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.

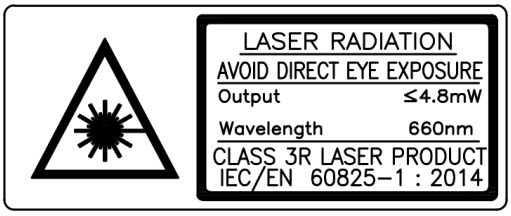
2. CE compliance

The gauge has been developed for use in industry and meets the requirements of the following Directives:

- EU directive 2014/30/EU. Electromagnetic compatibility (EMC).
- EU directive 2011/65/EU, “RoHS“ category 9.

3. Laser safety

The sensor mounted in the gauge makes use of an c.w. 660 nm wavelength semiconductor laser. Maximum output power is 4.8 mW. The sensor belongs to the 3R 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 to measure the back-to-back distance of railway, metro and tram wheels in the course of checkup, examination, repair and formation of wheelsets. Measurements are made directly on the rolling stock without rolling out the wheelset.

5. Basic technical data

Parameter	Value
Measurement range, mm	L±25 (L – nominal distance)
Measurement error, mm	±0.1
Indication discreteness	0.1 mm, or 0.01 inch **
Display	build-in, LED
Operating temperature, °C	-5…+40
Weigh, kg	1
Dimensions	figure 1
Power supply	rechargeable batteries 4xAA 1.2V

6. Example of item designation when ordering

IMR-D

Symbol	Description
D	Nominal back-to-back distance, mm.

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

7. Complete set to be supplied

Name	Quantity	Weight, kg
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. The “Charge” connector for charging device connection is situated on the top panel of the gauge.

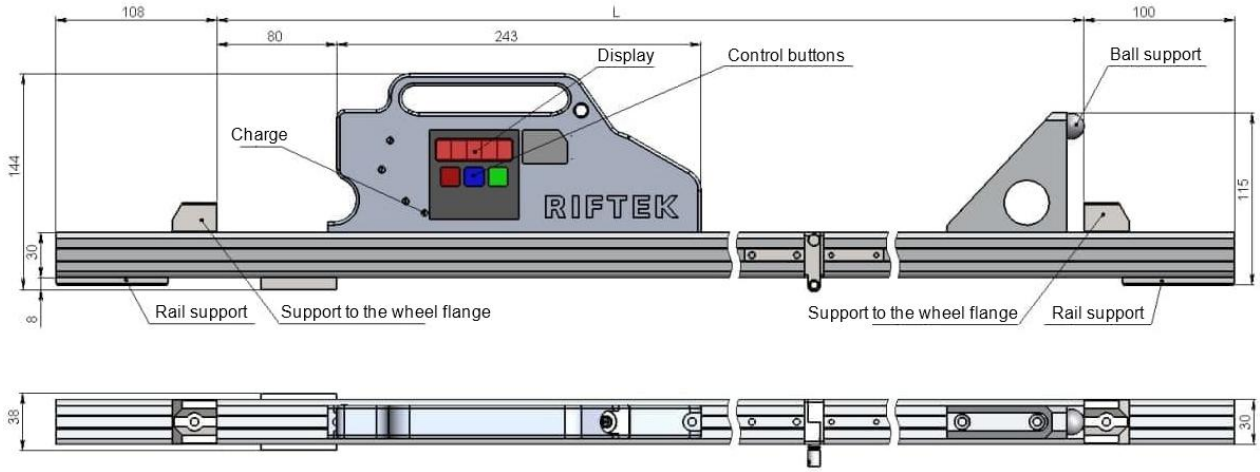


Figure 1

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. Turning on the gauge

Press **Red** button to turn on the power. The display shows **"ErrP"** message if the accumulator battery voltage became lower than 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 one second the display will show the value of the back-to-back distance.

For viewing the result of measurement with indication discreteness of 0.01 mm (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 one 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 0.01 mm (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. Turning off the gauge

Shutdown 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 off completely. You can turn the gauge off by long pressing **Red** button (more than 3 sec.).

11. Indication parameters

11.1. Image brightness

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"**.

Figure 2

- Choose the necessary brightness value by **Green** button pressings.
- To save the changed parameters, press **Red** button. The display shows **"SAUE"** message. Press **Green** button to confirm saving and **Red** button 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

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 **Green** button to confirm saving and **Red** button to cancel saving of the changed parameters.

12. Service operation mode

This section describes the gauge calibration mode. As erroneous actions in this mode can lead to invalid measurement results, only specially trained personnel should perform such operations.

7

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. 3).

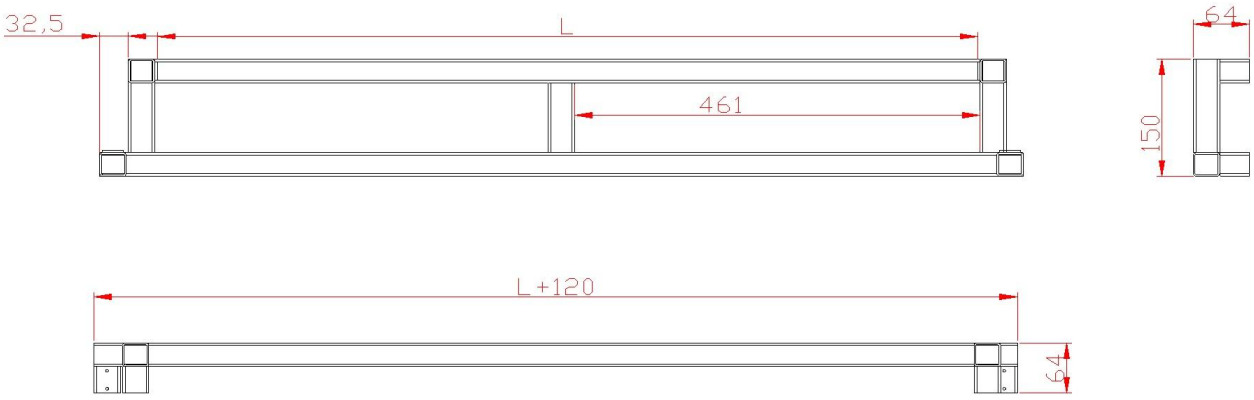


Figure 3

12.2. Get into the operation mode

- To get into the operation mode, it is necessary to turn off the device (press **Red** button for more than 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.
- To exit the calibration mode, 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 the **Red** button, respectively.
- Press the **Green** button, and the length value starts blinking, which means that the device must be placed onto the calibration tool. The measurement tip and support ball of the gauge must be tightly fitted to the flat plates of the calibration tool (figure 4).
- 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.

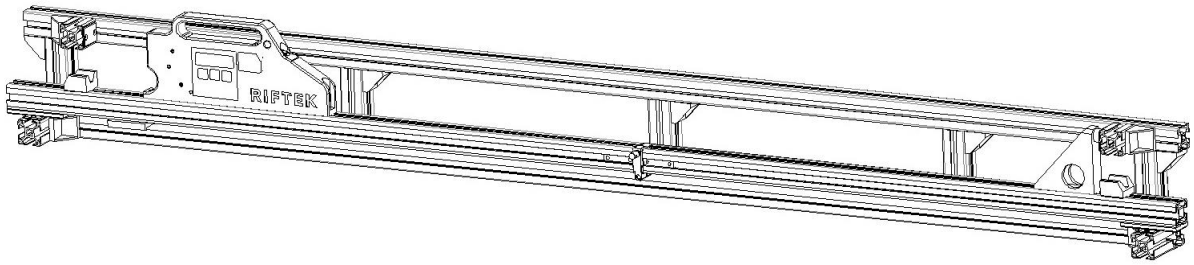


Figure 4

- 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** button or the **Red** button to confirm or cancel saving of the results, respectively.

13. Charging of built-in accumulator battery

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

The time of charging is 15 hours.

14. Warranty policy

Warranty assurance for the Back-to-Back Distance Measuring Gauge - 24 months from the date of putting in operation; warranty shelf-life - 12 months.

15. Distributors

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16. RIFTEK's measurement instruments for railway transport

Railway wheel profile gauge, IKP Series

Laser Profilometer IKP-5 Series is employed for:

- Measuring geometrical parameters of the wheel flange (thickness, slope, height), rim/tire thickness.
- Taking full profile of the wheel rolling surface.
- Maintaining the wear database.
- Tolerance control and sorting when checking, inspecting, repairing and forming railway wheelsets.

Measurements are made directly on the rolling stock without rolling out the wheelset.

Rail profile measurement gauge, PRP Series

The main functions of PRP are as follows:

- Obtaining information on the cross-section profile of the railhead acting face.
- Full profile scanning and analysis of the railhead acting face.
- Visualization of combined graphic images of the actual and new cross-section profiles of the railhead.

Wheel diameter measuring gauge, IDK Series

Electronic gauge is designed to measure the wheel rolling circle diameter of railway, metro and tram wheelsets. Measurements are made directly on the rolling stock without rolling out the wheelset.

Back-to-back distance measuring gauge, IMR Series

Electronic gauge is designed to measure the back-to-back distance of railway, metro and tram wheels in the course of checkup, examination, repair and formation of wheelsets. Measurements are made directly on the rolling stock without rolling out the wheelset.

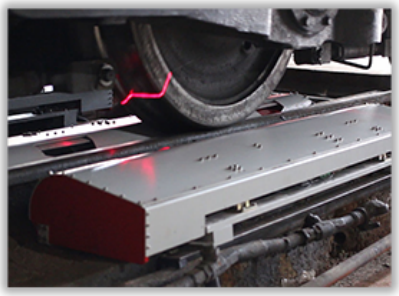
Back-to-back distance measuring gauge, IMR-L Series

Electronic gauge is designed to measure the back-to-back distance of railway, metro and tram wheels in the course of checkup, examination, repair and formation of wheelsets. Measurements are made directly on the rolling stock without rolling out the wheelset.

Disc brakes profile gauge, IKD Series

Electronic gauge is employed for laser scanning and measurement of disc brakes wear parameters.
The main functions of IKD are as follows:

- Obtaining information on the profile of the disc brakes acting face.
- Full profile scanning and analysis of the disc brakes acting face.
- Visualization of combined graphic images of the actual and new disc brakes profiles.



Real-time wheels geometry measurement system 3DWheel

The system is designed for non-contact automatic measurement of geometrical parameters of railway wheels and uses a combination of 2D laser scanners mounted wayside in the track area.
The system can be easily installed on any type of railway infrastructure.