

ABB Mine Hoist Systems





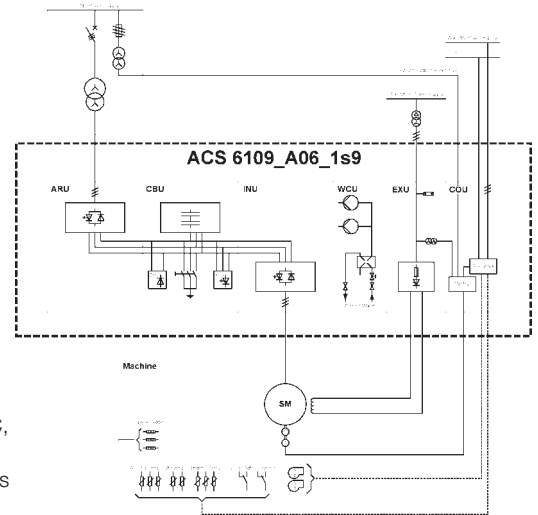
Pyhäsalmi head frame. ABB has delivered a complete package of mechanical and electrical equipment including the Drive^{IT} ACS 6000SD synchronous motor drive.



Friction hoist with pulley diameter of 4.5 m.



ABB's AHM 110 Advant Hoist Monitor provides very accurate monitoring of essential safety parameters.



Block diagram of DTC, Direct Torque Control, drive with synchronous motor.

ABB, the only supplier of complete mine hoist systems

ABB has the unique capability to engineer, deliver, install and provide after-sales service of entire mechanical and electrical mine hoist systems of all types. They include friction hoists, single drum hoists as well as double drum hoists. We offer the

- Lowest possible life cycle cost, LCC
- Shorter project execution time
- Single source for service and spare parts.

Our global presence makes us always close to our customers. Strong engineering resources are available for feasibility studies and conceptual solutions.

Hoist control and monitoring systems

ABB's hoist control system is based on Industrial^{IT} technology. Complying with stringent safety and availability requirements of mine hoist applications, this powerful, user-friendly control system is built up from ABB Control^{IT} and ABB Operate^{IT}.

The fully automatic system includes control of feeders, conveyors and measuring flasks at the loading level as well as pushbutton control of multi-level man/material hoists. The system also provides semi-automatic testing of safety functions

and prints out comprehensive production and performance reports.

The AHM 110 Advant Hoist Monitor is an independent unit that provides protection against over-speed and overwinding.

Drive systems

ABB is the leader in drive technology. The latest technology, Drive^{IT} ACS 6000SD, with DTC, Direct Torque Control, using IGCT, Integrated Gate Commutated Thyristors, for torque and speed control of AC motors is now well proven for hoist applications. It offers high efficiency, superior control performance, low voltage drop in the supply network and low harmonic distortion as well as very low flicker.

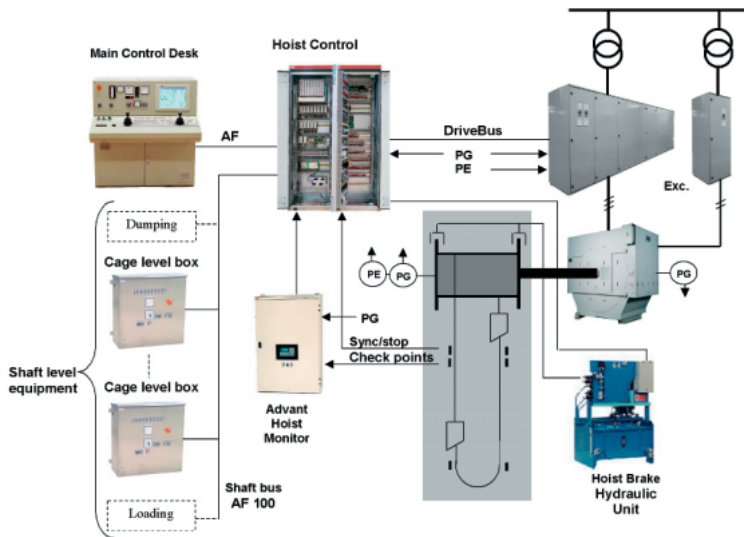
Synchronous motors are used for direct drives and induction motors for geared drives.

DC motors of all sizes are available for geared drive applications and for thyristor converter drives.

All drives are equipped with powerful maintenance software, Drives Window.

Hoist machinery

ABB employs powerful FEA and 3D tools for the engineering of the systems and their components. Full quality assurance is implemented throughout the engineering and manufacturing processes.



A block diagram of a friction hoist.

Pulleys and drums are available in split or unsplit design. Brake discs are welded or bolted on to the shell plate. SKF spherical roller bearings are selected to ensure high efficiency and long service life.

Hydraulic disc brake system

Multi-caliper disc brakes are used for emergency stop and holding at standstill.

The hydraulic control unit is equipped with dual systems to meet the highest safety requirements. The correct operation of all components is continuously monitored.

Controlled retardation provides the set retardation rate independent of the actual payload and direction of movement. It also increases the margins to rope slip in friction hoists.

Rope Oscillation Control

For mine hoists operating in deep shafts, ABB has developed ROC, Rope Oscillation Control. Integrated into the electric drive system, it greatly reduces the oscillations during the hoisting cycle while increasing the rope life and the transport comfort during men hoisting. Integrated into the emergency control brake circuit, it allows the static rope safety to be reduced in accordance with SABS 0294's (South Africa) requirements.

Shaft equipment

ABB engineers and supplies complete shaft equipment including skips, cages, guides, head and tail ropes with their attachments. Measuring flasks and weighing conveyors are also part of ABB's product portfolio.

Argus Advanced Diagnostic Tool

Argus is a powerful maintenance tool for local or remote fault finding, condition monitoring and monitoring of the mine hoist performance. It is of modular design and integrated into the hoist control and drive system. Using the remote diagnostic function, mine hoist specialists in ABB service centers can identify the majority of faults and address them.

Modernization of existing mine hoists

In recent years, ABB has executed numerous projects for the modernization of mine hoists manufactured by ABB or others. They range from minor upgrades of single hoists to large revamps of complete hoisting plants such as that at LKAB's mine in Kiruna, Sweden, where a total of ten hoists with a combined capacity of 26.5 million tonnes per year were modernized.



A new hydraulically controlled disc brake system was supplied by ABB to Alrosa, the Russian diamond mining company, for the revamping of a mine hoist in one of its diamond mines in Mirny in eastern Siberia.



Hydraulic disc brake control unit.



One of the two 13-tonne deadweight skips prior to installation at BHP Minerals' Cannington Mine, Australia.



LKAB, Kiruna, Sweden. A total of ten hoists with a combined capacity of 26.5 million tonnes per year have been modernized.



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