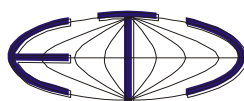


EA133

1:10/100, 10/100MHz differential probe

User's guide

Version 1.0



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Thank you for choosing a product of ETC s.r.o. We believe it will meet your expectations. Please help us provide you with the best possible service by filling out the registration form on the ETC website.

Should you need any information or have any additional questions, please do not hesitate to contact us either by postal mail or preferably via e-mail. Our contact details are as follows:

Address:

ETC s.r.o.
Rosinská cesta 8
010 08, Žilina
Slovenská republika (*Slovak Republic*)

Phone:

+421-41-5652687

Fax:

+421-41-5652687

Internet:

URL: <http://www.etc.eu>
e-mail: support@etc.eu – technical support
sales@etc.eu – sales

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Package contents

- EA133 probe – 1pc
- 9V battery – 1pc
- Power adapter – 1pc
- User's guide – 1pc
- Warning leaflet – 1pc

Limited Warranty

ETC s.r.o. guarantees reliable operation of the EA133 series probe in compliance with this documentation during a period of 24 months from the date of purchase.

Should a malfunction occur during the warranty period, excluding errors for which ETC cannot be held responsible, ETC guarantees the repair of the product or its replacement with a new or repaired one free of charge.

The ETC company shall not be responsible for device malfunctions caused by an accident, incorrect handling, unauthorised interventions or similar occurrences.

When requesting the warranty service, the customer should send the device in its original package to the dealer from whom it was purchased or directly to the ETC company. The warranty certificate together with a description of the defect or malfunction should be included in the package. The customer agrees that a new or repaired product to be shipped will be insured against damage or loss during transport and that he or she will cover the costs for the shipment and insurance.

Precautions

Please observe the following recommendations in order to avoid possible problems that might occur while using the probe:

- Do not connect voltages lower than -1200V or higher than 1200V (with respect to oscilloscope's ground) to the input
- Do not use the probe in a wet environment
- Please be careful when measuring voltages above 50V. Touching parts under voltages higher than 50V could be dangerous to your health.

1. Installation

The layout of the controls and connectors are shown in Figures 1.1 and 1.2.



Fig. 1.1. – Controls and connectors



Fig. 1.2. – Position of the attenuation switch

The probe can be operated from the 9V battery or from the wall power adapter. When the power adapter is connected, the probe is switched to adapter input, and the power from battery will be not used.

WARNING: When the wall adapter connector is inserted into the probe, the battery is disconnected. Inserting the unpowered adapter into the probe disables the power supply.

Before installing the battery, remove the battery cover located on the bottom side of the probe. Connect the battery to the connector and insert it into the holder. Then push the cover back on. We recommend using a 6LR61 or 6F22 type of 9V battery with a minimum capacity of 550mAh; this gives the probe at least 2 hours of continuous operation.

The power adapter can be connected to the power connector on the right side of the probe just next to the power switch.

Use the BNC connector to connect the probe to the measuring device. The input resistance of the measuring device should be higher than 20 kOhm and its input capacity between 15 to 30 pF. When an oscilloscope is the measuring device, switch the input to the 1Mohm mode.

The input terminals of the probe are 4mm protected banana plugs. Use the proper measuring leads to connect to the device under test. The proper measuring leads are available as optional accessories.

2. Description

The EA133 differential probe is an auxiliary device designed for any oscilloscope or other voltage-measuring device. It can be connected to any of the measuring inputs of an oscilloscope. It is powered by a battery or by a power adapter.

The attenuation of the EA133 probe is switchable between 1:10 and 1:100, while the working common mode voltage remains the same. Therefore, it is possible to measure differential voltages of tens of millivolts while the common mode voltage is up to 1000V.

3. Performance characteristics

No. of channels	1
Input type	differential
Gain	0.1 (1:10) or 0.01 (1:100)
Frequency range at 1:100 (-3dB)	0 to 100 MHz
Frequency range at 1:10 (-3dB)	0 to 10 MHz
Gain error at 20°C (f < 100 Hz, Rload > 500 kΩ)	< 1 %
Gain versus temperature	< 0.01% / °C
Initial offset	< 2 mV
Noise at 1:10	< 500 μ Vrms
Noise at 1:1	< 1500 μ Vrms
Common mode rejection at 1:10 (DC)	> 110 dB (< 3.16 μ V/V)

Common mode rejection at 1:10 ($f < 100\text{Hz}$)	$>90\text{ dB}$ ($< 31.6\mu\text{V/V}$)
Common mode rejection at 1:100 (DC)	$>130\text{ dB}$ ($0.316\mu\text{V/V}$)
Common mode rejection at 1:100 ($f < 100\text{Hz}$)	$>110\text{ dB}$ ($< 3.16\mu\text{V/V}$)
Differential input resistance	$12\text{ M}\Omega$
Differential input capacity	1.5 pF
Input resistance to output ground	$6\text{ M}\Omega$
Output resistance	$120\text{ }\Omega$
Output load resistance	$>20\text{ k}\Omega$
Output load capacity	$15\text{pF to }30\text{ pF}$
Differential operating input voltage range for att. 1:100	$-1200\text{V to }1200\text{V}$ ($f < 380\text{kHz}$)
Differential operating input voltage range for att. 1:10	$-120\text{V to }+120\text{V}$ ($f < 3.8\text{MHz}$)
Operating common mode voltage range (to output GND)	$-1000\text{V to }1000\text{V}$ ($f < 300\text{kHz}$)
Maximum non-destructive voltage of any input (to output GND)	$-1200\text{V to }1200\text{V}$ ($f < 300\text{kHz}$)
Maximum non-destructive differential voltage	$-1400\text{V to }1400\text{V}$ ($f < 380\text{kHz}$)
Supply power from battery	$< 1.1\text{W}$
Supply power from power adaptor	$< 1.3\text{W}$
Voltage range of power adaptor input	$9\text{V to }16\text{V DC}$
BNC cable length	approx. 440 mm
Dimensions (w/h/d) in mm	$175/61/23$

Measurements were made after 15 minutes warm-up.

Table 3.1. Performance characteristics

The common mode rejection (CMR) depends on the frequency, as is shown in the Fig. 3.1.

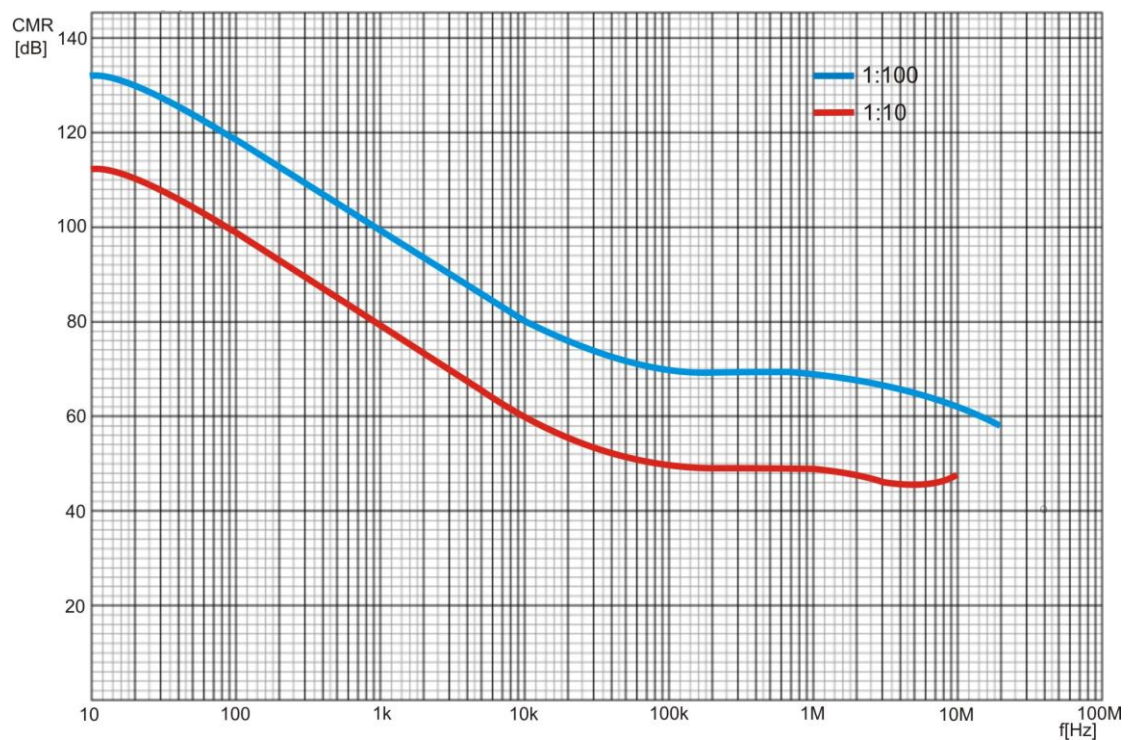


Fig. 3.1. Typical CMR on frequency characteristics

The maximum non-destructive differential input voltage depends on the frequency, as is shown in Fig. 3.2.

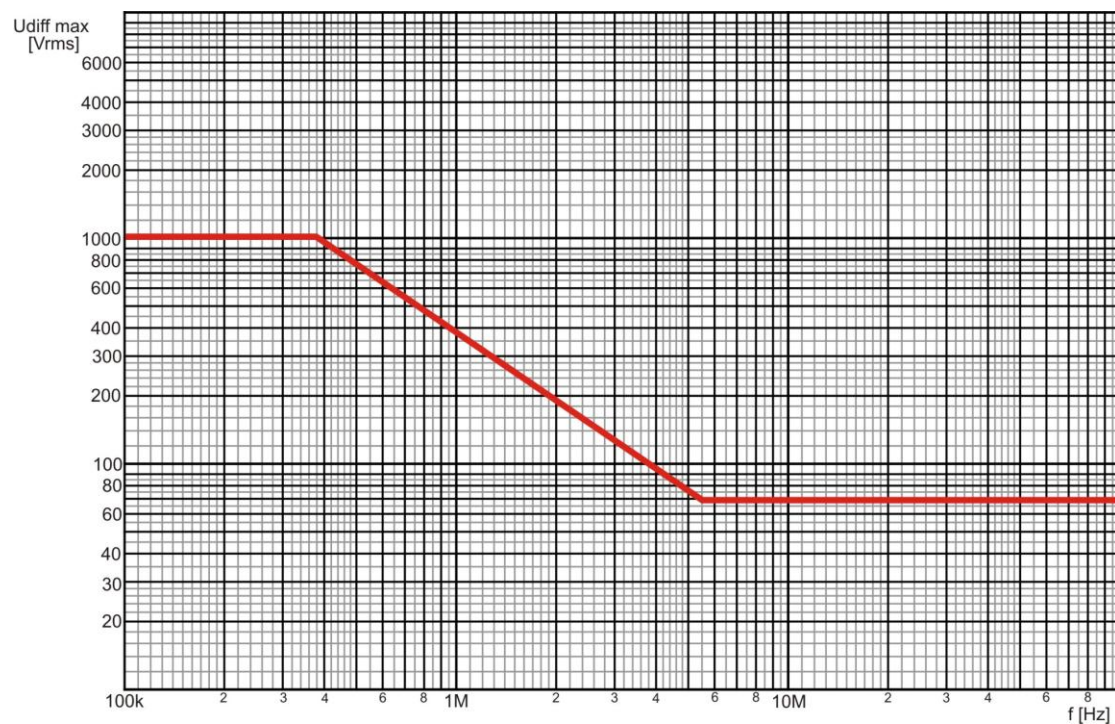


Fig. 3.2. Maximum non-destructive differential input voltage characteristics