

BECK[®]



ELECTRONIC
CONTROL DRIVES
FOR WATER AND
WASTEWATER
TREATMENT PLANTS



Long lasting and dependable in water treatment applications

Valves and dampers in today's water treatment plants require dependable and precise positioning control. However, heavy duty cycles, high humidity, and harsh weather often cause typical electric actuators to be unreliable or to fail prematurely.

For 40 years, Beck has supplied the municipal and industrial water treatment industry with rugged, dependable drives for modulating and fixed position control. The unique design of Beck drives eliminates the problems associated with other electric actuators. Troublesome thermal overloads and torque limiting switches are not needed because the motor never overheats or burns out. Worm gears are also not used because they are inefficient and wear quickly. And since the gear train does not require an oil bath, Beck drives can be mounted in any position, providing total installation flexibility.

Beck drives do not require regular maintenance, so downtime and operating costs are greatly reduced. Most importantly, Beck drive performance remains consistent over years of service, delivering control as accurate and dependable as when first installed.

Drive durability, factory-direct support, ease of installation, and robust design make Beck the best choice for water and wastewater actuation processes.



Beck drives provide decades of dependable service

Beck is a plant-wide solution for both modulating and open/close applications

Beck drive applications in water and wastewater treatment plants include:

- Filter flow control valves
- Filter backwash valves
- Wash water return valves
- Chemical addition valves
- Aeration blower inlet vanes
- Air distribution header valves
- Return activated sludge valves
- Sludge valves
- Primary effluent valves
- Incinerator natural gas valves
- Incinerator combustion air dampers
- Incinerator exhaust gas dampers
- Incinerator fan dampers
- Fluid and magnetic pump and fan adjustable speed couplings
- Variable pump control on MagnaDrive installations



Beck Model 11-200/300 installed on a MagnaDrive Vertical ASD

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 control 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 . . .

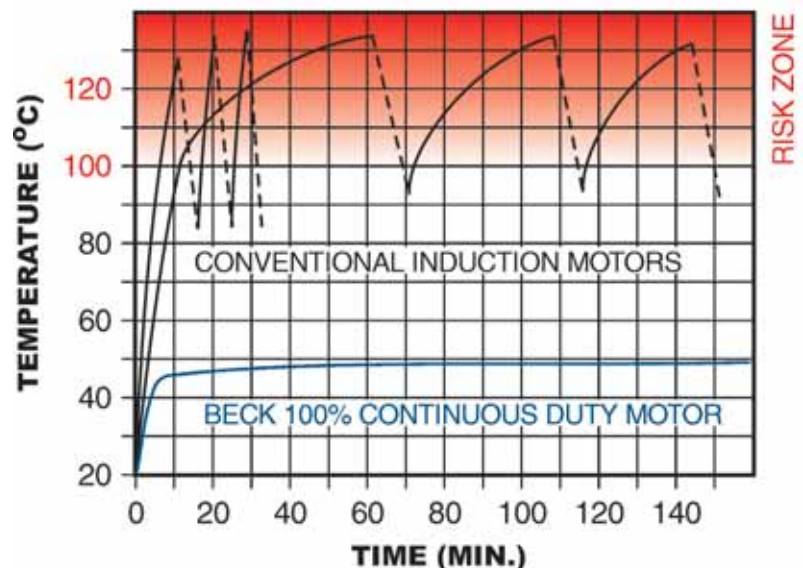
- Never overheats or burns-out; even under demanding modulating control or stalled conditions. Thermal overloads and torque switches are not included in Beck drives because they are not required.

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.



Multiple Beck drives on flow control valves

Rise in Motor Operating Temperatures 100% Modulating Duty Cycle



∩ = Time elapsed between auto shut-off and restart.

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

Beck control drives for modulating applications 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 valve or damper responds exactly as the control loop requires.

The Beck Digital Control Module (DCM) resides within the drive. It provides unparalleled position control as well as advanced features like stall protection and diagnostics. It is available with HART® communications capabilities or with a local configuration interface panel.

The DCM local interface makes calibration and routine configuration changes a simple push-button operation at the drive, while HART® communications provide even greater flexibility and more advanced diagnostic and interface capabilities. Calibration, configuration, detailed diagnostics, even an optional live torque measurement can be accessed through a HART® capable Handheld Communicator 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. Unlike typical position sensors, the CPS does not wear due to its contactless design. The DCM also uses the sensor signal to source a 4–20 mA external position signal for remote monitoring of drive position.



Digital Control Module (DCM)

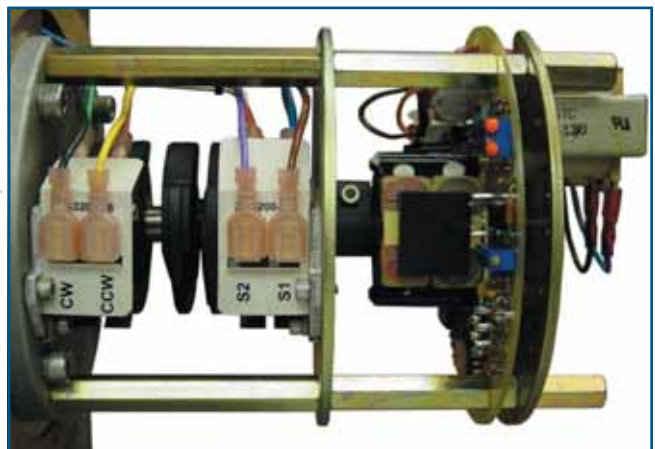
Over-travel Limit and Auxiliary Switches

Beck drives 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 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.



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.

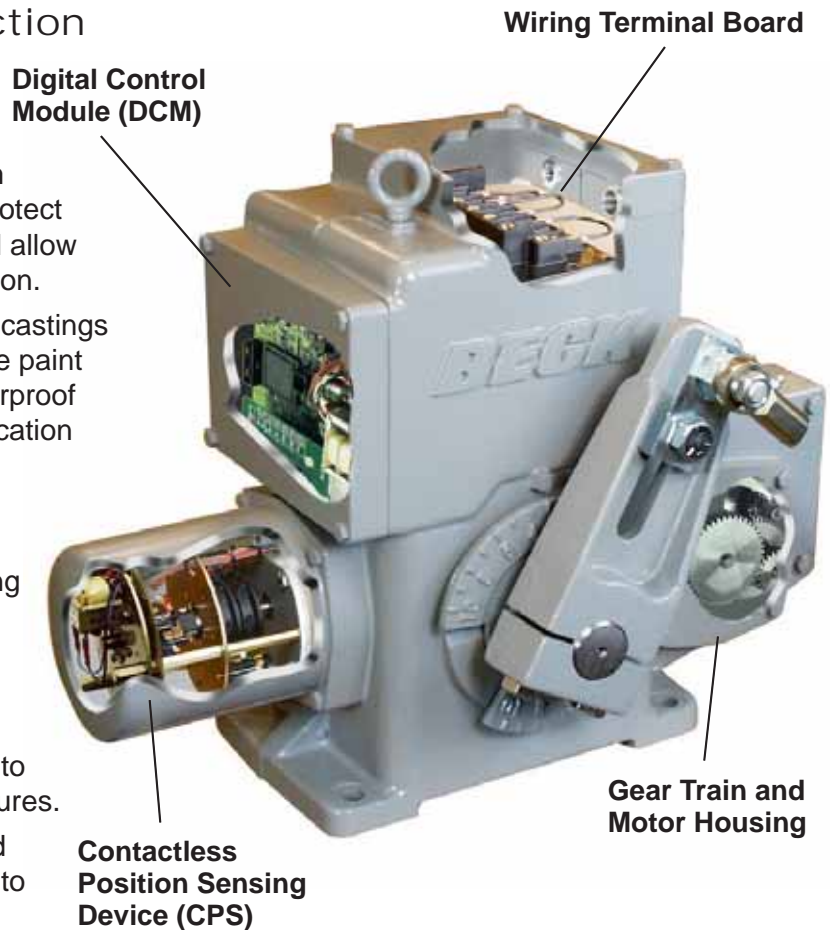
- Handwheel can be used to move valves/dampers to any position smoothly and easily—even under full load conditions.
- Mechanical stops in the housing prevent manual over-travel.



Housing: Superior Protection and Convenient Access to Components

Beck 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. 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 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 valve or 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™ provides a printout showing 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.

Beck actuators can be mounted in any orientation



Beck linkages are optimized for your application



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.

Every Beck drive is shipped from the factory set up and calibrated to your specifications. Beck will also factory-mount control drives to your valves and ship them to you fully calibrated and ready for simple, drop-in installation.

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 for water treatment plants.

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

BEFORE & AFTER PHOTOS OF A BECK MODEL 11-469 REPLACING AN UNRELIABLE ELECTRIC ACTUATOR ON A RETURN ACTIVATED SLUDGE VALVE



AFTER REPLACEMENT



BEFORE REPLACEMENT

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 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, 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.**

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HART 
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