Manual

TERA Ohmmeter TOM 610

With USB Interface, Touch-Display and
"Break Down Resistance" Measurement etc.

1. Product Description

Due to its compact design and battery powered operation the TOM 610 is suited for mobile applications in industrial areas. It also can be operated stationary with the provided wall power supply.

The menu-driven TOM 610 is operated by only 2 pushbuttons and its touch display and therefore very user-friendly. All set measurement parameters are shown in the display for a better orientation. The provided PC software enables the user to perform computer driven measurements. The enclosed PC software also allows the TOM 610 to be operated computer-controlled. In addition the measurement data can be administrated and processed.

The TOM 610 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.

As a new world innovation, we measure the „Break-Down" Resistor and Voltage and also the „Break-OFF" – Time if it happens. The measured data including environment parameters, can be stored in an internal memory (up to 200 records). Thereby the measurements are maintained and can be read out later via the USB interface.

As resistance values of some materials depend on air humidity and temperature, these environmental 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:	Graphic Touch Display size: 75 mm x 50 mm	
	Resistance: 1 KΩ~10 TΩ	accuracy ± 5%~± 10%
	Temperature: 0~60 °C	accuracy ± 5%
	Rel. Humidity: 20%~80%r.F.	accuracy ± 3°C
PC interface:	USB interface	
PC software:	Turned-out 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	

The TERA – Ohm Meter TOM 610 calibration accuracy of the selected measure voltage.

Measure Voltage 10V   from 1KΩ until 10GΩ

Measure Voltage 100V   from 1MΩ until 1TΩ

Measure Voltage 500V   from 3MΩ until 5TΩ

Measure Voltage 1000V   from 5MΩ until 10TΩ

Auto Measuring Voltage   10V- from 1KΩ until 1MΩ

                          100V- from 1MΩ until 1TΩ

As long as the selected measuring voltage is not stable, the displayed measured value is highlighted in blue.

When the measured value is displayed without a blue background it is stable !

This can take up to a few seconds with very high resistances.

After switching on it can also take a few seconds until the temperature and humidity are displayed. As long as these are set to zero no operation is possible !

Important Information

Please consider the following advices for reproducible results:

- The contact surface of the measurement electrodes must be kept clean to ensure an optimal contact resistance
- The covering to measure should also be cleaned
- Measurements may only be performed in zero-potential conditions
- 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 the standards

1.2. Legend
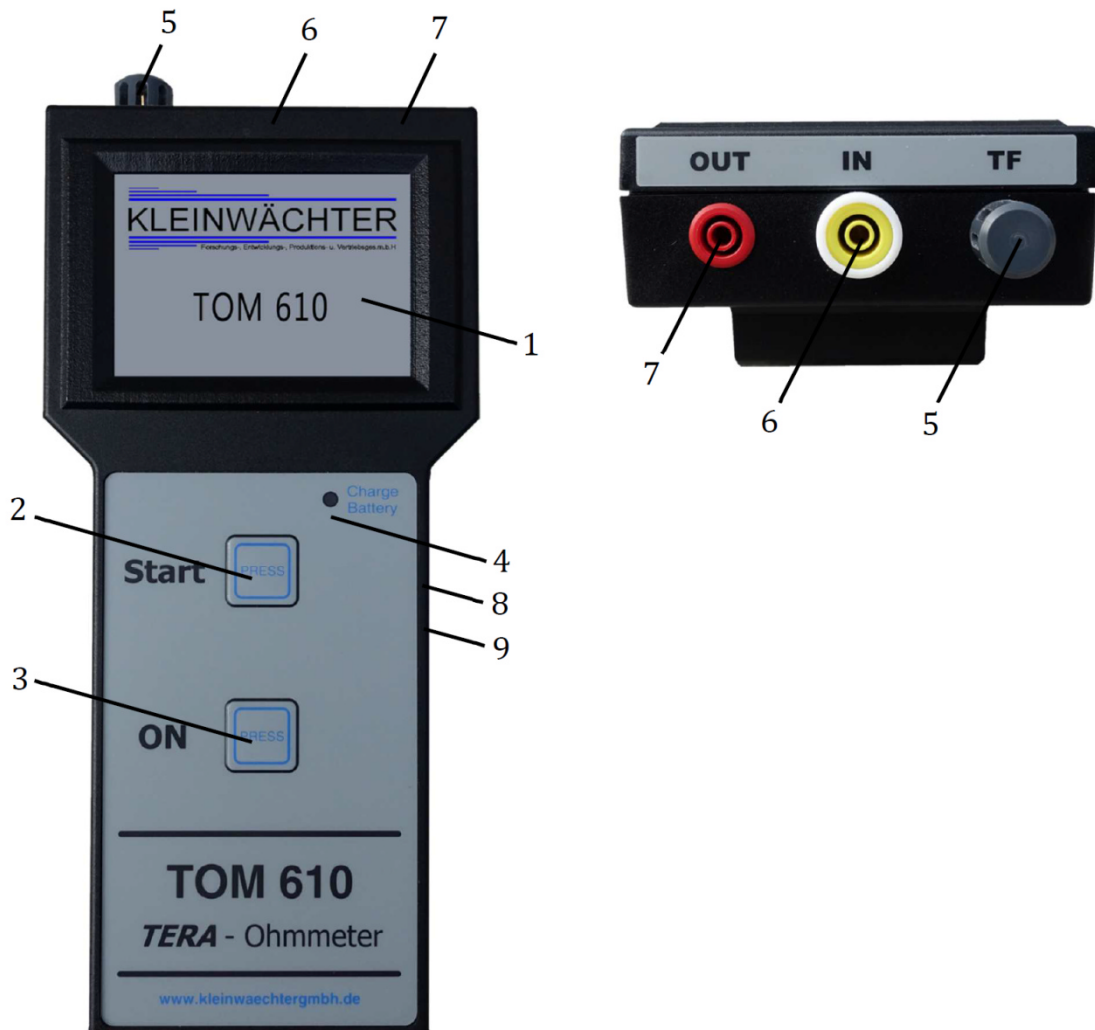
1 LCD – Touch Display

2 Start Button

3 ON Button

4 Battery charge LED

5 Temperature- and humidity sensor

6 Measurement input

7 Measurement Voltage output

8 Power supply connector

9 USB – Interface

2. Manual

2.1. Operation

The TERA Ohmmeter TOM 610 is shipped with 4 AA NiMH rechargeable batteries and is immediately ready to start.
For charging the batteries and for continuous operation only the provided wall power supply may be used.

For start measurements, first connect the electrodes to the appropriate connectors (see legend) and position it on the object to be measured. Afterwards touch button «**Measure»** or «**Measure with timer»** has to be pressed to start the measurement.
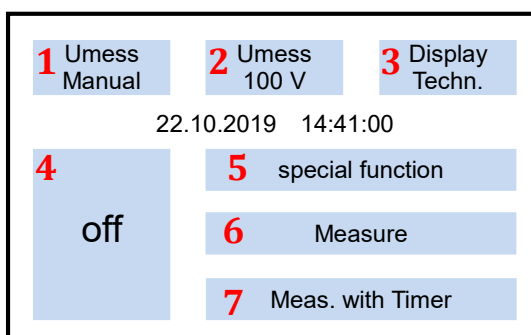
Please pay attention by moving the measure cables or people passing by as it can cause electrostatic induction of the measurement setup.ON
Switch on the unit by touching button **"ON"**

After powering on, the software version is displayed and after 3 seconds it switches to the main menu:

KLEINWÄCHTER

TOM 610
Software Version 1.55
Kleinwächter GmbH

2.2 MAIN MENU

Seven touch fields are available in the main menu:

1 Umess Manual	2 Umess 100 V	3 Display Techn.
22.10.2019 14:41:00		
4	5 special function	
off	6 Measure	
	7 Meas. with Timer	

1   Umess => Manual ↔ Auto ⇨ Selection between automatic and fixed measuring voltage - Field 3 is only active if fixed is selected !

2   Umess => submenu select measuring voltage 2.3 will be open

3   Display Mode Techn. ↔ Expo. ⇨ selection between displaying the Measure Value in technical (235MOhm) or exponential ($2,35 \times 10_8$ Ohm) representation

4   By touching => off => the device switches off.

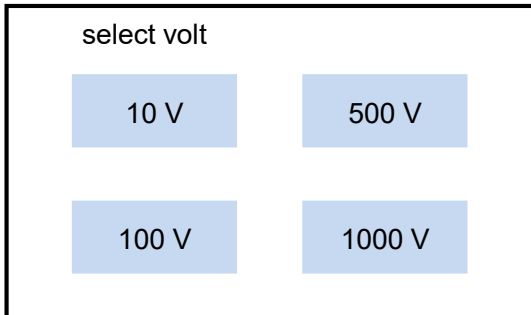5   special function => submenu "special function" 2.4 will be opened.

6   Measure => Start the measurement 2.5 with selected parameters

7   Meas. with Timer => submenu "measuring with timer" 2.6 will be opened.
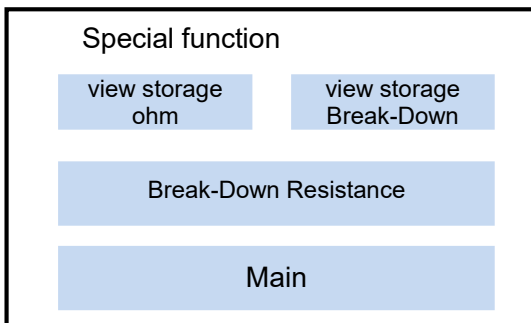
The current date and time will also be displayed.

By pressing the Button "Start" the measuring will start with the selected parameters.

2.3 select measuring voltage

```
 select volt

    10 V           500 V


    100 V          1000 V
```

By touching =>desired Measure Voltage => it will be selected, and switches back to the main menu.

2.4 Special function

```
 Special function

 view storage        view storage
 ohm                 Break-Down

      Break-Down Resistance


             Main
```
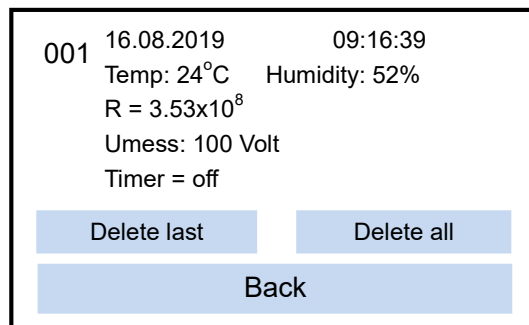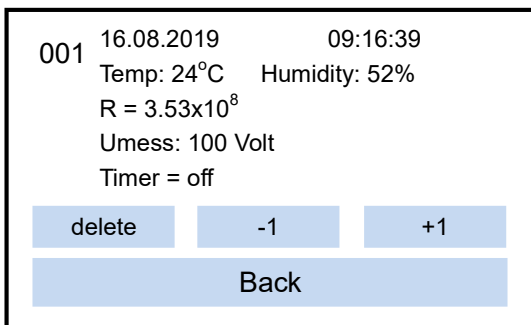
By touching => view storage => submenu storage 2.4.1 will be opened.
By touching => Break down voltage => submenu Break down voltage 2.4.2 will be opened.
By touching => Main => It will switch to the main menu.

2.4.1 view storage

```
 001  16.08.2019        09:16:39
      Temp: 24°C    Humidity: 52%
      R = 3.53x10^8
      Umess: 100 Volt
      Timer = off

   delete       -1        +1
             Back
```

```
 001  16.08.2019        09:16:39
      Temp: 24°C    Humidity: 52%
      R = 3.53x10^8
      Umess: 100 Volt
      Timer = off

   Delete last       Delete all
             Back
```

The saved file number (top left) is displayed and further the saved data.

By touching => -1 or +1 => changes the displayed file number

By touching => delete =>it switches into the delete menu and there you can select "delete last" or "delete all"

By touching => Back => It will switch to menu "special function" 2.4

2.4.2 Break down resistance

Measuring the "Break Down" resistance in dependence of the measuring voltage

Important !! Measuring range 5MOhm up to 200GOhm !! ($5x10^6$ . . . $2x10^{11}$)

Measurement procedure :

• Measure Voltage starts by 10V

• Continued by 100V and then in steps from +50V up to 1.000V.

• The resistance is measured continuously.

• If a Break Down takes place, the resistance value goes down sharply (>50%).

• This voltage value is displayed as BDV (Break Down Voltage)

• The resistance before and after is also displayed.

Break-Down Resistance

Rmess
Umess

t
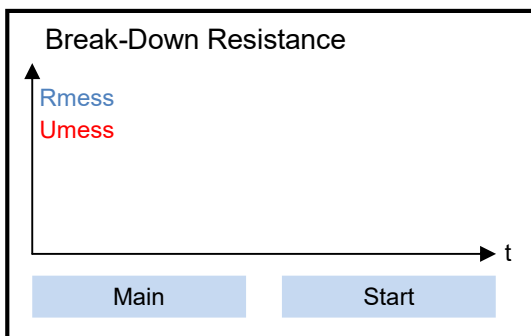
| Main | Start |

By touching => Start => (or by pressing the button Start")
 it starts measuring.

By touching => Main => it will switch back to the main menu.

After "Start" The resistance value and the Measure voltage is displayed. Down right, the time remaining of this voltage step is displayed. (The voltage step time can be selected in the user setup).

Break-Down Resistance

58.7 Mohm
993 V

t

| Main | Start |
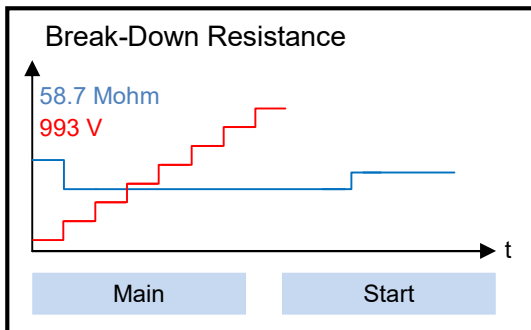
By touching => Stop => the measuring will stop and then it switches back to the start menu.

If the resistance is out of the measuring range an overflow or underflow will be displayed
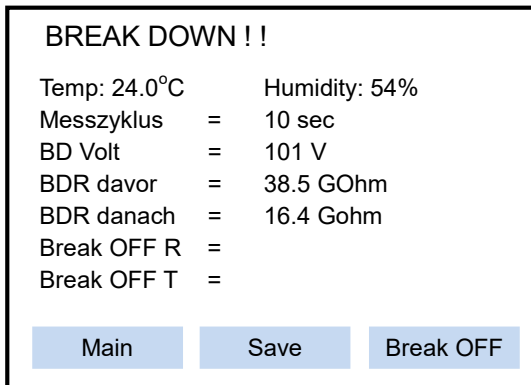
Break-Down Resistance

58.7 Mohm
993 V

no Break-Down

t

| Main | OKt |
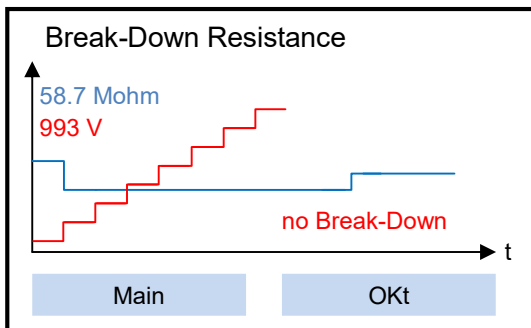
If there was no Break Down up to 1.000V => "no Break-Down" appears.

By touching => Main => It switches to the main menu.

By touching => ok => It switches to "Break Down Resistance" menu 2.4.2

2.4.3 Break down Voltage detected

```
BREAK DOWN ! !

Temp: 24.0°C          Humidity: 54%
Messzyklus      =     10 sec
BD Volt         =     101 V
BDR davor       =     38.5 GOhm
BDR danach      =     16.4 Gohm
Break OFF R     =
Break OFF T     =


    Main          Save        Break OFF
```

The "BREAK DOWN ! !" menu opens automatically after a break-down occurs.

By touching => Main => It switches to the main menu.

By touching => Save => it saves the measured data.

By touching => Break Off => It switches to menu "BOFF Time" 2.4.4

** If no "Break OFF" measurement has taken place => No values will be displayed.
After Break OFF measurement without Break OFF display shows "NO BOFF".

If Break OFF has occurred, the Break OFF resistance value and the Break OFF time are displayed.

2.4.4 Break OFF

```
Break Off Time

   Timer     =    5 sec
   Umess     =    1002 V
   R    =    39.5 GOhm
   Break OFF R   =    39.5 Gohm


                          Back
```
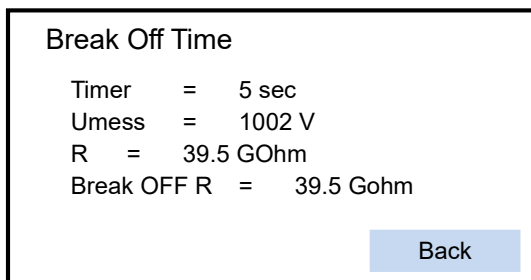
Measuring of the Break Off time (BOFF)

The voltage switches to 1.000 Volt and the timer will start.

If there is a sharp change in resistance value (<50%) this value (before and after) and the timer (BOFF) are displayed.

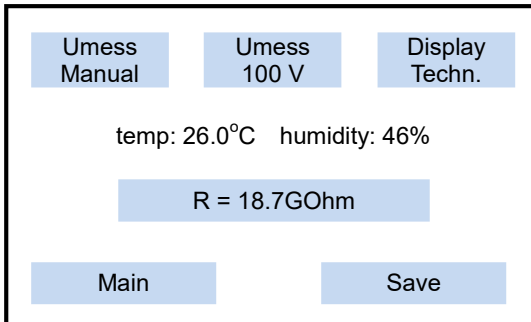Break OFF time can be selected in the user setup.
If the timer counts up to the max. time and no Break off occurs => it displays NO BOFF

By touching => Back => it switches back to menu 2.4.3 with "break OFF R = 0" and "Break OFF T"

If Break Off occurs , the timer stops and displays "Break Off R = xx.x Ohm" (actually value)

By touching => Back => it switches back to menu 2.4.3 with measured values in "break OFF R" and "Break OFF T"

2.5 measure

Umess Manual	Umess 100 V	Display Techn.

temp: 26.0^{o}C　humidity: 46%

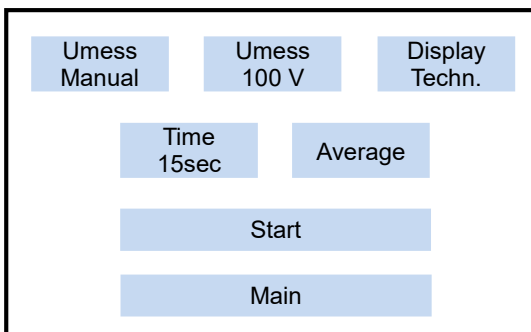R = 18.7GOhm

Main	Save

By touching => Umess / Display => you can select as well in the main menu.

By touching => Main => It switches to the main menu.

By touching => Save => It switches to menu "save measurement" 2.7

2.6 measuring with timer

Umess Manual	Umess 100 V	Display Techn.

Time 15sec	Average

Start

Main

By touching => Umess / Display => you can change it, like in the main menu

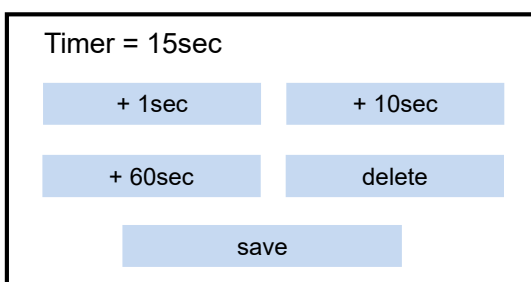By touching => Time => It switches to menu "select timer" 2.6.1

By touching => Lapse / Average => it switches between lapse** and average* mode

By touching => Start => it starts measuring 2.6.2

*Average => Averaging during the measuring time
**Lapse => At the end of the measuring time, the last measured value is displayed.

2.6.1 select timer

Timer = 15sec

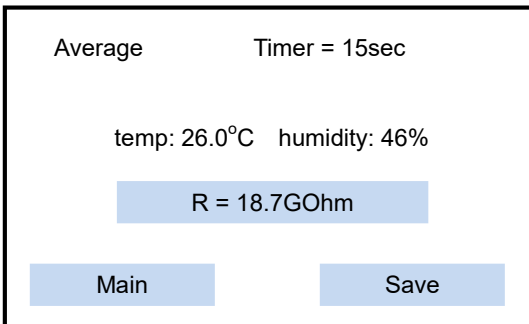| + 1sec	+ 10sec
+ 60sec	delete

save

By touching => delete => sets the timer to zero

By touching => +1 / +10 / +60 => It choses your time

By touching => save => saves the chosen time and goes back to "measuring with timer" menu 2.6

2.6.2 measure with timer started

Average	Timer = 15sec

temp: 26.0°C   humidity: 46%

R = 18.7GOhm

Main	Save

In the first row you see the Measure mode and timer counts down to zero when the measured value is stabile.
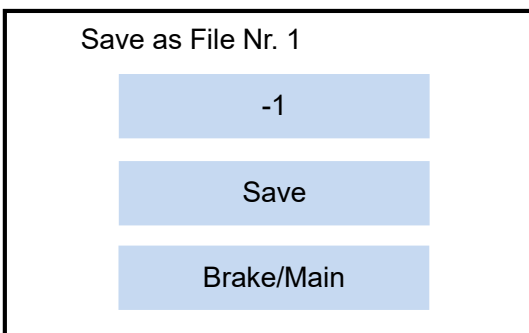In the 2nd row temperature and humidity
In the 3rd row the measure value
By touching => Save => It switches to menu "save measurement" 2.7
By touching => Main => It switches to the main menu.

2.7 save measurement
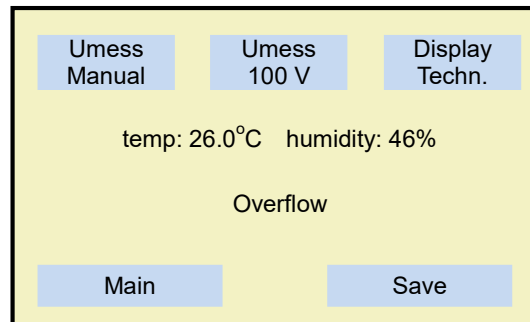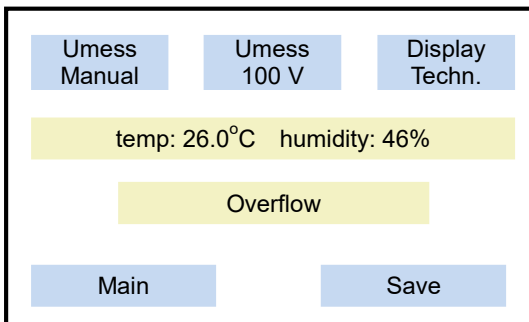
Save as File Nr. 1

-1

Save

Brake/Main

In the first row you see the next file number
By touching = -1 => It goes back to overwrite an old file number
By touching => Save => The measure is saved by the displayed file number in the EEPROM
By touching => brake/Main => It switches to the main menu.

2.8 Battery monitoring

Umess Manual	Umess 100 V	Display Techn.

temp: 26.0°C   humidity: 46%

Overflow

Main	Save

Umess Manual	Umess 100 V	Display Techn.

temp: 26.0°C   humidity: 46%

Overflow

Main	Save

If the battery voltage drops below 4. 4 V, the current values are highlighted. (yellow)

When switching to another menu, the background color also changes. (yellow)

In this case it is absolutely necessary to connect the power plug adapter!

If the battery voltage drops below 4. 0 V , the device is switched off to prevent over discharge of the batteries!

3. User Setup

The user setting can be accessed by pressing the button „Start" while the start screen is displayed !

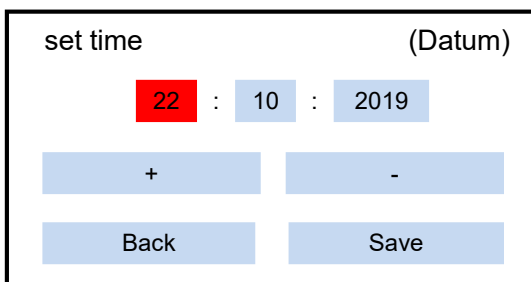| User Setup	
date and time	Break Down T.
Info	Break Off T.
Language	
Back	
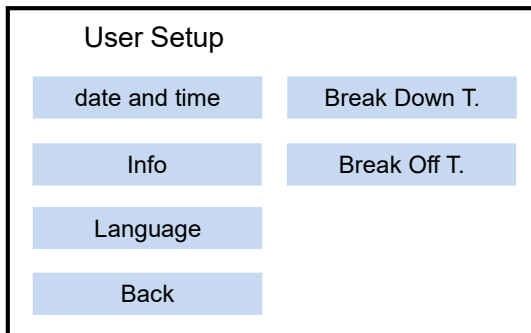
By touching
- Date and time
- Info
- Language
- Break Down T. It switches to the sub-menus
- Break Off T It switches to the sub-menus

By touching => Back => It switches to the main menu.

3.1 date and time

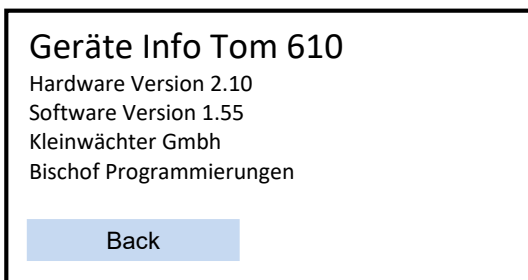| set time	(Datum)
22 : 10 : 2019	
+	-
Back	Save

By touching => + / - => The field highlighted in red can be changed. First the date then the time.

By touching => Save => The data will be saved.

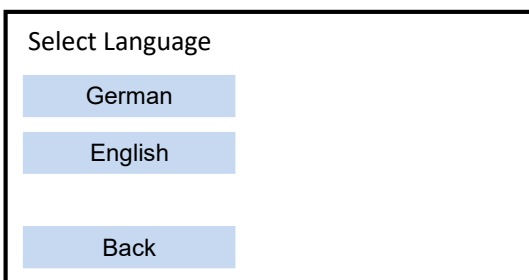By touching => Back => It switches to the User Setup menu.

3.2 Info

Geräte Info Tom 610
Hardware Version 2.10
Software Version 1.55
Kleinwächter Gmbh
Bischof Programmierungen

Back

Information about the hardware and software version.

By touching => Back => It switches to the User Setup menu.

3.3 Select Language

Select Language
German
English

Back

By touching => German / English => It selects the language from the display

By touching => Back => It switches to the User Setup menu.

3.4 Break Down T. / Break OFF T.

It switches to the sub – menu "Select Timer" 2.6.1

It is possible to set step duration time of Break Down measurement or the time for how long the Break OFF voltage is applied.

Break Down Time is the time how long the individual steps last during the Break Down Measurement. (Range 10. . . . 200 seconds)

Break Off Time is the time how long the Break OFF measurement last during.
(Range 10. . . . 999 seconds)

4. PC Operation

4.1. System Requirements

• Intel Pentium CPU or higher
• Free USB Port
• Microsoft Windows XP, Win 7 or WIN10
• Microsoft Excel (To edit the saved files)

4.2. Installation

First install the TOM_ReadOut Software. Start "TOM_ReadOut Setup" (as Administrator) and follow the instructions.

Attach the TOM 610 by using of the provided cable for a USB Port and wait until Windows confirms it. Then turn the device on. Double-click the corresponding desktop icon to start the KL_ReadOut software.

5. 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 otherwise device warranty is void. If the device is not used for long time batteries should be removed. Always store batteries charged.

The recommended factory calibration interval is 1 year.

If necessary, the manufacturer of the device can update the software via the USB interface.

6. Warranty

In case of proper use, we issue warranty within 24 months after shipping. Mechanical damage and the batteries are exempted from the warranty.

Warranty is void when the device is opened !!

7. Security Advices

The TOM 610 is not approved for use in explosive areas. Operation in power plants is not permitted.

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

Do not touch the measure equipment during measurement !
The device must not be operated without rechargeable batteries!
By using non rechargeable batteries, you lost your Warranty !

8. Measuring Electrodes

The 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 61340-2-3
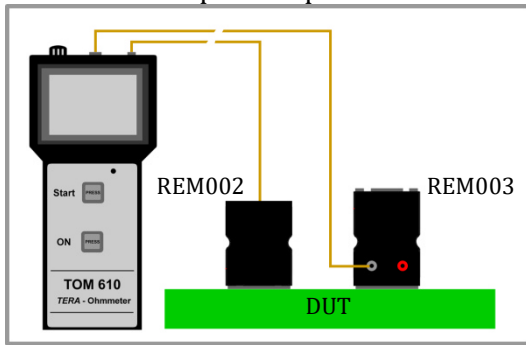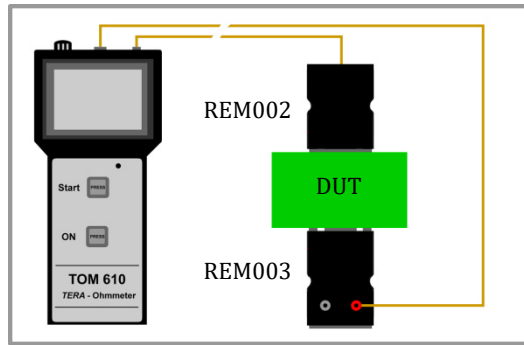DIN IEC 61340-4-1

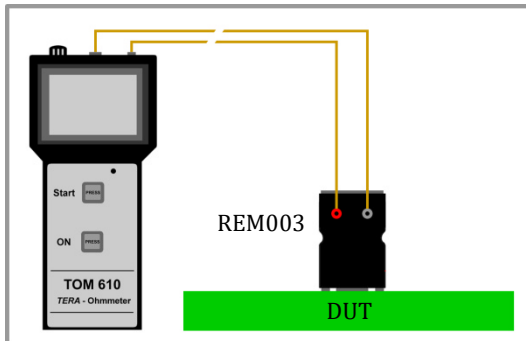REM001 Electrode   REM002 Electrode   REM003 Electrode

Measure point to point resistance

Measure volume resistance

Measure surface resistance

Measure small item
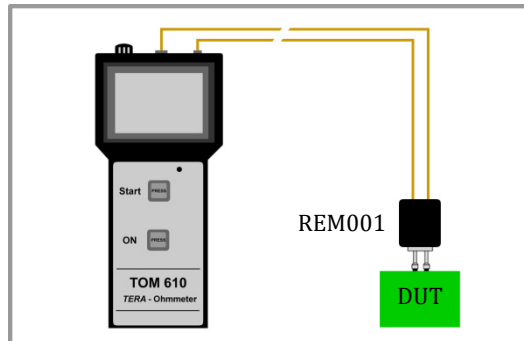
9. Scope of Delivery

TOM-610-TF

1	Tera Ohmmeter TOM610
2	REM002 electrode
2	Teflonized measurement line
1	Power supply 9VDC/500mA
1	USB to USB mini cable
1	USB Stick with PC software
1	Conductive carrying case

TOM-610-SE

1	Tera Ohmmeter TOM610
1	REM002 electrode
1	REM003 electrode
2	Teflonized measurement line
1	Power supply 9VDC/500mA
1	USB to USB mini cable
1	USB Stick with PC software
1	Conductive carrying case

Option: REM001 Electrode