ZERO DEFECT FOR PRODUCTION THAT NEVER FAILS!

Customer satisfaction highly depends on the quality of the finished goods or the performance of the machine in use. Zero defect during production is a key criterion for success. The speed of production lines is getting increasingly faster. On the other hand the machines should never fail. But can you trust the result?

The necessity for quality inspection and control in any production process is no longer a discussion point. The cost of non quality is much higher than the investment, which pays for itself within a short time. In order to further reduce the number and cost of defective goods, there is a clear trend from having just one inspection at the end of the process towards several quality checks within or even at the beginning of the process. This effect further increases the demand for accurate, reliable and fast inspection systems.

Omron offers a complete portfolio of measurement and inspection systems using different technologies and principles, but following the same guideline: keep it simple for the user.

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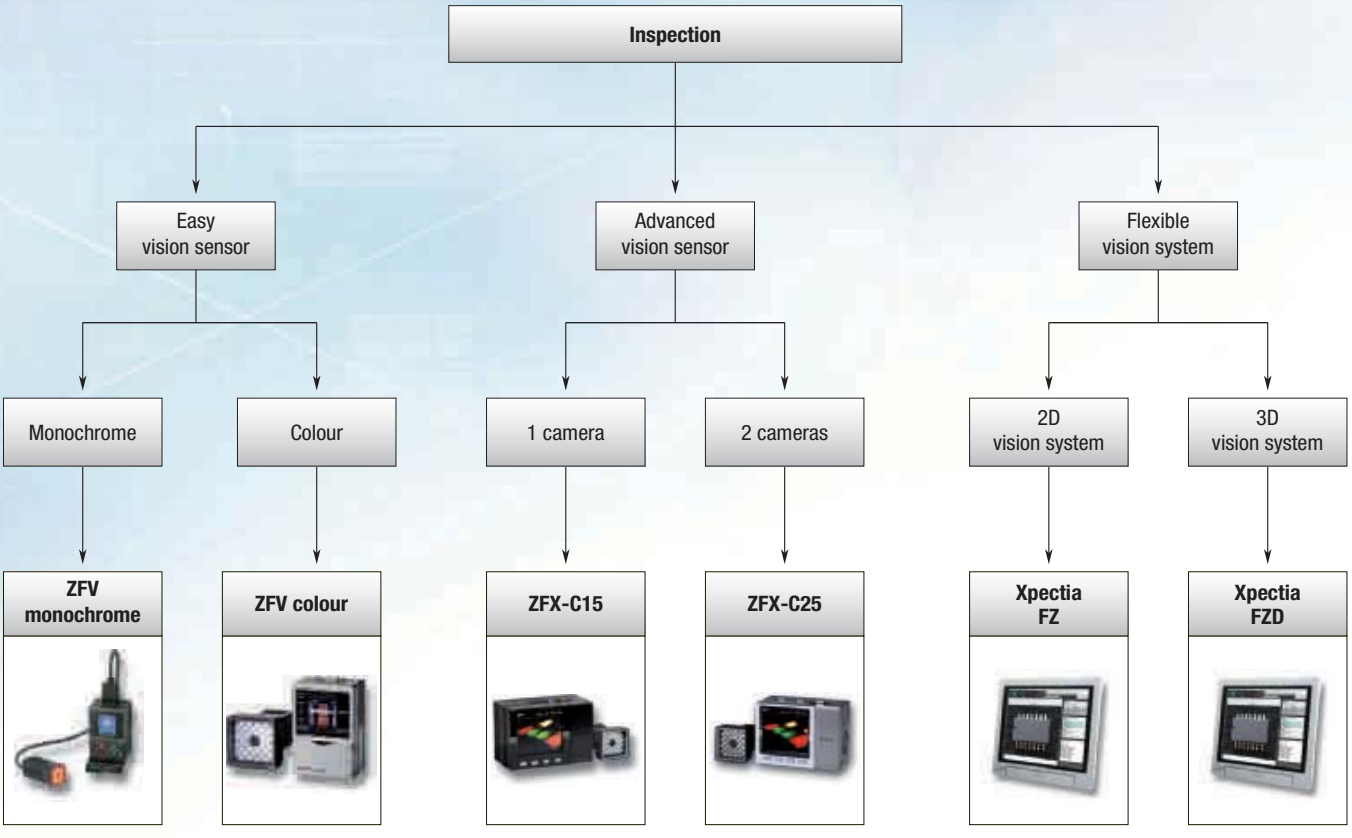
EASY VISION: TOUCH, COMMUNICATE AND GO

Built-in LCD monitor for setup and immediate image visualization

The easy vision sensor ZFV solves the applications by an intuitive teach & go procedure. For advanced applications features such as multiple inspections, position correction, intelligent image filtering and ethernet communication are offered by the ZFX. The high end is addressed by the new FZ.

- Easy vision – intuitive user interfaces
- Communication – centralized set-up & inspection via Ethernet
- High-end vision – PC-based system (Windows-CE inside) for challenging applications
- True colour – close to human eye identification and image processing



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Ident system

- Barcode
  - **V500-R5**  Page 325
- Barcode & Datamatrix
  - **V400-R1**  Page 323
- Datamatrix
  - Fixed
    - **V400-F**  Page 322
  - Handheld
    - **V400-H**  Page 324
- RFID
  - **V680**  Page 326

Selection table

			Vision sensors			
						
Selection criteria	Model		ZFV Monochrome	ZFV Colour	ZFX-C15	ZFX-C25
	Number of connectable cameras		1	1	1	2
	Camera type		Digital black&white	Digital colour	Digital Colour or black & white	Digital Colour or black & white
	Resolution (usable) Display dots		468×432	468x432	up to 608 x 464	up to 608 x 464
	Working distance mm	Min.	34	34	Depends on selected head and lens	Depends on selected head and lens
		Max.	194	227	–	–
	Field of view mm	Min.	5	5	Depends on selected head and lens	Depends on selected head and lens
		Max.	50	150	–	–
	Number of storable configurations		8	8	32	32
	Number of tools/configuration		1	1-8	32	128
	Cycle time		app. 4-25 ms depending on setup	app. 7-25 ms depending on setup	Depends on setup and used tools	Depends on setup and used tools
	IP-Rating camera head		IP65	IP65/IP67	Depend on head, up to IP65/IP67	Depend on head, up to IP65/IP67
	Supply voltage		24 VDC			
Features	Image processing tools		Up to seven (area, brightness, width, position, character, count, pattern)	Up to seven (hue, area, brightness, width, position, character, count, pattern)	App. 20 image processing tools, plus position compensation, calculations and others, in -CD version: Barcode + Datamatrix	App. 30 image processing tools, plus position compensation, calculations and others, flexible search, graphical search, grouping, labelling, in -CD version: Barcode + Datamatrix
	Image preprocessing		–	–	Smoothing, erosion, dilation, edge enhancement, median, sharpen and background suppression	Smoothing, edge enhancement, edge extraction, erosion, dilation, median, background suppression
	Optional macro programming interface		–	–	–	–
	User interface		On board 'teach&go'	On board 'teach&go'	On board "teach&go" touch screen	On board "teach&go" touch screen
	Optional PC configuration software		–	–	–	–
	Security tools		–	–	–	–
Communication	RS-232C		Optional via ZS-DSU	■	■	■
	USB		–	■	■	■
	Ethernet		–	–	■	■
	Number of digital I/O		5 in/3 out	5 in/3 out	12 in/22 out	12 in/22 out
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			Vision systems	Code reader		
						
Selection criteria	Model		XpectiaFZ	V400-F	V400-R1	V400-H
	Number of connectable cameras		4	1	1	1
	Camera type		Digital colour & black&white	Digital	Digital	Digital black&white
	Resolution (usable) Display dots		from 640x480 to 2448 x 2044	512x484	1280x1024	–
	Working distance mm	Min.	depends on selected lens	100 mm	60 mm	40 mm
		Max.	–	200 mm	–	40 mm
	Field of view mm	Min.	depends on selected lens	14x18 mm	52x41 mm	5x5 mm
		Max.	–	31x42 mm	–	30x30 mm
	Number of storable configurations		–	–	–	limited by SD card
	Number of tools/configuration		limited only by memory space	–	–	–
	Cycle time		Depends on setup & tools	Depends on code side, type and orientation	Depends on code, type and orientation	–
	IP-Rating camera head		IP20	IP67	IP54	IP64
	Supply voltage		–	24 VDC	5 VDC	5 VDC
Features	Image processing tools		App. 70 processing tools for object or defect recognition, measurements, calculations, input/output, display and more. Includes also character recognition and high precision edge code inspection tools.	Data Matrix, ECC200, 10x10 to 64x64, 8x18 to 16x48, QR Code (Models 1, 2), 21x21 to 57x57 (Versions 1 to 10)	Barcode: JAN/EAN/UPC (A, E), CODE39, NW-7, ITF Industrial2of5, CODE93, CODE128 (including EAN128), RSS DataMatrix (ECC200), QR Code, Micro QR Code, PDF417, RSS	Data Matrix, ECC200, 10x10 to 64x64, 8x18 to 16x48, QR Code (Models 1, 2), 21x21 to 57x57 (Versions 1 to 10)
	Image preprocessing		Smoothing, edge enhancement, edge extraction, erosion, dilation, median, background suppression - multiple passes, configurable	Smoothing, Dilation, Erosion, and Median.	–	–
	Optional macro programming interface		■	–	■	–
	User interface		■	–	point to point GUI	–
	Optional PC configuration software		■	–	■	–
	Security tools		■	–	Yes, user log in, 3 user levels, change history log, etc., via optional PC software	–
Communication	RS-232C		■	■	■	–
	USB		■	–	–	–
	Ethernet		■	–	–	–
	Number of digital I/O		11 in/26 out	–	–	–
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■ Standard – No/not available

Easy vision – “teach&go”

The ZFV proves that vision sensors can be “teach & go”. Parameter settings are available at the touch of a button. A smart user interface allows intuitive configuration using a built-in colour monitor. In Run-mode, the display gives live feedback showing results and images in real time.

- Intuitive – “teach & go” user interface
- Live – LCD display for setup and live inspection feedback
- Versatile – up to seven inspection tools included
- Scalable – add controllers to add functionality
- Flexible – adjustable working distance and area

Ordering information

Sets of camera and controller

Type	Order code	
	NPN	PNP
Narrow view/single function	ZFV-R1010	ZFV-R1015
Narrow view/standard	ZFV-R1020	ZFV-R1025
Wide view/single function	ZFV-R5010	ZFV-R5015
Wide view/standard	ZFV-R5020	ZFV-R5025

Cameras

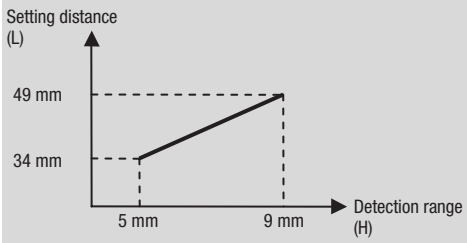
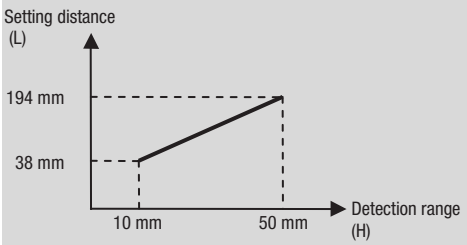
Type	Working length	Sensing area	Order code
Narrow view	34 to 49 mm (variable)	5x4.6 mm (HxV) to 9x8.3 mm (HxV)	ZFV-SR10
Wide view	38 to 194 mm (variable)	10x9.2 mm (HxV) to 50x46 mm (HxV)	ZFV-SR50

Controller

Type	Power supply	Output type	Order code
Single function	24 VDC ±10%	NPN	ZFV-A10
		PNP	ZFV-A15
Standard		NPN	ZFV-A20
		PNP	ZFV-A25

Specifications

Cameras

Item	ZFV-SR10 (narrow view)	ZFV-SR50 (wide view)
Setting distance (L)	34 to 49 mm	38 to 194 mm
Detection range (H×V)	5x4.6 mm to 9x8.3 mm	10x9.2 mm to 50x46 mm
Relation between setting distance and detection range		
Guide light	Provided (center, sensing area)	
Built-in lens	Focus: f15.65	Focus: f13.47
Object lighting method	Pulse lighting	
Object light source	Eight red LEDs	
Sensing element	1/3-inch CCD, partial scan	
Shutter	Electronic shutter, shutter time: 1/1,000 to 1/4,000	
Power supply voltage	15 VDC (supplied from Amplifier Unit.)	
Current consumption	Approx. 200 mA	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min	
Vibration resistance (destruction)	10 to 150 Hz, 0.35 mm single amplitude, 10 times each in X, Y, and Z directions for 8 min	
Shock resistance (destruction)	150 m/s^2, three times each in six directions (up/down, left/right, forward/backward)	
Ambient temperature	Operating: 0 to 40°C, storage: -25 to 65°C (with no icing or condensation)	
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)	
Ambient atmosphere	Must be free of corrosive gas	
Connection method	Prewired, standard cable length: 2 m	
Degree of protection	IEC60529, IP65	
Materials	Case: ABS, mounting bracket: PBT	
Weight	Approx. 200 g (including mounting bracket and cord)	
Accessories	Mounting bracket (1), ferrite core (1), instruction sheet	

Controller

Item		Single function models		Multi function models	
		ZFV-A10	ZFV-A15	ZFV-A20	ZFV-A25
Output method		NPN	PNP	NPN	PNP
Inspection items		Pattern (PTRN), Brightness (BRGT)		Patterns (PTRN), Brightness (BRGT), Area (AREA), Width (WID), Position (POSI), Count (CNT), Characters (CHAR)	
Teaching area		Rectangular, one area			
Teaching area size		• Pattern (PTRN), Brightness (BRGT): any rectangular area (256x256 max.) • Area (AREA), Width (WID), Position (POSI), Count (CNT), Characters (CHAR): any rectangular area (full screen max.)			
Sensing area		Full screen			
Resolution		468 Hx432 V max.			
Bank selection		Supported for 8 banks			
Response time		Pattern (PTRN), Brightness (BRGT): High-speed: 4 ms, standard: 8 ms, high-precision: 12 ms (not using partial scan) Area (AREA), Width (WID), Position (POSI), Count (CNT), Characters (CHAR): 128x128: 15 ms max.			
Other functions		Control output switching: ON for OK or ON for NG ON-delay/OFF-delay, one-shot output, 'ECO' mode			
Output signals		(1) Control output (OUTPUT), (2) Enable output (ENABLE), (3) Error output (ERROR)			
Input signals		(1) Simultaneous measurement input (TRIG) or continuous measurement input (TRIG), switched by using menu (2) Bank selection inputs (BANK1 to BANK3) (3) Workpiece still teaching (TEACH) or workpiece moving teaching (TEACH), switched by using menu			
Connecting to ZS-DSU	Image logging trigger	Stores NG images or all images			
	Sampling rate	ZFV measurement cycle *1			
	Number of logged image	Logs up to 128 images in series			
	Number of connected	15 max. (ZFV: 5 units max., ZS-LDC: 9 units max., ZS-MDC *2: 1 unit max.)			
	External bank function	Amplifier unit setting data can be saved to the memory card as bank data. Reading bank data enables bank switching.			
Sensor head interface		Digital interface			
Image display		Compact TFT 1.8-inch LCD (Display dots: 557x234)			
Indicators		• Judgement result indicator (OUTPUT) • Inspection mode indicator (RUN)			
Operation interface		• Cursor keys (up, down, left, right) • Setting key (SET) • Escape key (ESC) • Operating mode switching (slide switch) • Menu switching (slide switch) • Teaching/display switching key (TEACH/VIEW)			
Power supply voltage		20.4 to 26.4 VDC (including ripple)			
Current consumption		600 mA max. (with sensor head connected)			
Dielectric strength		1,000 VAC, 50/60 Hz for 1 min between leads and amplifier unit case			
Noise immunity		1 kV, Pulse rise: 5 ns, pulse width: 50 ns, burst duration: 15 ms, cycle: 300 ms			
Vibration resistance		Destruction: 10 to 150 Hz, 0.1-mm single amplitude, 10 times each in X, Y, and Z directions for 8 min			
Shock resistance		Destruction: 150 m/s^2, three times each in six directions (up/down, left/right, forward/backward)			
Ambient temperature		Operating: 0 to 50°C, storage: -25 to 65°C (with no icing or condensation)			
Ambient humidity		Operating and storage: 35% to 85%			
Ambient atmosphere		Must be free of corrosive gas			
Degree of protection		IEC60529, IP20			
Materials		Polycarbonate			
Weight		Approx. 300 g (including cord)			
Accessories		Ferrite core (1), instruction sheet			

*1 This is the sampling rate when logging images. To log measurement data only, use the ZS-DSU settings.
*2 Image logging is not possible when the ZS-MDC is connected.

Easy vision – “teach&go” – in colour

The ZFV colour comes with the same intuitive user interface as the grey scale version. But by using the colour information in the image, it adds more security and reliability to your application. More cameras and communication options make it more versatile.

- Intuitive – “teach&go” user interface
- Live – LCD display for setup and live inspection feedback
- Versatile – 8 inspection tools included
- Scalable – add controllers to add functionality
- Flexible – adjustable working distance and area
- Multiple – up to 8 simultaneous inspections

Ordering information

Cameras

Type	Setting distance	Sensing area	Order code
Narrow view	39 to 49 mm (variable)	5x4.6 mm to 9x8.3 mm (variable)	ZFV-SC10
Standard view	31 to 187 mm (variable)	10x9.2 mm to 50x46 mm (variable)	ZFV-SC50
Wide view	66 to 141 mm (variable)	50x46 mm to 90x83 mm (variable)	ZFV-SC90
Ultra-wide view	114 to 226 mm (variable)	90x83 mm to 150x138 mm (variable)	ZFV-SC150

Controller units ZFV colour series

Power supply		Output type	Order code
24 VDC	single inspection	NPN	ZFV-CA40
		PNP	ZFV-CA45
	multi inspection	NPN	ZFV-CA50
		PNP	ZFV-CA55

Accessories ZFV colour series (order separately)

Data storage units

Power supply	Output type	Order code
24 VDC	NPN	ZS-DSU11
	PNP	ZS-DSU41

Controller link unit

Type	Order code
Controller link unit	ZS-XCN

External lightning

Type	Order code
Bar lightning	ZFV-LTL01
Bar double lightning	ZFV-LTL02
Bar low-angle lightning	ZFV-LTL04
Light source for through-beam lightning	ZFV-LTF01

Camera Extension Cable

Cable length	Order code
3 m	ZFV-XC3B *1
8 m	ZFV-XC8B

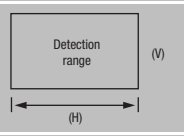
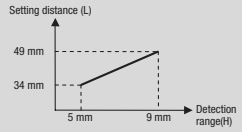
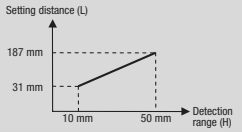
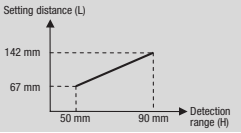
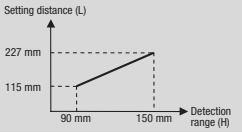
*1 ZFV-XC3BR robot cable is also available.

Panel-mounting adapter

Type	Order code
First unit	ZS-XOM1
Additional units (for expansion)	ZS-XPM2

Specifications

Cameras

Item	ZFV-SC10 (Narrow View)	ZFV-SC50/SC50W (Standard View)	ZFV-SC90/SC90 (Wide view)	ZFV-SC150/SC150W (Ultra wide view)
Setting distance (L)	34 to 49 mm (variable)	31 to 187 mm (variable)	67 to 142 mm (variable)	115 to 227 mm (variable)
Sensing range (HxV) 	5x4.6 mm to 9x8.3 mm (variable)	10x9.2 mm to 50x46 mm (variable)	50x46 mm to 90x83 mm (variable)	90x83 mm to 150x183 mm (variable)
Relation between setting distance and detection range				
Built-in lens	Focus: f15.65	Focus: f13.47	Focus: f6.1	
Object lighting method	Pulse lighting			
Object light source	8 white LEDs	36 white LEDs	20 white LEDs	72 white LEDs
Lightning I/F (option)	None	Yes		None
Sensing element	1/3-inch CCD			
Shutter	Electronic shutter, shutter time: 1/500 to 1/8,000			
Power supply voltage	15 VDC (supplied from amplifier unit)	15 VDC, 48 VDC (supplied from amplifier unit)		
Current consumption	Approx. 200 mA	Approx. 350 mA [15 V: approx. 150 mA, 48 V: approx. 200 mA] (Including the current consumed when external light is connected)		
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min			
Vibration resistance (destructive)	10 to 150 Hz, 0.35 mm single amplitude, 10 times each in X, Y, and Z directions for 8 min			
Shock resistance (destructive)	150 m/s^2, three times each in six directions (up/down, left/right, forward/backward)			
Ambient temperature	Operating: 0 to +40°C, storage: -25 to +65°C (with no icing or condensation)			
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)			
Ambient atmosphere	Must be free of corrosive gas			
Connection type	Prewired, standard cable length: 2 m			
Degree of protection (IEC 60529)	IP65	ZFV-SC__: IP65 ZFV-SC__W: IP67		
Material	Case: ABS, mounting bracket: PBT			
Weight	Approx. 200 g (including mounting bracket and cord; packaged condition: approx. 300 g)	Approx. 270 g (including mounting bracket and cord; packaged condition: approx. 350 g)	Approx. 300 g (including mounting bracket and cord; packaged condition: approx. 380 g)	Approx. 600 g (including mounting bracket and cord; packaged condition: approx. 780 g)
Accessories	Mounting bracket ZFV-XMF (1), ferrite core (1), instruction sheet	Mounting bracket ZFV-XMF2 (1), ferrite core (2), warning label (1) instruction sheet	Mounting bracket ZFV-XMF2 (1), ferrite core (2), warning label (1) instruction sheet	Ferrite core (2), instruction sheet
LED class*1	Class 1	Class 2	Class 2	Class 1

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

Controller

Item		ZFV-CA40/ZFV-CA50	ZFV-CA45/ZFV-CA55
Output specifications		NPN open collector, 30 VDC 50 mA max., residual voltage 1.2 V max.	PNP open collector, 50 mA max., residual voltage 1.2 V max.
Input specifications	ON	Short-circuited with 0 V terminal or 1.5 V or less	Supply voltage short-circuited or within supply voltage -1.5 V max.
	OFF	Open (leakage current 0.1 mA max)	Open (leakage current 0.1 mA max)
Serial I/O	USB2.0	1 port, full-speed (12 Mbps) MINI-B	
	RS-232C	1 port, 115,200 bps max.	
Inspection items		PATTERN, AREA, HUE (Colour), WIDTH, POSITION, COUNT, BRIGHT, CHARA, multi inspection (ZFV-CA50/55 only)	
Teaching area		Rectangular, one area	
Teaching area size		• PATTERN, BRIGHT: any rectangular area (256x256 max.) • AREA, HUE (Colour), WIDTH, POSITION, COUNT, CHARA: Any rectangular area (full screen max.)	
Sensing area		Full screen	
Resolution		468x432 (HxV) max.	
Bank switching		Supported for 8 banks	
Image input interval		13 ms (standard), 8 ms (1/2 for partial scan), 5 ms (1/4 for partial scan)	
Other functions		Control output switching: ON for OK or ON for NG, ON-delay/OFF-delay, One-shot output, “ECO” mode	
Output signals		(1) Control output (OUTPUT) (2) Enable output (ENABLE) (3) Error output (ERROR)	
Input signals		(1) Sync measurement input (TRIG)/continuous measurement input (TRIG); switched from menu (2) Bank selection input (BANK1-3) (3) Object stationary teaching (TEACH)/object motion teaching (TEACH); switched from menu	
Sensor head interface		Digital interface	
Image display		TFT 1.8-inch colour LCD (Display dots: 557x234)	

Item	ZFV-CA40/ZFV-CA50	ZFV-CA45/ZFV-CA55
Indicators	• Judgment result indicator (OUTPUT, colour: orange) • Inspection mode indicator (RUN, colour: green) • Error indicator (ERR, colour: red) • Ready status indicator (READY, colour: blue)	
Operation interface	• Cursor keys (up, down, left, right) • Setting key (SET) • Escape key (ESC) • Operating mode switching (slide switch) • Menu switching (slide switch) • Teaching/display switching key (TEACH/VIEW) • Function keys (A to D, 4 inputs)	
Power supply voltage	20.4 to 26.4 VDC (including ripple)	
Current consumption	800 mA max. (with sensor head connected)	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between leads and amplifier unit case	
Noise resistance	1 kV, pulse rise: 5 ns, pulse width: 50 ns, burst duration: 15 ms, cycle: 300 ms	
Vibration resistance (destructive)	10 to 150 Hz, 0.1 mm single amplitude, 10 times each in X, Y, and Z directions for 8 min	
Shock resistance (destructive)	150 m/s^2, three times each in six directions (up/down, left/right, forward/backward)	
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	Must be free of corrosive gas	
Degree of protection	IEC 60529, IP20	
Material	Polycarbonate (PC)	
Weight	Approx. 300 g (including cord; packaged condition: 450 g)	
Accessories	Ferrite core (1), instruction sheet, label (1)	

External light units (optional)

Item	ZFV-LTF01	ZFV-LTL01	ZFV-LTL02	ZFV-LTL04
Applicable sensor head	ZFV-SC50/SC50W/SC90/SC90W			
Lighting method	Pulse lighting			
Lighting interval	Fixed (1.1 to 1.4 ms)			
Light source (Qty.)	White LEDs			
	60	20	40	80
Power supply voltage	48 VDC (supplied from sensor head)			
Current consumption	Approx. 160 mA	Approx. 80 mA	Approx. 120 mA	Approx. 210 mA
Dielectric strength	300 VAC, 50/60 Hz for 1 min			
Vibration resistance (destructive)	10 to 150 Hz, 0.35 mm single amplitude, 10 times each in X, Y and Z directions for 8 min			
Shock resistance (destructive)	150 m/s^2, 3 times each in six directions (up/down, left/right, forward/backward)			
Ambient temperature	Operating: 0 to 40°C, storage: -20 to 65°C (with no icing or condensation)			
Ambient humidity	Operating and storage: 35% to 85% RH (with no condensation)			
Ambient atmosphere	Must be free of corrosive gas			
Connection type	Prewired, standard cable length: 2 m			
Degree of protection	IEC60529 IP20			
Material	SPCC	SPCC, aluminium		
Weight	Approx. 500 g (when packaged: approx. 550 g)	Approx. 250 g (when packaged: approx. 300 g)	Approx. 650 g (when packaged: approx. 900 g)	Approx. 900 g (when packaged: approx. 1,150 g)
LED class	Class 1 Applicable standards IEC0825-1: 1993 +A1:1997 +A2:2001 EN60825-1: 1994 +A1:2002 +A2:2001			

Easy vision – touch, connect & go

- Easy vision – intuitive “teach & go” user interfaces
- Live – built-in LCD touch monitors for setup and immediate feedback
- Communication – centralized setup & inspection via Ethernet
- Versatile – approx. 20 tools, 32 inspections per image
- Simplicity – auto-adjustment functions for easy image setup
- Reading - Barcode and Datamatrix

Ordering Information

Controller

Power supply	Circuit type	Order code	
		Standard models	Code reading models
21.6 to 26.4 VDC	NPN	ZFX-C10	ZFX-C10-CD
	PNP	ZFX-C15	ZFX-C15-CD
21.6 to 26.4 VDC	NPN	ZFX-C20	ZFX-C20-CD
	PNP	ZFX-C25	ZFX-C25-CD

Cameras

Type		Setting distance	Sensing area	Remarks	Order code
Camera with lighting	Monochrome type	34 to 49 mm	5x4.9 mm to 9x8.9 mm (variable)	Cable length: 2 m	ZFX-SR10
		38 to 194 mm	10x9.8 mm to 50x49 mm (variable)		ZFX-SR50
	Colour type	34 to 49 mm	5x4.9 mm to 9x8.9 mm (variable)		ZFX-SC10
		34 to 187 mm	10x9.8 mm to 50x49 mm (variable)		ZFX-SC50 ZFX-SC50W(IP67)
		67 to 142 mm	50x49 mm to 90x89 mm (variable)		ZFX-SC90 ZFX-SC90W(IP67)
		115 to 227 mm	90x89 mm to 150x148 mm (variable)		ZFX-SC150 ZFX-SC150W(IP67)
Camera only	Monochrome type	The CCTV lens is selected according to the range of detection and the installation distance.		–	ZFX-S
	Colour type				ZFX-SC

Cables

Type		Cable length	Order code
Camera cable*1	Normal type	3 m, 8 m	ZFX-VS
	Robot cable type	3 m	ZFX-VSR
Camera extension cable	Normal type	3 m	ZFX-XC3A
		8 m	ZFX-XC8A
	Robot cable type	3 m	ZFX-XC3AR
Parallel I/O cable		2 m, 5 m	ZFX-VP
RS-232C cable		2 m	ZFX-XPT2A
RS-422 cable		2 m	ZFX-XPT2B
Monitor cable		2 m, 5 m	FZ-VM

*1 It is necessary for ZFX-S and ZFX-SC. ZFX-SR_/SC_ is a cable drawing out type, it doesn't use it.

Accessories

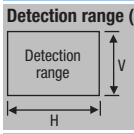
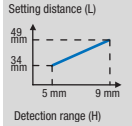
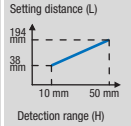
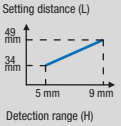
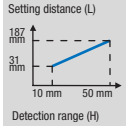
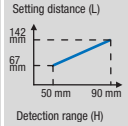
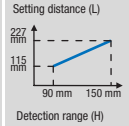
Type		Order code
Console		ZFX-KP (2 m / 5 m)
LCD monitor		FZ-M08
Panel mount adapters		ZFX-XPM
Optional lighting	bar lighting	ZFV-LTL01
	bar double-lighting	ZFV-LTL02
	bar low-angle lighting	ZFV-LTL04
	light source for through beam	ZFV-LTF01

Specifications

Controller

Item			ZFX-C10(-CD)	ZFX-C15(-CD)	ZFX-C20(-CD)	ZFX-C25(-CD)
Number of connected cameras			1		2	
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 colour LCD (320x240 pixels)			
		Indicator	"Measuring" indicator (colour: green): RUN Trigger indicator (colour: blue): ENABLE Judgment indicator (colour: orange): OUTPUT Error indicator (colour: red): ERROR			
External I/F	Parallel interface	Input	12 points (RESET, DSA, DI0 to 8, TRIG)			
		Output	22 points (OR, ERROR, RUN, ENABLE, GATE, STGOUT0, DO0 to 15)			
		Circuit type	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		Analogue RGB output, 1 ch (resolution VGA: 640x480)			
	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		32 items/1 bank		128 items/1 bank	
	Measurement items	Shape inspection	Pattern search, sensitive search		Pattern, sensitive, graphic, flexible search	
		Size inspection	Area		Area, labelling	
		Edge inspection	Position, width, count			
		Brightness/colour inspection	Brightness, HUE			
		Application-based inspection	Defects		Defects, grouping	
		Code reading (-CD models only)	Barcode (WPC(JAN/EAN/UPC), Code 39, Codebar (NW-7), ITF (Interleaved 2 of 5), Code 93, Code 128, GS1-128, GS1 Databar, Pharmacode) Datamatrix (ECC200, QR Code, MicroQR Code, PDF417, MicroPDF417, Maxi Code, AZtec Code, Codablock)			
	Position correction		1 model search, 2 model search, position, area			
Support	Image memory function		Max. 100 images		Max. 100 images (50 for 2 x cameras)	
Ratings		Power supply voltage	21.6 to 26.4 VDC (including ripple)			
		Current consumption	1.0 A max.		1.5 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: 0.35 mm acceleration: 50 m/s^2 10 times for 8 minutes			
		Shock resistance (destructive)	150 m/s^2 3 times each in 6 directions (up/down, left/right, forward/backward)			

Camera

Item	ZFX-SR10	ZFX-SR50	ZFX-SC10	ZFX-SC50 /SC50W	ZFX-SC90 /SC90W	ZFX-SC150 /SC150W	ZFX-S (monochrome type)	ZFX-SC (colour type)
Detection range (H x V) 	5x4.9 mm to 9x8.9 mm (variable)	10x9.8 mm to 50x49 mm (variable)	5x4.9 mm to 9x8.9 mm (variable)	10x9.8 mm to 50x49 mm (variable)	50x49 mm to 90x89 mm (variable)	90x89 mm to 150x148 mm (variable)	The CCTV lens is selected according to the detection range and the setting distance.	
Setting distance (L)	34 to 49 mm	38 to 194 mm	34 to 49 mm	31 to 187 mm	67 to 142 mm	115 to 227 mm		
Relationship between setting distance and detection range								
Image rate function	All-pixel capture inter-line transfer type 1/3" CCD (monochrome)		All-pixel capture inter-line transfer type 1/3" CCD (colour)				All-pixel capture inter-line transfer type 1/3" CCD (mono-chrome)	All-pixel capture inter-line transfer type 1/3" CCD (colour)
Lens mount	–						C mount	

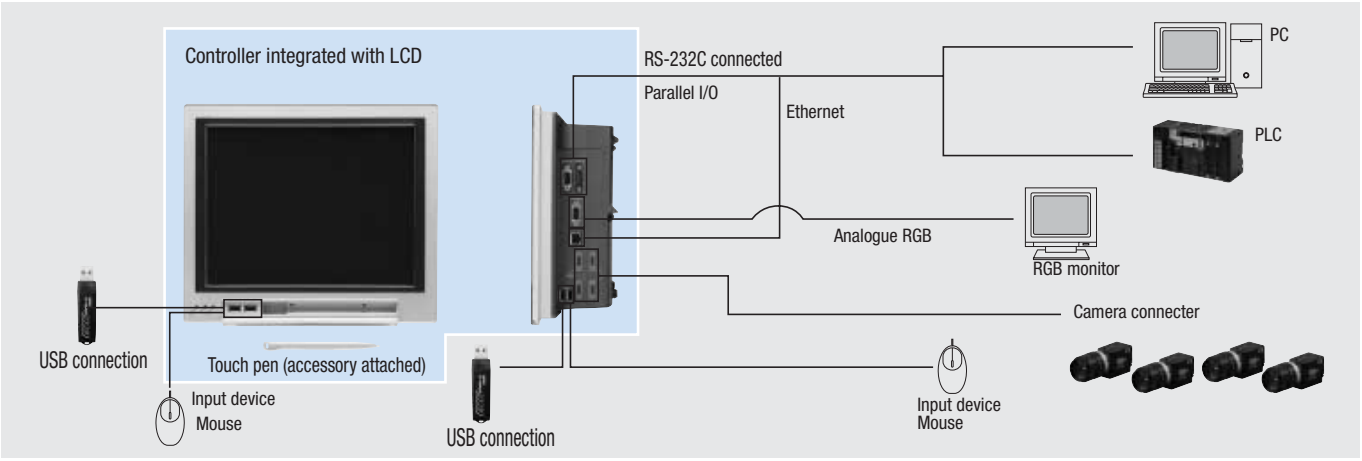
Item		ZFX-SR10	ZFX-SR50	ZFX-SC10	ZFX-SC50 /SC50W	ZFX-SC90 /SC90W	ZFX-SC150 /SC150W	ZFX-S (monochrome type)	ZFX-SC (colour type)
Lighting	Lighting method	Pulse lighting						–	
	LED	Red LED		White LED					
	Type	Direct lighting							
	Guide light	Available (center, measurement region)		Not available					
	Optional lighting I/F	Not available		Not available	Available (ZFV-LT Series)		Not available	Available external lighting: 3Z4S-LT Series Flash Controller: made by Moritex Corporation 3Z4S-LT MLEK-C100E1TSX	
	Indicator class*1	–		Class 1	Class 2	Class 2	Class 1	–	
Ratings	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)			Approx. 100 mA	
Operation environment robustness	Ambient temperature range	Operating: 0 to +40°C, storage: -20 to +65°C (with no icing or condensation)						Operating: 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)							
	Ambient atmosphere	No corrosive gases allowed							
	Degree of protection	IP65 (IEC60529)		ZFX-SC_ _ _: IP65 (IEC60529), ZFX-SC_ _ _W: IP67 (IEC60529)				IP20 (IEC60529)	
	Dielectric strength	1000 VAC 50 Hz/60 Hz 1 min						500 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)						Connector connection type (camera cable ZFX-VS/VSR required)	

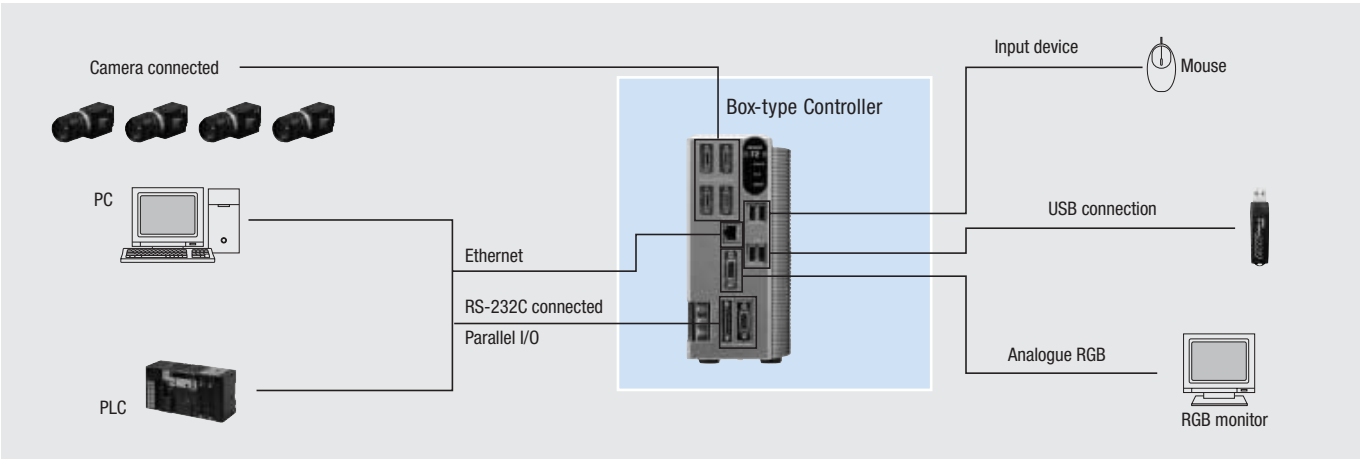
*1 Applicable standards IEC60825-1:1993 +A1:1997 +A2:2001, EN60825-1:1994 +A2:2001

Simplicity in touch with performance

- True real colour system
- Intelligent and high resolution cameras
- Touch screen for easy operation
- Customization – open & programmable
- Industry grade PC platform

System configuration





Ordering information

FZ3 series

Item		Descriptions			Remarks	Order code
Controllers	Multi-core, high grade, high speed controllers	Controller integrated with LCD	Two-camera controllers	PNP/NPN	With touch pen	FZ3-H905/FZ3-H900
			Four-camera controllers	PNP/NPN		FZ3-H905-10/FZ3-H900-10
		Box-type Controller	Two-camera controllers	PNP/NPN	---	FZ3-H955/FZ3-H950
			Four-camera controllers	PNP/NPN		FZ3-H955-10/FZ3-H950-10
	Multi-core, high speed controllers	Controller integrated with LCD	Two-camera controllers	PNP/NPN	With touch pen	FZ3-905/FZ3-900
			Four-camera controllers	PNP/NPN		FZ3-905-10/FZ3-900-10
		Box-type Controller	Two-camera controllers	PNP/NPN	---	FZ3-955/FZ3-950
			Four-camera controllers	PNP/NPN		FZ3-955-10/FZ3-950-10
	High grade, high speed controllers	Controller integrated with LCD	Two-camera controllers	PNP/NPN	With touch pen	FZ3-H705/FZ3-H700
			Four-camera controllers	PNP/NPN		FZ3-H705-10/FZ3-H700-10
		Box-type Controller	Two-camera controllers	PNP/NPN	---	FZ3-H755/FZ3-H750
			Four-camera controllers	PNP/NPN		FZ3-H755-10/FZ3-H750-10
	High grade controllers	Controller integrated with LCD	Two-camera controllers	PNP/NPN	With touch pen	FZ3-H305/FZ3-H300
			Four-camera controllers	PNP/NPN		FZ3-H305-10/FZ3-H300-10
		Box-type Controller	Two-camera controllers	PNP/NPN	---	FZ3-H355/FZ3-H350
			Four-camera controllers	PNP/NPN		FZ3-H355-10/FZ3-H350-10
	High speed controllers	Controller integrated with LCD	Two-camera controllers	PNP/NPN	With touch pen	FZ3-705/FZ3-700
			Four-camera controllers	PNP/NPN		FZ3-705-10/FZ3-700-10
		Box-type Controller	Two-camera controllers	PNP/NPN	---	FZ3-755/FZ3-750
			Four-camera controllers	PNP/NPN		FZ3-755-10/FZ3-750-10
	Standard controllers	Controller integrated with LCD	Two-camera controllers	PNP/NPN	With touch pen	FZ3-305/FZ3-300
			Four-camera controllers	PNP/NPN		FZ3-305-10/FZ3-300-10
		Box-type Controller	Two-camera controllers	PNP/NPN	---	FZ3-355/FZ3-350
			Four-camera controllers	PNP/NPN		FZ3-355-10/FZ3-350-10
Cameras	Intelligent cameras	Wide field of vision	Colour		Camera + Zoom, Autofocus Lens + Intelligent Lighting	FZ-SLC100
		Narrow field of vision	Colour			FZ-SLC15
	Autofocus cameras	Wide field of vision	Colour		Camera + Zoom, Autofocus Lens	FZ-SZC100
		Narrow field of vision	Colour			FZ-SZC15
	Digital cameras	300,000 Pixels	Monochrome		Lens required	FZ-S
			Colour			FZ-SC
		2 million pixels	Monochrome			FZ-S2M
			Colour			FZ-SC2M
		5 million pixels	Monochrome			FZ-S5M2
			Colour			FZ-SC5M2
	Small digital cameras	300,000-pixel flat type	Monochrome		CCTV lens required	FZ-SF
			Colour			FZ-SFC
		300,000-pixel pen type	Monochrome			FZ-SP
			Colour			FZ-SPC
Cameras, peripheral devices	Intelligent camera diffusion plate		Wide field of vision		---	FZ-SLC100-DL
			Narrow field of vision		---	FZ-SLC15-DL
	CCTV Lenses				---	3Z4S-LE Series
	Extension Tubes					
	Low-distortion Lenses				Low distortion lens for 2-million pixel cameras and 5 million-pixel cameras	FZ-LEH5/LEH8/LEH12/LEH16/LEH25/LEH35/LEH50/LEH75/LEH100
	Lenses for small camera				Lens for 300,000-pixel small cameras	FZ-LES3/LES6/LES16/LES30
	Extension Tubes for small camera				Extension Tubes for 300,000-pixel small cameras	FZ-LESR
Cables	Camera Cable				Cable length: 2 m, 5 m, or 10 m *1	FZ-VS
	Bend resistant Camera Cables				Cable length: 2 m, 5 m, or 10 m *2	FZ-VSB
	Right-angle Camera Cable *3				Cable length: 2 m, 5 m, or 10 m *1	FZ-VSL
	Long-distance camera cable				Cable length: 15 m *4	FZ-VS2
	Long-distance right-angle camera cable				Cable length: 15 m *4	FZ-VSL2
	Cable extension unit				Up to two Extension Units and three Cables can be connected.(Maximum cable length: 45 m *5)	FZ-VSJ
	Monitor cable				Cable length: 2 m or 5 m	FZ-VM
	Parallel cable				Cable length: 2 m or 5 m	FZ-VP
Peripheral devices		LCD monitor			For Box-type Controllers	FZ-M08
		USB memory	1GB		Capacity: 1 GB	FZ-MEM1G
		VESA attachment			For installing the LCD integrated-type controller	FZ-VESA
		Desktop controller stand			For installing the LCD integrated-type controller	FZ-DS
Mouse					Recommended Products (Optical Mouse) • Microsoft Corporation: Compact Optical Mouse, U81 Series	---
External Lighting					---	3Z4S-LT Series

Item	Descriptions	Remarks	Order code
Strobe Controller (for FZ Series Vision Sensors)		Required to control external lighting from a Controller	Manufactured by MORITEX Corporation 3Z4S-LT MLEK-C100E1TS2
Adapter for the strobe controller designed specifically for the 5 million-pixel camera		Required to mount a strobe controller on a 5 million-pixel camera	Manufactured by MORITEX Corporation 3Z4S-LT LBK-003

*1 The 10-m cable cannot be used for the intelligent camera, autofocus camera and 5 million-pixel camera.
*2 The 10-m cable cannot be used for the intelligent camera, autofocus camera 2 million-pixel camera and 5 million-pixel camera.
*3 This Cable has an L-shaped connector on the Camera end.
*4 The 15-m cable cannot be used for the intelligent camera, autofocus camera and 5 million-pixel camera.
*5 The maximum cable length depends on the Camera being connected, and the model and length of the Cable being used.For further information, please refer to the "Ratings and specifications" table on page 320.

FZD series (for 3D measurements)

Item		Description	Remarks	Model
Controllers	Controller integrated with LCD	PNP/NPN	–	FZD-505-10/FZD-500-10
	Box-type Controller	PNP/NPN		FZD-555-10/FZD-550-10
Cameras	3D Vision Camera	Colour	Integrated Camera (installation distance: 24 cm max.)	FZD-STC2M
	Digital Camera	Monochrome	2-million-pixels (lens required)	FZ-S2M
		Colour	2-million-pixels (lens required)	FZ-SC2M
3D Camera Base Plate		Short-distance Version	Installation distance of up to 30 cm	FZD-CBS
		Medium-distance Version	Installation distance of 30 cm to 1 m	FZD-CBM
		Long-distance Version	Installation distance of 1 m to 2 m	FZD-CBL
3D Calibration Tool			–	FZD-CAL
High-luminance lighting	Line pattern		White LEDs	FZD-LTW
	Custom pattern		White LEDs	FZD-LTPW

Ratings and specifications

Controllers

Model		NPN Output	FZ3-700	FZ3-700-10	FZ3-H700	FZ3-H700-10	FZ3-750	FZ3-750-10	FZ3-H750	FZ3-H750-10
		PNP Output	FZ3-705	FZ3-705-10	FZ3-H705	FZ3-H705-10	FZ3-755	FZ3-755-10	FZ3-H755	FZ3-H755-10
No. of Cameras*1			2	4	2	4	2	4	2	4
Processing resolution	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*2	When connected to a 300,000-pixel camera	Connected to 1 camera	Colour camera: 250, Monochrome Camera: 252							
		Connected to 2 cameras	Colour camera: 125, Monochrome Camera: 126							
		Connected to 3 cameras	Colour camera: 83, Monochrome Camera: 84							
		Connected to 4 cameras	Colour camera: 62, Monochrome Camera: 63							
	When connected to a 2 million-pixel camera	Connected to 1 camera	Colour camera: 40, Monochrome Camera: 40							
		Connected to 2 cameras	Colour camera: 20, Monochrome Camera: 20							
		Connected to 3 cameras	Colour camera: 13, Monochrome Camera: 13							
		Connected to 4 cameras	Colour camera: 10, Monochrome Camera: 10							
	When connected to a 5 million-pixel camera	Connected to 1 camera	Colour camera: 11, Monochrome Camera: 11							
		Connected to 2 cameras	Colour camera: 5, Monochrome Camera: 5							
Codes that can be read with FZ3-H			< Bar Codes > 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) < 2D Codes > Data Matrix (ECC200), QR Code							
Operation			Touch pen, mouse, etc.				Mouse or similar device			
Settings			Create series of processing steps by editing the flowchart (Help messages provided).							
Serial communications			RS-232C/422A:1CH							
Network communications			Ethernet 100BASE-TX/10BASE-T							
Parallel I/O			11 inputs (RESET, STEP, DSA, and DI 0 to 7), 26 outputs (RUN, BUSY, GATE, OR, READY, ERROR, STGOUT 0 to 3, and DO 0 to 15)							
Monitor interface			Integrated Controller and LCD 12.1 inch TFT colour LCD (Resolution: XGA 1,024 × 768 dots)				Analogue 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*3	When connected to a intelligent or autofocus camera		5 A max.	7.5 A max.	5 A max.	7.5 A max.	5 A max.	7.5 A max.	5 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, 0 to 50°C *4, 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. 3.2 kg	Approx. 3.4 kg	Approx. 1.8 kg	Approx. 1.9 kg	Approx. 1.8 kg	Approx. 1.9 kg
Accessories			Touch pen (one, inside the front panel), Please Read First, Instruction Manual (Setup), 6 mounting brackets				Please Read First, Instruction Manual (Setup)			

*1 When connecting 5 million-pixel cameras, up to two cameras can be connected.
*2 The number of logged images will vary when connecting multiple Cameras with different models.
*3 When the strobe controller is connected to the lights, the controller uses power as much as it does when connected to the intelligent camera.
*4 The operating mode can be switched from the Controller Menu settings.

Cameras

Intelligent camera, autofocus camera

	FZ-SLC100	FZ-SLC15	FZ-SZC100	FZ-SZC15
Image elements	Interline transfer reading all pixels, 1/3-inch CCD image elements			
Colour/Monochrome	Colour			
Effective pixels	640(H)×480(V)			
Pixel size	7.4×7.4 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(12.5 ms)			
Field of vision*1	13 to 100 mm*2	2.9 to 14.9 mm*2	13 to 100 mm*2	2.9 to 14.9 mm*2
Installation distance	70 to 190 mm*2	35 to 55 mm*2	77.5 to 197.5 mm*2	47.5 to 67.5 mm
LED class*3 (lighting)	Class 2		---	
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. 670 g	Approx. 700 g	Approx. 500 g	
Accessories	Instruction Sheet and hexagonal wrench			

*1 The length of the visual field is the lengths along the Y axis.
*2 Tolerance: ±5% max.
*3 Applicable standards: IEC 60825-1: 1993 + A1: 1997 + A2-2001, EN 60825-1: 1994 + A1: 2002 + A2: 2001

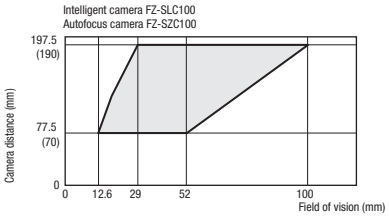
Digital cameras

	FZ-S	FZ-SC	FZ-S2M	FZ-SC2M	FZ-S5M	FZ-SC5M
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		Interline transfer reading all pixels, 2/3-inch CCD image elements	
Colour/Monochrome	Monochrome	Colour	Monochrome	Colour	Monochrome	Colour
Effective pixels	640(H)×480(V)		1600(H)×1200(V)		2448(H)×2044(V)	
Pixel size	7.4×7.4 μm		4.4×4.4 μm		3.45×3.45 μm	
Shutter function	Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s		Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s		Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s	
Partial function	12 to 480 lines		12 to 1200 lines		12 to 2044 lines	
Frame rate (image read time)	80 fps(12.5 ms)		30 fps(33.3 ms)		16 fps(62.5 ms)	
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)		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		Approx.140 g	
Accessories	Instruction manual					

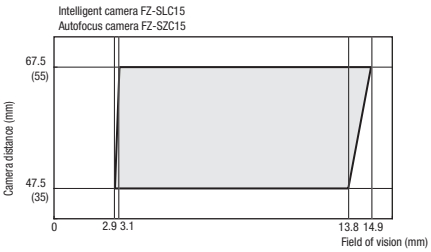
Small digital cameras

	FZ-SF	FZ-SFC	FZ-SP	FZ-SPC
Image elements	Interline transfer reading all pixels, 1/3-inch CCD image elements			
Colour/Monochrome	Monochrome	Colour	Monochrome	Colour
Effective pixels	640(H)×480(V)			
Pixel size	7.4×7.4 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(12.5 ms)			
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)		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)		Operating and storage: 35% to 85% (with no condensation)	
Weight	Approx.150 g		Approx.150 g	
Accessories	Instruction manual, installation bracket, Four mounting brackets(M2)		Instruction manual	

Optical chart

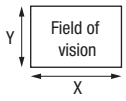


The value in parentheses is for the camera installation distance when using an intelligent camera.



The value in parentheses is for the camera installation distance when using an intelligent camera.

- Be sure to check the instruction sheet packed with the product before using an intelligent camera or autofocus camera.
- The lengths of the fields of vision given in the optical charts are the lengths of the Y axis.



One step to read the code

- Easy adjustment of parameters
- Accurate reading of codes
- Direct print marks on any material
- Eliminate the effects of print quality and work piece changes

Ordering information

2D code readers

Name	Field of vision	Order code
Special lighting lens	14x18 mm	V400-F250
	31x42 mm	V400-F350
C-mount	Changes according to the lens	V400-F050

Accessories (order separately) and cables

Name	Cable length	Remarks	Order code
Communications cable	5 m	For connection to SYSMAC series PLC (includes power line)	V400-W23 (NPN)
			V400-W23P (PNP)
		For connection to an IBM PC/AT or compatible (includes power line)	V400-W24 (NPN)
			V400-W24P (PNP)
Monitor cable		–	V400-WM0

Monitor

Name	Order code
LCD monitor	F150-M05L-2D*1

*1 There is no need for an external power supply when this monitor is used. (Power is supplied from the V400-F).

Specifications

Item	V400-F050	V400-F250	V400-F350
Dimensions	40x50x75.3 mm	40x50x97.1 mm	
Working distance (WD)	Depends on the lens	Approx. 100 mm	Approx. 200 mm
Field of vision	Depends on the lens	Approx. 14x18 mm	Approx. 31x42 mm
Lighting	Up to two can be directly powered	Red LED	
Image sensor	1/3" CCD		
Effective pixels	640x480 pixels		
Power supply voltage	24 VDC ±10%		
Power consumption	0.5 A max.		
Insulation resistance	20 MΩ min.		
Withstand voltage	1,000 VAC for 1 min.		
Leakage current	0.25 mA max.		
Noise resistance	Power line: 2 kVp-p, pulse width: 50 ns, rise time: 5 ns, consecutive burst time: 15 ms, cycle: 300 ms		
Applicable standards	CE: EN 61326:1997, +A1:1998, +A2:2001 (EMI: class A)		
Vibration resistance	10 to 150 Hz, 0.35-mm half-amplitude (maximum acceleration: 50 m/s^2), 10 times for 8 minutes each in 3 directions		
Shock resistance	150 m/s^2 3 times each in 6 directions		
Ambient temperature	Operating: 0 to 45°C, storage: -25 to 65°C		
Ambient humidity	Operating/storage: 25% to 85% (with no icing or condensation)		
Ambient environment	No corrosive gases		
Degree of protection	None	IEC 60529 IP67	
Weight	Approx. 130 g	Approx. 150 g	

Multi-code reading at a touch

- Accurate reading of barcode and datamatrix
- Easy adjustment of parameters
- 1.3 MPixel CMOS image sensor
- Flexible installation: front and side view variants

Ordering information

Code Reader

Name	Type	Order code
Multi code reader	Front view	V400-R1CF
	Side view	V400-R1CS

Cables

Name	Length	Order code
PC communication cable (incl. power)	0.8 m	V509-W011D
	5 m	V509-W016D
PLC communication cable (incl. power)	0.8 m	V509-W011
	5 m	V509-W016

Specifications

Item	V400-R1CF/V400R1CS
Bar code	JAN/EAN/UPC (A, E), CODE39, NW-7, ITF Industrial2of5, CODE93, CODE128 (including EAN128), RSS
2D code	DataMatrix (ECC200), QR code, micro QR code, PDF417, RSS
Number of reading digits	No upper limit (depends on bar width and reading distance)
Light source	Four red LEDs (wave length: 630 nm)
Aiming light	Two green LEDs (wave length: 527 nm)
Minimum resolution	0.1 mm (bar code), 0.169 mm (2D code)
Image capture device	CMOS area sensor 1280x1024 (H+V)
Working distance (WD)	60 mm
Field of view	52x41 mm (for WD = 60 mm)
Skew angle	-50 to 0 , 0 to +50
Pitch angle	-50 to 0 , 0 to +50
Tilt angle	360
Reading of bar codes on curved surfaces	R > 15 mm (JAN8), R > 20 mm (JAN13)
Communication specification	RS-232C
OK/NG outputs	NPN open collector output
Function setting method	Menu sheet reading method or host command method
Reading trigger	External trigger (transistor input) Trigger by command (RS-232C) Trigger a test reading by pressing the SCAN button on the product
OK/NG signals	OK signal is turned on to indicate a successful read OK signal is turned on to indicate a successful read of registered label NG signal is turned on to indicate a successful read of a non-registered label
Indication LED	OK LED (green) illuminates to indicate a successful read NG LED (red) illuminates for failed reading with an error message output
Buzzer	Notifies a successful reading with a buzzer sound (muting available)
Power voltage	4.5 to 5.5 VDC
Consumption current	During operation: 500 mA or less; during standby: 300 mA or less
Ambient temperature	Operation: 0 to +45 C, storage: 2 to +60 C
Ambient humidity	Operation and storage: 20 to 85% RH (with no icing or condensation)
Ambient atmosphere	No corrosive gases
Ambient light resistance	10,000 lx (fluorescent lamp), 100,000 lx (sunlight)
Vibration resistance	12 to 100 Hz, 19.6 m/s^2 (2G), 1 hour each in three directions
Degree of protection	IP54 (IEC60529)
Weight	Approximately 270 g (including cables, ferrite core, mounting bracket, insulation board and screws)
Dimensions	58x46x24.2 mm
Input connector	Round DIN connector
Accessories	Operation manual, ferrite core, menu sheet, mounting bracket, insulation board, M3x8 screws (four), M5x10 screws (two)
Housing	Aluminium die-cast (ADC12)

Target, “touch&go”

- Easy to use – target, “touch&go”
- Built-in LCD monitor for immediate display of results
- Accurate – reading of direct print marks
- Variable field of view

Ordering information

Main unit

Name	Communications interface	Field of vision	Remarks	Order code
2D code reader	RS-232C	5x5 to 10x10 mm	–	V400-H111
	RS-232C	15x15 to 30x30 mm	–	V400-H211

Accessories

Name	Cable length	Remarks	Order code
Contactor	–	Contactor for positioning (detachable)	V400-AC2
Communications cable	2 m	For SYSMAC series connection (with power cord)	V400-W20-2M
	5 m		V400-W20-5M
	2 m	For PC-compatible connection (with power cord)	V400-W21-2M
	5 m		V400-W21-5M
	2 m	For PC-compatible connection (when using AC adaptor)	V400-W22-2M
	5 m		V400-W22-5M
AC adaptor	–	–	V600-A22

Ratings and specifications

Item	V400-H111	V400-H211
Field of vision	5x5 to 10x10 mm	15x15 to 30x30 mm
Working distance	40 mm (flush when contactor is mounted)	
Power supply	5 VDC ±10%	
Current consumption	1.0 A max.	
Serial interface	RS-232C	
Applicable codes	Data matrix, ECC200, 10x10 to 64x64, 8x18 to 16x48, QR code (models 1, 2), 21x21 to 57x57 (versions 1 to 10)	
Operation method	Pressing the trigger button	
Settings	Make settings by using the manual setting window, uploading from an SD memory card, or by using support software.	
Memory card	SD memory card	
Monitor	1.8 inch TFT LCD, displaying images and read data	
Display illumination	Operation display, memory card access	
Ambient temperature	Operation: 0 to 40°C, storage: -25 to 60°C	
Ambient humidity	35 to 85% (with no condensation)	
Ambient conditions	No corrosive gases	
Vibration resistance	10 to 150 Hz, single amplitude 0.35 mm (50 m^2/s max. acceleration)	
Shock resistance	150 m^2/s in ±X, Y, and Z directions, 3 times	
Weight	Approx. 230 g	
Degree of protection	IEC 60529 IP64	
Materials	Case: ABS; optical surface: PC; display surface: PMMA	

Compact Laser

- Compact design
- Easy installation & setup
- Strong reading performance

Ordering information

Name	Product	Model
Barcode Readers	Cable output	V500-R521B2
	Round DIN connector	V500-R521C2
ID Link Unit (sold separately)		V700-L12
Cables (sold separately)	SYSMAC D-sub 9-pin cable, 0.8 m	V509-W011
	SYSMAC D-sub 9-pin cable, 5 m	V509-W016
	IBM PC/AT or compatible D-sub 9-pin cable, 0.8 m	V509-W011D
	IBM PC/AT or compatible D-sub 9-pin cable, 5 m	V509-W016D

Ratings and Specifications

Item		V500-R_
Applicable barcodes	Type of barcode	Code 39, NW-7, ITF, STF (2 of 5 bars), Code 93, Code 128 (including EAN128), EAN/UPC (A and E)
	Number of read digits	32 digits max. (depends on bar width and read size)
Reading performance *1	Resolution	0.15 mm (for PCS0.9)
	Contrast (PCS value)	0.45 min. (70% white reflectance min.)
	Reading distance	60 to 270 mm (with 1.0-mm thin bar)
	Reading angle	Within 40° (including left and right margins)
	Skew angle	±50° (excluding the upper 10° and lower 5° ranges)
	Pitch angle	±25° (25° right and left)
	Light source	Red laser diode (wavelength: 650 nm)
	Optical output	1.0 mW max.
	Scan type	Raster scan
	Number of scans	500 scans/s
	Number of read repetitions	2 to 6 times
	Reading verification	Buzzer and LED indicators
Interfaces	Communications specifications	RS-232C
	OK/NG output (V500-R521B2 only)	30 mA at 24 VDC, NPN open-collector output
Function setting method		Menu sheet reading or host commands
Read trigger		· External trigger (transistor input) · Trigger by command (RS-232C) · Test read trigger with the TEST Button on the Reader
Read results output	RS-232C output	Read data is output.
	OK/NG signal (V500-R521B2 only)	The OK signal turns ON when reading is successful. The NG signal turns ON when reading fails.
	LED indicators	The OK indicator lights when reading is successful. The NG indicator lights when reading fails.
	Buzzer	The buzzer sounds when reading is successful. (The buzzer can be muted.)
Power supply specifications	Power supply voltage	5 VDC ±10% *2
	Current consumption	220 mA typ. (330 mA max.)
	Inrush current	2.5 A max.
Environment	Ambient temperature	Operating: 0 to 45°C, Storage: -10°C to 60°C (with no icing or condensation)
	Ambient humidity	Operating and storage: 30% to 85% (with no icing or condensation)
	Vibration resistance	12 to 100 Hz, 19.6 m/s2 acceleration in X, Y, and Z directions for 3 hours each
	Allowable ambient light	3,000 lx max. (fluorescent light; excluding inverter fluorescent lighting)
Enclosure rating		IP54 (IEC 60529 standard)
Weight		80 g (excluding cable and connector)
I/O connector		V500-R521B2: Cable output
		V500-R521C2: DIN 8-pin connector
Cable length		2 m

*1 Unless otherwise specified, specifications are for a barcode set to JAN 1´ with an MRD of 63% or higher (a PCS value of 0.9 or higher) is used with the pitch angle (a) set to 0°, the skew angle (b) set to 15°, the tilt angle (g) set to 0°, and the curvature (R) set to infinity.

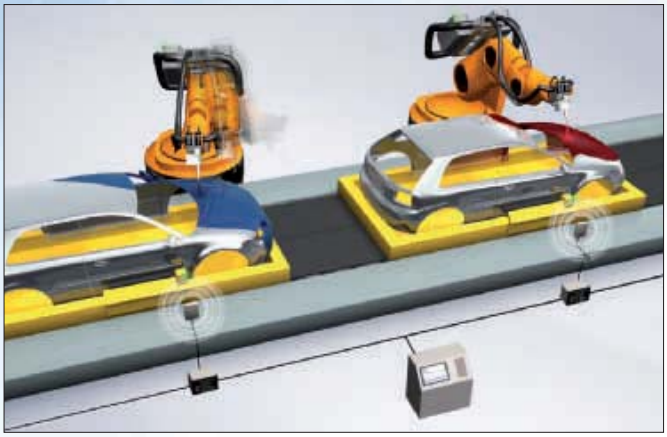
*2 The power supply voltage is specified at the I/O connector of the Barcode Reader

V680 RFID SYSTEM

One for all

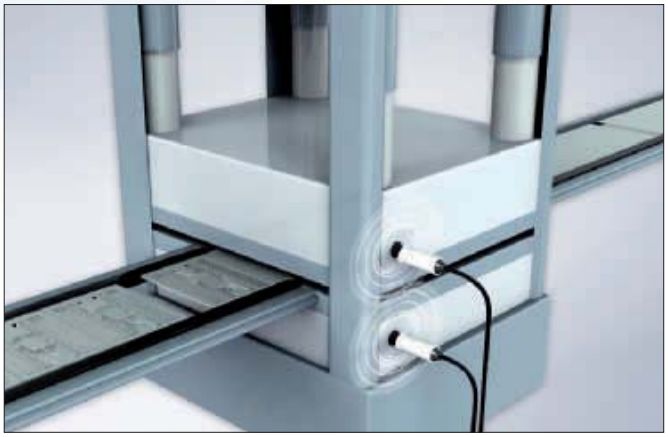
The powerful Omron V680 series offers a complete set of tags, antennas and control devices for any RFID application. V680 can run in an autonomous stand alone environment as well as in high speed communication with PLCs. A wireless handheld RFID reader complements the portfolio.

- Diagnostic functions for maintenance
- One for all: modular platform concept
- Flexible installation: Long range antennas
- Fit for speed: Short communication time
- Save time & costs: easy setup & maintenance



Production ID system for the paint shop

A RFID system is used to store the process parameters needed for the production of the car throughout the process. Harsh conditions through chemicals and high temperatures occur during the production steps. RFID is ideal for this application as it features high resistance tags for tough conditions.

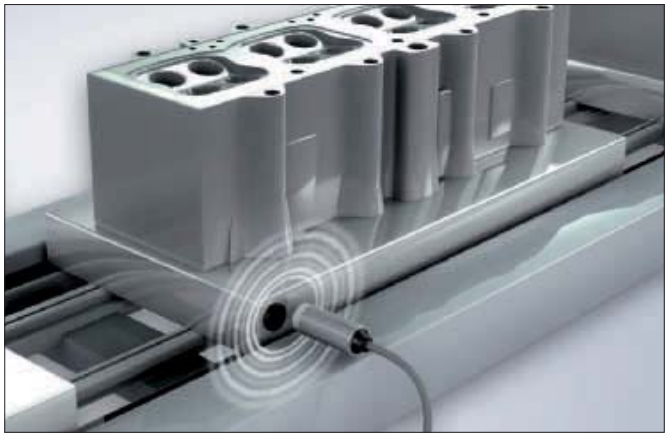


Monitoring of the moulding history

Process and maintenance related information of a moulding press can be stored by using RFID. The information can be read out permanently or on demand from a remote location and can be used to control the process.

YOUR BENEFITS

- High speed air communication
- Standardized protocol (ISO15693)
- Large memory (up to 32kByte) and very compact tags
- Long life time of tags (FERAM variants)
- All protocols for PLC communication



Traceability of automotive parts

Track the parts in the production process. Process related information can be stored to guarantee high quality production.

Carrier Management

For the administration and traceability of transport carriers along the hole process RFID represents a smart solution. V680 is working on the standardized universal frequency of 13.56MHz. The flexible platform with its versatile and compact design can be easily integrated into any point in the production process.

V680 RFID Platform overview

Mobile transponder (FeRAM + EEPROM)

Please refer to the datasheet for the recommended antennas

V680-D1KP52MT, 1 kByte (metal mounting)
V680-D2KF52M, 2 kByte (metal mounting)

V680-D1KP66T, 2 kBytes
V680-D1KP66MT, 1 kBytes (metal mounting)

V680-D2KF67, 2 kBytes
V680-D2KF67M, 2 kBytes (metal mounting)
V680-D8KF67, 8 kBytes
V680-D8KF67M, 8 kBytes (metal mounting)

V680-D1KP66T-SP, 1 kByte
(PFA enclosure / chemical resistant)

V680-D8KF68, 8 kBytes
V680-D32KF68, 32 kBytes

Other tags are available on request.

Wireless data acquisition

Antenna/Interrogator*

V680-HS51/M12

V680-HS52/M22

V680-HS63, rectangular

V680-HS65, rectangular

Amplifier*

V680-HA63A, 1kByte
V680-HA63B, >1kByte

Amplifier with noise measurement function (for use of serial controller or PLC unit)

Please contact your local Sales Representative to recommend you best suitable tag/antenna combination.

V680-H01-V2, rectangular
(with integrated amplifier)

Handheld reader/writer

Handheld reader
USB for PC/IPC use
V680 CHUD (V680-CH1D / RS232 / 5V DC connector)

Handheld reader
RS-232C for handheld terminal
V680-CH1D-PSI
5V AC adapter for V680-CH1D: E3X-MC11-S-PS3 BYOMG

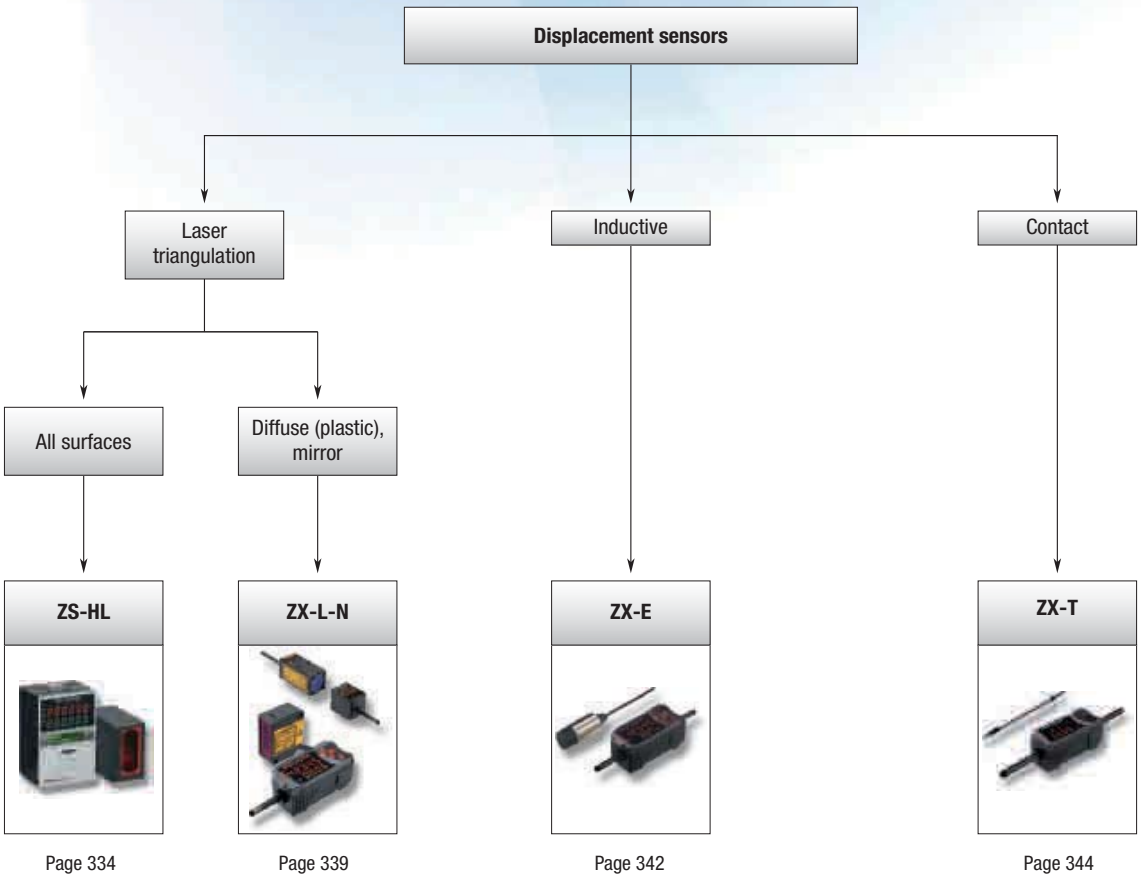
Controlling device	Feature and benefits	Communication and system integration
Easy to maintain 1/2 controller for long wired serial communication V680-CA5D01-V2 (1 channel) V680-CA5D02-V2 (2 channels) 	High speed communication system noise and distance measurement for self diagnosis and preventive maintenance. Protocol analyzer function comfortable software for quick start-up and operation.	**Serial communication for long wiring (<500 m)**
Modular multi functional RFID communication system CJ1W-V680-C11 (1 channel) CJ1W-V680-C12 (2 channels) CS1W-V680-C11 (1 channel) CS1W-V680-C12 (2 channels) 	Future-proofed RFID system with enhanced connectivity and additional functionality. Up to 160 antennas can be cascaded Multi-functional intelligent controller for multi-purpose use. V680-C#-SYS can be operated as multi-tasking stand-alone system beside of existing PLC setups CX-One Software allows easy integration using function blocks.	**Advanced modular RFID communication system:** **- Ethernet IP** **- DeviceNet** **- PROFIBUS-DP** **- CAN** **- CompoBus/S**
V680-HAM81 PNP ID Flag Sensor V680-HAM91 NPN ID Flag Sensor 	Cost effective DeviceNet slave controller with integrated amplifier for direct connection to any DeviceNet nodes.	**DeviceNet fieldbus high speed communication (integrated amplifier)**
ID Flag Sensor (PNP/NPN) V680-HAM81/HAM91 	Easy to setup ID flag system addressing up to 64.000 ID's.	**ID flag sensor communication**
Handheld Terminal V680-A-7527S-G2-EG-S 	Wireless handheld to R/W data at any time in production process or logistics. Further possibility to communicate on PC/IPC platform via USB. Demosoftware is pre-installed.	**Handheld/PLC/PC communication**

HIGH PRECISION QUALITY INSPECTION

Zero defect becomes reality – scalable accuracy in inspection

The Smart displacement sensor family offers a modular and scalable approach to solve the most challenging measurement tasks. The powerful portfolio enables you to measure profiles, thickness, distance, evenness/warpage, as well as width, edge, etc. Several measurement profiles can be performed simultaneously, using a single- or multi-controller unit. Aided by Omron's advanced technologies, the highest accuracy over long distances, speed and reliability will be achieved.

- Accurate and fast – 0.25 µm at less than 110 µs sampling time
- Scalable – multi-controller unit to coordinate and calculate up to 9 units
- Smart – data storage and remote control via networking capabilities



Measurement sensors

- Profile
  - **ZG2**

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- Position/ Diameter/Width
  - **ZX-GT**

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Selection table

		1D smart laser measuring sensors		Inductive measuring sensors
				
Selection criteria	Model	ZS-HL	ZX-L-N	ZX-E
	Measurement range Z Min.	10 ±0.5 mm	30 ±2 mm	0.5 mm
	Max.	1500 ±500 mm	300 ±200 mm	7 mm
	Measurement range X Min.	–	–	–
	Max.	–	–	–
	Resolution Z	0.25 µm	0,25 µm	1 µm
	Resolution X	–	–	–
	Linearity (±% of full scale)	0.05%	0,2%	0.5%
	Response time	110 µs	150 µs	150 µs
	Spot beam	■	■	–
	Line beam	■	■	–
	IP-rating head	IP64/IP67	IP50	IP67
	IP-rating controller	IP40	IP40	IP40
	Ambient oper. temperature	0 to 50°C	0 to 50°C	0 to 50°C
	Number of connectable sensors	9	5	5
Features	Thickness measurement	■	■	■
	Eccentricity	■	■	■
	Height	■	■	■
	Step	■	■	■
	Profile	–	–	–
	Distance	–	–	■
	Evenness	–	–	■
	Warpage	–	–	■
	Edge	–	–	–
	Width	–	–	–
	Peak	■	■	■
	Peak to peak	■	■	■
	Bottom	■	■	■
	Self-trigger	■	■	■
	Calibration	■	■	–
	Signal scaling	–	–	■
	PC-software	■	■	■
Application	Mirror	■	–	–
	Glass	■	–	–
	Metal	■	□	■
	Plastic	■	■	–
	Black rubber	■	–	–
	Paper	■	□	–
Supply voltage	12 to 24 VDC	–	■	■
	21.6 to 26.4 VDC	■	–	–
Control I/O	4 to 20 mA	■	■	■
	1 to 5 VDC	–	■	■
	Judgement output High/Pass/Low	■	■	■
	Trigger	■	■	■
Commu-nication	RS-232C	■	■	■
	USB2.0	■	–	■
	Page	334	339	342

		Contact measuring sensors	Profile measuring sensor	Smart laser micrometer
				
Selection criteria	Model	ZX-T	ZG2	ZX-GT
	Measurement range Z Min.	1 mm	20 ±0.5 mm	–
	Max.	10 mm	210 ±30 mm	28 mm
	Measurement range X Min.	–	3 mm	–
	Max.	–	70 mm	–
	Resolution Z	0.1 µm	0.2 µm	10 µm
	Resolution X	–	3 mm/631 pixels	–
	Linearity (±% of full scale)	0.3%	0.5%	0.1%
	Response time	1 ms	5 ms	150 µs
	Spot beam	–	–	–
	Line beam	–	□	–
	IP-rating head	IP67	IP64/66	IP40
	IP-rating controller	IP40	IP20	IP40
	Ambient oper. temperature	0 to 50°C	0 to 50°C	0 to 50°C
	Number of connectable sensors	7	1	5
Features	Thickness measurement	■	■	■
	Eccentricity	■	■	■
	Height	■	■	■
	Step	■	■	■
	Profile	–	□	–
	Distance	■	–	–
	Evenness	■	–	–
	Warpage	■	–	–
	Edge	–	–	■
	Width	–	□	■
	Peak	■	■	■
	Peak to peak	■	■	■
	Bottom	■	■	■
	Self-trigger	■	■	■
	Calibration	–	■	–
	Signal scaling	■	–	■
	PC-software	■	■	■
Application	Mirror	■	■	■
	Glass	■	■	■
	Metal	■	■	■
	Plastic	■	■	■
	Black rubber	■	■	■
	Paper	–	■	■
Supply voltage	12 to 24 VDC	■	–	■
	21.6 to 26.4 VDC	–	■	■
Control I/O	4 to 20 mA	■	■	■
	1 to 5 VDC	■	–	■
	Judgement output High/Pass/Low	■	■	■
	Trigger	■	■	■
Commu-nication	RS-232C	■	■	■
	USB2.0	–	■	–
	Page	344	347	351

■ Standard □ Available – No/not available

The scalable high-precision laser measurement sensor

The ZS laser sensor family provides outstanding measurement performance on all kind of materials. Its huge range of sensor heads and scalable concept makes it a versatile platform for all high precision sensing applications.

- Highest resolution and dynamic sensing range for all surfaces
- Modular and scalable platform concept for up to 9 sensors
- Easy to use, install and maintain for all user levels
- Fast response time of 110 µs
- Multi-tasking capability – manages up to 4 measurement tools in one controller

Ordering information

Sensors

ZS-HL-series sensor heads

Optical system	Sensing distance	Beam shape	Beam diameter	Resolution*1	Order code
Regular reflective models	20±1 mm	Line beam	1.0 mmx20 µm	0.25 µm	ZS-HLDS2T
	25±2 mm		2.2 mmx45 µm	0.6 µm	ZS-HLDS2VT
Diffuse reflective models	50±5 mm		1.0 mmx30 µm	0.25 µm	ZS-HLDS5T
	100±20 mm		3.5 mmx60 µm	1 µm	ZS-HLDS10
	600±350 mm		16 mmx0.3 mm	8 µm	ZS-HLDS60
	1500±500 mm		40 mmx1.5 mm	500 µm	ZS-HLDS150

*1 Refer to the table of ratings and specifications for details.

ZS-HL-series sensor heads (for nozzle gaps) also compatible with ZS-L controller

Optical system	Sensing distance	Beam shape	Beam diameter	Resolution*1	Order code
Regular reflective models	10±0.5 mm	Line beam	900x25 µm	0.25 µm	ZS-LD10GT
	15±0.75 mm				ZS-LD15GT

*1 Refer to the table of ratings and specifications for details.

ZS-L-series sensor heads

Optical system	Sensing distance	Beam shape	Beam diameter	Resolution*1	Order code
Regular reflective models	20±1 mm	Line beam	900x25 µm	0.25 µm	ZS-LD20T
		Spot beam	25 µm dia.		ZS-LD20ST
	40±2.5 mm	Line beam	2000x35 µm		ZS-LD40T
Diffuse reflective models	50±5 mm	Line beam	900x60 µm	0.8 µm	ZS-LD50
		Spot beam	50 µm dia.		ZS-LD50S
	80±15 mm	Line beam	900x60 µm	2 µm	ZS-LD80
	130±15 mm	Line beam	600x70 µm	3 µm	ZS-LD130
	200 ±50 mm	Line beam	900x100 µm	5 µm	ZS-LD200
	350 ±135 mm	Spot beam	240 µm dia.	20 µm	ZS-LD350S

*1 This is the peak-to-peak displacement conversion value in the displacement output at the measuring center distance in high-precision mode when the number of samples to average is set to 128 and the measuring mode is set to the high-resolution mode. The standard workpiece is white aluminium ceramics in diffuse reflection mode and glass in the regular reflection mode.

ZS-HL-series sensor controllers

Supply voltage	Control outputs	Order code
24 VDC	NPN outputs	ZS-HLDC11
	PNP outputs	ZS-HLDC41
		ZS-HLDC41A (incl. USB cable + Smart monitor)

Multi-controllers

Supply voltage	Control outputs	Order code
24 VDC	NPN outputs	ZS-MDC11
	PNP outputs	ZS-MDC41

Data storage units

Supply voltage	Control outputs	Order code
24 VDC	NPN outputs	ZS-DSU11
	PNP outputs	ZS-DSU41

Accessories (sold separately)

Controller link

Item	Order code
Controller link	ZS-XCN

Panel mount adapter

Model	Order code
For 1st controller	ZS-XPM1
For expansion (from 2nd controller on)	ZS-XPM2

Cables for connecting to a Personal Computer

Type	Quantity	Order code
RS-232C	1	ZS-XRS2
USB	1	ZS-XUSB2

Extension cables for sensor heads

Cable length	Quantity	Order code
1 m	1	ZS-XC1A
4 m	1	ZS-XC4A
5 m	1	ZS-XC5B*1,*2
8 m	1	ZS-XC8A
10 m	1	ZS-XC10B*1

*1 Up to two ZS-XC_B cables can be connected (22 m max.).
*2 A robot cable (ZS-XC5BR) is also available.

Logging software

Item	Order code
Smart monitor zero professional	ZS-SW11E

Memory card

Model	Order code
64 MB	F160-N64S(S)
128 MB	QM300-N128S
256 MB	F160-N256S

Safety precautions for using laser equipment

Laser Label Indications

Attach the following warning label to the side of the ZS-L-series Sensor Head.

Specifications

Sensor heads

ZS-HL-series sensor heads

Item		ZS-HLDS2T		ZS-HLDS2VT	ZS-HLDS5T		ZS-HLDS10		ZS-HLDS60	ZS-HLDS150
Applicable controllers		ZS-HLDC series								
Optical system		Regular reflection	Diffuse reflection	Regular reflection	Regular reflection	Diffuse reflection	Regular reflection	Diffuse reflection	Diffuse reflection	Diffuse reflection
Measuring center distance		20 mm	5.2 mm	25 mm	44 mm	50 mm	94 mm	100 mm	600 mm	1,500 mm
Measuring range		±1 mm	±1 mm	±2 mm	±4 mm	±5 mm	±16 mm	±20 mm	±350 mm	±500 mm
Light source		Visible semiconductor laser (wavelength: 650 nm, 1 mW max., JIS Class							Visible semiconductor laser (wavelength 658 nm, 1 mW max., Class 2)	
Beam shape		Line beam								
Beam diameter*1		1.0 mmx20 µm		2.2 mmx45 µm	1.0 mmx30 µm		3.5 mmx60 µm		0.3 mmx16 mm	1.5 mmx40 mm
Linearity*2		±0.05% F.S.		±0.2 %F.S.	±0.1% F.S.				±0.07 %F.S. (250 mm to 750 mm) ±0.1% F.S. (750 mm to 950 mm)	±0.2 %F.S.
Resolution*3		0.25 µm (No. of samples to average: 256)		0.5 µm (No. of samples to average: 128)	0.25 µm (No. of samples to average: 512)		1 µm (No. of samples to average: 64)		8 µm (average 64) (at 250 mm) 40 µm (average 64) (at 600 mm)	500 µm (average 64)
Temperature characteristic*4		0.01% F.S./°C		0.1% F.S./°C	0.01% F.S./°C					
Sampling cycle		110 µs (high-speed mode), 500 µs (standard mode), 2.2 ms (high-precision mode), 4.4 ms (high-sensitivity mode)								
Indicators	NEAR indicator	Lights near the measurement center, and nearer than the measurement center distance inside the measuring range. Flashes when the measurement target is outside of the measuring range or when the received light amount is insufficient.								
	FAR indicator	Lights near the measurement center, and further than the measurement center distance inside the measuring range. Flashes when the measurement target is outside of the measuring range or when the received light amount is insufficient.								
Operating ambient illumination		Illumination on received light surface 3,000 lx or less (incandescent light)							Illumination on received light surface 1,000 lx or less (incandescent light)	Illumination on received light surface 500 lx or less (incandescent light)
Ambient temperature		Operating: 0 to +50°C, storage: -15 to +60°C (with no icing or condensation)								
Ambient humidity		Operating and storage: 35% to 85% (with no condensation)								
Degree of protection		IP64		IP67	Cable length 0.5 m: IP66, cable length 2 m: IP67				IP66 (IEC60529)	
Vibration resistance (destructive)		10 to 150 Hz, 0.7 mm double amplitude, 80 min each in X, Y, and Z directions								
Shock resistance (destructive)		150 m/s² 3 times each in six directions (up/down, left/right, forward/backward)								
Materials		Case: aluminium die-cast, front cover: glass								
Cable length		0.5 m, 2 m		2 m	0.5 m, 2 m					
Weight		Approx. 350 g			Approx. 600 g				Approx. 800 g	

*1 Defined as 1/e² (13.5%) of the center optical intensity in the measurement center distance. The beam diameter is sometimes influenced by the ambient conditions of the workpiece such as leaked light from the main beam.

*2 This is the error on the measured value with respect to an ideal straight line. Linear curve may change according to the workpiece. The following lists the workpieces

Model	Diffusive reflection	Mirror reflection
ZS-HLDS2T	SUS block	Glass
ZS-HLDS5T/HLDS10	White alumina ceramic	Glass
ZS-HLDS60/HLDS150	White alumina ceramic	-
ZS-HLDS2VT	-	Glass

*3 This is the "peak-to-peak" displacement conversion value of the displacement output in the measurement center distance when high-resolution mode and the average number in the table are set (For ZS-HLDS60, the maximum resolution at 250 mm is also included). The following lists the workpieces.

Model	Diffusive reflection	Mirror reflection
ZS-HLDS2T	SUS block	Glass
ZS-HLDS5T	White alumina ceramic	Glass
ZS-HLDS10	White alumina ceramic	
ZS-HLDS60/HLDS150	White alumina ceramic	-
ZS-HLDS2VT	-	Glass

*4 Value obtained when the sensor part and object part are fixed with an aluminium jig.

ZS-L-series sensor heads

Item		ZS-LD20T		ZS-LD20ST		ZS-LD40T		ZS-LD10GT	ZS-LD15GT
Applicable controllers		ZS-HLDC/LDC series							
Optical system		Regular reflection	Diffuse reflection	Regular reflection	Diffuse reflection	Regular reflection	Diffuse reflection	Regular reflection	
Measuring center distance		20 mm	6.3 mm	20 mm	6.3 mm	40 mm	30 mm	10 mm	15 mm
Measuring range		±1 mm	±1 mm	±1 mm	±1 mm	±2.5 mm	±2 mm	±0.5 mm	±0.75 mm
Light source		Visible semiconductor laser (wavelength: 650 nm, 1 mW max., JIS Class 2)							
Beam shape		Line beam		Spot beam		Line beam			
Beam diameter*1		900 x 25 µm		25 µm dia.		2,000 x 35 µm		Approx. 25 x 900 µm	
Linearity*2		±0.1%F.S							
Resolution*3		0.25 µm		0.25 µm		0.4 µm		0.25 µm	0.25 µm
Temperature characteristic*4		0.04% FS/°C		0.04% FS/°C		0.02% FS/°C		0.04% FS/°C	
Sampling cycle*5		110 µs (high-speed mode), 500 µs (standard mode), 2.2 ms (high-precision mode), 4.4 ms (high-sensitivity mode)							
Indicators	NEAR indicator	Lights near the measuring center distance, and nearer than the measuring center distance inside the measuring range. Flashes when the measurement target is outside of the measuring range or when the received light amount is insufficient.							
	FAR indicator	Lights near the measuring center distance, and further than the measuring center distance inside the measuring range. Flashes when the measurement target is outside of the measuring range or when the received light amount is insufficient.							
Operating ambient illumination		Illumination on received light surface: 3,000 lx or less (incandescent light)							
Ambient temperature		Operating: 0 to 50°C, storage: -15 to 60°C (with no icing or condensation)							
Ambient humidity		Operating and storage: 35% to 85% (with no condensation)							
Degree of protection		Cable length 0.5 m: IP66, cable length 2 m: IP67						IP40	
Materials		Case: Aluminium die-cast, front cover: Glass							
Cable length		0.5 m, 2 m							
Weight		Approx. 350 g						Approx. 400 g	
Accessories		Laser labels (1 each for JIS/EN, 3 for FDA), ferrite cores (2), insure Locks (2), instruction sheet						Laser safety labels (1 each for JIS/EN),ferrite cores (2), insure locks (2)	

*1 Defined as 1/e² (13.5%) of the center optical intensity at the actual measurement center distance (effective value). The beam diameter is sometimes influenced by the ambient conditions of the workpiece, such as leaked light from the main beam.
*2 This is the error in the measured value with respect to an ideal straight line. The standard workpiece is white aluminium ceramics in diffuse reflection mode and glass in the regular reflection mode of the ZS-LD20T/40T/50. Linearity may change according to the workpiece.
*3 This is the peak-to-peak displacement conversion value in the displacement output at the measuring center distance in high-precision mode when the number of samples to average is set to 128 and the measuring mode is set to the high-resolution mode. The standard workpiece is white aluminium ceramics in diffuse reflection mode and glass in the regular reflection mode.
*4 This is the value obtained at the measuring center distance when the Sensor and workpiece are fixed by an aluminium jig.
*5 This value is obtained when the measuring mode is set to the high-speed mode.

ZS-L-series sensor heads

Item		ZS-LD50		ZS-LD50S		ZS-LD80		ZS-LD130		ZS-LD200		ZS-LD350S
Applicable controllers		ZS-HLDC/LDC series										
Optical system (reflection)		Diffuse	Regular	Diffuse	Regular	Diffuse	Regular	Diffuse	Regular	Diffuse	Regular	Diffuse
Measuring center distance		50 mm	47 mm	50 mm	47 mm	80 mm	78 mm	130 mm	130 mm	200 mm	200 mm	350 mm
Measuring range		±5 mm	±4 mm	±5 mm	±4 mm	±15 mm	±14 mm	±15 mm	±12 mm	±50 mm	±48 mm	±135 mm
Light source		Visible semiconductor laser (wavelength: 650 nm, 1 mW max., JIS Class 2)										
Beam shape		Line beam		Spot beam		Line beam		Line beam		Line beam		Spot beam
Beam diameter*1		900 x 60 µm		50 µm dia.		900 x 60 µm		600 x 70 µm		900 x 100 µm		240 µm dia.
Linearity*2		±0.1%F.S.							±0.25%F.S.	±0.1%F.S.	±0.25%F.S.	±0.04%F.S.
Resolution*3		0.8 µm		0.8 µm		2 µm		3 µm		5 µm		20 µm
Temperature characteristic*4		0.02% FS/°C		0.02% FS/°C		0.01% FS/°C		0.02% FS/°C		0.02% FS/°C		0.04% FS/°C
Sampling cycle*5		110 µs (high-speed mode), 500 µs (standard mode), 2.2 ms (high-precision mode), 4.4 ms (high-sensitivity mode)										
Indicators	NEAR indicator	Lights near the measuring center distance, and nearer than the measuring center distance inside the measuring range. Flashes when the measurement target is outside of the measuring range or when the received light amount is insufficient.										
	FAR indicator	Lights near the measuring center distance, and further than the measuring center distance inside the measuring range. Flashes when the measurement target is outside of the measuring range or when the received light amount is insufficient.										
Operating ambient illumination		Illumination on received light surface: 3,000 lx or less (incandescent light)						Illumination on received light surface: 2,000 lx or less (incandescent light)		Illumination on received light surface: 3,000 lx or less (incandescent light)		
Ambient temperature		Operating: 0 to 50°C, storage: -15 to 60°C (with no icing or condensation)										
Ambient humidity		Operating and storage: 35% to 85% (with no condensation)										
Degree of protection		Cable length 0.5 m: IP66, cable length 2 m: IP67										
Materials		Case: AAluminium die-cast, front cover: Glass										
Cable length		0.5 m, 2 m										
Weight		Approx. 350 g										
Accessories		Laser labels (1 each for JIS/EN, 3 for FDA), ferrite cores (2), insure Locks (2), instruction sheet										

*1 Defined as 1/e² (13.5%) of the center optical intensity at the actual measurement center distance (effective value). The beam diameter is sometimes influenced by the ambient conditions of the workpiece, such as leaked light from the main beam.
*2 This is the error in the measured value with respect to an ideal straight line. The standard workpiece is white aluminium ceramics in diffuse reflection mode and glass in the regular reflection mode of the ZS-LD20T/40T/50. Linearity may change according to the workpiece.
*3 This is the peak-to-peak displacement conversion value in the displacement output at the measuring center distance in high-precision mode when the number of samples to average is set to 128 and the measuring mode is set to the high-resolution mode. The standard workpiece is white aluminium ceramics in diffuse reflection mode and glass in the regular reflection mode.
*4 This is the value obtained at the measuring center distance when the sensor and workpiece are fixed by an aluminium jig.
*5 This value is obtained when the measuring mode is set to the high-speed mode.

Sensor controllers

ZS-HL-series sensor controllers

Item			ZS-HLDC11	ZS-HLDC41
NPN/PNP			NPN	PNP
No. of samples to average			1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1,024, 2,048, or 4,096	
Number of mounted sensors			1 per sensor controller	
External interface	Connection method		Serial I/O: connector, other: pre-wired (standard cable length: 2 m)	
	Serial I/O	USB 2.0	1 port, full speed (12 Mbps max.), MINI-B	
		RS-232C	1 port, 115,200 bps. max.	
	Output	Judgement output	HIGH/PASS/LOW 3 outputs NPN open collector, 30 VDC, 50 mA max., residual voltage 1.2 V max	HIGH/PASS/LOW: 3 outputs PNP open collector, 50 mA max., residual voltage 1.2 V max
		Linear output	Selectable from 2 types of output, voltage or current (selected by slide switch on bottom). Voltage output: .10 to 10 V, output impedance: 40 Ω Current output: 4 to 20 mA	
	Inputs	Laser OFF, ZERO reset timing, RESET	ON: Short-circuited with 0 V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Short-circuited to supply voltage or within 1.5 V of supply voltage. OFF: Open (leakage current: 0.1 mA max.)
Functions			Display: Measured value, threshold value, voltage/current, received light amount, and resolution/terminal block output Sensing: Mode, gain, measurement object, head installation Measurement point: Average, peak, bottom, thickness, step, and calculations Filter: Smooth, average, and differentiation Outputs: Scaling, various hold values, and zero reset I/O settings: Linear (focus/correction), judgments (hysteresis and timer), non-measurement, and bank (switching and clear) System: Save, initialization, measurement information display, communications settings, key lock, language, and data load Task: Single task or multitask (up to 4)	
Status indicators			HIGH (orange), PASS (green), LOW (orange), LDON (green), ZERO (green), and ENABLE (green)	
Segment display		Main digital	8-segment red LED, 6 digits	
		Sub-digital	8-segment green LEDs, 6 digits	
LCD			16 digitsx2 rows, colour of characters: green, resolution per character: 5x8 pixel matrix	
Setting inputs		Setting keys	Direction keys (UP, DOWN, LEFT, and RIGHT), SET key, ESC key, MENU key, and function keys (1 to 4)	
		Slide switch	Threshold switch (2 states: High/Low), mode switch (3 states: FUN, TEACH, and RUN)	
Power supply voltage			21.6 V to 26.4 VDC (including ripple)	
Current consumption			0.5 A max. (when sensor head is connected)	
Ambient temperature			Operating: 0 to 50°C, storage: -15 to +60°C (with no icing or condensation)	
Ambient humidity			Operating and storage: 35% to 85% (with no condensation)	
Degree of protection			IP20	
Materials			Case: Polycarbonate (PC)	
Weight			Approx. 280 g (excluding packing materials and accessories)	
Accessories			Ferrite core (1), instruction sheet	

ZS-MDC11/MDC41 multi controllers

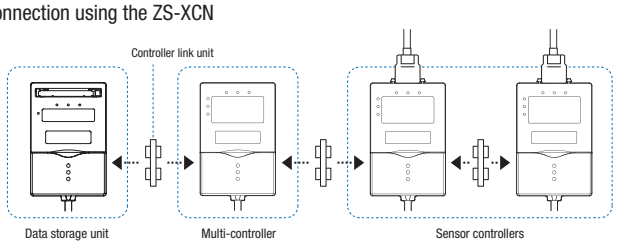
Basic specifications are the same as those for the sensor controllers.

The following points, however, are different.

(1) Sensor heads cannot be connected.
(2) A maximum 9 of controllers can be connected. Control link units are required to connect controllers.
(3) Processing functions between controllers: Math functions

Controller link unit

Connection using the ZS-XCN



Data storage units

Sensor controllers	Model		ZS-DSU11	ZS-DSU41
Number of mounted censor heads			Cannot be connected	
Number of connectable controllers			10 controllers max. (ZS-MDC: 1 controller, ZS-HLDC: 9 controllers max.)*1	
Connectable controllers			ZS-HLDC__, ZS-MDC__	
External interface	Connection method		Serial I/O: connector, other: pre-wired (standard cable length: 2 m)	
	Serial I/O	USB 2.0	1 port, full speed (12 Mbps), MINI-B	
		RS-232C	1 port, 115,200 bps max.	
	Outputs		3 outputs: HIGH, PASS, and LOW NPN open-collector, 30 VDC, 50 mA max., residual voltage: 1.2 V max.	3 outputs: HIGH, PASS, and LOW PNP open-collector, 50 mA max., residual voltage: 1.2 V max.
	Inputs		ON: Short-circuited with 0V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Short-circuited to supply voltage or within 1.5 V of supply voltage OFF: Open (leakage current: 0.1 mA max.)
Data resolution			32 bits	
Functions	Logging trigger functions		Start and stop triggers can be set separately; external triggers, data triggers (self-triggers), and time triggers	
	Other functions		External banks, alarm outputs, saved data format customization, and clock	
Status indicators			OUT (orange), PWR (green), ACCESS (orange), and ERR (red)	
Segment display			8-segment green LEDs, 6 digits	
LCD			16 digitsx2 rows, colour of characters: green, resolution per character: 5x8 pixel matrix	
Setting inputs		Setting keys	Direction keys (UP, DOWN, LEFT, and RIGHT), SET key, ESC key, MENU key, and function keys (1 to 4)	
		Slide switch	Threshold switch (2 states: High/Low), mode switch (3 states: FUN, TEACH, and RUN)	

Sensor controllers Model	ZS-DSU11	ZS-DSU41
Power supply voltage	21.6 V to 26.4 VDC (including ripple)	
Current consumption	0.5 A max.	
Ambient temperature	Operating: 0 to 50°C, storage: -15 to 60°C (with no icing or condensation)	
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)	
Materials	Case: Polycarbonate (PC)	
Weight	Approx. 280 g (excluding packing materials and accessories)	
Accessories	Ferrite core (1) instruction sheet, tools for data storage unit: CSV file converter for data storage unit, smart analyzer macro edition (Excel macros for analysis of collected data)	

*1 Control link units are required to connect controllers.

Smart, fast and accurate laser measurement sensor

Smart ZX-L-N offers plug & measure technology for applications where high resolution and fast response time is required. A wide range of interchangeable sensor heads provide greater flexibility in solving most demanding applications.

- Small and light sensor heads for easy integration
- High speed response time of 150 µs
- Easy sensor head replacement
- Scalability through a modular platform concept
- Multipoint measurement with up to 5 sensors
- Wide range of sensor heads offering laser beam width from 1 mm to 30 mm

Ordering information

Sensors

Sensor head (reflection type)

Optical method	Beam shape	Sensing distance	Resolution *1	Size in mm (HxWxD)	Order code
Diffuse-reflective	Spot beam	40±10 mm	2 µm	39x33x17	ZX-LD40
		100±40 mm	16 µm		ZX-LD100
		300±200 mm	300 µm		ZX-LD300
	Line beam	40±10 mm	2 µm		ZX-LD40L
		100±40 mm	16 µm		ZX-LD100L
		300±200 mm	300 µm		ZX-LD300L
Regular reflection type	Spot beam	30±2 mm	0.25 µm	45x55x25	ZX-LD30V
	Line beam				ZX-LD30VL

*1 At average count of 4,096 times

Sensor head (through-beam)

Optical method	Measurement width	Sensing distance	Resolution *1	Size in mm (HxWxD)		Order code
				Transmitter	Receiver	
Through-beam	1 mm dia.	0 to 2,000 mm	4 µm	15x15x34	15x15x19	ZX-LT001
	5 mm	0 to 500 mm				ZX-LT005
	10 mm			20x20x42	20x20x25	ZX-LT010
	30 mm		12 µm	64.25x70x22.6	64.25x54x22.6	ZX-LT030

*1 At average count of 64 times

Amplifier units

Power supply	Output specifications	Order code
DC	NPN output	ZX-LDA11-N
	PNP output	ZX-LDA41-N

Note: Compatible with sensor head connection.

Accessories (order separately)

Calculating unit

	Order code
Calculating unit	ZX-CAL2

Side-view attachments

Applicable sensor head	Order code
ZX-LT1001/LT005	ZX-XF12
ZX-LT010	ZX-XF22

SmartMonitor sensor setup tool for Personal Computer connection

Name	Order code
ZX-series communications interface unit	ZX-SF11
ZX-series communications interface unit + Setup Software (CD-ROM)	ZX-SFW11EV3*1,*2
ZX-series sensor setup and logging software (CD-ROM)	ZX-SW11EV3*1

*1 When using the ZX-TDA11/41 with the SmartMonitor, either the ZX-SFW11EV3 or the ZX-SW11EV3 SmartMonitor must be used. Earlier versions cannot be used.
*2 The ZX-SFW11EV3 SmartMonitor can be used only to set functions and monitor waveforms.

Cables with connectors on both ends (for extension)*1

Cable length	Order code
1 m	ZX-XC1A
4 m	ZX-XC4A
8 m	ZX-XC8A
9 m*2.	ZX-XC9A

*1. Robot cable models are also available. The model numbers are ZX-XC_R.
*2. For use only with reflective sensors.

Specifications

Sensor head (reflection type)

Item	ZX-LD40	ZX-LD100	ZX-LD300	ZX-LD30V	ZX-LD40L	ZX-LD100L	ZX-LD300L	ZX-LD30VL
Optical method	Diffuse reflection			Regular reflection	Diffuse reflection			Regular reflection
Light source (wave length)	Visible-light semiconductor laser (wavelength 650 nm, 1 mW or less, Class 2)							
Measurement center distance	40 mm	100 mm	300 mm	30 mm	40 mm	100 mm	300 mm	30 mm
Measurement range	±10 mm	±40 mm	±200 mm	±2 mm	±10 mm	±40 mm	±200 mm	±2 mm
Beam shape	Spot				Line			
Beam diameter *1	50 µm dia.	100 µm dia.	300 µm dia.	75 µm dia.	75 µmx2mm	150 µmx2 mm	450 µmx2 mm	100 µmx1.8 mm
Resolution*2	2 µm	16 µm	300 µm	0.25 µm	2 µm	16 µm	300 µm	0.25 µm
Linearity*3	±0.2% F.S. (entire range)	±0.2% F.S. (80 to 121 mm)	±2% F.S. (200 to 401 mm)	±0.2% F.S. (entire range)	±0.2% F.S. (32 to 49 mm)	±0.2% F.S. (80 to 121 mm)	±2% F.S. (200 to 401 mm)	±0.2% F.S. (entire range)
Temperature characteristic*4	±0.03% FS/°C (except for ZX-LD300 and ZX-LD300L, which are ±0.1% FS/°C.)							
Ambient illumination	Incandescent lamp: 3,000 lx max. (on light receiving side)							
Ambient temperature	Operating: 0 to 50°C, storage: -15 to 60°C (with no icing or condensation)							
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)							
Insulation resistance	20 MΩ min. at 500 VDC							
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min							
Vibration resistance (destruction)	10 to 150 Hz, 0.7-mm double amplitude 80 min each in X, Y, and Z directions							
Shock resistance (destruction)	300 m/s^2 3 times each in six directions (up/down, left/right, forward/backward)							
Protective structure	IEC 60529 IP50			IEC standard IP40	IEC 60529 IP50			IEC standard IP40
Connection method	Connector relay (standard cable length: 500 mm)							
Weight (packed state)	Approx. 150 g			Approx. 250 g	Approx. 150 g			Approx. 250 g
Materials	Case: PBT (polybutylene terephthalate), Cover: Aluminium, lens: Glass			Case and cover: Aluminium, lens: Glass	Case: PBT (polybutylene terephthalate), Cover: Aluminium, lens: Glass			Case and cover: Aluminium, lens: Glass
Accessories	Instruction sheet, Laser warning label (English)							

*1 Beam diameter: This is the value of the measurement center distance (actual value), and is defined at 1/e^2 (13.5%) of the central light intensity. If there is stray light outside, the defined area and the area around the object has a higher reflectance than the object.
*2 Resolution: Indicates the amount of fluctuation (±3 δ) in the linear output when connected to the ZX-LDA. (The measured value when the average count of the ZX-LDA is set to 4,096 and our standard object (white ceramic) is used for the central distance.) This indicates the repeatability precision when the work is in a static state, and does indicate the distance precision. The resolution performance may not be satisfactory in a strong electromagnetic field.
*3 Linearity: This indicates the error with respect to the ideal straight line of the displacement output when measuring our standard object.
*4 Temperature characteristic: The temperature characteristic is measured at the measurement point with the sensor and reference object (Omron's standard reference object) secured with an aluminium jig.

Note: Highly reflective objects can result in incorrect detection by causing out-of-range measurements.

Sensor head (through-beam)

Item		ZX-LT001		ZX-LT005	ZX-LT010	ZX-LT030
Optical method		Through-beam				
Light source (wave length)		Visible-light semiconductor laser (wavelength 650 nm, 1 mW or less, Class 1)				
	Maximum output	0.2 mW max.		0.35 mW max.		0.2 mW max.
Measurement width		1 mm dia.	1 to 2.5 mm dia.	5 mm	10 mm	30 mm
Sensing distance		0 to 500 mm	500 to 2,000 mm	0 to 500 mm		
Min. sensing object		8 mm dia. opaque object	8 to 50 µm opaque object	opaque: 0.05 mm dia.	opaque: 0.1 mm dia.	opaque: 0.3 mm dia.
Resolution*1		4 µm*2	–	4 µm*3		12 µm*4
Temperature characteristic		±0.2% FS/°C				±0.3% FS/°C
Ambient illumination		Incandescent lamp: 10,000 lx max. (on light-receiving side)				
Ambient temperature		Operating: 0 to 50°C, storage: -25 to 70°C (with no icing or condensation)				
Ambient humidity		Operating: 35% to 85% (with no condensation)				
Protective structure		IEC 60529 IP40				IP 40
Connection method		Connector relay (standard cable length: 500 mm)				
Weight (packed state)		Approx. 220 g				Approx. 450 g
Cable length		Extendable up to 10 m with special extension cable.				
Materials	Case	Polyetherimide				Zinc die-cast
	Cover	Polycarbonate				
	Front filter	Glass				
Tightening torque		0.3 Nm max.				
Accessories		Instruction sheet, sensor head-amplifier connection cable				
		Optical axis adjustment seal				Mounting Bracket

*1 The amount of fluctuation (±3 δ) of the linear output when connected to an amplifier unit, converted to a detection span.
*2 When the average count is 64. 5 µm when the count is 32. The value when the smallest detection object shades the vicinity of the center of the 1 mm dia. detection span.
*3 When the average count is 64. 5 µm when the count is 32.
*4 For an average count of 64. The value is 15 µm for an average count of 32.

Amplifier units

Item	ZX-LDA11-N	ZX-LDA41-N
Measurement period	150 μs	
Possible average count settings*1	1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1,024, 2,048, or 4,096	
Temperature characteristic	When connected to a reflective sensor head: 0.01% FS/°C, when connected to a through-beam sensor head: 0.1% FS/°C	
Linear output*2	4 to 20 mA/FS, max. load resistance: 300 Ω, ±4 V (± 5 V, 1 to 5 V *3), output impedance: 100 Ω	
Judgement outputs (3 outputs: HIGH/PASS/LOW)*1	NPN open-collector outputs, 30 VDC, 50 mA max. Residual voltage: 1.2 V max.	PNP open-collector outputs, 30 VDC, 50 mA max. Residual voltage: 2 V max.
Laser OFF input, zero reset input, timing input, reset input	ON: Short-circuited with 0-V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Supply voltage short-circuited or supply voltage within 1.5 V OFF: Open (leakage current: 0.1 mA max.)
Functions	Measurement value display, present value/set value/light level/resolution display, scaling, display reverse, display OFF mode, ECO mode, number of display digit changes, sample hold, peak hold, bottom hold, peak-to-peak hold, self-peak hold, self-bottom hold, average hold, delay hold, intensity mode, zero reset, initial reset, ON-delay timer, OFF-delay timer, one-shot timer, deviation, previous value comparison, sensitivity adjustment, keep/clamp switch, direct threshold value setting, position teaching, 2-point teaching, automatic teaching, hysteresis width setting, timing inputs, reset input, monitor focus, linear output compensation, (A-B) calculations *4, (A+B) calculations *4, mutual interference *4, laser deterioration detection, zero reset memory, zero reset display, key lock	
Indications	Operation indicators: High (orange), pass (green), low (yellow), 7-segment main display (red), 7-segment subdisplay (yellow), laser ON (green), zero reset (green), enable (green)	
Power supply voltage	12 to 24 VDC ±10%, Ripple (p-p): 10% max.	
Current consumption	140 mA max. with power supply voltage of 24 VDC (with sensor connected)	
Ambient temperature	Operating: 0 to 50°C, storage: -15 to 60°C (with no icing or condensation)	
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)	
Insulation resistance	20 MΩ min. at 500 VDC	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min	
Vibration resistance (destruction)	10 to 150 Hz, 0.7-mm double amplitude 80 min each in X, Y, and Z directions	
Shock resistance (destruction)	300 m/s^2 3 times each in six directions (up/down, left/right, forward/backward)	
Connection method	Prewired (standard cable length: 2 m)	
Weight (packed state)	Approx. 350 g	
Materials	Case: PBT (polybutylene terephthalate), cover: Polycarbonate	
Accessories	Instruction sheet	

*1 The response speed of the linear output is calculated as the measurement period x (average count setting + 1) (with fixed sensitivity).
The response speed of the judgement outputs is calculated as the measurement period x (average count setting + 1) (with fixed sensitivity).
*2 The output can be switched between a current output and voltage output using a switch on the bottom of the amplifier unit.
*3 Setting is possible via the monitor focus function.
*4 A calculating unit (ZX-CAL2) is required.

Calculating unit

Item	ZX-CAL2
Applicable amplifier units	ZX-LDA11-N/41-N/ZX-EDA11/41/ZX-TDA11/41
Current consumption	12 mA max. (supplied from the smart sensor amplifier unit)
Ambient temperature	Operating: 0 to 50°C, storage: -15 to 60°C (with no icing or condensation)
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)
Connection method	Connector
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min
Insulation resistance	100 MΩ (at 500 VDC)
Vibration resistance (destructive)	10 to 150 Hz, 0.7-mm double amplitude 80 min each in X, Y, and Z directions
Shock resistance (destructive)	300 m/s^2 3 times each in six directions (up/down, left/right, forward/backward)
Materials	Display: Acrylic, case: ABS resin
Weight (packed state)	Approx. 50 g

ZX-series Communications Interface Unit

Item		ZX-SF11
Current consumption		60 mA max. (supplied by the amplifier unit)
Applicable amplifier units		ZX series
Applicable amplifier unit versions		ZX-LDA_1-N Ver. 1.000 or higher ZX-EDA_1 Ver. 1.100 or higher ZX-TDA_1 Ver. 1.000 or higher
Max. No. of amplifier units		5
Communications functions	Communications port	RS-232C port (9-pin D-Sub connector)
	Communications protocol	CompoWay/F*1
	Baud rate	38,400 bps
	Data configuration	Data bits: 8, parity: none, start bits: 1, stop bits: 1, flow control: none
Indicators		Power supply: green, sensor communications: green, sensor communications error: red, external terminal communications: green, external terminal communications error: red
Protective circuits		Reverse polarity protection
Ambient temperature		Operating: 0 to 50°C, storage: -15 to 60°C (with no icing or condensation)
Ambient humidity		Operating and storage: 35% to 85% (with no condensation)
Insulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strength		1,000 VAC, 50/60 Hz for 1 min, Leakage current: 10 mA max.
Materials		Case: PBT (polybutylene terephthalate), cover: Polycarbonate
Accessories		Instruction sheet, 2 clamps

*1 Contact your Omron representative for CompoWay/F communications specifications.

Smart inductive measurement sensor

ZX-E offers the best solution for the accurate measurement of metallic objects. It is highly recommended in harsh environments such as automotive and metal working machines.

- High resolution of 1 µm
- High speed response time of 150 µs
- Easy sensor head replacement
- Modular platform concept for different sensing technologies
- Easy linearity adjustment for any metal

Ordering information

Sensors

Sensor heads

Shape	Dimensions	Sensing distance	Resolution*1	Order code
Cylindrical	3 dia. x 18 mm	0.5 mm	1 µm	ZX-EDR5T
	5.4 dia. x 18 mm	1 mm		ZX-ED01T *2
	8 dia. x 22 mm	2 mm		ZX-ED02T *2
Screw-shaped	M10x22 mm	2 mm		ZX-EM02T *2
	M18x46.3 mm	7 mm		ZX-EM07MT *2
Flat	30x14x4.8 mm	4 mm		ZX-EV04T *2,*3
Heat-resistant, cylindrical	M12x22 mm	2 mm		ZX-EM02HT*4

*1 For an average count of 4,096.
*2 Models with protective spiral tubes are also available. Add a suffix of "-S" to the above model numbers when ordering. (Example: ZX-ED01T-S)
*3 Be sure to use ZX-EDA amplifier unit version 1,200 or later with the ZX-EV04.
*4 Be sure to use ZX-EDA amplifier unit version 1,300 or later with the ZX-EM02H.

Amplifier units

Power supply	Output type	Order code
DC	NPN	ZX-EDA11
	PNP	ZX-EDA41

Note: Compatible connection with the sensor head.

Accessories (order separately)

Calculating unit

	Model
Calculating unit	ZX-CAL2

Amplifier mounting brackets

Remarks	Model
Attached to each sensor head	ZX-XBE1
For DIN track mounting	ZX-XBE2

SmartMonitor sensor setup tool for Personal Computer connection

Name	Model
ZX-series communications interface unit	ZX-SF11
ZX-series communications interface unit + setup software (CD-ROM)	ZX-SFW11EV3*1
ZX-series sensor setup and logging software (CD-ROM)	ZX-SW11EV3

*1 The ZX-SFW11EV3 SmartMonitor can be used only to set functions and monitor waveforms.

Cables with connectors on both ends (for extension)*

Cable length	Model
1 m	ZX-XC1A
4 m	ZX-XC4A
8 m	ZX-XC8A

* Robot cable models are also available. The model numbers are ZX-XC_R.

Specifications

Sensor heads

Item		ZX-EDR5T	ZX-ED01T	ZX-ED02T/EM02T	ZX-EM07MT	ZX-EV04T	ZX-EM02HT
Measurement range		0 to 0.5 mm	0 to 1 mm	0 to 2 mm	0 to 7 mm	0 to 4 mm	0 to 2 mm
Sensing object		Magnetic metals (Measurement ranges and linearities are different for non-magnetic metals. Refer to engineering data on B-67.)					
Standard reference object		18x18x3 mm		30x30x3 mm	60x60x3 mm		45x45x3 mm
		Material: Ferrous (S50C)					
Resolution *1		1 µm					
Linearity *2		±0.5% F.S.					±1% F.S. *3
Linear output range		Same as measurement range.					
Temperature characteristic *4 (including amplifier unit)		0.15% F.S./°C	0.07% F.S./°C				0.1% F.S./°C
Ambient temperature	Operating *5	0 to 50°C (with no icing or condensation)	-10 to 60°C (with no icing or condensation)				-10 to 200°C
	Storage *5		-20 to 70°C (with no icing or condensation)				-20 to 200°C

Item			ZX-EDR5T	ZX-ED01T	ZX-ED02T/EM02T	ZX-EM07MT	ZX-EV04T	ZX-EM02HT
Ambient humidity			Operating and storage: 35% to 85% (with no condensation)					
Insulation resistance			50 MΩ min. (at 500 DC)					
Dielectric strength			1,000 VAC, 50/60 Hz for 1 min between charged parts and case					
Vibration resistance (destruction)			10 to 55 Hz with 1.5-mm double amplitude for 2 h each in X, Y, and Z directions					
Shock resistance (destruction)			500 m/s^2, 3 times each in X, Y, and Z directions					
Degree of protection (sensor head)			IEC60529, IP65	IEC60529, IP67				IEC60529, IP60 *6
Connection method			Connector relay (standard cable length: 2 m)					
Weight (packed state)			Approx. 120 g	Approx. 140 g		Approx. 160 g	Approx. 130 g	Approx. 160 g
Materials	Sensor head	Case	Brass	Stainless steel	Brass		Zinc (nickel-plated)	Brass
		Sensing surface	Heat-resistant ABS					PEEK
	Preamplifier		PES					
Accessories			Amplifier mounting brackets (ZX-XBE1), instruction manual					

*1 Accuracy: The resolution is the deviation (±3σ) in the linear output when connected to the ZX-EDA amplifier unit. The above values indicate the deviations observed 30 minutes after the power is turned ON.
(The resolution is measured with Omron's standard reference object at ½ of the measurement range with the ZX-EDA set for the maximum average count of 4,096 per period.)
The resolution is given at the repeat accuracy for a stationary workpiece, and is not an indication of the distance accuracy. The resolution may be adversely affected under strong electromagnetic fields.
*2 Linearity: The linearity is given as the error in an ideal straight line displacement output when measuring the standard reference object. The linearity and measurement values vary with the object being measured.
*3 The value given is for an ambient temperature of 25°C.
*4 Temperature characteristic: The temperature characteristic is measured with Omron's standard reference object at ½ of the measurement range.
*5 The ambient temperature given is only for the sensor head. It is -10 to 60°C for the preamp.
*6 Do not use in moist environments because the case is not waterproof.

Amplifier units

Item	ZX-EDA11	ZX-EDA41
Measurement period	150 µs	
Possible average count settings*1	1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1,024, 2,048, or 4,096	
Linear output*2	Current output: 4 to 20 mA/F.S., max. load resistance: 300 Ω Voltage output: ±4 V (±5 V, 1 to 5 V *3), output impedance: 100 Ω	
Judgement outputs (3 outputs: HIGH/PASS/LOW)	NPN open-collector outputs, 30 VDC, 50 mA max. Residual voltage: 1.2 V max.	PNP open-collector outputs, 30 VDC, 50 mA max. Residual voltage: 2 V max.
Zero reset input, timing input, reset input, judgement output hold input	ON: Short-circuited with 0-V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Supply voltage short-circuited or supply voltage within 1.5 V OFF: Open (leakage current: 0.1 mA max.)
Function	- Measurement value display - Linearity adjustment (materials selection) - Display reverse - Number of display digit changes - Bottom hold, peak-to-peak hold - Average hold - Initial reset - OFF-delay timer - Non-measurement setting - Automatic teaching - Reset input - Linear output correction - K-(A+B) calculation*4 - Sensor disconnection detection - Key lock - set value/output value/ resolution display - display OFF mode - sample hold - self-peak hold - delay hold - linearity initialization - one-shot timer - direct threshold value setting - hysteresis width setting - judgement output hold input - (A-B) calculations*4 - mutual interference prevention*4 - zero reset memory - Scaling - ECO mode - peak hold - self-bottom hold - zero reset - ON-delay timer - previous value comparison - position teaching - timing inputs - monitor focus - (A+B) calculations*4 - zero reset indicator	
Indications	Judgement indicators: High (orange), pass (green), low (yellow), 7-segment main digital display (red), 7-segment sub-digital display (yellow), power ON (green), zero reset (green), enable (green)	
Voltage influence (including sensor)	0.5% F.S. of linear output value at ±20% of power supply voltage	
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p): 10% max.	
Current consumption	140 mA max. with power supply voltage of 24 VDC (with sensor connected)	
Ambient temperature	Operating and storage: 0 to 50°C (with no icing or condensation)	
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)	
Insulation resistance	20 MΩ min. (at 500 DC)	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min	
Vibration resistance (destruction)	10 to 150 Hz with 0.7-mm double amplitude for 80 min each in X, Y, and Z directions	
Shock resistance (destruction)	300 m/s^2, 3 times each in 6 directions (up, down, left, right, forward, backward)	
Connection method	Prewired (standard cable length: 2 m)	
Weight (packed state)	Approx. 350 g	
Materials	Case: PBT (polybutylene terephthalate), cover: Polycarbonate	
Accessories	Instruction manual	

*1 The response speed of the linear output is calculated as the measurement period x (average count setting + 1) (with fixed sensitivity).
The response speed of the judgement outputs is calculated as the measurement period x (average count setting + 1) (with fixed sensitivity).
*2 The output can be switched between a current output and voltage output using a switch on the bottom of the amplifier unit.
*3 Setting is possible via the monitor focus function.
*4 A calculating unit (ZX-CAL or ZX-CAL2) is required.

Smart contact measurement sensor

ZX-T is ideal for applications where the target object may contain oil deposits or other micro-structures. In this case contact measurement is the most reliable way.

- Modular platform concept for different sensing technologies
- Air-retracting types for automated inspection
- Multipoint measurement with up to 8 sensors
- Pressing force alarm prevents malfunction
- Strong ball bearing structure assures long life time

Ordering information

Sensors

Sensor heads

Size	Type	Sensing distance	Resolution (See note.)	Order code
6 dia.	Short type	1 mm	0.1 µm	ZX-TDS01T
	Standard type	4 mm		ZX-TDS04T
	Low-load type			ZX-TDS04T-L
8 dia.	Standard type	10 mm	0.4 µm	ZX-TDS10T
	Ultra-low-load type			ZX-TDS10T-L
	Air lift type			ZX-TDS10T-V
	Air lift/air push type			ZX-TDS10T-VL

Note: The resolution refers to the minimum value that can be read when a ZX-TDA_1 amplifier unit is connected.

Amplifier units

Power supply	Output type	Order code
DC	NPN	ZX-TDA11
	PNP	ZX-TDA41

Accessories (order separately)

Calculating unit

	Order code
Calculating unit	ZX-CAL2

SmartMonitor sensor setup tool for Personal Computer connection

Name	Order code
ZX-series communications interface unit	ZX-SF11
ZX-series communications interface unit + setup software (CD-ROM)	ZX-SFW11EV3*1,*2
ZX-series sensor setup and logging software (CD-ROM)	ZX-SW11EV3*1

*1 When using the ZX-TDA11/41 with the SmartMonitor, either the ZX-SFW11EV3 or the ZX-SW11EV3 SmartMonitor must be used. Earlier versions cannot be used.
*2 The ZX-SFW11EV3 SmartMonitor can be used only to set functions and monitor waveforms.

ZX-series communications interface unit

Name	Order code
ZX-series communications interface unit	ZX-SF11

Cables with connectors on both ends (for extension)*

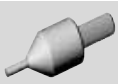
Cable length	Order code
1 m	ZX-XC1A
4 m	ZX-XC4A
8 m	ZX-XC8A

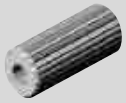
* Robot cable models are also available. The model numbers are ZX-XC_R.

Preamplifier mounting brackets

Remarks	Order code
Attached to each sensor head	ZX-XBT1
For DIN track mounting	ZX-XBT2

Actuators

Type (material)	Screw section	Appearance	Application	Applicable sensor (see note.)	Order code
				ZX-TDS_T	
Ball type (steel)	Female screw M2.5x0.45		Measuring ordinary flat surfaces (standard actuator supplied with the ZX-TDS series)	○	D5SN-TB1
Ball type (carbide steel)	Female screw M2.5x0.45		Measurements where abrasion resistance is critical Measured objects: Carbide (HR90) or lower.	○	D5SN-TB2
Ball type (ruby)	Female screw M2.5x0.45		Measurements where abrasion resistance is critical Measured objects: Carbide (HR90) or higher.	○	D5SN-TB3
Needle type (carbide steel)	Male screw M2.5x0.45		Measuring the bottom of grooves and holes	△	D5SN-TN1

Type (material)	Screw section	Appearance	Application	Applicable sensor (see note.)	Order code
				ZX-TDS_T	
Flat (carbide steel)	Male screw M2.5x0.45		Measuring spherical objects	△	D5SN-TF1
Conversion adapter (stainless steel)	Through-hole female screw M2.5x0.45		Mounting D5SN-TN1/-TF1 or commercially available actuators on ZX-TDS-series sensors	○	D5SN-TA

Note: ○ Replacement possible △ Conversion adapter required

Specifications

Amplifier units

Item	ZX-TDA11	ZX-TDA41
Measurement period	1 ms	
Possible average count settings *1	1, 16, 32, 64, 128, 256, 512, or 1,024	
Linear output *2	Current output: 4 to 20 mA/F.S., max. load resistance: 300 Ω Voltage output: ±4 V (±5 V, 1 to 5 V*3), output impedance: 100 Ω	
Judgement outputs (3 outputs: HIGH/PASS/LOW)	NPN open-collector outputs, 30 VDC, 30 mA max. Residual voltage: 1.2 V max.	PNP open-collector outputs, 30 VDC, 30 mA max. Residual voltage: 2 V max.
Zero reset input, timing input, reset input, judgement output hold input	ON: Short-circuited with 0-V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Supply voltage short-circuited or supply voltage of 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)
Function	- Measurement value display - Display reverse - Sample hold - Self-peak hold - Initial reset - Hysteresis width setting - Judgement output hold input - (A+B) calculations (see note 4.) - Zero reset memory - Clamp value setting - Span adjustment - present value/set value/output value display - ECO mode - peak hold - self-bottom hold - direct threshold value setting - timing inputs - monitor focus - sensor disconnection detection - function lock - scale inversion - warming-up display - number of display digit changes - bottom hold, peak-to-peak hold - zero reset - position teaching - reset input - (A-B) calculations*4 - non-measurement setting - zero reset indicator - pressing force alarm	
Indicators	Judgement indicators: High (orange), pass (green), low (yellow), 7-segment main digital display (red), 7-segment sub-digital display (yellow), power ON (green), zero reset (green), enable (green)	
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p): 10% max.	
Current consumption	140 mA max. (with sensor connected), for 24-VDC power supply voltage: 140 mA max. (with sensor connected)	
Ambient temperature	Operating and storage: 0 to 50°C (with no icing or condensation)	
Temperature characteristic	0.03% F.S./°C	
Connection method	Prewired (standard cable length: 2 m)	
Weight (packed state)	Approx. 350 g	
Materials	Case: PBT (polybutylene terephthalate), cover: Polycarbonate	

*1 The response speed of the linear output is calculated as the measurement period x (average count setting + 1).
The response speed of the judgement outputs is calculated as the measurement period x (average count setting + 1).
*2 The output can be switched between a current output and voltage output using a switch on the bottom of the amplifier unit.
*3 Setting is possible via the monitor focus function.
*4 A calculating unit (ZX-CAL2) is required.

Sensor heads

Item		ZX-TDS01T	ZX-TDS04T	ZX-TDS04T-L
Measurement range		1 mm	4 mm	
Maximum actuator travel distance		Approx. 1.5 mm	Approx. 5 mm	
Resolution*1		0.1 μm		
Linearity*2		±0.3% F.S.		
Operating force *3		Approx. 0.7 N		Approx. 0.25 N
Degree of protection (sensor head)		IEC60529, IP67		IEC60529, IP54
Mechanical durability		10,000,000 operations min.		
Ambient temperature		Operating: 0 to 50°C, storage: -15 to 60°C (with no icing or condensation)		
Ambient humidity		Operating and storage: 35 to 85% (with no icing or condensation)		
Temperature characteristic*4	Sensor head	0.03% F.S./°C		
	Preamplifier	0.01% F.S./°C		
Weight (packed state)		Approx. 100 g		
Materials	Sensor head	Stainless steel		
	Preamplifier	Polycarbonate		
Accessories		Instruction manual, preamplifier mounting brackets (ZX-XBT1)		

*1 The resolution is given as the minimum value that can be read when a ZX-TDA_1 amplifier unit is connected. This value is taken 15 minutes after turning ON the power with the average number of operations set to 256.
*2 The linearity is given as the error in an ideal straight line displacement output.
*3 These figures are representative values that apply for the measurement mid-point, and are for when the provided actuator is used, with the actuator moving downwards. If the actuator moves horizontally or upwards, the operating force will be reduced. Also, if an actuator other than the standard one is used, the operating force will vary with the weight of the actuator itself.
*4 These figures are representative values that apply for the mid-point of the measurement range.

Sensor heads (long-range type)

Item		ZX-TDS10T	ZX-TDS10T-V	ZX-TDS10T-L	ZX-TDS10T-VL
Vacuum retract (VR) and air push (AP) compatible		No	VR	No	VR/AP
Measurement range		10 mm			
Maximum actuator travel distance		10.5 mm			
Resolution*1,*2		0.4 µm			
Linearity*2,*3		±0.5% FS			
Operating force *4		Approx. 0.7 N	Approx. 0.6 N	Approx. 0.065 N	0.09 to 1.41N
Air pressure	Vacuum retracting	–	-0.55 to 0.70 (bar)	–	-0.05 to 0.22 (bar)
	Air push		–		0.125 to 2 (bar)
Degree of protection	Sensor head	IP65		IP50	
	Preamplifier	IP40			
Mechanical durability		10,000,000 operations min.			
Ambient temperature		Operating: 0 to 50°C, storage: -10 to 60°C (with no icing or condensation)			
Ambient humidity		Operating and storage: 35 to 85% (with no icing or condensation)			
Temperature characteristic*5	Sensor head	±0.01% FS/°C			
	Preamplifier	±0.01% FS/°C			
Vibration resistance		0.35 mm single amplitude at 10 to 55 Hz for 50 min each in the X, Y, and Z directions			
Shock resistance		150 m/s^2 3 times each in 6 directions (up/down, left/right, and forward/backward)			
Connection method		Prewired connector (2 m from the sensor head to the preamplifier, 0.2 m from the preamplifier to the connector)			
Weight (packed state)		Approx. 100 g			
Materials	Sensor head	Stainless steel			
	Rubber sleeve	Viton		None	
	Preamplifier	Polycarbonate			
	Mounting brackets	Stainless steel			
Accessories		Instruction manual, preamplifier mounting brackets (ZX-XBT1), right-angle adapter *6			

*1 The resolution is given as the minimum value that can be read when a ZX-TDA_1 amplifier unit is connected. This value is taken 15 minutes after turning ON the power with the average number of operations set to 256.
*2 These values were measured at an ambient temperature of 23°C.
*3 The linearity is given as the error in an ideal straight line displacement output.
*4 These figures are representative values that apply for the measurement mid-point, and are for when the provided actuator is used, with the actuator moving downwards. If the actuator moves horizontally or upwards, the operating force will be reduced. Also, if an actuator other than the standard one is used, the operating force will vary with the weight of the actuator itself.
*5 These figures are representative values that apply for the mid-point of the measurement range.
*6 The ZX-TDS10_ comes with a right-angle adapter.

Easy profile measurement – “Teach & Go”

The ZG2 enables precise shape measurement on challenging materials and surfaces. An easy and intuitive user interface enables efficient installation, setup and operation. A built-in LCD monitor indicates the measurement result in real time.

- Easy to use – intuitive user interface
- Live – built-in LCD monitor for setup and immediate profile display
- Versatile – 18 measurement tools
- Accurate – 5 µm resolution (3 mm / 631 pixels)
- Wide profiles – up to 70 mm

Ordering information

Sensor heads

Optical method	Sensing distance		Resolution		Order code
	Height direction	Width direction	Height direction	Width direction	
Diffuse reflective	210±48 mm	70 mm	6 µm	111 µm	ZG2-WDS70
Diffuse reflective	100±12 mm	22 mm	2.5 µm	35 µm	ZG2-WDS22
Diffuse reflective	50±3 mm	8 mm	1 µm	13 µm	ZG2-WDS8T
Regular reflective	22.3±0.5 mm	3 mm	0.25 µm	5 µm	ZG2-WDS3VT

Note: - For details, refer the ratings and specifications table.
- Designate the cable length (0.5 m, 2 m) when ordering.

Sensor controllers

Power supply	Output type	Order code
24 VDC	NPN	ZG2-WDC11A*1
	PNP	ZG2-WDC41A

*1 Setup support software for PC is attached

Accessories (order separately)

Real-time parallel output unit

Output type	Order code
NPN	ZG-RPD11
PNP	ZG-RPD41

RS-232C cable

Connecting device	Order code
For personal computer connection (2 m)	ZS-XRS2
For PLC/PT connection (2 m)	ZS-XPT2

Sensor head extension cable

Name	Order code
3 m extension cable	ZG2-XC3CR
8 m extension cable	ZG2-XC8CR
15 m extension cable	ZG2-XC15CR
25 m extension cable	ZG2-XC25CR
Digital equalizer (relay device)	ZG2-XEQ
0.2 m digital equalizer connection cable	ZG2-XC02D

Parallel mounting adaptor

	Order code
For 1 unit	ZS-XPM1
For 2 units or more	ZS-XPM2

Controller link unit

Item	Order code
Controller link unit	ZS-XCN

Memory card

Capacity	Order code
128 MB	F160-N1285
256 MB	F160-N2565

Specifications

Sensor heads

Item		ZG2-WDS70	ZG2-WDS22		ZG2-WDS8T		ZG2-WDS3VT	
Optical system		Diffuse reflective	Diffuse reflective	Regular reflective	Diffuse reflective	Regular reflective	Regular reflective	Diffuse reflective
Measurement range	Height direction	210±48 mm (In the high-precision mode)	100±12 mm	94±10 mm	50±3 mm	44±2 mm	22.3±0.5 mm	10.6±0.4 mm
	Width direction (typical)	70 mm	22 mm		8 mm		3 mm	
Resolution	Height direction*1	6 µm	2.5 µm		1 µm		0.25 µm	
	Width direction	111 µm (70 mm/631 pixels)	35 µm (22 mm/631 pixels)		13 µm (8 mm / 631 pixels)		5 µm (3 mm / 631 pixels)	
Linearity (in the height direction)*2		±0.1% F.S.						
Temperature characteristic*3		0.02% F.S./°C			0.03% F.S./°C		0.08% F.S./°C	
Light source	Type	Visible semiconductor laser						
	Wavelength	658 nm					650 nm	
	Output	5 mW max. output, 1 mW max. exposure (without using optical instruments)					1 mW max.	
	Laser class	Class 2M of EN60825-1 / IEC60825-1 Class IIIB of FDA (21CFR 1040.10 and 1040.11)					Class 2 of EN60825-1 / IEC60825-1 Class II of FDA (21CFR 1040.10 and 1040.11)	
Beam shape (at measurement center distance)*4		120 µm × 75 mm (typical)	60 µm × 45 mm (typical)		30 µm × 24 mm (typical)		25 µm × 4 mm (typical)	
LED		STANDBY : Lights when laser irradiation preparation is complete (indication colour: green)						
		LD_ON : Lights when the laser is irradiating (indication colour: green)						
Measurement object		Surface of non-transparent objects	Surface of non-transparent / transparent objects					
Environmental resistance	Ambient light intensity	Illumination on the photo-receiving face 7,000 lx max.: Incandescent lamp						
	Ambient temperature	Operating : 0 to 50°C, Storage : -15 to 60°C (with no icing or condensation)						
	Ambient humidity	Operating and storage : 35 to 85 % (with no condensation)						
	Degree of protection	IP66 (IEC60529)					IP67 (IEC60529)	
	Vibration resistance (destruction)	10 to 150 Hz with 0.35 mm single amplitude for 80 min each in X, Y, and Z directions						
	Shock resistance (destruction)	150 m/s², 3 times each in 6 directions (up / down, right / left, forward / backward)						
Materials		Case: Aluminium diecast, Front cover : Glass, Cable insulation : Heat-resistive polyvinyl chloride (PVC), Connector : Zinc alloy or brass						
Cable length		0.5 m, 2 m (flexible cable)						
Weight		Approx. 650 g	Approx. 500 g				Approx. 300 g	
Accessories		Laser labels (EN : 2 labels, FDA : 3 labels), Ferrite core (1), Instruction manual						

*1 Obtained by setting an Omron standard measurement object at the measurement center distance and determining the average height of the beam line. The conditions are given in the table below. However, satisfactory resolution cannot be attained in strong electromagnetic fields.The minimum resolution of the ZG2-WDS8T/WDS3VT is 0.25 ƒÊm, even when the average number of operations is increased. Resolution does not go any lower.

Model	CCD Mode	Average No. of operations	Measurement object	
			Regular reflective	Diffuse reflective
ZG2-WDS70/WDS22/WDS8T	Standard mode	64	Omron standard white alumina ceramic object	
ZG2-WDS3VT	Standard mode		Omron standard mirrored object	Omron standard diffuse reflective object

*2 The tolerance for an ideal straight line obtained by determining the average height of an Omron standard measurement object for the beam line. The CCD high-resolution mode is used. Linearity varies depending on the measurement object.

Model	Measurement object	
	Regular reflective	Diffuse reflective
ZG2-WDS70/WDS22/WDS8T	Omron standard white alumina ceramic object	
ZG2-WDS3VT	Omron standard mirrored object	Omron standard diffuse reflective object

*3 A value attained by using an aluminium jig to secure the distance between the Sensor head and the measurement object. The CCD standard mode is used.

*4 Defined as $1/e^2$ (13.5%) of the center light intensity. This may be influenced when light leakage also exists outside the defined area and the reflectivity of the light around the measurement object is higher than that of the measurement object.

Sensor controllers

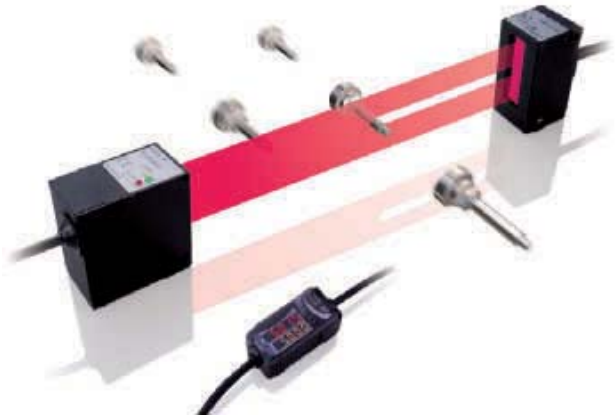
Item			ZG2-WDC11/WDC11A	ZG2-WDC41/WDC41A
Input/output type			NPN	PNP
No. of connectable Sensor Heads			1 per Controller	
No. of connectable Controllers			2	
Measurement cycle *1			16 ms (high-precision mode), 8 ms (standard mode), 5 ms (high-speed mode)	
Min. display unit			10 nm	
Display range			-999.99999 to 999.99999	
Display		LCD monitor	1.8-inch TFT colour LCD (557x234 pixels)	
		LEDs	• Judgment indicators for each task (indication colour: orange): T1, T2, T3, T4 • Laser indicator (indication colour: green): LD_ON • Zero reset indicator (indication colour: green): ZERO • Trigger indicators (indication colour: green): TRIG	
External interface	Input/output signal lines	Analogue outputs	Select voltage or current (using the sliding switch on the bottom surface) • Voltage output: .10 to 10 V, output impedance: 40 Ω • Current output: 4 to 20 mA, maximum load resistance: 300 Ω	
		Judgment output (ALL-PASSING/ERROR)	NPN open collector 30 VDC, 50 mA max. Residual voltage: 1.2 V max.	PNP open collector 50 mA max. Residual voltage: 1.2 V max.
		Trigger auxiliary output (ENABLE/GATE)		
		Laser stop input (LD-OFF)	ON: 0 V short or 1.5 V max. OFF: Open (leakage current: 0.1 mA max.)	ON: Power supply voltage short or power supply voltage -1.5 V max. OFF: Open (leakage current: 0.1 mA max.)
		Zero reset input (ZERO)		
		Measurement trigger input (TRIG)		
		Bank switching input (BANK A, B)		
	Serial I/O	USB2.0	1 port, full speed (12 Mbps), MINI-B	
		RS-232C	1 port, 115,200 bps max.	
	Parallel output*2	Output	18 - terminal	
Main functions		No. of settings banks	16	
		Sensitivity adjustment	Multi, High speed multi, Auto, Fixed	
		Measurement items	Height, 2-point Step, 3-point Step, Edge position, Edge width, Angle, Intersection coordinates, Intersection angle, Sectional area (up to eight items can be measured simultaneously)	
		Auxiliary functions	Filter, Laser power adjustment, Position correction (height, position, lope), Linked operation, Point of inflection measurement	
		Profiles saved	16 profiles (1 profile per bank)	
		Trigger modes	External trigger / continuous	
Ratings		Power supply voltage	21.6 to 26.4 VDC (including ripple current)	
		Current consumption	0.8 A max. (per sensor head)	
		Insulation resistance	20 MΩ at 250 V between lead wires and Controller case	
		Dielectric strength	1,000 VAC, 50 / 60 Hz for 1 min between lead wires and Controller case	
Environmental resistance		Ambient temperature	Operating : 0 to 50°C, Storage : -15 to 60°C (with no icing or condensation)	
		Ambient humidity	Operating and storage : 35 to 85 % (with no condensation)	
		Degree of protection	IP20 (IEC 60529)	
		Vibration resistance (destruction)	Vibration frequency: 10 to 150 Hz, single amplitude: 0.35 mm, acceleration: 50 m/s²	
		Shock resistance (destruction)	150 m/s², 3 times each in 6 directions (up/down, right/left, forward/backward)	
Material			Case : Polycarbonate (PC), Cable insulation : Heat-resistive polyvinyl chloride (PCV)	
Cable length			2 m	
Weight			Approx. 300 g (including cable) (Packed state: Approx. 450 g)	
Accessories			ZG2-WDC_1: Large Ferrite Core (1 piece), Instruction Manual ZG2-WDC_1A: Large Ferrite Core (1 piece), Small Ferrite Core (2 pieces), Instruction Manual, Setup Support Software (CD-ROM), USB cable (1 m)	

*1 The image input periods listed here are for fixed/auto sensitivity. The image input period will be longer for multi-sensitivity, high-speed multi-sensitivity, or other settings. When the high-power mode is ON, the shortest image input period is 95 ms regardless of the setting of the CCD mode. Use the eco monitor in the RUN mode to determine the actual image input period.
*2 when ZG-RPD is mounted

Data storage unit

Item			ZG2-DSU11	ZG2-DSU41
Input/output type			NPN	PNP
No. of connectable Controllers			2*1	
Connectable controllers			ZG2-WDC11/WDC41	
External interface	Input/output signal lines	Inputting starting/ terminating logging	ON: 0 V short or 1.5 V max. OFF: Open (leakage current : 0.1 mA max.)	ON: Power supply voltage short or power supply voltage -1.5 V max. OFF: Open (leakage current: 0.1 mA max.)
		Judgment output (HIGH/PASS/LOW/ERROR)	NPN open collector 30 VDC, 50 mA max. Residual voltage : 1.2 V max.	PNP open collector 50 mA max. Residual voltage : 1.2 V max.
	Serial I/O	USB2.0	1 port, full speed (12 Mbps), MINI-B	
		RS-232C	1 port, 115,200 bps max.	
Functions	No. of logged data*2	Memory of the main unit	Profiles saved: 5,120 profiles Measurement values saved: 65,000 values max.*3	
		Memory card (256 MB)*4	Profiles saved: 35,328 profiles max. (256 profiles x 138 files) Measurement values saved: 7,150,000 values max. (65,000 values x 110 files)	
	Logging trigger functions		External triggers, data triggers (self-triggers), and time triggers	
	External banks functions		4096	
	Other functions		Alarm output functions	
Ratings		Power supply voltage	21.6 to 26.4 VDC (including ripple current)	
		Current consumption	0.5 A max.	
Environmental resistance		Ambient temperature	Operating : 0 to 50°C, Storage: 0 to 60°C (with no icing or condensation)	
		Ambient humidity	Operating and storage : 35 to 85% (with no condensation)	
Material			Case : Polycarbonate (PC)	
Cable length			2 m	
Weight			Approx. 280 g	
Accessories			Ferrite Core (1 piece), Instruction Manual	

*1 The controller link unit is necessary for linking.
*2 Data is saved in the memory of the main unit during logging. The data is automatically saved in a memory card after logging is completed. The maximum number of logging differs according to set conditions. For details, refer to the Users Manual.
*3 Measurement values for 65,000 measurements can be saved even when two sensor controllers are connected and each performs eight tasks.
*4 The value is the maximum number achieved in the following conditions:
- One sensor controller performs one measurement task.
- Either profiles or measurement values are logged.



Smart laser micrometer

- High accuracy: 5-10 µm
- All surfaces
- Long sensing distance: < 500 mm
- Line width up to 28 mm
- Calculation unit for multiple heads
- Fast sampling time: 0.5 ms
- PC software for setup

Ordering information

Sensors

Type	Optical system	Measuring width	Sensing distance	Resolution	Output type	Order code
Separate type	Through-beam	28 mm	0 to 500 mm	10 µm	NPN	ZX-GT28S11
					PNP	ZX-GT28S41
Integrated type			40 mm		NPN	ZX-GT2840S11
					PNP	ZX-GT2840S41

Controller

Power supply	Output type	Order code
DC	NPN	ZX-GTC11
	PNP	ZX-GTC41

Accessories (order separately)

Set of interface unit and setup software PCs

Output type	Order code
NPN	ZX-GIF11A
PNP	ZX-GIF41A

Interface unit(RS-232C/binary output)

Power supply	Output type	Order code
DC	NPN	ZX-GIF11
	PNP	ZX-GIF41

Setup software PCs

Name	Order code
Smart monitor GT	ZX-GSW11

Calculating units

	Order code
Calculating unit	ZX-CAL2

Receiver-controller extension cable

Cable length	Quantity	Order code	
		Standard cable	Flexible cable
1 m	1 m	ZX-XGC1A	ZX-XGC1R
2 m		ZX-XGC2A	ZX-XGC2R
5 m		ZX-XGC5A	ZX-XGC5R
8 m		ZX-XGC8A	ZX-XGC8R
20 m		ZX-XGC20A	ZX-XGC20R

Up to two extension cables can be connected. However, be sure to limit the total extension cable length between the receiver and the controller to 30 meters (including the receiver cable).

Specifications

Sensor

Item	ZX-GT28S11	ZX-GT2840S11	ZX-GT28S41	ZX-GT2840S41
Output type	NPN		PNP	
Appearance	Separate type	Integrated type	Separate type	Integrated type
Light source	Visible semiconductor laser diode (wavelength 650 nm, CLASS 1 of EN60825-1/IEC60825-1, CLASS of FDA(21CFR 1040.10 and 1040.11)			
Measuring width	28 mm			
Sensing distance	0 to 500 mm	40 mm	0 to 500 mm	40 mm
Minimum sensing object	0.5 mm dia.*1	0.2 mm dia.	0.5 mm dia.(*1)	0.2 mm dia.
Linearity	±0.1% F.S.*2			
Resolution	10 µm (number of process values to average: 16)*3			
Temperature characteristic	±0.01% F.S/C*4			
Indicators (emitter)	Laser ON indicator (green), laser alarm indicator (red)			
Indicator (receiver)	Optical axis setting indicator (green)			
Laser OFF input/sync input	ON: Short-circuited with 0 V or 1.5 V max. OFF: Open (leakage current: 0.1 mA max.)		ON: Short-circuited with power supply voltage or power supply voltage -1.5 V max. OFF: Open (leakage current: 0.1 mA max.)	
Laser deterioration alarm output	NPN open-collector output 30 VDC 20 mA max. Residual voltage 1.2 V max.		PNP open-collector output 30 VDC 20 mA max. Residual voltage 2 V max.	
Power consumption (emitter)	30 mA max.			
Power supply voltage (emitter)	24 VDC +10%, -15% ripple (p-p) 10% max.			
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min			
Insulation resistance	20 MΩ (at 500 VDC megger)			
Operating ambient illumination (emitter)	3,000 lx (incandescent light)			
Operating ambient illumination (receiver)	1,000 lx (incandescent light)*5			
Ambient temperature	Operating: 0 to +40°C, storage: -15 to +50°C (with no icing or condensation)			
Ambient humidity	Operating and storage: 35 to 85% (with no condensation)			
Vibration resistance (durability)	10 to 150 Hz single-amplitude: 0.75 mm for 80 min each in X, Y and Z directions			
Degree of protection	IEC60529 IP40			
Cable length	2 m			
Material	Case: aluminium die-cast, Lens: glass			
Weight (packed state)	Approx. 550 g	Approx. 570 g	Approx. 550 g	Approx. 570 g
Accessories	Laser warning labels, instruction sheet			

F.S.: 28 mm measuring range of receiver

*1 Distance between emitter and receiver: 500 mm, measurement object at 250 mm from receiver. Glass ends of chamfer 0.1 mm or more can be detected in glass edge measurement mode. (at binary level 70%)

*2 Linearity is given to be a typical error with respect to an ideal straight line when the distance between the emitter and receiver is 100 mm and light is blocked at a distance of 50 mm from the receiver. (On the ZX-GT2840_, the measurement object is measured at a distance of 20 mm from the receiver.)

*3 The amount of fluctuation (±3 σ) in the analogue output when the distance between the emitter and receiver is 100 mm and a ZX-GTC_ is connected

*4 Change in the light cutoff value on one side when the distance between the emitter and receiver is 100 mm and the light is half-cutoff at a distance of 50 mm from the receiver (On the ZX-GT2840_, the measurement object is measured at a distance of 20 mm from the receiver.)

*5 Standard mode (NORM) used

Controller

Item		ZX-GTC11	ZX-GTC41
Output type		NPN	PNP
Measurement cycle*1		1.5 ms (standard mode (NORM)) 0.5 ms (high-speed mode (FAST))*2	
Samples to average		1/2/4/8/16/32/64/128/256/512/1024/2048/4096	
Analogue output*3		For current output: 4 to 20 mA/F.S., max. load resistance 300 Ω For voltage output: ±4 V, (±5 V, 1 to 5 V*4), output impedance 100 Ω	
Timing input, bank switching input, zero reset input, reset input		ON: short-circuited with 0 V or 1.5 V max. OFF: Open (leakage current: 0.1 mA max.)	ON: short-circuited with power supply voltage or power supply voltage -1.5 V max. OFF: Open (leakage current: 0.1 mA max.)
HIGH/PASS/LOW Judgment output*5 Sync output*6		NPN open-collector output 30 VDC 50 mA max. Residual voltage 1.2 V max.	PNP open-collector output 30 VDC 50 mA max. Residual voltage 2 V max.
Indicator		Judgment output indicator: HIGH (orange), PASS (green), LOW (orange) Main display (red) sub-display (yellow) bank 1/2 (orange), zero reset (green)	
Main functions	Number of registered setups	2 banks	
	Measurement mode	Interrupted beam width measurement, incident beam width measurement, outer diameter measurement, center position measurement, IC lead pitch, IC lead width judgment, specified edge measurement, wire position measurement, glass edge position measurement	
	Display during measurement	Measured value, resolution, threshold, voltage output value, current output value (number of display digits can be changed)	
	Zero reset functions	Offset setting of zero reset value, zero reset value memory	
	Hold	Sample hold, peak hold, bottom hold, peak-to-peak hold, average hold, delay hold	
	Timer functions	ON-delay, OFF-delay, one-shot	
	Adjustment functions	Optical axis adjust mode/light intensity writing mode, variable binary level, variable edge filter, analogue output scaling	
	Calculation	2 possible on up to two controllers (calculation Unit ZX-CAL2 is required for connecting controllers to each other.) A-B, A+B, width	
	Other	Measurement cycle setting, threshold setting, hysteresis setting, initialization, key lock	
Temperature characteristic		±0.005% F.S./°C	

Item	ZX-GTC11	ZX-GTC41
Current consumption	150 mA max. (including receiver)	
Power supply voltage	24 VDC +10%, -15% ripple (p-p) 10% max.	
Dielectric strength	1,000 VAC, 50/60 Hz for min	
Insulation resistance	20 MΩ (at 500 VDC megger)	
Ambient temperature	Operating: 0 to +50°C, storage: -15 to +60°C (with no icing or condensation)	
Ambient humidity	Operating and storage: 35 to 85% (with no condensation)	
Vibration resistance(durability)	10 to 150 Hz single-amplitude: 0.35 mm for 80 min each in X, Y and Z directions	
Degree of protection	IEC60529 IP20	
Cable length	2 m	
Material	Case: PBT (polybutylene terephthalate), cover: Polycarbonate	
Weight (packed state)	Approx. 330 g	
Accessories	Instruction sheet	

*1 The first response time is “measurement cycle x (number of samples to average setting + 1) + 1 ms” max. For the second response time onwards, the specified measurement cycle time is output.
*2 The response time in the high-speed mode (FAST) for the IC lead pitch and IC lead width judgment modes is 1 ms.
*3 Current/voltage can be switched using the switch provided on the rear of the Controller.
*4 Can be set by the analogue output scaling function.
*5 The error (ERR) state is displayed when all HIGH/PASS/LOW outputs turn OFF.
*6 Normally, wire the sync output wire directly to the emitter's sync input wire and run the controller in the standard mode. On an NPN type controller, use an NPN type emitter, and on a PNP type controller, use a PNP type emitter. Wiring of the sync wires is not required when the controller is run in the high-speed mode.
(Note, however, that the controller becomes more susceptible to the influence of ambient light in this case.)

Interface unit

Item	ZX-GIF11/-GIF11A	ZX-GIF41/-GIF41A
Compatible controller	ZX-GTC11	ZX-GTC41
Indicator	Power ON (green), controller communications (orange), controller communications error (red), RS-232C communications (orange), RS-232C communications error (red), binary output (orange)	
Communications port	RS-232C (9-pin D-sub connector)	
12-bit binary output (D11 toD0, GATE)	NPN open-collector output 30 VDC 20 mA max. Residual voltage 1.2 V max.	PNP open-collector output 30 VDC 20 mA max. Residual voltage 2 V max.
Power supply voltage	Supplied from controller (power consumption: 60 mA max.)	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min	
Insulation resistance	20 MΩ (at 500 VDC megger)	
Ambient temperature	Operating: 0 to +50°C, storage: -15 to +60°C (with no icing or condensation)	
Ambient humidity	Operating and storage: 35 to 85% (with no condensation)	
Vibration resistance(durability)	10 to 150 Hz single-amplitude: 0.35 mm for 80 min each in X, Y and Z directions	
Degree of protection	IEC60529 IP20	
Cable length	RS-232C 0.5 m, binary output 2 m	
Material	Case: PBT (polybutylene terephthalate), cover: Polycarbonate	
Weight (packed state)	ZX-GIF_1A: Approx. 550 g ZX-GIF_1: Approx. 330 g	
Accessories	ZX-GIF_1A: Setup software (CD-ROM), 2 clamps, instruction sheet ZX-GIF_1: 2 clamps, instruction sheet	