

Automation Control for Powertrain Applications

Rockwell Automation and FANUC: CNC, Robot, and PAC Integration

A Pre-engineered Integrated Automation Solution for Powertrain Applications

Benefits

- Manufacturers: Reduce start-up time and cost; simplify machining system architecture specification
- Machine Tool Builders: Reduce system engineering time and cost to integrate multiple CNCs and robots with a cell controller
- Integrated safety network provides simple diagnostics and coordinates machine tools, robots and cells for overall improvements including safety provisions for machining, material handling and guarding
- Easily identify and manage safety signature changes to the machining cell with safety signature aggregation
- Improve quality, quantity and usability of manufacturing intelligence; production and machine information is easily transferred to enterprise IT systems enabling better decision making and cost reductions
- Monitor, backup and restore configurations to reduce down time with critical information securely controlled with FactoryTalk® Security, readily available in FactoryTalk AssetCentre

Solution

- Integrated or standalone solution
- Scalable machining cell controller architecture comprised of multiple FANUC robots, CNCs and Rockwell Automation devices
- Connections to FANUC robots and CNCs are included in Rockwell Automation Studio 5000® software to quickly configure a control and communication system
- FactoryTalk AssetCentre provides monitoring capabilities with identified changes to CNC programs
- EtherNet/IP™ is the only network needed to connect the cell controller to CNCs, robots and other devices



The Challenges

Aggressive global fuel economy and emissions standards are driving manufacturers to redesign powertrains. More flexible and agile manufacturing systems are needed that also meet today's new safety and security requirements, as well as address the growing importance of manufacturing intelligence. All these requirements result in more complex systems. The optimal answer is to implement an integrated automation solution with standardized products so operations, maintenance, management and intelligence are streamlined.

Today, within a complex system, more sophisticated devices are being used that need to be connected, controlled and have the ability to communicate data over integrated control and information networks. The needs of operators, management and IT vary, yet they all need to be addressed within the manufacturing system. Operators want intuitive diagnostic information to identify the cause when machine safety systems stop production. Management wants meaningful reports showing production history, as well as quality data to help them make more informed decisions and stay competitive. IT systems require specific data formats to be followed in every machine to ensure the integrity of usable intelligence. Additionally, these systems need to be integrated across multiple suppliers' machines in continuously shorter project cycles.

FANUC

LISTEN.
THINK.
SOLVE.®

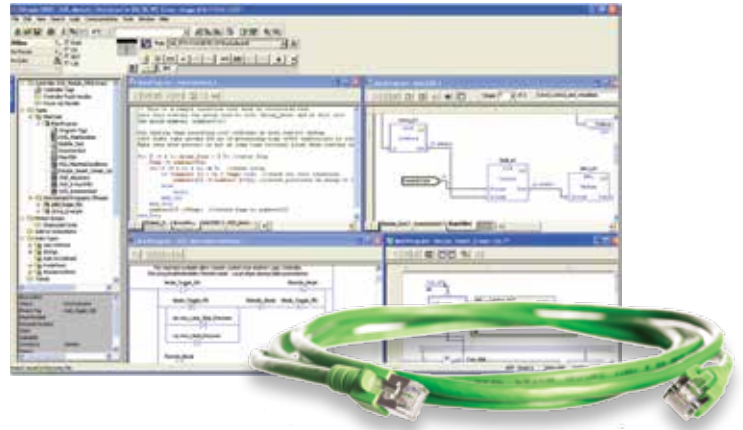
Solution

To address the market challenges of the increasing complexity of machine systems, Rockwell Automation and FANUC offer a pre-engineered integrated automation solution for powertrain applications that integrates FANUC CNCs and robots to Rockwell Automation® cell controllers. This provides cost efficiencies, reduced set-up, better part quality, safer work environment, usable manufacturing intelligence and overall increased productivity. The Rockwell Automation and FANUC integrated automation powertrain solution provides engineering advantages and cost saving benefits for both manufacturers and machine tool builders.

Manufacturers will be able to control and collect data from a wide variety of devices over a single industrial EtherNet/IP network. While no single vendor makes every device necessary for complex machining, more suppliers are offering EtherNet/IP connectivity for their machine tool devices and Rockwell Automation has pre-developed logic instructions and HMI faceplates for many of them. Even machine safety guarding and control is handled on the same EtherNet/IP network as standard I/O and data collection traffic. Users can easily identify and manage safety signature changes to the machining cell with safety signature aggregation.



Rockwell Automation and FANUC design complementary solutions based on the Rockwell Automation Integrated Architecture™ with a complete hardware and software suite for your powertrain application. The Integrated Architecture production control and information system can help you improve productivity and reduce costs.



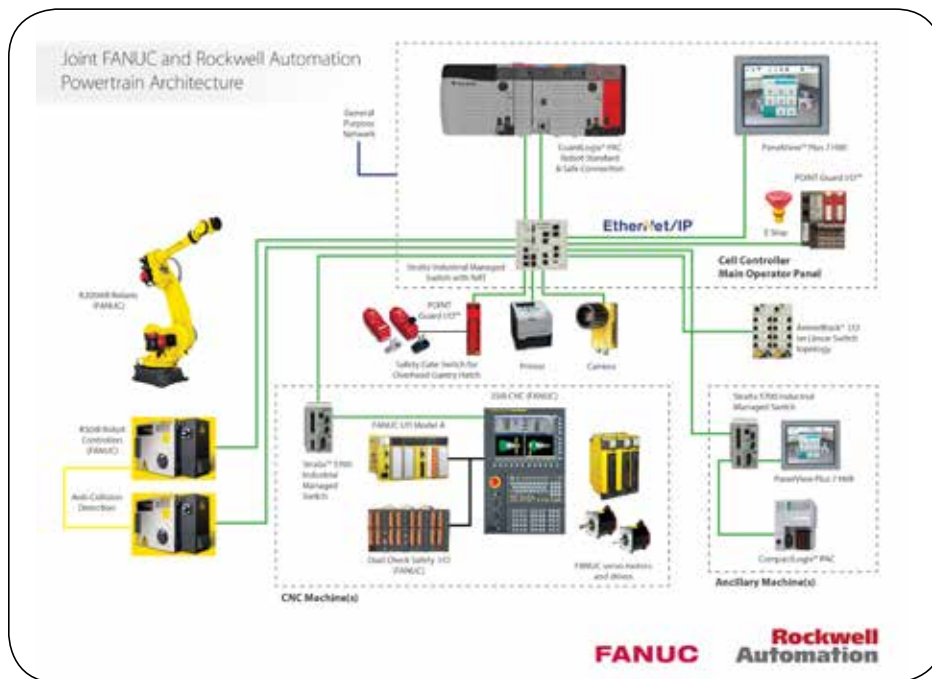
By using a common network topology, valuable machine status and part production data is available anywhere on the machining cell, plant floor and enterprise without the complexity and expense of custom engineered networking hardware and software. A common network also supports the growing trend of IT and OT convergence, allowing both industrial and enterprise workers to contribute to a more holistic network management approach. With pre-engineered integration between the CNCs, robots and the cell controller, manufacturers minimize the time specifying these connections and then reviewing each machine builder's work for compliance.

Machine tool builders will benefit from reduced engineering time and cost savings with one network and one programming environment. Rockwell Automation Studio 5000 programming software has pre-defined connection profiles for FANUC CNCs and robots that can be quickly loaded. The programmer can simply choose a FANUC device by name from the connection menu and begin writing the application program; the integration work is already done. Benefits include: machine control programs become simpler to develop and troubleshoot; machine safety is in the same cell controller; operator diagnostic messages can be embedded; and data collection and reporting can use the same systems. Additionally, sending part data to IT systems becomes much easier with Studio 5000 exclusive tag-based addressing. Part information from the machining operations can go directly to IT servers, eliminating the need to collect it into a cumbersome memory map format. In fact, larger volumes of data can be transferred in a simple array.



Typical Architectures

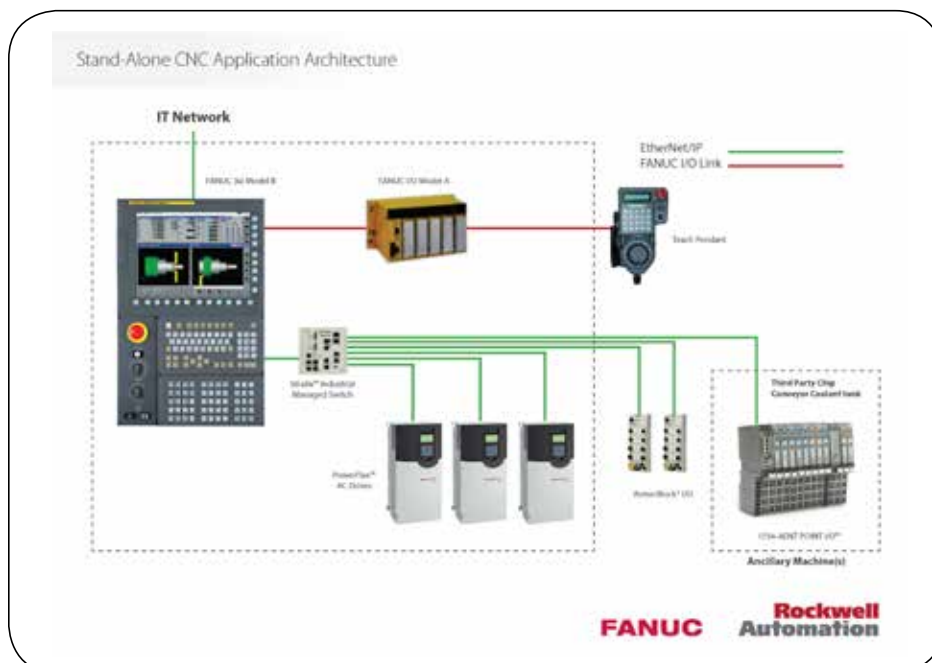
Integrated Solution



- Allen-Bradley® Programmable Automation Controller (PAC)
- FANUC CNCs
- FANUC Robotics robots
- EtherNet/IP network
- SIL 3 integration with modular Safety I/O
- PAC and CNC information available on Rockwell Automation HMI
- Simplified CNC and robot integration with Studio 5000 Add-on Profile (AOP) jointly developed by Rockwell Automation and FANUC
- FactoryTalk AssetCentre provides configuration change management and disaster recovery

An integrated solution is ideal for a machining cell controller architecture comprised of several FANUC CNCs cutting parts and FANUC robots handling the loading and unloading. These architectures typically include coolant and chip removal systems, debur and wash machines, test operations, part marking, identification and inspections stations and more. Common connectivity to EtherNet/IP makes engineering and managing all of this integration much more simple, especially with those devices that are already profiled in the Studio 5000 programming software. This solution is very scalable, allowing you to choose the devices you need. Take advantage of the pre-developed tools and preferred integration to reduce engineering time.

Standalone Solution



- FANUC CNCs
- Rockwell Automation I/O and devices controlled by FANUC CNC over EtherNet/IP
- Optional Rockwell Automation HMI for machine status and diagnostics
- FactoryTalk AssetCentre provides configuration change management and disaster recovery

A standalone solution is ideal for lower volume/higher product mix applications where complete integration with PACs is not required. This solution is scalable to an integrated solution with minimal engineering effort.



CNC Machining Accelerator Toolkit

The CNC Machining Accelerator Toolkit is designed to simplify the integration between Rockwell Automation Logix control, motion and safety platforms with FANUC CNC systems.

The toolkit provides:

- FANUC CNC/Allen-Bradley GuardLogix® PAC machining center system architecture
- CAD layout and wiring drawings
- FANUC CNC/GuardLogix PAC interface
- Pre-configured supervisory and safety logic
- Pre-configured supervisory HMI faceplates
- Step-by-step Quick Start manual

Request from your local sales representative.



Rockwell Automation and PartnerNetwork companies collaborate to help you develop an ongoing approach to plant-wide optimization, improve your machine performance and achieve your sustainability objectives.

FANUC

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FANUC America Corporation of Rochester Hills MI, is a subsidiary of FANUC CORPORATION Japan, and provides industry-leading robotics, CNC systems, and factory automation. FANUC's innovative technologies and proven expertise help manufacturers in the Americas maximize efficiency, reliability and profitability.

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The FANUC European headquarters (FANUC Luxembourg Corporation) is based in Echternach, Grand-Duchy of Luxembourg. FANUC Luxembourg Corporation has a network of 28 subsidiaries in Europe and provides sales, technical, operations, marketing and service support all over the continent for FANUC CNC, Robots and Robomachines products.

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