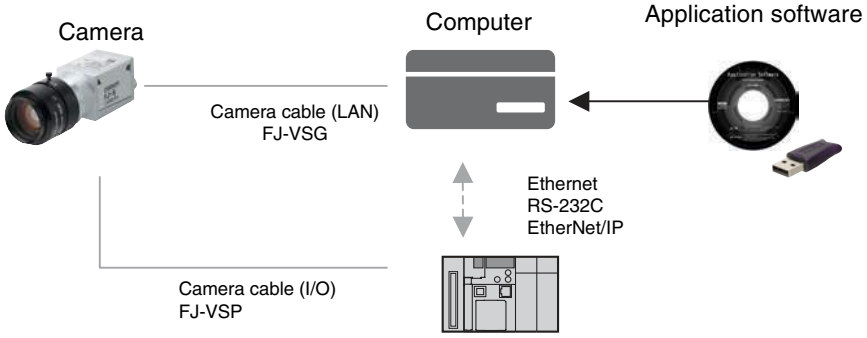
PC Vision System FJ Series

Camera & Software Vision Package

- Built-in high-quality image processing in a PC system
- Resolving a variety of applications with highly robust and advanced measurement algorithm
- Gigabit Ethernet camera that can be readily connected to the FJ application software (the connectivity tested and verified)
- Building an ideal machine vision using a customized sample in no time

System Configuration



PLC / Sensor / External power supply, etc.

Ordering Information

Type				Model	Operating environment
Camera & Software Vision Package • Application software × 1 license • Camera × 1 unit		300,000 pixels	Monochrome	**FJ-SG-S**	• CPU: Intel Pentium Processor (SSE2 or higher) • OS: Windows XP Professional (32bit) Service pack 3 or later, or Windows 7 Professional (32bit) or Enterprise (32bit) or Ultimate (32bit) • .NET Framework: .NET Framework 3.5 or higher • Memory: At least 2 GB RAM Available disk space: At least 2 GB • Camera interface: Ethernet 1000BASE-T • Display: XGA (1024 × 768), True Color (32-bit) or higher • Optical drive: CD/DVD drive
		300,000 pixels	Color	**FJ-SCG-S**	
		2 million pixels	Monochrome	**FJ-S2MG-S**	
		2 million pixels	Color	**FJ-SC2MG-S**	
		5 million pixels	Monochrome	**FJ-S5MG-S**	
		5 million pixels	Color	**FJ-SC5MG-S**	
Camera (Single unit)		300,000 pixels	Monochrome	**FJ-SG**	–
		300,000 pixels	Color	**FJ-SCG**	
		2 million pixels	Monochrome	**FJ-S2MG**	
		2 million pixels	Color	**FJ-SC2MG**	
		5 million pixels	Monochrome	**FJ-S5MG**	
		5 million pixels	Color	**FJ-SC5MG**	
Camera cable (LAN)		Cable length: 3 m, 5 m, 10 m, 20 m, 40 m		**FJ-VSG**	
Camera cable (Power, I/O)		Cable length: 3 m, 5 m, 10 m *1		**FJ-VSP**	
Development environment		Application Producer		**FJ-AP1**	• CPU: Intel Pentium Processor (SSE2 or higher) • OS: Windows XP Professional (32bit) Service pack 3 or later, or Windows 7 Professional (32bit) or Enterprise (32bit) or Ultimate (32bit) • .NET Framework: .NET Framework 3.5 or higher • Memory: At least 2 GB RAM Available disk space: At least 2 GB • Browser: Microsoft® Internet Explorer 6.0 or later • Display: XGA (1024 × 768), True Color (32-bit) or higher • Optical drive: CD/DVD drive • The following operating environment is required to use the camera FJ-S□□□G. Camera interface: Ethernet 1000BASE-T • The following software is required to customize the software: Microsoft® Visual Studio® 2010 Professional

*1. 10-m cable can be used with 300,000-pixel cameras FJ-SCG/SG and 2-million pixel cameras FJ-SC2MG/S2MG.

Lenses

High-resolution, Low-distortion Lenses

Model	FZ-LEH5	FZ-LEH8	FZ-LEH12	FZ-LEH16	FZ-LEH25	FZ-LEH35	FZ-LEH50	FZ-LEH75	FZ-LEH100
Appearance									
Focal length	5mm	8mm	12.5mm	16mm	25mm	35mm	50mm	75mm	100mm
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.

CCTV Lenses

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	6mm	8mm	12mm	16mm	25mm	35mm	50mm	75mm	100mm
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.

- 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 Performance

		FJ-SCG/SG	FJ-SC2MG/S2MG	FJ-SC5MG/S5MG
Imaging element		Progressive scan 1/3-inch CCD	Progressive scan 1/1.8-inch CCD	Progressive scan 2/3-inch CCD
Effective pixels		658 (H) × 492 (V): Color	1624 (H) × 1234 (V): Color	2454 (H) × 2056 (V): Color
		659 (H) × 494 (V): Monochrome	1626 (H) × 1236 (V): Monochrome	2456 (H) × 2058 (V): Monochrome
Pixel size		7.4 (μm) × 7.4 (μm)	4.4 (μm) × 4.4 (μm)	3.45 (μm) × 3.45 (μm)
Synchronous system		Internal synchronous		
Frame rate		90fps	20fps	17fps
Number of uptake lines		Min 2 line to Effective pixels (V) (2 lines interval)		
Gain		0dB to +25dB	0dB to +18dB	0dB to +14dB
Shutter speed		17 μs to 1 s	25 μs to 1 s	29 μs to 10 s
Video output		Digital 8 bit		
Trigger input		External trigger / Software trigger (Ethernet)		
External output		Strobe trigger / Trigger READY		
I/F		Gigabit Ethernet (1 Gbit/s)		
Lens mount		C mount		
Power voltage		PoE/12VDC±10%		11.3 to 13.2VDC
Pick-up voltage when camera cable FJ-VSP is used	3 m	11.3 to 13.2VDC		11.8 to 13.8VDC
	5 m			
	10 m			Cannot be used.
Power consumption		PoE supply: 3.6 W	PoE supply: 3.8 W	Power and I/O connector supply: 6.4 W
		Power and I/O connector supply: 3.1 W	Power and I/O connector supply: 3.2 W	
Vibration resistance		10 to 150 Hz, Half amplitude 0.35 mm (Acceleration: Max. 50 m/s^2), 3 directions (X/Y/Z) 8 minutes each, 10 times		
Impact resistance		150 m/s^2, 6 directions (Up and Down, Right and Left, Back and Forth) 3 times each		
Ambient temperature		In operation: 0 to 40°C (Chassis surface temperature should be 55°C or lower.)		
		In storage: -25 to +65°C (no freezing or condensation)		
Ambient humidity		In operation and storage: 35 to 85% RH each (no condensation)		
Ambient environment		No corrosive gas		
Protective structure		IEC60529 standard IP30		
Weight		Approx. 90 g		Approx. 220 g

Processing Items

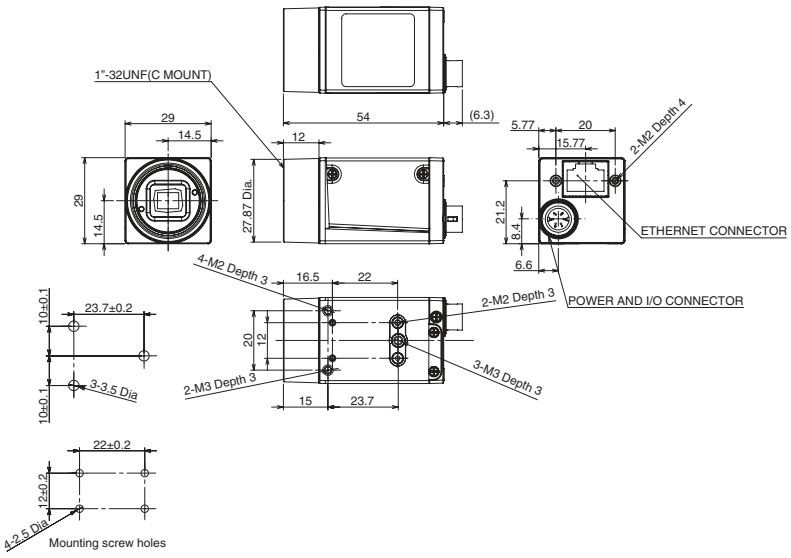
Group	Icon	Processing Item	
Inspections / Measurement		Search	Used to identify the shapes and calculate the position of measurement objects.
		Flexible Search	Recognizing the shapes of workpieces with variation and detecting their positions.
		Sensitive Search	Search a small difference by dividing the search model in detail, and calculating the correlation.
		ECM Search	Used to search the similar part of model form input image. Detect the evaluation value and position.
		Ec Circle Search	Extract circles using "round " shape information and get position, radius and quantity in high preciseness.
		Classification	Used when various kinds of products on the assembly line need to be sorted and identified.
		Edge Position	Measure position of measurement objects according to the color change in measurement area.
		Edge Pitch	Detect edges by color change in measurement area. Used for calculating number of pins of IC and connectors.
		Scan Edge Position	Measure peak/bottom edge position of workpieces according to the color change in separated measurement area.
		Scan Edge Width	Measure max/min/average width of workpieces according to the color change in separated measurement area.
		Color Data	Used for detecting presence and mixed varieties of products by using color average and deviation.
		Gravity and Area	Used to measure area, center of gravity of workpieces by extracting the color to be measured.
		Labeling	Used to measure number, area and gravity of workpieces by extracting registered color.
		Label Data	Selecting one region of extracted Labeling, and get that measurement. Area and Gravity position can be got and judged.
		Defect	Used for appearance measurement of plain-color measurement objects such as defects, stains and burrs.
		PreciseDefect	Check the defect on the object. Parameters for extraction defect can be set precisely.
		Fine Matching	Difference can be detected by overlapping and comparing(matching) registered fine images with input images.
		Character Inspection	Recognize character according correlation search with model image registered in [Model Dictionary].
		Date Verification	Reading character string is verified with internal date.
		Model Dictionary	Register character pattern as dictionary. The pattern is used in [Character Inspection].
		Circle Angle	Used for calculating angle of inclination of circular measurement objects.
Image Capturing		Camera image input GigE	Capture images from a GigE camera.
		Camera Image Input HDR	Create high-dynamic range images by acquiring several images with different conditions.
		Measurement Image Switching	To switch the images used for measurement. Not input images from camera again.
Correcting images		Position Compensation	Used when positions are differed. Correct measurement is performed by correcting position of input images.
		Filtering	Used for processing images input from cameras in order to make them easier to be measured.
Correcting images		Background Suppression	To enhance contrast of images by extracting color in specified brightness.
		Color Gray Filter	Color image is converted into monochrome images to emphasize specific color.
		Extract Color Filter	Convert color image to color extracted image or binary image.
		Anti Color Shading	To remove the irregular color/pattern by uniformizing max.2 specified colors.
		Polar Transformation	Rectify the image by polar transformation. Useful for OCR or pattern inspection printed on circle.

Group	Icon	Processing Item	
Assisting inspections / measurement		Macro	Advanced arithmetic processing can be easily incorporated into workflow as macro processing items.
		Calculation	Used when using the judge results and measured values of ProcItem which are registered in processing units.
		Line Regression	Used for calculating regression line from plural measurement coordinate.
		Circle Regression	Used for calculating regression circle from plural measurement coordinate.
		Set Unit Data	Used to change the ProcItem data (setting parameters,etc.) that has been set up in a scene.
		Get Unit Data	Used to get one data (measured results, setting parameters,etc.) of ProcItem that has been set up in a scene.
		Set Unit Figure	Used for re-setting the figure data (model, measurement area) registered in an unit.
		Get Unit Figure	Used for get the figure data (model, measurement area) registered in an unit.
		Trend Monitor	Used for displaying the information about results on the monitor, facilitating to avoid NG and analyze causes.
		Image Logging	Used for saving the measurement images to the memory and USB memory.
		Data Logging	Used for saving the measurement data to the memory and USB memory.
		Elapsed Time	Used for calculating the elapsed time since the measurement trigger input.
		Wait	Processing is stopped only at the set time. The standby time is set by the unit of [ms].
		Focus	Focus setting is supported.
		Iris	Focus and aperture setting is supported.
Branching processing		Conditional Branch	Used where more than two kinds of products on the production line need to detected separately.
		End	This ProcItem must be set up as the last processing unit of a branch.
		DI Branch	Same as ProcItem "Branch". But you can change the targets of conditional branching via external inputs.
Outputting results		Data Output	Used when you need to output data to the external devices such as PLC or PC via serial ports.
		Fieldbus Data Output	Outputs data to an external device, such as a Programmable Controller, through a fieldbus interface.
Displaying results on the monitor		Result Display	Used for displaying the texts or the figures in the camera image .
		Display Image File	Display selected image file.
		Display Last NG Image	Display the last NG images.

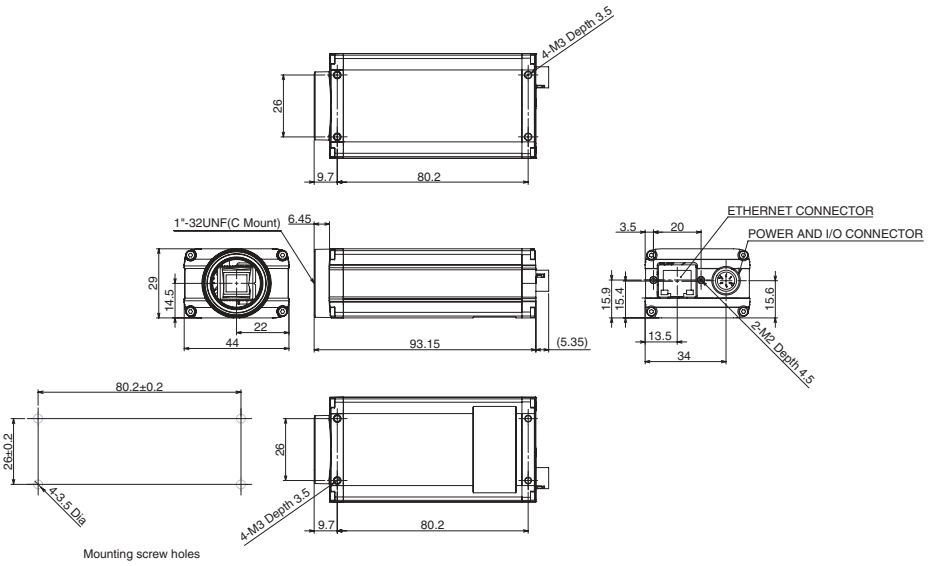
External Dimensions

(Unit: mm)

FJ-SCG/SG/SC2MG/S2MG

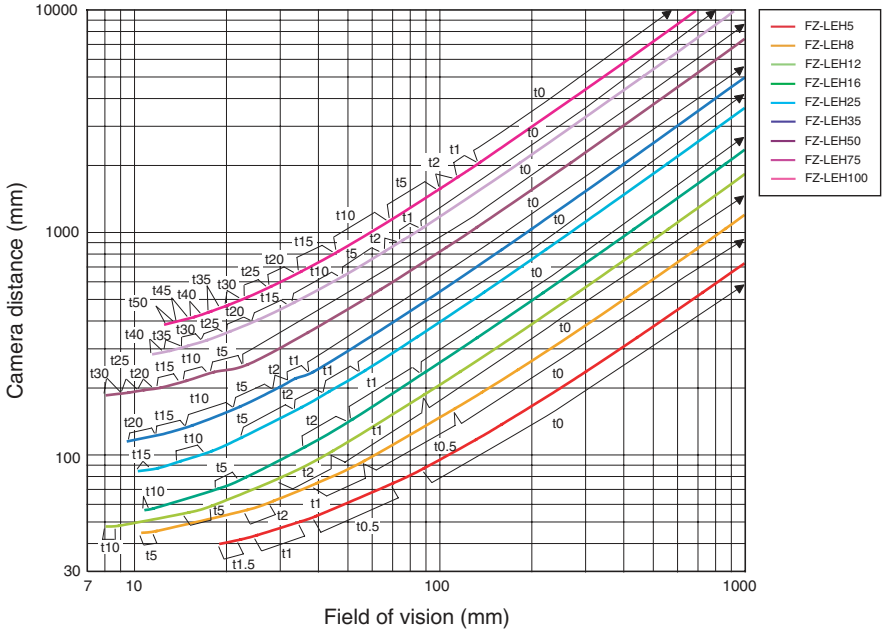


FJ-SC5MG/S5MG



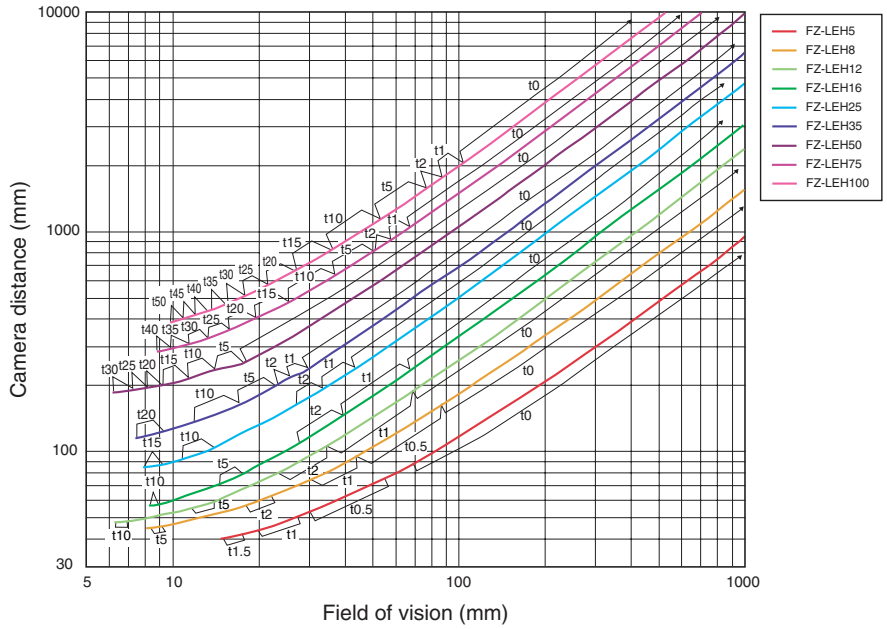
Optical Chart

5 million-pixel digital camera FJ-SC5MG/S5MG



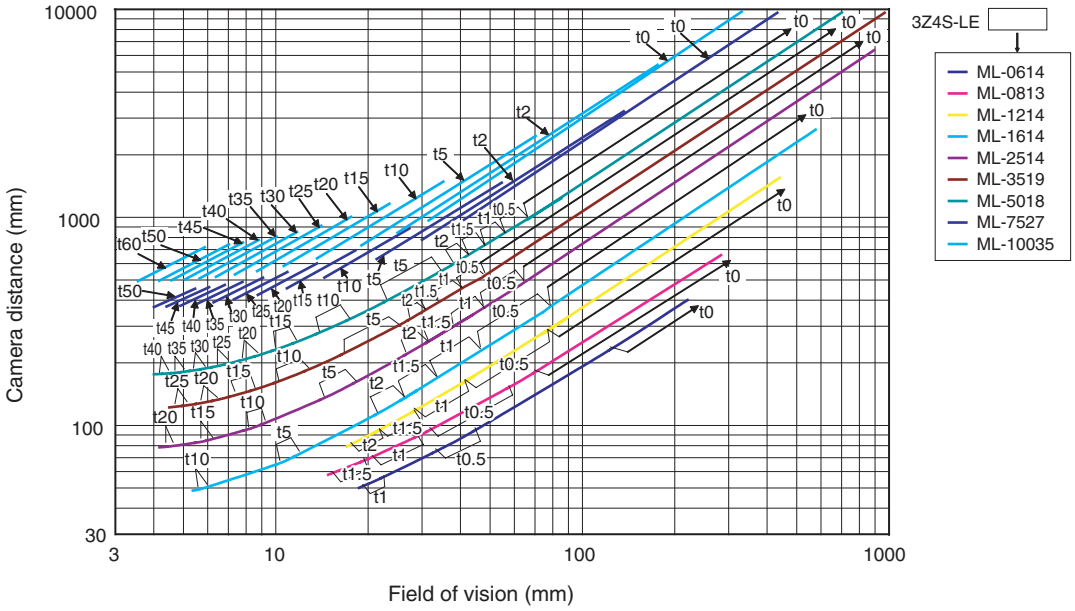
The 5-mm Extension Tubes (3Z4S-LE ML-EXR) cannot be used with FZ-LEH25 Lenses.

2 million-pixel digital camera FJ-SC2MG/S2MG



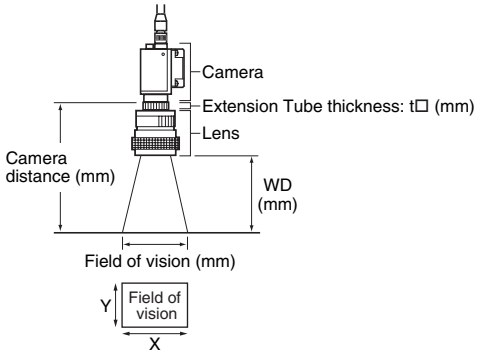
The 5-mm Extension Tubes (3Z4S-LE ML-EXR) cannot be used with FZ-LEH25 Lenses.

300,000-pixel digital camera FJ-SCG/SG



■ 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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OMRON Corporation **Industrial Automation Company**
Tokyo, JAPAN
Contact: www.ia.omron.com

Regional Headquarters
OMRON EUROPE B.V.
Sensor Business Unit
Carl-Benz-Str. 4, D-71154 Nufringen, Germany
Tel: (49) 7032-811-0/Fax: (49) 7032-811-199

OMRON ELECTRONICS LLC
One Commerce Drive Schaumburg,
IL 60173-5302 U.S.A.
Tel: (1) 847-843-7900/Fax: (1) 847-843-7787

OMRON ASIA PACIFIC PTE. LTD.
No. 438A Alexandra Road # 05-05/08 (Lobby 2),
Alexandra Technopark,
Singapore 119967
Tel: (65) 6835-3011/Fax: (65) 6835-2711

OMRON (CHINA) CO., LTD.
Room 2211, Bank of China Tower,
200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120, China
Tel: (86) 21-5037-2222/Fax: (86) 21-5037-2200

Authorized Distributor:

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