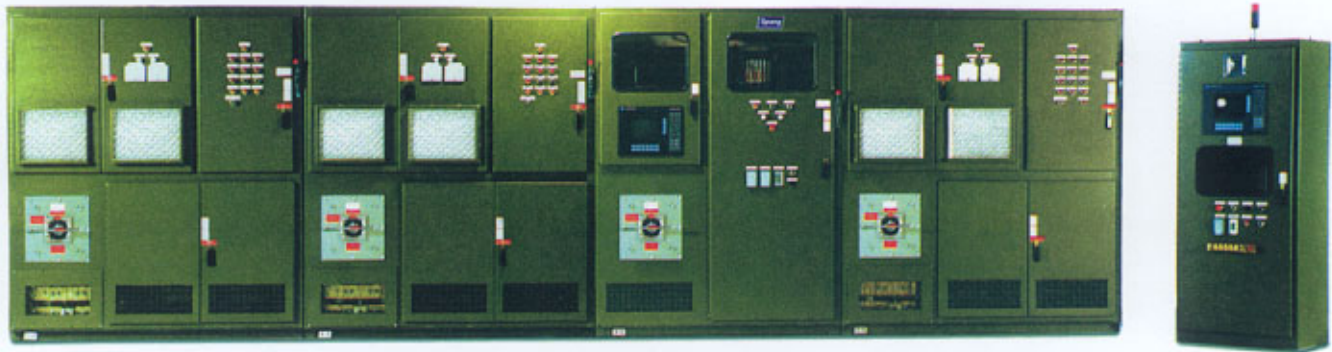


Spang Power Electronics

PROJECT PROFILE



Spang Power Electronics designed and manufactured a multi-zone, 12-pulse, rectifier system for Ford Motor Corporation's Ontario, Canada truck plant. It is used for the electrical deposition of rust inhibitive coating to car bodies. This electrocoating system paints one car body each minute and a total of approximately 1000 car bodies each day.

The rectifier system consists of three (3) rectifier modules, each capable of delivering 1400 ADC at 500 VDC into two zones. A DC distribution/control section contains a programmable logic controller to control the functions of the rectifier system. A remote operator's control console serves as the main operator control center. The 12-pulse design allows a high current output while minimizing input harmonics and output ripple. This results in reduced power source distortion and higher product quality.

Rectifier System Operation

Each rectifier module is a completely self-contained power supply. One rectifier module serves each zone. SPANG designed the third module to be switchable into either zone in the event of a rectifier failure. Each module consists of an input circuit breaker; a 920 KVA rectifier transformer; two 6-pulse bridges; an interphase transformer, an L-C filter, an output DC switch and control circuitry.

The input circuit breaker serves as the main disconnect. The power transformer isolates the line from the load and steps down the 480 volt input. A dual wound Delta-Wye secondary splits the output into two, 30° phase shifted voltage sources. A 6-pulse SCR bridge, connected to each secondary, rectifies the output into 12-pulse DC. To ensure equal sharing between the two bridges, each

system incorporates an interphase transformer. The L-C filter reduces output ripple to a maximum of 4¹/₂% for improved paint quality.

DC Distribution and Control Center

The DC distribution/control section sits in the middle of the rectifier line-up. There are two compartments with two different functions. The front compartment contains the PLC and the main controls for the entire rectifier system. The rear compartment serves as the DC power wiring

Two Zone Electrocoating Rectifier System for Ford Motor Corporation

consolidation area for rectifier load wires. Customer wiring to the tank zone anodes and conveyor rail are located in this section. A Panelview is mounted on the front of the compartment and allows process monitoring and local control at the line-up. Most operator control occurs via a second Panelview mounted on the remote console.

Improved Reliability

Downtime on the electrocoating line cannot be tolerated. System downtime can cost Ford Motor Corporation about \$5,000 per minute! As a result, Spang Power Electronics designs electrocoating rectifier systems for the highest degree of reliability.

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Two Zone Electrocoating Rectifier System

The PLC design simplifies process monitoring for quick troubleshooting and easy process modification. PLC data feeds directly into the Ford's Factory Information System (FIS). This information is then retrievable via the company's mainframe computer system. The PLC also

contains a modem. This allows the project engineer at Spang Power Electronics to monitor the process from his own computer. This can allow him to review diagnostic data and perform immediate troubleshooting or programming changes as needed.



Example of the Panel View screen while monitoring the electrocoating process.