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Nidec Industrial Solutions in mining

NIDEC CORPORATION IS A GLOBAL MANUFACTURER OF ELECTRIC MOTORS AND DRIVES. FOUNDED IN 1973, NIDEC HAS OPERATIONS ON FOUR CONTINENTS AND A WORKFORCE OF 100,000 WHO DEVELOP, MANUFACTURE AND INSTALL MOTORS AND CONTROLS USED IN A WIDE RANGE OF COMMERCIAL AND INDUSTRIAL APPLICATIONS, INCLUDING MINING AND MINERAL PROCESSING. WE DEVELOP NEXT-GENERATION SOLUTIONS FOCUSED ON IMPROVING EFFICIENCY, REDUCING ENERGY CONSUMPTION AND ENABLING TOTAL CUSTOMER SUCCESS.

Nidec Industrial Solutions offers a wide range of rugged power, motion and control products built to perform in harsh mining and minerals processing environments. Whether you are designing a new site, optimizing existing operations or modernizing equipment, our engineers will help you create a solution that works the way you do. Each solution is engineered to deliver peak performance in extreme conditions, while improving system efficiency, reliability and production flexibility. Engineered to exceed the industry's most stringent standards, our solutions are the mining industry's choice for performance and durability.



Draglines

A surface mine's operational success often depends on the efficiency of its excavators. That's why a dragline powered by Nidec controls and drives makes such good financial sense. Our control systems not only increase mine production, but also improve cycle times and increase machine availability. With our electric drive upgrades, we can replace obsolete electronics with state-of-the-art controls. Our dragline-specific control algorithms reduce gear wear and optimize swing control. The addition of remote diagnostic capabilities results in faster trouble-shooting. With more than 200 drives installed on draglines worldwide, we have the engineering and field staff to provide a deep bench of support to your mine.

SOLUTIONS INCLUDE:

- Dragline drives and control system upgrades
- MineView diagnostic systems
- Synchronous motors
- Motors, generators, and synchronous prime movers

Shovels



Many of today's mines are being operated with aging equipment that may be in good mechanical shape, but is inefficient and obsolete. Nidec can help you keep production volume up without investing in new shovels. We will replace obsolete drives and controls at a reasonable cost with very little downtime. With a PLC upgrade, we can add Ethernet to your shovel to give you better diagnostic capabilities. Our remote diagnostics solutions enable faster troubleshooting, helping you save time on repairs and maintenance and increasing production up-time.

SOLUTIONS INCLUDE:

- Complete AC drive and motor upgrade
- DC drive upgrade
- PLC upgrades
- Remote diagnostics
- RPC upgrade
- Operator chair and controls

Conveyors



Reliability and safety are critical in a mine conveyor system. You can help assure both, while also increasing mine production, with a conveyor drive system from Nidec. With installations around the world, our solutions can be designed to support both new and existing conveyor projects. Whether installing a new line or replacing obsolete electronics, our state-of-the-art controls enable "smart" conveyors that permit you to move more materials across any terrain or distance safely and efficiently.



SOLUTIONS INCLUDE:

- Slope conveyors
- Overland conveyors
- Underground conveyors
- Turn-key drives, motors, transformers, encoders, operator stations, installation and commissioning



Hoists & Winches

Miners working underground depend on motor-powered hoists and winches to raise and lower conveyances within the mine shaft. Reliability and safety are critical to day-to-day operations in these challenging environments. Nidec supports both new and existing projects with sustainable state-of-the-art controls that are not only safe and reliable, but also improve cycle times and increase mine production. Our drive systems & controls offer remote diagnostic capabilities to support faster troubleshooting. They come with a deep level of engineering and field service support to assure maximum up-time.

SOLUTIONS INCLUDE:

- Drum & friction (Koepe) hoists
- Blair hoists
- Production hoists
- Service hoists
- Man hoists
- Emergency hoists
- Chippy or Mary Anne hoists
- Sinking hoists
- Winches
- Horizontal & vertical transports



LV & MV Drive systems



Flame Proof Motors
Special machines for installation in hazardous areas, from 150 to 4,500 kW.

When your crews are working underground in a potentially explosive atmosphere, flameproof drive systems are critical. Nidec has developed variable speed low- and medium-voltage drives specifically for this purpose. Our DIAMOND® drive, for instance, is a flameproof system comprised of a switched reluctance motor and a medium voltage controller. Both water-cooled units are custom engineered to interface with the electrical equipment in these potentially hazardous environments. The system, which has obtained Group I hazardous area approval, is constructed of rugged materials that can withstand the arduous conditions of underground mining. Our electric motor-drive systems are used today on key material handling applications throughout the underground mining industry. Our rugged, heavy duty motors are particularly suitable for slurry pumps, crushers, and other mechanical equipment where high torque and reliability are essential.

SOLUTIONS INCLUDE:

- DC drive systems
- AC drive systems
- Large induction & synchronous motors
- Switched reluctance drive systems

WASTEWATER PUMPING SYSTEM UPGRADE

Arequipa, Peru

The challenge: to expand the water pumping system at a copper mining operation.

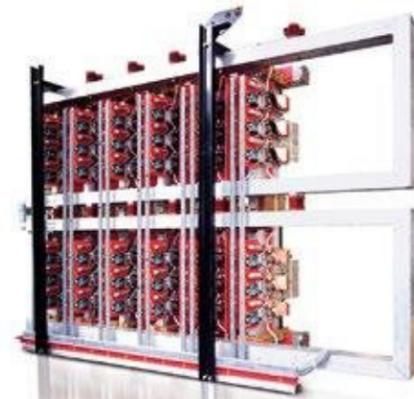
The solution: when the copper mining operation in Arequipa underwent a major expansion, it needed to substantially increase its water supply. Pumping 1000 L/sec of water used annually at the mountaintop mine would be no small feat. Due to the massive pressure spike standard vertical split case pumps would have produced at shutdown, the mine instead chose new horizontal split case pumps. After considering several options, Nidec provided an innovative solution mounting to expand the pumps' frame size and mount two separate flywheels internally on the motor rotor. This created the added inertia needed to eliminate the threat of pressure spikes. The pump station today consists of six of these pumps mounted in parallel, each driven by 3250 HP U.S. MOTORS brand TITAN® motors.

Scope of supply: six 3250 - U.S. MOTORS brand TITAN® motors

Nidec Industrial Solutions also offers Variable Speed Drive systems and supervision controls for water treatment plants with a full range of IEC and NEMA products.



Power Solutions



Silcomax
 Industrial Power Rectifier
 Typically used in DC arc furnaces, smelters (aluminum, magnesium, zinc, copper), electrochemical processes (chlorine, caustic soda, PVC...), and research facilities for nuclear energy.
 Current ratings:
 Silcomax Light 8 – 50 kA
 Silcomax Large 40 – 120 kA
 Voltage:
 Silcomax Light up to 1000 V
 Silcomax Large up to 1600 V



Rectifiers – power supply Decentralized generation Smart microgrids Power quality

Without power, a mining operation grinds to a deafening halt. With industry-leading expertise and a full menu of power products, we can help you design, improve or revamp your energy and power systems. When needed, we can help you incorporate renewable energy sources in to your existing supply. Using our in-house power management system – ARTICS Smart Energy – we are able to design and install smart microgrids. Our in-depth knowledge of electrical balance of plant (BOP) allows us to optimize energy consumption and help ensure a stable, high quality energy supply.

SOLUTIONS INCLUDE:

- Smart microgrid design & installation
- Plug and play solar solutions
- Battery energy storage solutions
- Wind turbine solutions
- Electric generators (1-50 MVA)
- Turbine starters
- High current rectifier systems
- SVC and D-Statcom
- ARTICS Smart Energy



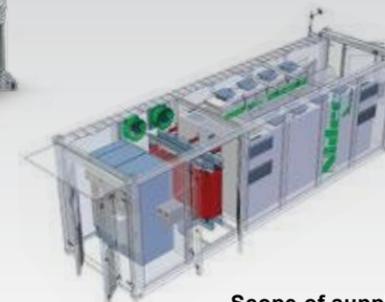
Artics smart energy is a combined power and energy management system specifically designed to optimize energy consumption, integrating renewable energy sources



SMART MICROGRID *Ollagüe, Chile*

The challenge: to create an isolated microgrid able to provide a continuous power supply to a small mining village located at an altitude of 3660 meters.

The solution: Nidec customized a Power Management System that integrates multiple renewable energy sources (wind energy, photovoltaic energy, battery energy storage system and diesel generator) in a smart microgrid configuration. The project also includes two Trinun systems that produce electricity and hot water for a local school. With an unbalanced peak load demand of 100 kW, the stand-alone plant includes a 520 kWh electrochemical storage system able to handle all the grid's technical requirements, providing electricity to local residents 24 hours a day.



Scope of supply: ARTICS Smart Energy Power Management System
 Air-cooled containerized Power Conversion System

Service



Revampings

THE EFFICIENCY AND RELIABILITY OF THE EQUIPMENT WE BUILD ARE ESSENTIAL TO YOUR OPERATION'S PERFORMANCE. THAT'S WHY NIDEC INDUSTRIAL SOLUTIONS HAS ONE GOAL: TO PROVIDE OUTSTANDING CUSTOMER SUPPORT FROM INITIAL CONCEPT DESIGN TO DECOMMISSIONING. SERVICE IS THE BACKBONE OF OUR BUSINESS.

Our experience in installing turn-key automation and control solutions, as well as stand-alone drives and motors is deep. That experience, coupled with our production technology know-how, enables us to tailor revamping and upgrade solutions to your specific needs. We can also support end users in implementing mechanical modifications to help reduce downtime.

Retrofitting

We specialize in retrofit upgrades of existing electric drives, controls and diagnostics. A digital front-end retrofit of an older generation system - where we retain the existing SCRs and replace old obsolete control boards - is significantly less expensive than purchasing new equipment, while still increasing mine production, cycle times and machine availability.

Upgrades

When we undertake an upgrade project, our goal is to minimize downtime, while maximizing production and maintainability. Our strength lies in our ability to integrate legacy components with new updated software and hardware. We focus on assessing the needs of your particular situation, recommending that you keep your equipment and systems at the level where they can be maintained effectively and economically for many years. By enhancing diagnostics, we can also help you reduce troubleshooting time.

Predictive maintenance

In our predictive maintenance programs, we document machine performance, including baseline data and performance recordings. Later recordings are compared to the baseline to predict mechanical failures based on increased current draw, speed variations and other factors. This information is invaluable in the event that a drive must be replaced or retuned to meet performance objectives. Predictive maintenance assessments do not interfere with ongoing operations.

Long Term Maintenance Agreements

We offer personalized contracts covering all aspects of mine maintenance. We have also developed a wide variety of engineering tools for preventive and predictive diagnostics that can help increase equipment life and performance. A full range of on-site and remote service and diagnostics are also available.

SHOVEL DC DRIVE UPGRADE

Wyoming, USA

The challenge:

to upgrade a 10-year-old P&H 4100A shovel with a new digital control system to maximize the performance of the new, larger motors its owner wished to install prior to its recommissioning.

The solution:

a drop-in control system replacement based on an open architecture to facilitate future upgrades. Designed to be configured in the field, system installation required minimal shutdown.

The results:

the reconfigured shovel reduced cycle time by 13.2% and produces 30 to 75 additional truckloads per shift, outperforming even the latest OEM digital control system on a new shovel at the same mine.

Scope of supply:

turn-key control & drive system

