



Magnetek Mining Controls: RDH Mining Equipment battery powered underground loader (LHD)

Project – RDH Mining Equipment Ltd

Application – Battery Powered Underground Loader (LHD) Drive Location in Alban Ontario, Canada

Products Used – M-FORCE SD500 Liquid Coded Variable Frequency Drive

RDH Mining Equipment Ltd., located in Alban, Ontario, Canada, has been providing mobile mining and tunneling equipment for use in global mining applications for over 30 years. Traditionally underground mobile mining equipment was powered by diesel engines which require the use of costly ventilation systems to handle emissions. Government regulations require a certain amount of cfm ventilation per horse power of diesel equipment.

In 2011, RDH began developing a new line of battery powered mobile equipment for mining applications that would eliminate the diesel motor and associated emissions issues. Initially RDH incorporated a competitive drive into their first battery-powered prototype, the Muckmaster 300EB LHD, a compact 3 cubic yard loader suited for narrow vein mining and tunneling applications. Similar in function to a front end loader, an LDH is designed to meet the harsh conditions in underground hard rock mining and is used to remove the muck after the blasting operation.

During initial prototype testing of the Muckmaster 300EB LHD, and their follow-up 2012 Haulmaster 800-20EB, a 20 ton battery-powered haul truck, RDH recognised the need for a drive supplier with an understanding of the “harsh” conditions inherent in underground mining.

RDH came to Magnetek, a world leading designer and manufacturer of mining control products. Magnetek engineers provided RDH Mining Equipment with a rugged, liquid cooled Variable Frequency Drive (VFD) that would work with a lithium battery to control an electric motor, delivering optimum performance and efficiency. Magnetek’s M-FORCE SD500 drive controls the electric motor from an onboard battery.

The combination of the M-FORCE SD500, battery and electric motor made it possible for RDH to successfully replace the diesel engine and launch the Muckmaster 300EB in 2013. RDH followed this up in 2015 with their Muckmaster 600EB, the world’s first 6 cubic yard battery powered underground loader. Above ground testing with the M-FORCE SD500 system showed the battery powered LHD exceeded performance of the diesel operated machine. The Muckmaster 600EB has been successfully operating in gold mines at various locations around the world.

“We selected Magnetek as our Variable Frequency Drive supplier because of their proven track record of providing VFDs to the underground coal mining industry. They understand the harsh conditions under which the electronic equipment must operate in a mine,” said Gus Portalier, Chief Operating Officer at RDH. “Magnetek very quickly



provided a fully functional traction drive for testing that met our requirements, and also sent a team of engineers and service technicians to assist us with the launch of the Muckmaster 600EB, tuning the motor drive system on site for optimum performance.”

Incorporation of this state-of-the-art battery powered electric motor system into RDH’s mobile mining equipment was revolutionary in the mining industry, providing underground miners with a healthier work environment by lowering diesel particulate matter (DPM) and reducing noise and heat associated with a diesel powered machine. Use of RDH’s battery powered equipment results in reduced ventilation and maintenance costs for mine operators, and battery powered LHD performance meets or exceeds the performance of previous diesel engine equipment.

Magnetek’s engineering team continues to work with RDH to develop further battery powered mobile mining equipment. Magnetek has been providing drives for battery powered mining equipment for over 10 years, with over 350 battery powered machines in service in underground coal mines worldwide. A leader in the mining industry, Magnetek has been supplying DC and AC Drives to large original equipment manufacturers for over 40 years.

CHALLENGE

- Provide a rugged Variable Frequency Drive (VFD) for a battery powered LHD that allows elimination of diesel engine power
- Provide a healthier work environment for underground miners
- Reduce ventilation and maintenance costs
- Reduce heat generated by the diesel machine
- Meet or exceed the performance of the diesel engine LHD

SOLUTION

- Magnetek designed our M-FORCE SD500 Liquid Cooled VFD to meet this demanding application
 - 300 - 800 VDC input for a 460 VAC output, 300 HP, with 150% overload
 - -10° to 55° C ambient temperature with 50/50 Glycol coolant
 - Full regenerative capabilities
- Water-tight enclosure
- Rugged design meets harsh mine conditions