VS40 Machine Vision Smart Camera

Comprehensive machine vision features integrated into a single package

From the factory floor to the control room, manufacturers are under intense pressure to meet increasing business demands. Every day, production lines strive to achieve consistent product quality and throughput quotas. Success requires a reliable and dependable process at every stage of production—a process that increases automation, reduces defects and validates assembly and tracking information.

Now, manufacturers can address it all with the Zebra VS40 Machine Vision Smart Camera. The VS40 provides a new level of intelligence and automation that enables production lines to ensure product quality and meet production goals. Operations are leaner—only error-free components are utilized in the right product at the right time. The result? Product defects are practically eliminated. Manufacturing costs are lower. And customer satisfaction is higher.

The Zebra VS40 Smart Camera brings a new level of simplicity to your machine vision solutions. It all starts with Zebra Aurora—a powerful and intuitive software platform that makes it exceptionally easy to set up, deploy and run Zebra's entire portfolio of Machine Vision Smart Cameras and Fixed Industrial Scanners. Built-in options for illumination, connectivity, power and more make the VS40 one of the most flexible devices in its category. Zebra-exclusive features such as ImagePerfect+ reduce steps, training, management time and cost, as well as the need for external peripherals. And since you can add advanced tools at any time with a simple software license upgrade, the device you buy today can support new needs tomorrow.

Take your success to the next level with extraordinary visibility into your operational processes—with the VS40, only from Zebra.

Zebra Aurora™ Software

A single unified platform across Zebra's fixed industrial scanner and machine vision portfolio

Zebra Aurora brings a new level of simplicity to controlling enterprise-wide manufacturing and logistics automation solutions. This powerful interface makes it easy to set up, deploy and run all of Zebra's Fixed Industrial Scanners and Machine Vision Smart Cameras, while eliminating the need for different tools.

For experts and beginners

Experienced and first-time users can easily navigate the highly intuitive modern interface, reducing training and deployment time. Experienced users will appreciate easy access to all functions and streamlined processes, while first-time users are guided through all the steps in the proper order. And if users need a little help, Learn-As-You-Go offers built-in tutorials, walk-throughs and videos on all aspects of the software and its comprehensive management toolset.

The VS40—Enable performance. Inspire potential. Experience the difference with Zebra.
For more information, visit www.zebra.com/vs40

Easy to Set Up

Automatic Setup With Auto-Tune
Just Auto-Tune and run for consistent, reliable inspections—right out of the box. With the press of one button, Auto-Tune dials in the perfect image for faster and more accurate set up.

IoT Ready with Zebra Savanna™
The IoT-ready VS40 can send images to Zebra's subscription-based cloud service, Zebra Savanna—or any other cloud service—allowing you to meet industry regulations or store images for further analysis, all without the need to purchase and manage servers.

Power it All Over Ethernet
Reduce setup complexity and cost with support for Power-over-Ethernet (PoE). This standard feature powers the VS40 and attached accessories right over the network, eliminating the cost of power drops and power supplies. Don't have a PoE infrastructure? No problem. You can also power the VS40 with a standard 24V DC power supply or even a standard USB-C port.

Limitless Expansion Options With USB-C
Ready for a new level of flexibility? USB-C allows you to power your camera with a single cable and provides limitless accessory options. Seamlessly integrate with other Zebra devices such as a printer or tablet. You can also backup your system or save images for future analysis by connecting external storage devices to the VS40.

Create Tools Faster With QuickDraw
Simply draw right on an image to create a tool in fewer steps than most competitive systems require.

Locate the Right Part Successfully—Every Time
Zebra takes a new approach to the creation of two key error-proofing tools—Object Locate and Pattern Matching. Zebra's optimized algorithms and carefully crafted default settings enable users to dependably create successful tools with fewer clicks, less trial and error, and less deployment time and effort.

Easy to Deploy

Programmable Input/Output (I/O) Ports
Get the ultimate in I/O flexibility. Up to nine digital I/O ports can be individually controlled to expand application functionality and improve error-proofing. Support additional peripherals, activate lights or trigger an action to more fully automate your processes.

Powerful Integrated Lighting
Reliable inspection starts with the highest quality image—something which frequently requires the purchase and management of expensive, external lighting. With the VS40, you can do more with less with the powerful integrated ring lighting system. The flexible and field-interchangeable lighting is available in red, white, blue, infrared or a single model that includes them all. And you can add any filter or polarizer to control ambient light and reduce glare. These comprehensive lighting options enable you to achieve the high-quality flawless images required to ensure reliable performance.

Ultra-Rugged and Ready for Industrial Spaces
Rely on dependable operation in the most demanding environments with an ultra-rugged design. The aluminum housing is chemical and oil resistant. IP65 and IP67 sealing ratings make the device dust tight and able to withstand high-power wash downs—or even total immersion in water.

Operator Feedback/Status Indicators
With 360° LED lights, your operators can instantly see image and camera status. Workers can see at a glance if image capture was successful or unsuccessful—protecting product quality and traceability. Five built-in camera status LEDs—Power, Online/Run, Focus Warning, Error and Ethernet Status—make it easy to verify whether cameras are fully operational or in need of attention. In addition, a beeper with adjustable volume provides an audible cue of successful capture, so workers can keep their eyes on the job—instead of the device.

Added Flexibility With The Zebra Aurora HMI Dashboard
Give workers actionable intelligence right where they need it—at their station. Operators can see and interact with the Zebra Aurora Human Machine Interface (HMI) dashboard via any web browser or by directly connecting a monitor to the VS40. The need to install a PC at every workstation is eliminated, reducing hardware requirements and installation costs.

Simple, Easy And Fast Integration With Your Network Infrastructure
Built-in Ethernet/IP, PROFINET and other network protocols enable painless integration with any common PLC or host system. Network architecture is simplified and deployment time and cost are reduced.

Key Differentiators

The VS40 is loaded with class-leading features, including:

ImagePerfect+

Eliminate bypassed systems and false rejects with perfect images

In one trigger event, capture up to 16 different images, each with its own unique setting for focus, exposure gain, illumination control and more.

Golden Image Compare

Rapid troubleshooting for failed image capture

Compare any image to a golden 'perfect' image created at setup to immediately locate the source of the image degradation—such as a dirty lens, lighting issue or misalignment of the camera.

Software Upgradeable

Add what you need, whenever you need it

Add support for new barcode symbologies, faster barcode capture and all the machine vision tools you need through simple software licensing.

USB-C

Limitless expansion options

Easily connect all the peripherals you need—from a printer or tablet to an external drive and more.

PoE+

Power it all over Ethernet

Power the VS40 right over your Ethernet cable—no more costly power drops and no more power supplies to purchase and manage.

Easy to Run

Eliminate Bypassed Inspections and False Rejects With ImagePerfect+
Uneven lighting and the need to read images at various distances can require additional cameras, external lights or complex custom code—additions that can substantially increase the total cost of ownership. Address it all with a groundbreaking new feature—ImagePerfect+. In one trigger event, this Zebra-exclusive feature captures up to 16 different images, each with its own unique setting for focus, exposure gain, illumination control and more. The result? Perfect images that enable fast, flawless inspections.
A significant reduction in solution complexity. And a lower total cost of ownership.

Get the Features You Need Today—and Add the Features You Need Tomorrow
The modular architecture lets you select the Machine Vision (MV) toolset you need now, and add new functionality any time in the future. Just purchase licenses to upgrade to more advanced MV tools, allowing you to meet tomorrow's needs with the products you have today.

First-Time Every-Time Barcode Capture
Need to capture barcodes? Superior optics and Zebra's exclusive PRZM Intelligent Imaging technology work together to deliver the reliable data capture you need to keep your operations running at peak capacity. The optical system enables the simultaneous capture of multiple barcodes, extends read ranges and focal distances and allows a larger field of view to capture more information with less equipment. And PRZM Intelligent Imaging delivers first-time capture of virtually any 1D, 2D and DPM barcode on any surface, in practically any condition.

Rapid Troubleshooting With Golden Image Compare
If any image capture or barcode reads fail, this Zebra-only tool allows you to quickly identify and resolve the issue by comparing any image to a golden 'perfect' image created at setup. Minimize downtime by immediately diagnosing and rapidly correcting the source of any degradation—from a dirty lens or a lighting problem to misalignment of the camera.

Eliminate Production Delays With Dual Ethernet Connections
The VS40 is the only device in its class to offer dual Ethernet ports. Completely isolate the Controls Network to protect key production data and utilize a second Ethernet connection to send images to the cloud or local server for storage. Don't need a second Ethernet port? Just choose the single port configuration to pay only for what you need.

Complete Support Service—Everything's Covered
Get the constant peak performance and device uptime today's businesses demand with Zebra OneCare™ Essential and Select Support Services. Unexpected disruptions and unbudgeted repair expenses are eliminated. Everything is covered—including normal wear and tear and accidental damage. You can customize your support plan with numerous options to get the service level your business needs, including next-day delivery of a replacement device, on-site support, cloud-based visibility into your contracts, repair data, tech support cases—and more.

Introducing the Zebra Fixed Industrial Scanner and Machine Vision Portfolio

FS10

FS20/VS20

FS40/VS40

FS70/VS70

Specifications

Device Characteristics	
Dimensions	2.1 in. H x 2.5 in. W x 3.6 in. D 54.0 mm H x 64.0 mm W x 91.4 mm D
Weight	14.1 oz./400.0 g
Power	External power supply: 10-30 VDC, 1.5 A max @ 24 VDC (36 W max) PoE+ supply: Class 4, 25.5 W max PoE supply: Class 3, 13 W max USB-C host: 5 VDC, 3 A max (15 W max)
Configurable IO	Four opto-isolated GPIO: GPIO0,1,2,3 Five non-isolated GPIO: GPIO4,5,6*,7*,8* *Unavailable when External Light Mode is enabled
Color and Material	Industrial green aluminum housing
Interface Ports	One M12 X-Coded 1000/100/10 Mbps Ethernet* One M12 12-pin Power/GPIO/RS-232 One M12 5-pin External Light Power and Control/GPIO One USB 3.0 SuperSpeed Type-C with DisplayPort Alt Mode *Available with one or two Ethernet ports; PoE is only supported by the primary Ethernet port
Communication Protocols	Ethernet/IP, PROFINET, Modbus TCP, TCP/IP, RS-232
Keyboard Support	USB HID
User Indicators	360 Degree Decode/Job Status LEDs, Power LED, Online/Run LED, Focus Warning LED, Error LED, Ethernet Status LED; Beeper
Performance Characteristics	
Image Sensor	**2.3MP:** 1/2.3 inch CMOS, global shutter 1920 x 1200 3.0 um square pixels Monochrome **5.1MP:** 1/2.5 inch CMOS, rolling shutter 2592 x 1952 2.2 um square pixels Monochrome
Acquisition Rate	2.3MP: Up to 60 frames/second 5.1MP: Up to 30 frames/second
Aimer	Red Class II Laser; 8-point sunburst pattern
Illumination	Field replaceable modules: Eight 660nm Red LEDs Eight 470nm Blue LEDs Eight 850nm IR LEDs Eight 2700K (Color Temperature) White LEDs Four 660nm Red LEDs + Eight 850nm IR LEDs + Four 470nm Blue LEDs + Eight 2700K (color temperature) White LEDs External Illumination
Imager Field of View	SR (Standard Range): 10.8 mm Liquid Lens 30° H x 19° V Nominal WA (Wide Angle): 6.8 mm Liquid Lens 46° H x 29° V Nominal
User Environment	
Operating Temp.	32° F to 113° F/0° C to 45° C (10-30VDC external power supply, duty cycle-dependent) 32° F to 113° F/0° C to 40° C (PoE, duty cycle-dependent)
Storage Temp.	-40° F to 158° F/-40° C to 70° C
Environmental Sealing	IP65 and IP67
Humidity	5% to 90% RH, non-condensing
Shock Resistance	EN 60068-2-27, 30 g; 11 ms; 3 shocks on each axis
Vibration Resistance	EN 60068-2-6, 14 mm @ 2 to 10 Hz, 1.5 mm @ 13 to 55 Hz; 2 g @ 70 to 500 Hz; 2 hours on each axis
Supported Symbologies[2]	
1D	Codabar, Code 39, Code 93, Code 128, I 2 of 5, MSI Plessey, UPC/EAN
2D	Aztec, Data Matrix, DotCode, MaxiCode, PDF417, Micro PDF417, QR Code, Micro QR
OCR	WITH Deep Learning-based OCR via an add-on license[1]. Supports Latin Letters (A-Z, a-z, digits or one of: !#$%&()*+,-./:;<=>?@[]^_`{|}~"'\€£¥)
Software	
Management	Zebra Aurora
Decoder Packages	Included in Standard and Advanced Machine Vision toolsets: 1D/2D Standard (5 FPS); 1D/2D Fast (60 FPS); 1D/2D DPM Full (60 FPS)
Machine Vision Toolsets	Sensor, Standard, Advanced (MV toolsets vary by SKU; upgrades available via a software license)
Regulatory	
Environmental	EN 50581:2012; EN IEC 63000:2018
Electrical Safety	IEC 62368-1 (Ed.2); EN 62368-1:2014/A11:2017
Laser Safety	21CFR1040.10 & 21CFR1040.11 IEC/EN 60825-1:2014 (Ed.3)
LED Safety	IEC 62471:2006 (Ed.1); EN 62471:2008
EMI/EMS	EN 55032:2015/A11:2020 (Class B) EN 55035:2017 EN 61000-3-2:2014 (Class A) EN 61000-3-3:2013 47 CFR Part 15, Subpart B, Class B ICES-003, Issue 7, Class B
EU Declaration of Conformity	2014/30/EU; 2014/35/EU; 2011/65/EU. For more information visit: www.zebra.com/doc

Accessories

Internal illumination, external illumination, internal filters, external filters, brackets, cables, power supplies

Warranty

Subject to the terms of Zebra's hardware warranty statement, the VS40 is warranted against defects in workmanship and materials for a period of Two (2) Years from the date of shipment. Complete Zebra hardware product warranty statement: www.zebra.com/warranty

Recommended Services

Zebra OneCare Select™; Zebra OneCare Essential™

Specifications

VS40-SR—30° FOV Lens

Symbology/Resolution	Near	Far
5 mil Code 128	3 in./8 cm	24 in./61 cm
10 mil Code 128	3 in./8 cm	49 in./124 cm
15 mil Code 128	3 in./8 cm	70 in./178 cm
20 mil Code 128	3 in./8 cm	92 in./234 cm
5 mil DataMatrix	3 in./8 cm	13 in./33 cm
10 mil DataMatrix	3 in./8 cm	28 in./71 cm
15 mil DataMatrix	3 in./8 cm	40 in./102 cm
30 mil DataMatrix	3 in./8 cm	78 in./198 cm

VS40-WA—46° FOV Lens

Symbology/Resolution	Near	Far
5 mil Code 128	3 in./8 cm	14 in./36 cm
10 mil Code 128	3 in./8 cm	30 in./76 cm
15 mil Code 128	3 in./8 cm	42 in./107 cm
20 mil Code 128	3 in./8 cm	56 in./142 cm
5 mil DataMatrix	3 in./8 cm	8 in./20 cm
10 mil DataMatrix	3 in./8 cm	18 in./46 cm
15 mil DataMatrix	3 in./8 cm	27 in./69 cm
30 mil DataMatrix	3 in./8 cm	52 in./132 cm

Machine Vision (MV) Tools

Tool	Description	Sensor	Standard	Advanced
Object Locate	Find high contrast features	•	•	•
Pixel Counter	Count pixels with a set/given grey level in a specific area	•	•	•
Brightness	Provide the average brightness for an area	•	•	•
Contrast	Provide the average contrast for an area	•	•	•
Edge Tool	Find edges for fixturing and presence/absence	•	•	•
Distance Tool	Measure the distance between two existing tool results	•	•	•
Advanced Pattern	Find challenging features		•	•
Blob	Find, sort and count areas of joined pixels with a similar grey level		•	•
Optical Character Verification (OCV)	Inspects the quality of text or logos		•	•
Find Circle	Find and measure circles		•	•
Caliper Tool	Find and measure the distance between two edges		•	•
Filters	Enhance image quality for more robust inspection		•	•
1D/2D/DPM	Read 1D, 2D and DPM barcodes		•	•
Deep Learning OCR	Deep Learning-based OCR			•

Footnotes

1. Some features available in a future release. Contact your Zebra Partner or sales representative for more information.
2. Refer to Product Reference Guide for complete list of symbologies.
3. Printing resolution, contrast, power source, illumination source, and ambient light dependent

Specifications subject to change without notice.

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