Flexible electrical heating solutions for potentially explosive areas

Now also possible with SIL 3

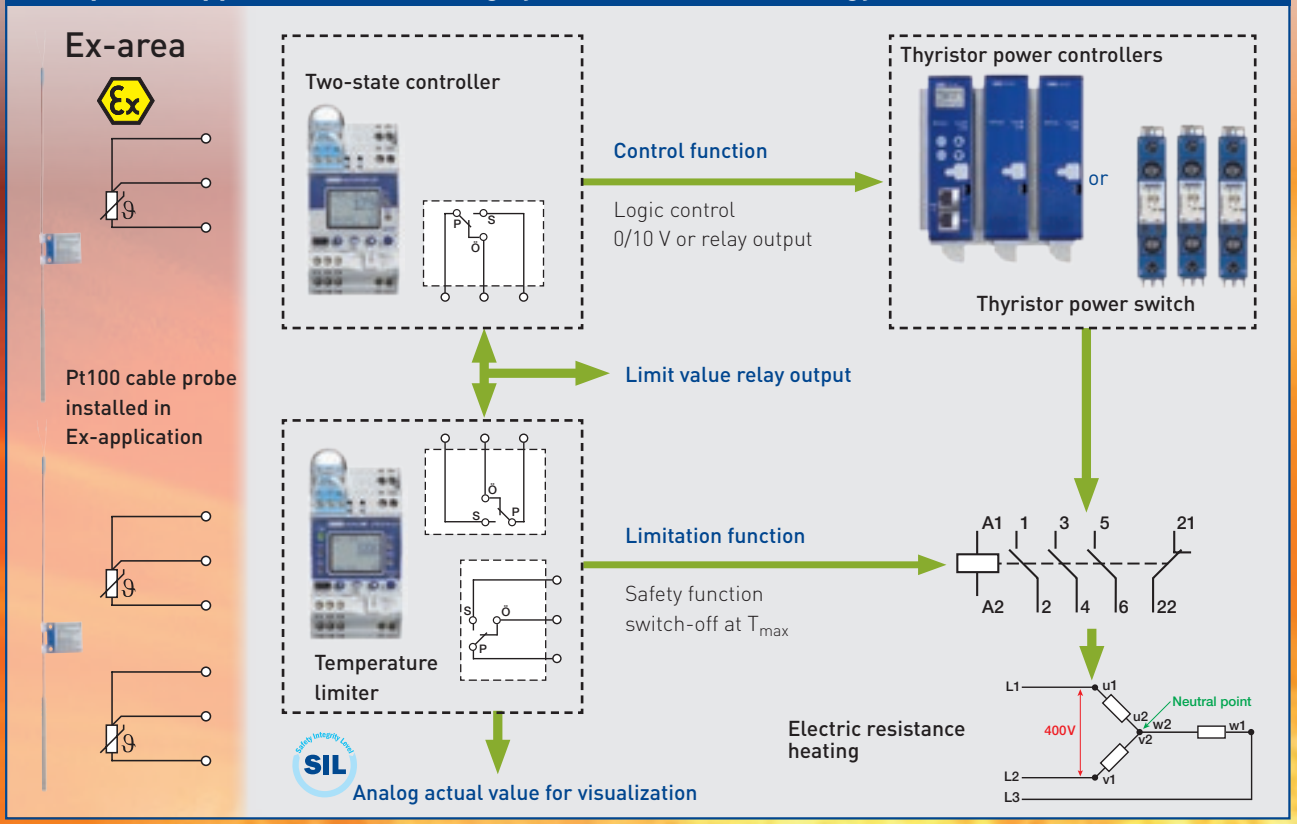
These days, auxiliary heating is needed to maintain or increase temperatures, particularly in chemical processes or process engineering, to optimize the increasingly complex processes that are used in modern industrial facilities. Flexible electrical heaters are not restricted here to individual industries or special applications. Instead, they can be universally applied.

Through the basic physical property of resistance heating, it is possible to use electrical heaters in precisely the places where they are needed and also only when auxiliary heating is necessary. Even existing plants or process sequences can be easily retrofitted with an electrical heater using little technical effort. The Winkler company, based in Heidelberg, Germany has been designing and building flexible electrical heaters for 40 years. In addition to many standard solutions, Winkler has created special, customer-specific heating solutions, especially when it comes to explosion-proof heater systems.

This product range, which is primarily influenced by directives, regulations, and standards, has grown tremendously in recent years. In this case the products have a system certification. With this certification, the operator is no longer required to perform additional acceptance of the delivered heaters for a potentially explosive plant, as the manufacturer (Winkler) has already certified the device in advance. Informative documentation is also part of the scope of delivery.

As part of a compliance evaluation process according to the directive 2014/34/EU and an ignition hazard assessment, the installed explosion-relevant components have also been subjected to a special selection process. That is why Winkler has always installed

Examples of applications for heating systems in SIL 3 technology



EC-type certified Pt100 RTD temperature probes from JUMO in its flexible explosive-proof heaters. The Pt100 RTD temperature probes are an important safety component in the heaters, since the installed resistance heating conductor would exceed the maximum admissible temperature without appropriate controllers and limiters. Exceeding the maximum temperature would not only damage the heater itself, but would also become a hazardous source of ignition. Here, a temperature limit must work independently of the temperature control to switch the heating system off permanently before the maximum admissible surface temperature (on the heater conductor) is exceeded.

The system cannot be switched back on until the system operator is certain of the reason why the safety equipment was activated and is sure that the corresponding maximum temperature of the Ex-area is no longer exceeded. The temperature sensor must be positioned at the hottest point in the process. This hot spot could, for example, be on a heating hose between the heating conductor and the object to be heated, which is the base hose (see application example). This way, not only operating temperatures of the process can be controlled, but also ignition sources that come about in the heater due to uncontrolled excess temperatures can be avoided.

In addition to proper installation and correct positioning of the RTD temperature probes in the flexible heater, corresponding process stability is also decisive here. This process stability depends primarily on the utilized evaluation unit.

The JUMO safetyM STB/STW safety temperature limiter/monitor is particularly well-suited for this task. It enables a compact single-channel safety control with selectable redundant input signals for standard signals and temperature sensors. This solution is especially ideal for smaller functional applications such as special machines and individual applications with a low density and number of signals. The JUMO safetyM STB/STW Ex is also ATEX-approved.

In addition to low investment costs, the advantages here include low parameterizing effort for each application. Three different analog and binary functional outputs are available. In connection with special JUMO temperature probes, which are also available in ATEX variants, the whole SIL safety chain has already been evaluated and corresponding certificates up to SIL 3 can be issued by JUMO.

Further information

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Example of the sensor position in an analyzer line/heating tube

ATEX/IECEx RTD temperature probe
With connecting cable according to DIN EN 60751
Type 902821

1. Ex "i" – screw-in RTD temperature probe
2. Ex "i" – push-in RTD temperature probe
3. Ex "i" – mineral-insulated RTD temperature probe

JUMO safetyM STB/STW Ex
Safety temperature limiter/monitor acc. to DIN EN 14597 and SIL 2/3, PLd/e
Type 701155

Applications for winkler.eu

JUMO exTHERM-DR
Two-state controller with Ex (ia) input according to ATEX
Type 701055

JUMO TYA 203
Three-phase thyristor power controller
Type 709063