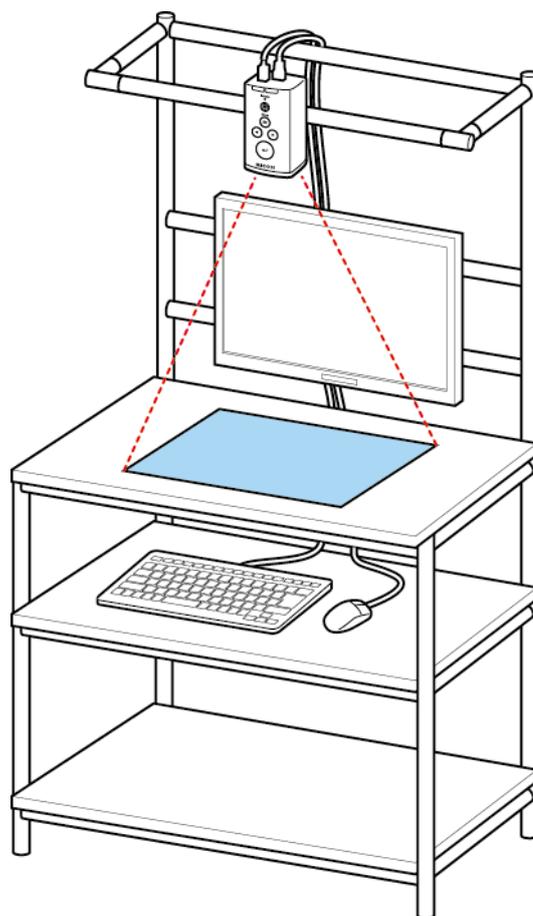**RICOH**

INSPECTION CAMERA SYSTEM

RICOH SC-10 SERIES

Operating Instructions

RICOH Industrial Solutions Inc.

RICOH

<u>Introduction</u>

Thank you for purchasing this product.
These operating instructions describe how to use this product correctly and precautions on its use. Please read these operating instructions carefully until the end before use to ensure the correct use. Furthermore, keep these operating instructions close at hand for future reference.

Safety Precautions	Be sure to read "Safety Precautions" before operation to ensure safe and correct use.
Disclaimer	• RICOH Industrial Solutions Inc. assumes no liability whatsoever for any damages that occur as a result of use in a way other than described in the operating procedures of the user's manual. • RICOH Industrial Solutions Inc. assumes no liability whatsoever for any incidental damages resulting from the use of this product. • RICOH Industrial Solutions Inc. assumes no liability whatsoever for any damages resulting from willful misconduct or negligence on the part of the user. • RICOH Industrial Solutions Inc. assumes no liability whatsoever for any damages resulting from fire, earthquakes, or other abnormal conditions. • RICOH Industrial Solutions Inc. assumes no liability whatsoever for the misoperation of an SD card, USB memory device, network device, or other peripheral device or damage to data that occurs as a result of being connected with this product.
About This Manual	The content of this manual is subject to change without notice.
Precautions Regarding Radio Waves	• This product incorporates radio equipment that has acquired technical standards conformity certification. The certificate label is affixed to the radio equipment. • The incorporated radio equipment has received technical standards conformity approval so doing any of the following may incur legal penalties. (1) Dismantling or modifying the incorporated radio equipment (2) Removing the certification label printed on the incorporated radio • Industrial, scientific, and medical equipment such as microwaves, premises radio stations for mobile object identification (radio stations requiring a license) used on, for example, factory production lines, specified low-power radio stations (radio stations not requiring a license), and amateur radio stations (radio stations requiring a license) operate in the frequency band of this product. (1) Before using this product, make sure that no premises radio stations for mobile object identification, specified low-power radio stations, and amateur radio stations are operating nearby. (2) In the event that this equipment causes harmful radio wave interference to a premises radio station for mobile object identification, immediately change the frequency being used or stop radio wave emission and contact the number below to consult about measures to avoid interference (such as the installation of partitions). (3) If other trouble occurs such as this product causing harmful radio wave interference to a specified low-power radio station for mobile object identification or amateur radio station, contact the Inquiries described in this manual. The above information is based on the requirements of ARIB STD-T66 established by Association of Radio Industries and Businesses. Scope:

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	The above information assumes this product will be sold and used within Japan. With regard to selling and using this product outside of Japan, contact our sales representative.

Installed wireless LAN model

FCC CAUTION
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines. This equipment should be installed and operated keeping the radiator at least 20 cm or more away from person's body (excluding extremities: hands, wrists, feet and ankles).

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with Industry Canada's licence-exempt RSSs.
Operation is subject to the following two conditions:
(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.
L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment and meets RSS-102 of the IC radio frequency (RF) Exposure rules. This equipment should be installed and operated keeping the radiator at least 20 cm or more away from person's body (excluding extremities: hands, wrists, feet and ankles).

Cet équipement est conforme aux limites d'exposition aux rayonnements énoncées pour un environnement non contrôlé et respecte les règles d'exposition aux fréquences radioélectriques (RF) CNR-102 de l'IC. Cet équipement doit être installé et utilisé en gardant une distance de 20 cm ou plus entre le radiateur et le corps humain (à l'exception des extrémités: mains, poignets, pieds et chevilles).

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Notes to Users in the State of California (Notes to Users in USA)

This product contains a Lithium Battery which contains Perchlorate Material–special handling may apply.
See www.dtsc.ca.gov/hazardouswaste/perchlorate.

$C \in$

Hereby, RICOH Industrial Solutions Inc. declares that the radio equipment type RICOH SC-10A is in compliance with Directive 2014/53/EU.
　Frequency band : 2400MHz-2483.5MHz
　MAX Transmission Power : 17dBm

CE Marking Traceability Information
Manufacturer:
RICOH Industrial Solutions Inc.
3-2, Shin-Yokohama 3-chome, Kohoku-ku, Yokohama-shi, Kanagawa, 222-8530, Japan
Importer:
Ricoh International B.V. - German Branch
Oberrather Strasse 6, 40472 Düsseldorf, Deutschland

As this equipment with the radiating part is not intended to be used in close proximity to the human body, it is recommended to use at least 20 cm apart from the user.

Warning
This is a group1/class A product of EN 55011. Class A product is intended for use in an industrial environment. In other environments, this product may cause radio interference.

User Information on Electrical and Electronic Equipment

Users in the countries where this symbol shown in this section has been specified in national law on collection and treatment of E-waste

Our Products contain high quality components and are designed to facilitate recycling.
Our products or product packaging are marked with the symbol below.

The symbol indicates that the product must not be treated as municipal waste. It must be disposed of separately via the appropriate return and collection systems available. By following these instructions you ensure that this product is treated correctly and help to reduce potential impacts on the environment and human health, which could otherwise result from inappropriate handling. Recycling of products help to conserve natural resources and protect the environment.
For more detailed information on collection and recycling systems for this product, please contact the shop where you purchased it, your local dealer or sales/service representatives.

RICOH

Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

KORIA

A급 기기 (업무용 방송통신기자재)

이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

본 기기는 통상 이용 상태의 경우 인체(머리, 몸통)와 20 ㎝ 초과하는 거리에서 사용되어야 합니다

AUSTRALIA/NEWZELAND

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

How to Read This Manual

About Symbols
The symbols used in this manual have the following meanings.

⭐ Important

Indicates an explanation containing points to pay attention to when operating the device, restrictions, or other information. Be sure to read the explanation.

⬇ Note

Indicates an explanation containing information that is useful to know, a supplementary operating procedure, or other information.

📄 Reference / (→P.##)

Indicates reference information.

[ ]
Indicates a screen item or button name.

Abbreviation
The following abbreviation is used for simplicity in this manual.

- SD card: Indicates an SD memory card and SDHC memory card.

Safety Precautions

Warning Symbols

Various symbols are used throughout this instruction manual and on the product to prevent physical harm to you or other people and damage to property. The symbols and their meanings are explained below.

⚠ **Danger**	This symbol indicates matters that may lead to imminent risk of death or serious injury if ignored or incorrectly handled.
⚠ **Warning**	This symbol indicates matters that may lead to death or serious injury if ignored or incorrectly handled.
⚠ **Caution**	This symbol indicates matters that may lead to injury or physical damage if ignored or incorrectly handled.

Sample Warnings

❗	The symbol alerts you to actions that must be performed.
🚫	The symbol alerts you to prohibited actions. 🚫 The symbol may be combined with other symbols to indicate that a specific action is prohibited. **Sample Warnings** 🚫: **Do not touch** 🚫: **Do not disassemble**

Observe the following precautions to ensure safe use of this device.

⚠ Danger

🚫	Do not attempt to disassemble, repair, or modify the device yourself.
🚫	Discontinue use immediately in the event of abnormalities such as smoke, unusual odors, or excessive heat being emitted.

⚠ Warning

❗	Turn off the power immediately in the event of abnormalities such as smoke or unusual odors being emitted. Be sure to remove the power plug of the AC adapter or external power supply from the outlet. Failing to do so may cause a fire or electric shock. Also contact RICOH Industrial Solutions Inc. Do not continue using the device if it has a failure or malfunction.

❗	Turn off the power immediately if any metallic object, water, liquid or other foreign object gets into the product. Be sure to remove the power plug of the AC adapter or external power supply from the outlet. Failing to do so may cause a fire or electric shock. Also contact RICOH Industrial Solutions Inc. Do not continue using the device if it has a failure or malfunction.
❗	Keep the SD card used with this device out of the reach of infants and other small children to prevent accidental ingestion. Consumption is harmful to human beings. If swallowed, seek medical assistance immediately.
❗	Wipe off any dust that accumulates on the power plug. Failing to do so may cause a fire.
🚫	Keep this product out of the reach of infants and other small children. Infants and other small children could become injured if they attempt to use this product as they are too young to comprehend the Safety Precautions properly.
🚫	Do not touch the internal components of the device if they become exposed as a result of the device being dropped or damaged. In the event of damage, contact RICOH Industrial Solutions Inc.
🚫	Do not use the device near flammable gases, gasoline, benzene, paint thinner, or similar substances. Doing so may cause an explosion, fire or burn.
🚫	Do not use the device with a voltage other than the indicated power voltage. Doing so may cause fire or electric shock.
🚫	Use the AC adapter designed specifically for this product. Do not use other than the AC cord included with this product. (Model including an AC adapter only)
🚫	Do not remove or insert the power plug with a wet hand. Doing so may cause an electric shock.
🚫	Do not cut, damage, bundle, or modify the power cord. In addition, placing a heavy load on the power cord or pulling or excessively twisting it may damage the power cord, resulting in a fire or electric shock.
🚫	When removing the power plug, be sure to hold the power plug. Do not pull the power cord. Doing so may damage the power cord, resulting in a fire or electric shock.

⚠ Caution

🚫	Do not install the device in any of the following locations. · Location where the ambient temperature goes outside of the rated range · Location subject to sudden changes in temperature (location with condensation) · Location where the relative humidity goes outside of 30 to 80% RH range · Location where the device will be directly subject to vibration or impacts · Location exposed to strong ambient light (laser beams, arc welding light, ultraviolet light, etc.)

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	- Location subject to direct sunlight or near a heating appliance - Location subject to a strong magnetic field or intense electric field - Location where corrosive gas or combustible gas is present - Location where dust, salt, or iron particles are present - Location where the atmosphere contains water, oil, or chemical spray or mist
🚫	Before cleaning, disconnect the power plug from the outlet for safety reasons. When the product will not be used, disconnect the power plug from the outlet for safety reasons.
🚫	Do not use the product wrapped in a cloth or other material. Doing so may cause a fire. Do not short the terminals or metal parts of the power cord. Doing so may cause a fire. Do not use the product in a kitchen or other place where it will be exposed to oily smoke and humidity or in a place with moisture. Doing so may cause fire or electric shock.
❗	When connecting or disconnecting the AC adapter or external power supply, be sure to do so while the power plug is disconnected from the outlet. Connecting or disconnecting it while power is being supplied may cause a failure.
❗	When inserting or removing an SD card, be sure to do so while the power is turned off. Inserting or removing it while power is being supplied may cause the data to be damaged.
❗	Check whether or not the power supply is correct, whether or not there is a load short circuit or other incorrect connection, and whether the load current is appropriate before turning on the power after wiring. Incorrect wiring or other problems may cause a failure.
❗	Be sure to shut down the system before turning the power off. Failing to do so may cause the data to be damaged.

Precautions for Use

- Due to the nature of the materials used for this product, some pixels at the optical axis center may change as a result of changes in ambient temperature.
- Due to the specifications of the CMOS image sensor (photodetector) of this product, lines may appear in images as a result of the measurement conditions or sensitivity, but please note that this does not indicate a defect or malfunction of the product. There may also be multiple defective pixels, but please note that this does not indicate a defect or malfunction of the product.
- After shutting down or turning off the power, wait at least 30 seconds before turning on the power again. The product may not operate correctly.
- Be sure to keep a copy of the administrator password. The administrator password cannot be recovered.
- Registered contents may be changed or lost due to operational errors, incorrect operation, or malfunctions.
- Regarding the various interfaces installed, it is not guaranteed that the all peripheral equipment connected to this product will operate correctly.

RICOH

Contents

12. RECOVERY AND UPDATE

13. OPERATION LOGS

14. SHORTCUT KEYS

15. ADJUSTING THE CAMERA FOCUS

16. TROUBLESHOOTING

17. SPECIFICATIONS

18. RESTRICTIONS

19. APPENDIX

1. Package Contents

- Unit

- AC adapter
  (Model including an AC adapter only)
- AC cord
  (Model including an AC adapter only)

- Hexagonal wrench
- Quick Start Guide
- Read this first

* The serial number of this product is on the bottom of the unit.

The following can be downloaded from our website.
Software:
http://industry.ricoh.com/en/support/fa_camera_lens/download/soft/
User's Guide:
http://industry.ricoh.com/en/support/fa_camera_lens/download/manual/
- SC-10 Series Operating Instructions (This manual)
- SC-10 Series Work Instructions Editor (PC software)
- SC-10 Series Work Instructions Editor User's Guide

2. Names of Parts

Top of unit:

①	FAIL judgment LED lamp (red)	When One Shot mode: · When the Inspection Step judgment is FAIL: Lights for a set time. When Keep mode: · When the Inspection Step judgment is FAIL: Lights. · When the Inspection Step judgment is OK: Turns off. 📄 **Reference** · [Sound / LED Settings (→P 69)](#)
②	OK judgment LED lamp (green)	When One Shot mode: · When the Inspection Step judgment is OK: Lights for a set time. When Keep mode: · When the Inspection Step judgment is OK: Lights. · When the Inspection Step judgment is FAIL: Turns off. 📄 **Reference** · [Sound / LED Settings (→P 69)](#)
③	Power button	When power off: Turns on the power. When power on: · Main screen: Starts/stops the workflow. · When pressed for approximately 1 second: Displays the shutdown selection options (except while a workflow is being executed). · When pressed for approximately 4 seconds: Forcibly turns off the power. ⭐ **Important** If the power is forcibly turned off, data may be damaged. Normally, press and hold the power button for approximately 1 second to display the shutdown dialog box and then turn off the power.

| ④	Menu button	Moves the focus* to the menu area. Press the button again to return.
⑤	◄ button	Moves the focus* left or up.
⑥	Enter button	Executes the button or menu with the focus* on it.
⑦	Remote LED lamp (green)	Lights when connected to a network.
⑧	Power LED lamp (green)	Lights when the power turns on. Flashes while the workflow is stopped.
⑨	► button	Moves the focus* right or down.

* Focus: Broken line frame indicating that a button, menu, or other item is selected.

Front of unit:
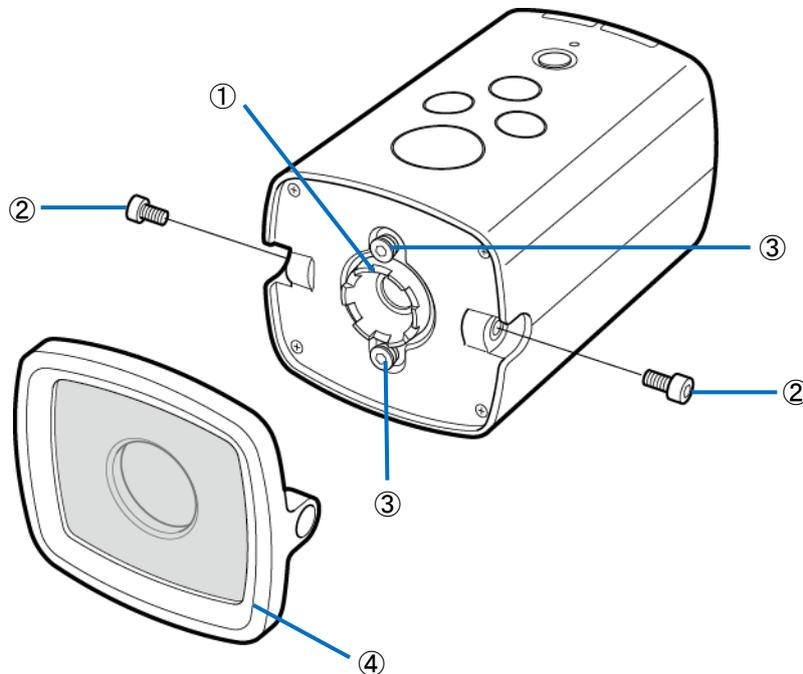
①	Focus adjustment ring
②	Front cover fixing screws
③	Focus fixing screws
④	Front cover

Rear of unit
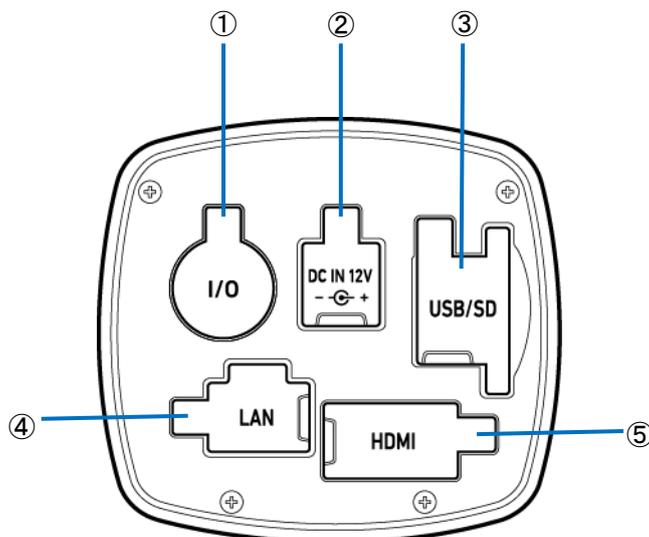
①	External connector
②	DC IN
③	USB connector/SD card slot
④	LAN connector
⑤	HDMI connector

Bottom of unit:
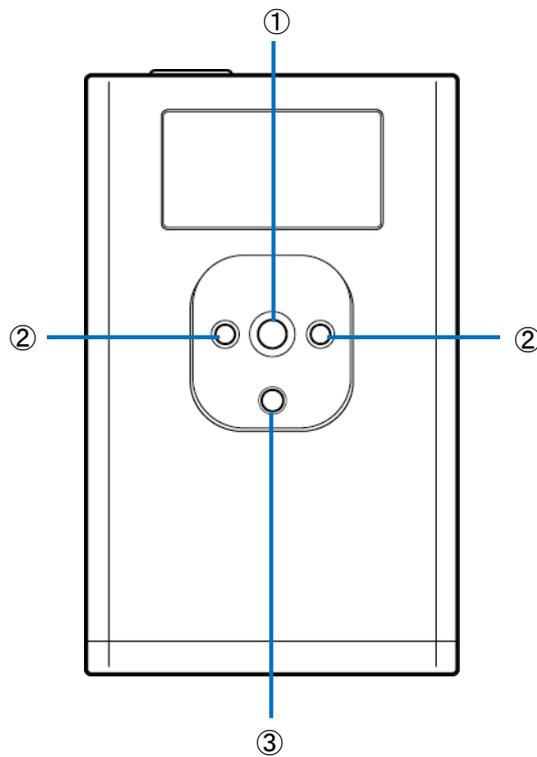
①	Tripod mount screw hole
②	M4 screw holes
③	Tripod positioning hole

3. Overview of SC-10

SC-10 can be used to judge the degree of similarity of a Inspection Step Reference Image and camera image.
It supports automatic judgment by the pattern matching function and manual judgment by visual checking.

SC-10 has three work modes.
1. Matching mode (basic function)
2. Check mode
3. S/N (Serial number) input mode

Register a combination of work modes to the workflow and then operate the device.

1. Matching mode:
This mode judges the degree of similarity (shape pattern, color, or texture) of an Inspection Step Reference Image and camera using the pattern matching function and then displays the matching judgment result (OK or FAIL).

There are the following matching methods
- Relative search:
  If an Anchor point is set when creating the flow, this method makes a judgment by searching for the Anchor point from the camera image and searching for check points with relative positions from the Anchor point.
- Absolute search:
  If an Anchor point is not set when creating the flow, this method makes a judgment by searching for check points with absolute positions from x: 0 and y: 0 of the camera image.
  Use an absolute search when the target is fixed.

Matching mode execution screen:

Displays the image set for the check points.

Displays the image set for the reference point.

Displays the result of matching.
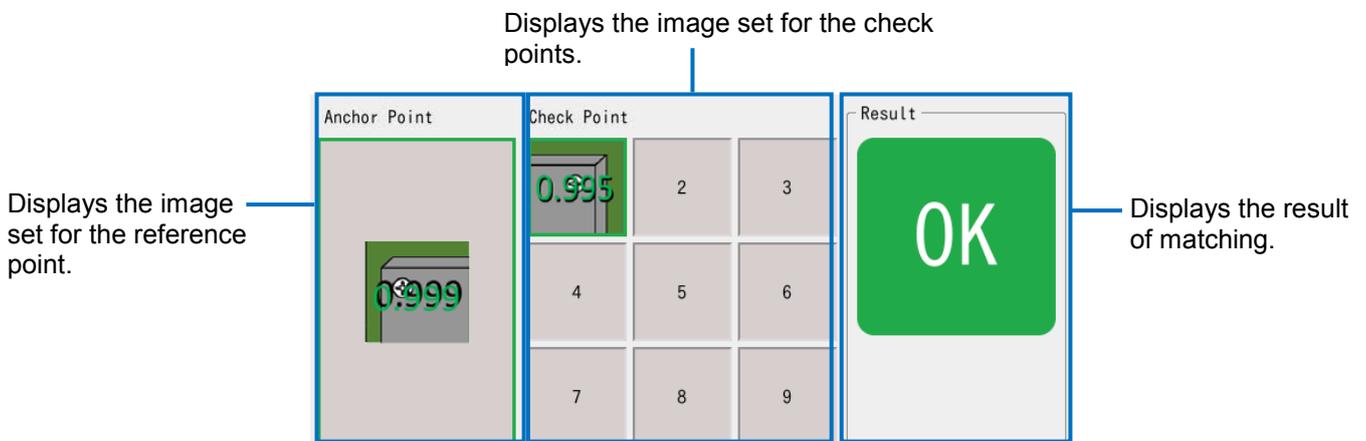
◆ Note

- When the color similarity check is set (when [Color Recognition] is set for [Check Method] (→P.55)), the color used for the matching judgment is displayed at the right bottom of the check point image.

Color used for judgment
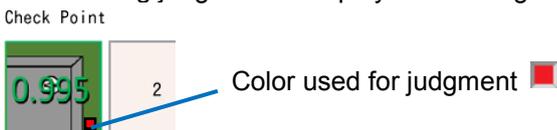
- When the texture similarity check is set (when [Textured] is set for [Check Method] (→P.55)), a checkered pattern is displayed at the right bottom of the check point image.

Check Point

Checkered pattern

- When the inversion of each similarity judgment logic is set (when [Inverted] is set for [Similarity] (→P.55)), an exclamation mark (!) is displayed at the left bottom of the check point image.
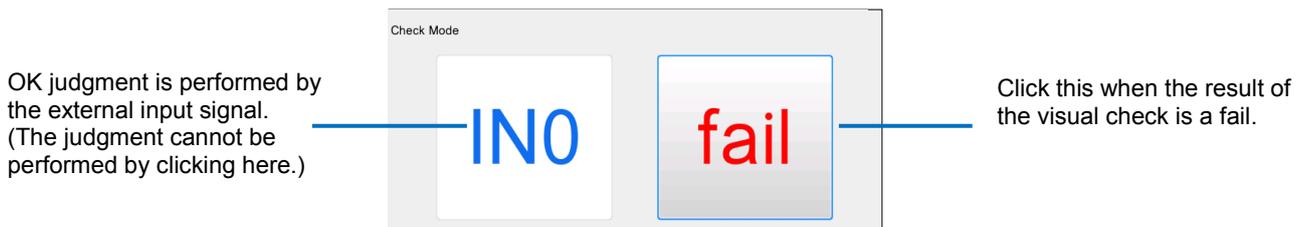
Check Point

Exclamation mark (!)

Outline flow of matching mode

A relative search and absolute search are performed according to the following flow.

Start

Is time limit exceeded?
Is Infinite Loop mode set?
NG judgment

Is anchor point set?
Is target area set?
Set anchor point search area

Is One Shot mode set?
Is anchor point search OK?

Set check point search area with relative positions from anchor point

Set check point search area with absolute positions from x: 0 and y: 0

Is search of check point complete?
Is Bulk or One Shot mode set?

Is search of all check points complete?
Is search of all check points complete?
Is One Shot mode set?

Move to next check point
OK judgment

Note
- The flow is the same regardless of the [Check Method] setting ([Matching], [Color Recognition], or [Texture] (→P. 55)).
- If check points are not set, the searches in the dotted line area are not performed.

2. Check mode

Use this mode when the degree of similarity cannot be judged by pattern matching, when a visual check is required, when waiting for an external input, or when waiting only for a specified time.
An operation log is recorded so using it as a check sheet is possible.

Check mode execution screen:
<When not using the external input>

Click this when the result of the visual check is a pass (OK).

Check Mode

OK   fail

Click this when the result of the visual check is a fail.

<When using the external input>

OK judgment is performed by the external input signal.
(The judgment cannot be performed by clicking here.)

Check Mode

IN0   fail

Click this when the result of the visual check is a fail.

3. S/N (Serial number) input mode

When the serial number of a part is entered manually, this mode judges whether or not the entered serial number is correct.

If the entered value differs from the character string and number of characters set when the workflow was created, a warning screen appears.
A judgment is made by comparing the number of characters and character string from the specified start point (→P.58).
This is case sensitive.

S/N (Serial number) input mode execution screen:

S/N Mode
S/N

Set
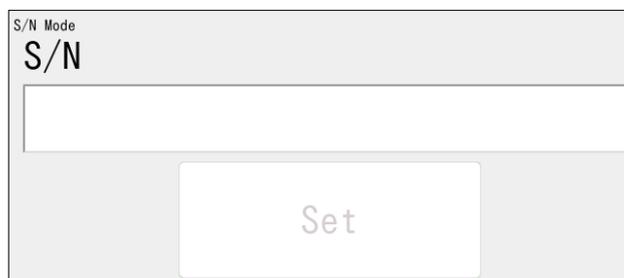
Enter the serial number of a part and click [Set] to perform the judgment.

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4. Operation Workflow

This manual describes how to install, set, and operate this device using the following workflow.

Installation
Install the device and configure the initial settings.

STEP 1: Installation and Connections
Install the device and connect the cables.
- Installation and Connections (→P.21)

STEP 2: Power-on and Initial Settings
Turn on the power and configure the initial settings.
- Power-on and Initial Settings (→P.33)

Settings (Administrator Mode)
Log in to the device, create a workflow, and configure various settings.

STEP 1: Logging In
Log in to the device.
- Logging In (→P.35)

STEP 2: Creating a Workflow
Register the Job ID, work instructions, work instruction images, work items, and work mode to create a workflow.
- Creating a Workflow (→P.41)

STEP 3: Other Settings
Configure various settings.
- Settings (→60)

Creating the work instruction image
Create the work instruction image with Work Instructions Editor. For details, refer to "SC-10 Series Work Instructions Editor User's Guide."

Operation (User Mode) / **Adjustments** (Administrator Mode)
Operate or stop the workflow and make adjustments to the parameters.
- Operation (→P.80)

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5. Installation and Connections

System Configuration

Use the supplied AC adapter (model including an AC adapter only) or an external power supply to supply power to the unit. If an external device is connected to the unit, the external I/O control is available.

When connecting the AC adapter (model including an AC adapter only)
Example:
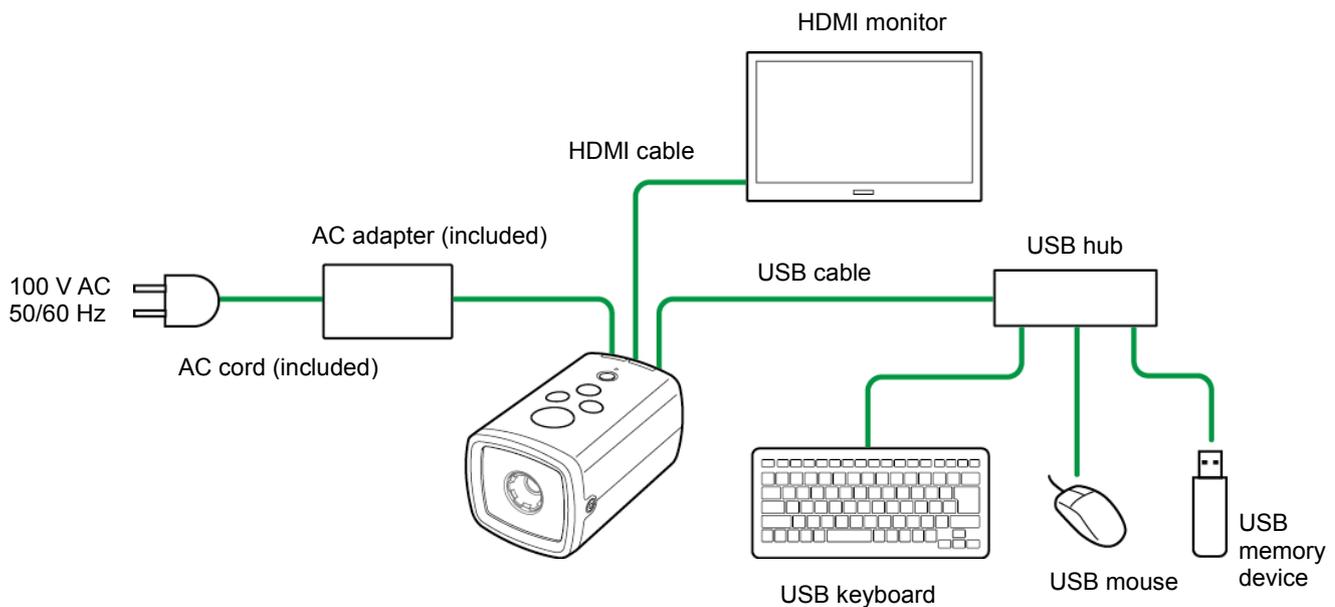
When connecting an external power supply
Example:
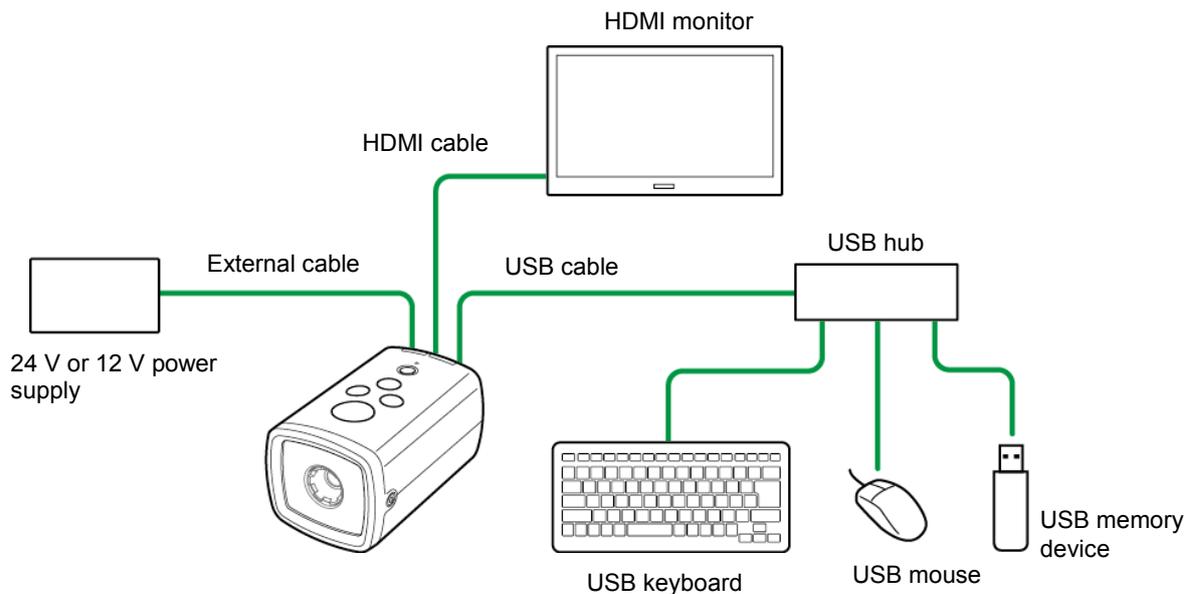
When connecting an external device (using the external I/O control)
Example:
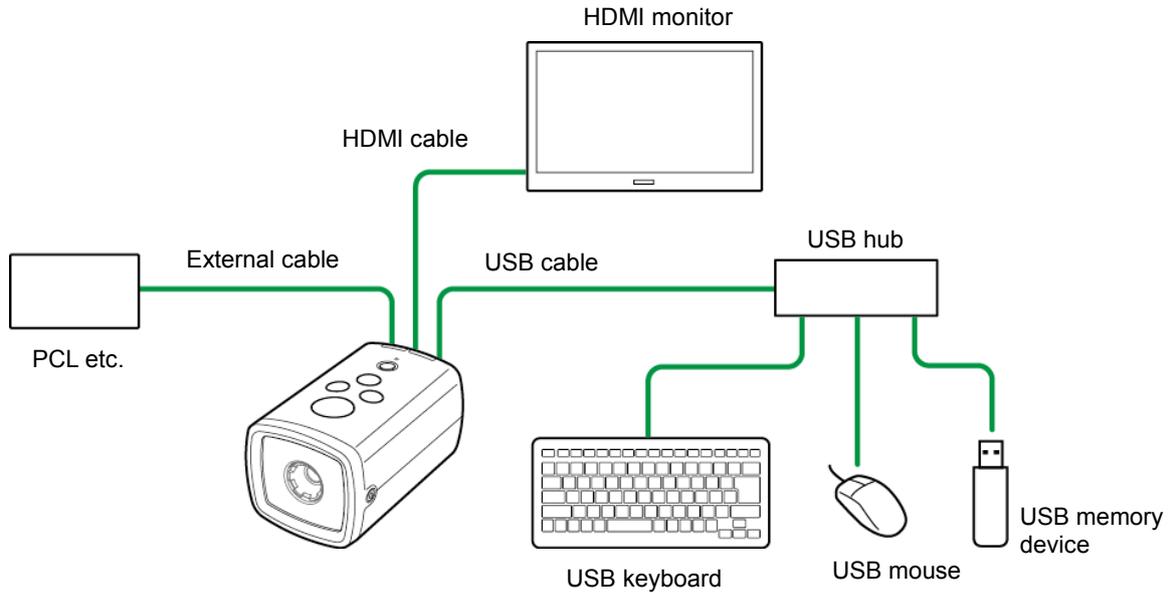
HDMI monitor

HDMI cable

External cable   USB cable   USB hub

PCL etc.

USB keyboard   USB mouse   USB memory device

🔽 **Note**

・ For using the external I/O control, separate power supply from the unit is required for the external I/O.

Installation

1. Check the capture field of view and installation distance in the optics graph.

Optics graph:

Standard model RICOH SC-10A

Installation distance (L) (mm)

High magnification model RICOH SC-10A (H)
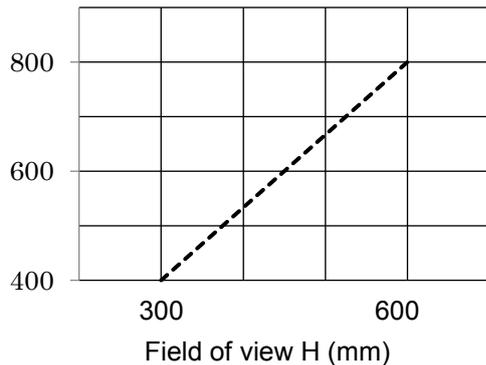
Installation distance (L) (mm)

Field of view H (mm)
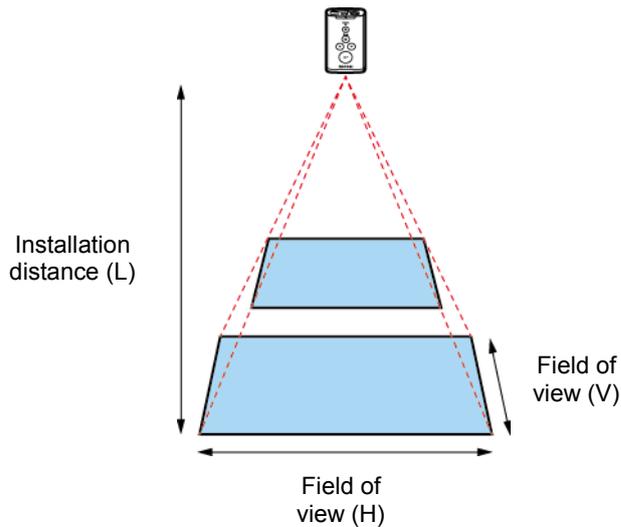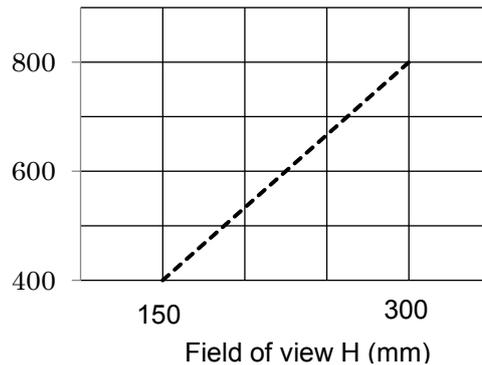
Field of view H (mm)

Installation distance L (mm)

- The optics graph displays the field of view (H).
- The field of view (V) is approximately 50% of the field of view (H).
- The optical center differs depending on the sensor. When a sensor is attached, check the image center and field of view in the image displayed on the monitor.

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2. **Align the screw(s) (sold separately) with the tripod mount hole or M4 screw holes on the bottom of the unit and then fix the unit to the installation location.**

⭐ **Important**

- Use screws (sold separately) that conform to the following screw hole sizes.
  - Tripod mount (1/4") screw hole: Effective screw depth 6 mm
  - M4 screw hole: Effective screw depth 6 mm

📄 **Reference**

- Bottom of unit (→15)
- Outline Drawings (→P.96)

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Connections

⭐ Important
• Connect the cables while the power of the device is off.

1. **Fix the unit to the installation location (→P.23).**
2. **Open the HDMI connector cover on the rear of the unit.**
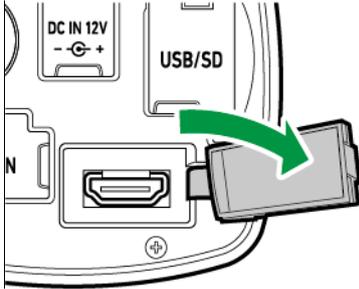
3. **Connect the unit and monitor with an HDMI cable.**
4. **Open the USB/SD connector cover on the rear of the unit.**
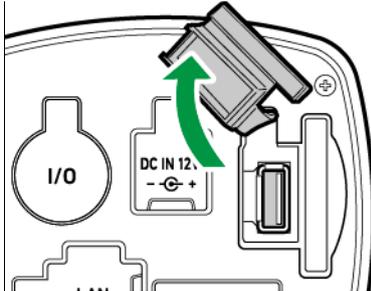
5. **Connect the unit to a USB hub and connect a keyboard, mouse, and USB memory device to the USB hub with USB cables.**
6. **Connect to a power supply.**
   • When using the AC adapter (model including an AC adapter only):
     Open the DC IN cover on the rear of the unit and connect the included AC adapter. Connect the AC adapter and AC cord and connect to a power supply (100 V AC, 50/60 Hz).
   • When using an external power supply:
     Open the external connector cover on the rear of the unit and connect an external cable (→P.27). Connect the external cable to a power supply (24 V or 12 V).

7. **Connect an SD card and LAN cable if necessary.**
   • When connecting an SD card:
     Open the USB/SD connector cover on the rear of the unit.
     While being careful with regard to the orientation of the SD card, insert the SD card until you hear a clicking sound.

To eject an SD card, push in the SD card again.
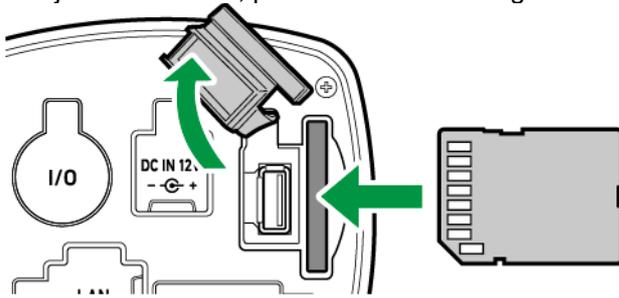
- When connecting a LAN cable:
  Open the LAN connector cover on the rear of the unit and connect a LAN cable.

⭐ **Important**

- Use the included AC adapter (model including an AC adapter only). Using other than the supplied AC adapter may cause a failure.

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External connector/cable

The external connector can be used for the external power supply and external I/O control.

Use the following cable connector (sold separately) for the external cable.
- External connector: HR10A-10R-12PB (Hirose Electric) or equivalent product
- Cable connector: HR10A-10P-12S (Hirose Electric) or equivalent product

Connector shape:
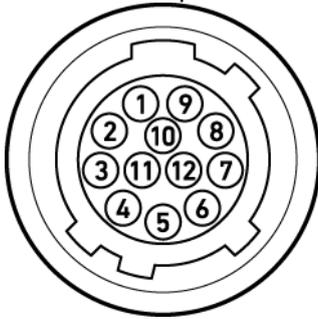
External connector pin assignment:

Pin No.	Signal Name	Specification
1	Power GND	GND for the unit
2	Power input	Power for the unit 12 or 24 V ±10%
3	OUT 0	Output (Insulated)
4	OUT 1	Output (Insulated)
5	OUT 2	Output (Insulated)
6	OUT 3	Output (Insulated)
7	Reserved	Do not connect
8	IN 0	Input (Insulated)
9	IN 1	Input (Insulated)
10	IN 2	Input (Insulated)
11	I/O power	I/O power 5V to 24V±10%
12	I/O GND	I/O GND

Note
- For using the external I/O control, separate power supply from the unit is required for the external I/O.
- The input/output can be used for an external control signal respectively.
  The polarity is set to high by default. The high setting is applied while starting up regardless of the [External I/O Settings] setting (→P.71).
- When connecting a cable to the external connector, observe the following. Failure to do so may cause incorrect operation or an accident.
  - Connect the cable correctly.
  - Connect or disconnect the cable when the power is off.
  - Connect the cable to the power supply independently of other devices.
  - Do not connect the AC adaptor when using the external power supply.
  - When connecting an external device (input/output), supply the power between the I/O power and I/O GND.
  - Do not apply the power voltage higher than for the I/O power to the input/output. And do not apply the power voltage lower than for the I/O GND.
  - Do not connect anything to the pin No.7 (Reserved).
  - Use an external cable with a cable length of 3 m or less.
  - Connect an external cable with a ferrite core (sold separately) attached in one place. (Seiwa E04SRS251512 or equivalent product)
- Start the operation of the unit after you confirm that the unit works correctly with all peripheral devices such as a monitor and power supply connected.

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External I/O control: Input circuit diagram

The input power current is limited to 6 mA (typ.) by the constant current circuit. The use of open collector output is recommended.
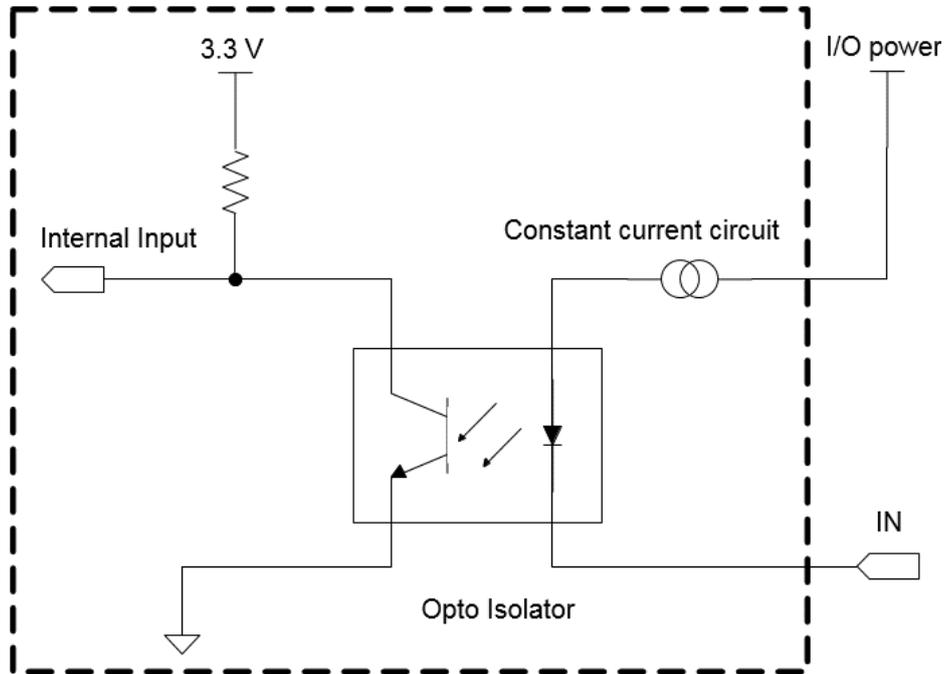
External I/O control: Output circuit diagram

The driving current of the output transistor is 4 mA (typ.).
The connection of an external device which supplies large current may cause incorrect operation.
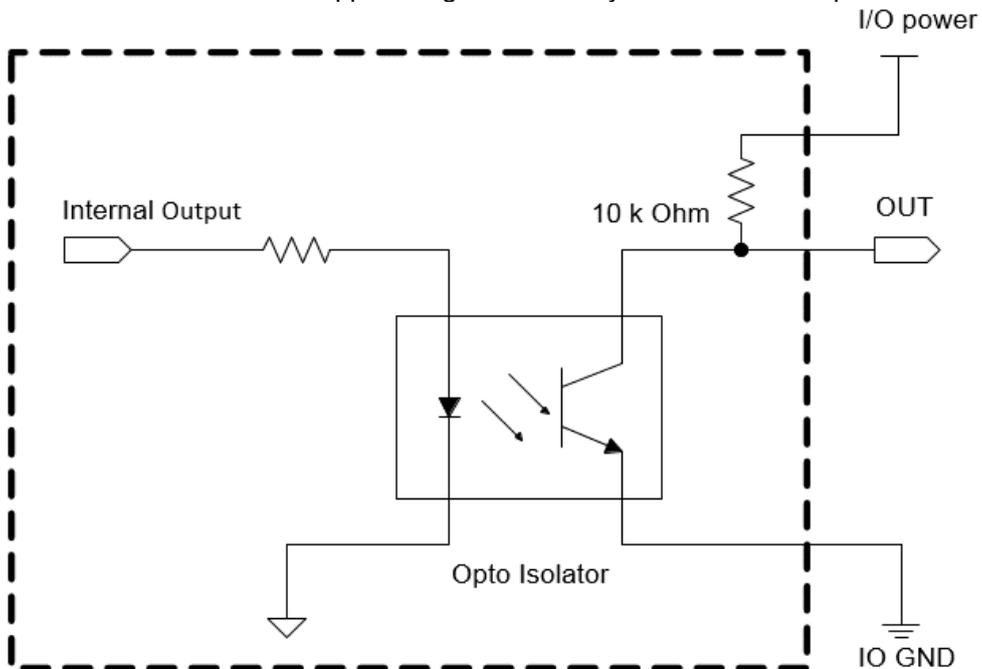
External I/O timing diagram

The following diagram shows the timing (OK/FAIL judgment and stop of a workflow) of the external I/O control.

🔻 Note

- Indications in the diagram:
  − ON: indicates that the signal is active.
  − OFF: indicates that the signal is inactive.
- The actual high or low level differs according to the specified polarity setting in [External I/O Settings]. For details on the signal names, refer to the descriptions for [External I/O Settings] (→P.71).

When the workflow is judged to be OK
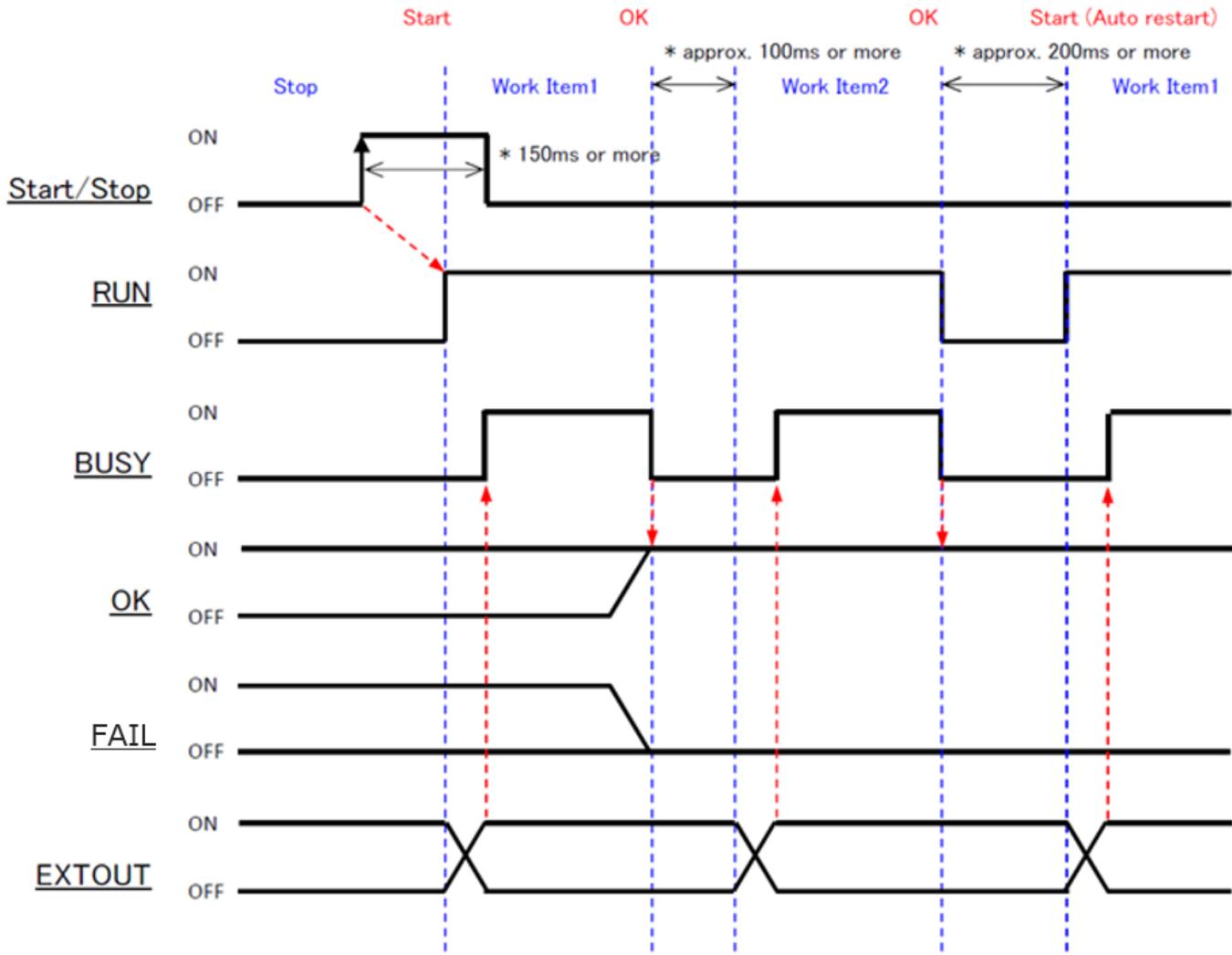
When the workflow is judged to be FAIL

When the workflow is stopped

*Hold OK/FAIL/EXTOUT
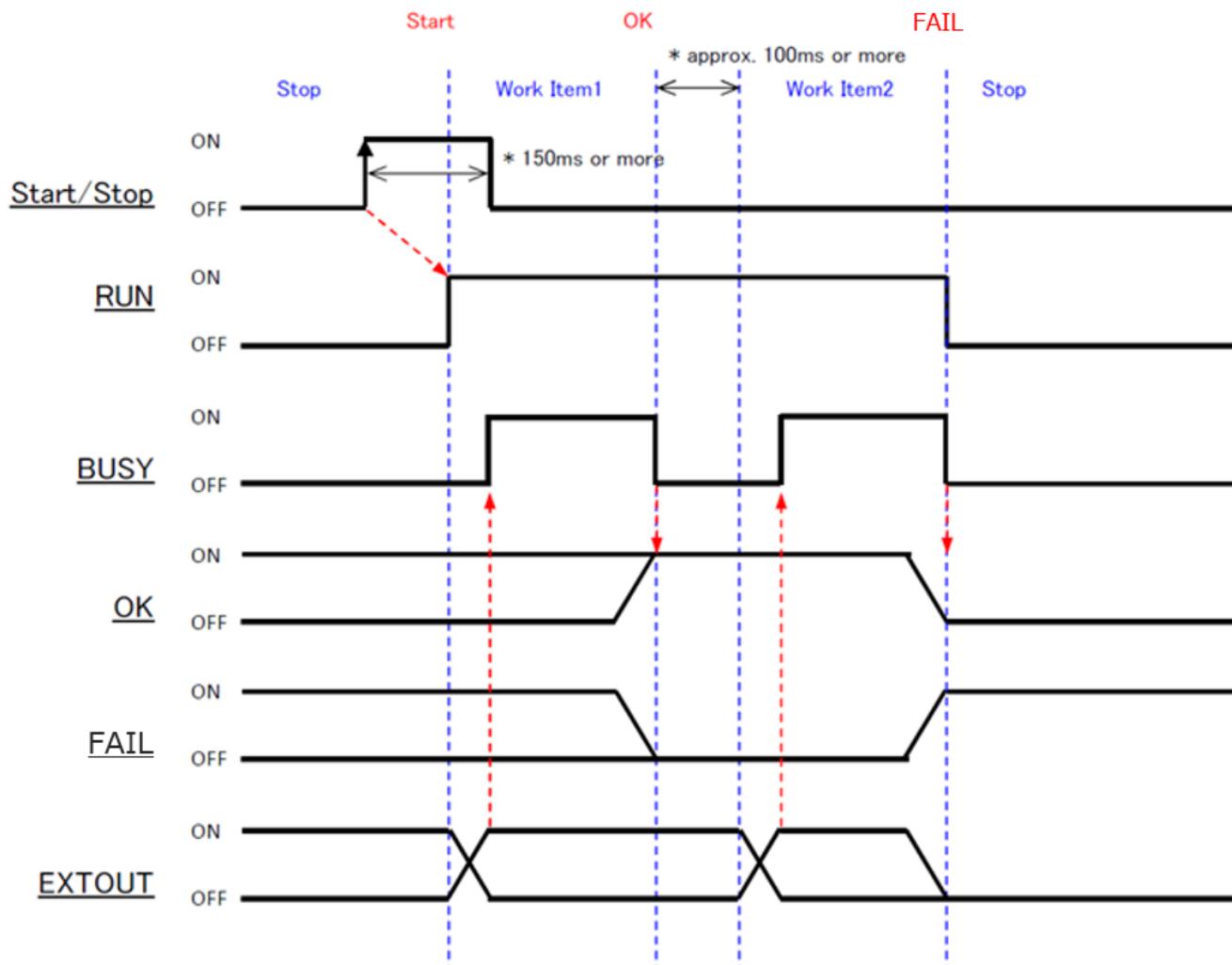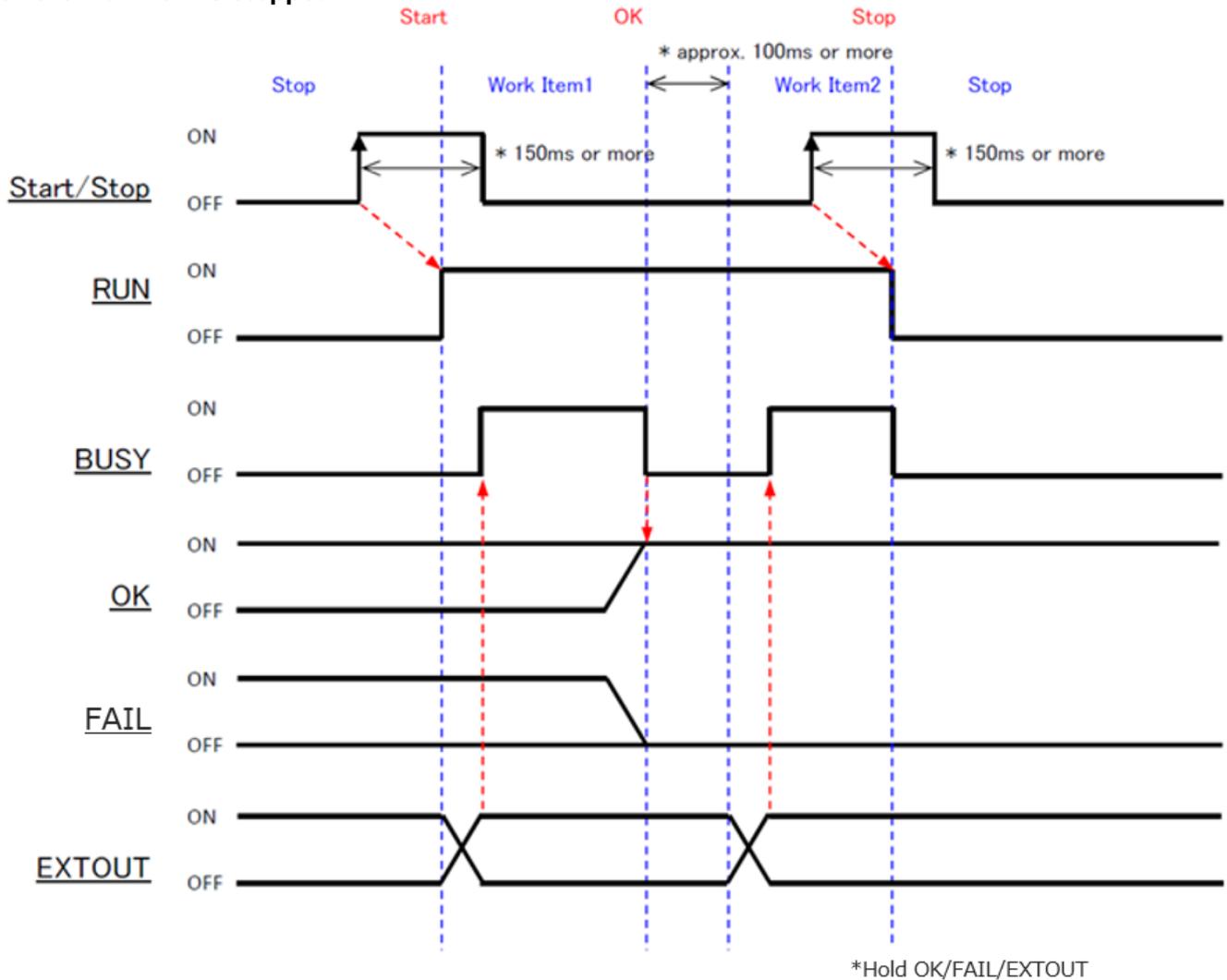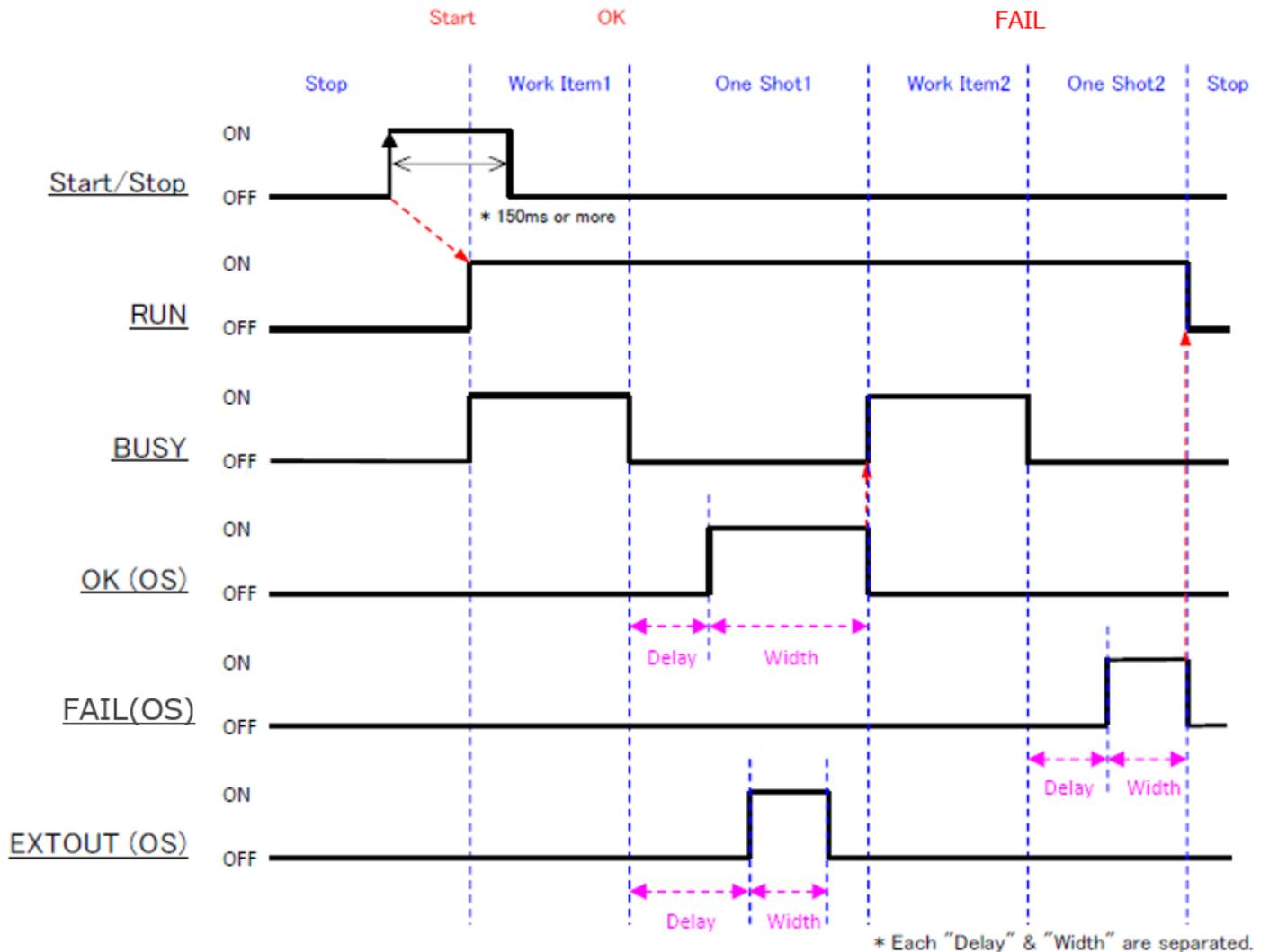
- **One Shot output**

Note

- When using One Shot output, select [OK (OS)], [FAIL (OS)], and [EXTOUT (OS)] in [External I/O Settings].
  The delay time (delay in the figure) and One Shot time (width in the figure) can be set individually for each output (→ P71).
- The base for the delay time (delay in the figure) is when the OK/FAIL judgment of the Inspection Step is determined and BUSY changed from ON to OFF.
- When using One Shot output, select [OK (OS)], [FAIL (OS)], and [EXTOUT (OS)] in [External I/O Settings].

6. Power-on and Initial Settings

⭐ **Important**

- Connect a monitor to the device (→P.25) and turn on the power of the monitor before turning on the power of the device.
  The device refers to the monitor information to determine the output resolution at startup. If the monitor information cannot be acquired, the screen will not be displayed correctly.
- SXGA (1280x1024) and 1080p (1920x1080) are supported for the screen resolution.
  Output is at 1080p if the optimal resolution of the monitor is 1080p, and at SXGA if the optimal resolution is other than that.

1. **Press the power button on the top of the unit.**
   The [Initial Settings] screen appears at first startup or after initialization.
   - The Login screen appears at normal startup (→P.35).

2. **Configure the following settings on the [Initial Settings] screen.**

①	Reset	Initializes the settings and restarts the device automatically. • This is not displayed at the first startup.
②	Language	Select the display language from the pull-down list.
③	Destination Folders	Specify the following save destinations. Click the [...] button to display the save destination specification dialog box. • [Parameter]: Specify the path of the xml for saving the workflow information. • [Image]: Specify the save destination of the image log. • [Log]: Specify the save destination of the csv log file (file name: sc-10_log_yyyymmdd.csv).
④	Password	Set the administrator password. • The initial password is "root." Change the password from the initial password for security reasons. • Set a password from 1 to 20 characters long.

		• Alphanumeric characters (a-z, A-Z, and 0-9), underbars (_), and periods (.) can be entered for the password. • The password is case sensitive.
⑤	Keyboard	Set the keyboard layout. • The device does not support Japanese input. Japanese cannot be input even if you select [jp106].
⑥	AC Power Frequency	Set the AC power frequency.

- The [Initial Settings] screen can be displayed from the [System] menu after logging in (→P.39).

3. Click [Save].

The Login screen appears after restarting (→P.35).

7. Logging In

The Login screen appears when the device starts up (after configuring the initial setting at first startup).
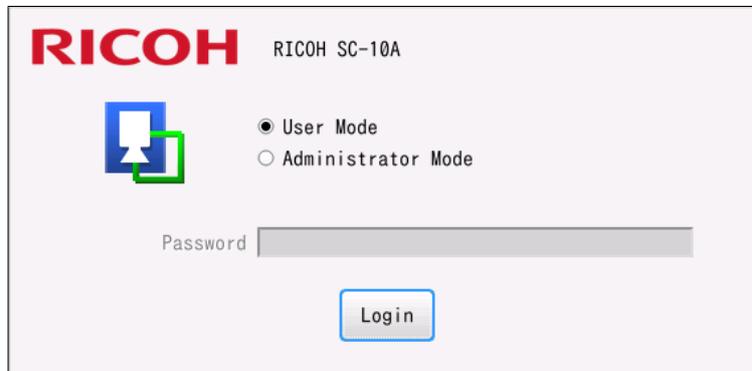
1. **Select [Administrator Mode] or [User Mode].**
   - To create a workflow and set parameters, select [Administrator Mode].
   - If you log in with [User Mode], you will only be able to operate a workflow (→P.80).

2. **When [Administrator Mode] is selected, enter the password in [Password].**
   - Enter the password set in [Password] of the [Initial Settings] screen (→P.33).
   - The initial password is "root."

3. **Click [Login].**
   - When [Administrator Mode] is selected, [Login] is not displayed until the password is entered in [Password].
   - When you log in, the [User ID] input screen appears (→P.80).

🔽 Note
- When the following items are set, the login screen will not be displayed when starting the application.
  - [Job ID change by external input] of [External Preset] (→P.60)
  - [Job ID change by external input] of [External I/O Settings] (→P71)
  - [Job ID change by external file] of [Job plan Preset] (→P.61)
- If [Do not display the login dialog] is selected in [Internal Preset], the login screen will not be displayed when starting the application (→P.60). The user mode is automatically enabled when the login screen is not displayed.
- The user mode is enabled when the login screen is not displayed.

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8. Screen Operations

Main Screen

①	Menus	Configure settings and perform operations from each menu (→P.38).

②	Status display area	Displays the work progress, Job ID related settings, internal/external preset settings, standard time, elapsed time, and delay in respect to the standard time (→P.82).
		 • The indicator of [Job ID related] indicates the related state.
		     – When not related :
		      ○ Job ID related
		     – When related :
		      ● Job ID related
		     – When a related setting is invalid :
		      ● Job ID related
		 • The indicator of [Preset] indicates the preset condition.
		     – When the preset setting is not set :
		      ○ Preset
		     – When an internal preset is set :
		      ● Internal Preset
		     – When a Job plan preset is set :
		      ● Job Plan Preset
		     – When an external preset is set :
		      ● External Preset

		– When a preset setting is invalid (e.g., Job plan preset) : 🔴 Job Plan Preset	
③	Work instructions area	Displays the work instruction image set for the workflow.	
④	Workflow adjustment buttons	Executes and adjusts the workflow (→P.86).	

⑤	Parameter display area	Displays various settings and information.
		• The following values increase according to the work results. The values are reset when the User ID and Job ID are changed.
		Furthermore, you can also set the values not to be reset when the User ID and Job ID are changed (→P.60).
		  – [Num. of OK]: When the work flow completes
		  – [Num. of FAIL]: When the Inspection Step is judged to be FAIL
		  – [Total Number]: Total number of [Num. of OK] and [Num. of FAIL]
		• A comment can be entered in [Comment] only when the workflow is paused (→P.84).	

⑥	Camera image capture button	Captures a camera image (→P.43).	
⑦	Camera image area	Displays the camera image.	
⑧	Inspection Step display area	Displays the Inspection Steps (→ P. 82).	

Menus

The menu items are split into the four categories of [File], [Job], [System], and [Help].

[File] menu
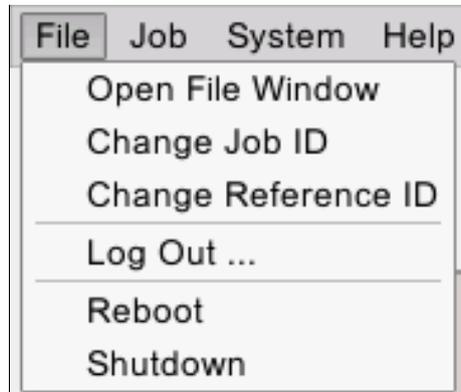
Open File Window	Displays the folder configuration of the unit. • This can be selected only when logged in with [Administrator Mode].
Change Job ID	Changes the Job ID.
Change Reference ID	Changes the Reference ID of the workflow.
Log Out...	Logs out.
Reboot	Restarts the device.
Shutdown	Shuts down the device.

[Job] menu
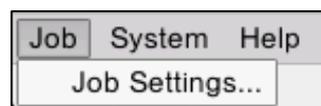
Job Settings...	Displays the [Settings] screen (→P.40). The [Settings] screen allows you to manage Job IDs, create a workflow, and configure various settings. • This can be selected only when logged in with [Administrator Mode].

[System] menu
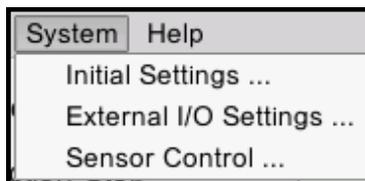
Initial Settings...	Displays the [Initial Settings] screen (→P.33).
	• Changed settings are reflected after the device restarts.
	• This can be selected only when logged in with [Administrator Mode].
External I/O Settings...	Displays the [External I/O Settings] screen.
	Assigns functions to the external connector pins (→P.71).
Sensor Control...	Displays the [Sensor Control] screen.
	Sets the camera sensor control settings (→P.74).

[Help] menu
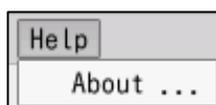
About...	Displays the version information of the application.

Settings Screen

Select [Job Settings...] of the [Job] menu to display the [Settings] screen.
The [Settings] screen allows you to manage Job IDs, create a workflow, and configure various settings.
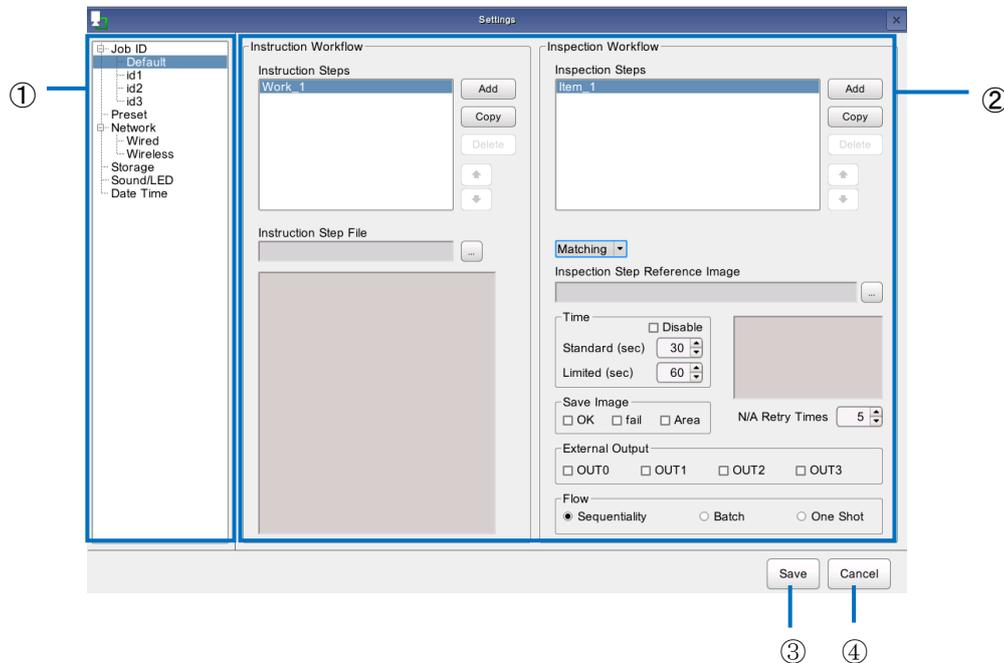
①	Settings menu	Job ID: Set the Job ID (→P.44) or workflow (→P.41). • A list of the registered Job IDs is displayed below [Job ID]. Select a Job ID to display the settings (→P.47).	
		Preset: Set the preset settings for the unit (→P.60)	
		Network: Set wired network or wireless network (→P.62).	
		Storage: Check information on the storage device being used, safely remove a USB device, and connect or disconnect a network device (→P.67).	
		Sound/LED: Set the beep volume and the lighting mode of the OK and FAIL LEDs of the unit (→P.69).	
		Date Time Set the date and time (→P.70).	
②	Setting item display area	Displays the setting items of the selected setting menu item.	
③	Save	Saves the settings.	
④	Cancel	Cancels the settings.	

9. **Creating a Workflow**

Manage Job IDs and create a workflow on the [Settings] screen (→P.40).
Display the [Settings] screen by selecting [Job Settings...] from the [Job] menu of the main screen (→P.36).

Flow for creating a workflow:
Create a workflow by creating work instructions and setting work instruction images and Inspection Steps (work modes).

STEP 1: Preparing an Inspection Step Reference Image (→P.43) and Work Instruction Image
- To set the pattern matching function for the flow (register the matching mode for the Inspection Step), prepare a Inspection Step Reference Image in advance.
- Create the work instruction image with Work Instructions Editor.
  - 🔲 Reference
    - SC-10 Series Work Instructions Editor User's Guide

⬇

STEP 2: Registering a Job ID (→P.44)
> Registering Job IDs enables workflows to be managed by ID.
> Register a Job ID by newly creating a Job ID or by copying an existing Job ID.

⬇

STEP 3: Creating a Workflow
1. Create workflow instructions (→P.47).
2. Create Inspection Steps (→P.49).
3. Save the workflow.

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Flow example for matching mode settings:

Job ID list

Job ID II
Reference ID

Change Job ID

Instruction Steps

Job ID I
Reference ID

Instruction Step A
Instruction Step file A (jpg file)

Inspection Step A-1
Matching A-1

Inspection Step A-2
Check A-2

Inspection Steps A

Instruction Step B
Instruction Step file B (jpg file)

Inspection Step B-1
S/N B-1

Inspection Step B-2
Matching B-2

Inspection Steps B-3
Check B-3

Inspection Steps B

Work Flow

Instruction Step C
Instruction Step file C (jpg file)

Inspection Step C-1
Matching C-1

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Preparing a Inspection Step Reference Image

To set the matching, color recognition, and texture function for the workflow (register the matching mode for the Inspection Step), prepare a Inspection Step Reference Image in advance.

Reference
- Adjusting the camera focus (→P.91)

Capturing a Inspection Step Reference Image

Important
- The matching function of the device makes a matching judgment by comparing the Inspection Step Reference Image and camera image. To improve the judgment accuracy, capture an image in the actual environment of use whenever possible.

1. **Display the target to be set as the Inspection Step Reference Image in the camera image area.**
2. **Click the camera image capture button in the main screen.**
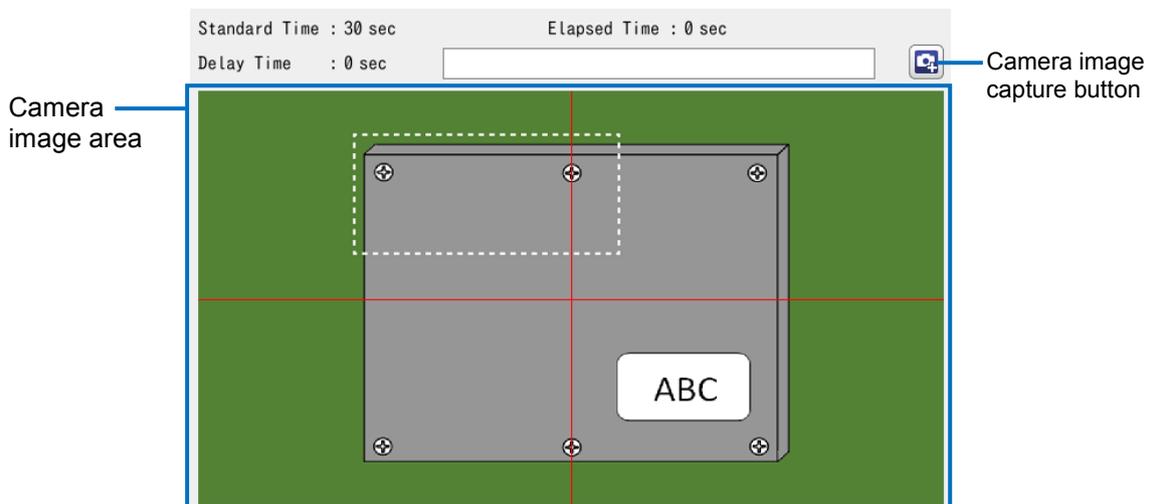
Note
You can also capture an image by double-clicking the camera image area.

Registering/Managing Job IDs

Registering Job IDs to create workflows enables the workflows to be managed by ID.

1. Click [Job ID] in the Settings menu of the [Settings] screen (→P.40).

The Job ID Management screen appears.
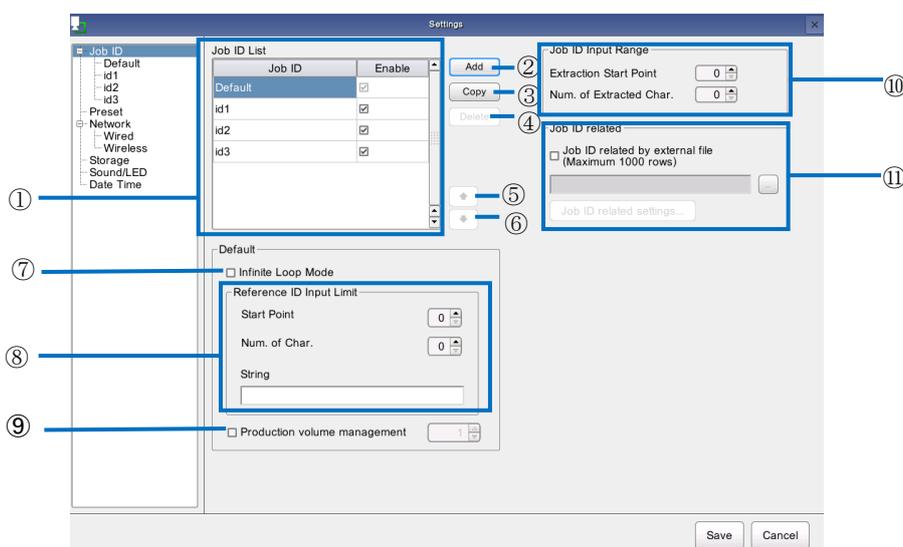
2. Perform the following operations as necessary.

①	Job ID List	Displays the registered Job IDs. • [Default] is the Job ID set by default. [Default] cannot be renamed or deleted. • Selecting a Job ID and then pressing the F2 button allows you to rename the Job ID. • This is not case sensitive. • Selecting the [Enable] check box enables the Job ID to be specified by Job ID input at the time of workflow execution (→P.80).
②	Add	Adds a new Job ID.
③	Copy	Selecting a Job ID in the Job ID list and then clicking [Copy] creates a copy of that Job ID.
④	Delete	Selecting a Job ID in the Job ID list and then clicking [Delete] deletes the selected Job ID.
⑤	⬆	Selecting a Job ID in the Job ID list and then clicking [⬆] moves that Job ID up one place in the list.
⑥	⬇	Selecting a Job ID in the Job ID list and then clicking [⬇] moves that Job ID down one place in the list.
⑦	Infinite Loop Mode	If the check box is selected, the workflow does not stop even when it is judged to be FAIL, and the workflow is executed from the first item.

⑧	Reference ID Input Limit	Sets the conditions for the Reference ID check.
		• [Start Point]: Specify the check start point with a number for checking the string of a Reference ID.
		   Set from 0 to 99 characters.
		• [Num. of Char.]: Specify the number of characters to check from the specified start point.
		   Set from 0 to 99 characters.
		• [String]: Specify the character string to check. The number exceeds the value set in [Num. of Char.] cannot be set (except when 0 is set in [Num. of Char.]).
		
		Example for check flow:
		
		A warning is displayed if the Reference ID is judged to be FAIL.

⑨	Production volume management	If you enable this and enter the volume, the [Job ID] input screen is displayed when the specified volume is completed. Set from 1 to 9999 units. This is disabled in the following cases. • When [Infinity loop mode] is enabled. (→P.45) • When [External Preset] is enabled (→P.60) • When [Job plan Preset] is enabled (→P.61) • When [Job ID] of [Internal Preset] is enabled (→P.61) • When [Display the Job ID input dialog when the work flow is completed] of [Internal Preset] is enabled (→P.61)

⑩	Job ID Input Range	Sets the conditions for the Job ID check.
		• [Extraction Start Point]: Specify the start point with a number for checking the string of a Job ID.
		  Set from 0 to 99 characters.
		• [Num. of Extracted Char.]: Specify the number of characters to check from the specified start point.
		  Set from 0 to 99 characters.
		
		Example for check flow:
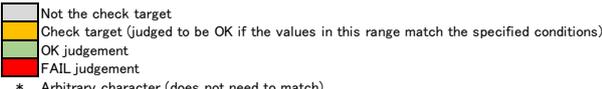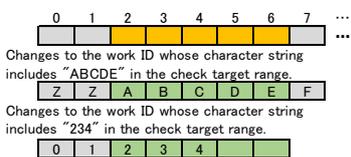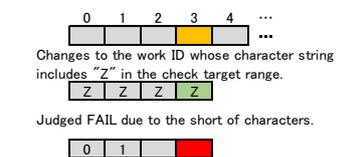		
		A warning is displayed if the Job ID is judged to be FAIL.
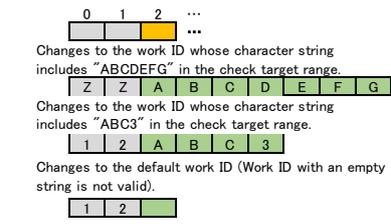
⑪	Job ID related	Sets the Job ID related. Use this when you wish to associate multiple different strings to one Job ID. • [Job ID related by external file]: Enables Job ID related. Specify a CSV file as the Job ID related list (→P.77). [Job related settings]: Displays the [Job related settings] dialog box (→P. 76.)

Note
- Clicking [Save] saves the settings. An added Job ID is displayed below [Job ID] of the Settings menu.

Important
- Renaming, copying, and deleting cannot be canceled, even by clicking [Cancel] (original state is not restored).
- Job ID related is possible for up to a maximum of 1000 lines for Job IDs.
- When judging whether or not a Job ID is correct when [Job ID related] is set, use a Job ID related list.
- If the [Job ID related] setting is not correct, the Job ID cannot be switched.
- The Job ID related list is read at the time of login and when the [Settings] screen is closed.

Creating Workflow Instructions

Create a work instruction and register a work instruction image to create a workflow related to the work instruction image.
Multiple work instructions (work instruction images) can be set for each workflow.

⭐ **Important**

· Create the work instruction images in advance with Work Instructions Editor.

🗐 **Reference**

· SC-10 Series Work Instructions Editor User's Guide

1. **Click the Job ID below [Job ID] in the Settings menu of the [Settings] screen (→P.40).**

2. **Click [Add] of [Instruction Steps].**
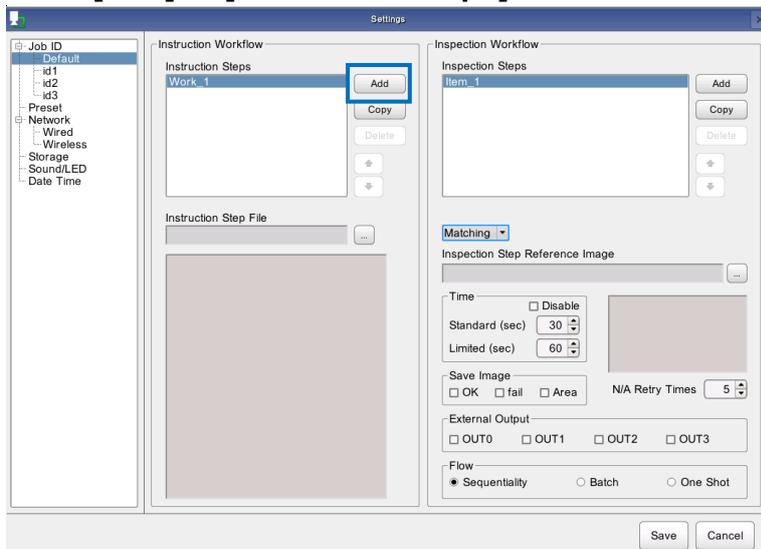
- You can also add a work instruction by right-clicking in the work instruction list and then selecting [Add to List].

3. **Click [...] of [Instruction Step File] and set a work instruction image.**
The selected work instruction image appears in the work instruction image display area.

Work instruction image display area

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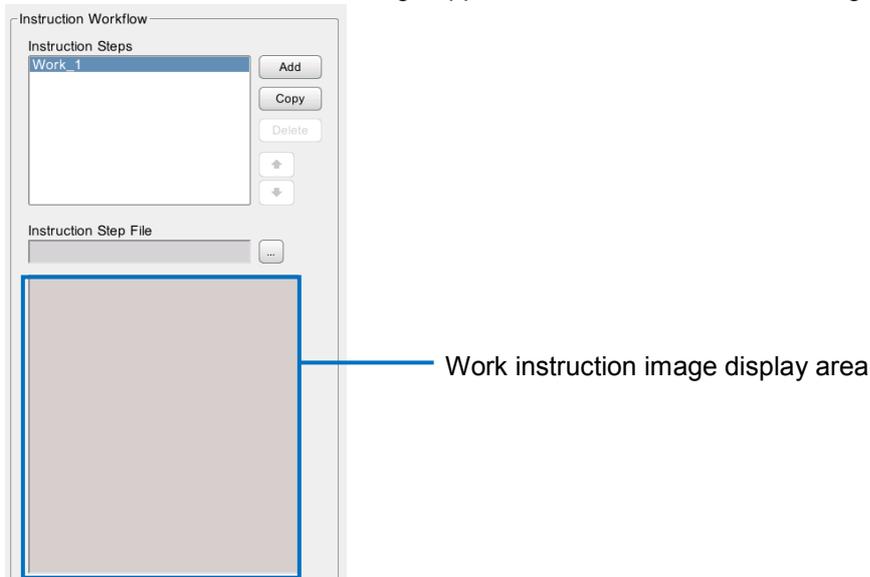
8. Repeat steps 2 and 3 to Instruction Workflow instructions as necessary.

⬇ **Note**

· Clicking [Save] saves the settings.
· Selecting a work instruction and then clicking ⬆ or ⬇ changes the order in the list.
· Selecting a work instruction and then pressing the F2 button allows you to rename the work instruction.
· Selecting a work instruction and then clicking [Copy] creates a copy of that work instruction.
· This is not case sensitive.
· Selecting a work instruction and then clicking [Delete] or right-clicking a work instruction and then selecting [Delete from List] deletes the selected work instruction.

⭐ **Important**

· A work instruction deleted from the list is also deleted from the storage device.
· Renaming, copying, and deleting cannot be canceled, even by clicking [Cancel] (original state is not restored).

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Creating Inspection Steps

Register an instruction item to a work instruction (→P.47) and set the work mode (matching mode, check mode, or serial number (S/N) input mode).

Multiple Inspection Steps can be registered to each work instruction. A workflow can be configured by combining multiple work modes.

1. **Click the Job ID below [Job ID] in the Settings menu of the [Settings] screen (→P.40).**
2. **Select a work instruction from [Instruction Steps].**
3. **Click [Add] of [Inspection Steps].**
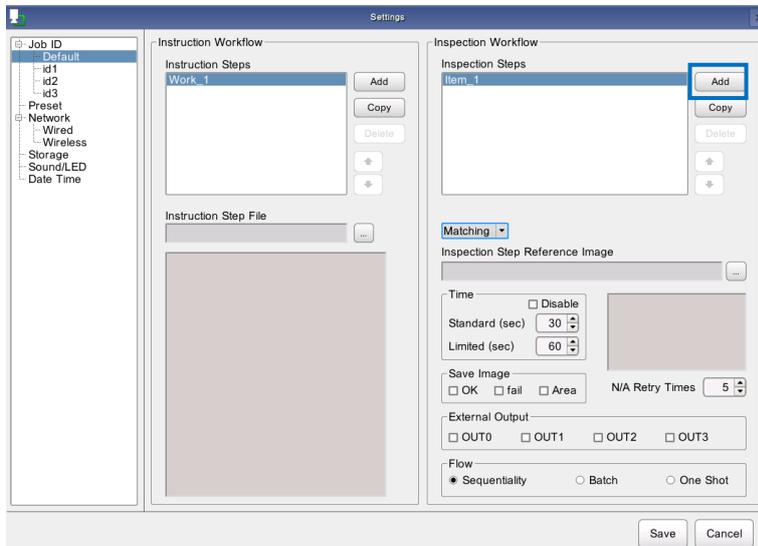
- You can also add a Inspection Step by right-clicking in the list and then selecting [Add to List].

4. **Select a work mode from the pull-down list.**
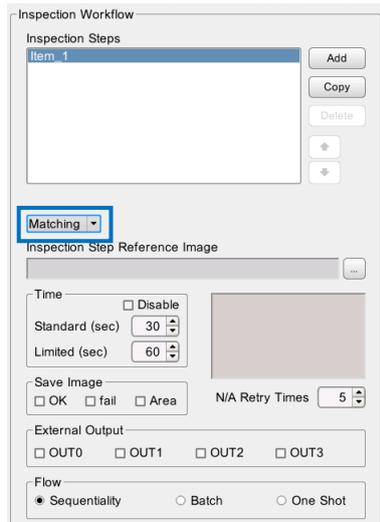
- Select from the following.
  - Matching: Sets the matching mode (matching, color recognition, texture).
  - Check: Sets the check mode (visual check function).
  - S/N: Sets the S/N (serial number) input mode.

5. Configure the following settings in [Time].

Disable	Selecting the check box disables the [Standard (sec)], [Limited (sec)] , and [N/A Retry Times] settings (the workflow will not be judged to be FAIL even if the time exceeds the set time limit).
Standard (sec)	Set the standard time for Inspection Step execution. • Set from 1 to 999 seconds. • A value that is larger than [Limited] cannot be set. • The workflow execution progress bar is displayed in blue up to the set standard time （→P.82）.
Limited (sec)	Set the time limit for Inspection Step execution. • Set from 1 to 999 seconds. • A value that is smaller than [Standard] cannot be set. • If the time limit is exceeded, the Inspection Step is judged to have failed (FAIL). • The workflow execution progress bar is displayed in yellow from the standard time to the time limit. If the time limit is exceeded, it is displayed in red （→P.82）.

6. Set image saving for when the Inspection Step ends in [Save Image].
- Selecting [OK] saves the image when OK judgment.
- Selecting [FAIL] saves the image when fail judgment.
- Selecting [Area] adds the OK, N/A, and FAIL frames to the image that is saved (matching mode only).
- Both the [OK] and [FAIL] settings can be selected.
- The save target image is saved to the save destination set in [Image] of [Destination Folders] of the [Initial Settings] screen.
- The image is saved under the following file name.
  - Judgment result_ Reference ID._Job ID name_ Instruction Step name_Inspection Step name_time.jpg
    Example:
    Judgment result: OK
    Reference ID.: R000
    Job ID name: id-1
    Instruction Step name: work-1
    Inspection Step name: function-1
    Time: 12:34:56 on January 31, 2016
    For the above, the file name is as follows.
    "OK_R000_id-1_work-1_function-1_20160131_123456.jpg"

7. Enable or disable the output functions assigned to the external connector pins in [External Output].
- Select the check box when enabling the output functions assigned in [External I/O Settings...] (→P71) (also set the corresponding [EXTOUT] number in [External I/O Settings...]).

8. Set the parameters of the corresponding mode.
  Reference
- Matching mode parameters (→P.52)
- Serial number (S/N) input mode parameters (→P.58)
- Check mode parameters (→P.59)

9. Repeat steps 2 to 6 to register Inspection Steps as necessary.
10. When the settings are completed, click [Save].
  The settings are saved.

↓Note

- Selecting an Inspection Step and then clicking ⬆ or ⬇ changes the order in the list.
- Selecting an Inspection Step and then pressing the F2 button allows you to rename the Inspection Step.
- Selecting an Inspection Step and then clicking [Copy] creates a copy of that item.
- This is not case sensitive.
- Selecting an Inspection Step and then clicking [Delete] or right-clicking a Inspection Step and then selecting [Delete from List] deletes the selected Inspection Step.

★Important

- An Inspection Step deleted from the list is also deleted from the storage device.
- Renaming, copying, and deleting cannot be canceled, even by clicking [Cancel] (original state is not restored).

Matching mode parameters

If [Matching] is selected for the work mode setting when registering a Inspection Step (→P.49), set the Inspection Step Reference Image to use for pattern matching and the number of times to retry matching when not applicable (N/A) judgment.

⭐ Important

- Prepare a Inspection Step Reference Image in advance (→P.43).

1. **Click [...] of [Inspection Step Reference Image].**
2. **Set the Inspection Step Reference Image.**
3. **The selected Inspection Step Reference Image appears in the Inspection Step Reference Image display area.**
   - Check that the correct image is selected.

Master image display area
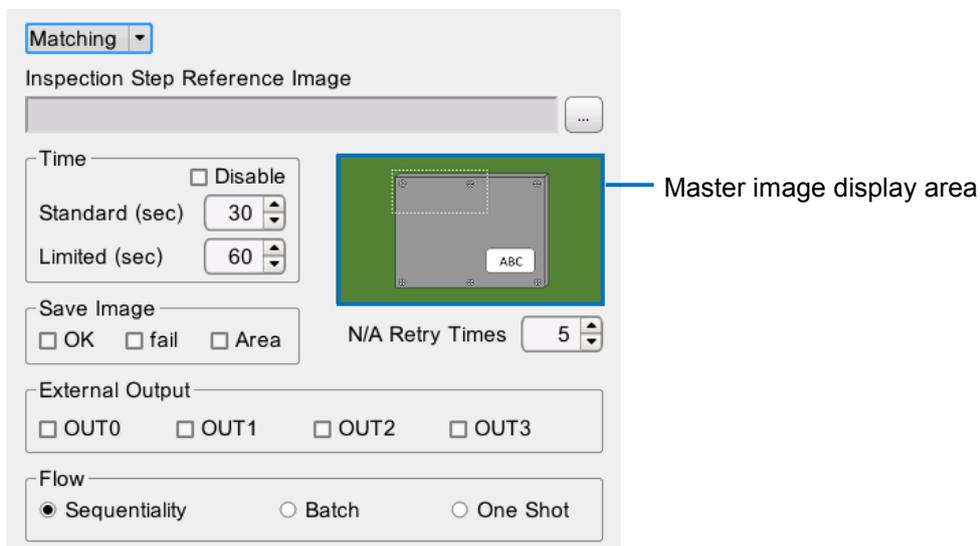
4. **Click the Inspection Step Reference Image.**
   The [Inspection Step Settings] screen appears.
   - When the mouse is moved to the Inspection Step Reference Image display area, the ✏ icon appears.

5. **Click the item to set.**

①	ROI	Set the area to search for an anchor point. • Set this when specifying an anchor point. • If a target area is not specified, the anchor point is searched for from the entire area.
②	Anchor point	Set an anchor point. • Set this when using the relative search mode (→P.16).
③	Check Point	Set check target points. • Up to 9 places can be set. • When an anchor point is set, check points are searched for in the relative search mode (→P.16). • When an anchor point is not set, check points are searched for in the absolute search mode (→P.16).

6. Click [Show All].
7. Operate the mouse over the Inspection Step Reference Image display area to specify the position and size of the area.

	A dotted line frame is displayed while you specify the target area.
	A green frame is displayed while you specify the anchor point. • The maximum size that can be specified for the anchor point is 350 x 350 pixels. • The minimum size that can be specified for the anchor point is 30 x 30 pixels

	A yellow dotted line frame is displayed while you specify the check points. A number for the search order is displayed inside the frame. • The maximum size that can be specified for a check point is 100 x 100 pixels. • The minimum size that can be specified for a check point is 30 x 30 pixels.
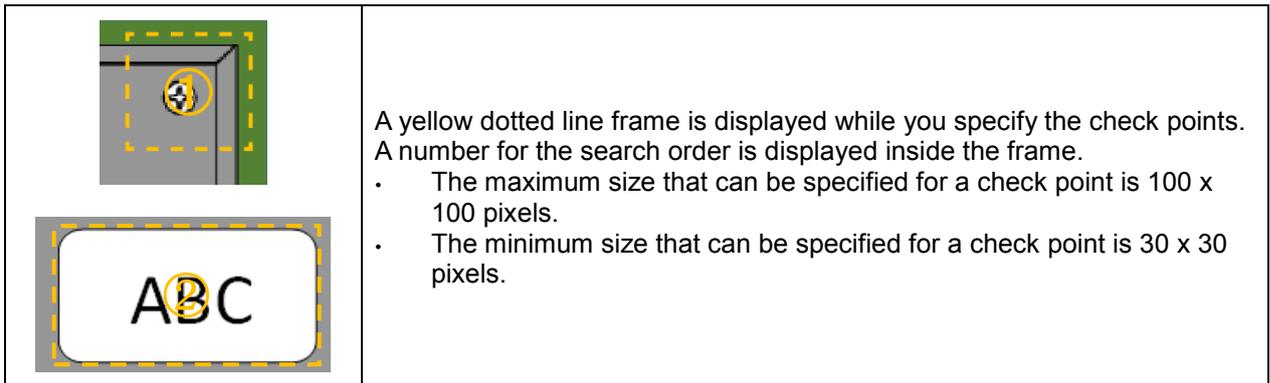
8. **Right-click in the specification area of the anchor point or check point and then select [Parameter Settings].**
The [Parameter Settings] screen appears.

• Clicking [Delete] deletes the specified area.

9. Configure the following settings.

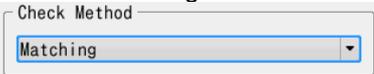|	
Matching order	Set check point order. • This is settable only when specifying a check point.
Check Method	Set the matching check method. Check Method `Matching ▼` • [Matching]: Judges the similarity by the shape pattern. • [Color Recognition]: Judges the similarity by the area comparison of the screen image to the color specified in [Color Setting]. • [Textured]: Judges the similarity by the comparison of the screen image to the texture.

Similarity
(When [Matching],
[Color Recognition],
or [Texture] is set)
	Set the upper limit value and lower limit value of the degree of similarity to use for judgment.
	
	Similarity
	Upper Limit `0.85`
	Lower Limit `0.70`
	☐ Linkage ☐ Inverted
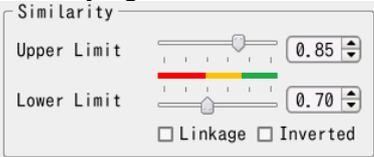	
	• [Upper Limit]: Set the upper limit for judgment.
	    - Set from 0.50 to 1.00.
	    - A value that is smaller than [Lower Limit] cannot be set.
	• [Lower Limit]: Set the lower limit for judgment.
	    - Set from 0.50 to 1.00.
	A value that is larger than [Upper Limit] cannot be set.
	• [Linkage]: Set the upper limit value and lower limit value to the same value.
	• [Inverted]: Invert the OK and fail logic.
	    - This cannot be set with the anchor point.
	The OK, N/A (not applicable), or fail judgment is made based on the upper limit value and lower limit value.
	• OK: If the degree of similarity is the upper limit value or higher, a OK judgment is made and a search for the next point is performed. If the point is the last point to be searched, a OK judgment is made and then the workflow proceeds to the Inspection Step.
	• N/A: If the degree of similarity is the lower limit value or higher and below the upper limit value, the point is judged to be N/A.
	• fail: If the degree of similarity is below the lower limit value, an fail judgment is made and a search for the same point is performed again.
	• If the elapsed time exceeded the time limit, the Inspection Step is judged to be fail and the workflow is forcibly stopped.
	• When [One Shot] is selected in [Flow], N/A is judged to be fail.
	
	fail N/A OK
	
	Lower limit Upper limit
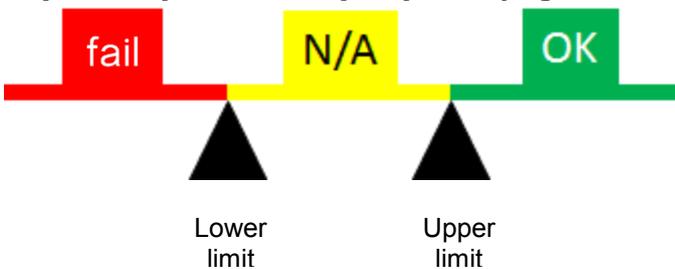	
	N/A judgment is not available when [Linkage] is set.
	The OK and fail judgments are inverted when [Inverted] is set.

Rotation Angle (When [Matching] is selected)	Set the rotation range for the search.
	Example: When 10 is set, the search range becomes ±10.
	
	Rotation Angle
	Max [slider] [10] [▲▼]
	
	• [Max]: Set the maximum value of the rotation range.
	    - Set from 0 to 180°.
	    Example: When 10 is set, the search area becomes ±10°.
	If the value of [Rotation Angle] is increased, the setting data will become larger and time will be required to generate the data and switch the work instruction data during operation.
	It is recommended to set as small a value as possible for [Rotation Angle].

Search Area	Set the overlapped search range from the area selected as the check point. Search Area ◉ Wide ○ Narrow • [Wide]: Performs a search in a wide area. • [Narrow]: Performs a search in a narrow area. Yellow dotted line: Area image of check points Pink line: Search area image of [Narrow] Light blue dotted line: Search area image of [Wide]
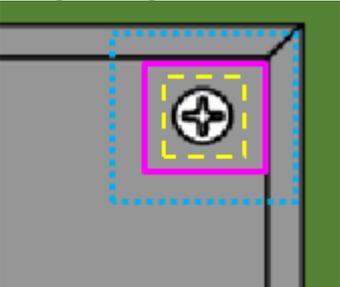
Color Setting (When [Color Recognition] is set)	Set the color to be used for the similarity judgment of color recognition.
	Example: When ocher color on the upper left is set in [Inspection Step Reference Image]
	
	Color Setting
	Master Image Select Area
	
	Allowance [slider] [15] [▲▼] ■
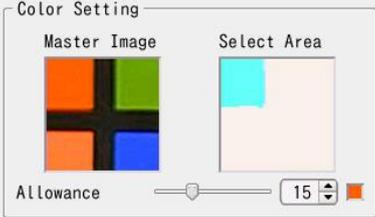	
	• [Inspection Step Reference Image]: Displays the image set as the check point.
	    Click on the color to set as the judgment target in the image.
	    The set color is displayed in the box to the right of the [Allowance] slider.
	• [Select Area]: Highlights the area of color similar to the set color.
	• [Allowance]: Sets the allowance for the similarity to the set color (the similarity range becomes wider in proportion to the value).
	    - Set from 0 to 50.

Gain Setting (When [Textured] selected)	Set the recognition sensitivity to be used for the similarity judgment of texture. ┌─ Gain Setting ──────────── │ Gain [slider] [0.0 ▲▼] • [Gain]: Sets the recognition sensitivity for the screen image (the similarity range becomes narrower in inverse proportion to the value). - Set from 0.0 to 10.0.

10.   **Click [OK].**

11.   **When the area and point settings are completed, click [Save].**
The [Inspection Step Settings] screen closes.
•   Time may be required for saving depending on the settings.

12.   **Set the number of times to retry when N/A judgment in [N/A Retry Times].**
•   When the set number of time is exceeded, a dialog box appears. Perform a visual check ().
   - Set from 0 to 99 times.

13.   **Set the check point matching method in [Flow].**

Sequentially	Checks the registered check points in sequence.
Batch	Checks the registered check points all at once.
One Shot	Checks the registered check points all at once only one time. N/A is judged to be FAIL.

Serial number (S/N) input mode parameters

If [S/N] is selected for the work mode setting when registering the Inspection Step, set the comparison target character string and number of characters for the serial number.

1. Enter the serial number in [Part No.].

| S/N | ▼ |

Part No. |_____|

┌─ Time ──────────────────┐ ┌─ Comparison ──────────────┐
        ☐ Disable   Start Point | 0 |▲▼
Standard (sec) | 30 |▲▼   Num. of Char. | 0 |▲▼
Limited (sec) | 60 |▲▼   String

┌─ Save Image ──────────┐ |_____|
 ☐ OK   ☐ fail

┌─ External Output ─────────────────────────────────┐
 ☐ OUT0   ☐ OUT1   ☐ OUT2   ☐ OUT3

2. Specify [Start Point], [Num. of Char.], and [String] in [Comparison].

Reference

For details on [Start Point]/[Num. of Char.]/[String]: Reference ID Input   (→P.45)

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Check mode parameters

If [Check] is selected for the work mode setting when registering the Inspection Step, set the check method (trigger) when using the external I/O, and enable or disable the output functions assigned to the external connector pins.

1. Set Timeout, OK, or FAIL in [Judgment Conditions].

Timeout	Sets the judgment condition for when timeout. 　　[FAIL]: Judgment becomes FAIL. 　　[OK]: Judgment becomes OK.
OK	Configure the judgment condition (OK) settings. ・　[Button]: Performs the judgment manually. 　[EXTIN0]/[EXTIN1]/[EXTIN2]: Performs the judgment using the signal of the input pin (→P.68) of the external connector as the trigger. 　[Disable]: Disables the OK button.
FAIL	Configure the judgment condition (FAIL) settings. 　　[Button]: Performs the judgment manually. 　　[Disable]: Disables the FAIL button.

10. **Settings**

Presets

Set the dialog display setting and register a User ID, Job ID, and Reference ID for use as presets.

1. **Click [Preset] in the Settings menu on the [Settings] screen (→P.40).**
   The screen for setting a preset appears.

2. **Configure the following settings.**

①	Do not reset the number of executions when changing User ID and Job ID	The values of [Num. of OK], [Num. of FAIL], and [Total Number] are not reset even if the User ID and Job ID are changed.
②	External Preset	Sets the external preset. • [Job ID change by external input]: Enables the external preset. – Operation is the same as when [Job ID change by external input] of [External I/O Settings] (→P71). • [External I/O Settings]: Displays the [External I/O Settings] screen (→P.71).

③	Job plan Preset	Sets the Job plan preset.
		• [Job ID change by external file]: Enables the Job plan preset. Specify a Job plan CSV file • (→P77). • [Do not display the Job plan completion dialog]: The completion dialog box that appears when the Job plan completes will not be displayed. • [Job plan Settings]: Displays the [Job plan] screen (→P.78).
④	Internal Preset	Sets the internal preset.
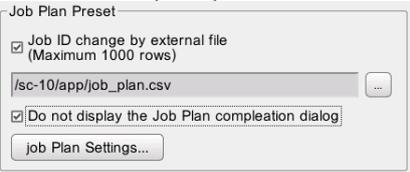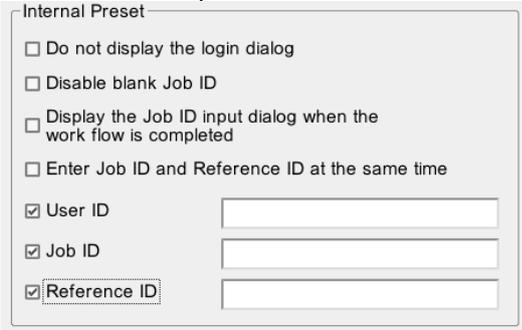
		• [Do not display the login dialog]: The login screen will not be displayed when starting the application.
		  – The application starts in the user mode.
		  – To return to the setting that displays the login screen at startup, log out from the user mode, and log in to the application in the administrator mode.
		• [Disable blank Job ID]: Disables execution if blank in [Job ID] input screen (→P.80)
		• [Display the Job ID input dialog when the work flow is completed]: Displays the [Job ID] input screen when the workflow completes.
		  – [Production volume management] of [Job ID] is disabled (→P.45).
		  – [Job ID] of [Internal Preset] is disabled.
		• [Enter Job ID and Reference ID at the same time]: Sets the string entered in the [Job ID] input screen as the Reference ID.
		  – The [Reference ID] input screen will not be displayed (→P.80).
		  – [Reference ID Input Limit] of [Job ID] is disabled (→P.45).
		  – [Job ID] of [Internal Preset] is disabled.
		  – [Reference ID] of [Internal Preset] is disabled.
		• [User ID]: Register the preset User ID.
		  – The registered User ID is applied when starting the operation of a workflow.
		• [Job ID]: Register the preset Job ID.
		  – The registered Job ID is applied when starting the operation of a workflow.

		− If the specified Job ID is not registered, the [Default] Job ID is applied and the preset indicator turns red. 🟢 **Internal Preset** • [Reference ID]: Register the preset Reference ID. − The registered Reference ID is applied when starting the operation of a workflow.	
⑤	User Mode Settings	Enable or disable the buttons and menus for the user mode. User Mode Settings ☑ Do not display the confirmation dialog ☑ Disable the Next button ☑ Disable the Back button ☑ Disable the Change Job ID button and menu ☑ Disable the Change Reference ID menu • [Do not display the confirmation dialog]: The confirmation dialog will not be displayed before executing the following. − [Change Job ID] − [Change Reference ID] − [Start/Stop] − [Next] − [Back] When [External Preset] and [Job plan Preset] are enabled, the confirmation dialog box will not be displayed. • [Disable the Next button]: Disables the [Next] button. • [Disable the Back button]: Disables the [Back] button. • [Disable the Change Job ID button and menu]: Disables the [Change Job ID] button and menu. • [Disable the Change Reference ID menu]: Disables the [Change Reference ID] menu.	

⭐ **Important**

- The maximum number of lines for the Job plan is 1,000.
- If a Job plan setting is set to an invalid setting, the workflow cannot be started.
- The priority order of presets is external preset → Job plan preset → internal preset.
- The Job plan list is read at the time of login, when the Settings screen is closed, and when the Job plan is completed.

Network Settings

Set the network to be used.

1. Click [Network] in the Settings menu of the [Settings] screen ().

The Select Network Device screen appears.

Displays the IP address.

Displays the log.
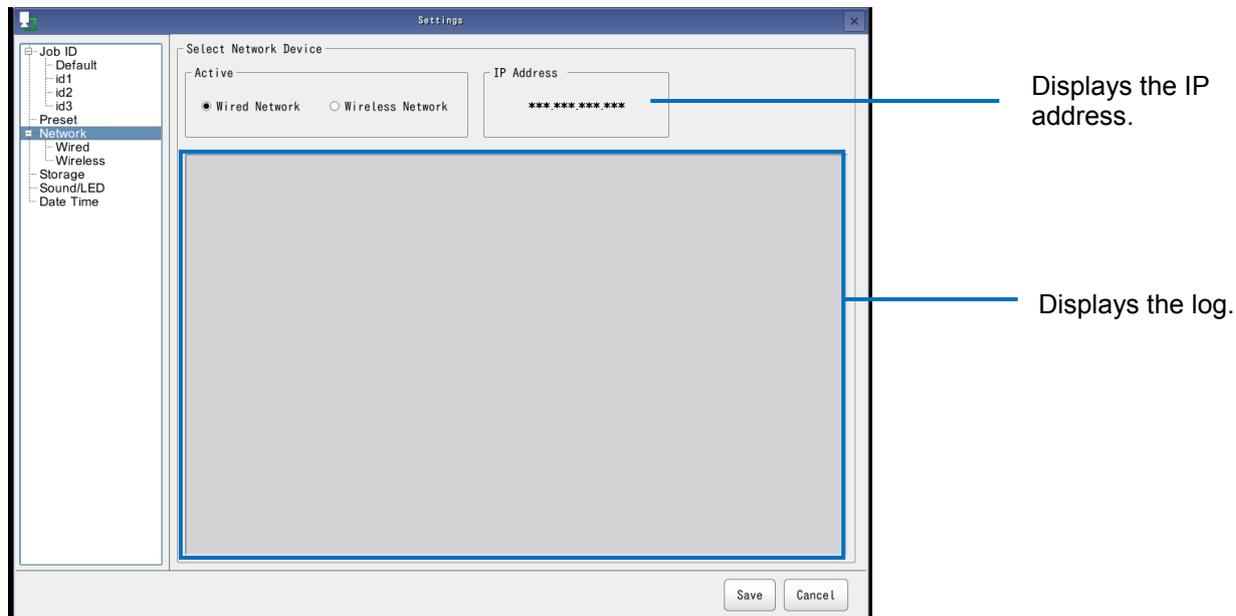
2. Select [Wired Network] or [Wireless Network] in [Active].

• A wired network and wireless network cannot be used at the same time.

Note

If you change the settings, the settings cannot be restored by clicking [Cancel].

Important

• Configure the settings of the selected network connection.

Reference

• Wired network settings (→P.64)
• Wireless network settings (→P.65)

Wired network settings

If [Wired Network] is selected in [Active] on the [Network] screen, configure the settings for a wired network connection.

1. Click [Wired] of [Network] in the Settings menu of the [Settings] screen (→P.40).

The Wired Network Settings screen appears.

2. Configure the following settings.

①	DHCP	Set ON or OFF for DHCP. Click [TEST] to perform a communication check. • When this is set to [ON], clicking [OFF] applies the static IP address setting.
②	MAC Address	Displays the MAC address.
③	IP Address	Displays the IP address.
④	Status	Displays the following status information. • Link up: Displayed when communication is possible. • Link down: Displayed when communication is not possible. • Retrieving an IP address from DHCP: Displayed when getting the IP address from DHCP.
⑤	Static IP Address	Set the IP address. • This can be set when [DHCP] is set to [OFF].
⑥	Network Mask	Set the subnet mask. • This can be set when [DHCP] is set to [OFF].
⑦	Default Gateway	Set the default gateway. • This can be set when [DHCP] is set to [OFF].

⬇ Note

If you change the settings, the settings cannot be restored by clicking [Cancel].

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Wireless network settings

If [Wireless Network] is selected in [Active] on the [Network] screen, configure the settings for a wireless network connection.

1. Click [Wireless] of [Network] in the Settings menu of the [Settings] screen (→P.40).

The Wireless Network Settings screen appears.

2. Configure the following settings.

①	DHCP	Set ON or OFF for DHCP. Click [TEST] to perform a communication check. • When this is set to [ON], clicking [OFF] applies the static IP address setting.
②	MAC Address	Displays the MAC address.
③	IP Address	Displays the IP address.
④	Status	Displays the following status information. • Link up: Displayed when communication is possible. • Link down: Displayed when communication is not possible. • Retrieving an IP address from DHCP: Displayed when getting the IP address from DHCP.
⑤	Access Points	Displays a list of the available access points.
⑥	Static IP Address	Set the IP address. • This can be set when [DHCP] is set to [OFF].
⑦	Network Mask	Set the subnet mask. • This can be set when [DHCP] is set to [OFF].
⑧	Default Gateway	Set the default gateway. • This can be set when [DHCP] is set to [OFF].

⑨	SSID	Refer to the access point list and then enter the SSID of the access point to be used.
⑩	Password	Enter the connection password of the specified SSID.
⑪	Security	Select the security method to use when connecting to the access point from the pull-down list. The following security methods are supported. • None • WEP • WPA-AES • WPA2-AES
⑫	Connect	Connects to the access point according to the settings specified in [SSID], [Password], and [Security].

🔵Note

If you change the settings, the settings cannot be restored by clicking [Cancel].

Storage Settings

Check information on the storage or network device being used by the device, safely remove a USB device, and connect or disconnect a network device.

This device supports the following storage devices.
- Internal memory
- USB device
- SD card

1. Click [Storage] in the Settings menu of the [Settings] screen (→P.40).

The Storage Settings screen appears.
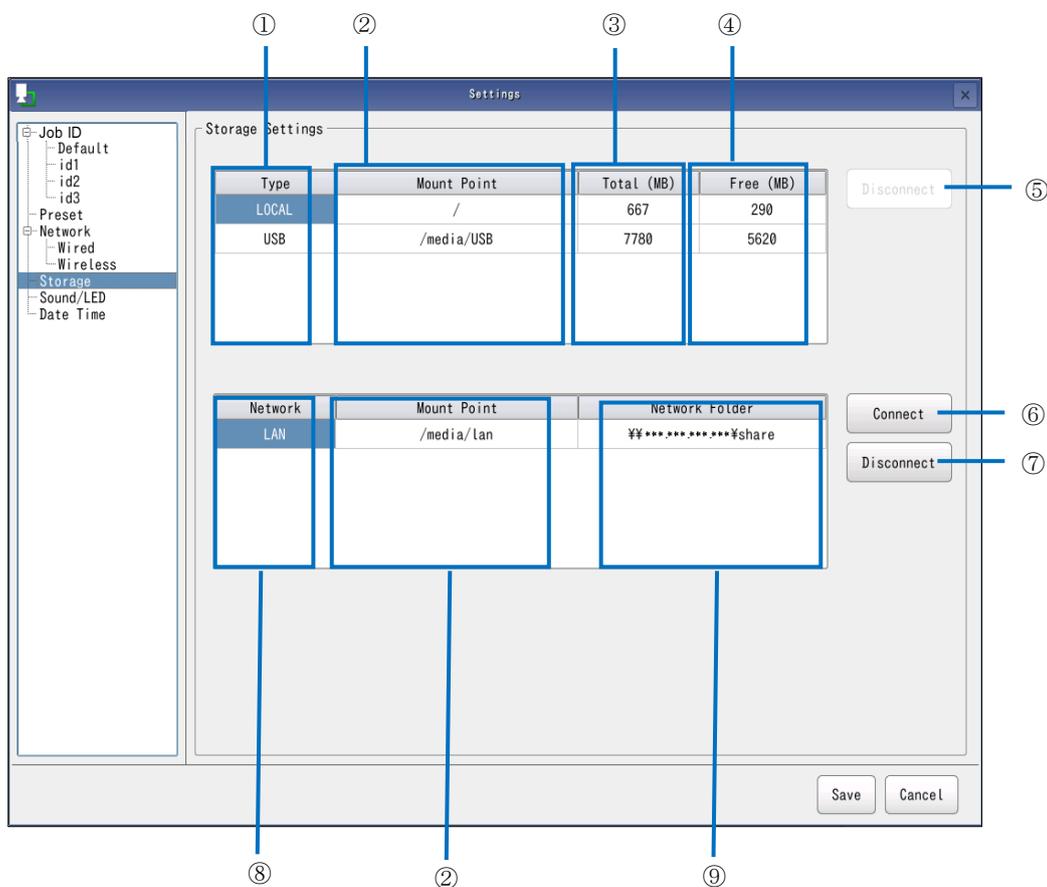
①	Type	Displays the type of device. • LOCAL: Internal memory • USB: Displayed when a USB device is connected. • SD-CARD: Displayed when an SD card is connected.
②	Mount Point	Displays the point where the device/network drive is mounted.
③	Total (MB)	Displays the total space of the device.
④	Free (MB)	Displays the free space of the device.

⑤	Disconnect	Select a USB device in the list and then click [Disconnect] to safely remove the USB device. ⭐Important • The [Disconnect] function is disabled for an SD card because hot plugging is not supported for an SD card. Before connecting or removing an SD card, be sure to turn off the power of the device.
⑥	Connect	Connects to a network device. Clicking the [Connect] button displays the following dialog box. Specify the IP address, shared folder, and mount location of the connection destination and then click [OK]. Enter the user name, password, and security information in the authentication screen and then connect. ⭐Important • Use a network folder as the save destination for the image log and CSV log files.
⑦	Disconnect	Disconnects a network device.
⑧	Network	[LAN] is displayed to indicate a network device connection. • [LAN] is displayed in black and the Remote LED lamp on the top of the unit is lit when connected. • [LAN] is displayed in red when not connected.
⑨	Network Folder	Displays the shared network folder.
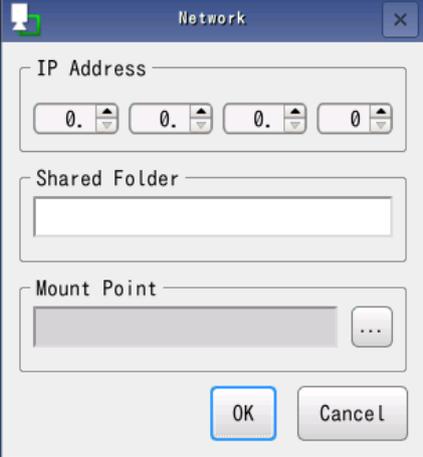
🔽Note

If you change the settings, the settings cannot be restored by clicking [Cancel].

RICOH

Sound / LED Settings

Set the beep volume and the lighting mode of the LEDs.

1. Click [Sound / LED Setting] in the Settings menu of the [Settings] screen (→P.40).
   The [Sound /LED Settings] screen appears.

2. Configure the following settings.

①	Sound / Volume	Set the beep volume. • [None]: A beep does not sound. • [Low]: Sets the volume to low. • [High]: Sets the volume to high. – When you select [Low] or [High], the beep sounds so that you can check the volume.
②	LED / Mode	Set the lighting mode of the OK and FAIL LEDs for Inspection Step judgment. • [One Shot]: Lights for a set time when Inspection Step judgment. • [Keep]: Keeps the OK/FAIL lighting state until the next Inspection Step completes.

3. Click [Save].
The settings are saved.

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Clock Settings

Set the date and time.

1. Click [Date Time] in the Settings menu of the [Settings] screen (→P.40).
The [Date Time] screen appears.
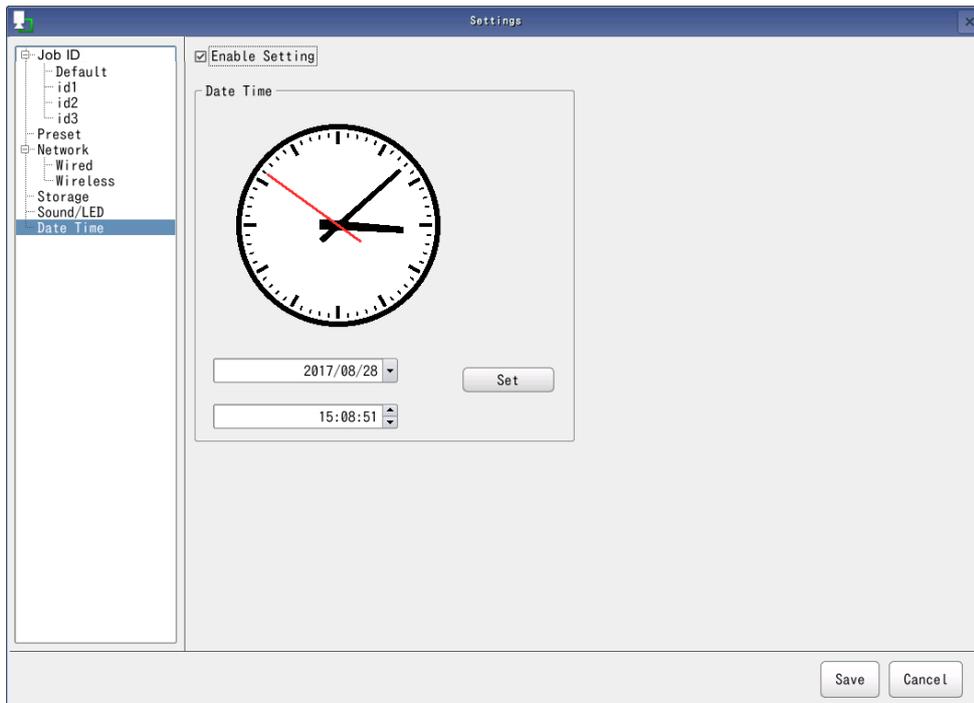
2. Select [Enable Setting].
The clock settings become able to be set.

3. Set the date and time.
4. Click [Set].

⬇ Note
・   After you set the clock, the original settings cannot be restored, even by clicking [Cancel].

External I/O Settings

Assign functions to the external connector pins (→P.27).

1. Click [External I/O Settings...] in the [System] menu (→P.39).

The [External I/O Settings] screen appears.
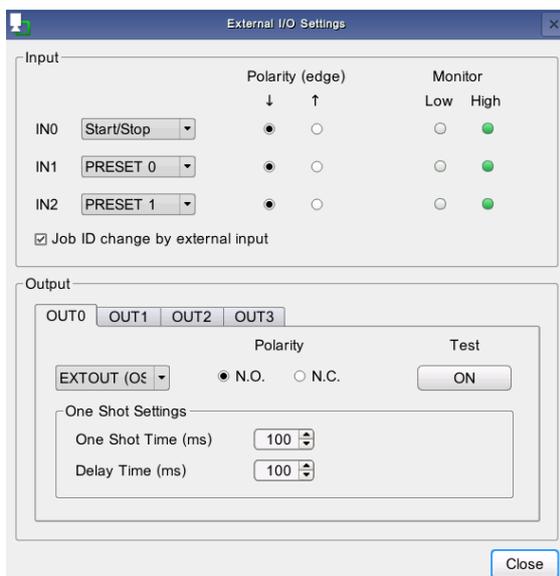
- The [External I/O Settings] screen can be displayed by clicking [External I/O Settings...] in [Internal Preset] (→P.60).
- For the input and output timing, refer to the external I/O timing chart(→P.29).

2. Configure the following settings.

Input	Set the input functions to the external connector pins. • [IN0]: Sets the input function to the pin No.8. [Unused], [EXTIN], and [Start/Stop] can be set. • [IN1]: Sets the input function to the pin No.9. [Unused], [EXTIN], [PRESET 0], and [CHG JOB ID] can be set. • [IN2]: Sets the input function to the pin No.10. [Unused], [EXTIN], [PRESET 1], and [ENTER] can be set. • [Polarity (edge)]: Sets the signal polarity for the input trigger. "↑" indicates high signal, and "↓" indicates the low signal. • [Monitor]: Sets the polarity for the input signal. • [Job ID change by external input]: Enables the external preset. − Operation is the same as when [Job ID change by external input] of [External Preset] (→P.60).
Output	Set the output functions to the external connector pins. • [OUT0]: Sets the output function to the pin No.3. [Unused], [EXTOUT], [RUN], and [EXTOUT (OS)] can be set. • [OUT1]: Sets the output function to the pin No.4. [Unused], [EXTOUT], [BUSY], and [EXTOUT (OS)] can be set. • [OUT2]: Sets the output function to the pin No.5. [Unused], [EXTOUT], [OK], [EXTOUT (OS)], and [OK (OS)] can be set. • [OUT3]: Sets the output function to the pin No.6. [Unused], [EXTOUT], [FAIL], [EXTOUT (OS)], and [FAIL (OS)] can be set.

	• [Polarity]: Sets the output switch setting. [N.O.] indicates Open (high output), and [N.C.] indicates Close (low output). The default setting is [N.O.].
	• [Test]: Tests the output switch setting.
	• One Shot Time (ms): Sets the time for output in one shot.
	    − Set from 10 to 2000 (ms).
	• Delay Time (ms): Sets the delay time until one-shot output.
	    − Set from 0 to 2000 (ms)

• The details of the functions that can be assigned to the pins are as follows.

EXTIN (IN0/1/2)	Judges to be OK when the input is turned ON while checking a Inspection Step.
Start/Stop (IN0)	Starts the operation of a workflow, or stops it while performing a workflow (→P.84)
PRESET (N1/2)	Starts the workflow of the Job ID specified for PRESET 0/PRESET 1. • The "0" after PRESET indicates bit 0 and "1" indicates bit 1. • Up to three Job IDs (ID0 to ID3) can be set. "Default" and the sixth Job ID in the list cannot be set for the Job ID of PRESET. If a Job ID that is not registered to PRESET is set, [Default] is applied and the preset indicator turns red.

PRESET, polarity, and Job ID relations:

		PRESET0				
	Trigger	↓		↑		Unused
Trigger	Input signal	H	L	H	L	
↓	H	ID0	ID1	ID1	ID0	ID0
↓	L	ID2	ID3	ID3	ID2	ID2
↑	H	ID2	ID3	ID3	ID2	ID2
↑	L	ID0	ID1	ID1	ID0	ID0
Unused		ID0	ID1	ID1	ID0	ID0

(Left column labeled PRESET1)

Signal	Description
CHG JOB ID（IN1）	Operation is the same as with the Change Job ID button. Operates only when the workflow is stopped.
ENTER（IN2）	Operation is the same as with the Enter button of the unit.
EXTOUT (OUT0/1/2/3)	Turns ON when starting an arbitrary Inspection Step, and OFF when judging the Inspection Steps that are not specified. Outputs according to the pin number.
EXTOUT（OS）（OUT0/1/2/3）	Turns ON when starting an arbitrary Inspection Step, and OFF when judging a Inspection Step that is not specified. Output is according to the pin number.
RUN (OUT0)	Turns ON while performing a workflow, and OFF when the operation of the workflow ends.
BUSY (OUT1)	Turns ON while performing a Inspection Step, and OFF when the judgment ends.
OK (OUT2)	Turns ON when all Inspection Steps are judged to be OK, and OFF when items are judged to be FAIL.
OK（OS）	Turns ON for a set time when an arbitrary Inspection Step ends. Set the ON timing and output time in [One Shot Time (ms)] and [Delay Time (ms)].
FAIL (OUT3)	Turns ON when all Inspection Steps are judged to be FAIL, and OFF when items are judged to be OK.
FAIL（OS）（OUT3）	Turns ON for a set time when each Inspection Step is judged to be OK. Set the ON timing and output time in [One Shot Time (ms)] and [Delay Time (ms)].

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Sensor Control

Set the camera sensor control.

1. Click [Sensor Control...] in the [System] menu (→P.39).
   The [Sensor Control] screen appears.
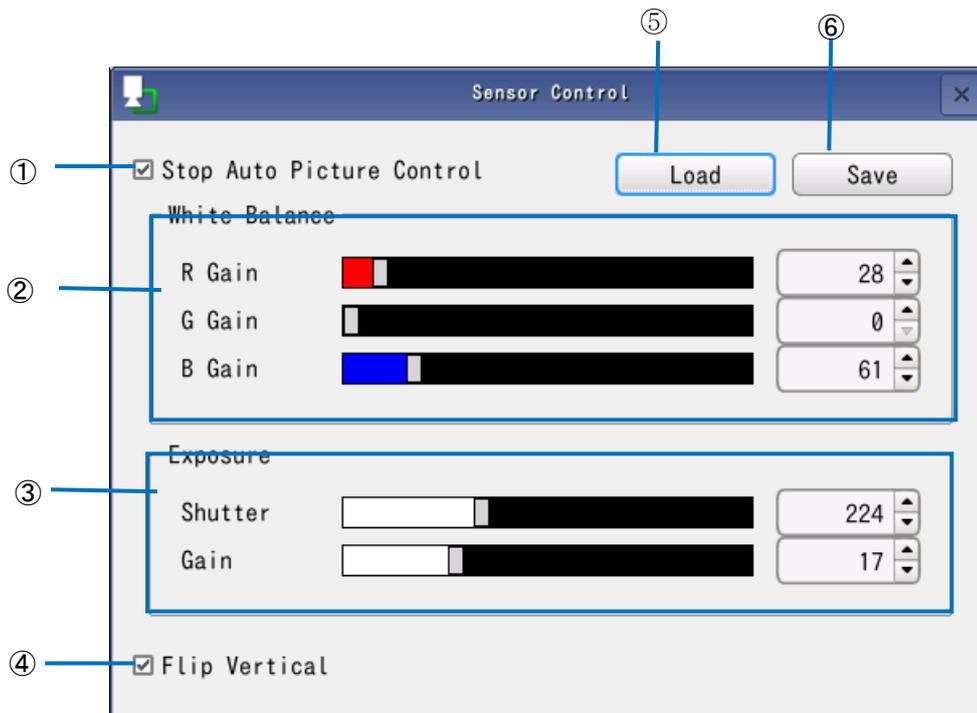
2. Configure the following settings.

①	Stop Auto Picture Control	The auto exposure (AE) and auto white balance (AWB) functions are enabled by default. Selecting the check box turns off the AE and AWB functions. The values at the time of the functions are turned off will be maintained.
②	White Balance	Set the white balance. • [R Gain]: Adjusts the red gain. • [G Gain]: Adjusts the green gain. • [B Gain]: Adjusts the blue gain. − Set each of them from 0 to 384.

③	Exposure	Set the exposure.
		 • [Shutter]: Adjusts the shutter.
		   − Set from 0 to 672.
		 • [Gain]: Adjusts the gain.
		   − Set from 0 to 64.

④	Flip Vertical	The unit is intended for use in suspended manner. If the unit is used by being installed on a tripod, etc. without changing from the default settings, the image on the screen is vertically inverted.

		Selecting the check box in this case inverts the top and bottom of the image to display the image in the correct orientation.
⑤	Load	Loads the saved white balance and exposure setting states.
⑥	Save	Saves the manually set white balance and exposure setting states.

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Job related settings

Set strings (aliases) to associate with Job IDs.

Important

- The maximum number of relates that can be loaded by this device is 1,000, but the maximum number of relates that can be set on this screen is 10. If you wish to set more than 10 of them, load a file that has been created externally.
- Please note that if you edit a file that has been created externally in the [Job ID related] screen, the data outside of the edit area will be deleted and the file will be saved by overwriting.

1. Click [Job ID] in the Settings menu of the [Settings] screen (→P.40).

The [Job ID Management] screen appears.

2. Click [Job related settings] of [Job ID related].

The [Job related settings] screen appears.

Configure the following settings.

①	External File	Click [...] and set the external file (CSV) to be used. If a file name has been specified in the [Settings] screen in advance, that file name is displayed.
②	Add	Add an related list.
③	Delete	Delete the selected related list.
④	⬆	Move the selected related list up.
⑤	⬇	Move the selected related list down.
⑥	Related list display area	[Job ID]: Specify the Job IDs to relate. • This is not case sensitive. • When an invalid setting is set, the input area turns red.

		[Alias]: Specify another name to associate with a Job ID. • This is not case sensitive. • [Default] cannot be used. • Identical names cannot be used. • A blank string cannot be used. • When an invalid setting is set, the input area turns red.
⑦	OK	Apply the settings. • Saving overwrites the file specified as the external file.
⑧	Cancel	Cancel the settings.

3. Click [OK].

The settings are saved.

🔸Note

• Describe the settings in the following order separated by commas (,) in the external file (CSV).
1. Job ID
2. Alias (string to associate)
Example:
ID1,index1
ID1,index2
ID2,alias1
ID2,alias2
ID2,alias3

Job plan Settings

Set Job plans for automatically switching the Job ID when the workflow completes.
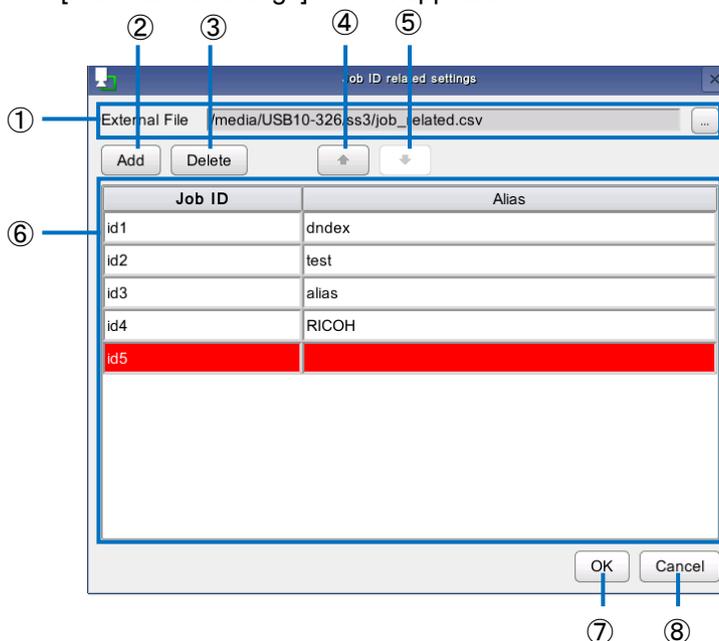
⭐ Important

- The maximum number of Job plans that can be loaded by this device is 1,000, but the maximum number of Job plans that can be set on this screen is 10. If you wish to set more than 10 of them, load a file that has been created externally.
- Please note that if you edit a file that has been created externally in the [Job plan Settings] screen, the data outside of the edit area will be deleted and the file will be saved by overwriting.

1. **Click [Preset] in the Settings menu on the [Settings] screen (→P.40).**

   The [Preset] screen appears.

2. **Select the [Job ID change by external file] check box of [Job plan Preset].**

   The [Job plan Settings...] button is enabled.

3. **Click [Job plan Settings] of [Job plan Preset].**
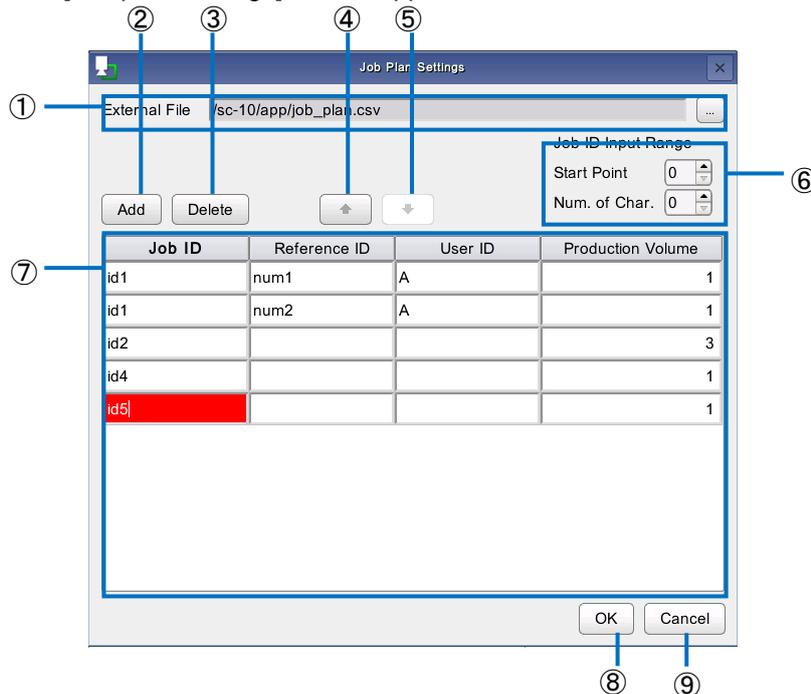
   The [Job plan Settings] screen appears.

Configure the following settings.

①	External File	Click [...] and set the external file (CSV) to be used. If a file name has been specified in the [Settings] screen in advance, that file name is displayed.
②	Add	Add a Job plan list.
③	Delete	Delete the selected Job plan list.
④	🔼	Move the selected Job plan list up.

⑤	[↓]	Move the selected Job plan list down.
⑥	Job ID Input Range	Set the conditions for the Job ID check. • [Start Point]: Specify the start point with a number for checking the string of a Job ID. • [Num. of Char.]: Specify the number of characters to check from the specified start point. Operation is the same as when [Job ID Input Range] of [Job ID] (→P. 46).
⑦	Job plan List Display Area	[Job ID]: Specify the Job ID name. • This is not case sensitive. • When an invalid setting is set, the input area turns red. [Reference ID]: Specify the Reference ID. [User ID]: Specify the User ID. [Production Volume]: Specify the production volume. • Set from 1 to 9999 units. If another character or value is included, 1 unit is set. • When an invalid setting is set, the input area turns red. • Settings other than [Job ID] can be skipped.
⑧	OK	Apply the settings. • Saving overwrites the file specified as the external file.
⑨	Cancel	Cancel the settings.

4. Click [OK].
The settings are saved.

🔻Note
• Describe the settings in the following order separated by commas (,) in the external file (CSV).
1. Job ID
2. Reference ID
3. User ID
4. Production volume
Example:
ID1,,,1
ID2,number1,user1,10

11. Operation

Starting of Operation

Start operation of a workflow using the following procedure.

1. **Log in to the device (→P.35) or click [Start] on the Main screen (→P.36).**
   The [User ID] input screen appears.

   - The [User ID] input screen does not appear when [External Preset] or [Job plan Preset] is registered, or the User ID is set in [Internal Preset] (→P. 60).

2. **Enter the User ID and then click [OK].**
   The [Job ID] input screen appears.

   - The [User ID] input screen does not appear in the following cases:
     - [External Preset] is registered
     - [Job plan Preset] is registered
     - [Job ID] is registered in [Internal Preset] (→P.60)
   - If [OK] is clicked without entering a Job ID, the [Default] Job ID is applied. You can also disable no input in [Internal Preset] (→P.6260).

3. **Enter the Reference ID and then click [OK].**
   The [Reference ID] input screen appears.
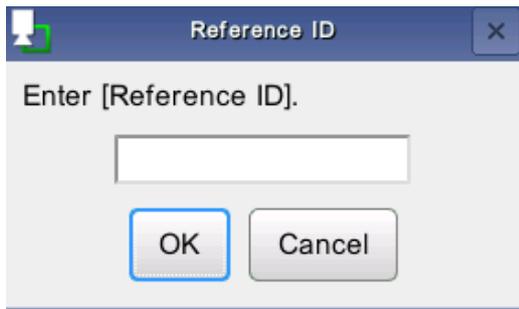
- The [Reference ID] input screen does not appear in the following cases:
  - [External Preset] is registered
  - [Job plan Preset] is registered
  - [Reference ID] is registered in [Internal Preset]
  - [Enter Job ID and Reference ID at the same time] is registered in [Internal Preset] (→P.60)

4. Enter the Reference ID and then click [OK].
The Work flow operation starts.

Note

The User ID, Job ID, and Reference ID entered when starting the work are recorded in the log (→P.89).
If you click [Cancel] on the [User ID] screen, the login screen reappears.
If you click [Cancel] on [Job ID] or [S/N] screen, the workflow stops.

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Operation Screen

The following explanation uses the example of the screen when the Inspection Step is matching mode.

Main screen during operation

①	0/1 Instruction Step	Displays the rate of progress of the entire work instruction in a progress bar. "0/1" indicates "No. of executions completed/Total number."
②	0/1 Inspection Step	Displays the rate of progress of the entire Inspection Step in a progress bar. "0/1" indicates "No. of executions completed/Total number."
③	Work instruction image area	Displays the work instruction image set for the workflow.
④	Stop	Stops the workflow (→P.84).
⑤	Work time information	Displays the following information. [Standard Time]: Displays the set standard time. [Elapsed time]: Displays the elapsed time. The progress bar is displayed in blue up to the standard time. It is displayed in yellow from the standard time to the time limit. If the time limit is exceeded, it is displayed in red. [Delay Time]: Displays the delay time.
⑥	Camera image area	Displays the camera image.
⑦	Inspection Step display area	During matching mode execution, the matching result is displayed as a thumbnail in [Anchor point] and [Check Point], and one of the following is displayed in [Result]. · ![1]: Indicates the number of the completed check point. · ![OK]: Displayed when the check result is OK.

		• fail : Displayed when the check result is FAIL.

⑧	Parameter display area	Displays various settings and information.
		• The following values increase according to the work results. They are reset when the User ID and Job ID are changed. Furthermore, you can also set the number of executions not to be reset when the User ID and Job ID are changed (→P.60).
		    − [Num. of OK]: When work flow completes
		    − [Num. of FAIL]: When Inspection Step judged to be FAIL
		    − [Total Number]: Total number of [Num. of OK] and [Num. of FAIL]
		• A comment can be entered in [Comment] only when the workflow is paused (→P.84).
		• [Job ID related]: Displays the name of the file that is used when Job ID related is set (→P.76).
		• [Job plan]: Displays the name of the file that is used when a Job plan preset is set (→P.78).
		• [Planned Volume:]: Displays the total volume of the Job plan when a Job plan preset is set (→P.78).

📑 Reference

Shortcut key （→P.90）

Visual check dialog box

If the number of retries exceeded the [N/A Retry Times] setting (→P.52) during matching mode execution, the visual check dialog box appears.

Judge whether OK or FAIL by visually checking or click [Retry] to perform matching again.
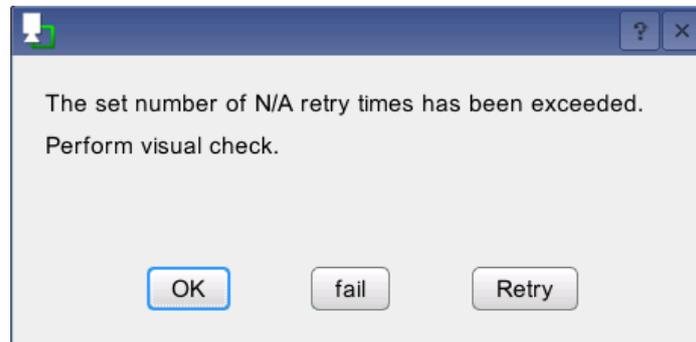
⬇ Note

•   The time is not counted as processing time while the visual check dialog box is displayed.

Stopping of Operation

The workflow stops in the following cases.
- When the Inspection Step is judged to be FAIL.
  - When the infinity loop mode is set, the operation does not stop. （→P.45）
- When the user clicks [Stop]. （→P.82）
- When the power button of the unit is pressed. （→P.12）
- When "Start/Stop" signal of the External I/O is input （→P.72）

Screen while stopped
The following operations can be performed while the flow is stopped.
The power LED flashes while the flow is stopped.

①	Change Job ID	Changes the Job ID. • The Job ID can also be changed from [Change Job ID] of the File menu (→P.38). 🔵Note The Job ID cannot be changed when any of the following is set in user mode. • When [External Preset] is enabled (→P.60) • When [Job plan Preset] is enabled (→P.61) • When [Job ID] of [Internal Preset] is enabled (→P.61)	
②	Back	Goes to the previous Job ID.	
③	Start	Starts the work flow. Resumes the work from the current Inspection Step when the work is stopped. ⭐Important If the work is started in the following case, it starts from the first Inspection Step. • When [External Preset] is enabled (→P.60)	

④	Next	Goes to the next Job ID.
⑤	Settings...	Change the work mode settings (→P.86).
⑥	Work Mode Settings	Change the parameter settings (→P.52, P.58).
⑦	Comment	Enter a comment. • The entered comment is output to the log after the workflow completes (→P.89). Any line feed included in the comment will be omitted when the comment is output to the log. The comment in the comment field is cleared after being output to the log.

Reference

Adjusting the Parameter Settings While Workflow Stopped

The parameter settings of the workflow can be adjusted while the workflow is stopped. Adjustment is not possible when in user mode.

🔽 **Note**

- The settings can be changed by selecting [Job Settings...] from the [Job] menu while the workflow is stopped (→P.40).

1. **Click [System...] on the Workflow Stopped screen (→P.84).**
2. **Adjust the parameters.**

> **Parameter adjustment during matching mode operation:**
> Click the thumbnail in [Anchor Point] or [Check Point] in the work mode area (→P.36) on the main screen to open the parameter settings dialog box.

Parameter setting dialogs:

Anchor point

Check Point	Check Point	Check Point

(Matching)	(Color Recognition)	(Textured)
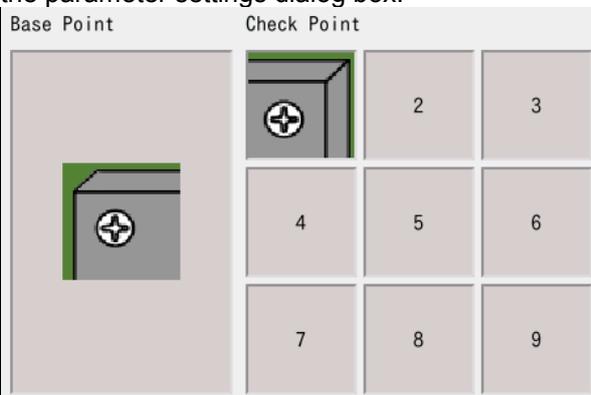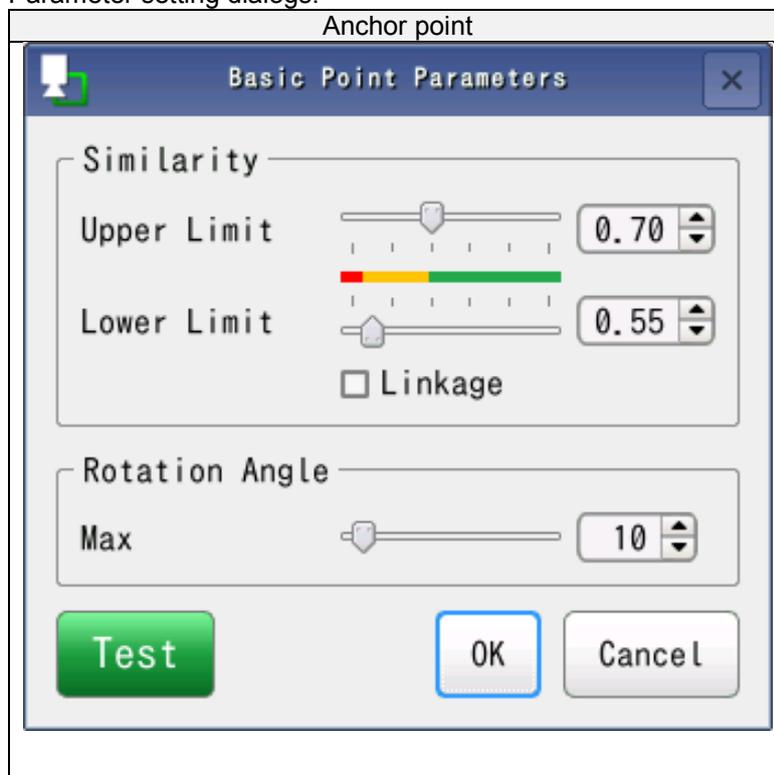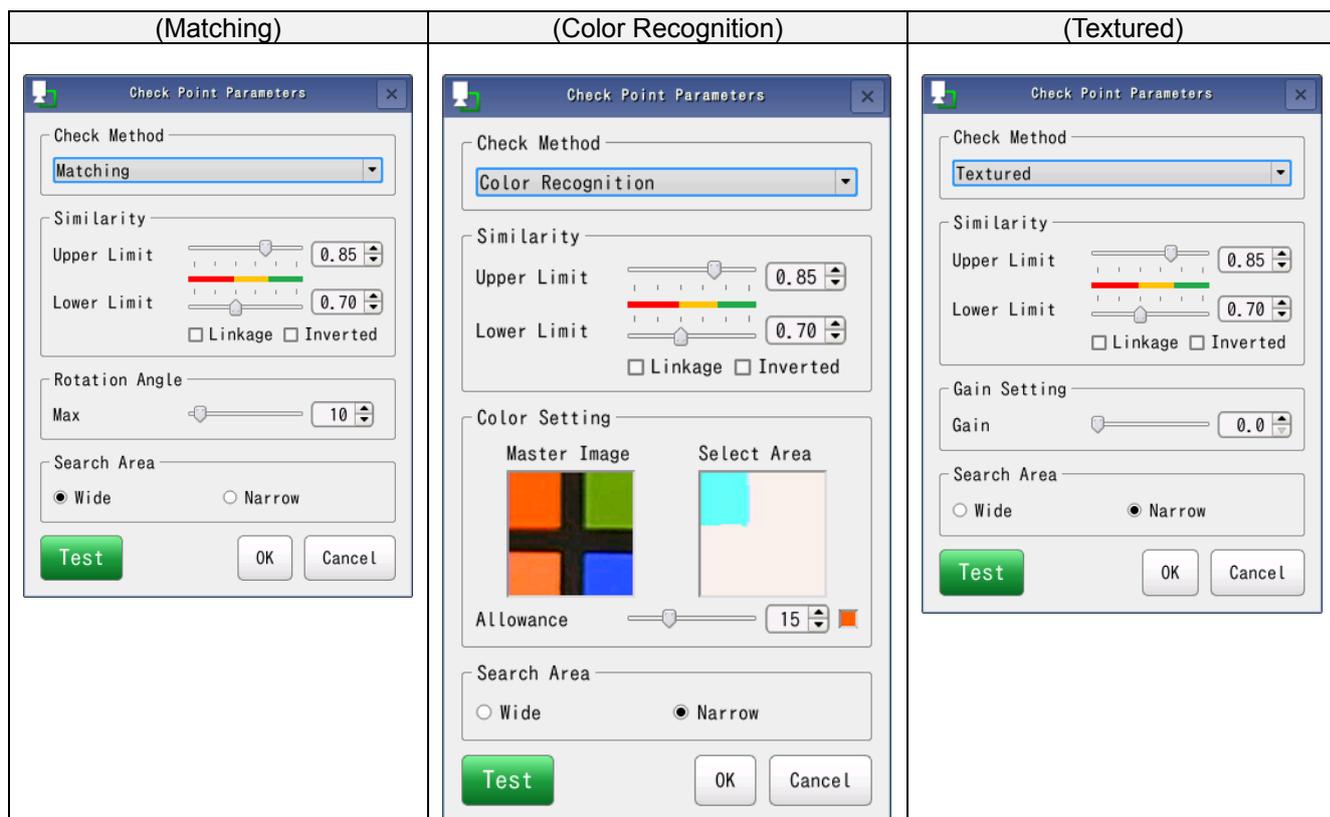
- The dialog box is not displayed if you click an area without an icon displayed.
- Click [Test] in the parameter dialog box to check the operation with the specified settings.

📘 Reference
- Matching mode parameters (→P.52)
- Serial number (S/N) input mode parameters (→P.58)
- Matching mode parameters (→P.52)

3. Click [OK].
The adjusted settings are reflected.

12. Recovery and Update

Use a USB memory device or SD card (sold separately) to perform a recovery or update of the device's software.
A recovery or update takes about 5 to 10 minutes.

⭐ **Important**

- A recovery or update uses approximately 200 MB of the internal ROM. Free up sufficient memory before performing a recovery or update.
- Do not remove the USB memory device or SD card or turn off the power of the device during the recovery or update. The device may become no longer able to start.
- Turn off the power of the device before performing a recovery or update.
- If a recovery or update is started, the settings of the device and the data stored in internal memory are all deleted.
- Do not save multiple update files on the same hierarchical level.
- Do not connect multiple devices.
- Delete the old update file.

1. **Access the following site and download the update file (sc-10_x_y_z.dat).**
   http://industry.ricoh.com/en/support/fa_camera_lens/download/soft/
2. **Save the update file in the layer directly under the USB memory device or SD card.**
3. **Open the USB connector cover or SD card slot cover on the rear of the unit and then connect the USB device or SD card to which the update file is saved.**
4. **Press the power button while holding down the → button and ← button.**
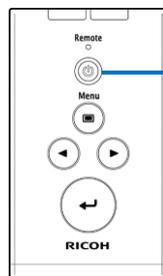   - Hold down the → button and ← button until the power LED lamp flashes continually.
   - Do not hold down the power button. If the power button is held down for at least 4 seconds, the power of the device turns off.
   - When the recovery or update begins, the power LED lamp begins flashing. Release the → button and ← button.

Confirm that the power LED is flashing continually.

- When the recovery or update completes, the power LED lights, a beep sounds, and the device restarts automatically.

⬇ **Note**

- An SD card or SDHC card can be used with the device.
  - x: Major version
  - y: Minor version 1
  - z: Minor version 2

13. Operation Logs

Executing a workflow in user mode outputs information to the log (execution information is not output in administrator mode).
The log file (file name: sc-10_log_yyyymmdd.csv) is output to the folder specified (→P.33) on the [Initial Settings] screen.
The log file of the most update check (file name: sc-10_log_last_check_data.csv) is also output to the same folder.

Information is recorded to the log in the following order.
1. Job ID
2. Reference ID
3. User ID name
4. Inspection Step name
5. Inspection Step name
6. Date
7. Time
8. Standard time [sec]
9. Elapsed time [sec]
10. Processed items (Start, Pause, Next, Back, log out, change Job, change S/N, Matching, S/N, Check)
11. Judgment result (OK, FAIL, or N/A)
12. Final judgment result (OK, FAIL, or blank)
13. Image log file name
14. Comment (if one is entered in the comment field)
15. Process data (the output process data varies depending on each process.)
    - When matching mode:
      15. Anchor point degree of similarity
      16. Anchor point rotation angle
      17. Check point ID
      18. Check point degree of similarity
      19. Check point rotation angle
      20. Matching time [msec]
      21. Degree of color similarity
      22. Degree of texture similarity
    - When S/N mode:
      15. Part number (set number)
      16. Part serial number (value entered by user)
    - When check mode: None

14. Shortcut Keys

The device can be controlled with shortcut keys.

Keys 1 to 9 of the keyboard are supported for shortcut keys.

7 Shutdown (→P.38)	8 Log out (→P.38)	9 Reboot (→P.38)
4 Back (→P.84)	5 Start/stop (→P.84)	6 Next (→P.85)
1 Change Job ID (→P.38)	2 Change Reference ID (→P38)	3 None

Note
- When the button and menu cannot be selected, the shortcut key is also disabled.
- The shortcut keys cannot be operated when the focus is on a comment.
- When the Print Screen key is pressed, a screenshot of the current screen is captured.

15. Adjusting the camera focus

1. **Use the supplied hexagonal wrench to remove the unit front cover fixing screws and then remove the front cover from the unit.**
   - When removing the front cover fixing screws, perform the work carefully while supporting the front cover with a hand so as not to drop it.
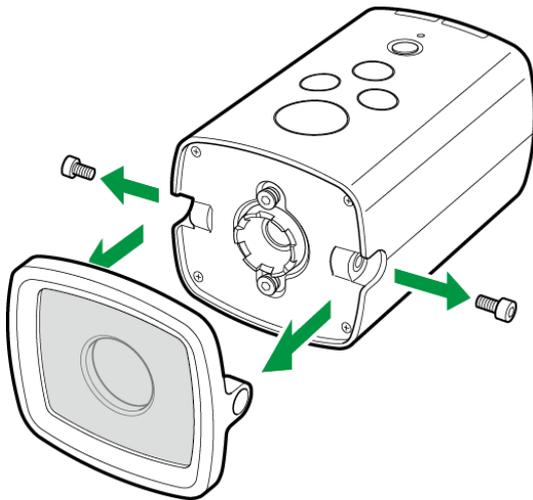
2. **Loosen the focus fixing screws until the focus adjustment ring turns smoothly.**
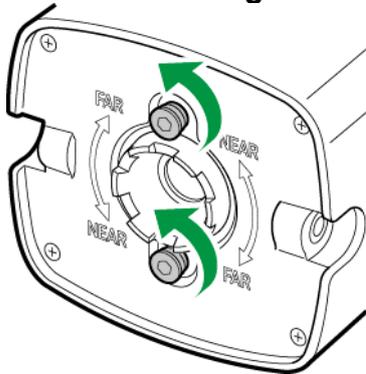
3. **Turn the focus adjustment ring by hand until the display image in the camera image area can be seen clearly.**
   - Turning the ring clockwise moves the focus farther away (FAR).
   - Turning the ring counterclockwise moves the focus nearer (NEAR).

4. **Tighten the focus fixing screws and check that the focus adjustment ring does not turn.**
5. **Attach the front cover and front cover fixing screws to the unit.**

16. Troubleshooting

Symptom	Cause	Solution
Camera does not start.	A power supply is not connected.	Use an AC adapter or external cable to connect a power supply to the device properly.
Keyboard and mouse cannot be operated.	They are not connected properly.	Connect the device, keyboard, and mouse properly with USB cables.
USB device is not recognized.	The file format of the USB device is not supported.	NTFS format is not supported. Use a USB device in FAT or FAT32 format.
	The current supplied to the USB device is insufficient.	Use a USB hub that supplies power using an AC adapter or other means.
Images are not displayed on the monitor.	The HDMI cable is not connected properly.	Connect the device and monitor properly with an HDMI cable.
	An HDMI cable that is an unsupported version is being used.	Use an HDMI cable and monitor that support HDMI version 1.4.
	The device has not started up.	Images are not displayed while the device is starting up. Wait approximately 40 seconds after pressing the power switch.
	The monitor does not support the output resolution of this unit.	Use the monitor that supports the following formats (the output resolution supported by the unit.) • SXGA (1280X1024) • 1080p (progressive 1920x1080)
Images are blurred.	The subject is out of focus.	Adjust the focus by turning the focus adjustment ring.
Not recognized. Incorrectly recognized.	The settings are not configured appropriately.	Adjust the matching degree of similarity and judgment setting values. When [Color Recognition] is set, enabling [Stop Auto Picture Control] is recommended.
	The distance at which the Inspection Step Reference Image was captured and the installation distance differ.	Use the device installed at a distance that is the same as the distance at which the Inspection Step Reference Image was captured.
Images are affected by a lot of noise.	The camera gain is high.	Increase the illuminance of the subject.
Flickering occurs on the monitor.	Flickering is occurring due to the frequency.	Set the AC power frequency (50/60 Hz) to the same frequency as the light source.

Symptom	Cause	Solution
		Set the illuminance of the subject to 1000 lux or less.
Software update fails.	There is not enough internal memory require for software update.	Free space of 200 MB is required in the internal memory for software update. Save the data in the internal memory to the external memory (USB or SD memory card) and spare the free space.
A screenshot of the screen was not captured even though I pressed the Print Screen key.	A screenshot cannot be captured during operation.	Capture a screenshot while operation is stopped.
	Multiple file dialog boxes cannot be opened at the same time.	Close the other file dialog boxes and then perform the operation.
File operations cannot be performed in the user mode.	File operations (Cut, Copy, Paste, New Folder, Delete, Rename, and Save) cannot be performed in a file dialog box in the user mode.	Log in to the application in the administrator mode and then perform file operations.
Shortcut keys do not work.	The focus is on a comment.	When the focus is on a comment, input will be to the comment field. Move the focus from the comment and then use the shortcut keys.
	Buttons and menus are disabled.	When buttons and menus are disabled, the shortcut keys are also disabled.
The work settings cannot be saved or the work settings cannot be loaded.	The destination folder of the parameters set in the Initial Settings screen has been changed or deleted.	Set the destination folder of the parameters of the Initial Settings screen again.
	The destination folder of the parameters set in the Initial Settings screen is set to a folder in a USB memory device or SD card, but that device does not exist.	Start up the device while the USB memory device of SD card used for the settings is inserted.
	The parameter file of the initial settings was used by copying it to another USB memory device or SD card, but the drive name is different.	Set the USB memory device or SD card to the same drive name. * If the drive name is not set, the folder name may become a string unique to the device. We recommend setting the drive name before use with this device.

17. Specifications

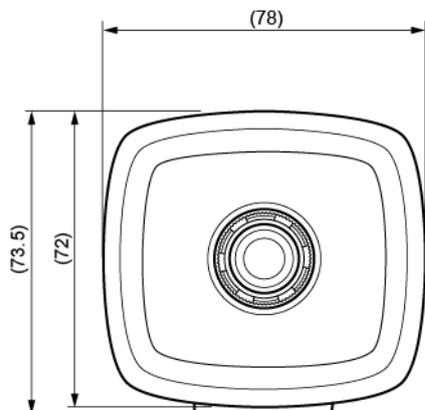| Item		Specifications
Installation distance		400 to 800 mm
Field of view		[Standard model] RICOH SC-10A Installation distance 400 mm: 300 (H) x 150 (V) mm to installation distance 800 mm: 600 (H) x 300 (V) mm [High magnification model] RICOH SC-10A(H) Installation distance 400 mm: 150 (H) x 75 (V) mm to installation distance 800 mm: 300 (H) x 150 (V) mm
Image sensor		1/3-inch color CMOS
	Number of pixels	1280x720
Operating procedure	Operating procedure image	JPG format (610x680)
Pattern matching	Area specification (ROI)	Specify area with absolute position
	Position correction	Relative position correction from reference position
	Position rotation correction	±180°
	Number of simultaneous registrations	Maximum 9 places
Serial number recording	Number of characters check	Check whether matches set number of characters
	Character string check	Check whether 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, operating procedure , 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 Inspection Step.
External interfaces	HDMI	1920x1080/60 Hz, 1280x1024/60 Hz
	USB	TYPE-A x1 USB2.0 High Speed supported (Host) * Enabled device : USB-HID, USB-Mass Storage
	Ethernet	RJ-45 x1 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, FAIL, Remote
	Switches	Power, Menu, Enter, ◄, ►
Ratings	Power voltage	12 V DC ±10% (DC IN connector for AC adapter) 12/24 V DC ±10% (external connector) * Power must not be supplied from both connectors at the same time.
	Power consumption	8.9 W 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

Item	Specifications
External dimensions	78 (W) x 73.5 (H) x 126.5 (D) mm (excluding connectors)
Weight	Approx. 400 g
Mounting holes	Tripod screw hole (ISO 1222 compliant), M4 screw hole x 2

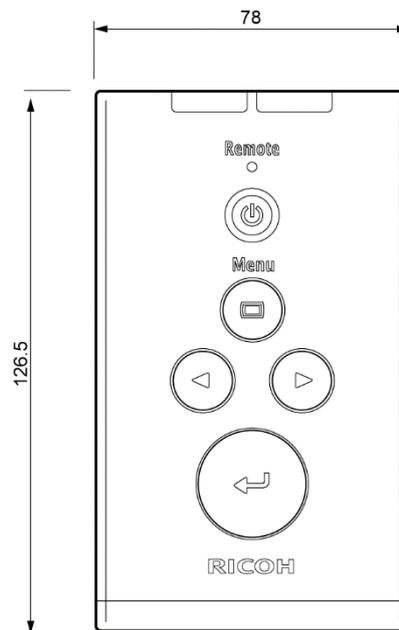**AC adapter (model including AC adapter only)**

Item		Specifications
Product name		ATS024T-A120
Manufacturer		Adapter Technology Co., Ltd.
Ratings	Input voltage	100 to 240 V AC / 50 to 60 Hz
	Output voltage	+12 V ±5%
	Output current	2 A max.
External dimensions		50 (W) x 34 (H) x 88.5 (D) mm (excluding cable)
Weight		Approx. 170 g

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Outline Drawings

Front of unit:

Top of unit:

Side of unit:

Bottom of unit:

2×M4, effective screw depth 6
1/4-20 UNC, effective screw depth 6

⌀4.6 hole, depth 7.5
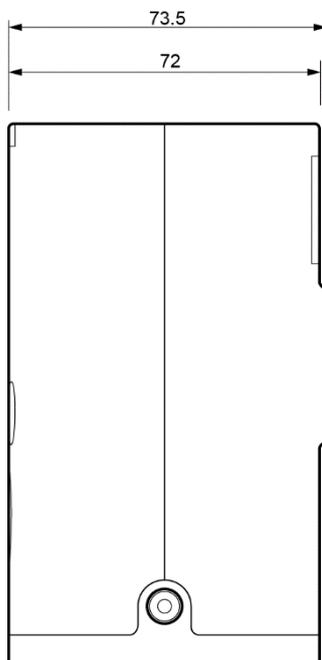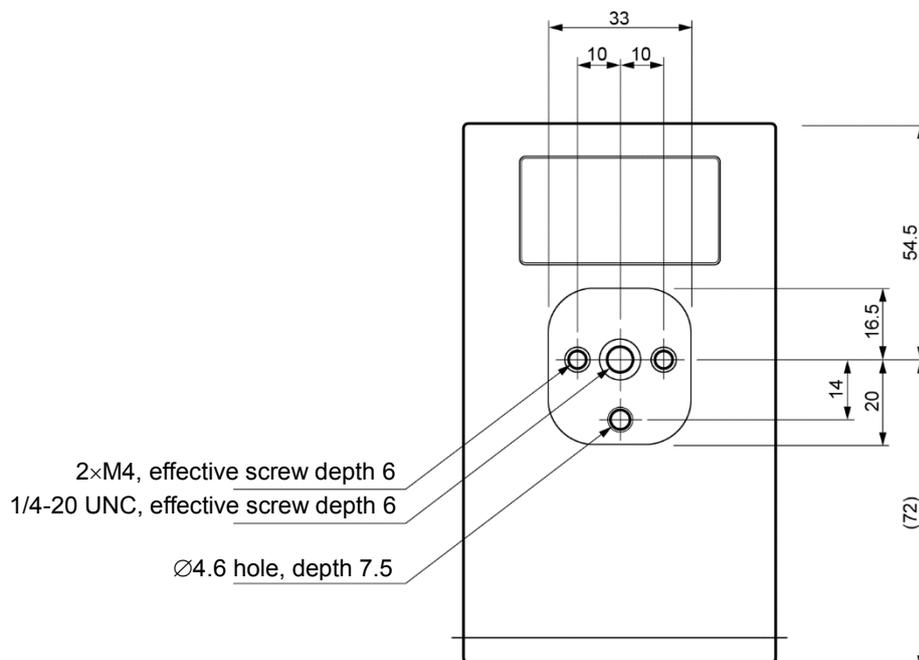
18. Restrictions

- Language support
  Input of alphanumeric characters and symbols is supported. Japanese cannot be input.
  Folders with names containing 2-byte characters may not be accessible. Use ASCII characters except ":", "/", "¥", "|", "*", "?", "″", "<", and ">" for folder names and file names.
- Monitor
  There is no guarantee that display on all monitors will be possible. Display on a monitor whose monitor information cannot be acquired may not be possible.
- Power-off
  Turning off the power by pressing and holding down the power button (for at least 4 seconds) may cause a problem with the system.
- File format
  The Windows compatible file system of FAT and FAT32 are supported. NTFS is not supported.
- Hot plugging
  Hot plugging is not supported for SD cards and HDMI. If you wish to use an SD card or HDMI cable, turn off the power of the device before connecting the SD card or HDMI cable.

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19. Appendix

Trademarks

- HDMI is a trademarks or registered trademarks of HDMI Licensing LLC.
- Ethernet is a trademarks or registered trademarks of Fuji Xerox Co., Ltd.
- IEEE is a trademark of The Institute of Electrical and Electronic Engineers, Inc.
- All other product names or names are trademarks or registered trademarks of the respective companies.

Licenses

This product includes software licensed by open source software (OSS) and software from third parties that is subject to copyright licenses, disclaimers, and notices.
For the exact terms, refer to the DVD supplied with the product.

Cleaning and Operation/Storage Location

Cleaning
- Please note that image quality may deteriorate if fingerprints or dirt gets on the lens.
- When dust or dirt gets on the lens, do not touch the lens directly but instead remove the dust or dirt by using a commercially available blower to blow it off or using a soft cloth to gently wipe it off.
- In the event that the product malfunctions, contact RICOH Industrial Solutions Inc.
- Never dismantle the product yourself as doing so is dangerous.
- Do not expose this product to volatile substances such as thinner, benzene, and pesticides. Failure to observe this precaution could result in damage such as deterioration or peeling of paint.

Operation/Storage Location
- Do not install the device in any of the following locations.
  - Location where the ambient temperature goes outside of the rated range
  - Location subject to sudden changes in temperature (location with condensation)
  - Location where the relative humidity goes outside of 30 to 80% RH range
  - Location where the device will be directly subject to vibration or impacts
  - Location exposed to strong ambient light (laser beams, arc welding light, ultraviolet light, etc.)
  - Location subject to direct sunlight or near a heating appliance
  - Location subject to a strong magnetic field or intense electric field
  - Location where corrosive gas or combustible gas is present
  - Location where dust, salt, or iron particles are present
  - Location where the atmosphere contains water, oil, or chemical spray or mist
- Avoid using or storing this product in any of the following locations, as they may cause a failure of the product.
  - Location with a lot of sand, dirt, or dust
  - Location subject to severe vibration
  - Location where the product will be in direct contact with chemicals including insect mothballs and other insect repellent, rubber or vinyl products, etc. for long periods of time.
  - Location where a strong magnetic field is generated
- Take care that water does not enter inside this product.

Precautions for Cleaning
- Be sure to turn off the power before cleaning.

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Warranty

1. In the event that this product fails, it will be repaired free of charge within one year of the date of purchase, so please contact RICOH Industrial Solutions Inc. You may need to bear some of the costs of shipment depending on the shipping method.
2. The warranty does not apply in any of the following cases, even during the above warranty period.
   (1) Failure resulting from misuse (incorrect operation not in accordance with the operating instructions)
   (2) Failure resulting from repair, modification, overhaul, etc. not conducted by an authorized service center specified by RICOH Industrial Solutions Inc.
   (3) Failure resulting from a fire, natural disaster, natural calamity, lightning, abnormal voltage, etc.
   (4) Failure resulting from exposure to water, dropping, mud, sand, etc. due to misuse.
   (5) Failure resulting from improper storage (as described in the operating instructions), insufficient care, etc.
3. This warranty applies only to the unit. It does not apply to the accessories.
4. RICOH Industrial Solutions Inc. cannot compensate for any incidental damages resulting from a failure of this product (costs incurred for recording and playback, loss of profits that could have been earned by recording and playback, etc.)

Unauthorized reproduction of this manual in part or in whole is prohibited.
RICOH Industrial Solutions Inc.
The content of this manual is subject to change without notice.

Inquiries

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September 2018

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Revision History

Rev.	Date	Changes	Note
1.00	2016/03/25	New issue	
2.00	2016/09/26	3. Overview of SC-10 • Addition: Color Recognition to the matching mode. • Modification: Outline flow of matching mode • Addition: External input function to the check mode 5. Installation and Connections • Addition: Input and output circuit diagrams • Addition: External I/O timing diagram • Addition: When connecting an external device (external I/O control) • Modification: Assignments to external connector pins 6. Power-on and Initial Settings • Modification: Screen UIs 7. Logging In • Addition: Information on the operation when [Do not show the log in dialog] is set. 8. Screen Operations • Addition: Status display of the Preset settings • Menus − Addition: [Open File Window] function − Addition: [External I/O Settings...] function − Addition: [Sensor Control...] function • Settings Screen − Addition: [Preset] function 9. Creating a Workflow • Registering/Managing Job IDs − Addition: The following functions [Infinite Loop Mode] [Work Number Input Validation] [Work ID Input Range] • Creating Inspection Steps − Addition: [Disable] function − Addition: Check mode parameters • Matching mode parameters − Addition: [Check Method] function − Addition: [Search Area] function − Addition: [Linkage] option to [Similarity] function − Addition: [Color Setting] function − Addition: [External Output] function − Addition: [Flow] function • Serial number (S/N) input mode parameters − Modification: Settings items for [Comparison] setting − Addition: [External Output] function • Check mode parameters − Addition: [Internal Output] function − Addition: [External Output] function 10.Settings • Presets − Addition: [Preset] function − Addition: [External I/O Settings] function − Addition: [Sensor Control] function 11. Operation • Starting of Operation	

Rev.	Date	Changes	Note
		− Addition: Information on the operations when corresponding settings are set in [Internal Preset]. • Adjusting the Parameter Settings While Workflow Stopped − Addition: Parameter setting dialogs 12. Recovery and Update • Addition: Notes on the update. 13. Operation Logs • Addition: Log output of the most update check • Addition: "21. Color similarity" to the matching mode under "15. Process data" 16. Troubleshooting • Addition: Output resolution of the unit • Addition: Recommended setting for when [Color Recognition] is set • Addition: Symptom when software update fails 18. Restrictions • Modification: Limitations for language support	
3.00	2017/09/22	2.Names of Parts Addition: Information on the OK/NG judgment LED lamp 3.Overview of SC-10 • Addition: Textured and Inverted on Matching mode • Addition: Waiting for a specified time on Check mode 5.Installation and Connections • Addition: Optic graph of high magnification model • Addition: One Shot output diagram to external I/O timing diagrams 7.Logging In • Addition: Note when the login screen is not displayed. 8.Screen Operations • Addition: Status display of the association and preset settings • Addition: Parameter display area • Settings Screen − Addition: [Sound / LED Settings] function 9.Creating a Workflow • Registering/Managing Job IDs − Addition: The following functions [Production volume management] [WORK ID Association] • Creating Workflow Instructions − Addition: Setting the OK, N/A, and NG frames to the image • Matching mode parameters − Addition: [Search Area] − Addition: [Gain Setting] • Check mode parameters − Addition: [Judgment Conditions] 10.Settings • Presets − Addition: The function that number of executions is not reset − Addition: [Work Plan Preset] function − Addition: Setting the [Internal Preset] − Addition: User Mode Settings • Sound / LED Settings	

Rev.	Date	Changes	Note
		− Addition: LED mode • External I/O Settings − Addition: CHG WORK ID − Addition: One Shot output • Sensor Control − Addition: [White Balance] − Addition: [Exposure] − Addition: [Load] and [Save] • Addition: Work Association Settings • Addition: Work Plan Settings 11. Operation • Starting of Operation • Addition: Information on the operations when corresponding settings are set in Internal Preset. • Operation Screen • Addition: Parameter display area • Stopping of Operation • Addition: Notes on preset • Adjusting the Parameter Settings While Workflow Stopped • Addition: Parameter setting dialogs 12. Recovery and Update • Addition: Notes on the update. 13. Operation Logs • Addition: "22. Textured similarity" to the matching mode process data. 14. Shortcut Keys • Addition: Shortcut Keys 16. Troubleshooting • Addition: USB device • Addition: Print Screen key • Addition: File operations cannot be performed in the user mode. • Addition: Shortcut Keys • Addition: Saving or loading the work settings 17. Specifications • Addition: High magnification model specification	

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