

# FA Sensor



## Vision Sensor Connection Guide

-VS20M-11F310 -VS20M-12F410 -VS20M-13F410 -VS20C-12F410 -VS20C-13F410 -VS70M-600-E -VS70M-600-ER -VS70M-600 -VS70M-600-R -VS70M-800-E -VS70M-800-ER -VS70M-800 -VS70M-800-R -VS70M-802-E -VS70M-802-ER -VS70M-802 -VS70M-802-R -VS70C-600-R -VS70C-800-R -VS70C-802-R

-VS80M-100-E -VS80M-100 -VS80M-200-E -VS80M-200-ER -VS80M-200 -VS80M-200-R -VS80M-400-E -VS80M-400-ER -VS80M-400 -VS80M-400-R -VS80M-202-E -VS80M-202-ER -VS80M-202 -VS80M-202-R -VS80M-402-E -VS80M-402-ER -VS80M-402 -VS80M-402-R -VS80C-100 -VS80C-200-R -VS80C-400-R -VS80C-202-R -VS80C-402-R

Powered by

COGNEX

This product is designed and manufactured by Cognex Corporation. \*Note that the warranty and general specifications of this product differ from that of programmable controller products.

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## 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 for other modules, refer to their respective user's manuals.

In this manual, the safety precautions are classified into two levels: " MARNING" and " CAUTION".

Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
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 "A 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]

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- Before handling the product, touch a conducting object such as a grounded metal to discharge the static electricity from your body. Failure to do so may cause the vision sensor to fail or malfunction.
- Be sure to install an I/O connector module to a main module. If not installed, dust or water-proof performance may not be obtained.

## [Security Precautions]

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 To maintain the security (confidentiality, integrity, and availability) of the programmable controller and the system against unauthorized access, denial-of-service (DoS) attacks, computer viruses, and other cyberattacks from external devices via the network, take appropriate measures such as firewalls, virtual private networks (VPNs), and antivirus solutions.

## [Installation Precautions]

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- 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. Do not force the connections or damage may occur.

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- Use only 24 VDC 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 sensor and peripheral devices such as programmable controllers via cables. For safe operation, it is recommended to connect all the ground connections securely.

## [Startup and Maintenance Precautions]

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

## [Disposal Precautions]

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When disposing of this product, treat it as industrial waste.

## **CONDITIONS OF USE FOR THE PRODUCT**

(1)This vision sensor shall be used in conditions;

i) where any problem, fault or failure occurring in the vision sensor, if any, shall not lead to any major or serious accident; and

ii) where the backup and fail-safe function are systematically or automatically provided outside of the vision sensor for the case of any problem, fault or failure occurring in the vision sensor.

(2)This vision sensor has been designed and manufactured for the purpose of being used in general industries. MITSUBISHI ELECTRIC SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY THIS VISION SENSOR THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI ELECTRIC USER'S, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the VISION SENSOR. ("Prohibited Application")

Prohibited Applications include, but not limited to, the use of the vision sensor in;

Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the vision sensor.

Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.

Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above restrictions, Mitsubishi Electric may in its sole discretion, authorize use of the vision sensor in one or more of the Prohibited Applications, provided that the usage of the vision sensor is limited only for the specific applications agreed to by Mitsubishi Electric and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the vision sensors are required. For details, please contact the Mitsubishi Electric representative in your region.

(3)Mitsubishi Electric shall have no responsibility or liability for any problems involving programmable controller trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

## INTRODUCTION

Thank you for purchasing the Mitsubishi Electric FA sensor, MELSENSOR.

This manual describes the network connections to use the vision sensors listed below.

Before using the product, please read this manual and relevant manuals carefully, and develop familiarity with the functions and performance of the MELSENSOR vision sensor to handle the product correctly.

Please make sure that the end users read this manual.

#### Available vision sensors

Product	Model
name	
VS20	VS20M-11F310, VS20M-12F410, VS20M-13F410, VS20C-12F410, VS20C-13F410
VS70	VS70M-600-E, VS70M-600-ER, VS70M-600, VS70M-600-R, VS70M-800-E, VS70M-800-ER, VS70M-800, VS70M-800-R, VS70M-802-E, VS70M-802-E, VS70M-802-R, VS70C-800-R, VS70C-800-R, VS70C-802-R
VS80	VS80M-100-E, VS80M-100, VS80M-200-E, VS80M-200-ER, VS80M-200, VS80M-200-R, VS80M-400-E, VS80M-400-ER, VS80M-400, VS80M-400-R, VS80M-202-E, VS80M-202-ER, VS80M-202-R, VS80M-202-R, VS80M-202-R, VS80M-202-R, VS80M-402-ER, VS80M-402-ER, VS80M-402, VS80M-402-R, VS80C-100, VS80C-200-R, VS80C-400-R, VS80C-202-R, VS80C-402-R

#### INSTALLATION

To connect a vision sensor, the following must be installed on a networked personal computer.

#### ■ In-Sight Explorer

Download In-Sight Explorer from the Mitsubishi Electric FA website. www.MitsubishiElectric.co.jp/fa

#### Engineering tool

Install any of the following engineering software, depending on the programmable controller system used.

- GX Works3
- GX Works2

#### Profile

To configure communication between a programmable controller and a vision sensor with an engineering tool, a profile of the vision sensor needs to be registered to the engineering tool.

A profile is data that stores information of a connected device (such as a model name.)

By registering the profile to an engineering tool, vision sensors are added to "Module List" in the "Ethernet Configuration" window and the "CC-Link IEF Basic Configuration" window.

For details on how to register a profile, refer to the following manual.

GX Works2 Version 1 Operating Manual (Common)

GX Works3 Operating Manual

Download the profile of a vision sensor from the Mitsubishi Electric FA website.

www.MitsubishiElectric.co.jp/fa

#### ■ EtherNet/IP Configuration Tool for RJ71EIP91

For the EtherNet/IP connection, network settings are required by using EtherNet/IP Configuration Tool for RJ71EIP91. Download EtherNet/IP Configuration Tool for RJ71EIP91 from the Mitsubishi Electric FA website. www.MitsubishiElectric.co.jp/fa

#### EDS file

To configure communication between an RJ71EIP91 or FX5-ENET/IP and a vision sensor with EtherNet/IP Configuration Tool, registering an EDS file to EtherNet/IP Configuration Tool is required.

An EDS file is data that stores information of a connected device (such as a model name).

For details on how to register an EDS file, refer to the following:

MELSEC iQ-R EtherNet/IP Network Interface Module User's Manual (Application)

MELSEC iQ-F FX5-ENET/IP User's Manual

The EDS file for a vision sensor can be downloaded from the Mitsubishi Electric FA website.

www.MitsubishiElectric.co.jp/fa

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## **RELEVANT MANUALS**

Manual name [manual number]	Description	Available form
Vision Sensor Connection Guide [BCN-P5999-0861](this manual)	Procedures for connecting a vision sensor to a MELSEC programmable controller to control a vision system through a CC-Link IE Field Network Basic connection, an SLMP connection, an I/O connection, or an EtherNet/IP connection	e-Manual PDF
Vision Sensor VS20 User's Manual	Functions, installation methods, system configuration, and required hardware	Print book
[SH-081769ENG]	components, etc. of the vision sensor VS20	e-Manual PDF
Vision Sensor VS70 User's Manual       Functions, installation methods, system configuration, and required hardware components, etc. of the vision sensor VS70		Print book
		e-Manual PDF
Vision Sensor VS80 User's Manual	Functions, installation methods, system configuration, and required hardware	Print book
[SH-081891ENG]	components, etc. of the vision sensor VS80	e-Manual PDF

#### Point P

e-Manual refers to the Mitsubishi Electric FA electronic book manuals that can be browsed using a dedicated tool.

e-Manual has the following features:

- Required information can be cross-searched in multiple manuals.
- Other manuals can be accessed from the links in the manual.
- Hardware specifications of each part can be found from the product figures.
- Pages that users often browse can be bookmarked.
- Sample programs can be copied to an engineering tool.

## TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
Buffer memory	Memory in an intelligent function module to store data such as setting values and monitor values. For CPU modules, it refers to memory to store data such as setting values and monitor values of the Ethernet function, or data used for data communication of the multiple CPU system function.
CC-Link IE Field Network Basic	A factory automation network using standard Ethernet. Data is periodically exchanged between a master station and slave stations using link devices (cyclic transmission).
Cyclic transmission	A function by which data are periodically exchanged among stations on the same network
Discrete online	Online status set to a vision sensor by a user interface
EDS file	Data that stores information of an EtherNet/IP connection device (such as a model name)
Engineering tool	GX Works3. A tool used for setting up programmable controllers, programming, debugging, and maintenance.
EtherNet/IP	An industrial network protocol that adapts CIP (Common Industrial Protocol) to standard Ethernet
EtherNet/IP Configuration Tool	EtherNet/IP Configuration Tool for RJ71EIP91. A tool for setting the EtherNet/IP network configuration.
GX Works2	A generic product name for SWnDND-GXW2 and SWnDNC-GXW2. ('n' indicates its version.) GX Works2 corresponding to MELSOFT Navigator is the product later than GX Works2 Version 1.11M.
GX Works3	A generic product name for SWnDND-GXW3 ('n' indicates its version.)
Job	A file created with the vision sensor setup tool to control a vision sensor. The file extension is 'Job.' (*.Job)
Job ID	A number used to identify the job. The number is added to the front of a file name.
Module label	A label that represents one of memory areas (I/O signals and buffer memory areas) specific to each module in a given character string. For the module used, GX Works3 automatically generates this label, which can be used as a global label.
Native mode command	A command to control a vision sensor
Poll interval	An interval to periodically send a read request to external devices (such as programmable controllers, robot controllers)
Profile	Data that stores information of a connected device (such as a model name)
Refresh	Processing to transfer data between link devices in a network module and devices in a CPU module
Remote I/O (RX/RY)	RX: Bit data input from a slave station to the master station. RY: Bit data output from the master station to a slave station.
Remote register (RW/RWw)	RWr: Word data input from a slave station to the master station. RWw: Word data output from the master station to a slave station.
Rotation tolerance	A parameter for specifying the angle of detected pattern rotating
RPI	An abbreviation for Requested Packet Interval. A communication cycle that is decided by the originator during communications between EtherNet/IP devices.
SLMP	An abbreviation for SeamLess Message Protocol. The protocol to access the programmable controller connected from the external device to the SLMP corresponding device, or connected to the SLMP corresponding device.
SLMP scanner	A function to periodically read from and write to external devices (such as programmable controllers, robot controllers) by using the SLMP protocol
Soft event	A function to assign an operation set in a spreadsheet as an event, and to trigger a specific operation of a job by using an execution bit of SoftEvent
Spreadsheet	A programming interface of In-Sight Explorer for programming by using image processing functions and control functions
Vision sensor setup tool	In-Sight Explorer. A tool for setting a vision sensor.
Vision sensor VS20	A generic term for VS20M-11F310, VS20M-12F410, VS20M-13F410, VS20C-12F410, and VS20C- 13F410
Vision sensor VS70	A generic term for VS70M-600-E, VS70M-600-ER, VS70M-600, VS70M-600-R, VS70M-800-E, VS70M-800-ER, VS70M-800, VS70M-800-R, VS70M-802-E, VS70M-802-ER, VS70M-802, VS70M-802-R, VS70C-600-R, VS70C-800-R, and VS70C-802-R
Vision sensor VS80	A generic term for VS80M-100-E, VS80M-100, VS80M-200-E, VS80M-200-ER, VS80M-200, VS80M-200-R, VS80M-400-E, VS80M-400-ER, VS80M-400, VS80M-400-R, VS80M-202-E, VS80M-202-ER, VS80M-202-E, VS80M-202-E, VS80M-402-E, VS80M-402-ER, VS80M-402, VS80M-402-R, VS80C-100, VS80C-200-R, VS80C-400-R, VS80C-202-R, and VS80C-402-R

**1** CC-Link IE Field Network Basic CONNECTION

This chapter explains the procedure for connecting a vision sensor VS20 to a programmable controller and controlling the vision sensor with CC-Link IE Field Network Basic connection.

For details on CC-Link IE Field Network Basic, refer to the following manual.

CC-Link IE Field Network Basic Reference Manual

# **1.1** System Configuration Example for Connecting a Vision Sensor

The following figure shows the system configuration for connecting a vision sensor VS20.



CC-Link IE Field Network Basic connection is available for other vision sensors (VS70 and VS80). For details on the system configuration, refer to the user's manual of the vision sensor used.

## Configurations

The devices used in the system configuration are as follows.

#### **Required equipment**

#### Mitsubishi Electric products



#### COGNEX products

	COGNEX			
	In-Sight Explorer for MELSENSOR Vision	$\bigcirc$		
Vision sensor profile for engineering tool <sup>*1</sup>	Vision sensor setup tool • In-Sight Explorer	Ethernet cable	Breakout cable	

\*1 Download this product from the Mitsubishi Electric FA website. www.MitsubishiElectric.co.jp/fa

#### Commercial products

		and the second s	
Switching hub	Ethernet cable	USB cable (Type Mini-B)	24 VDC power supply

Point P

For available devices for the system configuration, refer to the user's manual of the vision sensor used.

## Connection and wiring of a vision sensor

This section shows the procedure for connecting and wiring a vision sensor.

#### Operating procedure

- 1. Check that the 24 VDC power supply is OFF.
- 2. Connect an I/O wire or a serial wire of a breakout cable to an appropriate device (such as a programmable controller).
- **3.** Connect the 24 VDC (red wire) and GND (black wire) of a breakout cable to the corresponding terminals on the power supply.
- 4. Connect the M12 connector of the breakout cable to the Power, I/O and RS-232 connector of the vision sensor.
- 5. Connect the Ethernet cable's M12 connector to the vision sensor's Ethernet connector.
- 6. Turn ON the 24 VDC power supply.

#### Precautions

- When connecting a vision sensor and a programmable controller, simultaneously turn ON the power of the vision sensor and programmable controller, or first turn ON the power of the programmable controller.
- Cut unused wires or protect them with insulating materials. Be careful not to short-circuit with 24 VDC wires.
- The cable is designed to connect with its key aligned with the keyway of the connector on the Vision Sensor. Do not force the connections or damage may occur.

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For details on the connection with a vision sensor, refer to the user's manual of the vision sensor used.

## **1.2** Basic Operations for a CC-Link IE Field Network Basic Connection

## Basic operation process for a CC-Link IE Field Network Basic connection

With a CC-Link IE Field Network Basic connection, data communication (cyclic transmission) is periodically performed between a master station (programmable controller) and a slave station (vision sensor) using link devices.

Remote input and output (RY and RX), and remote registers (RWr and RWw) are used for data communication.

Status block (RX) and output data block (RWr) are link devices to send data from a vision sensor to a master station (programmable controller).

Control block (RY) and input data block (RWw) are link devices to send data from a master station (programmable controller) to a vision sensor.





## Signals used for a CC-Link IE Field Network Basic connection

The following shows the I/O signals for a master station (programmable controller) in a CC-Link IE Field Network Basic connection.

For details on each data, refer to the help of vision sensor setup tool.

#### Precautions

Do not write data to '(Reserved)' bits in remote I/O signals (RX/RY). Doing so may cause an unexpected error.

#### Remote I/O signals (RX/RY)

#### ■ Control blocks (RY)

Control blocks (RY) are output signals for a master station (programmable controller) to control a vision sensor.

Control block list

RY7	RY6	RY5	RY4	RY3	RY2	RY1	RY0
Set Offline	(Reserved)		Execute Command	Inspection Results Ack	Buffer Results Enable	Trigger	Trigger Enable
RYF	RYE	RYD	RYC	RYB	RYA	RY9	RY8
(Reserved)							

RY17	RY16	RY15	RY14	RY13	RY12	RY11	RY10
(Reserved)			Clear Exposure Complete	Clear Error	(Reserved)	Set User Data	
RY1F	RY1E	RY1D	RY1C	RY1B	RY1A	RY19	RY18
Soft Event 7	Soft Event 6	Soft Event 5	Soft Event 4	Soft Event 3	Soft Event 2	Soft Event 1	Soft Event 0

#### RY20..RY3F

User Data (Bit Area)

#### · Control block details

Bit	Data name	Description (Application)
0	Trigger Enable	To enable an image capturing trigger by 'Trigger.' • ON: An image capturing trigger is enabled. • OFF: An image capturing trigger is disabled.
1	Trigger	<ul> <li>To start (trigger) image capturing.</li> <li>ON: Image capturing is started.</li> <li>OFF: —</li> <li>The following conditions must be satisfied to start image capturing properly:</li> <li>"Industrial Ethernet" is selected in the [Set Up Image] ⇔ [Trigger] tab in the vision sensor setup tool. (Creating a new job)</li> <li>The vision sensor is online.</li> <li>'Trigger Enable' and 'Trigger Ready' are turned ON.</li> </ul>
2	Buffer Results Enable	To enable the buffer for read results. New read results are stored in the buffer queue of a vision sensor. To acquire the next read results, turn ON 'Inspection Results Ack'. • ON: The buffer for read results is enabled. • OFF: The buffer for read results is disabled.
3	Inspection Results Ack	To respond to receiving the latest read results. A vision sensor turns 'Results Valid' OFF when recognizing that this bit turns ON. If 'Buffer Results Enable' is turned ON, the next read results are read out from the buffer queue when receiving a response. • ON: Read results are received. • OFF: —
4	Execute Command	To load a job of the job ID specified to 'Command.' • ON: Job load is executed. • OFF: — Until 'Command Completed' is turned ON, the ON state for this bit must be retained. The following conditions must be satisfied to start job load properly: • A vision sensor is set to offline by 'Set Offline.' • A job of the job ID specified to 'Command' exists.
5 to 6	(Reserved)	-

1 CC-Link IE Field Network Basic CONNECTION

Bit	Data name	Description (Application)
7	Set Offline	To make a vision sensor offline while this bit is ON. • ON: A vision sensor is set to offline. • OFF: —
8 to 15	(Reserved)	_
16	Set User Data	<ul> <li>To notify a vision sensor that the 'User Data' field was updated.</li> <li>ON: 'User Data' field update is notified.</li> <li>OFF: —</li> <li>A vision sensor updates data defined in the [Format Input Data] tab of a communication setting with the vision sensor setup tool when this bit is turned ON.</li> <li>The timing of contents in the 'User Data' field to be applied depends on whether "Enable User Data Bypass" is selected or not; that can be selected from [Sensor] ⇔ [Network Settings] ⇔</li> <li>"Industrial Ethernet Protocols" ⇔ "CC-Link IE Field Basic" ⇔ the [Settings] button ⇔ "Enable User Data Bypass."</li> <li>Selected: Applied when 'Set User Data' is turned ON</li> <li>Unselected: Applied when 'Set User Data' is turned ON and a trigger is input</li> </ul>
17	(Reserved)	_
18	Clear Error	To clear an error and error code signal. When multiple errors occur, the next error and error code are set by turning this bit OFF. • ON: Error clear is executed. • OFF: —
19	Clear Exposure Complete	To turn 'Exposure Complete' OFF. 'Exposure Complete' does not turn ON while this bit is ON. • ON: Exposure completion is cleared. • OFF: —
20 to 23	(Reserved)	-
24 to 31	Soft Event	To enable a soft event trigger in a spreadsheet. A related software event in a spreadsheet is executed by turning this bit ON.
32 to 63	(Reserved)	-

#### ■ Status blocks (RX)

Status blocks (RX) are input signals for a master station (programmable controller) to acquire the status of a vision sensor (status).

#### · Status block list

RX7	RX6	RX5 RX4 R		RX3	RX2	RX1	RX0
Online	Offline Reason			Missed Acq	(Reserved)	Trigger Ack	Trigger Ready
RXF	RXE	RXD	RXC	RXB	RXA	RX9	RX8
Error	Command Failed	Command Completed	Command Executing	Results Valid	Results Buffer Overrun	Inspection Completed	System Busy
RX17	RX16	RX15	RX14	RX13	RX12	RX11	RX10
(Reserved)			Job Pass	Exposure Complete	(Reserved)	(Reserved)	Set User Data Ack
RX1F	RX1E	RX1D	RX1C	RX1B	RX1A	RX19	RX18
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
RX20RX3F							

Inspection Results (Bit Area)

#### · Status block details

Bit	Data name	Description (Application)
0	Trigger Ready	<ul><li>This bit turns ON when 'Trigger Enable' is set and an image capturing trigger can be received.</li><li>ON: An image capturing trigger can be received.</li><li>OFF: An image capturing trigger cannot be received.</li></ul>
1	Trigger Ack	<ul> <li>This bit shows that a vision sensor recognizes 'Trigger' is ON, and an image capturing trigger is received.</li> <li>Until 'Trigger' is turned OFF, the ON state for this bit is retained.</li> <li>ON: An image capturing trigger is received.</li> <li>OFF: —</li> </ul>
2	(Reserved)	-

Bit	Data name	Description (Application)
3	Missed Acq	This bit shows that image capturing is failed. This bit is turned OFF if the next image capturing is succeeded. • ON: Image capturing is failed. • OFF: —
4 to 6	Offline Reason	<ul> <li>This bit shows the cause of a vision sensor being offline by three bits.</li> <li>0: Online</li> <li>1: Job is being edited.</li> <li>2: Offline is set by a discrete signal.</li> <li>3: Offline is set by a predefined protocol.</li> </ul>
7	Online	This bit shows the online/offline status. When a vision sensor is offline, the reason is shown in the 'Offline Reason' field. • ON: Online • OFF: Offline
8	System Busy	This bit shows that a vision sensor is executing or loading a job, or responding to user inputs. • ON: System busy • OFF: —
9	Inspection Completed	This bit is inverted every time when an inspection is completed and a series of inspection results ('Inspection ID,' 'Inspection Result Code,' 'Inspection Results,' and 'Job Pass') is sent to a programmable controller.
10	Results Buffer Overrun	<ul> <li>This bit shows that a vision sensor discards a series of read results after the buffer for read results becomes full.</li> <li>When the next read results are stored in the buffer queue properly, this bit is turned OFF.</li> <li>Only when 'Buffer Results Enable' is enabled, this bit is enabled.</li> <li>ON: Read results are discarded.</li> <li>OFF: —</li> </ul>
11	Results Valid	This bit shows that a series of inspection results is available ('Inspection ID,' 'Inspection Result Code,' 'Inspection Results,' and 'Job Pass' fields contain valid data). Until 'Inspection Results Ack' responds, this bit remains ON. • ON: With new read results • OFF: Without new read results
12	Command Executing	This bit shows that job load is executed. • ON: Job load is being executed. • OFF: —
13	Command Completed	This bit is turned ON when job load is completed. When a job load command is not completed properly, 'Command Failed' is also turned ON. • ON: Job load is completed. • OFF: —
14	Command Failed	<ul> <li>This bit is turned ON when job load is not completed properly.</li> <li>It is turned OFF when a new job is loaded by a programmable controller.</li> <li>When changing a job by using the vision sensor setup tool, this bit is not changed.</li> <li>ON: Job load is failed.</li> <li>OFF: —</li> </ul>
15	Error	This bit is turned ON when an error occurred. • ON: Error occurred. • OFF: —
16	Set User Data Ack	This bit is turned ON when 'Set User Data' command execution is completed. • ON: 'Set User Data' command execution is completed. • OFF: —
17 to 18	(Reserved)	-
19	Exposure Complete	This bit is turned ON when an exposure for a vision sensor is completed. It is turned OFF by 'Clear Exposure Complete.' When 'Clear Exposure Complete' is set to ON, the OFF state of this bit is retained. • ON: Exposure is completed. • OFF: —
20	Job Pass	This bit is turned ON when the latest job is passed. It is turned OFF when a job is failed. • ON: Inspection result is passed. • OFF: —
21 to 23	(Reserved)	_
24 to 31	Soft Event Ack	This bit shows that a vision sensor received a soft event command.
32 to 63	(Reserved)	-

#### Remote registers (RWr and RWw)

#### ■ Output data blocks (RWr)

Output data blocks (RWr) are link devices to send data from a vision sensor to a master station (programmable controller). • Output data block list

RWr0	RWr1	RWr2	RWr3	RWr4	RWr5
Current Job ID	Error Code	Acquisition ID	Inspection ID	Inspection Result Code	Inspection Results

· Output data block details

Word	Data name	Description (Application)
0	Current Job ID	Job ID of a job being executed is stored. If no job ID is specified for the job, '65535 (0xFFFF)' is stored.
1	Error Code	<ul> <li>This shows an error occurred in 16-bit integer.</li> <li>0x0000: No error</li> <li>0x0100: An image capturing trigger is generated when the image capturing trigger is disabled.</li> <li>0x0101: An image capturing trigger is generated when a vision sensor is offline.</li> <li>0x0400: Another command execution command is generated when a command is being executed.</li> <li>0x0401: Job load is requested when a vision sensor is online.</li> </ul>
2	Acquisition ID	Image capturing ID associated with the image capturing is stored. This can be used to synchronize image capturing and inspection results.
3	Inspection ID	Inspection ID associated with a series of inspection results ('Inspection ID,' 'Inspection Result Code,' 'Inspection Results,' and 'Job Pass') is stored.
4	Inspection Result Code	Any inspection result code specified for "Result code" of the WriteResultsBuffer function in the vision sensor setup tool (spreadsheet) is stored.
5 or later	Inspection Results	The data defined in the [Format Output Data] tab of a communication setting with the vision sensor setup tool is stored.

#### ■ Input data blocks (RWw)

Input data blocks (RWw) are link devices for a vision sensor to receive data from a master station (programmable controller).

Input data block list

RWw0	RWw1
Command	User Data

#### • Input data block details

Word	Data name	Description (Application)
0	Command	To specify job IDs (0 to 999).
1 or later	User Data	Data buffer to transfer data from a programmable controller to a vision sensor. This can be used for the following application: To update the data defined in the [Format Input Data] tab of a communication setting with the vision sensor setup tool: Store data to be updated in the data format defined in the [Format Input Data] tab.

For details on each data to control a vision sensor, refer to the help of vision sensor setup tool.

Enter "CC-Link IE Field Network Basic" as a keyword in the [Search] tab of Help, and refer to the explanation of the data.

😰 In-Sight® Explorer Help		3
Hide Locate Back Forward Print		
Contents         Search           Type in the word(s) to search for:            CC-Link IE Field Basic            List Topics         Display	CC-Link IE Field Network Basic Factory Interface Mitsubishi Communications In-Sight Communications Reference This topic covers the CC-Link IE Field Basic communication protocol for In-Sight vision systems.	* III
Select topic:         Found: 3           Title         Loc           Communicating with a Mitsubishi Automation Cont         In:S           CCLink LE Field Basic Settings Dialog         In:S           CCLink LE Field Network Basic Factory Interface         In:S	Ports Ports	
	Port         Description           61450         Cyclic request/response messages           61451         NodeSearch and IPAddressSet messages           45237         Base SLMP messaging (GetCommunicationSetting)	
Search previous results           Match similar words           Search titles only	Signal Layout         The defined data blocks allow you to control where the vision system is reading and writing data to and from the Automation Controller. For easier application setup, the various control and status bits required for command functionality are grouped into contiguous blocks, which can be processed together. When setting up the interaction between the vision system and the Automation Controller, you will need to choose the starting address and device type for each block of data.         Block   Address        Bit 7       Bit 6       Bit 5       Bit 4       Bit 3       Bit 2       Bit 1       Bit 0	Ŧ

## **1.3** Setting the Vision Sensor

Start the vision sensor setup tool to set the vision sensor.

#### Setting an IP address to a personal computer

Set the IP address (192.168.3.3) to a personal computer.

#### Connecting the vision sensor

Start the vision sensor setup tool to set the vision sensor.

**1.** Start the vision sensor setup tool.



2. Add the vision sensor to the network.



• Add the vision sensor to the network.

• IP Address: 192.168.3.1

• Subnet Mask: 255.255.255.0

Olick the [Apply] button.

#### **3.** Connect to the vision sensor.



• Click the [Connect] button to connect to the vision sensor.

#### Creating a new job

As an example, set a CE mark for inspection target.

**1.** Create a new job.



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



- Click the [Set Up Image] button.
- Select the [Trigger] tab.
- Select "Industrial Ethernet".
- Oclick the [Live Video] button to

adjust the image. After adjusting the image, click the [Live Video] button again.



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



#### Configuring a communication setting

1. Configure the communication setting (CC-Link IE Field Network Basic).



**2.** Add the CC-Link IE Field Network Basic.



- O Click the [Communication] button.
- 2 Click the [Add Device] button.

- Configure a device setting.
- Device: PLC/Motion Controller
   Manufacturer: Mitsubishi
- Protocol: CC-Link IE Field Basic
- 2 Click the [OK] button.

**3** When the message "Protocol

Service Change Required" appears, click the [OK] button.

**3.** Add the data to be transmitted in the cyclic transmission of the CC-Link IE Field Network Basic.



<ol> <li>Select the [Format Output Word</li> </ol>	d

- Data] tab.
- Olick the [Add] button.
- Select the data to add in the
- following order.
- Pattern\_1.Pass
- Pattern\_1.Fail
- Job.Inspection\_CountClick the [OK] button.

VS70M-600-E_xxxxxx - Select Output Data	×
Select items to add	
Name	Data Type
✓ Acquisition	
✓ FOV	
✓ Inputs	
dol 🌣	
Job.External_Reset_Counters	Integer
Job.Fail	Integer
Job.Fail_Count	Integer
JobInspection_Completed	Integer
JobInspection_Count	Integer
Job.Pass	Integer
Job.Pass_Count	Integer
Job.Status	Integer
A Pattern_1	
Pattern_1.Fail	Integer
Pattern_1.Pass	Integer

#### Saving the job

1. Name the created job.



**2.** Enter a file name and save the job.

VS20M-13F410 - S	Save As	×
Look <u>i</u> n: 🌱 VS201	M-13F410 💌 – 😢 🖿 🛙	1
Desktop	201CCIEFBasicJob	
Documents		
This PC		
Network		
မြို့ခို In-Sight Sensors	0 0	
	File name: 1test Save	
	Files of type: Job files (*.job)	





The running job can be changed (loaded) to another job by prefixing a numeric value to a file name. For the procedure to change jobs, refer to the following section.

Page 36 Changing jobs (loading another job)

Click the [Save Job] button.

2 Click the [Save As] button.

#### **3.** Set startup options for the vision sensor.





#### Restarting the vision sensor

Turn the power of the vision sensor OFF and ON to restart.

Click the [...] button under "Job".
Select the checkbox of "Load Job on Startup".

Select the file name saved in step 2.

Select the checkbox of "Start the Sensor in Online Mode".

G Click the [OK] button.

## **1.4** Setting a Programmable Controller

Set parameters of a programmable controller in an engineering tool.

## **Registering a profile**

Register a profile of the vision sensor in an engineering tool.

**Point** 

Profiles need to be registered when an engineering tool project is closed.

- **1.** Start an engineering tool.
- **2.** Resister a profile.



- $\textbf{O} \text{ Select [Tool]} \Rightarrow [Profile Management] \Rightarrow [Register].$
- Select the profile obtained previously.
- Olick the [Register] button.

## Setting a programmable controller

Set parameters of a programmable controller.

1. Select a CPU module and a program language in the "New" screen.



⑦ Select [Project] ⇒ [New].

The "New" screen appears.

**2** Set a CPU module and a program language.

- Series: RCPU
- Type: R08
- Program Language: Ladder
- Click the [OK] button.
- Olick the [OK] button.

**2.** Set the module parameter.



 Double-click "Module Parameter" in the "Navigation" window.
 The "R08CPU Module Parameter"

- screen appears. Set "IP Address" and "To Use or Not to Use CC-Link IEF Basic Setting."
- IP Address: 192.168.3.2
- To Use or Not to Use CC-Link IEF Basic Setting: Use

3 Double-click the "<Detailed

Setting>" of "Network Configuration Settings."

The "CC-Link IEF Basic Configuration" screen appears. (ﷺ Page 28 "CC-Link IEF Basic Configuration" screen) Double-click the "<Detailed

Setting>" of "Refresh Settings." The screen to set the device of the

refresh target appears. ( 🖙 Page 28 Refresh settings)

G Click the [Apply] button to end the parameter settings.

#### "CC-Link IEF Basic Configuration" screen

Detect the connected vision sensor. Make sure to turn ON the power of the programmable controller in advance.



## Point P

For the system configuration in which the automatic detection function of connected devices is not supported, a vision sensor can be added by dragging and dropping a corresponding device in "Vision Sensor" from "CC-Link IEF Basic Module (Mitsubishi Electric Corporation)" in "Module List."

- The parameter settings are as follows:
- "RX/RY Setting" "Points": 64 (1 Occupied Station)
- "IP Address": 192.168.3.1 (IP address of a vision sensor set in the vision sensor setup tool)

#### **Refresh settings**

R08CPU Module Parameter											x
Setting Item List	Setting Item										
Input the Setting Item to Search											
		Link Side				0		CPU Side	3		
Basic Settings	Device Name	Points	Start	End		Target		Device Name	Points	Start	End
🖉 Own Node Settings	RX	64	00000	0003F	- 🖨	Specify Device	$\sim$	X v	64	01000	0103F
CC-Link IEF Basic Settings	RY	64	00000	0003F	- 🖨	Specify Device	$\sim$	Y v	64	01000	0103F
External Device Configuration	RWr	32	00000	0001F	- 🖶	Specify Device	$\sim$	W ~	/ 32	00000	0001F
	R\v/w	32	00000	0001F	- 😝	Specify Device	$\sim$	W v	/ 32	01000	0101F
	Evolution										
	Set the device start	No. of CPL	l device f	or Refree	h range						<b>A</b>
	[Setting range]	NO. OF CEL	acvice i	ornelles	mange						^
	Use the device setti	ing of CPU	paramete	r.							~
< >					_						
Item List Find Result	Chec <u>k</u>		Re	store the	Defa <u>u</u> l	t Settings		(	8		
										<u>A</u> pply	

 Set "Target," "Device Name," and "Start" on the "CPU Side."
 Click the [Apply] button to end the parameter settings.

Link side	CPU side				
Device name	Target	Device name	Points	Start	End
RX	Specify Device	Х	64	01000	0103F
RY	Specify Device	Y	64	01000	0103F
RWr	Specify Device	W	32	00000	0001F
RWw	Specify Device	W	32	01000	0101F

## Creating a program

Create a program using the devices set in the refresh settings.

#### Devices used in the program

Signal	Signal name	Description	Remarks
SM1536	Cyclic transmission status	This signal turns ON when the cyclic transmission starts.	CC-Link IE Field Network Basic
SD1536.0	Cyclic transmission status for each station (station No.1)	The cyclic transmission status for each station is stored. The status of the station No.1 is stored to bit 0.	Reference Manual
X1000	Trigger Ready	The reception status of 'Trigger Enable' (Y1000) is stored. • ON: Trigger is enabled. • OFF: Trigger is disabled.	Refresh device for RX0
X1001	Trigger Ack	The reception status of 'Trigger' (Y1001) is stored. • ON: With trigger • OFF: Without trigger	Refresh device for RX1
X1007	Online	The online status of a vision sensor is stored. • ON: Online • OFF: Offline	Refresh device for RX7
X1009	Inspection Completed	This signal is changed (toggled) at the completion of an inspection of a vision sensor.	Refresh device for RX9
Y1000	Trigger Enable	'Trigger' (Y1001) is enabled while this signal is ON.	Refresh device for RY0
Y1001	Trigger	By turning this signal OFF and ON, an image capture is started.	Refresh device for RY1
M0	Online command	'Trigger Enable' (Y1000) turns ON to make a vision sensor online while this signal is ON.	—
M1	Trigger directive	By turning this signal OFF and ON, 'Trigger' (Y1001) is turned ON, and an image capture is performed.	
M200	Communication condition satisfied flag (station No.1)	This signal turns ON while the cyclic transmission with the station No.1 is performed.	

#### Program example



(0): Check that the cyclic transmission is normally performed between the master station (programmable controller) and the station No.1 (vision sensor). When the cyclic transmission is normally performed, the program in line (4) and later are executed.

(4): Enable a trigger on the vision sensor.

(7): Request the start of the image capture to the vision sensor. ('Trigger' (Y1001) turns ON.)

(12): The processing for the completion of the image capture of the vision sensor is performed.

#### Precautions

Use 'Trigger Ack' (X1001) to set an interlock when checking 'Inspection Completed' (X1009).

#### Timing chart of a CC-Link IE Field Network Basic connection

A timing chart when controlling a vision sensor using a programmable controller is shown below.

To enable a trigger from a programmable controller, turn ON 'Trigger Enable' (RY0).

When 'Trigger' (RY1) is turned ON while 'Trigger Ready' (RX0) is ON by turning ON 'Trigger Enable' (RY0), the status of the vision sensor is output to 'Trigger Ack' (RX1) and 'Inspection Completed' (RX9).

The status of 'Inspection Completed' (RY9) is changed (toggled) at the completion of an inspection.



## **1.5** Writing Data to a Programmable Controller

Write the parameters and program set in an engineering tool to the programmable controller.

#### Writing to the programmable controller

- **1.** Turn ON the programmable controller.
- 2. Write parameters and program to the programmable controller in the "Online Data Operation" screen.

Online Data Operation									<ul> <li>⑦ Select [Online] ⇒ [Write to PLC</li> <li>② Click the [Parameter + Program</li> </ul>
Display Setting Related Functions									button
2 Write Write Read	9	1	Verif	1 🔜 🧳	Delete				Olick the [Execute] button.
Parameter + Program( <u>F</u> ) Select <u>A</u> ll	egend			-					
Open/Close All( <u>T</u> ) Deselect All( <u>N</u> )	CPU E	Built-in Mer	nory	SD M	emory Card 👔	Intelligent Function Module			
Module Name/Data Name				Detail	Title	Last Change	Size (Byte)	<u>^</u>	
🔳 🦺 Untitled Project									
🖶 🛃 Parameter									
System Parameter/CPU Parameter	$\checkmark$					2017/11/20 15:18:00	Not Calculated		
Module Parameter	•					2017/11/20 15:36:59	Not Calculated		
Memory Card Parameter						2017/11/20 15:18:00	Not Calculated	E	
Remote Password	•					2017/11/20 15:18:00	Not Calculated		
🕀 🏦 Global Label									
Global Label Setting						2017/11/20 15:18:01	Not Calculated		
🖨 🔚 Program				Detail	1				
MAIN	•					2017/11/20 15:18:01	Not Calculated		
🗆 🙆 Device Memory									
AIN				Detail		2017/11/20 15:18:01	-		
Display Memory Capacity (2)					<u>ai</u>	8 (	Execute	Close	

#### Restarting the programmable controller

After writing the parameters and program, reset the programmable controller to RUN.

#### 1.6 **Checking Operations**

Check the operation by controlling the vision sensor using the programmable controller.

#### Making the vision sensor online

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



O Check that the operating status is "Online".

#### Enabling a trigger on the vision sensor

Enable a trigger on the vision sensor to acquire the inspection results.

#### 1. Display device values.

1 [Device/Buffer Men	nory Batch M	onitor]				×
Oevice <u>N</u> ame	MO		J		Detailed Conditions 🛛 😵	Stopping
⊜ Buffer <u>M</u> emory	<u>U</u> nit		✓ (HEX)	<u>A</u> ddress		<u>S</u> tart Monitoring
Device Name F	EDCBA	9 8 7 6 5 4 3	2 1 0	Current Value	String	•
J						

 Select [Online] 
 ⇒ [Monitor] 
 ⇒
 [Device/Buffer Memory Batch Monitor] with an engineering tool. The "Device/Buffer Memory Batch Monitor" window appears. 2 Enter "M0" for "Device Name".

3 Click the [Start Monitoring] button.

**2.** Enable a trigger on the vision sensor.

1 [De	vice/Buffer M	1em	ory	Bat	:ch	Mo	nito	r] M	loni	tor	ng															3	Ð Ena	Turn able'	M" i (Y1	0" O	N to ) ON	turr I.	י Tr	igge
۲	Device <u>N</u> ame		M	)	_					_		•					Detai <u>l</u> e	d Con	dition	;	8	N	lonito	ring		-								
0	Buffer <u>M</u> emory	/	<u>U</u> n	it								-	(HEX)	<u>A</u> ddre:	s				DE	C	-	<u>S</u> top	o Mon	itorin	¢									
Devio	e Name	9 8	7	6	5	4	3 2	1	0	0																								
MO		0 0	0	0	0	0	D O	C	1																									
M1 0		0 0	0	0	0	0	o j o	0	0																-									

#### **3.** Trigger a device.



#### Checking inspection results

Check the inspection results.

**1.** Check the completion of the inspection.

I [Device/Burler Memory Batch Monito	)r]			×
Device Name		Detai <u>l</u> ed	Conditions 💽 2	Stopping
⊚ Buffer <u>M</u> emory <u>U</u> nit	→ (HEX) <u>A</u> d	ldress	DEC -	<u>S</u> tart Monitoring
Device Name F E D C B A 9 8	7 6 5 4 3 2 1 0	Current Value	String	
1 [Device/Buffer Memory Batch Monit	or] Monitoring			×
1 [Device/Buffer Memory Batch Monito	or] Monitoring	Detailed	Conditions 😵	Monitoring
1 [Device/Buffer Memory Batch Monito	or] Monitoring ▼ ↓ (HEX) <u>A</u> c	Detailed	Conditions 😵	Monitoring Stop Monitoring
1 [Device/Buffer Memory Batch Monito	рг] Monitoring (HEX) <u>А</u> с 7 6 5 4 3 2 1 0	Detailed Idress	Conditions 😵	Monitoring Stop Monitoring
	vr] Monitoring ▼ (HEX) Ac 7 6 5 4 3 2 1 0 1 0 0 0 0 0 0 1	Detailed Idress Durrent Value 268	Conditions 😵	Monitorine Stop Monitorine

0.

0

 Input "X1000" in "Device Name". Olick the [Start Monitoring] button. 3 Check that the bit of 'Inspection Completed' (X1009) is changed (toggled).

#### 2 Check the inspection results

0 0 0 0 0 0 0 0 0 0 0

1 [Device/Buffer N	Memory Batch	Monitor]				
) Device <u>N</u> ame	0				Detailed Conditions	Stopping
⊚ Buffer <u>M</u> emor	y <u>U</u> nit		→ (HEX)	Address	TEC T	<u>S</u> tart Monitoring
Device Name	F E D C B	A 9 8 7 6	5 4 3 2 1 0	Ourrent Value	String	
	★					
1 [Device/Buffer M	Memory Batch	ı Monitor] Mor	nitoring			
1 [Device/Buffer M	Memory Batch	I Monitor] Moi	nitoring		Detailed Conditions 😵	Monitorine
1 [Device/Buffer Memore Device Name	Memory Batch W0 y <u>U</u> nit	I Monitor] Mon	(HEX)	Address	Detailed Conditions 😵	Monitoring Stop Monitoring
[Device/Buffer N     Oevice Name     Device Name	Vemory Batch W0 y Unit	A 9 8 7 6	• (HEX)	<u>A</u> ddress	Detailed Conditions 😵	Monitoring Stop Monitoring
[Device/Buffer Mame     Device Name     Buffer Memor     Device Name     W0	Memory Batch W0 y Unit F E D C B	A 9 8 7 6 1 1 1 1 1	HEX)	<u>A</u> ddress Current Value	Detailed Conditions () () DEC () String	Monitoring Stop Monitoring
[Device/Buffer N     @ Device Name     Buffer Memor Device Name W0 W1	4emory Batch           W0           y         Unit           F         E         D         C           1         1         1         1           0         0         0         0         0	A 9 8 7 6 1 1 1 1 1 0 0 0 0 0	•     •       •     •       •     •       •     •       •     •       •     •       •     •       •     •       •     •       •     •       •     •       •     •       •     •       •     •       •     •       •     •       •     •       •     •       •     •	<u>A</u> ddress Current Value	Detailed Conditions () () () () () () () () () ()	Monitorine Stop Monitorine
[Device/Buffer N     Oevice Name     Device Name     W0 W1 W2	Image: W0         W0           y         Unit           F         E         D         C           1         1         1         1           0         0         0         0         0	A Monitor] Monitor A 9 8 7 6 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0	Imitoring         Imitoring	<u>A</u> ddress Current Value	Detailed Conditions (*) (*) DEC (*) String -1 0 0	Monitoring Stop Monitoring
[Device/Buffer Mame     Device Name     W0     W1     W2     W     W2     W2     W     W2     W2     W2     W     W     W     W2     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W     W	Image: Additional optimized interview         Matche interview           y         Unit         Image: Additional optimized interview           F         E         D         C         B           0         0         0         0         0         0           0         0         0         0         0         0         0           0         0         0         0         0         0         0         0	Monitor] Monitor] Monitor] Monitor] Monitor] Monitori (Monitori (M	Itoring         Itoring           Image: Constraint of the state	<u>A</u> ddress Current Value	Detailed Conditions v DEC v String -1 0 - 0 - 0 - 0 - 0 - 0 -	Monitoring Stop Monitoring
[Device/Buffer Mame     Device Name     W0 W1 W2 W3 W4	Vermory Batch W0 y Unit F E D C B 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	A 9 8 7 6 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Itoring         Itoring           Image: Constraint of the state	Address Current Value	Detailed Conditions         >           +         DEC +           -1         -           0         -           0         -           0         -           0         -           0         -           0         -           0         -	Monitoring Stop Monitoring

- Enter "W0" for "Device Name".
- 2 Click the [Start Monitoring] button. Ocheck the following information.
- 'Job PASS' (W5.0): This bit turns ON when the set inspection target is detected in the captured image.
- 'Job FAIL' (W6.0): This bit turns ON when the set inspection target is not detected in the captured image.
- · 'Number of jobs inspected' (W7): The number of times the device is triggered is stored.

#### Changing a recognition parameter

When locating a target object using the pattern in the location tool, the rotation tolerance of the target object can be changed to  $\pm 90^{\circ}$ .

- **1.** Make the vision sensor offline with the vision sensor setup tool.
- **2.** Add parameter items to the list in the [Format Input Word Data] tab.





O Click the [Add] button.

Select the [Format Input Word

Data] tab and click the [Add] button.

		-			_		_			_		_	_		_	-	_	_	_	_				-	_
	ove Device		A	id	R	emove		Up			<u>D</u> own	R	<u>e</u> set	Data Ty	pes			_	_		_	_			
	it Device			_		_			_	_	_	-	_	_	_						_				
	d Device																								
1	IE Field Basic							. utt						on	ge										
	FTP		00001	Start	ting Ad	dress		Patte	ern 1.	N Rotați	ame on Tol	erance		16 bit	integer	pata Ty	/pe				Size		1 1	5	
5	syView	1	Tonna	mput	on D'ata	om	ac ing	Juc Wo	iu Dai	•	onnat (	Jacput	on D		onnati	ompu	monu	Data							
j	ions		Forme	loout		Form	at lo	out M/-	rd D-			) utout		عا جو		Outour	Word	Data							
					$\bot$																				
					1																				
										<b>4</b>		<u>0</u> K		<u>C</u> a	ncel										
		_	_	_	_	_	_				_			\	_										
1	n_1.Tool_Enable	d												Integ	jer	-									
1	rn_1.Timeout													Integ	jer										
	1_1.5care_101c1							_	_				_	inceg	per										
1	n_1.Rotation_To	lera	nce											Integ	er	1									
	n_n.bescription	•												Sunn	9										
1	n_1.Accept_Thre	sho	ld											Integ	jer -	-									
r	n_1															-									
					Nar	ne								Dat	а Туре										
101	s to add																								
1	10 - Select Input	Dat	a													×									
1	10 - Select Input	Dat	a	-		-					-	-		-	-	×									

**3.** Save the job and make the vision sensor online. ( >> Page 24 Saving the job)

Point P

Parameter items need to be added to the list in the [Format Input Word Data] tab in advance to change parameter values.

More than one parameter item can be selected.
**4.** Set "Pattern\_1.Rotation Tolerance" as a parameter to be changed.

l [Device/Buffer Memo	ry Batch Monito	·]								
) Device <u>N</u> ame	<u>W1000</u>		•			Deta	ailed Conditions	8	Stopping	
Buffer <u>M</u> emory	<u>U</u> nit		- (H	HEX)	<u>A</u> ddress		▼ DEC		<u>S</u> tart Monitoring	
Device Name F	EDCBA	987	6543	2 1 0		Current Value		String		-
										Ŧ
	$\bot$									
	•									
. [Device/Buffer Memo	ry Batch Monito	] Monitorin	9							X
. [Device/Buffer Merno	ry Batch Monito	] Monitorin	g •			Deta	ailed Conditions	8	Monitoring	×
. [Device/Buffer Memo	ry Batch Monito W1000 Unit	'] Monitorin	9	IEX)	Address	Deta	ailed Conditions	×	Monitoring Stop Monitoring	X
[Device/Buffer Memo     Device Name     Buffer Memory Device Name     F	ry Batch Monito	] Monitorin	g • • (F	HEX)	<u>A</u> ddress	Deta Current Value	ailed Conditions	String	Monitoring Stop Monitoring	
Image: Image: Device /Buffer Memory           Image: Device Name           Device Name           Pevice Name           V1000           0           V1001	y Batch Monito	9 8 7 0 0 0 0 0 0	9 • • • • • • • • • • • • • • • • • • •	HEX) 2 1 0 0 0 0 0 1 0	Address	Deta Current Value	nijed Conditions DEC n - 90 Z.	String	Monitoring Stop Monitoring	

Select [Online] ⇒ [Monitor] ⇒ [Device/Buffer Memory Batch Monitor] with an engineering tool. The "Device/Buffer Memory Batch Monitor" window appears. Enter 'W1000' for "Device Name".

Click the [Start Monitoring] button.

 Enter '90' for 'User Data' (W1001) of a remote register (RWw).

### 5. Change parameter values.

0	•											
1 [Device/Buffer Memory Batch Monitor] Monitoring												
Device <u>N</u> ame	O (Y1000		·	Detailed Conditions	Monitoring							
Buffer <u>Memory</u>	<u>U</u> nit			The DEC of	Stop Monitoring							
Device Name	F E D C B	A 9 8 7 6 5 4	4 3 2 1 0	Current Value	String 🔺							
Y1000	0 0 0 0 0	0 0 0 0 0 0	0 0 0 0	1								
Y1010	0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 1 2	1								
Y1020	0 0 0 0 0 0		0 0 0 0 0	0	-							

• Enter 'Y1000' for "Device Name". 2 Turn ON 'Set User Data' (Y1010) of a remote output.

Benter 'X1000' for "Device Name". **4** By completing the settings, 'Set User Data Ack' (X1010) of a remote input turns ON. After that, turn OFF 'Set

User Data' (Y1010).

1 [Device/Buffer Me	mo	ry I	Bato	:h l	Мo	nit	or]	M	oni	tori	ng																							×
Oevice <u>Name</u>	3	(	X1(	000										Ŧ	]									De	etaije	d Co	nditio	ons	(	8		Monito	oring	
Buffer <u>M</u> emory			<u>U</u> nit											Ŧ	] (	ΉE	EX)				<u>A</u> ddress						-	DEC		-		<u>S</u> top Mo	nitoring	
Device Name	F	E	D	0	:   E	3	A	9	8	7	6	5	5	4	3	2	2	1	0	ľ		Cu	irrent \	/alue			1			Stri	ng			
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×1020	0	0	0	0	1	)	0	0	0	0	0	10	) [	0	0	0	) [	0	U	1	-						0.							Ŧ

## **6.** Trigger a device.

																										_
1 [Device/Buffer M	emo	ry E	Batc	h№	loni	itor	] M	oni	torir	ng																
Oevice <u>N</u> ame	1		Y10	00								•	)						Detailed	l Condit	ions	*		Monito	ring	
Buffer <u>Memory</u>	y	ļ	<u>U</u> nit										) (	HE>			<u>A</u> ddress				DEC	-		<u>S</u> top Mor	nitoring	
Device Name	F	Ε	D	С	В	А	9	8	7	6	5	4	3	2	0	0		Current Va	alue	]		Stri	ing			
Y1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1				3						
Y1010	0	0	0	0	0	0	0	0	0	0	0	0	0	0	U	0				0						
Y1020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0					]	-

D Enter 'Y1000' for "Device Name". Turn ON 'Trigger' (Y1001) of a remote output.

1.6 Checking Operations

35

1 CC-Link IE Field Network Basic CONNECTION

#### Changing jobs (loading another job)

The following shows the procedure to load the job file "1Test".

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The number '1' prefixed to the file name indicates an ID. By setting this ID number to 'Command' (W1000) of a remote resister (RWw), the job ("1Test") can be loaded.

**1.** Set an ID number of a job.



145

0

(Y1004) of a remote output to load a job.

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÷

Enter 'X1000' for "Device Name". **6** When the loading of the job is 1 [Device/Buffer Memory Batch Monitor] Monitoring completed, 'Command Completed' 💿 Device <u>N</u>ame 🕢 ×1000 Detailed Conditions Monitoring (X100D) of a remote input is turned ON. After that, turn OFF 'Execute - DEC Buffer Memory Unit - (HEX) Address Stop Monitoring Command' (Y1004) and 'Set Offline' 6 
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 (Y1007). Device Name Current Value String . ×1000 10800 0 ×1010 8 0 ×1020

Point P

Device Name

Y1000

Y1010

To load a job, the file name of the job need to begin with an ID number. When loading a job, make a vision sensor offline.

### 2 **SLMP SCANNER CONNECTION**

This chapter explains the procedure for connecting a vision sensor VS20 to a programmable controller and controlling the vision sensor with SLMP scanner connection.

#### 2.1 System Configuration Example for Connecting a **Vision Sensor**

The following figure shows the system configuration for connecting a vision sensor VS20.



For details on the system configuration, refer to the user's manual of the vision sensor used.

### Configurations

The devices used in the system configuration are as follows.

#### **Required equipment**

#### Mitsubishi Electric products



#### COGNEX products

	COGNEX In-Sight Explorer for MELSENSOR Vision		
Vision sensor profile for engineering tool <sup>*1</sup>	Vision sensor setup tool <ul> <li>In-Sight Explorer</li> </ul>	Ethernet cable	Breakout cable

\*1 Download this product from the Mitsubishi Electric FA website. www.MitsubishiElectric.co.jp/fa

#### Commercial products

	and the		
Switching hub	Ethernet cable	USB cable (Type Mini-B)	24 VDC power supply

Point P

For available devices for the system configuration, refer to the user's manual of the vision sensor used.

### Connection and wiring of a vision sensor

This section shows the procedure for connecting and wiring a vision sensor.

#### Operating procedure

- 1. Check that the 24 VDC power supply is OFF.
- 2. Connect an I/O wire or a serial wire of a breakout cable to an appropriate device (such as a programmable controller).
- **3.** Connect the 24 VDC (red wire) and GND (black wire) of a breakout cable to the corresponding terminals on the power supply.
- 4. Connect the M12 connector of the breakout cable to the Power, I/O and RS-232 connector of the vision sensor.
- 5. Connect the Ethernet cable's M12 connector to the vision sensor's Ethernet connector.
- 6. Turn ON the 24 VDC power supply.

#### Precautions

- When connecting a vision sensor and a programmable controller, simultaneously turn ON the power of the vision sensor and programmable controller, or first turn ON the power of the programmable controller.
- Cut unused wires or protect them with insulating materials. Be careful not to short-circuit with 24 VDC wires.
- The cable is designed to connect with its key aligned with the keyway of the connector on the Vision Sensor. Do not force the connections or damage may occur.

Point P

For details on the connection with a vision sensor, refer to the user's manual of the vision sensor used.

# 2.2 Basic Operations for an SLMP Scanner Connection

### Basic operation process for an SLMP scanner connection



### Basic operations for an SLMP scanner connection

In SLMP scanner connection, a vision sensor reads a control block from a programmable controller in the poll interval set with the vision sensor setup tool, and processing according to the change of the bit information in the control block is performed. In addition, the status of the processing is written to the corresponding bit in the status block.

By assigning devices of a programmable controller to each of the defined data blocks (including control block), a vision sensor can be controlled using the devices.

The following shows the functions of six data blocks.

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

### Signals used for an SLMP scanner connection

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

#### Precautions

Do not write data to '(Reserved)' bits and words in data blocks. Doing so may cause an unexpected error.

Soft Event 4

#### Data blocks

#### Control blocks

Control block list

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 3

Soft Event 2

Soft Event 1

Soft Event 0

· Control block details

Soft Event 6

Soft Event 5

Soft Event 7

Bit	Data name	Description (Application)
0	Trigger Enable	To enable an image capturing trigger by 'Trigger.' • ON: An image capturing trigger is enabled. • OFF: An image capturing trigger is disabled.
1	Trigger	<ul> <li>To start (trigger) image capturing.</li> <li>ON: Image capturing is started.</li> <li>OFF: —</li> <li>The following conditions must be satisfied to start image capturing properly:</li> <li>"Industrial Ethernet" is selected in the [Set Up Image] ⇒ [Trigger] tab in the vision sensor setup tool. (C Page 49 Creating a new job)</li> <li>The vision sensor is online.</li> <li>'Trigger Enable' and 'Trigger Ready' are turned ON.</li> </ul>
2	Buffer Results Enable	To enable the buffer for read results. New read results are stored in the buffer queue of a vision sensor. To acquire the next read results, turn ON 'Inspection Results Ack.' • ON: The buffer for read results is enabled. • OFF: The buffer for read results is disabled.
3	Inspection Results Ack	To respond to receiving the latest read results. A vision sensor turns 'Results Valid' OFF when recognizing that this bit turns ON. If 'Buffer Results Enable' is turned ON, the next read results are read out from the buffer queue when receiving a response. • ON: Read results are received. • OFF: —
4	Execute Command	To load a job of the job ID specified to 'Command.' • ON: Job load is executed. • OFF: — Until 'Command Completed' is turned ON, the ON state for this bit must be retained. The following conditions must be satisfied to start job load properly: • A vision sensor is set to offline by 'Set Offline.' • A job of the job ID specified to 'Command' exists.
5 to 6	(Reserved)	_
7	Set Offline	To make a vision sensor offline while this bit is ON. • ON: A vision sensor is set to offline. • OFF: —
8 to 15	(Reserved)	-

Bit	Data name	Description (Application)
16	Set User Data	To notify a vision sensor that the 'User Data' field was updated. • ON: 'User Data' field update is notified. • OFF: — A vision sensor updates data defined in the [Format Input Data] tab of a communication setting with the vision sensor setup tool when this bit is turned ON.
17	Initiate String Command	To read data from the 'String Command' field and execute a command. • ON: Native mode command is executed. • OFF: —
18	Clear Error	To clear an error and error code signal. When multiple errors occur, the next error and error code are set by turning this bit OFF. • ON: Error clear is executed. • OFF: —
19	Clear Exposure Complete	To turn 'Exposure Complete' OFF. 'Exposure Complete' does not turn ON while this bit is ON. • ON: Exposure completion is cleared. • OFF: —
20 to 23	(Reserved)	_
24 to 31	Soft Event	To enable a soft event trigger in a spreadsheet. A related software event in a spreadsheet is executed by turning this bit ON.

### Status 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 6 Soft Event Ack 5						

#### · Status block details

Bit	Data name	Description (Application)
0	Trigger Ready	<ul><li>This bit turns ON when 'Trigger Enable' is set and an image capturing trigger can be received.</li><li>ON: An image capturing trigger can be received.</li><li>OFF: An image capturing trigger cannot be received.</li></ul>
1	Trigger Ack	<ul> <li>This bit shows that a vision sensor recognizes 'Trigger' is ON, and an image capturing trigger is received.</li> <li>Until 'Trigger' is turned OFF, the ON state for this bit is retained.</li> <li>ON: An image capturing trigger is received.</li> <li>OFF: —</li> </ul>
2	(Reserved)	-
3	Missed Acq	<ul> <li>This bit shows that image capturing is failed.</li> <li>This bit is turned OFF if the next image capturing is succeeded.</li> <li>ON: Image capturing is failed.</li> <li>OFF: —</li> </ul>
4 to 6	Offline Reason	<ul><li>This bit shows the cause of a vision sensor being offline by three bits.</li><li>0: Online</li><li>1: Job is being edited.</li><li>2: Offline is set by a discrete signal.</li><li>3: Offline is set by a predefined protocol.</li></ul>
7	Online	This bit shows the online/offline status. When a vision sensor is offline, the reason is shown in the 'Offline Reason' field. • ON: Online • OFF: Offline
8	System Busy	This bit shows that a vision sensor is executing or loading a job, or responding to user inputs. • ON: System busy • OFF: —

Bit	Data name	Description (Application)
9	Inspection Completed	This bit is inverted every time when an inspection is completed and a series of inspection results ('Inspection ID,' 'Inspection Result Code,' 'Inspection Results,' and 'Job Pass') is sent to a programmable controller.
10	Results Buffer Overrun	<ul> <li>This bit shows that a vision sensor discards a series of read results after the buffer for read results becomes full.</li> <li>When the next read results are stored in the buffer queue properly, this bit is turned OFF.</li> <li>Only when 'Buffer Results Enable' is enabled, this bit is enabled.</li> <li>ON: Read results are discarded.</li> <li>OFF: —</li> </ul>
11	Results Valid	This bit shows that a series of inspection results is available ('Inspection ID,' 'Inspection Result Code,' 'Inspection Results,' and 'Job Pass' fields contain valid data). Until 'Inspection Results Ack' responds, this bit remains ON. • ON: With new read results • OFF: Without new read results
12	Command Executing	This bit shows that job load is executed. • ON: Job load is being executed. • OFF: —
13	Command Completed	This bit is turned ON when job load is completed. When a job load command is not completed properly, 'Command Failed' is also turned ON. • ON: Job load is completed. • OFF: —
14	Command Failed	<ul> <li>This bit is turned ON when job load is not completed properly.</li> <li>It is turned OFF when a new job is loaded by a programmable controller.</li> <li>When changing a job by using the vision sensor setup tool, this bit is not changed.</li> <li>ON: Job load is failed.</li> <li>OFF: —</li> </ul>
15	Error	This bit is turned ON when an error occurred. • ON: Error occurred. • OFF: —
16	Set User Data Ack	<ul> <li>This bit is turned ON when 'Set User Data' command execution is completed.</li> <li>ON: 'Set User Data' command execution is completed.</li> <li>OFF: —</li> </ul>
17	String Command Ack	<ul> <li>This bit is turned ON when a native mode command execution is completed.</li> <li>ON: Native mode command execution is completed.</li> <li>OFF: —</li> </ul>
18	String Command Error	<ul> <li>This bit is turned ON when a native mode command execution is failed.</li> <li>ON: Native mode command execution is failed.</li> <li>OFF: —</li> </ul>
19	Exposure Complete	This bit is turned ON when an exposure for a vision sensor is completed. It is turned OFF by 'Clear Exposure Complete.' When 'Clear Exposure Complete' is set to ON, the OFF state of this bit is retained. • ON: Exposure is completed. • OFF: —
20	Job Pass	This bit is turned ON when the latest job is passed. It is turned OFF when a job is failed. • ON: Inspection result is passed. • OFF: —
21 to 23	(Reserved)	_
24 to 31	Soft Event Ack	This bit shows that a vision sensor received a soft event command.

#### Input data blocks

Input data block list				
Word 0	Word 1	Word 2		
Command	(Reserved)	User Data		

#### · Input data block details

Word	Data name	Description (Application)
0	Command	To specify job IDs (0 to 999).
1	(Reserved)	-
2 or later	User Data	<ul> <li>Data buffer to transfer data from a programmable controller to a vision sensor.</li> <li>This can be used for the following application:</li> <li>To update the data defined in the [Format Input Data] tab of a communication setting with the vision sensor setup tool: Store data to be updated in the data format defined in the [Format Input Data] tab.</li> </ul>

#### Output data blocks

Output data block list

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

#### · Output data block details

Word	Data name	Description (Application)
0	Current Job ID	Job ID of a job being executed is stored. If no job ID is specified for the job, '65535 (0xFFFF)' is stored.
1	Error Code	<ul> <li>This shows an error occurred in 16-bit integer.</li> <li>0x0000: No error</li> <li>0x0100: An image capturing trigger is generated when the image capturing trigger is disabled.</li> <li>0x0101: An image capturing trigger is generated when a vision sensor is offline.</li> <li>0x0400: Another command execution command is generated when a command is being executed.</li> <li>0x0401: Job load is requested when a vision sensor is online.</li> <li>0x0402: Job ID that does not exist is specified in the 'Command' field for the execution.</li> </ul>
2	Acquisition ID	Image capturing ID associated with the image capturing is stored. This can be used to synchronize image capturing and inspection results.
3	Inspection ID	Inspection ID associated with a series of inspection results ('Inspection ID,' 'Inspection Result Code,' 'Inspection Results,' and 'Job Pass') is stored.
4	Inspection Result Code	Any inspection result code specified for "Result code" of the WriteResultsBuffer function in the vision sensor setup tool (spreadsheet) is stored.
5 or later	Inspection Results	The data defined in the [Format Output Data] tab of a communication setting with the vision sensor setup tool is stored.

#### String command blocks

· String command block list

Word 0	Word 1
String Command Length	String Command

#### · String command block details

Word	Data name	Description (Application)
0	String Command Length	Data length of native mode command stored in 'String Command' field is saved in bytes.
1 or later	String Command	Native mode command and the terminator are stored.

#### String command result blocks

String command result block list

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

#### · String command result block details

Word	Data name	Description (Application)
0	String Command Result Code	The execution result of a native mode command is stored. '1' is returned when the execution is succeeded; however, a different failure code is returned depending on the native mode command when it is failed. For details of the failure code, refer to the topic of each native mode command.
1	String Command Result Length	Data length of data stored in 'String Command Result' field is saved in bytes.
2 or later	String Command Result	The result string of a native mode command is stored in ASCII text.

For details on the data block functions to control a vision sensor, refer to the help of vision sensor setup tool. Enter "SLMP scanner" as a keyword in the [Search] tab of Help, and refer to the explanation of the data block.

😵 In-Sight® Explorer Help	
Hide Locate Back Forward Print	
Contents Search Type in the word(s) to search for: SLMP Scenne List Topics Display Select topic: Found: 5 Title Loc	SLMP Scanner Factory Interface - In-Sight 5.x.x Firmware In-Sight Function Reference This topic covers the SLMP Scanner communication protocol for In-Sight vision systems running In-Sight 5.1.0 and later firmware. Refer to Firmware Versions for a complete list of models and supported firmware versions.  SLMP Scanner Operations
SLMP Scanner Factory Interface In-S SLMP Scanner Settings Dialog In-S SLMP Scanner Factory Interface - In-Sight 4.x.x Firmware In- Configuring In-Sight Vision Systems for SLMP Scanner C In-S SLMP Scanner Factory Interface - In-Sight 5.x.x Firmware In-	SLMP Defined Data Blocks SLMP Scanner Operations SLMP Scanner is a command/response-based protocol, which originates from the In-Sight vision system, and the vision system must send read requests to the Automation Controller at periodic intervals to determine if there are changes in the control bits. This process is called "polling," and defines the polling cycle.
<ul> <li>✓ III → </li> <li>Search previous results</li> <li>☑ Match similar words</li> <li>☑ Search titles only</li> </ul>	Polling Cycle     Typical Sequence Diagram     Typical Acquisition Sequence     Typical Inspection Sequence     Typical Job Management Sequence     Typical Soft Event Sequence     Typical Soft Event Sequence     Typical String Command Sequence     Typical String Command Sequence

# **2.3** Setting the Vision Sensor

Start the vision sensor setup tool to set the vision sensor.

#### Setting an IP address to a personal computer

Set the IP address (192.168.3.3) to a personal computer.

#### Connecting the vision sensor

Start the vision sensor setup tool to set the vision sensor.

**1.** Start the vision sensor setup tool.



2. Add the vision sensor to the network.



• Add the vision sensor to the network.

• IP Address: 192.168.3.1

• Subnet Mask: 255.255.255.0

Olick the [Apply] button.

#### **3.** Connect to the vision sensor.



• Click the [Connect] button to connect to the vision sensor.

#### Creating a new job

As an example, set a CE mark for inspection target.

**1.** Create a new job.



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



- Click the [Set Up Image] button.
- Select the [Trigger] tab.
- 3 Select "Industrial Ethernet."
- Olick the [Live Video] button to
- adjust the image. After adjusting the image, click the [Live Video] button again.



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



### Configuring a communication setting

**1.** Configure the communication setting (SLMP scanner).



Click the [Communication] button.
 Click the [Add Device] button.

#### **2.** Add the SLMP scanner.

	<ul> <li>Configure a device setting.</li> <li>Device: PLC/Motion Controller</li> <li>Manufacturer: Mitsubishi</li> <li>Protocol: SLMP Scanner</li> <li>Click the [OK] button.</li> <li>When the message "Protocol Service Change Required" appears, click the [OK] button.</li> </ul>
Protocol Service Change Required X	
The Network Protocol Services setting has been automatically changed to match the selected configuration.	
Please save your job and reset your In-Sight vision system (from the Sensor menu, select Restart) for the communication protocol to function properly.	

#### 3. Set the SLMP Scanner.

In-Sight Explorer - admin - [VS20M-	13F410 - VS20M-13F410 - EasyBuilder View]X
<u>File E</u> dit <u>V</u> iew I <u>m</u> age <u>S</u> ensor Sy	stem Window Help _ 🗁 🖂
🗋 🗳 🐱 🧔 🖪 🔥 🖄 🖻	· × 🤊 🔍 🕫 🖬 🔍 및 및 🥝 🖾 🦛 🏭 🌋 🕛
Application Steps	MELSEC-Q MITSUBISHI ETHERNET I/F UNIT MODEL Q MAC ADD. 0 SERIAL 10071 BOM1 IND. CONT. EQ. AMTSUBISHI ELECTRIC MADE IN JAPAN
Kunjub	85% Job Size Available Offline . Time: 0.0ms
Communications	Settings O Addressing Format Input Data Format Output Data
EasyView	Controller Type: IQ-R/Q/L Series (3E Frame)
SIMP Scapper	IP Address: 192 . 168 . 3 . 2 Network Number: 0
	Host Port: Dec T 12289
	Timeout (ms): 1000
	Poll Interval (ms): 100 Constant Communication with the MCL CFC Constant Local Station
Add Device	Cannot Communicate with the MELSEC Controller.
Edit Device	Reset Test Connection
Remove Device	

#### • Setting contents are as follows.

- Controller Type: iQ-R/Q/L Series (3E Frame)
- IP Address: 192.168.3.2
- Host Port: 12289 (Port number set for the Ethernet parameter in an engineering tool)
- Timeout (ms): 1000
- Poll interval (ms): 100

#### Point P

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

#### Assigning devices

	average in online input but		. Output Dut	•		
Name	Selected Device		Offset	Number of Devices	0	Description
Control	D - Data Register	-	1000	2	4 *	tarting PLC address of the vision control block.
Status	D - Data Register	-	1002	2	*	tarting PLC address of the vision status block.
Input Block	None	-	0	\$2	*	tarting PLC address of the user data block.
Output Block	D - Data Register	-	1010	\$	4	tarting PLC address of the inspection results block.
Command	None	-	0	\$	4	tarting PLC address of the command string.
Command Result	None	-	0	1	<u>^</u>	tarting PLC address of the command result data.

 Select the [Device Addressing] tab.
 Set a selected device, offset, and the number of devices to each of the six data blocks as shown left.
 (Image 52 Device addressing)

#### Device addressing

Name	Selected Device	Offset	Number of Devices
Control	D-Data Register	1000	2
Status	D-Data Register	1002	2
Output Block	D-Data Register	1010	8

#### Outputting to the programmable controller

- As an example, set "Pass," "Fail," and "Inspection Count" to the output data block (D1015 to D1017).
- 1. Set data to be output from the vision sensor to the programmable controller.



 Select the [Format Output Data] tab. Olick the [Add] button.

- 2. Select the data to be output to the programmable controller.
- VS20M-13F410\_xxxxx Select Output Data × Select items to add Acquisition V FOV Inputs 🔺 Job Integer Job.External\_Reset\_Counters Job.Fail Integer Job.Fail\_Count Integer Job.Inspection\_Completed Integer 2 Job.Inspection\_Count Integer Job.Pass Integer Job.Pass\_Count Integer Job.Status Integer Pattern\_1 0 Pattern\_1.Fail Integer Pattern\_1.Pass Integer 3 <u>OK</u> Cancel
- Select "Pattern\_1 inspection result (PASS/FAIL)".
- Select "Job.Inspection\_Count".
- Click the [OK] button.

3. The output result to the programmable controller is displayed.



O Device Address: D1015 to D1017

Ø Message size (words): 3

Items corresponding to the device address can be changed by using the [Up] and [Down] buttons. As an example, sort as above.

D01015: Pattern\_1.Pass

- D01016: Pattern\_1.Fail
- D01017: Job.Inspection\_Count

#### Saving the job

#### 1. Name the created job.



**2.** Enter a file name and save the job.

VS20M-13F410 - Save A			×
Look <u>i</u> n: 🌱 VS20M-13F	410	•	- <u> </u>
Desktop Documents Documents This PC Network	ISLMPScanner.job 2SLMPScanner.job		2
File <u>n</u>	ame: Itest		Save
Files	of type: Job files (*.job)		Cancel

1 Enter an arbitrary file name.2 Click the [Save] button.

Point P

The running job can be changed (loaded) to another job by prefixing a numeric value to a file name. For the procedure to change jobs, refer to the following section.

Page 67 Changing jobs (loading another job)

#### **3.** Set startup options for the vision sensor.



Click the [...] button under "Job".
Select the checkbox of "Load Job on Startup".

Select the file name saved in step 2.

Select the checkbox of "Start the Sensor in Online Mode".

Olick the [OK] button.



#### Restarting the vision sensor

Turn the power of the vision sensor OFF and ON to restart.

2

# 2.4 Setting a Programmable Controller

Set parameters of a programmable controller in an engineering tool.

### **Registering a profile**

Register a profile of the vision sensor in an engineering tool.

**Point** 

Profiles need to be registered when an engineering tool project is closed.

- **1.** Start an engineering tool.
- **2.** Resister a profile.



- Select [Tool] 
   ⇒ [Profile Management] 
   ⇒ [Register].
- **2** Select the profile obtained previously.
- Olick the [Register] button.

### Setting a programmable controller

Set parameters of a programmable controller.

**1.** Select a CPU module and a program language in the "New" screen.



The "New" screen appears.

**2** Set a CPU module and a program language.

- Series: RCPU
- Type: R08
- Program Language: Ladder
- Click the [OK] button.
- Olick the [OK] button.

**2.** Set the module parameter.



• Double-click "Module Parameter" in the "Navigation" window. The "R08CPU Module Parameter" screen appears.

Set "IP Address," "Enable/Disable Online Change," and "Communication Data Code."

- IP Address: 192.168.3.2
- Enable/Disable Online Change: Enable All (SLMP)

• Communication Data Code: Binary Ouble-click [External Device

#### Configuration].

The "Ethernet Configuration" screen appears.

( SP Page 58 "Ethernet Configuration" screen)

Olick the [Apply] button to end the settings.

#### "Ethernet Configuration" screen

Detect the connected vision sensor. Make sure to turn ON the power of the programmable controller in advance.



### Point P

For the system configuration in which the automatic detection function of connected devices is not supported, a vision sensor can be added by dragging and dropping a corresponding device in "Vision Sensor" from "Ethernet Device (Mitsubishi Electric Corporation)" in "Module List."

The parameter settings are as follows:

- "Protocol": TCP
- "PLC" "Port No.": 12289 (SLMP port number set in the vision sensor setup tool)
- "Sensor/Device" "IP Address": 192.168.3.1 (IP address of a vision sensor set in the vision sensor setup tool)

### Creating a program

Create a program to control a vision sensor using the devices set in the vision sensor setup tool.

#### Devices used in the program

Signal	Signal name	Description
D1002.0	Trigger Ready	The reception status of 'Trigger Enable' (D1000.0) is stored. • ON: Trigger is enabled. • OFF: Trigger is disabled.
D1002.1	Trigger Ack	The reception status of 'Trigger' (D1000.1) is stored. • ON: With trigger • OFF: Without trigger
D1002.7	Online	The online status of a vision sensor is stored. • ON: Online • OFF: Offline
D1002.9	Inspection Completed	This signal is changed (toggled) at the completion of an inspection of a vision sensor.
D1000.0	Trigger Enable	'Trigger' (D1000.1) is enabled while this signal is ON.
D1000.1	Trigger	By turning this signal OFF and ON, an image capture is started.
M0	Online command	'Trigger Enable' (D1000.0) turns ON to make a vision sensor online while this signal is ON.
M1	Trigger directive	By turning this signal OFF and ON, 'Trigger' (D1000.1) is turned ON, and an image capture is performed.

#### Program example

(0)	M0	D1002.7			 				D1000.0
(3)-	M1	D1002.0	D1002.1	D1000.1	 			SET	D1000.1
(8)-	D1002.1	D1002.9			 			RST	D1000.1
		D1002.9			 			RST	M1
(16)-									[END ]

(0): Enable a trigger on the vision sensor.

(3): Request the start of the image capture to the vision sensor. ('Trigger' (D1000.1) turns ON.)

(8): The processing for the completion of the image capture of the vision sensor is performed.

#### Precautions

Use 'Trigger Ack' (D1002.1) to set an interlock when checking 'Inspection Completed' (D1002.9).

#### Timing chart of SLMP scanner connection

A timing chart when controlling a vision sensor using a programmable controller is shown below. To enable the trigger from a programmable controller, turn ON 'Trigger Enable' of the control block. When 'Trigger' of the control block is turned ON while 'Trigger Ready' of the status block is ON by turning ON 'Trigger Enable,' the status of the vision sensor is output to 'Trigger Ack' and 'Inspection Completed' of the status block. The status of 'Inspection Completed' is changed (toggled) at the completion of an inspection.



# 2.5 Writing Data to a Programmable Controller

Write the parameters and program set in an engineering tool to the programmable controller.

#### Writing to the programmable controller

- **1.** Turn ON the programmable controller.
- 2. Write parameters and program to the programmable controller in the "Online Data Operation" screen.

Sisplay Setting Related Functions		. 100							appears.
		1	Vert	/ 😹 🗸	Delete				button
Parameter + Program(E) Select <u>A</u> ll	Legend								
Open/Close All( <u>T</u> ) Deselect All( <u>N</u> )	CPUI	Built-in Me	mory	SD M	emory Card 🛛 🛅	Intelligent Function Module			Click the [Execute] button.
Module Name/Data Name				Detail	Title	Last Change	Size (Byte)	-	
🗉 🐴 Untitled Project									
🖶 🛃 Parameter									
System Parameter/CPU Parameter	•					2017/11/20 15:18:00	Not Calculated		
Module Parameter	•					2017/11/20 15:36:59	Not Calculated		
Memory Card Parameter						2017/11/20 15:18:00	Not Calculated	=	
Remote Password	•					2017/11/20 15:18:00	Not Calculated		
🕂 🏦 Global Label									
Global Label Setting						2017/11/20 15:18:01	Not Calculated		
🖻 🔚 Program				Detail					
MAIN						2017/11/20 15:18:01	Not Calculated		
🖃 🙆 Device Memory									
				Detail	1	2017/11/20 15:18:01	-		

Restarting the programmable controller

After writing the parameters and program, reset the programmable controller to RUN.

# 2.6 Checking Operations

Check the operation by controlling the vision sensor using the programmable controller.

#### Making the vision sensor online

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



Enabling a trigger on the vision sensor	
Enable a trigger on the vision sensor to acquire the inspection results. <b>1.</b> Display device values.	_
1 [Device/Buffer Memory Batch Monitor]         Image: Device Name	<ul> <li>Image: Select [Online] ⇔ [Monitor] ⇔</li> <li>[Device/Buffer Memory Batch Monitor] with an engineering tool.</li> <li>The "Device/Buffer Memory Batch Monitor" window appears.</li> <li>Image: Enter "M0" for "Device Name".</li> <li>Click the [Start Monitoring] button.</li> </ul>
2. Enable a trigger on the vision sensor.     1 [Device/Buffer Memory Batch Monitor] Monitoring	Turn "M0" ON to turn 'Trigger Enable' (D1000.0) ON.
O Device Name         M0         Detailed Conditions         Monitoring           Buffer Memory         Unit         (HEX)         Address         DEC         Stop Monitoring           Device Name         9         8         7         6         4         2         1         0           Monitoring         Monitoring         Image: Condition of the state of the stat	
Trigger a device.      I [Device/Buffer Memory Batch Monitor] Monitoring	Turn "M1" ON to turn 'Trigger' (D1000.1) ON.
Device Name         M0         Detailed Conditions         Monitoring           Buffer Memory         Unit         (HEX)         Address         DEC         Stop Monitoring           Device Name         9         7         6         5         4         2         1         0           Monitoring         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0	

#### Checking inspection results

Check the inspection results.

**1.** Check the completion of the inspection. 1 [Device/Buffer Memory Batch Monitor] -O Device <u>Name</u> 1 01000 Detailed Conditions Stopping 0 <u>A</u>ddress Buffer <u>M</u>emory - (HEX) - DEC Start Monitoring Unit F E D C B A 9 8 7 6 5 4 3 2 1 0 Current Value Device Name String ÷ 1 [Device/Buffer Memory Batch Monitor] Monitoring Oevice <u>N</u>ame D1000 • Detailed Conditions Monitoring + (HEX) Address Buffer Memory Unit - DEC Ŧ Stop Monitoring 
 F
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 Device Name Current Value String D1 000 D1 001 0 D1 002 2689 D1 003 24 D1 004 0

Denter "D1000" for "Device Name".
Click the [Start Monitoring] button.
Check that the bit of 'Inspection Completed' (D1002.9) is changed (toggled).

#### **2.** Check the inspection results.

1 [Device/Buffer N	1er	no	ry	Ba	tch	n M	lon	ito	r] N	1or	nito	orir	ng									
Oevice <u>N</u> ame			D1	00	0	_			_	_		_		Ŧ	]			Detail	ed C	onditions 💌	Мо	nitoring
1 [Device/Buffer Memory Batch Monitor] Monitoring            • Device Name           1000         •         •         Detailed Conditions         •         Detailed Condition		Monitoring																				
Device Name	F	Е	D	С	в	A	9	8	7	б	5	4	3	2	1	0		Current Value		String		
D1 01 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	i n	1 c		0	0			
D1 01 5	0	0	0	0	0	0	0	0	0	0	0	0	0	T	0	1	Ĩ	U	1			
D1 01 6	0	0	0	0	0	0	0	0	0	0	0	0	0	T	0	C	٦Ì		0			1
D1 01 7	Device Name         D1000         Monitoring           Buffer Memory         Unit         (HEX)         Address         Decailed Conditions         Stop Monitoring           Ce Name         F         E         D         B         A         3         7         6         4         3         2         1         Ourrent Value         Stop Monitoring           Ce Name         F         E         D         B         A         3         7         6         5         4         3         1         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O																					
D1 01 8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	j.	1		0	-		<b>.</b>

- Check the following information.
- 'Job PASS' (D1015.0): This bit turns ON when the set inspection target is detected in the captured image.
- 'Job FAIL' (D1016.0): This bit turns ON when the set inspection target is not detected in the captured image.
- 'Number of jobs inspected' (D1017): The number of times the device is triggered is stored.

#### Changing a recognition parameter

When locating a target object using the pattern in the location tool, the rotation tolerance of the target object can be changed to ±90°.

- 1. Make the vision sensor offline with the vision sensor setup tool.
- 2. Add parameter items to the list in the [Format Input Data] tab.



O Click the [Communication] button. **2** Enter the following information to the cells in the "Input Block" row in the

[Device Addressing] tab. · Selected Device: D - Data Register

- Offset: 2000
- Number of Devices: 3

3 Select the [Format Input Data] tab and click the [Add] button.



METHIE 23 - Select Inp	ut Data	×	
Select items to add			
	Name	Data Type	
V FOV			
v Job			
Pattern_1			
Pattern_1.Accep	t_Threshold	Integer	
Pattern 1.Descr	ntion	String	
Pattern_1.Rotat	on_Toleranœ	Integer	
Pattern_1.Scale	Tolerance	Integer	
Pattern_1.Timeo	ut	Integer	
Pattern_1.Tool_I	inabled	Integer	
	Ø	2K <u>Cancel</u>	
Communications	Sattinger Device Addressing Exemptional Data Exempt Output Data		
EasyView	Device Address Name Data Time	Size Value	Data Tara di Bata data da
FTP SLMP Scapper	D02002 Pattern_1.Rotation_Tolerance 16 bit integer	1 45	Element Size (words)
Add Device			High Byte/Low Byte High Word/Low Word
Edit Device			
Remove Device	Add_ Remove Up Down Reset Data Types		Message size (words): 1

3. Save the job and make the vision sensor online. ( Page 54 Saving the job)

Select "Pattern 1.Rotation Tolerance". G Click the [OK] button.



Parameter items need to be added to the list in the [Format Input Data] tab in advance to change parameter values.

More than one parameter item can be selected.

Set the number of devices of "Input Block," depending on the number and size of parameters. When the number entered in "Number of devices" is smaller than the total size of the parameter items added to the list in the [Format Input Data] tab, a warning mark is displayed next to "Message size (words)".

#### 4. Set "Pattern\_1.Rotation Tolerance" as a parameter to be changed.

1 [Device/Buffer Memory Batch Monitor]	Select [Online]	or]
Device Name      Detailed Conditions      Stopping	with an engineering tool. The "Device/Buffer Memory Batch	-
Buffer Memory Unit     (HEX) Address     DEC      EC	Monitor" window appears. 2 Enter 'D2000' for "Device Name"	
Device Name         F         E         D         C         B         A         9         8         7         6         5         4         3         2         1         0         Current Value         String	Click the [Start Monitoring] button     Enter '90' for 'User Data' (D2002)     an input data block	n. ) of
$\checkmark$		
1 [Device/Buffer Memory Batch Monitor] Monitoring		

#### **5.** Change parameter values.

. [Device/Buffer M	emo	ry E	latc	h N	lon	itor	] M	oni	tori	ng	_	_	_		_	_								X
Oevice <u>Name</u>	1		D10	000								•						Detailed Co	onditi	ions	8	Monitori	ng	
) Buffer <u>M</u> emor	у	ļ	<u>J</u> nit										) (	HE:	X)		<u>A</u> ddress		Ŧ	DEC	Ŧ	<u>S</u> top Moni	oring	
Device Name	F	E	D	С	В	A	9	8	7	6	5	4	3	2	1	0		Current Value	1		Strin	g		*
D1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1			1					
D1001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0		1					
D1002	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0		1		129					
D1003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	] (3		1					
D1004	0	0	n	n	n	0	n	0	0	0	0	0	0	0	0	0	1		0					-

Enter 'D1000' for "Device Name".
Turn ON 'Set User Data' (D1001.0) of a control block.

By completing the settings, 'Set User Data Ack' (D1003.0) of a status block turns ON. After that, turn OFF 'Set User Data' (D1001.0).

#### **6.** Trigger a device.

L [Device/Buffer Memory Batch Monitor] Monitoring													×																				
Device <u>N</u> ame		[	D10	)00									•								Det	ailed (	Condit	ions		8			Monit	oring			
Buffer <u>M</u> emory		ļ	<u>J</u> nit										•	(HE	EX)			<u>A</u> ddress					Ŧ	DEC	;	-		St	ор Мо	onitori	ng		
Device Name	F	Ε	D	С	В	A	9	8	7	6	5	4	3	2	2	2	0		Cur	rrent \	/alue		]			Stri	ng						
D1000	0	0	0	0	0	0	0	0	0	0	0	0	0	1 0	Ī	1	1						3										
D1001	0	0	0	0	0	0	0	0	0	0	0	0	0	1 (		U	1						1										
D1002	0	0	0	0	1	0	1	0	1	0	0	0	0	1	)	1	1						2691	f									
D1003	0	0	0	0	0	0	0	0	0	0	0	1	1	0	) [	0	1						25										
D1004	0	0	0	0	0	0	0	0	0	0	0	0	0	1 0	)	0	0						0									Ŧ	

Turn ON 'Trigger' (D1000.1) of a control block.

#### Changing jobs (loading another job)

The following shows the procedure to load the job file "1Test".

The number '1' prefixed to the file name indicates an ID. By setting this ID number to 'Command' (D2000) of an input data block, the job ("1Test") can be loaded.

**1.** Set an ID number of a job.

[Device/Buffer Memo	ory Batch Monitor]	×
Oevice <u>N</u> ame	Detailed Conditions 😨 🕄 Stopping	
O Buffer <u>M</u> emory	Unit (HEX) Address DEC - Start Monitoring	
Device Name F	E D C B A 9 8 7 6 5 4 3 2 1 0 Current Value String	*
		Ŧ
	1	
	↓	
Device/Buffer Memo	ory Batch Monitor] Monitoring	×
Device/Buffer Memo	D2000	×
Device/Buffer Memo Device <u>N</u> ame Duffer <u>M</u> emory	D2000	×
Device/Buffer Memore Device <u>N</u> ame Buffer <u>M</u> emory Device Name F	D2000     Detailed Conditions     Monitoring       Unit     (HEX)     Address     DEC     Stop Monitoring       E     D     C     B     A     9     8     7     6     5     4     3     2     1     0     Current Value     String	

⑦ Select [Online] ⇔ [Monitor] ⇔ [Device/Buffer Memory Batch Monitor] with an engineering tool. The "Device/Buffer Memory Batch Monitor" window appears.

Enter 'D2000' for "Device Name".

Click the [Start Monitoring] button.

Enter '1' for 'Command' (D2000) of an input data block.

#### **2.** Change jobs (load another job).



Enter 'D1000' for "Device Name".
Turn ON 'Set Offline' (D1000.7) of a control block to make the vision sensor offline.

 Turn ON 'Execute Command' (D1000.4) of a control block to load a job.

When the loading of the job is completed, 'Command Completed' (D1002.D) of a status block is turned ON. After that, turn OFF 'Execute Command' (D1000.4) and 'Set Offline' (D1000.7).



To load a job, the file name of the job need to begin with an ID number. When loading a job, make a vision sensor offline.

### Controlling the vision sensor by using native mode commands

The vision sensor can be controlled by using native mode commands.

As an example, send the native mode command "GF (Get File)" to acquire the file name of the job in use.

#### Setting the vision sensor

- **1.** Make the vision sensor offline with the vision sensor setup tool.
- 2. Set devices in the [Device Addressing] tab.
- 3. Save the job and make the vision sensor online. ( Page 54 Saving the job)

- Communica	itions	Settings Device Addr	essing Format Input Da					
E	asyView							
	FTP	Name	Selected Device		Offset	Numbe	er of Devices	Description
SLM	1P Scanner	Control	D - Data Register	-	1000	2	÷	Starting PLC address of the vision control block.
		Status	D - Data Register	-	1002	2	÷	Starting PLC address of the vision status block.
		Input Block	D - Data Register	-	2000	<b>♣</b> 3	A V	Starting PLC address of the user data block.
		Output Block	D - Data Register	-	1010	8	4	Starting PLC address of the inspection results block.
Ac	dd Device	Command	D - Data Register	-	3000	20	1	Starting PLC address of the command string.
Ec	dit Device 2	Command Result	D - Data Register	-	3050	\$ 50	A P	Starting PLC address of the command result data.
Rem	nove Device							

• Enter the following information to the cells in the "Command" row.

- Selected Device: D Data Register
- Offset: 3000
- Number of Devices: 20
- 2 Enter the following information to
- the cells in the "Command Result" row. • Selected Device: D - Data Register
- Offset: 3050
- Number of Devices: 50

Point P

Set an appropriate number of devices in the "Command" row for command length (size). Set an appropriate number of devices in the "Command Result" row for the size of the data to be acquired.

#### Acquiring a file name

Send the native mode command "GF" to acquire a file name.

1. Set a native command and a command length.

(0)	SM400					MOV	H0A0D	D100	Ieft v ∙S∉
					\$+	″GF″	D100	D3001	LF a • Se
						LEN	D3001	D3000	i 'S a ØF func
(11)								-{END }	

Create a ladder program as shown left with an engineering tool.

- Set the native command "GF" and the line feed code of terminator "CR/ LF" for 'String Command' (D3001) of a string command block.
- Set the native command length for 'String Command Length' (D3000) of a string command block.

**2** Perform the online program change function.

#### 2. Check that the command and the command length are set correctly.

O Device Name	0	DB0	n					<b>ה</b>				Deteller	1 C			1
C DONICO <u>H</u> anno	~	-		_	_							Detalied	Conditions		3 Stopping	
Buffer <u>M</u> emory	,	<u>U</u> nit						- (HE	X)	<u>A</u> ddress			▼ DEC	-	<u>S</u> tart Monitoring	]
)evice Name	FE	D	СB	A	98	76	54	32	1 0		Current \	/alue		String	g	
		V														
		*														
Device/Buffer Me	mory	Batch	Mon	itor]	Monit	toring										
Device/Buffer Me	mory	Batch	Mon 0	itor] l	Moni	toring		<b>•</b>				Detailed	l Conditions		Monitoring	1
Device/Buffer Me	mory	Batch	Mon 0	itor]	Moni	toring		•				Detailed	I Conditions	8	Monitoring	
Device/Buffer Me Device <u>N</u> ame Buffer <u>M</u> emory	emory	Batch D300 <u>U</u> nit	Mon 0	itor]	Monit	toring		<ul> <li>(HE</li> </ul>	X)	Address		Detailed	l Conditions	~	Monitoring <u>S</u> top Monitoring	
Device/Buffer Me	rmory	Batch D300 Unit	Mon 0 C B	itor]   [   A	Monit	toring	5 4	<ul> <li>(HE</li> <li>3 2</li> </ul>	X)	Address	Current \	Detai <u>l</u> eo	I Conditions	Strin	Monitoring Stop Monitoring	
Device/Buffer Me Device Name Buffer Memory Device Name D3000	F E	Batch D300 Unit	Mon 0 C B 0 0	itor]   [   A   0	Monit 9 8 0 0	toring 7 6 0 0	54	<ul> <li>✓ (HE</li> <li>3 2</li> <li>0 1</li> </ul>	×) 1 0 0 0	Address	Current	Detai <u>l</u> eo /alue	J Conditions DEC 4	Strine	Monitoring	]
Device/Buffer Me Device Name Buffer Memory Device Name 23000 23001	F E 0 0	Batch D300 Unit D	Mon 0 C B 0 0 0 0	itor]   [   A   0   1	Monit 9 8 0 0	toring 7 6 0 0 0 1	5 4 0 0 0 0	<ul> <li>✓ (HE</li> <li>3 2</li> <li>0 1</li> <li>0 1</li> </ul>	×) 1 0 0 0	Address	Current	Detaileo /alue	I Conditions DEC 4 17991 GF	Strine	Monitoring Stop Monitoring	

● Select [Online] ⇔ [Monitor] ⇔ [Device/Buffer Memory Batch Monitor] with an engineering tool. The "Device/Buffer Memory Batch

Monitor" window appears. 2 Enter 'D3000' for "Device Name".

Click the [Start Monitoring] button.

Check that the following information is set.

D3000: 4 (character length)
D3001: "GF" (native mode

command)

D3002: 2573 (line feed code of terminator: (CR/LF))

#### 3. Send the native mode command.

1 [Device/Buffer Me	mo	ry E	Batc	h N	1on	itor	] M	loni	tori	ng														
Oevice <u>N</u> ame	0	(	D10	000								,						Deta	ailed Condi	tions	8	Monitor	ing	
Buffer <u>M</u> emory		ļ	<u>U</u> nit										-	ΉE	X)		<u>A</u> ddress		T	DEC	-	<u>S</u> top Moni	itoring	
Device Name	F	Е	D	C	B	A	9	8	7	6	5	4	3	2	1	1	0	Current Value			String	]		
D1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	L n	Ţ	1		1					
D1001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		02		2					
D1002	0	0	0	0	0	0	0	0	1	0	0	0	0	0		K	1		129					
D1003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		0 3		2					
D1004	0	0	i n	i n	i n	i n	i n	i n	i n	i n	n i	0	0	i n	<u> </u>		• •		0					-

€ Enter 'D1000' for "Device Name".
€ Turn ON 'Initiate String Command' (D1001.1) of a control block.
§ 'String Command Ack' (D1003.1) of a status block turns ON. After that, turn OFF 'Initiate String Command' (D1001.1).

#### **4.** Check the acquired data.



Enter 'D3050' for "Device Name".
The information in the following string command result blocks can be acquired.

 'Result Code' (D3050): '1' (successfully completed)

• 'String Command Result Length' (D3051): 9 (file name length)

 'String Command Result' (from D3052 to D3056): "1test.job" (file name) 2

For details on the native mode commands to control a vision sensor, refer to the help of vision sensor setup tool. Enter "Native Mode Commands" as a keyword in the [Search] tab of Help, and refer to the explanation of Native Mode Commands.

울 In-Sight® Explo	orer Help				<
Hide Locate B	ack Forward	Frint			_
Contents Search				Nativo Mada Commanda	Â
Type in the word(s) t	to search for:			Nauve Mode Commands	
native mode comma	ands	•	F	In-Sight Communications Reference	=
List Topic	cs (	Display			
Calaat tania:	Eaunal 124			Extended Native Mode Commands	
The select jupic.	FOUND, 124				
Title	Location	Капк		Basic Native Mode Commands	
Set Integer	In-Sight®	13		File & Job Commands	
Unline	In-Sight®	14			
Serial Port Setting	In-signt≪ In-Sight®	10	=	Load File: (LF) Loads the specified job from flash memory on the In-Sight vision system, making it the active	
Native Mode Com	In-Sight®	17		job.	
Get	In-Sight®	18		Store File: (TF) Saves the current job in flash memory on the vision system.	
Communicate with.	In-Sight®	19		Read File: (RF) Reads a job from the flash memory on the vision system.	
PROFINET IO Mo.	In-Sight®	20		• Write File: (WE) Sends a job to the flash memory on the vision system	
Robot Communica.	In-Sight®	21			
Status Bar	In-Sight®	22		<ul> <li><u>Delete File</u>: (DF) Deletes the specified job or cell data file (.cxd) from flash memory on the vision system.</li> </ul>	
Set Region	In-Sight®	23		<ul> <li>Get File: (GF) Returns the filename of the active job on the vision system.</li> </ul>	
bet Float	In-signt∾ In-Sight®	24 25		• Set Job: (SJ) Loads a job from one of the job slots in flash memory on the vision system, making it the active	
AcquireImage	In-Sight®	26		job.	
In-Sight Communi	. In-Sight®	27		• <u>Store Job</u> : (TJ) Saves the current job into the specified slot in flash memory on the vision system.	
Motoman Commu.	. In-Sight®	28		Read Job: (B1) Reads a job from the specified In-Sight job slot.	
GetCellValue	In-Sight®	29			
SetDiscreteOutput	In-Sight®	30	-	<ul> <li><u>write jop</u>: (wj) Sends a job to the specified job slot in flash memory on the vision system.</li> </ul>	
CatChina	La Cialaño	21		<ul> <li><u>Delete Job</u>: (DJ) Deletes the job from the specified slot in flash memory on the vision system.</li> </ul>	
Search previous	res <u>u</u> lts			Get Job: (GJ) Gets the currently loaded job's ID number.	
Search titles only	105				
obd_on allos only				J	Ŧ
# **3** I/O CONNECTION

This chapter explains the procedure for connecting a vision sensor VS20 to a programmable controller and controlling the vision sensor with I/O connection.

# **3.1** System Configuration Example for Connecting a Vision Sensor

The following figure shows the system configuration for connecting a vision sensor VS20.



Point P

I/O connection is available for other vision sensors (VS70 and VS80).

For details on the system configuration, refer to the user's manual of the vision sensor used.

## Configurations

The devices used in the system configuration are as follows.

#### **Required equipment**

#### Mitsubishi Electric products



#### COGNEX products

COGNEX			
In-Sight Explorer for MELSENSOR Vision		$\bigcirc$	Second         Pail 2 - Out         Pail 2 - Out
Vision sensor setup tool • In-Sight Explorer <sup>*1</sup>	Ethernet cable	I/O module cable	I/O module • CIO-1400 I/O extension module

\*1 Download this product from the Mitsubishi Electric FA website. www.MitsubishiElectric.co.jp/fa

#### Commercial products





For available devices for the system configuration, refer to the user's manual of the vision sensor used.

## Connection and wiring of a vision sensor

This section shows the procedure for connecting and wiring a 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.

#### Connecting an I/O module (CIO-1400 I/O extension module) and an input/output module

- 1. Check that the 24 VDC power supply is OFF.
- 2. Connect a CIO-1400 I/O extension module and an input/output module as shown in the following figure.



#### Precautions

- · Use only 24 VDC and observe the indicated polarity.
- When connecting a vision sensor and a programmable controller, simultaneously turn ON the power of the vision sensor and programmable controller, or first turn ON the power of the programmable controller.
- Cut unused wires or protect them with insulating materials. Be careful not to short-circuit with 24 VDC wires.
- The cable is designed to connect with its key aligned with the keyway of the connector on the Vision Sensor. Do not force the connections or damage may occur.

Point P

For details on the connection with a vision sensor, refer to the user's manual of the vision sensor used.

# **3.2** Setting the Vision Sensor

Start the vision sensor setup tool to set the vision sensor.

#### Setting an IP address to a personal computer

Set the IP address (192.168.3.3) to a personal computer.

#### Connecting the vision sensor

Start the vision sensor setup tool to set the vision sensor.

**1.** Start the vision sensor setup tool.



2. Add the vision sensor to the network.



• Add the vision sensor to the network.

- IP Address: 192.168.3.1
- Subnet Mask: 255.255.255.0
- Olick the [Apply] button.

#### **3.** Connect to the vision sensor.



• Click the [Connect] button to connect to the vision sensor.

#### Creating a new job

As an example, set a CE mark for inspection target.

**1.** Create a new job.

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



- Click the [Set Up Image] button.
- Select the [Trigger] tab.
- Select "Camera".

Click the [Live Video] button to adjust the image. After adjusting the image, click the [Live Video] button again.





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



- Set a model. (CE mark is selected.)
- Olick the [OK] button.
- Ocheck that Name is "Pattern\_1".

3

Click the [Add] button.

#### I/O settings

1. Set inputs and outputs (I/O connection).



#### 2. Select an I/O module.



- 0	Discrete I/O							
		Name	Signal Type	Edge Type	Job Result			
4	<ul> <li>Input</li> </ul>		_	_				
	1	Line 1	Online/Offline		Undefined	None		
I	2	Line 2	User Data	-	Undefined	None		
I	3	Line 3	User Data	-	Undefined	None		=
I	4	Line 4	User Data	-	Undefined	None		
I	5	Line 5	User Data	-	Undefined	None		
	6	Line 6	User Data	-	Undefined	None		
4	Output							
	Direct 0	HSOUT 0	Job Result	-	Pattern_1.Pass	None 💌	Details	J
H	Direct 1	HSOUT 1	Job Result		Pattern_1.Fail	Vone 💌	Details	
	2	Line 2	Online/Offline	-	Undefined	Vone	Details	I
	3	Line 3	Job Completed		Undefined	None 2	Details	J,

- Set inputs and outputs.
- Click the [Details] button in the row of '3'.

#### ■Setting I/O signals

Input	Signal Type	Job Result
1	Online/Offline	Undefined
Output	Signal Type	Job Result
Direct 0	Job Result	Pattern_1.Pass
Direct 1	Job Result	Pattern_1.Fail
2	Online/Offline	Undefined
3	Job completion	Undefined

#### 4. Set output details.



- Set "1000" (1 second) in pulse length. Olick the [OK] button.

#### Saving the job

**1.** Name the created job and save it.



Click the [Save Job] button.
Click the [Save As] button.
Select the file name saved in "Startup Job" after saving the job.

**2.** Enter a file name and save the job.



- Enter an arbitrary file name.
- 2 Click the [Save] button.

**3.** Set startup options for the vision sensor.



Click the [...] button under "Job".
Select the checkbox of "Load Job on Startup".

Select the file name saved in step 2.

Select the checkbox of "Start the

Sensor in Online Mode". **G** Click the [OK] button.

3



#### Restarting the vision sensor

Turn the power of the vision sensor OFF and ON to restart.

# **3.3** Setting a Programmable Controller

Set parameters of a programmable controller and create a program in an engineering tool.

## Setting a programmable controller

Set parameters of a programmable controller.

- **1.** Start an engineering tool.
- **2.** Select a CPU module and a program language in the "New" screen.

New		>	<
Series 0	RCPU	~	
<u>T</u> ype	🎦 R08	~	
Mode		~	
Program Language	\rm 🔂 Ladder	~	
	ОК	Cancel	
	↓		
MELSOFT GX Works3			
Add a module. [Module [Start I/	Name] R08CPU O No.] 3E00		
Module Setting		Setting Change	
Module Label:Not use Sample Comment:Use		^	
		× .	
Do Not Show this Dialo	g Again 🛛 🤇	ОК	

I Select [Project] ⇔ [New].
The "New" screen appears.
Set a CPU module and a program language.
Series: RCPU
Type: R08
Program Language: Ladder
Click the [OK] button.
Click the [OK] button.

82 <sup>3</sup> I/O CONNECTION 3.3 Setting a Programmable Controller

### **3.** Set the system parameter.

Navigation	×
□ <b>E-</b>   □=   🌣   All	•
🚹 Project	
III Module Configuration	
🗉 猛 Program	
🔂 FB/FUN	
🖬 🌆 Label	
🖬 醟 Device	
🗉 🛃 Parameter	0
🤣 System Parameter	
II 😥 ROSENCPU	
🙆 Module Information	
👔 Remote Password	
p	
1	

ystem Parameter						X
Sotting Transligt	Synchronization Se	tting				
	Read Mountir Status	Display Setting	Change CPU Order	U <u>p</u> Down	Base Mode:A	utom
	Slot	Module Name	Module Status Setting	Points	Start XY	
Acade Setting     Acade Setting     Setting of Points Uccupied by Empty Slot	Base     CPU <b>a</b> (*-4) <b>3</b> (*-4) <b>3</b> (*-4) <b>5</b> (*-5) <b>6</b> (*-6)     7(*-7) <b>8</b> (*-8) <b>4</b> (*-4) <b>4</b> (*-4) <b>5</b> (*-5) <b>6</b> (*-6)	R08ENCPU/Host Station) RX4007 (RY40NT5P RY40NT5P	No Setting No Setting	16 Points 16 Points	3E00 0000 0010	
Item List   Find Result	Explanation Set the module na Module configurat the base model na Unable to change Assignment Settin Chec <u>k</u>	nme. ion diagram is not shown ame has not been set in 'E this setting when using in g. Restore th	if a module name other th Base/Power/Extension Ca nter-module synchronization e Defa <u>u</u> lt Settings	ian host CPU ible Setting'. on function to	is set although fix the '1/O	•
System Parameter Diversion			0	ок	Cancel	

• Double-click [System Parameter] in the "Navigation" window to set input/ output modules.

Select [I/O Assignment Setting].
Set "RX40C7" for slot 0 and "RY40NT5P" for slot 1.

Olick the [OK] button.

# Creating a program

Create a program to control a vision sensor using I/O signals set in the vision sensor setup tool.

#### Devices used in the program

Signal	Signal name	Description	Remarks		
X0	Pattern_1.Pass	<ul><li>This signal turns ON when the inspection target set in Pattern_1 is detected in the captured image.</li><li>ON: Pattern match</li><li>OFF: Pattern mismatch or capture not implemented</li></ul>	When the vision sensor is not in the online status, this signal turns OFF.		
X1	Pattern_1.Fail	This signal turns ON when the inspection target set in Pattern_1 is detected in the captured image. • 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	This signal turns ON when a vision sensor is online. • ON: Online • OFF: Offline, or discrete online	_		
Х3	Job completion	This signal turns ON for the set time when the image capture processing is completed.	For the settings of ON time, refer to I/O settings. ( I Page 78 I/O settings)		
Y10	Trigger	When the trigger setting of the vision sensor is set to "Camera," an image capture is performed by turning this signal OFF and ON. To perform the image capture again, turn the signal ON and OFF, and then turn it OFF and ON.	It becomes enabled only when the vision sensor is online.		
Y12	Online request	Turn this signal ON to change the vision sensor in discrete online status to online. Turn this signal OFF to change the vision sensor to discrete online status.	If the vision sensor is offline, it will not go online even if it is turned ON.		
M0	Online command	'Online Request' (Y12) turns ON to make a vision sensor online while this signal is ON.	_		
M1	Trigger directive	By turning this signal OFF and ON, 'Trigger' (Y10) is turned ON, and an image capture is performed.	_		
M10	Pattern_1.Pass	This signal turns ON when the inspection target set in Pattern_1 is detected in the captured image. • ON: Pattern match • OFF: Pattern mismatch or capture not implemented	It becomes the same status as X0.		
M11	Pattern_1.Fail	This signal turns ON when the inspection target set in Pattern_1 is detected in the captured image. • ON: Pattern match • OFF: Pattern mismatch or capture not implemented	It becomes the same status as X1.		

#### Program example



(0): Enable a trigger on the vision sensor.

(2): Request the start of the image capture to the vision sensor. ('Trigger' (Y10) turns ON.)

(7): "M0" turns ON when the inspection target set in Pattern\_1 is detected in the captured image.

(9): "M1" turns ON when the inspection target set in Pattern\_1 is not detected in the captured image.

(11): The processing for the completion of the image capture of the vision sensor is performed.

#### Timing chart of an I/O connection





(1) The bit turns ON for one second (set time period).

# **3.4** Writing Data to a Programmable Controller

Write the parameters and program set in an engineering tool to the programmable controller.

#### Writing to the programmable controller

- **1.** Start the programmable controller.
- 2. Write parameters and program to the programmable controller in the "Online Data Operation" screen.

e Data Operation				1					The "Online Data Operation" sc appears.
Write Read	9	1	Verif	/ 🖳 🧳	Delete				Click the [Parameter + Progr
Parameter + Program(F) Select All	Legend								button.
	CPU F	Built-in Me	mory	SD N	lemory Card 🛛 🚮	Intelligent Function Module			Olick the [Execute] button.
						-			
Module Name/Data Name				Detail	Title	Last Change	Size (Byte)		
Untitled Project									
Parameter									
System Parameter/CPU Parameter						2017/11/20 15:18:00	Not Calculated		
Module Parameter						2017/11/20 15:36:59	Not Calculated		
Memory Card Parameter						2017/11/20 15:18:00	Not Calculated		
Remote Password						2017/11/20 15:18:00	Not Calculated		
😑 🏦 Global Label									
Global Label Setting						2017/11/20 15:18:01	Not Calculated		
😑 🔚 Program				Detail					
MAIN	<b>V</b>					2017/11/20 15:18:01	Not Calculated		
😑 🙆 Device Memory									
MATN .				Detail		2017/11/20 15:18:01	-	-	

#### Restarting the programmable controller

After writing the parameters and program, reset the programmable controller to RUN.

# 3.5 Checking Operations

Check the operation by controlling the vision sensor using the programmable controller.

#### Making the vision sensor online

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



O Check that the operating status is "Online".

### Enabling a trigger on the vision sensor

Enable a trigger on the vision sensor to acquire the inspection results.

1. Display device values.

1 [Device/Buffer Me	emory E	atch	n Mo	nito	r1																×
Oevice <u>N</u> ame	MO								,	-	)					Detai <u>l</u> ed C	onditions	*	Sto	opping	٦
) Buffer <u>M</u> emory	<u>U</u> nit									-	()	łΕΧ	0	<u>A</u> ddress			UEC	3	<u>S</u> tart I	Monitoring	D
Device Name F	ED	в	A	9 8	7	6	5	4	3	2	1	0		Ourren	t Value			String			*
																					_
J													-				-				Ψ.

Select [Online] ⇒ [Monitor] ⇒
 Device/Buffer Memory Batch Monitor]
 vith an engineering tool.
 The "Device/Buffer Memory Batch
 Monitor" window appears.
 Enter "M0" for "Device Name".

3 Click the [Start Monitoring] button.

#### 2. Make the vision sensor online.

1 [Device/Buffer Me	emory Batch	Monitor] Monitor	ing			×	Req
Oevice <u>N</u> ame	MO		•		Detai <u>l</u> ed Conditions 😵	Monitoring	
⊚ Buffer <u>M</u> emory	<u>U</u> nit		→ (HEX)	<u>A</u> ddress	The DEC T	Stop Monitoring	
Device Name 9	8 7 6 5	4 3 2 1 0 0					
MO	0000	0 0 0 C 🚺					
M10 C	0 0 0 0	0000				-	

**1** Turn "M0" ON to turn 'Online Request' (Y12) ON.

### **3.** Trigger a device.

1 [Device/Buffer Me	emory Batch Mor	nitor] Monitoring				×	
Oevice <u>N</u> ame	M0	T		Detailed Conditions	8	Monitoring	
⊚ Buffer <u>M</u> emory	<u>U</u> nit		<u>A</u> ddress	The DEC	-	<u>S</u> top Monitoring	
Device Name 9	876543	3 2 1 0					
MO C	0 0 0 0 0 0						
M10 C						Ψ.	

Turn "M1" ON to turn 'Trigger' (Y10)

### Checking inspection results

Check the inspection results.

#### **1.** Check the inspection results.

1 [Device/Buffer Mem	ory Batch Mo	nitor] Monitoring					×
Oevice <u>N</u> ame	M0	•	]		Detailed Conditions	8	Monitoring
⊚ Buffer <u>M</u> emory	<u>U</u> nit		(HEX)	Address	▼ DEC	-	Stop Monitoring
Device Name 9	8 7 6 5 4	3 2 1 0					*
M0 0	0 0 0 0	0 0 111 1					
M10 0	0 0 0 0						•

• Check the following information.

- 'Pattern\_1.Pass' (M10): This bit turns ON when the set inspection target is detected in the captured image.
- 'Pattern\_1.Fail' (M11): This bit turns ON when the set inspection target is not detected in the captured image.

# 3.6 Using CIO-MICRO I/O module

An IP address needs to be set to use a CIO-MICRO I/O module.

OK <u>C</u>ance

This section shows the procedure to set an IP address to a CIO-MICRO I/O module.

Point Point For the vision sensors that can be connected to a CIO-MICRO I/O module, refer to the user's manuals of vision sensors.

1. Set inputs and outputs (I/O connection).



- Oclick the [Inputs/Outputs] button.
- Olick the [I/O Module] button.
- 3 Set items as follows.
- Select I/O Module: CIO-Micro
- Connect To: cioMicro\_xxxxxx
- Ø Select the [Change Settings] button.

15	I/O Module Net	vork Settings ×	
	<u>H</u> ost Name:	cio Micro_xxxxxx	
	Use DHCP Se	wer 🚺	
	IP Address:	192.168.3.4	
	<u>S</u> ubnet Mask:	255,255,255,0	
	Default <u>G</u> atewa	r 192 , 168 , 3 , 254	
	DNS Server:	192 . 168 . 3 . 254	
	D <u>o</u> main Name:		
	DHCP <u>Timeout</u> :	60	
	9	<u>OK</u> <u>C</u> ancel	
		<b>—</b>	
5	I/O Module Configu	ration	×
	Salact I/O Madula		
	CIO-Micro	-	
	Connect <u>T</u> o:		
	cioMicro_xxxxxx	-	
	<u>U</u> pdate Time (ms):	20	
	- Details		
	IP Address:	192.168.3.4	
	Serial Number:	<u>Change Settings</u> K72071903	
	Firmware Version:	1.3.1 (90)	
		U	
		ОК	<u>C</u> ancel

#### 3. Select the I/O module.

In-Sight Explorer - admin - [VS80M-400-R_5	5a8aa - VS80M-400	-R - EasyBuilder View]								- • ×
<u>File E</u> dit <u>V</u> iew I <u>m</u> age <u>S</u> ensor System <u>V</u>	<u>Vindow</u> <u>H</u> elp									
🗋 🎯 🗟 🖉 🖾 🗶 🖻 🖾 🗙 🕨	9 @ · : N <	k 🕨 🕅 🖉 🛅	0 47 - 0, 0, 0		2 🔣 🔜 🖂 🖄	😳 💑 🏜 🛎 🙂				
Application Steps 1 Start Cet Connected Set Up Image 2 Set Up Trads Coate Part 3 Contigues Results M Trads / Odaputs Communication 4 Finish Finish Run Job	PC Sensor	MTTSLAM Gertalin Waster Waster Waster Waster On an American	MELSEA 14 00 AL 15 00 AL 10 NUT 17 AL 11 AZ 10 AL 11 A	÷0 111 €			Palet He	te p Results UO Test Manne P Patern_1 u e: 0.0ms	Run**	Links Result 0.150.0) -0.1
0	Discusto 140									
Select DO Module	Discrete I/O	Name	Signal Type		Edge Type	Job Result		Force		
De-Energize While Offline	<ul> <li>Output</li> </ul>		Signal Type		cage type					
Module: Direct I/O	Direct 0	HSOUT 0	Job Result			Undefined		None		Details
	Direct 1	HSOUT 1	Job Result	-		Undefined	-	None		Details
	LED 4	Green LED	Job Result	-		Undefined	-	None	-	Details
	LED 5	Red LED	Job Result	-		Undefined	-	None	-	Details
UD Module										

Set items as follows.
IP Address: 192.168.3.4
Subnet Mask: 255.255.255.0
Click the [OK] button.
Click the [OK] button.

• Select the checkbox of [De-Energize While Offline].

# **4** EtherNet/IP CONNECTION

This chapter explains the procedure for connecting a vision sensor VS20 to a programmable controller and controlling the vision sensor with an EtherNet/IP connection.

# 4.1 System Configuration Example for Connecting a Vision Sensor

The following figure shows the system configuration for connecting a vision sensor.



## Configurations

The devices used in the system configuration are as follows.

#### **Required equipment**

#### Mitsubishi Electric products



\*1 Download this product from the Mitsubishi Electric FA website. www.MitsubishiElectric.co.jp/fa

#### COGNEX products

	COGNEX In-Sight Explorer for MELSENSOR Vision		
EDS file • EDS file for a vision sensor <sup>*1</sup>	Vision sensor setup tool • In-Sight Explorer <sup>*1</sup>	Ethernet cable	Breakout cable

\*1 Download this product from the Mitsubishi Electric FA website. www.MitsubishiElectric.co.jp/fa

#### Commercial products

		in the second se	
Switching hub	Ethernet cable	USB cable (Type Mini-B)	24 VDC power supply



For available devices for the system configuration, refer to the user's manual of the vision sensor used.

## Connection and wiring of a vision sensor

This section shows the procedure for connecting and wiring a vision sensor.

#### Operating procedure

- 1. Check that the 24 VDC power supply is OFF.
- 2. Connect an I/O wire or a serial wire of a breakout cable to an appropriate device (such as a programmable controller).
- **3.** Connect the 24 VDC (red wire) and GND (black wire) of a breakout cable to the corresponding terminals on the power supply.
- 4. Connect the M12 connector of the breakout cable to the Power, I/O and RS-232 connector of the vision sensor.
- 5. Connect the Ethernet cable's M12 connector to the vision sensor's Ethernet connector.
- 6. Turn ON the 24 VDC power supply.

#### Precautions

- When connecting a vision sensor and a programmable controller, simultaneously turn ON the power of the vision sensor and programmable controller, or first turn ON the power of the programmable controller.
- Cut unused wires or protect them with insulating materials. Be careful not to short-circuit with 24 VDC wires.
- The cable is designed to connect with its key aligned with the keyway of the connector on the Vision Sensor. Do not force the connections or damage may occur.

Point *P* 

For details on the connection with a vision sensor, refer to the user's manual of the vision sensor used.

# **4.2** Basic Operations for an EtherNet/IP Connection

### Overview

An EtherNet/IP connection uses the following object model.

The Vision Object included in this object model enables to use data such as a trigger, status, and result.



\*1 For details, refer to the following:

□ Page 97 Input/Output Assemblies used for cyclic (Implicit) communications The Vision Object consists of attributes (data) and services (functions).

For details on attributes and services, refer to the help of vision sensor setup tool.

#### **Communication methods**

An EtherNet/IP connection has two types of the communication methods: cyclic (Implicit) communications and message (Explicit) communications.

#### Cyclic (Implicit) communications

Cyclic (Implicit) communications are the method where data communications are periodically performed with the set interval by using the Assembly Object.

Some attributes of the Vision Object are exposed in the Assembly Object.

#### Message (Explicit) communications

Message (Explicit) communications are the method where a message is sent to a specific device (vision sensor) when desired, and the device (vision sensor) that received the message sends a response.

Attributes can be accessed by using the services of the Vision Object via message (Explicit) communications.



An EtherNet/IP network interface module (RJ71EIP91) is used for an EtherNet/IP connection between a programmable controller and a vision sensor.

For details on an RJ71EIP91, refer to the following:

MELSEC iQ-R EtherNet/IP Network Interface Module User's Manual (Startup)

## Basic operation process for cyclic (Implicit) communications

The Class 1 instance communications function of an EtherNet/IP network interface module (RJ71EIP91) is used for cyclic (Implicit) communications.

Cyclic (Implicit) communications perform data communications periodically with the Requested Packet Interval (hereafter abbreviated as RPI) set in an RJ71EIP91, and the specified buffer memory is updated.

Data communications are performed between the originator (RJ71EIP91) that sends the connection request and the target (vision sensor) that receives the connection request.

In addition, defined Input/Output Assemblies are used to transmit data.

Cyclic (Implicit) communications establish a connection between an RJ71EIP91 and a vision sensor; therefore, it is suitable for receiving measured data from inspection tools and for detecting an error early.





(1): Turn ON 'EtherNet/IP communication start request' (Y10).

- (2): Connection open
- (3): Response (normal)
- (4): Store data in the buffer memory at the RPI interval.
- (5): Acquire the stored data.
- (6): Store data in the buffer memory.
- (7): Send the data of the buffer memory at the RPI interval.

# Input/Output Assemblies used for cyclic (Implicit) communications

The Assembly Object is used for cyclic (Implicit) communications.

For details on each assembly data, refer to the help of vision sensor setup tool.

#### Precautions

Do not change the value of the '(Reserved)' area in the Input/Output Assemblies. Doing so may cause an unexpected error.

#### Input Assembly

The Input Assembly is input signals for a programmable controller to acquire the status of a vision sensor. The instance 13 of the Input Assembly contains status information and inspection results.

#### Input Assembly list

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0				
13	0	Online	Offline Reason	Offline Reason     Missed Acq     (Reserved)     Trigger Ack     Trigger Read									
	1	Error	Command Failed	Command Completed	Command Executing	Results Valid	Results Buffer Overrun	Inspection Completed	System Busy				
	2	(Reserved)	(Reserved)	(Reserved)	Job Pass	Exposure Complete	(Reserved)	(Reserved)	Set User Data Ack				
	3	SoftEvent Ack 7	SoftEvent Ack 6	SoftEvent Ack 5	SoftEvent Ack 4	SoftEvent Ack 3	SoftEvent Ack 2	SoftEvent Ack 1	SoftEvent Ack 0				
	4	Error Code (16	Error Code (16-bit integer)										
	5												
	6	(Reserved)											
	7												
	8	Current Job ID (16-bit integer)											
	9												
	10	Acquisition ID (16-bit integer)											
	11												
	12	Inspection ID (	16-bit integer)										
	13												
	14	Inspection Res	ult Code (16-bit	integer)									
	15												
	16	Inspection Res	ults 0										
	to	to											
	499	Inspection Res	ults 483										

	Details	on	the	Input	Assembly	
--	---------	----	-----	-------	----------	--

Byte	Bit	Data name	Description (Application)			
0	0	Trigger Ready	<ul><li>This bit turns ON when 'Trigger Enable' is set and an image capturing trigger can be received.</li><li>ON: An image capturing trigger can be received.</li><li>OFF: An image capturing trigger cannot be received.</li></ul>			
	1	Trigger Ack	<ul> <li>This bit shows that a vision sensor recognizes 'Trigger' is ON, and an image capturing trigger is received.</li> <li>Until 'Trigger' is turned OFF, the ON state for this bit is retained.</li> <li>ON: An image capturing trigger is received.</li> <li>OFF: —</li> </ul>			
	2	(Reserved)	-			
	3	Missed Acq	<ul> <li>This bit shows that image capturing is failed.</li> <li>This bit is turned OFF if the next image capturing is succeeded.</li> <li>ON: Image capturing is failed.</li> <li>OFF: —</li> </ul>			
	4	Offline Reason	This bit shows the cause of a vision sensor being offline by three bits.			
	5		<ul> <li>0: Online</li> <li>1: Job is being edited</li> </ul>			
	6		<ul> <li>2: Offline is set by a discrete signal.</li> <li>3: Offline is set by a predefined protocol.</li> </ul>			
	7	Online	This bit shows the online/offline status. When a vision sensor is offline, the reason is shown in the 'Offline Reason' field. • ON: Online • OFF: Offline			
1	0	System Busy	<ul> <li>This bit shows that a vision sensor is executing or loading a job, or responding to user inputs.</li> <li>ON: System busy</li> <li>OFF: —</li> </ul>			
	1	Inspection Completed	This bit is inverted every time when an inspection is completed and a series of inspection results ('Inspection ID,' 'Inspection Result Code,' 'Inspection Results,' and 'Job Pass') is sent to a programmable controller.			
	2	Results Buffer Overrun	This bit shows that a vision sensor discards a series of read results after the buffer for read results becomes full. When the next read results are stored in the buffer queue properly, this bit is turned OFF. Only when 'Buffer Results Enable' is enabled, this bit is enabled. • ON: Read results are discarded. • OFF: —			
	3	Results Valid	This bit shows that a series of inspection results is available ('Inspection ID,' 'Inspection Result Code,' 'Inspection Results,' and 'Job Pass' fields contain valid data). Until 'Inspection Results Ack' responds, this bit remains ON. • ON: With new read results • OFF: Without new read results			
	4	Command Executing	This bit shows that job load is executed.  • ON: Job load is being executed.  • OFF: —			
	5	Command Completed	<ul> <li>This bit is turned ON when job load is completed.</li> <li>When a job load command is not completed properly, 'Command Failed' is also turned ON.</li> <li>ON: Job load is completed.</li> <li>OFF: —</li> </ul>			
	6	Command Failed	<ul> <li>This bit is turned ON when job load is not completed properly.</li> <li>It is turned OFF when a new job is loaded by a programmable controller.</li> <li>When changing a job by using the vision sensor setup tool, this bit is not changed.</li> <li>ON: Job load is failed.</li> <li>OFF: —</li> </ul>			
	7	Error	This bit is turned ON when an error occurred. • ON: Error occurred. • OFF: —			

Byte	Bit	Data name	Description (Application)					
2	0	Set User Data Ack	<ul> <li>This bit is turned ON when 'Set User Data' command execution is completed.</li> <li>ON: 'Set User Data' command execution is completed.</li> <li>OFF: —</li> </ul>					
	1	(Reserved)	_					
	2	(Reserved)	-					
	3	Exposure Complete	This bit is turned ON when an exposure for a vision sensor is completed. It is turned OFF by 'Clear Exposure Complete.' When 'Clear Exposure Complete' is set to ON, the OFF state of this bit is retained. • ON: Exposure is completed. • OFF: —					
	4	Job Pass	This bit is turned ON when the latest job is passed. It is turned OFF when a job is failed. • ON: Inspection result is passed. • OFF: —					
	5	(Reserved)	-					
	6	(Reserved)	-					
	7	(Reserved)	-					
3	0	Soft Event Ack	This bit shows that a vision sensor received a soft event command.					
	1							
	2							
	3							
	4							
	5							
	6							
	7							
Byte	Data nam	10	Description (Application)					
4	Error Code	(16-bit integer)	This shows an error occurred in 16-bit integer.					
5			<ul> <li>0x0000: No error</li> <li>0x0100: An image capturing trigger is generated when the image capturing trigger is disabled.</li> <li>0x0101: An image capturing trigger is generated when a vision sensor is offline.</li> <li>0x0400: Another command execution command is generated when a command is being executed.</li> <li>0x0401: Job load is requested when a vision sensor is online.</li> <li>0x0402: Job ID that does not exist is specified in the 'Command' field for the execution.</li> </ul>					
6	(Reserved)	)	_					
7								
8	Current Jol	b ID (16-bit integer)	Job ID of a job being executed is stored.					
9	1		If no job ID is specified for the job, '65535 (0xFFFF)' is stored.					
10	Acquisition	ID (16-bit integer)	Image capturing ID associated with the image capturing is stored.					
11	1		This can be used to synchronize image capturing and inspection results.					
12	Inspection	ID (16-bit integer)	Inspection ID associated with a series of inspection results ('Inspection ID,' 'Inspection Result Code,'					
13			'Inspection Results,' and 'Job Pass') is stored.					
14	Inspection	Result Code (16-bit	Any inspection result code specified for "Result code" of the WriteResultsBuffer function in the vision					
15	integer)		sensor setup tool (spreadsheet) is stored.					
16	Inspection	Results 0	The data defined in the [Format Output Data] tab of a communication setting with the vision sensor setup					
to	to		tool is stored.					
499	Inspection Results 483							

#### Output Assembly

The Output Assembly is output signals for a programmable controller to control a vision sensor.

The instance 22 of the Output Assembly contains control signals, software event signals, and any user data required for the trigger and inspection.

#### Output Assembly list

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
22	0	Set Offline	(Reserved)		Execute Command	Inspection Results Ack	Buffer Results Enable	Trigger	Trigger Enable	
	1	(Reserved)								
	2	(Reserved)				Clear Exposure Complete	Clear Error	(Reserved)	Set User Data	
	3	SoftEvent 7	SoftEvent 6	SoftEvent 5	SoftEvent 4	SoftEvent 3	SoftEvent 2	SoftEvent 1	SoftEvent 0	
	4	Command								
	5									
	6	(Reserved)								
	7									
	8	User Data 0								
	to	to								
	495	User Data 487								

#### Details on the Output Assembly

Byte	Bit	Data name	Description (Application)
0	0	Trigger Enable	To enable an image capturing trigger by 'Trigger.' • ON: An image capturing trigger is enabled. • OFF: An image capturing trigger is disabled.
	1	Trigger	To start (trigger) image capturing. • ON: Image capturing is started. • OFF: — The following conditions must be satisfied to start image capturing properly: • "Industrial Ethernet" is selected in the [Set Up Image] ⇔ [Trigger] tab in the vision sensor setup tool. (ﷺ Page 105 Creating a new job) • The vision sensor is online. • 'Trigger Enable' and 'Trigger Ready' are turned ON.
	2	Buffer Results Enable	To enable the buffer for read results. New read results are stored in the buffer queue of a vision sensor. To acquire the next read results, turn ON 'Inspection Results Ack'. • ON: The buffer for read results is enabled. • OFF: The buffer for read results is disabled.
	3	Inspection Results Ack	To respond to receiving the latest read results. A vision sensor turns 'Results Valid' OFF when recognizing that this bit turns ON. If 'Buffer Results Enable' is turned ON, the next read results are read out from the buffer queue when receiving a response. • ON: Read results are received. • OFF: —
	4	Execute Command	To load a job of the job ID specified to 'Command.' Until 'Command Completed' is turned ON, the ON state for this bit must be retained. • ON: Job load is executed. • OFF: — The following conditions must be satisfied to start job load properly: • A vision sensor is set to offline by 'Set Offline.' • A job of the job ID specified to 'Command' exists.
	5	(Reserved)	-
	6	(Reserved)	-
	7	Set Offline	To make a vision sensor offline while this bit is ON. • ON: A vision sensor is set to offline. • OFF: —

Byte	Bit	Data name	Description (Application)						
1	0	(Reserved)	-						
	1								
	2								
	3								
	4								
	5								
	6								
	7								
2	0	Set User Data	To notify a vision sensor that the 'User Data' field was updated. A vision sensor updates data defined in the [Format Input Data] tab of a communication setting with the vision sensor setup tool when this bit is turned ON. • ON: 'User Data' field update is notified. • OFF: —						
	1	(Reserved)	-						
	2	Clear Error	To clear an error and error code signal. When multiple errors occur, the next error and error code are set by turning this bit OFF. ON: Error clear is executed. OFF: —						
	3	Clear Exposure Complete	To turn 'Exposure Complete' OFF. 'Exposure Complete' does not turn ON while this bit is ON. • ON: Exposure completion is cleared. • OFF: —						
	4	(Reserved)	-						
	5	(Reserved)	—						
	6	(Reserved)	—						
	7	(Reserved)	-						
3	0	SoftEvent	To enable a soft event trigger in a spreadsheet.						
	1		A related software event in a spreadsheet is executed by turning this bit ON.						
	2	_							
	3	_							
	4								
	5	-							
	6	-							
	7								
Byte	Data nam	ne	Description (Application)						
4	Command		To specify job IDs (0 to 999).						
5									
6	(Reserved)	)	-						
7									
8	User Data	0	Data buffer to transfer data from a programmable controller to a vision sensor.						
to	to		This can be used for the following application:						
495	User Data 487		To update the data defined in the [Format Input Data] tab of a communication setting with the vision sensor setup tool: Store data to be updated in the data format defined in the [Format Input Data] tab						

## Basic operation process for message (Explicit) communications

The client function of UCMM message communications of an EtherNet/IP network interface module (RJ71EIP91) is used for message (Explicit) communications.

Message (Explicit) communications send a message to a vision sensor, and the vision sensor that received the message sends a response.

Unlike cyclic (Implicit) communications, data communications are performed without establishing a connection between an RJ71EIP91 and a vision sensor; therefore, it is suitable for operations that are not frequently performed.



- (1): Turn ON 'EtherNet/IP communication start request' (Y10).
- (2): Store data in the buffer memory.
- (3): Command request
- (4): Command processing execution
- (5): Command response
- (6): Acquire the stored data.

# 4.3 Setting the Vision Sensor

Start the vision sensor setup tool to set the vision sensor.

#### Setting an IP address to a personal computer

Set the IP address (192.168.3.3) to a personal computer.

#### Connecting the vision sensor

Start the vision sensor setup tool to set the vision sensor.

**1.** Start the vision sensor setup tool.



2. Add the vision sensor to the network.



O Click the [Add] button.

• Add the vision sensor to the network.

- IP Address: 192.168.3.1
- Subnet Mask: 255.255.255.0
- Click the [Apply] button.

#### **3.** Connect to the vision sensor.



• Click the [Connect] button to connect to the vision sensor.

#### Creating a new job

As an example, set a CE mark for inspection target.

**1.** Create a new job.

🖸 In-Sight Explorer - admin - IVS20M-13F410 xxxx - VS20M-13F410 - EasyBuilder Viewi 💶 🔍 🗙	Click the [New Job] button.
Ble Edit <u>Urev</u> Image Sensor System Window Help	
E B B B B X Ø C I ∰ B X Ø C I ∰ B X Ø E B Ø B Ø B Ø C I O Ø ■ Q Q Q Q G U ,	
Application Steps         3 Saft         Set Up Image         2. Set Up Image         2. Set Up Tools         Compute Results         Spects / Oddputs         Production Steps         Set of Tools         Communication         4. Final         Production Steps         Set of Tools         Communication         4. Final         Production Steps         Set of Tools         Communication         4. Final         Product Steps Connection         Set of InD Sight Sensor or Emulator         Connect of the VS20M-13410_xxxx         Model Tome         VS20M-13410_xxxx         Decomet         Open Job         Final         Add         Emulator	

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



- Click the [Set Up Image] button.
- Select the [Trigger] tab.
- 3 Select "Industrial Ethernet."

Click the [Live Video] button to adjust the image. After adjusting the image, click the [Live Video] button again.

#### 3. Set a tool.



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



- O Click the [Locate Part] button.
- 2 Select "Pattern."3 Click the [Add] button.

- Set a model. (CE mark is selected.)
- Olick the [OK] button.
- Ocheck that Name is "Pattern\_1."
### Configuring a communication setting

1. Configure the communication setting (EtherNet/IP).



- O Click the [Communication] button.
- Olick the [Add Device] button.

#### 2. Add the EtherNet/IP.



O Configure a device setting.

- Device: Other
- Protocol: EtherNet/IP
- Olick the [OK] button.

When the message "Protocol Service Change Required" appears, click the [OK] button.



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### Outputting to the programmable controller

- As an example, set PASS, FAIL, and the number of inspections to the output data.
- **1.** Set data to be output from the vision sensor to the programmable controller.
- Communications
   Format In ()
   Format Output Data ()

   FTP
   File
   Data Type
   Size
   Value
   Data ()

   EthenNet/IP
   Add Device
   Image: Communication ()
   Image:
- 2. Select the data to be output to the programmable controller.



3. The output result to the programmable controller is displayed.



- **1** Output data to the programmable controller
- Message size (bytes): 6
- O The order to output can be changed by using the [Up] and [Down] buttons. As an example, sort as above.
- Pattern\_1.Pass
- Pattern\_1.Fail
- Job.Inspection\_Count

Select the following data.

Select the [Format Output Data] tab.

Olick the [Add] button.

- Pattern\_1.Pass
- Pattern\_1.Fail
- Job.Inspection\_CountClick the [OK] button.

### Saving the job

1. Name the created job.



**2.** Enter a file name and save the job.

Enter an arbitrary file name.
 Click the [Save] button.

O Click the [Save Job] button.

Olick the [Save As] button.



Point P

The running job can be changed (loaded) to another job by prefixing a numeric value to a file name. For the procedure to change jobs, refer to the following section.

 $\boxtimes$  Page 135 Changing jobs (loading another job)

### **3.** Set startup options for the vision sensor.



O Click the [...] button under "Job."

Select the checkbox of "Load Job on Startup."

Select the file name saved in step 2.

Select the checkbox of "Start the

Sensor in Online Mode."

G Click the [OK] button.

### Restarting the vision sensor

Turn the power of the vision sensor OFF and ON to restart.

## 4.4 Setting a Programmable Controller

Set parameters of a programmable controller and create a program in an engineering tool.

### Setting a programmable controller

Set parameters of a programmable controller.

- **1.** Start an engineering tool.
- 2. Select a CPU module and a program language in the "New" screen.

New		×
Series 2	📲 RCPU 🗸 🗸	)
<u>T</u> ype	12 R08 ~	
Mode	~	
Program Language	🚯 Ladder 🛛 🗸 🗸	J
	Cancel	
	Ļ	
MELSOFT GX Works3		
Add a module. [Module Nam [Start I/O No	e] R08CPU .] 3E00	
Module Setting	Setting Change	
Module Label:Not use Sample Comment:Use	^	
	×	
Do Not Show this Dialog Age	ain OK	

3. Add a network module in the "Add New Module" screen.





• Right-click "Module Information" in the "Navigation" window, and select [Add New Module] in the shortcut menu.

2 Set the items in "Module Selection."

- Module Type: Network Module
- Module Name: RJ71EIP91
- Mounting Slot No.: 0

 Start I/O No. Specification: Not Set If "RJ71EIP91" is not in the pull-down list of "Module Name," install EtherNet/ IP Configuration Tool for RJ71EIP91 before setting a programmable controller.

Click the [OK] button.

4

### 4. Set to use module labels.

Save Revision

MELSOFT GX Works3 Add a module. [Module Name] [Start I/O No.]	RJ71EIP91 0000
Module Setting	Setting Change
Module Label:Not use Sample Comment:Use	↓
Do Not Show this Dialog Agair	OK
Options	
THE Project	Operation Setting

0(

Message

Read Sample Comment

2 Select "Yes" for "Use Module Label."3 Click the [OK] button.

Reference/Reflection Target	Show the confirmation message in adding module Yes	-
Add New Module		
Navigation		
Element Selection		
🔁 Program Editor		
😰 Other Editor		
🔏 Edit		
Hind/Replace	Use Module Label	
🎒 Parameter	Select whether to add the module label in adding module.	
R Monitor	[Caution]	
Soline	Please set other than module labels as refresh destination for module parameter to use the	he
R Convert	label of direct access in program. If module labels are selected as refresh destination, the value which has been set to label	lof
♣q Intelligent Function Module	direct access is overwritten in refreshing with the value of label for Auto-refresh.	
Simulation 🗸		
·		
	Import Export	
Back to Default Back to User D	Default Set as User Default OK Cancel	

Yes Yes

Add a module. [Module Name] RJ7 [Start I/O No.] 000	1EIP91 0
Module Setting Module Label:Use Sample Comment:Use	Setting Change
	~

Olick the [OK] button.

O Click the [Setting Change] button.

**5.** Set module parameters of the network module.



Double-click the module name (RJ71EIP91) in the "Navigation" window.

Select "Basic Setting," and set "Mode Settings," "IP Address," and "Subnet Mask."

- Mode Settings: Online
- IP Address: 192.168.3.60
- Subnet Mask: 255.255.255.0

MELSOFT GX Works3 (Untitled Pro - 8 × Project Edit Find/Replace Con vert <u>V</u>iew <u>O</u>nline De<u>b</u>ug <u>R</u>ecording <u>D</u>iagnostics <u>T</u>ool <u>W</u>indow <u>H</u>elp 1 🗅 📂 💾 🎒 😏 🖉 🚯 ProgPou [PRG] [LD] 2Step 👔 0000:RJ71EIP91 Module Parat ProgPou [PRG] [Local Label Set. 🖳 🔅 🗁 📲 -Project ng Item to S 👫 FB/FUN 0 ng Value - F 0 💼 Label 🔮 Device Blo - Application Setting 🙉 Paramete R08CPU Set whether 'Enable' or 'Disable' of the input/output data assurance per connection unit in Class 1 communication. When 'Enable' is set and FB(Class1GetInputData, Class1SetOutputData) is used, the data inconsistency is prevented Restore the Default Settings Check m List Find Result 🚰 Conne... 🍍 Naviga.

Select "Application Setting," and select "Enable" for "Block assurance per connection."

#### Precautions

When selecting "Disable" for "Block assurance per connection," data inconsistency may occur.

To prevent data inconsistency, use the following module FBs and select "Enable" for "Block assurance per connection."

- M+RJ71EIP91\_Class1GetInputData
- M+RJ71EIP91\_Class1SetOutputData

For details on the module FB, refer to the following:

MELSEC iQ-R EtherNet/IP Network Interface Module Function Block Reference

### Point P

The "Block assurance per connection" setting in the module parameter is not available for FX5-ENET/IP. '16: Perform data assurance' must be written in 'Block assurance specification per connection' (Un\G5000) of the buffer memory.

For details, refer to the following:

MELSEC iQ-F FX5-ENET/IP User's Manual

## Writing parameters

Write the set parameters to a programmable controller. ( 🖙 Page 129 Writing to the programmable controller)

# Configuring communication settings in EtherNet/IP Configuration Tool

For cyclic (Implicit) communications, use EtherNet/IP Configuration Tool to set the EtherNet/IP network configuration and the trigger type, RPI, etc. for each connection in an EtherNet/IP network interface module (RJ71EIP91).

Point P

For details on EtherNet/IP Configuration Tool, refer to the following:

### Communication settings for an EtherNet/IP connection

- 1. Start EtherNet/IP Configuration Tool.
- 2. Enter an IP address.

Add	New Eleme	nt		$\times$
Ele	ement 1:			
Г	Select the Ele	ement to Add:		
	Туре	Description		
	RJ71EIP91	MELSEC iQ-R Se	ries EtherNet/IP module	
		IP Address:	192 . 168 . 3 . 60	
			OK <u>C</u> ancel Help	

# • In the "Add New Element" window, enter the IP address (192.168.3.60) that is set for an RJ71EIP91 in an engineering tool.

**3.** Add an EDS file.



⑦ Select [Library] ⇒ [Add].
 The "EDS Management" screen appears.

EDS Management	×
This Wizard allows you to add EDS files.	
< Bac 2 Nex	xt > Cancel Help

management		
Select the Location of the	e EDS File(s) :	
O Add File	s)	
Add all the second s	ne EDS from the Directory	Look in Subfolders
Directory or File Name :		Browse
C:\Users\fattership	nloads\VS20_v12	
The EDS files usable in Elf and click on Next button to	P-CT are registered in the EDS insert the EDS files in the ba	S base. Select the location of the file(s se.

Product Name	Status	Major Revision	Minor Revision	Vendor
✓ VS20 Series Revision 11.1	Correctly added.	11	1	Cognex
<				>

Olick the [Next] button.

O Click the [Browse] button and specify a necessary EDS file.O Click the [Next] button.

G Check that the EDS file is added properly and click the [Next] button.



4. Add a vision sensor in the network configuration setting.



6 Click the [Finish] button.

4

• In the [Device Library] tab, right-click a vision sensor under the tree of "EtherNet/IP Devices," and select [Insert in Configuration] from the shortcut menu.

Device Designation	n			
berice besignation				
Device Name :	DEVICE-A		Active Config	guration : 🗹
Number :	001 V	k Parameters		
Comment :				$\hat{}$
				*
Network Propertie	s			1
0	Name Value	Unit		
0	I Address Tophod	000/001		
Description :	IP address of the partne	r device.		^
				>
Ping				
Ping	Ping Result			
Loop				
Stop on Error				
Clear				
Series Revision 11.1		QK	<u>C</u> ancel	<u>H</u> elp
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**②** In the [General] tab, set the connection number and IP address of the device.

- Number: 001
- IP Address: 192.168.3.1 (IP address of the vision sensor)

Select the [Connections] tab to set Class 1 instance communications.

- Select "General," and set parameters as follows:
- Input Size: 100 bytes
- Input Mode: Point to Point
- Request Packet Interval (RPI): 10 ms
- Output Size: 100 bytes
- Output Mode: Point to Point
- Request Packet Interval (RPI): 10 ms

Set the packet size to be larger than the input/output data size. **③** Click the [OK] button.

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check that the vision sensor is added in the network iguration setting.

4

Click 🚇 (Online command.) on the command bar. Click 😤 (Download the current configuration in the module.) he command bar.

Select the checkbox of "configuration.apa" of "File to Download."

Olick the [Download] button.

Ethernet: auto negotiation					
EtherNet/IP Configuration T	ool for RJ71ElP91	×			
Target Parameters					
IP Address :	192 . 168 . 3 . 60				
User Name :	MELSEC				
Password :	RJ71EIP91				
FTP Path :	/				
File to Download :	EipConfData.BIN				
8 🖂	configuration.apa				
Download	Cancel				

Precautions

Settings that are written to an EtherNet/IP network interface module (RJ71EIP91) in EtherNet/IP Configuration Tool are applied at either of the following timings:

- 'EtherNet/IP communication start request' (Y10) is turned from OFF to ON.
- An execution command of a module FB is turned from OFF to ON.

### Creating a program

The following shows the procedure to create a program.

- Page 120 Creating a program for cyclic (Implicit) communications
- Page 125 Creating a program for message (Explicit) communications

### Creating a program for cyclic (Implicit) communications

Create a program for controlling a vision sensor via cyclic (Implicit) communications.

#### Devices used in the program

Device	Device name	Description
M0	Image Capturing Trigger Enable command	'Trigger Enable' (D1000.0) is turned ON and an image capturing trigger is enabled.
M1	Image Capturing Trigger command	'Trigger' (D1000.1) is turned ON and an image is captured when this device is turned ON.
M10	ID storage area initialization completion	Initializing the storage area for the ID is completed.
M11	Inspection Completed	Inspection is completed.
M12	Inspection ID acquisition completion	Acquiring the latest inspection ID is completed.
M100	Input execution command	Processing for acquiring input data is performed when this device is turned ON.
M110	Input execution status	The execution status of processing for acquiring input data is output. • ON: Execution in progress • OFF: Not executed
M111	Output execution status	The execution status of processing for setting output data is output. • ON: Execution in progress • OFF: Not executed
M120	Input normal completion	Processing for acquiring input data is normally completed if this device is ON.
M121	Output normal completion	Processing for setting output data is normally completed if this device is ON.
M130	Input error completion	Processing for acquiring input data is completed with an error if this device is ON.
M131	Output error completion	Processing for setting output data is completed with an error if this device is ON.
M132	Communication error detection	A communication error is detected if this device is ON.
M200	Communication stop command	Communication is stopped when this device is turned ON.
D100	Image capturing ID storage area	The image capturing ID used for verification is stored temporarily.
D101	Inspection ID storage area	The inspection ID used for verification is stored temporarily.
D102	Inspection result of "Pattern_1" (Pass)	The inspection result of "Pattern_1" (Pass) is stored.
D103	Inspection result of "Pattern_1" (Fail)	The inspection result of "Pattern_1" (Fail) is stored.
D104	Job.Inspection_Count	The job inspection count is stored.
D1000.0	Trigger Enable	An image capturing trigger is enabled while this device is ON.
D1000.1	Trigger	An image is captured when this device is turned ON.
D1050.0	Trigger Ready	<ul> <li>The reception availability status of an image capturing trigger is stored.</li> <li>ON: An image capturing trigger is enabled.</li> <li>OFF: An image capturing trigger is disabled.</li> </ul>
D1050.1	Trigger Ack	The reception status of an image capturing trigger is stored. • ON: With an image capturing trigger • OFF: Without an image capturing trigger
D1050.7	Online	The online status of a vision sensor is stored. • ON: Online • OFF: Offline
D1050.9	Inspection Completed	The status of this device is inverted every time when an inspection of a vision sensor is completed and the result is sent to a programmable controller.
D900	Input error code	An error code is stored when processing for acquiring input data is completed with an error.
D905	Input connection communication error code	An error code is stored when a connection communication error occurs (when 200H is stored in 'Input error code' (D900)).
D910	Output error code	An error code is stored when processing for setting output data is completed with an error.
D915	Output connection communication error code	An error code is stored when a connection communication error occurs (when 200H is stored in 'Output error code' (D910)).
D999	EtherNet/IP connection number	The connection number of a connected device that is set in EtherNet/IP Configuration Tool is stored.

Device	Device name	Description
D1000 to D1049	Output data	Devices in which output data is stored.
D1050 to D1099	Input data	Devices in which input data is stored.

### Module labels used in the program

Module label	Function	Device
EIP91_1	Module label	—
EIP91_1.bSts_ModuleReady	Module Ready	X0
EIP91_1.bSts_CommunicationReady	Communication Ready	X1F
EIP91_1.bSts_CommunicationDuringStartup	EtherNet/IP communication in process	X10
EIP91_1.bSet_CommunicationStartupRequest	EtherNet/IP communication start request	Y10

### ■ Program example

(0)	MO	D1050.7	M200						SET	D1000 <u>.</u> 0
		D1050.0	<u> –</u> и–					 		1/000
(4)								 OUT	1100	K600
		T100							Г	M132
								 	SET	
•		D1050.0	M10						D1055	D100
		I	<i>1</i> 1					 MOV		
								моу	D1056	D101
									SET	M10
		D-1050.0	D.1050.1	B.1000.1						
(24)		01050,0							SET	D1000.1
	D1050.1		D1055	D100					D1055	D100
(29)		⇔_u						 MOV		
		D1050 <u>.</u> 9								M11
		ifi							SET	
		D1050.9								
		< <u>^</u> u	D1056	D101				MOV	D1056	D101
		-								
									SET	M12
	D1050.1	M11	M12		D100	D101			D1058	D102
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									D1059	D103
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									RST	D1000.1
								 		M1
								 	RST	mi
										M11
									RST	
									DOT	M12
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(68)	EIP91_1.bSts_Mod uleReady x0	EIP91_1.bSts_Com municationReady X1F	M200							M100
	├ <u></u>	——————————————————————————————————————	-и-							0
								MOV	K1	D999

						M_RJ71EIP91_Class1GetInputData_	00A_1 (M+RJ71EIP91_Class1GetInputData_00A)			
(74)						Get C	Dass1 input data			
	M100									M110
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									 	M120
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							o_uStatusId :UW	-[ D905 ]-	 	
							o_uInputData :UW	[ D1050 ]		
						M_RJ71EIP91_Class1SetOutputData_	00A_1 (M+RJ71EIP91_Class1SetOutputData_00A)			
(326)						Set Cl	ass1 Output data			
	M120									M111
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					[ D1000 ]	- UW: LuOutputData	o_uErrId :UW	-[ D910 ]-	 	
							o_uStatusld :UW	-[ D915 ]		
	M200	M110	M111	M100	EIP91_1.bSts_Comm unicationDuringStart					EIP91_1.bSet_Communic
(578)					up X10				RST	ationStartupRequest
		<u> </u>	-11-	<u> </u>						Y10
(584)										END
										-, cno ;

(0): Enable an image capturing trigger on the vision sensor.

(24): Request the start of the image capture to the vision sensor. (Turn 'Trigger Enable' (D1000.1) ON.)

(29): Perform the processing for the completion of the image capture of the vision sensor.

(50): Verify the image capturing ID and the inspection ID, and acquire the inspection result.

(68): Check the communication status and turn ON the input execution command.

(74): Acquire input data by using the module FB (M+RJ71EIP91\_Class1GetInputData<sup>\*1</sup>) of an RJ71EIP91.

(326): Set output data by using the module FB (M+RJ71EIP91\_Class1SetOutputData<sup>\*1</sup>) of an RJ71EIP91. (578): Stop communication.

\*1 For details on the module FB, refer to the following:

MELSEC iQ-R EtherNet/IP Network Interface Module Function Block Reference

### Timing chart of cyclic (Implicit) communications

A timing chart when controlling a vision sensor by using a program of the program example via cyclic (Implicit) communications is shown below.

To enable a trigger from a programmable controller, turn ON 'Trigger Enable' (RY0) of the Output Assembly.

When 'Trigger' of the Output Assembly is turned ON while 'Trigger Ready' of the Input Assembly is ON, the status of the vision sensor is output to 'Trigger Ack' and 'Inspection Completed' of the Input Assembly.

The status of 'Inspection Completed' of the Input Assembly is inverted at the completion of inspection.



### Creating a program for message (Explicit) communications

Create a program for acquiring the job file name of a vision sensor via message (Explicit) communications by using native mode commands.

### Devices used in the program

Device	Device name	Description
M0	UCMM data link request command data initialization command	Data of the UCMM data link request command is initialized when this device is turned ON.
M1	Native mode command string initialization command	The string of a native mode command is initialized when this device is turned ON.
M2	UCMM data link request command data store command	Data of the UCMM data link request command is stored when this device is turned ON.
M3	UCMM data link request command execution command	The UCMM data link request command is executed when this device is turned ON.
M10	Communication stop command	UCMM communications are stopped when this device is turned ON.
M100	Communication error detection	A communication error is detected if this device is ON.
D50	Native mode command terminator	The line feed code of terminator 'CR/LF' is stored.
D90	Number of words in UCMM data link request data	The number of words in UCMM data link request data is stored.
D91	Remainder of dividing the number of words in UCMM data link request data	The remainder of dividing the number of words in UCMM data link request data is stored.
D100	Native mode command string	The string of a native mode command is stored.
D151	UCMM data link request target IP address (upper)	"HC0A8 (192 168)" is stored as the IP address (upper) to which a UCMM data link request is sent.
D150	UCMM data link request target IP address (lower)	"H0301 (003 001)" is stored as the IP address (lower) to which a UCMM data link request is sent.
D152	UCMM data link request service number	The service code "H34 (SendNativeCmd)" is stored.
D153	UCMM data link request class ID	The class ID "H78 (Vision Object)" is stored.
D154	UCMM data link request instance ID	The instance ID "H1" is stored.
D155	UCMM data link request attribute ID	The attribute ID "H0" is stored.
D190	Number of words in UCMM data link receive data	The number of words in UCMM data link receive data is stored.
D191	Remainder of dividing the number of words in UCMM data link receive data	The remainder of dividing the number of words in UCMM data link receive data is stored.
D200	UCMM data link receive data start address	UCMM data link receive data is stored.

#### Module labels used in the program

Module label	Function	Device
EIP91_1.bSts_ModuleReady	Module Ready	X0
EIP91_1.bSts_CommunicationReady	Communication Ready	X1F
EIP91_1.bSet_CommunicationStartupRequest	EtherNet/IP communication start request	Y10
EIP91_1.stnUCMMCommandArea[1].unSet_Request_TargetIPAddress_D	UCMM data link request command (No.1) Target IP Address	U0\G393281
EIP91_1.stnUCMMCommandArea[1].uSet_Request_Service_D	UCMM data link request command (No.1) Service	U0\G393283
EIP91_1.stnUCMMCommandArea[1].uSet_Request_Class_D	UCMM data link request command (No.1) Class	U0\G393286
EIP91_1.stnUCMMCommandArea[1].uSet_Request_Instance_D	UCMM data link request command (No.1) Instance	U0\G393287
EIP91_1.stnUCMMCommandArea[1].uSet_Request_Attribute_D	UCMM data link request command (No.1) Attribute	U0\G393288
EIP91_1.stnUCMMCommandArea[1].uSet_Request_DataLength_D	UCMM data link request command (No.1) Data length	U0\G393289
EIP91_1.stnUCMMCommandArea[1].unSet_Request_RequestData_D	UCMM data link request command (No.1) Request data	U0\G393312
EIP91_1.bnSet_UCMMSendRequest_D[1]	UCMM data link execution request	U0\G393216.0
EIP91_1.bnSts_UCMMSendRequestAcceptance_D[1]	UCMM data link execution request acceptance	U0\G393232.0
EIP91_1.bnSts_UCMMSendCompletion_D[1]	UCMM data link execution completion	U0\G393248.0

Module label	Function	Device
EIP91_1.stnUCMMCommandArea[1].uResult_Response_ResultStorageArea_ D	UCMM data link receive command (No.1) Result storage area	U0\G394048
EIP91_1.stnUCMMCommandArea[1].unResult_Response_ReceiveData_D	UCMM data link receive command (No.1) Receive data	U0\G394080
EIP91_1.stnUCMMCommandArea[1].uResult_Response_DataLength_D	UCMM data link receive command (No.1) Data length	U0\G394057

### ■ Program example

(2)	EIP91_1.bSts_Module Ready	EIP91_1.bSts_Comm unicationReady	M10							EIP91_1.bSet_CommunicationStartu pRequest
(0)	X0		<i>v</i>			 				V10 O
(4)	мо							MOV	H0C0A8	D151
						 		•		
								MOV	H301	D150
									1054	DIFA
								MOV	139	0152
									H78	D153
						 		MOV		
									H1	D154
						 		MOV		
						 			H0	D155
								MOV		
(17)	мı ——— I ————					 		MOV	H0A0D	D50
								"QF"	D50	D100
							\$+			
(25)	M2						вмоу	D150	EIP91_1.stnUCMMCommandArea [1].unSet_Request_TargetIPAddress_D U0¥G393281	K2
									D152	EIP91 1.stnUCMMCommandArea
						 		MOV		[1].uSet_Request_Service_D U0¥G393283
									D153	EID91_1_stpl/CMMCommandArea
								MOV	5100	[1] uSet_Request_Class_D U0¥G393286
									D154	EIP91_1.stnUCMMCommandArea
								MOV		[1].uSet_Request_Instance_D U0¥G393287
								MOV	D155	EIP91_1.stnUCMMCommandArea [1].uSet_Request_Attribute_D
						 				U0¥G393288
								LEN	D100	EIP91_1.stnUCMMCommandArea [1].uSet_Request_DataLength_D U0¥G393289
						 	r	EIP91_1.stnUCMMCommandArea	K2	D90
						 	7 <u>U</u>	[1].uSet_Request_DataLength_D U0¥G393289		
			D91	ко					К1	D90
		<				 		+_U		
							BMOV	D100	EIP91_1.stnUCMMCommandArea [1].unSet_Request_RequestData_D	D90
						 			U0¥G393312	
(17)	мз								SFT	EIP91_1.bnSet_UCMMSendRequest_ D[1]
	— I I —					 				U0¥G393216.0
									RST	M3
						 				M2
						 			RST	
									RST	M1
						 				мо
		L			<u> </u>				RST	
	1									

	EIP91 1.bnSts UCM	EIP91 1.bnSts UCM							
(86)	MSendRequestAcce ptance_D[1] U0¥G393232.0	MSendCompletion D[1] U0¥G393248.0	$\diamond$	EIP91_1.stnUCMMCommandArea [1].uResult_Response_ResultStorageArea_D U0¥G394048	К0			SET	M100
		ļ							
						/ <u>u</u>	EIP91_1.stnUCMMCommandArea [1].uResult_Response_DataLength_D U0¥G394057	K2	D190
			<	D191	K0		+ <u>U</u>	К1	D190
							10	D000	KEO
						FMOVP	KU	0200	K50
ļ									
						BMOV	EIP91_1.stnUCMMCommandArea [1].unResult_Response_ReceiveData_D	D200	D190
							U0¥G394080		
								DCT	EIP91_1.bnSet_UCMMSendRequest_ D[1]
								ng i	U0¥G393216.0
(131)									(TND )
									LEND J

(0): Perform the processing for starting communications.

(4): Initialize data of the UCMM data link request command.

(17): Initialize the native mode command string ("GF").

(25): Store data of the UCMM data link request command.

(77): Perform UCMM communications.

(86): Store response data and reset the command request.

## 4.5 Writing Data to a Programmable Controller

Write the parameters and program set in an engineering tool to the programmable controller.

### Writing to the programmable controller

- **1.** Turn ON the programmable controller.
- 2. Write parameters and program to the programmable controller in the "Online Data Operation" screen.

Online Data Operation									– 🗆 X	<b>9</b> Select [Online] $\Rightarrow$ [Write to PLC].
Display Setting Related Functions										The "Online Data Operation" screen
2 Write 24 11 Rea	9	1	Verify	-	Dele	te				<ul><li>appears.</li><li>Olick the [Parameter + Program]</li></ul>
Parameter + Program( <u>F</u> ) Select <u>A</u> ll	Legend			_		-				button.
Open/Close All( <u>T</u> ) Deselect All( <u>N</u> )	CPUI	Built-in Me	emory	SD M	emory Card	inte Inte	elligent Function Module			Olick the [Execute] button.
Module Name/Data Name	*	-		Detail	Title		Last Change	Size (Byte)	^	
Untitled Project										
Parameter										
System Parameter/CPU Parameter	•						2019/01/21 13:56:20	Not Calculated		
- Module Parameter	~						2019/01/21 14:29:38	Not Calculated		
Memory Card Parameter							2019/01/21 13:56:20	Not Calculated		
Remote Password	•						2019/01/21 13:56:20	Not Calculated		
🗆 🏦 Global Label										
Global Label Setting	•						2019/01/21 13:56:21	Not Calculated		
🖻 🔚 Program				Detail						
MAIN							2019/01/21 13:56:21	Not Calculated		
🗉 🙆 Device Memory										
main				Detail	]		2019/01/21 13:56:21	-	~	
	1									
Display Memory Capacity										
							0	Execute	Close	
							<u> </u>			

### Restarting the programmable controller

After writing the parameters and program, reset the programmable controller and switch to RUN.

## 4.6 Checking Operations

Check the operation by controlling the vision sensor using the programmable controller.

Page 130 Checking operations of cyclic (Implicit) communications

Page 136 Checking operations of message (Explicit) communications

## Checking operations of cyclic (Implicit) communications

Use a created program to check the operation. ( Frage 120 Creating a program for cyclic (Implicit) communications)

### Making the vision sensor online

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



• Check that the operating status is "Online."

### Enabling a trigger on the vision sensor

Enable a trigger on the vision sensor to acquire the inspection results.

**1.** Display device values.

1 [Device/Buffer Memory Batch Monitor]											
Device <u>N</u> ame	MO		~ Open	D <u>i</u> splay Format	Detailed Conditions	Stopping					
O Buffer Memory	<u>U</u> nit		V (HEX)	<u>A</u> ddress	V DEC	Start Monitoring					
Device Name F	E D C B A 9	8 7 6 5 4 3 2	1 0	Current Value	String	^					
						¥					

● Select [Online] ⇔ [Monitor] ⇔ [Device/Buffer Memory Batch Monitor] with an engineering tool. The "Device/Buffer Memory Batch

Monitor" window appears. 2 Enter "M0" for "Device Name".

Click the [Start Monitoring] button.

### **2.** Enable a trigger on the vision sensor.

1 [Device/Buffer Memory Batch Monitor] Monitoring										
Device <u>N</u> ame	M0	✓ Open D <u>i</u> splay Format	Detailed Conditions	Monitoring						
O Buffer <u>M</u> emory	<u>U</u> nit	✓ (HEX) <u>A</u> ddress	V DEC V	Stop Monitoring						
Device Name 9 8	7 6 5 4 3 2 1 0			^						
M0 0 0	0 0 0 0 0 0 ( 1									
M10 0 0	0 0 0 0 0 0 0			¥						

• Turn "M0" ON to turn 'Trigger Enable' (D1000.0) ON.

### **3.** Trigger a device.

1 [Device/Buffer Me	emory Batch Mo	nitor] Monitoring					×
Oevice <u>N</u> ame	MO		<ul> <li>✓ Open</li> </ul>	D <u>i</u> splay Format	Detailed Conditions	8	Monitoring
O Buffer <u>M</u> emory	<u>U</u> nit	0	<ul> <li>(HEX)</li> </ul>	<u>A</u> ddress	✓ DEC	$\sim$	<u>S</u> top Monitoring
Device Name	9 8 7 6 5 4	3 2 1 0					<b>^</b>
MO	0 0 0 0 0 0	0 0 1					
M10	0 0 0 0 0 0	0 0 0 0					*

**1** Turn "M1" ON to turn 'Trigger' (D1000.1) ON.

4

### Checking inspection results

Check the inspection results.

**1.** Check the completion of the inspection.

1 [Device/Buffer Memo	ry Batch Monitor]			×
Device <u>Name</u>	D1050	Open D <u>i</u> splay Format	Detailed Conditions	Stopping
O Buffer <u>M</u> emory	<u>U</u> nit	✓ (HEX) <u>A</u> ddress	V DEC V	Start Monitoring
Device Name F E	D C B A 9 8 7 6 5 4 3 2	1 0 Current Value	String	Ô
	1			
	<b>•</b>			_
1 [Device/Buffer Memo	ry Batch Monitor] Monitoring			x
Device <u>N</u> ame	D1050	✓ Open D <u>i</u> splay Format	Detailed Conditions	Monitoring
O Buffer <u>M</u> emory	Unit	✓ (HEX) <u>A</u> ddress	V DEC V	Stop Monitoring
Device Name         F         E           D1050         0         0         0           D1051         0         0         0	D     C     B     A     9     8     7     6     5     4     3     2       0     0     1     1     1     0     0     0     0       0     0     0     0     0     0     0     0     0	1         0         Current Value           0         1	String           2689            24	^
D4050 0 0			0	

Enter 'D1050' for "Device Name."
Click the [Start Monitoring] button.
Check that the bit of 'Inspection Completed' (D1050.9) is changed (toggled).

### **2.** Check the inspection results.

1 [Device/Buffer N	len	noi	y I	Bat	ch	М	oni	tor	r] N	/lor	nito	orir	ng						
Device <u>N</u> ame			D	010	50											~	Open D <u>i</u> splay Format	Detai <u>l</u> ed Conditions	Monitoring
O Buffer Memory	/		<u>U</u>	nit												~	(HEX) <u>A</u> ddress	V DEC V	Stop Monitoring
Device Name	F	E	D	C	в	A	9	8	7	6	5	4	3	2	1	0	Current Value	String	
D1050	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	1	266	9	
D1051	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0		4	
D1052	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	
D1053	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	1
D1054	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			1	
D1055	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			1	
D1056	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	1	
D1057	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	٥		0	
D1058	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1		1 -	
D1059	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0		0	
D1060	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	J_0	1_	
D1061	U	U	U	10	1	•	v	•	U	•	•	•	۷	U	U	U	1	0	

- Check the following information.
- 'Job PASS' (D1058.0): This bit turns ON when the set inspection target is detected in the captured image.
- 'Job FAIL' (D1059.0): This bit turns ON when the set inspection target is not detected in the captured image.
- 'Number of jobs inspected' (D1060): The number of times the device is triggered is stored.

### Changing a recognition parameter

When locating a target object using the pattern in the location tool, the rotation tolerance of the target object can be changed to  $\pm 90^{\circ}$ .

- **1.** Make the vision sensor offline with the vision sensor setup tool.
- **2.** Add parameter items to the list in the [Format Input Data] tab.



Select items to add		
	Name	Data Type
▼ FOV		
✓ Job		
▲ Pattern_1		
Pattern_1.Accept_Thresho	ld	Integer
Pattern_1.Description		String
Dattern 1 External Train		Integer
Pattern_1.Rotation_Tolera	ance	Integer
Pattern_1.5cale_10lerance	8	integer
Pattern_1.Timeout		Integer
Pattern_1.Tool_Enabled		Integer
		<u>Sir</u>
Communications	<b></b>	
Communications	Format Input Data Format Output Data	
Communications EasyView FTP	Format Input Data Format Output Data Name	Size
Communications EasyView FTP EtherNet/IP	Format Input Data Name Data Type Pattern 1.Rotation_Tolerance 16 bit integer	Size 2
Communications EasyView FTP EtherNet/IP Add Device	Format Input Data Format Output Data Name Data Type Pattern_1.Rotation_Tolerance 16 bit integer	Size 2
Communications EasyView FTP EtherNet/IP Add Device Edit Device	Format Input Data Format Output Data Name Pattern_1.Rotation_Tolerance 16 bit Integer	Size 2

3. Save the job and make the vision sensor online. (

### Point P

Parameter items need to be added to the list in the [Format Input Data] tab in advance to change parameter values.

More than one parameter item can be selected.

Click the [Communication] button.
Select the [Format Input Data] tab and click the [Add] button.

Select "Pattern\_1.Rotation Tolerance."
Click the [OK] button.

### 4. Set "Pattern\_1.Rotation Tolerance" as a parameter to be changed.

Device <u>Name</u> Device <u>Name</u> Device <u>Name</u> F E D	Jnit	Open D <u>i</u> splay Format (HEX) <u>A</u> ddress	Detailed Conditions (S)	3 Stopping
Buffer Memory	<u>J</u> nit V	(HEX) <u>A</u> ddress		
Device Name F E D			V DEC V	Start Monitoring
	0 C B A 9 8 7 6 5 4 3 2 1 0	Current Value	String	<b>^</b>
	L			
1 [Device/Buffer Memory B	Batch Monitor] Monitoring			×
Device <u>N</u> ame	D1000 ~	Open D <u>i</u> splay Format	Detailed Conditions	Monitoring
O Buffer Memory	Init 🗸	(HEX) <u>A</u> ddress	V DEC V	Stop Monitoring
Device Name F E D	C B A 9 8 7 6 5 4 3 2 1 0	Current Value	String	^
D1000 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 1		1 -	
D1001 0 0 0	0000000000000000		0_	
D1002 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0		0	
D1003 0 0 0	00000000000000000		01	
0 0 0		L	<u>.</u>	

● Select [Online] ⇔ [Monitor] ⇔ [Device/Buffer Memory Batch Monitor] with an engineering tool. The "Device/Buffer Memory Batch Monitor" window appears. ● Enter 'D1000' for "Davice Name"

- 2 Enter 'D1000' for "Device Name."
- Olick the [Start Monitoring] button.
- Enter '90' for 'User Data' (D1004) of the Output Assembly.

### **5.** Change parameter values.

Device <u>N</u> ame	D1000		~ Оре	n D <u>i</u> splay Format	Detailed Conditions	Monitoring
O Buffer Memory	<u>U</u> nit		(HEX)	Address	V DEC V	Stop Monitoring
evice Name F	E D C B A 9	8 7 6 5 4 3 2	1 0	Current Value	String	
000 0	0 0 0 0 0	0 0 0 0 0 0 0			1	
001 0	0 0 0 0 0 0	0 0 0 0 0 0 0			1	
002 0	0 0 0 0 0 0	0 0 0 0 0 0 0	0 0		0	
003 0	0 0 0 0 0 0	0 0 0 0 0 0 0	0 0		0	
[Device/Buffer Mer	mory Batch Monit	tor] Monitoring				E
Device <u>N</u> ame	<b>2</b> D1050		✓ Ope	n D <u>i</u> splay Format	Detailed Conditions 📎	Monitoring
O Buffer <u>M</u> emory	<u>U</u> nit		(HEX)	<u>A</u> ddress	✓ DEC ✓	Stop Monitoring

Turn 'Set User Data' (D1001.0) of he Output Assembly ON.

Enter 'D1050' for "Device Name."
By completing the settings, 'Set User Data Ack' (D1051.0) of the Input Assembly turns ON. After that, turn OFF 'Set User Data' (D1001.0).

### **6.** Trigger a device.

1 [Device/Buffer N	1en	nor	y E	3at	ch	м	on	ito	or]	Mo	oni	toı	ring	9																						
Device <u>N</u> ame	(		D	10	00											~	)		Op	ben	D <u>i</u> s	play	For	mat		Detai	<u>l</u> ed	Co	ndit	tion	s		8	Monit	oring	
O Buffer <u>M</u> emor	у		<u>U</u> r	nit												~	(	HE	X)		ł	<u>A</u> ddr	ess						~	D	EC		$\sim$	<u>S</u> top Mo	nitoring	9
Device Name	F	E	D	С	в	A	9	8	1	6	1	5 4	1 3	I į		10						Currer	t Valu						Stri	ing						~
D1000	0	0	0	0	0	0	0	0	0	0	0		e		l		L	_	_	_	_	_	_	_	-	3	_	_	_	_	_	_				~

03

0 0 0 0

Enter 'D1000' for "Device Name."
Turn 'Trigger' (D1000.1) of the Output Assembly ON.

### Changing jobs (loading another job)

The following shows the procedure to load the job file "1Test."

The number '1' prefixed to the file name indicates an ID. By setting this ID number to 'Command' (D1002) of the Output Assembly, the job ("1Test") can be loaded.

**1.** Set an ID number of a job.

1 [Device/Buffer Me	emory Batch Moni	tor]					2
Device <u>N</u> ame	<b>2 D1000</b>	~	Open	n D <u>i</u> splay Format	Detailed Conditions	8	Stopping
O Buffer <u>M</u> emory	<u>U</u> nit		(HEX)	Address	→ DEC	8	Start Monitoring
Device Name F	FEDCBA9	8 7 6 5 4 3 2 1	0	Current Value	String		
							•
Dovice/Puffer Mon	man (Patch Manit	orl Monitoring					
l [Device/Buffer Men	mory Batch Monit	or] Monitoring					X
[Device/Buffer Men	mory Batch Monit	or] Monitoring	Open	Dįsplay Format	Detailed Conditions	8	× Monitoring
<ul> <li>[Device/Buffer Men</li> <li>Device Name</li> <li>Buffer Memory</li> </ul>	mory Batch Monit	or] Monitoring v	Open (HEX)	Display Format Address	Detailed Conditions	×	X Monitoring Stop Monitoring
[Device/Buffer Men     ① Device <u>N</u> ame     ① Buffer <u>M</u> emory Device Name     F	mory Batch Monit	or] Monitoring	Open (HEX)	Display Format Address	Detailed Conditions           V         DEC           Sving         Sving	S	Monitoring Stop Monitoring
[Device/Buffer Men     ① Device Name     ① Buffer Memory Device Name     F 1000 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	mory Batch Monit	or] Monitoring	Open (HEX)	Display Format Address	Detailed Conditions       Detailed Conditions       String	×	X Monitoring Stop Monitoring
[Device/Buffer Men     ① Device Name     ② Buffer Memory Device Name     F 2000     0 2000     0	Import Batch Monit           D1000           Unit           Import Batch Bata           Import Bata	or] Monitoring	Open (HEX)	Display Format Address	Detailed Conditions DEC String 1 - 0 -	×	X Monitoring Stop Monitoring

● Select [Online] ⇔ [Monitor] ⇔ [Device/Buffer Memory Batch Monitor] with an engineering tool. The "Device/Buffer Memory Batch Monitor" window appears.

2 Enter 'D1000' for "Device Name."3 Click the [Start Monitoring] button.

Enter '1' for 'Command' (D1002) of the Output Assembly.

### **2.** Change jobs (load another job).

1 [Device/Buffer Men	nory Batch Monitor] Mon	toring			X
Device <u>N</u> ame	D1000	<ul> <li>✓ Open</li> </ul>	D <u>i</u> splay Format	Detai <u>l</u> ed Conditions 🛛 😒	Monitoring
O Buffer <u>M</u> emory	<u>U</u> nit	<ul> <li>(HEX)</li> </ul>	Address	✓ DEC ✓	Stop Monitoring
Device Name F	E D C B A 9 8 7 6	3 4 3 2 1 0	Current Value	String	^
D1000 0 D1001 0	0000000		145	5 °. 0	~

Turn ON 'Set Offline' (D1000.7) of the Output Assembly to make the vision sensor offline.

Turn ON 'Execute Command' (D1000.4) of the Output Assembly to load a job.

1 [Device/Buffer Memor	y Batch Monito	or] Monitoring			2
Device <u>N</u> ame	D1050	~	Open D <u>i</u> splay Format	Detailed Conditions	Monitoring
O Buffer <u>M</u> emory	<u>U</u> nit	~	(HEX) <u>A</u> ddress	V DEC V	<u>S</u> top Monitoring
Device Name F	C B A 9 8	8 7 6 5 4 3 2 1 0	) Current Value	String	^
D1050 0		0 0 0 1 1 0 0 0 0	2	8240 0	
01001			,	8 -	v

Enter 'D1050' for "Device Name."
When the loading of the job is completed, 'Command Completed' (D1050.D) of the Input Assembly is turned ON. After that, turn OFF 'Execute Command' (D1000.4) and 'Set Offline' (D1000.7).

### Point P

To load a job, the file name of the job need to begin with an ID number. When loading a job, make a vision sensor offline.

## Checking operations of message (Explicit) communications

Acquire response data by sending native mode commands to a vision sensor from a programmable controller. Use a created program to check the operation. ( Page 125 Creating a program for message (Explicit) communications)

### Making the vision sensor offline

Select [Sensor] ⇒ [Online] in the vision sensor setup tool to set the online status to offline.

### Checking read results

Check the execution result of native mode commands in an engineering tool. **1.** Start monitoring in the "Device/Buffer Memory Batch Monitor" window.

1 [Device/Buffer Mem	ory B	atcl	h M	oni	itor	]																		x
Device <u>N</u> ame	M	0										~		(	)pen D <u>i</u> sp	lay Form	iat	Detai <u>l</u> ed (	Conditio	ns	3	S	topping	
O Buffer <u>M</u> emory	<u>U</u> n	it										~	( -	IEX	) <u>A</u> (	ddress			~ [	)EC	0	<u>S</u> tart	Monitorine	
Device Name F	E D	С	в	A	9	8	7	6	5	4	3	2	1	0		Curre	nt Value			ŝ	String			^
																								~

✔ Select [Online] ⇔ [Monitor] ⇔
 [Device/Buffer Memory Batch Monitor]
 with an engineering tool.
 The "Device/Buffer Memory Batch
 Monitor" window appears.
 ④ Enter "M0" for "Device Name."
 ④ Click the [Start Monitoring] button.

2. Prepare transmission data of the UMCC data link request command and native mode commands.



Turn ON 'UCMM data link request command data initialization command' (M0), 'Native mode command string initialization command' (M1), then 'UCMM data link request command data store command' (M2).

### **3.** Check command length.



Enter "D100" for "Device Name."
Check that the native mode command "GF" is displayed in "String" of "D100."

• Check that the line feed code of terminator "2573" (CR/LF) is displayed in "Current Value" of "D101."

#### 4. Execute the native mode command.

1 [Device/Buffer Memory Batch Monitor] Moni	toring		×
Device <u>N</u> ame     M0	✓ Open Display Format	Detai <u>l</u> ed Conditions 😵	Monitoring
O Buffer Memory Unit	✓ (HEX) <u>A</u> ddress	V DEC V	<u>S</u> top Monitoring
Device Name         9         8         7         6         5         4         3         2         1           MO         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 <t< th=""><th>0</th><th></th><th>^</th></t<>	0		^
M10 0 0 0 0 0 0 0 0 0 0	0		×

Enter "M0" for "Device Name."
Turn 'UCMM data link request command execution command' (M3) ON.

### **5.** Check response data.

1 [Device/Buffer Memory Batch Monitor] Monitoring																				
Device <u>N</u> ame	(	D	0	20	0											~	Open Display Format	Detailed Conditions	Monitoring	
O Buffer Memor	y		<u>U</u>	nit												~	(HEX) <u>A</u> ddress	V DEC V	<u>S</u> top Monitorin	ıg
Device Name	F	E	D	С	в	A	9	8	7	6	5	4	3	2	1	0	Current Value	String		•
D200	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0	180	) <u>*</u> .		
D201	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		-	
D202	0	1	1	1	0	1	0	0	0	0	1	1	0	0	0	1	2974	1t	6	
D203	0	1			0	0	1	1	0	1	1	0	0	1	0	1	2954	8		
D204	0	0	1	0	1	1	1	0	0			1	0	1	0	0	1189	t		
D205	0	1	1	0	1			1	0		1	0	1	0	1	0	2852	jo		
D206	0	0	0	0	0	0	0	0	0		1	0	0	0	1	0	9	b.		
D207	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1-	,	~

Enter "D200" for "Device Name."
Check that the file name "1test.job" is displayed in "String" of "D202" to "D206."

## **REVISIONS**

" I he manual number is given on the bottom left of the back cover.							
Revision date	*Manual number	Description					
May 2017	BCN-P5999-0861-A	First edition					
February 2018	BCN-P5999-0861-B	■Added or modified parts Chapter 1, Chapter 2, Chapter 3					
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