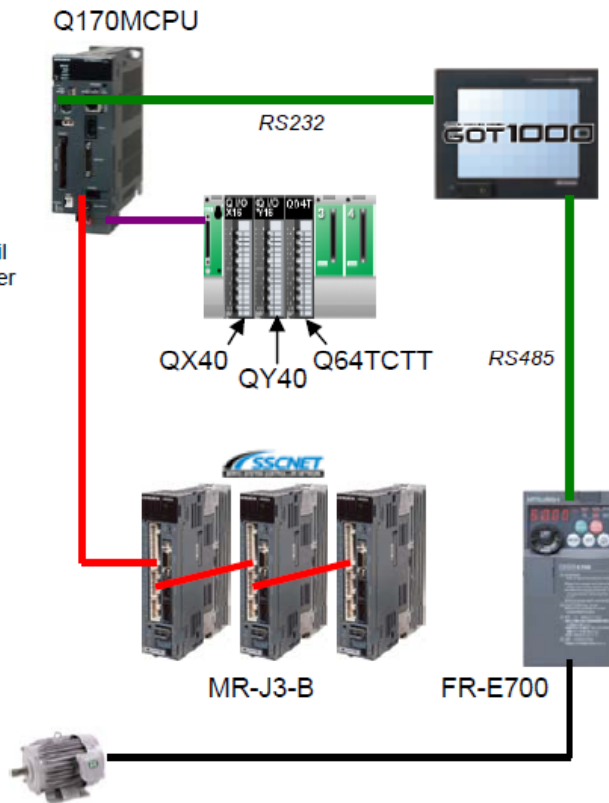
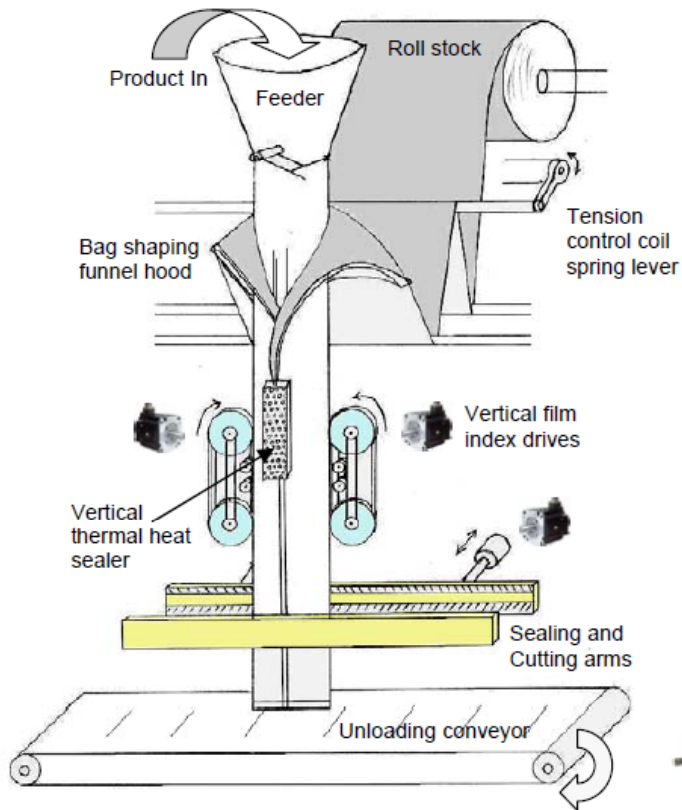


Vertical Form Fill & Seal



Unique Points:

- 1) Stand alone motion controller with built-in PLC for dedicated control
- 2) Direct VFD control from a GOT

Solutions Marketing

Vertical Form Fill & Seal Application

Overview



Vertical form fill & seal applications utilize servo motor technology to accurately pull and feed plastic film material from a roll stock to be heat formed, volume dosed with a product, and then sealed and cut to be carried away by an unloading conveyor. While the methods for filling and sealing vary from machine to machine, vertical form fill & seal applications are essentially organized into two categories; Continuous motion bagging machines and intermittent motion bagging machines.

Product entering the feeder can vary from a viscous fluid to a solid material and will often play a key role in how the machine is designed.

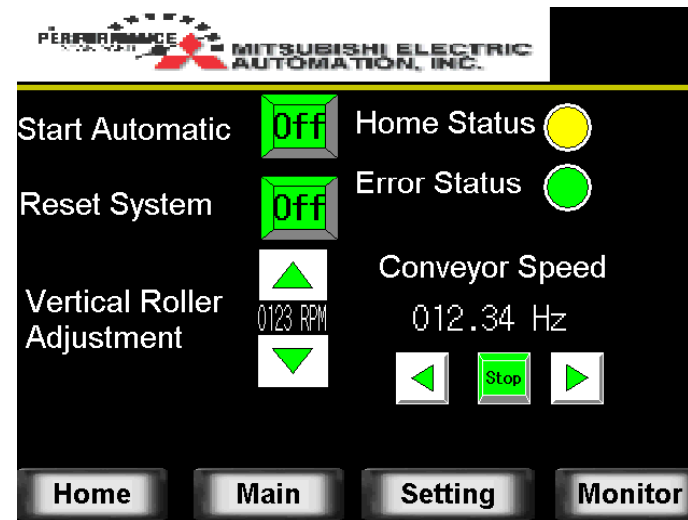
Vertical Form Fill & Seal Application

Mitsubishi Solutions

- ◆ Controller: **Q170MCPU**
- ◆ Temperature control : **Q64TCTT**
- ◆ Servo Amplifier: **MR-J3-B**
- ◆ Servomotor: **HF-KP, HF-JP**
- ◆ Graphic Operation Terminal: **GOT1000**
- ◆ VFD: **FR-E700**

Other Options

- ◆ QD75MH, FX3U-20SSC-H Controllers
- ◆ Large Selection of Motors
- ◆ CC-Link communication to VFD



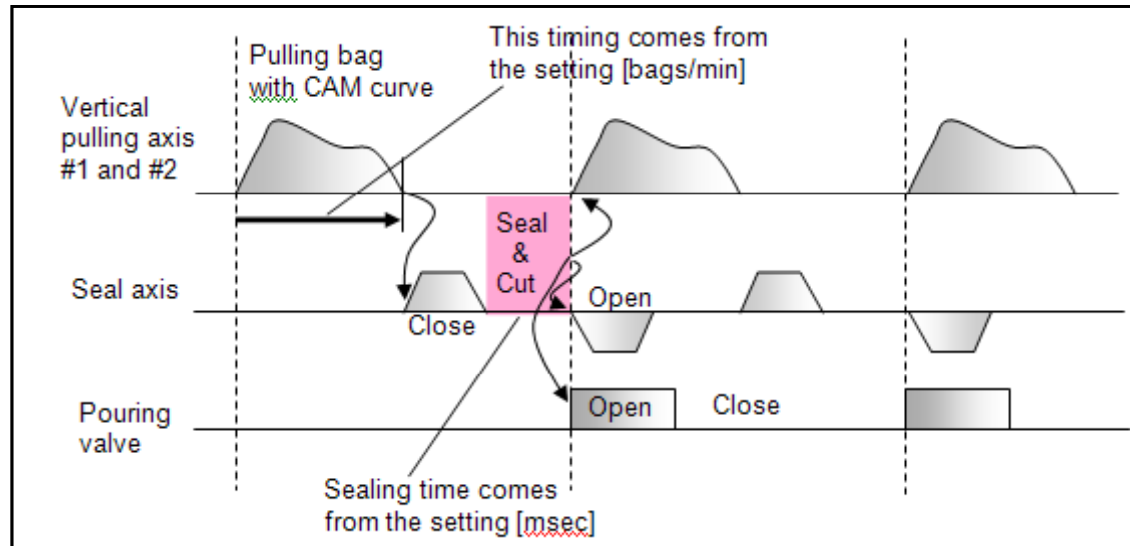
Example Applications

- ▲ Food/beverage bag filling
- ▲ Pouch packaging
- ▲ Industrial powder filling

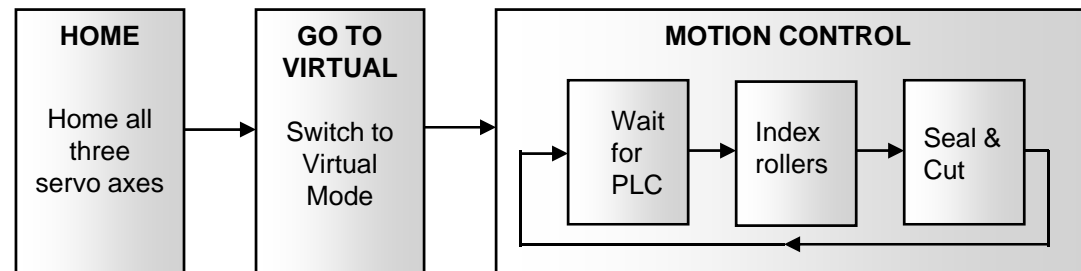
Vertical Form Fill & Seal Application

Sequence of Operation

Timing Chart



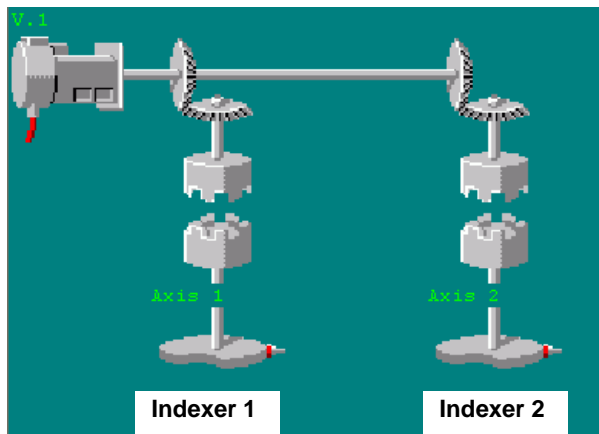
SFC Control Pattern



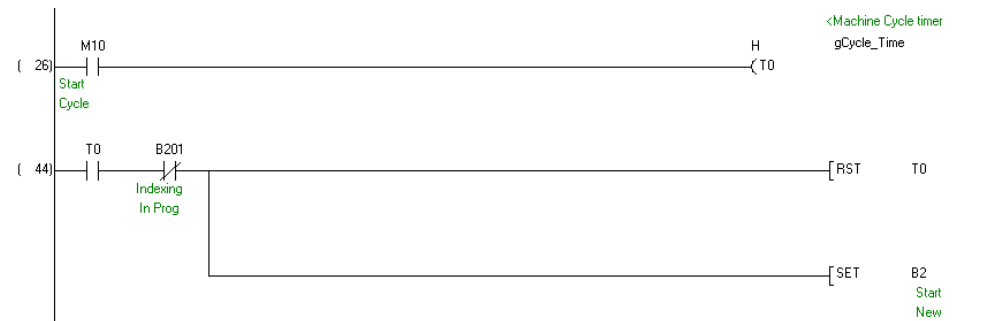
Vertical Form Fill & Seal Application

Synchronized index movements

A virtual servomotor commands both servo axes to move simultaneously downward. SSCNET III helps to prevent the film material from breaking.





The PLC code commands the index move to begin based on a machine cycle PLC timer



Vertical Form Fill & Seal Application

Mitsubishi Features, Advantages and Benefits

◇ Solution features, advantages and benefits

Features	Advantages/Benefits
<ul style="list-style-type: none"> • Combined motion controller + PLC <ul style="list-style-type: none"> ➢ High-speed processing times with direct memory sharing ➢ Built-in I/O and encoder input with mark registration capability 	<ul style="list-style-type: none"> • Reduced overall cost <ul style="list-style-type: none"> ➢ Reduced inventory cost (only one unit) • 25% improved machine throughput <ul style="list-style-type: none"> ➢ 0.44ms refresh time for servo network ➢ Industry leading memory sharing speeds
<ul style="list-style-type: none"> • VFD control from the HMI <ul style="list-style-type: none"> ➢ Direct access to all parameters <ul style="list-style-type: none"> ▪ Change speed on the fly ➢ Monitoring status screens 	<ul style="list-style-type: none"> • Reduced wiring costs and labor <ul style="list-style-type: none"> ➢ Direct control from one component • Less downtime <ul style="list-style-type: none"> ➢ Easy to remotely monitor and troubleshoot problems from an HMI
<ul style="list-style-type: none"> • SSCNET III fiber optic servo network <ul style="list-style-type: none"> ➢ Easy to set up and configure <ul style="list-style-type: none"> ▪ Automatic parameter transfer ➢ Noise immunity 	<ul style="list-style-type: none"> • 20% reduced wiring cost • Reduced setup time (plug & play) 
<ul style="list-style-type: none"> • Mechanical support language with virtual axes <ul style="list-style-type: none"> ➢ Easy to design complex motion profiles using motion development software, MT Works2. 	<ul style="list-style-type: none"> • 50% reduced programming time • Reduced labor cost • Reduced machine cost (less mechanical and electrical components) 

Vertical Form Fill & Seal Application

Application Materials

- Reference Guide
- Application Guide
- Example Movie
- Program Files
- Basic Customer Presentation

The screenshot displays the Mitsubishi Electric Automation website interface. The top navigation bar includes links for ABOUT US, PRODUCTS, TRAINING, SERVICE AND SUPPORT, DOWNLOADS, and SITE MAP. A sidebar on the left lists various product categories and services. The main content area features an 'Application Reference Guides' section with a video thumbnail and links to 'Roller Knife Application' and 'High-Speed Feeder Application'. Below this, a detailed 'Carton Filling' application reference is shown, including a diagram of the production line and a list of Mitsubishi components: iQ platform sequence controller (Q03UDE CPU), iQ platform Motion Controller (Q172D CPU), Servo Amplifier (MR-J3-B), Servomotor (HF-SP, HF-JP), and Graphic Operation Terminal (GOT1000). The diagram illustrates the process from heating to form, filling, and sealing, to a robot (RV-SQ) picking and placing the cartons onto a pallet. A control cabinet diagram shows the connection of various components like Q03UDE, Q172D, Q172DR, Q240, Q140, Q64TCTT, and MR-J3-B.

Application Reference
Carton Filling

Mitsubishi Solution
iQ platform sequence controller: Q03UDE CPU | iQ platform Motion Controller: Q172D CPU
Servo Amplifier: MR-J3-B | Servomotor: HF-SP, HF-JP | Graphic Operation Terminal: GOT1000

Overview
Carton filling applications in the packaging industry load cartons onto a conveyor to be filled with a viscous liquid and then sealed shut for distribution. A loading arm rotates each carton to be formed with heat before placement onto a conveyor. The conveyor then carries cartons toward a filler station while coordinating movement with two servos to perform the filling process. As an option, a robot is used to pick and place the cartons onto a pallet. Mitsubishi Electric provides a complete solution through combining PLC, HMI, motion, and robot programming products under one platform.

Example Applications

- Juice box filling
- Food/ medicine powder filling
- Liquid packaging

Vertical Form Fill & Seal Application

Questions

