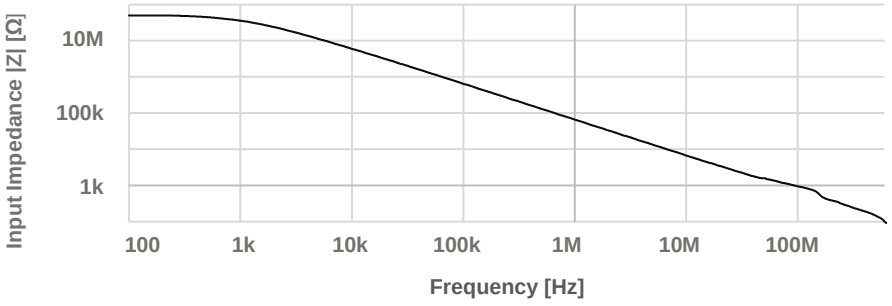
(1) As defined in IEC 61010-1. See definitions explained in the instruction manual.

Typical Input Impedance

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

The charts given here are valid for no measurement category, not in CAT II, III, IV ([1]).

Typical Input Impedance – PHVX4kV-2 Models (full bandwidth)



([1]) As defined in IEC 61010-1. See definitions explained in the instruction manual.

Scope of Delivery

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

- 1x PHVX series probe
- 1x **890-440-005** PHVX-GND ring “A” for 2500V DC or AC peak,5.08mm pitch
- 2x Spring tip, gold-plated
- 2x Solid tip, gold-plated
- 1 **890-440-008** PHVX-GND ring with 10cm GND lead to 2mm banana, with clamp
- 1x **890-880-101** Set of 10 Contact Pins 0.64mm
- 3x Pin connectors, 7 pin single row, pin width 0.635m (SL 1 053 7 G)
- 1x Set cable coding rings 14mm (3x4 colors)
- 1x **018-292-007** Trimmer tool
- 1x Instruction manual

Ordering Information

Step 1: Select Base Probe

Each voltage model is available in different cable lengths and configurations, w/o intelligent read-out function, and w/o additional Silicon insulation (S) for high power measurements. The optional read-out (RO) features intelligent communication with automatic scaling on the oscilloscope display. The fully equipped model with intelligent read-out and extra Silicon insulation end with nomenclature -S-RO.

4000V DC / 4000V pk, **2m cable length**, >600MHz, 100:1 divider models:

PHVX4kV-2-0-RO	with read-out
PHVX4kV-2-S-RO	with readout, with additional Silicon insulation for high current applications
PHVX4kV-2-0	no readout
PHVX4kV-2-S	no readout, with additional Silicon insulation for high current applications

4000V DC / 4000V pk, **3m cable length**, >600MHz, 100:1 divider models:

PHVX4kV-3-0-RO	with read-out
PHVX4kV-3-S-RO	with readout, with additional Silicon insulation for high current applications
PHVX4kV-3-0	no readout
PHVX4kV-3-S	no readout, with additional Silicon insulation for high current applications

4000V DC / 4000V pk, **5m cable length**, >600MHz, 100:1 divider models:

PHVX4kV-5-0-RO	with read-out
PHVX4kV-5-S-RO	with readout, with additional Silicon insulation for high current applications
PHVX4kV-5-0	no readout
PHVX4kV-5-S	no readout, with additional Silicon insulation for high current applications

Step 2: Select optional Calibration Certificate

KAL-PHVX4kV	factory calibration certificate
KAL-DAKKS-PHVX4kV	ISO 17025 (re-)calibration certificate

Step 3: Select Additional Accessories

More PHVX-series connectivity options are in planning. If no fitting solution is shown below, please reach out to sales@pmk.de with your specific need and application information.

890-440-001	PHVX-PCB Adapter 4000V max 4000V DC or AC peak (observe layout requirements) *same footprint as PMK's high voltage PCB-Adapter 5.0-L for PMK's PHV1000/2000 series*	
890-440-002	PHVX-BNC Adapter Max. 750V DC/ 750V pk	
890-440-003	PHVX-Dual adapter to 2mm banana max. 4000V DC/ 4000V pk	
890-440-004	PHVX-Sprung Hook (red) max. 4000V DC/ 4000V pk	
890-440-005	PHVX-GND ring "A" for 2500V DC or AC peak with 5.08mm pitch, for >360° rotational angle *included in scope of delivery*	
890-440-015	PHVX-GND ring "B" for 4000V DC or AC peak with 7.62mm pitch, for >360° rotational angle	
890-440-006	PHVX-dualGND ring "A" for 2500V DC or AC peak with 2x 5.08mm pitch, >360° rotational angle	TBD
890-440-016	PHVX-dualGND ring "B" for 4000V DC or AC peak with 2x 7.62 mm pitch, >360° rotational angle	TBD
890-440-007	PHVX-GND ring with GND lead to 2mm banana, without clamp	
890-440-008	PHVX-GND ring with GND lead to 2mm banana, with clamp *included in scope of delivery*	
890-800-001	Spring tips, gold-plated, 5x	
890-800-000	Solid tips, gold-plated, 5x	
890-440-009	PHVX-Dual adapter to 2mm banana, with pair of clamps (red/black), max. 4000V DC/ 4000V pk	
890-440-010	Set 2 clamps, for use with 2mm banana plugs (red/black) max. 4000V DC/ 4000V pk	

ES France - Département Tests & Mesures
127 rue de Buzenval BP 26 - 92380 Garches
Tél. 01 47 95 99 45
Fax. 01 47 01 16 22
e-mail : tem@es-france.com
Site Web : www.es-france.com