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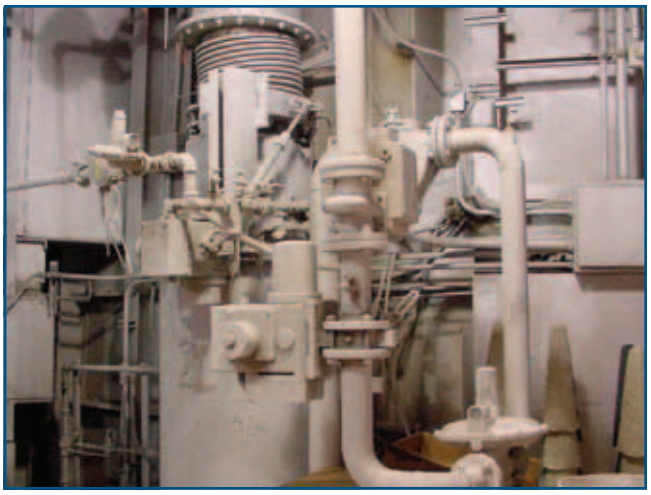
BECK®

ELECTRONIC CONTROL DRIVES FOR THE ALUMINUM INDUSTRY

BECK ELECTRONIC CONTROL DRIVES

Furnace Combustion Air Damper



Melting Furnace Gas Valve

Pre-melt Furnace Gas & Air Valves

Rugged & Dependable Control for Demanding Applications

The dependability and precise control capability of Beck drives have made them a standard in nearly 150 aluminum facilities worldwide with over 6,000 drives installed. Beck drives deliver maintenance-free operation in temperature extremes and other harsh conditions common to the aluminum industry.

Beck drives provide tight, responsive position control under the most demanding modulating conditions. This precise control makes Beck drives a key element for improved process efficiency, reduced energy costs and reduced emissions.

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

On the cover: Alcan's Alma Works Smelter, Quebec, Canada

Installing New or Retrofit Beck Drives Results in Immediate Cost Savings

Beck control drives improve reliability and process efficiency as soon as they are installed, thus reducing waste and eliminating costly maintenance.

Beck Sales Engineers can assist you in selecting the correct models, planning mounting locations, linkage hardware and signal connections. All Beck drives are shipped from the factory fully calibrated as specified. Drives can be supplied with fabricated mounting bases or mounted to valves for drop-in installation.

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 modern plants throughout the world.

Typical applications for Beck drives include:

Extraction Process:

Boiler -- Combustion Air Dampers, Fuel Valves, Feedwater & Steam Valves

Digesters -- Steam Valves, Caustic Valves, Slurry Valves

Water Control Valve

Kiln Reverse Air Fan Damper

Washers & Thickeners -- Product & Underflow Valves

Kiln -- Combustion Air Dampers, Fuel Valves

Reduction Process:

Raw Material -- Baghouse Dampers (air flow balancing)

Potlines -- Cell Exhaust Dampers

Anode/Carbon Ovens -- Fuel Valves, Flue Exhaust Dampers

Fabrication:

R-type Furnace -- Fuel & Waste Gas Valves, Air & Exhaust Dampers

Incinerator -- Fuel and Air Valves

Melting Furnace -- Fuel Valves, Air & Exhaust Dampers

Holding/Alloying Oven -- Fuel Valves, Air & Exhaust Dampers

Caster -- Water Valves

Heating Furnace -- Combustion Air Dampers & Fuel Valves

Reheat & Pusher Furnaces -- Combustion Air Dampers & Fuel Valves

Soaking Pits -- Combustion Air Dampers & Fuel Valves

Annealing Furnace -- Gas & Air Valves

The Beck Motor: 100% Availability

Beck's unique 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 permits.

The Beck motor:

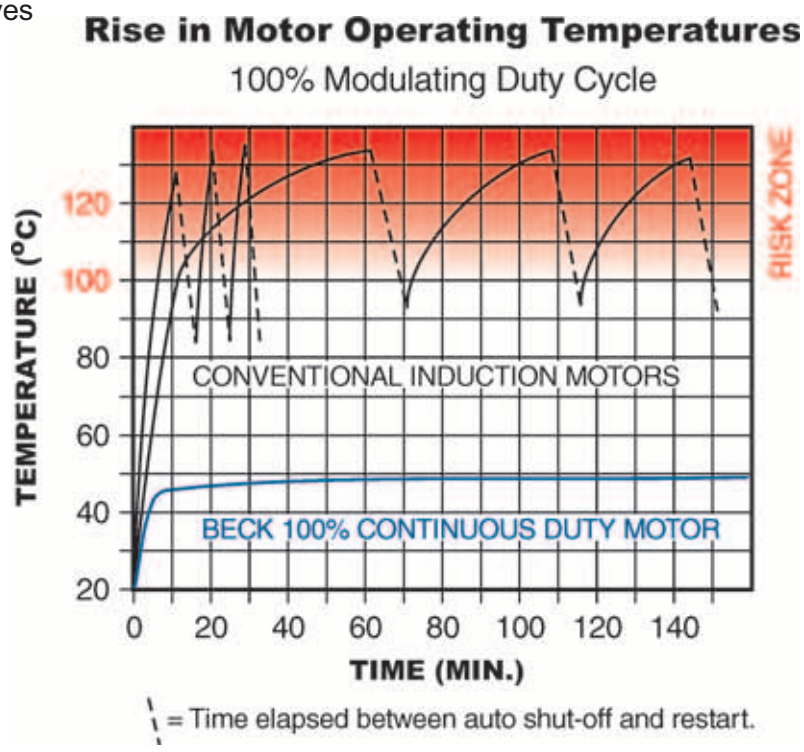
- Reaches full speed and torque in milliseconds and stops in milliseconds, eliminating dead time.
- Provides extremely accurate and repeatable positioning for modulating applications.
- Will not coast or overshoot the desired position.
- Draws low current (0.16 A to 3.0 A). The low power consumption 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.

Furnace Hopper

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

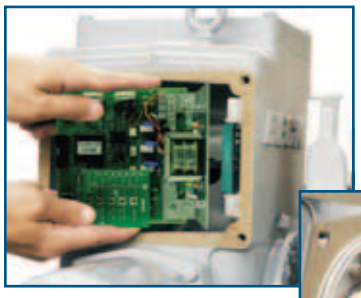
Our field-proven electronics provide excellent position control in response to modulating control signals. This maximizes control loop performance by ensuring that the drive responds exactly as the control loop requires.

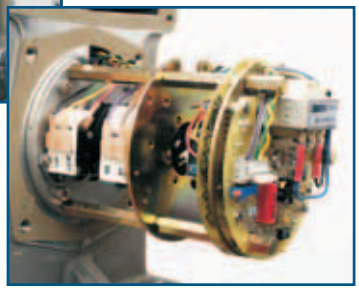
The DCM is equipped with a local interface panel for pushbutton calibration functions without the need for external devices or software. A bank of LED diagnostic lights are provided to display a number of status conditions.

The DCM is also equipped with a HART® communications interface to provide bidirectional digital communications over the existing analog demand wiring—providing access to the added functions and information without interfering with control or requiring new wiring. Communications can be accomplished either remotely or locally using any standard HART®-based Handheld Communicator. In addition, the DCM is compatible with common asset management systems.

A serial interface also allows for drive configuration changes, drive information reporting and assistance in troubleshooting.

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.





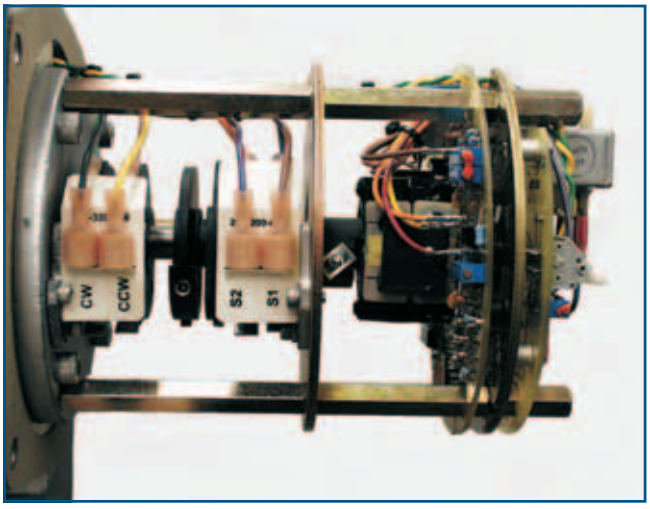
Over-travel Limit Switches

Beck drives include heavy-duty, single-pole, double-throw (SPDT) switch mechanisms 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:

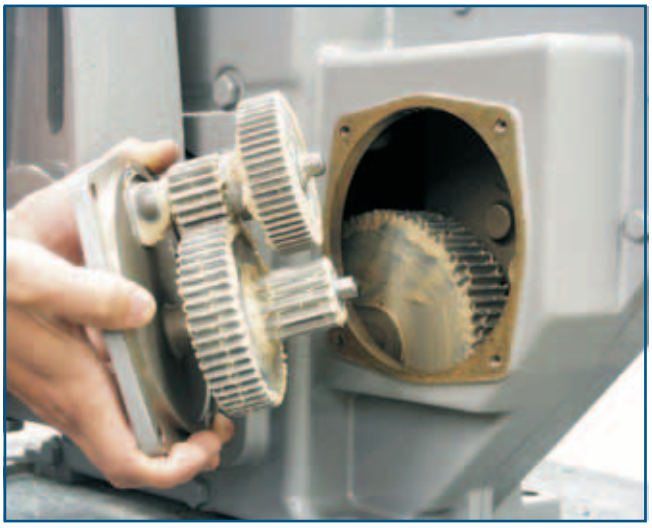
- A maximum rating of 6 A at 120 V ac (three times the maximum motor current for most models) to ensure long life.
- Auxiliary switches are field-adjustable with infinite positioning throughout the drive's travel range.
- May initiate secondary functions or provide remote indication of drive position.



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. If the motor tries to run in one direction for more than 300 seconds, the DCM will shut off power to the motor and a status indication LED will activate indicating a 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.
- The motor / Handwheel operates at 72 or 120 RPM and therefore poses no safety hazard.
- The Handwheel does not require excessive turning to move the load.

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.
- Each compartment can be accessed without exposing other components to the environment.
- Output and Handwheel shafts are sealed with weatherproof, double-lip cartridge seals.

Group 11 drive with the gasketed control end cover removed

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.

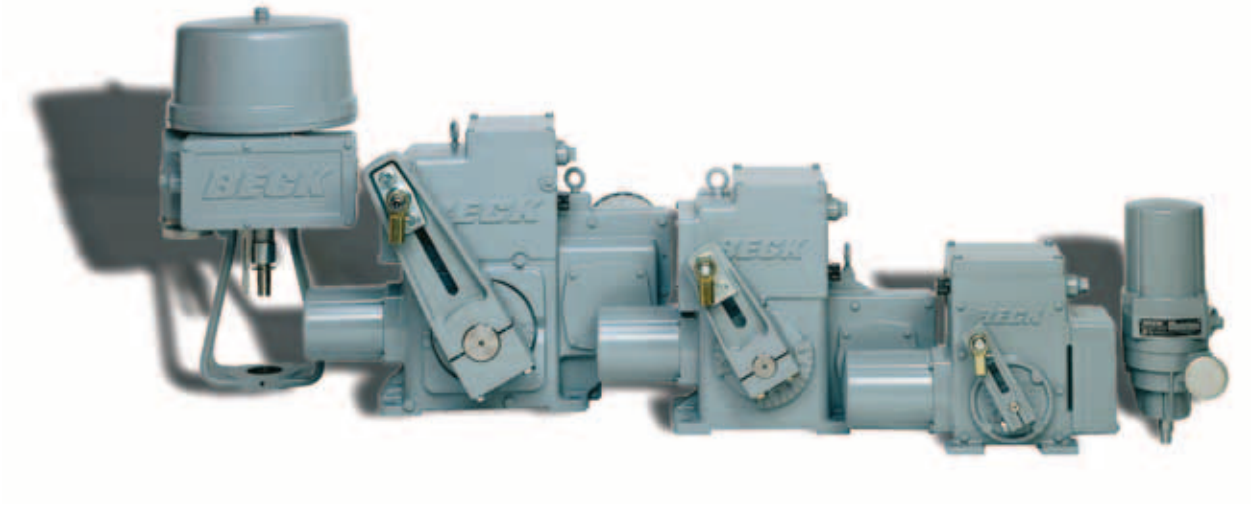
Engineered linkage kits are available to complete the connection from the crank arm to the damper. Once the connection is made, the linkage length may be adjusted, simplifying the final mechanical calibration. Also, Beck rod ends incorporate a bearing to compensate for some lateral misalignment.

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.

Mixing Air Bottom Damper

GENERAL SPECIFICATIONS

Drive Power Models 11 and 14	 120, 240 V ac, single-phase, 50 or 60 Hz
Output Torque Model 11 Model 14	 Up to 1,800 lb-ft Up to 4,000 lbs of thrust
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 for digital control
Pulsed Input Options	120 V ac or 24 V dc
Communication Interface Options	HART® protocol, 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, manual Handwheel operation
Enclosure	NEMA 4X. Models approved for use in Hazardous classified locations are also available—contact a Beck Sales or Application Engineer for details.



BECK®
HAROLD BECK & SONS, INC.
2300 TERRY DRIVE • NEWTOWN, PENNSYLVANIA 18940 • USA
PHONE: 215-968-4600 • FAX: 215-860-6383
www.haroldbeck.com