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

Certified according to ISO 9001:2008
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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 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:

![Laser safety warning label](image)

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 (H_v);
- side wear (H_h), that is measured 13 mm lower the top of railhead or side wear( H_{h_{45}}), 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: H_r = H_v + 0,5H_h or H_r = H_v + 0,5H_{h_{45}}.

5. Basic data and performance characteristics

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

6. Complete set to be supplied

<table>
<thead>
<tr>
<th>Designation</th>
<th>Name</th>
<th>Quantity</th>
<th>Weight kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF303</td>
<td>PDA</td>
<td>1</td>
<td>0,4</td>
</tr>
<tr>
<td>RF570</td>
<td>Laser scanning module</td>
<td>1</td>
<td>3,5</td>
</tr>
<tr>
<td>RF570.10</td>
<td>Power supply, laser module</td>
<td>1</td>
<td>4,0</td>
</tr>
<tr>
<td>RF570.40</td>
<td>Charging device  5V 3.0A for PDA</td>
<td>1</td>
<td>0,2</td>
</tr>
<tr>
<td>RF570.41</td>
<td>Charging device  9V 3.0A for laser module</td>
<td>1</td>
<td>0,5</td>
</tr>
<tr>
<td>RF570.42</td>
<td>Universal cable (USB-port)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>RF570.43</td>
<td>Bluetooth/USB - adapter</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>RF570.30</td>
<td>Packing case</td>
<td>1</td>
<td>1,5</td>
</tr>
<tr>
<td>PRP_DB</td>
<td>Database management system (CD)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>RF570UM</td>
<td>User's manual</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
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](image)

(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](image)

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](image)

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
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 competed, the PDA will show values of measured parameters selected for presentation (см. п.□□):

<table>
<thead>
<tr>
<th>Rail parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>( H_v : 1.48 \text{ mm} )</td>
</tr>
<tr>
<td>( H_h : 0.57 \text{ mm} )</td>
</tr>
<tr>
<td>( H_r : 1.76 \text{ mm} )</td>
</tr>
<tr>
<td>( H_{45} : 0.64 \text{ mm} )</td>
</tr>
<tr>
<td>( R_{45} : 1.80 \text{ mm} )</td>
</tr>
</tbody>
</table>

• 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).
Table 1.

<table>
<thead>
<tr>
<th>L-parameter</th>
<th>Default value</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>13 mm</td>
<td>Used for calculation of railhead wear, mm</td>
</tr>
</tbody>
</table>

9.2. Geometric parameters of the rail under control

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

Table 2.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Designation</th>
<th>Calculation method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Railhead vertical wear</td>
<td>Hv</td>
<td>is calculated as a difference between the measured value and nominal value of new rail in direction of rail axis of symmetry.</td>
</tr>
<tr>
<td>Lateral railhead wear</td>
<td>Hh</td>
<td>is measured at the height of L1 = 13 mm from the rolling surface of rail head</td>
</tr>
<tr>
<td>Lateral railhead wear at angle 45 degrees</td>
<td>H45</td>
<td>(Hh&lt;sub&gt;∟45&lt;/sub&gt;), is measured at 45 degrees relative to the rail symmetry axis at the point that passes through the center of lateral working fillet</td>
</tr>
<tr>
<td>reduced head wear</td>
<td>Hr</td>
<td>that is determined as vertical one + the half of lateral wear, namely :Hr = Hh + 0,5Hh or Hr = Hv + 0,5Hh&lt;sub&gt;∟45&lt;/sub&gt;</td>
</tr>
<tr>
<td>reduced head wear at 45 degrees</td>
<td>R45</td>
<td>is determined as vertical one + the half of lateral wear, namely : Hv = Hh + 0,5Hh&lt;sub&gt;∟45&lt;/sub&gt;</td>
</tr>
</tbody>
</table>

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]

<table>
<thead>
<tr>
<th>PRP</th>
<th>Service</th>
<th>Data</th>
<th>About</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parameters</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Date/Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Units of measurement</td>
<td>✓ mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Language</td>
<td>inch</td>
<td></td>
</tr>
<tr>
<td></td>
<td>New PRP [RF570 00312 ]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 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
• 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:

- 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.
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:  

  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).

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;
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 code (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:

![Profile Selection Window](image)

**Buttons:**
- Import reference profile from *.ref file;
- Export 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). 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
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
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

![Image of a dialog box for entering COM port number]

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

![Image of a window with multiple tabs, including 'Measurement']

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

![Image of the measurement interface with a graphical display of a rail profile]

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

![Profile Image](image)

![Profile Values](image)

### Enter parameters

<table>
<thead>
<tr>
<th>Organization</th>
<th>Worker</th>
<th>Side</th>
</tr>
</thead>
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<td>Number of the railway</td>
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![Save profile](image)

- 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.
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:

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.
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 where 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 database,

- 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:
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:

![Hardware Update Wizard](image-url)
- 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 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:
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 – 12 hours (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**

<table>
<thead>
<tr>
<th>AUSTRALIA</th>
<th>AUSTRALIA</th>
<th>BENELUX</th>
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<tr>
<td><strong>Applied Measurement Australia Pty Ltd</strong>&lt;br&gt;RAILWAY INSTRUMENTS ONLY&lt;br&gt;Suite 1, 8 French Ave, Bankstown, NSW 2200, Australia&lt;br&gt;Tel: +61 (0) 297082000&lt;br&gt;Fax: +61 (0) 297084444&lt;br&gt;<a href="mailto:sales@appliedmeasurement.com.au">sales@appliedmeasurement.com.au</a>&lt;br&gt;www.appliedmeasurement.com.au</td>
<td><strong>XN Innovation</strong>&lt;br&gt;LG Centre, Suite 1, Level M, 55 Parramatta Rd,&lt;br:NSW, 2141, Lidcombe, Australia&lt;br&gt;Tel: +61 (0)2 8091 2426&lt;br&gt;Fax: +61 (0)2 9648 6597&lt;br&gt;<a href="mailto:xni.sales@gmail.com">xni.sales@gmail.com</a></td>
<td><strong>Altheris B.V.</strong>&lt;br&gt;Scheveningseweg 15&lt;br&gt;2517 KS The Hague,&lt;br&gt;The Netherlands&lt;br&gt;Tel: +31 (70) 3924421&lt;br&gt;Fax: +31 (70) 3644249&lt;br&gt;<a href="mailto:sales@altheris.nl">sales@altheris.nl</a>&lt;br&gt;www.altheris.com</td>
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<tr>
<td>BULGARIA</td>
<td>RMT Ltd. R Zahradni 224 R 739 21 Paskov, Czech Republic Tel: +420 558640211 Fax: +420 558640218 <a href="mailto:rmt@rmt.cz">rmt@rmt.cz</a> <a href="http://www.rmt.cz">www.rmt.cz</a></td>
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<td>BRAZIL</td>
<td>CAPI Controle Av. Paschoal Arditó, 1880 Americana-SP, Brazil Tel: +55 19 36047068 Fax: +55 19 34681791 <a href="mailto:capi@capicontrol.com.br">capi@capicontrol.com.br</a> <a href="http://www.capicontrol.com.br">www.capicontrol.com.br</a></td>
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<tr>
<td>CHINA</td>
<td>Zhenshangyou Technologies Co., Ltd. Rm 1806, Block B, Jinhai Building Chuangye Road, Nanshan District Shenzhen, 518054, China Tel: +86 755-26528100/8011/8012 Fax: +86 755-26528210/26435640 <a href="mailto:info@51sensors.com">info@51sensors.com</a> <a href="http://www.51sensors.com">www.51sensors.com</a></td>
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<td>CHINA</td>
<td>Shanghai micron-metrology com., Ltd. Room 602 unit 4, lane 399, Mudan road, Pudong New district Shanghai, China Tel: +86-21-68416510 <a href="mailto:sales@micron-metrology.cn">sales@micron-metrology.cn</a> <a href="http://www.micron-metrology.cn">www.micron-metrology.cn</a></td>
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<td>FINLAND</td>
<td>TERÄSPYÖRÄ-STEELWHEEL OY RAILWAY INSTRUMENTS ONLY Juvan teollisuuskatu 28 FI-02920 ESPOO, Finland Tel: +358 400 422 900 Fax: +358 9 2511 5510 <a href="mailto:steelwheel@steelwheel.fi">steelwheel@steelwheel.fi</a> <a href="http://www.terasporya.fi">www.terasporya.fi</a></td>
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<td>FRANCE</td>
<td>DB Innovation (ALITHERIS France) 26, avenue de la Mediterranee 34110 Frontignan France Tel: +33-(0)467786166 Fax: +33-(0)467740134 <a href="mailto:dbi@altheris.fr">dbi@altheris.fr</a> <a href="http://www.altheris.fr">www.altheris.fr</a></td>
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<td>GERMANY</td>
<td>Disynet GmbH Westwall 12 D-41379 Brueggen, Germany Tel: +49 (2157) 8799-0 Fax: +49 (2157) 8799-22 <a href="mailto:disynet@sensoren.de">disynet@sensoren.de</a> <a href="http://www.sensoren.de">www.sensoren.de</a></td>
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<td>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 <a href="mailto:info@bip-industrie.de">info@bip-industrie.de</a> <a href="http://www.bip-industrietechnik.de">www.bip-industrietechnik.de</a></td>
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<td>GERMANY</td>
<td>Finger GmbH &amp; Co. KG OPTICAL MICROMETERS ONLY Sapelloh 172, 31606 Warmsen, Germany Tel: +49 5767 93004 Fax: +49 5767 93004 <a href="mailto:finger@finger-kg.de">finger@finger-kg.de</a> <a href="http://www.finger-kg.de">www.finger-kg.de</a></td>
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<td>Hylewicz CNC-Technik SHTRIKH-2 ONLY Siemensstrasse 13-15, 47608 Geldern, Germany Tel: +49 2831 91021-20 Fax: +49 2831 91021-99 <a href="mailto:info@cnc-step.de">info@cnc-step.de</a> <a href="http://www.cnc-step.de">www.cnc-step.de</a></td>
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<td>Pragathi Solutions #698, 5th Main, 8th Cross, HAL 3rd Stage, New Tippanasandra Road, Bangalore, 560075, India Tel: +91 80 32973388 Tel/fax: +91 80 25293985 Mobile: +91 9448030426/ +919448492380 sales@ pragathisolutions.in arghya@ pragathisolutions.in <a href="http://www.pragathisolutions.in">www.pragathisolutions.in</a></td>
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<td>INDONESIA</td>
<td>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 <a href="mailto:management@ptdbs.co.id">management@ptdbs.co.id</a></td>
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<tr>
<td>ISRAEL</td>
<td>Nisso Dekalo Import Export LTD 1 David Hamelech Street Herzlia 46661 Israel Tel: +972-99577888 Fax: +972-99568860 <a href="mailto:eli@fly-supply.net">eli@fly-supply.net</a> <a href="http://www.fly-supply.net">www.fly-supply.net</a> <a href="http://www.aircraft-partsupply.com">www.aircraft-partsupply.com</a></td>
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<td>SIA &quot;SOLARTEX&quot; RAILWAY INSTRUMENTS ONLY</td>
<td>Duntes 15a, 5th floor, office B7 Riga, Latvia</td>
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<tr>
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<td>P.U.T. GRAW Sp. z o.o.</td>
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<td>Acuity Products of Schmitt Industries, Inc.</td>
<td>2765 NW Nicolai Street Portland, OR, 97210, USA</td>
</tr>
</tbody>
</table>
23. Annex 1. RIFTEK measurement instruments for railway transport

**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.