MITSUBISHI ELECTRIC

FA Sensor

MELSENSOR

Vision Sensor VS20
Connection Guide

-VS20M-11F310
-VS20M-12F410
-VS20M-13F410
-VS20C-12F410
-VS20C-13F410

Powered by COGNEX

This product was manufactured by Cognex Corporation.
*Note that the warranty on this product differs from that on other programmable controller products.

COGNEX

SAFETY PRECAUTIONS

(Read these precautions before using this product.)
Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly. The precautions given in this manual are concerned with this product only. For the safety precautions of the programmable controller system, refer to the user's manual for the CPU module used.
In this manual, the safety precautions are classified into two levels: "⚠WARNING" and "⚠CAUTION".

⚠ **WARNING**	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠ **CAUTION**	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Under some circumstances, failure to observe the precautions given under "⚠CAUTION" may lead to serious consequences.
Observe the precautions of both levels because they are important for personal and system safety.
Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

[Installation Precautions]

⚠WARNING

- Before touching the Vision Sensor, be sure to touch an electric conductor such as grounded metal to discharge the static electricity from your body. Otherwise, damage or faulty operation of the Vision Sensor may occur.
- Be sure to install the I/O connector module to the main module. If not installed, dust/water-proof performance may not obtained.

[Installation Precautions]

⚠CAUTION

- IP protection rating is guaranteed only when all the connectors are connected with cables or sealed with sealing caps.
- The cable is designed to connect with its key aligned with the keyway of the connector on the Vision Sensor. It may be damaged if you try to connect it forcibly.

[Wiring Precautions]

⚠CAUTION

- Use only 24 V DC and observe the indicated polarity. Otherwise, fire or damage may result.
- The frame ground terminal of the I/O module and the shield ground of each connector (RS232 OUT port and SENSOR port) are internally conducting. The system ground is designed on the condition that a ground connection is provided. The ground potential may affect the vision system and peripheral devices such as sequencer via cables. For safe operation, it is recommended to connect all the ground connections securely.

[Startup and Maintenance Precautions]

⚠CAUTION

- Do not clean the Vision Sensor VS20 with highly irritating or corrosive solvent such as caustic alkali solution, methyl ethyl ketone (MEK), and gasoline. Doing so may cause a fault.

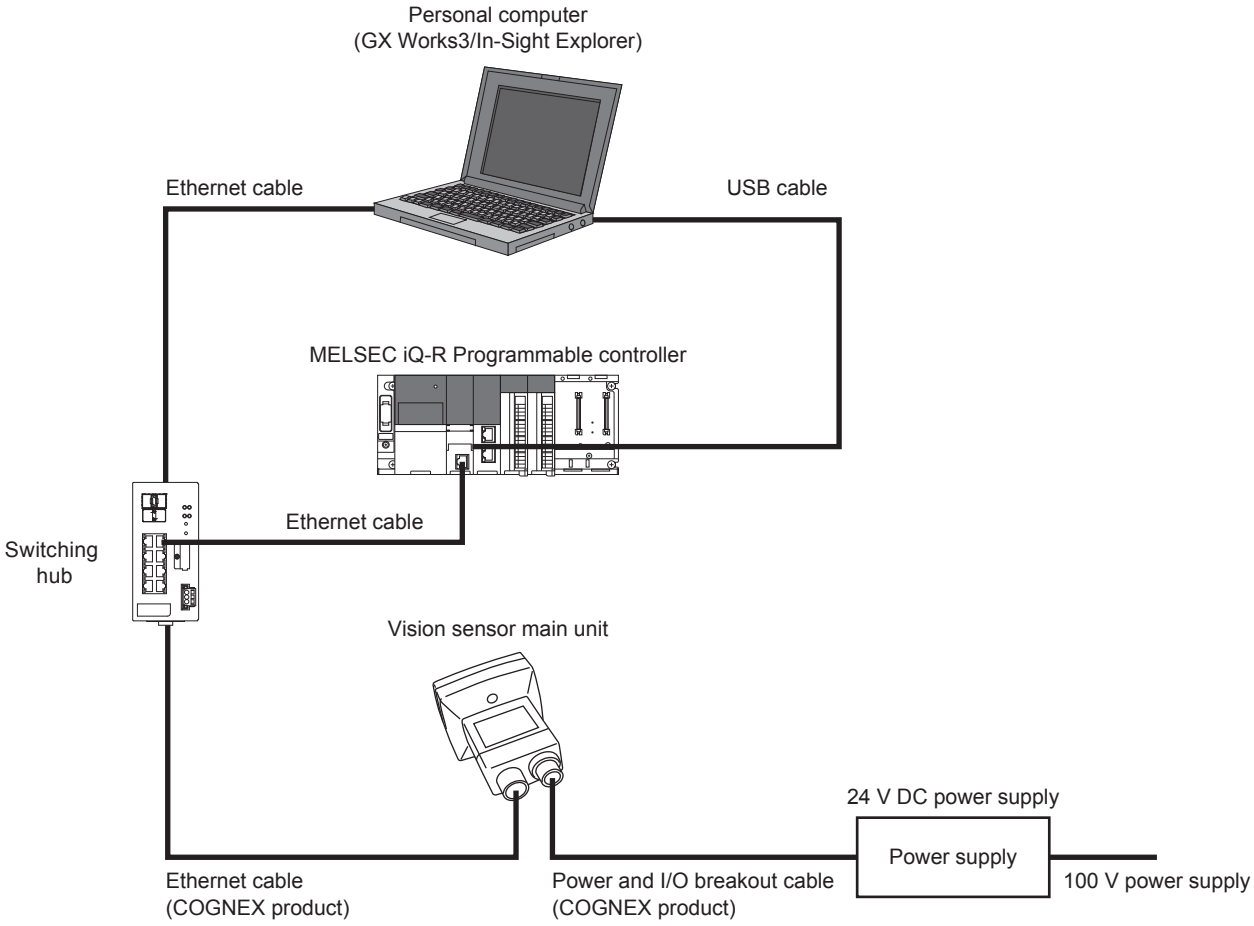
CONTENTS

1 THE SLMP SCANNER CONNECTION

1.1 Introduction

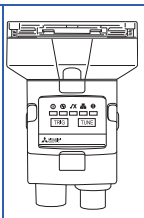
This chapter describes the procedures for connecting the Vision Sensor VS20 to a MELSEC programmable controller and controlling the vision sensor with a SLMP Scanner Connection.

Example of system configuration for connecting the vision sensor



Required modules and devices

■Mitsubishi Electric products

	
MELSEC iQ-R Programmable controller • CPU module: R04CPU	Vision Sensor VS20 • VS20M-13F410
	
GX Works3 (Engineering software for programmable controller)	In-Sight Explorer (Setup tool for Vision Sensor)

■COGNEX products

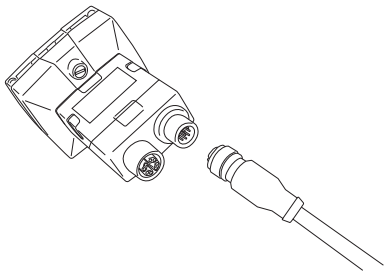
	
Ethernet cable	Power and I/O breakout cable

■Commercial products

			
Switching hub	Ethernet cable	USB cable	24 V DC power supply

Connecting and wiring of the vision sensor

1. Verify that the 24 V DC power supply being used is unplugged and not receiving power.
2. Optionally, connect the I/O or serial wires to an appropriate device (for example, a programmable controller).
3. Attach the power and I/O breakout cable's [24 V DC] (Red wire) and [GND] (Black wire) to the corresponding terminals on the power supply.
4. Connect the power and I/O breakout cable's M12 connector to the vision sensor's power, I/O and RS-232 connector.



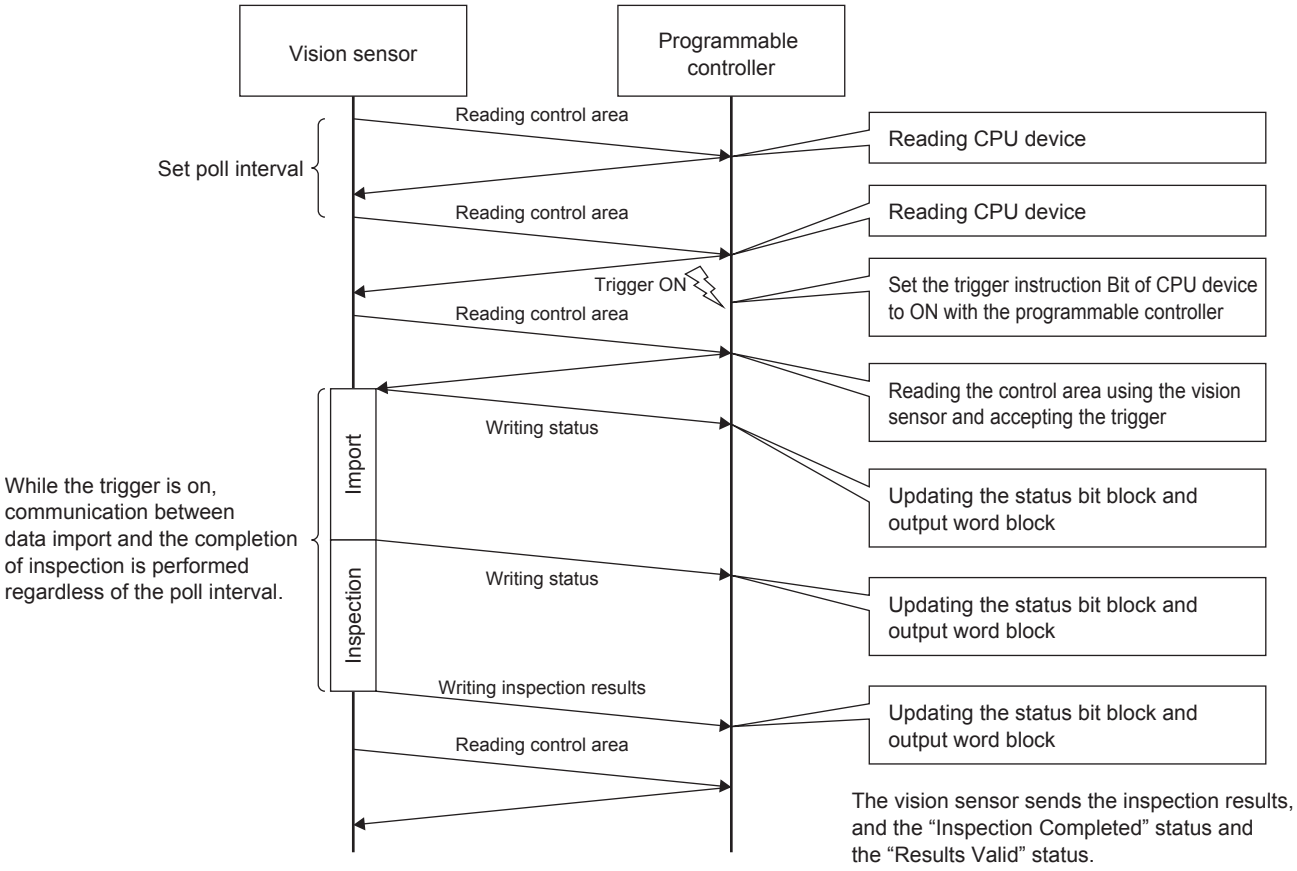
5. Turn on the 24 V DC power supply switch.

Precautions

- When connecting the vision sensor and programmable controller, simultaneously turn on the vision sensor and programmable controller, or first turn on the programmable controller.
- Cut unused wires or protect them with insulating materials. Keep all bare wires separated from the 24 V DC wire.
- All cable connectors are "keyed" to fit the connectors on the vision sensor. Do not force the connections or damage may occur.

1.2 Basic Operations of the SLMP Scanner Connection

Basic operation flow of the SLMP scanner connection



Basic operations of the SLMP scanner connection

In the SLMP Scanner Connection, the vision sensor reads control bit blocks from the programmable controller at the poll interval set with In-Sight Explorer, and the processing is performed responding to the change of the bit information in the control bit blocks.

The processing status is written to the corresponding bit in the status bit block.

To control the vision sensor, assign the devices of the programmable controller to each of the defined data blocks (including control bit blocks) and use them.

The following shows the functions of six data blocks.

Data Blocks	Contents
Control bit block	This block is used to perform control instructions (such as trigger) to the vision sensor, using bit information. The vision sensor is controlled by turning on and off the devices set to the control bit block using the programmable controller.
Status bit block	This block indicates the status of the vision sensor, and can be checked with bit information.
Input word block	This block is used to input application data (including parameters for inspection) from the programmable controller, and uses word information.
Output word block	The vision sensor uses this block to output application data (including inspection results) to the programmable controller. This block uses word information.
String command word block	This block is used to set commands (string commands) to control the vision sensor. This block uses word information.
String command result word block	This block is used to output the results controlled by the commands. This block uses word information.

The next section shows the data blocks and the timing chart of the SLMP Scanner Connection.

Data blocks

The following shows the six data blocks defined to control the vision sensor.

Control Bit Blocks

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Set Offline	Reserved		Execute Command	Inspection Results Ack	Buffer Results Enable	Trigger	Trigger Enable
Bit 15	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**
Reserved							
Bit 23	**Bit 22**	**Bit 21**	**Bit 20**	**Bit 19**	**Bit 18**	**Bit 17**	**Bit 16**
Reserved				Clear Exposure Complete	Clear Error	Initiate String Command	Set User Data
Bit 31	**Bit 30**	**Bit 29**	**Bit 28**	**Bit 27**	**Bit 26**	**Bit 25**	**Bit 24**
Soft Event 7	Soft Event 6	Soft Event 5	Soft Event 4	Soft Event 3	Soft Event 2	Soft Event 1	Soft Event 0

Status Bit Blocks

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Online	Offline Reason			Missed Acq	Reserved	Trigger Ack	Trigger Ready
Bit 15	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**
Error	Command Failed	Command Completed	Command Executing	Results Valid	Results Buffer Overrun	Inspection Completed	System Busy
Bit 23	**Bit 22**	**Bit 21**	**Bit 20**	**Bit 19**	**Bit 18**	**Bit 17**	**Bit 16**
Reserved			Job Pass	Exposure Complete	String Command Error	String Command Ack	Set User Data Ack
Bit 31	**Bit 30**	**Bit 29**	**Bit 28**	**Bit 27**	**Bit 26**	**Bit 25**	**Bit 24**
Soft Event Ack 7	Soft Event Ack 6	Soft Event Ack 5	Soft Event Ack 4	Soft Event Ack 3	Soft Event Ack 2	Soft Event Ack 1	Soft Event Ack 0

Input Word Blocks

Word 0	Word 1	Word 2..N
Command	Reserved	User Data

Output Word Blocks

Word 0	Word 1	Word 2	Word 3	Word 4	Word 5..N
Current Job ID	Error Code	Acquisition ID	Inspection ID	Inspection Result Code	Inspection Results

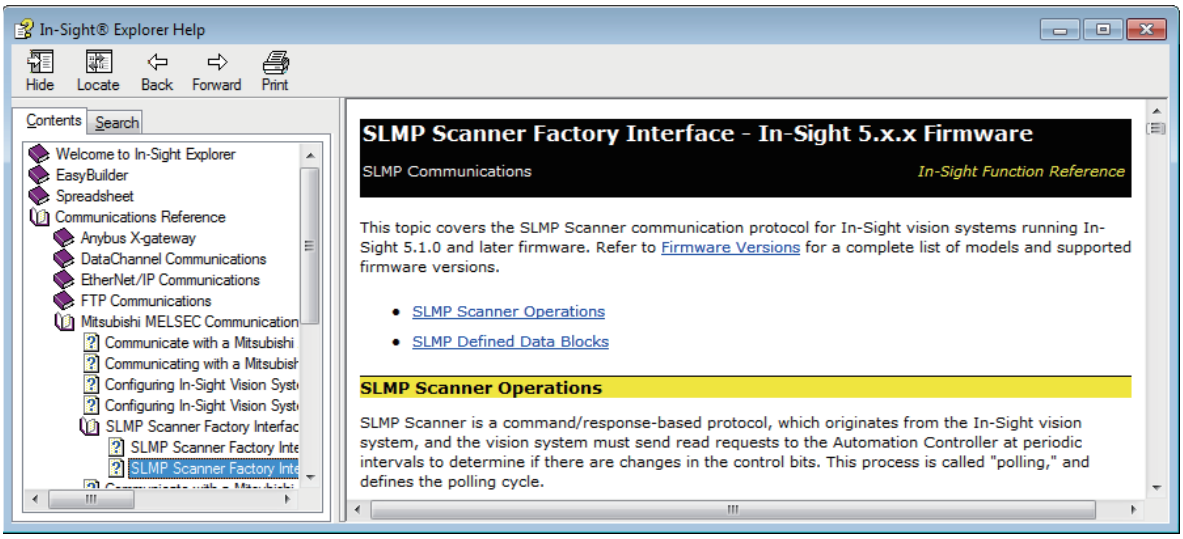
String Command Word Blocks

Word 0	Word 1..N
String Command Length	String Command

String Command Result Word Blocks

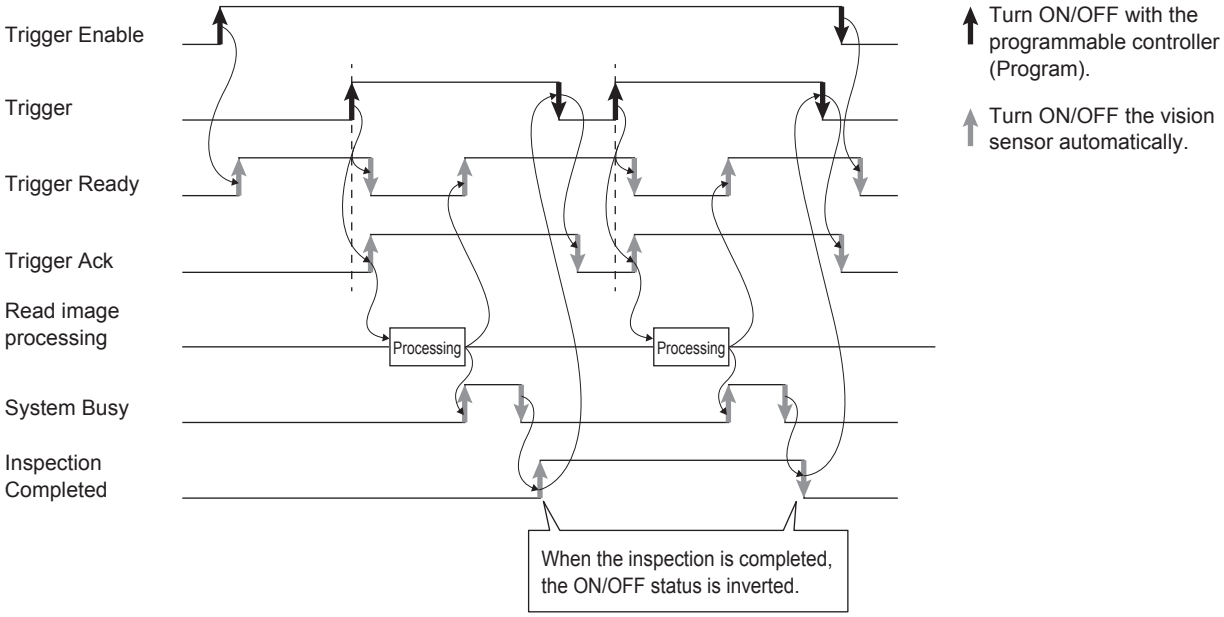
Word 0	Word 1	Word 2..N
Result Code	String Command Result Length	String Command Result

For details of the data block functions to control the vision sensor, refer to In-Sight Explorer's HELP.
Set “SLMP” as a keyword in HELP and refer to the explanation of data blocks.



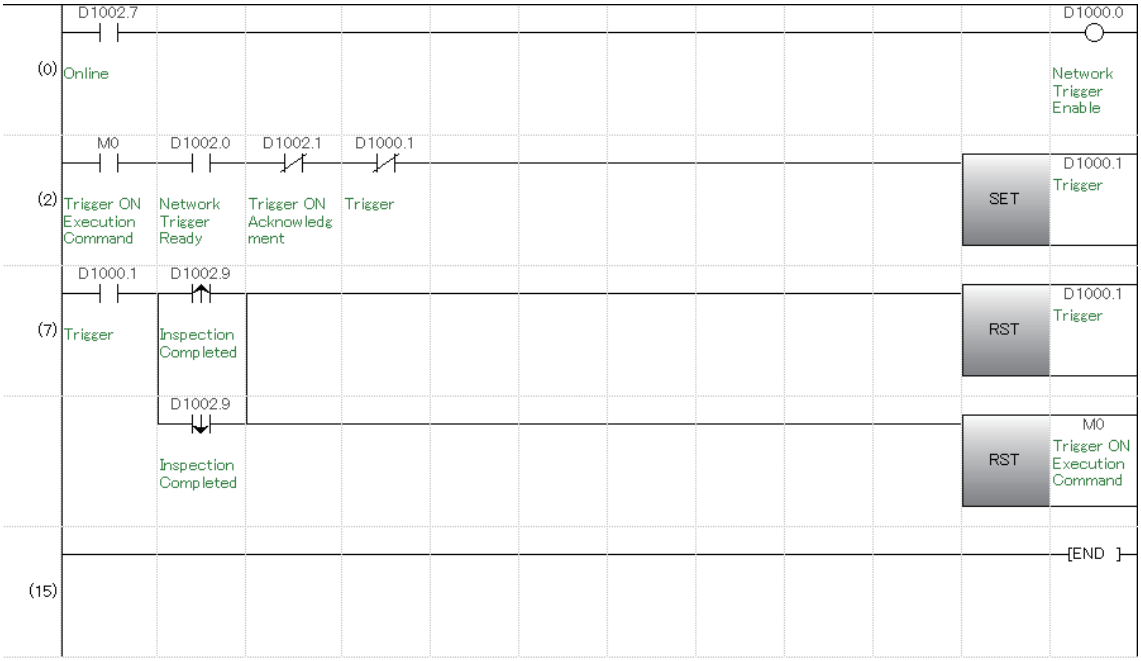
Timing chart of the SLMP scanner connection

The following shows a timing chart when [Trigger] of the control bit block is turned on from the programmable controller.
To enable the trigger from the programmable controller, turn on [Trigger Enable] of the control bit block.
When [Trigger] of the control bit block is turned on from the programmable controller while [Trigger Ready] of the status bit block is on, the status of the vision sensor is output to [Trigger Ack], [Acquiring], [System Busy], and [Inspection Completed] by the status bit block.
[Inspection Completed] changes (toggles) the status at every completion.



• Program example

Program example is shown below.



1.3 Vision Sensor Setting

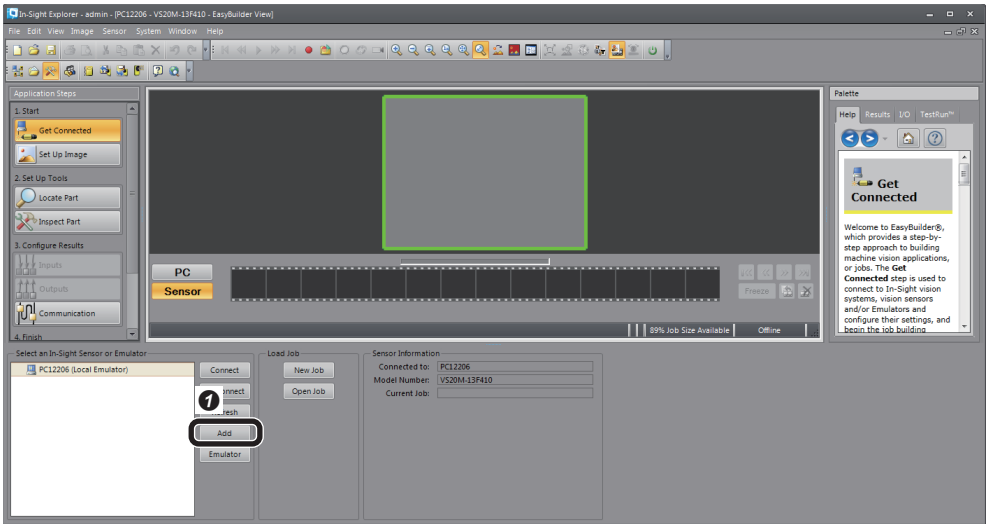
Setting an IP address to the personal computer

Set the IP address 192.168.3.3 to the personal computer.

Connecting of the vision sensor

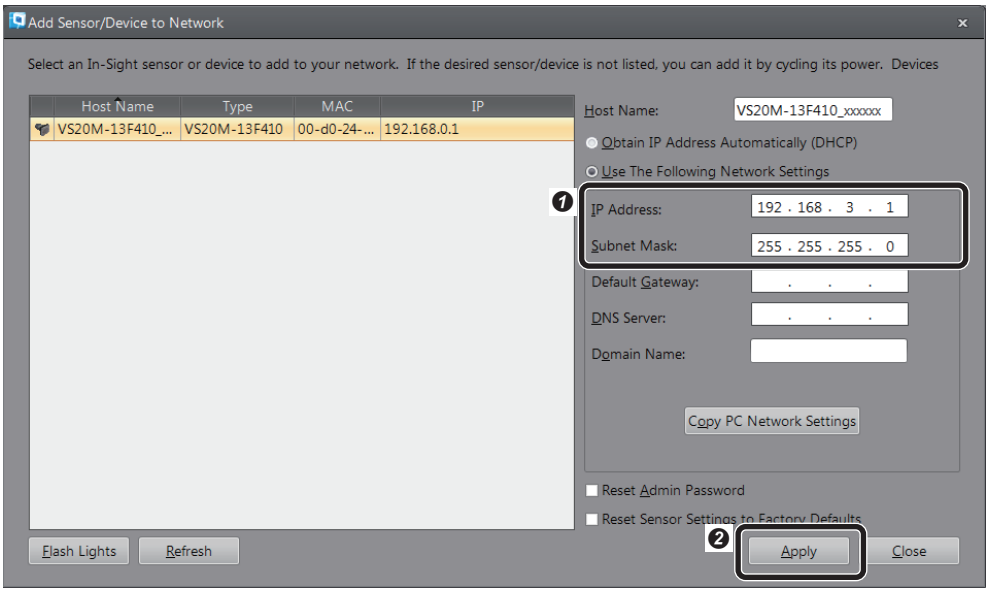
Start In-Sight Explorer to set the vision sensor.

1. Start the In-Sight Explorer software.



❶ Click [Add].

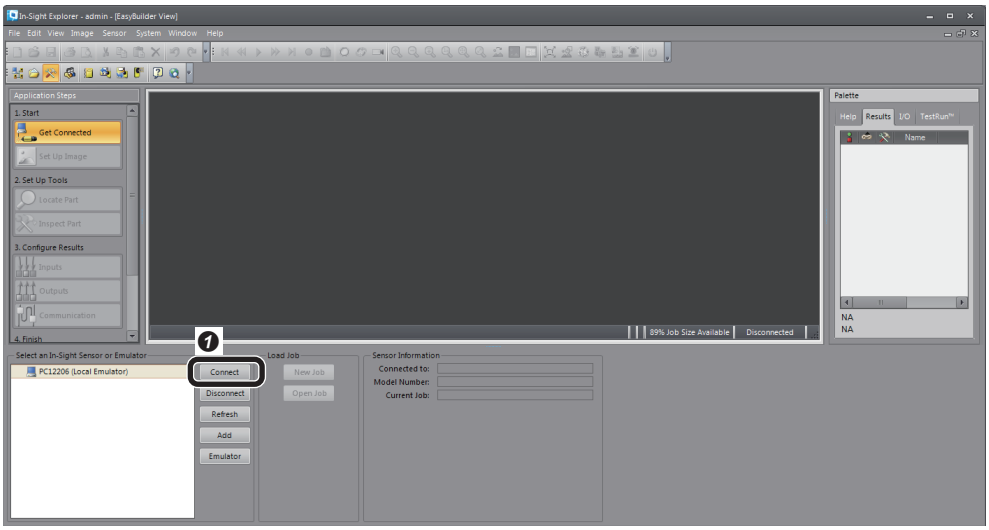
2. Add the vision sensor to the network.



❶ Set the sensor and device to the network as shown left.
- IP Address: 192.168.3.1
- Subnet Mask: 255.255.255.0

❷ Click [Apply].

3. Connect to the vision sensor.

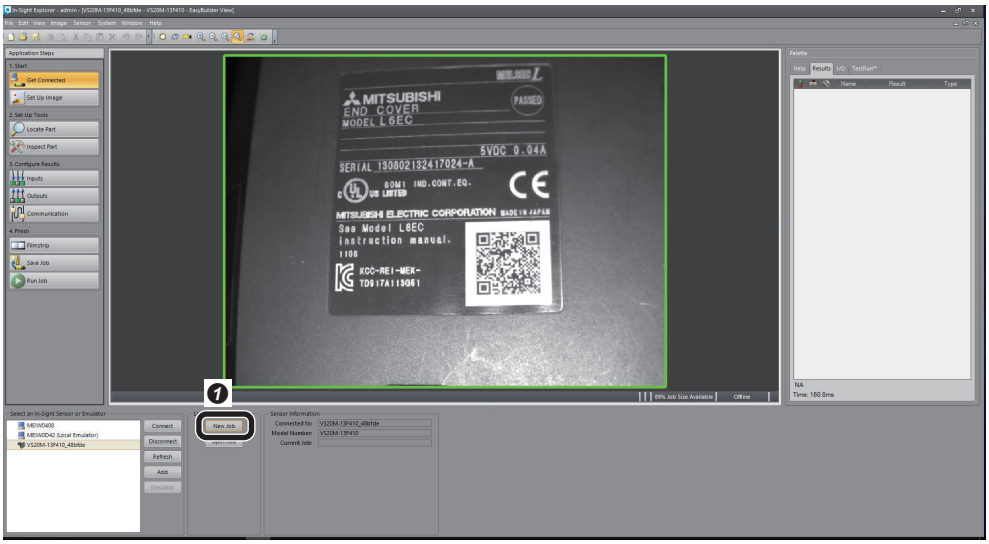


❶ Click [Connect] to connect to the vision sensor.

Creating a new job

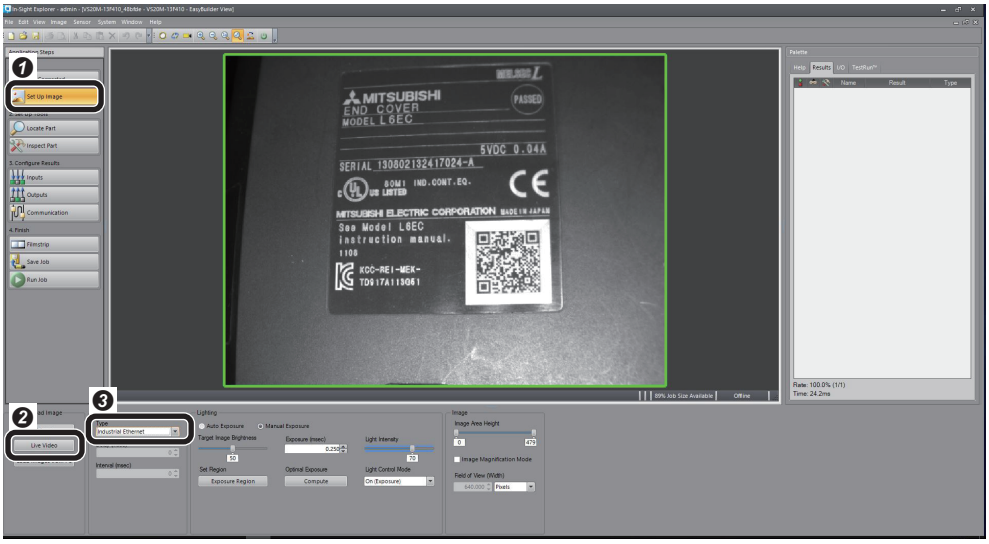
1. Create a new job.

As an example, configure the setting of an inspection to see if there is a “CE” mark on the inspection object.



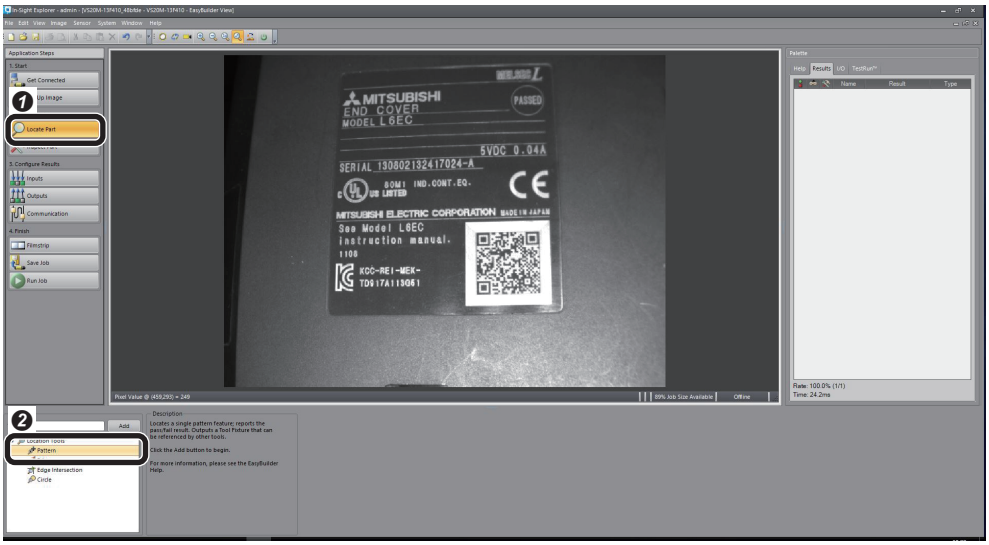
❶ Select [New Job].

2. Adjust the lens so that the lens captures an inspection target in [Set Up Image], and configure the settings to acquire the image.



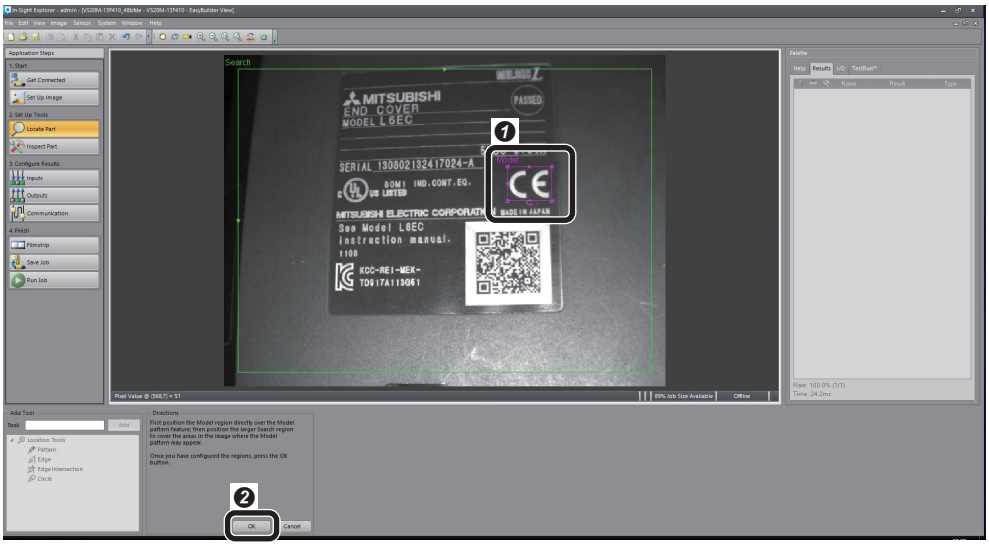
❶ Select [Set Up Image].
❷ Select [Live Video] to adjust the image. After adjusting the image, select [Live Camera] again.
❸ Select “Industrial Ethernet”.

3. Set a tool.



❶ Select [Locate Part].
❷ Select “Pattern”.

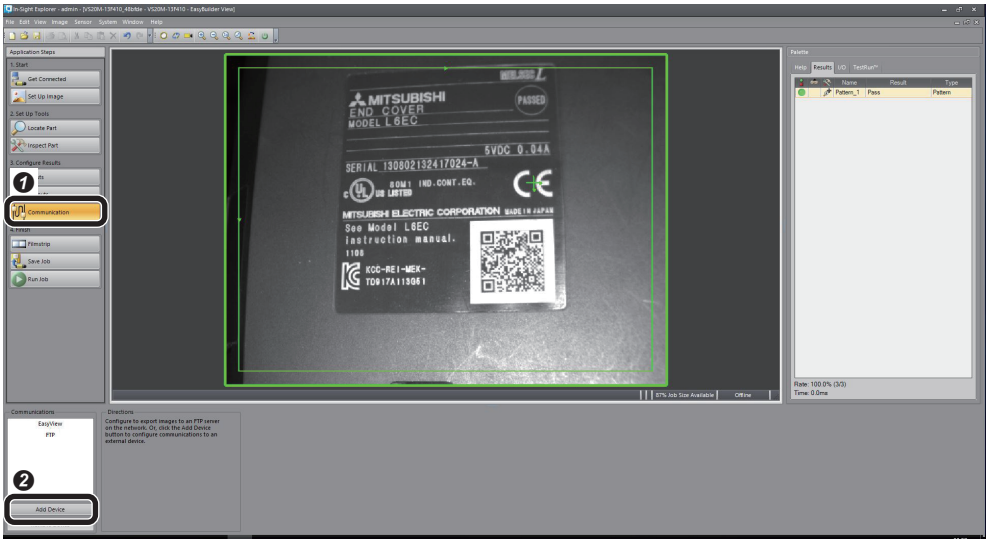
4. Set a model on the position to be detected.



❶ Set the model. (Select “CE” mark)
❷ Click [OK].

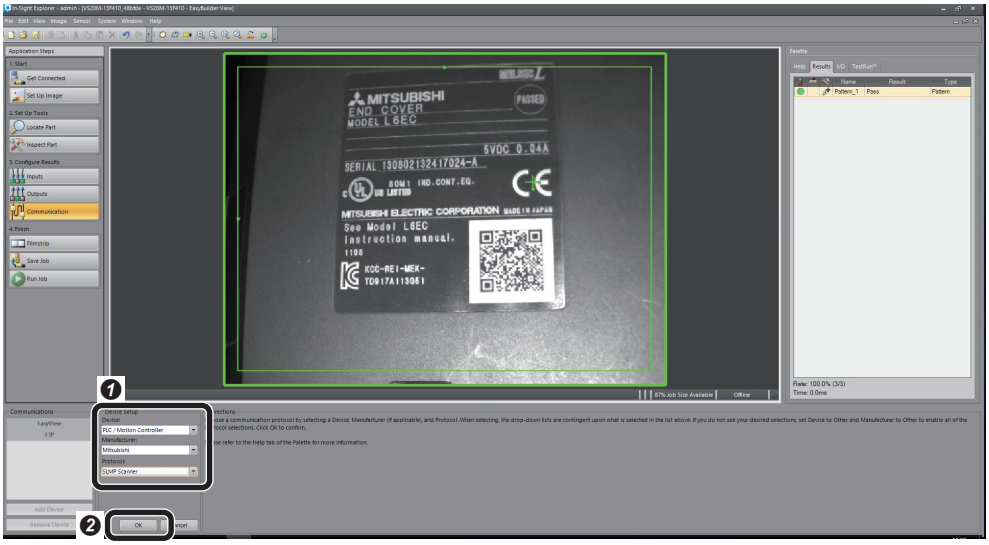
Communication setting

1. Configure the communication setting (SLMP scanner).



❶ Select [Communication].
❷ Select [Add Device].

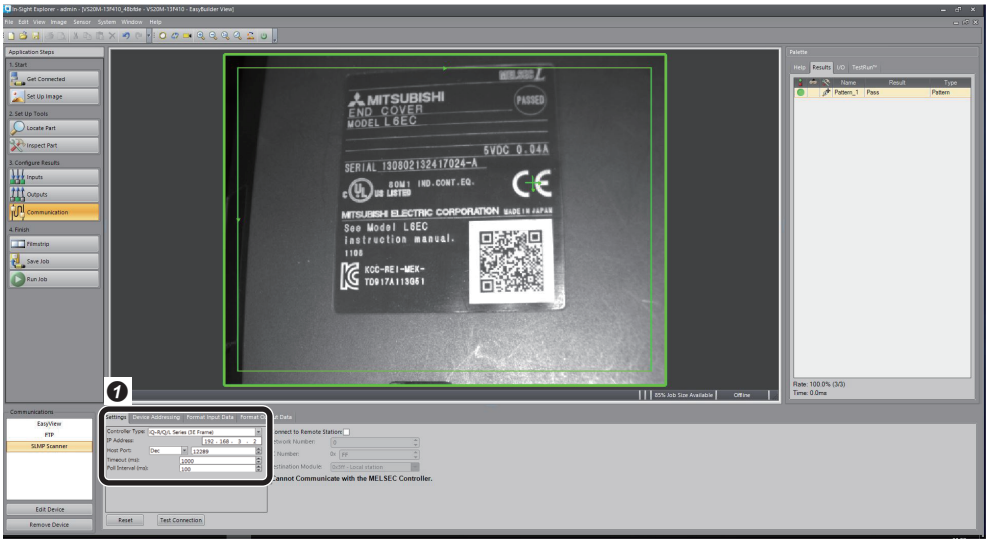
2. Add the SLMP Scanner to the communication.



❶ Configure the device setting as shown left.
- Device: PLC/Motion Controller
- Manufacturer: Mitsubishi
- Protocol: SLMP Scanner

❷ Click [OK].

3. Set the SLMP Scanner.



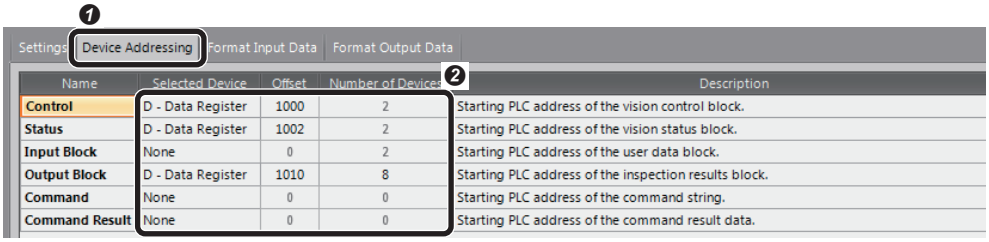
❶ Configure the settings as shown left.

- Controller Type: iQ-R/Q/L Series (3E Frame)
- IP Address: 192.168.3.2
- Host Port: 12289 (Port No. of the Ethernet parameter set in GX Works3)
- Timeout (ms): 1000
- Poll interval (ms): 100

Point

- SLMP response from the programmable controller may be delayed due to on-line operation to the programmable controller, etc., making connections disconnected in some cases, so ensure a sufficient margin for the timeout time.
- Shortening the poll interval also shortens the interval to monitor the programmable controller status.

Assigning devices

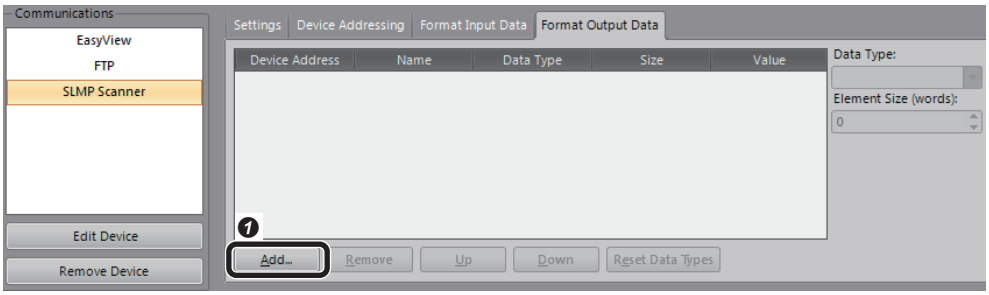


❶ Select [Device Addressing].
❷ Set a selected device, offset, and the number of devices to each of the six data blocks as shown left.
For control contents of when the device is assigned to each data block, refer to ☞ Page 25 Contents in data blocks.

Outputting to the programmable controller

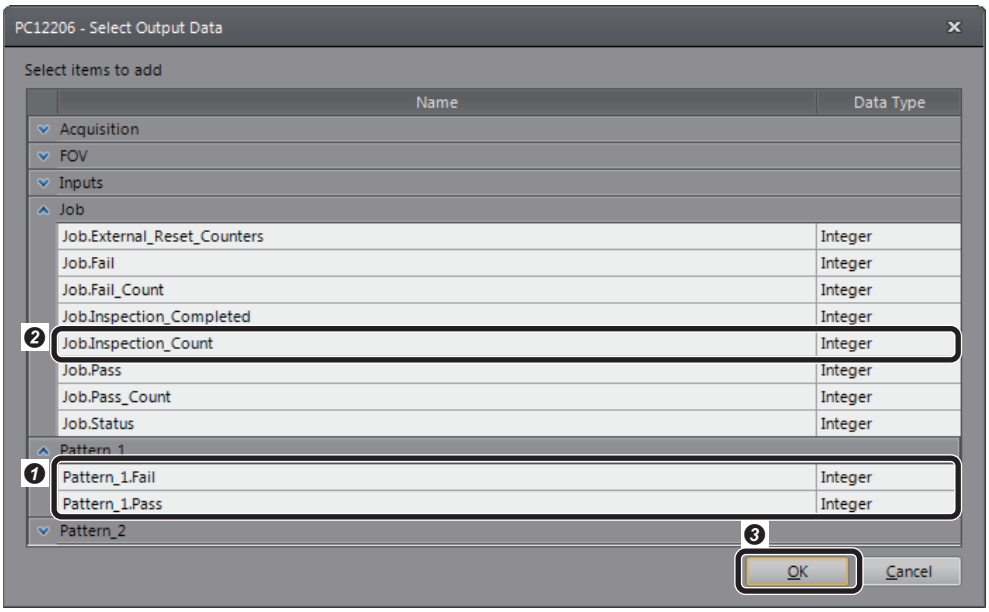
1. Set data to be output from the vision sensor to the programmable controller.

As an example, set PASS, FAIL, and the number of inspection to the output word block (D1015 to D1017).



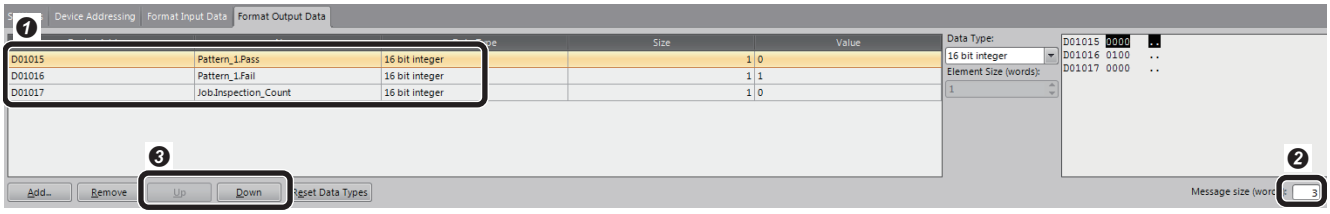
❶ Click [Add].

2. Select the data to be output to the programmable controller.



❶ Select “Pattern_1 inspection result (PASS/FAIL)”.
❷ Select “Job.Inspection_Count”.
❸ Click [OK].

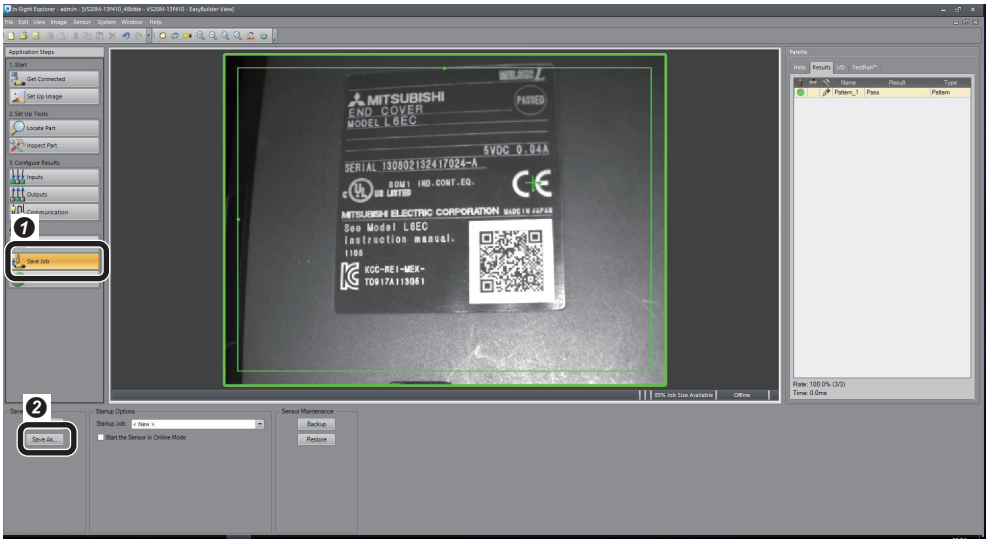
3. Display the output result to the programmable controller.



❶ Device Address: D1015 to D1017
❷ Message size (words): 3
❸ Items corresponding to the device address can be changed by using the [Up] and [Down]. As an example, sort as above for easy viewing.

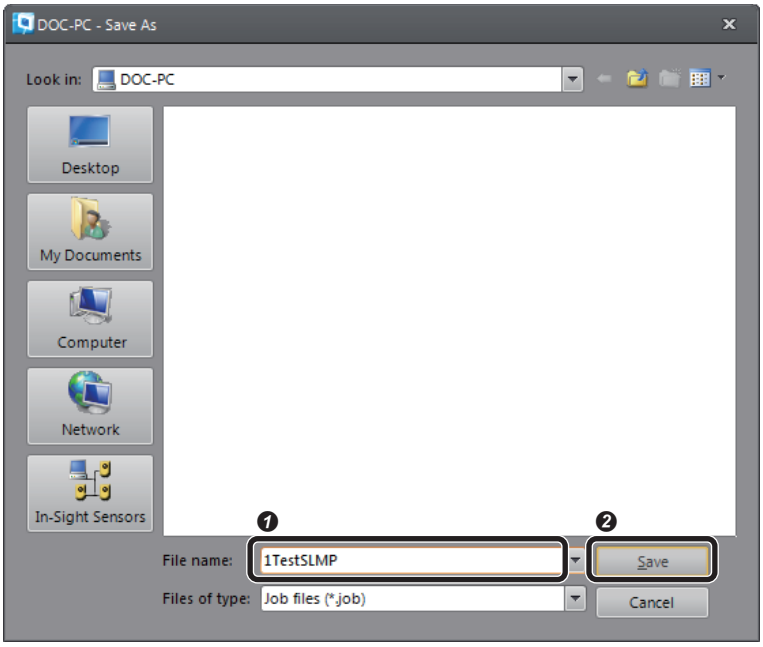
Saving the job

1. Name the created job.



❶ Select [Save Job].
❷ Click [Save As...].

2. Input the file name and save the job.



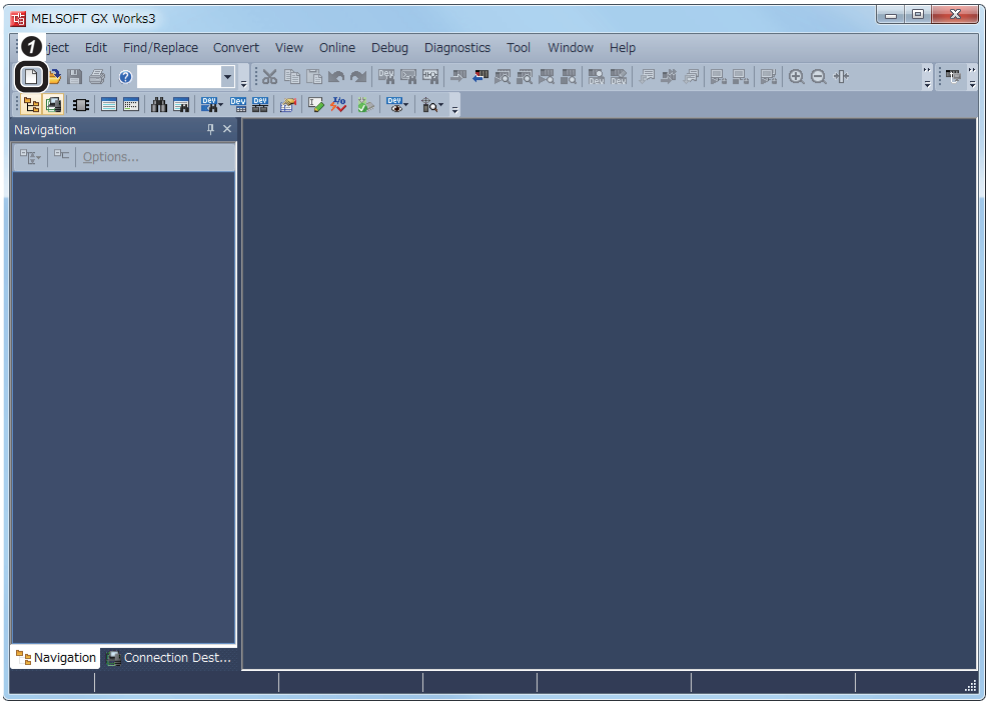
❶ Set “1TestSLMP” in “File name”.
❷ Click [Save].

1.4 Setting the Programmable Controller

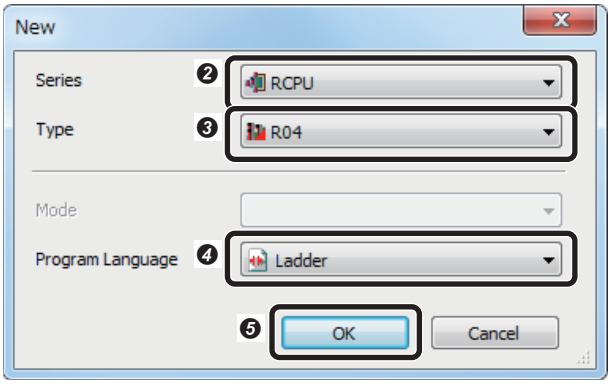
Setting the programmable controller

Start GX Works3 to set the programmable controller.

1. Start GX Works3.



❶ Start GX Works3 and create a new project.



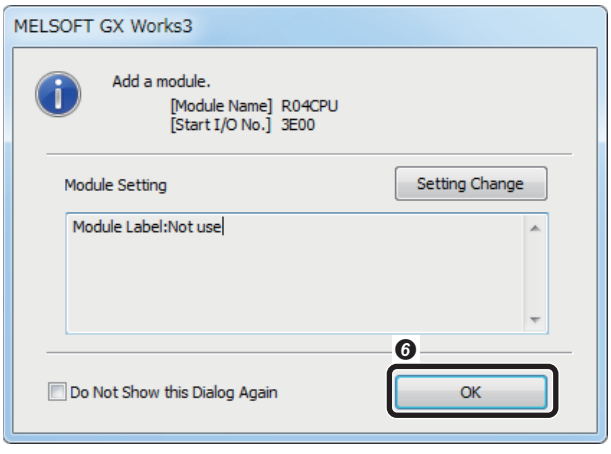
On the newly created screen, configure the settings as shown left.

❷ Series: RCPU

❸ Type: R04

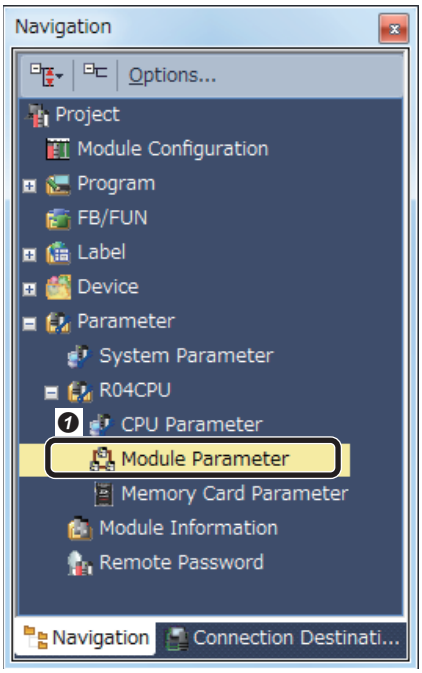
❹ Program Language: Ladder

❺ Click [OK].

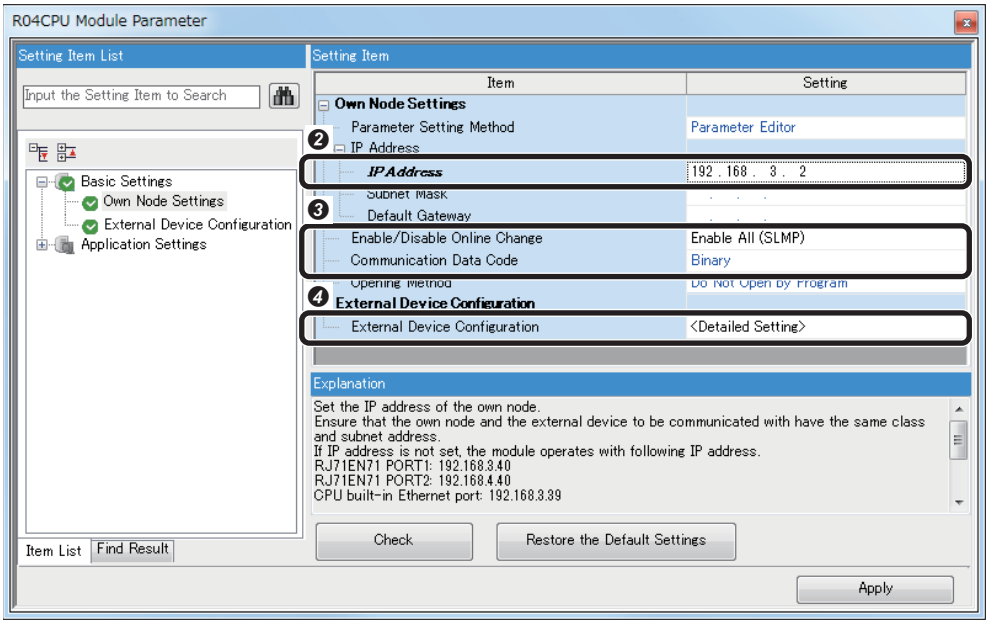


❻ Click [OK].

2. Configure the parameter settings.

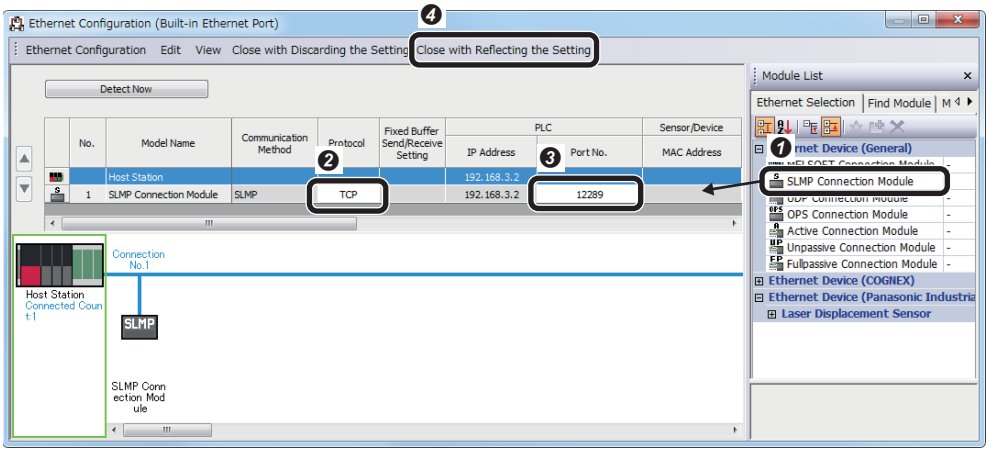


❶ Double-click [Module Parameter] in the Navigation window.



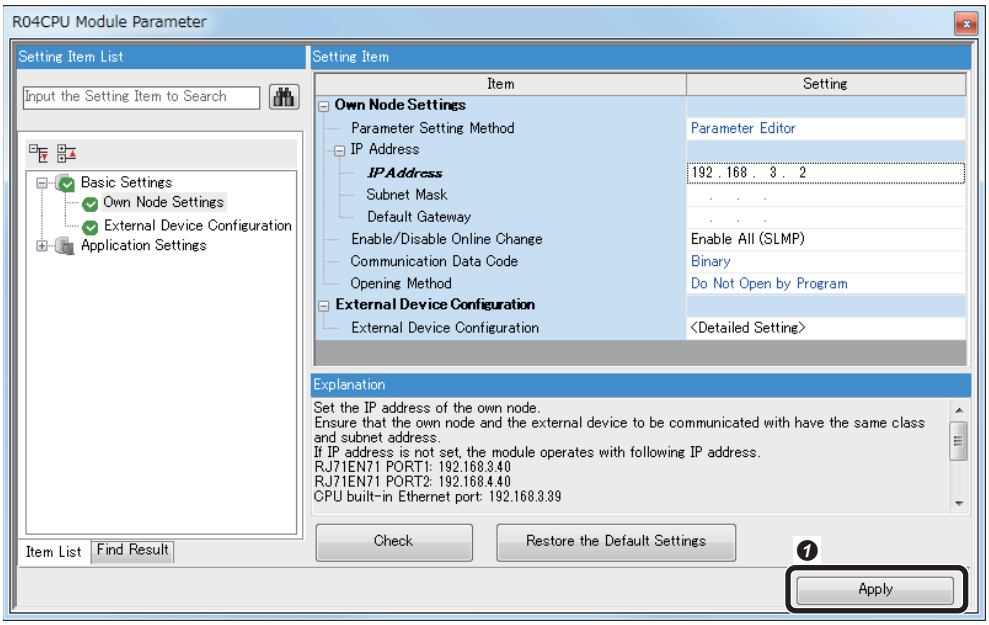
Set [Module Parameter] of R04CPU as shown left.
❷ IP Address: 192.168.3.2
❸ Enable/Disable Online Change: Enable All (SLMP)
Communication Data Code: Binary
❹ Click [External Device Configuration].

3. Configure the Open setting.



❶ Select “SLMP Connection Module” from the module list and paste by drag&drop.
❷ Select “TCP” in “Protocol”.
❸ Input “12289” to “Port No.”.
❹ Click [Close with Reflecting the Setting].

4. End Setting.



❶ Click [Apply] and end the settings.

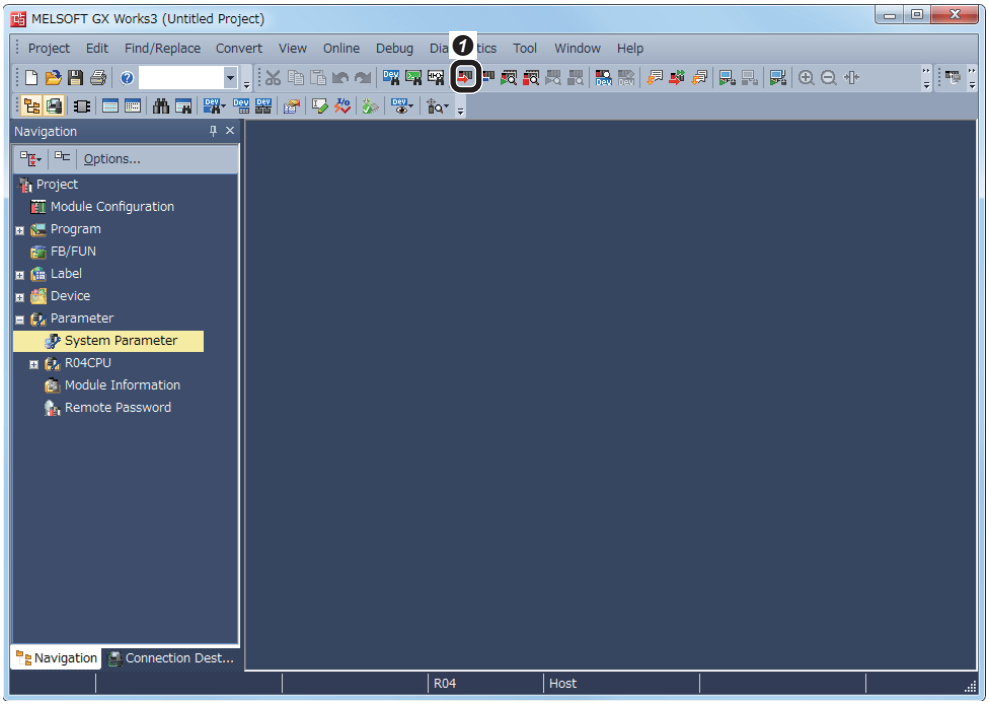
Point

The user has to set parameters for communication for the programmable controller, and does not need to create a program for communication.

1.5 Execute Programmable Controller and Vision Sensor

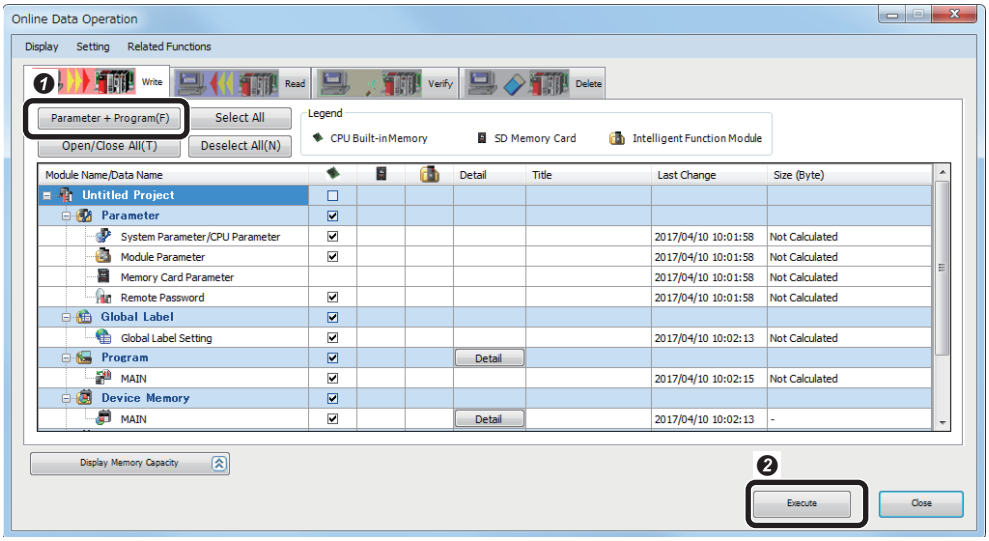
Execute the programmable controller

1. Start the programmable controller.



❶ Click [Write to PLC].

2. Write the parameters.



❶ Select [Parameter + Program].
❷ Click [Execute].

After writing the parameters is completed, reset and run the programmable controller.

Execute the vision sensor

Turn OFF→ON the power supply of the vision sensor and restart it.

1.6 Checking Operations

Control the vision sensor using the programmable controller and check the operations.

Make the vision sensor online

Make the vision sensor online and start the communication with the programmable controller.

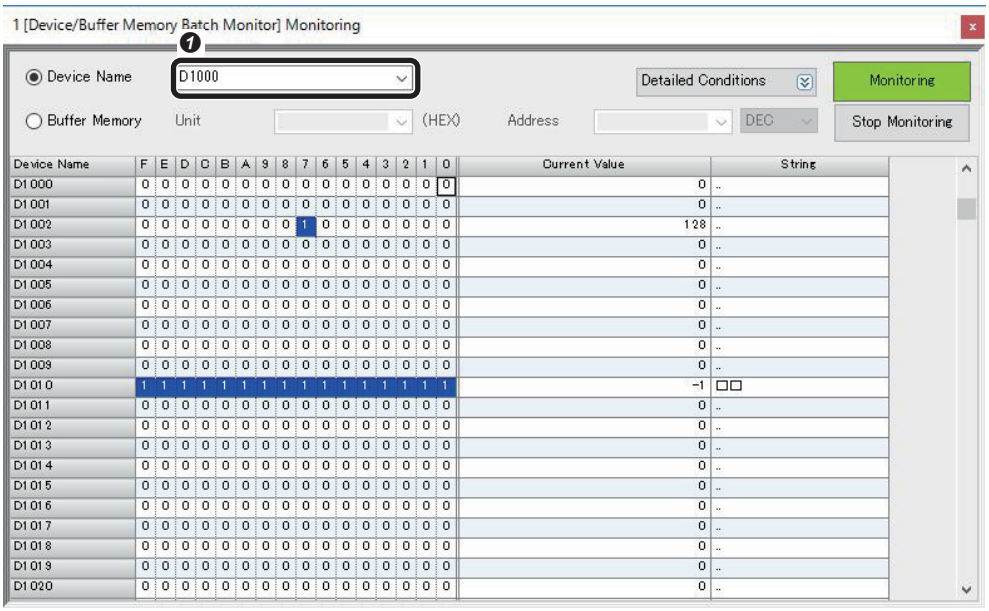
❶ Select [Communication].
❷ Select [Online].
❸ Check that “Connected.” is displayed for the SLMP Scanner.

Set the trigger to the vision sensor

Set the trigger to the vision sensor, and acquire inspection results.

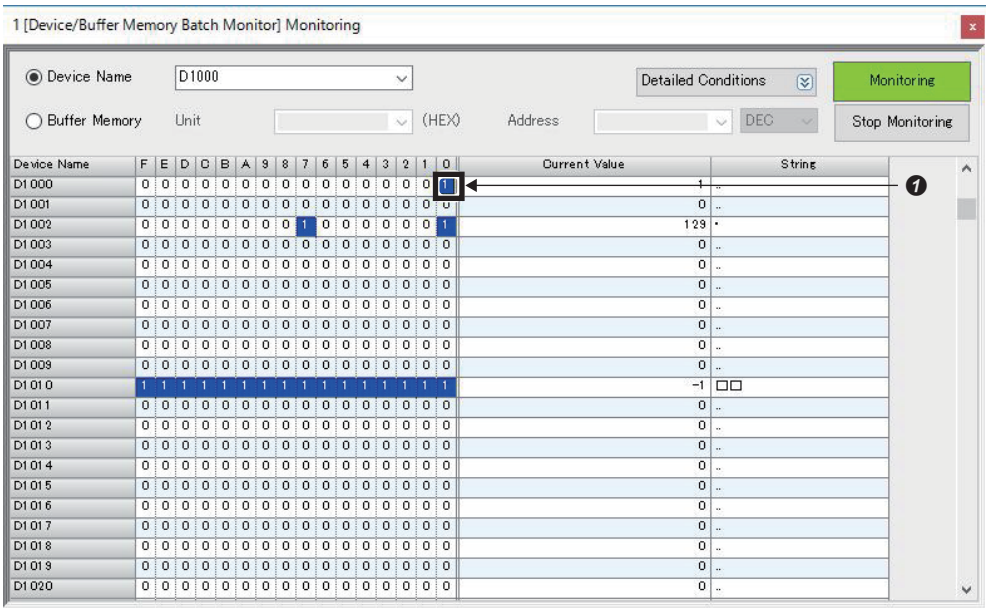
Open [Online]⇨[Monitor]⇨[Device/Buffer Memory Batch Monitor] in GX Works3 to display devices.

1. Display devices.



❶ Input “D1000” in [Device Name] and monitor the contents of the data block.

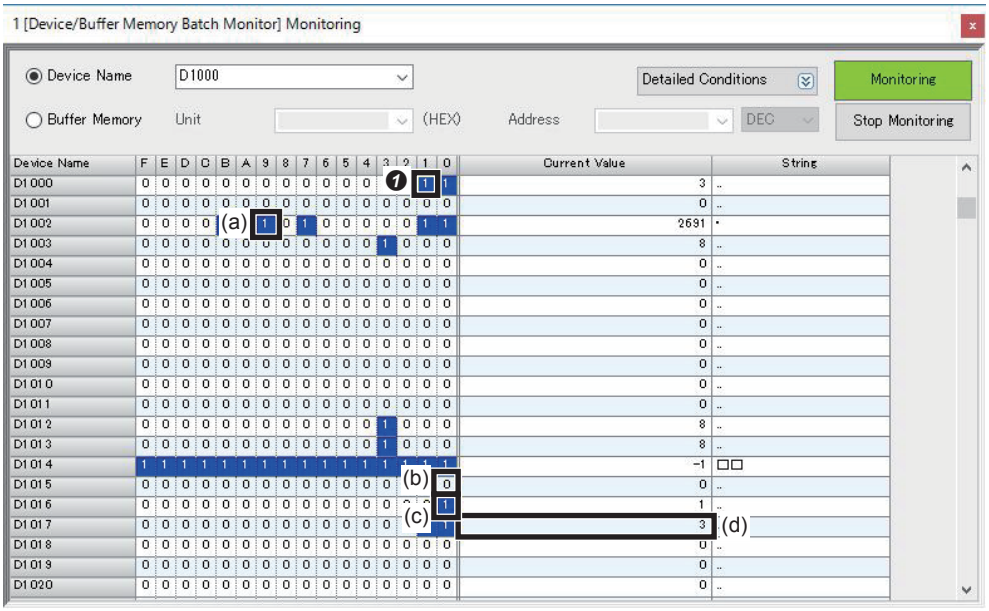
2. Set the trigger.



❶ To enable the trigger from the programmable controller, turn “ON” the “Network Trigger Enable” bit (D1000.0) of the control bit block.
When the “Network Trigger Enable” bit (D1000.0) is “OFF”, the vision sensor does not operate even though the trigger is ON.

Check inspection results

Check inspection results.



❶ Turn “ON” the “Trigger” bit (D1000.1) of the control bit block.
(a) Inspection Completed: The vision sensor is triggered and an search result is output. As the inspection result, the format output data set with the SLMP Scanner of In-Sight Explorer is output.
(b) D1015 = Pattern_1 PASS
(c) D1016 = Pattern_1 FAIL
(d) D1017 = Inspection count
When the inspection is completed, the “Inspection Completed” bit (D1002.9) of the status bit block changes (toggles).
To set the trigger to the vision sensor again, turn “ON” D1000.1.

1.7 Contents in Data Blocks

Contents in data blocks

Set a start device and the number of devices to each data block with In-Sight Explorer.

The start device types (such as D, M, and X) and the start devices can be changed. The number of devices, excluding the ones for the control bit block and status bit block, can be changed. The control details set to each data block are fixed in the system.

The following shows the control details of the six data blocks where devices have been assigned.

Function	Start device	Number of devices
Control bit block (Control)	D1000	2
Status bit block (Status)	D1002	2
Input word block (Input block)	—	—
Output word block (Output block)	D1010	8
String command word block (Command)	—	—
String command result word block (Command result)	—	—

■Device assignment to be used control bit block

Classification	Device	Control details (Application)	Supplement
Control bit block	D1000.0	Network Trigger Enable	The trigger is enabled by turning on this “trigger” bit and is disabled by clearing this bit.
	D1000.1	Trigger	The following conditions need to be satisfied to enable the trigger. • The vision sensor is online when the Network Trigger Enable bit is on. • In the setting of In-Sight Explorer, “Industrial Ethernet” is set for the [Trigger] parameter.
	D1000.2	Buffer Result Enable	
	D1000.3	Inspection Result ON Acknowledgment	
	D1000.4	Job Load Trigger	Store an ID of the job to be loaded to the Job Load ID of the input word block and turn it on.
	D1000.5	Reserved	
	D1000.6		
	D1000.7	SetOffline	The vision sensor goes offline when this bit is turned on.
	D1000.8	Reserved	
	D1000.9		
	D1000.A		
	D1000.B		
	D1000.C		
	D1000.D		
	D1000.E		
	D1000.F		
	D1001.0	Set User Data	This bit turns off→on when the user data of the input word block is updated.
	D1001.1	Send Native Mode Command	
	D1001.2	Clear Error	The error code of the output word block is cleared when this bit turns ON.
	D1001.3	Clear Image Complete Signal	
	D1001.4	Reserved	
	D1001.5		
	D1001.6		
	D1001.7		
	D1001.8	Soft Event 0 Trigger	It cannot be used with this model.
	D1001.9	Soft Event 1 Trigger	It cannot be used with this model.
	D1001.A	Soft Event 2 Trigger	It cannot be used with this model.
	D1001.B	Soft Event 3 Trigger	It cannot be used with this model.
	D1001.C	Soft Event 4 Trigger	It cannot be used with this model.
	D1001.D	Soft Event 5 Trigger	It cannot be used with this model.
	D1001.E	Soft Event 6 Trigger	It cannot be used with this model.
	D1001.F	Soft Event 7 Trigger	It cannot be used with this model.

■Device assignment to be used status bit block

Classification	Device	Control Details (Application)	Supplement
Status Bit Blocks	D1002.0	Network Trigger Ready	This bit turns on when the trigger can be input.
	D1002.1	Trigger ON Acknowledgment	This bit notifies that the trigger ON is acknowledged. This bit remains ON until the “trigger” bit is cleared.
	D1002.2	Reserved	
	D1002.3	Importing Failed	This bit turns on when importing an image failed. This bit is cleared when importing an image is properly completed.
	D1002.4	Offline Reason	0: Online status 1: Offline operation from the program 2: Offline operation from the discrete signal input 3: Offline operation from the communication
	D1002.5		
	D1002.6		
	D1002.7	Online	This bit turns on when the vision sensor is online.
	D1002.8	System Busy	This bit turns on during inspection processing.
	D1002.9	Inspection Completed	This bit changes (toggles) the status when inspection is completed.
	D1002.A	Result Buffer Overrun	
	D1002.B	Results Valid	
	D1002.C	Job Loading	
	D1002.D	Job Load Complete	
	D1002.E	Job Load Failed	
	D1002.F	Fault	It cannot be used with this model.
	D1003.0	Set User Data Trigger Acknowledgment	
	D1003.1	Send Native Mode Command Trigger Acknowledgment	
	D1003.2	Native Mode Command Error	
	D1003.3	Imaging Completed	
	D1003.4	Job Pass	It cannot be used with this model.
	D1003.5		
	D1003.6		
	D1003.7		
	D1003.8	Soft Event 0 Trigger Acknowledgment	It cannot be used with this model.
	D1003.9	Soft Event 1 Trigger Acknowledgment	It cannot be used with this model.
	D1003.A	Soft Event 2 Trigger Acknowledgment	It cannot be used with this model.
	D1003.B	Soft Event 3 Trigger Acknowledgment	It cannot be used with this model.
	D1003.C	Soft Event 4 Trigger Acknowledgment	It cannot be used with this model.
	D1003.D	Soft Event 5 Trigger Acknowledgment	It cannot be used with this model.
	D1003.E	Soft Event 6 Trigger Acknowledgment	It cannot be used with this model.
	D1003.F	Soft Event 7 Trigger Acknowledgment	It cannot be used with this model.

■Device Assignment to be Used Output Word Blocks

Classification	Device	Control Details (Application)	Supplement
Output Word Blocks	D1010	Loaded Job ID	
	D1011	Error Code	
	D1012	Image Import ID	
	D1013	Inspection Result ID	
	D1014	Image Inspection Result Code	
	D1015 to D1021	Inspection Result	These devices store the data that has been specified with the format output data and is to be output from the vision sensor. In this example these are as shown below. • D1015: Pattern_1.PASS • D1016: Pattern_1.FAIL • D1017: Job Inspection Count

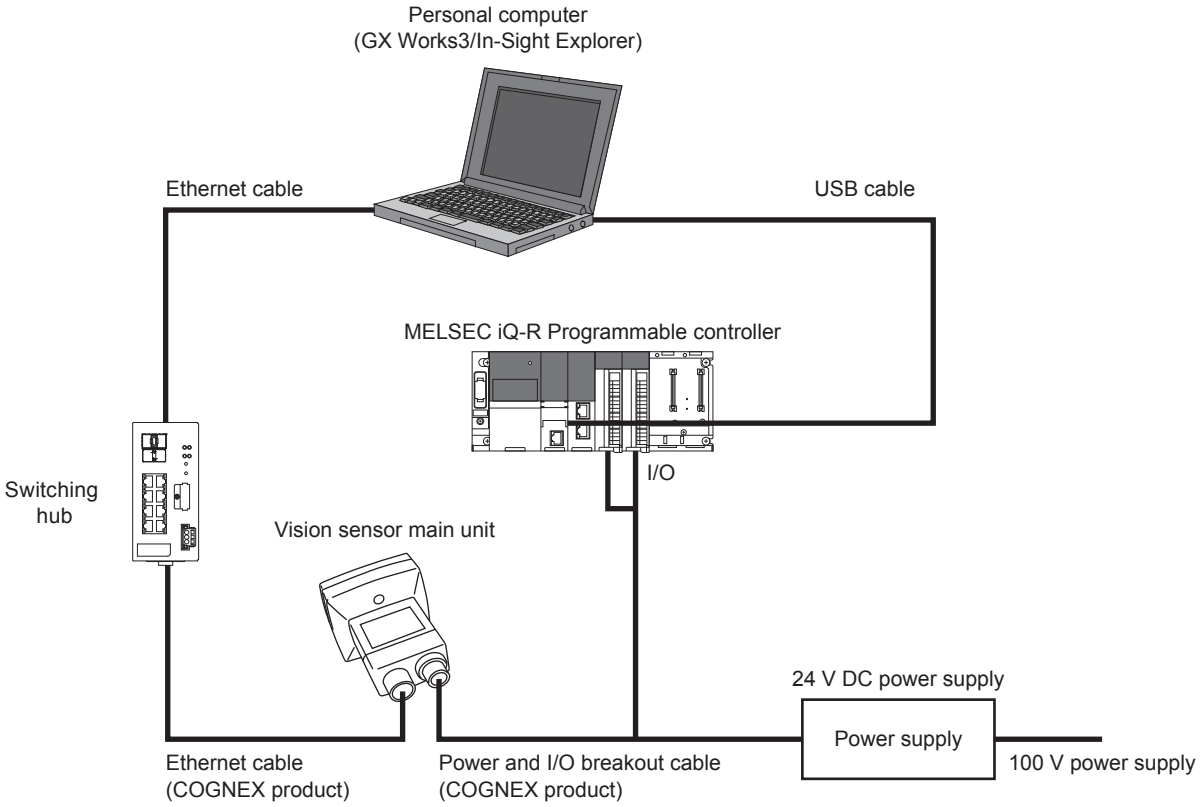
MEMO

2 I/O CONNECTION

2.1 Introduction

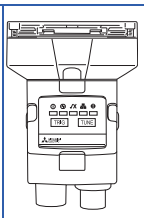
This chapter describes the procedures for connecting the Vision Sensor VS20 to a MELSEC programmable controller and controlling the vision sensor with I/O.

Example of system configuration for connecting the vision sensor



Required modules and devices

■Mitsubishi Electric products

	
MELSEC iQ-R Programmable controller • CPU module: R04CPU • Input module: RX40C7 • Output module: RY40NT5P	Vision Sensor VS20 • VS20M-13F410
	
GX Works3 (Engineering software for programmable controller)	In-Sight Explorer (Setup tool for Vision Sensor)

■COGNEX products

	
Ethernet cable	Power and I/O breakout cable

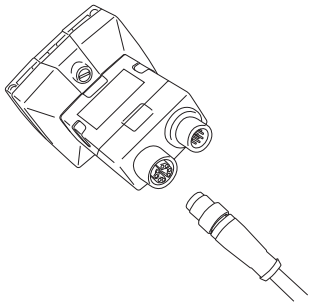
■Commercial products

			
Switching hub	Ethernet cable	USB cable	24 V DC power supply

Connecting and wiring of the vision sensor

Ethernet cable connection

1. Connect the Ethernet cable's M12 connector to the vision sensor's Ethernet connector.



2. Connect the Ethernet cable's RJ-45 connector to the switching hub or personal computer, as applicable.

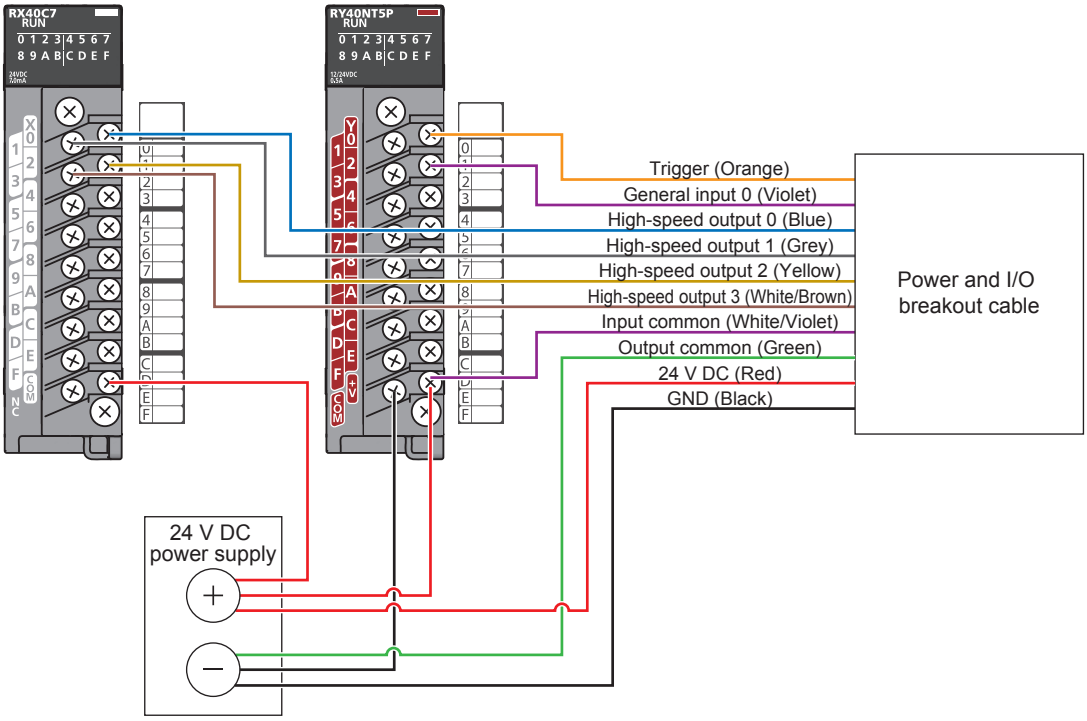
Connect the power and I/O breakout cable

Precautions

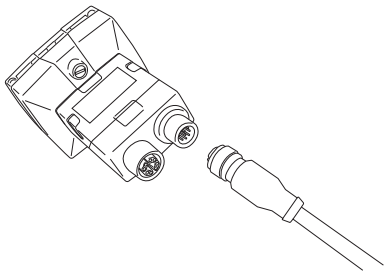
- When connecting the vision sensor and programmable controller, simultaneously turn on the vision sensor and programmable controller, or first turn on the programmable controller.
- Cut unused wires or protect them with insulating materials. Keep all bare wires separated from the 24 V DC wire.

1. Verify that the 24 V DC power supply being used is unplugged and not receiving power.

2. Connect the wires of the power and I/O breakout cable, I/O module and power supply as shown below.



3. Connect the power and I/O breakout cable's M12 connector to the vision sensor's Power, I/O and RS-232 connector.



4. Turn on the 24 V DC power supply switch.

2.2 Vision Sensor Setting

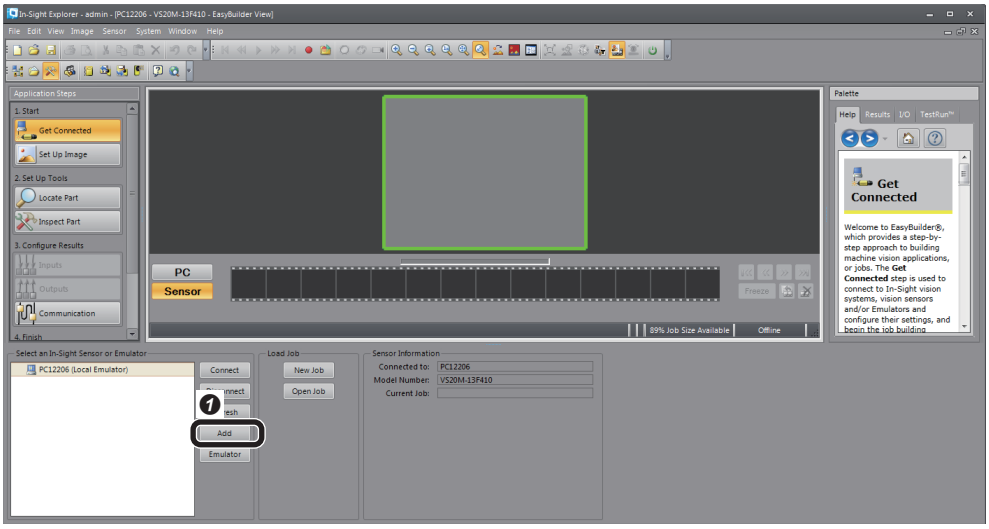
Setting an IP address to the personal computer

Set the IP address 192.168.3.3 to the personal computer.

Connecting of the vision sensor

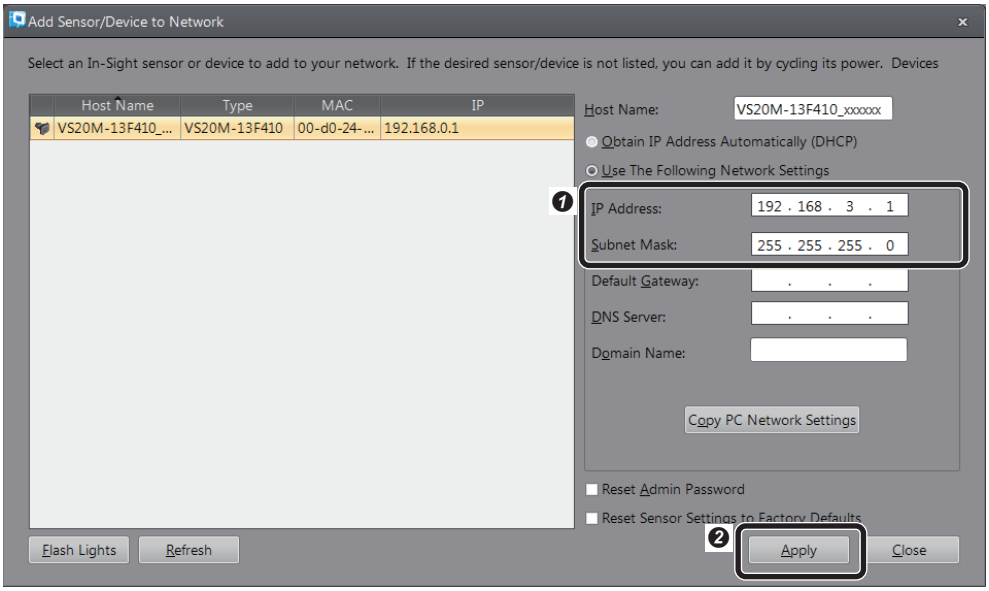
Start In-Sight Explorer to set the vision sensor.

1. Start the In-Sight Explorer software.



❶ Click [Add].

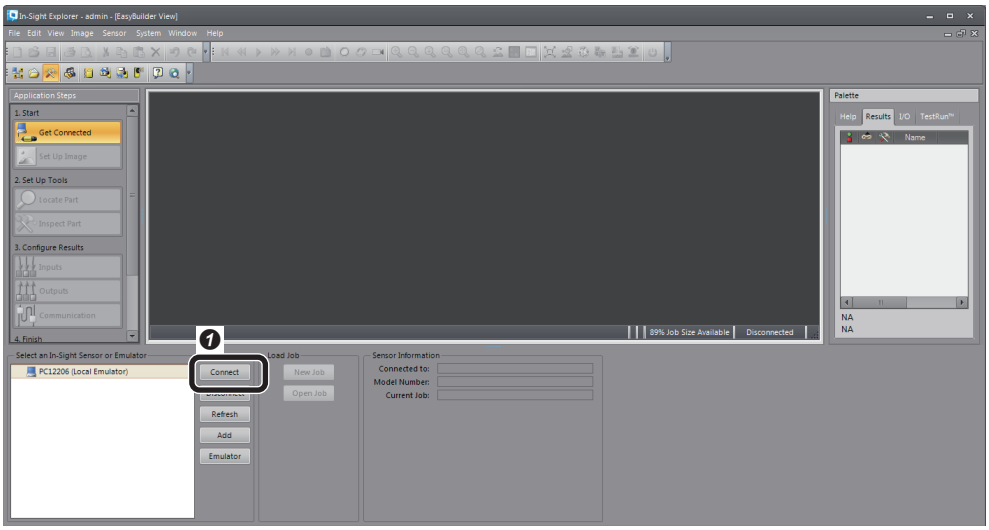
2. Add the vision sensor to the network.



❶ Add the sensor and device to the network as shown left.
- IP Address: 192.168.3.1
- Subnet Mask: 255.255.255.0

❷ Click [Apply].

3. Connect to the vision sensor.

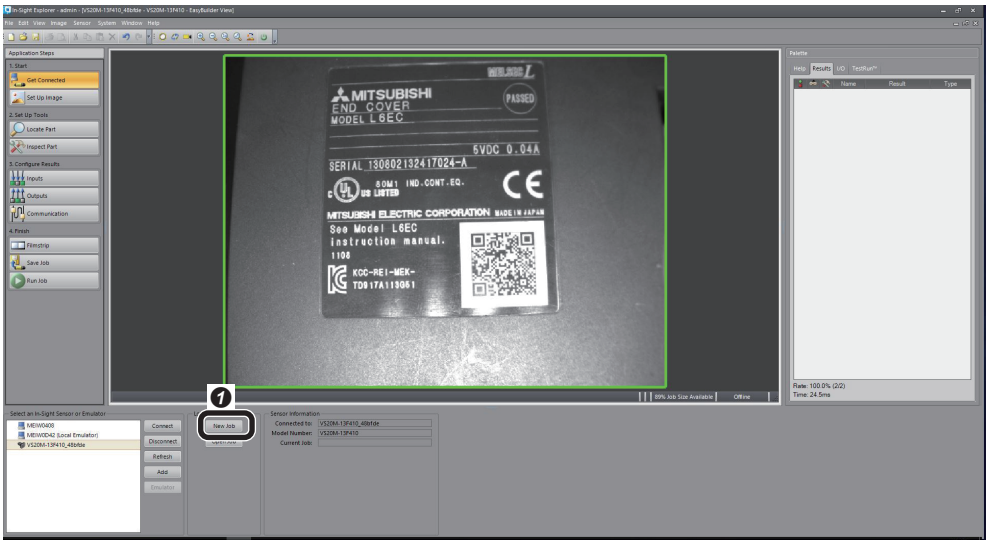


❶ Click [Connect] to connect to the vision sensor.

Creating a new job

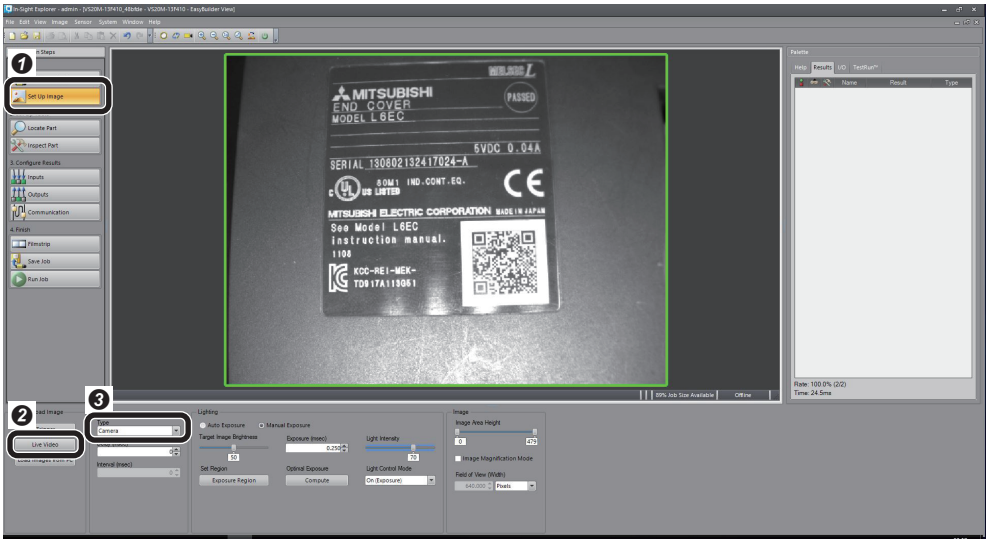
1. Create a new job.

As an example, configure the setting of an inspection to see if there is a “CE” mark on the inspection object.



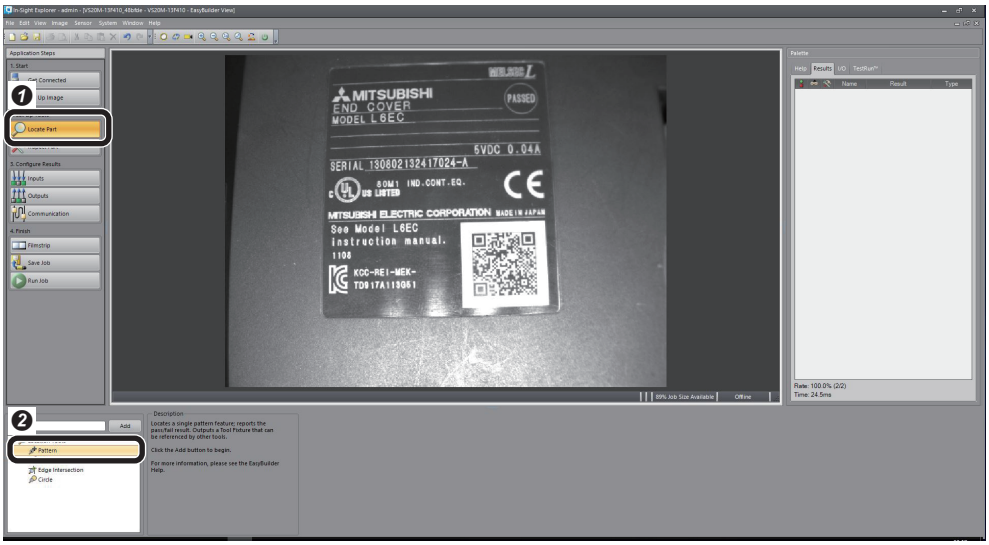
❶ Select [New Job].

2. Adjust the lens so that the lens captures an inspection target in [Set Up Image], and configure the settings to acquire the image.



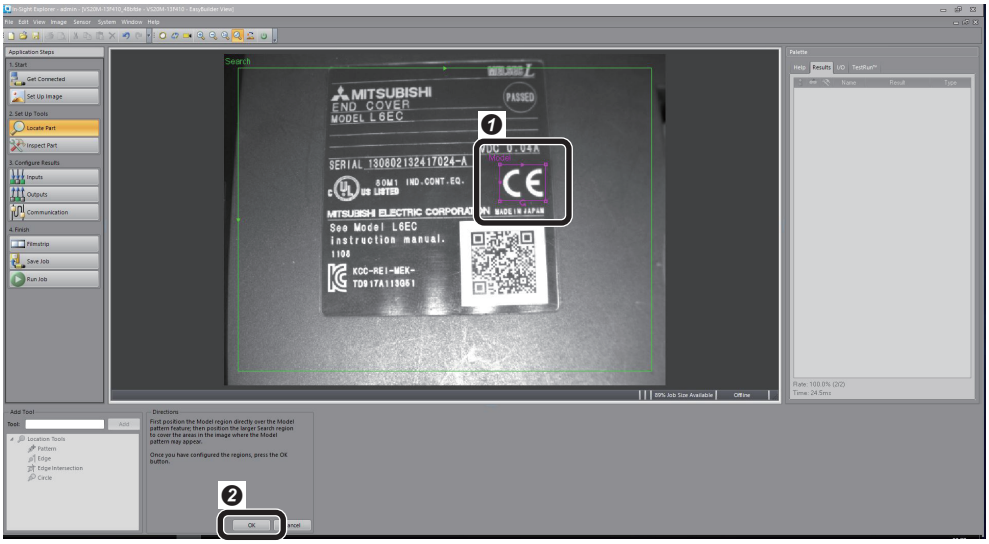
❶ Select [Set Up Image].
❷ Select [Live Video] to adjust the image. After adjusting the image, select [Live Video] again.
❸ Set the type of trigger to “Camera”.

3. Set a tool.



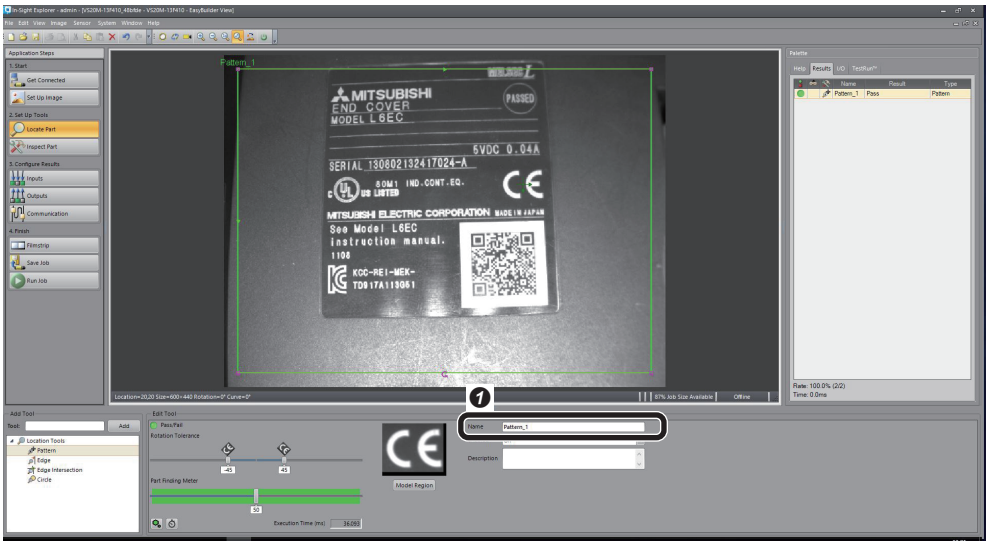
❶ Select [Locate Part].
❷ Select [Pattern].

4. Set a model on the position to be detected.



❶ Set the model. (Select “CE” mark)
❷ Click [OK].

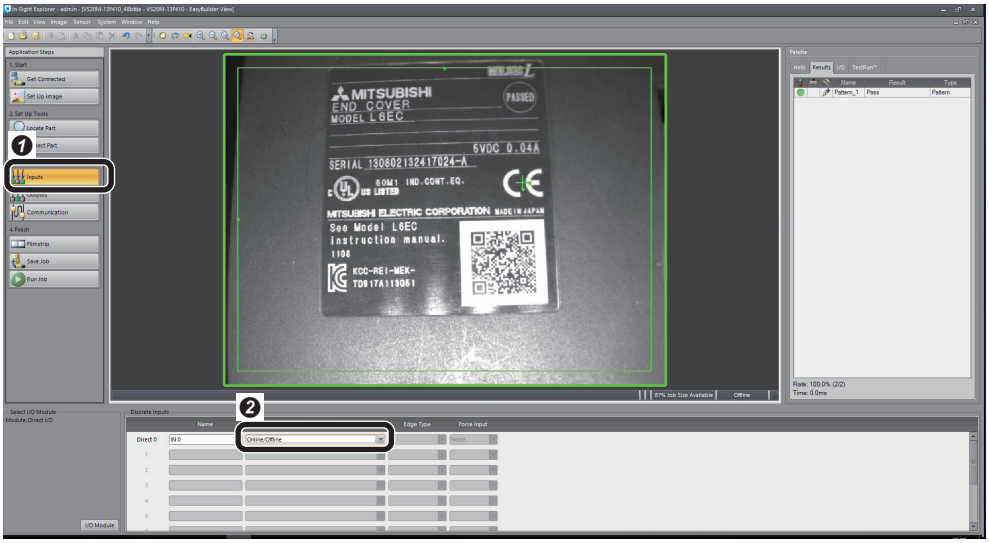
5. Set the name of the set pattern.



❶ Input an arbitrary name in the tool name. (In this guide it will remain the default “Pattern_1”.)

Inputting from the programmable controller

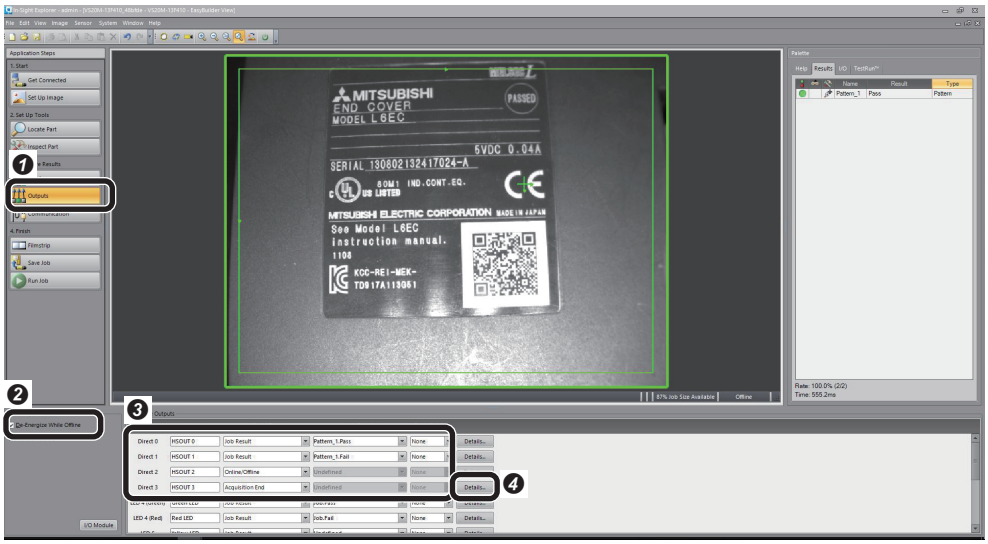
Set the input data from the programmable controller.



❶ Select [Inputs].
❷ Set the Direct 0 signal type to "Online/Offline".

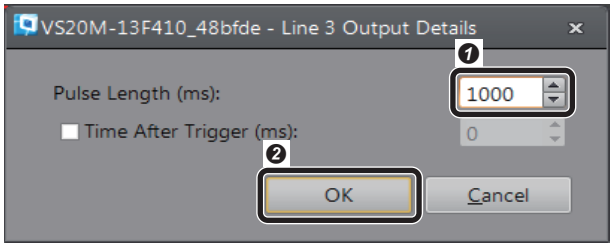
Outputting to the programmable controller

1. Set the data to be output to the programmable controller.



❶ Select [Outputs].
❷ Check [De-Energize While Offline].
❸ Configure the settings for Direct 0 to 2 as shown left.
❹ Click [Details] of Direct 3.

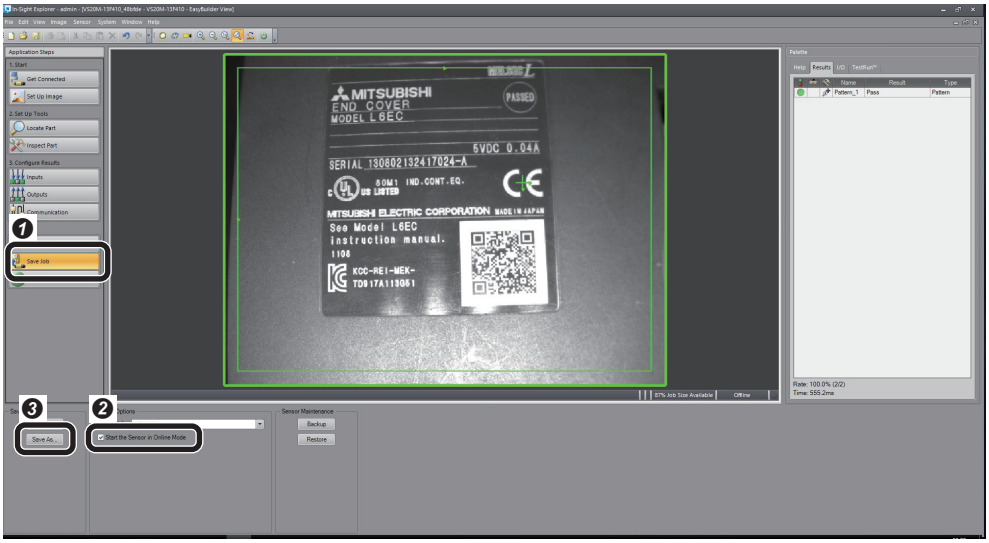
2. Set output details.



❶ Set the ON time of the signal to turn ON when processing is completed.
• Range: 1-1000 ms
❷ Click [OK].

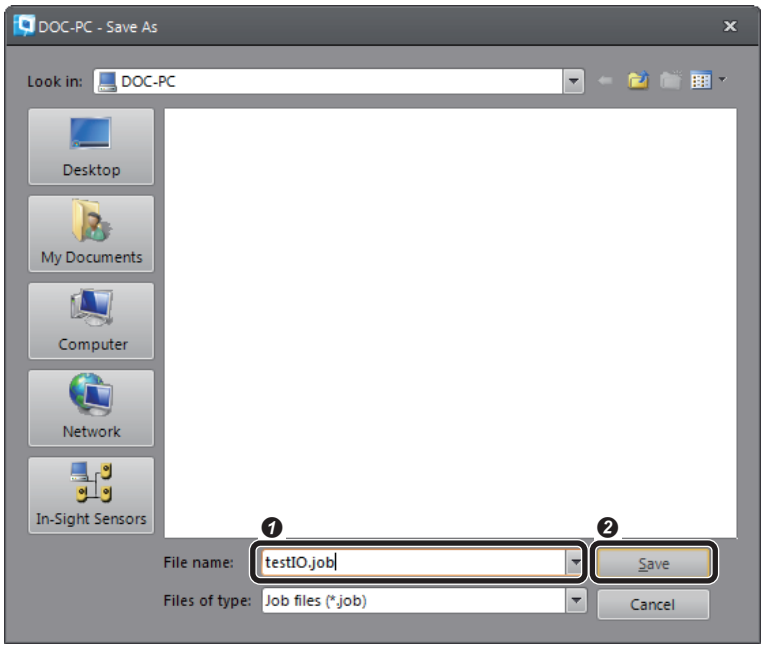
Saving the job

1. Name the created job and save it.



❶ Select [Save Job].
❷ Check [Start the Sensor in Online Mode].
❸ Click [Save As].

2. Input the file name and save the job.



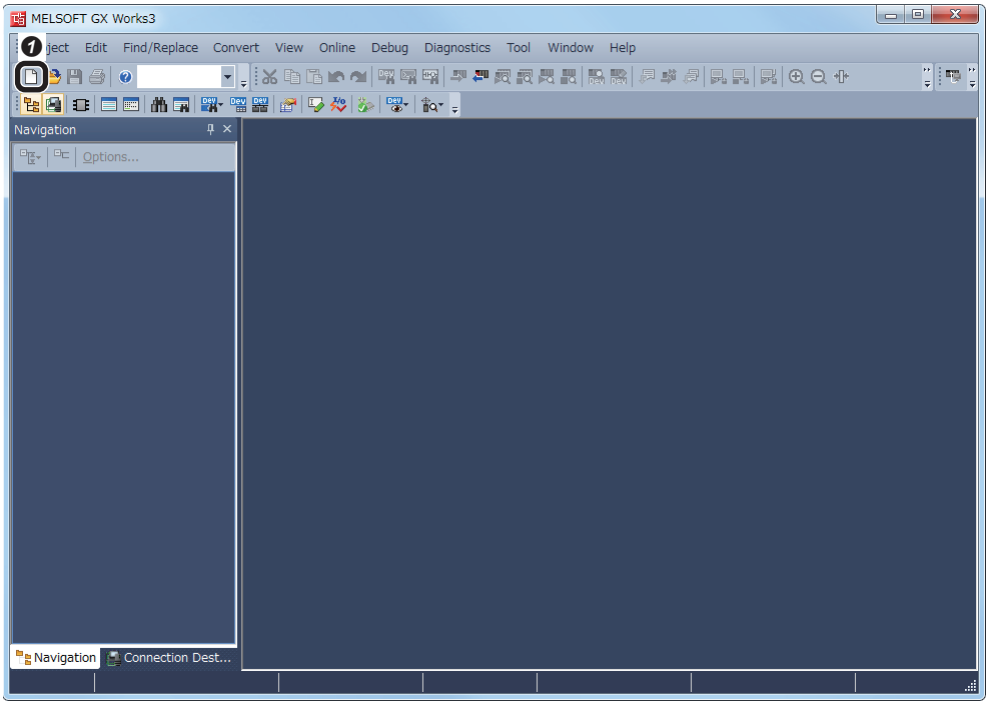
❶ Set any file name.
❷ Click [Save].

2.3 Setting the Programmable Controller

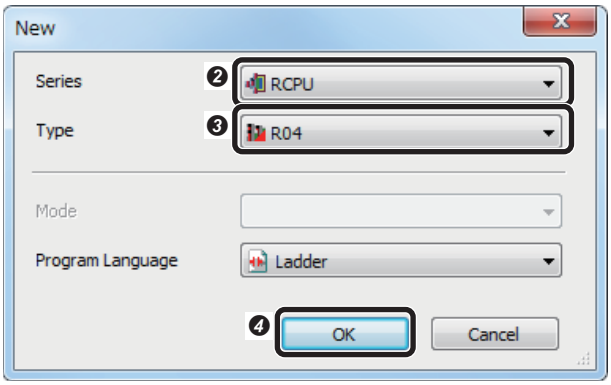
Setting the programmable controller

Start GX Works3 to set the programmable controller.

1. Start GX Works3.



❶ Start GX Works3 and create a new project.

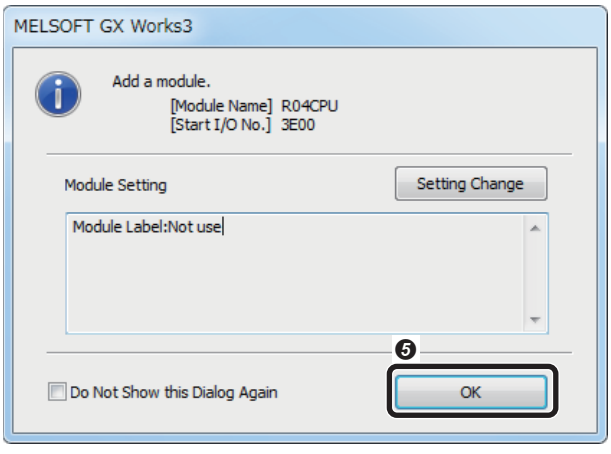


On the newly created screen, configure the settings as shown left.

❷ Series: RCPU

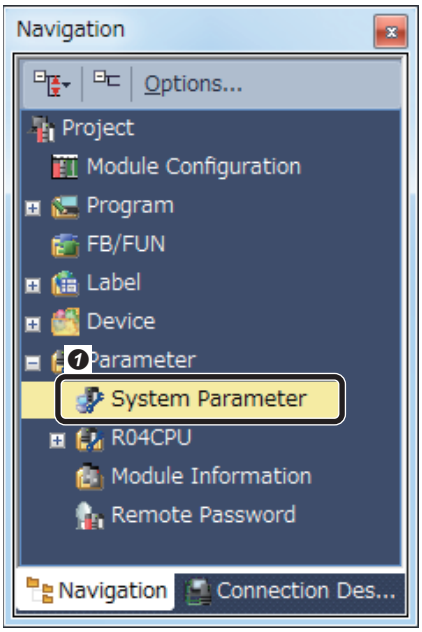
❸ Type: R04

❹ Click [OK].



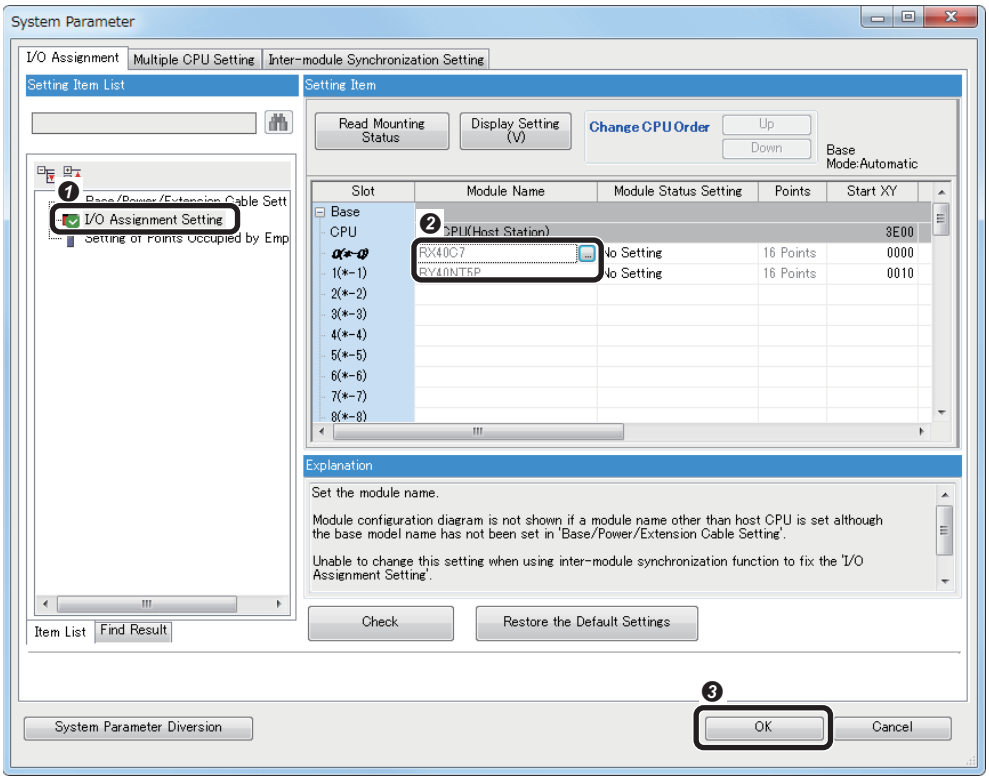
❺ Click [OK].

2. Configure the parameter settings.



❶ Double-click “System Parameter” in the Navigation window.

3. Set I/O module.



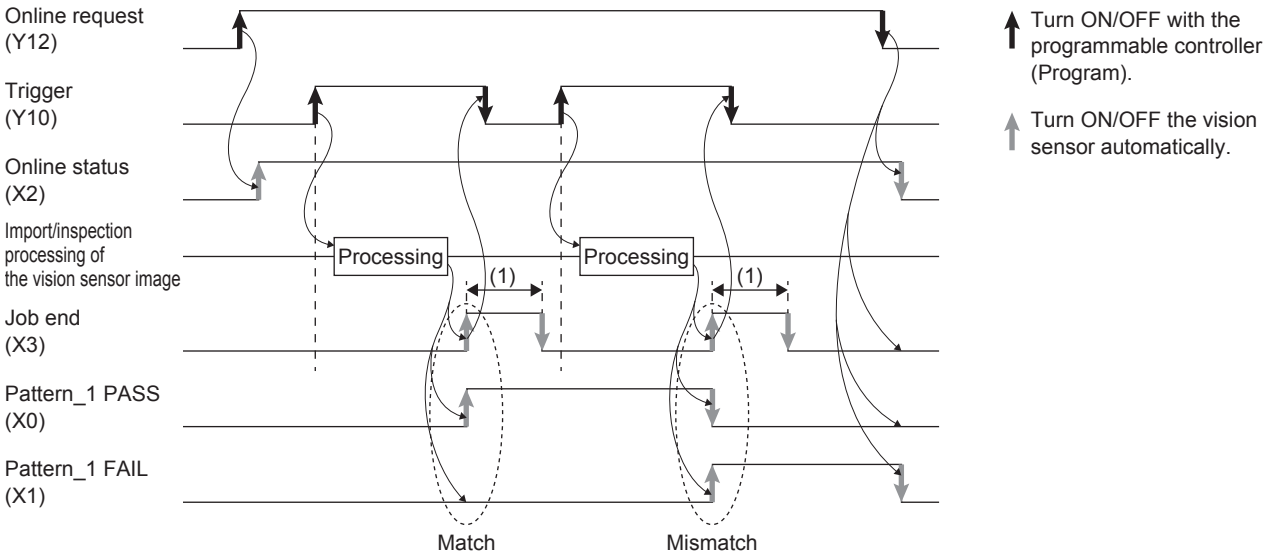
❶ Select [I/O Assignment Setting].
❷ Set “RX40C7” for slot 0 and “RY40NT5P” for slot 1.
❸ Click [OK].

Creating program

As applicable, create a program using the following I/O signals.

Signal	Signal Name	Contents	Remarks
X0	Pattern_1 PASS	It turns on when the captured image matches the model (feature) set in Pattern_1. ON: Pattern match OFF: Pattern mismatch or capture not implemented	When the vision sensor is not in the online status, this signal turns off.
X1	Pattern_1 FAIL	It turns on when the captured image differs from the model (feature) set in Pattern_1. ON: Pattern mismatch OFF: Pattern match or capture not implemented	When the vision sensor is not in the online status, this signal turns off.
X2	Online	It turns on when the vision sensor is online. ON: Online OFF: Offline, or discrete online	—
X3	Job completion	It turns ON for the set time when image capture processing is completed.	For the setting of ON time, refer to ☞ Page 37 Outputting to the programmable controller.
Y10	Trigger	When the trigger setting of the vision sensor is set to [Camera], image capture is executed with OFF→ON. To execute again, please set it to ON→OFF once, then OFF→ON.	It becomes enabled only when the vision sensor is online.
Y12	Online request	Turn on when making the vision sensor online in discrete online status. Turn off when making the vision sensor the discrete online status.	If the vision sensor is in the offline status, it will not go online even if it is turned on.

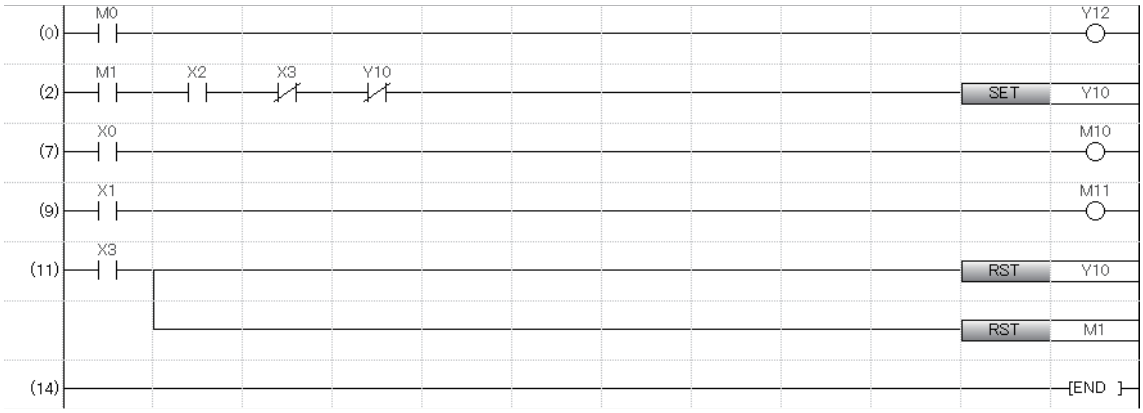
The timing chart is shown below.



(1) Turn on the set time.

• Program example

Program example is shown below.



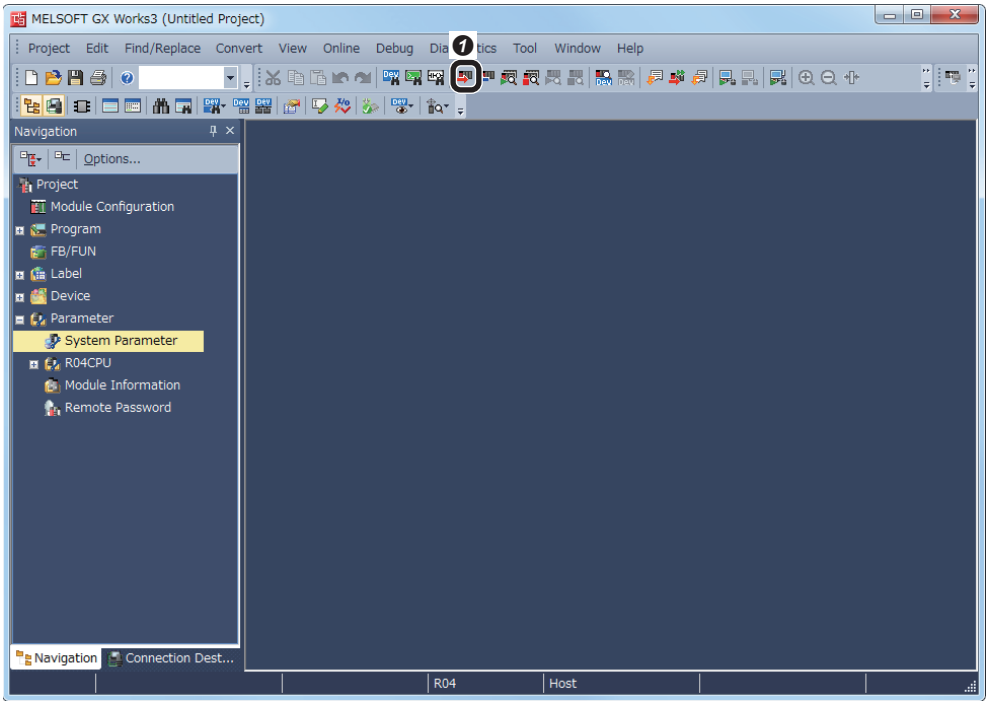
The CPU devices used in the program example are as follows. For the I/O signals, refer to the previous page.

Signal	Signal Name	Contents	Remarks
M0	Online command	During the on status, Y12 turns on, becoming the online status.	—
M1	Trigger directive	At OFF→ON, Y10 is turned ON, and image capture is executed.	—
M10	Pattern_1 PASS	It turns on when the captured image matches the model (feature) set in Pattern_1. ON: Pattern match OFF: Pattern mismatch, or capture not implemented	It becomes the same status as X0.
M11	Pattern_1 FAIL	It turns on when the captured image differs from the model (feature) set in Pattern_1. ON: Pattern match OFF: Pattern mismatch, or capture not implemented	It becomes the same status as X1.

2.4 Execute Programmable Controller and Vision Sensor

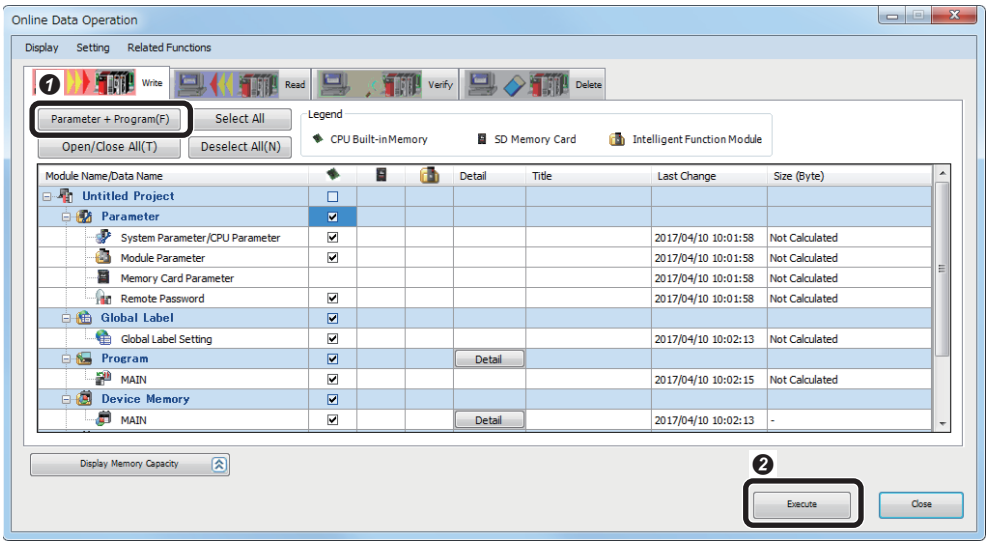
Execute the programmable controller

1. Start the programmable controller.



❶ Click [Write to PLC].

2. Write the parameters.



❶ Select [Parameter + Program].
❷ Click [Execute].

After writing the parameters is completed, reset and run the programmable controller.

Execute the vision sensor

Turn OFF→ON the power supply of the vision sensor and restart it.

2.5 Checking Operations

Control the vision sensor using the programmable controller and check the operations.

Make the vision sensor online

Turn on the programmable controller online command (M0) and shift the vision sensor from the discrete online status to the online status.

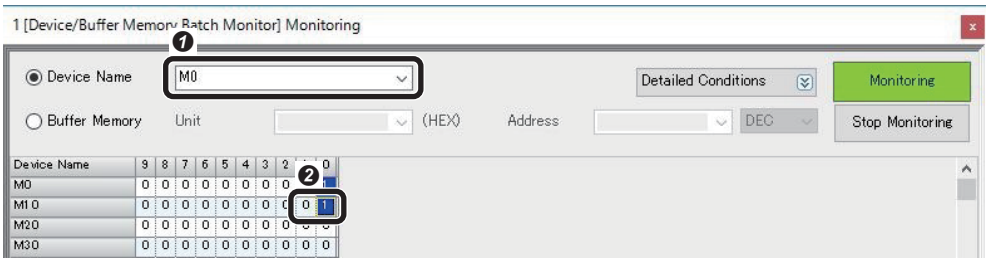
Set the trigger to the vision sensor

Turn on the trigger command (M1) of the programmable controller and trigger it to the vision sensor.

Check inspection results

Pattern_1 PASS (M10) turns on if the inspection subject matches the model set in Pattern_1, and Pattern_1 FAIL (M11) turns on if the inspection subject does not match.

Open [Online]⇨[Monitor]⇨[Device/Buffer Memory Batch Monitor] in GX Works3 to display devices.



❶ Input “M0” in [Device Name].
❷ Check M10 and M11.

REVISIONS

*The manual number is given on the bottom left of the back cover.

Revision date	* Manual number	Description
June 2017	BCN-P5999-0861-A	First edition

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TRADEMARKS

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MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS : 1-14 , YADA-MINAMI 5-CHOME , HIGASHI-KU, NAGOYA , JAPAN