

PROJECT PROFILE

New High Current Active Regen Digital DC Rectifiers

Spang Power Electronics was awarded an order to provide a new High Current Digital DC Rectifier as a universal replacement for multiple, (6) distinct magnetic separators.

Background

Thiele Kaolin Company, an industry leader in innovative products for paper and packaging mines, processes, and delivers a wide range of kaolin and silica products. Kaolin, also called china clay, is a soft white clay that is an essential ingredient in the manufacture of china and porcelain and widely used in the making of paper, rubber, paint, and many other products.

Sandersville is known as the “Kaolin Capital of the World.” One of Georgia’s most important minerals, kaolin is a white, alumina-silicate clay used in hundreds of products ranging from paper to cosmetics to the nose cones of rockets.

Thiele, with processing facilities in Sandersville and Wrens, Georgia, utilizes many magnet-based separators to remove contaminants from the mined kaolin for the purpose of improving the purity or “whiteness”. These magnets are powered by high current DC power supplies or rectifiers that actively control the charge and discharge process. The separators and rectifiers are critical to Thiele’s production process.

Thiele contacted Spang seeking its support and technical expertise to design a universal rectifier that would electrically and mechanically fit any / all its existing rectifier installations. This single rectifier could be quickly installed, connected, and configured to power any of its separator magnets. The rectifier was a universal spare which would be available to quickly replace any existing rectifier in the event of a catastrophic failure. Due to the multiple ratings and wide voltage and current ranges as well as differences in installation locations, this was a technical challenge.

Thiele recognized Spang as an industry leader and by its own experience, a manufacture of high quality and long-lasting equipment. Thiele had and continues to enjoy reliable operation from an existing Spang rectifier. Commissioned in 1981, this rectifier is over 40 years old.

Thiele additionally required application specific features including:

- Adjustable active regeneration / discharge
 - Adjustable to increase / decrease the rate of magnet discharge
 - 2nd quadrant operation removes the energy from the magnet and returns it to the power source
- Crowbar safety circuit
 - In the case of equipment failure, the crowbar safety circuit automatically shorts the output of the power supply / input to the magnet and discharges the magnet’s energy. This protects the magnet and connected equipment from possible overvoltage conditions.
- Magnet flow / temperature interlocks
 - Integral magnet separator interlocks within the power supply, with annunciation and shutoff
- Ethernet IP Communications
- PC Configurations
- Integrated Panelview HMI

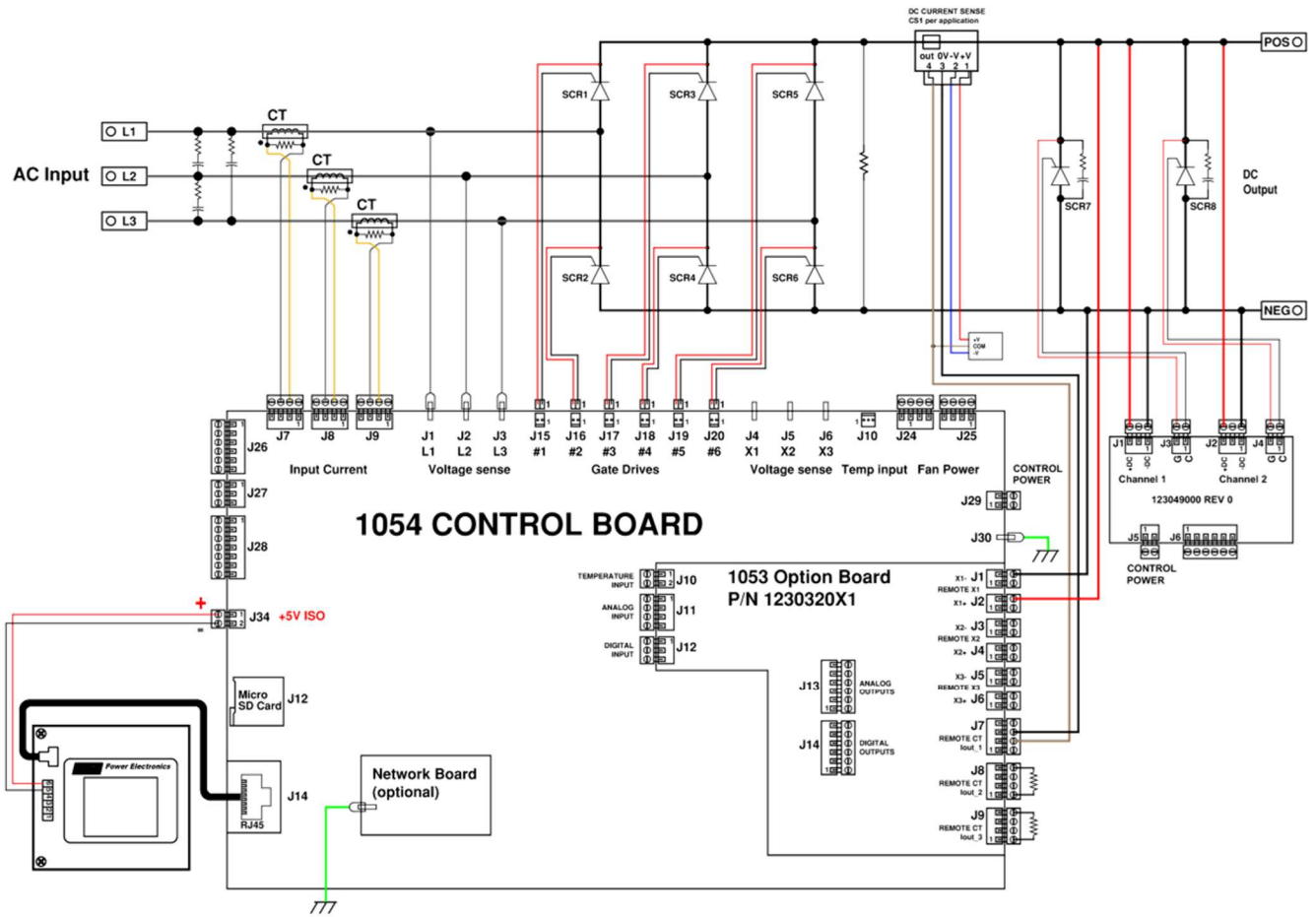
Spang and the Thiele worked closely together from initial budgeting, to detailed design, and through installation / startup of the power supply and automation equipment. Close electrical, mechanical, and process control coordination was critical to ensure a quick change over to the Spang solution. Within the planned process outage, the team successfully commissioned the equipment.

Summary - DC Rectifier Specification

Input: 480VAC/3 Phase/60Hz
 Power Supply Output: 307VDC Max / 3950ADC Max
 Regulation Mode: Current

1054.06 Control

The precise customer requested functionality and rectifier control comes from Spang Power Electronics **1054.06 Series Digital Power Controller** and its proprietary firmware. The 1054.06 is a multifunctional Digital Signal Processor (DSP) based power controller that includes all necessary hardware interfaces required to properly gate the SCRs, accept voltage and current feedback from the process, and interface with the I/O required to operate the power supply.



1054.06 One Line Power Topology



NEMA 12 Power Supply Enclosure

Spang Power Electronics

9305 Progress Parkway
Mentor, Ohio 44060

Website: www.spangpower.com
Email: spesales5@spang.com
Phone: 440-352-8600
Fax: 440-352-8630