PORTABLE LASER RAIL PROFILOMETER

PRP Series

User's manual

22, Logoisky tract, Minsk
220090, Republic of Belarus
tel/fax: +375 17 281 35 13
info@riftek.com
www.riftek.com

2

Contents

3

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;
- redused head wear, that is determined as vertical one + the half of lateral wear, namely : $Hr = Hv + 0,5Hh$ or $Hr = Hv + 0,5Hh_{\llcorner R45}$.

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
Redused 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, 7200мАч
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
РФ 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.

6

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.
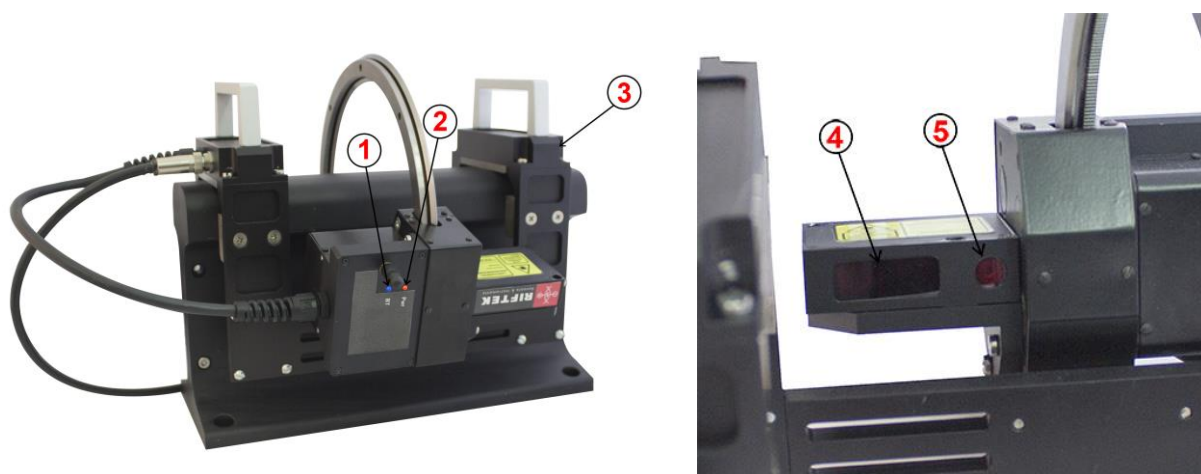
Figure 2

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.

7

Figure 3

7.1.2. Power supply

The power supply is stored in a battery box.
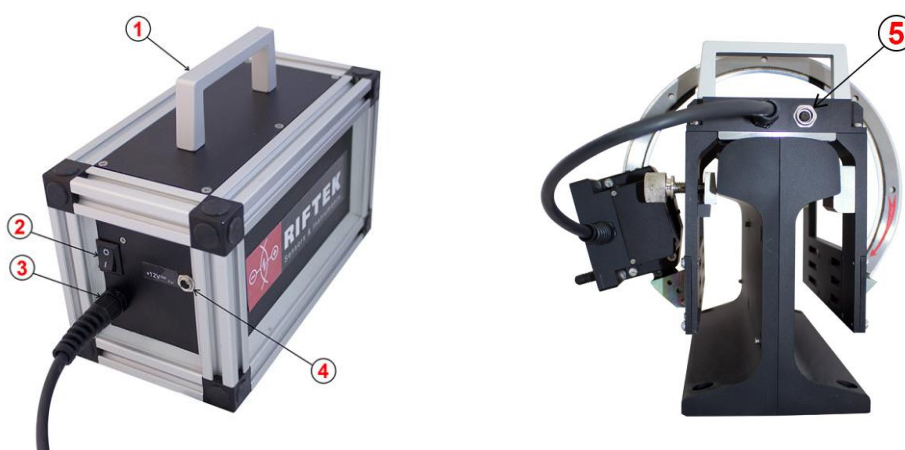
Figure 4

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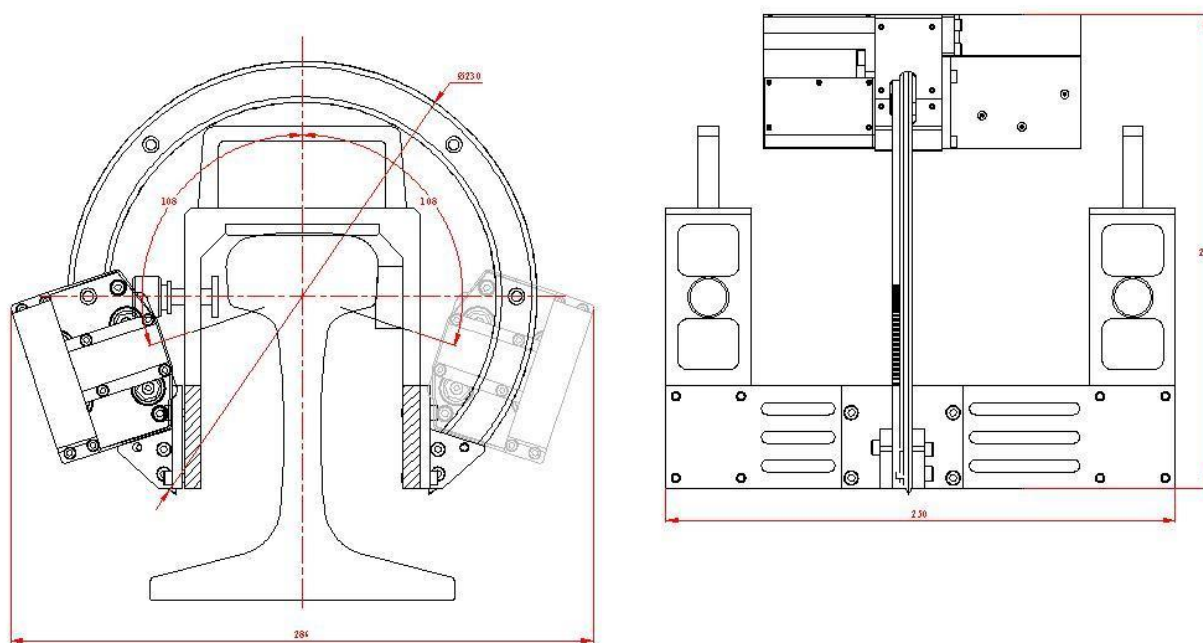
PDA is designed for control of the laser scanning module, data reception from the scanning module, indication of measurement results, parameter input and data storage.

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

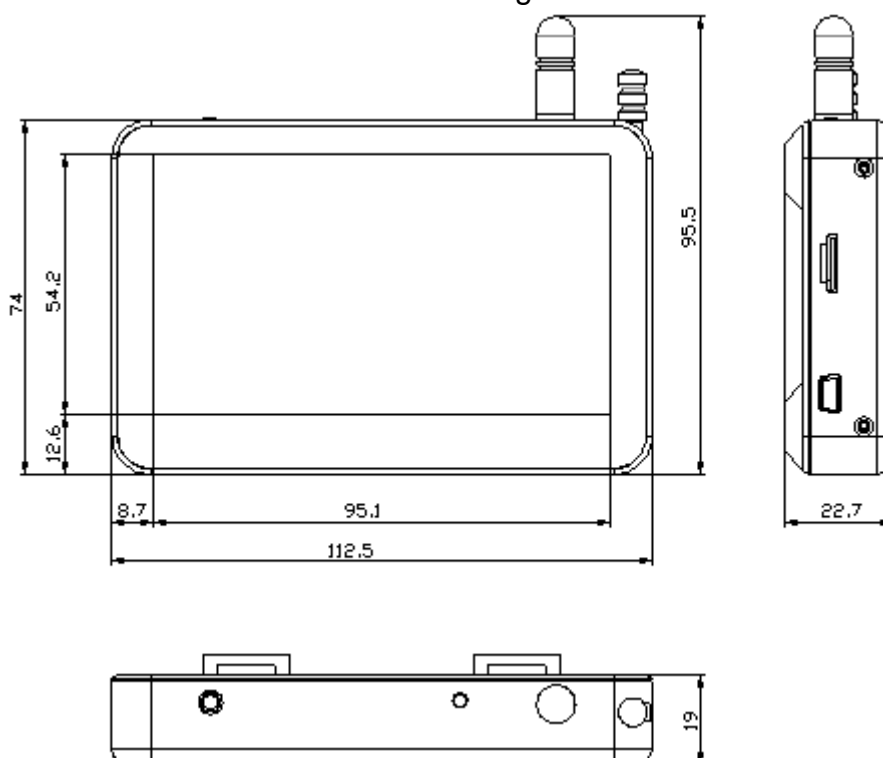Operator mounts the laser scanning module onto the railhead to be measured. Having received a command from PDA or PC, the laser module performs non-contact scanning of rail surface. Measurement results (geometric parameters and profile of the surface) are displayed on PDA, can be saved in the PDA memory, 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:
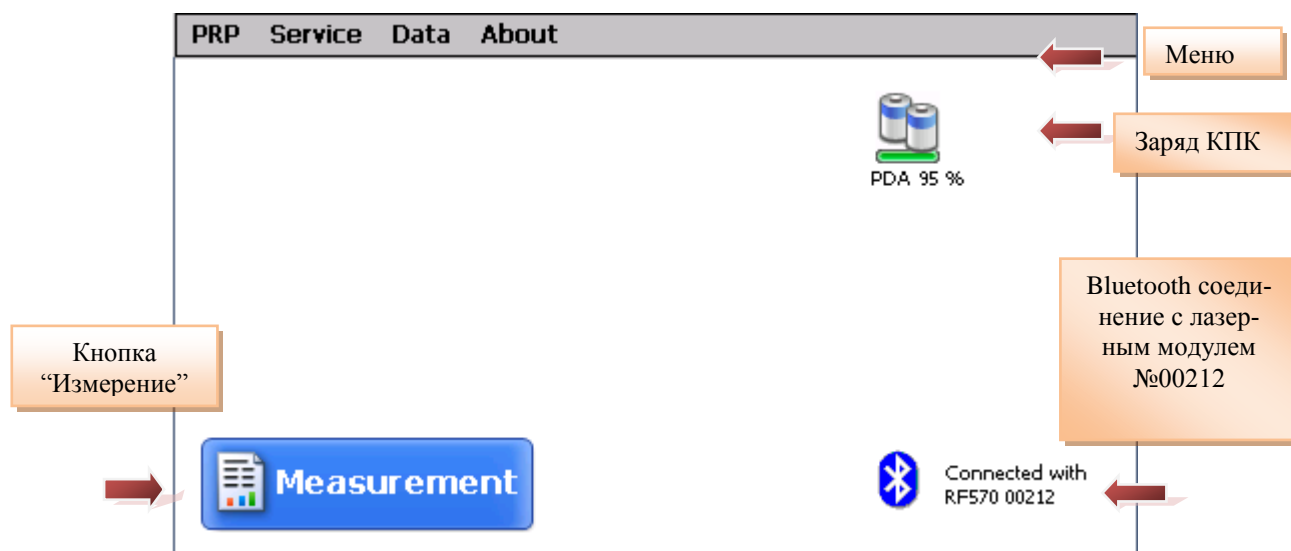

8.2. Measurement

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;

10

- 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 competed, the PDA will show values of measured parameters selected for presentation (см. п.□□):
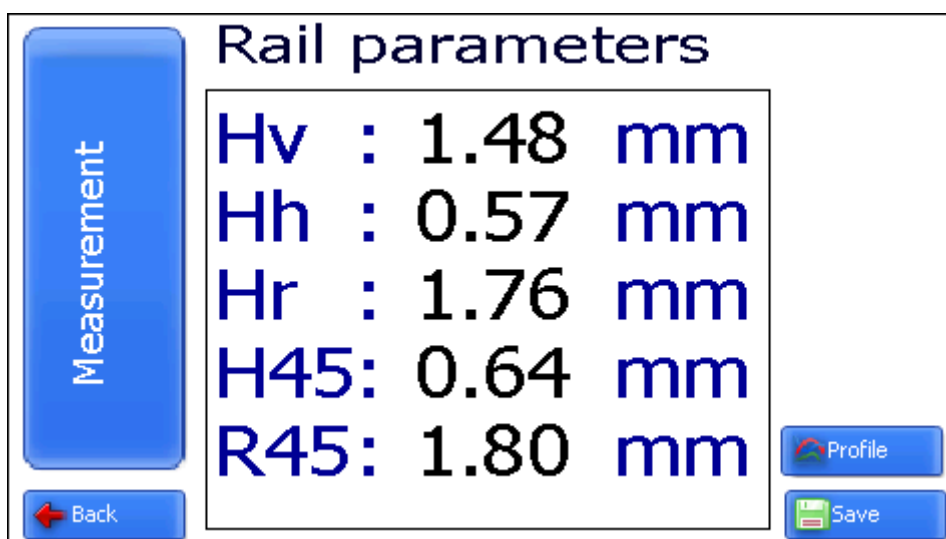
- To look at rail profile, press the **Profile** button, and the PDA will display scanned rail profile as well as measured parameters:
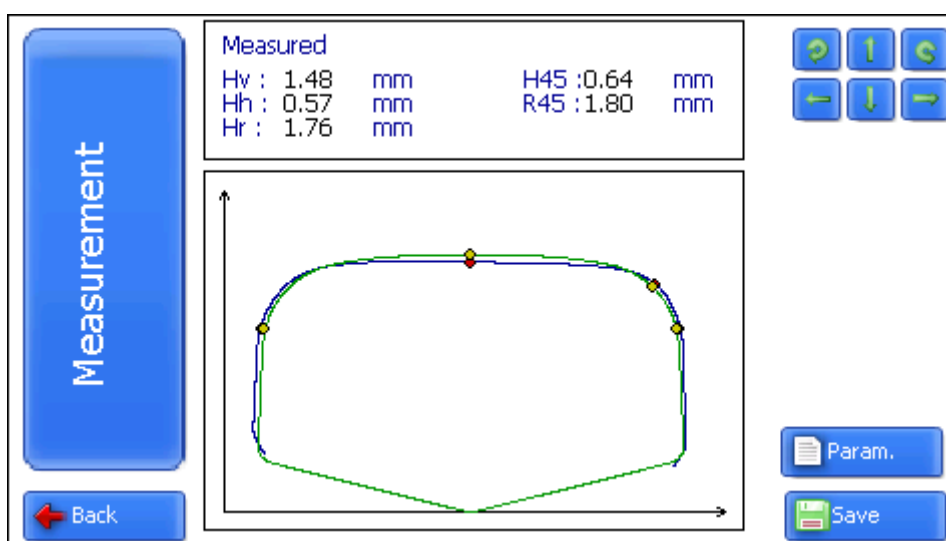
9.   Rail parameters under control. Terms and definitions

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.**).
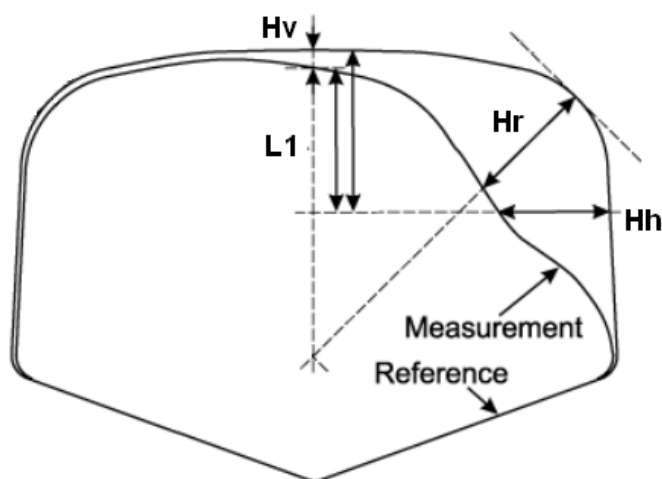
11

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 mm from the rolling surface of rail head
Lateral railhead wear at angle 45 degrees	H45	($Hh_{\llcorner R45}$), is measured at 45 degrees relative to the rail symmetry axis at the point that passes through the center of lateral working fillet
redused head wear	Hr	that is determined as vertical one + the half of lateral wear, namely : $Hr = Hh + 0{,}5Hh$ or $Hr = Hv + 0{,}5Hh_{\llcorner R45}$
redused head wear at 45 degrees	R45	is determined as vertical one + the half of lateral wear, namely : $Hv = Hh + 0{,}5Hh_{\llcorner R45}$

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]**
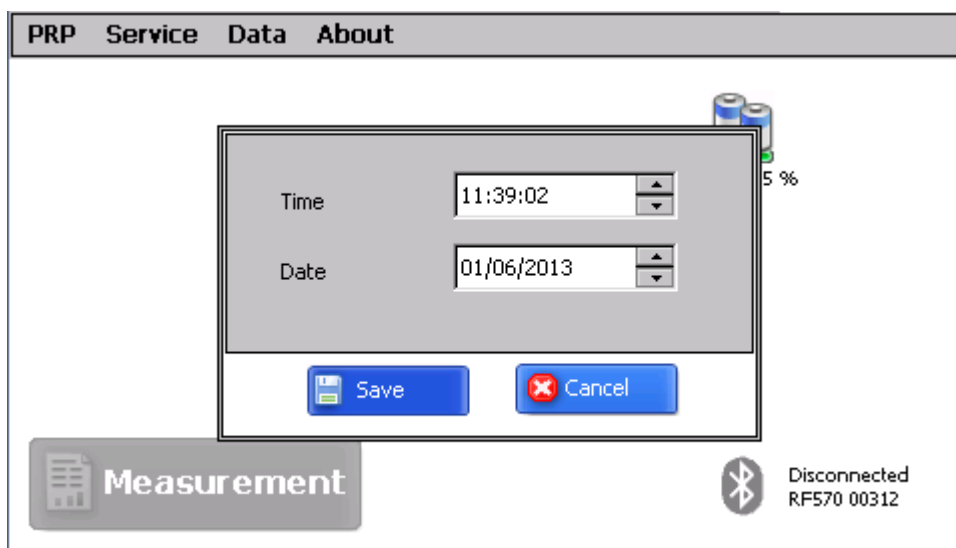

12
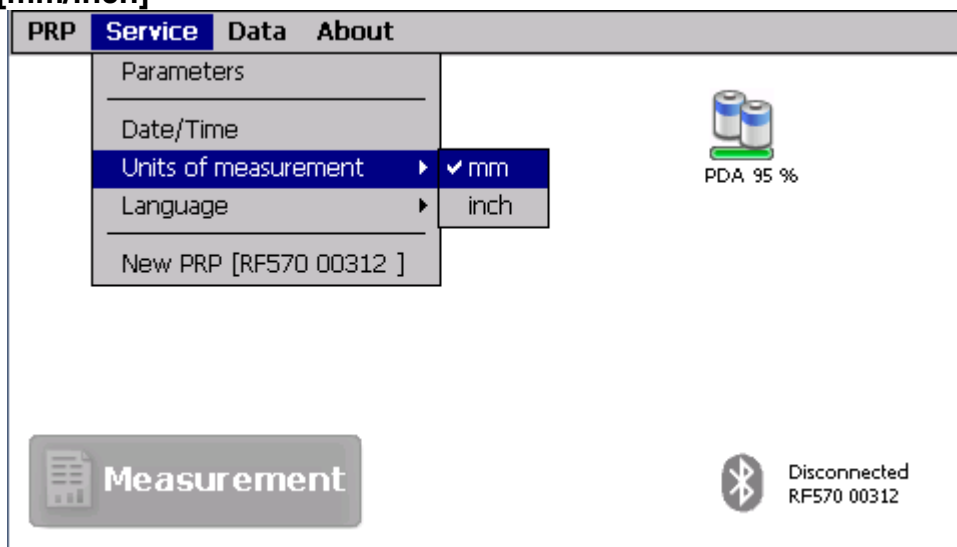
- select **mm** or **inch** options

10.2. Data and Time settings

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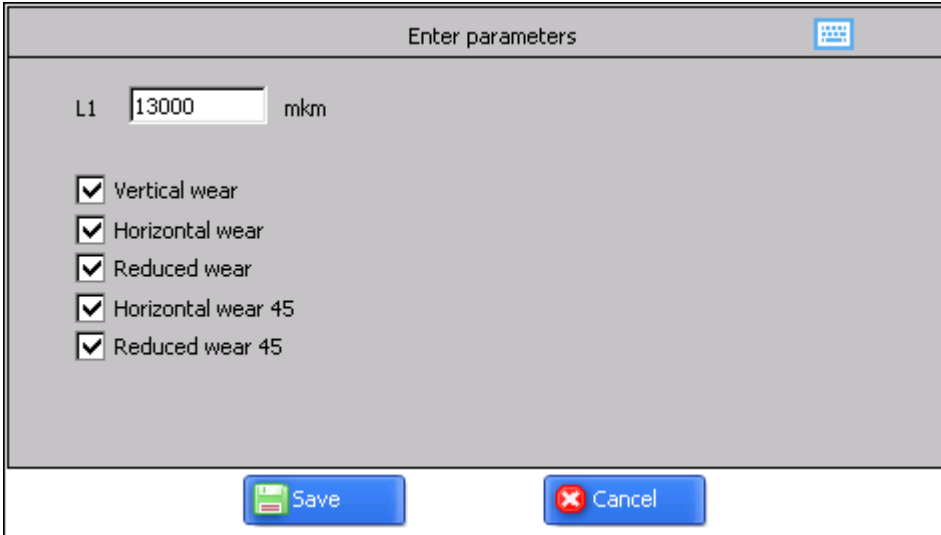- select **Service > Data/Time** in main window of the program. View on the PDA screen:

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

10.3. L-parameters and tolerances settings

To change L-parameters:
- select **Service** > **L Parameters**
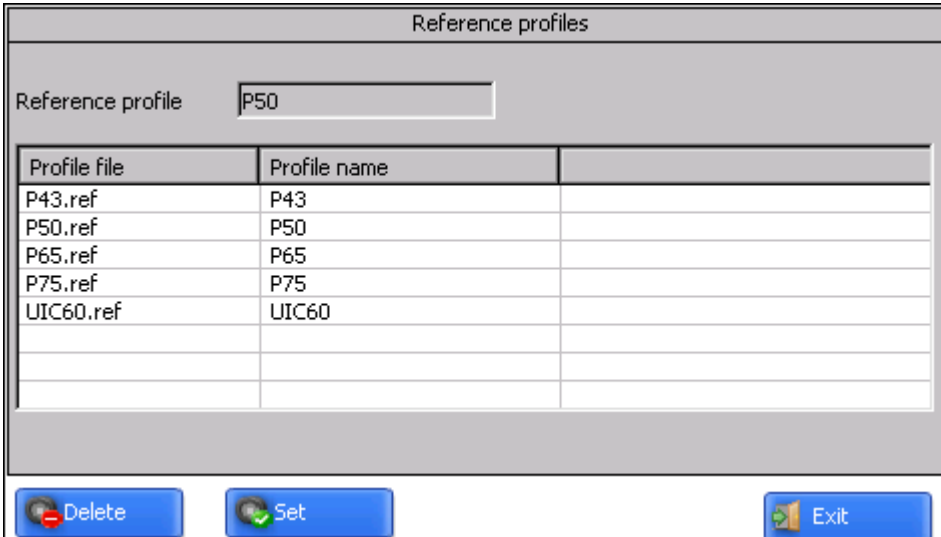
13

- 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**:

- 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:

14
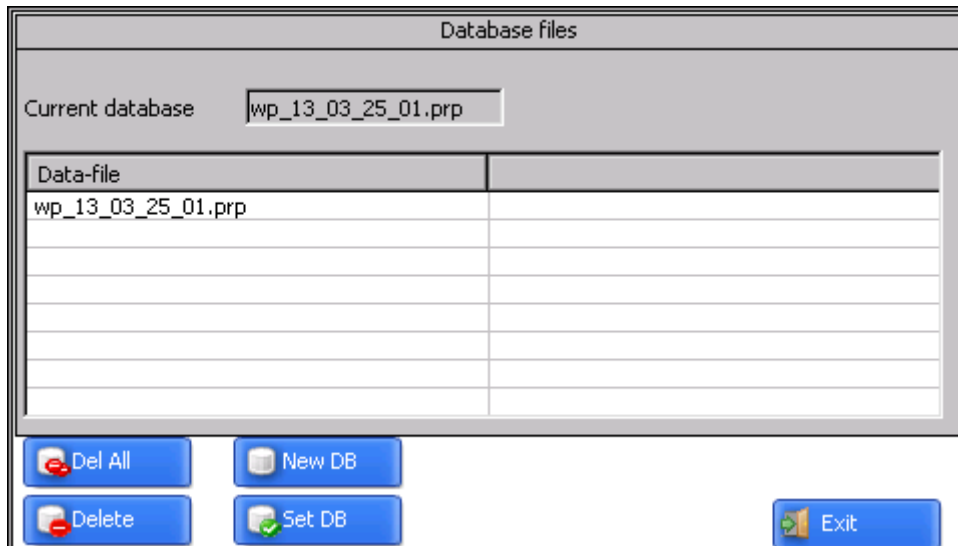
- To create a new database, press **New DB**. File with the name **wp_yy_mm_dd.prp** will be formed automatically, where **yy_mm_dd** is the current date;
- to select the available database, activate the line with the file name and press **Select DB**;
- to delete the selected file press **Delete**;
- to delete all files press **Delete all**;
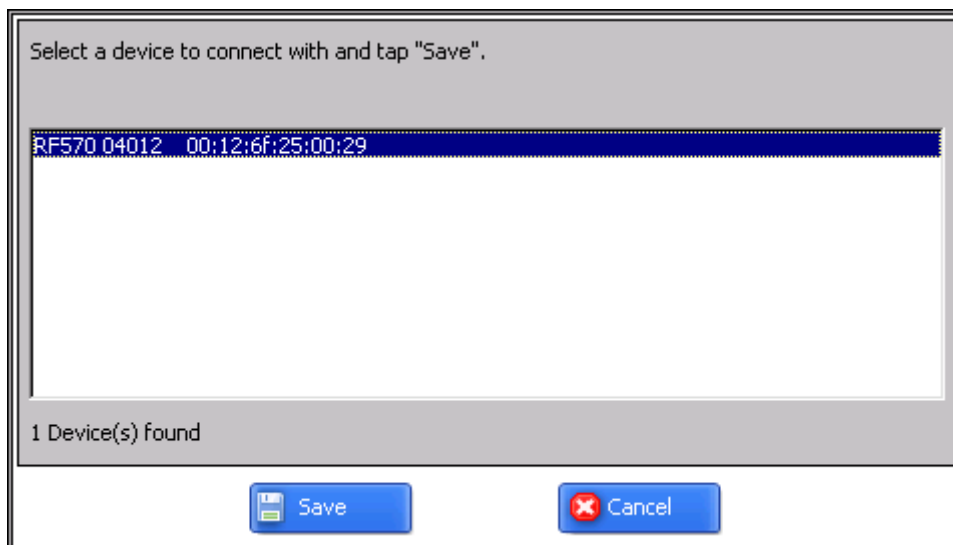- to exit from the window press Exit

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:
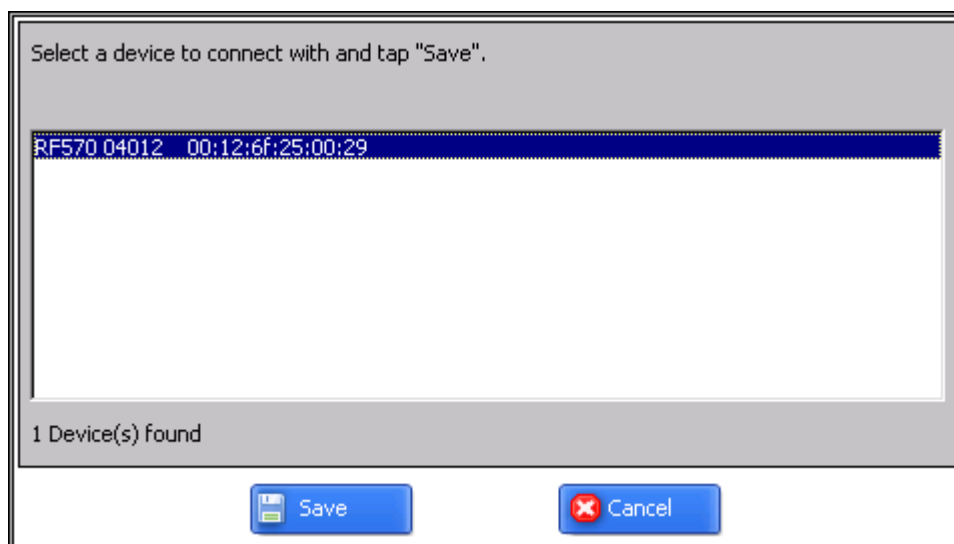
- Select **Service > New PRP**
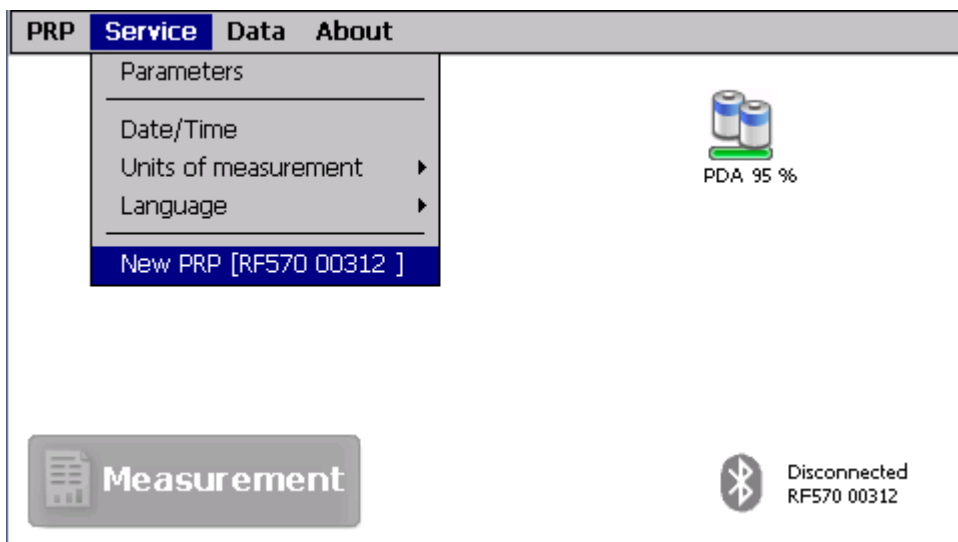
- press **Start** and wait for new devices (with serial numbers) will appear on the screen

- 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

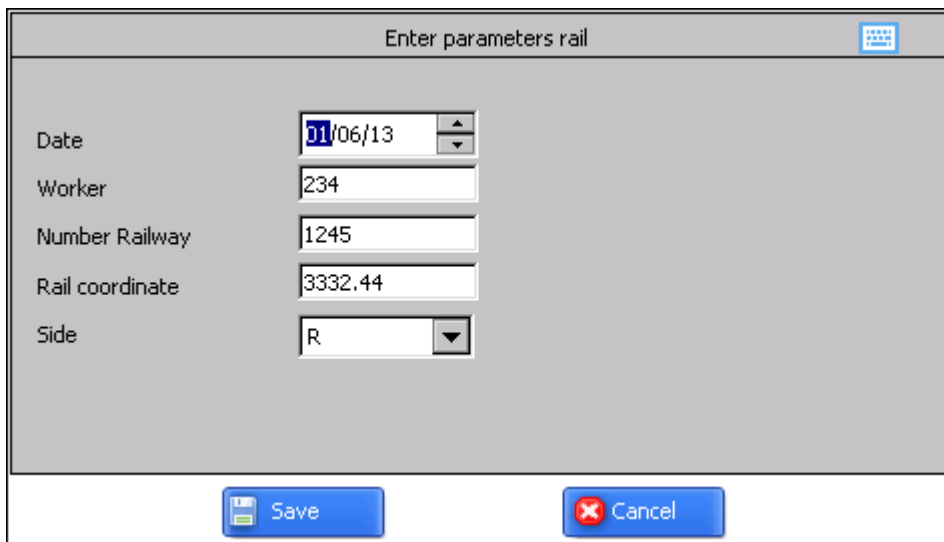Switch on the PDA and scanning module as shown in par. **8.1.**

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
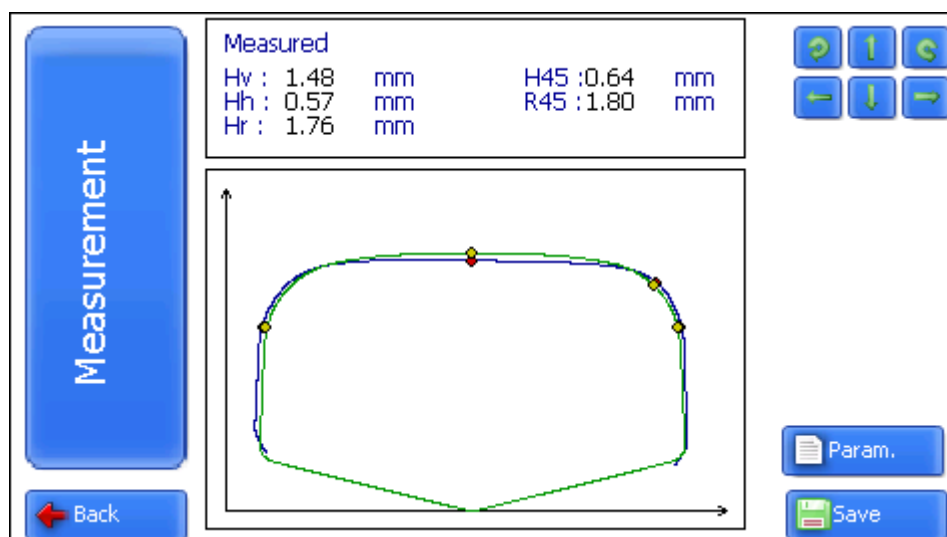

- If necessary, fill in/edit the required fields
- to save parameters, press the **Save** button
- measure the rail
- after the scanning surface is laser-scanned, the PDA will show the value of selected geometrical rail parameters.
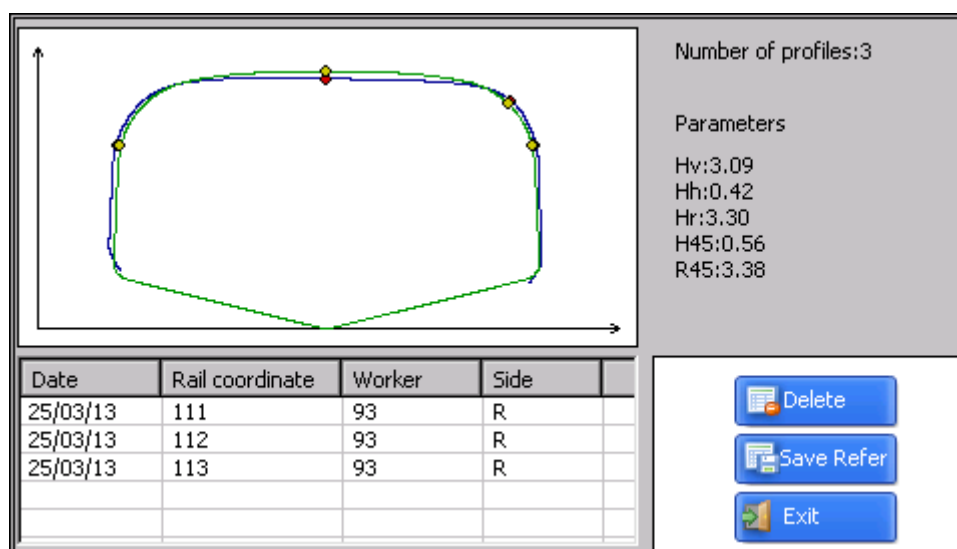
17

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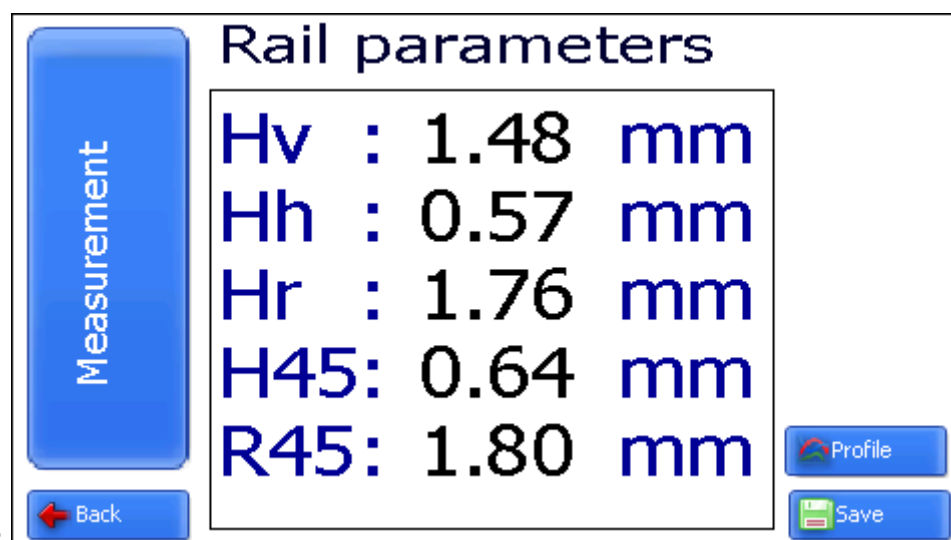
- to look at the profile press **Profile** button:

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:
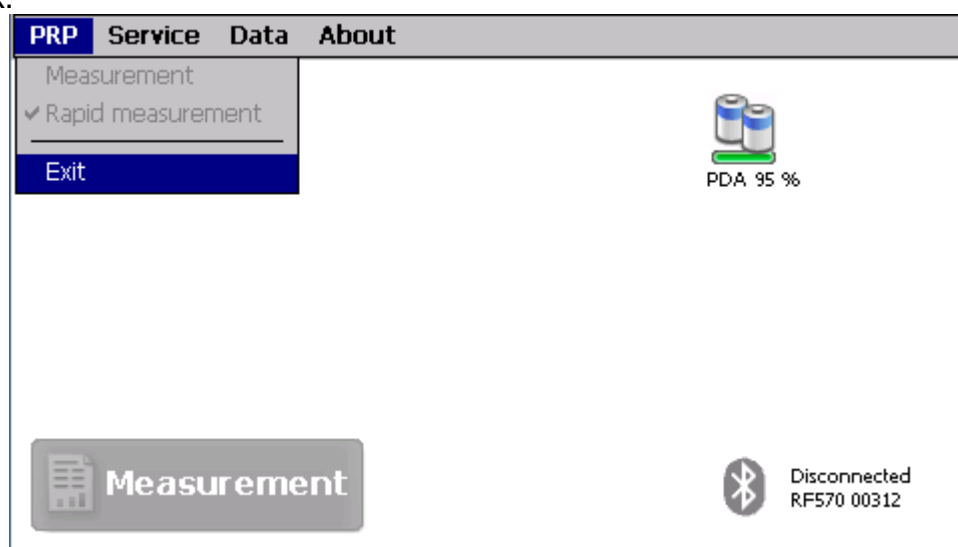
 – create reference profile **(profile_name.ref).**

- 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).

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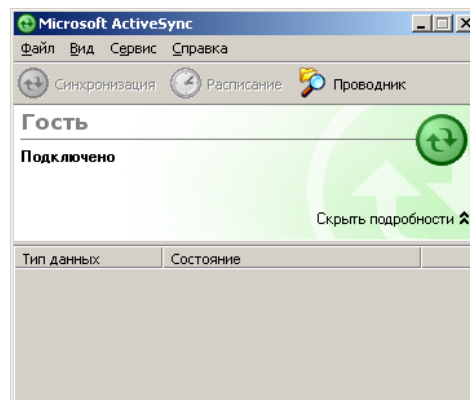
NOTE: For PC with Microsoft Windows Vista or Microsoft Windows 7 installed, use **Windows Mobile Device Center** synchronization program instead of Microsoft Activesync.

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.lng** and **ENG.lng,** 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.lng** under the other name, for example, **GER.lng**
- 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 ***.lng** 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 ***.lng** 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.
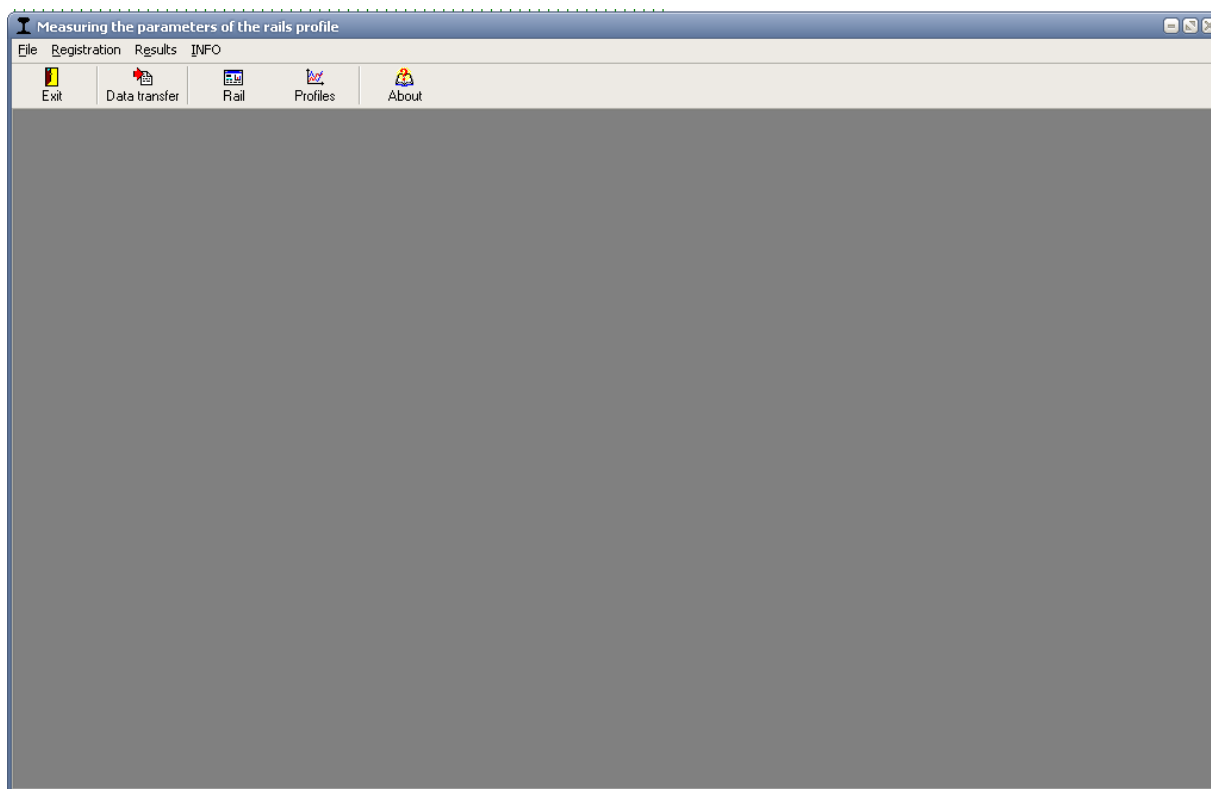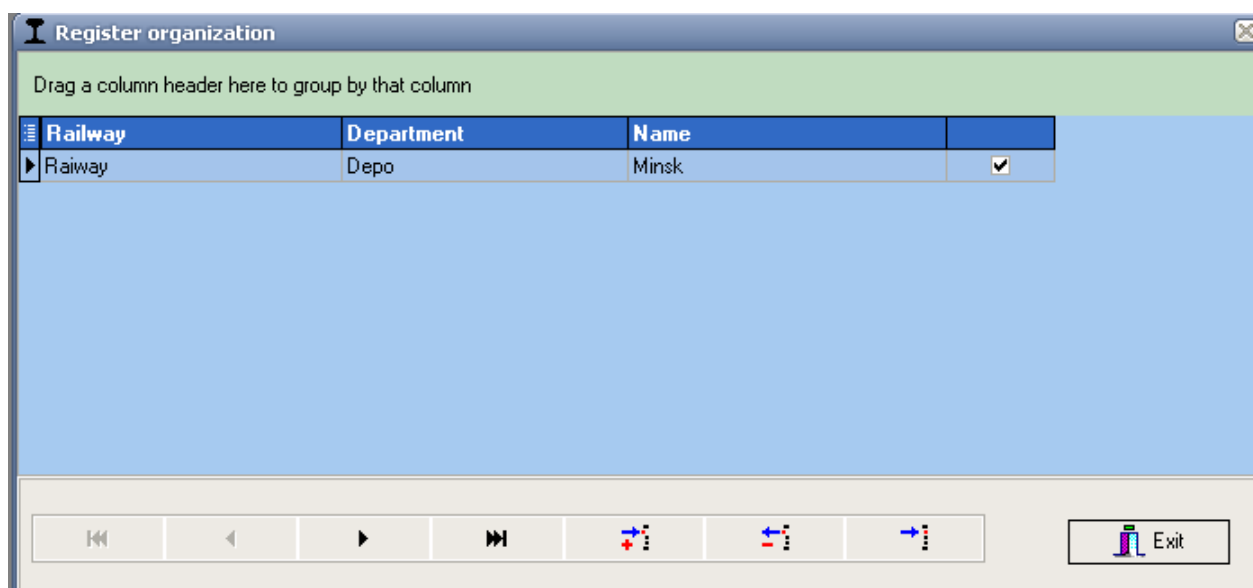
13. User settings of the program

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.
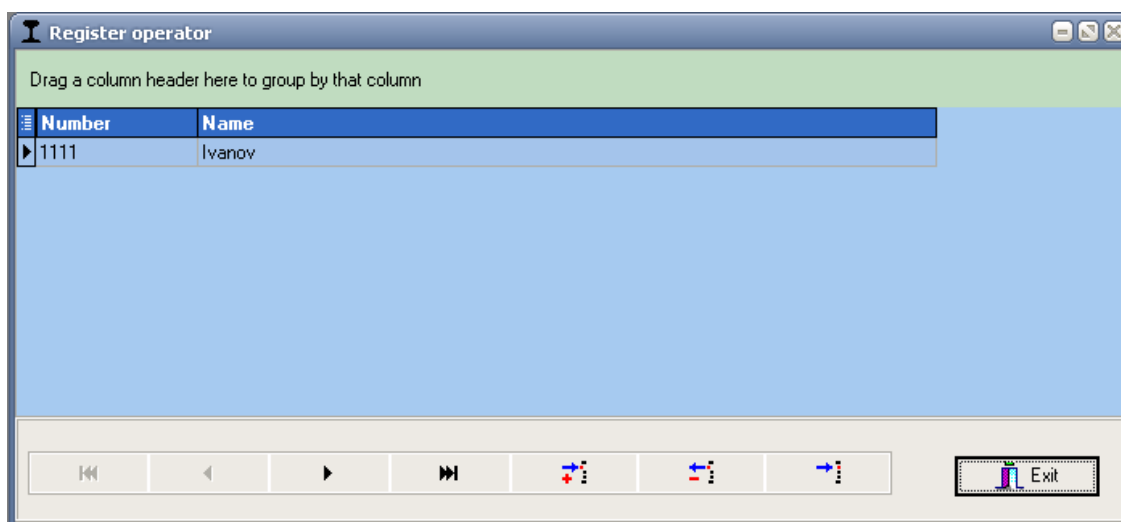
Buttons:

 -    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:**
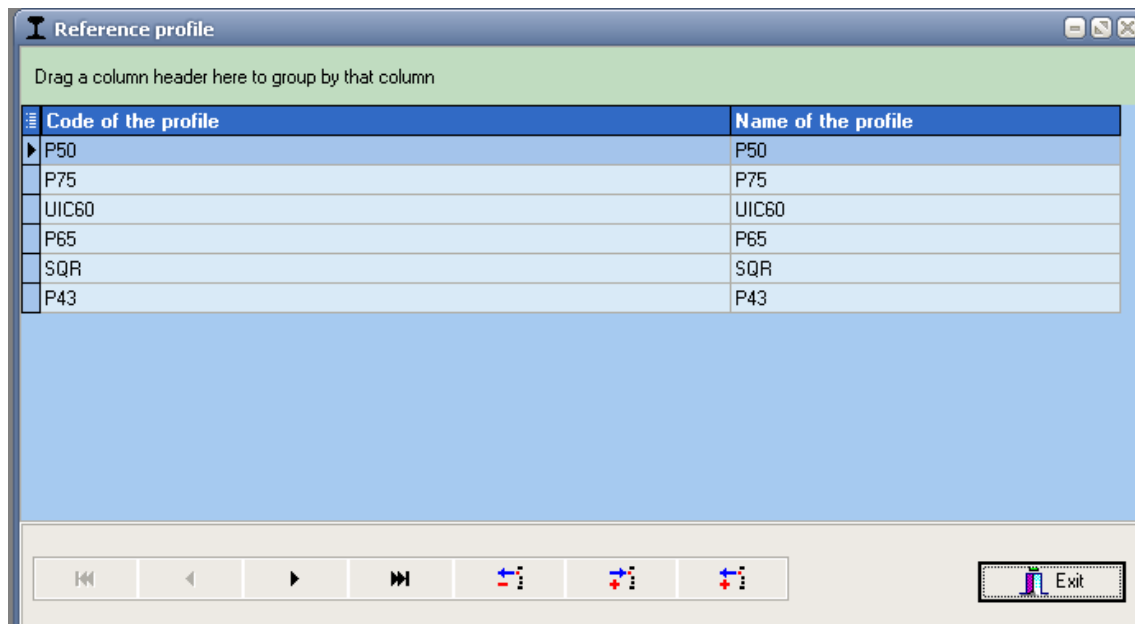
Buttons:
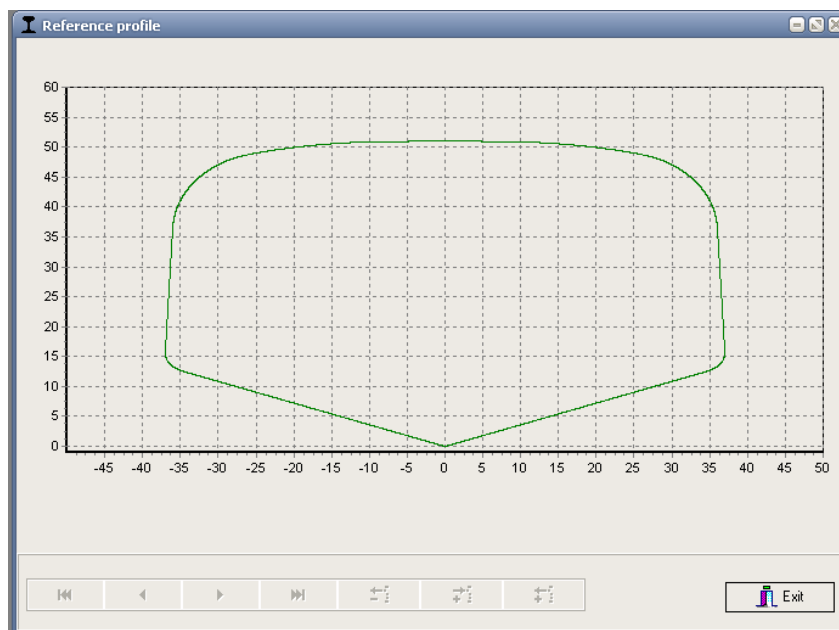
  - import of reference profile from ***.ref** file;

  - 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**.

23
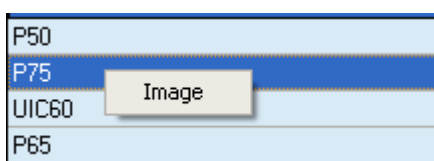
13.3.1. Request and registration of the reference profile file

To get **.ref-**file of reference profile send the drawing of profile to **RIFTEK** (info@riftek.com). 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.
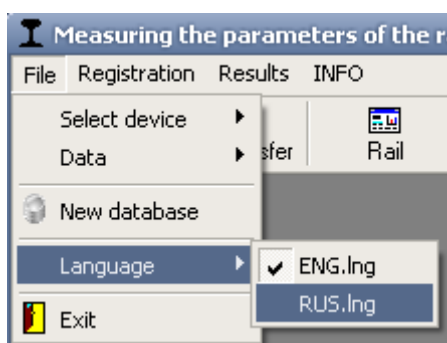
14. Data exchange between PDA and PC

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.**
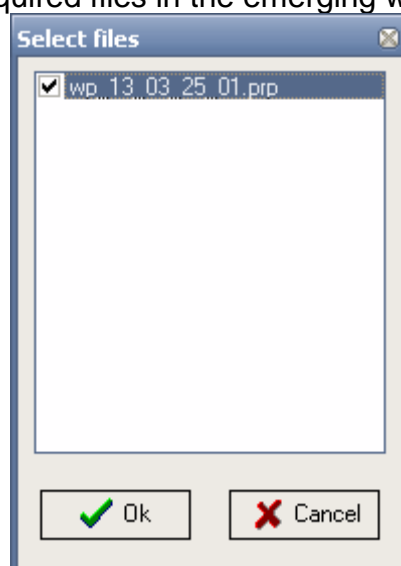
24
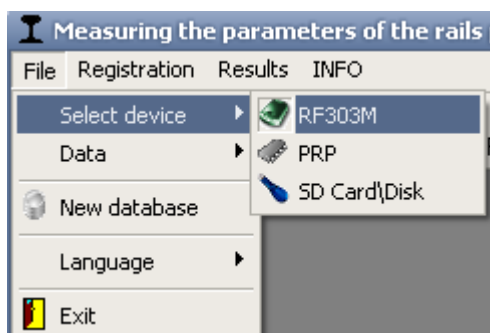
14.1.1. Transfer of database file to PC

To transfer database file from PDA to PC, it is necessary to:
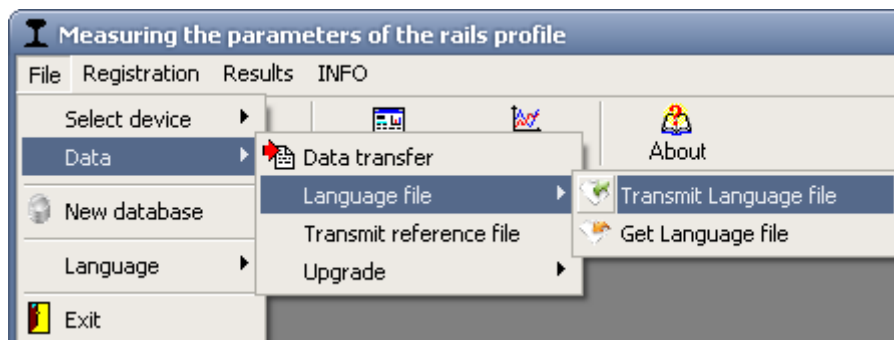- select **File > Data > Data transfer**
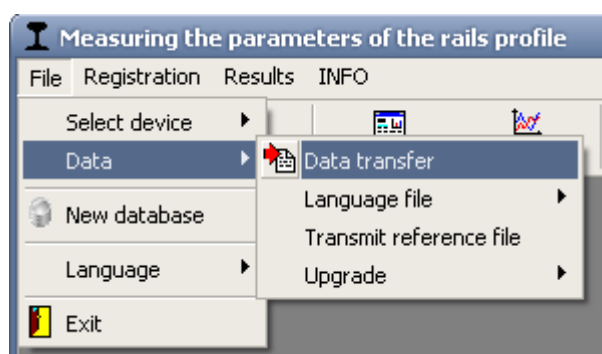
- check the required files in the emerging window and click **OK**.
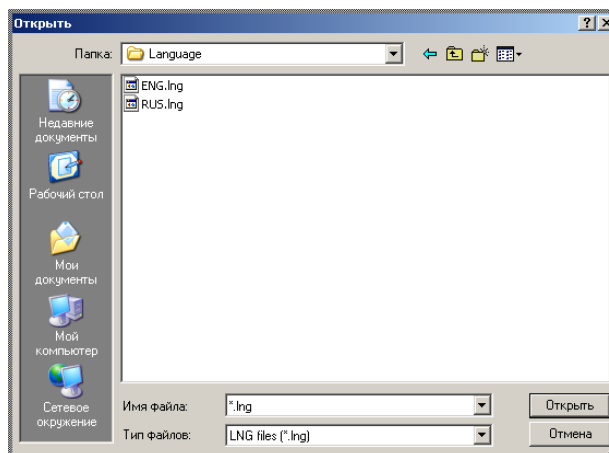

14.1.2. Transfer of language file from PC to PDA

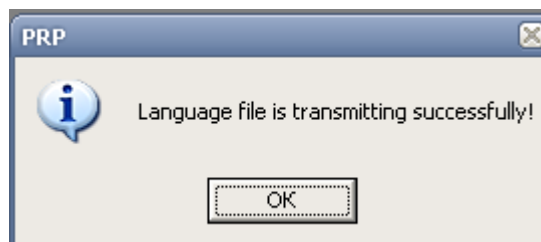To transfer language file from, PC to PDA, it is necessary to:
- select **File > Data > Resource file > Transfer resource file**
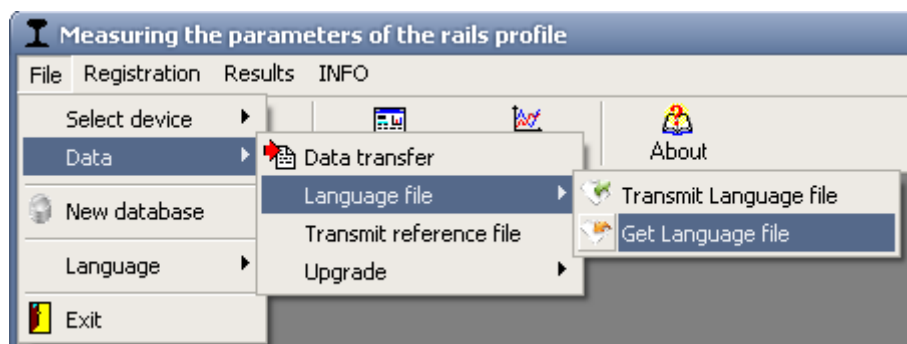
25

- select required file

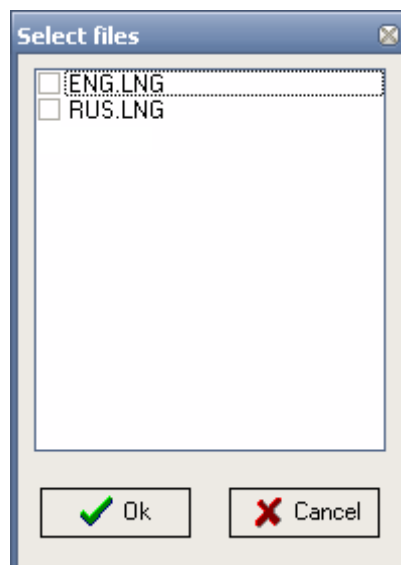- if transfer is successful, the screen will show:

14.1.3. Transfer of reference profile files from PC to PDA

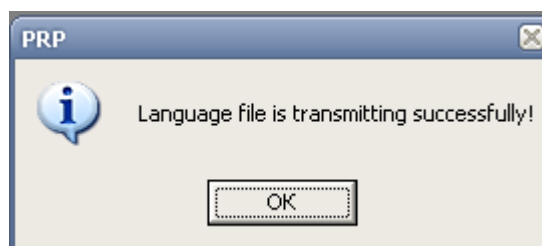To transfer reference profile file from PC to PDA, it is necessary:

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

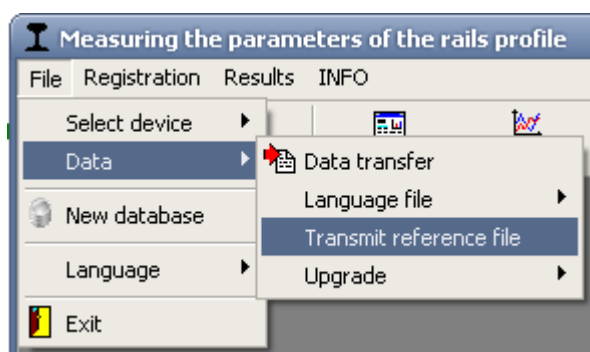- check required files with extension **.ref**

26
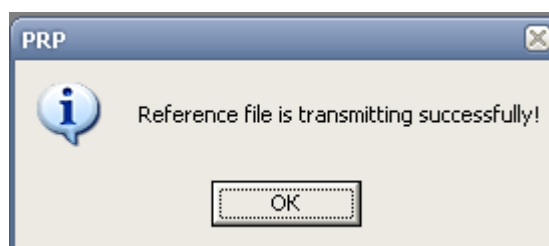

- if transfer is successful, the screen will show:

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**
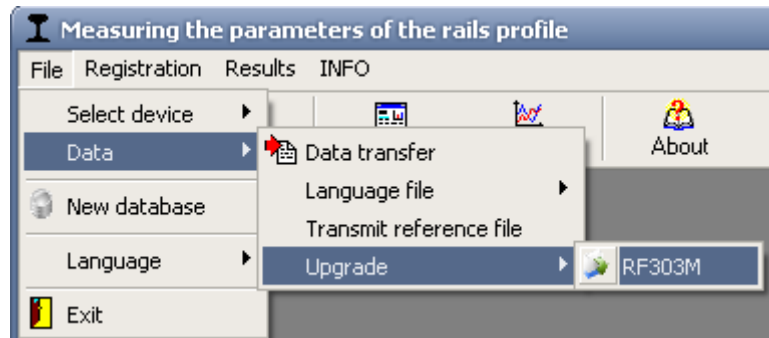- if transfer is successful, the screen will show the following message:

14.1.5. Updating of PDA software

The updated software version can be downloaded from ther site www.riftek.com. To transfer the update file to PDA, it is necessary to:
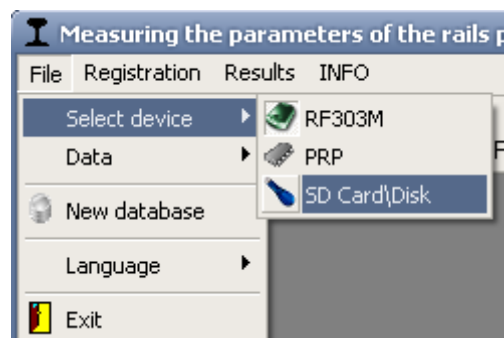- select **File > Update > RF303**

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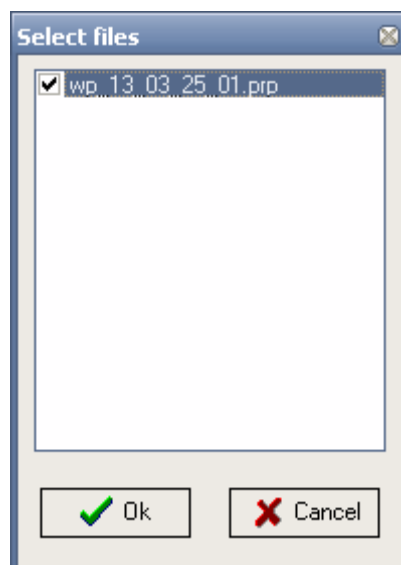- if transfer is successful, the screen will show:

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

28

15. Taking measurements under PC control (without PDA)

The laser scanning module can work under direct control of PC without PDA.
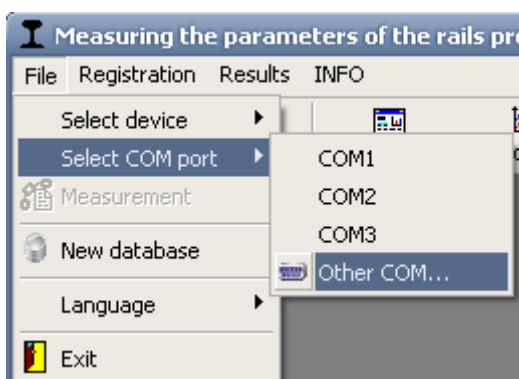
15.1. Preparation for taking measurements

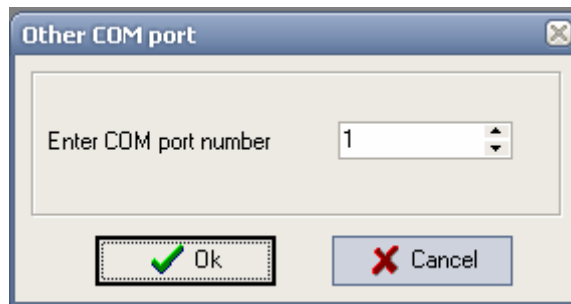To work under direct control of PC, it is necessary to:
- install Bluetooth-connection between the scanning module and PC. The procedure is described in par. .
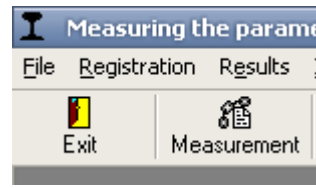- select **File > Device selection > Profilometer** in the main window menu.
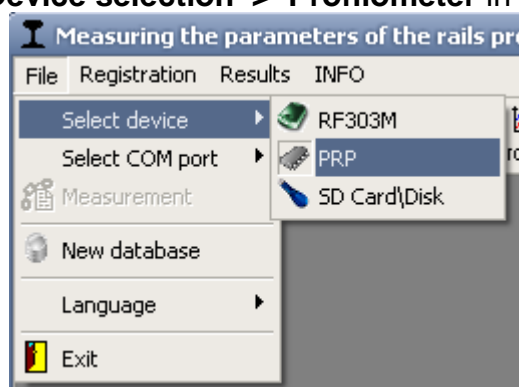
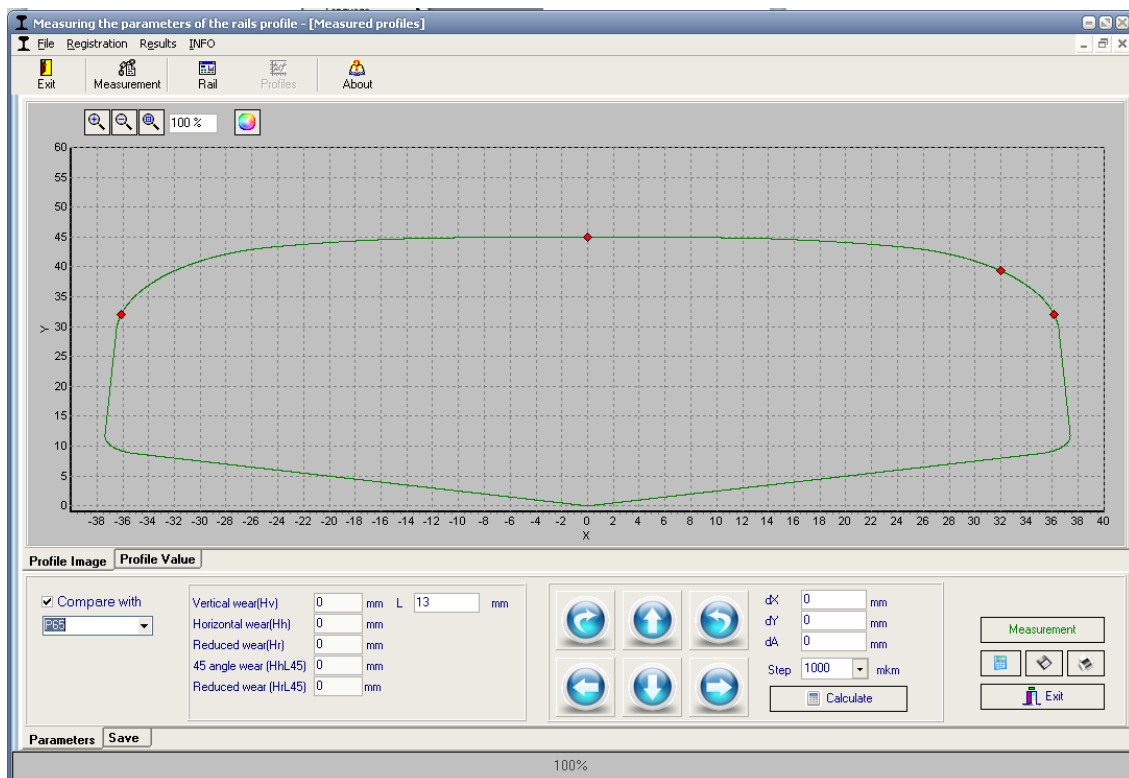

- select required port (see par.)

- click **OK** for connection

29

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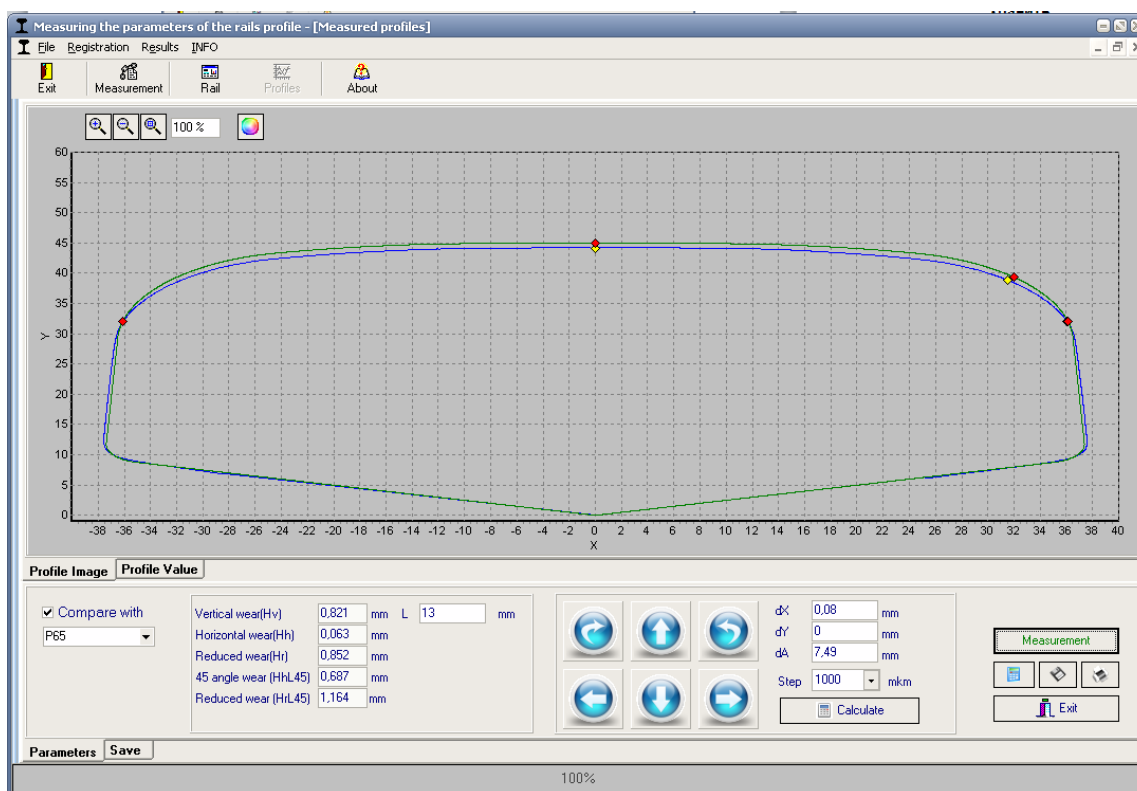

- Press the **Measurement** button or select **File > Measurement** in the menu. After the scanning module parameters are read, the program is ready for work:

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.

30

- 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:
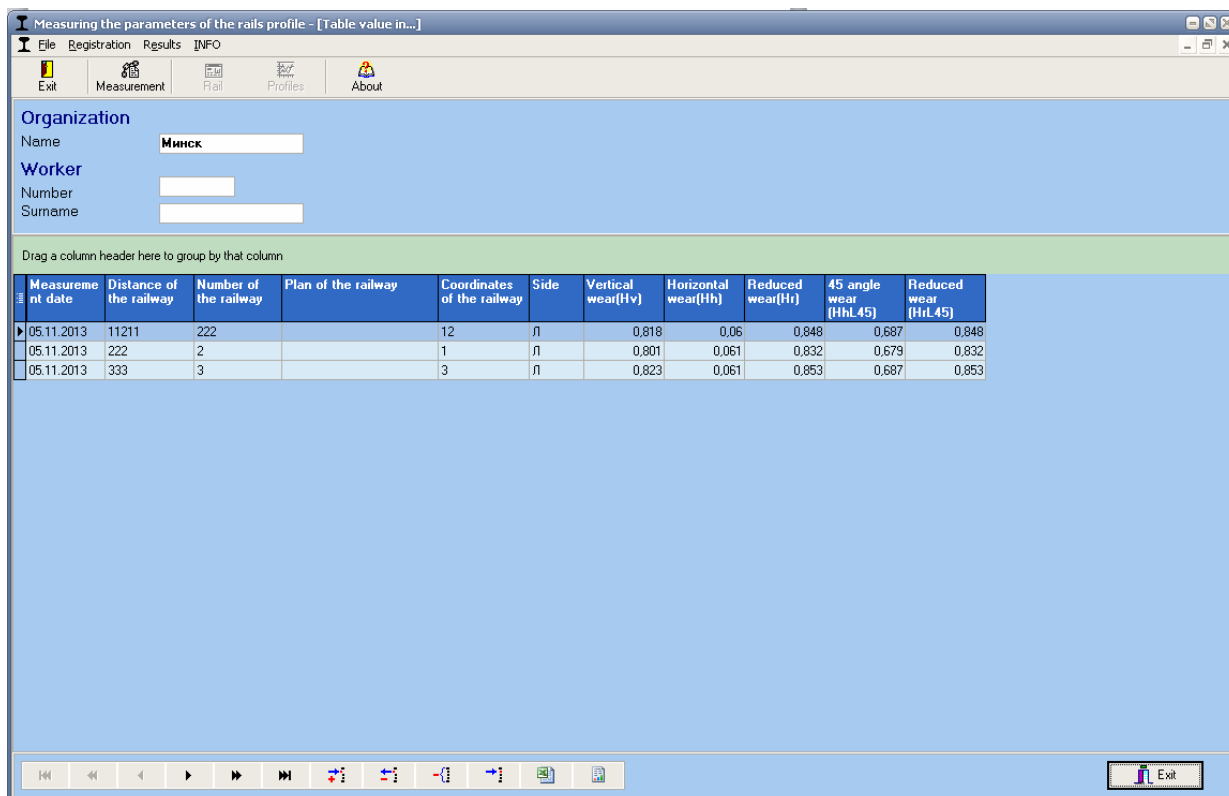
16. Working with profilograms and wear calculations

16.1. Profiles lookup

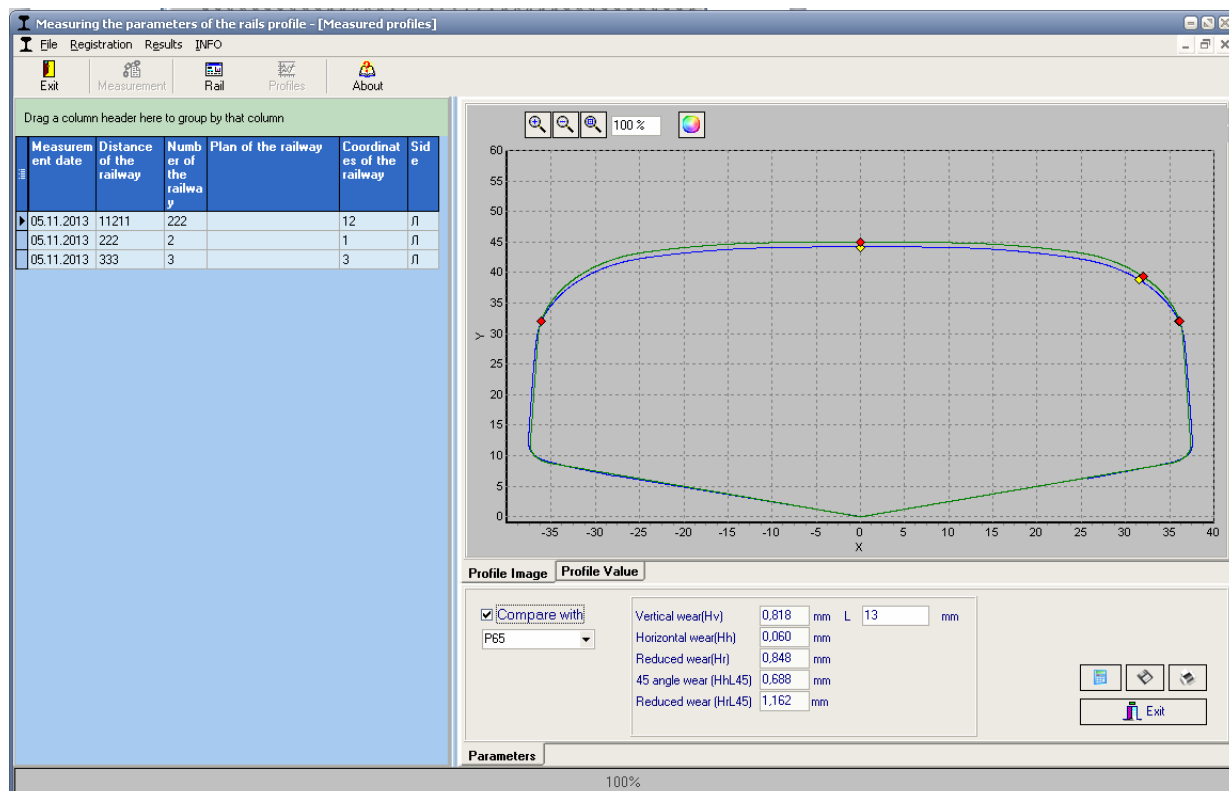To look at rolling surface profiles select **Results > Profiles**, or press button **Profiles**

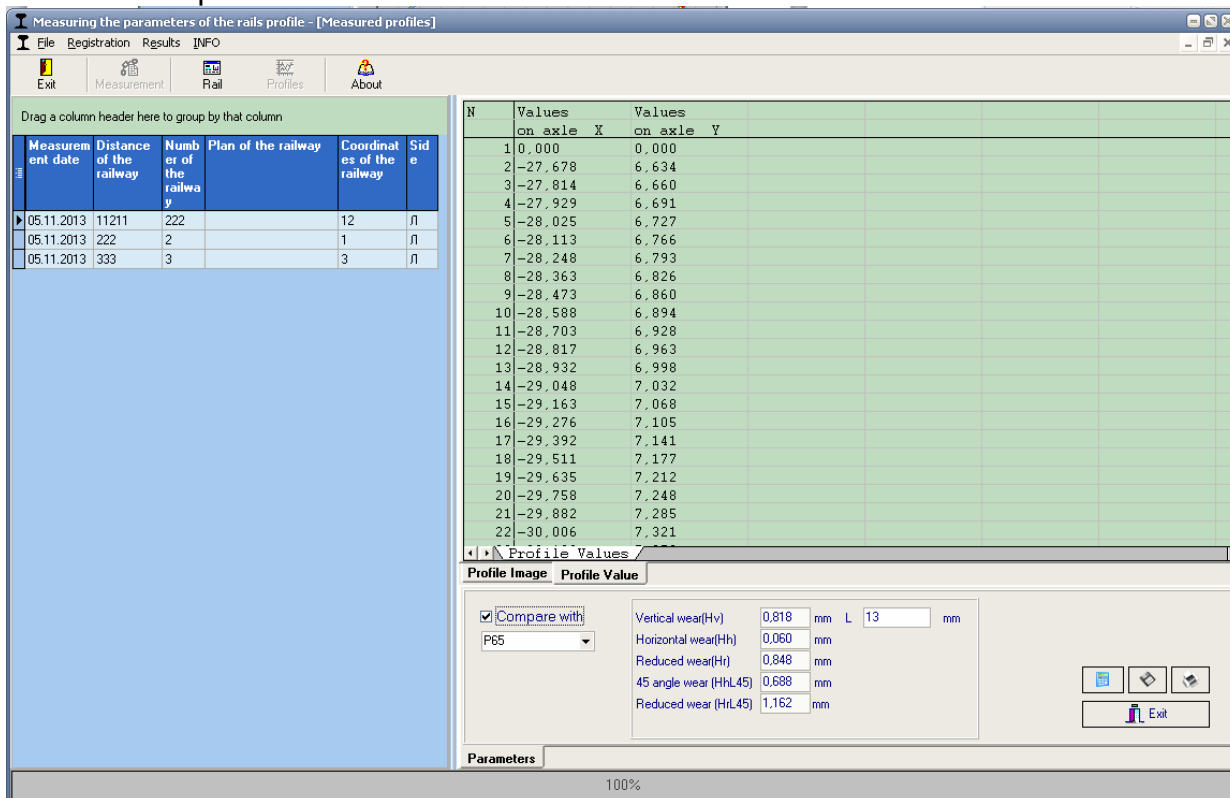Select the required wheel pair from the table offered.

To print picture press button ![button]

To save picture in separate file (**.bmp** file) press button ![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.
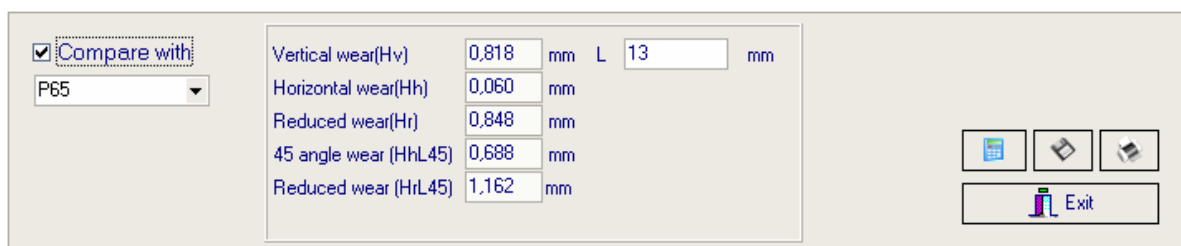
To recalculate values of flange parameters for other L-parameter, it is necessary to change values of L-parameter and press the Calculate button - ![button].

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

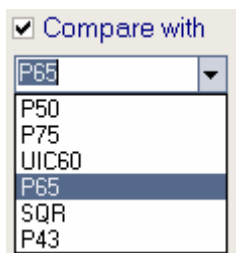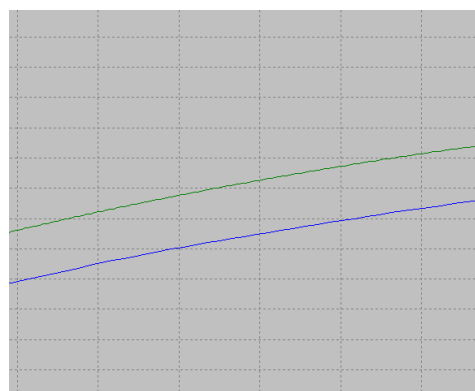To change image scale, mark part of the image with the left mouse key, move the image by holding it with the right mouse key pressed or with buttons **Increase** - , **Decrease** - and **Show all** - .
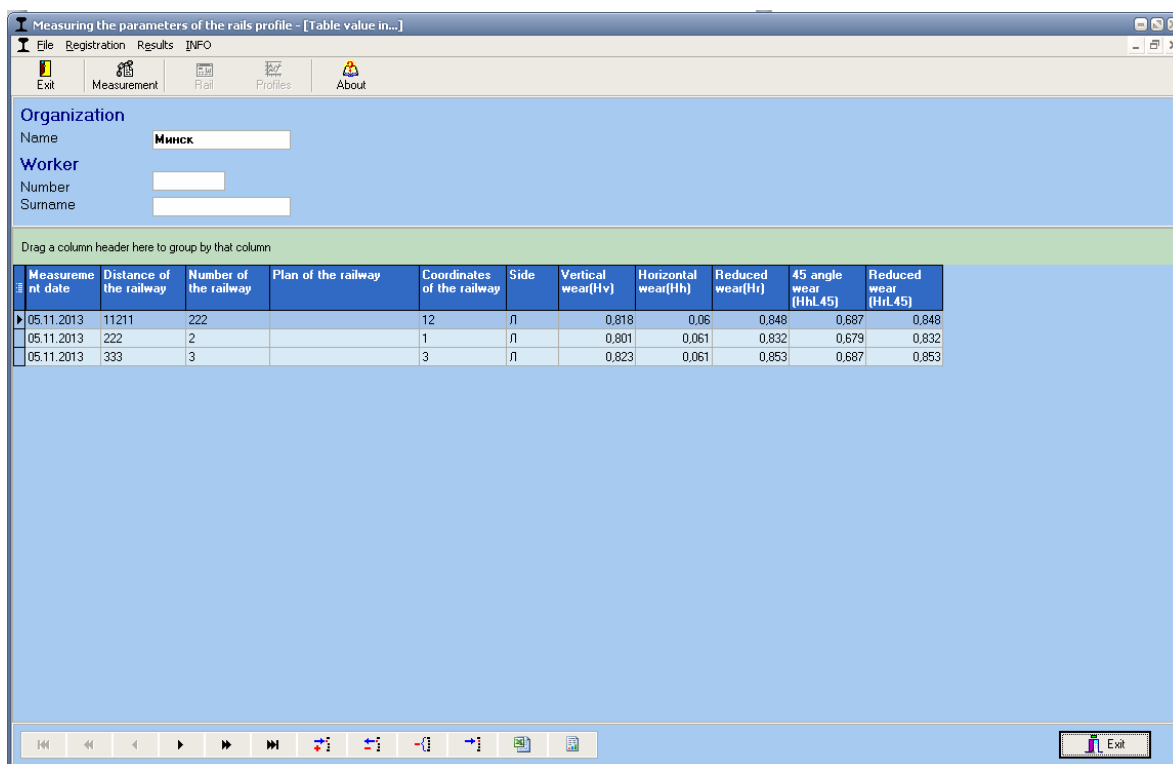

17. Scanning and editing of data

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:

33

34

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

Button		
⏮	-	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:

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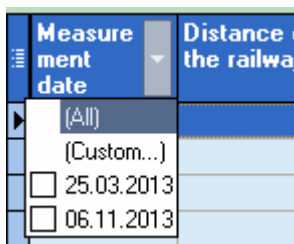
To cancel filtering, all steps should be taken in the reverse order.

- ### *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 with the mouse key pressed, drag it outside the table header:
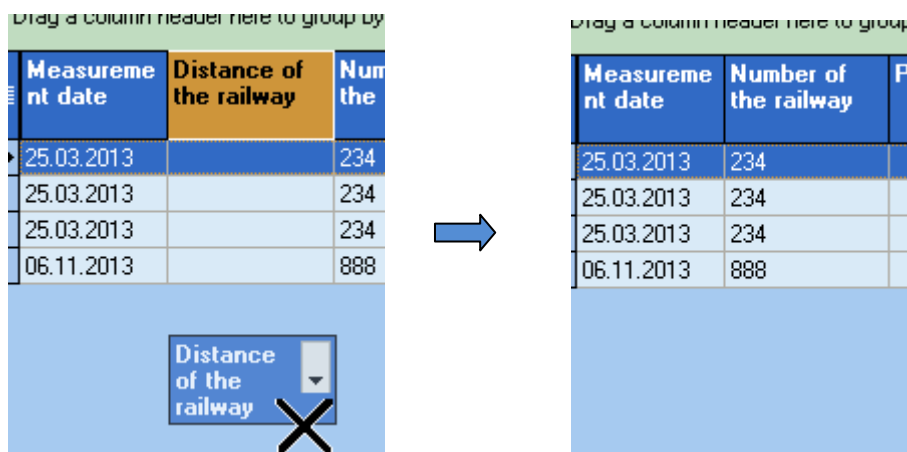
The second method: to hide/show the field, click left mouse key on the utmost left header ( ), and remove mark from /mark required field in the table

- *Changing of the field position order*

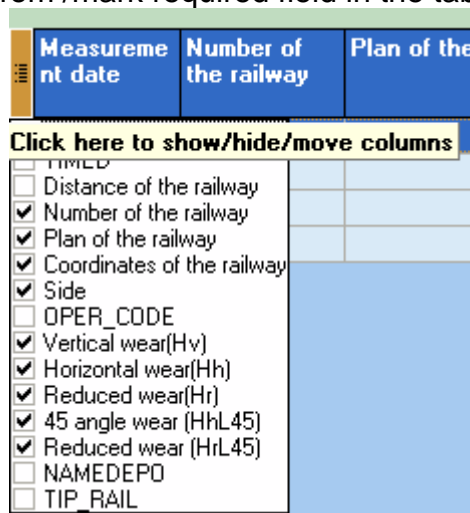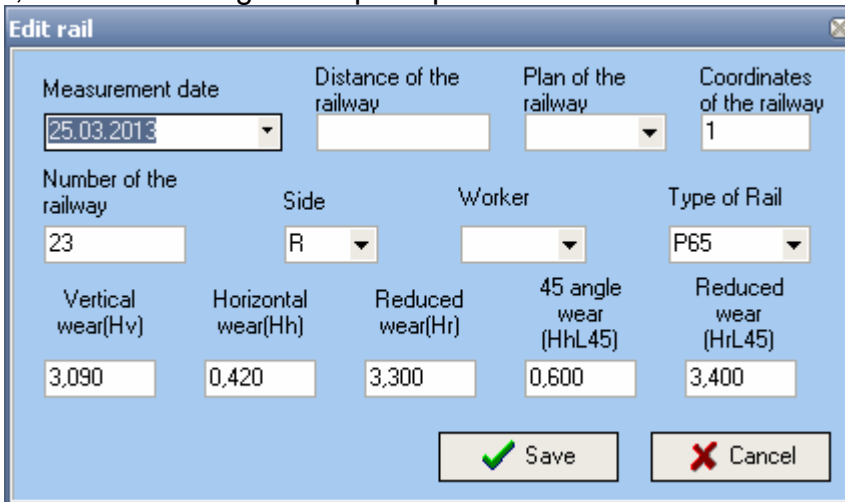To change the field position, click left mouse key on the header of the field column and, with the mouse key pressed, drag it to required position:

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.
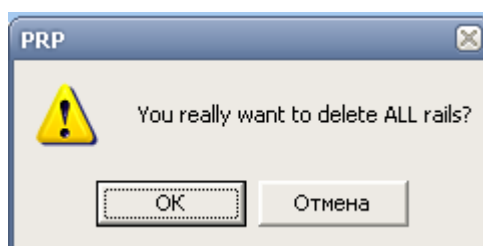
17.3. Creation of empty database

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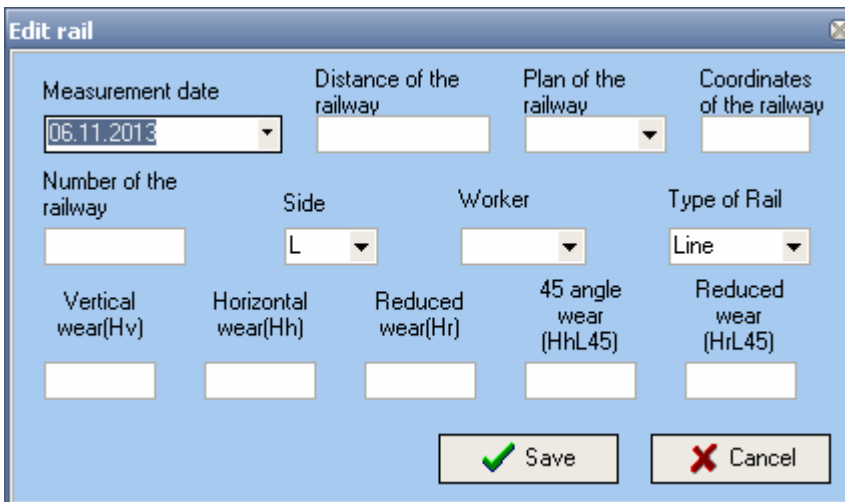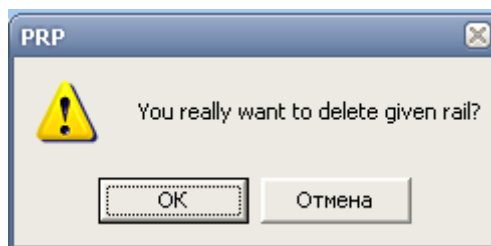 installation directory whereto all deleted data (**dd.mm.yy** – current date) will be copied. Subsequently, these data can be restored (see par. **Ошибка! Источник ссылки не найден.**).

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:

38
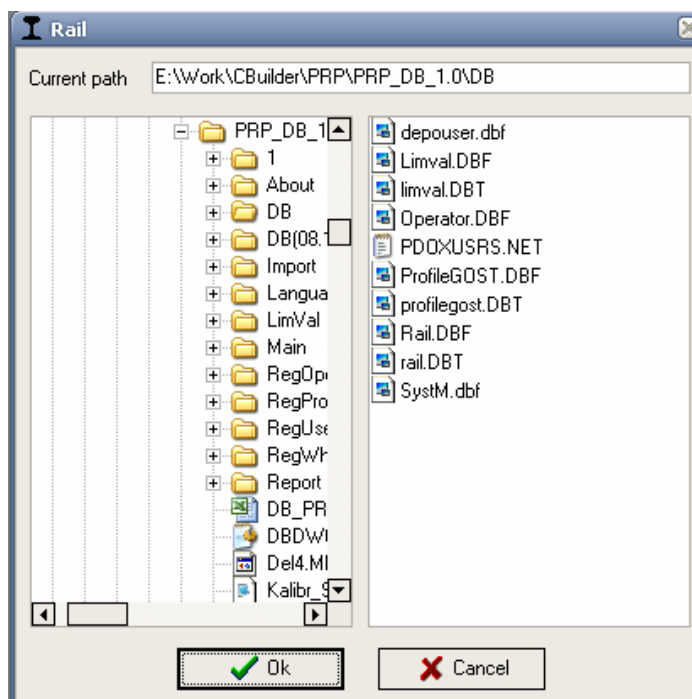
- press **OK** to import data.

18. Report preparation
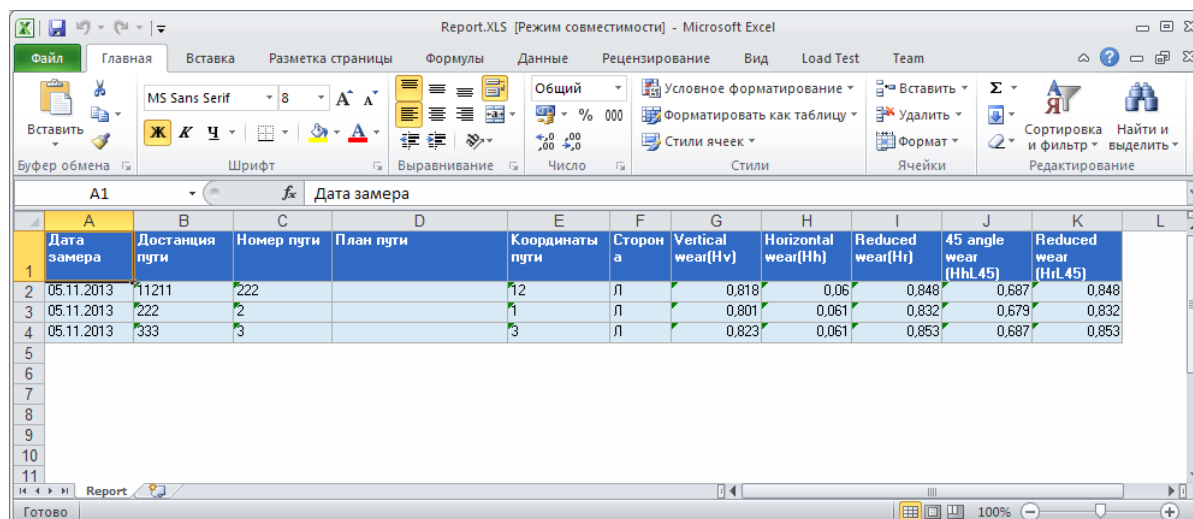
When staying in the scanning and editing of date mode according to par. 17, user can prepare reports in **Excel, RTF, TXT** formats or print out reports. In the formation of report sorting used at the moment is taken into account.

To generate a report, press the [ ] button, and the program will to select the following options:
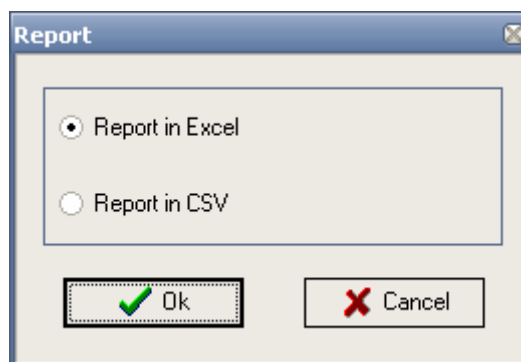
18.1. Exel-format report

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

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:
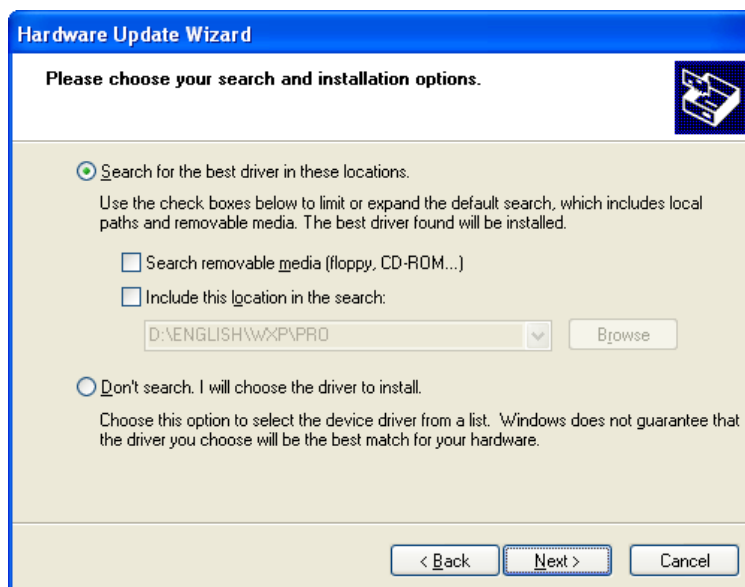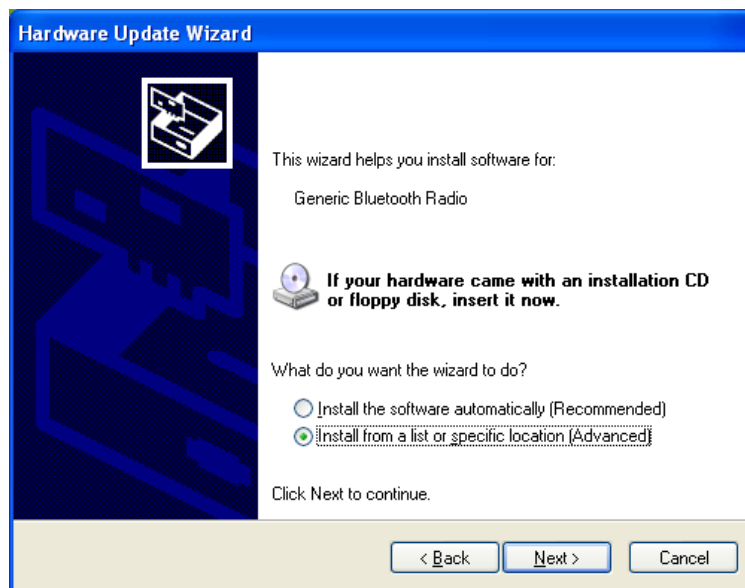
- when drivers are installed, the corresponding message and Bluetooth icon will appear in the screen:
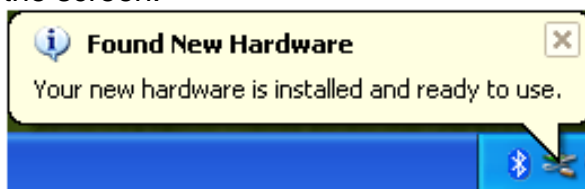
- activate PRP.
- click right mouse key on the Bluetooth icon and select **Add Bluetooth device**

41
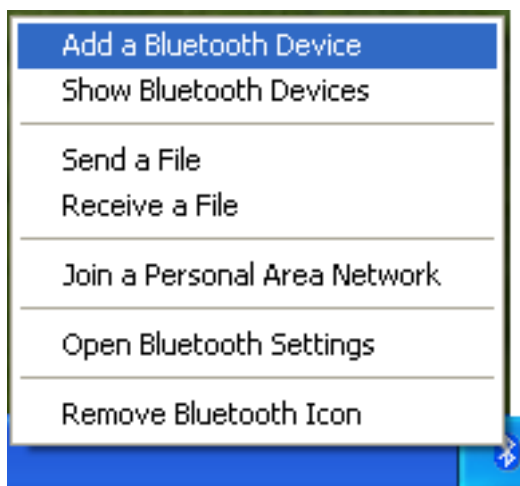
- Then Bluetooth installation wizard will start working:

- tick the **Device is installed and ready for connection**
- select **Next** for search
- when the search is competed, the wizard will show the devices found:
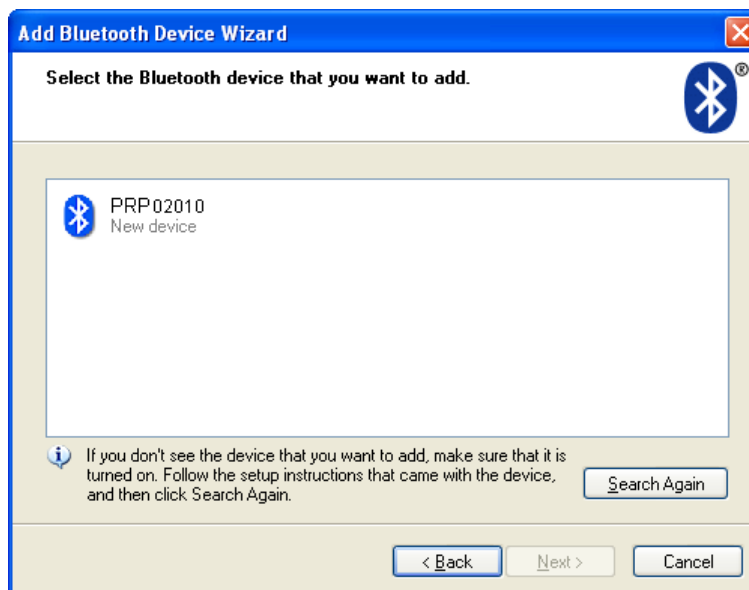
- select the required device (PRP), press **Next** and type access key (Pin). The key for each device consists of 4 symbols and is set based on the PRP serial number. For example, if the PRP number is 02010, then Pin=0200; 01309 - Pin=0139, etc.
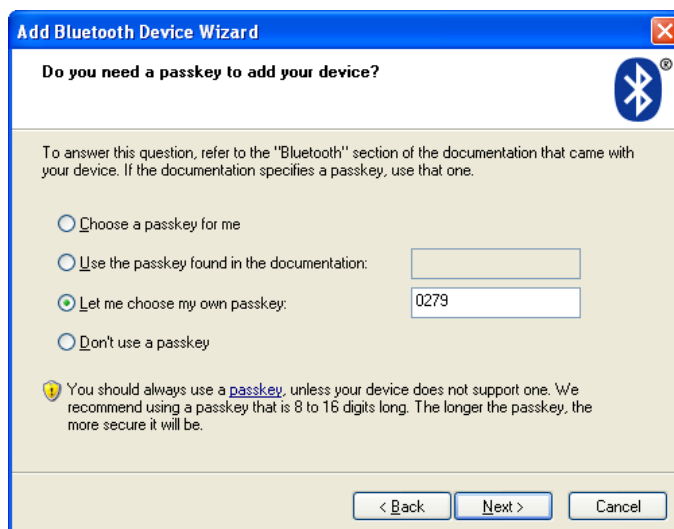
- press **Next** and continue installation process.
- when required drivers are installed, the Bluetooth device will give a message with COM-port (outgoing) which should be opened for connection with PRP during measuring. In this case, the port is COM3:

43

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

AUSTRALIA	AUSTRALIA	BENELUX
Applied Measurement Australia Pty Ltd **RAILWAY INSTRUMENTS ONLY** Suite 1, 8 French Ave, Bankstown, NSW 2200, Australia Tel: +61 (0) 297082000 Fax: +61 (0) 297084444 sales@appliedmeasurement.com.au www.appliedmeasurement.com.au	**XN Innovation** LG Centre, Suite 1, Level M, 55 Parramatta Rd, NSW, 2141, Lidcombe, Australia Tel: +61 (0)2 8091 2426 Fax: +61 (0)2 9648 6597 xni.sales@gmail.com	**Altheris B.V.** Scheveningseweg 15 2517 KS The Hague, The Netherlands Tel: +31 (70) 3924421 Fax: +31 (70) 3644249 sales@altheris.nl www.altheris.com

44

BULGARIA, HUNGARY	BRAZIL	CHINA
RMT Ltd. R Zahradni 224 739 21 Paskov, Czech Republic Tel: +420 558640211 Fax: +420 558640218 rmt@rmt.cz www.rmt.cz	**CAPI Controle** Av. Paschoal Ardito, 1880 Americana-SP, Brazil Tel: +55 19 36047068 Fax: +55 19 34681791 capi@capicontrole.com.br www.capicontrole.com.br	**Zhenshangyou Technologies Co.,Ltd.** Rm 1806, Block B, Jinhaian Building Chuangye Road, Nanshan District Shenzhen,518054, China Tel: +86 755-26528100/8011/8012 Fax: +86 755-26528210/26435640 info@51sensors.com www.51sensors.com
CHINA	**CHINA**	**CZECH REPUBLIC**
Shanghai micron-metrology com., Ltd. Room 602 unit 4, lane 399, Mudan road, Pudong New district Shanghai, China Tel: +86-21-68416510 sales@micron-metrology.cn www.micron-metrology.cn	**JRKtech Co., Ltd.** 1F, Building 9, 100 Xianlie Rd., Guangzhou, China Tel: +86-20-87684601 Fax: +86-20-87582371 shengz_k@163.com www.jrktech.com	**RMT Ltd.** Zahradni 224 739 21 Paskov, Czech Republic Tel: +420 558640211 Fax: +420 558640218 rmt@rmt.cz lubomir.kolar@rmt.cz www.rmt.cz
FINLAND	**FRANCE**	**GERMANY**
TERÄSPYÖRÄ-STEELWHEEL OY **RAILWAY INSTRUMENTS ONLY** Juvan teollisuuskatu 28 FI-02920 ESPOO, Finland Tel: +358 400 422 900 Fax: +358 9 2511 5510 steelwheel@steelwheel.fi www.teraspyora.fi	**DB Innovation (ALTHERIS France)** 26, avenue de la Mediterranee 34110 Frontignan France Tel: +33-(0)467786166 Fax: +33-(0)467740134 dbi@altheris.fr www.altheris.fr	**Disynet GmbH** Westwall 12 D-41379 Brueggen, Germany Tel: +49 (2157) 8799-0 Fax: +49 (2157) 8799-22 disynet@sensoren.de www.sensoren.de
GERMANY	**GERMANY**	**GERMANY**
BIP-Industrietechnik GmbH **RAILWAY INSTRUMENTS ONLY** Am Elisabethhof 22, D-14772 Brandenburg D-41379 Brueggen, Germany Tel: +49 (0) 33 81 75 90 0 Fax: +49 (0) 33 81 75 90 11 info@bip-industrie.de www.bip-industrietechnik.de	**Finger GmbH & Co. KG** **OPTICAL MICROMETERS ONLY** Sapelloh 172, 31606 Warmsen, Germany Tel: +49 5767 96020 Fax: +49 5767 93004 finger@finger-kg.de www.finger-kg.de	**Hylewicz CNC-Technik** **SHTRIKH-2 ONLY** Siemensstrasse 13-15, 47608 Geldern, Germany Tel: +49 2831 91021-20 Fax: +49 2831 91021-99 info@cnc-step.de www.cnc-step.de
INDIA	**INDONESIA**	**ISRAEL**
Pragathi Solutions #698, 5th Main, 8th Cross, HAL 3rd Stage, New Tippasandra Road, Bangalore, 560075, India Tel: +91 80 32973388 Tel/fax: +91 80 25293985 Mobile: +91 9448030426/ +919448492380 sales@pragathisolutions.in arghya@pragathisolutions.in www.pragathisolutions.in	**PT. DHAYA BASWARA SANI-YASA** Sentra Niaga Puri Indah Blok T6 No. 41 Kembangan Jakarta,11610, Indonesia Tel: 021 5830 4517 Fax: 021 5830 4518 management@ptdbs.co.id	**Nisso Dekalo Import Export LTD** 1 David Hamelech Street Herzlia 46661 Israel Tel: +972-99577888 Fax: +972-99568860 eli@fly-supply.net www.fly-supply.net www.aircraft-partsupply.com

45

ITALY	LATVIA, ESTONIA	MALAYSIA
FAE s.r.l. Via Tertulliano, 41 20137 Milano, Italy Tel: +39-02-55187133 Fax: +39-02-55187399 fae@fae.it www.fae.it	**SIA "SOLARTEX"** **RAILWAY INSTRUMENTS ONLY** Duntes 15a, 5th floor, office B7 Riga, Latvia Tel.: +371 67 130 787 solartex@inbox.lv	**OptoCom Equiptech (M) Sdn Bhd** H-49-2, Jalan 5, Cosmoplex Industrial Park. Bandar Baru Salak Tinggi, Sepang, Malaysia Tel: 603 8706 6806 Fax: 603 8706 6809 optocom@tm.net.my www.optocom.com.my
POLAND	POLAND	POLAND
P.U.T. GRAW Sp. z o.o. ul. Karola Miarki 12, skr.6. 44-100 Gliwice, Poland Tel/fax: +48 (32) 231 70 91 info@graw.com www.graw.com	**MTL ASCO Sp. z o.o.** **RAILWAY INSTRUMENTS ONLY** ul. Wielowiejska 53 44-120 PYSKOWICE (k/ GLIWIC), Poland Tel: +48 32 233 33 33 Fax: +48 32 233 21 34 serwis@mtlasco.pl www.ascorail.pl	**RMT Ltd.** Zahradni 224 739 21 Paskov, Czech Republic Tel: +420 558640211 Fax: +420 558640218 rmt@rmt.cz lubomir.kolar@rmt.cz www.rmt.cz
PORTUGAL	RUSSIA	RUSSIA
UltraSens Qt. da Portela, Lt. 22.1, Ap. 152 3030 - 502 Coimbra, Portugal Phone +351 239 796 277 Fax: +351 239 918 267 info@ultrasens.com www.ultrasens.com	**Sensorika-M LLC** Dmitrovskoye shosse 64-4 127474, Moscow, Russia Tel: +7 499 487 0363 Fax: +7 499 487 7460 info@sensorika.com www.sensorika.com	**Diesel-test-Komplekt LLC** 620030, Karjernaya St, 16 Ekaterinburg, Russia Tel/fax: +7 343 2227565 Tel/fax: +7 343 2227370 mail@d-test.ru twww.d-test.ru
SERBIA, SLOVAKIA	SOUTH KOREA	SOUTH KOREA
RMT Ltd. Zahradni 224 739 21 Paskov, Czech Republic Tel: +420 558640211 Fax: +420 558640218 rmt@rmt.cz lubomir.kolar@rmt.cz www.rmt.cz	**PROSEN. CO., LTD** 211/ Jung-woo Venture 2, 341 Sansal-lo, Danwon-gu, Ansan-si, Gyeonggi-do, 425839 Republic of Korea Tel: +82-(0)31-508-3456~7 Fax: +82-(0)31-624-3458 prosensor@naver.com www.prosen.kr	**DAESHIN T&S CO., LTD** 1702 Ace High-End Tower 5 Gasan-dong, Geumcheon-Gu Seoul, Korea Tel: +82-2-2279-8800 Fax: +82-2-2277-6667 railstar1983@korea.com www.railstar.co.kr
SPAIN	SWEDEN, NORWAY, DENMARK	UKRAINE
Iberfluid Instruments S.A. Cardenal Reig, 12 08028 Barcelona, Spain Tel: +34 93 447 10 65 Fax: +34 93 334 05 24 myct@iberfluid.com www.iberfluid.com	**BLConsult** Rävbergsvägen 31 SE 713 30, Nora, Sweden Tel: +46 (0) 587 153 20 Mobile: +46 (0) 70 663 19 25 info@blconsult.se www.blconsult.se	**KODA** Frunze st 22 61002, Harkov, Ukraine Tel/fax: +38 057 714 26 54 mail@koda.com.ua www.koda.com.ua
UNITED KINGDOM, IRE-LAND	USA, CANADA, MEXICO	USA, CANADA, MEXICO
Ixthus Instrumentation Ltd The Stables, Williams' Barns Tiffield road, Towcester, Northents Tel: 01327 353437 Fax: 01327 353564 www.ixthus.co.uk info@ixthus.co.uk	**International Electronic Machines Corporation** **RAILWAY INSTRUMENTS ONLY** R 60 Fourth Avenue, Albany, New York, USA Tel: +1 518 449-5504 Fax: +1 518 449-5567 railway_marketing@iem.net www.iem.net	**Acuity Products of Schmitt Industries, Inc.** 2765 NW Nicolai Street Portland, OR, 97210, USA Tel: +1-503 227 7908 Fax: +1 503 223 1258 sales@acuitylaser.com www.acuitylaser.com

23. Annex 1. RIFTEK measurement instruments for railway transport

46

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.