

Decentralized without Protective Housings IP67 remote I/O system designed for harsh industrial use

The trend in the field of automation technology to a distributed design with modular peripheral devices remains unchanged. One reason for this are the modular and flexible IP67 I/O systems. They must provide the comfort and flexibility of the familiar IP20 fieldbus devices and at the same time guarantee user-friendly handling with an optimum footprint. A high end system with exceptional levels of serviceability featuring a variable diagnostics concept and features such as “hot swapping” or separation of electronics and connection technology are presented here.

A whole range of I/O systems from different manufacturers are available for the IP20 area within the control cabinet which cover the entire range from cost-optimised low-cost systems to high-end systems with exceptional levels of availability featuring channel-related diagnostics and further features such as “Hot Swapping” or the separation of connection technology and electronics. It is now particularly easy to take the existing systems and to install them in an installation housing directly on the machine.

Modular IP67 fieldbus stations without module racks enable flexible expansions

This may reduce the cable lengths to the sensors but does not offer any particular advantages. It is still necessary to invest a lot of time to lead out the sensor cables, to put them through the cable glands and to connect them to the IP20 bus terminals. Unfortunately polarity reversal errors with the cabling occur. If the fieldbus nodes then have to be extended by a few signals, chaos may ensue. Further cable glands must be installed in the installation housing and in the worst case scenario no more space will be available in the housing. This is exactly the point at which the IP67 fieldbus devices come into play. It is only possible to comprehensively implement the distributed automation technology concept with high-performance and flexible IP67 fieldbus devices. This is where Turck can optimally apply its particular competence with products for harsh industrial environments featuring IP67 degree of protection. In this field Turck is a full-range supplier of automation solutions downstream of the controller level with its sensor, interface, connection and fieldbus technologies. The BL67 system is also an important platform for the fieldbus technology.

The modular I/O system

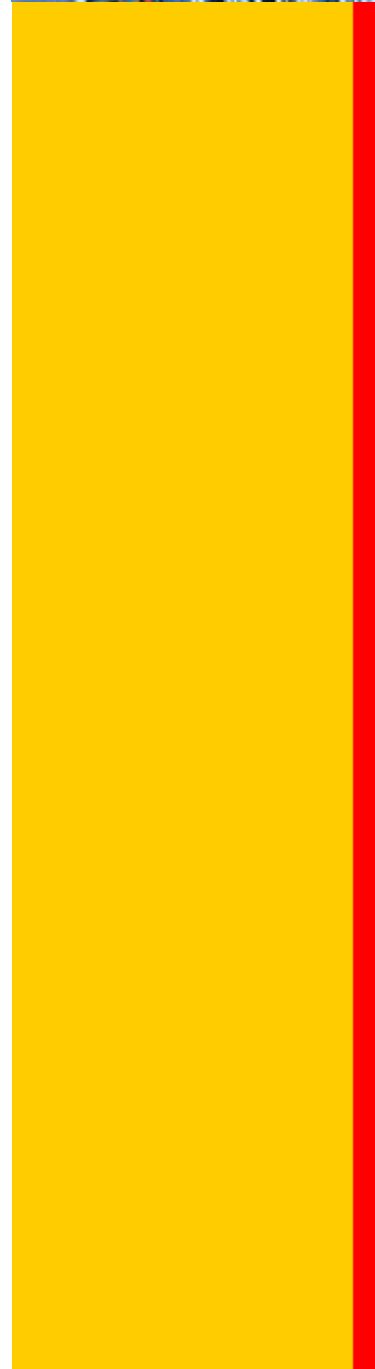
BL67 is a modular I/O system featuring a high degree of protection, and consists of a gateway and the expansion modules. The gateways are used for communication with the fieldbus and are available for Profibus-DP, DeviceNet, CANopen and Ethernet. Up to 32 expansion modules can be connected side-by-side on the right of the gateway. No module racks and no mounting panels are necessary. The base modules are purely passive components and are successively plugged into the system from above and fixed with two screws. The result is a compact and mechanically stable unit which is in turn completed with a passive end plate. This ensures that the fieldbus stations can be extended or modified at any time.

The electronic modules are plugged into the base modules and then fixed with 2 screws. Due to the compact design of the BL67 components and with a module width of 32 mm with the expansions, the fieldbus nodes can be situated in a space-saving manner directly at the machine or in the production line. In this manner the distances to the sensors/actuators are kept short and the use of prefabricated cables reduces the effort and expense of wiring.

Areas of application are for example the wood processing industry in the press line areas. Another similar field is the field which concentrates on the manufacture of concrete slabs and formed concrete parts. Both application examples feature a high degree of automation and demand high-performance I/O systems, which are used to detect a large number of different signal types.

Engineering, commissioning and maintenance

In order to compare the different I/O systems with one another, it is not sufficient to simply compare the hardware costs and functionalities with each other. The entire service life of the system must be considered. Here an additional component must be taken into consideration. At Turck this is the I/O-Assistant software which is provided free-of-charge. This tool accompanies the user through all phases of the system.



The first steps involved are the engineering of the modular fieldbus stations. This includes the components which are required, the type designations and the associated ordering numbers. The software provides savings in time and effort, when the stations are graphically represented using it, and documentation including ordering lists, drawings, dimensional drawings and parameter lists are created directly.

The software will only indicate the logically useful base modules for the respective electronics modules and calculates the maximum total currents of the digital inputs and outputs. The user will also be issued with a warning indicating that a new power supply may be required if it should prove relevant.

The next decisive stage is the commissioning phase. The user can connect his PC with the I/O-Assistant via a serial service cable with the BL67 gateway, and read in all online digital and analogue inputs and set or supply all digital and analogue outputs with values.

In this manner the entire wiring and all sensors and actuators can be simply checked. It is not necessary for example, to put the PLC with the Profibus master into operation in order to check the sensors. With the I/O-Assistant every fieldbus station can be tested preliminarily as a local unit. Commissioning times can be reduced considerably as a direct result. If however problems still occur the software can be used for diagnostics. All diagnostics are displayed directly in plain text.

Variants for industrial Ethernet

The entire functionality of the I/O-Assistant is also available with the Ethernet gateways along the entire Ethernet network. All fieldbus stations can be maintained from a central point. This open Ethernet standard is a primary factor in its advance into the field and cell levels of industrial automation. Several industrial standards have become established in order to meet new demands. With the BL67 system the focus is on the Profinet IO, EtherNet/ IP and Modbus TCP protocols. A corresponding gateway is available for every one of these protocols. With this holistic approach the BL67 can today offer more performance than a conventional I/O system.

In the future, Turck will not ignore customer requirements and will integrate further technologies into the BL67 I/O system. This will include issues such as programmable gateways, motor starters and fault-proofed assemblies.

IP67 I/O systems offer many benefits

In the area of I/O systems, there has been practically no area in the last number of years which has experienced a similar dynamic than the IP67 fieldbus modules. Previously used individually as block modules or as simple data collectors in systems, entire series production and machine concepts are now equipped with this I/O technology. This includes for example, hydraulic presses and the respective handling and material feed units, where a whole host of these signals occur, so that a well conceived I/O structure can contribute considerably to a reduction in the cost of the overall machine concept. These costs are not exclusively pure hardware costs. In fact, a considerably greater share of the costs can be saved by the selection of suitable I/O components when constructing the system, during commissioning and even later during maintenance.

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