

**RIFTEK**  
Sensors & Instruments



# PORTABLE LASER RAIL PROFILOMETER

**PRP Series**

## User's manual

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## 1. Safety precautions and measurement conditions

- Prior to mounting the profilometer onto the rail, areas of contact and laser scanning of the rail surface should be thoroughly cleaned from dirt.
- When mounting the module on the rail, do not allow heavy shocks of its support against the rail.
- The output windows of the laser sensor must be carefully inspected and cleaned
- Do not use laser module in locations close to powerful light sources.

## 2. Electromagnetic compatibility

The profilometer have been developed for use in industry and meet the requirements of the following standards:

- EN 55022:2006 Information Technology Equipment. Radio disturbance characteristics. Limits and methods of measurement.
- EN 61000-6-2:2005 Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments.
- EN 61326-1:2006 Electrical Equipment for Measurement, Control, and Laboratory Use. EMC Requirements. General requirements.

## 3. Laser safety

The profilometer make use of an c.w. 660 nm wavelength semiconductor laser. Maximum output power is 1 mW. The device belongs to the 2 laser safety class. The following warning label is placed on the profilometer body:



The following safety measures should be taken while operating the profilometer:

- Do not target laser beam to humans;
- Do not disassemble the sensor;
- Avoid staring into the laser beam.

## 4. General information

Portable laser rail profilometer (PRP) is designed for non-contact registration of cross-section of the railhead acting face.

The main functions of PRP are:

- obtaining the information on the cross-section profile of the working railhead surface;
- full profile scanning and analyze of the railhead acting face;
- visualization of the combined graphical images of actual and new cross-section railhead profiles on the display of system unit;

## 4.1. Controlled parameters

- railhead vertical wear ( Hv );
- side wear ( Hh ), that is measured 13 mm lower the top of railhead or side wear(  $Hh_{R45}$  ), that is measured at 45 degrees relative to the rail symmetry axes at the point that passes through the center of lateral working fillet;
- reduced head wear, that is determined as vertical one + the half of lateral wear, namely :  $Hr = Hv + 0,5Hh$  or  $Hr = Hv + 0,5Hh_{L R45}$ .

## 5. Basic data and performance characteristics

Name of parameter	Value
Railhead vertical wear, mm	-15,0 ...+20,0
Lateral railhead wear, mm	-15,0...+20,0
Reduced railhead wear, mm	Up to 20,0
Scanning angle inside the rail track, degrees	108
Scanning angle outside the rail track, degrees	108
Inaccuracy, not more than, mm	±0.1
Scanning time, sec	3
Digital readout device dimensions, mm	see Fig.5
Dimensions of laser scanning, mm	see Fig.3
Power supply, laser module	Lead-Acid battery 12V, 7200mAч
Power supply, PDA	Lithium-polymer batteries, 3,7V, 3300mAh
The number of measurements that can be taken before battery recharge is not less than	1000
PDA memory capacity, no less	100 000 measurements
Interface to PC	Bluetooth

## 6. Complete set to be supplied

Designation	Name	Quantity	Weight kg
RF303	PDA	1	0,4
RF570	Laser scanning module	1	3,5
PФ 570.10	Power supply, laser module	1	4,0
RF570.40	Charging device 5V 3.0A for PDA	1	0,2
RF570.41	Charging device 9V 3.0A for laser module	1	0,5
RF570.42	Universal cable (USB-port)	1	
RF570.43	Bluetooth/USB - adapter	1	
RF570.30	Packing case	1	1,5
PRP_DB	Database management system (CD)	1	
RF570UM	User's manual	1	

## 7. Structure and operation principle

### 7.1. Basic components of the device and their functions

Fig. 1 shows basic components of the device.

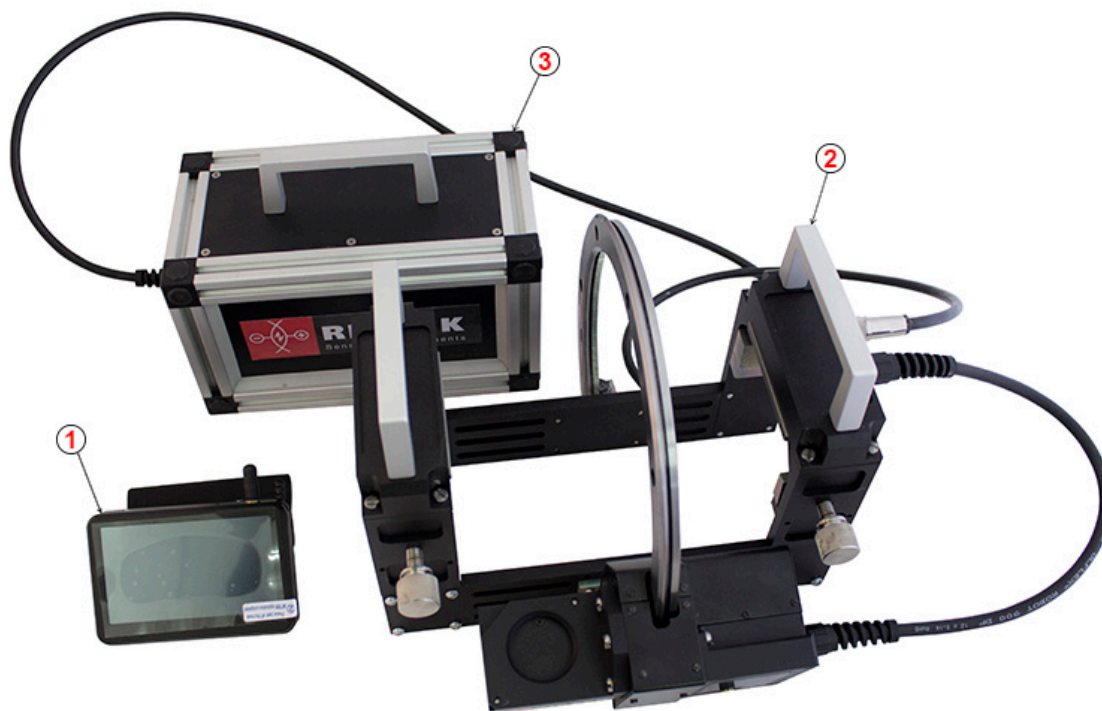


Figure 1

- (1) PDA.
- (2) Laser scanning module.
- (3) Box for battery.

#### 7.1.1. Laser scanning module

The module is intended for laser scanning of rail surface.

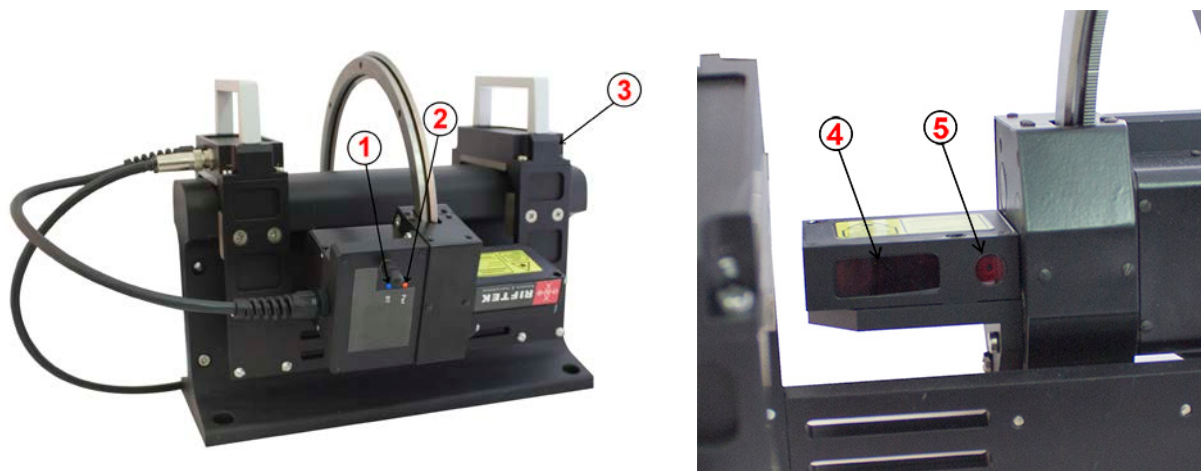


Figure 2

The module is intended for laser scanning of rail surface.

- (1) Indicator of Bluetooth connection (blue LED)
- (2) Indicator of turn ON (red LED)
- (3) Support for mounting of the device on the rail



- (4) Input window of laser sensor  
(5) Output window of laser sensor  
Overall dimensions of scanning module are shown in figure 3.

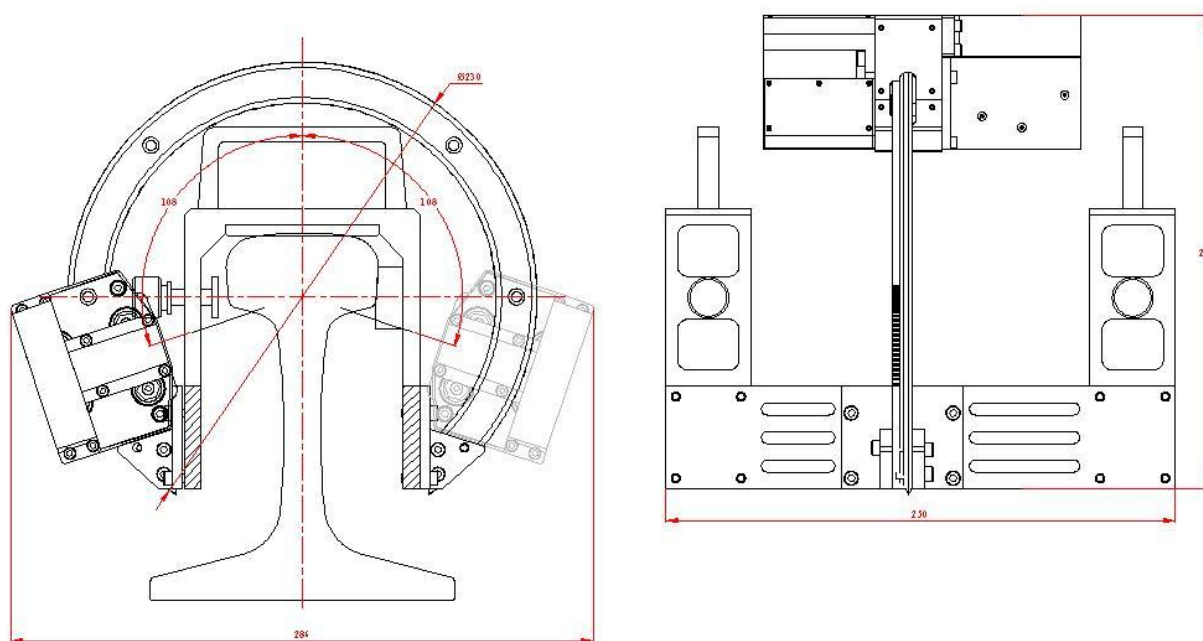


Figure 3

### 7.1.2. Power supply

The power supply is stored in a battery box.

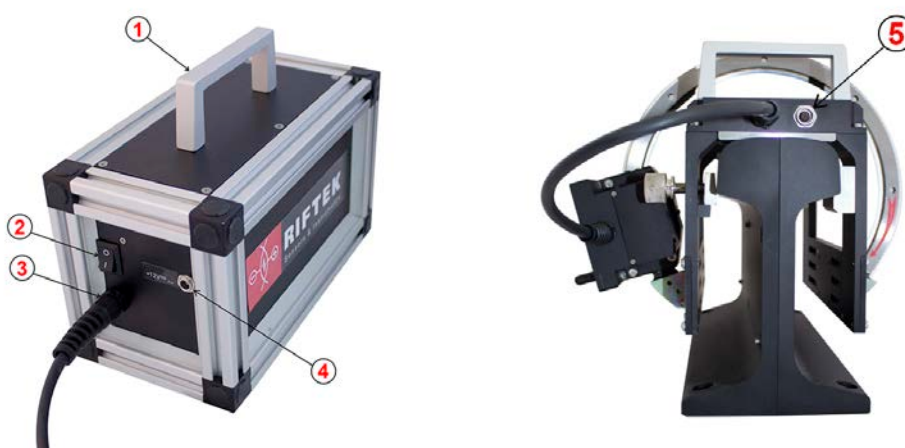


Figure 4

Fig.4: indicates:

- (1) Carrying handle
- (2) ON/OFF button
- (3) Cable connector for the connection to the laser module
- (4) Connector to the charging device
- (5) Connector to the battery box

### 7.1.3. PDA

PDA is designed for control of the laser scanning module, data reception from the scanning module, indication of measurement results, parameter input and data storage.



**Figure 5**

Fig. 5 indicates:

- (1) Turn-on button
- (2) Charge indicator (red/green LED)
- (3) Connector to PC USB-port or charging device.
- (4) Connector of flash memory card
- (5) Stylus
- (6) Bluetooth antenna

Overall dimensions of PDA are shown in figure 6

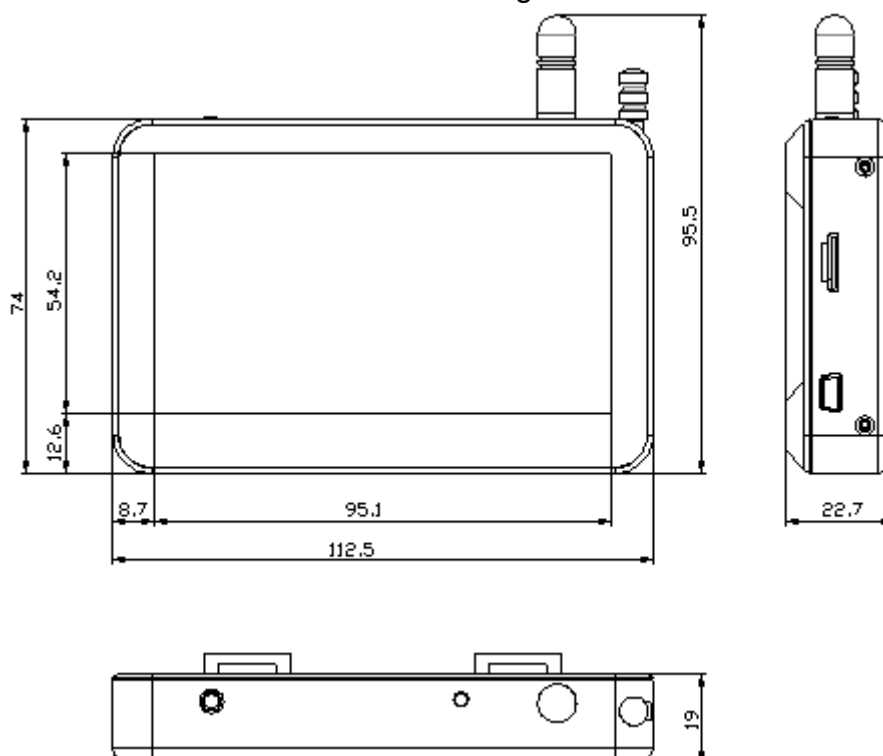




Figure 6

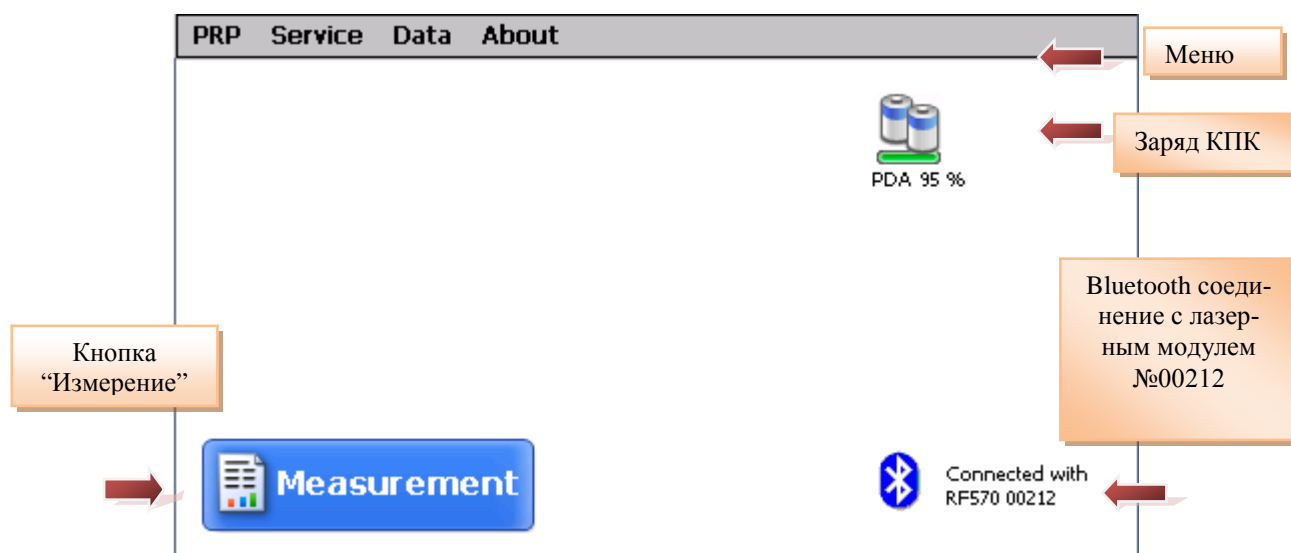
## 7.2. Operation principle

Operator mounts the laser scanning module onto the railhead to be measured. Having received a command from PDA or PC, the laser module performs non-contact scanning of rail surface. Measurement results (geometric parameters and profile of the surface) are displayed on PDA, can be saved in the PDA memory, and transferred to the PC database. Simultaneously, additional parameters can be saved: date, operator number, permanent way division, track number, rail type, etc.

## 8. Measurement procedure

### 8.1. Activation

- Connect the battery box (cable connector (3) at Fig.4) to the laser module (connector (5) at Fig.4)
- Switch the laser module on by pressing ON/OFF button on battery box: button (2), Fig. 4 – red LED is lit (2).
- Turn the PDA on by pressing the button (1), Fig. 5.
- After the laser module is switched on, some time will pass until automatic wireless communication is set between the profilometer and the PDA, which is accompanied by blinking of a blue LED on the laser module. The LED goes out when the link is established.
- The PDA screen will show the main program window containing: main menu; indicators of PDA and laser module charging degree; indicator of Bluetooth connection showing serial number of the laser module with which connection is established and the Measurement button:

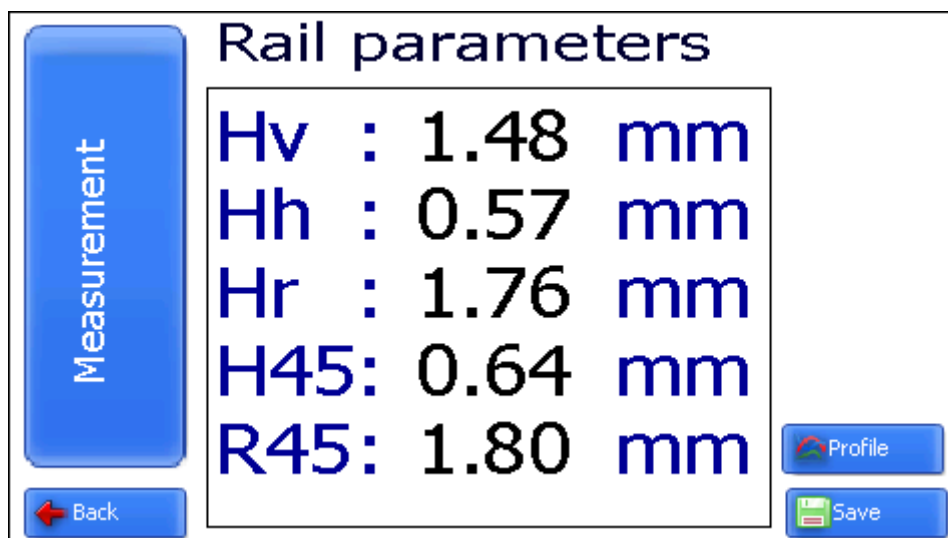


### 8.2. Measurement

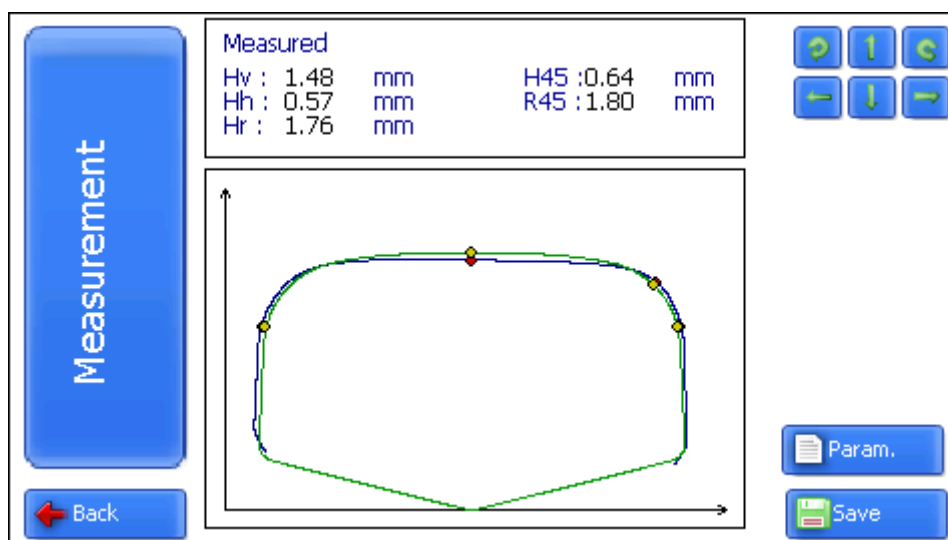
To perform measurement, it is necessary to:

- Fix the laser module on the rail,
- **Set Carriage to zero position!**
- Press **Measurement** button on the PDA display;

- With the **Measurement** button pressed, the laser module will scan the rail surface. During scanning time of about 10 seconds red LED (2) is lit.
- When scanning is completed, the PDA will show values of measured parameters selected for presentation (см. п.10.3):



- To look at rail profile, press the **Profile** button, and the PDA will display scanned rail profile as well as measured parameters:



## 9. Rail parameters under control. Terms and definitions

### 9.1. L-parameters

Geometric parameters of the rail are calculated automatically after laser scanning of the rail is completed. To calculate geometric parameters, use is made of reference points on the railhead. Location of the reference points is shown in Fig. 7 and is defined by **L-parameters** (parameters L1). Values of L-parameters preset in PDA are given in Table 1 and can be changed by user (see par. [10.3.](#)).

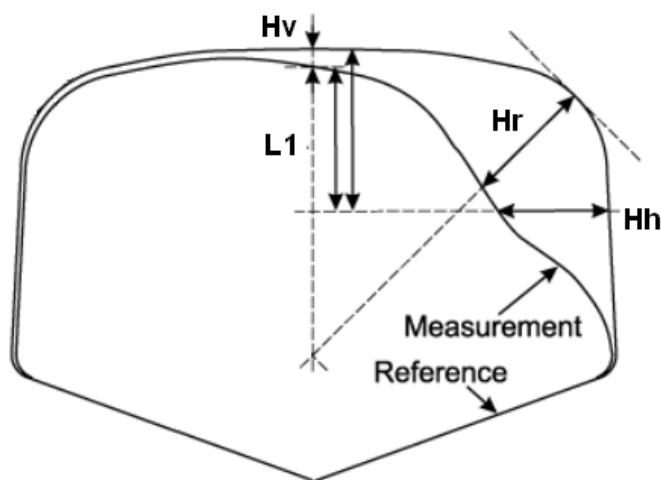


Figure 7

Table 1.

L-parameter	Default value	Purpose
L1	13 mm	Used for calculation of railhead wear, mm

## 9.2. Geometric parameters of the rail under control

The parameters under control and respective calculation methods are given in Table 2.

Table 2.

Parameter	Designation	Calculation method
Railhead vertical wear	Hv	is calculated as a difference between the measured value and nominal value of new rail in direction of rail axis of symmetry.
Lateral railhead wear	Hh	is measured at the height of $L1 = 13 \text{ mm}$ from the rolling surface of rail head
Lateral railhead wear at angle 45 degrees	H45	$(Hh_{L_{R45}})$ , is measured at 45 degrees relative to the rail symmetry axis at the point that passes through the center of lateral working fillet
reduced head wear	Hr	that is determined as vertical one + the half of lateral wear, namely : $Hr = Hh + 0,5Hh$ or $Hr = Hv + 0,5Hh_{L_{R45}}$
reduced head wear at 45 degrees	R45	is determined as vertical one + the half of lateral wear, namely : $Hv = Hh + 0,5Hh_{L_{R45}}$

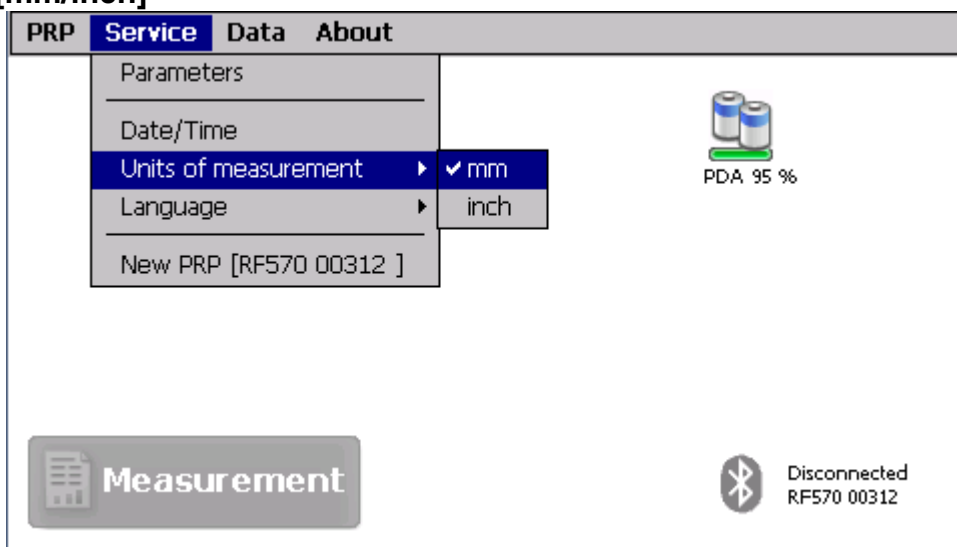
## 10. PDA program setting

Prior to starting work with the rail profilometer, PDA program setting must be performed.

### 10.1. Selection of measurement units

- All parameters as well as measurement results can be presented in the metric system (millimeters) or in the English system of units (inches). To set

measurement units, it is necessary to select **PRP > Units of measuring >[mm/inch]**

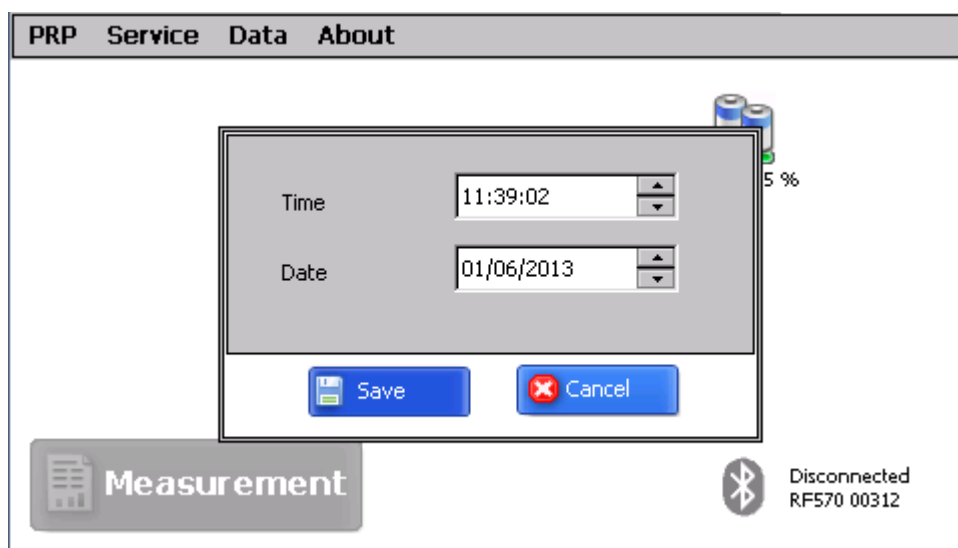


- select **mm** or **inch** options

## 10.2. Data and Time settings

To set data and time:

- select **Service > Data/Time** in main window of the program. View on the PDA screen:

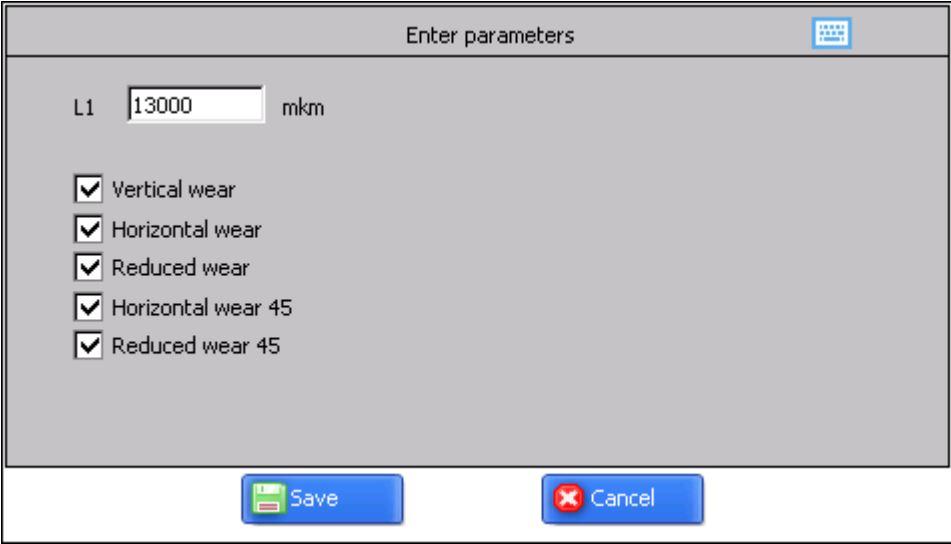


- write data and time
- press **Save**.

## 10.3. L-parameters and tolerances settings

To change L-parameters:

- select **Service > L Parameters**



Enter parameters

L1  mkm

☒ Vertical wear  
☒ Horizontal wear  
☒ Reduced wear  
☒ Horizontal wear 45  
☒ Reduced wear 45

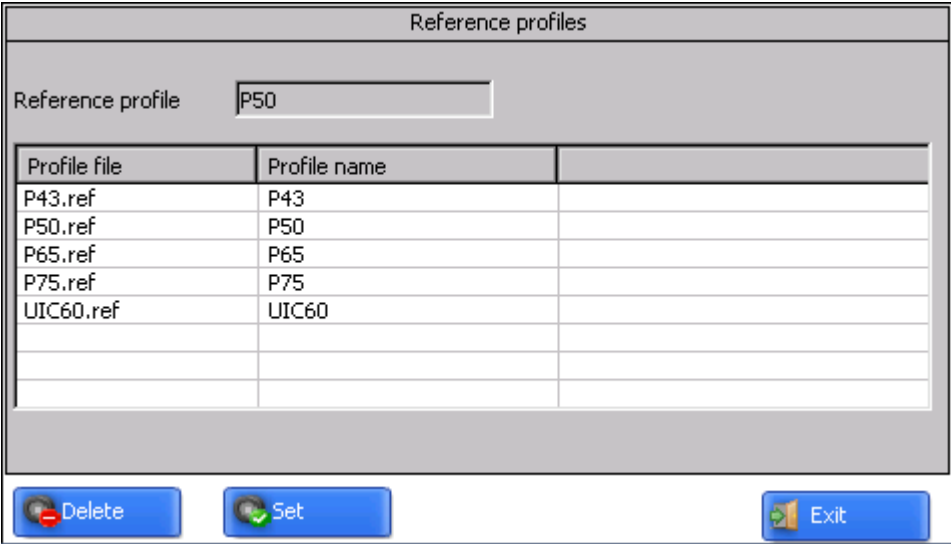
- write parameter's value
- select parameters, that values must be displayed.
- press Save

## 10.4. Reference profile selection and installation

The program lets compare scanned profile of the rail with reference profile. Reference profiles are /stored in the PDA database as profile description files with extension **.ref**. PDA is supplied with several pre-installed profiles. If there is no required reference profile in the database, user can form profile description himself or request the lacking profile from **RIFTEK** (free service).

### 10.4.1. Reference profile selection

To select reference profile press **Service > Reference profiles**:



Reference profiles

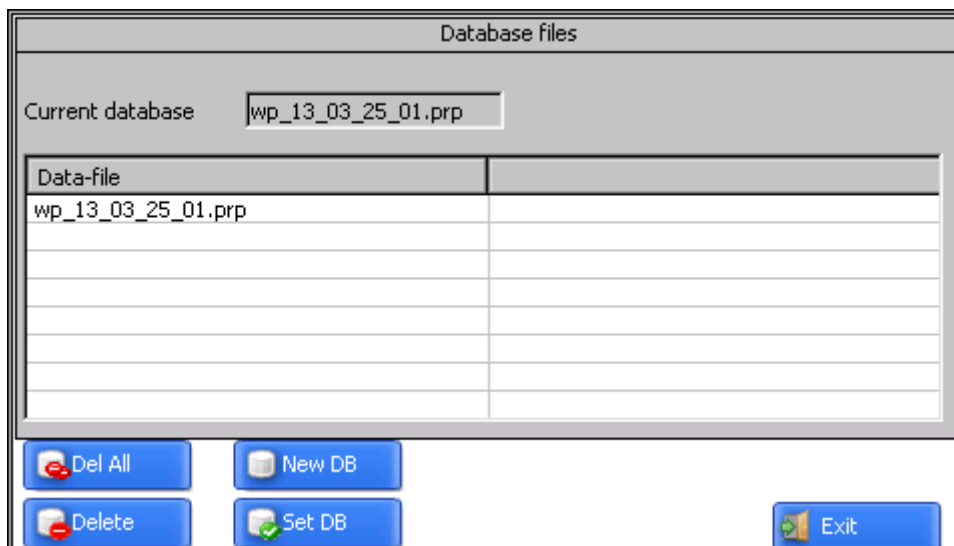
Reference profile

Profile file	Profile name
P43.ref	P43
P50.ref	P50
P65.ref	P65
P75.ref	P75
UIC60.ref	UIC60

- Activate the required profile and press the Set key;
- To delete profile from the database, activate the line with selected profile and press the Delete key;
- To exit from the window, press the **Exit** key.

## 10.5. Database selection

If necessary, measurement results are saved in the PDA database. The program makes it possible to simultaneously create and store several database files connected with a concrete date of taking measurements. To select a database file, choose **Service > DB files** in the main window menu. The screen will show:

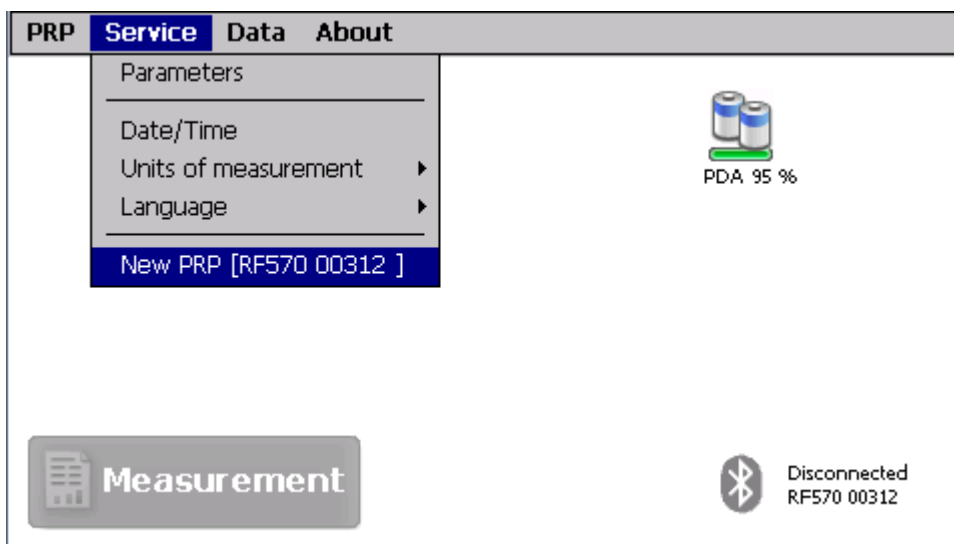


- To create a new database, press **New DB**. File with the name **wp\_yy\_mm\_dd.prp** will be formed automatically, where **yy\_mm\_dd** is the current date;
- to select the available database, activate the line with the file name and press **Select DB**;
- to delete the selected file press **Delete**;
- to delete all files press **Delete all**;
- to exit from the window press **Exit**

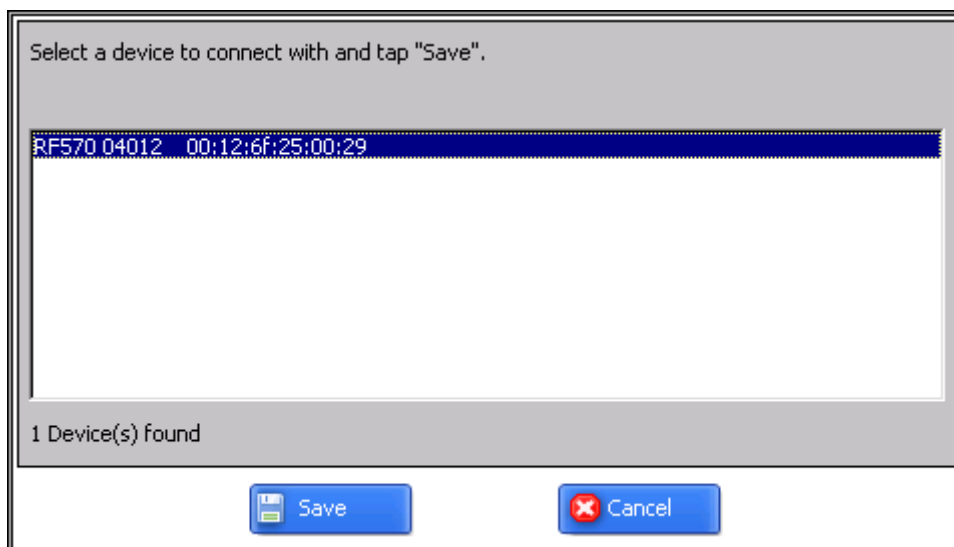
## 10.6. New laser module connection

Bluetooth-connection of PDA is adjusted for work with the laser scanning module supplied with PDA complete package. To connect other scanning module it is necessary to:

- Select **Service > New PRP**







- press **Start** and wait for new devices (with serial numbers) will appear on the screen



- select device and press **Save** to save new device address

## 10.7. Selection and changing of language and terminology

It is possible for the user to change the program language, form his own language support files as well as change/edit the terminology used.

To choose language in the main window menu, select **PRP > Language**. Select the required language support file.

## 10.8. Browsing and updating PDA software

To look at the software version in the main window menu, select **About Program** tab. The screen will show:



## 11. Operations with rail profilometer

### 11.1. Activation

Switch on the PDA and scanning module as shown in par. 8.1.

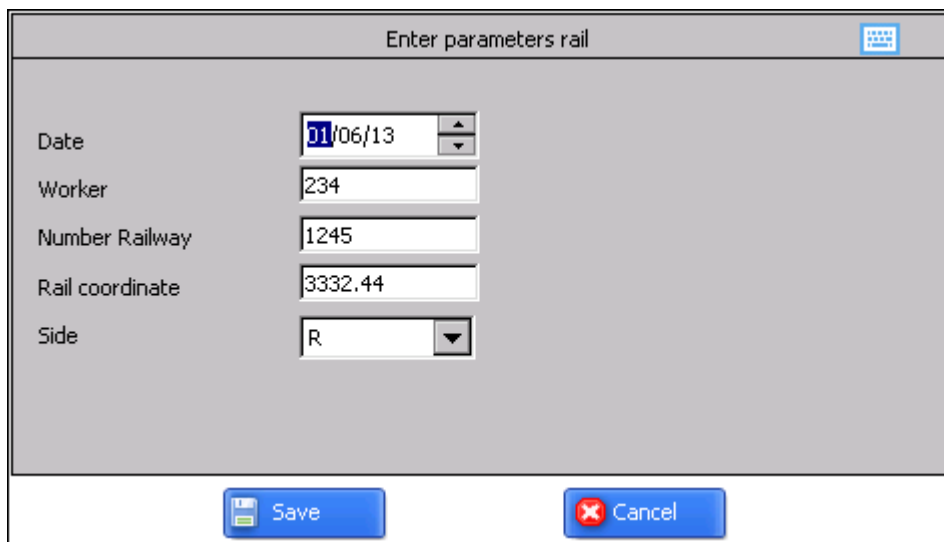
### 11.2. On-line measurements

Procedure of on-line measurements is described in par. 8.2.

### 11.3. Measurements with database maintenance

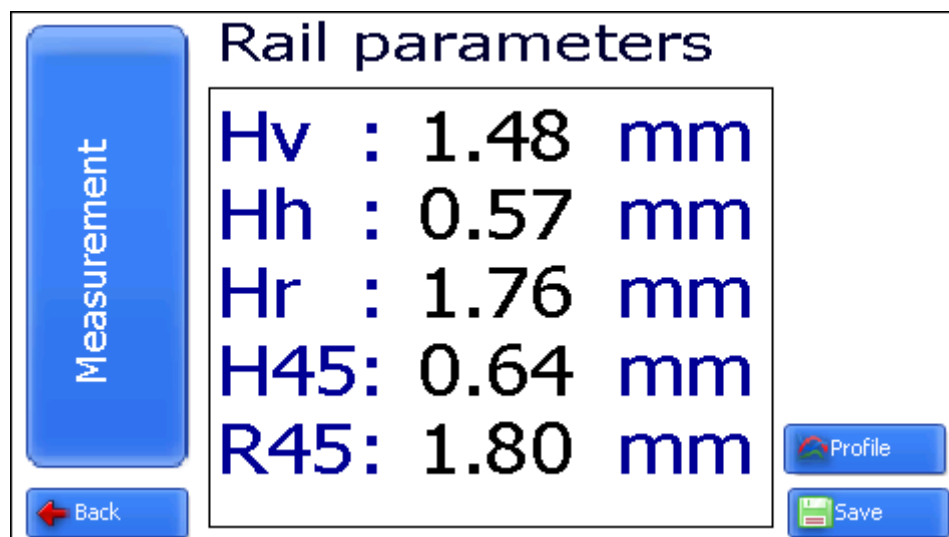
A fully functional work with the rail profilometer involves maintenance of the measurements database.

- To take measurements Select in the main menu **PRP > Measurement**, the window of parameters input will appear

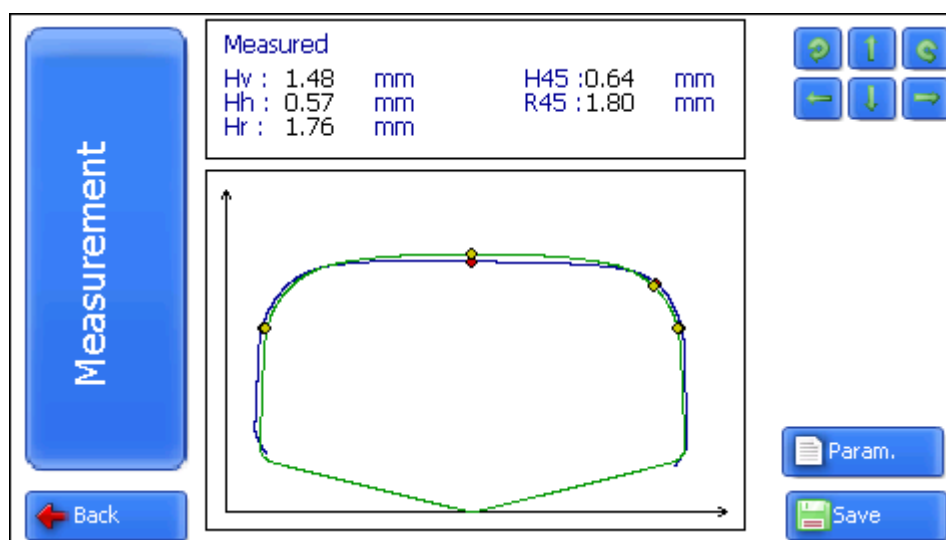


- If necessary, fill in/edit the required fields
- to save parameters, press the **Save** button
- measure the rail
- after the scanning surface is laser-scanned, the PDA will show the value of selected geometrical rail parameters.

17



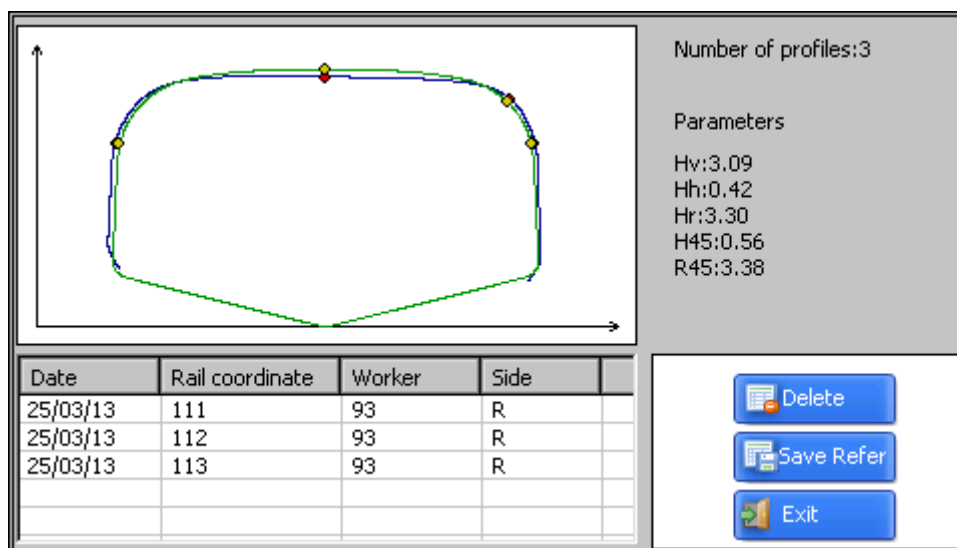
- to look at the profile press **Profile** button:



## 11.4. Browsing the database

To browse the database:

- select **Service > Profiles** in the main window. View on the screen:

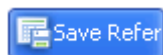


### Buttons:



— delete selected profile;

- when in this mode, it is possible to save the selected profile as a reference profile by pressing Save button:



— create reference profile (**profile\_name.ref**).



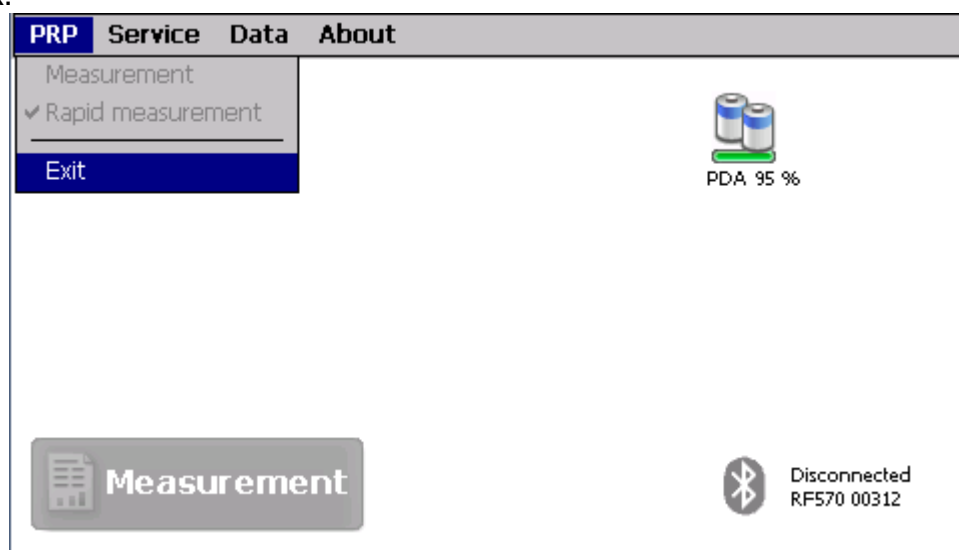
Name of the profile.

Buttons: Save, Cancel

- write profile name and press **Save**.

## 11.5. Deactivation

To turn off the PDA, press power supply button and hold it down until the screen is blank.



To turn off the laser module, press button (2), Fig. 4 .

## 12. Installation of software on PC and startup

### 12.1. Installation of database support software

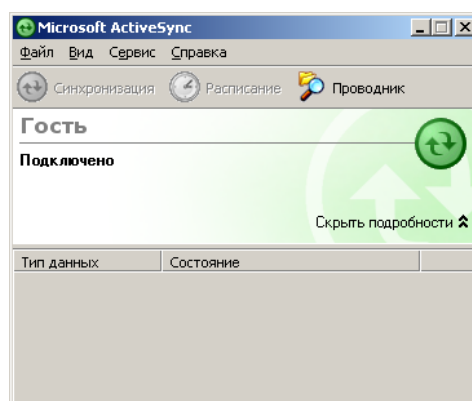
The **PRP\_DB** software is intended for maintaining rail wear database on a personal computer (the updated version of the program can be downloaded from [www.riftek.com](http://www.riftek.com)).

To install the software, insert compact disk to PC CD drive, select and start **Install\_PRP.exe** file in the **Software** folder. Follow instructions of the installation wizard. The program is installed in **C:\Program Files\RIFTEK\** folder by default.

### 12.2. Installation of Microsoft Activesync

For combined work **PDA** and **PC**, it is necessary to install Microsoft Activesync. Proceed as follows:

- Start ActiveSync42.exe file from the **Software** folder on CD.
- Follow program installation instructions.
- Check for correctness of the installation by activating PDA and connecting it PC USB port using cable which is part of supply package. In case of successful connection the screen will show the following message:



**NOTE:** For PC with Microsoft Windows Vista or Microsoft Windows 7 installed, use **Windows Mobile Device Center** synchronization program instead of Microsoft Activesync.

### 12.3. Preparation and installation of language support file

By default, working language of the program is English. User can change the language, form his own language support files as well as change/edit the terminology used. Language support files are located in the directory used in the process of installation. By default the following directory is used: **C:\Program Files\RIFTEK\Prp\_db\Language\**. The directory contains two files, **RUS.Ing** and **ENG.Ing**, to support Russian and English languages respectively.

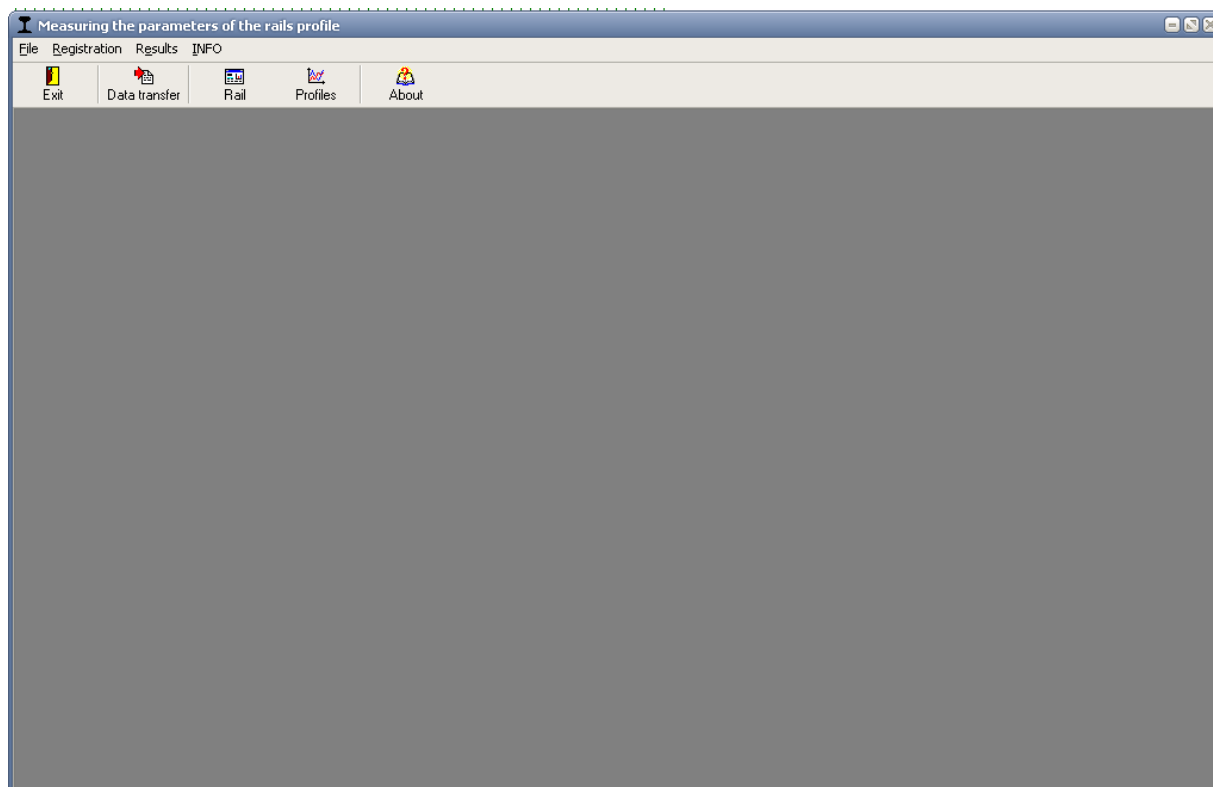
To create support file for any other language, it is necessary to

- copy one of the existing files. For example, **ENG.Ing** under the other name, for example, **GER.Ing**
- edit the renamed files by using any text processor, namely, change all terms and phrases to analogous ones from the required language
- save the edited **\*.Ing** file in the **Language** folder
- To change and edit terminology, it is necessary to:
- edit the corresponding language file by using any text processor;

- save the edited \*.Ing file in the **Language** folder
- 

## 12.4. Program starting

To start the program click **Start > All programs > IKP5 > IKP5\_DB**. View of the main program window is shown in the figure.

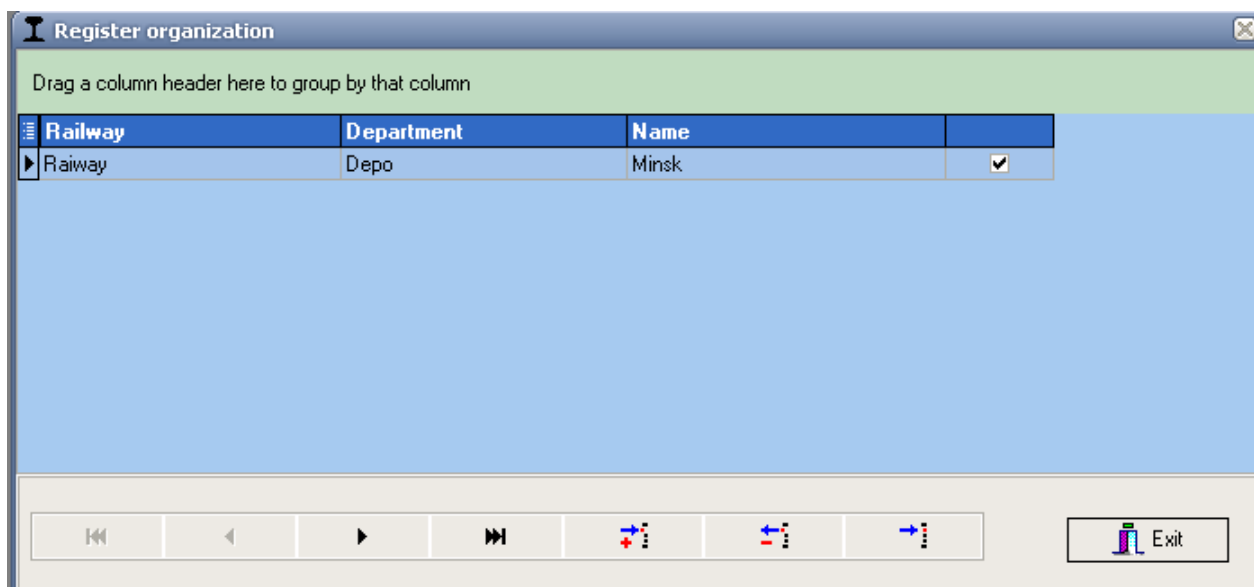


## 13. User settings of the program





### 13.1. Registration of user organization

For registration user organization select **Registration > Organization**. Fill out the required fields in the opening window. Subsequently, the filled out information will be used in automatic generation of reports.



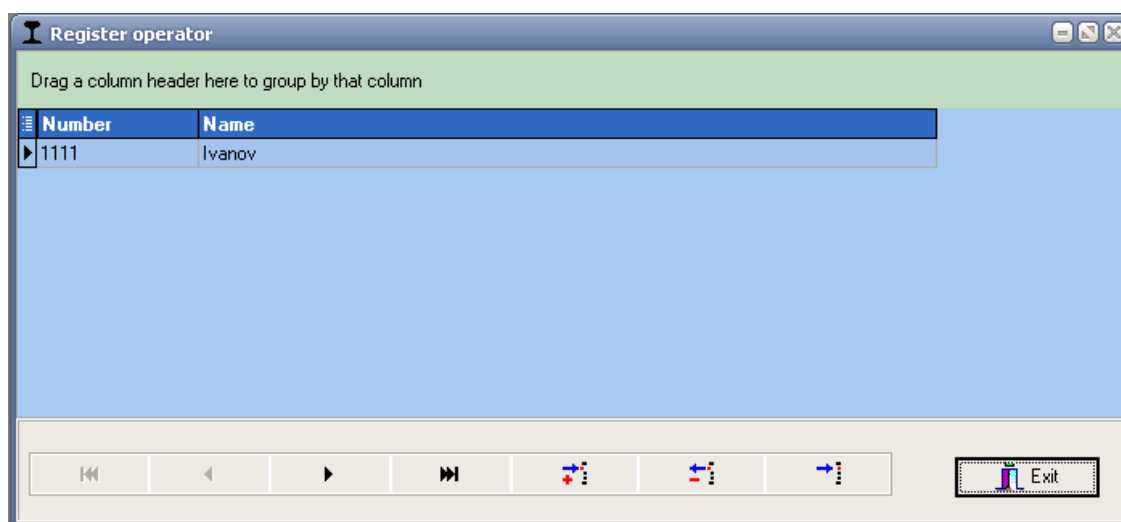


### Buttons:

-  - add new body;
-  - edit selected body;
-  - delete selected body;
-  - exit.

## 13.2. Registration of operators

Steps to follow: menu **Registration > Operator**. Fill out the required fields in the opening window by assigning a unique digital identification cod (up to 4 digits) to each operator.

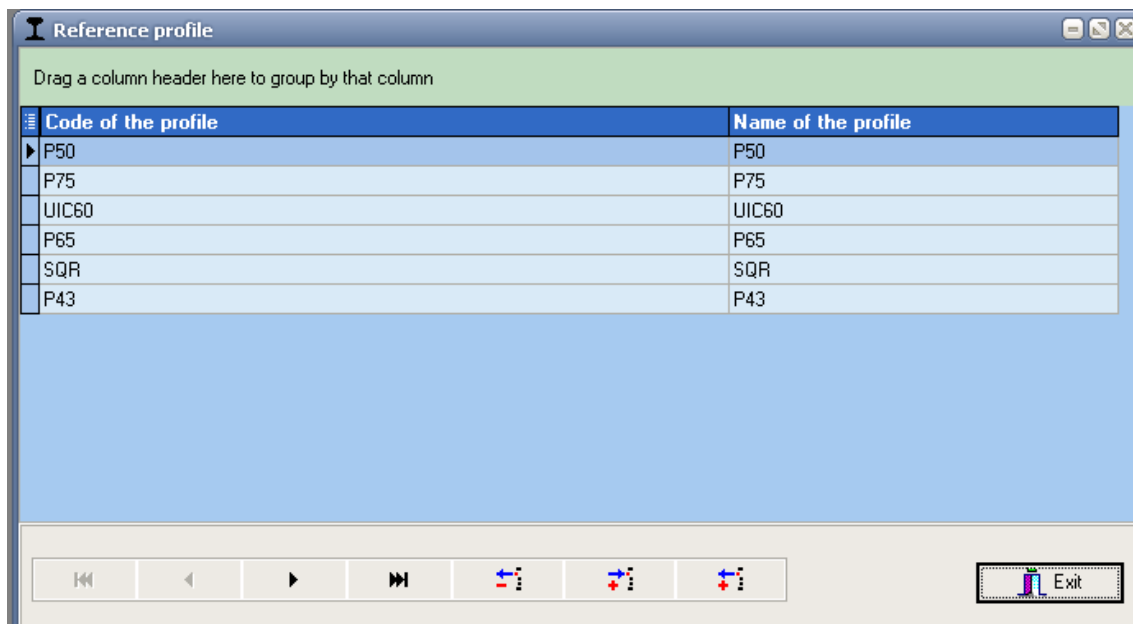


Functions of buttons are similar to those in par. [13.1.](#)

### 13.3. Registration of reference profiles

Reference profiles are stored in the database as profile description files with extension **.ref**. The program is supplied with several pre-set profiles. In addition, user can form a description of required profile himself or request it from **RIFTEK** (free service).

To browse available profiles, select menu **Registration > Profiles**:



**Buttons:**



- import of reference profile from **\*.ref** file;

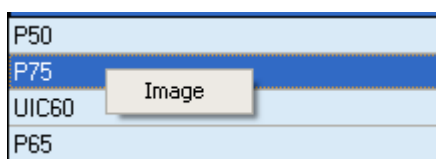


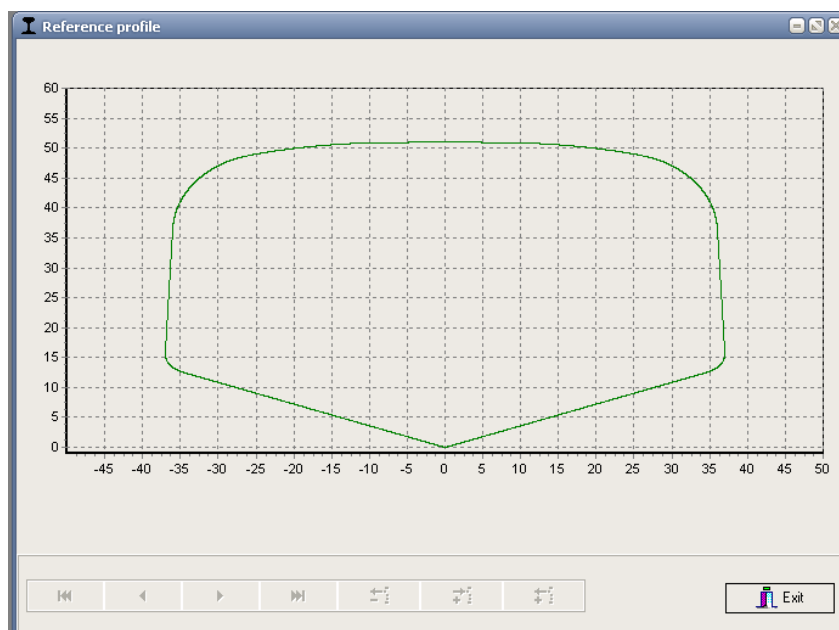
- export of reference profile into **\*.ref** file;



- delete reference profile;

For profile viewing make double click on selected profile or click right mouse button and press **Image**.





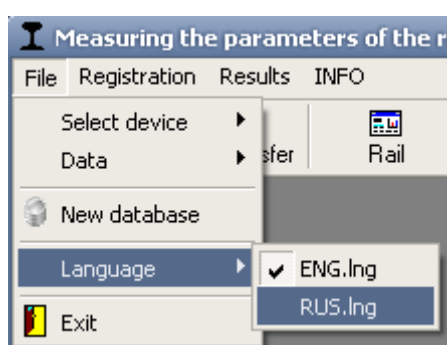
### 13.3.1. Request and registration of the reference profile file

To get **.ref**-file of reference profile send the drawing of profile to **RIFTEK** ([info@riftek.com](mailto:info@riftek.com)). Register received **.ref**-file:

- press button **Import**
- in the window appeared indicate the way to the **.ref**-file
- press button **Open**

### 13.4. Selection of software language

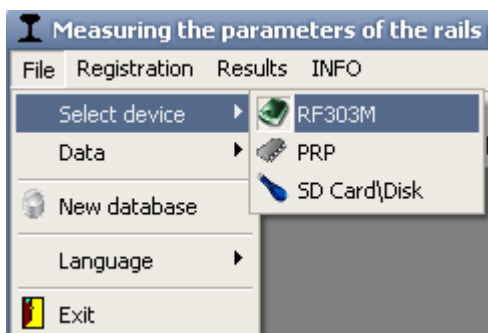
To choose software language, select **File > Language** in the main window menu and set the required language support file.



## 14. Data exchange between PDA and PC

Data exchanged is done by direct cable connection of PDA to PC USB-port (special **RF505.42** cable is supplied)

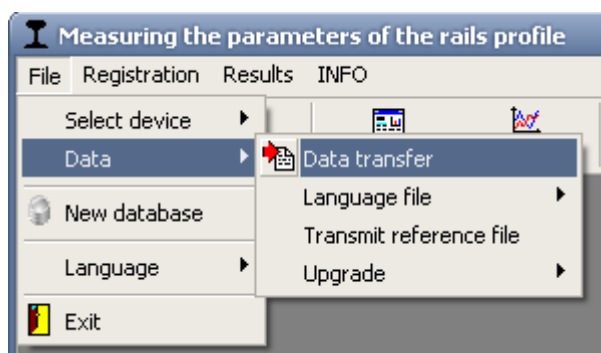
- activate PDA
- connect cable between PDA and PC (note: Microsoft Activesync must be installed on PC as shown in par. 12.2)
- select data exchange device by executing **File > Device selection > select either RF303M.**



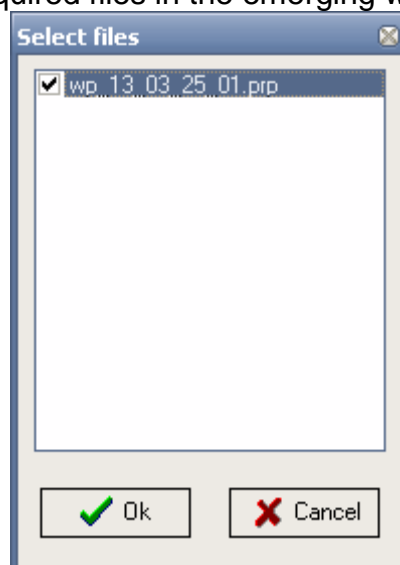
#### 14.1.1. Transfer of database file to PC

To transfer database file from PDA to PC, it is necessary to:

- select **File > Data > Data transfer**



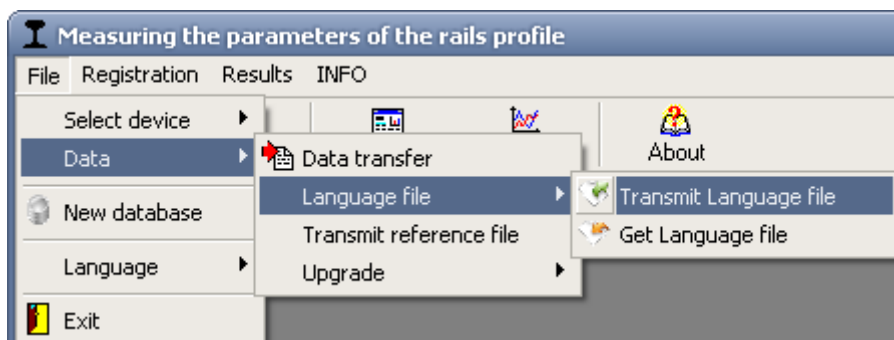
- check the required files in the emerging window and click **OK**.



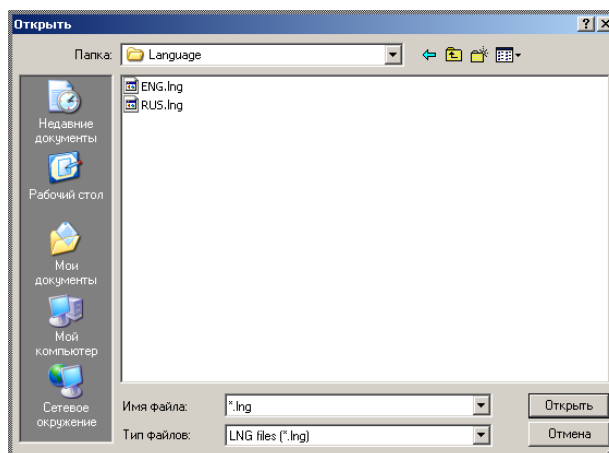
#### 14.1.2. Transfer of language file from PC to PDA

To transfer language file from, PC to PDA, it is necessary to:

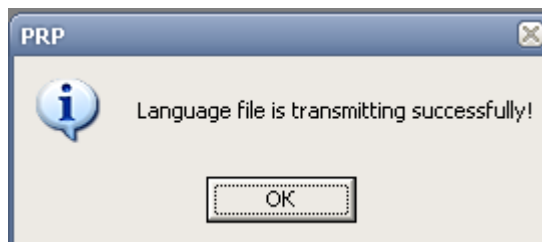
- select **File > Data > Resource file > Transfer resource file**



- select required file



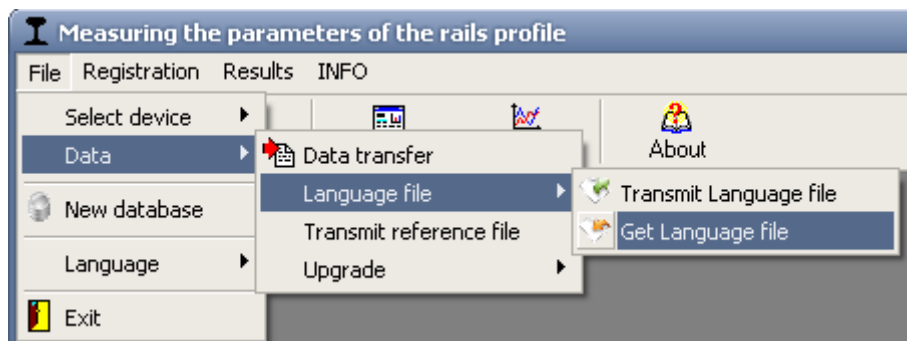
- if transfer is successful, the screen will show:



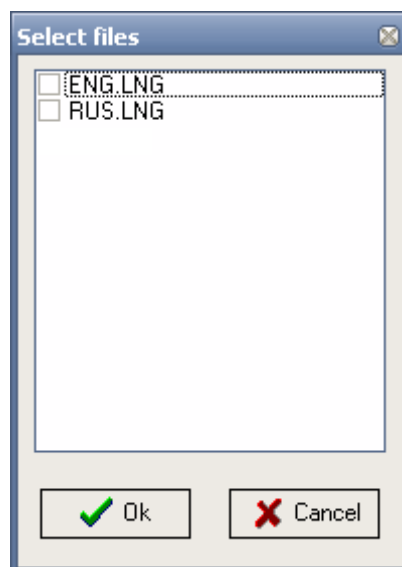
### 14.1.3. Transfer of reference profile files from PC to PDA

To transfer reference profile file from PC to PDA, it is necessary:

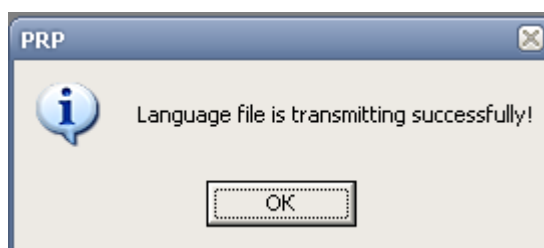
- select **File > Data > Transfer reference file**



- check required files with extension **.ref**



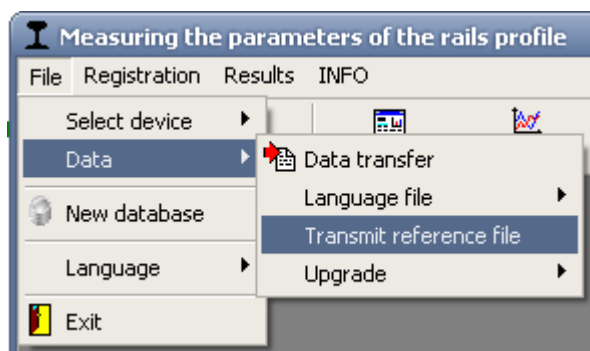
- if transfer is successful, the screen will show:



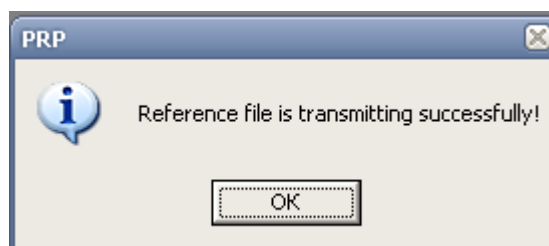
#### 14.1.4. Transfer of reference profile files from PC to PDA

To transfer reference profile file from PC to PDA, it is necessary:

- select **File > Data > Transfer reference file**



- select required file with extension **.ref**
- if transfer is successful, the screen will show the following message:

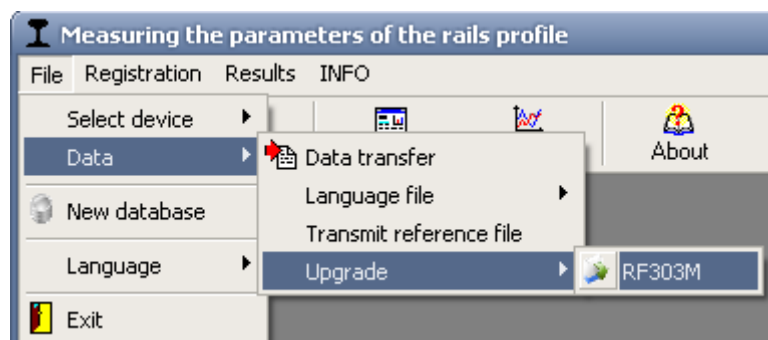




### 14.1.5. Updating of PDA software

The updated software version can be downloaded from their site [www.riftek.com](http://www.riftek.com). To transfer the update file to PDA, it is necessary to:

- select **File > Update > RF303**



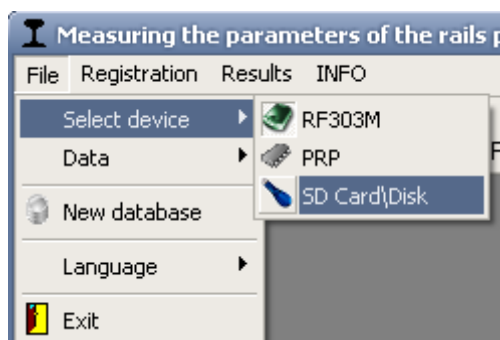
- select file for transfer
- if transfer is successful, the screen will show:



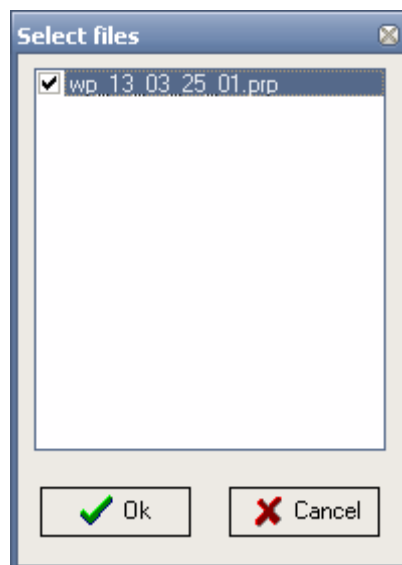
### 14.2. Data transfer by means of flash memory card

To transfer database files from PDA to PC by using flash memory card, it is necessary:

- insert flash card to PC USB-port
- select **File > Device selection > SD Card\Disk**



- select database files folder
- check files and click **OK** for transfer



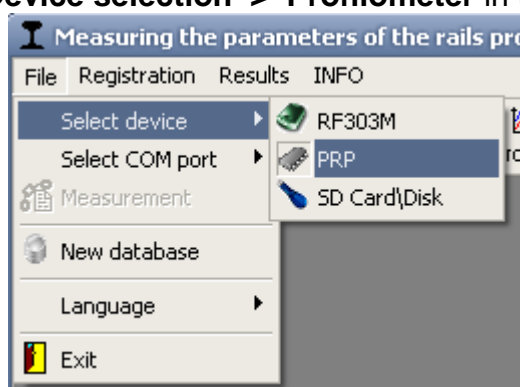
## 15. Taking measurements under PC control (without PDA)

The laser scanning module can work under direct control of PC without PDA.

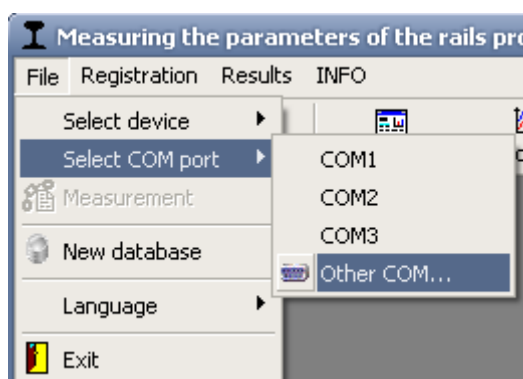
### 15.1. Preparation for taking measurements

To work under direct control of PC, it is necessary to:

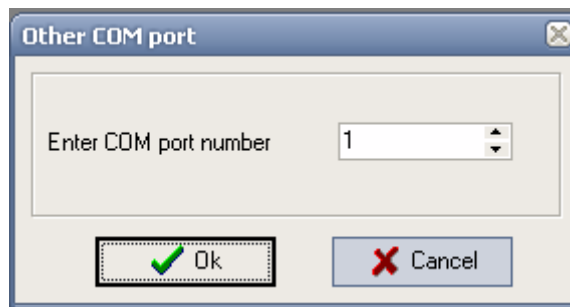
- install Bluetooth-connection between the scanning module and PC. The procedure is described in par. [19](#).
- select **File > Device selection > Profilometer** in the main window menu.



- select required port ( see par. [19](#))



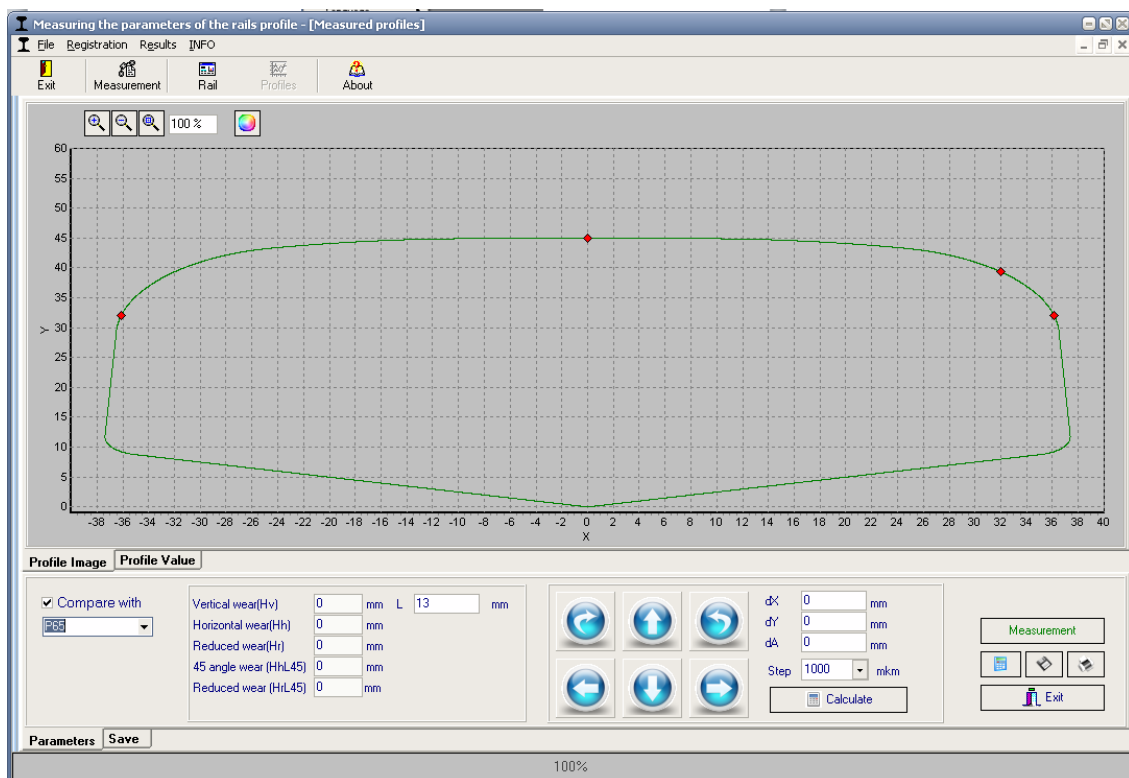
- click **OK** for connection



- If the connection is successful, the **Measurement** button in the main program window becomes active

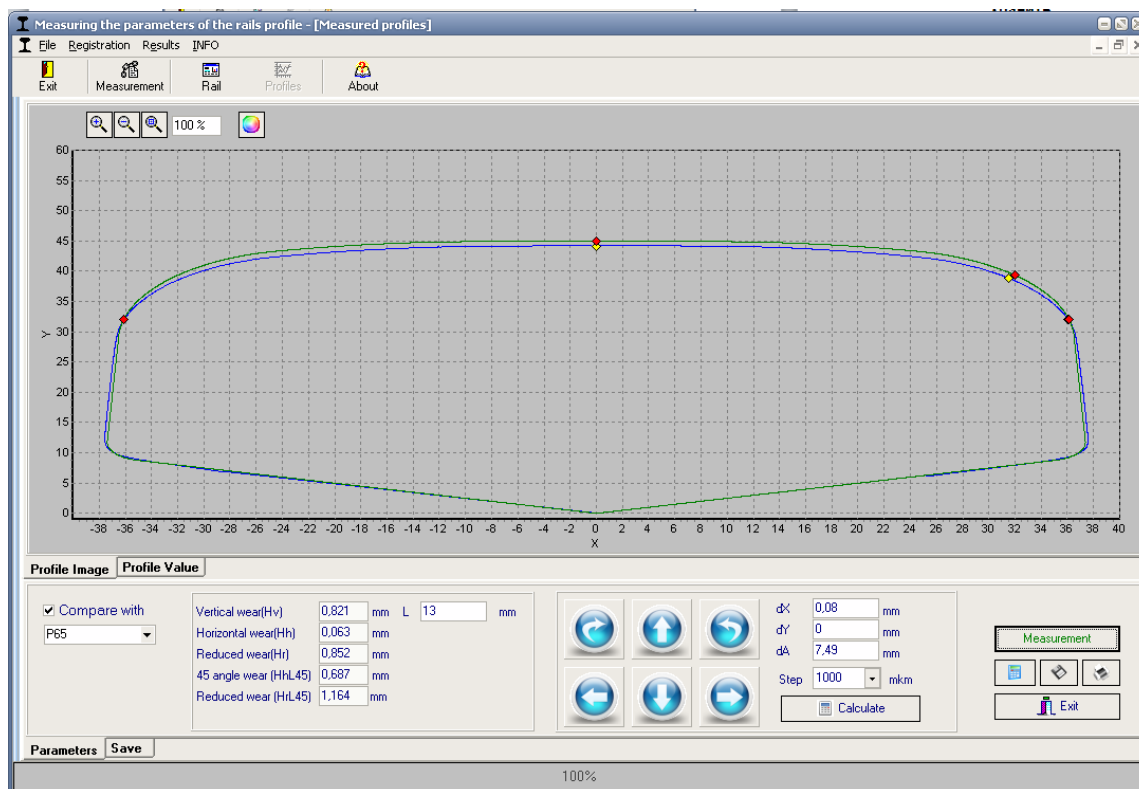


- Press the **Measurement** button or select **File > Measurement** in the menu. After the scanning module parameters are read, the program is ready for work:




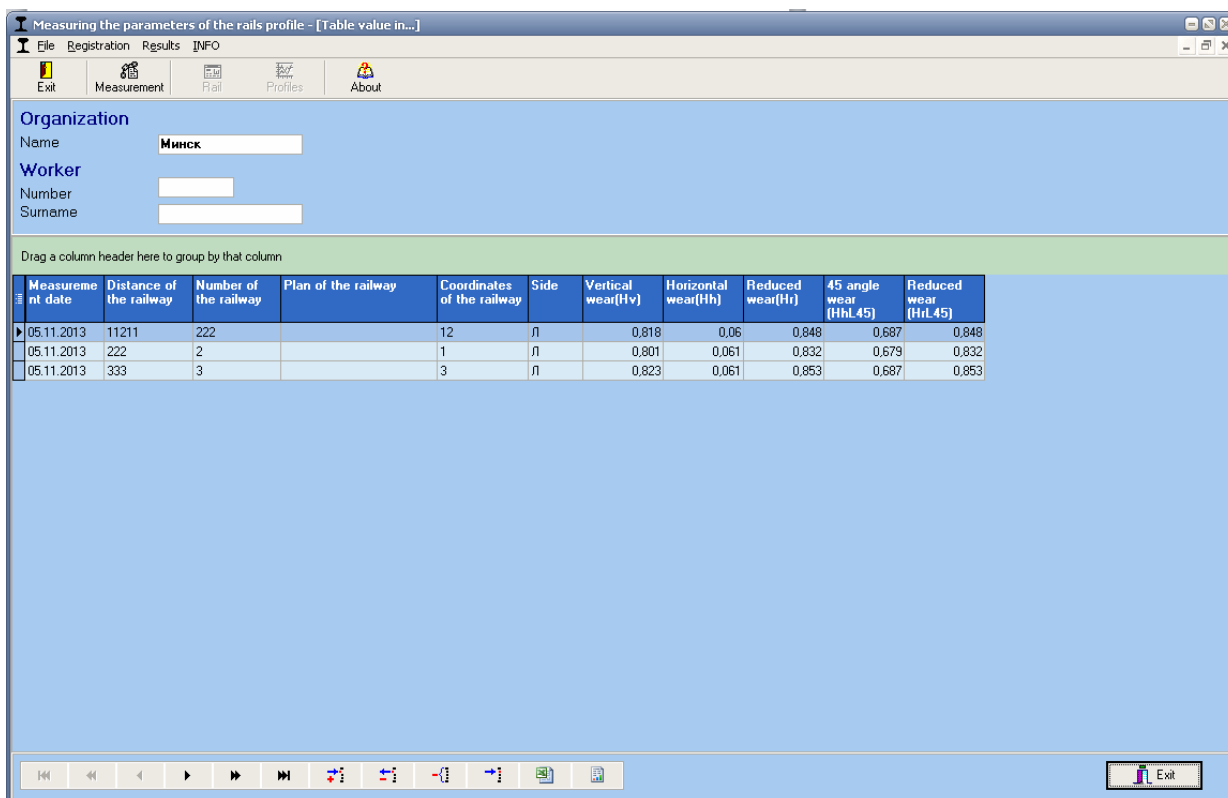
## 15.2. Measurement and saving of data

To measure the wheel profile, press the **Measurement** button. Measurement being completed, the screen will show graphic image of the rail profile and calculated profile parameters.



- to save the results in the database, go to the **Save** tab.
- fill in the required parameter fields in the emerging window

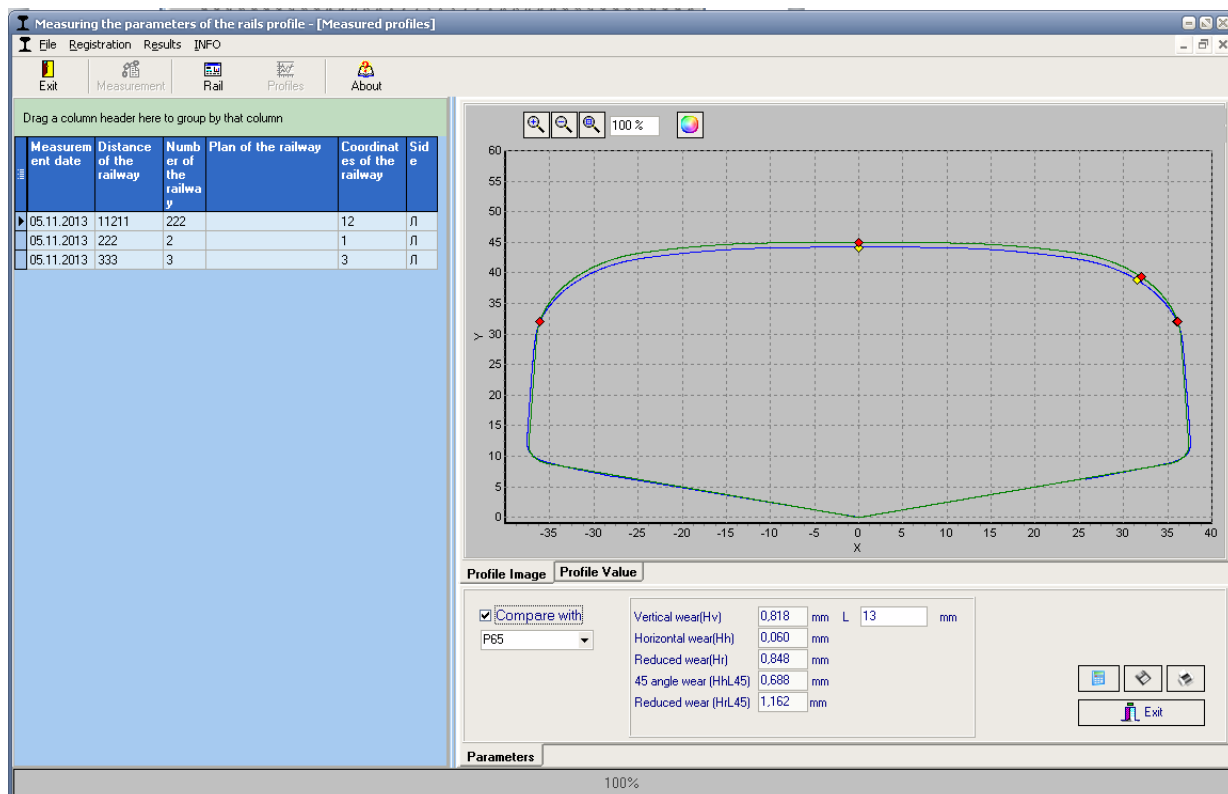
- after filling the fields press the  **Save profile** button
- the profile measured will be saved in the database:



## 16. Working with profilograms and wear calculations

### 16.1. Profiles lookup

To look at rolling surface profiles select **Results > Profiles**, or press button **Profiles**



Select the required wheel pair from the table offered.

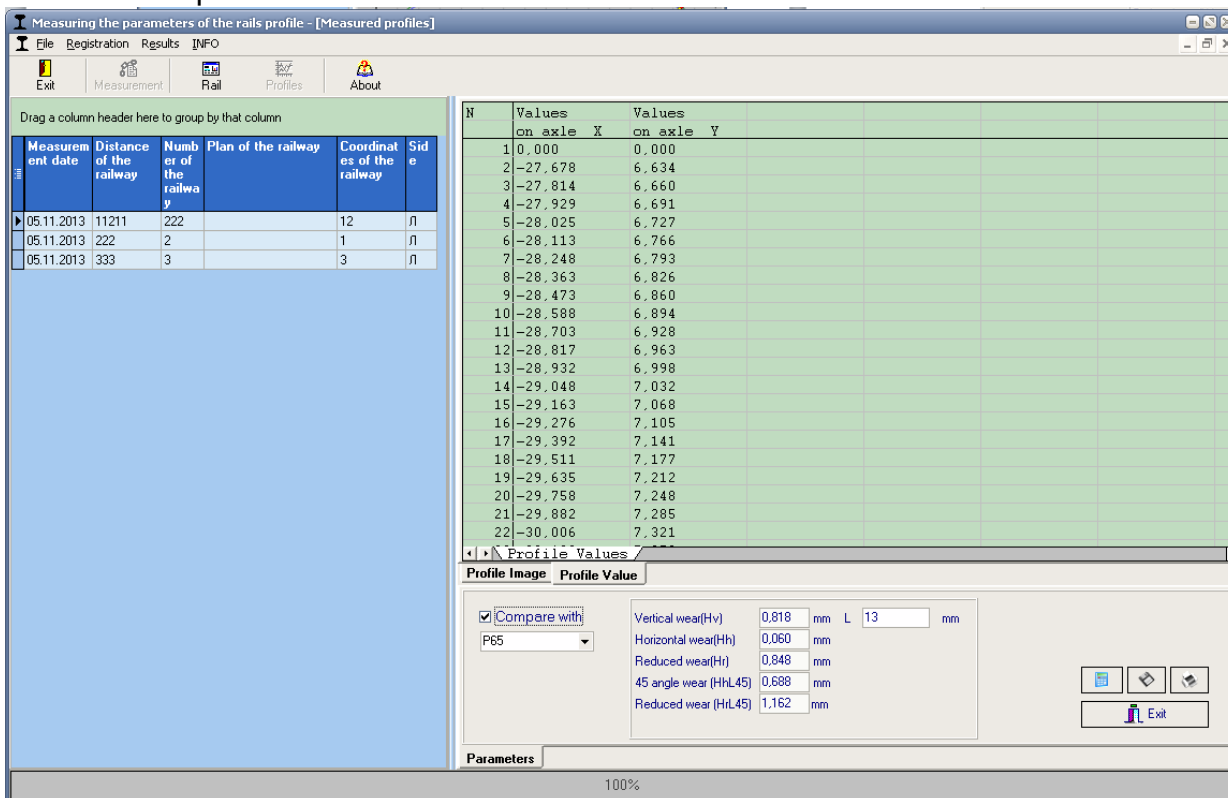
To print picture press button



To save picture in separate file (.bmp file ) press button

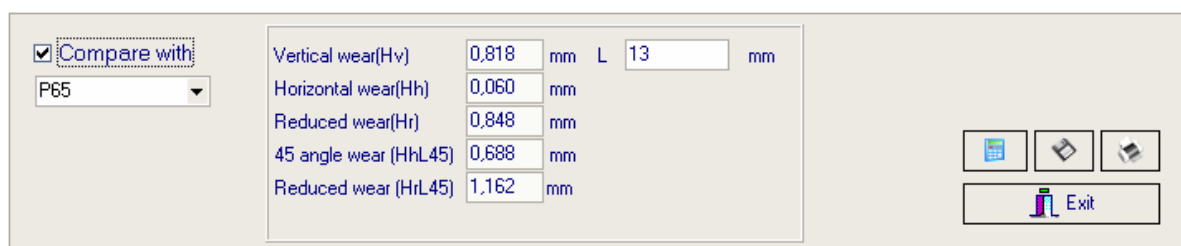



To look at the points coordinates use **Values** bookmark



## 16.2. Browsing/recalculation of parameters

In this tab shows calculated profile parameters and the corresponding values of L-parameter.



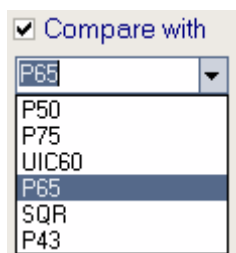
To recalculate values of flange parameters for other L-parameter, it is necessary to change values of L-parameter and press the Calculate button - .

## 16.3. Comparing profiles

### 16.3.1. Selection of reference profile

To compare measured profile with the reference profile, select **Parameters** tab and tick the **Compare with** field. Select required reference profile in the pullout list.

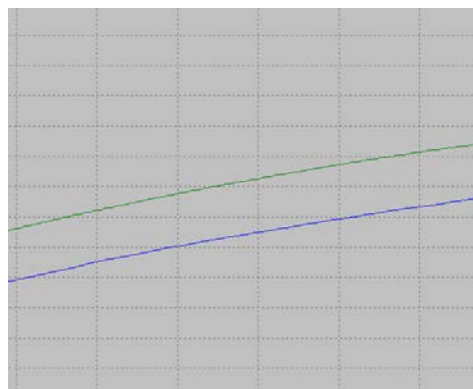
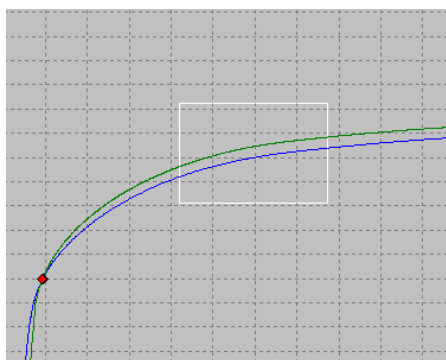




### 16.3.2. Change image scale

To change image scale, mark part of the image with the left mouse key, move the image by holding it with the right mouse key pressed or with buttons **Increase** -

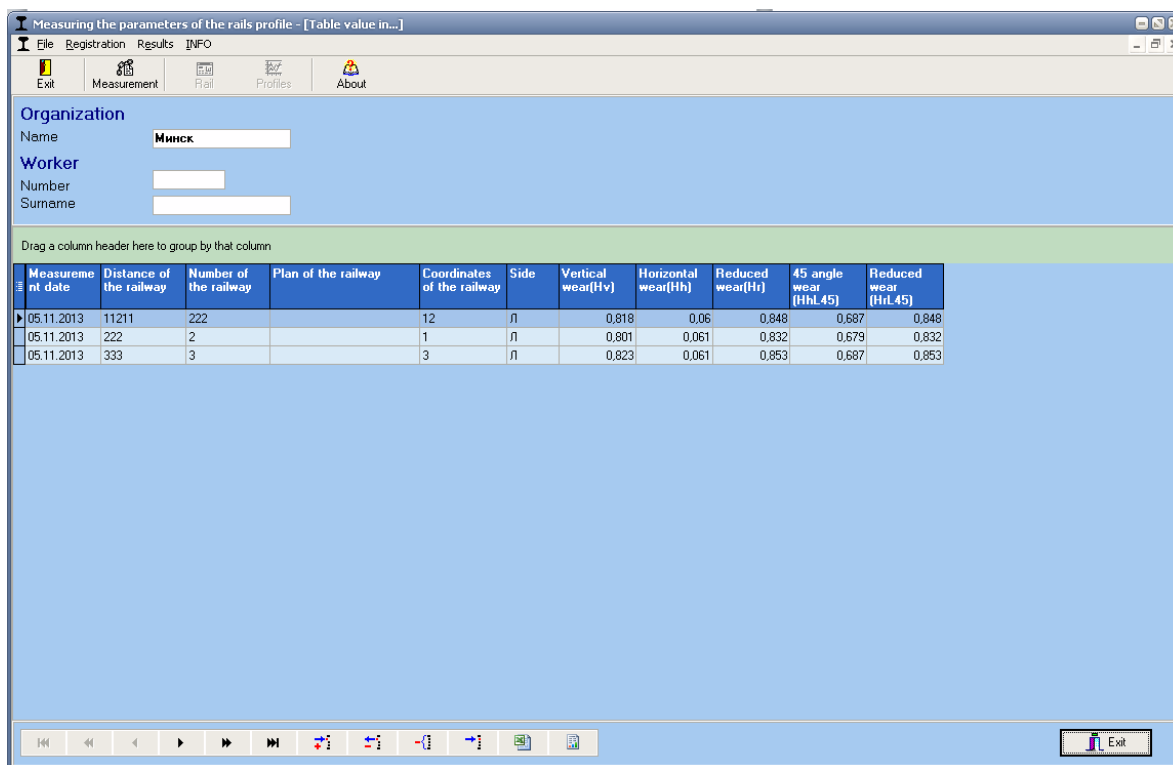
, **Decrease** -  and **Show all** - .




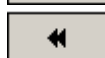


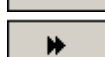
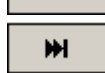
## 17. Scanning and editing of data

### 17.1. Scanning and filtering of data

To scan data, select **Results > Rails** in the menu or press the **Results** button. The form showing results will be as follows:




To navigate between the base entries, use “up/down” arrows or buttons of the navigation panel:

- |   |   |  |
|---|---|--|
|  | - | to the beginning of the database;      |
|  | - | to the previous page of the database;  |
|  | - | to the previous entry of the database; |
|  | - | to the next entry of the database;     |
|  | - | to the next page of the database;      |
|  | - | to the end of the database.            |

### • **Sorting of data**

To sort data for any of the fields, click left mouse key on the header of the field column:

Дата замера	Достанция пути
05.11.2013	11211
05.11.2013	222
05.11.2013	333

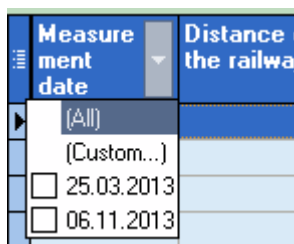


Дата замера	Достанция пути
05.11.2013	333
05.11.2013	222
05.11.2013	11211

To cancel data sorting, press **Ctrl** and click left mouse key on the header of the field column.

### • **Filtering of data**

In order to filter data in any of the fields, click left mouse key on the header of the field grouping, and select required value in the emerging pullout list:



To cancel filtering, all steps should be taken in the reverse order.

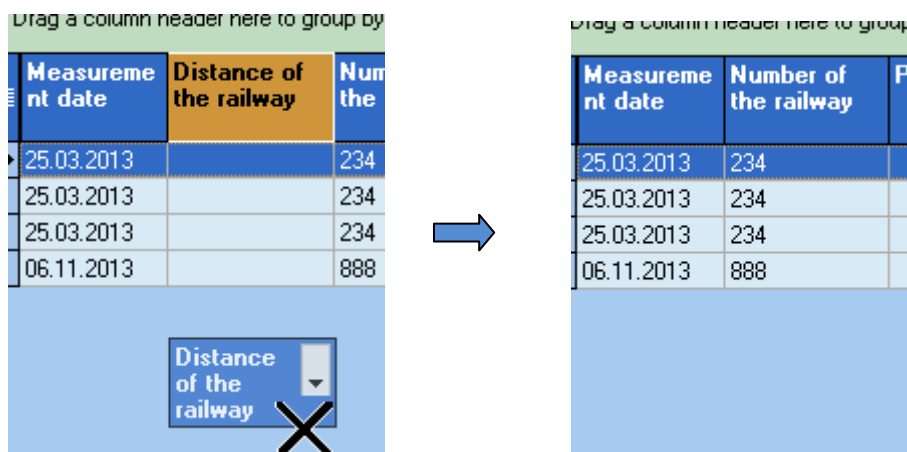
- **Data grouping**

To group data for any of the fields, click left mouse key on the header of the field column, and, with the mouse key pressed, drag it onto the table header


To filter data for a grouping field, click left mouse key on the header of the grouping field and select required value in the pullout list

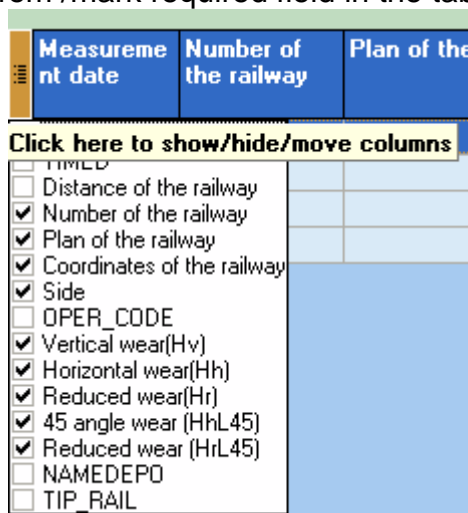
- **Hide/show field**

To hide field, it is necessary to click left mouse key on the header of the field column, and, with the mouse key pressed, drag it outside of the table header, drag it outside the table header:



The second method: to hide/show the field, click left mouse key on the utmost left head-

er (  ), and remove mark from /mark required field in the table




- **Changing of the field position order**

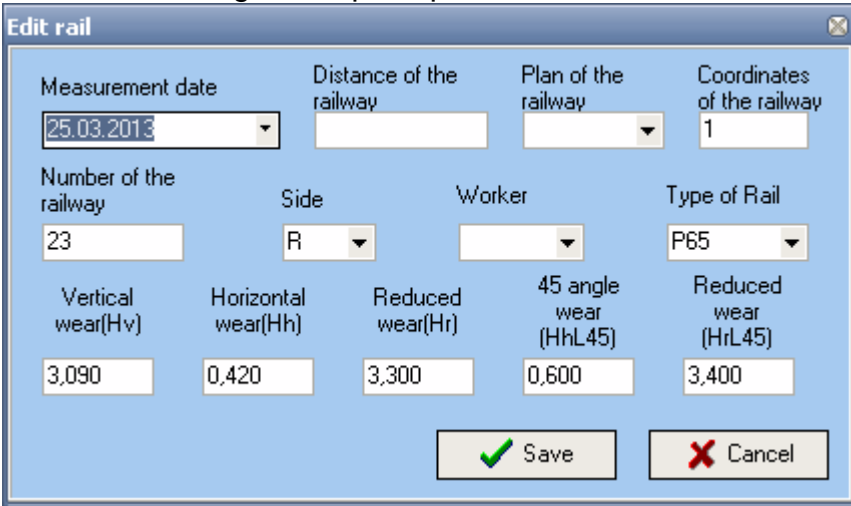
To change the field position, click left mouse key on the header of the field column and, with the mouse key pressed, drag it to required position:

## 17.2. Editing data


You can edit, add and remove data in/from the database.

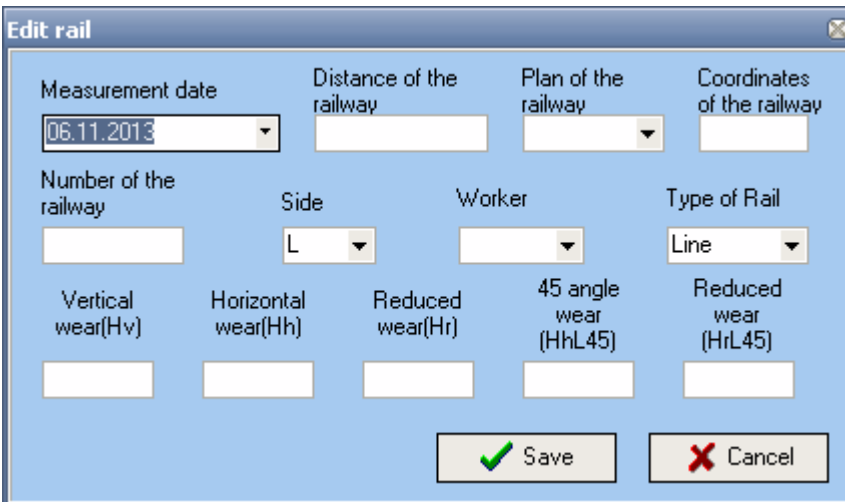
- **Editing data**

To edit the current entry, press the  button and input/change required parameter values, after the editing is complete press the **Save** button.



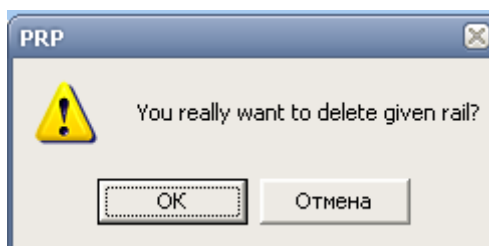
- **Adding data**

To add a new data entry, press the  button and type required parameter values, after the editing is complete press the **Save** button.



- **Deleting data;**

To delete a current entry, press the  button and confirm the deletion.

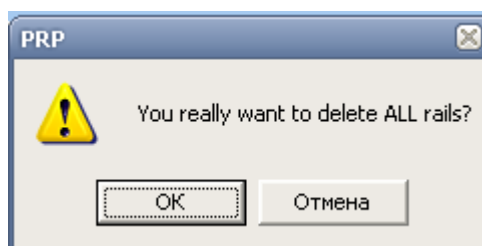


- **Deleting all selected data**

If it is necessary to delete not only one entry but several entries combined by some condition, filter the data according to the corresponding attribute, press the



button and confirm the deletion.



### 17.3. Creation of empty database

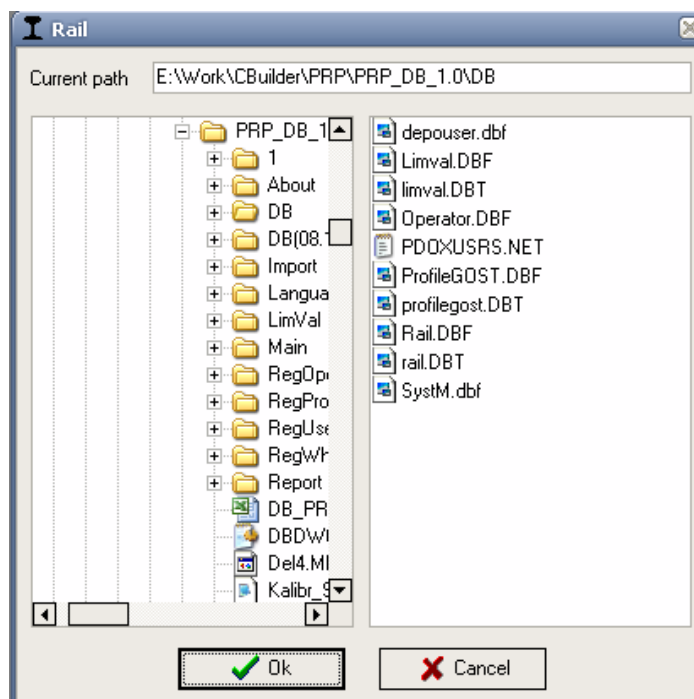
To create empty database, select **File > New DB** in the main menu.

All data except for reference files will be deleted from the database. At the same time, catalog **DB(dd.mm.yy)** will be created in the installation directory whereto all deleted data (**dd.mm.yy** – current date) will be copied. Subsequently, these data can be restored (see par. 17.4).

### 17.4. Import of database

To import data to data base,


- select **File > Data import** in the menu.
- select folder with DB files in the left-hand window. All files will appear in the right-hand window:

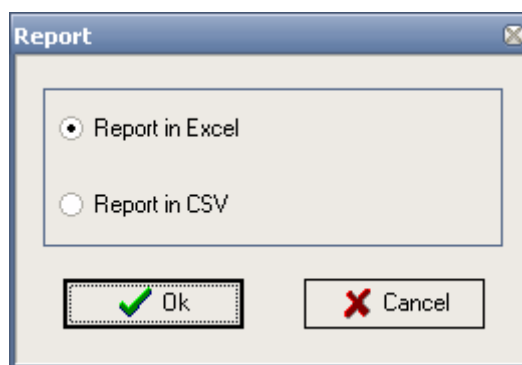


- press **OK** to import data.

## 18. Report preparation

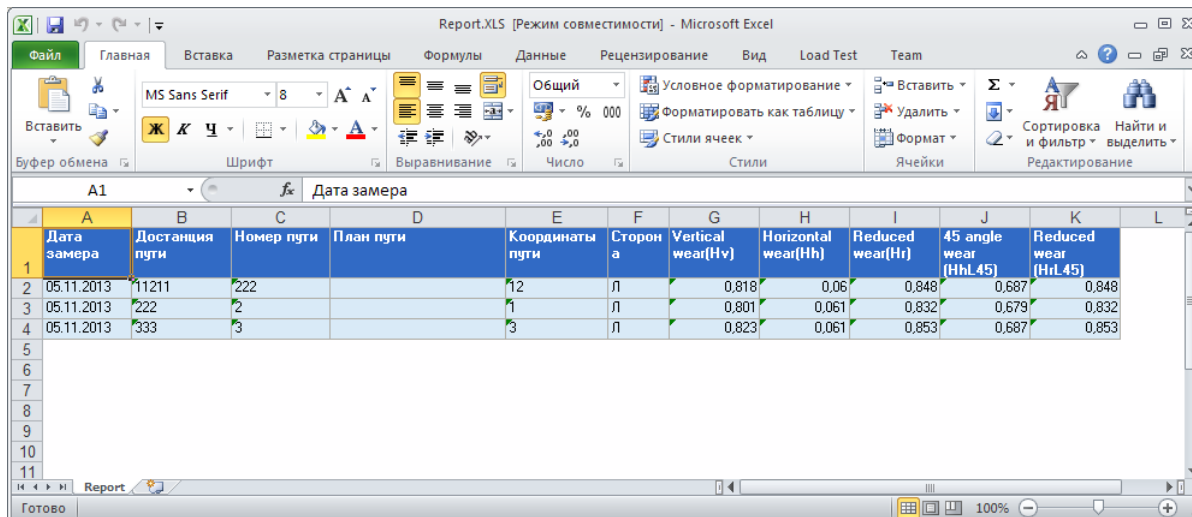
When staying in the scanning and editing of data mode according to par. [17](#), user can prepare reports in **Excel**, **RTF**, **TXT** formats or print out reports. In the formation of report sorting used at the moment is taken into account.

To generate a report, press the  button, and the program will to select the following options:



### 18.1. Exel-format report

To prepare a report in Excel format, select **Report in Excel** and press **OK**. The required data will be transferred to Excel-table:



Дата замера	Достанция пути	Номер пути	План пути	Координаты пути	Сторона	Vertical wear(Hv)	Horizontal wear(Hh)	Reduced wear(Hr)	45 angle wear (HhL45)	Reduced wear (HhL45)
05.11.2013	11211	222		12	л	0.818	0.06	0.848	0.687	0.848
05.11.2013	222	2		1	л	0.801	0.061	0.832	0.679	0.832
05.11.2013	333	3		3	л	0.823	0.061	0.853	0.687	0.853

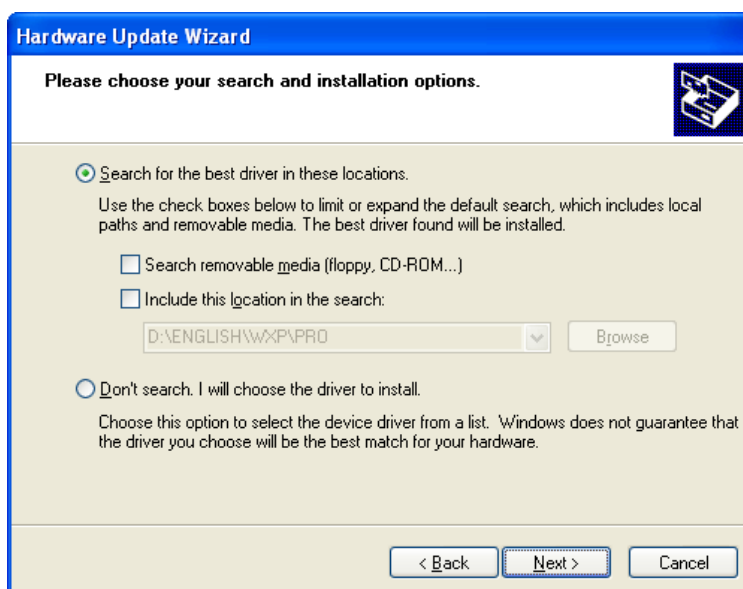
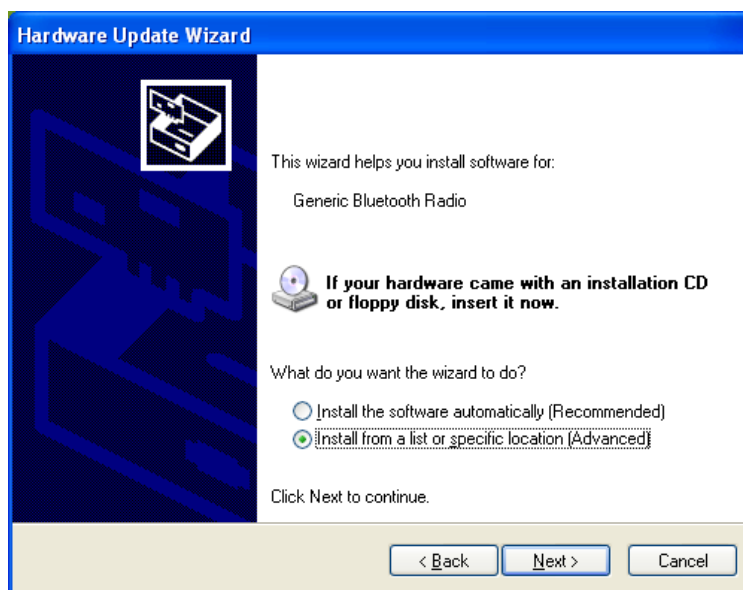
## 19. Procedure of installation of Bluetooth connection between PRP and PC

To install Bluetooth-connection between the PRP and PC, it is necessary to:

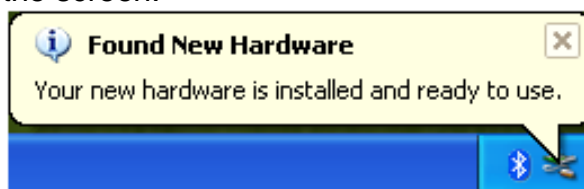
- insert USB/Bluetooth-module to PC USB-port.
- continue installation of the equipment following instructions of the wizard by selecting successively:







- when drivers are installed, the corresponding message and Bluetooth icon will appear in the screen:



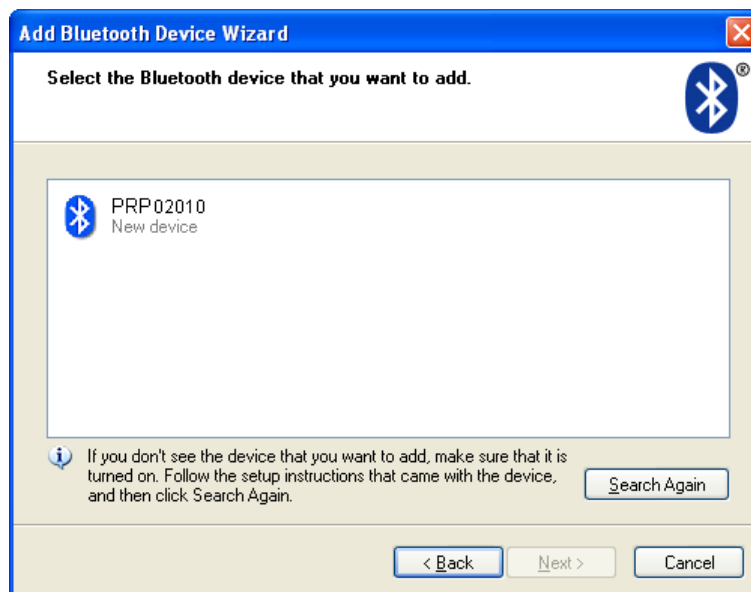
- activate PRP.
- click right mouse key on the Bluetooth icon and select **Add Bluetooth device**



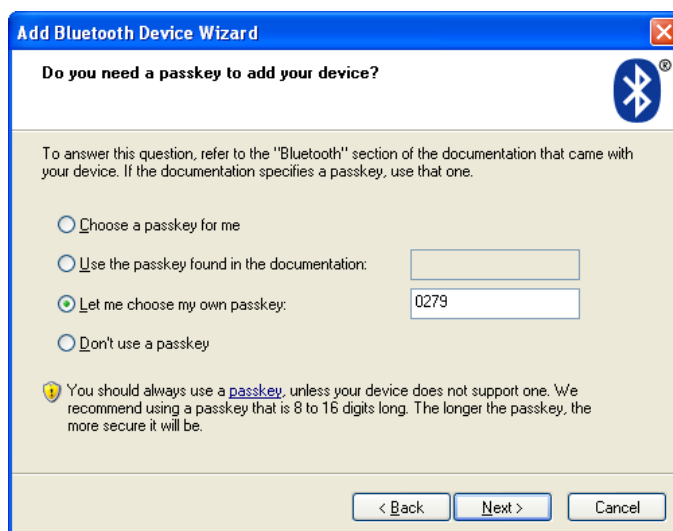
- Then Bluetooth installation wizard will start working:



- tick the **Device is installed and ready for connection**
- select **Next** for search
- when the search is completed, the wizard will show the devices found:



- select the required device (PRP), press **Next** and type access key (Pin). The key for each device consists of 4 symbols and is set based on the PRP serial number. For example, if the PRP number is 02010, then Pin=0200; 01309 - Pin=0139, etc.



- press **Next** and continue installation process.
- when required drivers are installed, the Bluetooth device will give a message with COM-port (outgoing) which should be opened for connection with PRP during measuring. In this case, the port is COM3:



## 20. Charging of built-in accumulator battery

To charge of built-in accumulator battery it is necessary to:

- Switch off PDA (laser module).
- Connect charging device and PDA (laser module)
- Connect charging device and 220V.
- Time of charging of DRD–5 hours (until red LED is OFF), laser module – 12hours (until green LED is OFF).
- Disconnect charging device and 220V
- Disconnect charging device and PDA (laser module)

ATTENTION: please follow the sequence of this points.

## 21. Warranty policy

Warranty assurance for the portable rail profilometer - 24 months from the date of putting in operation; warranty shelf-life - 12 months.

## 22. Distributors

<p><b>AUSTRALIA</b></p> <p><b>XN Innovation</b>  LG Centre, Suite 1, Level M, 55 Par-  ramatta Rd,  NSW, 2141, Lidcombe, Australia  Tel: +61 (0)2 8091 2426  Fax: +61 (0)2 9648 6597  <a href="mailto:xni.sales@gmail.com">xni.sales@gmail.com</a></p>	<p><b>BENELUX</b></p> <p><b>Altheris B.V.</b>  Scheveningseweg 15  2517 KS The Hague,  The Netherlands  Tel: +31 (70) 3924421  Fax: +31 (70) 3644249  <a href="mailto:sales@altheris.nl">sales@altheris.nl</a>  <a href="http://www.altheris.com">www.altheris.com</a></p>	<p><b>BULGARIA, HUNGARY</b></p> <p><b>RMT Ltd.</b>  R Zahradni 224  739 21 Paskov, Czech Republic  Tel: +420 558640211  Fax: +420 558640218  <a href="mailto:rmt@rmt.cz">rmt@rmt.cz</a>  <a href="mailto:lubomir.kolar@rmt.cz">lubomir.kolar@rmt.cz</a>  <a href="http://www.rmt.cz">www.rmt.cz</a></p>
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## 23. Annex 1. RIFTEK measurement instruments for railway transport

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### Laser wheel profilometer. IKP Series

A laser profilometer is designed for the measuring of:

- wheel flange height;
- wheel flange thickness;
- wheel flange slope;
- full profile scanning and analyze of wheel rolling surface;
- maintaining of electronic wear data base;
- control of tolerances and sorting in the course of checkup, examination, repair and formation of railway wheel sets;

Measurements are made directly on rolling stock without wheel set roll-out.



### Wheel diameter measuring gauge. IDK Series

Electronic gauge is designed for measuring wheel rolling circle diameter of railway, metro and tram wheel sets.

Measurements are made directly on rolling stock without wheel set roll-out.



### Back-to-back distance measuring gauge. IMR Series

The device is designed for:

- measuring back-to-back distance of railway, metro and tram wheels in the course of checkup, examination, repair and formation of wheel sets;

Measurements are made directly on rolling stock without wheel set roll-out.



### Disc brakes profile gauge, IKD Series

Laser disc brakes profilometer IKD Series is designed for disc brakes profile measuring.

The main functions of IKD are:

- obtaining the information on the profile parameters of the working disc brakes surface;
- full profile scanning and analyze of the disc brakes acting face;
- visualization of the combined graphical images of actual and new disc brakes profiles on the display of system unit.