Pharmaceutical Packaging in a Powerful Design

ESS Technologies, Inc., a packaging machinery manufacturer located in Blacksburg, VA who specializes in turnkey line integration, introduced an innovative Servo Bottle Filling & Capping Machine to the market in 2004, which is unique for the pharmaceutical and cosmetic industries. With this new machine development, ESS Technologies, Inc., who is also a UL panel builder, demonstrates its extensive experience in the industry and commitment to state of the art technology.

ESS Technologies, Inc.
DESIGN, INTEGRATION & SALES

Efficient Machine Design

The new MB120 Monoblock meters in bottles, fills them and finally screws on the cap. Many competitors have not yet achieved combining the filling and capping process into a single, clean balcony design machine, which makes this system very attractive to pharmaceutical and cosmetic customers.

"The clean balcony design along with the B&R ACOPOS servo drives makes this a perfect fit for these applications. Other unique features include quick size change, good visibility for the operator, and feedback controls from a check-weigher for automatic fill volume adjustment. The servo filling system has the ability to do "profile filling" for irregular shaped containers", describes Kevin Browne, President of ESS Technologies, Inc. This is one of many unique features of the new ESS MB120 Monoblock Filler/Capper.

The machine application, a seven axes motion-based system, uses four servo axes and three variable speed motors to accurately control the motions of the machine. The motion control, machine sequencing and HMI are all integrated into one controller. The software development tool B&R Automation Studio is used for all these automation tasks and allows integrated and simple control between all machine functions (HMI, PLC, Motion Control). It is quite simple to configure a wide range of products (requiring minimum tool changes) with a user-friendly graphic interface.

Besides the integrated control architecture, the new MB120 Monoblock has been developed with a stainless steel balcony design for easy cleaning and maintenance. With a footprint of only 6' long by 5' wide the machine also saves precious floor space. Designed and built in the USA to metric standards, the MB120 Monoblock is also built to US Food and Drug Administration (FDA) standards. The machine is available in single or dual pitch, depending

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on the speed requirements of the customer as well as with various filling systems. From 2ml vials used in hospitals to 16oz bottles found in our local drugstore, the MB120 Monoblock fills and caps a wide variety of containers.

Pharmaceutical Packaging Made Easy

During the actual packaging process bottles are fed into the machine via an in- feed conveyor. This servo driven conveyor runs continuously through the machine. After the bottles enter the system, they are then fed into a servo-driven timing screw, which controls the position of the bottles for the filling process.

Once the bottles are on pitch in the timing screw, the servo-driven fill head moves vertically down into the bottles. The filling pumps, which are also servo driven, allow you to meter the fill for accurate profile filling. This process is important to avoid splashing as fluids have different consistencies and bottles have different shapes and sizes. The HMI allows the operator to adjust the positions of the pump, the nozzle and the speeds on the screen. The machine offers complete flexibility with regards to the filling process and speed.

During this step of the packaging process the caps are tightened with constant, accurate torque using magnetic clutches.

When the timing screw indexes the next group of bottles into the process, the filled bottles leave the filling area via the continuous in-feed conveyor. The bottles are then fed into the capping starwheel. A dual pitch machine caps two bottles at a time, while a single pitch caps one bottle. A centrifugal sorter feeds the caps, orients them, releases the clamps and pre-torques the cap onto the bottle. The next station of the packaging process tightens the cap with constant, accurate torque using magnetic clutches, which is a mechanically controlled process. Once the cap is screwed onto the bottle the finished bottles are discharged from the dial and leave the machine via an exit conveyor.

The output performance of the machine can reach 120 bottles per minute depending on the size of the bottle and the consistency of the product.

Partnership and Service

The machine control system was developed by B&R USA's Partner Integrated Motion, Inc. according to the specifications of ESS Technologies Inc., including control architecture, machine sequence of operation, PLC I/O and the operator interface.

"What makes the machine unique is the highly integrated control system e.g. the networking of the drives, CAN interface etc. Another cost advantage to the customer is the reduced wiring. Additionally, the B&R X67 system simplifies wiring the sensors and solenoids. A simple machine operation with powerful performance", says Jim Mullins, Vice President of Engineering, Integrated Motion, Inc.

"ESS chose Integrated Motion and B&R controls because of the flexibility of the system along with the local and excellent support of Integrated Motion", says Kevin Browne, President of ESS Technologies, Inc. "It was very important for the company to exhibit the machine at the PMMI Show in Chicago in November 2004. The machine ran very well at the show and was well received by our customers and other visitors at the show", adds Mr. Browne. When asked if he would recommend the B&R solution, Mr. Browne answered with a simple "Yes".

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