Automatic palletizing of baked goods

Starting point / Task definition

When Kamps was looking for an automatic palletizing solution for its large-scale bakery in Pfungstadt, the most important factors for the company were minimal space requirements, speed, precise and gentle product handling, and greater cost-effectiveness. In addition, Kamps requested that the containers with the baked goods be vibrated into one another when stacking, to ensure stability.

Implementation / Solution

Kamps decided in favor of an automation solution involving three KUKA KR 180 PA robots. The robots are supplied with the baked goods via belt and roller conveyors. Four carriers filled with identical products stop on a grouping table in each cell, putting the products in the pickup position for the robot. Each KR 180 PA first guides its gripper's alignment cross between the four containers before pushing them together. If the containers are plastic boxes, the robots clamp them with the gripper jaws. Cardboard boxes, being more sensitive to pressure, are held on their outer edges by hooks that extend from the end-effector. The KR 180 PAs stack the product containers by type up to a height of almost two meters on europallets, gently vibrating them into a stable position. Even containers that have already gone through the system several hundred times can be stacked precisely, one on top of the other. Automatic product changes are made possible by the integrated vision system, as all the required data can be read from the code on the article's label.

Each robot uses the same intelligent gripper as its tool. The development of this pneumatic end-effector was essential in enabling the KR 180 PA to be used for this application, as this gripper allows the robots to pick up plastic containers or cardboard boxes without changing tools. Changing the end-effectors would have been too time-consuming, particularly given the fact that the robots often need to palletize several different products in parallel. This is because one of the robot cells handles three lines coming from the production area, and each of the other two handles two lines. With their universal grippers, the robots are each able to complete five cycles every minute. That means that each one works so fast that a single line could not keep it supplied with products.

System components / Scope of supply

- Three KUKA KR 180 PA robots
- Three PC-based KUKA robot controllers, including control panel with familiar Windows interface
- Three intelligent, pneumatic grippers
- Three grouping tables
- Robot programming
- Conveyor systems to and from the cells, including the vertical conveyors installed at the end of the production lines
- Safety devices
- Start-up

The supplier was KUKA system partner Komatec GmbH, Enkenbach-Alsenborn, Germany.

Number of report:
R 272

Industry:
Foodstuffs, beverages

Application:
Handling
Palletizing and order picking

Product:
Palletizing robots
KR C (Robot Controller)

Implementation:
02.12.2002

Customer:
Kamps AG, Duesseldorf, Germany

Results / Success

- Significant space savings

  The robots require little space, even though they need to move to several pallet positions. Other manufacturers were only able to provide the required payload capacity and reach with larger and more expensive six-axis robots. What puts the KR 180 PA ahead of its competition is the high rigidity of its lightweight arms, allowing it to stack loads weighing up to 180 kilograms to heights of up to three meters.
- Additional space was saved

  because there was no longer any need to set aside space in the packaging zones for palletized plastic containers waiting to be taken away. Today, the containers move directly on belt and roller conveyors to the shipping department where they are stacked by the KUKA robots. In this way, Kamps has also minimized its internal traffic.

- Fast and gentle

  The robots are programmed to start slowly, then speed up considerably, before gently braking again later. This procedure is indispensable, as it allows Kamps to achieve short cycle times while simultaneously protecting its baked goods from damage.

- Advantages of the “palletizing expert”

  The KR 180 PA “palletizing expert” is a four-axis robot with a passive fifth axis, whose application-specific, FEM-optimized kinematic system guarantees particularly efficient palletizing processes. In contrast to the KR 180 PA, a gantry robot would never be able to handle the goods volumes supplied from seven lines and vibrate the containers into a stable position.

- High availability

  A Service Plus agreement concluded with KUKA guarantees a response time of two hours, thus ensuring 99 percent availability. This is vital, because any disruption to the robot cells would mean significant financial losses for Kamps. The affected production lines would need to be switched off and the goods currently in the production process would need to be destroyed.

- Ease of operation

  To make operation of the robots even easier, the user interface of the KUKA Control Panel has been further simplified so that even non-technical personnel can change pallet heights and remedy simple faults.

- Increased cost-effectiveness

  Taking into account the many advantages that come into play especially during three-shift operation, the automation also brought a considerable increase in cost-effectiveness.

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