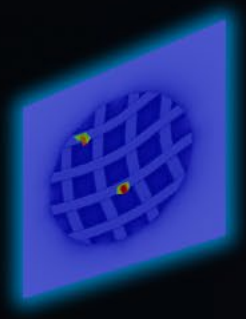
KEYENCE

Vision System with Built-in AI

NEW VS Series

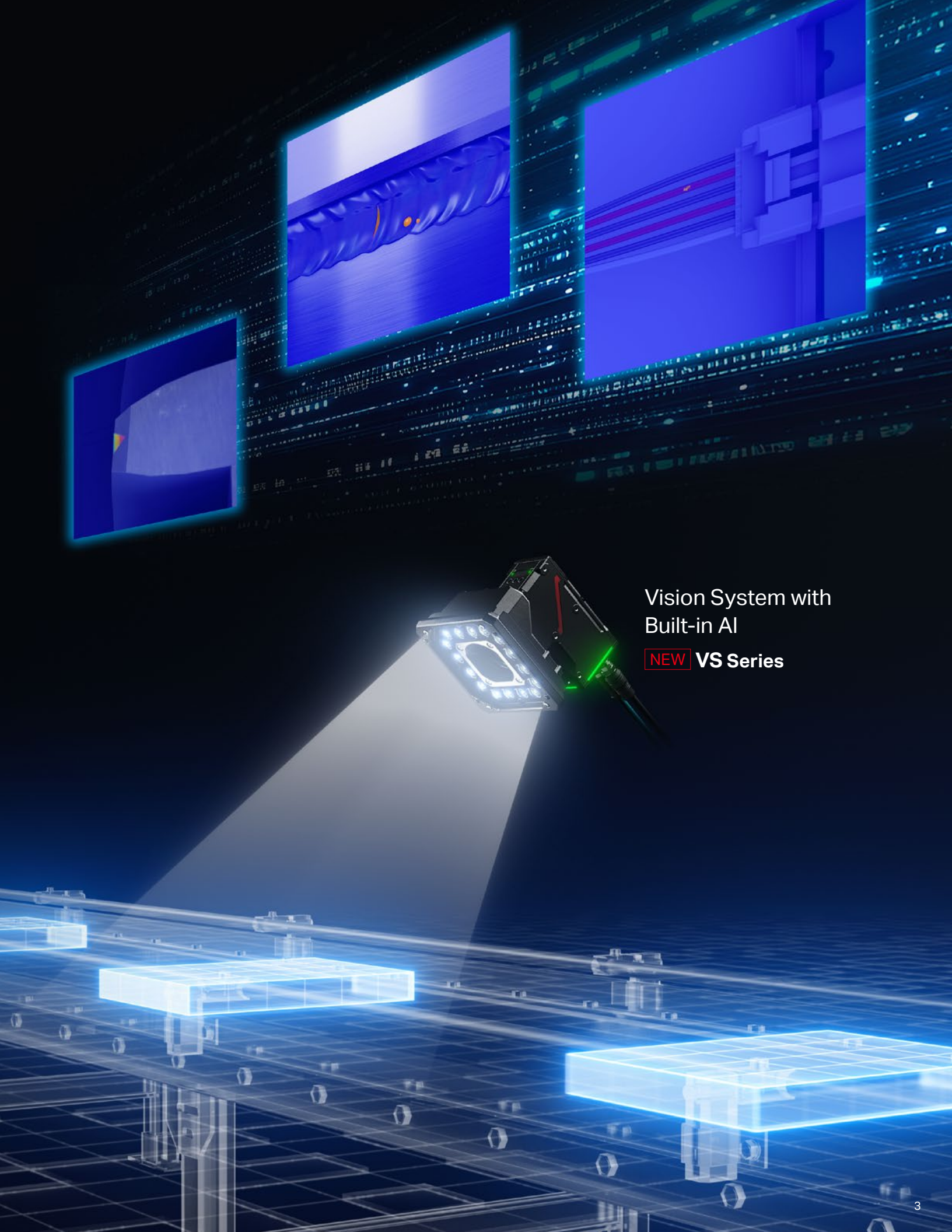
New AI Technology | Reliable Defect Identification



Two AI technologies
for automation of previously impossible vision inspections

[Technology 1] Increased detection performance: Proprietary KEYENCE algorithm for smart camera-based 25-megapixel high-accuracy AI inspection

[Technology 2] Increased operational efficiency: Quick and easy startup using a general-purpose PC and only a few dozen images for learning



Vision System with
Built-in AI

NEW **VS Series**

Optimal tools × Optimal image creation to meet a wide variety of inspection needs

Lineup

Standard zoom smart camera
VS-L

Short-range zoom smart camera
VS-S

C-mount smart camera
VS-C

Optimal inspection tools

[Two AI tools + Rule-based tools]

The combination of both supervised and unsupervised AI tools alongside rule-based inspection tools provide flexible solutions to a wide variety of vision applications.

Supervised AI learning

AI Segmentation

Unsupervised AI learning

AI Detection

Rule-based tools

Presence check

Scratches

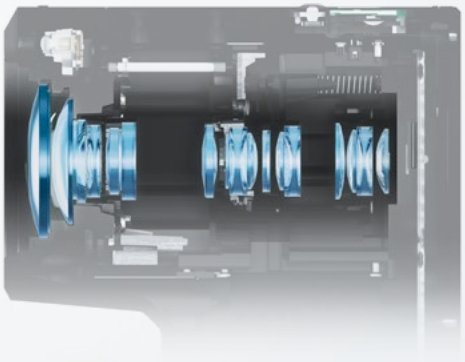
GD&T measurement

Count

Optimal image creation

[ZoomTrax × Specialized imaging]

Award-winning imaging and illumination tools such as LumiTrax, Multi-Spectrum, and ZoomTrax make it possible to create the ideal image for stable inspection.



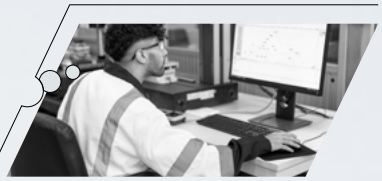
Multi-spectrum lighting

High-intensity smart ring illumination

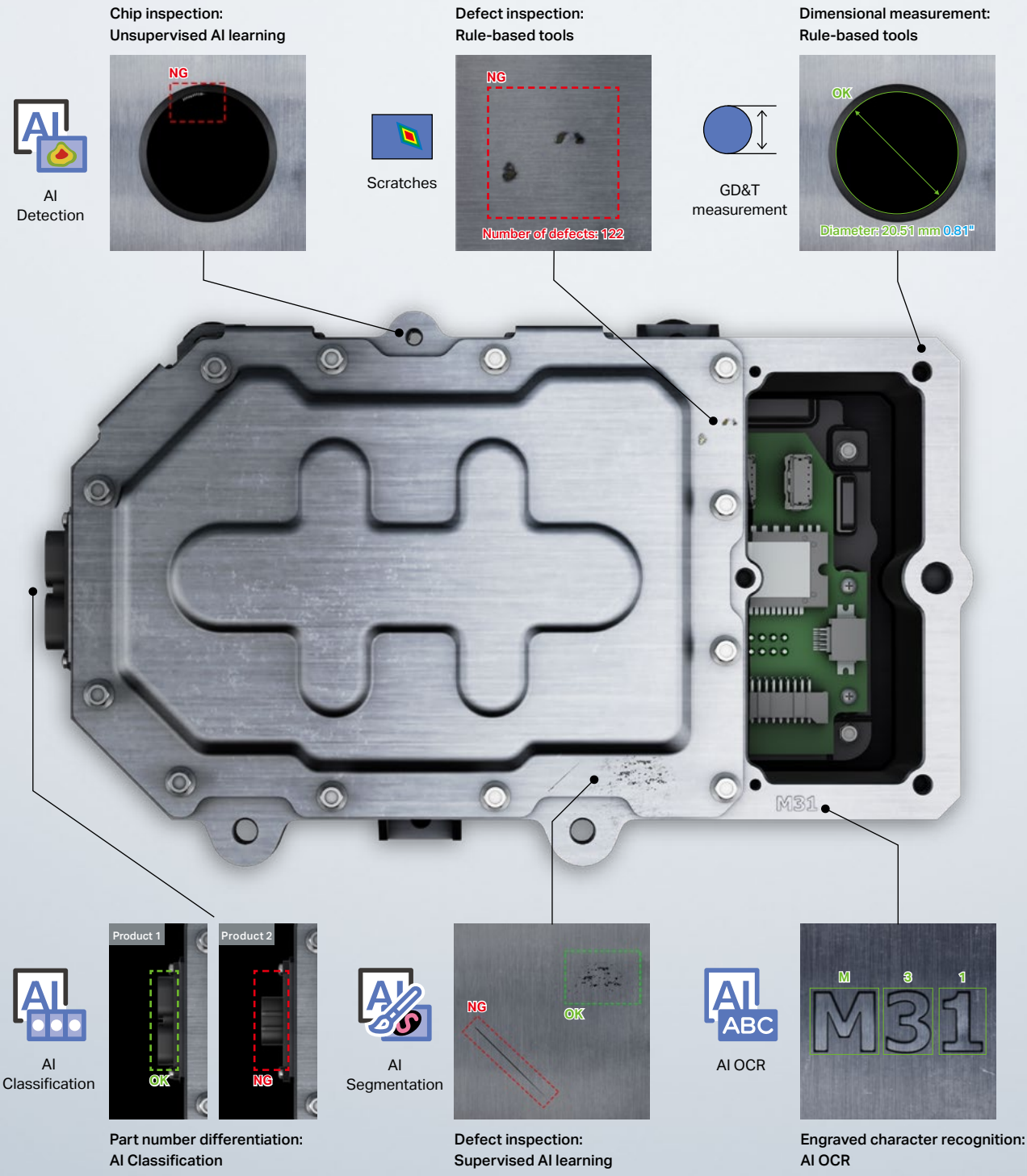
Optimal inspection tools

Two AI tools × Rule-based tools

Improving yield rates by reducing excessive detection of good products and minimizing accidental shipment of defective products is incredibly difficult.



Improve flexibility through supervised and unsupervised AI learning + rule-based inspection tools



See the video for more information

Application-specific AI tools × Rule-based tools

AI Tools

NEW Supervised AI learning
AI Segmentation

Unsupervised AI learning
AI Detection

Specialized for differentiation
AI Classification

NEW Specialized for OCR
AI OCR

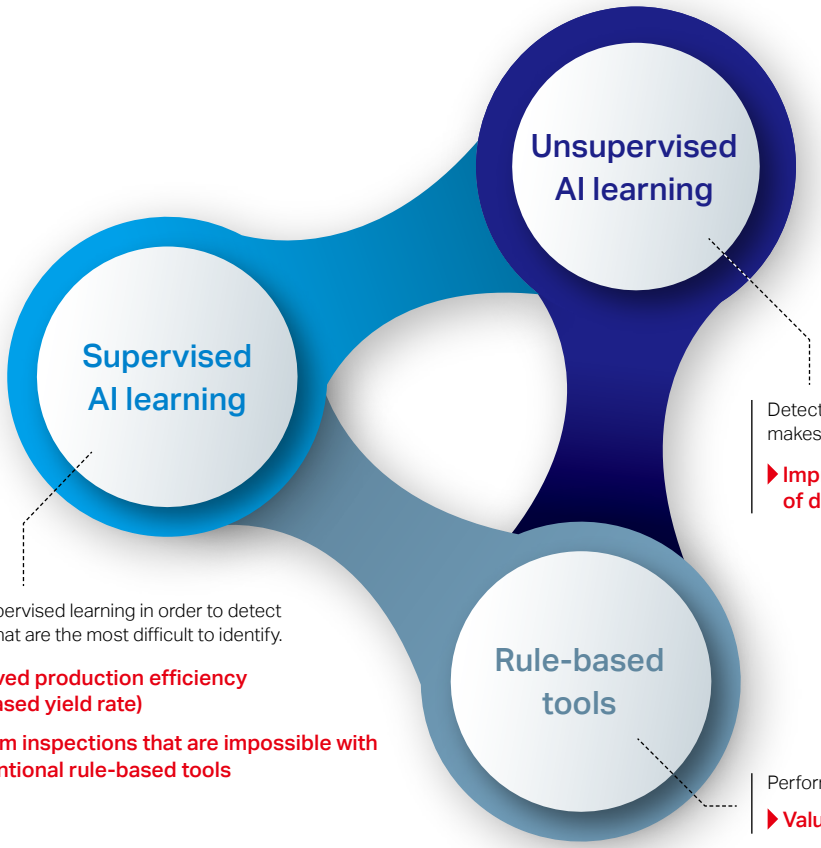
Rule-based tools

Presence check
Scratches
GD&T measurement
Positioning
Color inspection
Count
Character recognition
1D code
2D code
Calibration

* The VS-AD1 is required to use AI Segmentation and AI Detection Fine Mode.

The right tool for the right application

Take advantage of two AI tools along with rule-based tools to supercharge any inspection.



Detection of differences from known good products makes it possible to detect unexpected defects.

- **Improved prevention of accidental shipment of defective products**

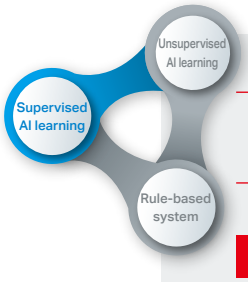
Utilize supervised learning in order to detect defects that are the most difficult to identify.

- **Improved production efficiency (increased yield rate)**
- **Perform inspections that are impossible with conventional rule-based tools**

Perform detailed adjustments of various parameters.

- **Value-based decision making**

Two AI tools × Rule-based tools



1 Supervised AI Inspection NEW AI Segmentation

NG Scratches

OK Stains

Challenge with conventional appearance inspection

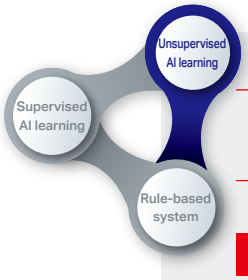
Excessive detection of defects

Varying part conditions lead to false detection of defects.

Solution with the VS Series

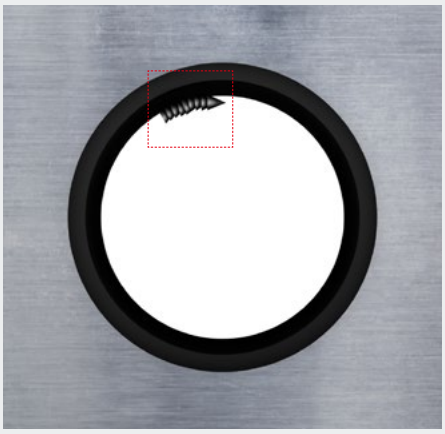
Detection of only specified defects

AI Segmentation makes it possible to learn specific defects, reducing excessive detection.



2 Unsupervised AI Inspection AI Detection

NG Unexpected chips



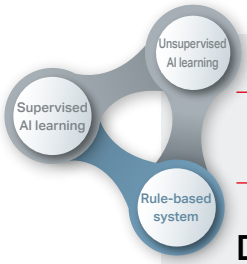
Challenge with conventional appearance inspection

Unexpected defects may not be detected

Solution with the VS Series

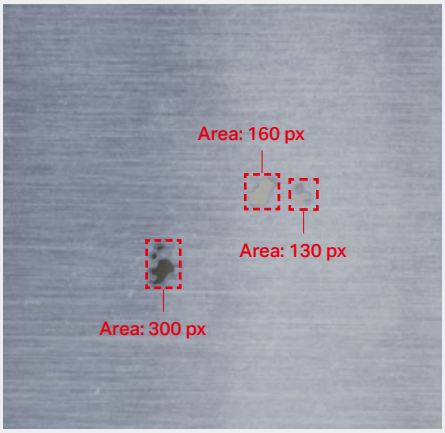
Detect defects by comparing products to the learned good conditions

Even unexpected defects can be detected by teaching only OK images.



3 Rule-Based Inspection

Detection based on size and count:
Cast holes



Challenge with conventional appearance inspection

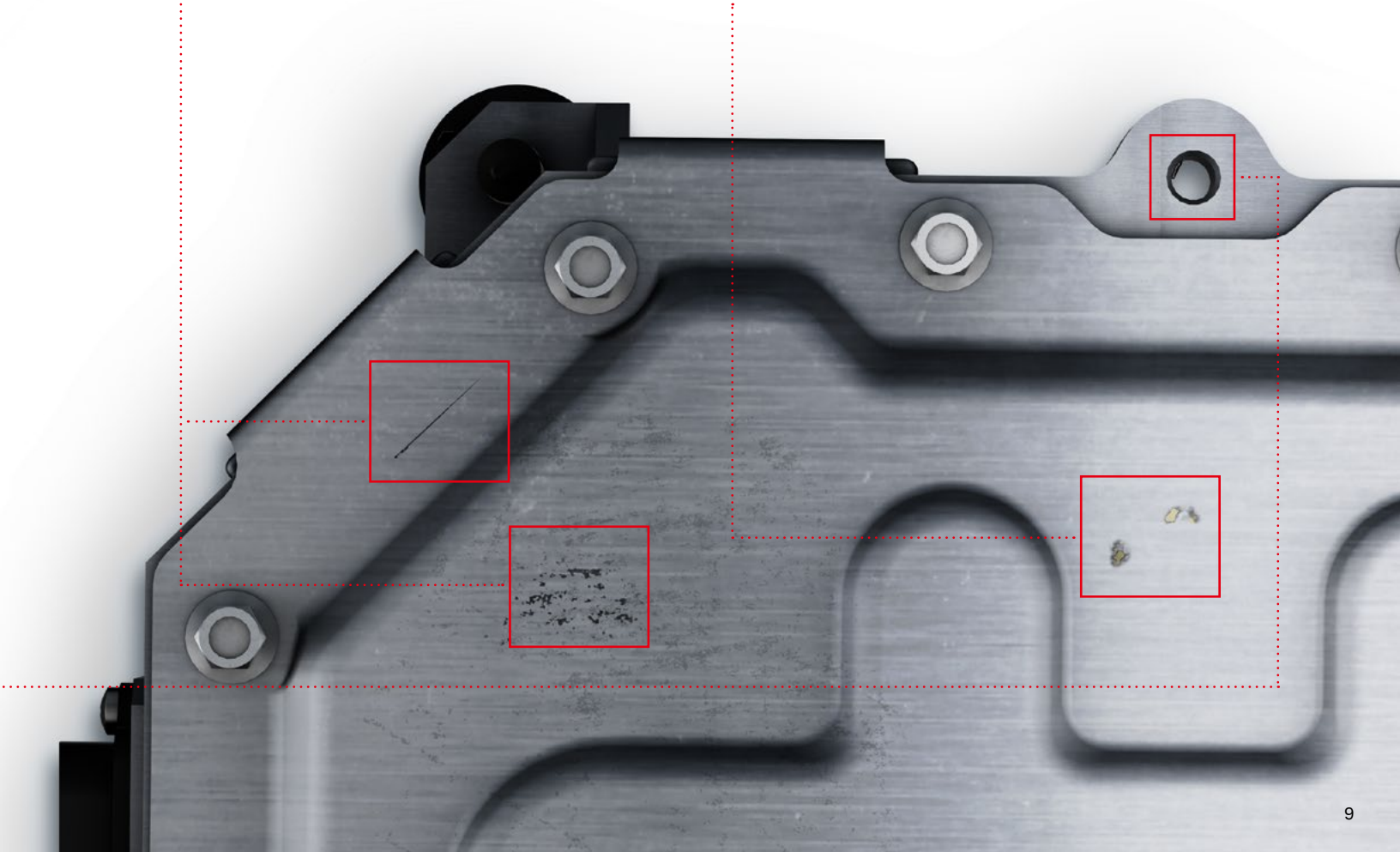
AI results do not provide size or count results

Setting judgment conditions for size or count are not possible with AI.

Solution with the VS Series

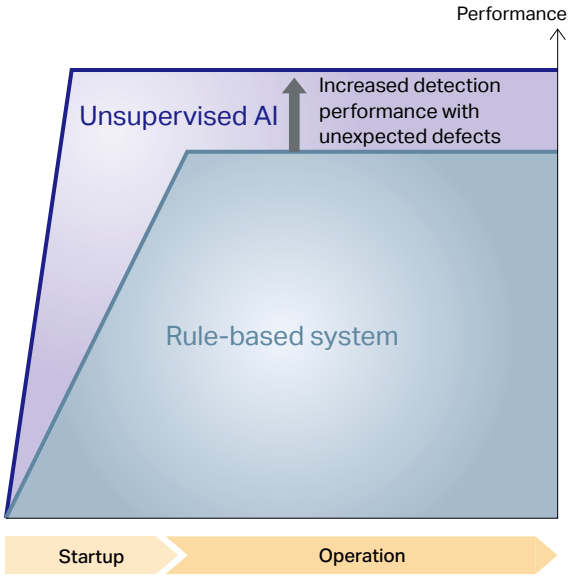
Detect size and count of defects that AI Tools flag using rule-based tools

Defective areas detected by AI tools can be re-inspected with rule-based inspection tools to set judgment conditions for defect size and count.



Three tools for optimizing inspection performance

Prevention of accidental shipment of defective products



Conventional products

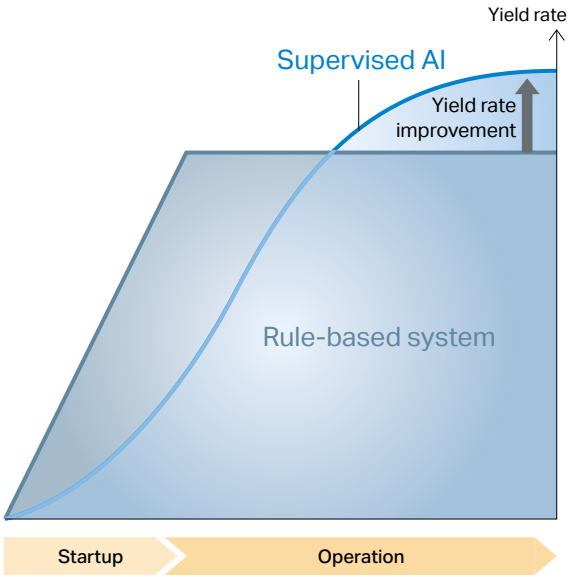
Rule-based system
Startup time can be reduced and detection of even minute defects is possible, but additional setting configuration is needed to detect unexpected defects.

VS Series

Rule-based system × Unsupervised AI learning

The adoption of AI capable of detecting unexpected defects makes it possible to prevent accidental shipment of defective products.

Yield rate improvement



Conventional products

Rule-based system
Although startup time is short, detecting defects in a wide variety of good products increases excessive detection and decreases the yield rate.

VS Series

Rule-based system × Supervised AI learning

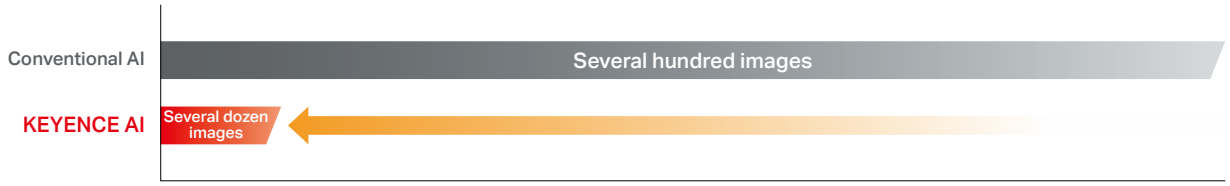
AI that can handle variations in good products without sacrificing operating speed makes it possible to improve yield rates.

Two AI tools × Rule-based system » **Simultaneous elimination of accidental shipment of defective products and improved yield rate**

KEYENCE proprietary AI: Immediate usability with only a few sample products

Conventional AI learning requires a large number of images (hundreds to thousands) to achieve the desired detection performance. With the VS Series, however, the AI tools offer impressive detection performance with only a small number of images (from just a few to several dozen), significantly reducing startup time.

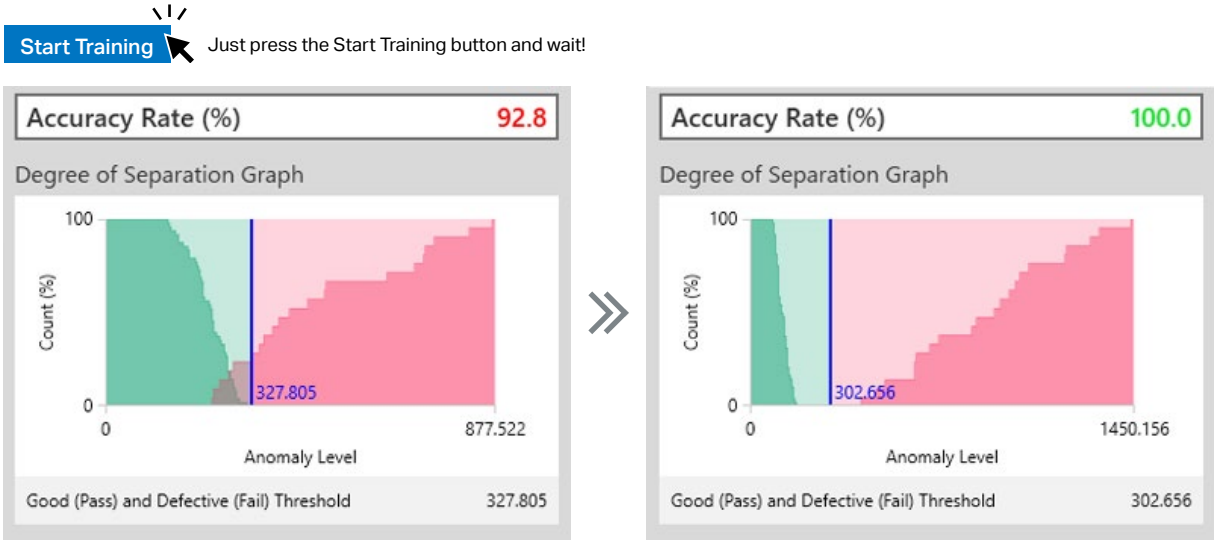
Number of images required for learning before operation



Maximum detection capability by learning just a small number of images » **Significantly reduced startup time**

Automatic selection of images for learning AI Auto Image Selector

With conventional AI systems, users have to select the images to use for learning manually, requiring a certain level of experience and a lot of time. With AI Auto Image Selector, the software automatically selects the images for learning, eliminating the need for specialized skills and significantly reducing the time needed for learning.



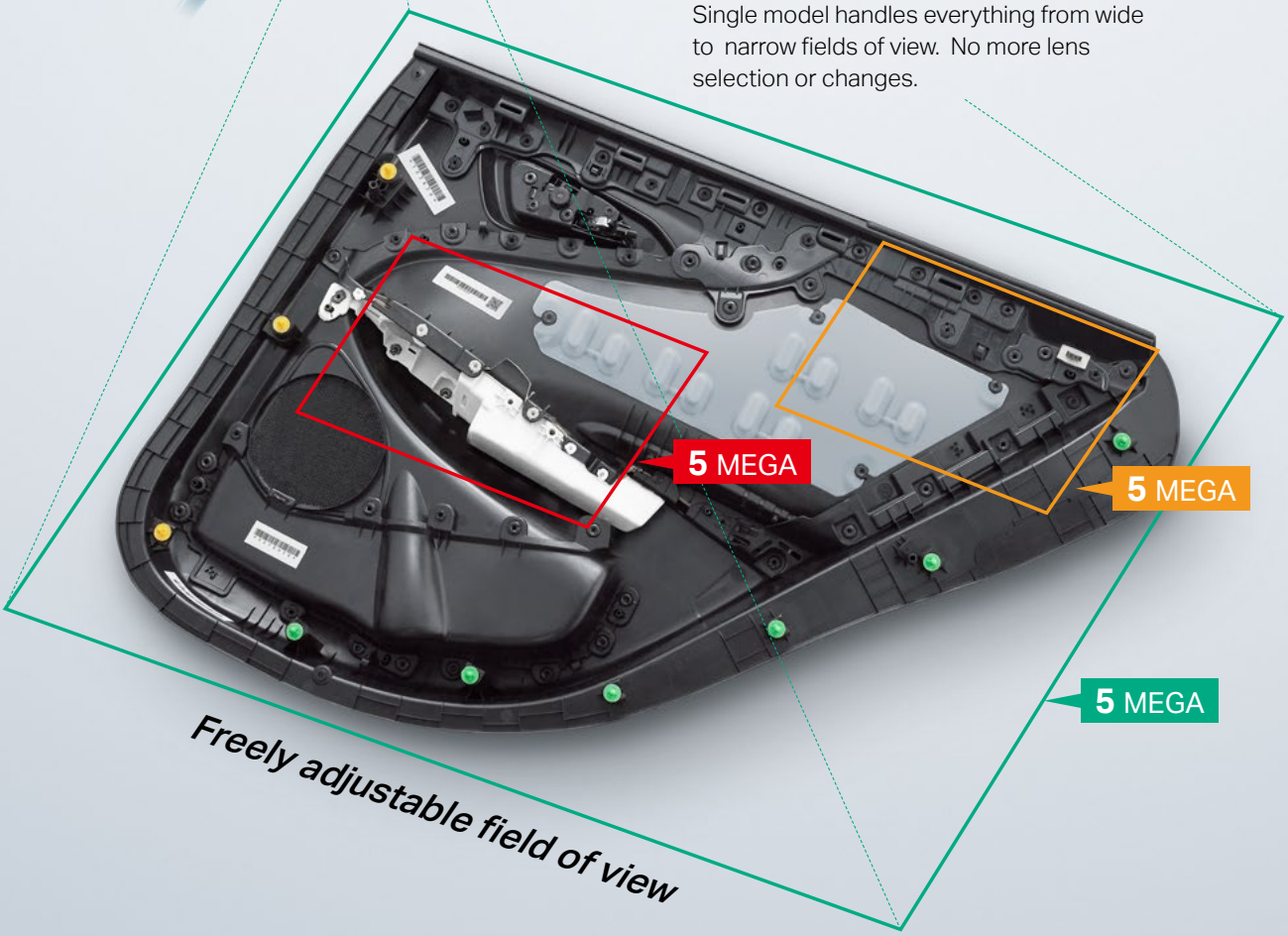
The Auto Image Selector automatically repeats learning until clear separation of results is possible.

No need for trial and error or special skills » **Significantly reduced time and effort spent on learning**

Image optimization used to require a great amount of time and skill.

Adjust focus and field of view with one click

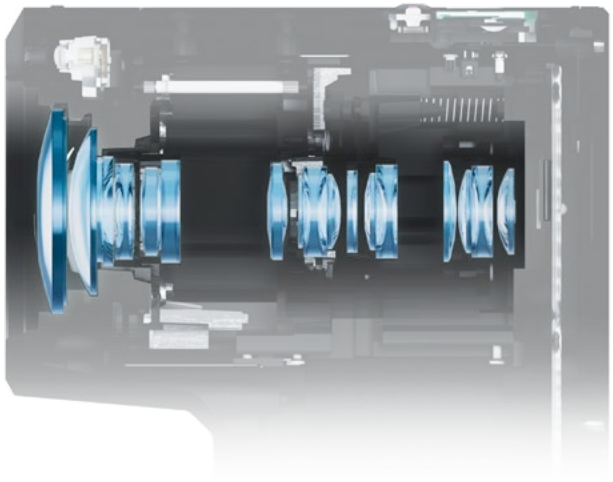
Single model handles everything from wide to narrow fields of view. No more lens selection or changes.



See the video for more information

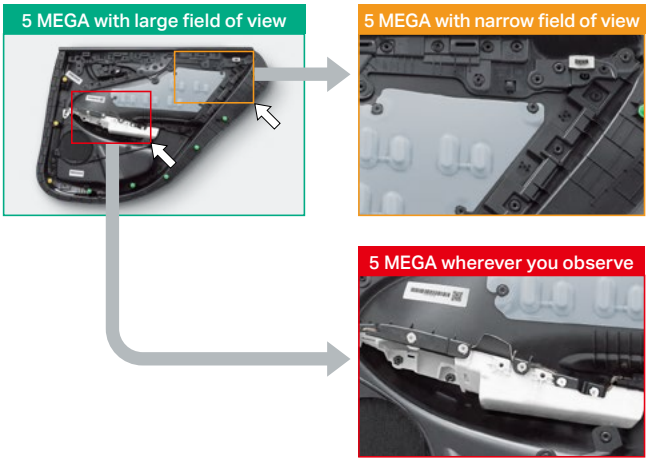
Optical zoom with no loss in resolution: ZoomTrax

A series of mechanical zoom lenses allows a single camera to be used across a wide range of mounting distances and fields of view without changing lenses.
Customized CMOS sensors are available from 1.6 to 15 MP. By integrating a series of 19 lenses and a CMOS sensor, the VS Series realizes high-grade optical performance with minimal distortion.



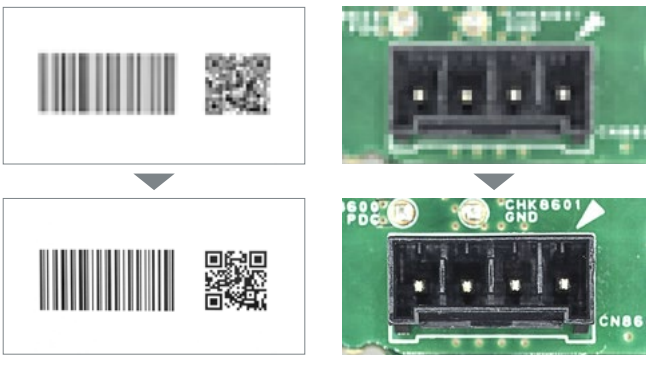
Simply specify the area to get the best field of view and resolution

Using optical zoom, the VS can easily change the field of view without sacrificing resolution. All adjustments can be completed from the software. No mechanical changes necessary!



Optimized images for robust inspections

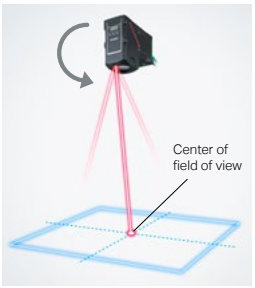
The VS Series utilizes a unique auto-focus algorithm to create the best image. This optimizes images for code reading, measurement, and flaw detection applications that require high resolution.



Our commitment to easy installation

We considered every possible issue that you may encounter with camera installation.
No control panel is required, so it can be installed immediately, anytime, before or during projects.

Laser pointer for easy installation



OLED Display

View connection status,
IP address, and other settings
directly on the camera.

Flexible mounting options

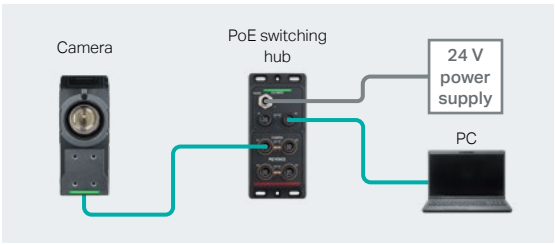
Ability to install on existing equipment by utilizing mounting holes on 4 sides.

IP67 Rated

A double-packed structure ensures a high level of waterproofing.

PoE

Supply power to both the camera and light with one cable using Power over Ethernet.



Lighting techniques and algorithms for reliable inspections

KEYENCE's high-intensity smart ring light features snap-on installation and the ability to cut ambient light as well as advanced algorithms that adapt to changes in the environment.

High-intensity lighting 20 times brighter than conventional models

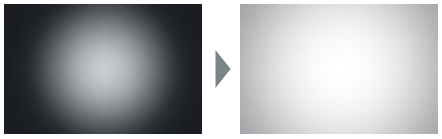
Overdrive lighting delivers high-intensity light using a burst-release of accumulated charge.

Lighting lens for uniform emission

A newly designed custom aspheric lens is installed on each of the LEDs. This creates clear, uniform images even over larger fields of view.

Conventional ring light illumination

High-intensity smart ring illumination

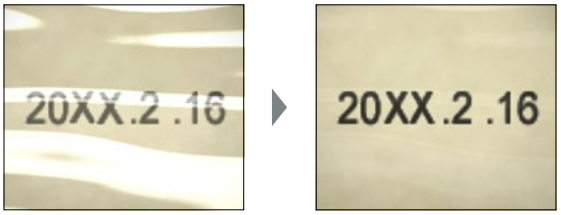


Fine HDR

Uniform images can be captured by correcting the contrast with one image capture. Multiple image captures are not required, so the VS Series can be used on high-speed lines.

LumiTrax Glare Reduction

LumiTrax mode combines smart ring lighting techniques with proprietary algorithms to minimize glare.

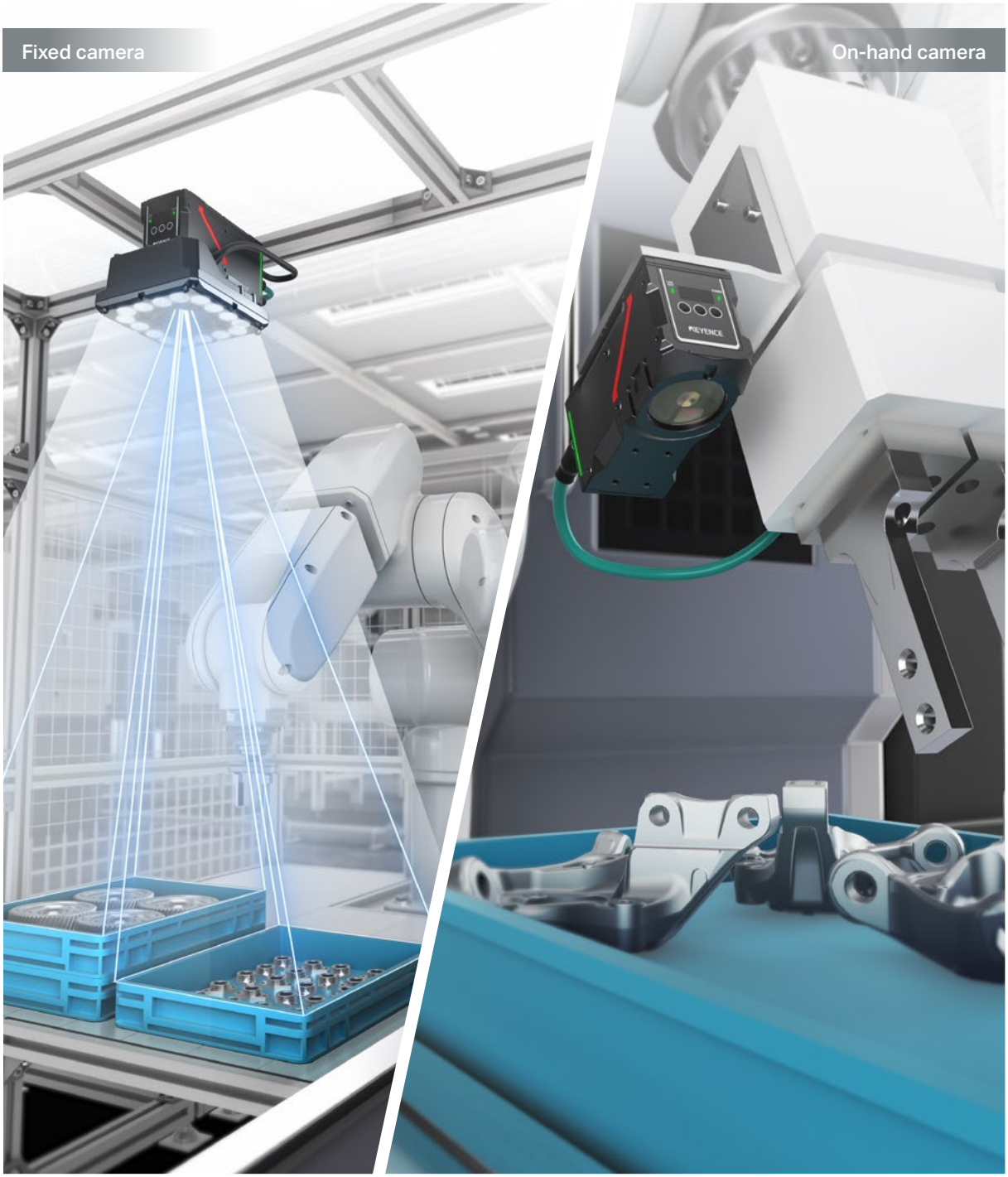


Optimal image creation with vision-guided robotics

Fixed and on-hand camera support

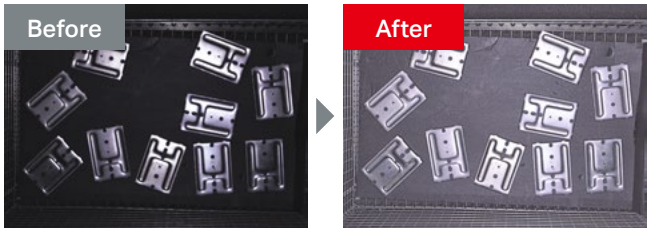
Improved stability of vision-guided robotics

The VS series improves vision-guided robotics applications by utilizing ZoomTrax, smart cameras, and high intensity smart ring illumination functions for greater imaging and environmental stability.



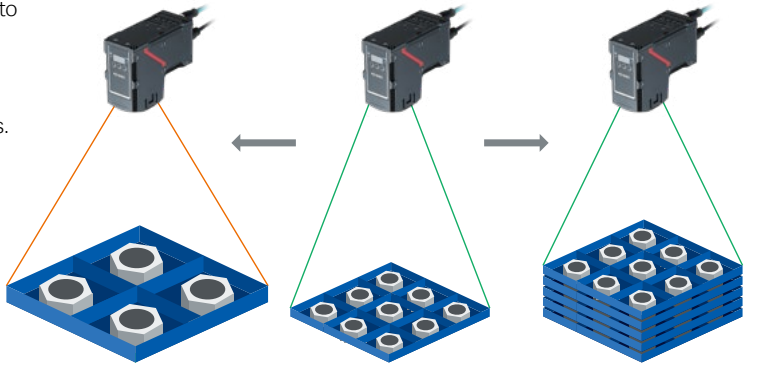
Bright, uniform illumination even over a wide field of view Fine HDR

With a wider field of view, brightness can be uneven with a noticeable difference in intensity between the center and the edges of the screen. Advanced imaging technologies such as overdrive lighting with high-intensity smart rings and HDR capturing help to minimize such differences even with a wide field of view.



Support for multiple pallets and tooling changeover ZoomTrax

ZoomTrax automatically changes the field of view to suit the size of the target, and automatic focusing makes it possible to handle pallets with different heights, allowing for usability in a wide variety of production environments without changing lenses.

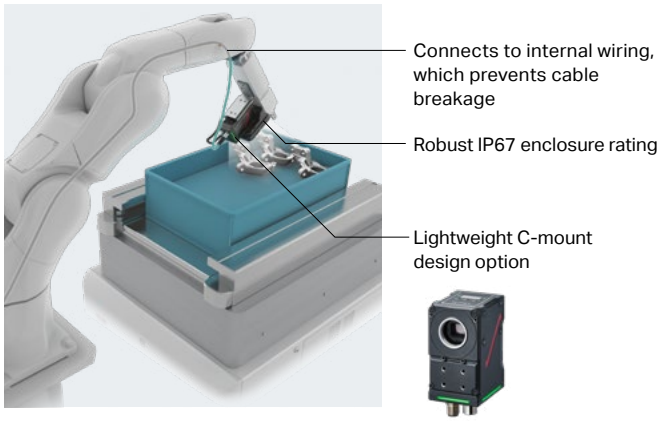


Targets of different sizes

Pallets with different heights

Optimal hardware for on-hand picking Internal wiring

A wider range of on-hand applications is possible thanks to on-robot PoE connectivity, IP67 environmental resistance, and a lightweight C-mount design.



VS Creator for quick programming of any inspection

Create both simple and sophisticated inspections

Quick inspection creation with one software package

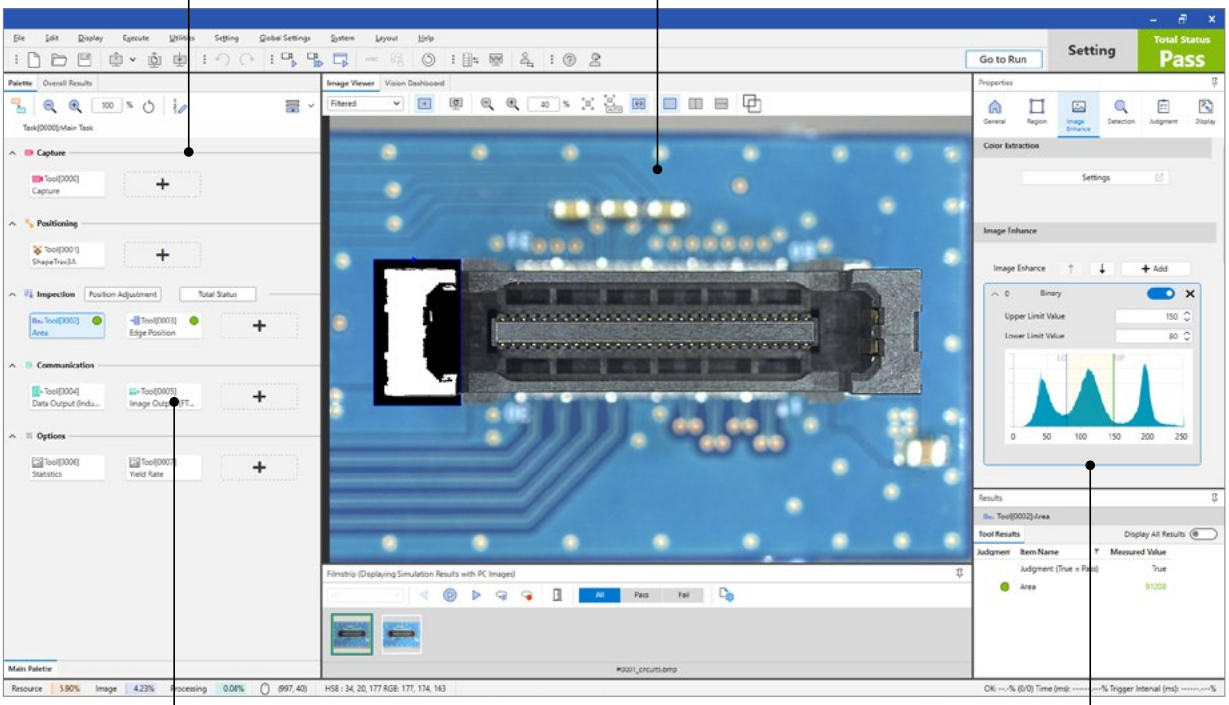
VS Creator is designed to be both easy to use and intuitive, allowing for flexible creation of inspection applications to suit a wide variety of needs.

Intuitive programming

Task View

Easy-to-see

Image View



Easy copy & paste

Shortcut keys available

Efficient setup

Properties View

See the video for more information

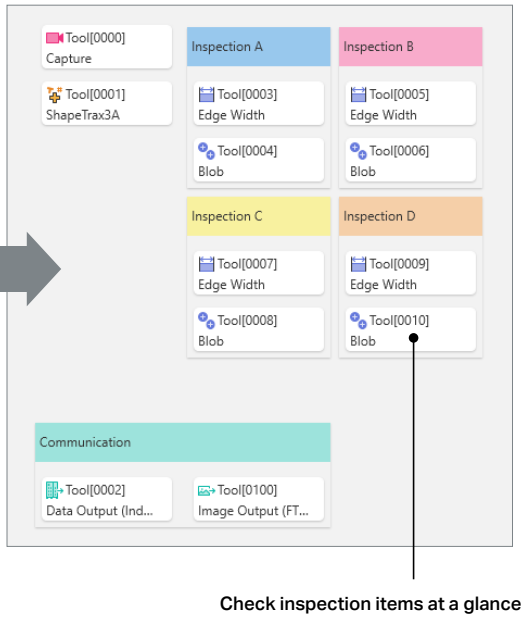
Capable, flexible, and easy to understand

The number of inspection tools needed tends to increase with application complexity. The VS Series keeps it simple and organized.

Step layout made in four steps

Switch anytime

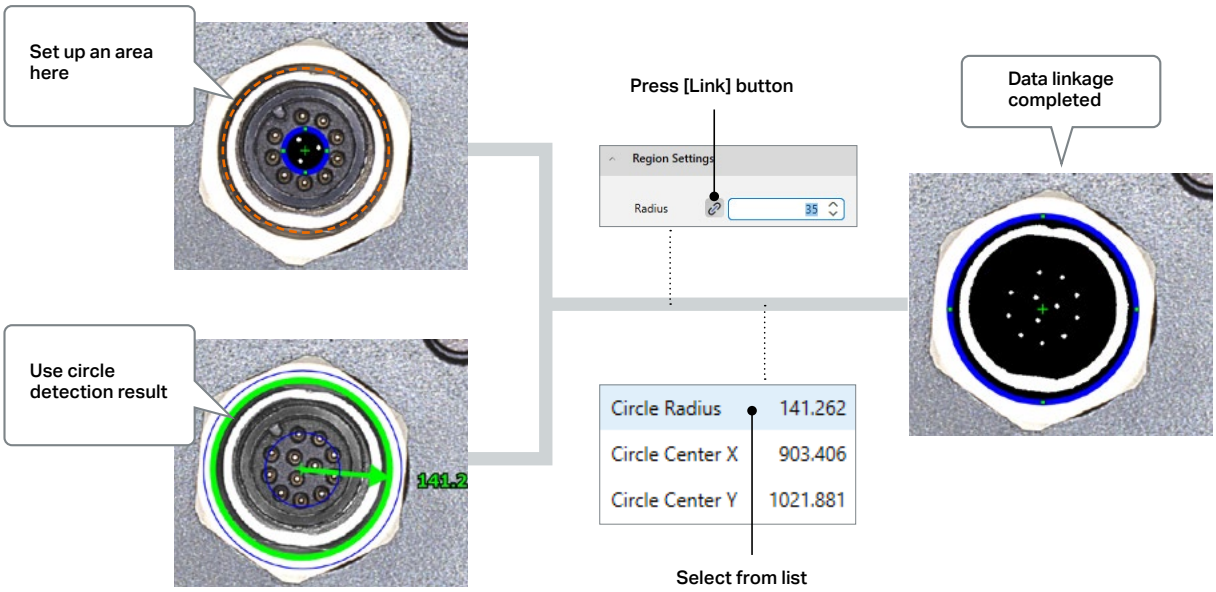
Free layout for easy organization



Check inspection items at a glance

Link tool results with ease

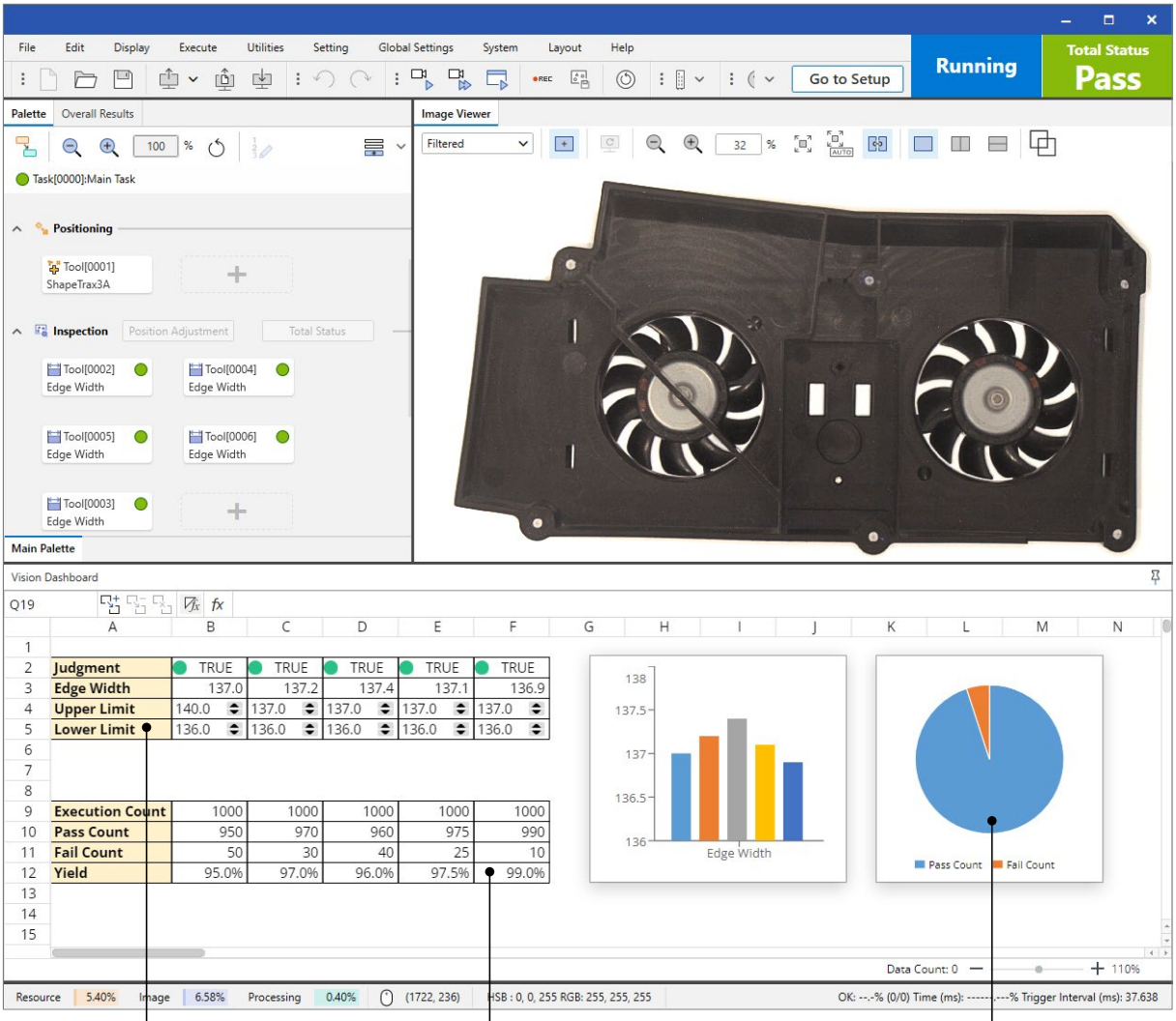
Create complex inspections by linking tools using conditional formatting.



Vision Dashboard — Immediate data utilization

Instantaneous data utilization and screen customization

The Vision Dashboard significantly reduces the time required for data utilization compared to conventional systems. The various tools and dashboard components also make operation screen customization incredibly easy.



Lists
to adjust settings

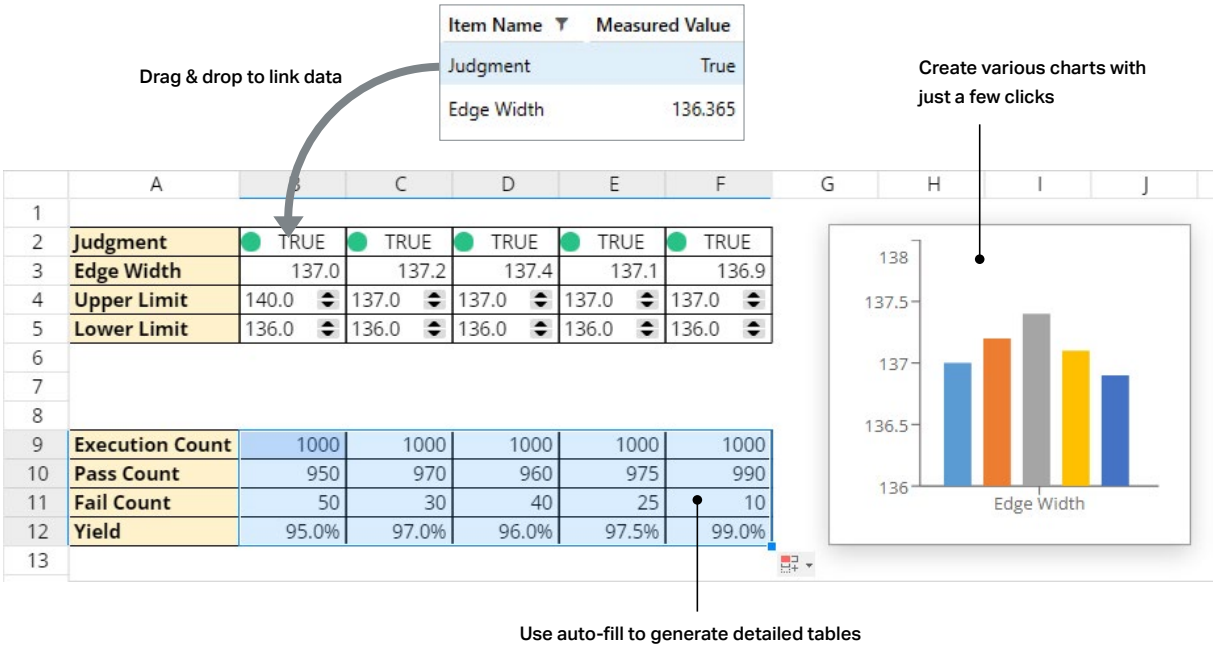
Table format
for yield rate management

Graphs
for quality analysis

See the video for more information

Quickly access necessary data

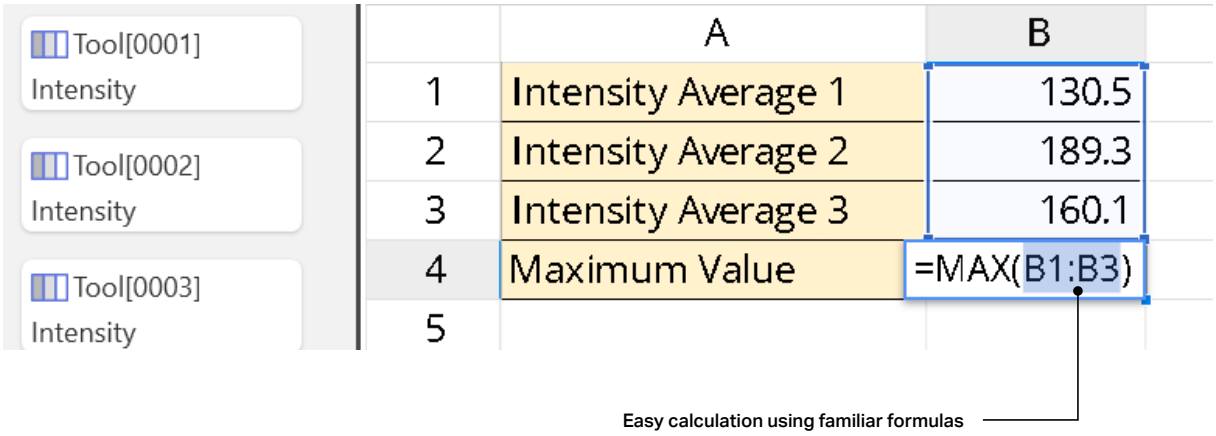
Create lists and graphs in an instant by utilizing standard spreadsheet functions.



Quick calculations using selected data

Formulas can be easily applied using the same rules as common spreadsheet software. You can also calculate multiple cells in a batch.

Example Calculating maximum value



Intuitive operation screens for onsite use

Easy operation screen customization

Custom Screen

Dedicated screens that are easy to use for onsite personnel can improve overall efficiency, but making the screens can take a long time. Custom Screen makes it easy to create intuitive, user-friendly operation screens quickly.

Multiple image processing screens displayed side by side

Customizable graphical component locations

History and NG image displays

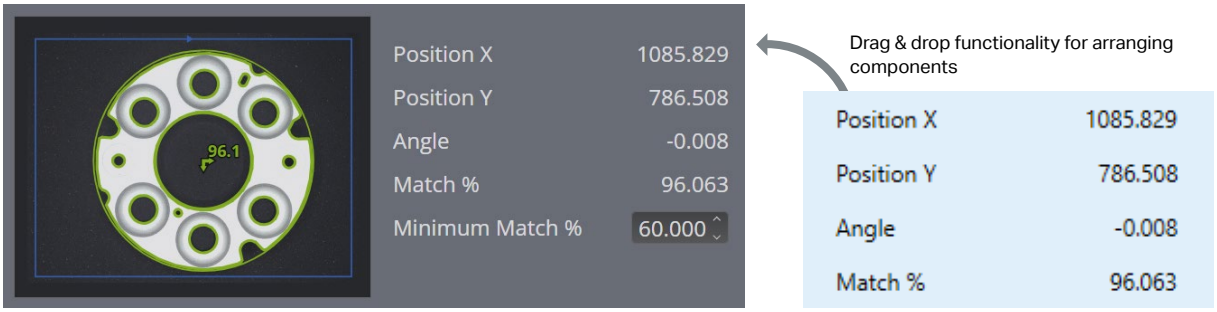
Easy-to-view screens for onsite use

When it comes to factory automation, screens that are clear and easy to read are important. Custom Screen makes it easy to create highly visible components such as buttons, text, and graphs.

Page switching to suit onsite needs

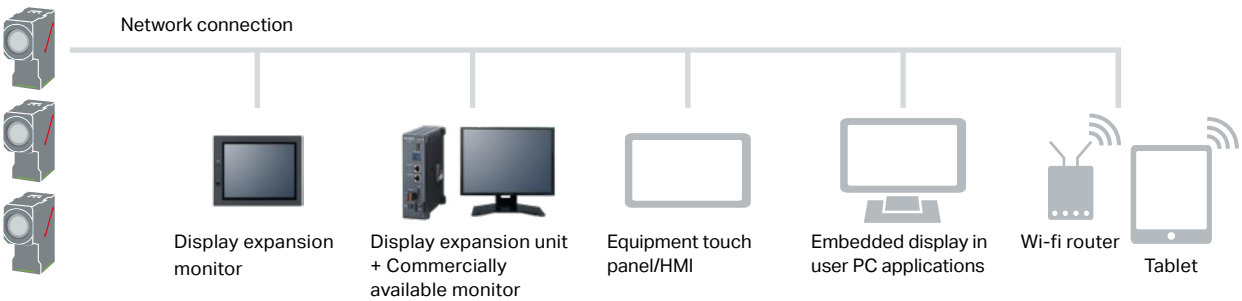
Intuitive screen editing

Values and input boxes can be easily arranged by dragging & dropping or by right-clicking and choosing the desired component. Intuitive PC operations make it easy to bring ideas to life on the screen.



Web-based HMI

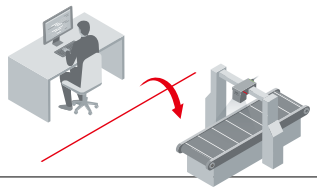
Custom operation screens can be used on a wide variety of network-connected display devices. Multiple camera screens can also be displayed on the same device, allowing for a wider choice of usable displays to fit a wider variety of equipment.



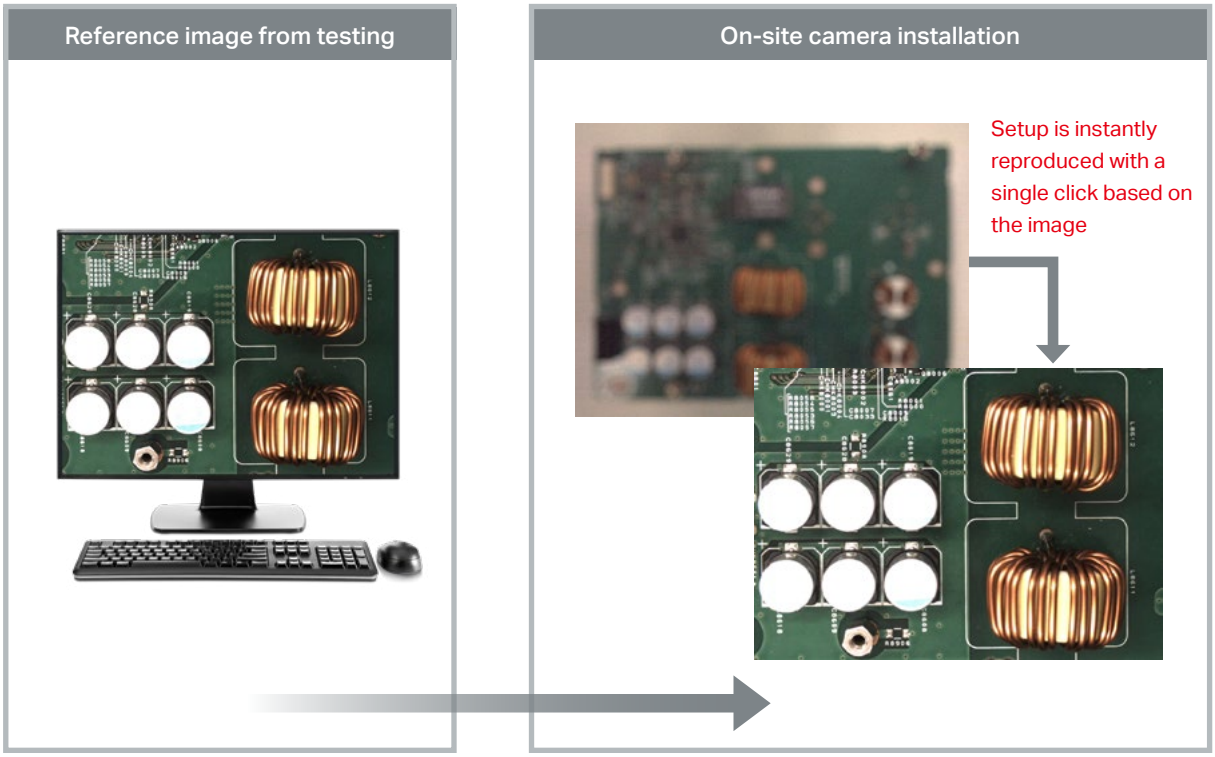
Utilities to facilitate troubleshooting and repeat deployments

Quick startup, scaling, and troubleshooting

Capture Replication function



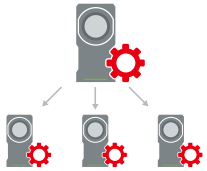
Suppose you want to reproduce lab conditions or need to fix a deployed camera that has been bumped or moved... ZoomTrax's Capture Replication function can instantly replicate the lens setup from a previous test or deployment based on a registered image. This can further reduce the time required to complete installation on-site.



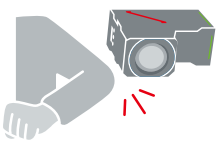
AI reproduces the imaging used in testing by automatically adjusting the field of view, focus, and exposure time.

When setup reproduction is necessary

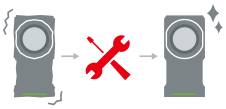
Reproducing a setup for repeated expansion of lines



Correcting device position when it shifts due to collision



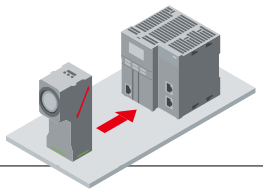
Replicating setup for repair or replacement



See the video for more information

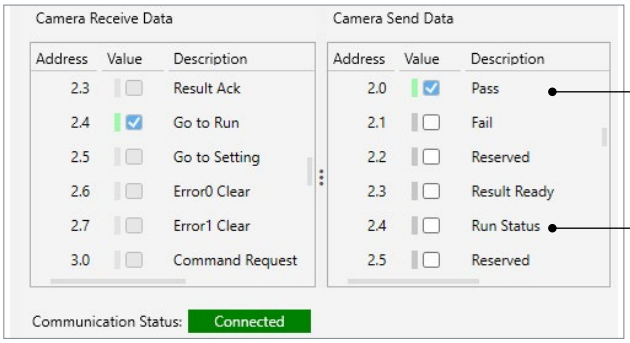
Visualizing communication

Communication debugging function



Connecting and coordinating communication is a tedious task when setting up a system.
The VS Series offers two visualization utilities that solve common communication issues.

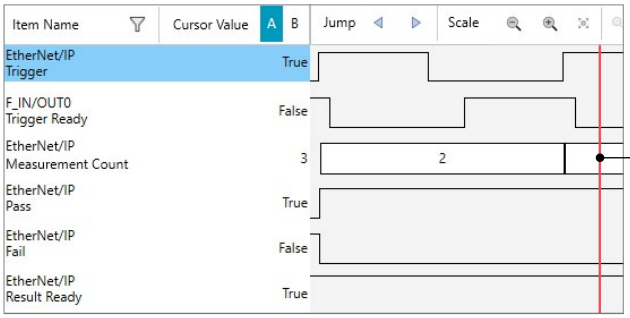
Communication monitor



Signal address and status are listed

Simple list format to establish connection with Ethernet/IP™, PROFINET, and PLC Link

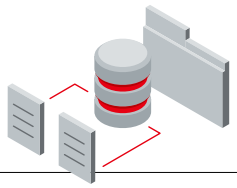
Timing chart monitor



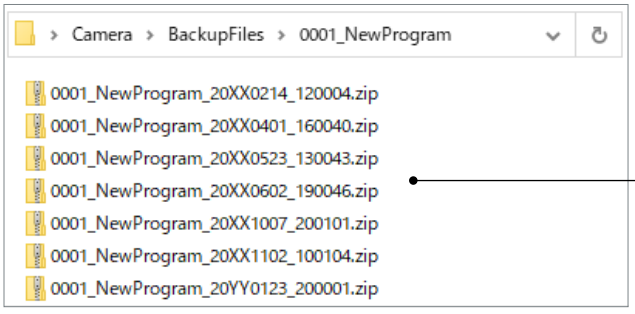
Changes in signals over time can be visualized
Timing errors and missing signals can be analyzed

Restore data after accidental overwrite

Automatic backup of setup



The most recent editing history is automatically backed up on the computer. Settings can be restored immediately if a problem arises.
This helps prevent the added work of recreating the settings.



The last 20 automatic backups are stored on the computer.
Settings can be quickly restored from the history.

Three types of smart cameras to support any application

Semi-automated machines

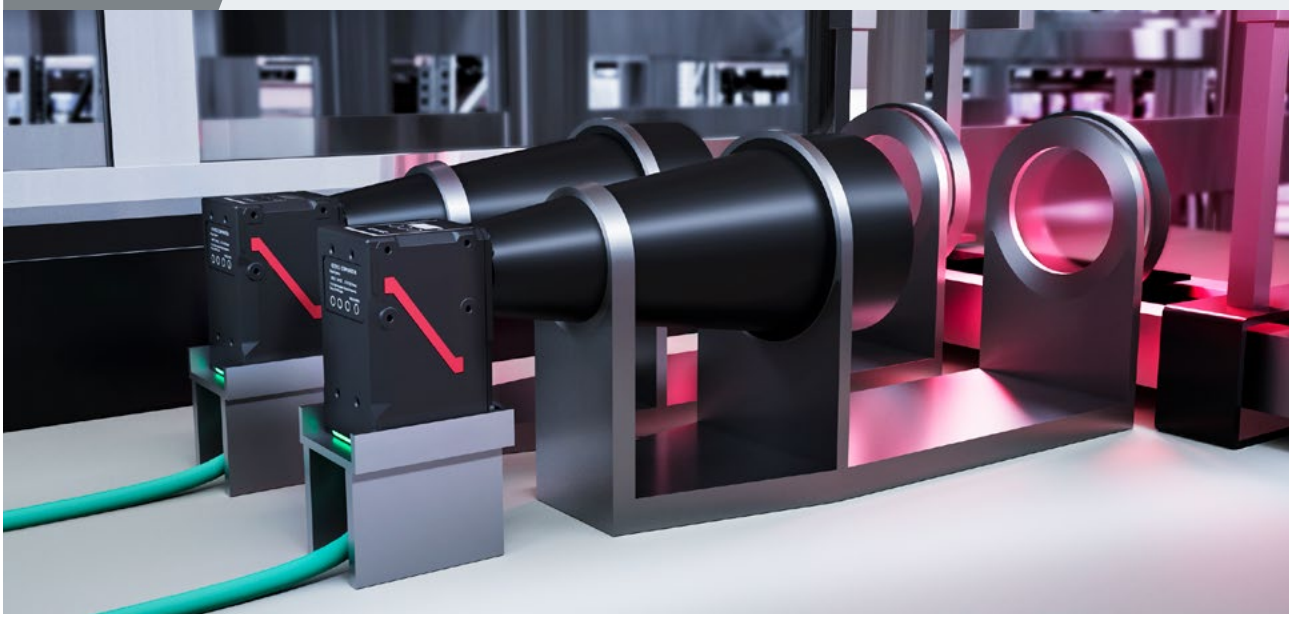
Versatile standard zoom type for varying fields of view and mounting positions

Fully automated machines

Short-range zoom type for short-range or space-saving installation needs

Customization for specialized purposes

C-mount type when specialty lenses are necessary



[Configure your VS Series Unit]

Easy four-step process for selecting your optimal hardware

STEP.1 Select the camera type

Zoom smart camera

This unit supports a wide range of applications and field-of-view sizes.
The zoom function saves you from having to make difficult optical adjustments.

Standard zoom type
VS-L

Short-range zoom type
VS-S

C-mount smart camera

Use a C-mount smart camera if you want to select from a variety of lenses for different field-of-view sizes and installation distances.

C-mount type
VS-C

Various lenses

STEP.2 Select the camera resolution

Selecting a zoom camera

Select the resolution according to your application.

1.6 MP	3.2 MP	5 MP	15 MP
Simple applications such as presence check	Assembly inspection, character recognition, etc.	For inspections that require high accuracy, such as measurement and appearance inspections	Ultra-high-precision inspections or for large targets

Supported target sizes and resolutions are listed on the field of view chart on page 30.

Access the Item Selector

STEP.3 Select the lighting

Smart ring lighting, High intensity

The lineup of camera-integrated lighting covers a wide range of applications.

Smart ring lighting,
High intensity
CA-DEW10X (white)

Smart ring lighting,
High intensity
CA-DER10X (red)

Smart ring lighting,
High intensity
CA-DEB10X (blue)

Smart ring lighting,
High intensity
CA-DEIR10X
(near-infrared)

Additional Lighting Options

The lineup includes lighting of various shapes and sizes, which can be matched to your application and detection requirements.

Multi-spectrum lighting
CA-DRMxX

Multi-angle lights (ring/square)
CA-DRxM
CA-DQxM

Bar lights
CA-DB
CA-DBxW

Back lights
CA-DS

Coaxial lights (on-axis)
CA-DX

Dome lights
CA-DD

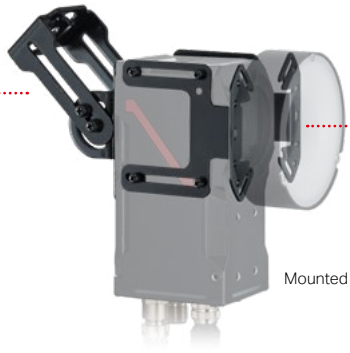
Spot lights
CA-DP

STEP.4 Select optional mounting

Different mounting jigs to meet your specific installation needs

* Other mounting jigs are listed on page 31.

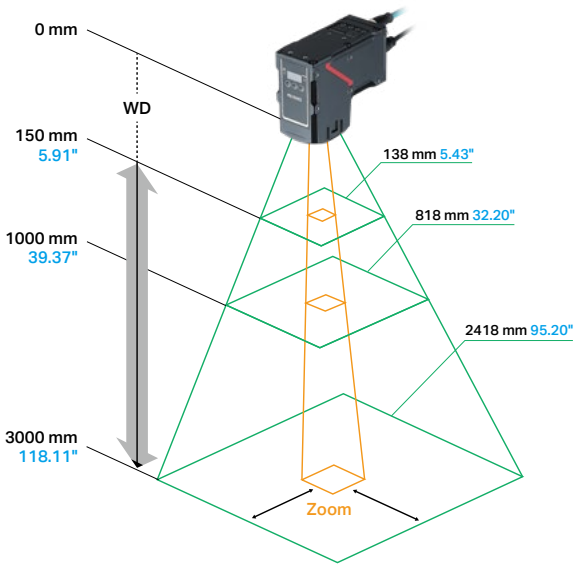
Mounting bracket,
Angle adjustable, for high performance camera
OP-88814



Mounted view

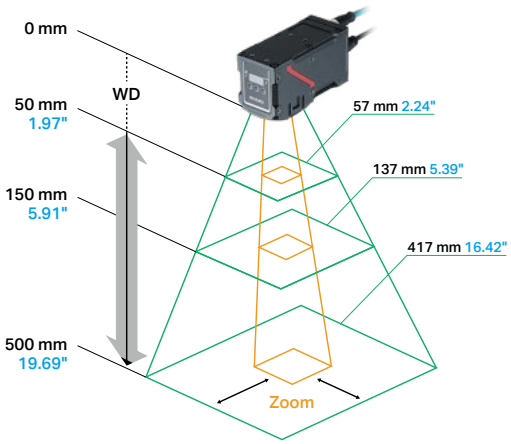
Mounting adapter for lighting, for high performance zoom camera
OP-88816

Field of view information for standard zoom smart cameras



	Working distance	Field of view	Pixel resolution
VS-L160	150 mm 5.91"	18 to 138 mm 0.71" to 5.43"	12 to 95 µm 0.47 to 3.74 Mil
	1000 mm 39.37"	94 to 818 mm 3.70" to 32.20"	65 to 568 µm 2.56 to 22.36 Mi
	3000 mm 118.11"	274 to 2418 mm 10.79" to 95.20"	190 to 1679 µm 7.48 to 66.10 Mil
VS-L320	150 mm 5.91"	25 to 138 mm 0.98" to 5.43"	12 to 67 µm 0.47 to 2.64 Mil
	1000 mm 39.37"	134 to 818 mm 5.28" to 32.20"	65 to 399 µm 2.56 to 15.71 Mil
	3000 mm 118.11"	390 to 2418 mm 15.35" to 95.20"	190 to 1180 µm 7.48 to 46.46 Mil
VS-L500	150 mm 5.91"	31 to 138 mm 1.22" to 5.43"	12 to 56 µm 0.47 to 2.20 Mil
	1000 mm 39.37"	162 to 818 mm 6.38" to 32.20"	65 to 331 µm 2.56 to 13.03 Mil
	3000 mm 118.11"	470 to 2418 mm 18.50" to 95.20"	190 to 981 µm 7.48 to 38.62 Mil
VS-L1500	150 mm 5.91"	55 to 138 mm 2.17" to 5.43"	13 to 31 µm 0.51 to 1.22 Mil
	1000 mm 39.37"	289 to 818 mm 11.38" to 32.20"	65 to 185 µm 2.56 to 7.28 Mil
	3000 mm 118.11"	839 to 2418 mm 33.03" to 95.20"	190 to 549 µm 7.48 to 21.61 Mil

Field of view information for short-range zoom smart cameras

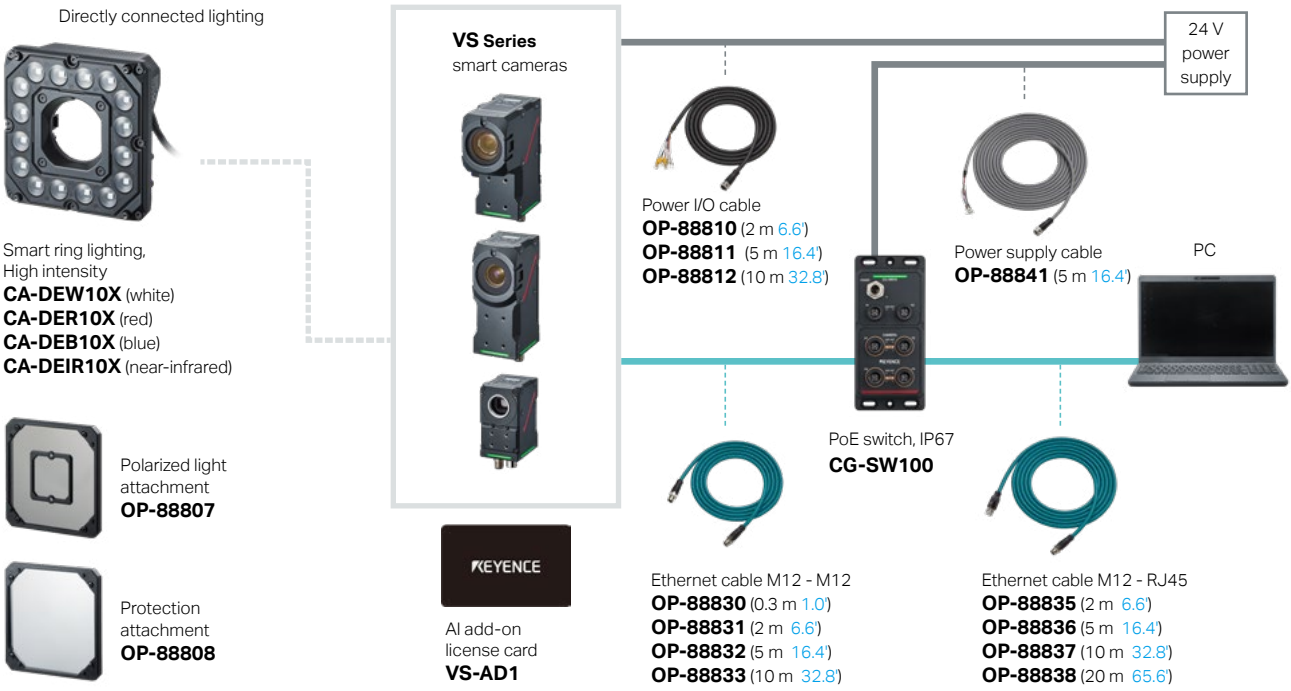


	Working distance	Field of view	Pixel resolution
VS-S160	50 mm 1.97"	16 to 57 mm 0.63" to 2.24"	11 to 39 µm 0.43 to 1.54 Mil
	150 mm 5.91"	37 to 137 mm 1.46" to 5.39"	25 to 95 µm 0.98 to 3.74 Mil
	500 mm 19.69"	116 to 417 mm 4.57" to 16.42"	80 to 289 µm 3.15 to 11.38 Mil
VS-S320	50 mm 1.97"	22 to 57 mm 0.87" to 2.24"	11 to 28 µm 0.43 to 1.10 Mil
	150 mm 5.91"	54 to 137 mm 2.13" to 5.39"	26 to 67 µm 1.02 to 2.64 Mil
	500 mm 19.69"	166 to 417 mm 6.54" to 16.42"	81 to 203 µm 3.19 to 7.99 Mil
VS-S500	50 mm 1.97"	27 to 57 mm 1.06" to 2.24"	11 to 23 µm 0.43 to 0.91 Mil
	150 mm 5.91"	66 to 137 mm 2.60" to 5.39"	26 to 55 µm 1.02 to 2.17 Mil
	500 mm 19.69"	200 to 417 mm 7.87" to 16.42"	81 to 169 µm 3.19 to 6.65 Mil
VS-S1500	50 mm 1.97"	49 to 57 mm 1.93" to 2.24"	11 to 13 µm 0.43 to 0.51 Mil
	150 mm 5.91"	118 to 137 mm 4.65" to 5.39"	26 to 31 µm 1.02 to 1.22 Mil
	500 mm 19.69"	358 to 417 mm 14.09" to 16.42"	81 to 94 µm 3.19 to 3.70 Mil

Supported communication protocol(s)

Communication networks (standard equipment)

PLC LINK EtherNet/IP PROFINET OPC UA TCP/IP



Lighting accessories

Lighting controller, IP67
CG-LC100

Lighting conversion unit (directly connected to camera)
CG-LC10

Lighting conversion unit (directly connected to camera),for third party
CG-LC20

Smart bracket, for high performance camera
OP-88818

Mounting adapter for lighting, for high performance zoom camera
OP-88816

Mounting adapter for lighting, for high performance C-mount camera
OP-88817

Refer to the Vision System Peripheral Equipment Lighting Lineup catalog for more information on the lighting lineup.

Camera mounting accessories

Mounting bracket, for high performance camera
OP-88813

Mounting bracket, Angle adjustable, for high performance camera
OP-88814

Adjustable bracket, for high performance camera
OP-88815

Lens accessories

Environment-resistant lens cover
OP-88806

Refer to the Vision System Peripheral Equipment Lineup catalog for more information on the lens lineup.

Display accessories

Display panel, 12-inch
CG-MP120T

Display unit
CG-MU100

Other accessories

microSD card
CA-MSD32G
(32 GB)
CA-MSD64G
(64 GB)

DIN rail mount (for PoE switching hub and environment-resistant illumination controller)
OP-88828

Standard zoom smart camera/Short-range zoom smart camera

Model		VS-LxxxMX				VS-LxxxCX				VS-SxxxMX				VS-SxxxCX			
		160	320	500	1500	160	320	500	1500	160	320	500	1500	160	320	500	1500
Storage	Internal storage	3 GB	7 GB	7 GB	7 GB	3 GB	7 GB	7 GB	7 GB	3 GB	7 GB	7 GB	7 GB	3 GB	7 GB	7 GB	7 GB
	microSD card (external)*1	Max. 64 GB															
Image sensor	Frame rate	85 fps	83 fps	81 fps	48 fps	85 fps	83 fps	81 fps	48 fps	85 fps	83 fps	81 fps	48 fps	85 fps	83 fps	81 fps	48 fps
Lens	Mount	Lens-integrated type															
	Max. optical magnification	× 8.75	× 6.0	× 5.0	× 2.75	× 8.75	× 6.0	× 5.0	× 2.75	× 3.5	× 2.4	× 2.0	× 1.1	× 3.5	× 2.4	× 2.0	× 1.1
	Installation distance*2	150 mm to 5000 mm 5.91" to 196.85"								50 mm to 500 mm 1.97" to 19.69"							
I/O connection	Number of inputs	1 (insulated)															
	Number of outputs	3 (insulated)															
	Number of inputs/outputs	2 (insulated) (input and output switched via settings)															
I/F	Ethernet	PoE IEEE 802.3at, M12 X cable × 1															
	I/O	1 In/3 Out/2 In, Out M12 A cable × 1															
	Lighting interface	Dedicated lighting connection interface × 1															
	External media	microSD card slot × 1 (UHS-1)															
Functions	Imaging mode	1.6 M	1.6 M 3.2 M	1.6 M 3.2 M 5 M	1.6 M 3.2 M 5 M 15 M	1.6 M	1.6 M 3.2 M	1.6 M 3.2 M 5 M	1.6 M 3.2 M 5 M 15 M	1.6 M	1.6 M 3.2 M	1.6 M 3.2 M 5 M	1.6 M 3.2 M 5 M 15 M	1.6 M	1.6 M 3.2 M	1.6 M 3.2 M 5 M	1.6 M 3.2 M 5 M 15 M
	Output image pixels	(1.6 M mode) 1440×1072 1072×1440 1248×1248 1664×928 928×1664 2160×720 720×2160	(3.2 M mode) 2048×1536 1536×2048 1776×1776 2368×1328 1328×2368 3072×1024 1024×3072	(5 M mode) 2544×1904 1904×2544 2224×2224 2976×1664 1664×2976 3824×1280 1280×3824	(15 M mode) 4400×3296	(1.6 M mode) 1440×1072 1072×1440 1248×1248 1664×928 928×1664 2160×720 720×2160	(3.2 M mode) 2048×1536 1536×2048 1776×1776 2368×1328 1328×2368 3072×1024 1024×3072	(5 M mode) 2544×1904 1904×2544 2224×2224 2976×1664 1664×2976 3824×1280 1280×3824	(15 M mode) 4400×3296	(1.6 M mode) 1440×1072 1072×1440 1248×1248 1664×928 928×1664 2160×720 720×2160	(3.2 M mode) 2048×1536 1536×2048 1776×1776 2368×1328 1328×2368 3072×1024 1024×3072	(5 M mode) 2544×1904 1904×2544 2224×2224 2976×1664 1664×2976 3824×1280 1280×3824	(15 M mode) 4400×3296	(1.6 M mode) 1440×1072 1072×1440 1248×1248 1664×928 928×1664 2160×720 720×2160	(3.2 M mode) 2048×1536 1536×2048 1776×1776 2368×1328 1328×2368 3072×1024 1024×3072	(5 M mode) 2544×1904 1904×2544 2224×2224 2976×1664 1664×2976 3824×1280 1280×3824	(15 M mode) 4400×3296
	Exposure time	0.037 msec to 1000 msec															
	Image correction functions	Gain, Offset, Gamma correction, White balance, Fine HDR															
	Indicators	OLED display, Status LED, Ethernet LED (LINK/ACT), SD card access indicator															
	Buttons	Operation buttons × 3															
	Installation support functions	Pointer (Class 1 laser product*3), Angle monitor															
Power supply	Voltage	24 V +25%/−20% or PoE (IEEE802.3at Power Class 4)															
	Current consumption (camera only)	0.97 A, 18.7 W (for 19.2 V)/0.78 A, 18.7 W (for 24 V)															
	Current consumption (including lighting)	4.7 A, 89.7 W (for 19.2 V)/3.8 A, 89.7 W (for 24 V)															
	Current consumption (With CA-DEx10X connected)*4	11.3 A, 216.7 W (for 19.2 V)/9.1 A, 216.7 W (for 24 V)															
Other	Weight	Approx. 700 g 24.71 oz								Approx. 570 g 20.12 oz							
	Size (H×W×D)	122.3 mm × 52.6 mm × 99.1 mm 4.81" × 2.07" × 3.90"								122.3 mm × 52.6 mm × 69.2 mm 4.81" × 2.07" × 2.72"							
	Enclosure rating	IP67 (IEC60529)															
	Materials*5	Case: Aluminum die-casting, Front cover: Glass															
	Case temperature*6	0°C to 65°C 32 to 149°F															
	Operating ambient humidity	85% RH or below (no condensation)															
	Standard certifications	CE, FCC, NRTL, KC, UKCA															
	Vibration resistance	10 to 500 Hz; Power spectral density: 0.05 G2/Hz; X, Y, and Z directions, 0.5 hours (IEC60068-2-64)															
	Shock resistance	50 G, 3 times in each of the 6 directions (IEC60068-2-27)															

*1 Using the configuration software, format the media before use. *2 VS-LxxxMX/CX's field-of-view measuring range is 150 mm to 3000 mm 5.91" to 118.11". VS-SxxxMX/CX's field-of-view measuring range is 50 mm to 500 mm 1.97" to 19.69". *3 FDA (CDRH) Part 1040.10 (The laser classification is implemented based on IEC 60825-1 in accordance with the requirements of Laser Notice), IEC60825-1. *4 Maximum instantaneous current. Average current is below current consumption (including lighting). *5 ESD-Safe, IEC61340-5-1 compliant. *6 Reference - Case temperature 65°C 149°F with 200 mm × 200 mm × 10 mm 7.87" × 7.87" × 0.39" aluminum board and at ambient temperature of 40°C 104°F.

• The "MX" model name suffix indicates a monochrome camera model, and the "CX" suffix indicates a color camera model.
• 1.6-megapixel cameras do not support AI Segmentation or AI Detection Fine Mode.

C-mount smart camera

Model		VS-C160M / CX	VS-C320M / CX	VS-C500M / CX	VS-C1500M / CX	VS-C2500M / CX
Storage	Internal storage	3 GB	7 GB	7 GB	7 GB	7 GB
	microSD card (external)*1	Max. 64 GB				
Image sensor	Image size	1/2.9"	1/1.8"	2/3"	1.1"	1.1"
	Pixel size	3.45 μm 0.14 Mil	3.45 μm 0.14 Mil	3.45 μm 0.14 Mil	2.5 μm 0.10 Mil	2.5 μm 0.10 Mil
	Frame rate	83 fps	62 fps	55 fps	40 fps	28 fps
Lens	Mount	C-mount				
I/O connection	Number of inputs	1 (insulated)				
	Number of outputs	3 (insulated)				
	Number of inputs/outputs	2 (insulated) (input and output switched via settings)				
I/F	Ethernet	PoE IEEE 802.3at, M12 X cable × 1				
	I/O	1 In/3 Out/2 In, Out M12 A cable × 1				
	Lighting interface	Dedicated lighting connection interface × 1				
	External media	microSD card slot × 1				
Functions	Output image pixels	1440 × 1072	2048 × 1536	2448 × 2048	4400 × 3296	5120 × 5120
	Exposure time	0.015 msec to 1000 msec	0.015 msec to 1000 msec	0.015 msec to 1000 msec	0.008 msec to 1000 msec	0.008 msec to 1000 msec
	Image correction functions	Gain, Offset, Gamma correction, White balance, Fine HDR				
	Indicators	OLED display, Status LED, Ethernet LED (LINK/ACT), SD card access indicator				
	Buttons	Operation buttons × 3				
	Installation support functions	Angle monitor				
Power supply	Voltage	24 V +25%/−20% or PoE (IEEE802.3at Power Class 4)				
	Current consumption (camera only)	0.97 A, 18.7 W (for 19.2 V)/0.78 A, 18.7 W (for 24 V)				
	Current consumption (including lighting)	4.7 A, 89.7 W (for 19.2 V)/3.8 A, 89.7 W (for 24 V)				
	Current consumption (With CA-DEx10X connected)*2	11.3 A, 216.7 W (for 19.2 V)/9.1 A, 216.7 W (for 24 V)				
Other	Weight	Approx. 420 g 14.83 oz				
	Size (H×W×D)	93.2 mm × 52.6 mm × 66 mm 3.67" × 2.07" × 2.60"				
	Enclosure rating	IP67 (IEC60529)				
	Materials*3	Case: Aluminum die-casting, Front cover: Glass				
	Case temperature*4	0°C to 65°C 32 to 149°F				
	Operating ambient humidity	85% RH or below (no condensation)				
	Standard certifications	CE, FCC, NRTL, KC, UKCA				
	Vibration resistance	10 to 500 Hz; Power spectral density: 0.05 G2/Hz; X, Y, and Z directions, 0.5 hours (IEC60068-2-64)				
	Shock resistance	50 G, 3 times in each of the 6 directions (IEC60068-2-27)				

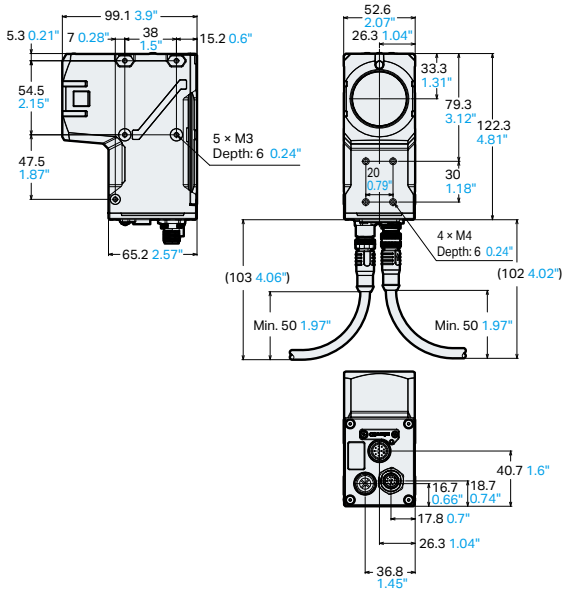
*1 Using the configuration software, format the media before use. *2 Maximum instantaneous current. Average current is below current consumption (including lighting). *3 ESD-Safe, IEC61340-5-1 compliant.
*4 Reference - Case temperature 65°C 149°F with 200 mm × 200 mm × 10 mm 7.87" × 7.87" × 0.39" aluminum board and at ambient temperature of 40°C 104°F.

• The "MX" model name suffix indicates a monochrome image sensor model, and the "CX" suffix indicates a color image sensor model.
• 1.6-megapixel cameras do not support AI Segmentation or AI Detection Fine Mode.

Standard zoom smart camera

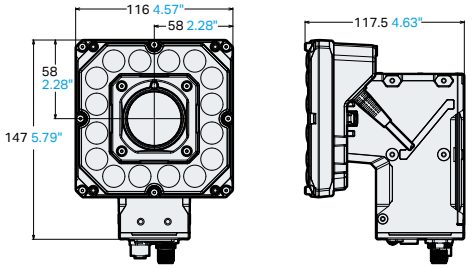
Camera

VS-L1500MX/L1500CX/L500MX/L500CX/L320MX/L320CX/L160MX/L160CX



Smart ring lighting, High intensity

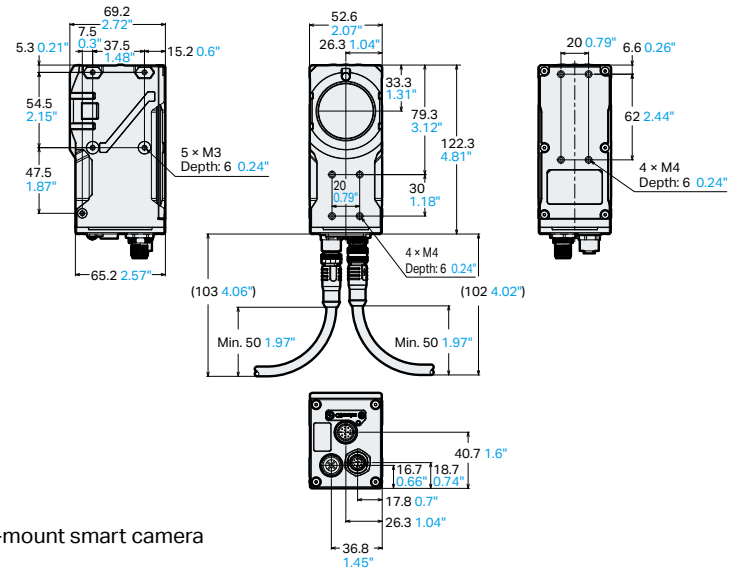
When used with **CA-DEW10X/DER10X/DEB10X/DEIR10X**



Short-range zoom smart camera

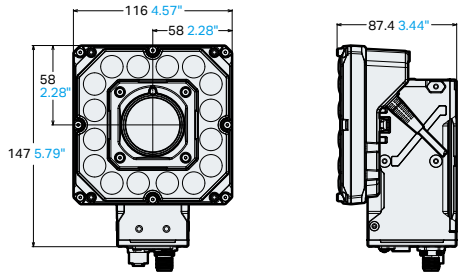
Camera

VS-S1500MX/S1500CX/S500MX/S500CX/S320MX/S320CX/S160MX/S160CX



Smart ring lighting, High intensity

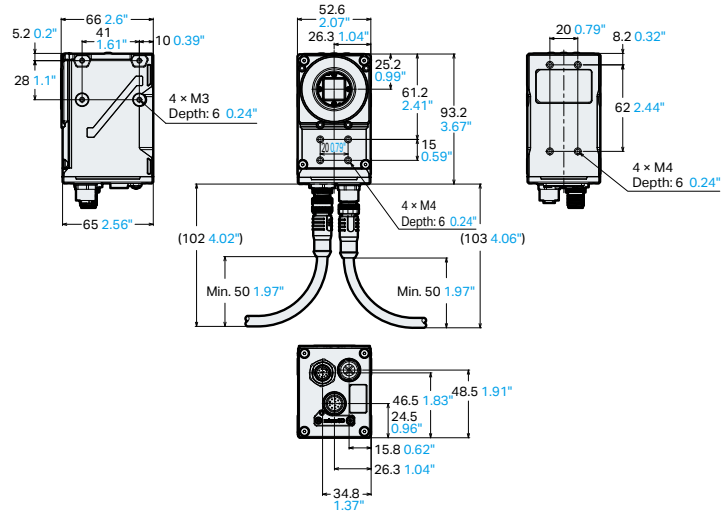
When used with **CA-DEW10X/DER10X/DEB10X/DEIR10X**



C-mount smart camera

Camera

VS-C2500MX/C2500CX/C1500MX/C1500CX/C500MX/C500CX/C320MX/C320CX/C160MX/C160CX

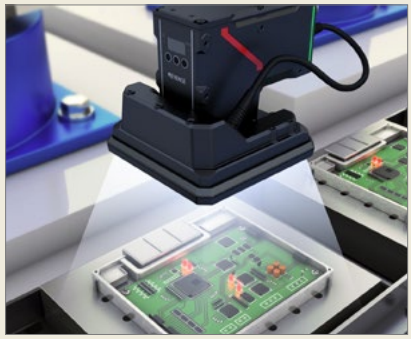


Application examples

Automobiles/Metals

Presence check

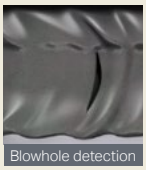
Inspection for desiccant on ECU



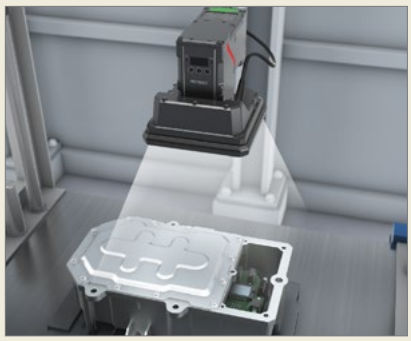

Remaining target detection


Appearance inspection

Laser welding appearance inspection

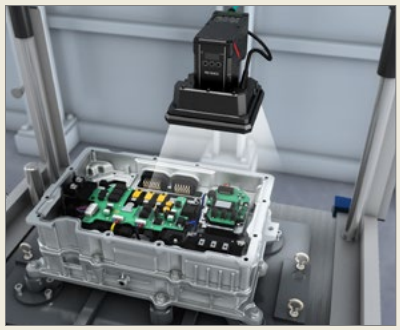



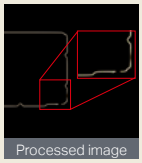
Die-cast product appearance inspection




Appearance inspection

Sealant application inspection



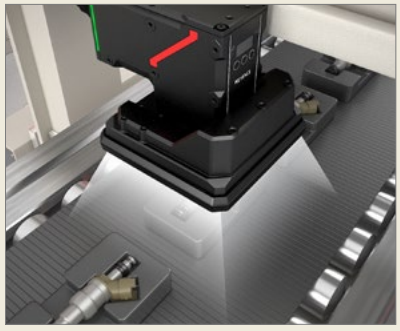



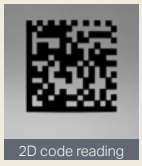
Dimension inspection

Connector terminal bend inspection


Identification inspection

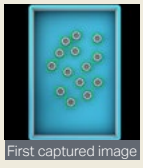
Injector part number OCR and 2D code reading

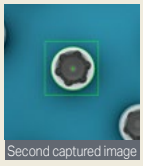


Vision-guided robotics

Two-step image-based picking of small parts on pallets

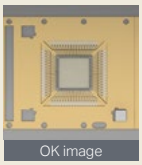



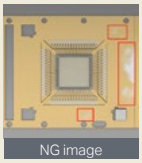


Electronic components

Presence check

Lead frame plating inspection



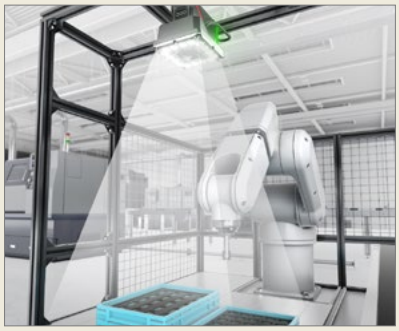


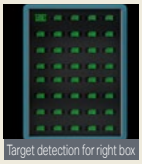
Appearance inspection

IC mold defect/blister inspection

Vision-guided robotics

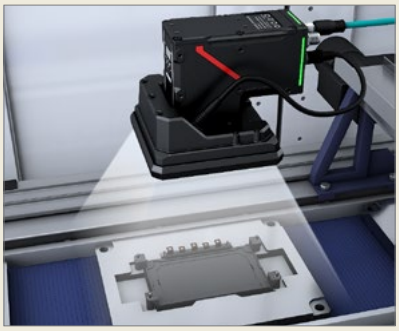
Stack picking of multiple targets

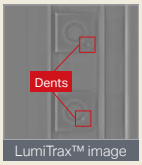




Appearance inspection

Bus bar appearance inspection





Food / Pharmaceuticals / Commodities

Presence check

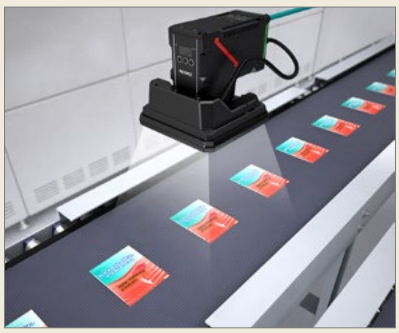
Commodity alignment inspection (missing/incorrectly positioned targets)

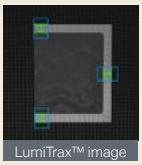
Appearance inspection

Food tray appearance inspection

Appearance inspection

Packing seal width inspection





Character recognition

Medicine text and barcode inspection

A Game-Changing

Vision System

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