

EMHART GLASS CONTROL SYSTEMS

IS machines have served the glass-container industry well. Originally developed by Emhart Glass, IS technology has been in use for over 80 years, and it's still going strong. However, those eight decades have seen continuous change and modernizations to improve efficiency, flexibility and quality.

Control systems are critical to reliability and precision, and have been the focus for some of the most dramatic leaps in technology at Emhart Glass. During the 1980s, we created the T600 control, which became the industry standard for 25 years. Many units are still in use. In 2004, we introduced FlexIS, the first fully integrated control system that could oversee the glass-container forming process from the feeder to the stacker. Since then, almost 400 complete systems and 120 standalones have been installed. As a consequence of this success, the T600 control system became obsolete in 2006, with a guaranteed supply of spare parts until 2016.

Birth of TS-E

Our latest control innovations offer new levels of integration, usability and modular expansion.

In 2010, customers began to ask whether FlexIS could be expanded to encompass a FlexPressure System (FPS), FlexPusher, Servo Takeout (SETO) or Servo Invert (SEI). In response, we restructured FlexIS to create the fully integrated FlexIS TS-E (Timing System Expandable) control system.

TS-E uses the same components as before, but unifies the section, machine and ware-handling controllers into a single system. Its simple, three-module configuration helps to keep spare-parts costs to a minimum. The system is capable of controlling both pneumatic and servo-electric devices, and can also mix analogue and servo valves within the same event.

TS-E can control a maximum of 12 sections, or as many as 24 in tandem configuration. All the existing drive components can be retained, as can the gearbox.

TS-E is now fitted as standard on new IS and AIS machines, and a special version with a larger cabinet is included with NIS machines.

Cabinets and controls

TS-E is housed in two different cabinet types: one type for the section controller, and one for the machine controller and ware-handling controller. The new cabinet design allows for simple step-by-step expansion with FPS, FlexPusher, SETO and SEI, as our customers have requested. TS-E is the first control system to integrate FPS control within the section control.

One section controller cabinet manages the section timing for four sections. Up to four servo drives can be added in order to support FlexPusher, SEI, SETO and other

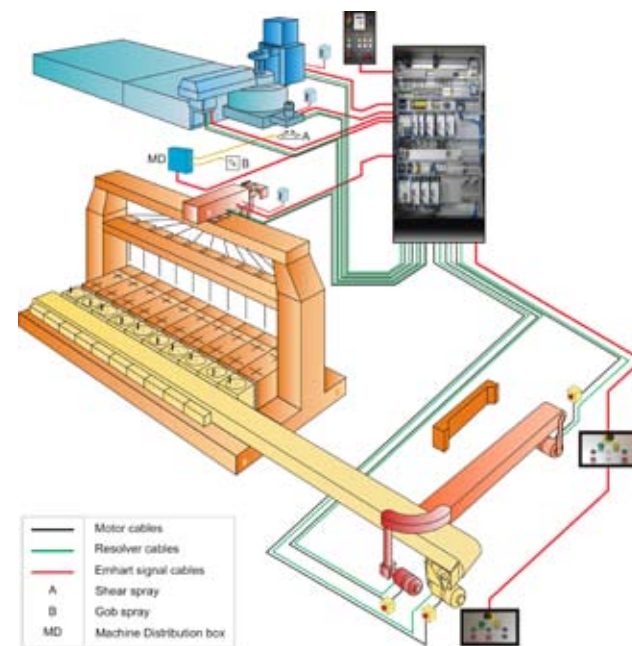
additional functions. Communication and synchronization are achieved via TCP/IP over Ethernet, which allows for remote access and control via the internet, if required. The system also includes a CAN open bus connection for configuring devices.

Moving across to the other cabinet, the machine controller drives the five gob-forming servo motors, ensuring precise and controlled motions for tube rotation, tube height, feeder plunger, shear and gob distributor. The ware-handling controller manages the various servo motors involved in smooth container handling: conveyor, ware transfer, cross-conveyor and stacker. In addition the ware-handling controller can control the conveyor height. The optional Ware Handling Supervision (WHS) operates as stuck-and down-ware reject. The Pressure Control Unit (PCU) is also optional, and manages in a closed loop up to 12 compressed air lines of an IS machine forming process.

Human interface

The best technology is nothing without effective control. On TS-E, operators use a human-machine interface (HMI) comprising the Universal Console (UC), the Hand Held Terminal (HHT), blankside panel, blow-side panel, feeder operator station and ware-handling control operator station.

The UC runs on a standard Windows PC with a touch screen, housed in an air-conditioned cabinet. The FlexIS software features ergonomic pull-down menus for rapid navigation, with which operators can quickly set the desired parameters or import/export job files. The software also provides alarms in the event of problems, together with reports on status, production and downtime. Servo



axis parameters are represented with intuitive graphical visualizations, showing both theoretical and real curves. UC supports a multi-language database, so operators around the world can use it in their first language.

The Hand Held Terminal gives an operator near the IS machine instant access to the key functions covered by the UC – viewing and changing setup parameters, viewing input status, activating mechanisms and troubleshooting.



The blank-side panel is located overhead on the blank side of the section, while the blow-side panel is located on the conveyor in front of each section. These two panels feature switches and buttons with functionality clearly indicated with pictograms. Operators can override or disable each mechanism individually, to allow manual operation, initiate an automatic calibration cycle for all the section's servo-mechanisms or activate special cycles including cold blank/blow cycle, manual swab, delivery request, normal stop and blow-side special cycle.

The feeder operator station provides an interface for all the feeder's servo-mechanisms: feeder, tube, shear and gob distributor. The user can optimize settings for the gob-forming axis and gob delivery. Finally, the ware-handling control operator station facilitates management of all ware-handling servo-motors.

Stand-alone control systems

Not every customer is in a position to replace their entire control system at a stroke; others may wish to integrate systems from different manufacturers. To support this,

Emhart Glass' control systems are also available as standalone systems.

As well as being integrated with TS-E, the servo-electric invert (SEI) control system is now available as a standalone, complementing the FlexPusher and Servo Takeout (SETO) modules that are already available. Now any standalone configuration can be realized, including pusher (860 or FlexPusher), SEI and SETO, on lines with six to twelve sections.

Standalone systems are controlled via an LCD touch screen with function keys. Connectivity is via an Ethernet interface. Each mechanism has its own local-disable switch, and there is also an overall E-stop. In the full configuration, to control two or three mechanisms, standalone controls feature a main cabinet for FlexPusher controls and an extension for the SETO and SEI drives. If controls for just one servo-mechanism are required, only the main cabinet with the requested axis is used.

Now, we are looking forward to helping clients old and new to make a truly future-proof investment in state-of-the-art glass manufacturing controls. The current Emhart Glass controls portfolio covers all customer needs for a flexible, scalable, best-fit control system allowing seamless and straightforward future expansion.



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