QUICK READ

As part of the diagnostic monitoring of devices in the field and control level, it is often the transmission routes and interfaces that are ignored. On-site cabinets with I/O systems – particularly in legacy installations – are thus nowadays often the Achilles heel of the installation technology. Condition monitoring here was previously only often possible with considerable effort. Turck's IMX12-CCM cabinet guard offers an easy solution for reliable cabinet condition monitoring – also with existing installations. The device on the DIN rail monitors correct door closure, humidity and temperature, and outputs an alarm signal to the control level if the limit value is reached.

Cabinet Guard

Turck's IMX12-CCM cabinet guard continuously monitors the relevant ambient data inside control cabinets and protective housings

Availability and reliability are parameters which are of prime importance for the operation of machines or process plants – unscheduled downtimes considerably reduce profitability. For this reason, the operation of installations without any intelligent sensors is a rare occurrence nowadays. Besides the actual process parameters, additional information is sent to the control level simultaneously. For example, measuring ranges can be adjusted during operation or the state of the equipment can be queried. These features offer several benefits and reduce the downtime of machines and plants. In recent years, considerable advances have been made, and field instruments have now been developed into well rounded devices.

If you consider the causes of unscheduled plant downtimes, you will often find that it is not faults in the instrumentation or control technology that stop the production process but the connections between the levels. The information routes, converters and connection points in the field are the elements which are found in analysis to be weak points. This infrastructure is mostly not suitable for direct exposure to the harsh ambient atmosphere that is very often found in processing plants. These devices are therefore installed in cabinets that protect them from humidity, temperature and other risks – such as mechanical loads.

Protection not permanent

As long as the control cabinet does not have any faults, the devices installed in them are well protected from external influences. However the protection offered can decrease as the period of operation and also the load increase. This can be due to mechanical damage, the aging of sealing material, but also human error such as incorrect closing. The cause may often involve creeping processes that lead to a failure of the devices installed in the control cabinets and thus also to a complete shutdown of the plant.

Modern electronic devices nowadays have their own onboard temperature monitoring. The measurements monitor the temperatures at critical points on the PCBs. This data can for example be read via

modern fieldbus systems and processed further. While these are good features in principle, they ignore some important points; not every plant concept is based on one fieldbus topology. In such cases, additional diagnostic information can only be supplied by providing additional interfaces on the devices. However, very few companies make the effort required and so plant sections without any particular communication technology cannot be monitored.

Furthermore, the temperature in the control cabinet cannot be derived reliably from the temperature on a printed circuit board. This particularly applies to large units. The measurement at a local hotspot can conceal the general temperature. The device temperature therefore provides little information about the condition of a control cabinet and could lead to incorrect interpretations. Moreover, temperature alone is not a parameter from which the general degree of protection of an enclosure or a control cabinet can be derived. Additional variables, such as humidity, light and position have to be integrated in the monitoring concept instead, in order to ensure optimum and reliable operation.

Condition monitoring for the control cabinet

Turck has tackled this issue and developed a device which can be retrofitted in virtually any control cabinet or box, and which can be configured for the local conditions through a simple teach-in process. The new IMX12-CCM (Cabinet Condition Monitoring) cabinet guard indicates the degree of protection of the control cabinet with a single switch signal. The 12 mm wide device comes with an intrinsically safe 2-wire isolating transducer interface, enabling it to be used in explosion hazardous areas. This means that only a maximum of four wires and available space on a DIN rail are required to install and commission the IMX12-CCM. The teach-in process can be carried out without the need for a computer or an additional tool. The standard HART interface is provided for additional diagnostic options, such as for reading out the absolute measured values.

The 12 mm wide device comes with an intrinsically safe 2-wire isolating transducer interface, thus enabling it to be used also in explosion hazardous areas

Multi-functional device

Besides the interface technology, Turck's control cabinet guard offers a range of sensors which monitor the actual status of the environment: a temperature sensor, an absolute humidity sensor and a triangulation sensor were integrated in the IMX12-CCM. This last sensor measures the precise distance to the cover or door. If the door is not closed correctly, the device indicates this condition and the operator can rectify the fault directly.

As humidity in closed systems is a recurring problem, its continuous monitoring is an important aspect of condition monitoring. The cause of humidity can be seals which have become porous and leaky due to environmental influences, or also faulty ventilation systems. Humidity increases slowly but constantly, and can suddenly cause a device failure. As these effects are mostly only detectable over a long period, the IMX12-CCM monitors these long term trends and outputs a signal to the control level if limit values are exceeded, in order to deal with instrumentation failure in advance. The cabinet guard continuously processes the recorded data of the sensors and compares it with the taught safe condition. As soon as defined limit values have been exceeded, this is indicated to the control level via a potential-free contact. This enables interventions to be made quickly and effectively.

Conclusion

Turck's cabinet guard, IMX12-CCM, is suitable for the continuous monitoring of protection in enclosures and control cabinets in the field, even in the explosion hazardous area. The simple mounting and integration in the existing topology enables it to be used not only in new installations, but also in existing plant sections. No additional cabling is required as the existing signal reserve can mostly be used. The combining of different parameters in one device – closed doors, humidity and temperature – produces an optimum monitoring function and considerably improves the availability and reliability of machines and plants. The CCM multi-function sensor is adapted automatically to the local conditions. Any extensive programming for normal operation is unnecessary. More comprehensive diagnostics can be called up via the HART interface. The cabinet guard will be available from May 2016.

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