



# LASER WHEEL PROFILOMETER

# **IKP-5, IKP-5R Series**

# **User's manual**

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# 1. Safety precautions and measurement conditions

- Prior to mounting the profilometer onto the wheel, areas of contact of the side supports with the wheel surface should be thoroughly cleaned from dirt.
- When mounting the module on the wheel, do not allow heavy shocks of its support against the wheel.
- The output window of the profilometer and profilometer supports 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

A laser profilometer IKP5 Series is designed for the measuring of

- wheel flange height
- wheel flange thickness
- wheel flange slope
- rim thickness
- 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.



# 5. Basic data and performance characteristics

Name of parameter	Value
Measurement range for the flange height, mm	2045
-"- flange thickness, mm	2040
-"- flange slope, mm	115
-"- rim thickness* , mm	3090
Measurement error for the flange height, mm	± 0,1
-"- flange thickness, mm	± 0,1
-"- flange slope, mm	± 0,2
-"- rim thickness , mm	± 0,1
Discreteness of indication of the flange height, mm	0,01
-"- flange thickness, mm	0,01
-"- flange slope, mm	0,01
-"- rim thickness , mm	0,01
Profile measurement range - the whole profile bet	ween of the wheel tire faces (145 mm
maximum)	
Discreteness of the profile formation, not worse	9 0,1
than, mm	
Digital readout device dimensions, mm	see Fig.5
Dimensions of laser scanning module (for the max-	see Fig.3
imum scanning range), mm	
Power supply –rechargeable battery	4.8V
The number of measurements that can be taken	1000
before battery recharge is not less than	
PDA memory capacity, no less	1000 measurements
Interface to PC	USB, Bluetooth

\*Rim thickness measurement is an option. Designation for the order is IKP-5R

# 6. Complete set to be supplied

Designation	Name	Quantity	Weight kg
RF303	PDA	1	0,4
RF505	Laser scanning module	1	0,6
RF505.40	Charging device 9V 3.0A for PDA	1	0,2
RF505.41	Charging device 9V 3.0A for laser module	1	0,2
RF505.42	Universal cable USB – mini USB	1	
RF505.43	Bluetooth/USB - adapter	1	
RF505.30	Packing case	1	0,9
IKP5_DB	Database management system (CD)	1	
RF505UM	User's manual	1	
	Calibration tools (option):		
RF505.11	Wheel-simulator,		
ΡΦ505.11	Calibration software		



# 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) Calibration block
- (4) Charging device
- (5) Data cable

### 7.1.1. Laser scanning module

The module is intended for laser scanning of wheel surface.

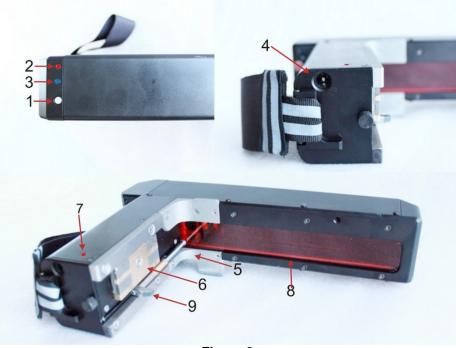
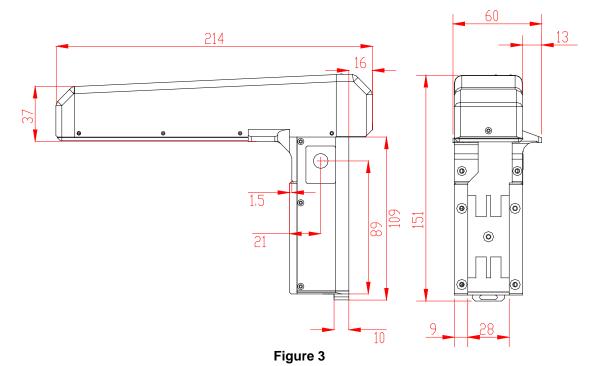


Figure 2

- Fig. 2 indicates:
- (1) Turn ON button
- (2) Indicator of turn ON (red LED)
- (3) Indicator of Bluetooth connection (blue LED)
- (4) Charging device connector
- (5) Support for mounting of the device on the wheel flange
- (6) Magnetic support for mounting on the wheel side surface
- (7) Charging indication, red/green LED
- (8) Output window
- (9) Rim measurement rod

Overall dimensions of scanning module are shown in figure 3.



#### 7.1.2. 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.



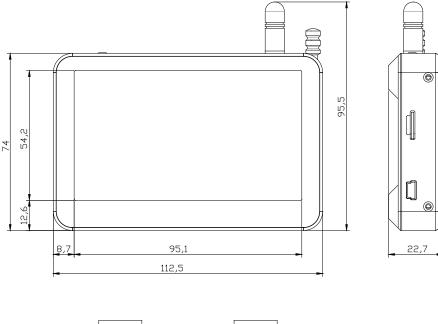
Figure 4



Fig. 4 indicates:

- (1) Turn-on button
- (2) Charging indication, red/green LED
- (3) Connector to PC USB-port or charging device
- (4) Flash memory card connector
- (5) Stylus
- (6) Bluetooth antenna

Overall dimensions of PDA are shown in figure 5.





#### Figure 5

#### 7.1.3. Calibration block

Calibration block is intended for calibration and tests of the profilometer. Calibration block is a metal imitator of the part of wheel with a definite profile.

Overall dimensions of calibration block are shown in figure 1A of paragraph  $\underline{20}$ . The suggested profiles are given in paragraph  $\underline{23}$ . Also possible is supply of a unit with a profile made to the customer's drawings.

#### 7.2. Operation principle

Operator mounts the laser scanning module onto the wheel to be measured. Having received a command from PDA or PC, the laser module performs non-contact scanning of the wheel 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: operator



number, side identifier (left or right wheel), axis number, locomotive (carriage) number, wheel pair number, etc.

# 8. First activation and measurement procedure

### 8.1. Preparation for use

• Before using the device for the first time, it is necessary to remove the lock screw 2 and to twist in the screw 1 instead (Fig. 6).

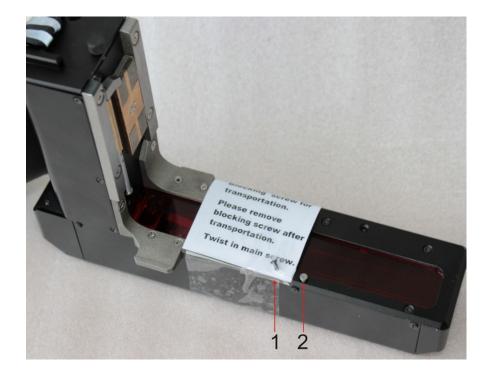


Figure 6

• Charge accumulators of the laser module and indication device by connecting them to charging devices (see par. <u>22</u>.).

### 8.2. Activation

- Turn the PDA on by pressing the button (1), Fig. 4. Activation indication (2) will show a green LED lit.
- Switch the laser module on by pressing ON/OFF (1) button and holding it until red LED is lit
- 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 (3) 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; information panels of the selected working parameters and tolerances and the **Measurement** button:



Laser Wheel Profilometer, IKP-5 and IKP-5R



# 8.3. Measurement

To perform measurement, it is necessary to:

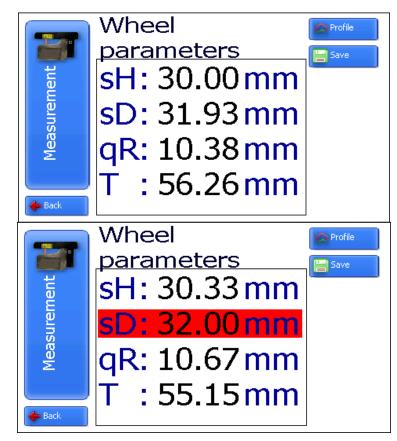
- Fix the laser module on the calibration unit or wheel by mounting the module support (5) onto the wheel flange and pressing magnetic support (6) to the internal face of the wheel;
- · For rim measurement extract rim measurement rod and hitch it up to the rim



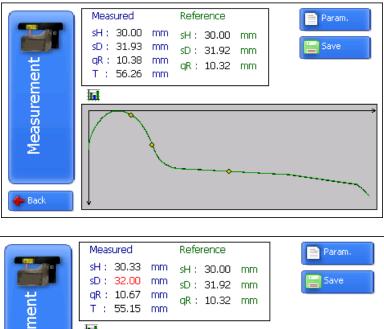
Figure 7

- Make sure that the module is mounted correctly without any misalignment and gaps;
- Press Measurement button on the PDA display;
- With the **Measurement** button pressed, the laser module will scan the wheel surface. During scanning time of about 1-2 seconds red LED (2) is lit.
- When scanning is competed, the PDA will show values of measured parameters selected for presentation (see par. <u>10.6.</u>). When the parameter goes beyond set limits its value is highlighted with red color:





• To look at wheel profile, press the **Profile** button, and the PDA display will scanned wheel profile as well as measured parameters and parameters of calibration element (or a wheel chosen as a reference):





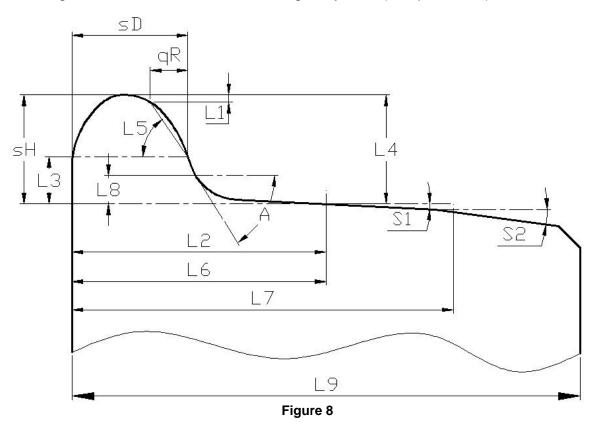


• If you scan calibration block or reference wheel and scanning results differ from the reference values by nor more than 0.1 mm, the device is ready for work, otherwise it must be calibrated in accordance with par. <u>20</u>.

# 9. Wheel parameters under control. Terms and definitions

# 9.1. L-parameters

Geometric parameters of the wheel are calculated automatically after laser scanning of the wheel is completed. To calculate geometric parameters, use is made of reference points on the wheel profile. Location of the reference points is shown in Fig. 8 and is defined by **L-parameters** (parameters L1...L9). Values of L-parameters preset in PDA are given in Table 1 and can be changed by user (see par.<u>10.3</u>).





#### Table 1.

L-parameter	Default value		Purpose	
	locomotive	MCRS *		
L1	2 mm	5 mm	Used for calculation of the flange slope	
L2	70	nm	Defines position of the wheel rolling circle	
L3	13 mm	18 mm	Used for calculation of the flange thickness	
L4	30 mm	28 mm	Used for calculation of tyre roll wear and is equal to	
			the height of flange of the reference profile	
L5	-	60 deg	Slope of the reference profile	
L6	70	70	Used for calculation of slope of the rolling surface	
			section	
L7	105	105	Used for calculation of slope of the rolling surface	
			section	
L8	0	0	Used for measurement of the profile inclination ang	
			at the required point	
L9	140	140	Used for inverting measurement direction	

\* MCRS – motor coach rolling stock

# 9.2. Geometric parameters of the wheel under control

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

# Table 2.

Parameter	Designation	Calculation method		
The flange thick- ness (calculation method #1) "From surface"	Sd (figure 8)	is determined as a distance measured horizontally at any pre-selected height (L3) from the surface of the wheel rolling surface between two points lying on the opposite sides of the flange top: one of which lies in the plane of the internal face of the wheel tire and the other - on the outer surface of the flange		
The flange thick- ness (calculation method #2) "From the top"	Sd	is defined as the distance from the flange top measured along the horizontal line at a selected height L3 (factory setting is 18 mm)		
The slope of flange (calcula- tion method #1) "Locomotive"	qR (figure 8)	is calculated as a difference between the flange thickness at the any pre-selected height from the surface of the wheel roll- ing surface (L3) and that measured at the any pre-selected distance (L1) away from the flange top		
The slope of flange (calcula- tion method #2) "Railcar"	qR	is calculated as the difference between the angle of slope of the reference profile (parameter L5) and the slope of the measured profile. Slope of the measured profile is calculat- ed as the inclination angle of a straight line passing through points on the wheel flange that are located at dis- tances L1 and L3 from the flange top		
The flange height	Sh	is determined as a distance measured vertically between the flange top and the point of wheel rolling surface at the ar pre-selected distance (L2) away from the inner face of the wheel tire.		
Roll wear	dW	is defined as the distance between the measured flange height and the nominal height determined by the parameter L4		
Rim thickness	Т	Is calculated as a distance between the edge of the rim and the point of wheel rolling surface at the any pre-selected dis-		



		tance (L2) away from the inner face of the wheel tire.
Angle 1	Slope 1	is calculated as the inclination angle of the straight line pass- ing through points on the wheel surface located at preset dis- tance L6 from the wheel face and the distance L6+10mm from the wheel face
Angle 2	Slope 2	is calculated as the inclination angle of the straight line pass- ing through points on the wheel surface located at preset dis- tance L7 from the wheel surface and the distance L7+10mm from the wheel surface
Inclination	Angle	Is calculated as the profile inclination angle at a point with L8 co-ordinate

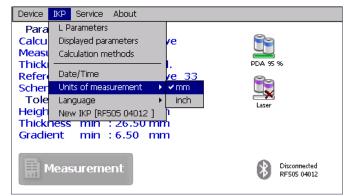
# 10. PDA program setting

Prior to starting work with the 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 IKP > Units of measuring > [mm/inch]



• select mm or inch options

# 10.2. Data and Time settings

To set data and time:

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

Device IKP Sei	rvice About							
Parameters	Parameters							
Calcul. meth	od : Locomotive							
Measuring								
Thickness fr	Time 11:55:20	95 %						
Reference		2						
Scheme	Date 24/09/2012 💌							
Tolerance		P						
Height r								
Thickness r								
Gradient r	🔚 Save 🛛 🔀 Cancel							
Measur	ement	Disconnected RF505 04012						

• write data and time



• press Save.

# 10.3. L-parameters settings

To change L-parameters:

• select IKP > L Parameters

			L Parameters			
L1	2000	mkm	Angle		Slope 🗌	
L2	70000	mkm	L8 0	mkm	L6 70000	mkm
L3	13000	mkm	Invert		L7 105000	 mkm
L4	30000	mkm	L9 140000	mkm		
		Save		🔀 Ca	ncel	

- write parameter's value
- press Save

# 10.4. Calculation methods setting

To set calculation methods (see. Table 2):

select IKP > Calculation methods

	Calcul	lation methods	
Calcul. method		O Car	
Thickness from — Wheel roll.		О Тор	
Measuring —		O Wear	
	E Save	Cancel	

- set the parameters required
- press Save

# 10.5. Selection of displayed geometric parameters

To select geometric parameters to be displayed after scanning:select Profilometer > Displayed parameters

	Displayed parameters						
🔽 Height		Uear					
✓ Thickness		Angle					
🔽 Gradient		Slopes					
Diameter		Tire					
	🔚 Save	🔀 Cancel					

- mark the parameters whose values must be displayed
- press Save



# **10.6.** Tolerances settings

The program automatically controls measured geometric parameters for going out beyond the tolerances set. It is possible for the user to create groups of tolerances. Control of parameters will be performed for a selected group. To set tolerances it is necessary to:

• select Service > Tolerances in the main window. View on the screen:

		Enter possible va	lues		
Name	Tolerance N1			3	
Tolerances			min	max	
		Height	27000	31000	mkm
Tolerance NI		Thickness	26500	32000	mkm
		Gradient	6500	12000	mkm
		Diameter	800000	1260000	mkm
1					
👍 Add	🔔 Delete	🔔 Edit		<b>3</b> E	kit

• adjust tolerances in the selected group or add a new group of tolerances and write corresponding values. All values are in micrometers.

#### Buttons:

🔔 Add	-	add new group of tolerances;
🔁 Delete	-	delete selected group of tolerances;
🔔 Edit	-	edit selected tolerance;
🛃 Exit	-	exit.

### 10.7. Reference profile selection and installation

The program lets compare scanned profile of the wheel 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 (see paragraph <u>23</u>). If there is no required reference profile in the database, user can form profile description himself (methods of **.ref files** formation are described in par. <u>13.6.</u>) or request the lacking profile from **RIFTEK** (free service).

#### **10.7.1. Reference profile selection**

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

Reference profiles				
Reference profile Locomotive_33				
Profile file	Profile name	▲ I		
BLR_Loco_33.ref	Locomotive_33			
BLR_Loco_29.ref	Locomotive_29			
FIN_PrflERRI.ref	UIC/ERRI			
FIN_PrflORE.ref	UIC/ORE			
SPA_28.ref	Profile_28			
SPA_30.ref	Profile_30			
SPA_18610.ref	Spane_18610			
SDA COMEA 1 VOF	LID 00 102E			
Contraction Contra		🛃 Exit		

• 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.

#### 10.7.2. Writing reference profile to database

If there is no required reference profile in the database, profile description file can be formed by user with the help of one of the procedures described in par. <u>13.6.</u> and transferred to the PDA as it is shown in par. <u>14.1.4.</u>

#### 10.8. 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:

Database files	
Current database wp_12_09_20_01.ikp	
Data-file	
wp_12_09_20_01.ikp	
	_
Ce Del All 🛛 📦 New DB	Export
CeDelete Set DB	Exit

- To create a new database, press New DB. File with the name wp\_yy\_mm\_dd.ikp 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 save file in TXT form press нажать Export;
- to exit from the window press **Exit**.

### **10.9.** Selection and formation of measurement scheme

Measurement scheme is meant as a sequence of making measurements/processing of wheels in the rolling stock. The program automatically offers operator to perform measurement on a concrete wheel in accordance with selected scheme of wheel processing. The program contains several preset schemes. Besides, the user can form his own measurement scheme.

#### **10.9.1.** Selection or removal of the measurement scheme

To select a measurement scheme in the main window menu:

• select Service > Schemes. View on the screen:

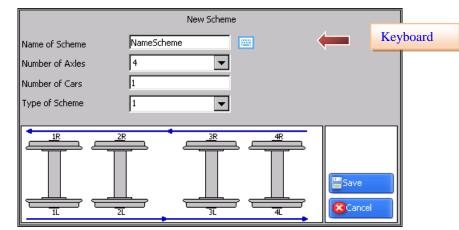


	Curent Scheme Scheme1		
	Profile file	Schemes	
	Scheme4.sch	Scheme4	
	Scheme5.sch	Scheme5	
	Scheme6.sch	Scheme6	
	Pendolino.sch	Pendolino	
	Scheme1.sch	Scheme1	
	Scheme2.sch	Scheme2	
Processing scheme			Set

- by activating lines containing the scheme file name it is possible to look at available wheel processing schemes. Arrows in the figure show direction of processing of wheel pairs as well as the names assigned to wheels (1L-first axis, left side; 2L-second axis, left side; 1R-first axis, right side, etc.);
- to set the selected scheme activate the respective line and press Install;
- to remove a scheme activate the respective line and press **Remove**.

#### 10.9.2. Formation of a new measurement scheme

To form a new measurement scheme, press Add. The screen will show:



- by using on-screen keyboard type the scheme name;
- select the number of axles;
- select the number of coaches in the rolling stock (train);
- select the wheel processing scheme out of the options suggested
- press **Save**.

#### 10.9.3. Loading of a new measurement scheme

If you can not form a new scheme in accordance with par. <u>10.9.2.</u>, it is possible to use a special program for PC, see par. <u>21</u> and then load the scheme to the PDA as it is shown in par. <u>14.1.5.</u>

### 10.10. Wheel type selection

If several wheels types are used it is possible to set definite measurement scheme, reference profile and L-parameters for every wheel type

#### An example.

WheelType1:Scheme1, Reference1, L-Parameters1;WheelType2:Scheme2, Reference 2, L-Parameters2;



WheelType3: Scheme3, Reference 3, L-Parameters3;

#### 10.10.1. Wheel type selection and removal

To select wheel type in the main window menu select **Service > Wheel type**, View on the screen:

Wheel type				
Name	Locomotive			
Choose a type Locomotive Car				
Locomotive				
Car				
Rew New	👿 Edit			
Delete	Set		<b>M</b> E:	kit

- activate wheel type line you need and press Set;
- for wheel type removal activate wheel type line and press **Delete**.
- press Edit for wheel type edit;
- to add new wheel type activate the line and press для редактирования активировать строку и нажать Add (see p. <u>10.10.2</u>).

#### 10.10.2. Wheel type addition

To add new type of the wheel press **New.** View on the screen:

	Enter parameters		
Name	Car		
Reference	UIC/ERRI		
Scheme	Scheme1		
L Parameters	Calculation methods		
	Save Cancel		

- use virtual keyboard to write type name (Name);
- select reference profile (Reference);
- select scheme (Sheme);
- write L-parameters( see. p. <u>10.3</u>
- write Calculation method
- press Save.

### 10.11. 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 IKP > New IKP

Device IKP Service About	
Para L Parameters	
Calcu Displayed parameters ve	
Meast Calculation methods	
Thick I.	PDA 95 %
Refer Date/Time /e_33	80
Scher Units of measurement	
Tole Language	Laser 51 %
Heigh New IKP [RF505 04012 ] Thickness min 26,50 min	
Gradient min : 6.50 mm	
	Connected with RF505 04012
Tap "Start" to search for other Bluetooth device.	
RF505.04012 00:12:6f:25:00:29	

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

Searching for Bluetoot	h devices		
0 Device(s) found			
	Start	Cancel	
Select a device to conr	nect with and tap "Save".		
RF505 04012 00:12	:6f:25:00:29		
1 Device(s) found			



- select device and press Save to save new device address
- in the Values tab, press the Save button to save all parameters

# **10.12. 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 **Profilometer > Language.** Select the required language support file.

If no such file is available, it is necessary to use new files preparation procedure which is described in par.<u>12.3.</u> and then load a new language file from PC to PDA as it is shown in par. <u>14.1.2.</u>

# 10.13. Browsing and updating PDA software

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



The updated software version can be downloaded from the site. Proceduire of PDA sofware updating is described in par. <u>14.1.6.</u> of this manual.

# 11. Working with the profilometer

### 11.1. Activation

Switch on the PDA and scanning module as shown in par. 8.2.

#### 11.2. On-line measurements

Procedure of on-line measurements is described in par. 8.3.

#### **11.3.** Measurements with database maintenance

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

To take measurements:

• Select in the main menu **Profilometer > Measurement**, the window of parameters input will appear



	Enter parameters wheel pair				
Date	24/09/12 💌	Worker	7754		
Date Wheel pair Series Locomotive	1	Run	234000		
Series	series	Side	L		
Locomotive	1238	Axle	1		
	E Save	Cance			

- If necessary, fill in/edit the required fields
- to save parameters, press the **Save** button, and the program will offer the selected measurement scheme (see par.<u>10.9.</u>):

Date Series Worker Number Section Axle Side	24/09/12 series 7754 123 1238 2 L 2	Measure
Wheel pair Run		

#### Designations:

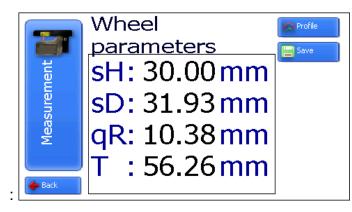
1(1)

order number of the car to be measured (number of cars in the train);

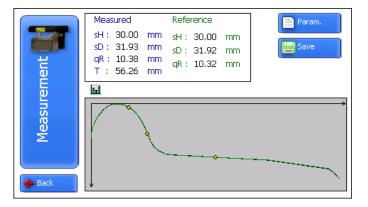
- - number of the car to be measured;

editing of the input wheel parameters;

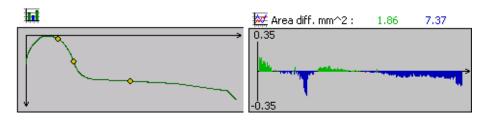
- a previous/subsequent wheel;
- a measured wheel;
- a wheel to be measured next time;
- a non-measured wheel;
- a measured wheel to be measured again
- measurement.
- Measure the wheel offered by the program (highlighted in green color), as it is shown in par. <u>8.3.</u>
- after the wheel surface is laser-scanned, the PDA will show the value of selected geometrical parameters. When a parameter falls out of the specific tolerance, its value is indicated with red color



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



• to look at wear degree press 🛄 button



- when a satisfactory result is obtained, press Save on the display to save it
- the program will offer to pass to measurement of the next wheel in accordance with selected scheme of measurement

#### 11.4. Browsing the database

To browse the database:

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

				→ Meas. Refer. sH:30.01 30.00 sD:31.91 31.92 qR:10.39 10.32 T:56.60	
Ļ					profiles:5
Wheel pair	Side	Axle	Worker		
000000000001	L	1	7754	Date	24/09/12 <
000000000002	L	2	7754	<u> </u>	
000000000003	L	3	7754	Series	series 🔍 🔻
000000000004	L	4	7754	Locomotive	1238 🔍
0000000000000	R	4	7754		
Delete	Save R	efer			🛃 Exit



• for data filtering select data, series and number of locomotive

#### Buttons:

🔁 Delete

Save Refer

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.	newprofile	
💾 Save	🔀 Cancel	

• write profile name and press **Save** 

#### 11.5. Deactivation

To turn off the PDA, select **Device > Turn Off**. To turn off the laser module, press button 5, Fig. 2 and hold it down until red LED 2 goes out.

Device IKP Service	About	
<ul> <li>IKP IDK</li> <li>Measurement Rapid measurement</li> <li>Turn off</li> <li>Constantse</li> </ul>	Locomotive Height Wheel roll. Locomotive_33 Scheme1	PDA 95 %
Height max : Thickness min : Gradient min :		Laser 50 70
Measureme	nt	Connected with RF505 03712

# 12. Installation of software on PC and startup

### 12.1. Installation of database support software

The **ikp5\_DB** software is intended for maintaining wheel sets wear database on a personal computer (the updated version of the program can be downloaded from <u>www.riftek.com</u>).

To install the software, insert compact disk to PC CD drive, select and start **In-stall\_lkp5.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:



😣 Microsof	t Actives	5ync	_ 🗆 🗙
<u>Ф</u> айл <u>В</u> ид	С <u>е</u> рвис	⊆правка	
🔁 Синхро	энизация	🕑 Расписание	📡 Проводник
Гость			
Подключен	но		
			Скрыть подробности 🗙
Тип данных		Состояние	Скрыть подробности 🗙
Тип данных	:	Состояние	Скрыть подробности 🗙
Тип данных	:	Состояние	Скрыть подробности 🖈
Тип данных	:	Состояние	Скрыть подробности 🛠
Тип данных	:	Состояние	Скрыть подробности 🖈

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

# 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\Ikp5\_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.



tivesync.



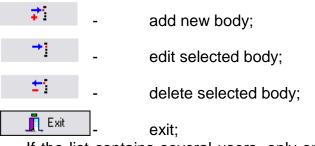
# 13. User settings of the program

# 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.

Bailway Railway N1	Department N1	Name	<u>.</u>	

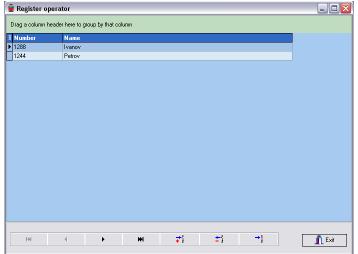
**Buttons:** 



If the list contains several users, only one of them can be active at the moment. Active user is selected by putting a " tick" in the **Organization** window.

# 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 locomotive series

Steps to follow: menu **Registration > Series**. Enter the name of a series of locomotives under service

🚆 Register series					
Drag a column header here to group by that (	olumn				
I Name of series					
▶ TC5					
TR3					
44 ↓ ▶	₩	<b>;</b> *1	±1	<b>→</b> ]	👖 Exit
	-/1	* •	- :	•	

Functions of buttons are similar to those in par. 13.1.

#### 13.4. Registration of locomotive numbers

Steps to follow: menu **Registration > Locomotive/car**. In the emerging window type locomotive numbers to be serviced and their characteristics (locomotive number and series code).

🚊 Register Rolling stocks					_ 0	
Drag a column header here to grou	up by that column					
	Code of Rolling stock	Number of Rolling stock	Number of car in the rolling stock	Invert		
▶ CH4	345	3	45			
H4	· • • +	1 <u>1</u>	→]	I}•	<b>Exit</b>	

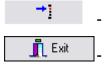
Functions of buttons are similar to those in par. 13.1.

# 13.5. Registration of wear limiting values

Steps to follow: menu **Registration > Limiting values**. Enter limiting wear parameters for wheel set for each registered series of locomotives. Subsequently these parameters will be used for automatic control of allowable wear.

Max flange height	31,00	mm	Normal flange height	30,00 mm
Min flange thickness	26,00	mm	Normal flange thickness	31,92 mm
Min flange gradient	6,50	mm	Normal flange gradient	10,32 mm
Min thickness of tyre	50,00	mm	Normal thickness of tyre	90,00 mm
Max diam difference	1,00	mm	Normal diam difference	0,00 mm
rag a column header here to group	by that column			
Name of series TC5				
TC5		_		
TC5		_		
TC5				
rC5				
rC5				
rC5				

**Buttons:** 



edit limiting value for selected series;

exit;

# 13.6. 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 (see par. <u>23</u>). 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**:

Reference profile	
)rag a column header here to group by that column	
Code of the profile	Name of the profile
Loco_33	Loco_33
2001_7871	2001_7871
2001_7873	2001_7873
2001_7874	2001_7874
2001_7875	2001_7875
2001_7876	2001_7876
2001_7877	2001_7877
2105	2105
2107	2107
9186	9186
9187	9187
9188	9188
H4 → ► H4	≠1 <b>‡</b> 1 Exit

Buttons:



import of reference profile from \*.ref file;



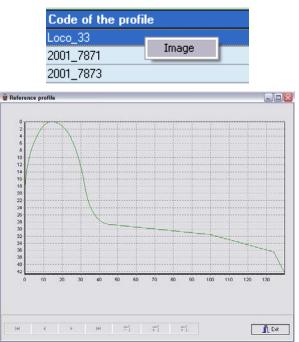
#1 #1

export of reference profile into \*.ref file;

- delete re

delete reference profile;

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



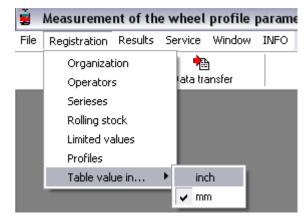
### 13.6.1. Request and registration of the reference profile file

To get **.ref**-file of reference profile send the drawing of profile to **RIFTEK** (<u>info@riftek.com</u>). Register received **.ref**-file:

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

# 13.7. Selection of measurement units

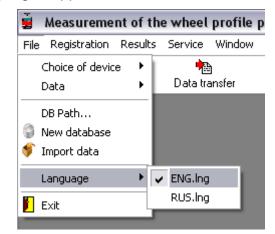
All parameters as well as measurement results can be presented in the metric system (millimeters) or in the English system of units (inches). To set measurement units, it is necessary to **select Registration > Values in... > mm** or **inch** in the main menu window. Upon the next program starting, information will be presented in the selected measurement units.





# 13.8. 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

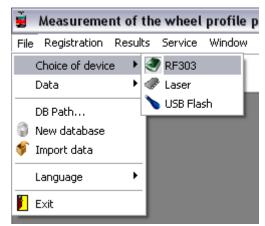
There are two possible methods of data exchange between PDA and PC:

- by means of direct cable connection of PDA to PC USB-port (special RF505.42 cable is supplied)
- through flash memory card.

### 14.1. Data exchange through cable

To use cable exchange, it is necessary to:

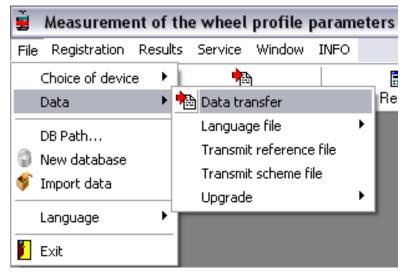
- activate PDA
- connect cable between PDA and PC (note: Microsoft Activesync must be installed on PC as shown in par. <u>12.2</u>)
- select data exchange device by executing File > Device selection > select either RF303.



#### 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



• mark 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

Measurement	of the wheel profile paran	neters	
File Registration Re	esults Service Window INFO		
Choice of device	• 🛉 🐂		<u>ko</u> r
Data	🔸 🚵 Data transfer	Results	Profiles
DB Path ③ New database ళ Import data	Language file Transmit reference file Transmit scheme file Upgrade	Transmit Langua     Get Language fil	-
Language		_	

• select required file



Canguage Canguage Canguage Canguage Canguage	
I ENG.ing	
File Name Tilng	
FileType LNG files (*.Ing)	

• if transfer is successful, the screen will show:



# 14.1.3. Transfer of language file from PDA to PC

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

• select File > Data > Resource file > Receive resource file

ž	Measureme	nt of t	he wheel profile parar	net	ters	
File	Registration	Result	s Service Window INFC			
	Choice of device	e ▶_	•			<u>ko</u> r
	Data	•	🔁 Data transfer		Results	Profiles
	DB Path		Language file	≯	🎯 Transmit Language	e file
10	New database		Transmit reference file		🕗 Get Language file	
	Import data		Transmit scheme file			
	-		Upgrade	•		
	Language				-	
	Exit					

• select required file

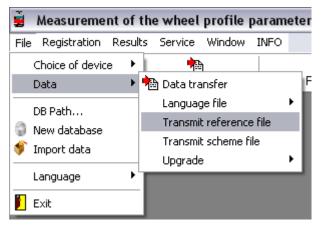


• if transfer is successful, the screen will show:



# 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



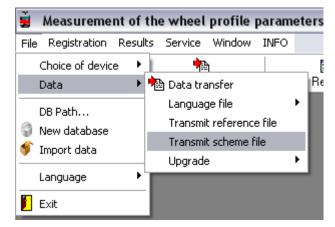
- select required file with extension .ref
- if transfer is successful, the screen will show the following message:



# 14.1.5. Transfer of processing scheme file from PC to PDA

To transfer processing scheme file from PC to PDAS, it is necessary to:

select File > Data > Transfer scheme file



- select required file with extension .sch
- if transfer is successful, the screen will show:

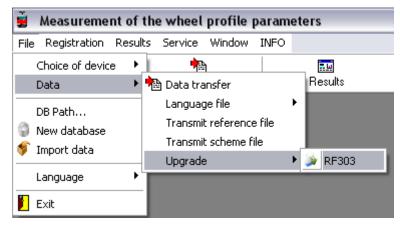




# 14.1.6. Updating of PDA software

The updated software version can be downloaded from ther site <u>www.riftek.com</u>. To transfer the update file to PDA, it is necessary to:

• select File > Update > RF303



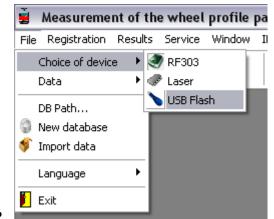
- select file for transfer
- if transfer is successful, the screen will show:



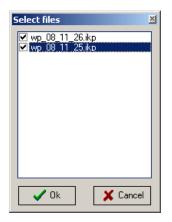
# 14.2. Data transfer by means of flash memory card

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 > USB Flash



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



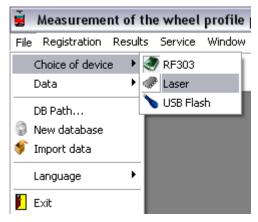
# 15. Taking measurements under PC control (without PDA)

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

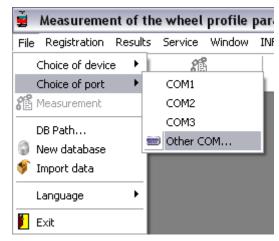
# 15.1. Preparation for taking measurements

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

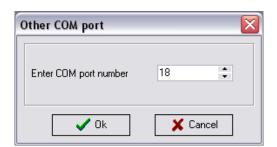
- install Bluetooth-connection between the scanning module and PC. The procedure is described in par. <u>19</u>.
- select File > Device selection > Profilometer in the main window menu



• select required port (see par. 19)



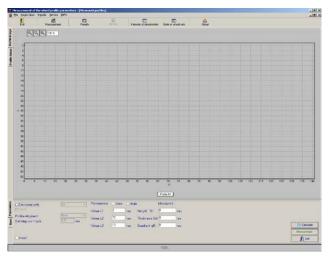
• click **OK** for connection



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

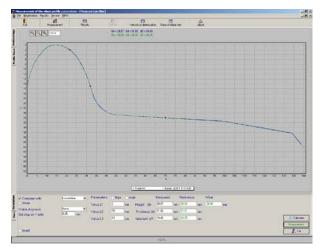
🧯 Measureme	nt of the	e wheel	profile	pä	ž	Measureme	nt of th	e wheel	profi
<u>File R</u> egistration	R <u>e</u> sults	<u>S</u> ervice	<u>W</u> indow	j	Eile	<u>R</u> egistration	R <u>e</u> sults	<u>S</u> ervice	<u>W</u> indo
) Exit		Measur				) Exit		Measur	

 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 <u>Measurement</u>. button. Measurement being completed, the screen will show graphic image of the wheel profile and calculated profile parameters.



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• the procedures of work with obtained data (Value and Parameters tabs) are described below.

button

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

Parameters		E	Enter parameters	3			
Para	Organization	Name 🔻	Worker	1900-Ivanov 🔻	Side	L	
Save	Measurement date	02.12.2009	Series	CH3 💌	Axle	1	Save profile
_	Wheeled set	0000008034	Locomotive	2004 💌	Run	1000000	Measurement
							L Exit

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

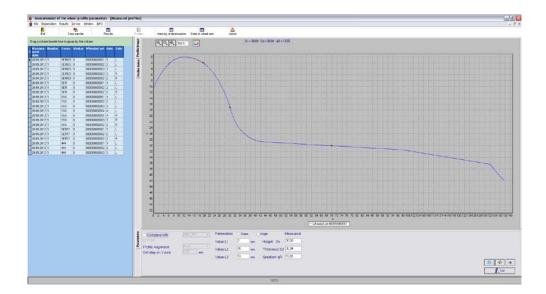
Parameter	rs of wheel													
Organiza	tion					Locomotiv								
Name		Nam	e .			Series	6	CH3						
Worker		-	1900			Number	14		2084					
Number		_	1900						1004					
Surname		lvan	0¥			Measuremen	t date	02.12.09						
Drag a column	header her	e to ge	oup by that o	olumn										~
Measurem ent date	Wheeled	set	Number	Series	Axle	Worker	Run	Thickness [lett]	Thickness (right)	Height [left]	Height (right)	Gradient (left)	Gradient (right)	Diame (left)
02122009	000000008	134												
			200	4 CH3	0	190	).	0 31,94		28	95	10,4	45	
				1 CH3	0	190		0 31.34		23	95	10,4	45	
				( 0+3	0			0 31.34		23	95	10,4		Dustomize

### 16. Working with profilograms and wear calculations

#### 16.1. Profiles lookup

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

files

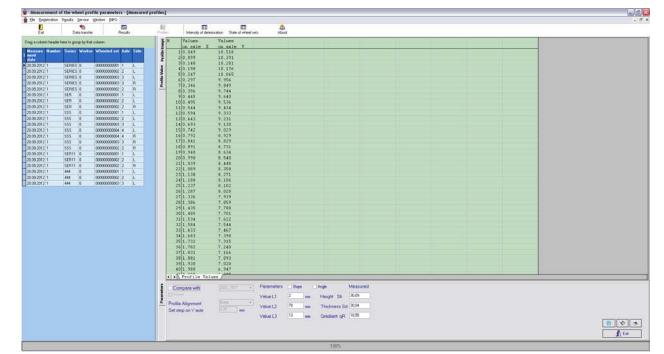




#### Select the required wheel pair from the table offered.

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-parameters.



By default, only the height (**Sh**), thickness (**Sd**) and steepness (**qR**) of selected profile are calculated. If necessary, values of **Slope** and profile inclination **Angle** can be obtained. To do so, put a "tick" on the field **Slope** and **Angle** respectively.

ters	Compare with	2001_7871	Ψ.	Parameters	<ul> <li>Slope</li> </ul>	<b>v</b> 4	Angle	Measured
Parameters	🗆 Wear			Value L1	2	mm	Height Sh	30,09
Pa	Profile Alignment	None	Ŧ	Value L2	70	mm	Thickness Sd	30,04
	Set step on Y axle	0,25 mm		Value L3	13	mm	Gradient qR	10,55
				Value L4	70	mm	Slope1	5,0
				Value L5	105	mm	Slope2	14,3
				Value L6	10	mm	Angle	67,1

To recalculate values of flange parameters for other L-parameters, it is necessary to change values of L-parameters 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.

To compare two arbitrarily chosen profiles to each other (for example, profiles of left and right wheels), it is necessary to select **Measured** in the pullout list instead of the reference profile. In the case where measured profile is chosen as comparison profile, the **Profiles** tab shows additional table for selection of comparison profile out of a number of measured profiles. Then, select profile from the additional table.

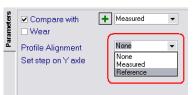
	Measure	Number	Series	Worker	Wheeled set	Axle	Side
	ment date						
	20.09.2012	1	SERIES	0	000000000001	1	L
	20.09.2012		SERIES		000000000002		L
	20.09.2012		SERIES		000000000003		L
	20.09.2012		SERIES		000000000003		B
	20.09.2012		SERIES		000000000002		B
	20.09.2012		SER	0	0000000000000	1	L
	20.09.2012		SER	0	000000000002		L
	> 20.09.2012		SER	0	000000000002		B
	20.09.2012		SSS	0	000000000001	******	L
	20.03.2012		SSS	0	0000000000002		L
	20.03.2012		SSS	0	000000000000		L
	20.03.2012		SSS	0	0000000000000		L
	20.09.2012		SSS	0	000000000004		B
	20.09.2012		SSS	0	00000000000		R
	20.09.2012		SSS	0	000000000000000000000000000000000000000		B
				0		2	L
	20.09.2012		SER11		000000000000		
	20.09.2012		SER11	0	00000000002		L
	20.09.2012		SER11	0	00000000002		R
	20.09.2012		444	0	000000000001	1	L
	20.09.2012 20.09.2012 Drag a colum	1	444 444 ere to grou	0 0 up by that (	00000000000000000000000000000000000000		L
	20.09.2012 Drag a colum Measure	1	444	0	000000000003		
	20.09.2012 Drag a colum	1 In header h	444 ere to grou	0 up by that (	0000000000003	3	L
	20.09.2012 Drag a colum Measure ment	1 In header he Number	444 ere to grou	0 up by that o Worker	00000000003 column Wheeled set	3	L
	20.09.2012 Drag a colum Measure ment date	1 In header h Number 1	444 ere to grou Series	0 up by that o Worker 0	00000000003 column Wheeled set	3 Axle 1	L
	20.09.2012 Drag a colum Measure ment date 20.09.2012	1 In header he Number 1 1	444 Series SERIES	0 up by that o Worker 0 0	00000000003 column Wheeled set 000000000001	3 Axle 1 2	L Side L
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	20.09.2012           Drag a colum           Measure ment date           20.09.2012	1 Number 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	444 Series SERIES SERIES SERIES SERIES SER SER SER SER SER SER SER SER SER S	0 up by that of Worker 0 0 0 0 0 0 0 0 0 0 0 0 0	00000000000000000000000000000000000000	3 Axle 1 2 3 3 2 2 1 2 2 1 2 2 1 2 3 4	L Side L L R R L L R L L L L
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	20.09.2012           Drag a colum           date           20.09.2012	1 Number Number 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	444 Series grou SERIES SERIES SERIES SERIES SERIES SERIES SERIES SER SER SER SSS SSS SSS SSS SSS SSS S	0 worker 0 0 0 0 0 0 0 0 0 0 0 0 0	2000000000     20	3 Axle 1 2 3 3 2 1 2 2 1 2 2 1 2 2 1 2 2 3 4 4 4 3 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 1 2 2 3 3 2 2 1 1 2 2 3 3 2 2 1 1 2 2 3 3 3 2 2 2 1 1 2 2 3 3 2 2 2 1 1 2 2 3 3 2 2 2 1 1 2 2 3 3 2 2 2 1 1 2 2 3 3 2 2 2 1 1 2 2 3 3 2 2 2 1 1 2 2 3 3 2 2 2 1 1 2 2 3 3 2 2 2 1 1 2 2 3 3 2 2 2 1 1 2 2 3 3 2 2 2 1 1 2 2 3 3 2 2 2 2	Side L L L R R R L L L L L L L L L L L L L
	20.09.2012 Drag a colum date 20.09.2012 20.09.201	1 Number Number 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	444 Series SERIES SERIES SERIES SERIES SER SER SER SER SSS SSS SSS SSS SSS S	0 worker 0 0 0 0 0 0 0 0 0 0 0 0 0	control c	3 Axle 1 2 3 3 2 1 2 2 1 2 3 4 4 3 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 3 3 2 2 1 2 2 3 3 2 2 1 2 2 3 3 2 2 1 2 2 3 3 2 2 1 2 2 3 3 2 2 1 2 2 3 3 2 2 1 2 2 3 3 2 2 1 2 2 3 3 2 2 1 2 2 3 3 2 2 1 1 2 2 3 3 2 2 1 1 2 2 3 3 2 2 1 1 2 2 3 3 2 2 1 1 2 2 3 3 2 2 1 1 2 2 3 3 2 2 1 1 2 2 3 3 2 2 1 1 2 2 3 3 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 2 1 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2	Side L L L R R L L L L L L L L L L L L L L

#### 16.3.2. Superposition of profiles and rescaling

UIC/ORI Valok1

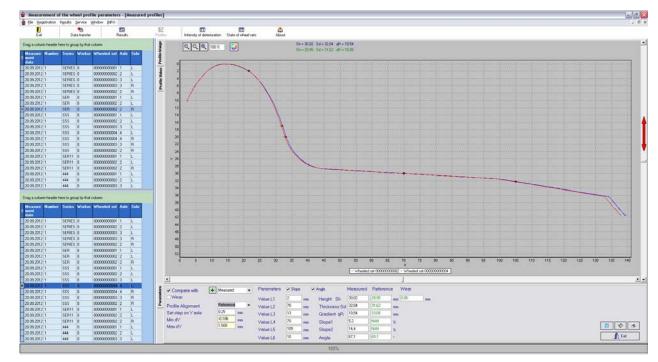
Measure

To superimpose profiles (by vertical translation), select profile to be translated in the **Matching** window: **Reference** or **Measured**.

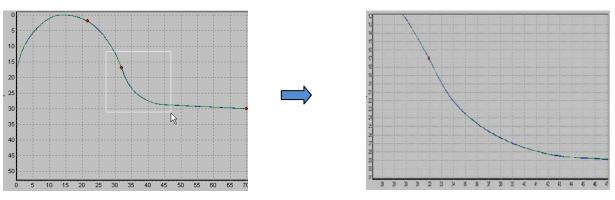


Set the vertical translation step in the **Set step along Y axis** window. By pressing the left mouse key drag the profile to required value on the scrolling bar.





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** - .



#### 16.4. Wear calculation

To calculate wear, select the **Parameters** and **Value** tabs, select reference profile and set the calculation step, if necessary. The table will show deviation of coordinates of the selected profile from those of the reference profile in two directions (X and Y).



End Data transfer Results	EC Intercity of	aterioration State of who	4	a.								
and a second												
ag a column header here to group by that column	N Values on axle 1	Values on sale V	Vear on axle X	Vear on axle V								
leasure Number Series Worker Wheeled ant Asle Side	\$ 12,110	10,500	-0.036	-0.092								
	2 2,360	9,942	-0,039	-0,082								
09.2012 1 SERIES 0 00000000001 1 L	3 2,610	9,403	-0.020	-0.039								
0.09.2012 1 SERIES 0 00000000002 2 L	4 2,860	8,905	0.000	0.001								
09 2012 1 SERIES 0 0000000000 0 L	5 3,110	8,436	-0.003	-0.006								
092012 1 SERIES 0 0000000000 3 R		8,005	-0.025	-0,045								
0.09.2012 1 SERIES 0 0000000002 2 R	£ 73,610	7,605	-0.036	-0.056								
0.09.2012 1 SER 0 00000000001 1 L	8 3,860 9 4,110	7,208	-0.021	-0,032								
0.09.2012 1 SER 0 0000000002 2 L	10 4,360	6,024	-0.019 -0.041	-0,028								
00920121 SER 0 00000000022 R	11 4,610	6.157	-0.057	-0.077								
0.09.2012 1 SSS 0 00000000000 1 L	12 4,860	5,010	-0.043	-0.054								
09.2012 1 SSS 0 0000000002 2 L	13 5.110	5.465	-0.012	-0.014								
0.09.2012 1 SSS 0 00000000003 3 L	14 5.360	5.142	0.010	0.012								
0.09.2012 1 SSS 0 00000000004 4 L	15 5.610	4.857	-0.009	-0.010								
0.09.2012 1 555 0 00000000004 4 R	16 5.860	4,587	-0.033	-0.039								
0.09.2012 1 555 0 00000000000 3 R	17 6.110	4,306	-0.029	-0.031								
0.09.2012 1 SSS 0 0000000002 2 R	18 6, 360	4.025	-0.010	-0.011								
0.09.2012 1 SER11 0 00000000001 1 L	19 5, 610	3,752	0.007	0,007								
0.09.2012 1 SER11 0 0000000002 2 L	20 6.860	3,495	0.014	0.013								
0.09.2012 1 SER11 0 0000000002 2 R	21 7, 110	3,259	0,005	0.005								
0.09.2012 1 444 0 000000000001 1 L	22 7.360 23 7.610	3.028	-0.010 -0.029	-0.010 -0.029								
0.09.2012 1 444 0 00000000002 2 L	24 7,860	2,548	-0.032	-0.029								
0.09.2012 1 444 0 00000000003 3 L	25 0,110	2,290	-0,002	-0,002								
	26 8, 360	2,066	0,015	0.013								
ig a column header here to group by that column	27 8.610	1.857	0.012	0.010								
leasure Number Series Worker Wheeled set Asle Side	28 8,860	1.677	-0.006	-0.005								
ent Me	29 9,110	1.524	-0.031	-0,020								
	30 9.360	1,378	-0.048	-0.029								
0.09.2012 1 SERIES 0 00000000000 1 L	31 9,610	1,230	-0.058	-0,035								
0.09.2012 1 SERIES 0 0000000002 2 L	32 9,060	1,006	-0.068	-0,040								
0.09.2012 1 SERIES 0 00000000003 3 L	33 10, 110	0,953	-0.092	-0.042								
0.09.2012 1 SERIES 0 00000000000 3 R	34 10,360	0,831	-0,080	-0.036								
0.09.2012 1 SERIES 0 0000000002 2 R	35 10.610	0,720	-0.076	-0.033								
0.09.2012 1 SER 0 00000000001 1 L	36 10,060 37 11,110	0,619 0,526	-0.096	-0.041								
0.09.2012 1 SEA 0 0000000002 2 L	38 11, 360	0.430	-0,131	-0,054								
1.09.2012 1 SER 0 0000000002 2 R	39 11.610	0,354	-0,101	-0,057								
209.2012 1 \$\$\$ 0 00000000001 1 L	40 11,860	0.289	-0.225	-0.064								
0.09.2012 1 \$\$\$ 0 0000000000 2 L		alues Profile		A 484			_					
0920121 SSS 0 000000000033L	Profile V	aines A Profile	veor /									
10820121 SES 0 0000000004 4 L	Compare with	+ Measured	· Parameters	V Skoe V	Angle Measure	d Reference	Webr					
0.09.2012 1 SSS 0 000000000064 4 Pi 0.09.2012 1 SSS 0 000000000000 3 Pi	Wear	C. Prototo										
	- Wodr		Value L1	2 88	Height Sh 30.02		0.06	R.C.				
	Profile Alignment	None	<ul> <li>Value L2</li> </ul>	70	Thickness Sd 32.04	31,62	n					
0.09.2012 1 SER11 0 00000000001 1 L	Set step on Y ade	0.25 mm				10.00						
	Constraint on Users			(an 1000)								
				and the second se	Choper	- Contraction (1)						8
			Value L5	105 mm	Slope2 14.4	NAN %						
			Value 16	10	Angle 67,1	69.7 -						In the
0.08.2012 1         SEP11 0         000000000001 1           0.09.2012 1         SEP11 0         000000000002 2           0.09.2012 1         SEP11 0         000000000002 2           0.09.2012 1         SEP11 0         000000000002 2           0.09.2012 1         444 0         000000000002 2           0.09.2012 1         444 0         00000000000 2           0.09.2012 1         444 0         00000000000 3	L R L L	L Set step on Y exte R L L	L Set step on Y code 0.25 mm R L L	L Set step on Y ade 0.5 mm Value L3 R Value L4	L Set step on Yaole 0.25 mm Value L3 13 mm A L Value L4 70 mm Value L5 105 mm	Satisfies on Y axie         0.25         nm         Value 1,3         11         nm         Gradient gA         164           Value 1,4         70         nm         Stope1         52         Value 1,4         70         nm         Stope1         52           Value 1,5         105         nm         Stope2         144	No.         Set Map on Y wells         0.25         min         Value L3         13         min         Gradient dipi         10.54         10.04           Value L4         Pit         min         Stope 1         22         Min         10.04	No.         Satisfies on Y adv         0.25         mm         Value 3         1         mm         Candidati dgl, 10.44         10.09         mm           Value 14         70         mm         Stopp 1         5.24         5.44         10.09         mm         10.04         10.09         10.04         10.09         10.04         10.04         10.04         10.04         10.04         10.04         10.04         10.04         10.04         10.04         10.04         10.04         10.04         10.04         10.04         10.04         10.04         10.04         10.04         <	No.         Set trilip on Y adult         0.25         mn         Value L3         13         mn         Gradiant git         0.45         0.00         mn           No.         Value L4         05         mm         Stoppe 1         52         Mix         1           No.         Value L5         05         mm         Stoppe 1         52         Mix         1	No.         Satisfies on Y adve         0.25         en         Value 13         13         mon         Gradient op         0.34         11.00         mon           No.         Value 14         70         mon         Stoppe1         52         Mon         14           No.         Value 15         050         mon         Stoppe1         14.4         Mon         1	No.         Satisfies on Y adv         0.25         mm         Value (3         1         mm         Candidati dgl, 10.44         10.06         mm           No.         No.	No.         Satisfies on Y adv         0.25         mm         Value (3         1         mm         Candidati dgl,         10.26         mm         Value (3         10.26         10.26         10.26         mm         No.         n         Value (3         10.26         mm         No.         n         Value (3         10.26         mm         No.         n         Value (3         No.         n         Value (3         No.         n         Value (3         No.         n         Value (3         No.         n         No.         n

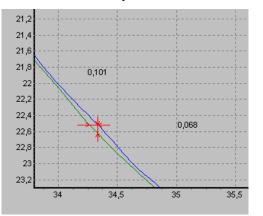
To save the table in the **Exel-format**, it is necessary to:

- click the right mouse key in the table values section;
- select File > Write in the emerging window;
- type the file name, select Excel 5 (\*.xls) and save.

Form	ıla One	Workboo	ok Design	er			_	
e Edit	View	Data Sh	neet Forr	nat Object	Help			
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		Ctrl+S						
Print		Ctrl+P	Valu	es	Vear	ŭ	lear	
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Print Se	etup		13,9	68	0,120	-	0,240	
1	1,119		12,9	51	0,048	-	0,080	
2	1,369		12,1	12	-0,024	C	1,034	
3	1,619		11,5	05	0,019	-	0,022	
4	1,869		10,9	84	0,086	-	0,092	
5	2,119		10,4	19	0,067	-	0,078	
6	2,369		9,80	6	0,015	-	0,016	-
I I I	Profil	le Valu	$les \wedge P$	rof <mark>il</mark> e Ve	ar / I			
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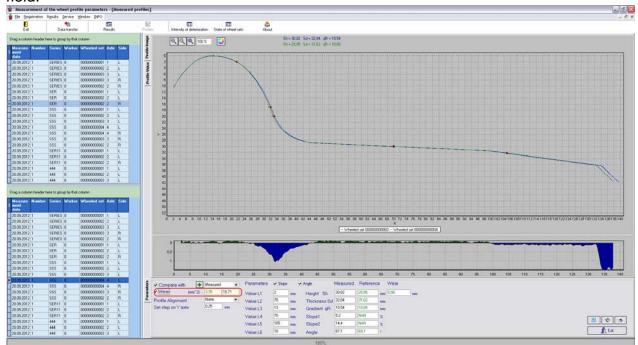
To obtain fast calculation of the profile wear at a certain point, put cursor bar to any of the profiles, and when a cross-like (+) mouse cursor appears press the left mouse key. The resulting screen will show the value of the co-ordinate difference between profiles taken along X- and Y-axes, as shown by arrows:



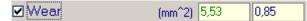


To remove size indication from the screen, it is necessary to put cursor to any of the profiles and press the right mouse key.

To obtain graphic presentation of wear, it is necessary to put a "tick" to the **Wear** field.



Value of the wear area is calculated in square millimeters with respect to selected reference profile:



#### 16.5. Calculation of wear intensity

The program allows automatic formation of the table of wheel sets wear intensity values. Two calculation options are available:

- in millimeters for 100000 km of wheel sets running distance
- To perform calculation, the database must contain values of wheel pair running distance. Measurements made on the latest date and the closest date previous to it are automatically taken from the database. The wear value in millimeters is given for (reduced to) the 1000000 km running distance.
- in millimeters over 1 year of wheel sets use
- Measurements made on the latest date and the closest date previous to it are automatically taken from the database. The wear value in millimeters is given for (reduced to) the period of 1 year.

Measurem

Wheeled set

Number

Series

Axle

Worker

• To form the table, select **Service > Wear intensity** in the main menu of the program. Select options: **mm/100000 km** or **mm/year** 



	Thickness (left)		Height (left)		Gradient (left)	Gradient (right)	Diam (left)
	31,90	31,93	30,00	30,04	10,30	10,32	
Parameters	31,86	31,84	30,20	30,14	9,20	9,34	
	Thickness (left)	Thickness (right)	Height (lef	t) Height (right)	Gradient (left)	Gradien (right)	ıt
Wear intensity	0,116	0,26	1 0,5	79 0,	,29 3	,187	2,839

43

In calculation, it is possible to average wheel sets wear values over all locomotives of a given series. To achieve this, put a "tick" in the **Average over series** field.

Procedures of navigation over the table, filtration and sorting are described in par. 17. Procedures of generation and printing of reports are given in par. 18.

#### 16.6. Calculation of percentage wear

The program allows automatic formation of tables showing percentage wear of wheel sets.

The percentage wear is calculated as follows:

Wear =  $(H - T)/(H - \Pi)$ \*100%, where H is the nominal parameter value (parameter value for reference profile), T is the current parameter value on the measurement date,  $\Pi$  is the limiting parameter value (in accordance with the table of limiting wear values, see par. <u>13.5.</u>).

To generate the table, select **Service > % wear** in the main program menu.

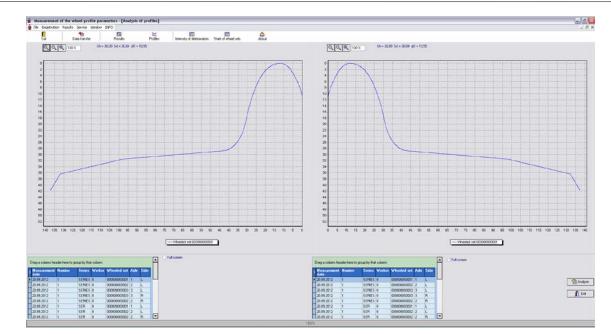
Exit		hata transfer		nesults		<b>™</b> Profiles		f deterioration	Etate of whe	eel sets	🖧 About		
Organiza	ation			L	ocomotiv	e							
Vame	na	ne		Se	eries	SM	3						
<b>∀orker</b> Number		1900		N	umber			7102					
Surname	lva	nov		M	easurement	date 07	.10.09						
-	header here to Wheeled set		olumn Series	Axle	Worker	Run	Thickness (left)	Thickness (right)	Height (left)	Height (right)	Gradient (left)	Gradient (right)	Dia (lei
07.10.2009	000000000111	7102	SM3	11	1900	1111	30,88	30,89	30,24	30,22	10,64	10,61	-
07.10.2009	000000000112	7102	SM3	12	1901	1112	30,90	0,00	30,22	0,00	10,62	0,00	
14.10.2009	000000000111	7102	SM3	11	1903	1111	31,93	0,00	29,99	0,00	10,39	0,00	

In calculation, it is possible to average wheel sets wear values over all locomotives of a given series. To achieve this, put a "tick" in the **Average over series** field.

Procedures of navigation over the table, filtration and sorting are described in par. 17. Procedures of generation and printing of reports are given in par. 18.

#### 16.7. Implementation of minimum wheel truing function

The program allows automatic selection of that wheel profile from the reference profile base for which the total truing depth will be minimal. To choose the required profile, select **Service > Profiles analysis** in the main program menu.



Select right and left wheel of wheel pair at the bottom part of the tables. The windows above the tables will offer optimal profile type.

To know the wheel cutting depth in a certain point, put the cursor to any profile, and when a cross-like (+) mouse cursor appears press the left mouse key. The resulting screen will show the value of difference between profiles along X- and Y-axes, as shown by arrows. To remove size indication from the screen, put cursor to any of the profiles and press the right mouse key.

### 17. Scanning and editing of data

#### 17.1. Scanning and filtering of data

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

Annu ber         Number         Image         Source of the state of the	Cal         Detailed         Partice         Partice         Safe of details of deta		istration Results	Service Wr	dow 1000	and the second	contract.											
Anne         Series         States           Anne         Name         States           States         States         States           States         States         States         States         States           States         <	Sense         Sense <th< th=""><th>Est</th><th></th><th></th><th>n</th><th><b>1</b></th><th>br. Proties</th><th>inter</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></th<>	Est			n	<b>1</b>	br. Proties	inter										
Anne         Series         States           Anne         Name         States           States         States         States           States         States         States         States         States           States         <	Sense         Sense <th< td=""><td>Organiz</td><td>ation</td><td></td><td></td><td>Locom</td><td>otive</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	Organiz	ation			Locom	otive											
Annumber         Number         I           ber         Number         1           Additional state         State         20 0 12	Image: second	lame	- 11 - C		1			SERIES										
ber         Name	Description         Faired         Material         20 to 12           de labeletie to yee, by the class:         2 00 12         <	Norker	8		-				_									
ame Vessuement des 20.01.2 solarmination here Is pora la far d'alla vesse des la construcción de la constru	Automation         Automat		0	-		Nomber		1										
Balancia         Number         Series         Auto         Virola         Part         Ref.org         Series         Series         Auto         Virola         Part         Ref.org         Series	Line         Control         Directed per la biol         Directed per la biol <thd< td=""><td></td><td></td><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></thd<>			1														
Schwarz         Marker         Saine         Auk         Weichen         The form         Beland         House         Forder         Forder         Spinder         Spinder </td <td>Inductional Mandame         Service A         Name         Value A         Name         Nam         <th< td=""><td>Sumame</td><td>1</td><td></td><td></td><td>Measure</td><td>mont date.</td><td>20.09.12</td><td>- 12</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<></td>	Inductional Mandame         Service A         Name         Value A         Name         Nam <th< td=""><td>Sumame</td><td>1</td><td></td><td></td><td>Measure</td><td>mont date.</td><td>20.09.12</td><td>- 12</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	Sumame	1			Measure	mont date.	20.09.12	- 12									
Adm         Party         P	0         000000000000000000000000000000000000	ALCON THE SECOND	A CONTRACTOR OF A	141 C 2 C 1 C 1 C C	1590-						In the second second							
3/372         000000000000000000000000000000000000	12         SERVES         2         0         0         37.8         77.8         77.9 <td>ent date</td> <td></td> <td></td> <td></td> <td>Aute</td> <td>Worker</td> <td>Run</td> <td></td> <td></td> <td></td> <td></td> <td>(left)</td> <td>(right)</td> <td>lett)</td> <td>(nght)</td> <td>of type (left)</td> <td>Thickness of type [right]</td>	ent date				Aute	Worker	Run					(left)	(right)	lett)	(nght)	of type (left)	Thickness of type [right]
3.212         0.00000000000000000000000000000000000	22         000000000000000000000000000000000000																	
2021         2000000000000000000000000000000000000	D2         DOMODIDIONI         SEPA         I         0         0         71,91         27,000         100,02         10,22         10,20         0,00																	
3/212         2000000000000000000000000000000000000	22         000000000000000000000000000000000000																	
2021         2000000000000000000000000000000000000	D2         DOMODIDIONE         1         555         1         0         0         73.92         22.95         10.20         0.00         0.00           D2         DOMODIDIONE         1         55         2         6         0         73.92         73.92         29.56         29.56         10.20         10.20         0.00					1		-										
9.2012         000000000000000000000000000000000000	D2         D000000000000000000000000000000000000					1		-										
B/D12         D000000000000000000000000000000000000	D2         D000000000 1         1555         3         0         0         31.86         21.95         12.95 <td></td> <td></td> <td></td> <td></td> <td>2</td> <td>8</td> <td></td>					2	8											
D272         D000000000         1         SDR1         1         0         0         71.54         22.93         10.19         0.00         0.00           D022         D000000000         1         SH1         2         0         0         71.54         25.03         10.20         10.20         0.00         0.00         0.00         6.00 <td>D2         ODMODMENT         STATIT         1         0         0         37.54         27.82         10.12         0.01         0.00           D2         DOMODMENT         STATIT         2         0         0         37.54         27.84         25.95         25</td> <td>20 09 2012</td> <td>00000000003</td> <td>1</td> <td>555</td> <td></td> <td></td> <td></td> <td></td> <td>1,96 31,9</td> <td>4 29,5</td> <td>36 29,95</td> <td>10.24</td> <td>10,24</td> <td>0.00</td> <td>0.00</td> <td>0.00</td> <td>0.00</td>	D2         ODMODMENT         STATIT         1         0         0         37.54         27.82         10.12         0.01         0.00           D2         DOMODMENT         STATIT         2         0         0         37.54         27.84         25.95         25	20 09 2012	00000000003	1	555					1,96 31,9	4 29,5	36 29,95	10.24	10,24	0.00	0.00	0.00	0.00
8.2012 0000000000000000000000000000000000	12         000000000000000000000000000000000000																	
8/20/2 (00000000001 1 444 1 0 0 31/32 3001 10.37 0.00 0.00 H/20/2 (0000000002 1 444 2 0 0 31/89 3001 10.34 0.00 0.00	N2         0000000000         1         444         1         0         0         31.32         30.01         10.37         0.00         0.00           N2         000000000000000000000000000000000000					1		-										
19.2912 00000000002 1 444 2 0 0 31.89 30.01 10.34 0.00 0.00	712 00000000002 1 444 2 0 0 31.89 30.01 10.34 0.00 0.00							-										
						2		-										
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ми	• • • • • <del>•</del> • • • • • • • • • • • • •	100	94 Q			1 =1	-1 *	. 3)	2			Wex						

• Navigation over the table



Number

2001

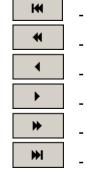
5

5

7102 7102

7102

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:

:	Measurem ent date	Wheeled set	Number		iiii	Measurem ent date	Wheele d set  △	Ŧ
Γ	01.01.2008	000000000000	2001			01.01.2008	000000000000	1
Γ	01.01.2008	000000000002	5			01.01.2008	00000000000	2
▶	01.01.2008	000000000003	5		Þ	01.01.2008	00000000000	3
Γ	01.01.2008	000000000004	5	v		01.01.2008	00000000000	4
Γ	07.10.2009	0000SU000111	7102			07.10.2009	0000SU00011	11
	07.10.2009	0000SU000112	7102			14.10.2009	0000SU00011	1
Г	14.10.2009	0000SU000111	7102			07.10.2009	0000SU00011	12

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:

≣ <mark>Measur</mark> ement ▼ date	Series	Wheeled set		:	Measurem ent date	Series	Wheeled set
(All)	СНЗ	000000000000	[	۲	07.10.2009	SM3	0000SU000111
	155	000000000002			07.10.2009	SM3	0000SU000112
01.01.2008		00000000003					
07.10.2009	100	00000000004	1				
14.10.2009	SM3	0000SU000111	1				
07.10.2009	SM3	0000SU000112					
14.10.2009	SM3	0000SU000111					

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:



_	-			_			-		
	ን Drag a columr ♪	n header here to g			Series 🛛 🛆				
ij	Measurem ent date	Wheeled set	Number	Series	Axic		:	Measurem ent date	Wheele
	01.01.2008	000000000001	2001	СНЗ	1				
	01.01.2008	000000000002	5	155	2			🖃 Series : 1	55
	01.01.2008	000000000003	5	155	3			01.01.2008	0000000
	01.01.2008	000000000004	5	155	4		►	01.01.2008	0000000
	07.10.2009	0000SU000111	7102	SM3	11	Ī		01.01.2008	0000000
	07.10.2009	0000SU000112	7102	SM3	12	Ī			
	14.10.2009	0000SU000111	7102	SM3	11	1		🕒 Series : C	:НЗ

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:

	Series V (All) (Custom) 155	
	CH3 SM3 A3	
•	<ul> <li>Series : CH3</li> <li>Series : 155</li> </ul>	

Measurem ent date	'heeled set	Numbe
+ Series:(		1

#### • 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:

Measurem ent date	Series	Wheeled set	Measurem ent date	Wheeled set	Number
01.01.2008	СНЗ	000000000001	01.01.2008	000000000000000001	20
01.01.2008	155	00000000002	01.01.2008	000000000002	
01.01.2008	155	00000000003	01.01.2008	000000000003	
01.01.2008	155	000000000004	01.01.2008	00000000000004	
07.10.2009	SM3	0000SU000111	07.10.2009	0000SU000111	71
07.10.2009	SM3	0000SU000112	07.10.2009	00005U000112	71
14.10.2009	SM3	0000SU000111	14.10.2009	0000SU000111	71
	Series			1	

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.



Measurem Series ≣ ent date	Wheeled set	Number	Axle
Click here to show/hid	e/move columns	2001	1
▼ Jenes ✓ Wheeled set	00000000002	5	2
✓ Writeeled set ✓ Number	00000000003	5	3
Section	000000000004	5	4
I Axle Worker	0000SU000111	7102	11
🗹 Run	0000SU000112	7102	12
✓ Thickness (left)	0000SU000111	columns         2001         1           0000002         5         2           0000003         5         3           0000004         5         4           0000111         7102         11           0000112         7102         12	
<ul> <li>Thickness (right)</li> <li>Height (left)</li> <li>Height (right)</li> <li>Gradient (left)</li> <li>Gradient (right)</li> <li>Diameter (left)</li> <li>Diameter (right)</li> <li>Thickness of tyre (left)</li> <li>Thickness of tyre (right)</li> </ul>			

#### • 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:

[	Drag a column header here to group by that co									
iiii	Measurem ent date	Wheeled set	Series							
	01.01.2008	ODCERSION F	СНЗ							
	01.01.2008	00000000002	155							
	01.01.2008	00000000003	155							
۲	01.01.2008	000000000004	155							
	07.10.2009	0000SU000111	SM3							
	07.10.2009	0000SU000112	SM3							
	14.10.2009	0000SU000111	SM3							

	[	Drag a column hea	ader here to gr	oup by that co
		Wheeled set	Measurem ent date	Series
		000000000000	01.01.2008	CH3
		000000000002	01.01.2008	155
$\Rightarrow$		00000000003	01.01.2008	155
	Þ	000000000004	01.01.2008	155
		0000SU000111	07.10.2009	SM3
		0000SU000112	07.10.2009	SM3
		0000SU000111	14.10.2009	SM3

#### 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.

🚊 Edit Wheeled set				
Measurement date 01.01.2008	Wheeled			Axle
Number	00000000     Section	Worker	Run	
2001	▼	1900	▼ 3344	
Thickness	Height	Gradient	Diameter	Thick.of tyre
left 31,95	30,02	10,4	0,	0,
right 0,	0,	0,	0,	0,
		🖌 🗸 Sa	ive	🗙 Cancel



#### • Adding data

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

Edit W	heeled set			
Measure	ement date	Wheele	d set Series	Axle
02.12.2	009	▼	CH4	<b>-</b>
Number		Section	Worker	Run
2001		•	1900 👻	
left right	Thickness	Height	Gradient D	iameter Thick.of tyr
			Save	X Cancel

#### • Deleting data;

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

IKP5	×
1	You really want to delete given wheeled set?
	Отмена

#### • Deleting all selected data

If it is necessary to delete not only one entry but several entries combined by some con-

dition, 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. <u>17.4.</u>).

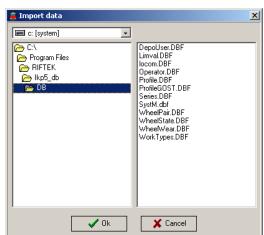
#### 17.4. Import of database

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 date mode according to par. <u>17</u>, 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:

Report	×
Report in Excel	
<ul> <li>Report on Printer</li> </ul>	
<ul> <li>Report in CSV</li> </ul>	
🗸 Ok	X Cancel

#### 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:

Стаенть	Cana como	nif • 8 • [•][[]] • [[]] Lilpurcht	Α΄ Α΄ • Δ · =	= = * = = :*			оместить в це		iupni)   - % 000   Marcon	• 76 49 oc	Условное	Форматиро • как табли	рать Стили цу * вчеек *	З <sup>со</sup> Вставить - З <sup>сь</sup> Удалить - Вормат - Ворілая		тировка Найт ильтр падел
A1	• (		Measurement	: date	pupan	onearone		- 201	числа	41		Crimi		Processor.	(10)	клирование
A	8	C	D	E	F	G	н	1	J	K	1	М	N	0	P	Q
Measurem ent date	Wheeled set	Number	Series	Axle	Worker	Run	Thickness (left)	Thicknes (right)	(left)	Height (right)	Gradient (left)	Gradient (right)	Diameter (left)	Diameter (right)	of tyre (left)	Thickness of tyre (right)
	100000000000	0	SERIES	0	D	1	0 31,9		30.		10.29		0.00		0.00	1
	00000000002	n i	SERIES	2	0		0 31.5								0.00	
	00000000000	0	SERIES	3	0	1	0 31,9								0.00	
	100000000000	0	SER	2	0		0 31.9		30.		10.35		0.00		0.00	
	20000000000	0	SER	2	D		0 31,9				02 10.32				0.00	
	1000000000000	0	\$\$\$	0	10	6	0 31.9		29.		10,20		0.00		0.00	
	20000000002	<u>p</u>	\$\$\$	2	D		0 31.9				96 10.20				0.00	
	100000000003	n	\$55	3	D		0 31.9 0 31.9				95 <sup>*</sup> 10.24 96 <sup>*</sup> 10.16					
	00000000004	n •	SSS SER11	4	0	-			29.		96 10.16		0.00		0,00	
	000000000000	5	SER11 SER11	0	0		0 31.9									
	000000000000000000000000000000000000000	5	SER11 444	14	10		0 31,9		n 23. 30		33 10.20		0.00		0.00	
	10000000000	5	7444	15	10	-	0 31.8		30		10.37		0.00		0.00	
	00000000000	5	744	5	10		0 31.9		30		10.34		0.00		0.00	
	port11			19		- K-	9 912		1 30		10,00		0.00		0.00	



### 18.2. Report for printout, Excel, RTF and text files

To prepare the report for printout, select **Report for printout** and press **OK**. Data will be presented in the form of report ready for printout. To start printing, press the **Printer** button.

Railv Depa	vay artment		Railway N Departme															
Nam	e	ľ	Vame															
					R	eport o	of value:	s of geo	metric	parame	ters of	wheel s	sets					
		Id	entificatio	n parameters	,					<u> </u>	arameter:					parame		
				n parameter.				Thic	kness	Height Gradient			lient	1	Diameter		Thickness	
Ne	Series	Number	Date	W.p. num	Axle	Section	Run	Left	Right	Left	Right	Left	Right	Left	Right	Diff.	Left	Right
1	SERIES	1	20.09.12	000000000000	1		0	31,92		30,02		10,29		0,00		0,00	0,00	
2	SERIES	1	20.09.12	00000000002	2		0	31,90	31,88	30,01	30,01	10,29	10,28	0,00	0,00	0,00	0,00	0,00
3	SERIES	1	20.09.12	000000000003	3		0	31,91	31,94	30,01	30,01	10,33	10,33	0,00	0,00	0,00	0,00	0,00
4	SER	1	20.09.12	000000000001	1		0	31,94		30,02		10,35		0,00		0,00	0,00	
5	SER	1	20.09.12	00000000002	2		0	31,91	31,88	30,02	30,02	10,32	10,30	0,00	0,00	0,00	0,00	0,00
6	SSS	1	20.09.12	000000000001	1		0	31,92		29,95		10,20		0,00		0,00	0,00	
7	SSS	1	20.09.12	000000000002	2		0	31,93	31,93	29,95	29,96	10,20	10,20	0,00	0,00	0,00	0,00	0,00
8	SSS	1	20.09.12	000000000003	3		0	31,96	31,94	29,96	29,95	10,24	10,24	0,00	0,00	0,00	0,00	0,00
9	SSS	1	20.09.12	000000000004	4		0	31,92	31,93	29,96	29,96	10,18	10,22	0,00	0,00	0,00	0,00	0,00
10	SER11 SER11	1	20.09.12 20.09.12	000000000000000000000000000000000000000	1 2		0	31,94 31,94	31.95	29,92	20.02	10,19 10,20	10.19	0,00	0.00	0,00	0,00	0.00
11 12	SER11 444	1	20.09.12	000000000000000000000000000000000000000	2		0	31,94	51,95	29,93	29,93	10,20	10,19	0,00	0,00	0,00	0,00	0,00
12	444	1	20.09.12	000000000000000000000000000000000000000	2		0	31,92		30,01 30,01		10,37		0,00		0,00	0,00	
13	444	1	20.09.12	0000000000002	3		0	31,89		30,01		10,34		0,00		0,00	0,00	

When staying in this mode, it is possible to export data to **Excel, RTF** and **text** files. To export, press the 🔂 button, and the pullout menu emerges:



To export data to text file, select **Text file...**, to export to **RTF-**file select **RTF** file..., to export to Excel-file select **Excel table(OLE)**.

When exporting to **Excel**, make required settings in the emerging window and press OK.

Export to Excel	×					
Page range						
<ul> <li>All</li> </ul>						
C Current page						
C Pages:						
Enter page numbers and/or page ranges, separated by commas. For example, 1,3,5-12						
Export settings						
✓ Styles	Merge cells					
✓ Pictures	WYSIWYG					
🗖 As text	✓ Background					
🔽 Fast export	Page breaks					
Open Excel afte	r export					
	OK Cancel					

Then, type the file name and press the **Save** button to export to **Exel.** As a result you will obtain:



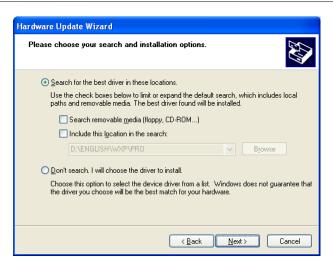
	Image: Craseria         Craseria															
1	Railw			ailway				_		-						
3		rtment	D	epartment												=
5	Name	•	N	ame												
2	Report of values of geometric parameters of wheel															
~	Tand					D	Penort	of valu	es of a	ometr	c nara	motore	of who	امه		
э ~ 7 8	1 value					R	Report	of valu	es of g	eometr	c para	meters	of whe	eel		
7				entification	narameters	R	Report	of valu	es of g		c para Tange pa		s			Ту
7 8 9 10	<u> </u>		Ide		parameters				Thic	l kness	lange pa Hei	irametei ght	rs Gra	dient		Diamete
7 8 9 10 11	Ne	Series	Ide	Date	parameters W.p. num	Axle	<b>Ceport</b> Section	Run	Thic	l kness Right	lange pa Hei Left	arameter ght Right	rs Gra Left	dient Right	Left	Diamete Righ
7 8 9 10 11 12	<u>Ne</u> 1	Series CH3	Ide Number 2001	Date 01.01.08	<b>W.p. num</b> 1	Axle 1		<b>Run</b> 3344	Thic Left 31,95	kness Right 0,00	Flange pa Hei Left 30,02	nameter ght Right 0,00	rs Gra Left 10,40	dient Right 0,00	Left 0,00	Diamete Righ
7 8 9 10 11 12 13	Ne 1 2	Series CH3 155	Ide <u>Number</u> 2001 5	Date 01.01.08 01.01.08	W.p. num 1 2	<b>Axle</b> 1 2		Run 3344 0	Thic Left 31,95 31,93	l kness Right	Flange pa Hei Left 30,02 30,02	arameter ght Right	rs Gra Left 10,40 10,41	dient Right	Left	Diamete Righ
7 8 9 10 11 12 13 14	Ne 1 2 3	Series CH3 135 155	Ide <u>Number</u> 2001 5 5	Date 01.01.08 01.01.08 01.01.08	W.p. num 1 2 3	Axle 1 2 3		Run 3344 0	Thicl Left 31,95 31,93 31,94	kness Right 0,00	Flange pa Hei 30,02 30,02 30,02	nameter ght Right 0,00	rs Gra 10,40 10,41 10,43	dient Right 0,00	Left 0,00	Diamete Righ
7 8 9 10 11 12 13 14 15	<b>Ne</b> 1 2 3 4	Series CH3 155	Ide <u>Number</u> 2001 5 5 5	Date 01.01.08 01.01.08 01.01.08 01.01.08	W.p. num 1 2	<b>Axle</b> 1 2		Run 3344 0	Thicl Left 31,95 31,93 31,94 31,95	kness Right 0,00 0,00	Left           30,02           30,02           30,02           30,02	nrameter ght 0,00 0,00	rs <b>Gra</b> <b>Left</b> 10,40 10,41 10,43 10,36	dient Right 0,00 0,00	Left 0,00	Diamete Righ
7 8 9 10 11 12 13 14 15 16	Ne 1 2 3	Series CH3 155 155 155	Ide <u>Number</u> 2001 5 5	Date 01.01.08 01.01.08 01.01.08	W.p. num 1 2 3 4	Axle 1 2 3 4		<b>Run</b> 3344 0 0	Thicl Left 31,95 31,93 31,94	kness Right 0,00	Flange pa Hei 30,02 30,02 30,02	nameter ght Right 0,00	rs Gra 10,40 10,41 10,43	dient Right 0,00	Left 0,00	Diamete Righ
7 8 9 10 11 12 13 14 15	<u>№</u> 1 2 3 4 5	Series CH3 155 155 155 155 8M3	Ide <u>Number</u> 2001 5 5 5 7102	Date 01.01.08 01.01.08 01.01.08 01.01.08 07.10.09	W.p. num           1           2           3           4           0000SU00011	Axle 1 2 3 4 11		Run 3344 0 0 0 1111	Thicl Left 31,95 31,93 31,94 31,95 30,88	kness Right 0,00 0,00	Left           30,02           30,02           30,02           30,02           30,02           30,02           30,02	nrameter ght 0,00 0,00	Cra Left 10,40 10,41 10,43 10,36 10,64	dient Right 0,00 0,00	Left 0,00	Diamete Righ

### 19. Annex 1. Installation of Bluetooth connection between scanning module and PC

To install Bluetooth-connection between the laser scanning module 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	
	Welcome to the Hardware Update Wizard Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on
	the Windows Update Web site (with your permission). Read our privacy policy Can Windows connect to Windows Update to search for
	software?
	Yes, this time only Yes, now and every time I connect a device
	<ul> <li>No, not this time</li> </ul>
	Click Next to continue.
	< Back Next > Cancel
Hardwaro Undato Wizard	
Hardware Update Wizard	This wizard helps you install software for:
Hardware Update Wizard	This wizard helps you install software for: Generic Bluetooth Radio
Hardware Update Wizard	
Hardware Update Wizard	
Hardware Update Wizard	Generic Bluetooth Radio
Hardware Update Wizard	Generic Bluetooth Radio
Hardware Update Wizard	Generic Bluetooth Radio ff your hardware came with an installation CD or floppy disk, insert it now. What do you want the wizard to do?
Hardware Update Wizard	Generic Bluetooth Radio  If your hardware came with an installation CD or floppy disk, insert it now.  What do you want the wizard to do?  Install the software automatically (Recommended)
Hardware Update Wizard	Generic Bluetooth Radio  If your hardware came with an installation CD or floppy disk, insert it now.  What do you want the wizard to do?  Install the software automatically [Recommended]  Install from a list or specific location [Advanced]



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

🤨 Found New Hardware	×
Your new hardware is installed and ready	to use.
	8 20

- activate PDA.
- 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 **Further** for search

• when the search is competed, the wizard will show the devices found:

Add Bluetooth Device Wizard
Select the Bluetooth device that you want to add.
RF505 02709 New device
If you don't see the device that you want to add, make sure that it is turned on. Follow the setup instructions that came with the device, and then click Search Again. Search Again
Cancel

• select the required device (RF505), press **Further** and type access key (Pin). The key for each device consists of 4 symbols and is set based on the profilometer serial number. For example, if the profilometer number is 00810, then Pin=0080; 01309 - Pin=0139, etc.

Add Bluetooth Device Wizard
Do you need a passkey to add your device?
To answer this question, refer to the "Bluetooth" section of the documentation that came with your device. If the documentation specifies a passkey, use that one.
O <u>C</u> hoose a passkey for me
O Use the passkey found in the documentation:
Let me choose my own passkey:     0279
O Don't use a passkey
You should always use a <u>passkey</u> unless your device does not support one. We recommend using a passkey that is 8 to 16 digits long. The longer the passkey, the more secure it will be.
< <u>B</u> ack <u>N</u> ext > Cancel

- press Further 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 profilometer during calibration or for controlling profilometer by PC (see par. <u>15.</u>). In this case, the port is **COM20**:

Add Bluetooth Device Wiz	ard 🛛 🔀
®	Completing the Add Bluetooth Device Wizard
	The Bluetooth device was successfully connected to your computer. Your computer and the device can communicate whenever they are near each other.
	These are the COM (serial) ports assigned to your device. Outgoing COM port: COM3 Incoming COM port: COM4
	Learn more about <u>Bluetooth COM ports</u> .
	To close this wizard, click Finish.
	< Back Finish Cancel



### 20. Annex 2. Testing and calibration

We can supply the profilometer complete with an RF432.10 (Figure 1A) calibration-wheel simulation unit and **F505Calibr** calibration program that are designed for periodic testing and self-calibration of the profilometer in case of unsatisfactory testing results

Instead of the calibration unit use can be made of the wheel with known profile entered to the database (see par. <u>13.6.</u>).

#### 20.1. Preparation for testing/calibration

- install the RF505Calibr program.
- install Bluetooth-connection between the scanning module and PC as described in par. <u>19</u>
- · adjust the profilometer to the reference profile
- run **RF505Calibr** program

Device type : none Device modification : none			
Device modification : none Seriel number : none			
Measuring range : none		<u>I</u> Est	
Parameters			
Initial position of scanning			
Final position of scanning :			
Time of a microstep		Wite parentera	
Size increment positions on 0.1 microns :			
Additional constant on an axis X			
Corner of turn(Alfa)			
Coefficient of the amendment(Koef1):		1	
Coefficient of the amendment(Koef2):		1	
<b>1</b> 0 0 100 10			
Compare	Parameters Invet Bades	Messured	
Compare eference 5001_7071 +	Canter Canter		
)Compare inference [5001_7071 +] Profile [1 ]	L1 2 mm L4 110 mm	Height Sh me	
	Canter Canter	Height Sh ms	

• select the required port

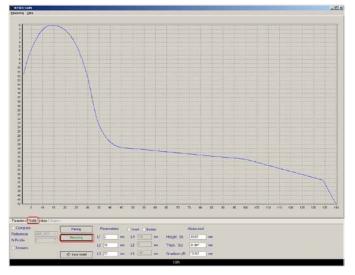
<b>%</b> RF505	
Measuring Data	
Port number 🔸	<u>⊂</u> OM1
⊆onnect	С <u>О</u> М2
Exit	O <u>t</u> her COM
Other COM port	×
Enter COM port number	107
🗸 ок	X Cancel

• press Connect to connection

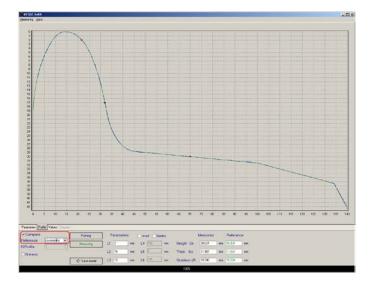


Description:     9:       Description:     9:       Static multiple:     20:0       Measured margin     20:0       Test models     0       Measured margin     00       Test models     00       Measured margin     00       Test models     00       State models	11505 3209				
Data data data data     4       Series markée     203       Maxing marge     0.       Presenter     0.       Presenter     0.       Sin location professiona de l'imograme     0.       Sin location professiona de l'imograme     0.       Cardicato da sensature@card)     0.       Cardicato da sensature@card)     0.       Cardicato da sensature@card)     0.       Cardicato da sensature@card)     0.	Beesuring Data				
State         XO           Maximing map         0.           Preventer         0.           State scenario         0.           Conficient of frage resolution (frage resolution (f	Device type :	55		Cont	
Number of more years     Display of the second					
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Name         No         No           No         No         No <td>Measuring range</td> <td>96</td> <td></td> <td></td> <td></td>	Measuring range	96			
Name         No         No           No         No         No <td></td> <td></td> <td></td> <td></td> <td></td>					
Name         No         No           No         No         No <td></td> <td></td> <td></td> <td></td> <td></td>					
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Twenter Today Today Stoppen Company Co					
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Dompsie         Featrage         Parameters         Bould         Massured           Allewands         13         mm         L4         mm         Hight Sh         mm           Namese:         Namese:         12         mm         L5         mm         Trick Sd         mm					
Dompsie         Featrage         Parameters         Bould         Massured           Allewands         13         mm         L4         mm         Hight Sh         mm           Namese:         Namese:         12         mm         L5         mm         Trick Sd         mm					
Dompsie         Featrage         Parameters         Bould         Massured           Allewands         13         mm         L4         mm         Hight Sh         mm           Namese:         Namese:         12         mm         L5         mm         Trick Sd         mm					
Dompsis         Parage         Parage         Parameters         Isode         Messare           Official         Messare         L3         mm         L4         mm         Hight Sh         mm           Namese         Messare         L2         mm         L5         mm         Truck Sd         mm					
Dompsie         Featrage         Parameters         Bould         Massured           Allewands         13         mm         L4         mm         Hight Sh         mm           Namese:         Namese:         12         mm         L5         mm         Trick Sd         mm					
Dompsie         Featrage         Parameters         Bould         Massured           Allewands         13         mm         L4         mm         Hight Sh         mm           Namese:         Namese:         12         mm         L5         mm         Trick Sd         mm					
Dompsie         Featrage         Parameters         Bould         Massured           Allewands         13         mm         L4         mm         Hight Sh         mm           Namese:         Namese:         12         mm         L5         mm         Trick Sd         mm					
Dompsie         Featrage         Parameters         Bould         Massured           Allewands         13         mm         L4         mm         Hight Sh         mm           Namese:         Namese:         12         mm         L5         mm         Trick Sd         mm					
Dempere         Petrug         Parameters         Boolen         Massured           Memorya         101         mm         L4         mm         Height Sh         mm           Namase:         Massured         12         mm         L5         mm         Trick Sd         mm					
Dempere         Petrug         Parameters         Boolen         Massured           Memorya         101         mm         L4         mm         Height Sh         mm           Namase:         Massured         12         mm         L5         mm         Trick Sd         mm					
Dempere         Petrug         Parameters         Boolen         Massured           Memorya         101         mm         L4         mm         Height Sh         mm           Namase:         Massured         12         mm         L5         mm         Trick Sd         mm					
Dempere         Petrug         Parameters         Boolen         Massured           Memorya         101         mm         L4         mm         Height Sh         mm           Namase:         Massured         12         mm         L5         mm         Trick Sd         mm					
Dompsie         Featry         Parameters         Bode         Massured           Allewange         L3         mm         L4         mm         Hight Sh         mm           Namese         Massured         12         mm         L5         mm         Trick Sd         mm					
Dempere         February         Parameters         Boulet         Messared           Messared         101         mm         L4         mm         Height Sh         mm           Namase         Messared         12         mm         L5         mm         Trick Ed         mm					
Dempere         February         Parameters         Boulet         Messared           Messared         101         mm         L4         mm         Height Sh         mm           Namase         Messared         12         mm         L5         mm         Trick Ed         mm					
Dempere         February         Parameters         Boulet         Messared           Messared         101         mm         L4         mm         Height Sh         mm           Namase         Messared         12         mm         L5         mm         Trick Ed         mm					
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Company         Parking         Parking         Parking         Date         Messured           Safewarea         100         100         100         Messured           Proble         100         100         100         Messured           Namese         120         mm         L2         mm         Height Sh         mm					
Subserve         00000000         Hermanno         L1         Time in Highty Sh         min           Altradie         12         Time in L5         min         Tiggty Sh         min           Namasia         Househout         L2         Time in L5         min         Tiggty Sh         min	Naranietona Pholife   Values   Dispose	2			
Software         100         000         10			meters	Manual	
UProfile Linearong LJ 2 mm L4 111 mm Height Sh mm Nmaase Massimut L2 70 mm L5 mm Trick Ed mm			and the second second second second		
Nmase Residuar L2 To no L5 no Thick Sd no		Massang L1 2	nn L4 110 mm	Height Sh	
Nmass			15 0	Thick Set	
LI J mm L6 mm GredientoR xm	Nmaes				
		13 (0	non 1.6 (10) non	GradientgR	300

• to measure the profile press **Measure** button. The display will show measured profile after measurement has been taken



• to compare with the reference profile, tick the **Compare** checkbox and select the required reference profile in the drop-down **Reference** list.





### 20.2. Testing

To carry out automatic testing, do the following steps:

- tick the **N Meas** checkbox (number of measurements);
- specify the number of measurements (5-10);
- delete the Calibr checkbox, if it is not specified;
- press button Measurement

Compare	]	Parking	Parameters	Invert Borders		Measured	Reference		Sh	Sd	qR	d_Sh	d_Sd
Reference	Locomotive 🗸							1	30,033	32,002	10,354	-0,029	-0,078
		Measuring	L1 2 mm	L4 140 mm	Height Sh	30,008 m	m 30,004 mm	2	30,023	31,982	10,301	-0,019	-0,058
N Profile	ų 🗘							3	30,021	31,983	10,287	-0,017	-0,059
N meas.	50 📫		L2 70 mm	L5 U mm	Thick Sd	31,973 m	im 31,924 mm	4	30,026	31,974	10,356	-0,022	-0,050
<u></u>				LG 140 mm				5	30,009	31,996	10,275	-0,005	-0,072
Calibr.		🗞 Save model	L3 13 mm	L6 140 mm	Gradient qR	10,358 m	m 10,324 mm	< >\ S	Sheet1 /				

- The scanning module will make the specified number of measurements whose results will be entered to the table. The first three columns will present measured values of height (Sh), thickness (Sd), and flange slope (qR), while the other three columns will present deviations of the measured values from the reference values (d\_Sh, d\_Sd, d\_qR). Deviation of the flange height and thickness from the reference values must not be more than 0.1 mm.
- If deviations exceed the permissible value, it is necessary to perform calibration of the scanning module.

#### 20.3. Calibration

To carry out automatic calibration, do the following steps:

- tick the **N Meas** checkbox (number of measurements)
- specify the number of measurements (5-10)
- tick the Calibr checkbox
- press button Measurement

Compare		Parking	Parameters	Invert Borders		Measured	Reference		Sh	Sd	qR	d_Sh	d_Sd
Reference	Locomotive -							1	30,033	32,002	10,354	-0,029	-0,078
	7	Measuring	L1 2 mm	L4 140 mm	Height Sh	30,008 mn	n 30,004 mm	2	30,023	31,982	10,301	-0,019	-0,058
N Profile	/ <del>•</del>							3	30,021	31,983	10,287	-0,017	-0,059
N meas.	0 🗘		L2 70 mm	L5 U mm	Thick Sd	31,973 mn	n 31,924 mm	4	30,026	31,974	10,356	-0,022	-0,050
_				L6 140 mm		10.050	10.004	5	30,009	31,996	10,275	-0,005	-0,072
Calibr.	)	🗞 Save model	L3 13 mm	L6 140 mm	Gradient qR	10,358 mn	n 10,324 mm	<b>I</b> ►\S	heet1 /				

• when scanning is completed, perform testing procedure in accordance with

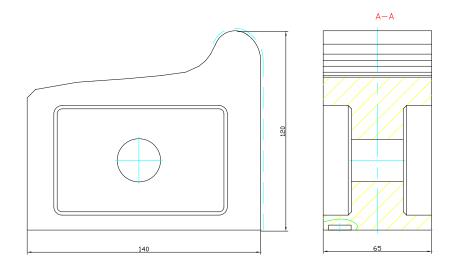
Write parameters (Write

par. <u>20.2.</u> In case of positive result, press the parameters) button to save the scanning module parameters.

Device type :	55		
Device modification :	46		🔁 Connect
Serial number :	3209		Exit
Measuring range :	55		
Parameters		80	
Initial position of scanning			Read parameters
Final position of scanning		2860	
Time of a microstep		6 5	Write parameters
	1 microne :	494	Load Default
Size increment positions on (	çi morono .		
•		2620	
Additional constant on an axi		2620	
Size increment positions on 0 Additional constant on an axi Corner of turn(Alfa) : Coefficient of the amendment	sX:		

• if parameters have incorrect values (negative or zero) for any reason, it is

(restore parameters) button. After that, recalibrate the profilometer.



#### Figure 1A

## 21. Annex 3. Program for making measurement schemes

To make measurement schemes, use can be made of the special software **SchemeBuilder.exe**. When the program is started, the main window appears on the screen:

🗘 Scheme Builder				
Scheme				New Scheme
Name of Scheme	:	NewScheme		Load Scheme
Number of axles	:	4 💌		
Number of cars	:	1		🚔 Save Scheme
Type of scheme	:	1		🛃 Exit
	r ==	2 R Diect v Series Number 2 L	3R J	
Axle Wheelset				
Run				

#### **Buttons:**

🎲 New Scheme				
🝓 Load Scheme				
🍓 Save Scheme				
🛃 Exit				
➡ ←				

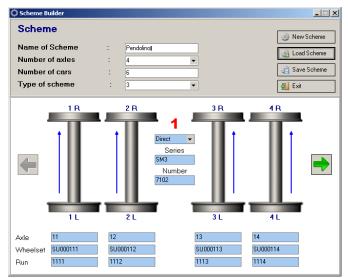
- create "empty" scheme;
- load the existing scheme;
- save the completed scheme;
- exit;
  - next/previous coach in the train.

Enter the scheme name, number of cars, number of axles, type of scheme and press the **New Scheme** button to create a new "empty" scheme.

Advice: In addition to formation of the wheel processing scheme this program can be conveniently used for input of wheel pair numbers of a rolling stock and running



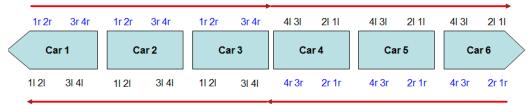
#### distance. If necessary, enter these data and press the Save scheme button.



To transfer the scheme file to PDA, use the procedure described in par. 14.1.5.

**Clarification.** The measurement scheme is a text file with extension **.sch**. User can create and edit such file by using any text processor.

Example:



#### Scheme\_EXAMPLE

#### Where:

1d – coaches arranged in direct order (1 – sequence number) 1i – coached arranged in the reverse order (1 – sequence order) SM3 – coach series 7102 -number 1I – sequence number of wheel pair and the side (I- left/r-right) 11 – axle number SU11 – name of wheel set

111 - running distance of wheel set

### 22. Annex 4. Charging of built-in accumulator battery

- Switch off PDA (laser module).
- Connect charging device and PDA (laser module)
- Connect charging device and 220V.
- Time of charging-4 hours, until green LED is lit.

- Disconnect charging device and 220V
- Disconnect charging device and PDA (laser module) ATTENTION: please follow the sequence of this points.

#### Annex 5. Reference profiles base 23.

Reference profile file	Name of the profile	Description
Australia		
AUS_WPR 140mm.ref	WPR 140mm	
AUS_WPR 130mm.ref	WPR 130mm	
AUS_WPR 120mm.ref	WPR 120mm	
AUS_WPR7_8 140.ref	WPR7_8 140	
AUS_WPR7_8 130.ref	WPR7_8 130	
AUS_QR_LW3_140.ref	QR_LW3_140	
AUS_QR_LW3_127.ref	QR_LW3_127	
AUS_QR_LW3_120.ref	QR_LW3_120	
Belarus		
BLR_Car_29.ref	Car _29	
BLR_ DMeTILB _33.ref	DMeTILB_33	
BLR_DMeTILR_30.ref	DMeTILR_30	
BLR_Loco_29.ref	Locomotive_29	
BLR_Loco_33.ref	Locomotive _33	
China		
CHN_Tram.ref	Tram	
UK		
ENG_S1002.ref	S1002	
Finland		
FIN_PrfIERRI.ref	UIC/ERRI	
FIN_PrfIORE.ref	UIC/ORE	
FIN_Bombardier.ref	Bombardier	
FIN_Tram.ref	Tram	
FIN_NRV.ref	NRV	
France		
FRA_NF_F_01_115.ref	NF_F_01_115	
Germany		
GER_2001_7871.ref	2001_7871	
GER_2001_7873.ref	2001_7873	
GER_2001_7874.ref	2001_7874	
GER_2001_7875.ref	2001_7875	
GER_2001_7876.ref	2001_7876	
GER_2001_7877.ref	2001_7877	
GER_2105.ref	2105	
GER_2107.ref	2107	
GER_9186.ref	9186	
GER_9187.ref	9187	
GER_9188.ref	9188	
Korea		



KOR.ref	Korea	
Russia		
RUS_Metro.ref	Metro	
New Zeeland		
NZL_B1.ref	Profile_B1	
NZL_B2.ref	Profile_B2	
NZL_3.ref	Profile_B3	
SAR		
SAR_908AB.ref	908AB	
SAR_N21.ref	N21	
SAR_N22.ref	N22	
SAR_N23.ref	N23	
SAR_Taiwan.ref	Taiwan	
Spain		
SPA_COMSA_1.ref	COMSA_1	
SPA_COMSA_2.ref	COMSA_2	
SPA_FGC.ref	FGC	
SPA_FSDR3_140.ref	FSDR3	
SPA_ 28.ref	Profile_28	
SPA_ 30.ref	Profile_30	
SPA18610.ref	Profile_18610	
SPA_ Metro.ref	Metro	
SPA_Rodadura.ref	Rodadura	
Russia		
UKR_CarMINETEK.ref	CarMINETEK	
UKR_DMETILR.ref	DMETILR	
UKR_Elektrovoz.ref	Elektrovoz	
UKR_LocoMINETEK.ref	LocoMINETEK	
UKR_EtalCar.ref	Car	
UKR_EtalLoc.ref	Locomotive	
USA		
USA_Cylindrical.ref	Cylindrical Tread	
USA_Tapered.ref	Tapered Tread	
USA_AAR_1B.ref	AAR_1B	
USA_UICERRI.ref	UIC_ERRI	

### 24. Warranty policy

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



## 25. Distributors

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# 26. Annex 6. RIFTEK measurement instruments for railway transport



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.



#### Portable laser rail profilometer. PRP Series

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.

#### 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.



#### 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.