



CASE STUDY

Welding Manufacturer Corrects Disruption and Unstable Voltage with PowerVar Capacitor Bank

The Challenge

An industrial chain-link manufacturer was experiencing power issues during high speed single-phase welding. This unique manufacturing process, coupled with running several machines simultaneously, placed a high level of strain on the power system supporting the welding — creating an extremely unbalanced network. The manufacturer needed a solution that could help the power system stabilize and react quickly to a multitude of single-phase loads.

The Solution

Upon reviewing the issue, Powerside determined that for the system to efficiently react to load changes within milliseconds, **three main problems needed to be addressed:**

- The machines produced harmonic distortion, or extra “noise” that interrupted power quality
- Unstable voltage kept power from flowing steadily
- Phase-to-phase connected loads couldn’t be properly managed with traditional 3-phase capacitor banks

Industry

Manufacturing/Welding

Project Type & Timeline

- A 480Y/277 VAC service feeding welding equipment and furnaces
- 8 weeks

Equipment

PowerVar Low Voltage Auto Bank



To deal with the rapidly changing power needs during welding, Powerside developed a capacitor bank with thyristor switches to manage the various filter stages. In this way, the system could quickly respond to fluctuating power demands of single-phase loads, balancing power distribution and ensuring voltage stability. While this system could now adequately react to the changing loads, there were also other network dynamics at play. Specifically, power factor needed correcting to neutralize each single-phase load.

Powerside built three independent capacitor banks for the A-, B- and C-phases to neutral. Each bank operated autonomously, enabling fine-tuning of the power factor correction to match the specific characteristics of each phase's load profile.

The Results

The implementation of the capacitor bank solution enhanced both the manufacturer's power system performance and efficiency. By introducing power factor correction across all phases, power usage is effectively maintained around a desired 0.98 level — eliminating penalties from the utility.

Not only that, achieving voltage stabilization during the welding cycles has mitigated disruptions, ensuring the seamless operation of machinery even during intense load fluctuations.

Notably, the total harmonic distortion of the network decreased. By mitigating unwanted noise and fluctuations, the power flowing through the system is cleaner and healthier for the connected equipment. **In turn, this contributes to an increased lifespan of machinery, reducing maintenance costs and enhancing operational reliability.**

The overall positive impact on the utility distribution grid voltage is a testament to the value of innovative engineering in shaping a more efficient and harmonious industrial landscape.

Operations Benefits At-A-Glance

- ⚠ Eliminated utility power factor penalties
- 🕒 Increased equipment lifespan
- ⚡ Improved distribution grid voltage



Ensure your large-scale industrial operations have the corrections equipment needed to keep production moving. Learn more about PowerVar Low Voltage Auto Bank today.

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