

MINING

We set your business in motion

Automation solutions and electrical equipment for open-pit mining and bulk-material handling



Whatever you are 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 through modern and flexible interfaces.

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. This experience and expertise makes us 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 distant locations, such as 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 ERP interface (e.g. SAP) or remote data transmission, can also be integrated.

State-of-the-art technology at all times

We offer evolution 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 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. Today, the required maximum availability to operate profitably is 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.

Building upon our 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 sands 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 standard today. 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: 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 backed up by belt conveyor systems that total more than 600km 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.

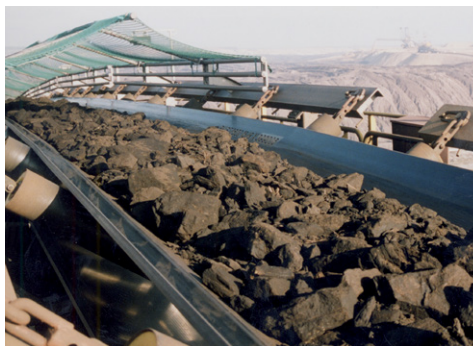
Crushers

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, as well as other parts of the world.



We promote your success worldwide – With a strong partnership

ABB offers global expertise and a local presence

The Process Industries 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 address 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, where we can draw on extensive experience in implementing a wide range of technological processes.

Expertise in project management

When you work with us, you 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
- Stockyard management

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 slip ring motors
 - with squirrel cage motors
 - 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)
- Air-conditioned containers and cabins
- 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

- Spare parts handling
- On-call management
- Service contracts



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