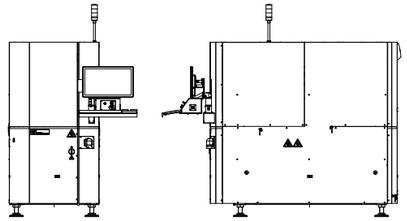
Specification

SE1000

Inspection	Camera		12 million-pixel CMOS color cameras
	Lighting unit		White LED 3 stage (upper, middle, and lower) + coaxial lighting
	Inspection resolution		12㎛/ 5㎛(option)
	Depth of field		12㎛: -0.9～+1.6㎜ / 5㎛: -0.5～+0.8㎜
	FOV		12㎛: 48.0×36.0mm / 5㎛: 20.0×15.0mm
	Inspection tact		0.25 seconds per image (FOV)*1
Common part	Inspectable work size		600×590×300mm*2
	Dimensions		925×1,926×1,800mm (W×D×H)
	Weight		1,300kg
	Power supply		3-phase 200V～230V
	Air		Dry air 0.5MPa (max. consumption 10L/min)
	Condition	In use	+15℃+ 40℃ Humidity: 30%～65% (non-condensing)
		Strage	+10℃+ 60℃ Humidity: 30%～80% (non-condensing)

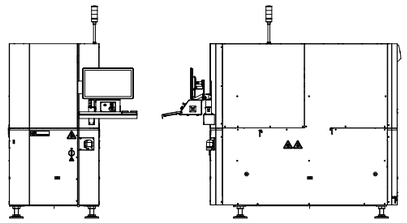
*1 0.7 seconds / screen (FOV) when using i-3D
*2 Long board type, maximum work size when using custom transport. Standard work size is 300 x 300 x 300mm



Hybrid inspection machine

2D Inspection	Camera	12 million-pixel CMOS color cameras
	Lighting unit	White LED 3 stage (upper, middle, and lower) + coaxial lighting
	Inspection resolution	12㎛ / 5㎛ (option)
	FOV	12㎛ : 48.0×36.0mm / 5㎛ : 20.0×15.0mm
	Recording time	0.25 sec per image (1 field of view) *1 Scratch detection
3D Inspection	Laser sensor	S40 (XTIA) : Class 1
	Resolution	Z: 1㎛ XY: 60㎛
Performance	Inspection area	600×600×300mm (W×D×H) width for double feeding (300mm per section)
Equipment	Transfer conveyor	With transfer stage
	Inspectable work size	600×590×300mm*2
	Dimensions	1,567×1,965×1,800mm (W×D×H) Inspection machine body: 925×1,927×1,800mm (W×D×H)
	Weight	1,500kg
	Power supply	Main machine: 3-phase AC200 ～ 230V Dust-proof rack: Single-phase AC100V

*1 0.7 seconds / screen (FOV) when using i-3D
*2 Long board type, maximum work size when using custom transport. Standard work size is 300 x 300 x 300mm



*Please refer to the product specifications for details.
■JUKI Specifications and appearance may be changed without notice.

JUKI Automation Site

JUKI CORPORATION HEAD OFFICE
The activities of research, development, design, sales, distribution, and maintenance services of industrial sewing machines, household sewing machines and industrial robots, etc., including sales and maintenance services of data entry systems,

MANUFACTURER : JUKI CORPORATION
INQUIRY : JUKI AUTOMATION SYSTEMS CORPORATION
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JUKI INDIA PVT. LTD. www.smtjukiindia.com
JUKI SMT ASIA CO.,LTD.

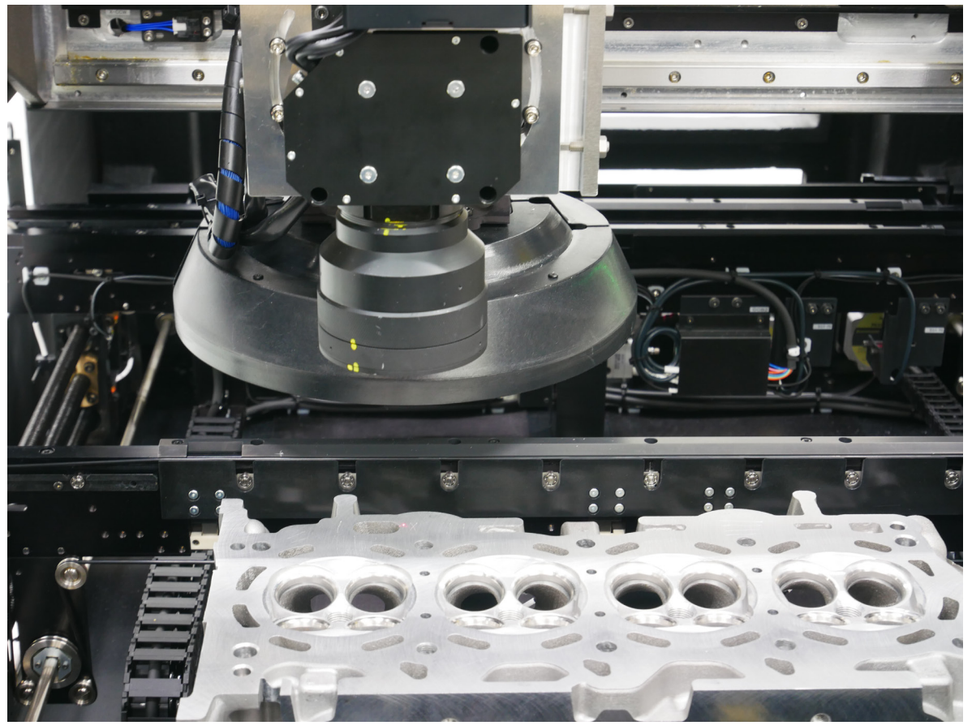
Oct- 2022/Rev.07

Inspection and Measurement

JUKI Smart Solutions

Surface appearance visual inspection automation
Quality assurance | Time saving

SOFTWARE STORAGE PRINTING INSPECTION PLACEMENT INSERTION SOLDERING






Product Lineup

Automatic appearance inspection of dirt, scratches and other imperfections

Visual inspection machine

SE1000

Appearance inspection:
Surface abnormality detection (scratches, dents, rust, etc.) and dimensional measurement

High-accuracy automatic appearance inspection for depth measurements

Hybrid inspection machine

High-accuracy scratch inspection:
Accurate measurement of scratch depth in addition to position and length. Optimized for inspection of precision machined surfaces, such as engine blocks.

Achieve full inspection and data integrity

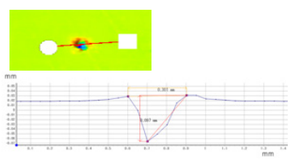
With the rise of autonomous driving, many products and their components are required to have the highest quality. The SE1000 is capable of high-speed, high-precision automatic inspection that ensures 100% reliable inspections and helps to achieve the highest quality.
All inspection data can be stored, and access levels can be strictly controlled by creating a database .
It is possible to ensure the integrity of all inspection data without any inconsistency.

Hybrid inspection

Hybrid inspection combines JUKI's 2D inspection with XTIA's Optical Comb laser for the most accurate and detailed measurements. Even minute scratches can be found and measured with high-speed and high-accuracy automatic inspections.

Optical Comb Laser

Optical Comb lasers (optical frequency comb) provide the most accurate measurement of frequency and time. XTIA's sensors are the first in the world to apply the Nobel Prize-winning physics technology of optical combs. They utilize coaxial lasers and high precision range finders.



XTIA sensor data profile

Advantages of automated inspection

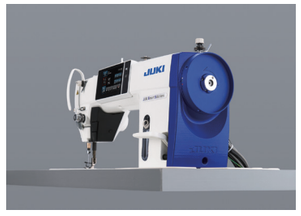
- ☑ - Automation of current visual and sensory inspection process
- ☑ - Reduction of inspection time
- ☑ - Inspection of every single piece
- ☑ - Elimination of human mistakes during inspection process
- ☑ - Automated inspection within the production line
- ☑ - Reduction of human involvement for inspection (just operator)
- ☑ - Creation of traceability records of inspection

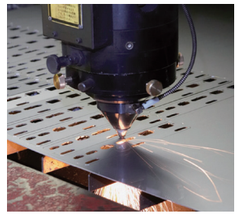
JUKI's experience makes the difference

JUKI's years of experience making inspection machines and manufacturing experience in sewing machines gives us the ability to understand the issues and offer exceptional tools to improve your quality and automation.

JUKI began developing inspection machinery over 35 years ago for our partner SONY. They are currently in use at countless electronics assembly plants around the world.

We now offer this sophisticated technology in machines for a wider range of industries where we can help improve manufacturing quality by accurately detecting defects in different processes.

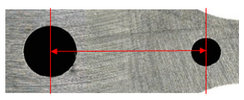




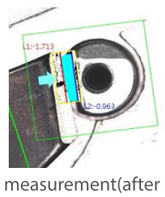
Inspection capabilities

One multi-purpose inspection machine covers all these inspection requirements.

Dimension measurement (length, distance, clearance)

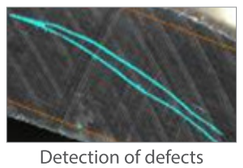


External dimension measurement



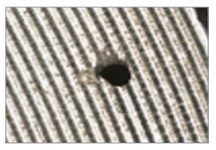
Clearance measurement(after binarization)

Surface anomaly inspection

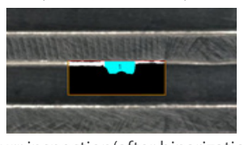


Detection of defects (after binarization)

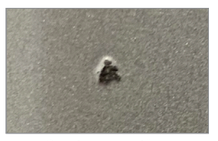
Rust inspection



Nest inspection



Burr inspection(after binarization)



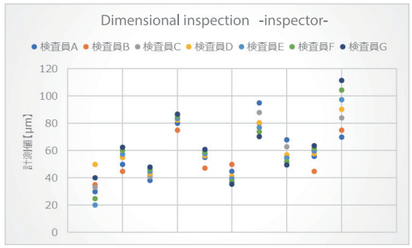
Dent inspection

Missing inspection

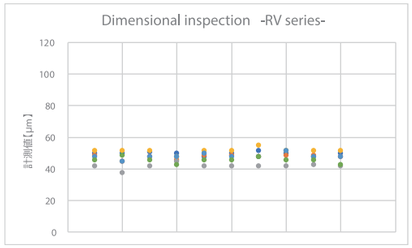
Advantages

Certification of inspection quality

Automated inspection offers continuous high-reliable inspection results and uninterrupted high-quality assurance compared with manual inspection.



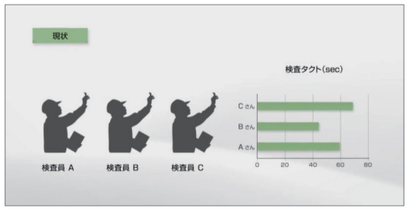
Variations using manual inspection



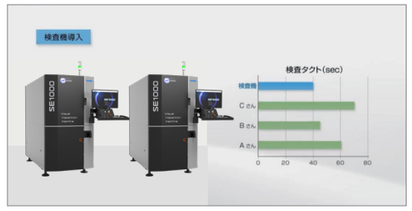
Variations using automated inspection

Faster inspection time and inspection of every piece

During the manual inspection, the inspection time varies from worker to worker, often resulting in limited sampling inspections. The automated inspection offers a faster processing time and 100% inspection of every part.



Worker variation



Faster inspection time

Automated inspection

The automated inspection and measurements support the automation of entire in-line inspection processes. Also, the automatic capture and collection of inspection results make it possible to access data trends analysis and traceable results at any time.

Full in-line inspection and measurement

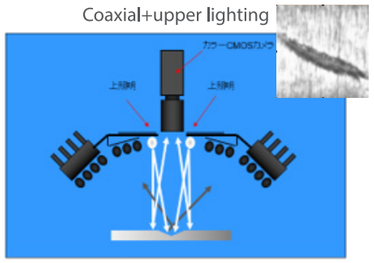
Software interface

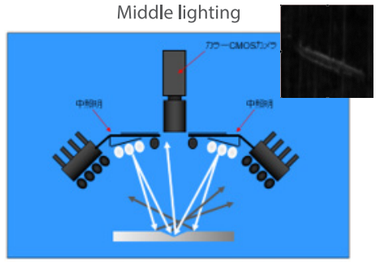
Traceability

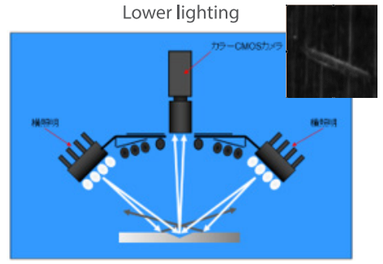
Automotive components and many other industrial products require high quality and traceability.
JUKI's inspection machines meet these requirements by providing high-reliable inspection and accurate data collection.
JUKI provides inspection solutions that support mass production and automation.

Detection of surface abnormalities (scratches, etc.) by 2D examination

Visual and sensory inspections performed by humans' eyes and hands in the past can now be replaced by optimized automatic illumination angles to achieve high-reliability inspection results.

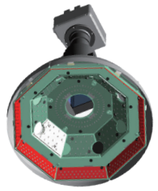




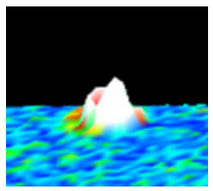


Detection of defective surfaces using the i-3D stereo system by illumination differences.

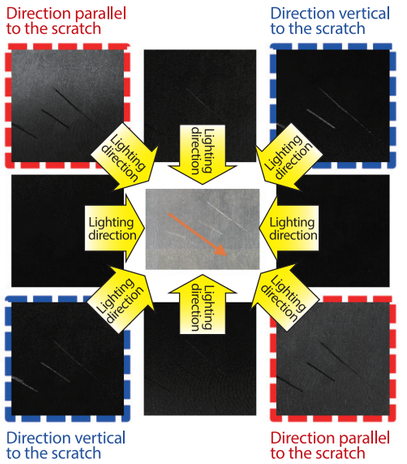
The eight-split illumination ring is sequentially lit and captured.
The detection accuracy is improved by acquiring a total of 11 images (3-stage illumination + 8 directions) for the same defective portion.
In addition, 3D images are generated by combining these images.



SE1000 8 direction lighting



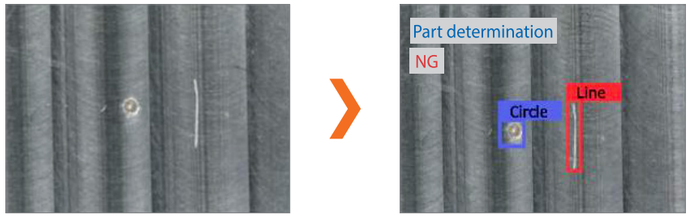
i-3D 3D image



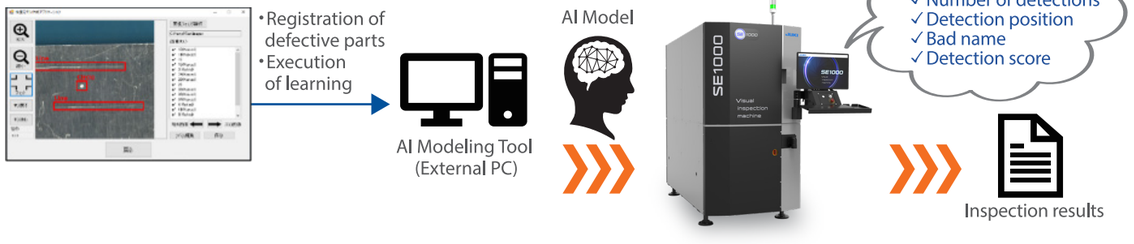
JUKI supports the automation of surface inspection utilizing AI function

The SE1000 offers an optional AI function for detecting objects that improve the detection accuracy of defective areas by learning the characteristics of defective modes such as scratches, nests, and clustering.

Object detection image by AI



Detected image by SE1000 AI function



Case studies

Provision of optimal solutions for your requirements utilizing our broad experience in the SMT and sewing machine businesses

CASE 1

Problem	Worker shortage
Solution	Significant reduction in man-hours through automatic inspection Reduction of data collection/recording time from automation

Before

Visual inspection

Throat inspection (Pin gauge inspection)

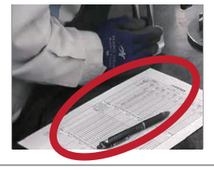
1,380 seconds

Inspection of inner and outer diameters (Height gauge inspection)

180 seconds

Paper operation

82 seconds



After

Automatic inspection using SE1000

95% reduction

Throat inspection (Image inspection)

60 seconds

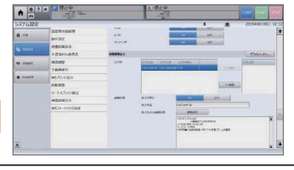
Inspection of inner and outer diameters (Image inspection)

22 seconds

85% reduction

Auto input

0 seconds



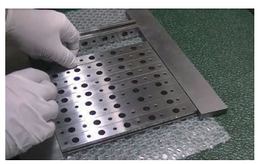
Dramatic reduction in inspection labor achieved to improve data reliability

CASE 2

Problem	Long inspection time and no standardized quality
Solution	Developing a jig to inspect top and bottom of several pieces simultaneously, achieving a substantial time reduction / Full-scale scanning with a laser

Before

Visual inspection one side at a time

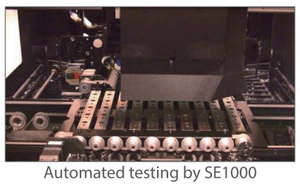


Warpage and roundness inspection

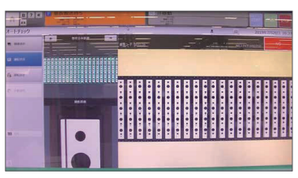
4-sided appearance inspection

After

Automatic rotation for 4-sided inspection



Automated testing by SE1000



Automatic inspection monitor image

Inspection time: Significantly reduced from 120 minutes to 3 minutes

CASE 3

Problem	Long inspection time and no standardized quality
Solution	Use hybrid system combining high speed camera with high accuracy laser to accurately find and measure all defects

Before

Manual inspection

1. Complete scanning of the surface area with laser and visual inspections.
2. Manually look for scratches and perform limited manual measurements.

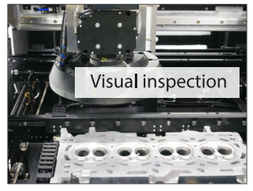
* Case of laser inspection

5,400 seconds

After

Hybrid inspection

1. Scanning the entire surface with high-speed 2D cameras
2. Pinpoint inspection (depth) with laser



Locate scratches with a high-speed 2D camera

Measure all scratches using optical comb laser

40 seconds

Inspection time: Significantly reduced from 5,400 seconds to 40 seconds

CASE 4

Problem	Pass over defects, unstable results, and increase in personnel cost.
Solution	The SE1000 improves inspection quality and realizes manpower savings in the inspection processes.

Before

Visual inspection and entry of results by 4 people
3 sec/1 piece

Production progress

After

Labor saving: 1 person (load components and removal of inspected ON/NG products)
The test results are stored in the server (data and images).
This system will drive DX(Digital Transformation)
Inspection tact time: target value within 12 sec/tray (0.8sec/1piece) achieved (including loading and unloading time).

Specially designed transport carrier

Labor saving: reduces the number of personnel in the inspection process from 4 to 1, improving the overall inspection quality. And establish traceability.