

IPB-CM  
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# **BECK**® **ELECTRIC ACTUATORS**

## **FOR INDUSTRIAL PROCESS CONTROL**



## **CEMENT & LIME PLANTS**



BECK  
VIDEO  
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## **Beck actuators are built to last—even in highly abusive conditions**

Beck has long been the actuator of choice in the Cement and Lime industry, not only in North America, but also throughout the world. This is due to the ability of Beck actuators to provide accurate and reliable control of process valves, dampers, fluid couplings and diverter gates under extremely harsh conditions of heat, dust and vibration. For years, new plants have been constructed using Beck actuators as original equipment on applications requiring modulating control and open/close service. Plant owners, operating personnel, and OEM's specify Beck for nearly all systems within the plant.

Cement and Lime plants depend on 100% availability of critical process control equipment. Accurate control is required to efficiently produce a high quality product. All of this is necessary while maintaining compliance with today's environmental regulations. Beck actuators are built rugged to withstand the harsh operating environment, while at the same time providing accurate control—consistently over time—without the need for periodic maintenance.



*Kiln ID Fan Damper*



*Kiln Reverse Air Fan Damper*

Beck actuator applications in cement and lime plants include:

### **Preheater Valves and Dampers**

A common application for Beck actuators are the modulating valves and dampers throughout the preheater tower.

### **Kiln Combustion Control**

Beck actuators are utilized on combustion fuel and air applications including ID and PA fan dampers, fan fluid couplings for speed control, coal mill dampers, and gas and oil control valves.

### **Clinker Cooler Fan Dampers**

Beck actuators are utilized to achieve uniform cooling of the finished product.

### **Grinding Mill and Finish Mill Diverter/Flop Gates**

To control the blending of materials, Beck actuators are used on diverter/flop gates and rotary drum valves.

### **Baghouse and Dust Collector Dampers**

Beck actuators are used on baghouse and dust collector dampers to optimize performance and ensure compliance with strict environmental regulations.

### **Process Water Valves**

Beck has a variety of products for all types of valves; including butterfly, ball and globe valves. Valve/drive assemblies are delivered for "drop-in" installation.



## 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:

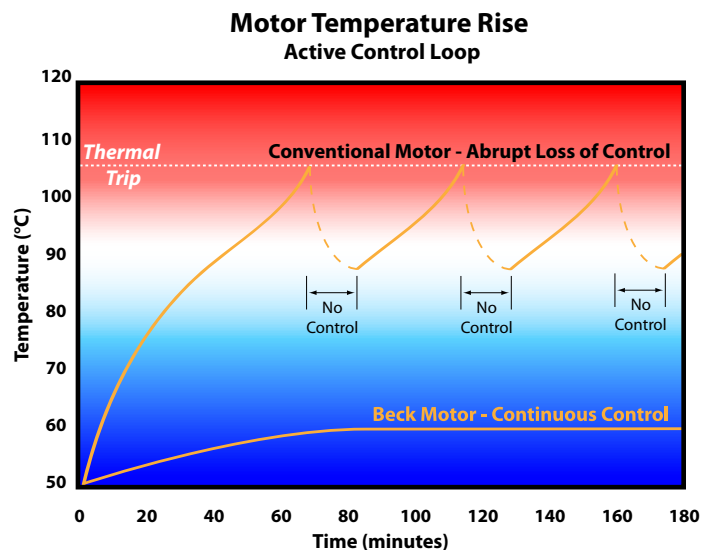
- Reaches full speed and torque in milliseconds—eliminating dead time.
- Stops instantaneously—eliminating coast and overshoot.
- Provides extremely accurate, repeatable positioning with no required maintenance.
- Draws very low current (0.16 to 3.0 A in most applications) permitting easy integration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

And . . .

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



Raw Mill Dust Collector Fan Speed 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

Beck actuators 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 actuator and damper respond 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 with the DCM over the existing analog demand wiring—facilitating 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 communication tool.

In addition to HART, other DCM versions are available that support Foundation Fieldbus, Probus 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, information reporting and assistance in troubleshooting.



Digital Control Module (DCM)

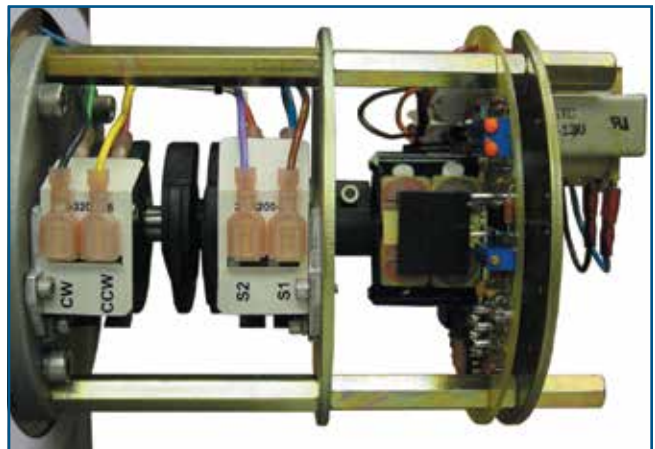
## Over-travel Limit and Auxiliary Switches

Beck actuators include heavy-duty, single-pole, double-throw (SPDT) switches for electrical over-travel protection, or either open/close or multi-position control. 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 actuator 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 actuator's travel range.
- May initiate secondary functions or provide remote indication of actuator 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 actuators 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 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. Hazardous location ratings are also available.
- 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 actuators 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*



*Main Fuel Gas Valve*



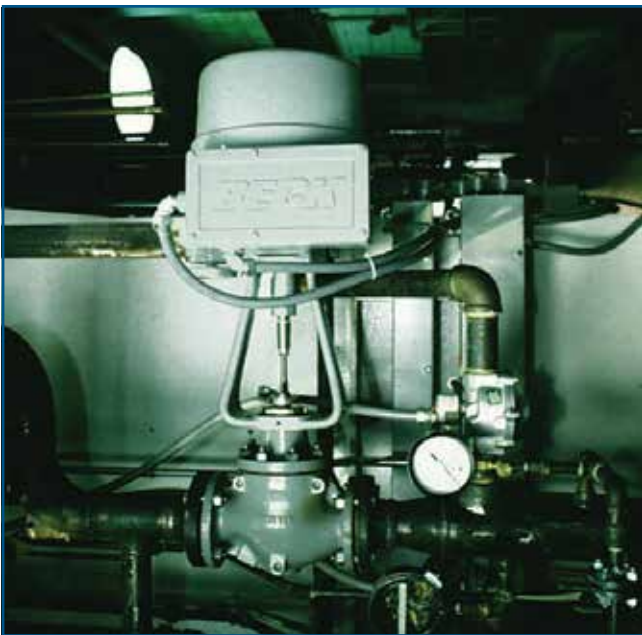
*Primary Air Fan Damper*

## **Installing New or Retrofit Beck Actuators can Result in Immediate Cost Savings**

Beck actuators 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 modern cement plants throughout the world.



*Kiln Fuel Oil Valve*

**Contact a Beck Sales Engineer at 215-968-4600 to find out more about the best actuators for your installations. Visit our website at [www.haroldbeck.com](http://www.haroldbeck.com). E-mail: [sales@haroldbeck.com](mailto:sales@haroldbeck.com)**

## GENERAL SPECIFICATIONS

<b>Power</b>	
Model 11	120 V ac, single-phase, 60 Hz (50 Hz Optional) (208, 240, 380, 415, 480 & 575 V ac, 60 or 50 Hz Optional)
Model 14, 29 & 42	120 V ac, single-phase, 60 Hz (50 Hz Optional) (240 V ac, single-phase, 60 or 50 Hz Optional)
Model 22-309	120 V ac, single-phase, 60 or 50 Hz (240 V ac Optional) (208, 240, 380, 416, 480, 575 V ac, three-phase, 60 or 50 Hz Optional)
Model 22-409	208 V ac, three-phase, 60 or 50 Hz (240, 380, 416, 480, 575 V ac Optional)
Model 22-809	480 V ac, three-phase, 60 or 50 Hz (208, 240, 380, 416, 575 V ac Optional)
<b>Output Torque/Thrust</b>	
Model 11	Up to 1,800 lb-ft (2440 N•m)
Model 14	Up to 4,000 lbs of thrust (17 800 N)
Model 22	Up to 8,000 lb-ft (10 846 N•m)
Model 29	Up to 6,100 lbs of thrust (27 134 N)
Model 42	Up to 1,000 lbs of thrust (4450 N)
<b>Operating Conditions</b>	
Model 11, 14 & 29	-40° to 185° F (-40° to 85° C) 0 to 100% relative humidity, non-condensing
Optional for Models 11-200, -300, -400	-58° to 185° F (-50° to 85° C) 0 to 100% relative humidity, non-condensing
<b>Communication Interface Options</b>	
All Models (Option 9 only)	HART, Modbus RTU, Modbus TCP (Ethernet), Foundation 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 some models)
Action on Loss of Power	Stays in place
Enclosure	Type 4 or 4X (depending on specific model). Models approved for use in Hazardous classified locations are also available—contact a Beck Sales or Application Engineer for details.



# **BECK**<sup>®</sup>

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