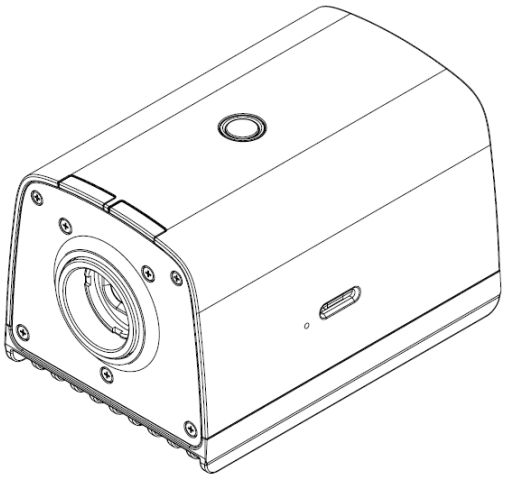
RICOH SC-20

Operating Instructions



RICOH Industrial Solutions Inc.

Introduction

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.
Scope of Use of This Product	This product is not designed to be used for applications where high-level safety and reliability are required and the failure or incorrect operation of the product may directly danger human lives, applications where there is a risk of damage to human bodies, or any special applications where there is a risk of causing tremendous damage to society (e.g. military affairs, atomic power, aerospace, air traffic control, power generation plant, transit and transportation operation control, medical equipment, life support systems).
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 Operating Instructions. • 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 a microSD 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.

The content of this manual is subject to change without notice.
Every effort has been made to ensure the accuracy of the information in this document. Should you nevertheless notice any errors or omissions, we would be grateful if you would notify us at the address listed on the back cover of this manual.

Wireless-Related Precautions/Indications (Models with a wireless communication system only)

How to check the wireless certification number: The wireless certification number is included on the label on the side of the device.
The 5 GHz band wireless access system is for indoors use only.

For the United States of America

This device complies with part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

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

Compliance with FCC requirement 15.407(c)
Data transmission is always initiated by software, which is the passed down through the MAC, through the digital and analog baseband, and finally to the RF chip. Several special packets are initiated by the MAC. These are the only ways the digital baseband portion will turn on the RF transmitter, which it then turns off at the end of the packet. Therefore, the transmitter will be on only while one of the aforementioned packets is being transmitted. In other words, this device automatically discontinue transmission in case of either absence of information to transmit or operational failure.

Frequency Tolerance: ±20 ppm

This device must not be co-located or operated in conjunction with any other antenna or transmitter except for Wireless LAN and Bluetooth module SX-SDMAC-2832S+ R2 which performed co-location testing.

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 20cm 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.

For Canada

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada’s licence-exempt RSS(s). Operation is subject to the following two conditions:
1.This device may not cause interference.
2.This device must accept any interference, including interference that may cause undesired operation of the device.

L’émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d’Innovation, Sciences et Développement économique 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;

2.L’appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d’en compromettre le fonctionnement.

5150-5350 MHz band is restricted to indoor operation only.

La bande 5150-5350 MHz est restreinte à une utilisation à l’intérieur seulement.

Compliance with ISED requirement RSS-247 6.4 a) Data transmission is always initiated by software, which is the passed down through the MAC, through the digital and analog baseband, and finally to the RF chip. Several special packets are initiated by the MAC. These are the only ways the digital baseband portion will turn on the RF transmitter, which it then turns off at the end of the packet. Therefore, the transmitter will be on only while one of the aforementioned packets is being transmitted. In other words, this device automatically discontinue transmission in case of either absence of information to transmit or operational failure.

Conformité à la norme CNR-247 6.4 a) La transmission des données est toujours initiée par le logiciel, puis les données sont transmises par l'intermédiaire du MAC, par la bande de base numérique et analogique et, enfin, à la puce RF. Plusieurs paquets spéciaux sont initiés par le MAC. Ce sont les seuls moyens pour qu'une partie de la bande de base numérique active l'émetteur RF, puis désactive celui-ci à la fin du paquet. En conséquence, l'émetteur reste uniquement activé lors de la transmission d'un des paquets susmentionnés. En d'autres termes, ce dispositif interrompt automatiquement toute transmission en cas d'absence d'information à transmettre ou de défaillance.

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 20cm 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)

For Europe, United Kingdom

CE Marking Traceability Information
Manufacturer:
RICOH Industrial Solutions Inc.
3-6, Nakamagome 1-chome, Ohta-ku, Tokyo 143-8555, Japan
Importer:
RICOH INTERNATIONAL B.V. — GERMAN BRANCH
Oberrather Strasse 6, 40472 Düsseldorf, Germany

Declaration of Conformity
Hereby, RICOH Industrial Solutions Inc. declares that the radio equipment type RICOH SC-20 is in compliance with Directive 2014/53/EU.
The decralation of conformity may be consulted at
[https://industry.ricoh.com/en/support/fa_camera_lens/download/manual]

Operating frequency band: 2400 - 2483.5 MHz
maximum radio-frequency power: 250mW

Operating frequency band: 5150-5350MHz(W52, W53)
maximum radio-frequency power: 250mW (with TPC)
* TPC: Transmit Power Control

Operating frequency band:5470-5725MHz(W56)
maximum radio-frequency power: 250mW (with TPC)

Outdoor use of the 5GHz band is prohibited.

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 20cm apart from the user.

Other Precautions/Indications

For the United States of America (State of California)

Perchlorate Material - special handling may apply.
See www.dtsc.ca.gov/hazardouswaste/perchlorate

For Europe
User Information on Electrical & 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 helps 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.

All Other Users
If you wish to discard this product, please contact your local authorities, the shop where you bought this product, your local dealer or sales/service representatives.

Note for the Battery and/or Accumulator Symbol
In accordance with the Battery Directive 2006/66/EC Article 20 Information for end-users Annex II, the above symbol is printed on batteries and accumulators.
This symbol means that in the European Union, used batteries and accumulators should be disposed of separately from your household waste.
In the EU, there are separate collection systems for not only used electrical and electronic products but also batteries and accumulators.
Please dispose of them correctly at your local community waste collection/recycling centre.

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.

- microSD card: Indicates microSD, microSDHC, and microSDXC memory cards.

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 caps used or packaged 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 a fire, electric shock, or burns.
	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.
	Keep the plastic bags for packaging this product out of the reach of children. Putting them over their head may cause suffocation.
	When using this product, do not touch the bottom of the unit (heatsink section) as it gets hot. It may cause burns.

⚠ 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.) • 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 a microSD 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.

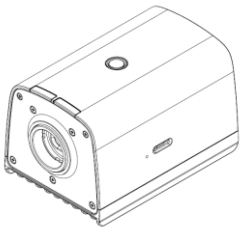
Precautions for Use

- 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 user ID of at least one administrator as well as the password for that ID. 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.
- Use a USB cable that is 3 m or shorter.
- Use the 5 GHz band wireless LAN indoors only. (Models with a wireless communication system only)

Contents

1. Package Contents

- Unit



- Read this first
- Lens mount cap (already attached to the unit)
- Set of connector caps

The following items are included only in "models including an AC adapter".

- AC adapter
- AC cord

* The serial number of this product is on the label on the side of the unit.
* This product is not provided with any lens. Please purchase one before use.
* Products other than those specified as "models including an AC adapter" do not include an AC adapter. Please purchase one before use.

Reference

- Recommended Lens / Field of View and Installation Distance (→P. 155)

The following can be downloaded from our website.

[Software]:
https://industry.ricoh.com/en/support/fa_camera_lens/download/soft/

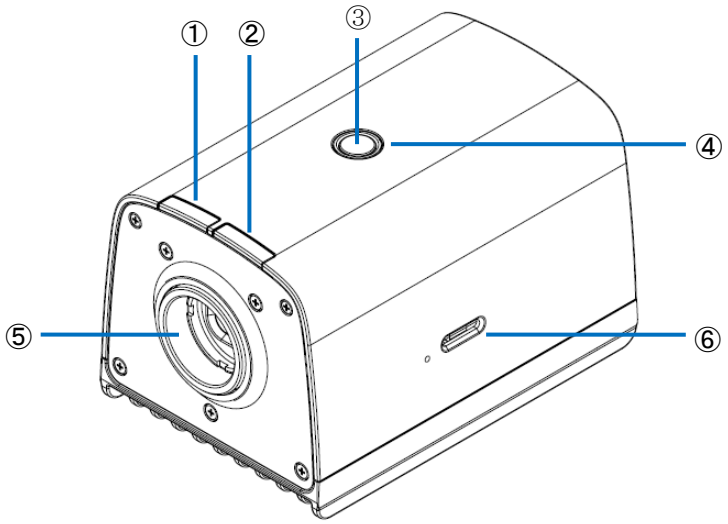
- SC-20 Work Instructions Editor (PC software)

[Manual]:
https://industry.ricoh.com/en/support/fa_camera_lens/download/manual/

- SC-20 Operating Instructions (This manual)
- SC-20 Quick Start Guide
- SC-20 Work Instructions Editor User's Guide
- SC-20 Socket Mode Function Operating Instructions
- SC-20 EtherNet/IP Mode Function Operating Instructions

2. Names of Parts

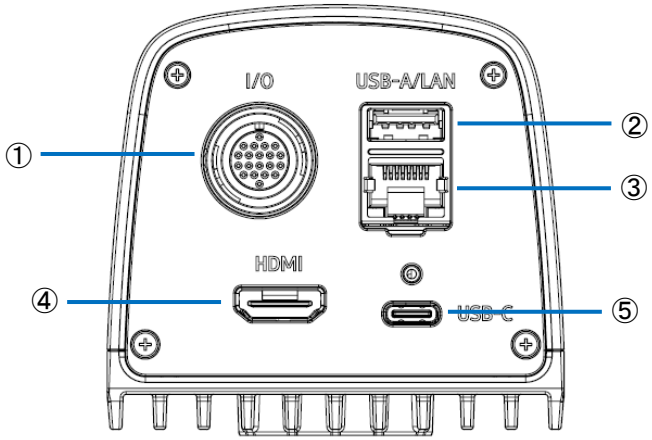
Top, front, and side of unit:



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 • LED Settings (→P. 93)
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 • LED Settings (→P. 93)
③	Power button	When power off: Turns on the power. When power on: • When pressed for approximately 1 second: Displays the shutdown selection options (functions only on the Login screen and the main screen when the workflow has stopped). • When pressed for approximately 4 seconds: Forcibly turns off the power. Important • If the power is forcibly turned off, data may be damaged. Normally, shut down the system from the menu before turning the power off.
④	Power LED lamp (green)	Lights when the power turns on. Flashes while the workflow is stopped.

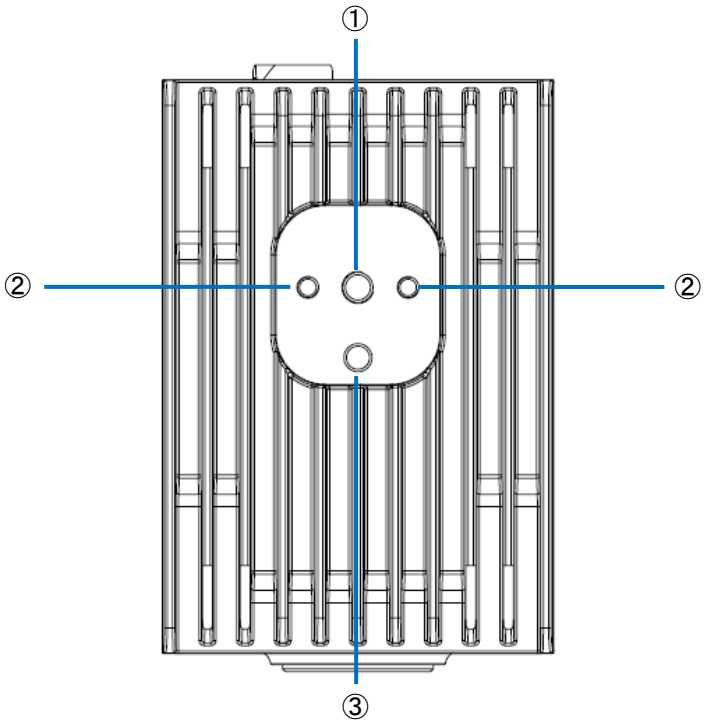
⑤	Lens mount	C mount
⑥	Card slot	microSD

Rear of unit:



①	External connector
②	USB Type-A connector
③	LAN connector
④	HDMI connector
⑤	USB Type-C connector (USB Power Delivery supported / DisplayPort Alternate Mode not supported)

Bottom of unit:



①	Tripod mount screw hole
②	M4 screw holes
③	Tripod positioning hole

3. Overview of SC-20

SC-20 can be used to judge the degree of similarity of a master image and camera image.
It supports automatic judgment by the pattern matching function and manual judgment by visual checking.

SC-20 has three work modes.
1. Matching mode
2. Check mode
3. Data input mode

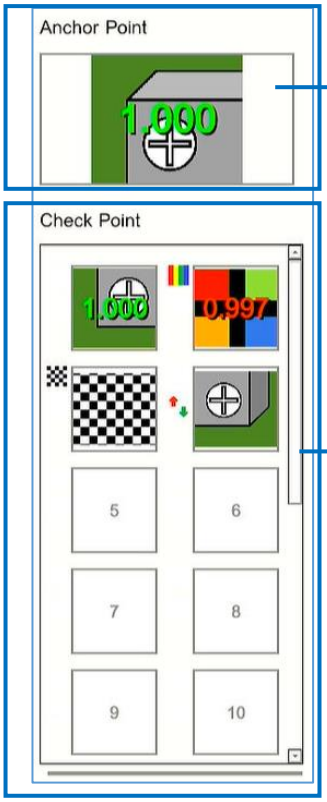
Register a combination of work modes to the workflow and then operate the device.

Reference
For details on the workflow, see the “Configuration example of workflow” below.
- Creating a Workflow (→P. 40)

1. Matching mode:

This mode judges the degree of similarity (shape pattern, color, or texture) of a master image and camera image using the pattern matching function.
The matching methods are as described below.
- Relative search:
  If an anchor point has been set when creating the workflow, this method makes a judgment by searching for the anchor point from the camera image and searching for the check points according to the relative position from the anchor point.
- Absolute search:
  If an anchor point has not been set when creating the workflow, this method assumes the top left of the camera image as the reference position (x: 0, y: 0), and makes a judgment by searching for the check points according to the absolute position from the reference position.
  Use an absolute search when the target is fixed.

Matching mode execution screen:



Displays the image set for the anchor point.

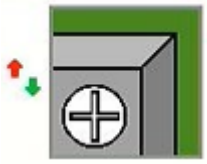
Displays the image set for the check points.

Note

- When the color similarity check is set (when [Color Recognition] is set for [Check Method] (→P. 49)), a color bar ( ) is displayed at the top left of the check point image.

- When the texture similarity check is set (when [Texture] is set for [Check Method] (→P. 49)), a checkered pattern ( ) is displayed at the top left of the check point image.

- When the inversion of each similarity judgment logic is set (when [Inversion] is set for [Similarity] (→ P. 49)), an arrow ( ) is displayed at the left center of the check point image.



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.
A job 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 OK.

Click this when the result of the visual check is FAIL.

<When using the external input>

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

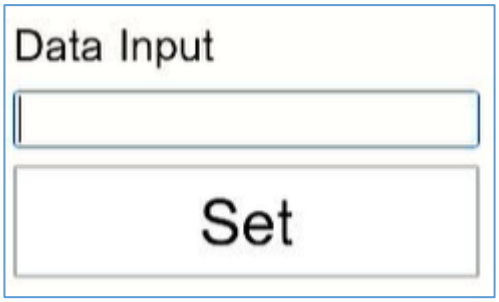
NG judgment is performed by the external input signal. (The judgment cannot be performed by clicking here.)

3. Data input mode

When the string data is entered, this mode judges whether or not the entered data is correct.

If the entered value differs from the string and number of characters set when the workflow was created, a warning screen appears.
A judgment is made by comparing the string and number of characters from the specified start point (→P. 55).
This is case sensitive.

Data input mode execution screen:



Enter the string data and click [Set] to perform the judgment.

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. 23)

STEP 2: Power-on and Initial Settings

Turn on the power and configure the initial settings.

- Power-on and Initial Settings (→P. 29)

Settings (administrator user)

Log in to the device as an administrator user and configure various settings.

STEP 1: Logging In

Log in to the device.

- Logging In (→P. 31)

STEP 2: Creating a User

Create a new user for using the device.

- Creating/Managing a User (→P. 38)

STEP 3: Creating a Workflow

Register the job ID, instruction step, instruction step file, inspection step, and work mode to create a workflow.

- Creating a Workflow (→P. 40)

STEP 4: Other Settings

Configure various settings.

- Settings (→P. 64)

Creating the instruction step file

Create the instruction step file with the “Work Instructions Editor”.
For details, refer to “SC-20 Work Instructions Editor User's Guide”.

Operation/adjustments (administrator user)

Operate or stop the workflow and make adjustments to the parameters.

- Applying (→P. 100)

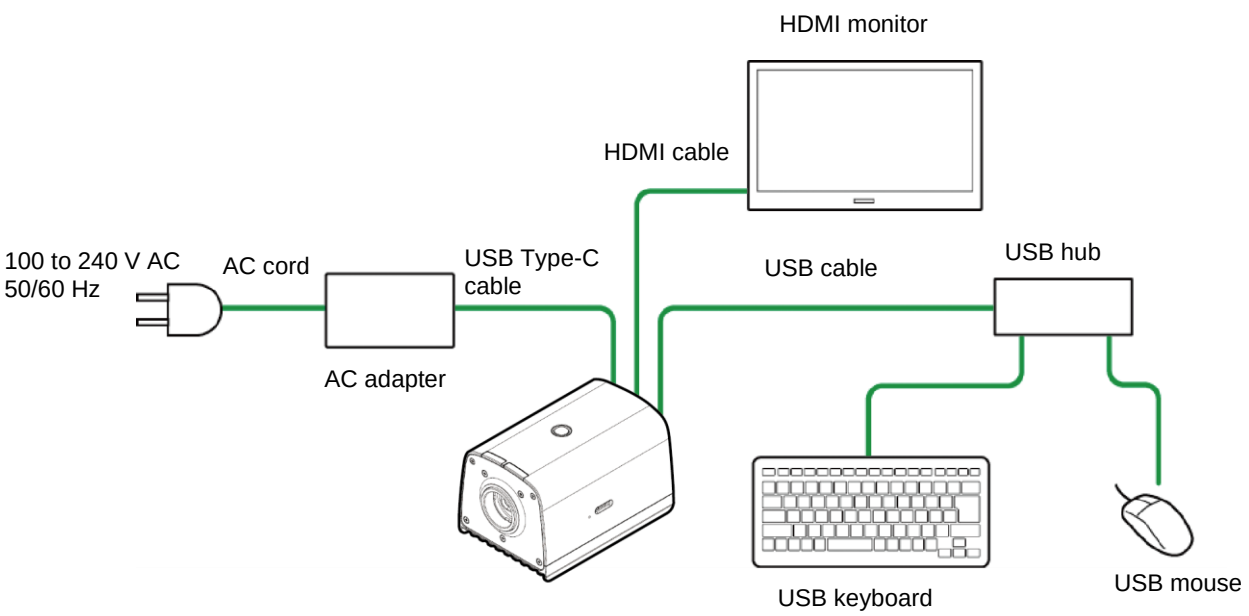
5. Installation and Connections

System Configuration

Use an AC adapter or an external power supply to supply power to the device.
Connect an external device to the unit to perform external I/O control.

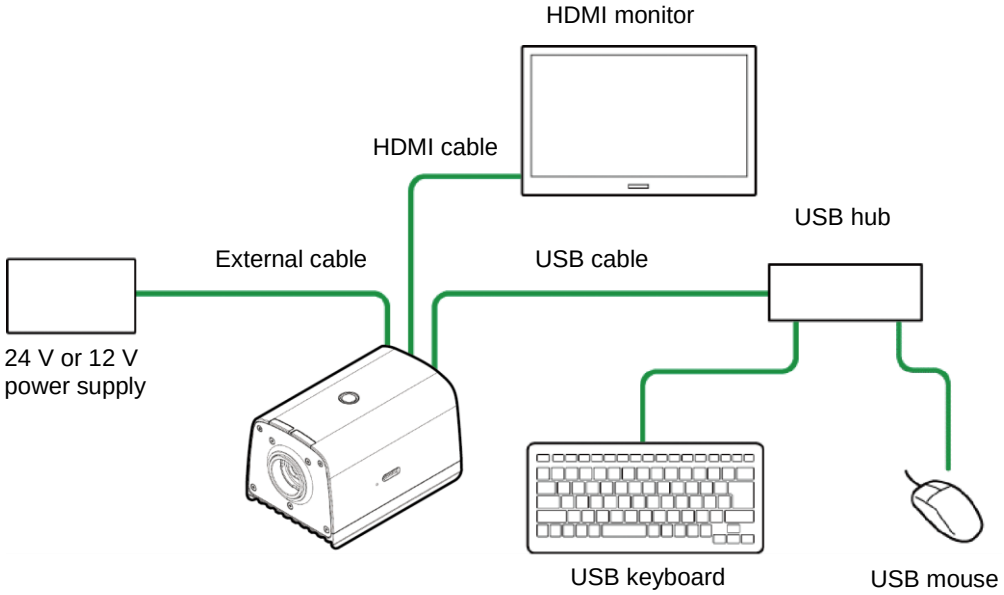
When connecting the AC adapter

Example:



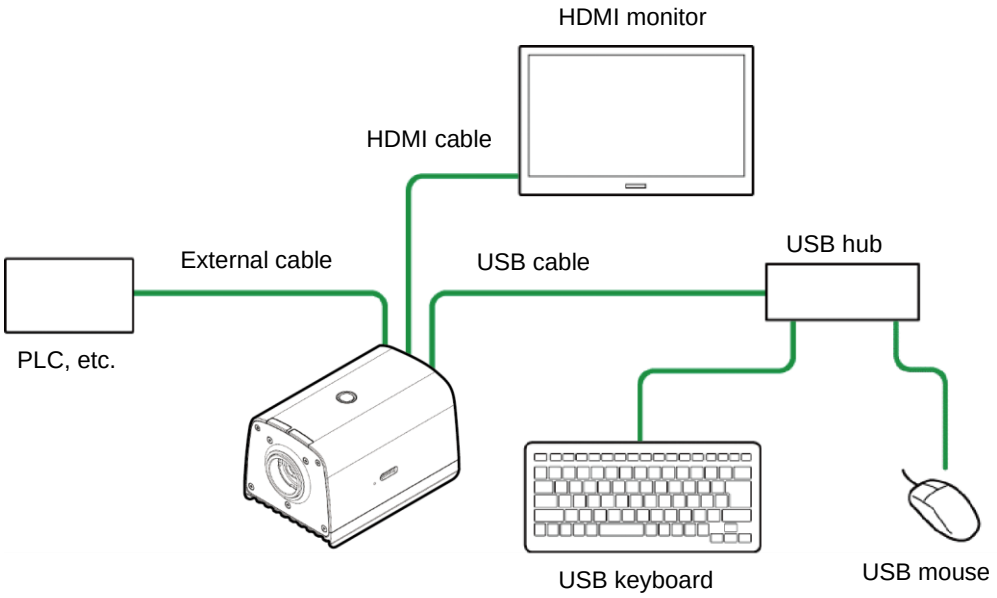
When connecting an external power supply

Example:



When connecting an external device (using the external I/O control)

Example:

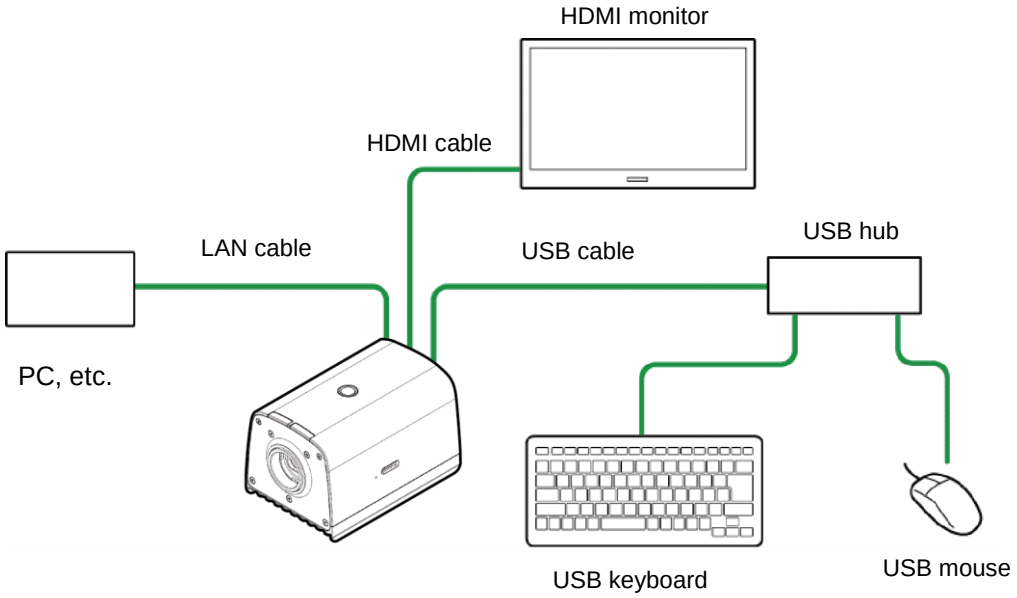


Note

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

When connecting an external device (using the Socket Mode control)

Example:

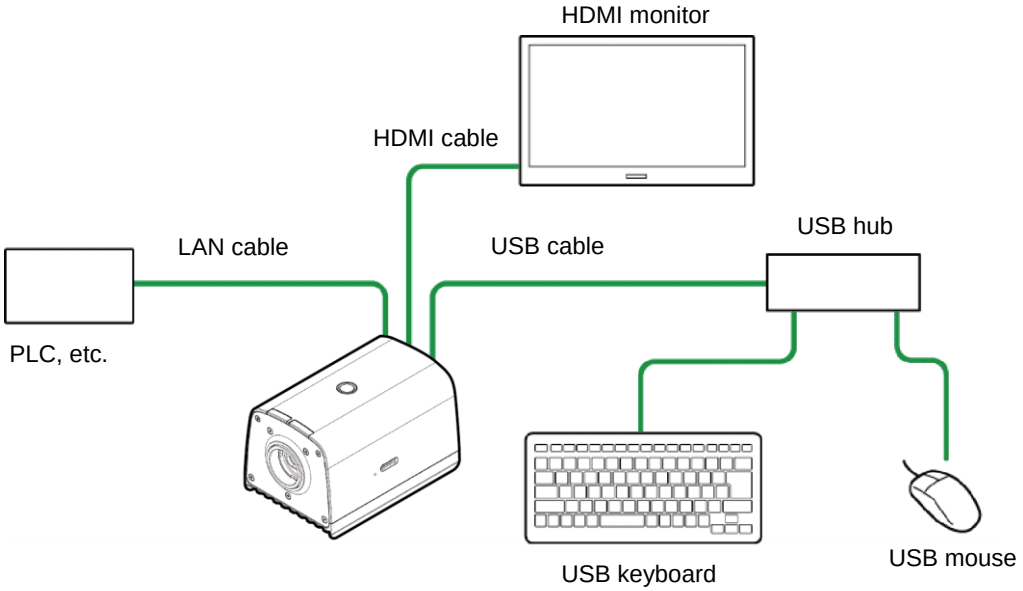


Note

- Software to instruct operations from an external device (PC, etc.) is required to use the Socket Mode function. For details, refer to “SC-20 Socket Mode Function Operating Instructions”.

When connecting an external device (using the EtherNet/IP Mode control)

Example:



Note

- Equipment to instruct operations from an external device (PLC, etc.) supporting EtherNet/IP is required to use the EtherNet/IP Mode function. For details, refer to “SC-20 EtherNet/IP Mode Function Operating Instructions”.

Attaching a Lens / Installing the Unit

1. Attach a lens (sold separately) to the lens mount.

2. Check the specifications of the attached lens and determine the installation distance in accordance with the field of view.

Important

- 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.

Reference

- Recommended Lens / Field of View and Installation Distance (→P. 155)

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

Important

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

Reference

- Bottom of unit (→P. 18)
- Outline Drawings (→P. 143)

Connections

Reference

- System Configuration (→P. 23)

Important

- Connect the cables while the power of the device is off.

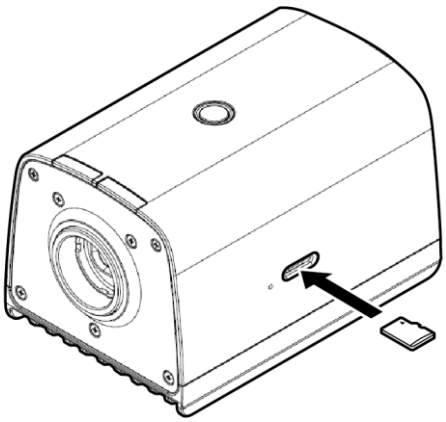
1. Attach the lens to the unit and fix the unit to the installation location (→P. 26).

2. Connect the unit and HDMI monitor with an HDMI cable.

3. Connect the unit to a USB hub and connect a keyboard and mouse to the USB hub with USB cables.

4. Connect a microSD card and LAN cable if necessary.

- When using a microSD card:
  While being careful with regard to the orientation of the microSD card, insert the microSD card into the microSD card slot on the side of the unit until you hear a clicking sound.
  To eject a microSD card, push in the card again.



5. Connect to a power supply.

When using the AC adapter:
Connect the AC adapter to the USB Type-C connector on the rear of the unit. Connect the AC adapter and AC cord and connect to a power supply (100 to 240 V AC, 50/60 Hz).

- When using an external power supply:
  Connect an external cable to the external connector on the rear of the unit (→P. 28). Connect the external cable to a power supply (24 V or 12 V).

Important

- If you connect the device to a power supply, then after the power-on state (power LED ON), the system turns OFF.
- By changing the settings, the system status (system OFF or system startup) after the power connection can be switched.
- When using a microSD card in a noisy environment, insert the microSD card into the slot, and then protect it with an insulating tape. The recommended size of the insulating tape is 26 mm x 15 mm. Affix the insulating tape such that it covers the microSD. Install or remove the microSD after performing static electricity elimination.

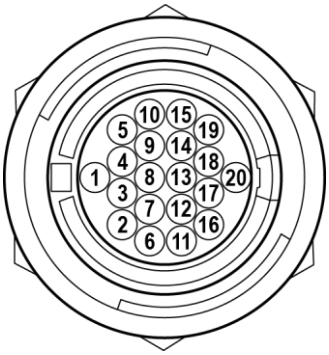
External connector/cable

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: LF13WBR-20S (Hirose Electric) or equivalent product
- Cable connector: LF13WBP-20P (Hirose Electric) or equivalent product

Camera-side connector shape:



External connector pin assignment:

Pin No.	Signal Name	Specifications
1	VPSU	Power for the unit 12/24 V ±10%
2	IN 0	Input (Insulated)
3	GPSU	GND for the unit
4	IN 1	Input (Insulated)
5	IN 2	Input (Insulated)
6	IN 3	Input (Insulated)
7	IN 4	Input (Insulated)
8	IN 5	Input (Insulated)
9	IN 6	Input (Insulated)
10	IN 7	Input (Insulated)
11	IN 8	Input (Insulated)
12	IN 9	Input (Insulated)
13	OUT 0	Output (Insulated)
14	OUT 1	Output (Insulated)
15	OUT 2	Output (Insulated)
16	OUT 3	Output (Insulated)
17	OUT 4	Output (Insulated)
18	OUT 5	Output (Insulated)
19	VCC_IO	External I/O (insulated input/output) power 5 V to 24 V ±10%
20	GND_IO	External I/O (insulated input/output) GND

Reference

- External I/O (Insulated Input/Output) Specifications (→P. 145)

Important

- For using the external I/O (insulated input/output) control, separate power supply from the device is required for the external I/O.
- 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 adapter when using the power input for the unit.
  - When connecting an external I/O, be sure to supply the power between the external I/O power and external I/O GND.
  - Do not apply a power voltage higher than for the external I/O power or lower than for the external I/O GND to the external I/O.
  - Use an external cable with a cable length of 10 m or less.
- 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.

Note

- The external I/O can be used for an external control signal respectively.
- The output polarity is set to high by default. The high setting is applied while starting up regardless of the [External I/O Settings ...] setting (→P. 86).

6. Power-on and Initial Settings

Important

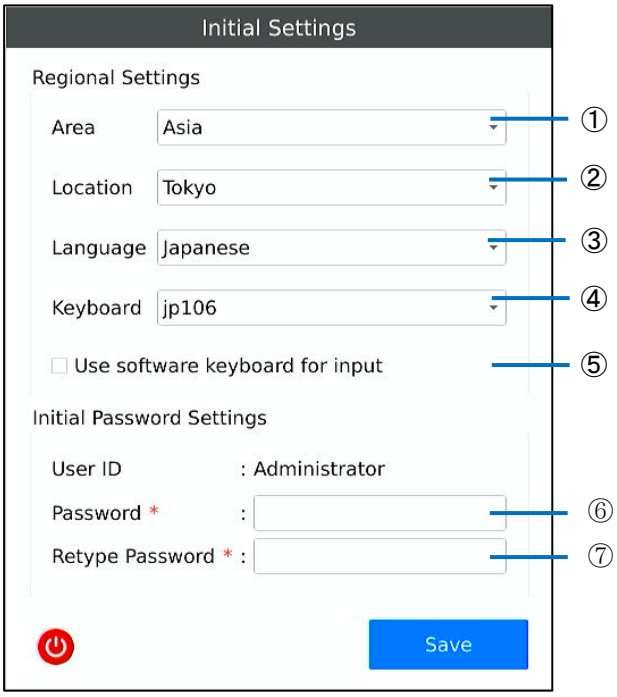
- Connect a monitor to the device (→P. 27) and turn on the power of the monitor before turning on the power of the device.
- Only 1080p (1920x1080) is supported for the screen resolution.
- Only a monitor that supports a 1080p (1920 × 1080), 60 Hz input can be used with this device.

1. Press the power button on the top of the unit after turning on the power.

The [Initial Settings] screen appears during the first startup, or after initializing the [System Settings] (→P. 134).

- The screen is displayed in English.

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



①	Area	Select the area in which the device is located.
②	Location	Select the location where the device is located. • If the corresponding location is not in the list, select the one that is the closest.
③	Language	Select the display language.
④	Keyboard	Set the keyboard layout. The device does not support Japanese input. Japanese cannot be input even if you select [jp106].
⑤	Use software keyboard for input	If this checkbox is selected, input can be made from the software keyboard. The layout of the software keyboard is a US keyboard regardless of the [Keyboard] setting.

⑥	Password	Set the password for the initial administrator user "Administrator" with 1 to 32 characters. Note Input is mandatory.
⑦	Retype Password	Enter the same password that you entered in ⑥. Note Input is mandatory.

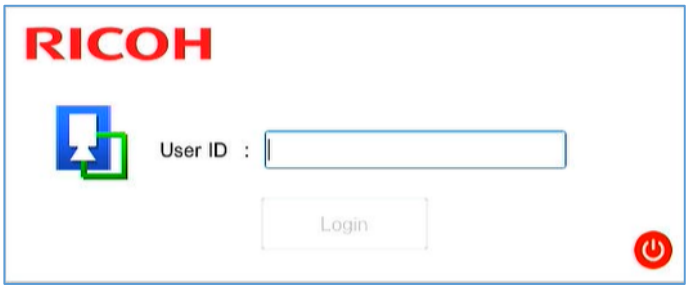
- The [Initial Settings] screen can also be displayed from the [System Settings] menu after logging in (→P. 35).
- Click to shut down the system.

3. Click [Save].

The Login screen appears after restarting the device (→P. 31).

7. Logging In

The user ID input screen appears when the device starts up (after configuring the initial setting at first startup).



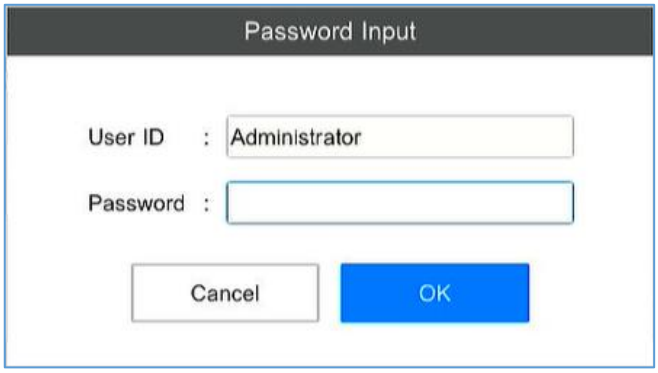
Note

- Click to shut down the system.

1. Enter the [User ID] and click [Login].

- Enter the user ID registered in [Login/User Settings]. (→P. 35)
- To create a workflow and set parameters, enter the user ID of the administrator.
- If you log in with a general user ID, you will only be able to operate a workflow. (→P. 100)
- The initial user ID for the administrator is "Administrator".

2. When the user ID for the administrator has been entered, enter the [Password] in the [Password Input] screen and click [OK].



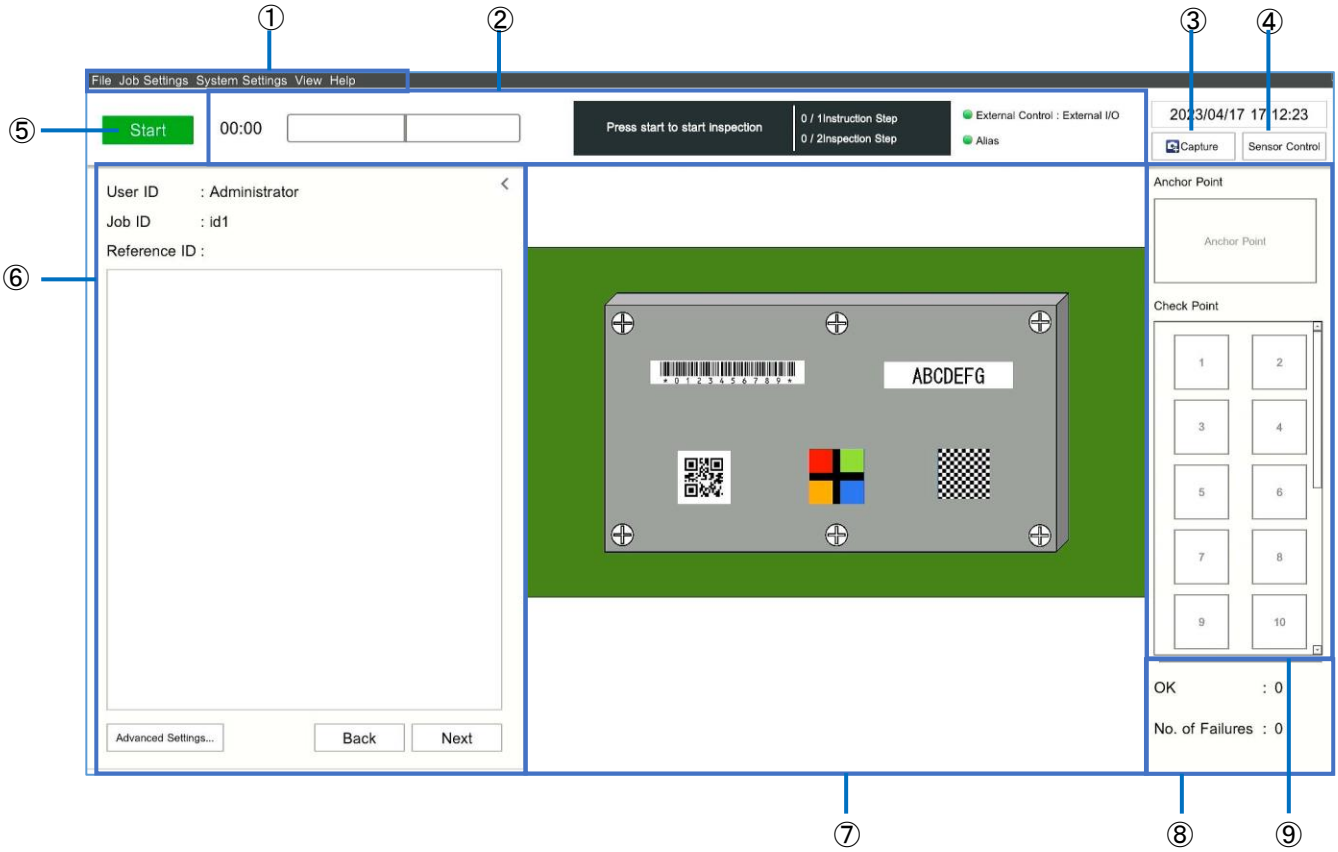
- Enter the password for the user ID registered in [Login/User Settings]. (→P. 35)
- For the initial administrator user ID (“Administrator”) password, enter the password registered in the [Initial settings] screen at the first startup. (→P.29)

Note

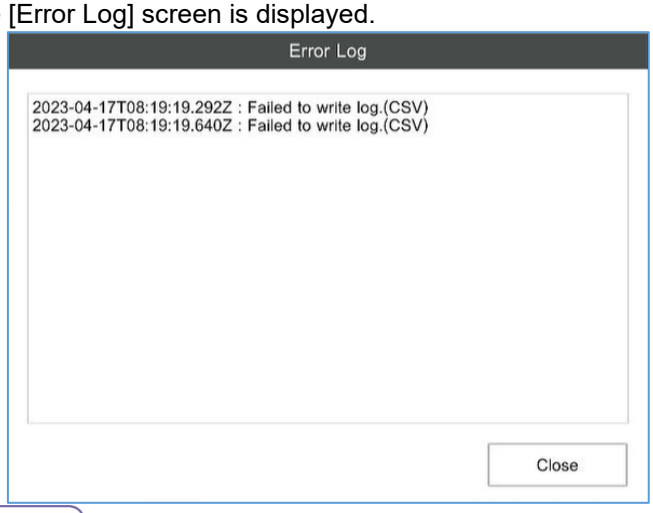
- In this manual, the state in which login is performed with a general user ID is called the [User Mode] and the state in which login is performed with the administrator user ID is called the [Administrator Mode].

8. Screen Operations

Main Screen

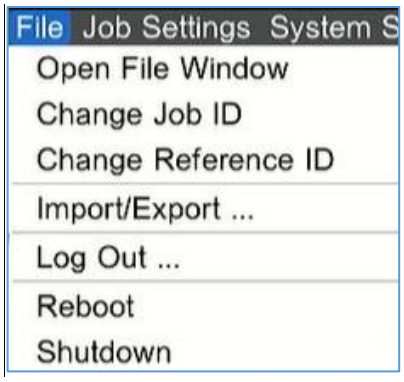


①	Menus	Configure settings and perform operations from each menu (→P. 34).
②	Status display area	Displays the progress of the job, alias settings, external control settings, standard time, and elapsed time (→P. 102). • If the alias settings are enabled, the [Alias] indicator is displayed. Alias • If the external control settings are enabled, the [External Control] indicator is displayed. – When External Control: External I/O has been set: External Control : External I/O – When External Control: Socket Communication has been set: External Control : Socket – When External Control: EtherNet/IP has been set: External Control : EtherNet/IP • If a warning/error that does not affect the execution of the workflow or the record of results, such as the record of the camera operation log while the workflow has stopped, occurs, a

		notification icon appears. If you click the notification icon , the [Error Log] screen is displayed.  **Note** • When the [Error Log] screen appears, the display of is cleared.
③	Camera image capture button	Captures a camera image (→P. 42).
④	Sensor control button	Switches the inspection step display area to the [Sensor Control] settings screen and sets sensor control (→P. 98).
⑤	Start button	Executes the workflow (→P. 100).
⑥	Job information/Instruction step file display area	The [User ID], [Job ID], [Reference ID] being executed, and the [Instruction Step File] set in the workflow are displayed (→P. 102). The [Job ID] can be changed from the pull-down menu. ([Change Job ID] button) If you click [<] at the top right, this area collapses and the camera image is magnified and displayed. If you click [>] in the collapsed state, this area is again displayed, and if you click [ ], the displayed state is fixed. **Note** This area is collapsed in the default state.
⑦	Camera image area	Displays the camera image.
⑧	Job result display area	Displays the job result OK/FAIL count (→P. 102).
⑨	Inspection step display area	Displays the inspection steps (→P. 102).

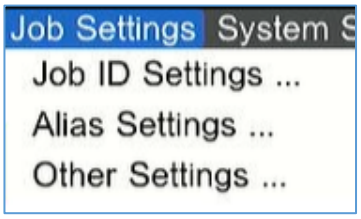
Menus

[File] menu



Open File Window	Displays a window for file operations. • This menu item can be selected only if you have logged in with [Administrator Mode].
Change Job ID	Changes the job ID.
Change Reference ID	Changes the reference ID of the workflow.
Import/Export ...	Displays the [Import/Export] screen (→P. 114). • This menu item can be selected only if you have logged in with [Administrator Mode].
Logout ...	Logs out.
Reboot	Reboots the device.
Shutdown	Shuts down the device.

[Job Settings] menu



Note

- This menu can be selected only if you have logged in with [Administrator Mode].

Job ID Settings ...	Displays the [Job ID Settings] screen (→P. 43), and creates a workflow.
Alias Settings ...	Displays the [Alias Settings] screen (→P. 60).
Other Settings ...	Displays the [Other Settings] screen (→P. 62).

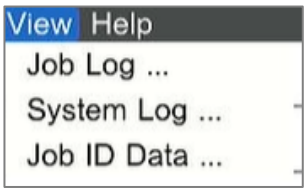
[System Settings] menu

Note

- This menu can be selected only if you have logged in with [Administrator Mode].

Initial Settings ...	Displays the [Initial Settings] screen (→P. 64). • Changed settings are reflected after the device restarts.
Power Settings ...	Set the start control when a power source is connected (→P. 65).
Login/User Settings ...	Configure the settings for the login processing and perform user management (→P. 66).
Preset Settings ...	Display dialogs, or register the job ID and reference ID used as the preset (→P. 67).
Network Settings ...	Set the network to use (→P. 69).
Bluetooth Settings ...	Configure the settings for the Bluetooth function, or perform pairing/connection/disconnection of the Bluetooth device. (→P. 74)
Storage Settings ...	Check the information about the storage and network device being used in this device, safely remove a USB device, and connect or disconnect a network device. (→P. 78)
External I/O Settings ...	Set the allocation of functions for external connector pins (→P. 81).
External Control Settings ...	Configure the settings for the protocol function (→P. 84).
Shortcut Settings ...	Set the allocation of shortcut keys (→P. 90).
Sound Settings ...	Set the sound (→P. 91).
LED Settings ...	Set the LED ON mode (→P. 93).
Date and Time Settings ...	Set the date and time (→P. 94).
Log Output Settings ...	Set the folder and file configuration of the image log, and also the feasibility of implementing CSV output of log (→P. 96).

[View] menu

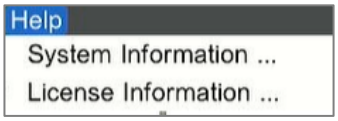


Note

- This menu can be selected only if you have logged in with [Administrator Mode].

Job Log ...	Displays the operations while the system is running, the execution results of the workflow and its details as a log in the form of a list (→P. 108).
System Log ...	Displays the errors detected while the system is running, and the system operation as a log in the form of a list (→P. 111).
Job ID Data ...	Displays all job IDs of the workflow that has been created, and the detailed settings of the work mode included in the job IDs in the form of a list (→P. 58).

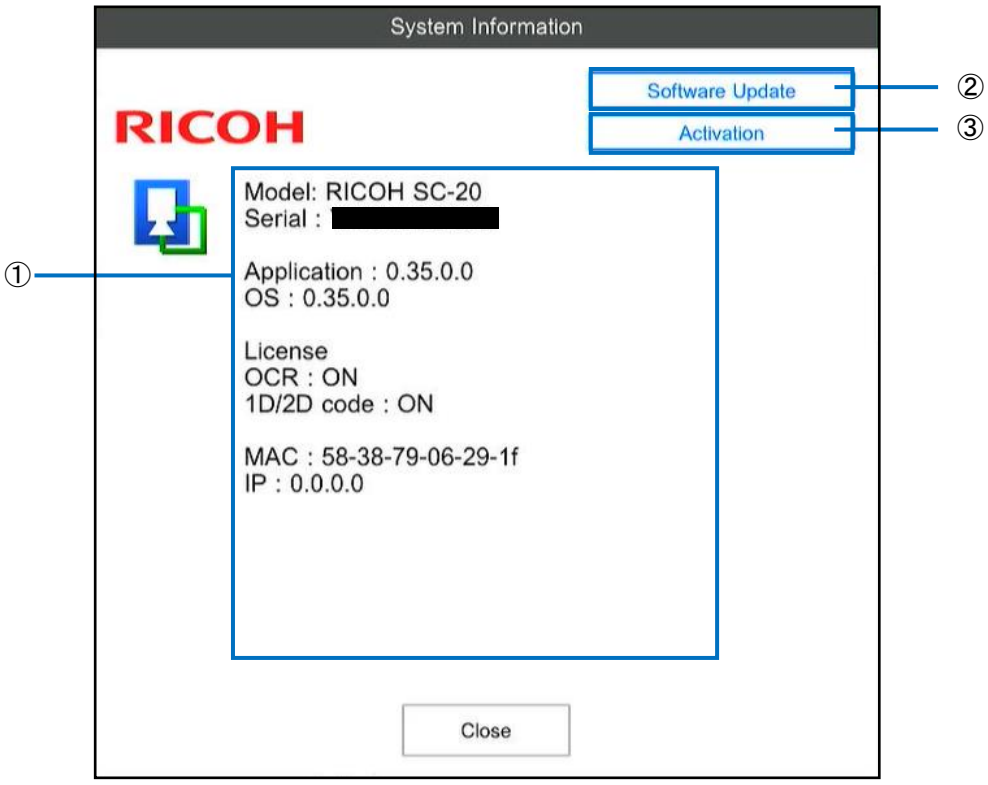
[Help] menu



System Information ...	Displays the system information (→P. 37).
License Information ...	Displays the license information of the software loaded on this device.

System Information Screen

Select [System Information ...] from the [Help] menu to view the [System Information] screen.
You can check the system information on the [System Information] screen.



①	System information display area	Model: The model name of the device is displayed.
		Serial: The serial number of the device is displayed.
		Application: The version of the installed application is displayed.
		OS: The version of the installed OS is displayed.
		License (OCR): Whether the option function (OCR) is enabled or disabled is displayed.
		License (1D/2D code): Whether the option function (1D/2D code) is enabled or disabled is displayed.
		MAC: The MAC address of the enabled network device is displayed. IP: The IP address (IPv4) of the enabled network device is displayed.
②	[Software Update] button	Displays the [Software Update] screen (→P. 136). • This menu item can be selected only if you have logged in with [Administrator Mode].
③	[Activation] button	Displays the [Activation] screen (→P. 120). • This menu item can be selected only if you have logged in with [Administrator Mode].

9. Creating/Managing a User

Create or manage a user for using the device.

Depending on the user authority, the users are divided into “general users” and “administrator users”. A “general user” can operate only some functions such as executing the workflow. An “administrator user” can perform all operations on the device such as creating a workflow or configuring system settings.

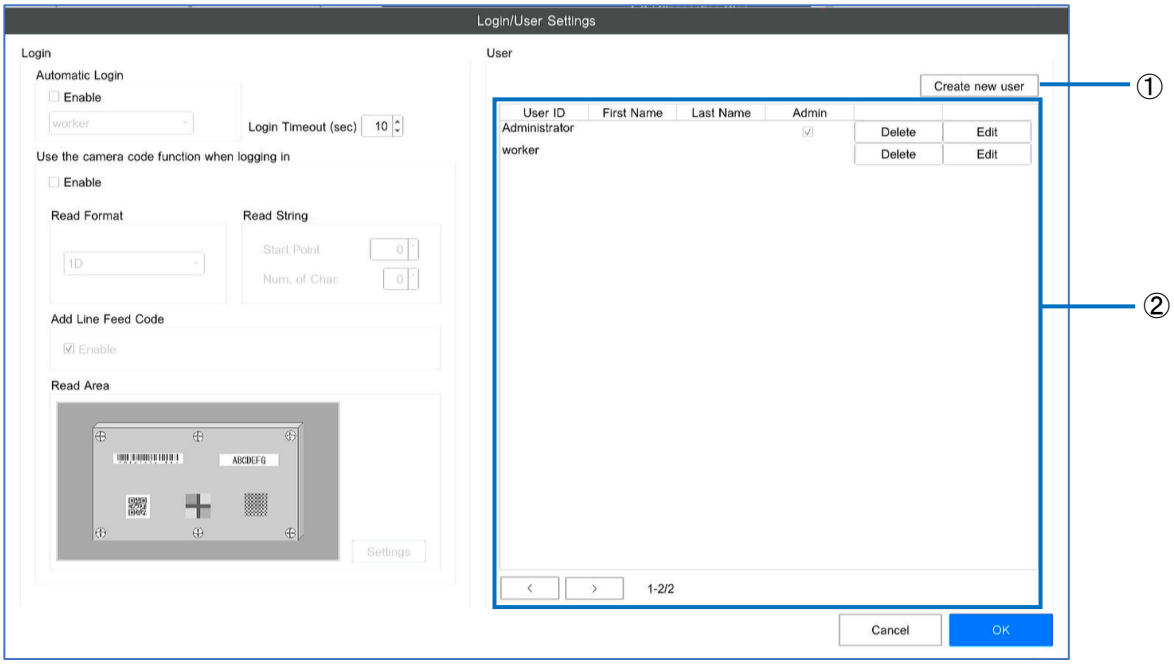
- The number of users that can be registered is up to 100 including the “general users” and “administrator users”.

Important

- The following users are registered in the default state. These users can also be deleted or edited.
  - “Administrator user”: Administrator
  - “General user”: worker

1. Click [Login/User Settings ...] from [System Settings].

The [Login/User Settings] screen appears. Use the right half of the screen for user management.



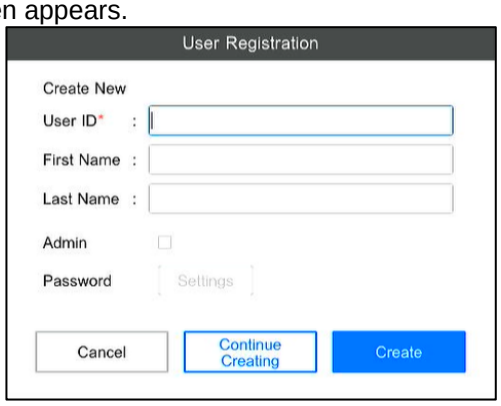
①	Create new user	Adds a new user.
②	User list	Displays the registered users. • [Delete]: Deletes a user. • [Edit]: Changes a user. • [<]: Returns the list to the previous page. • [>]: Advances the list to the next page. **Important** Register at least one user each in [Administrator user] and [General user].

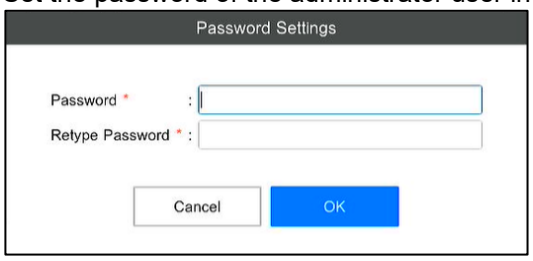
Important

The user list operations ([Create new user], [Delete], and [Edit]) are immediately reflected and saved. They cannot be canceled.

2. Click the [Create new user] button.

The [User Registration] screen appears.



User ID	Set the user ID to register in 1 to 32 characters. **Note** • Input is mandatory. • [\ / : * ? " < > |] cannot be used. • A blank or a period cannot be used as the starting or ending character.
First Name	Set the user's first name in 0 to 32 characters.
Last Name	Set the user's last name in 0 to 32 characters.
Admin	If this checkbox is selected, the user is registered as an "Administrator user".
Password	Set the password of the administrator user in 1 to 32 characters.  **Note** • Input is mandatory.

3. When the input is complete, click the [Create] button.

Note

If click the [Continue Creating] button, you can register another user without closing the [User Registration] screen.

10. Creating a Workflow

Manage job IDs and create a workflow on the [Job ID Settings] screen (→P. 43).
Display the [Job ID Settings] screen by selecting [Job ID Settings ...] from the [Job Settings] menu of the main screen (→P. 32).

Flow for creating a workflow:

Create a workflow by creating instruction steps and setting the instruction step file and inspection steps (work modes).

STEP 1: Preparing a Master Image (→P. 42) and an Instruction Step File

- To register a matching mode for an inspection step in the workflow, prepare a master image in advance.
- Create the instruction step file with the “Work Instructions Editor”.

  Reference

  – “SC-20 Work Instructions Editor User's Guide”

↓

STEP 2: Registering a Job ID (→P. 43)

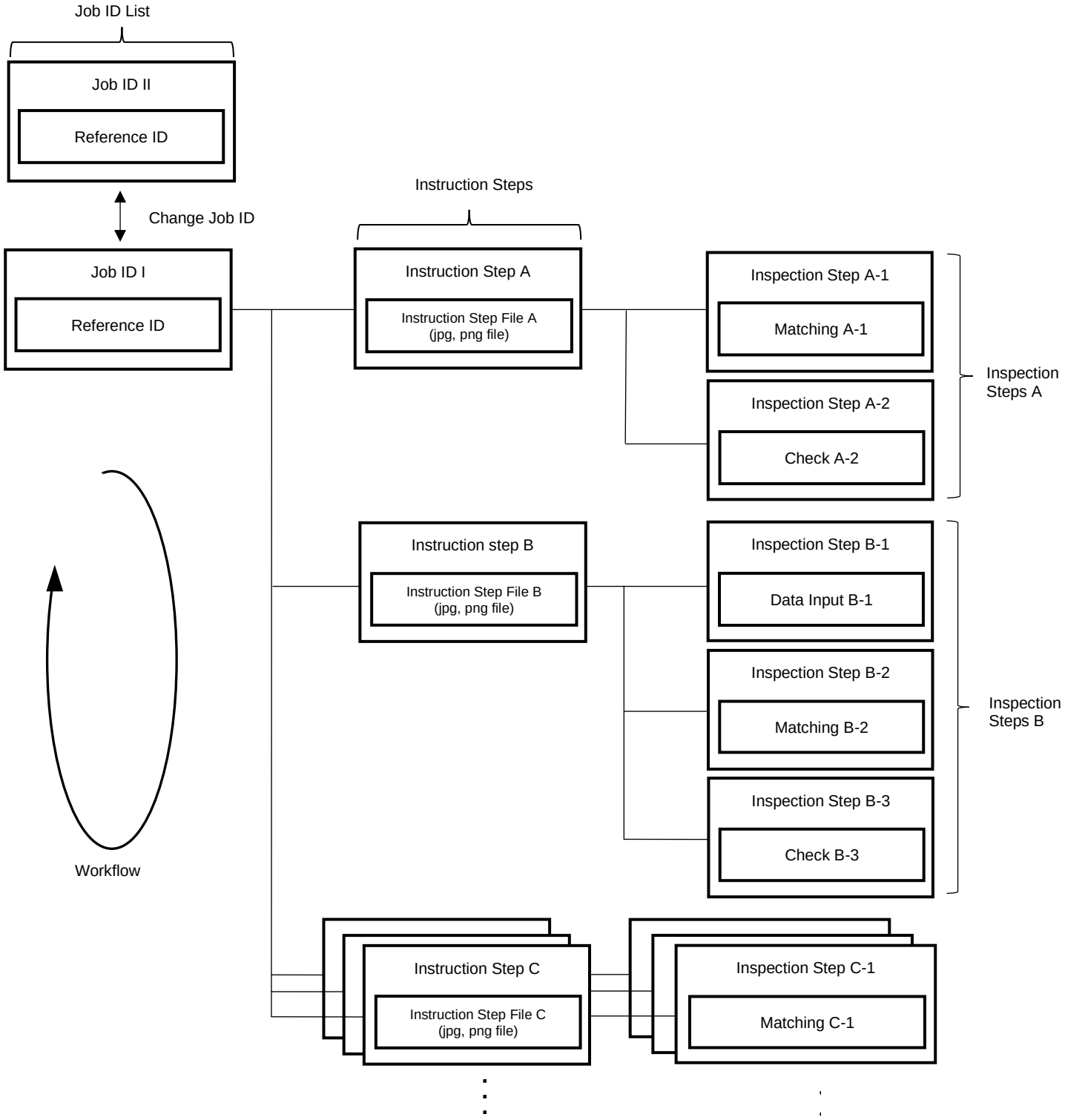
Registering job IDs enables workflows to be managed by IDs.
Either register a new job ID or copy and register an existing job ID.

↓

STEP 3: Creating a Workflow

1. Create instruction steps (→P. 45)
2. Create inspection steps (→P. 46)
3. Save the workflow

- **Workflow configuration example:**



Preparing a Master Image

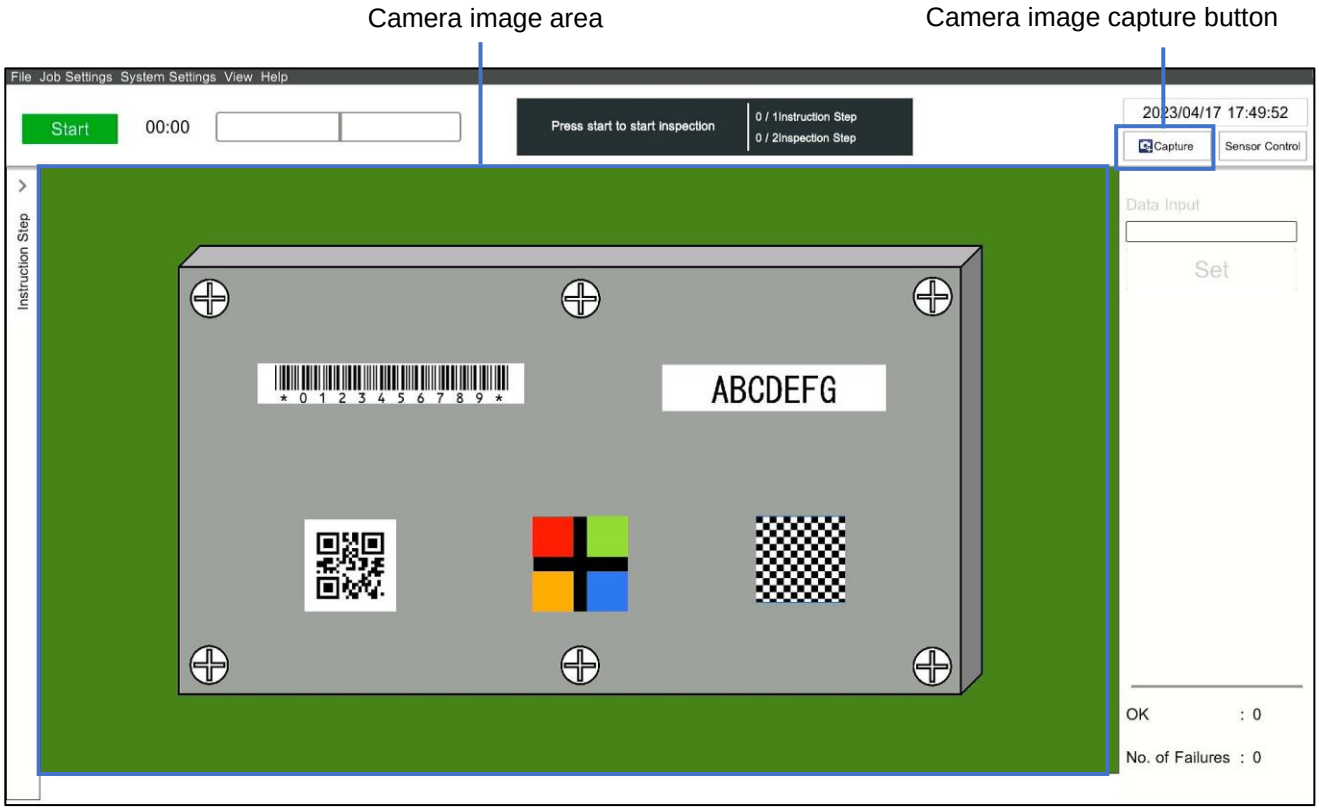
To register a matching mode for an inspection step in the workflow, prepare a master image in advance.

Capturing a master image

Important

- The matching function of the device makes a matching judgment by comparing the master 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 master image in the camera image area.**
2. **Click the camera image capture button on the main screen.**

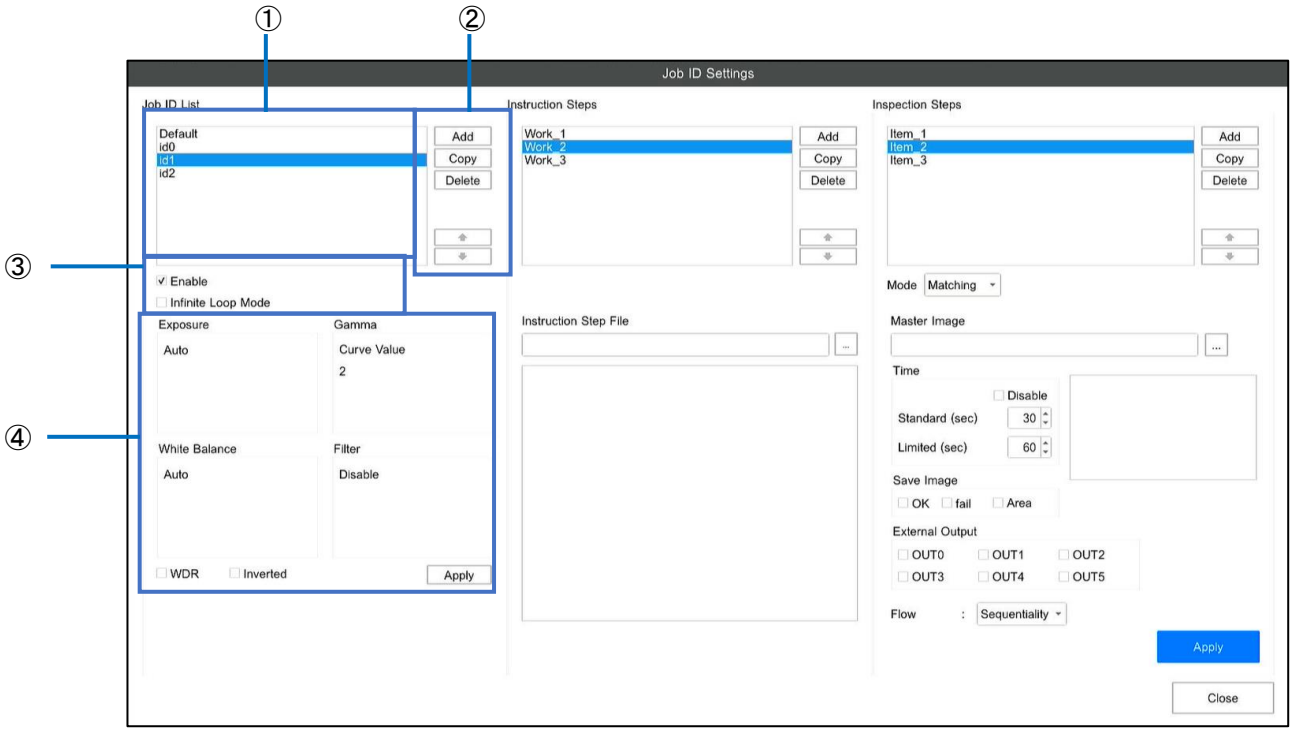


Registering/Managing Job IDs

Register or manage the job IDs to identify the workflow.

1. Click [Job ID Settings ...] from the [Job Settings] menu of the main screen (→P. 32).

The [Job ID Settings] 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. • The job ID can be renamed by double-clicking. • This is not case sensitive.
②	Job ID list operations	• [Add]: Adds a new job ID. • [Copy]: Selecting a job ID in the job ID list and clicking this button creates a copy of the selected job ID. • [Delete]: Selecting a job ID in the job ID list and clicking this button deletes the selected job ID. • ⬆: Selecting a job ID and clicking this button moves the selected job ID up one place in the list. ⬇: Selecting a job ID and clicking this button moves the selected job ID down one place in the list.
③	Job ID control	• [Enable]: If this checkbox is selected, the job ID can be specified through job ID input during the workflow execution (→P. 100).

		• [Infinite Loop Mode]: If this check box is selected, the workflow is automatically executed from the first inspection step when the workflow is completed. Even if the workflow is judged as FAIL, it is executed from the first inspection step without being stopped.
④	Sensor settings	Displays the sensor setting values retained by the selected job ID. • If you click the [Apply] button, the displayed setting values are reflected in the [Sensor Control] settings screen (→P. 98).

Important

- The operations performed for the job ID are immediately reflected and saved. They cannot be canceled.

Creating Instruction Steps

To create a workflow related to an instruction step file, create instruction steps and register the instruction step file. Multiple instruction steps (instruction step files) can be set for each workflow.

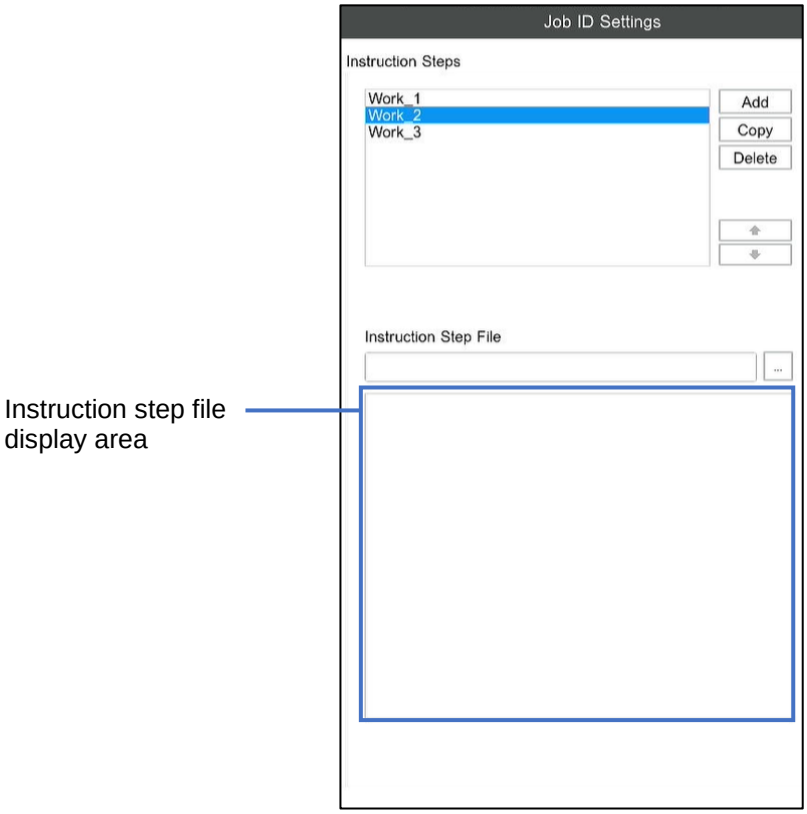
Important

- A JPG file created with the “Work Instructions Editor” is intended to be used as the instruction step file.
- While a capture image (PNG format) can also be used as the instruction step file, its size is adjusted to fit the entire image within the instruction step file display area.

Reference

- “SC-20 Work Instructions Editor User's Guide”

1. **Select a job ID from the [Job ID List] on the [Job ID Settings] screen (→P. 43).**
2. **Click [Add] under [Instruction Steps].**



3. **Click [...] under [Instruction Step File] to set an instruction step file.**
   The selected instruction step file appears in the instruction step file display area.

4. **If necessary, repeat steps 2 and 3 to register the instruction steps.**

Note

- If you select an instruction step and click [↑] and [↓], you can change its order in the list.
- The instruction step can be renamed by double-clicking.
- If you select an instruction step and click [Copy], you can create a copy of the selected instruction step.
- This is not case sensitive.
- If you select an instruction step and click [Delete], you can delete the selected instruction step.

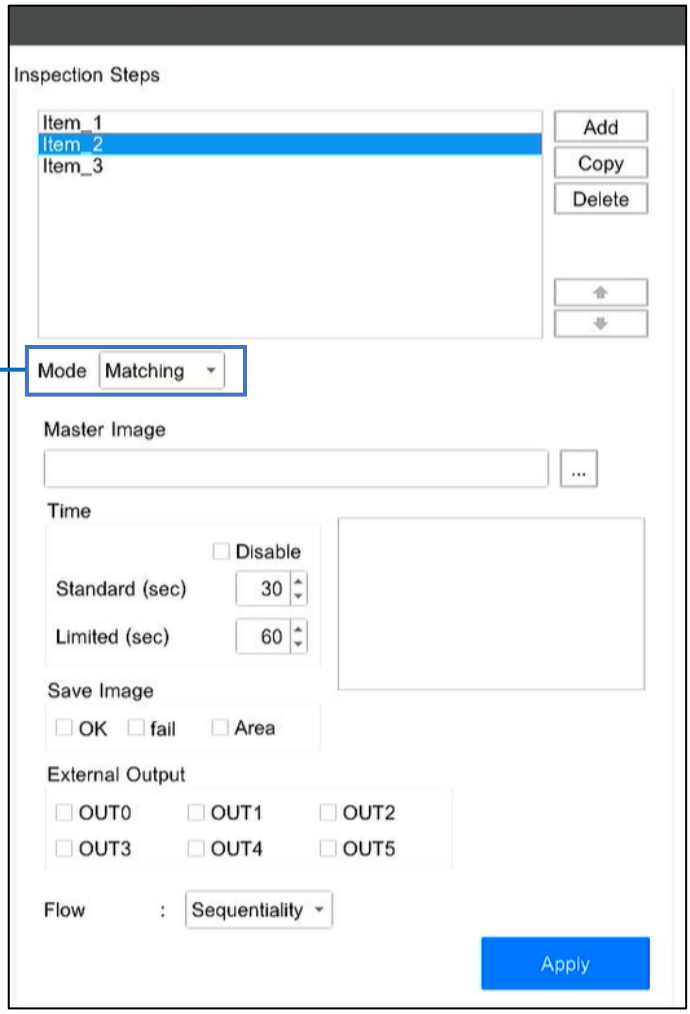
Important

- The operations performed for the instruction step are immediately reflected and saved. They cannot be canceled.

Creating an Inspection Step

Register inspection steps in an instruction step (→P. 45), and set the work mode (matching mode, check mode, data input mode).
Multiple inspection steps can be registered for each instruction step. A workflow can be configured by combining multiple work modes.

1. **Select a job ID from the [Job ID List] on the [Job ID Settings] screen (→P. 43).**
2. **Select an instruction step from [Instruction Steps].**
3. **Click [Add] under [Inspection Steps].**



Pull-down list for mode selection

4. **Select a work mode from the pull-down list for mode selection.**
   - Matching: Sets the matching mode (shape, color recognition, texture).
   - Check: Sets the check mode (visual check function).
   - Data input: Sets the data input mode.

5. Configure the following settings under [Time].

Disable	If you select this checkbox, the setting of [Standard Time] and [Upper Limit Time] is disabled. (The workflow is not judged as FAIL even if the job time exceeds the [Upper Limit Time].)
Standard (sec)	Set the standard time for the execution of the inspection step. • Set from 1 to 999 seconds. • You cannot set a value larger than the [Upper Limit Time]. • The workflow execution progress bar is displayed in green up to the set standard time (→P. 102).
Limited (sec)	Set the upper limit time for the execution of the inspection step. • Set from 1 to 999 seconds. • You cannot set a value smaller than the [Standard Time]. • If the upper limit time is exceeded, the inspection step is judged to have failed. • The workflow execution progress bar is displayed in yellow from the standard time up to the upper limit time, and in red when the upper limit time is exceeded (→P. 102). Important • If the judgment is made barely when the upper limit time is reached in the matching mode, the matching judgment may be OK, but FAIL may be judged for the inspection step.

6. Set saving of the camera image during judgment of inspection step result under [Save Image].

- If you select [OK], the image during OK judgment is saved.
- If you select [FAIL], the image during FAIL judgment is saved.
- If you select [Area], an OK (green) or FAIL (red) frame is added to the saved image (matching mode only).

Note

- Both the [OK] and [FAIL] settings can also be selected.
- The image to be saved is saved according to the [Log Output Settings] (→P. 96).
- If the work mode is [Matching] and the processing method is [Sequentiality] (→P. 49), an image is saved for each matching point.

7. Enable or disable the output functions allocated to the pins of the external connector under [External Output].

- Select the checkbox to enable the output function allocated to the pin of the external connector in [External I/O Settings ...] (→P. 81) (also set the corresponding [EXTOUT] number in [External I/O Settings]).

8. Set the parameters for each mode.

Reference

- Matching mode parameters (→P. 49)
- Data input mode parameters (→P. 55)
-

- Check mode parameters (→P. 57)

9. When the settings are completed, click [Apply].

The settings are saved.

10. If necessary, repeat steps 2 to 9 to register the inspection steps.

Note

- If you select an inspection step and click [↑] and [↓], you can change its order in the list.
- The inspection step can be renamed by double-clicking.
- If you select an inspection step and click [Copy], you can create a copy of the selected inspection step.
- This is not case sensitive.
- If you select an inspection step and click [Delete], you can delete the selected inspection step.

Important

- Renaming, copying, deleting, and changing the order are immediately reflected and saved. They cannot be canceled.
- It may take a while to save some settings.

Matching mode parameters

If [Matching] is selected in the work mode settings during the registration of an inspection step (→P. 46), set the master image and flow to use for matching.

Important

- Prepare the master image in advance (→P. 42).

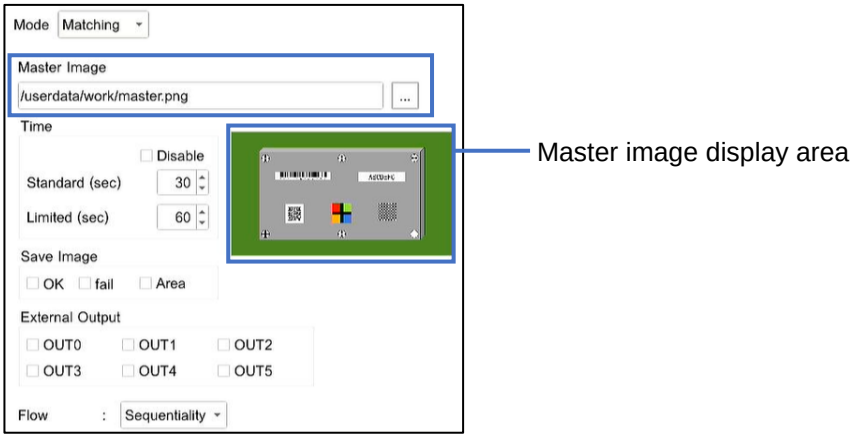
1. Click [...] on the [Master Image] to select the master image.

Important

- The master image is copied to the internal data area of the device and used.
- In the case of an already-created inspection step, the master image file path displays the path of the import-source master image file.

2. The selected master image is displayed in the master image display area.

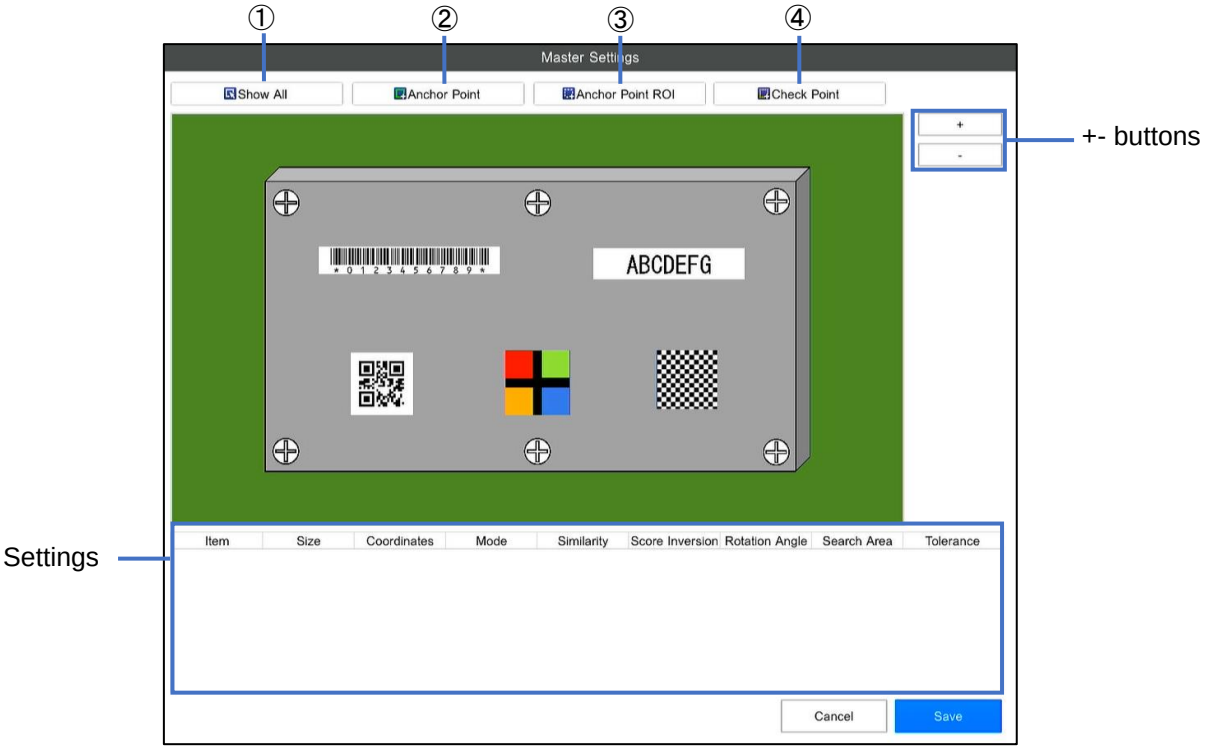
- Confirm that the correct image has been selected.



3. Click the master image display area.

The [Master Settings] screen appears.

4. Click the item to set.

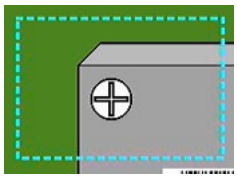
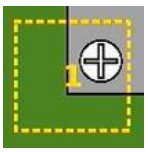
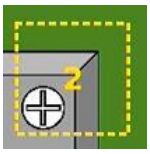
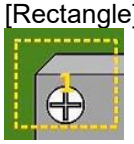
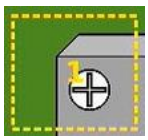
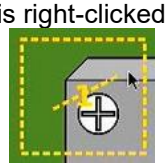
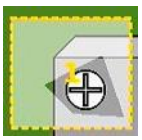


①	Show All	With [Show All], you can adjust the position and size of the area.
②	Anchor Point	Set the anchor point. • Set this when using the relative search mode (→P. 19).
③	Anchor Point ROI	Set the area for searching the anchor point. • Set this when specifying the anchor point. • Perform search so that the center of the anchor point is within this range. • If the anchor point ROI is not specified, the anchor point is searched from the entire area.
④	Check Point	Set the points to check. • Up to 20 points can be set. • If the anchor point has been set, the check points are searched in the relative search mode (→P. 19). • If the anchor point has not been set, the check points are searched in the absolute search mode (→P. 19). If you select a check point, the shape selection pull-down of the check point is displayed, and the shape of the matching target area can be specified. Check Point Rectangle • [Rectangle]: The area is specified as a rectangle. • [Ellipse]: The area is specified as an ellipse. • [Free-form]: The area is specified in any arbitrary shape.

5. Operate the mouse over the master image display area to specify the position and size of the area.

Note

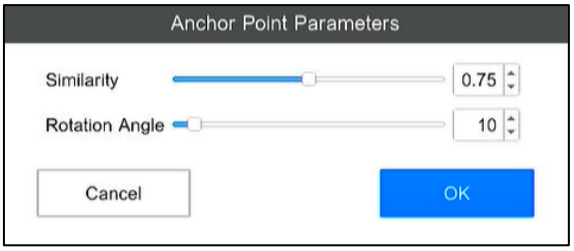
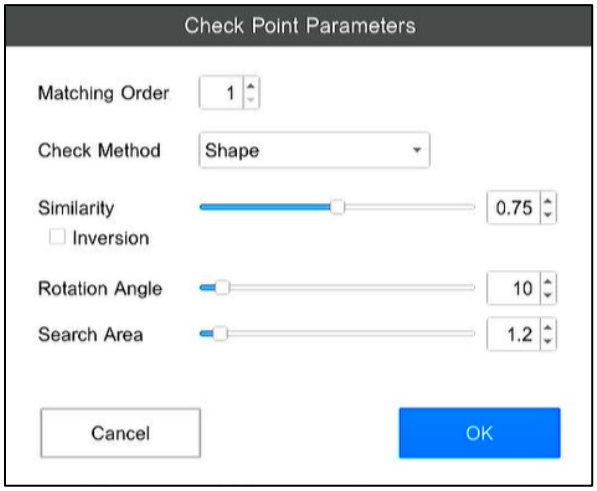
- The master image can be enlarged or reduced in size with the [+] and [-] buttons.
- If you specify [Show All], the area of all existing anchor points / anchor point ROIs / matching points is displayed, and the position and size of the area can be adjusted. If the master image has been enlarged, then by dragging the mouse outside the area, the display of the master image can be moved.
- The anchor point / anchor point ROI / check points set in the “Settings” are displayed.

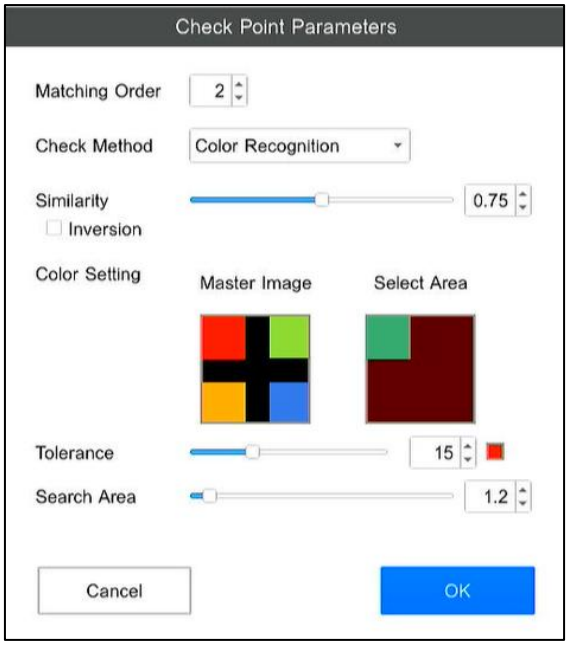
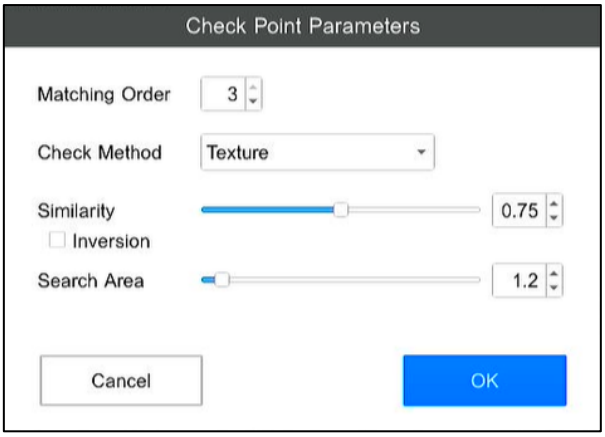
	A green frame is displayed when the [Anchor Point] is specified. • The maximum size that can be specified for the anchor point is 700 (pixels) x 700 (pixels). • The minimum size that can be specified for the anchor point is 50 (pixels) x 50 (pixels).
	A light blue dotted frame is displayed when the [Anchor Point ROI] area is specified.
 	A yellow dotted frame is displayed when the [Check Point] is specified. A number for the search order is displayed inside the frame. • The maximum size that can be specified for the check points is 500 (pixels) x 500 (pixels). • The minimum size that can be specified for the check points is 50 (pixels) x 50 (pixels). The method of selecting the area and the display vary depending on the settings specified in the shape selection pull-down. • [Rectangle]: Drag the mouse over the master image display area to draw a rectangle.  • [Ellipse]: Drag the mouse over the master image display area to draw a rectangle. The matching target area of the ellipse is created in accordance with the rectangle.  • [Free-form]: Drag the mouse over the master image display area to draw a rectangle. Click inside the drawn rectangle and connect a line. If the line is connected up to the point clicked first, only the area inside the line is recognized. If the mouse is right-clicked while drawing, the rectangle is deleted.    **Note** • The non-transparent area inside the rectangle of the [Ellipse] and [Free-form] is out of scope of matching.

6. Right-click in the specified area of the [Anchor Point] or [Check Point] and then select [Parameter Settings].

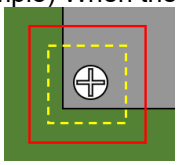
The [Parameter Settings] screen appears.

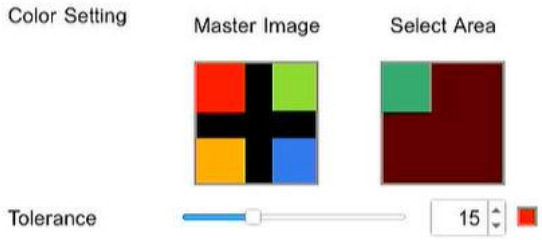
- Click [Delete] in the menu that appears by right-clicking to delete the specified area.
- The displayed items vary depending on the [Anchor Point] and the [Check Point]. Moreover, in the case of the [Check Point], the displayed items switch according to the [Check Method].

Anchor Point	Check Point (Shape)
	

Check Point (Color Recognition)	Check Point (Texture)
	

7. Configure the following settings.

Matching Order (Check points)	Set the order of the check points.
Check Method (Check points)	Set the check method for matching. • [Shape]: 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]. • [Texture]: Judges the similarity by the comparison of the screen image to the texture. **Note** • If this setting is changed, the items displayed in the [Parameter Settings] screen switch.
Similarity / Inversion	Set the threshold value for judgment based on similarity. • [Similarity]: Set the threshold value for judgment from 0.50 to 1.00. • [Inversion]: Invert the OK and FAIL logic. This cannot be set for the anchor point. OK and FAIL are judged with reference to the [Similarity]. • OK : If the [Similarity] of the inspection image is equal to or higher than the set [Similarity], an OK judgment is made and a search for the next point is performed. If the point is the last point to be searched, the workflow proceeds to the next inspection step after an OK judgment is made. • FAIL: If the [Similarity] of the inspection image is lower than the set [Similarity], a FAIL judgment is made and a search for the same point is performed again. • If the elapsed time exceeded the upper limit time, the inspection step is judged to be FAIL and the workflow is forcibly stopped. • The OK and FAIL judgments are inverted when [Inversion] is set.
Rotation Angle (Anchor point, matching [shape])	Set the rotation range for the search. • [Rotation Angle]: Set the maximum value for the rotation range. Set from 0 to 180° (Example: When 10 is set, the search area becomes ±10°). **Important** • 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 instruction step data during operation. It is recommended to set as small a value as possible for [Rotation Angle]. Particularly, since the setting of the anchor point is the basis of creation of the setting data of the check points, the effect is extremely large.
Search Area (Check points)	Set the overlapped search range for the shape from the area selected as the check point. • [Search Area]: Set from 1.0 to 5.0. Example) When the check point is 100 x 100 pixels, and this setting is 1.5.  • Yellow dotted line: Area image of check points (100 x 100 pixels) • Red line: Search area image (150 x 150 pixels)

Color Setting (Check point [color recognition])	Set the color to be used for the similarity judgment of color recognition. Example: When the red color at the top left is specified in [Master Image].  • [Master Image]: Displays the image registered for the check points. Click on the color to set as the judgment target in the image. The set color is displayed in the frame to the right of the [Tolerance] slider. • [Select Area]: Highlights the area of color similar to the set color. • [Tolerance]: Set the tolerance for the similarity to the set color from 0 to 50 (the similarity range becomes wider in proportion to the value).

8. Click [OK].

The display returns to the [Master Settings] screen.

9. When the area and point settings are completed, click [Save].

The display returns to the [Job ID Settings] screen.

10. Under [Flow], set the check point matching method.

Sequentiality	Checks the registered check points in a sequence.
Batch	Checks the registered check points all at once.
One Shot	Checks the registered check points all at once only one time.

11. On the [Job ID] settings screen, click [Apply].

The inspection steps that are created are saved.

Important

- It may take a while to save some settings. If the area of the anchor point or check point [shape], or the [Rotation Angle] setting is large, a significant amount of time is taken.

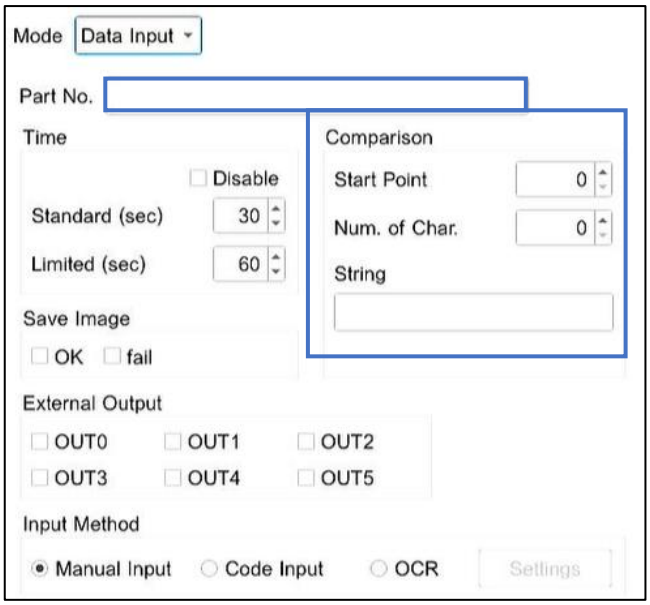
Data input mode parameters

If [Data Input] is selected in the work mode settings during the registration of an inspection step, set the comparison target string and number of characters for the entered data. Other than manual input as the data input method, input can also be performed by reading the 1D/2D code or OCR.

Important

- The input performed by reading the 1D/2D code can be used only when the 1D/2D code option function is enabled.
- The input performed by reading the OCR can be used only when the OCR option function is enabled.

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



2. Under [Comparison], set the [Start Point], [Num. of Char.], and [String].

Set the data input check conditions.

- [Start Point]: Set a number (0 to 99) for the start point of checking the data input string.
- [Num. of Char.]: Set the number of characters (0 to 100) to check from the start point.
- [String]: Specify the character string to check. You cannot set a character count exceeding the value set in [Num. of Char.] (except when 0 is set in [Num. of Char.]).

Example for check flow:

	Position outside checking scope
	Position of string to check (judged OK if values within this range are matching)
	OK
	FAIL
*	Invalid characters that need not necessarily be matching

<Example 1>

Start Point = 2
Num. of Char. = 5.
String = “ABC”

0	1	2	3	4	5	6
		A	**B**	**C**	*	*

OK

Z	Z	A	B	C	D	E
0	1	A	B	C	3	4

Fail (Different string at check position)

A	B	C	D	E	F	G

Fail (The number of characters is insufficient)

X	Y	A	B	C	D	

Fail (The number of characters is exceeded)

Q	W	A	B	C	D	E	F

<Example 2>

Start Point = 3
Num. of Char. = 1.
String = “ ” (not checked)

0	1	2	3
			*

OK

Z	Z	Z	B
1	2	A	B

Fail (The number of characters is insufficient)

X	Y	X	

Fail (The number of characters is exceeded)

0	1	2	3	4	5

<Example 3>

Start Point = 0
Num. of Char. = 0 (not checked)
String = “ ” (not checked)

No checking

All OK

<Example 4>

Start Point = 2
Num. of Char. = 0 (not checked)
String = “ABC”

0	1	2	3	4	...
		A	**B**	**C**	**...**

OK

Z	Z	A	B	C	D	E	F	G
1	2	A	B	C	3	4		

Fail (Different string at check position)

A	B	C	D	E	F	G

Fail (The number of characters is insufficient)

X	Y	A	B

3. Under [Input Method], set the data input method.

- [Manual Input]: Use a keyboard, etc. for manual input.

Important

- [Code Input] is displayed only when the 1D/2D code option function is enabled.
- [OCR] is displayed only when the OCR option function is enabled.

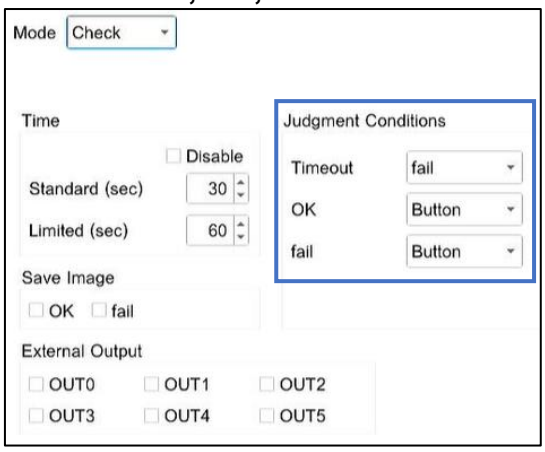
Reference

- 1D/2D Code Function (→P. 122)
- OCR Function (→P. 131)

Check mode parameters

If [Check] is selected in the work mode settings during the registration of an inspection step, set the check method (trigger) during the use of an external I/O, and enable or disable the functions allocated to the pins of the external connector.

1. Under [Judgment Conditions], set Timeout, OK, or FAIL.



Timeout	Set the judgment result for the case when the job time exceeds the [Upper Limit Time]. • [FAIL]: The judgment becomes FAIL. • [OK]: The judgment becomes OK.
OK	Configure the judgment conditions (OK). • [Button]: Perform the judgment manually. • [EXTIN0 to 9]: Perform the judgment using the signal of the input pins (→P. 81) of the external connector as the trigger. • [Disabled]: Disables the OK button.
FAIL	Configure the judgment conditions (FAIL). • [Button]: Perform the judgment manually. • [EXTIN0 to 9]: Perform the judgment using the signal of the input pins (→P. 81) of the external connector as the trigger. • [Disabled]: Disables the FAIL button.

Note

- The same EXTIN pin cannot be specified as [OK] and [FAIL].

Checking the Workflow (Job ID Data)

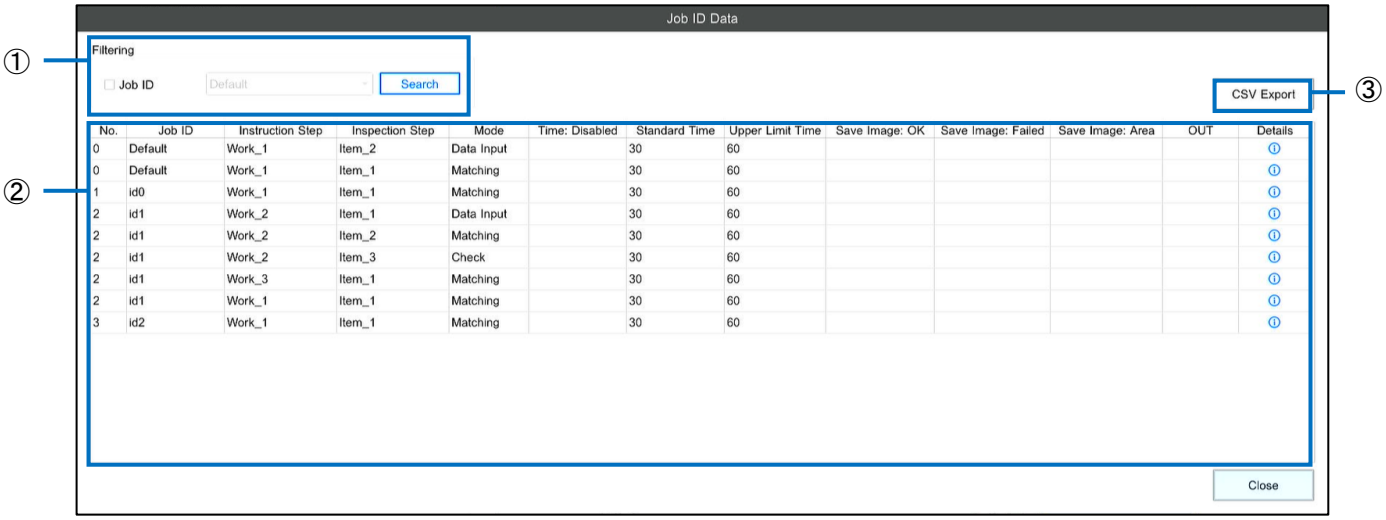
You can check the created workflow on the [Job ID Data] screen as a list.

Important

- You cannot edit the workflow (Job ID) on the [Job ID Data] screen.

1. Click [Job ID Data ...] from the [View] menu.

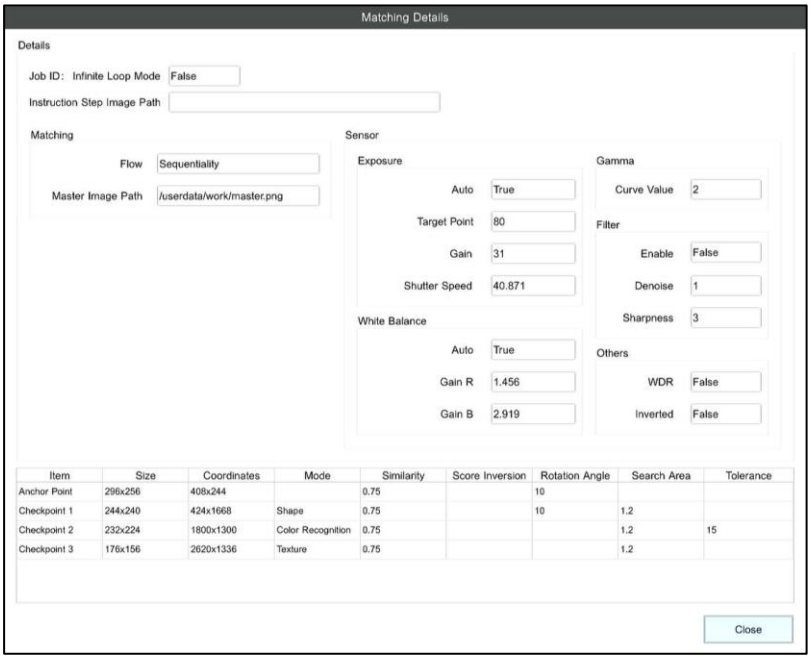
The [Job ID Data] screen appears.



No.	Job ID	Instruction Step	Inspection Step	Mode	Time: Disabled	Standard Time	Upper Limit Time	Save Image: OK	Save Image: Failed	Save Image: Area	OUT	Details
0	Default	Work_1	Item_2	Data Input		30	60					ⓘ
0	Default	Work_1	Item_1	Matching		30	60					ⓘ
1	id0	Work_1	Item_1	Matching		30	60					ⓘ
2	id1	Work_2	Item_1	Data Input		30	60					ⓘ
2	id1	Work_2	Item_2	Matching		30	60					ⓘ
2	id1	Work_2	Item_3	Check		30	60					ⓘ
2	id1	Work_3	Item_1	Matching		30	60					ⓘ
2	id1	Work_1	Item_1	Matching		30	60					ⓘ
3	id2	Work_1	Item_1	Matching		30	60					ⓘ

2. Perform the operation with reference to below.

①	Filtering	If the [Job ID] checkbox is selected, filtering is enabled. If you select a job ID and click the [Search] button, the data of the selected job ID is displayed in ②.
②	Job ID data display area	The registered job ID data is displayed for each inspection step. • [Job ID]: Displays the job ID name. • [Instruction Step]: Displays the instruction step name. • [Inspection Step]: Displays the inspection step name. • [Mode]: Displays the work mode. • [Time: Disabled]: Displays the time disabled setting. If enabled, a check mark is displayed. • [Standard Time]: Displays the standard time. • [Upper Limit Time]: Displays the upper limit time. • [Save Image: OK]: Displays the Save Image: OK setting. If enabled, a check mark is displayed. • [Save Image: Failed]: Displays the Save Image: Failed setting. If enabled, a check mark is displayed. • [Save Image: Area]: Displays the Save Image: Area setting. If enabled, a check mark is displayed. • [OUT]: Displays the external output setting. Displays the OUT number set as enabled. • [Details]: Displays the detailed information as a pop-up when the i mark is clicked. The displayed screen varies depending on the mode of the inspection step.

<table>
<tr>
<td></td>
<td></td>
<td>


Reference

See below for the contents displayed in [Details].

- Creating a Workflow (→P. 40)
</td>
</tr>
<tr>
<td>③</td>
<td>CSV Export</td>
<td>
Export the job ID data displayed in ② to a CSV file.

Important

- The generated CSV file can only be exported and not imported.

Reference

See below for the format of the CSV file to be exported.

- File Format (CSV): Job ID Data (→P. 159)
</td>
</tr>
</table>

11. Job Settings

Alias Settings

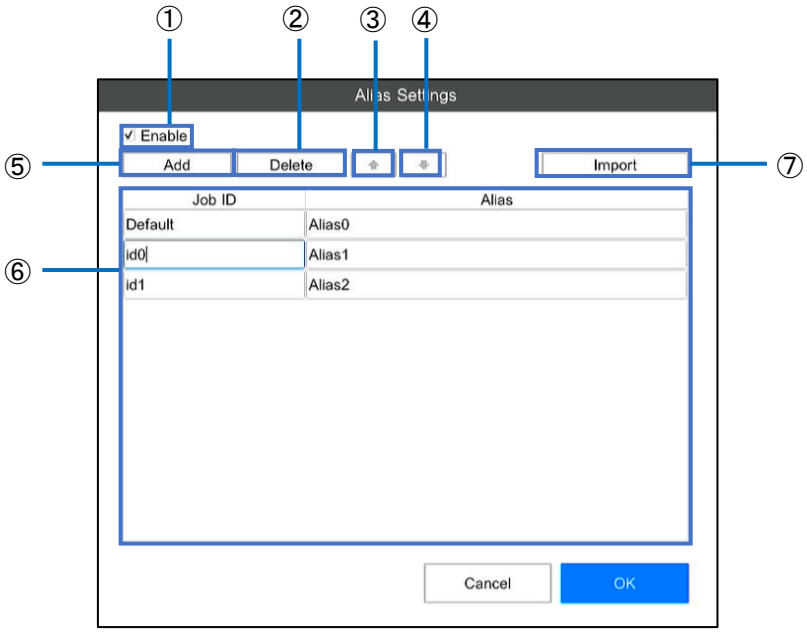
Set a string (alias) associated with the job ID.

Important

- A maximum of 1,000 aliases can be set in this device.
- If you enable the alias function, the [Alias] is used in place of the [Job ID] in the workflow (→P. 100).

1. Click [Alias Settings] from the [Job Settings] menu.

The [Alias Settings] screen appears.



2. Configure the following settings.

①	Enable	Enables the alias function.
②	Delete	Deletes the selected alias from the list.
③		Moves the selected alias up one place in the list.
④		Moves the selected alias down one place in the list.
⑤	Add	Adds an alias to the list.
⑥	Alias list display area	Specify the alias associated with the job ID. • [Job ID]: Specify the associated job ID. This is not case sensitive. If there is an error in the input, the input characters are displayed in red. • [Alias]: Specify another name associated with the job ID. This is not case sensitive. If there is an error in the input, the input

		characters are displayed in red. You cannot configure the following settings. – [Default] – Same name – [blank] Note You can also set multiple different aliases for the same [Job ID].
⑦	Import	Specify an external file (CSV) to load the alias settings. Important If more than 1,000 aliases exist in the external file (CSV), 1,000 aliases starting from the top are imported. • Once imported, all the current alias settings are overwritten.

3. Click [OK].

The settings are saved.

Note

- Code the external file (CSV) in the following order by demarcating with a comma (,).
  1. Job ID
  2. Alias (associated string)

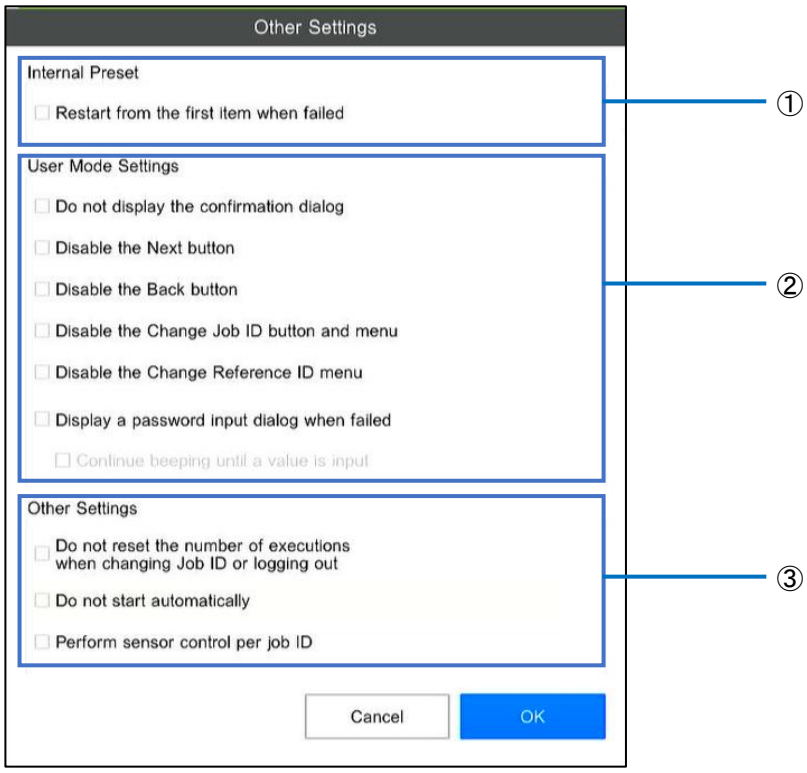
  Example:
  ID1,index1
  ID1,index2
  ID2,alias1
  ID2,alias2
  ID2,alias3

Other Settings

Configure the dialog display settings and settings related to the workflow.

1. Click [Other Settings] from the [Job Settings] menu.

The [Other Settings] screen appears.



2. Configure the following settings.

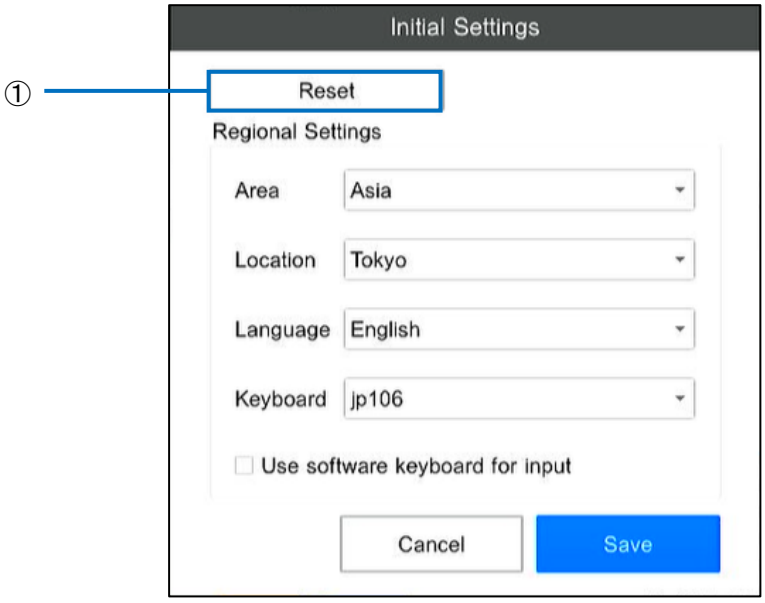
①	Internal Preset	Set the internal preset. • [Restart from the first item when failed]: Set the restart position of the workflow when a FAIL occurs in other than the Infinite Loop Mode to the first inspection step of the job ID.
②	User Mode Settings	Enable or disable the buttons and menus for the user mode. • [Do not display the confirmation dialog]: The confirmation dialog is not displayed before the execution of the following. – [Change Job ID] – [Change Reference ID] – [Start/Stop] – [Next→] – [←Back] The confirmation dialog is not displayed when [External Control] is enabled. • [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 the menu.

		When [External Control] is enabled, the [Change Job ID] button and menu are disabled. • [Disable the Change Reference ID menu]: Disables the [Change Reference ID] menu. When [External Control] is enabled, the [Change Reference ID] menu is disabled. • [Display a password input dialog when failed]: Displays the [Password Input] screen when a FAIL occurs. The password entered here is set as an unlocking password. The [Password Input] screen is not displayed when [External Control] is enabled. • [Continue beeping until a value is input]: An alert (beep sound) is continuously sounded while the password dialog is being displayed.
③	Other Settings	Set the other presets. • [Do not reset the number of executions when changing Job ID or logging out]: The OK count, FAIL count, and total count are not reset even after logging out and changing the job ID. • [Do not start automatically]: After logging in with user mode or after the completion of the workflow, the workflow of the next job ID does not start automatically. • [Perform sensor control per job ID]: During the execution of the workflow, use the sensor settings set for each job ID (→P. 98).

12. Settings

Initial Settings

The contents set under [Initial Settings ...] of the [System Settings] menu are the same as the [Initial Settings] screen (→P. 29) displayed after the initial startup (excluding the “Reset” button).
The [Initial Settings] screen displayed from the [System Settings] menu is displayed in the language selected in [Language].



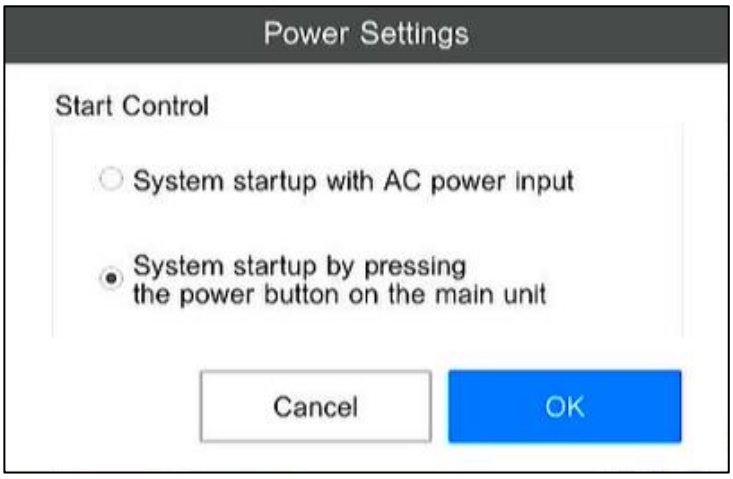
①	Reset	Used to initialize or delete the internal data. Reference • Initializing/Deleting the Internal Data (→P. 134)

Power Settings

Set the start control when an AC power source is connected.

1. Click [Power Settings ...] from the [System Settings] menu.

The [Power Settings] screen appears.



2. Configure the following settings.

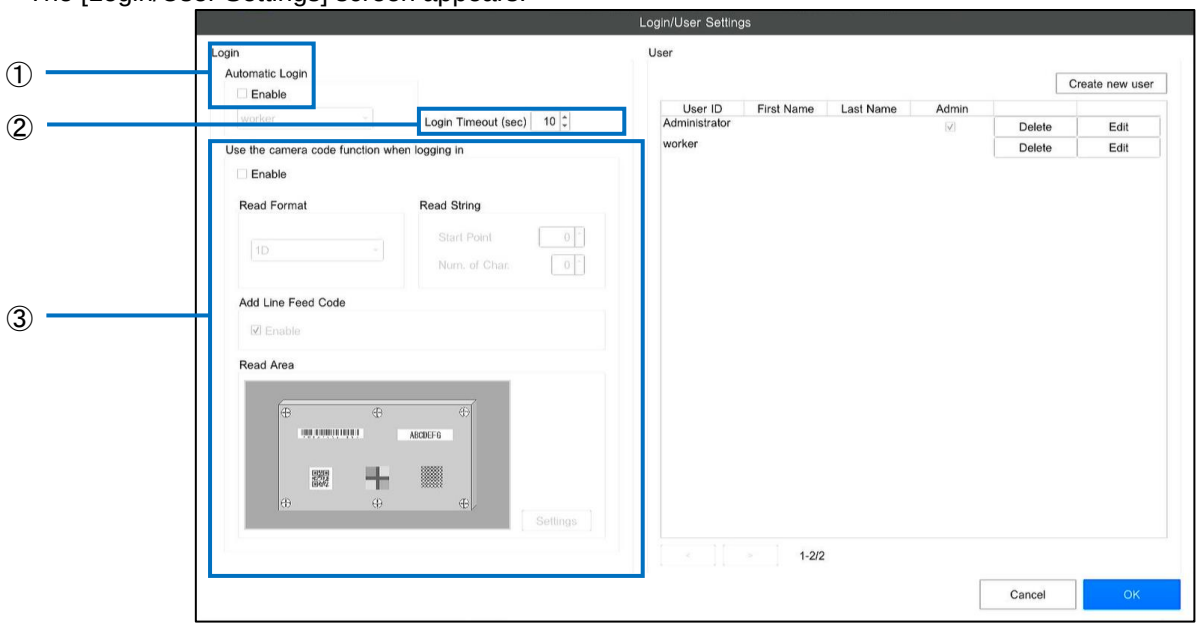
Start Control	Set the start control when a power source is connected. • [System startup with AC power input]: The system starts as is when a power source is connected. • [System startup by pressing the power button on the main unit]: After connecting the power source, the system starts when the power button on the main unit is pressed.

Login/User Settings

Configure the settings for login and perform user management. For details on user management, see Creating/Managing a User (→P. 38).

1. Click [Login/User Settings ...] from the [System Settings] menu.

The [Login/User Settings] screen appears.



2. Configure the following settings.

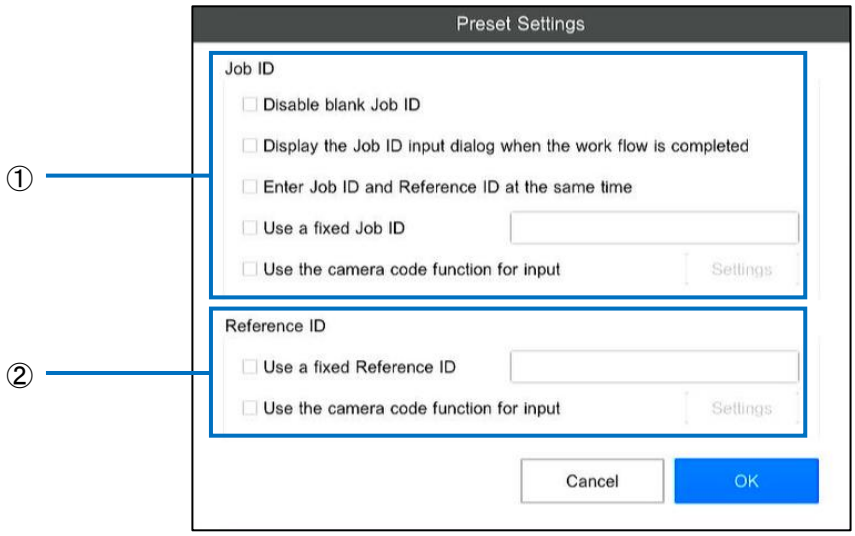
①	Automatic Login	If the [Enable] checkbox is selected, login is performed automatically with the user ID selected in the pull-down menu during login. **Note** • If [External Control] has been enabled, this setting is overwritten by the setting of [Auto Login User] on the [External Control Settings] screen (→P. 84).
②	Login Timeout (Sec)	Set the maximum wait time for connecting the network storage implemented from the start of system startup up to the login screen output or automatic login. After the elapse of the set time, an error pop-up is output. This function is enabled only when network storage has been set.
③	Use the camera code function when logging in	**Important** • This function is displayed only when the 1D/2D code option function is enabled. **Reference** • 1D/2D Code Function (→P. 122)

Preset Settings

Configure the dialog display settings and register the job ID and reference ID to be used as the preset.

1. Click [Preset Settings ...] from the [System Settings] menu.

The [Preset Settings] screen appears.



2. Configure the following settings.

①	Job ID	Configure the settings related to the job ID. • [Disable blank Job ID]: Disables execution of a workflow when blank has been set in the [Job ID] input dialog (→P. 100). • [Display the Job ID input dialog when the work flow is completed]: Displays the [Job ID] input dialog when the workflow is completed. [Use a fixed Job ID] is disabled. • [Enter Job ID and Reference ID at the same time]: Set the string entered in the [Job ID] input dialog as the reference ID. The [Reference ID] input dialog is not displayed (→P. 100). The following settings are disabled. – [Use a fixed Job ID] – [Use a fixed Reference ID] – [Use the camera code function for input] under [Reference ID] • [Use a fixed Job ID]: Perform preset registration of the job ID. The registered job ID is applied when the workflow is executed. If the specified job ID has not been registered, the [Default] job ID is applied. **Important** • The [Use the camera code function for input] function can be used only when the 1D/2D code option function is enabled. **Reference** • 1D/2D Code Function (→P. 122)
②	Reference ID	Configure the settings related to the reference ID. • [Use a fixed Reference ID]: Perform preset registration of the reference ID. The registered reference ID is applied when the workflow is executed.

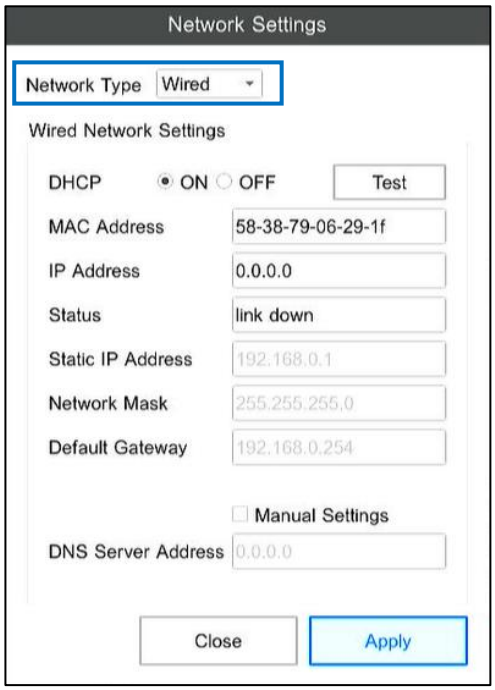
		Important • The [Use the camera code function for input] function can be used only when the 1D/2D code option function is enabled. **Reference** • 1D/2D Code Function (→P. 122)

Network Settings

Configure the network settings.

1. Click [Network Settings ...] from the [System Settings] menu.

The [Network Settings] screen appears.



2. Select [Wired] or [Wireless] as the [Network Type].

3. Configure the settings for the selected network.

Important

- A wired network and wireless network cannot be used simultaneously.
- If you select either [Socket] or [EtherNet/IP] in external control selection under [External Control Settings], the wireless network cannot be used (→ P. 84).

Reference

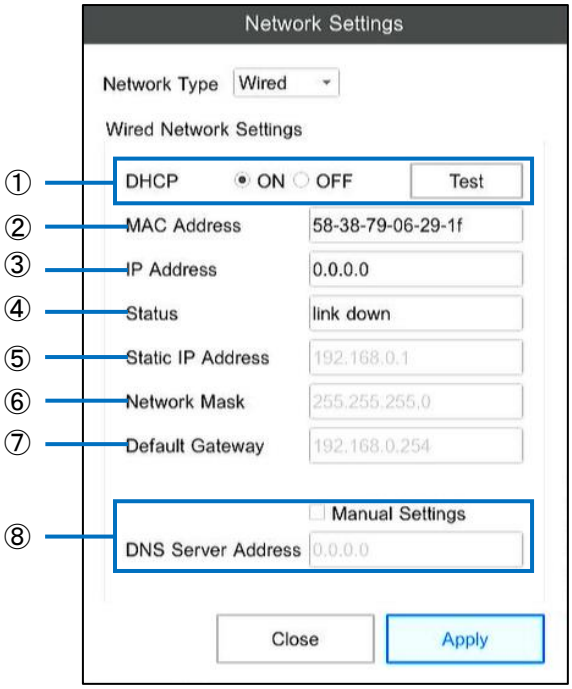
- Wired Network Settings (→P. 70)
- Wireless Network Settings (→P. 72)

Wired Network Settings

If you select [Wired] in [Network Type] on the [Network Settings] screen, configure the settings for the wired network connection.

1. Select [Wired] in [Network Type] on the [Network Settings] screen.

The [Network Settings] screen for wired network appears.



2. Configure the following settings.

①	DHCP	Set ON/OFF for DHCP. If you click [Test], a connectivity test is performed. • If you click [OFF] when this item has been set to [ON], the settings of the static IP address are reflected. Note • If you click [Test], the current settings are saved.
②	MAC Address	Displays the MAC address.
③	IP Address	Displays the IP address.
④	Status	The following status information is displayed. • link up: Displayed when communication can be performed. • link down: Displayed when communication cannot be performed.
⑤	Static IP Address	Set the IP address. • Can be set when [DHCP] is set to [OFF].
⑥	Network Mask	Set the subnet mask. • Can be set when [DHCP] is set to [OFF].

⑦	Default Gateway	Set the default gateway. • Can be set when [DHCP] is set to [OFF].
⑧	DNS Server Address	Set the DNS server. • Can be set when [Manual Settings] has been selected.

3. Click [Apply].

The settings are saved, and the wired network is enabled.

Important

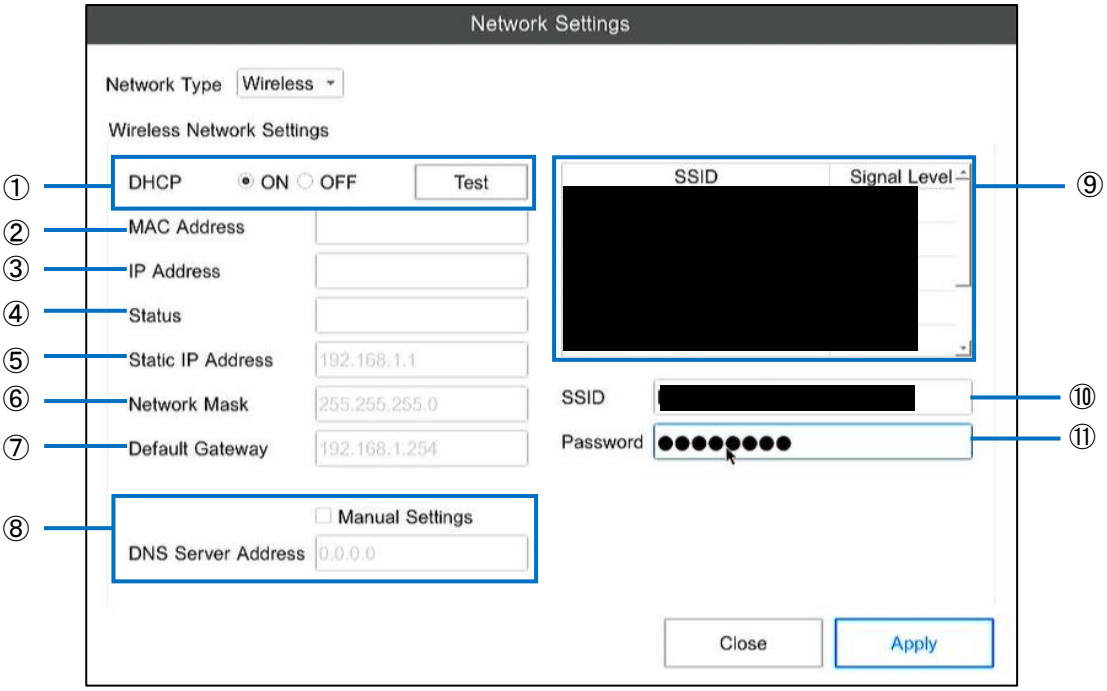
- [MAC Address], [IP Address], and [Status] are not displayed until [Apply] is executed immediately after changing the [Network Type].

Wireless Network Settings

If you select [Wireless] in [Network Type] on the [Network Settings] screen, configure the settings for the wireless network connection.

1. Select [Wireless] in [Network Type] on the [Network Settings] screen.

The [Network Settings] screen for wireless network appears.



2. Configure the following settings.

①	DHCP	Set ON/OFF for DHCP. If you click [Test], a connectivity test is performed. • If you click [OFF] when this item has been set to [ON], the settings of the static IP address are reflected. Note • If you click [Test], the current settings are saved.
②	MAC Address	Displays the MAC address.
③	IP Address	Displays the IP address.
④	Status	The following status information is displayed. • link up: Displayed when communication can be performed. • link down: Displayed when communication cannot be performed.
⑤	Static IP Address	Set the IP address. • Can be set when [DHCP] is set to [OFF].
⑥	Network Mask	Set the subnet mask. • Can be set when [DHCP] is set to [OFF].
⑦	Default Gateway	Set the default gateway. • Can be set when [DHCP] is set to [OFF].

⑧	DNS Server Address	Set the DNS server. • Can be set when [Manual Settings] has been selected.
⑨	Access point list	The usable access points are displayed as a list. If you double-click the list, the value of the selected access point is entered in [SSID].
⑩	SSID	Refer to the access point list and enter the SSID of the access point to use.
⑪	Password	Enter the connection password of the specified SSID.

3. Click [Apply].

The settings are saved, and the wireless network is enabled.
Connect to the access point using the set [SSID] and [Password].

Important

- [MAC Address], [IP Address], and [Status] are not displayed until [Apply] is executed immediately after changing the [Network Type].

Bluetooth Settings

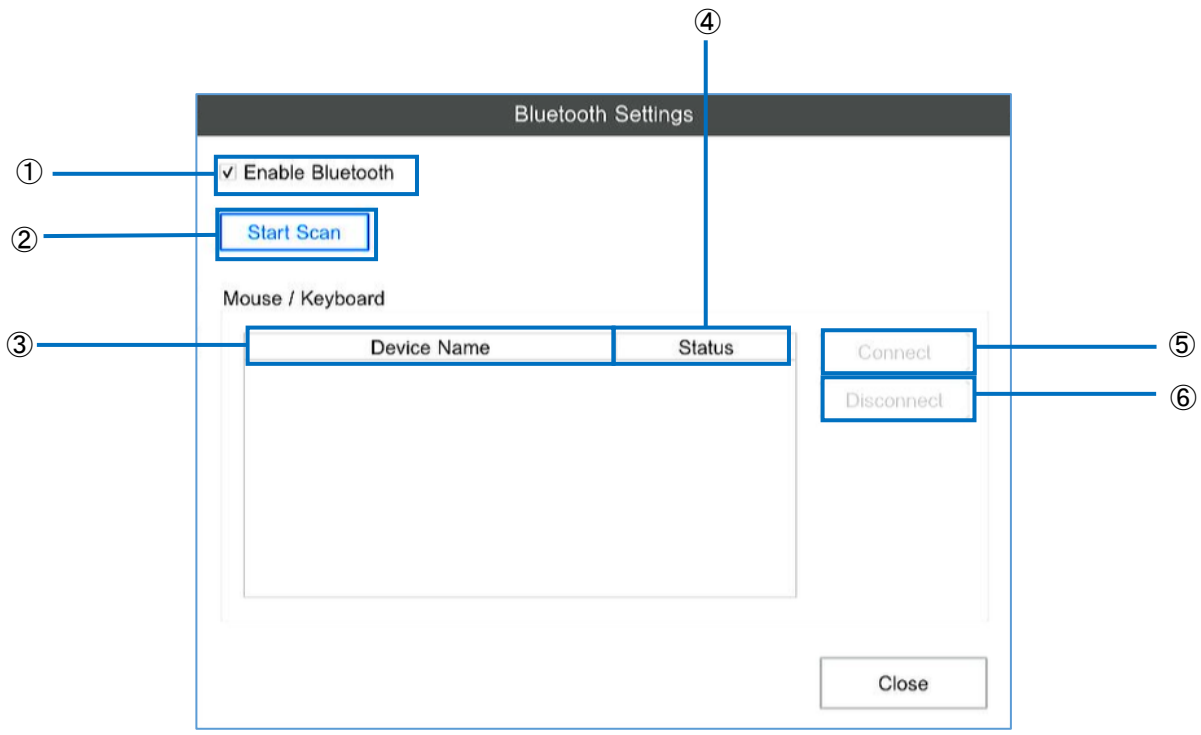
Manage the settings for the Bluetooth function, as well as the pairing, connection, and disconnection of the Bluetooth device.

This device supports the following Bluetooth devices.
- HID device: Keyboard
- HID device: Mouse

Important
- Up to three units each of the keyboard, mouse can be “paired” with or “connected” to this device as the Bluetooth device.
- The devices that use HOGP are not supported. Please do not connect.

1. Click [Bluetooth Settings ...] from the [System Settings] menu.

The [Bluetooth Settings] screen appears.

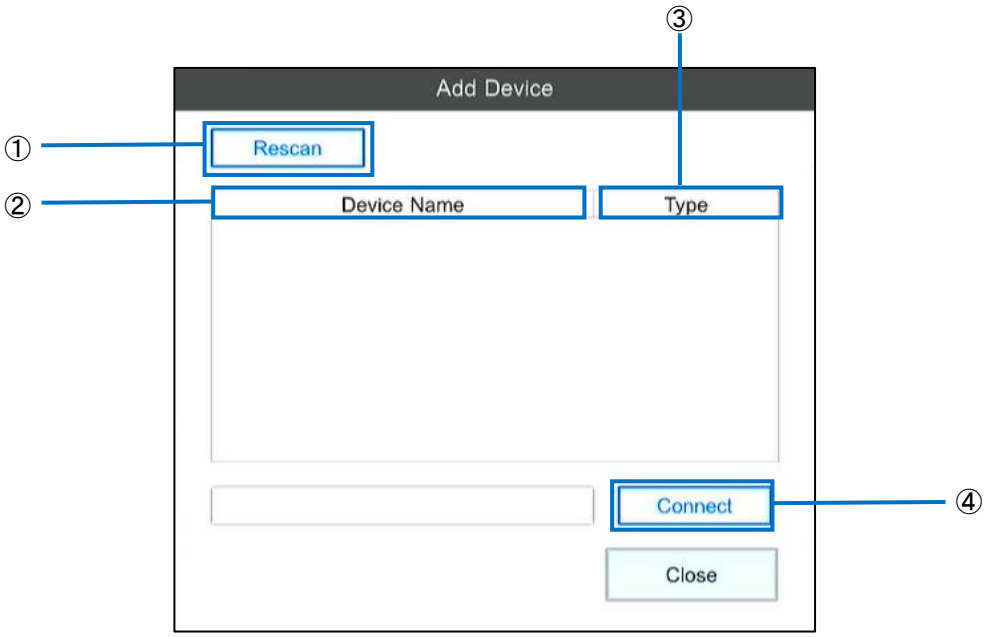


2. Configure the following settings.

①	Enable Bluetooth	If you select this checkbox, the Bluetooth function is enabled.
②	Start Scan	When you press this button, another window opens and search for the adjacent device starts.
③	Device Name (Mouse/Keyboard)	Displays the name of the paired or connected device. Up to three units each of the mouse and keyboard can be paired or connected.
④	Status (Mouse/Keyboard)	Displays the connection status of the device. ・ Paired: Indicates that the device is in a recognition state. The device cannot be used in this state. ・ Connected: Indicates that the device is in a usable state.
⑤	Connect (Mouse/Keyboard)	Select a paired device and press the [Connect] button to establish a connection to the device. * Mouse and keyboard in [Paired] status will shift to [Connected] status by operating the device.
⑥	Disconnect (Mouse/Keyboard)	Cancels the pairing of the device and deletes it from the list.

3. Perform device search and pairing.

If you press the [Start Scan] button on the [Bluetooth Settings] screen, the screen shown below is output, and the search for the Bluetooth devices is performed. After a fixed period of time has elapsed, a list of the detected devices is displayed. If the list is not displayed, or if the expected devices are not displayed in the list, press the [Rescan] button to start searching for the devices again.
After the expected devices are found and are displayed in the list, perform pairing. Select the device to pair with from the list, and press the [Pairing] button when the display is inverted. After the [Close] button is pressed, the device with which pairing is complete is displayed on the [Bluetooth Settings] screen.



①	Rescan	Searches for the device again. The displayed list information is cleared.
②	Device Name	Displays the name of the scanned device.
③	Type	Displays the type of the scanned device. The displayed types are as given below. ・ Keyboard ・ Mouse
④	Connect	If you press this button while clicking on a device in the list, pairing is performed. If pairing is successful, the device is added to the [Bluetooth Settings] screen. **Note** • The mouse and keyboard will be connected after pairing. • Depending on the keyboard, after pressing the [Connect] button, it is necessary to enter "0000" and press the enter key from the device side.

4. Connect the device.

Mouse and keyboard in [Paired] status will shift to [Connected] status by operating the device. If connection is successful, the device is set to a usable state.

5. Delete the device.

If you press the [Disconnect] button for a [Paired] or [Connected] device on the [Bluetooth Settings] screen, the deletion processing for the device starts. If deletion of the device is successful, the device is deleted from the list of Bluetooth devices. To use a deleted device again, start from the search process in step 3.

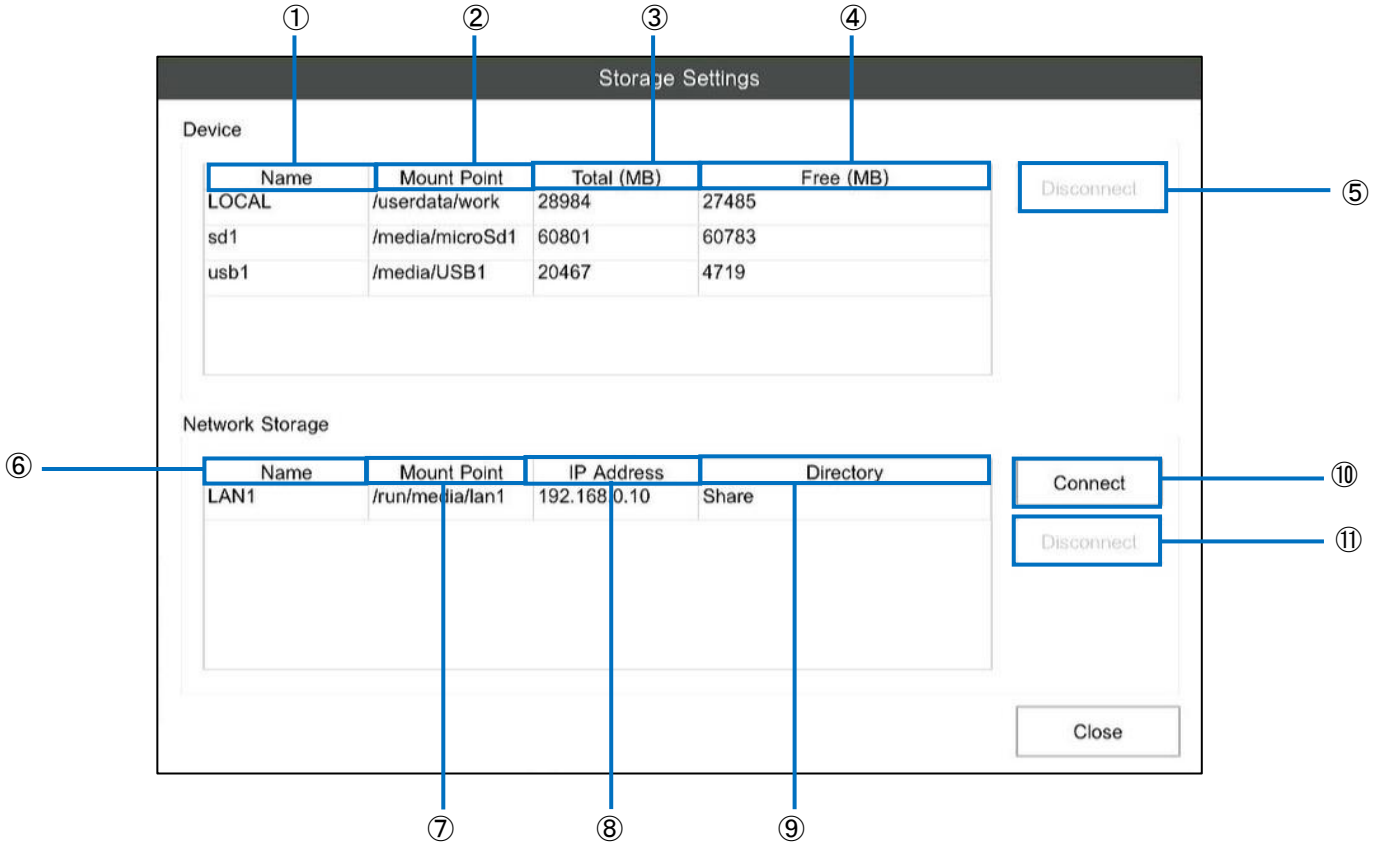
Storage Settings

Check the information about the storage and network device being used in this unit, safely remove a USB device, and connect or disconnect a network device.

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

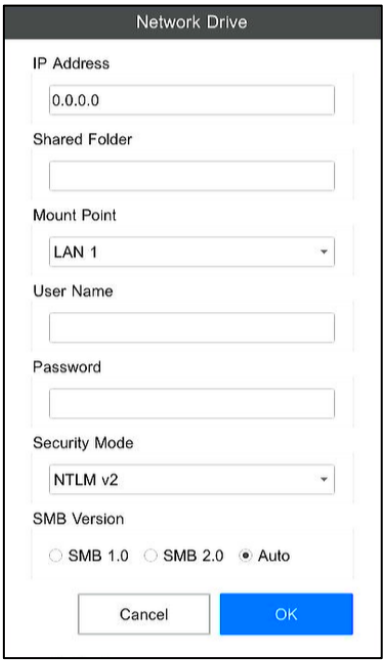
1. Click [Storage Settings ...] from the [System Settings] menu.

The [Storage Settings] screen appears.



2. Configure the following settings.

①	Name (Device)	The name of the device appears. • LOCAL: Internal memory • usb: Displayed when a USB device is connected. • sd: Displayed when a microSD card is connected.
②	Mount Point (Device)	Displays the point where the device is mounted.
③	Total (MB) (Device)	Displays the total capacity of the device.
④	Free (MB) (Device)	Displays the free space of the device.

⑤	Disconnect (Device)	Select a USB device in the list and then click [Disconnect] to safely remove the USB device. **Important** The microSD card does not support the hot plug. Therefore, the [Disconnect] function is disabled. Be sure to turn off the power of the device before connecting or removing the SD card.
⑥	Name (Network storage)	Displays the name of the network storage.
⑦	Mount Point (Network storage)	Displays the point where the network storage is mounted.
⑧	IP Address (Network storage)	Displays the IP address of the network storage.
⑨	Directory (Network storage)	Displays the shared folder name of the network storage.
⑩	Connect (Network storage)	Connects to a network storage. If you click [Connect], a dialog is displayed.  Enter the IP address of the connection destination, the shared folder, mount point, user name, password, and security, select the SMB version and establish a connection. **Note** • The network storage can be used as the save destination for the “image log” and the “Real-time CSV log file of the job logs”. • If you select [Auto] under [SMB Version], an attempt is made to establish a connection with SMB version 2.1 or higher.

		Important • A maximum of three network storages can be registered. Specify them under [Mount Point]. • Due to security concerns, it is recommended to use SMB as “Auto” as far as possible. • Accessing using the domain user is not supported.
⑪	Disconnect (Network storage)	Disconnects the network storage.

Note

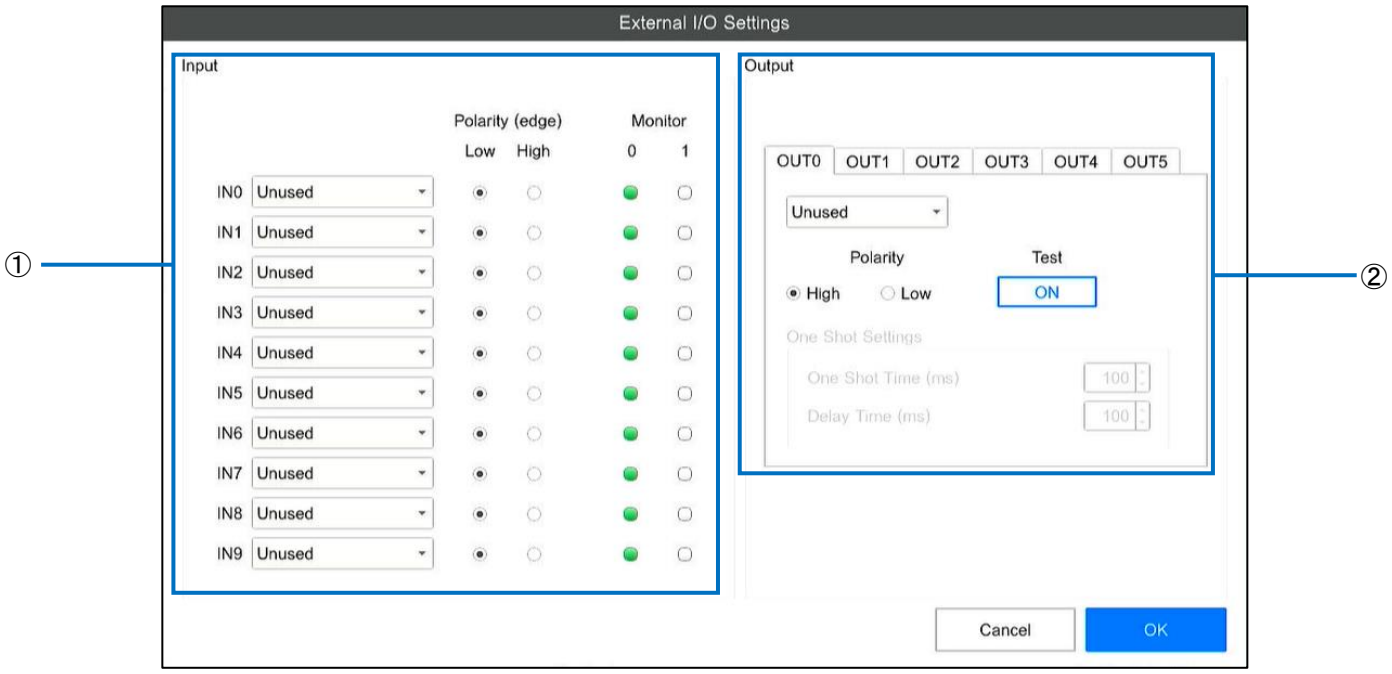
- A network storage that is connected is displayed in black, and a network storage that is not connected is displayed in red.

External I/O Settings

Allocate functions to the pins of external connector (→P. 28).

1. Click [External I/O Settings ...] from the [System Settings] menu.

The [External I/O Settings] screen appears.



- For details on the input and output timings, see the external I/O timing chart (→P. 147).

2. Configure the following settings.

①	Input	Set the input functions of the external connector pins. • [IN0-9]: Set the input function for the corresponding signal name. [Unused], [EXTIN], [Start/Stop], [Start], [Stop], [CHG JOB ID], [ENTER], [Next], and [Back] can be set. • [Polarity (edge)]: Set the polarity of the signal that acts as a trigger at the input side. • [Monitor]: Displays the current status of the input signal. If the setting of [Polarity (edge)] and the status of the input signal (High/Low) is matching, the value is “1”, and if these are different, the value is “0”. **Note** • If [External control: External I/O] is enabled, the setting of a higher signal is used as the setting of the PRESET pins depending on the [Maximum Number of Switchable Job IDs], and the settings cannot be made individually (→P. 86). • As for the setting of [Polarity (edge)] of the PRESET pins, the setting made for the lowest signal is used for all other signals and cannot be made individually.
②	Output	Set the output functions of the external connector pins. • [OUT0-5]: Set the output function for the corresponding signal name. [Unused], [EXTOUT], [EXTOUT (OS)], [RUN], [BUSY], [OK], [OK (OS)], [FAIL], [FAIL (OS)], [RUN OK (OS)] can be set. • [Polarity] Configure the output switch settings. • [Test]: Test the output switch settings.

		• [One Shot Time (ms)]: Set the time for output in one shot (10 to 2000 (ms)). • [Delay Time (ms)]: Set the delay time up to output in one shot (0 to 2000 (ms)).

- The functions allocated to the input pins are as described below.

EXTIN(n)	Used as an OK or FAIL input in the check mode of the inspection step (→P. 57).n matches the signal name.
Start/Stop	Starts the workflow when the workflow can be started. Stops the workflow while it is being executed.
Start	Starts the workflow when the workflow can be started.
Stop	Stops the workflow while it is being executed.
CHG JOB ID	Executes the same operation as when the [Change Job ID] menu is clicked.
ENTER	Executes the same operation as when Enter is pressed on the keyboard.
Next	Executes the same operation as when the [Next] button is clicked.
Back	Executes the same operation as when the [Back] button is clicked.
PRESET	Select the workflow of the job ID specified in PRESET. Reference • External I/O settings (→P. 86)

- The functions allocated to the output pins are as described below.

EXTOUT(n)	Turns ON when an arbitrary inspection step is started. Turns OFF when the judgment is complete or when judging an inspection step that is not specified (→P. 46).n is the signal name.
EXTOUT(n)(OS)	Turns ON for a certain period of time when an arbitrary inspection step ends. The ON timing and the output time are set in [One Shot Time (ms)] and [Delay Time (ms)] (→P. 46).n is the signal name.
RUN	Turns ON during the workflow and OFF when the flow is complete.
BUSY	Turns ON during the execution of an inspection step, and turns OFF when the judgment is complete.
OK	Turns ON during an OK judgment of each inspection step, and turns OFF during a FAIL judgment.
OK (OS)	Turns ON for a certain period of time during an OK judgment of each inspection step. The ON timing and the output time are set in [One Shot Time (ms)] and [Delay Time (ms)].
FAIL	Turns ON during a FAIL judgment of each inspection step, and turns OFF during an OK judgment.
FAIL (OS)	Turns ON for a certain period of time during a FAIL judgment of each inspection step. The ON timing and the output time are set in [One Shot Time (ms)] and [Delay Time (ms)].
RUN OK (OS)	Turns ON for a certain period of time when the workflow is complete. The ON timing and the output time are set in [One Shot Time (ms)] and [Delay Time (ms)].

Note

- The logical state of the input signal is represented by “0” and “1”, and is determined according to the setting of [Polarity (edge)] of the input, and the actual status of the input signal (High/Low).
  0: The setting of [Polarity (edge)] and the actual status of the input signal (High/Low) is not matching.
  1: The setting of [Polarity (edge)] and the actual status of the input signal (High/Low) is matching.
- The logical state of the output signal is represented by “ON” and “OFF”, and is determined according to the setting of [Polarity] of the output, and the actual status of the output signal (High/Low).
  ON: The actual status of the output signal (High/Low) is the same as the setting of [Polarity].
  (If [Polarity] = High, the output signal is High)
  OFF: The actual status of the output signal (High/Low) is the reverse of the setting of [Polarity].
  (If [Polarity] = High, the output signal is Low)

External Control Settings

Configure settings related to external control of the device. The device can be controlled externally by the following three methods.

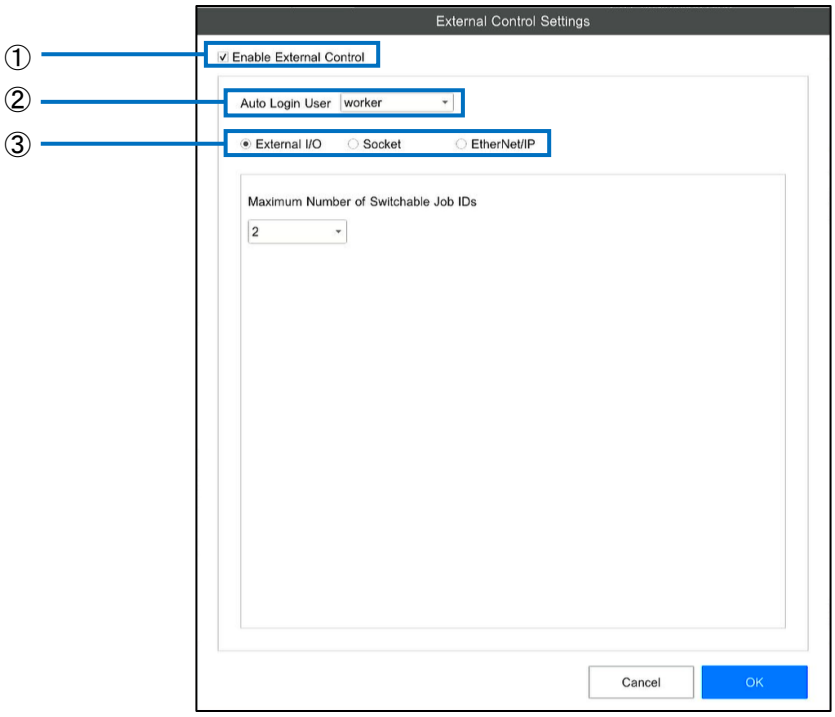
- External I/O
- Socket
- EtherNet/IP

Important

- Socket Mode and EtherNet/IP can be used only when a wired network is used.

1. Click [External Control ...] from the [System Settings] menu.

The [External Control Settings] screen appears.



2. Configure the following settings.

①	Enable External Control	If this checkbox is selected, the external control function is enabled. **Note** • If this function is enabled, automatic login is also enabled.
②	Auto Login User	Select a user for automatic login.
③	External control selection	Select the method of external control. • [External I/O] • [Socket] • [EtherNet/IP]

Important

- If external control is enabled, automatic login is forcibly enabled and the automatic login user of the [Login User Settings] screen is overwritten by the setting on this screen. If external control is changed from Enabled to Disabled, set automatic login on the [Login User Settings] screen again, if required (→P. 66).
- If the external control function is enabled, all settings under [Preset Settings] (→P. 67) and the following settings under [Other Settings] (→P. 62) are disabled.
  - [Internal Preset]
  - [Do not display the confirmation dialog], [Disable the Change Job ID button and menu], [Disable the Change Reference ID menu], and [Display a password input dialog when failed] under [User Mode Settings]
  - [Do not start automatically] under [Other Settings]

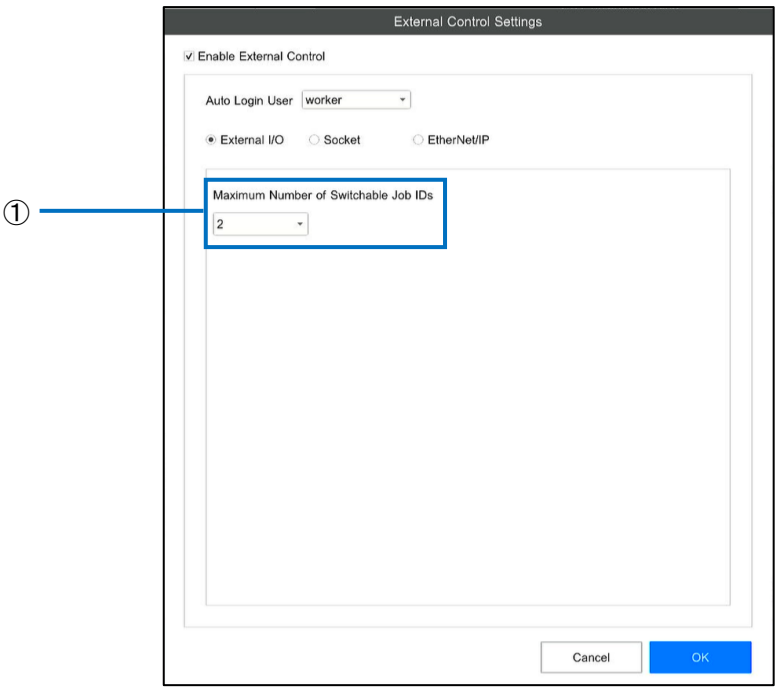
External I/O settings

Configure the settings for using external I/O during external control.

1. Select the [Enable External Control] checkbox on the [External Control Settings] screen (→P. 84).

2. Select [External I/O] in external control selection.

The [External Control Settings] screen appears.



3. Configure the following settings.

①	Maximum Number of Switchable Job IDs	Specify the number of Job IDs that can be selected using the input (IN) pins during external I/O control. **Note** • As a result of this setting, some of the input (IN) pins in [External I/O Settings] are forcibly set to the PRESET setting (→P. 81). • [Default] is included in the job IDs that can be selected.

- The correspondence between the setting of [Maximum Number of Switchable Job IDs] and the input (IN) pins that are forcibly set to the PRESET setting is as given below.

	IN0	IN1	IN2	IN3	IN4	IN5	IN6	IN7	IN8	IN9
2										PRESET9
4									PRESET8	PRESET9
8								PRESET7	PRESET8	PRESET9
16							PRESET6	PRESET7	PRESET8	PRESET9
32						PRESET5	PRESET6	PRESET7	PRESET8	PRESET9
64					PRESET4	PRESET5	PRESET6	PRESET7	PRESET8	PRESET9
128				PRESET3	PRESET4	PRESET5	PRESET6	PRESET7	PRESET8	PRESET9
256			PRESET2	PRESET3	PRESET4	PRESET5	PRESET6	PRESET7	PRESET8	PRESET9
512		PRESET1	PRESET2	PRESET3	PRESET4	PRESET5	PRESET6	PRESET7	PRESET8	PRESET9
1024	PRESET 0	PRESET1	PRESET2	PRESET3	PRESET4	PRESET5	PRESET6	PRESET7	PRESET8	PRESET9

- The “Job ID number” is decided according to the status of the PRESET pins. The “Job ID number” is represented by a binary number such as PRESET9 = bit0, PRESET8 = bit1, ... PRESET0 = bit9, and 0, 1, ..., 1023 is allocated in an order starting from Default from the [Job ID List] on the [Job ID Settings] screen.
  Example) When [Maximum Number of Switchable Job IDs] = 1024 and PRESET polarity is High
  * If the Polarity is Low, the meaning of Low and High is reversed.

Job ID	Job ID number	Binary number	IN0	IN1	IN2	IN3	IN4	IN5	IN6	IN7	IN8	IN9
			bit9	bit8	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
Default	0	0000000000 b	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
AAA	1	0000000001 b	Low	Low	Low	Low	Low	Low	Low	Low	Low	High
BBB	2	0000000010 b	Low	Low	Low	Low	Low	Low	Low	Low	High	Low
CCC	3	0000000011 b	Low	Low	Low	Low	Low	Low	Low	Low	High	High
DDD	4	0000000100 b	Low	Low	Low	Low	Low	Low	Low	High	Low	Low
EEE	5	0000000101 b	Low	Low	Low	Low	Low	Low	Low	High	Low	High
FFF	6	0000000110 b	Low	Low	Low	Low	Low	Low	Low	High	High	Low
GGG	7	0000000111 b	Low	Low	Low	Low	Low	Low	Low	High	High	High
:	:	:										
max	1023	1111111111 b	High	High	High	High	High	High	High	High	High	High

Important

- If a non-existent [Job ID number] is specified in PRESET, the workflow is not executed.

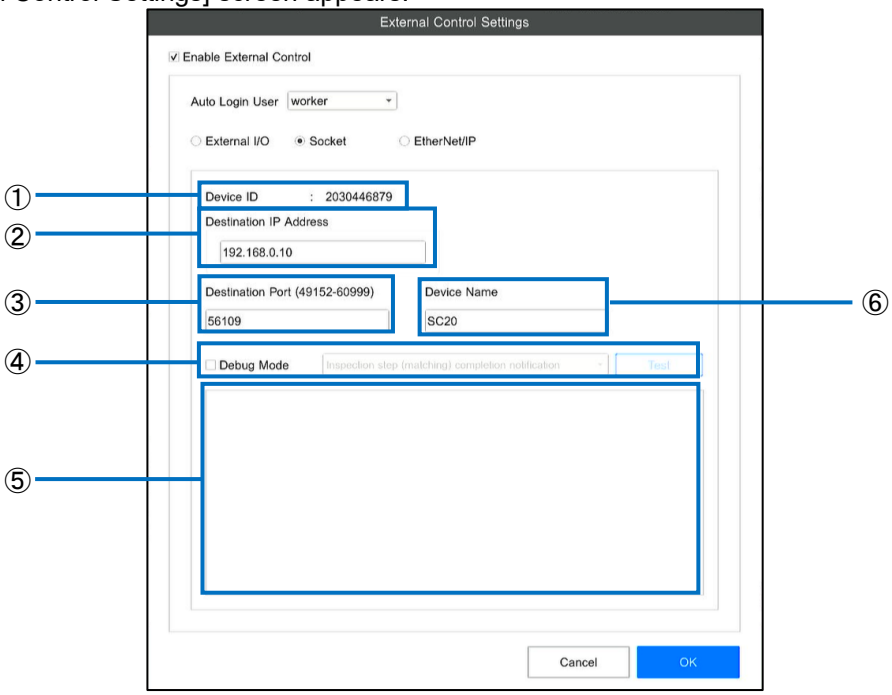
Socket Mode settings

Configure the settings for using Socket Mode.

1. Select the [Enable External Control] checkbox on the [External Control Settings] screen (→P. 84).

2. Select [Socket] in external control selection.

The [External Control Settings] screen appears.



3. Configure the following settings.

①	Device ID	Displays the ID of the device set automatically by the system.
②	Destination IP Address	Specifies the destination IP address of Socket Mode.
③	Destination Port	Specifies the destination port number of Socket Mode. The default setting is “56109”.
④	Debug Mode area	If this checkbox is selected, the debug mode of the Socket Mode function is enabled. If the message is selected and the [Test] button is clicked, the specified message is sent to the other device.
⑤	Log display area	The message log used with the Socket Mode function is displayed.
⑥	Device Name	Specify any arbitrary name. The default setting is “SC20”.

Note

- For details, refer to “SC-20 Series Socket Mode Function Operating Instructions”.

EtherNet/IP communication settings

Configure the settings for using EtherNet/IP communication.

1. **Select the [Enable External Control] checkbox on the [External Control Settings] screen (→P. 84).**

2. **Select [EtherNet/IP] in external control selection.**

Note

- For details, refer to “SC-20 Series EtherNet/IP Mode Function Operating Instructions”.

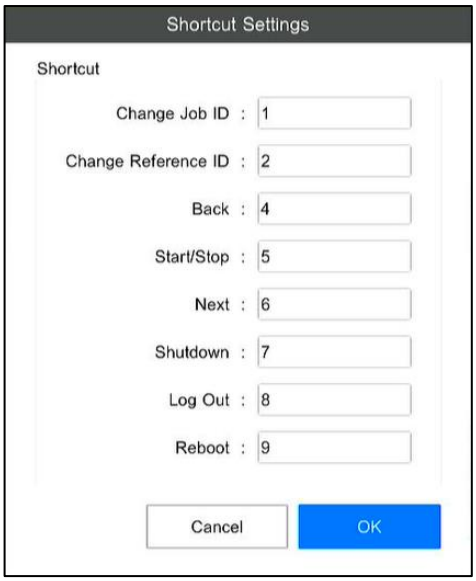
Shortcut Settings

Set the shortcut keys for operating the device.
In the initial settings, the shortcut keys correspond to keys 1 to 9 on the keyboard.

7 Shutdown	8 Logout	9 Reboot
4 ←Back	5 Start/Stop	6 Next→
1 Change Job ID	2 Change Reference ID	3 None

1. Click [Shortcut Settings ...] from the [System Settings] menu.

The [Shortcut Settings] screen appears.

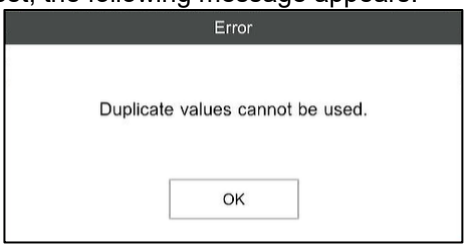


2. Change the allocation of shortcut keys.

Enter a numeric value (0 to 9999) in each textbox and click [OK].

Note

- If the entered numeric value is already set, the following message appears.



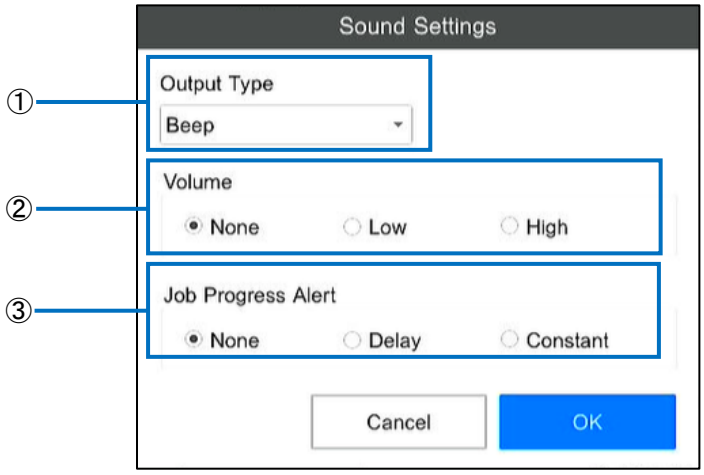
- If the buttons and menus cannot be selected, the shortcut keys are also disabled.

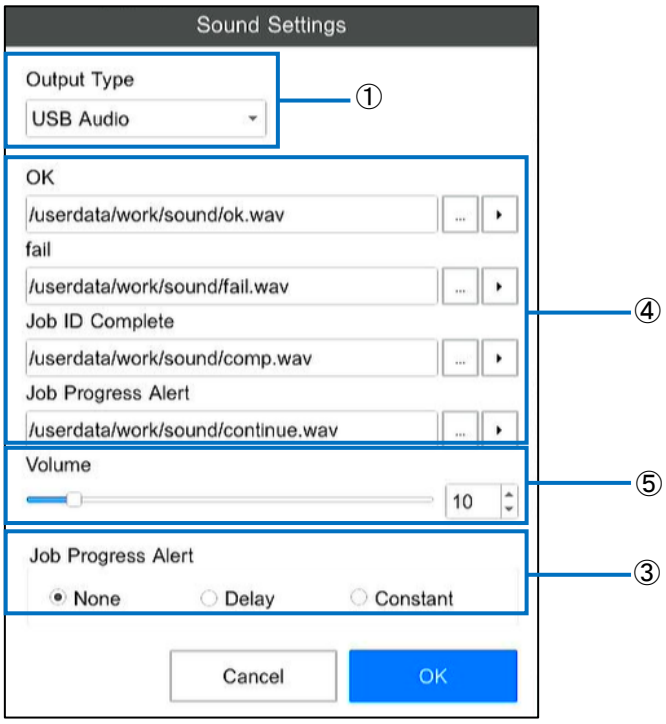
Sound Settings

Configure the sound settings.

1. Click [Sound Settings ...] from the [System Settings] menu.

The [Sound Settings] screen appears. The display varies depending on the settings.





2. Configure the following settings.

①	Output Type	Set the output type of the audio function. • [Beep]: Sets the output type to beep. • [USB Audio]: Sets the output type to USB audio. • [Bluetooth Audio]: Sets the output type to Bluetooth audio. **Note** • The display contents vary depending on the settings. The left side of the figure above is displayed when [Beep] is set, and the right side of the figure above is displayed when [USB Audio] or [Bluethooth Audio] is set.
②	Volume (Beep)	Set the beep volume. • [None]: No beep is sounded. • [Low]: Sets the volume to low. • [High]: Sets the volume to high. If [Low] or [High] is selected, a beep is sounded and its volume can be checked.
③	Job Progress Alert	Set an alert output in accordance with the setting of [Standard Time] and [Upper Limit Time] of the inspection step (→P. 46). • [None]: No alert is sounded. • [Delay]: An alert is sounded from the [Standard Time] up to the [Upper Limit Time].

		• [Constant]: An alert is sounded from the start of the inspection step up to the [Upper Limit Time].
④	File settings (USB Audio / Bluetooth Audio)	• [OK]: Sets the audio file that will be run when matching is OK. • [FAIL]: Sets the audio file that will be run when matching is FAIL. • [Job ID Complete]: Sets the audio file that will be run when the Job ID is complete. • [Job Progress Alert]: Sets the audio file that will be run when [Job Progress Alert] is enabled. • [▸]: Plays back the set audio file. • [...]: Sets the audio file. **Note** • The audio file that can be set is in the WAVE format and has the following sampling rate. - 44.1 kHz 16 bit Stereo - 48.0 kHz 16 bit Stereo
⑤	Volume (USB Audio / Bluetooth Audio)	Sets the volume of the audio device between 0 and 100. At 0, the audio device is muted.

3. Click [OK].

The settings are saved.

Important

- The volume cannot be controlled with this device in some USB audio devices. If the volume can be controlled in the audio device itself, please do so.

Reference

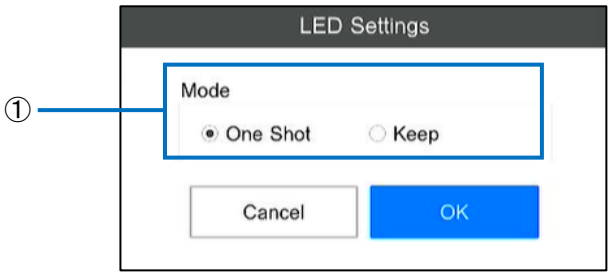
- Supported Devices (→P. 156)

LED Settings

Configure the settings for the operation of the OK/FAIL judgment LED (→P. 15).

1. Click [LED Settings ...] from the [System Settings] menu.

The [LED Settings] screen appears.



2. Configure the following settings.

①	Mode	Set the lighting mode for the OK/FAIL LED during judgment of an inspection step. • [One Shot]: Lights for a set time during inspection step judgment. • [Keep]: Keeps the OK/FAIL lighting status until the completion of the next inspection step. Turns OFF when a workflow starts and when a job ID is switched.

3. Click [OK].

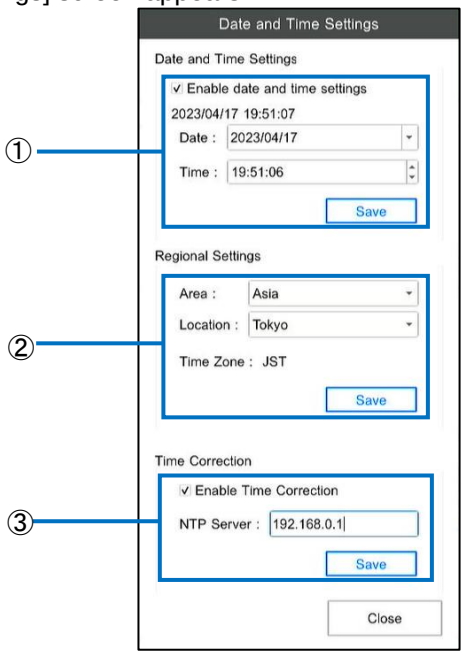
The settings are saved.

Date and Time Settings

Set the date and time.

1. Click [Date and Time Settings ...] from the [System Settings] menu.

The [Date and Time Settings] screen appears.



2. Configure the following settings.

①	Date and Time Settings	If you select this checkbox, the date and time settings function is enabled. If you specify the date and time and then click [Save], the settings are reflected.
②	Regional Settings	Set the location where the device is installed. Specify the following and click [Save] to reflect the settings. • [Area]: Select the area in which the device is installed. (If the area does not exist in the list, select the closest area.) – Asia: The Asian Continent – Africa: The African Continent – America: The American Continent (North America/Central America/South America) – Atlantic: The Atlantic Region – Europe: The European Continent – Indian: The Indian Ocean Region – Pacific: the Pacific Region [Location]: The locations within the selected [Area] are displayed. Select the location where the device is installed. (If the location does not exist in the list, select the closest location.) • [Time Zone]: Displays the time zone corresponding to the selected [Location]. Note • The [Time Zone] is updated after you click [Save].
③	Time Correction	If this checkbox is selected, the time correction function is enabled. Specify the following and click [Save] to reflect the settings. [NTP Server]: Enter the IP address or domain name of the time correction server.

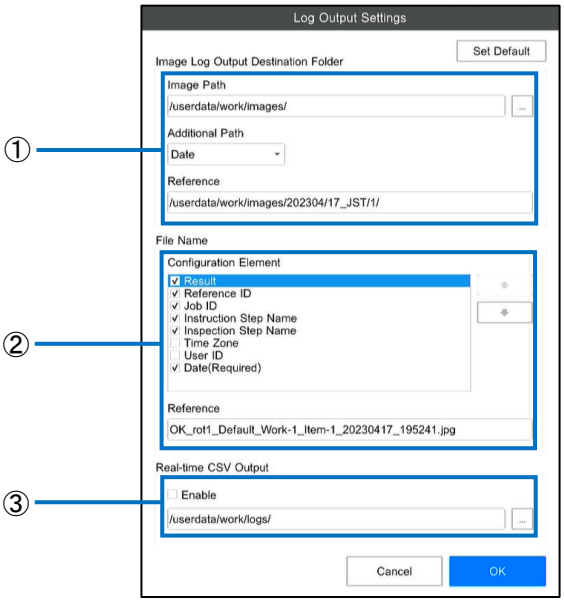
		Important • The settings are not saved if the NTP server cannot be accessed.

Log Output Settings

Set the image log output destination folder, the configuration of the file name, the real-time CSV file output of job log, and the output-destination folder.

1. Click [Log Output Settings ...] from the [System Settings] menu.

The [Log Output Settings] screen appears.



2. Configure the following settings.

①	Image Log Output Destination Folder	• [Image Path]: Specifies the save destination of the image log. If you click the [...] button, a dialog specifying the save destination is displayed. • [Additional Path]: Select the configuration of the folder added to the image path. [Date]: The folder is created with the year, month, and day. [Job ID]: A folder is created for each job ID. [Job ID / Date]: A folder is created for each job ID, and a date folder with the year and month is created in the subordinate folder. [Date / Job ID]: A date folder with the year, month, and day is created, and a folder for each job ID is created in the subordinate folder. [None]: No folder is created, and the folder set in the [Image Path] is used.
②	File Name Configuration Element	Select the configuration elements for generating the image log file name. The checked contents are reflected in the file name. The order of the configuration elements can be changed with the up/down buttons. • [Result]: The inspection judgment results are applied. • [Reference ID]: The entered reference ID is applied. • [Job ID]: The job ID for which the inspection was performed is applied. • [Instruction Step Name]: The instruction step names for which the inspection was performed are applied. • [Inspection Step Name]: The inspection step name for which the inspection was performed is applied. • [Time Zone]: The set time zone is applied. • [User ID]: The user ID for which the inspection was performed is applied.

		• [Date(Required)]: The date and time when the inspection was performed is applied. This item cannot be excluded from the file name.
③	Real-time CSV Output	If [Enable] is selected, the job log (CSV file) is output to the specified path in real-time. If you click the [...] button, a dialog specifying the save destination is displayed.

Reference

- Image Log (→P. 112)
- Checking from the job log file (→P. 110)

3. Click [OK].

The settings are saved.

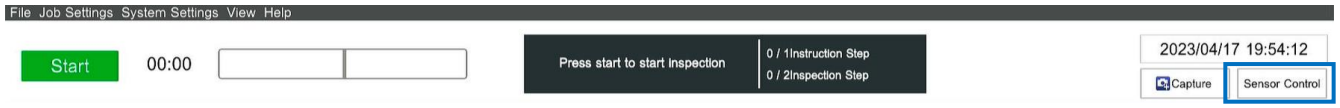
Important

- Changed settings are reflected after the device restarts.

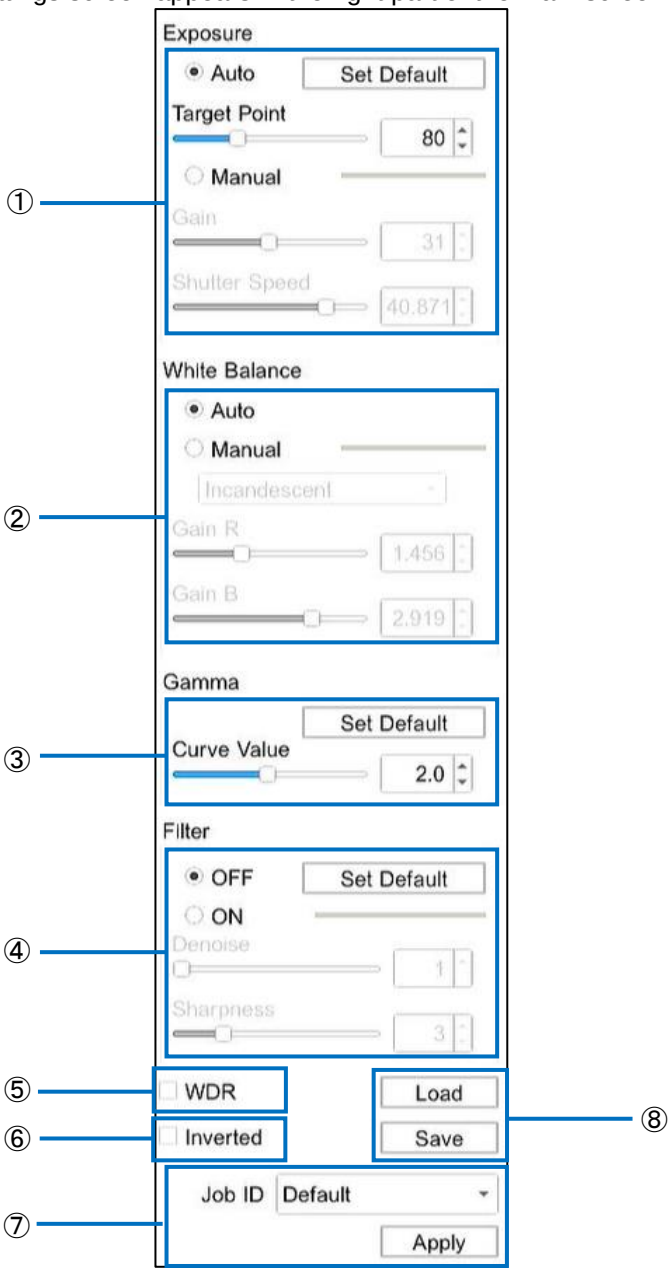
Sensor Control Settings

Set the camera sensor control.

1. Click [Sensor Control] at the top right of the main screen.



The [Sensor Control] settings screen appears in the right part of the main screen.



2. Configure the following settings.

①	Exposure	Adjust the luminance of the camera image. [Set Default]: Returns to the default status (Auto, Target Point 80). • [Auto]: The camera sensor automatically adjusts the luminance. You can configure the following settings. • [Target Point]: Set the luminance value for convergence during Auto. A value from 0 to 255 can be set. • [Manual Input]: Manually adjust the luminance. You can configure the following settings. • [Gain]: Set the luminance gain from 1 to 62. • [Shutter Speed]: Set the luminance shutter from 0.115 to 49.871.
②	White Balance	Adjust the white balance of the camera image. • [Auto]: The camera sensor automatically adjusts the white balance. • [Manual Input]: Adjust the white balance to a fixed state. By selecting the following four modes, [Gain R] and [Gain B] can be set to a specific value. [Gain R] and [Gain B] can also adjusted individually. – [Incandescent]: Set the gain value appropriate for incandescent lighting. – [Fluorescent]: Set the gain value appropriate for fluorescent lighting. – [Cool White]: Set the gain value appropriate for cool white sunlight. – [Daylight White]: Set the gain value appropriate for daylight white sunlight. • [Gain R]: Set the red gain from 0.200 to 3.900. • [Gain B]: Set the blue gain from 0.200 to 3.900.
③	Gamma	Adjust the gamma in the camera image. • [Set Default]: Returns to the default status (2.0). • [Curve Value]: Set the value of gamma curve from 0.1 to 4.0.
④	Filter	Perform filter correction on the camera image. • [Set Default]: Returns to the default status (OFF). [OFF]: Filter correction is not performed. • [ON]: Filter correction is performed. You can configure the following settings. • [Denoise]: Reduces the noise in the image. Set from 1 to 10. • [Sharpness]: Enhances the edge of the image. Set from 1 to 10.
⑤	WDR	If this checkbox is selected, the wide dynamic range (WDR) processing is performed on the camera image.
⑥	Inverted	If this checkbox is selected, the camera image is inverted (rotated) 180 degrees.
⑦	Job ID application	If you select the job ID to which the sensor value is to be applied, and click the [Apply] button, the sensor setting values from ① to ⑥ are applied to the specified job ID.
⑧	Settings Load / Save	The settings from ① to ⑥ can be saved to a file (*.sensor), and the saved file can be imported.

3. Click [Complete].

The settings are saved.

Note

- The main screen cannot be operated while the [Sensor Settings] screen is open.

13. Applying

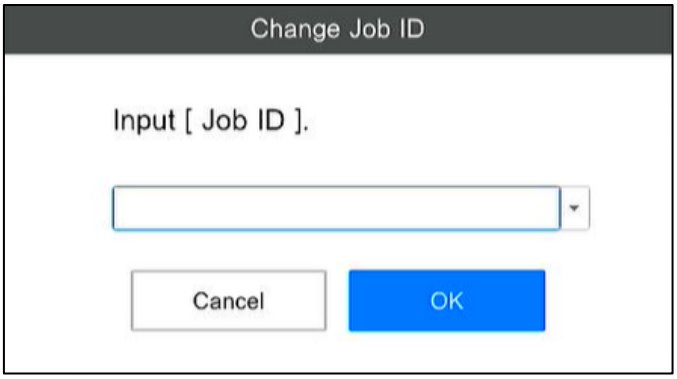
Starting the Operation

Start the operation of a workflow.

Important
Some operations are different in the administrator mode.

1. Log in to the device as a general user (→P. 31).

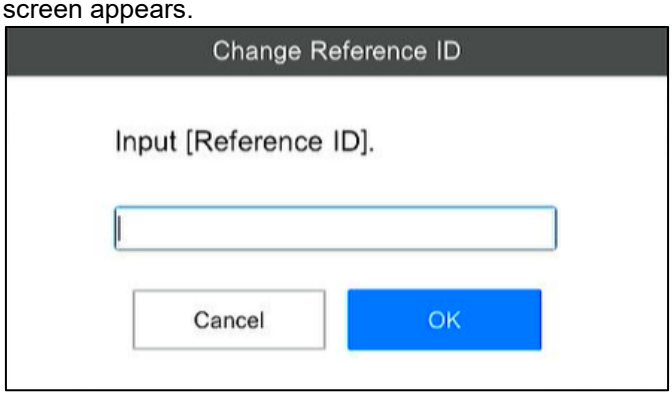
The [Change Job ID] screen appears.



- The [Change Job ID] screen does not appear in the following cases:
  When [External Control] is enabled (→P. 84)
  When [Use a fixed Job ID] is enabled in [Preset Settings] (→P. 67)
- If you click [OK] without entering the job ID, the [Default] job ID is applied. In [Preset Settings], the execution of a workflow can be disabled if a job ID is not entered (→P. 67).

2. Enter the job ID and click [OK].

The [Change Reference ID] screen appears.



- The [Change Reference ID] screen does not appear in the following cases:
  When [External Control] is enabled (→P. 84)
  When [Use a fixed Reference ID] is enabled in [Preset Settings] (→P. 67)
  When [Enter Job ID and Reference ID at the same time] is enabled in [Preset Settings] (→P. 67)

3. Enter the reference ID and click [OK].

The operation of the workflow starts.

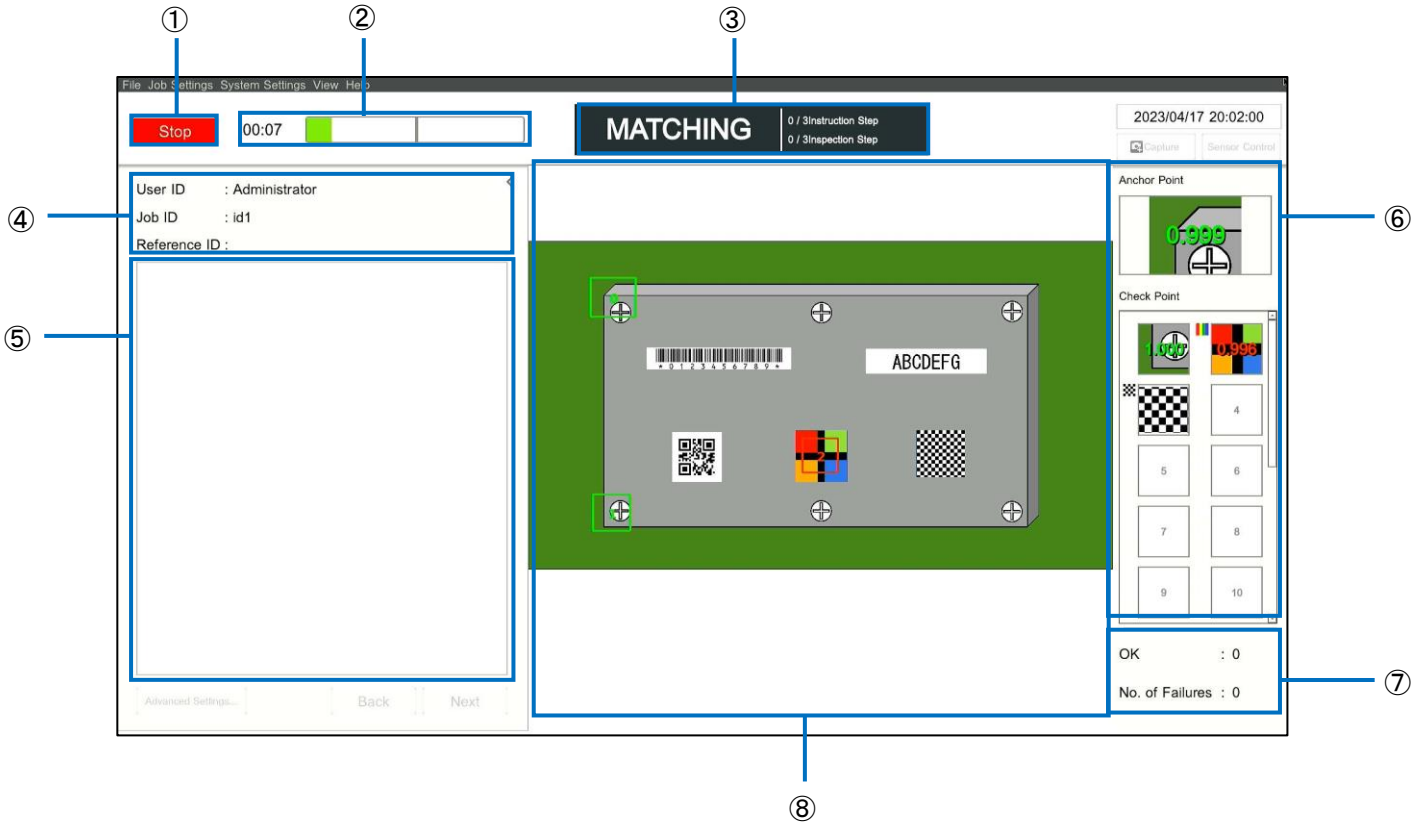
Note

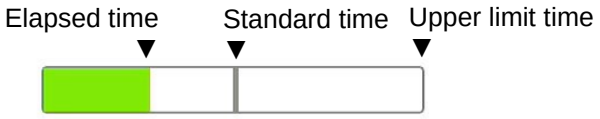
- The job ID and reference ID are recorded in the job log (→P. 108).
- If you click [Cancel] on the [Change Job ID] screen or [Change Reference ID] screen, the workflow stops.

Operation Screen

The following explanation uses the example of the screen when the inspection step is matching mode.

Main screen during operation



①	Stop	Stops the workflow (→P. 104).
②	Status display area: Job time	Displays a progress bar visually representing the elapsed time, standard time, and upper limit time.  The progress bar is displayed in green up to the standard time, and in yellow from the standard time up to the upper limit time. If the upper limit time is exceeded, the progress bar is displayed in red.
③	Status display area: Job status	Displays the job status. During the execution of the workflow, the background color turns black, and the work mode being executed is displayed. The job result (OK/FAIL) is displayed when the workflow is complete. The background color is green when the job result is OK, and red when the job result is FAIL. The “X / X Instruction Step” indicates the “Executed number of instruction steps / Total number of instruction steps”.

		The “X / X Inspection Step” indicates the “Executed number of inspection steps / Total number of inspection steps”.
④	Job information display area	The following job information is displayed: [User ID]: Displays the ID of the logged in user. [Job ID]: Displays the job ID of the workflow being executed. [Reference ID]: Displays the reference ID of the workflow being executed.
⑤	Instruction step file area	Displays the instruction step file set in the workflow.
⑥	Inspection step display area	When the matching mode is being executed, the matching results are displayed in [Anchor Point] and [Check Point] as thumbnails.
⑦	Job result display area	The following numeric values are incremented according to the job results: – [OK]: When the workflow is complete – [No. of Failures]: When the inspection step is judged to be FAIL This information is reset when logging out or changing Job ID. You can also make the setting to not reset the number of executions when logging out or changing Job ID (→P. 62).
⑧	Camera image area	Displays the camera image.

Reference

- Shortcut Settings (→P. 90)

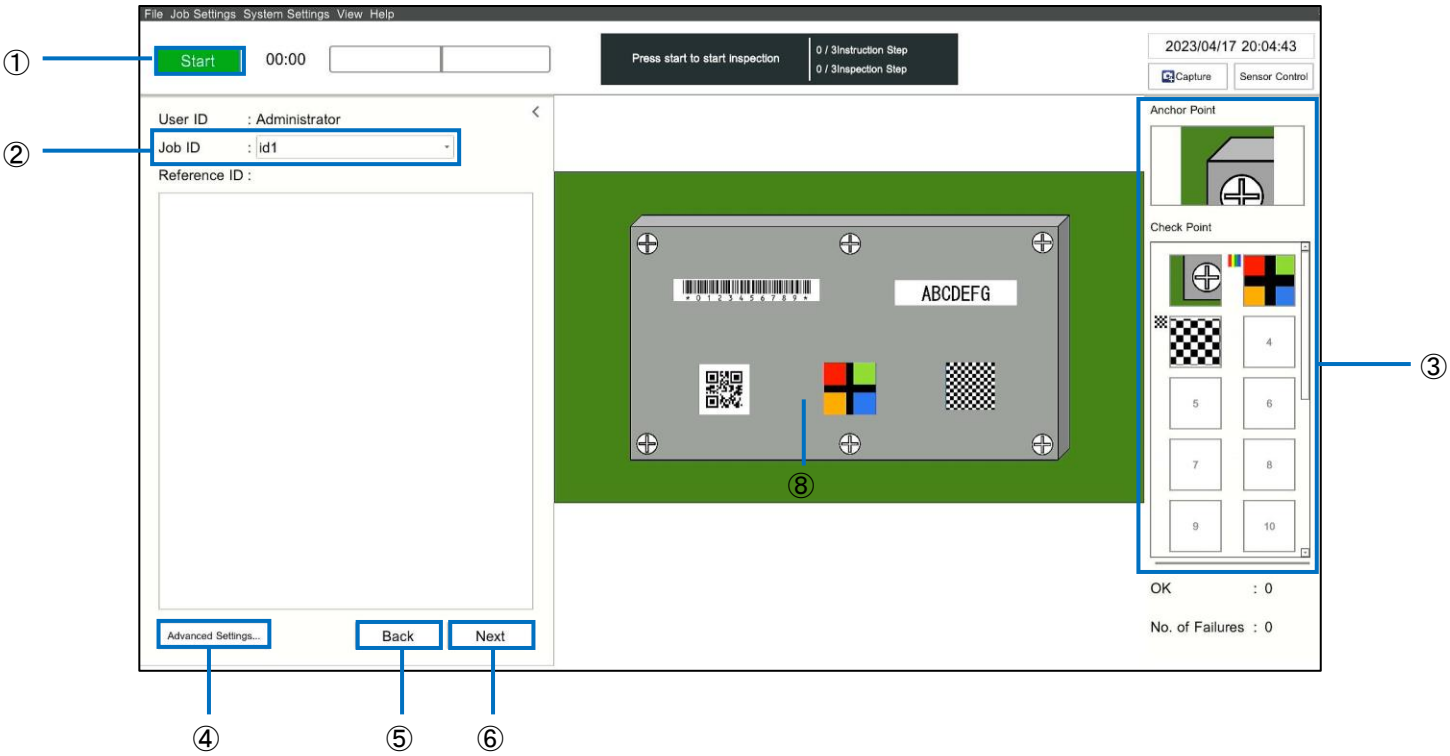
Stopping the Operation

The workflow is stopped in the following cases:

- When the inspection step is judged as “FAIL” (the workflow does not stop if the Infinite Loop Mode is set) (→P. 43)
- When the [Stop] button is clicked on the main screen (→P. 102)
- When the “Start/Stop” or “Stop” signal for external I/O is input (→P. 81)
- When a “Stop request” for Socket Mode is entered
- When a “Stop request” for EtherNet/IP is entered

Screen when the workflow has been stopped

The following operations can be performed while the flow has been stopped.
The power LED flashes while the workflow has been stopped.



①	Start	Starts the workflow. If the job has been stopped, the workflow resumes from the current inspection step.
②	Job ID	Select a job ID from the pull-down to change the job ID. • You can also change the job ID from [Change Job ID] in the [File] menu (→P. 34). • The job ID cannot be changed if the following settings are made in the user mode: – [External Control] is enabled (→P. 84) – [Use a fixed Job ID] is enabled in [Preset Settings] (→P. 67)
③	Inspection step display area	Change the parameter settings (→P. 106).
④	Advanced Settings...	Change the settings of the work mode (→P. 106). This item is disabled in user mode.
⑤	←Back	Moves to the previous inspection step.

⑥	Next→	Moves to the next inspection step.

Reference

- Shortcut Settings (→P. 90)

Adjusting the Parameter Settings While Workflow Has Been Stopped

The parameter settings in the work mode can be adjusted while the workflow has been stopped.

Important

- Adjustments cannot be made in the user mode.

Note

- The settings can also be changed by selecting [Job ID Settings] in the [Job Settings] menu while the workflow has been stopped (→P. 34).

1. Click [Advanced Settings...] on the screen when the workflow has been stopped (→P. 104).

The [Inspection Step Settings] screen appears.

2. Adjust the parameters.

Reference

- Matching mode parameters (→P. 49)
- Data input mode parameters (→P. 55)
-

- Check mode parameters (→P. 57)

3. Click [OK].

The adjusted settings are reflected.

A parameter settings dialog box appears when you click the thumbnails of the [Anchor Point] and [Check Point] in the inspection step display area (→P. 104) of the main screen during operation of matching mode, and the target parameters can be adjusted (→P. 49).

- The dialog box is not displayed if you click an area where the icons are not displayed.
- A [Test] button is displayed in the parameter settings dialog box displayed according to this procedure. If you click the [Test] button, the operation according to the specified settings can be checked.

14. Checking the Log

The following are recorded as logs in the device.

- Job Log: The execution results of the operations and workflows performed on the device are recorded.
- System Log: The operation status such as error detection in the device is recorded.
- Image Log: The camera images during the execution of the inspection step are recorded.

Important

- Logs using the view of the main unit can be checked only in the administrator mode.

Job Log

The execution results of the operations and workflows performed on the device are recorded. The recorded logs are classified into the following three categories.

- Camera Operation Log: Operations performed on the device such as login, logout, and shutdown are recorded.
- Job Result Log: The OK/FAIL result and details for each inspection step according to the execution of the workflow are recorded.
- Job ID Result Log: The final results of the job ID according to the execution of the workflow are recorded.

The job log can be checked from the viewer on the main unit and from the log file (Real-time CSV).

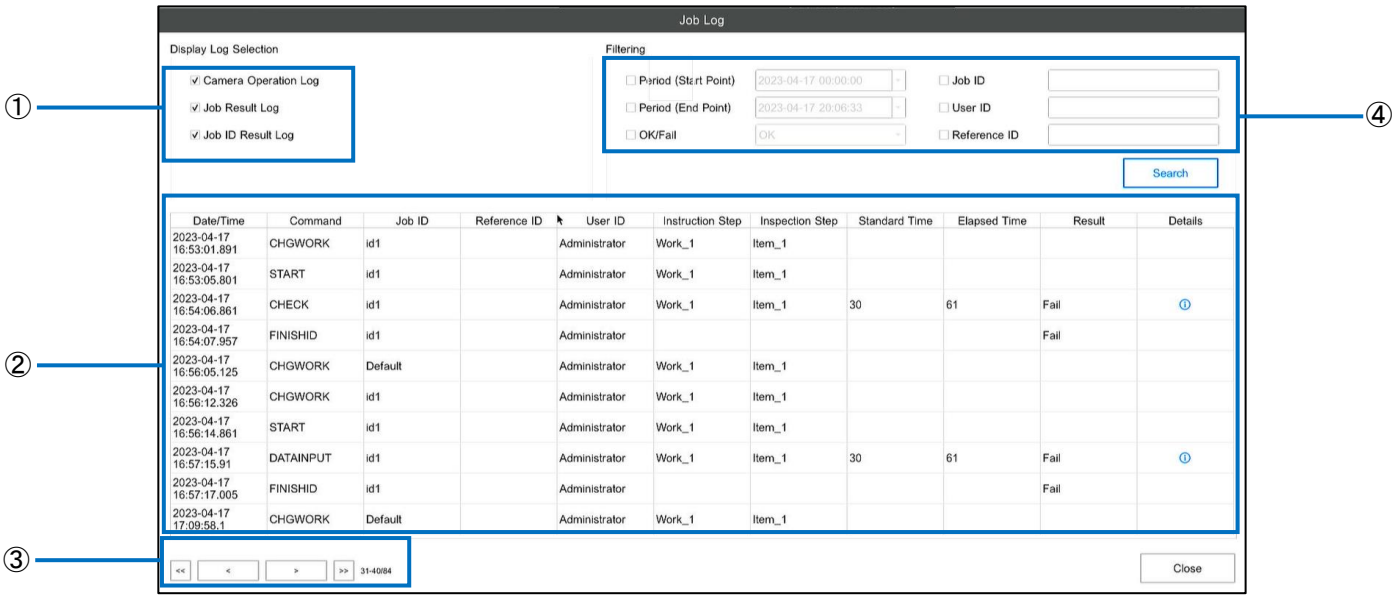
Note

- The job log is always saved in the built-in storage for logs.

Checking on the job log viewer

1. Click [Job Log] from the [View] menu.

The [Job Log] screen appears.



2. Perform the operation with reference to below.

①	Display Log Selection	Select the type of the log to be displayed in ②. • [Camera Operation Log]: Displays the log during the operation of the camera. • [Job Result Log]: Displays the log of each item result in the job ID flow. • [Job ID Result Log]: Displays the log of the final result of the job ID flow.
②	Job log display area	After setting the conditions in ① and ④, click [Search] to display the log in each row for each job. The log is displayed in an order starting from the oldest. • [Date/Time]: Displays the date and time when the log was recorded. • [Command]: Displays the operation and processing. [Camera Operation Log] – [START]: Start workflow – [PAUSE]: Pause workflow – [NEXT]: Change inspection step to next – [BACK]: Change inspection step to previous – [LOGOUT]: Logout operation – [CHGWORK]: Change job ID – [CHGSN]: Change reference ID – [LOGIN]: Login operation – [BOOT]: Startup operation – [REBOOT]: Restart operation – [SHUTDOWN]: Shutdown operation [Job Result Log] – [MATCHING]: Inspection step (matching) – [DATAINPUT]: Inspection step (data input) – [CHECK]: Inspection step (check mode) [Job ID Result Log] – [FINISHID]: Workflow execution completed • [Job ID]: Displays the job ID of the workflow. • [Reference ID]: Displays the reference ID of the workflow. • [User ID]: Displays the user ID. • [Instruction Step]: Displays the instruction step name. • [Inspection Step]: Displays the inspection step name. • [Standard Time]: Displays the standard time. • [Result]: Displays the processing results. • [Details]: Displays the detailed information as a pop-up when the i mark is clicked. The displayed screen varies depending on the mode of the inspection step.

		
③	Page operation	The log is displayed in units of 10 rows on one screen. If there are 11 rows or more, move the page. • [<<]: Moves to the first page. • [<]: Moves to the previous page. • [>]: Moves to the next page. • [>>]: Moves to the last page.
④	Filtering	Select the conditions of the log to be displayed in ②. • [Period (Start Point)]: Set the log start period. • [Period (End Point)]: Set the log end period. • [OK/Fail]: Displays the log only when the processing result of the workflow is OK or FAIL. • [Job ID]: Displays the log only for the specified job ID. • [User ID]: Displays the log only for the specified user ID. • [Reference ID]: Displays the log only for the specified reference ID.

Checking from the job log file

The job log can also be output in real-time as a CSV file. You can enable the output and set the save destination from [Real-time CSV Output] under [Log Output Settings]. The following files are created in the specified folder.

- sc-20_log_yyyymmdd.csv: All job logs are recorded and created for each day.
  The year, month, and day are set in yyyy, mm, and dd.
- sc-20_log_last_check_data.csv: Only one recent job log is recorded.

See below for the format of the file that will be output.

- File Format (CSV): Job Log Real-time CSV Output (→P. 157)

Reference

- Log Output Settings (→P. 96)

Important

- By default, output to the job log file (Real-time CSV output) is disabled.

System Log

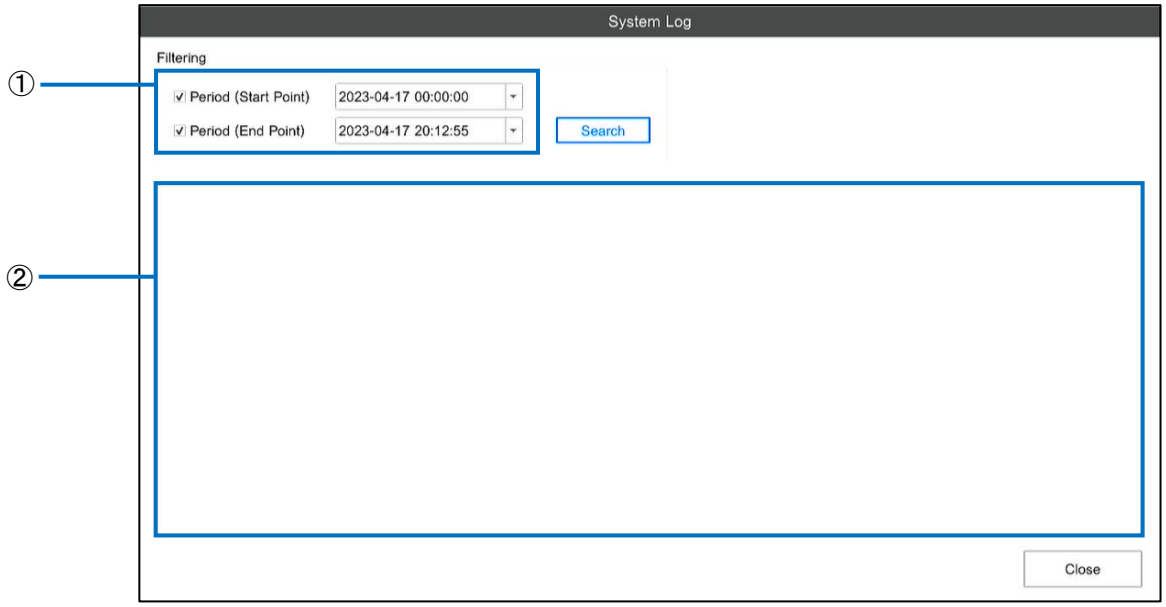
The operation status such as error detection in the device is recorded.

Note

- The system log is always saved in the built-in storage for logs.

1. Click [System Log ...] from the [View] menu.

The [System Log] screen appears.



2. Perform the operation with reference to below.

①	Filtering	Set the period for the log to be displayed in ②. If this checkbox is not selected, search is performed by ignoring both the start period and end period. • [Period (Start Point)]: Set the log start period. • [Period (End Point)]: Set the log end period.
②	System log display area	After setting the conditions in ①, click [Search] to display the log. **Important** • If a large volume of search results are found, only some logs are displayed from the recent ones. If the log of the desired date and time is not displayed, revise the filtering conditions.

Image Log

If an inspection step for which any one item is selected under [Save Image] (→P. 47) during the creation of the inspection step matches the conditions at the time of execution of the workflow, the camera image during the execution of the inspection step is recorded as an image log.

- The save destination and file name of the image log can be set from [Log Output Settings].
- The image log is recorded in the 3840 x 2160 JPG format.

Reference

- Log Output Settings (→P. 96)

Configuration of the image log output destination folder

The image log output destination folder is configured by the [Image Path] and [Additional Path] in the [Image Log Output Destination Folder] under [Log Output Settings].

✓ **When [Date] is selected in the [Additional Path]**
A “year / month” folder”, “day_time zone” folder, and “serial number” folder are created hierarchically under the “Image Path”, and the image file is saved in the “serial number” folder.

✓ **When [Job ID] is selected in the [Additional Path]**
A “Job ID” folder and “serial number” folder are created hierarchically under the “Image Path”, and the image file is saved in the “serial number” folder.

✓ **When [Job ID / Date] is selected in the [Additional Path]**
A “Job ID” folder, “year / month” folder, “day_time zone” folder, and “serial number” folder are created hierarchically under the “Image Path”, and the image file is saved in the “serial number” folder.

✓ **When [Date / Job ID] is selected in the [Additional Path]**
A “year / month” folder, “day_time zone” folder, and “serial number” folder are created hierarchically, and the image file is saved in the “serial number” folder.

✓ **When [None] is selected in the [Additional Path]**
The image log file is directly saved in the “Image Path”.

Note

- The “serial number” folder is created as 2, 3, ... in an order starting from 1.
- A maximum of 500 files are saved in the “serial number” folder. If the number of files exceeds 500, an additional “serial number” folder is created, and the 501st file and thereafter are saved to the additional “serial number” folder.

Configuration of the image log file name

The configuration of the image file name can be set from [File Name] - [Configuration Element] under [Log Output Settings]. The configuration elements and setting values are as described below.

Configuration element	Setting value
Judgment result	OK or FAIL
Reference ID	A reference ID set with 0 to 50 characters. * If blank (0 characters), the reference ID is not applied to the file name, and is saved as a continuing underscore.
Job ID	Corresponding job ID containing 1 to 50 characters.
Instruction Step Name	Corresponding instruction step name containing 1 to 50 characters.
Inspection Step Name	Corresponding inspection step name containing 1 to 50 characters.
Time Zone	The time zone defined in [Regional Settings].
User ID	A user ID containing 1 to 32 characters.
Date (Required)	Time when the judgment is complete. * This item cannot be deleted.

Example: The image file name when each of the items of [Judgment Result], [Reference ID], [Job ID], [Instruction Step Name], [Inspection Step Name], and [Date(Required)] is selected in an order starting from the top, and when the contents of each item are as described below.

Judgment Result: OK
Reference ID: R000
Job ID Name: id-1
Instruction Step Name: work-1
Inspection Step Name: function-1
Time: 2022/01/31 23:59:59

Generated file name: OK_R000_id-1_work-1_function-1_20220131_235959.jpg

15. Exporting/Importing Data

Data Type and [Import/Export] Screen

The following data saved in the device can be saved (exported) to another storage. Some data can also be imported to the device. As a result, it is possible to take a data backup and use the same settings in a different camera.

Important

- This function can be executed only in the [Administrator Mode].

✓ System Settings (Export/Import)

This is the system settings data including the following data. It is exported in a unique format (extension: .camsetting). Exported data can be used for import.

- Settings other than [Job ID Settings] in the [Job Settings] menu (→P. 34)
- Each setting in the [System Settings] menu (→P. 35)
- Created user data (including the password) (→P. 38)

Note

- System-specific information such as the serial number and MAC address is not included.

✓ Job ID Data (Export/Import)

Data of all job IDs created in “Creating a Workflow” (→P. 40).The instruction step file and master image during matching mode are also included. It is exported in a unique format (extension: .camwork). Exported data can be used for import. Some of the data of the parameter file (extension: .xml) in which the workflow information of the RICOH SC-10A is saved can be imported (→ P. 117).

Important

- There are some variations in camera images in each system. Therefore, it is not necessary that the same results are obtained by importing the job ID data to different systems. Re-adjustments are required.

✓ Job Log (Export)

All data of “Job Log” that can be checked from the viewer of the main unit (→P. 108).It is exported in the CSV format (extension: .csv). The CSV format is the same as the Real-time CSV Output format of the job log.

Reference

- Checking from the job log file (→P. 110)

✓ System Log (Export)

All data of “System Log” that can be checked from the viewer of the main unit (→P. 111).It is exported in a unique format (extension: .dat). It is expected to be used for error analysis, etc.

The export or import of the [System Settings], [Job ID Data], [Job Log], and [System Log] can be performed from the [Import/Export] screen. Select [Import/Export ...] from the [File] menu (→P. 34).

Note

In addition, the following data can be exported or imported.

- Export of job ID data list (→P. 58)
- Import of alias (→P. 60)
- Saving (export) of sensor settings / Import of sensor settings (→P. 98)

Exporting

This operation is executed from the [Import/Export] screen.

Important

- Depending on the data size, it may take a very long time for processing. Do not turn OFF the power of the device during the operation.
- Perform the operation after ensuring that there is enough free space in the export-destination storage.

1. Click the [Export] button for the data to be exported.

The [File Dialog] screen appears.

2. Specify the save-destination folder and file name for export, and then click the [Execute] button.

The progress status is displayed on the [Progress] screen.

3. When [Complete] is displayed, click [Close].

The data is saved with the specified file name.

Importing

This operation is executed from the [Import/Export] screen.

Important

- **Never turn OFF the power of the device during the import operation. The device may not start up.**
- Depending on the data size, it may take a very long time for processing.
- The device must be restarted after import.
- During the import processing, all the target internal data is overwritten. In view of a failure, it is recommended to take a backup in advance during export.
- During the import of [System Settings], all the user data is also overwritten. Take note when logging in after restart.

1. Click the [Import] button for the data to be imported.

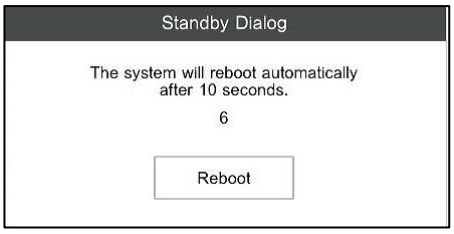
The [File Dialog] screen appears.

2. Specify the file name for import, and then click the [Execute] button.

The progress is displayed on the [Progress] screen.

3. When [Complete] is displayed, click [Close].

A standby dialog box is displayed. The system restarts after 10 seconds. The system restarts immediately when the [Reboot] button is clicked.



Job ID Data: Import the parameter file of the RICOH SC-10A

By using the parameter file of the RICOH SC-10A (extension: .xml) as the import file of the job ID, some of the job ID data can be imported. The settings that are imported are described below.

Important

- For settings that are out of scope of import, the default values of this device are set.
- The job ID data immediately after being imported is in an incomplete state, and the workflow cannot be executed as is. Be sure to revise the job ID data, and use it after corrections (→ P. 40).

■ **Settings of the Job ID / Instruction Step / Inspection Step (Common)**

Supported setting items			
Category 1	**Category 2**	**Setting item**	**Remarks**
Job ID Settings	-	Job ID	
Job ID Settings	Job ID	Enable	
Job ID Settings	Job ID	Infinite Loop Mode	
Sensor Settings	Others	Inverted	
Sensor Settings	Exposure	Auto / Manual Input	
Sensor Settings	White Balance	Auto / Manual Input	
Job ID Settings	-	Instruction Step	
Job ID Settings	Instruction Step	Instruction Step Image Path	The path configuration is not compatible with this device, and therefore, must be revised.
Job ID Settings	-	Inspection Step	
Inspection Step Settings	-	Mode	S/N is the [Data Input] mode.
Inspection Step Settings	Time	Disable	
Inspection Step Settings	Time	Standard (sec)	
Inspection Step Settings	Time	Limited (sec)	
Inspection Step Settings	Save Image	OK	
Inspection Step Settings	Save Image	FAIL	
Inspection Step Settings	Save Image	Area	
Inspection Step Settings	External Output	OUT0	
Inspection Step Settings	External Output	OUT1	
Inspection Step Settings	External Output	OUT2	
Inspection Step Settings	External Output	OUT3	

■ **Settings of the Inspection Step (Matching Mode)**

Supported setting items			
Category 1	**Category 2**	**Setting item**	**Remarks**
Matching	-	Flow	

■ **Settings of the Inspection Step (Check Mode)**

Supported setting items			
Category 1	**Category 2**	**Setting item**	**Remarks**
Check	Judgment Conditions	Timeout	
Check	Judgment Conditions	OK	
Check	Judgment Conditions	FAIL	

■ **Settings of the Inspection Step (Data Input Mode)**

Supported setting items			
Category 1	**Category 2**	**Setting item**	**Remarks**
Data Input	-	Part No.	
Data Input	Comparison	Start Point	
Data Input	Comparison	Num. of Char.	
Data Input	Comparison	String	

16. Enabling the Option Functions

Enable (activate) the option functions of this device so that they can be used.

A license file is required to enable the option functions.
For information on obtaining and enabling the license file, see the RICOH website.
https://industry.ricoh.com/en/fa_camera_lens/ics/sc-20/option_function

Important

- The enabled option functions cannot be disabled.
- The enabled option functions are not disabled even after initializing/deleting the internal data (→P. 134) and updating the software (→P. 136).
- The license file is a file unique to the unit that is specified during issue. It cannot be used with another unit.

Reference

- Option Functions (→P. 122)

1. Log in to the device as an administrator (→P. 31).

2. Click [System Information ...] from the [Help] menu.

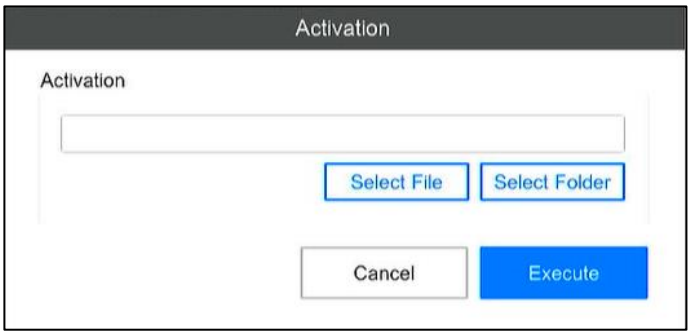
The [System Information] screen appears.

Reference

- System Information Screen (→P. 37)

3. Click the [Activation] button.

The [Activation] screen appears.



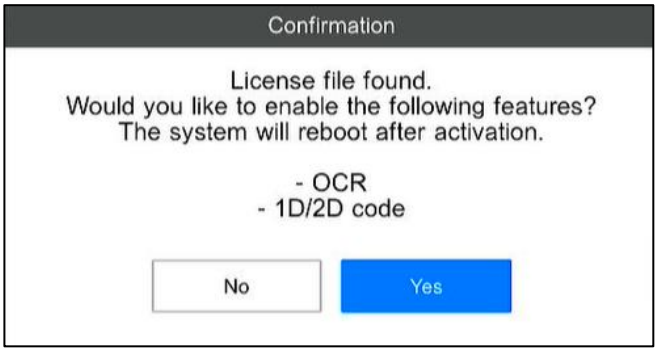
4. Click the [Select File] button and select the license file. Alternatively, click the [Select Folder] button and specify the folder in which the license file is saved.

Note

- All license files that can be used in the local device from among those present immediately below the folder specified in [Select Folder] are loaded. For example, if license files for the local device and for another unit are present in the folder, only the license files for the local device will be loaded.

5. Click the [Execute] button.

The [Confirmation] screen appears. The option functions to be enabled are displayed on the confirmation screen.



6. Click [Yes].

Activation is performed and the system restarts.

Note

- Whether the option functions have been enabled can be confirmed on the [System Information] screen (→P. 37).

17. Option Functions

The device has option functions. Activation is necessary for using the option functions.

Reference

- Enabling the Option Functions (→P. 120)

1D/2D Code Function

The 1D codes (barcode) and 2D codes are read from the camera images.
This function can be used for the following purposes.

- Input of [User ID] during login (→P. 31)
- Data input in inspection steps (data input mode) during the workflow (→P. 55)
- Input of [Job ID] and [Reference ID] during the execution of workflow (→P. 100)

The 1D/2D codes that can be read are as described below. The type of the 1D codes is determined automatically while reading. The 2D codes need to be specified.

1D codes (determined automatically)	2D codes (selected manually)
• 2/5 Industrial • 2/5 Interleaved • Codabar • Code 39 • Code 32 (converted from Code 39) • Code 93 • Code 128 • MSI • PharmaCode • EAN-8 • EAN-8 Add-On 2 • EAN-8 Add-On 5 • EAN-13 • EAN-13 Add-On 2 • EAN-13 Add-On 5 • UPC-A • UPC-A Add-On 2 • UPC-A Add-On 5 • UPC-E • UPC-E Add-On 2 • UPC-E Add-On 5 • GS1-128 • GS1 DataBar Omnidirectional • GS1 DataBar Truncated • GS1 DataBar Stacked • GS1 DataBar Stacked Omnidirectional • GS1 DataBar Limited • GS1 DataBar Expanded • GS1 DataBar Expanded Stacked	• Aztec • Data Matrix ECC 200 • Dot • Micro QR • PDF417 • QR

Note

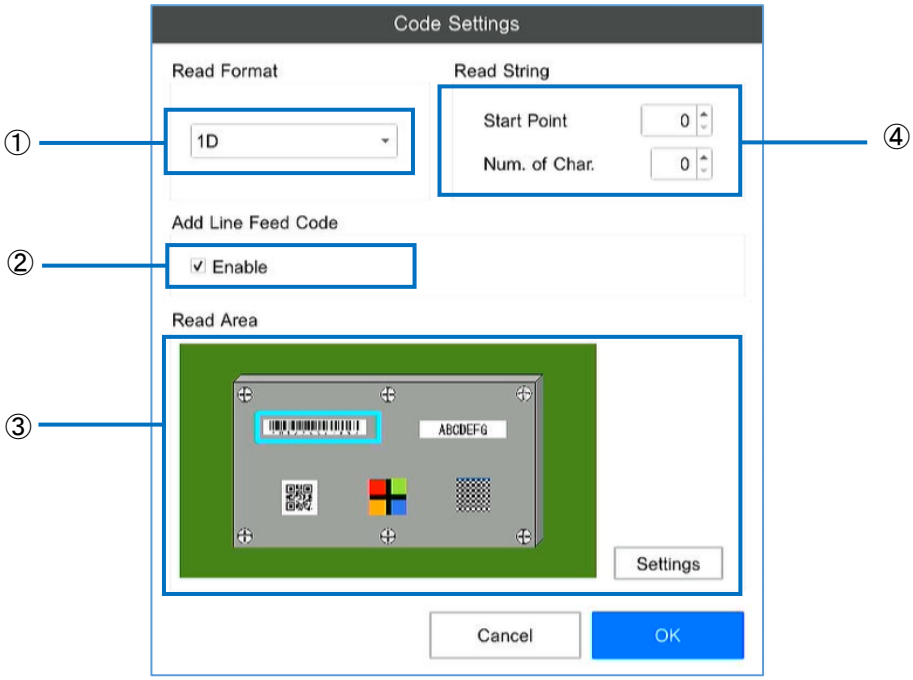
- The 1D/2D codes can be read even if rotated.

Important

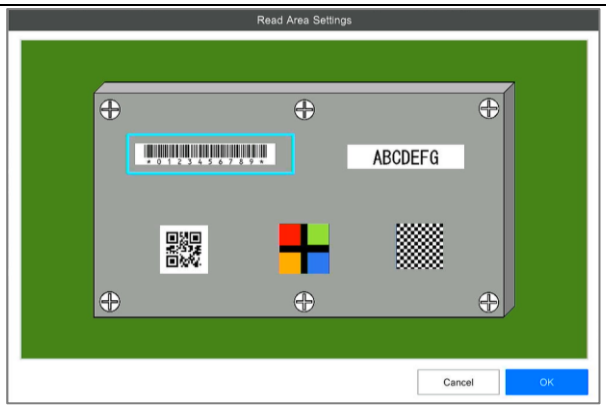
- The 1D/2D codes are used by cutting off a part of the read string, and the cut-off start position and number of characters are decided according to the [Read String] on the [Code Settings] screen.
- Maximum reading area size is 1920 x 1080.

Code Settings screen

Set the 1D/2D codes on the [Code Settings] screen. The startup method of the [Code Settings] screen varies depending on the purpose.



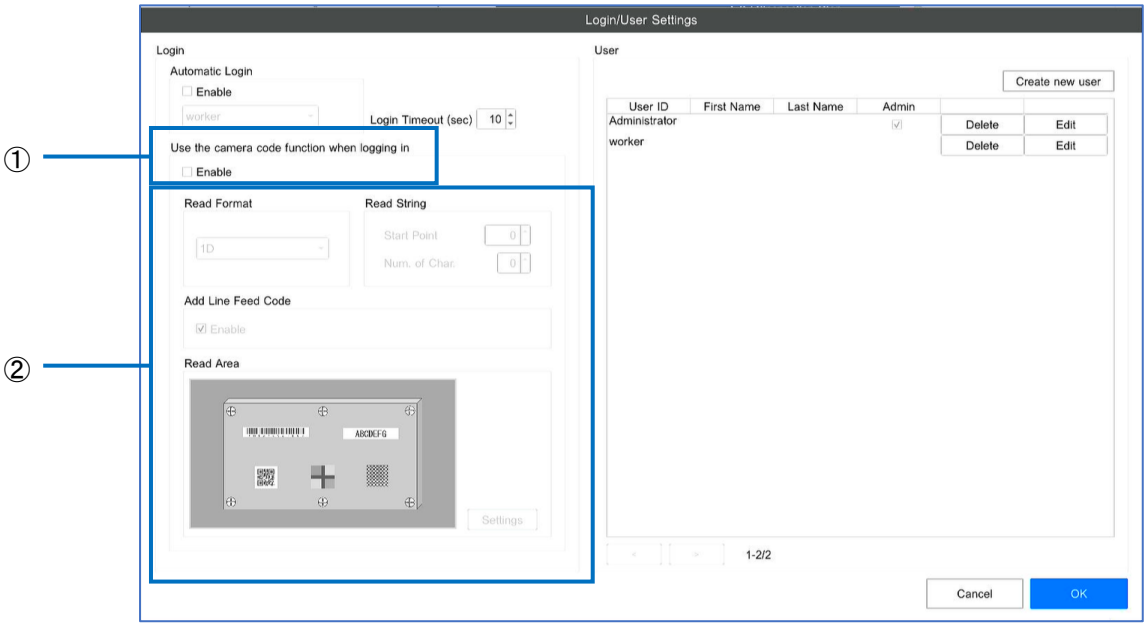
①	Read Format	Set the code to read or mode. • [1D]: Reads the 1D barcode. • [Aztec]: Reads the Aztec format of the 2D code. • [Data Matrix ECC 200]: Reads the Data Matrix ECC 200 format of the 2D code. • [Dot]: Reads the Dot format of the 2D code. • [Micro QR]: Reads the Micro QR format of the 2D code. • [PDF417]: Reads the PDF417 format of the 2D code. • [QR]: Reads the QR format of the 2D code.
②	Feed Code	If this checkbox is selected, a feed code is added at the end of the read string. After reading, the operation is performed in the same way as when the Enter key is pressed automatically.
③	Read Area	Set the position of the barcode reading area. • [Settings]: If clicked, a pop-up such as that shown in the figure below is displayed.

		 Operate the light blue frame with the mouse, adjust the barcode reading area on the camera screen, and then click [OK] to reflect the changes.
④	Read String	Set the conditions for the read string. • [Start Point]: Set the reading start point for the code string from 0 to 7088. The position is 0, 1, 2, ... in an order starting from the first. • [Num. of Char.]: Set the number of characters to read from the start point. The number of characters that can be read varies depending on the purpose. If 0 is set, the maximum number of characters that can be used for the purpose are read. **Note** The string and the maximum number of characters that can be read vary depending on the purpose.

Input of [User ID] during login

1. Enabling the function and making read settings

Click [Login/User Settings ...] from the [System Settings] menu to enable the function and make the read settings on the [Login/User Settings] screen.

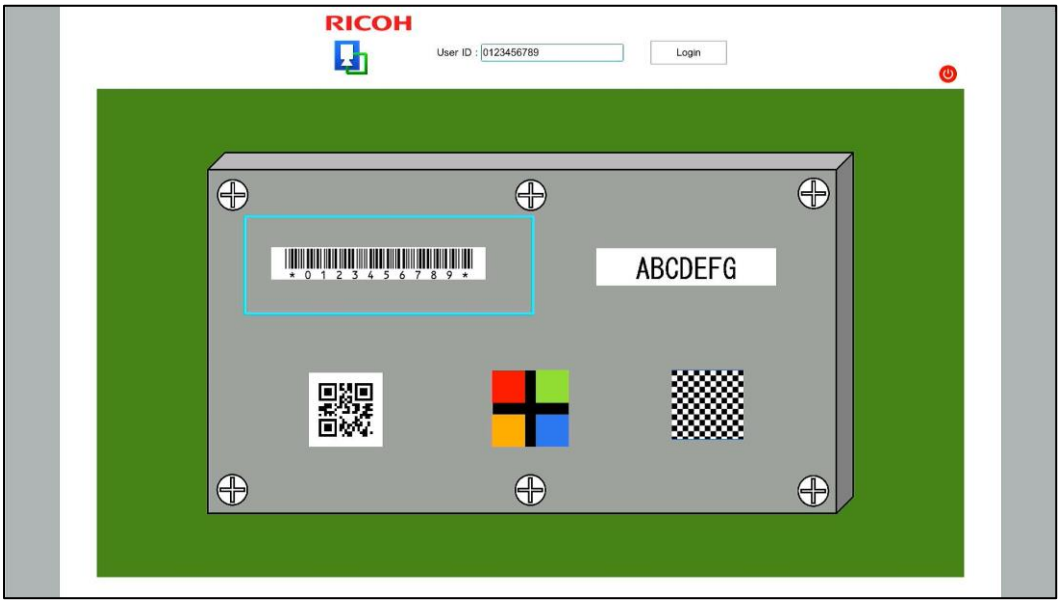


①	Use the camera code function when logging in	If [Enable] is selected, 1D/2D code reading can be used on the user ID input screen of the Login screen.
②	Code Settings screen	Set the read format for 1D/2D codes. The maximum [Num. of Char.] of the [Read String] is 32. Reference • Code Settings screen (→P. 123)

Reference
- Login/User Settings (→P. 66)

2. Using the function

If the function is enabled, the Login screen changes to a code login screen such as that shown below.



If the 1D/2D code is displayed in the read area (cyan frame), the code is read as the user ID according to the setting.
If [Add Line Feed Code] is set to [Enable], the operation of clicking the [Login] button (login execution) is automatically performed after reading.

The processing hereafter is same as the regular operation performed on the Login screen.

Note

- Login can be performed through manual input on the code login screen as well. However, the input is overwritten when the 1D/2D codes are read.
- If the user ID is an administrator user, the [Password Input] screen is displayed. The password must be entered manually.
- The user ID that can be used and the function restrictions are the same as when login is performed through manual input.

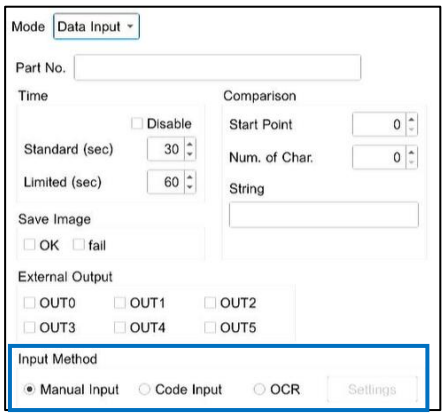
Reference

- Logging In (→P. 31)

Data input in inspection steps (data input mode) during the workflow

1. Enabling the function and making read settings

The settings can be configured from the parameter settings screen of the inspection steps (data input mode) created on the [Job ID Settings] screen.



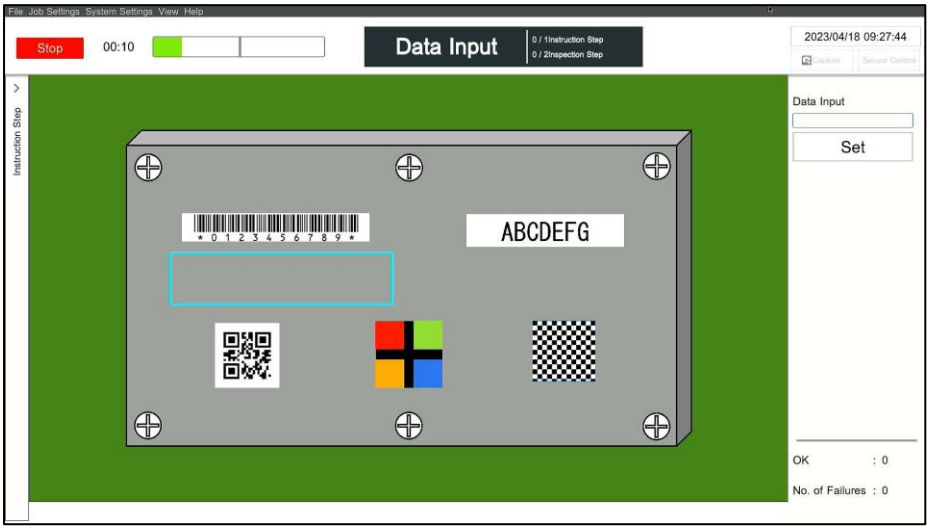
- By selecting [Code Input] as the [Input Method], the reading of the 1D/2D code can be used for the input in the data input mode.
- If you click the [Settings] button, the [Code Settings] screen is displayed, and the read settings can be made. The maximum value of the [Num. of Char.] of the [Read String] on the [Code Settings] screen is 100.

Reference

- Data input mode parameters (→P. 55)
- Code Settings screen (→P. 123)

2. Using the function

When the inspection step (data input mode) for which the function is enabled is executed during the execution of the workflow, a 1D/2D code read area (cyan frame) is displayed on the camera image.



If the 1D/2D code is displayed in the read area (cyan frame), the code is read as the input data for data input according to the setting.
If [Add Line Feed Code] is set to [Enable], the operation of clicking the [Set] button (input judgment) is automatically performed after reading.

Note

- Data input can be performed through manual input during the use of code input as well. However, the input is overwritten when the 1D/2D codes are read.
- The restrictions on data that can be entered are the same as for manual input.

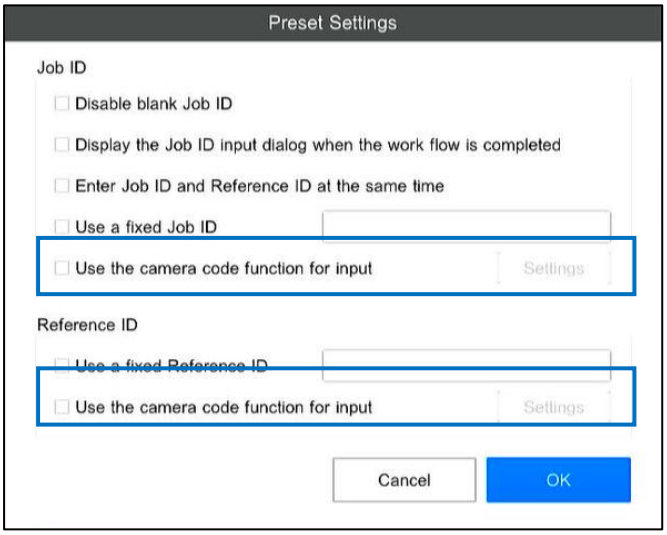
Reference

- **Applying** (→P. 100)

Input of [Job ID] and [Reference ID] during the execution of workflow

1. Enabling the function and making read settings

The settings for enabling the function and the read settings can be configured on the [Preset Settings] screen displayed by clicking [Preset Settings ...] from the [System Settings] menu.



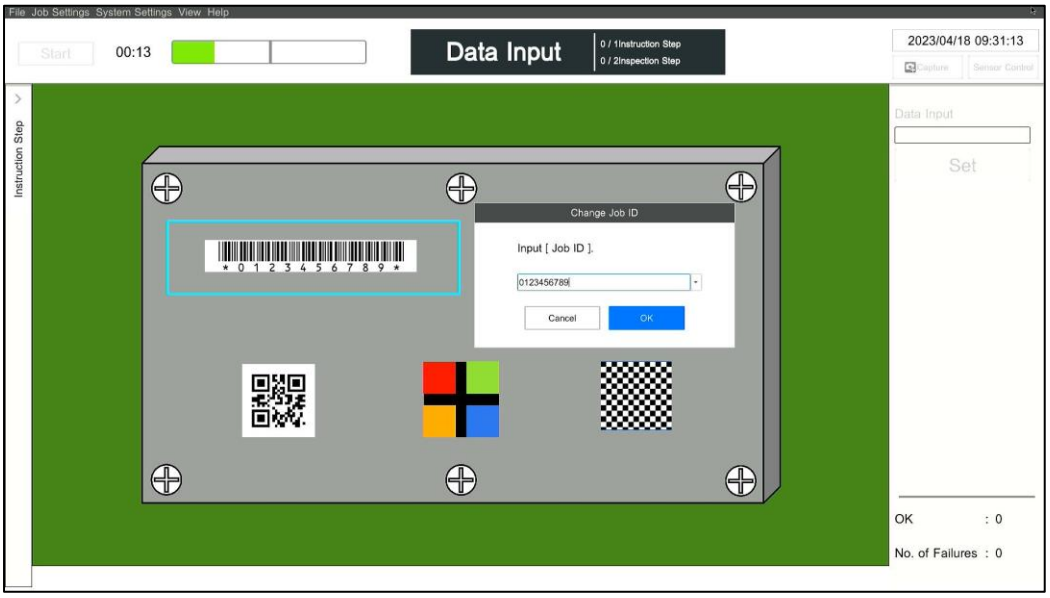
- By selecting [Use the camera code function for input], the reading of the 1D/2D code can be used for each input in the [Job ID] and [Reference ID] during the execution of the workflow.
- If you click the [Settings] button, the [Code Settings] screen is displayed, and the read settings can be made. The maximum value of the [Num. of Char.] of the [Read String] on the [Code Settings] screen is 50.

Reference

- Preset Settings (→P. 67)
- Code Settings screen (→P. 123)

2. Using the function

When the function is enabled, the 1D/2D code read area (cyan frame) is displayed on the camera image while the [Job ID] and [Reference ID] input screen is being displayed during the execution of the workflow.



If the 1D/2D code is displayed in the read area (cyan frame), the code is read as the input data for [Job ID] and [Reference ID] according to the setting.
If [Add Line Feed Code] is set to [Enable], the operation of clicking the [OK] button is automatically performed after reading.

Note

- Data input can be performed through manual input during the use of code input as well. However, the input is overwritten when the 1D/2D codes are read.
- The restrictions on data that can be entered are the same as for manual input.

Reference

- **Applying** (→P. 100)

OCR Function

This is a function for reading strings from the camera images using an OCR.
This function can be used for the following purposes.

- Data input in inspection steps (data input mode) during the workflow (→P. 55)

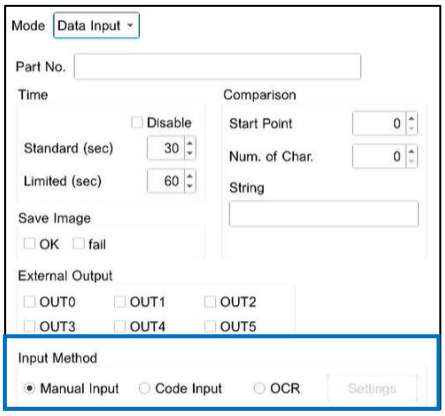
Important

- Only single-byte upper-case alphabets and numbers can be read.
- Rotated text cannot be read correctly.
- Reading may not be performed correctly depending on the font and shape of letters.
- Maximum reading area size is 1920 x 1080.

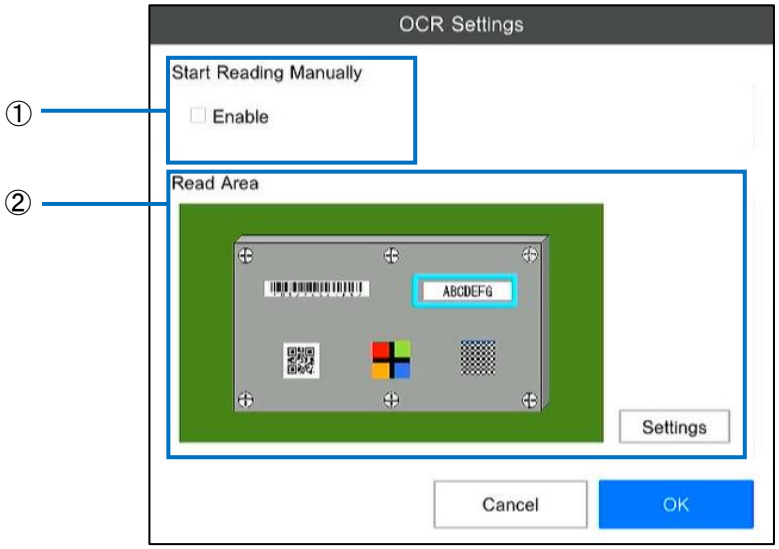
Data input in inspection steps (data input mode) during the workflow

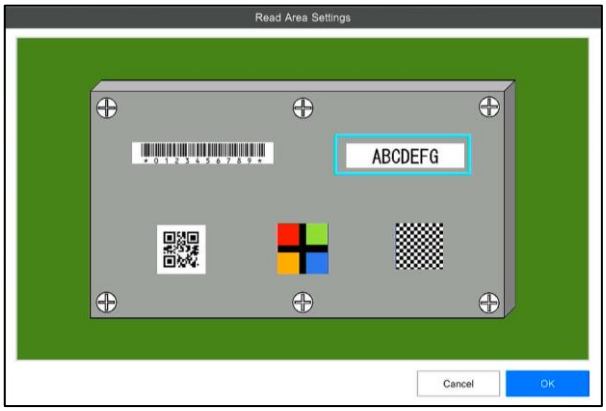
1. Enabling the function and making read settings

The settings can be configured from the parameter settings screen of the inspection steps (data input mode) created on the [Job ID Settings] screen.



- By selecting [OCR] as the [Input Method], the reading of strings by OCR can be used for the input in the data input mode.
- If you click the [Settings] button, the [OCR Settings] screen is displayed, and the read settings can be made.



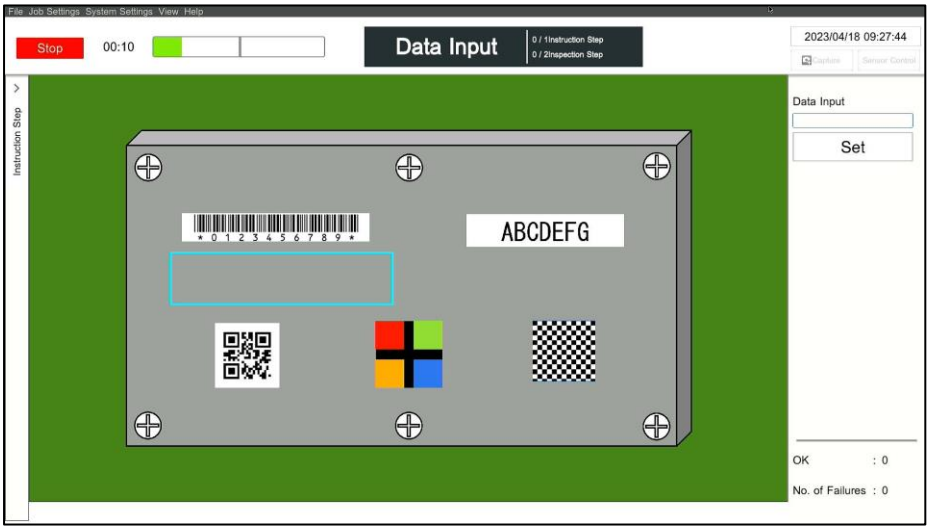
①	Start Reading Manually	• [Enable]: If this checkbox is selected, it becomes necessary for the user to perform an action (such as clicking the button) during reading.
②	Read Area	Set the position of the OCR reading area. • [Settings]: If clicked, a pop-up such as that shown in the figure below is displayed.  Operate the light blue frame with the mouse, adjust the OCR reading area on the camera screen, and then click [OK] to reflect the changes.

Reference

- Data input mode parameters (→P. 55)

2. Using the function

When the inspection step (data input mode) for which the function is enabled is executed during the execution of the workflow, an OCR read area (cyan frame) is displayed on the camera image.



If the string is displayed in the read area (cyan frame), the OCR is read as the input data for data input according to the setting.
If [Add Line Feed Code] is set to [Enable], the operation of clicking the [Set] button (input judgment) is automatically performed after reading.

Note

- Data input can be performed through manual input during the use of OCR input as well. However, the input is overwritten when a string is read by OCR.
- The restrictions on data that can be entered are the same as for manual input.

Reference

- **Applying** (→P. 100)

18. Initializing/Deleting the Internal Data

Initialize or delete the internal data of this device. The data to be initialized/deleted is as described below.

- System Settings
- Job ID Data
- Job Log

Reference

- Data Type and [Import/Export] Screen (→P. 114)

Important

- **Never turn OFF the power of the device during processing. The device may not start up.**
- Deleted data cannot be restored. If necessary, export and take a backup of data before deleting (→ P. 116).
- If you initialize [System Settings], all the user data is also initialized. Log in as the initial administrator user when logging in after reboot.

1. Log in to the device as an administrator (→P. 31).

2. Click [Initial Settings ...] from the [System Settings] menu.

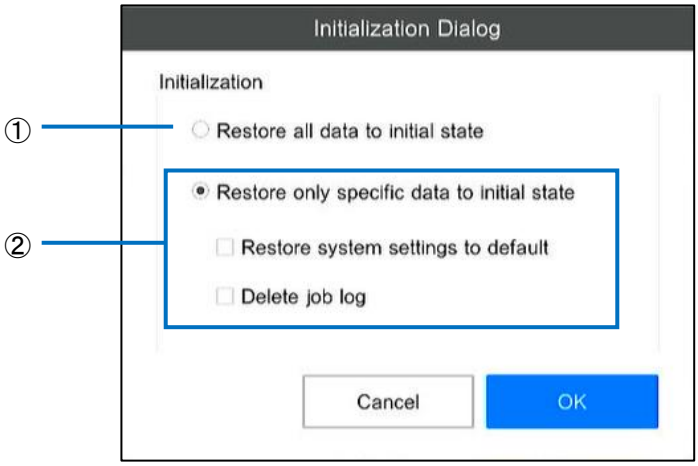
The [Initial Settings] screen appears.

Reference

- Initial Settings (→P. 64)

3. Click the [Reset] button.

The [Initialization Dialog] screen appears.



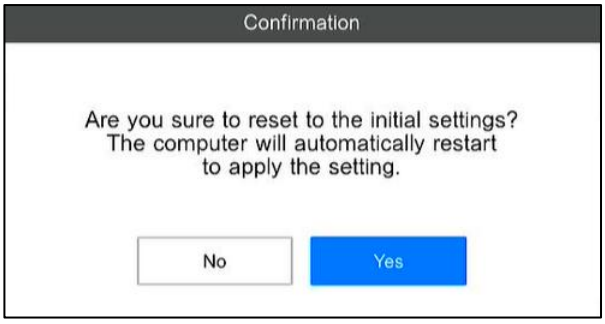
4. Select the data to initialize/delete.

①	Restore all data to initial state	Initializes or deletes all the internal data. • Sets the “System Settings” to the initial state. • Sets the “Job ID data” to the initial state. • Deletes the “Job Log”.
②	Restore only specific data to initial state	If this item is selected, the following can be selected individually.

		• [Restore system settings to default]: Sets the “System Settings” to the initial state. • [Delete job log]: Deletes the “Job Log”.

5. Click the [OK] button.

The [Confirmation] screen appears.



6. Click [Yes].

The selected internal data is initialized/deleted, and the system restarts.

Note

- If you initialize the “System Settings”, the [Initial Settings] screen is displayed after reboot (→ P. 29).

19. Updating the Software

Update the software of this device. Update takes around 5 to 10 minutes.

Important

- **Never turn OFF the power of the device while updating. The device may not start up.**
- A free space of 2 GB in the built-in memory is required for performing update. The free space in the built-in memory can be checked from the [Storage Settings] (→ P. 78).
- If you perform update, the [System Log] is deleted. The other internal data is retained (→ P. 114).Moreover, data saved by the user is also retained in the internal memory.
- Remove unnecessary devices before updating.

1. Access the website below and download the update file (sc-20_a_b_c_d.sc20)* to a storage that can be accessed by this device.

https://industry.ricoh.com/en/support/fa_camera_lens/download/soft/

* a, b, c, d vary depending on the version.

Reference

- Storage Settings (→P. 78)

2. Log in to the device as an administrator (→P. 31).

3. Click [System Information ...] from the [Help] menu.

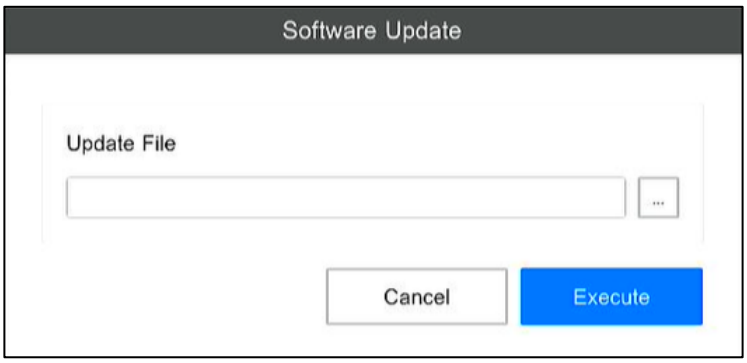
The [System Information] screen appears.

Reference

- System Information Screen (→P. 37)

4. Click the [Software Update] button.

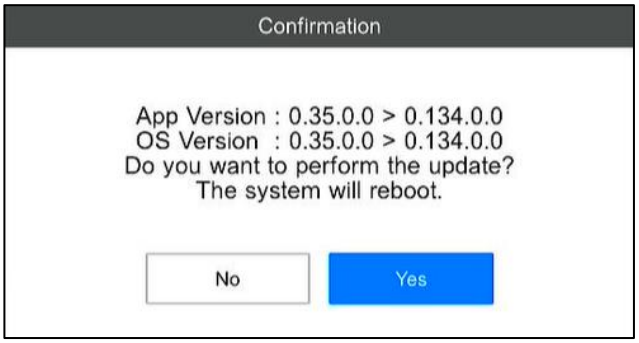
The [Software Update] screen appears.



5. Click the ... button and select the update file.

6. Click the [Execute] button.

The [Confirmation] screen appears. The current version of the application and OS, and the version after update are displayed on the confirmation screen as “Current version > Version after update”.



7. Click [Yes].

Preparations are made to perform update, and the system restarts. It takes up to one minute for the system to restart after the completion of preparation.

Important

- Screen updates, such as the time, are halted during preparation.

8. Update is performed, and the system restarts automatically after completion.

- The screen below appears and update is performed. It takes around 5 minutes for update to complete.

- While update is being performed, the “FAIL judgment LED (red)” and the “OK judgment LED (green)” light up, and the “Power LED (green)” flashes.
- When update is complete, the “Power LED (green)” lights up, a beep is heard, and the system restarts automatically. The [Login] screen appears after restarting.

Reference

- Names of Parts（→P. 15）

Important

- Do not operate the device while updating. Do not turn OFF the power of the device.

Note

- The software version can be confirmed on the [System Information] screen (→P. 37).

20. Troubleshooting

Symptom	Cause	Action
The camera does not start.	The power supply is not connected.	Use an AC adapter or external cable to properly connect the device to the power supply.
The keyboard and mouse cannot be operated.	They are not connected properly.	Properly connect the device, keyboard, and mouse with USB cables.
The USB device is not recognized.	The current supplied to the USB device is insufficient.	Use a USB hub that supplies power using an AC adapter or other means.
	A device that cannot be used with this device is being used.	Some USB Hubs cannot be used with this device. Use another USB Hub.
Images are not displayed on the monitor.	The HDMI cable is not connected properly.	Properly connect the device and monitor 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 for approximately 15 seconds after pressing the power switch.
	The monitor does not support the output resolution of this device.	Use a monitor that supports the output resolution supported by this device. • 1080p (1920 x 1080 progressive)/60 Hz
Images are blurred.	The focus is not set correctly.	Adjust the focus according to the manual of the lens you are using.
Recognition is not performed. Incorrect recognition is performed.	The settings are not appropriate.	Adjust the matching similarity and judgment setting values. When [Color Recognition] is set, it is recommended to set the [Exposure] and [White Balance] under [Sensor Settings] to [Manual Settings].
	The distance at which the master 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 master image was captured.
The network cannot be connected.	The LAN cable is disconnected. (Wired network)	Insert the LAN cable into the wired LAN port.
	The cable is disconnected. The destination device has broken down. (Wired network)	The inserted LAN cable is either disconnected or the destination device may have broken down. Either replace the cable or check the status of the destination device.

Symptom	Cause	Action
	A connection cannot be established to the access point (AP). (Wireless network)	• The SSID or password for connecting to the AP may be incorrect. Check the AP information and network settings. • The AP may not have been turned ON, or the operation may be instable. Check the condition of the AP.
	The IP address cannot be assigned. (When the DHCP is enabled)	The DHCP server may not be running. Check with the network administrator.
	A connection cannot be established using the DNS name.	The DNS server address may be incorrect. Check with the network administrator.
	Mounting to the network storage is not possible.	• The setting items may be incorrect. Check each setting item. • An error may have occurred in the destination device or network path. Check with the network administrator.
The Bluetooth device cannot be found during search.	The target device has not been turned ON.	Turn ON the device.
	The target device is not set to the pairing mode.	Perform search after setting the device to the pairing mode. For details on how to set the device to the pairing mode, see the device manual.
The Bluetooth device cannot be connected.	The target device has not been turned ON.	Turn ON the device.
	The target device is not paired.	First pair the device and then connect it.
	The connection to the target device has timed out.	Press the [Connect] button under [Bluetooth Settings]. Alternatively, refer to the device manual and connect again.

Symptom	Cause	Action
Images are affected by a lot of noise.	The camera gain is high.	Increase the illuminance of the subject.
Flickering occurs in the image.	Flickering occurs.	When [Exposure] is set to [Auto] ・ Slightly narrow the lens aperture. ・ Slightly turn down the illuminance of the subject
		When [Exposure] is set to [Manual] Set the shutter speed to any of the following values: ・ 50 Hz area: 10 ms, 20 ms, 30 ms, 40 ms, 49.871 ms ・ 60 Hz area: 8.33 ms, 16.67 ms, 25 ms, 33.33 ms, 41.67 ms * Adjust the image brightness through the lens aperture.
Software update fails.	The built-in memory required for update is insufficient.	A free space of 2 GB in the built-in memory is required for updating. Save data to an external memory (USB, microSD card) to secure space in the built-in memory.
	The update file is corrupted.	Download the update file again.
The shortcut keys are not operating.	The buttons and menus are disabled.	If the buttons and menus disabled, the shortcut keys are also disabled.
Failed to perform real-time output of the job log, or to save the image log.	The free space in the save-destination storage is insufficient.	Delete unnecessary data from the save-destination storage to secure free space.
	The external storage set as the output destination does not exist.	Perform the operation again after connecting the external storage used during setup. Alternatively, again set the output destination in accordance with the current environment.
Failed to save the job log, or create a new job ID or save changes.	The built-in memory for internal data is insufficient.	Delete unnecessary job IDs. Also, initialize/delete the internal data. When deleting internal data, if necessary, export and take a backup of data.
The file name is garbled in the file dialog. It cannot be copied.	A character code that is not supported by this device is used.	This device cannot access files or folders that include double-byte characters. Use ASCII characters excluding “:”, “/”, “\”, “|”, “*”, “?”, “””, “<”, “>” in the folder names and file names.

21. Specifications

Item		Specifications
Lens mount		C mount
Image sensor		1/1.8 inch 4K (QFHD) progressive color CMOS
	Number of pixels	3840 (H) x 2160 (V)
	Cell size	2.0 (H) x 2.0 (V) μm
Instruction step	Instruction step file	JPG format (610 (H) x 680 (V))
Matching	Method	Shape, color, texture
	Area setting (ROI)	Specify area with absolute position
	Position correction	Relative position correction from reference position
	Position rotation correction	±180° (shape only)
	Number of simultaneous registrations	Maximum 20 places
Data input	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, instruction step, inspection step, date/time, standard time, elapsed time, process item, judgment result, final judgment result, image log file name, 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	1920 (H) x 1080 (V) / 60 Hz ∗ Audio output not supported
	USB	Type-A x1: USB3.0 Super Speed supported (Host) Type-C x1: USB3.0 Super Speed supported (Host) USB PD supported, USB DP Alt Mode not supported ∗ Supported class: USB-HID, USB-Mass Storage, USB-Audio
	Ethernet	RJ-45 x1 100Base-TX / 1000Base-T
	microSD card	microSD / SDHC / SDXC x1 High Speed / UHS-I supported
	External GPIO	OUT (insulated): 6 pieces IN (insulated): 10 pieces OUT/IN (insulated) power: 5 V to 24 V ±10%
	Wireless LAN (Models with a wireless communication system only)	IEEE802.11a/b/g/n/ac (2.4 GHz/5 GHz) compliant
	Bluetooth (Models with a wireless communication system only)	Bluetooth 5.0 BR/EDR Class 2 ∗ Supported profile: SDP, L2CAP, GAP, A2DP, HID
I/O	Buzzer	Electromagnetic (Volume: high, low, mute)
	LED indicator lamps	Power, OK, FAIL
	Switch	Power

Ratings	Power voltage	12 V DC ±10% (USB PD) 12/24 V DC ±10% (external connector) ∗ Power must not be supplied from both connectors at the same time.
	Power consumption	8.6 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
External dimensions		78 (W) x 73.5 (H) x 117.9 (D) mm (excluding attached lens and connectors)
Weight		Approx. 460 g
Mounting holes		Tripod screw hole (ISO 1222 compliant), M4 screw hole x 2

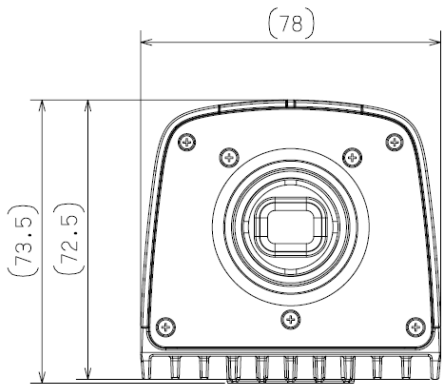
- **AC adapter (models including an AC adapter only)**

Item		Specifications
Product name		D-AC166-SC
Manufacturer		Adapter Technology Co., Ltd.
Ratings	Input voltage	100 to 240 V AC / 50 to 60 Hz
	Output voltage	+12 V ±5%
	Output current	3 A max.
External dimensions		33 (W) x 50 (H) x 99 (D) mm (excluding cable)
Weight		Approx. 210 g

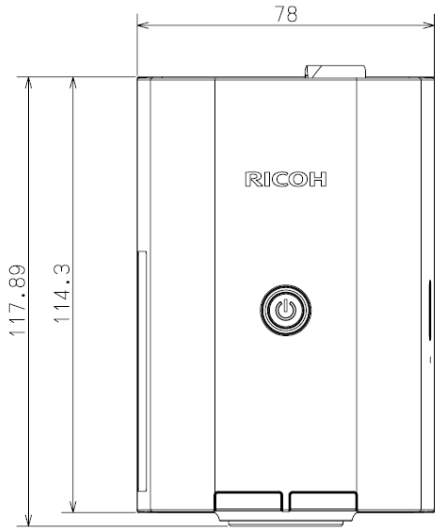
Outline Drawings

Unit: mm

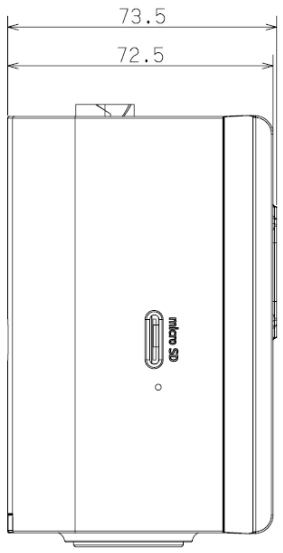
Front of unit:



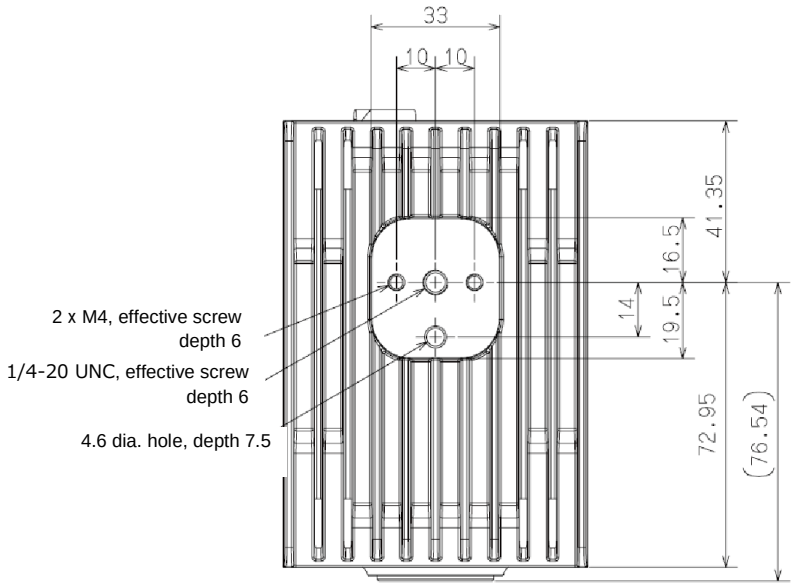
Top of unit:



Side of unit:



Bottom of unit:



22. Restrictions

- Language support
  Input of alphanumeric characters and symbols is supported. Japanese cannot be input.
  Folders with names containing double-byte characters may not be accessible. Use ASCII characters excluding “:”, “/”, “\”, “|”, “*”, “?”, “”, “<”, “>” in the folder names and file names.

- Monitor
  Monitors that do not support a 1920 x 1080 60 Hz input must not be used. Doing so may result in an accident.

- 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, or result in corruption of data.

- Hot plugging
  Hot plugging is not supported for microSD cards. If you wish to use a microSD card, connect the microSD card before turning the device ON.

- [Initial Settings] screen during first startup and screen while update is being executed
  Notations are only in English. National languages are not supported.

- USB speaker
  In some USB speakers, volume adjustment from software settings does not function. In such cases, adjust the volume on the device.

- USB Type-C Hub
  Some USB Type-C Hubs cannot be used with this device.

- USB Storage
  When removing the USB storage, be sure to select [Disconnect] from [Storage Settings] before removing it. Data corruption may occur.

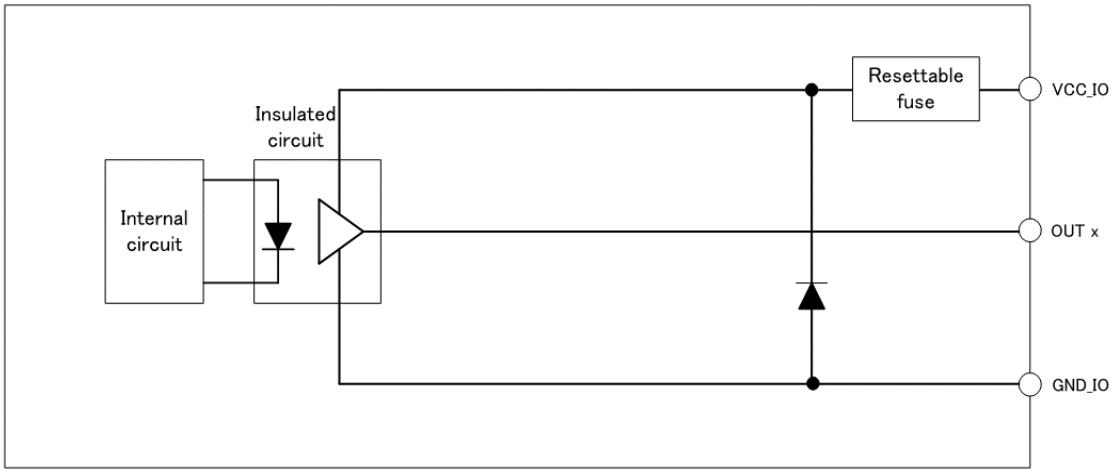
- system folder in internal memory
  The system folder in the internal memory (LOCAL) stores data provided by the system and cannot be written to. Do not delete or rename the system folder.

23. Appendix

External I/O (Insulated Input/Output) Specifications

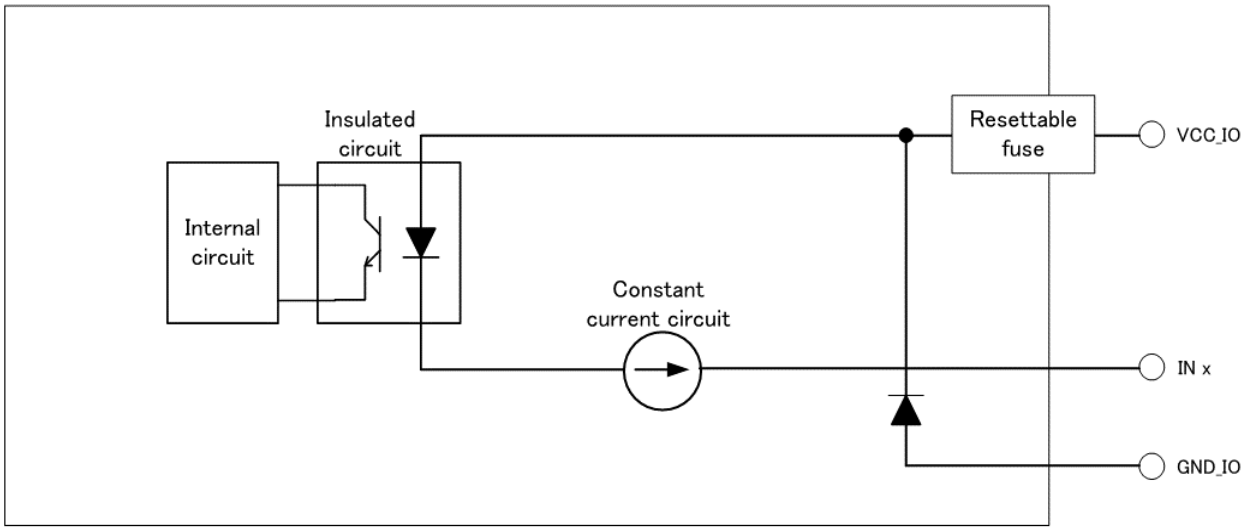
External output (insulated output) specifications:

[Functions]
Rated power voltage: 5 V to 24 V ±10%
Output current: 3 mA (Max)
Output voltage (source): VCC_IO-0.3 V @ 3 mA
Output voltage (sink): 0.3 V @ -3 mA
Output method: Push-pull
ON/OFF response time: 0.5 us or less / 0.25 us or less
Insulation system: Photocoupler
Electrostatic protection element: Present



External input (insulated input) specifications:

[Functions]
Rated power voltage: 5 V to 24 V ±10%
Input current: There is a constant current circuit (6 mA (typ)).
Input method: NPN open drain
ON current: 6 mA
ON/OFF response time: 10 us or less / 1000 us or less
Insulation system: Photocoupler
Electrostatic protection element: Present



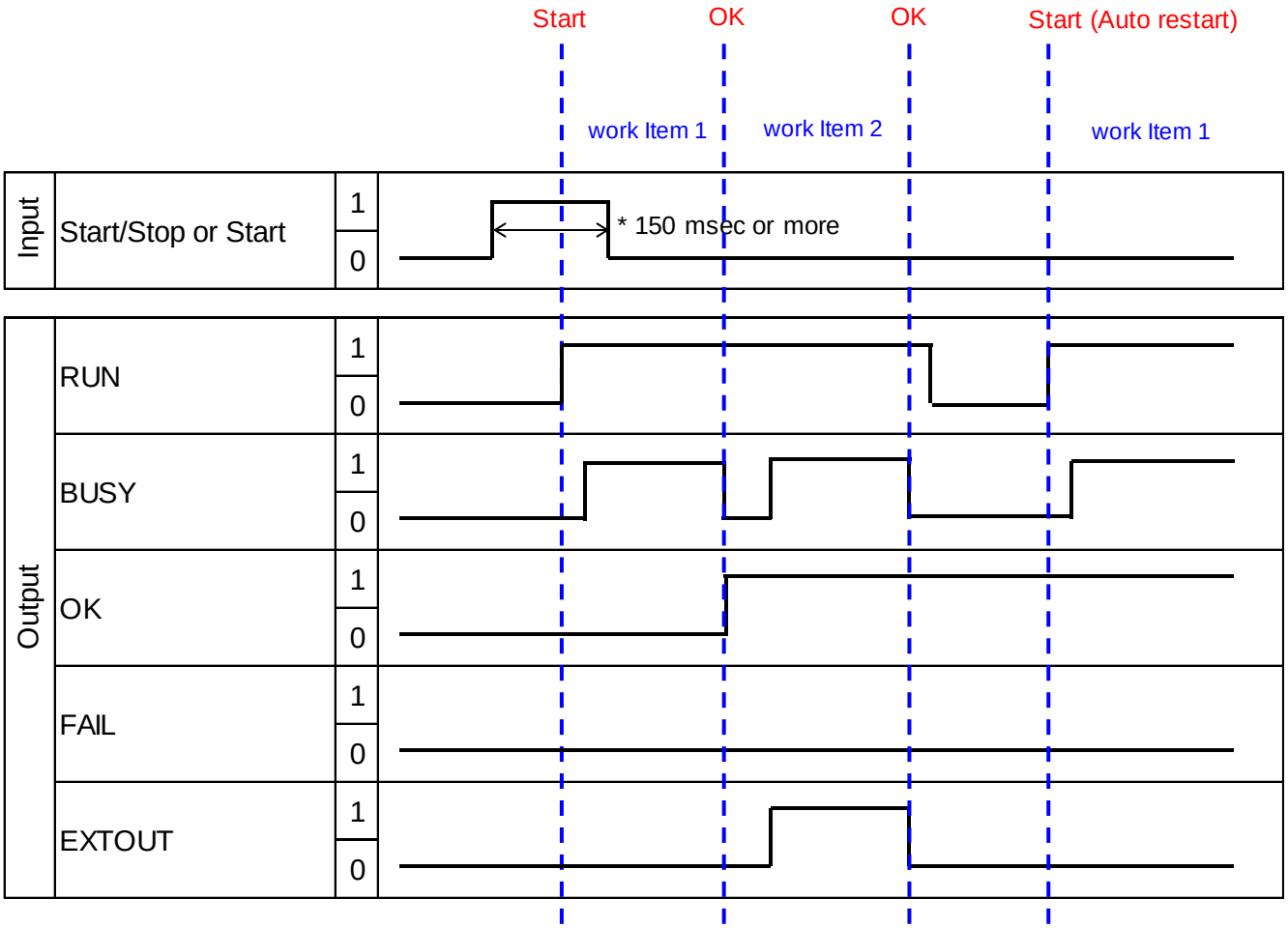
Timing Chart of External I/O

The timing of external I/O control is described below.
As for the detection timing of input signals other than PRESET, retain the enabled state for 150 msec or longer.

Note

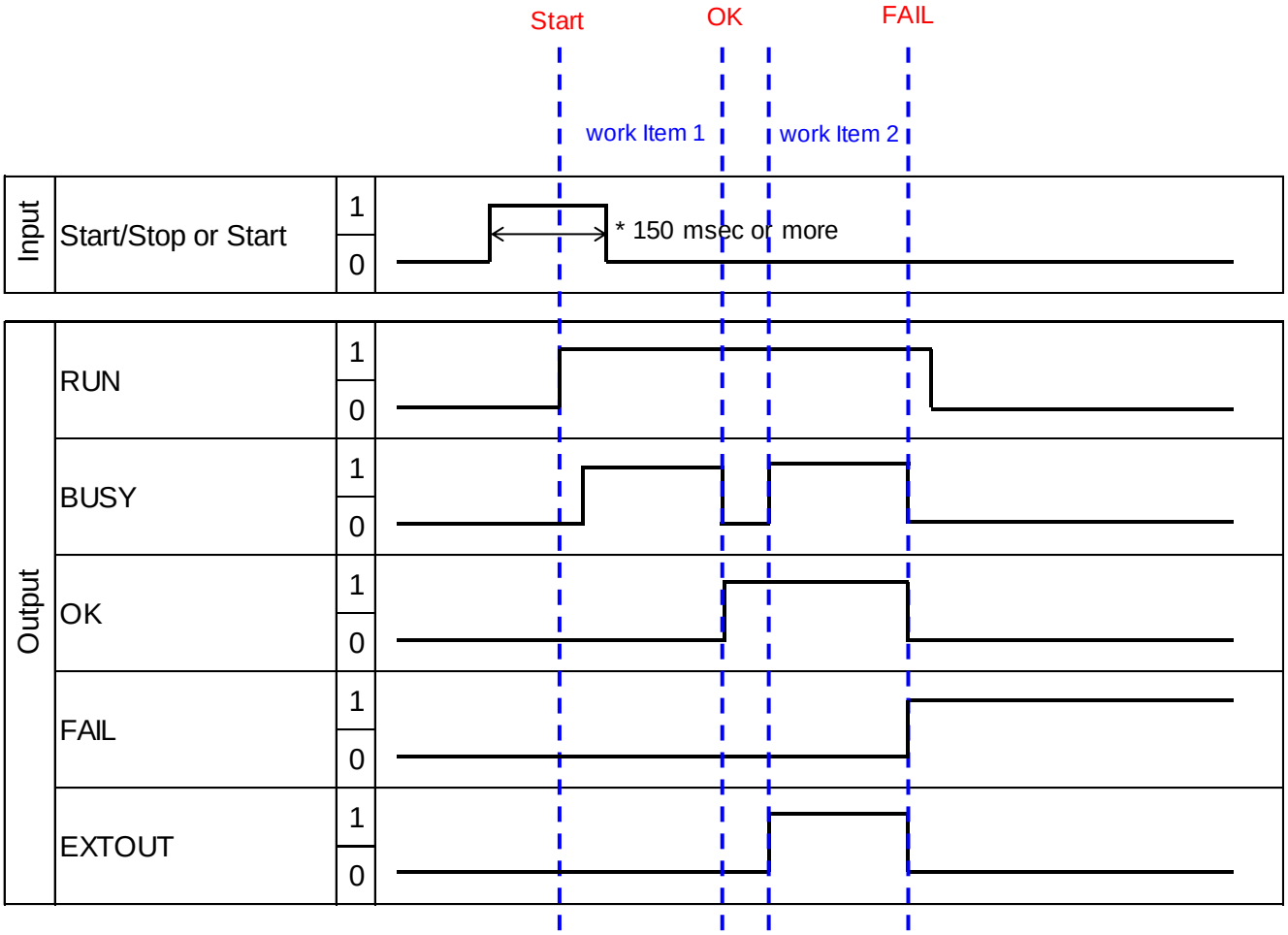
- The display in the figures indicates the following:
  1: The signal is enabled
  0: The signal is disabled
- The actual High/Low level varies depending on the polarity setting of [External I/O Settings ...].
- For details on the signal names, see each setting under [External I/O Settings ...]. (→P. 81)

Workflow OK judgment



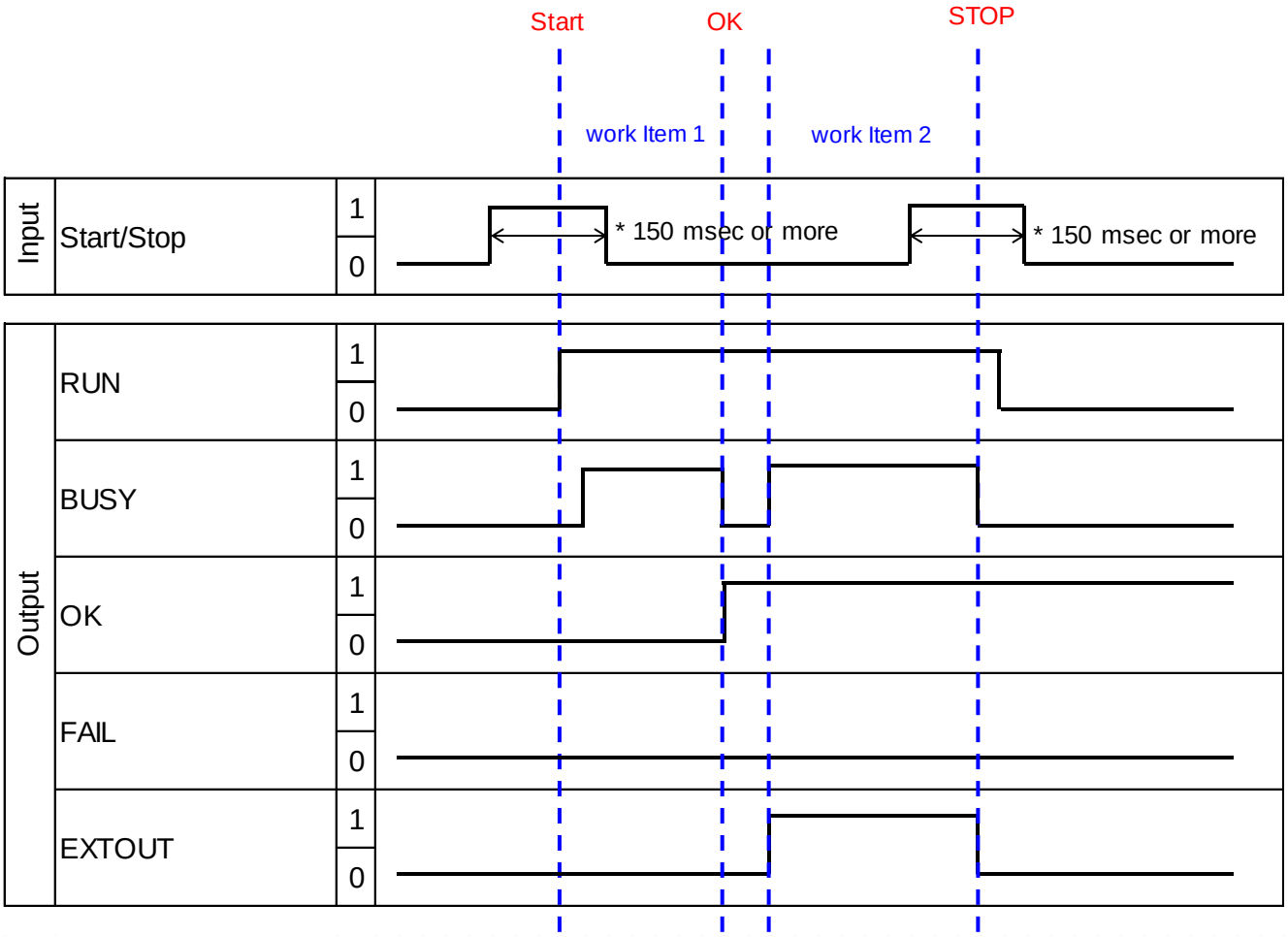
Workflow FAIL judgment

The flow when the inspection step is judged as FAIL is described below.
When the OK signal and the FAIL signal have been set and the OK signal rises, the signal is made to fall if a failure a detected, and instead, the FAIL signal is made to rise.



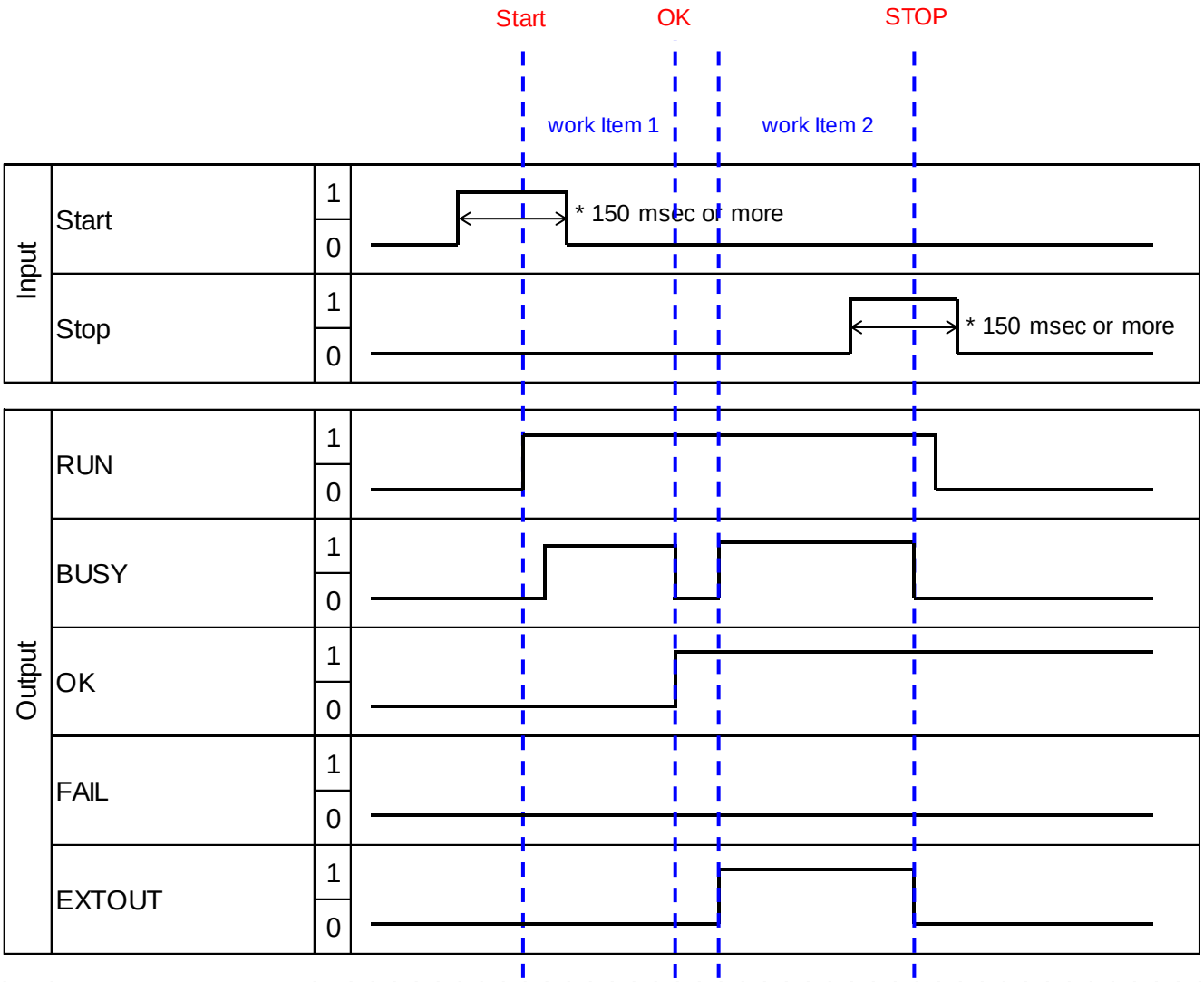
Execute STOP (Start/Stop)

The operation when STOP is executed is described below.
If start/stop is activated before the execution of the job ID, the job ID is set to the RUN state.
If start/stop is activated during the execution of the job ID, the job ID is set to the STOP state.
Both the RUN signal and BUSY signal turn OFF while the job ID is in the stopped state, and if an OK signal is detected, the ON state is retained.



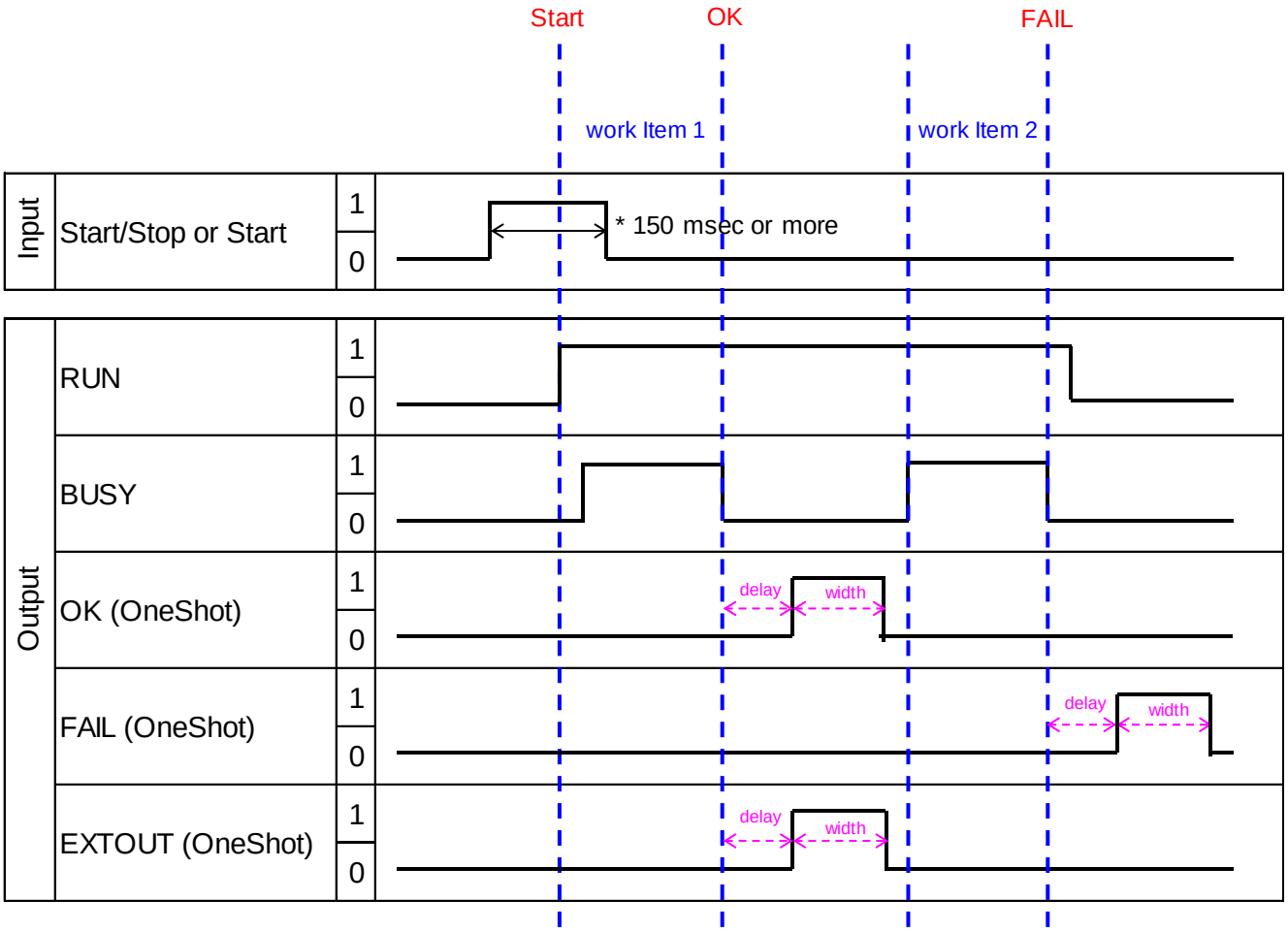
Execute STOP (Stop)

The operation when STOP is executed is described below.
If start is activated before the execution of the job ID, the job ID is set to the RUN state.
If stop is activated during the execution of the job ID, the job ID is set to the STOP state.
Both the RUN signal and BUSY signal turn OFF while the job ID is in the stopped state, and if an OK signal is detected, the ON state is retained.



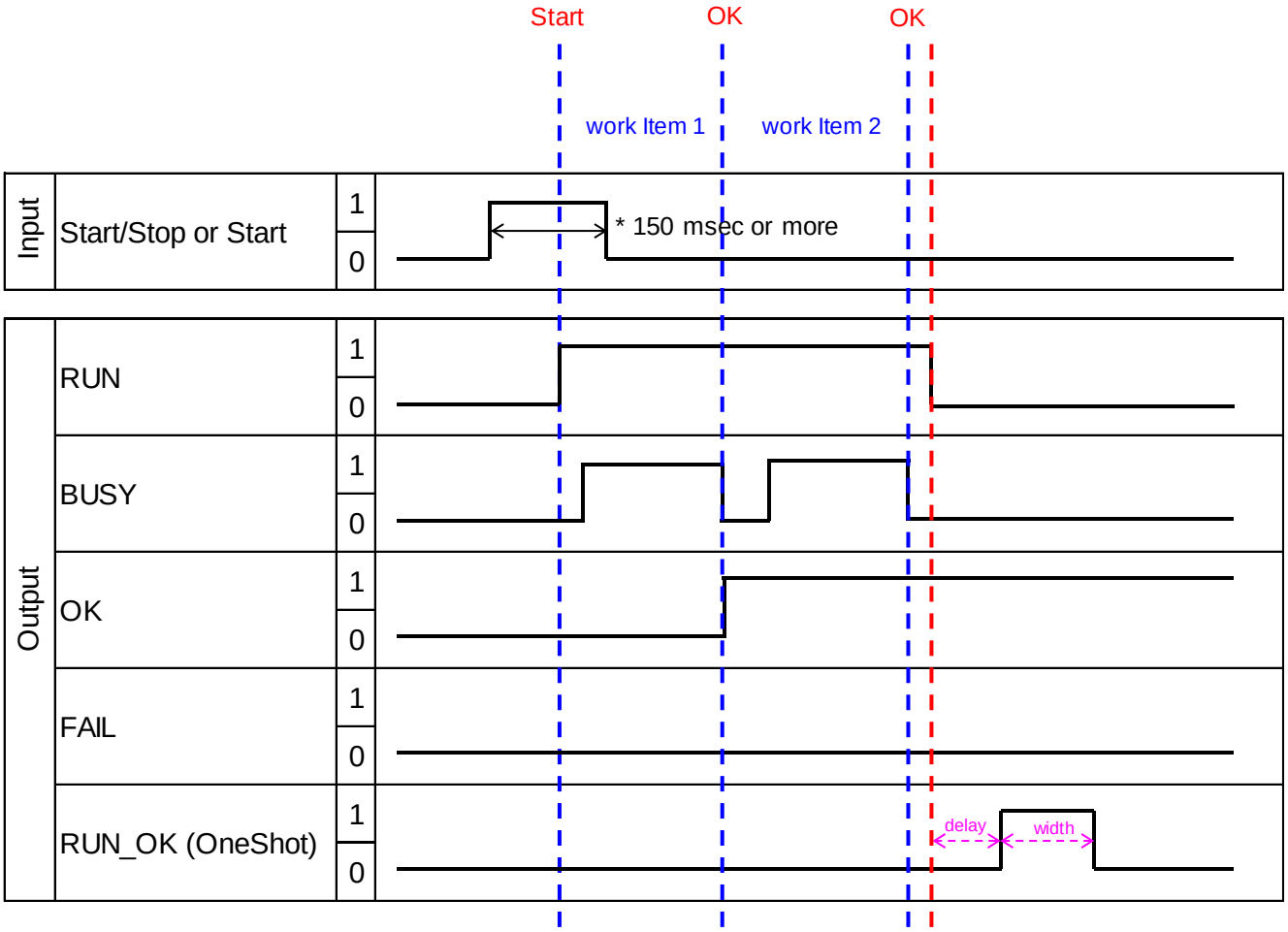
One Shot

If the job ID ends normally, the signal rises for a fixed period of time.
The delay time and one shot time are the same as other one shot settings.



RUN_OK

If the job ID ends normally, the signal rises for a fixed period of time.
The delay time and one shot time are the same as other one shot settings.



PRESET

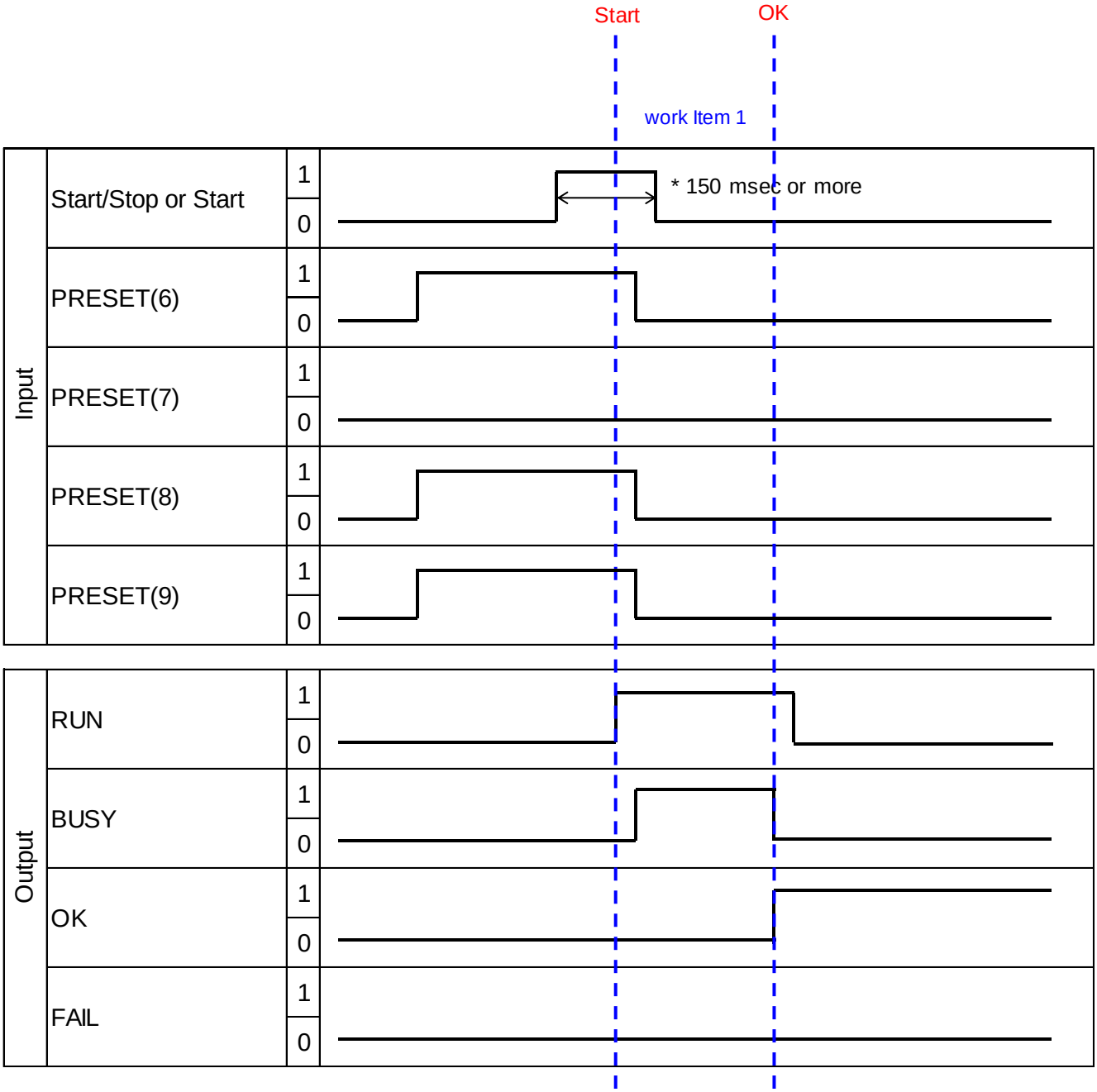
The method of switching job IDs using PRESET is described below.

Retain the state of the PRESET signal until the beginning of Start.
The start of the job ID can be detected at the timing of rise of the RUN signal.

Note

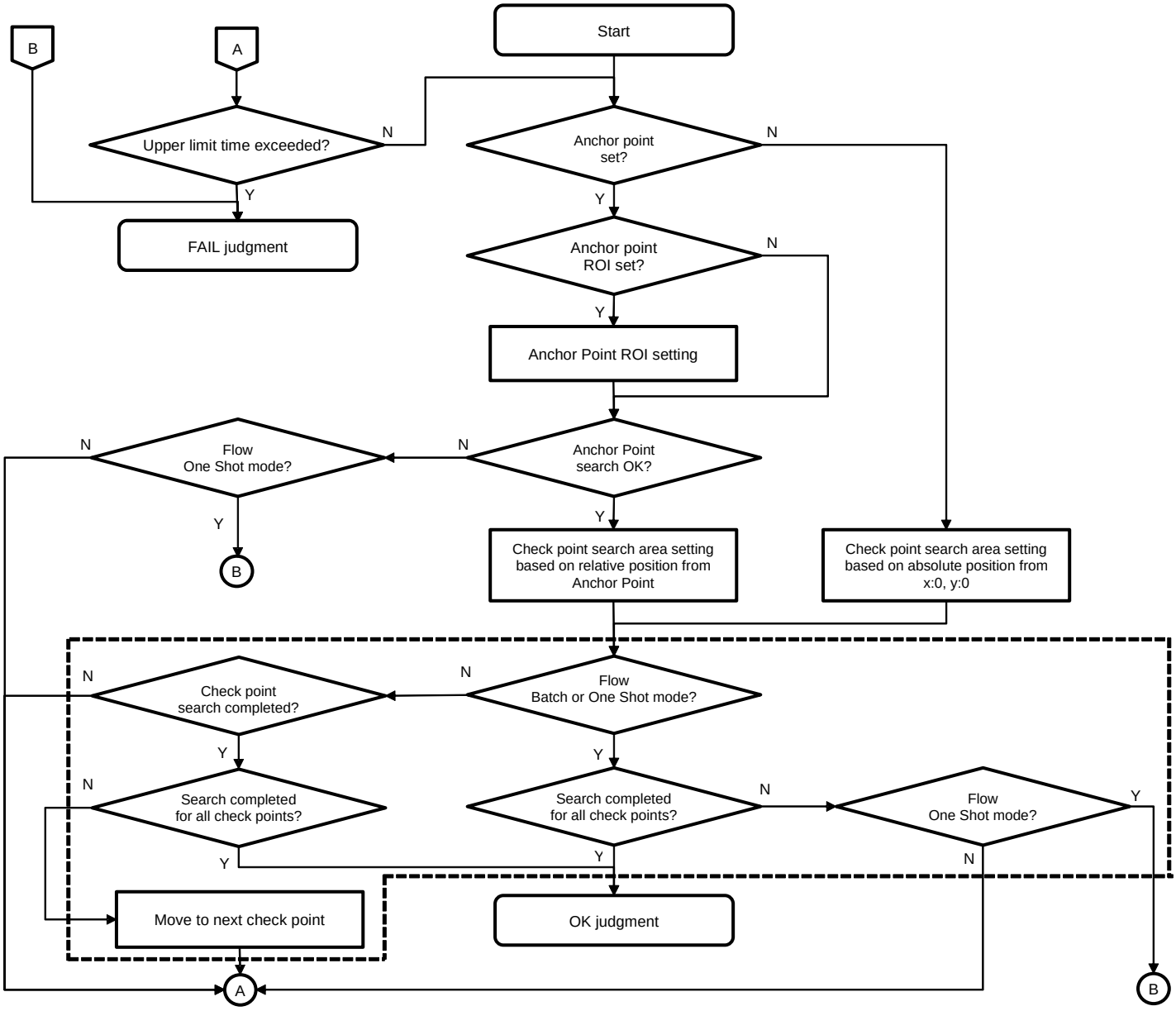
For details on the correlation between the PIN and the job ID number, see [External I/O Settings] (→ P. 86).

Example) Signal setting when the [Maximum Number of Switchable Job IDs] is set to 16 and the job ID number is to be changed to 11.



Matching Mode Flow

The relative search and absolute search are performed according to the flow described below.



Note

- The flow is similar regardless of the [Check Method] setting ([Shape], [Color Recognition], [Texture]) (→P. 49).
- If the check points have not been set, search is not performed for the dotted area.

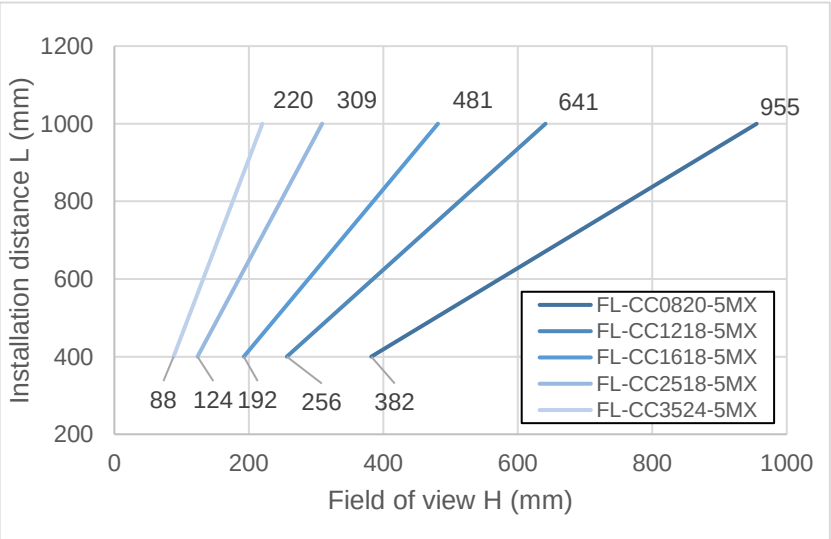
Recommended Lens / Field of View and Installation Distance

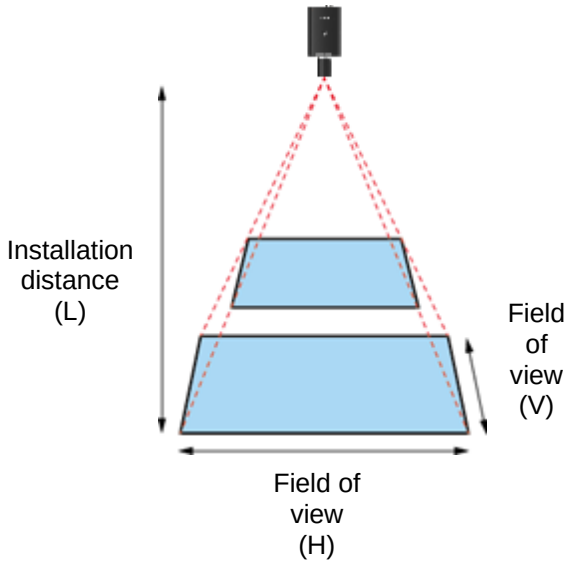
- Use a lens (sold separately) conforming to the following specifications:
  - Mount: C mount
  - Image circle: 1/1.8” or more
  - Supported number of pixels: 5 MP or more (recommended)

- Recommended lens: 5 megapixel lens (manual diaphragm lens for image processing) 5MX series

Model Number	Focal Distance	Diaphragm Value	External Dimensions	Weight	Field of View and Installation Distance
FL-CC0820-5MX	8 mm	2.0 to 16	φ33 x 43 mm	78 g	Installation distance 400 mm: 382 (H) x 215 (V) mm to installation distance 1000 mm: 955 (H) x 537 (V) mm
FL-CC1218-5MX	12 mm	1.8 to 16	φ33 x 47 mm	85 g	Installation distance 400 mm: 256 (H) x 144 (V) mm to installation distance 1000 mm: 641 (H) x 361 (V) mm
FL-CC1618-5MX	16 mm	1.8 to 16	φ33 x 47 mm	80 g	Installation distance 400 mm: 192 (H) x 108 (V) mm to installation distance 1000 mm: 481 (H) x 271 (V) mm
FL-CC2518-5MX	25 mm	1.8 to 16	φ33 x 50 mm	68 g	Installation distance 400 mm: 124 (H) x 70 (V) mm to installation distance 1000 mm: 309 (H) x 174 (V) mm
FL-CC3524-5MX	35 mm	2.4 to 16	φ33 x 65.5 mm	100 g	Installation distance 400 mm: 88 (H) x 50 (V) mm to installation distance 1000 mm: 220 (H) x 124 (V) mm

- Optical chart





- The optical chart indicates the field of view (H).
- The field of view (V) is almost 56% of the field of view (H).

Supported Devices

The device supports the following peripheral devices.

Connection I/F	Device	Remarks
HDMI	Monitor	A monitor that supports 1920 x 1080 p, 60 Hz input. * Voice output is not supported.
USB	Keyboard	HID Class
USB	Mouse	HID Class
USB	Barcode reader	HID Class
USB	Touch panel	HID Class * Display input is not supported (Display Port Alt Mode is not supported) * Multi-touch is not supported * Calibration cannot be performed with this unit. * Right-click functionality is not available.
USB	Speaker	Audio Class * In some devices volume control by this device does not function.
USB	HDD / SSD / Memory	Mass Storage Class *1
USB	Hub	USB Hub * Some devices may not function with this device.
microSD	microSD card	microSD/SDHC/SDXC *1
Bluetooth	Keyboard	HID Profile *2
Bluetooth	Mouse	HID Profile *2

*1: Supported file formats: FAT/FAT32/NTFS/exFAT/ext2/ext3/ext4

*2: Bluetooth Low Energy is not supported. The devices that use the HID over GAT Profile (HOGP) are not supported. Please do not connect.

Reference

- Specifications(→P. 141)

File Format (CSV): Job Log Real-time CSV Output

Reference

- Checking from the job log file (→P. 110)

- The log generated by job log real-time CSV output is described in one row each for each operation and job.
- The number of columns is variable depending on the type of the recorded log, and the contents of the columns are also different.
- The type of the recorded log can be judged from the values in the 1st column and 11th column.
- The generated CSV file uses commas (,) for demarcation, and each content is recorded as a string.

■ Camera Operation Log: (1st column = 1)

1st column: Type of log (1: Camera Operation Log)
2nd column: Year, month, day
3rd column: Time
4th column: Operation type

- Start: Start workflow
- Pause: Pause workflow
- Next: Proceed to the next workflow
- Back: Return to the previous workflow
- log out: Log out
- change Work: Change job ID
- change S/N: Change reference ID
- login: Log in
- boot: Startup
- shutdown: Shut down
- reboot: Restart

■ Job Result Log (Matching) (1st column = 2, 11th column = Matching)

1st column: Type of log (= 2: Job Result Log)
2nd column: Year, month, day
3rd column: Time
4th column: Job ID
5th column: Reference ID
6th column: User ID
7th column: Instruction step name
8th column: Inspection step name
9th column: Standard (sec)
10th column: Elapsed time (sec)
11th column: Inspection step mode (= Matching)
12th column: Inspection step judgment result (1 = OK, 2 = FAIL)
13th column: Image log path
14th column: Checkpoint ID
15th column: Checkpoint matching result (1 = OK, 0 = FAIL)
16th column: Anchor point matching score
17th column: Anchor point matching angle
18th column: Score for shape matching
19th column: Angle for shape matching
20th column: Matching processing time (msec)
21st column: Score for color matching
22nd column: Score for texture matching

■ Job Result Log (Data Input Mode) (1st column = 2, 11th column = Data input)

1st column: Type of log (= 2: Job Result Log)
2nd column: Year, month, day
3rd column: Time
4th column: Job ID
5th column: Reference ID
6th column: User ID
7th column: Instruction step name
8th column: Inspection step name
9th column: Standard (sec)
10th column: Elapsed time (sec)
11th column: Inspection step mode (= Data input)
12th column: Inspection step judgment result (1 = OK, 2 = FAIL)
13th column: Image log path
14th column: Part No.
15th column: Entered data string

■ Job Result Log (Check Mode) (1st column = 2, 11th column = Check)

1st column: Type of log (= 2: Job Result Log)
2nd column: Year, month, day
3rd column: Time
4th column: Job ID
5th column: Reference ID
6th column: User ID
7th column: Instruction step name
8th column: Inspection step name
9th column: Standard (sec)
10th column: Elapsed time (sec)
11th column: Inspection step mode (= Check)
12th column: Inspection step judgment result (1 = OK, 2 = FAIL)
13th column: Image log path

■ Job ID Result Log (1st column = 4)

1st column: Type of log (= 4: Job ID Result Log)
2nd column: Year, month, day
3rd column: Time
4th column: Job ID
5th column: Reference ID
6th column: User ID
7th column: Job ID judgment result (1 = OK, 2 = FAIL)

File Format (CSV): Job ID Data

Reference

- Checking the Workflow (Job ID Data) (→P. 58)

- The CSV generated as a result of export of job ID data is recorded in one row each for each inspection step.
- The number of columns is variable depending on the mode of the inspection step, and the contents of the columns are also different. The mode is common up to the 32nd column.
- The mode of the recorded inspection step can be judged from the values in the 20th column.
- The generated CSV file uses commas (,) for demarcation, and each content is recorded as a string.
- Header information representing the details of the columns is recorded in the first three rows in the order of “For Matching Mode”, “For Check Mode”, “For Data Input Mode”.

■ Data common to modes

	Supported setting items			
Column	Category 1	Category 2	Setting item	Details
1	Job ID Settings	—	Job ID	String
2	Job ID Settings	Job ID	Enable	true = Enabled, false = Disabled
3	Job ID Settings	Job ID	Infinite Loop Mode	true = Enabled, false = Disabled
4	Sensor Settings	Others	Inverted	true = Enabled, false = Disabled
5	Sensor Settings	Others	WDR	true = Enabled, false = Disabled
6	Sensor Settings	Exposure	Auto / Manual Input	true = Auto, false = Manual
7	Sensor Settings	Exposure	Target Point	Number
8	Sensor Settings	Exposure	Shutter Speed	Number
9	Sensor Settings	Exposure	Gain	Number
10	Sensor Settings	White Balance	Auto / Manual Input	true = Auto, false = Manual
11	Sensor Settings	White Balance	Gain R	Number
12	Sensor Settings	White Balance	Gain B	Number
13	Sensor Settings	Gamma	Curve Value	Number
14	Sensor Settings	Filter	OFF/ON	true = ON, false = OFF
15	Sensor Settings	Filter	Denoise	Number
16	Sensor Settings	Filter	Sharpness	Number
17	Job ID Settings	—	Instruction Step	String
18	Job ID Settings	Instruction Step	Instruction Step Image Path	String
19	Job ID Settings	—	Inspection Step	String
20	Inspection Step Settings	—	Mode	Matching = Matching Check = Check Data input = Data input
21	Inspection Step Settings	Time	Disable	true = Enabled, false = Disabled * true means that “Disabled” is enabled.
22	Inspection Step Settings	Time	Standard (sec)	Number
23	Inspection Step Settings	Time	Limited (sec)	Number
24	Inspection Step Settings	Save Image	OK	true = Enabled, false = Disabled
25	Inspection Step Settings	Save Image	FAIL	true = Enabled, false = Disabled
26	Inspection Step Settings	Save Image	Area	true = Enabled, false = Disabled
27	Inspection Step Settings	External Output	OUT0	true = Enabled, false = Disabled
28	Inspection Step Settings	External Output	OUT1	true = Enabled, false = Disabled

29	Inspection Step Settings	External Output	OUT2	true = Enabled, false = Disabled
30	Inspection Step Settings	External Output	OUT3	true = Enabled, false = Disabled
31	Inspection Step Settings	External Output	OUT4	true = Enabled, false = Disabled
32	Inspection Step Settings	External Output	OUT5	true = Enabled, false = Disabled

■ For Matching Mode (20th column = Matching)

	Supported setting items			
Column	Category 1	Category 2	Setting item	Details
33	Matching	—	Flow	sequent” = Sequentiality same = Batch OneShot = One Shot
34	Matching	—	Master Image	String
35	Anchor Point	—	Similarity	Number
36	Anchor Point	—	Rotation Angle	Number
37	Anchor Point	Size	width	Number
38	Anchor Point	Size	height	Number
39	Anchor Point	Coordinates	x	Number
40	Anchor Point	Coordinates	y	Number
41	Anchor Point ROI	Size	width	Number
42	Anchor Point ROI	Size	height	Number
43	Anchor Point ROI	Coordinates	x	Number
44	Anchor Point ROI	Coordinates	y	Number
45	Check Point	—	Check Method	Matching = Shape Color = Color Recognition Texture = Texture
46	Check Point	Size	width	Number
47	Check Point	Size	height	Number
48	Check Point	Coordinates	x	Number
49	Check Point	Coordinates	y	Number
50	Check Point	—	Similarity	Number
51	Check Point	—	Inverted	true = Enabled, false = Disabled
52	Check Point	—	Search Area	Number
53	Check Point: Shape	—	Rotation Angle	Number
54	Check Point: Color Recognition	—	Tolerance	Number
55	(Check points 2 ... 20)	Repeat 45th to 54th columns		

■ **For Check Mode (20th column = Check)**

	Supported setting items			
Column	Category 1	Category 2	Setting item	Details
33	Check	Judgment Conditions	Timeout	OK, FAIL
34	Check	Judgment Conditions	OK	0 = Button, 1 = Disabled, 2 = EXTIN0, 3 = EXTIN1, 4 = EXTIN2, 5 = EXTIN3, 6 = EXTIN4, 7 = EXTIN5, 8 = EXTIN6, 9 = EXTIN7, 10 = EXTIN8, 11 = EXTIN9
35	Check	Judgment Conditions	FAIL	0 = Button, 1 = Disabled, 2 = EXTIN0, 3 = EXTIN1, 4 = EXTIN2, 5 = EXTIN3, 6 = EXTIN4, 7 = EXTIN5, 8 = EXTIN6, 9 = EXTIN7, 10 = EXTIN8, 11 = EXTIN9

■ **For Data Input Mode (20th column = Data input)**

	Supported setting items			
Column	Category 1	Category 2	Setting item	Details
33	Data Input	—	Part No.	String
34	Data Input	Comparison	Start Point	Number
35	Data Input	Comparison	Num. of Char.	Number
36	Data Input	Comparison	String	String
37	Data Input	—	Input Method	manual = Manual Input code = Code Input ocr = OCR
38	Code Settings	—	Read Format	0 = 1D, 1 = Aztec, 2 = Data Matrix ECC 200, 3 = Dot, 8 = Micro QR, 9 = PDF417, 10 = QR
39	Code Settings	Read String	Start Point	Number
40	Code Settings	Read String	Num. of Char.	Number
41	Code Settings	Add Line Feed Code	Enable	true = Enabled, false = Disabled
42	OCR Settings	Start Reading Manually	Enable	true = Enabled, false = Disabled
43	OCR/Code Settings	Read Area: Size	width	Number
44	OCR/Code Settings	Read Area: Size	height	Number
45	OCR/Code Settings	Read Area: Coordinates	x	Number
46	OCR/Code Settings	Read Area: Coordinates	y	Number

Trademarks

- HDMI is a trademark or registered trademark of HDMI Licensing LLC.
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Software / License

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 “License Information” in the menu on the unit.

The following user is registered to this product as the administrator in advance.
User ID: Administrator

Cleaning and Operation / Storage Location

Cleaning

- Please note that image quality may deteriorate if fingerprints or dirt get on the image sensor.
- When dust or dirt gets on the image sensor, do not touch the sensor 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 has a problem, contact RICOH Industrial Solutions Inc.
- Never dismantle the product 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

- 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.
- When no lens is attached, be sure to attach the included lens mount cap.

Precautions for Cleaning

- Be sure to turn off the power before cleaning.

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.)

Inquiries

RICOH Industrial Solutions Inc.
https://www.rins.ricoh.co.jp/en/contact/

June 2023

Revision History

Rev.	Date	Changes	Note
1.0.0	June 14, 2023	New issue	
1.1.0	July 5, 2023	1.Package Contents • Manual addition of "SC-20 EtherNet/IP Mode Function Operating Instructions " 5.Installation and Connections • System Configuration – Added "When connecting an external device (using the EtherNet/IP Mode control)" 6.Power-on and Initial Settings • Added "Password" and "Retype Password" to Initial Settings 8.Screen Operations • Main Screen – External control: EtherNet/IP added to [Status display area] 12.Settings • Network Settings – Added restrictions when selecting EtherNet/IP • External Control Settings – Added EtherNet/IP – Added “EtherNet/IP Communication Settings” • Bluetooth Settings – Added HOGP restrictions 14.Checking the Log • Image Log – Corrected the description about "individually continuous" for specification correction	

RICOH Industrial Solutions Inc.