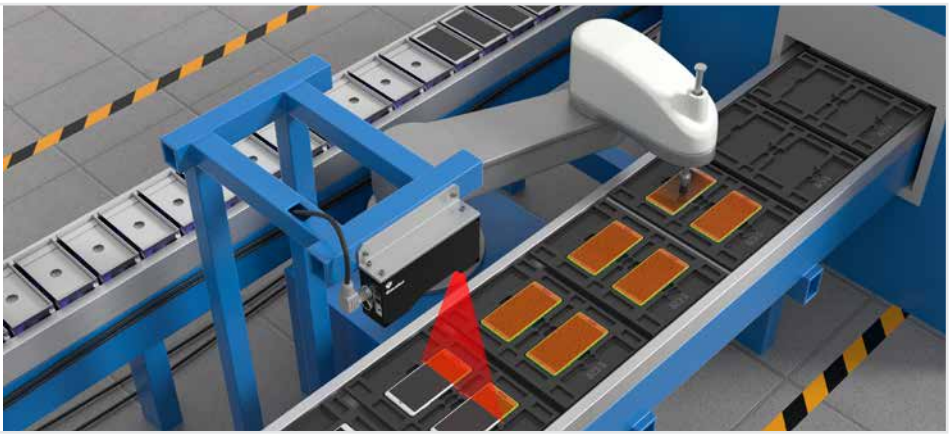
HOW ROBOTS AND 3D SMART SENSORS ARE DRIVING INCREASED FACTORY AUTOMATION

The use of robots for factory automation applications is growing at a rapid rate. More and more manufacturers are streamlining their production lines by taking simple, repetitive tasks out of the hands of workers and using small to medium-sized collaborative robots that can perform more accurately and efficiently.



The Importance of Pick-and-Place

Although robots can perform elaborate tasks like visual guidance or motion-based scanning, it is our experience that the majority of today's robot automation applications are pick-and-place—which requires the robot system to locate and move parts from one cell to another. Parts can be positioned systematically or randomly on moving conveyors, stacked bins, or pallets.

Such systems usually involve a robotic arm equipped with a vacuum- or pneumatic-based grip that allows the robot to contact the part on a variety of surfaces and effectively transport the part while avoiding collisions to a target destination. Some specialized applications require mechanical grips that have "fingers" to pick up, manipulate, and place the part.

Making Robots Smart

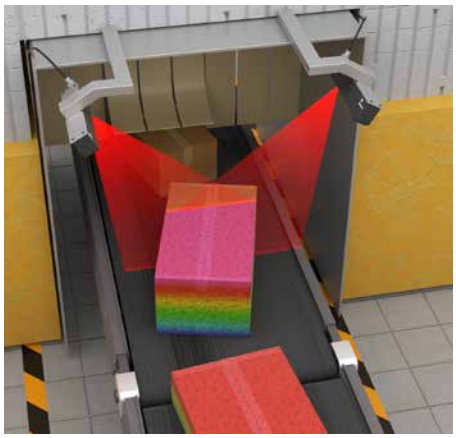
Robots are not "smart" enough to perform pick-and-place applications on their own. This is because they can't "see" or "think". As a result, robots require machine vision to visualize the scene, process information to make control decisions and execute precision-based mechanical movements. To provide these critical functions, manufacturers can pair 3D smart sensors with robots to create a complete automation solution.

Why You Need 3D

2D-driven systems can only locate parts on a flat plane relative to the robot. Robotic systems equipped with 3D vision, on the other hand, can identify parts randomly posed in three dimensions (i.e., X-Y-Z), and accurately discover each part's 3D orientation. This is a key capability for effective robotic pick-and-place—3D delivers both position and orientation information.

Application Examples - Gocator® Mounted and Mapped to a UR Robot

A Gocator 3D snapshot sensor can be mounted and mapped directly into a UR robot over Ethernet using the Gocator® URCap and standard communications via ASCII protocol. The resulting 3D vision-guided robotic system is simple and highly efficient—consisting of only the Gocator® sensor, the sensor's standard tool set, and the UR robot. No additional software or PC is required.



Examples of application uses for such a system include:

- Pick-and-place of incoming raw materials or subassemblies travelling on a transport system (e.g., conveyor, pallets). Gocator® scans the target part/assembly, reports its position in global coordinates, and places it randomly or directly on a conveyor/pallet.
- Random placement and picking up off of a conveyor (i.e., random bin-picking). Gocator® scans a part as it travels down a conveyor, and direct the robot to pick up the part and and place into the appropropriate bin.
- Placing finished products/assemblies into structured bins by height of the parts (e.g., 1, 2, 3, 4 stacks high). The Gocator® sensor uses 3D information to place the parts in the appropriate bin, and set them at the appropriate clock angle using the part matching algorithm onboard Gocator.

Gocator® is able to perform all three of the aforementioned pick-and place operations using just three of its more than 140+ built-in measurement tools. The specific tools it uses for this application include the Bounding Box tool, Height tool, and Part Matching.

This simplicity makes it easy for the engineer to set up, run, and get the desired results from their system. And don't forget, every Gocator® sensor is factory pre-calibrated, which means you don't have to convert pixels to measurement units on your own time. Those units are already onboard the sensor, which allows you to scan and measure out-of-the-box.