

Safe in Potentially Explosive Environments

Working in potentially explosive environments is not as rare as one might think. A small electrical spark can be enough to cause great suffering and damage. Products and equipment used in such areas have to comply with the ATEX directives in the EU.



SCHURTER PSE EX: piezoelectric switch with ATEX and IECEx certification

The abbreviation ATEX stands for the French term ATmosphères EXplosibles (explosive atmospheres). ATEX regulates the aspects of explosion protection in the European Union and comprises the two directives 1999/92/EC (operation) and 2014/34/EU (products).

The ATEX directives establish a specific sequence for the various measures of explosion protection:

- The measures of primary explosion protection prevent the formation of hazardous explosive atmospheres.
- The task of the secondary explosion protection measures is to prevent the ignition of explosive hazardous atmospheres.
- Tertiary explosion protection deals with the possible effects of an explosion. The aim of tertiary explosion protection measures is to reduce the effects of an explosion to a harmless level.

Definition of "potentially explosive atmosphere"

A potentially explosive atmosphere is a situation in which a potentially explosive atmosphere may occur. A potentially explosive atmosphere occurs when a mixture of air gases, vapors, mists or dusts combines in such a way that it can ignite under certain conditions. Such can occur, for example, in refineries (petroleum industry), mills (food processing), gas plants, the chemical industry, mining and more. In principle, explosion-proof components must be used wherever potentially explosive atmospheres can occur or are present.

ATEX and IECEx

ATEX certification means that such a product may be used and operated in

potentially explosive atmospheres. It thus has the required safety of not being able to trigger the ignition of hazardous air-gas mixtures. The potential areas of application for such components are very diverse. The distinction between ATEX and IECEx is regional in nature. ATEX is the European certification, while IECEx applies worldwide.

Two certificates required

In order to be allowed to offer ATEX/IECEx-certified products, the manufacturer always requires a product certification as well as a production site certification.

Application areas

It goes without saying that in the pharmaceutical industry, for example, work is also carried out in places with potentially explosive atmospheres. And so there is

laboratory or production equipment there. These want to be controlled. So we need an HMI (Human Machine Interface) – an interface between man and machine.

In the simplest case, these are switches. There are many different switch technologies. The one we are most familiar with is certainly the mechanical switch, which we use to turn the lights on and off at home. But then there are also capacitive, piezoelectric and countless good as well as less good touchless variants. Not all of them are suitable to the same extent for use in potentially explosive atmospheres. With one exception: piezo.

The piezo effect describes the change in electrical polarization and thus the occurrence of an electrical voltage on solids (mostly crystals) when they are elastically deformed. Or in short: If you press a piezo switch, an electrical signal is generated at its end. And this is where the big difference lies: a piezo switch does not need an electrical power supply for a tactile process. And where there is no power supply, there are – almost always – no dangerous sparkovers.

Ideal choice = piezo

Piezoelectric switches are also particularly tough. They are hermetically sealed and

have no mechanical switching contacts – thus no sparking and no penetration of explosive substances. The SCHURTER PSE EX family of switches have housings made of aluminum or stainless steel. They offer maximum reliability and a long service life. Due to their hermetically sealed housings (IP69K), they are predestined for use in the harshest environments, in above-ground explosive plants, in areas with flammable air-gas mixtures, mists, vapors and dusts.

What about touchscreens?

Things get much more complex with more sophisticated input systems. Here you have to ensure that no gases can penetrate the system, where sparking of the electrical parts could lead to an explosion. In HMI systems for ATEX environments air cavities where gases could accumulate must be reduced to a defined minimum.

Bonding necessary

To achieve this, bonding with a special adhesive between the display and the touch is necessary. In addition, the display must be adjusted in many cases. This means that the back of the display must

be opened and the air cavities filled with various filling materials. The front glass of the HMI system may undergo special treatment to ensure that it has the required impact resistance in the event of an explosion. In many cases, such HMIs are used outdoors and/or in particularly harsh environments. Therefore, water resistance and EMC compliance must also be considered.

About SCHURTER

The SCHURTER Group is a globally successful Swiss family business. With our components ensuring the clean and safe supply of power, input systems for ease of use and sophisticated overall solutions, we impress our customers with agility and excellent product and service quality.

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