

Safety for fully automatic infeeding: advantages of pick and place robotics

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For the food processing industry, hygiene is an important issue, if not the central one. Throughout the sector, tremendous efforts are made from all sides to continuously increase food safety in processing.

In fact, food processing machines are nowadays equipped with technologies that, even in long processing lines, do not leave much space for the development of pathogenic agents.

Furthermore, the launch of robotics has considerably increased the safety in food processing. In particular, pick and place robotics open up new possibilities of easily sorting and designing portions and feeding them into packages.

Robotic solutions

The Weber group is one of the forerunners offering robotic solutions in the food processing sector. The Weber Food Robot (WFR) for instance, is a jointed arm robot made for the infeeding and designing of simple portions. The pick and place robots made by Weber (WPR) differentiate from comparable systems by their large working space and rank among the most flexible delta kinematic robots in the market.



This is not without good reason. For over 30 years, the business association Weber Maschinenbau has been one of the key players in the food processing industry.

In the field of high performance slicing machines, Weber is globally the market leader.

Industrial firms and small businesses all over the world use the systems made in Breidenbach and Neubrandenburg primarily for slicing and portioning sausage and ham.

In the field of food safety Weber is one of the industry's pioneers.

Under the name of 'Weber Hygiene Design' goes a whole catalogue of measures and requirements that the company pre-

scribes for all of their systems. As an example, every machine in the product portfolio is made of high grade stainless steel.

The housing edges are ground and rounded. Surfaces are sloping to a certain gradient in order to guarantee that cleaning water can run off instead of accumulating on the housing.

Furthermore, all loading and eject conveyors of the slicers and modules can easily and conveniently be loosened and removed without the use of tools. All these features guarantee perfect conditions for thorough and fast cleaning of the machine within the daily routine.

Despite all the progress made in construc-



tion, some weak points remain, since wherever in the process line a portion has to be touched by the operator directly, a certain residual risk of contamination is implied.

On its way from the slicer to the packaging machine, the unprocessed log or product passes a few critical points where a contact of the operator with the product is possible: during loading of the slicer with the product to slice, during weight and position correction of the portion and, last but not least, during infeeding into the packaging tray.

The response to this challenge consists more and more in automated solutions such as the Weber Pick Robot WPR that drastically reduce the necessity of manual intervention into the process.

Moreover, these systems offer many more interesting aspects to the food processing industry – from increased economic efficiency to completely new forms of portion designing.

Exceeding expectations

In the phase of developing and designing the WPR, Weber put the concepts of existing pick and place robotic solutions on trial and optimised them for the actual requirements of their customers in the food processing sector.

The result is a system exceeding all expectations by far. The picker is at the end of the processing line and places the portions, arriving on conveyors, into the trays of the packaging machine. Previously, conventional robot systems had to be provided with precisely positioned portions. Sticking to the subject of slicing, it may always happen that a portion 'slides'.

The reasons are various. Sometimes the particularities of the selected portion design, the diminishing sharpness of the slicer blade or simply the length of the processing line cause irregularities of placement.

The 'spoilt' portions still have to be corrected manually. Developing the WPR, the Weber engineers and technicians had exactly this point on their list of requirements. The solution for this problem is as simple as it is intelligent. A camera system is integrated in the Weber Pick Robot that detects and controls the position of the incoming portions.

Based on the data received, the robot itself makes corrections, if necessary. At this stage of the process, another advantage of the Weber Pick Robot becomes manifest: the working space of the system amounting to more than 1,300mm.

Hence, the WPR even feeds into broad packaging machines without any problem. The outstanding advantages also qualify the system for applications beyond the food processing industry.

It goes without saying that the Weber Hygiene Design has also been consequently implemented in the WPR.

Furthermore, the system meets with all criteria of EU and FDA certification. As for



Weber's slicers, skidders and icers, the basic material is high grade stainless steel. The working space of the robot is enclosed by panes and doors made of transparent Macrolon.

Both from the operator's side and from the far side from the operator the work-space is easily accessible and fast and convenient to clean. The arms of the robot themselves are not made of carbon fibre, as usual, but of stainless steel.

The big advantage of this is that, contrary to the composite material, the metal can be traced with a metal detector, which improves the food safety considerably. The grippers can be easily removed and refitted, which reduces cleaning and modification times to a minimum.

Groundbreaking technology

The WPR is a parallel-kinematic robot. Three joint shafts equipped with fixed drives move the system. Thanks to their parallel positioning, the shafts form a closed kinematic chain. The bearings of the drive motors and arms of the robot kinematic are arranged in a common suspended basic frame.

The coordinated activation of all drive units moves the end effector three-dimensionally. The robust construction of the robot allows for handling of heavy weights. The particular Weber engineering achievement becomes manifest especially in the flagship – the Quadruple Weber Pick Robot. As its name suggests, four robotic units work together side by side and in perfect synchronisation.

The WPR end effectors themselves function according to a proprietary developed principle.

The system corrects and designs the portions so that they fit into the trays without

gaps and without destroying the requested design. Even portions critical in shape such as 'shaved meat', i.e. sausage or bacon 'gauzily' sliced and placed, perfectly find their way from slicing into the packaging machine.

The picker itself realises even most various portion designs and, hence, can replace an optional turning station or an overlapper connected to the slicer.

Furthermore, there are hardly any limits set to creativity regarding individual portion designs.

By using the intuitively usable touch panel, operators can quickly and easily teach the WPR new placement situations within the work thanks to the so-called teach-in process. Neither programming knowledge nor the help of a service technician are required to 'teach' the Weber system.

Possibilities of use

Even beyond the classical Weber application fields of sausage and ham, the WPR has already proven its performance.

For a Scandinavian customer, for instance, the system was adapted in a way that it perfectly feeds in portioned salmon without manual intervention.

As a stand-alone solution, it can handle any conceivable application. To put it briefly, the Weber Pick Robot fully plays off its advantages wherever applications require a maximum of hygiene at outstanding performance and optimal operational safety.

Of course, here, the same is valid as with all Weber systems — the WPR creates ultimate flexibility and maximal product and food safety alike.

Possibilities of contamination caused by human interference into the process line are reduced to a minimum by this benchmarking system. ■