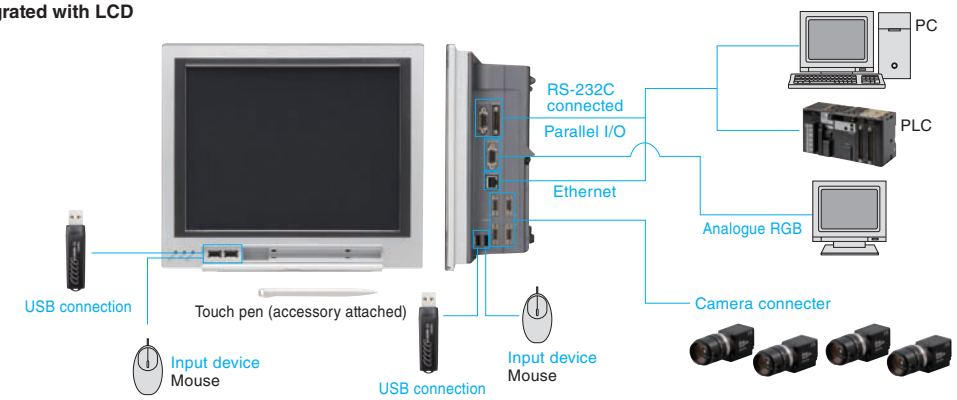
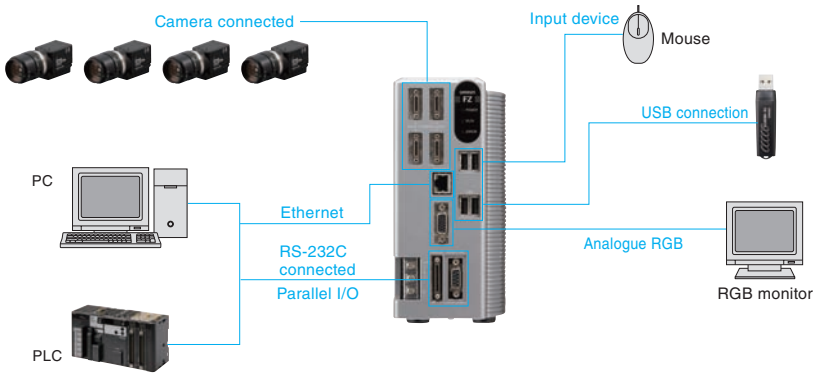
System configuration

Controllers integrated with LCD



Box-type Controllers



Lenses

High-resolution, Low-distortion Lenses

Model	3Z4S-LE SV-0614H	3Z4S-LE SV-0814H	3Z4S-LE SV-1214H	3Z4S-LE SV-1614H	3Z4S-LE SV-2514H	3Z4S-LE SV-3514H	3Z4S-LE SV-5014H	3Z4S-LE SV-7525H	3Z4S-LE SV-10028H
Appearance/ Dimensions (mm)									
Focal length	6 mm	8 mm	12 mm	16 mm	25 mm	35 mm	50 mm	75 mm	100 mm
Brightness	F1.4	F1.4	F1.4	F1.4	F1.4	F1.4	F1.4	F2.5	F2.8
Filter size	M40.5 P0.5	M35.5 P0.5	M27 P0.5	M27 P0.5	M27 P0.5	M35.5 P0.5	M40.5 P0.5	M34.0 P0.5	M37.5 P0.5

CCTV Lenses

Model	3Z4S-LE SV-03514V	3Z4S-LE SV-04514V	3Z4S-LE SV-0614V	3Z4S-LE SV-0813V	3Z4S-LE SV-1214V	3Z4S-LE SV-1614V	3Z4S-LE SV-2514V	3Z4S-LE SV-3518V
Appearance/ Dimensions (mm)								
Focal length	3.5 mm	4.5 mm	6 mm	8 mm	12 mm	16 mm	25 mm	35 mm
Brightness	F1.4	F1.4	F1.4	F1.3	F1.4	F1.4	F1.4	F1.8
Filter size	–	–	M27 P0.5	M25.5 P0.5	M27 P0.5	M27 P0.5	M27 P0.5	M27 P0.5

Model	3Z4S-LE SV-5018V	3Z4S-LE SV-7527V	3Z4S-LE SV-10035V
Appearance/ Dimensions (mm)			
Focal length	50 mm	75 mm	100 mm
Brightness	F1.8	F2.7	F3.5
Filter size	M30.5 P0.5	M30.5 P0.5	M30.5 P0.5

Lenses for small camera

Model	FZ-LES3	FZ-LES6	FZ-LES16	FZ-LES30
Appearance/ Dimensions (mm)				
Focal length	3 mm	6 mm	16 mm	30 mm
Brightness	F2.0	F2.0	F3.4	F3.4

Extension Tubes

Model	3Z4S-LE SV-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.

Extension Tubes for small camera

Model	FZ-LESR
Contents	Set of 3 tubes (15 mm,10 mm, 5 mm) Maximum outer diameter: 12 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 is required to protect against vibration when Extension Tubes exceeding 30 mm are used.

Ratings and Specifications(Controllers)

FZ4 series Quad Processing High-speed Controllers

Model		NPN Output	FZ4-1100	FZ4-1100-10	FZ4-1150	FZ4-1150-10	FZ4-H1100	FZ4-H1100-10	FZ4-H1150	FZ4-H1150-10
		PNP Output	FZ4-1105	FZ4-1105-10	FZ4-1155	FZ4-1155-10	FZ4-H1105	FZ4-H1105-10	FZ4-H1155	FZ4-H1155-10
Controller type			Controllers integrated with LCD		Box-type controllers		Controllers integrated with LCD		Box-type controllers	
High-grade Processing items			No				Yes			
No. of Cameras			2	4	2	4	2	4	2	4
Connected Camera			Can be connected to all cameras.							
Processing resolution	When connected to an 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)							
	When connected to a 5 million-pixel camera		2448(H)×2044(V)							
No. of scenes			32							
Number of logged images (See note 1.)	When connected to an intelligent compact camera	Connected to 1 camera	232							
		Connected to 2 cameras	116							
		Connected to 3 cameras	77							
		Connected to 4 cameras	58							
	When connected to a 300,000-pixel camera	Connected to 1 camera	Color camera: 270, Monochrome Camera: 272							
		Connected to 2 cameras	Color camera: 135, Monochrome Camera: 136							
		Connected to 3 cameras	Color camera: 90, Monochrome Camera: 90							
		Connected to 4 cameras	Color camera: 67, Monochrome Camera: 68							
	When connected to a 2 million-pixel camera	Connected to 1 camera	Color camera: 43, Monochrome Camera: 43							
		Connected to 2 cameras	Color camera: 21, Monochrome Camera: 21							
		Connected to 3 cameras	Color camera: 14, Monochrome Camera: 14							
		Connected to 4 cameras	Color camera: 10, Monochrome Camera: 10							
	When connected to a 5 million-pixel camera	Connected to 1 camera	Color camera: 16, Monochrome Camera: 16							
		Connected to 2 cameras	Color camera: 8, Monochrome Camera: 8							
		Connected to 3 cameras	Color camera: 5, Monochrome Camera: 5							
		Connected to 4 cameras	Color camera: 4, Monochrome Camera: 4							
Operation			Controllers integrated with LCD: Touch pen, mouse, etc. Box-type controllers: Mouse or similar device							
Settings			Create series of processing steps by editing the flowchart (Help messages provided).							
Serial communications			RS-232C/422A: 1 CH							
Network communications			Ethernet 100BASE-TX/10BASE-T							
EtherNet/IP communications			Ethernet port baud rate: 100 Mbps (100Base-TX)							
Parallel I/O			(When used in Multi-line random-trigger mode) 17 inputs (RESET, STEP0/ENCTRIG_Z0, STEP1/ENCTRIG_Z1, DSA0 to 1, ENCTRIG_A0 to 1, ENCTRIG_B0 to 1, DI0 to 7), 29 outputs (RUN/BUSY1, BUSY0, GATE0 to 1, OR0 to 1, READY0 to 1, ERROR, STGOUT0 to 3, DO0 to 15) (When used in other mode) 13 inputs (RESET, STEP0/ENCTRIG_Z0, DSA0, ENCTRIG_A0, ENCTRIG_B0, DI0 to 7), 26 outputs (RUN, BUSY0, GATE0, OR0, READY0, ERROR, STGOUT0 to 3, DO0 to 15) *STGOUT 2 to 3 only for camera 4 ch type							
Monitor interface			Controllers integrated with LCD: Integrated Controller and LCD 12.1 inch TFT color LCD (Resolution: XGA 1,024 × 768 dots) Box-type controllers: Analog RGB video output, 1 channel (Resolution: XGA 1,024 × 768 dots)							
USB interface			4 channels (supports USB 1.1 and 2.0)							
Power supply voltage			20.4 to 26.4 VDC							
Current consumption (at 24.0 VDC) (See note 2.)	When connected to an intelligent compact camera		5.0 A max.	7.5 A max.	5.0 A max.	7.5 A max.	5.0 A max.	7.5 A max.	5.0 A max.	7.5 A max.
	When connected to a 300,000-pixel camera		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.
	When connected to a 2 million-pixel camera									
	When connected to a 5 million-pixel camera									
Ambient temperature range			Operating: 0 to 45°C for low cooling fan speeds, 0 to 50°C for high cooling fan speeds 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. 1.8 kg	Approx. 1.9 kg	Approx. 3.2 kg	Approx. 3.4 kg	Approx. 1.8 kg	Approx. 1.9 kg
Accessories			Controllers integrated with LCD: Touch pen (one, inside the front panel), Instruction Manual, 6 mounting brackets Box-type controllers: Instruction Manual							

Note 1: The image logging capacity changes when multiple cameras of different types are connected at the same time.
2: 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 compact camera is connected.

FZ4 series High-speed Controllers

Model		NPN Output	FZ4-700	FZ4-700-10	FZ4-750	FZ4-750-10	FZ4-H700	FZ4-H700-10	FZ4-H750	FZ4-H750-10
		PNP Output	FZ4-705	FZ4-705-10	FZ4-755	FZ4-755-10	FZ4-H705	FZ4-H705-10	FZ4-H755	FZ4-H755-10
Controller type			Controllers integrated with LCD		Box-type controllers		Controllers integrated with LCD		Box-type controllers	
High-grade Processing items			No				Yes			
No. of Cameras			2	4	2	4	2	4	2	4
Connected Camera			Can be connected to all cameras. (When connecting 5 million-pixel cameras, up to two cameras can be connected.)							
Processing resolution	When connected to an 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)							
	When connected to a 5 million-pixel camera		2448(H)×2044(V)							
No. of scenes			32							
Number of logged images (See note 1.)	When connected to an 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							
	When connected to a 5 million-pixel camera	Connected to 1 camera	Color camera: 11, Monochrome Camera: 11							
		Connected to 2 cameras	Color camera: 5, Monochrome Camera: 5							
		Connected to 3 cameras	–							
		Connected to 4 cameras	–							
Operation			Controllers integrated with LCD: Touch pen, mouse, etc. Box-type controllers: Mouse or similar device							
Settings			Create series of processing steps by editing the flowchart (Help messages provided).							
Serial communications			RS-232C/422A: 1 CH							
Network communications			Ethernet 100BASE-TX/10BASE-T							
EtherNet/IP communications			Ethernet port baud rate: 100 Mbps (100Base-TX)							
Parallel I/O			13 inputs (RESET, STEP0/ENCTRIG_Z0, DSA0, ENCTRIG_A0, ENCTRIG_B0, DI0 to 7), 26 outputs (RUN, BUSY0, GATE0, OR0, READY0, ERROR, STGOUT0 to 3, DO0 to 15) *STGOUT 2 to 3 only for camera 4 ch type							
Monitor interface			Controllers integrated with LCD: Integrated Controller and LCD 12.1 inch TFT color LCD (Resolution: XGA 1,024 × 768 dots) Box-type controllers: Analog RGB video output, 1 channel (Resolution: XGA 1,024 × 768 dots)							
USB interface			4 channels (supports USB 1.1 and 2.0)							
Power supply voltage			20.4 to 26.4 VDC							
Current consumption (at 24.0 VDC) (See note 2.)	When connected to an intelligent compact camera		5.0 A max.	7.5 A max.	5.0 A max.	7.5 A max.	5.0 A max.	7.5 A max.	5.0 A max.	7.5A max.
	When connected to an intelligent camera									
	When connected to a 300,000-pixel camera		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.	4.9A max.
	When connected to a 2 million-pixel camera									
	When connected to a 5 million-pixel camera									
Ambient temperature range			Operating: 0 to 45°C for low cooling fan speeds, 0 to 50°C for high cooling fan speeds 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. 1.8 kg	Approx. 1.9 kg	Approx. 3.2 kg	Approx. 3.4 kg	Approx. 1.8 kg	Approx. 1.9 kg
Accessories			Controllers integrated with LCD: Touch pen (one, inside the front panel), Instruction Manual, 6 mounting brackets Box-type controllers: Instruction Manual							

Note 1: The image logging capacity changes when multiple cameras of different types are connected at the same time.
2: 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.

FZ4 series Standard Controllers

Model		NPN Output	FZ4-600	FZ4-600-10	FZ4-650	FZ4-650-10	FZ4-H600	FZ4-H600-10	FZ4-H650	FZ4-H650-10
		PNP Output	FZ4-605	FZ4-605-10	FZ4-655	FZ4-655-10	FZ4-H605	FZ4-H605-10	FZ4-H655	FZ4-H655-10
Controller type			Controllers integrated with LCD		Box-type controllers		Controllers integrated with LCD		Box-type controllers	
High-grade Processing items			No				Yes			
No. of Cameras			2	4	2	4	2	4	2	4
Connected Camera			Can be connected to all cameras. (When connecting 5 million-pixel cameras, up to two cameras can be connected.)							
Processing resolution	When connected to an 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)							
	When connected to a 5 million-pixel camera		2448(H)×2044(V)							
No. of scenes			32							
Number of logged images (See note 1.)	When connected to an 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							
	When connected to a 5 million-pixel camera	Connected to 1 camera	Color camera: 11, Monochrome Camera: 11							
		Connected to 2 cameras	Color camera: 5, Monochrome Camera: 5							
		Connected to 3 cameras	–							
		Connected to 4 cameras	–							
Operation			Controllers integrated with LCD: Touch pen, mouse, etc. Box-type controllers: Mouse or similar device							
Settings			Create series of processing steps by editing the flowchart (Help messages provided).							
Serial communications			RS-232C/422A: 1 CH							
Network communications			Ethernet 100BASE-TX/10BASE-T							
EtherNet/IP communications			Ethernet port baud rate: 100 Mbps (100Base-TX)							
Parallel I/O			13 inputs (RESET, STEP0/ENCTRIG_Z0, DSA0, ENCTRIG_A0, ENCTRIG_B0, DI0 to 7), 26 outputs (RUN, BUSY0, GATE0, OR0, READY0, ERROR, STGOUT0 to 3, DO0 to 15) *STGOUT 2 to 3 only for camera 4 ch type							
Monitor interface			Controllers integrated with LCD: Integrated Controller and LCD 12.1 inch TFT color LCD (Resolution: XGA 1,024 × 768 dots) Box-type controllers: Analog RGB video output, 1 channel (Resolution: XGA 1,024 × 768 dots)							
USB interface			4 channels (supports USB 1.1 and 2.0)							
Power supply voltage			20.4 to 26.4 VDC							
Current consumption (at 24.0 VDC) (See note 2.)	When connected to an intelligent compact camera		5.0 A max.	7.5 A max.	5.0 A max.	7.5 A max.	5.0 A max.	7.5 A max.	5.0 A max.	7.5 A max.
	When connected to a 300,000-pixel camera		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.
	When connected to a 2 million-pixel camera									
	When connected to a 5 million-pixel camera									
Ambient temperature range			Operating: 0 to 45°C for low cooling fan speeds, 0 to 50°C for high cooling fan speeds 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. 1.8 kg	Approx. 1.9 kg	Approx. 3.2 kg	Approx. 3.4 kg	Approx. 1.8 kg	Approx. 1.9 kg
Accessories			Controllers integrated with LCD: Touch pen (one, inside the front panel), Instruction Manual, 6 mounting brackets Box-type controllers: Instruction Manual							

Note 1: The image logging capacity changes when multiple cameras of different types are connected at the same time.
2: 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 compact camera is connected.

FZ4 series Lite Controllers

Model		NPN Output	FZ4-L350	FZ4-L350-10
		PNP Output	FZ4-L355	FZ4-L355-10
Controller type			Box-type controllers	
High-grade Processing items			No	
No. of Cameras			2	4
Connected Camera			Can be connected to all cameras. (When connecting 5 million-pixel cameras, up to two cameras can be connected.)	
Processing resolution	When connected to an 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)	
	When connected to a 5 million-pixel camera		2448(H)×2044(V)	
No. of scenes			32	
Number of logged images (See note 1.)	When connected to an 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	
	When connected to a 5 million-pixel camera	Connected to 1 camera	Color camera: 11, Monochrome Camera: 11	
		Connected to 2 cameras	Color camera: 5, Monochrome Camera: 5	
		Connected to 3 cameras	–	
		Connected to 4 cameras	–	
Operation			Mouse or similar device	
Settings			Create series of processing steps by editing the flowchart (Help messages provided).	
Serial communications			RS-232C: 1 CH	
Network communications			Ethernet 1000BASE-T/100BASE-TX/10BASE-T	
EtherNet/IP communications			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) *STGOUT 2 to 3 only for camera 4 ch type	
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)	
Power supply voltage (See note 2.)			20.4 to 26.4 VDC	
Current consumption (at 24.0 VDC) (See note 3.)	When connected to an intelligent compact camera		4.0 A max.	5.5 A max.
	When connected to a 300,000-pixel camera		2.6 A max.	2.9 A max.
	When connected to a 2 million-pixel camera			
	When connected to a 5 million-pixel camera			
Ambient temperature range			Operating: 0 to 45°C, 0 to 50°C Storage: –20 to 65°C (with no icing or condensation)	
Ambient humidity range			Operating and storage: 35% to 85% (with no condensation)	
Weight			Approx. 1.8 kg	
Accessories			Instruction Manual	

Note 1: The image logging capacity changes when multiple cameras of different types are connected at the same time.
2: Do not ground the positive terminal of the 24-VDC power supply to a 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 compact camera is connected.

Ratings and Specifications(Cameras)

Digital Cameras

	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	Monochrome	Color	Monochrome	Color
Effective pixels	640(H)×480(V)		1600(H)×1200(V)	
Pixel size	7.4(μm)×7.4(μm)		4.4(μm)×4.4(μm)	
Shutter function	Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s			
Partial function	12 to 480 lines		12 to 1200 lines	
Frame rate (image read time)	80 fps (12.5ms)		30 fps (33.3ms)	
Field of vision, installation distance	Selecting a lens according to the field of vision and installation distance			
Ambient temperature range	Operating: 0 to 50°C Storage: –25 to 65°C (with no icing or condensation)		Operating: 0 to 40°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. 55 g		Approx. 76 g	
Accessories	Instruction manual			

Small Digital Cameras

	FZ-SF	FZ-SFC	FZ-SP	FZ-SPC
Image elements	Interline transfer reading all pixels, 1/3-inch CCD image elements			
Color/Monochrome	Monochrome	Color	Monochrome	Color
Effective pixels	640(H)×480(V)			
Pixel size	7.4(μm)×7.4(μm)			
Shutter function	Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s			
Partial function	12 to 480 lines			
Frame rate (image read time)	80 fps (12.5ms)			
Field of vision, installation distance	Selecting a lens according to the field of vision and installation distance			
Ambient temperature range	Operating: 0 to 50°C (camera amp) 0 to 45°C (camera head) Storage: –25 to 65°C (with no icing or condensation)			
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)			
Weight	Approx. 150 g			
Accessories	Instruction manual, installation bracket, Four mounting brackets (M2)		Instruction manual	

High-speed Cameras

	FZ-SH	FZ-SHC
Image elements	Interline transfer reading all pixels, 1/3-inch CCD image elements	
Color/Monochrome	Monochrome	Color
Effective pixels	640(H)×480(V)	
Pixel size	7.4(μm)×7.4(μm)	
Shutter function	Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s	
Partial function	12 to 480 lines	
Frame rate (image read time)	204 fps (4.9ms)	
Field of vision, installation distance	Selecting a lens according to the field of vision and installation distance	
Ambient temperature range	Operating: 0 to 40°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. 105 g	
Accessories	Instruction manual	

Intelligent Compact Cameras

	FZ-SQ010F	FZ-SQ050F	FZ-SQ100F	FZ-SQ100N
Image elements	1/3-inch CMOS image elements			
Color/Monochrome	Color			
Effective pixels	752(H)×480(V)			
Pixel size	6.0(μm)×6.0(μm)			
Shutter function	1/250 to 1/32,258			
Partial function	8 to 480 lines			
Frame rate (image read time)	60 fps			
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
LED class (See note)	Class 2			
Ambient temperature range	Operating: 0 to 50°C Storage: –25 to 65°C			
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)			
Weight	Approx. 150 g		Approx. 140 g	
Accessories	Mounting bracket (FQ-XL), polarizing filter attachment (FQ-XF1), instruction manual and warning label			

Note : Applicable standards: IEC62471-2

Ratings and Specifications(LCD Monitor,Cable)

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 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

Camera Cables

	FZ-VS3 (2m)	FZ-VSB3 (2m)	FZ-VSL3 (2m)	FZ-VSLB3 (2m)
Type	Standard	Bend resistant	Right-angle	Bend resistant Right-angle
Shock resistiveness (durability)	10 to 150 Hz single amplitude 0.15 mm 3 directions, 8 strokes, 4 times			
Ambient temperature range	Operation and storage: 0 to 65°C (with no icing or condensation)			
Ambient humidity range	Operation and storage: 40 to 70%RH (with no condensation)			
Ambient atmosphere	No corrosive gases			
Material	Cable sheath, connector: PVC			
Minimum bending radius	69 mm	69 mm	69 mm	69 mm
Weight	approx. 170 g	approx. 180 g	approx. 170 g	approx. 180 g

Monitor Cable

	FZ-VM
Vibration resistiveness	10 to 150Hz 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

Cable Extension Unit

	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 65°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 12-VDC power supply must be provided to the Cable Extension Unit when connecting the Intelligent Compact Camera, the Strobe Controller, or the Lighting Controller.
2: The current consumption shows when connecting the Cable Extension Unit to an external power supply.

Long-distance Camera Cables

	FZ-VS4 (15m)	FZ-VSL4 (15m)
Type	Standard	Right-angle
Shock resistiveness (durability)	10 to 150 Hz single amplitude 0.15 mm 3 directions, 8 strokes, 4 times	
Ambient temperature range	Operation and storage: 0 to 65°C (with no icing or condensation)	
Ambient humidity range	Operation and storage: 40 to 70%RH (with no condensation)	
Ambient atmosphere	No corrosive gases	
Material	Cable sheath, connector: PVC	
Minimum bending radius	78 mm	
Weight	approx. 1400 g	

Parallel Cable

	FZ-VP	FZ-VPX
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: resin	
Minimum bending radius	75 mm	
Weight	approx. 160 g	approx. 180 g

Connection Table

Camera Connection Table

Type of camera	Model	Resolution	FZ4 series			
			Quad Processing High-speed Controllers FZ4-11□	High-speed Controllers FZ4-7□	Standard Controllers FZ4-6□	Lite Controllers FZ4-L35□
Digital cameras	FZ-SC	300,000 Pixels	Yes	Yes	Yes	Yes
	FZ-S	300,000 Pixels	Yes	Yes	Yes	Yes
	FZ-SC2M	2 million pixels	Yes	Yes	Yes	Yes
	FZ-S2M	2 million pixels	Yes	Yes	Yes	Yes
High-speed cameras	FZ-SHC	300,000 Pixels	Yes	Yes	Yes	Yes
	FZ-SH	300,000 Pixels	Yes	Yes	Yes	Yes
Small digital cameras	FZ-SFC	300,000 Pixels	Yes	Yes	Yes	Yes
	FZ-SF	300,000 Pixels	Yes	Yes	Yes	Yes
	FZ-SPC	300,000 Pixels	Yes	Yes	Yes	Yes
	FZ-SP	300,000 Pixels	Yes	Yes	Yes	Yes
Intelligent compact cameras	FZ-SQ010F	360,000 Pixels	Yes	Yes	Yes	Yes
	FZ-SQ050F	360,000 Pixels	Yes	Yes	Yes	Yes
	FZ-SQ100F	360,000 Pixels	Yes	Yes	Yes	Yes
	FZ-SQ100N	360,000 Pixels	Yes	Yes	Yes	Yes

Cameras / Cables Connection Table

Type of camera	Model	Cable length	High-speed cameras	Digital cameras			Small digital cameras	Intelligent compact cameras
				300,000-pixel	2 million-pixel	5 million-pixel	Pen type / flat type	
Camera Cables Right-angle camera cables	FZ-VS3 FZ-VSL3	2m	Yes	Yes	Yes	Yes	Yes	Yes
		3m	Yes	Yes	Yes	Yes	Yes	Yes
		5m	Yes	Yes	Yes	Yes	Yes	Yes
		10m	Yes	Yes	Yes	No	Yes	Yes
Bend resistant camera cables Bend resistant right-angle camera cables	FZ-VSB3 FZ-VSLB3	2m	Yes	Yes	Yes	Yes	Yes	Yes
		3m	Yes	Yes	Yes	Yes	Yes	Yes
		5m	Yes	Yes	Yes	Yes	Yes	Yes
		10m	Yes	Yes	Yes	No	Yes	Yes
Long-distance camera cable Long-distance right-angle camera cable	FZ-VS4 FZ-VSL4	15m	Yes	Yes	Yes	No	Yes	Yes

Processing Items

* The items in red are High Grade processing items.

Group	Icon	Processing Item		Corresponding Page in the Catalog
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.	P20
		Sensitive Search	Search a small difference by dividing the search model in detail, and calculating the correlation.	P20
		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.	
		Shape Search+	Used to Search the similar part of models from input image.Detect the evaluation value and position.	
		Shape Search II	Used to search the similar part of model from input image regardless of environmental changes. Detect the evaluation value and position.	P6
		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.	
		Circular Scan Edge Position	Measure center axis, diameter and radius of circular workpieces.	P20
		Circular Scan Edge Width	Measure center axis, width and thickness of ring workpieces.	P20
		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 workpices 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.	
		Labeling+	Extract objects of registered color, and measure many features such as number and circularity.	
		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.	P21
		Fine Matching	Difference can be detected by overlapping and comparing(matching) registered fine images with input images.	P21
		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].	
		Barcode+ *1	Recognize barcode, verify and output decoded characters.	
		2DCode *2	Recognize 2D code and display where the code quality is poor.	P21
		2DCode+ *2	Recognize 2D code, verify and output decoded characters.	
		Circle Angle	Used for calculating angle of inclination of circular measurement objects.	
Image Capturing		Camera Image Input	To input images from cameras. And set up the conditions to input images from cameras.	
		Camera Image Input HDR	Create high-dynamic range images by acquiring several images with different conditions.	P19
		Camera Image Input HDR Lite	HDR function for FZ-SQ☐ Intelligent Compact Cameras.	
		Camera Switching	To switch the cameras used for measurement. Not input images from cameras again.	
		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.	
		Trapezoidal Correction+	Rectify the trapezoidal deformed image.	P12
		Filtering	Used for processing images input from cameras in order to make them easier to be measured.	

Group	Icon	Processing Item		Corresponding Page in the Catalog
Correcting images		Backgrond Suppression	To enhance contrast of images by extracting color in specified brightness.	
		Brightness Correct Filter	Track brightness change of entire screen and remove gradual brightness change such as uneven brightness.	P15
		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.	
		Stripes Removal Filter+	Remove the background pattern of vertical, horizontal and cross stripes.	
		Stripes Removal Filter II	Remove the background pattern of vertical, horizontal and diagonal stripes.	P18
		Halation Cut+	Remove halation from input image.	
		Panorama+	Combine multiple image to create one big image.	
		Polar Transformation	Rectify the image by polar transformation. Useful for OCR or pattern inspection printed on circle.	
Assisting inspections / measurement		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 coodinate.	
		Circle Regression	Used for calculating regression circle from plural measurement coordinate.	
		Calibration+	Transform (X,Y) position to the real coodinate system.	
		Precise Calibration	Used for calibration corresponding to trapezoidal distortion and lens distortion.	P18
		User Data	Used for setting of the data that can be used as common constants and variables in scene group data.	
		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.	
		Image Conversion Logging	Used for saving the measurement images in JPEG and BMP format.	P15
		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.	P19
		Iris	Focus and aperture setting is supported.	P19
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.	P19
		Parallel Data Output	Used when you need to output data to the external devices such as PLC or PC via parallel ports.	
		Parallel Judgement Output	Used when you need to output judgement results to the external devices such as PLC or PC via parallel 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.	P19

*1. Bar Codes that can be read : JAN/EAN/UPC (including add-on codes), Code 39, Codabar (NW-7), ITF (Interleaved 2 of 5), Code 93, Code 128, GS1-128, GS1 DataBar (RSS-14 / RSS Limited / RSS Expanded), Pharmacode

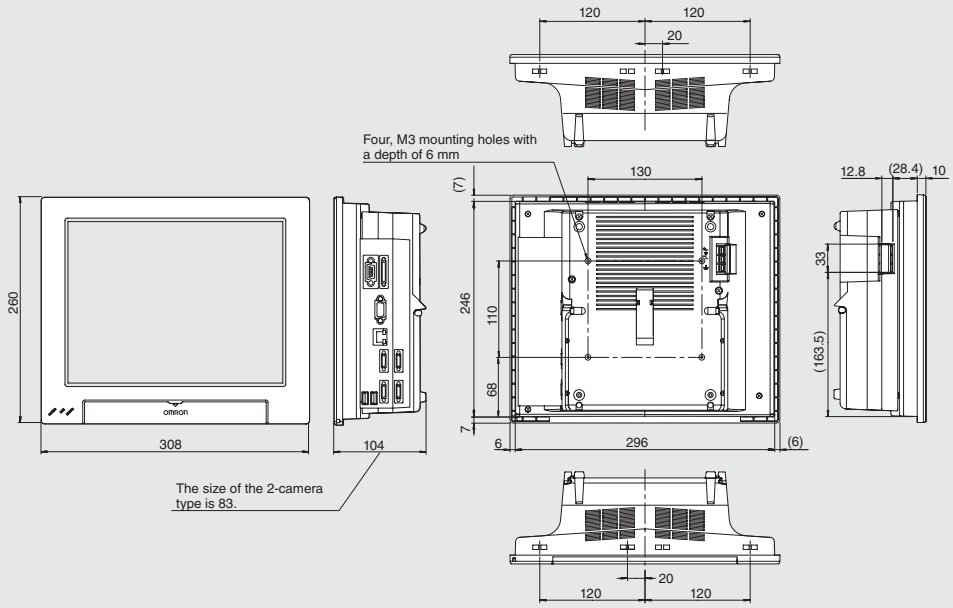
*2. 2D Codes that can be read : Data Matrix (ECC200), QR Code

External Dimensions (Unit: mm)

FZ4-series Controllers

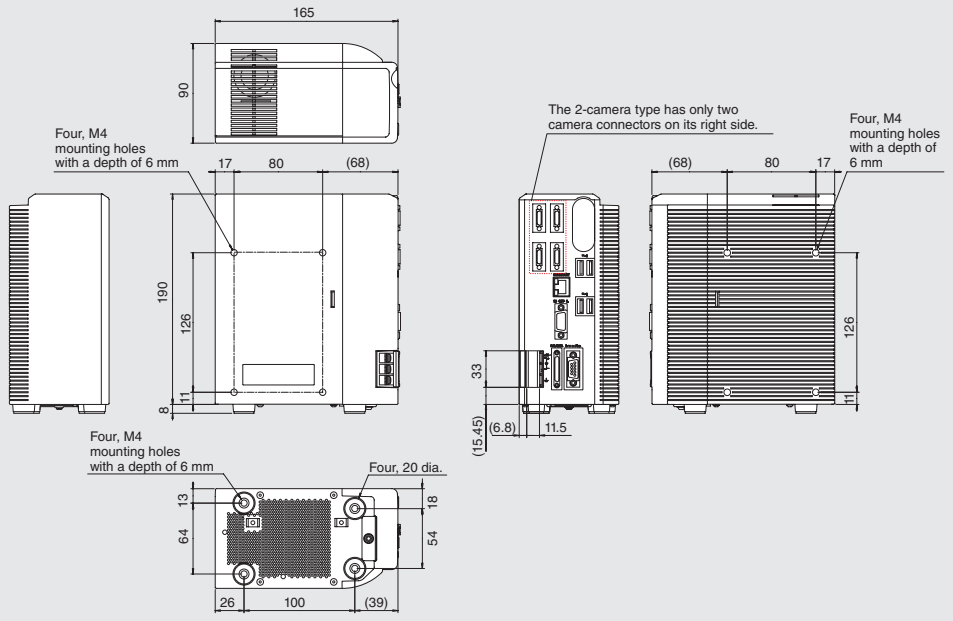
■ LCD-integrated type

FZ4-H110□/-H110□-10
FZ4-110□/-110□-10
FZ4-H70□/-H70□-10
FZ4-70□/-70□-10
FZ4-H60□/-H60□-10
FZ4-60□/-60□-10

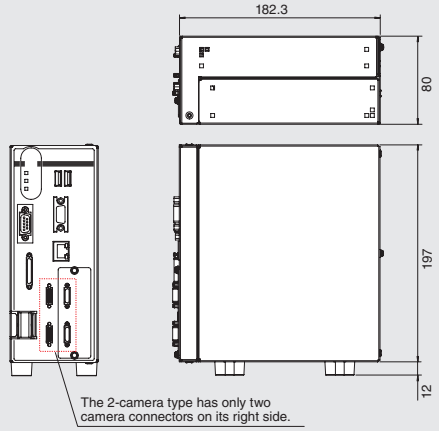


■ Box-type

FZ4-H115□/-H115□-10
FZ4-115□/-115□-10
FZ4-H75□/-H75□-10
FZ4-75□/-75□-10
FZ4-H65□/-H65□-10
FZ4-65□/-65□-10



FZ4-L35□/-L35□-10

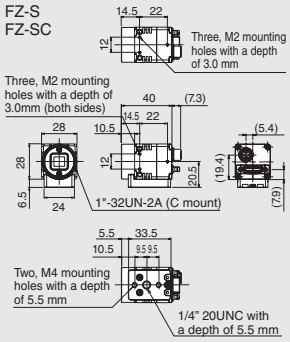


Cameras

Digital Cameras

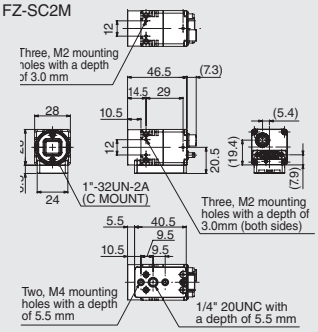
■ 300,000-pixel camera

FZ-S
FZ-SC



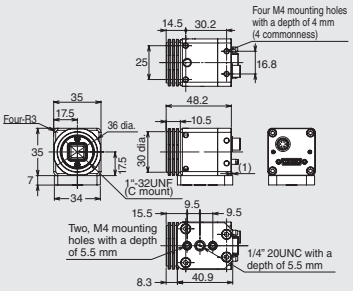
■ 2 million-pixel camera

FZ-S2M
FZ-SC2M



■ High-speed Camera

FZ-SH
FZ-SHC

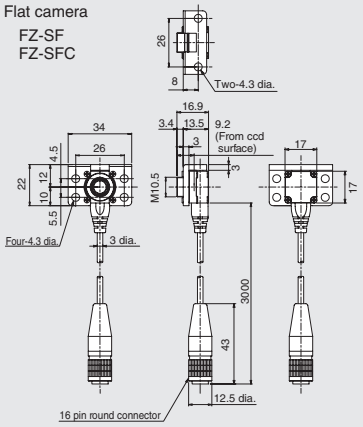


Small digital cameras

■ Camera head

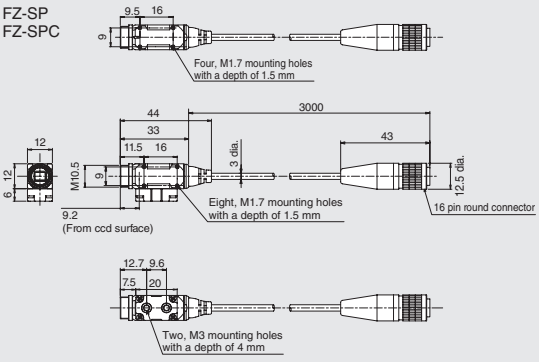
Flat camera

FZ-SF
FZ-SFC



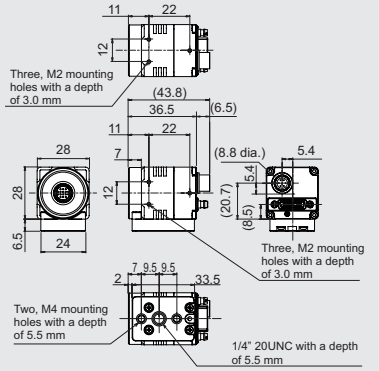
Pen-shaped camera

FZ-SP
FZ-SPC



■ Camera amplifier

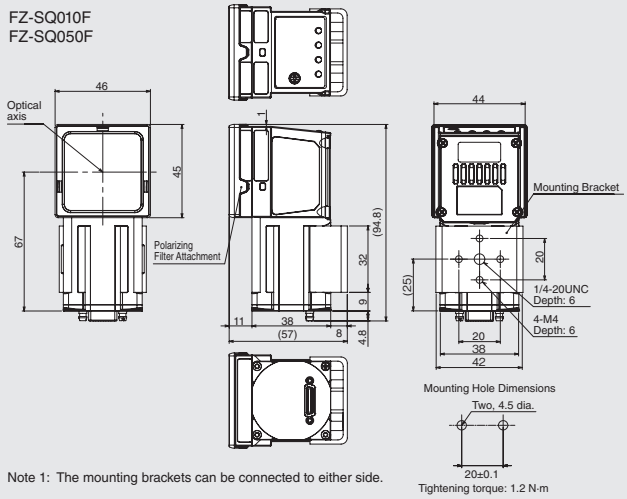
Can be used for both flat cameras and pen-shaped cameras



■ Intelligent Compact Cameras (Dimensional drawings are provided here only for the products that have undergone design changes as of Dec. 2012.)

Narrow view / Standard

FZ-SQ010F
FZ-SQ050F

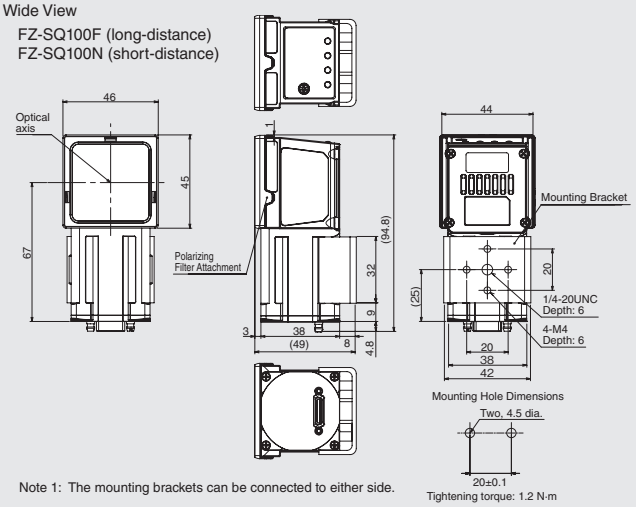


Note 1: The mounting brackets can be connected to either side.

Tightening torque: 1.2 N·m

Wide View

FZ-SQ100F (long-distance)
FZ-SQ100N (short-distance)



Note 1: The mounting brackets can be connected to either side.

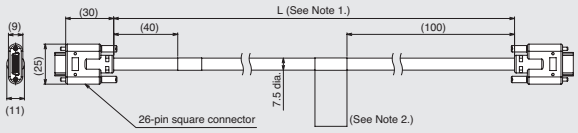
Tightening torque: 1.2 N·m

Cables

Camera Cables

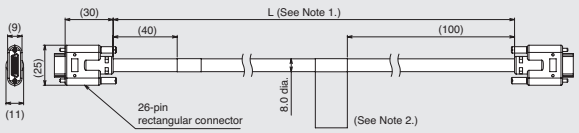
■ Camera Cable

FZ-VS3



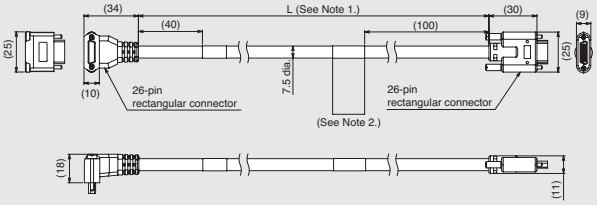
■ Bend resistant Camera Cable

FZ-VSB3



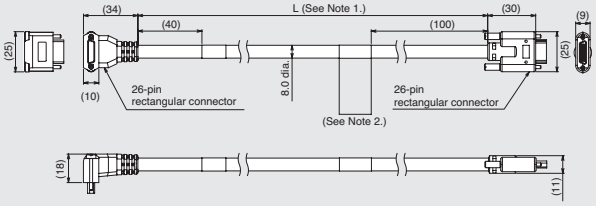
■ Right-angle Camera Cable

FZ-VSL3



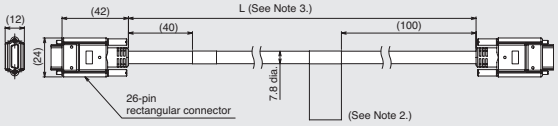
■ Bend resistant Right-angle Camera Cable

FZ-VSLB3



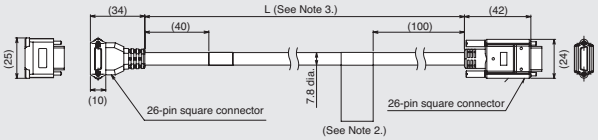
■ Long-distance Camera Cable

FZ-VS4



■ Long-distance Right-angle Camera Cable

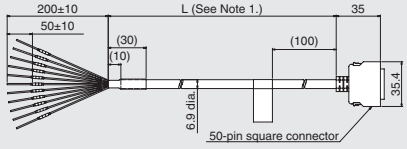
FZ-VSL4



Note 1: Cable is available in 2m/3m/5m/10m.
2: Each camera cables has polarity.
Please ensure that the name plate side of the cable is connected to the controller.
3: Cable is available in 15m.

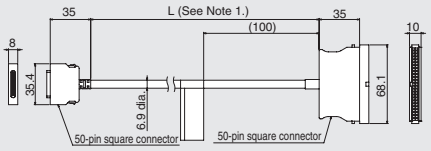
Parallel Cable

FZ-VP



Note 1: cable is available in 2m/5m.

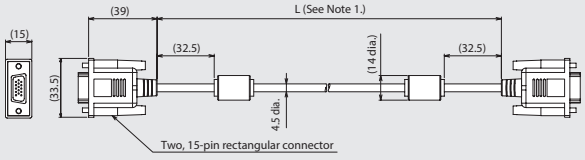
FZ-VPX



Note 1: cable is available in 2m/5m.

Monitor Cable

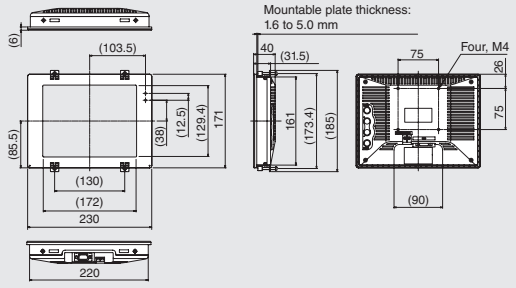
FZ-VM



Note 1: Cable is available in 2m/5m.

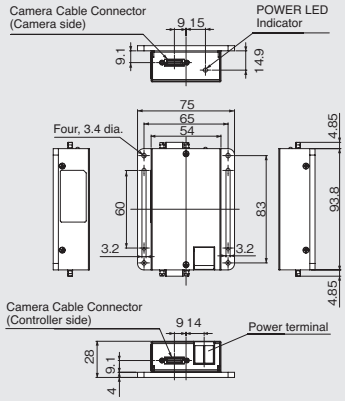
LCD Monitor

FZ-M08



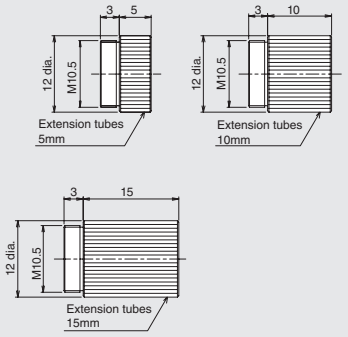
Camera Cable Extension Unit

FZ-VSJ



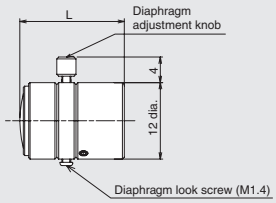
Extension Tubes for Small Camera

FZ-LESR



Lens for Small Camera

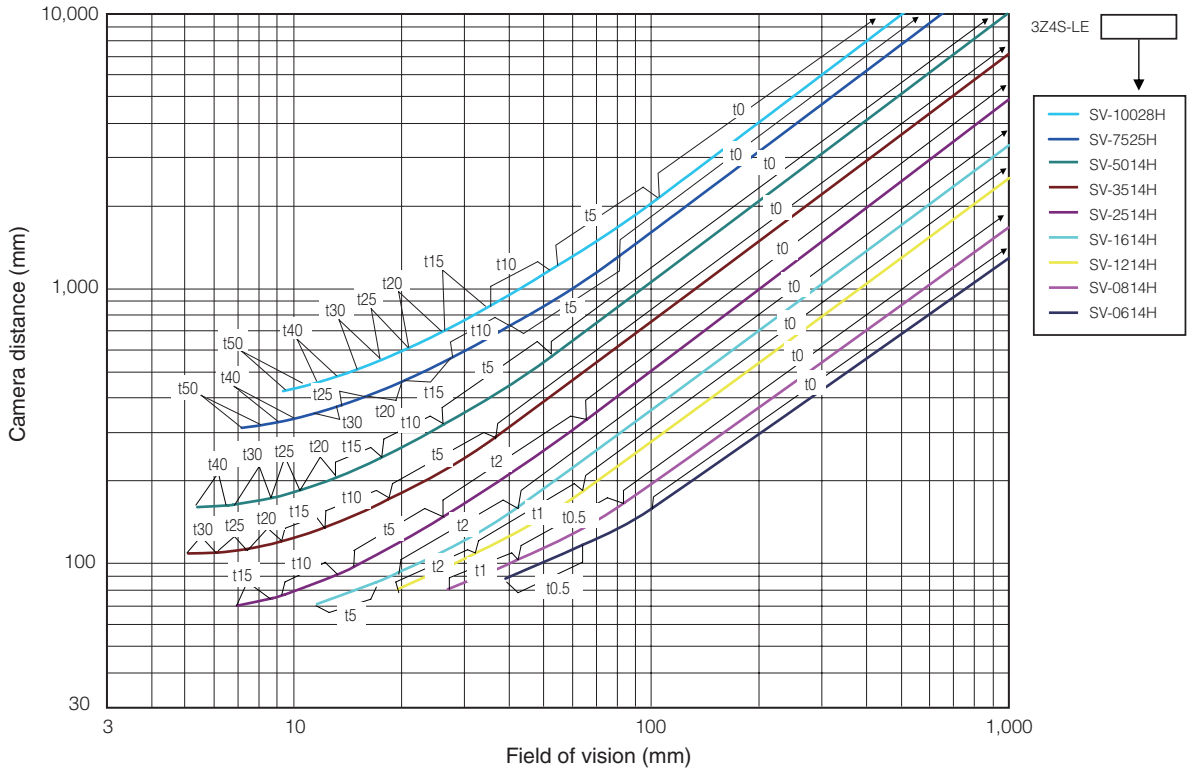
FZ-LES Series



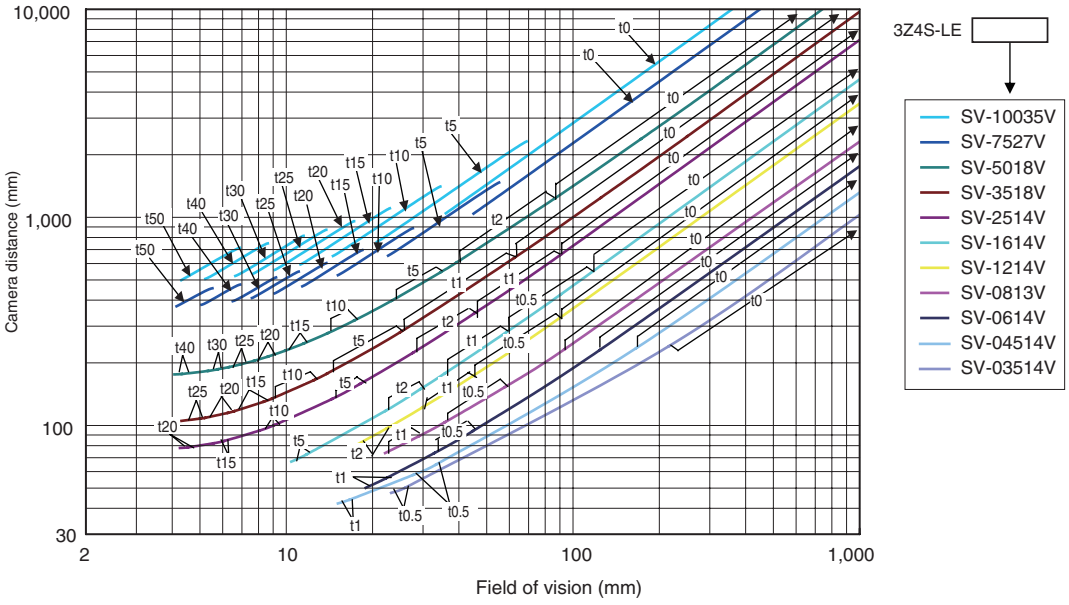
Lenses Model	Focal length	Brightness	Maximum outside diameter	Overall length
FZ-LES3	3 mm	F2.0	12 dia.	16.4 mm
FZ-LES6	6 mm	F2.0	12 dia.	19.7 mm
FZ-LES16	16 mm	F3.4	12 dia.	23.1 mm
FZ-LES30	30 mm	F3.4	12 dia.	25.5 mm

Optical Chart

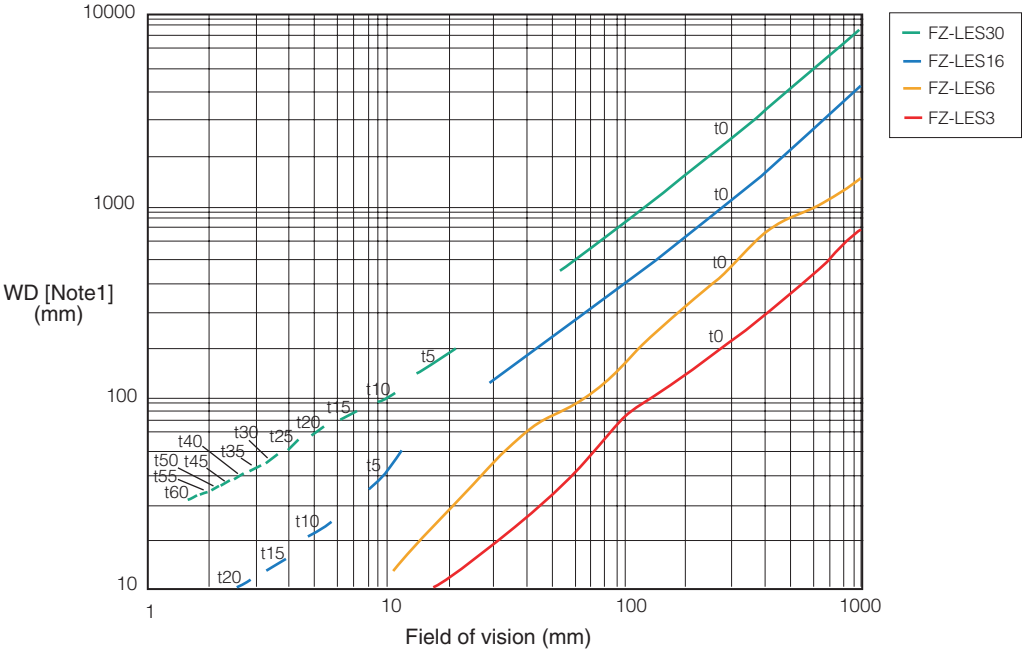
2 million-pixel digital camera FZ-S□2M



300,000-pixel High-speed camera FZ-SH□, and Digital camera FZ-S□



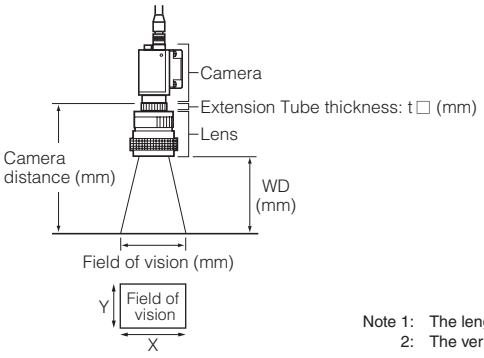
300,000-pixel small digital cameras FZ-SF□, FZ-SP□



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

■ Meaning of Optical Chart

The X axis of the optical chart shows the field of vision (mm) (See Note 1.),
and the Y axis of the optical chart shows the camera installation distance (mm) (See Note 2.).



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.