



Hygienic conform control units and indicator lights

Type series N



A SCHMERSAL company

Hygienic conform control units and indicator lights

Background¹

Irrespective of a number of standards, legal and other regulations, finally “hygiene” became a subject of the EC Machine Directive in 1995 and thus of relevance to machine safety. This is something that affects food machinery in particular.

The integration of this subject in the “Basic safety and health requirements in the design and building of machines and safety components”² leads us to the conclusion that the rules on hygiene serve two purposes:

1. They are intended to protect employees from infection and disease (employee health protection).
2. They are also intended to prevent the product becoming contaminated by the machine (consumer protection)

¹ Partially extracted from: Special imprint of the Berufsgenossenschaft for Food and Restaurants, Test and Certification Centre in Mannheim from Handbuch Maschinentestsicherheit, Issue 01/96, Chapter 5.30, Wickert: Hygienegerechte Konstruktion von Nahrungsmittelmachines

² Cf. EC Machine Directive, Annex 1, No. 2.1.: Basic Safety and Health Requirements for Specific Machine Equipment – Food Machines

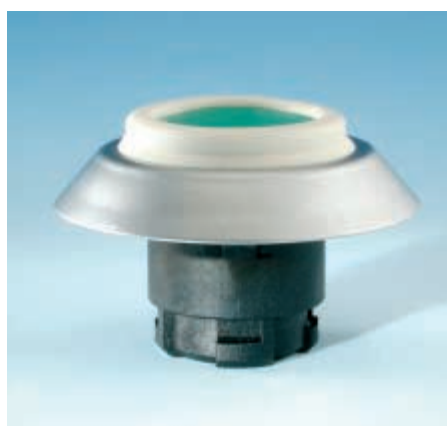
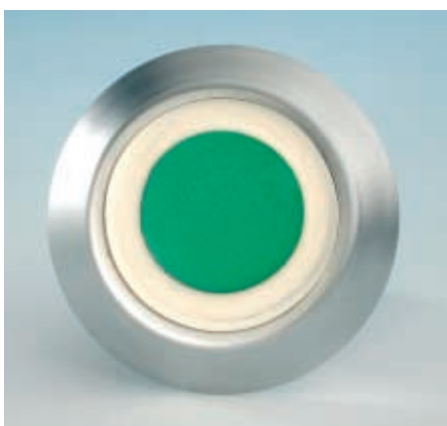
Basic requirements placed on a hygienic design

Two aspects need to be taken into consideration for the hygiene requirements placed on machines (and also on other technical equipment). Firstly, the suitability of materials and secondly a hygienic design, the principles of which can be summarised as follows:

- Surfaces and their transitions must be sufficiently smooth.
- Connections must be designed in such a way that protruding parts, strips and concealed corners are kept to a minimum.
- Connections of inner-surfaces must be realized by curvatures with sufficient diameter.
- Operating materials (e.g. lubricants) may not come into contact with food insofar as these materials are not compatible with food.
- Liquids (food and cleaning agents) must be able to flow off the machines at least in cleaning position.

- Any surfaces coming into contact with food must be easy to clean.
- Areas not accessible for cleaning must be sealed against ingress of organic substances.

¹ Toils quotes from: Special imprint of the Berufsgenossenschaft Nahrungsmittel und Gaststätten, Prüf- und Zertifizierungsstelle Mannheim, aus Handbuch Maschinentestsicherheit, Ausgabe 01/96, Kapitel 5.30, Wickert: Hygienegerechte Konstruktion von Nahrungsmittelmachines



Hygienic command and indicator devices – type series N

If these fundamental principles are now applied to the hygienic design of components used in food machines it becomes evident that commercially available command and indicator devices do not satisfy these requirements – at least not entirely or not without additional measures. Facing this background this new range of Hygienic conform control units and indicator lights for bore holes of 22.3 mm diameter (type series N) was developed under extensive consideration of the design principles described above.

Boreholes of 30.5 mm can also be accommodated by the type series N using an adapter ring.

The program consists of the following:

- Pushbuttons
- Illuminated pushbuttons with LEDs
- Maintained or spring-return selector switches with 2 and 3 positions and short and long knobs
- Mushroom buttons
- High and flat pilot lights with LEDs
- Emergency-stop devices
- Blanking plugs
- Lockable cover for selector switches
- Adapters D-30/D-22 mm

The contact and light element system used is the well tried and tested EF/EL system using screw terminals, flat-pin plugs, cage clamp terminals or printed circuit board connections (for details refer to catalogue D-22.G).



Special design features

The advantageous features are described below:

- Special sealing to extensively prevent the ingress of dirt and bacteria in the gaps between fixed and moving device parts.
- Specially shaped devices which are easy to clean and which avoid corners and edges or which create smooth surfaces so that dirt and bacteria cannot accumulate.
- Plus a special selection of materials and colour design.



Special design features in detail

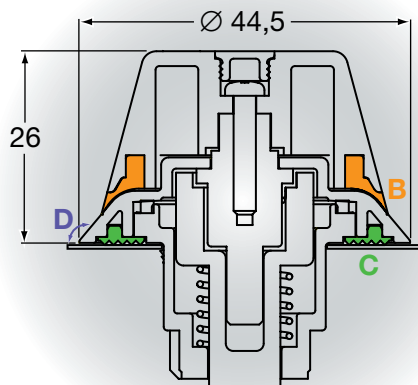
The special sealing measures (1), the specially shaped devices (2) and the material selection (3) are facilitated by the following construction features.

(1): Device sealing

The protection from ingress of dirt and bacteria in the gaps between fixed and moving device parts is provided by special seals.

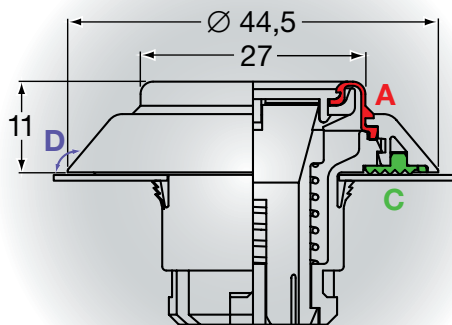
A: In the case of pushbuttons, mushroom buttons and emergency-stop devices, i.e. axially operated actuators, this seal is permanently attached by means of recesses on the bezel and on the actuators, outwardly sealing the gap.

B: In the case of rotatable actuators, e.g. maintained or spring-return selector switches, the device sealing is designed in such a way that it is only attached on one side to the actuators but extends over the bezel, i.e. an unhygienic gap is not produced when the actuator is turned. Another seal in the inside of the device also protects against the ingress of pressurized water.



C: The front plate is also sealed on all devices.

The degree of protection of all devices is IP 67 to EN 60529.



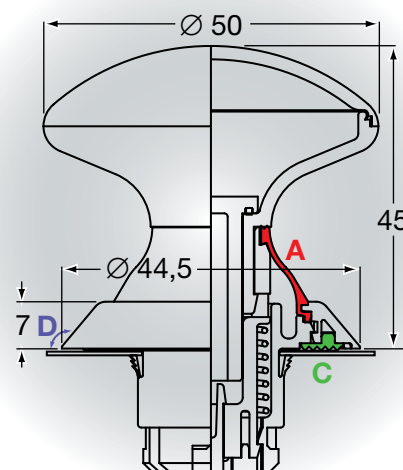
(2): Device shape

Special thought has been given to making the devices easier to clean as follows³:

- Bezel design
- Design of the outer surfaces of the device seals
- Design or shape of the actuators.

³ See "Special remarks" with respect to resistance to high pressure cleaning.

D: The bezel is designed in such a way that the front plate and the outside surface of the bezel are positioned at an angle of approx. 135° to each other, thus producing a surface without "sharp" edges and corners. Owing to the fact that the bezel with front plate sealing lies flush on the front plate there is little room only for dirt and bacteria to accumulate (another advantage).



Illuminated devices

Illuminated pushbuttons and indicator lights in the N range have been designed under consideration of the features specified above as applicable in the same way as the other devices. "Super-bright" LEDs with virtually unlimited life time are used instead of traditional bulbs in order to avoid the need to replace bulbs not least for reasons of device hygiene. Should an LED be defective the device head is to be replaced.

Lockable covers for maintained or spring-return selector switches

Since key-operated maintained or spring-return selector switches cannot be included in the N range for reasons of hygiene, a lockable frame to cover the devices has been created, i.e. a type of cover which can be locked in the desired position by means of one or two padlocks. The

frame is designed in such a way that the requirements placed on a hygienic design are satisfied. Any padlocks used are to be viewed separately.

The outer surfaces of the device seals pass over flush (in the case of pushbuttons and illuminated buttons) and constantly (in the case of other device types) from the bezel to the free outer surface of the actuator, i.e. a smooth transition is ensured here too. The same applies to maintained or spring-return selector switches. The only difference being that the seal is attached in the actuator and extends over the bezel in a bell-shaped manner.

Also from the point of view of being able to clean the devices easily, the actuators of all devices with knob or mushroom shape have radii of curvature of > 3.2 mm at all corners and edges.

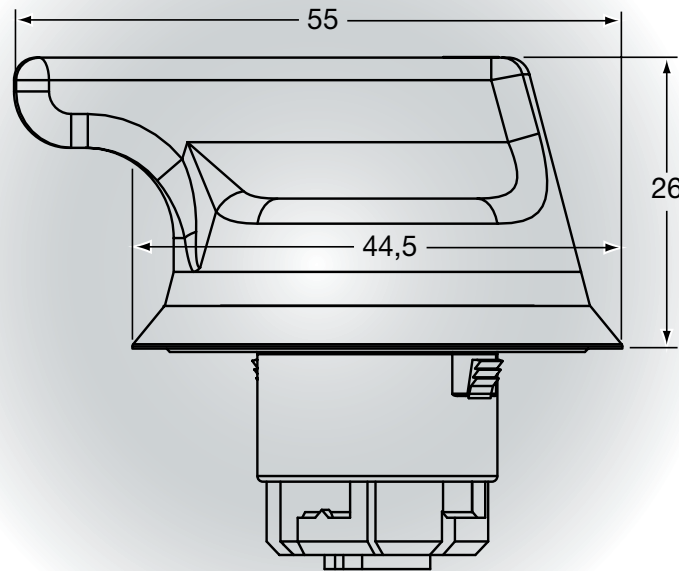
Furthermore, a distance is always kept to the fixing surfaces which is larger than one finger-width in order to make it easy to clean by hand.

(3): Material selection

All external parts of the command devices and indicator lights of this range are made of thermoplastics. These materials are approved to European directive standard for the use

in the food and beverage areas. The materials are commercially available ones such as PA, PC, POM, TPE and ABS.

The bezels are galvanically chrome-plated (ABS) so that their surface is smooth and easy to clean. The other parts are highly close-pored and thus also make the devices easy to clean.



Notice related to the device shown left:

Maintained or spring-return selector switches with extended knob length need mounting grids of 50 x 60 mm. Length of maintained or spring-return selector switches with standard knob length: 46 mm.

Blind plugs

Unused bore holes in an operating or control panel can be sealed using this accessory. Here too, the requirements of hygienic design are satisfied.

Adapter ring

An adapter ring is currently being prepared for the N range which permits the new devices also to be installed in bore holes of 30.5 mm diameter.

BG prototype testing in preparation

The basis for the N range is in correlation to the special requirements of standards EN 1672-1 and EN 1672-2 with the safety and hygiene requirements for food machines in general as well as EN 13570 (ditto for mixing machines) and EN 12268 (ditto for endless saw machines).

A BG prototype test with respect to the satisfaction of these design requirements is in preparation.

Special remarks

- Organizational actions must be provided to ensure that devices whose seals are damaged or have been destroyed must be replaced immediately.
- With respect to resistance to high pressure cleaners: the devices have been designed to the best knowledge and belief within the framework of that which is technically possible. In view of the different conditions of use which come into consideration here the design feature of resistance to high pressure cleaners is not an assured characteristic.

Your contact persons for the new product range of Hygienic conform control units and indicator lights are as follows:

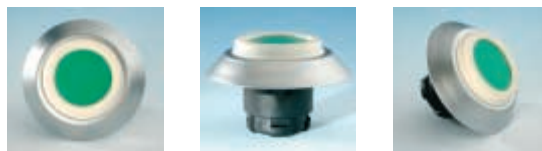
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Range at a glance

Pushbuttons:

Center areas available in 6 colours, optionally printed with symbols (in the case of safety-relevant ON commands only to be operated in connection with the switching element EF 304 or EF 304 F).



Illuminated pushbuttons:

Center areas available in 5 colours, optionally printed with symbols (in the case of safety-relevant ON commands only to be operated in connection with the switching element EF 304 or EF 304 F).



Pilot lights (available in 5 colours):

With flat lens cover, optionally printed with symbols



Pilot lights (available in 5 colours):

With high lens cover, good side view, not possible to print with symbols



Maintained or spring-return selector switches:

Version with short knob, optionally with 1 or 2-plungers, colours: grey (similar to RAL 7016) or beige (similar to RAL 9001)



Maintained or spring-return selector switches:

Ditto with long knob



Mushroom buttons:

Version without latching, mushroom available in 5 colours, printed with symbol upon request



Emergency STOP devices:

EN 418 in connection with the latching element EFR (refer to catalogue D-22.G), actuator red, release by pulling the device head, yellow washer as accessory: refer to catalogue D-22.G



Blind plugs:

Chromed version



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