Improving PLC Compatibility and

Compatibility issues can bring an entire upgrade project to a standstill.

Jim McMahon
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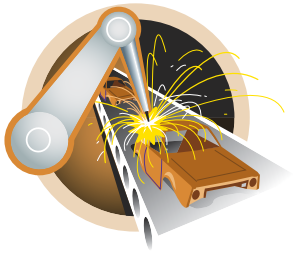


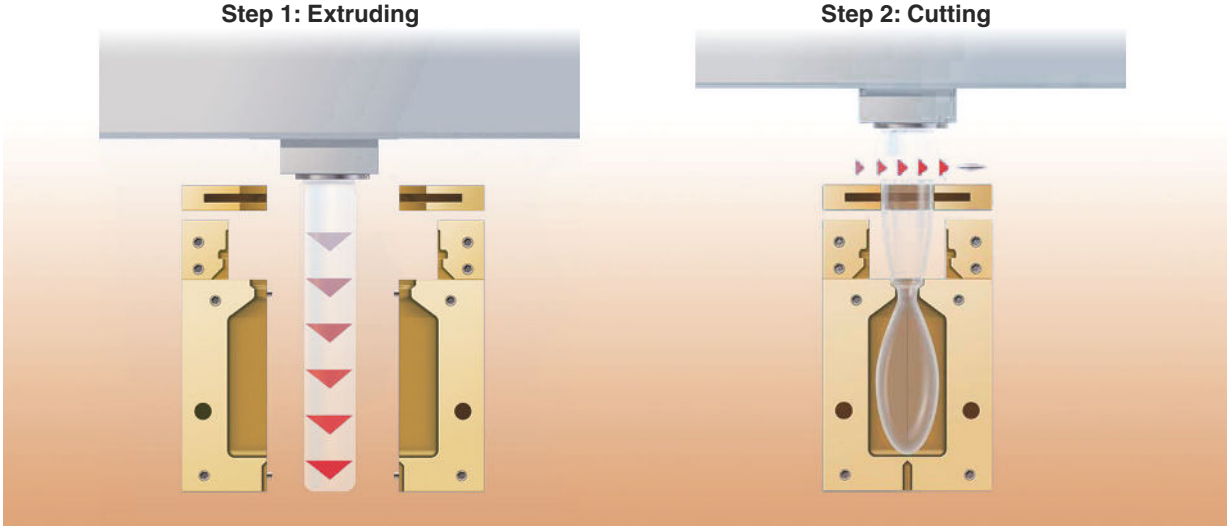
When original equipment manufacturer (OEM), Weiler Engineering, Inc., upgraded the drive systems on its aseptic blow-fill-seal machines, a problem with its existing controller compatibility was limiting the functionality of its equipment. A one-on-one PLC-integration engineering solution not only provided the machine-operation interface Weiler Engineering needed, but also significantly expanded its application's flexibility.

Upgrading components in manufacturing process equipment is something that plant engineers take very seriously and think through carefully. Equipment upgrade options are inspected and tested empirically before a selection is made. The newly modified machine must operate flawlessly to fulfill the requirements of the facility and must integrate smoothly with other designated equipment within the plant. However, engineers frequently settle with less capability from their new components due solely to compatibility issues with their control systems.

For OEMs, the endeavor to make component changes to their production machines is critically magnified in importance. OEMs must take into consideration the machine's operating variables for the wide spectrum of their clients' plant usages, as well as the integration of the full gamut of equipment options that will interface with the machine.

Weiler Engineering confronted serious PLC compatibility issues when its original controls supplier changed its product offering. The company is a leading provider of aseptic custom packaging machinery for pharmaceutical and

Plastic container extruding and filling process



Source: Weiler Engineering and Control Engineering

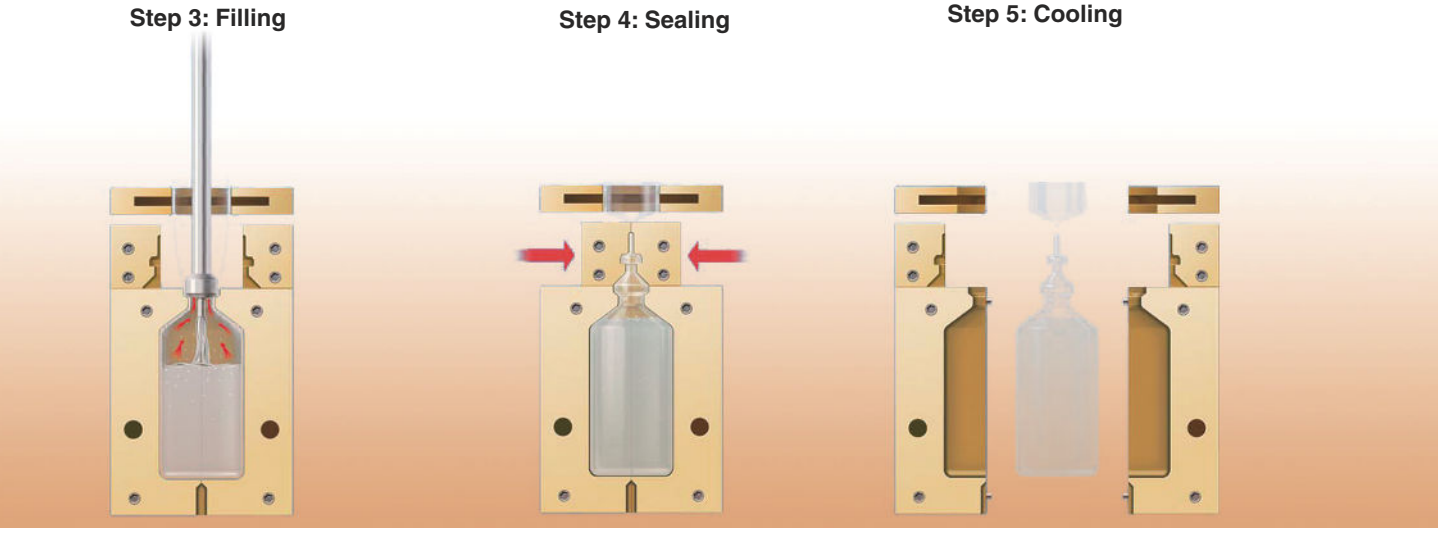
Function Flexibility

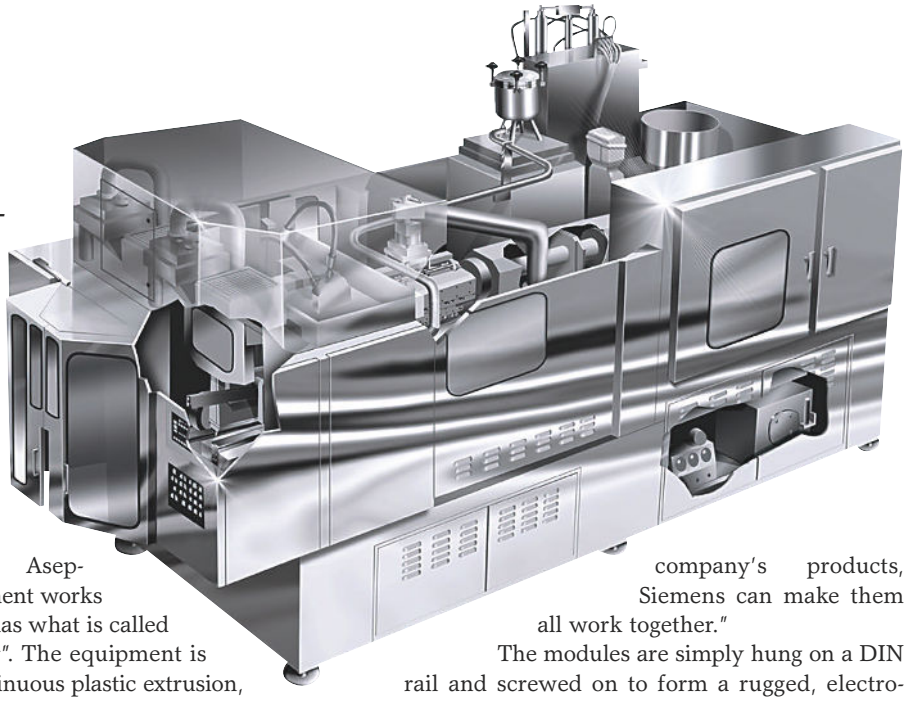
healthcare applications and its machines are distributed worldwide. Based in Elgin, Illinois, and founded in 1959, Weiler's proprietary blow/fill/seal system is the culmination of 40 years of innovation in machine design and sterile process development, producing a highly advanced aseptic liquid packaging system. Weiler's Asep-Tech blow/fill/seal technology integrates blow molding, sterile filling and hermetic sealing in one continuous operation to produce aseptically manufactured products.

The company uses the latest technological advances in equipment design and systems development to ensure the highest level of quality in the production of sterile liquid products. The ability to provide these products, which must meet corporate, scientific, regulatory and end-user requirements, can be quite demanding. These application challenges are met by specific container and closure designs available with its systems. Weiler offers several machine models designed to manufacture containers ranging in size from 0.2 mL to 1,000 mL at production rates of up to 15,000 units per hour, depending on container configuration.

"We have been using PLCs on our machines for 25 years, and a specific controller for a long time," says Robert Mazur, manager of electrical engineering for Weiler. "Problems arose when the company that was providing our PLCs decided to make the product line we were using obsolete. That company's new, second-generation PLCs were not up to our standards. Another PLC manufacturer brought in to help us could not provide a completely functional controller for our machines. We were quite concerned, but it was not the manufacturer's PLCs that failed, it was the integration of its PLCs with our equipment that was the problem."

(1) An extruder forms a tube of hot plastic that will become the container. (2) The mold surrounds the tube closing off the bottom, while a knife cuts the top to allow filling. (3) The mold carries the bottle forward and a filler pipe injects the liquid into the container while removing trapped air. (4) The upper part of the mold closes to seal the container's top. (5) The mold opens to remove the finished, filled container and start over.





Weiler's Asep-Tech blow/fill/seal technology integrates blow molding, sterile filling and hermetic sealing in one continuous operation to produce aseptically manufactured products.

Weiler's Asep-Tech equipment works like this: It has what is called an "extruder". The equipment is doing a continuous plastic extrusion, anywhere from five parisons (round tubes of plastic) to sixteen parisons. The machine carriage, which holds a mold, will then go back and close on those open tubes. The parisons are then cut, and the carriage is moved forward, while plastic continues to come out for the next cut. The machine, affixed with anywhere from five to 60 fill nozzles, will then fill the containers formed inside the mold with a liquid. The nozzles will then come out of the mold and the containers are sealed off with a final sealing die. After forming and cooling, everything opens up and the carriage will pull back and repeat the cycle. The formed containers are conveyed out of the machine room to a remote st excess plastic is removed and the finished product is conveyed to final packaging.

When Weiler began developing an all-electric machine, it used a different PLC manufacturer from the drive manufacturer, causing the integration to become a major problem. "After a number of unsuccessful attempts to resolve the PLC difficulty we approached Siemens and asked them to come in, look at our product line, and tell us what we needed," Mazur says.

Siemens not only engineered a one-on-one solution to its PLC compatibility problems, but also provided engineering for the debug time needed. Weiler now uses the Siemens Simatic S7-300 series PLC and touch screens on its all-electric equipment.

"When a company is having trouble, it is very useful when the supplier has personnel that can come in and understand what needs to be done," says Mazur. "Siemens understood how to communicate with a third-party device that had issues, as well as how to help us work through those issues. Even when it is with another company's products, Siemens can make them all work together."

The modules are simply hung on a DIN rail and screwed on to form a rugged, electromagnetically compatible configuration. The backplane bus is already integrated into the modules - the bus connectors can just be plugged in. With the varied range of modules for the Simatic S7-300, centralized expansions and simple distributed structures can be configured.

Mazur explains: "Each of the input/output cards that we use and each of the drops that we use is self diagnostic. If anything should go wrong - such as shorts or a bad connection on a particular card - it will indicate on the card that it has a problem and internally set alarm bits that are trapped onto a diagnostic screen. It immediatelv gives the maintenance people at site a very fast way of finding the card that is the problem."

> **"Integrating PLCs was the problem."**

The user interface went from approximately 15 screens that were used for basic operations, to about 75 - 80 screens now. Weiler still has the 15 or so basic screens that most of its customers are used to, but now features even more detailed information, including all the screens used for troubleshooting and diagnostics.

The system also has the interface flexibility to work with Siemens' products as well as third-party products that are Profibus registered. Weiler can now simply connect the wires and control them. **ce**

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