

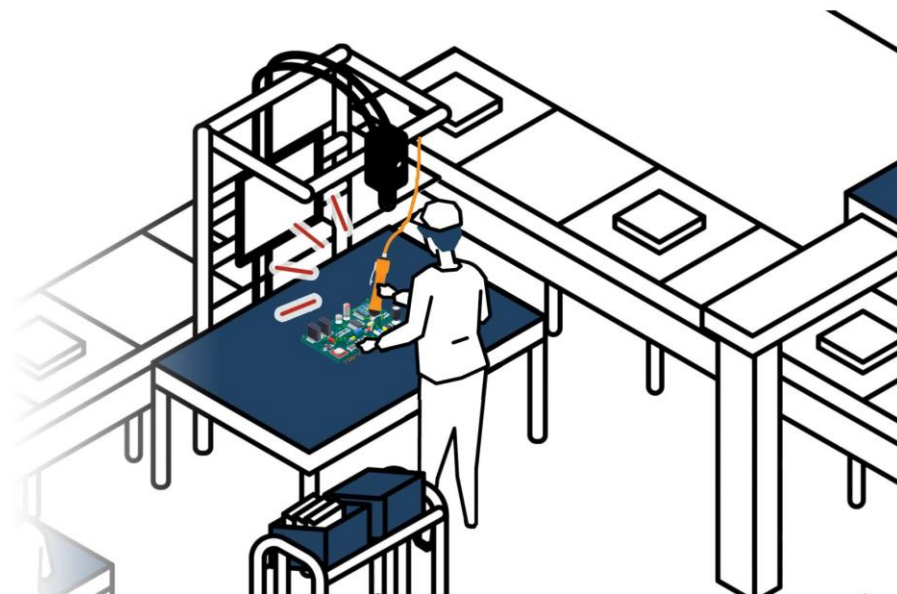
Work Inspection Camera

## RICOH SC-20

- Electric screwdriver
- Check mode

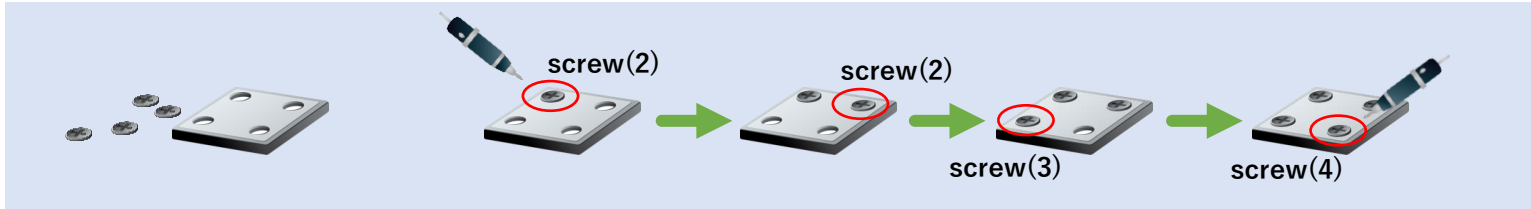
Example of utilization

**RICOH**  
imagine. change.

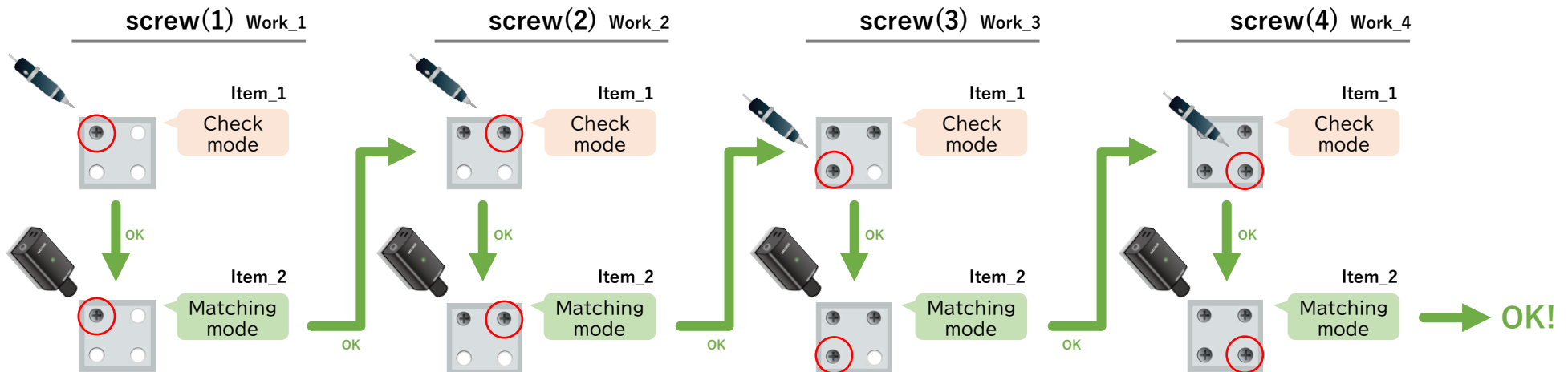


# Cooperation with electric screwdriver

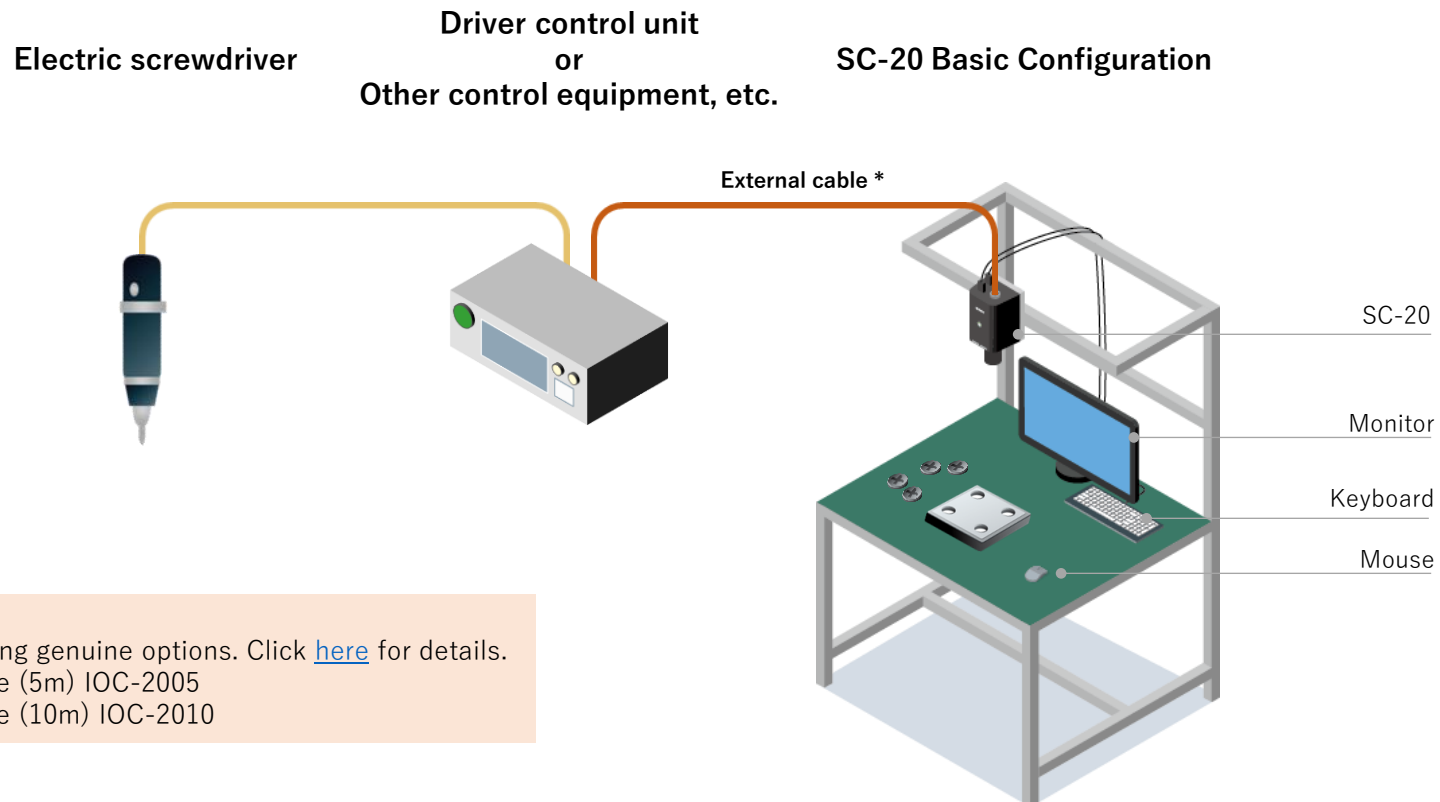
This document provides an example of an inspection setup using SC-20 for tightening screws at four locations using an electric screwdriver, as shown in the figure below.



Although the operator performs only four processes as described above, the SC-20 can perform reliable work inspections by setting up a total of eight inspection processes that combine **detection of the presence or absence of screws by image recognition** in addition to **detection of the tightening operation with an electric screwdriver**.



SC-20 can receive electrical signals from the electric screwdriver, but it cannot receive numerical data or other information. Therefore, the following example shows how to build an environment in which SC-20 can be informed that the driver has performed the tightening operation correctly via a driver control unit.



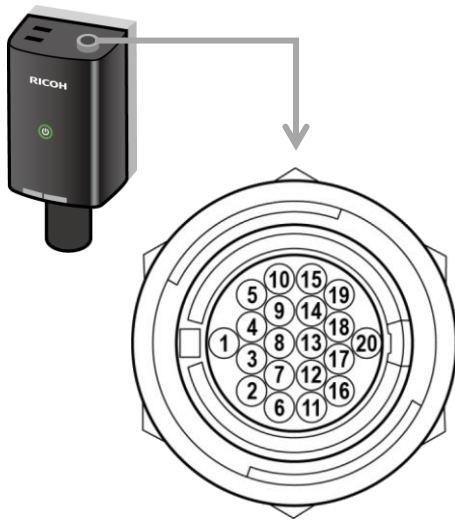
**\*External cable**

Please use the following genuine options. Click [here](#) for details.

- External I/O cable (5m) IOC-2005
- External I/O cable (10m) IOC-2010

## External connector

This interface is used to control external I/O and supply external power. In the example of cooperation with an electric driver, the following pin numbers can be used to receive OK/NG signals from the control device.



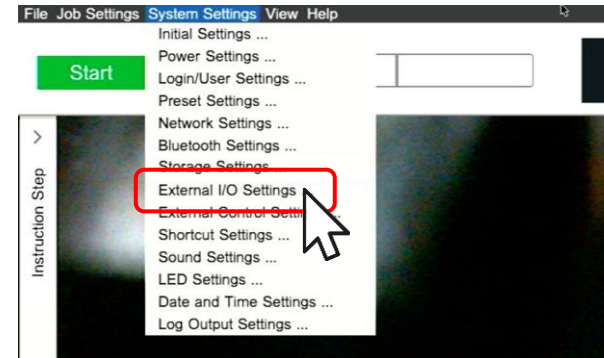
Pin No.	Signal Name	Specifications	For electric screwdriver linkage
1	VPSU	Power for the unit 12/24 V ± 10%	Not connected when using AC adapter
2	IN 0	Input (Insulated)	Used for Start/Stop as needed
3	GPSU	GND for the unit	Not connected when using AC adapter
4	IN 1	Input (Insulated)	Connect for OK signal from electric driver
5	IN 2	Input (Insulated)	Connect for OK signal from electric driver
6	IN 3	Input (Insulated)	Not used in this example
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)	Use as needed
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)	Use as needed
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	Used for GND for external I/O

# Setup procedure (1) External I/O setting

Assign the required function to each pin of the external connector to be used.

1

From the menu bar "System Settings" select "External I/O Settings..."

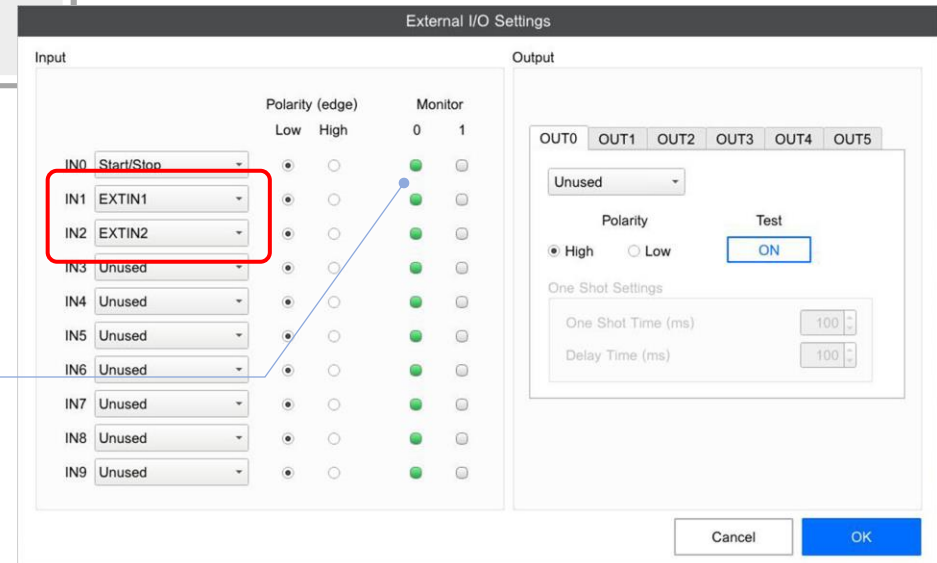


2

The following functions are set in the "Input" section of the "External I/O Settings" dialog.

- IN1: **EXTIN1** (Polarity :Low)  
※ Applies to the "OK" signal from the driver
- IN2: **EXTIN2** (Polarity :Low)  
※ Applies to the "NG" signal from the driver

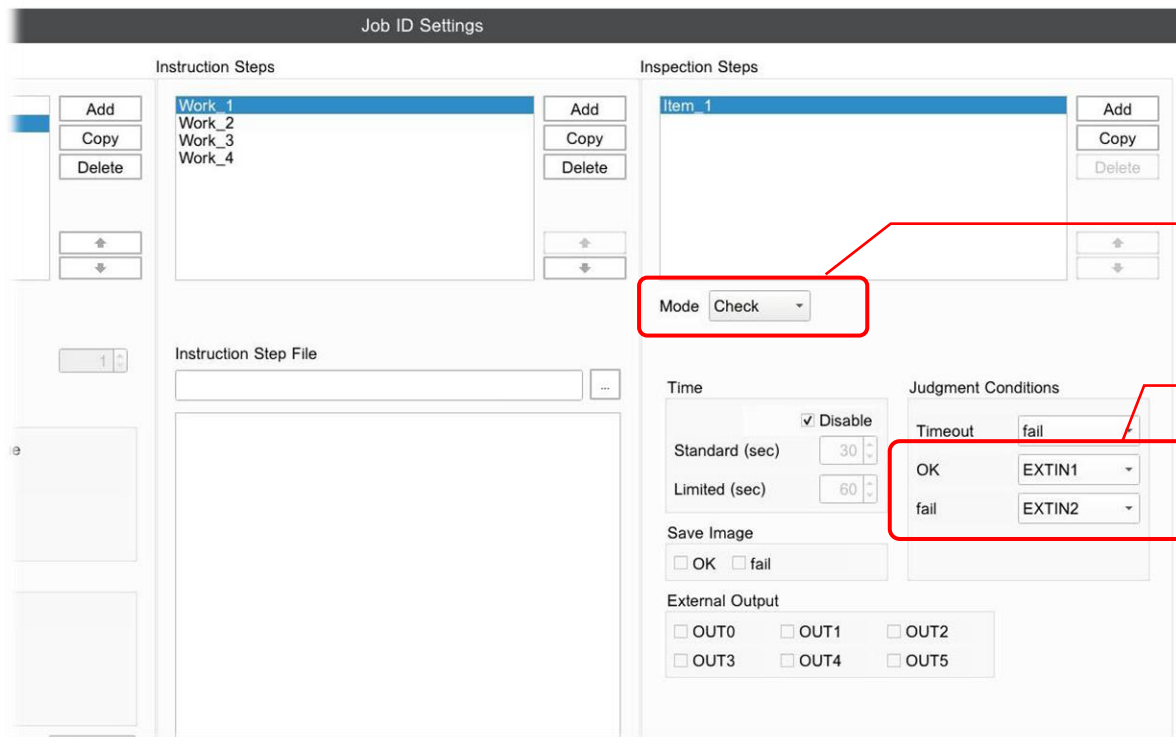
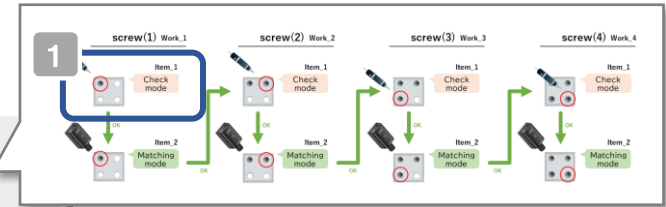
If the signal from the electric driver is coming normally, the "Monitor" display changes from "0" to "1".



# Setup procedure (2) screw (1) Work setting

Create a Job ID and set up an inspection for screw (1).

**1** Create "Work\_1" as a work for screw (1) and set the first work item "Item\_1" to inspect screw tightening of the screwdriver.



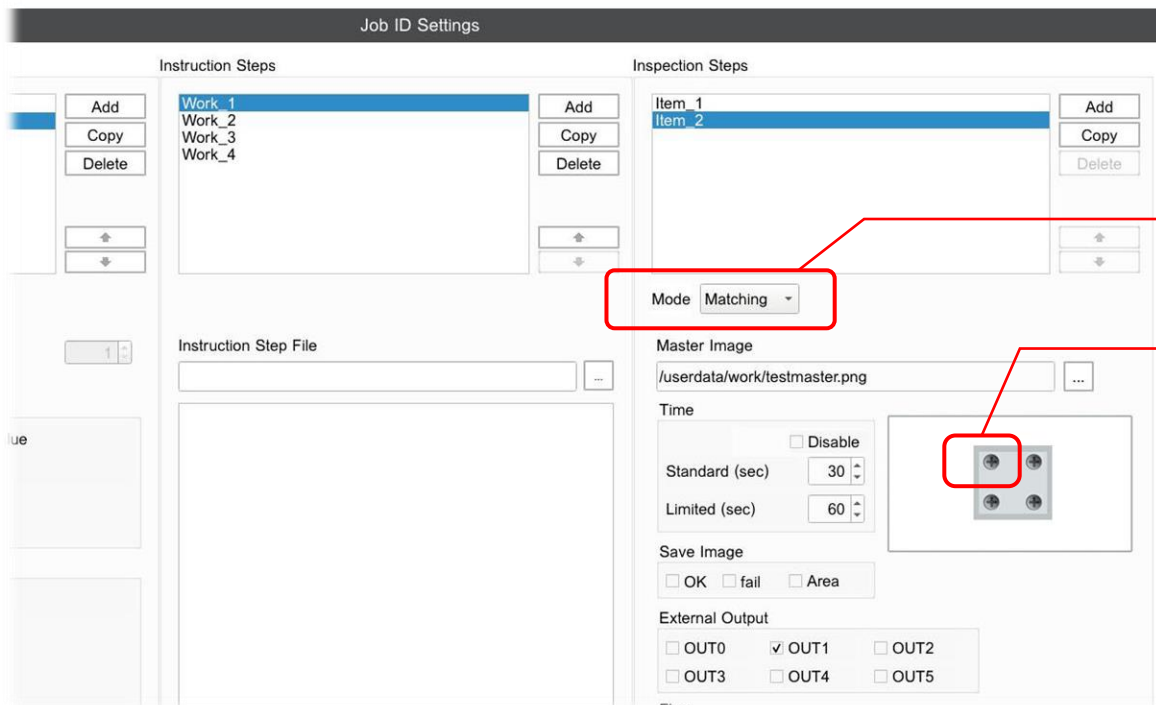
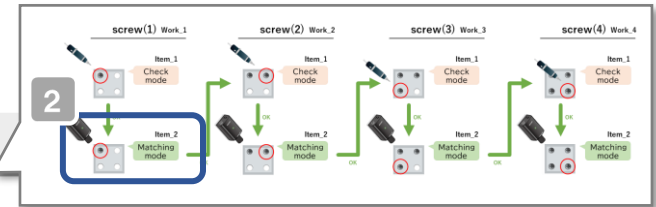
Select "Check" for inspection mode

Set the following as judgment conditions

- OK : [EXTIN1]
- NG : [EXTIN2]

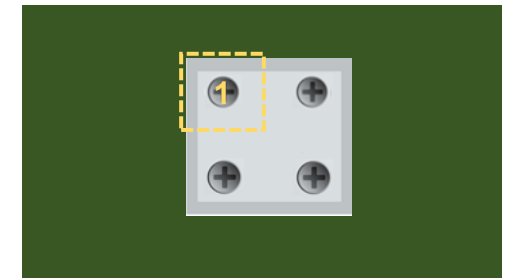
# Setup procedure (3) screw (1) Work setting

2 Next, add a second work item "Item\_2" and configure it to inspect for the presence of screw.



Select "Matching" for inspection mode

Set a checkpoint at the location of screw (1)

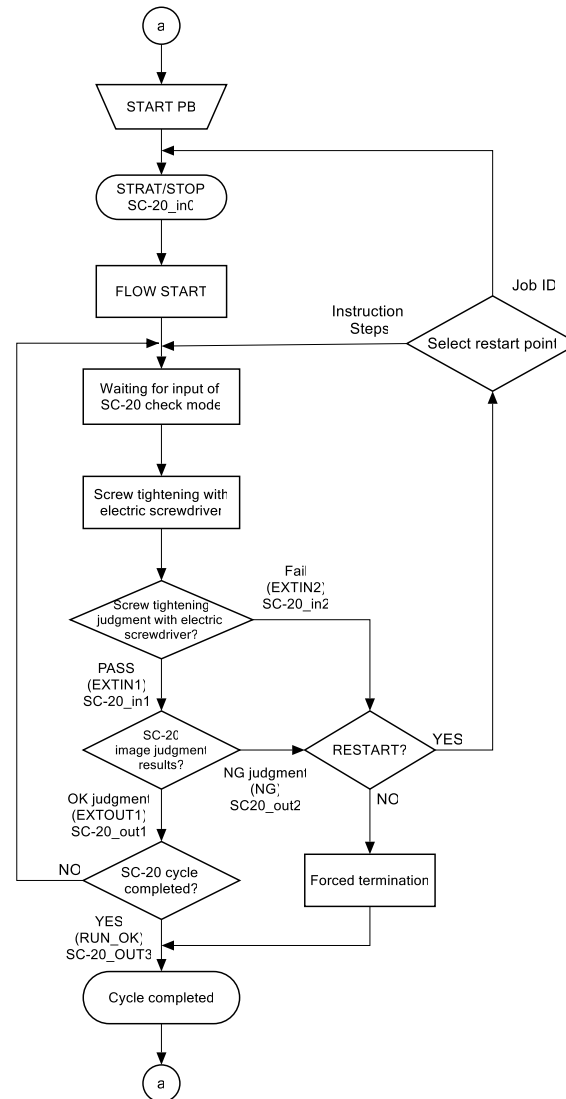


3 Thereafter, "Work\_2" through "Work\_4" are created in the same manner, and screws (2) through (4) are set in sequence. As a result, inspections of screwdriver tightening operations can be performed for the four screws.

# [Supplementary information] Judgment Flow Chart

When configured according to the procedures in this document, the SC-20 inspection operates in the flow shown in the figure.

Work is set according to the number of screws and this part is repeated



# [Supplementary information] External I/O Settings

## Input

Set the input functions of the external connector pins.

## Output

Set the output functions of the external connector pins.

### IN0 ~ IN9

Set the input function for the corresponding signal name.

Unused  
EXTIN0  
Start/Stop  
Start  
Stop  
CHG JOB ID  
ENTER  
Next  
Back

### 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".

Input	Function	Polarity (edge)		Monitor	
		Low	High	0	1
IN0	Unused	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
IN1	Unused	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
IN2	Unused	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
IN3	Unused	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
IN4	Unused	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
IN5	Unused	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
IN6	Unused	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
IN7	Unused	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
IN8	Unused	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
IN9	Unused	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Output	Function	Polarity	Test	One Shot Time (ms)	Delay Time (ms)
OUT0	Unused	<input checked="" type="radio"/> High <input type="radio"/> Low	<input checked="" type="checkbox"/> ON	100	100
OUT1					
OUT2					
OUT3					
OUT4					
OUT5					

### OUT0 ~ OUT5

Set the output function for the corresponding signal name.

Unused  
EXTOUT0  
EXTOUT0 (OS)  
RUN  
BUSY  
OK  
OK (OS)  
FAIL  
FAIL (OS)  
RUN OK (OS)

※ See next page for RUN, BUSY, OK, NG

### Test

Test the output switch settings.

### One Shot Time

Set the time for output in one shot (10 to 2000 (ms)).

### Delay Time

Set the delay time up to output in one shot (0 to 2000 (ms)).

### Polarity

Configure the output switch settings.

## IN0 ~ IN9

Set the input function for the corresponding signal name.

Unused  
EXTIN  
Start/Stop  
Start  
Stop  
CHG JOB ID  
ENTER  
Next  
Back

### EXTIN 0~9

Used as an OK or FAIL input in the check mode of the inspection step.

### Start/Stop

Starts the workflow when the workflow can be started.  
Stops the workflow while it is being executed.

## OUT0 ~ OUT5

Set the output function for the corresponding signal name.

Unused  
EXTOUT  
EXTOUT (OS)  
RUN  
BUSY  
OK  
OK (OS)  
FAIL  
FAIL (OS)  
RUN OK (OS)

### EXOUT 0~5 (OS)

Turns ON for a certain period of time when an arbitrary inspection step ends.

### 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(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(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)].

※ For details on external I/O, see [RICOH SC-20 Operating Instructions](#) [12.Settings - External I/O Settings]

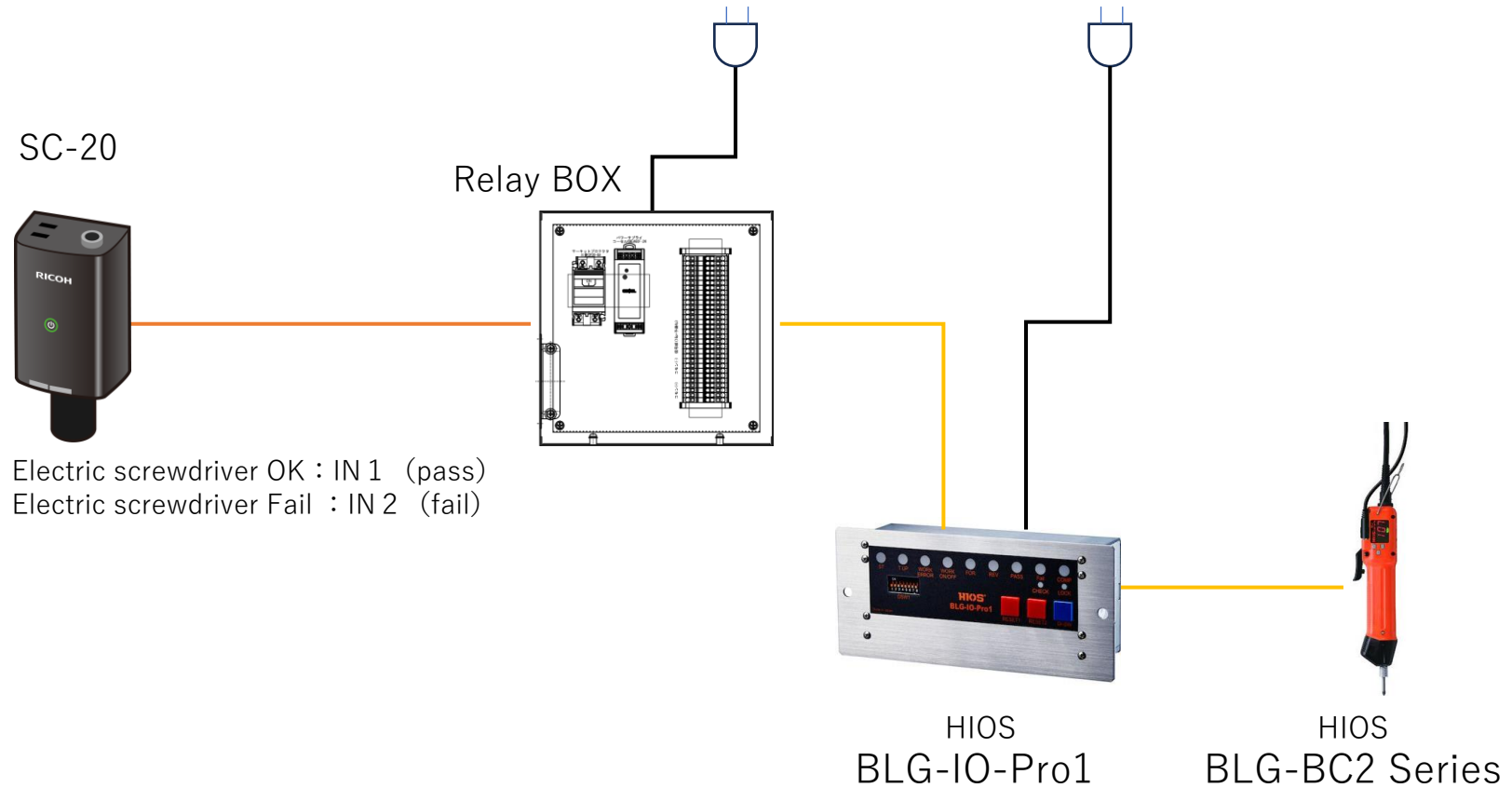
Tools to check connection

Manufacture	Product name	Model	Remarks
HIOS Inc.	JUKUREN	BLG-5000 BC2	
	External I/O Box	BLG-IO-Pro1	External I/O Box
	T-45BL	T-45BL	Dedicated power
	External Input/output cab	BLG-BC2-3010	External Input/output
Panasonic Corporation	Screw driver	EYADA212WA	
	Airlog	EYARW1	
	Power Adapter	EYSZP001	



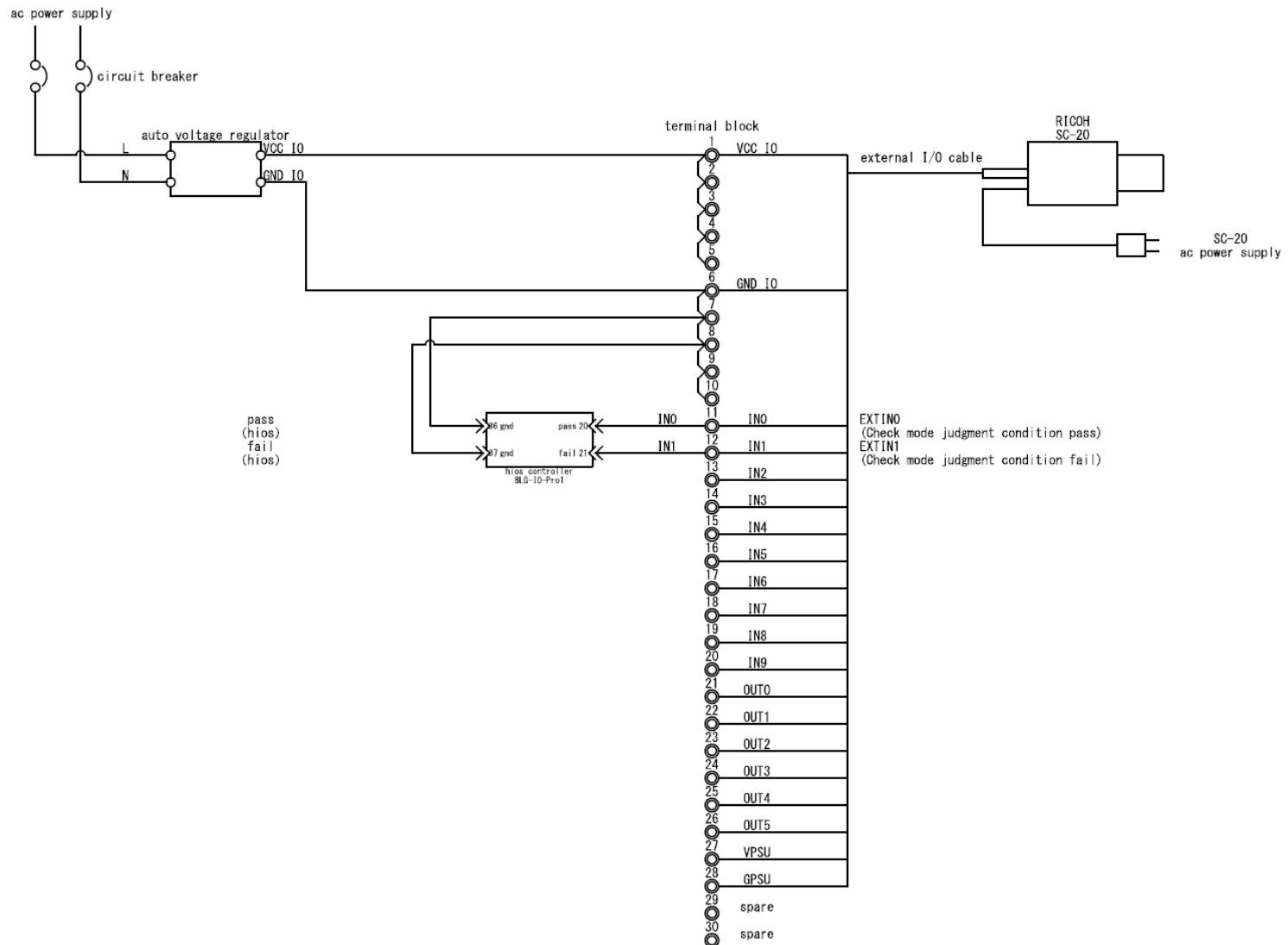
# [Supplement] HIOS connection example

## Configuration

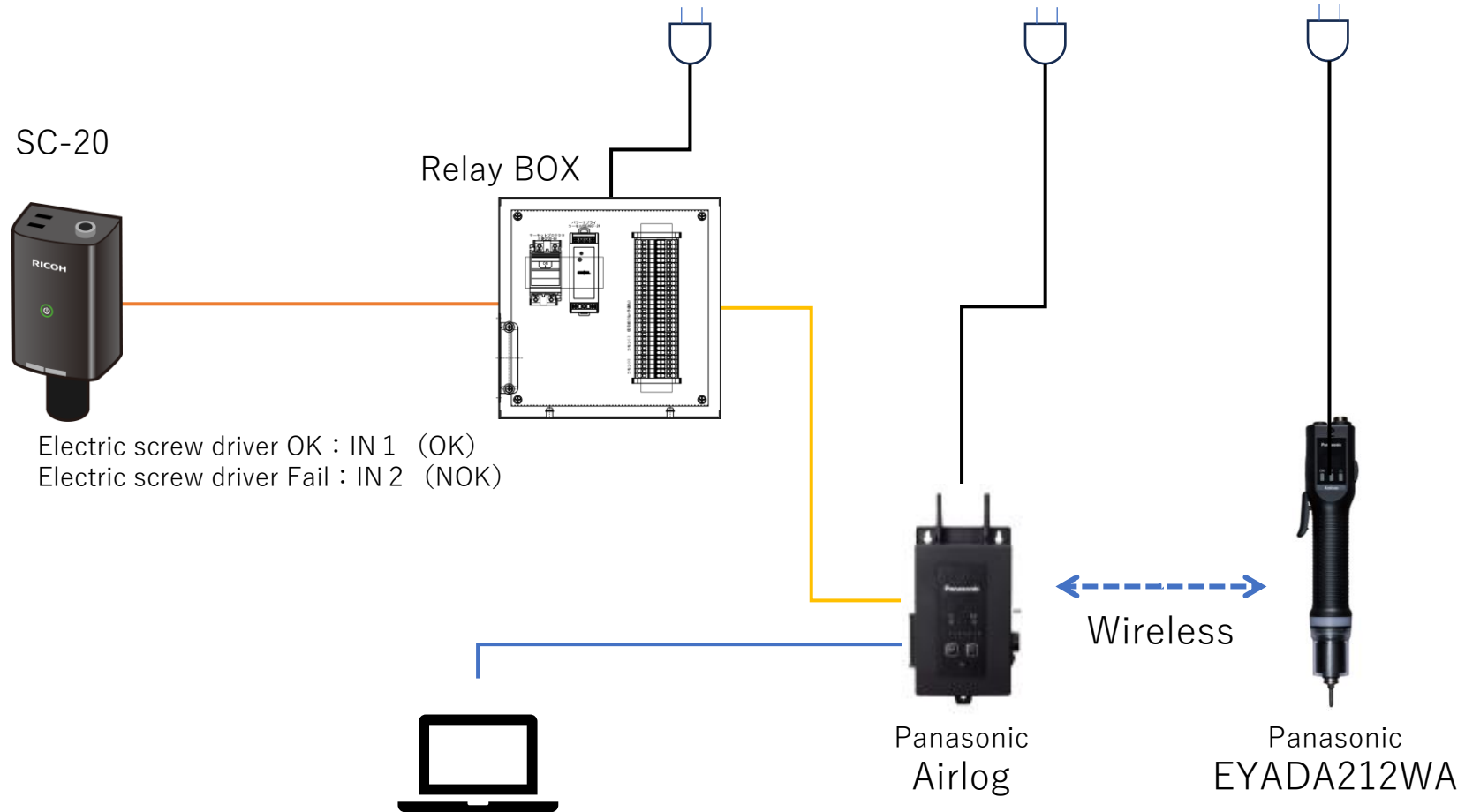


# [Supplement] HIOS connection example

## Connection diagram



## Configuration



\* Various settings must be configured through web.

# [Supplement] Panasonic connection example

## Connection diagram

