



USER MANUAL

SONEL MIC MOBILE mobile application

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

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

1	<i>Getting started with the app</i>	4
2	<i>Side menu</i>	5
3	<i>Remote control of the meter</i>	6
4	<i>Downloading data from the meter</i>	10
4.1	<i>Method 1</i>	10
4.2	<i>Method 2</i>	13
5	<i>Data viewing</i>	14
6	<i>Data management</i>	17
6.1	<i>Menu “Data from the meter”</i>	17
6.2	<i>Data selection</i>	19
6.3	<i>Backup</i>	20
6.4	<i>Data sharing</i>	21
6.4.1	<i>Sharing a data set</i>	21
6.4.2	<i>Sharing a single measurement</i>	22
6.5	<i>Transferring data between mobile devices</i>	24
6.6	<i>Deleting data</i>	25
7	<i>Insulation resistance conversion factors</i>	26
8	<i>Functionality of the app</i>	27
9	<i>Manufacturer</i>	28



- 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

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
- remote control of the meter

③

Data menu for data obtained and downloaded from the meter

④

List of measurements triggered from Sonel MIC Mobile

⑤

Access to the manufacturer's website

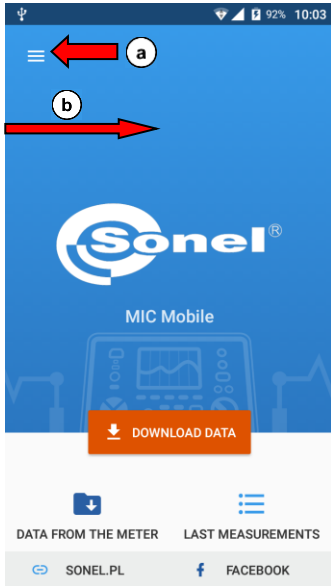
⑥

Access to the manufacturer's Facebook profile


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

2 Side menu

1

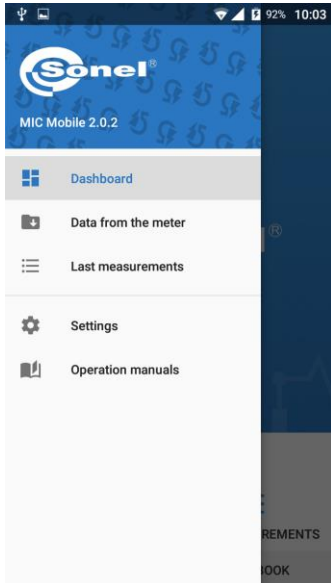


On the main screen

(a) select icon  or

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

2



The menu with options will be displayed.

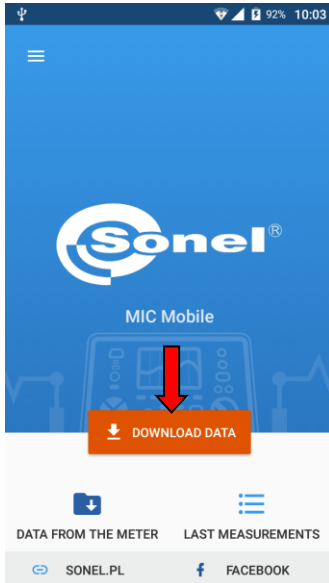
- **Dashboard** – return to the main panel.
- **Data from the meter** – menu of data downloaded from the meter.
- **Last measurement** – list of measurements triggered from Sonel MIC Mobile.
- **Settings** – list of related meters and changing their labels and information about the application.
- **Operation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

3 Remote control of the meter



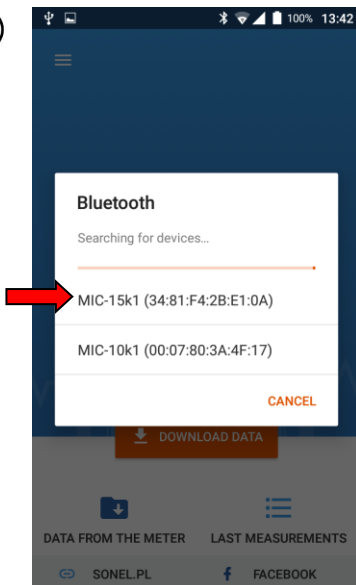
Connection with the meter depends on the phone's Bluetooth range. Do not move too far with the phone from the mobile device - it may break the connection.

1



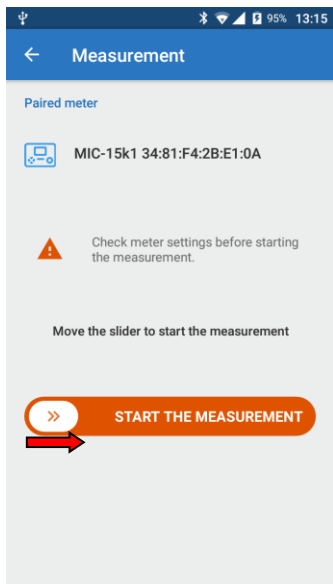
On the main panel of the application, select **Download data**.


2

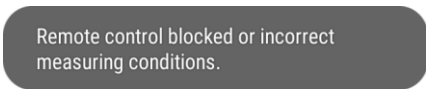


Select the meter.

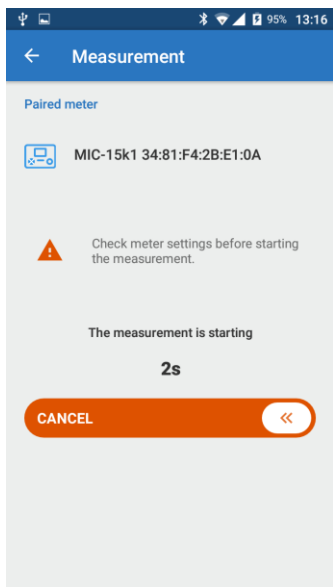
3




- 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.

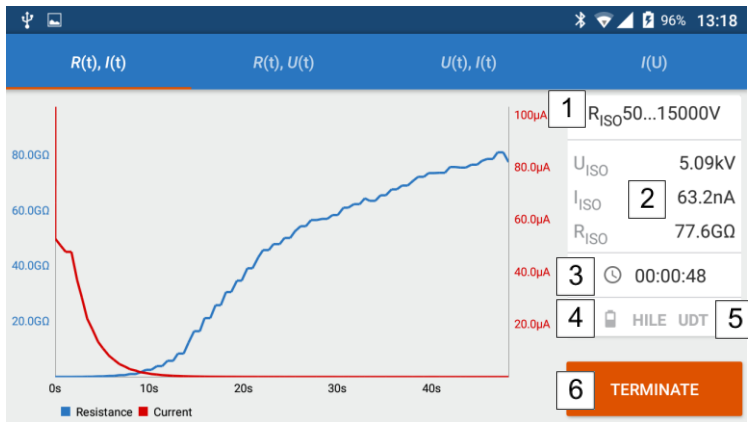


4



- 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.



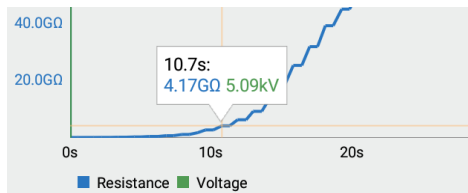
Selecting items on the top bar of the screen, you may display different waveforms of measured parameters:

- 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.

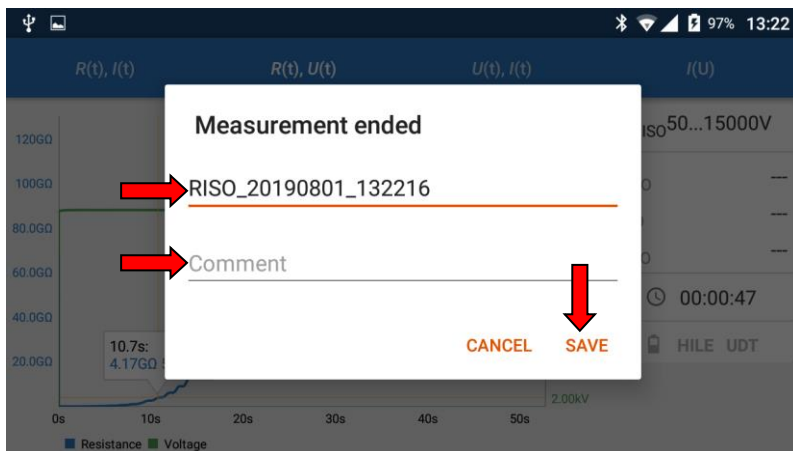
To display the box with instantaneous values, touch the graph at the selected point.



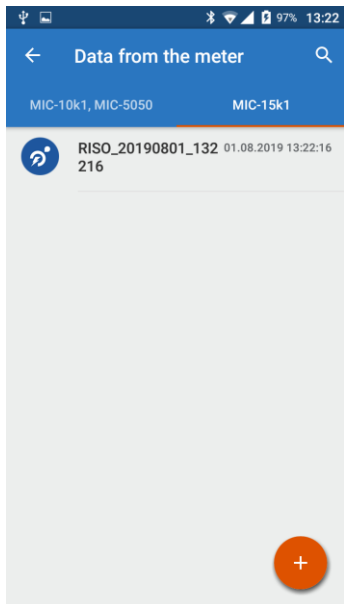
The graph may be:

- 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

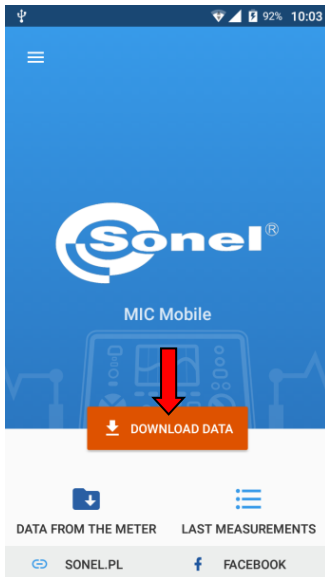


Saved data is in the location **Data from the meter, right tab.**

4 Downloading data from the meter

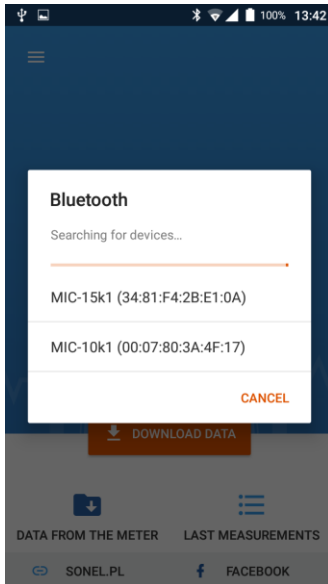
4.1 Method 1

①



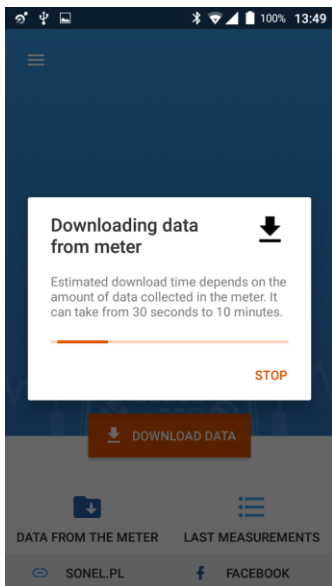
- Set the knob of the meter on the position marked as **MEM**.
- On the main panel of the application, select **Download data**.
- If the knob is in a position other than 'MEM', the meter will not be detected.

②



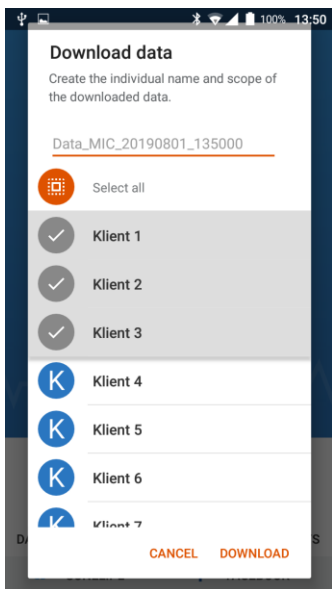
The menu with available devices will be shown.
Select the meter.

3



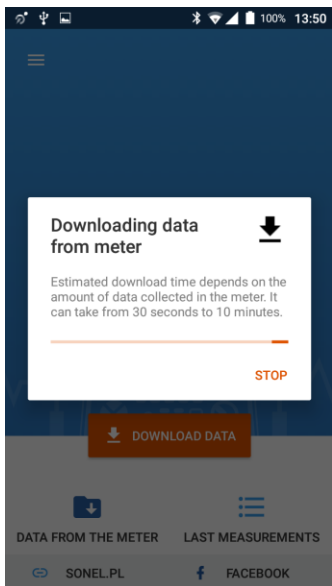
The application collects information about the data stored in the device.

4



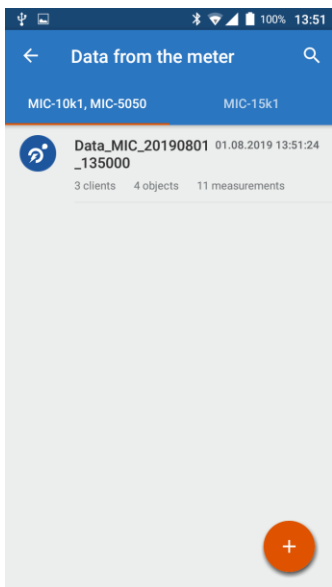
- Enter a name for the package of downloaded data or leave the default name. Hide the keyboard by pressing '**Back**' button in your phone.
- Select data range to be downloaded:
 - ⇒ individual clients or
 - ⇒ all (**Select all**).
- Select **DOWNLOAD**.

5



The application downloads measurement data from the meter.

6



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

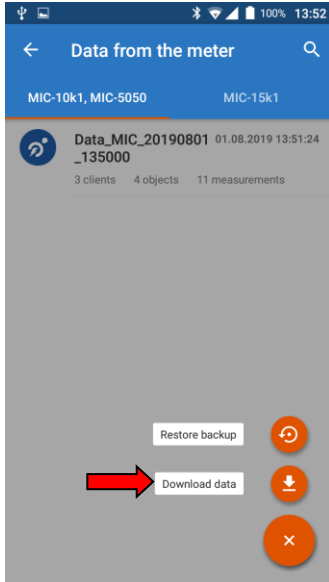
4.2 Method 2

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.

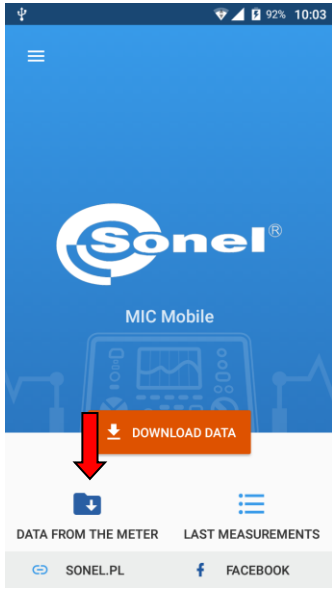
2



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

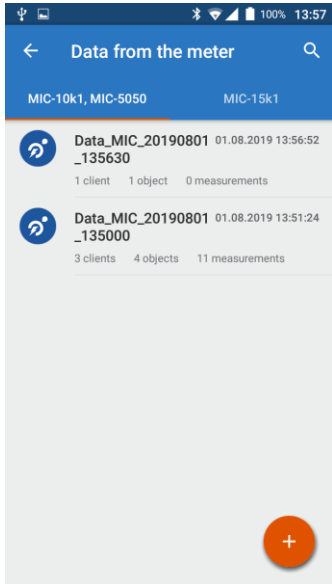
5 Data viewing

1



Select **Data from the meter**.

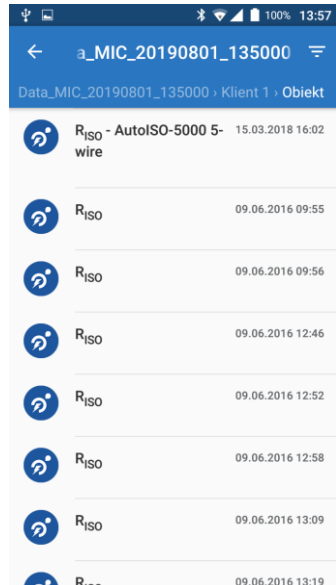
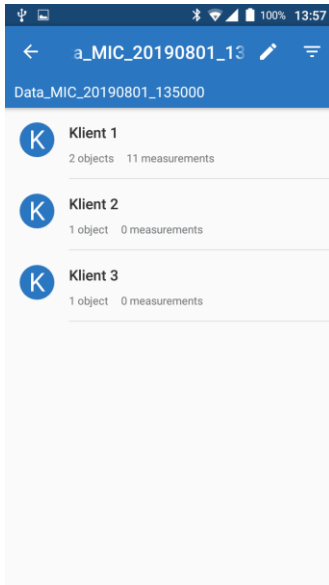
2



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

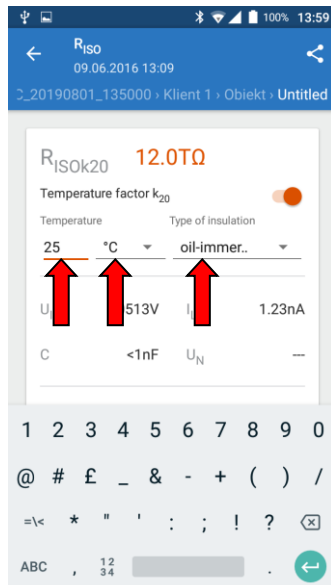
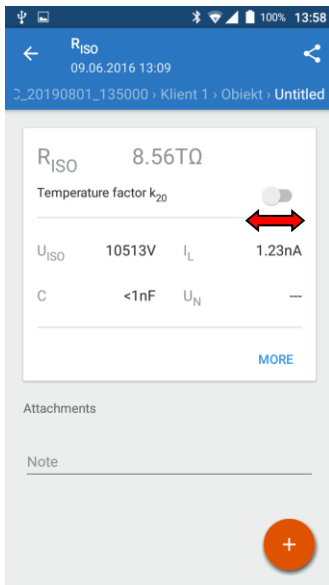
Customers
└ Objects
└ Measurements

3 Go to the selected measurement.



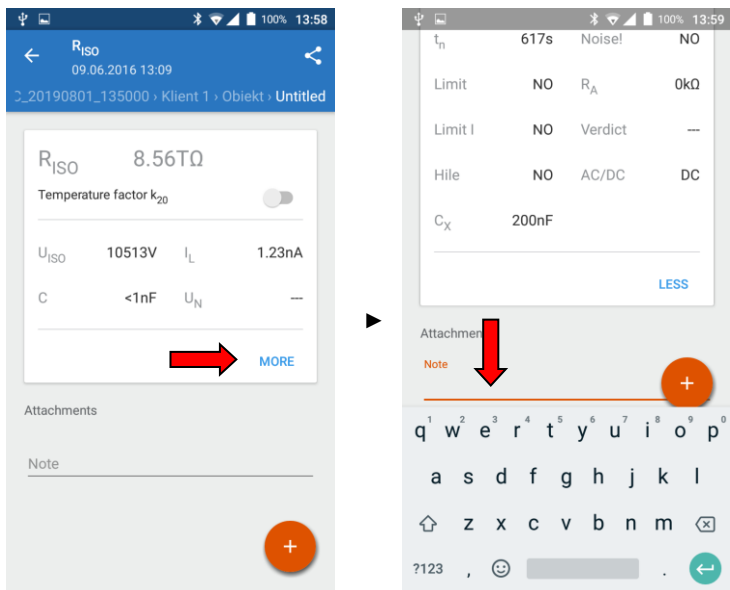
4 The measurement screen shows values measured.

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. 7**.

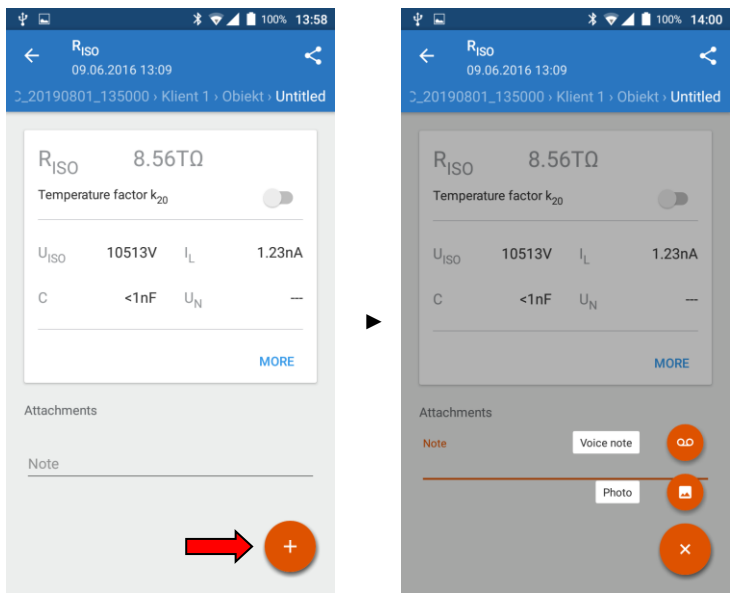


- 5 Select **MORE** to see detailed measurement results.

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"

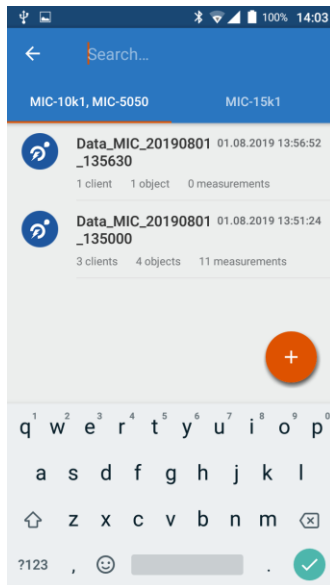
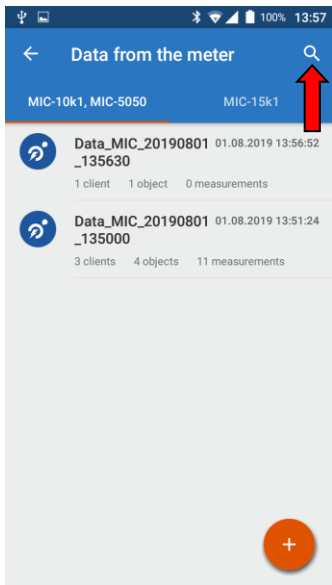
1

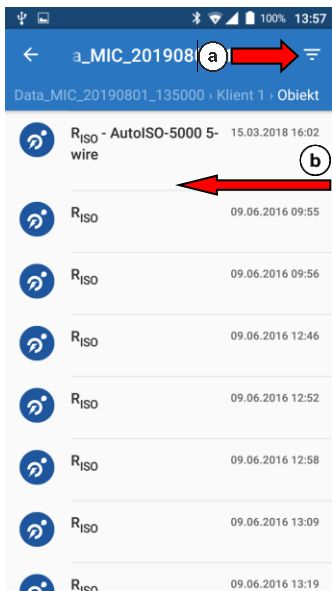


Select **Data from the meter**, and then the data source.


2

Select icon  to open a dynamic search of stored data.



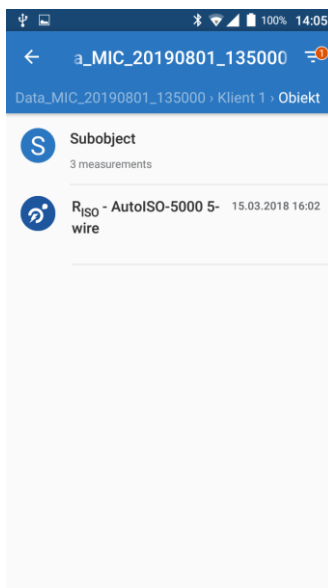
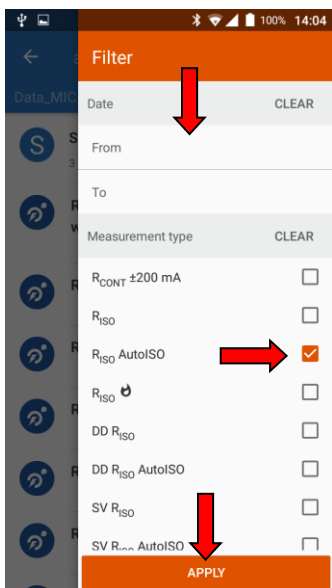


You can filter the data. To do this, display filter list:

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

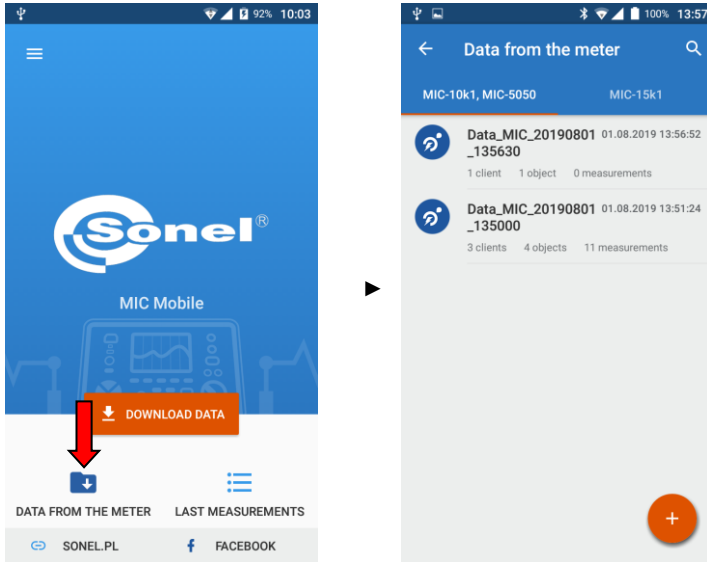
3


- 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**.

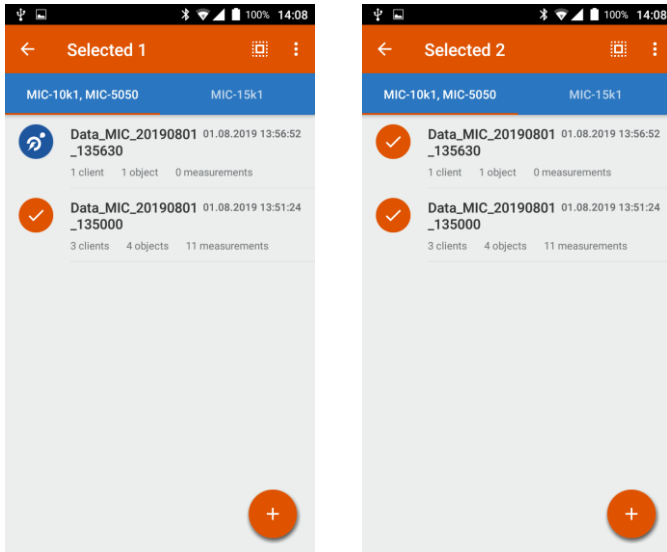


6.2 Data selection

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

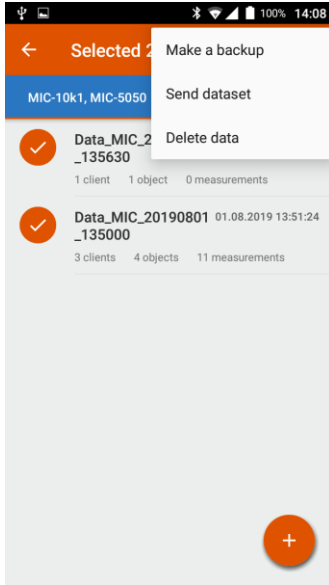



- 2 Tap and hold the item with data you want to backup.
 - ⇒ If you want to choose more items, just check them.
 - ⇒ If you want to select all, select icon .



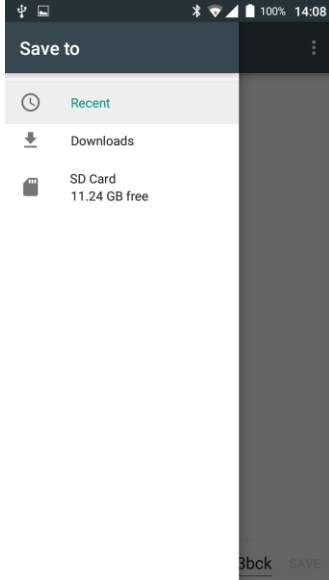
6.3 Backup

1



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

2

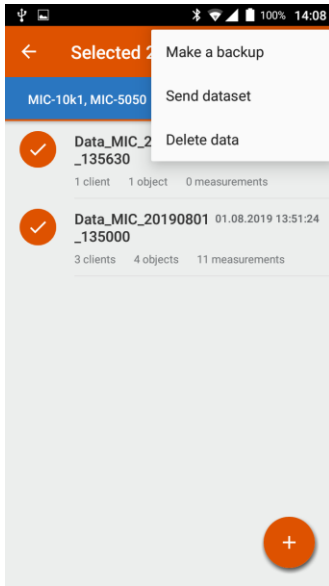



- Select location to save the backup.
- The file will be saved in *.s3bck format.

6.4 Data sharing

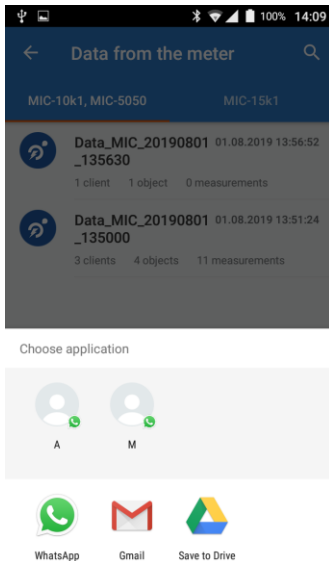
6.4.1 Sharing a data set

1



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

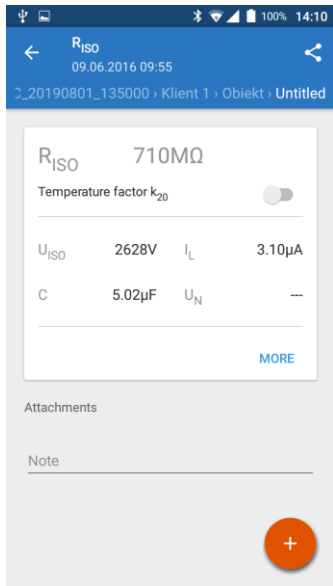
2



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

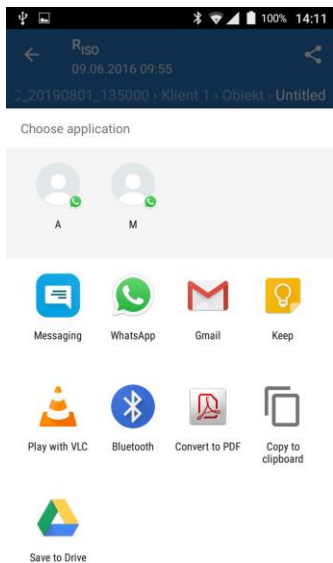
6.4.2 Sharing a single measurement

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 the **left** tab) or in the *.csv format (results from the **right** tab).

RISO

Data_MIC_20190801_135000 | Klient 1 | Obiekt | Untitled

Main result RISO: 710MΩ

UI50: 2628V

IL: 3.10μA

C: 5.02μF

UN: ---

Rt1: ---

Rt2: ---

Rt3: ---

TC: 3563s

T: ---

L: >10000m

Un: 2500V

Ab1: ---

Ab2: ---

DAR: ---

PI: ---

tn: 17s

NoiseI: NO

Limit: NO

RA: 0kΩ

Limit I: NO

Test result: ---

Hide: NO

AC/DC: DC

CX: 200nF

--

Sonel MIC Mobile | created by RST Software Masters

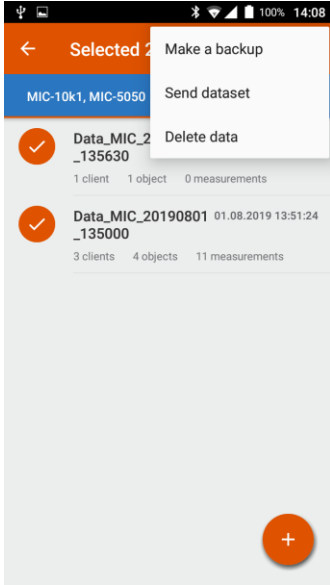
	A	B	C	D	E	F
1	t [ms]	I[A]	U[V]	R[Ω]		
2	0	7.20E-04	1794.754	2.30E+07		
3	0	0.02E-04	2093.3193	2634402.5		
4	0	0.0019209056	2339.9994	2300902.2		
5	0	0.0011943591	2427.4946	2237064.5		
6	0	0.00114484211	2500.202	2198451.2		
7	0	0.0011942332	2036.3276	2198451.2		
8	0	0.00117737076	2547.916	2171390.5		
9	0	0.0011792997	2055.9421	2171390.5		
10	507	0.0011819016	2562.6177	2168327.5		
11	1094	0.0011922903	2565.2717	2168327.5		
12	1672	0.0011891996	2561.6767	2168327.5		
13	2229	0.001189986	2568.9426	2169267.5		
14	2795	0.0011907378	2670.1156	2160013.5		
15	3343	0.0011919105	2070.0066	2190313.5		
16	3900	0.0011914346	2571.3286	2190820.5		
17	4458	0.0011918162	2571.693	2190221.8		
18	5094	0.0011919999	2572.126	2190221.8		
19	5630	0.0011920516	2572.3623	2190963		
20	6228	0.0011921907	2572.6267	2190963		
21	6795	0.0011922310	2572.8962	2191767		
22	7342	0.0011921787	2573.1022	2191767		
23	7899	0.0011922845	2573.243	2190962		
24	8507	0.001192329	2573.2827	2190962		
25	9093	0.0011924434	2573.4912	2191913.5		
26	9658	0.0011925376	2573.5671	2191913.5		
27	10223	0.0011925993	2573.6265	2191481.5		
28	10781	0.0011926779	2673.894	2191481.5		
29	11386	0.0011926747	2573.7961	2190671		
30	11942	0.0011926843	2573.9314	2190671		
31	12497	0.0011926954	2574.0046	2190088.5		
32	13053	0.0011927037	2573.9646	2190088.5		
33	13681	0.0011927996	2574.0168	2191817.5		
34	14217	0.0011928764	2574.177	2191817.5		
35	14775	0.0011928909	2574.2017	2190918.8		
36	15333	0.0011929968	2574.239	2190918.8		
37	15940	0.0011930394	2574.4214	21917891		
38	16496	0.0011930462	2574.3716	21917891		
39	17055	0.0011930907	2574.4304	21917845.5		
40	17612	0.0011931437	2574.4214	21917845.5		
41	18218	0.0011931108	2574.5025	21917749		
42	18774	0.0011932117	2574.4005	21917749		
43	19330	0.0011932425	2574.529	21917752.8		

Results from the **left** tab

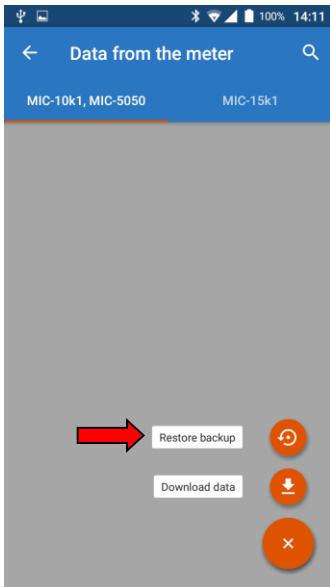
Results from the **right** tab

6.5 Transferring data between mobile devices

1



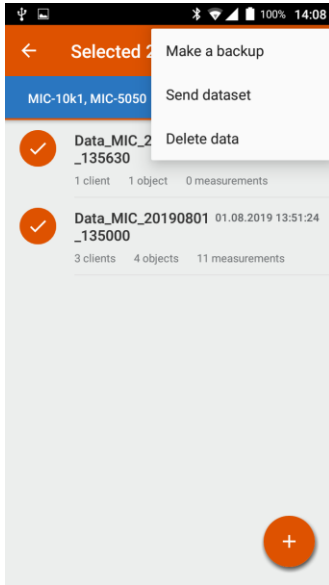
- Make a backup as described in **Sec. 6.3**.
- Move the backup file to the target mobile device.




- 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 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

$$R_{ISO_{cor}} = R_{ISO} * K$$

where:

R_{ISO} – measured resistance

$R_{ISO_{cor}}$ – 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 measurement results from the meter's non-volatile memory	Remote control
MIC-5005	HW B	√	
MIC-5005	HW B, firmware from v1.30 onwards	√	√
MIC-5010	HW D	√	
MIC-5010	HW D, firmware from v1.30 onwards	√	√
MIC-5050	HW A	√	
MIC-5050	HW B	√	
MIC-5050	HW C, firmware below v1.46Ca	√	
MIC-5050	HW C, firmware from v1.46Ca onwards	√	√
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	√	√
MIC-05s1	HW A	√	
MIC-05s1	HW B	√	
MIC-10s1	HW A	√	
MIC-10s1	HW B	√	
MIC-15k1	HW A	√	√
MIC-15k1	HW B	√	√
MIC-15k1	HW C	√	√

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 74 884 10 53 (Customer Service)

e-mail: customerservice@sonel.com

web page: www.sonel.com