

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

ZFV Series



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 |
| | Wide View | 38 to 194 mm (variable) | 10 × 9.2 mm (H × V) to 50 × 46 mm (H × V) | ZFV-SR50 |

■ 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


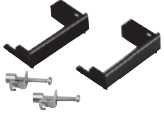
| Appearance | Model |
|---|--------|
|  | ZS-XCN |

Sensor Head Extension Cable

| Cable length | Model | Quantity |
|--------------|------------------------|----------|
| 3 m | ZFV-XC3BV2 (See note.) | 1 |
| 8 m | ZFV-XC8BV2 | 1 |

Note: ZFV-XC3BRV2 Robot Cable is also available.

Panel-mounting Adapter

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

Specifications

■ Sensor Heads

| Item | ZFV-SR10 (Narrow View) | ZFV-SR50 (Wide View) |
|---|---|--|
| 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 | 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 | |

■ 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 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 1.8-inch LCD (Display dots: 557 × 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) | | | |
| 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 | | | |

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

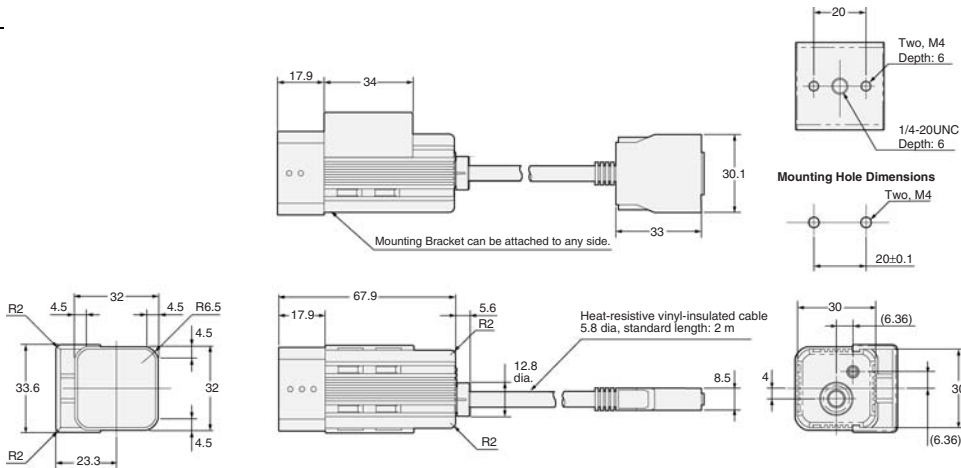
2. Image logging is not possible when the ZS-MDC is connected.

Dimensions

Note: All units are in millimeters unless otherwise indicated.

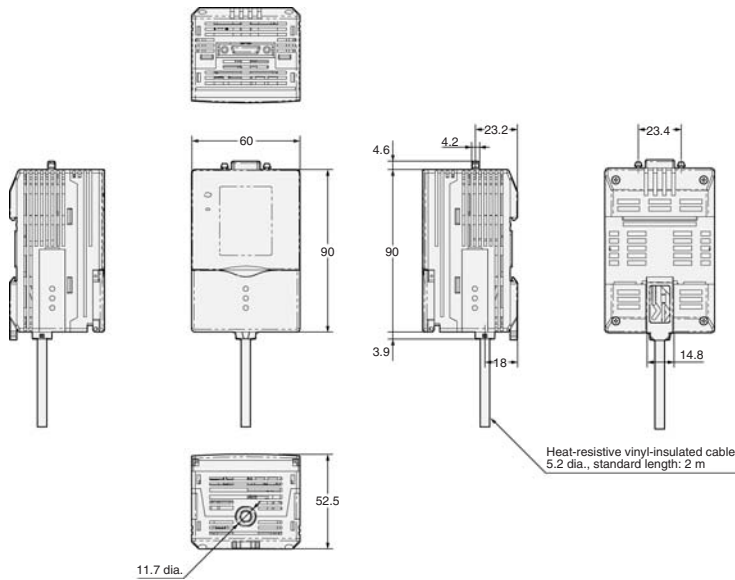
Sensor Heads

ZFV-SR□



Amplifier Units

ZFV-A□



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