

Olexander Russu  
P.U. Ogeenko, research supervisor  
N.V. Poperechna, language adviser  
SHEI “National Mining University”, Dnipropetrovsk

## Closing the Gap

Due to complexity of automation technologies, the implementation of full decentralization is more and more demanded. Today most of the input/output devices, except sensors and actuators, are integrated into manufacturing networks.

With automation technology entering all areas of the production, the question arose how to link many different automation units with each other for the optimization of the production cycle. The process data accumulated was to be merged at the process management level to control the flow of goods, assure the quality and increase the plant availability from a central location.

Digital input/output modules in essence only supply binary information about the status of the sensors controlling the production process. At certain places, analog information is also occasionally reported to the controller, such as the fill level of a container in the food industry or the remaining diameter of a paper roll in the printing industry. In doing so, the exchange of information is limited to one direction: from the sensor to the controller. A parameterization of the sensor is carried out during the commissioning – performing this while an operation can only be done manually with considerable effort and corresponding downtimes.

By keeping the number of input channels as low as possible, essentially only the switching or analog information is transmitted, a diagnosis of the sensor does not take place. Here is where the concept of IO-Link (a standard for communication between industrial system control units (master devices) and sensors or actuators (slave devices)) comes into play.

IO-Link allows saving number of wires of the input channels and adding some new functions such as real-time diagnostics and parameterization. This was made possible by the installation microcontroller in the sensor module or actuator. With IO-Link technology you can carry out individual reparameterization of every device connected to the field bus.

With IO-Link on the field level, the multitude of sensor interfaces can be reduced noticeably. Dissimilar interfaces on sensors become dispensable through the application of a consistent IO-Link interface. It does not only simplify the variety of interfaces of sensors and IO-periphery, but also the variety of connecting cables required. Multipole-cables can be replaced with an unshielded standard cable. The complexity of wiring and installation can be reduced significantly through IO-Link.

In addition, the compatibility of IO-Link also permits the connection of standard sensor/actuator technology. This is done particularly economically with the IO-Link I/O modules that permit the simultaneous connection of several sensors/actuators to the controller over one cable.