OMRON

True Color Vision Sensors
FZ2/FZD Series

FZ2/FZDVISION

Real Color Sensing Technology

»Touch screen controllers, real-time images
»16.77 million 24-bit true-color inspection
»Inline 3D image sensing and measurement
»High-speed, intelligent cameras with zoom capability

Automation...simple...powerful.

Leading-edge Sensing Technology

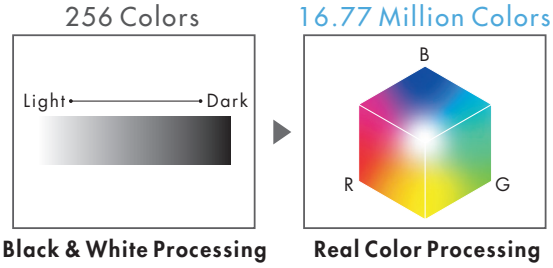
The ARCS (Advanced Real Color Sensing) Engine achieves high-precision sensing. This technology is 65,536 times better than earlier processing technology, where measurements were based on monochrome contrast. An amazing 16.77 million colors are captured and processed at high speed to approach human color perception.

Color

Humanlike Sensing with ARCS

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

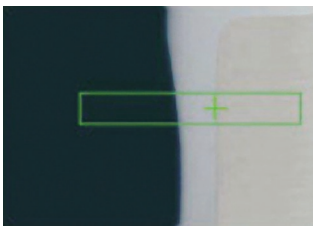


Previous Monochrome

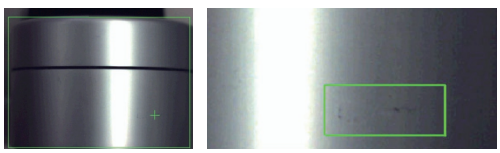
Real Color Processing

Omron's FZ2 Vision Sensor handles any type of inspection or measurement. Omron has raised sensing performance beyond the competition by developing the world's first vision sensor capable of 3D measurements.

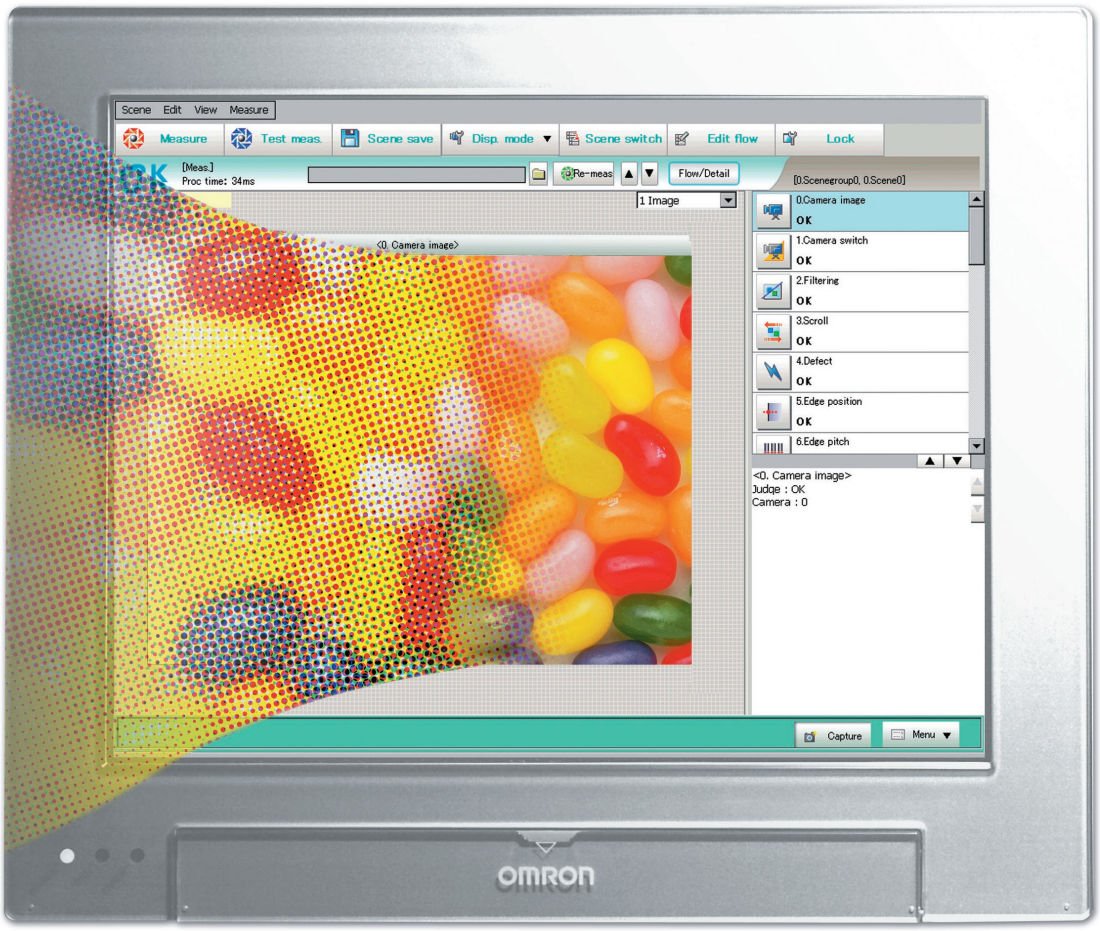
Detect Color Edges of Similar Colors Regardless of Background



Detect Defects Even on Reflective Metal Surfaces



The World of Real Color Sensing*

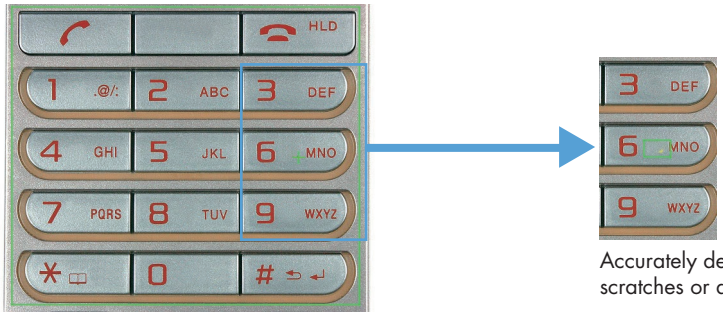


* Patent Pending.

Resolution

Precise Sensing

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



Accurately detect tiny scratches or dirt.

Automation...simple...powerful.

Power Engine for Speed and Volume

Omron's new Mega ARCS Engine features the PBS (Processing Boost Software) and the fastest CPU in the industry allowing you to perform inspections beyond what was previously possible.

Rapidly complete

Both simple and complex instructions

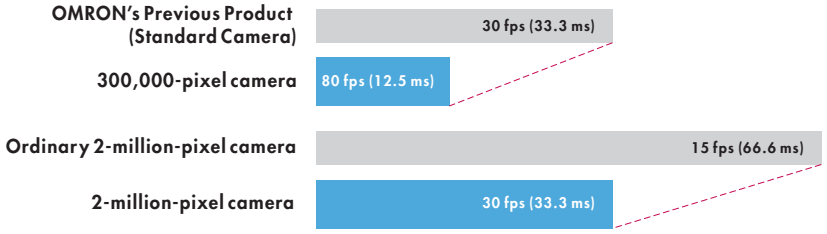
For example, cap inspections take only 40 ms.

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

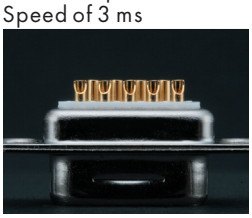
Fastest CPU in the industry

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.



Partial Capture at Maximum Speed of 3 ms

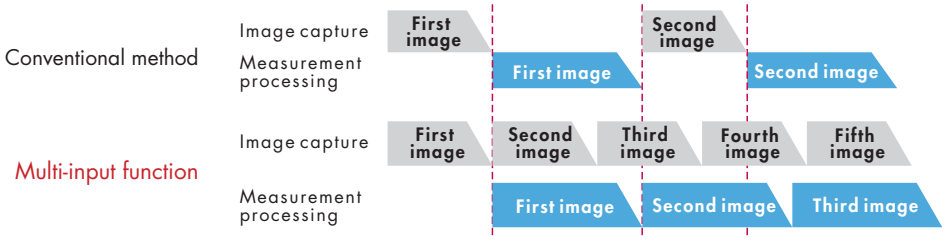


Out of all of the lines from 0 to 479 on a full screen, the required portion can be specified for capture. This can make image capture even faster.

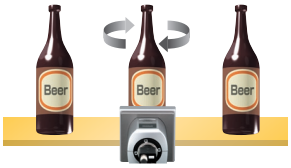
PBS Architecture (Processing Boost Software)

Large Data Processing by Multi-input Function

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.



Continuous image capture is possible while processing measurements.



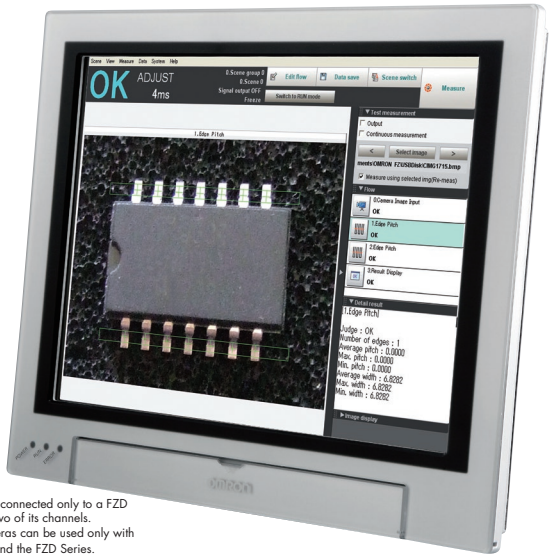
Note: The number of frames that can be captured continuously depends on the controller and the type of camera attached to.

FZ2-5□□ Series	2-million-pixel camera: 8 image 300,000-pixel camera: 32 images
FZ2-3□□ Series	300,000-pixel camera: 16 images

Full Camera Lineup Meets Every Application Requirement

Up to four cameras connected to a single controller

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 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.

For Mixed Production Lines

Autofocus Camera Intelligent Camera (Auto-focus Camera with Illumination)

Color

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.

High Resolution High Precision

2 million-pixel High-speed Camera

Color
Black & White

High resolution at 2 million pixels, and an image capture speed of 30 fps (33.3ms), the 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 Mixed Production Lines

Autofocus Camera

Color
Black & White

World's first image processing camera with Autofocus. With this camera, there is no need to change the camera position or adjust settings.

For High-speed Production Lines

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.

For High-speed Production Lines

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.

Interconnectivity

Camera Cable Extension Unit

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

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.

Maximum Length: 45 m

Reflective images

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.

High-resolution, high-precision measurements

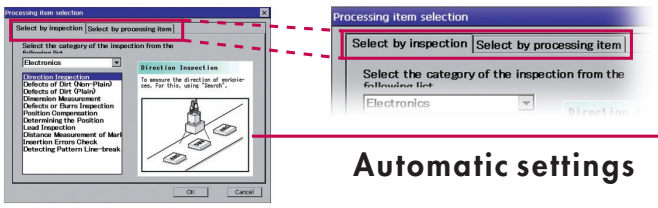
Low-distortion Lenses

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.

Support Tool for your Operation

Select from Inspection Items

Select the inspection: the required processing items will be automatically registered.
For example, if Dimension Measurement is selected, then the two Edge Position processing items and the Calculation processing item will automatically be selected.



Flow Menu Programming

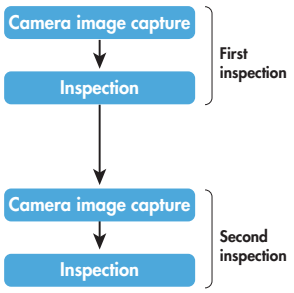
OMRON's unique Flow Menu is built into the FZ2. This makes it possible to change measurements depending on inspection results or input conditions. It is now easy to make the equivalent of programming changes, such as changing measurement regions for workpiece tolerances or switching to different measurement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

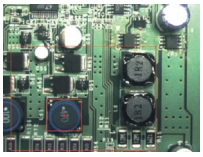
Other Applications

- 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).



First Inspection: Defect Inspection of Metallic Components on a PCB

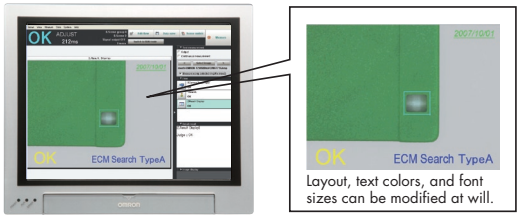
Second inspection: Checking for Presence of Electronic Components on the PCB



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

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.



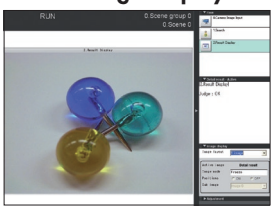
Layout, text colors, and font sizes can be modified at will.

Evolved Displays

Multi-layout screen displays during measurements

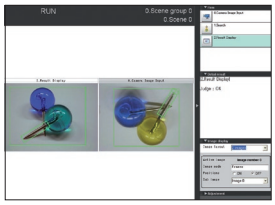
The measurement display layout can be arranged to suit the needs at the site and the number of cameras being used. Unusable images can be identified, inspection images can be compared, and selected images can be expanded to confirm details, allowing defects to be identified even while the measurement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

One-image Display

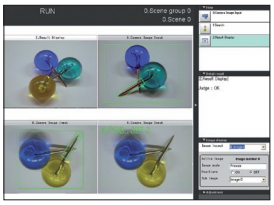


The large image size is ideal for confirming details.

Two-image Display

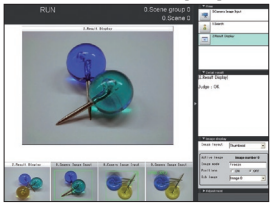


Four-image Display



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

Thumbnail Display

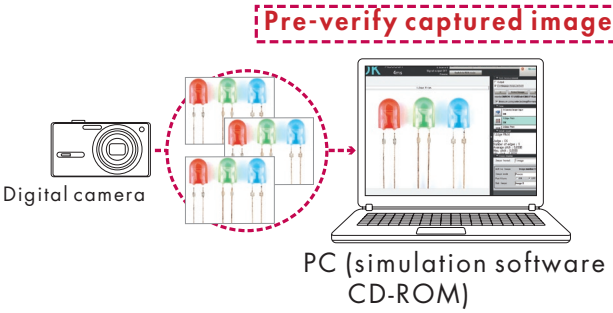


Four images can be displayed at the bottom of the screen, while above it one selected image can be expanded to a larger size for confirmation of details.

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.

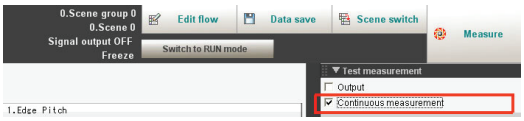


Note: Compatible with BMP (24-bit) image format. For details, refer to the simulation software documentation.

Readjustment

3. Continuous Automatic Re-measurement of Stored Images

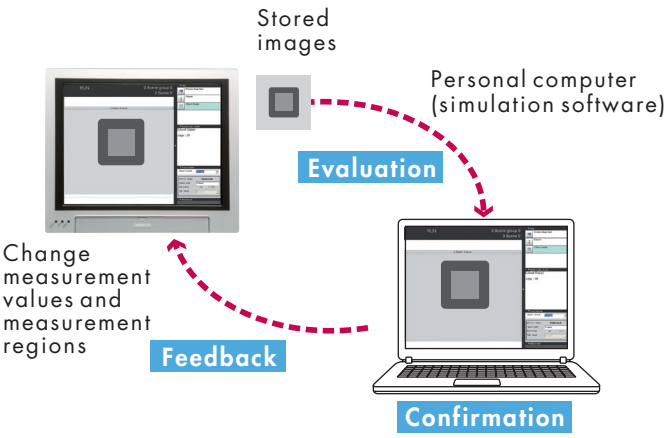
Store measured image data in the Controller or a USB storage device. OMRON has added continuous automatic re-measurement to the function that allows re-measurement of stored image data obtained while adjusting the settings. A single click enables the continuous automatic re-measurement function, even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



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.



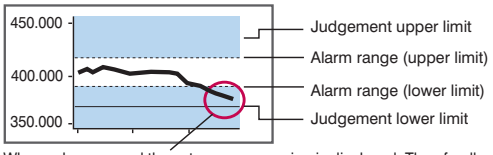
Note: Some functions, such as model confirmation, cannot be changed during operation.

Trend Analysis

4. Trend Monitor Function

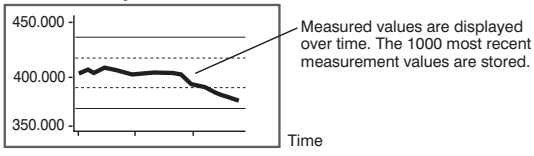
The system not only displays measured values in graph form, it also can display warnings before defects occur. Use the warning range settings for measured values to help prevent NG occurrences in advance. This allows for feedback to previous work processes, and can be useful in casual analyzing after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

Prevent High Defect Rates in Advance

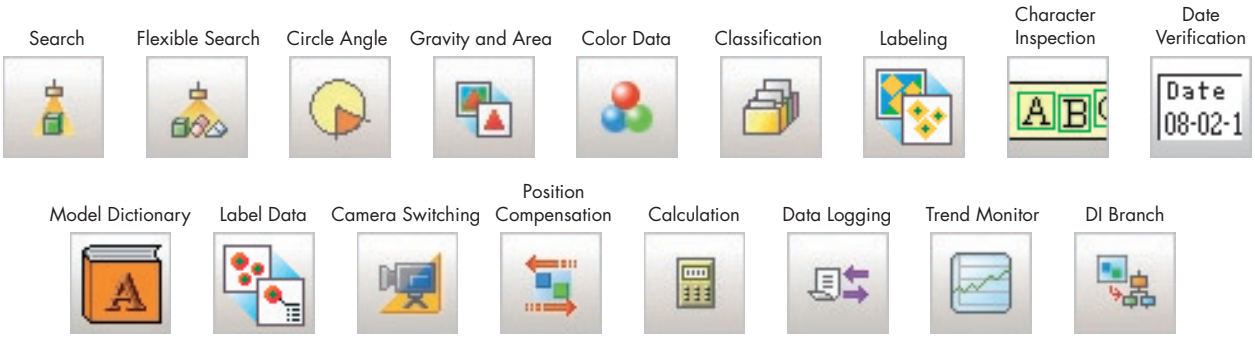


When values exceed the set range, a warning is displayed. Then feedback can be applied to previous steps in the work process before large amounts of defective items occur.

Cause Analysis when Defects Occur



Precision Measurement

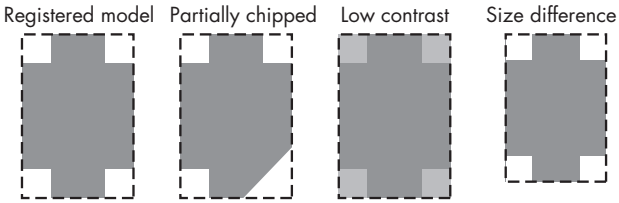


ECM Search

New

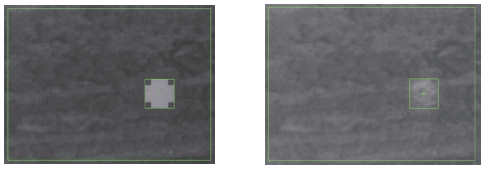
Accurate searches even with low contrast, soiling, or chipping

The search is performed by generating an edge code model ECM from edge extraction images. Achieve stable searching even when workpiece conditions change easily or when the workpiece is dirty or chipped.



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.



Original model, High Contrast

Effective Detection Even at Low Contrast

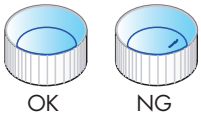
Other applications: Inspecting printing on electronic components or metal stampings.

Defect, Fine Matching

The ultimate in defect inspection enabled by real color processing

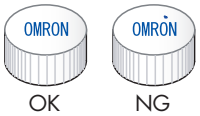
Through the use of real color processing, it is possible to detect unexpected dirt or scratches in the color.

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



OK NG

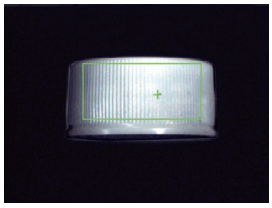
Use "Fine Matching" to detect differences between a registered image and the actual image.



OK NG

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.



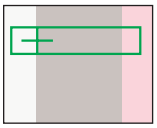
Other applications: General defect inspections, such as inspecting for dirt on aluminum cans or non-woven textiles.

Edge Position, Edge Pitch

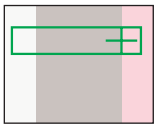
New Mode

Accurate position measurement

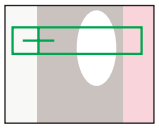
Using real color enables detecting even subtle variations between similar colors as edges. OMRON has also added a new Absolute Value mode that is not affected by environmental changes such as halation within the measurement region. Our edge detection capability has become even better.



Recognize subtle color variations as edges.



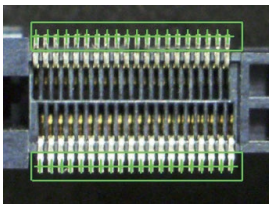
Recognize edges by specifying pink.



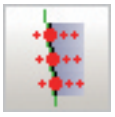
Recognize edges using the absolute values of the assigned color densities.

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.



Scan Edge Position, Scan Edge Width

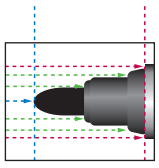
New

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

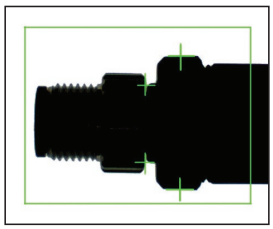
Position of furthest edge:
Base of the marker tip



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

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. This method has a wide range of other applications as well.



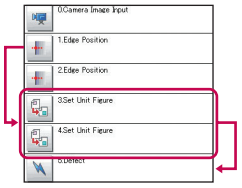
Other applications: Inspecting the width of electrodes on chip resistors or inspecting ampoule positions.

Set Unit Figure

New

Active threshold control for dimensional tolerances

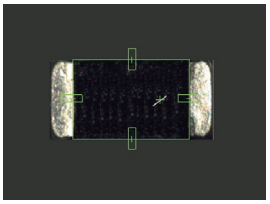
A certain amount of variation and tolerances are unavoidable within workpieces. The Set Unit Figure item enables inspections after adjusting the position and size of the measurement region according to these variations. This helps to increase the accuracy of defect inspections.

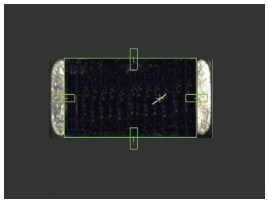


For example, based on measurement results for edge positions 1 and 2, it is possible to adjust defect measurement region 5.

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 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.)

FZD Vision Sensor

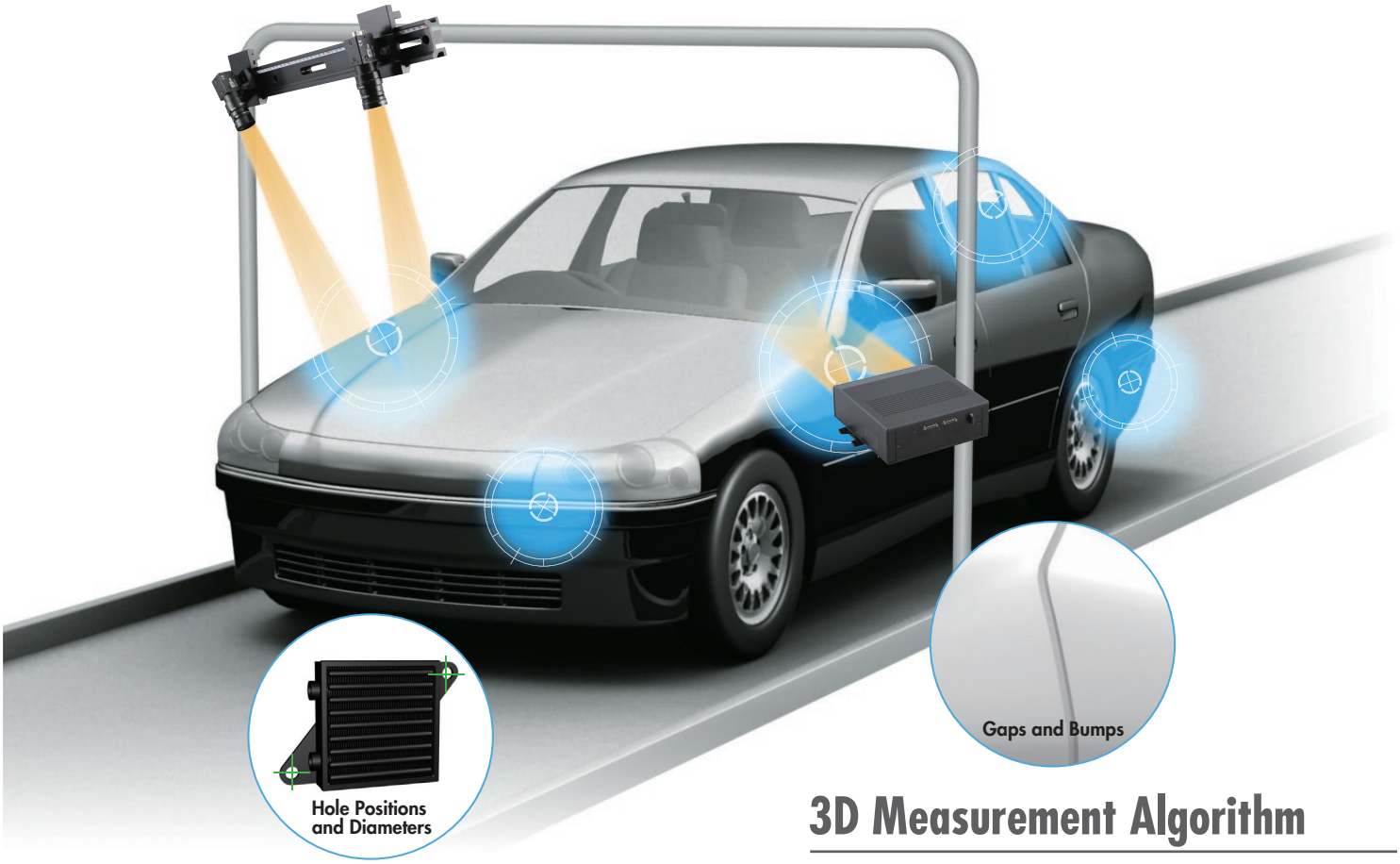
The world's first 3D Inline Image Sensor capable of inline measurement of 3D data.

Advanced technology makes it possible to achieve accurate inline measurement even with workpieces that come down the production line at a variety of locations and angles.

3D Long-distance Camera

The camera has a field of view of 75 mm, a resolution of 0.1 mm, and a maximum installation distance of 2 m.

The resolution is not affected even if the camera is mounted at an angle, so assembled car body inspections can now be conducted using a single Sensor.



3D Space Calibration

By combining advanced 3D sensing technology with our own unique calibration technology, OMRON has succeeded in creating a high-speed 3D measurement system.

With 3D image sensing, workpieces with complex shapes that cannot be laid horizontally can now be measured easily using calculations based on space coordinates.

3D Measurement Algorithm

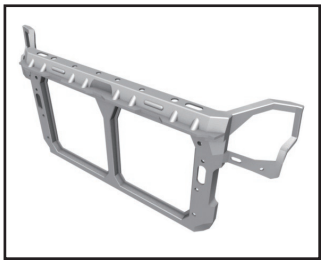
3D image sensing makes it possible to instantaneously measure length, width, and height inline without stopping the production line. Multiple locations can be measured simultaneously within a single visual field.

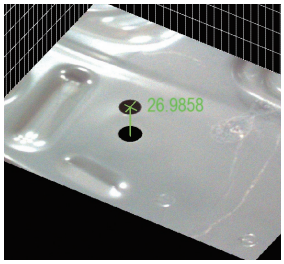
REAL 3D Measurement from Parts to Finished Goods

Modular Composite Parts

Hole Position and Diameter Inspections

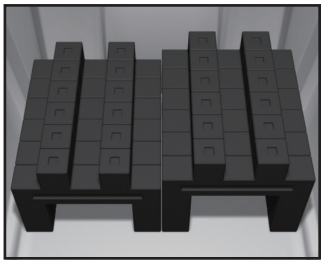
Hole positions and diameters can be measured accurately even for parts with complex shapes that cannot be laid horizontally.
Subtle differences in hole location or diameter can be measured instantaneously, so accurate discrimination is possible even with modular parts of similar shapes. This sensing system is also perfect for pre-shipping inspections.

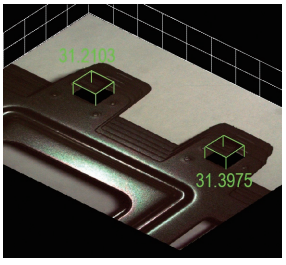




Part Selection

This application enables a robot to select desired part from the parts lined up in a box. The FZD Sensor can automatically calculate the heights within the designed measurement region.
Even if the parts have no distinctive characteristics, such as surface irregularities or patterns, the sensor can use custom pattern illumination to accurately determine the heights.

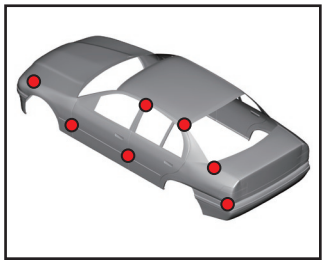


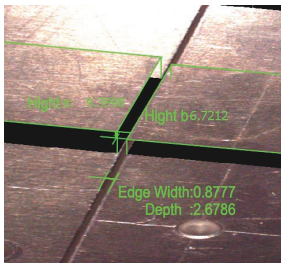


Assembly and Finished Products

Gap and Bump Inspections

Gaps and bumps between edges can be measured simultaneously. Moreover, multiple locations within the same field of vision can also be measured simultaneously.
3D edge detection has reached a new level of stability thanks to real color processing. Even for workpieces with edges that are difficult to detect, the use of 3D sensing in combination with custom pattern illumination enables accurate detection of gaps and bumps.

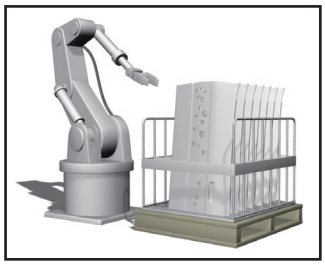


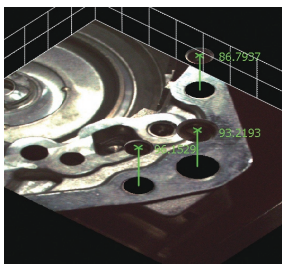


Part Orientation Measurement: Hole Positions

OMRON's unique EC algorithm makes it possible to search for hole positions regardless of the background.

It can also be used with a robot for picking work.





Practical 3D Sensing Technology

A variety of functions have been added to make 3D sensing technology commercially applicable.

All of OMRON's image processing technologies have been designed into this new sensor.

Installation

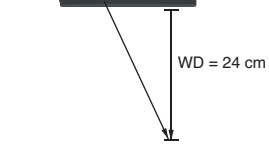
3D measurement requires the use of two cameras.

3D Vision Camera System

Introducing a new camera system that allows for the easy installation of two cameras. In our Integrated Camera, two cameras are mounted inside the same housing, so all you have to do is install a single unit. Also available are separate cameras that can be used simply by attaching two of them to a single Camera Base Plate.

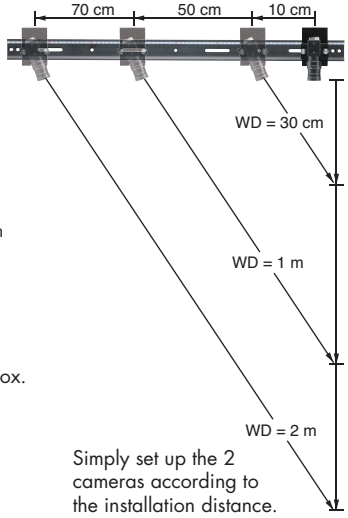
Choose your Camera depending on the installation distance

Integrated Camera
(Installation distances of 24 cm or less)



OMRON takes care of the calibration prior to shipment. It's ready to install out of the box.

Separate Cameras
(Installation distances up to 2m)



Simply set up the 2 cameras according to the installation distance.

High-luminance Pattern Lighting

OMRON has developed a 3-W miniature high-intensity LED that can be used even at a work distance of 2 m. When edges are difficult to distinguish on the image, Line Pattern LED Lighting is used, and when the height of objects without feature points is required, our Custom Pattern Lighting provides powerful support for high-luminance 3D measurement.

Settings

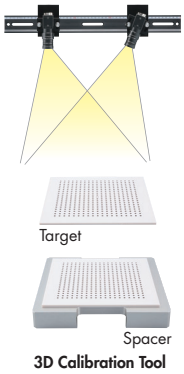
Coordinates from images obtained from the two cameras are combined to generate 3D coordinates. The more precise the calibration, the more accurate the 3D measurements.

3D Calibration

This sensor features the world's most advanced calibration technology. Our calibration resolution (0.025 mm) is the highest in the world and enables precise 3D measurement. Moreover, the settings are quite simple. The functions of this sensor allow it to be used in any work environment.

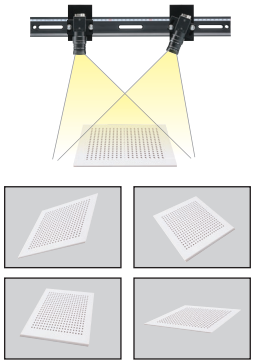
Calibration Method

Target placed horizontally



3D Calibration Tool

Targets that can't be placed on a reference plane



Obtain images from near and distant perspectives.

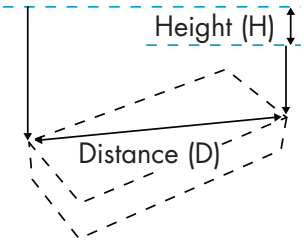
Place calibration target on reference plane and capture first image. Then place a spacer underneath the calibration target and obtain a second image. That's all there is to it - only two images are needed to complete the calibration.

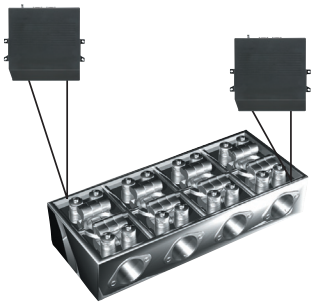
Capture 10 rough images.

This is the first technology in the world to make it possible to complete the calibration by simply holding up the calibration target by hand and capturing images from 5 different directions and 2 different heights (a total of 10 images).

Compatible with World Coordinates

World coordinates are needed for systems using robots for picking or for measurement of two different locations on large-sized parts. This new sensor system is compatible with these types of coordinate conversions.





This calibration technology makes use of techniques developed by 3D MEDiA Co., Ltd.

Measurement

The actual 3D shape of the workpiece is measured.

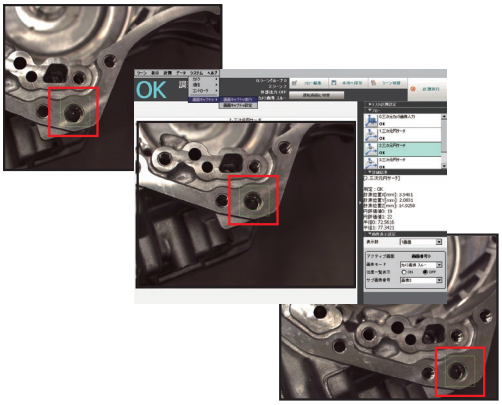
Simultaneous 2D and 3D Measurement

2D and 3D image processing can be carried out simultaneously using a single controller.

For example, inspections for the presence of specified marks or for surface scratches and dirt can be conducted in 2D mode, while using 3D processing to determine the XYZ coordinates of hole positions.

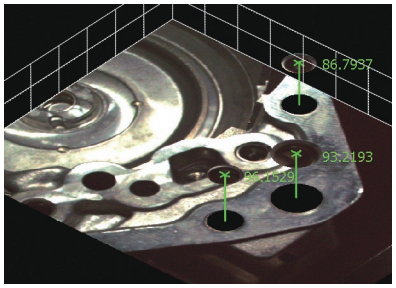
Also, because 3D measurements can be made after compensating for position displacement using 2D processing, measurement results are more stable than with laser displacement sensors, even when position determination is rough.

Measurements can be made after compensating for position displacement.



3D Graphic Displays

It is possible to display measurement results, text, or figures in 3D format in the image display area. Even on a 2D monitor, one can tell at a glance what segment is being measured, so the system can be used with confidence at the worksite.



Basic Configuration

OMRON

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
FZ-M08

Monitor Cable
FZ-VM

Input Devices
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

FZ-SLC15/
FZ-SLC100

Autofocus Cameras

FZ-SZC15/
FZ-SZC100

Digital Cameras

FZ-S/FZ-SC/
FZ-S2M/FZ-SC2M

CCTV Lenses
3Z4S-LE Series

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
FZ-M08

Monitor Cable
FZ-VM

Input Devices
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
3D Vision Camera
FZD-STC2M

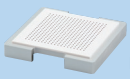
Separate Cameras
3D Camera Base Plate
FZD-CBS
FZD-CBM
FZD-CBL

Digital Camera
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.

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.

Note:
- 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.

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

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									
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.

Ratings and Specifications

OMRON

Controllers

Model										
	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 x 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□□□□□		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 mm						4.4 × 4.4 mm	
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 icing or 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

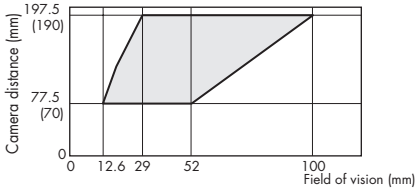
	FZ-M08
Size	8.4 inches
Type	Liquid crystal color TFT
Resolution	1,024 × 768 dots
Input signal	Analog RGB video input, 1 channel
Power supply voltage	21.6 to 26.4 VDC
Current consumption	Approx. 0.7 A max.
Ambient temperature range	Operating: 0 to 50°C, storage: –25 to 60°C (with no icing or condensation)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

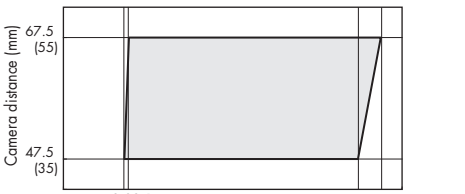
Note 1: A power supply must be connected to the Strobe Controller and Camera when connecting a FZ-SLC100/SLC15/SZC100/SZC15 and using a Strobe Controller (3Z4S-LT MLEK-C100E1TS2.)
Note 2: The current consumption is when every Camera and Strobe Controller is connected to a power supply.

Intelligent Camera FZ-SLC100
Autofocus Camera FZ-SZC100



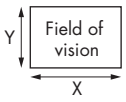
The value in parentheses is for the camera installation distance when using an Intelligent Camera.

Intelligent Camera FZ-SLC15
Autofocus Camera FZ-SZC15

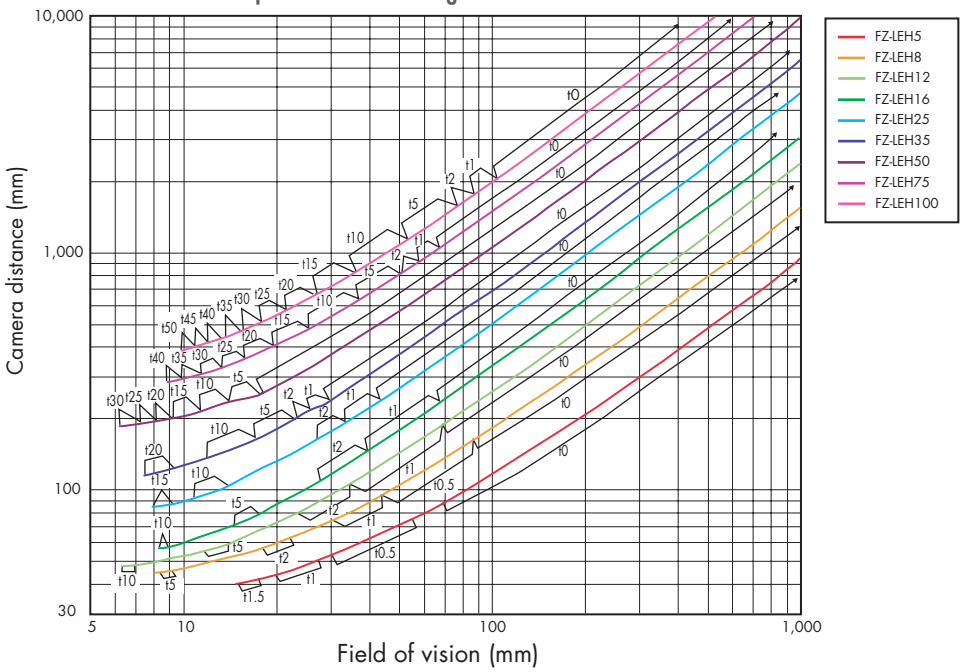


The value in parentheses is for the camera installation distance when using an Intelligent Camera.

- 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.



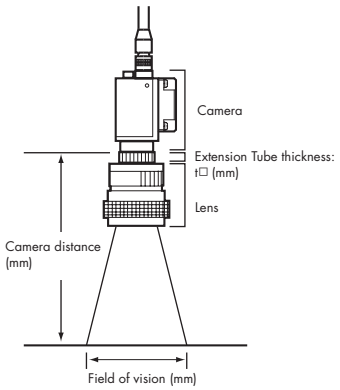
FZ-S□2M Two-million-pixel Standalone Digital Camera



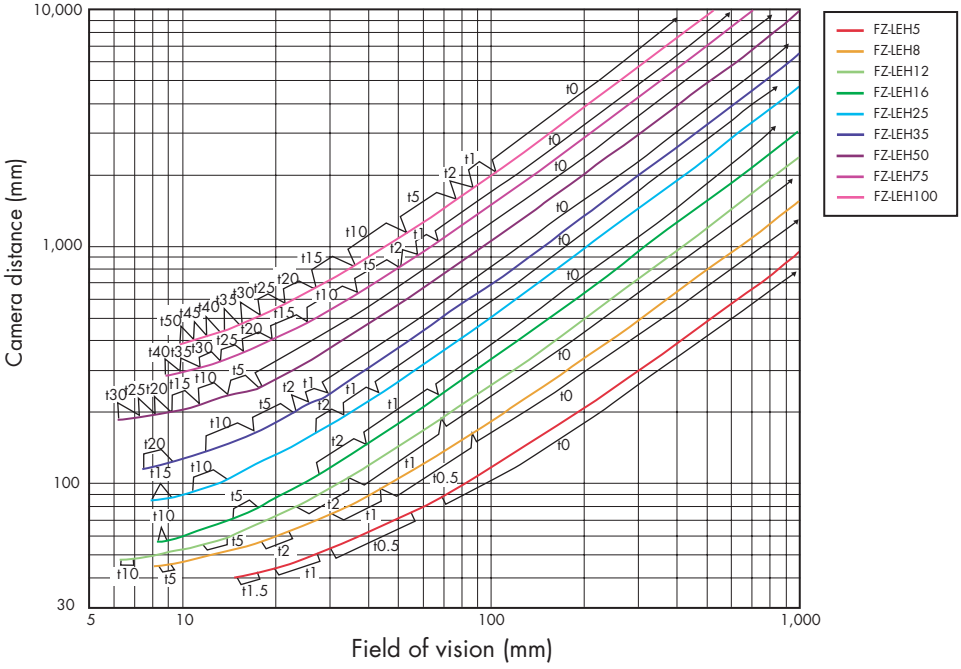
The 5-mm Extension Tubes (3Z4S-LE ML-EXR) cannot be used with FZ-LEH25 Lenses.

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).



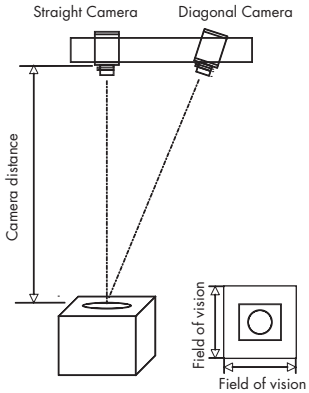
Standalone Digital Camera



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

Meaning of Optical Chart

Select a lens for the Straight Camera according to the field of vision and camera installation distance. Fit the Diagonal Camera with the same lens as the Straight Camera.



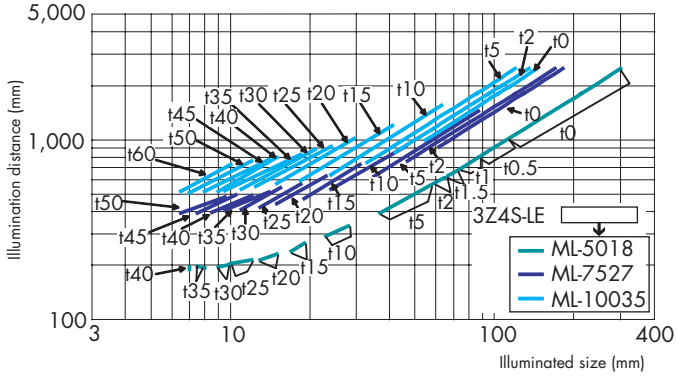
Optical Chart (continued)

OMRON

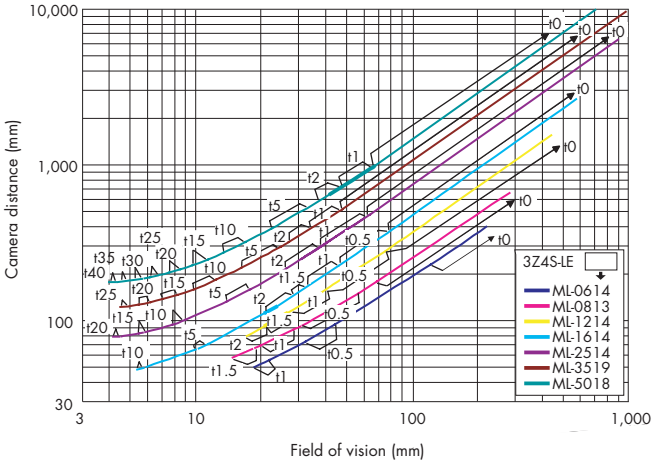
High-luminance Pattern Lighting

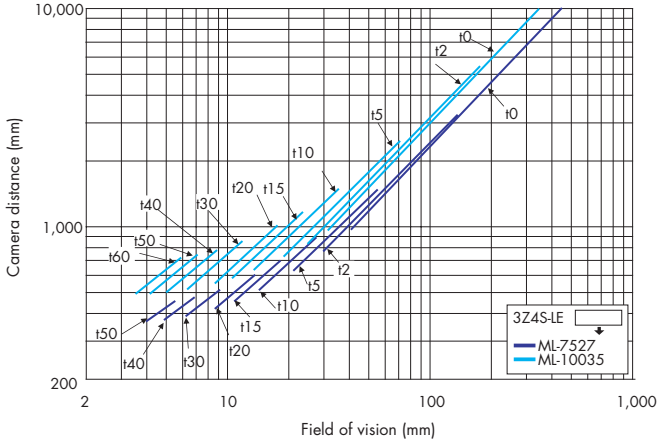
	FZD-LTW	FZD-LTPW
Power consumption	11 W	
Ambient temperature range	Operating: 0 to 50°C, Storage: −25 to 60°C (with no icing or condensation)	
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)	
Installation distance	Select the CCTV lens according to the field of vision and installation distance (See note 1).	
LED Class (See note 2.) (light section)	Class 2	
Weight	Approx. 450 g (Including installation base)	
Accessories	Instruction Sheet, 4 installation screws, ferrite core, hexagonal wrench.	

Note:
1: Refer to Optical Chart.
2: Applicable standards: IEC 60825-1:1993 + A1:1997 + A2:2001,
EN 60825-1:1994 + A1:2002 + A2:2001.



FZ-S□ Standalone camera 300,000 pixels

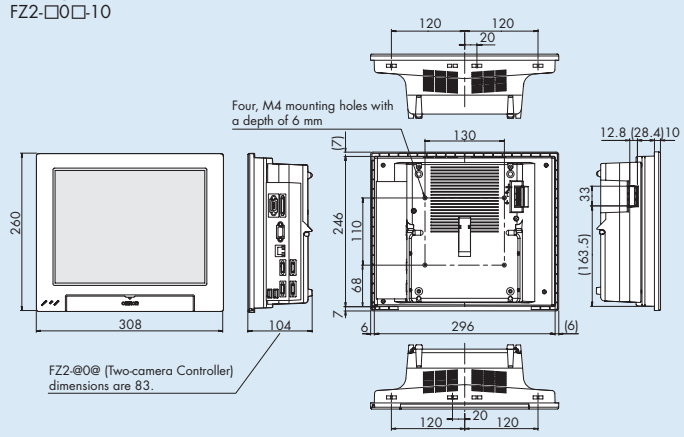




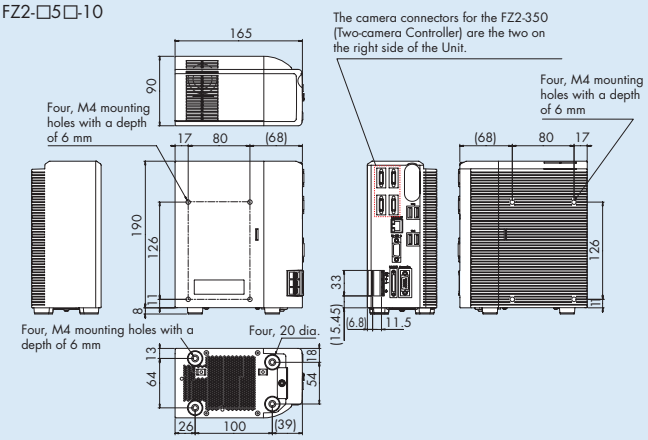
External Dimensions (Unit: mm)

FZ2 Series Controllers

FZ2-□0□
FZ2-□0□-10

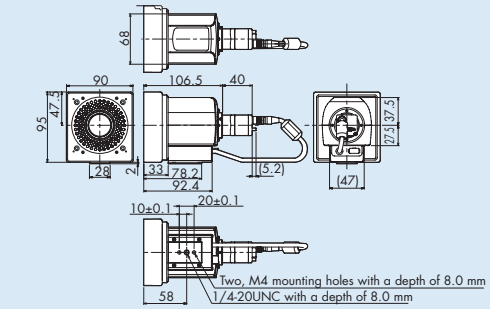


FZ2-□5□
FZ2-□5□-10

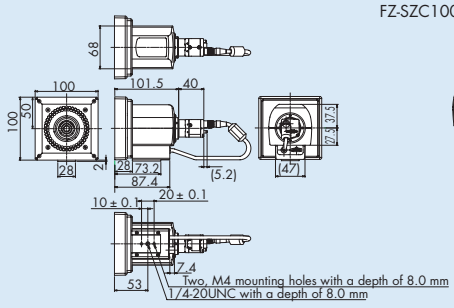


Cameras

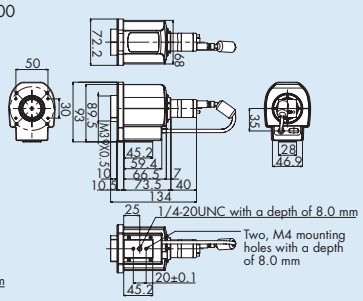
FZ-SLC15



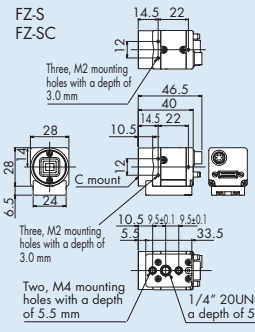
FZ-SLC100



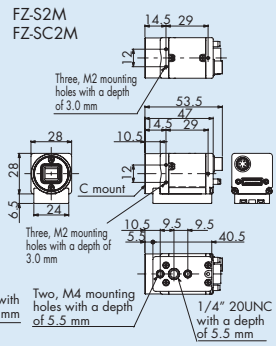
FZ-SZC15
FZ-SZC100



FZ-S
FZ-SC

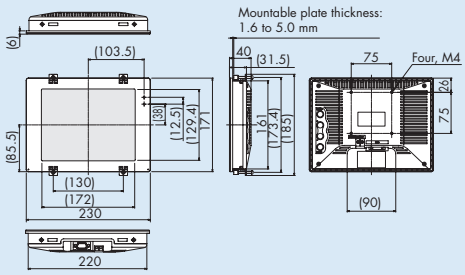


FZ-S2M
FZ-SC2M



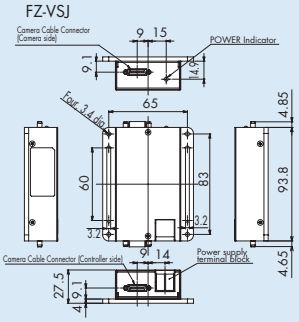
LCD Monitor

FZ-M08



Camera Cable Extension Unit

FZ-VSJ

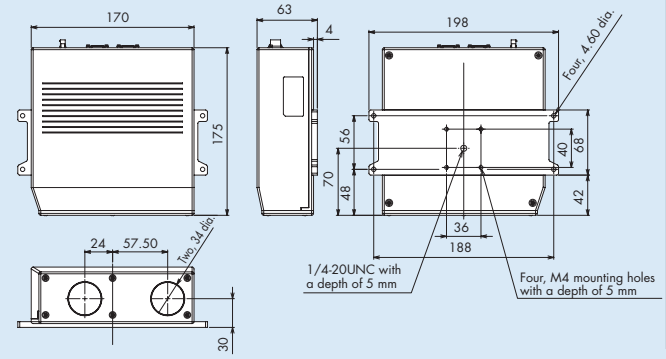


External Dimensions (Unit: mm) (continued)

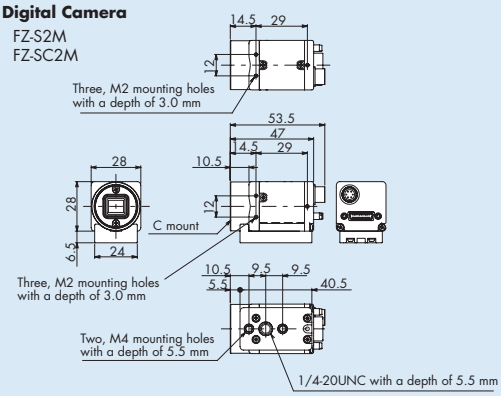
OMRON

FZD Series Cameras

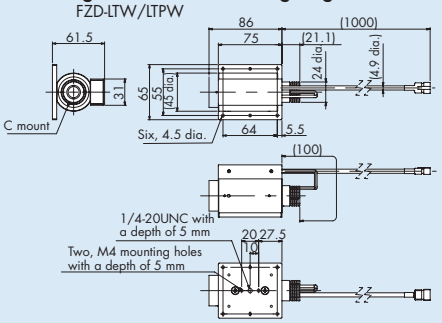
3D Vision Camera
FZD-STC2M



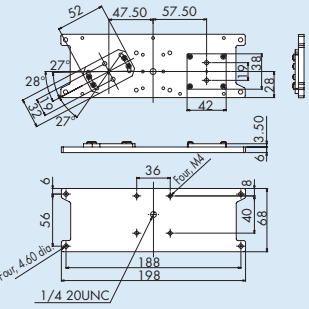
Digital Camera
FZ-S2M
FZ-SC2M



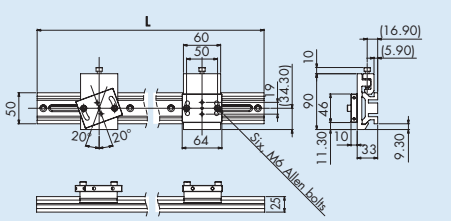
High-luminance Pattern Lighting
FZD-LTW/LTPW



3D Camera Base Plate
FZD-CBS



FZD-CBM/CBL

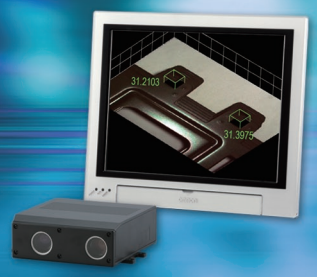


L: FZD-CBM 500 mm
FZD-CBL 800 mm

Vision Sensor Lineup

OMRON provides a complete vision offering to solve customer problems based on their unique objectives.

FZD Series



3D Measurement Vision Sensors.

FZ2 Series

Color Image, High-speed Processing.

ZFX General-purpose

High-speed Vision Sensors. Touch, connect and go.

ZFV-C

Easy Color Vision Sensor.

OMRON

Automation...simple...powerful.

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