



## **USER MANUAL**

### **SONEL MIC MOBILE**

**software**

**Applies to insulation resistance meters:**

**MIC-15k1**

**MIC-10s1**

**MIC-10k1**

**MIC-05s1**

**MIC-5050**



**SONEL S.A.  
Wokulskiego 11  
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Sonel MIC Mobile is designed for remote readout of measurement results (MIC-15k1, MIC-10s1, MIC-10k1, MIC-05s1, MIC-5050) and for control (MIC-15k1) 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](http://www.sonel.pl/en).

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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.

# 1 Getting started with the application

① Turn on Bluetooth communication in the meter

②



Turn on the application.

③



The main application panel will be shown.

①

Hidden **side menu**

②

Access to:

- data download from the meter (only MIC-10s1, MIC-10k1, MIC-05s1, MIC-5050)
- remote control of the meter (only MIC-15k1)

③

Data menu:

- for data obtained and downloaded from meters MIC-10k1, MIC-5050
- obtained with MIC-15k1 meter

④

List of measurements triggered from Sonel MIC Mobile

⑤

Access to **www.sonel.pl**

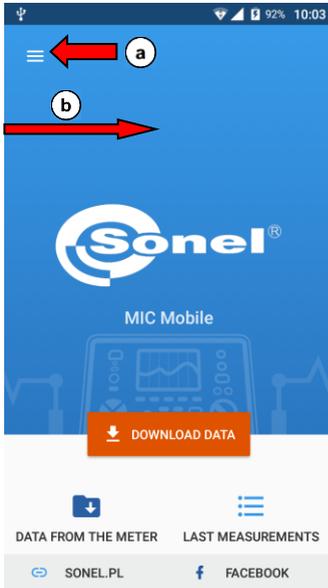
⑥

Access to Facebook profile of SONEL S.A.

Double clicking **back** in the phone minimizes the application.

## 2 Side menu

1

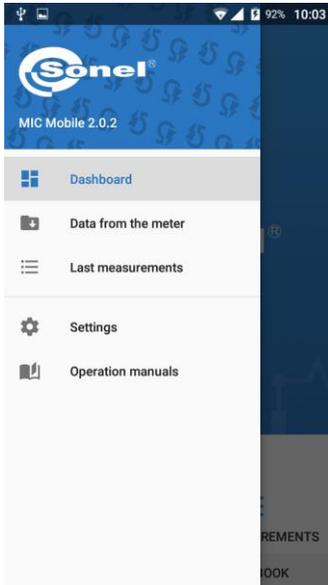


On the main screen

(a) select icon  or

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

2



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



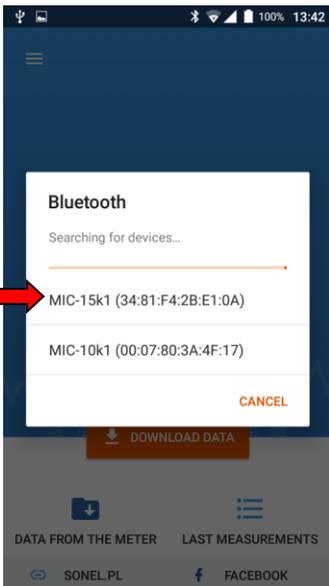
- Remote control applies only to MIC-15k1 meter.
- Connection with the meter depends on the phone's Bluetooth range. Do not move too far with the phone from the mobile device - it may break the connection.

1



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

2

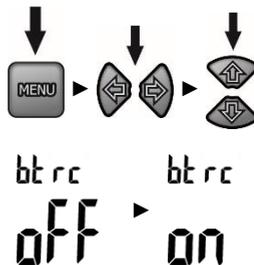


Select **MIC-15k1** meter.

3



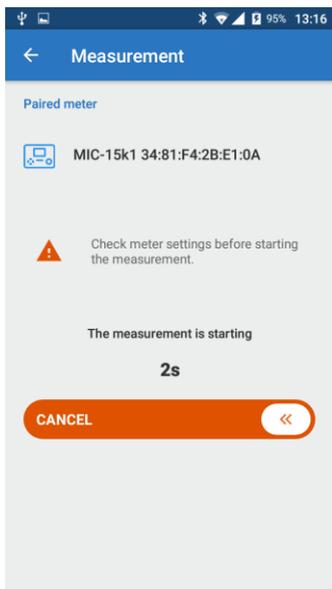
- The screen for remote triggering of measurement will be shown.
- Prepare the meter as described in its manual:
  - ⇒ turn ON the Bluetooth function,
  - ⇒ enter measurement settings,
  - ⇒ turn ON the remote control.



- Swipe icon  to start the measurement.
- If the remote control is inactive, the following message will be displayed.

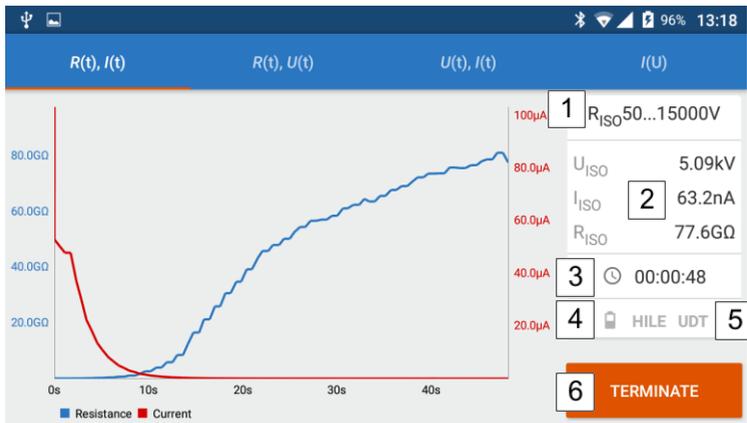
Remote control blocked or incorrect measuring conditions.

4



- The measurement is preceded by a 5-second countdown, indicated by the meter with beeps.
- During the countdown, the meter does not generate voltage.
- During the countdown, the measurement may be cancelled by swiping left the following icon .

5 Measurement in progress.



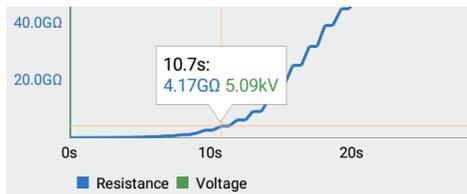
Selecting items on the top bar of the screen, you may display different waveforms of measured parameters:

- 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)
- 2 instantaneous values of the measured parameters,
- 3 duration of the measurement,
- 4 meter's battery charge level,
- 5 interferences on the measured object,
- 6 icon terminating the measurement.

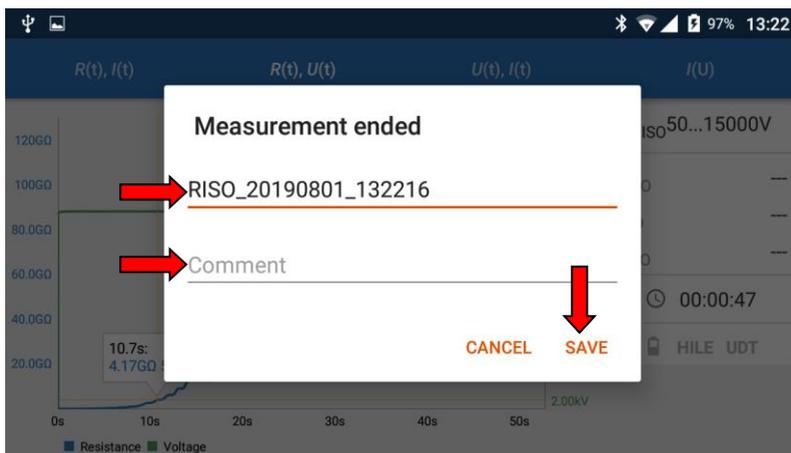
To display the box with instantaneous values, touch the graph at the selected point.



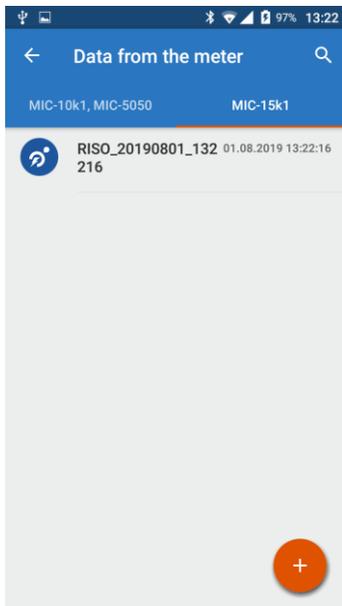
The graph may be:

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

- 6
- 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.



7



Saved data is in the following location  
**Data from the meter ► MIC-15k1.**

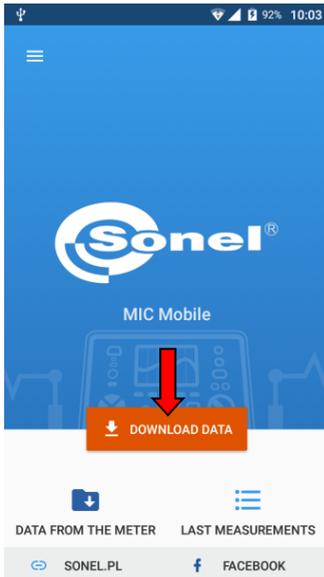
## 4 Downloading data from the meter



You can download data only from the following meters: MIC-10s1, MIC-10k1, MIC-05s1 and MIC-5050.

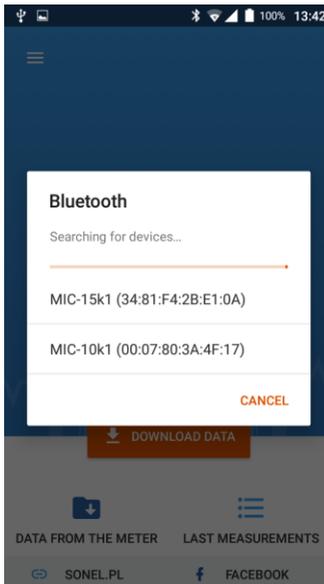
### 4.1 Method 1

1



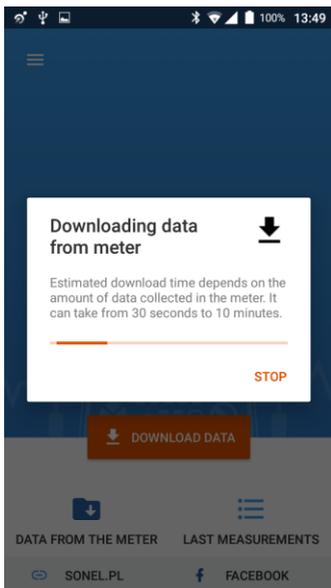
- Set the knob of the meter on the position marked as **MEM**.
- On the main panel of the application, select **Download data**.
- If the knob is in a position other than 'MEM', the meter will not be detected.

2



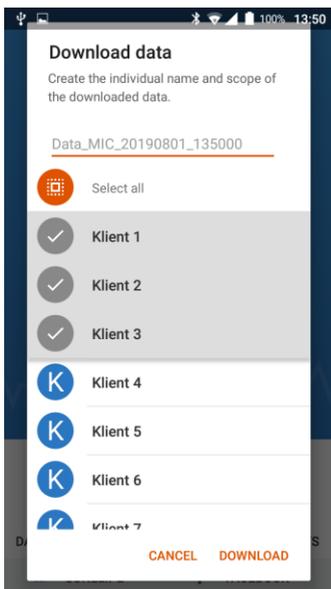
The menu with available devices will be shown. Select meter MIC-10s1, MIC-10k1, MIC-05s1 or MIC-5050.

3



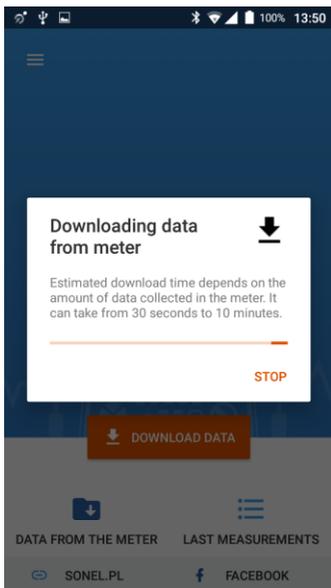
The application collects information about the data stored in the device.

4



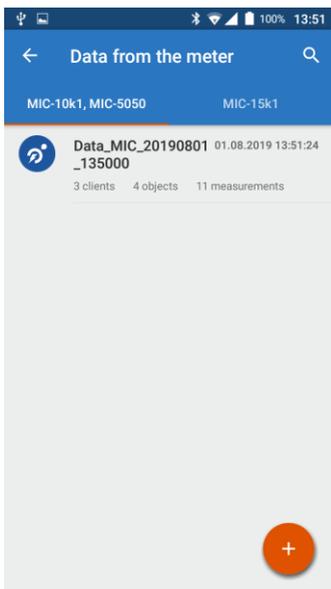
- Enter a name for the package of downloaded data or leave the default name. Hide the keyboard by pressing '**Back**' button in your phone.
- Select data range to be downloaded:
  - ⇒ individual clients or
  - ⇒ all (**Select all**).
- Select **DOWNLOAD**.

5



The application downloads measurement data from the meter.

6



Downloaded data are available in the following location **Data from the meter ► MIC-10k1, MIC-5050.**

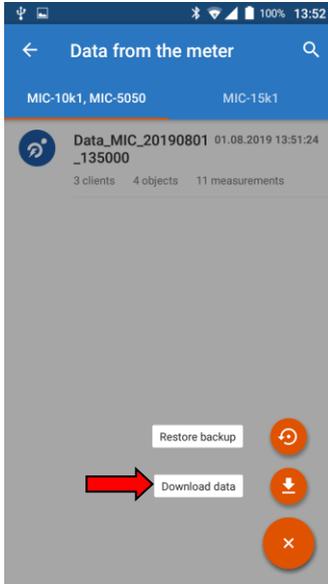
## 4.2 Method 2

1



- 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.

2



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

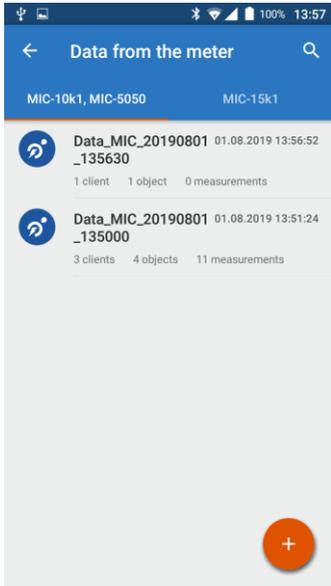
## 5 Data viewing

1



Select **Data from the meter**.

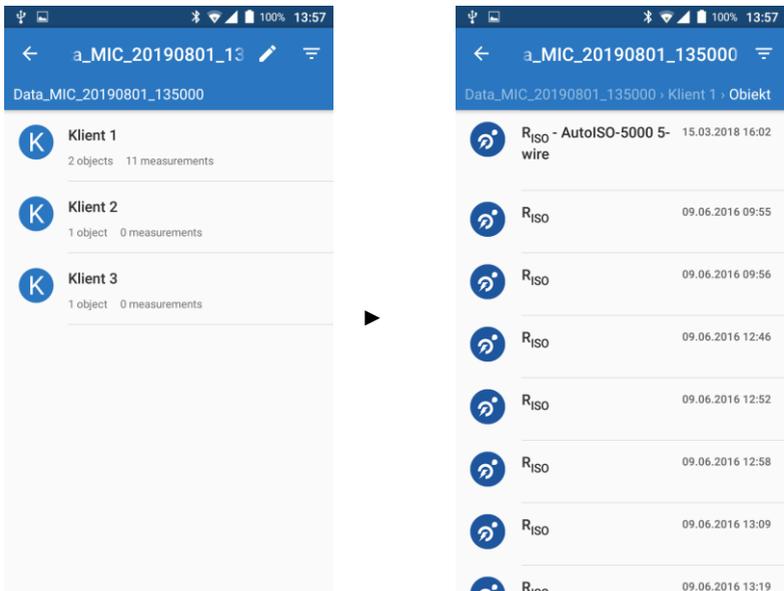
2



- Select data source.
- Select desired data.
- Each data set in tab **MIC-10k1, MIC-5050** has a hierarchical structure.

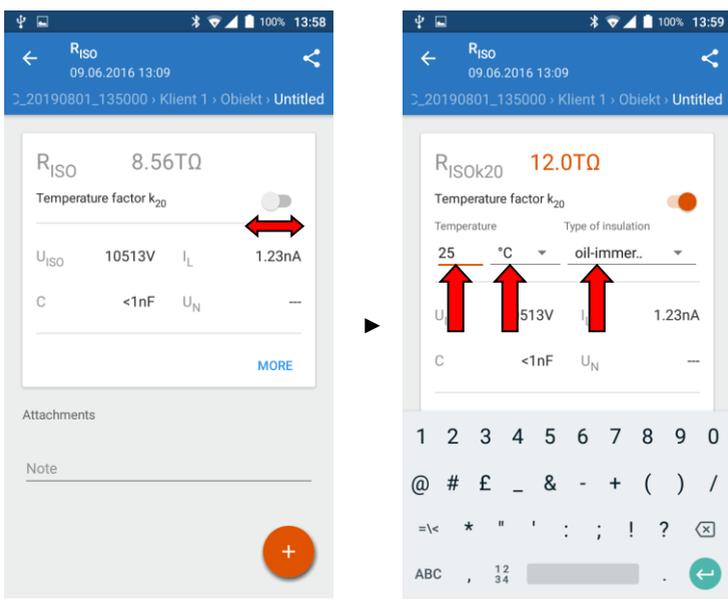
Customers  
└ Objects  
└ Measurements

3 Go to the selected measurement.



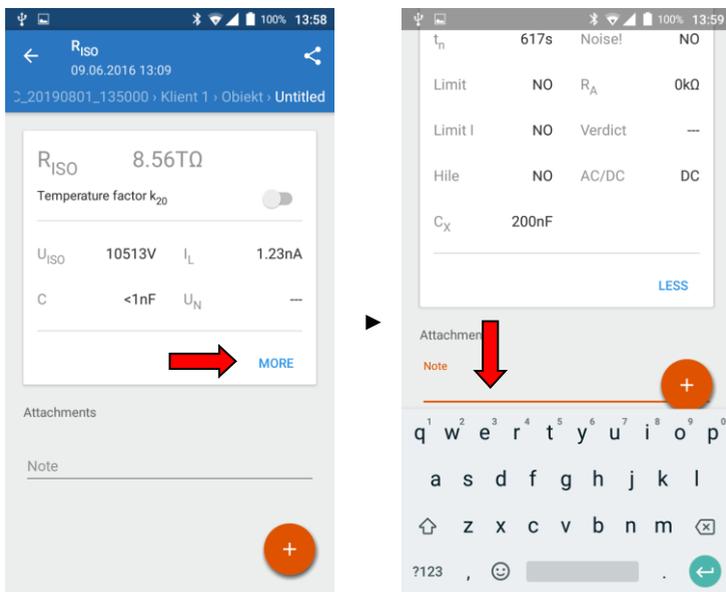
4 The measurement screen shows values measured.

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. 8**.

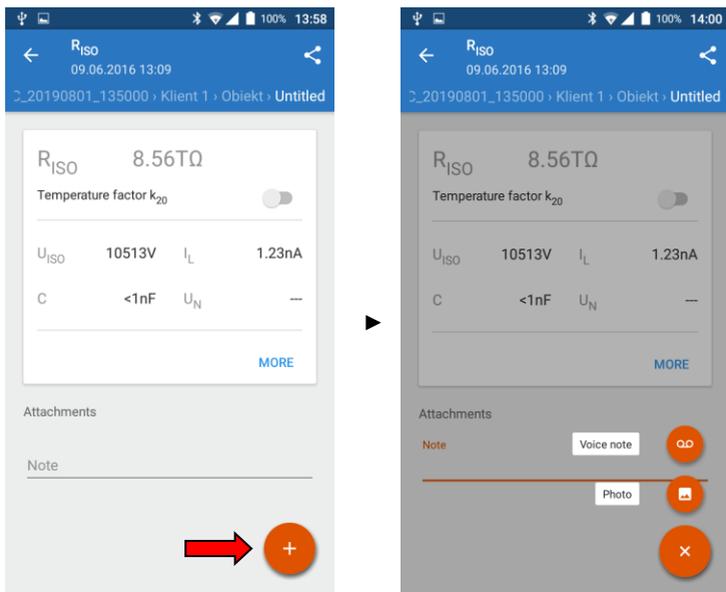


5 Select **MORE** to see detailed measurement results.

In **Note** field, you can enter a note. Hide the keyboard by pressing **'Back'** button in your phone.



6 Select icon **+** to display menu for adding a voice note or image to the measurement.



## 6 Data management

### 6.1 Menu "Data from the meter"

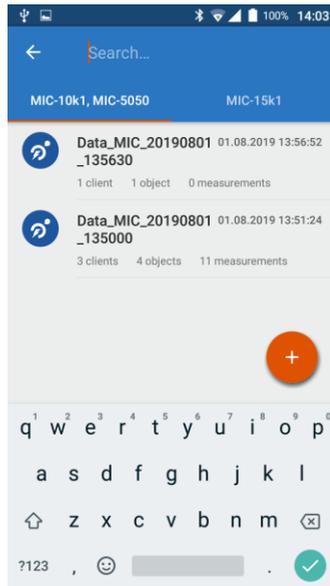
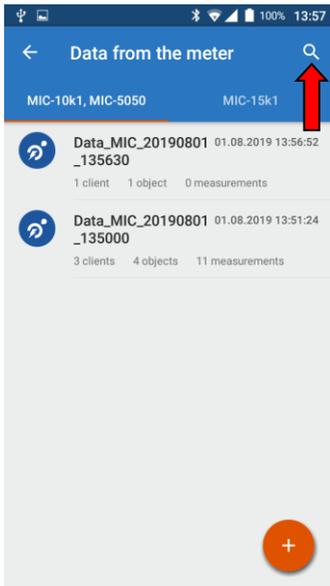
1

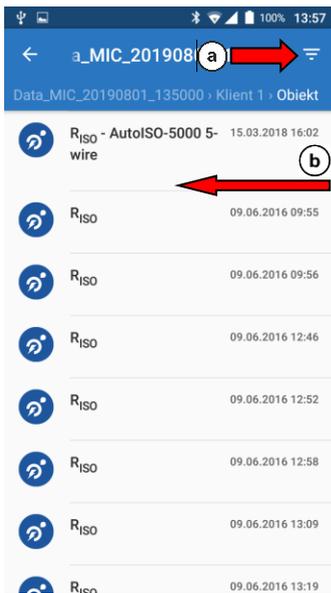


Select **Data from the meter**, and then the data source.

2

Select icon  to open a dynamic search of stored data.



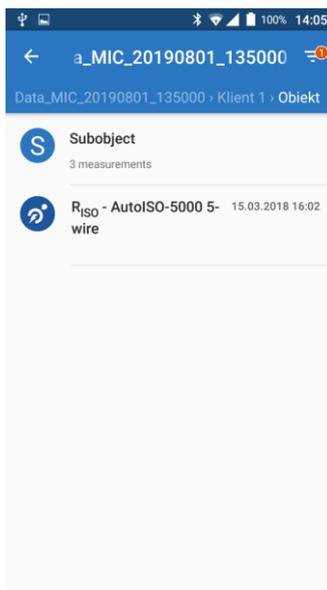
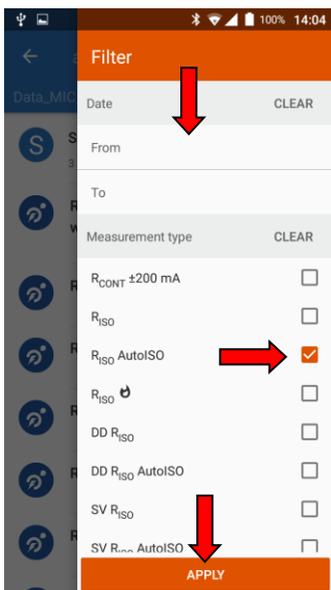


You can filter the data. To do this, display filter list:

- (a) select icon  or
- (b) swipe from the right edge of the screen to the left.

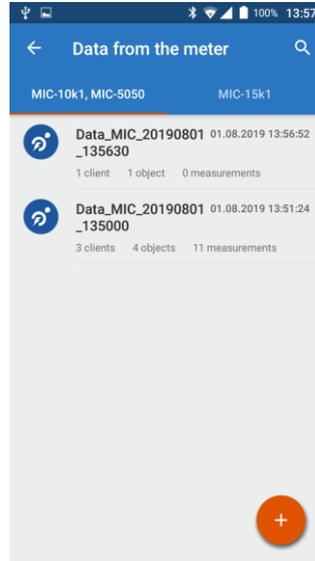
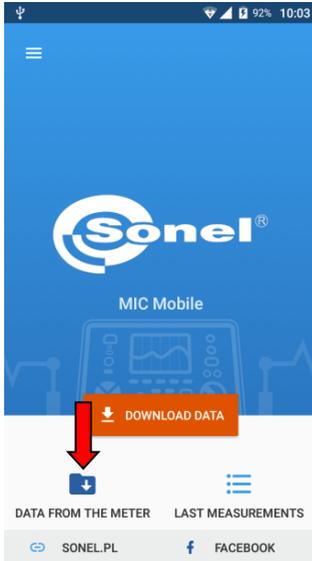
3

- Here you can set:
  - ⇒ date range of the measurements,
  - ⇒ type of measured parameters.
- The filters may be cleared by selecting **CLEAR**.
- After choosing filter(s), select **APPLY**.

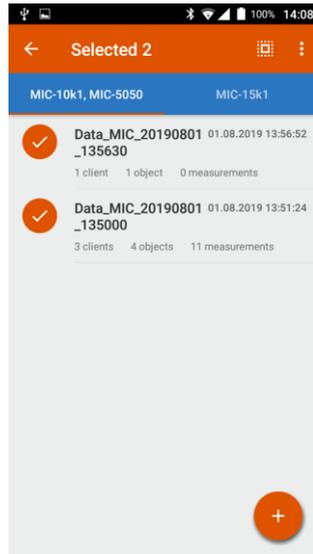
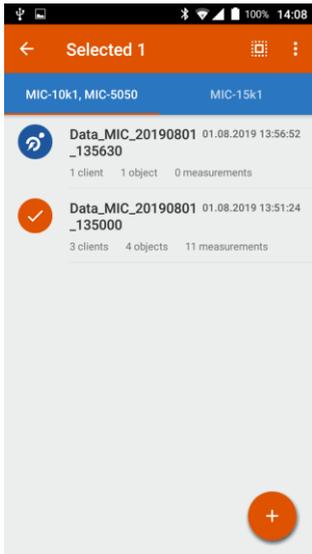


## 6.2 Data selection

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

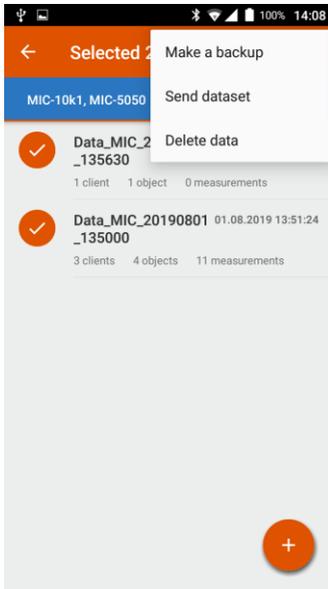


- 2 Tap and hold the item with data you want to backup.
  - ⇒ If you want to choose more items, just check them.
  - ⇒ If you want to select all, select icon



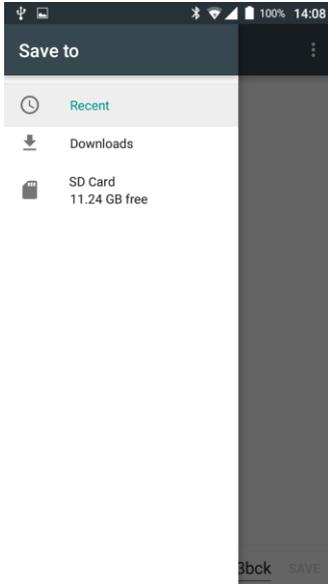
## 6.3 Backup

1



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

2

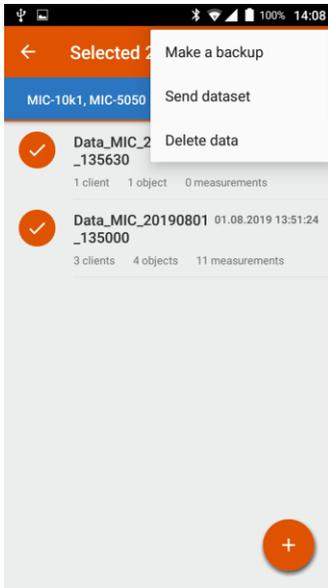


- Select location to save the backup.
- The file will be saved in \*.s3bck format.

## 6.4 Data sharing

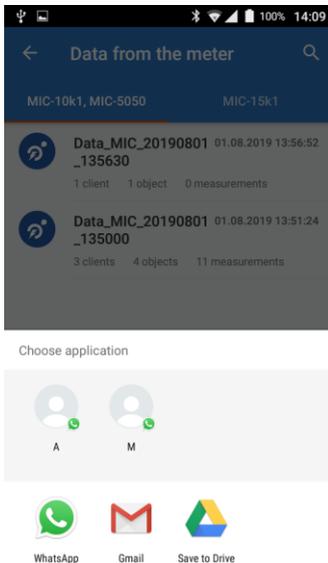
### 6.4.1 Sharing a data set

1



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

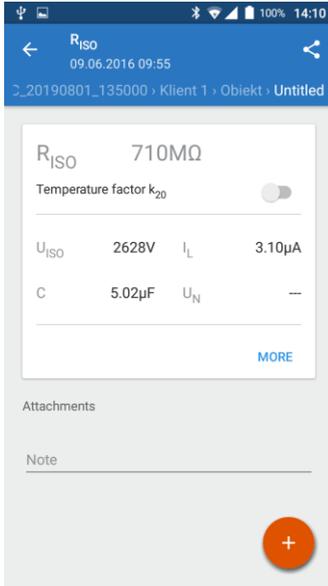
2



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

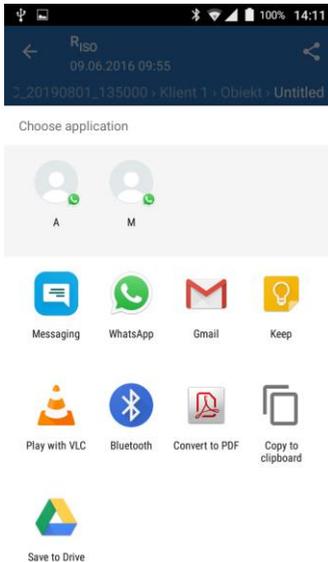
## 6.4.2 Sharing a single measurement

1



- Go to the selected measurement.
- Select icon .

2



Select application for sharing the data.

3

The data will be sent as text (results from **MIC-10k1**, **MIC-5050** tab) or in the \*.csv format (results from **MIC-15k1** tab).

RISO

Data\_MIC\_20190801\_135000 > Klient 1 > Obiekt > Untitled

Main result RISO: 710MΩ  
 UIISO: 2628V  
 IL: 3 10μA  
 C: 5.02μF  
 UN: ---  
 Rt1: ---  
 Rt2: ---  
 Rt3: ---  
 TC: 3563s  
 T: ---  
 L: >10000m  
 Un: 2500V  
 Ab1: ---  
 Ab2: ---  
 DAR: ---  
 PI: ---  
 tn: 17s  
 Noise! NO  
 Limit NO  
 RA: 0kΩ  
 Limit I: NO  
 Test result: ---  
 Hile: NO  
 AC/DC: DC  
 CX: 200nF  
 --

Sonel MIC Mobile | created by RST Software Masters

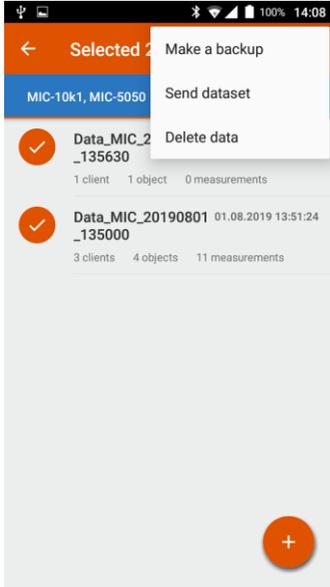
	A	B	C	D	E	F
1	[mm]	I [A]	U [V]	R [Ω]		
2	0	7.25E-04	1794.7574	2.35E+07		
3	0	9.02E-04	2093.3193	2634432.5		
4	0	0.0005050956	3339.9964	2303062.2		
5	0	0.001104309	2427.6948	2237054.5		
6	0	0.0014484211	2500.202	2198451.2		
7	0	0.001642312	2626.3276	2198451.2		
8	0	0.001773876	2547.916	2171360.5		
9	0	0.001792997	2555.9421	2171360.5		
10	537	0.001816976	2562.6177	2169337.5		
11	1064	0.001822905	2565.2717	2169337.5		
12	1672	0.001831896	2567.6797	2169267.5		
13	2229	0.001839996	2569.9426	2169267.5		
14	2785	0.001847376	2571.1155	2169213.8		
15	3343	0.0018549105	2570.5906	2169003.5		
16	3900	0.0018614348	2571.3296	2168920.5		
17	4458	0.001867162	2571.653	2169221.8		
18	5084	0.0018729999	2572.125	2169221.8		
19	5620	0.0018789516	2572.3623	2159063		
20	6228	0.0018849197	2572.6257	2159063		
21	6795	0.001891315	2572.8562	2157987		
22	7342	0.0018971787	2573.0522	2157987		
23	7899	0.0018929485	2573.2443	2159062		
24	8537	0.00189399	2573.2627	2159062		
25	9083	0.001894434	2573.4512	2159170.5		
26	9698	0.0018925376	2573.5671	2159170.5		
27	10223	0.0018929903	2573.6285	2159145.5		
28	10781	0.0018930279	2573.694	2159145.5		
29	11386	0.0018928747	2573.7961	2159071		
30	11942	0.0018929643	2573.9314	2159071		
31	12487	0.0018929854	2574.0346	2159008.5		
32	13033	0.0018927927	2573.9648	2159008.5		
33	13681	0.0018927988	2574.0188	2159117.5		
34	14217	0.0018928764	2574.117	2159117.5		
35	14775	0.0018928909	2574.2517	2159018.8		
36	15333	0.0018929958	2574.239	2159018.8		
37	15940	0.0018930394	2574.4214	2157981		
38	16498	0.0018930482	2574.3746	2157981		
39	17055	0.0018930807	2574.4324	2157945.5		
40	17612	0.0018931437	2574.4214	2157945.5		
41	18218	0.0018931105	2574.5025	2157749		
42	18774	0.0018932217	2574.4805	2157749		
43	19330	0.0018932425	2574.529	2157752.8		

Results from **MIC-10k1**, **MIC-5050** tab

Results from **MIC-15k1** tab

## 6.5 Transferring data between mobile devices

1



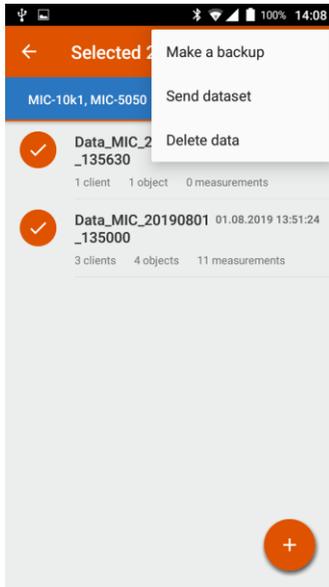
- Make a backup as described in **Sec. 6.3**.
- Move the backup file to the target mobile device.



- 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

1



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

## 7 Manufacturer

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

### **SONEL S.A.**

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Web page: [www.sonel.pl](http://www.sonel.pl)

## 8 Insulation resistance conversion factors

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

Temperature of the measurement in relation to reference temperature

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