

Teraohm-Meter



TOM 374

The Teraohm-Meter 374 operates according the Voltage-Measurement Principle by using an Electro - Fieldmeter as the measurement amplifier because of its high impedance, thus allows resistance measurement directly to earth potential. High resistance values up to $10^{14} \Omega$ can be measured with a test voltage of 100 volts only with an accuracy of 5%.

KLEINWÄCHTER
Forschungs-, Entwicklungs-, Produktions- u. Vertriebsges.m.b.H.

Krummattstr. 9 · D-79688 Hausen i.W. · Tel. 07622 / 6863 - 0 · Fax 07622 / 6863 - 40

1. Product Description

The Tera-Ohmmeter TOM 374 is battery powered and due to its compact design, it is very suitable for the mobile use in industrial areas. It could also be run on the power supply (230/115 V AC.).

The TOM 374 is menu-driven and will be controlled by means of 2 switches for simple operation. All selected parameters will be shown in the 2 rows LCD-display for a better orientation of the operator.

The enclosed PC-software enables the remote control operation of the TOM 374 and data processing by means of a PC.

The Teraohm-Meter 374 operates according the Voltage-Measurement Principle by using an electro-fieldmeter as the measurement amplifier because of its high impedance. Thus allows the measurement of high resistance values up to $10^{14} \Omega$ with an accuracy of 5% with a test voltage of 100 volts only. Sockets for individual ground connections are available for the use of shielding cables to prevent inaccuracy of measurement caused by parasitic effects (influence).

The integrated timer is very useful to select the specified measurement time as required in several national and international standards such as IEC, EN, DIN, BS and VDE.

The significant advantage of the Voltage-Measurement Principle is, that resistance to earth potential can be directly measured and therefore failures at resistance to ground measurement do not happen anymore.

2. Operation

2.1. Switching on the meter

The Tera-Ohmmeter TOM 374 is equipped with a NiCd-battery and ready for operation - use the enclosed transformer only for recharging the battery or running the unit.

- The electrodes will be connected to the appropriate sockets (see legend) and positioned on the specimen
- It is recommended to ground the unit
- Press button **B** to switch on the TOM 374

The software version will be shown for a short moment before the request appears to press the „start“-button **A**. The actual measurement reading, used test voltage and the timer-setting will appear on the display. The timer is switched off in the factory setting:

R = 5.0 E 12 Ohm
U=100V T=off

2.2 Charging the battery

Use the enclosed transformer only to run the TOM 374 on the power supply or to recharge its installed NiCd-battery. Bond the transformer to the appropriate socket of the TOM 374 and connect the transformer to the power supply. The TOM 374 consists of an integrated protection to prevent overcharging of the NiCd- battery. The battery is fully charged after max. 14 hours and will last approximately 6 hours at continuous operation.

2.3. Range selection

The TOM 374 features autoranging of the test voltage according the applied resistance measurement value over the whole resistance range.

- Resistance smaller or equal 100 kOhm — measurement voltage is 10 VDC
- Resistance greater than 100 kOhm — measurement voltage 100 VDC determined at open circuit

Please note:

The TOM 374 can measure up to $1,9 \times 10^{13} \Omega$, if the timer was switched off or set to less than 1 minute. Change the timer setting to 1 minute or greater to increase the measuring range up to even $9,9 \times 10^{14} \Omega$.

3. „set-up“ Function

Press the switches **A** and **B** simultaneously to select the „**set-up**“ function. The TOM 374 requests the selection of timer-function or calibration mode:

TIMER A
CALIBRATION B

3.1. Calibrate the unit

Press the switch **B** to start the calibration mode, „**CALIBRATION**“ will appear shortly on the screen. The display informs to short the incoming sockets (figure 2):

SHORT
confirm B

Perform the short and confirm by pressing the switch **B**. To re-open the incoming sockets is requested by the following message:

OPEN
confirm B

Perform the open and confirm by pressing the switch **B**. Finally the TOM 374 informs that the adjustment is finished:

END
CALIBRATION

Please note:

This adjustment procedure should be repeated once in a month but does not supersede the annual calibration of the unit!

3.2. Use the timer - average function lapse time

Press the switches **A** and **B** simultaneously to select the „**set-up**“ function. The option between the timer-function and calibration mode is requested first:

TIMER **CALBR**
A < **> B**

Press the switch **A** to select the timer function and the following appears on screen:

TIMER
A < on **off > B**

Press **A** to activate the timer and select between 10 seconds and 4 minutes. The following information appears on screen:

TIMER **T = 1 min**
A < OK **change > B**

Press **B** to increase the timer, **T = 2 min** appears next on the screen and can be changed in 1 minute increments until 4 minutes (max. time setting) is reached. After that, the timer will continue at **T= 10s** and can be increased in 10 seconds-steps until the 1 minute level is reached again, etc.
(...- 1 min - 2 min - ... - 4 min - 10s - 20s - ... - 1 min - ...).

Press **A** to confirm the timer-setting and the following appears on screen:

AVG **Lapse**
A < **> B**

If **A** will be pressed, then the average of obtained measurements over the pre-selected time will be shown. If **B** will be pressed, the actual reading will be stored after the elapsed time.

Finally the resistance figure appearance could be changed, which is described in part 3.3. separately:

CHANGE DISPLAY
A = yes **no = B**

Press **B** to go back to the measurement mode and the timer is ready to start if selected. The following will appear on screen:

PRESS START

The resistance figure, test voltage and timer-setting will then appear on screen, such as:

R = 5.0 E 12 Ohm
U=100V T= 20s

3.3. Change the resistance appearance form

This option can be selected in the „*set-up*“ menu after the timer part:

CHANGE DISPLAY

A = yes no = B

Press **A** to change the resistance appearance form. The display will show the optional appearance form:

R = 5.0 E 11Ohm

A=ok change=B

Press **A** to confirm this proposal or press **B** to switch to the initial option:

R = 500 GOhm

A=ok change=B

When one of the 2 appearance form is confirmed, the TOM 374 is ready to measure. The following will appear on screen if the timer was pre-selected:

PRESS START

Otherwise, the unit will switch directly to the resistance on-line mode, the following could appear on screen:

R = 500 GOhm

U=100V T=off

4. Other Displays

You can measure up to $1,9 \times 10^{13} \Omega$, if the timer was switched off or set to less than 1 minute. If this value will be exceeded, the following could appear on screen with a flashing resistance value:

R > 1.9 E 13 Ohm

(display mode 1)

U=100V T=off

In case that the timer was set to 1 minute or greater, the unit can even measure up to $9,9 \times 10^{14} \Omega$. If this value will be exceeded, the following could appear on screen with a flashing resistance value:

R > 99.9 Tohm

(display mode 2)

U=100V T=100

If the voltage of the battery is less than 6,7 volts, the reading in the second row will alternate with:

LOW BATTERY

The battery has to be recharged again but has still enough capacity to finish the actual or next measurement series.

If the power supply is less than 6,1 volts, the following message would appear for approximately 2 seconds before the unit will switch off automatically to prevent a total discharge of the NiCd-battery:

AUTO OFF

LOW BATTERY

5. Specification

| | |
|-------------------------------------|--|
| Housing : | aluminum-housing 150 mm x 150 mm x 88 mm (L x B x H) |
| Weight : | 990 g |
| Display : | alphanumeric display, 2 rows of 16 digits / each , Dimension 100 mm x 24 mm |
| Measurement Range: | 100 Ohm - 19.9 TOhm, Timer is switched off or set to max. 1 minute 100 Ohm - 99.9 TOhm, Timer setting is equal to or greater than 2 minutes accuracy $\pm 5,0\%$ |
| Impedance : | greater than $10^{15} \Omega$ |
| PC-Interface : | serial port, 9-contacts Sub D - socket |
| Battery : | NiCd, 7,2 V / 850 mAh last approximately 6 hours at continuous operation, if battery was fully charged, charging time is max. 14 hours |
| Power Supply : (Battery Charger) | 12 V / 350 mA |
| Current : | battery operating - approximately 120 mA transformer operating - approximately 350 mA |

6. Electrodes

Different electrodes including the needed measurement leads are optionally available:

- **2.27 kg-Electrode-Kit according EOS/ESD S 4.1 and S 7.1**
to measure resistance to ground and point-to-point resistance especially on flooring and work surfaces,
supplied with 2 extra long measurement leads and grounding clip
- **Ring-Electrode according EOS/ESD S 11.11**
to measure volume and surface resistance, 1 shielded and 1 unshielded measurement lead included
- **Other Electrodes are available on request**

Please note:

Please check before each measurement that the object is not powered. Foreign voltage could influence the measurement results.

7. Warranty

We provide 12 month warranty from date of receiving the unit, if the unit was handled properly. The NiCd-battery is excluded from warranty. Warranty is not provided, if the housing was been opened.

8. Safety advice

The TOM 374 is not approved for the use in explosive areas

The TOM 374 is not approved for the use in power utilities

Measurements shall only be taken on non powered objects