Vision Sensor
FZ2 Series

OMRON

Beyond the Competition

real**i**zing

Looking to the future!
State-of-the-art Sensing Technology

OMRON's top-of-the-line FZ2 Vision Sensor handles essentially any type of inspection or measurement. To achieve this OMRON has raised sensing performance beyond the competition. Another "dimension" has been added to advanced color and resolution capabilities to develop the world's first Vision Sensor capable of 3-dimensional measurements.
"Color," "resolution," and "3D" capabilities were combined to provide the ultimate solution to all your future inspection needs.

Co
From Black
to Real Color

World's First Patent pending.

Real Color Sensing as It Is

The Vision Sensor recognizes 256 gradations of each of the RGB colors, so over 16.77 million colors are captured. It also features a completely new high-speed image processing technology. The Vision Sensor processes color data approaching the abilities of the human eye, so stable measurements are possible even in lighting conditions that are similar to natural light. Subtle variations in color are thus accurately recognized, even when there is little contrast between the sample and the background.

■ Data Volume 65,536 Times that of Black & White
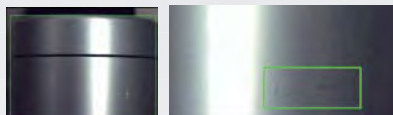
● 256 Colors   ● 16.77 Million Colors

Light ← → Dark

B

R   G

Black & White Processing   **Real Color Processing**
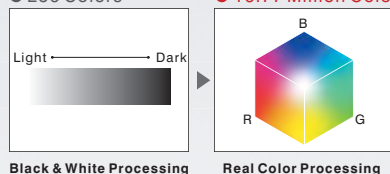
■ Previously Unstable Inspections Can Now Be Performed Reliably

**Detect Color Edges of Similar Colors Regardless of Background**

Detect Defects Even on Reflective Metal Surfaces

World's First

3D Sensing as It

By combining advanced 3D processing technology with our own unique calibration technology, OMRON has succeeded in creating the world's first commercially viable sensor capable of 3D measurements. Installed inline it can instantaneously measure length, width, and height, making it possible to automate processes that until now have relied on human labor.
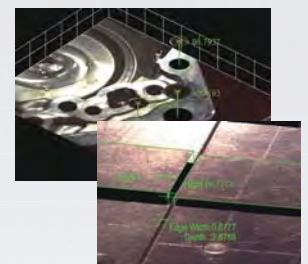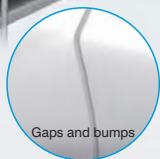
lor
& White
Sensing

Resolution
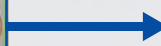2 Million Pixels

Dimensions
From 2-Dimensional
to 3-Dimensional

Is

Precise Sensing as It Is

Our lineup includes both Black & White and Real Color
Sensors equipped with 2-million-pixel CCDs, which
offer the best resolution available.

Hole positions
and diameters

Gaps and bumps

Note: For details, refer to the FZD catalog provided separately.

Accurately detect tiny
scratches or dirt.

Looking to the future!
Powerful Engine for Speed and Volume

Presenting the newly evolved version of our Mega ARCS Engine featuring Processing Boost Software (PBS) architecture and the fastest CPU in the industry. This new engine allows you to perform "yet another inspection item" beyond what was previously possible.

This high-speed processing capability becomes increasingly valuable as data volumes increase, for example when conducting inspections of multiple locations simultaneously, or when processing high-resolution images.
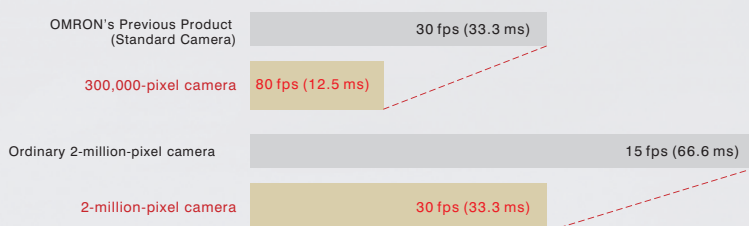
Fastes
in the in

Mega ARCS
Engine

ADVANCED
ARCS
REALCOLOR
SENSING
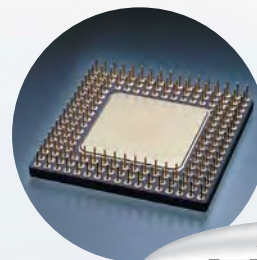
Fastest in the industry

80-fps Ultra High-speed Input

Our camera image capture speeds have improved dramatically. Our 300,000-pixel camera boasts high-speed recording at 80 fps, much faster than conventional cameras. Even our 2-million-pixel high-definition processing cameras have capture speeds of 30 fps.

|	
OMRON's Previous Product (Standard Camera)	30 fps (33.3 ms)
300,000-pixel camera	80 fps (12.5 ms)
Ordinary 2-million-pixel camera	15 fps (66.6 ms)
2-million-pixel camera	30 fps (33.3 ms)

■ Partial Capture at Maximum Speed of 3 ms

Out of all of the lines from 0 to 479 on a full screen, the required portion can be specified for capture. This can make image capture even faster.

Note: ARCS stands for Advanced Real Color Sensing.

t CPU
dustry

PBS Architecture
(Processing Boost Software)

Rapidly Complete
Both Simple and Complex Inspections
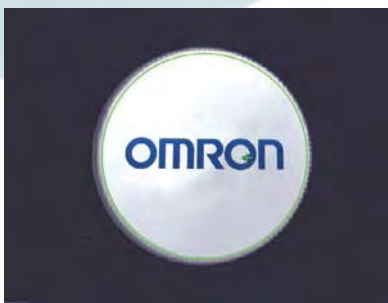
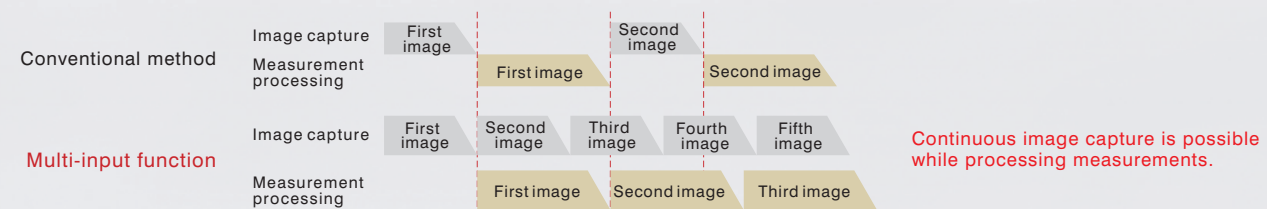**For example, cap inspections take only 40 ms.**

Processing:
1. Camera Image Input
2. Edge Position (Confirm position.)
3. Position Compensation
4. Circle Angle (Correct rotation.)
5. Fine Matching (Inspect for dirt.)

Evolution

Large Data Processing by Multi-input Function (See note.)

Each camera has its own image buffer for storing image data that is separate from the main memory used for measurement processing. This allows for up to 32 frames of continuous high-speed image capture even while the main memory is processing measurement data.

Conventional method

Image capture — First image — Second image

Measurement processing — First image — Second image

Multi-input function

Image capture — First image — Second image — Third image — Fourth image — Fifth image

Measurement processing — First image — Second image — Third image

Continuous image capture is possible while processing measurements.

Beer Beer ...er

Note: The number of frames that can be captured continuously depends on the controller and the type of camera attached to.

● FZ2-5□□ Series   2-million-pixel camera: 8 images
                    300,000-pixel camera: 32 images

● FZ2-3□□ Series   300,000-pixel camera: 16 images

Looking to the future!
Camera Lineup for Your Diversified Needs

For Mixed Production Lines

World's First Autofocus Camera   `Color`

World's First Intelligent Camera
(Auto-focus Camera with Illumination) Patent Pending.

World's first image processing camera with autofocus. With this Camera, there is no need to change the camera position or adjust settings, including zoom and illumination pattern, when making layout changes.
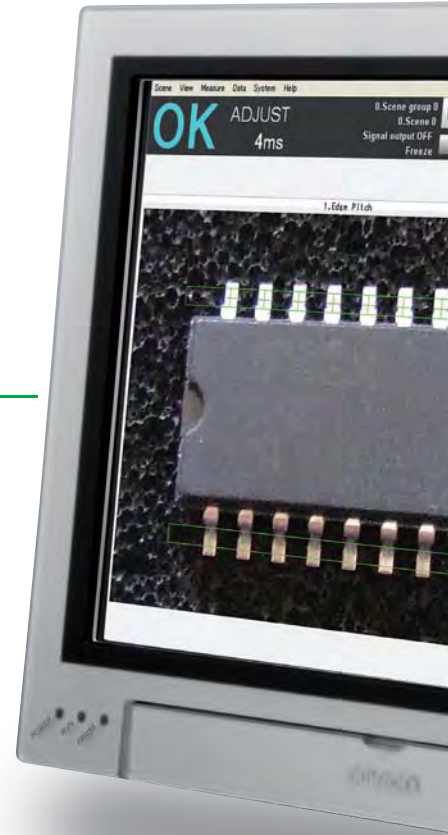
For High-speed Production Lines

Fastest in Its Class 300,000-pixel
Ultra-high Speed Camera   `Color` `Black & White`

Despite the small size, an image capture speed of 80 fps has been obtained, the fastest in this class.

Up to four connected to a

Nine different types of camera are available, and up to four cameras can be connected to a single controller. Different kinds of cameras can be connected simultaneously to the same controller, making it possible to combine both color cameras and black & white cameras, or

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Intelligent Camera Diffusion Plate

When the target is shiny, reflections from the Intelligent Camera's LED illumination may appear in the image. For such cases, OMRON provides an easily attachable Diffusion Plate. This Diffusion Plate suppresses reflections from the illumination, enabling the Intelligent Camera to take measurements of reflective targets.

`Maximum Length: 45 m`

Camera Cable Extension Unit

This Unit allows Camera Cables to be interconnected. Camera Cables can be extended to up to 45 m (see note). This is useful when the control panel is located some distance from the production line.

Note: Up to two Units can be used between the Camera and the Controller. For details on cable lengths, refer to the Ordering Information section.
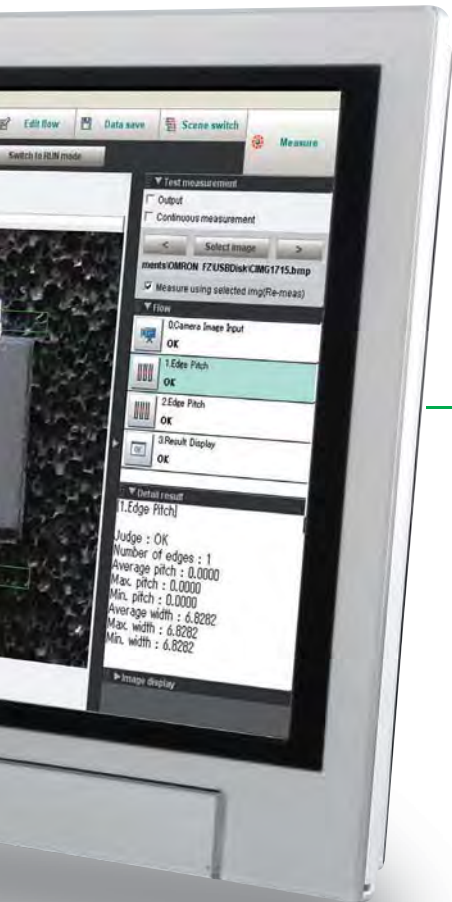
For High-definition Inspections

Fastest in Its Class ## 2-million-pixel High-speed Camera

`Color` `Black & White`

High resolution at 2 million pixels, and an image capture speed of 30 fps (33.3 ms), fastest in its class. This high-precision camera provides both high resolution and high-speed image capture, and is also compact at 1/4th the size of previous models.

For 3D Measurements

World's First ## 3D Vision Camera System `Color`

Sophisticated 3D measurements are now possible with this advanced new camera system. Measurements are possible at a distance of up to 2 m. Select between integrated or separated models depending on the installation distance.

Note: Photograph shows the integrated model.
Note: For details, refer to the FZD catalog provided separately.

Cameras single Controller

300,000-pixel and 2-million-pixel cameras. All the cameras required for the inspection job can be attached to a single controller for more optimal image capture.

* The FZ2-ST2C can be connected only to a FZD Controller, and uses two of its channels.
* Two-million-pixel cameras can be used only with the FZ2-5□□ Series and the FZD Series.

Low-distortion Lenses

For high-resolution, high-precision measurements, OMRON offers a lineup of low-distortion lenses that are specially designed for use in high-resolution cameras. Nine different lenses are available, with focal lengths ranging from 5 to 100 mm.

Looking to the future!
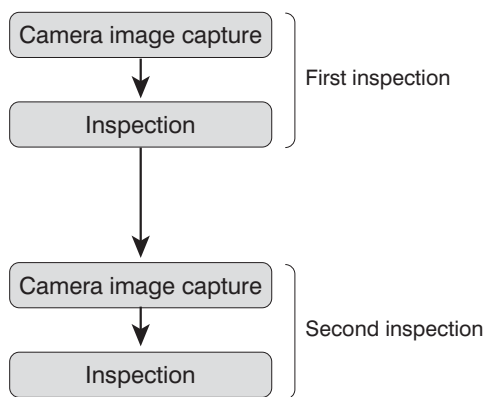## Supporting Tool for Your Efficient Operatio

OMRON Only   Flow Menu Programming

OMRON's unique Flow Menu is built into the FZ2. This makes it possible to change measurements depending on inspection results or input conditions. It is now easy to make the equivalent of programming changes, such as changing measurement regions for workpiece tolerances, or switching to different measurement items depending on the workpiece.

Measuring a Single Sample while Changing the Illumination Conditions

For example:
When measuring objects with uneven surfaces, the optimal illumination conditions often depend on which part of the object is being measured. In such cases, the flow menu can be used to make select processing, and to arrange and join them together so that multiple images can be captured while changing the illumination conditions by means of a single trigger signal.

```
┌─────────────────────────┐
│ Camera image capture    │ ┐
└───────────┬─────────────┘ │  First inspection
            ▼               │
┌─────────────────────────┐ │
│ Inspection              │ ┘
└───────────┬─────────────┘
            │
            ▼
┌─────────────────────────┐
│ Camera image capture    │ ┐
└───────────┬─────────────┘ │  Second inspection
            ▼               │
┌─────────────────────────┐ │
│ Inspection              │ ┘
└─────────────────────────┘
```

First Inspection: Defect Inspection of Metallic Components on a PCB

Second inspection: Checking for Presence of Electronic Components on the PCB

This is perfect for cases where it is necessary to change the illumination conditions in order to measure different components on the same PCB.

Other Applications

- Inspection items can be changed using external inputs.
- Measurement ranges or measurement parameters can be modified depending on previous measurement results.
- Ideal for regularly checking variation in data
  (e.g., the maximum and minimum values resulting from multiple measurements can be output).

Confirmation

1. Conduct Simulations using a PC

Use a computer to conduct trial measurements using images from a digital camera or images obtained using the logging function. This allows you to verify the system in advance from your desktop without a Controller to reduce setup time onsite.

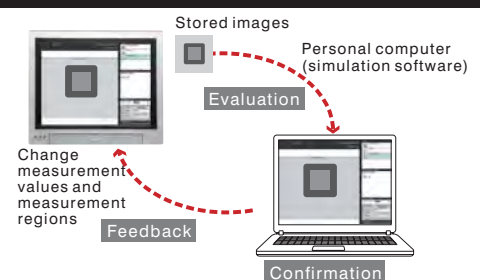Please contact your OMRON representative for details.

Pre-verify captured images

Digital camera

PC (simulation software CD-ROM)
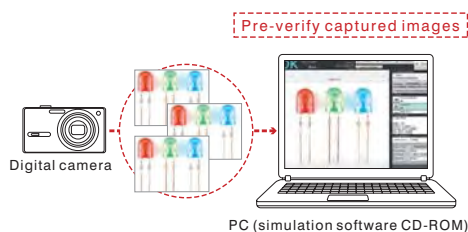
Note: Compatible with BMP (24-bit) image format. For details, refer to the simulation software documentation.

Feedback

2. Online Adjustments

You can adjust settings, such as threshold levels, while measurements are underway. Settings verified in advance using the simulation software on a computer can be downloaded to the Controller using this online adjustment function, allowing adjustments to be made without stopping operation.

Stored images

Personal computer (simulation software)

Evaluation

Change measurement values and measurement regions

Feedback

Confirmation

Note: Some functions, such as model confirmation, cannot be changed during operation.

Evolved Displays

Multi-layout Screen Displays during Measurements

The measurement display layout can be arranged to suit the needs at the site and the number of cameras being used. Unusable images can be identified, inspection images can be compared, and selected images can be expanded to confirm details, allowing defects to be identified even while the measurement process is underway.
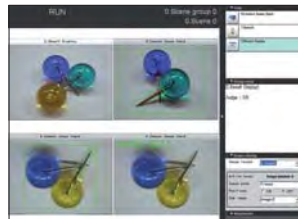
One-image Display

The large image size is ideal for confirming details.
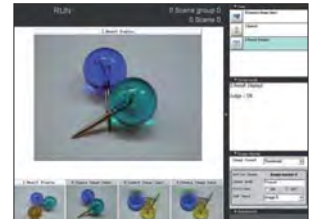
Two-image Display

When multiple cameras are used, images from each camera can be viewed side-by-side on the same screen for comparison.

Four-image Display

Thumbnail Display

Four images can be displayed at the bottom of the screen, while above it one selected image can be expanded to a larger size for confirmation of details.

Measurement Results Display

To make it possible to view measurement results at a glance, figures or text can be displayed as you like on the screen. Display items can be changed at will according to the needs at the site, so the operator is free to display only those items that are needed at any given time.
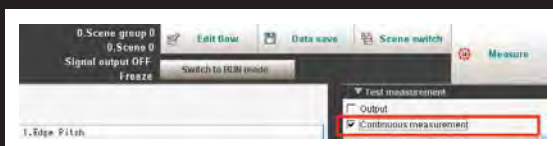

Layout, text colors, and font sizes can be modified at will.

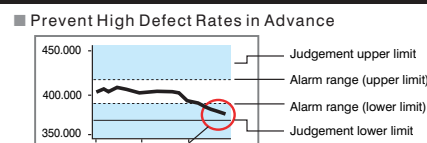## 3. Continuous Automatic Re-measurement of Stored Images

Store measured image data in the Controller or a USB storage device. OMRON has added continuous automatic re-measurement to the function that allows re-measurement of stored image data obtained while adjusting the settings. A single click enables the continuous automatic re-measurement function, even if there are hundreds of stored images.
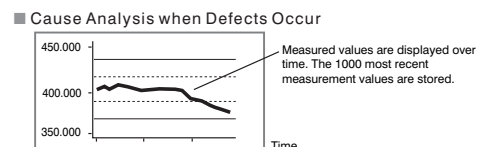

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4. NG Warning Trend Monitor

The system not only displays measured values in graph form, it also can display warnings before defects occur. Use the warning range settings for measured values to help prevent NG occurrences in advance. This allows for feedback to previous work processes, and can be useful in casual analyzing after defects occur.

■ Prevent High Defect Rates in Advance

- Judgement upper limit
- Alarm range (upper limit)
- Alarm range (lower limit)
- Judgement lower limit

When values exceed the set range, a warning is displayed. Then feedback can be applied to previous steps in the work process before large amounts of defective items occur.

■ Cause Analysis when Defects Occur

Measured values are displayed over time. The 1000 most recent measurement values are stored.

Looking to the future!
Fine-tuned Measurement Items


New Patent pending.

ECM Search

OMRON only:
Accurate Searches even with Low Contrast, Soiling, or Chipping

The search is performed by generating an edge code (EC) model from edge extraction images. Achieve stable searching even when workpiece conditions change easily or when the workpiece is dirty or chipped.
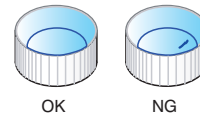
Registered model   Partially chipped   Low contrast   Size difference

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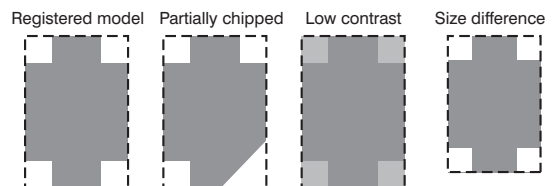
Defect
Fine Matching
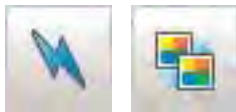
The Ultimate in Defect Inspection Enabled by Real Color Processing

Through the use of real color processing, it is possible to detect unexpected dirt or scratches in the color.

Use "Defect" to detects subtle variations in color or color density.

Use "Fine Matching" to defects differences between a registered image and the image being.

OK   NG   OK   NG
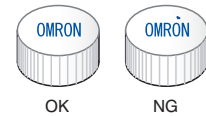
New Mode

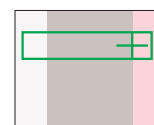### Edge Position
Edge Pitch

Accurate Position Measurement

Using real color enables detecting even subtle variations between similar colors as edges. OMRON has also added a new Absolute Value mode that is not affected by environmental changes such as halation within the measurement region. Our edge detection capability has become even better.
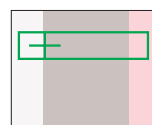
Recognize subtle color variations as edges.

Recognize edges by specifying pink.
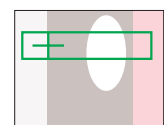
Recognize edges using the absolute values of the assigned color

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New

Scan Edge Position
Scan Edge Width

Measurement of the Top of Curved Surfaces, and the Maximum and Minimum Edge Widths within the Measurement Region

The Scan Edge Position item examines edge position data from all the different parts and determines the closest points, furthest points, inclination of the object, and degree of surface irregularity. The Scan Edge Width item detects localized or average widths of the object. This makes it easy to determine the tip of an object or the inner diameter of a hole.

Position of nearest edge: Point of the marker

Position of furthest edge: Base of the marker tip
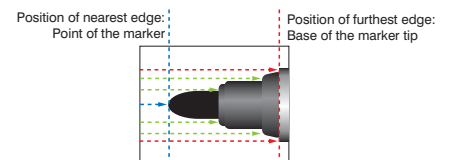
By analyzing the edge positions in all the different dividing measurement area, the tip and base of the marker can be measured.

New Patent pending.

Set Unit Figure
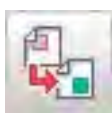
Active Threshold Control for Dimensional Tolerances

A certain amount of variation and tolerances are unavoidable within workpieces. The Set Unit Figure item enables inspections after adjusting the position and size of the measurement region according to these variations. This helps to increase the accuracy of defect inspections.

For example, based on measurement results for edge positions 1 and 2, it is possible to adjust defect measurement region 5.

Search	Flexible Search	Circle Angle	Gravity and Area	Color Data	Classification	Labeling	Character Inspection	Date Verification

Model Dictionary	Label Data	Camera Switching	Position Compensation	Calculation	Data Logging	Trend Monitor	DI Branch

Determining Alignment Mark Positions

When detecting marks or stamps, the state of the surface or the workpiece creates a noise element, and if the stamp is faded, stable detection is difficult. However, OMRON's unique ECM Search item allows for amazingly stable detection even when the surface is dirty or when contrast is low.
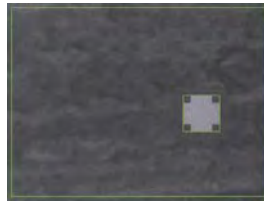
Effective Detection Even at Low Contrast

Other applications: Inspecting printing on electronic components or stamps in metal

Inspection for Dirt on Caps

Use the Fine Matching item to inspect for dirt on the background of print characters or to inspect for imperfectly printed characters, as can occur on bottle caps. For dirt on plain backgrounds, as with the sides of caps, use the Defect item. In this way, highly accurate defect inspection is possible without using filtering or other difficult adjustments.

Other applications: General defect inspections, such as inspecting for dirt on aluminum cans or non-woven textiles

IC Pin Inspections

By combining a 2-million-pixel camera with real color processing, it is now possible to count pins and measure pin pitches with high precision. For spots in metallic components where halation is likely to occur, use the Color Edge item and the Absolute Value Mode to achieve high repeat accuracy.

Other applications: Precise dimensional measurements in dimensional inspection of connectors and others items

Groove Depth Inspections in Metal Shafts

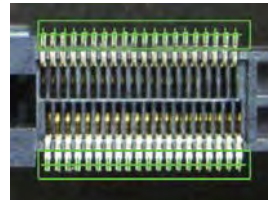For dimensional measurements of metal shafts, the Scan Edge Width measurement item, which allows simultaneous measurement of the maximum and minimum widths within the measurement region, is an ideal method. This method has a wide range of other applications as well.
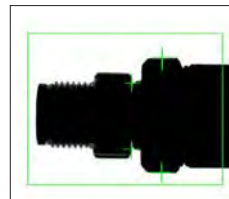
Other applications: Inspecting the width of electrodes on chip resistors or inspecting ampoule positions

Chip Resistor Electrode Defect Inspection

It is important to take the allowed dimensional tolerances into account during measurements of the electrode portion of chip resistors. After measuring the position of the electrode using the Edge Position item, the results can be used to flexibly adjust the measurement region for the Defect item, the Gravity and Area item, or any other item to achieve high-precision measurements.

Adjust the measurement region to match the electrode portion, and then carry out the inspection.

Other applications: PCB through hole inspections.
(When drawings of multiple measurement regions are required, individual measurement regions can be moved sequentially while performing measurements.)

Basic Configuration

■ FZ2 Series

Controllers

■ Controller integrated with LCD

2-camera Type
FZ2-300/FZ2-305
FZ2-500/FZ2-505

4-camera Type
FZ2-300-10/FZ2-305-10
FZ2-500-10/FZ2-505-10

Touch Pen (accessory)

■ Box-type Controller

2-camera Type
FZ2-350/FZ2-355
FZ2-550/FZ2-555

4-camera Type
FZ2-350-10/FZ2-355-10
FZ2-550-10/FZ2-555-10

LCD Monitor	Monitor Cable	Input Devices
FZ-M08	FZ-VM	Mouse or Trackball (commercially available devices with USB interface)

Camera Cable

Camera Cable	FZ-VS
Bend resistant Camera Cable	FZ-VSB
Right-angle Camera Cable	FZ-VSL
Long-distance Camera Cable	FZ-VS2
Long-distance Right-angle Camera Cable	FZ-VSL2

Cameras

Intelligent Cameras	Autofocus Cameras	Digital Cameras	CCTV Lenses 3Z4S-LE Series
FZ-SLC15/ FZ-SLC100	FZ-SZC15/ FZ-SZC100	FZ-S/FZ-SC/ FZ-S2M/FZ-SC2M	High-resolution, Low-distortion Lenses FZ-LEH Series

*The FZ-SC2M/FZ-S2M Camera can be connected only to a FZ2-5□□/FZ2-5□□-10 Controller.

■ FZD Series (for 3D Measurements)

Controllers

■ Controller integrated with LCD

FZD-500-10/FZD-505-10

Touch Pen (accessory)

■ Box-type Controller

FZD-550-10/FZD-555-10

LCD Monitor	Monitor Cable	Input Devices
FZ-M08	FZ-VM	Mouse or Trackball (commercially available devices with USB interface)

Camera Cable

Camera Cable	FZ-VS
Bend resistant Camera Cable	FZ-VSB
Right-angle Camera Cable	FZ-VSL
Long-distance Camera Cable	FZ-VS2
Long-distance Right-angle Camera Cable	FZ-VSL2

Two Cables required.

Cameras

Integrated Camera	Separate Cameras	Digital Camera	
3D Vision Camera FZD-STC2M	3D Camera Base Plate FZD-CBS FZD-CBM FZD-CBL	FZ-S2M/ FZ-SC2M	High-resolution, low-distortion Lenses FZ-LEH Series

(Two Cameras of the same model are required.)

3D Calibration Tool

FZD-CAL

Illumination

High-luminance Pattern Lighting
FZD-LTW
FZD-LTPW

CCTV Lenses
3Z4S-LE Series

*The Intelligent Camera and Autofocus Camera can be connected for 2D measurements.

High-resolution, Low-distortion Lenses

Models

Lens model	FZ-LEH5	FZ-LEH8	FZ-LEH12	FZ-LEH16	FZ-LEH25	FZ-LEH35	FZ-LEH50	FZ-LEH75	FZ-LEH100
Appearance	42 dia. 38.7	34 dia. 41.6	34 dia. 37.0	33 dia. 36.5	33 dia. 39.5	34 dia. 36.5	34 dia. 55.0	36 dia. 51.0	42 dia. 70.0
Focal length	5 mm	8 mm	12.5 mm	16 mm	25 mm	35 mm	50 mm	75 mm	100 mm
Brightness	F2.8	F1.4	F1.4	F1.4	F1.4	F2	F2.8	F2.5	F2.8
Filter size	M40.5 P0.5	M27.0 P0.5	M27.0 P0.5	M27.0 P0.5	M27.0 P0.5	M27.0 P0.5	M27.0 P0.5	M34.0 P0.5	M40.5 P0.5

The 5-mm Extension Tubes (3Z4S-LE ML-EXR) cannot be used with FZ-LEH25 Lenses.

▌Ordering Information

▌FZ2 Series

Item	Descriptions				Model	Remarks
Controllers	Integrated with LCD	Can connect Cameras other than 2-million-pixel Digital Camera.	Two-camera Controller	NPN	FZ2-300	With touch pen
				PNP	FZ2-305	
			Four-camera Controller	NPN	FZ2-300-10	
				PNP	FZ2-305-10	
		Can connect all Camera models.	Two-camera Controller	NPN	FZ2-500	
				PNP	FZ2-505	
			Four-camera Controller	NPN	FZ2-500-10	
				PNP	FZ2-505-10	
	Box-type	Can connect Cameras other than 2-million-pixel Digital Camera.	Two-camera Controller	NPN	FZ2-350	---
				PNP	FZ2-355	
			Four-camera Controller	NPN	FZ2-350-10	
				PNP	FZ2-355-10	
		Can connect all Camera models.	Two-camera Controller	NPN	FZ2-550	
				PNP	FZ2-555	
			Four-camera Controller	NPN	FZ2-550-10	
				PNP	FZ2-555-10	
Cameras	Intelligent Cameras	Narrow field of vision	Color		FZ-SLC15	Camera + Zoom, Autofocus Lens + Intelligent Lighting
		Wide field of vision			FZ-SLC100	
	Autofocus Camera	Narrow field of vision	Color		FZ-SZC15	Camera + Zoom, Autofocus Lens
		Wide field of vision			FZ-SZC100	
	Digital Camera	300,000 Pixels	Monochrome		FZ-S	CCTV Lens required.
			Color		FZ-SC	
		2 million pixels	Monochrome		FZ-S2M	
			Color		FZ-SC2M	
Lenses	High-resolution, Low-distortion Lenses				FZ-LEH5/LEH8/LEH12/LEH16/ LEH25/LEH35/LEH50/LEH75/ LEH100	Only for 2-million-pixel Camera.
	CCTV Lenses				3Z4S-LE Series	---
Cables	Camera Cable				FZ-VS	Cable length: 2 m, 5 m, or 10 m (See note 2.)
	Bend resistant Camera Cables				FZ-VSB	Cable length: 2 m, 5 m, or 10 m (See note 3.)
	Right-angle Camera Cable (See note 1.)				FZ-VSL	Cable length: 2 m, 5 m, or 10 m (See note 2.)
	Long-distance Camera Cable				FZ-VS2	Cable length: 15 m (See note 4.)
	Long-distance Right-angle Camera Cable				FZ-VSL2	Cable length: 15 m (See note 4.)
	Cable Extension Unit				FZ-VSJ	Up to two Extension Units and three Cables can be connected. (Maximum cable length: 45 m (See note 5.))
	Monitor Cable				FZ-VM	Cable length: 2 m or 5 m
	Parallel Cable				FZ-VP	Cable length: 2 m or 5 m
Peripheral Devices	Diffusion Plate for Intelligent Camera	Narrow field of vision			FZ-SLC15-DL	---
		Wide field of vision			FZ-SLC100-DL	---
	LCD Monitor				FZ-M08	For Box-type Controllers
	USB Memory	256 MB			FZ-MEM256	Capacity: 256 MB
		1 GB			FZ-MEM1G	Capacity: 1 GB
	VESA attachment				FZ-VESA	For installing LCD integrated type controller
	Desktop Stand				FZ-DS	For installing LCD integrated type controller
Mouse					---	Recommended Products (Optical Mouse)" • Microsoft Corporation: Compact Optical Mouse, U81 Series
External Lighting					3Z4S-LT Series	---
Strobe Controller (for FZ Series Vision Sensors)					Manufactured by MORITEX Corporation 3Z4S-LT MLEK-C100E1TS 2	Required to control external lighting from a Controller

Note 1: This Cable has an L-shaped connector on the Camera end.
  2: The 10-m Cable cannot be connected to the FZ-SLC□□□ or FZ-SZC□□□ Cameras.
  3: The 10-m Cable cannot be connected to the FZ-S□2M, FZ-SLC□□□, or FZ-SZC□□□ Cameras.
  4: The 15-m Cable cannot be connected to the FZ-SLC□□□ or FZ-SZC□□□ Cameras.
  5: The maximum cable length depends on the Camera being connected, and the model and length of the Cable being used.

▌FZD Series (for 3D Measurements)

Item		Name	Model	Remarks
Controllers	Integrated with LCD	NPN	FZD-500-10	---
		PNP	FZD-505-10	
	Box-type	NPN	FZD-550-10	
		PNP	FZD-555-10	
Cameras	3D Vision Camera	Color	FZD-STC2M	Integrated Camera (installation distance: 24 cm max.)
Camera peripherals	3D Camera Base Plate	Short-distance Plate	FZD-CBS	Installation distance: max. 30 cm
		Medium-distance Plate	FZD-CBM	Installation distance: 30 cm to 1 m
		Long-distance Plate	FZD-CBL	Installation distance: 1 to 2 m
3D Calibration tool			FZD-CAL	---
High-luminance lighting	Line pattern		FZD-LTW	White LEDs
	Original pattern		FZD-LTPW	White LEDs

▌CCTV Lenses

Models

Lens model	3Z4S-LE ML-0614	3Z4S-LE ML-0813	3Z4S-LE ML-1214	3Z4S-LE ML-1614	3Z4S-LE ML-2514	3Z4S-LE ML-3519	3Z4S-LE ML-5018	3Z4S-LE ML-7527	3Z4S-LE ML-10035
Appearance									
Focal length	6 mm	8 mm	12 mm	16 mm	25 mm	35 mm	50 mm	75 mm	100 mm
Brightness	F1.4	F1.3	F1.4	F1.4	F1.4	F1.9	F1.8	F2.7	F3.5
Filter size	M27 P0.5	M25.5 P0.5	M27 P0.5	M27 P0.5	M27 P0.5	M27 P0.5	M30.5 P0.5	M30.5 P0.5	M30.5 P0.5

Extension Tubes

Model	3Z4S-LE ML-EXR
Contents	Set of 7 tubes (40 mm, 20 mm, 10 mm, 5 mm, 2.0 mm, 1.0 mm, and 0.5 mm) Maximum outer diameter: 30 mm dia.

■ Precautions

• Do not use the 0.5-mm, 1.0-mm, and 2.0-mm Extension Tubes attached to each other. Since these Extension Tubes are placed over the threaded section of the Lens or other Extension Tube, the connection may loosen when more than one 0.5-mm, 1.0-mm or 2.0-mm Extension Tube are used together.
• Reinforcement may be required for combinations of Extension Tubes exceeding 30 mm if the Camera is subject to vibration.

■ Ratings and Specifications

Controllers

For information on FZD-series refer to the FZD Series 3D Vision Sensor catalog (Cat. No. Q156) provided separately.

Model			FZ2-300	FZ2-300-10	FZ2-500	FZ2-500-10	FZ2-350	FZ2-350-10	FZ2-550	FZ2-550-10
	NPN Output		FZ2-300	FZ2-300-10	FZ2-500	FZ2-500-10	FZ2-350	FZ2-350-10	FZ2-550	FZ2-550-10
	PNP Output		FZ2-305	FZ2-305-10	FZ2-505	FZ2-505-10	FZ2-355	FZ2-355-10	FZ2-555	FZ2-555-10
Connected Camera			FZ-S, FZ-SC, FZ-SLC15, FZ-SLC100, FZ-SZC15, FZ-SZC100		FZ-S, FZ-SC, FZ-SC2M, FZ-S2M, FZ-SLC15, FZ-SLC100, FZ-SZC15, FZ-SZC100		FZ-S, FZ-SC, FZ-SLC15, FZ-SLC100, FZ-SZC15, FZ-SZC100		FZ-S, FZ-SC, FZ-S2M, FZ-SC2M, FZ-SLC15, FZ-SLC100, FZ-SZC15, FZ-SZC100	
No. of Cameras			2	4	2	4	2	4	2	4
Processing resolution			640 × 480 (H × V)		640 × 480 (H × V)/1600 × 1200 (H × V) (See note 1.)		640 × 480 (H × V)		640 × 480 (H × V)/1600 × 1200 (H × V) (See note 1.)	
No. of scenes			32							
Number of logged images (See note 2.)	Connected to a FZ-SC Camera	Connected to 1 camera	71		243		71		243	
		Connected to 2 cameras	35 × 2		121 × 2		35 × 2		121 × 2	
		Connected to 4 cameras	18 × 4		60 × 4		18 × 4		60 × 4	
	Connected to a FZ-SC2M Camera	Connected to 1 camera	---		39		---		39	
		Connected to 2 cameras	---		19 × 2		---		19 × 2	
		Connected to 4 cameras	---		9 × 4		---		9 × 4	
Operation			Touch pen, mouse, etc.				Mouse or similar device			
Settings			Create series of processing steps by editing the flowchart (Help messages provided).							
Serial communications			RS-232C/422:1 channel							
Network communications			Ethernet 100BASE-TX/10BASE-T							
Parallel I/O			11 inputs (RESET, STEP, DSA, and DI 0 to 7), 26 outputs (RUN, BUSY, GATE, OR, READY, ERROR, STGOUT 0 to 3, and DO 0 to 15)							
Monitor interface			Integrated Controller and LCD 12.1 inch TFT color LCD (Resolution: XGA 1,024 × 768 dots)				Analog RGB video output, 1 channel			
USB interface			4 channels (supports USB 1.1 and 2.0)							
Power supply voltage			20.4 to 26.4 VDC							
Current consumption	Connected to FZ-SC□		3.7 A max.	4.9 A max.	3.7 A max.	4.9 A max.	3.7 A max.	4.9 A max.	3.7 A max.	4.9 A max.
	Connected to FZ-S□C□□□		5 A max.	7.5 A max.	5 A max.	7.5 A max.	5 A max.	7.5 A max.	5 A max.	7.5 A max.
	Connected to FZ-S□2M		---		3.7 A max.	4.9 A max.	---		3.7 A max.	4.9 A max.
Ambient temperature range			Operating: 0 to 45°C, 0 to 50°C (See note 3.), Storage: −20 to 65°C (with no icing or condensation)							
Ambient humidity range			Operating and storage: 35 to 85 (with no condensation)							
Weight			Approx. 3.2 kg	Approx. 3.4 kg	Approx. 3.2 kg	Approx. 3.4 kg	Approx. 1.8 kg	Approx. 1.9 kg	Approx. 1.8 kg	Approx. 1.9 kg
Accessories			Touch pen (one, inside the front panel), Please Read First, Instruction Manual (Setup), 6 mounting brackets				Please Read First, Instruction Manual (Setup)			

Note 1: Connected to a 2-million-pixel Camera.
2: The number of logged images will vary when connecting multiple Cameras with different models.
3: The operating mode can be switched from the Controller Menu settings.

Cameras

	FZ-SLC100	FZ-SLC15	FZ-SZC100	FZ-SZC15	FZ-S	FZ-SC	FZ-S2M	FZ-SC2M
Image elements	Interline transfer reading all pixels, 1/3-inch CCD image elements						Interline transfer reading all pixels, 1/1.8-inch CCD image elements	
Color/Monochrome	Color				Monochrome	Color	Monochrome	Color
Effective pixels	640 × 480 (H × V)						1600 × 1200 (H × V)	
Pixel size	7.4 × 7.4 μm						4.4 × 4.4 μm	
Shutter function	Electronic shutter select shutter speeds from 1/10 to 1/50,000 s							
Partial function	12 to 480 lines						12 to 1200 lines	
Frame rate (image read time)	80 fps (12.5 ms)						30 fps (33.3 ms)	
Visual field	13 to 100 mm (See note 1.)	2.9 to 14.9 mm (See note 1.)	13 to 100 mm (See note 1.)	2.9 to 14.9 mm (See note 1 and 2.)	Select a lens according to the visual field and installation distance.			
Installation distance	70 to 190 mm (See note 1.)	35 to 55 mm (See note 1.)	77.5 to 197.5 mm (See note 1.)	47.5 to 67.5 mm				
LED class (See note 3.) (lighting)	Class 2		---					
Ambient temperature range	Operating: 0 to 50 C Storage: 25 to 60 C (with no icing or condensation)						Operating: 0 to 40 Storage: 25 to 65 C (with no icing or condensation)	
Ambient humidity range	Operating and storage: 35 to 85 (with no condensation)							
Weight	Approx. 670 g	Approx. 700 g	Approx. 500 g		Approx. 55 g		Approx. 76 g	
Accessories	Instruction Sheet and hexagonal wrench				Instruction Sheet			

Note 1: Tolerance: ±5 max. Note 2: The length of the visual field is the lengths along the Y axis. Note 3: Applicable standards: IEC 60825-1: 1993 + A1: 1997 + A2: 2001, EN 60825-1: 1994 + A1: 2002 + A2: 2001

LCD Monitor

	FZ-M08
Size	8.4 inches
Type	Liquid crystal color TFT
Resolution	1,024 768 dots
Input signal	Analog RGB video input, 1 channel
Power supply voltage	21.6 to 26.4 VDC
Current consumption	Approx. 0.7 A max.
Ambient temperature range	Operating: 0 to 50 C, storage: 25 to 60 C (with no icing or condensation)
Ambient humidity range	Operating and storage: 35 to 85 (with no condensation)
Weight	Approx. 1.2 kg
Accessories	Instruction Sheet and 4 mounting brackets

## Camera Cable Extension Units

	FZ-VSJ
Power supply voltage (See note 1.)	11.5 to 13.5 VDC
Current consumption (See note 2.)	1.5 A max.
Ambient temperature range	Operating: 0 to 50 C, storage: 25 to 60 C (with no icing or condensation)
Ambient humidity range	Operating and storage: 35 to 85 (with no condensation)
Maximum Units connectable	2 Units per Camera
Weight	Approx. 240 g
Accessories	Instruction Sheet and 4 mounting screws

Note 1: A power supply must be connected to the Strobe Controller and Camera when connecting a FZ-SLC100/SLC15/SZC100/SZC15 and using a Strobe Controller (3Z4S-LT MLEK-C100E1TS2.)
Note 2: The current consumption is when every Camera and Strobe Controller is connected to a power supply.
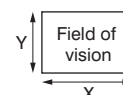
■ Optical Chart
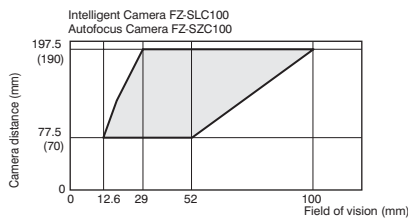
Intelligent Camera FZ-SLC100
Autofocus Camera FZ-SZC100

The value in parentheses is for the camera installation distance when using an Intelligent Camera.

Intelligent Camera FZ-SLC15
Autofocus Camera FZ-SZC15
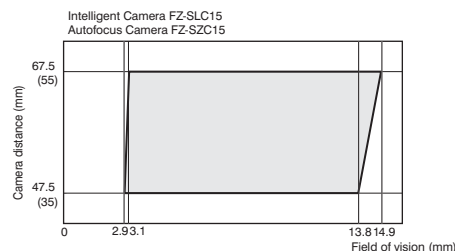
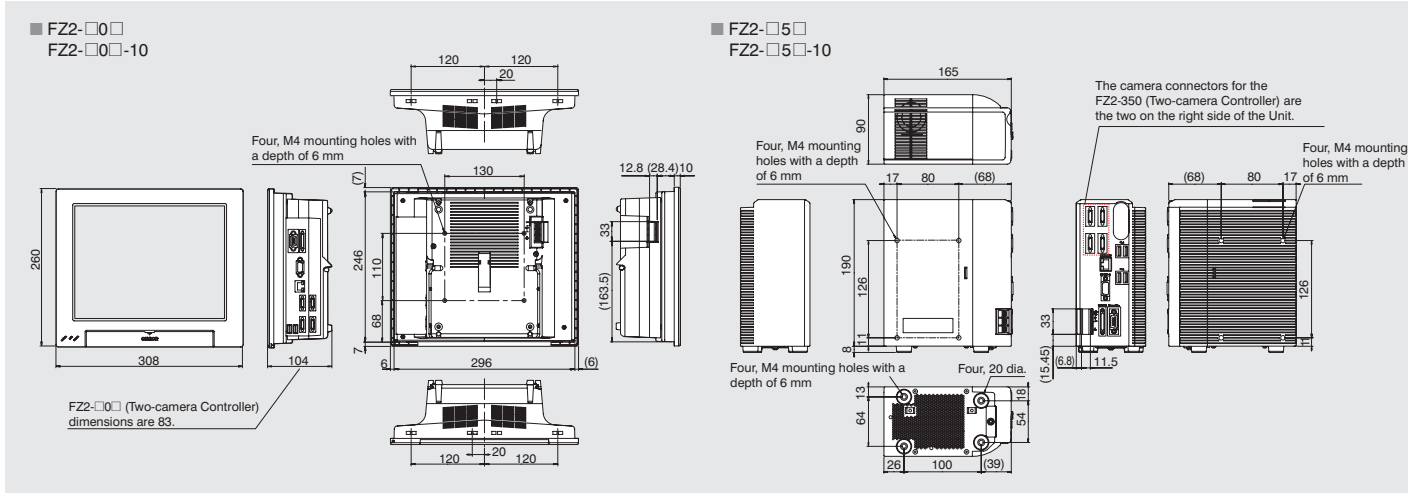The value in parentheses is for the camera installation distance when using an Intelligent Camera.

- Be sure to check the Instruction Sheet packed with the product before using an Intelligent Camera or Autofocus Camera.
- The lengths of the fields of vision given in the optical charts are the lengths of the Y axis.
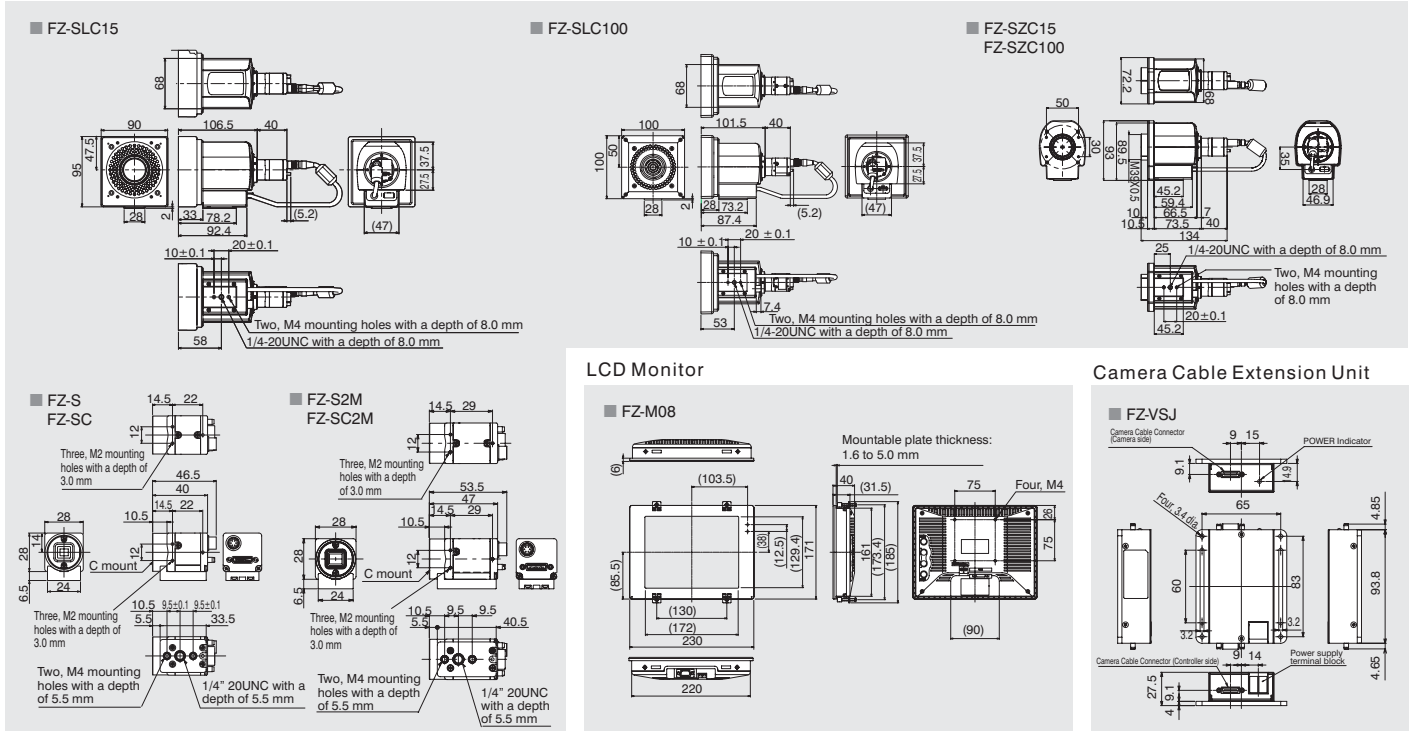
External Dimensions (Unit: mm)

For information on FZD-series, refer to the FZD Series 3D Vision Sensor catalog (Cat. No. Q156) provided separately.
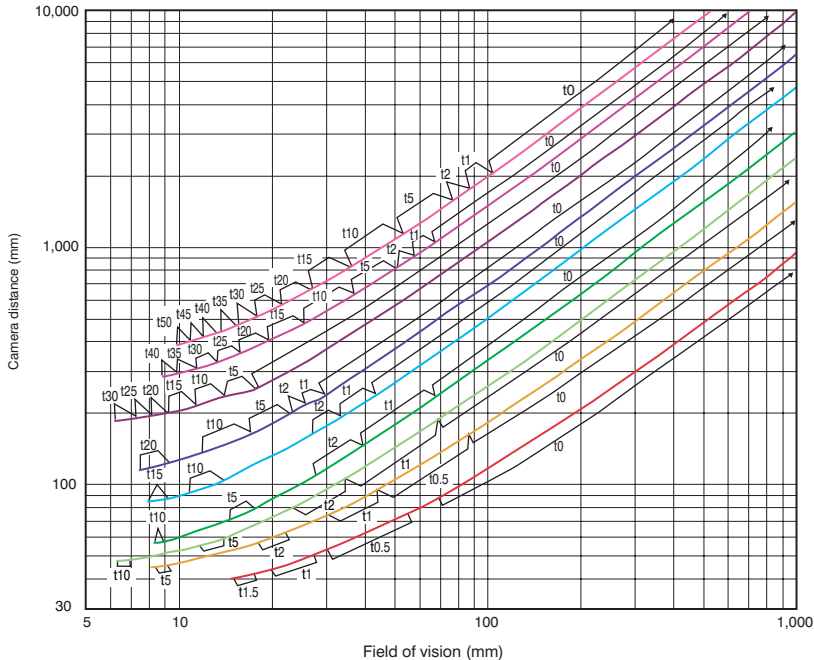
FZ2-series Controllers

■ FZ2-□0□
FZ2-□0□-10

FZ2-□0□ (Two-camera Controller) dimensions are 83.

■ FZ2-□5□
FZ2-□5□-10

The camera connectors for the FZ2-350 (Two-camera Controller) are the two on the right side of the Unit.

Cameras

■ FZ-SLC15

■ FZ-SLC100

■ FZ-SZC15
FZ-SZC100

■ FZ-S
FZ-SC

■ FZ-S2M
FZ-SC2M

LCD Monitor

■ FZ-M08

Mountable plate thickness: 1.6 to 5.0 mm

Camera Cable Extension Unit

■ FZ-VSJ

Optical Chart

FZ-S□2M Two-million-pixel Standalone Digital Camera

|	
FZ-LEH5	
FZ-LEH8	
FZ-LEH12	
FZ-LEH16	
FZ-LEH25	
FZ-LEH35	
FZ-LEH50	
FZ-LEH75	
FZ-LEH100	

■ Meaning of Optical Chart
The X axis of the chart shows the field of vision (mm), and the Y axis shows the camera installation distance (mm).

Camera
Extension Tube thickness: t□ (mm)
Lense
Camera distance (mm)
Field of vision (mm)
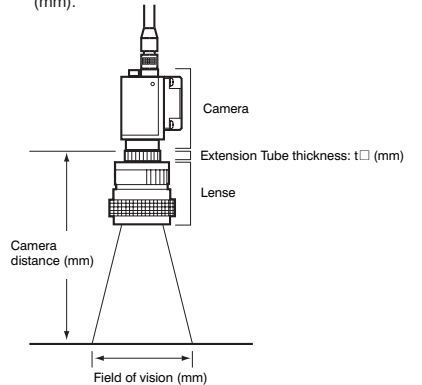
The 5-mm Extension Tubes (3Z4S-LE ML-EXR) cannot be used with FZ-LEH25 Lenses.

Optical Chart

FZ-S☐ Standalone camera 300,000 pixels

3Z4S-LE
- ML-0614
- ML-0813
- ML-1214
- ML-1614
- ML-2514
- ML-3519
- ML-5018

3Z4S-LE
- ML-7527
- ML-10035
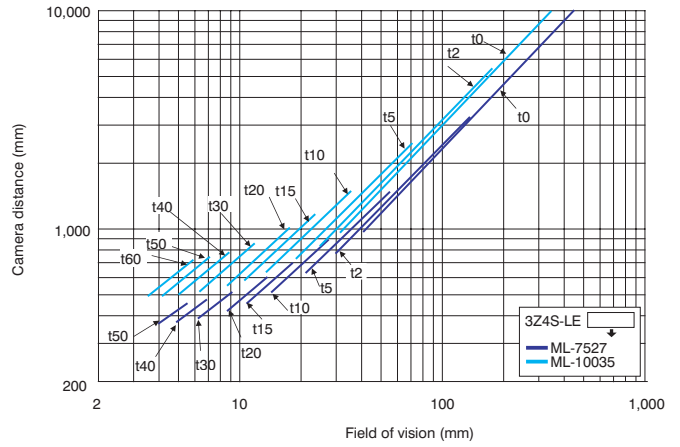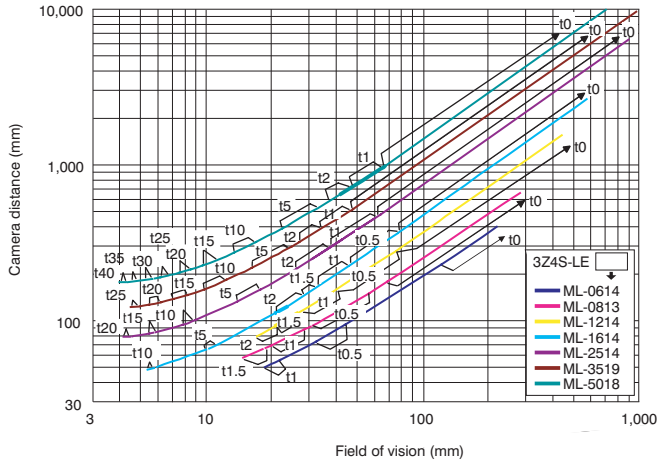
Vision Sensor Lineup

OMRON provides a product lineup that customers can choose from according to their objectives or inspection difficulty in order to solve problems.

FZD Series 3D Measurement Vision Sensors	ZFX General-purpose High-speed Vision Sensors	ZFV-C easy Vision Sensor
NEW		
World's First 3D Measurement Vision Sensors	Touch, connect, and go.	Easy Color Vision.

This document provides information mainly for selecting suitable models. Please read the User's Manual (Z275) carefully for information that the user must understand and accept before purchase, including information on warranty, limitations of liability, and precautions.

Authorized Distributor:

Note: Specifications subject to change without notice.

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