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CAUTIONS TO BE TAKEN TO ENSURE SAFETY

- For those persons involved with the operation / service of your system, including Kawasaki Robot, they must strictly observe all safety regulations at all times. They should carefully read the Manuals and other related safety documents.
- Products described in this catalogue are general industrial robots. Therefore, if a customer wishes to use the Robot for special purposes, which might endanger operators or if the Robot has any problems, please contact us. We will be pleased to help you.
- Be careful as Photographs illustrated in this catalogue are frequently taken after removing safety fences and other safety devices stipulated in the safety regulations from the Robot operation system.

* Materials and specifications are subject to change without notice.

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Kawasaki
Powering your potential

Kawasaki Robot

Vision System

Vision System

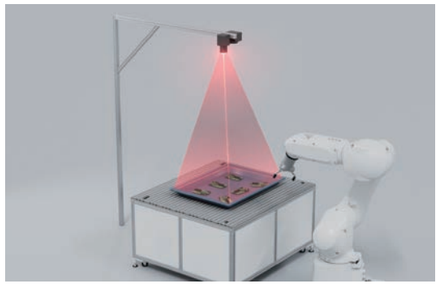
It is a technology that uses cameras and sensors to recognize the surrounding environment and control the robot's movements. In general, image processing and AI are used to recognize the position and shape of objects and reflect them in the robot's motion plan.

Common Types of Vision Systems

2D Vision

2D vision is used to accurately recognize parts and products on a flat surface and to correct their position and orientation. For example, it can locate products flowing on a conveyor, read QR codes and barcodes, and inspect labels for printing and defects. It does not handle height information, but is ideal for picking and aligning aligned workpieces.

Object Recognition	Pattern Matching
Position Correction	XY Coordinates and Rotation Angle
Picking	Workpiece on a Plane
Robot Cooperation	Simple Operation



3D Vision

3D vision can recognize three-dimensional information, including depth and height, so it can handle complex tasks. Accurately determine the position of loosely stacked parts and tilted products and calculate the optimal gripping position. This allows for automatic picking of randomly stacked cases and workpieces with complex geometries, enabling advanced operations such as depalletizing and obstacle avoidance.

Object Recognition	Shape, Depth, and Bulk Stacking Recognition
Position Correction	XYZ Coordinates and Tilt Correction
Picking	Bulk Stacking Picking
Robot Cooperation	Complex Movements and Obstacle Avoidance

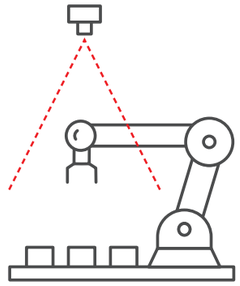
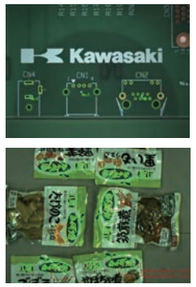
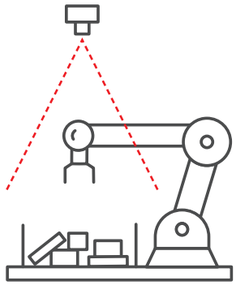
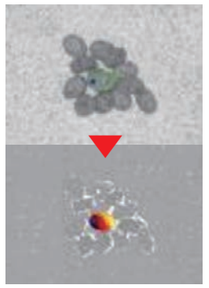
AI Vision

AI vision enables higher perception by combining AI with images acquired by 2D and 3D cameras. It can flexibly respond to workpieces with irregular shapes and arrangements, which were difficult in the previous vision, as well as new products that have not been registered. AI analyzes images and automatically determines the type and orientation of objects, streamlining complex picking and sorting tasks. It is especially effective in logistics, food, pharmaceuticals, and other sites where there are many product variations.

Object Recognition	Identification by AI, support for unregistered work
Position Correction	Flexible position and posture recognition with AI inference
Picking	Automatic identification of products with multiple types and random placement
Robot Cooperation	Automatic generation of efficient operation plans

Comparing 2D Vision to 3D Vision

Object Recognition / Position Correction and Guidance Function

2D Vision	3D Vision
 	 
• Correction of XY coordinates and angle of rotation (no height information) • Workpiece misalignment (positioning on 2D coordinates) • Alignment on plane • Identification of objects based on the color and contour of the image • Reading of QR codes and barcodes • Label inspection (print confirmation and defect detection) • Positioning of parts and workpieces on a flat surface	• Correction of X, Y, Z coordinates and tilt information • Positioning of workpieces with height variations and inclinations • Selection of the optimal gripping position for bulk picking • Acquisition of depth information for three-dimensional shape recognition • Recognition of loosely stacked parts (for picking applications) • Identification of complex geometries and overlapping workpieces

Picking / Depalletizing

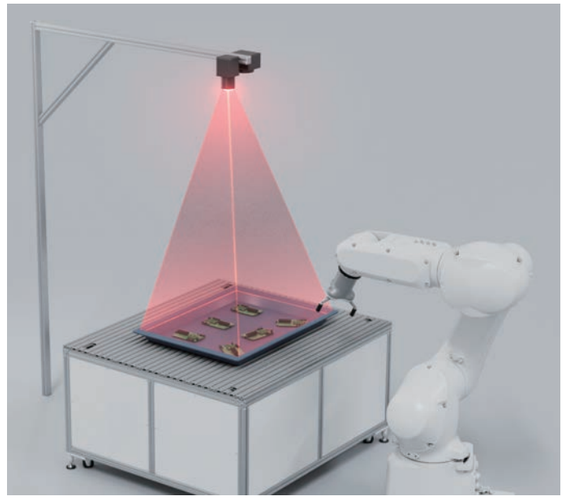
2D Vision	3D Vision
 	 
• Picking of workpieces aligned on a flat surface • Positioning of parts flowing on a conveyor	• Picking of randomly arranged workpieces • Depalletizing of boxes and bags (removal from stacked state) • Avoiding obstacles during picking and placement

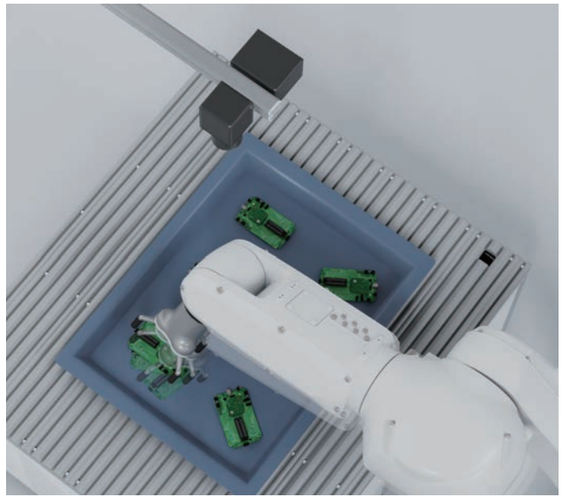
Types of Kawasaki Robot Vision Systems

2D Vision

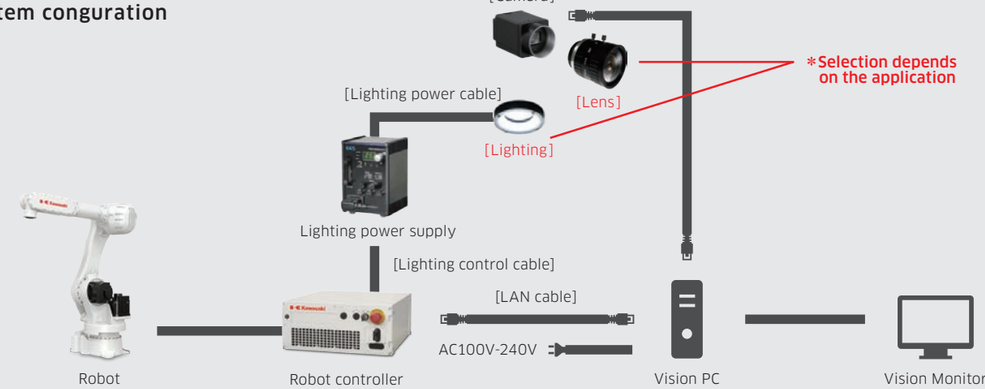
K-VFinder is a 2D image processing software provided by Kawasaki Robotics.The software works with the camera to acquire images and provides functions such as position measurement, interference checking, detection, and coordinate conversion.

Kawasaki Robot Solutions K-VFinder





System conguration



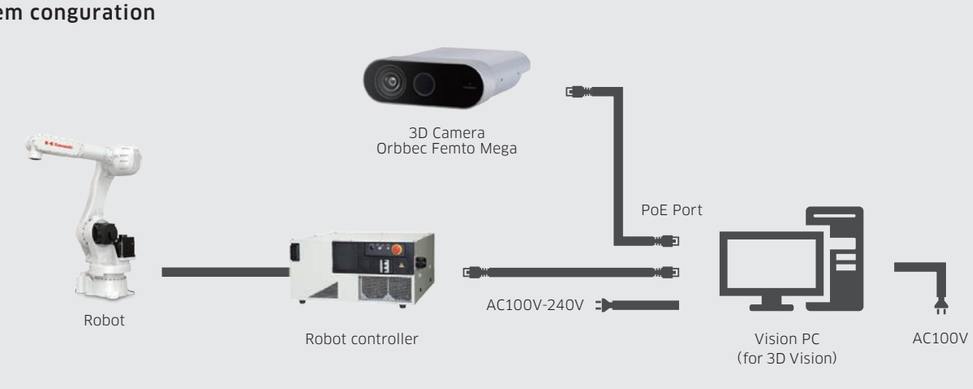
3D Vision

K-VStereo is an advanced 3D image processing software provided by Kawasaki's robots. The software works with the camera to acquire 3D images and provides functions such as position measurement, interference detection, detection, and coordinate conversion.

＊K-VStereo is optimized for logistics applications and is not designed for bulk picking tasks.

Kawasaki Robot Solutions K-VStereo

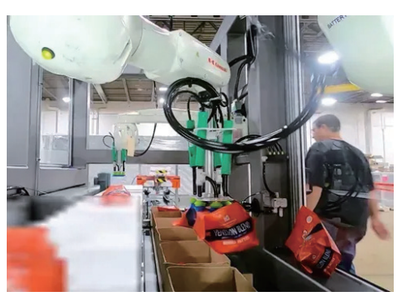
System conguration



Case Study

Cartoning system with vision recognition

MWES, a certified system integrator by Kawasaki Robotics based in Michigan, USA has built a flexible cartoning automation cell using conveyor trackers and vacuum grippers by combining Kawasaki's small general-purpose robot RS007L with vision software "K-VFinder" to address labor shortages and the handling of various product types and box sizes in the food and beverage industry. The system accurately tracks the flowing bag product through vision recognition and determines the optimal picking position in real time, achievaing a high speed of 80 bags per minute and immediate response to different box sizes, reducing labor equivalent to three workers and achieving high productivity.



Click here for case studies and videos

Application Cases

Decorating automation with K-VStereo

Kawasaki's 3D AI vision system "K-VStereo" automates previously difficult devanning work by accurately recognizing cases in consolidated containers and grasping their position and posture. K-VStereo analyzes the shape and tilt of the case using a 3D camera and AI to calculate the optimal pick position in real time, so it can flexibly handle diagonally stacked cases and luggage of different sizes. This technology was used in the Vambo self-propelled devaning robot, which provides highly efficient unloading of up to 600 cases weighing up to 30 kg per hour. Vambo is a system that combines RS080N robots and AGVs to leverage K-VStereo's recognition data to perform safe and secure picking even in narrow consoles. In addition, it can be operated with can be operated easily without the need for programming, greatly reducing the burden on the site.

Kawasaki's in-house AI vision system specializes in robotic picking.

It is a technology that enables complex recognition and judgment that is difficult to achieve with conventional 2D and 3D vision. The biggest features are "flexibility" and "learning ability".

Kawasaki Robot Solutions K-VStereo

Kawasaki Robot Solutions K-VFinder

+

AI by KAWASAKI

Features

■ Masterless operation

There is no need to register varieties and stacking patterns in advance, and it can handle unknown workpieces and random placements.

■ Expandable with additional learning

Even if new shapes or special cases are distributed, recognition accuracy can be maintained by additional training by AI.

■ Supports unregistered or irregularly arranged workpieces

No complex programming is required, shortening the system start-up time. It can also handle unknown workpieces and random placement.

■ Advanced recognition capabilities

Combining 2D and 3D information with AI inference, it accurately recognizes shapes, tilts, and overlapping workpieces.

■ Specialty Applications

Logistics : Unloading of consolidated containers, sorting of cardboard
Manufacturing : Picking and assembly of various types of parts
Food and Pharmaceuticals : Randomly placed product sorting

Case Study

Automates heavy load unloading and reduces physical strain on workers

Matsuura Packing & Transportation Co., Ltd.

The Okazaki Higashi Logistics Center introduced Kawasaki's depalletization solution to reduce the physical burden of labor shortages and heavy material handling. This system uses AI vision to recognize cases and achieve masterless operation without the need for prior variety registration or stacking pattern setting. It can flexibly handle different sizes and shapes of the case, and the robot will automatically operate by simply registering the placement position. This shortens the system start-up time and streamlines the unloading of heavy loads. In the field, the physical strain on workers is greatly reduced, contributing to a safer and more comfortable working environment.

Click here for case studies and videos

2D Vision with Built-in Robot Controller

The built-in vision function in the robot controller eliminates the need for an external PC or complex wiring, enabling a space-saving and simple system configuration.

Features

■ No external PC required

Since the vision function is built into the robot controller, there is no need for an additional PC or complex wiring. It is a space-saving and simple configuration.

■ Stable operation

Since the robot and vision run on the same controller, data retrieval is stable. Reduce the risk of time lag and communication problems.

■ Easy to set up

No troublesome work such as communication settings or coordinate conversion is required, and the system can be introduced with just basic operations. On-site start-up time can be significantly reduced.

■ Easy maintenance

The integrated equipment makes it easy to troubleshoot and update. Support can also be centralized.

K-AddOn

K-AddOn refers to robot peripherals that have been confirmed to be connected to Kawasaki's robots. Robot vision can be combined not only with Kawasaki's products but also with many products. It offers the most suitable solution for your application.

Click here for the K-AddOn website

Case Study

Expanding Robotic Possibilities with 3D AI Vision – K-AddOn Partner : Mech-Mind

One of our partners, Mech-Mind, has developed its own industrial 3D camera "Mech-Eye" and AI vision software to achieve high-level automation such as bulk picking and palletizing. Mech-Eye offers high precision, fast processing, and strong resistance to ambient light resistance, and can handle complex shapes and highly reflective workpieces. In addition, the robot path planning software "Mech-Viz" and the image processing software "Mech-Vision" allow intuitive operation without programming skills. Kawasaki robots and Mech-Mind products are K-AddOn certified, ensuring smooth integration and quick start-up. In a wide range of fields, including logistics, automotive, and heavy industry, it contributes to automation such as palletizing and depalletizing.

Click here for case studies and videos