NS42 Smart Vision Sensor

Unbeatable reliability, flexibility, and power combined

In today's business landscape, the escalating demands of global commerce and its intricate supply chain exert greater pressure on companies to ensure quality, enhance productivity, and accelerate delivery timelines. Whether in manufacturing, logistics, or reaching the end consumer, the key to success lies in inspecting and tracking the essential products delivered by your enterprise.

Zebra's NS42 Smart Vision Sensor offers a versatile machine vision solution engineered to meet the challenging needs of modern production and delivery processes. It comes standard with artificial intelligence-driven OCR (AI-OCR)—enabling highly accurate reads without training—as well as advanced tools for anomaly detection and assembly verification tasks.

Equipped with a neural processing unit optimized to accelerate AI and machine learning algorithms, the NS42 has the computational power and memory capacity to take on the most intensive AI-OCR and anomaly detection tasks with industrial-grade reliability. New tools can be added through the purchase of a software license to future-proof your investment.

The NS42's AI-OCR solution combines the power of Zebra's Aurora Focus software to deliver read times as fast as 40 milliseconds, throughput up to 900 products per minute, and near 100% accuracy even on hard-to-read surfaces. Transform date and lot code inspection from a bottleneck into a competitive advantage with Zebra machine vision.

Zebra Aurora Focus Software

Zebra's Aurora Focus introduces a seamless, consolidated platform for managing Zebra's machine vision portfolio. This innovative software elevates the control of manufacturing and logistics automation across the enterprise with its refined simplicity and efficiency. With Aurora Focus, users can effortlessly set up, deploy, and operate all Zebra fixed industrial scanners and smart vision sensors, streamlining operations by eliminating the requirement for multiple tools.

Both seasoned users and newcomers can intuitively navigate the software's user-friendly interface, slashing training and setup times. Experienced users will enjoy seamless access to all features and streamlined procedures while beginners are walked through each step in a logical sequence.

Enhance Traceability and Quality

AI-Driven OCR

Zebra's AI-OCR tool uses a pretrained deep neural network to read characters, digits, and symbols without the need for font definitions to automate a critical part of the manufacturing process. Misprinted

The NS42—Elevate capabilities. Unlock possibilities. Experience the difference with Zebra.
For more information, please visit www.zebra.com/ns42.

date and lot codes and the potential release of incorrectly marked items are a constant risk. By automating the verification process with near 100% accuracy, teams can significantly reduce errors and operational costs while improving throughput.

Advanced Anomaly Detection

Minimize defects with the NS42's cutting-edge anomaly detection. Its automated image comparison flags deviations from the reference samples, saving considerable time and resources on training and deployment. In contrast, supervised learning requires hundreds or even thousands of labeled defect images, requiring extensive manual annotation and categorization of every flaw type.

Speed Deployment

Get Power and Data from Ethernet

Power the NS42 and attached accessories using the network, with support for Power-over-Ethernet (PoE). This reduces setup complexity and avoids the cost of additional power drops and power supplies. You can also power the NS42 with a standard 24 VDC power supply or standard USB-C port in environments without PoE.

USB-C Flexibility

With USB-C, users can power the NS42 using a single cable and integrate the scanner with various Zebra devices, such as printers or tablets. Additionally, users can back up the system or store images for later analysis by connecting external storage devices to the NS42.

Quickly Access Device and Job Settings

The highly intuitive modern interface presents logical workflows. No need to hunt for needed features and functions—they are just a click or two away. Even complicated settings are easy to configure using sliders and radio buttons.

Simplify Usability

Integrated Lighting and Multifunctional Light Support

Zebra's NS42 features a powerful integrated illumination system, which comes standard with white light and options for red, infrared, or multi-wavelength output. The NS42 also supports Zebra's Integrated Multifunction Light (ZIML), which offers white, red, or infrared illumination. ZIML also offers 10x standard output via DualOverDrive mode, direct strobe control through camera trigger, and dual dot lasers for conveyor setup or continuous use in manual stations.

Programmable Input/Output (I/O)

Individually control up to nine digital I/O ports to increase application functionality and improve error proofing. You can add peripherals, activate lights, or trigger an action to more fully automate your processes.

Status Indicators/Operator Feedback

Your operators can instantly review decode statuses with 360-degree LED lights. Workers can see at a glance whether a decode was successful or unsuccessful—preserving product quality and traceability. Easily verify whether cameras are fully operational or in need of attention with five built-in camera status LEDs—Power, Online/Run, Focus Warning, Error, and Ethernet Status. For added safety, a beeper with adjustable volume provides an audible cue of a successful decode, so workers can keep their eyes on the job—instead of the device.

Tough and Reliable

The ultra-rugged design ensures dependable operation in even the most demanding environments. The aluminum housing is chemical and oil resistant. IP65 and IP67 sealing ratings mean the device is dust-tight and able to withstand high-power washdowns—or even total immersion in water.

Real-Time Performance Insights

Empower workers with actionable intelligence at their workstations. Operators have access to key metrics for every camera from your web browser, including device health, resource utilization, decode results, and scan performance metrics. Eliminating the need to install a PC at each workstation reduces hardware needs and installation expenses.

Easy to Run

Worry-Free Coverage with Complete Support

Achieve the consistent peak performance and device uptime that modern businesses require with Zebra OneCare™ Essential and Select Support Services. Avoid unexpected disruptions and

unplanned repair costs. With comprehensive coverage, everything is taken care of—including normal wear and tear and accidental damage. Tailor your support plan with a range of options to match your business needs, such as next-day delivery of replacement devices, on-site support, cloud-based access to your contracts, repair data, tech support cases, and beyond.

Accurate Image Capture

Poor lighting conditions or variable distances often require multiple cameras, external lighting, or complex custom coding to capture accurate image data. ImagePerfect+, a Zebra-exclusive feature, captures up to 16 different images of a single item, each with its own unique settings for focus, exposure, gain, illumination control, and more. The result is flawless image capture that ensures quick, accurate inspections in a streamlined solution.

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 I/O	Four opto-isolated GPIO: GPIOs (0, 1, 2, 3) Five non-isolated GPIO: GPIOs (4, 5, 6*, 7*, 8*) Voltage GPIO: 10–30 VDC *Unavailable when External Light Mode is enabled
Color & 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 & control/GPIO One USB 3.0 SuperSpeed Type-C with DisplayPort Alt Mode
Communication Protocols	Ethernet/IP, PROFINET, Modbus TCP, TCP/IP, RS-232
Keyboard Support	USB HID
User Indicators	360° decode/job status LEDs, power LED, device status LED, focus status LED, warning LED, Ethernet status LED; beeper (adjustable volume)
Performance Characteristics	
Image Sensor	**2.3 MP**: 1/2.6 in CMOS, global shutter 1920 x 1200 3.0 µm square pixels monochrome **5 MP**: 1/2.5 in CMOS, global shutter 2592 x 1944 2.2 µm square pixels monochrome
Acquisition Rate	2.3 MP: up to 60 frames/second 5 MP: up to 42 frames/second
Aimer	Red Class II laser; 8-point sunburst pattern
Illumination	Field replaceable modules: >Eight 660 nm red LEDs >Eight 850 nm IR LEDs >Eight 2700 K (color temperature) white LEDs >Four 660 nm red LEDs + eight 850 nm IR LEDs + eight 2700 K (color temperature) white LEDs
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 (10–30 VDC external power supply, duty cycle dependent) 32°F to 104°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%–90% RH, noncondensing
Shock Resistance	EN 60068-2-27, 30 g; 11 ms; three shocks on each axis
Vibration Resistance	EN 60068-2-6, 14 mm @ 2–10 Hz, 1.5 mm @ 13–55 Hz; 2 g @ 70–500 Hz; two hours on each axis
Software	
Management	Zebra Aurora Focus
Decoder Packages	All SKUs include 1D/2D standard (5 FPS); Varies by SKU: 1D/2D fast (60 FPS), 1D/2D DPM with fast 2D (60 FPS); OCR, AI-OCR.
Machine Vision (MV) Toolsets	Standard machine vision toolset included. AI-OCR & Anomaly Detection varies by SKU. Upgrades available via a software license.
Supported Symbologies[1]	
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	Artificial intelligence-driven OCR via an add-on license. Supports Latin letters (A–Z, a–z, digits or any of: !#$%&()*+,-./:;<=>?@[]^_`{|}~"'\€£¥)
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

Markets and Applications

Transportation and Logistics

- Barcode reading and OCR
- Dock door
- Forklift scanning
- Conveyor routing
- Scan tunnels
- Product aggregation
- Process control
- Tote and container ID

Manufacturing

- Barcode reading and OCR
- Anomaly detection
- Batch reading
- Long-range identification (automotive)
- High-resolution code reading (electronics)
- Tire barcode, label identification, sorting, and tracking

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 (including Zebra's ZIML multifunction light), internal filters, brackets, cables, power supplies

Warranty

Subject to the terms of Zebra's hardware warranty statement, the NS42 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

Decode Ranges (Typical Working Ranges)[2]

NS42-SR—30° FOV Lens

Symbology/ Resolution	Near	5MP-SR Far
5 mil Code 128	3 in./8 cm	33 in./83 cm
10 mil Code 128	3 in./8 cm	65 in./166 cm
15 mil Code 128	3 in./8 cm	98 in./249 cm
20 mil Code 128	3 in./8 cm	131 in./332 cm
5 mil DataMatrix	3 in./8 cm	17 in./44 cm
10 mil DataMatrix	3 in./8 cm	35 in./89 cm
15 mil DataMatrix	3 in./8 cm	52 in./133 cm
30 mil DataMatrix	3 in./8 cm	105 in./267 cm

NS42-SR—30° FOV Lens

Symbology/ Resolution	Near	5MP-WA Far
5 mil Code 128	3 in./8 cm	20 in./52 cm
10 mil Code 128	3 in./8 cm	41 in./104 cm
15 mil Code 128	3 in./8 cm	62 in./157 cm
20 mil Code 128	3 in./8 cm	82 in./209 cm
5 mil DataMatrix	3 in./8 cm	11 in./28 cm
10 mil DataMatrix	3 in./8 cm	22 in./56 cm
15 mil DataMatrix	3 in./8 cm	33 in./84 cm
30 mil DataMatrix	3 in./8 cm	66 in./168 cm

Footnotes

1. Refer to Product Reference Guide for complete list of symbologies.
2. Printing resolution, contrast, power source, illumination source, and ambient light dependent.