The Development of a New Technology

Remote interface technology - a new approach

If you look at the history of interface technology, it is clear to see that it continuously produced some interesting innovations. One new approach is based on the idea of turning the interface device into a local device, and also bringing this technology closer to the field device.

The requirements placed on associated equipment for use in the field are considerably different to those placed on conventional devices. Firstly, the mechanical requirements have to be considered since the device has to be as small as possible but still easy to handle for connecting and servicing. It must also feature a certain level of mechanical and chemical resistance.

Temperature factors also vary greatly, whilst optical indication options and the resulting diagnostics options are important features for operation. When transferring the features normally expected of conventional rail-mounted devices to devices for remote interface technology, it soon becomes clear that reconciling the options and requirements involved is not so straightforward. With galvanic isolation being the current state of the art, a certain amount of space is required, which nowadays, for an increasing number of installations in the process industry, is a rare commodity.

This valuable resource therefore had to be treated with due care. The “Cartridge” devices were therefore developed from the inside to the outside. It became clear very quickly that the reduced housing size requirements could only be achieved with a planar transformer. Unlike wound transformers, this type of component offers increased space utilisation.

A housing size of only 125 x 25 x 32 mm was possible, which included the minimum moulded encapsulation required. These housing dimensions still offered enough space to integrate the M12 connectors, provide the LEDs required and to print the necessary information. Further space reductions were achieved as a result of successful fundamental research in self-correcting circuits. This enabled the number of components required to be further reduced, with all the inherent benefits such as space saving, cost saving as well as low heat generation.

Figure 1: Remote solution in the network: piconet fieldbus station and interface module cartridge

Handling

Optical LEDs are used for reliable diagnostics or also status recognition. These are integrated on the circuit board as SMD components and made externally visible by means of light pipes and compound material. These light pipes protrude slightly since it is also conceivable that the cartridges are positioned at 90 °, so that the LED signals must also be visible from the side. Spacers were provided on the top of the cartridge in order to prevent the protruding light pipes from damage.

The plug connectors also simplify handling, and M12 connectors come as standard components. Cables with premoulded connectors or also those for local assembly are available from a large number of suppliers. The use of connectors ensures a fault-free and straightforward connection, even when visibility and access are poor. When the cartridge is mounted in zone 2, accidental removal of the connectors on the non-intrinsically safe side must be prevented, and this is ensured by means of metal covers provided. These eliminate the need for a mounting cabinet and enable the devices to be mounted directly in zone 2 without any additional protective measures required.

The connectors are aligned in the cartridge in such a way that angle connectors are positioned at 50 ° to the cartridge. This ensures safe cable routing without any bending of the cable, which may impair operational reliability. Special vibration-proof connectors are available for use on mobile units or in environments subject to vibration.

The pinning of the connectors has been selected so that piconet and BL67 types can be connected easily to Turck fieldbus devices. In this case, only a 1:1 continuous cable is required on the control side.

Explosion protection in plug and play

Suitable blue cables must be selected for the intrinsically safe circuits and grey cables for the connection to the higher-level controllers. The blue cables are normally provided with premoulded connectors since most field devices on the market come with a terminal chamber. In this way, explosion protection can be achieved simply, and installing the cartridge for relaying the signals from and to the explosion hazardous area means that the user does not have to provide explosion protection on the control side.

If field-wireable connectors with two intrinsically safe circuits are to be used, the required creepage and clearance distances between the two circuits must be ensured in accordance with EN 50020. When using dual-channel devices, block junctions are available for connecting two sensors or actuators.

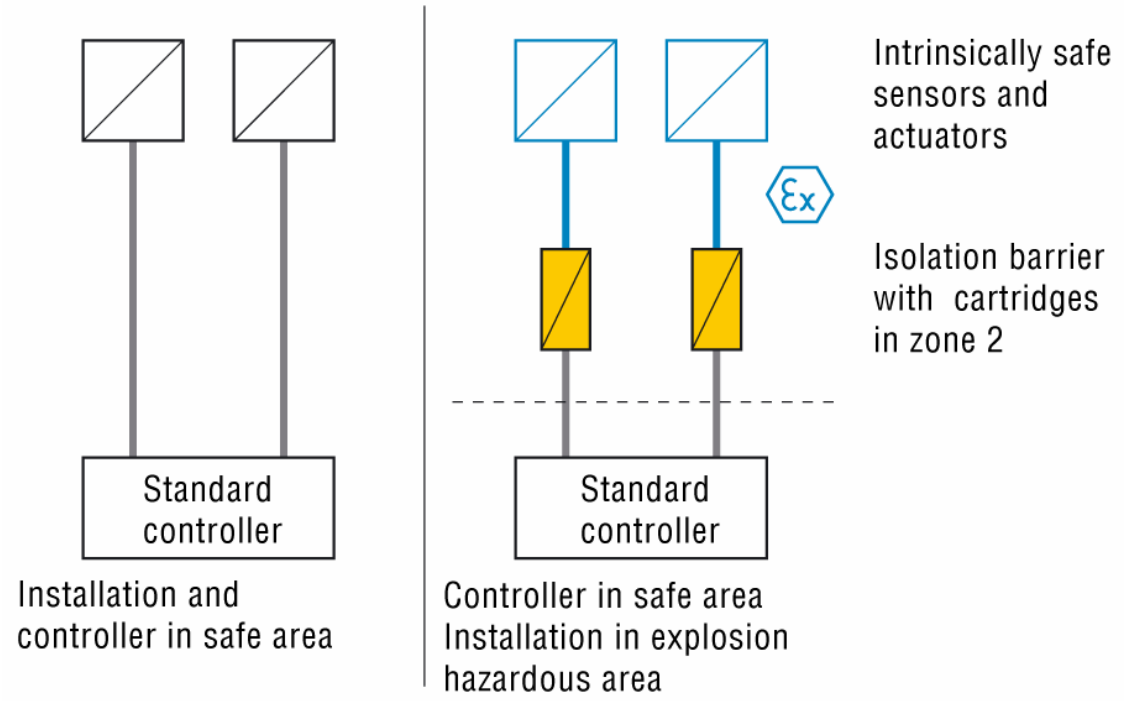

Figure 2: Controller with its connected peripheral devices in the safe area and in the explosion hazardous area

Applications

The compact design enables the cartridges to be arranged and assigned to plant sections, thus enabling a faster overview in the field of the operating status. The small mounting height also means that the cartridge can be mounted in passages, transport routes etc. A mounting cabinet fitted here would be considerably larger. IP67 protection makes the cartridge suitable for the aggressive environmental conditions of the chemical industry or also in outdoor applications, whilst the moulded encapsulation and metal protection plate ensure the robust mechanical design. The intrinsically safe terminals of the cartridge can be plugged or unplugged during operation without the need for any special permissions.

The cartridge is also useful in applications where explosion protection is optional. For example, it allows the use of a standard mounting cabinet for the control technology, whilst intrinsically safe inputs and outputs can then be designed by connecting the cartridges. This brings flexibility to the standard, allowing the user to save costs in engineering, purchasing and stock-keeping.

It is also possible to configure application-specific remote I/O using fieldbus components approved for zone 2. The one step of moving the interface technology out of the mounting cabinet and into the installation has opened up new possibilities. The user benefits from the know-how gained from the IP67 fieldbus stations and sensors as well as from our many years of experience in interface technology.

The new product line enables installation requirements to be met precisely.
Automation units are increasingly being located remotely in the installation. These components must therefore also be suitable for use close to the field device. The cartridges with their IP67 protection make the use of switch boxes unnecessary. Any retrofitting can be carried out optimally because no substantial space requirements are involved.

Remote interface technology combines standard solutions with flexibility. In this way, installations with and without explosion protection can be designed with the same structure.

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