MOTION & CONTROL™

NSK

Bearings and Ball Screws for Robots

New Products

Patent Pending

Proven performance and reliability built on NSK's comprehensive expertise and tribology technologies tailored for humanoid robots.



NSK TOTAL SOLUTIONS

NSK Solutions Set the Robots of the Future in Motion

For over 100 years, NSK has helped deliver smooth motion across industries worldwide through precision components, starting with bearings and ball screws.

Our breadth of experience is our strength, with decades of technical expertise and research data, extensive development capacity, precision technologies proven in industrial machinery, and high-quality manufacturing and mass-production capabilities honed in automotive applications.



Ball Screws



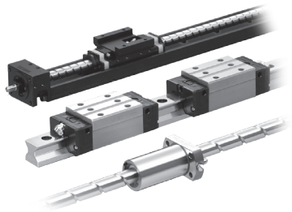
Bearings

NSK
Core Technologies

NSK
Linear Guides



Actuators



Using our comprehensive capabilities, we are developing products and technologies for the rapidly expanding field of robotics, including compact, lightweight, and high-performance bearings and ball screws.

We aim to serve as a trusted partner in robotics, directly addressing challenges in the field and providing support from development to mass production and stable supply.
Together, we will help advance the deployment and evolution of robots towards a society driven by human-robot collaboration.

Shoulder Joints:
Thin-Section Four-Point-Contact
Ball Bearings



Elbow Joints:
Thin-Section Deep Groove
Ball Bearings



Hand Actuators:
Ultra-Small Ball Screws



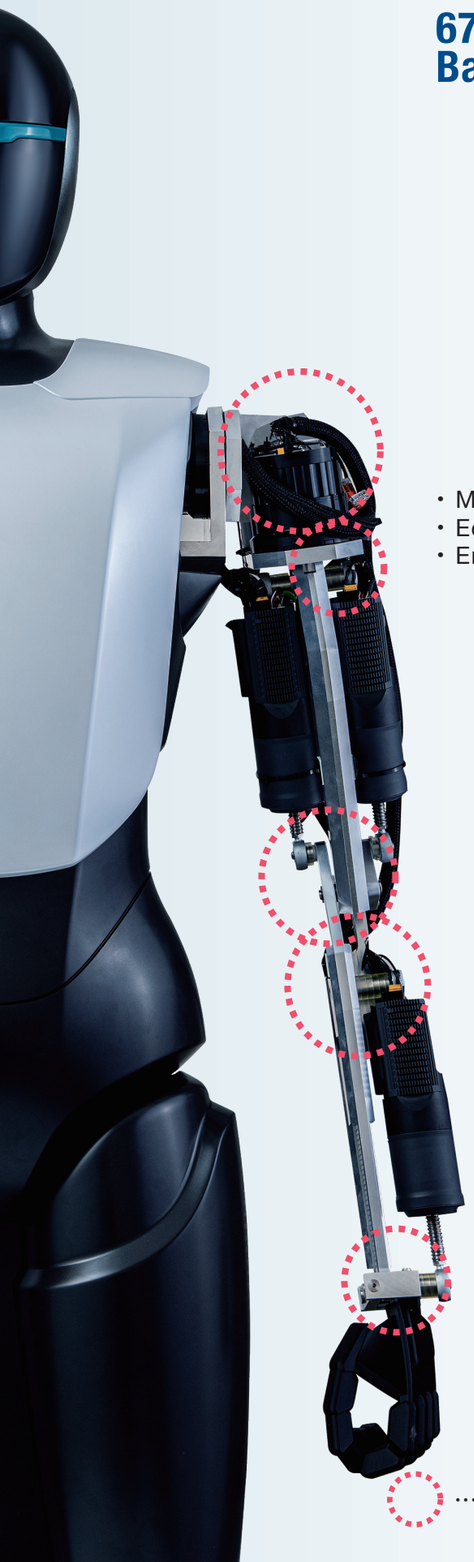


Robot Hands:
Miniature Four-Point-Contact
Ball Bearings

Scan the code on the right to view NSK's full lineup of solutions for robots, including compact and smooth motion offerings tailored to humanoid robot applications.

NSK TOTAL SOLUTIONS

Products for Robotic Joints



67 Series Thin-Section Deep Groove Ball Bearings

(Mass production starting in 2026)



- More compact than conventional 68 Series thin-section bearings
- Equipped with seals and high-performance grease
- Enables more compact robot designs

Thin-Section Four-Point-Contact Ball Bearings

(Launching in 2027)

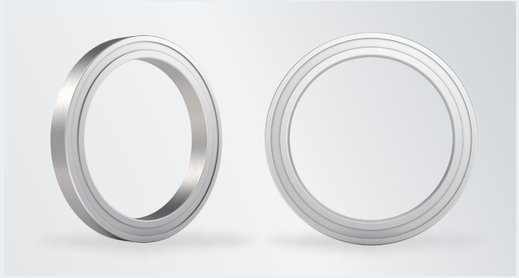


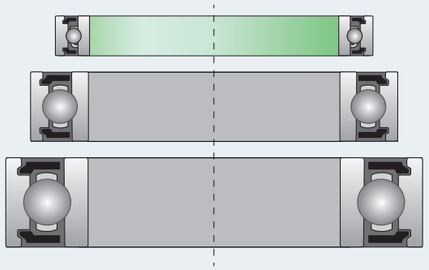
- Dimensionally interchangeable with existing 67 and 68 Series
- Equipped with seals and high-performance grease
- Specialized internal structure reduces axial backlash
- Space-saving and lightweight, while offering same advantages as matched angular contact ball bearings
- Suited for areas needing moment stiffness, such as shoulders and hip joints

⋯Reference Application (Examples)

■ 67 Series Thin-Section Deep Groove Ball Bearings

POINT **Bearings in the 67 Series offer a compact design with the smallest outside diameter and width for a given bore diameter.**





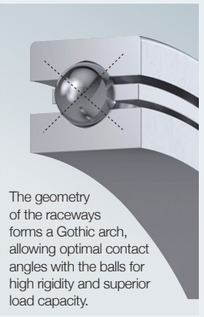
Designation	Boundary Dimensions				Basic Load Ratings		Mass(1) (g) (Approx.)
	Bore Diameter	Outside Diameter	Width		C_r	C_{0r}	
			Open	Sealed			
6700 (MT1510)	10	15	3	4	1050	515	1.8
6701	12	18	4	4	1020	530	3.1
6702	15	21	4	4	1040	585	3.7
6703	17	23	4	4	1100	680	4.1
6704	20	27	4	4	1140	780	6.0
6705	25	32	4	4	1210	925	7.3
6706	30	37	4	4	1260	1070	8.5
6707	35	44	5	5	2150	1980	16.0
6708	40	50	6	6	2840	2590	23.6
6709	45	55	6	6	2960	2910	26.2
6710	50	62	6	6	2940	3050	37.6

Note
1. Values shown are reference values for bearings with seals.

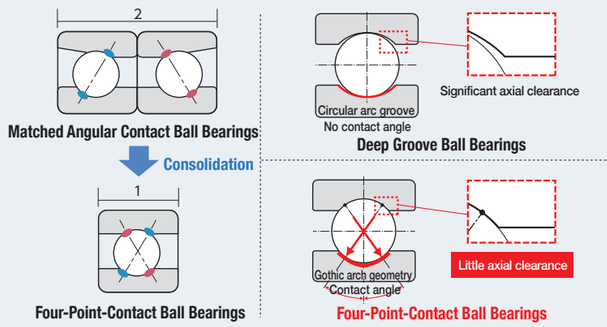
■ Thin-Section Four-Point-Contact Ball Bearings

POINT **Four-point-contact ball bearings offer less axial play and higher rigidity than deep groove ball bearings.**





The geometry of the raceways forms a Gothic arch, allowing optimal contact angles with the balls for high rigidity and superior load capacity.



Designation	Boundary Dimensions				Basic Load Ratings		Mass(1) (g) (Approx.)
	Bore Diameter	Outside Diameter	Width		C_r	C_{0r}	
			Open	Sealed			
4C-6702	15	21	4	4	1540	1080	3.7
4C-6703	17	23	4	4	1630	1250	4.1
4C-6704	20	27	4	4	1690	1430	6.0
4C-6705	25	32	4	4	1780	1690	7.3
4C-6706	30	37	4	4	1860	1960	8.5
4C-6707	35	44	5	5	3150	3600	16.0
4C-6802	15	24	5	5	3400	2320	6.8
4C-6803	17	26	5	5	4300	2900	7.5
4C-6804	20	32	7	7	6600	4550	17.8
4C-6805	25	37	7	7	7350	5800	21.4
4C-6806	30	42	7	7	7700	6650	25.1
4C-6807	35	47	7	7	8000	7500	28.0

Note
1. Values shown are reference values for bearings with seals.

NSK TOTAL SOLUTIONS

Products for Multi-Fingered Robot Hands

Extra-Small Ball Screws (Launching in 2027)

- New recirculation method realizes some of the world's smallest nut outside diameters
- High-efficiency transmission of motor torque delivers strong gripping force
- Smooth reverse operation advances torque control
- Product design suited for mass production





Miniature Four-Point-Contact Ball Bearings (Launching in 2027)

- Dimensionally interchangeable with standard deep groove ball bearings
- Equipped with seals and high-performance grease
- Reduced axial backlash with optimized internal structure
- Applicable to various applications beyond ball screw supports, including small motors and robotic hand joints.

■ Extra-Small Ball Screws

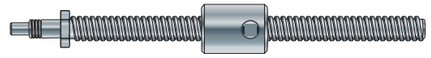


POINT Nut outside diameter among world's smallest

RNCD0301-3 (Actual Size)
— Shaft diameter: 3 mm, Nut outside diameter: 6 mm



RNCD0401-3 (Actual Size)
— Shaft diameter: 4 mm, Nut outside diameter: 8 mm



The figure above in print reflects the actual size of the ball screw. Note that when viewed electronically, dimensions may differ from actual size depending on display settings.

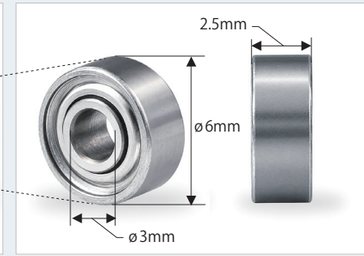
Reference No.	Boundary Dimensions				Turns × Circuits	Basic Load Ratings		Tolerance Class
	Screw Shaft Outside Diameter	Lead	Minimum Nut Outside Diameter	Minimum Nut Length		C_a	C_{0a}	
RNCD0301-3	3	1	6	7	1×3	280	310	Ct7
RNCD0301-4	3	1	6	8.5	1×4	360	415	Ct7
RNCD0401-3	4	1	8	10	1×3	475	555	Ct7
RNCD0401-4	4	1	8	12	1×4	605	740	Ct7

Remarks
The shape of the screw shaft/nut can be customized and other specifications may be accommodated; contact NSK for details.

■ Miniature Four-Point-Contact Ball Bearings

POINT Four-point-contact ball bearings offer less axial play and higher rigidity than deep groove ball bearings.







Designation	Boundary Dimensions				Basic Load Ratings		Mass(1) (g) (Approx.)
	Bore Diameter	Outside Diameter	Width		C_r	C_{0r}	
			Open	Sealed			
4C-MR63	3	6	2	2.5	355	140	0.26
4C-683	3	7	2	3	670	251	0.44
4C-693	3	8	3	4	970	350	0.83

Note
1. Values shown are reference values for bearings with seals.

Remarks
Additional sizes are under development. Contact NSK for the latest availability.

MOTION & CONTROL™

NSK

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www.nsk.com

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Eco-awareness and reliability in motion™

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