Technical article, published in:
ME, trade magazine for mechatronic & engineering, issue 6/2022,
TeDo Verlag

CLEAN BUSINESS
NEW RANGE OF CONTROL UNITS FOR FOOD-PROCESSING MACHINES

A new series of command and signalling devices from Schmersal has been designed to ensure maximum hygiene. The extensive range of command devices can be flexibly adapted to the requirements of machine engineering, such as with pluggable contact carriers.

Human-machine interfaces in the food-processing industry must meet particular requirements. Keywords include hygienic design, avoidance of cross-contamination, dead space-free design.

Characteristic features of the range of command and signalling devices, including the emergency-stop button, for these applications are gap-free transitions between sealing elements and surfaces and an absence of protruding parts. These features help to actively support cleaning of the command devices, as points at which dirt and contaminants can adhere are reduced to a minimum. At the same time, the exposed sealing elements must be designed to be much more robust so that they can withstand daily cleaning with a high-pressure water jet and with aggressive media, as well as disinfection. This means that a high degree of protection, IP69, and high resistance to media are required of all materials.

The degree of protection isn't everything

At this point we need to counter a common yet incorrect assumption – that the degree of protection is the be all and end all. It isn't. An operating system can have a sufficient degree of protection and yet still be unsuitable for use on food-processing machines because it is a challenge to clean, and the requisite 'hygienic design' requirements are not satisfied.

These requirements are also set out in DIN EN ISO14159 (Safety of machinery – Hygiene requirements for the design of machinery). It must be ensured, for example, that there are no dead spaces in which material residues can settle or biofilms can form. The surfaces and geometries must be designed in such a way that they can be cleaned with ease. It is also important that moisture is unable to accumulate in the enclosures, e.g. those of switches and control panels.

Fig. 1: Versatile and hygienic – the new H range with command and signalling devices.

Tried and tested and now improved

It is under these unique conditions in food-processing machine engineering that Schmersal's N range of devices has proven itself. The N range has been specially developed for hygiene-sensitive applications and comprises a wide selection of command and signalling devices, plus a divergent range of accessories, including emergency-stop pushbuttons, mushroom pushbuttons and other pushbuttons. With its wide range of different hygienic switchgear devices, the range is unique to the market. There are two reasons why this range is now being replaced by the H range: in the first instance, there are new standards for food-processing machines in the Machinery Directive, which also have implications for the design of command devices, including emergency-stop pushbuttons. Secondly, there was a desire to further simplify assembly of the devices.

A new standard for the HMI of food-processing machines

To start with, the new edition of the standard. DIN EN 1672-2 outlines the hygiene and cleanability requirements for food-processing machines. It is based on the globally uniform and familiar EHEDG guidelines o the European Hygienic Engineering and Design Group.

The standard goes into considerable detail. For example: for the front ring, which forms the transition from the operating device to the front panel of the enclosure, there is a specified minimum angle, which is dependent on the distance between the operating devices. This helps to ensures that personnel can thoroughly clean the gaps on the front panel with a cloth and can inspect the devices for damage from all sides.

New development: compliant with standards and more

In accordance with the requirements of this new standard, Schmersal has developed a completely new range of control elements for hygiene-sensitive applications, taking into consideration another new regulation (Regulation 10/2011/EU), which formulates requirements forthe selection of materials for this particular application.

The new H series contains various types of switchgear: pushbuttons, indicator lights, selector switches, potentiometer drives and emergency-stop devices with the characteristic red mushroom-shaped control element as an impact button.

A comparative glance at the command devices in the N and H ranges highlights the further development that these devices have undergone. The connection of the emergency-stop pushbutton to the front panel has been redesigned. The seal in the industry-standard blue colouring is no longer concealed by the front ring, but clearly visible. This ensures that the user can check for damage at a glance – another benefit in terms of hygiene. The angle of the stainless steel front ring is consistent with the new version of the standard. The yellow front ring on the emergency-stop device avoids the need for not only the yellow plate, but also a dirt-collecting edge, which the yellow plate would cause. On all switches, the designers have paid particular attention to soft transitions without dead spaces and without burrs or edges.

Fig. 3: The new H range contains various types of switchgear, including the emergency-stop button. Most striking is the blue O-ring as a sealing-connecting element, for a higher degree of hygiene.

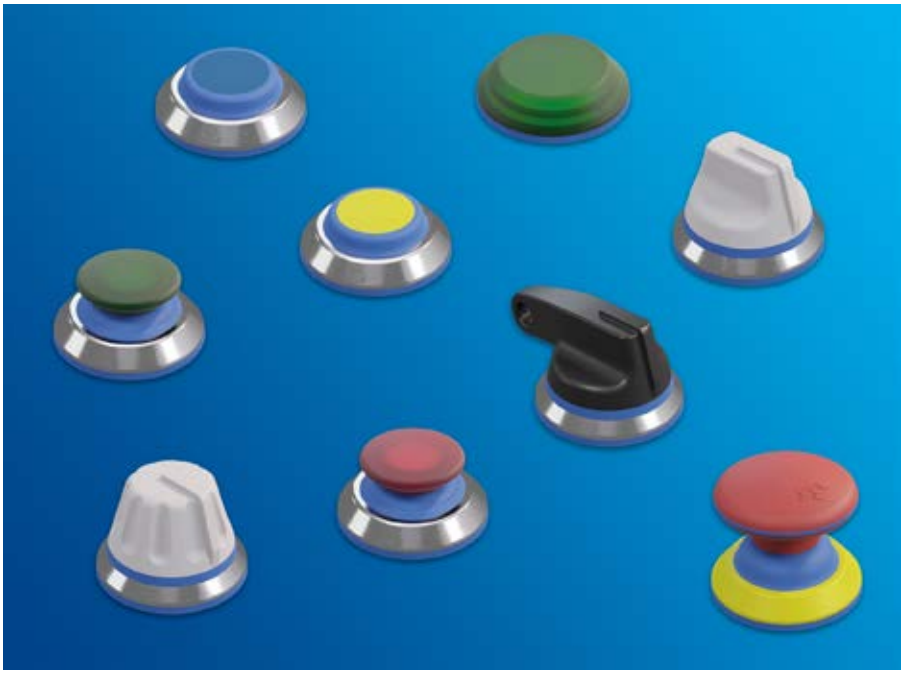

Fig. 2: The new H series contains various types of switchgear: pushbuttons, indicator lights, selector switches, toggle switches and emergency-stop command devices.

Emergency stop under hygienic conditions

The most striking feature is the blue sealing element between the hull and the top of the impact button, which cannot be produced as a single, injection-moulded component but comprises two parts. For the N range, these two parts have been ultrasonically welded. Welding does, however, create open-pored structures at the weld edge – these may be small, but are nevertheless undesirable. To resolve this, the top is now latched, with an O-ring to seal the connection, which helps to ensure a higher degree of hygiene.

Modular structure

Aside from the requirements of the standards and 'hygienic design' as a design principle, the new H range is entirely modular. All devices – including the master switches – have central nut attachment of the device heads and a snap-on contact carrier. The contact elements are designed as individual contacts and can be variably combined on the snap-on contact carrier, including in piggyback mode. In the first instance, this concept enables very straightforward and rapid installation; secondly, a high degree of flexibility; thirdly, it creates the prerequisite for pre-wiring.

Fig. 4: The H range includes devices such as illuminated pushbuttons and small impact buttons (illuminated and non-illuminated).

The stainless steel front ring is also not a part of the standardisation. It does, however, enable use of command devices in areas where the hygiene requirements go beyond those of the meat-processing industry – such as in the dairy industry, where machines are even more thoroughly cleaned with much more aggressive media.

There are a total of 147 different designs of switch available in the H range, including 26 mushroom pushbuttons, 24 selector switches with two or three positions and four potentiometer-rotary switches. The designer of a food-processing machine can freely decide which type of control element from the H range he wishes to use for the design of the HMI. In addition, and also new, the designer can order these command and signalling devices with individual laser marking, e.g. as an OEM version with logo.

Integration into machines or surface-mounted enclosures

The new hygienic command devices are not only for use in food processing and packaging, but also for other hygiene-sensitive areas, such as the pharmaceuticals industry.

If they cannot or should not be integrated directly into the front panel of the machine or control panel, there is also a range of surface-mounted enclosures in the form of the NBG series, which has been developed specially for food-processing machines.

Fig. 6: The snap-on contact carrier allows for straightforward removal with a screwdriver thanks to the easily locatable release tab.

Fig. 5: The new H range has a modular design: The contact carriers are designed as individual contacts and can be combined variably.

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