

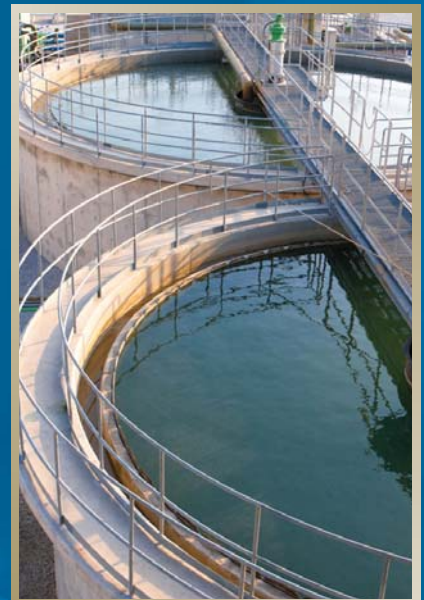
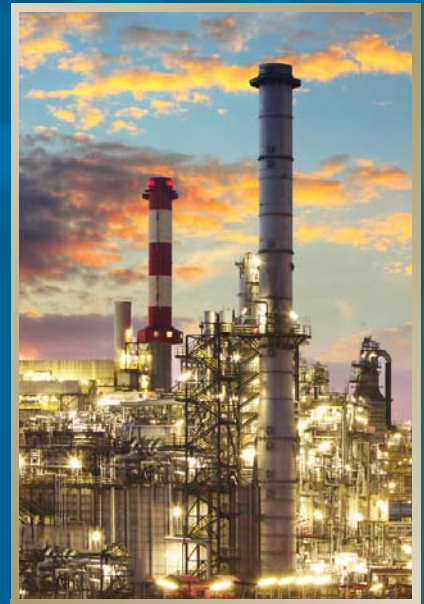
BECK[®]

ELECTRIC ACTUATORS

DSG-191



www.haroldbeck.com



MADE IN USA
SINCE 1936



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VIDEO**
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GROUP 11

DAMPER & QUARTER-TURN VALVE ACTUATORS

Accurate, dependable control for a wide variety of applications.



Beck Group 11 electric actuators provide precise, consistent modulation of all types and sizes of dampers and valves. Unlike traditional electric actuators, Beck actuators have no duty cycle limitation and can continuously modulate without overheating.

Beck actuators have the unique ability to quickly, accurately and consistently track the control signal. This ability significantly decreases process variability—improving product quality and reducing operating costs.

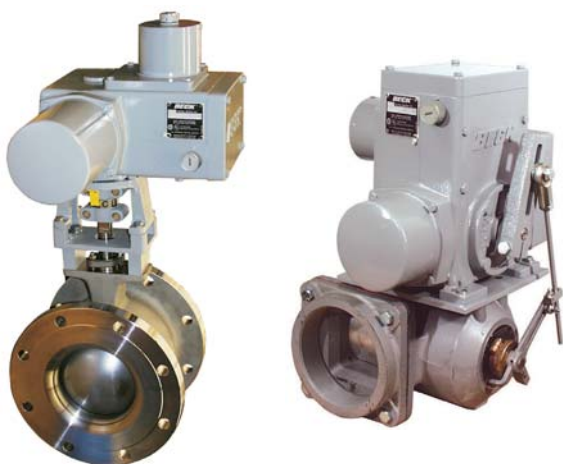
Beck has eliminated the problems associated with pneumatic actuators such as stick-slip response, inconsistent performance and air quality issues. Virtually maintenance-free and designed for harsh industrial environments, Beck will drastically reduce your maintenance costs while improving your process control.



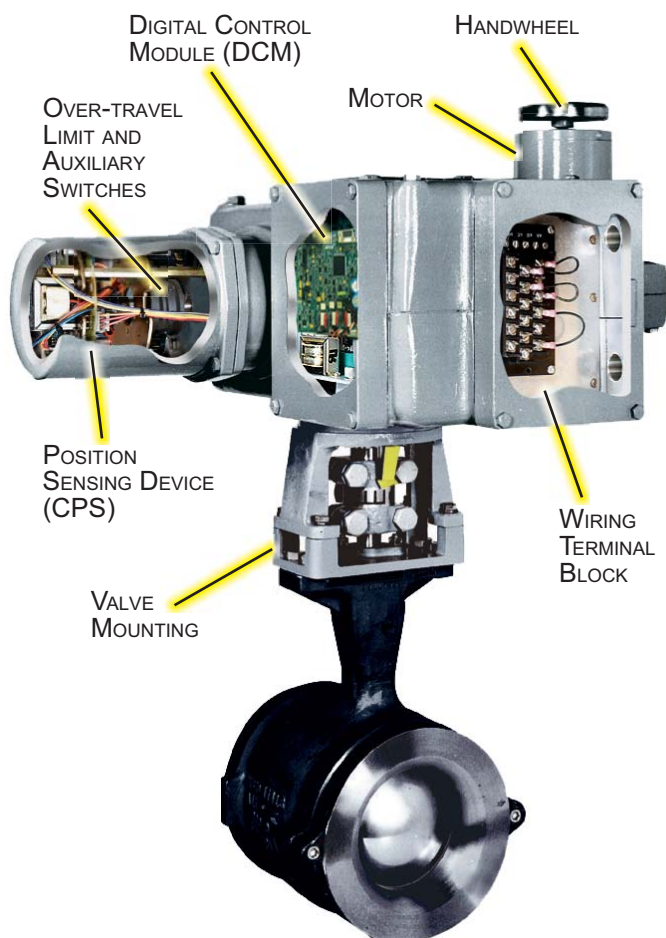
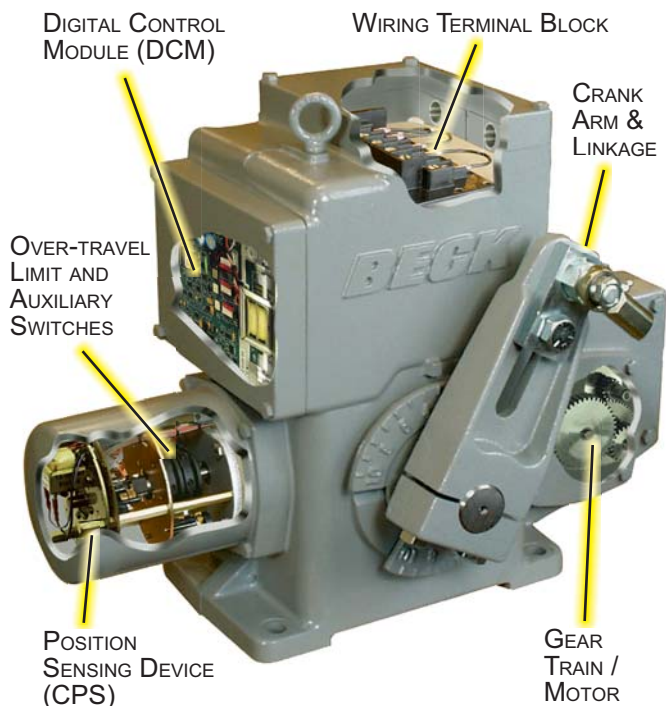
Beck Group 11 damper drives are equipped with a specially engineered crank arm. Custom linkage arrangements are available.

Beck Group 11 valve actuators are engineered for direct-coupling on quarter-turn ball, plug and butterfly valves. They may also be installed using specially engineered crank arm and linkage arrangements.

Valves and actuators may be ordered together as pre-engineered assemblies ready for drop-in installation; or actuators can be supplied separately along with the necessary hardware for field installation on existing valves.



FEATURES



Group 11 Components

Beck Motor

Precise, Reliable Control

Together with Beck's control electronics and rugged gear train, Beck motors provide the precise, reliable positioning required for modern control loops.

- **Never overheats or burns out**, even under demanding modulating control or stalled conditions.
- Reaches full speed and torque in less than 50 milliseconds and stops within 25 milliseconds, eliminating deadtime.
- Provides extremely accurate positioning in modulating applications.
- **Will not coast or overshoot** the desired position.
- Low current draw of 0.17 A to 3.0 A, and therefore low power consumption, eliminates the need for relays and permits the use of uninterruptible power supplies.
- Maintenance-free with double-lipped, grease-sealed bearings.

Electric Handswitch

Time-Saving Local Operation

Dampers or valves may be operated at their individual locations with the built-in electric Handswitch. This saves time during installation and troubleshooting, allowing online adjustments to be made quickly and easily by bypassing the electronics in the actuator and control system.

The Handswitch also serves as an electrical backup in the event of control system failure.

Auxiliary and Over-travel Limit Switches

Two over-travel protection limit switches are provided. Up to four auxiliary switches are available. Optional switch features:

- SPDT switches rated for a minimum of 6 A at 120 V ac, (three times maximum motor current for most models) to ensure long life.
- Field-adjustable to operate at any point in the actuator's travel range.
- May initiate secondary functions or provide remote indication of actuator position.
- Eliminates unreliable and maintenance-intensive proximity switches.

Drive Train

Power and Durability to Maximize Control Availability

Beck's durable gear train maintains accurate, consistent control element positioning even under the demanding conditions of an active control loop.

- Gear trains employ a unique, all spur gear construction of heat-treated alloy steels and ductile iron.
- Efficient, wide-face spur gearing essentially eliminates wear-induced backlash and positioning inaccuracies.
- Durable design provides up to 4 days of protection against intermittent or extended accidental stalls.
- Integral self-locking mechanism ensures that drives hold a minimum of 200% of rated torque with the motor de-energized.

Manual Handwheel

Convenient Manual Control Without Declutch

An easy-to-turn, spoke-free Handwheel is incorporated into the Group 11 design to allow manual operation during installation or power outages.

- Handwheel can be used to move valves and dampers to any position smoothly and easily under full load conditions.
- Mechanical stops in housing prevent manual overtravel.
- The motor operates at 72 or 120 RPM, so the Handwheel poses no safety hazard.

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 poly-urethane paint provide a rugged, dust-tight, weatherproof Type 4X enclosure. Models approved for use in Hazardous classified locations are available—contact a Beck Sales or Application Engineer for details.

- Individual compartments protect all major components: Motor, DCM, CPS, gear train and installation wiring terminal board.
- Each compartment can be accessed without exposing other components.
- Gasketed, precision-machined covers provide extra protection for harsh indoor and outdoor environments.
- Output and Handwheel shafts are also sealed with weatherproof, double-lip seals.

Mounting Versatility

Beck Actuators can be Mounted in any Orientation for Greater Installation Flexibility

Beck actuators are configured and lubricated in such a way that they may be mounted in any convenient position. This flexibility allows actuators to be installed in hard-to-fit locations.

If housing compartments are accessible, there are no mounting orientation limits.

Mounting Arrangements

Direct-Coupled Configurations

A factory machined coupling is used to connect the actuator directly to the valve. This configuration is compact in design and is ideal for applications where a constant torque is desired over the full 90° range of travel.

Crank Arm / Linkage Configurations

Valve / actuator assemblies may be specified with crank arm and linkage mounting arrangement. This design allows 100° actuator travel, thus providing variable torque distribution and increased seating effectiveness.

- With linkage characterization, high seating torques can be obtained for certain valve types.
- Standard bracket and linkage mounting hardware is available for most popular valve types.
- Custom mountings are easily handled allowing Beck actuators to be economically mounted to virtually any rotary valve.
- Link-Assist™ computer program helps you specify the ideal arrangement for your application (see Appendix).

CONTROL OPTIONS & SAMPLE WIRING DIAGRAMS

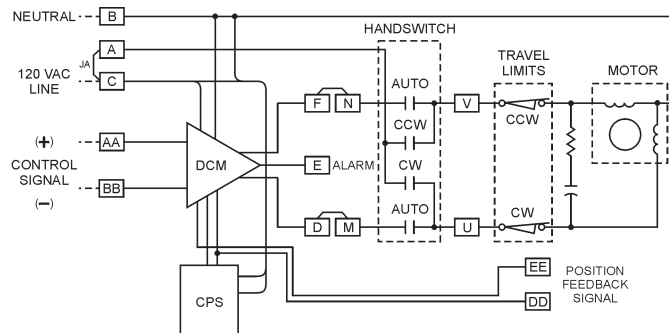
Diagrams are functional—customer wiring may vary. Certified wiring diagrams can be provided for the actuator you select.

Modulating Option 9

Digital Position Control with Contactless Position Sensing

The Beck DCM positions the actuator in proportion to an input current or voltage signal, and the CPS provides integral feedback for the DCM. A 4–20 mA position feedback signal is available for remote indication. Foundation Fieldbus is also available.

The DCM may be used to provide pre-determined positioning of the actuator upon loss of input control signal.

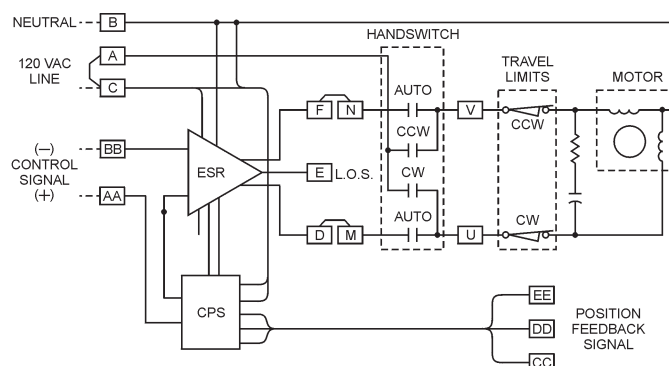


Modulating Option 8

Analog Position Control with Contactless Position Sensing

The Beck ESR positions the actuator in proportion to an input current or voltage signal, and the CPS provides integral feedback for the ESR and isolated feedback for remote position indication (also available without external feedback).

The ESR may be used to provide pre-determined positioning of the actuator upon loss of input control signal.

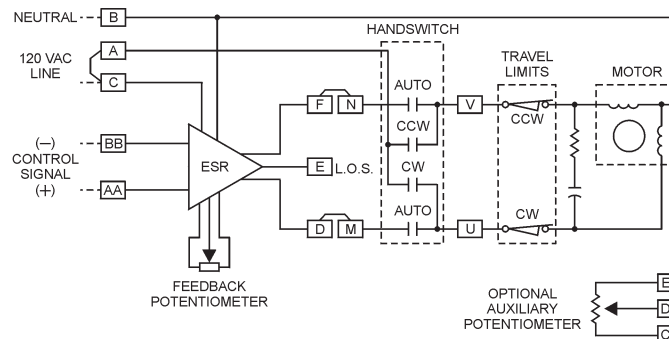


Modulating Option 7

Analog Position Control with Potentiometer Position Sensing

The Beck ESR positions the actuator in proportion to an input current or voltage signal. A film potentiometer is used in place of the CPS for position sensing and internal feedback to the ESR.

An optional auxiliary potentiometer, requiring external power, may be added for remote position indication or control. The ESR may be used to provide predetermined positioning of the drive upon loss of input control signal.



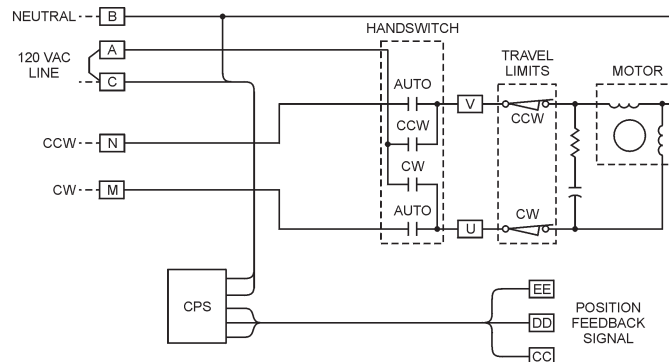
Modulating Option 6

Direct AC Control with Contactless Position Sensing

Control option 6 features clockwise / counterclockwise control from a remote automatic controller or manual switches.

The CPS provides a feedback signal for remote position indication.

If the available 120 / 240 V ac control voltage is not able to supply enough current to operate a actuator, a Relay Board must be added to the control compartment.

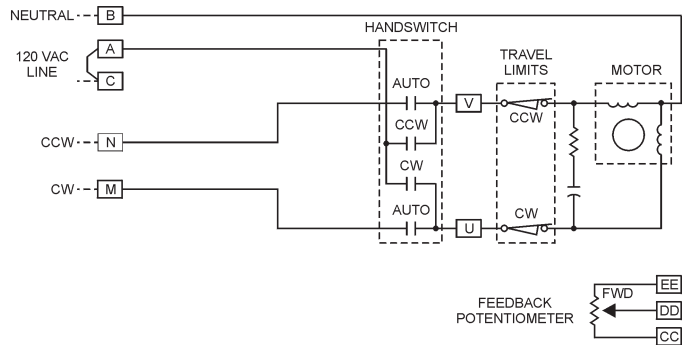


Modulating Option 5

Direct AC Control with Potentiometer Position Sensing

Actuated in clockwise or counterclockwise from a remote location or manual switches, this configuration includes a 1000 ohm film potentiometer for remote feedback. An optional auxiliary 1000 ohm potentiometer can be added as an additional remote position indication.

If the available 120 / 240 V ac control voltage is not able to supply enough current to operate an actuator, a Relay Board must be added to the control compartment.



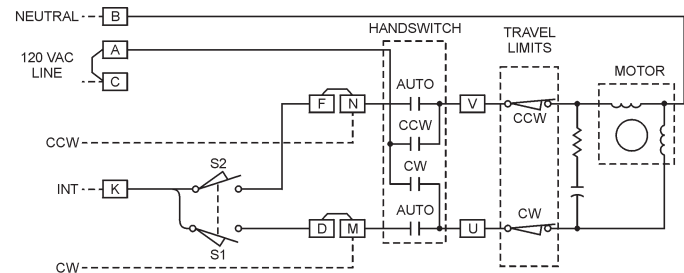
Multi-Position Option 4

Direct AC Control with Cam-Operated Switches to Stop Actuator Travel

Option 4 incorporates adjustable cam-operated switches to stop the actuator in 6 positions (two end-of-travel, four intermediate positions), or 3 positions (one intermediate position). 4-position and 5-position control can also be attained using a different number of switches.

Standard end-of-travel switches have extra contacts that can be used for external signaling or interlocking.

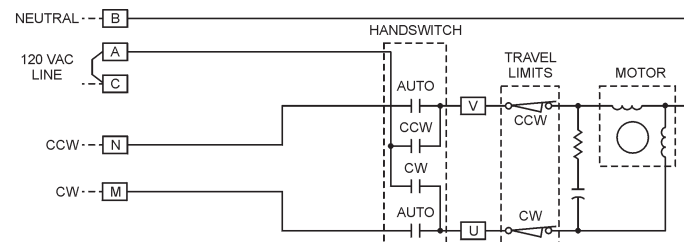
Configuration shown: BASIC 3-position.



Open / Close Option 3

Direct AC Control

For simple open / close operation, Option 3 includes two limit switches, which stop the actuator at each end of travel and may also be used for external signaling.

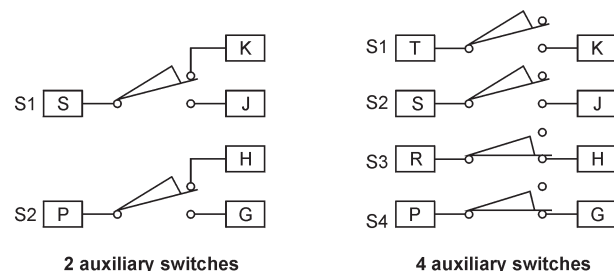


Other operating voltages available

All of the options described on this page and the previous page are also available for 208, 240, 380, 415, 480 & 575 V ac operation instead of 120 V ac operation.

Auxiliary Switch Terminals

Auxiliary switches may be added for control or annunciation functions. Switches are rated at 6 A 120 V ac. They may be factory-set or field-adjusted to operate at any point in the actuator's travel.



2 auxiliary switches

4 auxiliary switches

SPECIFICATIONS

Use the charts on this page to create a full specification model number.

First, select the basic model no. from the chart at right (blue column) and enter the first four digits in the blue "Model No." field below. Now select the control option that suits the application requirements using the information in the chart at the bottom of the page (brown column). Enter the control option designation number (3 through 9) in the brown area of the "Model No." field below.

The next step is to determine the required torque for the application as well as select the full stroke time in seconds as shown in the chart at right (green and yellow columns). Enter the selected torque option in the green "Torque" field and the selected timing option in the yellow "Timing" field below.

Finally, select the number of auxiliary switches desired (0, 2 or 4) and enter that number in the purple "Aux. Switches" field below.

The full specification model number is complete and can be used to specify a Beck drive.

For example, **11-409-1000-40-2** denotes an 11-400 basic model for modulating control (option 9 Digital Control Module) that is rated for 1,000 lb-ft (1355 N•m) torque output with a full stroke time of 40 sec/100°. It is equipped with two auxiliary form C switches.

TORQUE, TIMING & MOTOR CURRENTS

Basic Model No.	Torque (lb-ft)[N•m]	Timing ^{4*} (sec./100°)	Timing ^{4**} (sec./90°)	Motor 1,2,3 Current (A)
11-150 (100°)* 11-160 (90°)**	15 [20]	11	10	0.31
	20 [27]	20	18	0.17
	40 [54]	20	18	0.31
	40 [54]	40	36	0.17
	60 [81]	60	54	0.17
	80 [108]	24	22	0.32
	80 [108]	40	36	0.31
	80 [108]	90	81	0.17
11-200 (100°)* 11-260 (90°)**	120 [163]	40	36	0.44
	125 [169]	20	18	0.71
	125 [169]	40	36	0.43
	175 [237]	60	54	0.43
	250 [339]	24	22	0.74
	250 [339]	40	36	0.71
11-300 (100°)* 11-360 (90°)**	250 [339]	75	68	0.43
	300 [406]	24	22	0.74
	300 [406]	40	36	0.71
	300 [406]	100	90	0.43
	400 [542]	36	32	0.74
	400 [542]	60	54	0.71
	550 [745]	75	68	0.71
11-400 (100°)* 11-460 (90°)**	650 [881]	100	90	0.71
	350 [474]	24	22	1.30
	550 [745]	40	36	1.30
	650 [881]	24	22	2.30
	800 [1084]	60	54	1.30
	1,000 [1355]	24	22	3.00
	1,000 [1355]	40	36	2.30
	1,000 [1355]	75	68	1.30
	1,500 [2032]	100	90	1.30
	1,800 [2439]	36	32	3.00
11-430 (100°)*	1,800 [2439]	60	54	2.30
	2,900 [3929]	72	n/a	3.00
	2,900 [3929]	120	n/a	2.20
	5,200 [7046]	108	n/a	3.00
	5,200 [7046]	180	n/a	2.20

Model Number

Torque

Timing

Aux. Switches

— — — — —

— — — — —

— — — — —

—

0 = Standard
2 or 4 = Optional⁵

CONTROL OPTION CHART⁶

Control Option	Control Mode	Control Board	Std. Control Input	Position Sensor	Std. Position Feedback
9	Modulating	DCM [^]	4–20 mA	CPS	4–20 mA
8	Modulating	ESR	4–20 mA	CPS	4–20 mA
7	Modulating	ESR	4–20 mA	Film Potentiometer	None
6	Modulating	None	120 V ac	CPS	4–20 mA
5	Modulating	None	120 V ac	Film Potentiometer	Film Potentiometer
4	5-Position	None	120 V ac	None	None
4	3-Position	None	120 V ac	None	None
3	2-Position (Open / Close)	None	120 V ac	None	None

¹ Unique Beck motor design has starting & stall current that approximate running current, so thermal overload protection is not required—just provide normal short-circuit protection.

² Motor currents shown are 60 Hz -- 50 Hz currents do not exceed 120% of 60 Hz levels.

³ Actuator current @ 240 V ac is approx. 1/2 the 120 V ac current (motor current does not change @ 240 V ac).

⁴ Stroke timings shown are based on 60 Hz power; 50 Hz power provides timings 20% greater.

⁵ 2 or 4 auxiliary switches are available for most Group 11 actuators. Contact the factory regarding switch availability on control option 4 models.

Standard travel limit switches have extra contacts which can be used for external signaling on 2-, 3- or 5-position control modes.

⁶ Contact the factory if the signal options listed do not meet your requirements.

[^] Smart Digital Control Module with std. HART communication capabilities (Foundation Fieldbus is available as an extra cost option).

Input Power

120 V ac, single-phase 50 or 60 Hz
208, 240, 380, 415, 480, 575 V ac, 50 or 60 Hz—requires optional integral transformer

Operating Conditions

–40° to 85°C (–40° to 185°F)
–50° to 85°C (–58° to 185°F); optional for 11-200/-300-400 models
0 to 100% relative humidity

Isolation

Demand Input and Position Feedback signals are isolated from the ground and the ac power line.

Action on Loss of Power

Stays in place.

Control Types

Modulating with Digital Control Module (DCM)
Modulating with analog electronics (ESR)
Modulating direct ac motor control
3 or 5 position control
2 position (open/close) control

Input and Feedback Signals

Depends upon the actuator control option. See page 14.

Available Communication Protocols

Option 9 actuators (see page 14) may be equipped with HART® or Fieldbus Foundation™ technology.
Contact a Beck Sales Engineer for details and information regarding other options.

Minimum Step Size (Modulating Control)

DCM -- 0.10% (0.15% typical) (configurable)
ESR -- 0.10% (0.15% typical)
Direct AC -- 0.1° (function of control system capabilities)

Stall Protection (protects actuator and driven elements under stall conditions)

DCM -- Time to stall is configurable from 30 to 300 seconds.
Other control types -- Optional Stall Protection Module is available.

Action on Loss of Input Signal (Power On)

Stays in place or, with some options, is field configurable to move to any preset position.

Overtravel Limit Switches (Dedicated)

Two Form C switches provide overtravel protection.

Auxiliary Switches (Non-Dedicated)

Up to four 6A, 120 V ac switches available. Switches are cam-operated and field-adjustable.

Handswitch

Permits local electrical operation independent of the controller signal. Standard on all units. An optional auxiliary contact can be used to indicate that the Handswitch is in "AUTO" mode or to sound an alarm if it is taken out of "AUTO". A locking Handswitch is also available.

Enclosure

Precision-machined, aluminum alloy castings painted with corrosion-resistant polyurethane paint provide a rugged, dust-tight, weatherproof enclosure. Type 4X; IP68, 3 meters/48 hours.

NOTE: Internal water damage is not covered by warranty.

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. 2, Groups A, B, C & D; Class II, Div. 1, Groups E, F & G; Class II, Div. 2, Groups F & G;
Class III, Div. 1 & 2.

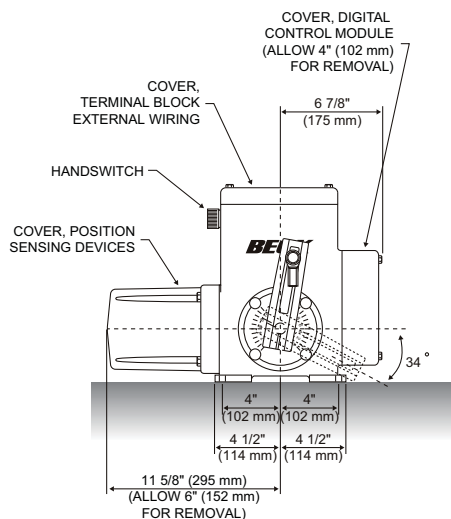
NOTE: May not be available with all options & models. If these ratings do not meet your requirements, call Beck at 215-968-4600.

Mounting Orientation

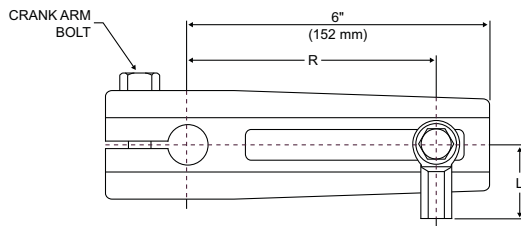
Any orientation—no limitations.

OUTLINE DIMENSION DRAWINGS

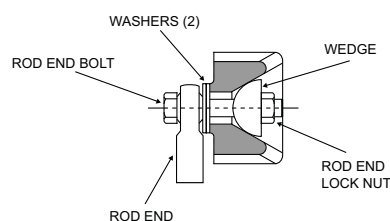
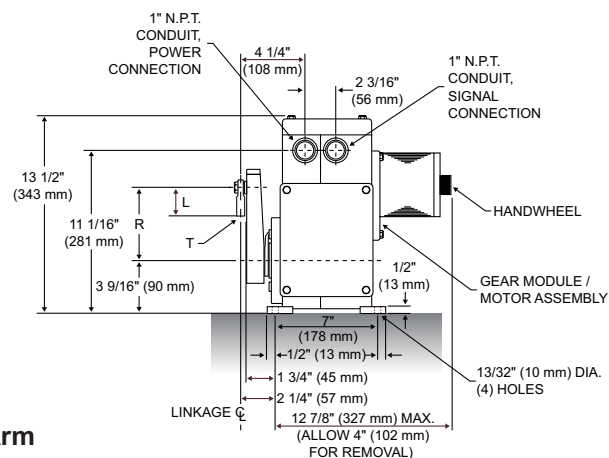
Model 11-150



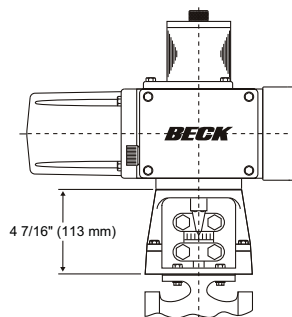
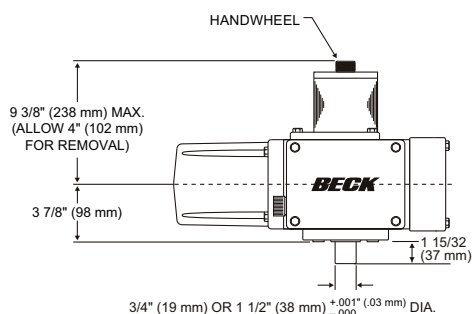
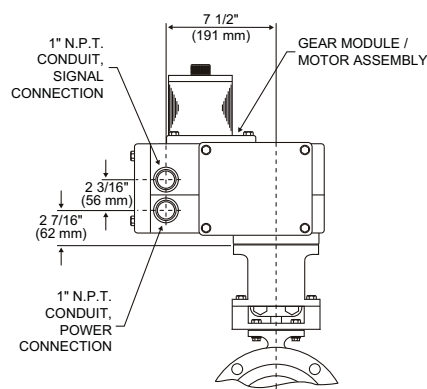
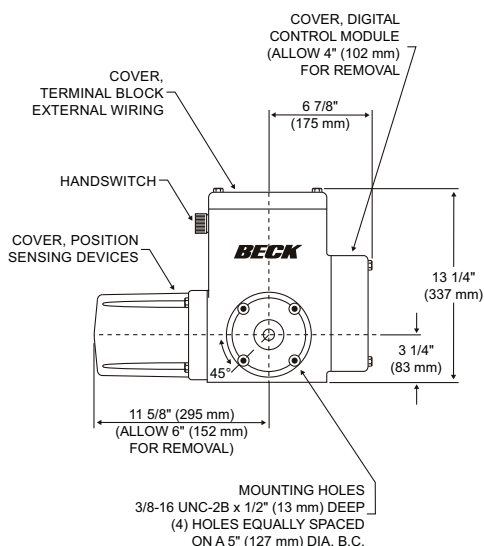
Crank Arm



ADJUSTABLE RADIUS "R" 1 1/2" (38 mm) TO 5 1/8" (130 mm)



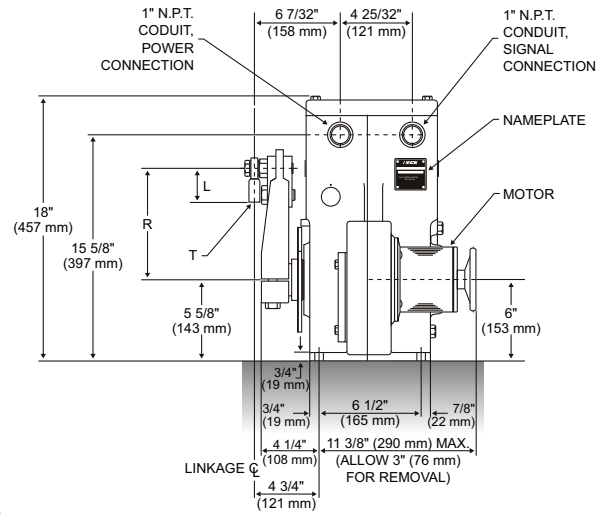
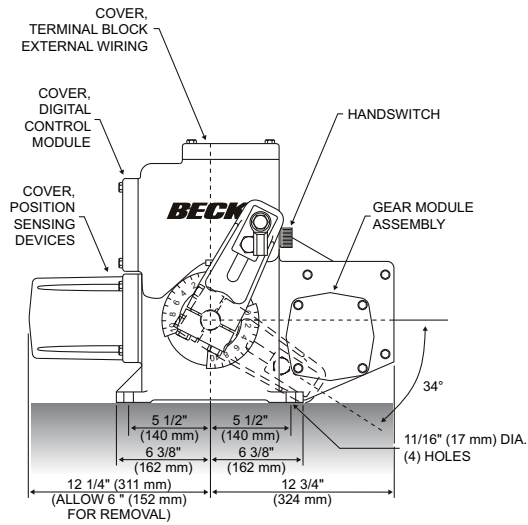
Model 11-160



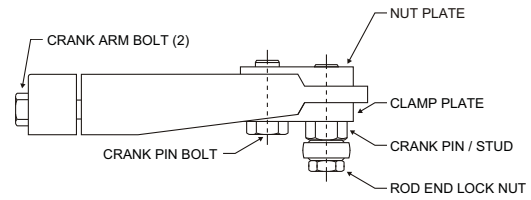
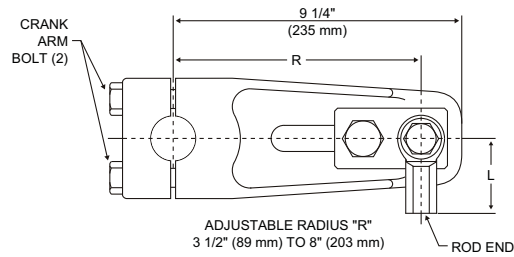
Actuators may be mounted in any orientation.

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

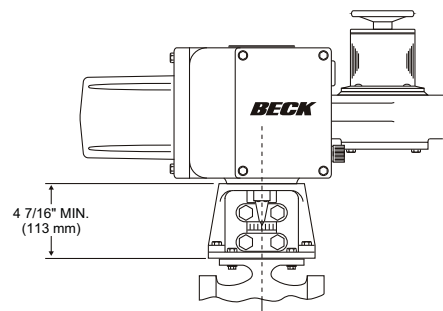
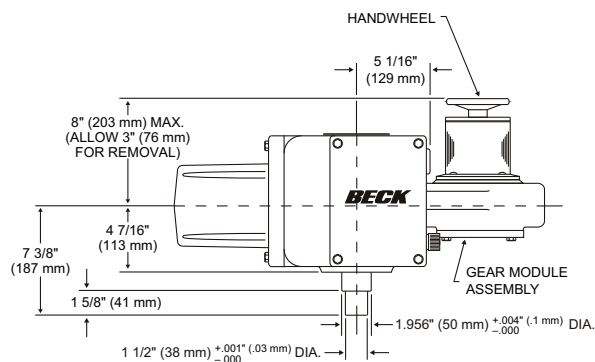
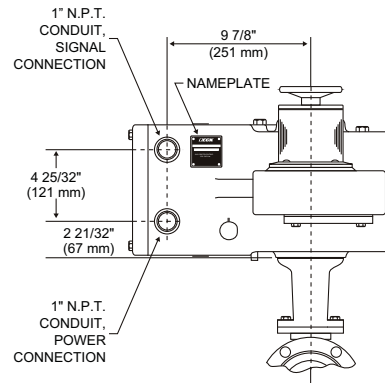
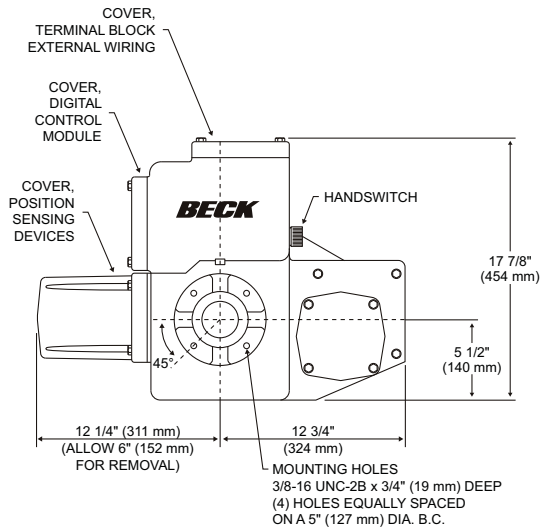
Model 11-200/-300



Crank Arm

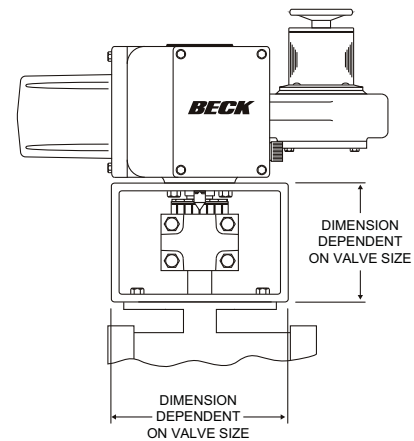
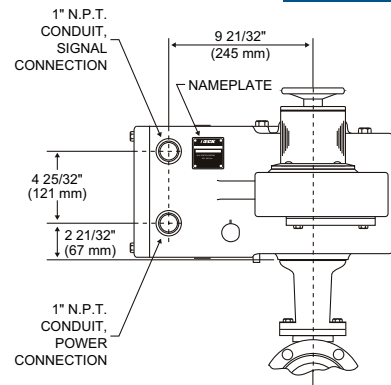
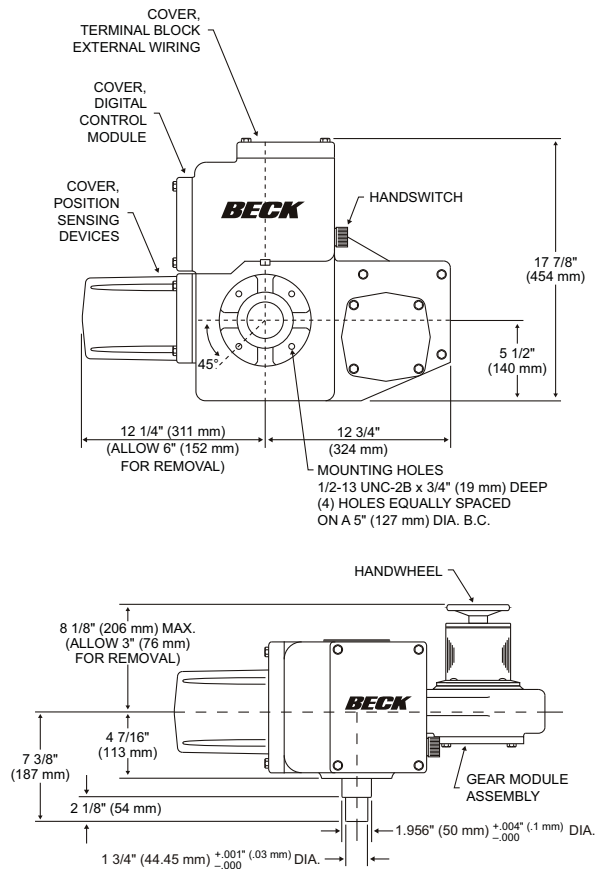


Model 11-260

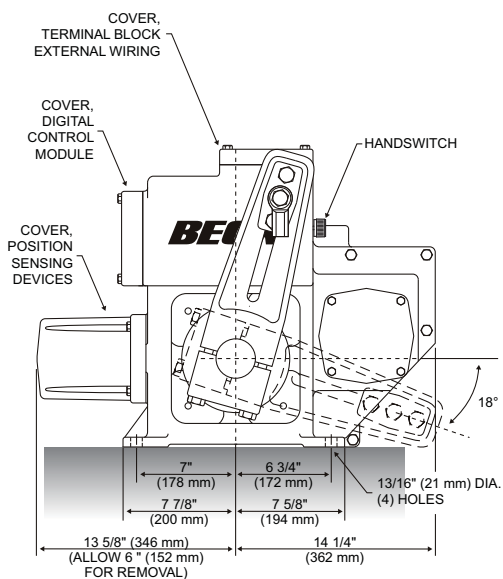


OUTLINE DIMENSION DRAWINGS

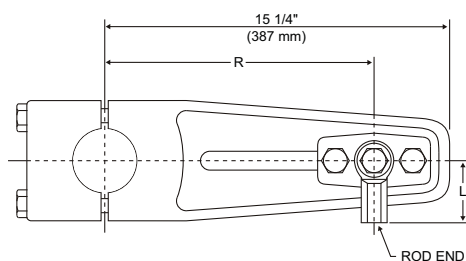
Model 11-360



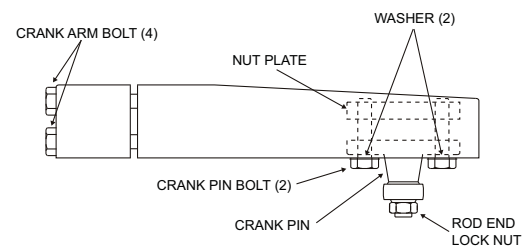
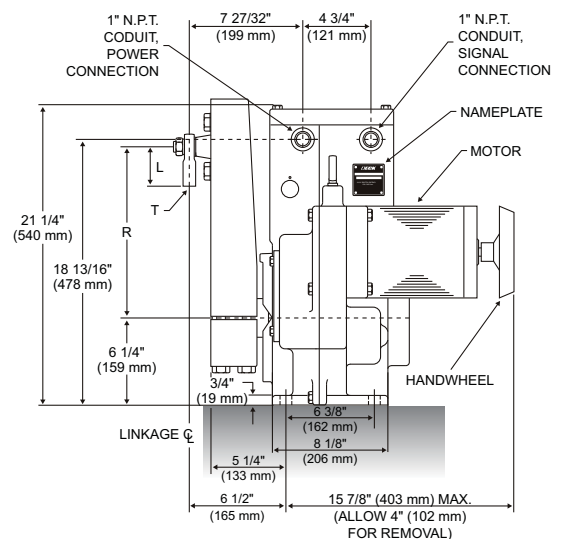
Model 11-400

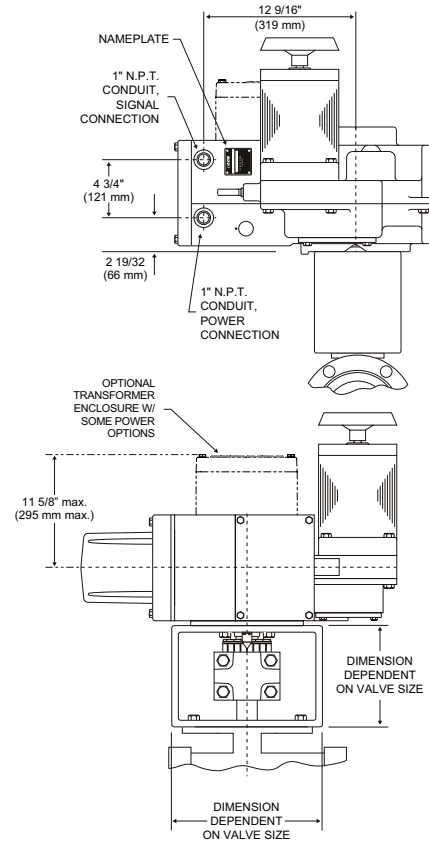
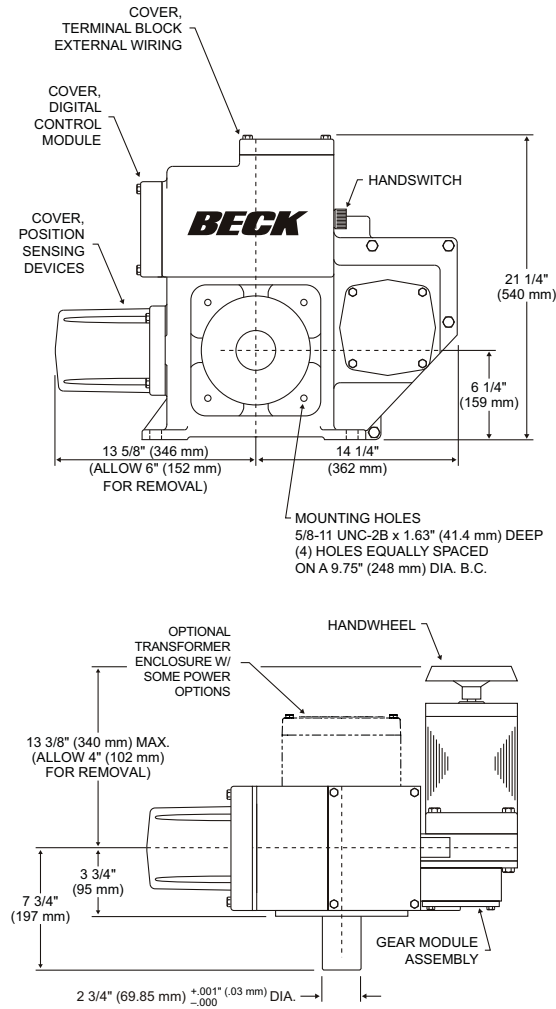


Crank Arm



ADJUSTABLE RADIUS "R" 6" (152 mm) TO 12" (305 mm)





Mechanical Specifications

			Crank Arm & Rod End Supplied as Standard				
Beck Actuator Model Number	Approx. Wt. (lbs) [kgs]*	Output Shaft Diameter (in) [mm]	Crank Arm Part Number	Crank Arm Radius "R" (adjustable) (in) [mm]**	Rod End Length "L" Dimension (in) [mm]	Rod End Internal Thread "T" (in) [mm]	Maximum Overhung Load (lbs) [kgs]
11-150	(60) [23]	(.75) [19]	10-3491-05	(1.5 - 5.125) [38 - 130]	(2.125) [54]	(1/2-20 x 1.125) [1/2-20 x 29]	(750) [340]
11-200	(120) [54]	(1.5) [38]	14-7330-26	(3.5 - 8) [89 - 203]	(2.125) [54]	(1/2-20 x 1.8175) [1/2-20 x 30]	(3,000) [1361]
11-300	(125) [57]	(1.75) [44]	14-8010-34	(3.5 - 8) [89 - 203]	(2.5) [64]	(5/8-18 x 1.5) [5/8-18 x 38]	(4,500) [2041]
11-400	(270) [122]	(2.75) [70]	14-8018-02	(6 - 12) [152 - 305]	(2.875) [73]	(3/4-16 x 1.75) [3/4-16 x 44]	(9,000) [4082]

*Approx. weights are the same for the 11-160, -260, -360 & -460 and their counterparts in the table above.

**Longer or shorter crank arms allowing for a greater or lesser radius are available as an option.

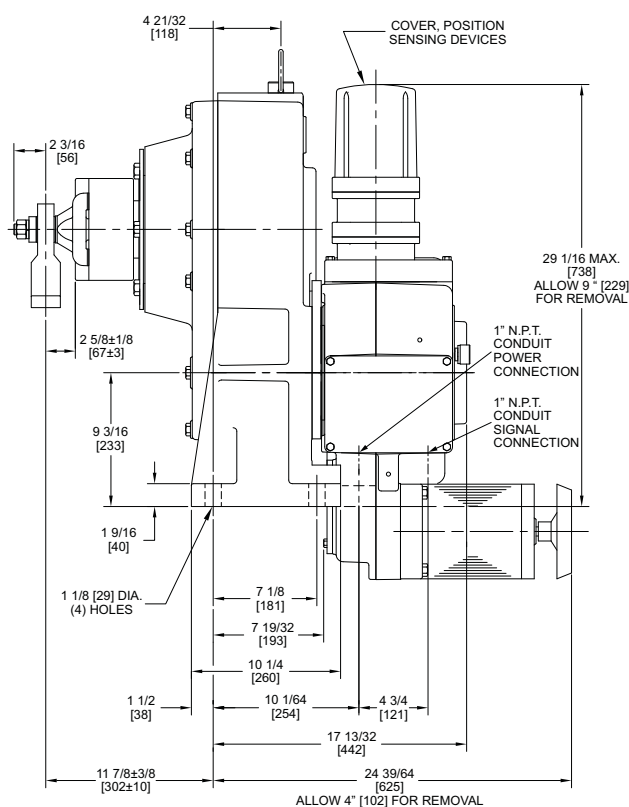
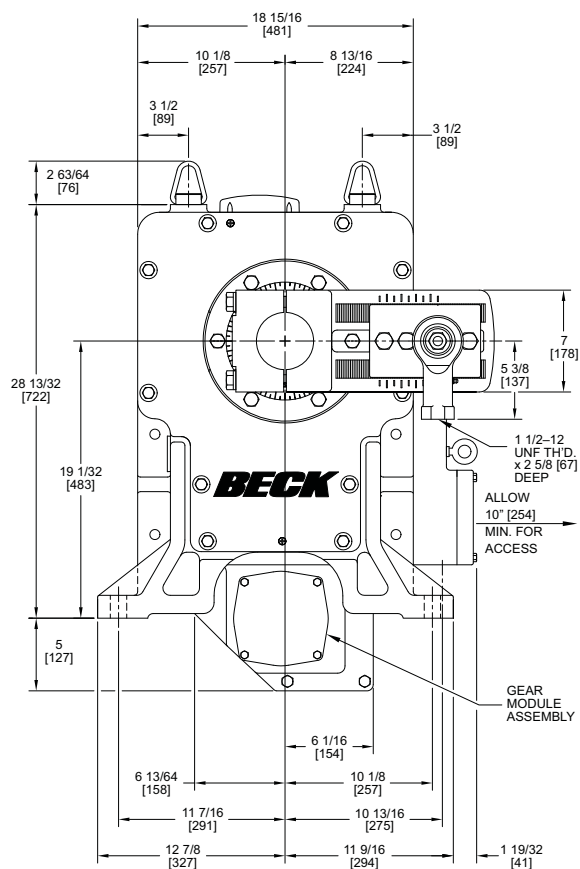
Actuators may be mounted in any orientation.

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

OUTLINE DIMENSION DRAWINGS

Model 11-430

Orientation A

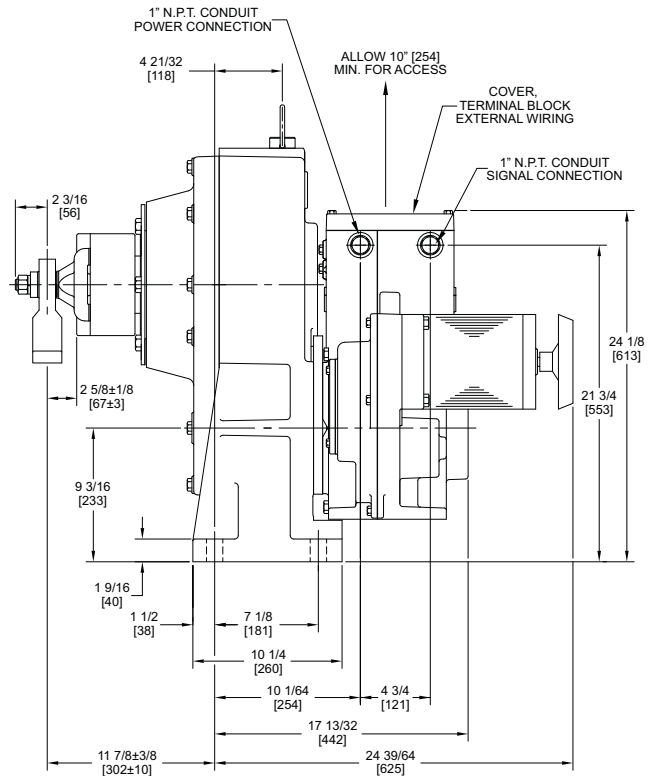
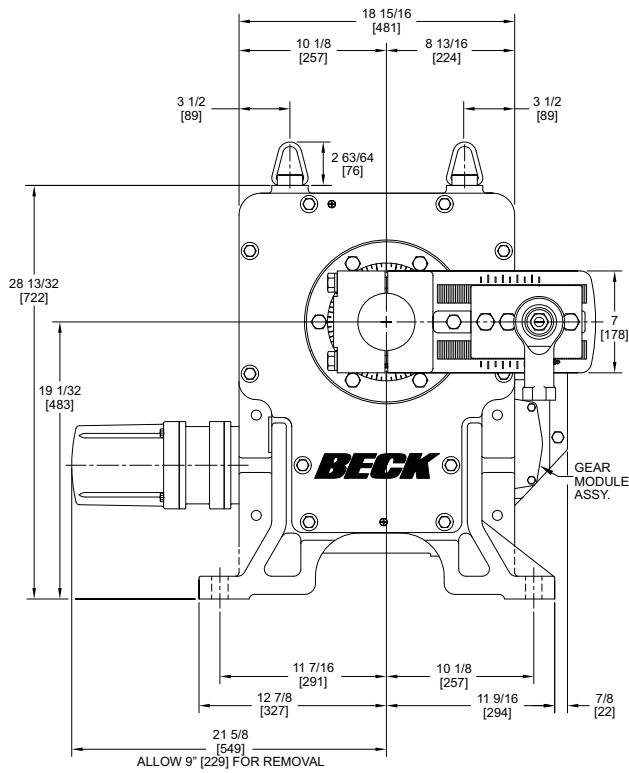


Approx. Wt. (lb) [kg]	Output Shaft Dia. (in) [mm]	Max. Overhung Load (lb) [kg]
790 [358]	3 15/16 [100]	20,000 [9072] Crank Arm 14-8022-42 or 15,000 [6804] Crank Arm 14-8022-44

Actuators may be mounted in any orientation.

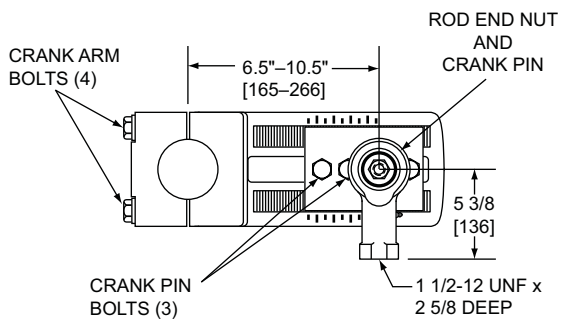
All dimensions are subject to change. Request certified dimensional drawings for the actuators you select.

Orientation B



Available Crank Arms

Standard Crank Arm (p/n 14-8022-42)



Alternate Crank Arm (p/n 14-8022-44)

