

Application of Thyro-A Power Controllers in Vibration Technology

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Introduction to Vibration Technology

Vibration conveying technology is a proven method for controlled movement and dosing of bulk materials in industrial processes. It is used in numerous industries—from food processing and chemicals to metallurgy and recycling. The conveying motion is typically generated by electromagnetic drives that produce linear or oscillating movement to transport material efficiently and evenly.

Precise control of these magnetic drives is crucial for process quality, energy efficiency, and system longevity. Power controllers play a central role by regulating the energy supply to the magnetic drive and adapting it to specific process requirements.

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2. Challenges in Controlling Electromagnetic Drives

The requirements for controlling magnetic drives in vibration systems are demanding:

- Long-term reliability under harsh industrial conditions
- Robustness against current spikes and voltage disturbances
- Compact device design
- Flexible parameter settings
- Global usability with various voltages and frequencies
- Compliance with standards and fieldbus integration
- Challenges with proprietary devices: maintenance, standards, and fieldbus support

3. Solution Approach with AE Thyro-A Power Controllers

Technical Features:

- Voltage range: 110 V to 550 V, current range: 8 A to over 100 A
- Automatic frequency adjustment (50/60 Hz)
- Fieldbus support: Profibus DPV1, CANopen, PROFINET, Modbus TCP/IP, EtherNet/IP, EtherCAT
- Device protection: integrated semiconductor fuse, temperature and voltage monitoring, fault signal relay
- Certifications: CE, UL, CSA, RoHS
- Software: Thyro-Tool Pro for parameterization and maintenance
- Control modes: phase angle, voltage control (U, UxU), feedback control

Operational Benefits:

- Stable and precise drive control
- Easy maintenance
- Scalability
- Future-proof integration
- Space-saving design
- High reliability
- Improved energy efficiency

4. Application Example: Integration and Optimization in Existing Conveyor Systems

In an existing industrial conveyor system, proprietary control devices were replaced with Thyro-A thyristor power controllers. The goal was to modernize the control of electromagnetic drives while improving operational safety and energy efficiency.

The previous devices included an analog input for measuring vibration amplitude, essential for process control. Initially, Thyro-A devices did not offer this feature.

Through close collaboration with the development team, the firmware was enhanced to include an analog input for the vibration amplitude sensor. The original sinusoidal signal was later averaged for more stable control. Limit parameters and the setpoint-to-output voltage curve were adjusted to eliminate dead zones.

Results:

- More stable conveying performance
- Reduced commissioning times
- Increased energy efficiency
- Improved communication with PLC
- Extended drive lifespan
- 12 devices integrated via PROFINET

5. Conclusion and Outlook

The use of Thyro-A power controllers clearly demonstrates the adaptability and customer-oriented approach of Advanced Energy solutions. Firmware modifications enabled tailored solutions for specific requirements.

This flexibility is not unique—similar adaptations have been successfully implemented in the past, and Advanced Energy will continue to support customer-specific needs in the future. Ongoing product development and the integration of new features into standard devices reflect the commitment to providing cutting-edge, practical solutions for industry.

Should further requirements arise in the field of vibration technology, Advanced Energy is ready to analyze and implement them—ensuring efficient, reliable, and future-proof control of magnetic drives.



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AE's power solutions enable customer innovation in complex semiconductor and industrial thin film plasma manufacturing processes, demanding high and low voltage applications, and temperature-critical thermal processes.

With deep applications know-how and responsive service and support across the globe, AE builds collaborative partnerships to meet rapid technological developments, propel growth for its customers and power the future of technology.

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