

APPLICATION NOTE

High voltage motors for mills

More for mining



ABB's motors for mill applications are built for high levels of performance, quality and reliability in harsh conditions. They meet high demands for availability and help mining companies to operate mills continuously 24/7.

Perfect compatibility with mill starting requirements

ABB's motors are compatible with different starting, controlling and driving requirements for mills. The engineering of each motor is customized according to the mill's requirements. This enables reliable, precise and smooth control of mills, which has a significant impact on production throughput and operating costs.

ABB offers a full range of low and medium voltage drives, and can provide induction or synchronous motors according to the power, torque and speed requirements. The design of the drive and motor combination is optimized to match the solution needs, resulting in important benefits for the overall process.

Mills require high starting torque, low speed and overload capability. There are many options for starting, controlling and driving mills, with the optimum choice depending on the size of mill or power requirement.

The selection between variable speed drive (VSD), direct-on-line or gearbox solutions usually depends on economic life cycle evaluation and site requirements.

Gearless mill drive

For mills that are large in diameter or require over 20 MW (approx.) of power, the only viable alternative is currently the gearless mill drive (GMD).

In GMD systems the motor's poles are directly installed on a pole flange on the mill shell, and the body of the mill itself becomes the rotor.

Ring-gear mill drive

For mills with standard diameters or requiring less than 20 MW (approx.) of power, ring-gear mill drives (RMDs) offer the best solution.

Three of the most common drive types for RMDs are low speed motors without a gearbox, high speed motors with a reduction gearbox, and variable speed drives (VSDs).

No gearbox: The low speed motor is connected directly to the pinion. The rated speed is typically around 200 to 400 rpm. Synchronous motors are typically used due to the high available torque and high efficiency.

With gearbox: The high speed motor is connected to the gearbox, which is coupled to the pinion and ring gear. The rated speed is typically around →



1,000 or 1,200 rpm. An asynchronous wound rotor induction motor with secondary starter is normally used to meet the high starting torque requirements. ABB has a complete range of gearbox and slip-ring motors, and can offer an optimized motor and gearbox solution for any type of mill application.

Variable speed control allows the system to easily react to changes in ore characteristics and throughput. Therefore changes in ore characteristics do not require changes in mechanical components. Also, the speed of the mill can be tuned for optimal grinding and maximum throughput, resulting in a more efficient use of the grinding power. VSDs can adjust the speed according to the fill level of the mill.

**ABB's high voltage motors:
the best way to drive your mill**

ABB's motors are based on reliable designs, proven in thousands of mining installations, and provide high productivity in demanding conditions.

Induction motors are the workhorses of industry due to their versatility, reliability and simplicity. Squirrel cage induction motors are available up to 28.5 MW, and they are usually the first choice in the power range up to 10 MW. They can be connected direct-on-line, with fluid couplings or fed via variable speed drives. They are the best choice for in-plant and medium scale overland conveyors.

Synchronous motors are typically preferred when higher power and torque are required.

In addition to their high power capabilities (up to 75 MW), synchronous motors offer the benefits of high efficiency, high performance and an adjustable power factor. This solution is a perfect match for the low speed and high torque requirements of overland conveyors. They can be connected direct-on-line, with fluid couplings or fed via variable speed drives. ABB can also provide low voltage synchronous permanent magnet motors. These motors are ideal choice for low voltage, high torque, high efficiency and direct drive applications.

Slip-ring motors are induction motors with a wound rotor solution. They are available up to powers of 8 MW and represent a good choice for installations in remote areas or with high starting torque requirements. A liquid rheostat is used for starting.

ABB's motors represent a robust, safe and energy efficient solution for energy-intensive processes in harsh conditions and remote areas. For mining companies, energy costs represent 25 to 30 percent of operating costs and motors account for around 60 percent of on-site energy consumption. Selecting the right motor lowers the cost of ownership of the entire mining plant.

ABB's excellent mining application specific know-how and technical expertise, gained from thousands of mining installations, make us an ideal partner for mining companies who want to improve reliability and efficiency of their processes.

For more information please visit:

www.abb.com/motors&generators

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