One for all – and all in the Ex zone

Intrinsically safe, universal and, above all, simple to configure: these are the attributes that make the ACT20X signal conditioners the optimum product for Tyratronics, the Swedish system developer. The module means that they can perform precise and flexible signal conversions as part of their control solutions for gas filling plants.

“We have the goal to tailor every one of our solutions precisely to meet the unique circumstances and needs of every one of our customers – even adapted to meet country specific standards and safety regulations. For our control and feedback control systems which we have developed for gas filling plants, it is therefore natural for us that all the components are fully safe for unrestricted use in explosive-risk zones,” explained Tyratronic’s sales manager, Stig Corneliusson. “We needed a solution to safely collect signals in explosive-risk zones, and we found an optimum solution from Weidmüller – the intrinsically-safe ACT20X signal conditioner.”

“One product for all explosive hazard areas and types of sensors”

Depending on the customer and the site of use, the systems Tyratronic makes must be suitable for zones 0, 1 or 2. It was important for the Swedish company that the same signal conditioner type could be used for all of these applications. A further demand on the flexibility was that it should be a conditioner type that could be configured for different types of sensor. This is not just cost efficient; the use of a universal module makes installation and any later servicing easier as the technician must only be familiar with a single product. It also makes exchanging and expanding systems easier. For these requirements, the ACT20X was predestined to be used.

“The top priority in areas with explosive atmospheres is to avoid dangerous situations. Therefore, an intrinsically safe electrical circuit is used here. It uses voltage and current limiters to limit the energy that is introduced to the area. Ignition by a spark or thermal effect is effectively prevented in this way,” explained sales representative Claes Lindgren from Weidmüller. “Our ACT20X signal conditioner offers an intrinsically-safe input for standard DC, temperature and resistance signals and therefore isolates the explosion risk area from the safe
area. With its six different basic functions, the universal product range covers the whole area of Ex applications. Signals that come from all three of the Ex zones, are precisely prepared for the controller.

Reliable, standardised signal values

Measuring the gas temperature is done, in the Tyratronics applications, using a PT100 resistance thermometer (RTD) which comes with a three wire circuit, as well as thermocouples. The 4-20 mA output is used to measure the flow rate of the gas. Signals from all three different types of sensor can be processed with just one module as Tyratronic can configure the signal conditioner as needed. Used close to the sensor, the ACT20X modules offer optimum characteristics to galvanically decouple the sensor level from the control level and give you reliable, standardised signal values.

The gas plant operator benefits from exactly determined measurements, that can be transmitted as stable 4-20 mA signals over long paths. The characteristics of the ACT20X ensure that temperature fluctuations, electromagnetic interference, vibration, corrosion and explosive risk atmospheres do not influence the accuracy of the signal transmission and conversion.

Extra safety is offered thanks to the comprehensive monitoring and alarm functions of the signal conditioner. The integrated relay output, which can be programmed, issues and alerts in the event of an error message. This makes troubleshooting easier and thereby raises the system availability. Tyratronic uses this function to sound an alert if there is a leak. Above a specified temperature window, you can monitor the gas temperature so that a direct alarm is sounded if the values are too high.

Further safety is provided in the form of an integrated alarm function for cable or sensor errors in form of an additional built-in relay. In the event of an error in one of the devices connected, a diagnostic signal is sent to the controller. The error can be directly identified and dealt with.

Image supported configuration

“We have tested other products too, but always had problems programming them using a PC. It is very important to us that our customers benefit from simple configuration and can make adjustments themselves even after the system has been handed over. This made our decision for this product a quick one,” reported automation engineer Johnny Andersson about his experiences. “Weidmüller’s solution surprised us in a positive way. After successfully installing and configuring the software programme, everything went very smoothly. We then just needed to connect the device and were able to get started straight away.”

The configuration software is based on the manufacturer-independent FDT/DTM technology. This means all ACT20X products can be adjusted individually for differing process applications using a PC. Weidmüller provides a device type manager (DTM) for its modules, this can be used in any FDT-based frame. DTMs allow you to configure different devices quickly and accurately. They also enable you to analyse measurements and diagnostics data. The DTM can also be used to clearly identify the connected device.

“The exact and extensive usage settings of the ACT20X modules provide us with the most outstanding advantage overall. The pictures in the configuration software, as an example, provide enormous help. They show very clearly how you need to make the connections. It is most helpful as there are various connection possibilities for complex projects like this one,” Andersson reported. “The clear pictures significantly reduce the potential for error. This helps our customers too, as they can simply make their own adjustments to the signal conditioners. Our experience shows that this works very well in practice.”

The ACT20X is approved for installation in zone 2 and converts signals from zones 0, 1 or 2 for the controller.