

Palletizing of boxes

Starting point / Task definition

Nestlé Nespresso in Orbe, Switzerland was experiencing continuous growth, and therefore decided to have a new production center built. This is now in operation seven days a week, 24 hours a day, and produces exclusively Nespresso capsules – of all types, and to meet the global demand. Since by opening the new factory the company had quintupled its production capacity, an efficient palletizing system was required.

Implementation / Solution



Palletizing of the boxes of Nespresso capsules in the Classic and Professional variants, which each contain 200 and 300 capsules respectively, is now carried out by three KUKA KR 180 PA palletizing robots. The boxes are brought on conveyors from the production area to the robotic cells. There they are held pneumatically in pickup positions high up off the floor. Previous to this, a scanner reads the barcodes of the boxes, a mixture of which is present on the conveyor, thus enabling the controller to send each type unmixed to the “correct” robot. The KR 180 PAs pick up four boxes at a time and stack them on europallets in accordance with the specified stacking patterns. The europallets rest on floor-level roller conveyors. By offsetting the stacking patterns from one

layer to the next, extraordinary stability is achieved.

The stacking patterns differ between the Classic and Professional variants. Classic capsules are stacked by the robots in five layers per pallet, with 16 boxes per layer: two rows of six boxes crosswise and one row of four boxes lengthwise. First the KR 180 PAs set down two rows of four boxes simultaneously. They then pick four of them up again, putting them back on the pallet two at a time in two steps. They then pick up four more boxes, which they palletize individually. The larger boxes filled with Professional capsules are set down by the robots twelve to a layer, and six layers on a pallet. They begin with two groups of two boxes, followed by two groups of four. The KR 180 PAs create the desired stacking patterns by rotating their suction grippers. Since the vacuum circuits in their end-effectors can be controlled individually, the robots can hold or set down any desired number of the four boxes which they pick up. To handle the empty pallets needed for palletizing, the KR 180 PAs fold out two hooks on each of the narrow ends of their grippers.

System components / Scope of supply

- :: Three KUKA KR 180 PA palletizing robots
- :: Three PC-based KUKA robot controllers, including control panels with familiar Windows interface for easy operator control and troubleshooting
- :: Three adjustable suction grippers
- :: Robot programming
- :: Start-up

Results / Success

- :: 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.

- :: Very long reach

The KR 180 PA was chosen above all due to its long reach. Even though the roller conveyor leading into the cell is installed about three meters above floor level, the palletizing experts are able to take packages from it and to set them down near the floor. It was thus possible to avoid additional investment costs for the roller conveyor –



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R 246

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Foodstuffs, beverages

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Handling
Palletizing and order
picking

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Controller
KR C (Robot Controller)

Implementation:
22.07.2002

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Nestlé Nespresso SA,
Orbe, Switzerland

thanks to the KR 180 PAs' long reach, the conveyor did not have to be routed downwards.

:: Availability of nearly 100%

Another advantage of the robots is their availability of nearly 100%. In order to enhance availability and thus ensure high throughput, Nestlé Nespresso has concluded a Service Plus agreement with KUKA Roboter Schweiz AG. In this contract KUKA is obliged in the event of a malfunction to dispatch a customer support technician and the necessary spare parts to the production center within 24 hours. KUKA Roboter also guarantees that its own service hotline is available 24 hours a day, 365 days a year.

:: Large reserve capacity

At present, Nestlé Nespresso is using only about 75% of the robots' capacity; just two of the KR 180 PAs handle the bulk of the 260 pallets which are loaded each day. The third robot is primarily intended to prevent bottlenecks in the handling process when the user expands production capacity in the future.



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