EN

PMK

Probing Solutions.
Made in Germany.

SONIC Series

Robust Single-Ended Active Probes

1 GHz to 4 GHz, < 1 pF, up to ± 15 V

Instruction Manual

Manufacturer

PMK Mess- und Kommunikationstechnik GmbH
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Warranty

PMK warrants this product for normal use and operation within specifications for a period of two years from the 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 disclaims 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

Safety 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. Always make 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.

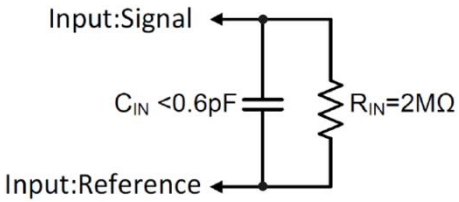
Do not operate the product in an explosive atmosphere.

About the SONIC Probe Series

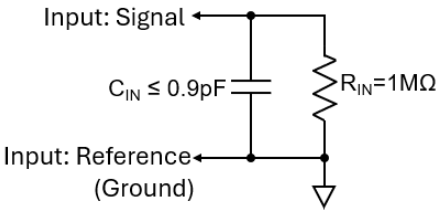
The SONIC active probe series offers best-in-class performance, robustness and is easy to use to make in-circuit measurements. With the SONIC series different bandwidth models up to 4GHz, very low ,< 1pF, input capacitance, low noise and wide dynamic input range of ±8V or ±15V (model depended) makes the SONIC series ideal for a variety of applications.

The 2.5GHz SONIC2500 and 4GHz SONIC4000 input capacitance of <0.6pF parallel >2MΩ between probe tip and probe reference (1 MΩ to the oscilloscope ground) provides the best input impedance in its class. Unlike traditional single-ended probes, both models are ideal for in-circuit browsing of an energized circuit without the possibility for shortening to earth ground, because of their high impedance probe tip reference connection.

SONIC2500/4000 Input Loading Schematic



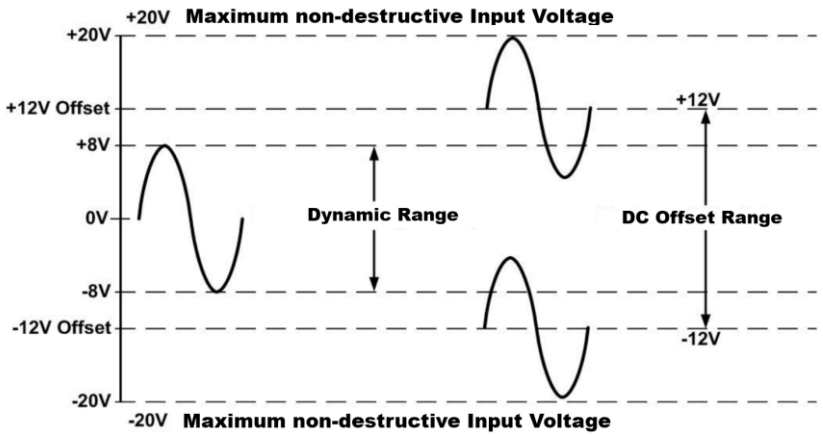
SONIC1500/1000 Input Loading Schematic



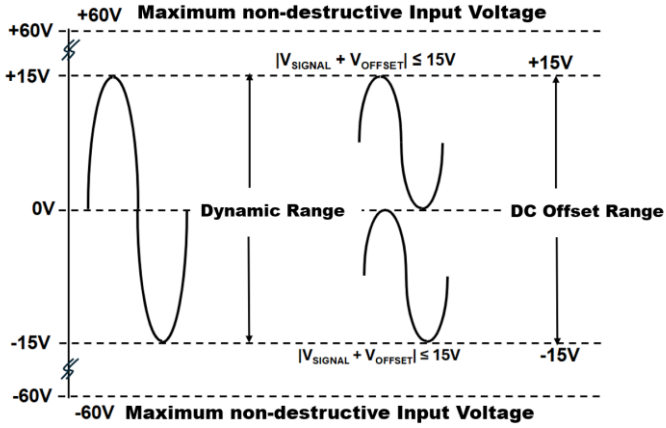
The 1GHz SONIC1000 and 1.5GHz SONIC1500 probes also have a very low input capacitance of <1pF parallel >1MΩ between probe tip and probe reference. Both models are ideal as general-purpose single-ended probe, with the probe reference connected to the oscilloscope ground. They do not have the 1MΩ reference protective impedance to ground like the SONIC2500 and SONIC4000 models.

When used with one of PMK's multi-channel power supplies, the remote-controllable input offset range capability of SONIC series is ±12V or ±15V, depending on model type, extending the input dynamic voltage range of each probe model.

SONIC2500/4000 Input Voltage Range example



SONIC1500/1000 Input Voltage Range example



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

Specifications that are not marked with (*) as guaranteed are typical. Warm-up time is 20 minutes.

The electrical specifications are determined when using a PS2 power supply at +23 °C ambient temperature. This probe comes with 2 years warranty.

Electrical Specifications

Order Numbers	SONIC4000-BUN1 SONIC4000	SONIC2500-BUN1 SONIC2500	SONIC1500-BUN1 SONIC1500	SONIC1000-BUN1 SONIC1000
Attenuation Ratio	10:1	10:1	10:1	10:1
Attenuation Accuracy (DC) *	±1 %	±1 %	±1 %	±1 %
Bandwidth (- 3 dB)	> 4 GHz	> 2.5 GHz	> 1.5 GHz	> 1 GHz
Input Dynamic Range*	±8 V	±8 V	±15 V	±15 V
Input DC Offset [1)]	±12 V	±12 V	±15 V	±15 V
Non-destructive Input Voltage *	±20 V [2)]	±20 V [2)]	±60 V [2)]	±60 V [2)]
Input Impedance [3)]	2 MΩ || 0.6 pF	2 MΩ || 0.6 pF	1 MΩ || 0.9 pF	1 MΩ || 0.9 pF
Output Impedance	50 Ω	50 Ω	50Ω	50 Ω
Propagation Delay	approx. 7 ns	approx. 7 ns	approx. 6ns	approx. 6 ns
Zero Offset Error (referred to input)	<± 20 µV	<± 20 µV	<± 20 µV	<± 20 µV

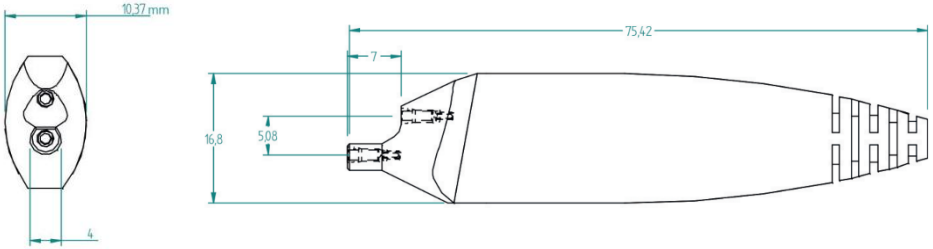
Notes:
[1)] Only available when used with a recommended power supply with remote control capabilities.
[2)] See Maximum Input Voltage frequency derating on page 8.
ESD protected, IEC 61000-4-2 Contact Discharge Level 2, IEC 61000-4-2 Air Discharge Level 3.
[3)] Referred to probe reference input.

Mechanical Specifications

Order Number	SONIC4000	SONIC2500	SONIC1500	SONIC1000
Weight (Probe only)	110g			
Output Connector [1]	BNC (male)			
Probe Input Sockets	0.64 mm square/ 0.8 mm round			
Cable Length	1.3 m		1.2 m	

[1] SMA output is available on request.

Probe Dimensions



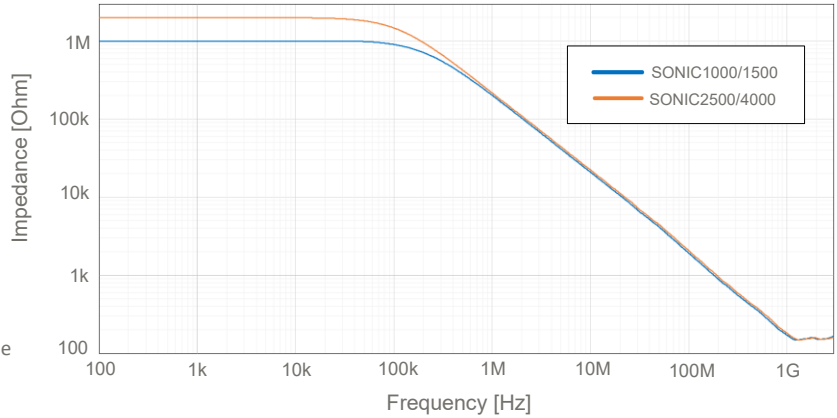
Environmental Specifications

		SONIC4000	SONIC2500	SONIC1500	SONIC1000
Altitude	operating	up to 2000 m			
	non-operating	up to 15000 m			
Temperature Range	operating	0 °C to +45 °C		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-operating	95% relative humidity for temperatures up to +40°C			

Input Impedance referred to Probe Ground

The input impedance of the probe decreases as the frequency of the applied signal increases.
The SONIC2500/4000 high impedance probe tip reference connection allows safe in-circuit browsing of an energized circuit without the possibility for shorting the probe tip reference connection directly to earth ground to prevent damage of the probe.

Input Impedance SONIC1000/1500/2500/4000

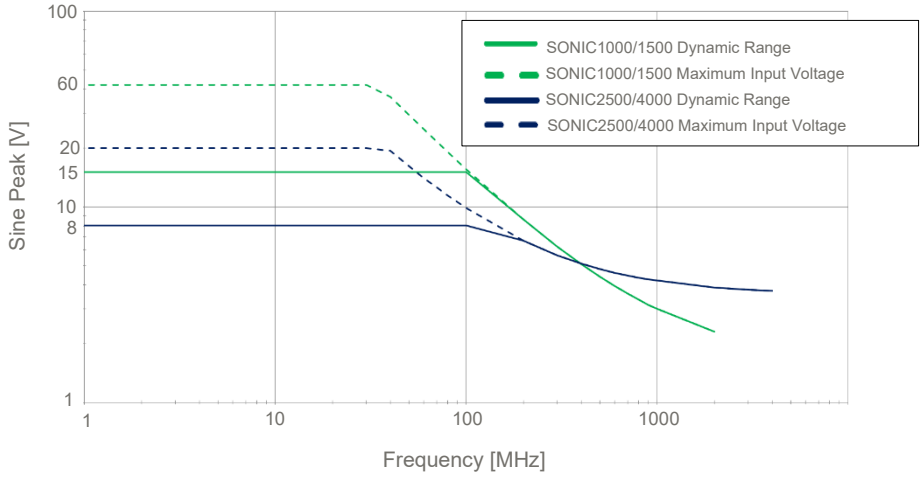


the

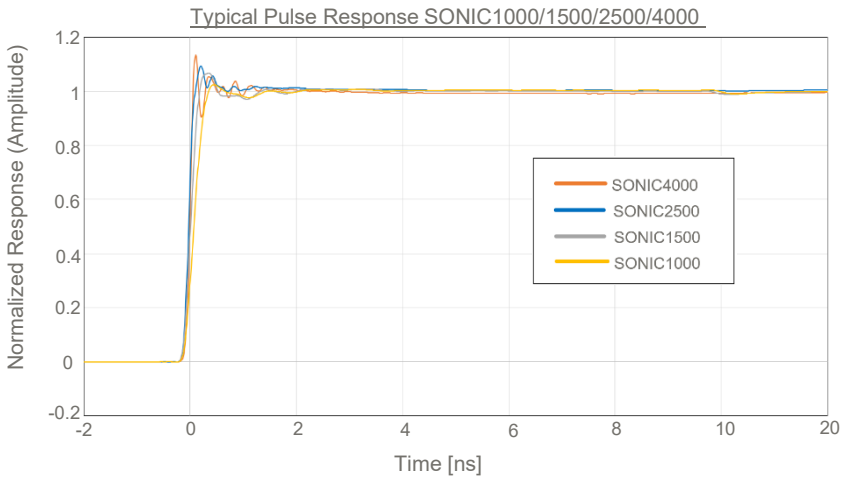
Maximum Input Voltages

The SONIC active probes are protected against electro-static-discharge voltage (ESD). The maximum amplitude of the applied signal may not exceed the limits of the graph below, to avoid input linearity errors and damage to the probe.

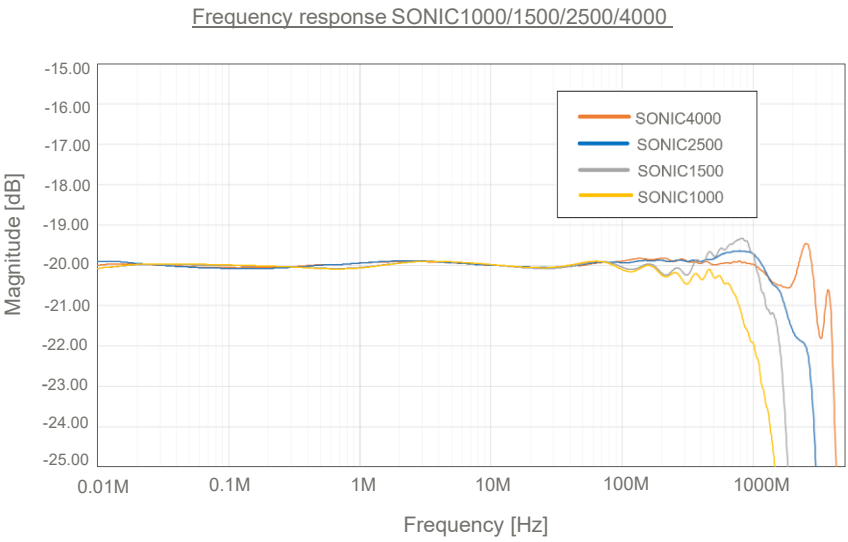
Input Voltage vs. Frequency



Typical Pulse Response



Typical Frequency Response



Scope of Delivery

See also Ordering Information for more details on the accessories that are included or optional.
If a bundle was ordered, a PS05 wall plug power supply is included too.

Item	Qty	Item	Qty
Probe SONIC Series	1	Ground Lead 90° 10 cm	1
Calibration Certificate	1	Ground Leaf	1
Instruction Manual	1	Z-Ground	1
White Case	1	Pair Picohook™ (black & red)	1
2-Footer (black)	1	PCB Adapter	2
2.54mm Adapter	1	Self-adhesive Cu Pad (2cm x 2cm)	2
Ground Blade	1	Set Coding Rings, 2x4 colors (installed on cable)	1
Ground Lead 7cm	1	Solid Tip	2
Ground Lead 13 cm	1	Spring Tip	1
Ground Lead 90° 5 cm	1	Y-Lead Adapter to 0.8mm sockets	1

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

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.

Use ground leads 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.

Maintenance

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.

Ordering Information

A power supply with remote control capabilities or a battery pack for portable use are required and optional. The standard accessories are listed in Step 3.

Step 1: Select Probe

If a bundle is selected, an high-quality wall plug power supply without remote control capabilities is already included and the probe bundle comes ready to use. Step 2 can be skipped. If remote control is of interest, select the probe only and move to Step 2.

Probe bundles with wall plug power supply:

SONIC4000-BUN1 SONIC4000 bundle, 4GHz single-ended active probe, ±8V, max 20V non-destructive input voltage, with universal BNC output, international wall plug power supply PS-05 included, ready to use probe

SONIC2500-BUN1 SONIC2500 bundle, 2.5GHz single-ended active probe, ±8V, max 20V non-destructive input voltage, with universal BNC output, international wall plug power supply PS-05 included, ready to use probe

SONIC1500-BUN1 SONIC1500 bundle, 1.5GHz single-ended active probe, ±15V, max 60V non-destructive input voltage, with universal BNC output, international wall plug power supply PS-05 included, ready to use probe

SONIC1000-BUN1 SONIC1000 bundle, 1GHz single-ended active probe, ±15V, max 60V non-destructive input voltage, with universal BNC output, international wall plug power supply PS-05 included, ready to use probe

Probe ONLY, without wall plug power supply:

SONIC4000 SONIC4000, 4GHz single-ended active probe. Power supply and supply cable to be selected

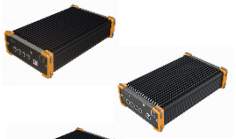
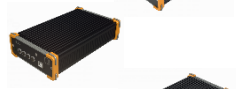
SONIC2500 SONIC2500, 2.5GHz single-ended active probe. Power supply and supply cable to be selected

SONIC1500 SONIC1500, 1.5GHz single-ended active probe. Power supply and supply cable to be selected

SONIC1000 SONIC1000, 1GHz single-ended active probe. Power supply and supply cable to be selected

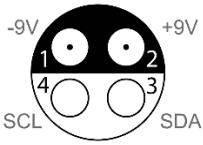
Step 2: Select optional Power Supply

If a bundle was selected, a wall plug power supply is already included, and Step 2 can be skipped. A multi-channel power supply offers offset and remote control capabilities. If the single probe, without wall plug power supply, was selected, choose a multi-channel power supply and power supply cable.

Order No.	Item	Picture
889-09V-PS2	2ch power supply PS-02 with USB for remote and offset control	
889-09V-PS2-L	2ch power supply PS-02-L with LAN and USB for remote and offset control	
889-09V-PS3	4ch power supply PS-03 with USB for remote and offset control	
889-09V-PS3-L	4ch power supply PS-03-L with LAN and USB for remote and offset control	
889-09V-PS6	8ch power supply PS-06 with USB for remote and offset control	
889-09V-PS6-L	8ch power supply PS-06-L with LAN and USB for remote and offset control	
889-09V-AP01	1ch Battery pack AP-01, no remote or offset control capabilities	
889-09V-PS5	International wall plug power supply PS-05, no remote or offset control capabilities, primary adapters for EU, UK und USA *Already included in the bundle*	
890-520-900	Power supply cable 0.6m	
890-520-915	Power supply cable 1.5m	

The power supply pin assignment is different from other power supplies.
Use only original PMK power supplies with PMK probes.

Observe Connector Pin-Out for PMK power supply cables:



Step 3: Select optional Accessories

Accessories that are already included with the scope of delivery of a probe are marked with x.

Order No.	Item	Scope of Delivery X = included	Picture
890-502-130	Pair QFP IC-clips 13mm (long) up to 0.5mm (1 pair: red, blue)		
890-502-000	Pair QFP IC-clips (short) up to 0.5mm (1 pair: red, blue)		
899-000-002	Pair SMD Test grabber 0.8mm pin, flex nose (red/black)		
For re-ordering:			
890-100-150	self-adhesive Cu-pads x10 (2 cm x 2 cm)	x (2 pcs)	
890-400-812	Ground blade	x	
890-400-811	Z-ground	x	
890-400-813	Ground leaf	x	
891-010-810	2.54 mm adapter x10	x (1 pc)	
891-025-810	2.54 mm adapter x25		
891-010-814	PCB adapter x10	x (2 pcs)	
891-025-814	PCB adapter x25		
890-800-001	Spring tip x5	x (1 pc)	
890-800-000	Solid tip x5	x (2 pc)	
P25-0 /-2	Pico Hook™ (black, red)	x	
890-720-840	Y-adapter to 0.8mm sockets	x	
890-880-105	2-Footer (black)	x	
n/a	Marker bands 2 x 4 colors (installed on probe cable)	x	
890-400-808	Ground lead 7cm	x	
890-400-809	Ground lead 13cm	x	
890-400-803	Ground lead 90° 5cm	x	
890-400-804	Ground lead 90° 10cm	x	

Step 4: Select optional 3D Positioning System

Select one of PMK's 3D probe positioning systems with the universal probe holder. The arms and probe holders are also compatible with PMK's SKID positioning systems for probes and PCBs, which are also available for temperature ranges from -55°C to +155°C. To review all 3D positioning solutions, visit us at www.pmk.de

Order No.	Item	Picture
893-350-006	Universal 3D Probe Positioner MSU1500 with steel base (893-100-001), arm with span width 200mm (893-200-200), universal probe holder (893-090-000)	
893-350-011	Universal 3D Probe Positioner with magnet foot (893-100-004), arm with span width 200mm (893-200-200), universal probe holder (893-090-000)	
893-500-START	SKID-S Starter Kit: 3U Board Tester (160 x 160mm) including SKID vertical adapter kit (893-291-501), universal probe holder (893-090-000), PMK probe holder 5-12mm (893-050-000), arm with span width 130 mm (893-200-130) and with 200 mm (893-200-200)	
893-600-START	SKID-M Starter Kit: 6U Board Tester (240 x 160mm) including SKID vertical adapter kit (893-291-501), universal probe holder (893-090-000), PMK probe holder 5-12mm (893-050-000), arm with span width 130 mm (893-200-130) and with 200 mm (893-200-200)	
893-700-START	SKID-M Starter Kit: Board Tester (340 x 300mm) including SKID vertical adapter kit (893-291-501), universal probe holder (893-090-000), PMK probe holder 5-12mm (893-050-000), arm with span width 130 mm (893-200-130) and with 200 mm (893-200-200)