SUCCESS STORY

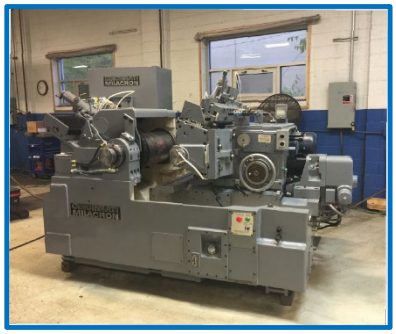
STEEL BAR GRINDING SOLUTION

INFORMATION

Industry:
Material Handling

Application:
Grinding Machines

Product:
U1000 Industrial Matrix Drive



OVERVIEW

Based in Clinton Township, MI, Excel Industrial Electronics, Inc. stands as a leading industrial distributor, system integrator, and Yaskawa authorized service provider. This firm, reputed for customized, cost-effective drive solutions, adeptly applied a Yaskawa U1000 Industrial Matrix drive to resolve a steel bar grinding issue experienced by a machine builder in Detroit.

APPLICATION CHALLENGE

Centerless Grinder Repair (CGR), a company located in Roseville, MI, required a method to enhance and optimize the performance of its centerless grinding machines that catered to the steel bar market. The existing machines incorporated standard variable frequency drives coupled with dynamic brake resistors. These systems functioned satisfactorily with light stock removal (ranging from .008/in. to .012/in.) and shorter steel bar stock lengths. However, issues arose when loading longer steel bar stock lengths with a higher stock removal requirement. In such situations, excessive heat accumulation in the dynamic brake resistor. With an ineffective resistor, the drive would immediately stop the motor due to an overvoltage (ov) fault. This resulted in considerable downtime while waiting for the resistor to cool down. Increases to the steel bar stock's weight, length, and cut increased the machine's downtime due to frequent ov faults.

The project's primary objectives included enabling the machine builder to feed steel bar stock without restrictions on weight, length, and grinder cut, thereby improving customer productivity.

THE YASKAWA SOLUTION

Excel Industrial Electronics introduced the U1000 Matrix drive to CGR to accomplish the primary goals, save energy, and eliminate moving parts and peripheral components. Differing from conventional drives, the U1000 has no DC link circuit with diode and main capacitor, resulting in higher efficiency.

The centerless grinding machine is operating with a 10 HP, 460 V U1000 Matrix drive and a 5 HP induction gear motor (10:1 ratio). By implementing the U1000, the machine can increase throughput due to the drive's ability to immediately redirect energy back onto the line. This allowed continuous drive operation during periods of excessive demand.

The full regeneration capability now allows the machine to handle longer bar stock lengths, heavier steel bar weights and deeper cuts (> .024/in) while returning the regenerative energy to the utility company to save energy rather than being discarded as heat.

CGR has successfully provided its customers with machines that are performing optimally and has allowed its customers to increase production, save energy, and eliminate costly components.

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Innovative Matrix Technology

The U1000 can be used for standard and regenerative applications with the unique advantage of direct AC-to-AC power conversion. This unique design offers the best choice for induction motors (IM) and permanent magnet motors (PM). Benefits include low input current harmonics with near unity power factor allowing for increased energy efficiency. The bi-directional switching technology allows for continuous motoring or continuous regeneration. This means that fewer parts are required, leading to higher machine reliability. Moreover, the U1000 can automatically switch into across-the-line operation through the drive, eliminating drive generated harmonics, drive losses, and motor noise.

Low Harmonic Solution

The U1000 offers the best low harmonic solution in one unit. It does not need any external devices for IEEE 519 compliance. Its harmonic performance meets the most stringent requirement of IEEE 519 at the input of the drive, making it an all-around green solution. Its input harmonics remain low, not just at rated power, but well below leading harmonic solutions throughout the speed/load range.

Clean Power

The sinusoidal input current, with a total harmonic distortion of less than 5%, and a displacement power factor of approximately 1.0, minimize losses in grid components like generators and transformers. This, at the same time, greatly reduces the potential of disturbance of other devices and improves the reliability of your system.

Energy Saving 4Q Operation

Thanks to matrix technology, the U1000 can operate in full, continuous regeneration. It is your best drive for applications like conveyor, winder, escalator, lift or test bench, where braking energy needs to be considered. The AC-to-AC design does not require any braking resistor which takes space in the cabinet and creates additional heat during regeneration. Best of all, no parameter settings are needed to enable the U1000's regeneration. The U1000 can instantaneously and automatically switch from full motoring operation to full regenerative operation.

Compact Size

The U1000 is an all-in-one compact solution for low harmonics and regeneration. There is no smaller solution. Save as much as 80% space. Retrofits and upgrades are easy, since it easily fits in nearly every 18-Pulse package.

Cost Saving

The U1000 provides cost-saving benefits through a simplified installation and smaller panel requirements. The U1000 eliminates braking resistors that convert regenerative energy into heat which can be a safety concern in some application environments.

Time-Saving Installation

As no external components like harmonic filters or active front end units are required, connecting a U1000 drive becomes a matter of minutes. 3 wires in, 3 wires out. It cannot be easier to build a low harmonic regenerative solution.

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