

ZFV

High-Speed Inspection Sensor



Multifunction Capabilities with Simple-to-Use Setup and Operation



**HIGH-SPEED CCD DIGITAL CAMERA
ONE-TOUCH TEACH AND LEARN
1.8-INCH EMBEDDED MONITOR**

OMRON[®]



Target



Teach

Easy-to-use smart matching sensor delivers high-speed quality inspections

Use Omron's ZFV smart digital CCD sensor for high-performance quality inspections to improve productivity and reduce waste. It lets you tackle a wide range of tasks with seven easily selectable sensing functions. This high-speed vision sensor includes built-in lighting and an amplifier with embedded LCD monitor that provides real-time grayscale

measurement displays to show good and bad parts at a glance. The ZFV offers the most versatility to handle changing inspection needs. Operations and maintenance staff can confidently update production settings for fast change over with minimum downtime. The ZFV offers high value features in a compact, affordable sensor.



and Go!

Key reasons to use a ZFV Sensor

Fast response time – 4 milliseconds per inspection

Simple setup, operation and production changeover with one-touch teach and learn

Real-time, gray-scale images from built-in 1.8-inch LCD monitor

No PC required for setup

Expandable configuration for multiple inspections

Multi-functional inspection capabilities

High-integrity images for inspection

Easy to Set Up and Operate

Omron's ZFV delivers sophisticated inspection capabilities with the industry's easiest-to-use setup tools. This smart matching sensor combines a compact CCD sensing head with built-in lighting and a separate amplifier with built-in LCD monitor.

Ultra-Fast for High-Speed Production Lines

With 4 millisecond response time, the ZFV matching sensor can easily keep pace with your fastest production lines. Even when expanded to a maximum of five amplifiers, the ZFV processing speed stays high.

Visual Setup Tools

The amplifier's LCD monitor displays a set of seven icons that visually describe the functions available. Use the one-button teach capability to set the images for comparison. Setup and change over are completed in just a few minutes.

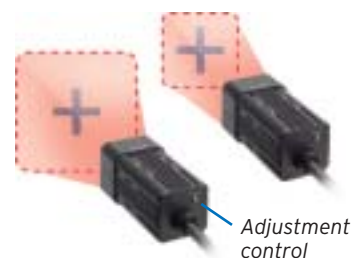
Designed for Stand-Alone Inspection

The ZFV provides stand-alone inspection capability that easily adds onto your existing systems. It provides a transistor output for a failed match. No PC is required for setup or monitoring.

Simple Installation

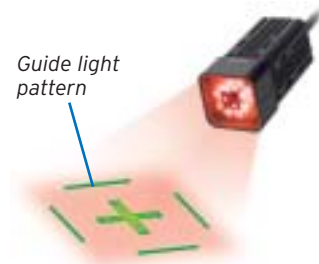
Simple Focus Adjustment

An easy-to-use, manual focus adjustment on the camera eliminates the need to change the head or modify programming for different work piece sizes. Confirm the proper setting using the amplifier's LCD monitor. This enables quick changeover and optimizes sensing within the detection area for new work piece sizes.



Guide Light Simplifies Alignment

A built-in guide light projects the perimeter and center point of the detection area to simplify accurate aiming during installation and target placement for teaching.



Optimize Lighting Pattern

Intelligent lighting changes the on/off pattern of LED elements to obtain the optimum illumination for sensing. Control lighting patterns in either auto or manual mode from simple settings on the amplifier.



7 High-level Matching Capabilities for a Wide Range of Applications

Easy-to-Use, Pre-Programmed Algorithms



Omron makes it simple to select, set and operate the advanced inspection algorithms programmed into the ZFV sensor. They include:

- Pattern matching
- Edge detection
- Edge count measurement
- Edge width measurement
- Average density
- Character string matching



actual size



Pattern

Measure difference or presence of patterns to match shape of object.

- Detect promotional labels
- Align products by bar code
- Detecting packaging inserts
- Determine direction of cans

Expandable for Multi-Function and Multi-Image Inspections

The ZFV's versatile design allows simple expansion for high-speed inspection of multiple images or multiple locations using a single image.

- A digital communications bus between amplifiers allows simultaneous inspection of one image using five different functions without diminishing the 4-millisecond response time.
- Use two sensing heads for two-side inspections using multiple functions. Up to five sensing heads can be used.

See the configuration options at right using the optional connector between amplifiers.



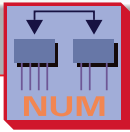
Standard



Application expansion



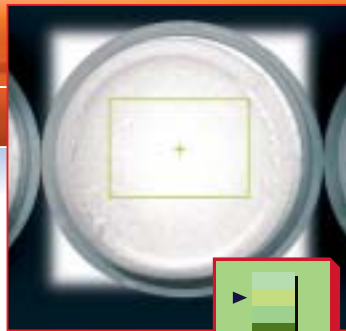
Integrate inspections from multiple sites



Number

Perform Edge Count measurement for lead presence and ink jet bars.

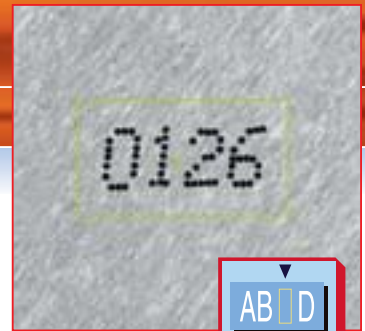
- Inspect IC leads in circuit board assembly
- Verify bar code on label or carton



Brightness

Detect presence/absence based on measurement of average white content of area.

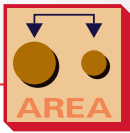
- Inspect seal inside plastic cap
- Detect defects such as scratches and dirt on plain work pieces



Character

Match entire character string or detect one missing character.

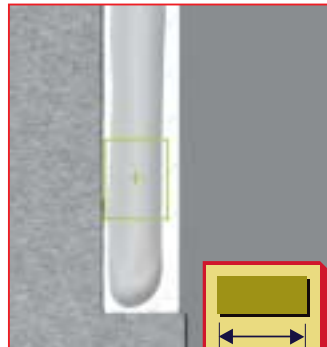
- Detect presence of lot codes, expiration dates, or embossed characters
- Identify incompletely marked items



Area

Measure the area of shapes to compare against the model.

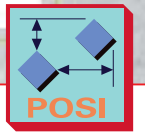
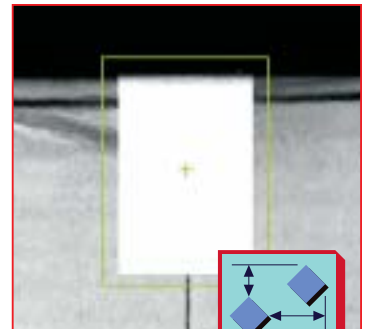
- Sort boxes by marks
- Detect presence of paste
- Check specific lettering on a label



Width

Measure object dimensions using Edge Width to determine proper assembly.

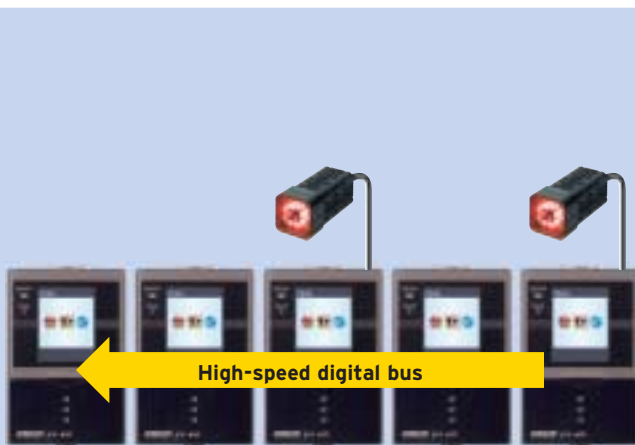
- Measure width of glue or caulk bead
- Detect O-ring insertion in automotive parts



Position

Measure the edge position of labels or sheets.

- Detect sealing tape positioning on packing boxes
- Use for edge detection
- Detect label positioning



Mixed inspection



Nomenclature

Sensing Heads



Narrow View:
34 mm to 49 mm
setting distance
5 x 4.6 mm to
9 x 8.3 mm
detection area



Wide View:
38 mm to 194 mm
setting distance
10 x 9.2 mm to
50 x 46 mm
detection area

Amplifier Types



Single Function:
Pattern and Brightness



Standard Function:
Pattern, Brightness,
Area, Width, Position,
Count and Character

Complete System

System includes a sensing head with built-in lighting, mounting bracket, and 2 m cable, and a DIN rail-mounting amplifier with built-in LCD monitor and 2 m cable.

Part Number	Description
ZVF-R1010	Narrow View/Single Function, NPN output
ZFV-R1015	Narrow View/Single Function, PNP output
ZFV-R1020	Narrow View/Standard Function, NPN output
ZFV-R1025	Narrow View/Standard Function, PNP output

Part Number	Description
ZFV-R5010	Wide View/Single Function, NPN output
ZFV-R5015	Wide View/Single Function, PNP output
ZFV-R5020	Wide View/Standard Function, NPN output
ZFV-R5025	Wide View/Standard Function, PNP output

Expansion Options

Sensing Heads

Order additional sensing heads with built-in lighting and mounting bracket for multiple input configurations.

Part Number	Description
ZFV-SR10	Narrow View Sensing Head
ZFV-SR50	Wide View Sensing Head

Amplifiers

Order additional amplifiers with built-in LCD monitors for multiple function/multiple input configurations.

Part Number	Description
ZFV-A10	Single Function Amplifier, NPN output
ZFV-A15	Single Function Amplifier, PNP output
ZFV-A20	Standard Function Amplifier, NPN output
ZFV-A25	Standard Function Amplifier, PNP output

Accessories

Part Number	Description
ZS-XCN	Connector; links up to 5 controllers for integrated communications

Part Number	Description
ZS-XPM1	Panel Mounting Adapter (starting unit)
ZS-XPM2	Panel Mounting Adapter (expansion unit)



Specifications - Amplifier Units

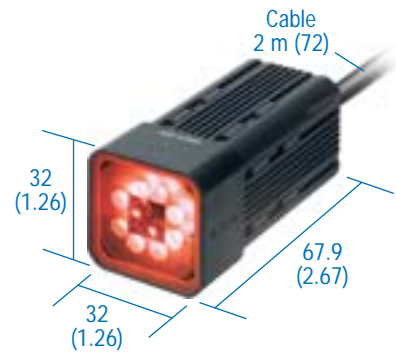
Item	Single-function Models		Standard Models	
	ZFV-A10	ZFV-A15	ZFV-A20	ZFV-A25
Output method	NPN	PNP	NPN	PNP
Inspection items	Pattern (PTRN), Brightness (BRGT)		Patterns (PTRN), Brightness (BRGT), Area (AREA), Width (WID), Position (POSI), Count (CNT), Characters (CHAR)	
Teaching area	Rectangular, one area			
Teaching area size	<ul style="list-style-type: none"> • Pattern (PTRN), Brightness (BRGT): Any rectangular area (256 x 256 max.) • Area (AREA), Width (WID), Position (POSI), Count (CNT), Characters (CHAR): Any rectangular area (full screen max.) 			
Sensing area	Full screen			
Resolution	468 x 432 (H x 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 x 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.			
Sensor Head interface	Digital interface			
Image display	Compact TFT 1.8-inch LCD (Display dots: 557 x 234)			
Indicators	<ul style="list-style-type: none"> • Judgement result indicator (OUTPUT) • Inspection mode indicator (RUN) 			
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)			
Environmental	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)			

Dimensions mm (inches)

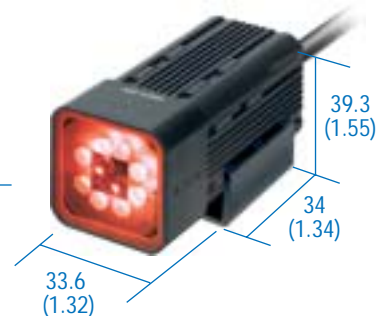


Versatile Mounting Options

Amplifier is designed for DIN track mounting or panel mounting with optional hardware.



Sensing head mounting bracket (included) fits all four sides to allow flexible mounting in tight installation locations.



Specifications - Sensor Heads

Item	ZFV-SR10 (Narrow View)	ZFV-SR50 (Wide View)
Setting distance (L)	34 to 49 mm	38 to 194 mm
Field of view (H x V)	5 x 4.6 mm to 9 x 8.3 mm	10 x 9.2 mm to 50 x 46 mm
Detection area	Setting distance (L) 	Setting distance (L)
Guide light	Provided (center, sensing area)	
Built-in lens	Focus: f15.65	Focus: f13.47
Lighting	Pulse lighting with 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)	
Environmental	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. Degree of protection: IEC60529, IP20	
Connection method	Prewired, Standard cable length: 2 m	
Materials	Case: ABS, Mounting bracket: PBT	
Weight Approx.	200 g (including mounting bracket and cord)	
Accessories	Mounting bracket (1 - included)	

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