Manual

TERA Ohmmeter TOM 600

With integrated temperature and humidity sensor

1. Product Description

Due to its compact design and battery powered operation the TOM 600 is suited for mobile applications in industrial areas. Furthermore it can be driven stationary with the provided wall power supply.

The menu-driven TOM 600 is operated by only 2 push-buttons and therefore very user-friendly. All set measurement parameters are shown in the display for a better orientation. Die provided PC software enables you to perform computer driven measurements. In addition the measurement data can be administrated and processed.

The TOM 600 works according to the voltage current measurement principle. The measurement time required by norms, like DIN EN 61340 or EOS-ESD 4.1/6.1, can be set with an internal timer.

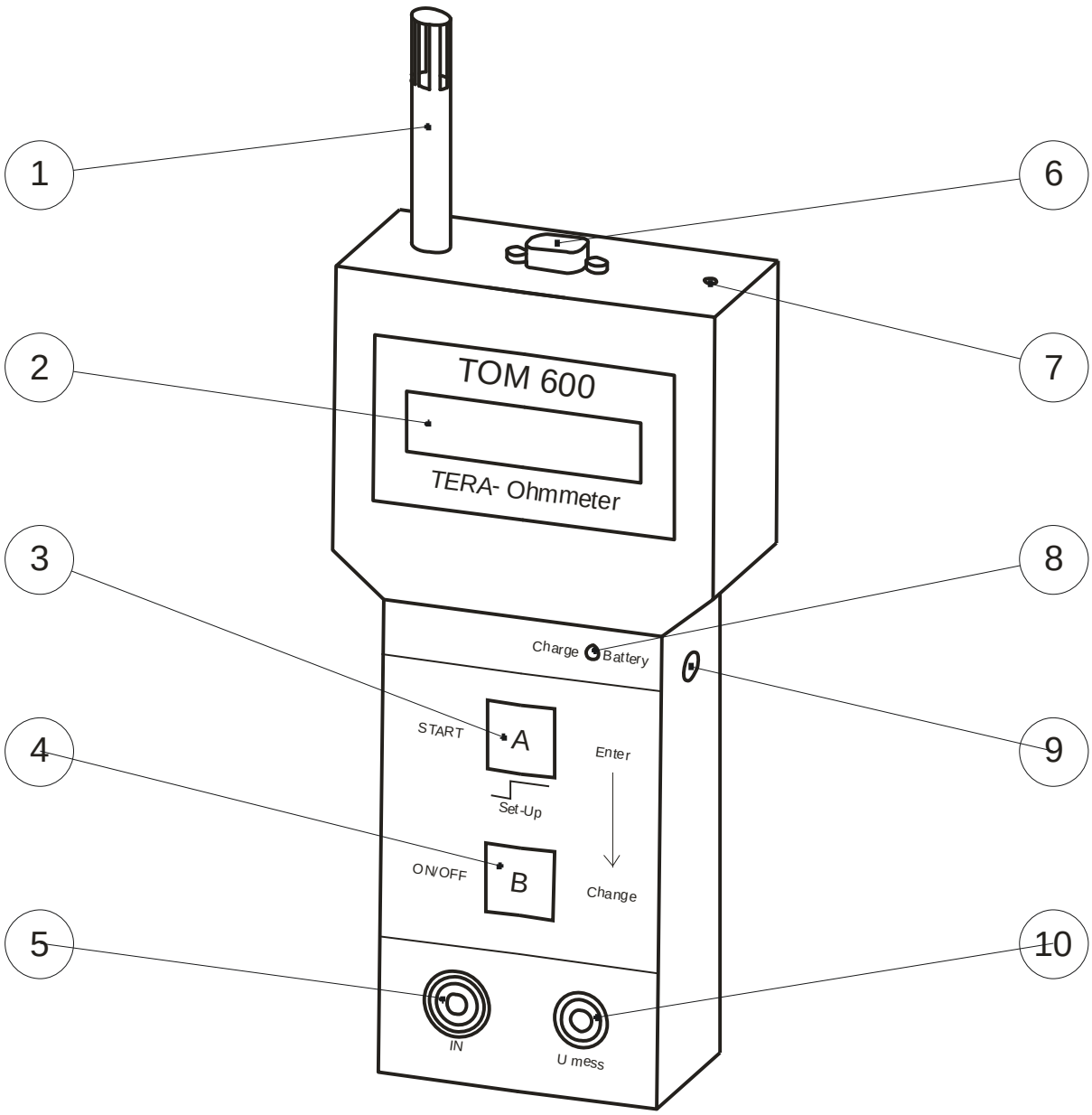
While measuring in TIMER=ON mode data, including environment parameters, is stored in the internal EEPROM memory. Thereby the data is maintained and can be read out later via the serial PC port.

As resistance values of some materials depend on air humidity and temperature, these environment parameters are measured and saved together with each measurement value. Thus reproducible measurements can be performed.

1.1. Specifications

Dimensions (L x W x H):	224mm x 81mm x 40mm
Weight:	350g
Display:	Alpha-numerical display, 2 lines with 16 digits each, size: 60 mm x 25 mm
Ranges:	Resistance: 20 kΩ - 2.0 TΩ accuracy ± 1xEXX Ω Temperature: 0°C....60°C accuracy ± 3°C Rel. Humidity: 10%...90%r.F. accuracy ± 5%
PC interface:	Serial interface, internal COM – USB Adaptor
PC software:	KL_ReadOut Software
Battery:	4 x AA-NiMH 2100 mAh Operation time with fully charged battery: > 12 hours permanent operation Charging time with provided wall power supply: max. 14h
Power supply:	9V-DC / 300 mA

1.2. Legend



1 Temperature and humidity sensor
2 LCD display
3 Button A
4 Button B
5 Measurement input
6 USB interface
7 Display contrast trimmer
8 Battery charge indicator
9 Power supply connector
10 Measurement voltage output

2. Manual

2.1. Initiation

The TERA ohmmeter TOM 600 is shipped with 4 AA batteries and is therefore plug-and-play. For charging the batteries only the provided wall power supply may be used.

For measuring the electrodes have to be connected to the appropriate connectors (q.v. legend) and positioned on the object to measure. Afterwards button **«B»** has to be pressed to power the device on.

Please pay attention moving on measurement lines and passing people as they can cause electrostatic induction at the measurement input.

After powering on the software version is displayed::

TOM 600 V3.1
(c)KL/ 09.2004

In case of set measurement time the device prompts to press button **«B»**. Afterwards the current resistance value and the timer settings are displayed. If the timer is not set, the device immediately returns:

R>2.0xE12Ω[1] **T=OFF**[2]
Air: xx°C xx%r.F

Press button **«B»** to power the device off. In battery mode the device powers off automatically after 5 minutes when no button was pressed.

2.2. Charging the NiMH Battery

The provided wall power supply has to be used to charge the batteries or operate the TOM 600. For this the jack (9) must be connected to the power supply. If the charging works properly the green indicator LED (8) is lit. The charging time for the provided batteries is max. 14h. Longer charging has to be avoided as batteries can be overcharged and damaged.

The TOM 600 can be operated up to 12 hours with fully charged batteries.

2.3. Range Selection and Measurement Voltage

The TOM 600 provides a automatic range selection over the entire measurement range. The device selects the measurement range according to the connected resistance.

Measurement range	Measurement voltage
≤ 200kΩ:	10V DC
> 200kΩ:	100V DC

The automatic range selection can be turned off in the setup. A fixed measurement voltage can be set. The available options are:

Measurement voltage	Measurement range
10V	20kΩ ... 200GΩ
100V	200kΩ ... 2TΩ

3. Setup

By pressing button «A» for about 2 seconds the setup menu is loaded. The device displays:

SET TIMER !

TIMER ON/OFF

By pressing button **«B»** (Change) the timer can be switched on and off. If button «**A**» is pressed while the display indicates *OFF*, the timer is turned off. Read on at section 3.1. If button «**A**» is pressed while the display indicates *ON*, the measurement time can be set up next and the device displays:

NEW TIMER !

TIME = 001s

By pressing button **«B»** the measurement time is changed as follows:

1s → 2s → ... → 10s → 15s → ... → 60s → 120s → ... → 240s → 1s

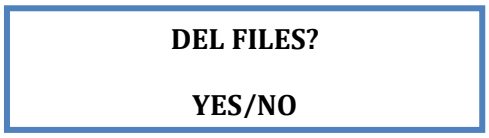
Press button **«A»** to confirm the measurement time shown in the display. The device returns:

TIMER MODE:

AVERAGE/LAPSE

The measurement mode can switched between the average over the whole measurement time (AVERAGE) or the last value at the end of the measurement (LAPSE) by pressing button **«B»**. The displayed mode can be confirmed with button **«A»**.

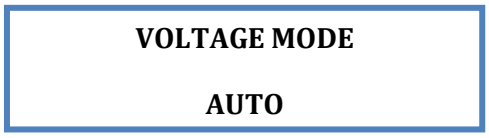
Afterwards the device prompts whether the data stored in the EEPROM (files) should be deleted:



Pressing button **«B»** switches between YES and NO. The selected action is confirmed by pressing button **«A»**. If all data is erased the saving will start on *File No. 001* the next time. The display returns:

3.1. Measurement Voltage / Display Mode

After finishing section 3 the measurement voltage and the display mode can be set up. First the device prompts for the measurement voltage:



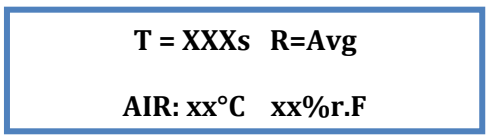
By multiply pressing button **«B»** you can choose between the following options:

Press button **«A»** to confirm the displayed function. Afterwards the number representation is prompted:

By pressing button **«B»** you can switch between scientific and engineering representation. The selection can be confirmed by pressing button **«A»**.

If the timer is set off continue reading in section 3.2.

Afterwards the device is reset and returns in case of activated timer:



The next measurement can be started by pressing button **«A»**. The time T decrements in steps of 1s, by reaching 0 the measured resistance value is displayed with the amendment **Avg** for *AVERAGE* or **Lap** for *LAPSE*. The second line shows the measured temperature and humidity values, e.g:

Avg=2.5xE9Ω

AIR: xx°C xx%r.F

Alternating with the temperature and humidity values the second line shows every 2s:

Avg=2.5xE9Ω

FN:XXX T=XXXs

By pressing button **«A»** the measurement result, including temperature and humidity values, can be saved using the displayed file number. Stored data can be read out via the PC interface later.

3.2. Timer

In case of not activated timer the TOM 600 switches automatically to a live display of the measured resistance value. The device returns e.g.:

R=5.5xE10Ω T=OFF ⇔ AUTO

AIR: xx°C xx%r.F

4. Further Messages

In case of excessing the maximal measurement range, the device returns in the first line:

Scientific representation:

R>2.0xE12(11)Ω T=OFF

AIR: xx°C xx%r.F

Engineering representation:

R>2.0TΩ(200GΩ) T=OFF

AIR: xx°C xx%r.F

In case of undercutting the minimal measurement range, the device returns:

Scientific representation:

R<2.0xE04(05)Ω T=OFF

AIR: xx°C xx%r.F

Engineering representation:

R<20(0)kΩ T=OFF

AIR: xx°C xx%r.F

In case of changing resistance values the device searches the proper measurement range and returns:

If the battery voltage undercuts 4,6 Volt, the display's second line alternates with:

The battery has to be charged, though the current measurement can be completed. If the battery voltage undercuts 4,3 Volt, the device powers automatically off to prevent battery drain after displaying:

4.1. Adjust Display Contrast

On the device top side the display contrast can be adjusted with a tiny screw driver through a small hole.

5. PC Operation

5.1. System Requirements

- Intel Pentium CPU or higher
- CD drive
- Free USB Port
- Microsoft Windows 95/98, 2000 or XP
- Microsoft Excel

5.2. Installation

see the the KL_ReadOut Manual

5.3. Starting the Software

Attach the TOM 600 by use of the provided cable to a USB Port and wait until Windows confirm it. Then turn the device on. Double-click the corresponding desktop icon to start the KL_ReadOut software.

6. Maintenance / Calibration

The device is maintenance-free. If the device is contaminated it can be cleaned by using a non-fuzzing cotton cloth and solvent-free cleanser. The device must not be opened On opening the device warranty is void. If the device is not used for longer terms batteries should be removed. Always store batteries charged.

The recommended factory calibration interval is 1 year.

7. Warranty

In case of proper use we issue warranty within 24 month after shipping. Mechanical damage and the batteries are exempted from the warranty. Warranty is void on opening the device.

8. Scope of Delivery

TOM 600

- TERA ohmmeter TOM600 with temperature and humidity sensor
- 4 x. NiMH batteries (AA)
- Conductive carrying case with foam insert
- Wall power supply 9V-DC / 500mA
- 2 x teflonized measurement line (1m)
- PC cable 9 pol.
- CD with PC software and manual
- Manual
- Declaration of factory calibration

TOM 600 ME

Same as TOM 600, but:

- 1 x. teflonized measurement line (5m) instead of 1 x teflonized.measurement line (1m)
- Pair of 2,50 kg electrodes according to EOS/ESD S 4.1/S 7.1 and DIN EN 61340 –5-1, -4-1, -2-3 for the measurement of grounding bleeder resistances and point to point measurements, especially for conductive table and floor coverings

9. Security Advices

The TOM 600 is not approved for measurements in explosive areas. Operation in power plants is not permitted.

Notice: Please make sure the object to be measured is potential free before every measurement. External voltage can distort the measurement results and damage the instrument.

The device must not be operated without rechargeable batteries!

10. Measuring Electrodes ME 250

The 2.5kg electrodes enable measurements of surface and bleeder resistances on table or floor coverings according to the following norms:

- EOS / ESD – S 4.1 /S 7.1
- EN 100015 Teil1, IEC 93
- IEC 61340-5-1
- DIN IEC 1340-4-1

10.1. Specifications

Dimensions (L x W x H):	Diameter 70mm, height 100mm
Contact rubber:	Diameter: 63mm, Shore hardness: 60
Weight:	2,5kg
Connection:	Banana jack 4mm, topside centrical
Isolation:	Shrink hose R>10^{11}Ω (U=100V)
Contact resistance:	<1kΩ (measured on a metal plate, U=10V)

10.2. Important Information

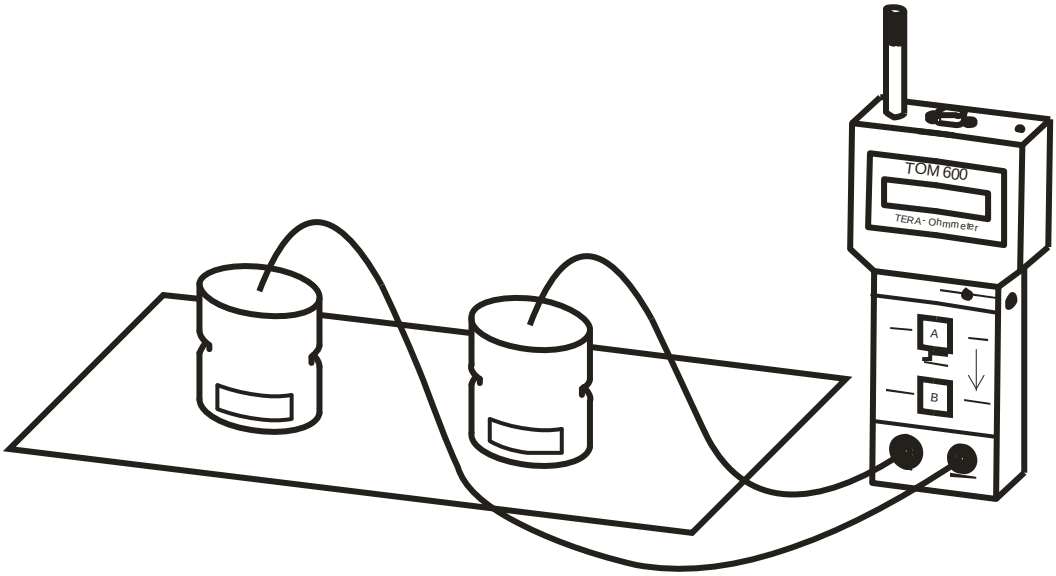
Please consider the following advices for reproducible results:

- The contact surface of the measurement electrodes must be kept clean to ensure a optimal contact resistance
- The covering to measure should also be cleaned
- Measurements may only be performed in zero-potential condition
- The measurement line should be as short as possible but as long as necessary
- For the measurement of high resistances teflonized measurement lines are inevitable
- For repetitious accuracy in high resistance ranges holding time or a timer function should be considered
- To avoid influences of electrostatic induction cables must not be moved during the measurement
- The conductivity of some materials depends on temperature and humidity, therefore these values need to be logged
- For adequate accuracy the corresponding norms should be complied with

11. Measuring Techniques according to IEC 61340-4-1

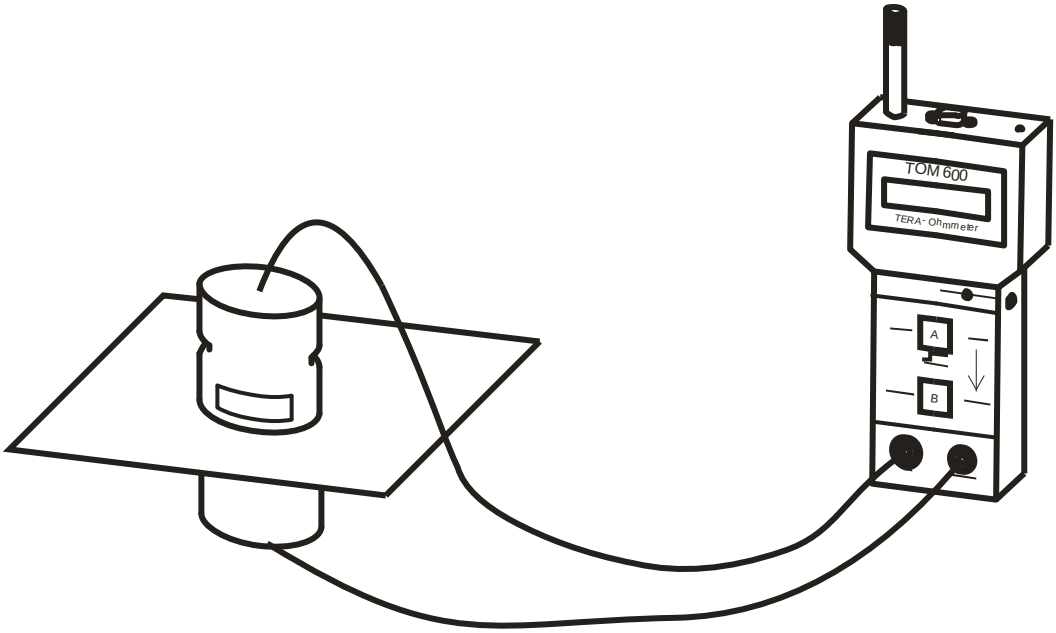
11.1. Surface Resistance (point to point)

The electrodes have to be put on the covering to measure. The measured resistance depends on the conductivity, the surface condition and the distance between the electrodes.



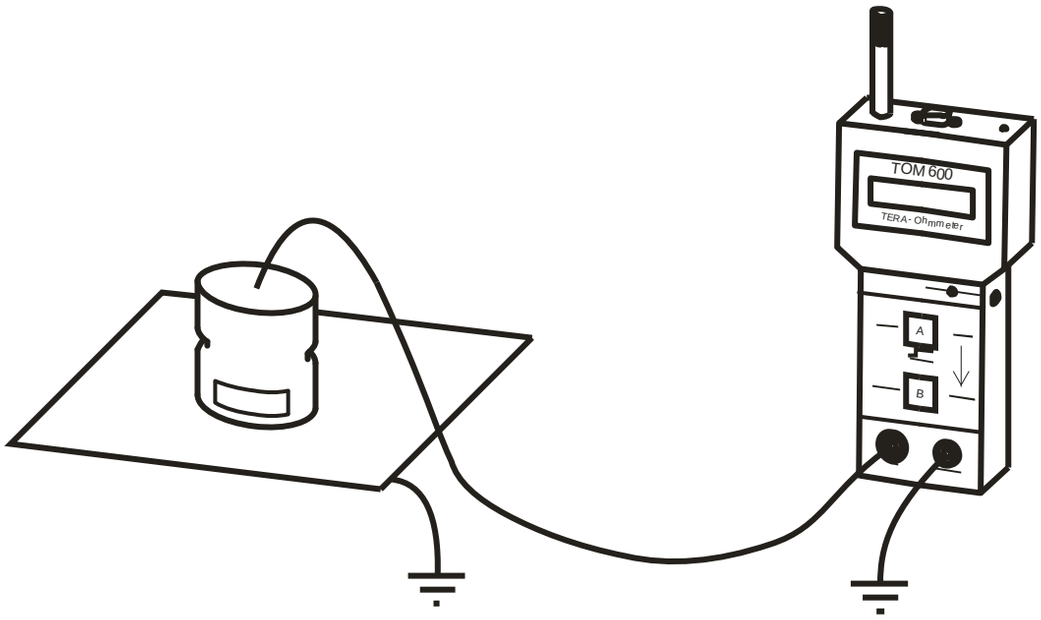
11.2. Volume Resistance

The covering has to be put between a metal plate and one electrode or between both electrodes. The measured resistance depends on the conductivity, the material thickness and the surface condition.



11.3. Leakage Resistance (point to ground)

The resistance of a covering to ground potential is measured. The measured resistance depends on the material's conductivity, its surface condition, the electrodes distance to the grounding point and the quality of the grounding.



Furthermore a ring measurement electrode for measurements according to DIN EN 61340-2-3 is available as accessory.