<table>
<thead>
<tr>
<th>Measurement Type</th>
<th>Icon</th>
<th>Measurement Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displacement and Position Measurement</td>
<td>![Diagram]</td>
<td>Gap Measurement</td>
</tr>
<tr>
<td>Thickness and Width Measurement</td>
<td>![Diagram]</td>
<td>Profile Measurement</td>
</tr>
<tr>
<td>Outer Diameter and Profile Measurement</td>
<td>![Diagram]</td>
<td>Level Measurement</td>
</tr>
<tr>
<td>Inner Diameter and Profile Measurement</td>
<td>![Diagram]</td>
<td>2D Measurement</td>
</tr>
<tr>
<td>Vibration and Run-Out Measurement</td>
<td>![Diagram]</td>
<td>3D Measurement</td>
</tr>
</tbody>
</table>

ISO 9001-2015
The parent company, Scientific and Production Company «RIFTEK» was founded in 1993. The enterprise specializes in development and fabrication of optoelectronic instruments for measuring of geometrical quantities.

The group also includes:
Enterprise «RIFTEK TECHNO» — manufacturing of mechanical parts and components for the parent company, contract manufacturing;
Enterprise «RIFTEK-SMT» — automated assembling of printed circuit boards (PCB), contract manufacturing;
Enterprise «Riftek Russia» — assembly unit in Russia.

The basic product line includes:
- laser triangulation position sensors;
- 2D and 3D laser scanners;
- absolute linear encoders;
- optical micrometers;
- hardware and software system for welding robots;
- specialized systems for measuring dimensions, displacements and distances, thickness, diameter, etc.;
- measurement instruments for railway transport;
- video processing FPGA IP-cores and hardware;
- machine vision systems.

RIFTEK products are delivered in more than 60 countries. Company representative offices operate in 45 countries.

RIFTEK company is certified according to ISO 9001:2015 in the field of management of quality of design and manufacture of optoelectronic instrumentation.

We offer integrated solution to control and automation problems — from sensing devices to multifunctional measuring and control systems.
LASER TRIANGULATION SENSORS

PURPOSE
Contactless dimensions, surface profile, deformation, vibration measurement, sorting, sensing presence or absence, positional checking, bulk materials and liquids level measurement.

OPERATION
Sensor operation is based on the principle of optical triangulation. Radiation of a semiconductor laser is focused by an objective on an object. The radiation scattered at the object is collected on the CMOS array by the input lens. Object motion causes a corresponding motion of the image. Built-in signal processor calculates the distance to the object according to the light spot image position on the CMOS array.

MAIN FEATURES
- Measuring ranges from 2 to 2500 mm
- ±1 um accuracy
- Sampling rate up to 180 kHz
- RS232/RS485/Ethernet/CAN/CANopen +4...20 mA/0...10 V/ModbusRTU
- Binocular sensors for laser scanning
- Binary and ASCII data formats
- Sensors with BLUE lasers to control high temperature, mirrored and semitransparent objects
- Sensors with IR lasers
- Mutual synchronization of the sensors (master-slave) for multi-axis measurement tasks
- Service Software for parameter setting and results visualization
- Free SDK and examples for Windows, Linux, NET, MathLAB, LabView

MODELS
RF603 — universal sensors
RF603HS — high speed sensors
RF600 / RF6001 — large-base and long range sensors
RF605 — compact sensors
RF602 — super compact sensors
RF607 — high-precision high-speed sensors
RF609 — laser probes for inner surface control
Sensors for special applications.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output interface</td>
<td>digital</td>
</tr>
<tr>
<td></td>
<td>analog</td>
</tr>
<tr>
<td>Synchronization input</td>
<td>2,4 – 5 V (CMOS, TTL)</td>
</tr>
<tr>
<td>Logic output</td>
<td>programmed functions, NPN: 100 mA max; 40 V max for output</td>
</tr>
<tr>
<td>Power supply, V</td>
<td>9 ... 36</td>
</tr>
<tr>
<td>Power consumption, W</td>
<td>1,5...2</td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>IP67 (for the sensors with cable connector only)</td>
</tr>
<tr>
<td>Vibration</td>
<td>20g/10...100Hz, 6 hours, for each of XYZ axes</td>
</tr>
<tr>
<td>Shock</td>
<td>30 g / 6 ms</td>
</tr>
<tr>
<td>Operation temperature, °C</td>
<td>-10...+60, (-30...+60 for the sensors with in-built heater),</td>
</tr>
<tr>
<td>Permissible ambient light, lx</td>
<td>(-30...+120 for the sensors with in-built heater and air cooling housing)</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>5-95% (no condensation)</td>
</tr>
<tr>
<td>Storage temperature, °C</td>
<td>-20...+70</td>
</tr>
<tr>
<td>Housing material</td>
<td>aluminum</td>
</tr>
</tbody>
</table>

liquid level | automotive | object | dimensions | thickness | profiling
measurement | industry tests | sorting | measurement | measurement |
SOFTWARE

- Setting sensor parameters
- Receiving, storage, visualization
- Speed and acceleration calculation

OPTIONS

- Protective housing with air and water cooling
- Custom versions with non-standard base, range or housing shape
- Special version for use in high vibration conditions
- Special flexible cable for robotic applications
- Variants with round and elliptical spot

RF603 Series

- Universal high-speed compact laser sensors
- Available with Red and Blue laser diodes
- Ideal for fast event logging

RF603HS Series
LASER TRIANGULATION SENSORS

RF603HS-

<table>
<thead>
<tr>
<th>Base distance X, mm</th>
<th>X/2</th>
<th>X/5</th>
<th>X/10</th>
<th>X/15</th>
<th>X/25</th>
<th>X/30</th>
<th>X/50</th>
<th>X/100</th>
<th>X/250</th>
<th>X/500</th>
<th>X/750</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>15</td>
<td>15</td>
<td>25</td>
<td>35</td>
<td>55</td>
<td>95</td>
<td>105</td>
<td>60</td>
<td>80</td>
<td>125</td>
<td>145</td>
</tr>
<tr>
<td>Measurement range, mm</td>
<td>2</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>25</td>
<td>30</td>
<td>50</td>
<td>100</td>
<td>250</td>
<td>500</td>
<td>750</td>
</tr>
<tr>
<td>Max. measurement frequency, kHz</td>
<td>60, 120, 160</td>
<td>60 or 120</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linearity, % of the range</td>
<td>±0.1 (60 kHz), ±0.2 (120 kHz), ±0.3 (160 kHz)</td>
<td>±0.1 (60 kHz), ±0.2 (120 kHz), ±0.3 (160 kHz)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution, % of the range</td>
<td>0.01 (60 kHz), 0.02 (120 kHz), 0.04 (160 kHz)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature drift</td>
<td>0.02% of the range/°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light source</td>
<td>red semiconductor laser (660 nm wavelength) or blue semiconductor laser (405 nm wavelength)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output power</td>
<td>≤4.8 mW</td>
<td>≤20 mW</td>
<td>≤50 mW</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

RF600 Series

LARGE-BASE AND LONG RANGE SENSORS

- High-precision measurement of the position of remote objects
- High-speed (70 kHz) sensors

RF600-

<table>
<thead>
<tr>
<th>X/10</th>
<th>X/30</th>
<th>X/40</th>
<th>X/100</th>
<th>X/250</th>
<th>X/500</th>
<th>X/600</th>
<th>X/1000</th>
<th>X/1000</th>
<th>X/1500</th>
<th>X/2000</th>
<th>X/2500</th>
<th>X/20</th>
<th>X/50</th>
</tr>
</thead>
<tbody>
<tr>
<td>230</td>
<td>300</td>
<td>330</td>
<td>500</td>
<td>230</td>
<td>300, 100</td>
<td>230</td>
<td>1300</td>
<td>380</td>
<td>390</td>
<td>410</td>
<td>420</td>
<td>540</td>
<td>535</td>
</tr>
<tr>
<td>Measurement range, mm</td>
<td>10</td>
<td>30</td>
<td>40</td>
<td>100</td>
<td>250</td>
<td>500</td>
<td>600</td>
<td>1000</td>
<td>1000</td>
<td>1500</td>
<td>2000</td>
<td>2500</td>
<td>20</td>
</tr>
<tr>
<td>Max. measurement frequency</td>
<td>9.4 kHz, 70 kHz</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>
</tr>
<tr>
<td>Linearity, % of the range</td>
<td>±0.1</td>
<td>±0.2</td>
<td>±0.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution, % of the range</td>
<td>0.01 of the range (digital output only)</td>
<td>0.03</td>
<td>0.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature drift</td>
<td>0.02% of the range/°C</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>
</tr>
<tr>
<td>Light source</td>
<td>red semiconductor laser, 660 nm wavelength or UV semiconductor laser 405 nm wavelength (BLUE version)</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>
</tr>
<tr>
<td>Output power</td>
<td>≤4.8 mW</td>
<td>≤20 mW</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laser safety Class</td>
<td>3R (IEC60825-1)</td>
<td>3B (IEC60825-1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (without cable)</td>
<td>500</td>
<td>2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

RF605 Series

COMPACT LASER SENSORS

RF605-

<table>
<thead>
<tr>
<th>25/50</th>
<th>45/100</th>
<th>65/250</th>
<th>105/500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base distance X, mm</td>
<td>25</td>
<td>45</td>
<td>65</td>
</tr>
<tr>
<td>Measurement range, mm</td>
<td>50</td>
<td>100</td>
<td>250</td>
</tr>
<tr>
<td>Max. measurement frequency</td>
<td>2000 Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linearity, % of the range</td>
<td>±0.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution, % of the range</td>
<td>0.01 (digital output only)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature drift</td>
<td>0.02% of the range/°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light source</td>
<td>red semiconductor laser, 660 nm wavelength</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output power</td>
<td>≤0.95 mW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laser safety Class</td>
<td>2 (IEC60825-1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (without cable)</td>
<td>60</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
LASER TRIANGULATION SENSORS

**SUPER COMPACT LASER SENSORS**

**RF602 Series**

- **Unique combination of dimensions, performance and operating ranges**

<table>
<thead>
<tr>
<th>RF602-20/10</th>
<th>20/20</th>
<th>30/30</th>
<th>50/50</th>
<th>75/75</th>
<th>105/105</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base distance X, mm</td>
<td>20</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>75</td>
</tr>
<tr>
<td>Measurement range, mm</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>100</td>
<td>250</td>
</tr>
<tr>
<td>Max. measurement frequency</td>
<td>9400 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linearity, % of the range</td>
<td>±0.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution, % of the range</td>
<td>0.01 (digital output only)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature drift</td>
<td>0.02% of the range/°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light source</td>
<td>red semiconductor laser, 660 nm wavelength or UV semiconductor laser 405 nm wavelength (BLUE version)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output power, mW</td>
<td>≤0.95 mW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laser safety Class</td>
<td>2 (IEC60825-1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**RF603 Series**

**SPECIFIC LASER SENSORS**

**FOR PAVEMENT PROFILE AND TEXTURE MEASUREMENT**

**RF60i Series**

- **Accuracy ± 0.03% of working range**
- **Sampling rate up to 70 kHz**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>SPECIFIC FEATURES</th>
<th>ASSIGNMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF603P-125/500</td>
<td>high resistance to solar radiation</td>
<td>Pavement profile measurement</td>
</tr>
<tr>
<td>RF603P-245/1000</td>
<td>high resistance to solar radiation, stable operation on wet surfaces, 70 kHz operating frequency</td>
<td>Pavement profile measurement</td>
</tr>
<tr>
<td>RF607-195/500</td>
<td>70 kHz operating frequency, round laser spot, diameter &lt;1 mm</td>
<td>Pavement profile measurement</td>
</tr>
<tr>
<td>RF607-210/230</td>
<td>70 kHz operating frequency, round laser spot, diameter &lt;0.8 mm, accuracy ±0.03% of the range</td>
<td>Pavement roughness (texture) measurement</td>
</tr>
<tr>
<td>RF607-230/250</td>
<td>70 kHz operating frequency, round laser spot, diameter &lt;0.8 mm, accuracy ±0.03% of the range</td>
<td>Pavement roughness (texture) measurement</td>
</tr>
<tr>
<td>RF60T-30/30</td>
<td>reduced triangulation angle, round laser spot, diameter &lt;60 um, simultaneously obtaining profile and image of the surface</td>
<td>Pavement roughness (texture) measurement</td>
</tr>
</tbody>
</table>
Contactless measurement of inner diameter, ovality, coaxiality, cylindricity and shape of holes, tubes, hosepipes, bushes, gun barrels, etc.

The probe is inserted into the hole and probe or sample is driven in rotation. Laser triangulation sensor built in the probe measures the distance to the hole wall synchronously with the rotation angle. The set of the polar surface coordinates allows to calculate the required parameters. Additional linear translation allows to build 3D model of the hole.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>RF609 (609Rt)-9/19</th>
<th>RF609 (609Rt)-16/48</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured diameters, mm</td>
<td>9,2…19</td>
<td>16…48</td>
</tr>
<tr>
<td>Diameter measurement accuracy, µm</td>
<td>±2</td>
<td>±10</td>
</tr>
<tr>
<td>Sensor measurement frequency, Hz</td>
<td>9400</td>
<td></td>
</tr>
<tr>
<td>Rotational speed for Rt version, no more rps</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Laser safety Class</td>
<td>2 (IEC60825-1)</td>
<td></td>
</tr>
<tr>
<td>Interface</td>
<td>RS232 or RS485 or Ethernet</td>
<td></td>
</tr>
<tr>
<td>Synchronization input:</td>
<td>trigger, A-B encoder, V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2,4-24</td>
<td></td>
</tr>
<tr>
<td>Minimal distance to the hole bottom, mm</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Hole depth, mm</td>
<td>by request</td>
<td></td>
</tr>
<tr>
<td>Power supply, V</td>
<td>9…36</td>
<td></td>
</tr>
<tr>
<td>Power consumption, W</td>
<td>1,5-2</td>
<td></td>
</tr>
</tbody>
</table>

* for other measured diameters and hole depth ranges please consult factory
ABSOLUTE LINEAR ENCODERS

Absolute linear encoders are designed for measuring and checking displacements, dimensions, run-outs, surface profiles and deformations of engineered objects.

- Innovative technology of absolute measurement
- Measuring ranges from 3 to 55 mm
- 0.1 um resolution
- Emulation of incremental encoder signals

### RF25X Series

<table>
<thead>
<tr>
<th>Measurement range, mm</th>
<th>3</th>
<th>25</th>
<th>15</th>
<th>35</th>
<th>55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy (at T=20 °C), um</td>
<td>±2</td>
<td>±3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution, um</td>
<td>0.1 or 0.5 or 1 or 5 or 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output interface</td>
<td>digital RS422 (RS485 and SSI or RS232) and (EncD5 or EncD10 – emulation of quadrature signals of incremental transducers)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog</td>
<td>no</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synchronization input</td>
<td>opto-isolated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logical outputs</td>
<td>two outputs, NPN: 100 mA max; 40 V max</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indication</td>
<td>two-color LED (red/green)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply, V</td>
<td>12 (without analogue output) 15 (with analogue output)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption, W</td>
<td>0.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>IP57</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating temperature, °C</td>
<td>-40...+50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (without cable), gram</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

CMOS sensor reads the signal from the scale
Quartz Glass Scale carries special positional pattern
LED forms parallel beam
Processor calculates scale position
PURPOSE
Contactless diameter, gaps and technological object position measurement.

WORKING PRINCIPLE
The micrometer operation is based on the so-called ‘shadow’ principle. The micrometer consists of two blocks – transmitter and receiver. Radiation of a semiconductor laser or LED is collimated by a lens. With an object placed in the collimated beam region, shadow image formed is scanned with a photo-detector array. A processor calculates the position (size) of the object from the position of shadow border (borders).

MODELS
- RF651 — universal micrometers
- RF656 — high-precision micrometers with telecentric optics
- RF656XY and RF656.3 — two and three axis micrometers
- RF656.2D — 2D optical micrometers
- RF659 — edge sensors

MAIN FEATURES
- Measurement range from 5 to 100 mm
- Up to ±0.3 um accuracy
- Up to 10 000 Hz sampling rate
- RS232/RS485/Ethernet/CAN +4...20 mA/0...10V
- Micrometers with telecentric lens
- Mutual synchronization of the sensors (master-slave) for multi-axis measurement tasks
- Service Software for micrometers parameterization
- Free SDK and examples for Windows, Linux, .NET, MathLAB, LabView
- Dual, three and multi axis Micrometers
- Air-knife window protection
RF656 TWO AND TREE AXIS MICROMETERS. TWIN MICROMETERS

The parameters for each axis of the micrometer match to the parameters of the corresponding single-axis micrometer, see Table above.

RF656XY-5

RF656XY-25

RF656XY-25

RF656XY-50
OPTICAL MICROMETERS

RF656 TWO AND TREE AXIS MICROMETERS. TWIN MICROMETERS

**RF656XY-75**

**RF656XY-100**

**RF656.3-25**

**RF656TWIN-75**

The sensors are intended for non-contact measuring and monitoring the position of the edge (edges) of various objects, such as tapes, plates, substrates, etc.

**Parameter | Value**
--- | ---
Distance between transmitter and receiver | 30 mm
Measurement range | 7 mm
Accuracy | ±20 um

SOFTWARE

RF659 Series

Measurement of geometrical parameters of complex objects.

Available in 2019

EDGE AND DIAMETER SENSORS
**PURPOSE**

Non-contact measuring and checking of surface profile, dimensions, deformations, flatness, gaps, volume, 3D models construction.

**WORKING PRINCIPLE**

Scanner operation is based on the principle of optical triangulation.

Radiation of a semiconductor laser is formed by a lens in a line and projected to an object. Radiation scattered from the object is collected by the lens and directed to a two-dimensional CMOS image sensor. The image of object outline thus formed is analyzed by a signal processor, which calculates the distance to the object (Z-coordinate) for each point of the set along the laser line on the object (X-coordinate). scanners are characterized by base distance (beginning of the range), SMR, for Z-coordinate, measuring range (MR) for Z-coordinate, measuring range for X-coordinate at the beginning of Z (Xsmr) and measuring range for X-coordinate at the end of Z (Xemr).

**MODELS**

- **RF627** — universal high-speed scanners
- **RF627Weld** — scanners for welding robots
- **RF627AVIKScan** — weld inspections scanners
- **RF627Smart** — scanners with in-built measurement functions (from September 2019)
- **RF629** — ultra-fast scanners, up to 50000 profiles/s (from September 2019)

**MAIN FEATURES**

- Measuring ranges from 10 to 1100 mm
- 0.05% linearity
- Sampling rate up to 6800 profiles/s
- Scanners with RED, BLUE and IR lasers
- Laser Safety Class 2M
- Binocular scanners
- Trigger and encoder synchronization, mutual synchronization
- WEB-interface
- Free SDK and examples for Windows, Linux, .NET, MathLAB, LabView
- Specialized scanners for hole control

---

**GAPS**

**DIAMETER**

**WELD JOINT**

**PROFILE**

**OBJECT**

**DIMENSIONS**
LASER SCANNERS

RF627 Series

OPTIONS

- Cooling plate with air-knife and air/water cooling
- Customized versions with non-standard base, range and housing shape
- Special version for use in vacuum conditions
- Special flexible cable for robotic applications

<table>
<thead>
<tr>
<th>RF627-</th>
<th>MR, mm</th>
<th>SMR, mm</th>
<th>EMR, mm</th>
<th>Xsmr, mm</th>
<th>Xemr, mm</th>
<th>Size, mm</th>
<th>Weight, g</th>
</tr>
</thead>
<tbody>
<tr>
<td>25/10-8/11</td>
<td>10</td>
<td>25</td>
<td>35</td>
<td>8</td>
<td>11</td>
<td>Fig. 1</td>
<td>0,37</td>
</tr>
<tr>
<td>65/25-20/22</td>
<td>25</td>
<td>65</td>
<td>90</td>
<td>20</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>75/50-30/41</td>
<td>50</td>
<td>75</td>
<td>125</td>
<td>30</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70/100-48/82</td>
<td>100</td>
<td>70</td>
<td>170</td>
<td>48</td>
<td>82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70/150-58/122</td>
<td>150</td>
<td>70</td>
<td>220</td>
<td>58</td>
<td>122</td>
<td></td>
<td></td>
</tr>
<tr>
<td>95/100-50/105</td>
<td>150</td>
<td>95</td>
<td>245</td>
<td>53</td>
<td>106</td>
<td></td>
<td></td>
</tr>
<tr>
<td>82/200-60/150</td>
<td>200</td>
<td>82</td>
<td>282</td>
<td>60</td>
<td>150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90/250-65/180</td>
<td>250</td>
<td>90</td>
<td>340</td>
<td>65</td>
<td>180</td>
<td></td>
<td></td>
</tr>
<tr>
<td>180/250-170/278</td>
<td>250</td>
<td>180</td>
<td>430</td>
<td>170</td>
<td>278</td>
<td></td>
<td></td>
</tr>
<tr>
<td>190/300-160/280</td>
<td>300</td>
<td>150</td>
<td>490</td>
<td>160</td>
<td>300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>220/300-200/330</td>
<td>300</td>
<td>220</td>
<td>520</td>
<td>203</td>
<td>330</td>
<td></td>
<td></td>
</tr>
<tr>
<td>260/400-210/400</td>
<td>400</td>
<td>260</td>
<td>660</td>
<td>210</td>
<td>400</td>
<td>Fig. 2</td>
<td>0,6</td>
</tr>
<tr>
<td>325/500-268/500</td>
<td>500</td>
<td>325</td>
<td>825</td>
<td>268</td>
<td>500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400/500-320/600</td>
<td>600</td>
<td>400</td>
<td>1000</td>
<td>320</td>
<td>600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>475/700-374/700</td>
<td>700</td>
<td>475</td>
<td>1175</td>
<td>374</td>
<td>700</td>
<td></td>
<td></td>
</tr>
<tr>
<td>545/800-425/800</td>
<td>800</td>
<td>545</td>
<td>1345</td>
<td>425</td>
<td>800</td>
<td></td>
<td></td>
</tr>
<tr>
<td>615/900-480/900</td>
<td>900</td>
<td>615</td>
<td>1515</td>
<td>480</td>
<td>900</td>
<td></td>
<td></td>
</tr>
<tr>
<td>690/1000-535/1000</td>
<td>1000</td>
<td>690</td>
<td>1690</td>
<td>535</td>
<td>1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>620/1165-430/1010</td>
<td>1165</td>
<td>620</td>
<td>1785</td>
<td>430</td>
<td>1010</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L=326</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>L=374</td>
<td>2,1</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>L=350</td>
<td>2,2</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>L=415</td>
<td>2,3</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>L=490</td>
<td>2,4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L=558</td>
<td>2,5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L=627</td>
<td>2,6</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>L=696</td>
<td>2,7</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>L=765</td>
<td>2,8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L=554</td>
<td>2,5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Overall specifications

- Sampling rate, Hz: Full range: 485 or 938 (DS mode), 5096 or 6800 (DS mode)
- Linearity Z, %FS: 0,05 or 0,1 for DS mode
- Linearity X, %FS: 0,1
- Resolution Z, %FS: 0,01% or 0,02% (DS mode)
- Resolution X: 648 or 1296 (programmable value)
- Environment resistance:
  - Enclosure rating: IP67
  - Vibration: 20g/10...1000Hz, 6 hours, for each of XYZ axes
  - Shock: 30 g/6 ms
- Ambient temperature, °C: 0...+40, (-20...+40 for the sensors with in-built heater), (-30...+120 for the sensors with in-built heater and water/air cooling housing)
- Relative humidity: 5-95% (no condensation)
- Storage temperature, °C: -20...+70
- Housing/windows material: aluminum/glass

SOFTWARE

- Setting sensor parameters
- Data receiving, storage, visualization

WEB-INTERFACE
for scanner parameterization, image and profile visualization
Rail profile control scanners with high-power (2W) IR laser

Ore volume control scanners with high-power (2W) IR laser

Internal thread control scanners
MAIN FEATURES
- Laser scanners and software for welding robots
- Recognition, tracking and measuring in real time
- Various protocols for communication with robots

Laser Scanners RF627Weld Series. Working ranges

<table>
<thead>
<tr>
<th>Range</th>
<th>SMR, mm</th>
<th>MRL, mm</th>
<th>Xmr, mm</th>
<th>Xmr, mm</th>
<th>Laser</th>
</tr>
</thead>
<tbody>
<tr>
<td>65/25-21/25</td>
<td>65</td>
<td>25</td>
<td>21</td>
<td>25</td>
<td>Class 2M</td>
</tr>
<tr>
<td>70/135-35/86</td>
<td>70</td>
<td>130</td>
<td>35</td>
<td>86</td>
<td></td>
</tr>
<tr>
<td>90/250-65/180</td>
<td>90</td>
<td>250</td>
<td>65</td>
<td>180</td>
<td></td>
</tr>
</tbody>
</table>

For the rest parameters see “Overall specifications” in the previous page.

LASER SCANNERS RF627WELD AND RIFTEK LAMIA SOFTWARE

RF627Weld-65/25-21/25 and RF627Weld-90/250-65/180

RF627Weld-70/130-35/86

Connect equipment in accordance with functional diagram:
1. Connection between the scanner and Controller RIFTEK RF017 (or PC) with Riftek Lamia
2. Connection between Controller RIFTEK RF017 (or PC) with Riftek Lamia and the robot controller
3. Connection between the robot and the robot controller

Select Template

Select Robot Exchange Protocol

START WORKING
Integrated in one system:
- 2D scanner for measurement control automation
- Video camera for visual control automation
- Sampling rate — more than 2000 profiles/s
- Linear parameters measurement error — ±0.05 mm for 100 mm range
- Defect detection (porosity, cracks)
- Real time OK/NOK analysis
- Systems mounted on the robot
- Interchangeable measuring heads with different ranges

### Technical Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>2D scanner VOF, mm</td>
<td>2 - 120, X - 30...110</td>
</tr>
<tr>
<td>Sampling frequency, profiles/s</td>
<td>&gt;2000</td>
</tr>
<tr>
<td>Measurement accuracy, mm</td>
<td>±0.05</td>
</tr>
<tr>
<td>X resolution, mm</td>
<td>0.025...0.08</td>
</tr>
<tr>
<td>Color camera resolution</td>
<td>1296 x 976</td>
</tr>
<tr>
<td>Camera speed, frames/s</td>
<td>120</td>
</tr>
<tr>
<td>Laser</td>
<td>red (660 nm) or blue (405 nm), Class 2</td>
</tr>
<tr>
<td>Working temperature, °C</td>
<td>-40...50</td>
</tr>
<tr>
<td>Measured parameters</td>
<td>width, height, angles, mismatch, undercut and so on</td>
</tr>
</tbody>
</table>

### Measurement Features

- Measurement of weld height and width, cutting depth, camber and etc.
- Weld control
- Edge preparation control

### Design

3D Visualization Software

Digital visualization of weld and preparation quality.
### 3D Laser Scanning Kit

3D Laser Scanning Kit is designed for mounting on any type of CNC machine and intended for non-contact scanning of products and obtaining 3D computer-simulated models.

In the scanning mode, the machine CNC system moves the sensor line-by-line over the item prototype. Thus, XYZ coordinate array for the surface is formed, i.e. a digital prototype model is created which is saved as a point cloud file as well as in a common STL format suitable for subsequent use in CNC.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials to be scanned</td>
<td>any material</td>
</tr>
<tr>
<td>Size of scanning area</td>
<td>arbitrary</td>
</tr>
<tr>
<td>Average scanning speed, points/s</td>
<td>up to 100 000</td>
</tr>
</tbody>
</table>

### 3D Laser Scanning Kit - SHTRIKH-2 Series

### 3D Measurement Machine - RF1010SS

3D measuring machine is designed for non-contact measurement of geometrical parameters of objects, specifically sunflower seeds. Laser scanner RF625 Series, that is installed in the machine, scans the objects and identifies it’s geometry. As result of scanning we get the parameters of every sunflower seed and their total quantity.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal sampling rate, profiles/sec</td>
<td>250</td>
</tr>
<tr>
<td>Scanning speed, mm/s</td>
<td>100</td>
</tr>
<tr>
<td>Accuracy, um</td>
<td>±150</td>
</tr>
</tbody>
</table>

### 3D Measurement Machine - RF1010SL

3D Measurement Machine was specially developed to measure suspension arm’s parameters for automotive industry. Laser scanner RF625 Series, which is installed in the machine, scans the suspension arm, measures and controls its geometrical parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal sampling rate, profiles/sec</td>
<td>250</td>
</tr>
<tr>
<td>Scanning speed, mm/s</td>
<td>50</td>
</tr>
<tr>
<td>Accuracy, % of the range</td>
<td>±0,1</td>
</tr>
</tbody>
</table>

### 3D Measurement Machine - RF1240TB Series

3D Measurement Machine is specially designed for control of geometric parameters of large diameter pipes. The machine consists of 24 wide-range high speed synchronized laser scanners type RF625-650 located on the outer circumference of the pipe, which makes it possible to inspect full profile of the pipe in the course of manufacture.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipes diameter range, mm</td>
<td>500...1450</td>
</tr>
<tr>
<td>Accuracy, mm</td>
<td>±0,1</td>
</tr>
</tbody>
</table>

Developed together with MARVIE LLC
Systems are intended for contactless measuring of inner diameter and profiles of gun barrels, cylindrical and taper pipes, progressive cavity stators, turbodrills and so on.

TWO WORKING PRINCIPLES
- Multisensor measurement by stationary laser sensors - RF040 Series
- Inner surface laser scanning by rotating sensors - RF096 Series

SYSTEMS PARAMETERS
- Measured ID – from 6 mm
- Up to several um accuracy
- Up to 32000 measured points on the surface in 2 seconds
- Calculation of ovality and roundness
- Surface defects detection and measurement
- 3D model of inner surface design

SYSTEM STRUCTURE
- Laser measurement module with
  - stationary sensors
  - rotating sensors
- Translation module intended for transportation of measurement module inside the pipe:
  - self propelled
  - any kind of pulling machine
- Software for PC
- Calibration rings

SYSTEM CAN CONTAIN
- Centering frame to hold measurement module near pipe axis
- Pipe straightness measurement module
- Video inspection module
- Wireless connection (Wi-Fi) module

MULTISENSOR MEASUREMENT HEAD

The Multisensor Measurement Module contains up to 6 laser triangulation sensors located circumferentially in one housing at known fixed angles. The measurement module is inserted into the pipe and moved by translation module to the definite position. Calibrated laser sensors measure distances to the inner surface. Software calculates diameter of the pipe.

MULTISENSOR LASER SYSTEM FOR SMOOTH GUN BARRELS CONTROL

Developed together with D-Test Company

**Parameter** | **Value**
---|---
6 laser triangulation sensors | 
Diameter range, mm | 65...115 or by request
Accuracy, % of range | ±0,1

**Parameter** | **Value**
---|---
Diameter of the module, mm | 70
Diameter range, mm | 95...195 mm (main range) 160...300 mm (extended range)
Accuracy, mm | ±0,05 mm (main range) ±0,2 mm (extended range)

Developed together with D-Test Company

**Parameter** | **Value**
---|---
Six triangulation sensors inside | 
Diameter range, mm | 125...132
Accuracy, um | ±2
Barrels straightness measurement accuracy, um | ±5
Self-propelled system for device translation
INNER DIAMETER MEASUREMENT SYSTEMS

MULTISENSOR MEASUREMENT MODULE CONTAINS

laser triangulation sensor 1 (one or several with different measurement range and stand-off distance), mounted on rotating platform 2, which contains motor 3 with electronic driver 4, and rotary encoder 5 coupled to the motor 3. The system also includes a tilt sensor 6, intended for control of inclination of rotating platform during measurement.

OPTIONS

in-built Wi-Fi module 7 is used for communication between the system and PC; the system can be powered from internal batteries 8.

2D laser scanner can be installed instead of points sensor.

The measurement module is inserted into the pipe and moved by pulling machine to the definite position.

Rotating laser sensor scans inner surface of the pipe and the module transmits polar coordinates of the surface (distance from rotation axis, measured by triangulation sensor and a corresponding angle, measured by encoder).

Software uses the set of transmitted coordinates

■ to calculate:
  • ID of measured pipe
  • ovality and roundness

■ to find:
  • surface defects

■ to design:
  • Full profile in definite section
  • 3D model of the pipe inner surface

WHEEL CENTER BORE INNER DIAMETER MEASURING GAUGE

MODEL RF096-50/70-200-C1b

Non-contact scanning and inner surface geometry measurement of wheel center bore.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotating measurement head with 2 sensors</td>
<td></td>
</tr>
<tr>
<td>ID range, mm</td>
<td>50...70</td>
</tr>
<tr>
<td>ID measurement accuracy, um</td>
<td>±5</td>
</tr>
<tr>
<td>Depth of measurement, mm</td>
<td>200</td>
</tr>
<tr>
<td>Autocalibration</td>
<td></td>
</tr>
</tbody>
</table>

MOBILE LASER SCANNING SYSTEM FOR PIPE DIAMETER CONTROL

■ Rotating measurement head with 2 sensors
■ Linear scanning along the tube

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID range, mm</td>
<td>146...176</td>
</tr>
<tr>
<td>ID measurement accuracy, um</td>
<td>±10</td>
</tr>
<tr>
<td>Depth of measurement, mm</td>
<td>programmable, up to 70</td>
</tr>
<tr>
<td>Battery power supply</td>
<td></td>
</tr>
<tr>
<td>Built-in Wi-Fi module</td>
<td></td>
</tr>
</tbody>
</table>

LASER SCANNING SYSTEMS FOR PIPE DIAMETER CONTROL

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID range, mm</td>
<td>45…55 or by request</td>
</tr>
<tr>
<td>ID measurement accuracy, um</td>
<td>±2</td>
</tr>
</tbody>
</table>
The system is intended for non-contact detection of the debris inside the circular grooves of different technological items, for example brake calipers and so on. The system can be used also for groove seal profiling (seal deformation inspection).

**Parameter** | **Value**
--- | ---
Inspected grooves diameter range, mm | 35-53
Minimal size of detected debris, mm | 0,1x0,1x0,1
Laser sensor linearity, um | ±10
Depth of measured hole, mm | 120
Inspection time, s | 1,2

---

**RF096-30/75-120**

The machine is designed for contactless scanning and geometrical parameters measurement of the leaf springs holes.

**LEAF SPRING HOLE INNER DIAMETER MEASUREMENT MACHINE**

**Parameter** | **Value**
--- | ---
Measured diameters, mm | 30-75
ID measurement accuracy, mm | ±0,04
Depth of measured hole, mm | 120
Measured parameters | diameter, roundness, conicity, cylindricity

**RF096-9/16-800**

The machine is designed for contactless scanning and geometrical parameters measurement of small diameter pipes.

**PIPES ID MEASUREMENT MACHINE**

**Parameter** | **Value**
--- | ---
ID measurement range, mm | ±5
Pipe length, mm | Up to 800

**RF096-35/50-100**

The machine is designed for in-line contactless scanning and geometrical parameters measurement of small diameter pipes.

**PIPES ID MEASUREMENT MACHINE**

**Parameter** | **Value**
--- | ---
ID measurement range, mm | ±5
Pipe length, mm | Up to 100
INNER DIAMETER MEASUREMENT SYSTEMS

PIPE INNER DIAMETER MEASUREMENT MACHINE

MODEL RF096-32/42-100

The machine is designed for contactless scanning and geometrical parameters measurement of inner diameter of pipes, bushes, holes, tubes, and so on.

Application of the machine - large-scale production.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured diameters, mm</td>
<td>32..42</td>
</tr>
<tr>
<td>ID measurement accuracy, um</td>
<td>±5</td>
</tr>
<tr>
<td>Depth of measured hole, mm</td>
<td>≤80</td>
</tr>
<tr>
<td>Measurement cycle (5 sections), s</td>
<td>13</td>
</tr>
</tbody>
</table>

LASER SCANNING SYSTEM FOR METALLURGICAL NOZZLE INNER DIAMETER CONTROL

MODEL RF096_Insp2D-50/140-1000-A

- 2D rotating laser scanner
- synchronous linear translation
- air cooling system
- generating of 3D model of inner surface
- surface defects detection

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured diameters, mm</td>
<td>50...140</td>
</tr>
<tr>
<td>ID measurement accuracy, um</td>
<td>±50</td>
</tr>
<tr>
<td>Minimum size of defects controlled, mm</td>
<td>0,1</td>
</tr>
</tbody>
</table>

ROTATING LASER SYSTEMS FOR GUN BARRELS CONTROL

The multipurpose instrument is designed to measure smooth and profiled pipes with various diameters, including conical and multi-conical tubes.

The instrument allows to measure:
- inner diameter;
- ovality;
- out-of-roundness;
- probe position in respect to the pipe end;
- profiling and rifling geometrical dimensions (step, height, width, spherical radius, angles);
- geometrical dimensions of visible superficial defects.

The probe may consist of:
- 2D laser rotating scanner (one or two);
- six-beam laser diameter sensor (one or two);
- front channel for non-straightness (warpage) measuring;
- laser distance meter which measures the distance from the probe to the pipe end to bind measured results;
- inclinometer;
- front/side video inspection channel (one or two).

Developed together with D-Test Company

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy:</td>
<td></td>
</tr>
<tr>
<td>Inner diameter, mm</td>
<td>±0,01</td>
</tr>
<tr>
<td>Ovality, mm</td>
<td>±0,01</td>
</tr>
<tr>
<td>Out-of-roundness, mm</td>
<td>±0,01</td>
</tr>
<tr>
<td>Non-straightness (warpage), mm</td>
<td>±0,01</td>
</tr>
<tr>
<td>Profile height, mm</td>
<td>±0,01</td>
</tr>
<tr>
<td>Profile width, mm</td>
<td>±0,05</td>
</tr>
</tbody>
</table>
SPECIAL MEASUREMENT SYSTEMS

LAMINATED TUBES GEOMETRY MEASUREMENT SYSTEM

The system is designed for contactless scanning and geometrical parameters (outer and inner diameter, foil thickness, weld width, tube length) measurement of laminated tubes, made of PBL and ABL foil.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured diameters, mm</td>
<td>13...50</td>
</tr>
<tr>
<td>Diameter measurement accuracy, um</td>
<td>±10</td>
</tr>
<tr>
<td>Foil thickness range, mm</td>
<td>0,05...0,5</td>
</tr>
<tr>
<td>Foil and weld thickness measurement accuracy, um</td>
<td>±5</td>
</tr>
<tr>
<td>Tube length measurement accuracy, mm</td>
<td>±0,1</td>
</tr>
<tr>
<td>Interface to PC</td>
<td>Ethernet</td>
</tr>
<tr>
<td>Power supply</td>
<td>220</td>
</tr>
</tbody>
</table>

ONLINE SYSTEMS FOR CONTROL AND REGULATION OF DIAMETER

The systems are designed for non-contact measurement, control and regulation of diameter of technological objects (wire, fiber, hoses, tubes, rods, sausage casings) during their production.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured diameters, mm</td>
<td>0,3...100</td>
</tr>
<tr>
<td>Accuracy, um</td>
<td>from ±1</td>
</tr>
<tr>
<td>Number controlled sections</td>
<td>up to 6</td>
</tr>
</tbody>
</table>

Laser systems for sheet materials thickness control

The systems are intended for in-process contactless measurements of thickness of various sheet materials (plastic, metal, rubber).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured diameters, mm</td>
<td>0,1...25</td>
</tr>
<tr>
<td>Accuracy, um</td>
<td>±1</td>
</tr>
<tr>
<td>Carriage movement range, mm</td>
<td>200</td>
</tr>
<tr>
<td>Scanning speed, mm/s</td>
<td>50</td>
</tr>
</tbody>
</table>

AUTOMATED SYSTEM FOR MOTOR SHAFTS MEASUREMENT

The system is designed for motor shafts measurement and control.

ADVANTAGES
- Manufacturing process optimization
- Continuous quality monitoring

OPTIONS
- Based on laser triangulation sensors
- Based on laser scanners
- Based on optical micrometers
- Based on laser absolute linear sensors

WORKING PRINCIPLE

Parameter | Value |
---|---|
Measured diameters, mm | 0,1...25 |
Accuracy, um | ±1 |
Carriage movement range, mm | 200 |
Scanning speed, mm/s | 50 |
SPEED AND DISTANCE SENSORS

The sensors are intended for automotive and industrial application for precise contactless measurement of speed and length of nearly any moving object.

Designed for use in automobile and railway transport, metallurgy, cable, chemical, pulp and paper, textile and wood industries, in automated control systems, cutting and accounting systems.

### ISD-3 Parameter | Value | Comments
--- | --- | ---
Speed range, Km/h | 0,4 – 200 | At TTLout 400 Hz per m/s. Others on request
Speed accuracy | ±0,2 % RMS | Determined on test bench (treadmill) at 18,38 km/h
Absolute distance accuracy | ±0,2 % RMS | After calibration at S >100 m
Measuring frequency, Hz | 22 | Up to 800 mm on request
Nominal distance to the road and tolerance (range of working distance), mm | 280 ± 140 (140 – 420) | Up to 10 m on request
System power supply (tolerance) | 12 V nominal (11 – 14,5V) | Sensor head: 10 W Processor unit: 5 W
System power consumption, W | Sensor head: 10 W Processor unit: 5 W | Sensor head: 10 W Processor unit: 5 W
Sensor head operation temperature range, °C | -20…+50 | Without cable
Weight of the sensor + mounting bracket, g | 280 + 120 | Without cable
Weight of the processor unit, g | 400 | Without cable
Sensor dimensions, mm | Ø55 x 205 + illuminator | Ø55 x 205 + illuminator
Processor unit dimensions, mm | 120x100x35 | 75x75x35
Sensor cable length, m | 2,5 | Up to 10 m on request
System power cable length, m | 2 | Up to 10 m on request
Environmental sensor head protection | IP67 | IP67
Magnetic fixing tool | 4 magnets x 16 kg strength | 4 magnets x 16 kg strength
Output signal | TTL (SMOS) 0 – 5 V meander type, 400 Hz per m/s (=400 pulses/m) | Others on request

### ISD-5 Parameter | ISD-5 Standard | ISD-5 Mini | Comments
--- | --- | --- | ---
Speed range, m/s | 0,02 - 20 | 0,005 - 5 | Typical values. The less nominal working distance the less min and max speed range
Speed accuracy*, % RMS | ±0,07 ±0,02 | ±0,15 ±0,05 | No signal averaging
With averaging 0,2 - 0,3 s, at V > 1 m/s
Length accuracy*, % RMS | <±0,05 | <±0,1 | While pre-calibration for path lengths > 2 m
Measuring frequency, Hz | 16 - 54 | 10, 20, 30, 50, 100 | 10, 15, 20
Nominal distance to the object (tolerance), cm | 10, 20, 50, 75, 100 | 10, 15, 20 | Could be noted at ordering
Distance tolerance | ±20-25% of nominal | Depends on the surface (on the edge of the range signal decreased)
Emitter type, mW | Visible or IR c.v. laser, 5 – 120 | Visible c.v. laser, <5 | Class 3B – 3R
Power supply, V | 12 (8 - 14) | Internal linear voltage regulators +5V in sensor and controller unit
Power consumption, W: Sensor Controller unit | 0,5 - 2 | 0,5 | 1
Temperature working range, °C | +15…+50 | -10...+50 – with active thermostabilization option): -50...+80°C with protect air cooling housing (option)
Sensor weight, g | 320 | 70 | Without connector, blend and fixing holes
Sensor size, mm | 85х79х46 | 58х43х30 | Without connector, blend and fixing holes
Sensor cable length from sensor to controller unit, V | 1,8 or 3 | Standard cable RS-232 or VGA with DB9 connectors are used. To extend a length it is possible to connect cables sequential
Sensor environmental protection | IP67 | IP67 | IP67
Controller unit:
Dimensions, mm | 120х100х35 | Weight, g | 350
Weight, g | 350 | Analog out: Length, 2000 pulses/m (=speed 2000 Hz/(m/s), meander 0 – 3 V, TTL compatible, up to 200 kHz)
Frequency out: Ethernet (UDP protocol) | Others on request | Digital out: | Physical data latency at measurement freq, ms | 9 | 31 | Stable, ≈½ of measuring time, without averaging
Base Software | - Program to read data via Ethernet, visualization and saving data, - Program for sensor diagnostics, - Read data example (LabView 8.2.1 and higher), - Dynamic library (DLL) to read data via Ethernet, - Sensor parameters configuration via any Internet browser | Custom software by request are possible
The laser profilometer is designed for measuring:
- flange thickness, slope and height, rim/tire thickness,
- full profile scanning and analysis 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.

The device is supplied with database and software package for wheel sets wear data storage and processing.

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range flange heigh, mm</td>
<td>20...45</td>
</tr>
<tr>
<td>flange thickness, mm</td>
<td>20...50</td>
</tr>
<tr>
<td>flange slope, mm</td>
<td>1...15</td>
</tr>
<tr>
<td>rim thickness, mm</td>
<td>36...100 (30...90)</td>
</tr>
<tr>
<td>diameter (calculation method), mm</td>
<td>400...1400</td>
</tr>
<tr>
<td>Measurement error flange heigh, mm</td>
<td>± 0,03</td>
</tr>
<tr>
<td>flange thickness, mm</td>
<td>± 0,03</td>
</tr>
<tr>
<td>flange slope, mm</td>
<td>± 0,1</td>
</tr>
<tr>
<td>rim thickness, mm</td>
<td>± 0,1</td>
</tr>
<tr>
<td>diameter, mm</td>
<td>± 0,3</td>
</tr>
<tr>
<td>Discreteness of indication all parameters, mm</td>
<td>0,01</td>
</tr>
<tr>
<td>Profile measurement range, mm</td>
<td>145</td>
</tr>
<tr>
<td>Discreteness of the profile formation, not worse than, mm</td>
<td>0,025 (5800 points for profile)</td>
</tr>
<tr>
<td>Power supply (laser scanning module)</td>
<td>3,7V, Li-ion rechargeable battery 5400mAh for standard IKP and 2400mAh for Short and SShort</td>
</tr>
<tr>
<td>The number of measurements that can be taken before battery recharge is not less than</td>
<td>5000 for standard IKP and 2200 for Short and Super-short</td>
</tr>
<tr>
<td>Laser module battery life time</td>
<td>5 million measurement cycles</td>
</tr>
<tr>
<td>Power supply (PDA)</td>
<td>Li-polymer battery 3300mAh</td>
</tr>
<tr>
<td>PDA memory capacity</td>
<td>100 000 measurements</td>
</tr>
<tr>
<td>Interface between laser scanning module and PDA</td>
<td>Bluetooth</td>
</tr>
<tr>
<td>Working temperature range, °C</td>
<td>-20...+50</td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>IP42 or IP64</td>
</tr>
</tbody>
</table>

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

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.

**MAIN FEATURES**
- User-Friendly Interface;
- Flexible setting of measured Parameters of the Wheel Flange;
- The list of Calculated Parameters:
  - Flange Height, Thickness and Slope,
  - Wear parameters (Vertical, Horizontal and Angular Wear, Hollow, Difference of Diameters, Even/Uneven Wear),
  - Angular Profile Parameters,
  - Rim Width and Thickness,
  - Wheel Diameter,
  - Wheel Defects (Slides and Cavities),
- Setting of displayed Identification Parameters of the Wheelset. I.e., you can select only required parameters (number, series, operator, mileage, and etc.) for displaying on the screen;
- Simple Calibration Procedure: it performs automatically by clicking one button;
- The possibility to compare several Saved Profiles;
- The possibility to align Measured Profile manually (by buttons) relative to the reference with saving;
- Possibility to save several Bluetooth-devices in the PDA memory and then to select the required one from the list. I.e. You save addresses of several IKP and after that you need only to select the required one from the list without a necessity of searching procedure (the same is for IMR and IDK);
- Possibility to connect PDA to PC as an External Storage Device (alternative of ActiveSync).
Electronic gauge is designed for measuring wheel rolling circle diameter. Measurements are made directly on rolling stock without wheel set roll-out. The measurement of the diameter is performed according to the “three points” technique, without the complete wheel coverage.

The gauge contains numeric display to show the value of the wheel diameter. IDK-BT gauge contains Bluetooth interface for transfer results into wheel-set wear database management system.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range, mm</td>
<td>400…1400 or on request</td>
</tr>
<tr>
<td>Measurement error, mm</td>
<td>±0.2</td>
</tr>
<tr>
<td>Indication discreteness</td>
<td>0.1mm, 0.01mm * or 0.01 inch **</td>
</tr>
<tr>
<td>Position of measurement, S, mm</td>
<td>On request</td>
</tr>
<tr>
<td>Distance between axes of ball bearings (base), mm and diameters measurement range, mm</td>
<td>122±0.5 (400…750 mm) or 200±0.5 (400…950 mm) or 250±0.5 (750…950 mm) or 300±0.5 (720…1400 mm)</td>
</tr>
<tr>
<td>Display</td>
<td>build-in, LED</td>
</tr>
<tr>
<td>Operating temperature, °C</td>
<td>-15...+55</td>
</tr>
<tr>
<td>Power supply</td>
<td>rechargeable battery 2 x AAA 1.2V</td>
</tr>
<tr>
<td>Weight, kg</td>
<td>0.5</td>
</tr>
<tr>
<td>The number of measurements that can be taken before battery recharge is not less than</td>
<td>1000</td>
</tr>
</tbody>
</table>

Special models of IKP-5 and IDK are designed especially for measurement of wheels with restricted space for device placement (tramway wheels):

- Laser Wheel Profile Gauge model IKP-5-short (Fig. A) with a shortened handle,
- Laser Wheel Profile Gauge model IKP-5-Super short (Fig. B) version for Ansaldo Breda low floor trams,
- Wheel Diameter Measurement Gauge model IDK-compact (Fig. C) with the measurement base (distance between ball supports) of the gauge 122 mm and diameter measurement range 400…750 mm.

The device consists of frame for device placement on the rails and laser measurement head placed with possibility of linear translation. The measurements are carried out automatically. The measurement result is rails transfer profile.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range, mm</td>
<td>600</td>
</tr>
<tr>
<td>Measurement error, mm</td>
<td>±0.1</td>
</tr>
</tbody>
</table>
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. The method of measurement is based on direct measurement the distance by contactless laser sensor. Measurements are made directly on rolling stock without wheel set roll-out.

**IMR SERIES**

![IMR Gauge Image]

- **Parameter** | **Value**
  | **Value**
- Measurement range, mm | ±25 (L – nominal distance)
- Measurement error, mm | ±0.1
- Indication discreteness | 0.1mm, or 0.01 inch **
- Display | build-in, LED
- Operating temperature, °C | -15…+50
- Weigh, kg | 1
- Dimensions, mm | D=127х30х124
- Power supply | rechargeable batteries 2xAAA, 1.2V

**IMR-L SERIES**

![IMR-L Gauge Image]

- **Parameter** | **Value**
  | **Value**
- Measurement range, mm | 1360…1440 or on request (nominal distance ± 15mm)
- Measurement error, mm | ±0.3
- Indication discreteness | 0.1mm, 0.01mm * or 0.01 inch
- Display | build-in, LED
- Operating temperature, °C | -15…+50
- Weigh, kg | 0.88
- Dimensions, mm | 234,2x87,7x32
- Power supply | rechargeable batteries 4 x AA 1.2V
- Connection to PC | Bluetooth

**DISK BRAKES PROFILE GAUGE**

Profilometer uses non-contact method of registration with a laser sensor and a scanning device.

**MAIN FUNCTIONALITY**

- obtaining data on the parameters of railway wheel disk brakes working surface;
- full profile scanning and analysis of the working surface of disk brakes;
- visualization of combined graphic images of the actual and new profiles of the wheel brake disks;
- support of the electronic database of profiles.

**Parameter** | **Value**
| **Value**
- Measurement range, mm | 30
- Profile measurement range, mm | 150
- Measurement error | ± 0.03
- Discreteness of indication, mm | 0.01
- Discreteness of the profile formation, not worse than, mm | 0.1
- Power supply, laser module | 3,7 Li-ion rechargeable battery 6800 mAh
- Power supply, PDA | 3,7 Li-polymer battery 3300 mAh
- The number of measurements that can be taken before battery recharge is not less than | 1000
- PDA memory capacity | 100 000 measurements
- Interface between laser scanning module and PDA | Bluetooth
- Working temperature range, °C | -15…+35
- Enclosure rating | IP42

www.riftek.com
MEASUREMENT INSTRUMENTS FOR RAILWAY TRANSPORT

Portable laser rail profilometer (PRP) is designed for non-contact registration of cross-section of the railhead acting face.

The profilometer uses non-contact method of registration with a laser sensor and a scanning device.

MAIN FUNCTIONALITY
- 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 crosssection.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Railhead vertical wear, mm</td>
<td>± 15.0...+20.0</td>
</tr>
<tr>
<td>Lateral railhead wear, mm</td>
<td>± 15.0...+20.0</td>
</tr>
<tr>
<td>Redused railhead wear, mm</td>
<td>Up to 20.0</td>
</tr>
<tr>
<td>Scanning angle inside the rail track, degrees</td>
<td>108</td>
</tr>
<tr>
<td>Scanning angle outside the rail track, degrees</td>
<td>108</td>
</tr>
<tr>
<td>Measurement error, not more than, mm</td>
<td>± 0.03</td>
</tr>
<tr>
<td>Scanning time, sec</td>
<td>0.1-12</td>
</tr>
<tr>
<td>Digital readout device (PDA) dimensions, mm</td>
<td>112.5x95.5x22.7</td>
</tr>
<tr>
<td>Laser module dimensions, mm</td>
<td>293x230x230</td>
</tr>
<tr>
<td>Power supply, laser module</td>
<td>3.7V, Li-ion battery, 6800mAh</td>
</tr>
<tr>
<td>Power supply, PDA</td>
<td>3.7V, Li-polymer battery, 3300mAh</td>
</tr>
<tr>
<td>The number of measurements that can be taken before battery recharge is not less than</td>
<td>500</td>
</tr>
<tr>
<td>PDA memory capacity, no less</td>
<td>100 000 measurements</td>
</tr>
<tr>
<td>Interface to PC</td>
<td>Bluetooth</td>
</tr>
</tbody>
</table>

The system is intended for contactless automatic real-time measurement of geometrical parameters of railway vehicles (locomotives, railcars, subway, trams) and uses combination of 2D laser scanners mounted wayside in the track area and calibrated into one common coordinate system.

Measurement cycle starts when an inductive sensor detects a wheel.

While the wheel passes through the system of synchronized 2D laser scanners its profile is taken at many sections.

All measurement readings for all the wheels are sent through Ethernet to control computer for profiles reconstruction and dimensions calculations.

Finally, all the data are collected in the host depot computer in wheel sets wear database.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheel profiles</td>
<td>± 0.1 mm</td>
</tr>
<tr>
<td>Flange height</td>
<td>± 0.1 mm</td>
</tr>
<tr>
<td>Flange width</td>
<td>± 0.1 mm</td>
</tr>
<tr>
<td>Flange angle</td>
<td>± 0.1 mm</td>
</tr>
<tr>
<td>Rim thickness</td>
<td>± 0.1 mm</td>
</tr>
<tr>
<td>Tread width</td>
<td>± 0.1 mm</td>
</tr>
<tr>
<td>Back to back gauge</td>
<td>± 0.05 mm</td>
</tr>
<tr>
<td>Wheel diameter</td>
<td>± 0.2 mm</td>
</tr>
</tbody>
</table>
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