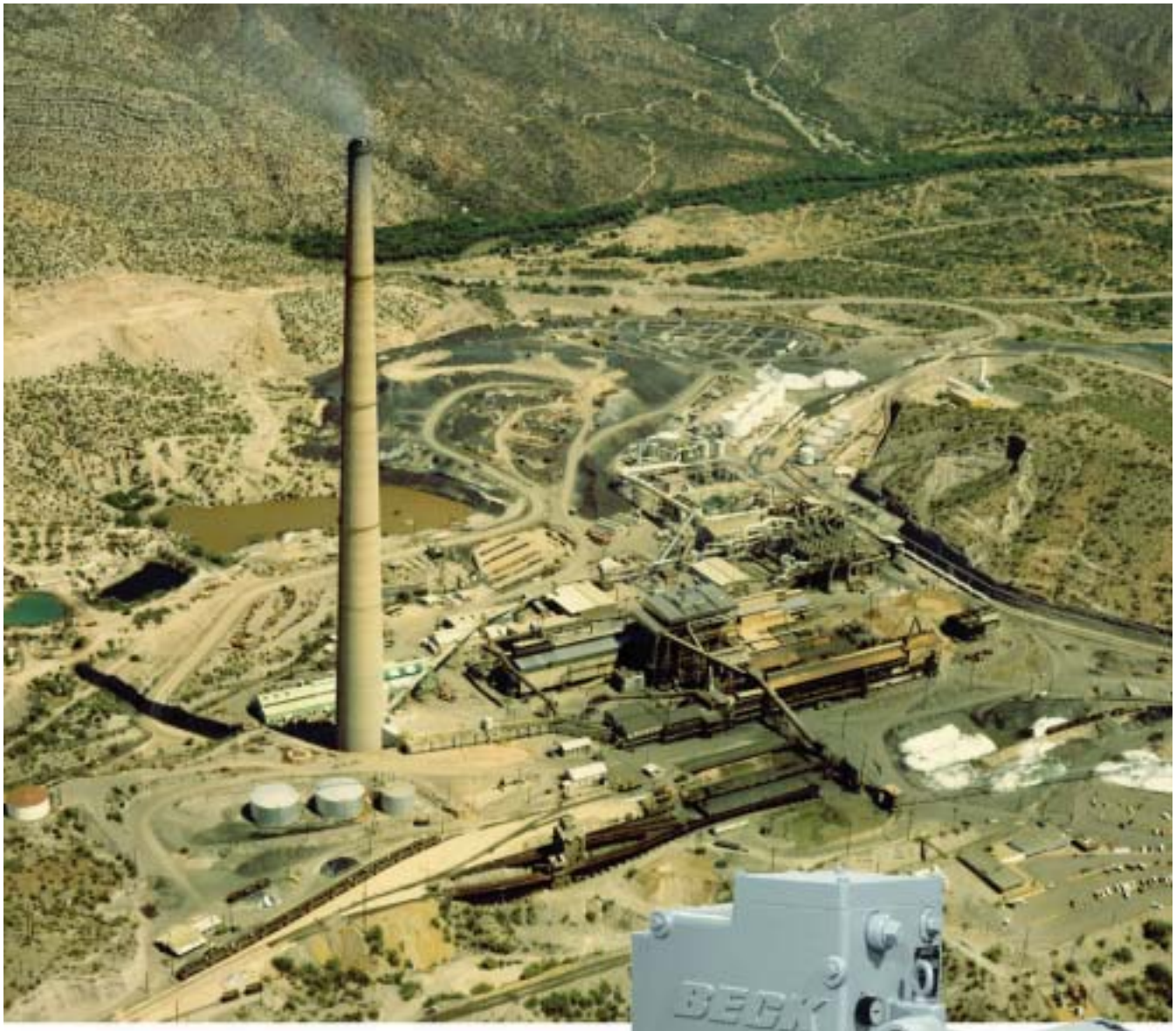
IPB-MI

BECK®



ELECTRONIC CONTROL DRIVES FOR THE MINING AND MINERAL INDUSTRIES

Beck drives are built to last—even in highly abusive conditions

Beck drives have been providing accurate and reliable performance in the mining industry since the 1930s. Today, there are more reasons than ever to specify Beck drives for modern mining operations.

Beck drives are maintenance-free, which is particularly significant now that many operations are at peak production, but with a reduced maintenance staff.

When installed on important control applications, Beck drives increase mineral recovery—which goes straight to the bottom line. Beck drives also improve process efficiency, thereby resulting in substantial fuel savings.

With escalating competition and lower margins, having the Beck advantage is now more valuable than ever.

Model 11-200 on a Mixing Air Damper

Model 11-400 on an FD Fan Damper

Beck drive applications in mining and mineral processing facilities include:

Smelters
- Pressure Control Dampers
- Roaster Pressure Dampers
- Air Flow Dampers
- Baghouse Dampers
- ID Fan Dampers
- Combustion Air Dampers
- Fuel Valves
- Exhaust Dampers
- Recirculation Dampers
- Tempering Air Dampers

Heavy Media Coal Plants
- Sump Level Valves
- Magnetite Diverter Valves

Flotation Plants
- Sump Level Valves
- Froth Airflow Valves

SX-EW Plants
- Reagent Flow Valves
- Slurry Valves
- Sump Level Valves

Pelletizing Plants
- Acid Control Valves
- Sump Level Valves
- Slurry Valves

Boilers
- ID Fan Dampers
- FD Fan Dampers
- Coal Mill Dampers
- Underfire Air Dampers
- Windbox Dampers
- Boiler Feedwater Valves
- Fuel Valves

The Beck Motor: 100% Availability

The Beck motor design makes the precise, reliable performance of the drives possible. This no burnout motor ensures that the drive is available 100% of the time. There are no duty cycle limitations typical of most electric actuators, so the drive performs as the loop requires rather than the loop performing as the actuator requires.

The Beck motor:

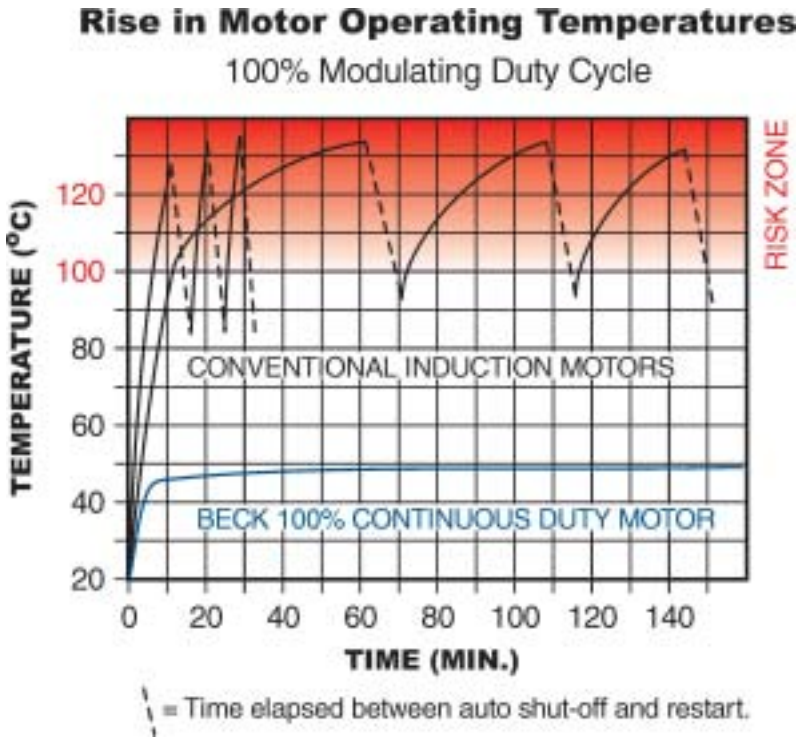
- Reaches full speed and torque in milliseconds and stops in milliseconds, eliminating dead time.
- Provides extremely accurate and repeatable positioning for modulating applications.
- Will not coast or overshoot the desired position.
- Draws low current (0.16 A to 3.0 A). The low power consumption permits easy use with uninterruptible power supplies.
- Uses double-lipped, grease-sealed bearings for maintenance-free operation.

And . . .

- Never overheats or burns-out; even under demanding modulating control or stalled conditions. Thermal overloads and torque switches are not included in Beck drives because they are not required.

Model 11-200 on an Exhaust Damper

Tested in an active modulating loop, conventional motors rose rapidly in temperature, tripping thermal overload devices and becoming unavailable for extended time intervals. Only the Beck motor remained stable for continuous operation.



Digital Electronics: Repeatable Control, Simple Operation, and Diagnostic Capabilities

Beck control drives are equipped with field-proven electronics that provide excellent position control in response to modulating control signals. This maximizes control loop performance by ensuring that the damper or valve responds exactly as the control loop requires.

The Beck Digital Control Module (DCM) resides within the drive and provides unparalleled position control. It is available with HART® digital communications capabilities (DCM-H) or with a local configuration interface panel (DCM-L). The local interface makes calibration and routine configuration changes a simple push-button operation at the drive. It also provides advanced features like stall protection and diagnostics.

The HART® capable DCM-H provides greater flexibility and more advanced diagnostic and interface capabilities. Calibration, configuration, detailed diagnostics, even an optional live torque measurement can be accessed through a 275 Handheld Communicator, other HART® capable device, or asset management system.

Beck's Contactless Position Sensor (CPS) also resides within the drive, and provides reliable internal position feedback to the DCM for position control. The DCM also uses the sensor signal to source a 4–20 mA external position signal for remote monitoring of drive position. Unlike typical position sensors, the CPS does not wear due to its contactless design.

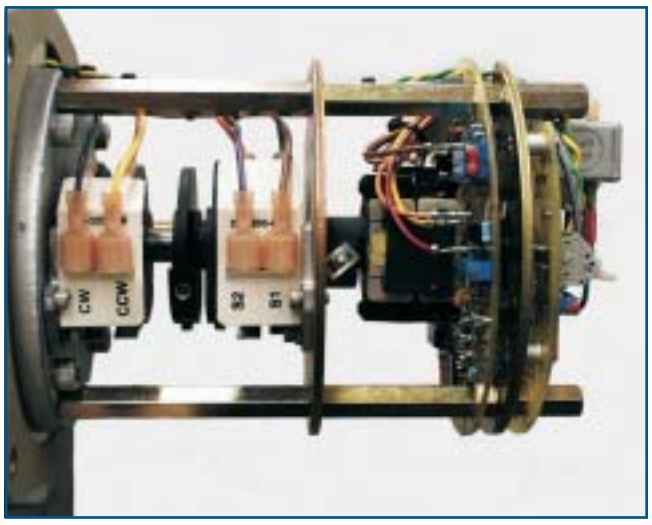
Over-travel Limit and Auxiliary Switches

Beck drives include heavy-duty, single-pole, double-throw (SPDT) switches for electrical over-travel protection. Switch cams will not slip because each is mounted to the shaft by an integral, tangential clamping means—with no set screws to mar the shaft.

Every drive is equipped with two over-travel limit switches. Optionally, drives can be equipped with up to four auxiliary switches that can be set to operate at any desired point of drive travel, thus providing discrete inputs for control or indication.

Common throughout most Beck drive models, the SPDT switches provide the following:

- A maximum rating of 6 A at 120 V ac (three times the maximum motor current for most models) to ensure long life.
- Auxiliary switches are field-adjustable with infinite positioning throughout the drive's travel range.
- May initiate secondary functions or provide remote indication of drive position.



Drive Train: Power and Durability

Beck's durable gear train maintains accurate, consistent positioning even under the demanding conditions of an active control loop.

- Gear trains employ a unique, all spur gear construction using only heat-treated alloy steels and ductile iron.
- Efficient, wide-faced spur gears ensure long life and eliminate wear-induced backlash and positioning inaccuracies common in worm gear and "Scotch-yoke" designs.
- Integral self-locking mechanism ensures that drives hold a minimum of 200% of rated torque with the motor de-energized.
- Durable design provides up to 4 days of protection against intermittent or extended accidental stalls.
- Stall protection is provided by the DCM. This configurable, time-based function shuts off motor power and provides alarm indication in the event of a drive stall.

Electric Handswitch: Timesaving Local Operation

The built-in electric Handswitch allows simple operation of the driven device. This saves time during installation and troubleshooting, allowing on-line adjustments to be made quickly and easily by bypassing the electronics in the drive and control system.

The Handswitch also serves as an electrical backup in the event of control system failure.

Manual Handwheel: Convenient Manual Control Without Declutch

An easy-to-turn spoke-free Handwheel is incorporated into the design to allow manual operation during installation or power outages.

- Handwheel can be used to move dampers to any position smoothly and easily—even under full load conditions.
- Mechanical stops in the housing prevent manual overtravel.

Housing: Superior Protection and Convenient Access to Components

Beck drives feature a cast aluminum body with individual compartments to protect components from moisture and dirt, and allow easy access for installation and calibration.

- Precision-machined aluminum alloy castings with corrosion-resistant polyurethane paint provide a rugged, dust-tight, weatherproof NEMA-4X enclosure.
- Individual compartments protect all major components: Motor, DCM, CPS, gear train and installation wiring terminal board.
- Gasketed covers provide extra protection for abusive indoor environments and harsh outdoor climates. Beck drives are designed to operate in -40°F. to 185°F. temperatures.
- Each compartment can be accessed without exposing other components to the environment.
- Output and Handwheel shafts are sealed with weatherproof, double-lip cartridge seals.

Individual compartments protect components

Linkage: Beck Linkage Kits and Link-Assist™ Program Ensure the Best Connection

The unique design of the crank arm allows infinite position adjustment to simplify installation.

Engineered linkage kits are available to complete the connection from the crank arm to the damper. Once the connection is made, the linkage length may be adjusted, simplifying the final mechanical calibration. Also, Beck rod ends incorporate a bearing to compensate for some lateral misalignment.

Beck's Link-Assist™ program provides a printout showing the optimum drive and linkage configuration for the application. The linkage arrangement can be characterized to match the torque profile of the application. Request this free service to save time, simplify installation and ensure the best performance at the lowest possible cost.

Baghouse Tempering Air Damper

Group 31 drive on a North American valve

Model 11-400 on a Furnace Hopper

Installing New or Retrofit Beck Drives can Result in Immediate Cost Savings

Beck control drives can start improving reliability and process efficiency as soon as they are installed, by reducing waste and eliminating costly maintenance.

Beck Sales Engineers will assist you in selecting the models that are best suited to your needs. Beck will also help plan mounting locations, linkage hardware, torque, timing, and signal connections. Beck can help you save time, simplify installation, and ensure the best performance at the lowest possible cost.

Whether you are equipping a new facility or upgrading an existing system, you can maximize the efficiency of your plant by specifying Beck, the proven choice of mining facilities throughout the world.

Model 11-200 on a Reverse Air Fan Damper

Contact a Beck Sales Engineer at 215-968-4600 to find out more about the best drives for your installations.
Visit our website at www.haroldbeck.com.
E-mail: sales@haroldbeck.com

GENERAL SPECIFICATIONS

Drive Power	
Models 11, 14 & 22-309	120, 240 V ac, single-phase, 50 or 60 Hz
22-409	208 V ac, three-phase, 50 or 60 Hz
22-809	208, 240, 480, 575 V ac, three-phase, 50 or 60 Hz
Model 31	120 V ac, single-phase, 50 or 60 Hz
Output Torque	
Model 11	Up to 1,800 lb-ft
Model 14	Up to 4,000 lbs of thrust
Model 22	Up to 8,000 lb-ft
Model 31	Up to 30 lb-ft
Operating Conditions	–40° to 185° F (–40° to 85° C) 0 to 99% relative humidity
Input Signal Options	4–20 mA or 1–5 V dc.
Communication Interface Options (not avail. w/ Model 31)	HART® protocol or local pushbutton/LED panel and RS-232 Serial Commands
Position Feedback Signal	4–20 mA
Action on Loss of Input Signal	Stays in place (all models) or moves to a preset position (some models)
Action on Loss of Power	Stays in place

Note: Models approved for use in Hazardous classified locations are available—contact a Beck Sales or Application Engineer for details.

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