

World Class Mining Drives

When you operate in an industry where the productivity and downtime stakes are so high, you need to be secure in the knowledge that you have selected the best equipment on the market.

ATB Morley have manufactured custom-engineered mining motors on the same site for more than a century. Renowned for their endurance and unwavering reliability, Morley's no compromise approach to quality has led it to become the specified supplier for longwall systems across the globe.



PRODUCT RANGE

ATB Morley has achieved global recognition in all the key mining markets and the company's products are certified to comply with a variety of international standards.



Mining motor products include, but are not limited to the following drives:-

VFD MOTORS

Morley motors power some of the world's most productive longwall systems. From AFC to Shearer applications, our mining motors are at the heart of delivering power both smoothly and reliably. In conjunction with our alliance partner Lianli Automation, ATB Morley launched its first 3,300V integrated motor and inverter at the Beijing coal show. Designed for the longwall's of tomorrow, the initial offering be at 1,200kW of shaft power.

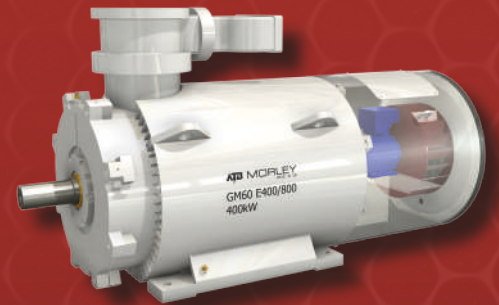
- Up to 2,000kW
- Mine water cooled
- 12 pole input
- 3300V
- 1200kW Shaft Power
- Full control of torque from zero to full speed
- Smooth, user defined acceleration periods
- Reduction in shock loading
- Up to 2.5 x full load torque at zero speed
- Reduced energy costs



SHEARER MOTORS INCLUDING CUTTING, HAULAGE, LUMPBREAKER & HYDRAULIC PUMP MOTORS

Offering maximum reliability and the highest power densities per volume available, ATB Morley shearer motors are specifically engineered for continuous productivity and the most demanding working environments.

- Up to 2,000kW
- Supply voltages up to 11,000V
- Manufactured to very specific customer interface dimensions
- Performance characteristics designed for the application
- Quick drive shaft disengagement if required



BELT CONVEYOR MOTORS

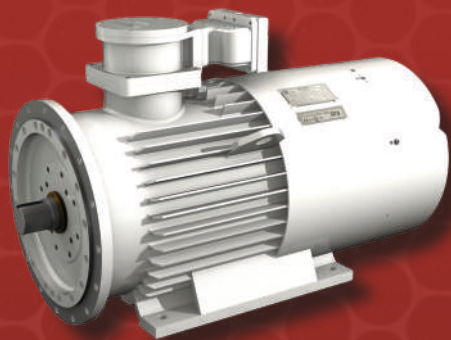
ATB Morley belt conveyor motors can be designed for operation on variable speed drives and can operate down to low speeds even on constant torque applications. Force ventilation units are incorporated where required in order to maintain constant cooling as the motor drive speed is reduced.

- Up to 2,000kW
- Supply voltages up to 11,000V
- Variable speed drive compatible where required
- Force ventilation options available

ALL ATB MORLEY FLAMEPROOF MINING MOTORS ARE:

- Performance characteristics designed for the application
- Quick drive shaft disengagement if required

The company designed and manufactured the first generation of 11kV conveyor motors for underground mining, embracing traditional high voltage technology in a flameproof package.



PUMP & FAN MOTORS

From small scrubber fans and hydraulic powerpack motors for conveyor belt tensioners to face hydraulics and large ventilation drives, ATB Morley has a wide range of air and water cooled motors available to suit any pumping or ventilation requirement.

- From 3kW to 2,000kW
- Supply voltages up to 11,000V
- Variable speed drive compatible where required
- Custom designed motor internals also available for incorporation into customers equipment



CONTINUOUS MINERS AND SHUTTLE CAR MOTORS

ATB Morley manufacture a range of drive motors for continuous miners and shuttle cars, including traction, conveyor, cutter, hydraulic and gathering arm drives. Motors are designed for maximum possible output from the envelope due to the space constraints of the driven equipment.

- From 3kW to 2,000kW
- Supply voltages up to 11,000V
- Manufactured to very specific customer interface dimensions
- Performance characteristics designed for the application



PLOW MOTORS

ATB Morley manufacture motors for the notoriously arduous plow application. With water cooled stator frame, endplates and rotor options, the ATB Morley product is engineered for complete reliability in the worst of circumstances. The high frequency of machine restarts and direction reversals require a robust rotor construction; the ATB Morley Barlok rotor design prevents rotor bar failures by accommodating the expansion of the copper bars and preventing stress concentrations.

- Up to 2,000kW
- Supply voltages up to 11,000V
- Water cooled frame, endplate and rotor options
- Performance characteristics designed for the application
- Variable speed drive compatible where required

- Available to bespoke specifications to integrate seamlessly into customers' equipment
- Tailored to give the optimum performance for your specific application
- Highly efficient with a low lifetime cost of ownership

Founded as Morley Electrical Engineering Company in Morley, Yorkshire, in 1897, the company is now based in Stanningley. Owned by the Austrian ATB group, the company is committed to UK design and manufacture and employs 150 staff.



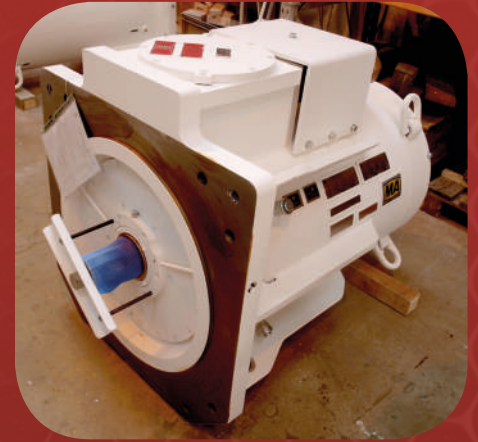
Originally deeply involved in the mining industry, the company developed a comprehensive range of robust, heavy duty motors available in any of the commonly used enclosure, cooling and mounting configurations. Outputs are available up to 2000 kW for supplies up to 11 kV and frequencies of 50 and 60Hz, including the ability to be inverter driven.

- The company supplies a wide range of 'special' machines for arduous flameproof and industrial applications.
- Flameproof underground mining motors
- Bespoke engineered retrofit motors primarily for the power and metals industries
- Hazardous area motors for the oil and gas markets
- Very heavy duty motors for high inertia loads and long acceleration times such as ball mills, coal pulverising mills, large fans and loads with high starting frequency requirements such as crane travel or hoist duties and coal mining plow drives



- High efficiency water jacket cooled motors
- Permanent magnet generators to provide excitation for turbo alternators.
- Shaftless overhung compressor motors for reciprocating compressors
- Stator rotor units for submersible pumps
- Ethylene reactor vessel stirrer motors
- Wind turbine induction generators
- Gas turbine starter motors
- Shockproof motors for marine vessels and naval vessels

The company makes use of proven mechanical and electrical design software and modern design tools including 3D computer-aided drawing. We also have in-house expertise to fully model the dynamic response of rotors using finite element analysis software.



By accurately calculating natural frequencies and critical speeds of major components, vibration during acceleration and at rated speed can be confidently predicted to be within acceptable limits.

The unique copper 'Barlok' rotor construction is now a standard feature on most ATB Morley motors and is specified by many users. With a history of zero failures in regular service since its introduction in 1980, it is arguably the most robust rotor construction available in the world today.

ATB Morley's goal is to produce the best products with the highest level of customer service available. The company has a wealth of experience in many high profile global installations.

We strive to help our clients create world leading solutions in terms of performance and reliability. Utilising only the best materials available, we ensure customer expectations are continuously met through compliance with very stringent quality systems.



INNOVATION

All machines are designed and manufactured to meet the customer's specific requirements. Skilled sales and engineering teams are ready to consider and embrace difficult or niche applications that demand more than just an off-the-shelf product. With a pedigree in developing innovative machines, ATB Morley can provide complete solutions for difficult applications.

FLEXIBILITY

ATB Morley are able to adapt to most motor design situations, whether it be manufacturing a single special motor for a particularly difficult application or cooperating in a joint development to manufacture very specialised motors not available from mainstream manufacturers. Because each motor is individually electrically and mechanically designed, we can offer a solution for almost any application.



RELIABILITY

We use only the highest quality materials available, most of which are fully processed in-house, ensuring our customers' expectations are continuously met through compliance with our stringent quality systems. Comprehensive load testing of every new design is conducted in-house at our facilities in Leeds and Stockport.

PERFORMANCE

With some of the highest power densities in the world, ATB Morley continue to develop new designs and remain at the forefront of electric motor manufacturing. All new contracts are engineered and designed according to the application.



SERVICE

Customer focus is of paramount importance and with the technical support of the head office in Leeds, there is an international network of representatives and service centres which provide the highest standard of after sales support.

QUALITY

ATB Morley operates a registered ISO 9001-2008 QA system, which has also been assessed by a European Notified / Certified Body and has been found to satisfy the requirements for IECEx approval and the requirements for Quality Modules under Annex VII of ATEX directive 94/9/EC. In connection to the latter, the system is subject to an annual audit by IEC/ATEX accredited bodies. Consistently high quality products are only achievable by the application of a comprehensive Quality Plan combined with a rigorous inspection regime.

Since its original concept and development in-house at ATB Morley in 1980, we have utilised our Barlok design of rotor as a standard feature included in the specification of ATB Morley squirrel cage machines.

STATOR FRAMES

ATB Morley stator frames and endplates are generally manufactured from fabricated steel as this allows the flexibility to tailor individual designs to specific customer requirements.

Frames for water jacket cooled motors consist of a substantial rolled steel barrel with a series of water passage guide vanes and heavy section rings welded to each end. A steel outer skin is fitted over the inner barrel and welded to each of the endrings.

Air cooled stator frames are also constructed from fabricated steel and have deep external welded cooling fins.

As all machines are individually designed and manufactured to suit the installation, material thicknesses can be tailored to offer optimum life expectancy and maximum resistance to damage from unexpected impact and abuse. All stator frames are also stress relieved after fabrication prior to machining.

STATOR AND ROTOR CORES

High quality low loss insulated silicon steel laminations are used for stator and rotor cores which are then sandwiched between substantial laser

cut thick plates to minimise lamination spread during the working life of the machine. Stator frames are shrunk onto stator cores, whilst rotor cores are fitted with a full length key, pressed between two heavy duty compression rings against a shaft shoulder at one end and a castellated shaft nut and tab washer at the other.

STATOR WINDINGS

High voltage windings are formed from diamond shaped coils made from epoxy glass mica insulated, annealed rectangular copper strip. Lower voltage wire windings are insulated with a dual coat polyester Amide/Imide covering although at higher ratings rectangular strip may be used. Coils are inserted into open slots and secured with magnetic or epoxy glass wedges. The end windings are braced to help withstand the forces generated by direct-on-line switching. Quality checks and tests are conducted at various stages of the winding process and on the completed winding.

Finally, the windings are vacuum pressure impregnated in a solventless, class H, thermosetting polyester resin to seal and consolidate the stator.

Further quality checks and tests confirm acceptability and conformance with design requirements. The resulting high grade proven insulation system provides a high overload capacity and the ability to pass a water immersion test. On occasion, epoxy impregnating resin may be used.

Two speed motors employ two separate windings or tapped windings where appropriate and specified by the customer. Although rectangular conductor windings predominate for 3.3kV machines, the introduction of high integrity micaceous round wire windings has allowed the use of these on small 3.3kV motors to good effect. Maximum allowed temperature rise can fully utilize the insulation system capabilities or it can be restricted to class B limits as defined in BS EN60034-1. Standard outputs are based on 90K rise over a maximum water inlet temperature of 30°C for water cooled motors and 80K rise over maximum air temperature of 40°C for air cooled motors.

ROTOR CONSTRUCTION

ATB Morley rotors are fabricated copper or copper alloy, pool brazed to jointless copper or copper alloy short circuit rings. The unique Barlok method of rotor bar pinning allows rotor bars to expand and contract whilst being mechanically



All new designs undergo comprehensive testing at our Leeds factory. We use the best materials available, ensuring customer expectations are consistently met through compliance with stringent quality systems.



secured in position, preventing vibration and cyclic bending associated stress fractures.

BEARINGS

Bearings are sourced from only the most reputable global manufacturers. Grease lubricated rolling element bearings are the most common arrangement, but alternatives such as spigotted housing split race roller, force lubricated or self contained sleeve bearings can be offered when required. Relubrication facilities allow bearing grease to be easily replenished, whilst pressure relief valves ensure that bearings cannot be overgreased.

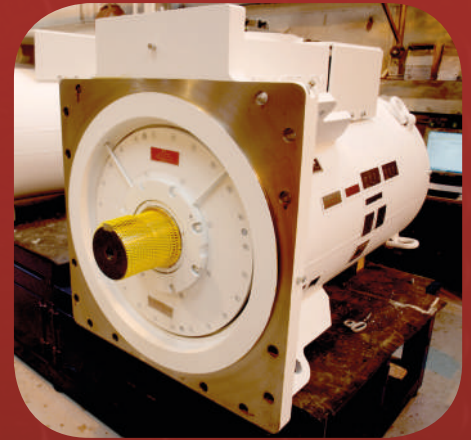
For inaccessible drives, for example shearer cutting motors, sealed for life bearings are utilised to minimise routine intervention. Initially developed for the mining industry, the design was specifically aimed at satisfying the requirements of the most demanding applications in the world where high inertia loads produce very long acceleration times and incredible stresses and forces upon the rotor bar.



In order to solve the problem at its source, it was necessary to develop an exceptional design concept such that the usual failure mechanisms were considered and overcome. The following obstacles are the usual causes of rotor bar fractures and failure:

- The substantial electromagnetic forces that induce vibration during every start, which, if left undamped, could lead to low stress and high cycle fatigue of the rotor bar.
- The non-uniform thermal expansion of the rotor cage and the subsequent arching of the bar within the slot
- Centrifugal forces upon the endrings and bar extensions
- Inbuilt, non-uniform joint stresses resulting from uncontrolled brazing operations

The rotor bars are designed with a location groove on the underside of the bar where a sprung pin can be inserted between this groove and a matching groove in the laminated core.



The presence of these sprung pins along the length of the rotor core ensures the rotor bar is securely locked in position within the slot whilst allowing the rotor bars to expand and contract as they are affected by the thermal changes to the system.

The arrangement and location of the bars using the Barlok system completely eliminates radial vibration therefore dramatically reducing the risk of potential failures associated with this phenomenon.

In addition, only pure copper or copper alloy bars are utilised, with each application receiving a complete evaluation of material requirements.

In view of the supreme reliability and ability of the Barlok rotor design, ATB Morley are able to demonstrate a comprehensive reference list of high profile global installations including resellers, original equipment manufacturers and end users across a wide range of industries from underground mining to petrochemical and power generation.

PERFORMANCE FROM WITHIN

ATB Morley, along with ATB Laurence scott and ATB Special products is a member of ATB Group UK. These companies possess over 300 years of experience, spanning across the UK and offering the optimum in customised drive solutions across numerous industries:



MINING



POWER GENERATION



MARINE/DEFENCE



INDUSTRIAL



OIL & GAS

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