

# Inspection Camera System RICOH SC-10 Series

Prevents operational errors with image recognition technology  
Introducing a new high magnification model to our  
inspection camera system line-up

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The RICOH SC-10A inspection camera system launched in April 2016, integrates a camera, image recognition technology and control application into one compact unit. It simply provides an image recognition system that simultaneously improves product quality and production efficiency.

Now, the high magnification RICOH SC-10A (H) launched in June 2017 comes with a high magnification lens with roughly twice the focal length of the standard RICOH SC-10A model for use in an even wider variety of situations.

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## History of high magnification model development

Since its development, the standard SC-10A model has been used mainly by customers in the manufacturing industry in a wide variety of applications.

We developed the SC-10A (H) high magnification model to meet the growing needs of customers in these industries who want to check smaller parts and install the camera high above work benches to increase workability.

The high magnification model (Fig.1) incorporates a lens with roughly twice the focal length of the standard

model, allowing users to check the orientation of small screws and connectors, and otherwise check small objects that would be difficult to detect with the standard model (Fig.2).

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## Main Features of the SC-10 Series

### [Feature 1] Operational errors prevented by image recognition technology

- Checks images of current work against images of preregistered correct work results using image recognition to prevent mistakes including missing or incorrect parts.



Fig.1 RICOH SC-10A(H)

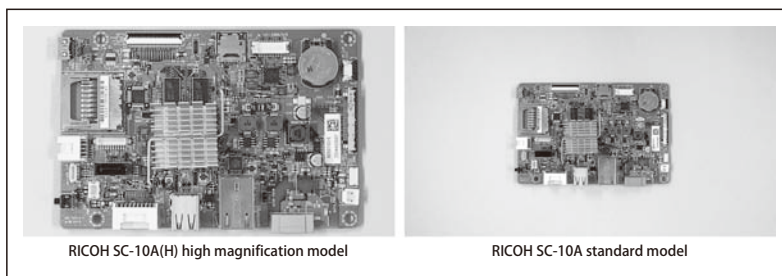


Fig.2 Images captured with the high magnification model and standard model

- Mistakes during the working process are prevented by halting progress to the next stage until work is recognized as correct during image recognition checks. Users decrease mistakes during the assembly process increasing production efficiency (Fig.3).

### [Feature 2] Simple operation as all-in-one system

- Features an integrated system with image recognition technology and control application built into the camera. No computers are required, allowing users to reduce costs and save space (Fig.4).
- The built-in application is programmed, so no specialist image recognition knowledge is required.

The camera can be easily set-up with just a mouse and keyboard.

- Operators just perform their work according to the monitor that was set up, allowing for simple operation. Can be operated after set up without mouse or keyboard!

### [Feature 3] Support for computerising your workplace

- Part's serial numbers and images of the assembly condition are collected on SD card or network's shared folder, where they can be kept as performance or image data records, facilitating work analysis and traceability (Fig.5).

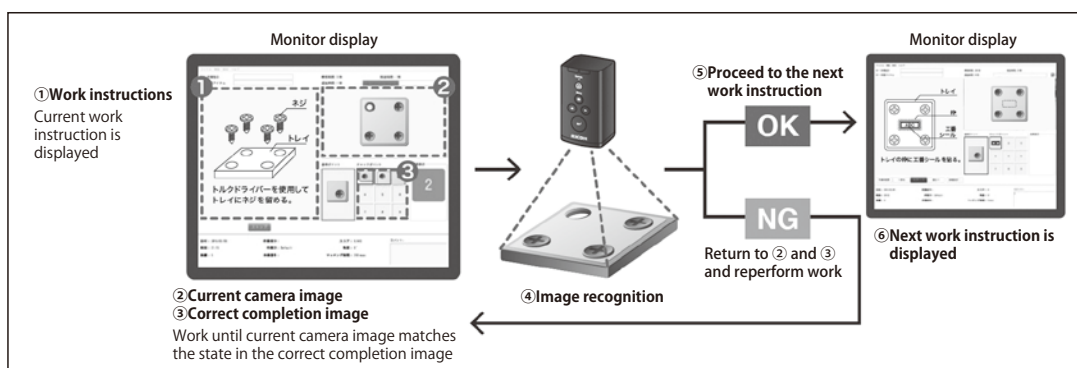


Fig.3 Monitor display and flow of work instruction

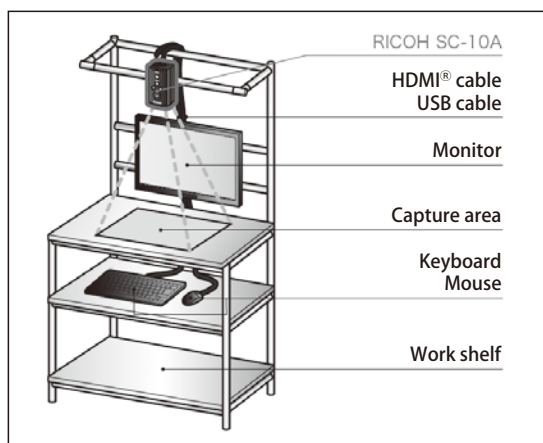


Fig.4 System configuration

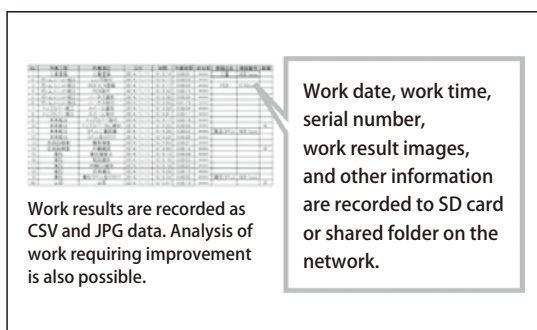


Fig.5 Image of actual data

- Work instructions and check sheets can be digitised, helping your workplace go paperless.
- Work instruction data created, can be easily converted to image data, optimised for the system with Microsoft® Office (Word, PowerPoint®, Excel®) using the accompanying PC software.

### 3 Application examples

#### [Application 1] Checking assembly work

Normally there is a visual check in assembly work such as attaching parts or tightening screws to prevent missing pads and screws.

There will be problems with the quality of a component's stability if workers do not tighten screws in the correct order.

Using the SC-10 Series to link image recognition and work instructions allows the system to be used in checking for missing pads and screws, as well as for proper work sequence (Fig.6).

#### [Application 2] Checking packing work

Normally there is a visual check during packing for instructions in the wrong language, missing products, etc.

Using the SC-10 Series, instructions and codes can be matched and checked before packing.

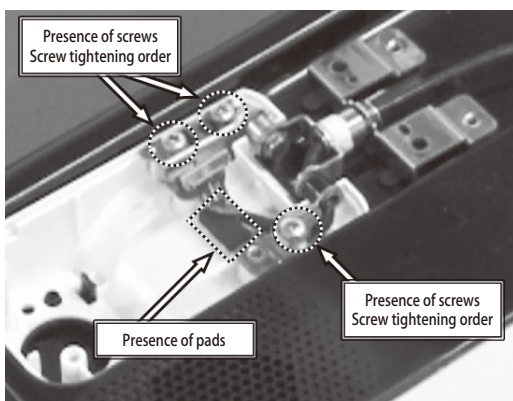


Fig.6 Example of checking assembly work

The work instructions are also linked and checked sequentially, meaning that even work that is overlapping and hidden can be automatically checked while working, allowing you to check sequences and for missing items during packing (Fig.7).

#### [Application 3] Checking model numbers

There are parts during assembly work that have the same visual appearance but different specifications, e.g. Hard Disk Drive (HDD) capacity, so the model numbers need to be checked during assembly.

Capacity differences can be detected during the inspection process, but the work has to go back a step. Therefore, it would be ideal to be able to check capacity during assembly.

Using the SC-10 Series, the camera can be connected via USB to an external barcode reader to enable barcode character strings to be checked.

This allows the HDD barcode to be read during assembly, enabling the correct model number and disk capacity to be checked (Fig.8).

The character strings read by barcode can be stored as an actual log, meaning the system can be used for traceability by reading part's serial numbers.

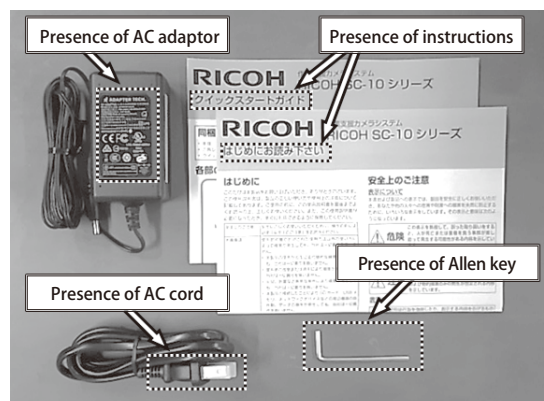


Fig.7 Example of checking packing work

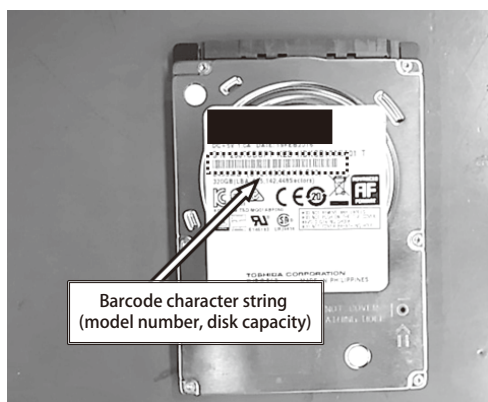


Fig.8 Example of checking model numbers

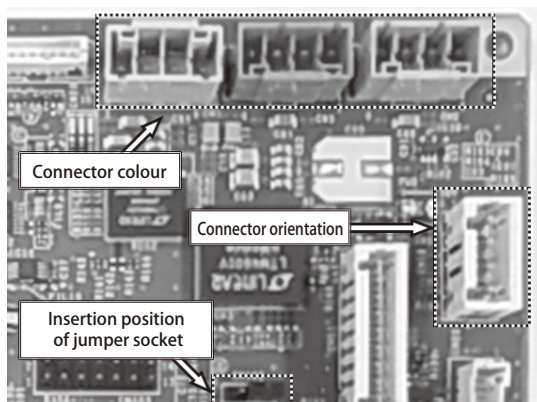


Fig.9 Example of checking manual PCB assembly work

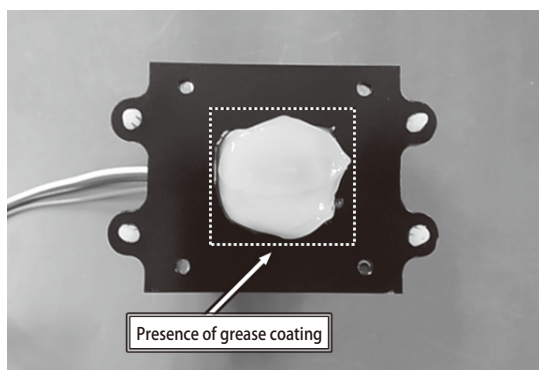


Fig.10 Example of checking grease coating

#### [Application 4] Checking PCB manual assembly work

Manual work inserting lead parts, attaching jumper sockets and heat sinks are required in the PCB (printed circuit board) assembly process.

Using the SC-10 Series to match the orientation of connectors and insertion position of jumper sockets allows them to be checked by recognising connector colour differences, allowing the camera to be used in manual PCB assembly work as well (Fig.9).

#### [Application 5] Checking grease application

Assembly can progress even if thermal grease and adhesive are not applied, so it is easy to forget this step.

The shape of the item to be coated is also not fixed, so it's difficult to detect missing grease with normal matching.

Using the SC-10 Series, users can check the presence of grease using colour recognition (Fig.10).

## 4 Conclusion

RICOH Industrial Solutions Inc. combines the technologies of optics, image processing, electronic devices, electronic mounting, and material chemistry to support the wide range of RICOH Group business in developing its machine vision business.

Although we have just introduced our SC-10 Series inspection camera system, we also offer a complete lineup of other products such as our FA lenses and industrial stereo cameras that enable high precision, high speed 3D measurements thanks to our unique calibration and parallax computation technologies.

By creating this kind of new machine vision environment, we will continue to provide our customers with added value by expanding our existing imaging range.

☆ RICOH Industrial Solutions Inc.