

Bosch-Rexroth develops a high-power winch test stand with software solution by Blue System Integration using NI FieldPoint RT controller and LabVIEW-RT

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The Challenge:

Developing a stand-alone, versatile winch test stand system that can be easily upgraded as test requirements evolve.

The Solution:

Using National Instruments Compact FieldPoint RT and a touch-screen system, both running embedded real-time OS.

Introduction:

Bosch Rexroth Canada was looking for a robust software system to act as both controller and user interface of a newly designed winch test stand system. The system had to be versatile, fully embedded, and flexible so that future modifications at the hydraulic level could be matched by modifications and upgrades at the software level. The test stand had also to be designed to be operational in an industrial environment with frequent oil spills and temperature fluctuations.

The Solution

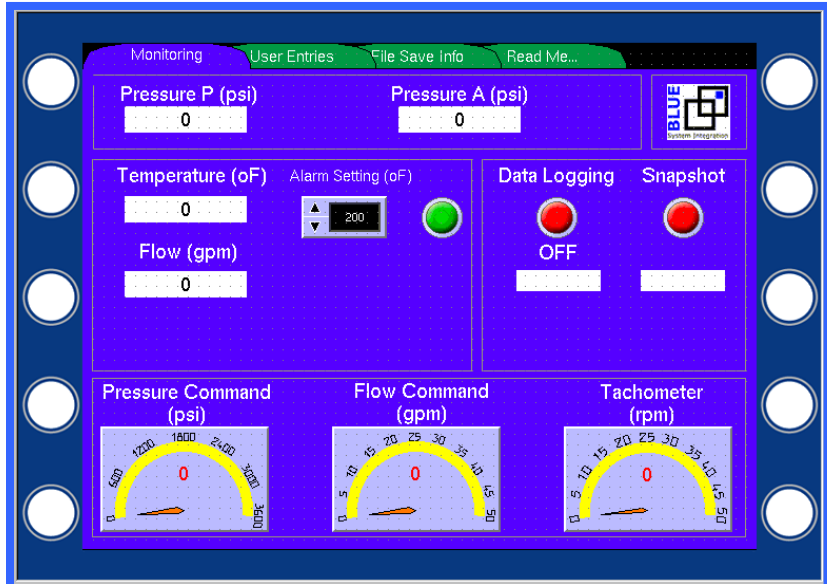
First of all, one of the two main components of the acquisition system was selected. National Instruments Compact FieldPoint RealTime controller - cFP 2020 - offers the ideal choice for the system onboard intelligence: running as an embedded system, it can control the broad



selection of compact FieldPoint modules allowing for high flexibility in data acquisition, control and communication capabilities. The cFP 2020 is also equipped with a separate, removable flash RAM storage that allows local backup of

critical test data.

For data acquisition, we used a cFP-AI-110 for multi sensors analog inputs such as pressure, flow, and temperature transducers. To measure angular motion, a

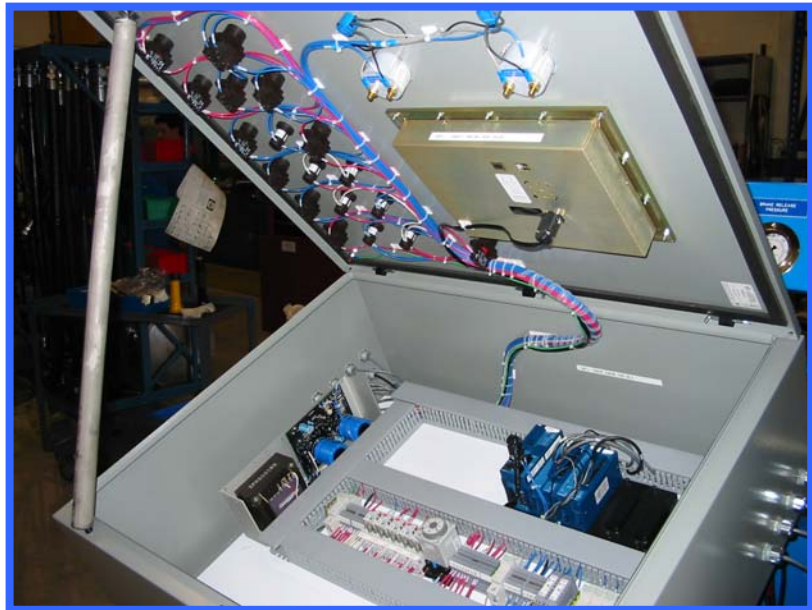


cFP-CTR-500 module was used to count pulses out of an angular encoder. Here the flexibility of Compact FieldPoint leaves the door open to the addition of several extra modules to perform as varied I/Os functions as may be required in the future.

The second main component of the system was a QSI G75 touch-screen embedded computer chosen for its reliability, ruggedness, and easy integration with National Instruments LabVIEW. Connectivity between the cFP 2020 and touch-screen was eased by QSI's LabVIEW VI library, and the communication options available on the FieldPoint controller: RS232, RS485, Ethernet. We chose serial communication with RS232 in order to keep both systems' Ethernet ports available. This way, touch-screen and FieldPoint controller can become part of a network creating a larger data sharing architecture.

Expandability and Versatility

There are many ways the current system can be upgraded according to new requirements. Testing often includes the tracking of part and serial numbers so each element making a given winch can be identified during testing and in the future well after the test had been performed. To do so, a relational database should be used to keep record of past and present tests. In the database, creating an adequate relationship structures would allow effective inventory of parts, testing cycles, and performance. This data tracking is not only critical for warranty and customer satisfaction, but also, for industrial certifications, and for providing value-added to customers data. It empowers the user with many powerful analysis tools and techniques to obtain the meaningful information that is contained in the data provided by the application.



Database connectivity, test report generations, advanced analysis are all part of National Instruments LabVIEW capabilities and can be easily implemented in the current application.

Conclusion

This application is an example of a fully embedded solution for an industrial test stand system. Data acquisition is based on Compact FieldPoint running LabVIEW RT while the graphical user interface is made of a touch-screen system running on its devoted embedded system, making the

whole application embedded.

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