

RBS Ball Screws and Ball Nuts



About Ball Screws

A ball screw is a precision mechanical device that converts rotary motion to linear motion (or vice versa) using recirculating ball bearings between the screw shaft and ball nut. This design achieves over 90% efficiency, making ball screws significantly more efficient than traditional ACME or lead screws.

Ball screws operate with matching helical grooves (races) machined into both the screw and nut. As the screw or nut rotates, ball bearings roll through these races, and when they reach the trailing end, they are guided through return tubes back to the leading end where the cycle resumes. This continuous recirculation ensures smooth, consistent motion.

The key advantage of ball screws is that there is no physical contact between the screw and nut — only the ball bearings touch both components. This results in minimal friction, high mechanical efficiency, exceptional positioning accuracy, and long service life even under demanding conditions.



Product Overview

Ball Screws

- 6 available sizes: R10, R20, R30, R37, R40, R44
- Available lengths: 24in, 48in and 72in
- Material: 1045 Steel, Case Hardened to Rc 56–60
- Finish: Black Oxide
- 3 end types
 - 2 plain ends (not machined)
 - 1 plain end, 1 2A machined end
 - 1 plain end, 1 5A machined end

Ball Nuts

- 2 Styles available: with or without Safety Spring
- 6 sizes to match each ball screw size
- Housing Material: carbon steel
- Finish: Black Oxide

Accessories

- Bearing Mounts (standard and compact)
- Flanges
- Wiper Kits



BMK10
Compact Bearing
Mount

BM10
Bearing
Mount



R104
Wiper Kit



R103
Mounting
Flange

Features

High Efficiency (>90%)

- Minimal friction loss compared to ACME or lead screws
- Reduces motor size and energy consumption
- Lower heat generation extends component life

Precision & Accuracy

- Standard grade: $\pm 0.007''$ per foot lead accuracy
- Smooth, consistent motion for reliable positioning

Complete System Solutions

- Ball screws with factory-matched ball nuts
- Mounting flanges for secure nut installation
- Wiper kits to protect against contamination
- Compatible bearing mounts (BM, BMBK series)

Flexible Configuration

- Standard unmachined ends allow for customer-specific end preparation
- Two bearing mount options for different end fixity requirements
- Bearing mounts supplied sealed and pre-lubricated

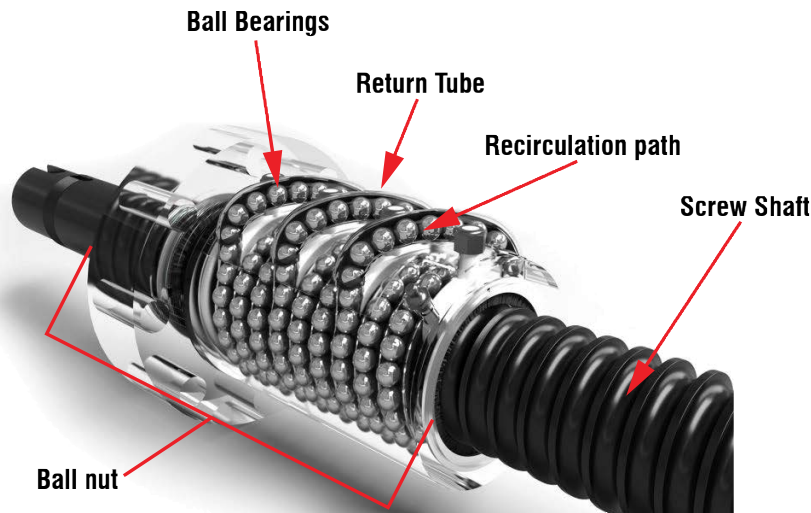
Typical Applications

- CNC machine tools and machining centers
- Material handling and conveyor systems
- Packaging machinery
- Medical device manufacturing
- Robotic systems and XY positioning stages



Cutaway of Ball Nut with Safety Spring

RBS Ball Screws and Ball Nuts



Definitions

Major Diameter (Land Diameter)

The outside diameter of the screw thread. This is the nominal diameter used to identify the ball screw series (e.g., R37 = 0.750" Major Diameter).

Minor Diameter (Root Diameter)

The diameter of the screw shaft measured at the bottom of the ball thread track. This dimension is critical for:

- Column load calculations (compressive buckling strength)
- Critical speed calculations
- Support bearing selection

Ball Pitch Diameter (Ball Circle Diameter)

The theoretical cylinder passing through the center of the balls when they are in contact with both the ball screw and ball nut races. This diameter determines the mechanical advantage and torque characteristics.

Lead

The axial distance the nut travels along the screw in one complete revolution (360°). For single-start threads, lead equals pitch. For multiple-start threads, lead equals pitch multiplied by number of screw starts. Lead directly determines:

- Linear speed for a given RPM
- Mechanical advantage (torque-to-force ratio)
- Positional resolution

Lead Error (Accuracy)

The cumulative difference between actual travel distance and theoretical travel based on the lead specification. RBS standard grade ball screws meet Class 7-8 ANSI B5.48-1977:

- Standard grade: ± 0.007 " per foot maximum
- Lead error is cumulative over the length of the threaded portion

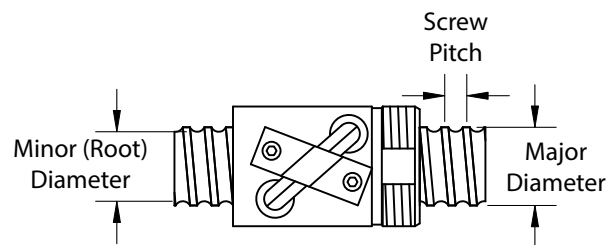
Dynamic Load Rating (lbs @ 1,000,000 inches)

The axial load the ball screw can support while achieving 1,000,000 inches (15.78 miles) of travel life. This rating assumes:

- Proper lubrication maintained
- Clean operating environment
- Load applied parallel and concentric to screw axis
- No shock loading or moment forces
- 90% reliability (L10 life)

To calculate expected life at different loads, use: $\text{Life} = (\text{Dynamic Load Rating} \div \text{Applied Load})^3 \times 1,000,000 \text{ inches}$

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Maximum Static Load (lbs)

The maximum axial load that can be applied to a stationary ball screw without causing permanent deformation of the ball tracks. This rating applies when:

- System is at rest
- Safety factor should be applied for critical applications

Static load should never exceed the maximum rating to prevent brinelling (permanent indentation) of the ball races.

Safety Spring

A coiled spring installed in the inactive portion of the ball nut that conforms to the ball nut thread. The spring remains inactive during normal operation and does not contact the ball screw shaft. In the rare event that balls are lost from the ball nut, the safety spring engages to assume the load and prevent the nut from free-falling down the screw.



THE SAFETY SPRING IS NOT DESIGNED NOR RATED TO KEEP THE BALL NUT FROM BACK DRIVING DURING NORMAL OPERATION.

R10 Series Ball Screws



R10 Series Ball Screws

- Ball Pitch Diameter: 0.375in
- Major Diameter: 0.360in
- Minor (Root) Diameter: 0.3in
- Material: 1045 Alloy Steel
- Case hardened to Rc56-60HRC
- Finish: Black Oxide
- Screw Pitch: 0.125in
- Screw Direction: Right Hand
- Dynamic Load Rating: 150 lbf
- Static Load Rating: 1300 lbf
- Lead: 0.125in/rev
- Lead Accuracy: ±0.007in per foot maximum
- Number of Screw Starts: 1

R10 Series Ball Screw					
Part Number	Price	Length	End Machining*	Weight	Drawing Links
R10-1-2AD	\$56.00	24.0in [609.6mm]	None	0.62 lbs [0.28 kg]	PDF
R10-1-4AD	\$74.00	48.0in [1219.2mm]		1.24 lbs [0.56 kg]	PDF
R10-1-6AD	\$92.00	72.0in [1828.8mm]		1.86 lbs [0.84 kg]	PDF
R10-24337-1	\$678.00	24.0in [609.6mm]	2A one end	0.62 lbs [0.28 kg]	PDF
R10-24338-1	\$765.00	48.0in [1219.2mm]		1.24 lbs [0.56 kg]	PDF
R10-24339-1	\$787.00	72.0in [1828.8mm]		1.86 lbs [0.84 kg]	PDF






R10-1-2AD



R10-24337-1

*Shaft key is not supplied for machined ends.

R10 Series Accessories				
Part Number	Price	Description	Photo	Drawing Links
R102	\$47.00	Rockford Ball Screw R10 series ball nut, 0.75in diameter. For use with all R10 series ball screws.		PDF
R103	\$99.00	Rockford Ball Screw R10 series mounting flange, for use with R102 ball nut.		PDF
R104	\$18.00	Rockford Ball Screw R10 series wiper kit, for use with R102 ball nut, includes (2) wipers.		PDF

Additional Information			
Product Manual	How to Size a Ball Screw	Product Videos	
		Non-machined end	Machined end
PDF	PDF	Link	Link



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R20 Series Ball Screws



R20 Series Ball Screws

- Ball Pitch Diameter: 0.5in
- Major Diameter: 0.505in
- Minor (Root) Diameter: 0.4in
- Material: 1045 Alloy Steel
- Case hardened to Rc56-60HRC
- Finish: Black Oxide
- Screw Pitch: 0.25in
- Screw Direction: Right Hand
- Dynamic Load Rating: 850 lbf
- Static Load Rating: 4150 lbf
- Lead: 0.5in/rev
- Lead Accuracy: ±0.007in per foot maximum
- Number of Screw Starts: 2

R20 Series Ball Screw					
Part Number	Price	Length	End Machining*	Weight	Drawing Links
R20-1-2AD	\$63.00	24.0in [609.6mm]	None	1.16 lbs [0.53 kg]	PDF
R20-1-4AD	\$81.00	48.0in [1219.2mm]		2.32 lbs [1.05 kg]	PDF
R20-1-6AD	\$99.00	72.0in [1828.8mm]		3.48 lbs [1.58 kg]	PDF
R20-24340-1	\$682.00	24.0in [609.6mm]	2A one end	1.16 lbs [0.53 kg]	PDF
R20-24341-1	\$769.00	48.0in [1219.2mm]		2.32 lbs [1.05 kg]	PDF
R20-24342-1	\$792.00	72.0in [1828.8mm]		3.48 lbs [1.58 kg]	PDF
R20-24343-1	\$682.00	24.0in [609.6mm]	5A one end	1.16 lbs [0.53 kg]	PDF
R20-24344-1	\$769.00	48.0in [1219.2mm]		2.32 lbs [1.05 kg]	PDF
R20-24345-1	\$792.00	72.0in [1828.8mm]		3.48 lbs [1.58 kg]	PDF

*Shaft key is not supplied for machined ends.

R20 Series Accessories				
Part Number	Price	Description	Photo	Drawing Links
R202	\$34.00	Rockford Ball Screw R20 series ball nut, 1.062in diameter. For use with all R20 series ball screws.		PDF
R202BS	\$96.00	Rockford Ball Screw R20 series ball nut with safety spring, 1.062in diameter. For use with all R20 series ball screws.		PDF
R203	\$56.00	Rockford Ball Screw R20 series mounting flange, for use with R202 and R202BS ball nuts.		PDF
R204	\$19.00	Rockford Ball Screw R20 series wiper kit, for use with R202 and R202BS ball nuts, includes (2) wipers and (1) end cap.		PDF
BM10	\$770.00	Rockford Ball Screw R20 series bearing mount, for use with R20 series ball screws with 2A machined end.		PDF
BMBK10	\$213.00	Rockford Ball Screw R20 series compact bearing mount, for use with R20 series ball screws with 5A machined end.		PDF



[R20-1-2AD](#)



[R20-24340-1](#)



[R20-24343-1](#)



SAFETY SPRING DOES NOT MAINTAIN LOAD DURING NORMAL OPERATION

Additional Information			
Product Manual	How to Size a Ball Screw	Product Videos	
		Non-machined end	Machined end
PDF	PDF	Link	Link



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R30 Series Ball Screws



R30 Series Ball Screws

- Ball Pitch Diameter: 0.631in
- Major Diameter: 0.615in
- Minor (Root) Diameter: 0.5in
- Material: 1045 Alloy Steel
- Case hardened to Rc56-60HRC
- Finish: Black Oxide
- Screw Pitch: 0.2in
- Screw Direction: Right Hand
- Dynamic Load Rating: 825 lbf
- Static Load Rating: 6250 lbf
- Lead: 0.2in/rev
- Lead Accuracy: ±0.007in per foot maximum
- Number of Screw Starts: 1

R30 Series Ball Screw					
Part Number	Price	Length	End Machining*	Weight	Drawing Links
R30-1-2AD	\$52.00	24.0in [609.6mm]	None	1.66 lbs [0.75 kg]	PDF
R30-1-4AD	\$71.00	48.0in [1219.2mm]		3.32 lbs [1.51 kg]	PDF
R30-1-6AD	\$90.00	72.0in [1828.8mm]		4.98 lbs [2.26 kg]	PDF
R30-24347-1	\$592.00	24.0in [609.6mm]	2A one end	1.66 lbs [0.75 kg]	PDF
R30-24348-1	\$679.00	48.0in [1219.2mm]		3.32 lbs [1.51 kg]	PDF
R30-24349-1	\$702.00	72.0in [1828.8mm]		4.98 lbs [2.26 kg]	PDF
R30-24350-1	\$592.00	24.0in [609.6mm]	5A one end	1.66 lbs [0.75 kg]	PDF
R30-24352-1	\$679.00	48.0in [1219.2mm]		3.32 lbs [1.51 kg]	PDF
R30-24353-1	\$702.00	72.0in [1828.8mm]		4.98 lbs [2.26 kg]	PDF

*Shaft key is not supplied for machined ends.



[R30-1-2AD](#)



[R30-24347-1](#)



[R30-24350-1](#)

R30 Series Accessories				
Part Number	Price	Description	Photo	Drawing Links
R302	\$19.00	Rockford Ball Screw R30 series ball nut, 1 x 1in. For use with all R30 series ball screws.		PDF
R302BS	\$61.00	Rockford Ball Screw R30 series ball nut with safety spring, 1 x 1in. For use with all R30 series ball screws.		PDF
R303	\$56.00	Rockford Ball Screw R30 series mounting flange, for use with R302 and R302BS ball nuts.		PDF
R304	\$27.00	Rockford Ball Screw R30 series wiper kit, for use with R302 and R302BS ball nuts, includes (2) wipers and (1) end cap.		PDF
BM12	\$802.00	Rockford Ball Screw R30 series bearing mount, for use with R30 series ball screws with 2A machined end.		PDF
BMBK12	\$267.00	Rockford Ball Screw R30 series compact bearing mount, for use with R30 series ball screws with 5A machined end.		PDF



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Additional Information			
Product Manual	How to Size a Ball Screw	Product Videos	
		Non-machined end	Machined end
PDF	PDF	Link	Link



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R37 Series Ball Screws



R37 Series Ball Screws

- Ball Pitch Diameter: 0.75in
- Major Diameter: 0.760in
- Minor (Root) Diameter: 0.63in
- Material: 1045 Alloy Steel
- Case hardened to Rc56-60HRC
- Finish: Black Oxide
- Screw Pitch: 0.25in
- Screw Direction: Right Hand
- Dynamic Load Rating: 3400 lbf
- Static Load Rating: 21000 lbf
- Lead: 0.5in/rev
- Lead Accuracy: ±0.007in per foot maximum
- Number of Screw Starts: 2

R37 Series Ball Screw					
Part Number	Price	Length	End Machining*	Weight	Drawing Links
R37-1-2AD	\$67.00	24.0in [609.6mm]	None	2.70 lbs [1.22 kg]	PDF
R37-1-4AD	\$86.00	48.0in [1219.2mm]		5.40 lbs [2.45 kg]	PDF
R37-1-6AD	\$105.00	72.0in [1828.8mm]		8.10 lbs [3.67 kg]	PDF
R37-24354-1	\$631.00	24.0in [609.6mm]	2A one end	2.70 lbs [1.22 kg]	PDF
R37-24355-1	\$718.00	48.0in [1219.2mm]		5.40 lbs [2.45 kg]	PDF
R37-24356-1	\$741.00	72.0in [1828.8mm]		8.10 lbs [3.67 kg]	PDF
R37-24357-1	\$631.00	24.0in [609.6mm]	5A one end	2.70 lbs [1.22 kg]	PDF
R37-24358-1	\$718.00	48.0in [1219.2mm]		5.40 lbs [2.45 kg]	PDF
R37-24359-1	\$741.00	72.0in [1828.8mm]		8.10 lbs [3.67 kg]	PDF

*Shaft key is not supplied for machined ends.

R37 Series Accessories				
Part Number	Price	Description	Photo	Drawing Links
R372	\$47.00	Rockford Ball Screw R37 series ball nut, 1.312in diameter. For use with all R37 series ball screws.		PDF
R372BS	\$74.00	Rockford Ball Screw R37 series ball nut with safety spring, 1.312in diameter. For use with all R37 series ball screws.		PDF
R373	\$75.00	Rockford Ball Screw R37 series mounting flange, for use with R372 and R372BS ball nuts.		PDF
R374	\$28.00	Rockford Ball Screw R37 series wiper kit, for use with R372 and R372BS ball nuts, includes (2) wipers and (1) end cap.		PDF
BM15	\$745.00	Rockford Ball Screw R37 series bearing mount, for use with R37 series ball screws with 2A machined end.		PDF
BMBK15	\$244.00	Rockford Ball Screw R37 series compact bearing mount, for use with R37 series ball screws with 5A machined end.		PDF



[R37-1-2AD](#)



[R37-24354-1](#)



[R37-24357-1](#)



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Additional Information			
Product Manual	How to Size a Ball Screw	Product Videos	
		Non-machined end	Machined end
PDF	PDF	Link	Link



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R40 Series Ball Screws



R40 Series Ball Screws

- Ball Pitch Diameter: 1in
- Major Diameter: 0.980in
- Minor (Root) Diameter: 0.84in
- Material: 1045 Alloy Steel
- Case hardened to Rc56-60HRC
- Finish: Black Oxide
- Screw Pitch: 0.25in
- Screw Direction: Right Hand
- Dynamic Load Rating: 1625 lbf
- Static Load Rating: 13000 lbf
- Lead: 0.25in/rev
- Lead Accuracy: ±0.007in per foot maximum
- Number of Screw Starts: 1

R40 Series Ball Screw					
Part Number	Price	Length	End Machining*	Weight	Drawing Links
R40-1-2AD	\$75.00	24.0in [609.6mm]	None	4.36 lbs [1.98 kg]	PDF
R40-1-4AD	\$93.00	48.0in [1219.2mm]		8.72 lbs [3.96 kg]	PDF
R40-1-6AD	\$111.00	72.0in [1828.8mm]		13.08 lbs [5.93 kg]	PDF
R40-24360-1	\$635.00	24.0in [609.6mm]	2A one end	4.36 lbs [1.98 kg]	PDF
R40-24362-1	\$722.00	48.0in [1219.2mm]		8.72 lbs [3.96 kg]	PDF
R40-24363-1	\$745.00	72.0in [1828.8mm]		13.08 lbs [5.93 kg]	PDF
R40-24364-1	\$635.00	24.0in [609.6mm]	5A one end	4.36 lbs [1.98 kg]	PDF
R40-24365-1	\$722.00	48.0in [1219.2mm]		8.72 lbs [3.96 kg]	PDF
R40-24366-1	\$745.00	72.0in [1828.8mm]		13.08 lbs [5.93 kg]	PDF

*Shaft key is not supplied for machined ends.

R40 Series Accessories				
Part Number	Price	Description	Photo	Drawing Links
R402	\$43.00	Rockford Ball Screw R40 series ball nut, 1.5 x 1.5in. For use with all R40 series ball screws.		PDF
R402BS	\$47.00	Rockford Ball Screw R40 series ball nut with safety spring, 1.5 x 1.5in. For use with all R40 series ball screws.		PDF
R403	\$69.00	Rockford Ball Screw R40 series mounting flange, for use with R402 and R402BS ball nuts.		PDF
R404	\$30.00	Rockford Ball Screw R40 series wiper kit, for use with R402 and R402BS ball nuts, includes (2) wipers and (1) end cap.		PDF
BM20	\$828.00	Rockford Ball Screw R40/R44 series bearing mount, for use with R40 and R44 series ball screws with 2A machined end.		PDF
BMBK20	\$328.00	Rockford Ball Screw R40/R44 series compact bearing mount, for use with R40 and R44 series ball screws with 5A machined end.		PDF



R40-1-2AD



R40-24360-1



R40-24364-1



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Additional Information			
Product Manual	How to Size a Ball Screw	Product Videos	
		Non-machined end	Machined end
PDF	PDF	Link	Link



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R44 Series Ball Screws



R44 Series Ball Screws

- Ball Pitch Diameter: 1in
- Major Diameter: 0.970in
- Minor (Root) Diameter: 0.84in
- Material: 1045 Alloy Steel
- Case hardened to Rc56-60HRC
- Finish: Black Oxide
- Screw Pitch: 0.25in
- Screw Direction: Right Hand
- Dynamic Load Rating: 2300 lbf
- Static Load Rating: 11500 lbf
- Lead: 1in/rev
- Lead Accuracy: ±0.007in per foot maximum
- Number of Screw Starts: 4

R44 Series Ball Screw					
Part Number	Price	Length	End Machining*	Weight	Drawing Links
R44-1-2AD	\$83.00	24.0in [609.6mm]	None	4.34 lbs [1.97 kg]	PDF
R44-1-4AD	\$101.00	48.0in [1219.2mm]		8.68 lbs [3.94 kg]	PDF
R44-1-6AD	\$119.00	72.0in [1828.8mm]		13.02 lbs [5.91 kg]	PDF
R44-24367-1	\$637.00	24.0in [609.6mm]	2A one end	4.34 lbs [1.97 kg]	PDF
R44-24368-1	\$724.00	48.0in [1219.2mm]		8.68 lbs [3.94 kg]	PDF
R44-24370-1	\$747.00	72.0in [1828.8mm]		13.02 lbs [5.91 kg]	PDF
R44-24371-1	\$637.00	24.0in [609.6mm]	5A one end	4.34 lbs [1.97 kg]	PDF
R44-24372-1	\$724.00	48.0in [1219.2mm]		8.68 lbs [3.94 kg]	PDF
R44-24373-1	\$747.00	72.0in [1828.8mm]		13.02 lbs [5.91 kg]	PDF

*Shaft key is not supplied for machined ends.



[R44-1-2AD](#)



[R44-24367-1](#)



[R44-24371-1](#)

R44 Series Accessories				
Part Number	Price	Description	Photo	Drawing Links
R442	\$71.00	Rockford Ball Screw R44 series ball nut, 1.5 x 1.5in. For use with all R44 series ball screws.		PDF
R442BS	\$118.00	Rockford Ball Screw R44 series ball nut with safety spring, 1.5 x 1.5in. For use with all R44 series ball screws.		PDF
R443	\$69.00	Rockford Ball Screw R44 series mounting flange, for use with R442 and R442BS ball nuts.		PDF
R444	\$30.00	Rockford Ball Screw R44 series wiper kit, for use with R442 and R442BS ball nuts, includes (2) wipers and (1) end cap.		PDF
BM20	\$828.00	Rockford Ball Screw R40/R44 series bearing mount, for use with R40 and R44 series ball screws with 2A machined end.		PDF
BMBK20	\$328.00	Rockford Ball Screw R40/R44 series compact bearing mount, for use with R40 and R44 series ball screws with 5A machined end.		PDF



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		Non-machined end	Machined end
PDF	PDF	Link	Link



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