



We set your business in motion  
Automation solutions and electrical  
equipment for open-pit mining and  
bulk-material handling

# Whatever you're handling – We promote your success

Whatever your business is handling – from coal to copper ore, from iron ore to overburden – to be successful in the fields of open-pit mining and bulk-material handling you need a strong partner – ABB.

You need to be in the position to react economically and flexibly, to maintain high safety standards for personnel and equipment, to make investments with short amortization periods, to avoid downtime even under extreme conditions, to fulfill numerous environmental requirements, to precisely plan the handling of both volumes and qualities, as well as being able to react to suddenly changing parameters.

Only those who can satisfy all these demands will remain successful over the mid and long-term – in a business that is driven by the global market's dynamic prices for raw materials.

## **ABB is the right partner for your success**

We can offer you over 50 years of experience in delivering electrical equipment for open-pit mining and high-volume bulk material handling.

## **With individually tailored solutions for new equipment or reconstruction**

Be it the reconstruction of your existing machines or the installation of new equipment ABB develops and implements individually tailored solutions to suit your specific needs.

## **With flexibility and latest technology**

In the electrical modernization and automation of mining systems, we have mastered the art of integrating new components with existing equipment. That goes for the drives level as well as the controller and operator level. Our solutions are designed for easy installation within your existing infrastructure – including the integration of third party systems.

Moreover, our products and solutions offer you the highest reliability, even under extreme temperatures, strong vibrations and heavy dust conditions. As a result, you can take advantage of minimized downtime due to reduced maintenance and repairs.

## **With experience and expertise**

We ensure the maximum availability of your installations, because we are familiar with the technological demands in open-pit mining and also provide solutions to difficult technical problems with reliable engineering and extensive know-how. It's not for nothing that we are a world leader in energy and automation engineering.



# Optimum and efficient operation – Under the toughest conditions





# Our solutions – Field-tested and ready for the future

## Central control stations for open-pit mining

The control station is used for the central monitoring, operation and control of the equipment and complex operating processes of an open-pit mine. This involves the recording and processing of several thousand variables, which are often relayed to the control room from locations several kilometers away e.g. via WLAN.

Graphics and diagrams linked with messages present a complete picture of all the processes in a clearly arranged and user-friendly manner, thereby enabling the operator to make fast and qualified decisions. A large number of options, such as quality management systems, an SAP interface or remote data transmission, can also be integrated.

## State-of-the-art technology at all times

We offer migration to the latest control system generation for the existing control equipment, thereby protecting your investment. ABB has successfully completed a large number of migration projects. State-of-the-art ABB control technology is used in the open-pit mines of Welzow-Süd, Jänschwalde, Schleenhain/Peres, Tamnava and the control rooms of the F60 overburden conveyor bridges in the Nochten and Reichwalde mines.

## Shovel and dragline excavators

Discontinuous mining technology is the most widely used technology in the world and is becoming more and more efficient in combination with ultra-class trucks or crushers with belt-conveyor systems.

In this respect, the shovel excavator is the most important removal device. The required maximum availability to operate profitably is nowadays mainly met with high-performance AC drive technology, which ABB can offer with the specially

developed „Drives for Mining“. Here standard AC multi-drive installations are made suitable for mining through mechanical reinforcement. The integrated software enables drive-related automation of the conveying process.

On account of its experience in the modernization of open-pit mining equipment in hard rock mining, ABB now supplies drive solutions to a leading vendor of shovel and dragline excavators in the USA. These AC drive systems have set standards for productivity and low operating costs, e.g. in the Canadian oil sand industry, with energy savings of up to 15%.

## Fully automatic operation of stockpiles

Both coal and ore are temporarily stored on stockpiles on the way from the pit to processing, and different batches are blended to adjust the quality. The operation of such stockpiles requires sophisticated management to ensure efficient stacking and reclaiming, to guarantee the required quality of the blended material and to provide optimum management of the available storage space.

An automation concept was developed and implemented for the unmanned fully automated operation of a stacker and two reclaimers, including a collision protection system, of a 400,000 ton coal stockpile which supplies a power station. The specified quality parameters were all fully complied with obligations.

3D laser scanners for measuring the surface and the volume of the stockpile are nowadays standard. As a result, the handling equipment can be operated more efficiently in line with the geometric structure of the stockpile.

ABB supplies complete solutions for the fully automatic operation of stockpiles.



# Reliable technology – In use worldwide

## Automatic operation in open-pit mining

Open-pit mining equipment works in an optimum manner when it extracts as much material as possible in a short time without exceeding its mechanical load limits.

No matter whether it concerns the uniform loading of conveying belts, the minimization of conveying losses caused by technology, the formation of safe slopes or precise subgrades, ABB has developed automation solutions for the precise interplay of all the dynamic basic movements of open-pit mining equipment and conveyors which help the operator to operate the systems optimally and energy-efficiently.

Our software library includes solutions for the partly and fully automatic operation of shovel and bucket-wheel excavators, shovel and dragline excavators and spreaders and equipment for stacking and reclaiming.

## Complex belt drives

The implementation of a drive system for several connected belt-conveyor systems requires exceptional know-how. A large number of critical aspects must be considered in the engineering: the starting sequence, mass flow separations, ascent and descent angles, conveyed masses, varying operating conditions (the belt tension and longitudinal oscillations are particularly difficult to define), emergency and repair modes, etc.

We use advanced simulation techniques and precisely controllable low-wear drive technology such as frequency-converter-driven three-phase motors to provide solutions which meet the highest demands with regard to low wear, efficient energy utilization and controllability.

Our expertise in this field is represented by belt-conveyor systems with a length of approx. 600 km, worldwide.

## Electronic starters for slip-ring motors

Conventional slip-ring motors still play an important role in applications without speed control in operation under rated conditions. Two-stage resistance or liquid-resistor starters are used until now for starting up.

As an alternative to this, ABB has developed an electronic compact starter which enables low-wear start-ups with various control concepts. This solution is also characterized by higher reliability and lower maintenance costs through the elimination of failure-prone contactors. An attractively priced alternative to the frequency converter is therefore available, especially for the reconstruction of existing installations.

## Crushers

Crushing plants which break up the materials before they are fed to continuous belt conveyor systems are used for the continuous extraction of harder materials such as minerals, ores or hard coal.

These crushing plants can be stationary on concrete foundations, semimobile on supporting steel structures or, of late, fully mobile on crawlers. Continuously operating crushing plant systems can mainly be found in raw material extraction for the energy supply sector.

The main drives of the crushers are equipped with frequency-controlled AC drives and monitored and controlled by modern control equipment. Data communication with the nearest control station takes place via WLAN.

Crushers equipped with ABB technology operate e. g. in Australia, Canada, Chile, China, Russia, Thailand and Turkey.



# We promote your success worldwide – With a strong partnership

## **ABB offers global expertise and a local presence**

The Minerals Business Unit of ABB is represented in all the important mining markets of the world with an industry-specific portfolio of solutions which are tailored to the particular requirements of open-pit mine operators.

We counteract the trend towards increasing globalization of the commodity markets with transnational project teams which are able to complete complex large-scale projects according to schedule and to a high quality standard.

## **Global engineering centers**

We can take the project-specific requirements for the capacity and the application-specific know-how into account by combining strong local engineering teams with global engineering centers.

## **Cooperation with partners**

In addition to direct business relationships with established mining companies, we maintain conventional long-standing partnerships with leading engineering suppliers of mining machinery and bulk material plants. We carry out a major part of our projects as a reliable subcontractor or associated partner of these companies, whereby we can draw on extensive experience in implementing a wide range of technological processes.

## **Expertise in project management**

If you work altogether with us, you will have access to teams of specialists and experienced project managers who have proven themselves in many national and international large-scale projects.

Numerous references attest to our distinction as an international Center of Excellence for mining applications.

Our certified project managers supervise the entire process from the conclusion of the contract until the handover of the installation to the customer. They guarantee flawless communication between the partners involved and ensure full compliance with all contractual obligations.

## **Worldwide support**

As a strong partner committed to your success, we naturally provide you with a wide range of services for all of your needs during and after final delivery. We are at your service around the world and around the clock to ensure uninterrupted operations and the rapid delivery of spare parts.

## **You can depend on us!**

Working together with ABB provides you with a large number of advantages. We advise and support you in terms of consulting, design, engineering, installation, commissioning, training or after-sales service from the outset. Worldwide.





# Electrical engineering and automation – For reconstructions and new systems

## Automation solutions

- Partial and full automation of individual machines and complex systems
- Real-time processing of up to several 1000 I/Os
- Safety management
- Central control stations
- Unmanned operation of mining machinery including anti-collision system
- Radio data links
- Laser scanning of stockyard profiles
- GPS positioning

## Operation and observation

- Application-specific process displays
- Alarm and event listings, statistics
- 2D and 3D visualization of mass flows
- Touch panels for machine operation
- Operator cabin equipment
- Video camera supervision
- On-site and remote operation

## Data management

- Quality management systems
- System status diagnosis
- Shift reports, daily protocols etc.
- SAP interface
- Communication with mobile equipment via wireless LAN
- Transportation models, stockyard and bunker models

## Drive solutions

- DC drives
- AC drives with SL motors (starter: dual, fluid, electronic)
- AC drives with KL motors (direct start up, soft starter, converter)
- Speed variable drives (single and multi drives) also with energetic recovery
- Air- and liquid cooled converter for LV and MV
- Simulation, modeling, net analysis

## Individual components

- Transformers, power supplies
- Switchgears (MV and LV)
- Containers, cabins and motors
- Transmitters and sensors
- Communications and lighting systems
- Emergency power supply and UPS

## Complete electrical equipment for

- Electric mining shovels and walking draglines
- Bucket-wheel and bucket-chain excavators
- Conveyor drive stations
- Spreaders (with or without tripper car)
- Stackers and reclaimers
- Ship loaders
- Bunker management systems
- Mobile and semi-mobile crushers

## Project management and after-sales services



# Contact us

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### **ABB business unit Minerals is represented in the following countries:**

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