

Presseinformation

Two-layer tray filling with 180° rotation for PE bottles Packaging head over heels

The Sizilia company is a traditional producer of citrus juices located in Berlin, Germany. When it came time to modernize their machine park with consistent, fully-electronic equipment, Schubert was commissioned to create the packaging line. A packaging machine construction in this line uses a unique conveyor device, the TLM transmodule.

At Sizilia, PE bottles are packed in trays, but there's a twist. With two-layer filling, the top bottles are to be placed upside-down in the spaces between the bottles on the bottom layer. A cardboard tag or brand emblem is loosely fitted on the neck of each bottle.

The three current sizes are:

1. 23 x 200 mL bottles, bottom layer upright (3 x 5), top layer upside-down (2 x 4)
2. 33 x 100 mL bottles, bottom layer upright (3 x 7), top layer upside-down (2 x 6)
3. 24 x 200 mL bottles, one layer, 4 x 6

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Despite the demanding tasks it performs, the line features a highly compact design thanks to its novel conveyor device. The TLM transmodule is a robotic vehicle which moves through the packaging line on a track and transports packages and items being packaged in this way.

Each TLM transmodule has its own control unit, which communicates with the VMS controller wirelessly. The current transmission which powers the servomotor and a vacuum blower is also wireless, by way of induction. The track has a turning unit at each end. Unloaded modules return to the other end on a lower track.

If the line owner removes a module from the track, the processes continue seamlessly. Conversely, all that is necessary to start using a new unit is to place it on the track and register it at the terminal. Configuration is carried out automatically. The TLM transmodule robot features exchangeable tools. At Sizilia, the size part is a partition for 36 bottles.

It's obviously not a simple conveyor device. The TLM transmodule is unique in packaging machine construction, because the robot unit's intelligence makes it an autonomous unit. It "knows" where it is, as well as the position of the previous module. Multiple

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units can move at different speeds on a track without colliding. In addition, modules can be moved one next to another with a spacing of as little as 0.2 mm.

The practical benefits of this are seen in use in Berlin. The TLM transmodule loaded with products enters the loading station. The size plate holds 36 bottles, which is more than one complete pattern, but less than two. This is why the next module moves right next to the first one after the first removal. The robot now removes the bottles from two size plates as it overlaps them. With conventional transport equipment, this additive process is not possible. Usually, at least the buffer unit is placed on a grouping table. It can get even more complex, depending on the technology used.

The advantage in freedom of design which appears during process organization with the TLM transmodule enables the processes to approach ideal conditions. They are not limited by technical constraints, and are fully flexible.

The entire packaging line is comprised of four sub-machines. 220 bottles are fed in a single lane every minute. The controller cycles bottles into a grouping chain in the transition area to the third sub-machine.

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This, in turn, brings 12 products to the pick-up area of a two-axis TLM F2 robot.

The following process step varies depending on whether the running program is handling upside-down bottles. If the tray only receives one layer, only the size plates of ready transmodules are filled. If another layer is to be positioned "on its head" later on, the robot also equips a horizontal tool alternatively to the transmodule. Metal clips are placed in the bottom contour line of the bottles and secure them in this way.

The tool belongs to a three-axis TLM-F3 unit which is also located in the third sub-machine. Its task is to flip over the bottles.

A vacuum transport system positions three cartons which already contain a layer of bottles to the working area of the robot. The TLM-F3 then executes a turning movement with the tool until the bottles are upside-down and lowers them precisely into the spaces between the layer of upright bottles.

The TLM-F3 groups passively and fills actively. It eliminates the need for a buffer unit and therefore equipment, space and energy. The product is protected.

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Another two-axis robot located in the second sub-machine is used for placement of the upright bottles. From here, the trays either stop to accept upside-down bottles and then continue on to the end of the line, or the vacuum conveyors bring them right to the last sub-machine. The "suspender" tabs used with this size are glued along the way there. The TLM-F2 robot which pushes the containers onto the discharge belt also folds the tabs over in the same movement.

The trays are erected in the first sub-machine. A blank which is removed from the magazine is glued and led through the folding frame. The container undergoes the rest of the processing steps secured firmly to a vacuum transport rail which stands ready. A downstream machine shrink-wraps the container.

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