Work Assistance Camera System

RICOH SC-10A

RICOH
imagine. change.

All-In-One Unit - easier to use

Automatically checks work flow using

image recognition & comparison

Revolutionises workplace work flow

Image recognition	**Serial number input**
Pattern matching, Color recognition Texture check	Checks number of characters and character string

Result log	**Image log**
CSV	**JPG**

Work mistakes can be prevented by comparing currently captured images with preregistered correct work results.

RICOH SC-10A automatically checks similar part, incorrect part, work instruction and other assembly condition during the work process by pattern matching. The data can be used for work analysis and traceability by recording the work result images and the result such as serial number and work time.

RICOH SC-10A

Operational errors prevented by image recognition
- Mistakes during the working process are prevented by halting progress to the next stage until work is recognized as correct.

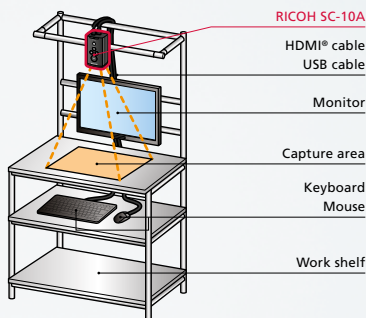### Simple operation as all-in-one system
- The camera, image recognition, and application are integrated into one system, which makes its setup easy.
- Work instructions are easily imported using dedicated software.

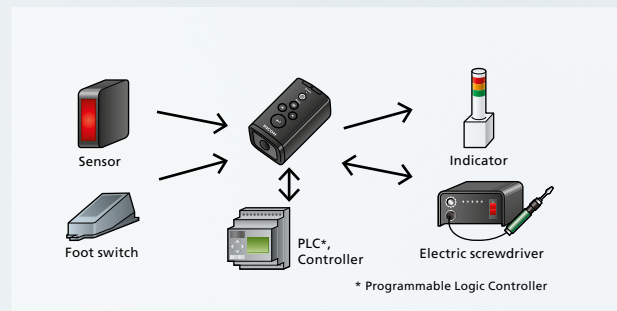### Support for computerizing your workplace
- Work analysis and traceability are facilitated by the recording of result data.
- Paper reduction by the digitalized instructions and check sheets.

Image of System Configuration

Easy setup as all you need is a mouse, keyboard and monitor.
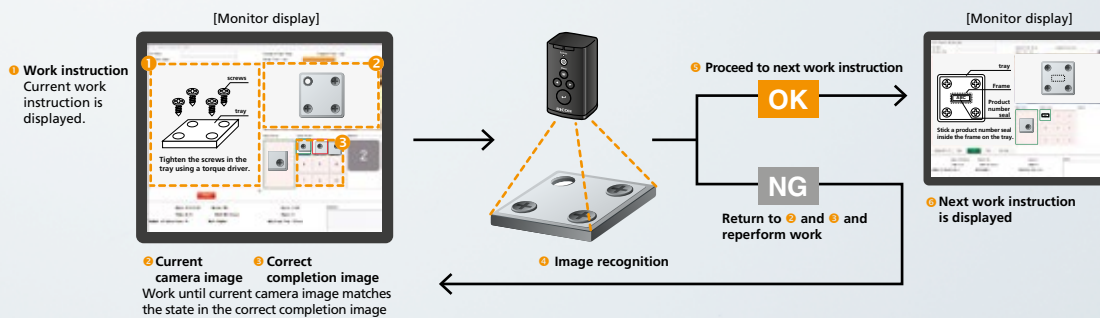Wiring and space reduced as a PC is not required.

- RICOH SC-10A
- HDMI® cable
- USB cable
- Monitor
- Capture area
- Keyboard
- Mouse
- Work shelf

Work with external devices via external I/O.

- Sensor
- Foot switch
- PLC*, Controller
- Indicator
- Electric screwdriver

* Programmable Logic Controller

Monitor Display and Work Instruction Workflow

Image recognition and work instructions are linked. The process does not advance to the next instruction if the work is incorrect.

[Monitor display]

❶ Work instruction
Current work instruction is displayed.

screws
tray
Tighten the screws in the tray using a torque driver.

❷ Current camera image ❸ Correct completion image
Work until current camera image matches the state in the correct completion image

❹ Image recognition

❺ Proceed to next work instruction

OK

NG
Return to ❷ and ❸ and reperform work

[Monitor display]

tray
Frame
Product number seal
Stick a product number seal inside the frame on the tray.

❻ Next work instruction is displayed

What RICOH SC-10A can do

Similar part checks	Color check	Work process, Incorrect part checks	Texture check	Character string check for barcode*	Work result recording
Correct **SC-10A** Incorrect **SC-10B**	Correct Incorrect	Incorrect part	Smooth surface Uneven surface	*Requires a separate USB-connected barcode reader.	Work results are recorded as CSV and JPG data. Analysis of work requiring improvement is also possible. Work date, work time, serial number, work result image and other information are recorded to SD card or shared folder on the network.

Features a high-magnification lens RICOH SC-10A(H) NEW

The inclusion of a high-magnification lens on the RICOH SC-10A(H) enables smaller objects to be targeted than the standard model. The orientation of parts mounted to electronic substrates and whether or not minute parts used for assembly are present can also be checked, expanding its potential uses.

| Enables minute parts to be checked | Increased flexibility for installation distance |

Images taken by high-magnification and standard models

High-magnification model: RICOH SC-10A(H)   Standard model: RICOH SC-10A

Usage and introduction examples for the RICOH SC-10A series (Customers' opinions in manufacturing industry)

Problem **1**

Similar parts or labels have been erroneously mounted during assembly of equipment, such as brakes for cars and motorcycles. Low-cost and simple countermeasures against human error were required.
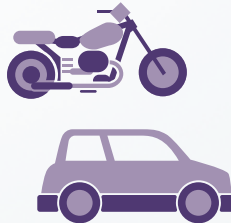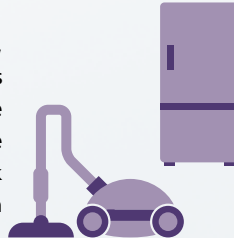
Opinion after installation

Quality has been improved by reducing assembly line errors. Work logs can also be retained automatically, so we have a positive outlook for reducing man-hours further enhancing quality.

Problem **2**

On the assembly line for household appliances, parts have been erroneously mounted or parts of the wrong color but correct shape were wrongly attached due to human error. We wanted to automate the cell production work table in cooperation with existing production equipment.
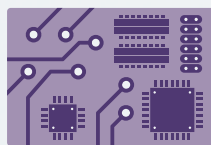
Opinion after installation

Set-up is simple using a keyboard and mouse, which is very appealing, and prevents human error. The work date, time, serial number, and pictures of the work output can be automatically recorded, which also improved efficiency. It could be connected to external I/O equipment, and achieved collaboration with existing equipment, such as PLC.

Problem **3**

There are over 50 visual checks to be made for manual mounting of the substrate used on vehicular audio devices. There are limitations to performing visual checks, leading to oversights in the checking process. A system that can check the orientation and mounting of minute parts was required.
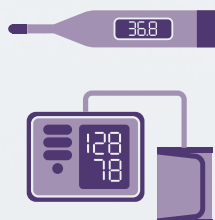
Opinion after installation

The SC-10A(H)'s high-magnification lens enables fine parts to be checked. This rendered visual checks for almost 50 items related to relays, condensers, and coils, obsolete, and jumper and dip-switch statuses can also be checked, so a significant improvement is expected. Almost 50 checks are performed in around five seconds, so operational efficiency has also been improved.

Problem **4**

In the manufacturing of household medical devices, a system that can check whether a coating has been applied or not and for any harness assembly status that causes variation in the assembly status is sought. Many foreign workers work on the manufacturing line, and passing on their know-how is often difficult, so we want to install a system that supports foreign languages.

Opinion after installation

The SC-10A not only performs pattern matching, but also has color recognition capability so it can detect inconsistent coatings, and countermeasures against human error could be implemented. Furthermore, work instruction image files can be created in foreign languages with the included software, making it easier for foreign workers to learn the process.
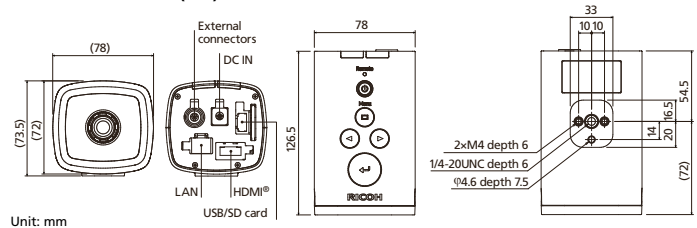
RICOH SC-10A Basic Specifications

Item		Standard model RICOH SC-10A	High-magnification model RICOH SC-10A(H)
Installation distance		400 to 800 mm	
Field of view		Installation distance 400 mm: 300 (H) × 150 (V) mm - Installation distance 800 mm: 600 (H) × 300 (V) mm	Installation distance 400 mm: 150 (H) × 75 (V) mm - Installation distance 800 mm: 300 (H) × 150 (V) mm
Image sensor · Number of pixels		1/3-inch color CMOS Number of pixels: 1280×720	
Work instruction (Work instruction image)		JPG format (610×680)	
Applicable languages		Japanese, English, German, French, Italian, Swedish, Polish, Korean and Chinese (simplified characters)	
Pattern matching		Area specification (ROI): Specify area with absolute position Position correction: Relative position correction from reference image Level surface rotation correction: ±180° Number of simultaneous registrations: Maximum 9 places	
Serial number input mode		Number of characters check: Matches set numbers of characters Character string check: Matches set character string on left	
Result logging	Output method	Saved in CSV format to the specified path	
	Log information	Job ID, reference ID, user ID, work instruction, inspection step, date, time, standard time, elapsed time, process item, judgment result, final judgment result, image log file name, comment, process data	
Image logging	Output method	Saved in JPG format to the specified path	
	Setting method	Image logging can be enabled or disabled for each work item.	
External interfaces		HDMI® (1920×1080/60Hz, 1280×1024/60Hz) USB (TYPE-A x1 USB2.0 High Speed supported (Host) *Enabled device : USB-HID, USB-Mass Storage) Ethernet (RJ-45×1 10Base-T/100Base-TX/1000Base-T) SD card (SD/SDHC x1 High Speed supported *UHS-I not supported) Wireless LAN (IEEE802.11b/g/n (2.4 GHz) compliant (Wireless LAN model only))	
I/O		Buzzer, Electromagnetic (Volume: high, low, mute) LED indicator lamps (Power, OK, NG, Remote) Switches (Power, Menu, Enter, ◀, ▶)	
Ratings	Power voltage	DC12V±10% (IN connector for AC adapter) (Model including an AC adapter only) DC12, 24V±10% (External connector) *Do not connect both power supply sources at the same time.	
	Power consumption	8.9W or less	
Environmental resistance	Operating temperature range	0 to +40 ℃	
	Storage temperature range	-20 to +60 ℃	
	Ambient humidity range	30 to 80% RH * No condensation	
External dimensions		78 (W) × 73.5 (H) × 126.5 (D) mm (excluding connectors)	
Weight		Approx. 400 g	
Mounting holes		Tripod mount screw hole (ISO 1222 compliant), M4 screw hole × 2	
AC adapter (Model including an AC adapter only)	Product name (Manufacturer)	ATS024T-A120 (Adapter Technology Co., LTD.)	
	Ratings	Input voltage : 100 to 240 V AC / 50 to 60 Hz Output voltage: +12V ±5% Output current: 2 A max.	
	External dimensions	50 (W) × 34 (H) × 88.5 (D) mm (excluding cable)	
	Weight	Approx. 170 g	

• Recommended operating conditions of Instructions Editor (PC software) for RICOH SC-10 Series

This PC software is for creating work instruction images optimized for the SC-10 series.
[Supported OS]
Windows® 7 (32-bit/64-bit), Windows® 8 (32-bit/64-bit), Windows® 8.1 (32-bit/64-bit), Windows® 10 (32-bit/64-bit)
[Requirements for running application]
Microsoft® .NET Framework 3.5 SP1 and one of the following versions of the Microsoft® Office
applications (Microsoft® Office Word, PowerPoint®, and Excel®) must be installed.
Microsoft® Office 2007, Microsoft® Office 2010, Microsoft® Office 2013, Microsoft® Office 2016
[Hard disk] 1.0 GB of free space
[Display] Screen resolution of 1024×768

• External dimensions (mm)

Unit: mm

⚠ **For safe product use**
- •Carefully read the user guide and use the product correctly. •Use the correct power supply and voltage as indicated.
- •Do not install or use the products in locations with excessive water, humidity, steam, dust, smoke, etc.