

Storopack

Intuitive void fill paper cushioning machine

Compact control, servo drives and touch panel as a compact solution save time and money

During transportation, goods must be packed securely. For practical reasons, many products are sent in conventional cardboard boxes. Since the size of the cardboard boxes is often standardized and not matching size with the contents, the trade relies on void fill material. This material tightly surrounds the goods inside the box, protecting them from knocks and is mostly made from renewable, recyclable paper and increasingly becoming the medium of choice. Automatically and rapidly scrunched up by machine, the paper is transformed into a voluminous packaging filler with good cushioning properties. To adapt the void fill paper cushioning machine to the respective customer needs, the paper dispenser is equipped with a compact control system, servo motors, and a clear touch panel for intuitive, icon-based operation.



Image 1 The new PPS GE paper dispenser makes paper pads to measure directly on site at the packaging station (Image: Storopack)

Time is money, weight increases transportation costs, and damaged goods cost money and impact customer satisfaction. These basic facts apply to all shipments, whatever the size of your business. To cater to the needs of smaller businesses with minimal available space looking to create their own void fill paper cushioning material for the secure and flexible packaging of smaller item consignments, Storopack, the specialist in protective packaging, developed a new, compact-size paper pad system. To help with the implementation, Storopack's developers called upon the assistance of Omron, the machine automation experts, resulting in a flexible, easy-to-use system that is ready for use on site in no time.

Mobile and powerful

Paper has long been an important packaging material. In cardboard box form, for example, it remains the transport packaging of choice for smaller consignments. Paper is also an excellent material for protecting the products inside the box. In the past, scrunched up pieces of newspaper or strips of paper would be used. Today, however, greater demands are placed upon the material and storage space also plays a major role. What is required is a solution that offers large volumes of void fill material, takes up little storage space, and is suitable for mobile use on site. Apparently the solution is quite simple: take a paper web that is coiled on a space-saving roller, unwind it, and scrunch it up to form a voluminous strand of packaging filler. This is the operating principle of the void fill paper cushioning machine. However, what at first glance looks simple actually requires sophisticated engineering performance. The new Storopack PPS GE paper dispenser is perfectly matched to the paper web properties. Despite the high unwinding speed, the paper web must not rip, so it must be guided safely. To this end, a precisely controllable, relatively comprehensive

drive system is necessary, but one that takes up little space. The machine, including the chassis, is a maximum of 1.83 m high, 1.1 m deep, and 0.76 m wide (image 1). Its height can be adjusted automatically, permitting ergonomic access to the ejected strand of paper cushioning. Paper rolls of up to 600 mm wide allow the paper dispenser to dispense strands at a speed of up to 40 m/min depending on the quality of the paper engaged and the individual setting. This means that the user, e.g. for 60 x 40 x 40 cm boxes and 6 m of packaging filler, can fill up to three cardboard boxes per minute. With smaller boxes, e.g. 40 x 30 x 30 cm, as many as six packages per minute can be filled. The choice of paper ranges from strong kraft paper to recycled paper, different thicknesses ensure that the springiness of the packaging filler is adapted to the weight of the goods. To ensure optimal coordination with the respective packaging line, the new packaging dispenser can easily be set using a clearly arranged touch panel.

Interaction important

The paper web must be withdrawn evenly from the feeder roller housed in the chassis. To do this, the web is fixed and guided via spring-loaded rollers. After the web has been fed in, the rollers complete an initial forming of the paper web (image 3). The web, in its slightly preformed state, is then folded and compressed further as it passes through the machine. Cross folding is then added at regular intervals to ensure optimal stability of the finished paper strand. This requires all drives, rollers and the cutting edges to work together at the correct speed and in a coordinated manner. Only in this way can a voluminous paper pad — one that offers effective cushioning over the long term — be created from a thin sheet of paper. As the paper passes through the machine, a certain amount of paper dust will naturally arise and all moving parts must be resistant to this in order to guarantee long, maintenance-free service.

All of the components used in the system are Omron components, which help to ensure that everything works together perfectly. Through the use of the latest servo technology, consisting of a drive mechanism, control system and input interface (optimal control quality is ensured). However, the service provided by the Omron automation experts went above and beyond providing the individual technology components, they also selected the components, designed the drive, and programmed the system in advance as part of their full service package. The compact machine controller is programmed via ST (structured text), which saves time when programming and enables even complex functions and calculations to be generated quickly. This “one-stop” solution allows faster development and ensures the correct interaction of all components in the device. In this case, the CP1L compact machine controller (Image 4) was used as the control system. It allows the connection of a wide range of sensors and drive systems and, if required, can also communicate via an Ethernet interface. This enables communication with PCs and other devices, as well as simple remote access to the internal network, including WLAN or the Internet (via VPN). Four fast counter inputs, two pulse outputs as well as a large number of predefined function blocks for different positioning tasks facilitate the work of the system manufacturer. The modular concept allows option cards such as digital and analog I/O, temperature inputs or serial interfaces to be fitted.

Compact G-series servo drives (Image 2) convert the control commands of the compact control system into mechanical movement. These high-performance servo drives are extremely energy efficient, which saves on electricity costs, and also to offer dynamic, precision operation. In the case of the PPS GE machine,



Image 2 Compact servo drives ensure safe guidance of the paper web. (Image: Omron)



Image 3 Like clockwork; complex workings create the perfect paper cushioning (Image: Storopack)



this means less waste thanks to a very accurate feed system. By saving on electricity and material, compact machines also save considerable resources over their lifetime, helping to keep operating costs down.

Responding to the strong customer demand for a beautiful operating screen, the automation experts at Omron opted for a modern clear touch panel for the HMI (image 5). The solution, which is often used in much larger and more expensive machines, greatly simplifies configuration activities. Intuitive operation via easy-to-understand graphical elements makes it easier to use on site, even for unskilled workers. For example, the operator is able to enter the desired parameters for the device controller quickly and reliably on site. The clear and bright back-lit display of the NB series displays the individual data and input fields reliably, so that they are easy to read even in a for operating screens challenging lighting conditions.

Even with small, compact machines like the PPS GE paper dispenser, time and cost savings are possible by selecting the most appropriate components and services at the development stage. Perfectly coordinated components and external, expertly performed programming allow the OEM to concentrate on their core competency, allowing them to achieve their objectives more quickly and reduce time to market. This saves costs and improves market opportunities.



Image 5 Intuitive touch panel for straightforward data input and parameter display (Image: Omron)

About Storopack

Storopack is a specialist in the field of protective packaging. Its product portfolio encompasses both customized and flexible packaging systems and their integration into customer packaging processes. The services provided by the internationally active company group based in Metzingen (Germany) are performed by the two divisions Molding and Packaging.

The Packaging division offers flexible protective packaging including air cushions, paper pads, PU foam-in-place packaging systems, and loose fill packaging materials.

It supplies demand-driven equipment solutions covering everything from single workstations through to the design and implementation of packaging lines integrated into a company's intralogistics and equipped with manual, semi-and fully automated infeed packaging systems. Specialized application engineers of Storopack ensure that the entire work flow takes place in keeping with economic and ergonomic principles (working comfort) in order to constantly improve the customers' protective packaging process. The Packaging Division is represented by locations in North America, Europe and Asia. The products are available through dealers in over 40 countries.

About Omron

Omron Industrial Automation is a leading manufacturer of high-tech products and solutions for industrial automation. The company is part of the Omron Corporation founded in 1933 in Kyoto, Japan, and employs more than 35,000 people worldwide. The wide product range includes control, drive and safety technology, image processing and sensor systems, as well as control and switching components. The aim is to provide mechanical engineers with demand-driven, integrated automation solutions from a single source. In addition, Omron offers its customers comprehensive application know-how, as well as region-wide on-site service. In Europe alone, Omron has 19 sales offices and operates its own production sites.