Introduction

Before launching into the market, well-wrapping is required for all kinds of products in various industries. Accordingly, the wrapping equipment is deservedly become the important machine tools for product manufacturing. In addition, speed, precision and stability of the wrapping equipment will affect the production efficiency directly. Therefore, full automatic control function are turned into the current market trend of the advanced wrapping machine tools.

The pillow-pack wrapping machine is a three-side pillow-shaped sealing and wrapping equipment which is able to automatically accomplish the process of bag making, filling, cutting and removing finished products. In actual applications, it can combine the other control devices and complete flow-wrapping of foods, daily chemicals and medicine industries. This kind of machine is mainly applied to the wrapping of rectangular or round candy. The motion curve of sealing knife of the traditional type pillow-pack wrapping machine is achieved by the cam of the mechanical system. However, the defects are complex mechanical process, complicated installation, high noise and low efficiency, etc. Due to the limit of the mechanism, the maximum speed is 600pcs/min only. As the competition between industries gets increasingly critical and the labor cost increases extremely as well, the requirements of high wrapping speed and auto wrapping machine becomes higher and higher. To satisfy these demanding requirements, the frequency response and wrapping speed of the whole system need to be enhanced and the speed of the conveyer and sealing and cutting should be synchronized to ensure the processing position is the same all the time. Besides, even because of small calculation and timing errors, it will result in the large waste of the materials. Therefore, the conveying distance and time interval of the wrapping should keep the same so as to assure that the products are positioning at the right place. In the meantime, the wrapping film should also be placed in the middle to let the product name and registration mark display clearly.

Function

The pillow-pack wrapping machine employs the film feeding axis to be the master axis of the system. The cutting axis and material feeding axis receives the signal of the master axis and move following the master axis. The films feeding and material feeding operations of pillow-pack wrapping machine are synchronized. The servo drive which controls the material feeding and horizontal cutting will capture the signal of film color mark directly and fix the position errors between registration marks to ensure both the positions of material feeding and cutting axes are correct. After the compound thin film is converted to the rolled sealing film by forming machine, the vertical heat sealing will be performed. At this time, the products will move toward the rolled sealing film and pass through the horizontal sealing and cutting position. When the products are wrapped by sealing film, the rotary knife will cut the film and complete the wrapping automatically.
Application Analysis

After testing, Delta Automation System Solution can totally meet the requirements of the customers.

(1) Wrapping precision is highly increased. The cutting precision can reach 0.5mm.

(2) When the system uses four cutters, 900 ~ 1000pcs/min is possible.

(3) Use electronic cam (E-CAM) instead of mechanical cam. The mechanical structure of material and cutting position is no more needed. The mechanical structure can be simplified. Easy for tuning and maintenance. Save cost and reduce the noise.

(4) The motion is achieved via PR mode of ASDA-A2 series. The external controller, i.e. PLC could be eliminated, greatly save the wiring and the cost.

(5) Multiple groups of electronic cam (E-CAM) curve for rotary knife and flying shear can be created easily. When production conditions (cutting length) is changed, all settings can be changed as well just via HMI. No need to use PC Software.
Delta Automation Solution:

ASD-A2-1521-B  1 unit, Film Feeding
ASD-A2-1521-B  1 unit, Feeding Axis
ASD-A2-2023-B  1 unit, Horizontal Sealing Axis
DVP-14SS       1 unit, External (Host) Controller

Conclusion:

Not only the built-in electronic cam (E-CAM) function, ASDA-A2 series AC servo system also features 32-bit high-speed DSP (Digital Signal Processor) technology, Capture and Compare function for high-speed pulses and high-speed motion control performance. Therefore, using ASDA-A2 series AC servo system is capable of meeting all the demanding requirements of the wrapping machine tools. In addition, the user-friendly and easy to operate ASDA-A2-Soft servo configuration software is also an efficient tool for the users to work out the system more smoothly and simple to operate so that the tuning and testing time could be save drastically.

The functions of flying shear electronic cam (E-CAM) function, high-speed and real-time capture synchronous correction, etc. are the most required functions of advanced and high-level wrapping machine tools in the field of wrapping and packaging industries. In the near future, the system which provides all of the above functions and is able to increase the double or thriple efficiency of production will be the main stream of motion control. The successful application of Delta’s ASDA-A2 series servo system in high-speed wrapping machine proves that Delta is ready to provide the complete industrial automation products and total solution for high-speed wrapping and packaging industries.