

# **USER MANUAL**

# SONEL MIC MOBILE

app Applies to insulation resistance meters: MIC-15k1 MIC-10s1 • MIC-05s1 MIC-10k1 • MIC-5050 MIC-5010 • MIC-5005



SONEL S.A. Wokulskiego 11 58-100 Świdnica Poland

Version 1.02 03.01.2023

Sonel MIC Mobile is designed for remote readout of measurement results and for control via Bluetooth. Please acquaint yourself with this manual in order to avoid problems in operation of the application.

The manual is updated periodically. The latest version can be downloaded from www.sonel.pl/en.

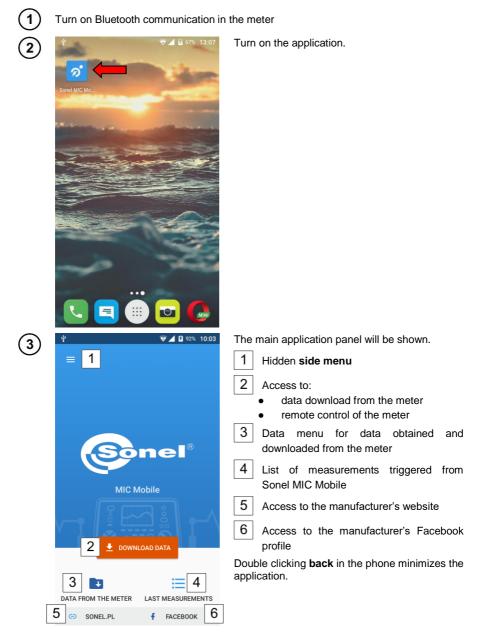
#### CONTENTS

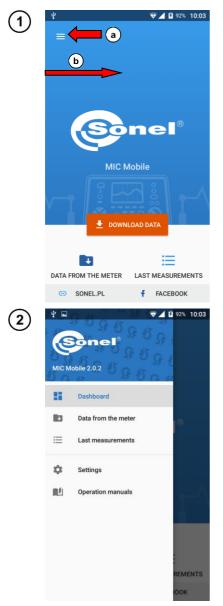
| <ul> <li>2 Side menu</li> <li>3 Remote control of the meter</li> </ul> | 6  |
|--|----|
| 3 Remote control of the meter  | -  |
|  | 10 |
| 4 Downloading data from the meter                                      |    |
| 4.1 Method 1   |    |
| 4.2 Method 2   | 13 |
| 5 Data viewing   | 14 |
| 6 Data management  |    |
| 6.1 Menu "Data from the meter"   |    |
| 6.2 Data selection   |    |
| 6.3 Backup   |    |
| 6.4 Data sharing   |    |
| 6.4.1 Sharing a data set   | 21 |
| 6.4.2 Sharing a single measurement                                     | 22 |
| 6.5 Transferring data between mobile devices                           |    |
| 6.6 Deleting data  | 25 |
| 7 Insulation resistance conversion factors                             | 26 |
| 8 Functionality of the app   | 27 |
| 9 Manufacturer   | 28 |



• The application works with devices operating on Android system in version 5.0 and The application works with devices operating on Android system in version 5.0 and later. Before installing the app, make sure that you have the latest version of the system. Version other than the recommended may cause problems with the use or improper work of the application.
The application requires Bluetooth communication and GPS location to be enabled for proper operation.

# 1 Getting started with the app





# 2 Side menu

On the main screen

(a) select icon = or

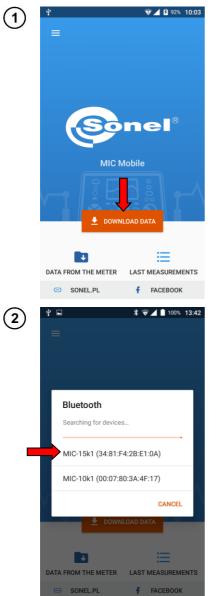
(b) swipe from the left edge of the screen to the right.

The menu with options will be displayed.

- Dashboard return to the main panel.
- Data from the meter menu of data downloaded from the meter.
- Last measurement list of measurements triggered from Sonel MIC Mobile.
- Settings list of related meters and changing their labels and information about the application.
- Operation manuals redirects user to a website for downloading the manual of the meter.

## 3 Remote control of the meter

Connection with the meter depends on the phone's Bluetooth range. Do not move too far with the phone from the mobile device - it may break the connection.



On the main panel of the application, select **Download data.** 

#### Select the meter.



#### Measurement in progress.

5



Selecting items on the top bar of the screen, you may display different waveforms of measured parameters:

- resistance and current as a function of time,
- resistance and measuring voltage as a function of time,
- voltage and current as a function of time,
- current as a function of measuring voltage.

The side panel has the following items:

1 currently set measuring function (position of the meter's knob)

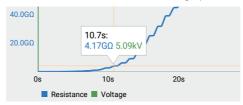
instantaneous values of the measured parameters,

- duration of the measurement,
- 4 meter's battery charge level,

5 interferences on the measured object,

6 icon terminating the measurement.

To display the box with instantaneous values, touch the graph at the selected point.



The graph may be:

2

3

- swiped (with a finger),
- zoomed-in by a double tap,
- scaled (zoom-in / zoom-out) by pitching / spreading two fingers on the screen.

- After the measurement is completed / terminated, an appropriate window is shown. Use it to save the recorded data to the application memory.
- The default data package name contains the type of measurement, date and time it was taken.
- Before saving, you can change the name of the package and add a comment.

| ψ 🖬    | ]                |                |                  |      |                            |      | * マ 🖌 🖪 97%          | 13:22 |
|--------|------------------|----------------|------------------|------|----------------------------|------|----------------------|-------|
|        |                  | R(             | t), <i>U</i> (t) |      | <i>U</i> (t), <i>l</i> (t) |      | /(U)                 |       |
|        |                  | Measure        | ement en         | ded  |                            |      | <sub>ISO</sub> 50150 | 00V   |
|        |                  | RISO_2019      | 90801_13         | 2216 |                            |      | o                    |       |
| 80.0GQ |                  |                |                  |      |                            |      |                      |       |
| 60.0GD | _                | Comment        |                  |      |                            | _    | 0<br>                | 17    |
| 40.0GQ |                  |                |                  |      |                            | ➡    | 0 00.00.             |       |
|        | 10.7s:<br>4.17GΩ |                |                  |      | CANCEL                     | SAVE | HILE U               | DT    |
|        |                  | 7              |                  |      |                            |      |                      |       |
| Os     | s 10s            | 20s<br>Voltage | 30s              | 40s  | 50s                        |      |                      |       |

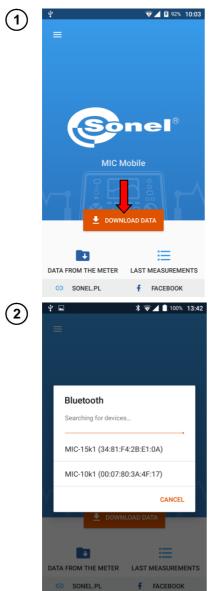


(6)

Saved data is in the location Data from the meter, right tab.

# 4 Downloading data from the meter

#### 4.1 Method 1



- Set the knob of the meter on the position marked as **MEM**.
- On the main panel of the application, select **Download data.**
- If the knob is in a position other than 'MEM', the meter will not be detected.

The menu with available devices will be shown. Select the meter.

| (3)        | গ ৼ 🖬 🕺 🕏 ⊿ 🗎 100% 13:49   |
|------------|--|
| $\smile$   | ≡  |
|            |  |
|            |  |
|            | Downloading data 🚽   |
|            | Estimated download time depends on the<br>amount of data collected in the meter. It<br>can take from 30 seconds to 10 minutes.   |
|            | STOP   |
|            | DOWNLOAD DATA  |
|            |  |
|            | C SONEL.PL <b>f</b> FACEBOOK   |
|            |  |
| $\bigcirc$ | Ŷ <u></u> \$ <b>⊽</b> ▲ 100% 13;50   |
| 4          | ♥ ■ ★ ▲ ■ 100% 13:50     Download data     Create the individual name and scope of     the downloaded data.  |
| 4          | Download data<br>Create the individual name and scope of   |
| 4          | <b>Download data</b><br>Create the individual name and scope of<br>the downloaded data.  |
| 4          | Download data<br>Create the individual name and scope of<br>the downloaded data.<br>Data_MIC_20190801_135000   |
| 4          | Download data<br>Create the individual name and scope of<br>the downloaded data.<br>Data_MIC_20190801_135000<br>Select all   |
| 4          | Download data<br>Create the individual name and scope of<br>the downloaded data.<br>Data_MIC_20190801_135000<br>Select all<br>Select all<br>Klient 1   |
| 4          | Download data<br>Create the individual name and scope of<br>the downloaded data.<br>Data_MIC_20190801_135000<br>Select all<br>Klient 1<br>Klient 2   |
| 4          | Download data<br>Create the individual name and scope of<br>the downloaded data.<br>Data_MIC_20190801_135000<br>Select all<br>Select all<br>Klient 1<br>Klient 2<br>Klient 3                         |
| 4          | Download data<br>Create the individual name and scope of<br>the downloaded data.<br>Data_MIC_20190801_135000<br>Select all<br>Select all<br>Klient 1<br>Klient 2<br>Klient 3<br>Klient 4             |
| 4          | Download data<br>Create the individual name and scope of<br>the downloaded data.<br>Data_MIC_20190801_135000<br>Select all<br>Select all<br>Klient 1<br>Klient 2<br>Klient 3<br>Klient 4<br>Klient 5 |

The application collects information about the data stored in the device.

- Enter a name for the package of downloaded data or leave the default name. Hide the keyboard by pressing 'Back' button in your phone.
- Select data range to be downloaded:
  - $\Rightarrow$  individual clients or
  - $\Rightarrow$  all (Select all).
- Select DOWNLOAD.

| 5 | ଟ ଏ ।<br>≡     | 2  | ≹ 🔻 🛋 🖿 100% 13:50                       |
|---|----------------|--|--|
|   | fr<br>Es<br>an | ownloading da<br>om meter<br>stimated download tir<br>nount of data collect<br>an take from 30 secor | me depends on the<br>ed in the meter. It |
|   | v              |  | STOP                                     |
|   |                |  | DAD DATA                                 |
|   |                |  | LAST MEASUREMENTS                        |
|   | Θ              | SONEL.PL   | FACEBOOK                                 |
|   |                |  |  |
| 6 | <b>₽</b>       |  | * ⊽⊿ ∎ 100% 13:51                        |
| 6 | ÷              | Data from the  | meter Q                                  |
| 6 | ←<br>MIC-1     | 0k1, MIC-5050  | meter Q<br>MIC-15k1                      |
| 6 | ÷              | 0k1, MIC-5050<br>Data_MIC_20190<br>_135000   | MIC-15k1<br>0801 01.08.2019 13:51:24     |
| 6 | ←<br>MIC-1     | 0k1, MIC-5050<br>Data_MIC_20190  | MIC-15k1<br>0801 01.08.2019 13:51:24     |
| 6 | ←<br>MIC-1     | 0k1, MIC-5050<br>Data_MIC_20190<br>_135000   | MIC-15k1<br>0801 01.08.2019 13:51:24     |
| 6 | ←<br>MIC-1     | 0k1, MIC-5050<br>Data_MIC_20190<br>_135000   | MIC-15k1<br>0801 01.08.2019 13:51:24     |
| 6 | ←<br>MIC-1     | 0k1, MIC-5050<br>Data_MIC_20190<br>_135000   | MIC-15k1<br>0801 01.08.2019 13:51:24     |
| 6 | ←<br>MIC-1     | 0k1, MIC-5050<br>Data_MIC_20190<br>_135000   | MIC-15k1<br>0801 01.08.2019 13:51:24     |
| 6 | ←<br>MIC-1     | 0k1, MIC-5050<br>Data_MIC_20190<br>_135000   | MIC-15k1<br>0801 01.08.2019 13:51:24     |
| 6 | ←<br>MIC-1     | 0k1, MIC-5050<br>Data_MIC_20190<br>_135000   | MIC-15k1<br>0801 01.08.2019 13:51:24     |
| 6 | ←<br>MIC-1     | 0k1, MIC-5050<br>Data_MIC_20190<br>_135000   | MIC-15k1<br>0801 01.08.2019 13:51:24     |

The application downloads measurement data from the meter.

Downloaded data are available in the location **Data from the meter, left** tab.

#### 4.2 Method 2



- Set the knob of the meter on the position marked as **MEM**.
- On the main panel of the the application, select **Data from the meter.**
- If the knob is in a position other than 'MEM', the meter will not be detected.

Select

- Select Download data.
- Follow as described in **Sec. 4.1** steps (2)(3)(4)(5)(6).

| $\bigcirc$ | =  |  |
|------------|--|--|
|            | —  |  |
|            |  |  |
|            |  |  |
|            |  |  |
|            | <b>Senel</b> <sup>8</sup>  |  |
|            | MIC Mobile   |  |
|            |  |  |
|            |  |  |
|            |  |  |
|            | DATA FROM THE METER LAST MEASUREMENTS  |  |
|            | C SONEL.PL FACEBOOK  |  |
| $\bigcirc$ | 받 🖬 🔰 🕏 ⊿ 🗎 100% 13:57   |  |
|            | $\leftarrow$ Data from the meter Q   |  |
|            | MIC-10k1, MIC-5050 MIC-15k1  |  |
|            | Data_MIC_20190801 01.08.2019 13:56:52<br>_135630<br>1 client 1 object 0 measurements |  |
|            | Data MIC 20190801 01 08 2019 13:51:24  |  |
|            | 2 _135000<br>3 clients 4 objects 11 measurements                                     |  |
|            | 3 clients 4 objects 11 measurements  |  |
|            |  |  |
|            |  |  |
|            |  |  |
|            |  |  |
|            |  |  |
|            |  |  |
|            |  |  |
|            |  |  |

# 5 Data viewing

Select Data from the meter.

- Select data source.
- Select desired data.
- Each data set in the **left** tab has a hierarchical structure.

Customers <sup>L</sup> Objects <sup>L</sup> Measurements

|           | \$ ⊽⊿ 🗎                               | 100% | 13:57 |
|-----------|---------------------------------------|------|-------|
|           | a_MIC_20190801_13                     | r    | Ŧ     |
| a_N       | IIC_20190801_135000                   |      |       |
|           | Klient 1<br>2 objects 11 measurements |      |       |
|           | Klient 2<br>1 object 0 measurements   |      |       |
| $\langle$ | Klient 3<br>1 object 0 measurements   |      |       |
|           |                                       |      |       |
|           |                                       |      |       |
|           |                                       |      |       |
|           |                                       |      |       |
|           |                                       |      |       |

The measurement screen shows values measured.

(4)

Swipe the slider of  $k_{20}$  parameter to activate the temperature correction of the measurement. You can set the temperature at which the measurement was conducted, and the type of tested insulation. Using this, the resistance is converted to the value that would be measured at 20°C. See also **sec. 7**.

| × ×                                    | 🕏 🔟 📋 100% 13:58             | 4 🖬    |                                      | * マ 🔟 📋 100% 1           |
|--|------------------------------|--------|--------------------------------------|--------------------------|
| ← R <sub>ISO</sub><br>09.06.2016 13:09 | <                            | ÷      | R <sub>ISO</sub><br>09.06.2016 13:09 |                          |
| 20190801_135000 > Klient               | 1 → Obiekt → <b>Untitled</b> | C_2019 | 90801_135000 › Klien                 | t 1→ Obiekt→ <b>Unti</b> |
| R <sub>ISO</sub> 8.56TΩ                | 2                            | R      | SOk20 12.0T                          | 2                        |
| Temperature factor k <sub>20</sub>     |                              |        | nperature factor k <sub>20</sub>     | of insulation            |
| U <sub>ISO</sub> 10513V I <sub>L</sub> | 1.23nA                       | 25     | i °C ▼ oil                           | -immer 🔻                 |
| C <1nF U <sub>N</sub>                  |                              | ► U    | 513V I <sub>I</sub>                  | 1.23nA                   |
|  | MORE                         | С      | <1nF ∪                               | N                        |
| Attachments                            |                              | 1 3    | 23456                                | 789                      |
| Note                                   |                              | @ #    | #£_&-                                | + ( )                    |
|  |                              | =\<    | * " ' :                              | ; ! ? <                  |
|  |                              | ABC    | 12<br>, 34                           |                          |

Sonel MIC Mobile – USER MANUAL



(5)

(6)

In Note field, you can enter a note. Hide the keyboard by pressing  ${\bf 'Back'}$  button in your phone.

| 2 🖻 |                  |                          | * *     | 7 🖌 🗎 1 | 00% 13:58  |
|-----|------------------|--------------------------|---------|---------|------------|
| ÷   | R <sub>ISO</sub> |                          |         |         | <          |
| 201 |                  |                          |         |         | > Untitled |
|     |                  |                          |         |         |            |
| R   | ISO              | 8.56                     | 5ΤΩ     |         |            |
| Te  | emperatur        | e factor k <sub>20</sub> |         |         |            |
|     |                  |                          |         |         |            |
| U   | ISO              | 10513V                   | ΙL      | 1.      | .23nA      |
| С   |                  | <1nF                     | $U_{N}$ |         |            |
|     |                  |                          |         |         |            |
|     |                  |                          |         | ▶ ►     | IORE       |
| ta  | chments          |                          |         |         |            |
|     |                  |                          |         |         |            |
| Not | te               |                          |         |         |            |
|     |                  |                          |         |         |            |
|     |                  |                          |         | (       | +          |
|     |                  |                          |         |         | -          |

Select icon 🔁 to display menu for adding a voice note or image to the measurement.

| ' 🖬 🛛 🕷 🗣 🖌                            | 100% 13:58       | ¥ 🖬              |                              | * 🗟 🖌          | 📋 100% ·              |
|--|------------------|------------------|------------------------------|----------------|-----------------------|
| R <sub>ISO</sub><br>09.06.2016 13:09   | <                |                  | <b>so</b><br>9.06.2016 13:0  |                |                       |
| 0190801_135000 > Klient 1 > Ob         | piekt > Untitled | 0_2019080        | 1_135000 > K                 | Klient 1→ Obi  | ekt⇒ <mark>Unt</mark> |
| R <sub>ISO</sub> 8.56TΩ                |                  | R <sub>ISO</sub> | 8.5                          | 6ТО            |                       |
| Temperature factor k <sub>20</sub>     |                  |                  | ature factor k <sub>20</sub> |                |                       |
| U <sub>ISO</sub> 10513V I <sub>L</sub> | 1.23nA           | U <sub>ISO</sub> | 10513V                       | IL.            | 1.23n                 |
| C <1nF U <sub>N</sub>                  | -                | С                | <1nF                         | U <sub>N</sub> | -                     |
|  | MORE             |                  |                              |                | MORE                  |
| ttachments                             |                  | Attachmer        | nts                          |                |                       |
| lote                                   |                  | Note             |                              | Voice note     | Q                     |
|  |                  |                  |                              | Photo          |                       |
|  |                  |                  |                              |                |                       |
| · · · · · · · · · · · · · · · · · · ·  |                  |                  |                              |                | ×                     |

Sonel MIC Mobile – USER MANUAL

## 6 Data management

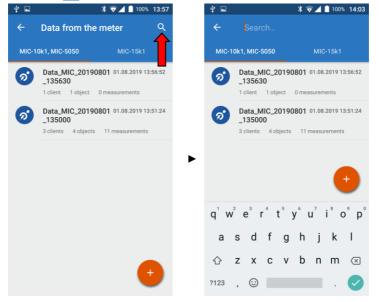
#### 6.1 Menu "Data from the meter"



Select **Data from the meter**, and then the data source.



Select icon Q to open a dynamic search of stored data.



| ¥ 🖬 | * ⊽  | <b>1</b> 100% <b>13:57</b> |
|-----|--|----------------------------|
| ÷   | a_MIC_201908                               |                            |
|     |  | lient 1→ Obiekt            |
| Ø   | R <sub>ISO</sub> - AutoISO-5000 5-<br>wire | 15.03.2018 16:02           |
| Ø   | R <sub>ISO</sub>                           | 09.06.2016 09:55           |
| Ø   | R <sub>ISO</sub>                           | 09.06.2016 09:56           |
| Ø   | R <sub>ISO</sub>                           | 09.06.2016 12:46           |
| Ø   | R <sub>ISO</sub>                           | 09.06.2016 12:52           |
| Ø   | R <sub>ISO</sub>                           | 09.06.2016 12:58           |
| Ø   | R <sub>ISO</sub>                           | 09.06.2016 13:09           |
|     | Rien                                       | 09.06.2016 13:19           |

You can filter the data. To do this, display filter list:

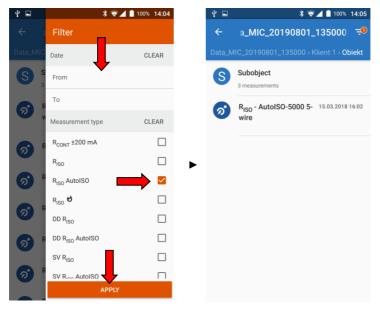
a) select icon 🚍 or

b swipe from the right edge of the screen to the left.

• Here you can set:

(3)

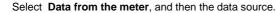
- $\Rightarrow$  date range of the measurements,
- $\Rightarrow$  type of measured parameters.
- The filters may be cleared by selecting CLEAR.
- After choosing filter(s), select APPLY.

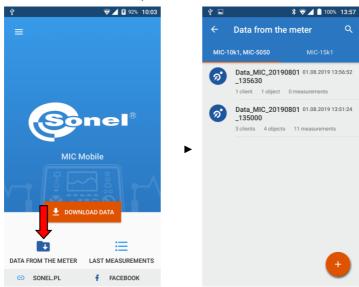


#### 6.2 Data selection

1

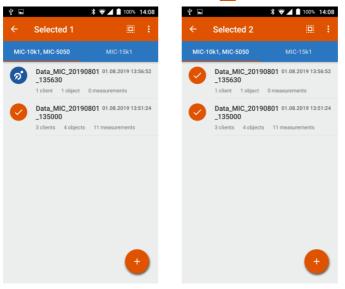
2



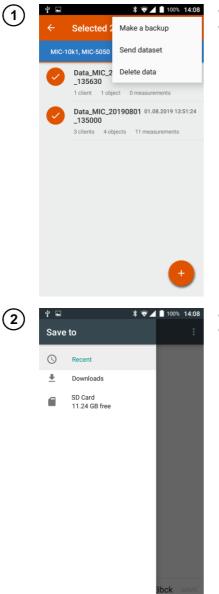


Tap and hold the item with data you want to backup.

- $\Rightarrow$  If you want to choose more items, just check them.
- $\Rightarrow$  If you want to select all, select icon



### 6.3 Backup

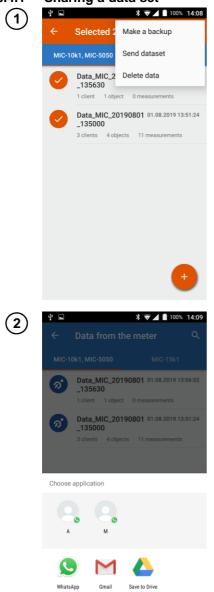


- Select desired items.
- Use icon to expand the control menu and select Make a backup.

- Select location to save the backup.
- The file will be saved in \*.s3bck format.

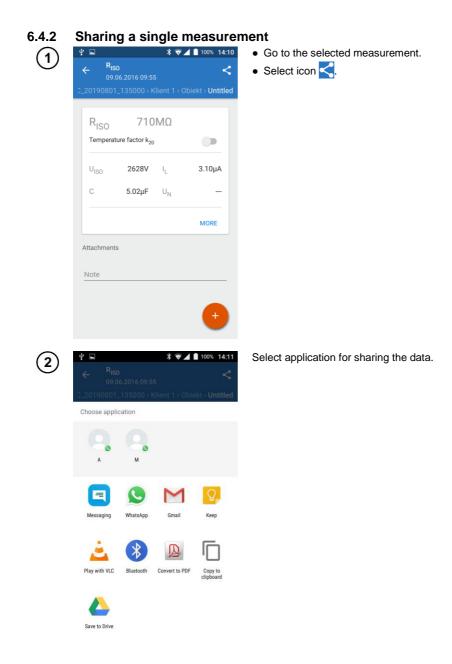
#### 6.4 Data sharing

#### 6.4.1 Sharing a data set



- Select the items you want to share.
- Use icon to expand the control menu and select **Send dataset**.

- Select application for sharing the data.
- The data will be sent.





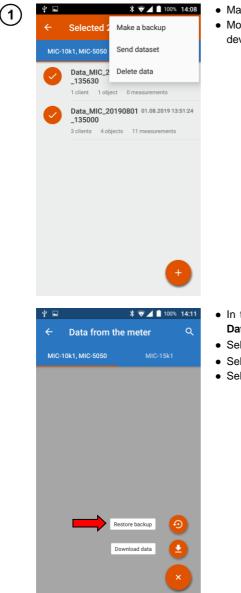
The data will be sent as text (results from the **left** tab) or in the \*.csv format (results from the **right** tab).

| RISO  | PI       | us 😗 🚥       |                             |                        | 21 *                   | n al | 100% | 14: |
|---|----------|--------------|-----------------------------|------------------------|------------------------|------|------|-----|
| Data_MIC_20190801_135000 > Klient 1 > Obiekt > Untitled |          | ×            |                             |                        | 5                      | 2    | +•   | ;   |
| Main result RISO: 710MΩ                                 |          | A            | 0                           | c                      | D                      | £    |      |     |
| UISO: 2628V   |          | t (ms)       | I [A]                       | U [V]                  | R [4:]                 |      |      |     |
|   | 2        | 0            | 7.25E-04<br>9.02E-04        | 1794.7574<br>2093.3193 | 2.35E+07<br>2634402.5  |      |      |     |
| IL: 3.10µ.А.  | 4        | 0            | 0.0010509356                | 2003.3103<br>2339.5894 | 2034402.5              |      |      |     |
| C: 5.02µF   | 5        | 0            | 0.001104359                 | 2427.6948              | 2237054.5              |      |      |     |
| UN:   | 6        | 0            | 0.0011484211                | 2500.202               | 2198451.2              |      |      |     |
| Rt1:  |          | 0            | 0.0011642312 0.0011773878   | 2526.3276<br>2547.916  | 2198451.2<br>2171390.5 |      |      |     |
| Rt2:  |          | 0            | 0.0011792997                | 2555.9421              | 2171390.5              |      |      |     |
|   | 10       | 507          | 0.0011810018                | 2582.6177              | 2106327.5              |      |      |     |
| Rt3:  | 11<br>12 | 1064         | 0.0011822605                | 2565.2717<br>2567.6797 | 2166327.5              |      |      |     |
| FC: 3563s   | 13       | 2229         | 0.001189986                 | 2568.9426              | 2169267.5              |      |      |     |
| P   | 54       | 2785         | 0.0011907378                | 2570.1155              | 2160013.5              |      |      |     |
| L: >10000m  | 15       | 3343<br>3900 | 0.0011910105                | 2570.5806<br>2571.3286 | 2160013.5              |      |      |     |
|   | .17      | 4458         | 0.0011916152                | 2571.653               | 2156221.8              |      |      |     |
| Jn: 2500V   | 18       | 5064         | 0.0011918999                | 2572.125               | 2155221.8              | 1    |      |     |
| Ab1:  | 10       | 5620         | 0.0011920516                | 2572.3823              | 2158063                |      |      |     |
| 4b2:  | 20       | 6228 6785    | 0.0011921907<br>0.001192315 | 2572.6257<br>2572.8562 | 2158063                |      |      |     |
| DAR:  | 22       | 7342         | 0.0011921787                | 2573.0522              | 2157887                |      |      |     |
|   | 23       | 7899         | 0.0011922645                | 2573.243               | 2158062                |      |      |     |
| 'I:   | 24<br>25 | 8507         | 0.00119239                  | 2573.2827<br>2573.4512 | 2158062 2158170.5      |      |      |     |
| n: 17s  | 26       | 9008         | 0.0011925376                | 2573.5671              | 2158170.5              |      |      |     |
| Voise! NO   | 27       | 10223        | 0.0011925953                | 2573.6265              | 2158145.5              |      |      |     |
| imit NO   | 28       | 10781        | 0.0011926279 0.0011926747   | 2573.894<br>2573.7961  | 2158145.5<br>2158071   |      |      |     |
|   | 30       | 11942        | 0.0011920543                | 2573.9314              | 2158071                |      |      |     |
| λA: 0kΩ   | 31       | 12497        | 0.0011926854                | 2574.0046              | 2158088.5              |      |      |     |
| imit I: NO  | 32       | 13053        | 0.0011927527                | 2573.9546              | 2158088.5              |      |      |     |
| lest result:  | 34       | 13001        | 0.0011927998                | 2574.0168<br>2574.177  | 2158117.5              |      |      |     |
| file: NO  | 35       | 14775        | 0.0011929809                | 2574.2517              | 2158018.8              |      |      |     |
|   | 36       | 15333        | 0.0011929958                | 2574.239               | 2158018.8              |      |      |     |
| AC/DC: DC   | 37       | 15940        | 0.0011930394 0.0011930482   | 2574.4214<br>2574.3716 | 2157881<br>2157881     |      |      |     |
| CX: 200nF   | 39       | 17055        | 0.0011930857                | 2574.4324              | 2157845.5              |      |      |     |
|   | 40       | 17612        | 0.0011931437                | 2574.4214              | 2157845.5              |      |      |     |
|   | 41 42    | 18218        | 0.0011931108 0.0011932217   | 2574.5525<br>2574.4505 | 2157749                |      |      |     |
| -   | 42       | 18/74        | 0.0011932217                | 2574.4805              | 2157752.8              |      |      |     |
| Sonel MIC Mobile   created by RST Software Masters      |          | ≣ si         | heet1 🖣                     |                        | С                      |      | ]    | +   |

Results from the left tab

Results from the right tab

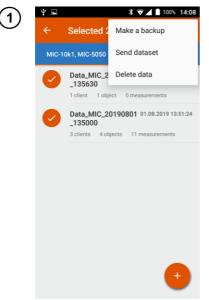
### 6.5 Transferring data between mobile devices



- Make a backup as described in Sec. 6.3.
- Move the backup file to the target mobile device.

- In the application on the target device, go to **Data from the meter** menu
- Select —.
- Select Restore backup.
- Select the backup file.

# 6.6 Deleting data



- Mark the data to be deleted.
- Use icon to expand management menu.
- Select Delete data.

# 7 Insulation resistance conversion factors

Converting the  $R_{\rm ISO}$  measurement value to resistance value at reference temperature acc. to ANSI/NETA ATS-2009 standard.

| Temperature |     | Correction factor K     |                  |
|-------------|-----|-------------------------|------------------|
| °C          | °F  | Oil immersed insulation | Solid insulation |
| -10         | 14  | 0.125                   | 0.25             |
| -5          | 23  | 0.180                   | 0.32             |
| 0           | 32  | 0.25                    | 0.40             |
| 5           | 41  | 0.36                    | 0.50             |
| 10          | 50  | 0.50                    | 0.63             |
| 15          | 59  | 0.75                    | 0.81             |
| 20          | 68  | 1.00                    | 1.00             |
| 25          | 77  | 1.40                    | 1.25             |
| 30          | 86  | 1.98                    | 1.58             |
| 35          | 95  | 2.80                    | 2.00             |
| 40          | 104 | 3.95                    | 2.50             |
| 45          | 113 | 5.60                    | 3.15             |
| 50          | 122 | 7.85                    | 3.98             |
| 55          | 131 | 11.20                   | 5.00             |
| 60          | 140 | 15.85                   | 6.30             |
| 65          | 149 | 22.40                   | 7.90             |
| 70          | 158 | 31.75                   | 10.00            |
| 75          | 167 | 44.70                   | 12.60            |
| 80          | 176 | 63.50                   | 15.80            |
| 85          | 185 | 89.789                  | 20.00            |
| 90          | 194 | 127.00                  | 25.20            |
| 95          | 203 | 180.00                  | 31.60            |
| 100         | 212 | 254.00                  | 40.00            |
| 105         | 221 | 359.15                  | 50.40            |
| 110         | 230 | 509.00                  | 63.20            |

 $R_{ISOcor} = R_{ISO} * K$ 

where:  $R_{ISO}$  – measured resistance  $R_{ISOcor}$  – resistance corrected to 20°C

# 8 Functionality of the app

The functionality of the application varies depending on the version of the meter with which the connection is established.

| Meter    | Hardware and firmware version of the meter | Downloading<br>measurement results<br>from the meter's non-<br>volatile memory | Remote control |
|----------|--|--|----------------|
| MIC-5005 | HW B                                       | $\checkmark$   |                |
| MIC-5005 | HW B, firmware from v1.30 onwards          |  | $\checkmark$   |
| MIC-5010 | HW D                                       |  |                |
| MIC-5010 | HW D, firmware from v1.30 onwards          |  | $\checkmark$   |
| MIC-5050 | HW A                                       | $\checkmark$   |                |
| MIC-5050 | HW B                                       | $\checkmark$   |                |
| MIC-5050 | HW C, firmware below v1.46Ca               | $\checkmark$   |                |
| MIC-5050 | HW C, firmware from v1.46Ca onwards        | $\checkmark$   | $\checkmark$   |
| MIC-10k1 | HW A                                       |  |                |
| MIC-10k1 | HW B                                       |  |                |
| MIC-10k1 | HW C, firmware below v1.43Ca               |  |                |
| MIC-10k1 | HW C, firmware from v1.43Ca onwards        |  | $\checkmark$   |
| MIC-05s1 | HW A                                       | $\checkmark$   |                |
| MIC-05s1 | HW B                                       | $\checkmark$   |                |
| MIC-10s1 | HW A                                       | $\checkmark$   |                |
| MIC-10s1 | HW B                                       | $\checkmark$   |                |
| MIC-15k1 | HW A                                       | $\checkmark$   | $\checkmark$   |
| MIC-15k1 | HW B                                       | $\checkmark$   | $\checkmark$   |
| MIC-15k1 | HW C                                       | $\checkmark$   | $\checkmark$   |
|          |  |  |                |

## 9 Manufacturer

The manufacturer of the software and provider of guarantee and post-guarantee services:

SONEL S.A. Wokulskiego 11 58-100 Świdnica Poland tel. +48 74 858 38 60 fax +48 74 858 38 09 E-mail: <u>export@sonel.pl</u> Web page: <u>www.sonel.pl</u>