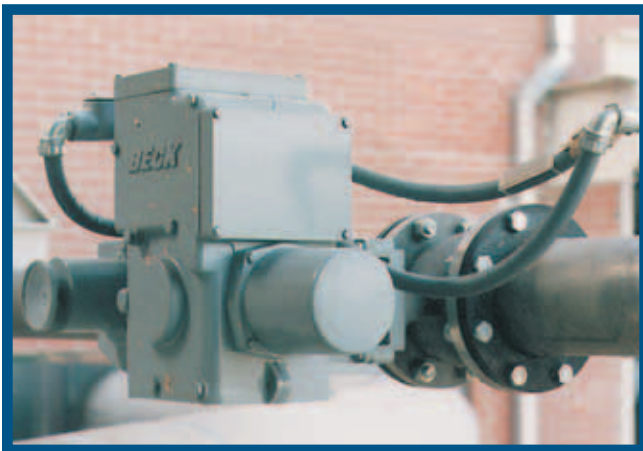


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# **BECK**<sup>®</sup>

## ***ELECTRONIC CONTROL DRIVES FOR QUARTER-TURN VALVES***



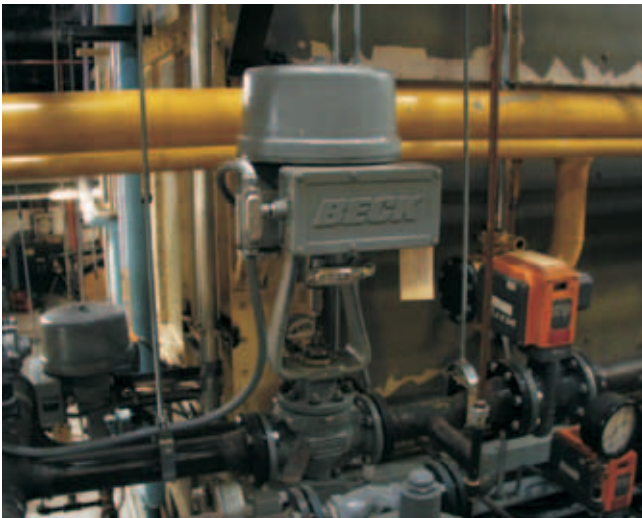
***RESPONSIVE CONTROL FOR DEMANDING APPLICATIONS***



*Machine chest level control valve*



*Group 11 drive on a main gas control valve (with linkage)*



*Beck also manufactures linear drives for globe valves*



*Machine chest recirculation control valve*

## **Beck control drives provide field-proven solutions to control problems**

Control loop performance is only as good as the performance of the control valve. It is a well-documented fact that many industrial control loops function poorly as a result of valve actuation problems. Beck control drives eliminate the problems caused by both pneumatic and typical electric actuators, and maximize the potential of control systems.

This is accomplished through the unique Beck design, which provides a number of key performance advantages including:

- Repeatable positioning down to 0.1% resolution
- Will not STICK, SLIP or OVERSHOOT
- Instantaneous start and stop capability
- No performance degradation over time or with changing loads
- No duty cycle limitations
- Rated from (-40) to 85°C. (185°F.)
- Requires little or no maintenance

Unlike pneumatic actuators, Beck drives provide consistent and precise performance over time regardless of changing process conditions.

**Pneumatic actuators** are subject to inherent characteristics that limit and disrupt control loop performance. Many recent developments in this technology center on advanced diagnostics to help detect and predict these problems, but the compressibility of air remains the major problem source. As such, the overall performance of pneumatic actuators varies as a function of frictional and dynamic load, process conditions, valve condition, and the performance of actuator accessories like the I/P transducers, positioners, and boosters. This results in inconsistent and often wide deadbands, poor resolution, sluggish response, and overshoot. Even when pneumatic actuators perform well when new, these problems become increasing prevalent and unpredictable over time. Heat, humidity, contamination, and air quality all serve to increase performance degradation and inconsistency, often making excessive maintenance necessary to maintain acceptable control.

“Stick and slip” is one of the most common pneumatic actuator problems. This condition occurs when an actuator builds pressure to

overcome a static load (usually frictional, but not always). As the pressure builds, the final control element does not respond, and therefore the controller continues to increase the demand. When the air pressure is high enough to initiate movement, the actuator takes off and overshoots the correct position. This can result in “limit cycling”—causing the controller to continuously cycle.

**Typical electric actuators** have problems of their own. Many designs incorporate high-speed induction motors that do not stop instantaneously and require a limited duty cycle to prevent overheating. In addition, most utilize inefficient worm gears, which can wear quickly, particularly within actuators installed in active loops. These problems dictate the use of wide deadbands, which can severely limit the resolution of a final control element. Another significant concern is the overall reliability of typical electric actuators. The electronics often cannot withstand harsh environmental conditions and cause costly control downtime.

Beck control drives are designed to eliminate the problems of both pneumatic and conventional electric actuators. Beck drives provide consistent and precise performance despite the effect of changing process conditions—without sticking, slipping or degrading over time.



*Group 11 drive on a 10" ball valve*

## Beck's Unique Design Incorporates Simplicity, Flexibility, Reliability, and Performance

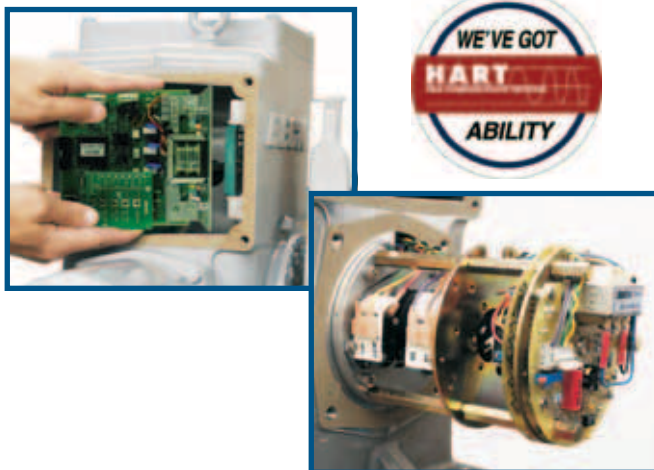
Not only are Beck drives designed to eliminate the shortcomings of other actuators, the many unique design features make them easy to install, easy to operate, reliable, maintenance-free and durable. The design also results in unbeatable control performance that remains consistent over time and with changing conditions.

## 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 drive and valve 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. 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 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 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.

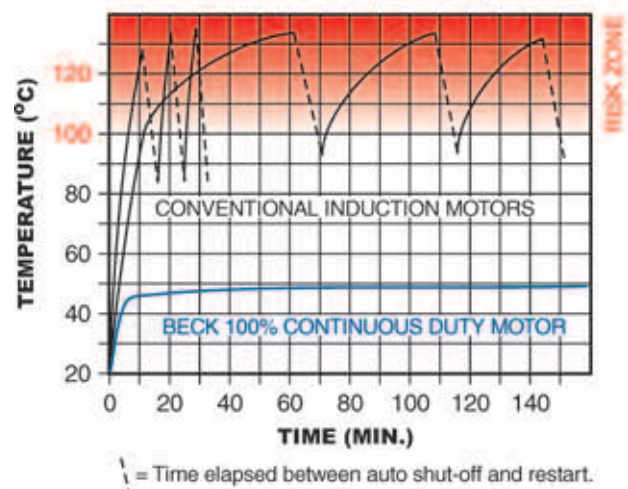
## Proven control motor and gearing deliver decades of trouble-free performance

The Beck control motor, unlike conventional motors, does not overheat or burnout; it stays cool under continuous modulation to provide 100% availability and reliable response to control signal input.

Tested in an active modulating control loop, conventional motors increased rapidly in temperature, tripping overload devices and making them unavailable for extended time intervals. Only the Beck control motor remained available for continuous operation.

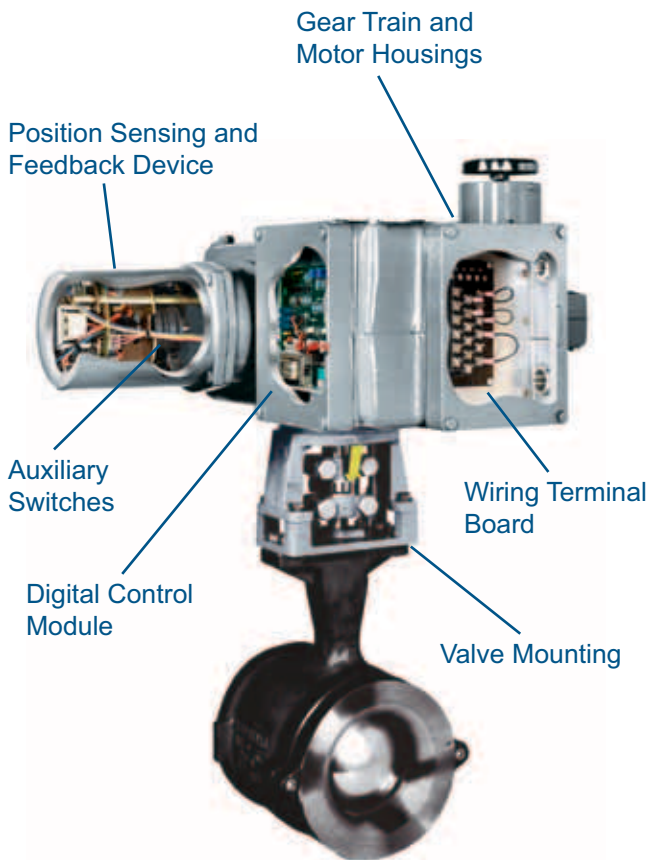
The motor transmits torque directly and efficiently through a drive train consisting of precision gears of alloy steel and ductile iron. The result is a powerful drive unit that works hand-in-hand with your electronic control system, responding to input signals instantly without coasting and without overshooting.

**Rise in Motor Operating Temperatures**  
100% Modulating Duty Cycle



## **Individual cast covers protect components from severe dirt, water and weather conditions**

Beck drives are well suited to abusive environments because of the extra measure of protection provided by their rigid, gasketed housing covers. Separate compartments protect the major components from dirt and moisture. Each of these compartments may be accessed without exposing other components to the environment. In addition, the drive can be mounted in any orientation.



## **Consistent performance with very low maintenance**

The Beck drive is designed for low maintenance operation over the life of the drive.

The electronics used in the drive are designed not to drift and, therefore, do not require periodic recalibration in the field. This is unlike pneumatic actuators that use I/P transducers and positioners which eventually drift and require recalibration. In addition, Beck's Contactless Position Sensor (CPS) feedback device does not wear, unlike the feedback potentiometers used in most other actuators and positioners.

The mechanical design features of the Beck drive permit unparalleled low maintenance operation, even in the harshest environments. These features include a sealed motor and gearing that require no periodic lubrication.

Additionally, because the drive operates on 120 V ac power, all the problems associated with air systems are completely eliminated.

## **Retrofitting with Beck drives can result in immediate cost savings**

Beck control drives can start improving product quality and process reliability immediately after installation, reducing waste and improving overall process efficiency. Beck Sales Engineers will assist you in selecting the models which are best suited to your needs. Beck will also help plan mounting locations, mounting hardware (if needed), and determine torque, timing, and signal connections. We can help you save time, simplify installation, and ensure the best performance at the lowest possible cost.

Contact Beck to find out more about how the efficiency, versatility, and durability of Beck drives can make a difference in your application.

## GROUP 11 MEDIUM AND HIGH TORQUE VALVE DRIVES



Beck Group 11 drives provide high torque output while maintaining the cool operating temperatures and stable, accurate performance characteristic of all Beck drives. Used in thousands of modulating valve applications, Beck drives have a field-proven track record for 100% availability, excellent control and low maintenance.

Group 11 units can be engineered for crank arm linkage or direct coupling for use on quarter-turn ball, plug, and butterfly valves.

### **Power and precision for process valves**

Proven in thousands of installations worldwide, Group 11 Electric Control Drives are available in a wide variety of torque and timing combinations for control of larger valves. Utilizing Beck's linkage kits and computerized Link-Assist™ Program, the right combination of torque and timing can be selected to meet specific application requirements. For example, torque can be maximized at the end of travel for tight shut-off.

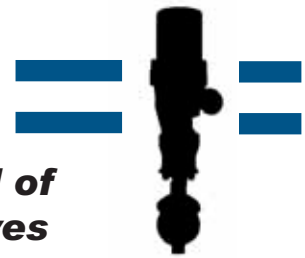
Digital electronics are designed to directly receive conventional 4–20 mA signals. Shaft movement is initiated in precise increments as small as 0.1% of full rotation. The electronics are designed for operation in temperatures ranging from -40 to 185° F. at 100% duty cycle. Beck's Contactless Position Sensor can be included for reliable control feedback with infinite resolution.

### Torque and Timing Options

Basic Model	Torque (lb-ft)	Timing (sec/90°) @ 60 Hz
11-160	15	10
	20	18
	40	18
	40	36
	60	54
	80	36
	80	81
11-260	125	18
	125	36
	175	54
	250	36
	250	68
11-360	300	36
	300	90
	400	54
	550	68
	650	90
11-460	350	22
	550	36
	650	22
	800	54
	1,000	22
	1,000	36
	1,000	68
	1,500	90
	1,800	32
1,800	54	



## GROUP 31 LOW TORQUE VALVE DRIVES



The Group 31 design was developed to address a need for reliable valve modulation in a small package.

Small electric actuators are typically characterized by inadequate gearing, seating torque, and poor reliability. Beck's Group 31 drive eliminates those characteristics by incorporating the design principles of larger Beck drives. The result is excellent performance even in low torque applications.

Direct coupled or mounted with factory designed crank arm and linkage, the Group 31 is ideal for 1/2" through 2 1/2" quarter-turn valves, and can be used in certain low torque valves up to 6".

### **Compact control of quarter-turn valves**

In an extremely compact design, Group 31 Electronic Control Drives provide 24 or 18 second timing for closure and modulation of low torque, quarter-turn valves. The output section consists of hypocycloidal gearing with precision-cut alloy steel and heat-treated ductile iron gears.

The drive's control electronics are designed to receive conventional 4–20 mA or 1–5 V dc signals directly and provide exceptional valve position control. Field-proven, the electronics are designed for operation in temperatures ranging from -40 to 150° F. at 100% duty cycle.

All components are protected by a single, easily removable, rugged cast cover available for a variety of NEMA standards—including weatherproof, watertight and explosion-proof requirements.

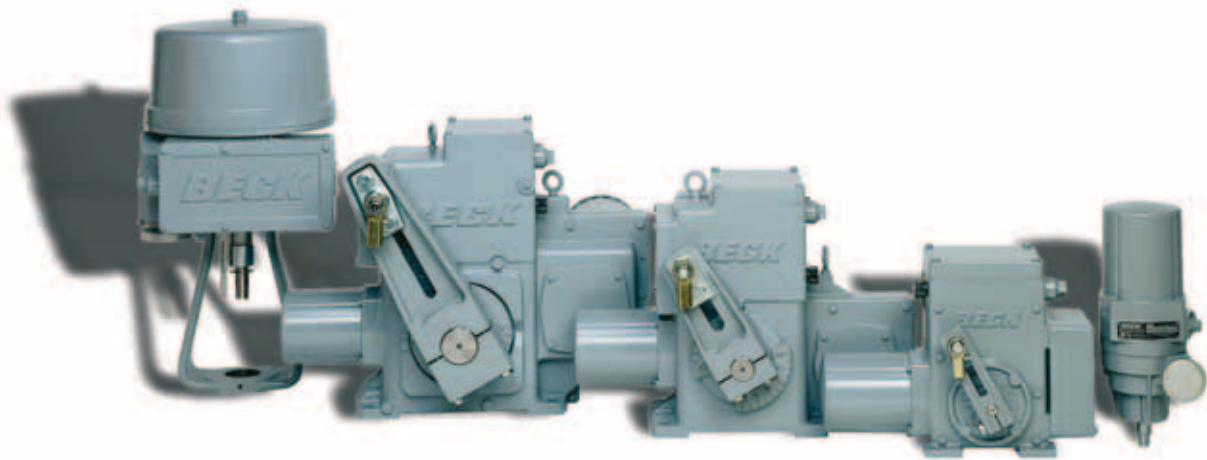
These features allow for highly accurate and stable control of smaller valves.

### **Torque and Timing Options**

Basic Model	Torque (lb-ft)	Timing (sec/90°) @ 60 Hz
31-230	15	18
31-250	30	24
31-330	15	18
31-350	30	24
31-M30	15	18
31-M50	30	24



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



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