MD 300 / MD 310 SURGE PULSE CURRENT PROBE SET

USER MANUAL

601-270B

TESEQ

Advanced Test Solutions for EMC

MD 300 / MD 310
SURGE PULSE CURRENT PROBE SET

USER MANUAL

CONTENTS

1 SAFETY TERMS AND SYMBOLS

Please take note of the following explanations of the symbols used in order to achieve the optimum benefit from this manual and to ensure safety during operation of the equipment.

The following symbol draws your attention to a circumstance where nonobservation of the warning could lead to inconvenience or impairment in the performance.

Example:

Caution statements identify conditions or practices that could result in damage to this product or other property.

The following symbol draws your attention to a circumstance where nonobservation of the warning could lead to component damage or danger to the operating personnel.

Example:

Warning statements identify conditions or practices that could result in injury or loss life.

Symbols used on the product:

Attention
refer to manual

2 GENERAL SAFETY SUMMARY

Study the following safety precautions carefully to avoid injury and prevent damage to the probe or any products connected to it.

Observe the maximum working voltage and the resulting current: To avoid any injury, use proper cables and connectors.

Do not operate in case of a suspected fault: If you suspect the probe might be damaged, have it inspected by a qualified service engineer or return it to a Teseq service centre without delay.

Never attempt to connect or disconnect the probe while the generator is in running mode.

If the probe is used to observe EUT power output line, it is imperative to power off EUT mains first before connect or disconnect the probe!

High peak current flows trough the probe! To protect against electric shock, use proper adapters, cables and accessories.

Respect the direction of the current flow which has to be in line with the arrow sign on the probe.

3 DESCRIPTION

3.1 MD 300

The MD 300 probe has been specially designed to verify surge current pulse as specified in IEC / EN 61000-4-5, ANSI C62.41 and they derivates.

The advantage of the MD 300 current probe is, that the measuring system is physically isolated from the circuit under test.

The MD 300 current probe is ready to use immediately, along with the delivered and already mounted coax cable and a simple memory oscilloscope. The BNC-end plug needs to be connected to the high impedance or 50 Ω input of the oscilloscope. Then the conductor carrying the surge current to be measured is passed through the hole in the current probe.

The design and sensitivity of the MD 300 probe is made to make it suitable to the ranges of IEC / EN 61000-4-5 and ANSI C62.41 without additional attenuators. The resulting voltage wave shape on the oscilloscope will then be an authentical reproduction of the actual current wave shape within the given accuracy.

Optional FISCHER connectors are available for matching the safety banana connectors of the shorting cable to the Surge Output of the generator. For

monitoring the EUT current during a test, an additional IEC adaptor with the safety banana connectors can be connected to the generator EUT output for observation of one lead at a time.

The nominal ratio is:
500:1 (into 1 MΩ system)
or
1000:1 (into 50 Ω system) this is equal 1 V / 1000 A on scope.

3.2 MD 310

The MD 310 probe is specially adapted to verify Slow Damped Oscillatory Wave current pulses as specified in IEC / EN 61000-4-18 or ANSI / IEEE C37.90.1 and their derivates.

The main advantage of the MD 310 current probe is, that the measuring system is physically isolated from the circuit under test.

The MD 310 current probe is ready to use. It comes with a pre-mounted coaxial cable as well as the conductor carrying the SOW current to be measured. The BNC-end plug needs to be connected to the high-impedance input or 50 Ω input of an ordinary memory oscilloscope. Then the conductor carrying the SOW current to be measured needs to be connected between the EUT Power Output. The resulting voltage wave shape on the oscilloscope will then be an authentically reproduction of the actual current wave shape within the given accuracy.

Optional FISCHER connectors are available for matching the safety banana connectors of the shorting cable to the Surge Output of the generator.

The nominal ratio is:

10:1	(into 1 MΩ system)
or	
20:1	(into 50 Ω system) ; this is equal 1 V/20 A on a scope.

4 PART IDENTIFICATION

The MD 300/MD 310 set come with:

- Carry case
- Calibration certificate
- Manual
- Current probe
- Coax cable with SMA/BNC connector
- Short cable with safety banana connectors

Recommended optional adapters:

INA 6560 — HV-Plug adaptor set (FISCHER to banana)

INA 2042 — HV-Plug adaptor set (LEMO to banana)

INA 6554 — IEC 320 single phase to safety banana adaptor leads

155-131 — 6 to 4 mm adaptor with safety banana connectors, 2 pcs. recommended

NOTE: The carry case has spare place for all optional equipment

MD 300/310 surge pulse current probe set

5 OPERATION

Never attempt to connect or disconnect the probe while the generator is running.

Operation of a surge generator without a protective earth connection is forbidden!

The surge current conductor must be insulated adequately for its voltage level. The conductive part of the current probe is insulated.

Connect the BNC end of the probe's coax cable to your oscilloscope.

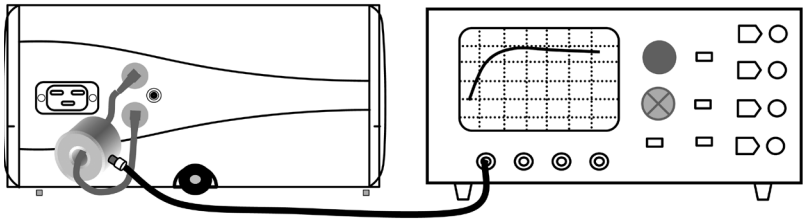
To prevent measurement errors, care has to be taken to the direction of the current flow which has to be in line with the arrow sign on the probe.

5.1 Short-circuit current pulse verification

High peak current flows trough the probe! To protect against electrical shock, use only proper adapters, cables and accessories.

Depending on the surge generator model, either the LEMO type or the FISCHER-connectors have got to be connected to the surge high and surge low output of the generator. Some generator might have safety banana plug connectors; therefore the short cable can be used.

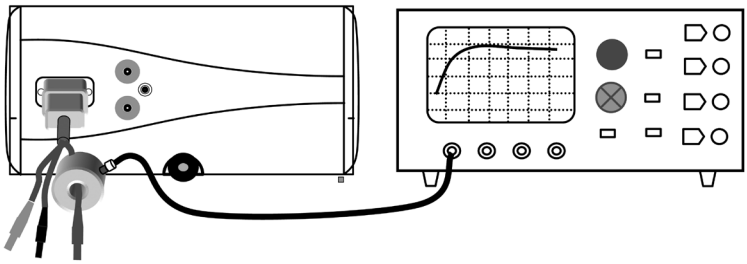
Use the short cable and put one end trough the hole of the probe and connect one end to the surge high and the other end to the surge low connector.



5.2 Current pulse measurement during test

High peak current flows trough the probe! To protect against electrical shock, use only proper adapters, cables and accessories.

During a surge test procedure, one lead at a time can be observed by usingthe optional EUT connector with the safety banana connectors. On the other end the EUT under test has to be connected. The two 6 mm adaptors can be used e.g. for EUT with screwed terminals



The two 6 mm adaptors can be used e.g. for EUT with screwed terminals.

6 SPECIFICATIONS

6.1 MD 300

Maximum peak current	5000 A
Maximum RMS current	> 63 A
Nominal ratio	500:1 (into 1 MΩ system) 1000:1 (into 50 Ω system)
Sensitivity	0.002 V / A (1 MΩ system) 0.001 V / A (50 Ω system)
Lower frequency (3 dB cut off)	< 10 Hz
Higher frequency (3 dB cut off)	> 20 MHz
Hole diameter	8 mm
Probe connector	SMA
Scope coax cable	SMA to BNC
Operating temperature	0 to 55°C
Output impedance	50 Ω
Accuracy	< ±2%

6.2 MD 310

Max. peak current	400 A
Max. RMS current	10 A
Nominal ratio	10:1 (into 1 MΩ system) 20:1 (into 50 Ω system)
Sensitivity	0.1 V / A (1 MΩ system) 0.05 V / A (50 Ω system)
Lower frequency (3 dB cut off)	30 Hz (approximate)
Higher frequency (3 dB cut off)	70 MHz (approximate)
Hole diameter	6.3 mm
Probe connector	SMA
Scope coax cable	with SMA and BNC
Operating temperature	0 to 65°C
Output impedance	50 Ω
Accuracy	+1 / -0 %

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7 TERMES

Sensitivity
The considerations here involve the peak current to be measured, the oscilloscope sensitivity, and trade-offs imposed by other specifications.

Maximum peak current
This value is based primarily on the voltage-breakdown rating of the connector used. For instance, a 500 V rating on the connector gives a 5000 Amp peak current rating for a 0.1 volt-per-ampere current monitor.

Maximum RMS current
This value is based on heating considerations involving the long term stability of the internal resistance element in the current monitor.

Approximate low and high frequency 3 dB points
Due to the ac nature of current probes, the flat midband response will roll off at low frequency. The «corner» or «cut-off» frequency, at which the response is 3 dB down, is specified. Internal resonances determine the useful high frequency cut off point. Response is within ±3 dB at the specified high frequency limit.

8 CLEANING

- Use a soft cloth, lightly fluid or lightly detergent to clean off any dirt. Take care not to damage the probe
- Do not immerse the probe in water
- Avoid using abrasive cleaners
- Avoid using chemicals containing benzene or similar solvents

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