# OMRON

NEW

# Vision sensor with built-in LCD monitor

"Smart Sensor" ZFX-C



"Essential Innovation for Future Generations"

realrzing

# **Easy Vision Being Our Vision**

The Omron's new ZFX-C Smart Vision Sensor is a total Image Processing system that includes everything from a camera with an integrated light source to an image-processing unit.

With Omron's newly developed proprietary measurement algorithm, the parameter can be set through only a few steps involving the operation of a touch-panel color monitor.

This "Smart" user interface provides simplicity of usage giving anyone all they can need to perform a complete image enhancement.

The new technology and style of the ZFX-C paves the way to a new era of vision sensors.



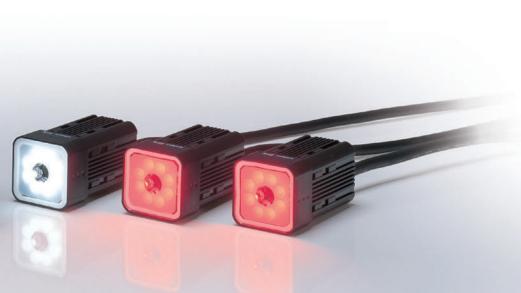
# "Smart Recipe" with condensed know-how World's first

Capturing the image processing know-how Omron has accumulated over many years, the world's first "Smart Recipe" has radically reduced setting up time allowing for greater productivity.

#### One-touch automatic setting

The essential skills for image processing are now packaged into Omron's unique algorithm. The setting that traditionally required much fumbling is now made easy with the "select from auto listed options" using recipes. Lighting setup, the longtime problem for image processing, and the tricky parameter details involved in measurement setup, can now be done automatically with just the flip of a switch.







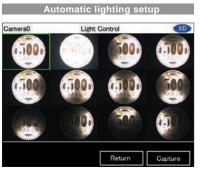
# Smart Recipe

Smart Recipe is on Omron's invention of 3-step setting procedure. By adopting a new algorithm to encapsulate "human know-how", the auto setup for lighting and measurement now possible. Anyone can rapidly perform a high level of image processing.

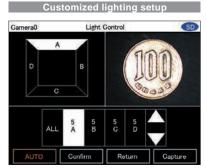


Patent pending

The know-how and trial and error that have been indispensable and required much time and effort up to now in lighting setup is now an automated process. By just selecting the best one from the candidate images automatically captured by changing the lighting pattern with the auto-lighting, anyone can easily find the optimal lighting. User can now easily determine settings for shiny work with high degrees of reflection and black monochrome work with low degrees of reflection, something very tricky before. In addition, when a more detailed setup is needed, the customized setup can be used to incorporate know-how.



With automatic lighting setup, user can simply select the best image from thumbnail of candidate images.



A more detailed set up is possible with the customized lighting setup while looking at the image.

#### Built-in lighting camera that enables an advanced automatic lighting



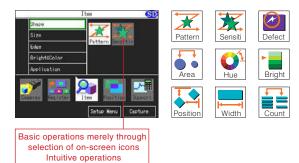
The Built-in lighting camera and improved controller brings about an even higher degree of automatic lighting. With this camera you can produce up to a maximum of 1296 patterns of reflective lighting making the chore of choosing lighting equipment unnecessary. The lighting setup can be managed as digital data so it is possible to store the optimal setup for each job, and it smoothly handles the changing of settings. It is also possible to fine-tune the customized setup can be added.





# Step2 Choose measurement icon

The measurement method can be specified by just choosing the icon from out of a total of 9 measurement items for different types of inspection.



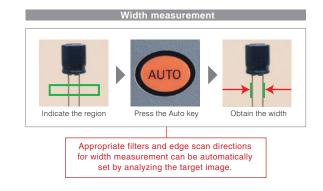


## Draw region, press and go

Just specify the region of interest and press Auto key and the system will determine the most suitable parameters for the target image.

Now anyone can easily perform a complex and advanced parameter setting which used to require special knowledge and cumbersome steps.

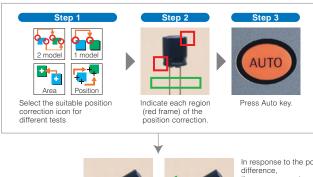
Customized setting is also possible by fine tuning the parameters automatically set up. The time required to set up parameters can be significantly reduced.



Easily adjusts position

# 3-step position correction

Even when the position of work changes due to the conveyer condition, the excellent position correction function can come into play allowing adjustment using the work contours, two stage position correction and so on. With the auto setup, position difference can be easily adjusted to enable stable measurement.







In response to the position difference, the measurement region is automatically adjusted.

# **Tailored** Measurement item

Including two shape measurement items, the system contains 5 categories and 9 types of Shape, Size, Edge, Bright and Hue, Application measurement items. It responds to the variety of inspection requirements in the manufacturing sites.

#### Shape measurement item

## Pattern search

#### Fastest in the industry

NEW

The shape measurement is a fundamental algorithm for image processing. By adopting a new image processor, the pattern search achieves a balance in the three factors of speed,

precision and stabilization, something that was an arduous task until now. It now supports a 360-degree revolving search and a sub-pixel processing of 1000 to 1 pixel units as well as a multi area searcher. The robust pattern search can respond to the multitude of inspects and measurements of any application.



A further improvement is the balance achieved in revolving searches that occur in pattern matching for a revolving work. The most time-consuming 360-degree revolving search can be performed with an excellent accuracy.

### Sensitive search

When it comes to the difficult processing of detecting small differences, the Omron's

unique sensitive search matches work at a smallest detail and in doing so makes such detection all the more possible.It resists variations in position and density to capture even the smallest detail in the complex patterns.



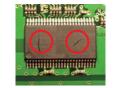
It is possible to detect even the smallest differences in the work

#### Application specific measurement item ---

Defect

It is used to detect smears, scratches, chipping and burrs on the work. Defects are displayed on the screen, which makes it ideal tool for visual inspection.





Almost indistinguishable Counts the number of scratches can be detected after enhancing contrast using the color filter.

#### Size measurement item

Region

Detects the existence of work within a region and measures its size based on the area to perform various classification.



LED illumination is determined based on the area of extracted color.

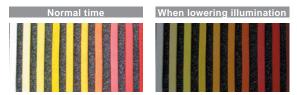




#### Bright and Hue measurement item

# Hue

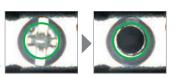
The three factors in color, i.e. hue, saturation and brightness value, are measured and digitalized. And whilst an accurate differentiation of the color is performed, it is also possible to measure the color variety with the deviation measurement function (with color camera connected).



The individual threshold for the hue, saturation and brightness value parameters can be set up so that even if one of them is different, it can be detected accurately and intensely. On the other hand, by expanding the range for the brightness value and saturation, and so on, it is possible to stabilize the color detection in the hue without any interference from illumination alterations.

## Bright

Measures the brightness within a region. It can be used for checking the presense of a component etc., by generating average density and density deviation values.



Based on the change in brightness, the presense of a screw (OK or NG) is determined.

#### Functions to support optimal measurements

#### Up to 32 regions

In one captured image, it is possible to measure a multiple up to 32 regions. When carrying out difficult inspection, it is possible to set-up a color filter and color extraction for each measurement item.

Screen registration function

#### Smear check Check

#### Measures three regions

It is possible to register the image used in the setup. When you use the live image during setup sometimes the set up is not correct due to position differences in the work. However, with the registered image saved in the SD memory card as a "master image for setup", it can be easily verified when abnormal measurements occur.

#### Edge measurement item

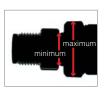
## Position

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The existence or not and the position of the edge is measured. Oblique edges can now be measured even in complex conditions and even more

complex conditions and even more accurate position measurements can be taken. The peak bottom measurement function that can accurately capture the edges is now supported.

## Width



The width of the edge is measured. By using the edge partitioning method, it is possible to measure the maximum and minimum width.



The number of edges inside the area is counted. Based on the number of edges on the pre-registered good model, it counts the edges in the area and determines the correctness.



Gray filtering setup using double screen

For each measurement item, it is possible to run 8 types of gray filtering such as expansion and contraction to enable stable measurements. Through the "setup while looking" option that makes it possible to check the preview, the optimal gray filtering can be selected.

#### Calculations function

It is possible to make arithmetical calculations for measurement values, and calculations involving general functions, trigonometry, geometrical functions and logical functions. It is possible to setup internal variables, and complex calculations can be carried out.

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# Visualized Controller

Smallest in class controller build in embedded LCD saves space and time.

# Visualized setting and monitoring

Smallest in class

Despite its small form factor, the enlarged screen significantly improves the visibility and the ease of operation. The method of operation can be selected from 3way - the touch pen, key pad or console.



#### **Rich interface support**

Automatically detects the connected camera and displays the appropriate menu. With rich selection of interface including parallel RS-232C/RS-422, USB 2.0, the extensibility is superior.







# **Intensive** camera solutions

8 types of cameras that can be selected for different types of work to achieve optimal measurement.

#### Built-in lighting camera Triple-speed camera (IP65)

Line up of 6 types of built-in lighting cameras that do not need lighting selection or setup. The color camera can respond to a wide range of work with a 5-150mm field of view. Through image compression and partial capturing, it can support a high-speed line.



#### C-mount camera unit NEW Triple-speed camera

This product line includes C-mount camera that can select the lens to match the field. It can be used in combination with optional lighting such as transmitted lighting, low angle lighting and bar lighting, etc. to support different inspection types.



#### Innovative triple-speed camera

#### Fastest in the industry

Performs fast transfer of 11.1ms that are 3 times faster than standard cameras and 1.5 times faster than high-speed cameras while maintaining a resolution of the whole screen. In addition, a super speed, minimum 3.2ms transfer is possible with image compressions and partial capturing.



#### Excellent ease of use

#### Flexible installation

Flexible installation supported for different mounting site conditions. It can be mounted on DIN rail as well as on the control panel surface. (Optional panel mount adapter available.)

#### Hybrid interface

wiring.





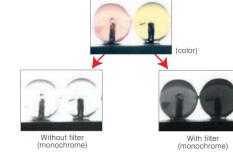
# advanced Color Engine

The ZFX-C's advanced auto-color processing ability makes stable and accurate measurements a reality, even for usually difficult to detect contrast and low lighting work.

# Automatic color filter

Even for images clearly distinguishable in color, when converted to monochrome the contrast tends to become low. Color filter analyzer automatically selects the optimal color filter (auto color filter) based on the image analysis result to adjust the contrast, to allow for stable image measurement. Any intermediate color can be arranged for the color filter using custom settings. Industry's first

NEW

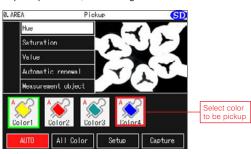


## Choose desired color

#### Simply select from the list of colors

It is now possible to run an automatic pickup of color, something that used to be a

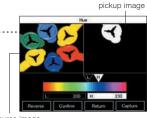
complex procedure, using simply the Auto key. The advanced color engine automatically detects the color distribution in the selected range and automatically lists up to 4 optional color pickup in the order of color area. After that, user can simply select the desired color to be pickup.



Specify the pickup area and press the Auto key to display 4 optional colors for pickup.

#### Fine-tuning by using dual-screen

The auto color pickup can fine-tune each of the hue, saturation and brightness value. Using double screens, the source image and the color pickup image can be compared and adjusted. This enables easy and stable pickup of colors with low illumination (traditionally difficult to pickup) and colors with large variation. The efficiency of operation is greatly increased.



Source image



# Versatile support tool

The concept behind Smart Recipe that eradicates the pain of image processing has been leveraged in the system ramp-up and deployment.

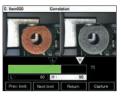
## Image storing and re-measurement

Stores up to 100 files of image data in the main memory without slowing measurement speed. Images data can be re-measured so even with a high-speed line, for example, the results of the measurements can be checked at leisure afterwards.



## On-site fine adjustment

On site variety adjustment of work is essential. Without returning to the menu mode, the measurement region, color contrast setup and so on can be tuned in adjust mode, using double screen to compare with the original image. The measurement results of the stored images can also be displayed so the unnecessary rejects can be efficiently reduced.



Variety adjustment can be controlled Simply using the adjust mode.

# Visualized monitoring and analysis

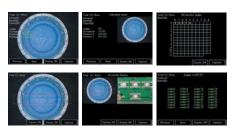
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NEW

Through a list/individual view of measurement results, and a logging monitor display, user can easily understand the measurement situation. The results display can be

chosen from 9 patterns including

individual results view (upper left, upper middle), lists of results/region view (lower left, lower middle), list of results/All results view (upper right), and data list view (bottom right). The results can be reviewed in detail which is useful for statistical analysis.



Password function

It is possible to set up a password that alters between operating mode and other. This protects against operational errors at the manufacturing site.

#### Display capture function

Display images can be captured and stored in the SD memory card. Useful for report documentation.

#### Ordering Information

#### Controllers

oontronera			
Appearance	Power supply	Circuit type	Model
1-camera model		NPN	ZFX-C10
	DC21.6 to 26.4V	PNP	ZFX-C15
2-camera model	DC21.01020.4V	NPN	ZFX-C20
		PNP	ZFX-C25

#### Cameras

Appearance	Тур	e	Setting distance	Sensing area	Model	Remarks	
		Managharana kara	34mm to 49mm	4.9mm x 4.9mm to 8.9mm x 8.9mm(variable)	ZFX-SR10 ZFX-SR10R (See note.)		
		Monochrome type	38mm to 194mm	9.8mm x 9.8mm to 49mm x 49mm(variable)	ZFX-SR50 ZFX-SR50R (See note.)		
	Como unita linkting		34mm to 49mm	4.9mm x 4.9mm to 8.9mm x 8.9mm(variable)	ZFX-SC10 ZFX-SC10R (See note.)		
	Camera with lighting	Color type	31mm to 187mm	9.8mm x 9.8mm to 49mm x 49mm(variable)	ZFX-SC50 ZFX-SC50W(IP67) ZFX-SC50R (See note.)	Cable length:2m	
(ZFX-SC50)			67mm to 142mm	49mm x 49mm to 89mm x 89mm(variable)	ZFX-SC90 ZFX-SC90W(IP67) ZFX-SC90R (See note.)		
			115mm to 227mm	89mm x 89mm to 148mm x 148mm(variable)	ZFX-SC150 ZFX-SC150W(IP67) ZFX-SC150R (See note.)		
	Company and	Monochrome type	The CCTV lens is s	selected according to the range of	ZFX-S	A Camera Cable	
	Camera only	Color type	detection and the ir	nstallation distance.	ZFX-SC	is required.	

Note. Equipped with a robot cable.

#### Camera Cables

Туре		Cable length	Model
	Normal type	3m	ZFX-VS 3M
Camera Cable (See note 1.)	Normal type	8m	ZFX-VS 8M
	Robot cable type	3m	ZFX-VSR
	Normal type	3m	ZFX-VSLA 3M
	(bending direction: A)	8m	ZFX-VSLA 8M
Right-angle Camera Cable	Robot cable type (bending direction: A)	3m	ZFX-VSRLA 3M
(See note 2.)	Normal type	3m	ZFX-VSLB 3M
	(bending direction: B)	8m	ZFX-VSLB 8M
	Robot cable type (bending direction: B)	3m	ZFX-VSRLB 3M

Note 1: It is necessary for ZFX-S and ZFX-SC. ZFX-SR\_/SC\_ is a cable drawing out type, it doesn't use it.

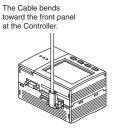
Note 2: Cable Bending Directions

Camera extension cable

Bending Direction A (Model numbers ending in "A")

The Cable bends downward at the Camera.





Bending Direction B (Model numbers ending in "B") The Cable bends upward at the Camera.



Туре

Accessories

Console

LCD Monitor

Panel Mount Adapters

Optional Lighting

(See note 1.)

The Cable bends toward the back panel at the Controller.



ZFX-KP 2M

ZFX-KP 5M

FZ-M08

ZFX-XPM ZFV-LTL01

ZFV-LTL02

ZFV-LTL04

Model

Туре		Cable length	Model
Camera	Normal type	3m	ZFX-XC3A (See note.1)
Extension	Normartype	8m	ZFX-XC8A (See note.1)
Cable	Robot cable type	3m	ZFX-XC3AR (See note.1)
	Extension cable	15m	ZFX-XC15BR
Camera Extension Cable	(See note 2.)	25m	ZFX-XC25BR
(long-distance	Digital equalizer (camera side)	0.2m	ZFX-XEQ01
type)	Digital equalizer (Controller side)	0.2m	ZFX-XEQ02

Note: The total combined length of the cables connected to the Controller and camera must not exceed 28.4 m (including the camera cable).

Note 1: Up to two camera extension cables can be connected to the camera cable as long as the total cable length between the controller and the camera does not exceed 19 m.

exceed 19 m. Note 2: Connect the ZFX-VS //VSR Camera Cable to the Camera and connect the ZFX-XC //XC //AR Extension Cable to the Controller.

#### Other cable

Туре	Cable length	Model
Parallel I/O Cable	2m	ZFX-VP 2M
	5m	ZFX-VP 5M
	2m	ZFX-XPT2A
RS-232C Cable	5m	ZFX-XPT5A
	15m	ZFX-XPT15A
	2m	ZFX-XPT2B
RS-422 Cable	5m	ZFX-XPT5B
	15 m	ZFX-XPT15B
Monitor Cable	2m	FZ-VM 2M
	5m	FZ-VM 5M
Special USB cable	1.8 m	ZFX-XUSB

 
 light source for through beam
 ZFV-LTF01

 CCTV Lenses /Extension Tubes
 3Z4S-LE series

 External Lighting
 FLV series

2m

5m

Note 1: It is possible to ZFX-SC50 and ZFX-SC90 use it.

bar lighting

bar double-lighting

bar low-angle lighting

#### Specifications

Item			ZFX-C20	ZFX-C25	ZFX-C10H	ZFX-C15H	ZFX-C10	ZFX-C15							
Number o	f connected camera	as	2		1	L		1							
Connecta	ble camera		ZFX-SR_/SC_/	S/SC											
Processin	g resolution			/SC_ is connected C is connected:60		I									
		LCD monitor	3.5" TFT color I	_CD (320 x 240 pi	xels)										
Display		Indicator	Trigger indicato Judgment indic	licator (color: gree r (color: blue): EN/ ator (color: orange color: red): ERRO	ABLE ): OUTPUT										
		Input	12 points (RES	ET, DSA, DI0 to 8,	TRIG)										
	Parallel interface	Output	23 points (OR,	ERROR, RUN, EN	IABLE, GATE, ST	GOUT0 to 1 (*1) , I	DO0 to 15)								
		Circuit type	NPN	NPN	PNP										
		USB2.0	1 port, FULL SI	PEED, MINI-B con	nector										
External	Serial interface	RS-232C	1 port, max. 11	5200 bps (cannot	be used simultane	ously with RS-422	interface)								
l/F		RS-422	1 port, max. 11	5200 bps (cannot	be used simultane	ously with RS-232	C interface)								
	Network communications	Ethernet	1 port, max. 115200 bps (cannot be used simultaneously with RS-232C interface) 1 port, 100BASE-TX/10BASE-T												
	Monitor output		Analog RGB output, 1 ch (resolution VGA: 640 x 480)												
	Memory card I/F		SD card slot 1 ch												
Operation	I/F		Touch panel, ke	ey operation, conso	ole connection										
	Number of registe	red banks	32 banks												
	Number of setup i	tems	128 items/1 bar	nk		32 items/1 bank									
		Shape inspection	Pattern search,	sensitive serch, fl	Pattern search,	sensitive searc									
Main	Measurement	Size inspection	Area, labeling				Area								
functions		Edge inspection	Position, width,	count, angle			Position, width,	count, angle							
	nems	Brightness/color inspection	Brightness, HU	E			Brightness, HUE								
		Application-based inspection	Defects, groupi	ng			Defects								
	Position correction	ı	1 model search	, 2 model search,	position, area, lab	eling, angle	1 model search position, area, a								
Additional	Image memory fu	nction	Max. 100 image	es (when 2 camera	as are connected,	50 images/camera		0							
functions	Analysis function		Logging monito	r											
Menu lanç	guage		Japanese/Engli												
		Power supply voltage	21.6 to 26.4 VD	C (including ripple	9)										
		Current consumption	1.5 A max.		1.2 A max.		1.0 A max.								
Ratings		Insulation resistance	Across all lead	wires and controlle	er case: 20 MΩ (by	/ 250 V megger)									
		Dielectric strength	Across all lead	wires and controlle	er case, 1000 VAC	, 50/60 Hz, 1 min									
		Ambient temperature range	Operating: 0 to	+ 50 C, Storage: -	15 to +60 C (with	no icing or conden	sation)								
		Ambient humidity range	Operating and	storage: 35% to 85	5% (with no conde	nsation)									
Operation	environment	Ambient atmosphere	No corrosive ga	ses allowed											
robustnes		Degree of protection	IP20 (IEC60529	9)											
		Vibration resistance (durability)	Vibration frequency: 10 to 150 Hz Single-amplitude: in0.35 mm Acceleration: 50 m/s <sup>2</sup> 10 times for 8 minutes in X, Y, and Z directons												
		Shock resistance (destructive)				/right, forward/bacl	(ward)								
Material			Case: Polycarb	onate (PC), Plate	face: PMMA										
Weight			Approx. 650 g				Approx. 620 g								
Accessori	es		Touch pen (ZFX-TP), Exhaust unit (ZFX-EU), Terminal block adapter (ZFX-XTB) Terminal block adapter mounting screws (4 p'ces) , Ferrite core (2 p'ces), Instruction Sheet, and Power connector												

\*1 Only STGOUT0 is functional on the ZFX-C10H/C15H/C10/C15.

#### Specifications

#### Cameras

Cameras														
Item		ZFX-SR10 /SR10R	ZFX-SR50 /SR50R	ZFX-SC10 /SC10R	ZFX-SC50 /SC50W /SC50R	ZFX-SC90 /SC90W /SC90R	ZFX-SC150 /SC150W /SC150R							
D	ange (H x V) etection range	4.9 mm x 4.9 mm to 8.9 mm x 8.9 mm (variable)	9.8 mm x 9.8 mm to 49 mm x 49 mm (variable)	4.9 mm x 4.9 mm to 8.9 mmx 8.9 mm (variable)	9.8 mm x 9.8 mm to 49 mm x 49 mm (variable)	49 mm x 49 mm to 89 mm x 89 mm (variable)	89 mm x 89 mm to 148 mm x 148 mm (variable)							
Setting dist		34 mm to 49 mm	38 mm to 194 mm	34 mm to 49 mm	31 mm to 187 mm	67 mm to 142 mm	115 mm to 227 mm							
Relationsh setting dist detection ra	ip between ance and	Setting distance (L) 49 mm 4 mm 4.9mm 8.9mm Detection range (H)	Setting distance (L) 194 38 mm 9.8mm 49mm Detection range (H)	Setting distance (L) 49 mm 4.9mm 4.9mm 8.9mm Detection range (H)	Setting distance (L) 187 31 9.8mm 49mm Detection range (H)	Setting distance (L) 142 67 mm 49mm 89mm Detection range (H)	Setting distance (L)							
Image cap	ure element	All-pixel capt transfe 1/3" CCD (m	r type	All-p	ixel capture inter-line tra	ansfer type 1/3" CCD (c	color)							
Effective n	umber of pixels	659(H) x 494 (V)												
Pixel size		7.4 μm (H) x 7.4 μm (V)												
Shutter spe	ed													
Partial fund (partial capt		OFF 1/2 partial, 1/4 partial												
Image rate	function	Fine, Normal, High speed Not available												
Frame rate (at capture o	of entire screen)	90 fps												
Lens mour	t	(with Lens)												
	Lighting method	Pulse lighting												
	LED	Red	LED		White LED									
	Туре			Direct lighti	-									
Lighting	Guide light	Available (center, m	neasurement region)		Not av	ailable								
	Optional lighting I/F	N	ot available			FV-LT Series)	Not available							
	Indicator Class			Risk Group 1 (IE	C62471-2)									
	Power supply voltage (supplied from Controller)		15 VDC			15 VDC, 48 VDC								
Ratings	Current consumption		Approx. 200 mA		4 (includ	50 mA (15 VDC: approx 8 VDC: approx. 200 m/ ing current consumption ional lighting is connec	A) n when							
	Ambient temperature range		Operating: 0 to + 4	0 C, Storage: -20 to +65	age: -20 to +65 C (with no icing or condensation)									
	Ambient humidity range		Operating	and storage: 35% to 85	% (with no condensation	n)								
Operation	Ambient atmosphere			No corrosive gase										
environment	Degree of protection	IP65 (IE	C60529)	ZFX-S	,	ZFX-SCW: IP67 (IEC	(60529)							
robustness	Dielectric strength			1000 VAC 50 Hz/60	) Hz 1 min									
	Vibration resistance (durability)	1	0 to 150 Hz Single-amp	litude 0.35 mm 10 times	s for 8 min each in X, Y,	and Z directions								
	Shock resistance (destructive)		150 m/s <sup>2</sup> 3 times e	ach in 6 directions (up/o	down, left/right, forward/	backward)								
Connectior	n method			Cable built-in type (cab	le length: 2 m)									
Cable type				-SCOOR/SCOOR/SF -SCOOR/SROR: Ro										
Material		Ci	ase: ABS, mounting fixt FX-SR10R/SR50R/SC1											
Weight		ZFX-SR10/SR5( ZFX-SR10R/SR ZFX-SC50/SC5( ZFX-SR50R: Ap	ZFX-SC90/SC90W: Approx. 300 g (including mounting fixture and cable) ZFX-SC90R: Approx. 400 g (including mounting fixture and cable)	Approx. 600 g (including mounting fixture and cable)										
Accessorie	S	ZFX-SR10/SR50/SC10:       ZFX-SC50/SC50W/SC90/SC90W:         Mounting fixture (ZFV-XMF) 1 p'ce, Ferrite core 2 p'ce,       Mounting fixture (ZFV-XMF2) 1 p'ce,         Instruction Sheet       Ferrite core 2 p'ces,         Mounting fixture (ZFV-XMF3) 1 set, Ferrite core 2 p'ces,       Mounting fixture (ZFV-XMF4) 1 set,         Instruction Sheet       Mounting fixture (ZFV-XMF4) 1 set,												

#### Specifications

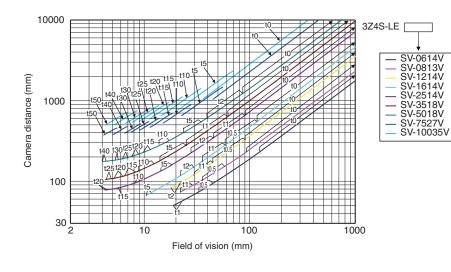
#### Cameras

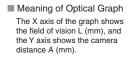
ameras									
Item		ZFX-S (monochrome type)	ZFX-SC (color type)						
D	ange (H x V) etection range $\downarrow$ V $\downarrow$ V tance (L)	The CCTV lens is selecte and the setting distance.	d according to the detection rang						
Relationshi setting dista detection ra	ance and								
Image capt	ture element	All-pixel capture inter-line transfer type 1/3" CCD (monochrome)	All-pixel capture inter-line transfer type 1/3" CCD (color)						
Effective nu	umber of pixels	659(H) ×	( 494 (V)						
Pixel size			κ 7.4 μm (V)						
Shutter spe		1/170s to	1/20000s						
Partial funct (partial captu		Not available	1/2 partial, 1/4 partial						
Image rate	function	Fine, Normal, High speed	Not available						
	of entire screen)		fps						
Lens moun		C m	ount						
	Lighting method LED								
	Туре	_	_						
Lighting	Guide light								
	Optional lighting I/F	Not av	ailable						
	Power supply voltage (supplied from Controller)	15 VDC,	48 VDC						
Ratings	Current consumption	Approx.	160 mA						
	Ambient temperature range	/ 14 · · ·	0 to + 50°C, 15 to +65°C r condensation)						
	Ambient humidity range	Operating and storage: 35% t	o 85% (with no condensation)						
Operation	Ambient atmosphere	No corrosive	gases allowed						
environment	Degree of protection	IP20 (IE							
robustness	Dielectric strength		lz/60Hz 1 min						
	Vibration resistance (durability)		, Y, and Z directions						
	Shock resistance (destructive)	150 m/s <sup>2</sup> 3 times e (up/down, left/right,	ach in 6 directions forward/backward)						
Connection	n method		nnection type K-VS/VSR required)						
Cable type		ZFX-SC X/SC X/SR X Normal cable							
Material		Case: Aluminum die-cast, Cover: Zinc-plated copper plate 0.5 mm thick, Camera mounting base:ABS							
Weight		Approz	x. 80 g						
Accessorie	s	Instructio	on Sheet						

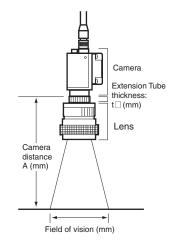
#### CCTV Lenses

Optical Graph

If using the ZFX-S/SC Camera (Camera only), refer to the optical graph below and select the lens and Extension Tubes. The lens to be selected will depend on the size of the measurement object and the camera distance.







#### CCTV Lenses

Lens model	3Z4S-LE SV-0614V	3Z4S-LE SV-0813V	3Z4S-LE SV-1214V	3Z4S-LE SV-1614V	3Z4S-LE SV-2514V	3Z4S-LE SV-3518V	3Z4S-LE SV-5018V	3Z4S-LE SV-7527V	3Z4S-LE SV-10035V
Appearance	29 dia.	28 dia.	29 dia.	29 dia.	29 dia.	29 dia.	32 dia. 37.0	32 dia. 42.0	32 dia. 43.9
Focal length	6 mm	8 mm	12 mm	16 mm	25 mm	35 mm	50mm	75 mm	100 mm
Brightness	F1.4	F1.3	F1.4	F1.4	F1.4	F1.8	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 SV-EXR
Contents	Set of seven tubes (0.5 mm, 1.0 mm, 2.0 mm, 5 mm, 10 mm, 20 mm, and 40 mm) Maximum outer diameter: 30 mm

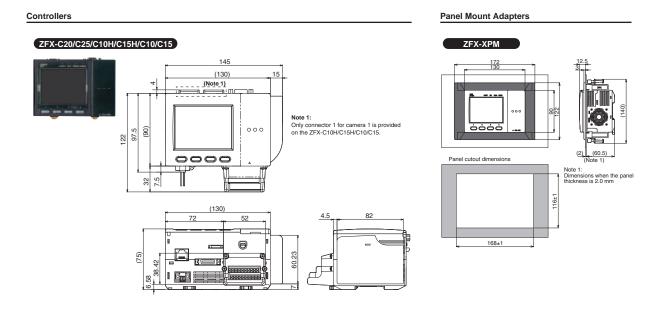
\*Do not use the 0.5-mm, 1.0-mm, and 2.0-mm Extension

Tubes next to each other. These Extension Tubes are placed over the threaded section of the Lens or other Extension Tube. If more than one them are used together, the connection of the threaded section may not be secure.

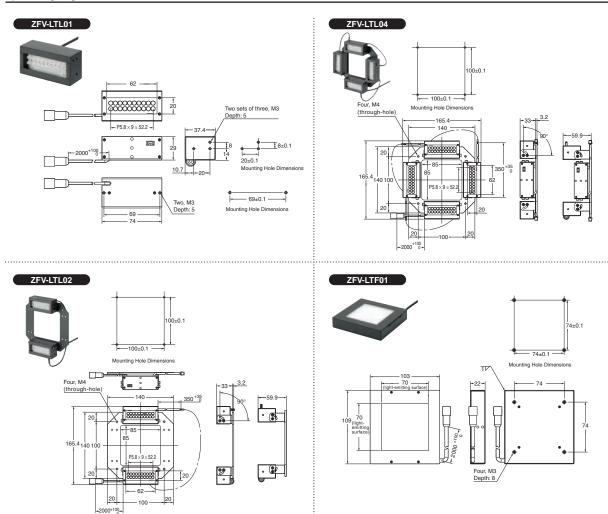
\*Reinforcement is required to protect against vibration when Extension Tubes exceeding 30 mm are used.

#### External Dimensions(Unit:mm)

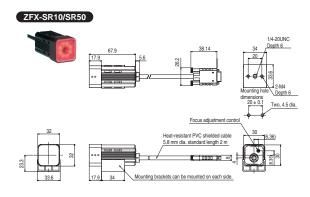
Tolerance class IT16 applies to dimensions in this datasheet unless otherwise specified.



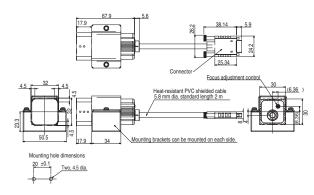
**Optional Lighting** 

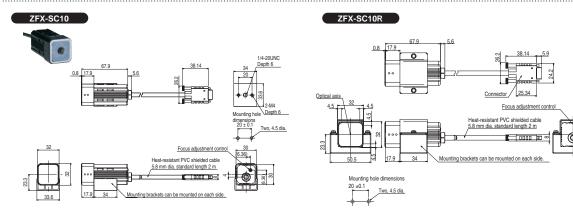


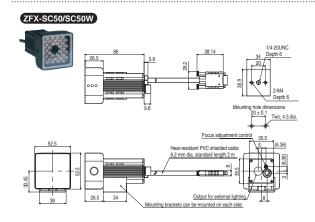
#### Cameras



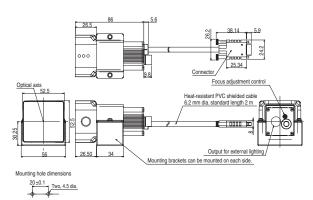
ZFX-SR10R/SR50R







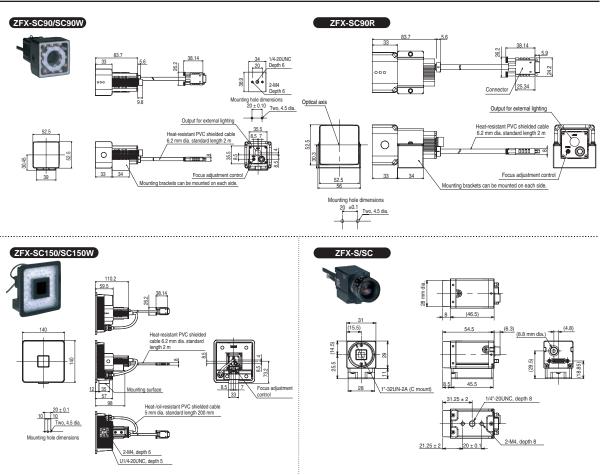
ZFX-SC50R



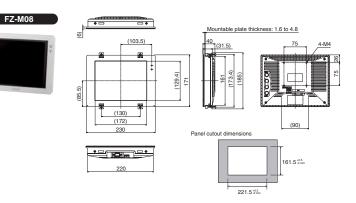


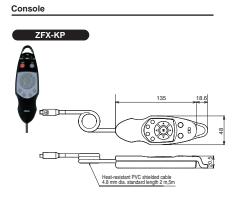
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LCD Monitor





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