OMRON

NEW

Vision sensor with built-in LCD monitor

"Smart Sensor" ZFX-C



"Essential Innovation for Future Generations"

realizing

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

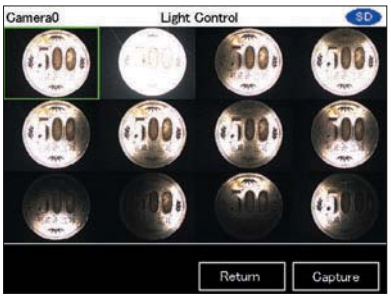
Smart Recipe is on Omron's invention of 3-step setting procedure.
By adopting a new algorithm to encapsulate “human know-how”, the auto setup for lighting and measurement now possible.
Anyone can rapidly perform a high level of image processing.

Step1 Choose best lighting

Patent pending

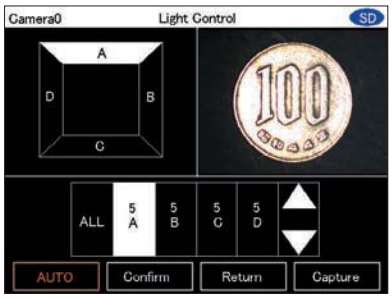
The know-how and trial and error that have been indispensable and required much time and effort up to now in lighting setup is now an automated process. By just selecting the best one from the candidate images automatically captured by changing the lighting pattern with the auto-lighting, anyone can 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.

Automatic lighting setup



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

Customized lighting setup



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.

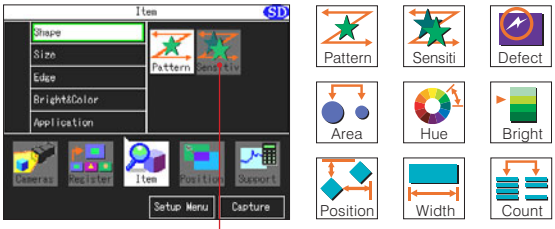




Smart sensor
ZFX-C

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.



Basic operations merely through selection of on-screen icons
Intuitive operations

Step3 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.

Width measurement



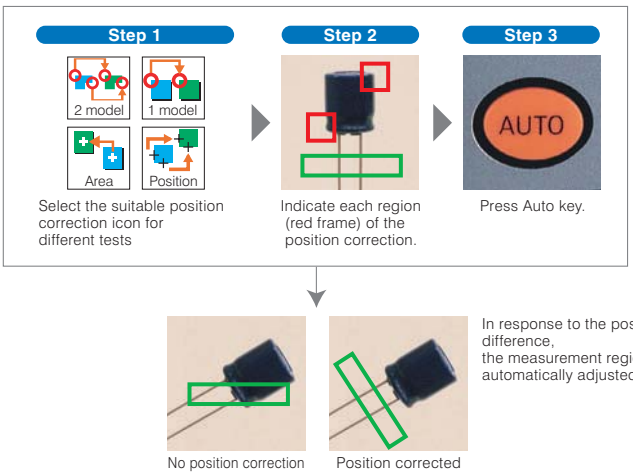
Indicate the region | Press the Auto key | Obtain the width

Appropriate filters and edge scan directions for width measurement can be automatically set by analyzing the target image.

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.



Tailored Measurement item

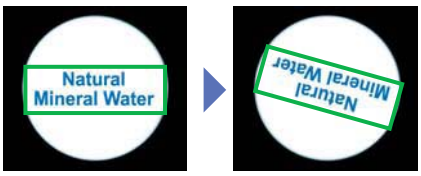
Including two shape measurement items, the system contains 5 categories and 9 types of Shape, Size, Edge, Bright and Hue, Application measurement items.
It responds to the variety of inspection requirements in the manufacturing sites.

Shape measurement item

Pattern search

Fastest in the industry

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

NEW

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.

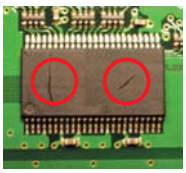
Application specific measurement item

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 scratches can be detected after enhancing contrast using the color filter.

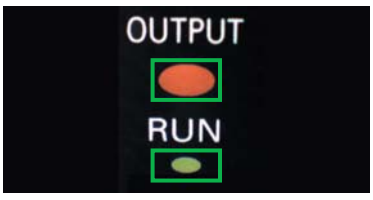


Counts the number of scratches

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.





Smart sensor

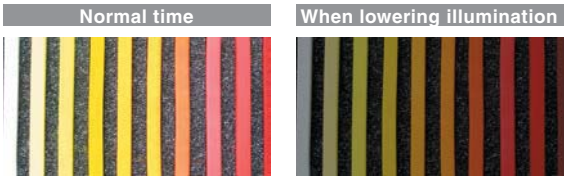
ZFX-C

Bright and Hue measurement item

Hue

NEW

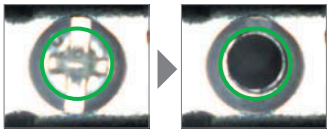
The three factors in color, i.e. hue, saturation and brightness value, are measured and digitalized. And whilst an accurate differentiation of the color is performed, it is also possible to measure the color variety with the deviation measurement function (with color camera connected).



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

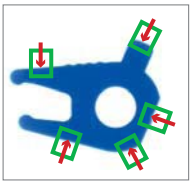
Measures the brightness within a region. It can be used for checking the presense of a component, etc., by generating average density and density deviation values.



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

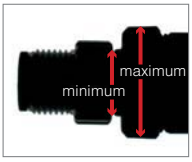
Edge measurement item

Position



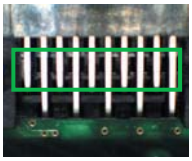
The existence or not and the position of the edge is measured. Oblique edges can now be measured even in complex conditions and even more accurate position measurements can be taken. The peak bottom measurement function that can accurately capture the edges is now supported.

Width



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

Count

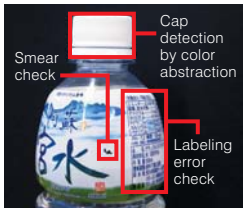


The number of edges inside the area is counted. Based on the number of edges on the pre-registered good model, it counts the edges in the area and determines the correctness.

■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.



Measures three regions.

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.



Screen registration function

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.

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.



Visualized Controller

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

Visualized setting and monitoring

Smallest in class

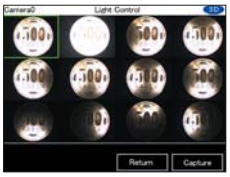
Despite its small form factor, the enlarged screen significantly improves the visibility and the ease of operation. The method of operation can be selected from 3way - the touch pen, key pad or console.



Enlarged screen enables wide range of views



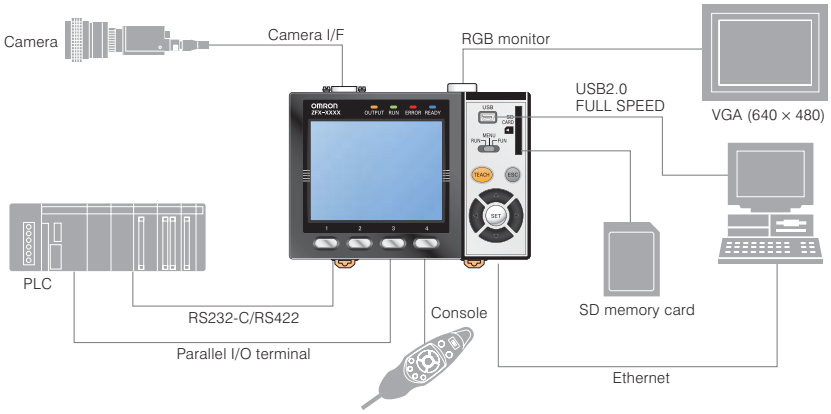
Simple setting with large screen



Overview with thumbnail screen

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.







Smart sensor
ZFX-C

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.



ZFX-SR10 (monochrome)
Field of view 5 › 9 mm



ZFX-SC50 (color)
Field of view 10 › 50 mm
(IP67 model available)



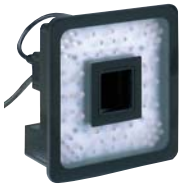
ZFX-SR50 (monochrome)
Field of view 10 › 50 mm



ZFX-SC90 (color)
Field of view 50 › 90 mm
(IP67 model available)



ZFX-SC10 (color)
Field of view 5 › 9 mm



ZFX-SC150 (color)
Field of view 80 › 150 mm
(IP67 model available)

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.



ZFX-SC
(color)

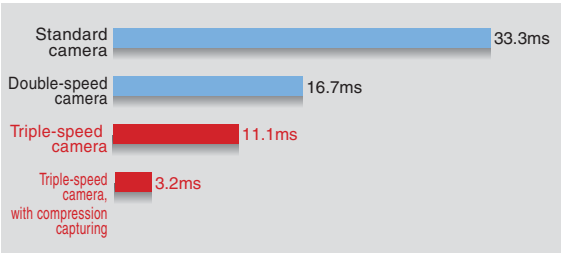


ZFX-S
(monochrome)

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

A new interface that supports both parallel I/O and terminal platform to dramatically improve the ease of wiring.



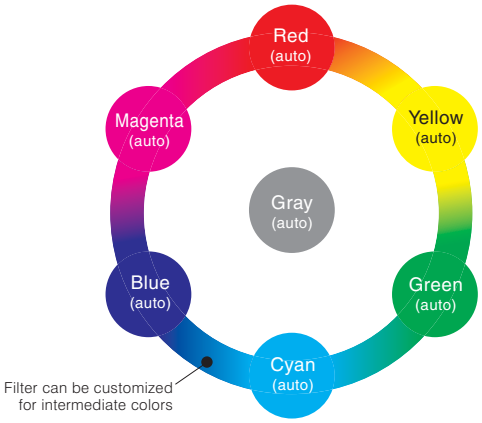


advanced Color Engine

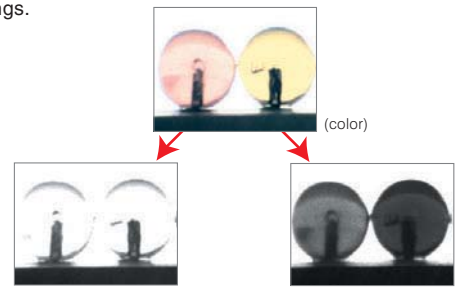
The ZFX-C's advanced auto-color processing ability makes stable and accurate measurements a reality, even for usually difficult to detect contrast and low lighting work.

Automatic color filter

Industry's first



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.

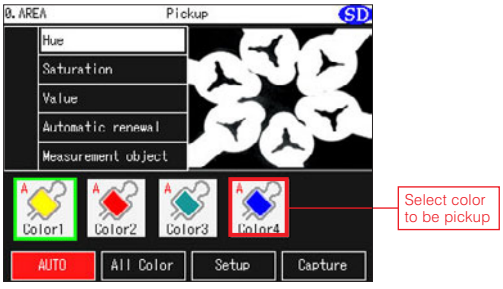


Choose desired color

NEW

Simply select from the list of colors

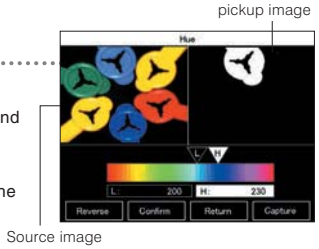
It is now possible to run an automatic pickup of color, something that used to be a complex procedure, using simply the Auto key. The advanced color engine automatically detects the color distribution in the selected range and automatically lists up to 4 optional color pickup in the order of color area. 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.



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.

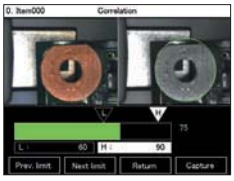


NG images can be grouped and stored separately.

On-site fine adjustment

NEW

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.

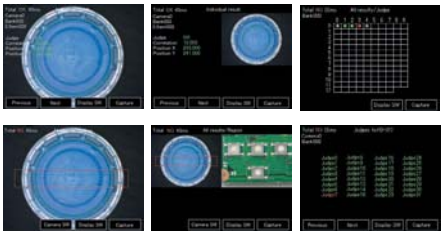


Variety adjustment can be controlled Simply using the adjust mode.

Visualized monitoring and analysis

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

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

Cameras

Appearance	Type		Setting distance	Sensing area	Model	Remarks
 (ZFX-SC50)	Camera with lighting	Monochrome type	34mm to 49mm	4.9mm x 4.9mm to 8.9mm x 8.9mm(variable)	ZFX-SR10 ZFX-SR10R (See note.)	Cable length:2m
			38mm to 194mm	9.8mm x 9.8mm to 49mm x 49mm(variable)	ZFX-SR50 ZFX-SR50R (See note.)	
		Color type	34mm to 49mm	4.9mm x 4.9mm to 8.9mm x 8.9mm(variable)	ZFX-SC10 ZFX-SC10R (See note.)	
			31mm to 187mm	9.8mm x 9.8mm to 49mm x 49mm(variable)	ZFX-SC50 ZFX-SC50W(IP67) ZFX-SC50R (See note.)	
			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.)	
	Camera only	Monochrome type	The CCTV lens is selected according to the range of detection and the installation distance.		ZFX-S	———
		Color type			ZFX-SC	

Note. Equipped with a robot cable.

Camera Cables

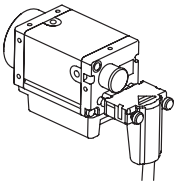
Type		Cable length	Model
Camera Cable (See note 1.)	Normal type	3m,8m	ZFX-VS
	Robot cable type	3m	ZFX-VSR
Right-angle Camera Cable (See note 2.)	Normal type (bending direction: A)	3m,8m	ZFX-VSLA 3M/8M
	Robot cable type (bending direction: A)	3m	ZFX-VSRLA 3M
	Normal type (bending direction: B)	3m,8m	ZFX-VSLB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

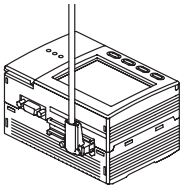
Note 2: Cable Bending Directions

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

The Cable bends downward at the Camera.

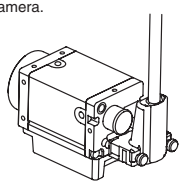


The Cable bends toward the front panel at the Controller.

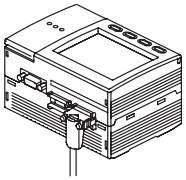


Bending Direction B
(Model numbers ending in "B")

The Cable bends upward at the Camera.



The Cable bends toward the back panel at the Controller.



Camera extension cable

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

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.

Note 2: The total combined length of the cables connected to the Controller and camera must not exceed 28.4 m (including the camera cable).

Other cable

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

Accessories

Type		Model
Console		ZFX-KP (2m / 5m)
LCD Monitor		FZ-M08
Panel Mount Adapters		ZFX-XPM
Optional Lighting (See note 1.)	bar lighting	ZFV-LTL01
	bar double-lighting	ZFV-LTL02
	bar low-angle lighting	ZFV-LTL04
	light source for through beam	ZFV-LTF01
CCTV Lenses /Extension Tubes		3Z4S-LE series
External Lighting		3Z4S-LT series
Strobe Controller (See note 2.)		Manufactured by MORITEX Corporation 3Z4S-LT MLEK-C100E1TSX

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

Note 2: It is possible to ZFX-S and ZFX-SC use it. It uses it so that the controller may control an external lighting. The Strobe Controller cannot be connected when using a Right-angle Camera Cable.

Specifications

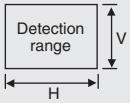
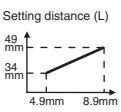
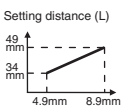
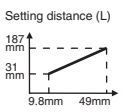
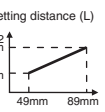
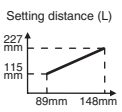
Controllers

Item			ZFX-C20	ZFX-C25	ZFX-C10H	ZFX-C15H	ZFX-C10	ZFX-C15
Number of connected cameras			2		1			
Connectable camera			ZFX-SR_/SC_/S/SC					
Processing resolution			When ZFX-SR_/SC_ is connected:464 (H) x464 (V) When ZFX-S/SC is connected:608 (H) x464 (V)					
Display		LCD monitor	3.5" TFT color LCD (320 x 240 pixels)					
		Indicator	"Measuring" indicator (color: green): RUN Trigger indicator (color: blue): ENABLE Judgment indicator (color: orange): OUTPUT Error indicator (color: red): ERROR					
External I/F	Parallel interface	Input	12 points (RESET, DSA, DI0 to 8, TRIG)					
		Output	23 points (OR, ERROR, RUN, ENABLE, GATE, STGOUT0 to 1 (*1) , DO0 to 15)					
		Circuit type	NPN	PNP	NPN	PNP	NPN	PNP
	Serial interface	USB2.0	1 port, FULL SPEED, MINI-B connector					
		RS-232C	1 port, max. 115200 bps (cannot be used simultaneously with RS-422 interface)					
		RS-422	1 port, max. 115200 bps (cannot be used simultaneously with RS-232C interface)					
	Network communications	Ethernet	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, key operation, console connection					
Main functions	Number of registered banks		32 banks					
	Number of setup items		128 items/1 bank				32 items/1 bank	
	Measurement items	Shape inspection	Pattern search, sensitive serch, flexible search, grapgic search				Pattern search, sensitive search	
		Size inspection	Area, labeling				Area	
		Edge inspection	Position, width, count, angle				Position, width, count, angle	
		Brightness/color inspection	Brightness, HUE				Brightness, HUE	
		Application-based inspection	Defects, grouping				Defects	
	Position correction		1 model search, 2 model search, position, area, labeling, angle				1 model search, 2 model search, position, area, angle	
Additional functions	Image memory function		Max. 100 images (when 2 cameras are connected, 50 images/camera)					
	Analysis function		Logging monitor				---	
Menu language			Japanese/English (can be switched)					
Ratings		Power supply voltage	21.6 to 26.4 VDC (including ripple)					
		Current consumption	1.5 A max.		1.2 A max.		1.0 A max.	
		Insulation resistance	Across all lead wires and controller case: 20 MΩ (by 250 V megger)					
		Dielectric strength	Across all lead wires and controller case, 1000 VAC, 50/60 Hz, 1 min					
Operation environment robustness		Ambient temperature range	Operating: 0 to + 50˚C, Storage: -15 to +60˚C (with no icing or condensation)					
		Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)					
		Ambient atmosphere	No corrosive gases allowed					
		Degree of protection	IP20 (IEC60529)					
		Vibration resistance (durability)	Vibration frequency: 10 to 150 Hz Single-amplitude: in0.35 mm Acceleration: 50 m/s^2 10 times for 8 minutes in X, Y, and Z directons					
		Shock resistance (destructive)	150 m/s^2 3 times each in 6 directions (up/down, left/right, forward/backward)					
Material			Case: Polycarbonate (PC), Plate face: PMMA					
Weight			Approx. 650 g				Approx. 620 g	
Accessories			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

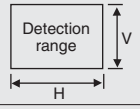
Cameras

Item		ZFX-SR10 /SR10R	ZFX-SR50 /SR50R	ZFX-SC10 /SC10R	ZFX-SC50 /SC50W /SC50R	ZFX-SC90 /SC90W /SC90R	ZFX-SC150 /SC150W /SC150R
Detection range (H x V) 		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 distance (L)		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
Relationship between setting distance and detection range							
Image capture element		All-pixel capture inter-line transfer type 1/3" CCD (monochrome)		All-pixel capture inter-line transfer type 1/3" CCD (color)			
Effective number of pixels		659(H) x 494 (V)					
Pixel size		7.4 µm (H) x 7.4 µm (V)					
Shutter speed		1/170s to 1/20000s					
Partial function (partial capture)		OFF		1/2 partial, 1/4 partial			
Image rate function		Fine, Normal, High speed		Not available			
Frame rate (at capture of entire screen)		90 fps					
Lens mount		—— (with Lens)					
Lighting	Lighting method	Pulse lighting					
	LED	Red LED		White LED			
	Type	Direct lighting					
	Guide light	Available (center, measurement region)		Not available			
	Optional lighting I/F	Not available			Available (ZFV-LT Series)		Not available
	Indicator Class*1	——		Class 1	Class 2	Class 2	Class 1
Ratings	Power supply voltage (supplied from Controller)	15 VDC			15 VDC, 48 VDC		
	Current consumption	Approx. 200 mA			Approx. 350 mA (15 VDC: approx. 150 mA, 48 VDC: approx. 200 mA) (including current consumption when optional lighting is connected)		
Operation environment robustness	Ambient temperature range	Operating: 0 to + 40˚C, Storage: -20 to +65˚C (with no icing or condensation)					
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)					
	Ambient atmosphere	No corrosive gases allowed					
	Degree of protection	IP65 (IEC60529)		ZFX-SC___: IP65 (IEC60529), ZFX-SC___W: IP67 (IEC60529)			
	Dielectric strength	1000 VAC 50 Hz/60 Hz 1 min					
	Vibration resistance (durability)	10 to 150 Hz Single-amplitude 0.35 mm 10 times for 8 min each in X, Y, and Z directions					
	Shock resistance (destructive)	150 m/s^2 3 times each in 6 directions (up/down, left/right, forward/backward)					
Connection method		Cable built-in type (cable length: 2 m)					
Cable type		ZFX-SC□□□/SC□□□W/SR□□: Normal cable ZFX-SC□□□R/SR□□R: Robot cable					
Material		ZFX-SR10/SR50/SC10/SC50/SC50W/SC90/SC90W/SC150/SC150W/SC150R: Case: ABS, mounting fixture: PBT ZFX-SR10R/SR50R/SC10R/SC50R/SC90R: Case: ABS, Mounting fixture (base): Aluminum, Mounting fixture (bracket): Stainless steel					
Weight		ZFX-SR10/SR50/SC10: Approx. 200 g (including mounting fixture and cable) ZFX-SR10R/SR50R/SC10R: Approx. 270 g (including mounting fixture and cable)			ZFX-SC50/SC50W: Approx. 270 g (including mounting fixture and cable) ZFX-SC50R: Approx. 400 g (including mounting fixture and cable)	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)
Accessories		ZFX-SR10/SR50/SC10: Mounting fixture (ZFV-XMF) 1 p'ce, Ferrite core 2 p'ce, Instruction Sheet ZFX-SR10R/SR50R/SC10R: Mounting fixture (ZFV-XMF3) 1 set, Ferrite core 2 p'ces, Instruction Sheet			ZFX-SC50/SC50W/SC90/SC90W: Mounting fixture (ZFV-XMF2) 1 p'ce, Ferrite core 2 p'ces, Warning label 1, Instruction Sheet ZFX-SC50R/90R: Mounting fixture (ZFV-XMF4) 1 set, Ferrite core 2 p'ces, Warning label 1, Instruction Sheet		Ferrite core 2 p'ces, Instruction Sheet

*1: Applicable standards IEC60825-1:1993 +A1:1997 +A2:2001, EN60825-1:1994 +A2:2001 +A1:2002

Specifications

Cameras

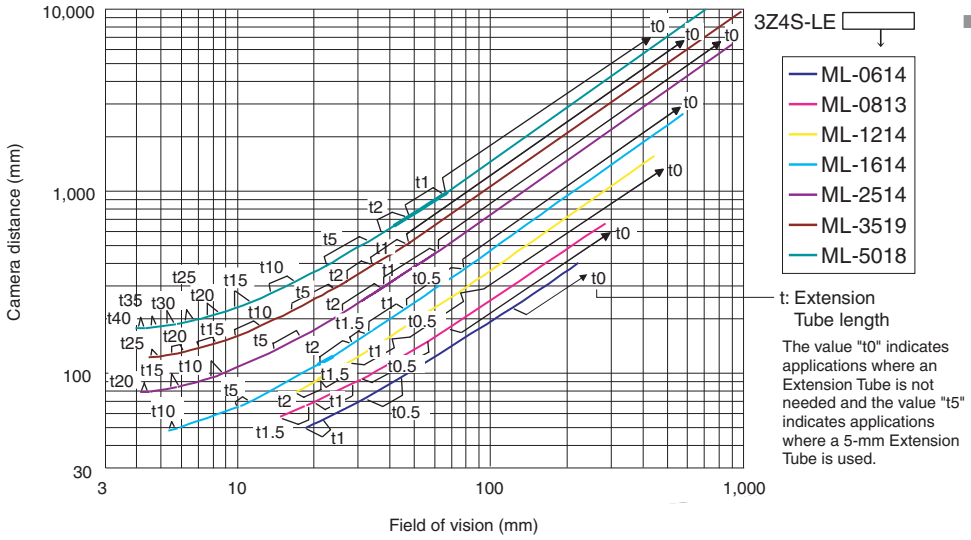
Item		ZFX-S (monochrome type)	ZFX-SC (color type)
Detection range (H x V) 		The CCTV lens is selected according to the detection range and the setting distance.	
Setting distance (L)			
Relationship between setting distance and detection range			
Image capture element		All-pixel capture inter-line transfer type 1/3" CCD (monochrome)	All-pixel capture inter-line transfer type 1/3" CCD (color)
Effective number of pixels		659(H) x 494 (V)	
Pixel size		7.4 µm (H) x 7.4 µm (V)	
Shutter speed		1/170s to 1/20000s	
Partial function (partial capture)		Not available	1/2 partial, 1/4 partial
Image rate function		Fine, Normal, High speed	Not available
Frame rate (at capture of entire screen)		90 fps	
Lens mount		C mount	
Lighting	Lighting method	——	
	LED		
	Type		
	Guide light		
	Optional lighting I/F	Available External lighting: 3Z4S-LT Series Flash Controller: made by Moritex Corporation 3Z4S-LT MLEK-C100E1TSX	
	Indicator Class*1	——	
Ratings	Power supply voltage (supplied from Controller)	15 VDC, 48 VDC	
	Current consumption	Approx. 160 mA	
Operation environment robustness	Ambient temperature range	Operating: 0 to + 50˚C, Storage: -25 to +65˚C (with no icing or condensation)	
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)	
	Ambient atmosphere	No corrosive gases allowed	
	Degree of protection	IP20 (IEC60529)	
	Dielectric strength	500VAC 50 Hz/60Hz 1 min	
	Vibration resistance (durability)	10 to 150 Hz Single-amplitude 0.35 mm 10 times for 8 min each in X, Y, and Z directions	
	Shock resistance (destructive)	150 m/s^2 3 times each in 6 directions (up/down, left/right, forward/backward)	
Connection method		Connector connection type (camera cable ZFX-VS/VSR required)	
Cable type		ZFX-SC□□□/SC□□□W/SR□□: Normal cable ZFX-SC□□□R/SR□□R: Robot cable	
Material		Case: Aluminum die-cast, Cover: Zinc-plated copper plate 0.5 mm thick, Camera mounting base:ABS	
Weight		Approx. 80 g	
Accessories		Instruction Sheet	

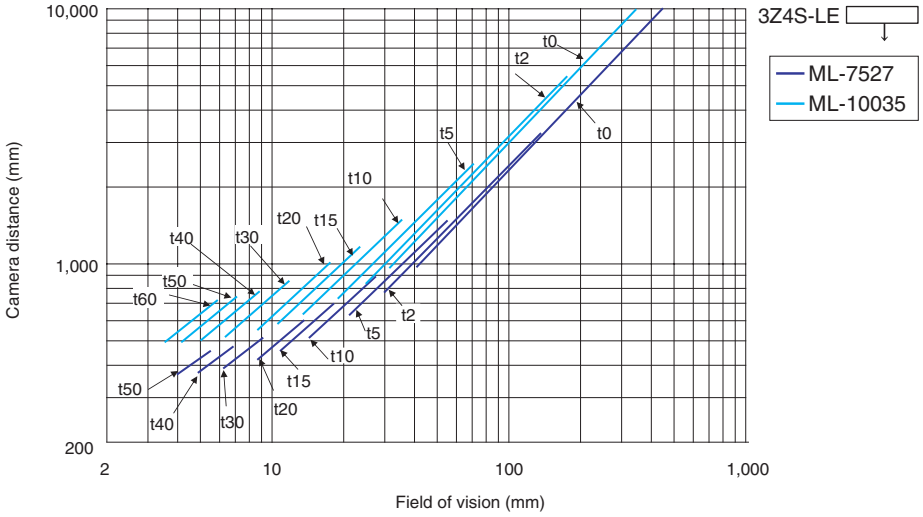
*1: Applicable standards IEC60825-1:1993 +A1:1997 +A2:2001, EN60825-1:1994 +A2:2001 +A1:2002

CCTV Lenses

Optical Graph

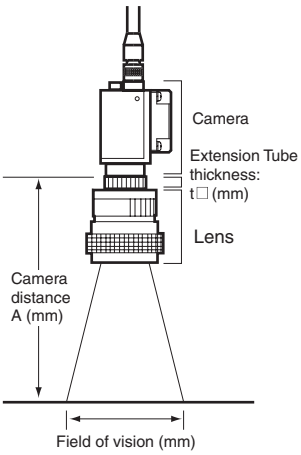
If using the ZFX-S/SC Camera (Camera only), refer to the optical graph below and select the lens and Extension Tubes. The lens to be selected will depend on the size of the measurement object and the camera distance.





Meaning of Optical Graph

The X axis of the graph shows the field of vision L (mm), and the Y axis shows the camera distance A (mm).



CCTV Lenses

	CCTV Lens								
Model	3Z4S-LE ML-0614	3Z4S-LE ML-0813	3Z4S-LE ML-1214	3Z4S-LE ML-1614	3Z4S-LE ML-2514	3Z4S-LE ML-3519	3Z4S-LE ML-5018	3Z4S-LE ML-7527	3Z4S-LE ML-10035
Appearance									
Focal length	6 mm	8 mm	12 mm	16 mm	25 mm	35 mm	50 mm	75 mm	100 mm
Brightness	F1.4	F1.3	F1.4	F1.4	F1.4	F1.9	F1.8	F2.7	F3.5
Filter size	M27 P0.5	M25.5 P0.5	M27 P0.5	M27 P0.5	M27 P0.5	M27 P0.5	M30.5 P0.5	M30.5 P0.5	M30.5 P0.5

Extension Tubes

Model	Contents
3Z4S-LE ML-EXR	Thickness: 40 mm 20 mm 10 mm 5 mm 2.0 mm 1.0 mm 0.5 mm  Set of 7 tubes Maximum outer diameter: 30 mm dia.

Precautions

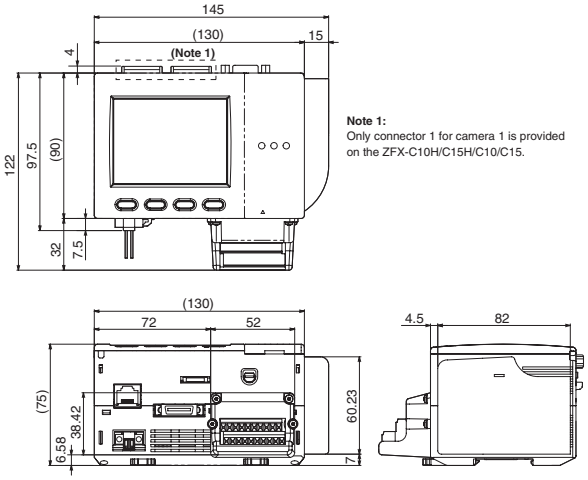
Do not use the 0.5-mm, 1.0-mm, and 2.0-mm Extension Tubes attached to each other. Since these Extension Tubes are placed over the threaded section of the Lens or other Extension Tube, the connection may loosen when more than one 0.5-mm, 1.0-mm or 2.0-mm Extension Tube are used together. Reinforcement may be required for combinations of Extension Tubes exceeding 30 mm if the Camera is subject to vibration.

External Dimensions(Unit:mm)

Controllers

ZFX-C20/C25/C10H/C15H/C10/C15

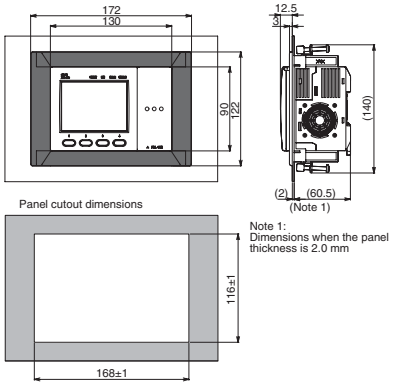




Note 1:
Only connector 1 for camera 1 is provided on the ZFX-C10H/C15H/C10/C15.

Panel Mount Adapters

ZFX-XPM

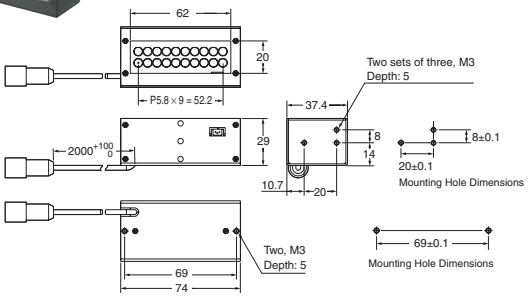


Note 1:
Dimensions when the panel thickness is 2.0 mm

Optional Lighting

ZFV-LTL01



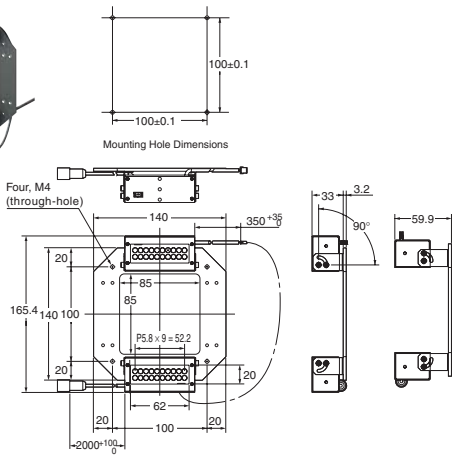


ZFV-LTL04



ZFV-LTL02



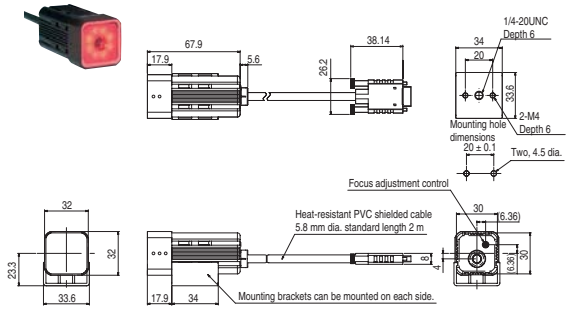


ZFV-LTF01

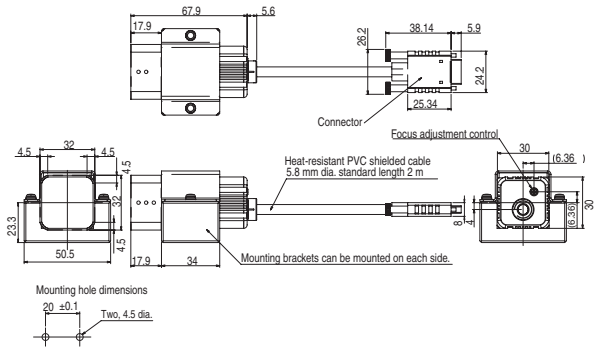


Cameras

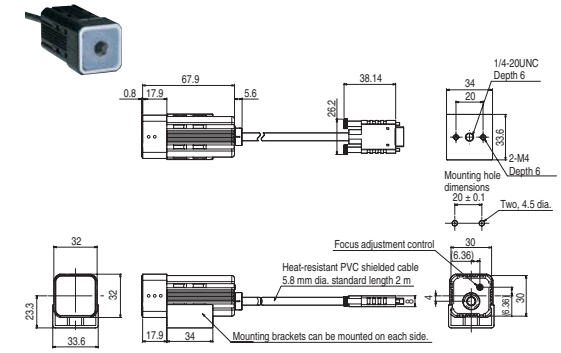
ZFX-SR10/SR50



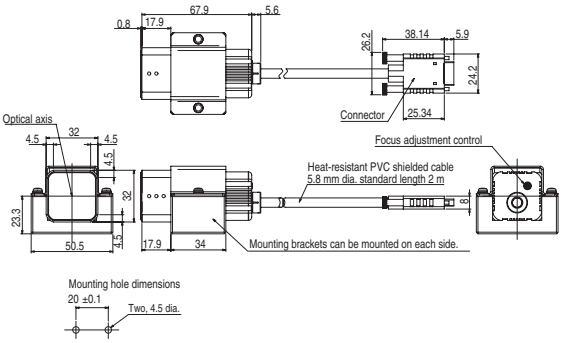
ZFX-SR10R/SR50R



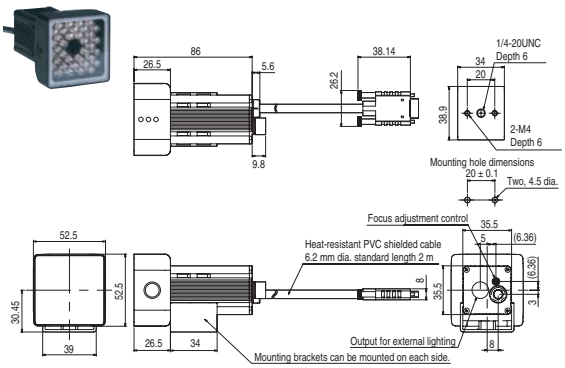
ZFX-SC10



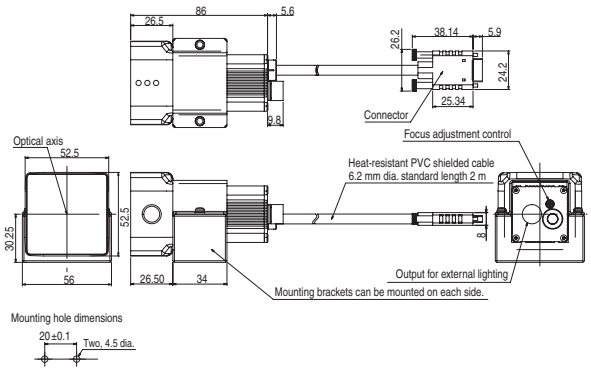
ZFX-SC10R



ZFX-SC50/SC50W

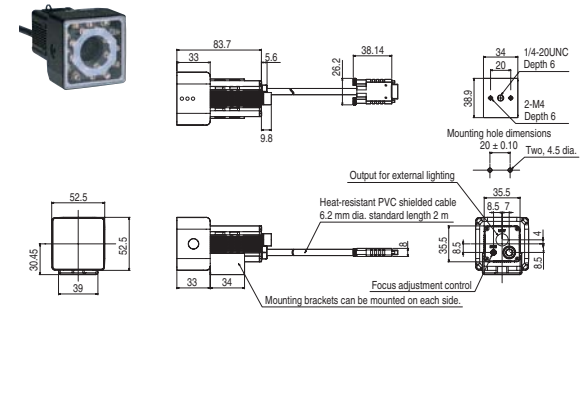


ZFX-SC50R

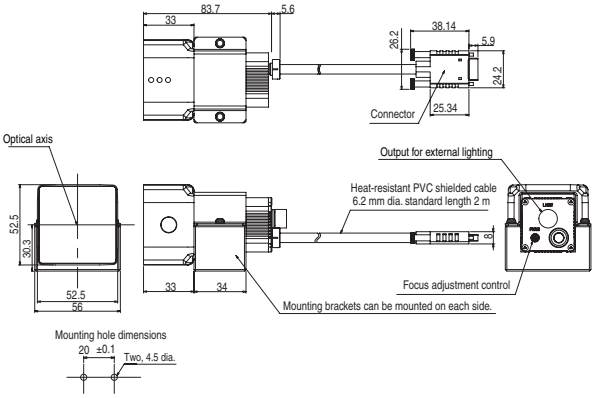


Cameras

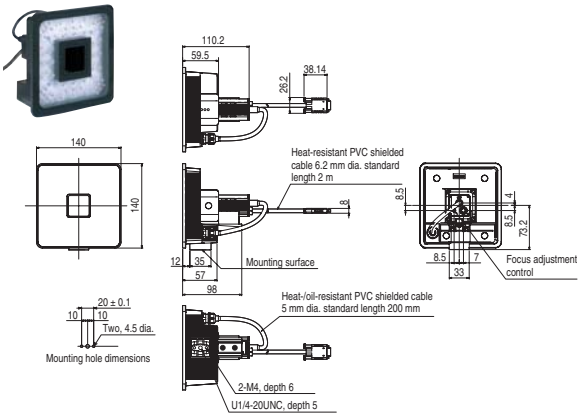
ZFX-SC90/SC90W



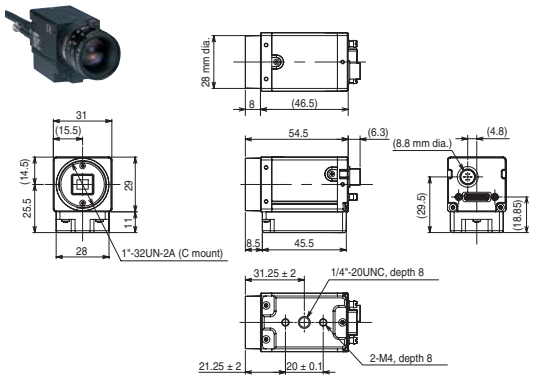
ZFX-SC90R



ZFX-SC150/SC150W

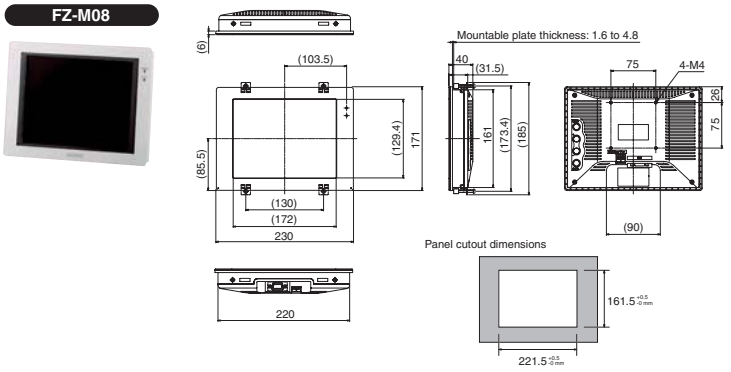


ZFX-S/SC



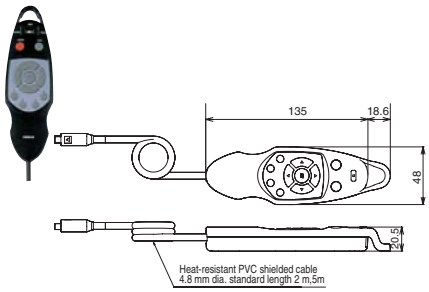
LCD Monitor

FZ-M08



Console

ZFX-KP



MEMO

MEMO

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The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PERFORMANCE DATA

Performance data given in this document is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON´s test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the product may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

ERRORS AND OMISSIONS

The information in this document has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user´s programming of a programmable product, or any consequence thereof.

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- Ultra-high response supports fast lines



This document provides information mainly for selecting suitable models. Please read the User's Manual (Z251-E1-01) carefully for information that the user must understand and accept before purchase, including information on warranty, limitations of liability, and precautions.

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