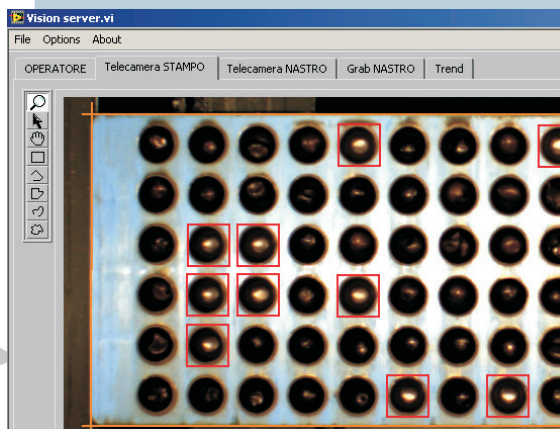


# Robotic station for in-line missing products restoring



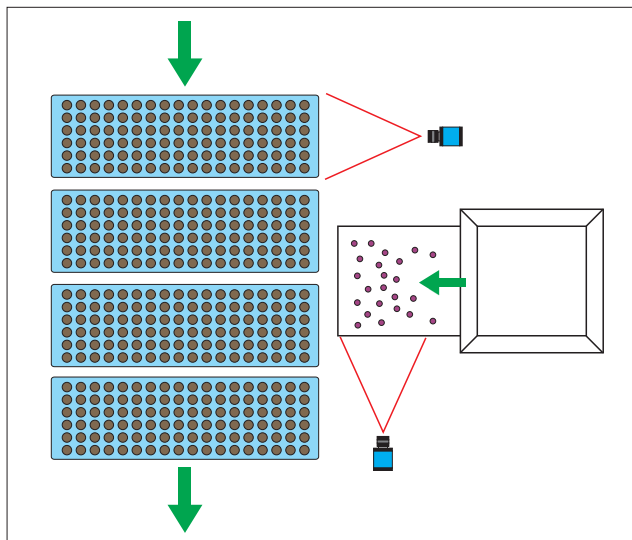
- ▶ Restores missing products in-line
- ▶ Hopper for bulk product feeding
- ▶ Detachable belt unit for easy cleaning
- ▶ Suitable also for removing non compliant products
- ▶ Statistical and monitoring functions



The robotic station has been developed for Laica chocolate industry. It is installed on a “boeri” production line, where the cherry dispenser guarantees a 95% efficiency. The task of the robotic station is to place a new cherry inside the remaining 5% of the products.

An advanced industrial vision system inspects the moulds flow and detects all the products missing the cherry inside them (at this stage the products are still open). Image processing is performed with custom algorithms, since the cherry and the external chocolate shell are the same color.

Bulk cherries are manually loaded in a hopper and then automatically spread on a moving belt; their position is then detected by a second industrial vision system. This operation is performed with high tolerance for cherry shape, angle, size and grouping.



The robot, communicating with both vision systems, performs its task picking cherries from the belt and placing them in the empty products.

<b>Errors in detecting cherry inside product</b>	< 1 / 10'000
<b>Picking accuracy</b>	< 1 mm
<b>Picking fault</b>	< 4% (1)
<b>Speed (successful cycles)</b>	90 cpm (2)
<b>Placing accuracy</b>	< 2 mm (stepping moulds)
<b>Maximum robot load</b>	1 Kg

(1) Vacuum picking may fail if the de-seeding hole happens to be vertical. The system detects this failure and starts a new pick and place cycle.

(2) This application requires a long picking time (due to cherry characteristics) and a long placing distance (about 700 mm). When more regular products and shorter distances are involved, the system normally reaches a speed of 120 cycles per minute.