



Uniquely configured drive and AFE system

ROCKWELL AUTOMATION AND STARO PROCESS CONTROL PROJECT SETS INDUSTRY STANDARD.

Rockwell Automation, together with system integrator Staro Process Control, have installed a 95%-efficient Allen-Bradley PowerFlex drive and active front end (AFE) system in an industry leading configuration that successfully meets the project demands of a retrofit upgrade on an existing DC to AC assembly for one of the country's top steel manufacturers.

Providing technical and commercial engineering assistance on the project, Rockwell Automation's responsibilities extended to component selection and the adequate matching to applications. The demand for the upgrade at the customer's rod mill section arose due to a lack of parts availability and the high costs associated with the maintenance of outdated DC technology. The main customer requirements of the new configuration included reliability, high speed, excellent performance and a successful integration into the manufacturer's existing ControlLogix platform.


To meet these demands, the Allen-Bradley PowerFlex 700S AC drive was selected for this project due to its easy starting, communication flexibility, performance, synchronicity and suitable flux vector mode operation. Four of these 600 A drives were installed and connected to a common DC bus, which ensures the supply provided to the drives is sufficient to maintain the torque and speed required during the massive changes in load. This bus is supported by two units of Allen-Bradley PowerFlex 700AFE, a regenerative DC bus supply used to supply DC power to a line-up of AC drives with common DC bus input on a single common bus drive. All of this equipment is built into panels that incorporate switch gear controls.

According to Rockwell the most impressive part of this project is the unique product configuration. The AC

supply enters into the AFEs, providing the common DC supply that is fed through the pre-charge circuitry of the drives and converted back to AC for the motors. In addition, the AFEs in this arrangement work together, as opposed to the usual master-slave set-up, allowing them to meet the current demands of the four drives when providing power for the motors.

The drives are controlled through the customer's existing ControlLogix system, which is connected to an Ethernet that provides data to other systems. Existing visualisation software, RSVIEWSE allows for easy, remote monitoring of manufacturing processes from an Internet browser, including several enhancements that help reduce visualisation solution implementation time for engineers. The system is also highly energy efficient as it does not waste regenerative energy with resistor braking technology, but rather directs it straight back into the grid. This achieves drive efficiency of about 97%, while the total efficiency of the system is about 95%. Incorporating safety features into the initial design the system was built to meet all EU safety requirements.

By applying Rockwell Automation products in slightly different ways, similar configurations could benefit other mining and metals and applications, including conveyor systems with a regenerative-type load requirement, high inertia loads and shock loads where dynamic torque and speed performance are needed.

This project represents the first time an active front end was implemented by one of Rockwell Automation's channel partners in South Africa. As an authorised Rockwell Automation distributor and the system integrator and lead engineer for the project, Staro Process Control managed groundbreaking installation, expanding the company's domain experience in the process. "Configuring the AFEs presented no challenges, everything flowed smoothly just as we expected," concluded Staro Process Control project manager, George Muller. 

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