YASKAWA

Subject: Application Overview	Product: MP2000iec, Sigma-5, MotionWorks IEC Pro, CamToolbox	Doc#: AO.MCD.10.005
Title: Blister Pack Thermoformer		

Blister Pack Thermoformer

Application Overview

Blister pack thermoforming is a process commonly used to package pharmaceutical tablets, capsules, or lozenges.   Blister packs are created by means of a form-fill-seal process at the pharmaceutical company or designated contract packager. The blister pack is thermoformed from rolls of flat sheet or film, filled with the pharmaceutical product and sealed onto a lidding foil that is then perforated to be dispensed by the user.

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Application Challenges:

- Maximize throughput while maintaining a small envelope for system components.
- Precise temperature control at forming station
- Simple interface to PLC and HMI for easy transfer of product and servo data
- On-the-fly adjustment of motion profiles.
- Regulatory compliance and quality inspection
- Simple programming for faster machine commissioning

Yaskawa Products:

Product	Feature	Benefit
Sigma-5	High-torque density Sigma-5 servomotors	Faster cycle times with a more power in a smaller sized motor allow for higher performance and throughput in the same or smaller space.
	SGDV Sigma-5 Servo amplifier frequency response of 1.6kHz	
MP2000iec	1-16 axes cammed to a virtual master	Simplified machine sequencing and enhanced machine coordination.

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	EtherNet/IP Communications	Easy transfer of servo data to supervisory PLC or MES data collection system. High speed connection to remote, self-contained temperature control modules.
MotionWorks IEC Pro	IEC61131-3 Global Standard Programming Environment	Reduced learning curve of standard machine languages results in faster machine commissioning. User libraries of reusable code can be easily imported into new projects, saving time and speeding the build cycle.
Cam Toolbox	Pre-written library that provides essential functions for Cam Generation and execution	Importable user library allows easy on-the-fly adjustments to all cam profiles and fine tuning of the machine cycle.

Application Details:

In a servo-driven blister pack thermoforming machine, a plastic film or sheet is unwound from the supply reel and pulled though a series of stations along the blister line by a Feed Axis. The sheet is first guided through a pre-heating station. The temperature in the pre-heat zone is maintained to create pliability in the sheet without melting. The warm plastic sheet will then be indexed into a forming station where a servo-controlled die press will form the blister cavity into a negative mold. The mold is cooled so that the plastic becomes rigid again and maintains its shape when removed.

The formed blister pack next enters a filling station where the pharmaceutical product is placed into the blister pack. After indexing past a quality inspection station, the product is then sealed into the package with a lidding foil at a press station. The next station perforates the package to simplify extraction of the product when used. Finally, the blister pack is fed to a die cutter station which cuts it from the carrier web for final product packaging. All servo-driven stations can be synchronized via electronic camming to a virtual master axis to maintain precise sequence timing.

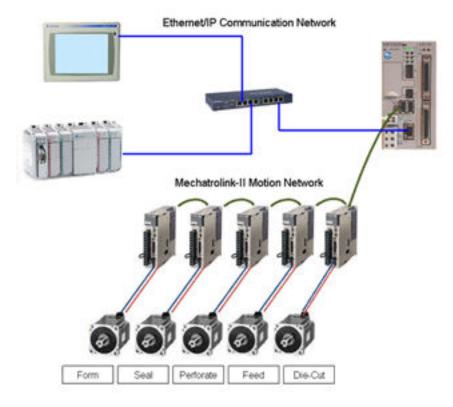| Subject: Application Overview	Product: MP2000iec, Sigma-5, MotionWorks IEC Pro, CamToolbox	Doc#: AO.MCD.10.005
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Alternative designs for blister pack thermoformers use pneumatically-driven or lineshaft-driven die stations. Pneumatic stations offer simple and inexpensive operation, but limit flexibility and automatic control of die positioning/pressure. Line-driven systems synchronize all the stations together but require several mechanical adjustments during product changeover. Today's manufacturing schedules call for a greater variety of product configurations and shorter production runs. Individual servo axes synchronized to an *electronic* line shaft meet the requirements for real-time adjustment and higher production throughput.

The MP2000iec multi-axis controller can cam all stations (feed, form, seal, perforate, and die cut) to a virtual master, thereby simplifying machine sequencing. 100 Mbaud EtherNet/IP communications provides easy transfer of motion data to a supervisory or workcell PLC for production monitoring. The controller can communicate to remote temperature control modules via Ethernet or Mechatrolink network connection.

Programming is also simplified with the use of MotionWorks IEC Pro software. The IEC-61131-3 standard software with predefined PLCopen function blocks and user libraries saves time and speeds development for the programmer. Yaskawa's Cam Toolbox provides pre-written application code essential for Cam Generation and execution that allows easy on-the-fly changes to all cam profiles and fine-tuning of the machine cycle.