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An ISO 9001 company

# **BECK**® **ELECTRIC ACTUATORS**

## **FOR INDUSTRIAL PROCESS CONTROL**



## **STEEL INDUSTRY**



BECK  
VIDEO  
Scan w/  
Smartphone



*Reheat Furnace Exhaust Damper*



*A & P Line Gas Valve*



*Stove Enrichment Gas Valves*

## **Rugged & Dependable Control for Demanding Applications**

The dependability and precise control capability of Beck actuators have made them a standard in the steel industry for over 70 years. Beck actuators deliver maintenance-free operation in temperature extremes and other harsh conditions common to the steel and iron making industry.

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

Beck actuators are designed for continuous modulation, so there are no duty-cycle, temperature rise, or wear concerns typical with most electric actuators.

***Contact a Beck Sales or Application Engineer  
to find out more about the best actuators for  
your installations.***

***Call 215-968-4600***

***E-mail: [sales@haroldbeck.com](mailto:sales@haroldbeck.com)***

## Installing or Retrofitting Beck Actuators: Immediate Cost Savings—Easy, Drop-in Installation

Beck actuators 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 actuators are shipped from the factory fully calibrated (as specified) and can be supplied with fabricated mounting bases or mounted to valves for quick, easy, drop-in installation.

Reliability in the harshest environments of heat, grit and moisture has made Beck actuators a long-time standard in many of the traditional, integrated mills as well as newer, modern mini-mills.

Beck actuators offer easy installation and can be mated to almost any final control element. Years of experience and expertise make it possible for Beck to custom fabricate all types of mounting hardware, adaptors and pedestals for simple drop-in replacement. Beck ensures a trouble-free installation.



*Recycle Water Control Valve*



*Lime Kiln Primary Air Damper*

## Typical Applications

Beck actuators are typically used on:

- Fume control and baghouse dampers from the coke plant to the BOP
- Coke battery stack, crossover and other pressure control applications
- Stove combustion valves in the blast furnace area
- Caster mold cooling and spray water valves
- Furnace main combustion air fans
- Furnace gas valves
- Furnace combustion air valves
- Furnace exhaust/pressure control dampers
- Melt shop furnace 4th hole
- DEC and canopy hood dampers

## The Beck Motor: No Burnout, Continuous Duty

The unique motor is one of the features that sets Beck actuators apart from other typical electric actuators. Beck's no burnout motor ensures that the actuator is available 100% of the time. There are no duty cycle limitations typical of most electric actuators, so the Beck actuator tracks the control signal perfectly, greatly simplifying loop tuning.

The Beck motor:

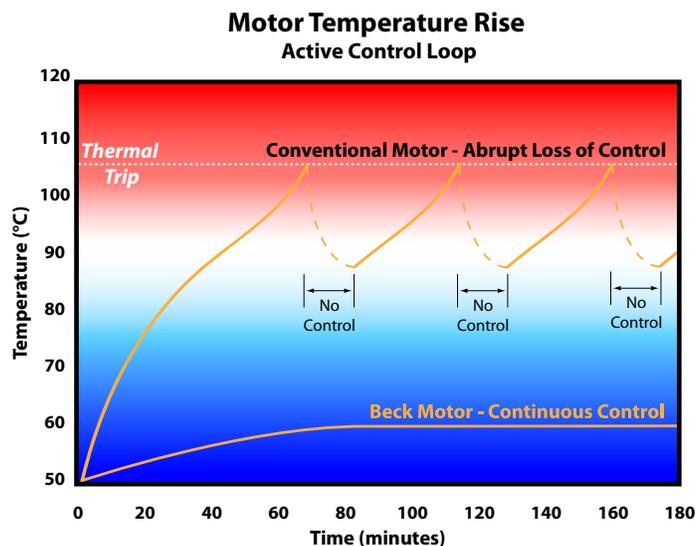
- Reaches full speed and torque in milliseconds—eliminating dead time.
- Stops instantaneously—eliminating coast and overshoot.
- Provides extremely accurate, repeatable positioning with no required maintenance.
- Draws very low current (0.16 to 3.0 A in most applications) permitting easy integration with UPS systems.

And . . .

- Never overheats or burns-out; even under demanding modulating or stalled conditions.



*Sinter Plant Fines Gate Control*



*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 actuator 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. LED diagnostic lights 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 established either remotely or locally using any standard HART®-based communication tool. In addition to HART, other DCM versions are available that support Foundation Fieldbus, Profibus PA or Modbus RTU communications. Modbus TCP (Ethernet) is supported using a Modbus RTU DCM along with an interface module. All interfaces are compatible with common asset management systems.

A serial interface also allows for actuator 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.



Digital Control Module (DCM)

**HART**  
COMMUNICATION PROTOCOL



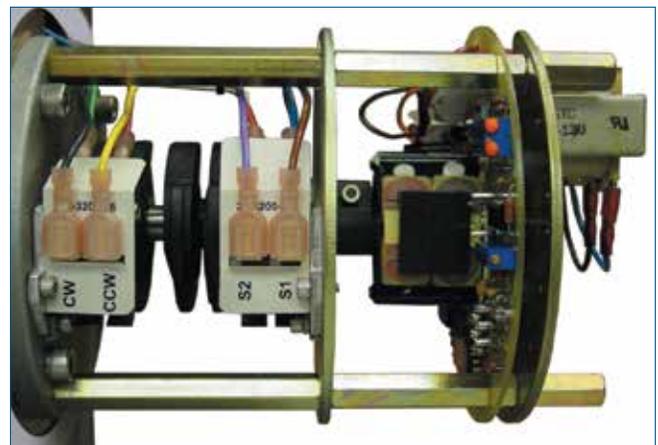
## Over-travel Limit and Auxiliary Switches

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

Common throughout most Beck 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.



Contactless Position Sensor (CPS),  
over-travel limit switches and auxiliary switches

## 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.

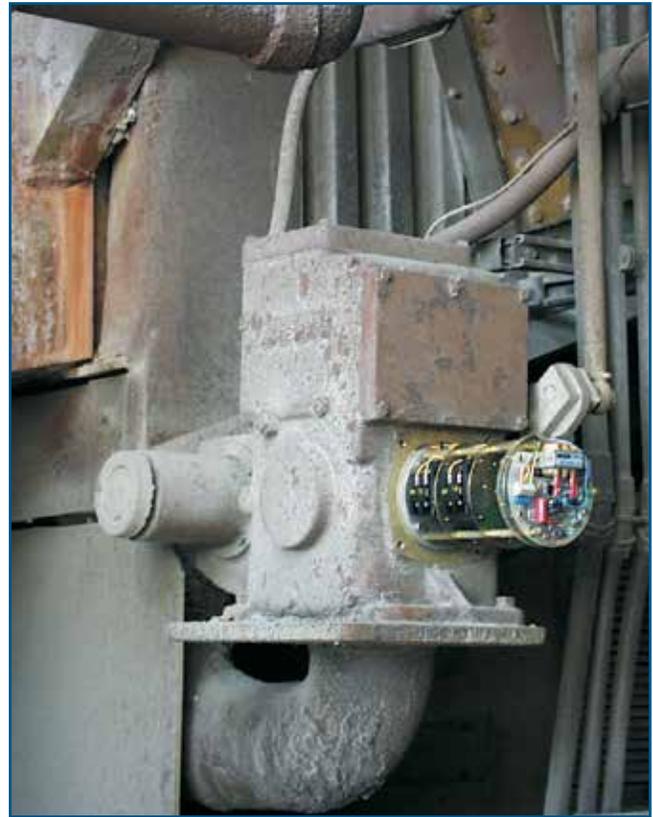
- Handwheel can be used to move valves/dampers to any position smoothly and easily—even under full load conditions.
- Mechanical stops in the housing prevent manual over-travel.



## **Housing: Superior Protection and Convenient Access to Components**

Beck actuators 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 Type 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 actuator 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.



*Melt Shop Fume Control Tempering Air Damper*

## GENERAL SPECIFICATIONS

|  |  |
|--|--|
| <u>Power</u>                           |  |
| Model 11                               | 120 V ac, single-phase, 60 Hz (50 Hz Optional)<br>(208, 240, 380, 415, 480 & 575 V ac, 60 or 50 Hz Optional)   |
| Model 14 & 29                          | 120 V ac, single-phase, 60 Hz (50 Hz Optional)<br>(240 V ac, single-phase, 60 or 50 Hz Optional)   |
| Model 31                               | 120 V ac, single-phase, 60 or 50 Hz  |
| <u>Output Torque/Thrust</u>            |  |
| Model 11                               | Up to 1,800 lb-ft (2440 N•m)   |
| Model 14                               | Up to 1,800 lbs of thrust (8010 N)   |
| Model 29                               | Up to 6,100 lbs of thrust (27 134 N)   |
| Model 31                               | Up to 30 lb-ft (41 N•m)  |
| <u>Operating Conditions</u>            |  |
| Models 11, 14 & 29                     | –40° to 185° F (–40° to 85° C)<br>0 to 100% relative humidity, non-condensing  |
| Optional for Models 11-200, -300, -400 | –58° to 185° F (–50° to 85° C)<br>0 to 100% relative humidity, non-condensing  |
| Model 31                               | –40° to 150° F (–40° to 65° C)<br>0 to 100% relative humidity, non-condensing  |
| <u>Communication Interface Options</u> |  |
| Models 11, 14 & 29<br>(Option 9 only)  | HART protocol, Modbus RTU, Modbus TCP (Ethernet), Foundation<br>Fieldbus, Profibus PA, local pushbutton/LEDs and DB9 Serial Commands   |
| Position Feedback Signal               | 4–20 mA or 1–5 V dc (V dc not available with Option 9)   |
| Action on Loss of Input Signal         | Stays in place (all models) or moves to a preset position (configurable with<br>some models)   |
| Action on Loss of Power                | Stays in place   |
| Enclosure                              | Type 4 or 4X (depending on specific model).<br>Models approved for use in Hazardous classified locations are also<br>available—contact a Beck Sales or Application Engineer for details. |

A 100% EMPLOYEE OWNED COMPANY

**BECK**

~ founded 1936 ~

SINCE 2021



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Rev. 3.5