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Smart medical products - safely produced

Harro Höfliger is highly specialised when it comes to web processing, and the development and launch of the company's new PMK series has been particularly significant. One of the most striking features of the new machines are the large transparent safety doors. To monitor the position of the doors, Harro Höfliger uses electromagnetic safety interlocks with integrated AS-I Safety interface from Schmersal, as on its existing MKC series cartoning machines.



Harro Höfliger is a renowned specialist when it comes to demanding process solutions and conceives ideas and products for the medical and pharmaceutical industries. With its established web converting business area, which involves the processing of web materials, the company is something of a trailblazer in the value chain, and through its PMK series, Höfliger provides manufacturers of pharmaceutical, medical and diagnostics products with a platform for web processing. These products include classic plasters as well as diagnostics test strips, transdermal therapeutic systems (TTS/TDS), asthma/pain patches and oral dissolvable films. These machines are also used for the production of an increasing number of 'smart' medical products.

Modular plant concept for web processing

Harro Höfliger employs around 1200 employees and takes the term 'platform' for

its plant series very seriously. Each individual plant that leaves the site in Allmersbach im Tal, near Stuttgart, is carefully tailored to the individual requirements of the user. If required, individual machines can be connected to create complete lines, allowing web processing machines (PMK series) to be linked with downstream cartoning machines (MKC series).

Handle, punch, seal, test

Web processing plants undertake numerous operations, including joining individual components (e.g. pain patches), connecting layers and, where necessary, adding active ingredients. Depending on the material property, various technologies, such as plate, roller and impulse sealing, ultrasonic welding and thermal sealing, can be employed. The joined layers are separated by punching or cutting to create the finished product. Visual test systems are used throughout the process



The MZM 100-AS safety interlocks from Schmersal are equipped with integrated ASi SaW interface

at relevant points and additional control stations to verify properties such as tightness and function can also be integrated. Product labelling and marking stations can also be supplied.

All processes take place at high speed and a PMK plant operating at a typical production rate can usually produce between 200 and 400 products per web and per minute. As many as 8 webs can be integrated.

The 'transparent machine'

All machining processes in the PMK series can be observed through fully transparent safety doors along the side of the machine module. Operators have a clear view of the plant's work areas, and in the event of maintenance or troubleshooting, all areas are easily accessible. In such cases, the safety doors cannot be easily opened, and for obvious reasons — interruptions to production should always be avoided. As such, Harro Höfliger does not use safety switches for safety door position monitoring — which for reasons of machine safety would be entirely adequate — but instead uses safety interlocks. These keep the folding doors locked until the machine has reached a defined stationary position and a subsequent restart can be executed without difficulty. In selecting the safety interlock, the designers at Harro Höfliger considered two key requirements, amongst others. The first of these was that all safety switchgear needed to allow greater tolerances between the switchgear and the actuator to ensure comfortable closure of the folding door by the operator. The second was that the interlocks needed to be easy to integrate into the safety circuit and needed to be connectable at signal level.

Electronic safety interlock

The first aspect was what led them to opt for the Schmersal MZM 100 electronic safety interlock. The locking force of this device is generated by an electromagnetic rather than

a mechanical locking system. This leads to a more hygienic design, which is an essential factor in all of the PMK's application areas. It also offers the advantage of insensitivity to safety door offset. The configurable electromagnetic latching force ensures that the safety doors can always be opened easily, regardless of their size.

Safety-oriented bus system

The second requirement — simple, flexible safety circuit device actuation — was satisfied by the Harro Höfliger designers with the 'AS Interface' standard (AS-I), which has now been implemented successfully in packaging technology worldwide. AS-I was developed specifically for sensor/actuator communication. Up to 62 subscribers are connected via the characteristically yellow ribbon cable, which ensures power supply at the same time, and is supplied from the master unit, if required.

This reduces the wiring effort and commissioning time while at the same time increasing flexibility thanks to the system's ease of expansion or modification via easy master configuration. The safety-oriented 'AS Interface Safety at Work' (AS-I Safety) protocol that is used in the PMK series is also a part of the AS-I standard. The flat ribbon cable is therefore also used for integrating the safety-oriented components into the safety circuit, with an AS-I Safety Monitor or AS-I master/monitor configuration responsible for activating and evaluating the signal. This simplifies installation. The space requirements in the control cabinet for the master/monitor combination are low and the Asimon software supports the programmer during configuration through easy 'drag and drop' software parametrisation of the desired functionalities. This function also allows additional safety circuit devices to be easily integrated into the existing system in the event of subsequent change requests or conversions. An important additional advantage of safety-oriented communication via AS-I Safety is improved information for operating and service

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The AS-I master/monitor combination allows for easy 'drag and drop' configuration of the safety functions

personnel during diagnostics.

For example: If there is a safety-oriented stoppage, the master will emit a message that states which slave triggered the safety function. This message will be displayed on the control panel of the PMK so that the user can quickly identify the cause. 'Schmersal has an extraordinarily comprehensive range of safety components with integrated AS-I interfaces. All of our important series are available with AS-I Safety nodes,' explains Siegfried Rüttger, Sector Manager for food, packaging and pharmaceuticals at the Schmersal Group. 'An additional advantage of an AS-I solution is the high level of manipulation protection that it offers.'

Tried-and-tested safety solutions

Both the electromagnetic safety interlocks and the ASI SaW protocol have proven their capabilities in the MKC series cartoning machines first presented by Harro Höflinger in 2015 and deployable as downstream units to PMK plants. This creates a unified design and machine safety concept which leads to both a high-quality design and improved plant operation as well as a high safety standard without unnecessary productivity limitations.