

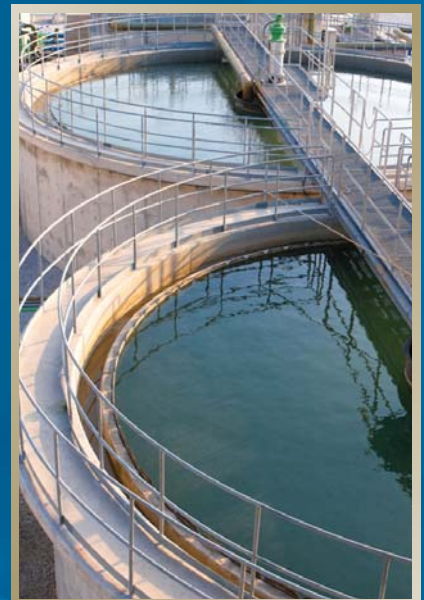
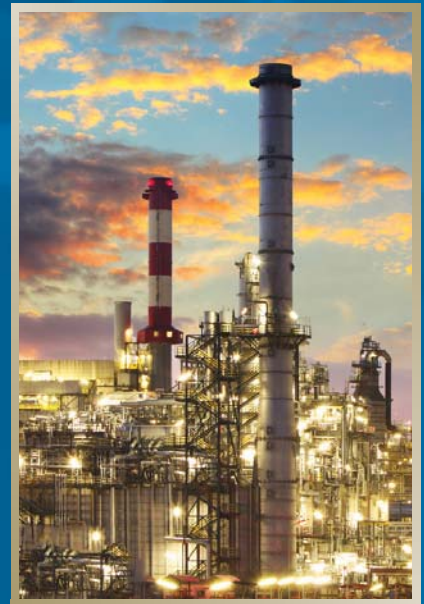
BECK[®]

ELECTRIC ACTUATORS

DSG-191



www.limitafrica.com



MADE IN USA
SINCE 1936



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VIDEO**

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GROUP 31

COMPACT ACTUATOR FOR LOW TORQUE DAMPER AND VALVE APPLICATIONS

High reliability and responsiveness in a small package.

The Group 31 actuator is designed for coupling to small quarter-turn ball and butterfly valves.

Its compact in-line design consists of an output section housing the drive train and motor, and a control module section containing the electronics. Together, these two sections provide an enclosure designed to meet Type 4 specifications for protection against corrosion, dust and moisture. A design that meets Type 7 specifications is also available.



The Group 31 incorporates the same type of motor used in Beck's Group 11 and Group 14 drives, which provides millisecond response to signal commands in a modulating control loop. This no-burnout, non-coasting motor is capable of more than 60 starts per minute during process upsets and will remain cool and stable during operation for unparalleled online performance.

FEATURES

Motor and Drive Train

Unequaled Availability

Beck's Group 31 rotary actuators incorporate an exclusive no-burnout motor, so that online dependability of valves is ensured. Heat-treated alloy steel and ductile iron hypocycloidal gearing transmits torque smoothly and powerfully to the output shaft. The Beck-built control motor provides millisecond response to signal commands in a modulating control loop—eliminating the coasting and overshooting problems typical of outdated electric actuators.

The motor stator of the Group 31 actuator is molded into the centerpiece, providing stable delivery of torque without overheating and without burning out.

Mechanical Stops

Protection from Overtravel Damage

Rugged mechanical stops are furnished as a standard component of the valve mounting assembly. These stops prevent over-travel damage to valves and limit drive travel during manual cycling to maintain proper orientation of the drive output shaft with respect to switches and controls. A built-in position indicator shows the valve position.

Manual Handwheel

Convenient Local Operation

A manual Handwheel is standard on all Group 31 models for use during installation and testing, or during power outages. This Handwheel does not require a declutch mechanism for operation and does not rotate during automatic operation.

Electronic Control Module

Accurate Position Control

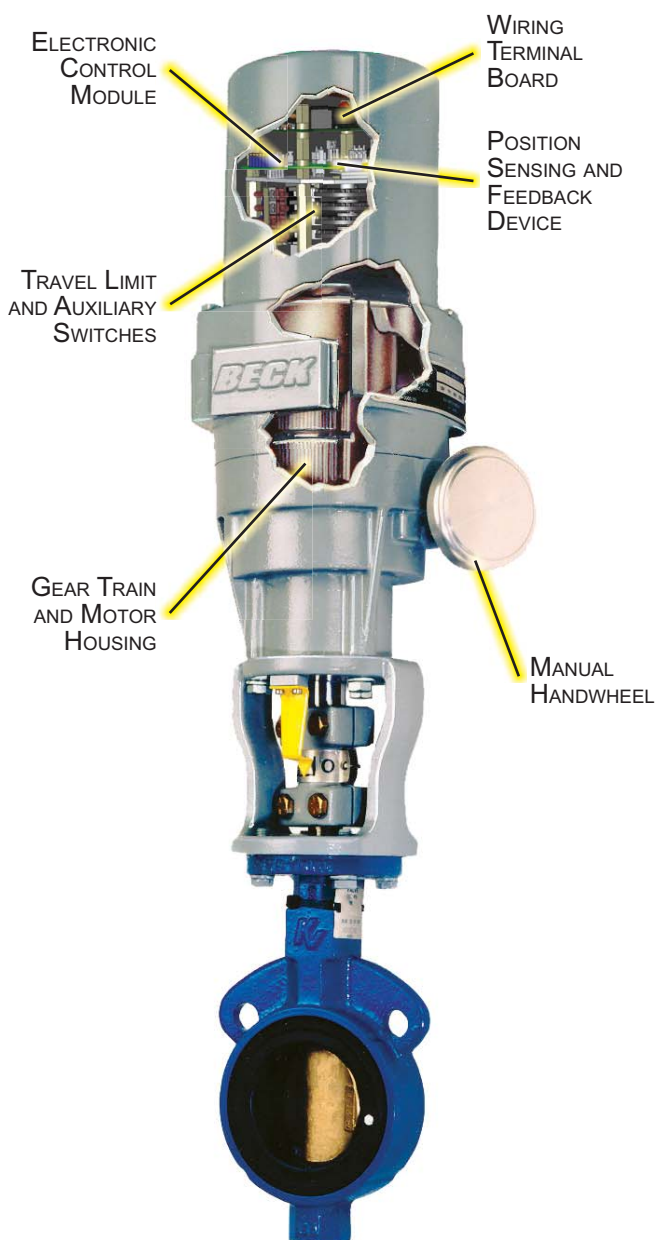
Group 31 Analog Modulating actuators include a single electronic control module which receives a 4–20 mA or 1–5 V dc input signal and provides a 4–20 mA or 1–5 V dc feedback for position control and indication.

- Electronic module has a deadband of 1.0% of span with sensitivity of 25% of deadband.
- The input signal span is nominally adjustable from 50% to 125% of the 4 V span, with the

zero adjustable up to 120% of span, providing flexibility for split range operation.

Limit & Auxiliary Switches

Four cam-operated switches are included as part of the control module. Two switches open the motor circuit and function as end-of-travel limit switches, and two auxiliary switches are for external signaling as required by the user. The switch cams are driven directly by the actuator's output shaft for accurate control.



Group 31 Rotary Actuator Components

Electric Handswitch

Convenient Local Operation

Included in the Analog Modulating models is an integral electric Handswitch, which permits safe, local operation at the valve's individual location. This feature saves time during installation and allows adjustments to be made quickly and easily.

Large Terminal Block

Easy Field Wiring

The upper board on the Group 31 actuator provides wiring terminals for field connection. This board is easily accessible to minimize time needed for installation wiring and testing.

Position Feedback

Beck Group 31 actuators equipped with feedback capability use a film potentiometer incorporated into the control module.

All modulating models feature electronic position indication. Direct AC models allow controllers to monitor drive position as the controller output directly positions the drive. Analog control modulating models provide electronic signal receiver circuitry, which compares the position indication to the control loop demand signal and provides automatic control.

Dual Feedback Capability

All models incorporating the film potentiometer have dual feedback capability, permitting user choice of 2-wire or 4-wire field connection.

- 2-wire systems for 4–20 mA feedback, as follows.

Either:

300 ohm max. load resistance, which requires less than 35 V dc external power supply.

or:

Up to 800 ohm max. load resistance, which requires greater than 36 V dc external power supply.

- 4-wire systems utilizing 120 V ac power supplied to the actuator.

Either:

4–20 mA feedback,

500 ohm max. load resistance.

or:

1–5 V dc feedback,

12,000 ohm min. load resistance.

Connections for feedback selection are made in the field and need not be specified on order.

Low Power Consumption for Use with Uninterruptible Power Supplies

The uniquely low power draw of Beck Group 31 actuators permits the use of various standard uninterruptible power supplies for operation during loss of AC power. Beck Sales Engineers can provide you with specifications on UPS equipment recommended for Beck drives.

Direct-Coupled Configurations

The Group 31 actuator may be coupled directly to the valve by the use of a factory machined, heat-treated coupling. This configuration is compact in design. A factory designed yoke between the actuator and the valve provides rigidity and accessibility to mounting hardware.

Crank Arm / Linkage Configurations

For applications requiring linkage connection, Beck Group 31 actuators can be furnished with a machined crank arm and mounting bracket. Beck hex linkage kits may be used to simplify final connections.

Factory Mounted Assemblies

The relationship of valve, actuator and mounting / coupling configuration can be of critical importance in ensuring a successful installation. For this reason, Beck provides Group 31 actuators and valves together—factory mounted and tested for simple drop-in installation. These fully integrated, unitized assemblies are pre-engineered to match the mechanical and electronic requirements of your system.

CONTROL OPTIONS & SAMPLE WIRING DIAGRAMS

Diagrams are functional—customer wiring may vary. Certified wiring diagrams can be provided for the drive you select.

Option 3, Modulating

Analog Position Control with Drive

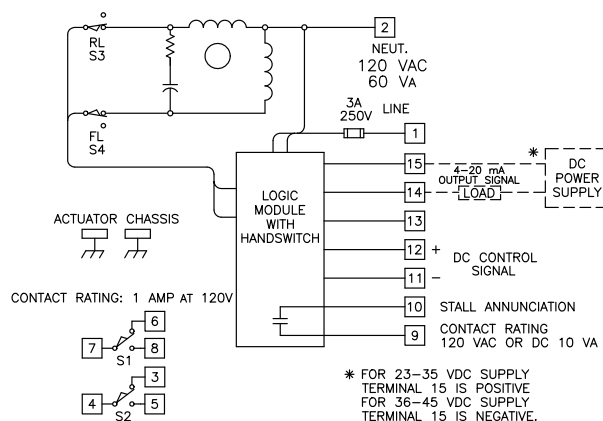
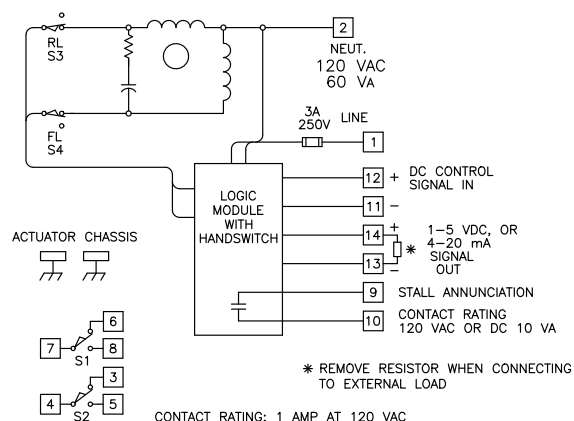
Powered Position Feedback Signal

Customer must supply two wires to power the drive: One 120 V ac line (terminal 1), and one neutral (terminal 2). Customer must supply two wires for analog control: Connect to terminal 11 (-) and to terminal 12 (+). Customer may supply two additional wires to monitor the analog position feedback signal: Connect to terminal 13 (-) and to terminal 14 (+). The drive's feedback circuit power supply is derived from the 120 V ac line, therefore the feedback signal must be wired to a "4-wire" type, non-powered analog input.

Analog Position Control with Loop

Powered Position Feedback Signal

Customer must supply two wires to power the drive: One 120 V ac line (terminal 1), and one neutral (terminal 2). Customer must supply two wires for the analog input control signal: Connect to terminal 11 (-) and to terminal 12 (+). The loop powered position feedback signal must be connected to a "2-wire" type analog input that provides a dc voltage over the signal wires (a dc voltage power supply must be wired in series with the signal wiring). If the dc supply is 24 to 35 volts, connect to terminal 14 (-) and to terminal 15 (+). If the dc power supply is 36 to 45 volts, reverse polarity and connect to terminal 14 (+) and to terminal 15 (-).

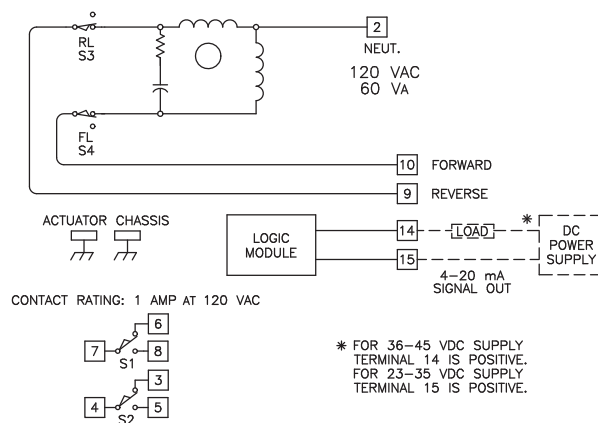


Option 2, Modulating

Direct AC Control with Loop Powered

Position Feedback Signal

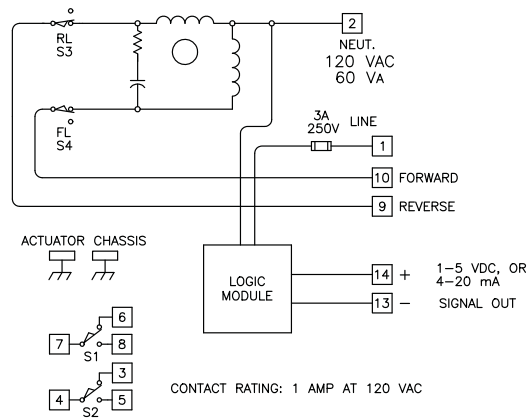
Customer must supply three wires to directly control the drive motor direction: One 120 V ac line to run Forward (terminal 10), one 120 V ac line to run Reverse (terminal 9), and one neutral (terminal 2). Customer may supply two additional wires to monitor a loop powered position feedback signal. The loop powered position feedback signal must be connected to a "2-wire" type analog input that provides a dc voltage over the signal wires (a dc voltage power supply must be wired in series with the signal wiring). If the dc supply is 24 to 35 volts, connect to terminal 14 (-) and to terminal 15 (+). If the dc supply is 36 to 45 volts, reverse polarity and connect to terminal 14 (+) and to terminal 15 (-).



Option 2, Modulating (con't)

Direct AC Control with Drive Powered Position Feedback Signal

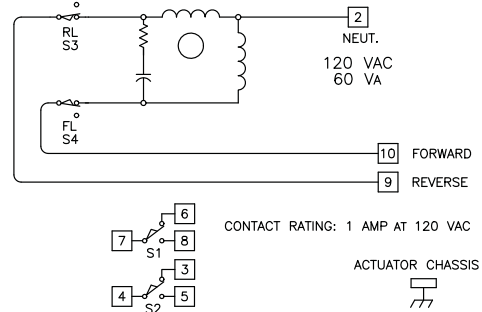
Customer must supply three wires to directly control the drive motor direction: One 120 V ac line to run Forward (terminal 10), one 120 V ac line to run Reverse (terminal 9), and one neutral (terminal 2). Customer may supply two additional wires to monitor the analog position feedback signal: Connect to terminal 13 (-) and to terminal 14 (+). If position feedback monitoring is desired, a 120 V ac line must be connected to terminal 1. The drive's feedback circuit power supply is derived from this 120 V ac line, therefore the feedback signal must be wired to a "4-wire" type, non-powered analog input.



Option 1, Open/Close

Direct AC Control

Customer must supply three wires to directly control the drive motor direction: One 120 V ac line to run Forward (terminal 10), one 120 V ac line to run Reverse (terminal 9), and one neutral (terminal 2).



SPECIFICATIONS

Control Options, Torque and Timing

Model Number	Control Option	Control Mode	Input Signal	Feedback Signal	Auxiliary Switches	Torque lb-ft [N•m]	Timing (sec./90°) 60 Hz ¹
31-M30 31-M50	3	Modulating (Analog Position Control)	4–20 mA 1–5 V dc	4–20 mA 1–5 V dc	2	15 [20] 30 [41]	18 24
31-330 31-350	2	Modulating (Direct AC Control)	120 V ac	4–20 mA 1–5 V dc	2	15 [20] 30 [41]	18 24
31-230 31-250	1	Open / Close Operation	120 V ac	None	2	15 [20] 30 [41]	18 24

¹50 Hz timing data does not exceed 120% of 60 Hz levels.
Maximum drive current is 0.5A.

Input Power

120 V ac, single-phase 50 or 60 Hz, 0.5 amp, 60 watts

Operating Conditions

–40° to 65°C (–40° to 150°F)

Action on Loss of Power

Stays in place.

Control Types

Milliamp modulating (Control Option 3)—Differences between the Feedback signal and Input signal are amplified, activating the electronic output switch necessary to drive the motor in the proper direction to force the signal differential to zero.

120 V ac contact closure (Control Options 1 & 2)—Motor is energized by 120 V ac line current from a remote controller or manual switches.

Deadband

1.0% of Span

Sensitivity

.2% of Span

Action on Loss of Input Signal (Option 3)

Stays in place or moves to a predetermined position with ac power supplied.

Action on Stall (Option 3)

Relay contacts open after 68 seconds of stall, remote signal available. Power to motor is turned off.

Enclosure

Precision machined aluminum alloy castings, painted with corrosion resistant polyurethane paint.
Rated Type 4, IP66.

Standards

CSA Labeled (US & Canada); CE Compliant

NOTE: For standards not specifically listed, please call Beck for more information at 215-968-4600.

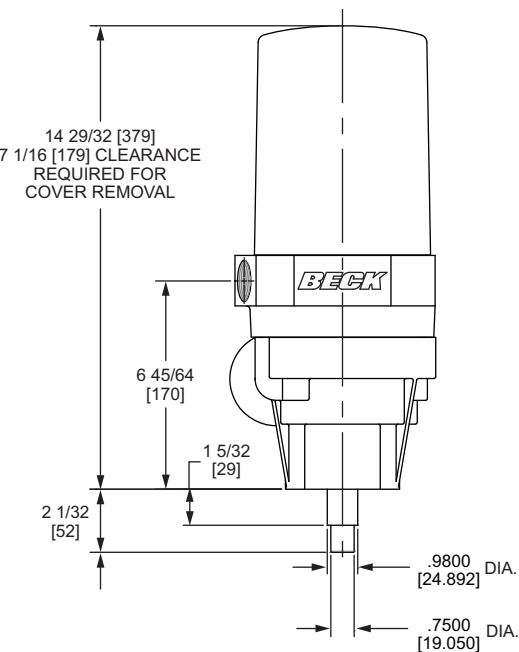
Hazardous Locations (Optional)

Class I, Div.1, Group D; Class I, Div.2, Group D; Class II, Div. 1, Groups E, F & G; Class II, Div.2, Groups F & G; Class III, Div.'s 1 & 2.

NOTE: May not be available with all options & models. If these ratings do not meet your requirements, call Beck at 215-968-4600.

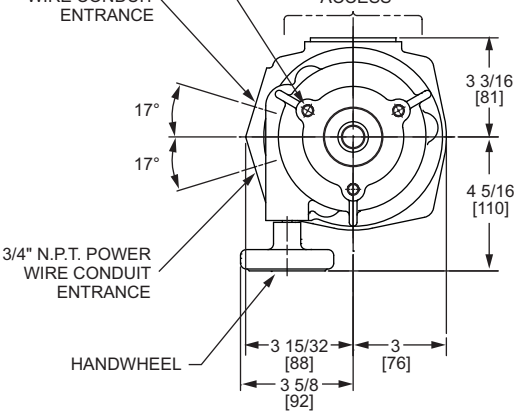
OUTLINE DIMENSION DRAWINGS

Basic Actuator



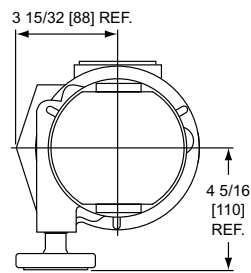
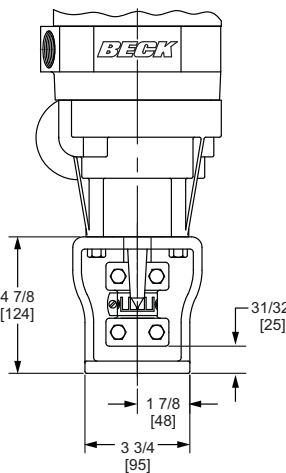
MOUNTING HOLES
3/8-16 UNC-2B x 7/8 [22] DEEP
TYP. (3) PLACES HOLES EQUALLY
SPACED ON 3 3/8 [86] B.C.

3/4" N.P.T. SIGNAL
WIRE CONDUIT
ENTRANCE

CONTROL CALIBRATION
ACCESS

Mounting Option A

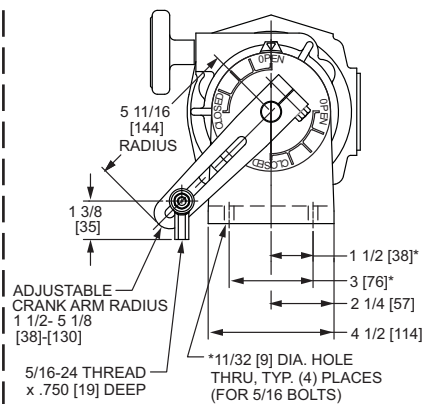
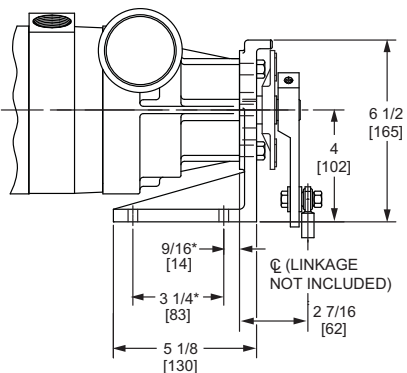
Yoke Mounting with coupling connection and mechanical stop



BOLT HOLE PATTERN AND SHAFT THROUGH HOLE DIMENSION MUST BE SPECIFIED PER APPLICATION

Mounting Option B

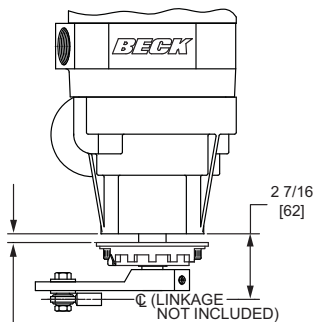
Bracket mounting with crank arm assembly and mechanical stop



*STANDARD BRACKET CAN BE SUPPLIED
WITHOUT HOLES OR HOLE PATTERN SHOWN.

Mounting Option C

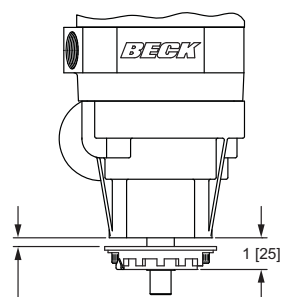
Basic actuator with crank arm assembly and mechanical stop



- USE 5/16 [8] MAX. MATERIAL THICKNESS FOR MOUNTING BRACKET. 1 1/8 [29] DIA. CLEARANCE HOLE REQUIRED FOR SHAFT.

Mounting Option D

Basic actuator with mechanical stop



—USE 5/16 [8] MAX. MATERIAL THICKNESS FOR MOUNTING BRACKET. 1 1/8 [29] DIA. CLEARANCE HOLE REQUIRED FOR SHAFT.

Mechanical Specifications

Beck Drive Model	Approx. Wt. lbs [kg]	Max. Overhung Load lbs [kg]
Group 31	36 [16]	500 [227]

Drives may be mounted in any orientation.

All dimensions are subject to change. Request certified dimensional drawings for the drives you select.