

The Ex switch which came in from the cold

Switchgear and sensors for subzero applications

Canada, Kamchatka, Barents Sea: exploration and extraction of oil and gas as raw energy sources are increasingly taking place in regions which are freezing cold. Electrotechnical components also have to cope with minus degrees in other areas of process engineering. Switchgear and sensors are now available for just such applications, suitable for explosive environments and temperatures down to -60°C .

A request made by a plant manufacturer to the steute business unit Extreme was very specific: the company was searching for a sensor to monitor the position of valves and instruments in an oil extraction plant being built in Siberia. Requirements included not only explosion protection, but also suitability for subzero temperatures down to at least -40°C .

Sensors for frosty applications

The proposal steute made was to take a type Ex RC M20 KST magnetic sensor. This sensor is suitable for use in gas Ex zones 1 and 2 and for even lower temperatures than requested (down to -60°C), providing the customer with additional leeway. Almost more importantly, however, the need for an additional switch amplifier – required for inductive sensors – could be eliminated. This meant savings for the plant manufacturer regarding both purchasing costs and installation. The housings of these diameter M 20 cylindrical sensors are made from a fibreglass-reinforced Duroplast material and can be used in gas Ex zones 1 and 2, as well as dust Ex zones 21 and 22. Their non-contact action simplifies sealing of the housings for extreme environments and guarantees

unimpaired operation in the long term: their electrical lifespan is calculated at 10^6 ... 10^9 switching cycles. In addition to magnetic sensors for extreme applications such as the one above, the steute range also includes inductive sensors. Several series of electromechanical switches and sensors are even available as dedicated offshore versions. Their features include special anti-corrosion protection and high protection classes IP 66 and IP 69.



Developed for extreme environments: the Ex 97 series of Ex position switches.

Position switches with extreme features

If, instead of a sensor, an electromechanical switch is required, the steute Extreme range has two new product series. Its first series, the Ex 97 position switches, can be used universally thanks to standard dimensions in accordance with

DIN EN 50047 and a wide variety of actuators (roller plungers, roller levers, fulcrum levers). This universality most definitely includes Ex environments since the series has been tested and approved by ATEX and IECEx for gas Ex zones 1 and 2, as well as dust Ex zones 21 and 22.

Housing construction makes high demands

These switching devices can be used in temperatures right down to -60°C , making high demands on the housing construction and sealings. For example, the protection class of the switchgear (IP 66) must be maintained following a 7-Joule impact test in these extremely cold temperatures. This is why the robust housing is manufactured from high-quality fibreglass-reinforced plastic, and the sealing of the housing cover is completely vulcanised. The plunger is sealed by means of a redundant sealing system. The sealing materials used in the new Ex 97 series are approved by their manufacturers for temperatures down to -95°C , while the lubricants are approved down to -75°C . This provides a generous safety net to the -60°C temperature guaranteed for the switchgear, giving users the certainty that these new position switches will work reliably even in truly extreme conditions.



Impact-resistant, perfectly sealed and suitable for temperatures down to -60°C : the Ex 99 series of Ex position switches.

Ex standard position switches for extreme cold

With the Ex 99 series, new larger standard Ex position switches are available to DIN EN 50041. They are also ATEX and IECEx tested and approved for use in Ex environments and can also withstand temperatures down to -60°C . Both the switchgear protection class and its redundant sealing system, which is similar to that of series Ex 97, facilitate use in adverse conditions. Thanks to the insulated plastic design, the necessity of earthing and voltage equalising is eliminated.

A metal alternative – also as an analogue switch

Customers who prefer position switches with metal housings can take the steute Extreme Ex 98 position switch series, with features such as a robust, anti-corrosive aluminium housing, as well as protection classes and standard dimensions to DIN EN 50041. Mounting of different actuators can be staggered at $4 \times 90^{\circ}$, approvals for gas and dust Ex zones are of course guaranteed. This series can be used down to -40°C and is thus also suitable for subzero environments. A new member of this series, the Ex 98 HS, provides a new functionality. It does not work with conventional on/off technology, but instead emits an analogue signal corresponding to the position of the actuator or plunger. This position is ascertained by an integrated Hall sensor which prepares the output signal in the three popular standards 0 ... 20 mA, 4 ... 20 mA or 0 ... 10 V, depending on the variant. This position switch thus delivers the exact position of a flap or a cover, for example, or even a proportional valve – and all that in a truly extreme environment.

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