

FA Sensor



Vision Sensor VS Series Setting 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

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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.

COGNEX

SAFETY PRECAUTIONS

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.

The precautions given in this manual are concerned with this product only. For the safety precautions 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 "ACAUTION" 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.

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.

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RELEVANT MANUALS

Manual name [manual number]	Description	Available form
Vision Sensor VS Series Setting Guide [BCN-P5999-1065] (this manual)	Functions of In-Sight Explorer and procedures for creating and executing a job, etc.	e-Manual PDF
Vision Sensor Setting Guide (Spreadsheet) [BCN-P5999-1072]	Operating and job creation methods, etc. for using a spreadsheet in In-Sight Explorer	e-Manual PDF
Vision Sensor Connection Guide [BCN-P5999-0861]	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 [SH-081769ENG]	Functions, installation methods, system configuration, and required hardware components, etc. of the vision sensor VS20	Print book e-Manual PDF
Vision Sensor VS70 User's Manual [SH-081889ENG]	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 [SH-081891ENG]	Functions, installation methods, system configuration, and required hardware components, etc. of the vision sensor VS80	Print book 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.

1 MELSENSOR VISION SENSOR OVERVIEW

1.1 Features of the MELSENSOR Vision Sensor

Tool-integrated sensor

This standalone vision sensor integrates a CPU with personal computer level performance and image processing tools in a compact camera.

Replaceable options

The lighting and lens structure can be arranged freely to match the requirements of the application.

Interaction with iQSS

Total costs can be reduced in design, startup, operation, and maintenance through the automatic detection of connected devices and tool interaction functions.

Linkage with a programmable controller

Vision sensors support SLMP and CC-Link IE Field Network Basic. A vision sensor can start and the state of the vision sensor can be monitored by assigning devices that control and monitor the vision sensor and turning the devices ON or OFF. In addition, parameters can be changed by assigning the devices.

FTP support

Vision sensor inspection images can be transferred to GOTs and host-computer systems to enable traceability combining recognition results and recognition images.

Simple setup on a personal computer

In-Sight Explorer (vision sensor setup tool) is an interface in which images play a central role and enables easy configuration of the vision sensor.

Furthermore, inspection configuration is program-free, and target characteristics in images can be selected by pointing and clicking, so configuration can be completed quickly.



7

8

2 OVERVIEW OF In-Sight Explorer

2.1 Procedure for Using In-Sight Explorer

Preparation of In-Sight Explorer

1. Installation

Check the installation requirements, and then install In-Sight Explorer.

Page 10 Installation of In-Sight Explorer

2. Acquisition of offline programming key

Acquire the offline programming key, and then enable the emulator function using In-Sight Explorer.

Page 13 About Emulator Use

9

2.2 Installation of In-Sight Explorer

When running In-Sight Explorer in EasyBuilder view, a VS series vision sensor can be configured and monitored using a Windows personal computer on the same network as the VS series vision sensor.

Precautions

For the latest operating system requirements, refer to In-Sight Explorer release notes.

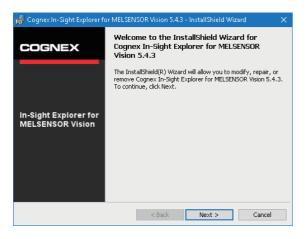
Installation requirements

Item	Description	
Operating system (English version)	Microsoft [®] Windows [®] 10 Professional (64-bit) Microsoft [®] Windows [®] 7 Professional, Service Pack 1 (64-bit) Microsoft Windows Server 2008 R2, Service Pack 1 (64-bit)	
CPU	Intel [®] Pentium [®] 4 processor 2.0 GHz or higher (Intel Core [™] i7 processor; 2.7 GHz or better recommended)	
Free memory	1 GB or more (4 GB or more recommended)	
Monitor	1024×768 (1980×1080 recommended)	
Free hard disk space	2 GB or more (2.5 GB or more recommended)	
Display colors	24-bit color (32-bit color recommended)	
Ethernet	100 Mbps (1 Gbps recommended)	

Installation procedure

Operating procedure

- **1.** Download the installer of In-Sight Explorer from the Mitsubishi Electric FA website. www.mitsubishielectric.co.jp/fa
- 2. Close all running applications.
- 3. Run the obtained installer.



4. In the "License Agreement" screen, select "I accept the terms in the license agreement", and click the [Next] button.

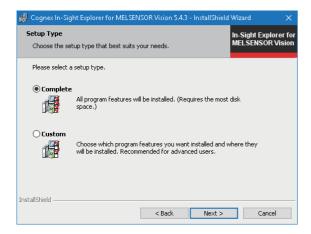


5. Configure the installation destination folder.

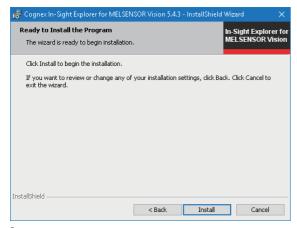
To change the default installation destination, click the [Change] button.

🕼 Cognex l	In-Sight Explorer for MELSEN	ISOR Vision 5.4.3	- InstallShield	Wizard		
Destinati Click Ne» different	t to install to this folder, or clic	< Change to install	to a		Explorer ISOR Vis	
Ø	Install Cognex In-Sight Explor C:\Program Files (x86)\Cogne		Vision 5.4.3 to		hange	
InstallShield –		< Back	Next >		Cancel	

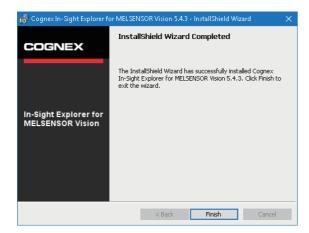
6. In the "Setup Type" screen, select the method that suits the conditions from "Complete" or "Custom". Click the [Next] button.



7. In the "Ready to Install the Program" screen, click the [Install] button to start installation.



8. In the "InstallShield Wizard Completed" screen, click the [Finish] button to close the setup utility and quit the installation.



2.3 About Emulator Use

Overview of emulator function

In-Sight Explorer has an emulator function.

The emulator allows the addition of tools to jobs and the editing of parameters even when the VS series vision sensor is not on hand.

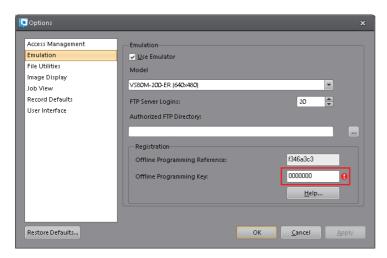
Images of inspection items captured with the VS series vision sensor or other cameras and saved to a personal computer can be imported, and the parameters of the location tools and inspection tools can be adjusted, added, and deleted.

Job files created using the emulator can be run on an actual vision sensor by loading the files on a VS Series vision sensor.

Registration of an offline programming key

Operating procedure

- 1. Select [Options] from the [system] menu of In-Sight Explorer.
- 2. In the "Options" screen, select [Emulation].
- 3. Copy the alphanumeric characters listed for "Offline Programming Reference" to the clipboard.



4. Access the following web site with a web browser. support.cognex.com/en/InsightEmulatorKey

5. The [IN-SIGHT KEY GENERATOR] page opens. Enter your company's name in "Company" under "An Emulator Key will be registered to the following:".

Paste the number copied in Step 3 onto "Offline Programming Reference", and click the [GENERATE KEY] button.

IN-SIGHT KEY GENERATOR

As a registered user of Cognex vision systems, you are entitled to install and run In-Sight Explorer software on one or more PCs with no time limit, as long as at least one In-Sight system is located on the same network as the PC(s).

In order to run In-Sight Explorer without an In-Sight system, you will need to enter a key to unlock the emulator software. The following instructions will help you with this process:

- Step 1: Start In-Sight Explorer.
- Step 2: Under the System menu, select Options. The Options dialog box will appear with emulation selected by default.
- NOTE: DO NOT CLOSE THE OPTIONS DIALOG BOX UNTIL INSTRUCTED.
- If you accidentally close it, you will need to start over from step 2.
- Step 3: In the Registration Section of the dialog box, locate the 8-character Offline Programming Reference string.
- Step 4: Copy the string into the text box below labeled Offline Programming Reference, then press the Get Key button to generate the unlocking Offline Programming Key.

An Emulator Key will be registered to the following:

Company	
Offline Progr	imming Reference
Q.	
GENERATE	KEY

6. The offline programming key is displayed. Copy it to the clipboard.

GENERATE KEY

Your In-Sight Emulator Key is **ESSENCES**. Please save for your records.

7. In the "Offline Programming Key" field of the "Options" screen, paste the offline programming key copied in Step 6.

Options		x	
Access Management Emulation File Utilities Image Display Job View Record Defaults User Interface	Emulation		
	Registration Offline Programming Reference: Offline Programming Key:	гз46азсз Если стана Неір	
Restore Defaults	0	K <u>C</u> ancel Apply	

8. In the "Options" screen, click either the [OK] button or the [Apply] button to apply the settings.

Precautions

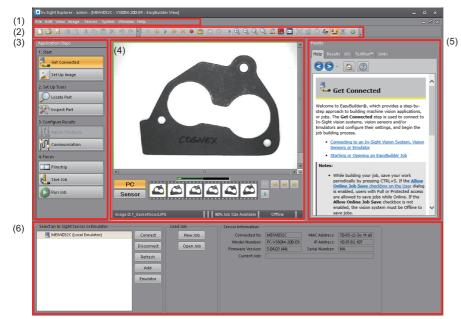
If In-Sight Explorer is started without the offline programming key already entered, Error 6001 or Error 6047 may appear. The offline programming key can only be acquired from a personal computer that can connect to the Internet. When using a personal computer that cannot connect to the Internet, acquire an offline programming key with another personal computer that can connect to the Internet, or please contact your local Mitsubishi Electric sales office or representative.

The job run time displayed by In-Sight Explorer when a job is run by the emulator may differ from the job run time on an actual machine.

2.4 Overview of EasyBuilder

The EasyBuilder graphical user interface (GUI) is centered on images.

It is designed so that vision applications can be constructed simply by configuration following the application steps. The EasyBuilder GUI is made up of the following six parts.



(1) Menu bar

(2) Toolbar (Standard, EasyBuilder, Explorer)

(3) Application Steps

(4) EasyBuilder View

(5) Palette

(6) Setting Pane

Application Steps

"Application Steps" are displayed in the order they are generally used for job creation.

These steps can be accessed again in an arbitrary order after job creation, so parameters can be changed and fine-tuned until the target results are acquired.

Every step of EasyBuilder can be accessed by one click from the [Application Steps] pane.

2.5 Operation Workflow

The basic operating procedure of In-Sight Explorer is as follows.

Vision sensor configuration procedure

1. Get Connected

Configure the vision sensor network and connect with In-Sight Explorer.

Page 18 GET CONNECTED

2. Set Up Image

Configure the trigger type settings and image import settings, and then run calibration.

Page 27 SET UP IMAGE

3. Locate Part

Add and configure tools to locate the part.

Page 51 Configuring Location Tools

4. Inspect Part

Add and configure tools to inspect the part.

Page 57 Configuration of Inspection Tools

5. Input/output configuration

Configure the I/O module connection settings and the input/output operation settings.

Page 103 INPUTS/OUTPUTS

6. Configuring a communication setting

Configure the EasyView and FTP settings, and configure communication via the industrial protocol.

- 7. Settings during operation

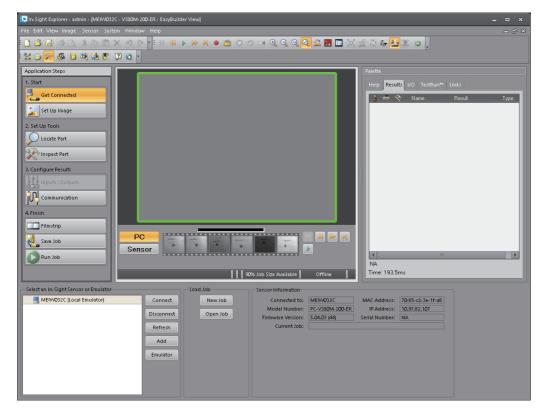
Configure Filmstrips, jobs to be loaded at startup, and online mode.

Page 117 FILMSTRIP, Page 122 SAVING JOB, Page 124 RUN JOB

3 GET CONNECTED

3.1 Connecting to a Vision Sensor or Emulator

The following screen appears when In-Sight Explorer is started.



If the vision sensor to be connected does not appear in the "Select an In-Sight Sensor or Emulator" area at the bottom left, run the following procedure.

Operating procedure

1. Click the [Add] button.

- Select an In-Sight Sensor or Emulator	
EIW032C	Connect
	Disconnect
	Refresh
	Add
	Emulator

2. In the "Add Sensor/Device to Network" screen, select the vision sensor to be connected.

When a personal computer cannot connect to the vision sensor, such as when the subnet of the displayed IP address is different from the subnet of the local personal computer, a warning mark is displayed on the right side of the IP address as shown in the following figure. In that case, enter an appropriate IP address.

🚓 Add Sensor/Device t	o Network				×
		to add to your network. If t to appear in the list after po		is not listed, you car	n add it by cycling its power.
Host Name	Туре	MAC	IP	<u>H</u> ost Name:	VS70M-800-R_527ba2
VS70M-800-R	V\$70M-800	00-d0-24-52-7b-a2	192.168.0.1) <u>O</u> btain IP Addr	ess Automatically (DHCP)
				● <u>U</u> se The Followi	ing Network Settings
				IP Address:	192 , 168 , 0 , 1 🕒
				<u>S</u> ubnet Mask:	255 , 255 , 255 , 0
				Default <u>G</u> ateway:	
				DNS Server:	
				D <u>o</u> main Name:	
				C <u>o</u> py PC	Network Settings
				📃 Reset <u>A</u> dmin Pa	ssword
				🗌 Reset Sensor Se	ttings to <u>F</u> actory Defaults
<u>F</u> lash Lights <u>R</u> e	fresh				Apply <u>C</u> lose

3. The warning mark disappears when an appropriate IP address is entered.

	to Network					×
		to add to your network. to appear in the list afte		levice is not listed, you (can add it by cycling its pow	er.
Host Name	Туре	MAC	IP	Host Name:	VS70M-800-R_527ba2	
VS70M-800-R	V\$70M-800	00-d0-24-52-7b-a2	192.168.0.1	📃 💿 <u>O</u> btain IP Ade	dress Automatically (DHCP)	
				● <u>U</u> se The Follo	wing Network Settings	
				IP Address:	192 , 168 , 3 , 5	
				<u>S</u> ubnet Mask:	255 , 255 , 255 , 0	
				Default <u>G</u> atewa	ıy: <u></u>	
				DNS Server:		
				D <u>o</u> main Name:		
				رم و ر C	PC Network Settings	
				Reset <u>A</u> dmin	Password	
				Reset Sensor	Settings to <u>F</u> actory Defaults	
Elash Lights R	efresh				<u>A</u> pply <u>C</u> lose	

4. After changing the IP address, click the [Apply] button. If the setting change is completed normally, the following message appears.



5. If it can be detected, the vision sensor appears as shown below. Select the vision sensor to be connected, and then click the [Connect] button.

— Select an In-Sight Sensor or Emulato	r	
📕 MEIW032C (Local Emulator)		Connect
VS70M-800-R_527ba2		Disconnect
		Refresh
		Add
		Emulator
l		

6. An In-Sight Explorer image appears in the background of the icon of the connected vision sensor. In the case of the emulator, an In-Sight Explorer image appears in the monitor of the personal computer icon.

Select an In-Sight Sensor or Emulator	
MEIW032C (Local Emulator)	Connect
VS70M-800-R_527ba2	Disconnect
	Refresh
	Add
	Emulator

Icon changes by the status of the connection to the vision sensor or emulator in In-Sight Explorer

Connection target	Not connected	Connected
Vision sensor (shape may differ by model)	()	i
Emulator		

When the target vision sensor is not displayed in the "Add Sensor/Device to Network" screen even though the vision sensor is connected to the network and the power is ON, right-click the sensor/device display area to open a menu and click [Show All Devices] from the menu to enable the display.

🕀 Ac	ld Sensor/Devi	ce to Network					×
			ce to add to your networ ds to appear in the list af	k. If the desired sensor/devi ter power is applied.	ice is not listed, you can	add it by cyclin	g its power.
	Host Name	Туре	MAC	IP	Host Name:		
			00-d0-24-4b-37-10	192.168.3.38	Obtain IP Addres		
	V\$70M-80	V\$70M-80	00-d0-24-52-7b-a2	192.168.3.5	O Use The Followin		
					<u>o o</u> se meronowin		
		_		_	IP Address:		
			<u>Show All Devices</u>		Subnet Mask:		
			<u>R</u> efresh List		Default Gateway:		
					DNS Server:		
					Domain Name:		
					C <u>o</u> py PC	Network Settin	
					Reset <u>A</u> dmin Pas		
					Reset Sensor Set		
<u>F</u> la	ish Lights	<u>R</u> efresh				Apply	<u>C</u> lose

Precautions

When a vision sensor is not recognized

When a vision sensor is not recognized, try the following operations:

- · Check that the cables are properly connected.
- · Allow the communication in the settings of a firewall or security software.
- For details, refer to the following:

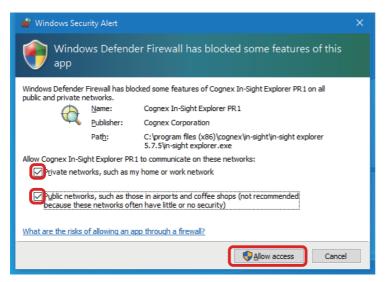
▷ Page 23 When communication with In-Sight Explorer (vision sensor setup tool) and In-Sight (emulator) is not allowed by a firewall

When a warning message appears

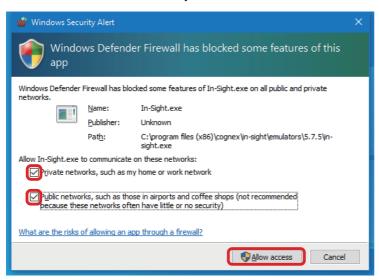
A warning message may appear, which indicates that a function of In-Sight Explorer (vision sensor setup tool) and In-Sight (emulator) is blocked by the Windows firewall.

Select the checkboxes of "Private networks" and "Public networks," click the [Allow access] button, then continue the operation.

· When the vision sensor setup tool is blocked by a firewall



· When the emulator is blocked by a firewall



When communication with In-Sight Explorer (vision sensor setup tool) and In-Sight (emulator) is not allowed by a firewall

When a firewall is enabled and communication with In-Sight Explorer (vision sensor setup tool) and In-Sight (emulator) is not allowed, a vision sensor may not be recognized since communication is not possible.

To allow the communication in the Windows firewall, refer to the procedure below.

When using other software with a firewall function, refer to the manual of the software and allow the communication with In-Sight Explorer (vision sensor setup tool) and In-Sight (emulator).

The following shows the procedure for Windows 10.

Operating procedure

1. Select [Control Panel] ⇒ [System and Security] ⇒ [Allow an app through Windows Firewall] from Windows Start.

Control Panel Home	Security and Maintenance
System and Security	Review your computer's status and resolve issues Status and resolve issues Review your control settings Troubleshoot common computer problems
Network and Internet	roubleshoot common computer problems
Hardware and Sound	Windows Defender Eirewall
Programs	Check firewall status Allow an app through Windows Firewall
User Accounts	System View amount of RAM and processor speed Speed States Launch remote assistance
Appearance and	See the name of this computer

2. Click the [Change settings] button.

Check if "Cognex In-Sight Explorer PR1" (vision sensor setup tool) and "In-Sight" (emulator) are displayed in the list. If they are displayed, the operations in Step 3 to 5 are not necessary.

Allow apps to communicate through Windows Defender Firewall To add, change, or remove allowed apps and ports, click Change settings.

What are the risks of allowing an app to communicate? For your security, some settings are managed by you	ır system ac	Iministrato	_	₩ Cha <u>n</u> ge setti	ngs
Allowed apps and features:					
Name	Domain	Private	Public	Group Policy	^
Cognex In-Sight Explorer PR1	✓			No	
E Connect	•	✓	✓	No	
Connected Devices Platform	•	✓	✓	No	
Core Networking	•	✓	•	No	
Cortana	•	✓	✓	No	
☑ In-Sight.exe	✓			No	
				No	
Key Management Service				No	
Mail and Calendar	✓	✓	✓	No	
✓ mDNS	✓	✓	\checkmark	No	
Media Center Extenders				No	
MELSEC iQ-R series OPC UA Server Module Confi	✓	✓	✓	No	\checkmark
			Detai <u>l</u> s	. Re <u>m</u> ove	e
			AI	low anothe <u>r</u> app	o

3. Click the [Allow another app] button.

- **4.** Click the [Browse] button in the "Add an app" screen, select "In-Sight Explorer"^{*1} in the folder where In-Sight Explorer is installed, then click the [Add] button.
- *1 The folder to be browsed is stored in the following if the installation destination folder for the vision sensor setup tool is not changed. (Example) When the version of the vision sensor setup tool is 5.7.5PR1 C:\Program Files (x86)\Cognex\In-Sight\In-Sight Explorer 5.7.5

Add an app				\times
	pp you want to add, hen dick OK.	or click Brows	e to find one th	nat is not
Apps:				
Cogney	In-Sight Explorer PF	R1		
P <u>a</u> th:	in-Sight Explorer 5.	7.5\In-Sight E	xplorer.exe	Browse
	risks of unblocking a se which network typ		s app to.	
Netwo	ork types		Add	Cancel

- **5.** Click the [Browse] button in the "Add an app" screen, select "In-Sight"^{*1} in the folder where In-Sight Explorer is installed, then click the [Add] button.
- *1 The folder to be browsed is stored in the following if the installation destination folder for the vision sensor setup tool is not changed. (Example) When the version of the vision sensor setup tool is 5.7.5PR1 C:\Program Files (x86)\Cognex\In-Sight\Emulators\5.7.5

Add an app				×
Select the ap listed, and th	p you want to add ien click OK.	l, or click Bro	wse to find one t	hat is not
Apps:				
📧 In-Sight	exe			
P <u>a</u> th:	>gnex\In-Sight\En	nulators\5.7.	5\In-Sight.exe	Browse
What are the	risks of unblocking	an app?		
	e which network t		this app to.	
			Add	Cancel
Netwo	rk types		Add	Cancel

6. Select the checkboxes of "Name," "Domain," "Private," and "Public" for "Cognex In-Sight Explorer PR1" (vision sensor setup tool) and "In-Sight" (emulator) in the list, and click the [OK] button.

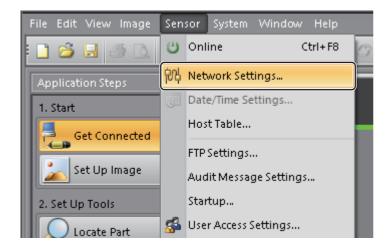
Name	Domain	Private	Public	Group Policy	
Cognex In-Sight Explorer PR1				No	l
Connect				No	
Connected Devices Platform	☑	✓	✓	No	
Core Networking	☑	✓	✓	No	
🗹 Cortana		✓	\checkmark	No	
🗹 n-Sight.exe				No	
iSCSI Service				No	
Key Management Service				No	
Mail and Calendar	\checkmark	✓	\checkmark	No	
✓ mDNS		\checkmark	\checkmark	No	
Media Center Extenders				No	
MELSEC iQ-R series OPC UA Server Module Confi		✓	✓	No	
			Details	. Remove	e

Allow anothe<u>r</u> app...

3.2 Vision Sensor Network Settings

To configure a vision sensor before connection (before configuration), refer to Page 18 Connecting to a Vision Sensor or Emulator.

To change the network settings of a connected vision sensor, click [Network Settings] from the [Sensor] menu.



In the "Network Settings" screen, settings including IP address-related settings, validation for iQ Sensor Solution and industrial Ethernet protocol settings are available.

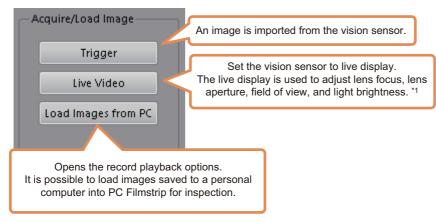
STOM-800-R_527ba2 - Network Sett	tings			×
<u>H</u> ost Name:	VS70M-800-R_527ba2	Protocol Services		
Use DHCP Server		🗸 Enable		
IP Address:	192,168,3,5	-Industrial Ethernet Protocols		
<u>S</u> ubnet Mask:	255 , 255 , 255 , O	 EtherNet/IP 	Settings	
Default <u>G</u> ateway:		O PROFINET	Settings	
DNS Server:		 SLMP Scanner 	Settings	
Domain Name:		OC-Link IE Field Basic	Settings	
DHCP <u>T</u> imeout:	30 🌲		Settings	
		O Modbus TCP Server	Settings	
Telnet Telnet Port	23 📥	• None		
Link	Auto-Negotiate 🔻			
Link Speed				
Current Speed	100 Mbps, Full Duple			
			OK Cancel	
			<u>O</u> K <u>C</u> ancel	

4 SET UP IMAGE

Using Set Up Image, it is possible to configure image import and calibration, and import using triggers, live video, and loading from a personal computer.

Acquire/Load Image	-Edit Acquisition Settings-		Calibrate Image to Real World Units			
Triager	Trigger	Camera 💌	Calibration Type:	Classic Orientation	X+ →	
Trigger	Trigger Delay (msec)	0	None 💌	-	Í	
Live Video	Trigger Interval (msec)	500 🌲				
Load Images from PC	Exposure (msec)	8.000		Y+		
	Start Row	0				
	Number Of Rows	600				
	Gain	0		•	1:1	
		Focus Region			1.1	
	Focus Controls	Disabled				
		Autofocus				
	Focus Position	0 🌲				
	Save Focus Position with Job					
		Light Settings				

4.1 Importing/Loading Images



*1 Image adjustment tips (I Page 28 Image adjustment tips)

Image adjustment tips

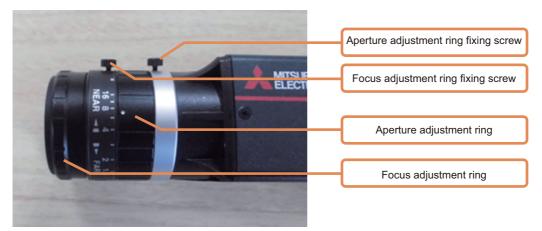
Focus: Set live video and adjust.

To focus, rotate and adjust the focus adjustment ring so that the inspection screen is displayed most clearly.

Brightness: To adjust the camera brightness, change the lens aperture (when available), the camera exposure time, and gain. Generally, the exposure time is the initial value, and the aperture should be roughly midway between the maximum and minimum. However, when the inspection target is moving during recording, shorten the exposure time until the image is not blurry.

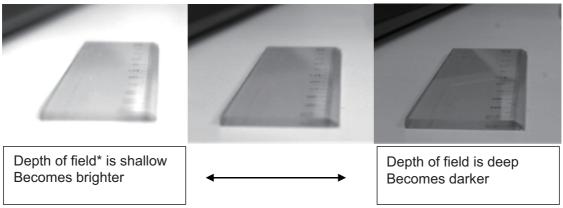
When the exposure time cannot be adjusted, adjust the brightness of the lighting.

Lens example (configuration may differ by manufacturer, type, etc.)



Lens aperture example (aperture may be fixed depending on the lens)





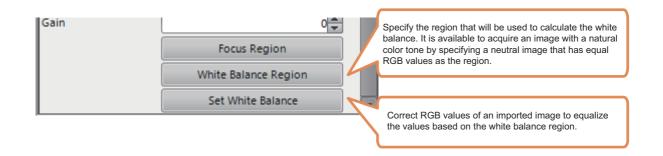
*Depth of field: Depth at which focus is reached.

4.2 Image Import Settings

Using the image import settings, it is possible to configure trigger settings, exposure time, focus control (when an autofocus lens is used), and lighting settings (with built-in lighting or when external lighting is connected to the vision sensor).

Edit Acquisition Settings		Configure a trigger type.
Trigger	Camera 💌	 This item is available to select the type according to the
Trigger Delay (msec)		system configuration or requirements of a vision sensor.
Trigger Interval (msec)	500 🌲	
Exposure (msec)	8.000	Configure the camera exposure time. The longer the setting, the brighter recorded images
Start Row	0	become, but the effects of environmental light are more likely to be received.
Number Of Rows	600 🗮	
Gain	0	
	Focus Region	
Focus Controls	Disabled	
	Autofocus	
Focus Position	0 🗘	
Save Focus Position with Job	v	
	Light Settings	

Additionally, when using a vision sensor that is compatible with color images, white balance settings are required. White balance is an important adjustment to obtain an appropriate color tone under different light sources.



Point P

It is recommended to initially import an image of a white piece of paper and specify the image for a white balance region.

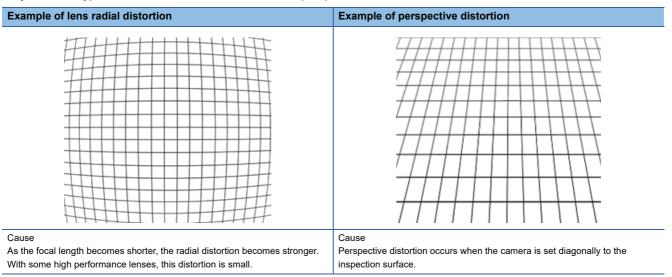
For details on each setting, refer to "Adjusting the Acquisition Settings" under "Set Up Image" on EasyBuilder Help.

4.3 Calibration

Calibration is a function to transform the dimensions that correspond to the measurement surface from pixel units to actual units.

There are two types of calibration: one in which actual workpieces or items with determined dimensions are arranged at the same height as the measurement surface, and one in which patterns defined in advance are arranged on the measurement surface.

Only the latter type can handle lens radial distortion and perspective distortion.



For details on calibration, refer to "Calibrating the Image to Real World Units" under "Set Up Image" in EasyBuilder Help.

Calibration types

Calibration type: Edge

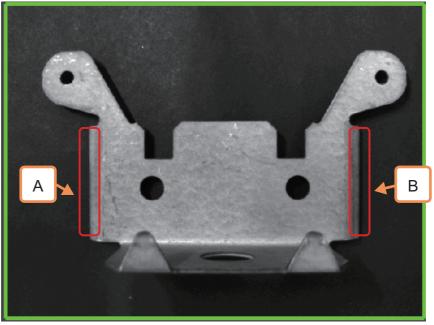
Edge calibration can be used when the distance between edges is known.

Because radial distortion and perspective distortion are not taken into consideration, precision is best when the measurement surface is parallel with the image sensor.

Operating procedure

1. The workpiece is captured.

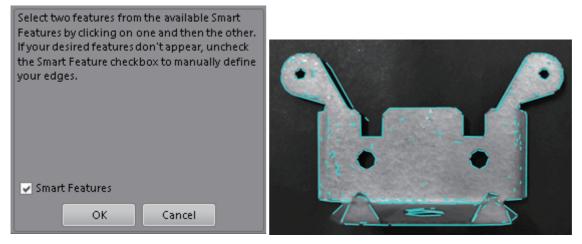
The distance between edges of the captured workpiece indicated by frames A and B is treated as 30 mm.



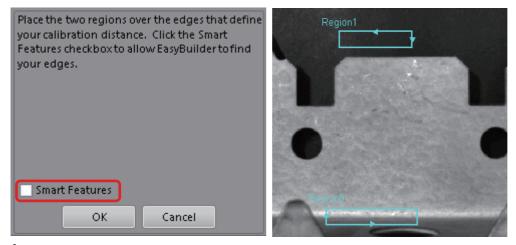
2. Select Edge for the calibration type of Set Up Image. Check the units, and then enter 30 for the dimension.

Calibrate Image to Real World L	Inits					
Calibration Type:	Select Edges Classic Orientation					X+ Y+↓
		Units:	Millimeters		•	10.0000
		Dimension	10.0000	1		
				Calibrate	0	

3. Click the edge selections, and then select the edges to be used for calibration.



Because the edges used for calibration are detected as smart features in this case, they are used for calibration. When they are not detected, it is possible to arrange the region in which an arbitrary edge is to be detected by clearing the "Smart Features" checkbox.



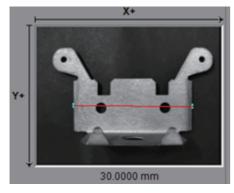
4. If one of the edges detected as a smart feature is selected, and then the other one is selected, they are entered.



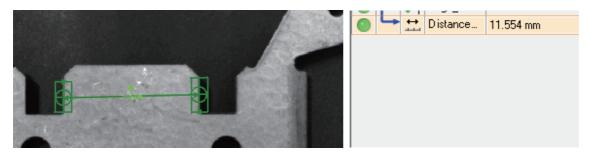
5. Click the [Calibrate] button.

Calibrate Image to Real World	Inits			
Calibration Type: Edge to Edge	Select Edges Classic Orientation			
	Units: Millimeters	10.0000		
	Dimension 10.0000			
	Calibrate			

If calibration is completed, an image like the one shown below appears.



If measurement is performed by a measurement tool, the measurement results are displayed using actual units.



Calibration Type: Grid

Grid calibration presents a predefined grid graphic to the camera. Performing calibration in this manner allows the radial distortion and perspective distortion to be calibrated nonlinearly.

The grid graphic used in calibration can be printed from In-Sight Explorer as well. However, use a calibration plate for locating that requires high precision.

Operating procedure

1. Select grid calibration.

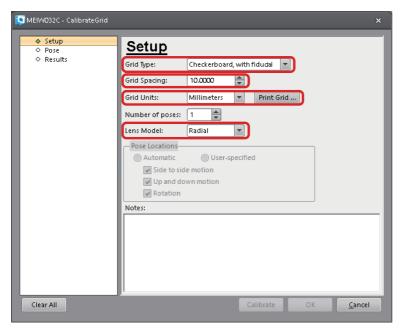
Select "Grid" for Calibration Type and click the [Calibrate] button.

Calibrate Image to Real World Units	
Calibration Type: Calibrate	
Grid Units: mm	
Dimension: 10.0000	

2. Specify the grid settings and lens model.

Select the type of grid to be presented, the grid interval and unit, and the lens model (radial distortion and perspective distortion).

If the [Print Grid] button is clicked, checkerboards or dots of the configured grid type and grid interval can be printed. (Paper size is A4 only)



Print Grid 🗕		×
Page Set <u>u</u> p <u>P</u> rint	C <u>l</u> ose	

3. Under Pose, import and calibrate an image.

After arranging a calibration plate, click the [Trigger] button to import an image. When using the image saved in advance, click [From File] and select the image. After importing the image, click the [Calibrate] button.

MEIW032C - CalibrateGrid					×
 ♦ Setup ♦ Pase > Results 	Origin Locat X: Y: Angle:	ion (World Coord	dinates)		Image Trigger Live Video From File
	Index	Row	Column	Grid X	Grid Y 🔄
	0	295.5	87.5	-100.000	-60.000
	1	295.5	105.5	-90.000	-60.000
	2	295.5	123.5	-80.000	-60.000
	3	295.5	141.5	-70.000	-60.000
	4	295.5	158.5	-60.000	-60.000
	5	295.5	176.5	-50.000	-60.000
Clear All			Calibra	te OK	<u>C</u> ancel

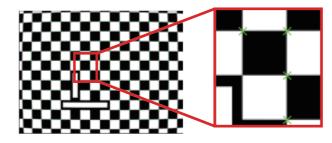
4. Check the results.

The total number of detected feature points, the average error, and the maximum error are displayed, and the calibration state is displayed from Excellent to Very Poor.

The average error is the average value of the pixel distance from the location in which the feature point was expected to be to the coordinates at which the feature point was actually detected.

MEIW032C - CalibrateGrid					×
 Setup Pose Results 	Result Total feature pr Average Error: Maximum Error 0.403	oints: 277 0.408			
	0 0.5 Good Excelle	i Marginal	2	Poor	5 Very Poor
	Index	Row	Column	World X	World Y 🔄
	0	295.5	87.5	-100.015	-59.980
	1	295.5	105.5	-89.938	-59.984
	2	295.5	123.5	-79.858	-59.988
	3	295.5	141.5	-69.758	-59.991
	4	295.5	158.5	-60.272	-59.994
Clear All			Calibrat	e OK	<u>C</u> ancel

The detected points are displayed on the grid when the calibration results are displayed.



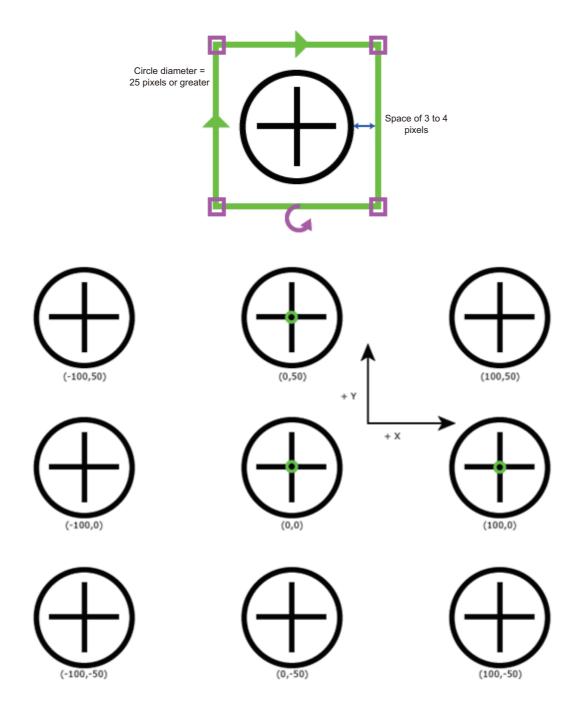
Calibration type: 9 Point

Nine point calibration is useful when creating an accurate coordinate space in a robot application.

This calibration option is based on the circle target shown in the illustration below.

A grid pattern with nine targets arranged evenly spaced makes for an ideal calibration plate.

Before calibration, it is necessary to know the horizontal and vertical distances between the targets.



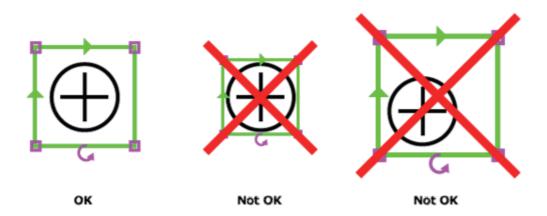
Before calibration, import a calibration plate image that includes nine targets arranged evenly spaced.

Operating procedure

- 1. From the [Calibration type] drop-down menu, select [9 point].
- 2. Click the [Edit model] button, configure the region so that the center target is enclosed, and then click the [OK] button. When configuring the region to enclose the target, leave a space of 3 to 4 pixels or more between the edge of the outer side of the circle and the region.

Furthermore, place the center of the region in the center of the target as best as possible.

[Example]



3. After the model is configured, all targets in the image are detected, and green cross marks are displayed on the targets. Note: When the target fiducial (cross mark section) is detected, but the circle that encloses the fiducial is not detected, a red cross mark appears.

In such a case, either register the model again or import a new image and solve the problem.

- 4. From the [Unit] drop-down menu, select the actual unit (microns, millimeters, centimeters, or inches).
- **5.** In the "X dimension" field, enter the actual horizontal distance (distance from the center of a target to the center of another target) of two targets in the same row.
- **6.** In the "Y dimension" field, enter the actual vertical distance (distance from the center of a target to the center of another target) of two targets in the same column.
- Click the [Calibrate] button to quit the calibration process.
 The results of the location and inspection tools are displayed in actual units.

Calibration Type: Import

For the procedure to import calibration data, refer to the following section.

Page 99 Calibration Tools: N Point

5 SET UP TOOLS

"2. Set Up Tools" in Application Steps is a step to add and configure location tools and inspection tools. This chapter lists methods to add a tool to a job and configure a tool, and overviews of each tool.

Application Steps
1. Start
Get Connected
Set Up Image
2. Set Up Tools
Docate Part
Inspect Part
3. Configure Results
Inputs / Outputs
4. Finish
Filmstrip
Save Job
Run Job

The following tools are explained in this chapter.

Usage	Classification	Tool name	Reference
Locate Part	Location Tools	PatMax Pattern, PatMax RedLine Pattern, Pattern	Page 51 Configuring Location Tools
Inspect Part	Presence/Absence Tools	Brightness	Page 58 Presence/Absence Tools: Brightness
	Measurement Tools	Distance	Page 61 Measurement Tools: Distance
	Counting Tools	Blob	Page 65 Counting Tools: Blobs
	Identification Tools	Read Text (OCRMax), Color Model ^{*1}	Page 67 Identification Tools: Read Text (OCR Max) Page 72 Identification Tools: Color Model
	Geometry Tools	Point-to-Point: Dimension	Page 77 Geometry Tools: Point-to- Point: Dimension
	Math & Logic Tools	Math	Page 80 Math & Logic Tools: Math
	Plot Tools	String	Page 84 Plot Tools: String
	Image Filter Tools	Filter	Page 88 Image Filter Tools: Filter
	Defect Detection Tools	Surface Flaw	Page 96 Defect Detection Tools: Surface Flaw
	Calibration Tools	N Point	Page 99 Calibration Tools: N Point

*1 A tool available in a vision sensor that is compatible with color tools.

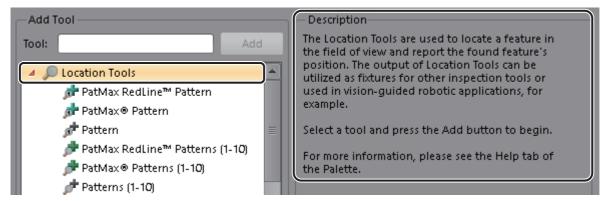
5.1 Adding a Tool to a Job

Operating procedure

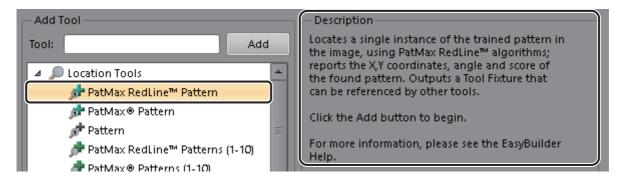
1. From Application Steps, select [Locate Part] or [Inspect Part].



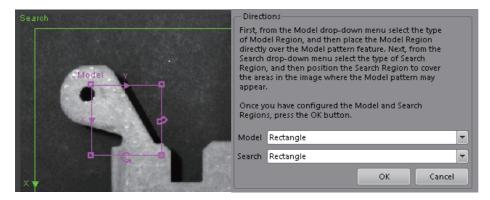
2. If a tool classification is clicked, a summary of the tool classification appears in the Description field.



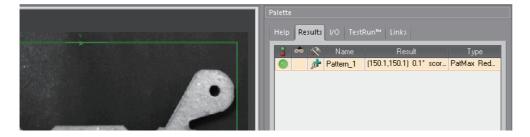
Furthermore, if a tool is clicked, a description of that tool appears.



3. If the [Add] button is clicked, the tool is added to the job, and the display changes so that initial settings that comply with the added tool are configured.



4. If [OK] is clicked, the settings are confirmed, and the tool is added to the Results tab of the Palette.



5.2 Configuring a Tool

Overview of the tool setting pane

Set Up Tools basically has [General] and [Settings] tabs. Depending on the tool, there are tabs to configure other advanced parameters.

The [General] tab is present for all tools, and it is possible to configure tool names, whether a tool is active, and whether to include it in the overall judgment.

ool Name	Pattern_1	
ool Image	Acquisition.Image	-
ool Fixture	None	-
ool Enabled	On	-
nclude In Job Pass		
xecution Time (ms		13.431
escription		

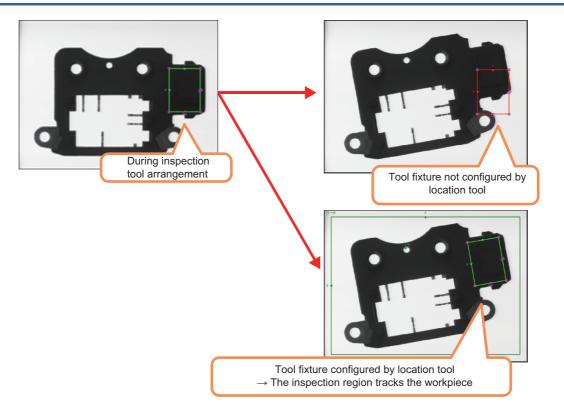
The [Settings] tab differs by tool. In some cases, there is no [Settings] tab. Special tabs may appear for tools for edges and defects.

Edit Tool - E	dgeDefe	.t_1				
🧧 General	Edges	Edge Scoring	Fit	Defects	Gaps	

Furthermore, there are also tools to configure detailed settings through displayed dialog boxes.

For parameter details and configuration methods of each tool, refer to "Locate Part" ⇔ "Choosing a Location Tool", or refer to "Inspect Part" ⇔ "Choosing Inspect Part Tools" in EasyBuilder Help.

Linking an inspection tool with a location Tool



When an inspection tool is not tracking the assumed location tool, open the inspection tool and browse to the [General] tab. Using "Tool Fixture", select the location tool to be tracked.

ſ	Edit Tool		
l	🕙 General Setting	5	
	Tool Name	Diameter_1	
l	Tool Fixture	None	-
l	Tool Enabled	On	-
l	Include In Job Pass	v	
	Execution Time (ms)		0.008
	Description		

If the setting is configured, it is possible to check which location tool the selected tool is using, even in the [Results] tab of the Palette.

– Edit Tool - Diameter	_1	F	'aleti	te			
General Settin	gs		Hel	o Re	sults	I/O Testi	Run™
Tool Name	Diameter_1	Iľ		-	4.25	Name	
Tool Fixture	Pattern_1.Fixture				Ì.	Pattern_1	(-65.0,2
Tool Enabled	On 🔻		Ō		0	Diameter	50.461
Include In Job Pass				<u> </u>			

Region configuration

Depending on the tool, the inspection region and model region may be configured.

Various regions can be created, from simple rectangles to complex polygons and partially masked regions.

Regions are configured when a tool is added, but regions can be configured or changed again later.

In the case of tools that require model registration such as PatMax patterns, it is possible to configure each region in the [Model] or [Search] tabs.

If [Model Region] is clicked in the [Model] tab, the model region can be edited.

Trained	Image <mark>Model</mark> Searc					i Image 🛛 Mo	odel Searc			
1	Rectan Add		Model Region	├	1	Rectan	Add		Train	
		Shape	Rectangle					Shape	Rectangle	-
		Operation	Add					Operation	Add	-
		Click or drag t	o insert a sub-region					Click or drag t	o insert a sub-region	
		्रि Rectangle	(Annulus					💢 Rectangle	🔇 Annulus	
		🖓 Circle	Storygon 🖓					😋 Circle	🦟 Polygon	
[① Mor	ve Up				[[́⊉Mo	ve Up	love Down			

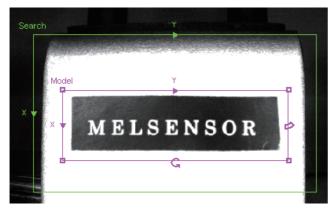
In the [Search] tab, various items can be edited, including shape and operation. Sub-regions can be inserted by click operations.

Use shapes and operations when adding changes to a selected region.

Trained Image Model Searc	h	
1 Rectan Add		Rectangle Add o insert a sub-region
[<table-cell> Circle</table-cell>	n Polygon

For example, when using only a border in the following model for locating part with PatMax pattern tool, add a subtraction region.

When the PatMax Pattern tool was added, the text inside the border is registered as well as the border.



When the entirety was registered, the score is affected even when the interior is changed.

Operating procedure

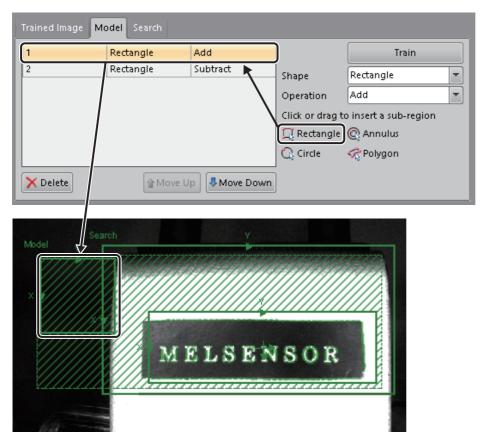
1. Image during registration



2. Case of an image in which the interior differs with the registration model



3. Click [Rectangle] of 'sub-region' to add the region.



4. Configure the subtraction region so that the area outside the border does not undergo model registration.



5. If [Train] is clicked at the [Model] tab, the section outside the subtraction region undergoes model registration again.

Į	Trained Image Model Search					
l	1	Rectangle	Add		Train	ור
l	2	Rectangle	Subtract	Shape	Rectangle	$\overline{}$
l				Operation	Add	F
l				Click or drag to	o insert a sub-region	
l				💢 Rectangle	🔇 Annulus	
l				🕼 Circle	😪 Polygon	
	XDelete	1 Move U	p 🖲 Move Down			

6. Only the border undergoes model registration.



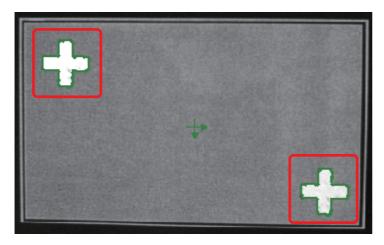
7. The score is not affected even when the area outside the border is changed.



To put isolated regions under model registration, click the appropriate sub-region shape to add the region, change this region from "Subtract" to "Add" and then allocate it.

Trained Image Model Search			
1 Rectangle	Add		Train
2 Rectangle	Add	Shape	Rectangle
		Operation	Add
		Click or drag to	o insert a sub-region
		💢 Rectangle	🔇 Annulus
		🕼 Circle	🚓 Polygon
Telete Move Up	Move Down]	
Madal			Rectangle region of
			addition

If [Register] is clicked, the two regions are registered again as models.



5.3 Configuring Location Tools

Location tools identify special locations included in an image and output the coordinates.

Furthermore, it is possible for inspection tools to track the movement of targets and send coordinates for use with robot position control.

Operating procedure

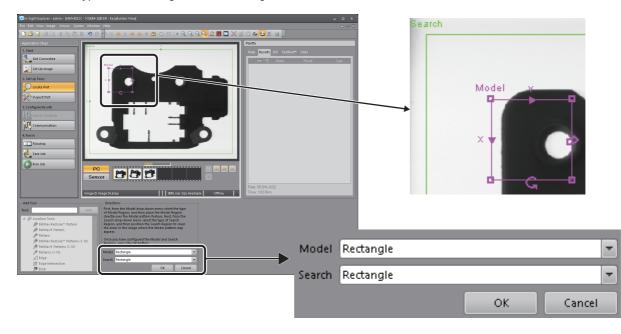
1. From Application Steps, select [Locate Part].



2. From Add Tool, select the appropriate location tool according to the workpiece features, tact time, and other conditions. If a location tool classification or a tool is clicked, a summary appears in the Description field to the right.

Add Tool	- Description
Tool: Add	Locates a single instance of the trained pattern in the image, using PatMax RedLine™ algorithms;
🔺 🔎 Location Tools 📃	reports the X,Y coordinates, angle and score of the found pattern. Outputs a Tool Fixture that
ør PatMax RedLine™ Pattern	can be referenced by other tools.
📌 PatMax® Pattern	Click the Add button to begin.
📌 Pattern 🔳	-
🏓 PatMax RedLine™ Patterns (1-10)	For more information, please see the EasyBuilder Help.
🏓 PatMax® Patterns (1-10)	
📌 Patterns (1-10)	Description field
📕 🧊 Edge	
🚽 🚽 Edge Intersection	Fool selection area
Blob	

3. If a tool is added, the display changes so that the model region (PatMax[®] pattern, PatMax Redline[™] pattern, and pattern tools only) and search region can be configured.



Point *P*

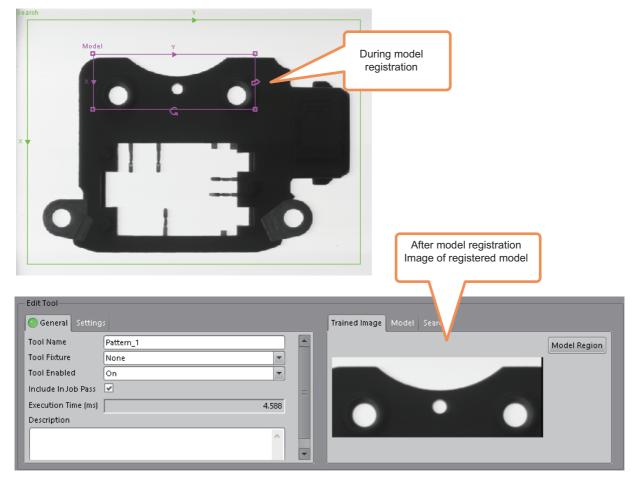
Tips during model region configuration in the PatMax pattern tool, etc.

- Select a shape with few common changes in any lot of the inspection target.
- When the pattern of background and work surface areas are erroneously registered as shapes, configure a subtraction region to exclude it.
- In a model subject to detection, for example, the orientation may be determined incorrectly in the case of a cylinder shaped workpiece.

Configure the model region so that the proportion of the special region becomes larger within the registered model.

For details of region settings, open the EasyBuilder help, search for "Inspection target region", and then see the "Region" page.

4. After model registration is complete, adjust the parameters to suit the conditions during operation.



The "Edit Tool" screen has the following tabs: [General], [Settings], [Trained Image], [Model], and [Search]. Details of each item are listed in the Help section of EasyBuilder, which is described later.

Settings tab

- Edit Tool			
💽 General 🛛 Setting	32		
Accept Threshold	50		
ContrastThreshold	0		
Rotation Tolerance	15 🚔		
Scale Tolerance	0		
Strict Scoring			
Ignore Polarity			
Horizontal Offset	0.000		
Vertical Offset	0.000		
Timeout	5000 📥		
Result	(284.5,131.5) 0.0° score = 99.8		

Model tab

Trained Image Model Search				
1	Rectan Add		Model Region	
		Shape	Rectangle	
		Operation	Add	
		Click or drag	to insert a sub-region	
		🖳 Rectangle	🛛 🖓 Annulus	
		🖓 Circle	埦 Polygon	
[∱ Mov	e Up			

Search tab

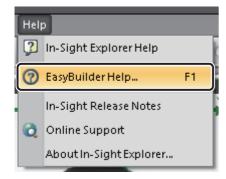
Trained Image Model Search				
1 Rectan Add	Shape Operation	Rectangle		
	💢 Rectangle	o insert a sub-region @ Annulus % Polygon		
Move Up				

Details of each parameter

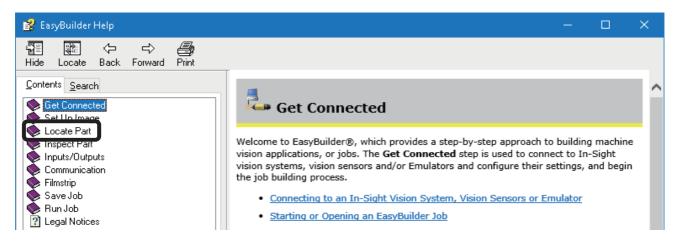
For details of each parameter, refer to the Help section of EasyBuilder as shown below.

Operating procedure

1. From the menu bar, select [Help], and then [EasyBuilder Help].



2. Select [Locate Part].



3. Click "Choosing Inspect Part Tools".



4. Click the corresponding tool.

Choosing a Location Tool

Examine your part and determine which type of feature (or features) meets your application's requirements.

- PatMax RedLine[™] Pattern
 PatMax® Pattern
 Pattern
 PatMax RedLine[™] Patterns (1-10)
 PatMax® Patterns (1-10)
 Patterns (1-10)
 Edge
 Edge Intersection
 Blob
 Blobs (1-10)
 Color Blobs (1-10)
 Circle
- <u>Compute Fixture</u>
- 5. A page with details of the tool appears.

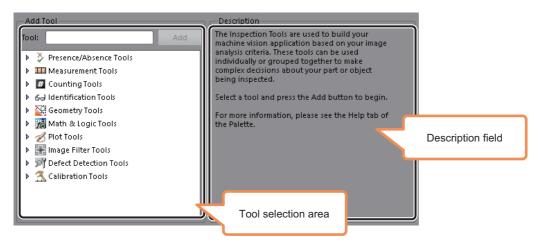
Location Tools - PatMax RedLine Pattern, PatMax Pattern, PatMax RedLine Patterns (1-10) and PatMax Patterns (1-10)
Note: The PatMax RedLine Pattern Location Tool and PatMax RedLine Patterns (1-10) Location Tool are only available on In-Sight vision systems running In-Sight firmware 5.2.0 and later. Refer to <u>Firmware Versions</u> for a complete list of models and supported firmware versions.
The PatMax RedLine Pattern Location Tool, PatMax Pattern Location Tool, PatMax RedLine Patterns (1-10) Location Tooland PatMax Patterns (1-10) Location Tool are used to locate the position of pattern features, using the PatMax RedLine or PatMax algorithm, based upon a trained representation of that pattern (called a <i>Model</i>). The PatMax RedLine Pattern and PatMax Pattern tools are used to locate a single pattern, while the PatMax RedLine Patterns (1-10) and PatMax Patterns (1-10) tools are used to locate up to 10 patterns.
Note: The tool reports X,Y coordinates in pixels, unless the image was calibrated to real-world units in <u>Set Up Image</u> .
These tools are useful in applications that require accurate positioning, such as vision guided robotic applications. These tools are also very useful as a <u>Fixture</u> for other vision tools, orienting their search within the image.
1. <u>Setting Up the PatMax RedLine Pattern, PatMax Pattern, PatMax RedLine Patters (1-10) and PatMax Patterns (1-10) Location</u> <u>Tool</u>
A. Selecting a Pattern Feature

5.4 Configuration of Inspection Tools

Inspection tools are a group of tools that are important for the vision sensor. EasyBuilder has an interface that makes it easy to configure complex inspection.

Application Steps
1. Start
Get Connected
🗾 Set Up Image
2. Set Up Tools
Locate Part
Inspect Part

If a tool classification or tool name is clicked, a summary appears in the Description field.



Presence/Absence Tools: Brightness

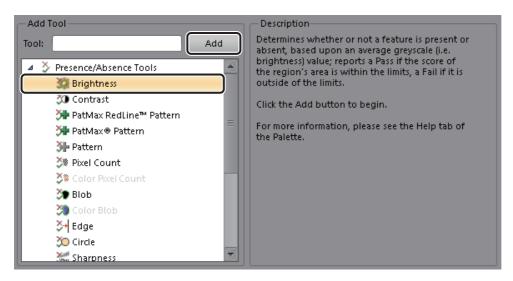
Presence/Absence Tools return presence/absence results about features in an image.

Tools include brightness, contrast, patterns, blobs, and edges, and a pass/fail judgment is made based on the presence of features that satisfy the specified conditions.

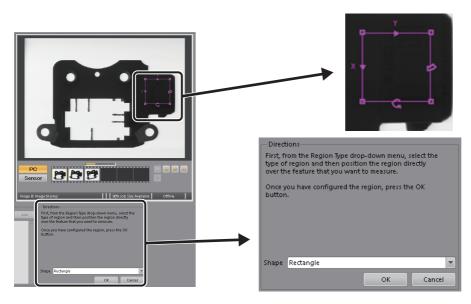
The brightness tool used here judges whether the average value of the brightness in the region is within the specified range. This easy-to-use tool processes quickly, and judgment conditions are easy to determine. However, an environment with stable lighting is necessary because the lighting conditions greatly affect the inspection results.

Operating procedure

1. Add "Brightness" under "Presence/Absence Tools" to the job.

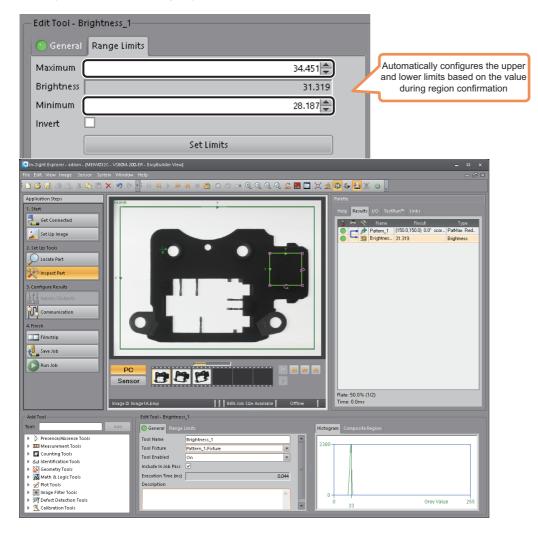


Configure the region subject to inspection.
 Configure only the necessary measurement range as the region to calculate the average value of brightness of the entire region.



3. If the region is entered, the maximum and minimum of the restricted range are configured automatically based on the average value of the brightness in this region.

As a result, a pass judgment state results when the tool is added. Adjust the restricted range by the conditions of the inspection section.



Point P

When location tools are added ahead of time, they are configured as tool fixtures for location tools and inspection tools added later.

When multiple location tools are being used, configure tool fixtures so that intended fixtures are followed.

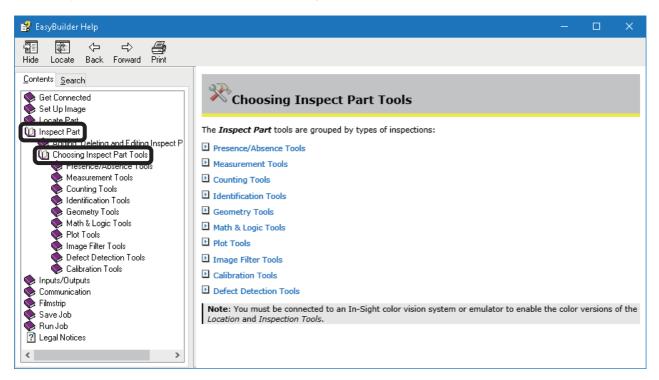
Edit Tool - Brightness_1			
🕑 General Range Limits			
Tool Name	Brightness_1		
Tool Fixture	Pattern_1.Fixture		
Tool Enabled	On 🔻		
Include In Job Pass	✓		
Execution Time (ms)	0.044		
Description			

Other Presence/Absence Tools

For details of other Presence/Absence Tools, use the following procedure to refer to the Help section.

Operating procedure

1. In EasyBuilder Help, open [Inspect Part] ⇒ [Choosing Inspect Part Tools].



2. If a section of Presence/Absence Tools is clicked, tools that can be used for presence/absence judgment appear.

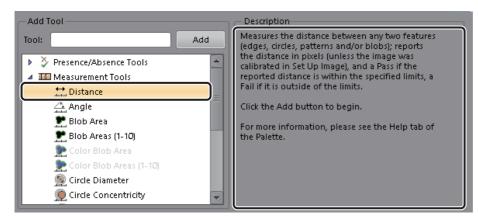


Measurement Tools: Distance

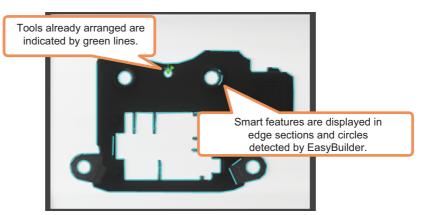
Measurement tools are used to measure the distance, diameter, angle, and surface area of features in images. For distance and surface area, running calibration makes it possible to output in actual dimensions instead of pixel units. This section describes Distance, which is used to measure the distance between features such as edges, circles, patterns, and blobs.

Operating procedure

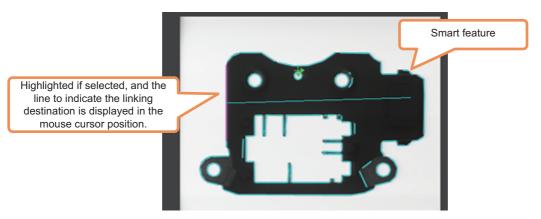
1. Add "Distance" under "Measurement Tools" to the job.



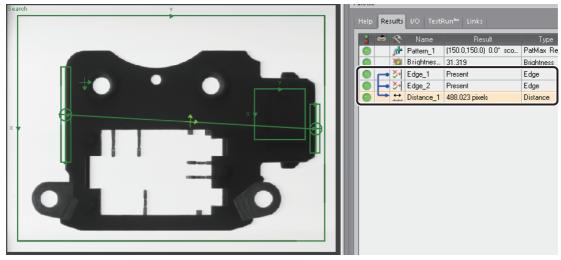
A smart feature is displayed in the image. Select the edge to be measured.
 It is possible to select the fixture position of edge tools (Presence/Absence Tools), circles (Presence/Absence Tools), and positioning tools that have already been arranged.



3. Click the smart features of the section to be measured in order, and then confirm the measurement locations.

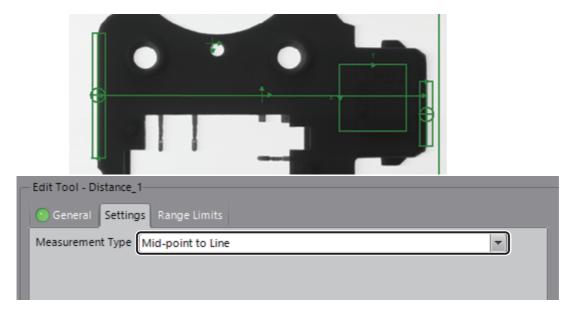


4. If a second edge smart feature is selected, two edge tools (Presence/Absence Tools) are created, and a distance tool to measure the interval of these edge tools is added.



At the default value, distance measurement between edges is from center to center.

When selecting "Mid-point to Line" for "Measurement Type" in the Settings tab, the perpendicular distance between the midpoint of the first selected edge and the line of the edge selected the next time is measured.



In the [Range Limits] tab, configure the range to pass inspection.
 When the calibration is performed, the results and range limits are displayed in the physical units determined by calibration.

■ Calibration not performed

💽 General 🛛 Set	tings Range Limits
Maximum	512.424
Distance (pixels)	488.023
Minimum	463.622

After calibration

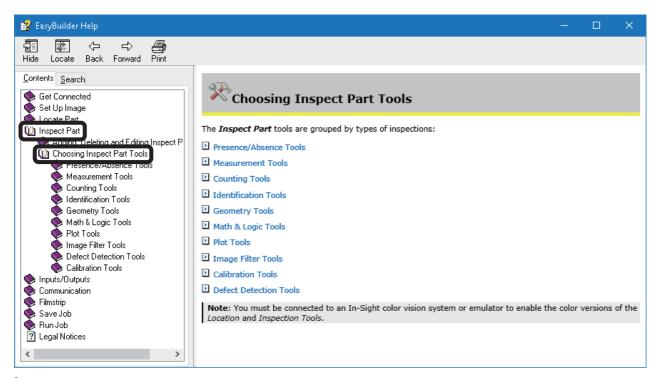
Seneral Settings Range Limits	
Maximum	10.514 🚔
Distance (mm)	10.013
Minimum	9.512 🜲

Other Measurement Tools

For details of other measurement tools, use the following procedure to refer to the Help section.

Operating procedure

1. In EasyBuilder Help, open [Inspect Part] ⇔ [Choosing Inspect Part Tools].



2. By clicking "Measurement Tools", available tools for measurement are displayed.

Choosing Inspect Part Tools				
The Inspect Part tools are grou	The Inspect Part tools are grouped by types of inspections:			
Presence/Absence Tools				
Measurement Tools The Measurement Tools are used to measure distances, diameters, angles and area of features in the image.				
<u>Distance</u>				
• Angle				
<u>Blob Area</u>				
 <u>Blob Areas (1-10)</u> 				
<u>Color Blob Area</u>				
<u>Color Blob Areas (1-10)</u>				
<u>Circle Diameter</u>				
<u>Circle Concentricity</u>				
Measure Radius				
<u>Min/Max Points</u>				

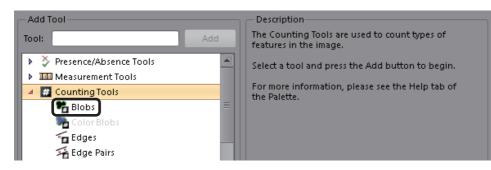
Counting Tools: Blobs

Counting tools count features included in images.

Use this tool when inspecting whether the required quantity has been set.

Blobs used here indicate black or white masses.

This tool is suitable for finding black or white features relative to the background with undefined shapes in the configured inspection region.

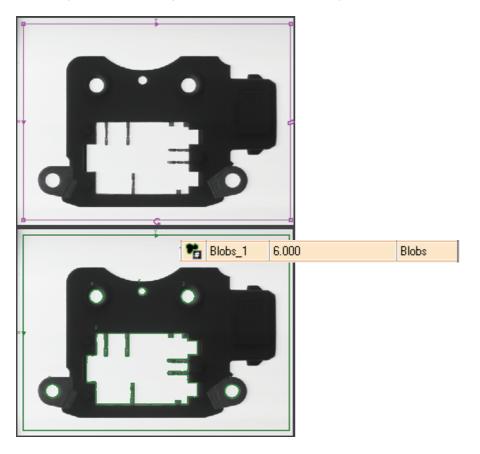


Operating procedure

1. Add "Blobs" under "Counting Tools" to the job.

Add Tool	
Tool: Add	Counts the number of groups of dark or light-colored connected pixels, called blobs,
🔺 🗰 Counting Tools	present in a region of the image; reports the number of found blobs, and a Pass if the number
🐂 Blobs	of blobs is within the specified limits, a Fail if it is
Color Blobs	outside of the limits or the blobs aren't found.
Tages	Click the Add button to begin.
र्म्त Edge Pairs ♣a PatMax RedLine™ Patterns	For more information, please see the Help tab of the Palette.

2. Arrange the inspection region so it encloses the entire region in which blobs are to be detected.

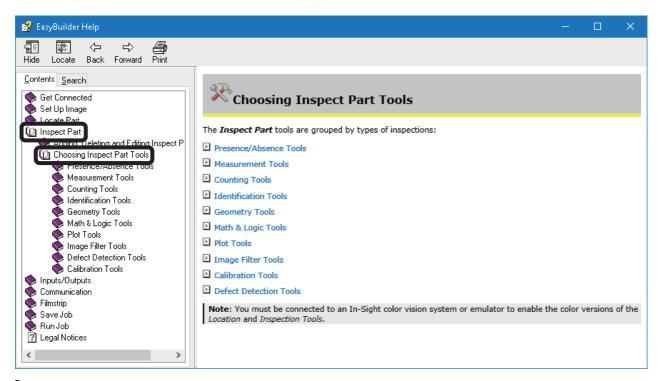


Other Counting Tools

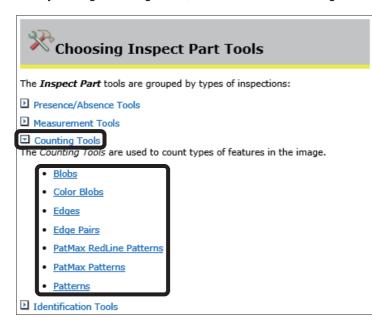
For details of other counting tools, use the following procedure to refer to the Help section.

Operating procedure

1. In EasyBuilder Help, open [Inspect Part] ⇒ [Choosing Inspect Part Tools].

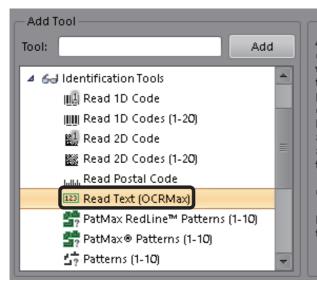


2. By clicking "Counting Tools", available tools for counting are displayed.



Identification Tools: Read Text (OCR Max)

Identification tools identify text, barcodes, 2D codes, colors and other predefined features in the inspection region. Read Text (OCR Max) identifies text strings in the inspection region, and then outputs the results. The OCR Max tool separates characters accurately during text recognition to improve the recognition rate. This improves scanning precision and speed compared to traditional OCR tools.



Description

After training and creating user-defined character fonts, reads and/or verifies a text string within a region. Using the OCRMax algorithm, the tool performs Optical Character Recognition (OCR) through a process of segmentation and classification against a trained font database. Reports the information from the text string, and a Pass if the characters in the text string are above the specified limits, a Fail if they are below the limits or the text string wasn't found.

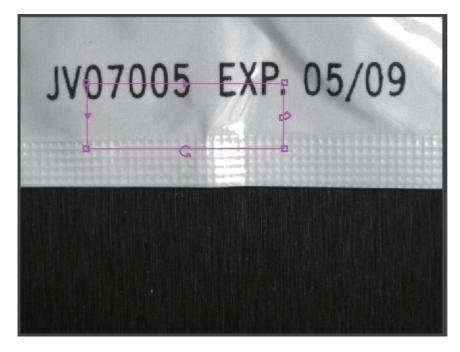
Click the Add button to begin.

For more information, please see the Help tab of the Palette.

Operating procedure

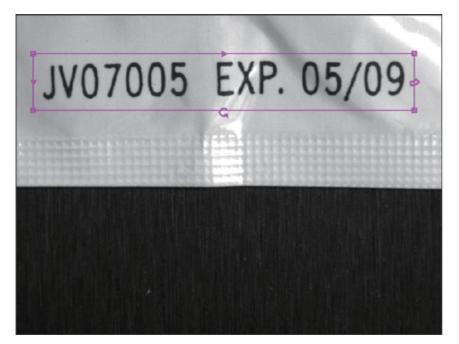
1. Add Read Text (OCR Max), and then adjust the region to match the section in which the features to be identified are present.

In this example, a location tool has been added in advance so that the inspection region of the Read Text tool can track the location of the text string.



5

Configure the inspection region so it encloses the target text string to be read.



2. If the region is entered, the display changes as shown below.



3. After the region is entered, click [Auto-Tune] in the [Segmentation] tab to open the "Auto-Tune" screen.

ſ	Edit Tool - Text_1		
	General Settings Segmentation	Advanced Spaces VariableLength	
		Auto-Tune	
	Character Polarity	Auto	
	Character Width Type	Auto	
	Minimum Character Width	3 🔺	
	Minimum Character Height	3 🗢	

4. In the [Auto-Tune] tab of the "Auto-Tune" screen, enter the text string set for the recognition target in the "Text" text box and click the [Fix Segmentation (Automatic)].

S Auto-Tune	x
Auto-Tune Settings Records Font	
Text JV07005EXP.05/09 II23 Fix Segmentation (Automatic) Fix Segmentation (Manual) II23 Train Characters Only	
OK <u>C</u> ancel	

5. The results of the auto-segment are displayed. Select the correct result and click the [OK] button. If all results are incorrect, click [Edit Result] to adjust each region.

Text_1 UNOZOOS EXP: 05/09
Auto-Segment Results × Select the result which best segments the characters. Auto-Segment Result Result_1 Result_2
C Edit Result
Image: Name Result Type Image: Text_1 JV07005EXP.05/09 Read Text
JV07005 EXP. 05/09

6. If the scanning fails for several times after the registration, adjust the region by the "Auto-Tune" function.

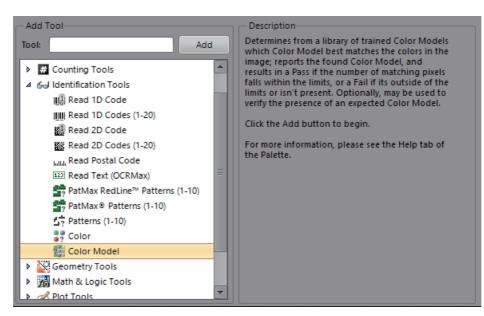


Identification Tools: Color Model

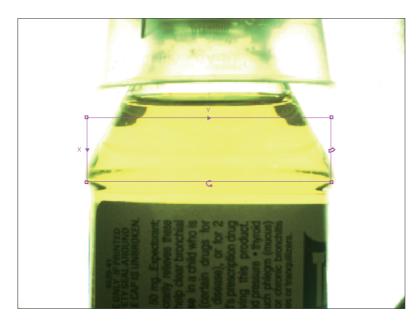
Color Model is a tool available only in a vision sensor that is compatible with color tools. The tool counts the number of pixels present in the inspection region that match a Color Model in the trained Color Library, and judges a Pass or Fail. Additionally, the tool outputs the name of the most found Color Model as a result.

Operating procedure

1. Add "Color Model" under "Identification Tools" to a job.



2. Set an inspection region.



3. Train a Color Model.

Click the [Train Color] button to open the "ExtractColor Training" screen.

Edit Tool - ColorModel	Identification_1	
General Settings		
	Train Color	
Color Library	ExtractColorLibrary_1	
Mode	Identify 🗸	
Match Color		
Minimum Pixel Count	1000	3
Show Original Image		
Result	yellow	

O Click the [New Model] button to create a new Color Model. Rename the Color Model as necessary.

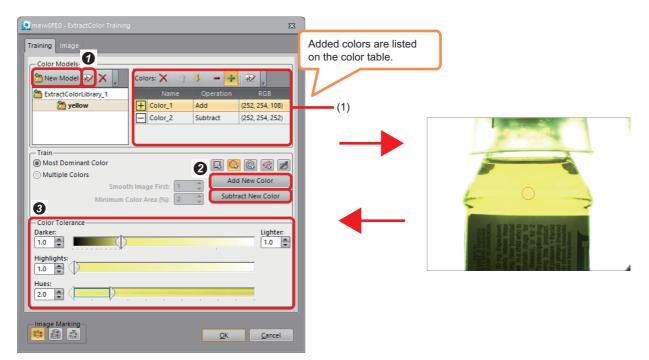
Oclick the [Add New Color] or [Subtract New Color] button in the [Training] tab to add a color(s) to a Color Model.

Most Dominant Color: To train a single color that occupies the largest area of the target region.

Multiple Colors: To train multiple colors included in the target region.

3 Set a color tolerance of each color selected in the color table.

Adjust brightness and darkness, highlights, and hues appropriately while checking the imported image.



(1) Color table

Pixels that are distinguished by the added color are marked as shown in the following figure.



4. Configure each setting of the tool.

Color Library: Select a library to perform matching.

Mode: In the "Identify" mode, the inspection passes when a color in the inspection region matches any of the Color Models in the Color Library.

In the "Match" mode, the inspection passes when a Match Color matches a Color Model that is detected in the inspection region.

Match Color: Set a Color Model to be detected when the Mode is set to "Match."

Minimum Pixel Count: Define the minimum pixel count threshold for determining whether or not a Color Model is considered to be a match.

The following settings are configured as an example:

Edit Tool - ColorModel	Identification 1	
General Settings		
General Settings		
	Train Color	
Color Library	ExtractColorLibrary_1	
Mode	Identify 💌	
Match Color		
Minimum Pixel Count	1000 🜩	
Show Original Image		
Result	yellow	

5. When the inspection passes

When the inspection region color is yellow, the tool outputs a Pass.



6. When the inspection fails

When the inspection region color is other than yellow, the tool outputs a Fail.



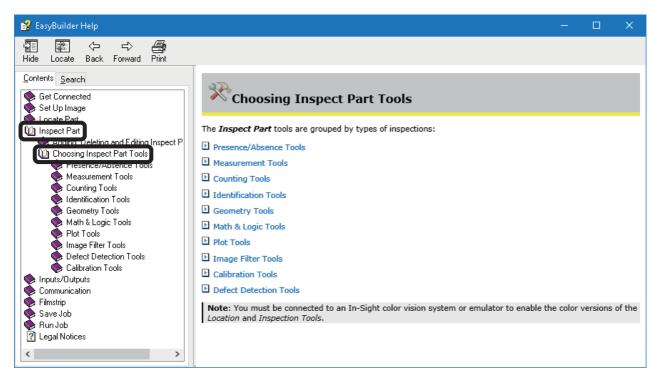
- 8	~ X			Pass	
	2	ColorModelIdentification_1	💢 No Match: Out of Range	0/1	1/1

Other Identification Tools

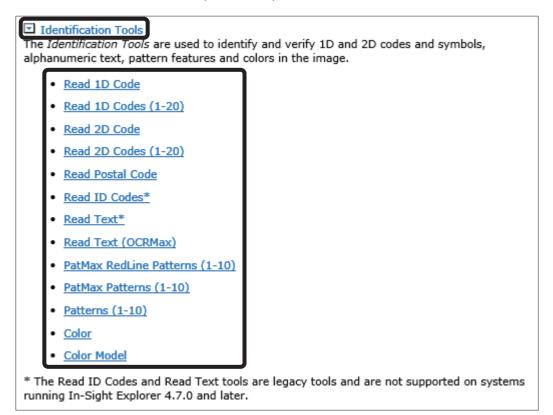
For details of other identification tools, use the following procedure to refer to the Help section.

Operating procedure

1. In EasyBuilder Help, open [Inspect Part] ⇒ [Choosing Inspect Part Tools].



2. Click "Identification Tools" to expand the Help section.

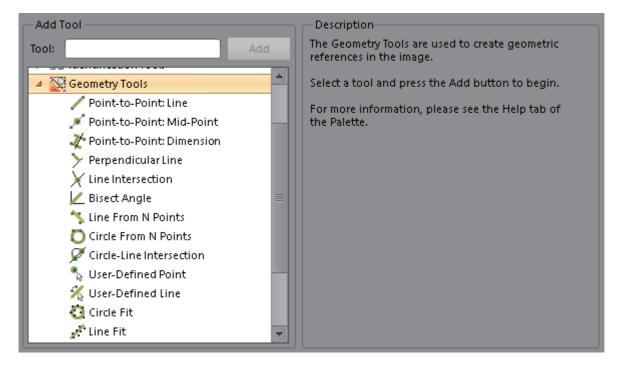


Geometry Tools: Point-to-Point: Dimension

Geometry tools create geometric reference shapes in images.

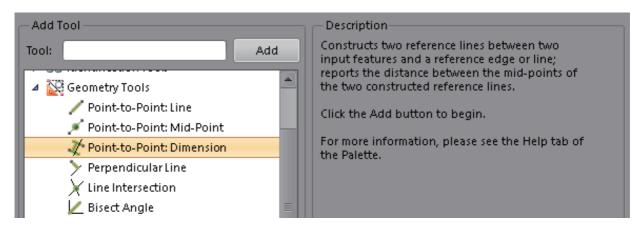
Furthermore, measurement can be run using the created tool.

The difference between [Point-to-Point: Dimension] and [Distance] of Measurement Tools is it is possible to specify another edge for the reference line to measure distance.

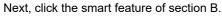


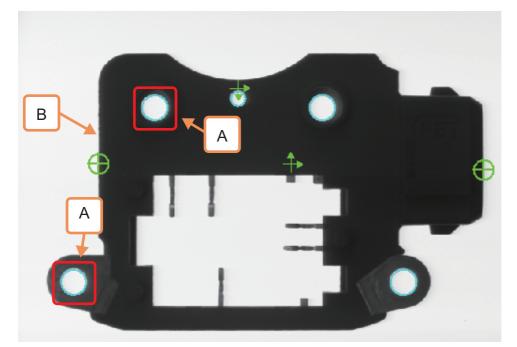
Operating procedure

1. Select "Point-to-Point: Dimension" from Add Tool.

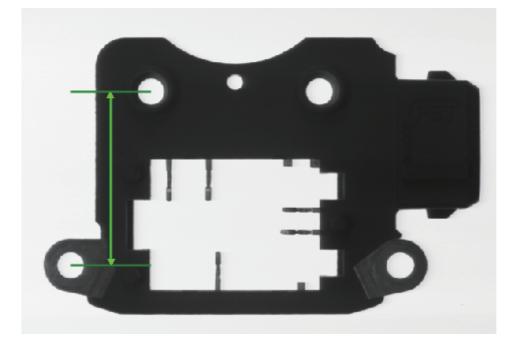


2. After the tool is added, specify the point to be measured first. In this example, settings are configured so that the distance between the centers of the two openings surrounded by red frames is measured in parallel with a line along the edges indicated by the blue lines. First, click the smart feature of section A.





3. If configuration is complete, the display shows the distance between the two points that was measured by a line parallel with the selected edges.

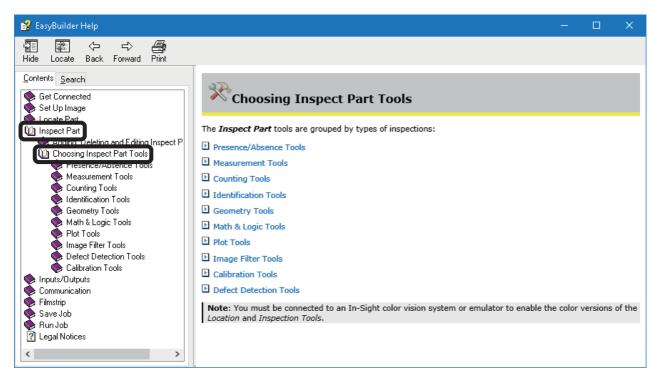


Other Geometry Tools

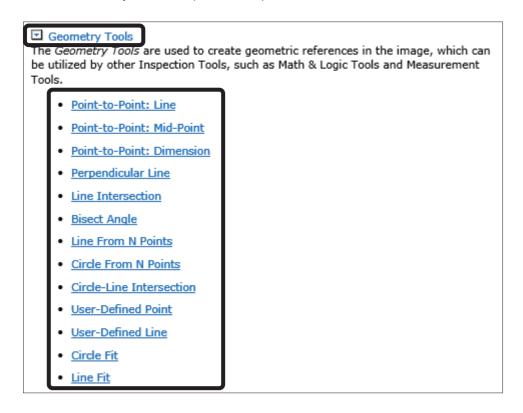
For details of other geometry tools, use the following procedure to refer to the Help section.

Operating procedure

1. In EasyBuilder Help, open [Inspect Part] ⇒ [Choosing Inspect Part Tools].



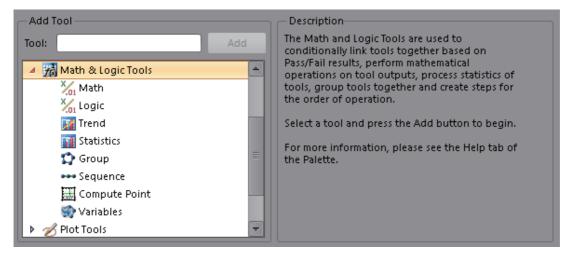
2. Click "Geometry Tools" to expand the Help section.



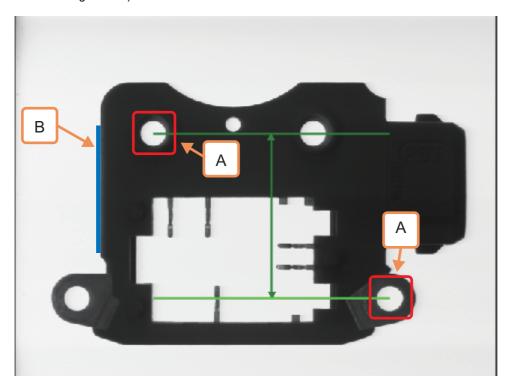
Math & Logic Tools: Math

Math and logic tools perform mathematical and statistical processing using the output values of location tools and other inspection tools (coordinates, brightness, presence/absence judgment values, etc.).

Math tools can carry out numerical calculations using parameters and output values of other tools and extract only identified sections from the results of identification tools using text string operations.

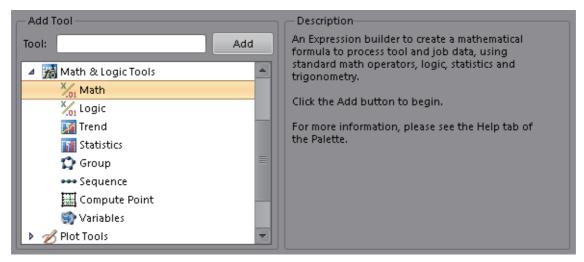


In this example, the Point-to-Point: Dimension tool added on Page 77 Geometry Tools: Point-to-Point: Dimension and another Point-to-Point: Dimension tool (measurement of the distance between the circles in frames A in parallel with a line along the edge of section B in the image below) are added and the difference of the measured distances is calculated.

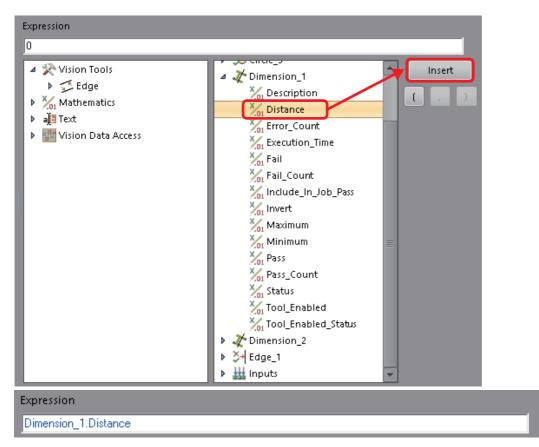


Operating procedure

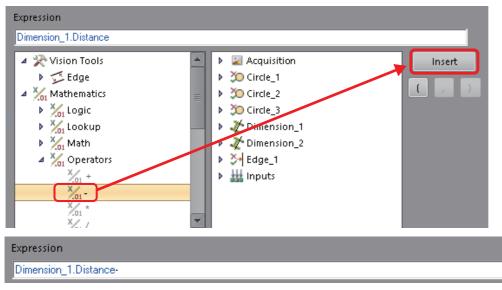
1. Add "Math" to the job.



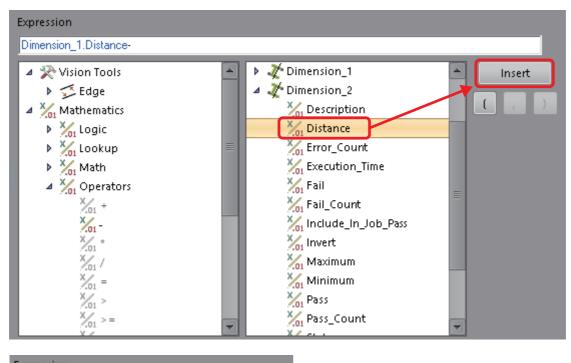
2. Insert the dimension of the Point-to-Point: Dimension tool to "Expression".



3. Either edit the formula directly or insert "-" from Operators under Mathematics.



4. Insert another dimension of the Point-to-Point: Dimension tool to "Expression".



Expression

Dimension_1.Distance-Dimension_2.Distance

5. In the [Range Limits] tab, configure the numerical range to pass judgment.Minimum value and maximum value can be configured by entering the values directly.In addition, range limits can be configured automatically by clicking the [Set Limits] button.

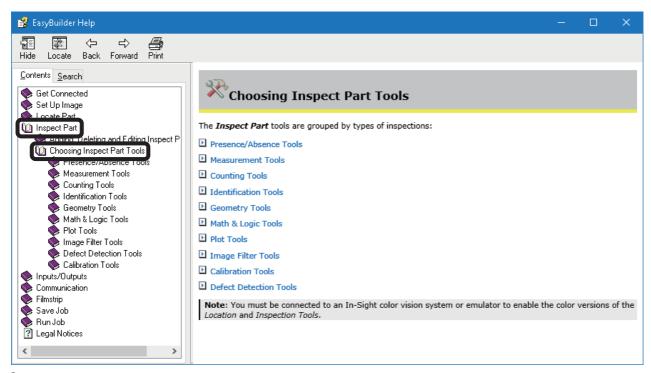
💽 General	Range Limits	
Maximum	3.000	
Result	0.003	
Minimum	-3.000	
Invert		
	Set Limits	

Other Math & Logic Tools

For details of other math and logic tools, use the following procedure to refer to the Help section.

Operating procedure

1. In EasyBuilder Help, open [Inspect Part] ⇔ [Choosing Inspect Part Tools].



2. Click "Math & Logic Tools" to expand the Help section.

Math & Logic Tools

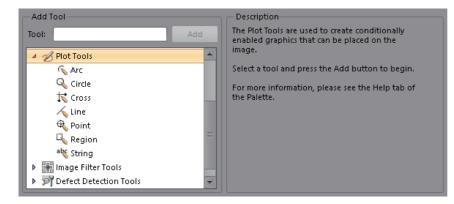
The Math & Logic Tools are used to conditionally link tools together based on tool and job data, perform mathematical operations on tool outputs, process statistics of tools, group tools together and create steps for the order of operation.

Math
Logic
Trend
Statistics
Group
Sequence
Compute Point
Variables

Plot Tools: String

Plot tools can display arbitrary shapes and character strings on the inspection screen in a manner similar to the results of other tools.

This section describes the String tool that displays character strings in arbitrary locations.



Operating procedure

1. Add "String" under "Plot Tools" to the job.

- Add Tool	- Description-
Add 1001 Tool: Add Add Arc Circle Circle Cross Line Point Region	Plots a text string graphic on the image based on mathematical expressions. Requires Location or Inspection Tools as inputs; add and configure those tools before adding this tool. Click the Add button to begin. For more information, please see the Help tab of the Palette.
abc String	
Image Filter Tools	
▶ 🔊 Defect Detection Tools	

2. Configure the String tool.

The X and Y tabs on the right side are the X and Y coordinates to be displayed, respectively. The String tab defines the character string to be displayed.

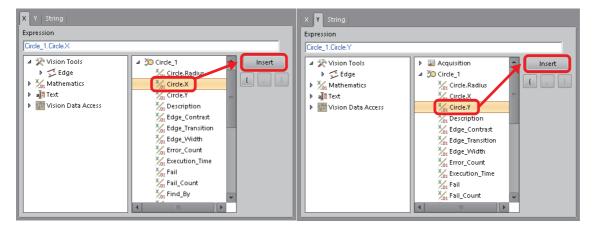
In each tab, it is possible to use the results of Math and other tools in a manner similar to the formula entry section on Page 80 Math & Logic Tools: Math.

– Edit Tool –					
General Settings		þ	X Y String		
Tool Name	String_1		Expression		
Tool Enabled	On 💌		0		
Include In Job Pass			🔺 🔆 Vision Tools	🕨 📓 Acquisition	Insert
Execution Time (ms)	0.005		🕨 🗲 Edge	Circle_1	
Description			Mathematics	Circle_2	
	^		🕨 aju Text	Circle_3	
			Vision Data Access	🕨 🤌 Dimension_1	
				🕨 🤾 Dimension_2	
				▶ 🏹 Edae 1	

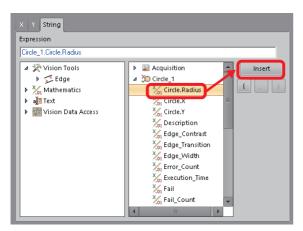
In this example, the screen displays the radius of the detected circle for Circle_1 of the Presence/Absence Tool added automatically to detect circles when the Point-to-Point: Dimension tool was added.

The display location uses the coordinates of the circle.

3. In the X formula section and Y formula section, insert Circle_1.Circle.X and Circle_1.Circle.Y, respectively.



4. In the String formula section, insert Circle_1.Circle.Radius.



5. The radius of the circle is displayed on the center coordinates of the circle detected by Circle_1.



It is possible to change the font, font size, color, and other features of the character string to be displayed at the [Settings] tab.

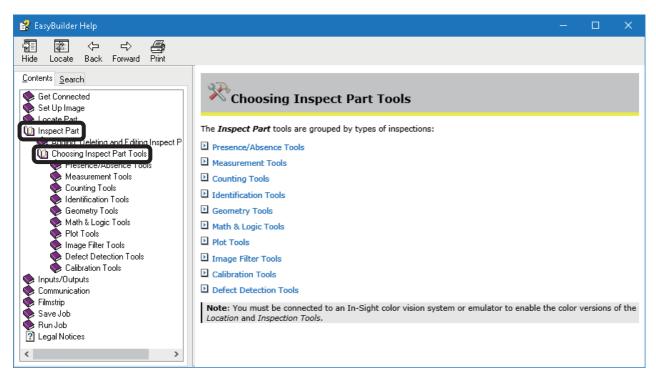
Edit Tool - St	ring_1	
🕙 General	Settings	
Result	16.709	
Color	Default	-
Font Name	Arial	-
Font Style	Regular	-
Font Size	9	-

Other Plot Tools

For details of other plot tools, use the following procedure to refer to the Help section.

Operating procedure

1. In EasyBuilder Help, open [Inspect Part] ⇒ [Choosing Inspect Part Tools].



2. Click "Plot Tools" to expand the Help section.

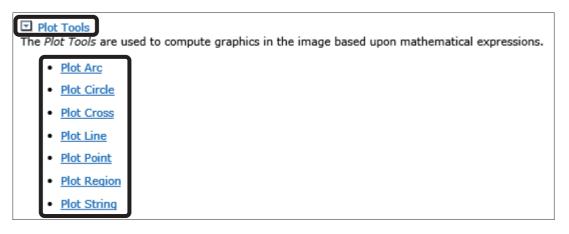


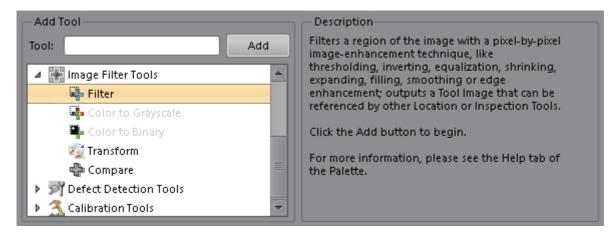
Image Filter Tools: Filter

The image filter tools are used to emphasize features as preprocessing for image analysis. This section describes the settings of [Filter].

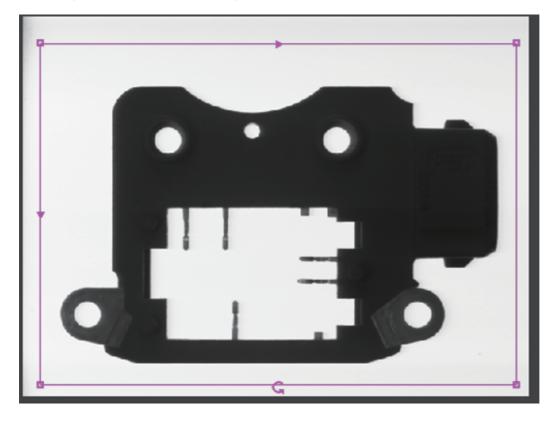
Operating procedure

1. Add "Filter" to the job.

The filter tool can run emphasis-processing on various images in the prescribed region.



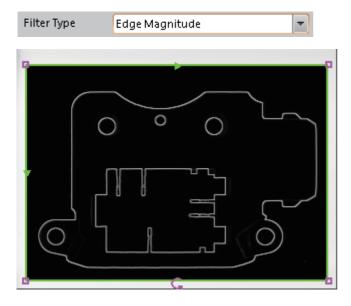
2. Specify the area to be emphasized by the filter.



3. Select the filter type.

Edit Tool								
🕙 General 🛛 Set	C General Settings							
Filter Type	Binarize	-						
Kernel Rows		3 🜲						
Kernel Columns		3 🌲						
Threshold Mode	Auto	-						
Threshold		128 🌲						
Min		128 🌲						
Max		128 🌲						
Gain		1.000 🌲						
Smoothness		1 📥						

For example, when selecting Edge Magnitude, an image as shown below is displayed.



Point P

To use images emphasized by Image Filter Tools with location tools and inspection tools, it is necessary to browse to the [General] tab in each tool setting, and then change "Tool Image" to "Filter_1.Image", etc.

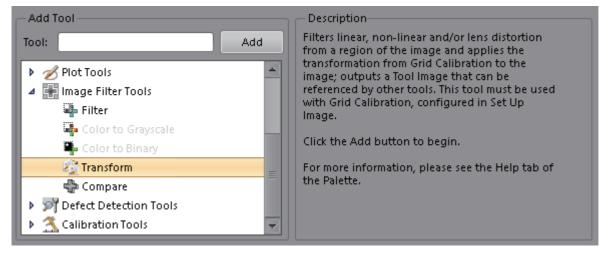
General S	ettings	💽 General 🛛 Se	ttings
Tool Name	Edge_1	Tool Name	Edge_1
Tool Image	Acquisition.Image	Tool Image	Filter_1.Image

■ About [Transform] of Image Filter Tools

[Transform] in the Image Filter Tools is a filter that can be used only when grid calibration has been run.

It is possible to generate an image in which radial distortion and perspective distortion have been eliminated from a captured image.

It can be utilized for inspection that depends on shapes subject to inspection, such as Identification Tools and Presence/ Absence Tools.



Example of use of the Transform filter

Operating procedure

1. Run calibration.

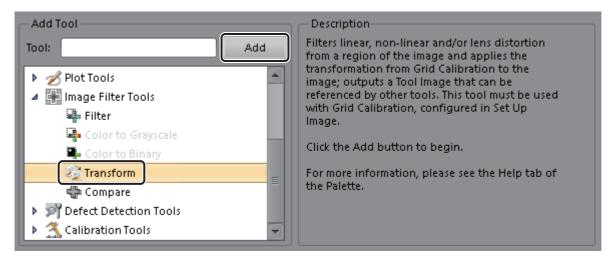
To correct the distortion for the inclination of the camera, set "Radial" for Lens Model. To correct the distortion for the lens, set "Projection" for Lens Model.

💽 VS70M-800-R_527ba2 - Calibr	steGrid	×
 ♦ Setup ♦ Pose ♦ Results 	Setup Grid Type: Checkerboard, with fidudal Grid Spacing: 10.0000 Grid Units: Millimeters Print Grid Number of poses: 1 Lens Model: Projection Pose Locations Automatic Viser-specified Side to side motion V up and down motion Rotation Notes:	
Clear All	Calibrate OK <u>C</u> ance	

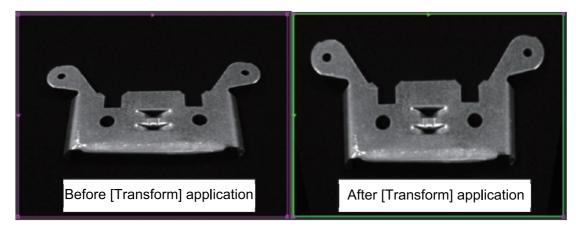
MEIW032C - CalibrateGrid	i and a second s				×
 Setup Pose 	Pose	1	_	Feature points	found: 277
 Pose Results 		 tion (World Coo 0.0000 0.0000	rdinates)	Acquire	Trigger Live Video From File
	Index	Row	Column	Grid X	Grid Y 🔄
	0	295.5	87.5	-100.000	-60.000
	1	295.5	105.5	-90.000	- 60.000
	2	295.5	123.5	-80.000	- 60.000
	3	295.5	141.5	-70.000	-60.000
	4	295.5	158.5	-60.000	-60.000
	5	295.5	176.5	-50.000	-60.000 💌
Clear All			Calibra	ate OK	<u>C</u> ancel

📮 MEIW032C - CalibrateGrid					x
 Setup Pose Results 	Result Total feature pr Average Error: Maximum Error	oints: 277 0.408			
	0 0.5 Good Excelle	1 Marginal	2	Poor	5 Very Poor
	Index	Row	Column	World X	World Y
	0	295.5	87.5	-100.015	-59.980
	1	295.5	105.5	-89.938	-59.984
	2	295.5	123.5	-79.858	-59.988
	3	295.5	141.5	-69.758	-59.991
	4	295.5	158.5	-60.272	-59.994
Clear All			Calibra	te OK	<u>C</u> ancel

2. Add "Transform" from "Image Filter Tools".

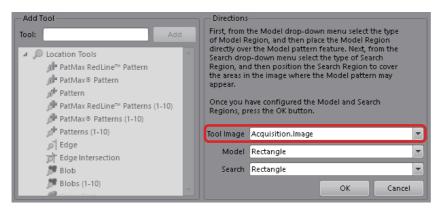


If [Transform] is added, and the region is configured, it is possible to check the image that was transformed according to the grid calibration results.

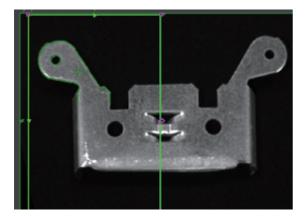


3. Use the image after [Transform] with other tools.

If location tools and inspection tools are added, the region configuration screen appears. It is possible to select the tool image to be used there when the Image Filter Tool has been added.



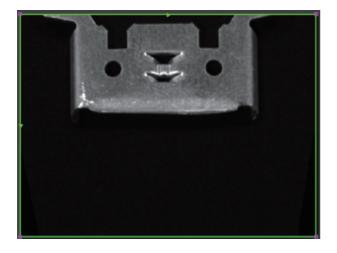
If this setting is changed to "Transform_1.Image", it is possible to use the image that was output by Transform of the Image Filter Tools as an inspection image.



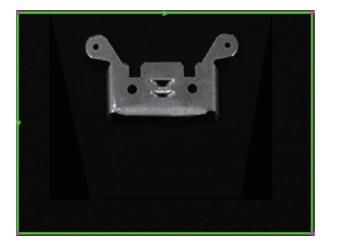
If [Transform] is used, the workpiece may not fit within the display region.

In that case, set the number less than 1 to "Image Scale" in the [Settings] tab of [Transform] so that the workpiece fits in the frame.

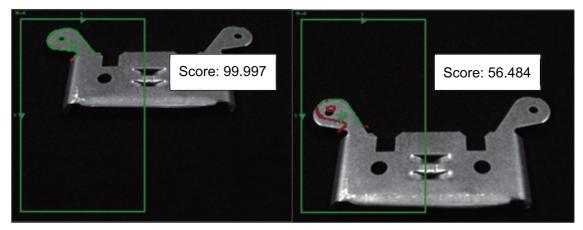
Edit Tool - Tr	ansform_1	
🕙 General	Settings	
Image Scale		1.000
Reference C	enter Image Center	_
Show Image		



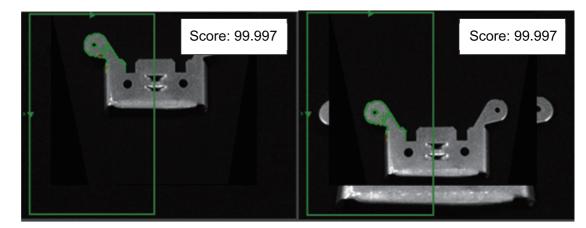
– Edit Tool - Transform 1								
Lateroor Hanstonn_1								
🕐 General 🛛 Setti	ngs							
Image Scale		0.6	20					
Reference Center	lmage Center		-					
Show Image	¥							



When a PatMax pattern is run without using a transformed image. (Model registration shown on the left)



When a PatMax pattern is run while using a transformed image. (Model registration shown on the left)

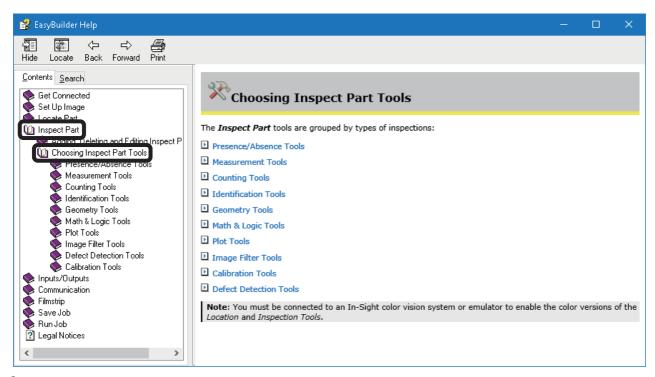


Other Image Filter Tools

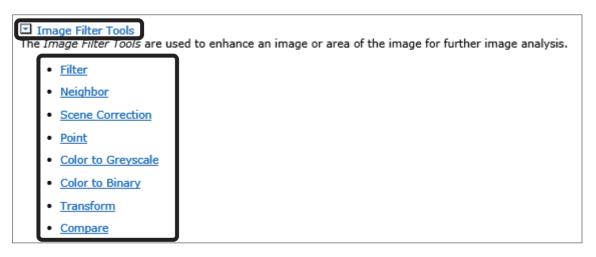
For details of other image filter tools, use the following procedure to refer to the Help section.

Operating procedure

1. In EasyBuilder Help, open [Inspect Part] ⇒ [Choosing Inspect Part Tools].



2. Click "Image Filter Tools" to expand the Help section.



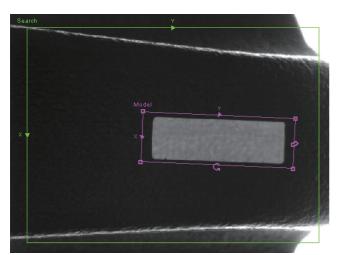
Defect Detection Tools: Surface Flaw

Defect detection tools determine whether there are cracks, wrinkles, depressions, gaps, scratches, and other defects on inspection target items or objects.

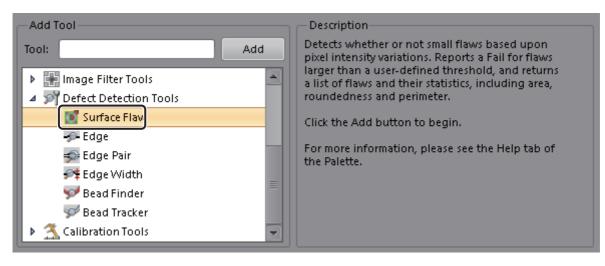
This section describes the Surface Flaw tool.

Operating procedure

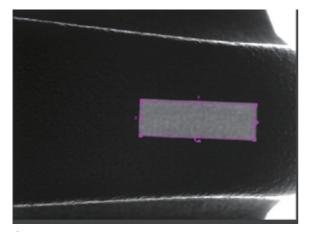
1. Arrange the location tool to identify the inspection area.



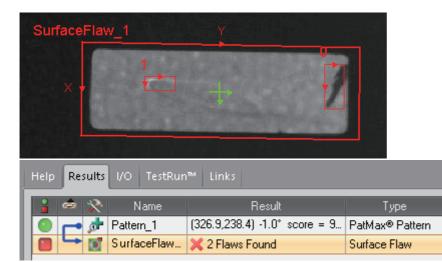
2. Add "Surface Flaw" from the "Defect Detection Tools" of Inspect Part.



3. Surround the range to run defect inspection using the region.



4. If flaws are detected, the number of detected flaws are output to Results.

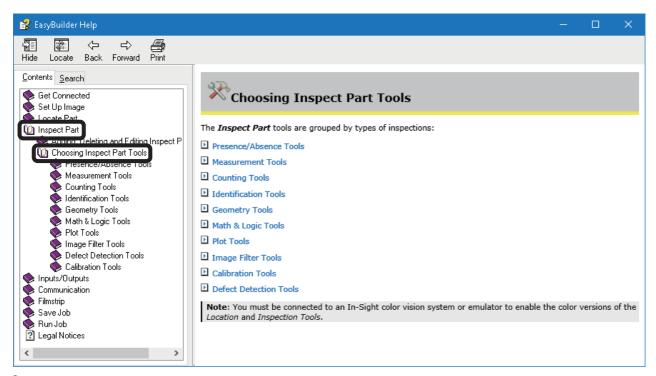


Other Defect Detection Tools

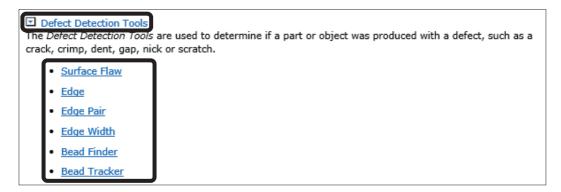
For details of other defect detection tools, use the following procedure to refer to the Help section.

Operating procedure

1. In EasyBuilder Help, open [Inspect Part] ⇒ [Choosing Inspect Part Tools].



2. Click "Defect Detection Tools" to expand the Help section.



Calibration Tools: N Point

Calibration tools are used to create calibration results that can be shared between jobs.

Generally, the tools are used to create jobs for calibration.

There are two types of calibration tools: N Point and Sequential N Point.

N Point is used when all targets used for calibration appear within the field of vision.

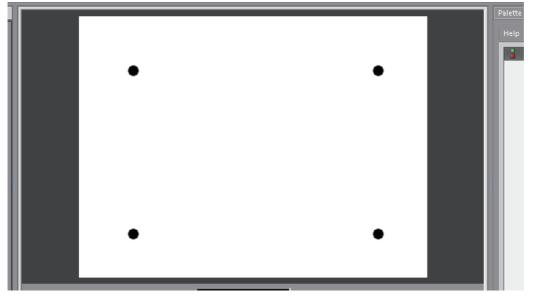
Sequential N Point is used when only one target used for calibration appears within the field of vision, and the indicator moves to known coordinates and capture is repeated.

N Point calibration and Sequential N Point calibration can be used to compensate for nonlinear distortion when five or more points are used.

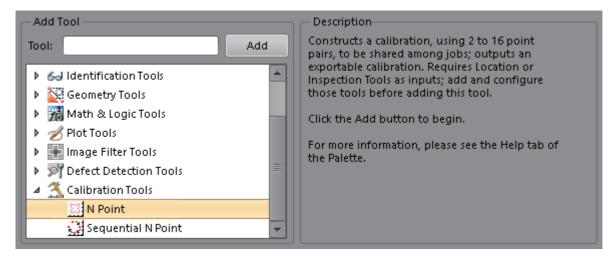
This section describes the calibration tools of N Point.

Operating procedure

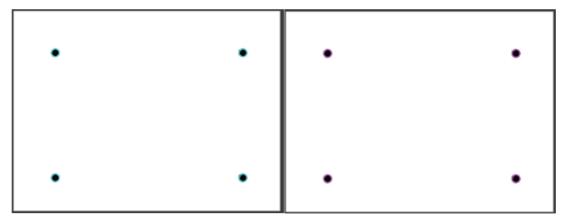
1. Import an image of the calibration targets.



2. Add "N Point" under "Calibration Tools" to the job.



3. Smart features are displayed. Select a section with known coordinates. Select 2 to 16 points.



4. Using tool editing, configure the world coordinates for each point.

Pixel row (X) and Pixel column (Y) indicate the coordinates on the image.

World X and World Y indicate the X coordinate (actual units) and Y coordinate (actual units) in the actual coordinate system, respectively.

Specify the dimensional unit entered here during the import of calibration results.

Point	Pixel Row	Pixel Column	World X	World Y	World X
PointO	99.314	99.361	99.314	99.361	99.314 ≑
Point1	99.432	549.372	99.432	549.372	World Y
Point2	399.128	99.378	399.128	99.378	99,361
Point3	399.442	549,457	399.442	549.457	≡ 99.361
Point4			0.000	0.000	
Point5			0.000	0.000	
Point6			0.000	0.000	
Point7			0.000	0.000	Select Points
Point8			0.000	0.000	
Point9			0.000	0.000 -	-
Doint10			0.000	0.000	

Point	Pixel Row	Pixel Column	World X	World Y	World X
PointO	99.314	99.361	10.000	12.000	41.000 🚔
Point1	99.432	549.372	41.000	12.000	World Y
Point2	399.128	99.378	10.000	52. 000	- 53 000 A
Point3	399,442	549.457	41.000	52.000	52.000
Point4			0.000	0.000	
Point5			0.000	0.000	
Point6			0.000	0.000	
Point7			0.000	0.000	Select Points
Point8			0.000	0.000	
Point9			0.000	0.000	
Doint10			0.000	0.000	

5. In the [Settings] tab, configure the file name, and click [Export].

Edit Tool - Ca	Edit Tool - Calib_1									
🕙 General	Settings									
File Name	Default									
Full Name	DefaultCalib									
Export	Export									
Auto Export										

6. Select "Import" in Calibration Image to Real World Units of Set Up Image to use the exported calibration file. For the file name, use the name set when the file was exported.

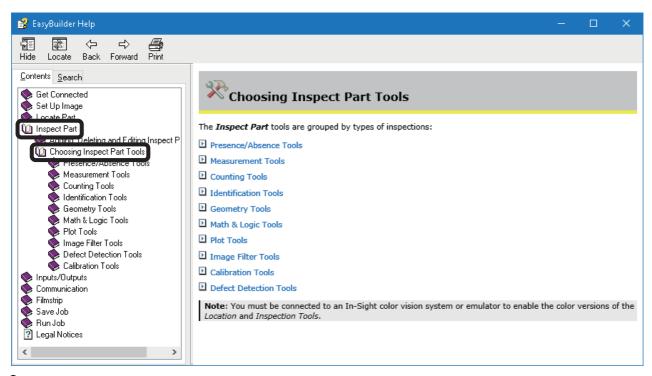
— Calibrate Image to Real Wo	rld Units	
Calibration Type:	File Name: DefaultCalib.cxd	-
Import	Units: Millimeters	-

Other Calibration Tools

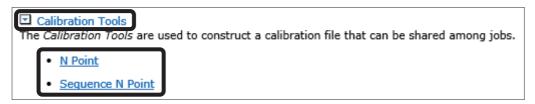
For details of other calibration tools, use the following procedure to refer to the Help section.

Operating procedure

1. In EasyBuilder Help, open [Inspect Part] ⇒ [Choosing Inspect Part Tools].



2. Click "Calibration Tools" to expand the Help section.



6 INPUTS/OUTPUTS

Configure inputs and outputs to input signals to control a camera and to output job pass/fail and run-complete signals. Because hardware configurations differ by model, refer to the following manual and help section before using the input/output function.

• EasyBuilder Help: Inputs/Outputs

This section describes the configuration method using Vision Sensor VS80.

Operating procedure

1. Under Application Steps, select Inputs/Outputs to open the discrete I/O settings screen.

1. Start								
1. Start								
Get Connected								
Set Up Image								
2. Set Up Tools								
Docate Part								
Inspect Part								
3. Configure Results								
Inputs / Outputs								
Communication								
4. Finish								
Filmstrip								
Save Job								
Run Job								

2. To connect an I/O module, connect the module and vision sensor, and then select the I/O module with the power of the I/ O module switched on as well.

Save Job	I/O Module Configu	iration	x	
Run Job	Select I/O Module:			
	Direct I/O	-		
	Direct I/O CIO-Micro			
	CIO-1400			
Select I/O Module				
De-Energize While Offline				
Module: Direct I/O				
ļ	/O Module	/	OK <u>C</u> ancel	
🛐 I/O Module Configura	tion	×		
Select I/O Module:	*			
CIO-Micro Connect <u>T</u> o:	▼			
cioMicro_4b3710				
Update Time (ms):	20			
— Details —	20 🔻			
Decans				
IP Address: 1:	92.168.3.38			
	<u>Chan</u> 72071903	ige Settings		
Firmware Version: 1.				
		OK <u>C</u> ancel		

Discrete I/O												
		Direction		Name	Signal Type		Edge Type	Job Result		Force		
▲ Inp	iut					_					_	
	0	Fixed Input		Line O	User Data	-		Undefined		None	-	
	1	Fixed Input		Line 1	User Data	-		Undefined		None	-	
	2	Fixed Input		Line 2	User Data	-		Undefined		None	-	
	3	Fixed Input		Line 3	User Data	-		Undefined		None	-	
	4	Fixed Input		Line 4	User Data	-		Undefined		None	-	
	5	Fixed Input		Line 5	User Data	-		Undefined		None	-	
	6	Fixed Input		Line 6	User Data	-		Undefined		None	-	
	7	Fixed Input		Line 7	User Data	-		Undefined		None	-	
	9	Fixed Input		IN 1	User Data	-		Undefined		None	-	
	10	Output	-	IN 2	User Data			Undefined		None		
	11	Output	-	IN 3	User Data			Undefined		None		
🔺 Ou	tput											
	0	Fixed Output		Line O	Job Result	-		Undefined	-	None	-	Details
	1	Fixed Output		Line 1	Job Result	-		Undefined	-	None	-	Details
	2	Fixed Output		Line 2	Job Result	-		Undefined	-	None	-	Details
	3	Fixed Output		Line 3	Job Result	-		Undefined	-	None	-	Details
	4	Fixed Output		Line 4	Job Result	-		Undefined	-	None	-	Details
	5	Fixed Output		Line 5	Job Result	-		Undefined	-	None	-	Details
	6	Fixed Output		Line 6	Job Result	-		Undefined	-	None	-	Details
	7	Fixed Output		Line 7	Job Result	-		Undefined	-	None	-	Details
	Direct 8	Fixed Output		hsout o	Job Result	-		Undefined	-	None	-	Details
	Direct 9	Fixed Output		HSOUT 1	Job Result	-		Undefined	-	None	-	Details
	Direct 10	Output	-	HSOUT 2	Job Result	-		Undefined	-	None	-	Details
	Direct 11	Output	-	HSOUT 3	Job Result	-		Undefined	-	None	-	Details
vХ	LED 12	Fixed Output		Pass/Fail LED	Job Result	•		Undefined	-	None	•	Details
0	LED 13	Fixed Output		Error LED	Job Result	-		Undefined	-	None	-	Details

3. If there is a connection to the module, the discrete I/O settings screen appears.

The items to be configured differ by signal type.

In this section, the method to specify the job ID and load the job file by input (Page 106 Loading a Job File by Specifying Job ID to Input Lines) and configuration to output the results of inspection tools (Page 107 Outputting the Result of Inspection Tools) are run.

6.1 Loading a Job File by Specifying Job ID to Input Lines

A job ID is a number from 0 through 127 added to the front of a job file name.

For the file named "1aaa.job", the job ID is "1".

For job ID specification, one input line is treated as one bit, and when multiple input lines are used, the form is binary. It is acceptable if input lines are configured so that the job ID range can be specified. In the case of 0 through 127, configure seven lines; in the case of 0 to 15, configure four lines, etc.

Operating procedure

1. Configure the input signal type.

When handling job IDs from 0 through 127, seven input lines must have a signal type of "Job ID Number", and one input line must have a signal type of "Job Load Switch", as shown in the image below.

Discrete I/O									
		Direction	Name	Signal Type	Edge T				
^	Input								
	0	Fixed Input	Line O	Job ID Number 💌					
	1	Fixed Input	Line 1	Job ID Number 💌					
	2	Fixed Input	Line 2	Job ID Number 💌					
	3	Fixed Input	Line 3	Job ID Number 💌					
	4	Fixed Input	Line 4	Job ID Number 💌					
	5	Fixed Input	Line 5	Job ID Number 💌					
	6	Fixed Input	Line 6	Job ID Number 🔫					
	7	Fixed Input	Line 7	Job Load Switch 💌	Rising Edg				

2. If the job IDs for input line 0 through 6 are specified and set input line 7 to ON, the job file of the specified job ID is opened.

(Example) When "3aaa.job" is loaded

3 (decimal number) = 0000011 (binary number). Therefore, Line 0 and Line 1 are set to ON and Line 2 through Line 6 are set to OFF.

In this condition, Line 7 is set to ON.

(Example) When "65bbb.job" is loaded

65 (decimal number) = 1000001 (binary number). Therefore, Line 0 and Line 6 are set to ON and Line 1 through Line 5 are set to OFF.

In this condition, Line 7 is set to ON.

6.2 Outputting the Result of Inspection Tools

On the output lines, pass/fail is output for each tool, not just for the job as a whole.

In this section, settings are configured so that a signal is output for output line 0 when Brightness of the Presence/absence tools fails.

Operating procedure

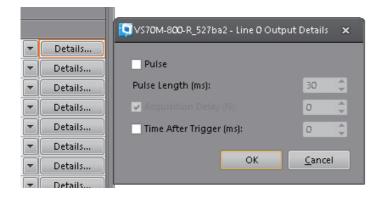
1. Configure the signal type of output line 0 to the job results.

^	Out	out				
		0	Fixed Output	Line O	Job Result	-
		1	Fixed Output	Line 1	Job Result	Ţ

2. Change the job results from "Undefined" to "Brightness_1.Fail".

	Job Result		Force			
Unc	defined	▼ None	_	.	Details	
^	None					
	Undefined			Undefined		
^	Brightness_1					
	Brightness_1.Fail			Fail		
	Brightness_1.Pass			Pass		
~	Circle_1					
~	Circle_2					
~	Dimension_1					
~	Distance_1					
~	Edge_1					
~	Edge_2					
~	Job					
~	Pattern_1					

3. In the output signal details, configure the pulse output time, etc.



7 COMMUNICATION

It is possible to connect the vision sensor with programmable controllers, servers, personal computers, and other equipment so that it is possible to change the parameters of the vision sensor, send detailed information of inspection results, and perform other operations.

7.1 CC-Link IE Field Basic Communication

CC-Link IE Field Network Basic is a factory automation network using standard Ethernet.

Data is periodically exchanged between a master station and slave stations using link devices (cyclic transmission).

The entire CC-Link IE Field Network Basic is configured by the master station.

Cyclic transmission is possible if IP addresses and subnet masks are configured for slave stations.

It is not necessary to configure master station information to slave stations.

For details of master station settings, refer to the following manual.

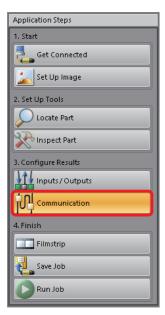
CC-Link IE Field Network Basic Reference Manual

For details on the connection procedure, refer to the following manual.

UVision Sensor Connection Guide

Operating procedure

1. From Application Steps, select Communication, and then add a communication device.



2. Configure CC-Link IE Field Network Basic for the vision sensor.

Click Add device, select the following settings (Device: PLC / Motion Controller; Manufacturer: Mitsubishi; Protocol: CC-Link IE Field Basic), and then click the [OK] button.

- Communications	- Device Setup Device:
EasyView	PLC / Motion Controller 🔹
FTP	Mitsubishi
	CC-Link IE Field Basic
Add Device	
Remove Device	OK Cancel

3. Specify the data to be input and output.

Specify the input and output data by words and bits.

Communications	Format Input Bit Data Format Input Word Data Format Output Bit Data Format Output Word Data	
OPC		
EasyView	Starting Address Name Data Type Size Value	Data Type:
FTP		Element Size (bits): 0 🗘
CC-Link IE Field Basic		
Edit Device		
Remove Device	Add Remove Up Down Reset Data Types	Message Size (bits): 0

Operating procedure

1. Select [Format Input Bit Data] and click the [Add] button.

Communications	Format Input Bit Data Format Input Word Data Format Output Bit Data Format Output Word Data	
EasyView	Starting Address Name Data Type Size Value	Data Type:
CC-Link IE Field Basic		
Edit Device	Add Remove Up Down Reset Data Types	Message Size (bits): 0

2. Select "Include_In_Job_Pass" under Pattern_1, and click the [OK] button.

	Name	Data Type	
~	Pattern_1		
	Pattern_1.Accept_Threshold	Integer	
	Pattern_1.Contrast_Threshold	Integer	
	Pattern_1.External_Retrain	Integer	
	Pattern_1.Find_Mode	Integer	
	Pattern_1.Horizontal_Offset	Floating P	
	Pattern_1.lgnore_Polarity	Integer	
	Pattern_1.Include_In_Job_Pass	Integer	
	Pattern_1.Rotation_Toleranœ	Integer	111
	Pattern_1.Scale_Tolerance	Integer	
	Pattern_1.Strict_Scoring	Integer	
	Pattern_1.Timeout	Integer	
	Pattern_1.Tool_Enabled	Integer	
	Pattern_1.Vertical_Offset	Floating P	

3. The parameter is added to the format input bit data.

Starting Address	Name	Data Type		Value	Data Type: Bit
00020	Pattern_1.include_in E	Bit	 1 1		Element Size (bits): 1
				///////////////////////////////////////	

4. In the case of word data, it is possible to specify the data type.

In the case of a character string, specify the length of each element by words.

Format Input Bit Data Format I	nput Word Data Format	Output Bit Data Format	Output Word	I Data	
Starting Address Name	: Data Type	Size	Value	Data Type:	16 bit integer 💌
00001 Pattern_1.A	ccept 16 bit integer	1 50		Element Size (words):	Bit
				,	16 bit integer
					16 bit unsigned integer
					32 bit integer
					32 bit float
					String
Add <u>R</u> emove	<u>U</u> p <u>D</u> own	Reset Data Types		Message size (words):	1

Data Type:	String	-
Element Size (words):	4	

5. Add format output data in the same manner.

	Format Input Bit Data	Format Input Word Data	Format Output Bit Data	Format Output Word Data
	Starting Name	Data Type Size	Value Data Type: Element Size (wo	prds):
l	<u>A</u> dd <u>R</u> ei	move Up	Down Reset Data Ty	ypes Message size (words):

It is possible to specify multiple items at the same time by clicking while holding down the ctril key of the keyboard.

t items to add	
Name	Data Typ
Pattern_1.Fail_Count	Integer
Pattern_1.Find_Mode	Integer
Pattern_1.Fixture.Angle	Floating
Pattern_1.Fixture.Scale	Floating
Pattern_1.Fixture.Score	Floating
Pattern_1.FixtureX	Floating
Pattern_1.Fixture.Y	Floating
Pattern_1.Horizontal_Offset	Floating
Pattern_1.lgnore_Polarity	Integer
Pattern_1.Include_In_Job_Pass	Floating
Pattern_1.Pass	Integer
Pattern_1.Pass_Count	Integer
Pattern_1.Result	String
Pattern_1.Rotation_Tolerance	Integer
Dattorn 1 Scale Telerano	Integer

6. In the case of format output data, a preview of the data to be output is displayed on the right.

Starting Address	Name	Data Type		Value	Data Type:	00005	dfff	ßÿ	
00005	Pattern_1.Fixtur	32 bit float	2	186.9995	32 bit float	- 00006		:C	
00007	Pattern_1.Fixtur	32 bit float	2	143.4982	Element Size (words):	00007		 	
00009	Pattern_1.Fixtur	32 bit float	2	0	2	000009			

00005	dfff	ßÿ	
00006	3a43	:C	
00007	8d7f		
00008		<u>.c</u>	
00009	0000		
A0000	0000		
			• • • • • • • • • • • • • • • • • • • •

7.2 SLMP Scanner Communication

This section lists the method to use the SLMP scanner communication function to connect to the MELSEC iQ-R Series programmable controller.

Operating procedure

1. From Application Steps, select Communication, and then add a communication device.

Application Steps
1. Start
Get Connected
Set Up Image
2. Set Up Tools
Docate Part
Inspect Part
3. Configure Results
Inputs / Outputs
4. Finish
Filmstrip
Save Job
Run Job

Select the protocol that suits the equipment to be connected.

- Communications OPC	— Device Setup Device:				
EasyView FTP	PLC / Motion Controller Manufacturer: Mitsubishi Protocol: SLMP Scanner				
Add Device					
Remove Device	OK Cancel				

2. Configure the controller type, IP address, host port, and other settings to suit the communication destination.

Settings Device Addressing Format Input Data Format O	utput Data
Controller Type: iQ-R/Q/L Series (3E Frame)	Connect to Remote Station:
IP Address: 192 , 128 , 3 , 120	Network Number: 0
Host Port: Dec 💌 12288 🚔	PC Number: 0x FF
Timeout (ms):	Destination Module: 0x3ff - Local station
Poli Interval (ms):	SLMP Protocol Scanner has not started.
Reset Test Connection	

For details of the vision sensor communication settings and the communication settings of the connection-destination programmable controller, refer to the following references.

- EasyBuilder Help: SLMP scanner communication
- Vision Sensor Connection Guide
- **3.** Configure the devices.

For each function, configure the device, offset (start address), and the number of devices.

Settings Device Addressing Format Input Data Format Output Data										
L	Name	Selected Devic	e	Offset	Number of Devices	Description				
L	Control	None	-	0	32	Starting PLC address of the vision control block.				
L	Status	None	-	0	32	Starting PLC address of the vision status block.				
L	Input Block	None	-	0	2	Starting PLC address of the user data block.				
L	Output Block	None	-	0	5	Starting PLC address of the inspection results block.				
	Command	None	-	0	1	Starting PLC address of the command string.				
	Command Result	None	-	0	1	Starting PLC address of the command result data.				

For details of each function, open the In-Sight Explorer Help section, and then search for "SLMP defined data blocks".

4. Specify the format input data and format output data.

The format input data and format output data use the devices specified by the input blocks and output blocks of Step 3. Using format input data, it is possible to specify parameters from the programmable controller by assigning the parameters of each tool.

Using format output data, it is possible to send the values of the measurement results, in addition to the pass/fail of the results of the inspection tool, to the programmable controller.

In this example, the acceptable threshold of the PatMax Redline[™] pattern tool is changed to the setting to control from the programmable controller.

Furthermore, settings are configured so that the X coordinates, Y coordinates, and angle results detected by the PatMax RedLine Pattern tool are output to the programmable controller.

5. Open the [Format Input Data] tab, and then click the [Add] button.

Settings Device Ad	dressing Forma	t Input Data Forma	t Output Data		
Device Address	Name	Data Type	Size	Value	Data Type:
<u>A</u> dd <u>R</u> e	emove	<u>Up</u> own	R <u>e</u> set Data Typ	es	Message size (words): 0

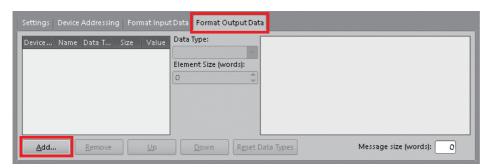
6. Select "Pattern_1.Accept_Threshold", and click the [OK] button.

/S701	M-800-R_527ba2 - Select Input Data			×
Sele	ct items to add			
	Name		Data Type	
~	Edge_1			
~	Edge_2			
~	Job			
^	Pattern_1			
	Pattern_1.Accept_Threshold		Integer	
	Pattern_1.Contrast_Threshold		Integer	
	Pattern_1.Description		String	
	Pattern_1.External_Retrain		Integer	
	Pattern_1.Find_Mode		Integer	
	Pattern_1.Horizontal_Offset		Floating P	
	Pattern_1.lgnore_Polarity		Integer	
	Pattern_1.include_in_Job_Pass		Integer	
	Pattern_1.Rotation_Tolerance		Integer	
	Pattern_1.Scale_Tolerance		Integer	Ţ
	Dathanna A Chuich Caanina		1	
		<u>о</u> к	<u>C</u> ancel	

7. One row is added as shown below.

Settings Device	Addressing Form	at Input Data Form	iat Output Data		
Device Address	Name Pattern_1.Acœ	Data Tvoe 16 bit integer	Size 1	Value 50	Data Type: 16 bit integer 👻 Element Size (words): 1 🛟
	Remove	<u>Up</u> owr	R <u>e</u> set Da	ita Types	Message size (words): 1

8. Open the [Format Output Data] tab and click the [Add] button.



9. Open Pattern_1, and then select "Pattern_1. Fixture.X", "Pattern_1. Fixture.Y", and "Pattern_1.Fixture.Angle" It is possible to select multiple items by clicking items while holding down the <u>Ctrul</u> key.

Name Pattern 1.External Retrain	Data Type Integer
Pattern_1.Fail	Integer
Pattern_1.Fail_Count	Integer
Pattern_1.Find_Mode	Integer
Pattern_1.Fixture.Angle	Floating P.
Pattern_1.Fixture.Scale	Floating P.
Pattern_1.Fixture.Score	Floating P.
Pattern_1.FixtureX	Floating P.
Pattern_1.Fixture.Y	Floating P.
Pattern_1.Horizontal_Offset	Floating P.
Pattern_1.lgnore_Polarity	Integer
Pattern_1.Include_In_Job_Pass	Integer
Pattern_1.Pass	Integer
Pattern_1.Pass_Count	Integer
Pattern 1.Result	String

10. Three rows are added as shown below.

Device Ad	Name	Data Type	Size	Value	Data Type:		D00205	dfff	ßÿ
D00205	Pattern_1	32 bit float	2	186.9995	32 bit float		D00206		Βÿ :C
D00207	Pattern_1	32 bit float	2	143,4982	Element Size (words):		D00207 D00208		 .с
D00209	Pattern 1	32 bit float	2	0	2	0.003	D00208		

8 FILMSTRIP

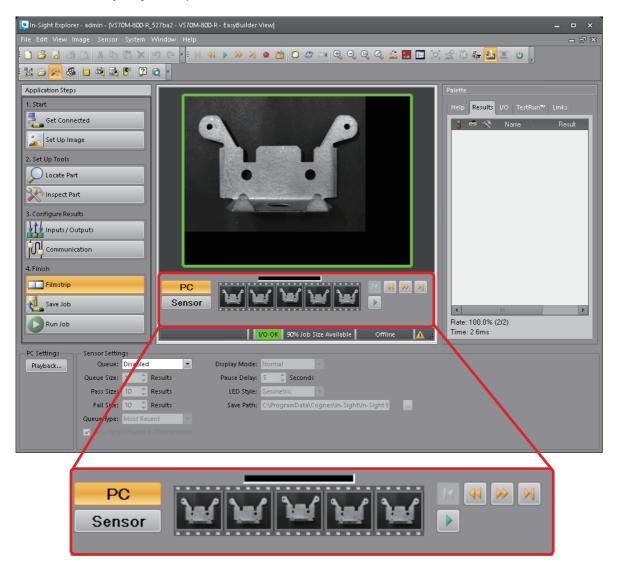
8.1 Overview of the Filmstrip GUI

Filmstrip is an interface modeled after photo film that can display scanned images and display a buffer of images of specified conditions in order.

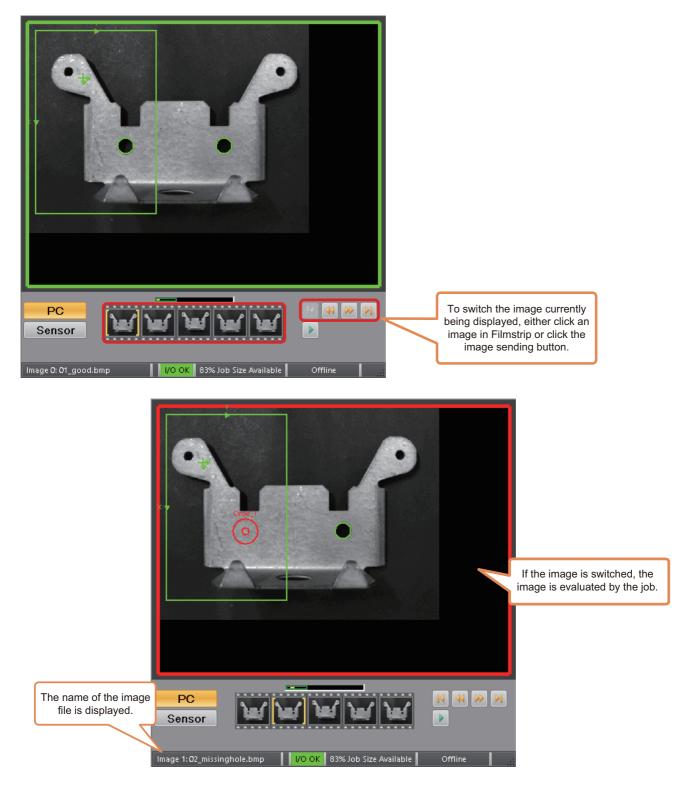
There are two types of filmstrips: PC filmstrip and sensor filmstrip, and each have the following functions.

- PC Filmstrip: Displays images in folders specified by the image playback settings as a list so that jobs can be verified while switching images.
- Sensor Filmstrip: Displays images accumulated in the vision sensor queue (image buffer) by specified conditions as a list so that jobs can be verified while switching images.

Because images are stored in the sensor memory, there is a limit to the queue size. (From 1 to 20; the maximum number of items is limited by the job size.)



If a Filmstrip image is clicked, this image is loaded, and the job is run.



8.2 PC Filmstrip Settings

Use the following procedure to configure PC Filmstrip settings.

Operating procedure

1. Under Application Steps, select [Filmstrip], and then click the [Playback] button under PC settings.

	PC Settings	Sensor Settings
4. Finish	Playback	Queue: Disabled
Filmstrip		Queue Size: 1 😂 Results
Save Job		Queue Type: Most Recent
Run Job		

2. In the [Playback] tab of the "Record/Playback Options" screen, specify the folder that contains the images to be displayed in the filmstrip.

To MEIW032C - Record/Playback Options	x
Record Playback	_,
Playback Folder C:\Users\Public\Documents\Cognex\In-Sight\In-Sight Explorer 5.4.3\Sample Jobs\EasyBuilder\Bracket Ins Image Count: 18	
Playback Mode © Contin <u>u</u> ous Single Pass <u>Time Delay:</u> 0.5 seconds	
Always Show this Dialog Before Record/Playback Restore Default	.5

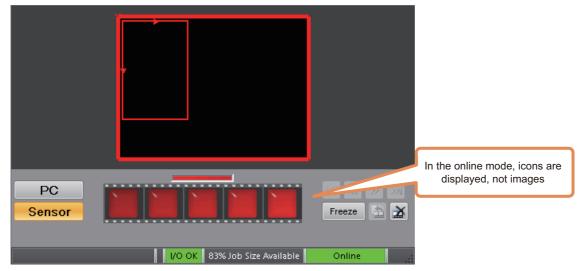
3. The images in the folder are displayed in the filmstrip.



8.3 Sensor Filmstrip Settings

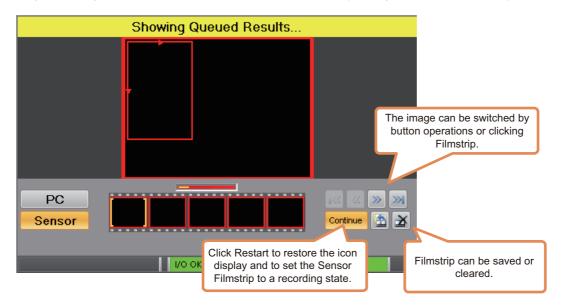
The sensor Filmstrip function temporarily retains images recorded while online and images in the vision sensor memory according to queue conditions.

For the queue conditions, select from the following: [Disabled], [Success results], [Fail results], and [Success/fail results]. While the vision sensor is online, images are not displayed in the filmstrip. Instead, icons specified by the LED style of the settings of the sensor are displayed. Images are displayed when the sensor filmstrip is stopped temporarily.



The recording of the filmstrip can be stopped, and recorded images are displayed if the [Freeze] button beside the filmstrip or the filmstrip itself is clicked.

Using the settings, it is possible to stop the filmstrip automatically during a failure or temporarily for a specified time only.



To configure the Sensor Filmstrip, under Application Steps, select [Filmstrip] to display "Sensor Settings".

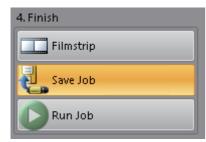
4. Finish Filmstrip Save Job Run Job	
- Sensor Settings	
Queue: Pass and Fail Results 🔻	Display Mode: Normal 💌
Queue Size: 1 🚔 Results	Pause Delay: 5 🗘 Seconds
Queue Type: Most Recent 💌	LED Style: Geometric 💌
Clear When Placed in Online Mode	Save Path: C:\ProgramData\Cognex\In-Sight\In-Sight Explore 🛕 🛄

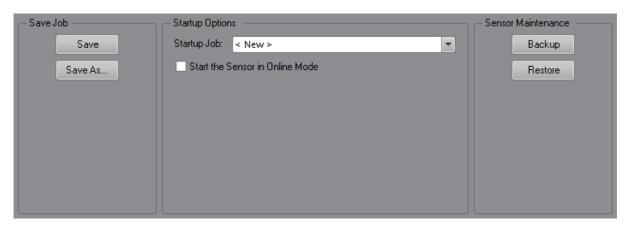
For details of each setting, open the EasyBuilder help, and then browse to [Filmstrip], and then [Sensor Settings].

9 SAVING JOB

9.1 Overview of the [Save Job] GUI

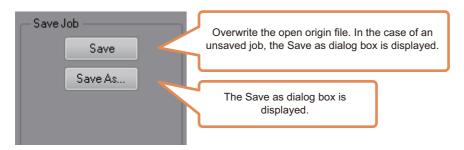
If [Save Job] under Application Steps is clicked, content related to saving jobs is displayed in the setting pane. Here, it is possible to save jobs, select jobs to be loaded during vision sensor startup, select online mode, and backup and restore data.





Save Job

Save job files to the memory of the vision sensor or a personal computer. To use startup jobs, save them on the vision sensor or a job server.



Precautions

Communication and input/output settings are not included in saved job files.

To save or restore communication settings, use the backup and restore functions of sensor maintenance.

Startup Options

It is possible to configure the job to be loaded when the vision sensor starts.

Startup Options						
Startup Job:	< New >	-				
Start the S	ensor in Online Mode					

Startup Job: It is possible to select a job file that is saved in the memory of the vision sensor.

When New was selected, an empty job is loaded.

Start the Sensor in Online Mode: if this checkbox is selected, the system enters online mode after the job file specified by Startup Job is loaded when the power supply of the vision sensor is switched ON.

Select this check box for normal operation.

Sensor Maintenance

It is possible to backup and restore the vision sensor using sensor maintenance.

Backup: Backup data in the vision sensor to a personal computer.

Only the most recent backup is retained.

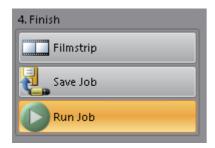
Restore: Restore the most recent backup, and then restart the vision sensor automatically.



10 RUN JOB

10.1 Overview of the [Run Job] GUI

If [Run Job] under Application Steps is clicked, the Online button, the Job Status button, the Options button, the Clear Pass/ Fail button, and the Print button for run results of each tool, and the detailed run results of each tool are displayed in the setting pane.

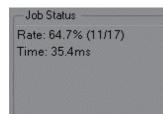


(') Online	2	*	Name	Result	Pass	Fail	Time(ms)	Туре
Job Status	0	ø	Pattern_1	(337.5,246.5) -0.0° score = 98.7	16/17	1/17	16.1	PatMax RedLine™ Pattern
Rate: 64.7% (11/17)		.	Filter_1	Pass	16/17	1/17	2.7	Filter
Time: 35.4ms		X+	Edge_1	Present	14/17	3/17	1.3	Edge
11110. 33.4113		X+	Edge_2	Present	15/17	2/17	1.1	Edge
		$\underset{\scriptstyle alual ad}{\leftrightarrow}$	Distance_1	410.962 pixels	14/17	3/17	0.8	Distance
		X	Circle_1	Present	14/17	3/17	0.5	Circle
		X	Circle_2	Present	15/17	2/17	0.4	Circle
Options Print		X	Circle_3	Present	16/17	1/17	1.1	Circle
Clear Pass/Fail	0 	32	Brightness_1	152.993	16/17	1/17	0.6	Brightness
Cicarr assyrai								

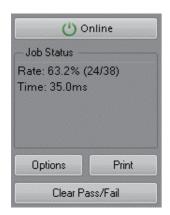
10.2 [Job Status] Group Box

The following items are displayed in the job status group box: Job PASS (no errors) rate, PASS count / inspection count, and job run time of the most recent inspection.

To clear the PASS rate, click the [Clear Pass/Fail] button listed in the next section.



10.3 The [Online], [Options], [Print], and [Clear Pass/ Fail] Buttons



It is possible to switch the vision sensor between online and offline mode by clicking the [Online] button.

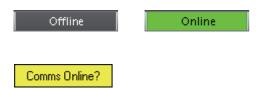
To run a job on the sensor, the sensor must be switched to online in advance.

Furthermore, the vision sensor must be set to offline to edit a job using EasyBuilder. Online mode





It is possible to determine whether the vision sensor is online or offline by looking at the status bar in the lower right corner of the user interface.



The vision system was configured to online from the GUI, but the vision system remains offline according to the communication protocol (SLMP scanner, CC-Link IE Field Network Basic, native mode, etc.) For example, the Set Online command SO0 to switch the vision system to offline mode was issued in native mode. To switch the vision system to online mode, it is necessary to send the Set online command SO1 to the vision system.

Discrete Online?

The vision system was configured to online mode from the GUI, but the discrete input line configured as the online/offline type is configured to Low (0).

If the status of the discrete input signal becomes High (1), the vision system switches to online mode.

If the [Options] button is clicked, the "Result Display Options" screen is displayed. It is possible to configure the content displayed by the results table and the display content in the EasyBuilder View.

- View Options		I Options			
Auto Size Columns	×	Name	Show Tool	Show Graphic	
Show Tool Icon		Pattern_1	>	>	
Show Tool Process Time		Filter_1	✓	•	
	≫ +	Edge_1	•	•	
Show Results String	<mark>.</mark> ≯+	Edge_2	✓	✓	=
Show Tool Dependencies	↔ 	Distance_1	•	•	
Show Tool Enabled Status	۵	Circle_1	•	•	
Show Pass/Fail Totals	۵	Circle_2	✓	✓	
	۵	Circle_3	✓	✓	
Show Counts	39	Brightness_1	~	~	-
Show Percents		Change Option	ns All None	: All No	ne

If the [Print] button is clicked, a print preview of the content displayed in the results table appears, and it is possible to print this data.

	2	2	Name	Result	Pass	Fail	Time(ms)	Туре	
			Pattern_1	(339.5,242.5) -0.0° score = 98.7	0/0	0/0	18.6	PatMax RedLine™ Pattern	
			Filter_1 Edge_1	Pass Present	0.0	0/0	2.9	Filter Edge	
			Edge_2	Present	0/0	0/0	1	Edge	
	5		Distance_1	410.963 pixels	0/0	0/0	0.1	Distance	
			Circle_1 Circle_2	Present	0/0	0/0	1	Circle	
-			Circle_2 Circle_3	Present	0/0	0/0	1	Circle	
			Brightness_1	153.102	0/0	0/0	1.2	Brightness	
		1.901)-R 527ba2						

10.4 [Results] Table

The [Results] table displays detailed run results of each tool as a list.

It is possible to sort the list by clicking an item name.

Furthermore, if the tool is clicked, tools that affect or are affected by the target tool are indicated by the green and blue link lines displayed in the second column from the left.

	æ	×	Name	Result	Pass	Fail	Time(ms)	Туре
0	-	ø	Pattern_1	(337.5,246.5) -0.0* score = 98.7	16/17	1/17	16.1	PatMax RedLine*** Pattern
0	•	9	Filter_1	Pass	16/17	1/17	2.7	Filter
	•	×+	Edge_1	Present	14/17	3/17	1.3	Edge
	•	×+	Edge_2	Present	15/17	2/17	1.1	Edge
		+	Distance_1	410.962 pixels	14/17	3/17	0.8	Distance
	ŀ	· 30	Circle_1	Present	14/17	3/17	0.5	Circle
0	•	· 30	Circle_2	Present	15/17	2/17	0.4	Circle
	•	· 30	Circle_3	Present	16/17	1/17	1.1	Circle
0	۲,	39	Brightness_1	152.993	16/17	1/17	0.6	Brightness

When there was a problem due to tact time or another issue, it is possible to check which tool is the bottleneck in the screen.

11 THE INSPECTION SCREEN MONITORING

The following methods are available to monitor the inspection screen depending on the display destination equipment.

No.	Display destination	Method	Features
1	GOT touch panel display device by Mitsubishi Electric Corporation	FTP transfer from vision sensor	 Can be monitored without a personal computer Can also be used as an operation panel to save space No additional equipment is necessary if there is an Ethernet connection
2		Display output video from COGNEX VisionView VGA on GOT	 Can be monitored without a personal computer Can also be used as an operation panel to save space Possible to display and adjust only the information necessary on-site
3	COGNEX VisionView 900	VisionView	 Can be monitored without a personal computer Possible to display and adjust only the information necessary on-site
4	Personal computer (LCD)	In-Sight Explorer	Display is updated quicklyVision sensor can be adjusted
5		COGNEX VisionView PC	 Display is updated quickly Possible to display and adjust only the information necessary on-site

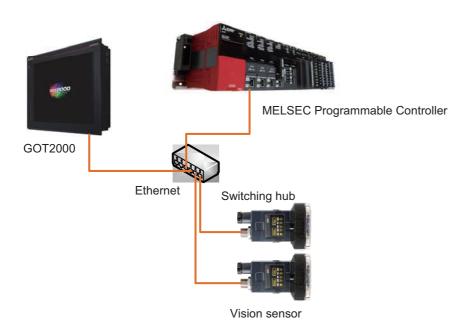
The following section lists the equipment configuration and details of each display method.

Descriptions of the vision sensor I/O and power supply are omitted because they differ by model.

11.1 Displaying an Image by FTP Transferring the Image from a Vision Sensor to a GOT

Components

- GOT 2000 Series touch panel display device by Mitsubishi Electric Corporation (GT25, GT27) (SD card)
- MELSENSOR Vision Sensor

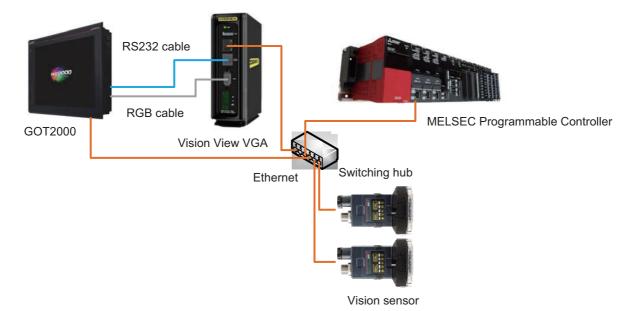


The vision sensor must be configured for FTP transfer advance. On the GOT2000, the FTP server function is enabled. For details on settings, refer to the following page.

11.2 Displaying a Moving Image of VisionView VGA on GOT

Components

- GOT 2000 Series touch panel display device by Mitsubishi Electric Corporation (GT25, GT27)
- RGB input module for GOT2000
- COGNEX VisionView VGA
- MELSENSOR Vision Sensor
- RGB cable, RS232 cable (CCB-VVVGA-GOT)



Connect the VisionView VGA and GOT using an RGB cable and RS232 cable to display the VisionView VGA image on the GOT screen.

Furthermore, enable the personal computer remote operation (serial) function of the GOT to manipulate the interface of the VisionView VGA using touch operations of the GOT.

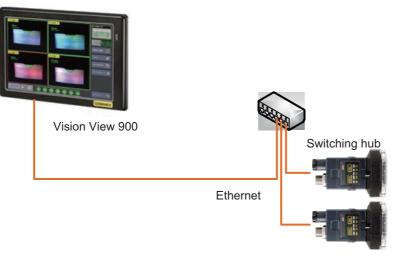
For connection details, visit the COGNEX website, browse to the VisionView support section, and then reference [VisionView VGA Mitsubishi GOT connection procedure and sample].

The interface can be constructed by configuring EasyView by [Communication] of In-Sight Explorer.

11.3 Monitoring a Vision Sensor by Using the VisionView 900

Device organization

- COGNEX VisionView 900
- MELSENSOR Vision Sensor



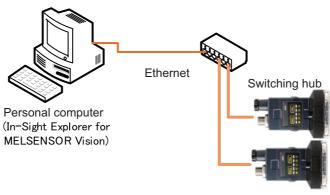
Vision sensor

VisionView 900 is a standalone touch panel display device that can monitor the vision sensor. Monitoring is possible simply by connecting to the vision sensor. It is not necessary to create a monitoring screen.

11.4 Monitoring a Vision Sensor by Using In-Sight Explorer on a Personal Computer

Device organization

- Personal computer (In-Sight Explorer)
- MELSENSOR Vision Sensor



Vision sensor

Use In-Sight Explorer for vision sensor configuration for monitoring.

If In-Sight Explorer is started normally and used for monitoring at a production site, there is a risk that settings may be changed accidentally because the software can change job and camera settings.

It is possible to restrict job changes by changing the user that logs into In-Sight Explorer to a monitoring-only user.

It is possible to check users configured to the sensor by opening In-Sight Explorer, clicking the [Sensor] menu, and the clicking [User Access Settings].

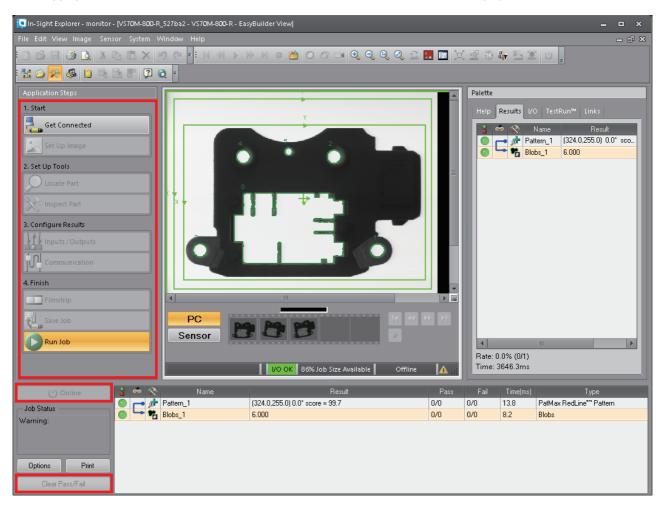
Use "monitor" or "operator" that is registered in advance for a user name, or register a new user name to be used.

VS70M-800-	R_527ba2 - User	r Access Settin	igs					2
Name	Access	View	FTP-R	FTP-W	Online/Offline	Online	Job Save	
admin	Full	Normal	Yes	Yes	Enabled	Disabled		
monitor	Locked	Custom	No	No	Disabled	Disabled		
operator	Protected	Custom	Yes	No	Enabled	Disabled		
					<u>A</u> dd	<u>E</u> dit	<u>D</u> elete	

To switch users, click [Log On/Off] from the [System] menu in In-Sight Explorer to display the screen below. The logon user can be switched by entering a user name and password, and clicking Log On.

🔽 Log On/Off	x
User Name	
Remember Password	
Log On Log Off Cancel	

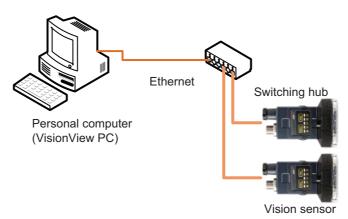
When logging on as "monitor" user, some functions are restricted as shown in the following figure.



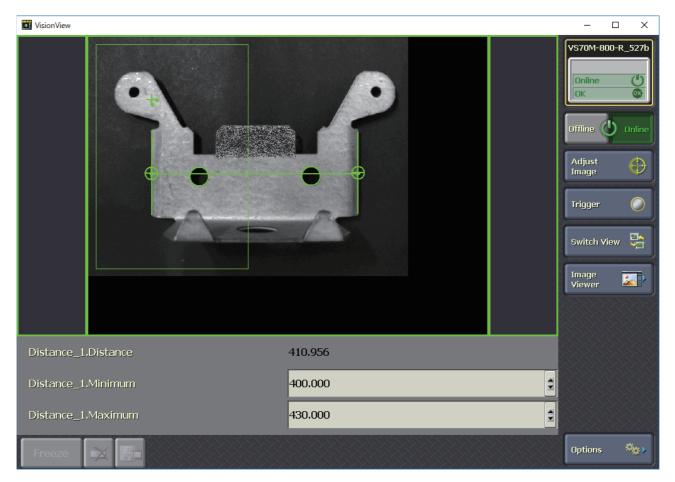
11.5 Monitoring a Vision Sensor by Using a VisionView PC on a Personal Computer

Device organization

- Personal computer (VisionView PC)
- MELSENSOR Vision Sensor



VisionView PC is software to realize the VisionView interface on the screen of a Windows personal computer. It is possible to monitor and adjust the vision sensor using the same interface as the VisionView 900 and VisionView VGA. A license is required for use.



APPENDIX

Appendix 1 Example of Robot Calibration

To use a vision sensor as robot guidance, calibration to gather the coordinate system is necessary.

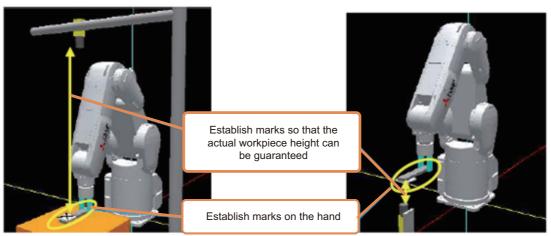
There are cases in which coordinate transformation after calibration is carried out by a robot and cases in which it is carried out by a vision sensor. This chapter describes the latter.

For detailed procedures, robot settings and programming, and other information, visit the Mitsubishi FA website and see [MELFA Vision System Automatic Calibration Sample Program].

In this section, the Sequential N Point Calibration Tool is used to create a calibration file, the file is imported by the job to be used during operation, and then calibration is carried out.

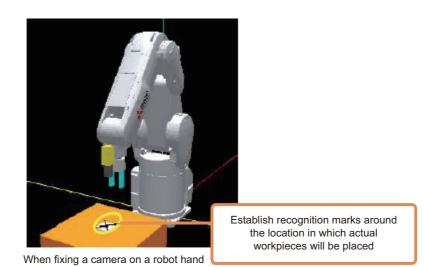
When the camera is fixed, attach visual marks to the robot hand.

When the camera is attached near the robot hand, set the visual marks on the stand upon which the workpiece is arranged.



When fixing a camera above a robot hand

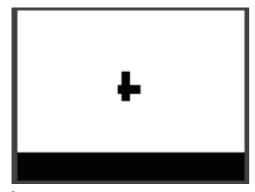
When fixing a camera below a robot hand



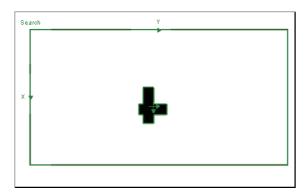
Operating procedure

1. Arrange the visual marks so they are within the field of view of the camera.

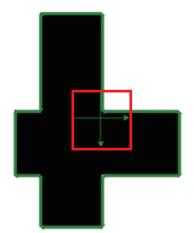
The marks do not need to be in the center of the field of view. However, because they are also used as reference points of the robot, for example, arrange the marks in locations in which workpieces are assumed to be arranged.



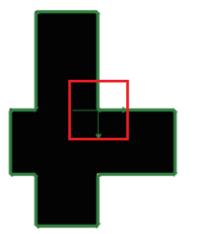
2. Add a location tool to locate the visual marks by the vision sensor.



If necessary, adjust [Horizontal Offset] and [Vertical Offset] to adjust the location coordinates.

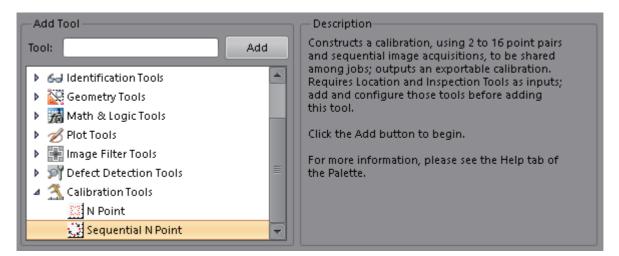


– Edit Tool –		
General Settin	gs	
Scale Tolerance	0	- -
Find Mode	PatMax	-
Strict Scoring		
Ignore Polarity		
Horizontal Offset	0.000	÷ =
Vertical Offset	0.000	₽ II
Timeout	5000	÷
Result	(316.0,213.5) 0.0° score = 100.0	



— Edit Tool ————			
🕙 General 🛛 Settin	gs		
Scale Tolerance		0	
Find Mode	PatMax	-	
Strict Scoring			
Ignore Polarity			
Horizontal Offset		h.000	
Vertical Offset		-2.500 🌲	
Timeout		5000 韋	
Result	(317.0,211.0) 0.0° score = 100.0		

3. Add [Sequential N Point] of Calibration Tools to the job.



4. Using a smart feature selection, select and enter the shape to indicate the coordinate point of the location tool.



5. Configure the Sequential N Point Calibration Tool.In this case, the number of points is 5, but up to 16 points can be acquired.The file name is the file name to be added when the calibration file is exported.Change to an easy-to-understand name.

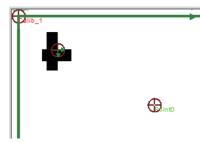
_	Edit Tool - Calib_1-		
	📒 General 🛛 Settir	igs	
	Number Of Points	5 🜩	
	Reset	Reset	
	Online Reset		
	Job Load Reset	✓	
	File Name	Default	
	Full Name	DefaultCalib	
	Export	Export	
	Auto Export		
	Result	Fail	

6. Set the camera to online mode, input the trigger, and then acquire the coordinates of the initial point. If the image is scanned, and a pattern is located, coordinates are entered in the pixel row and pixel column of Point 0 of the Sequential N Point Calibration Tool table.

Enter the robot coordinates at this time in World X and World Y.

Point	Pixel Row	Pixel Col	World X	World Y		World X
PointO	211.000	317.001	0.000	0.000		0.000
Point1			0.000	0.000		World Y
Point2			0.000	0.000		0.000 *
Point3			0.000	0.000	=	0.000
Point4			0.000	0.000		
Point5			0.000	0.000		
Point6			0.000	0.000		
Point7			0.000	0.000		Select Points
0			0.000	0.000		

7. Move the robot arm to the next point, and then switch ON the camera trigger.



Point	Pixel Row	Pixel Col	World X	World Y		World X	
PointO	211.000	317.001	0.000	0.000			0.000 🌻
Point1	93.000	106.000	0.000	0.000		World Y	
Point2			0.000	0.000	Constanting of the		0.000 *
Point3			0.000	0.000			0.000
Point4			0.000	0.000			
Point5			0.000	0.000			
n					17 3		

Acquire the pixel coordinates of the next point.

As with Step 6, enter the X and Y coordinates of the robot in World X and World Y.

Move, image scan, and enter World X and World Y for the remaining number of scan points.

2478										
			Φ	Point	Pixel Row	Pixel Col	World X	World Y		
	•	\oplus	PointO	211.000	317.001	102.000	250.000			
			Point1	93.000	106.000	80.000	150.000			
		`& b	Ψ		Point2	325.999	101.001	152.000	149.000	
	* 🕀		<u></u>	Point3	78.000	559.000	56.000	350.000		
	Ŭ			Point4	332.001	563.999	154.000	352.000		
				DointE			0.000	0.000	1	

8. After the necessary number of scans and coordinate configurations are complete, click the [Export] button.

File Name	Default
Full Name	DefaultCalib
Export	Export

If export is completed normally, "Pass: Export Complete" appears in the Palette results. Calibration files are saved in the non-volatile memory of the vision sensor.

Hel	Help Results I/O TestRun™ Links						
	🗢 💸	Name	Result	Туре			
	• - •	Pattern_1	(564.0,332.0) 0.0° score = 100	PatMax® Pattern			
) 🛏 🔡	Calib_1	Pass: Export Complete	Sequential N Point			

9. Use the exported calibration file for the calibration of the job to be used in operation.

In a job separate from the calibration, select "Import" for the Calibration type of the image settings.

Calibrate Image to Real World	Units		
Calibration Type:	File Name:	DefaultCalib.cxd	-
Import 🗾	Units:	-	

If "Import" is selected, a file name can be selected. Select the file exported in Step 8. Furthermore, specify the units of the entered World X and World Y.

Appendix 2 Saving Images

It is possible to configure the VS series to transfer images to an FTP server on the network.

If this setting is configured, images scanned for archives (based on the PASS/FAIL of the tool or job) are transferred and can be saved on other devices.

Furthermore, checking saved images can be useful for researching the cause of problems that occur during the manufacturing process.

Transferring images via FTP

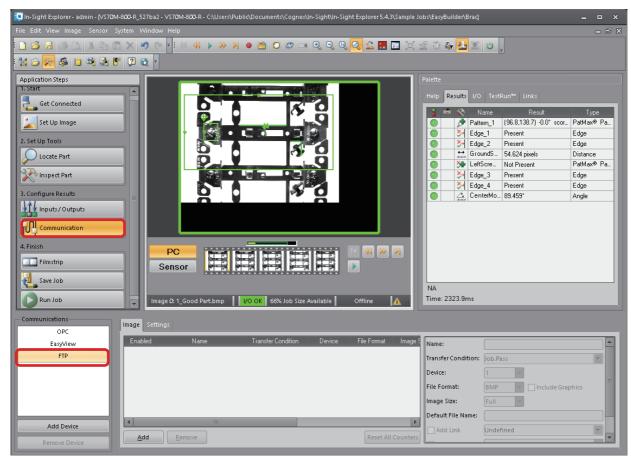
Image Transfer to In-Sight Explorer

Because In-Sight Explorer runs as an FTP server simply by starting it (connection with the VS series is not necessary), it is possible to construct an FTP server environment easily by configuring settings so that it starts automatically when the personal computer used as the server is started (Step 6 below).

This section explains the procedure to use the emulator run by In-Sight Explorer as an FTP server.

Operating procedure

1. From Application Steps, click [Communication], and then select [FTP].



2. Open the [Image] tab, and then click the [Add] button to add the FTP transfer settings.

ſ	Image	Settings									
I	Enab	led	Name	Transfer Condition	Device	File Format	Image Size	Include Graphics	Name:		
l									Transfer Condition:	Job.Pass 💌	
l									Device:	1 -	
l									File Format:	BMP Include Graphics	
l									Image Size:	Full	
	4			1111				Þ	Default File Name:		
	<u>A</u> c	id	<u>R</u> emove					Reset All Counters	Add Link	Undefined 🔻	-

3. Configure the added FTP settings.

Name:	WritelmageFtp_1	
Transfer Condition:	None]
Device:	1	
File Format:	BMP 🔄 🗌 Include Graphics	
Image Size:	Full	
Default File Name:	Image]
🗌 Add Link	Undefined	
Add Timestamp	Undefined	
Add Counter	999 🚖 (Maximum Value)	

• Name: WriteImageFtp_1

Transfer Condition: None

Select "None" to transfer all images.

To transfer according to the pass or fail condition of the inspection tool or job run results, select "Tool PASS" or "FAIL". To transfer when a job has failed, select "Job.FAIL".

- Device: 1
- File Format: BMP

Select the transfer file format from "BMP" (bitmap image) and "JPG" (JPEG image).

To verify again by the emulator regardless of format, select "BMP".

• Image Size: Full

Select the size of the transferred image from "Full", "Half", or "Quarter".

Select full access image transfer.

• Default File Name: Image

Configure the folder to store image files and the starting character string of the image file name.

(For details, see Page 148 Procedure to Specify the Folder by the Default File Name of the FTP Image Tab.)

Add Counter: 999

Configure the upper limit for the sequential number added to the end of the file name.

4. In the [Settings] tab, configure the FTP server settings of the transfer destination.

	Image Settings	
I		
	Host Name:	
	User Name:	
	Password:	
	Connection Type:	Standard FTP
I		

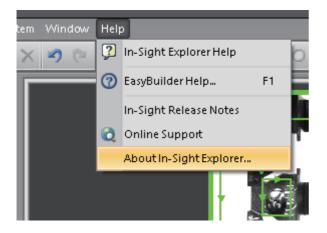
Host Name: IP address of the computer running In-Sight Explorer*1

User Name: admin

Password: (blank)

Connection Type: Standard FTP

*1 To check the IP address of the computer running In-Sight Explorer, from the menu, click [Help], and then [About In-Sight Explorer].



The IP addresses of computers running In-Sight Explorer are displayed in the bottom section of the displayed version information window.

📮 About In-Sight Expl	orer			_	x	
COGNEX						
		In-Sight Explorer for MELSENSOR Vision				
		In-Sight®Exp	lorer v5.4.3 (292)			
		Copyright (c) 2 004 -2	017 Cognex Corporatio	n.		
Name	Туре	Firmware Version	MAC Address	IP Address	Serial Number	
Newtone	PS-6400	5 26 25 66 16 (666)	40-80-945-95-46	10.97.82.82	NA	
M ACEC		5013 (p- q	115:23-1-8	10.97.82.107	NA	
VENDE	FC-5400	506 X 368 : DQ	C-94:370.2	10.97.82.116	NA	
			Close			

5. Specify the FTP root directory and the default file name of image files.

Page 146 Procedure to Specify the Root Directory in the Option Settings

IP Page 148 Procedure to Specify the Folder by the Default File Name of the FTP Image Tab

6. To start In-Sight Explorer automatically when the personal computer is started, configure the following settings.

Page 149 Starting In-Sight Explorer Automatically when the Personal Computer Starts

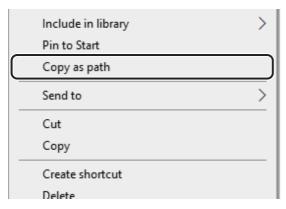
Procedure to Specify the Root Directory in the Option Settings

Ex. When image files are stored in a folder created in C:\Tmp

1. Create a folder in C:\Tmp. (For images, VS_FTP)

🔥 > This PC >	Local Disk (C:) 🔹 Tmp 🔹
Name	^

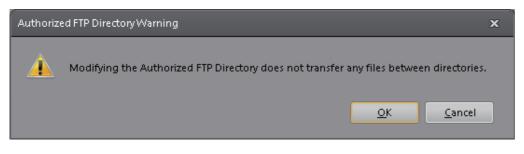
2. Move the mouse cursor over the folder, hold down the shift key, and then right-click. Select [Copy as path].



3. Click [System] ⇒ [Options] from the In-Sight Explorer menu to open the "Options" screen, and select "Emulation". Paste the folder path copied in step 2 onto the "Authorized FTP Directory" field. (At this time, remove double quotation marks.)

Options		×
Access Management Emulation File Utilities Image Display Job View Record Defaults User Interface	Emulation	▼ 20 ↓ [346a3c3 675e3d81 <u>H</u> elp
Restore Defaults		OK <u>C</u> ancel <u>Apply</u>

4. If the [OK] button or the [Apply] button is clicked, the following message appears. If the [OK] button is clicked, the emulator restarts. Configuration is complete.



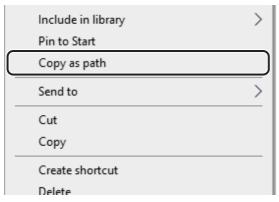
■ Procedure to Specify the Folder by the Default File Name of the FTP Image Tab

Ex. When image files are stored in a folder created in C:\Tmp

1. Create a folder in C:\Tmp. (For images, VS_FTP)

🔥 > This PC 🔅	Local Disk (C:) 🔹 Tmp 🔹
Name	^

2. Move the mouse cursor over the folder, hold down the shift key, and then right-click. Select [Copy as path].



3. Paste the folder path copied in Step 2 onto the Default File Name field, remove double quotation marks, and add "\Image" to the end of the path. [\] is converted to a backslash.

Name:	WritelmageFtp_1	
Transfer Condition:	None	-
Device:	1	
File Format:	BMP 🔄 🗌 Include Graphics	
Image Size:	Full	
Default File Name:	C:\Tmp\VS_FTP\Image	
🗌 Add Link	Undefined	-
🗌 Add Timestamp	Undefined	v
Add Counter	999 (Maximum Value)	

Starting In-Sight Explorer Automatically when the Personal Computer Starts

Operating procedure

1. From the menu, select [System], and then open [Options].

Syst	em Window Help					
4	Log On/Off					
	Create Report					
5	Backup					
	Restore					
	Restore From					
	Clone To					
	Update Firmware					
🝧 Add Sensor/Device To Network						
Explorer Host Table						
Remote Subnets						
Save View Layout Shift+Fi						
	Options					

2. Select "Start at Windows Log On" and click either the [Apply] button or the [OK] button.

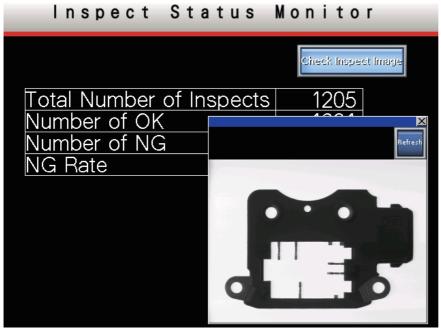
options 💽		×
Access Management Emulation File Utilities Image Display Job View Record Defaults User Interface	 Start at Windows Log On Confirm Program Exit Startup User Name admin Startup Password Program Exit Require a Password to Exit Set Password 	
Restore Defaults	OK <u>C</u> ancel <u>Ap</u>	oly

Image Transfer to a GOT

This chapter shows the method to connect the vision sensor and a GOT using Ethernet, and then transferring images captured by the vision sensor via FTP.

Network Structure Diagram for Vision Sensor and GOT

24 VDC power supply Vision sensor Ethernet cable Ethernet cable



GOT Screen Display Image

Necessary equipment

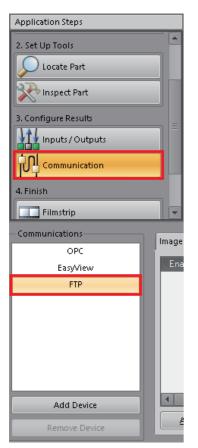
Equipment	Description
Vision sensor VS Series	-
GOT2000 or GOT1000 Series display device	For compliant GOT models, refer to the following items of the manuals. GT Designer3 (GOT2000) Screen Design Manual GOT1000 Series Gateway Functions Manual for GT Works3 Note: VS20 Series cannot transfer images via FTP to the GOT1000 Series.
SD card	NZ1MEM-2GBSD, NZ1MEM-4GBSD, NZ1MEM-8GBSD, NZ1MEM-16GBSD, L1MEM-2GBSD, L1MEM-4GBSD For SD cards manufactured by other companies, refer to the following technical news. Operation Check Results of Non-Mitsubishi SD Cards on GOT2000 Series Units(GOT-A-0065)
In-Sight Explorer (vision sensor configuration software)	-
GT Designer3 Version1	-

Vision Sensor Settings

Connect the vision sensor and computer, and then configure the FTP transfer settings on the vision sensor.

Operating procedure

- **1.** Connect the vision sensor and computer around a switching hub. Alternatively, connect to the vision sensor using In-Sight Explorer running on the personal computer.
- 2. In In-Sight Explorer, select [Communication] under Application Steps, and then click [FTP].



 In the FTP [Settings] tab, configure the settings to match the connection-destination GOT. Host Name: IP address of connection-destination GOT User Name: Admin Password: (password configured by the FTP server settings of GT Designer 3)

Connection Type: Standard FTP (when connecting to the GOT1000 Series, select [Mitsubishi GOT])

Image Settings	
- Device 1	
Host Name:	192.168.3.18
User Name:	Admin
Password:	Weikeleicheite
Connection Type:	Standard FTP 💌

4. In the FTP [Image] tab, click the [Add] button.

ſ	mage Setting								
l	Enabled	Name	Transfer Condition	Device	File Format	Image	Name:		
L							Transfer Condition:	None	-
l							Device:	1	=
L							File Format:	BMP Include Graphics	
L							Image Size:	Full	
J	•						Default File Name:		
	<u>A</u> dd	<u>R</u> emove			Reset All C	ounters	Add Link	Undefined	~ -

5. Configure the added image transfer settings as shown below.

Name:	WritelmageFtp_1	
Transfer Condition:	None	-
Device:	1 💌	
File Format:	JPG 🔄 Include Graphics	
Image Size:	Half	
Default File Name:	lmage1	
Add Link	Undefined	-
Add Timestamp	Undefined	v
Add Counter	0 🗘 (Maximum Value)	

Transfer Condition: "None" transfers all inspection images.

If necessary, configure for when the job is incorrect, etc.

File Format: File format to be transferred.

When using the image for the job re-verification, select BMP.

Image Size: Configure at what size to transfer via FTP for the imaging size.

The image size can be selected from "Full", "Half", or "Quarter".

When using the image for the job re-verification, select Full as well as File Format.

Default File Name: Configure the name of the file to be transferred via FTP.

Add Counter: Define the maximum value of the counter to be added to the name of the file to be transferred.

In this section, because files with the same name transferred to a GOT are overwritten each time, disable the addition of a counter.

■ Configuring the FTP Server Using GT Designer 3

Operating procedure

1. Configure the IP address in the GOT Ethernet settings.

Make sure that the content configured here and the FTP settings configured in In-Sight Explorer (Set Step 3 of Page 151 Vision Sensor Settings) match.

🙀 GOT Ethernet Setting		
GOT IP Address Setting GOT Ethernet Common S	Standard Port Extended Port Wireless LAN	^
🍄 IP filter Setting	Update GOT Ethernet Standard Port setting	
	The Ethernet Standard Port setting in the GOT will be over The setting will be retained if the update is disabled.	written with the contents set in GT Design
	GOT IP Address: 192 . 10	68 . 3 . 18
	Subnet Mask: 255 . 25	55 . 255 . 0
	Select from GOT Setting List:	~
		List
		v
< >>	<	>
		OK Cancel Apply

2. Configure the FTP server settings of the GOT. By default, a password is not configured.

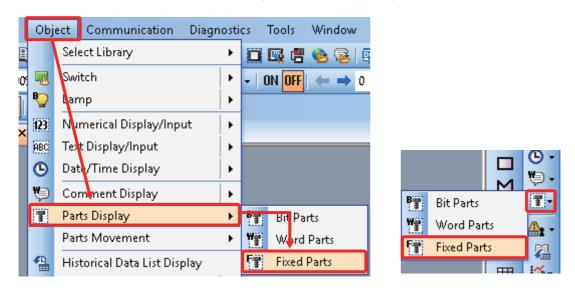
Configure a password as necessary and match it to the settings of In-Sight Explorer.

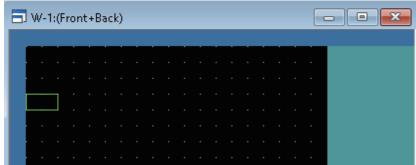
🖷 Controller Setting		
Controller Setting CH1:MELSEC IQ-R, RnA CH2:None CH2:None CH4:None Routing Information Gateway Communication Gateway Server Gateway Server Cateway Server Controller Settir Controller Settir	Use the function of FTP Server Command Input Observation Cycle: 15 Administrator(read/write) Login Name(Administrator): Admin Password(Administrator): *******	

■ Configuring the Screen of the GOT to Display Images

Operating procedure

1. Add a new window screen, and then arrange the part display (fixed) in the top left.





From the upper left edge of the part display, ensure a window size of the size of the image to be displayed.

In the window screen, right click. From the menu that appears, select [Resize Screen]. Use mouse operations to adjust the handles of the window screen. Alternatively, select [Screen Property], click [Screen Size], and then change the size using the "Change Window Screen Size" window.

It is possible to check the object arrangement coordinates of the part display by the docking window list or the Properties sheet.

Data View					₽×
Data View [W-1:)	(Front+Back)]				
Objects	Figures	Number of Objects	5 2		
Object/Figure	Name	Position	Layer	Object ID	^
Fixed Parts Display		(0,48)-(0,48)	Back	10000	
Bit Switch		(272,0)-(319,	Back	10001	

F	Property 📮 :				
	Fixed Parts Display				
⊡	Common Informa	ation	^		
	Object ID 10000				
	Name				
	X-Position	0			
	Y-Position	48			
	Width	1			
	Height	1			

Resize Screen	W-1:(Front+Back)
Screen Property	
Right-click menu	
Basic Vicey Window Basic Setting Vicey Window Advanced Setting Violage Window	dow Y Option Selection Window
Screen No.:	Size adjustment handles
Screen Name:	
Screen Type: Window Screen	
Detailed Description: <	Change Window Screen Size - (W-1)
Security: 0	
Front Layer Transparent Color:	X Range: 16-640
Screen Size	→ _x . <u>Bos</u>
Screen Design	X: 🗗
✓ Individually set the screen design: ■ Background Color:	Y Range: 2-480
	Y: 289
Option	Edit OK Cancel
Switch buffer memory unit No.	
	OK Cancel

Configure the part display so that the images transferred via FTP can be displayed.
 Double-click the part display (fixed) to open the Settings screen, and then configure the following settings.

Fixed Parts Display		×
Basic Settings	Advanced Settings /Extended Trigger Script	
Parts Type:	Image File 🗸 🗸	
	A:\Image1 Setting	
Display Mode:	O XOR Overwrite	
Alignment:	Top-Left O Center	
-Detail Settings of		
Image File No	n.: 1 📮	
Blink:	None V	
	Image File Setting ×	
	A:\Image1	
	Drive Name: A:Standard SD Card ~	
	Folder Name:	
	File Name: Image	
	Digits: 1	
	Transparent: From Image	
	OK Cancel	
Name:	OK Ca	incel

3. Configure an object script for the part display (fixed) object so that images can be updated. The script is listed below.

redraw_object();

[b:GB30400] = OFF;

Fixed Parts Display		×
Basic Settings Style	Advanced Settings xtended / Trigger / Script*	
Use Object Script		
Script User ID:	1	
Data Type:	Unsigned BIN16 \sim	
Trigger Type:	ON Trigge	er Setting
Trigger Device:	GB30400	
Script:	Edit Script Synt	ax Check
redraw_object(); [b:GB30400] = OFF;		
<		>

4. Arrange the start switch of the object script on the window screen so the image can be read again at an arbitrary time. Device: GB30400

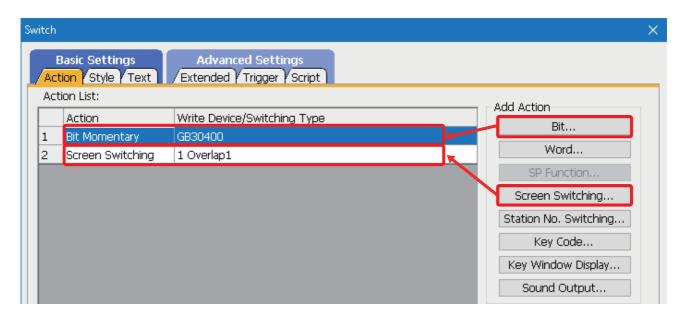
Operation setting: Bit set

	Obje	ect Communication Diagnost	ics	Tools Window Help
		Select Library	Ö	📖 💾 🍉 😼 📾 📲 🥊 🗄 🖅 8
2	<u>s</u>	Switch 🔸		Switch
[P	Lamp 🕨	B.	Bit Switch
¢	123	Numerical Display/Input	¥0	Word Switch
	ABC	Text Display/Input	50	Go To Screen Switch
	Θ	Date/Time Display	N	Change Station No. Switch
	ø	Comment Display	5	Special Function Switch
3		Parts Display	6	Key Window Display Switch
2		Parts Movement	R	Key Code Switch

GB30400) Bit Switch					
	Basic Settin		ced Settings led (Trigger		
	Switch Action Device: Action Mor Set	-	○Alternate ○Reset	 ▼ 	Add
	Lamp (Timing to OKey Touch	Device:	t) GB30400		·

Configure the switch to open the window screen from the base screen. At the same time, add an operation to switch ON the bit as well to update drawing.

Obj	Object Communication Diagnostics Tools Window Help			
	Select Library 🔹 🖬 📖 🖷 💁 😼 📲 📲			
۳.	Switch 🕨	R	Switch	
₽	Lamp 🕨	B	Bit Switch	
123	Numerical Display/Input	W.	Word Switch	
ABC	Text Display/Input	50	Go To Screen Switch	
G	Date/Time Display	N	Change Station No. Switch	
V	Comment Display	5	Special Function Switch	
	Parts Display	62	Key Window Display Switch	
	Parts Movement	K.	Key Code Switch	



Saving images in a local drive of a personal computer by using In-Sight Explorer

In-Sight Explorer has a function to record images captured automatically to the folder specified at the Record tab of the options of record playback.

This function saves image files when In-Sight Explorer is connected to the camera, and the trigger is switched ON when the [Record] button was pressed.

Operating procedure

1. Open the record playback options and configure the settings.

Help ₹ : M ≪ ► ► ► M ● 🙆 🔿 Ø	
Record Playback Options Record Playback Record Folder C:\Users\Public\Documents\Cognex\In-Sight\In-Sight	Explorer 5.4.3\RecordPlayback
Image Count: 0 Filename Format	Clear Good/Bad Folders Pass/Fail Sort Do Not Sort (Record All to Record Folder) Record Pags Images to Good Folder Record Fail Images to Bad Folder Record Fail Images to Bad Folder Record Fail Images to Bad Folder
Maximum Images: 10000	O Sort on Pass/Fail (Record to Good/Bad Folders)
Always Show this Dialog Before Record/Playback	<u>R</u> estore Defaults <u>OK</u> <u>Cancel</u>

The initial value of the record folder is as follows: C:\ProgramData\Cognex\In-Sight\In-Sight Explorer (Installation version)\RecordPlayback.

It is possible to separate the save destination of passed images and failed images by the PASS/FAIL result.

2. Click the [Record] button to set a recording state.

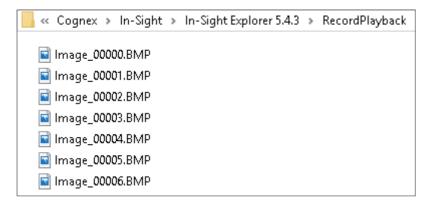


Before clicking



After clicking (flashing slowly)

If the trigger is switched ON in this state, captured images are stored in the record folder.



If the record folder and playback folder are specified to the same folder, images in the record folder are displayed in order in the PC Filmstrip.

Appendix 3 Updating the MELSENSOR VS Series Firmware

The firmware of the vision sensor is included in In-Sight Explorer. The firmware update is run by In-Sight Explorer.

Operating procedure

1. From the menu, click [System], and then [Update Firmware].

Syst	em Window Help					
4	Log On/Off					
	Create Report					
2	Backup					
	Restore					
	Restore From					
	Clone To					
	Update Firmware					
5	Add Sensor/Device To Network					
	Explorer Host Table					
	Remote Subnets					
	Save View Layout Shift+F7					
	Options					

2. Select the vision sensor to be updated, and then click the [Next] button.

I	🛒 Select	Vision Systems fo	r Firmware Updat	e				×
	Select th	e vision systems t	o update the firm	ware:			Enter text to filter the li	st.
		Name	Model	Version	New Version	2	itatus	
		VS20M-13F410	VS20M-13F410	5.04.03 PR1 (051)	5.04.03 PR1 (051)			
	Force	Update 📃 Disal	ole Backup and Re	estore			Next	Close

3. Check the vision system to be updated, and then click the [Update Firmware] button.

📮 U	📮 Update Vision System Firmware								
Cont	Confirm the vision systems to update:								
	Name	Version	New Version	Status					
VS	20M-13F410	5.04.03 PR1 (051)	5.04.03 PR1 (051)						
E F	orce Update	Disable Backup an	d Restore	Update Firmware	Cancel				

When In-Sight Explorer is connected to the corresponding vision sensor at this time, the following window appears, and the firmware update is stopped.

Disconnect the vision sensor, and then run the firmware update again.

💽 Firmware Upda	📮 Firmware Update Complete 🛛 🗙						
Firmware update	Firmware update complete, go back to select additional vision systems or close:						
Name	Version	New Version	Status				
VS20M-13F410	5.04.03 PR1 (051)	5.04.03 PR1 (051)	Firmware update aborted; a user is connected to admin at location meiw0335.				
Force Update	Disable Backup ar	nd Restore	0 Go Back	Close			

4. The system is restarted automatically. Wait until the completion screen appears.

E	🕽 Firmware Upda	ate Complete			×
F	Firmware update	complete, go back to	select additional vision	systems or close:	
	Name	Version	New Version	Status	
	VS20M-13F410	5.04.03 PR1 (051)	5.04.03 PR1 (051)	Firmware update complete.	
[Force Update	Disable Backup a	nd Restore		Go Back Close

Appendix 4 Manipulating Regions via the Keyboard

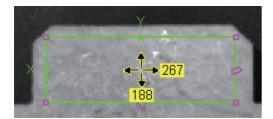
Basically all mouse operations are possible during adjustment of vision tool model regions, search regions, and inspection regions. However, it is possible to also use keyboard operations for fine adjustments, such as position adjustment in pixel units and angle adjustments by a single degree.

With the region to be edited selected, press $\boxed{F9}$ on the keyboard.

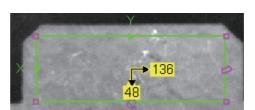
A state in which movements by key operations are possible appears as shown below.

In this state, press the 🗐 🔄 🔄 [1], Home, Pgue, End, and PgDown keys to make adjustments.

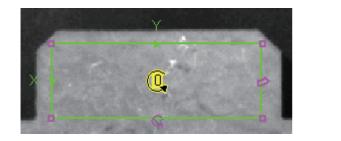
Furthermore, if the Finite key is pressed again, the system switches to scale mode, rotation mode, and bending mode. The modes available depend on the shape of the region.



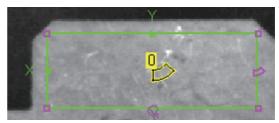
Movement mode



Scale mode



Rotation mode

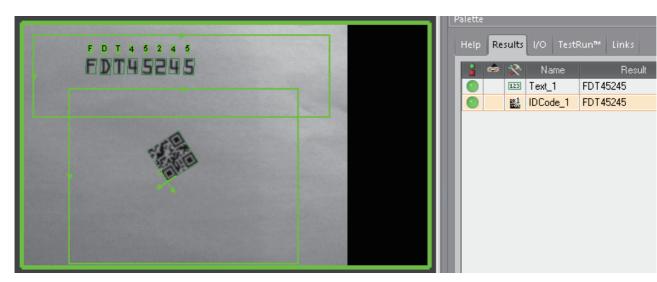


Bending mode

For details of key operations, open the In-Sight Explorer Help section, and then search for "Using interactive graphics mode".

Appendix 5 Using the Output Values of Other Tools for Parameters

If the link function is used, values output by other tools can be used as parameters. This section describes the link function assuming the following inspections.



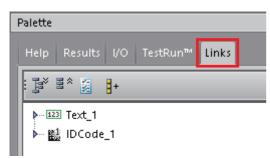
- · Scanning characters of notation using Read Text (OCRMax)
- · Scanning printed 2D codes using 2D code scanning
- Setting the inspection mode to 'Recognize and Compare' in the 2D code scanning settings to verify if the printed character string and 2D code content match

By setting a link, the read result of Read Text (OCRMax) is substituted into the "Match String" of 2D code scanning and the verification stated above is performed.

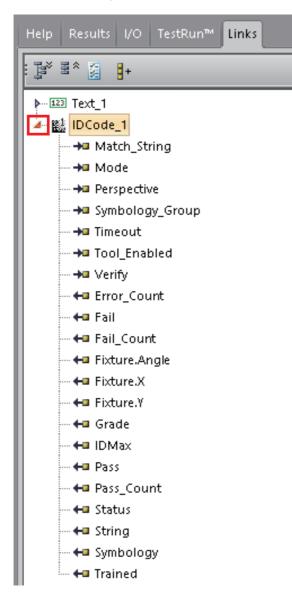
Operating procedure

1. Moving to the Link tab

In the Palette, click the [Links] tab.



2. Click the triangle to the left of the tool to be configured to expand it



3. Right click the parameter to be configured, and then click the output value to be linked.

Description				
	123 Text_1	•	X_01	Error_Count
Perspective	🞲 Variables_1	Þ	X	Execution_Time
Symbology_Group				Fail
🗝 Timeout				
Tool_Enabled				Fail_Count
+= Verify			X_01	Mismatch
←= Error_Count			X	Mismatch_Count
←■ Execution_Time				OCRMax
+= Fail				
🕶 Fail_Count			% 01	Pass
🕂 Fixture.Angle			X_01	Pass_Count
🕶 Fixture.X			X	Result_Length
🕶 Fixture.Y				 Status
🕂 🖬 Grade				
+= IDMax			ąb	String
+= Pass			X_01	Tool_Enabled_Status
+= Pass_Count			alb	Train_Dialog
🕶 Status		I	*	
🕶 String				
🕶 Symbology				

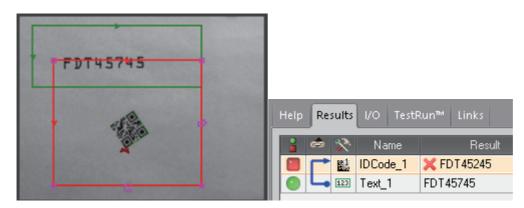
4. A linked status is indicated by a blue line.

•
🚈 🏙 IDCode_1
🗝 🖊 Match_String ┥
Perspective
→■ Timeout
🗝 🕶 Verify
🗝 🕶 Error_Count
🗝 🕂 🖬 Fail
🗝 🕂 🖬 Fail_Count
🗝 🕂 Fixture.Angle
Fixture.X
🕶 Fixture.Y
🗝 🕂 🖬 Grade
🕶 IDMax
🕶 Pass
🗝 🕶 Pass_Count
🛶 🕶 Status
🕶 🕶 String
🕶 🕶 Symbology
🕶 Trained

The Read Text (OCRMax) results are reflected in the match character string of 2D code scanning.

Help Results	I/O TestRun	™ Li	nks		
1 🚔 🔅	Name			Result	
🕘 🦵 🔛 II)Code_1	FDT4	5245		
💽 🖵 123 T	ext_1	FDT4	5245		
reispective	No perspec	uve			
Mode	Match Strin	g ,	,		-
Match String	FDT45245				
Timeout					5001 🚔
Verify	¥				

When Read Text (OCRMax) and 2D code scanning results are different, the 2D code scanning tool side configured to the match character string mode is incorrect.



Furthermore, depending on the parameter, link icons are displayed beside linked parameters and the parameters are changed so the manual editing is not possible.

Edit Tool - Q	uality_judgment-			
💽 General	Range Limits			
Maximum			181.640	69
Brightness			133.815	
Minimum			121.640	63
Invert				
		Set Limits		

If the cursor is moved over the link icon, it is possible to check the link origin tool and content.

Edit Tool - C	uality_judgment	
💽 General	Range Limits	Histog
Maximum	181.640	cə 🗌
Brightness	133.815	Math_2.Result
Minimum	121.640	GEO D
Invert		
	Set Limits	

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