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LASER GAUGE

LaserGauge Europe Distributor



Specialists in tools and measuring technology.

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● Service from specialists

for:

- LaserGauge-hand sensors
 - HS761
 - HS703
 - HS702 – Blau
 - TS-800
 - HS-733LE
- LaserGauge Automation
 - RS763
- Special sensors and controllers
 - LG5000 Controller
 - LG7000 Controller
 - GTR-1
 - PFG-3
 - 4DInSpec – 3D Scanner
- software
 - LGWorks
 - LGWorks-RT3
 - LGMonitor

● Specialists in tools and measuring technology.



● LaserGauge HS761 Sensor



HS761 Cross-Vector Sensor

With unique Cross-Vector scanning technology, the **HS761** provides more surface information around the edges of surfaces than any other handheld laser profiler. It is used primarily for measuring the gap and flush between assembled panels.

The HS761 sensor is a complete measurement system. No external components are needed. Utilizing a powerful 1GHz processor, measurements take less than two second. The 3.5" color display provides detailed graphics of plotted surface profiles, and the touch screen allows for easy menu navigation and expanded graphic functions.

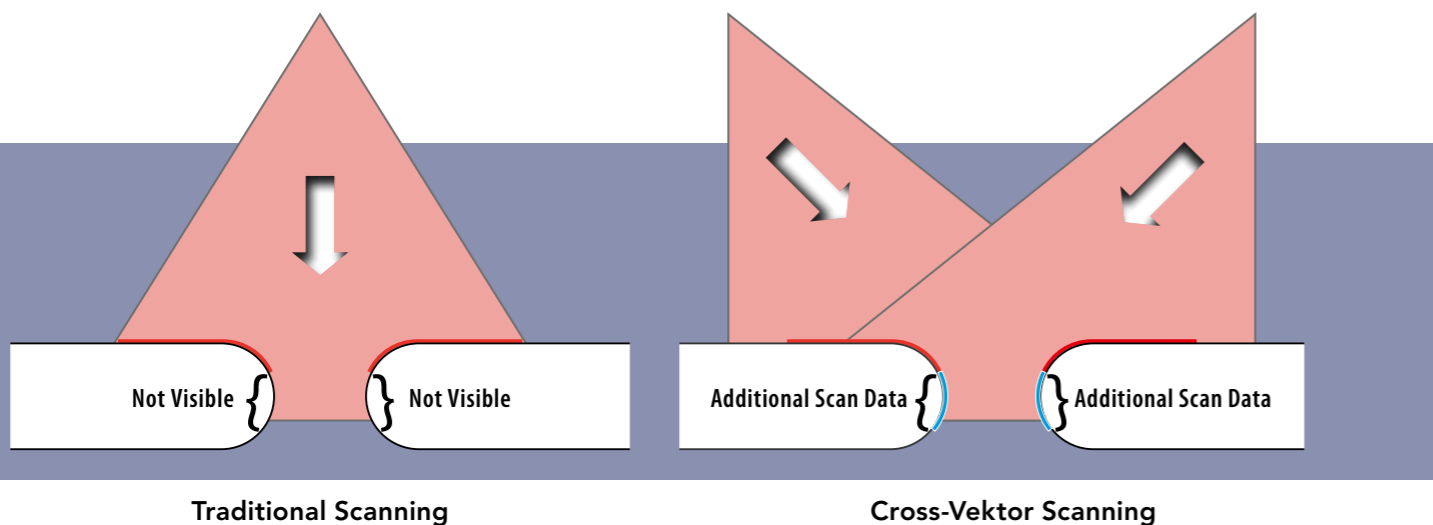
Operating Features

■ **Cross-Vector Scanning** – Traditional laser profilers utilize a single laser stripe coupled with a single imager to capture surface scans. But a single view cannot see surface points around the radius on the edge of the gap. The Cross-Vector sensor utilizes multiple lasers and multiple views at crossing angles. This allows the sensor to see around edges of the radius to the vertical tangent and beyond. The result is a complete surface profile and the most accurate gap measurements. (See the pictures below)

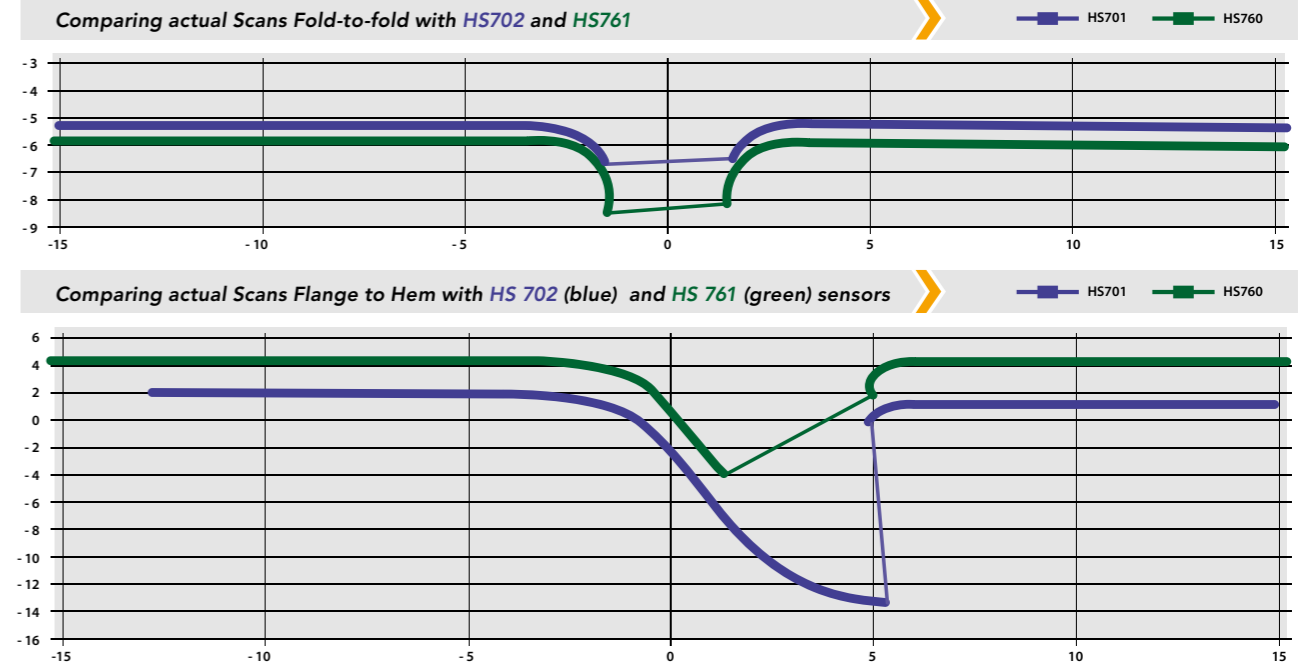
■ **User Interface** – The touch screen is used to navigate menus and access on-screen functions, or the 5-way joystick and two keypad buttons can be used to perform all the same operations without having to use a secondhand. Color LED's on the top and the underside of the sensor provide feedback on sensor positioning, scan completion, and scanning error. Menus can be displayed in selected languages and measurements can be expressed in inches or millimeters.

● **Sensor Specification:**

1. 100% compatible with all exciting LaserGauge® routines and gauge algorithm
2. 3,5" color display with touchscreen
3. 5-way Joystick and two Buttons
4. 1 GHz processor
5. 8 GB memory of Data/Scans/Routines
6. runs with all exciting LaserGauge routines
7. integrated Barcode scanner
8. Zigbee Wireless
9. connected by USB cable files can be easy transfered



● LaserGauge HS761 Sensor



■ **Color Display** – The 3.5" high resolution color LCD provides graphical and textual information before, during and after the scanning. The surface profile is plotted in real-time and the measurement results are instantly written to the data table. Results are color coded for immediate identification of our-of-spec conditions.

■ **Routine and Gauge Modes** – Inspection routines developed using the LGWorks software can be run directly on the sensor. Detailed graphics and on-screen messages guide the inspector from on measurement to the next. Complex calculations referencing measurement data can be processed in the routine and included in data file.

■ **Wireless Communications** – Data files and scan files that have been saved on the sensor can be retrieved wireless using the integral 2.4GHz ZigBee module to a matching USB stick plugged into a local computer. When connected by a USB cable to a computer, the sensor is mapped as a USB drive and files can be dragged and dropped for easy transfer.

Powerful ARM processor

The HS761 is utilizing a powerful 1GHz processor. In combination with a Linux system and a powerful graphical-chip is the HS761 a high-performance sensor. The HS761 gives more accurate surface information and allows measurement in less than two seconds.



● LaserGauge HS703 Sensor



HS703

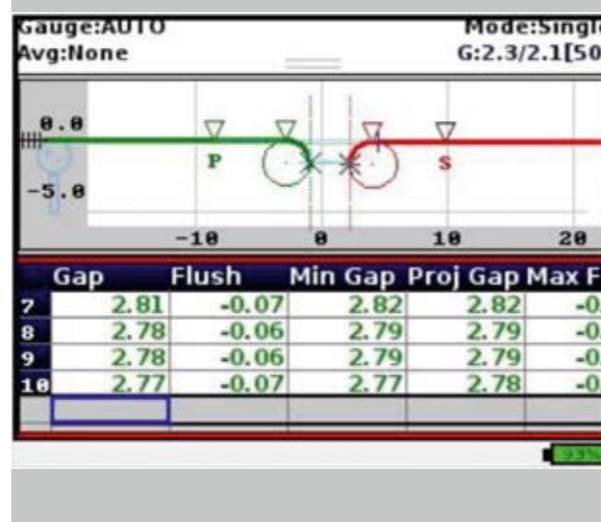
The **HS703** is the fastest and most versatile of the LaserGauge® DSP sensors. A high resolution imager and 1GHz processor produce accurate measurements in less than one second.

All operations are performed on the sensor. The 3.5" color display provides detailed graphics of plotted profiles, and the touch screen allows for easy menu navigation and expanded graphic functions. All of the LaserGauge® measurement gauges and algorithms run on the HS703; and the powerful onboard processor provides the advanced functions of high contrast and multi-angle scanning effortless.

Operating Features

■ **Color Display** – The 3.5" high resolution color LCD provides graphical and textual information before, during and after the scanning. The surface profile is plotted in real-time and the measurement results are instantly written to the data table. Results are color coded for immediate identification of out-of-spec conditions.

■ **Routine and Gauge Modes** – Inspection routines developed using the LGWorks software run directly on the sensor in the Routine Mode. Detailed graphics and on-screen messages guide the inspector from on measurement to the next. Scans can automatically be saved, measurements can be retaken at any time, and calculations viewed as the countersink or fastener algorithm. Pan and Zoom functions on the graph allow for the analysis of the scan. Data is written to a table and saved automatically.



● LaserGauge HS703 Sensor



■ **User Interface** – Operators can use the touch screen to navigate menus and access on-screen functions, or the 5-way joystick and two keypad buttons can be used to perform all the same operations without needing a second hand. Color LED's on the top and the bottom of the sensor provide roll angle and error feedback on each screen.

■ **Wireless Communication** – Data files and scan files that have been saved on the sensor can be retrieved wirelessly using the integral 2.4GHz ZigBee module to a matching USB stick plugged into a local computer. A USB cable can also be used files to and retrieve files from a computer.

■ **Power** – A rechargeable, lithium-ion battery provides power for three to four hours of constant operation. Power saving functions can be used to extend operating times even longer. Files are constantly saved, so data is never lost. The on-screen fuel gauge and a "low battery" message informs the operator when it is time for a fresh battery.

■ **Options** – A barcode reader can be added to the sensor for automatic documentation of part number or identification numbers such as VIN's. An optional holster and belt can be used to secure and protect the sensor while the operator moves from part to part.

Advantages

■ **Speed** – Measurements are completed in less than one second.

■ **High Resolution** – With a horizontal scanning resolution of 1280 surface points within the field-of-view, the sensor has 250% the resolution of most other handheld profilers.

■ **Complete System** – The HS703 is a complete inspection system. With its powerful processor, it can run complex inspection routines or be used as a GO/NO Gauge.

Type	DSP – Handheld
Size	Ca. 91,44mm (3,6") x 96,52 (3,8") x 246,40mm (9,7") (w/h/l)
Weight	0,65 Kg (23 oz.) / 0,77 KG (27 oz.) with Akku
User Interface	3,5" Color Display, 2 sets of 3 LED's, 5-Way Joystick and 2 Keypad Buttons
Communications	Wireless – 2.4GHz ZigBee module with ZigBee USB Stick for computer Cable – USB 2.0A to Mini 5-Pin USB
Processor	1GHz Speed
Memory	8GB of data/scans/routines
Battery	Rechargeable lithium-ion Akku
FOV Options / Horizontal Scanning Resolution / Depth Accuracy	30mm (1,20") / 20µm (0,0008") / ±20µm (0,0008")
Shock Protection	Cast urethane housing
Environment	0° - 70° C



● LaserGauge HS702 Blau



HS702 Blue Laser

The **HS702** with Blue Laser Technology is the smallest and most rugged of the LaserGauge® DSP sensors. It is perfect for high volume applications, such as measuring gap/flush measurements to be taken around spilt taillights, windshields, clear headlights, red and amber lenses, chrome and glass around transparent or translucent surfaces as well as gap/flush on solid metal or plastic body panels. With the 1GHz processor, accurate measurements are completed in less than one second. All operations are performed on the sensor. An integral battery powers the sensor. No cables are needed.

Blue Laser Technology When measuring on opaque, transparent or translucent materials, the reduced wavelength of the blue laser light does not penetrate the measuring object. The blue laser generates a minimal laser point on the surface and therefore offers stable, precise results on measuring objects that are normally considered as critical.

Sensor Specifications

1. 100% compatible with exciting LaserGauge routines and algorithm
2. 5-Way Joystick and 2 Keypad Buttons
3. USB 2.0A to Mini 5-Pin USB
4. 1 GHz processor
5. 8GB of data/scans/routines
6. MultiAngle scanning mode, provides additional surface information when measuring on opaque surfaces. This allows quicker gauge parameter setup.
7. Zigbee Wireless, Data files and scan files that have been saved on the sensor can be retrieved wirelessly using the integral 2.4GHz Zigbee module in the sensor matching USB stick plugged into a local computer.
8. Barcode Module, a barcode module can be installed on the front of the sensor to scan the identification number of assemblies or parts, such as the VIN or serial number.



● LaserGauge TS800 Sensor



TS800 Sensor

The **TS800 USB** sensor is specifically designed for inspecting and measuring small features in hard-to-access areas. Applications include edge radius, break angles, chamfer angle and length, gap/flush, step height and other measurements where accessibility to the feature is limited.



As with the other LaserGauge® USB sensors, a high-resolution imager captures the 2D surface profile and transfer it to a PC or to the LG5000 controller for processing and display.

Operating Features

Design – The TS800 is the smallest, most compact sensor in the LaserGauge® product offering. The unique removable standoff guides the user for correct alignment to ensure accurate measurement. The sensor's small size, light weight, reduced footprint and narrow tapered stem gives it access to highly restricted areas.

High Resolution – With a horizontal scanning resolution of around 8µm (0.0003") and a depth accuracy of around ± 6µm (0.00025") in the around 13mm (0.5") field-of-view (FOV) model, the sensor is ideal for measuring the smallest of features. The TS800 is available in a around 13mm (0.5") or around 25mm (1.0") field-of-view (FOV).



Configuration Software – A powerful, Windows™ based software program, LGcommander, is used to configure the sensor and run the algorithm. Scans are displayed in real time and can be saved automatically. Setups, user rights and operational preferences can be safeguarded under passwords, and certification of the gauge for a specific application can be managed the LGCommander software or with an LG5000 controller.

Type	DSP – Handheld
Size	44,45mm (1,75") x 66mm (2,6") x 165mm (6,5") (w/h/l)
Weight	0,18 Kg (6.5 oz.)
User Interface	2 sets of 3 feedback LED's
Cabel Length	USB 2.0A zu 5-Pin USB Stecker, 1,8 mtr. (6')
FOV Options	ca. 13mm (0,50") ca. 25mm (1")
Horizontal Scanning Resolution	ca. 8µm (0,0003")
Depth Accuracy	ca. ±12µm (0,00025")



● LaserGauge HS733LE



HS733LE

Tragbarer Anströmkanten-Sensor

The **HS733LE** sensor is used to inspect the leading edge of blades or vanes used in aircraft and power system engines. Designed to scan both sides of the blade simultaneously, the sensor returns a complete profile around the radius of the blade, which allows the accurate measurement of the thickness and the plotting of the blade profile for comparison to its engineering design. The edge radius can also be analyzed.

The sensor connects to a laptop or tablet PC via USB 2.0 cable. No other hardware or external power source is required.



Measurement Range

The HS733LE is designed to scan smaller blades and to fit into tighter spaces than the HS730LE model. The HS733LE has a around 3,81mm (0.150-inch) FOV. The table below shows the range of blade sizes that can be measured using the HS733LE sensor. The range is expressed in terms of the maximum blade thickness at a distance back from the leading edge. This distance is called the setback distance.

Blade Thickness	Maximum Setback
1,27 mm	6,35 mm
0,25 mm	5,72 mm
3,81 mm	5,08 mm

Resolution

With a around 3,81mm (0.150") FOV, the HS733LE has a scanning resolution of around 5µm (0.0002") and a measurement accuracy to within around 12 µm (0.0005) on the thickness.

Connectivity

The hand-held sensor is connected to a computer, laptop or tablet pc with a cable to a USB 2.0 port providing 500mA. No other hardware or external power source is required.

Feedback

Scanning is as simple as positioning the sensor on the edge of the blade and pulling the sensor trigger. Raw video and the plotted profile are displayed in real-time on the laptop or computer used with the sensor. Measurement are recorded when the trigger is released. Out-of-spec conditions are flagged with color symbols.



● LaserGauge HS733LE



Measurement

Blade Thickness

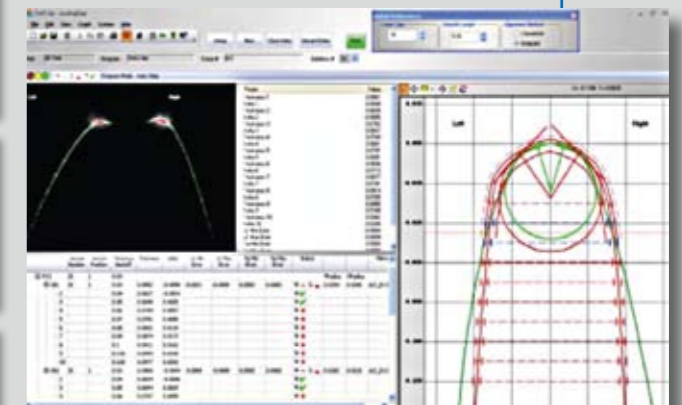
Blade thickness measured at specified distances (setback) from the leading edge. Thickness can be measured at up to 10 locations on the blade.

Profile Deviation

Profile of actual blade deviating outside a specified tolerance band around the blade design nominal, specified using customer engineering drawings as templates.

Edge Radius

Radius fit to the edge can be calculated automatically with each scan or with on-screen tools.



Programs

Separate programs can be developed for different blades, specifying different profile nominals and templates and different setback distances for thickness measurements.

Documentation

Data displayed in the table can be saved. The blade profile can be saved automatically for each scan, as well as an image of the plotted profile with measurement lines as shown in the above plot window.

Sensor specification

Type	USB – Handheld
Size	LxBxH 19x4,5x11,4 cm - width at scanning point is 3,2 cm
Weight	340 gr.
User Interface	3 LED's, 2 tactile buttons, finger trigger
Cable lenght	USB 2 oA zu Mini 5-Pin USB, ca. 1,80 mtr.
FOV Options/ Horizontal Scanning / Resolution/Depth Accuracy	4 mm (0.150") / ca. 5µm (0,0002") / ca. ±12µm (0,0005")
Shock protection	Cast urethane housing
Environment	0° - 70° C



● LaserGauge RS763 Sensor



RS763 Sensor

Overview

With unique Cross-Vector scanning technology, the RS763 provides more surface information around the edges of surfaces than any other end-of-arm laser profiler. It is used primarily for measuring the gap and flush between assembled panels.



The RS763 sensor is a complete measurement system. No external components are needed except an Ethernet interface to an external PC, robot controller or PLC. Utilizing a powerful 1GHz processor, measurements take less than one second.

Operating Features

Cross-Vector Scanning – Traditional laser profilers utilize a single laser stripe coupled with a single imager to capture surface scans. But a single view cannot see

surface points around the radius on the edge of the gap. The Cross-Vector sensor utilizes 2 red lasers, 1 blue laser and multiple views at crossing angles. This allows the sensor to see around edges of the radius to the vertical tangent and beyond. The result is a complete surface profile and the most accurate gap measurements.

Blaue Laser Technologie

Blue Laser Technology - A problem that has always existed is that the scan cannot be acquired if the laser cannot trace the surface feature. A red laser penetrates transparent or translucent surfaces.... windshields, headlights, etc. so features around these types of surfaces are difficult to measure. However, blue laser light is scattered 4x more than the red laser. Origin Technologies has resolved this challenge by utilizing a blue laser coupled with the traditional red lasers. The LaserGauge® RS763 sensor incorporates both blue lasers for the translucent surfaces and red lasers for the features on solid body panels.



● LaserGauge RS763 Sensor



Advantages

- **Speed** – The scanning process is completed, measurements calculated, and values sent to controlling system, all in less than one second.
- **Flexibility** – Compatible with all LaserGauge products and measurement methods.



- **Powerful** – All of the processing power to acquire measurements is contained in the sensor. There is no need for an external PC.
- **Communications** – An Ethernet interface allows an extra device (robot controller, PLC or PC) to communicate to the sensor through the AnyBus X-Gateway. The AnyBus module allows the sensor to be interfaced to any existing robot controller.
- **Supporting Software** – Includes Windows applications that provide feedback to the user for optimum measurement position and orientation, robot emulator and real-time monitoring and diagnostic feedback for sensor operation and functionality during use..
- **Power** – Standard 24VDC @ 1 Amp power

Sensor Specifications

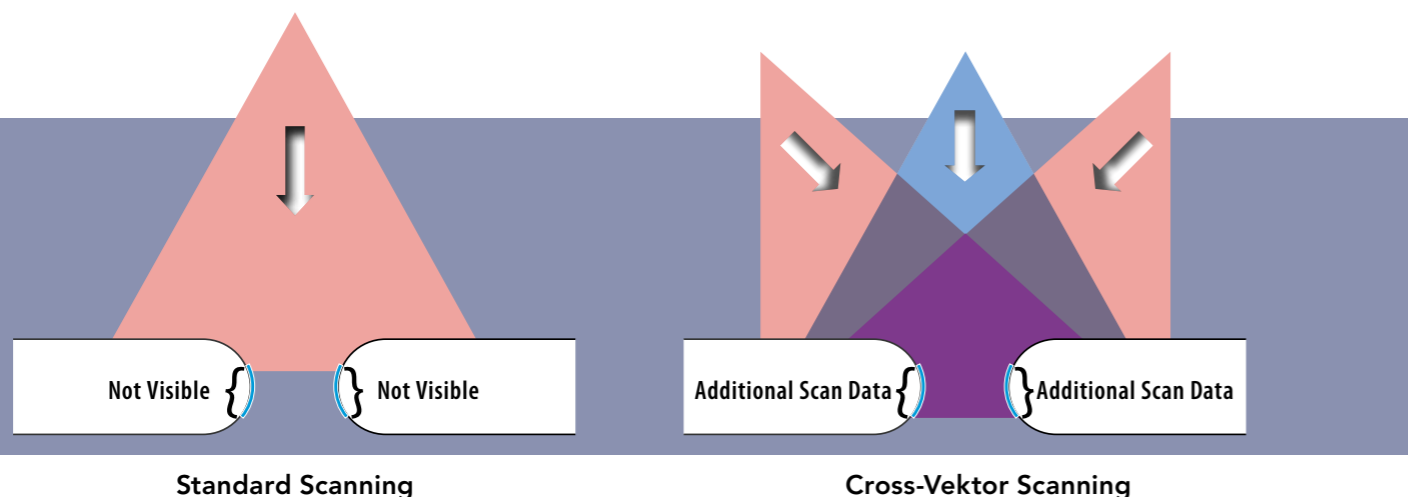
Type	DSP – Robot-mounted
Size	5.7" (w) x 6.75" (l) 3.7" (h) (144mm x 171mm x 94mm)
Weight	3.4 lbs (1.5 kg)
User Interface	None on sensor. Windows application is provided for virtual interface to the sensor.
Communications	Ethernet
Processor	1GHz Speed
Memory	8GB of data/scans/routines
Battery	None
FOV Options / Horizontal Scanning Resolution / Depth Accuracy	2.0" (50mm) / 0.0015" (60µm) / ± 0.0015" (60µm)
Shock Protection	Cast urethane housing, crash detection protection available
Environment	0° – 70° C

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Our continuing commitment to quality products may mean a change in specifications without notice.
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● LaserGauge LG5000 Controller



LG5000 Controller

Overview

The compact, lightweight **LG5000** controller can be used with all of the LaserGauge® controller-based sensors, including the HS305, HS306, HS410, HS602, and HS610 models, and it can also be used with the USB sensors including the HS722 model.



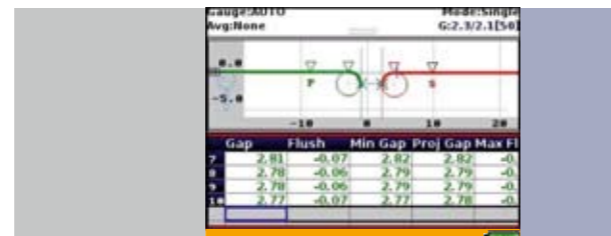
The controller is the smallest and lightest controller in the LaserGauge® product line, weighing only 19oz. The LG5000 has a 3.5" high resolution color display, and has both a touch screen and a joystick for alternative methods of interface. Data can be sent and received over a USB null modem cable or through wired and wireless Ethernet connection to a PC.

Operating Features

■ **Routine Mode** – Routine mode allows the user to run inspection routines developed using the LGWorks software. Multiple routines can be stored on the controller and automatically opened with the entry of an associated VIN, trace number or other identifier. Graphical and text instructions guide the operator to the proper measurement locations. Color-coded results and audible tones alert the operator to out-of-spec conditions.



■ **Gauge Mode** – The LG5000 controller supports all LaserGauge® measurement and analysis algorithms including virtual gauges, LGBasic algorithms, part setups and match-to-CAD. Scans are saved for each measurement taken and can be reviewed by simply selecting the data row. Algorithm settings can be modified and rerun against all scans in the data table to evaluate the impact of the change.



■ **User Interface** – A 320 x 240 graphical display with a touch screen provides a quick and easy way to navigate menus and select options. The keypad and joy stick also provide full selection functionality for environments not suited to touch screen use. Menus are organized in a flat tab format so that selections can be made quickly. Screen layouts can be configured according to the user's preference.



■ **Communications** – A peer-to-peer connection with a laptop and be established through a cross-over cable for direct communications. The most common method of sending and retrieving files is through a USB null modem cable. Files can also be copied to a removable USB drive and copied from the drive to the controller, or data and scan files can be copied from the controller to the USB drive.

● LaserGauge LG5000 Controller



■ **4 Way Rotational Screen** – The controller display can be rotated 90 degrees, depending on your desired viewing orientation. The operator can set their individual preferences left hand or right hand operation, as well as vertical with screen up or down.

■ **Battery Powered** - A rechargeable, hot swappable, lithium-ion battery provides power for approximately four hours of continuous operation. An on-screen fuel gauge shows the charge remaining in the battery. An external charger can be used to recharge the battery or AC power can be connected to the controller and the battery recharged while the controller is in use. The AC adapter is rated for worldwide use.

■ **Barcode Scanner** - An integrated barcode scanner allows the operator to scan a barcode on the part or on the assembly being inspected, and then the barcode will be recorded in the data file for automatic traceability to the inspection results. The operator no longer has to manually enter trace information, such as a serial number or VIN. The barcode reader supports practically all universal formats.

Advantages

■ **Portable** – A complete system: controller, battery and sensor, weighs less than 2.5lbs and can be carried comfortably over the shoulder in a nylon bag.

■ **Versatile** – Different languages can be selected through the menus. Measurements and settings can be expressed in millimeters or inches, with a decimal or comma delimiter.



■ **Advanced Features** – High contrast scanning is available for use on dissimilar surface colors. 4 way screen rotation allows for use with any hand and hot-swappable battery permits uninterrupted use.

Controller Specifications

Operating Modes	Algorithm Only or Algorithm and Routine
Housing	Cast urethane case with reinforced mounts
Size	6.5" (w) x 2.375" (d) x 3.625" (h)
Weight	1.0lb. without battery
Processor	1GHz ARM
Memory	8Gbytes of data/scans/routines
Sample Rate	Up to 10 processed samples per second for many applications
Display	800(H) x 480(V) x 256 colors
User Interface	2 multi-function buttons, 5-way joy stick
Other Interface(s)	USB 2.0 ports (1x Type A, 2x Mini-B)
Power Requirements	12 VDC @<2.5 Amps
Power Supply	Worldwide 60W A/C adapter, (optional 12V rechargeable battery)
Environment	0° – 70° C
PC Software Interface	LGWorks, Windows™ XP and Windows 7 compatible.



LaserGauge LG7000 Controller



LG7000 Controller

Overview

The LG7000 controller is used to run LaserGauge® USB model sensors, such as the TS800, instead running the sensor from a laptop or computer. The advantage of the LG7000 is that it supports the maximum functionality of the sensor and is rugged and portable, so measurements can be made anywhere.

Measurement data and scan images are saved to on-board memory, and can be analyzed on the controller or transferred to a computer using a USB cable or a wireless ZigBee connection.



Operating Features

User Interface – A 7-inch graphical display with a touch screen provides a quick and easy way to navigate menus and select options. The keypad and joystick also provide full selection functionality for environments not suited to touch screen use. Menus are organized in a flat tab format so that selections can be made quickly. Screen layouts can be configured according to the user's preference.

Battery Power - A rechargeable, lithium-ion battery provides power for approximately three hours of continuous operation. An on-screen fuel gauge displays the charge remaining. An external charger is used to recharge and recalibrate the batteries.

Connectivity – The LG7000 controller can be connected to a computer with a USB cable and recognized as a USB drive. Or the ZigBee USB stick can be plugged into a computer and the LG7000 can communicate wirelessly through the applications running on the computer.

Automatic Data Saving – Whether in Routine mode or Gauge mode, data and scans can automatically be saved. If the battery is removed or the power runs out, the data will not be lost. Saved profiles document every measurement in the data table.

File Transfer – When the LG7000 controller is connected to a computer through a USB cable and identified as drive, files can be transferred using the Windows™ .drag and drop functions. Files can also be transferred from a USB stick by plugging it into one of the controller's USB 2.0 type A ports. When the controller is connected wirelessly to a computer through the ZigBee module, files can be transferred using LaserGauge® applications.

Optional Barcode Scanner - An integrated barcode scanner is available as an option. It allows the operator to scan a barcode on the part or on the assembly being inspected, and the barcode will be recorded in the data file for automatic traceability. The operator no longer has to manually enter trace information, such as a serial number or VIN. The barcode reader supports practically all universal formats.

Sensor Support – The LG7000 controller supports all handheld models of USB sensors, including sensors utilizing red and blue lasers. All advanced scanning functions used with blue laser sensors are available in the menus. In addition to USB sensors, the LG7000 also supports end-of-life, controller-based sensors

LaserGauge LG7000 Controller

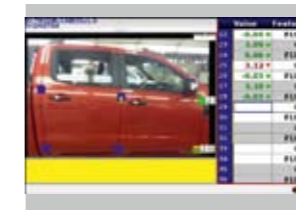


such as the HS305, HS306, and HS410 models. The controller-based sensors must have a removable sensor cable or an integral sensor cable with a plastic 13-pin plug for connection to a controller.



Operating Modes

Routine Mode – Routine mode allows the user to run inspection routines developed using the LGWorks software. Multiple routines can be stored on the controller and opened automatically with the entry of an associated VIN, trace number or other identifier. An optional barcode reader can be used to scan the VIN. Graphical and text instructions guide the operator to the proper measurement locations. Color-coded results and audible tones alert the operator to out-of-spec conditions.



Gauge Mode – The LG7000 controller supports all LaserGauge® measurement and analysis algorithms including virtual gauges, LGBasic algorithms, and part setups. Scans are saved for each measurement taken and can be reviewed by simply scrolling up and down the data table. Settings can be modified and the algorithm rerun against all the current scans in the data table allowing the user to evaluate the impact of a change.



Applications

Automotive – The LG7000 can be used with the TS800-F16 sensor to measure gap and flush on automotive exteriors, or used with the TS800-B-F08, blue laser option, to measure small, interior features or features on chrome and glass.

Aerospace – The LG7000 is particularly useful in aerospace applications when used with the TS800 sensor because the large display allows the user to analyze complex profiles as they are acquired.

Controller Specifications

Operating Modes	Algorithm Only or Algorithm and Routine
Housing	Cast urethane case with reinforced mounts
Size	8.4" (w) x 1.75" (d) x 6.25" (h)
Weight	1.8lb. without battery
Processor	1GHz ARM
Memory	8Gbytes of data/scans/routines
Display	800(H) x 480(V) x 256 colors, 7" display with touchscreen
User Interface	2 multi-function buttons, 5-way joy stick
Ports	USB 2.0 ports (2x Type A, 1x Mini-B) and 13pin circular DIN
Power Requirements	7.2 VDC @ <2.5 Amps
Power Supply	Lithium-ion (non-metal) rechargeable battery, 7.2V
Environment	0° – 70° C
PC Software Interface	LGWorks, Windows™ 7, 8, 10 compatible.

● **Pinch Force Gauge PFG-3**



PFG-3

Description

The **PFG-3** Pinch Force Gauge is used to measure the maximum pinch force created by an automatic driven side window, sun roof, deck-lid or sliding doors on passenger cars.

For different national or international standards like Europe or USA (PFG-E oder PFG-U) the required spring rate is setup for EU 74/60/EWG or USA for 49 CFR Ch.V(\$571.118).



The plastic coated fingers create a non-marring version that prevents the operator or sensor from producing scratches. The handle grip can be attached in 2 different positions for optimum use at the different locations like on rear deck lid or sun roof. The system will capture the maximum (peak) force created by the automatic window drive before the safety mode returns the motion.

The measurement is visualised in the GTR-1 display unit and can be transferred wirelessly by a push on the button to any data collection device.

Specification (PFG-3)

- ▶ Weight: 0,64 kg
- ▶ Range: ca. 10 – 130 N
- ▶ Dimension (LxW): 210 x 140 mm
- ▶ RF Spec: 868 MHz, range appr. 20 m



Specification (GTR-1)

- ▶ Weight: 0,15 kg
- ▶ Dimension (LxW): 120 x 78 mm
- ▶ Battery: Li-Ion Akku 740 mAh
- ▶ Operation: ca. 6 Stunden
- ▶ RF Spec: 868 MHz, range appr. 20 m



■ **Package includes**

- ▶ Charger
- ▶ Carrying case
- ▶ Optional: RF USB receiver
- ▶ Optional: Vacuum fixture for sun roof and door attachment

● **GTR-1**



GTR-1

Description

The **GTR-1** belongs to the range of portable data capture devices from jotbe GmbH. The latest innovative features have been included in this model to ensure that data recorded for quality purposes is captured more efficiently and in a failsafe manner. Data captured by the device can be transmitted just-in-time or after successful measurements have been taken. The progress of the measurement process is depicted graphically.

Special features

- ▶ Can be connected to potentiometers such as LMI, SealGap and many more
- ▶ Single and dual analogue input versions available for measuring devices
- ▶ Built-in lithium ion battery for an 8hr operating time
- ▶ Built-in 868 MHz radio module for wireless PC connections
- ▶ Data transfer at the touch of a button - "auto-send" function or on request by user

Technical specifications

Material:	▶ ABS
Weight:	▶ 150 g
Dimensions:	▶ 117 x 79 x 24 mm
Reference output voltage:	▶ 2.5 V
Internal SD flashcard:	▶ 4 GB
Battery:	▶ 3.7 V Li-Ion
Display:	▶ 2.4" QVGA TFT colour
Accuracy:	▶ Depends on measuring equipment



● 4D InSpec® Surface Gauge



Description 4D InSpec Surface Gauge

- Instant 3D Surface Measurement
- Measure Defects and Features from 5 µm–2.5 mm Deep
- Measure Large Components Directly—No Replication Needed
- Easy Measurement of Complex Geometries
- Handheld, Workstation or Robotic Operation

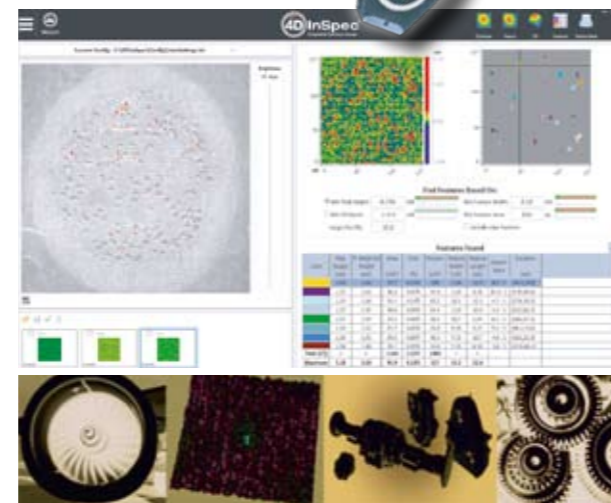
The 4D InSpec Surface Gauge is the first handheld, precision instrument for non-contact measurement of surface features and defects. With micrometer-level resolution, portability, affordability and ease-of-use, 4D InSpec puts high resolution measurement on the factory floor, in machine shops and deployed environments.

4D InSpec brings 3D measurement to the factory floor, to quantify pits, scratches, nicks, dents, bumps, porosity and other features from 0.0002" to 0.1" (5 µm–2.5 mm) deep or tall. 4D InSpec is far more repeatable and accurate than visual comparison techniques typically used for surface defect measurements. Unlike high-end metrology systems it is rugged, flexible and affordable, to measure a wide range of part geometries in the most challenging environments.

The 4D InSpec can be handheld to access tight corners or to sample large surfaces. An optional fold mirror accessory lets the system function like a borescope to access blind holes and inner diameters. One-button operation and immunity to sensor movement make it easy to align and measure, while a rugged design and single cable tether withstand the rigors of daily use. In a workstation configuration 4D InSpec makes it fast and easy to obtain repeatable quality control data. An intuitive, touchscreen interface handles setup, operation, analysis and report generation. The 4D InSpec can also be mounted on a robotic manipulator for fully automated measurements of complex components.

The included software automatically locates defects and calculates their height, volume, area, slopes and location. The operator can choose from 2D traces or 3D plots to view defects in great detail. The system also supports easy data transfer to quality control systems for rapid pass-fail analysis.

A complete 4D InSpec system includes the instrument, computer with HD 1080p touch-screen interface, single Ethernet cable tether and software. A portable workstation and Li-ion rechargeable battery with up to 8 hours of operational time are also available.



Das 4D InSpec quantifiziert Schäden, Verschleiß und Korrosion direkt an Teilen mit komplexer Geometrie, wie bei dieser Turbinenschaufel dargestellt. Automatische Eigenschaftserkennung, 2D-Bildspuren und 3D-Plots ermöglichen die einfache Analyse von Oberflächeneigenschaften und Defekten.

● 4D InSpec® Surface Gauge



■ Basic Specifications

Acquisition	Instantaneous, non-contact 3D surface measurement
Measurable Range	Defects and features 0.0002–0.1 in (5 µm–2.5 mm) deep/tall
Field of View (module)	0.31 x 0.31 in (8.0 x 8.0 mm)
Lateral Sampling	Lateral Sampling 0.00026 in (6.6 µm)
Vertical Resolution	0.0001 in (2.5 µm)
Mounting	Handheld or workstation mounted
Standoff Distance	1.4 in (35 mm)

■ Software

Analysis	4D InSpec control and analysis software
Measurement Modes	Single snapshot; enhanced resolution multi-snapshot mode
Defect Detection	Identify features based on height and area thresholds
Defect Calculations	Max height, volume, area, max slope, density, aspect ratio, XY location
Data Displays	Contour, 3D, XY slice with arbitrary cursors
Data Output	Tabular feature analysis statistics with 3D surface maps
Data Masking	Masking based on signal to noise ratio; rectangular ROI masks for analysis
Import and Export	Export data to XYZ point cloud
Computer	Multiple options including all-in-one touchscreen, laptop, or customer-supplied

■ Electrical/Mechanical

Dimensions	11 x 2 x 2.8 in (280 mm x 50 mm x 70 mm)
Light Source	450 nm LED with 100,000 hour MTBF
Sensor	1200 x 1200 pixel, 12-bit scientific CMOS camera
Power Consumption	< 10 W 4D InSpec unit; < 250 W with computer system @ 120 VAC
Weight	< 2 lbs (0.9 kg) instrument only
Cable Length	10 ft (3 m)
Operating Temperature	50–86° F (10–30° C)
Operating Humidity	> 98% non-condensing

■ Performance

Noise Floor	< 0.0001 in (2.5 µm) ¹
Vertical Repeatability	< 0.000024 in (0.6 µm) ²
Step Height Accuracy	< 2% ³
Step Repeatability	< 0.5%
Depth of Focus	> 0.10 in (2.5 mm)
Minimum Part Roughness	5 µin (120 nm) Ra

■ Warranty	One Year, limited
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- 1 Average Ra of difference between two measurements on 4D calibration sample.
- 2 1σ Ra for 30 measurements on 4D calibration sample.
- 3 Difference vs. PTB-certified values sample for features from 0.0008–0.035 in (20–900 µm) tall.
- 4 1σ standard deviation on 30 measurements of 50 µm tall feature.

Patents US 7777895, 7489408 and US 7230717. Others pending. This material is based upon work supported by the National Science Foundation under Grant No. 1556049. 4D InSpec is a registered trademark of 4D Technology Corporation. All specifications subject to change without notice

● LaserGauge LGWorks Software



● LaserGauge LGWorks Software



LGWorks Software

The **LGWorks** software program is used to develop multi-point inspection routines that run directly on the LG1200 and LG5000 controllers or wireless from a computer to the LG4101 and DSP sensors. Graphic and text in-structions in the routine guide the operator through each measurement point. Calculations utilizing measured values can be programmed into the routine and, the user can define the format for the generated data file..



Develop Routines

■ **Organize Routines** – Routines are built in a tree-view hierarchy so that points and groups of points can easily be cut, copied and pasted, or moved using drag and drop functionality. More than one measurement may be needed at each inspection point, such as gap and flush. Routine commands the LaserGauge® what methodology to use to make the measurements and one pull of the trigger completes all of the measurements at that location.



■ **Operator Instructions** – Photos or images of the part being inspected can be copied into LGWorks and the individual points marked by drawing an arrow on the image at the exact location for the measurement. The images are displayed on the graphical controllers with arrows advancing automatically as each measurement is taken.

■ **Measured Points and Calculations** – Formulas that use the results from measured points can be added to the routine for calculations such as A/V gaps, parallelism, max gap, range, etc.

■ **Spec Limits** – Specification limits can be entered in the routine and used by the LaserGauge® to flag out-of-spec conditions. A second set of limits, called reasonable limits, can also be entered to help filter errant measurements and identify measurements taken at the wrong location.

Run Routines with Wireless Systems

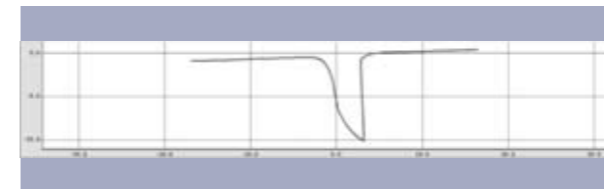
Routines can be run by one operator or by two operators working simultaneously using LG4101 wireless controllers. Two wireless systems can be used to measurement each vehicle or every part on a moving assembly line. The measurement results are displayed on a large screen mounted over the line, and out-of-spec conditions are color-coded for easy identification.



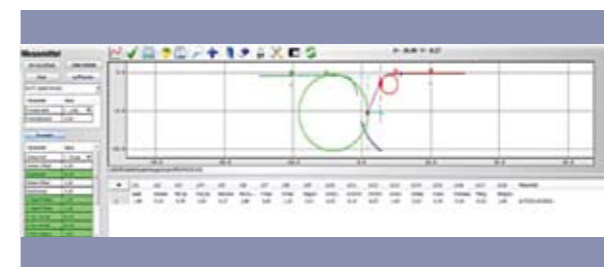
Test Gauges on Saved Scans

The LaserGauge® can be used to capture raw scans of a surface feature, such as a weld or a gap. Retrieved to the PC, the scan can be opened in LGWorks and used to test virtual gauge settings. The selected gauge and settings are the incorporated into the routine.

■ **Plotted Scans** – Plots showing virtual gauge tests on scans can be save das graphic images. These images can be used in reports to document the measurement methodology.



■ **On-screen Measurements** – Measurements can also be made on-screen in LGWorks using point and click tools.



Spezification

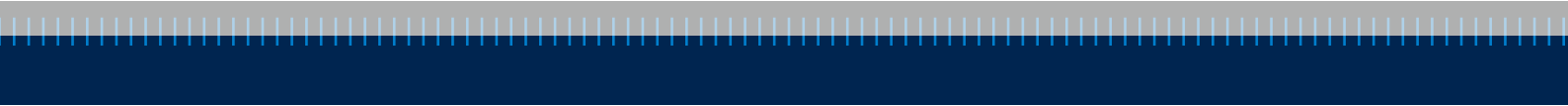
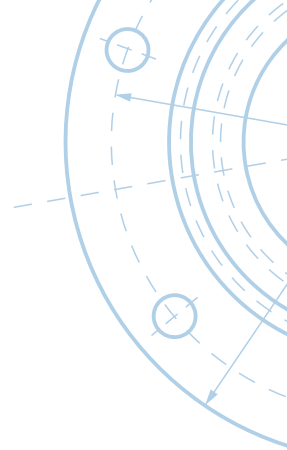
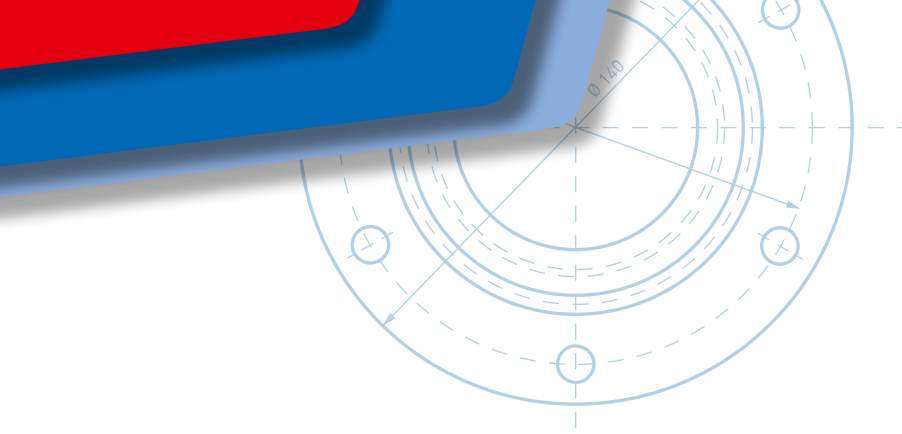
■ Functions	▶ Used to developed inspection routines, define data file formats, view scans, test gauge settings
■ System Compatibility	▶ LG5000, LG1200, LG4101 controllers and all DSP Sensoren
■ Communication to LaserGauge from Computer	▶ LG1200-USB null modem cable and Ethernet, LG5000 null modem cable and wireless ZigBee, LG4101-null modem cable an wireless RF
■ Operating Systems	▶ Windows 7 / 10
■ Requirements	▶ 64MB hard disk space, 512 MB RAM

Data and Documentation

■ **Roadmap** – Routines can be documented with a printable roadmap showing each measure-ment point on the vehicle image and user-selectable information specific to the points in a table. Measurement data from the running of a routine can be imported into the roadmap and values color coded as in-spec or out-of-spec.



■ **Data Files** – Data files are formatted by the user and can vary by routine. The user has a choice of delimiters and the file can include information contained in the routine or found on the controller. Operator input fields and LaserGauge® generated information can also be included in the data file, such as date, time, shift, operator, VIN, feature label, description, etc.



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