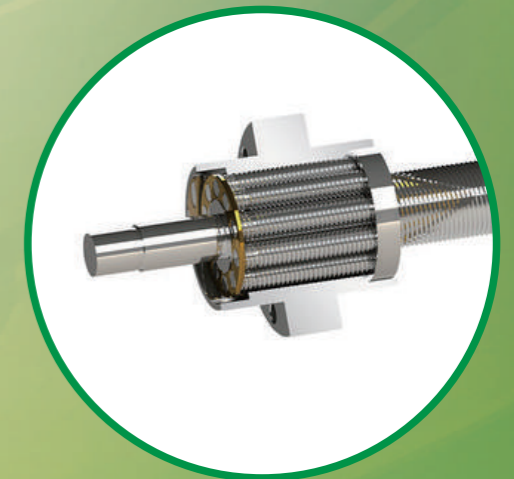
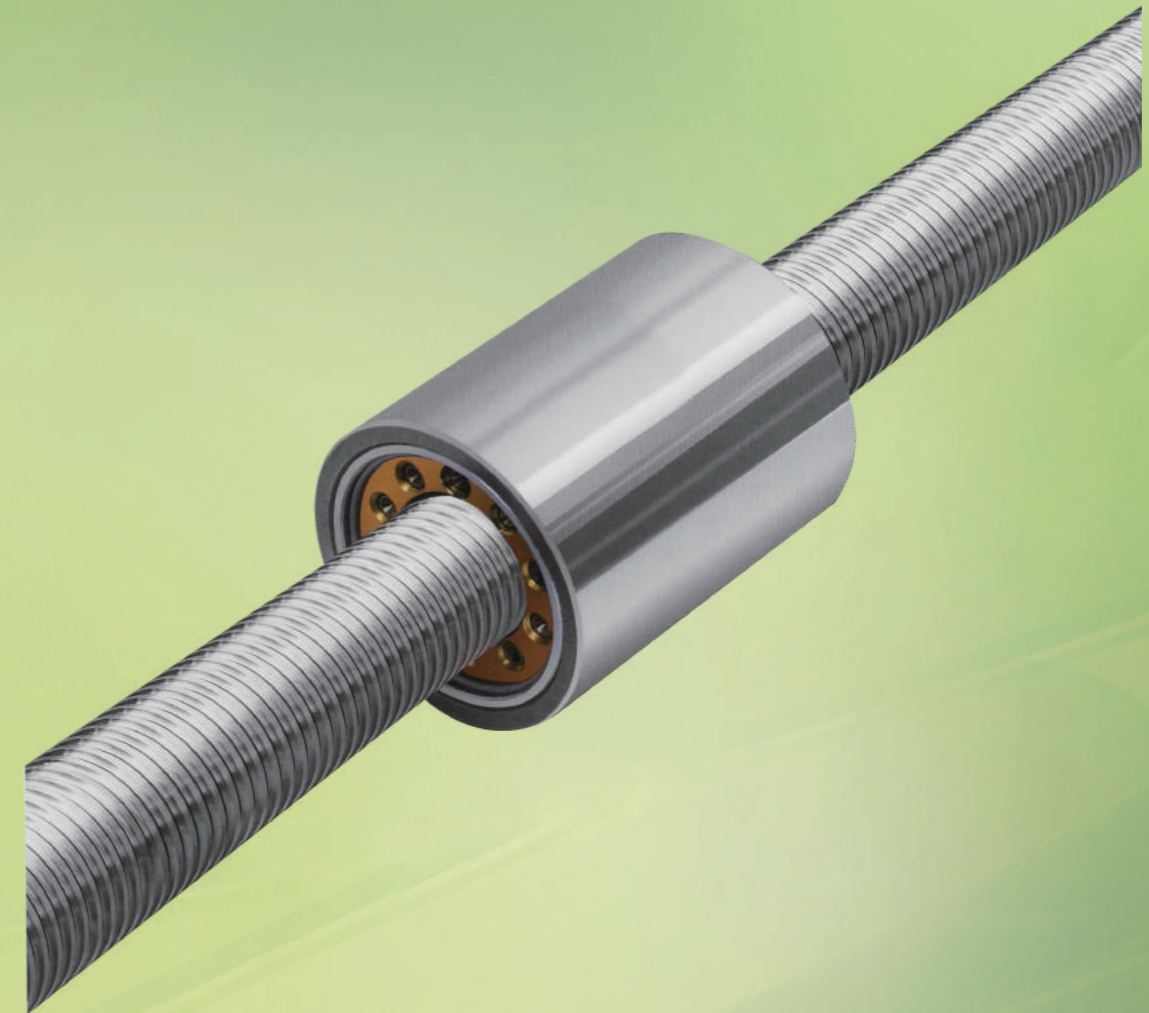




LTROBOT

Planetary roller screw

Motion The Future



Planetary roller screw

1 Comparison between roller screw and ball screw

The bearing capacity of the roller screw mainly depends on the radius of curvature of the contact surface between the rolling elements, the number of contact points, and the hardness and smoothness of the contact surface. Under the same contact surface hardness, smoothness and precision, the roller screw has more contact points than the ball screw, and the radius of curvature of the enveloping circle of the roller contact surface is also farther. It is larger than the radius of curvature of the steel ball of the ball screw, which determines that the roller screw has a higher load-carrying capacity than the ordinary ball screw.

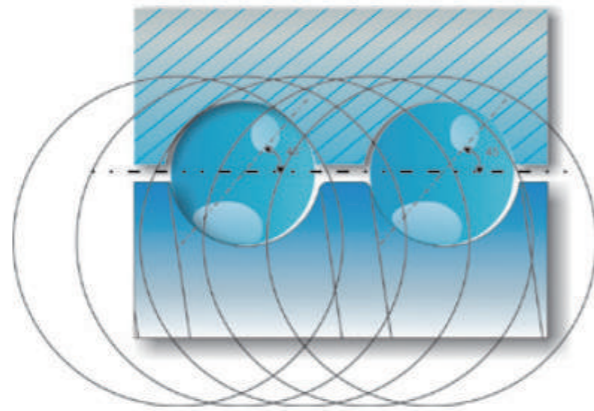
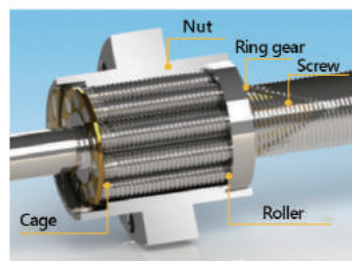


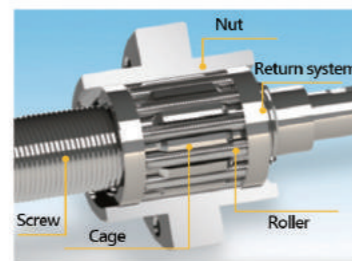
Fig.1 Schematic diagram of the comparison between the number of roller screw rolling elements, the radius of curvature and the contact envelope circle of the roller screw rolling elements

2 Classification and application of planetary roller screws

Roller screws can be divided into planetary roller screws and recirculating roller screws according to different structures. There is an essential difference between the two in the operation mode of the rollers: the rollers of the planetary roller screw do not move axially relative to the nut during revolution and rotation, while the recirculating roller screw does not move except for revolution and rotation. In addition, the relative nut has a circular movement in the axial direction.



Planetary roller screw



Recirculating planetary roller screw

The difference in structure determines that the two have different application fields. The planetary roller screw is mainly used in the heavy-duty field, while the recirculating roller screw is biased towards precision equipment. Planetary roller screws have high load capacity and high reliability, and are mainly used in:

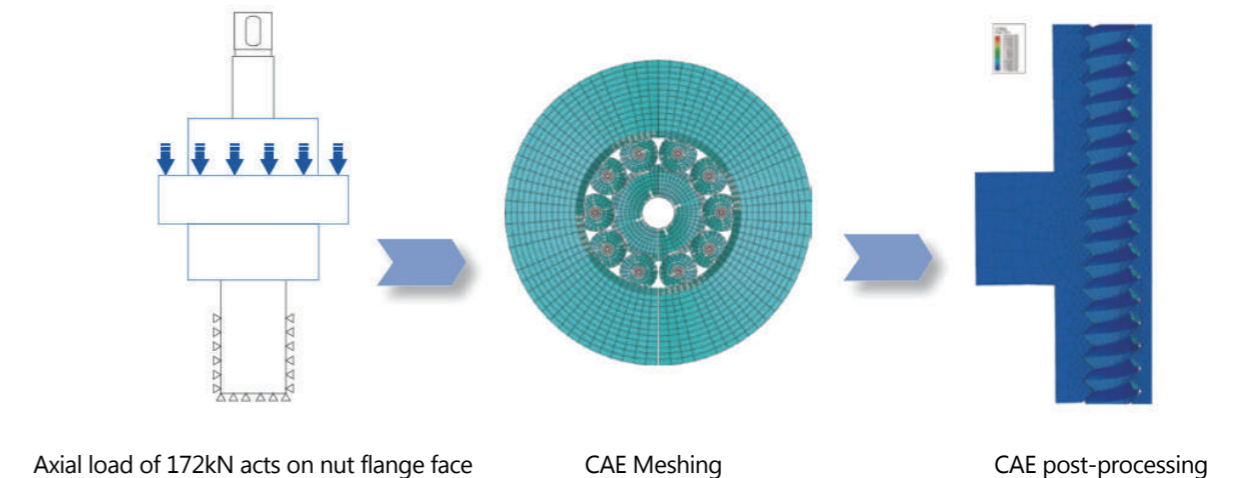
- Injection molding
- Steel industry
- Nuclear industry
- Press machine tools
- Military equipment

Due to the small screw lead (1~2mm), recirculating roller screw has high lead resolution, coupled with its high load capacity and high reliability, it is mainly used in:

- Precision Instruments
- Medical Devices
- Precision Grinding Machines
- Aerospace

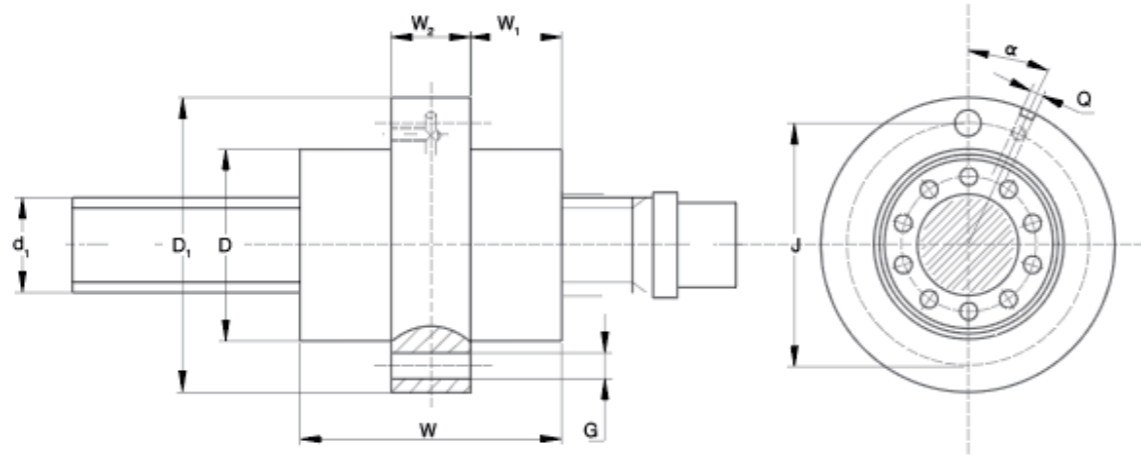
3 Contact analysis of planetary roller screw under given load

Taking the 3020 planetary roller screw as an example, analyze its contact stress under a given axial load. The grid unit of each contact element is a hexahedron unit, so as to improve the calculation accuracy of CAE contact analysis. The analysis process is shown in the figure below:



5 Planetary roller screw product series

Product family of planetary roller screw sets (LDR) with nut flange on center without axial preload:

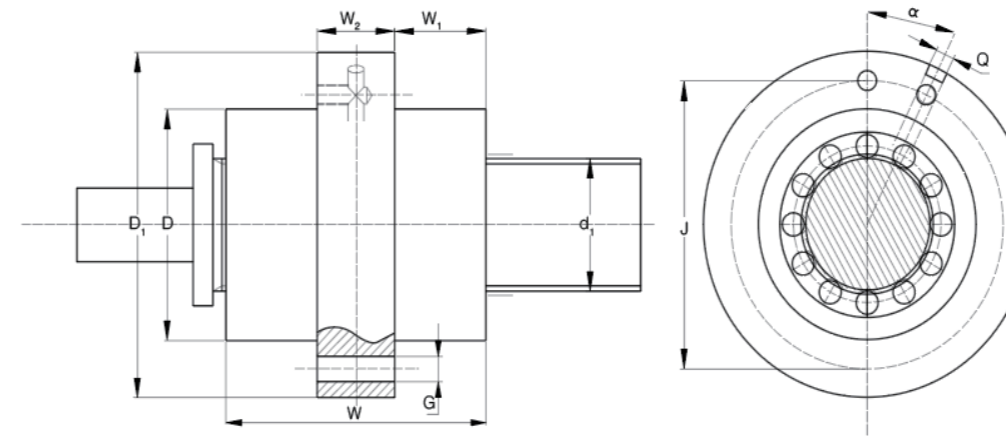


Name	N ^①	d ₁	D	W	W ₁	W ₂	D ₁	J	G	Q	α	Ca ^①	Coa ^①
	-	mm	mm	mm	mm	mm	mm	mm	mm	mm	°	kN	kN
LDRFS 18X05	5	18.3	40	58	20	18	62	51	6Xφ5.8	M6	30	35.3	65.9
LDRFS 20X05	5	19.8	44	64	23	18	64	53	6Xφ5.8	M6	30	46.4	97.5
LDRFS 20X10	5	20.2	44	64	23	18	64	53	6Xφ5.8	M6	30	50.1	87.6
LDRFS 25X05	5	24.3	53	78	29	20	84	70	6Xφ5.8	M6	30	72.8	133.7
LDRFS 25X10	5	24.7	53	78	29	20	84	70	6Xφ5.8	M6	30	84.2	129.2
LDRFS 30X05	5	30.3	64	85	29	27	97	81	6Xφ9	M6	30	88.4	168.1
LDRFS 30X10	5	30.7	64	85	29	27	97	81	6Xφ9	M6	30	106.3	174.4
LDRFS 30X20	5	31.4	64	85	29	27	97	81	6Xφ9	M6	30	123.3	177.3
LDRFS 39X05	5	39.3	82	100	33.5	33	124	102	6Xφ11	M6	30	129.2	268.9
LDRFS 39X10	5	39.7	82	100	33.5	33	124	102	6Xφ11	M6	30	152.6	270.9
LDRFS 39X15	5	40	82	100	33.5	33	124	102	6Xφ11	M6	30	167.6	272.9
LDRFS 39X20	5	40.4	82	100	33.5	33	124	102	6Xφ11	M6	30	172.8	260.9
LDRFS 42X10	5	42.7	87	118	41.5	35	130	109	6Xφ11	M6	30	185.3	341.2
LDRFS 48X05	5	48.3	105	127	45	37	150	127	6Xφ13.5	M8x1	30	195.6	482.3
LDRFS 48X10	5	48.7	105	127	45	37	150	127	6Xφ13.5	M8x1	30	231.5	475.1
LDRFS 48X20	5	49.4	105	127	45	37	150	127	6Xφ13.5	M8x1	30	265.7	462.3
LDRFS 60X10	5	60.7	122	152	53.5	45	180	150	6Xφ17.5	M8x1	30	338.6	779.7
LDRFS 60X20	5	61.4	122	152	53.5	45	180	150	6Xφ17.5	M8x1	30	395	785.7
LDRFS 60X25	5	61.8	122	152	53.5	45	180	150	6Xφ17.5	M8x1	30	405	817

①. Ca—Rated dynamic load; Coa—Rated static load; N—Number of threads.

6 Recirculating roller screw by-product series

Product series of recirculating roller screw sets (LDV) with central nut flange and no axial preload:



Name	N	d ₁	D	W	W ₁	W ₂	D ₁	J	G	Q	α	Ca	Coa
	-	mm	mm	mm	mm	mm	mm	mm	mm	mm	°	kN	kN
LDVFS 32X2	2	32	56	67	23.5	20	84	70	6X φ6.6	M6	30	64.3	159.2
LDVFS 40X2	2	40	68	84	28.5	27	102	85	6Xφ9	M6	30	49.9	117.2
LDVFS 50X2	2	50	82	101	34	33	124	102	6X φ11	M6	30	98.1	249.4

①. Ca—Rated dynamic load; Coa—Rated static load; N—Number of threads.