

Eaton's SmartWire-DT wiring solution helps Matrix Design increase the efficiency and flexibility of its machine systems

Location:

South Elgin, Illinois

Segment:

Machine building

Challenge:

Increase production throughput and reduce manufacturing assembly costs to develop industry-leading robotic handling solutions

Solution:

Integrated Eaton control panel and SmartWire-DT connectivity

Results:

Matrix Design increased the speed of manufacturing, simplified troubleshooting and achieved cost savings while producing more efficient and flexible robotic tending stations.

"With SmartWire-DT we reduced the wiring time of the pushbutton control console from two days to less than two hours. In addition, we reduced the complexity of wiring the pushbuttons and eliminated the I/O modules that would normally be needed."

*Matthew Maliszewski, Electrical Engineer,
Matrix Design, LLC*

Background

Matrix Design is a full-service automation provider that combines modern manufacturing technologies with years of industry experience to provide customers with simplified, reliable and safe machinery to fit their specific business needs.

The company specializes in manufacturing customized robotic handling equipment for a broad range of machine tools and machine tending applications. The automated tending stations reduce the manual handling of parts, reduces piece part costs and increases production throughput. In addition, their sheet metal enclosures offer a distinct advantage for their customers by enabling a small footprint that minimizes the plant floor space requirements.

Always looking for new ways to make their robotic more productive, Matrix Design strives to incorporate industry-leading technology that can not only speed machine building processes, but also support solutions that are easier to manage and maintain for customers.

Challenge

In the automotive machine-building segment, new powertrain programs and strong global competition create a shorter time-to-market and challenging cost competitive requirements. As a result, Matrix Design is constantly evaluating new technologies that enable faster time-to-market without sacrificing the performance or reliability of their machine systems.

Additionally, the safety of people and protection of plant equipment is of paramount importance to manufacturers, so it is vital that machine builders deliver machines that exceed the most stringent safety requirements and regulations.

Matrix Design's robotic tending stations incorporate operator control stations mounted on a swing arm assembly that allows the operator to move the controls when setting up and doing changeover tasks. This feature enables optimum operator functionality, but complicates the installation of traditionally wired pilot devices; a bundle of control wires must be threaded through the swing arm assembly. In addition, all wiring to the pilot device terminals needed to be individually marked with heat-shrinkable wire sleeves and



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crimped with ferrules. To help reduce this complexity, Matrix Design utilized pre-wired multi-conductor cables and terminal blocks to consolidate the bundles of wires threaded through the swing arm assembly—this added significant material costs to the configuration.

Solution

Matrix Design considered its ongoing challenges and was intrigued by the ability of Eaton to help the company more effectively manufacture their automation equipment. Matrix Design's first use of Eaton equipment was in the operator control stations and main control panels for multiple robotic tending stations for a Tier 2 automotive manufacturer.

The company first identified assembly time savings potential in Eaton's SmartWire-DT™ panel wiring solution, a single and durable 8-pole cable that can consolidate complex circuit wiring. Matrix Design's initial assessment showed that the SmartWire-DT technology would allow it to establish a standardized solution that could offer:

- Reduced operator control station wiring and installation time
- Reduced costs for engineering, wiring, testing and commissioning machines
- Improved flexibility for incorporating user-specified options

Matrix Design also liked the flexibility of SmartWire-DT and its ability to connect to PROFIBUS-DP or EtherNet/IP networks by simply changing the gateway module. This capability meant that all SmartWire-DT components could be easily integrated with different robotic controllers and fieldbus systems without

making major changes to connection diagrams and drawings. In addition, SmartWire-DT connected devices would eliminate the need to create I/O cross-reference charts that are used in traditionally wired systems.

Results

Using SmartWire-DT, Matrix Design was able to connect the pilot devices using one flat multi-conductor cable and simple plug-in connectors. This ease-of-use significantly enhanced productivity, circumvented wiring errors and simplified system testing. It allows Matrix Design to run the SmartWire-DT cable to the pilot devices in the console, connecting and programming the devices in less than two hours per panel—a significant time savings compared to the traditional process, which could take up to two days of assembly time.

Beyond simplifying the wiring process, SmartWire-DT streamlines testing, commissioning and troubleshooting to reduce labor time and costs. Connected nodes on SmartWire-DT have LED indicators that clearly display the status of each connected device. These visual indicators allow Matrix Design staff to immediately determine if the wiring is correct, mitigating the manual process of testing each wire individually.

The standardized solution is also allowing for a wide range of configurations. The communication flexibility provided by SmartWire-DT allows Matrix Design to integrate user-specified options per job as needed and at a late definition point in their manufacturing process—enabling the company to

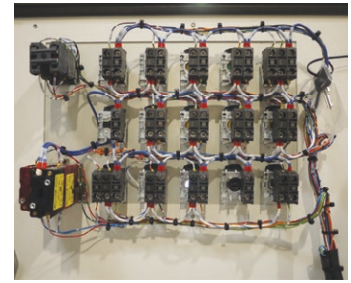
quickly and easily accommodate customer-requested modifications to the control console during the final factory testing phase if needed.

Matrix Design believes the collaboration with Eaton gives it a competitive edge by:

- Significantly reducing wiring time for the control consoles
- Error-proofing the connections to its pilot devices
- Simplifying the integration with different networks
- Increasing flexibility to incorporate last-minute customer changes
- Providing a single, expert resource for control panel components

Eaton's unique connectivity technology deliver proven competitive advantages, as the components work together to simplify and speed up the design and build of machines, while significantly reducing waste and cost. For Matrix Design, this means a more effective control panel design with reduced labor and complexity, and a shorter time-to-market.

To learn more, visit www.eaton.com.



Before SmartWire-DT—traditionally wired pilot devices.



After SmartWire-DT—pilot devices connected with the flat cable wiring solution.

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