

steute at the Powtech:

## Machine safety and Ex protection

**Machines which are constructed for mechanical process engineering applications in explosive zones have to meet not one, but two demanding sets of rules and standards. They are – for good reason – subject to both machine safety requirements and explosion protection requirements. At the Powtech, steute will be showing switching devices for this special combination of demands – and presenting a new product.**

**A**dmittedly: this is a niche market, and could even be called a "niche within a niche". But without high-performance, reliable switching devices compatible with the required standards, many safety-related tasks within the complex field of powder, pellet and bulk goods technology would be unrealisable.

Since these substances are often dust-explosive, necessary precautions and safety measures must be adhered to. This initially impacts the machine design: it has to guarantee that no, or almost no product residue can enter the environment.

### **Task: to safeguard hazardous machine zones**

Many processes such as milling, sieving, mixing and pelletising take place behind closed or even locked protective covers. They

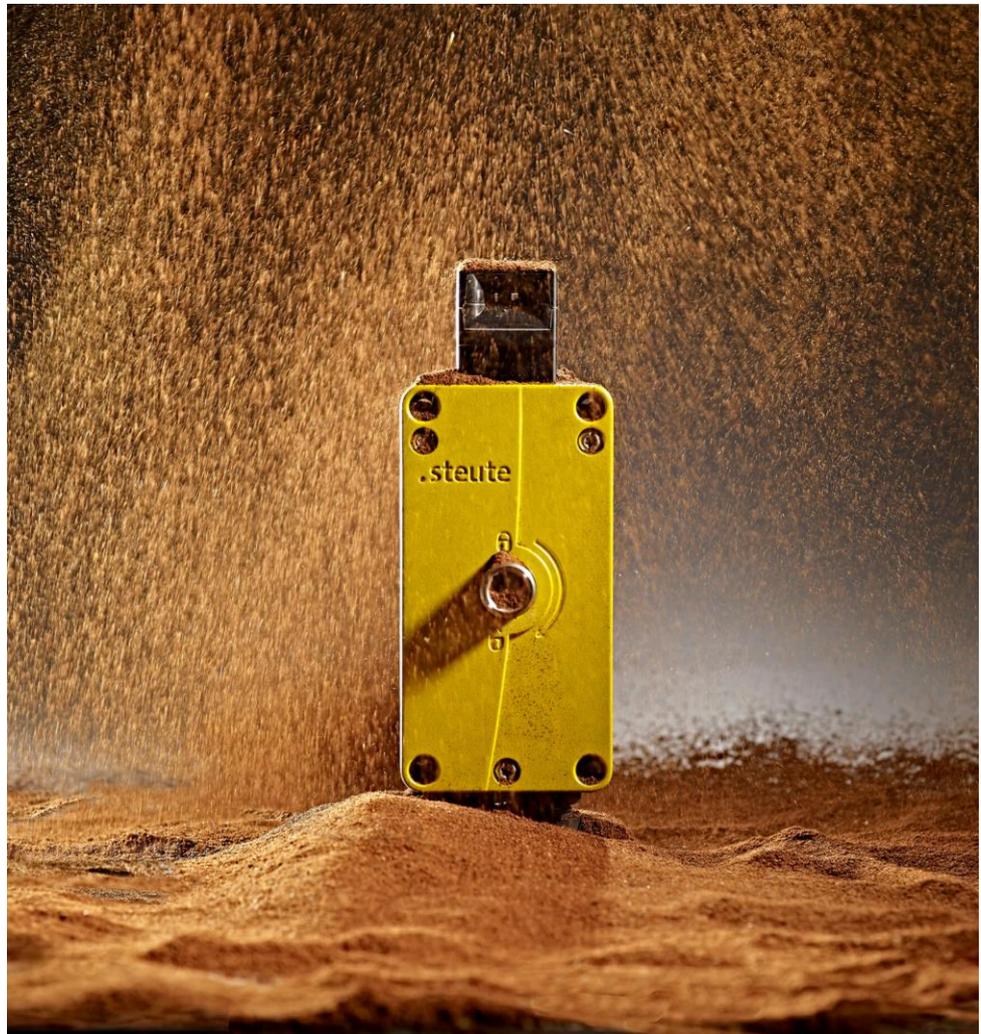


Fig. 1: New and extremely robust: the Ex STM 515 Ex safety solenoid interlock.

separate operators from hazardous moving machine parts, and also keep materials within the workspace.

For designers, this means finding a way to safeguard a danger point within a dust-explosive zone in line with machine safety requirements. This could be using an electromechanical safety switch, a non-contact safety sensor or a solenoid interlock.

### **Solenoid interlocks – for occupational and process safety**

A solenoid interlock is especially useful (and necessary) if a machine continues to move after it has been switched off and is potentially still dangerous. In such case, it is impossible to guarantee the required safety level with conventional position monitoring of guard doors, i.e. a safety switch or sensor which immediately triggers an emergency stop if an operator opens the door while the machine is switched on.

Occupational safety is not the only reason for favouring a solenoid interlock: another scenario could be when opening the guard door would interrupt an important process. Here the process itself requires protection, guaranteeing the highest degree of productivity. The guard door can only be opened once the machine has been shut down in a controlled manner – for example to eliminate the cause of a disturbance. This is particularly beneficial for linked machinery.

In food production plants, hygiene can be an additional important reason why a guard door should not be opened and a process interrupted: to avoid the possibility of contamination.

### **New Ex safety solenoid interlock series**

There is thus a need for solenoid interlocks which are compatible with dust-Ex zones, and it therefore makes sense for a medium-sized manufacturer of both Ex switchgear and safety switchgear to meet this need in the long term



Fig. 3: Impact and shock-resistant, perfectly sealed and suitable for temperatures down to  $-60^{\circ}\text{C}$ : the Ex 99 series of Ex position switches with safety function.

– with a new product series. The steute business division Controltec has developed precisely such a series, presented for the first time at the Powtech: the new Ex STM 515 series with both ATEX and IECEx approvals (Fig. 1).

The new Ex solenoid interlocks have a robust die-cast aluminium enclosure which meets the requirement of a long lifetime, even in conjunction with hard mechanical wear and tear and a locking force of 4000 N. The multiple coating of the enclosure (passivation, primer, powder coating) guarantees a high degree of corrosion protection. Highly effective sealing achieves IP 66 protection class. The electrical connections are well protected within a terminal compartment. All prerequisites for long-term use in challenging environments are thus fulfilled – to ATEX/ IECEx standards for explosive zones 1 and 2 (gas Ex), as well as 21 and 22 (dust Ex).

### **Robust, compact and with diverse options**

Other very practical features of the Ex STM 515 series include an actuator head which can be moved by  $4 \times 90^{\circ}$ . In conjunction with the



Fig. 2: Tried and tested, compact: the Ex STM 295 Ex safety solenoid interlock.



Fig. 4: Safety in Ex zones is provided by e.g. the Ex AZ 16, a safety switch with separate actuator and separate terminal compartment.



Fig. 5: As an alternative for electro-mechanical guard door monitoring, non-contact safety sensors are also available – in Ex versions.

compact design, this makes installation very flexible, not least because mounting can be in any position.

A modular design with a variety of additional functions is equally typical for steute switchgear. Users can choose, for example, between the closed-circuit or open-circuit principle, and as a further option they can select both an auxiliary release (from the access side) and an escape release (from the danger zone).

The Ex STM 515 series complements the existing steute range of Ex solenoid interlocks within the heavy-duty segment. For mechanical engineers requiring a more compact safety locking device, the Ex STM 295 series made of shock-proof plastic will also remain available (Fig. 2).

## Position monitoring of guard doors: various options

If the guard door of a machine within a dust-Ex zone does not require safety locking, the designer has multiple options. An electro-mechanical switching device would be one possibility, e.g. from the Ex AZ 16 series (Fig. 4): a "classic" safety switch with a separate actuator which can be used in Ex zones 1 and 2, as well as 21 and 22.

Another possibility would be a switch without a separate actuator: an Ex safety position switch. Here steute has its Ex 97 and Ex 99 series of standard switches (Fig. 3). They can be used in gas Ex zones 1 and 2, as well as dust Ex zones 21 and 22, and are suitable for temperatures down to -60°C.

Users who prefer a gas and dust-Ex safety position switch with a metal enclosure can opt for the Ex 98 series, featuring a robust anti-

corrosive aluminium enclosure with a stainless steel cover, high protection classes and dimensions to DIN EN 50041 standards.

## Non-contact safety

As an alternative to electromechanical safety switches, non-contact safety sensors are also popular. One of their benefits is that no dirt or dust can be transferred to the sensor or actuator and impair its function. The Ex HS Si 4 series is one example, monitoring the position of guard doors in combination with an encoded actuator and extremely shock-proof. Here, too, an alternative is available: the cylindrically designed magnetic safety sensors in the Ex RC Si 56 series. They are also available as an Extreme version in protection class IP 69K (Fig. 5).

## Conclusion: restrictive niche, wide choice, new development

This overview shows: even for highly complex and restrictive niche applications, such as the combination of (gas and/or dust) explosion protection and functional safety, designers and plant operators still have a range of options when selecting switching devices with Ex approvals to e.g. ATEX, IECEx, UL/ CSA, Inmetro or CCC Ex. And that is not all: they can also choose between different basic principles for safe switching devices (interlocks, position switches, switches with separate actuators, sensors, and the as yet unmentioned emergency pull-wire switches). And newcomers keep the market healthy. The new Ex safety solenoid interlock will be demonstrated "live" at the Powtech.

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