



**Industry Notification - Packaging Industry** 

# Delta Shift Fork Free Packaging Machine Solution

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## Introduction

The shift fork free packaging machine is a kind of pillow bag packaging machine used in packaging and printing industry, which usually consists of 3 axes: feeding axis, film feeding axis and cutter axis. Comparing with standard pillow bag packaging machine using chain hook for conveying, the shift fork free packaging machine uses conveyor belt to transfer some soft and sticky products that cannot be conveyed by the push rod. It detects products with a sensor above the feeding axis, then delivers them to the cutter accurately for packaging.

### **Application**

The shift fork free packaging machine is widely used for packaging of products of different sizes, or soft and sticky products that cannot be conveyed by the chain hook, such as fruit, vegetable, infusion bags and zippers.

# **Principle**

Different from regular push chain packaging machine, the shift fork free packaging machine usually delivers film from below via belt feeding unit to ensure materials fall onto the packaging film exactly.

- 1. Spacing materials: the previous material falls onto the film and moves forward a fixed distance. During this period, the feeding axis keeps moving until the sensor detects the next material, while the film feeding axis stops after this fixed distance is reached, and continues to move once the next material is detected.
- 2. Calibration of cutter axis and film feeding axis: use 3 Compares and 3 interpolators to represent the 1<sup>st</sup>, 2nd and 3rd package respectively. The V\_OUT value of all 3 interpolators are added to the additional spindle pulse variable V94 of the cutter axis and film feeding axis. Interpolator ACC and DEC are adjusted with operating speed ratio. As the spindle variable is the sum of all 3 interpolators, it can accelerate or decelerate automatically for calibration, without any manual calculation required.





#### **Solution Architecture**



#### **Features and Advantages**

#### **Comprehensive and Convenient**

- Delta Integrated AC Servo Drive has builtin custom development platform with servo's E-Cam function for efficient packaging.
- Ideal for packaging of materials of different lengths, which is able to cut out the right product length based on material length. The data is displayed on HMI for ease of use.
- Utilizes the film feeding axis as the spindle, cutting by flying shear to ensure consistent speed of cutter and film feeding axis, avoiding film jam and film stretching.

#### **Powerful Control Architecture**

- Delta Integrated AC Servo Drive has built-in PLC programs, allowing efficient logic and motion control.
- Built-in E-Cam plans E-Cam profiles according to process requirements, offering convenient path planning and accurate positioning.
- Offers high speed DOs. The system triggers cam engagement via high speed DO output of Compare function for efficient flying shearing and accurate positioning, meeting the demands for high speed and high precision.

#### **Efficient and Stable Production**

- Offer a production accuracy up to ±0.5 mm, with a maximum speed of 150 bag/min for production lines with color marks, and 15 m/min for production lines without color marks.
- Device parameter settings via HMI for easy operation.

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