

OVERVIEW

The LaserGauge® line of handheld inspection sensors have been serving automobile manufacturers for over 20 years. LaserGauge® Automation continues that functionality with an automated, robot-driven gap/flush inspection system used for 100% gap/flush measurement on the final moving assembly line in automobile manufacturing plants. Integrated into the manufacturing line by plant personnel or independent robot integrators, the measurement sensor subsystem automatically acquires fit and finish measurements on a vehicle in real-time on a moving line using proven, flexible measurement methodologies that are 100% compatible with all existing LaserGauge® products.

To eliminate any requirement for a stop station or to “pin” the automobile in a known location, a vehicle tracking subsystem tracks the position and orientation of the automobile for real-time robot path correction to ensure that the measurements are taken in the same position each time, regardless of the automobile’s position on the line.

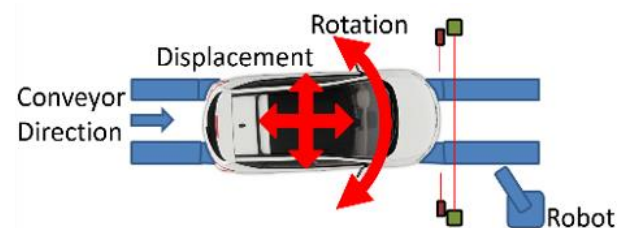
LGAutomation utilizes one robot on each side of the vehicle for left/right side inspection. More robots/sensors can be added as necessary if more measurement points are needed or if the two-robot configuration is unable to keep up with the line speed. Robots can be floor- or gantry-mounted as needed to access the desired measurement locations.

TECHNOLOGY

LGAutomation is built around the advanced LaserGauge® RS763 Cross-Vector Smart Sensor. This measurement sensor is a self-contained EOAT measurement subsystem that does not require external hardware for measurement. It communicates back to the robot using an Ethernet connection and can utilize most industrial network protocols (e.g. Profibus, DeviceNet, Modbus TCP, etc.).

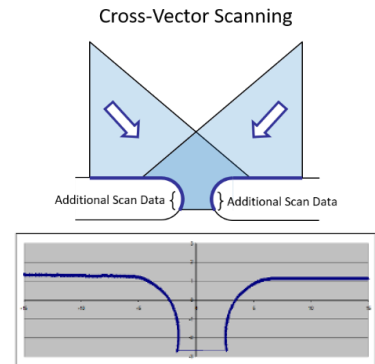
BLUE LASER TECHNOLOGY

The RS763 utilizes blue-laser scanning technology and advanced signal processing algorithms. This allows the sensor to scan almost all surfaces on an automobile: body panels, headlamps, tail lamps, window glass and chrome.



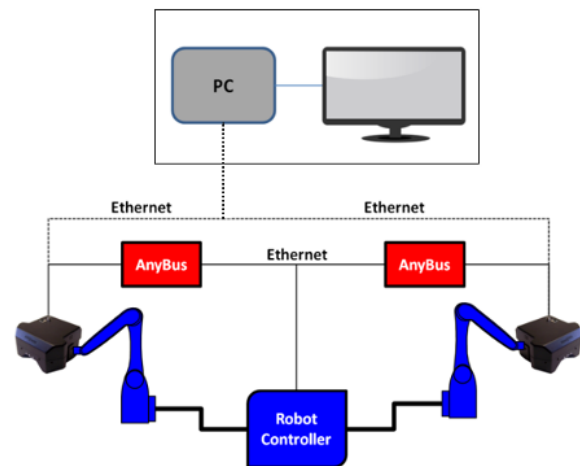
CROSS-VECTOR SCANNING

In addition to the blue laser capability, the RS763 uses the Cross-Vector scanning technique that gives precise edge/surface scanning capability unmatched in accuracy, speed, and flexibility. The angular scanning of the edges, as illustrated to the right, allows it to see “around” the edges to give more defined edge data for better measurements. No movement of the sensor is required. Measurements can be acquired very quickly, typically less than 1 second per measurement. For measurement on translucent or transparent surfaces, this angular scanning provides optical advantages to reduce reflections and/or unwanted distortions of the signal, resulting in a much better scan. No other gap/flush system has the blue laser with Cross-Vector capability.



PROVEN LASERGAUGE® CAPABILITIES

Inspection routines are created and edited using the LGWorks software. Virtual Gauges are configured specifically for each measurement point and specification limits are defined for each returned value. Detailed graphics and on-screen messages indicate the location and progress of the robotic sensor from one measurement to the next. Complex calculations referencing measurement data can be processed in real-time and included in the data file. All scans and numerical data can also be saved and output to various formats, pushed directly into the plant’s data handling system, and/or passed to a Fitter’s Station for manual refit and follow-up inspection of panels.



FLEXIBLE ROBOT INTERFACE

Flexibility and ease of setup has been designed into the system. Using a standard Ethernet connection, the RS763 sensor can communicate to a PC, robot controller or PLC using the Anybus X-Gateway, which allows the LaserGauge® to communicate using any number of industrial networks such as Profibus, DeviceNet, Modbus TCP, etc. The Automation software and the robot controller use two-way communication to control sequencing and operation. Development tools are available from LaserGauge® for third-party integrators or for the plant’s robot programmers to implement and support the system internally. Virtualization tools allow for the testing of the system before installation is complete. A special Teach Function provides sensor position and orientation feedback during robot path teach for optimum positioning of the sensor.

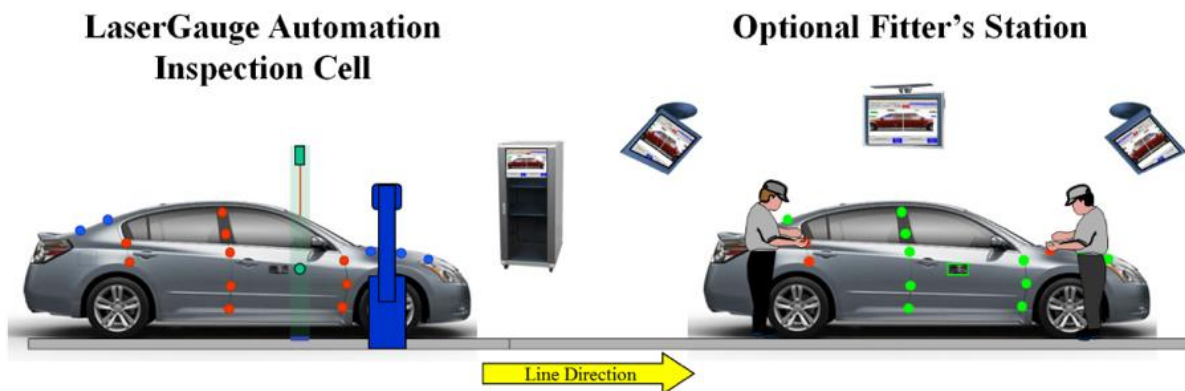
COLLISION AVOIDANCE & DETECTION

Multiple safeguards are embedded into the system to prevent the robot from colliding with the vehicle:

- **Robot limits** – configured by the integrator to limit the robot to a specified operating envelope
- **Software limits** – can verify that the car moving into the inspection station correlates with the VIN received.
- **Physical collision detection/prevention** – the LaserGauge® measurement sensor is surrounded by a rubber-coated protective cage that will detect when the robot positions the sensor too close to the vehicle. If a collision is detected, the robot will be notified immediately and can safely re-home itself to prevent any damage to the vehicle and determine why the collision occurred.
- **Displacement Detection** – can determine if a hood, doors or deck lid is open and alert robot to not measure that area of vehicle.

FITTER'S MODULE

The Fitter's Module accumulates and filters the measurement results from a LaserGauge® Automation station and then displays the results on a separate monitor for the manual refitting of out-of-spec parts. The fitter can use a handheld LaserGauge® inspection system for a secondary inspection or for confirmation. Rescanned data can be logged and passed to the factory's data handling system or it can be archived. The Fitter's module software runs on a separate PC from the LaserGauge® Automation station.



ADVANTAGES

Complete Surface Profile – The Cross-Vector approach captures surface profiles around edges and down into the gap. This results in the most complete surface profile and most accurate measurements from a single scan. No need for multiple measurement sensors or rotational scanning motion to acquire a complete scan.

Speed – The scanning process is completed, measurements calculated, results displayed in the data table, and the scan plotted on the graph, all in less than one second. The non-contact sensor can move from point to point while the assembly line is in motion.

PRODUCT DATASHEET

LGAutomation | For Gap / Flush

Cost – The LaserGauge® Automation system is more cost effective than other robotic systems. Use of plant preferred integrators or internal resources to install the system, the flexibility of the Automation software, and the ease of setup/implementation all help to reduce the overall cost of the system.

Flexibility – Points can be added and deleted from existing routines, and new routines can be added using the Teach Mode, without having to involve the robot programmers. The LaserGauge® Automation system supports 1, 2, 4, or more robots.

Adaptability – the vehicle tracking subsystem means that it can accurately measure consistent positions on a moving line, even when the vehicle placement on the conveyor is not consistent. No stop stations or pinning of the vehicle is required.

Compatibility – All routines, virtual gauge definitions, and data output capability are 100% compatible with all other LaserGauge® products.

SPECIFICATIONS

System Specifications	
Measurement Speed	<1 second
Robot Interface	Anybus X-Gateway Communicator module
Sensor Specifications	
Accuracy	± 0.001" (±25µm)
Communication Interface	Ethernet
Size/Weight	5.5" (w) x 6.8" (h) x 9.5" (l) / 6.2lbs
Power	24V @ 1 amp
Shock Protection	Cast urethane housing
Environment	0° – 70° C