

Thickness Measurement Systems

Digital Sensing Technology for Process Optimization

Commitment: Turning data into optimized performance. Reduce waste, improve quality, and deploy scalable solutions for any budget.

Credentials:

- 30+ Years of Experience
- 150+ Industrial Solutions
- 90% Customer Retention Rate

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lgeweb.com for product documentation

Note: Specifications subject to change without notice. Contact LGE for custom requirements and application-specific configurations.

Overview

LGE designs and manufactures non-contact thickness measurement systems for industrial applications in the metals, plastics, rubber, and composites sectors. LGE solutions combine laser, X-ray, and confocal technologies to deliver accurate real-time measurements, with direct integration into Automatic Gauge Control (AGC) systems.

The main product families for thickness measurement are:

- **LGauge** — balanced solution for moderate-duty applications
- **nGauge** — high-performance solution for critical environments and mill-duty applications

1. LGauge Series

Positioning: Balanced performance for moderate-duty applications. Designed for finishing lines, slitting lines, and Cut-to-Length (CTL) operations, where practical precision meets operational simplicity.

Technical Specifications:

Parameter	Specification
Technology	Laser Triangulation / Confocal Chromatic
Measuring Range	0.1 mm – 500 mm (custom up to 200 mm)
Resolution	1 micron
Repeatability	±0.5 microns
Linearity	±0.05% of Full Scale
Sampling Rate	Up to 2000 Hz
Interfaces	Ethernet/IP, PROFINET, Modbus TCP, EtherCAT
Analog Output	4-20 mA / 0-10 V
Protection Class	IP67 (sensor head)
Operating Temperature	-10°C to +50°C
Power Supply	24 VDC ±10%

Core Features:

- **Effective Speed:** Up to 2000 measurements per second for dynamic processes
- **Temperature Compensated:** Built-in thermal stability for consistent accuracy
- **Data Logging:** Historical trend analysis and reporting capabilities
- **AGC Integration:** Real-time signal for automatic gauge control

2. nGauge Series

Positioning: The standard of excellence for critical environments. Engineered to withstand extreme temperatures, high vibration, dust, moisture, and corrosive atmospheres common in heavy industries.

Technical Specifications:

Parameter	Specification
Technology	X-Ray (mass absorption principle)
Accuracy	$\pm 0.1\%$ across full thickness range (not better than 1 micron)
Response Time	3 ms (ideal for closed-loop AGC)
Measuring Range	7 μm (foil) to 50+ mm (hot steel)
Surface Independence	Unaffected by surface color, texture, or steam
Calibration	Digital calibration standards
Reliability	Mill-duty 24/7 operation

Core Features:

- **Ultimate Accuracy for AGC:** $\pm 0.1\%$ accuracy with millisecond-level response for automatic gauge control
- **Extraordinary Range:** Measures from ultra-thin foil at 7 microns to hot steel exceeding 50 mm
- **Digital Architecture:** Unified software platform manages data from multiple sensors and technologies
- **Rapid Calibration:** Digital calibration standards allow fast, automated setup and standardization
- **Mill-Duty Robustness:** Engineered to operate in extreme conditions without interruption

3. Thickness Measurement Technologies

LGE thickness measurement solutions are built on three complementary measurement principles.

3.1 Laser-Based Systems

Best For:

- High-precision thickness measurement (micron accuracy)
- 2D/3D profile measurement
- Distance and positioning measurement
- Speed and vibration measurement

Applications: Dimensions, Thickness, Speed, Position, Shape Reconstruction

3.2 X-Ray-Based Systems

Best For:

- Internal defect detection
- Density measurement
- Wall thickness of pipes and containers
- Multi-layer material analysis

Applications: Profile, Density, Continuity, Internal Defects

3.3 Confocal-Based Systems

Best For:

- Thickness measurement on transparent and translucent materials
- Reflective and glossy surfaces
- Thin layers and films
- Applications requiring high axial resolution

Applications: Film Thickness, Coatings, Optical Materials, Composites

4. General System Specifications

Parameter	Specification
Thickness Range	0.006 mm (foil) – 150 mm (plate)
Accuracy (foil/sheet)	$\pm 1 \mu\text{m}$ or $\pm 0.2\%$ of reading
Accuracy (plate)	$\pm 0.05 \text{ mm}$ or $\pm 0.5\%$ of reading
Sampling Rate	Up to 3000 Hz
Communication Interfaces	Ethernet/IP, PROFINET, Modbus TCP, EtherCAT, GigE Vision
Analog Output	4-20 mA / 0-10 V
Protection Class	IP65 / IP66 / IP67 depending on configuration
Operating Temperature	-10°C to +60°C (with cooling up to 120°C)
Power Supply	24 VDC $\pm 10\%$ / 110-230 VAC for controller

5. Core Features of Thickness Systems

- **Non-Contact Measurement:** No contact with the material, no risk of damage or wear
- **High Speed:** Up to 3000 measurements per second for high-speed lines
- **Thermal Compensation:** Guaranteed stability even under temperature variations
- **AGC Integration:** Real-time signal for automatic gauge control
- **Data Logging and Trend Analysis:** Complete measurement history for quality analysis and traceability
- **Digital Calibration:** Digital calibration standards for fast and repeatable setup
- **Mill-Duty Reliability:** Designed for continuous 24/7 operation in severe industrial environments

6. Typical Applications

- **Steel:** Hot and cold rolling, finishing lines, slitting, cut-to-length
- **Aluminum:** Cold rolling, casting lines, finishing lines, from foil to plate
- **Plastics and Rubber:** Extrusion, calendering, thin films, composites
- **Pipes and Profiles:** Wall thickness, dimensional control, finishing lines
- **Films and Coatings:** Thin layer measurement, transparent and translucent materials

7. Software and Integration

LGE Profiler Software Suite

- Real-time profile visualization
- Measurement tool configuration
- Data logging and trend analysis
- Compatible with C++, Python, .NET, and ROS
- Includes SDK documentation and code examples

Communication Protocols

All LGE systems support standard industrial communication interfaces:

- Ethernet/IP
- PROFINET
- Modbus TCP
- EtherCAT
- GigE Vision
- MQTT
- Analog Output: 4-20 mA / 0-10 V

Remote Maintenance and Diagnostics

Built-in remote diagnostic and support capabilities allow issues to be solved without waiting for an on-site service visit.

8. Retrofit and Upgrades

Ready-to-Use Retrofit Kits for Existing Measurement Systems

LGE upgrade kits breathe new life into existing mechanical frames without removing heavy civil works.

Key Features:

- **Non-Contact Measurement and 3D Reconstruction:** Digitizes measurement for long products including pipes, hollow profiles, and H, U, C, L beams
- **Automation Integration:** Converts legacy frames into smart sensors providing robot input coordinates
- **4G/IoT-NB Router:** Enables remote monitoring and diagnostics by LGE technicians
- **nGauge Software:** Modern Windows-based HMI replacing DOS-based or proprietary systems

Benefits:

- Significantly lower capex compared to full replacement
- Downtime measured in shifts rather than weeks
- Preservation of existing mounting and power infrastructure
- Faster operator training with modern HMI