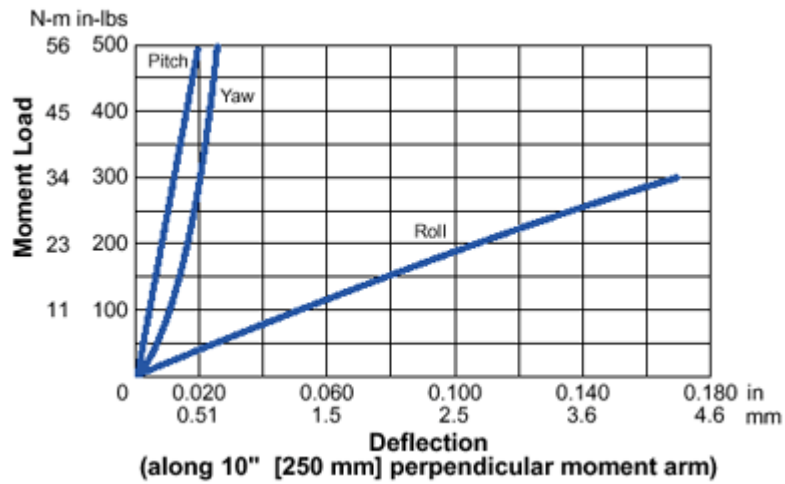


R3 Ball Screw Driven Actuator

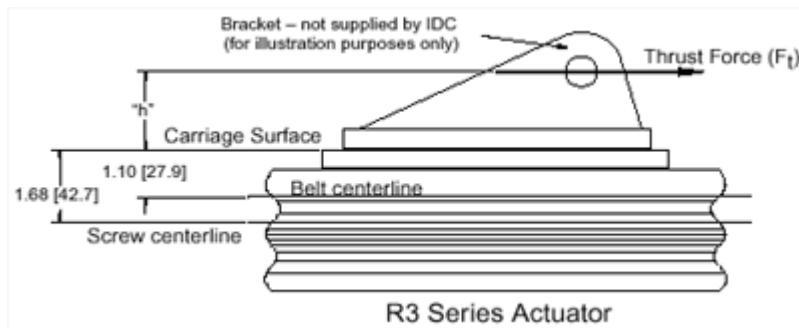


Product Dimensions

Moment Load vs. Carriage Deflection

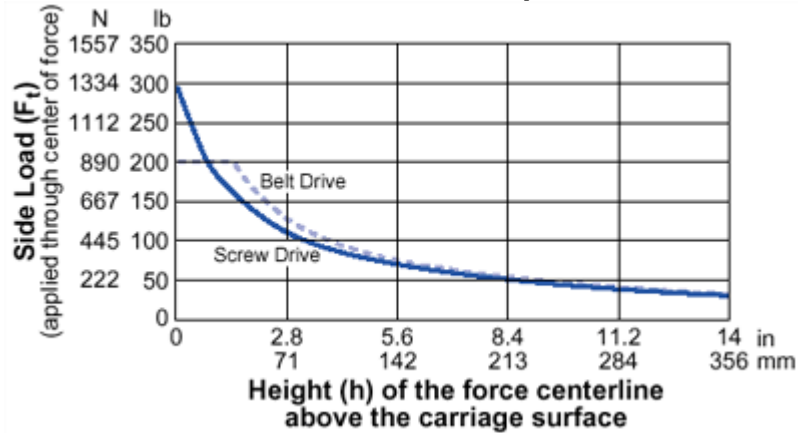


Pitch Moment

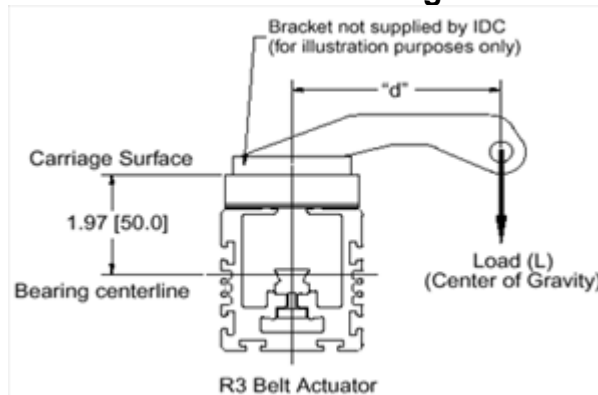


R3 Ball Screw Driven Actuator

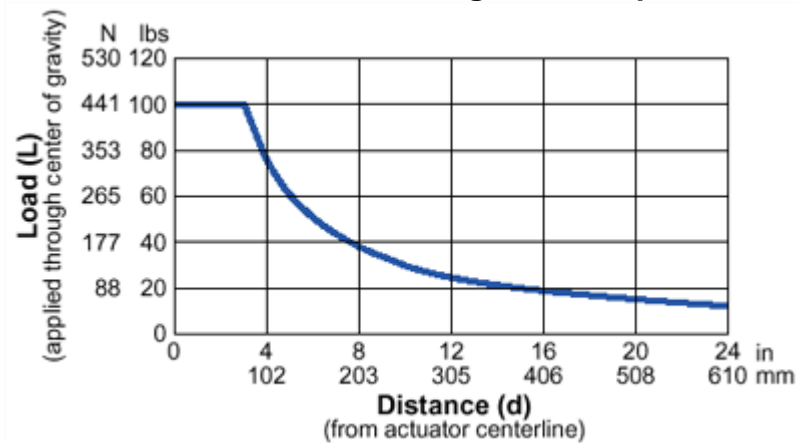
Pitch Moment Graph



Roll Moment Overhung Load

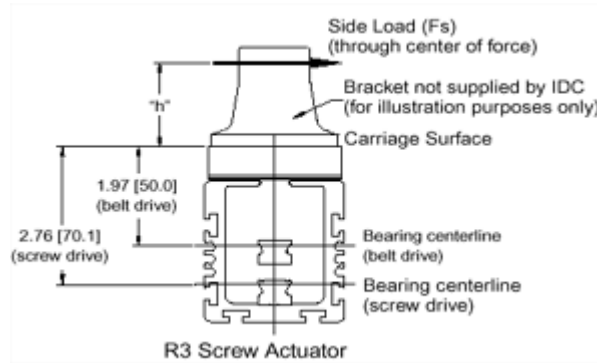


Roll Moment Overhung Load Graph

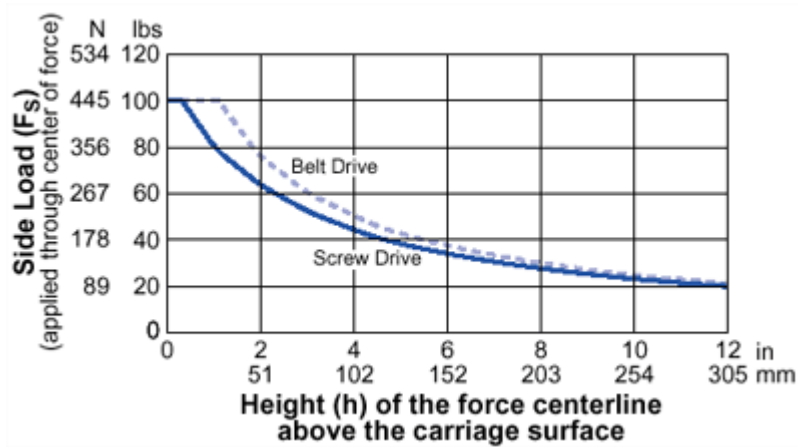


R3 Ball Screw Driven Actuator

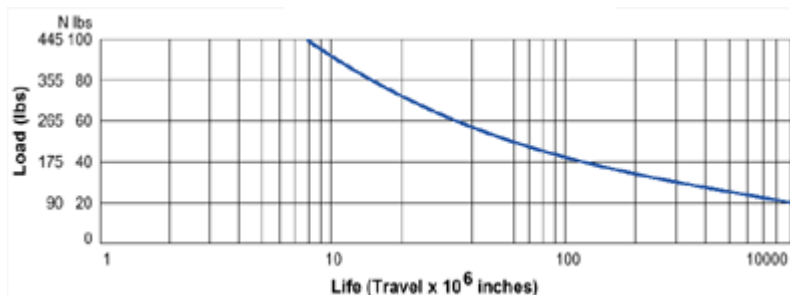
Roll Moment Side Load



Roll Moment Side Load Graph

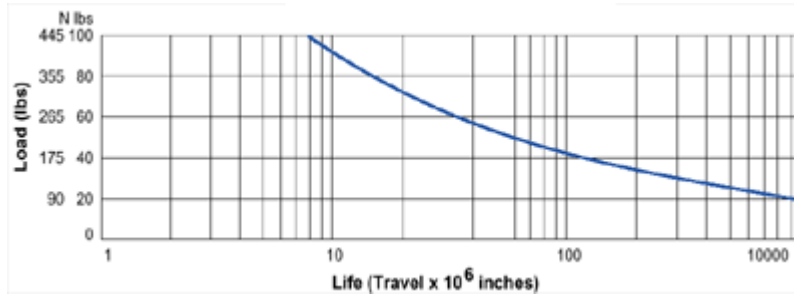


Carriage Load vs. Rail Life

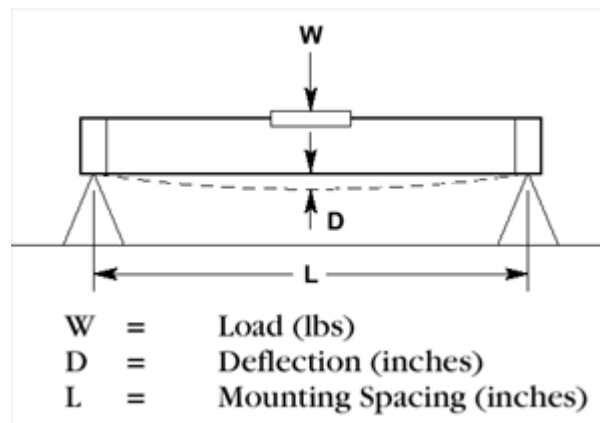


R3 Ball Screw Driven Actuator

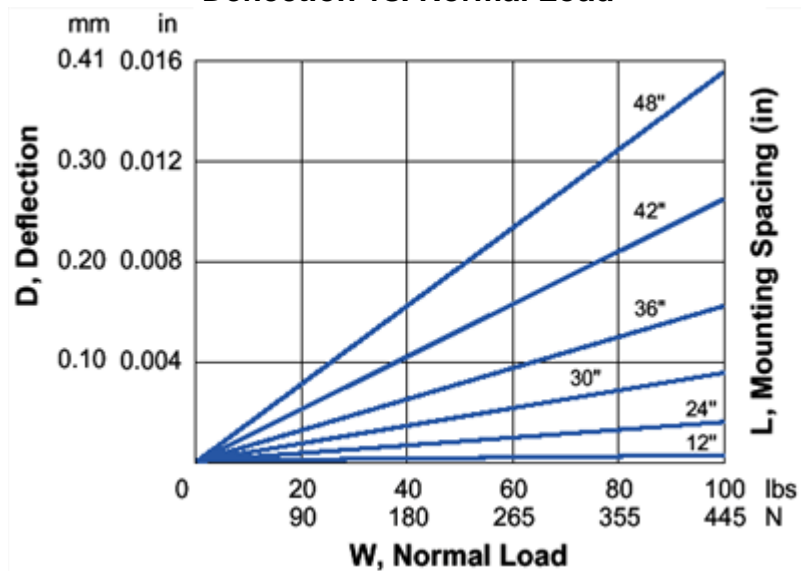
Ball Screw Life vs. Travel Life



Actuator Deflection



Deflection vs. Normal Load





R3 Ball Screw Driven Actuator

Specifications

| | R3-D Series | R3-H Series | R3-S/P Series | R3-B Series |
|----------------------------------|--|----------------------------------|--|----------------------------------|
| Load (Thrust) Capacity (lbs [N]) | 300 [1335] screw-drive | | 200 [890] belt-drive | |
| Max. No Load Speed (in/s [m/s]) | 40 [1,000] screw drive, 120 [3,000] belt drive | | | |
| Max. Carriage Load (lbs [kg]) | 100 [45] | | | |
| Repeatability (in [mm]) | ±0.005 [0.13] | ±0.001 [0.025] | ±0.0005 [0.013] | ±0.001 [0.025] |
| Motor Type | 24 Volt DC Servo | 160 Volt DC Servo | 1.8° Hybrid Stepper | Brushless Servo |
| Compatible Controls Offered | D2400 | B8001 B8501 B8961 B8962 | NextStep S6002 S6961 S6962 SmartStep | B8001 B8501 B8961 B8962 |

Servo*System cost based on single quantity price, 30 inch stroke actuator with control.

Common Specifications

| | | |
|-------------------------|--|---|
| Travel Lengths | 6, 12, 18, 24, 30, 36, 42, 48, 60, 72 inches | |
| Construction Materials | Bearing & Drive Housing | 6063-T6 aluminum, hardcoat anodized |
| | Guide Housing | 6063-T6 aluminum, hardcoat anodized |
| | Carriage Assembly | 6061-T6 aluminum, hardcoat anodized |
| | Internal Rail Bearings | Recirculating ball on precision ground rail |
| Leadscrew or belt | Support Bearings | Angular contact, high thrust ball bearings |
| | Acme Screw; drive nut | 0.625" diameter alloy steel screw; lubricated polyacetal plastic (R3-D) or lubricated bronze drivenut (R3-H, R3-S, R3-B) |
| | Ball Screw; drive nut | 0.625" diameter hardened alloy steel screw; alloy steel, heat treated ballnut |
| | Belt Drive | 1.0" wide XL pitch polyurethane with steel reinforcement cords |
| | Flexible Seal | Stainless steel band with elastomeric seal |
| Weight | R3-D R3-H R3-S23 R3-S33 R3-B23 R3-B32 | 17 + 0.4 x (inches stroke) lbs [7.7 + 0.18 x(inches stroke)] kg 19 + 0.4 x (inches stroke) lbs [8.6 + 0.18 x(inches stroke)] kg 17 + 0.4 x (inches stroke) lbs [7.7 + 0.18 x(inches stroke)] kg 20 + 0.4 x (inches stroke) lbs [9.1 + 0.18 x(inches stroke)] kg 17 + 0.4 x (inches stroke) lbs [7.7 + 0.18 x(inches stroke)] kg 25 + 0.4 x (inches stroke) lbs [11.3 + 0.18 x(inches stroke)] kg |
| Environmental Operation | Temperature | -20° to 140°F [-28° to 60°C] |
| | Moisture/Contaminants | IP 44 rated: Splash-proof, protected against ingress of solid particles greater than 0.040" [1 mm] diameter. |

R3 Series Actuator Inertia

Rotary Inertia (reflected to the motor) = A + B* (stroke, in) + C* (load, lb) + D

Linear Inertia (reflected to the carriage) = [A + B* (stroke, in) + D]/C + (load, lb)

Belt Driven

| Model | Motors | Ratio | Belt | A (lb-in-s ²) | B (lb-in-s ² /in) | C (lb-in-s ² /lb) |
|-----------|--------------------|-------|----------|------------------------------|---------------------------------|---------------------------------|
| R3...-20T | B23 | 2:1 | 1.0 wide | 1.56 E-03 | 4.82 E-06 | 5.78 E-04 |
| R3...-50T | H, P22/S33, B23/32 | 5:1 | | 3.78 E-04 | 7.61 E-07 | 9.12 E-05 |
| R3...-70T | H, P22/S33, B23/32 | 7:1 | | 1.75 E-04 | 3.93 E-07 | 4.72 E-05 |

R3 Ball Screw Driven Actuator

Screw Driven

| Model | Motors | Ratio | Screw | A (lb-in-s ²) | B (lb-in-s ² /in) | C (lb-in-s ² /lb) |
|-------------|-----------------|-------|-----------|------------------------------|---------------------------------|---------------------------------|
| R3...-102B | H, P22/S33, B23 | 1:1 | 0.625x0.5 | 2.15 E-04 | 7.12 E-05 | 1.64 E-05 |
| R3...-152B | All | 1.5:1 | | 9.80 E-05 | 3.17 E-05 | 7.29 E-06 |
| R3...-202B | All | 2:1 | | 5.70 E-05 | 1.78 E-05 | 4.10 E-06 |
| R3...-502B | All | 5:1 | | 1.41 E-04 | 2.80 E-06 | 6.48 E-07 |
| R3...-702B | D, H, P22 | 7:1 | | 6.38 E-05 | 1.45 E-06 | 3.35 E-07 |
| R3...-105BM | All | 1:1 | 0.625x0.2 | 1.80 E-04 | 7.12 E-05 | 2.62 E-06 |
| R3...-155B | All | 1.5:1 | | 8.22 E-05 | 3.17 E-05 | 1.17 E-06 |
| R3...-205B | All | 2:1 | | 4.81 E-05 | 1.78 E-05 | 6.64 E-07 |
| R3...-505B | D, H, P22/S33 | 5:1 | | 1.40 E-04 | 2.80 E-06 | 9.71 E-08 |
| R3...-705B | D, P22 | 7:1 | | 6.31 E-05 | 1.45 E-06 | 5.36 E-08 |
| R3...-102A | H, P22/S33 | 1:1 | 0.625x0.5 | 2.01 E-04 | 7.12 E-05 | 1.64 E-05 |
| R3...-105A | H, P22/S33, B23 | 1:1 | 0.625x0.2 | 1.79 E-04 | 7.12 E-05 | 2.62 E-06 |
| R3...-155A | D, B23 | 1.5:1 | | 8.19 E-05 | 3.17 E-05 | 1.17 E-06 |
| R3...-205A | All | 2:1 | | 4.80 E-05 | 1.78 E-05 | 6.64 E-07 |
| R3...-505A | All | 5:1 | | 1.40 E-04 | 2.80 E-06 | 9.71 E-08 |
| R3...-705A | D, H, P22 | 7:1 | | 6.31 E-05 | 1.45 E-06 | 5.36 E-08 |

| Motor | Inertia (lb-in-s ²) |
|-------|------------------------------------|
| D | 1.13 E-03 |
| H | 3.06 E-03 |
| P22 | 3.81 E-04 |
| S33 | 1.66 E-03 |
| B23 | 1.20 E-04 |
| B32 | 1.00 E-03 |

Metric Conversions:

1 mm = 0.03937 in

1 kg = 2,205 lb

1 lb-in-s² = 1129 kg-cm² = 1.152 kg-cm-s²

Carriage

| | |
|--------------------------|--|
| Straightness & Flatness | ±0.005 in/ft [0.125 mm/300 mm], not to exceed ±0.035 in [0.9 mm] |
| Load Linimits | |
| Normal (F _n) | ±100 lbs [±450 N] |
| Side (F _s) | ±100 lbs [450 N] |
| Pitch (M _p) | 500 in-lbs [56 N-m] |
| Roll (M _r) | 300 in-lbs [34 N-m] |
| Yaw (M _y) | 500 in-lbs [56 N-m] |

Deflection

| Orientation | Deflection Equation | Maximum Allowed |
|-------------|--|----------------------------|
| Normal | D=WL 3 /7.2 x 10 ⁸ , inches | 0.010" [0.25 mm] |
| Side | D=WL 3 /6.5 x 10 ⁸ , inches | 0.010" [0.25 mm] |
| Pitch | 3.3 x 10 ⁻⁶ radians/in-lb | 0.002 radians @ 500 in-lbs |
| Roll | 4.6 x 10 ⁻⁵ radians/in-lb | 0.014 radians @ 300 in-lbs |
| Yaw | 5.1 x 10 ⁻⁶ radians/in-lb | 0.003 radians @ 500 in-lbs |