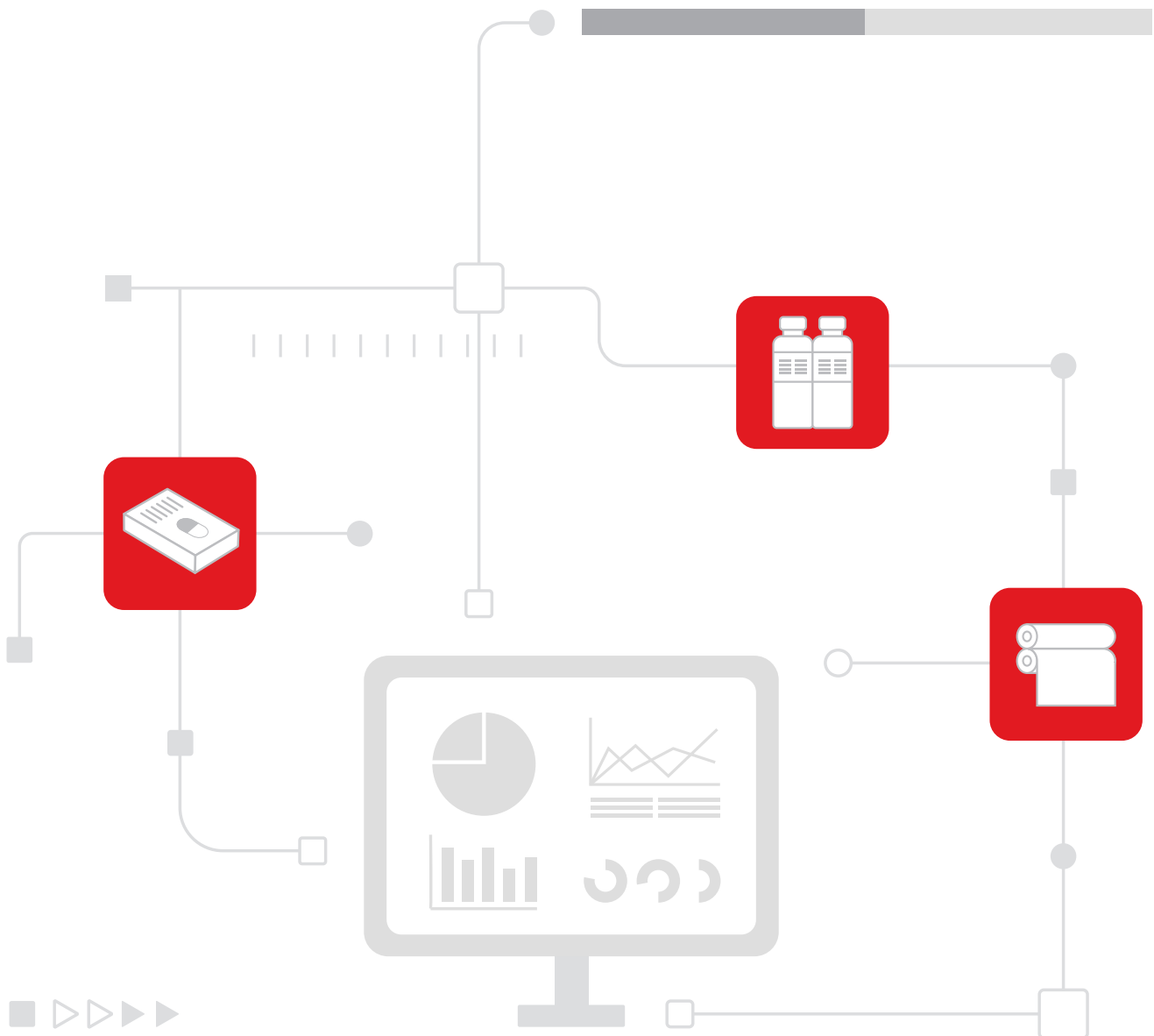


LUSTER

Printing Quality Inspection and Management Solutions



PREFACE

“

**Towards the
starry sky of
industrial
artificial
intelligence!**

”

People's yearning for a better life is the driving force for industrial production to intelligent manufacturing. The high-precision processing, personalized manufacturing, and defect-free product requirements make it impossible for manpower to meet the requirements of processing and manufacturing. Therefore, vision imaging and artificial intelligence (AI) have become the core of a new generation of intelligent manufacturing.

Since its inception in 1996, LUSTER has been focusing on vision imaging and fiber optics, providing innovative high-end products and solutions for the industries of Electronic Manufacturing, Display, Printing, Packaging, New Energy, Plastic Web, Television, Animation, Scientific Imaging, Rail Transportation, Optical Communication, Laser and Sensing.

Since 2000, LUSTER set out on the road to vision imaging and industrial AI. In this year, it cooperated with Shanghai Printing Paper Money Factory to jointly develop the "Online RMB Gravure Quality Inspection System" to eliminate the Renminbi printing errors and ensure that there are no defects larger than 0.1mm², freeing a large number of inspection workers, and starting the journey of independent development of vision imaging equipment. In 2006, it developed a display vision inspection equipment for Sharp to replace human eyes, helping to establish the standard for digital display inspection, freeing a large number of inspection workers and improving the level of factory automation. In 2008, it launched the independent commercial vision development software platform Visionwaw. In 2012, the vision system based on the independent vision positioning software VisionBox was used for solar silicon wafer production and processing, and began to serve the automatic process production line.

The company adheres to independent research and development, deeply cultivates in the field of vision imaging, and gradually forms a complete product line combination from vision devices, vision components, vision algorithms, vision systems to intelligent vision equipment. Facing the major historical opportunity of the Fourth Industrial Revolution brought by the popularization of emerging technologies such as AI and 5G, LUSTER has strategically laid out industrial AI with the accumulation of vision imaging technology for more than 20 years, and actively promoted the Chinese factories from semi-automatic production to fully automatic unmanned factories to realize flexible intelligent production.

For the field of consumer electronics, LUSTER provides automation and intelligent production process solutions required by smart factories to replace manpower, and complete "high-grade, precision and advanced" tasks such as identification and positioning, processing and assembly, and high-precision measurement, which greatly improves the processing accuracy and efficiency. So far, we have provided tens of thousands of sets of vision systems to serve the automated production line.

In the display panel industry, LUSTER provides end-to-end intelligent quality inspection solutions to achieve detection accuracy of 5μm, beyond the limit of human vision. At present, there are thousands of sets of systems to serve customers in industries such as BOE, Sharp and CSOT, freeing tens of thousands of inspection workers.

For the printing and packaging industry, LUSTER provides automated vision inspection solutions, outgoing quality control and intelligent quality management service for printing defect inspection. So far, thousands of sets of printing quality inspection systems have been installed, and successfully entered the international market, greatly promoting the printing industry quality management level.

For the field of advanced scientific research, LUSTER is committed to applying vision imaging and optical fiber technology in various industries, providing the railway and rail transit industry with dynamic image detection equipment for road surface and underbody detection and EMU operation failure detection, providing the life science industry with the core components of the world's largest flux gene sequencers, providing the stereo vision industry with comprehensive development of 3D stereo reconstruction system, dynamic capture system and light field imaging system, and providing the optical communication industry with high-end solutions for integrated photonics and quantum information, to boost China's science and technology level in the field of photoelectric information, support major national science and technology projects, and promote the development of industrialization.

To become a global leader in the field of vision AI and optoelectronic information is our unremitting pursuit. We firmly grasp the historical opportunities created by the explosion of information, AI and Internet of Everything, practice the principle of "developing the industry with high-quality product", increase investment in AI research and development, accelerate the development of intelligent and high-performance vision imaging equipment, and accelerate the construction of intelligent factories, hoping to make a contribution to the realization of the strategy of making China a strong country in AI science and technology. We are willing to join hands with colleagues in the industry to move forward rapidly towards the bright future of industrial AI.





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About LUSTER

LUSTER LightTech Co., Ltd. (hereinafter referred to as "LUSTER") takes innovation in optical technology as its foundation to develop businesses of vision imaging and fiber optics, with the aim of becoming a global leader in the fields of vision AI and opto-electronic information.

Focusing on vision imaging technology, LUSTER insists on "Implant Eyes and Brains in Machines", and provides customers with leading products and solutions such as configurable vision system, intelligent vision equipment and vision components. LUSTER has always adhered to the business philosophy of customer-orientation to promote intelligent "manufacturing" in different industries such as Electronic Manufacturing, Display, Printing, Packaging, New Energy, Plastic Web, Television, Animation, Scientific Imaging, Rail Transportation. With over 20 years' experiences of optical imaging, vision software and algorithms, innovative vision components etc., LUSTER continues to innovate its products and strives to be the optimal, strategic, trusted and honorable choice for its customers.

In the field of fiber optics, LUSTER is a solution provider of high-end optical devices and instruments, and it also provides independent broadband optical access and smart home networking solutions for the radio and television industry.

LUSTER currently has over 500 patents and property rights, and won one first prize of State Technological Invention Award and two second prizes of National Award for Science and Technology Progress which are the highest awards for technology innovation. LUSTER has undertaken numerous major national science and technology projects to help promote the national science and technology level and industrial development.

MISSION | To implant eyes and brains in machines, to empower optical inter-connection, to create and realize customer' s dream.

VISION | To become the world leader in vision artificial intelligence and optoelectronic information fields!

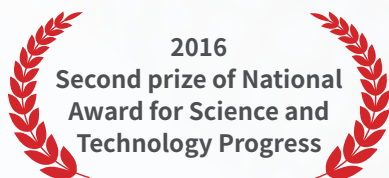
VALUE | To take the responsibility of promoting industry development and strive together. To transform knowledge into fortune, and to let the fortune belongs to its own creators!



LUSTER Achievements



LUSTER took the lead to propose the 3D modeling method of vision angle - illumination collaborative stereo video, and developed key technologies such as stereo video synthesis and reconstruction, planar video stereo modeling and naked eye display.



LUSTER took the lead in the research and development of new generation stereo vision method theory, key technology and equipment, and put forward a stereo vision system architecture with computational photography as the core.



Through code modulation and reconstruction of the illumination and light path, LUSTER achieved full clear perception of large depth scenes and accurate depth perception in complex environments, broke through the performance bottlenecks and limitations of traditional optical imaging depth of field, spatio-temporal resolution and lack of information dimensions, and made a series of breakthroughs in applying basic theories and commonality, common core technologies and key equipment platforms.



Milestones

2000

Established the vision imaging R&D center to develop online RMB gravure quality inspection system

2008

Successfully developed the first unit of label inspection system

2006

Developed the large sheet inspection system for RMB offset printing

2012

Developed PackHERO-T series cigarette package offline quality inspection equipment

2015

LabelMaster-P series inline label printing quality inspection equipment

2004

Developed the AOI inline inspection system for color Renminbi gravure printing

2007

Successfully developed the first inline inspection system for tipping paper

2014

PackHERO series flexible packaging printing quality inspection system and workflow system

2011

Successfully developed the second generation of label inspection system

2017

PrintMan series of carton box packaging printing quality solution

2019

PackSheet series offset inline inspection system
BNOS-2000/BNOS-4000 offset printing online/offline quality proofing equipment

2021

CartonTANK-650S carton offline quality inspection equipment
CartonTANK-650B folder gluer inline quality inspection equipment
ScanTANK Proofing system with non-contact scanner solution

2016

Successfully developed the third generation of label inspection system
LabelRoll-LT series low tension offline printing quality inspection equipment
LabelRoll-R series high-speed doctor machine

2020

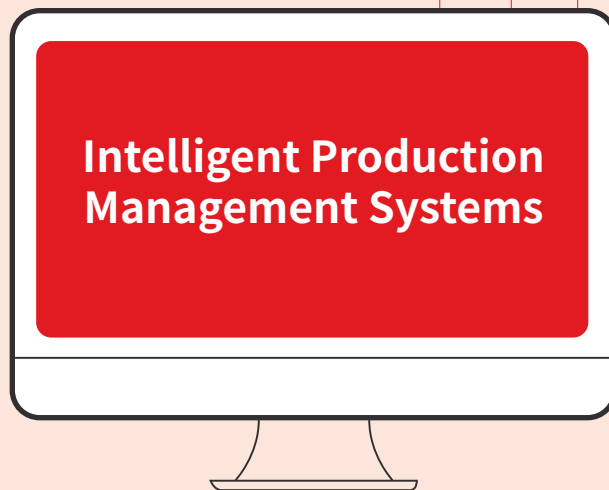
CartonTANK folder gluer full-connected inspection equipment
LabelTANK-220T Series Table Top Inspection Rewinder
SmartFAB management system

2018

PrintMan-650S inkjet printing and quality inspection all-in-one machine
PrintMan-650S folder gluer inline quality inspection equipment
PrintMan-200 tag inspection machine
PrintingProof inspection system

Solutions

- GMQM Quality Management Center
- MES System
- SmartFAB Management System



**Intelligent Production
Management Systems**



PrintingProof



**PrintingPlus
Quality Inspection
Software**



**VisionFilm &
VisionGlass
Inspection Software**

Intelligent Production Management System



Carton Packaging Inspection Products

- ScanTANK Proofing System with Non-contact Scanner Solution
- CartonTANK-650S offline quality inspection & ink-jet Equipment
- CartonTANK-650B Folder Gluer Inline Quality Inspection Equipment
- TagTANK-200 Tag Quality Inspection Equipment
- CartonHERO Offset Inline Printing Inspection System
- VA series Die cutting/Ink-jet Inline Inspection System



Flexible Packaging Inspection Products

- PackHERO-P Inline Inspection System
- PackHERO-F Offline Inspection System
- SlitTANK series Slitting Machine
- RewindTANK series Inspection Rewinding Machine

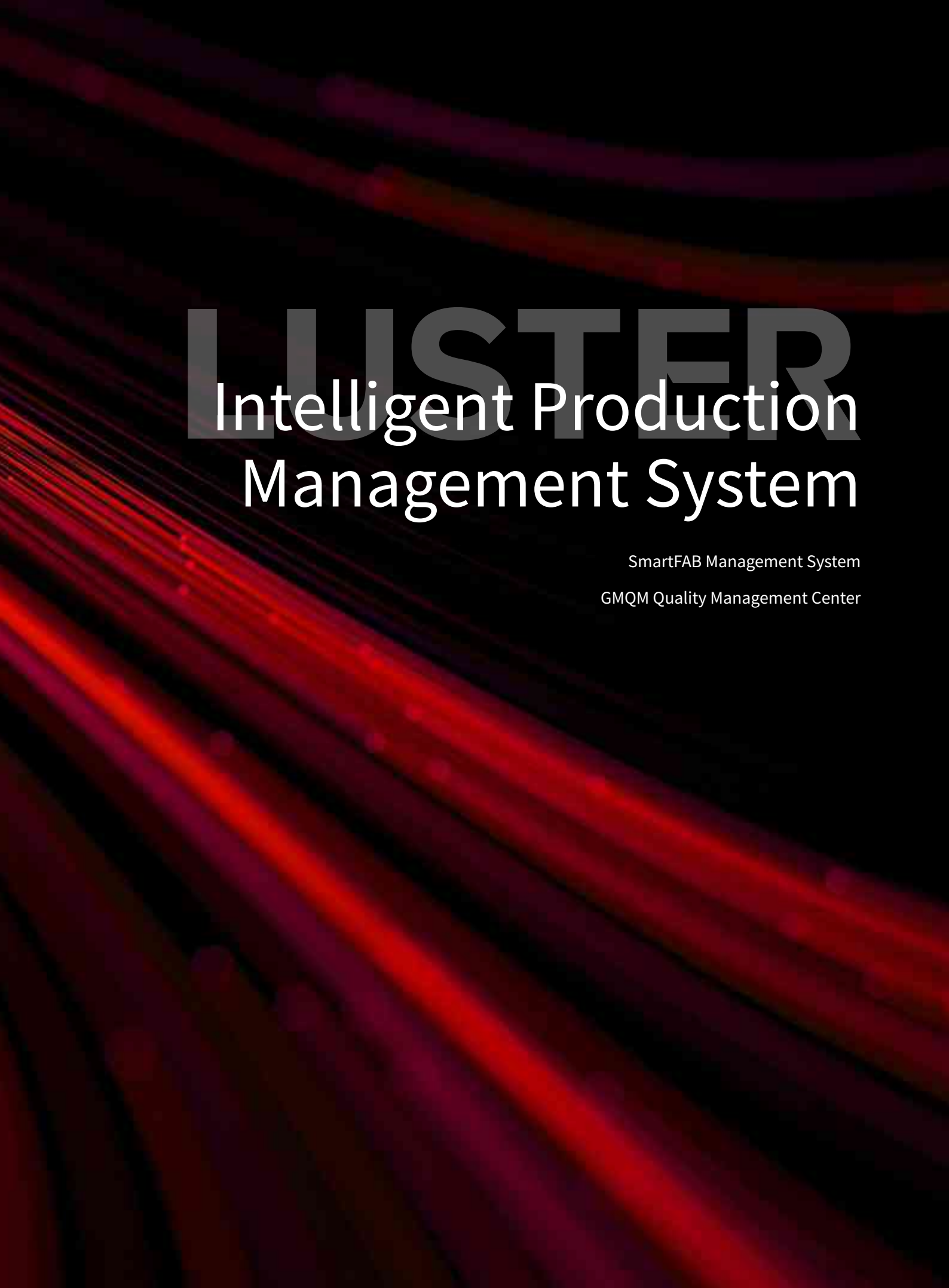


Narrow-web Inspection Products

- LabelMaster-P Inline Inspection System
- LabelMaster-F Offline Inspection System
- LabelTANK-220T Table Top Inspection Rewinder
- LabelMaster-LT series Low Tension Offline Inspection Equipment
- LabelMaster-RS series Roll-to-sheet Offline Inspection Equipment

Printing Quality Inspection and Management Solutions





CLUSTER

Intelligent Production Management System

SmartFAB Management System

GMQM Quality Management Center

SmartFAB Management System

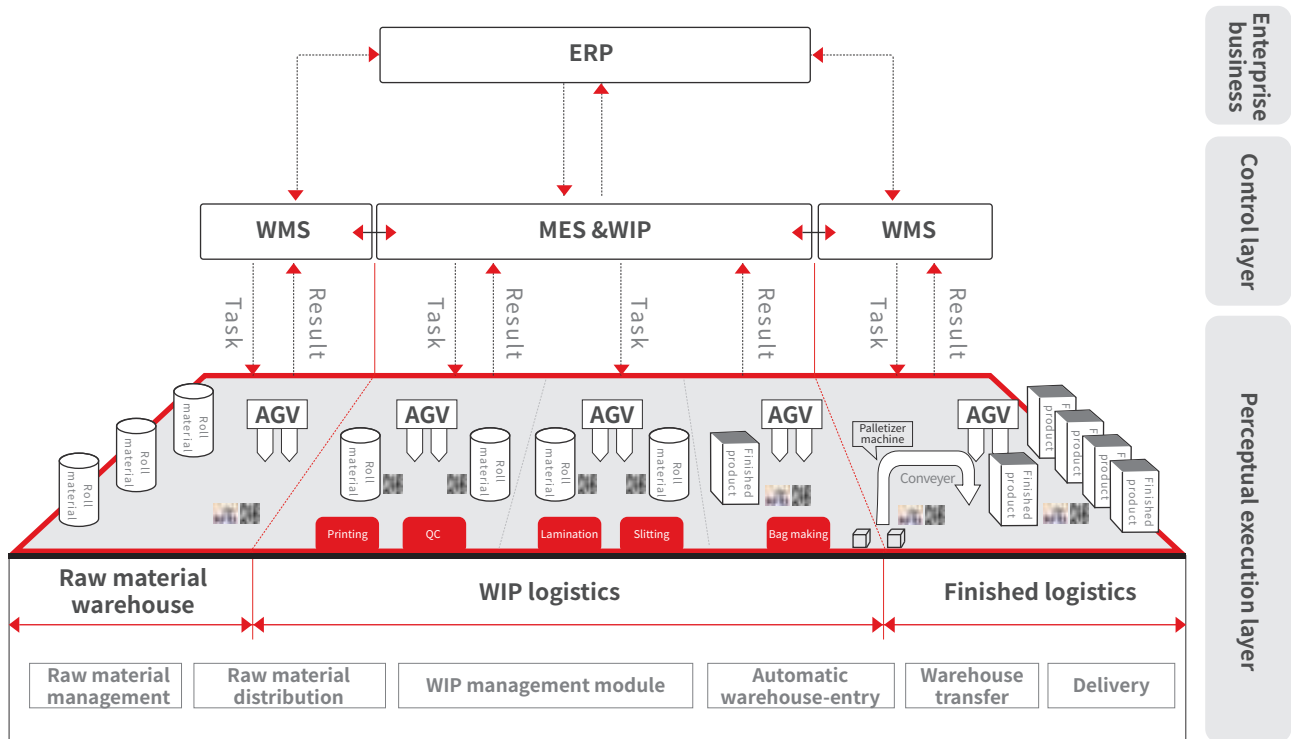
The SmartFAB management system is based on the digitization of printing and packaging production, driven by production data analysis and intelligent planning, to help printers to build an efficient, high-quality, accurate, transparent and smart printing and packaging factory.



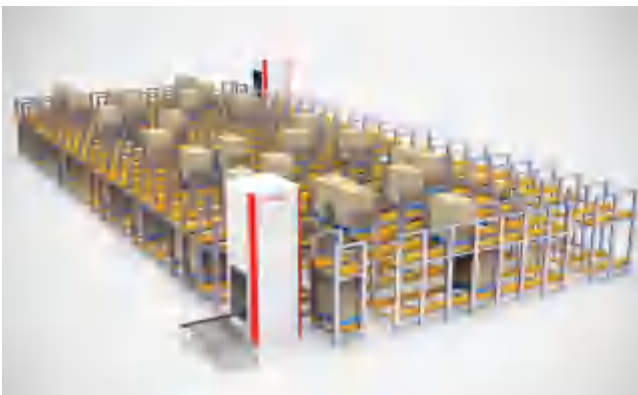
By devoting ourselves to printing and packaging industry for more than 20 years, LUSTER uses printing language to create a management system belonging to the printing industry.

Decision-making Level	Management	Closed-loop Decision Tracking	Risk	Business Indicator	Data Capitalization
Manufacturing Execution	Planning	Production&Execution (MES)		Quality Management (GMQM)	Inventory Management (WMS)
		Equipment Management (EMS)			
	Procurement plan	Intelligent dashboard	Sample management	IOQC	AGV
		Equipment information			
	Production plan	Product tracing	Automatic loading and unloading	Quality inspection	Warehouse in/out operations
		Equipment log			
	Planning and scheduling	Semi-finished management	Cylinder management	Process control	Sluggish warning
		Maintenance plan			
	Plan review	Error warning	Automatic job reporting	NG product management	Warehouse inventory
		Intelligent repair service			
	Consumables management	PDA	Virtual factory	Quality improvement	Intelligent three-dimensional warehouse
		Equipment monitoring			
Platform layer	Multiple heterogeneous data platform		Cloud platform	Safety protection	In-depth learning
Industrial interconnection	Knowledge graph				
	PLC	Bus	Sensor	Peripheral devices	Barcode
	ModBus	OPC UA/DA	CAN	Web service.....	

Deep combination of hardware and software creates an intelligent factory exclusive to the printing industry.



Intelligent semi-finished shelves

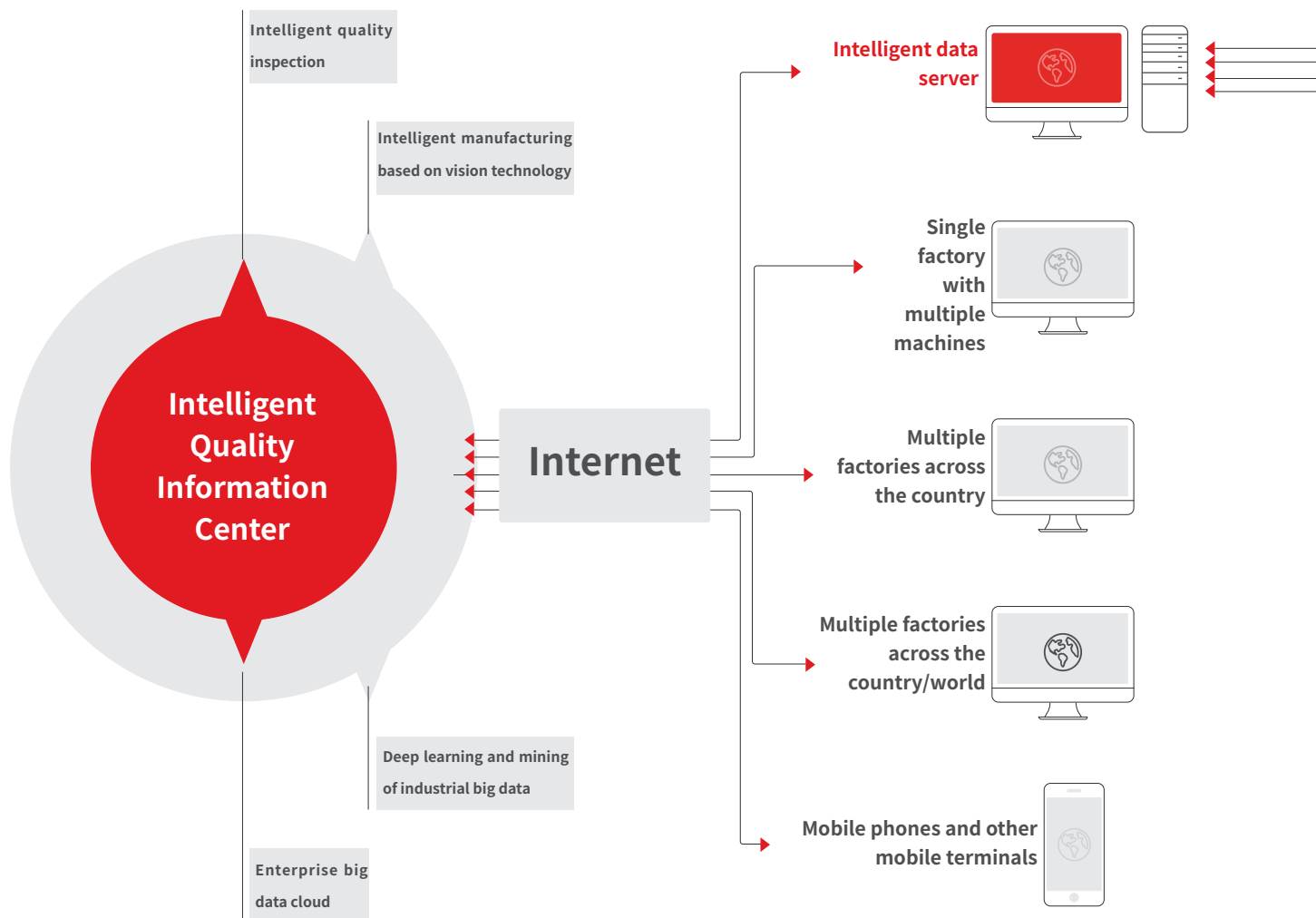


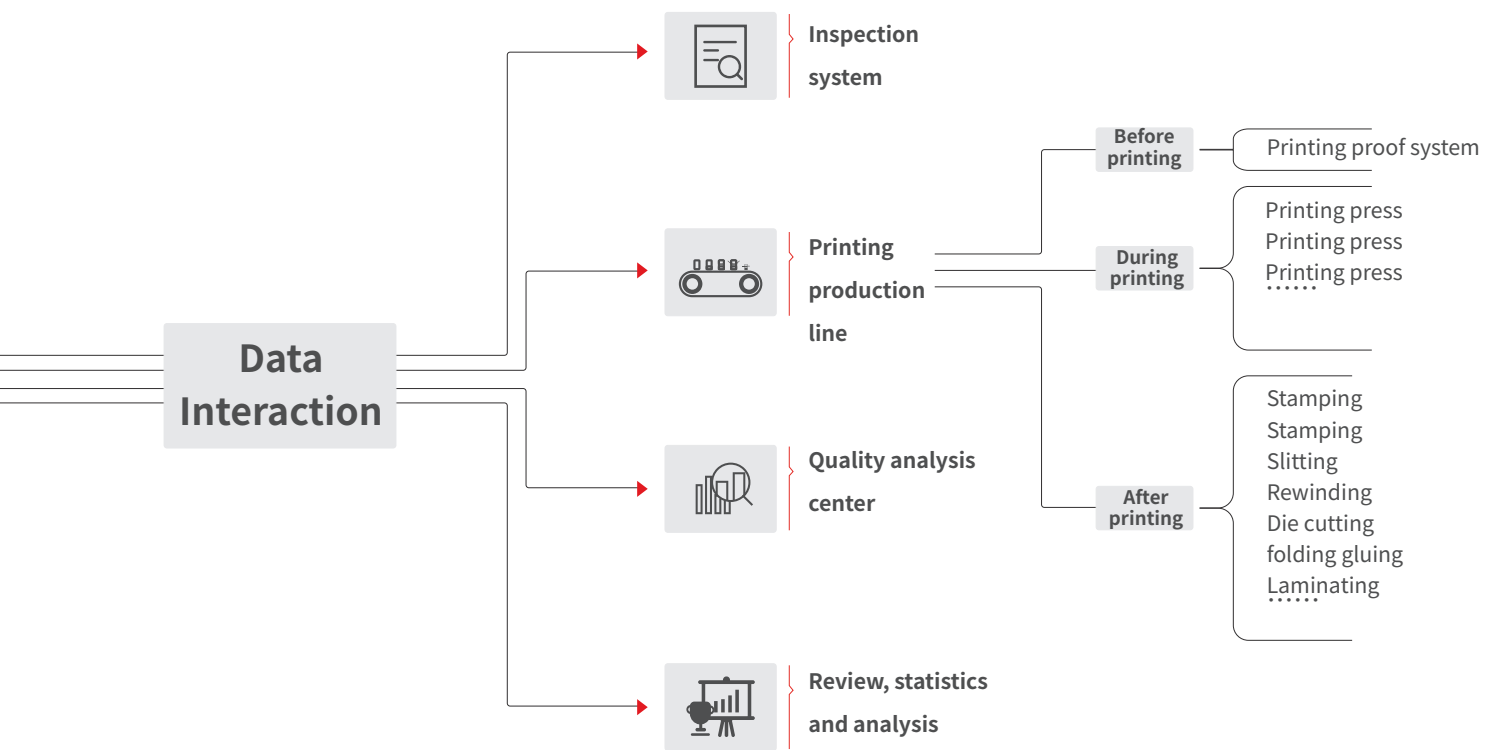
AGV



GMQM Quality Management Center

GMQM center provides customers with integrated quality management solutions. All inspection terminals can be connected to the central server and upload data information to the quality information center. Managers can monitor and manage the whole production process in real time through a variety of inspection terminals, so as to realize the informatization, visionization and intelligence of production and quality management.






Equipment status monitoring



Quality information statistics



Production quality report



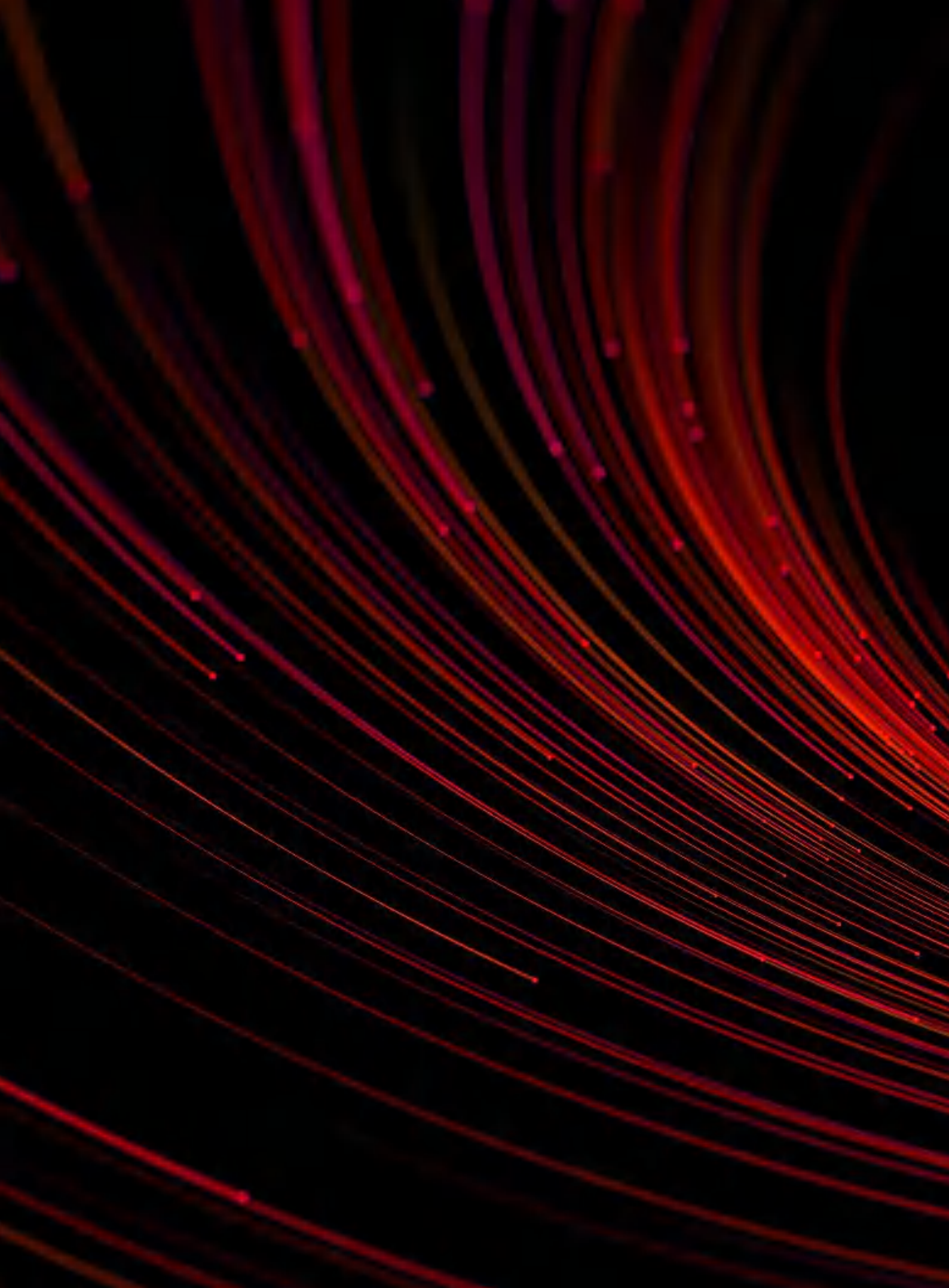
Production condition monitoring



Defect screening



Workshop dashboard





LUSTER

Printing Quality Inspection and Management Solutions

PrintingPlus Inspection Software

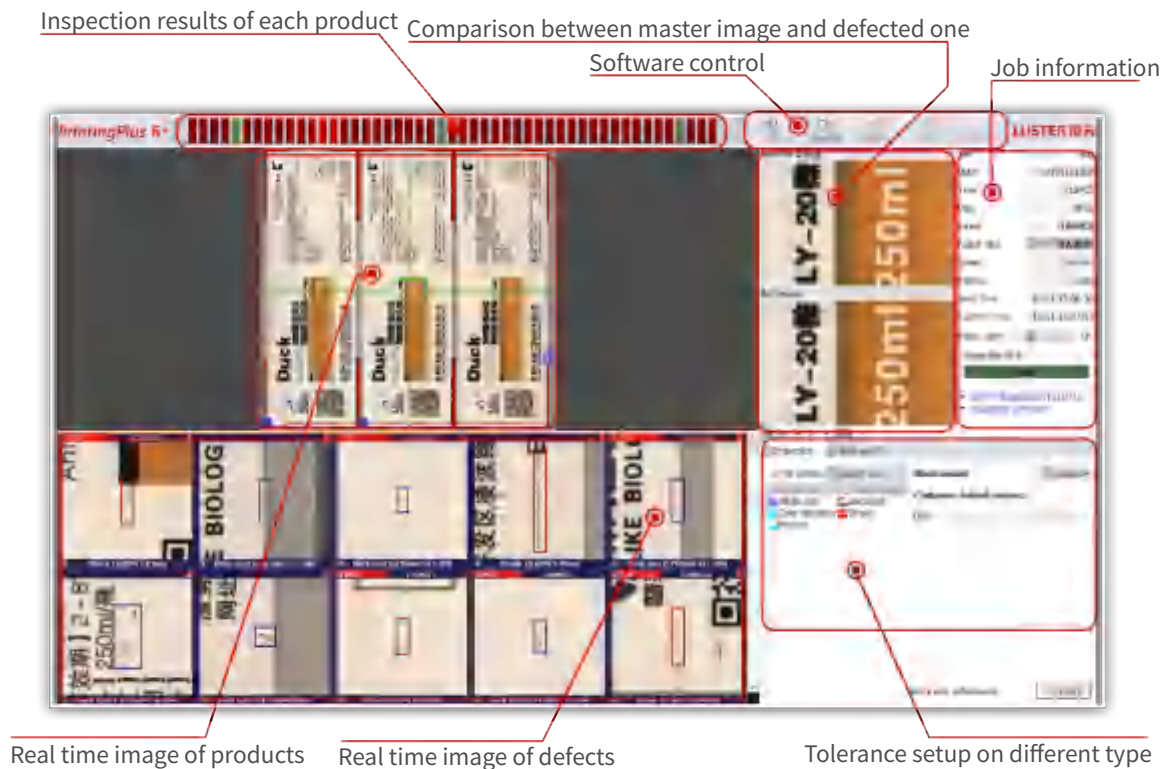
PrintingProof Inspection Software

Carton Packaging Inspection Products

Flexible Packaging Inspection Products

Narrow-web Inspection Products

PrintingPlus Inspection Software



01. Strong Inspection Capability

New version of Luster inspection software not only can 100% detect common print defects like register, color, spots, but also stably check some special defects like hazing, varnishing, light blade line (>3DN).

03. Quick Setup

Only need one reference as master, no "template training/learning" process, guarantee unified quality standard. Support auto job setup, wand auto selection, tolerance recipes and other features for more smart and automatic operation.

05. Innovative solutions for special needs

Provide double side or multiple inspection camera stations by using only one set of inspection system, all defects from each station will be processed, marked and demonstrated on one system and one interface for easy tracking and monitoring.

02. Efficiency Optimization

Support max. 600m/min inspection speed without sacrificing inspection resolution. Same inspection accuracy of 600m/min as 300m/min.

04. Special features only for printers and converters

Clear defect classification for accurate tolerance setting; Tolerance setting on different region of interest; One click to replace reference image without stopping inspection.

06. Comprehensive quality report to improve production quality

As standard function, after each inspection job is finished, users can generate two reports in PDF and excel to clearly demonstrate the statistic results and defect images for further analysis. User can choose to generate reports in different dimensions such as certain batch, time, machine etc.



Optional Modules



Variable Code Reading and Inspection: CodeHERO

- Barcode, 2D code, Sequence number, OCR and other variable data type accurate reading and inspection.
- Achieves decoding speed of 400 codes per second.
- Automatically recognition of variable data when setup.



Color Monitoring and Inspection: ColorHERO

- Live monitor of max. 20 color zones for color control.
- Color fluctuation curve monitoring and real-time visual, light and sound alarm.
- Color variation detection accuracy of $\Delta E \geq 2$.
- Real time demonstration of Delta E value, and L.a.b. value.



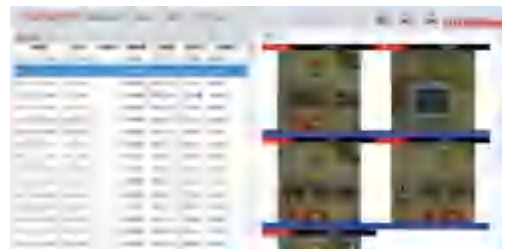
PDF Proof and Job Verification: ProofHERO

- Support printing jobs proofing against PDF, JPEG, TIFF, BMP etc.
- Supported different PDF layer setup.
- Avoid loading errors before job start.
- All master templates can be saved in the system, for repeated jobs.



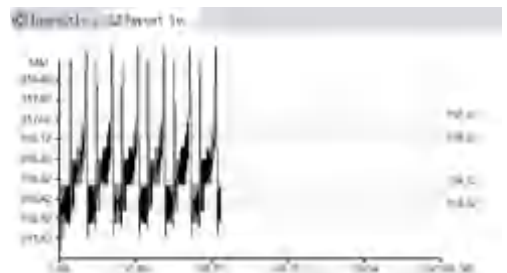
GradingHERO

- Special alarm and handling process of severe or continuous quality issues to prevent any human-caused errors.
- Intelligent and precise defects classification.
- Traceable of every quality issue.



Repeat Length Monitoring

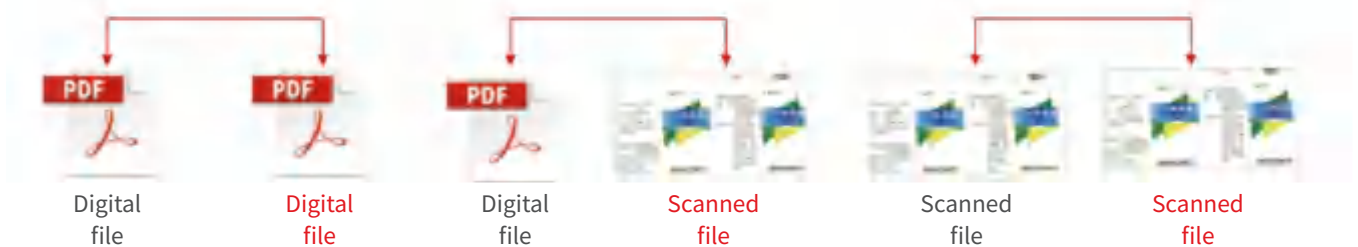
- Special tool to provide continuous inline monitoring for the length of the package and repeat.
- Identify live repeat length trend and alert on any changes in the package length above a defined threshold due to changes in tension, temperature, and other parameters to effectively prevent production issues and waste.



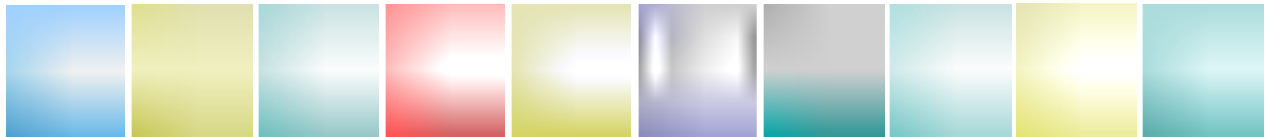
PrintingProof Inspection Software

The PrintingProof Inspection System can effectively proof digital files, printing samples, and sample files to control the quality in pre-press stage. It can be used to detect the errors in the pre-printing process, such as mis-registration, dirty spots, missing content, color variation, text/graphics/print errors, etc. The system is applicable throughout the whole process of printing, such as proofreading for the original sample and film assembly, initial printing, random printing sample inspection, etc. The system features high inspection efficiency and accuracy, which can significantly improve your work efficiency.

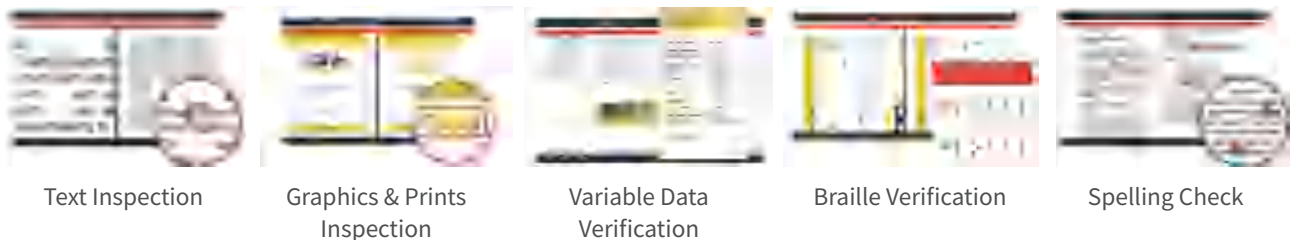
Solution



Files Supported

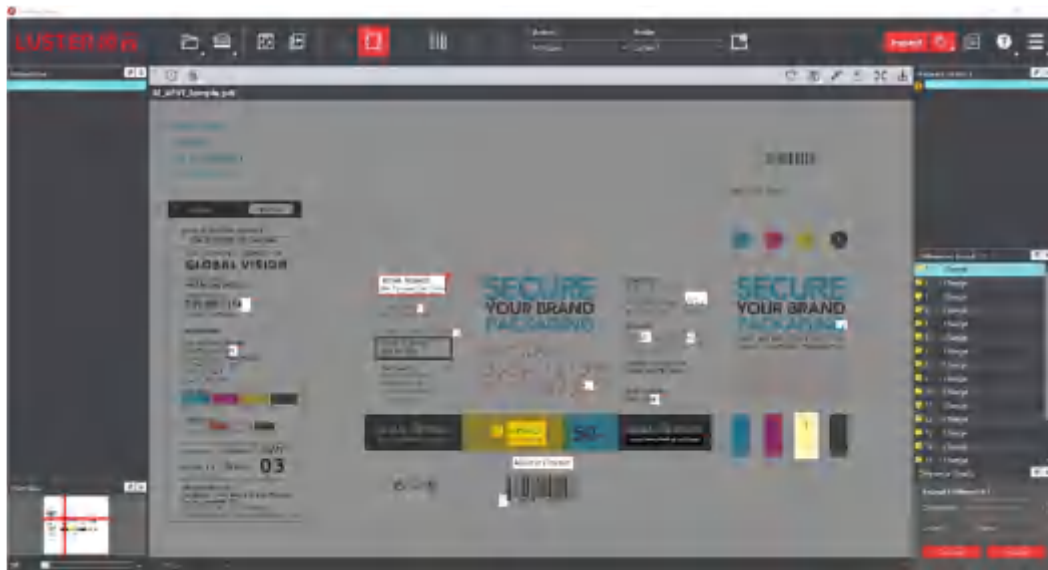


Sample of Defects



Workflow





Features

Various Configurations

Supports the comparison of multiple layer, layer comparison of PDF files, in-file divisional comparison and other comparison methods. Supports masking or flicker-displaying of the deviated area, which makes it convenient for users to view the differences in file comparison.

Advanced Tolerance Settings

For different materials and technics, different tolerance setting options are available to improve the efficiency, accuracy and adaptability.

Quality Report

The results of the proofing will be guaranteed as PDF reports, with compared results recorded in detail.

Easy to Use

Multiple language interface, easy to install and maintenance.

Other Value-Added Functions

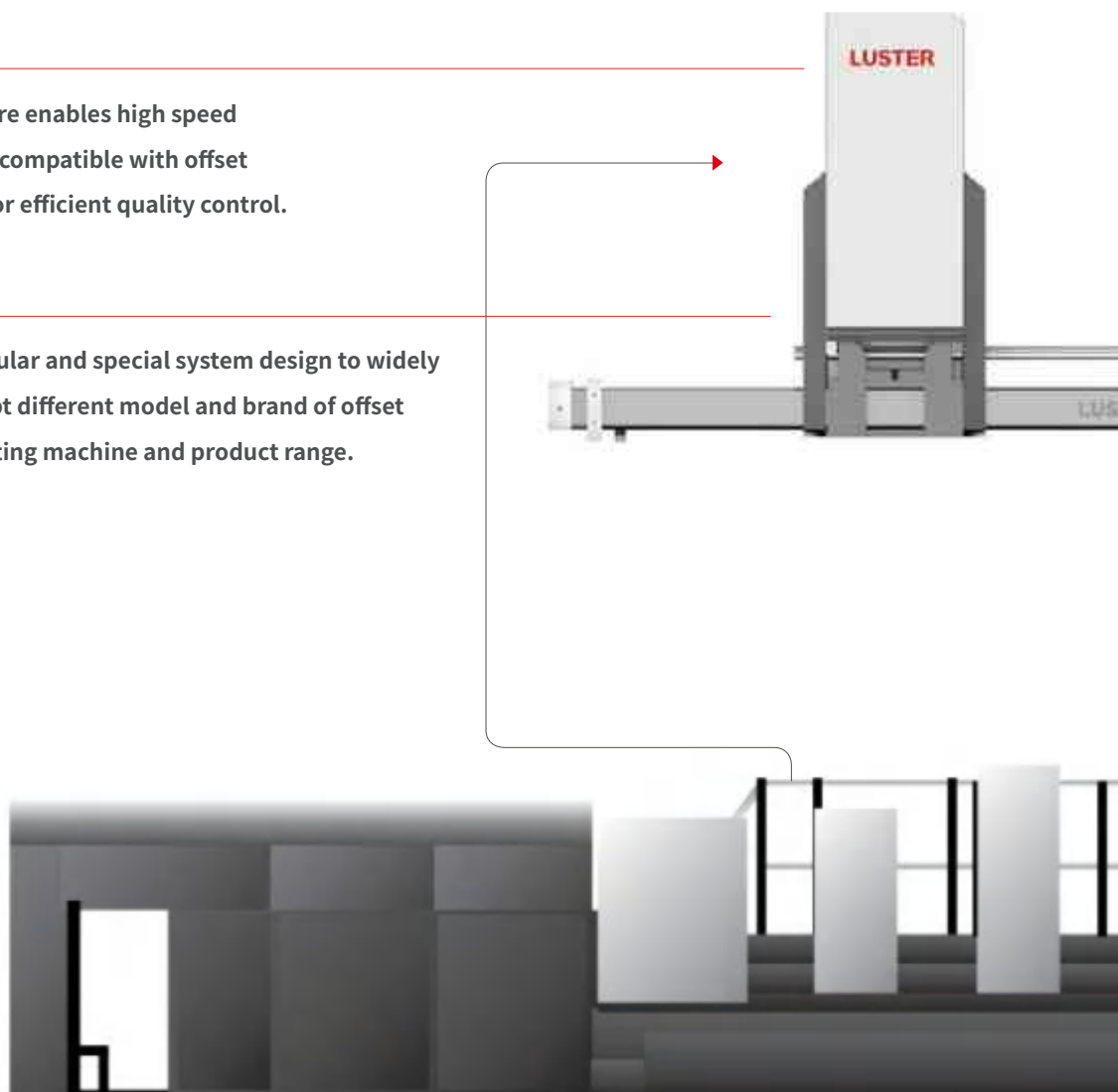
- **Barcode detection module:** locates and identifies variable codes. Grading the bar code rank and verifies the bar code printing quality based on the ISO standard.
- **Braille detection module:** detects braille inscriptions in printed matter, including missing spot detection, braille pattern identification, etc., which meets the needs of special braille printing applications, such as pharmaceutical packaging and bank notes.
- **Braille detection module:** classify user's authorization. Only administrator is authorized to change the back-end inspection tolerance setup of the PrintingProof system, while the basic users cannot.

CartonHERO Offset Inline Printing Inspection System

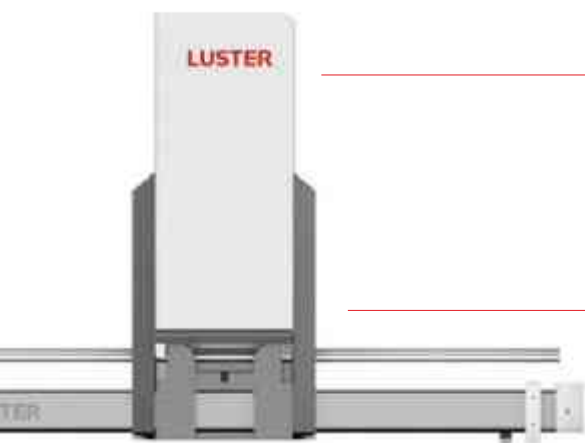
CartonHERO Offset Inline Printing Inspection System is a highly precise, automatic printing quality inspection system designed to effectively control text and graphics print quality and colour consistency during production, to reduce waste and improve production efficiency. It is mainly used for defect inspection of carton packaging printing, book and leaflets printing, examination paper printing, commercial print works, and other offset printing products.

● Powerful software enables high speed inspection to be compatible with offset printing speed for efficient quality control.

● Modular and special system design to widely adapt different model and brand of offset printing machine and product range.



- Only need one master image, setup process and user interface are easy to understand with smart and automatic features and ensure quick job start.



Various options of rejection handling, such as label flag or ink-jet marking.

Accurate inspection result for common detection requirements as well as special ones such as color monitoring and management, PDF proofing, micro text inspection, and reflective material inspection.



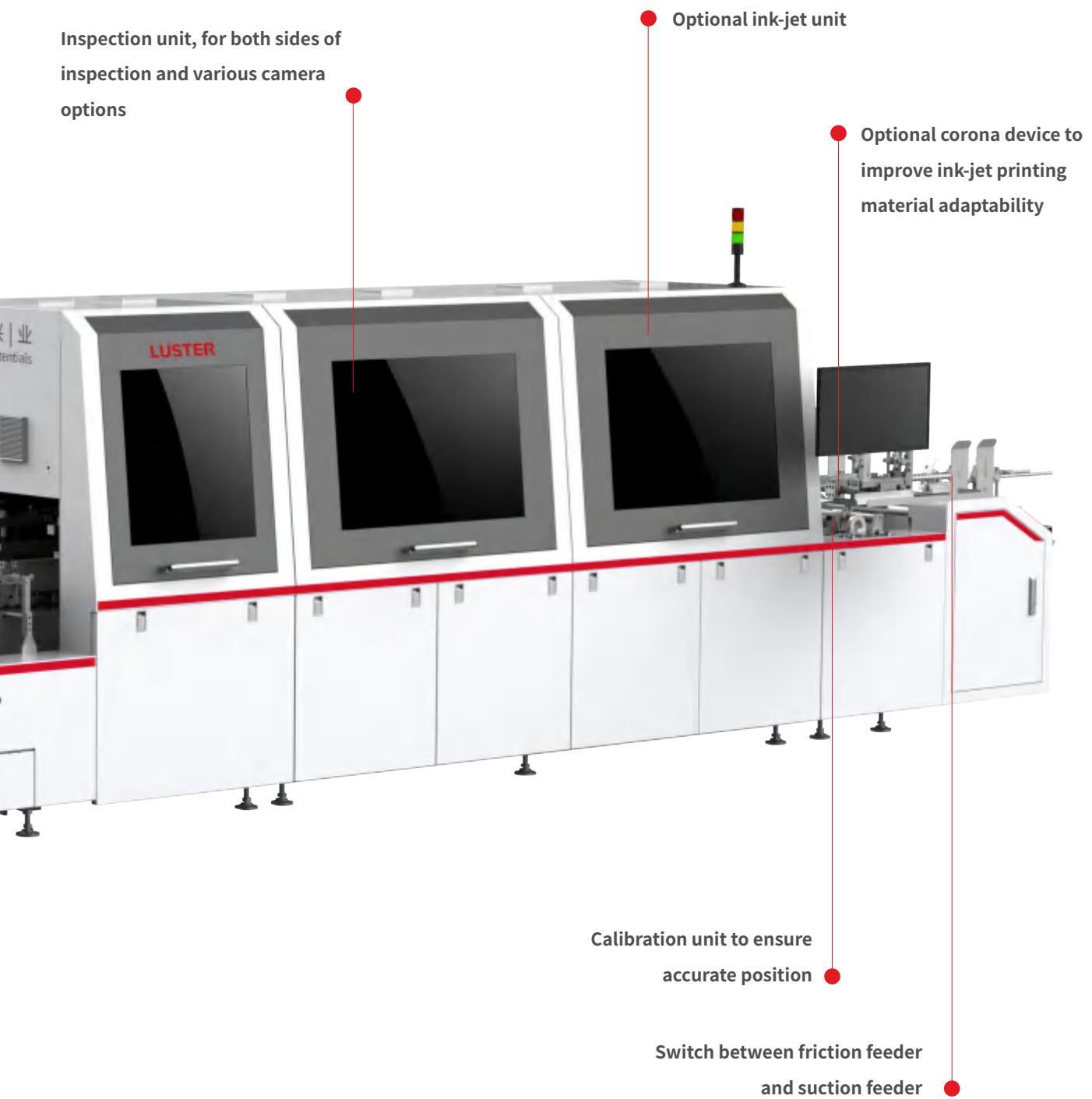
CartonTANK-650S Offline Quality Inspection & Ink-jet Equipment

Specially developed for carton packaging inspection such as pharmaceutical packaging, food & beverage packaging, 3C electronic products packaging, cosmetic packaging etc. Its wide adaptability allows accurate inspection of highly-reflective materials as well as normal ones, for instance gold and silver paperboard, holographic paperboard, aluminized material and stamping material. It is able to inspect defects like streak line, missing print, dirty spot, splash, mis-registration, colour variation as well as embossing defects. What's more, it can provide effective inspection and verification of variable data. The multi-purpose machine can be also used as an independent inkjet printing machine or all-in-one machine with both ink-jet and inspection function, especially for inkjet printing requirements less than 100,000 sheets per order.



● Stacking unit for good products

Two exits to separate common defects products and severe defects products ●

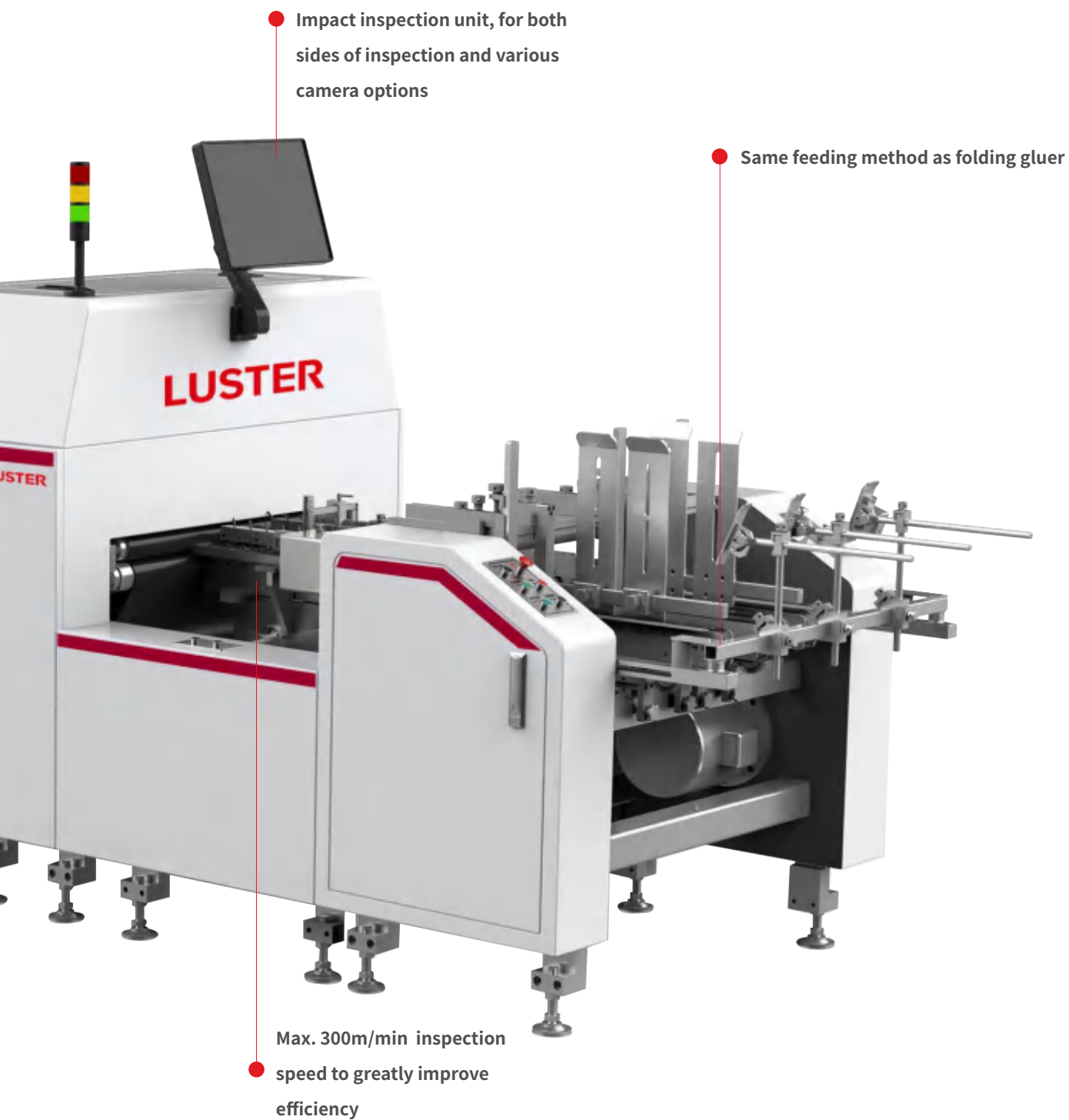


CartonTANK-650B Folder Gluer Inline Quality Inspection Equipment

CartonTANK-650B folder gluer inline quality inspection equipment combines the quality inspection and carton gluing processes into one, reducing 2-4 workers and production cost. This equipment can run up to 300m/min and able to be connected with many folding gluer models.



Automatic rejection unit with
automatic speed adjustment



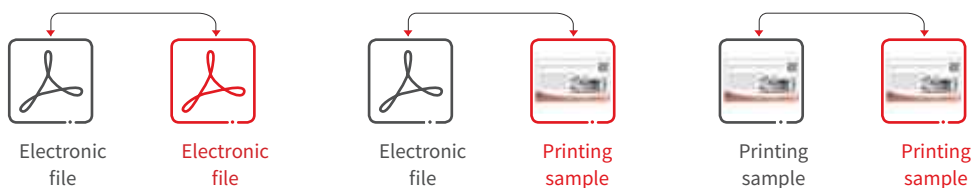
● Impact inspection unit, for both sides of inspection and various camera options

● Same feeding method as folding gluer

● Max. 300m/min inspection speed to greatly improve efficiency

ScanTANK Proofing System with Non-contact Scanner Solution

ScanTANK Proofing system is specially developed for carton box sample proofing, supported by powerful PrintingProof inspection software and a contact-less scanner to accurately and quickly identify any differences between electronic files, electronic file and printing sample, and printing samples.



The height of the scanning head can be adjusted based on the thickness of the material. The adjustment accuracy is 0.1mm to ensure non-contact scanning between the scanning head and the scanning material.

Powerful PrintingProof inspection software with value-added functions. Whole scanning and proofing can be finished within 3 minutes.

Powerful and motor controlled suction platform with dense suction holes to keep scanning material and the platform fit smoothly.

CartonTANK-200 Tag Quality Inspection Equipment

TagTANK-200 Tag Quality Inspection System is developed for quality inspection and final check of clothing tag, card and other small size sheet-fed products. It supports accurate inspection for front and back side printing with vacuum structure from both sides. It can achieve effective inspection of all kinds of defects as well as variable data and RFID inspection.



Flexible Packaging

PackHERO-P Inline Inspection System

PackHERO-P inline inspection system can be installed on printing machine, lamination machine and slitting machine. Real-time sound and light alarm, as well as visual alarm to reduce continuous waste, production cost and prevent further defects. Live web monitoring function to control roll printing quality.



Strong inspection performance for all kinds of defects

System can also be installed on flexo printing machine, lamination machine, slitting machine, and have double side inspection solution

Inspection speed up to 600m/min

High stability to ensure long
lifecycle

One-click operation ensures easy use. Quality
report can be generated to improve production

Various light sources are available to meet
different material inspection requirements



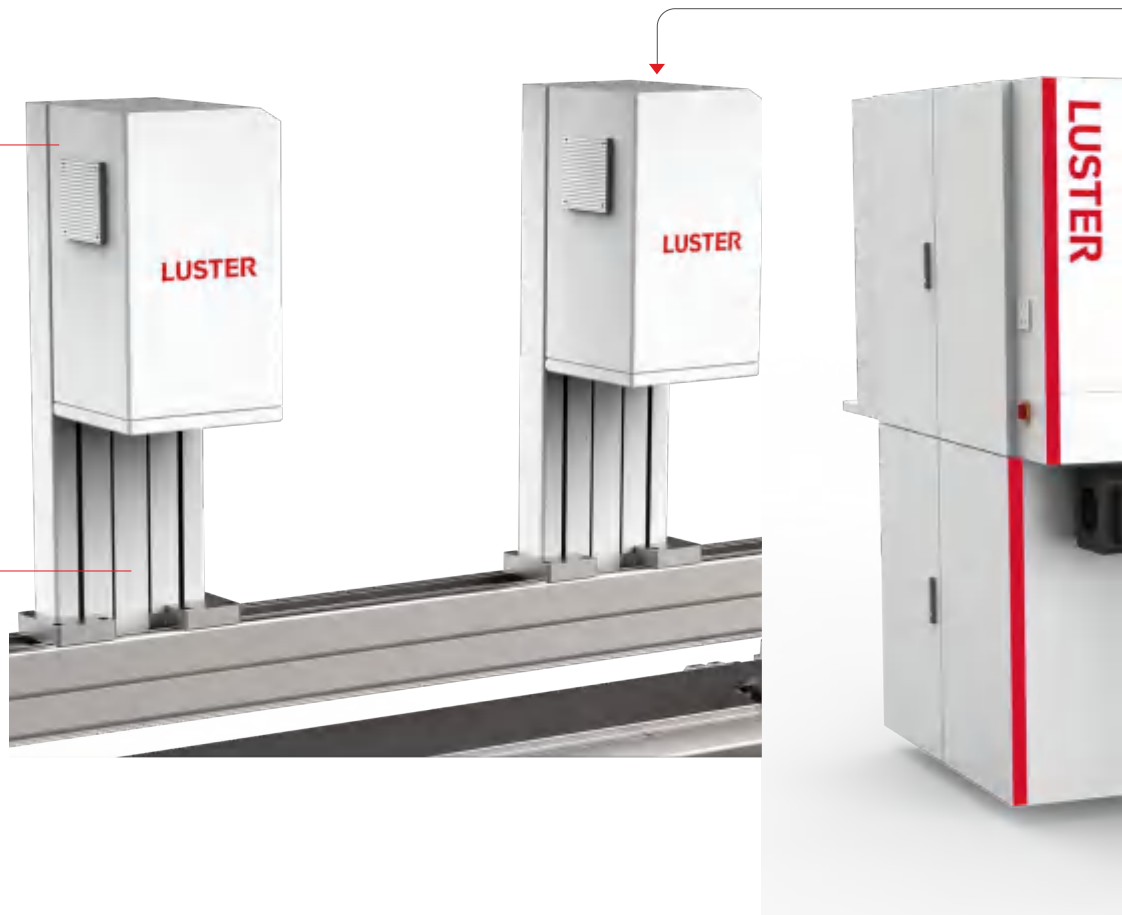
Flexible Packaging

PackHERO-F Offline Inspection System

PackHERO-F offline inspection system mainly installed on rewinder to provide accurate inspection before/after lamination, slitting process, to remove defected products and ensure delivery quality. Guaranteeing the product quality and decreasing the complain and rejection from end users.

- Only need one master image, support to setup tolerance on different regions and defect type, to enhance accuracy and reduce false alarm. Simple user interface to easily understand and operate.

- Can be installed on any brand and model of inspection rewinder, will automatically locate on defect position, and control to stop for defect removal and handling.





Support max. 600m/min inspection speed,
with clear imaging and same accuracy as
under 300m/min condition.

Enhance small text inspection and tilted
streak line inspection performance;
Next generation hardware design to ensure
stable and reliable quality.

Flexible Packaging

RewindTANK series Inspection Rewinding Machine

RewindTANK series Quality Inspection Rewinder is developed for flexible packaging quality inspection and high-speed rewinding, to provide 100% defect detection and quality control for finished rolls before delivery to end customers. In addition, LUSTER' s inspection system is fully integrated into the machine design, to provide more stable and accurate inspection result.

● The whole machine is driven by high-precision servo control system, with stable tension control technology for excellent stability.

● Automatic job setup function to greatly reduce setup times; Can save 10+ machine recipes for quick start.





All key machine components are from European/
Japan manufacturers to achieve high speed and
reliability through constantly good quality.

LUSTER' s inspection system and rewinding
machine can be fully integrated together, to reduce
space cost and maintenance and service cost.

SlitTANK series Slitting Machine

SlitTANK series slitting machines are perfect for high-speed slitting of flexible packaging, plastic films and laminated films. The machine is composed of rewinding, traction, slitting, unwinding and edge trim collection parts, together with servo-driven closed-loop tension control system, to ensure stable operation and accurate slitting performance. Various optional modules and user-friendly design will provide flexibility for daily use.

● The whole machine is driven by high-precision servo control system, with stable tension control technology to ensure the accurate and flat slitting end.

● All key machine components are from European/Japan manufacturers to achieve high reliability through constantly good quality.





Clear user interface with two touch screen navigations on both rewind and unwind side for easy operation. All settings can be pre-set and saved for re-use to greatly reduce set-up times.

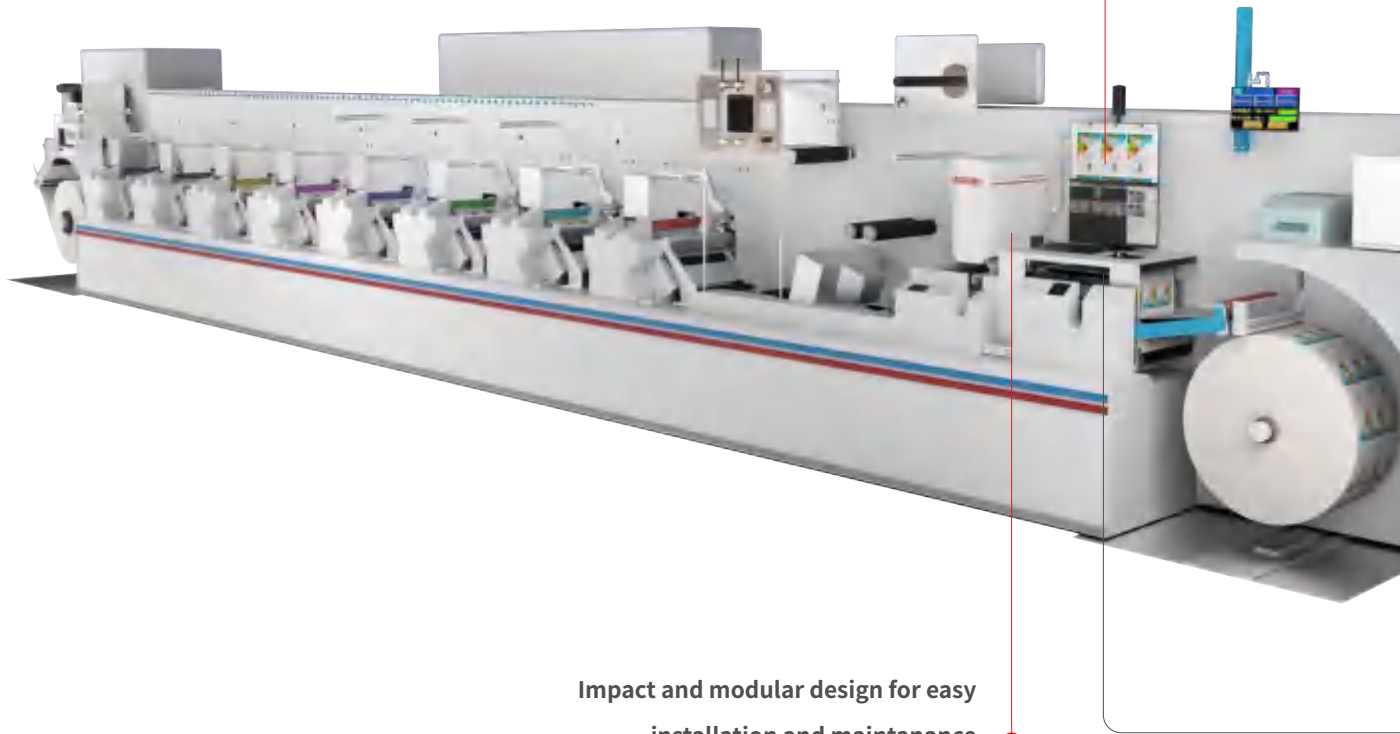
The machine is equipped with an IoT system which can monitor the working conditions remotely and provide remote diagnosis and service.

Narrow-web

LabelMaster-P Inline Inspection System

Installed on printing machine like flexo press, letter press and digital press, the LabelMaster-P series inline quality inspection system can 100% control print quality for all narrow web applications and labels to reduce waste, production cost and improve efficiency. It is able to inspect defects like incomplete/missing print, dirty spot, ink spot, mis-registration, color variation, improper stamping& die-cutting, variable data etc.. Integrates optical system into one box, camera and light source can be easily change to fulfil inspection requirements on different material.

**Real-time light and sound alarm,
as well as visual alarm to prevent
continuous waste**



**Impact and modular design for easy
installation and maintenance**

- Wide-adaptive optical design and illumination enables LUSTER' s system to stably detect all kinds of defects on different substrates,

- Various camera models and resolutions for different requirements



Narrow-web

LabelMaster-F Offline Inspection System

Integrated with rewinder/slitting rewinder, LabelMaster-F offers 100% quality control on finished rolls for final quality check to reduce customer rejection and complaints. Integrated with high speed slitting rewinder, the production efficiency is optimized meanwhile to achieve 100% quality inspection of common and very small defects, 3D defects and variable data defects.





Module and impact design,
“drawer” illumination
modules to cover more
substrates

Global Service Network





LUSTER LightTech Co., Ltd.

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