

Smart Sensors (with Ultra-High-Speed CCD Camera)

ZFV Series

CSM_ZFV_DS_E_1_1

Low-cost but advanced Smart Sensors combining benefits of optical and vision sensors.

- Sensor integrated with light for easy installation
- Easy operation by selecting icons while watching LCD monitor
- Ultra-high speed response for fast-moving production lines



Ordering Information

■ Sets of Sensor Head and Amplifier Unit

| Type | 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 |

■ Sensor Heads

| Appearance | Type | Working length | Sensing area | Model |
|------------|-------------|-------------------------|--|-------------------------|
| | Narrow View | 34 to 49 mm (variable) | 5 × 4.6 mm (H × V) to 9 × 8.3 mm (H × V) | ZFV-SR10 ZFV-SR10R * |
| | Wide View | 38 to 194 mm (variable) | 10 × 9.2 mm (H × V) to 50 × 46 mm (H × V) | ZFV-SR50 ZFV-SR50R * |

* Robot Cable type.

■ Amplifier Units


| Appearance | Type | Power supply | Output type | Model |
|------------|-----------------|--------------|-------------|---------|
| | Single Function | 24 VDC ± 10% | NPN | ZFV-A10 |
| | | | PNP | ZFV-A15 |
| | Standard | | NPN | ZFV-A20 |
| | | | PNP | ZFV-A25 |

■ Accessories (Order Separately)


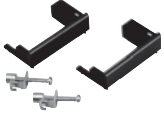
Data Storage Units

| Appearance | Power supply | Output type | Model |
|------------|--------------|-------------|----------|
| | 24 VDC | NPN | ZS-DSU11 |
| | | PNP | ZS-DSU41 |

Controller Link Unit

| Appearance | Model |
|---|--------|
|  | ZS-XCN |

Panel-mounting Adapter

| Appearance | Model | |
|---|---------|----------------------------------|
|  | ZS-XPM1 | First Unit |
|  | ZS-XPM2 | Additional Units (for expansion) |

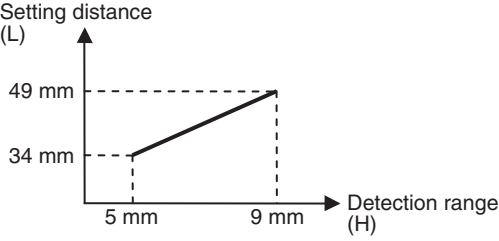
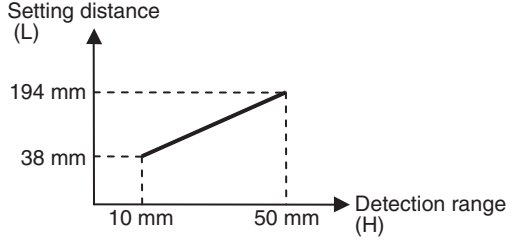
Sensor Head Extension Cable

| Cable length | Model |
|--------------|--------------------------------|
| 3 m | ZFV-XC3BV2 |
| | ZFV-XC3BRV2 (Robot cable type) |
| 8 m | ZFV-XC8BV2 |

Note: A maximum of two Extension Cables can be connected to extend the cable length of each Sensor Head. There are no restrictions on the combinations of the two Extension Cables to be used.

Specifications

■ Sensor Heads

| Item | ZFV-SR10 | ZFV-SR10R | ZFV-SR50 | ZFV-SR50R |
|---|---|--|--|--|
| Setting distance (L) | 34 to 49 mm | | 38 to 194 mm | |
| Detection range (H × V) | 5 × 4.6 mm to 9 × 8.3 mm | | 10 × 9.2 mm to 50 × 46 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 | Pre-wired cord | | | |
| Cable length | Standard cable (Available length: 2 m) | Robot cable (Available length: 2 m) | Standard cable (Available lengths: 2 m, 5 m) | Robot cable (Available length: 2 m) |
| Degree of protection | IEC60529, IP65 | | | |
| Materials (Case) | ABS | | | |
| Materials (Mounting fixture) | PBT | Base: Aluminum, bracket: Stainless steel | PBT | Base: Aluminum, bracket: Stainless steel |
| Weight (including mounting fixture and cord) | Approx. 200 g | Approx. 270 g | 2-m-long cord: Approx. 200 g 5-m-long cord: Approx. 350 g | Approx. 270 g |
| Accessories | ZFV-XMF mounting fixture (1), Ferrite core (1), Instruction guide (1) | ZFV-XMF3 mounting fixture (1), Ferrite core (1), Instruction guide (1) | ZFV-XMF mounting fixture (1), Ferrite core (1 (2 for 5-m-cord models)), Instructionguide (1) | ZFV-XMF3 mounting fixture (1), Ferrite core (1), Instruction guide (1) |

■ Amplifier Units

| Item | Single-function models | | Standard models | |
|-------------------------------|---|---|---|---------|
| | ZFV-A10 | ZFV-A15 | ZFV-A20 | ZFV-A25 |
| Output method | NPN | PNP | NPN | PNP |
| Output | NPN: NPN open-collector output, 50 mA max. at 30 VDC, Residual voltage: 1.2 V max. PNP: PNP open-collector output, 50 mA max., Residual voltage: 1.2 V max. | | | |
| 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 | <ul style="list-style-type: none"> • Pattern (PTRN), Brightness (BRGT): Any rectangular area (256 × 256 max.) • Area (AREA), Width (WID), Position (POSI), Count (CNT), Characters (CHAR): Any rectangular area (full screen max.) | | | |
| Sensing area | Full screen | | | |
| Resolution | 468 × 432 (H × 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): 128 × 128: 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. | | | |
| Connect- ing to ZS- DSU | Image log- ging trigger | Stores NG images or all images. | | |
| | Sampling rate | ZFV measurement cycle (See note 1.) | | |
| | Number of logged im- age | Logs up to 128 images in series | | |
| | Number of connected | 15 max. (ZFV: 5 Units max., ZS-LDC: 9 Units max., ZS-MDC (See note 2.): 1 Unit max.) | | |
| | External bank func- tion | 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 2.2-inch LCD (Display dots: 930 × 234) | | | |
| Indicators | <ul style="list-style-type: none"> • Judgement result indicator (OUTPUT) • Inspection mode indicator (RUN) | | | |
| Operation interface | <ul style="list-style-type: none"> • 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, power supply voltage 24VDC) | | | |
| 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% | | | |
| Connection method | Prewired, Standard cable length: 2 m | | | |
| 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 | | | |

Note 1. This is the sampling rate when logging images. To log measurement data only, use the ZS-DSU settings.

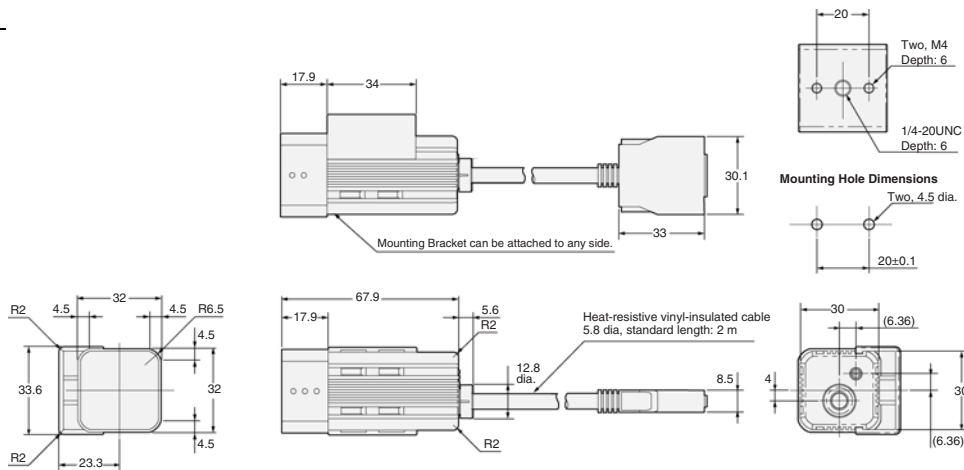
2. Image logging is not possible when the ZS-MDC is connected.

Dimensions

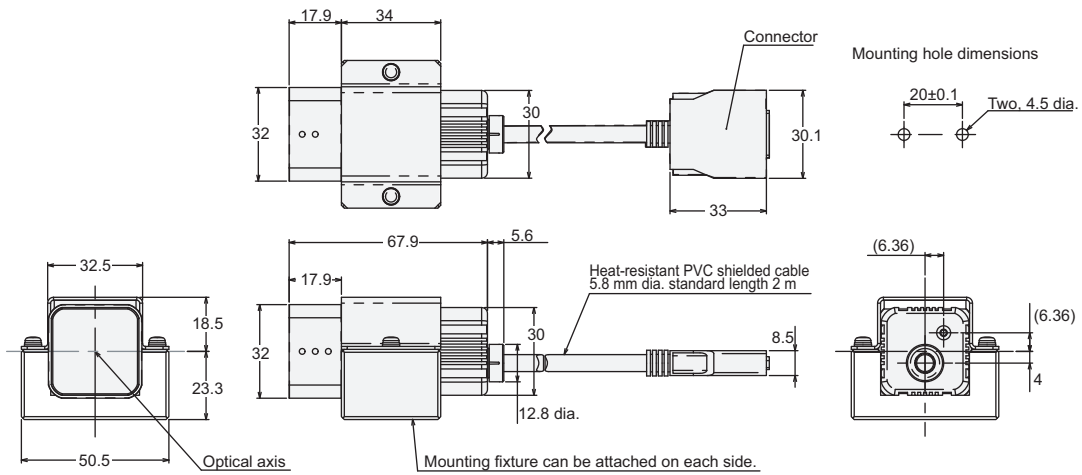
Note: All units are in millimeters unless otherwise indicated.

Sensor Heads

ZFV-SR□

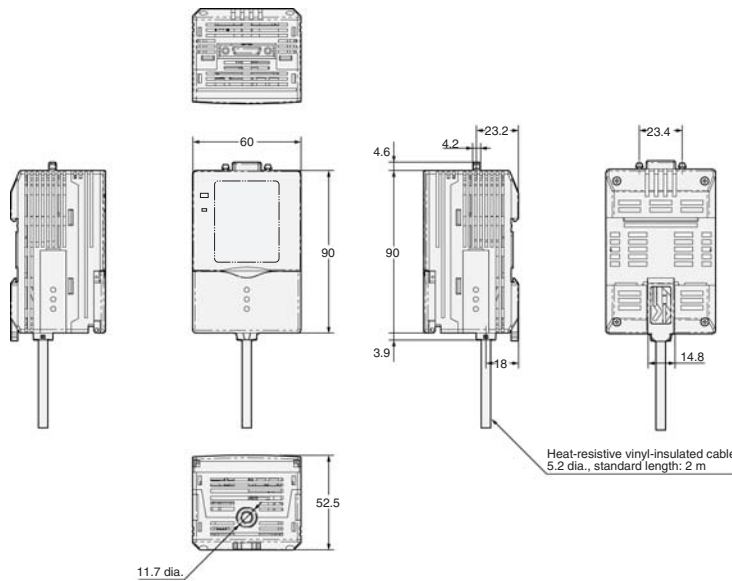


ZFV-SR10R/SR50R



Amplifier Units

ZFV-A□



Terms and Conditions Agreement

Read and understand this catalog.

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

Warranties.

(a) Exclusive Warranty. Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied.

(b) Limitations. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE.

Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) Buyer Remedy. Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty.

See <http://www.omron.com/global/> or contact your Omron representative for published information.

Limitation on Liability; Etc.

OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY.

Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.

Suitability of Use.

Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

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

Programmable Products.

Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.

Performance Data.

Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.

Change in Specifications.

Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

Errors and Omissions.

Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

2014.1

In the interest of product improvement, specifications are subject to change without notice.

OMRON Corporation
Industrial Automation Company

<http://www.ia.omron.com/>

(c)Copyright OMRON Corporation 2014 All Right Reserved.