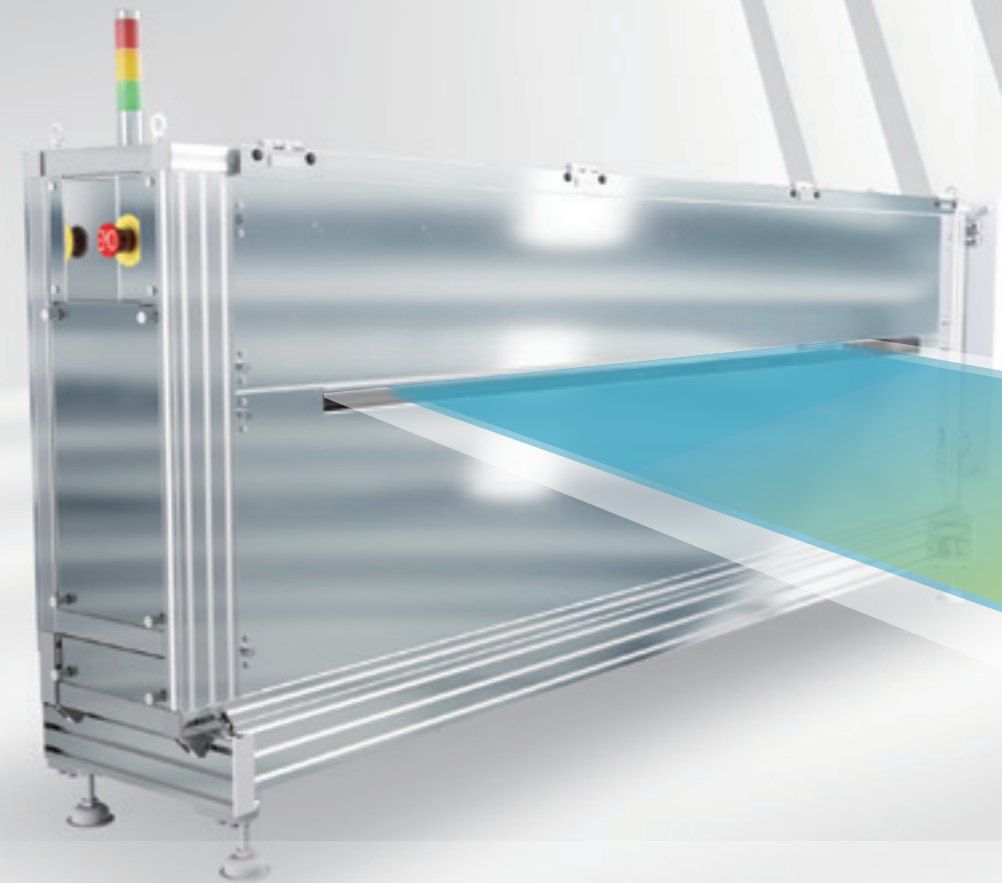




OpreX™ Quality Control System

OpreX Battery Web Gauge ES-5



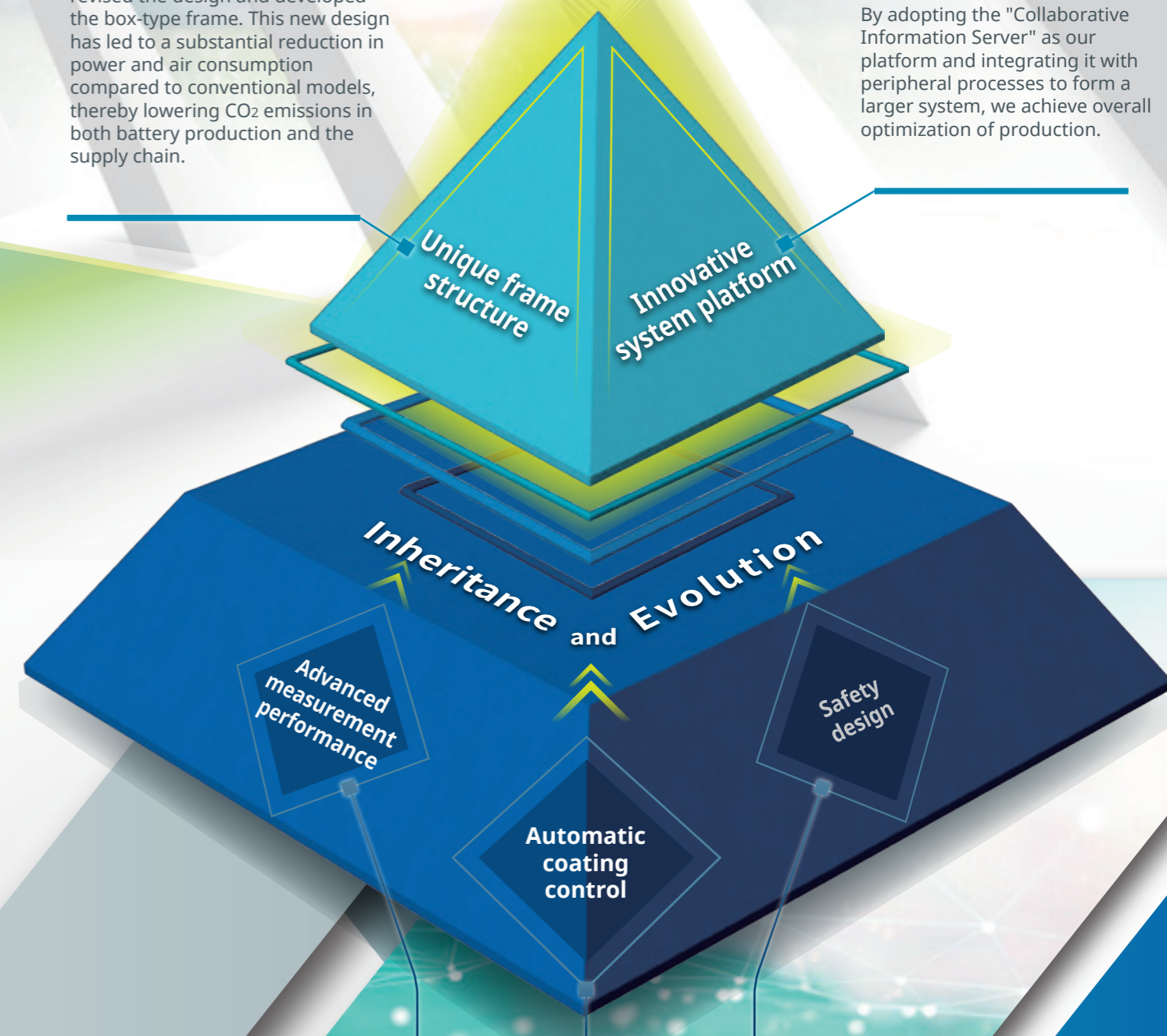
Reduction of the environmental impact

With "How we can contribute to reducing the environmental impact" in mind, we have significantly revised the design and developed the box-type frame. This new design has led to a substantial reduction in power and air consumption compared to conventional models, thereby lowering CO₂ emissions in both battery production and the supply chain.

New value

DX of battery manufacturing

By adopting the "Collaborative Information Server" as our platform and integrating it with peripheral processes to form a larger system, we achieve overall optimization of production.



Enabling the future of battery production

With the global transformation towards riding the electric vehicles, demand for high quality rechargeable batteries is growing rapidly. Alongside this trend, battery manufacturers face the dual challenge of reducing CO₂ emissions in their production processes and enhancing productivity in a highly price competitive market. "Battery Web Gauge ES-5" can contribute to solving these issues.

Battery Web Gauge *ES-5*

This is the successor to the previous model WEBFREX3ES, which has been supporting battery manufacturing sites since 2010. Inheriting and evolving the features of the previous model, the new frame structure and new system platform add new value in terms of reducing the environmental impact of battery manufacturing and DX (digital transformation).

Safe and secure battery manufacturing

Overlooking quality defects can lead to fire accidents. The ES-5 takes the conventional measurement and monitoring capabilities a step further. With enhanced scanning speed and higher-resolution measurements, the risk of missing quality abnormalities is minimized. In addition, the driving part is covered with a protective cover to increase safety during operation and maintenance.

New value

Battery Web Gauge ES-5

Box-type frame redefines conventional wisdom

Offering HMI tailored to specific requests.

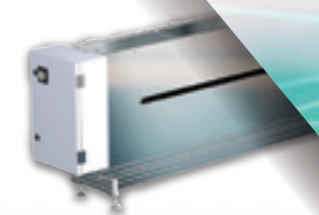
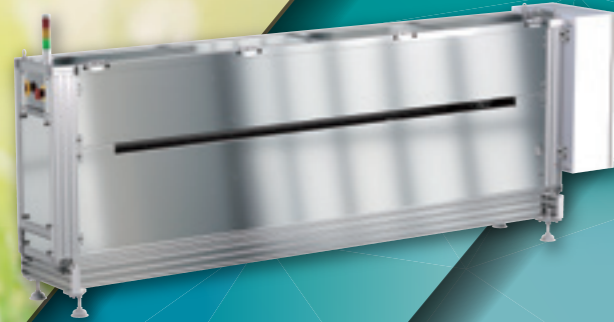


The platform features a highly flexible interface, allowing for a measurement and monitoring environment tailored to customer requirements.

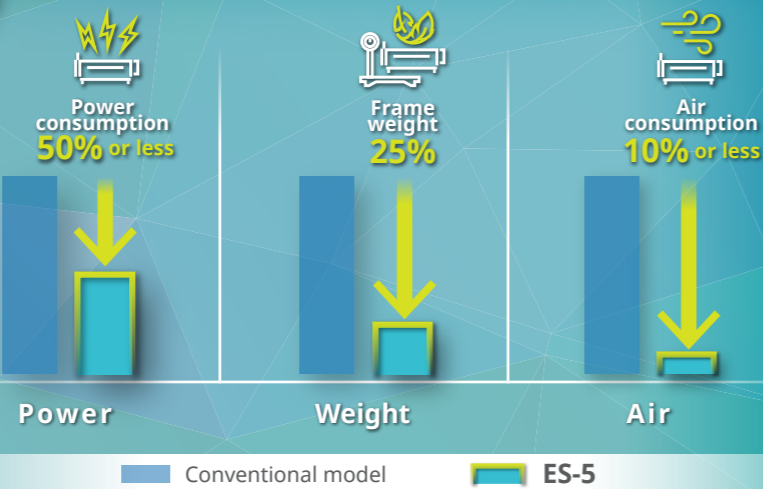
Reducing the environmental impact



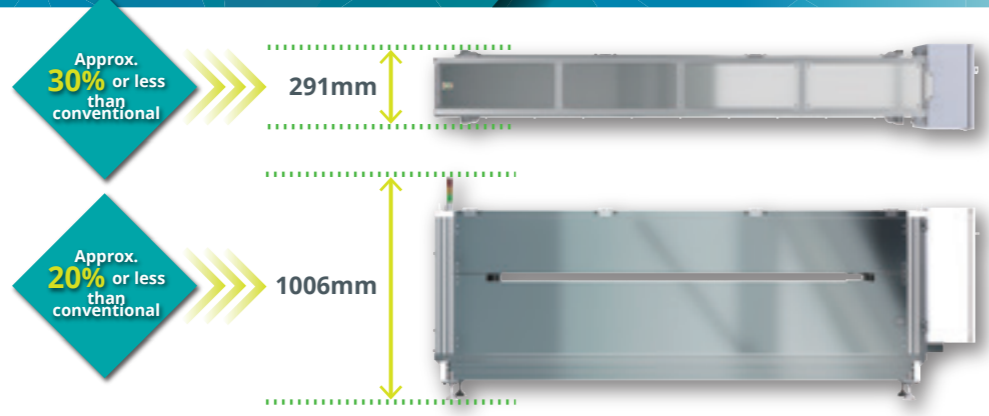
Adopting box-type frame reduces power consumption by over 50%, weighs 75% less, and reduces air consumption by 90% compared to the conventional model. This significantly lowers energy usage and CO₂ emissions related to thickness gauge operation.



Comparison to the conventional model



Compactness



Overall optimization through system expandability

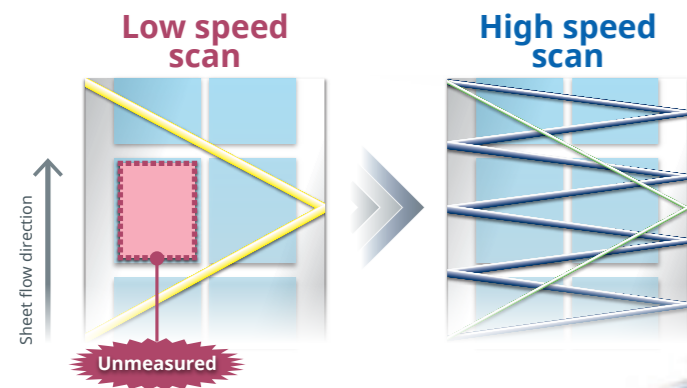
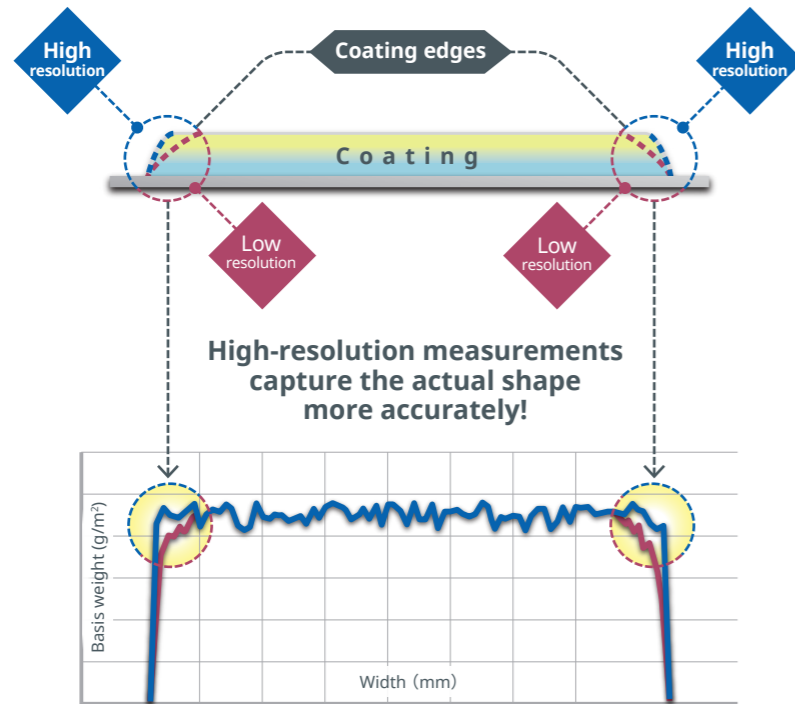


"Collaborative Information Server (CI Server)" has been adopted as the system platform, to aggregate data from other equipment and systems in the factory and support optimal centralized management of information. The electrode coating thickness measured by the ES-5 is a crucial quality indicator, influencing battery energy density, but it can fluctuate due to surrounding processes. By integrating with these peripheral processes, the platform enhances production efficiency and shifts from individual optimization of the coating process to overall optimization of the entire production line.

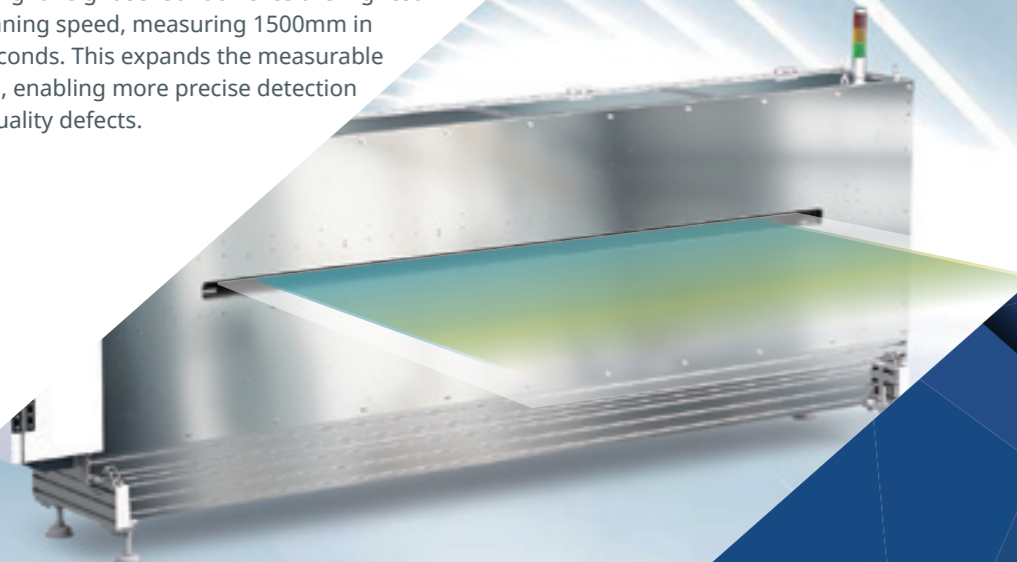
Innovative **system platform**

Advanced measurement performance

High-resolution measurement is achieved with a Beta-ray irradiation window slit width of 5mm and a minimum measurement pitch of 0.5mm. This enables high-precision measurement of coating edges, which are important for quality control.



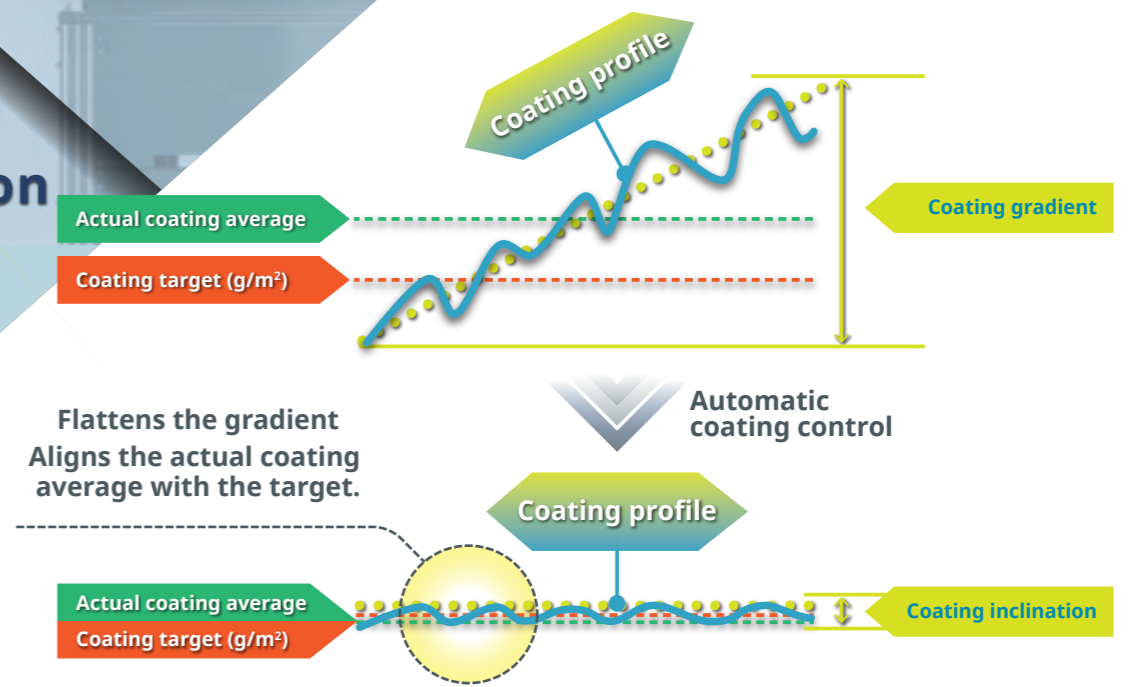
The lightweight sensor achieves the highest scanning speed, measuring 1500mm in 3 seconds. This expands the measurable area, enabling more precise detection of quality defects.



Battery Web Gauge ES-5 Inheritance and Evolution

Automatic coating control

Yokogawa's unique automatic coating control is expected to shorten the convergence time to a good quality level product and improve the yield, thereby boosting production efficiency. (Consultation required: optional)



Safety design

Similar to conventional products, the new product employs a safety design that eliminates the risk of secondary battery ignition, such as the fall of copper or other metal powder. In addition, by covering the driving part with a protective cover and by redesigning the structure of the on-board sensor, the risk of contact during operation and maintenance has been reduced, and also the radiation leakage radiation has been reduced, improving the safety during maintenance.

Components

Sensors	
Beta-ray	Measurement range: 0 to 1,200 g/m ² , or 850 to 2,000 g/m ² (*1)
X-ray	Measurement range: 0 to 600 g/m ² (*2)
Frame	
Box-type frame	Sheet width: 800 mm or less, 1,600 mm or less Number of sensors available to be mounted: One
System platform	
Operator station	General-purpose computer with Windows OS (Compatible with Windows 10/11)
Profile stack server	General-purpose computer with Windows OS (Compatible with Windows 10/11)
System network	Ethernet (100BASE-TX or higher)

*1: Measurement range should be selected depending on materials to be measured. For details, consult your local sales representative.
*2: X-ray Sensor cannot be selected when the United States is the destination.

Standard

Box-type frame, Beta-ray sensor, and X-ray sensor can be flexibly adapted to the following standards depending on the destination of the product.

Destination	Category	Standard No.
China	Safety Standard	China National Standards GB30439.1
EU	EMC Standard	[CE Marking] EMC Directive EN 55011, EN 61000-6-2, EN 61000-3-2, EN 61000-3-3
	Safety Standard (Machinery & Electrical)	[CE Marking] EMC Directive EN ISO 12100, EN 60204-1, EN ISO 13849-1
	RoHS	EN IEC 63000
US	Safety Standard	NFPA79
	TSCA	40 CFR Part 751
South Korea	EMC Standard	KS C9811:2019 Class A, Group 1, KS C9610-6-2:2019

For product information and related information regarding the OpreX Battery Web Gauge ES-5, please visit this website.

<https://www.yokogawa.com/solutions/products-and-services/control/quality-control-system/filmsheet-thickness-gauge/battery-web-gauge-es-5/>



OpreX™

Through the comprehensive OpreX portfolio of products, services, and solutions, Yokogawa enables operational excellence across the enterprise.

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