

PRECISION ROLLED BALL SCREWS

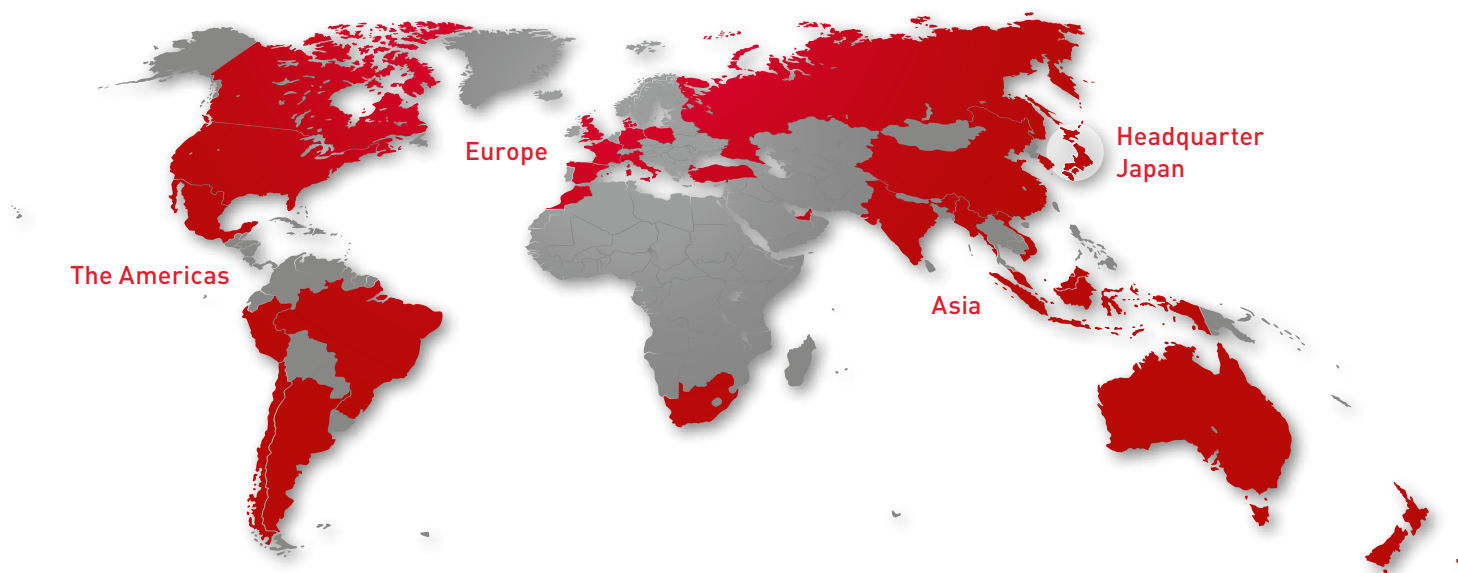
PR / LPR SERIES



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SETTING THE FUTURE IN MOTION

We are among the leading manufacturers for rolling bearings, linear technology components and steering systems worldwide. We can be found on almost every continent – with production facilities, sales offices and technology centres – because our customers appreciate short decision-making channels, prompt deliveries and local service.



The NSK company

NSK commenced operations as the first Japanese manufacturer of rolling bearings back in 1916. Ever since, we have been continuously expanding and improving not only our product portfolio but also our range of services for various industrial sectors. In this context our worldwide research and production facilities are linked together in a global network. Here we concentrate not only on the

development of new technologies, but also on the continuous optimisation of quality – at every process stage. Among other things, our research activities include product design, simulation applications using a variety of analytical systems and the development of different steels and lubricants for rolling bearings.

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OUR MOST IMPORTANT PRODUCT: OUR CUSTOMERS' SATISFACTION

One thing keeps us moving: we want to help you increase the reliability of your vehicles and equipment, not only with excellent products, but above all with excellent service. Our experienced engineers have a deep understanding of systems – together with you, they work to optimise products and processes and develop solutions for the future. The goal that we are dedicated to every day is ensuring that you remain competitive over the long run.

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PRECISION ROLLED BALL SCREWS

Compact ball nut heralding in the next generation standard.

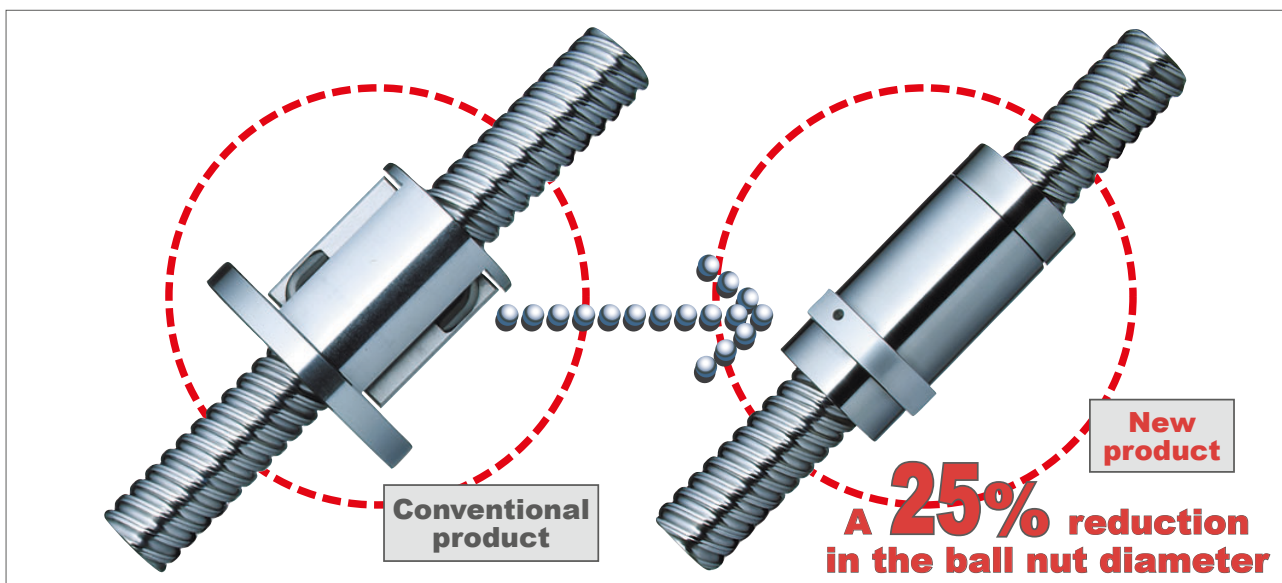
A 25% reduction in the ball nut diameter compared to the current series

No backlash, high speed and long stroke operation is possible.

Extended maintenance free operation achieved with NSK K1 lubrication unit and new grease retaining seal, thus contributing to total cost reduction.

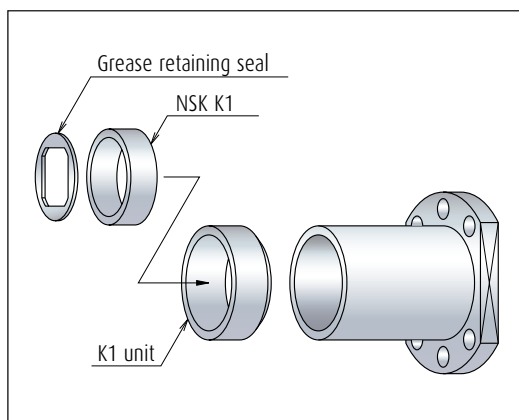
Compact ball nut

- Saves assembly space
- Suitable for rotating ball nut application because of its low inertia and balanced design



Remarkable improvement in sealing performance (introduction of grease retaining seal)

- Grease retention capabilities substantially enhanced
- Assists clean environment maintenance due to minimum grease scattering
- Superb sealing capabilities in contaminated environments



Maintenance free (equipped with NSK K1 lubrication unit as a standard feature)

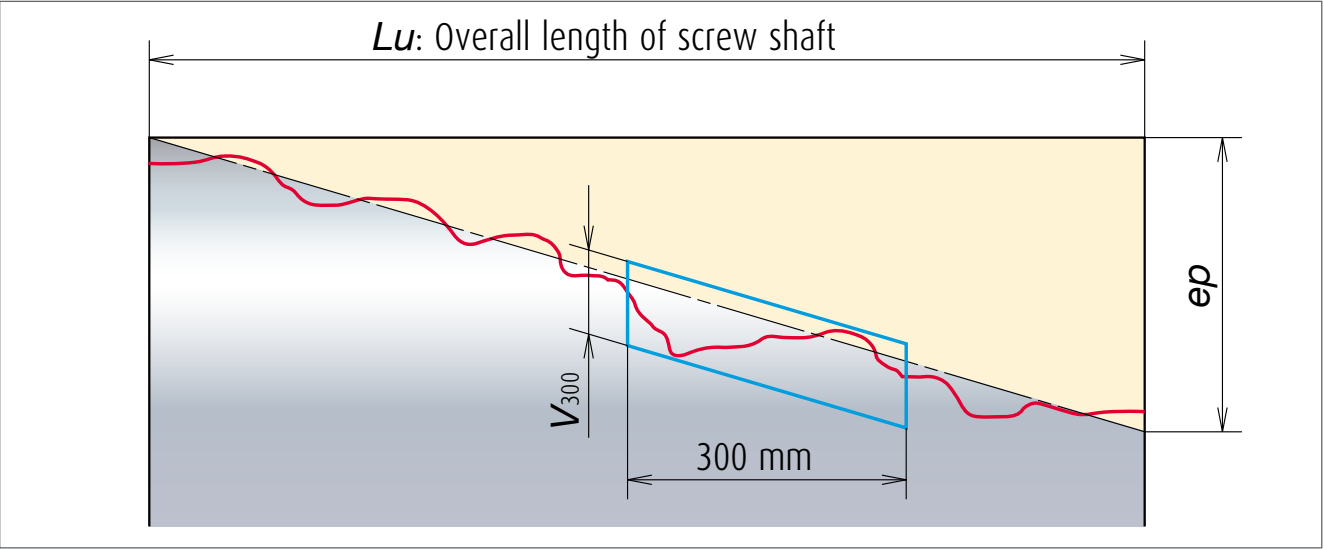
NSK K1 lubrication unit, that is molded from resin and is impregnated with lubrication oil, supplies fresh oil onto the ball rolling surfaces.

In unison with grease it retains the lubricating ability for an extended period of time. Since its first appearance on the market in 1996, it has been widely accepted in many industrial fields.

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Accuracy Grade

Accuracy grade of Ct7 is available.



Grade	Ct7
ep: Tolerance on specified travel	$ep = \pm \frac{2 \cdot L_u}{300} \cdot V_{300} \text{ (mm)}$ L_u : Overall length of screw shaft
Travel variation in a 300 mm range (anywhere in useful travel)	0.052 mm

Options

Support unit (sold separately)

NSK provides the support bearing units to accompany the ball screw shafts.

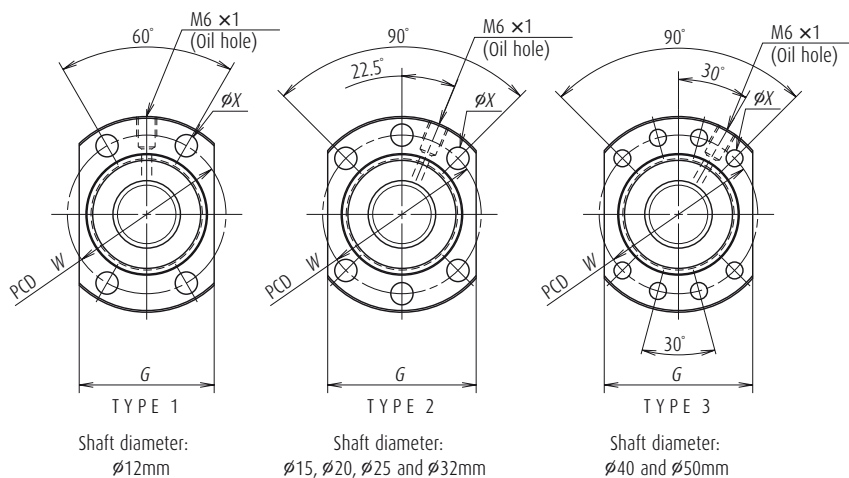
For further details, please contact NSK.

The bearing journal configurations of the screw shaft are provided on the following pages.

Applications

Woodworking machines, general transporting equipment, feeders, robots, etc.

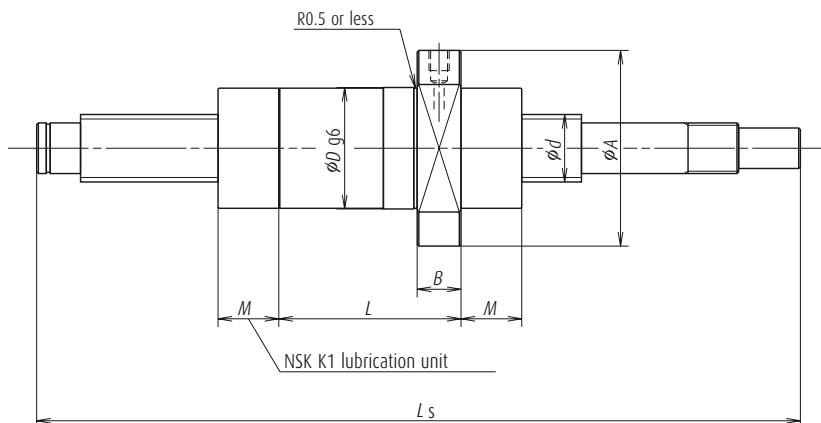
PRECISION ROLLED BALL SCREWS



Modell-No.	Shaft dia. d	Lead l	Effective turns of balls	Basic load rating (N)		Dimensions				
				Dynamic load rating C_a	Static load rating C_{0a}	D	A	G	B	L
PR1205	12	5	2.7x1	3200	5860	24	40	26	11	30
PR1505	15	5	2.7x1	5460	10200	28	48	40	11	30
PR1510	15	10	2.7x1	5460	10200	28	48	40	11	43
PR2005	20	5	2.7x1	8790	18500	36	58	44	13	31
PR2010	20	10	2.7x1	8790	18500	36	58	44	13	45
PR2505	25	5	4.7x1	15700	40900	40	62	48	12	42
PR2510	25	10	3.7x1	12800	32300	40	62	48	12	56
PR3210	32	10	3.7x1	19000	51500	50	80	62	12	59
PR3220	32	20	3.7x1	19000	51500	50	80	62	12	98
PR4010	40	10	3.7x1	33800	89900	63	93	70	14	60

Modell-No.	Shaft dia. d	Lead l	Effective turns of balls	Basic load rating (N)		Dimensions				
				Dynamic load rating C_a	Static load rating C_{0a}	D	A	G	B	L
LPR2020	20	20	1.7x2	9890	21600	36	58	44	13	54
LPR2525	25	25	1.7x2	11000	27500	40	62	48	12	63
LPR3232	32	32	1.7x2	16300	43900	50	80	62	14	79
LPR4040	40	40	1.7x2	29000	76200	63	93	70	16	94
LPR5050	50	50	1.7x2	32200	96200	75	110	85	18	115

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Unit: mm

Dimensions				Maximum screw shaft length	
				Ct7	
Type	W	X	M	Standard	On request
1	32	4.5	[18]	200 - 900	-1500
2	38	5.5	[18]	200 - 1200	-1500
2	38	5.5	[18]	200 - 1200	-1500
2	47	6.6	[18]	300 - 1600	-2000
2	47	6.6	[18]	300 - 1600	-2000
2	51	6.6	[21]	300 - 3200	-
2	51	6.6	[21]	300 - 3200	-
2	65	9	[21]	300 - 3200	-4000
2	65	9	[21]	300 - 3200	-4000
3	78	9	[21]	500 - 3200	-

Unit: mm

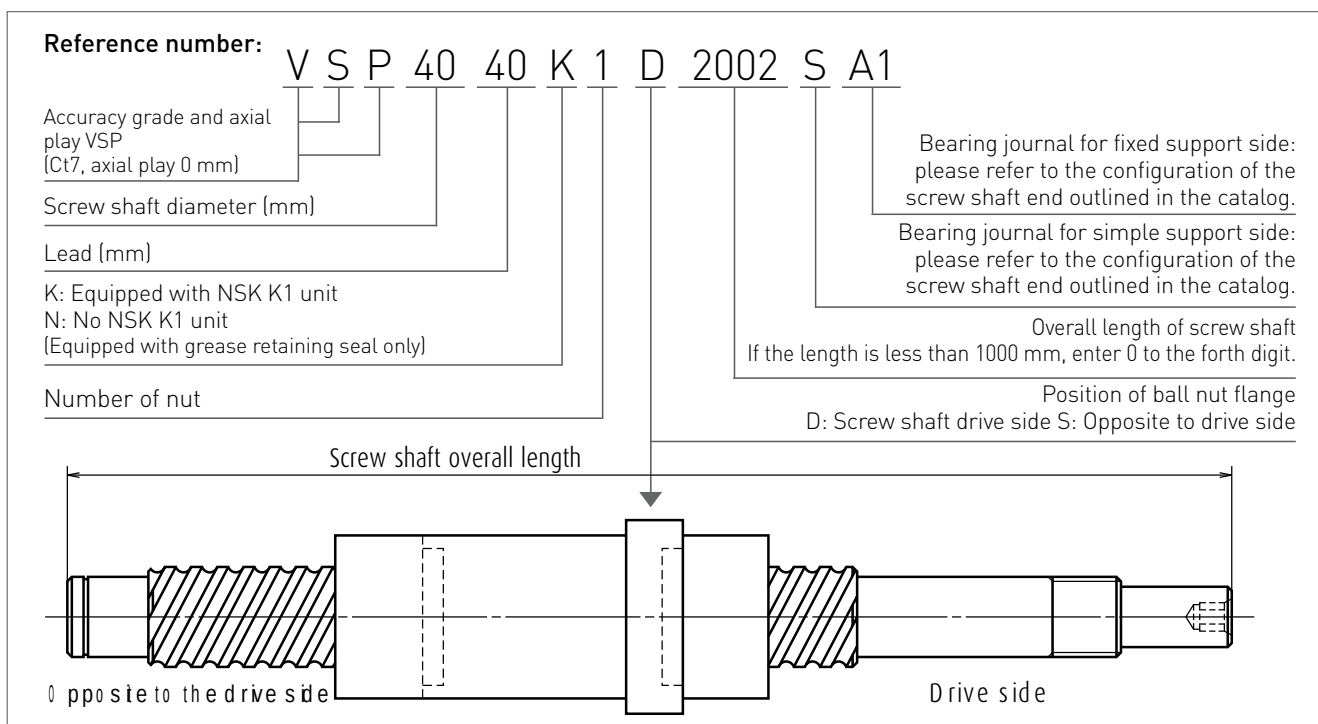
Dimensions				Maximum screw shaft length	
				Ct7	
Type	W	X	M	Standard	On request
2	47	6.6	[18]	300 - 1600	-2000
2	51	6.6	[21]	300 - 3200	-
2	65	9	[21]	300 - 3200	-4000
3	78	9	[21]	500 - 4500	-6500
3	93	11	[21]	500 - 4500	-6500

PRECISION ROLLED BALL SCREWS

1. Precision Rolled Ball Screws PR Series/LPR Series

1.1 Specification number

For ordering, please quote the specification number.



1.2 Permissible rotational speed of precision rolled ball screws

We strongly recommend reviewing the allowable speed of the screw shaft.

The allowable rotational speed of the ball screw shall be checked on the following:

- Permissible d·n value

d·n value, which is involved in damaging the ball re-circulation components

(where, d: shaft diameter measured in mm, n: rotational speed measured in min^{-1})

Preferably $d \cdot n \leq 150\,000$. Please consult with NSK if your ball screw exceeds the limitation.

- Critical speed

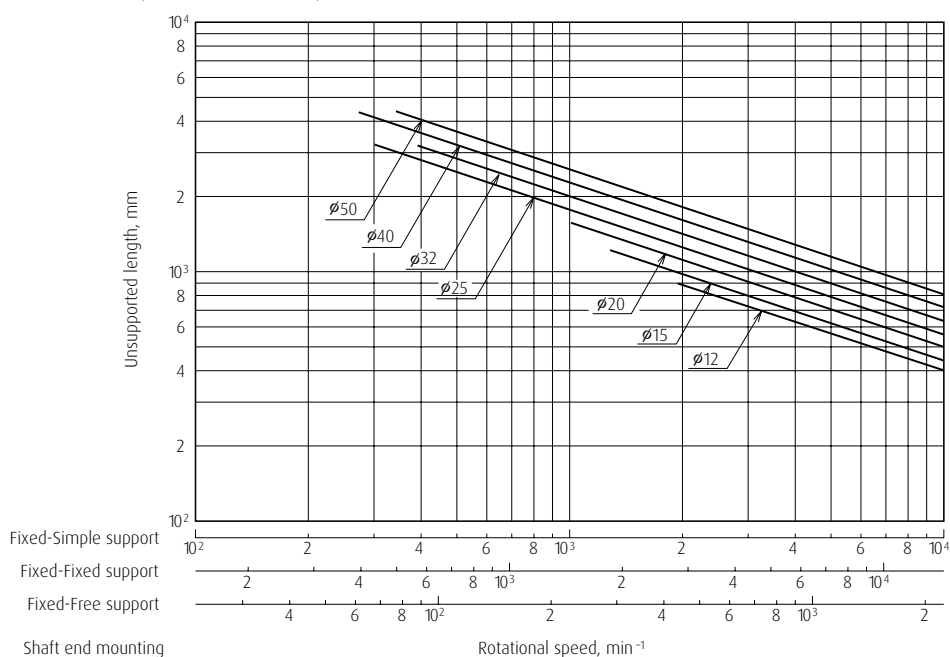
Critical speed of the screw shaft (caused by the resonance of the screw shaft)

See the chart below.

Please consult NSK if the maximum rotational speed exceeds $5\,000\text{ min}^{-1}$, even both the critical speed of the screw shaft rotation and the d·n value are in ranges of the allowable limit.

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Permissible rotational speed vs. critical speed.

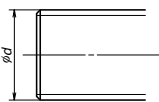


2. Recommendation of Screw Shaft End Configuration

2.1 Opposite to drive side shaft end: P

Unit: mm

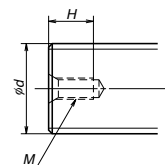
Screw shaft	
Diameter d	
12	
15	
20	
25	
32	
40	
50	



2.2 Opposite to drive side shaft end: R

Unit: mm

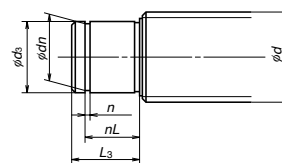
Screw shaft	Tap hole	
Diameter d	Size M	Depth H
12	M3x0.5	9
15	M4x0.7	10
20	M6x1	12
25	M6x1	12
32	M6x1	12
40	M8x1.25	16
50	M8x1.25	16



2.3 Opposite to drive side shaft end: S

Support unit	Screw shaft	Bearing journal		Snap ring groove		
Reference No.	Diameter d	Diameter d ₃ g6	Length L ₃	Width n Tolerance	Diameter dn Tolerance	Position nL
WBK08S-01	12	6	9	0.8 ^{+0.1} ₀	5.7 ⁰ _{-0.06}	6.8
WBK12S-01	15	10	12	1.15 ^{+0.14} ₀	9.6 ⁰ _{-0.09}	9.15
WBK15S-01	20	15	13	1.15 ^{+0.14} ₀	14.3 ⁰ _{-0.11}	10.15
WBK20S-01	25	20	19	1.35 ^{+0.14} ₀	19 ⁰ _{-0.21}	15.35
WBK25S-01	32	25	20	1.35 ^{+0.14} ₀	23.9 ⁰ _{-0.21}	16.35
{6206}	40	30	22	1.75 ^{+0.14} ₀	28.6 ⁰ _{-0.21}	17.75
{6207}	50	35	25	1.75 ^{+0.14} ₀	33 ⁰ _{-0.21}	18.75

Unit: mm



{ }: Reference number of bearing

PRECISION ROLLED BALL SCREWS

2.4 Opposite to drive side shaft end: T

Unit: mm

Support unit	Screw shaft	Bearing journal		Snap ring groove			Tap hole	
Reference No.	Diameter d	Diameter d_3 g6	Length L_3	Width n Tolerance	Diameter dn Tolerance	Position nL	Size M	Depth H
WBK08S-01	12	6	9	$0.8^{+0.1}_0$	$5.7^{+0.06}_0$	6.8	-	-
WBK12S-01	15	10	12	$1.15^{+0.14}_0$	$9.6^{+0.09}_0$	9.15	M3x0.5	9
WBK15S-01	20	15	13	$1.15^{+0.14}_0$	$14.3^{+0.11}_0$	10.15	M5x0.8	10
WBK20S-01	25	20	19	$1.35^{+0.14}_0$	$19^{+0.21}_0$	15.35	M6x1	12
WBK25S-01	32	25	20	$1.35^{+0.14}_0$	$23.9^{+0.21}_0$	16.35	M6x1	12
{6206}	40	30	22	$1.75^{+0.14}_0$	$28.6^{+0.21}_0$	17.75	M8x1.25	16
{6207}	50	35	25	$1.75^{+0.14}_0$	$33^{+0.21}_0$	18.75	M8x1.25	16

{ } : Reference number of bearing

2.5 Opposite to drive side shaft end: U

Unit: mm

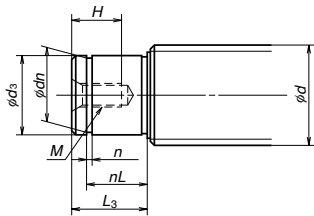
Support unit		Spacer	Screw shaft	Bearing journal	
Reference No.		Reference No.	Diameter d	Diameter d_3 g6	Length L_3
WBK08-01A	WBK08-11	WBK08K	12	8	32
WBK12-01A	WBK12-11	WBK12K	15	12	35
WBK15-01A	WBK15-11	WBK15K	20	15	50
WBK20-01	WBK20-11	WBK20K	25	20	64
WBK25-01	WBK25-11	WBK25K	32	25	76
WBK30DF-31		-	40	30	89
WBK35DF-31		-	50	35	92

2.6 Opposite to drive side shaft end: V

Unit: mm

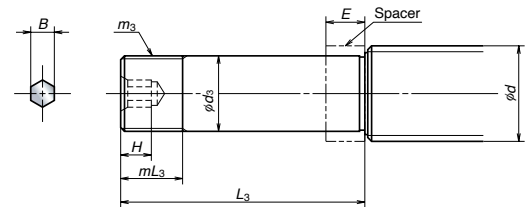
Support unit		Screw shaft	Bearing journal	
Reference No.		Diameter d	Diameter d_3 g6	Length L_3
WBK08-01A	WBK08-11	12	8	32
WBK12-01A	WBK12-11	15	12	35
WBK15-01A	WBK15-11	20	15	50
WBK20-01	WBK20-11	25	20	64
WBK25-01	WBK25-11	32	25	76
WBK30DF-31		40	30	89
WBK35DF-31		50	35	92

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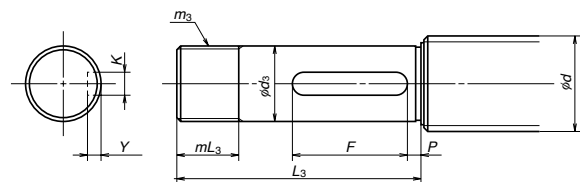
Unit: mm

Lock nut thread		Hexagon hole	
Nominal m_3	Length mL_3	Width across the flats $B^{+0.2}_0$	Depth H
M8x1	9	-	-
M12x1	10	4	6
M15x1	15	5	7
M20x1	16	6	8
M25x1.5	20	8	10
M30x1.5	26	10	12
M35x1.5	30	12	14



Unit: mm

Lock nut thread		Key seat			
Nominal m_3	Length mL_3	Width K N9	Position P	Depth $\gamma^{+0.1}_0$	Length F
M8x1	9	2	3	1.2	14
M12x1	10	4	3	2.5	20
M15x1	15	5	3	3	25
M20x1	16	6	4	3.5	30
M25x1.5	20	8	4	4	40
M30x1.5	26	8	5	4	40
M35x1.5	30	10	5	5	50



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2.7 Drive side shaft end: A1

Unit: mm

Support unit		Spacer	Screw shaft	Bearing journal		Lock nut thread	
Reference No.		Reference No.	Diameter d	Diameter d_1 g6	Length L_1	Nominal m_1	Length mL_1
WBK08-01A	WBK08-11	WBK08K	12	8	32	M8x1	9
WBK12-01A	WBK12-11	WBK12K	15	12	35	M12x1	10
WBK15-01A	WBK15-11	WBK15K	20	15	50	M15x1	15
WBK20-01	WBK20-11	WBK20K	25	20	64	M20x1	16
WBK25-01	WBK25-11	WBK25K	32	25	76	M25x1.5	20
WBK30DF-31		–	40	30	89	M30x1.5	26
WBK35DF-31		–	50	35	92	M35x1.5	30

2.8 Drive side shaft end: A3

Unit: mm

Support unit		Spacer	Screw shaft	Bearing journal		Lock nut thread		Drive section		D	
Reference No.		Reference No.	Diameter d	Diameter d_1 g6	Length L_1	Nominal m_1	Length mL_1	Diameter d_2 h7	Length L_2	Position P	Depth W
WBK08-01A	WBK08-11	WBK08K	12	8	32	M8x1	9	6	10	2	5.5
WBK12-01A	WBK12-11	WBK12K	15	12	35	M12x1	10	10	15	3	9
WBK15-01A	WBK15-11	WBK15K	20	15	50	M15x1	15	12	20	3	11
WBK20-01	WBK20-11	WBK20K	25	20	64	M20x1	16	15	27	4	14
WBK25-01	WBK25-11	WBK25K	32	25	76	M25x1.5	20	20	33	4	19
WBK30DF-31		–	40	30	89	M30x1.5	26	25	61	5	24
WBK35DF-31		–	50	35	92	M35x1.5	30	30	63	5	29

2.9 Drive side shaft end: A4

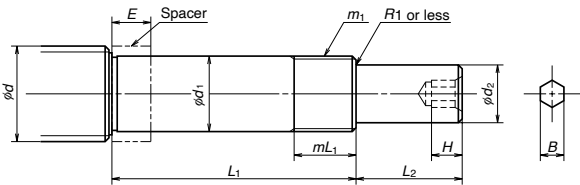
Unit: mm

Support unit		Spacer	Screw shaft	Bearing journal		Lock nut thread		Drive section		Key seat		
Reference No.		Reference No.	Diameter d	Diameter d_1 g6	Length L_1	Nominal m_1	Length mL_1	Diameter d_2 h7	Length L_2	Width K N9	Position P	Depth $Y^{+0.1}_0$
WBK08-01A	WBK08-11	WBK08K	12	8	32	M8x1	9	6	10	–	–	–
WBK12-01A	WBK12-11	WBK12K	15	12	35	M12x1	10	10	15	2	3	1.2
WBK15-01A	WBK15-11	WBK15K	20	15	50	M15x1	15	12	20	4	3	2.5
WBK20-01	WBK20-11	WBK20K	25	20	64	M20x1	16	15	27	5	4	3
WBK25-01	WBK25-11	WBK25K	32	25	76	M25x1.5	20	20	33	6	4	3.5
WBK30DF-31		–	40	30	89	M30x1.5	26	25	61	8	5	4
WBK35DF-31		–	50	35	92	M35x1.5	30	30	63	8	5	4

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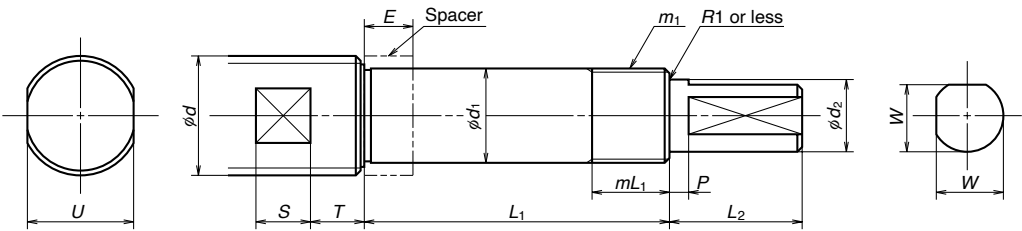
Unit: mm

Drive section		Hexagon hole	
Diameter d_2 h_7	Length L_2	Width across the flats $B^{+0.2}_0$	Depth H
6	10	-	-
10	15	4	6
12	20	5	7
15	27	6	8
20	33	8	10
25	61	10	12
30	63	12	14



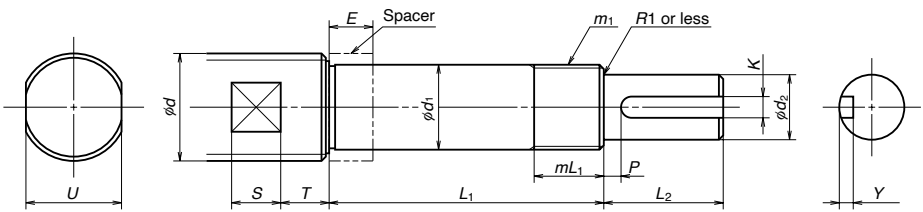
Unit: mm

Wrench flats		
Width across the flats U Tolerance	Position T	Length S
$10^{+0}_{-0.2}$	4	5.5
$12^{+0}_{-0.25}$	6	6.5
$17^{+0}_{-0.25}$	6	8.5
$22^{+0}_{-0.3}$	10	11
$27^{+0}_{-0.3}$	10	15
$36^{+0}_{-0.3}$	16	16
$41^{+0}_{-0.3}$	16	18



Unit: mm

Wrench flats		
Width across the flats U Tolerance	Position T	Length S
$10^{+0}_{-0.2}$	4	5.5
$12^{+0}_{-0.25}$	6	6.5
$17^{+0}_{-0.25}$	6	8.5
$22^{+0}_{-0.3}$	10	11
$27^{+0}_{-0.3}$	10	15
$36^{+0}_{-0.3}$	16	16
$41^{+0}_{-0.3}$	16	18



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2.10 Drive side shaft end: A5

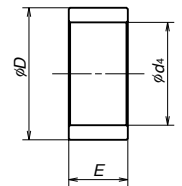
Unit: mm

Support unit		Spacer	Screw shaft	Bearing journal		Lock nut thread		Drive section	
Reference No.		Reference No.	Diameter d	Diameter d_1 g6	Length L_1	Nominal m_1	Length mL_1	Diameter d_2 h7	Length L_2
WBK08-01A	WBK08-11	WBK08K	12	8	32	M8x1	9	6	10
WBK12-01A	WBK12-11	WBK12K	15	12	35	M12x1	10	10	15
WBK15-01A	WBK15-11	WBK15K	20	15	50	M15x1	15	12	20
WBK20-01	WBK20-11	WBK20K	25	20	64	M20x1	16	15	27
WBK25-01	WBK25-11	WBK25K	32	25	76	M25x1.5	20	20	33
WBK30DF-31		–	40	30	89	M30x1.5	26	25	61
WBK35DF-31		–	50	35	92	M35x1.5	30	30	63

2.11 Spacer

Unit: mm

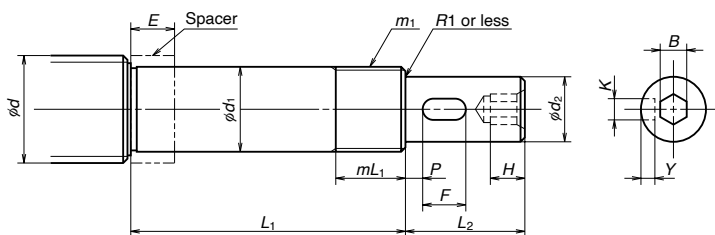
Reference No.	Bearing journal	Spacer dimensions		
	Diameter d	Bore d_4	Diameter D	Width E
WBK08K	8	8	11.5	5.5
WBK12K	12	12	14.5	5.5
WBK15K	15	15	19.5	10
WBK20K	20	20	25.5	11
WBK25K	25	25	32	14



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Unit: mm

Key seat				Wrench flats	
Width K N9	Position P	Depth $Y^{+0.1}_0$	Length F	Width across the flats $B^{+0.2}_0$	Depth H
-	-	-	-	-	-
-	-	-	-	4	6
4	3	2.5	7	5	7
5	4	3	10	6	8
6	4	3.5	15	8	10
8	5	4	40	10	12
8	5	4	40	12	14



RECOMMENDED SCREW SHAFT END CONFIGURATION

Screw shaft end configuration service

It is possible to have customised modifications of our ball screws implemented quickly and reliably by our service.

The following services can be provided as an alternative:

- Modification of ball screws based on a desired configuration
- End machining
- Change in preload
- Fitting of wipers and lubrication systems
- Fit holes
- Tap holes
- Coatings
- Special packing
- Production even in the smallest lot sizes of 1–50 units
- Individual and special production

Please request these optional services from NSK separately.



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