RIFTEK
Sensors & Instruments

BACK-TO-BACK DISTANCE MEASURING GAUGE

IMR Series

User's manual

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Contents

1. Safety precautions and measurement conditions

- The metering accuracy depends greatly on the wheel surface quality. Therefore it is necessary to carry out the check and presorting of the wheel surface flaws before measuring the diameter.
- Prior to place the gauge is a need to clean the wheels and rails parts that contact with gauge ball bearings and supports, of the mud.
- At arranging the gauge, do not allow hitting its supports on the wheel and rail
- It is necessary to inspect the gauge supports and laser sensors windows periodically and to cleanse them
- To save the battery power the display extinguishes if there were no buttons pressings for 60 seconds, at that only blinking dot is shown. Pressing any button just turns on the display and does not act in any other way in this case.

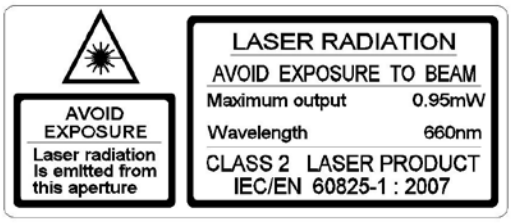
2. Electromagnetic compatibility

The gauge has been developed for use in industry and meets 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 sensor mounted in the gauge makes use of an c.w. 660 nm wavelength semiconductor laser. Maximum output power is 1 mW. The sensor belong to the 2 laser safety class. The following warning label is placed on the gauge body:



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

- Do not target laser beam to humans;
- Do not disassemble the sensor;

Avoid staring into the laser beam

4. General information

Electronic gauge 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.

5. Basic data and performance characteristics

Name of parameter	Value

Measurement range, mm	L±25 (L – nominal distance)
Measurement error, mm	±0.1
Indication discreteness	0.1mm, or 0.01 inch **
Display	build-in, LED
Operating temperature, ^{0}C	-5…+40
Weigh, kg	1
Dimensions	figure 1
Power supply	rechargeable batteries 2xAAA, 1.2V

6. Example of item designation when ordering

IMR- L

Symbol	Description
L	Nominal back-to-back distance, mm

Example: IMR-1590. Nominal back-to-back distance is equal 1590 mm.

7. Complete set to be supplied

Name	Quantity	Weight, kg
The measuring gauge IMR series	1 piece	1
Charger	1 piece	0,2
Manual	1 piece	
Case	1 piece	
Calibration tools (option)	on request	

8. Design.

Electronic gauge contains ball support to place the gauge onto the internal surface of the wheel, two side supports to base the gauge to the wheel flange, two bottom supports or the rails and contactless laser sensor.

There are a digital numeric display and control buttons on the front panel of the gauge. “Charge” connector for charging device connection is situated on the top panel of the gauge.

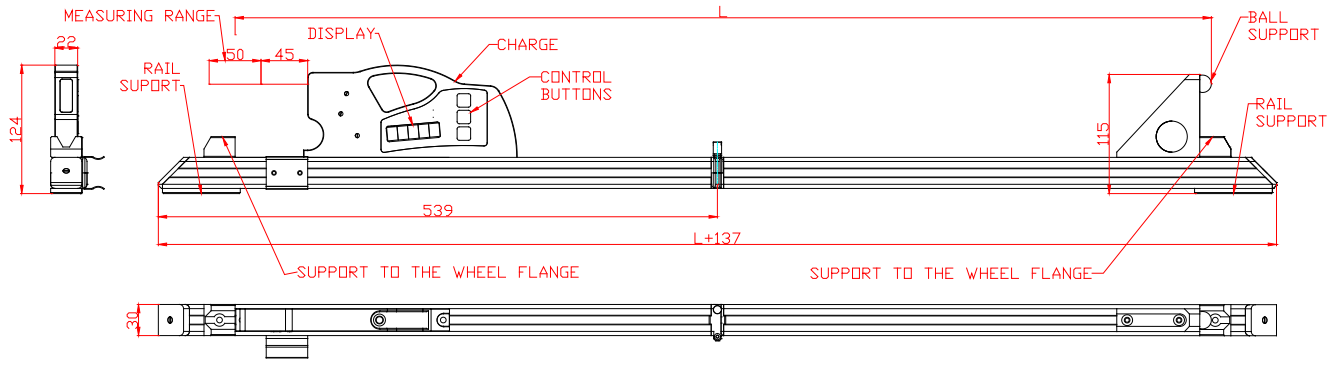


Figure 1

9. Operation principle

The method of measurement is based on direct measurement the distance by contactless laser sensor.

10. Working with the gauge

10.1. Gauge turn-on.

Press **Red** button to turn on the power. The display shows "**ErrP**" message if the accumulator battery voltage became lower then the control level. In this case the short-term work is possible after pressing any key.

10.2. Single measurement.

To perform measurement, it is necessary to:

- turn the power on (press **Red** button). The display shows "**- - - - -**";
- place the gauge on the rails between the wheels;
- make sure that the ball support is tight against the surface of the wheel and side supports are adjacent to the flanges of the wheels;
- press **Green** button.
- in a 1 second the display will show the value of the back-to-back distance.

For viewing the result of measurement with indication discreteness of **0.01mm** (it is accessible only in a mode of direct indication) it is necessary to press **Blue** button, thus displayed result will be shifted to the left on one digit. Next pressing **Blue** button will lead to return of indication to a starting position:

10.3. Measurement with averaging

The program of the back-to-back distance calculation contains an averaging algorithm that allows eliminating the surface defects influence on the distance measuring result. All the results of metering, performed after the **Red** button pressing, are averaged. The measurement is meant to be **Green** button pressing.

To carry out measurements it is necessary to

- turn the power on (press **Red** button). The display shows "**- - - - -**";
- place the gauge between the wheels
- make sure the ball support is tight against the surface of the wheel and side supports are adjacent to the flange of the wheels;
- press **Green** button;
- display shows the value of pressing counter "**n x**", where **x** – quantity of averaged values;
- in a 1 second display shows an average value over the set of metering (over the quantity of **Green** button pressings)
- reinstall the gauge and repeat the measuring.
  (The total quantity of measurements averaged in this way can run up to 9999.)
- Press **Red** button to reset averaging result at switching to another wheel.

For viewing the result of measurement with indication discreteness **0.01mm** (it is accessible only in a mode of direct indication) it is necessary to press **Blue** button, thus displayed result will be shifted to the left on one digit. Next pressing **Blue** button will lead to return of indication to a starting position.

10.4. Gauge turn-out

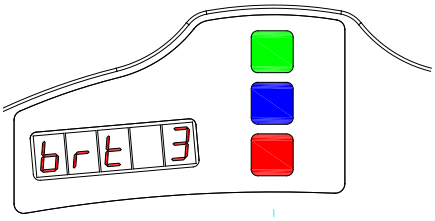
The gauge turn-out occurs automatically. The display extinguishes if there were no buttons pressings for 60 seconds, at that only blinking dot is shown. If there were no button pressings for 4 more minutes, the gauge is turned out completely. You can turn the gauge off by long pressing **Red** button (more then 3 sec.).

11. Indication parameters setup

11.1. Image brightness set-up.

To change the display brightness it is necessary to:

- turn the power on (press **Red** button).;
- press **Blue** button and keep it pressed for more than three seconds;
- display will show "**brt X**";



- choose the necessary brightness value by **Green** button pressings;
- to save the changed parameters press **Red** button the display shows "**SAUE**" message, press the **Green** button to confirm saving and **Red** to cancel saving of the changed parameters;

At brightness choosing one should take into account that increased brightness enhances power consumption and decreases the period till battery recharge moment.

11.2. Millimeters-Inches display set-up

To change the mode it is necessary to:

- turn the power on (press **Red** button).;
- press **Blue** button and keep it pressed for more than three seconds;
- display will show "**brt X**";
- press **Blue** button again until the either "**SI**" or "**Inch**" message appears on the display. "**SI**" – measuring results will be shown in mm, "**Inch**" – measuring results will be shown in inches;
- choose the necessary value by **Green** button pressings;
- to save the changed parameters press **Red** button the display shows "**SAUE**" message, press the **Green** button to confirm saving and **Red** to cancel saving of the changed parameters

12. Service operation modes

This section contains the description of the modes for the check of device efficiency and calibration. As erroneous actions in this mode can lead to invalid measurement results, only specially trained personnel should perform such operations.

12.1. Calibration conditions

Calibration of the device is not necessary in the current work. It is necessary only after producing, repairing and also after checking with negative result.

To perform calibration the following means are necessary:

- Calibration tool RF260.90.000 fig.2;

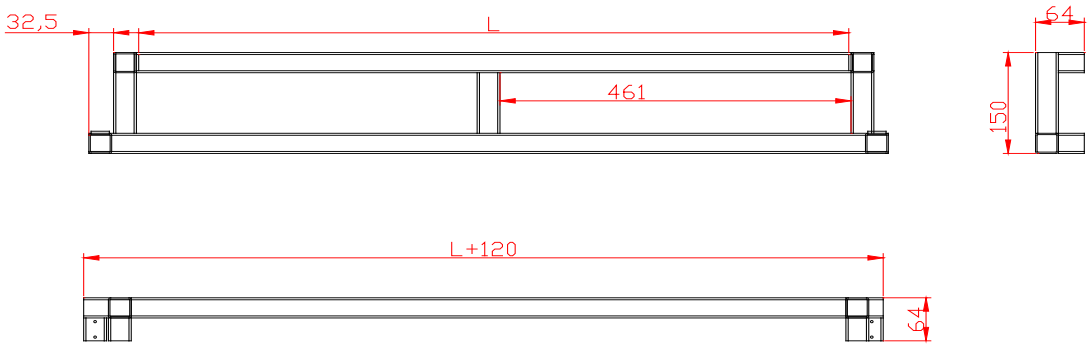


Figure 2

12.2. Get into operational modes

- To get into the operational modes it is necessary to turn-off the device (press **Red** button more then 3 seconds).
- Keeping **Green** button in pushed position turn-on the device (press **Red** button).
- Display shows "**CLbr.0**" message (the mode of calibration of the sensor's "**0**").
- To get into this mode it is necessary to press **Green** button (see. p. 11.2).
- For transition to next mode it is necessary to press **Blue** button.
- Display shows "**CLbr.b**" message (the mode of device base calibration).
- To get into this mode press **Green** button (see. p.11.3).
- To get out the mode of calibration press **Red** button.

12.3. Calibration of the sensor zero

- Zero calibration mode being enabled, the display shows the length of calibration tool.
- If editing of the length value is not required, go to the next step. To edit the length value, press the **Blue** button, and the digit to be edited starts blinking. Changing over between the digits is made by pressing the **Blue** button while changing of values is made by pressing the **Green** button. When editing is finished, press the **Red** button and confirm or cancel saving of the parameter by pressing the **Green** button or **Red** button, respectively.
- Press the **Green** button, and the length value starts blinking, which means that the device must be placed onto calibration tool. The measurement tip and support ball of the gauge must be tightly fitted to the flat plates of calibration tool (figure 3).
- Press the **Green** button, and the display shows current reading of the sensor in its own coordinate system. By moving the device, assure that repeatability of measurement results is obtained.

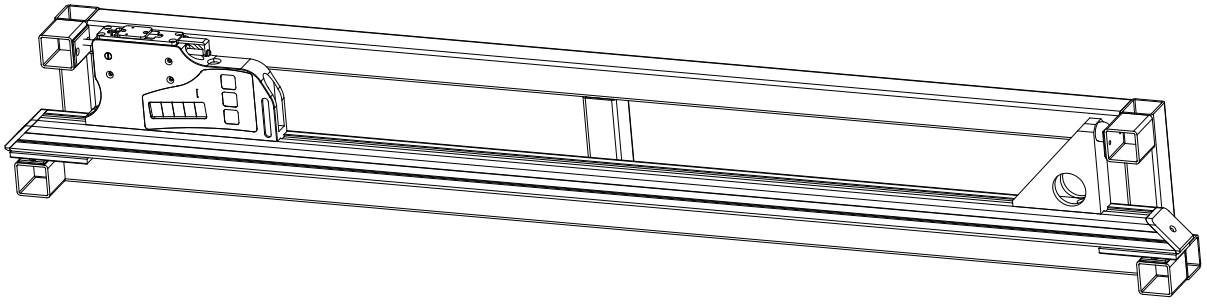


Figure 3

- If readings of the sensor are sufficiently stable, press the **Blue** button. Sensor zero position is calculated in the device coordinate system, and prompt appears to save calibration results. Press the **Green** or **Red** button to confirm or cancel saving of the results, respectively.

13. Charging of built-in accumulator battery

To charge accumulator battery it is necessary to connect charging devise to the power grid 85-250V and to a battery compartment on the top panel of the gauge.

The period of charging is 15 hours.

14. Warranty policy

Warranty assurance for the Back-to-back measurement gauge - 24 months from the date of putting in operation; warranty shelf-life - 12 months.

15. Distributors

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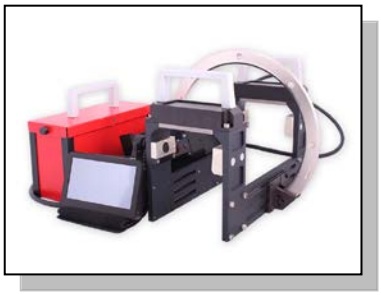
16. Annex 1. RIFTEK measurement instruments for railway transport

Laser wheel profilometer. IKP Series

A laser profilometer is designed for the measuring of:

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

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



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.