

Case Study

CS00016

German Machine Builder Uses Belden I/O Modules to Improve Factory Efficiency

Developing a full automated robot cell with LioN-R products helps textile manufacturer optimize productivity and flexibility

Project Overview

Erhardt + Abt is a Kuchen-based German machine builder who has manufactured integrated automation solutions for nearly 20 years for a wide range of industries. With its 75 employees Erhardt + Abt is part of the HEITEC enterprise group, a system supplier for industrial solutions with a total of 19 German locations.

The HEITEC subsidiary promises consistent and uncompromising quality at the highest level when it comes to its manufacturing processes.

Thus Erhardt + Abt uses only selected components which meet, if not exceed these specific requirements.

For this, the southern German machine builder counts on the competent and professional support of the Belden preferred partner h.team, a system supplier for the machine building sector who has specialized in the industry-specific sales of electro technical components and has successfully guided machine building companies through their development processes for more than ten years.

When looking for appropriate I/O modules including fieldbus and sensor connections for the development of a robot cell used in the textile industry, Erhardt + Abt decided in favor of the high-performance Belden products also being preferred by h.team.

The fully-automated robot cell was developed for the Saxonia Textile Parts GmbH, who wanted to realize not only improvements of their efficiency but also an enhanced flexibility with the new machinery. Thereby the longstanding customer and manufacturer of assembly parts for knitting machines required a completely new robot system being able to be moved at any site of operation without modifications.

The integrated adept robot system shall be used for the quality testing of circuit boards being manufactured in a previous production step which requires utmost precision and accuracy.



The fully automated robot cell can be moved to any site of operations without modifications, improving efficiency and flexibility.



Multiple control signals in the robot cell ensure the precise measurement of thread thickness.

In order to be picked up, the circuit boards are forwarded to the robot by means of bulk good feeds and a subsequent separation. The system checks their thickness and removes excess material by means of an integrated pneumatic press.

Components which did not pass this examination will be sorted out. Circuit boards meeting the qualitative requirements will be laid down onto a total of six mandrels in order to be processed. After being completely equipped, the mandrels will be removed by an operator.



Belden's LioN-R series with vibration and short circuit proof M-12 connectors were selected to meet the challenges of the textile industry.

The Challenge

For these intelligent processes to operate smoothly, a multiplicity of control signals are necessary.

Erhardt + Abt had the following requirements on the signal transmission solution from Belden:

- Quick installation and fast start-up of all components
- Reliable signal acquisition and output with maximum availability
- Robust modules resistant to dust and vibrations
- Modules with galvanic isolation and high IP protection class rating
- Use of standardized cabling
- Complete and integrated solution from a single source

The Belden Solution

The manufacturing environment prevailing in the production halls of the end customer places high demands on the wiring and network products from Belden. Vibrations and dust are not uncommon in the textile industry. Because of the integrated press also metal chips are part of the daily burden the modules have to withstand.

In order to meet these challenging requirements, h.team decided to recommend the ruggedized modules of the LioN-R series with vibration and short circuit proof M12 connectors as well as with galvanic isolation from Belden to Erhardt + Abt.

The fully encapsulated zinc die-cast housing guarantees a high level of mechanical stability as well functional reliability for a temperature range of -10°C to +60° C with a maximum current carrying capacity of 9 ampere per module.

To offer his customer a fully integrated solution from a single source, h.team also provided Erhardt + Abt with standardized actuator/sensor connecting cables equipped with ready-to-use connectors on both sides as well as with 7/8" power supply lines and matching M12- data cables also molded on both sides.

Altogether Erhardt + Abt installed three Belden LioN-R I/O modules on its robot plant.

Be Certain with Belden



All components of this integrated solution comply with the requirements of the IP67 protection class and therefore offer excellent protection against external strains like the penetration of dirt, dust or moisture.

When choosing the appropriate I/O solution, Erhardt + Abt decided in favor of a signal transmission via PROFINET. With the LiON-R modules signals from connected sensors and actuators are bundled before being sent to the controller via one PROFINET data line.

The real-time capable open communication protocol is based on Industrial Ethernet and is especially characterized by its detailed and significant diagnostic functions.

Thus the machine builder not only provides his customer with comprehensive LED status and diagnostic indications but also with the possibility to retrieve detailed information regarding addressing and diagnostics for each I/O channel via his standard web browser. A webserver being integrated into the module enables this functionality.

If it should come to a fault despite of these early protection measures, the fail-safe function guarantees a safe switch-off. However the behavior of each channel in case of faults can be determined individually.

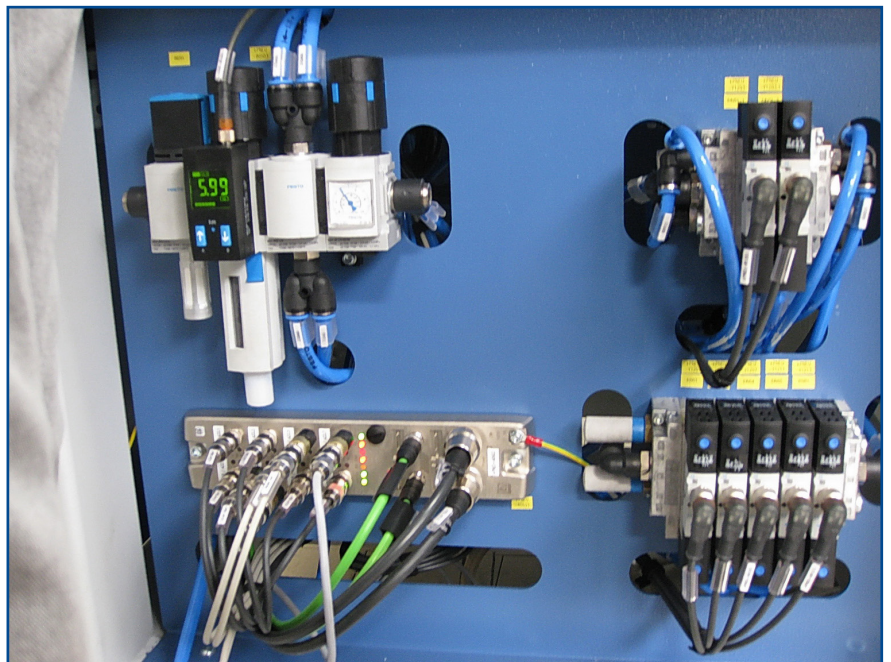
In such cases, the integrated plug and play principle plays a major role. This functionality enables a fast and simple installation and provides for a fast start-up after the system has been restarted.

Belden is aware of the limited space given in the machine building sector. Because of this only eight M12-ports are needed to place a total of 16 digital channels on just one module. Erhardt + Abt can decide how to use these channels, either as inputs, as outputs or as a combination of the two. An additional galvanic isolation between the in- and outputs provides for interference-free signals.

This enables not only a fast and reliable transmission but also reduces the amount of wiring needed. This in turn leads to a reduction of installation and maintenance costs for the Saxonia Textile GmbH.



LiON-R module signals from connected sensors and actuators are sent to the controller via one PROFINET data line.



Only eight M-12 ports are needed to place 16 digital channels on one module, fitting within the machine building sector's space constraints.

Why Belden

Belden supplied Erhardt + Abt with an integrated and flexible solution giving consideration to the limited space given in the machine building sector. This enabled the machine builder to exceed the expectations of his customers regarding the quality as well as the availability of his machines.

Beyond that Erhardt + Abt values the close and longstanding cooperation with h.team, which the automation specialist experienced as very professional both on a technical and commercial as well as on a human scale.



Belden Competence Center

As the complexity of communication and connectivity solutions has increased, so have the requirements for design, implementation and maintenance of these solutions. For users, acquiring and verifying the latest expert knowledge plays a decisive role in this. As a reliable partner for end-to-end solutions, Belden offers expert consulting, design, technical support, as well as technology and product training courses, from a single source: Belden Competence Center. In addition, we offer you the right qualification for every area of expertise through the world's first certification program for industrial networks. Up-to-date manufacturer's expertise, an international service network and access to external specialists guarantee you the best possible support for products. Irrespective of the technology you use, you can rely on our full support – from implementation to optimization of every aspect of daily operations.

About Belden

In a world moving toward new levels of interoperability made possible by the **Industrial Internet of Things (IIoT)**, visibility is vital to operators as they face increasing demands to receive, analyze and share data. Belden's industrial connectivity solutions address these needs head on. With more connected machines, rising data volumes and increasing productivity demands, customers can count on Belden cable and Lumberg Automation and Hirschmann industrial connectors for a complete communications infrastructure designed to last. Belden's customized systems provide high levels of performance and reliability to help a wide range of industrial automation applications handle the growth of intelligent, networked devices and robust analytics. Visit lumberg-automationusa.com to learn more.