

Robot Vision for Machine Tending - with No Manual Intervention

How adding a robot vision component enables precise pick-and-place for automated machine tending with 100+ different parts



As personnel is becoming increasingly scarce, supply chains increasingly complex and shopfloor space increasingly costly, the ability to efficiently automate low-value-add tasks such as machine tending with little to no manual intervention in the necessary pick-and-place process is becoming a competitive advantage across industries. At Danfoss, a Danish manufacturer of mobile hydraulics as well as electronic and electrical components, robotic systems equipped with 3D robot vision sensors now reliably and precisely recognize and move a large number of different components.

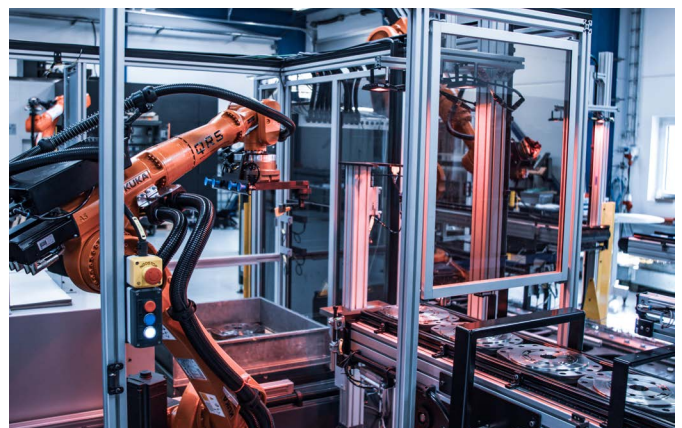
In the new production line implemented by Danish integrator Quality Robot Systems (QRS), a total of six KUKA robots take over work steps that were previously performed manually. For this, the robotic cells must recognize and move up to 100 different components with no manual intervention.

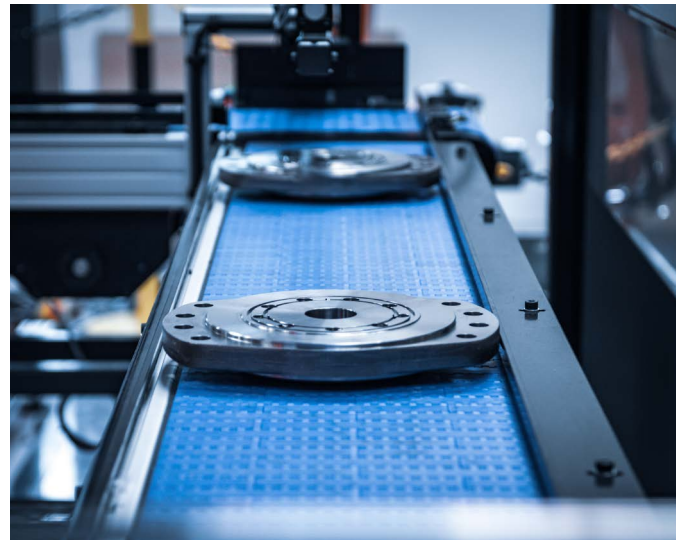
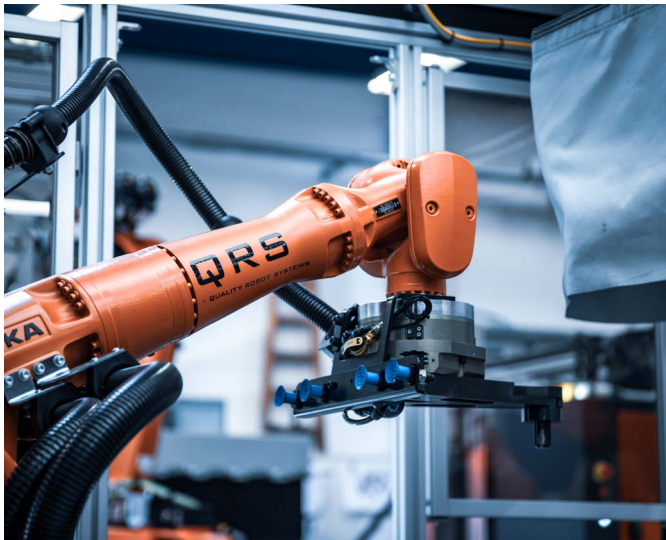
The Challenge: Machine Tending with a Large Variety of Parts

"The requirement for the robotic cells at Danfoss was a fully automatic feeding of the components

with no manual intervention. Obviously, this task can only be solved with a robot vision system, given the large number of variations," explains Olav K. Sjørsvlev, Sales Manager at KUKA integration partner QRS.

The alternative, namely feeding the blanks meticulously ordered and aligned, was simply not economically feasible. Instead, the objects arrive at the first robot station in standard roll boxes. They are sorted by box, however, the boxes are stacked on top of each other more or less indiscriminately. Furthermore, paper sheets separate the layers of objects.



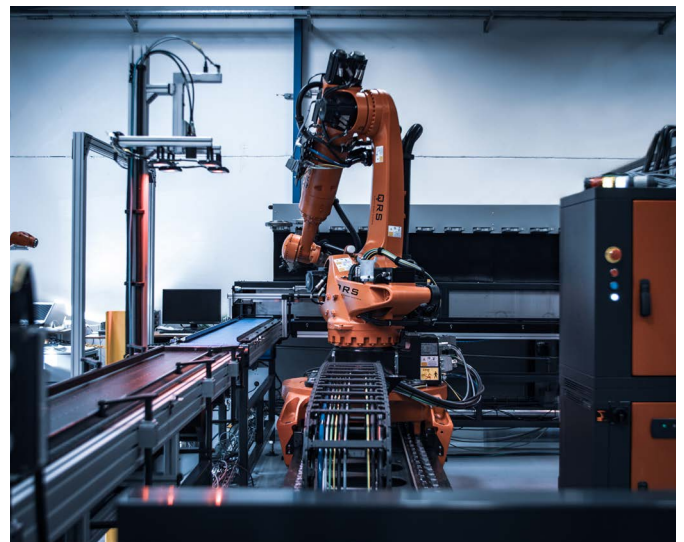
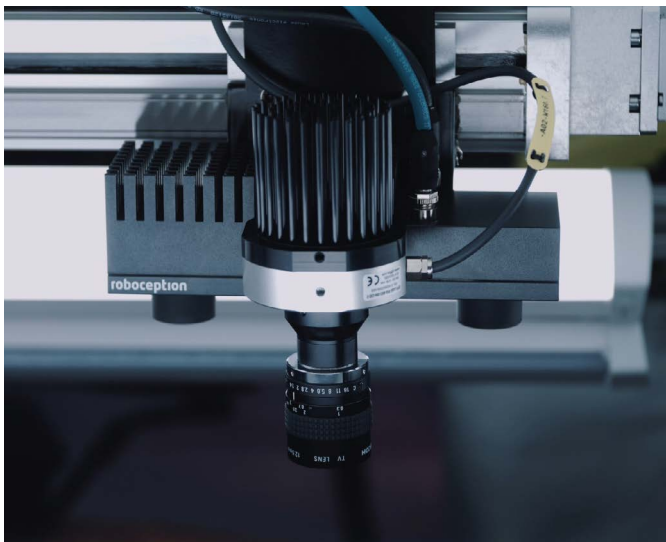


The Solution: Robot Vision for Machine Tending - with a System that Really Works

To meet the challenges of object recognition, QRS benefited from its close partnership with KUKA. For when it comes to robot vision systems, pick-and-place requirements and object recognition, KUKA turns to its Munich-based partner Roboception and their rc_visard 3D stereo sensor. At Danfoss, the rc_visard (using the SilhouetteMatch software), reliably detects the position and orientation of the flat, unordered objects on the flat paper surface. It

also provides the robot with the grasp points for the pick-and-place process at the same time.

A 2D solution was quickly ruled out for this machine tending project: The paper slipsheets are not always completely flat, or may be oily due to the components. In tests with other systems, the camera had sometimes misinterpreted imprints as work-pieces. SilhouetteMatch, on the other hand, recognizes exactly which components are supplied to the robotic cell. It reliably transmits the appropriate grasp points for a KR CYBERTECH from KUKA.



Roboception GmbH

'Eyes and Brains for Your Robot': Roboception is a leading provider of intelligent robot vision platforms and systems. The Munich-based company enables robots to see and think, thus providing key elements for flexible automation solutions in Industry 4.0.

Roboception supports integrators and end users in creating innovative automation solutions for the future-oriented use of robots in production and logistics.

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