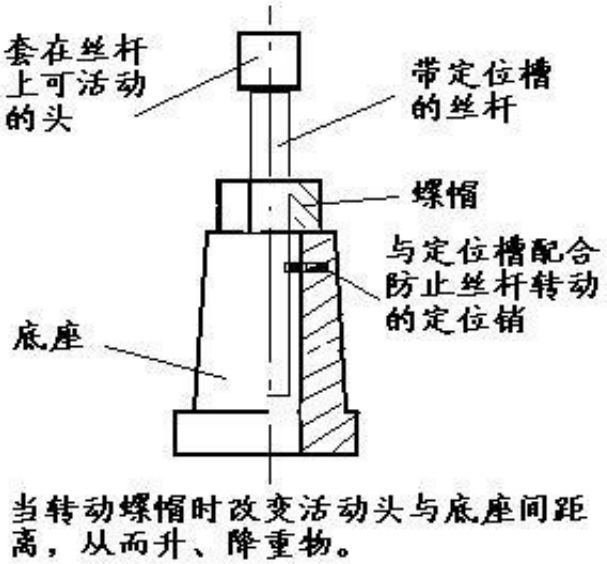
Design of automatic concentration control system in starch production line



With the development of food processing industry, the demand for potato in China's food processing industry is increasing. Compared with the developed countries in Western Europe, the processing technology of microwave sterilization machinery and equipment of potato starch in China started late, and the scale was relatively small, and all of them depended on workers'experience for production operation. In recent years, the large-scale starch processing production line imported from abroad has played an important role in promoting the development of domestic potato starch production technology and equipment, but its automatic control system is very expensive.

On the other hand, most of the existing control systems of potato starch production line in China are in the state of manual regulation, far from reaching the level of automatic control and regulation of the whole production line [1]. Therefore, the development of a control system suitable for domestic potato starch production line will play a great role in promoting the process of localization of this technology.

The main process of starch production line of Heilongjiang Jiusan Agricultural Reclamation Bureau is shown in Figure 1. The refined part of the production line is designed by Larsson Company of Sweden, and the key equipment is also imported from Larsson Company of Sweden. The production line has a high degree of automation and many control points

It needs the control system to automatically control the control points effectively. Potato starch production line has complex technology, diverse equipment and high process requirements, and the effective control of production line is relatively complex. So it is necessary to adopt the advanced process control mode to form a decentralized control system with multi-level hierarchical structure to effectively control and monitor the whole production process. The main equipment of the starch production line includes a screw conveyor with

frequency conversion for transporting processed potatoes to the production line. Three file mills can be exchanged at the same time.

The potatoes were crushed, and five groups of ten horizontal centrifuge screens were used to separate the fibers from the slurry. A station.

The calculation of starch concentration can be expressed as follows: Starch concentration (C%) = the total weight of dry starch / starch emulsion samples separated from starch emulsion samples is 100%.

Take the 500mL measuring cylinder, first add 300mL cool water, then add 40g starch. 340g, fully stirring, the measured volume is 328mL; 300 g starch is added to 300 mL pure cold water, fully stirring, the measured volume is 510mL, the weight is 600g, the calculated density is 1.176g/

Larsson, Sweden, controls starch concentration directly through a densitometer, a control valve and four on-off valves. This method regards starch concentration as 0-100%.

As shown in Fig. 3, a device for measuring the density of starch emulsion is made up of a differential pressure transmitter (density meter DT3614), a measuring cylinder, a standard cylinder and a density meter.