OMRON

FZ-Lite VISION SENSOR

Easy inspection beyond expectation

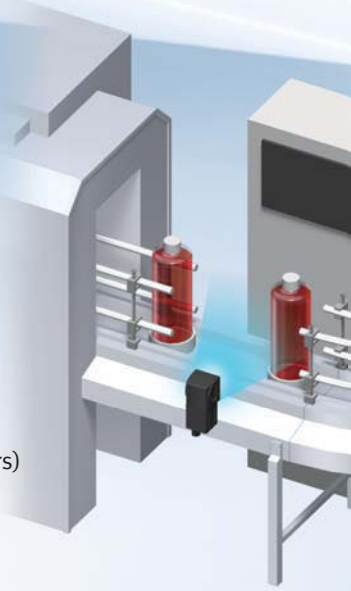
» Intuitive user guidance

» Crystal-clear imaging

» Flexible Vision platform

realizing

Simple, flexible & crystal clear



The new FZ-Lite integrates the benefits of a Smart Camera and a powerful Vision System in a single platform.
The unique image clarity achieved by using an intelligent camera enables simple setup, fast installation and enhanced optical performance.

In combination with the powerful FZ-Lite controller it takes you into a new dimension of image processing. Highest performance, simplicity and unique flexibility are defining a new standard for Compact Vision Sensors.

Features

- Crystal-clear image quality
- Real Color Processing (16 million colors)
- C-mount and Smart Cameras
- EtherNet/IP & TCP/IP communication

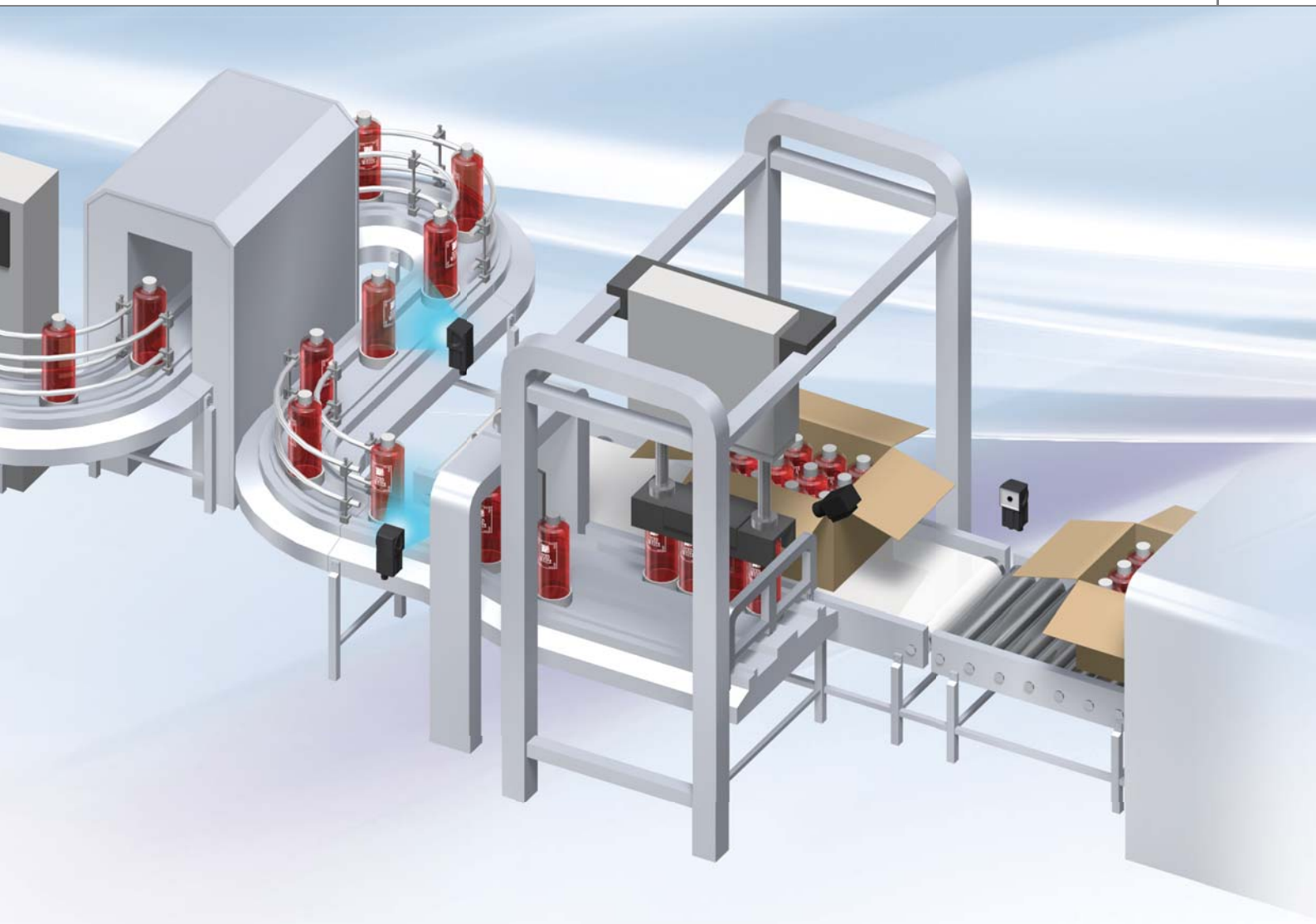
Benefits

- Simple and guided set-up
- Reliable results on any surface
- One platform for any application

Intelligent Compact Camera

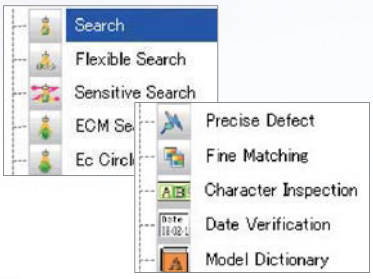
Lite Controller

Monitor



> Simple Operation

FZ-Lite supports the Smart Camera technology from the FQ-series Sensors. This allows fast and easy installation of the camera on the machine, without further optics and illumination. Crystal Clear images can be easily captured using High-power Lighting and a Polarizing Filter that eliminates glare.



>> Flexible Flow configuration

More than 20 processing items are provided by FZ-Lite, such as dimension measurements, various search items (pattern, contour), defects, edge and count tools. These processing items, can be combined in a flow program, offering branches or loops. This offers a new dimension of flexibility for Compact Vision Sensors.

>>> Open Network

EtherNet/IP, a global standard for factory automation data networking, is supported for seamless integration into a production line or machine. This allows users to easily connect to any EtherNet/IP enabled devices from any manufacturer. Further communication is possible via TCP/IP, serial and parallel interfaces.

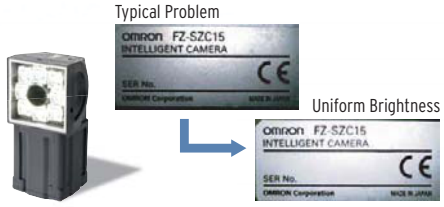
A new benchmark in image clarity

> Simple Operation

Achieving sharp and crystal clear images that improve inspection performance has never been so easy. The FZ-Lite features powerful functions, to eliminate the effects of direct reflections, environmental light interference and big variations in brightness. These cutting edge functions shorten and simplify the installation and setup procedure. Simply don't care anymore about how to install the camera in the best way, to get a sharp image.

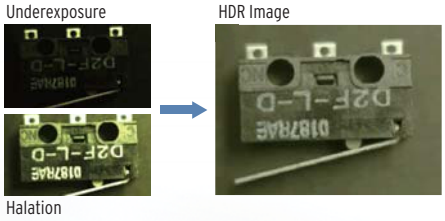
Camera with integrated High-power Lighting

The Camera utilizes integrated High-power Lighting that enables uniform illumination in the field of view. Utilizing a new optical design, bright and clear images can be achieved without additional lighting. A Polarizing Filter can be used to cut direct light reflections to eliminate the common issue of glare resulting from highly reflective surfaces.



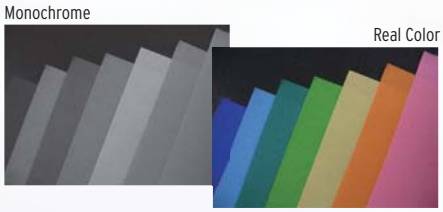
HDR Sensing

A high dynamic range (HDR) function is provided to eliminate the influence of objects with irregular reflectance and changes in external light conditions. By increasing the high dynamic range by a factor of up to 5,000, objects that previously could not be detected due to inconsistent lighting or halation can be clearly inspected.



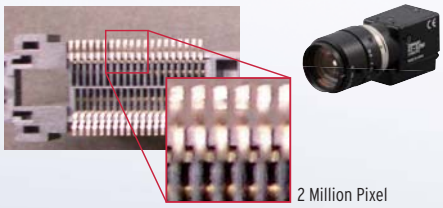
Real Color Sensing

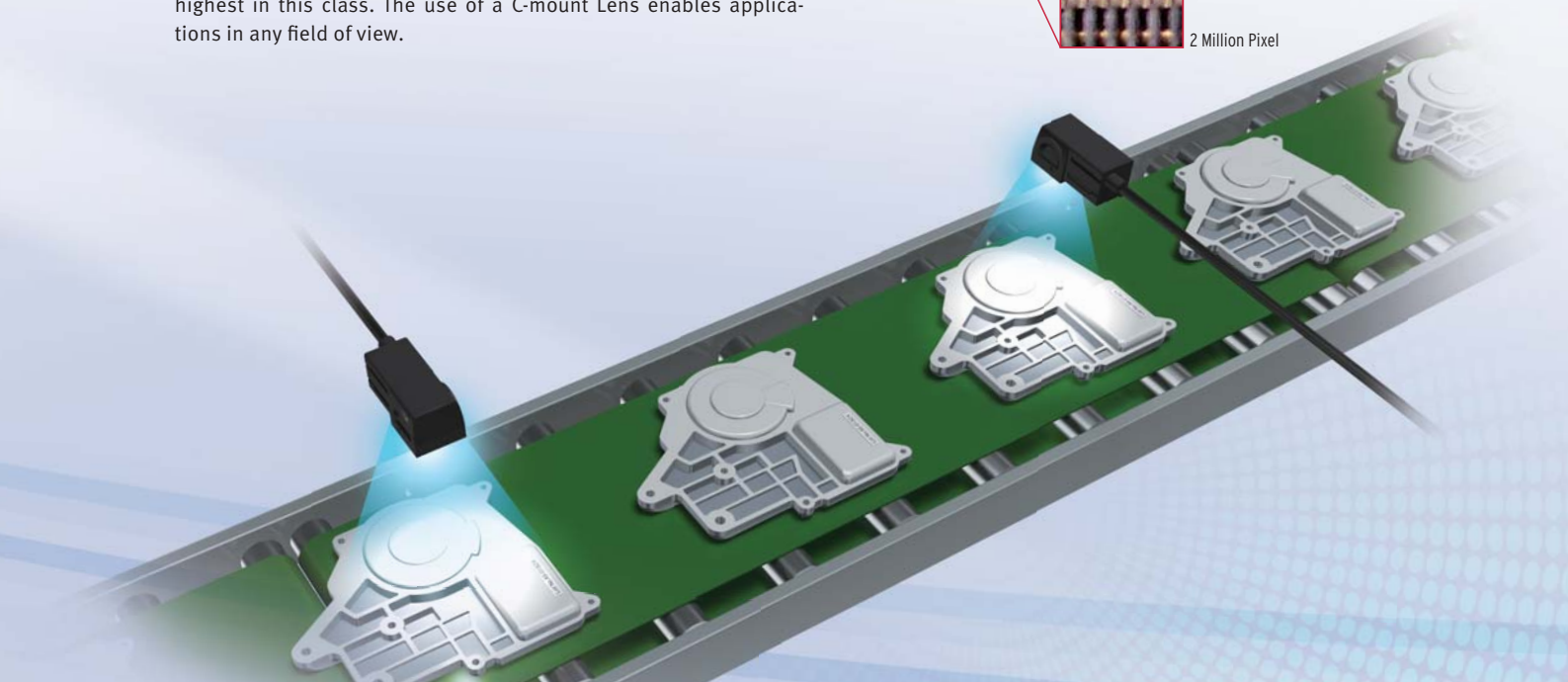
Color sensing is standard for OMRON Vision Sensors. Real color processing enables stable detection of minute color differences, which is difficult to perform using color gray processing or filtering. It is not necessary to perform color extraction or redo the setup every time the workpiece color changes.



2 Million Pixel Camera

Inspections that require high resolution can be solved with the 2 Million Pixel Camera. Presence and dimension inspections can be realized. At a rate of 30 frames per second. The input speed is the highest in this class. The use of a C-mount Lens enables applications in any field of view.

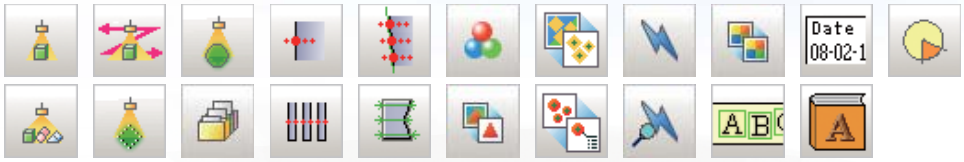




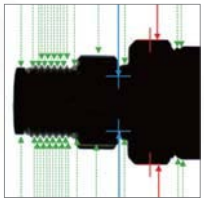
Powerful processing items for any inspection and industry

>> Flexible Application

Inspection and Measurement Items
21



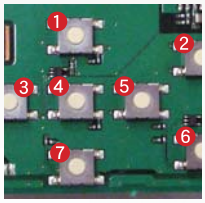
Measurements



Dimension Measurements

Scan Edge Width

Multiple measurements can be performed on the objects for their minimum width, maximum width, and average width. Enhanced performance is also provided to detect the depth of grooves on metal shafts.

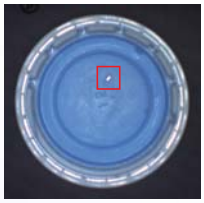


Workpiece Count

Labeling

A cluster of objects is extracted as labels, and the parameters for area, center of gravity, and other factors are generated for output and further processing. Perform measurements for roundness, enclosing rectangles, and circumference measurement. Counting by sorting of the labels according to coordinates or size can also be performed.

Appearance Inspections



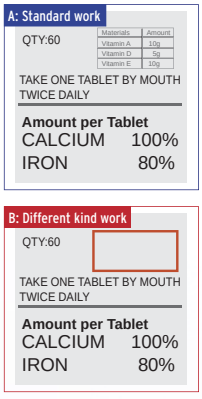
Inspection of Defects

Defects

Perform inspection of defects and dirt on solid-colored objects, component chips or burrs.

Fine Matching

Fine Matching is ideal when the background has a pattern. In Combination with the standard image it enables high-speed, high-precision inspection for minute dirt and edge chips.



Detection of Subtle Differences

Sensitive Search

Detailed matching is performed by automatically separating a registered image. Subtle differences that cannot be determined using normal searches are detected with good stability and correlation difference. So, there's no need for accurate threshold settings.

Character Inspections

Inspection of Expiration Dates

Date Verification

By simply setting the period of production, the character string can be automatically verified and the printing can be easily validated. The printed expiration date is changed automatically every day.

Prevention of False Rejections

Flexible Search

Inspection can be performed to accept items with variations in printing quality and shape, and to reject only those items that are obviously wrong. Registering multiple images of acceptable items as models enables stable searching regardless of the printing quality or changes in shape.

Choose the interface you need

>>> Open Network

A variety of interfaces, such as EtherNet/IP, general-purpose Ethernet, and serial communications allows easy communication with a PLC or other external devices.

EtherNet/IP

Easier, Faster

EtherNet/IP is a widely used communication protocol in factories around the world. You can easily connect to OMRON PLCs or any other vendor device that supports EtherNet/IP to enable high-speed communication.

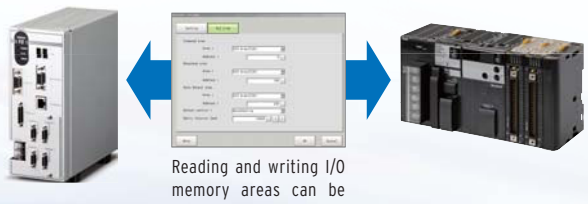
PLC Link Function

Easy Creation of Ladder Programs

A PLC Link function is included to reduce the effort in ladder programming for serial communications and standard Ethernet.

Applicable PLCs

- OMRON CS, CJ, CP, and NSJ Series
- Mitsubishi Electric Q Series

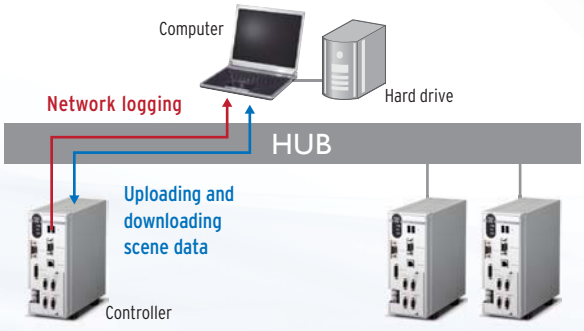


Reading and writing I/O memory areas can be easily set on the special menu screen.

Network Drive Function

Network Logging

The network drive function in FZ-Lite allows users to output and store images and measurement values to computers over a network, not limited to internal or only to USB memory. Connecting a large-capacity hard drive enables long-term image logging. It can also be used for storage of configuration data. Back-up and restore of any data over the network is also supported.



Ordering Information

Controllers

Appearance	Type			Model	Remarks
	Lite Controllers	Two-camera controllers	NPN	**FZ3-L350**	–
			PNP	**FZ3-L355**	–
		Four-camera controllers	NPN	**FZ3-L350-10**	–
			PNP	**FZ3-L355-10**	–

Cameras

Appearance	Type			Model	Remarks
	Intelligent Compact Cameras	Wide View (Short-distance) □100mm	Color	**FZ-SQ100N**	Camera +Lens + High-power Lighting
		Wide View (Long-distance) □100mm	Color	**FZ-SQ100F**	
		Standard □50mm	Color	**FZ-SQ050F**	
		Narrow View □10mm	Color	**FZ-SQ010F**	
	Intelligent Cameras	Wide field of vision	Color	**FZ-SLC100**	Camera + Zoom, Autofocus Lens + Intelligent Lighting
		Narrow field of vision	Color	**FZ-SLC15**	
	Autofocus Cameras	Wide field of vision	Color	**FZ-SZC100**	Camera + Zoom, Autofocus Lens
		Narrow field of vision	Color	**FZ-SZC15**	
	Digital Cameras	2 million pixels	Color	**FZ-SC2M**	Lens required
			Monochrome	**FZ-S2M**	
	Digital Cameras	300,000-pixels	Color	**FZ-SC**	
			Monochrome	**FZ-S**	
	Small Digital Cameras	300,000-pixel flat type	Color	**FZ-SFC**	
			Monochrome	**FZ-SF**	
	Small Digital Cameras	300,000-pixel pen type	Color	**FZ-SPC**	
			Monochrome	**FZ-SP**	
	High-speed Cameras	300,000-pixels	Color	**FZ-SHC**	
			Monochrome	**FZ-SH**	

Cameras peripheral devices

Appearance	Type		Model	Remarks
	CCTV Lenses		**3Z4S-LE Series**	–
	Extension Tubes			–
	Low-distortion Lenses		**FZ-LEH5/LEH8/LEH12/LEH16/ LEH25/LEH35/LEH50/LEH75/ LEH100**	Low distortion lens for 2-million Pixel Cameras
	Lenses for Small Camera		**FZ-LES3/LES6/LES16/LES30**	Lens for 300,000-pixel Small Cameras
	Extension Tubes for Small Camera		**FZ-LESR**	Extension Tubes for 300,000-pixel Small Cameras
	Intelligent Camera Diffusion Plate	Wide field of vision	**FZ-SLC100-DL**	–
		Narrow field of vision	**FZ-SLC15-DL**	–

Cables

Appearance	Type	Cable length:	Model	Remarks
	Camera Cable	2m, 5m, 10m (See note 2)	**FZ-VS**	–
	Bend resistant Camera Cables	2m, 5m, 10m (See note 3)	**FZ-VSB**	–
	Right-angle Camera Cable (See note 1)	2m, 5m, 10m (See note 2)	**FZ-VSL**	–
	Long-distance Camera Cable	15m (See note 4)	**FZ-VS2**	–
	Long-distance Right-angle Camera Cable	15m (See note 4)	**FZ-VSL2**	–
	Cable Extension Unit	Maximum cable length: 45 m (Up to two Extension Units and three Cables can be connected.)	**FZ-VSJ**	–
	Monitor Cable	2m, 5m	**FZ-VM**	–
	Parallel Cable	2m, 5m	**FZ-VP**	–
		2m, 5m, Connector-type	**FZ-VPX** (See note 5)	–

Note: 1. This Cable has an L-shaped connector on the Camera end.
2. The 10-m Cable cannot be used for the Intelligent Camera and Autofocus Camera.
3. The 10-m Cable cannot be used for the Intelligent Camera, Autofocus Camera and 2 Million-pixel Camera.
4. The 15-m Cable cannot be used for the Intelligent Camera and Autofocus Camera.
5. Connector-Terminal Block Conversion Units can be connected (Recommended Products: OMRON XW2B-50G4/50G5, XE2D-50G6).

Peripheral devices

Appearance	Type			Model	Remarks
	LCD Monitor			**FZ-M08**	–
	USB Memory			**FZ-MEM1G**	Capacity: 1 GB
	Strobe Controller	For 3Z4S-LT Series	One channel	Manufactured by MORITEX Corporation **3Z4S-LT MLEK-C100E1TS2**	Required to control external lighting from a Controller
	Strobe Controller	For FZ-LT Series	One channel	**FZ-LTA100**	
			Two channels	**FZ-LTA200**	
–	Mouse			–	–
–	External Lighting			**3Z4S-LT Series**	–
				FZ-LT Series	–

Lite Controller

Model	**NPN**		**FZ3-L350**	**FZ3-L350-10**
	PNP		**FZ3-L355**	**FZ3-L355-10**
No. of Cameras			2	4
Processing resolution	**With Intelligent Compact Camera**		752 (H) × 480 (V)	
	When connected to a 300,000-pixel camera		640 (H) × 480 (V)	
	When connected to a 2 million-pixel camera		1600 (H) × 1200 (V)	
Main functions	**Processing Items**	**Inspections / Measurement**	Search, Flexible Search, Sensitive Search, ECM Search, Ec Circle Search, Classification, Edge Position, Edge Pitch, Scan Edge Position, Scan Edge Width, Color Data, Gravity and Area, Labeling, Label Data, Defect, Precise Defect, Fine Matching, Character Inspection, Date Verification, Model Dictionary, Circle Angle	
		Image Capturing	Camera image Input, Camera Image Input HDR, Camera Image Input HDR Lite, Camera Switching, Measurement Image Switching	
		Correcting images	Position Compensation, Filtering, Backgrond Suppression, Color Gray Filter, Extract Color Filter, Anti Color Shading, Polar Transformation	
		Assisting inspections / measurement	Calculation, Line Regression, Circle Regression, Set Unit Data, Get Unit Data, Set Unit Figure, Get Unit Figure, Trend Monitor, Image Logging, Data Logging, Elapsed Time, Wait, Focus, Iris	
		Branching processing	Conditional Branch, End, DI Branch	
		Outputting results	Serial data output, Parallel data output, Parallel judgement output, Fieldbus data output	
		Displaying results onthe monitor	Result Display, Display Image File, Display Last NG Image	
	Number of simultaneous inspections1		No limit to setting (as permitted by memory capacity)	
	Position compensation		Yes (flexible combination with processing items for inspections and measurements)	
	Number of registered scenes		32	
Number of logged images (See note 1.)	**With Intelligent Compact Camera**	**Connected to 1 camera**	214	
		Connected to 2 cameras	107	
		Connected to 3 cameras	71	
		Connected to 4 cameras	53	
	When connected to a 300,000-pixel camera	**Connected to 1 camera**	Color Camera: 250, Monochrome Camera: 252	
		Connected to 2 cameras	Color Camera: 125, Monochrome Camera: 126	
		Connected to 3 cameras	Color Camera: 83, Monochrome Camera: 84	
		Connected to 4 cameras	Color Camera: 62, Monochrome Camera: 63	
	When connected to a 2 million-pixel camera	**Connected to 1 camera**	Color Camera: 40, Monochrome Camera: 40	
		Connected to 2 cameras	Color Camera: 20, Monochrome Camera: 20	
		Connected to 3 cameras	Color Camera: 13, Monochrome Camera: 13	
		Connected to 4 cameras	Color Camera: 10, Monochrome Camera: 10	
I/O specifications	**Serial communications**		RS-232C 1CH	
	Network communications		Ethernet 1000BASE-T/100BASE-TX/10BASE-T	
	EtherNet/IP		Ethernet port baud rate: 100 Mbps (100Base-TX)	
	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			Analog RGB video output, 1 channel (Resolution: XGA 1,024 × 768 dots)	
USB interface			2 channels (supports USB 1.1 and 2.0)	
Operation			Mouse or similar device	
Settings			Create series of processing steps by editing the flowchart (Help messages provided).	
Ratings	**Power supply voltage (See note 2.)**		20.4 to 26.4 VDC	
	Current consumption (See note 3.) (at 24.0 VDC)	**With Intelligent Compact Camera**	4.0 A max.	5.5 A max.
		When connected to a intelligent or autofocus camera		
		When connected to a 300,000-pixel camera	2.6 A max.	2.9 A max.
		When connected to a 2 million-pixel camera		
Environmental immunity	**Ambient temperature range**		Operating: 0 to 50 °C, Storage: –25 to 65 °C (with no icing or condensation)	
	Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)	
	Ambient atmosphere		No corrosive gas	
	Degree of protection		IEC 60529 IP20	
Materials			Plating steel board	
Weight			Approx. 1.8kg	
Accessories			Instruction Manual	

Note: 1. The number of logged images will vary when connecting multiple Cameras with different models.

2. Do not ground the positive terminal of the 24-VDC power supply to the Lite Controller.
If the positive terminal is grounded, electrical shock may occur when an SG (0-V) part, such as the case of the Controller or Camera, is touched.

3. The current consumption when the maximum number of Cameras supported by each Controller are connected. If a strobe Controller model is connected to a lamp, the current consumption is as high as when an Intelligent Camera is connected.

Ratings and Performance

LCD Monitor

Model	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 65 °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

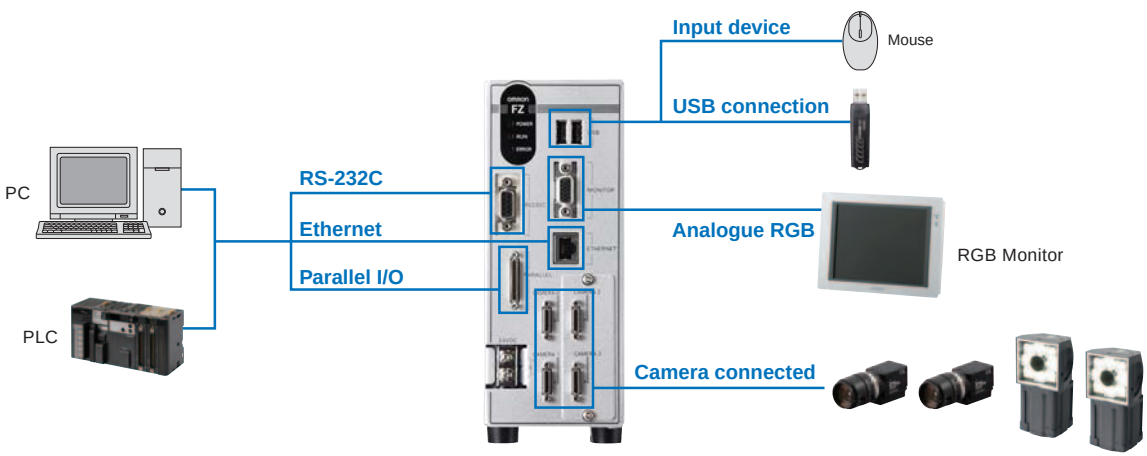
Monitor Cable

Model	FZ-VM
Vibration resistiveness	10 to 150 Hz single amplitude 0.15 mm 3 directions, 8 strokes, 4 times
Ambient temperature range	Operation: 0 to +50 °C, Storage: –20 to +65 °C (with no icing or condensation)
Ambient humidity range	Operation and storage: 35% to 85%RH (with no condensation)
Ambient atmosphere	No corrosive gases
Material	Cable sheath: heat-resistant PVC Connector: PVC
Minimum bending radius	75 mm
Weight	approx.170 g

Intelligent Compact Camera

Model		FZ-SQ010F	FZ-SQ050F	FZ-SQ100F	FZ-SQ100N
Field of vision		7.5×4.7 to 13×8.2 mm	13×8.2 to 53×33 mm	53×33 to 240×153 mm	29×18 to 300×191 mm
Installation distance		38 to 60 mm	56 to 215 mm	220 to 970 mm	32 to 380 mm
Image input	Image processing method	Real color			
	Image elements	1/3-inch color CMOS			
	Shutter	1/250 to 1/32258			
	Processing resolution	752 (H) × 480 (V)			
	Partial function	8 to 752 lines			
Lighting	Lighting method	Pulse			
	Lighting color	White			
	LED class	Class 2			
Environmental immunity	Ambient temperature range	Operating: 0 to 50 °C, Storage: –25 to 65 °C (with no icing or condensation)			
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)			
	Ambient atmosphere	No corrosive gas			
	Degree of protection	IEC 60529 IP40 (with Polarizing Filter Attachment mounted.)			
Materials		Camera: PBT, PC, SUS Mounting Bracket: PBT Polarizing Filter Attachment: PBT, PC			
Weight		Approx. 160 g		Approx. 150 g	
Accessories		• Mounting Bracket (FQ-XL) (1) • Polarizing Filter Attachment (FQ-XF1) (1) • Instruction Manual • Member registration sheet			

System configuration

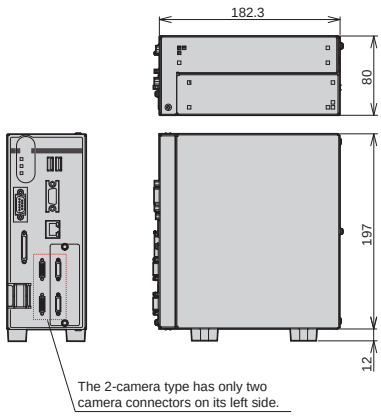


Dimensions

(Unit: mm)

Controllers

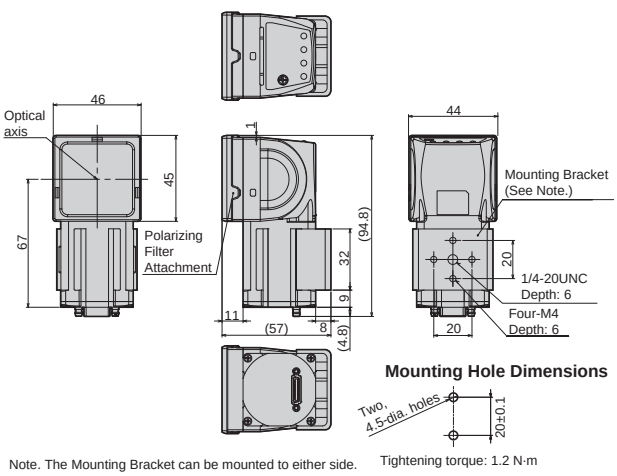
FZ3-L35□
FZ3-L35□-10



Intelligent Compact Camera

Narrow View and Standard

FZ-SQ010F
FZ-SQ050F

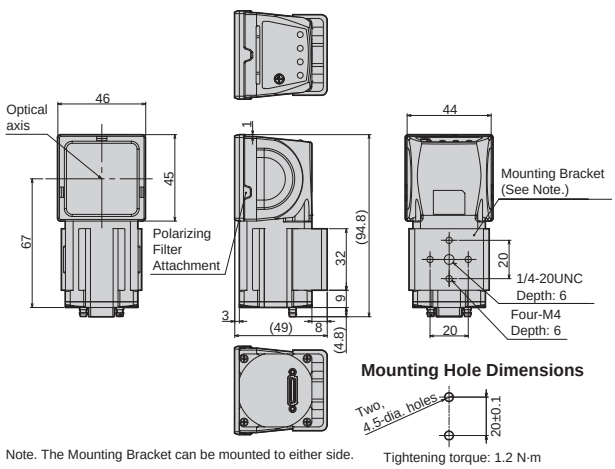


Note. The Mounting Bracket can be mounted to either side.

Tightening torque: 1.2 N·m

Wide View

FZ-SQ100F (Long-distance)
FZ-SQ100N (Short-distance)

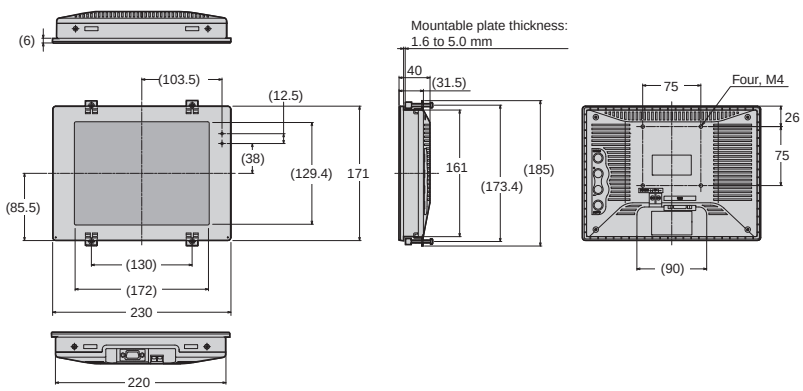


Note. The Mounting Bracket can be mounted to either side.

Tightening torque: 1.2 N·m

LCD Monitor

FZ-M08

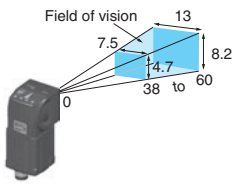


Refer to the FZ3-900-series Catalog (Cat. No. Q171-E1) for information on the ratings and performance of Intelligent Cameras, High-speed Cameras, Compact Digital Cameras, Camera Cables, and Peripheral Devices.

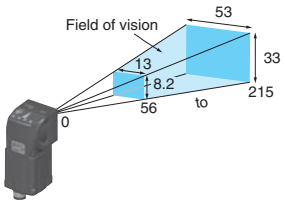
Optical Chart

Intelligent Compact Camera

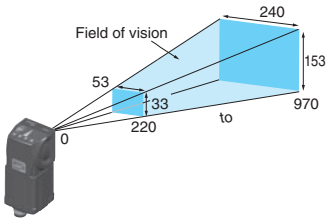
Narrow View
FZ-SQ010F



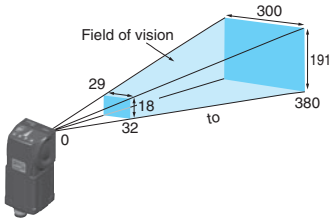
Standard
FZ-SQ050F



Wide View (Long-distance)
FZ-SQ100F



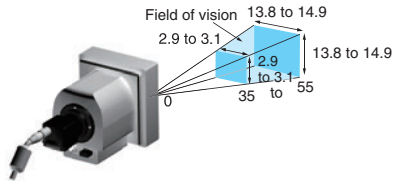
Wide View (Short-distance)
FZ-SQ100N



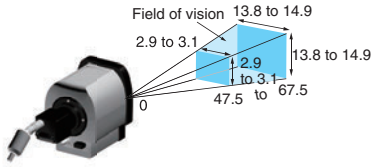
Intelligent Cameras, Autofocus Cameras

Narrow View

FZ-SLC15

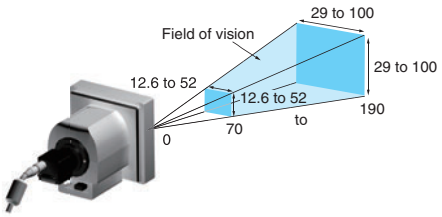


FZ-SZC15

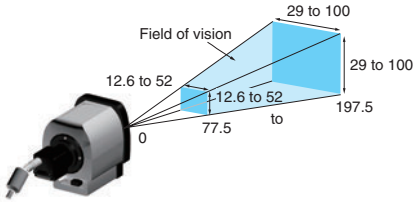


Wide View

FZ-SLC100



FZ-SZC100

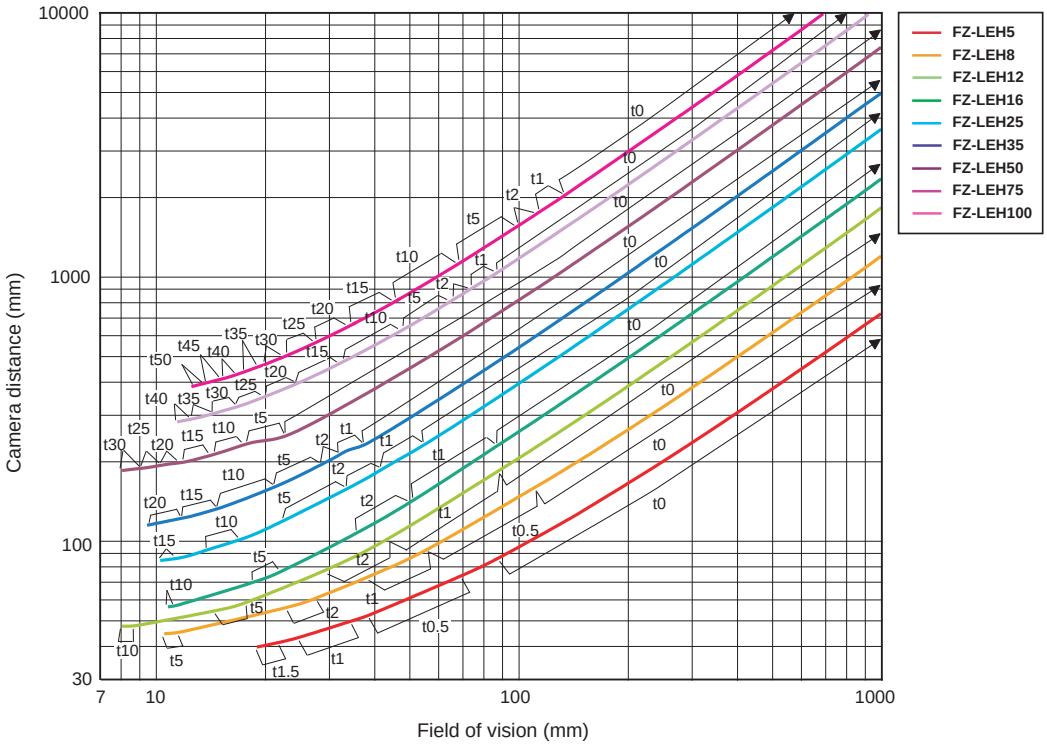


*** Field of Vision**

The images displayed on the monitor will be rectangular images of 640×480 pixels. The valid processing area for measurements is the 480×480-pixel area in the middle.
The above figures show the dimensions of the middle 480×480 pixels.

2 Million-pixel Digital Camera

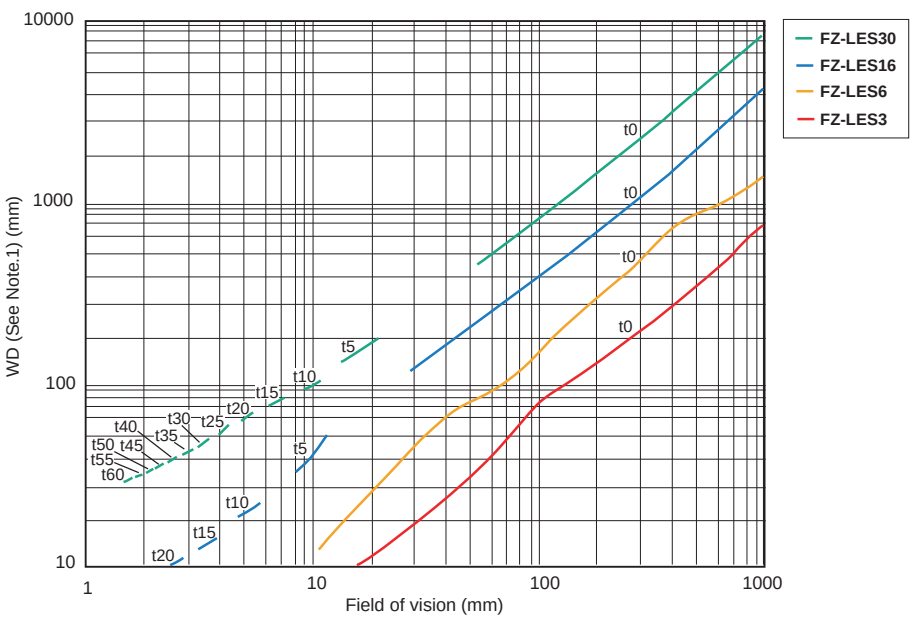
FZ-S□2M



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

300,000-pixel Small Digital Cameras

FZ-SF□, FZ-SP□

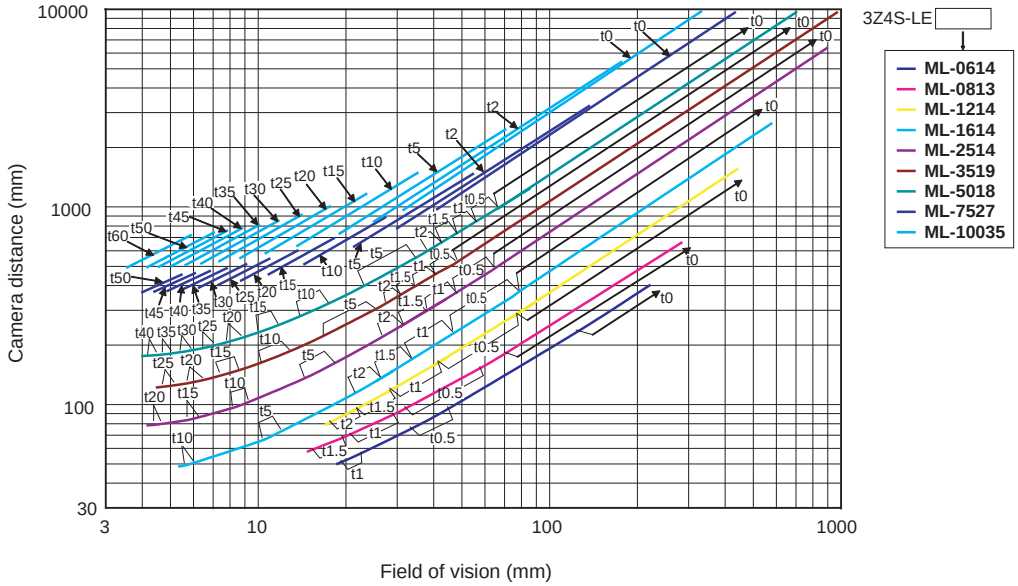


Note: 1. The vertical axis represents WD, not installation distance.

Optical Chart

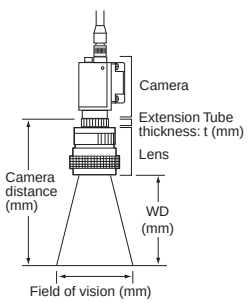
300,000-pixel High-speed Camera, and Digital Camera

FZ-SH□, FZ-S□



■ Meaning of Optical Chart

The X axis of the optical chart shows the field of vision (mm) (Note1),
and the Y axis of the optical chart shows the camera installation distance (mm) (Note2).



Note: 1. The lengths of the fields of vision given in the optical charts are the lengths of the Y axis.
2. The vertical axis represents WD for small cameras.

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