RIFTEK
Sensors & Instruments

Mobile application

MEASUREMENT OF WHEELSET PARAMETERS

User's manual

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Contents

1. General information

The software is installed on Android devices (smartphone, tablet) and is designed to work with devices for measuring the geometric parameters of wheelsets: IKP, IDK, and IMR, see https://riftek.com/products/railway_devices/?change_lang=en. A smartphone (tablet) with this application can be used instead of the PDA that comes with the Railway Wheel Profile Gauge IKP Series.

For information on how to operate the devices, please refer to the user manuals.

IKP:

https://riftek.com/upload/iblock/5a1/43s6e720jtxzoswaf1enftcvaeq8wxya/Railway_wheel_profile_gauge_IKP_Series_Model_2024_eng.pdf

IDK:

https://riftek.com/upload/iblock/acd/Wheel_Diameter_Measuring_Gauge_eng.pdf

IMR:

https://riftek.com/upload/iblock/eae/Back_to_Back_Distance_Measuring_Gauge_eng.pdf

https://riftek.com/upload/iblock/4a1/Back_to_back-Distance-Measuring-Gauge-IMR_L-Series-Manual.pdf

2. Licensing

The PDA supports work with three devices, namely IKP-5 (laser profiler of the tread surface of a wheel pair), IDK-BT (the gauge for measuring the diameter of a wheel sets) and IMR (back-to-back distance meter). By default, the PDA is configured to work with the IKP, IDK-BT and IMR devices with which it is supplied

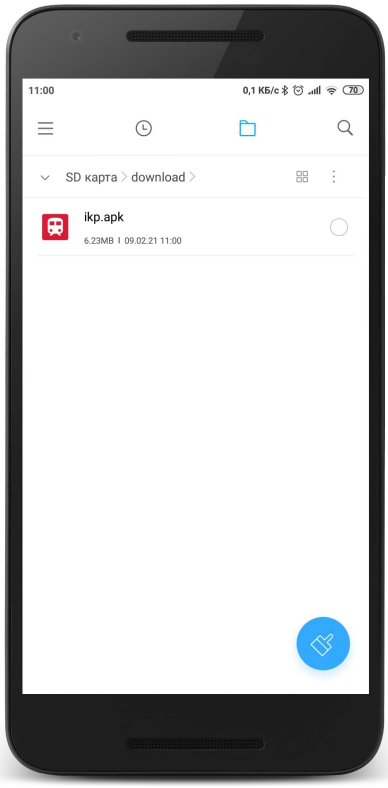
One software license allows you to connect one set of devices (IKP, IDK-BT and IMR) to the PDA.

One PDA can support an unlimited number of licenses to work with an unlimited number of instrument sets.

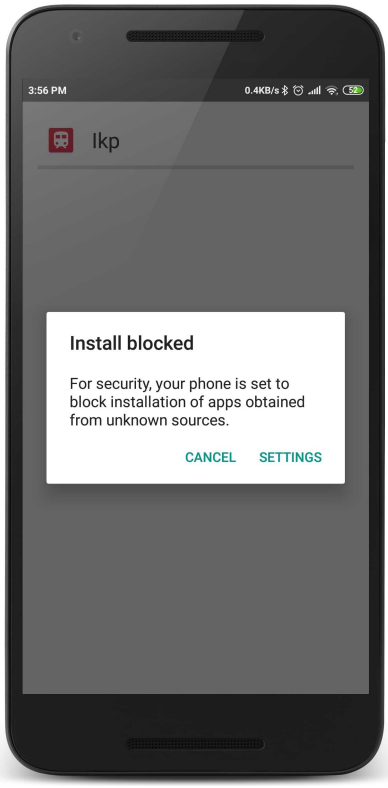
One license can be installed on an unlimited number of PDAs.

3. Installation

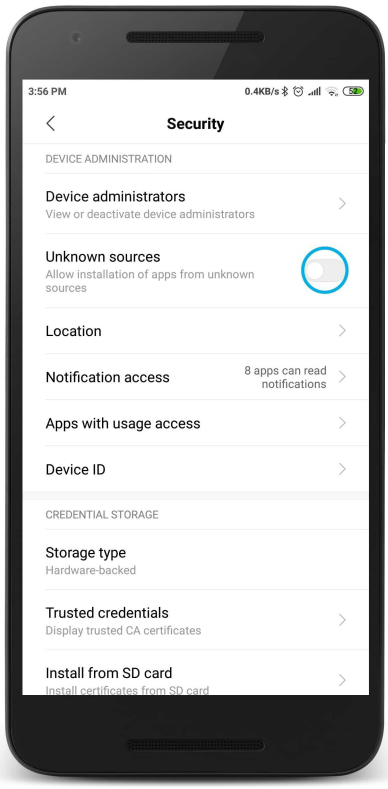
To install the application, copy the **Ikp.apk** file to the device, and then run this file:



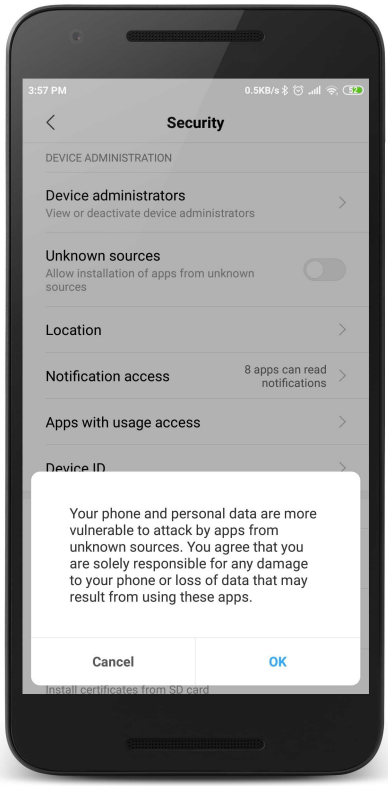
Open the file by tapping on it. Most likely, you will see the following message:



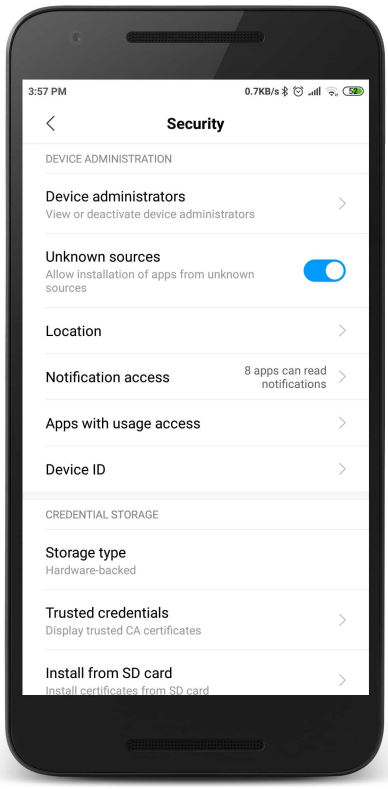
Tap the **SETTINGS** button. The **Security** page will open. There is the "Unknown sources" item, which is disabled by default.



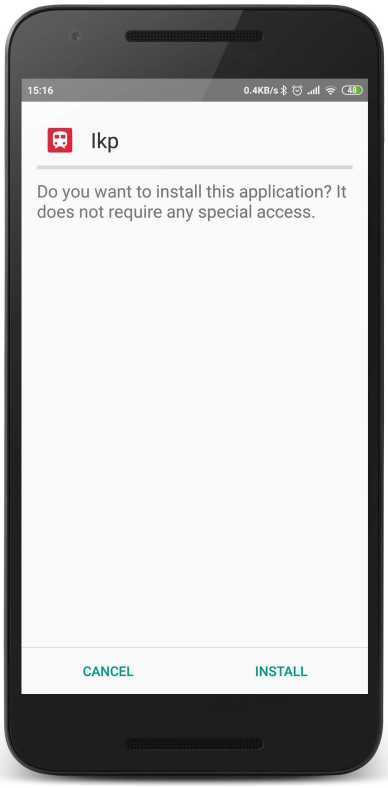
Change the toggle state to "On". After that, you will see a message stating that you are now solely responsible for any damage this application may cause. Tap **OK**.

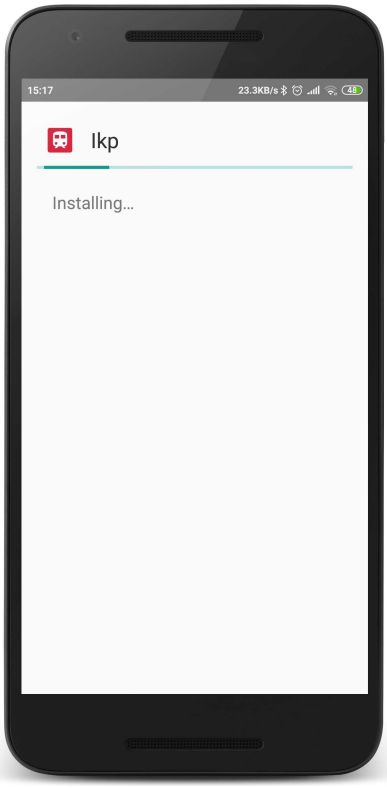


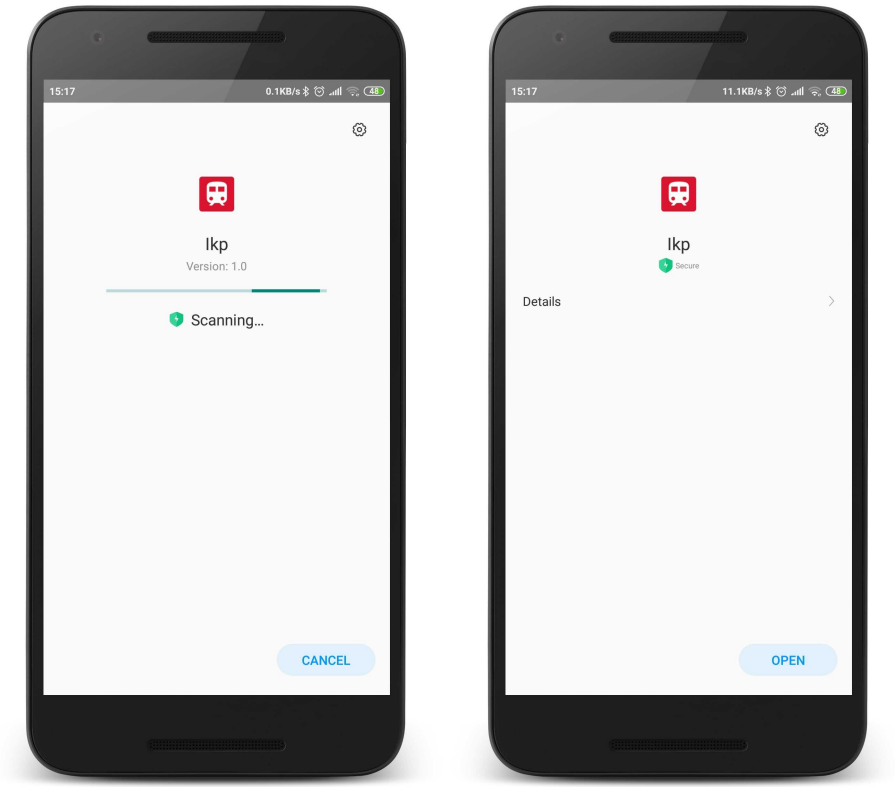
The installation of applications from unknown sources is enabled.



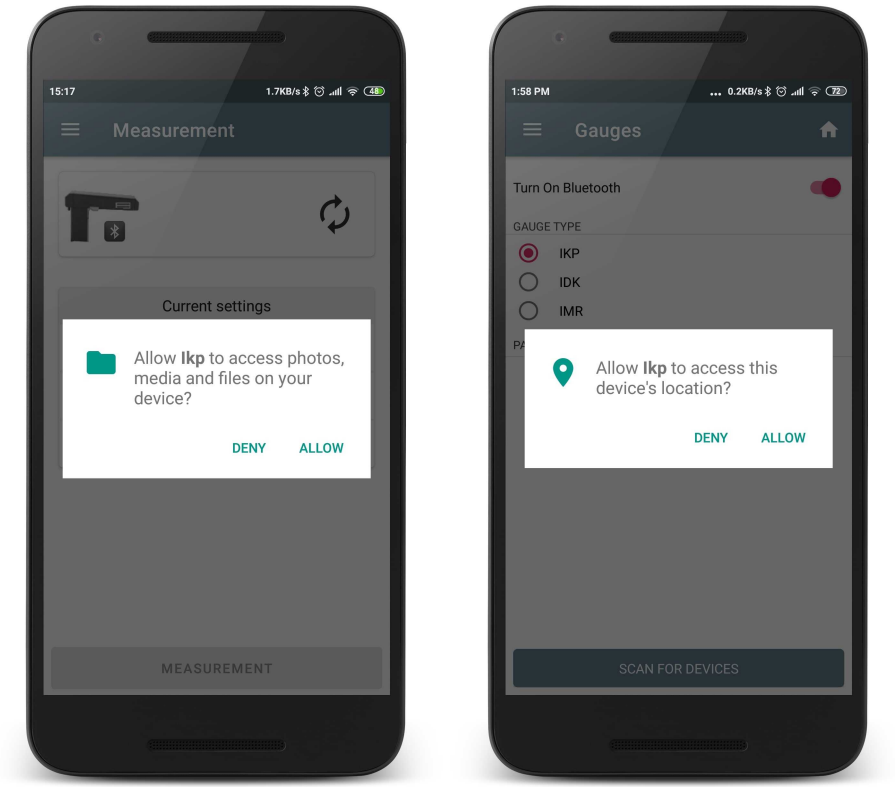
You can now proceed with the installation. Tap the **INSTALL** button. The installation will start.



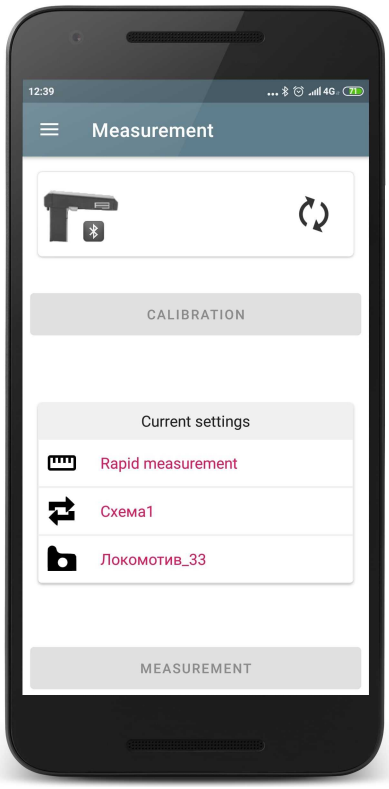




When launched, the app will ask for permission to access files on the device and the device's location data. Tap **ALLOW**. The first permission is required to generate data export files on a PC, the second permission is required to search for Bluetooth devices and pair them. If you tap **DENY**, some features of the app will become unavailable.

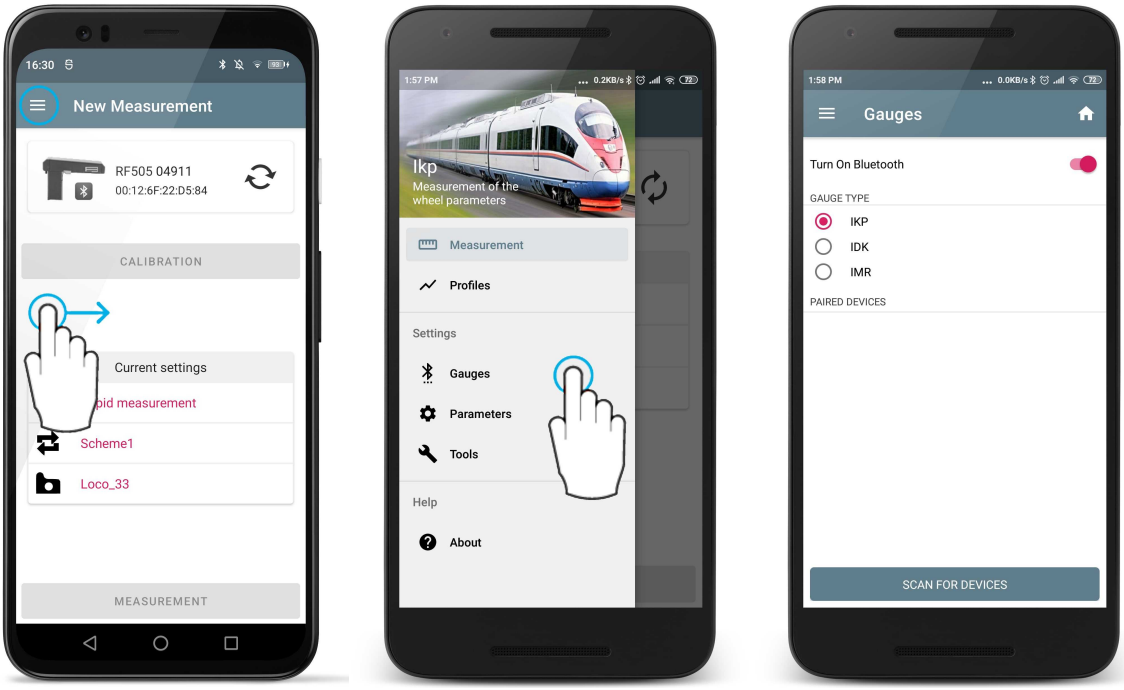


The main program window will appear:



4. Adding and selecting the measurement device

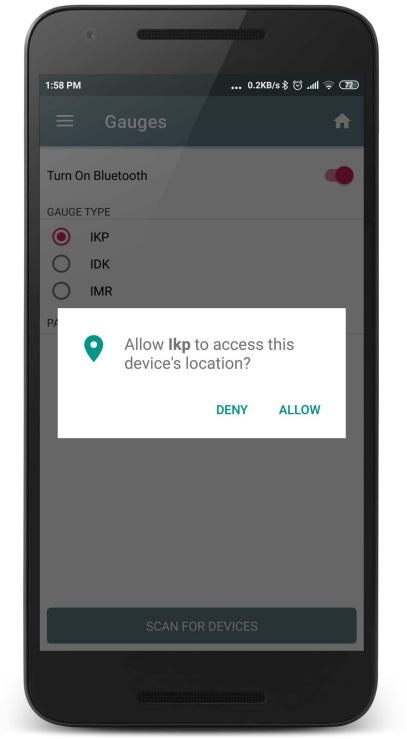
By default, the PDA is configured to work with the IKP, IDK-VT and IMR devices with which it is supplied. To add a new device, you must follow the following instructions: go to the **Gauges menu**, for which you need to press ☰, or swipe your finger from the left edge of the case to the center of the screen.



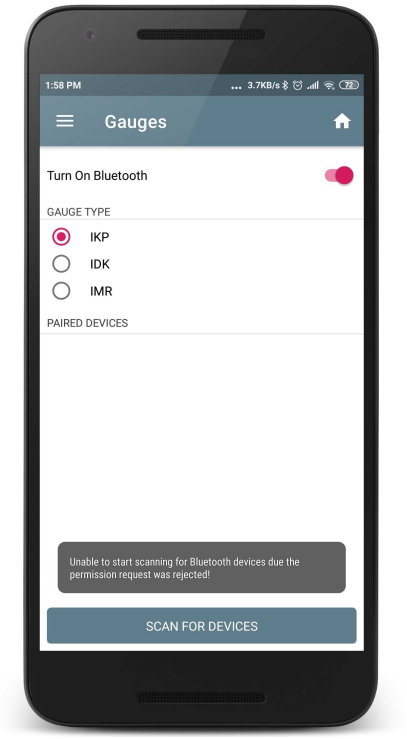
In the **Gauges** window, you can turn on/off Bluetooth, select the type of measuring gauge (by default, IKP) and add a new measuring gauge depending on the selected type.

To add IKP, turn on the laser module and tap **SCAN FOR DEVICES**.

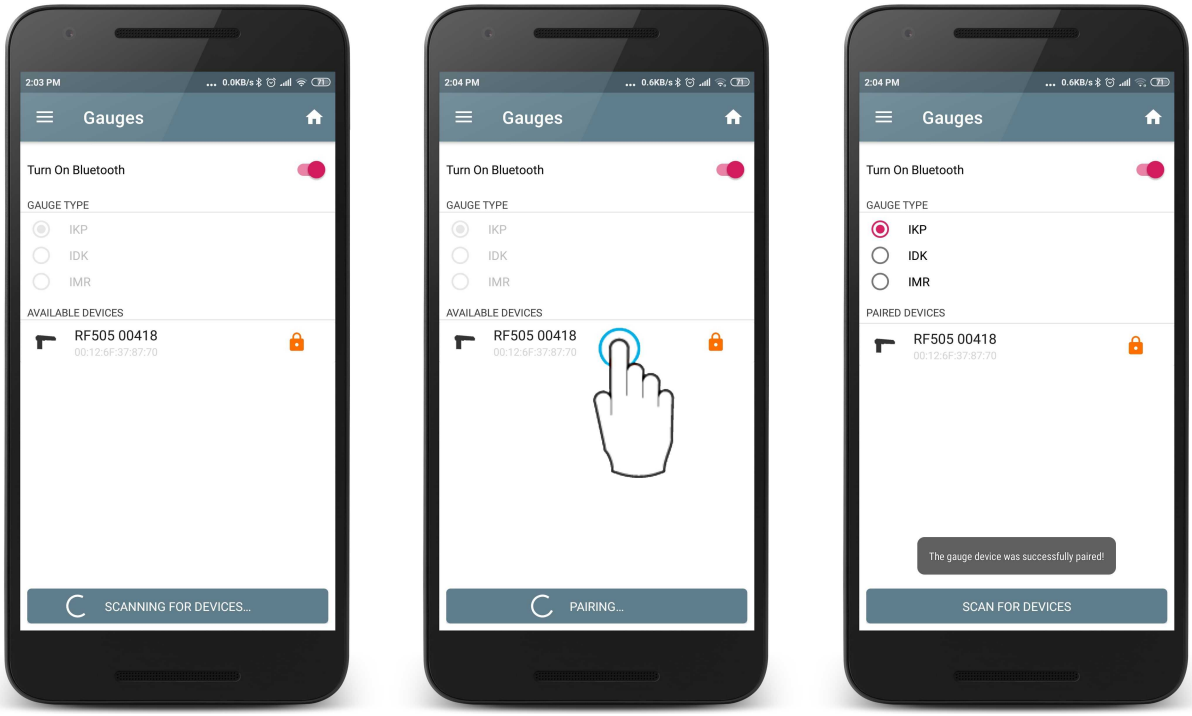
On the first search, the app will ask you to access the device's location data. To start the search, you need to tap **ALLOW**.



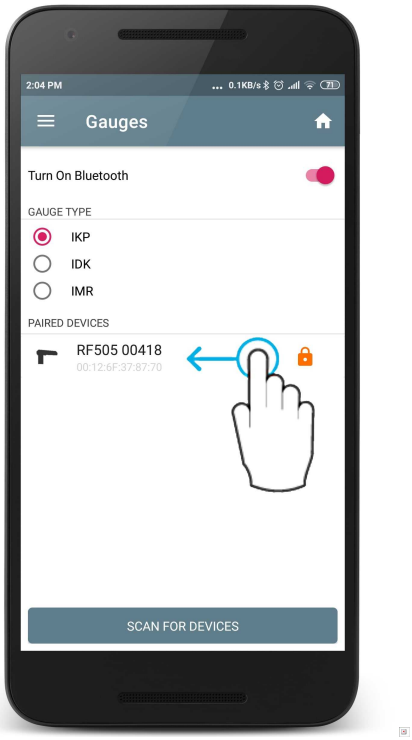
If you tap **DENY**, device search will not be available and the following message will be displayed:



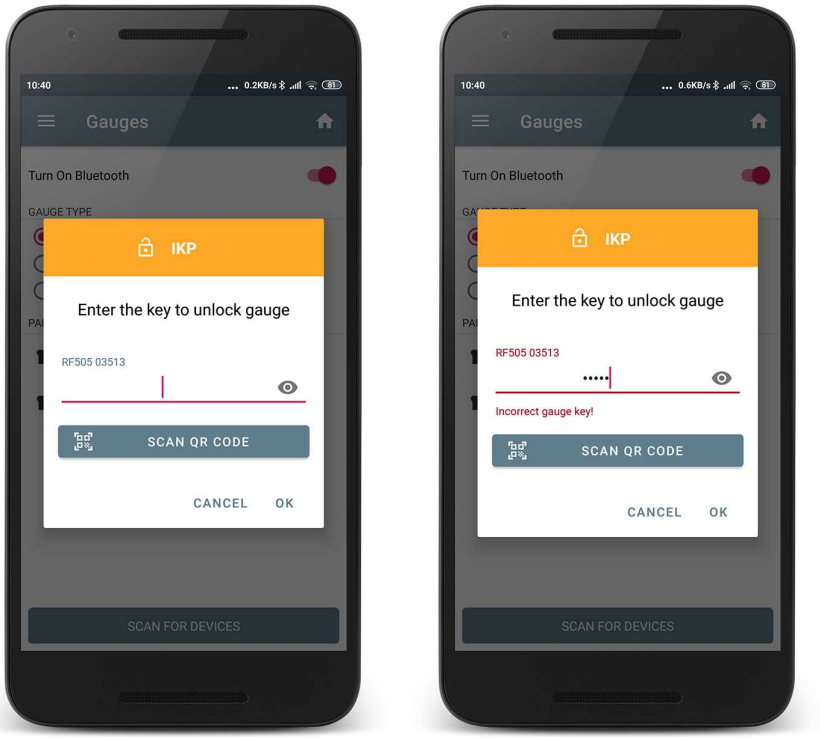
If the search is successful, the gauge will be added to the **AVAILABLE DEVICES** list and then, for pairing, you need to tap on this device.



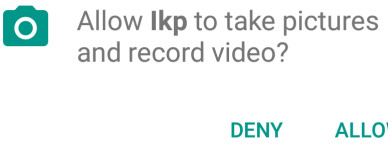
The device will be paired, but locked for selection as the primary for synchronization (🔒). To unlock and select it as the main one, you need to swipe left from the right edge and tap the **Select** button.



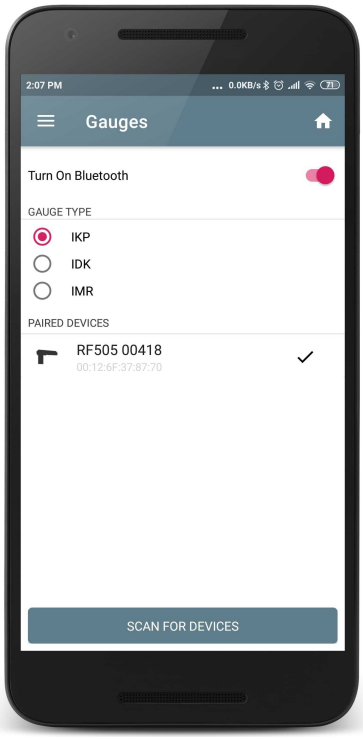
In the window that appears, enter the key to unlock the device or scan the QR code. A unique key or QR code is supplied with the measuring gauge or upon request. If the key is incorrect, an error message will appear.



To scan a QR code, you must allow the app to take photos and videos.

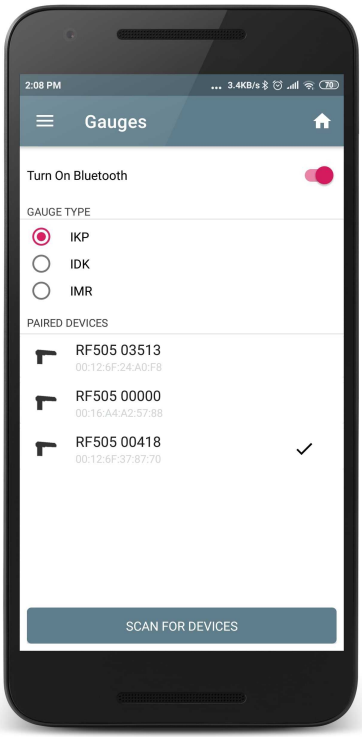


If the correct key is entered, the lock icon will disappear and a check mark (✓) will appear next to the selected device.

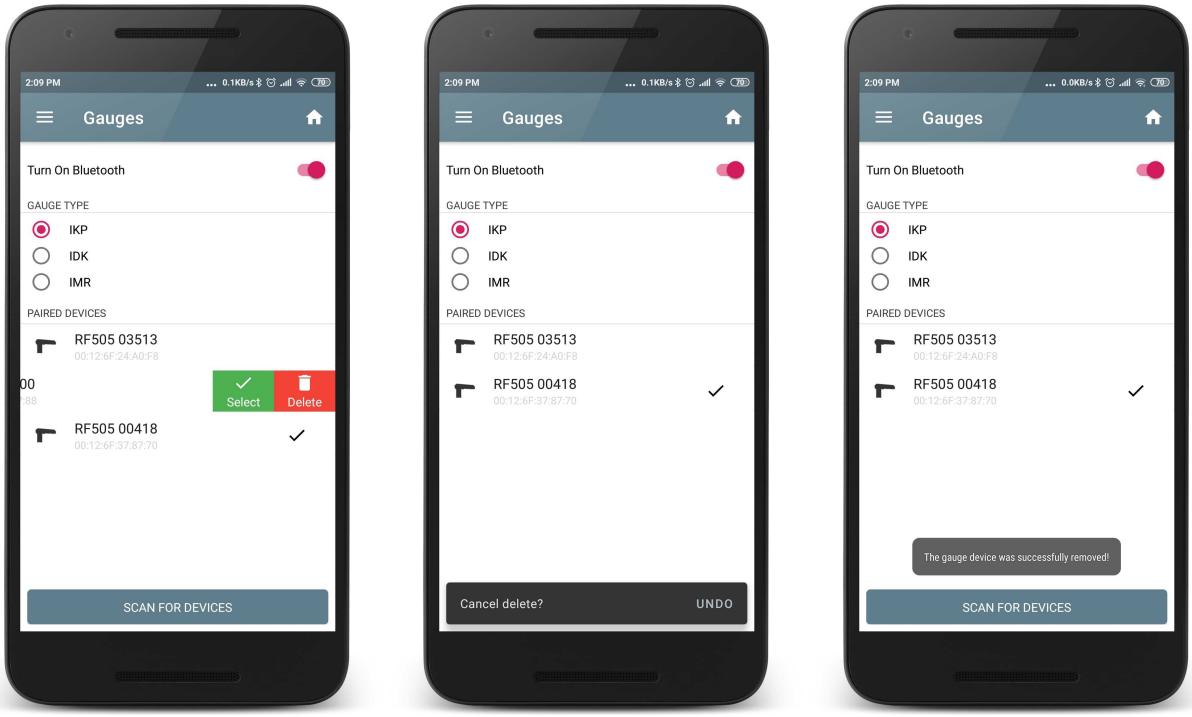


The selected device will be connected automatically after starting the application.

If the required device is in the list (and unlocked), you just need to select it.



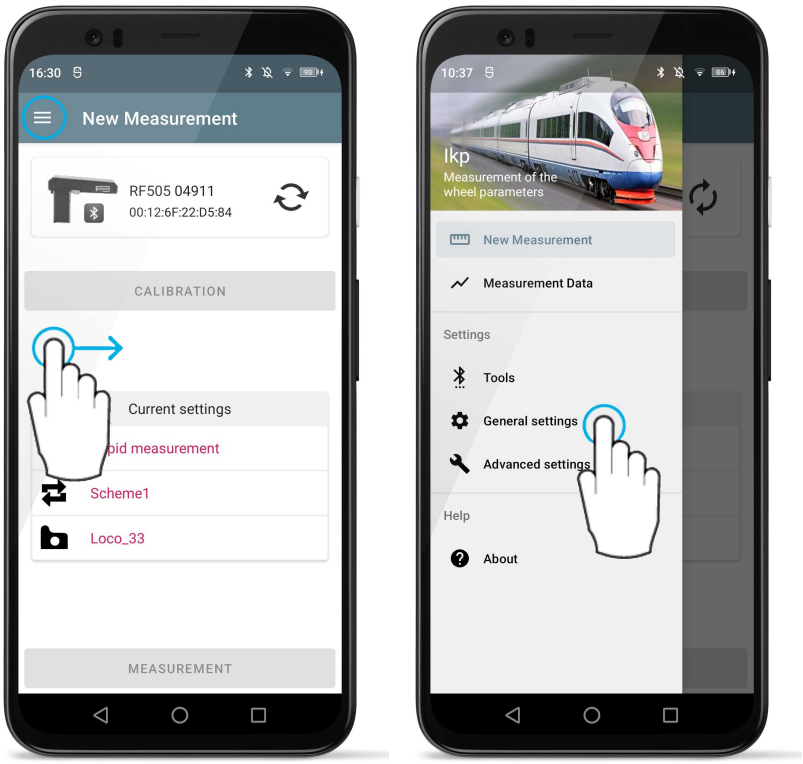
If the measuring gauge is no longer in use, you can remove it from the list of available devices by canceling the pairing. To do this, swipe left from the right edge and tap the **Delete** button.



To add another measuring gauge (IDK, IMR), follow the same steps.

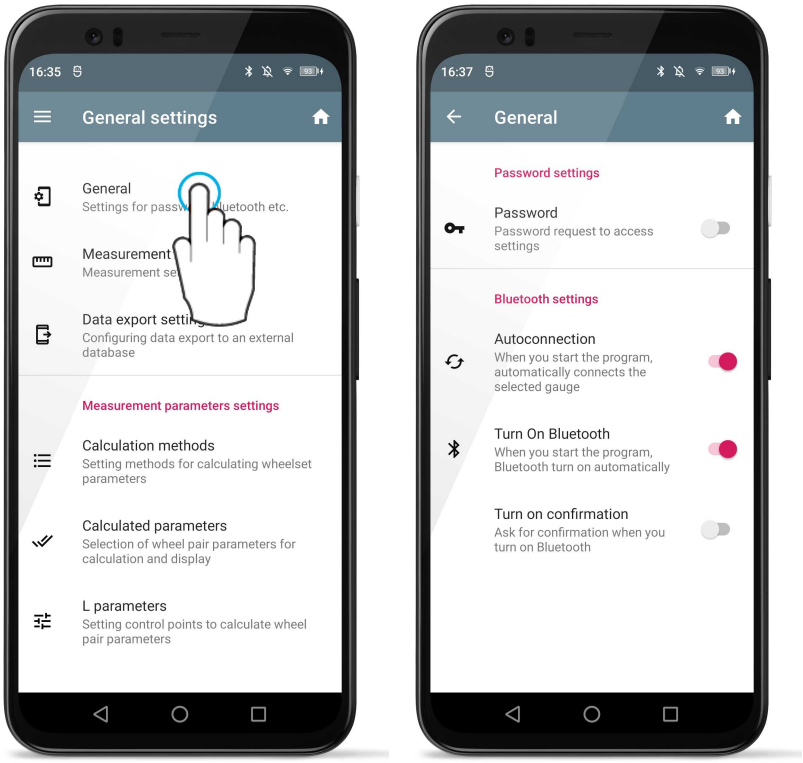
5. Setting up the program

Before you start working with gauges, you need to configure the software. To do this, select the **Parameters** item in the main menu:



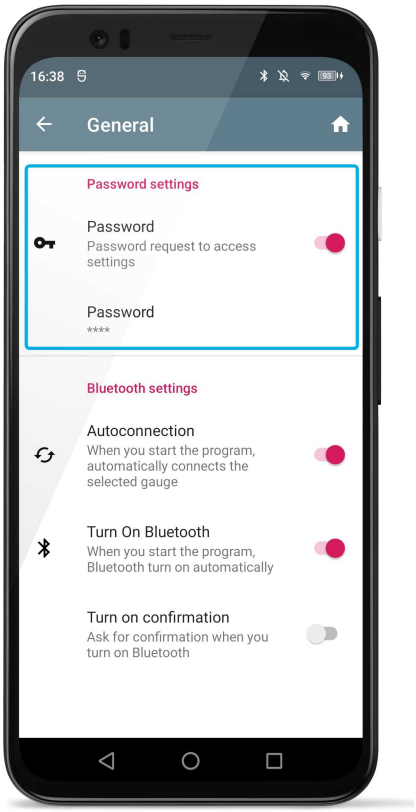
5.1. Setting general parameters

Selecting **General settings** opens a window for setting up an Access password and Bluetooth connection:

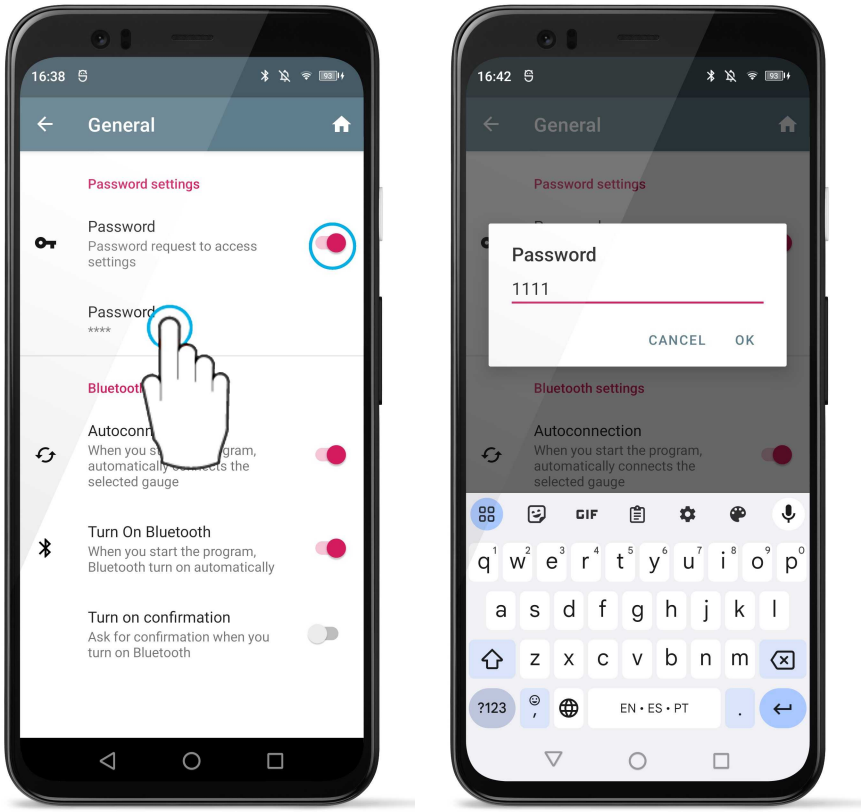


5.1.1. Setting a password

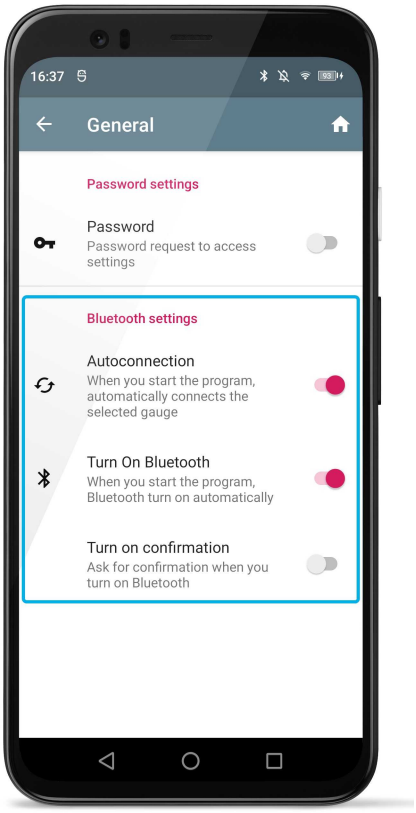
The **Password settings** section allows the user to set a password to access all basic settings.



To set a password, select the **Password** item, enter the password and confirm it. By default, the password is "1111".

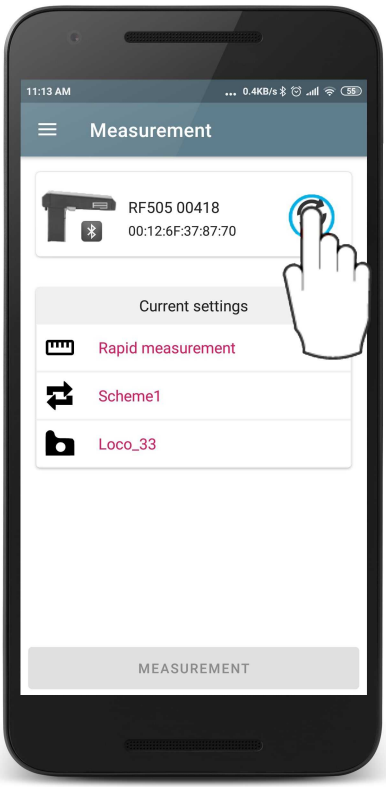


5.1.2. Bluetooth settings



Autoconnection - if this option is enabled, then at startup the application will try to connect to the measurement device that is selected in the settings (see par. Adding and selecting the measurement device).

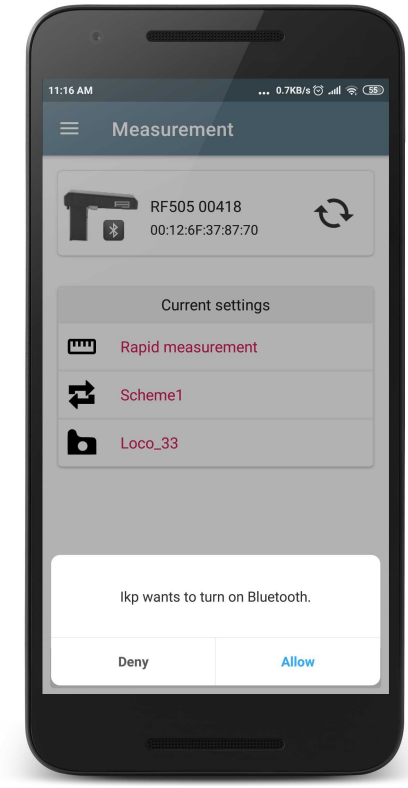
If this option is disabled, then you must tap on the synchronization icon in the main program window in order to establish a connection to the device.



Turn on Bluetooth - if this option is enabled, then at startup the application will automatically check if Bluetooth is enabled, and if not, enable it.

If this option is disabled, it will be necessary to manually enable Bluetooth each time you start the app in order to connect to the measuring gauge.

Turn on confirmation - this option becomes available only if the **Turn on Bluetooth** option is selected. If the option is enabled, the app will ask for confirmation to turn on Bluetooth.

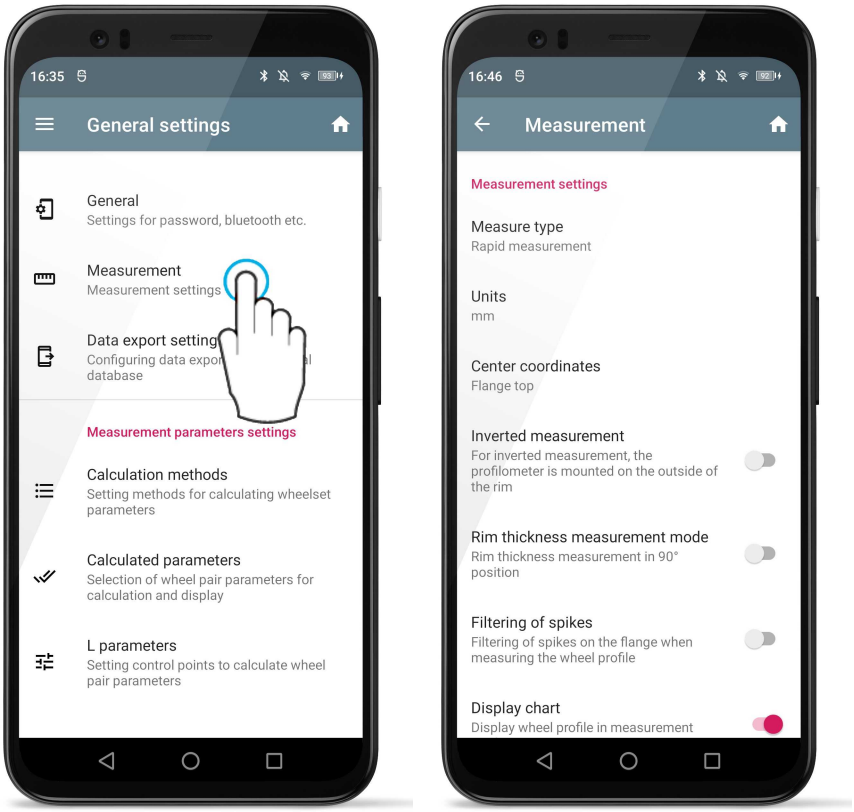


5.1.3. Change the program language

Changing the program language is performed upon request to the manufacturer (info@riftek.com) and is a free service.

5.2. Setting general measurement parameters

Selecting the **Measurement** item opens a window for setting measurement parameters.



Measurement type - see the next chapter.

Units - select mm/inch.

Inverted measurement - if this option is selected, the profilometer is installed on the outer base surface of the wheel during measurement.

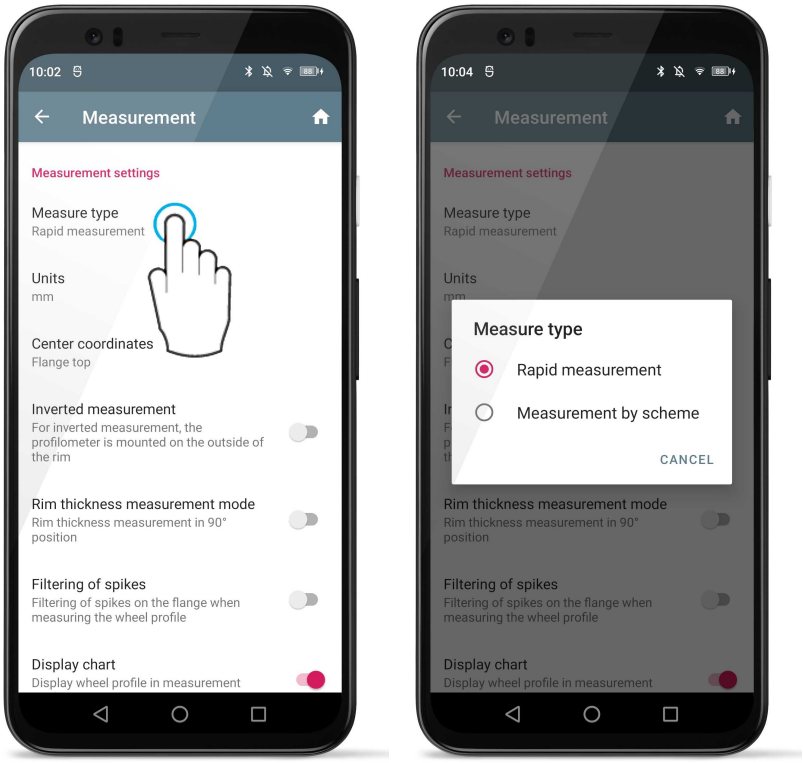
Rim thickness measurement mode - if this option is selected, the profilometer allows you to measure the thickness of the rim when installed on the inner surface of the wheel in the 90° position

Filtering of spikes- if this option is selected, additional data filtering is introduced during measurement to smooth out the dents on the wheel surface.

Display graph - this option allows you to display an image of the measured wheel profile.

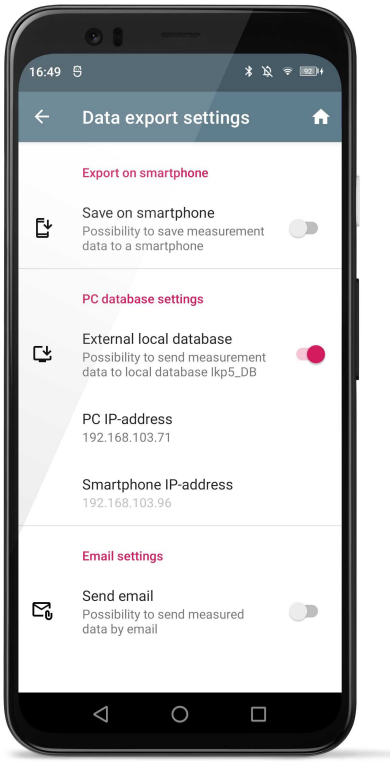
5.2.1. Setting the measurement type

To set the measurement type, tap the **Measure type** item and select **Rapid measurement** or **Measurement by scheme**.



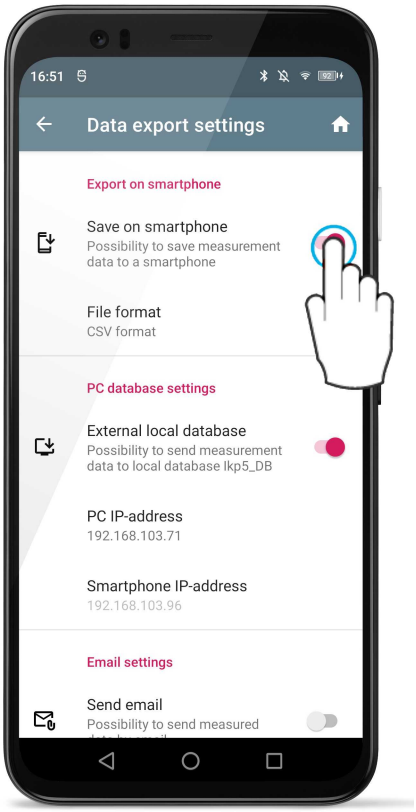
5.3. Setting up data export

Selecting the **Data export settings** item opens a window for setting options for exporting saved data:

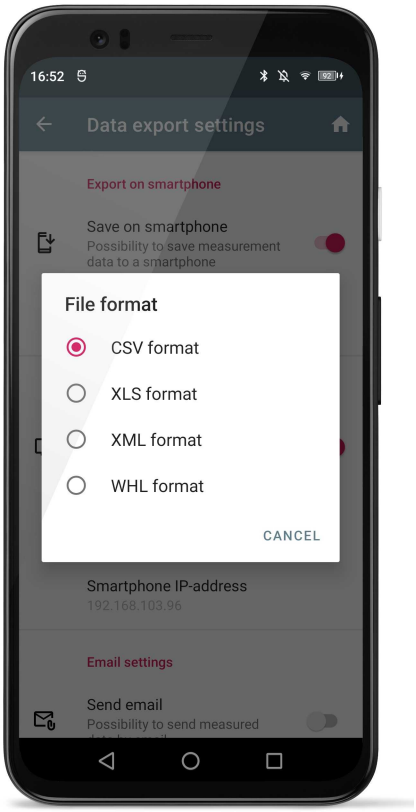


5.3.1. Export to PDA

To enable the ability to save a data file on your PDA, you need to set the **Save to smartphone** option.

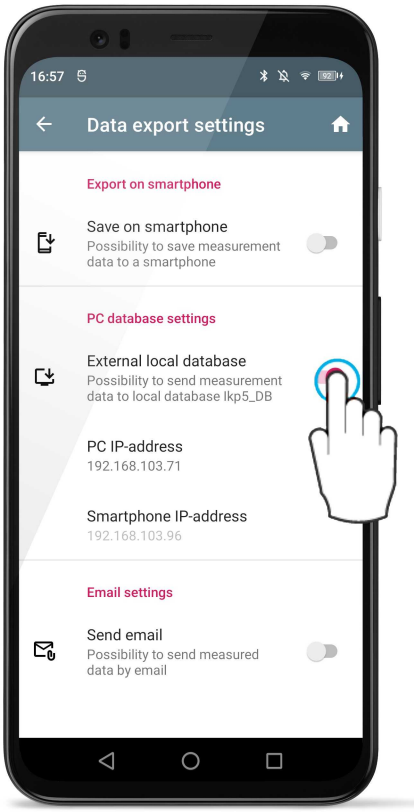


Next you need to select the file format (CSV, XLS, XML,WHL).



5.3.2. Export to PC data base

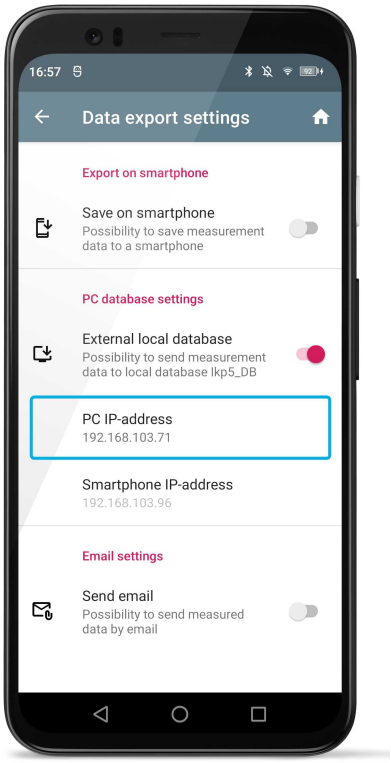
To enable the ability to export data, set the **External local database** option



To transfer data between a PDA and a PC, you need to configure the IP address of the PC. Data exchange is carried out via Wi-Fi. The PC and PDA must be connected to the same Wi-Fi network. This can be a dedicated network created on an Android device (virtual hotspot) or any home/work network.

5.3.2.1. PC server settings

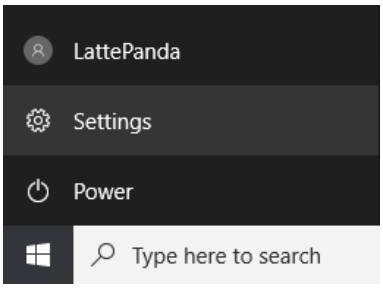
To transfer data to a PC, you need to specify the port and IP address of the server that is running in the **lkp5_DB** program (download link: https://riftek.com/upload/iblock/f57/lkp5_PC_Software.zip).



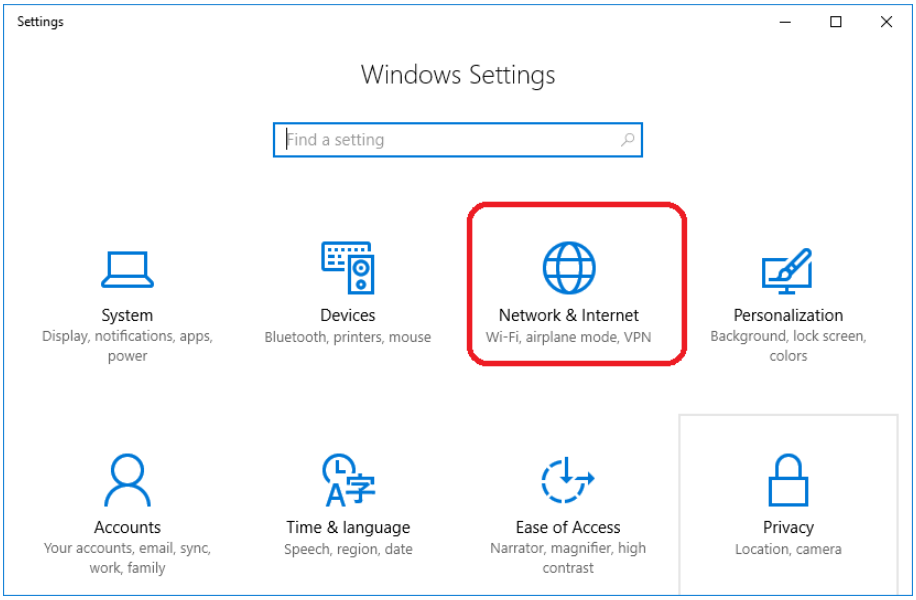
The IP address can be found on the PC. There are two ways to find your IP address on Windows.

Method 1. Find the IP address using the **Settings** app (Windows 10).

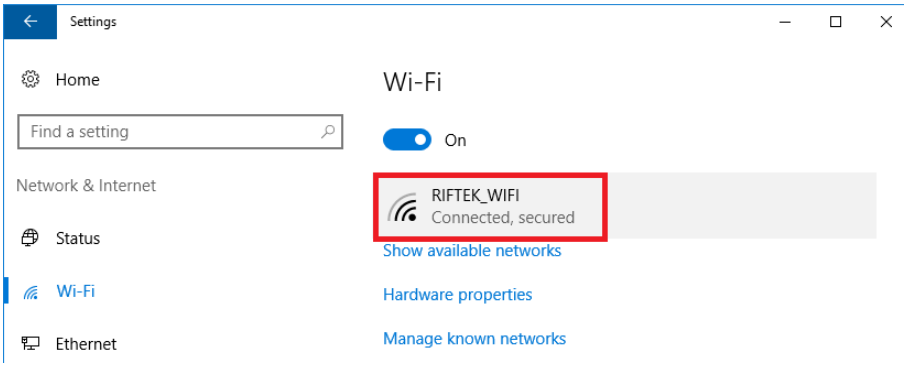
1. Select **Start > Settings**.



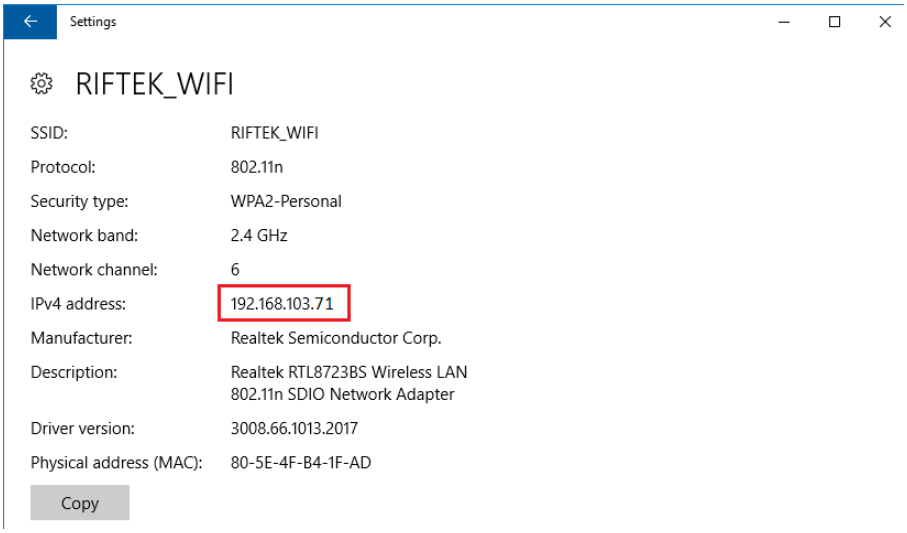
2. Select **Network & Internet**.



3. In the left panel, select **Wi-Fi**.

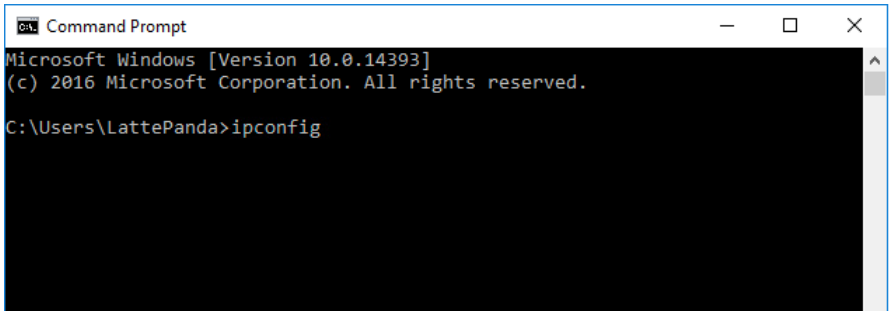


4. Click on your network name.
5. Scroll down to the IPv4 address - this is your IP address.

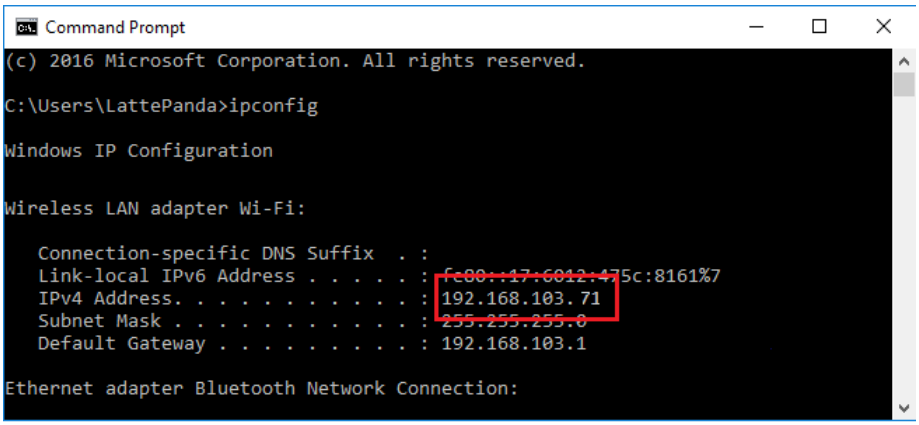


Method 2. Find the IP address using the command line.
1. Click **Start**, type *cmd* in the search bar and press **Enter**.

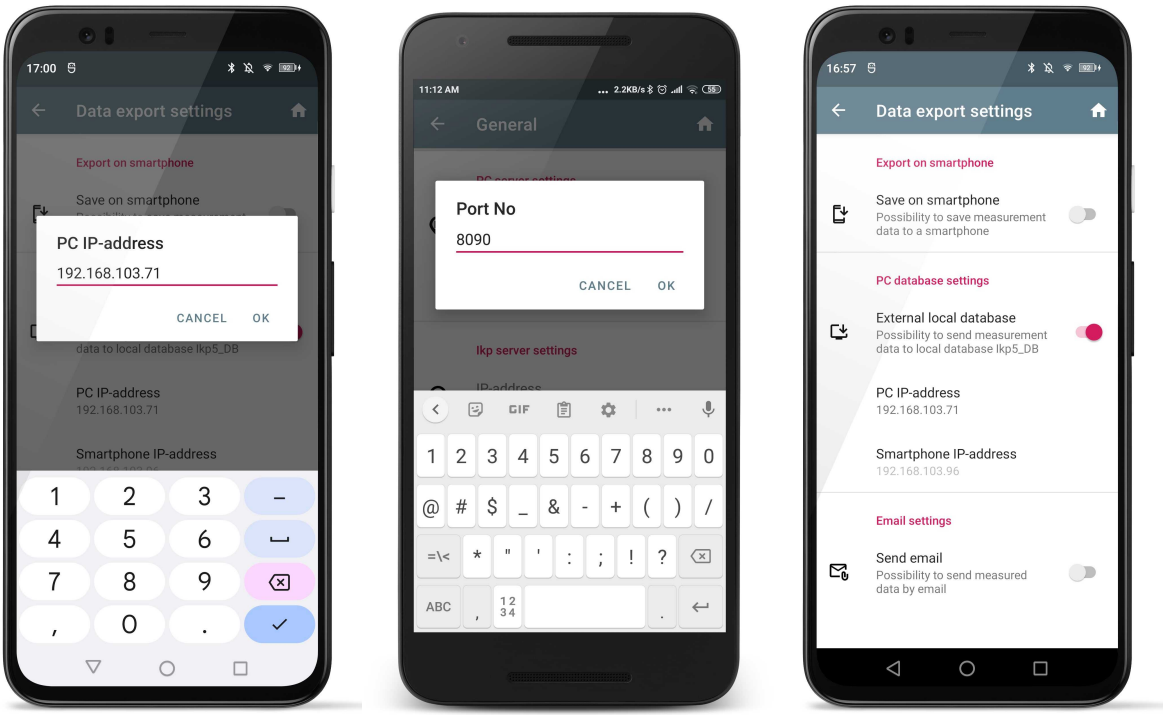
2. Type *ipconfig* and press **Enter**.



3. Find the IPv4 address - this is your IP address.



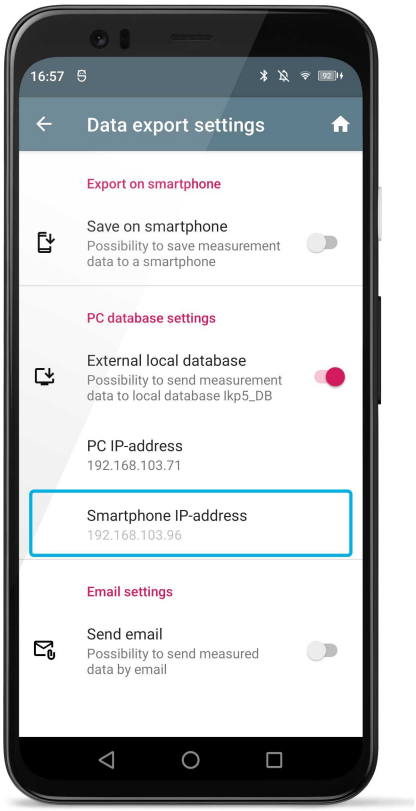
This IP address must be specified in the PC server settings. The port number is the same as in the settings of the **Ikp5_DB** program on the PC.



5.3.2.2. PDA server settings

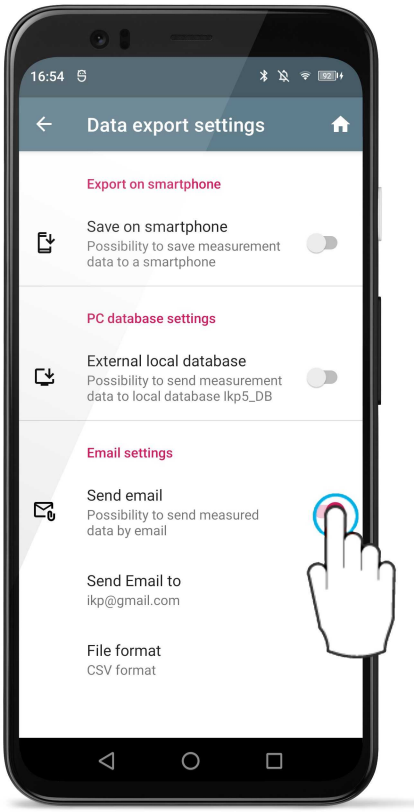
A server on PDA is needed to transfer reference files and processing scheme files from the **Ikp5_DB** program.

The **IP address** field is unavailable for editing, it displays the IP address of PDA in the Wi-Fi network. This IP address is used in the settings of the **Ikp5_DB** program.

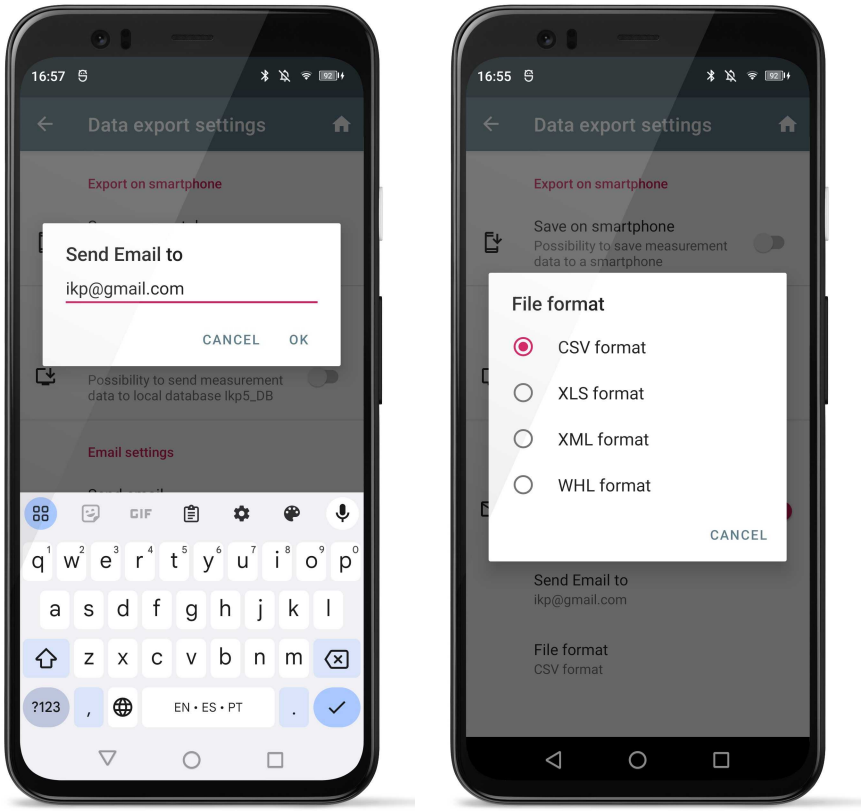


5.3.3. Sending data by email

To enable the ability to send a data file via Email, check the **Send email** option.

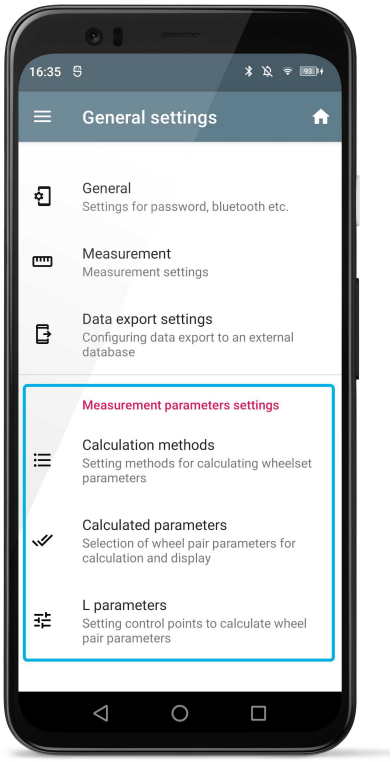


To send data, you need to enter the recipient's address and select the format of the sent file (CSV, XLS, XML, WHL).



5.4. Setting IKP measurement parameters

The menu item **Measurement Parameter Settings** is responsible for the settings for calculating the controlled wheel parameters.



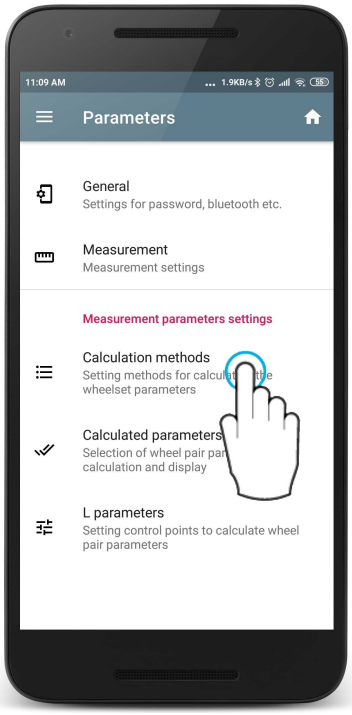
Calculation methods - setting up methods for calculating wheel sets parameters.

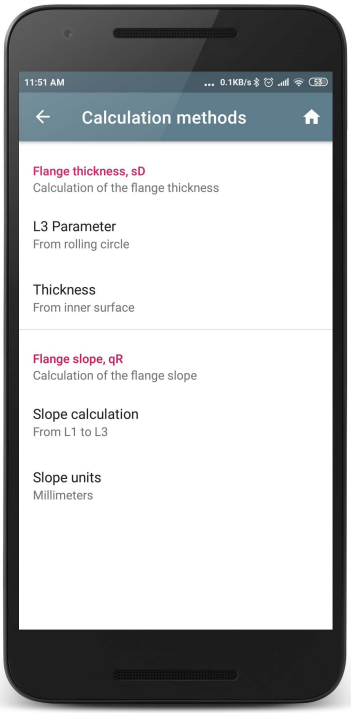
Calculated parameters - selection of wheel set parameters for calculation and display.

L parameters - setting the values of reference points for calculating the parameters of wheel sets.

5.4.1. Calculation methods

Select the **Calculation methods** item:

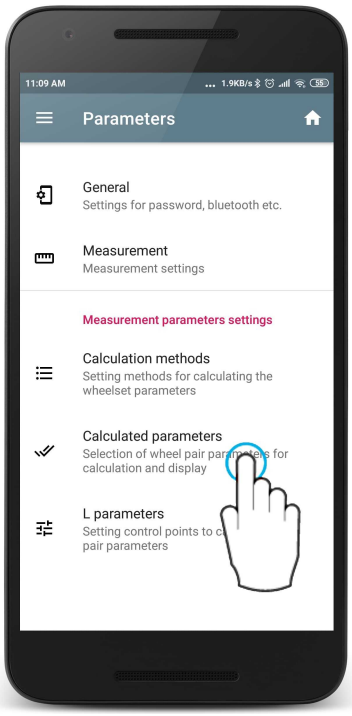


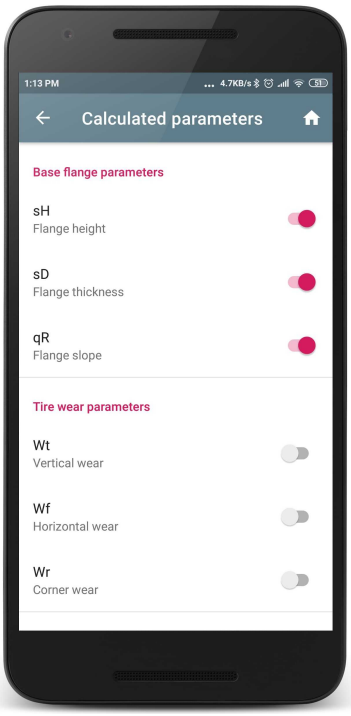


Methods for calculating parameters are described in the previous paragraphs.

5.4.2. Calculated parameters

Select the **Calculated parameters** item:

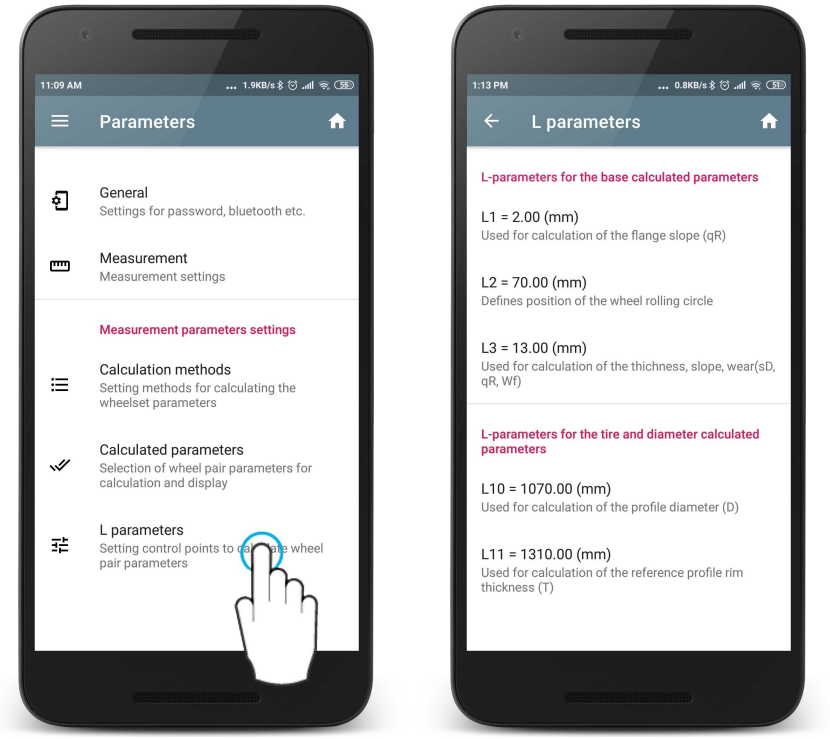




To select / deselect a parameter, tap the parameter.

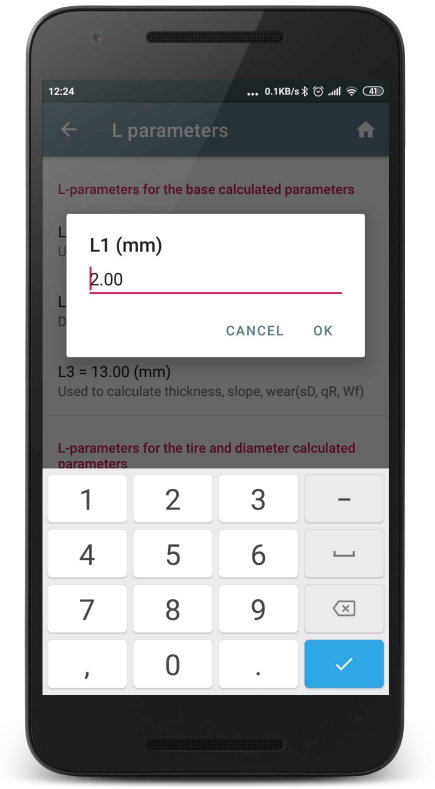
5.4.3. L parameters

Select the **L parameters** item:



The table displays only those parameters that are necessary for calculating the selected geometric parameters of the wheel (see par. Calculated parameters).

To edit a parameter, tap on the parameter and enter a new value in the window that appears. After entering, tap **OK**.

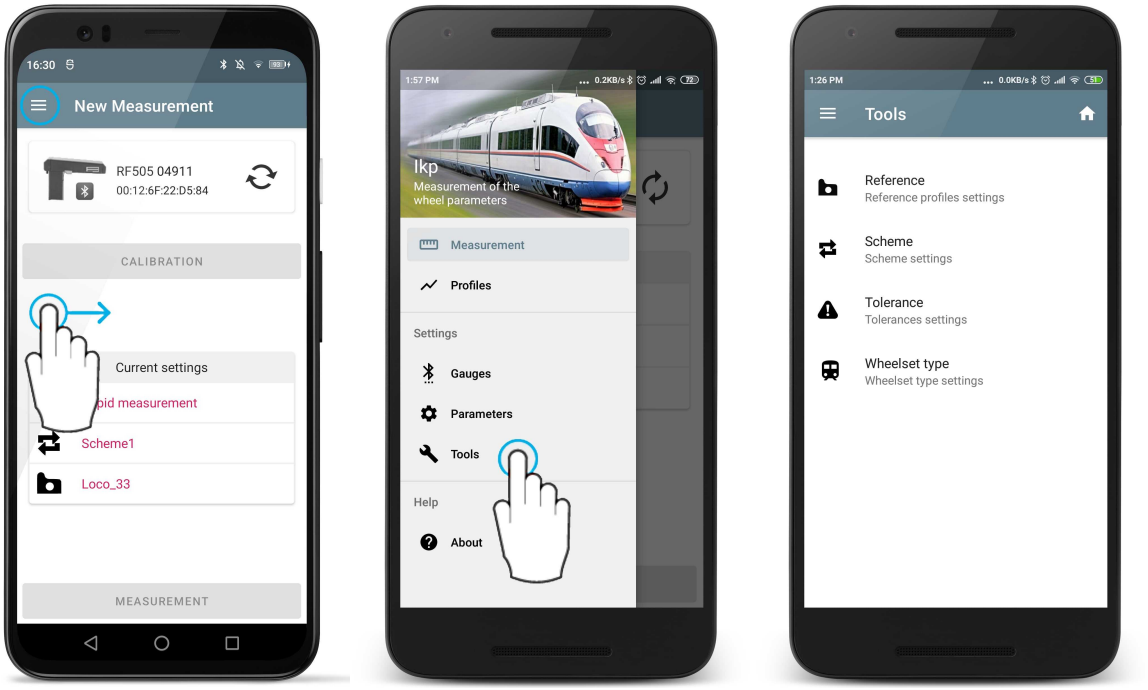


5.4.4. Preset values

L parameter	Default value	Assignment
L1	2 mm	It is used to calculate the flange slope (qR).
L2	70 mm	It sets the position of the wheel rolling circle and is used to calculate: - flange height (sH); - flange thickness (sD); - flange slope (qR); - inclination angle (A); - wheel diameter (D); - rim thickness (T); - wear (Wt, Wf, Wr).
L3	13 mm	It is used to calculate: - flange thickness (sD); - flange slope (qR); - wear (Wf).
L4	13 mm	Additional point for calculating the flange slope (qR).
L5	10 mm	It is used to calculate the angular wear (Wr).
L6	70 mm	It is used to calculate the slope of the rolling surface (S1).
L7	105 mm	It is used to calculate the slope of the rolling surface (S2).
L8	10 mm	It is used to measure the inclination angle of the profile at the desired point (A).
L9	140 mm	It is used when the measurement direction is inverted (L9 - profile width).
L10	599.35 mm	It is used to calculate the profile diameter (D).
L11	767 mm	It is used to calculate the rim thickness of the reference profile (T).
L15	13 mm	It is used to calculate the flange thickness of tram wheels (sD15).
P7 P8	70 mm 110 mm	It is used to calculate the hollow (Hl).
D1 D2	70 mm 107.5 mm	It is used to calculate the difference in wheel diameters in different sections (DD).

6. Setting reference profiles, measurement schemes, tolerances

Swipe right from the left edge and select **Tools**.



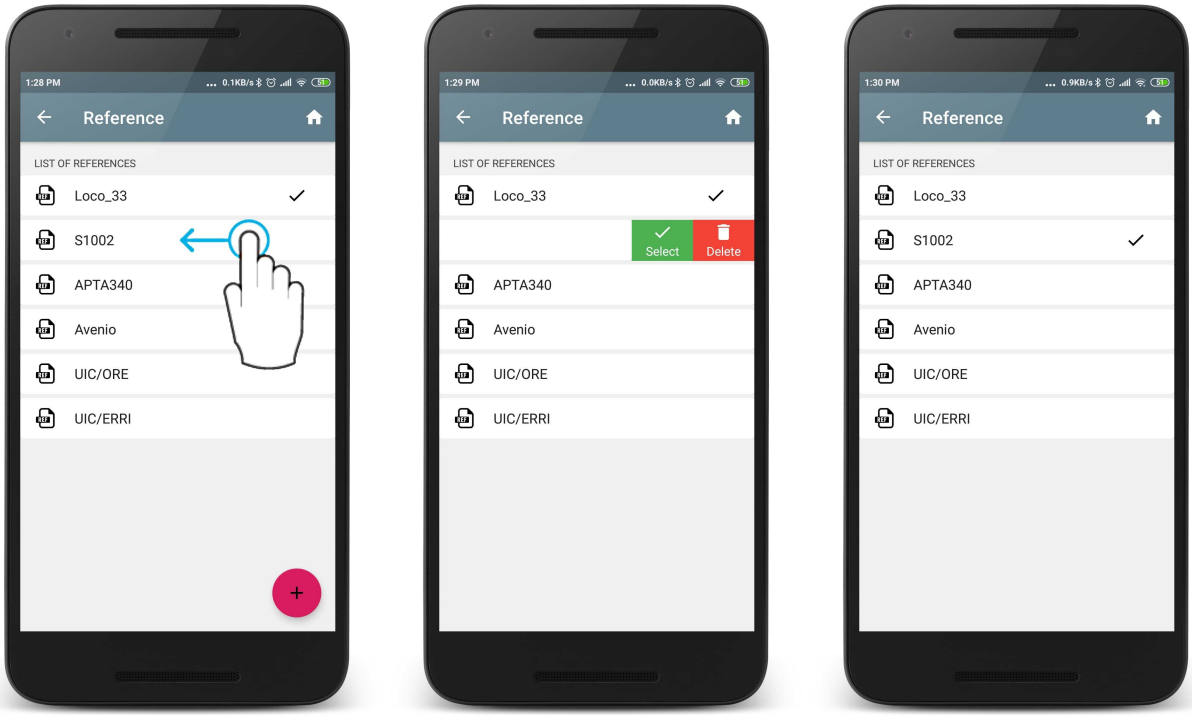
Reference - selection of reference profile.
Scheme - measurement scheme settings.
Tolerance - tolerance settings.
Wheelset type - wheelset type settings.

6.1. Reference profile

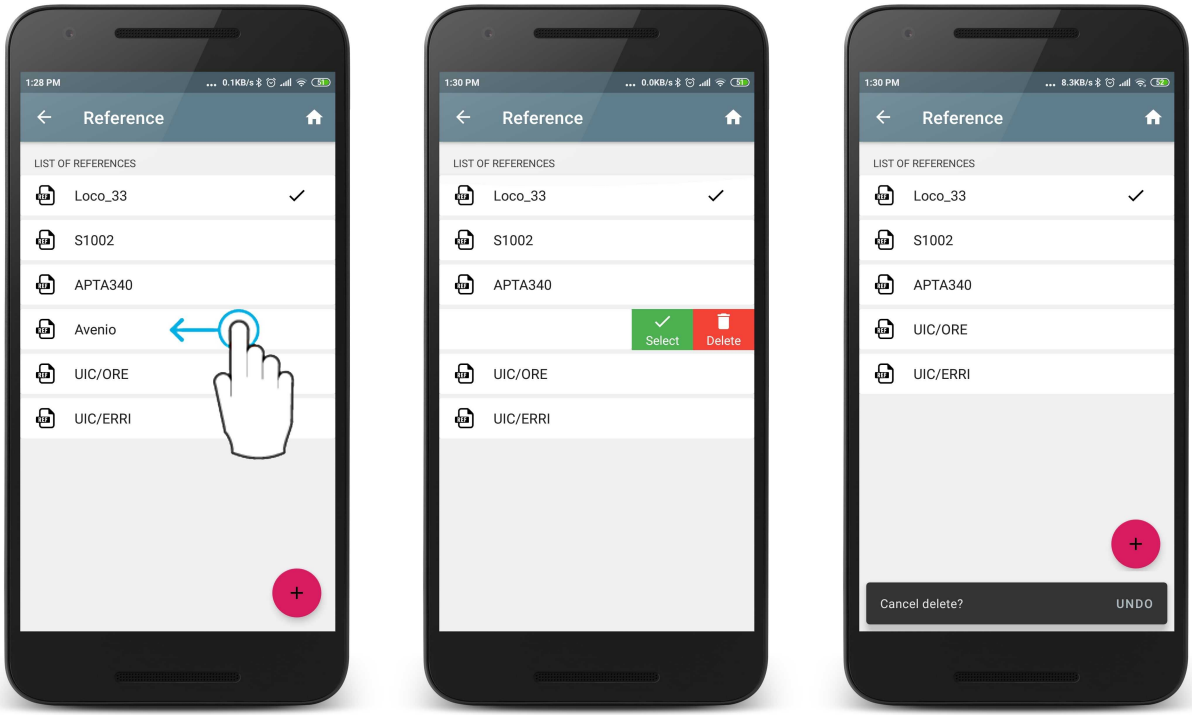
The program allows you to compare the scanned wheel profile with the reference profile.

6.1.1. Selecting and deleting the reference profile

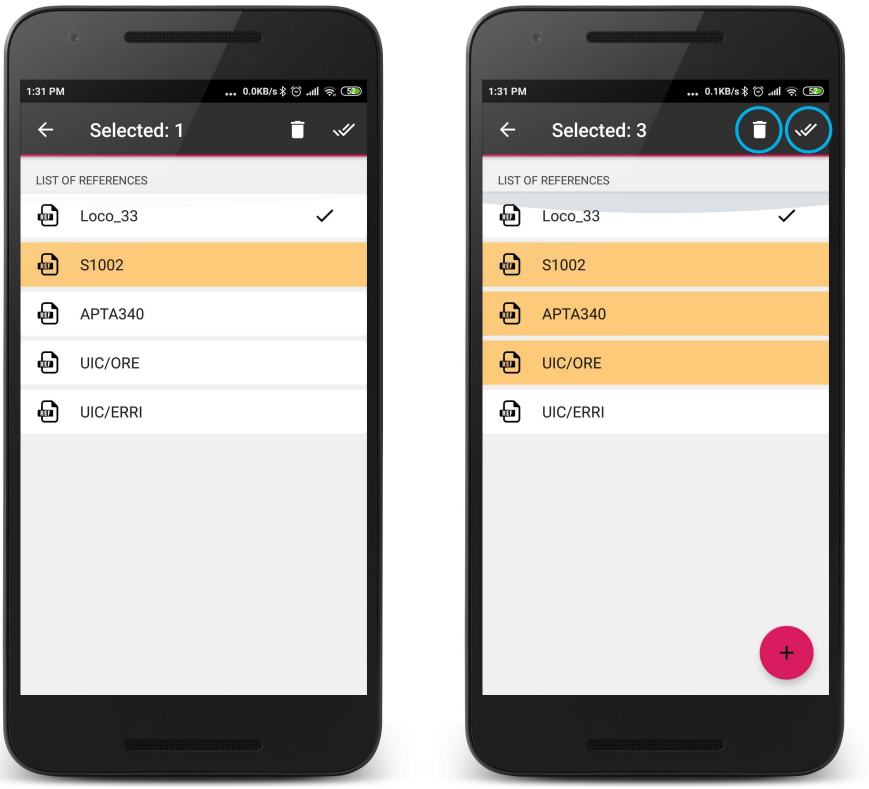
To select a reference as the main one, you need to swipe left from the right edge and tap **Select**. The selected reference will be marked with ✓.



To delete one reference, you need to swipe left from the right edge and tap **Delete**.



To delete several or all references, you need to tap and hold the item. Multiple selection mode will start.



Buttons:

- delete the selected references;
- select all.

To view the profile and reference parameters, you must tap on the required item.

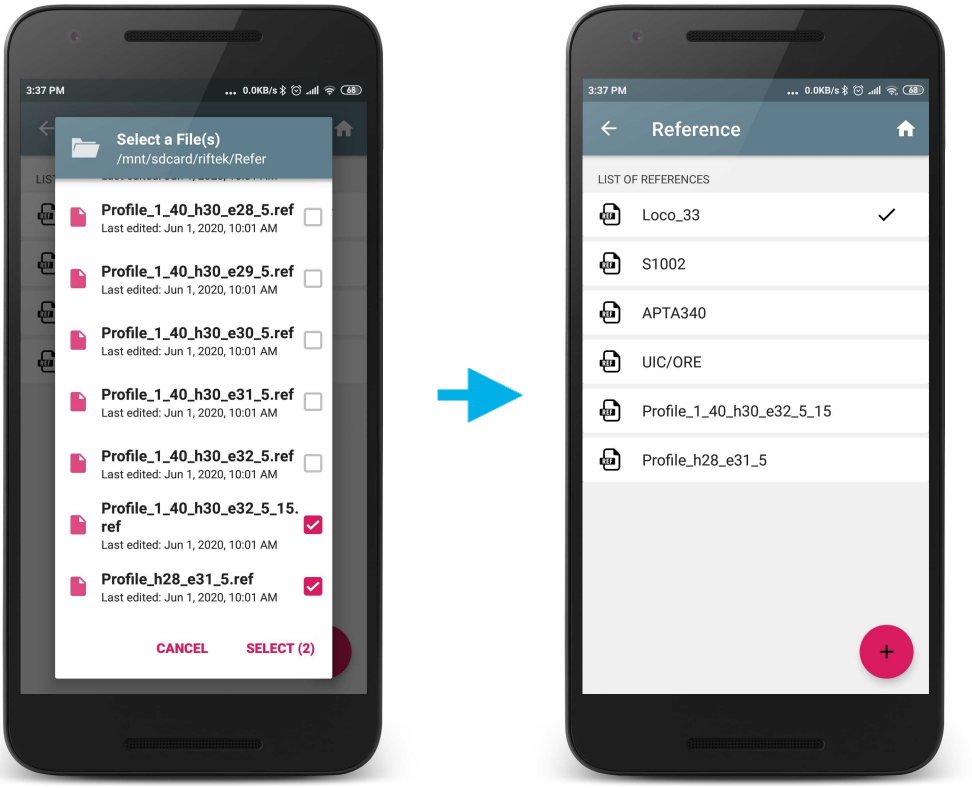
6.1.2. Uploading the reference profile to the database

The app comes with several pre-installed reference profiles.

If the required reference profile is not in the database, the user can request RIFTEK (free service) and then add the profile.

There are three ways to add a new reference to the database:

1. Copy the reference file to the device (in any standard way) and tap  . Select the files you need and tap **Select**.



2. Export a profile from the database of measured profiles (see par. Saving the wheel profile as the reference).

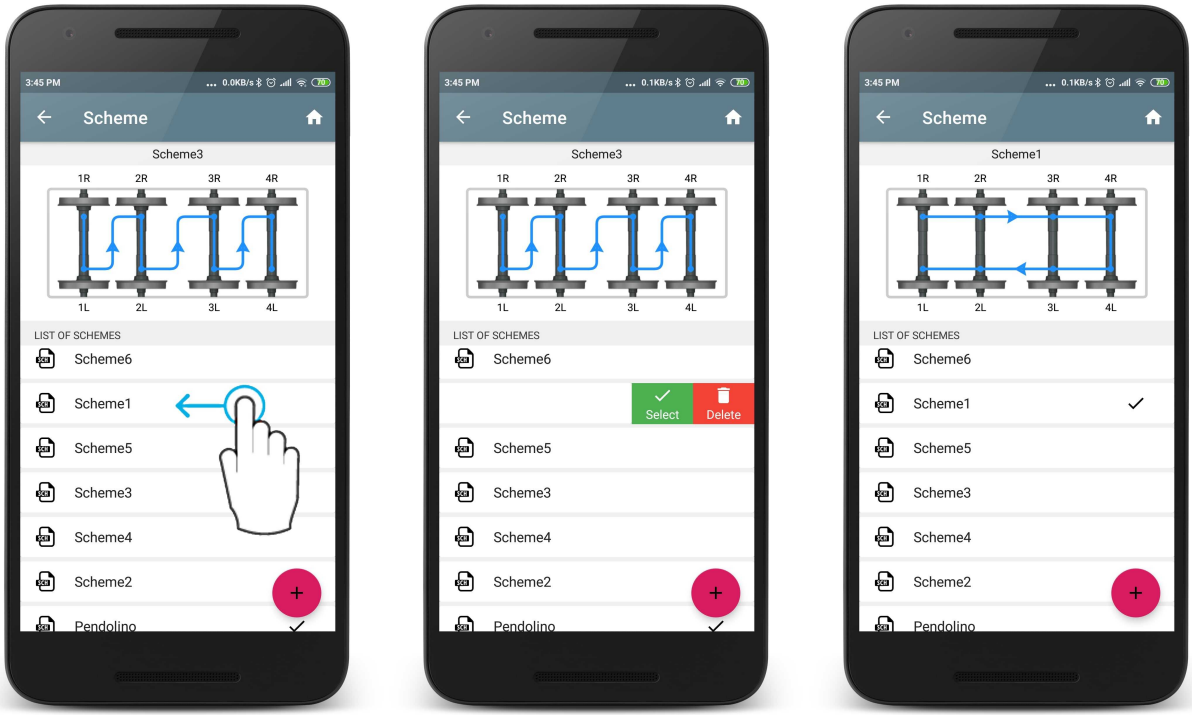
3. Export the reference file from the **Ikp5_DB** program to a PC (see par. Transferring the reference file).

6.2. Measurement scheme

The measurement scheme is the sequence of measurements of the wheels of the rolling stock with the given parameters of each wheelset (wheelset number, car number, series, etc.). The program automatically prompts the operator to measure a specific wheel in accordance with the selected scheme. The program contains several pre-installed schemes.

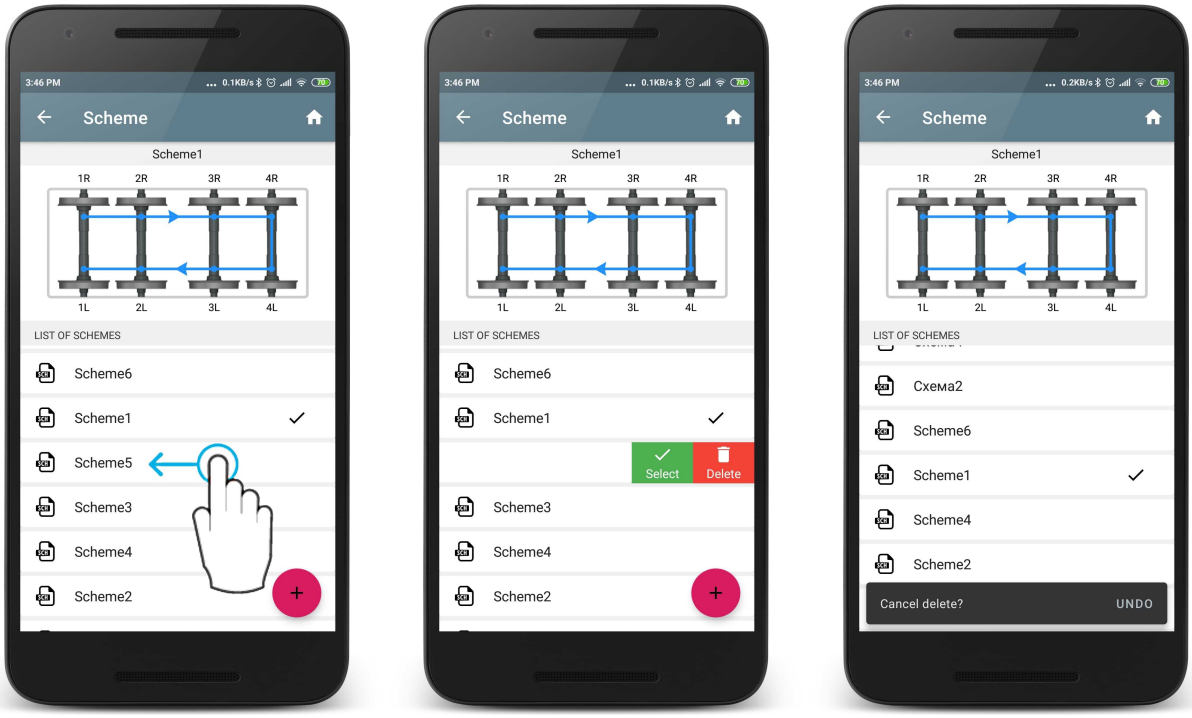
6.2.1. Selecting and deleting the measurement scheme

To select a scheme as the main one, you need to swipe left from the right edge and tap **Select**. The selected scheme will be marked with ✓.

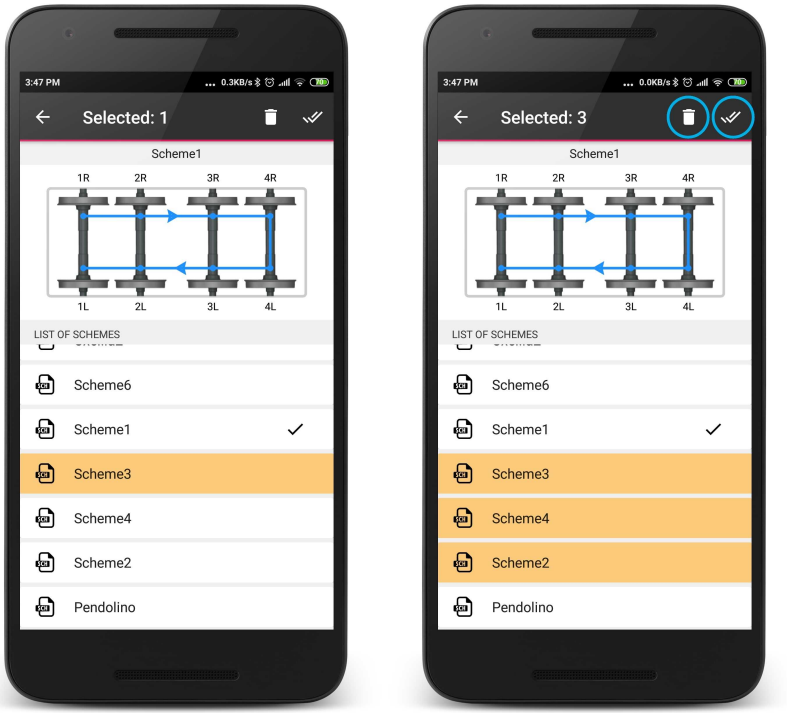


In the figure, the arrows show the direction of measuring the wheelsets, as well as the names assigned to the wheels (1L - first axle, left side; 2L - second axle, left side; 1P - first axle, right side, etc.).

To delete one scheme, you need to swipe left from the right edge and tap **Delete**.



To delete several or all schemes, you need to tap and hold the item. Multiple selection mode will start.



Buttons:

- delete the selected schemes;
- select all.

6.2.2. Uploading a new measurement scheme

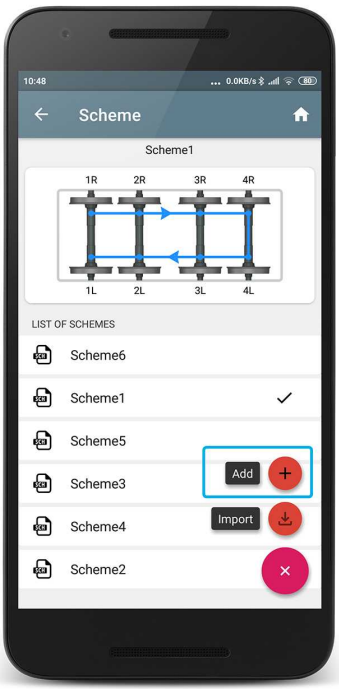
The app comes with several pre-installed measurement schemes.

If the measurement scheme is not in the database, the user can generate the scheme himself (see the User Manual for IKP) or request RIFTEK (free service) and then add the scheme.

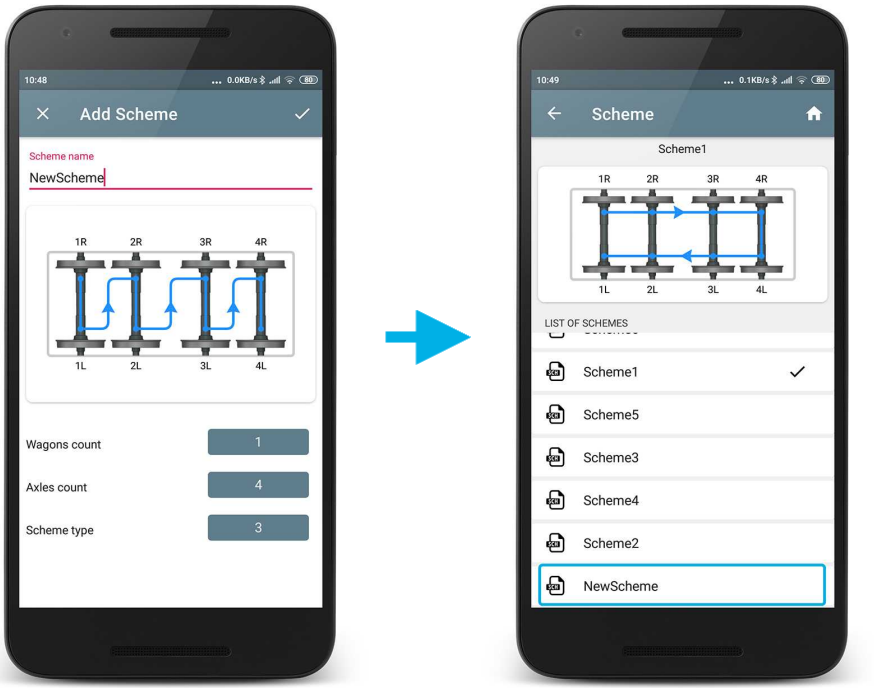
There are three ways to add a new measurement scheme to the database:

1. Create a new scheme yourself.

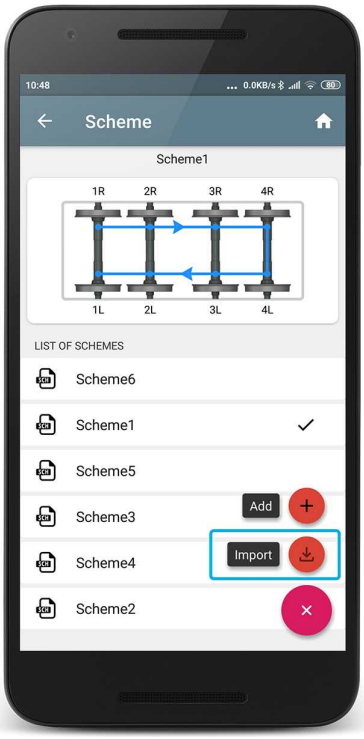
To do this, tap + and select **Add** from the drop-down menu.



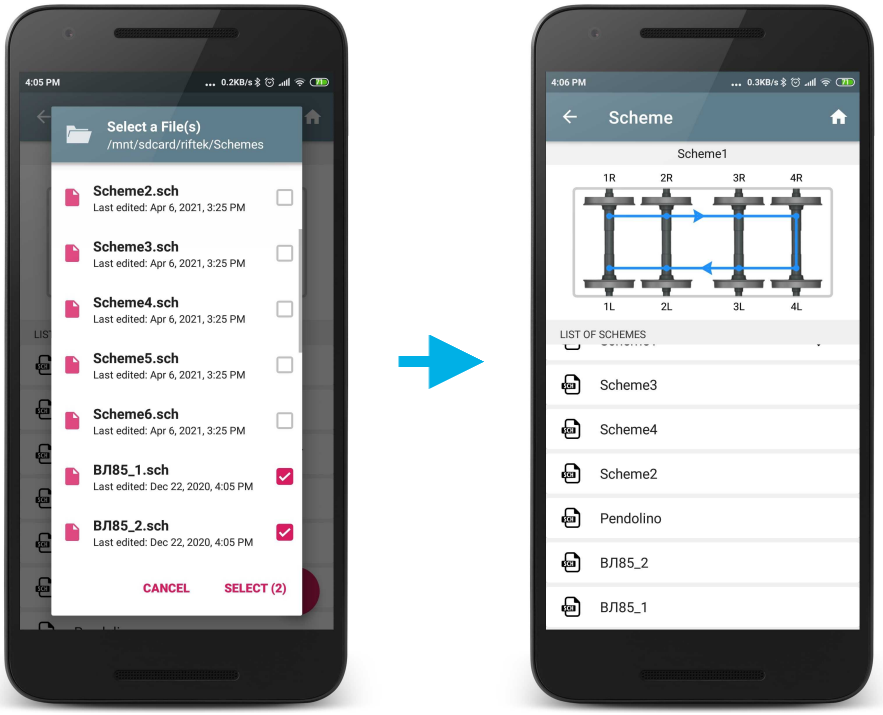
Enter the name of the scheme, the number of cars in the train, the number of axles in each car, and the type of scheme. After entering all these data, tap .



2. Copy the scheme file(s) to the device (by any standard method), tap + and select **Import** from the drop-down menu.



Tick the required files and tap **Select**.



3. Export the scheme file(s) from the **Ikp5_DB** program to a PC (see par. Transferring the scheme file).

6.3. Tolerance

The app automatically controls the measured geometric parameters for going beyond the specified tolerances.

6.3.1. Viewing and deleting tolerances

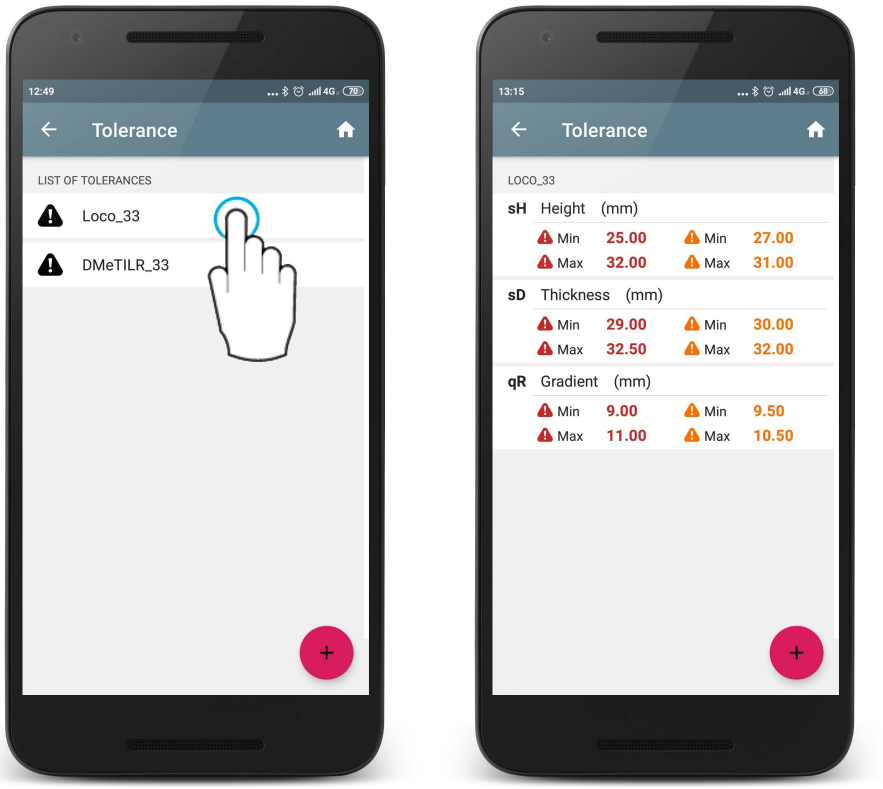
For each reference profile, you can add the tolerances for the calculated parameters of the wheelset.

The screenshots below show the tolerances for the "Loco_33" and "DMeTILR_33" references. If "Loco_33" is selected as the reference profile, the tolerance will also be used with the name "Loco_33".

To view or edit the values, you need to tap on the name of the tolerance.

The table displays the tolerances only for the selected geometric parameters of the wheel.

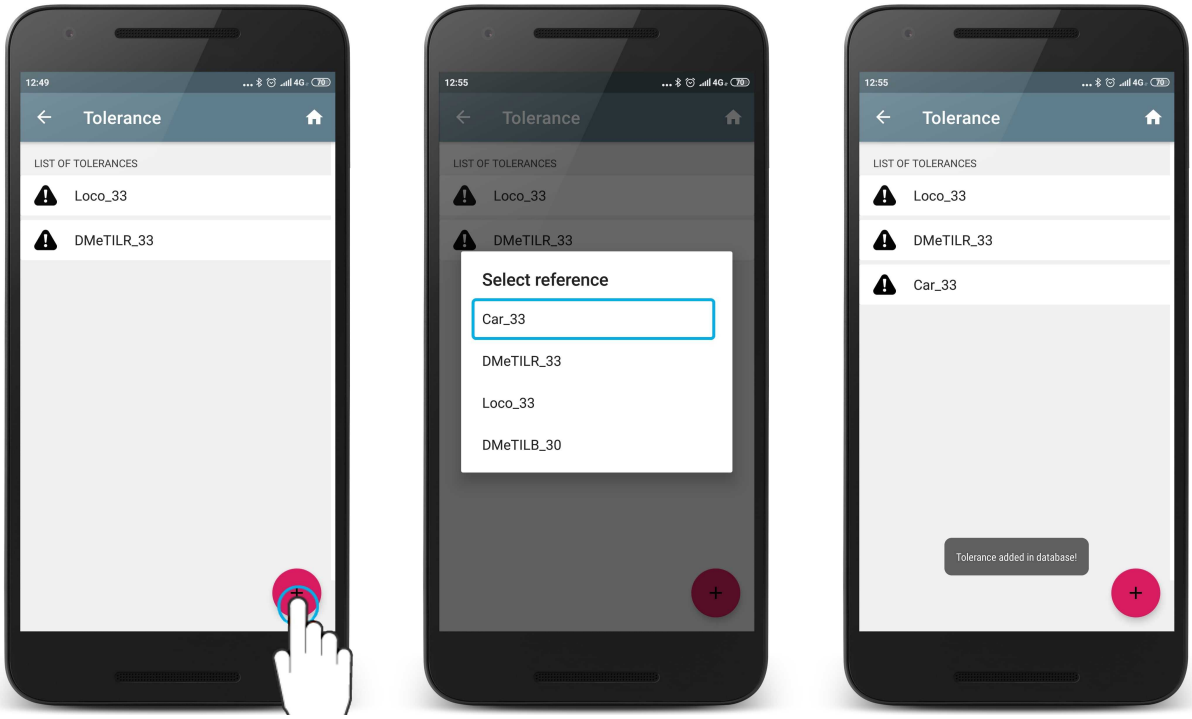
The maximum/minimum critical values of the parameters are displayed in red. The maximum/minimum values of the parameters, which are close to the critical values, are displayed in orange.



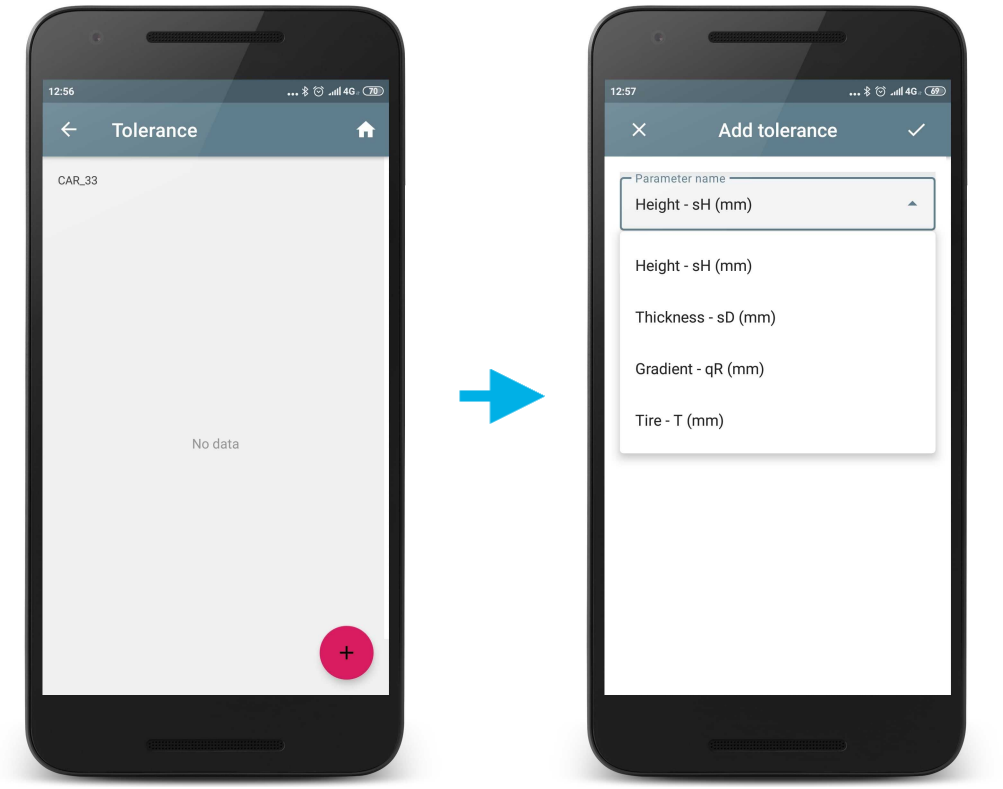
To delete a tolerance, you need to swipe left from the right edge and tap **Delete**, or tap and hold the item with the tolerance name (the procedure is the same as for the references - see par. Selecting and deleting the reference profile).

6.3.2. Adding tolerances

To add a tolerance, tap + and select a reference for which the tolerance will be set.

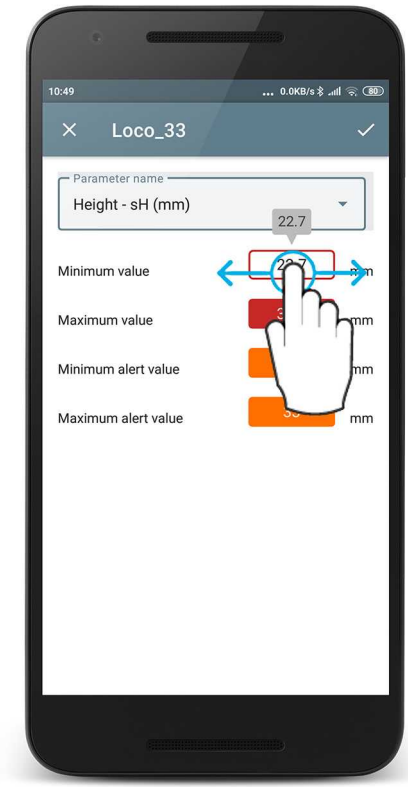


To set the tolerances for the calculated parameters of the wheelset, tap on the tolerance name. Then tap + and select the parameter for which the tolerances will be set. The drop-down list contains only those parameters that are selected for calculation (see par. Calculated parameters).

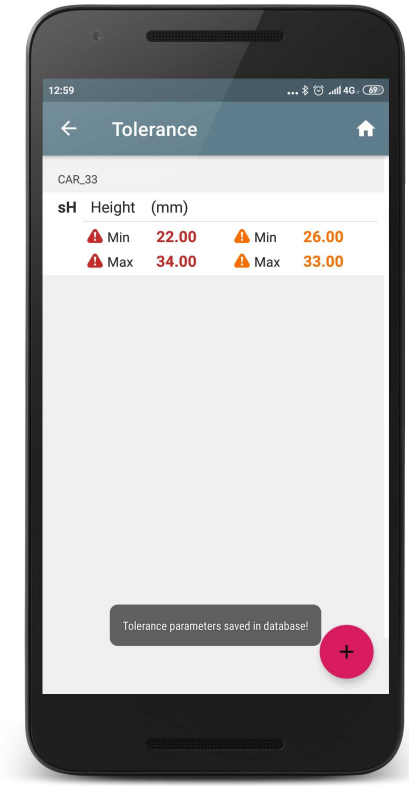


After selecting a parameter, the limit values must be entered.

To edit the tolerance, you can enter the desired value using the keyboard, or tap on the field and, holding your finger, select the desired value.



To save the tolerances, tap ✓. The added tolerances for the selected parameter will be displayed in the list.



6.4. Wheelset type

If different types of wheels must be measured, it is possible to set a specific scheme, reference profile and parameters for each type.

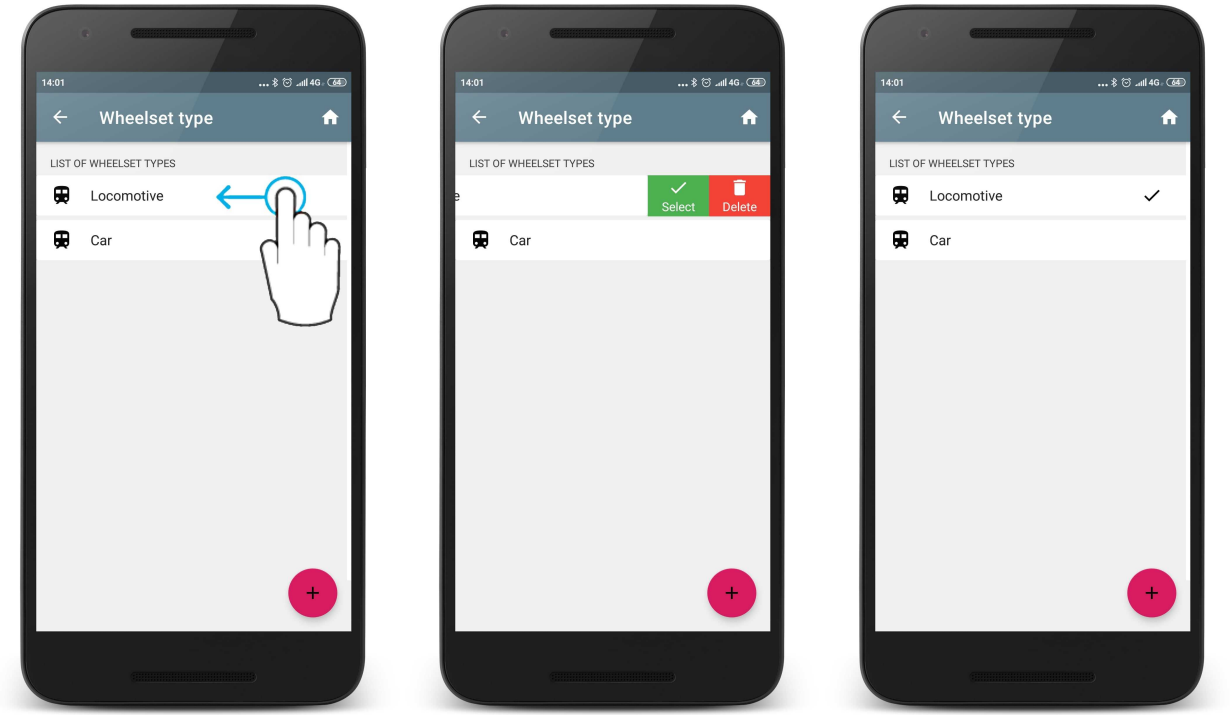
For instance, there are three types of wheels: WheelType1, WheelType2, WheelType3. Each time you switch to a new type, you can change the parameters, scheme and reference, or you can define these values for each type of wheel and, in the future, select only the required type.

An example:

WheelType1: Reference 1, Scheme 1, Parameters 1;
WheelType2: Reference 2, Scheme 2, Parameters 2;
WheelType3: Reference 3, Scheme 3, Parameters 3;

6.4.1. Selecting and deleting the wheelset type

To select a type as the main one, you need to swipe left from the right edge and tap **Select**. The selected type will be marked with ✓.

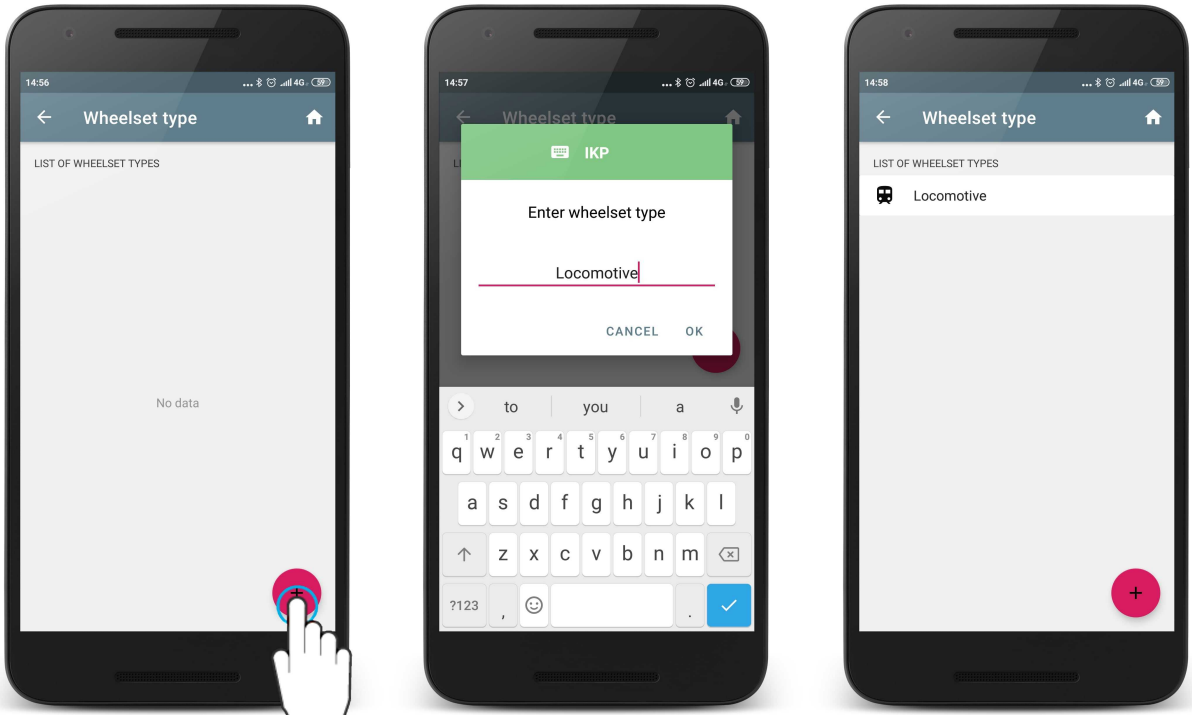


To delete a type, you need to swipe left from the right edge and tap **Delete**, or tap and hold the item with the type name (the procedure is the same as for the references - see par. Selecting and deleting the reference profile).

6.4.2. Adding the wheelset type

The app comes with preset measurement parameters.

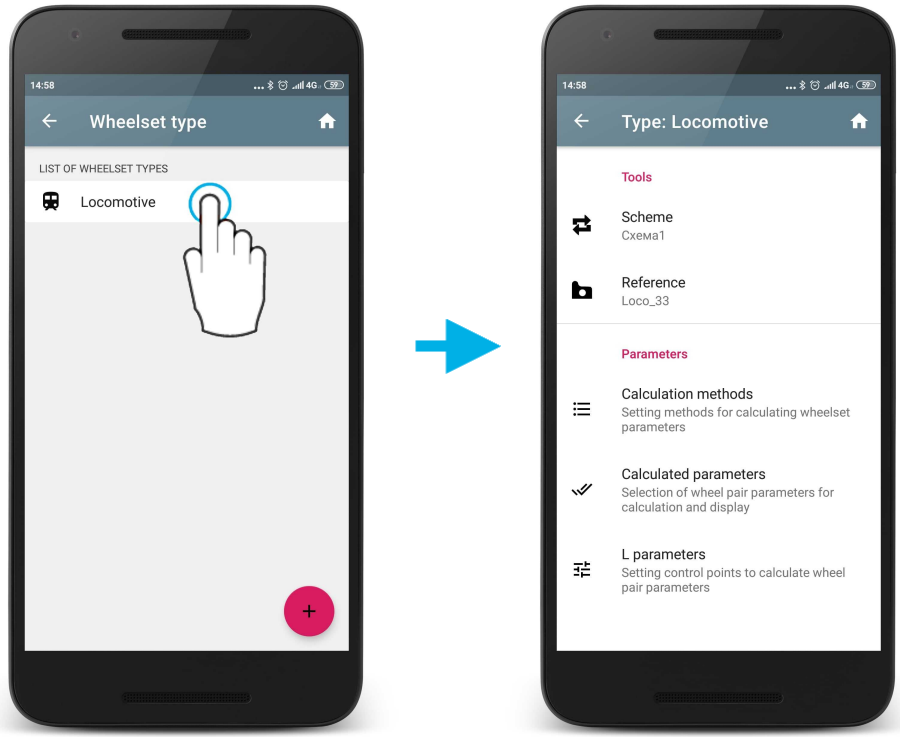
To add a new type of wheel, tap + and enter the name.



After adding a new type of wheelset, all settings contain standard preset values. To set specific values, you need to edit the created type of wheelset, see par. Editing the wheelset type.

6.4.3. Editing the wheelset type

To edit the wheelset type, tap on the type name.

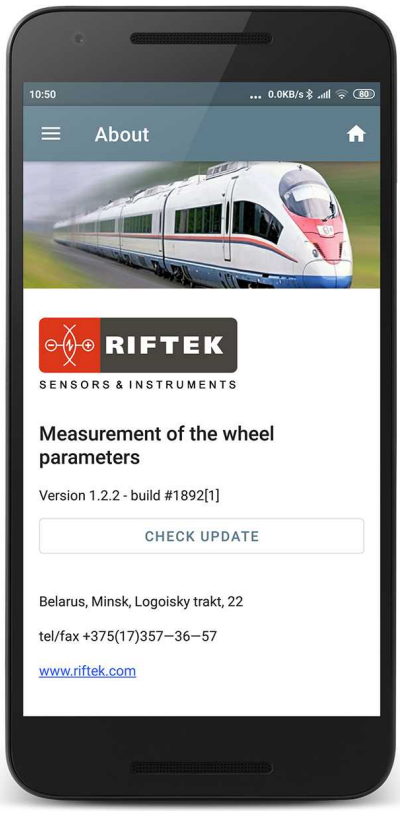


To set the values:

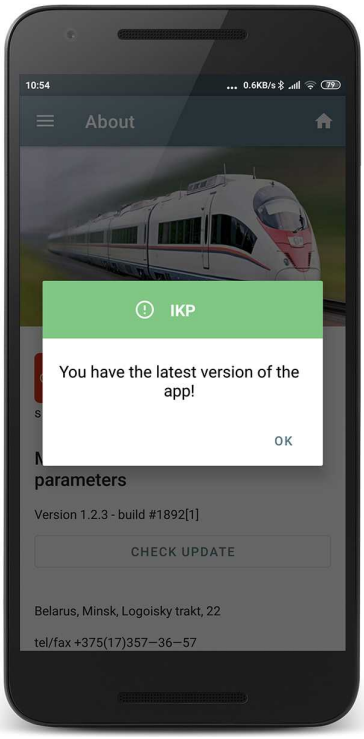
- Select the **Scheme**.
- Select the **Reference**.
- Set the **Calculation methods** (see par. Calculation methods).
- Set the **Calculated parameters** (see par. Calculated parameters).
- Set the **L parameters** (see par. L parameters).

7. Software update

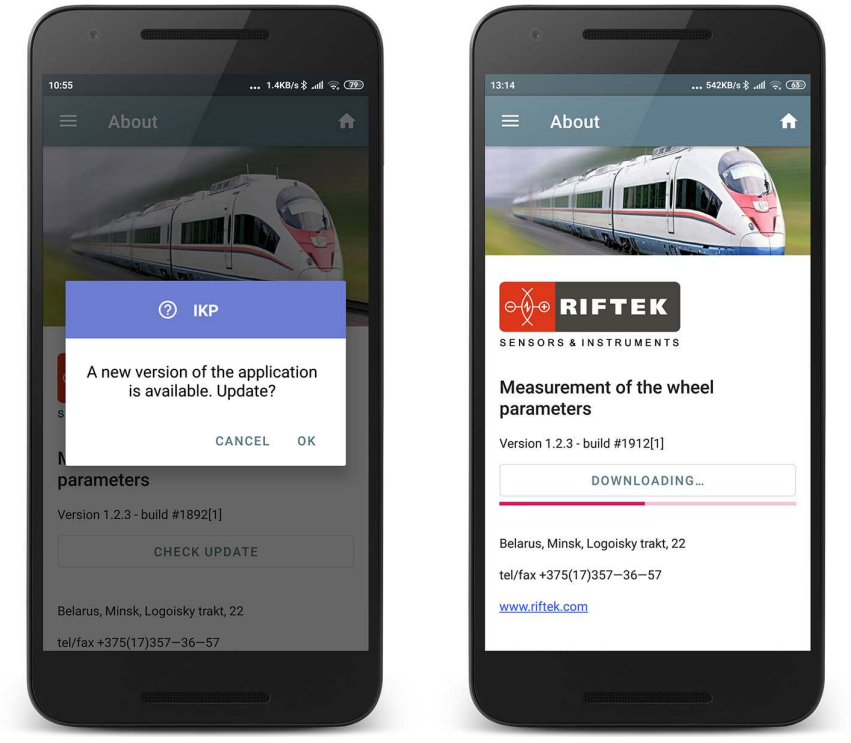
The software version is shown in the **About** window. To open the **About** window, tap ☰ or swipe right from the left edge and select **About**.



To check if you have the latest version, tap the **CHECK UPDATE** button. If you have the latest version installed, the app will display a corresponding message.



If you do not have the latest version installed, you will be prompted to update the application. Tap **OK** to update. The new version of the application will be downloaded and installed automatically.



The latest version of the software can be downloaded at: https://riftek.com/upload/medialibrary/a75/ikp.zip

The update procedure is the same as when installing the application (see par. Installation).

8. Measurement

There are two measurement types:
1. Rapid measurement (see par. Rapid measurement).
2. Measurement by scheme (see par. Measurement by scheme).

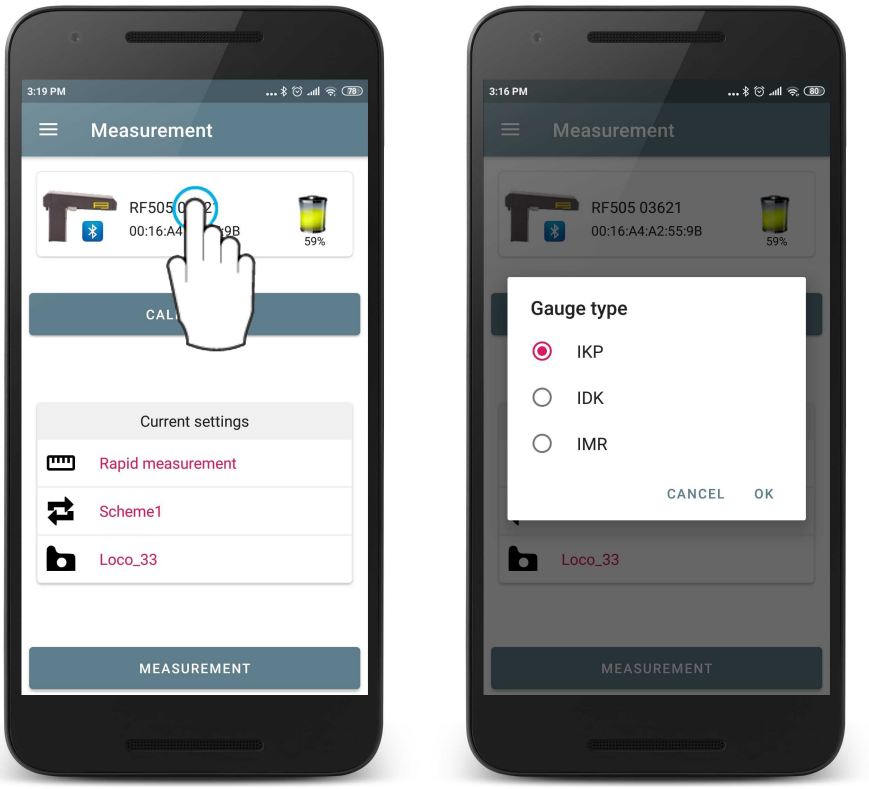
How to select the measurement type – see par. Setting the measurement type or par. Quick setup.

8.1. Quick setup

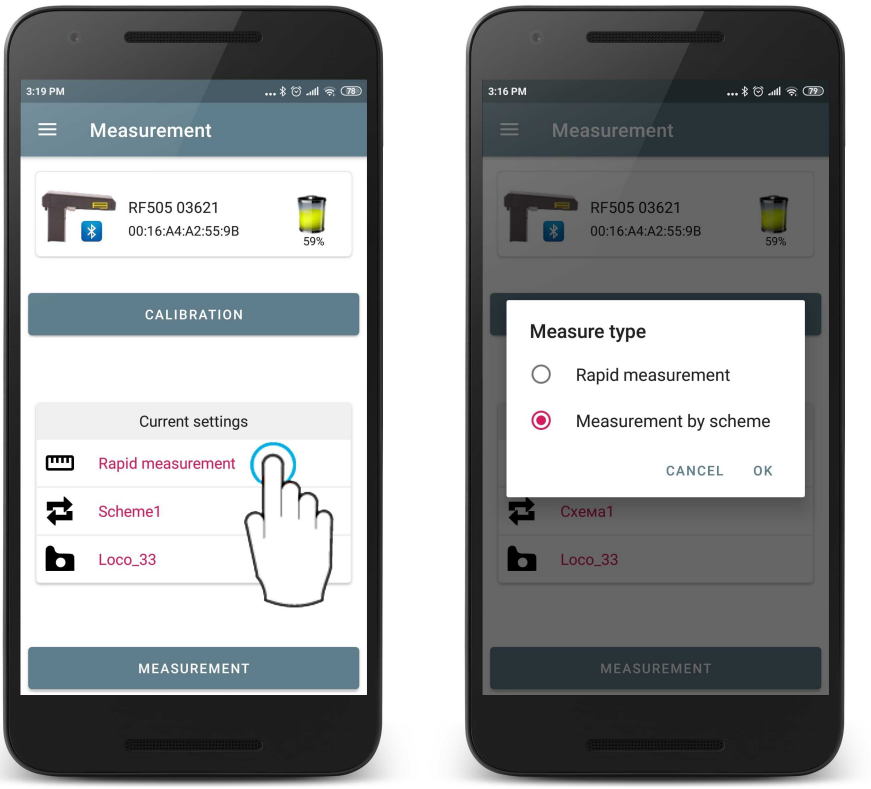
The main window contains tools that allow the user to quickly configure parameters.

> Quick setup is not active if a password for changing parameters is set.

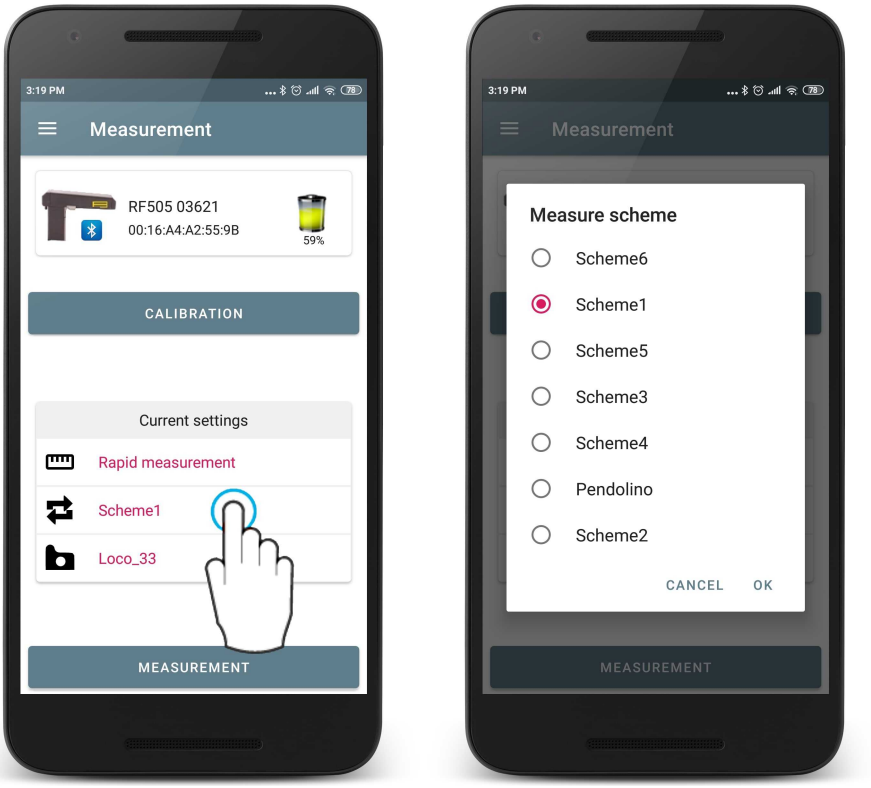
- To quickly select the type of measuring device, tap on the name of the current device and make a selection.



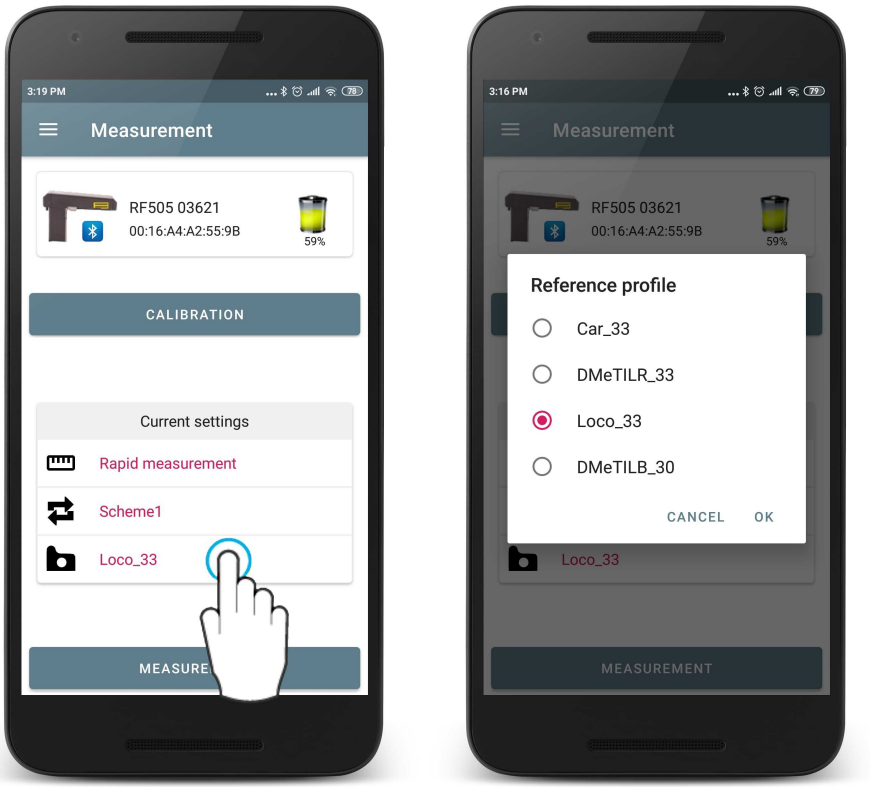
- To quickly select the measurement type, tap on the current measurement type and make a selection.



- To quickly select the measurement scheme (used when measuring according to the scheme, see par. Measurement by scheme), tap on the current measurement scheme and make a selection.



- To quickly select the reference, tap on the current reference and make a selection.

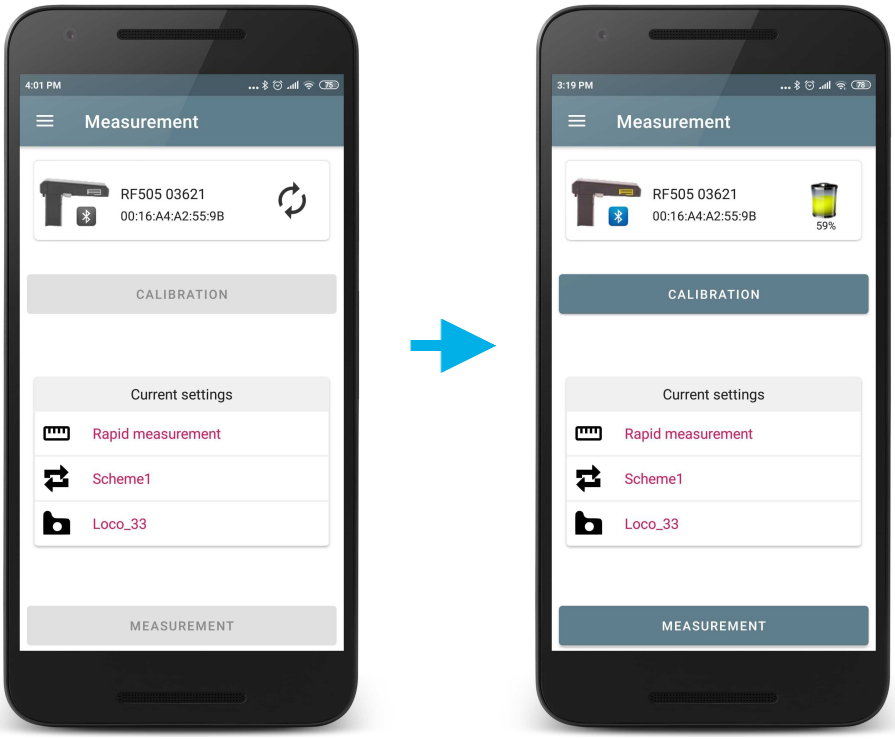


8.2. IKP-5

To synchronize with the profilometer, you need to select **IKP** as the gauge type. Selecting the type of measuring gauge – see par. Adding and selecting the measurement device or par. Quick setup.

8.2.1. Turning on the gauge

- Before first use, charge the laser module and PDA batteries by connecting them to the charger.
- Turn on the laser module by pressing and holding the power button for a few seconds. When turning on the laser module, the red LED flashes.
- After turning on the laser module, the wireless connection between the module and PDA will be automatically established (during this time, the blue LED is on). Once the connection is established, the blue LED turns off.
- The main program window will be updated:



All buttons and indicators become active.

8.2.2. Installing the gauge on the wheel

Attention!
Before installing the laser module on the wheel, you need to remove any dirt from the areas where the laser scanning module will be in contact with the wheel surface.
When installing the laser module on the wheel, do not allow strong impacts of its supports against the wheel, because this can lead to incorrect operation of the profilometer.

It is necessary to periodically inspect the output window and base supports of the laser module and clean them of dirt.
Do not clean glass with abrasive materials or aggressive cleaning agents.

To make measurements, follow these steps:

- Install the laser module on the calibration block or wheel - place the support of the laser module on the wheel flange and press the magnetic support against the inner edge of the wheel.
- For the rim measurement, extract the rim measurement rod and hitch it up to the rim.

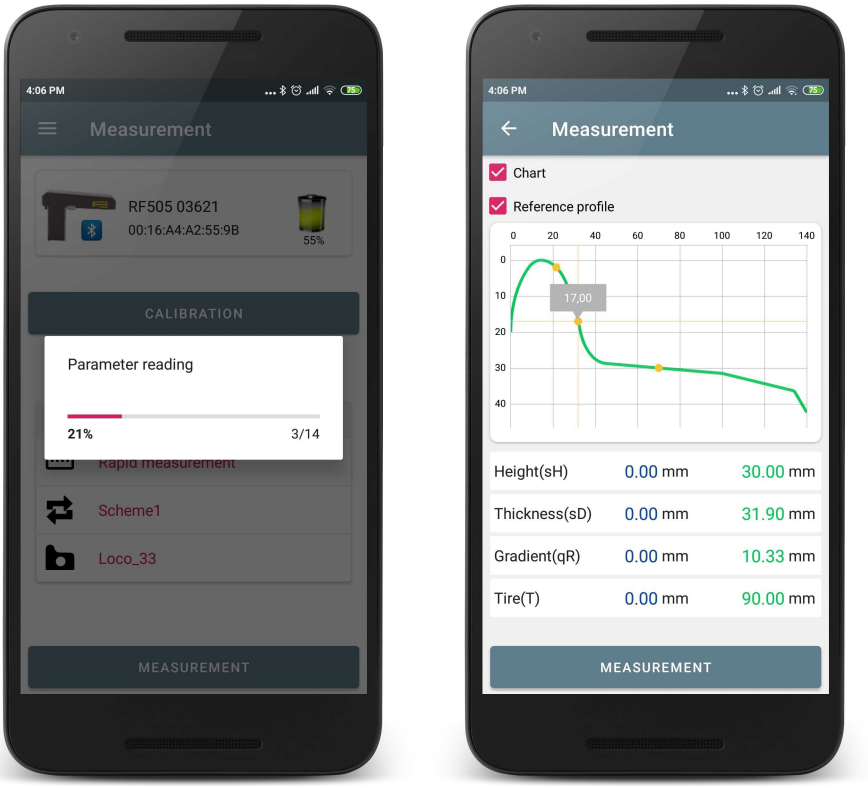
- Make sure that the module is mounted correctly without any misalignment and gaps.

8.2.3. Rapid measurement

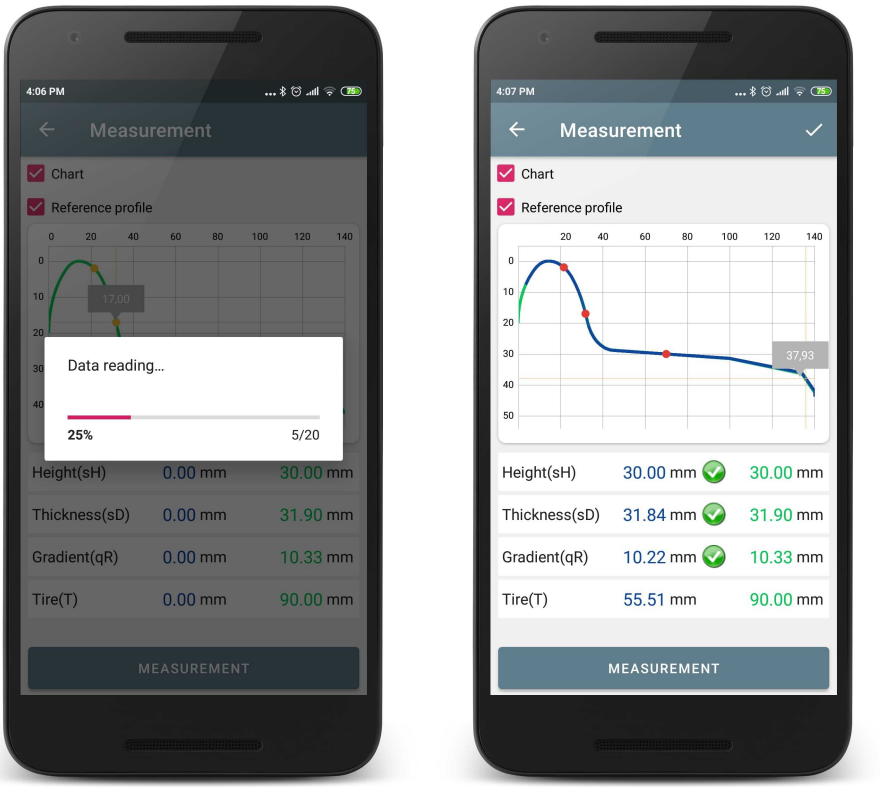
This measurement type is used to quickly measure parameters or to save a single measurement to the database with the possibility of setting wheel identification parameters.

Procedure:

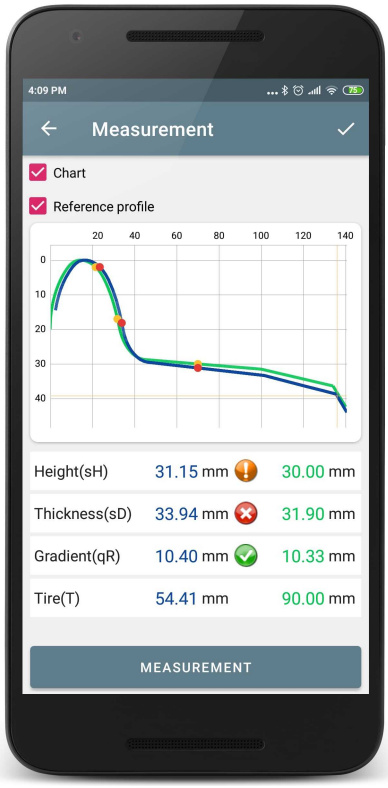
- Tap the **MEASUREMENT** button. The application will ask for the calibration parameters of the laser module and, in case of successful reading, the **Measurement** window will appear.



- When you tap the **Measurement** button, the laser module will scan the wheel surface. The scanning time is about 1-2 seconds, during which the red LED is on.
- After completing the scanning process, the application will display the measured parameters.

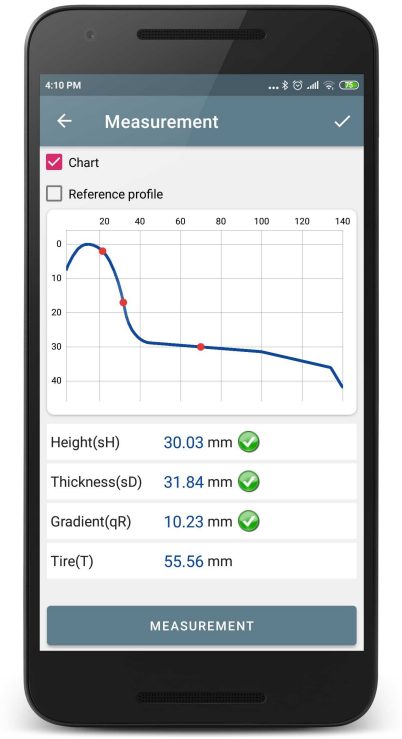


When the value is outside the specified tolerance, it is highlighted in red (orange):

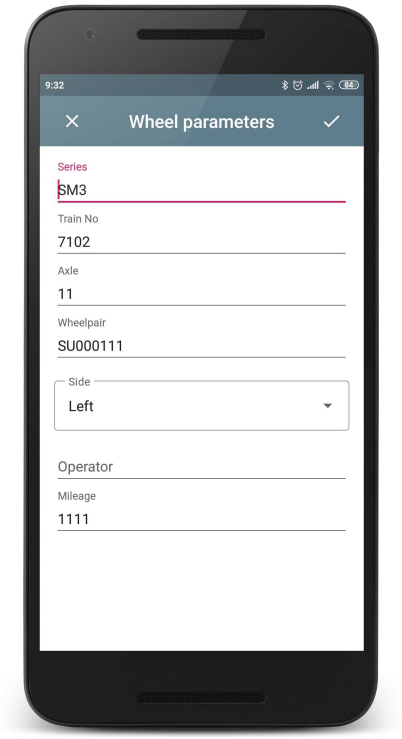


- If necessary, tap the **Measurement** button to scan the wheel surface again.

It is possible to display only the parameters of the measured profile. To do this, clear the **Reference profile** checkbox.



- When scanning the calibration block or the reference wheel, the scan results must differ from the nominal values by no more than 0.1 mm. In this case, the device is ready for operation, otherwise it is necessary to calibrate the device in accordance with the User Manual.
- If the wheel was scanned once, tap ✓ to save it and enter the wheel identification parameters.



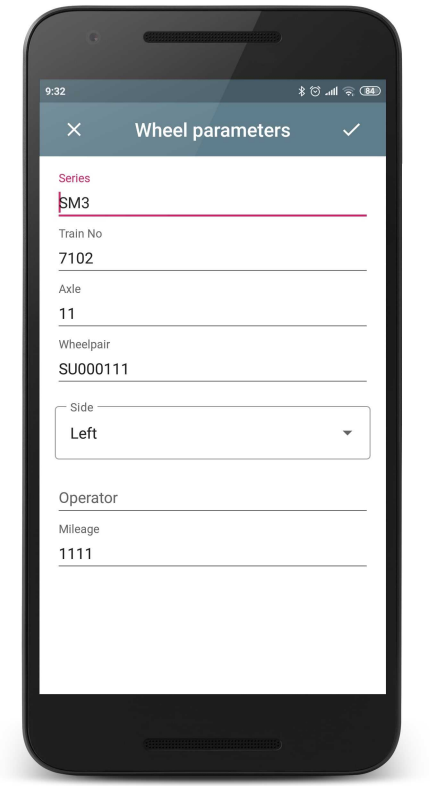
The measurement will be saved to the database (see par. Viewing measurement results).

8.2.4. Measurement by scheme

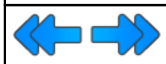
This measurement type makes it possible to use all features of the profilometer, such as working with the database of measurements.

Procedure:

- Tap the **Measurement** button. The application will request the calibration parameters of the laser module and, in case of successful reading, the **Wheel parameters** window will appear. The values are displayed in accordance with the selected measurement scheme. If necessary, the user can edit the parameters.



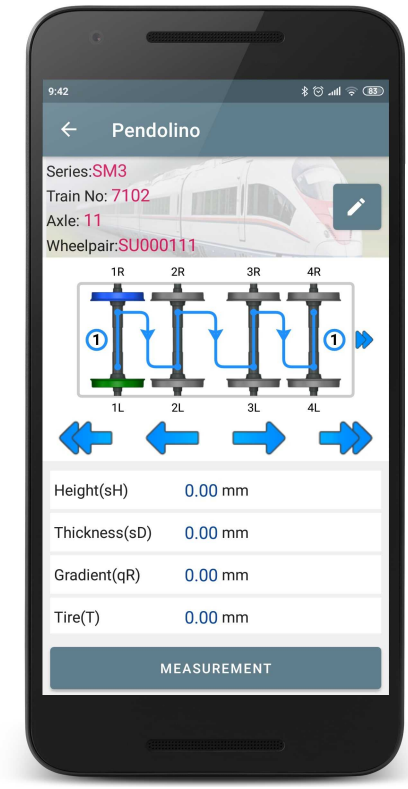
- To save the parameters, tap  . The application will display the selected measurement scheme, as well as the values of the wheel parameters that are selected for the calculation (see par. Calculated parameters).

	Editing the entered parameters of the wheelset.
	Moving to the previous/next wheel.
	Moving to the previous/next car.
	The unmeasured wheel.
	The wheel to be measured.
	The measured wheel (within tolerance).
	The measured wheel that will be measured again.
	The measured wheel, the parameters of which are close to the critical values.
	The measured wheel, the parameters of which are outside the critical values.
	Ordinal number of the car (displayed if there are several cars in the scheme)

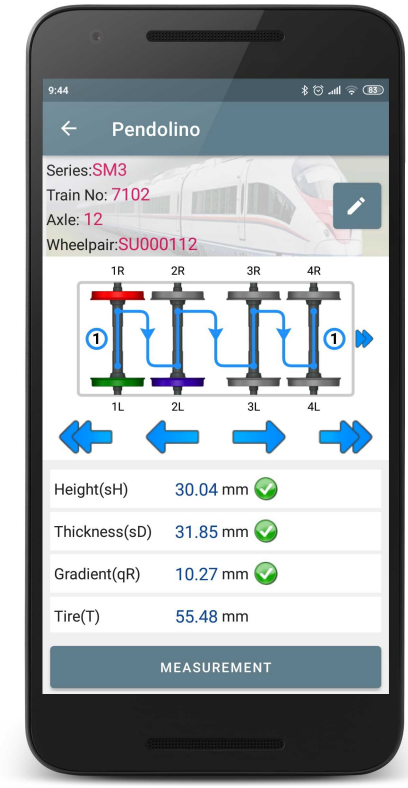
- To measure the wheel suggested by the application (highlighted in green), tap the **MEASUREMENT** button. The laser module will scan the wheel surface.
- After scanning, the measured values of the wheel geometric parameters are displayed on the screen. If a parameter is beyond the specified tolerance, its value is highlighted in orange or red:

It is possible to display only the parameters of the measured profile. To do this, clear the **Reference profile** checkbox.

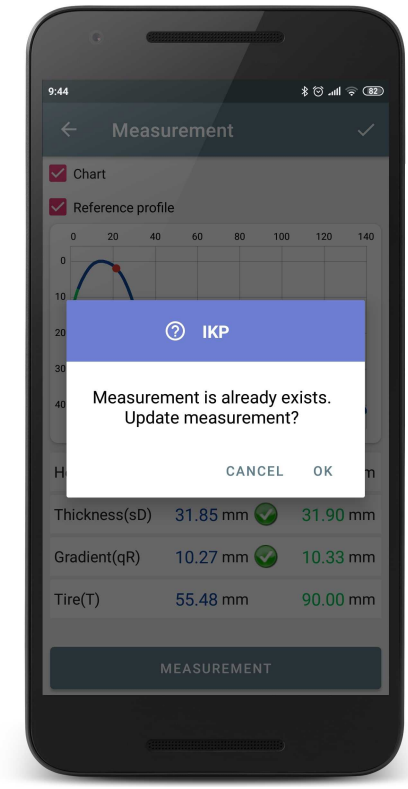
- To repeat the measurement, tap the **MEASUREMENT** button.
- When a satisfactory result is obtained, tap ✓ to save the data.
- The application will offer to measure the next wheel in accordance with the measurement scheme.



- Use the navigation arrows to view the results of the previous measurement. If you select the measured wheel, the saved wheel parameters will be displayed.



- When you select the measured wheel, the application will warn you that the measurement with such parameters has already been saved in the database and will offer to save the new measurement.



All saved measurements will be saved to the database (see par. Viewing measurement results).

8.3. IDK-BT

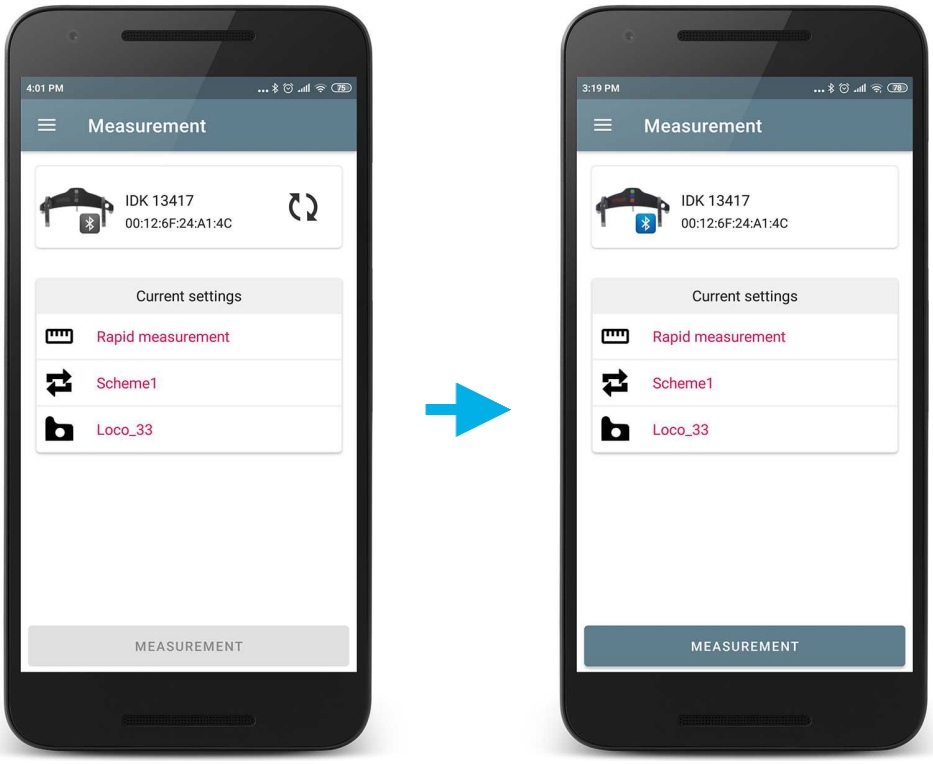
To synchronize with the wheel diameter measuring gauge, you need to select **IDK** as the gauge type. Selecting the type of measuring gauge – see par. Adding and selecting the measuring gauge or par. Quick setup.

8.3.1. Turning on the gauge

- Before using for the first time, charge the batteries of the IDK by connecting them to the charger.
- Press the **Red** button to turn on the gauge.

> The display shows “ErrP” message if the battery voltage is below the control level. In this case, short-term operation is possible after pressing any button.

- After turning on the gauge, a wireless connection is automatically being established between the module and the mobile device (the blue LED is on). Once the connection is established, the LED turns off.
- The main window will be updated:



The **MEASUREMENT** button and the Bluetooth connection indicator become active.

8.3.2. Installing the gauge on the wheel

To make a measurement, do the following:

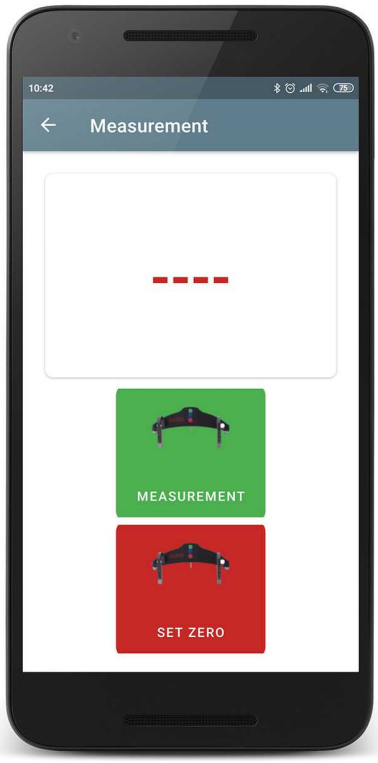
- Place the gauge onto the wheel.
- Make sure the ball supports and the measuring tip of the gauge are tight against the roll surface and side supports are adjacent to the edge of the wheel.

8.3.3. Rapid measurement

This measurement type is used to quickly measure the diameter or to save a single measurement to the database with the possibility of setting wheel identification parameters.

Procedure:

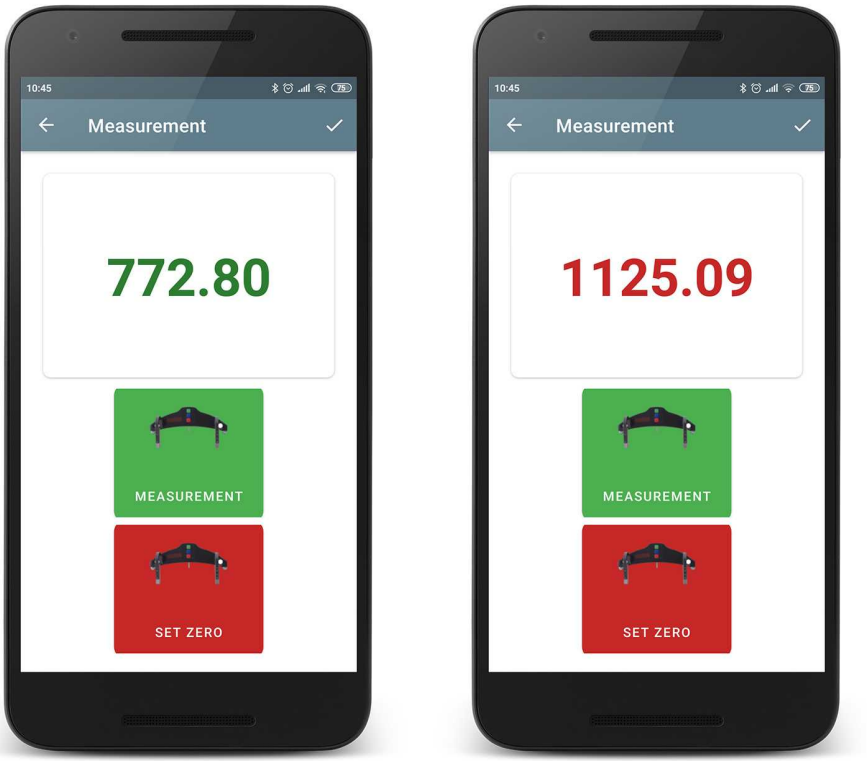
- Tap the **MEASUREMENT** button. The application will ask for the calibration parameters of the IDK and, in case of successful reading, the **Measurement** window will appear.



- Measure the diameter.

- Reset the averaging result (the display shows "------").

- Press the **Green** button. After a second, the wheel diameter value will appear on the display.
- When the diameter value exceeds the specified tolerance, its value is highlighted in red:



To continue measurements with averaging:

- Press the **Green** button.

- The IDK display will show the value of the **“n x”** counter, where x is the number of averaged measurements.
- After a second, the average value of the wheel diameter will be displayed.
- Install the gauge to a new position and repeat the measurements. The total number of measurements averaged in this way can reach 9999.
- Press the **Red** button to reset the averaging result.
- To save the measurement, click ✓ and enter the wheel identification parameters.

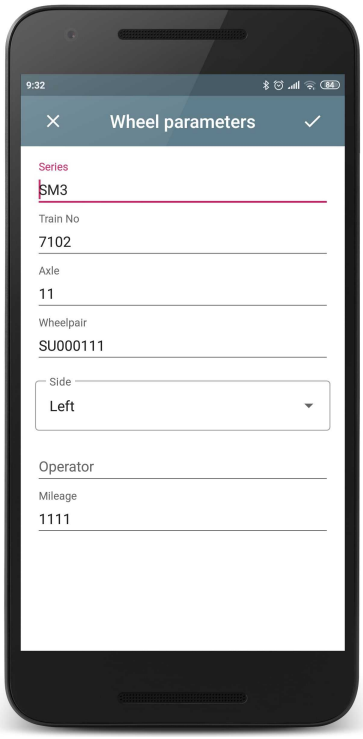
The measurement will be saved to the database (see Viewing measurement results).

8.3.4. Measurement by scheme

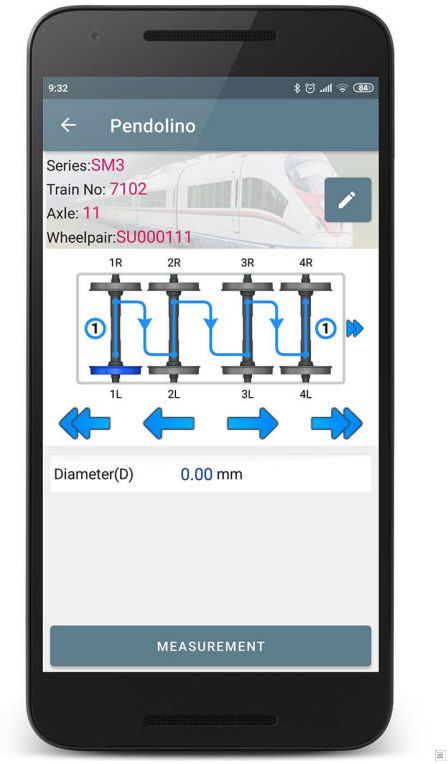
This measurement type makes it possible to use all features of the gauge, such as working with the database of measurements.

Procedure:

- Tap the **Measurement** button. The application will request the parameters of the IDK and, in case of successful reading, the **Wheel parameters** window will appear. The values are displayed in accordance with the selected measurement scheme. If necessary, the user can edit the parameters.



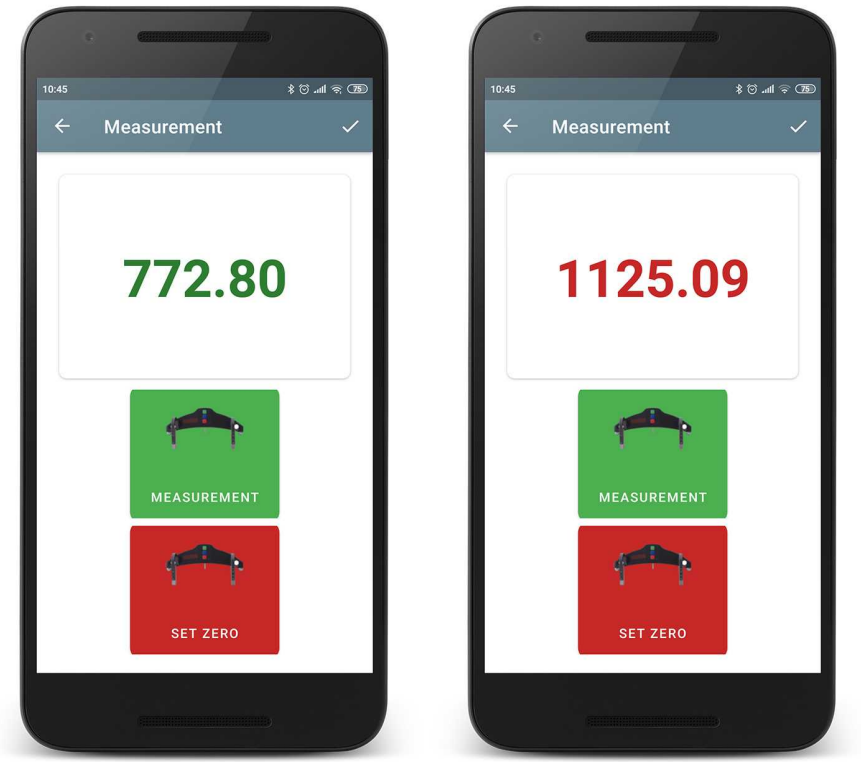
- To save the parameters, tap ✓. The application will display the selected measurement scheme and diameter values.



Buttons assignment - see Measurement by scheme.

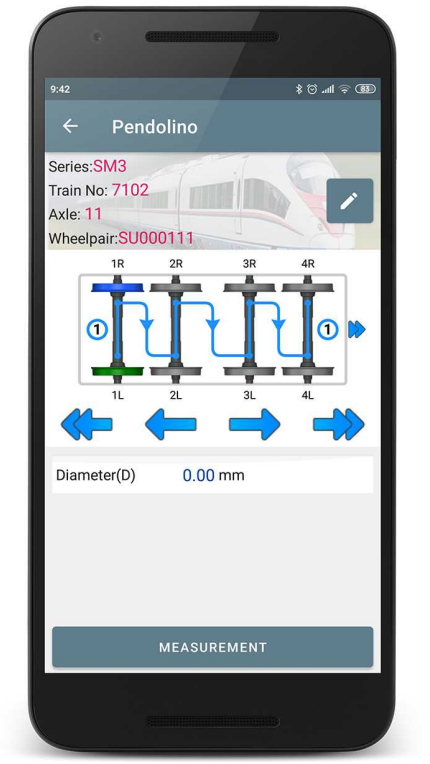
- To measure the wheel suggested by the application (highlighted in green), tap the **MEASUREMENT** button. The application will display the **Measurement** window and the IDK will measure the diameter. The measured wheel diameter will be displayed.

When the diameter value exceeds the specified tolerance, the value is highlighted in red:

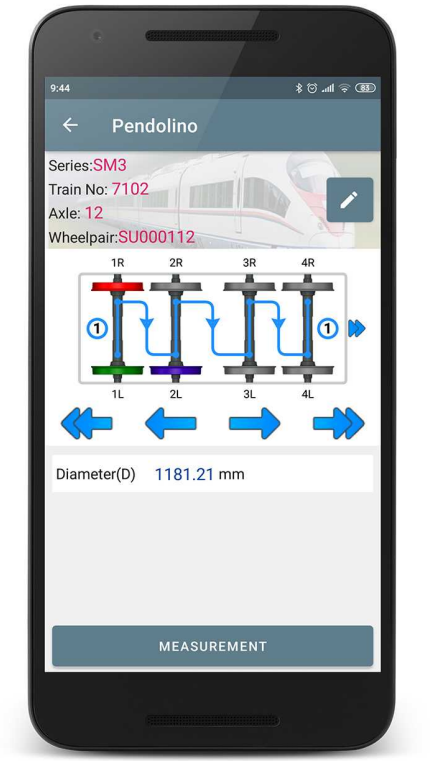


- To repeat the measurement, tap the **MEASUREMENT** button.

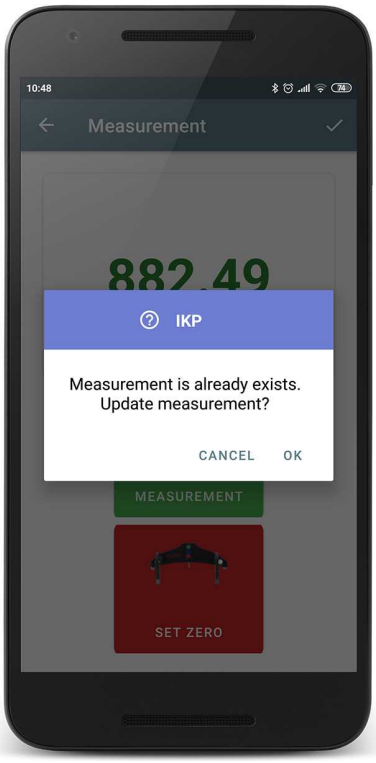
- When a satisfactory result is obtained, tap  to save the data.
- The application will offer to measure the next wheel in accordance with the measurement scheme.



- Use the navigation arrows to view the results of the previous measurement. If you select the measured wheel, the saved wheel diameter will be displayed.



- When you select the measured wheel, the application will warn you that the measurement with such parameters has already been saved in the database and will offer to save the new measurement instead of the existing one.



All saved measurements will be saved to the database (see par. Viewing measurement results).

8.4. IMR

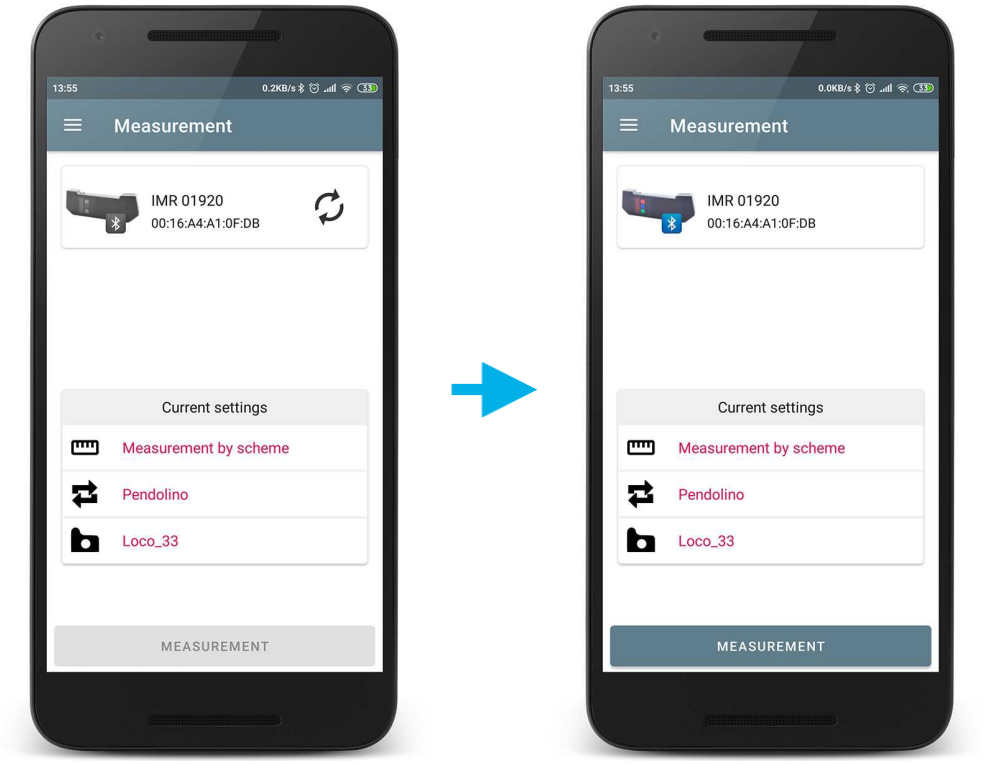
To synchronize with the back-to-back distance measuring gauge, you need to select **IMR** as the gauge type. Selecting the type of measuring gauge – see par. Adding and selecting the measuring gauge or par. Quick setup.

8.4.1. Turning on the gauge

- Before using for the first time, charge the batteries of the IMR by connecting them to the charger.
- Press the **Red** button to turn on the gauge.

> The display shows “ErrP” message if the battery voltage is below the control level. In this case, short-term operation is possible after pressing any button.

- After turning on the gauge, a wireless connection is automatically being established between the module and the mobile device (the blue LED is on). Once the connection is established, the LED turns off.
- The main window will be updated:



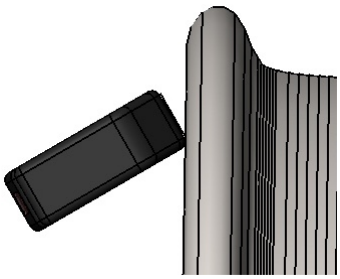
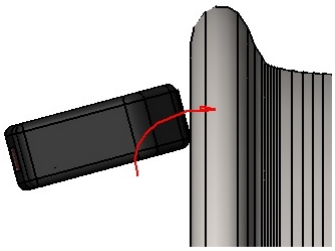
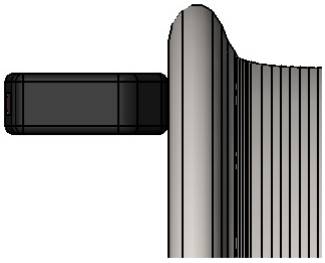
The **MEASUREMENT** button and the Bluetooth connection indicator become active.

8.4.2. Installing the gauge on the wheel

To make a measurement, do the following:

- Install the gauge on the inner surface of the wheel.
- Make sure the magnetic base is firmly attached to the surface.

To avoid hitting the gauge against the wheel, follow the instructions below:

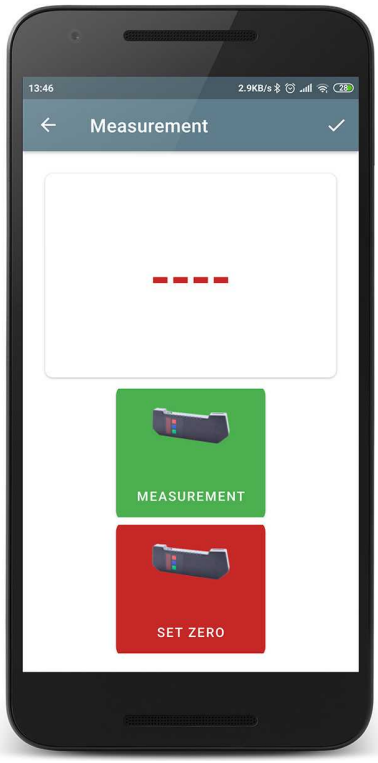
		
Place the gauge edge on the wheel	Gently tilt the gauge	Lock the gauge on the wheel

8.4.3. Rapid measurement

This measurement type is used to quickly measure the back-to-back distance or to save a single measurement to the database with the possibility of setting wheel identification parameters.

Procedure:

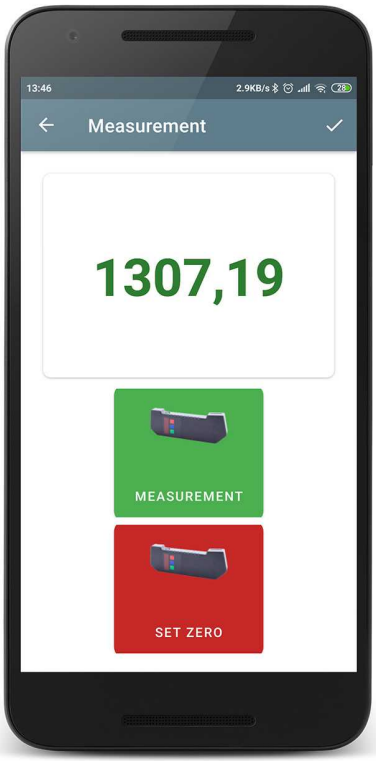
- Tap the **MEASUREMENT** button. The application will ask for IMR parameters and, in case of successful reading, the **Measurement** window will appear.

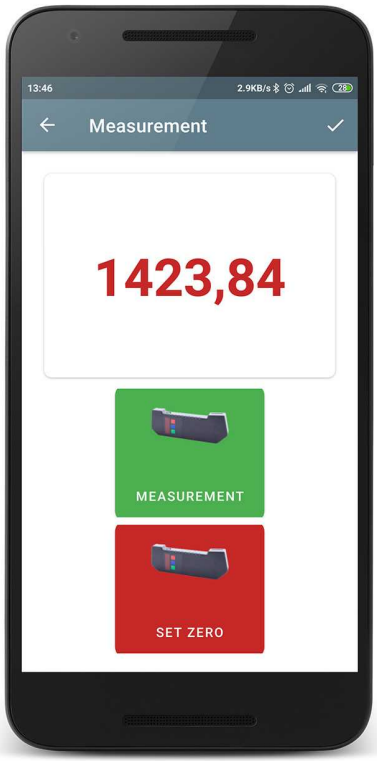


- Measure the back-to-back distance.

- Reset the averaging result (the display shows "------").

- Press the **Green** button. After a second, the measured value will appear on the display.
- When the value exceeds the specified tolerance, it is highlighted in red:





To continue measurements with averaging:

- Press the **Green** button.

- The display will show the value of the **“n x”** counter, where x is the number of averaged measurements.
- After a second, the average value of the back-to-back will be displayed.
- Install the gauge to a new position and repeat the measurements. The total number of measurements averaged in this way can reach 9999.
- Press the **Red** button to reset the averaging result.
- To save the measurement, click ✓ and enter the wheel identification parameters.

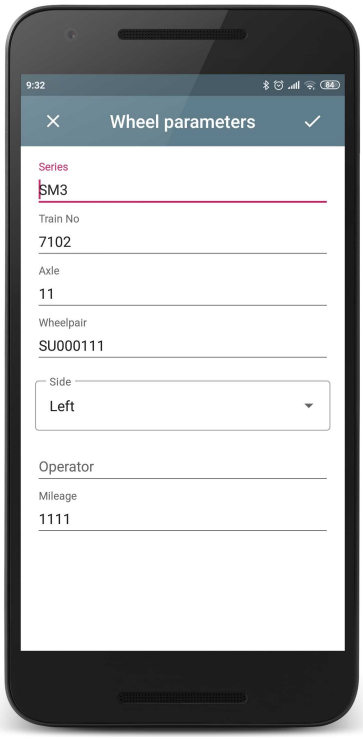
The measurement will be saved to the database (see Viewing measurement results).

8.4.4. Measurement by scheme

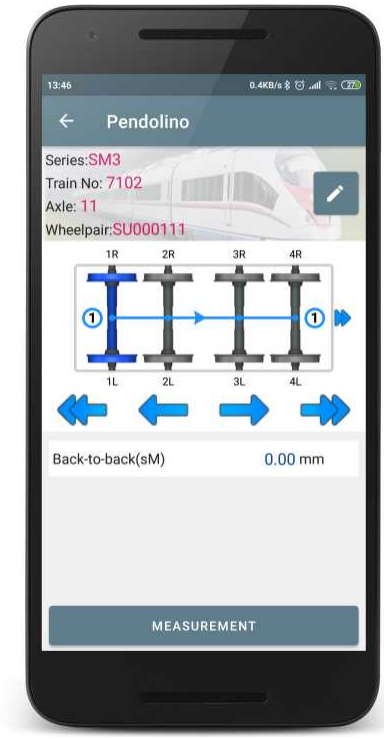
This measurement type makes it possible to use all features of the gauge, such as working with the database of measurements.

Procedure:

- Tap the **Measurement** button. The application will request the parameters of the IMR and, in case of successful reading, the **Wheel parameters** window will appear. The values are displayed in accordance with the selected measurement scheme. If necessary, the user can edit the parameters.



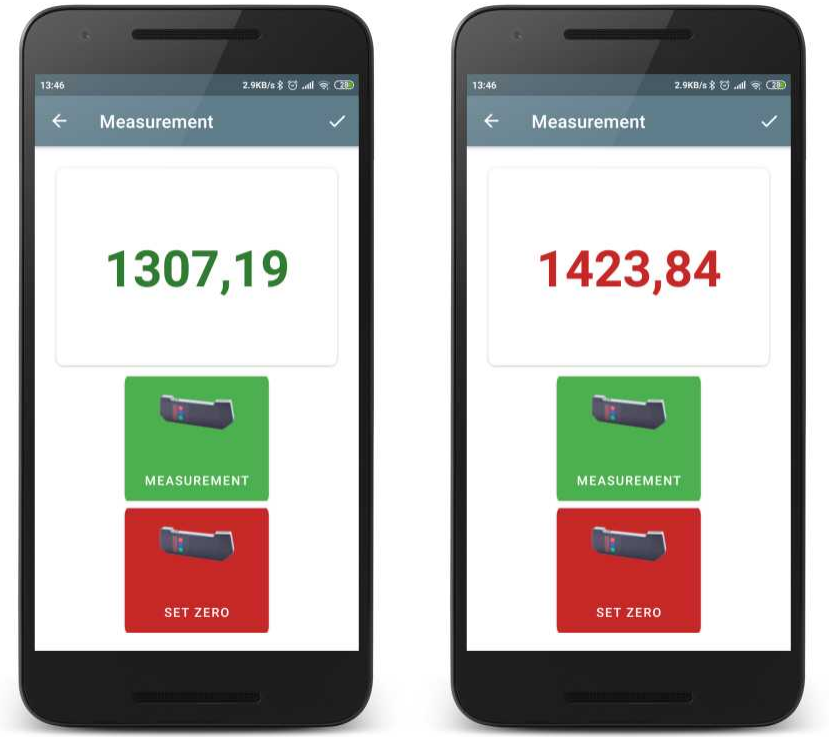
- To save the parameters, tap ✓. The application will display the selected measurement scheme and back-to-back distance values.



Buttons assignment - see Measurement by scheme.

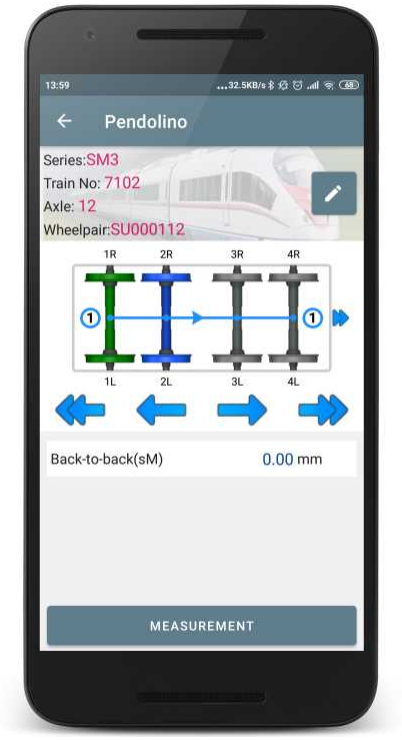
- To measure the back-to-back distance suggested by the application (highlighted in green), tap the **MEASUREMENT** button. The application will display the **Measurement** window and the IMR will perform the measurement. The measured back-to-back distance will be displayed.

When the back-to-back distance value exceeds the specified tolerance, the value is highlighted in red:

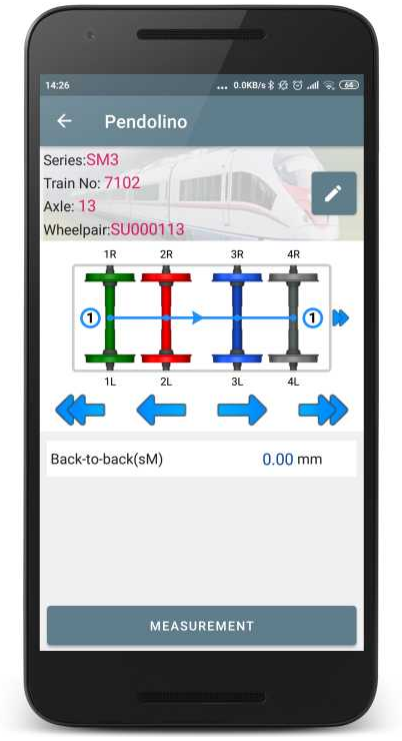


- To repeat the measurement, tap the **MEASUREMENT** button.
- When a satisfactory result is obtained, tap ✓ to save the data.

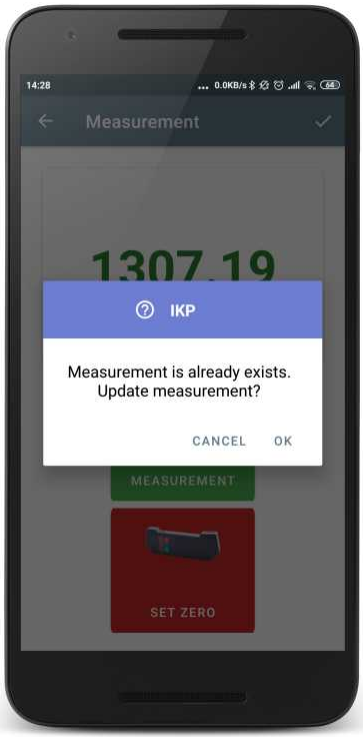
- The application will offer to measure the next wheel in accordance with the measurement scheme.



- Use the navigation arrows to view the results of the previous measurement. If you select the measured wheel, the saved back-to-back distance will be displayed.



- When you select the measured wheel, the application will warn you that the measurement with such parameters has already been saved in the database and will offer to save the new measurement instead of the existing one.



All saved measurements will be saved to the database (see par. Viewing measurement results).

9. IKP calibration

The profilometer can be supplied complete with the calibration block (RF505.1) designed for periodic testing and calibration of the profilometer.

Instead of the calibration block, you can use a wheel with a known profile saved in the database (see par. Reference profile).

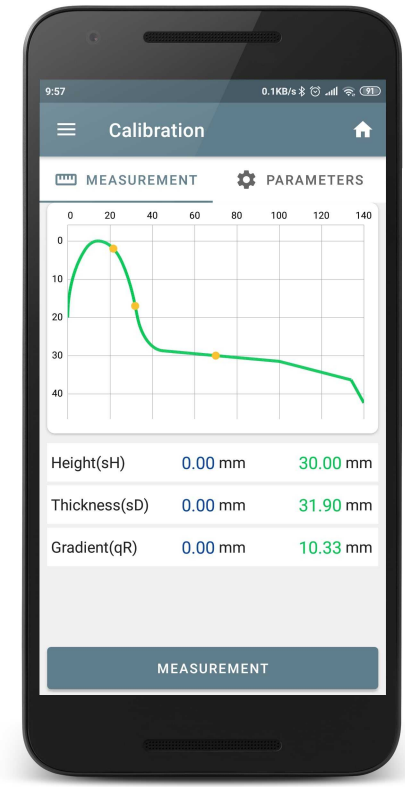
9.1. Preparing for calibration

- Turn on the laser module.
- Install laser module on the calibration block.
- Wait until the Bluetooth connection is established between the module and PDA - the **Calibration** button will become active.
- Tap the **Calibration** button. The application will request the calibration parameters of the laser module (if the parameters were not received earlier) and, if the parameters were successfully read, the **Calibration** window will appear.

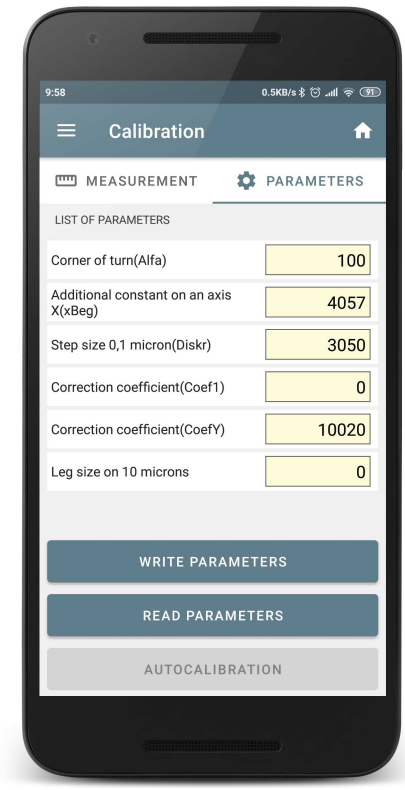
9.2. Calibration procedure

The **Calibration** window contains two tabs: **Measurement** and **Parameters**.

The **Measurement** tab displays the selected reference profile and its parameters, as well as the measured profile and calculated parameters (after measurement).

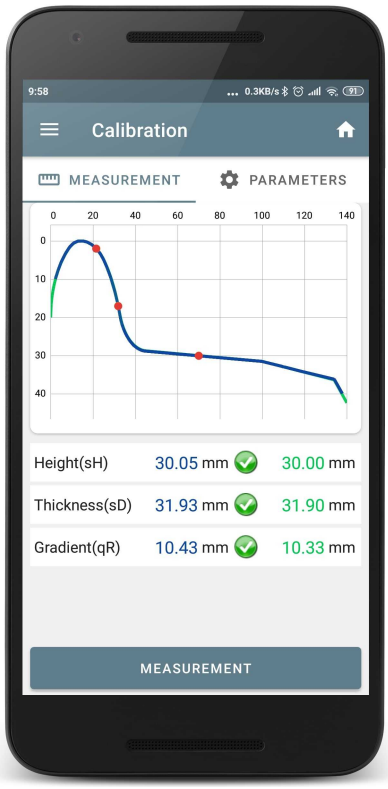


The **Parameters** tab displays the IKP calibration parameters written to the FLASH memory of the device.

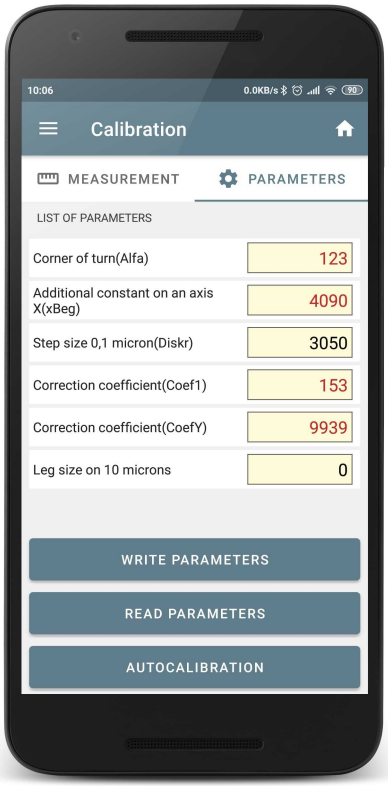


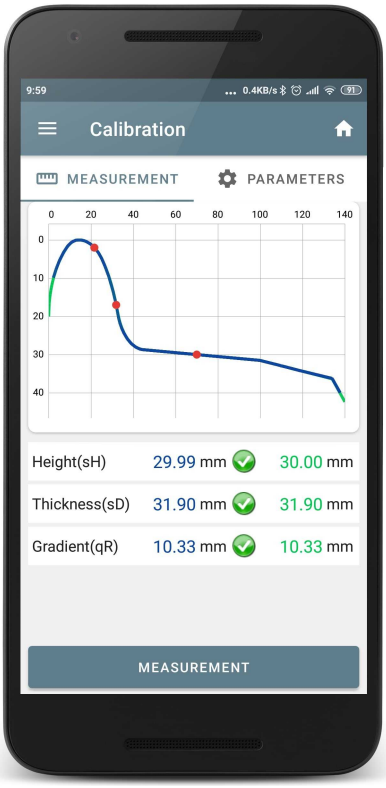
To perform automatic calibration, follow these steps:

- Tap the **MEASUREMENT** button.

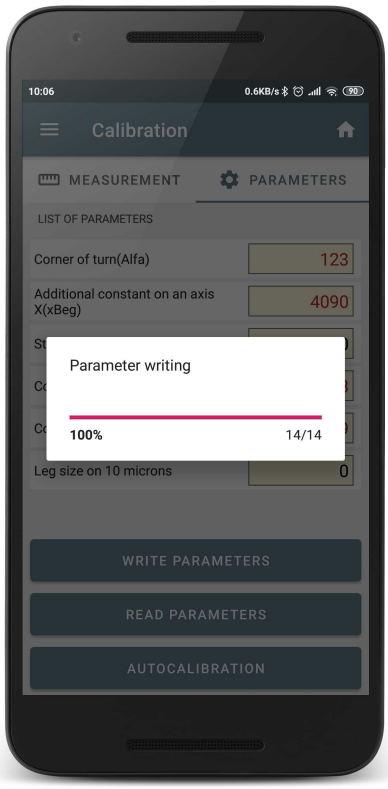


- Tap the **AUTOCALIBRATION** button. The calibration parameters will be automatically calculated and the measured profile will be recalculated.



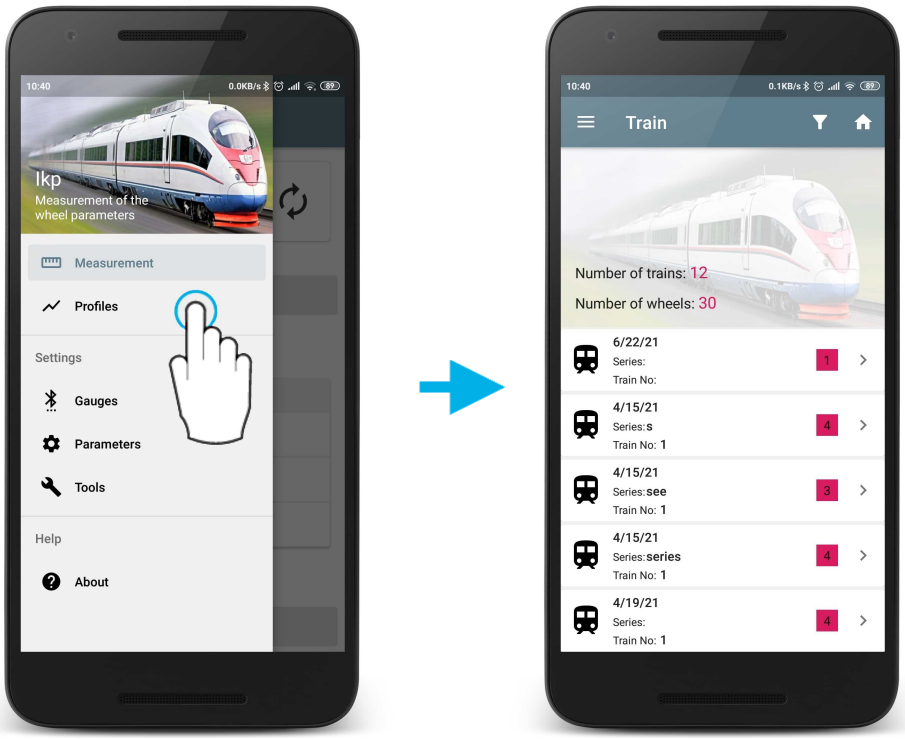


- Tap the **WRITE PARAMETERS** button to save parameters.



10. Browsing the database

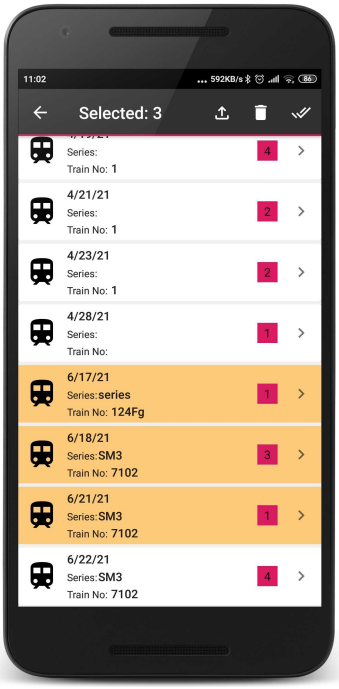
To view the saved data, go to the main menu (tap ☰, or swipe right from the left edge of the screen) and select **Profiles**.



The application will display a list of the measured locomotives/cars, as well as their total number and the number of measured wheels.

10.1. Exporting data to PC

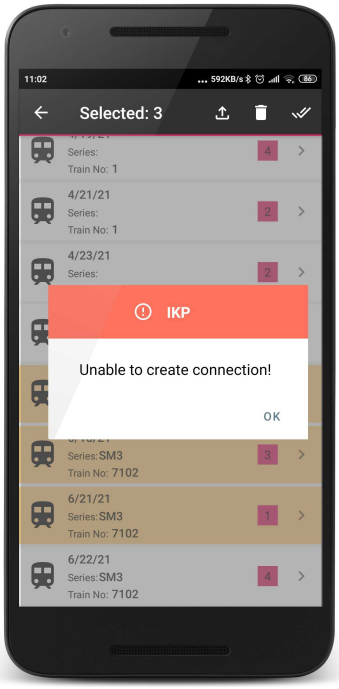
To export several or all locomotives/cars, you need to tap and hold the required locomotive/car. Multiple selection mode will start. Before exporting, you can filter the required data (see par. Filtering data).



Then select the locomotives/cars that you want to export to a PC and tap .

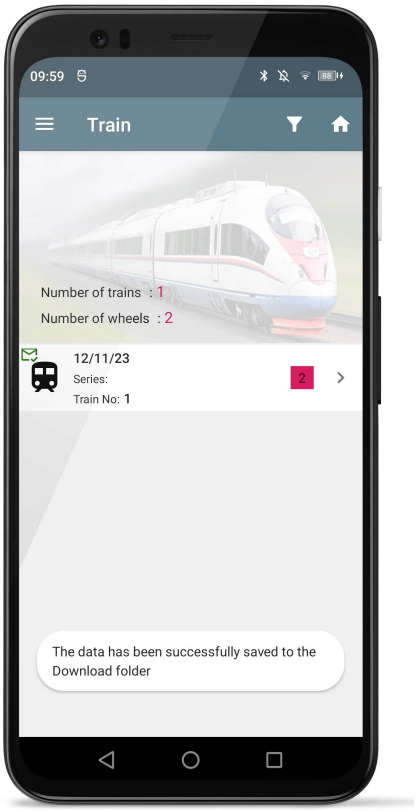
Attention!
To successfully export data to a PC, the Ikp5_DB program must be started, and the port and IP address must be correctly specified in the PC server settings (see par. PC server settings).

In case of failure, a pop-up message will appear on the screen.



- To save data to your Android device, select **Save to smartphone**

  The data will be saved in the internal memory in the \\Download folder

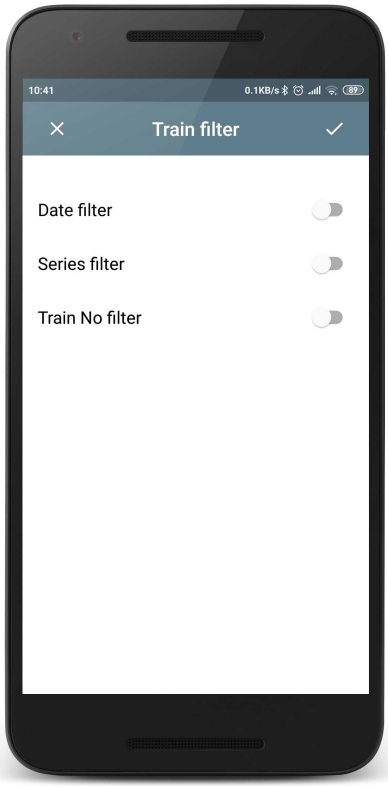


- To send data by email, select **Send email**
  he data will be sent to the email address entered in the settings

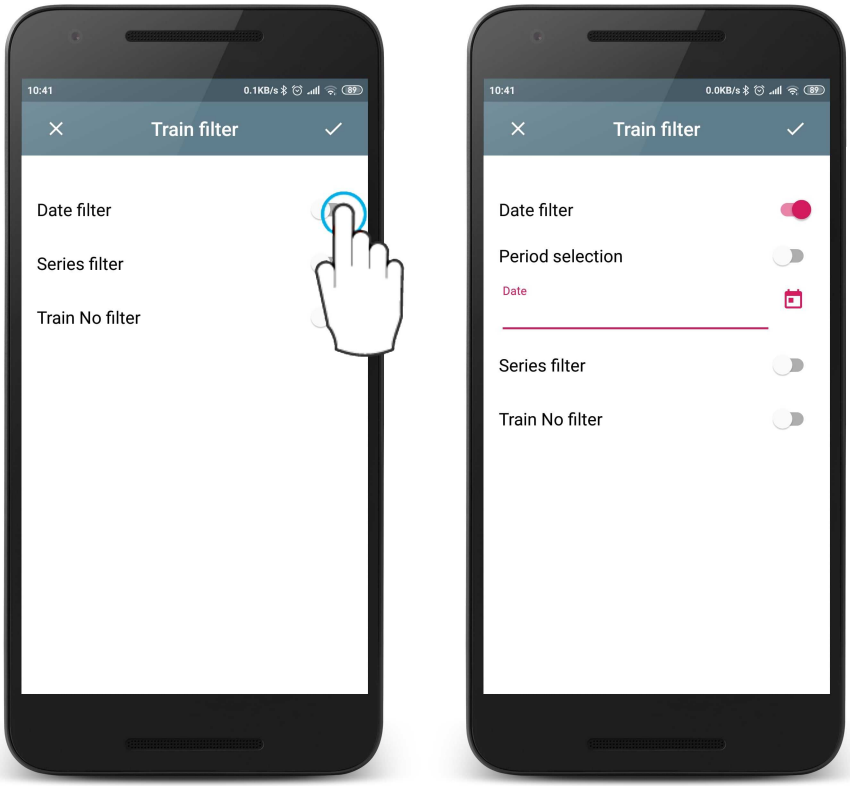
Attention!
To successfully send data, the smartphone must be connected to the Internet

10.2. Filtering data

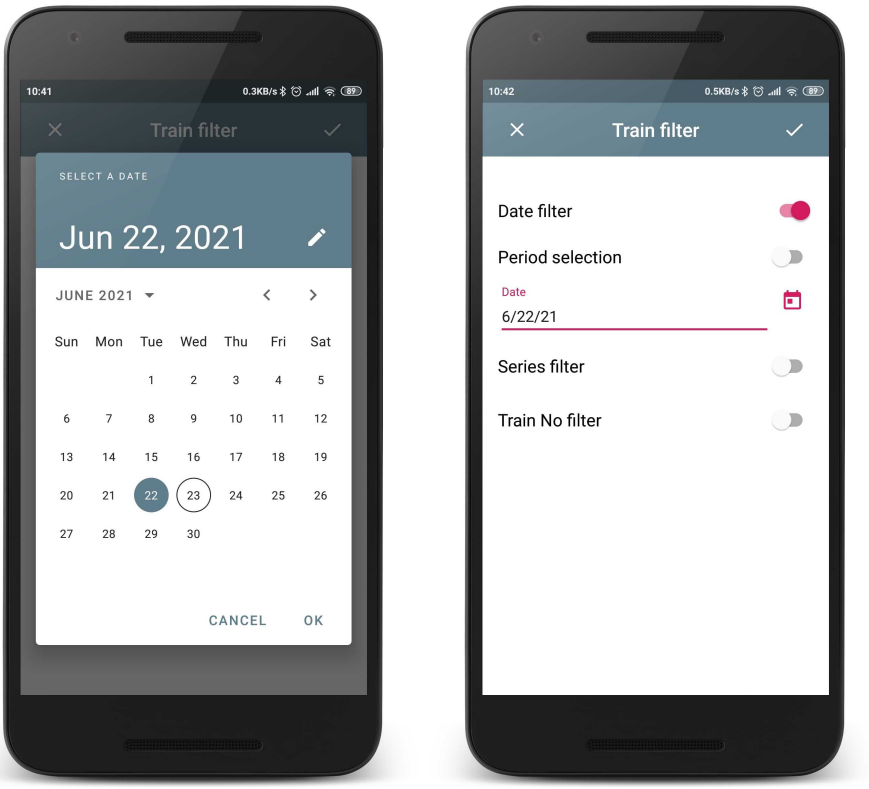
To add a filter, tap the **Filter** button ( ), and then select the fields by which the data will be filtered.



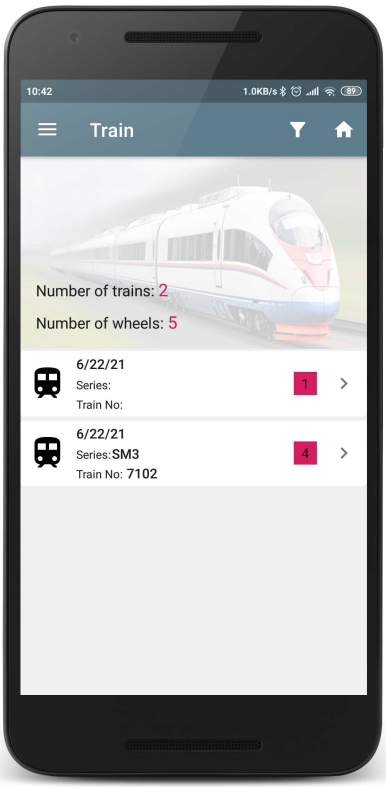
An example of filtering by date:



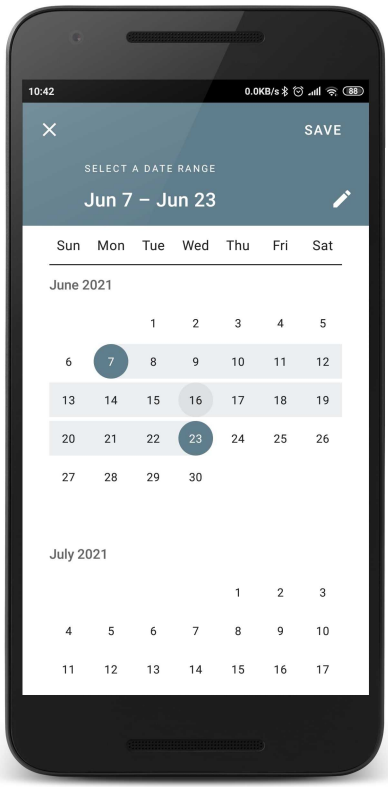
Tap on the date selection icon ( ) and select the date.



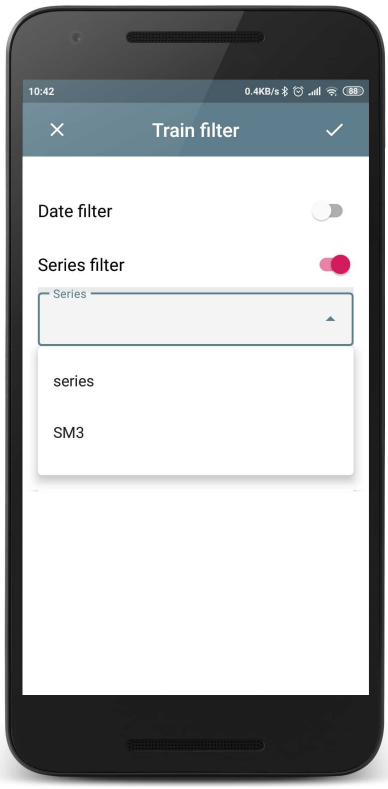
Tap  to apply a filter. The app will display only those measurements that match the filter.



You can also filter the measured data for a specific period of time. To do this, you need to enable the **Period selection** option and select the required period in the calendar.



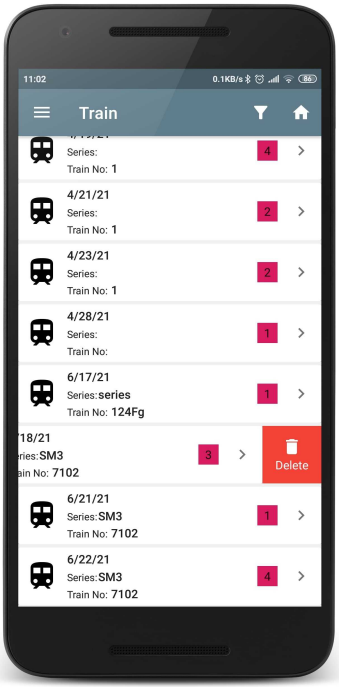
To add a filter by series or locomotive/car number, select the required value from the drop-down list.



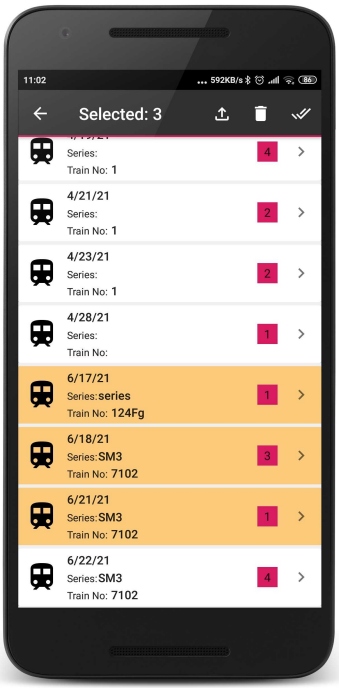
To delete the current filter, tap the filter button and disable the filter.

10.3. Deleting data

To delete a locomotive/car, swipe left from the right edge and tap **Delete**.



To delete some or all locomotives/cars, you need to tap and hold the item. Multiple selection mode will start.



Buttons:

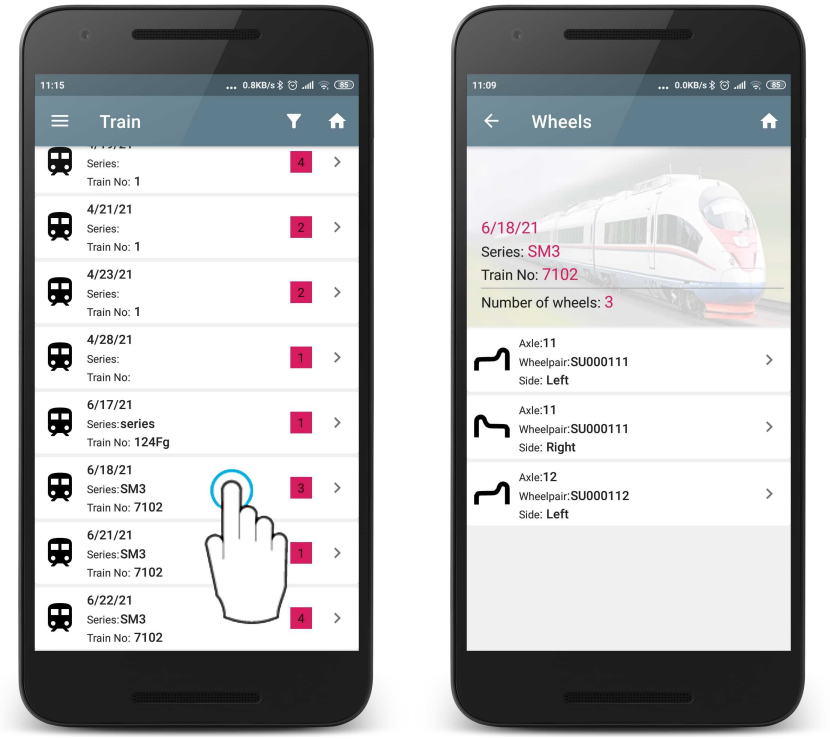
- delete the selected items;
- select all;
- export the selected data to a PC (**Ikp5_db** program).

If the **Send email** option is selected in the settings, the following button is also available:

- send the selected data by email.

10.4. Viewing measurement results

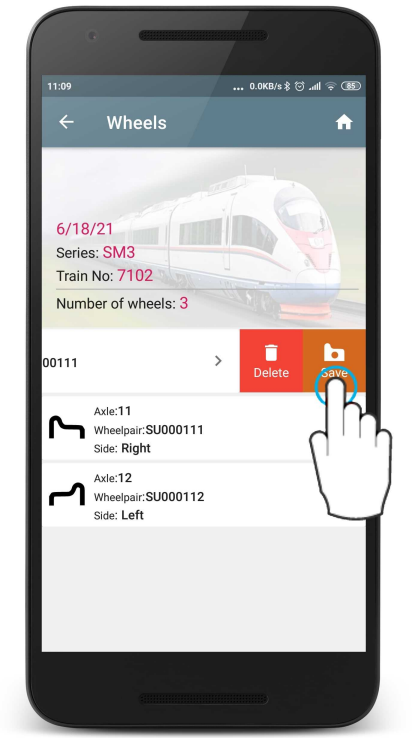
To view the measurement results, tap on the required locomotive/car. A list of measurements for the selected locomotive/car will appear.



In this mode, the user can delete or export data.

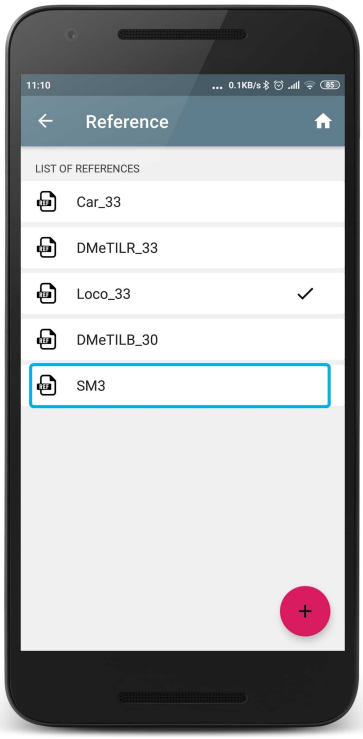
10.4.1. Saving the wheel profile as the reference

The user can also save the profile of the selected wheel as a reference. To do this, swipe left over the item and tap **Save**.



Then enter the name of the reference or agree with the proposed one (by default, the name is the locomotive/car series) and tap ✓ to save the reference.

The saved references are stored in the database: **Settings > References** (see par. Reference profile).



10.4.2. Viewing wheel parameters

To view the parameters and profile of the selected wheel, tap on the required item.

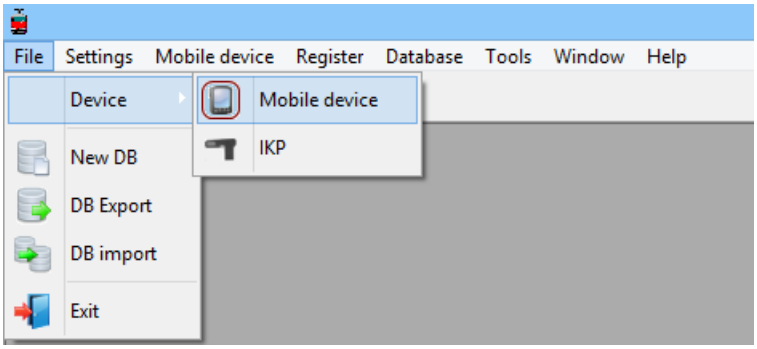
The window displays the identification data of the measured wheel, the measured profile and the calculated parameters. It is possible to disable the display of the reference profile - for this you need to clear the **Reference profile** check box.

10.4.3. Viewing the wheel profile

The profile can be zoomed in. To do this, touch the profile with two fingers at once and, without lifting the fingers from the screen, spread them apart.

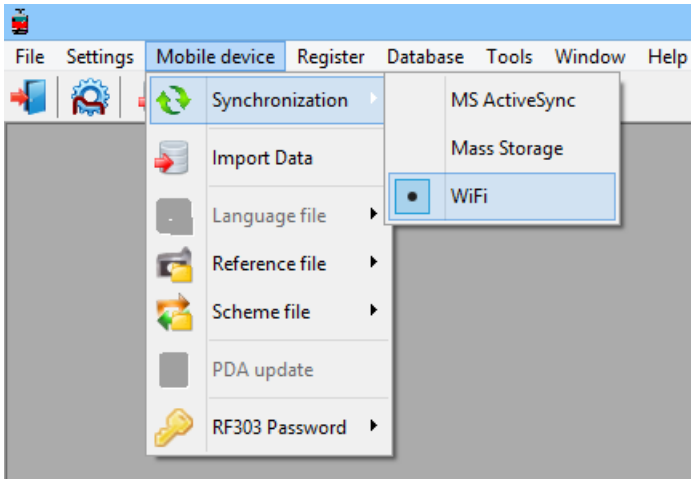
11. Data exchange between PDA and a PC

To exchange data between a mobile device and a PC, select the device: **File > Device > Mobile Device**.

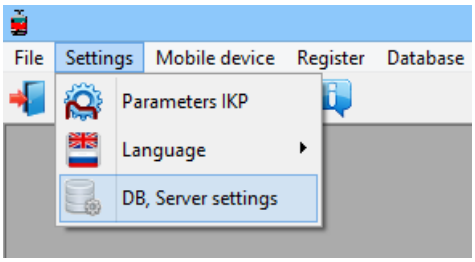


11.1. Synchronization of PDA and a PC

A Wi-Fi connection is used to transfer data between the mobile device
To connect you must do the following:
1. Select the synchronization type: **Mobile device** > **Synchronization** > **WiFi**.



2. Go to server settings: **Settings > DB, Server settings**.

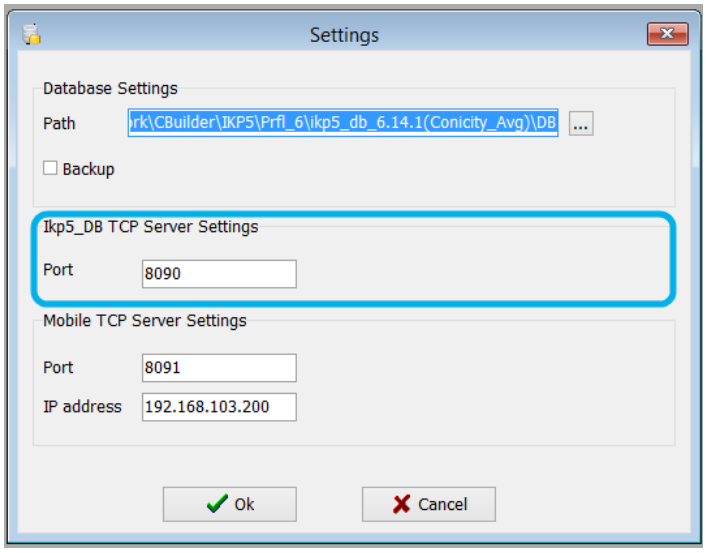


To transfer data, the PC and mobile device must be connected to the same Wi-Fi network. This can be a dedicated network created on an Android device (virtual hotspot) or any home/work network.

Ikp5_DB server port settings:

Port - port number for connecting a mobile device (**8090** by default)

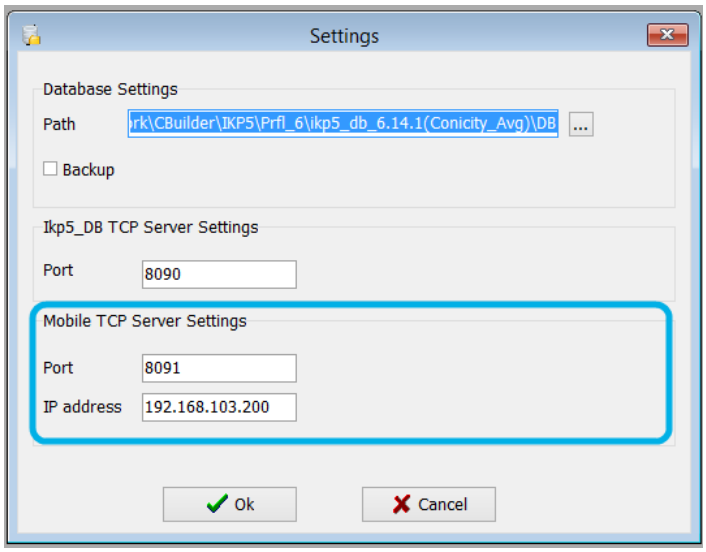
The port number must be the same as specified in the mobile application (see par. PC server settings).



Mobile device server settings:

IP address and **Port** - address and port number of a mobile device in the network.

These values must be the same as specified in the mobile application (see par. Ikp server settings).



11.2. Data transfer

When you select to sync over Wi-Fi, the following options become available:

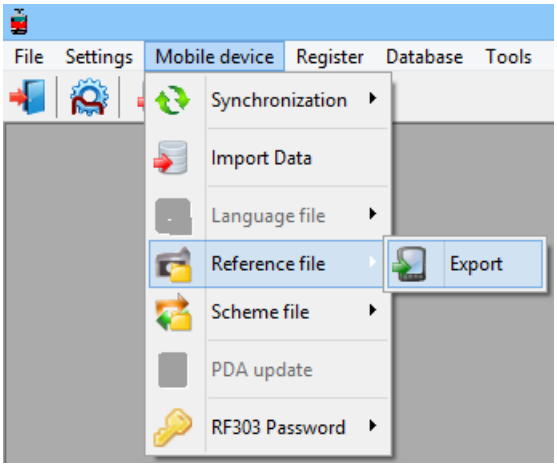
- Transferring the database file.
- Transferring the reference file.
- Transferring the scheme file.

11.2.1. Transferring the database file to a PC

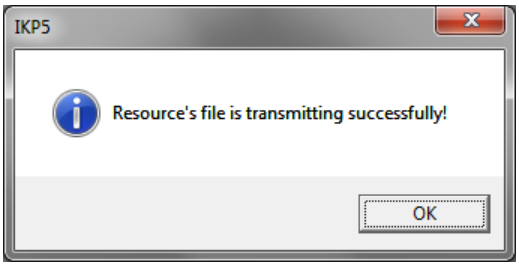
When you sync data over Wi-Fi, the measurement results are exported from the **Ikp** mobile app (see par. Exporting data to PC).

11.2.2. Transferring the reference file

To transfer the reference file from a PC to a mobile device, follow these steps:
- Select **Mobile device > Reference file > Export**.

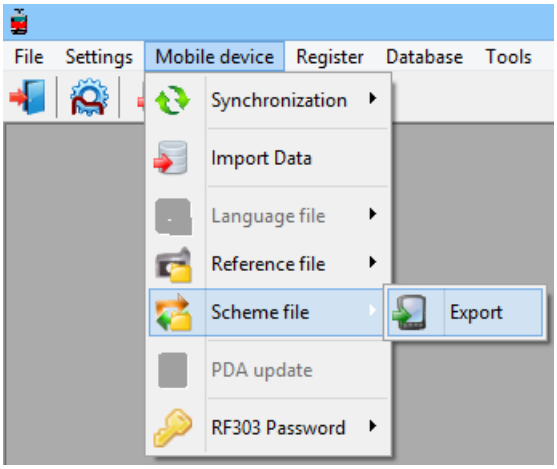


- Select the required file (***.ref**).
If the data transfer is successful, the following message will appear:

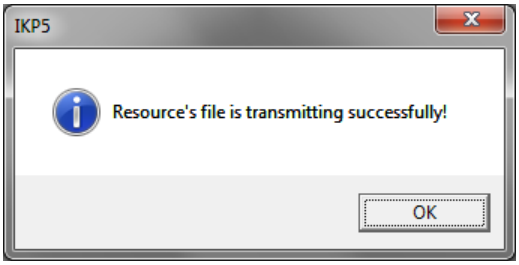


11.2.3. Transferring the scheme file

To transfer the scheme file from a PC to a mobile device, follow these steps:
- Select **Mobile device > Scheme file > Export**.



- Select the required file (***.sch**).
If the data transfer is successful, the following message will appear:



12. List of changes

Date	Revision	Description
17.05.2021	1.0.0	Starting document.
14.01.2024	1.0.1	The sections Configuring general parameters, Bluetooth, measurement parameters, data export, sending by email have been adjusted.

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14. RIFTEK's measurement instruments for railway transport

Railway wheel profile gauge, IKP Series

Laser Profilometer IKP-5 Series is employed for:

- Measuring geometrical parameters of the wheel flange (thickness, slope, height), rim/tire thickness.
- Taking full profile of the wheel rolling surface.
- Maintaining the wear database.
- Tolerance control and sorting when checking, inspecting, repairing and forming railway wheelsets.

Measurements are made directly on the rolling stock without rolling out the wheelset.

Rail profile measurement gauge, PRP Series

The main functions of PRP are as follows:

- Obtaining information on the cross-section profile of the railhead acting face.
- Full profile scanning and analysis of the railhead acting face.
- Visualization of combined graphic images of the actual and new cross-section profiles of the railhead.

Wheel diameter measuring gauge, IDK Series

Electronic gauge is designed to measure the wheel rolling circle diameter of railway, metro and tram wheelsets.
Measurements are made directly on the rolling stock without rolling out the wheelset.

Back-to-back distance measuring gauge, IMR Series

Electronic gauge is designed to measure the back-to-back distance of railway, metro and tram wheels in the course of checkup, examination, repair and formation of wheelsets.
Measurements are made directly on the rolling stock without rolling out the wheelset.

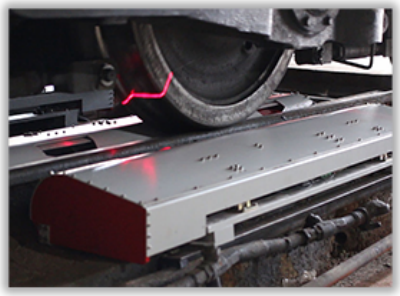
Back-to-back distance measuring gauge, IMR-L Series

Electronic gauge is designed to measure the back-to-back distance of railway, metro and tram wheels in the course of checkup, examination, repair and formation of wheelsets.
Measurements are made directly on the rolling stock without rolling out the wheelset.

Disc brakes profile gauge, IKD Series

Electronic gauge is employed for laser scanning and measurement of disc brakes wear parameters.
The main functions of IKD are as follows:

- Obtaining information on the profile of the disc brakes acting face.
- Full profile scanning and analysis of the disc brakes acting face.
- Visualization of combined graphic images of the actual and new disc brakes profiles.



Real-time wheels geometry measurement system 3DWheel

The system is designed for non-contact automatic measurement of geometrical parameters of railway wheels and uses a combination of 2D laser scanners mounted wayside in the track area.
The system can be easily installed on any type of railway infrastructure.