

Ball Splines

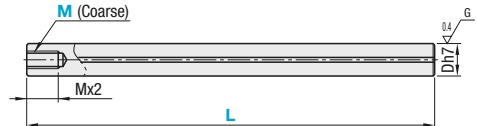
One End Tapped

One End Tapped



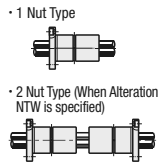
RoHS

One End Tapped	Spline Shafts Nut 1 pc.	Spline Shaft, Nut Nut 1 pc.
With Round Flange Nut	BSFM	BSFMS
With Compact Flange Nut	BSFN	-
With Straight Nut	BSFS	-



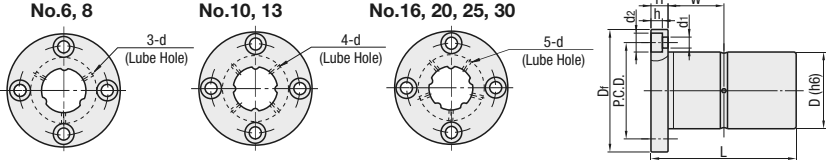
$\sqrt[3]{0.4}$ G

Flanged Nut Orientation

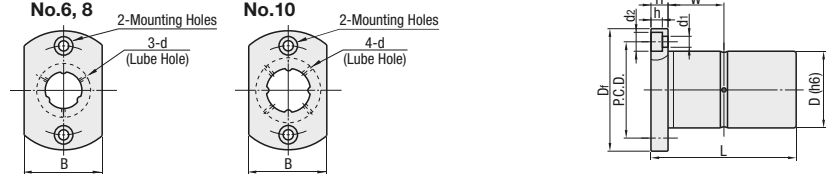


When selecting Overall Length (L Dimension), check the Annealing Range. P.340
Accuracy P.339 For the included nut, please select a shape from below.

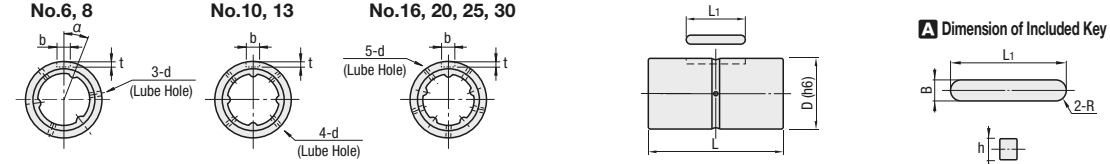
Round Flange Nuts



Compact Flange Nuts



Straight Nuts



* Please refrain from machining the nuts as it may have adverse effects on the accuracy.

Spline Shafts

Part Number Type	No.	L 1mm Increment		M (Coarse) Selection							D	Mass (kg/m)
		1-Nut Type										
BSFM BSFN BSFS BSFMS	*6	60-400(190)		3							6	0.23
	*8	60-400(190)		3	4						8	0.39
	*10	60-600(390)		3	4	5					10.4	0.65
	*13	60-600(390)		4	5	6					13.4	1.11
	*16	70-600(390)		4	5	6	8				16.6	1.65
	20	80-700		5	6	8	10				20.6	2.57
	25	90-900		5	6	8	10	12			25.8	4.04
	30	100-1150		6	8	10	12	16			30.8	5.85

For BSFMS, only * marked sizes are available, and the Max. L dimension is in ().

For BSFN, only No. 6, 8 and 10 are available.

Round Flange Nuts, Compact Flange Nuts

No.	D(h6)	L	Df	H	P.C.D.	d1	d2	h	W	d	B	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)
												Dynamic C _i (N·m)	Static Co (N·m)	Dynamic C _i (kN)	Static Co (kN)	M ₀₁ (N·m)	M ₀₂ (N·m)	
6	14	25	30	6	22	3.5	6	3.1	6.5		18	3.8	7	1.2	2.1	5	36	0.03
8	16		32		24						21	4.8	8.7	1.2	2.1	5	36	0.04
10	21	40(33)	42(41)	6(8)	32(30)			4.4(5.3)	14(8.5)	1.5	25	19(11)	34(21)	3.8(2.4)	6.9(4.3)	26(15)	181(102)	0.09
13	24	44(36)	44(45)	7(8)	33(34)	4.5	8		15(10)			28(20)	52(37)	4.6(3.3)	8.3(5.9)	36(22)	251(148)	0.11
16	31	50	51	7	40			4.4	18			51	93	6.2	11.1	56	386	0.2
20	35	63	58	9	45	5.5	9.5		22.5	2		85	154	8.5	15.3	83	611	0.3
25	42	71	65	9	52				26.5			193	348	15.4	27.7	173	1248	0.4
30	47	80	75	10	60	6.6	11	6.5	30	2.5		272	490	18.5	33.3	212	1581	0.57

Dimensions in () are for EN 1.4125 Equiv. Allowable static moment M₀₁ is a value measured when a single nut is used, and M₀₂ is a value measured when two nuts are used.

Straight Nuts

No.	D(h6)	L	b	Tolerance	t	+0.05/0	d	α	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)	Dimensions of Key (Included)					
									Dynamic C _i (N·m)	Static Co (N·m)	Dynamic C _i (kN)	Static Co (kN)	M ₀₁ (N·m)	M ₀₂ (N·m)		M ₀₁ (kN)	M ₀₂ (kN)	B	Tolerance	h	Tolerance
6	14							15°	3.8	7	1.2	2.1	5	36	0.012	2.5	+0.016	2.5	0	10.5	1.25
8	16	25	2.5	+0.014	1.2			25°	4.8	8.7	1.2	2.1	5	36	0.013				10.5		
10	21	40(33)	3	0	1.5	1.5			19(11)	34(21)	3.8(2.4)	6.9(4.3)	26(15)	181(102)	0.06		+0.006	3	-0.025	17(14)	1.5
13	24	44(36)							28(20)	52(37)	4.6(3.3)	8.3(5.9)	36(22)	251(148)	0.07				17(14)		
16	31	50	3.5		2				51	93	6.2	11.1	56	386	0.15	3.5			18	1.75	
20	35	63		+0.018					85	154	8.5	15.3	83	611	0.2				29		
25	42	71	4	0	2.5	2			193	348	15.4	27.7	173	1248	0.29		+0.024	4	0	33	2
30	47	80			2.5				272	490	18.5	33.3	212	1581	0.37		+0.012	4	-0.030	42	

Dimensions in () are for EN 1.4125 Equiv. Allowable static moment M₀₁ is a value measured when a single nut is used, and M₀₂ is a value measured when two nuts are used.

Part Number	Type	No.	Unit Price																		
			Min. L ~150	L151 ~200	L201 ~300	L301 ~400	L401 ~500	L501 ~600	L601 ~700	L701 ~800	L801 ~900	L901 ~1000	L1001 ~1150								
BSFM		6																			
		8																			
		10																			
		13																			
		16																			
		20																			
BSFN		6																			
		8																			
		10																			
		13																			
		16																			
		20																			
BSFS		6																			
		8																			
		10																			
		13																			
		16																			
		20																			

Part Number	Type	No.	Unit Price					
			Min. L ~150	L151 ~200	L201 ~250	L251 ~300	L301 ~350	L351 ~390
BSFMS		6						
		8						
		10						
		13						
		16						
		20						

No.	Additional Price for 2-Nut Type		
	Round Flange Nuts	Compact Flange Nuts	Straight Nuts
6			
8			
10			
13			
16			
20			
25			
30			



Alterations

Part Number - L - M - (SC, FC, NTW)
BSFS10 - 350 - M5 - SC15



Ordering Example

Part Number - L - M
BSFS10 - 350 - M5

BSFS10G - 350 - M5

BSFS10L - 350 - M5

Alternative grease types available.

For Days to Ship, Price and Performance, see P.340

Alterations	Wrench Flats	Set Screw Flat	Additional Spline Nuts
	SC	FC	NTW

Spec.	SC	FC	NTW
	Adds a wrench flat. SC=1mm Increment SC+L1≤L	Adds a set screw flat. Ordering Code:FC10-A8 FC, A=1mm Increment FC≤3xD 1.5xD<FC >> FC/L2 A=0 or A≥2	Adds a nut. (from one nut to two nuts) Applicable to BSFS, BSFM and BSFN only.

When selecting multiple alteration additions, more than 2mm is needed between each feature to be added.

Cautions for Ball Spline Assembly

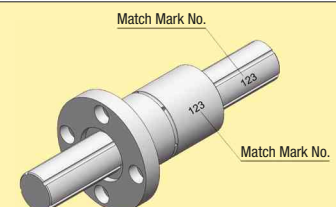
Check Assembly Position

Match Mark No.'s are entered on nuts and spline shafts (see diagram on right).

When re-assembling, match the character orientations of Match Mark No.'s, and positional relationship.

Tolerance for Mating Bores

An H7 tolerance is recommended for mating bores for the spline nuts.



Ball Splines

Both Ends Stepped

Both Ends Stepped

Both Ends Stepped	Spline Shaft Material: EN 1.4305 Equiv. Nut Material: EN 1.4125 Equiv. Hardness: 58HRC -	Spline Shaft, Nut Material: EN 1.4125 Equiv. Hardness: 55HRC -
	Nut 1 pc.	Nut 1 pc.
With Round Flange Nut	BSJM	BSJMS
With Compact Flange Nut	BSJN	-
With Straight Nut	BSJS	-

Flanged Nut Orientation

- 1 Nut Type
- 2 Nut Type (When Alteration NTW is specified)

Round Flange Nuts
No. 6, 8; No. 10, 13; No. 16, 20, 25, 30

Compact Flange Nuts
No. 6, 8; No. 10

Straight Nuts
No. 6, 8; No. 10, 13; No. 16, 20, 25, 30

Dimension of Included Key

RoHS

When selecting Overall Length (L Dimension), check the Annealing Range. **P.340**
Accuracy **P.339** For the included nut, please select a shape from below.

* Please refrain from machining the nuts as it may have adverse effects on the accuracy.

Spline Shafts

Part Number	No.	1mm Increment		P, Q Selection	D	(Y)		Mass (kg/m)
		L	F, E			1-Nut Type min-max	Mass	
BSJM BSJN BSJS BSJMS	*6	60-400(190)	When P, Q=3 2<F, E<9 When P, Q=4 2<F, E<16 When P, Q≥5 2<F, E<P, Qx5	3	6	56-396(186)	0.23	
	*8	60-400(190)		4	8	56-396(186)	0.39	
	*10	60-600(390)		4 5 6 8	10.4	56-596(386)	0.65	
	*13	60-600(390)		4 5 6 8 10	13.4	56-596(386)	1.11	
	*16	70-600(390)		5 6 8 10 12 13	16.6	66-596(386)	1.65	
	20	80-700		8 10 12 13 15 16	20.6	76-696	2.57	
	25	90-900		8 10 12 13 15 16 20	25.8	86-896	4.04	
	30	100-1150		10 12 13 15 16 20 25	30.8	96-1146	5.85	

For BSJMS, only * marked sizes are available, and the Max. L and Y dimensions are in ().
For BSJN, only No. 6, 8 and 10 are available.

Round Flange Nuts, Compact Flange Nuts

No.	D (h6)	L	Df	H	P.C.D.	d1	d2	h	W	d	B	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)
												Dynamic C _i (N·m)	Static C _o (N·m)	Dynamic C _i (kN)	Static C _o (kN)	M ₀₁ (N·m)	M ₀₂ (N·m)	
6	14	25	30	6	22	3.5	6	3.1	6.5	18	18	3.8	7	1.2	2.1	5	36	0.03
8	16	32	32	6	24	3.5	6	3.1	6.5	21	21	4.8	8.7	1.2	2.1	5	36	0.04
10	21	40(33)	42(41)	6(8)	32(30)	4.5	8	4.4(5.3)	14(8.5)	1.5	25	19(11)	34(21)	3.8(2.4)	6.9(4.3)	26(15)	181(102)	0.09
13	24	44(36)	44(45)	7(8)	33(34)	4.5	8	4.4	18	1.5	25	28(20)	52(37)	4.6(3.3)	8.3(5.9)	36(22)	251(148)	0.11
16	31	50	51	7	40	4.5	8	4.4	18	1.5	25	51	93	6.2	11.1	56	386	0.2
20	35	63	58	9	45	5.5	9.5	5.4	22.5	2	-	85	154	8.5	15.3	83	611	0.3
25	42	71	65	9	52	5.5	9.5	5.4	26.5	2	-	193	348	15.4	27.7	173	1248	0.4
30	47	80	75	10	60	6.6	11	6.5	30	2.5	-	272	490	18.5	33.3	212	1581	0.57

Dimensions in () are for EN 1.4125 Equiv. Allowable static moment M₀₁ is a value measured when a single nut is used, and M₀₂ is a value measured when two nuts are used.

Straight Nuts

No.	D (h6)	L	b	Tolerance	t	+0.05/0	d	α	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)	Dimensions of Key (Included)				
									Dynamic C _i (N·m)	Static C _o (N·m)	Dynamic C _i (kN)	Static C _o (kN)	M ₀₁ (N·m)	M ₀₂ (N·m)		M ₀₁ (kN)	M ₀₂ (kN)	B	Tolerance	h
6	14	25	2.5	+0.014	1.2	1.5	15°	3.8	7	1.2	2.1	5	36	0.012	2.5	+0.016	2.5	0	10.5	1.25
8	16	32	2.5	+0.014	1.2	1.5	25°	4.8	8.7	1.2	2.1	5	36	0.013	2.5	+0.016	2.5	0	10.5	1.25
10	21	40(33)	3	0	1.5	1.5	-	19(11)	34(21)	3.8(2.4)	6.9(4.3)	26(15)	181(102)	0.06	3	+0.006	3	-0.025	17(14)	1.5
13	24	44(36)	3	0	1.5	1.5	-	28(20)	52(37)	4.6(3.3)	8.3(5.9)	36(22)	251(148)	0.07	3	+0.006	3	-0.025	17(14)	1.5
16	31	50	3.5	0	2	2	-	51	93	6.2	11.1	56	386	0.15	3.5	+0.024	3.5	0	18	1.75
20	35	63	4	0	2	2	-	85	154	8.5	15.3	83	611	0.2	4	+0.024	4	0	29	2
25	42	71	4	0	2.5	2.5	-	193	348	15.4	27.7	173	1248	0.29	4	+0.012	4	-0.030	33	2
30	47	80	4	0	2.5	2.5	-	272	490	18.5	33.3	212	1581	0.37	4	+0.012	4	-0.030	42	2

Dimensions in () are for EN 1.4125 Equiv. Allowable static moment M₀₁ is a value measured when a single nut is used, and M₀₂ is a value measured when two nuts are used.

Part Number	Type	No.	Unit Price																		
			Min.L ~150	L151 ~200	L201 ~300	L301 ~400	L401 ~500	L501 ~600	L601 ~700	L701 ~800	L801 ~900	L901 ~1000	L1001 ~1150								
BSJM		6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BSJN		6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BSJS		6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Part Number	Type	No.	Unit Price						No.	Additional Price for 2-Nut Type		
			Min.L ~150	L151 ~200	L201 ~250	L251 ~300	L301 ~350	L351 ~390		Round Flange Nuts	Compact Flange Nuts	Straight Nuts
BSJMS		6	-	-	-	-	-	-	6	-	-	-
		8	-	-	-	-	-	-	8	-	-	-
		10	-	-	-	-	-	-	10	-	-	-
		13	-	-	-	-	-	-	13	-	-	-
		16	-	-	-	-	-	-	16	-	-	-
		20	-	-	-	-	-	-	20	-	-	-
	25	-	-	-	-	-	-	25	-	-	-	
	30	-	-	-	-	-	-	30	-	-	-	

Alterations

Alterations	Wrench Flats	Set Screw Flat	Keyway on Shaft End	Retaining Ring Groove	Additional Spline Nuts
Spec.	SC=1mm Increment SC+L1≤Y	FC, A=1mm Increment FC≤3xD 1.5xD<FC FC≤Y/2 A=0 or A≥2	PKC, QKC PKC10(QKC10)	TA, TB TA10-TB10 TA, TB=1mm Increment	NTW (from one nut to two nuts) Applicable to BSJS, BSJM and BSJN only.

When selecting multiple alteration additions, more than 2mm is needed between each feature to be added.

Ordering Example

Part Number - L - F - E - P - Q

- BSJS8 - 300 - F30 - E20 - P6 - Q5
- BSJS8G - 300 - F30 - E20 - P6 - Q5
- BSJS8L - 300 - F30 - E20 - P6 - Q5

Alternative grease types available.
For Days to Ship, Price and Performance, see **P.340**

Cautions for Ball Spline Assembly

- Check Assembly Position**
Match Mark No.'s are entered on nuts and spline shafts (see diagram on right).
When re-assembling, match the character orientations of Match Mark No.'s, and positional relationship.
- Tolerance for Mating Bores**
An H7 tolerance is recommended for mating bores for the spline nuts.

Ball Splines

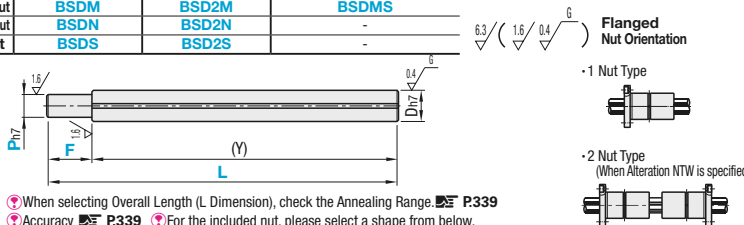
One End Stepped

One End Stepped



RoHS

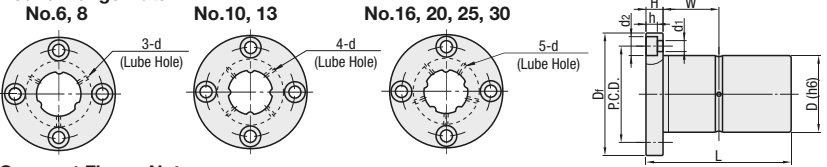
One End Stepped	Spline Shafts \square EN 1.3505 Equiv. Nut \square EN 1.7242 Equiv. \square Hardness: 58HRC ~		Spline Shaft, Nut \square Material: EN 1.4125 Equiv. \square Hardness: 55HRC ~
	Nut 1 pc.	Nut 2 pcs.	Nut 1 pc.
With Round Flange Nut	BSDM	BSD2M	BSDMS
With Compact Flange Nut	BSDN	BSD2N	-
With Straight Nut	BSDS	BSD2S	-



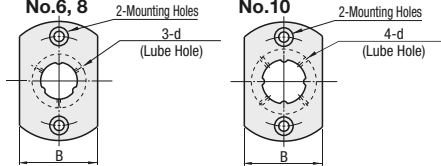
When selecting Overall Length (L Dimension), check the Annealing Range. \square P.339

Accuracy \square P.339 For the included nut, please select a shape from below.

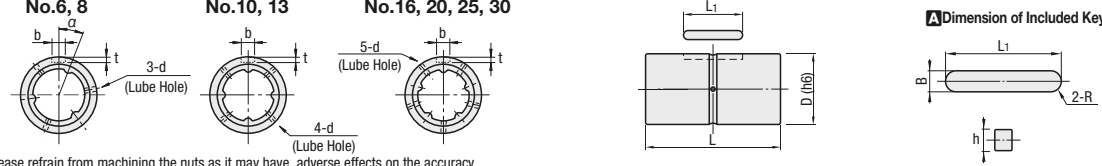
Round Flange Nuts



Compact Flange Nuts



Straight Nuts



* Please refrain from machining the nuts as it may have adverse effects on the accuracy.

Spline Shafts

Part Number	Type	No.	1mm Increment		F	P Selection		D	(Y)		Mass (kg/m)
			1-Nut Type	2-Nut Type		1-Nut Type min-max	2-Nut Type min-max				
BSDM BSDN BSDS BSD2M BSD2N BSD2S BSDMS	*	*6	60-400(190)	60-400	When P=3 2<F<9 When P=4 2<F<16 When P=5 2<F<P<5	3 4 5	6 8 10 12 13	6	58-398(188)	58-398	0.23
		*8	60-400(190)	60-400		4 5 6	8 10 12 13 15 16	8	58-398(188)	58-398	0.39
		*10	60-600(390)	90-600		4 5 6 8	8 10 12 13 15 16	10.4	58-598(388)	88-598	0.65
		*13	60-600(390)	100-600		5 6 8 10	8 10 12 13 15 16	13.4	58-598(388)	98-598	1.11
		*16	70-600(390)	110-600		5 6 8 10 12 13	8 10 12 13 15 16	16.6	68-598(388)	108-598	1.65
		20	80-700	130-700		8 10 12 13 15 16	8 10 12 13 15 16	20.6	78-898	128-898	2.57
		25	90-900	150-900		8 10 12 13 15 16 20	8 10 12 13 15 16 20	25.8	88-898	148-898	4.04
		30	100-1150	170-1150		10 12 13 15 16 20 25	10 12 13 15 16 20 25	30.8	98-1148	168-1148	5.85

For BSDMS, only * marked sizes are available, and the Max. L and Y dimensions are in ().

For BSDN and BSD2N, only No. 6, 8 and 10 are available.

Round Flange Nuts, Compact Flange Nuts

No.	D (h6)	L	Df	H	P.C.D.	d1	d2	h	W	d	B	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)
												Dynamic C _i (N·m)	Static C _o (N·m)	Dynamic C _i (kN)	Static C _o (kN)	M ₀₁ (N·m)	M ₀₂ (N·m)	
6	14	25	30	6	22	3.5	6	3.1	6.5	1.5	18	3.8	7	1.2	2.1	5	36	0.03
8	16	32	32	6	24	4.5	8	4.4(5.3)	14(8.5)	1.5	21	4.8	8.7	1.2	2.1	5	36	0.04
10	21	40(33)	42(41)	6(8)	32(30)	4.5	8	4.4	18	2	25	19(11)	34(21)	3.8(2.4)	6.9(4.3)	26(15)	181(102)	0.09
13	24	44(36)	44(45)	7(8)	33(34)	4.5	8	4.4	18	2	25	28(20)	52(37)	4.6(3.3)	8.3(5.9)	36(22)	251(148)	0.11
16	31	50	51	7	40	4.5 </td <td>8</td> <td>4.4</td> <td>18</td> <td>2</td> <td>25</td> <td>51</td> <td>93</td> <td>6.2</td> <td>11.1</td> <td>56</td> <td>386</td> <td>0.2</td>	8	4.4	18	2	25	51	93	6.2	11.1	56	386	0.2
20	35	63	58	9	45	5.5	9.5	5.4	22.5	2	25	85	154	8.5	15.3	83	611	0.3
25	42	71	65	9	52	5.5	9.5	5.4	26.5	2	25	193	348	15.4	27.7	173	1248	0.4
30	47	80	75	10	60	6.6	11	6.5	30	2.5	25	272	490	18.5	33.3	212	1581	0.57

Dimensions in () are for EN 1.4125 Equiv. Allowable static moment M₀₁ is a value measured when a single nut is used, and M₀₂ is a value measured when two nuts are used.

Straight Nuts

No.	D (h6)	L	b	Tolerance	t	+0.05/0	d	α	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)	Dimensions of Key (Included)					
									Dynamic C _i (N·m)	Static C _o (N·m)	Dynamic C _i (kN)	Static C _o (kN)	M ₀₁ (N·m)	M ₀₂ (N·m)		B	Tolerance	h	Tolerance	L ₁	R
6	14	25	2.5	+0.014	1.2	1.5	15°	3.8	7	1.2	2.1	5	36	0.012	2.5	+0.016	2.5	0	-0.025	10.5	1.25
8	16	32	3	0	1.5	1.5	25°	4.8	8.7	1.2	2.1	5	36	0.013	3	+0.006	3	0	-0.025	10.5	1.25
10	21	40(33)	3	0	1.5	1.5	-	19(11)	34(21)	3.8(2.4)	6.9(4.3)	26(15)	181(102)	0.06	3	+0.006	3	0	-0.025	17(14)	1.5
13	24	44(36)	3	0	1.5	1.5	-	28(20)	52(37)	4.6(3.3)	8.3(5.9)	36(22)	251(148)	0.07	3	+0.006	3	0	-0.025	17(14)	1.5
16	31	50	3.5	0	2	2	-	51	93	6.2	11.1	56	386	0.15	3.5	+0.024	3.5	0	-0.030	18	1.75
20	35	63	4	0	2	2	-	85	154	8.5	15.3	83	611	0.2	4	+0.012	4	0	-0.030	29	2
25	42	71	4	0	2	2	-	193	348	15.4	27.7	173	1248	0.29	4	+0.012	4	0	-0.030	33	2
30	47	80	4	0	2	2	-	272	490	18.5	33.3	212	1581	0.37	4	+0.012	4	0	-0.030	42	2

Dimensions in () are for EN 1.4125 Equiv. Allowable static moment M₀₁ is a value measured when a single nut is used, and M₀₂ is a value measured when two nuts are used.

Part Number	Type	No.	Unit Price									
			Min. L ~150	L151 ~200	L201 ~300	L301 ~400	L401 ~500	L501 ~600	L601 ~700	L701 ~800	L801 ~900	L901 ~1000
BSDM BSD2M	Price of BSD2M = BSDM + Additional price shown below	6	-	-	-	-	-	-	-	-	-	-
		8	-	-	-	-	-	-	-	-	-	
		10	-	-	-	-	-	-	-	-	-	
		13	-	-	-	-	-	-	-	-	-	
		16	-	-	-	-	-	-	-	-	-	
		20	-	-	-	-	-	-	-	-	-	
BSDN BSD2N	Price of BSD2N = BSDN + Additional price shown below	6	-	-	-	-	-	-	-	-	-	
		8	-	-	-	-	-	-	-	-		
		10	-	-	-	-	-	-	-	-		
		13	-	-	-	-	-	-	-	-		
		16	-	-	-	-	-	-	-	-		
		20	-	-	-	-	-	-	-	-		
BSDS BSD2S	Price of BSD2S = BSDS + Additional price shown below	6	-	-	-	-	-	-	-	-	-	
		8	-	-	-	-	-	-	-	-		
		10	-	-	-	-	-	-	-	-		
		13	-	-	-	-	-	-	-	-		
		16	-	-	-	-	-	-	-	-		
		20	-	-	-	-	-	-	-	-		

Part Number	Type	No.	Unit Price					Additional Price for 2-Nut Type			
			Min. L ~150	L151 ~200	L201 ~250	L251 ~300	L301 ~350	L351 ~390	No.	Round Flange Nuts	Compact Flange Nuts
BSDMS		6	-	-	-	-	-	6	-	-	-
		8	-	-	-	-	-	8	-	-	-
		10	-	-	-	-	-	10	-	-	-
		13	-	-	-	-	-	13	-	-	-
		16	-	-	-	-	-	16	-	-	-
		20	-	-	-	-	-	20	-	-	-

Alterations Part Number - L - F - P (SC, FC...etc)
 BSDN10 - 300 - F20 - P8 - SC15

Alterations	Wrench Flats	Set Screw Flat	Keyway on Shaft End	Retaining Ring Groove	Tapping
	SC	FC	PKC	TA	MC
Code	SC	FC	PKC	TA	MC
Spec.	Adds a wrench flat. SC=1mm Increment SC+ ℓ 1 \leq Y	Adds a set screw flat. Ordering Code FC10-A8 FC, A=1mm Increment FC \leq 3xD 1.5xD<FC FC \leq Y/2 A=0 or A \geq 2	Adds a keyway on the shaft end P. Ordering Code PKC10 PKC \leq 1mm Increment PKC \leq Px3 PKC \leq F-1 Keyway Details P.340	Adds retaining ring grooves. Ordering Code TA10 TA=1mm Increment P \geq 6 4<TA<F/2 For Retaining Ring Groove Details P.340	Machines tapped hole on the right end face. No. M 6 3 8 3, 4 10 3, 4, 5 13 5, 6 16 6, 8 20 6, 8, 10 25 6, 8, 10, 12 30 8, 10, 12

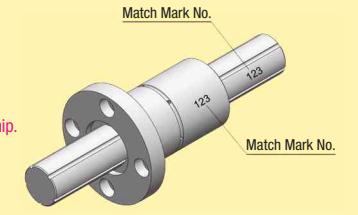
When selecting multiple alteration additions, more than 2mm is needed between each feature to be added.

Ordering Example Part Number - L - F - P
 BSDN10 - 300 - F20 - P6
 BSDN10G - 300 - F20 - P6
 BSDN10L - 300 - F20 - P6

Alternative grease types available.
 For Days to Ship, Price and Performance, see P.340

Cautions for Ball Spline Assembly

- Check Assembly Position
Match Mark No.'s are entered on nuts and spline shafts (see diagram on right).
When re-assembling, match the character orientations of Match Mark No.'s, and positional relationship.
- Tolerance for Mating Bores
An H7 tolerance is recommended for mating bores for the spline nuts.



Ball Splines

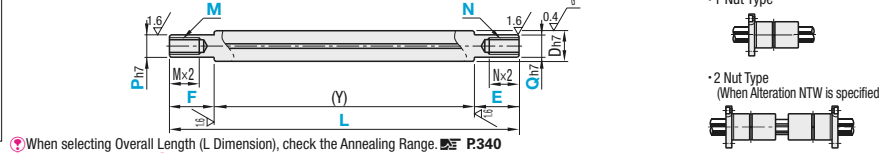
Both Ends Stepped and Tapped

Both Ends Stepped and Tapped



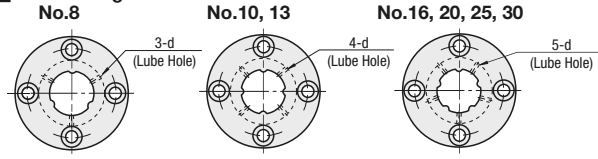
RoHS

	Spline Shafts <input type="checkbox"/> EN 1.3536 Equiv. Nut <input type="checkbox"/> EN 1.7242 Equiv. <input type="checkbox"/> Hardness: 58HRC -		Spline Shaft, Nut <input type="checkbox"/> Material: EN 1.4125 Equiv. <input type="checkbox"/> Hardness: 55HRC -	
	Nut 1 pc.		Nut 1 pc.	
With Round Flange Nut	BSLM		BSLMS	
With Compact Flange Nut	BSLN		-	
With Straight Nut	BSLS		-	

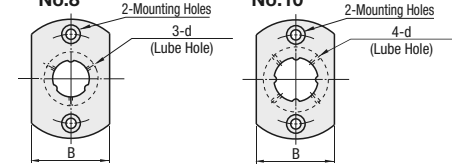


When selecting Overall Length (L Dimension), check the Annealing Range. **P.340**
Accuracy **P.339** For the included nut, please select a shape from below.

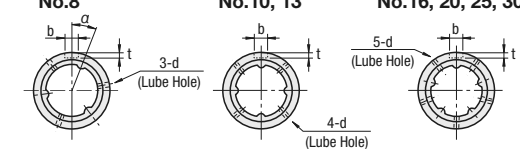
Round Flange Nuts



Compact Flange Nuts



Straight Nuts



Dimension of Included Key

* Please refrain from machining the nuts as it may have adverse effects on the accuracy.

Spline Shafts

Part Number	1mm Increment		P, Q Selection	M (Coarse) / N (Coarse) Selection (M+3≤P, N+3≤Q)	D	(Y) 1-Nut Type min-max	Mass (kg/m)	
	Type	No.						
BSLM BSLN BSLS BSLMS	*8	60-400(190)	2≤F·E≤P·Qx5	6	3	8	56-396(186)	0.39
	*10	60-600(390)		6 8	3 4	10.4	56-596(386)	0.65
	*13	60-600(390)		6 8 10	3 4 5 6	13.4	56-596(386)	1.11
	*16	70-600(390)		6 8 10 12 13	3 4 5 6 8 10	16.6	66-596(386)	1.65
	20	80-700		8 10 12 13 15 16	4 5 6 8 10 12	20.6	76-696	2.57
	25	90-900		8 10 12 13 15 16 20	4 5 6 8 10 12 16	25.8	86-896	4.04
	30	100-1150		10 12 13 15 16 20 25	4 5 6 8 10 12 16 20	30.8	96-1146	5.85

For BSLMS, only * marked sizes are available, and the Max. L and Y dimensions are in ().
For BSLN, only No. 8 and 10 are available.

Round Flange Nuts, Compact Flange Nuts

No.	D(h6)	L	Df	H	P.C.D.	d1	d2	h	W	d	B	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)
												Dynamic C _i	Static C _o	Dynamic C _i	Static C _o	M ₀₁ (N·m)	M ₀₂ (N·m)	
8	16	25	32	6	24	3.5	6	3.1	6.5	21	4.8	8.7	1.2	2.1	5	36	0.04	
10	21	40(33)	42(41)	6(8)	32(30)	4.4(5.3)	8	14(8.5)	15(10)	1.5	25	19(11)	34(21)	3.8(2.4)	6.9(4.3)	26(15)	181(102)	0.09
13	24	44(36)	44(45)	7(8)	33(34)							28(20)	52(37)	4.6(3.3)	8.3(5.9)	36(22)	251(148)	0.11
16	31	50	51	7	40							51	93	6.2	11.1	56	386	0.2
20	35	63	58	9	45	22.5	9.5	5.4	26.5	2	-	85	154	8.5	15.3	83	611	0.3
25	42	71	65	9	52							193	348	15.4	27.7	173	1248	0.4
30	47	80	75	10	60	6.6	11	6.5	30	2.5	272	490	18.5	33.3	212	1581	0.57	

Dimensions in () are for EN 1.4125 Equiv. Allowable static moment M₀₁ is a value measured when a single nut is used, and M₀₂ is a value measured when two nuts are used.

Straight Nuts

No.	D(h6)	L	b	Tolerance	t	d	α	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)	Dimensions of Key (Included)						
								Dynamic C _i	Static C _o	Dynamic C _i	Static C _o	M ₀₁ (N·m)	M ₀₂ (N·m)		B	Tolerance	h	Tolerance	L1	R	
8	16	25	2.5	+0.014	1.2	1.2	25°	4.8	8.7	1.2	2.1	5	36	0.013	2.5	+0.016	2.5	0	+0.025	10.5	1.25
10	21	40(33)	3	0	1.5	1.5	-	19(11)	34(21)	3.8(2.4)	6.9(4.3)	26(15)	181(102)	0.06	3	+0.006	3	-0.025	17(14)	1.5	
13	24	44(36)	3	0	2	2	-	28(20)	52(37)	4.6(3.3)	8.3(5.9)	36(22)	251(148)	0.07	3		3		17(14)	1.5	
16	31	50	3.5	0	2	2	-	51	93	6.2	11.1	56	386	0.15	3.5		3.5		18	1.75	
20	35	63	4	+0.018	2	2	-	85	154	8.5	15.3	83	611	0.2	4	+0.024	4	0	29		
25	42	71	4	0	2.5	2.5	-	193	348	15.4	27.7	173	1248	0.29	4	+0.012	4	-0.030	33	2	
30	47	80	4	0	2.5	2.5	-	272	490	18.5	33.3	212	1581	0.37	4		4		42		

Dimensions in () are for EN 1.4125 Equiv. Allowable static moment M₀₁ is a value measured when a single nut is used, and M₀₂ is a value measured when two nuts are used.

Part Number	Unit Price												
	Type	No.	Min. L ~150	L151 ~200	L201 ~300	L301 ~400	L401 ~500	L501 ~600	L601 ~700	L701 ~800	L801 ~900	L901 ~1000	L1001 ~1150
BSLM	8	-	-	-	-	-	-	-	-	-	-	-	-
	10	-	-	-	-	-	-	-	-	-	-	-	-
	13	-	-	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-	-	-
	25	-	-	-	-	-	-	-	-	-	-	-	-
BSLN	8	-	-	-	-	-	-	-	-	-	-	-	-
	10	-	-	-	-	-	-	-	-	-	-	-	-
	13	-	-	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-	-	-
	25	-	-	-	-	-	-	-	-	-	-	-	-
BSLS	8	-	-	-	-	-	-	-	-	-	-	-	-
	10	-	-	-	-	-	-	-	-	-	-	-	-
	13	-	-	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-	-	-
	25	-	-	-	-	-	-	-	-	-	-	-	-

Part Number	Unit Price							
	Type	No.	Min. L ~150	L151 ~200	L201 ~250	L251 ~300	L301 ~350	L351 ~390
BSLMS	8	-	-	-	-	-	-	-
	10	-	-	-	-	-	-	-
	13	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-
	25	-	-	-	-	-	-	-

No.	Additional Price for 2-Nut Type		
	Round Flange Nuts	Compact Flange Nuts	Straight Nuts
8	-	-	-
10	-	-	-
13	-	-	-
16	-	-	-
20	-	-	-
25	-	-	-
30	-	-	-

Alterations Part Number - L - F - E - P - Q - M - N - (SC, FC, NTW)
BSLM13 - 250 - F25 - E10 - P10 - Q8 - M5 - N5 - SC15

Alterations	Wrench Flats	Set Screw Flat	Additional Spline Nuts
	Code	SC	FC
Spec.	Adds a wrench flat. SC=1mm Increment SC+ℓ1≤Y	Adds a set screw flat. Ordering Code FC10-A8 FC, A=1mm Increment FC≤3xD When 1.5xD<FC, FC≤Y/2 A=0 or A≥2	Adds a nut. (from one nut to two nuts) Only available for BSLN, BSLM and BSLN.

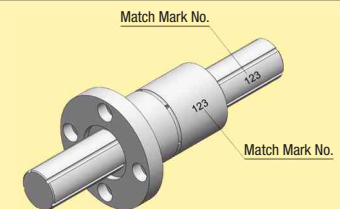
When selecting multiple alteration additions, more than 2mm is needed between each feature to be added.

Ordering Example Part Number - L - F - E - P - Q - M - N
BSLM13G - 250 - F25 - E10 - P10 - Q8 - M5 - N5
BSLM13L - 250 - F25 - E10 - P10 - Q8 - M5 - N5

Alternative grease types available.
For Days to Ship, Price and Performance, see **P.340**

Cautions for Ball Spline Assembly

- Check Assembly Position**
Match Mark No.'s are entered on nuts and spline shafts (see diagram on right).
When re-assembling, match the character orientations of Match Mark No.'s, and positional relationship.
- Tolerance for Mating Bores**
An H7 tolerance is recommended for mating bores for the spline nuts.



Ball Splines

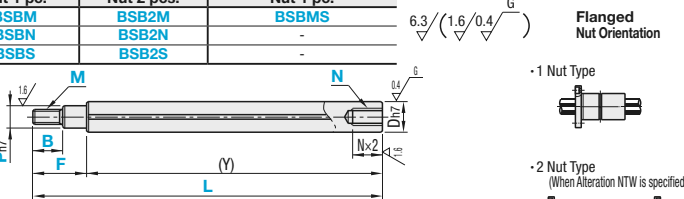
One End Stepped and Threaded, One End Tapped

■ One End Stepped and Threaded, One End Tapped



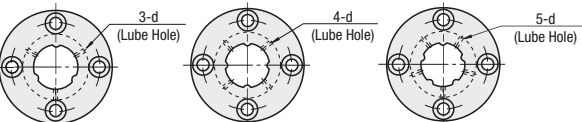
RoHS

One End Stepped and Threaded, One End Tapped	Spline Shafts EN 1.3505 Equiv. Nut EN 1.7242 Equiv. Hardness: 58HRC -		Spline Shaft, Nut Material: EN 1.4125 Equiv. Hardness: 55HRC -
	Nut 1 pc.	Nut 2 pcs.	Nut 1 pc.
With Round Flange Nut	BSBM	BSB2M	BSBMS
With Compact Flange Nut	BSBN	BSB2N	
With Straight Nut	BSBS	BSB2S	

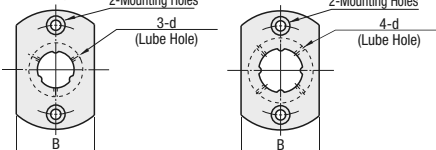


When selecting Overall Length (L Dimension), check the Annealing Range. P340
Accuracy P339 For the included nut, please select a shape from below.

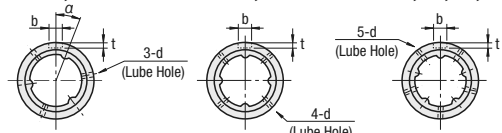
Round Flange Nuts



Compact Flange Nuts



Straight Nuts



Dimension of Included Key

* Please refrain from machining the nuts as it may have adverse effects on the accuracy.

Spline Shafts

Part Number	1mm Increment				P Selection	M (Coarse) Selection (M≤P)	N (Coarse) Selection	D	(Y)		Mass (kg/m)
	Type	No.	L	F					B	1-Nut Type min-max	
BSBM BSBN BSBS BSB2M BSB2N BSB2S BSBMS	*6	60-400(190)	60-400		3 4 5	3 4 5	3	6	56-396(186)	56-396	0.23
	*8	60-400(190)	60-600	When P=3 2≤B≤9	4 5 6	4 5 6	3 4	8	56-396(186)	56-596	0.39
	*10	60-600(390)	90-600	4≤F≤9 When P=4 2≤B≤16	4 5 6 8	4 5 6 8	3 4 5	10.4	56-596(386)	86-596	0.65
	*13	60-600(390)	100-600	When P=4 2≤B≤16	5 6 8 10	5 6 8 10	4 5 6	13.4	56-596(386)	96-596	1.11
	*16	70-600(390)	110-600	4≤F≤16 When P=5 2≤B≤Mx5	5 6 8 10 12 13	6 8 10 12	4 5 6 8	16.6	66-596(386)	106-596	1.65
	*20	80-700	130-700	4≤F≤Px5 F≥B+2	8 10 12 13 15 16	6 8 10 12 16	4 5 6 8 10	20.6	76-696	126-696	2.57
	*25	90-900	150-900	4≤F≤Px5 F≥B+2	8 10 12 13 15 16 20	6 8 10 12 16 20	5 6 8 10 12	25.8	86-896	146-896	4.04
	*30	100-1150	170-1150	4≤F≤Px5 F≥B+2	10 12 13 15 16 20 25	8 10 12 16 20 24	6 8 10 12 16	30.8	96-1146	166-1146	5.85

For BSBMS, only * marked sizes are available, and the Max. L and Y dimensions are in ().
For BSBN and BSB2N, only No. 6, 8, and 10 are available.

Round Flange Nuts, Compact Flange Nuts

No.	D (h6)	L	Df	H	P.C.D.	d1	d2	h	W	d	B	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)
												Dynamic C ₀ (N·m)	Static C ₀ (N·m)	Dynamic C ₀ (kN)	Static C ₀ (kN)	M ₀₁ (N·m)	M ₀₂ (N·m)	
6	14	25	30	6	22	6	3.1	6.5		18	18	3.8	7	1.2	2.1	5	36	0.03
8	16	32	32	3.5	24	3.5	6			21	21	4.8	8.7	1.2	2.1	5	36	0.04
10	21	40(33)	42(41)	6(8)	32(30)	1.5	25	4.4(5.3)	14(8.5)	19(11)	19(11)	3.8(2.4)	6.9(4.3)	3.8(2.4)	6.9(4.3)	26(15)	181(102)	0.09
13	24	44(36)	44(45)	7(8)	33(34)	4.5	8	4.4	15(10)	28(20)	28(20)	5.2(3.7)	4.6(3.3)	8.3(5.9)	8.3(5.9)	36(22)	251(148)	0.11
16	31	50	51	7	40			4.4	18	51	51	9.3	6.2	11.1	11.1	56	386	0.2
20	35	63	58	4	45			22.5	22.5	85	85	15.4	8.5	15.3	8.5	83	611	0.3
25	42	71	65	9	52	5.5	9.5	5.4	26.5	193	193	34.8	15.4	27.7	17.3	1248	0.4	
30	47	80	75	10	60	6.6	11	6.5	30	272	272	49.0	18.5	33.3	21.2	1581	0.57	

Dimensions in () are for EN 1.4125 Equiv. Allowable static moment M₀₁ is a value measured when a single nut is used, and M₀₂ is a value measured when two nuts are used.

Straight Nuts

No.	D (h6)	L	b	Tolerance	t	α	d	α	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)	Dimensions of Key (Included)			
									Dynamic C ₀ (N·m)	Static C ₀ (N·m)	Dynamic C ₀ (kN)	Static C ₀ (kN)	M ₀₁ (N·m)	M ₀₂ (N·m)		M ₀₁ (N·m)	M ₀₂ (N·m)	B	Tolerance
6	14	25	2.5	+0.014	0	15°	3.8	7	1.2	2.1	5	36	0.012	2.5	+0.016	2.5	0	10.5	1.25
8	16	32	3	0	25°	4.8	8.7	1.2	2.1	5	36	0.013	3	+0.006	3	-0.025	10.5	1.5	
10	21	40(33)	3	0	1.5	1.5	19(11)	34(21)	3.8(2.4)	6.9(4.3)	26(15)	181(102)	0.06	3			17(14)	1.5	
13	24	44(36)	3	0	1.5	1.5	28(20)	52(37)	4.6(3.3)	8.3(5.9)	36(22)	251(148)	0.07	3			17(14)	1.5	
16	31	50	3.5	0	2	2	51	93	6.2	11.1	56	386	0.15	3.5			18	1.75	
20	35	63	4	+0.018	2	2	85	154	8.5	15.3	83	611	0.2	4	+0.024	4	0	29	2
25	42	71	4	0	2.5	2.5	193	348	15.4	27.7	173	1248	0.29	4	+0.012	4	-0.030	33	2
30	47	80	4	0	2.5	2.5	272	490	18.5	33.3	212	1581	0.37	4			42	2	

Dimensions in () are for EN 1.4125 Equiv. Allowable static moment M₀₁ is a value measured when a single nut is used, and M₀₂ is a value measured when two nuts are used.

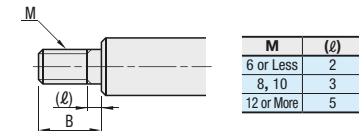
Part Number	Type	No.	Unit Price										
			Min. L ~150	L151 ~200	L201 ~300	L301 ~400	L401 ~500	L501 ~600	L601 ~700	L701 ~800	L801 ~900	L901 ~1000	L1001 ~1150
BSBM BSB2M	Price of BSB2M = BSBM + Additional price shown below	6	-	-	-	-	-	-	-	-	-	-	-
		8	-	-	-	-	-	-	-	-	-	-	-
		10	-	-	-	-	-	-	-	-	-	-	-
		13	-	-	-	-	-	-	-	-	-	-	-
		16	-	-	-	-	-	-	-	-	-	-	-
		20	-	-	-	-	-	-	-	-	-	-	-
		25	-	-	-	-	-	-	-	-	-	-	-
BSBN BSB2N	Price of BSB2N = BSBN + Additional price shown below	6	-	-	-	-	-	-	-	-	-	-	
		8	-	-	-	-	-	-	-	-	-	-	
		10	-	-	-	-	-	-	-	-	-	-	
		13	-	-	-	-	-	-	-	-	-	-	
BSBS BSB2S	Price of BSB2S = BSBS + Additional price shown below	6	-	-	-	-	-	-	-	-	-	-	
		8	-	-	-	-	-	-	-	-	-	-	
		10	-	-	-	-	-	-	-	-	-	-	
		13	-	-	-	-	-	-	-	-	-	-	
		16	-	-	-	-	-	-	-	-	-	-	
		20	-	-	-	-	-	-	-	-	-	-	

Part Number	Type	No.	Unit Price						Additional Price for 2-Nut Type			
			Min. L ~150	L151 ~200	L201 ~250	L251 ~300	L301 ~350	L351 ~390	No.	Round Flange Nuts	Compact Flange Nuts	Straight Nuts
BSBMS		6	-	-	-	-	-	-	6			
		8	-	-	-	-	-	-	8			
		10	-	-	-	-	-	-	10			
		13	-	-	-	-	-	-	13			
		16	-	-	-	-	-	-	16			
		20	-	-	-	-	-	-	20			
		25	-	-	-	-	-	-	25			
30	-	-	-	-	-	-	30					

Alterations Part Number - L - F - B - P - M - N - (SC, FC)
BSB2N10 - 300 - F20 - B10 - P5 - M5 - N3 - SC15

Alterations	Wrench Flats		Set Screw Flat																																													
	SC	FC	SC	FC																																												
Code	SC	FC	SC	FC																																												
Spec.	Adds a wrench flat. SC=1mm Increment SC+Δ1≤L		Adds a set screw flat. Ordering Code FC10-A8 FC, A=1mm Increment FC≤3xD When 1.5xD<FC, FC≤Y/2 A=0 or A≥2																																													
	<table border="1"> <tr><th>No.</th><th>W</th><th>Δ1</th></tr> <tr><td>6</td><td>5</td><td>8</td></tr> <tr><td>8</td><td>7</td><td>8</td></tr> <tr><td>10</td><td>8</td><td>10</td></tr> <tr><td>13</td><td>11</td><td>13</td></tr> <tr><td>16</td><td>14</td><td>10</td></tr> <tr><td>20</td><td>17</td><td>20</td></tr> <tr><td>25</td><td>22</td><td>25</td></tr> <tr><td>30</td><td>27</td><td>15</td></tr> </table>	No.	W	Δ1	6	5	8	8	7	8	10	8	10	13	11	13	16	14	10	20	17	20	25	22	25	30	27	15		<table border="1"> <tr><th>No.</th><th>h</th></tr> <tr><td>6</td><td>6</td></tr> <tr><td>8</td><td>8</td></tr> <tr><td>10</td><td>10</td></tr> <tr><td>13</td><td>13</td></tr> <tr><td>16</td><td>16</td></tr> <tr><td>20</td><td>20</td></tr> <tr><td>25</td><td>25</td></tr> <tr><td>30</td><td>30</td></tr> </table>	No.	h	6	6	8	8	10	10	13	13	16	16	20	20	25	25	30	30
No.	W	Δ1																																														
6	5	8																																														
8	7	8																																														
10	8	10																																														
13	11	13																																														
16	14	10																																														
20	17	20																																														
25	22	25																																														
30	27	15																																														
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13	13																																															
16	16																																															
20	20																																															
25	25																																															
30	30																																															

Incomplete Thread Dimensions



When selecting multiple alteration additions, more than 2mm is needed between each feature to be added.

Ordering Example Part Number - L - F - B - P - M - N
BSB2N10 - 300 - F20 - B10 - P5 - M5 - N3
BSB2N10G - 300 - F20 - B10 - P5 - M5 - N3
BSB2N10L - 300 - F20 - B10 - P5 - M5 - N3

Alternative grease types available.
For Days to Ship, Price and Performance, see P340

Cautions for Ball Spline Assembly

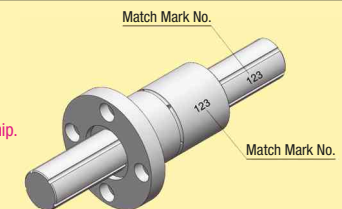
Check Assembly Position

Match Mark No.'s are entered on nuts and spline shafts (see diagram on right).

When re-assembling, match the character orientations of Match Mark No.'s, and positional relationship.

Tolerance for Mating Bores

An H7 tolerance is recommended for mating bores for the spline nuts.



Ball Splines

One End Stepped and Threaded

One End Stepped and Threaded

One End Stepped and Threaded	Spine Shafts M EN 1.3915 Equiv. Nut N EN 1.7242 Equiv. H Hardness: 58HRC -	Spine Shaft, Nut M Material: EN 1.4125 Equiv. H Hardness: 55HRC -
With Round Flange Nut	Nut 1 pc. BSKM	Nut 1 pc. BSKMS
With Compact Flange Nut	BSKN	-
With Straight Nut	BSKS	-

Flanged Nut Orientation

- 1 Nut Type
- 2 Nut Type (When Alteration NTW is specified)

When selecting Overall Length (L Dimension), check the Annealing Range. **P.340**
Accuracy **P.339** For the included nut, please select a shape below.

Round Flange Nuts

- No. 6, 8 (3-d Lube Hole)
- No. 10, 13 (4-d Lube Hole)
- No. 16, 20, 25, 30 (5-d Lube Hole)

Compact Flange Nuts

- No. 6, 8 (2-Mounting Holes, 3-d Lube Hole)
- No. 10 (2-Mounting Holes, 4-d Lube Hole)

Straight Nuts

- No. 6, 8 (3-d Lube Hole)
- No. 10, 13 (4-d Lube Hole)
- No. 16, 20, 25, 30 (5-d Lube Hole)

A Dimension of Included Key

* Please refrain from machining the nuts as it may have adverse effects on the accuracy.

Spline Shafts

Part Number	Type	No.	L			P Selection	M (Coarse) Selection (M≤P)	D	1-Nut Type min-max	Mass (kg/m)
			1mm Increment							
BSKM BSKN BSKS BSKMS	*	6	60-400(190)			3 4 5	3 4 5	6	56-396(186)	0.23
	*	8	60-400(190)			4 5 6	4 5 6	8	56-396(186)	0.39
	*	10	60-600(390)	When P=3 4≤F≤9	When M=3 2≤B≤9	4 5 6 8	4 5 6 8	10.4	56-596(386)	0.65
	*	13	60-600(390)	When P=4 4≤F≤16	When M=4 2≤B≤16	5 6 8 10	5 6 8 10	13.4	56-596(386)	1.11
	*	16	70-600(390)	When M=5 4≤F≤P×5	When M=5 2≤B≤M×5	5 6 8 10 12 13	5 6 8 10 12	16.6	66-596(386)	1.65
	*	20	80-700	When P=5 4≤F≤P×5	When M=5 2≤B≤M×5	8 10 12 13 15 16 20	6 8 10 12 16	20.6	76-696	2.57
	*	25	90-900	When P=5 4≤F≤P×5	When M=5 2≤B≤M×5	8 10 12 13 15 16 20	6 8 10 12 16 20	25.8	86-896	4.04
	*	30	100-1150	When P=5 4≤F≤P×5	When M=5 2≤B≤M×5	10 12 13 15 16 20 25	8 10 12 16 20 24	30.8	96-1146	5.85

For BSKMS, only * marked sizes are available, and the Max. L and Y dimensions are in (.)
For BSKN, only No. 6, 8 and 10 are available.

Round Flange Nuts, Compact Flange Nuts

No.	D (h6)	L	Df	H	P.C.D.	d1	d2	h	W	d	B	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)
												Dynamic Ci (N·m)	Static Co (N·m)	Dynamic Ci (kN)	Static Co (kN)	Mo1 (N·m)	Mo2 (N·m)	
6	14		30	6	22	3.5	6	3.1	6.5		18	3.8	7	1.2	2.1	5	36	0.03
8	16		32	6	24	3.5	6	3.1	6.5		21	4.8	8.7	1.2	2.1	5	36	0.04
10	21	40(33)	42(41)	6(8)	32(30)	4.5	8	4.4(5.3)	14(8.5)	1.5	25	19(11)	34(21)	3.8(2.4)	6.9(4.3)	26(15)	181(102)	0.09
13	24	44(36)	44(45)	7(8)	33(34)	4.5	8	4.4(5.3)	15(10)			28(20)	52(37)	4.6(3.3)	8.3(5.9)	36(22)	251(148)	0.11
16	31	50	51	7	40	4.5	8	4.4	18			51	93	6.2	11.1	56	386	0.2
20	35	63	58	9	45	5.5	9.5	5.4	22.5	2	-	85	154	8.5	15.3	83	611	0.3
25	42	71	65	9	52	5.5	9.5	5.4	26.5			193	348	15.4	27.7	173	1248	0.4
30	47	80	75	10	60	6.6	11	6.5	30	2.5		272	490	18.5	33.3	212	1581	0.57

Dimensions in () are for EN 1.4125 Equiv. Allowable static moment Mo1 is a value measured when a single nut is used, and Mo2 is a value measured when two nuts are used.

Straight Nuts

No.	D (h6)	L	b	Tolerance	t (+0.05/0)	d	α	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)	Dimensions of Key (Included)					
								Dynamic Ci (N·m)	Static Co (N·m)	Dynamic Ci (kN)	Static Co (kN)	Mo1 (N·m)	Mo2 (N·m)		Mo1 (kN)	Mo2 (kN)	B	h	Tolerance	L1
6	14						15°	3.8	7	1.2	2.1	5	36	0.012	2.5	+0.016	2.5	0	10.5	1.25
8	16	25	2.5	+0.014	1.2		25°	4.8	8.7	1.2	2.1	5	36	0.013	2.5	+0.016	2.5	0	10.5	1.25
10	21	40(33)	3	0	1.5	1.5		19(11)	34(21)	3.8(2.4)	6.9(4.3)	26(15)	181(102)	0.06	3	+0.006	3	-0.025	17(14)	1.5
13	24	44(36)						28(20)	52(37)	4.6(3.3)	8.3(5.9)	36(22)	251(148)	0.07					17(14)	
16	31	50	3.5					51	93	6.2	11.1	56	386	0.15	3.5			18	1.75	
20	35	63		+0.018	2			85	154	8.5	15.3	83	611	0.2				29		
25	42	71	4	0	2.5	2		193	348	15.4	27.7	173	1248	0.29	4	+0.024	4	0	33	2
30	47	80			2.5			272	490	18.5	33.3	212	1581	0.37		+0.012		-0.030	42	

Dimensions in () are for EN 1.4125 Equiv. Allowable static moment Mo1 is a value measured when a single nut is used, and Mo2 is a value measured when two nuts are used.

Part Number	Type	No.	Unit Price																				
			Min. L ~150	L151 ~200	L201 ~300	L301 ~400	L401 ~500	L501 ~600	L601 ~700	L701 ~800	L801 ~900	L901 ~1000	L1001 ~1150										
BSKM		6																					
		8																					
		10																					
		13																					
		16																					
		20																					
		25																					
BSKN		6																					
		8																					
		10																					
		13																					
BSKS		6																					
		8																					
		10																					
		13																					
		16																					
		20																					

Part Number	Type	No.	Unit Price					Additional Price for 2-Nut Type														
			Min. L ~150	L151 ~200	L201 ~250	L251 ~300	L301 ~350	L351 ~390	No.	Round Flange Nuts	Compact Flange Nuts	Straight Nuts										
BSKMS		6																				
		8																				
		10																				
		13																				
		16																				
		20																				
		25																				
	30																					

Alterations **Part Number** - L - F - B - P - M - (SC, FC, NTW)
BSKS8 - 250 - F20 - B15 - P6 - M6 - SC15

Alterations	Wrench Flats	Set Screw Flat	Additional Spline Nuts
	SC	FC	NTW
Spec.	Adds a wrench flat. SC=1mm Increment SC+L1≤L	Adds a set screw flat. Ordering Code FC10-A8 FC, A=1mm Increment FC≤3xD When 1.5xD<FC, FC≤Y/2 A=0 or A≥2	Adds a nut. (from one nut to two nuts) Applicable to BSKS, BSKM and BSKN only.

When selecting multiple alteration additions, more than 2mm is needed between each feature to be added.

Ordering Example **Part Number** - L - F - B - P - M
BSKS8 - 250 - F20 - B15 - P6 - M6
BSKS8G - 250 - F20 - B15 - P6 - M6
BSKS8L - 250 - F20 - B15 - P6 - M6

Alternative grease types available.
For Days to Ship, Price and Performance, see **P.340**

Cautions for Ball Spline Assembly

- Check Assembly Position
Match Mark No.'s are entered on nuts and spline shafts (see diagram on right).
When re-assembling, match the character orientations of Match Mark No.'s, and positional relationship.
- Tolerance for Mating Bores
An H7 tolerance is recommended for mating bores for the spline nuts.

Miniature Ball Guides - Overview

Features

1 Low friction rolling motion is enabled

Free from ball circulation and seal resistance, rolling motion with very low friction is allowed.

2 Capable of highly accurate rolling motion

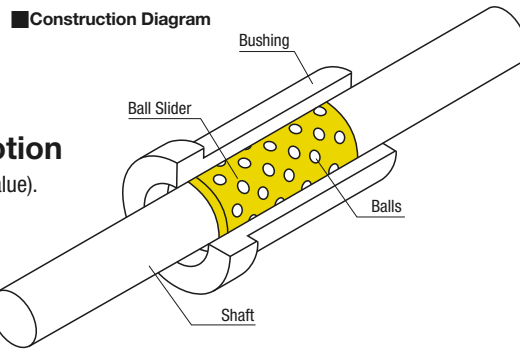
Clearance between the shaft and balls is $-3\sim+8\mu\text{m}$ (Reference Value). Low clearance rolling motion is enabled.

3 Enables Compact Designs

Bushing is selectable beginning with O.D.: 5mm / Overall Length: 10mm. Suitable for space saving designs.

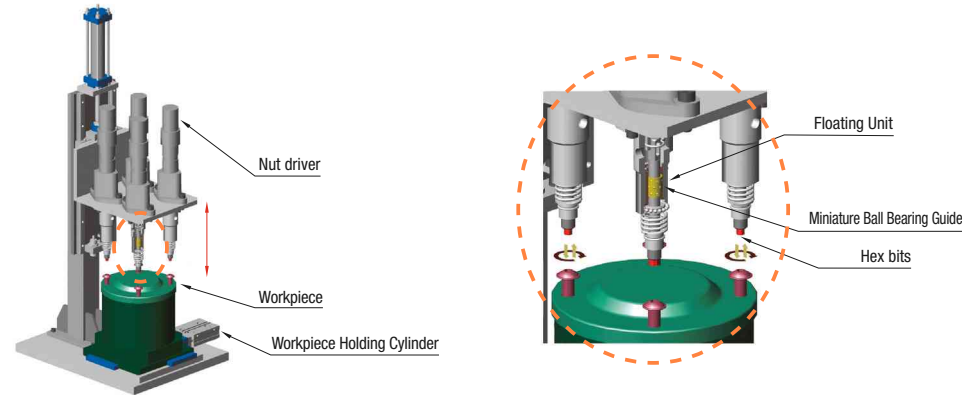
4 Linear and rotary motions can be combined

Since balls are aligned in the staggered arrangement, linear motion, rotary motion, and linear / rotary compounded motion are allowed for.



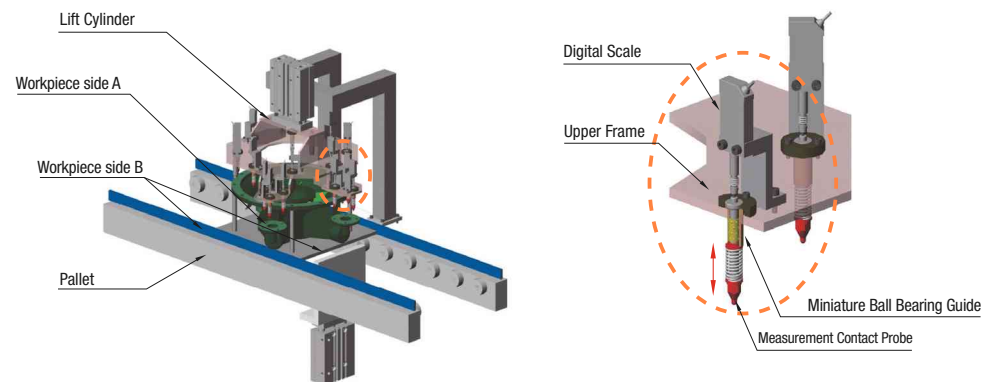
Screw Tightening Machine

When rotary / linear compounded motion is required, space-saving design is enabled by using Miniature Ball Bearing Guide.



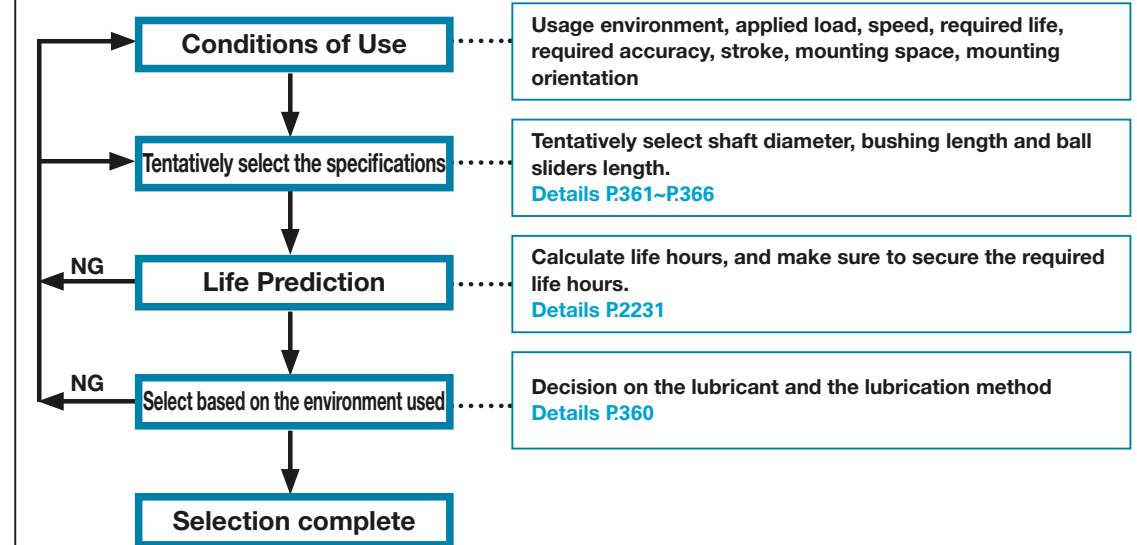
Machined Surface Distortion Measurement Device

If highly repeatable motion or device weight reduction is required, use of Miniature Ball Bearing Guide is effective.



Selection procedure

The basic selection procedure of the Miniature Ball Bearing Guide and the required considerations are shown below.



Precautions at the time of selection / usage

Mating designs

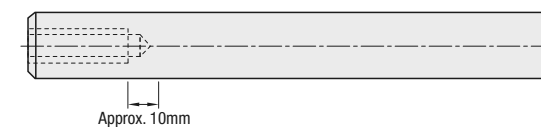
- It is recommended to use Misumi's miniature ball guide sets with hardened shafts.
- Recommended housing tolerance of Misumi's miniature ball guide sets is H7.

Shaft Dia. Tolerance		Housing Dia. Tolerance		
Shaft Diameter	Shaft Dia. Tolerance	Housing Diameter	H7	
2	0 -0.005	7~10	+0.015 0	
3			11~14	+0.018 0
4				15~18
5		19~24		
6				
8				
10				
12				

Annealing Range

- Shafts are hardened, and must be annealed before machining.
- Annealing may lower hardness on the machined area +10mm (See the examples below).
- Annealed sections are not included in the guaranteed O.D. Tolerance range. When calculating a stroke, exclude the annealed sections.

(Ex.) Tapped Ends



Lubrication

- Although Miniature Ball Guides are shipped with anti-rust oil coating, it is recommended to apply grease after washing and drying it before the use.
- Administer lubrication maintenance with appropriate lithium soap based grease (Alvania Grease S2 by Showa Shell Sekiyu K.K), etc. as needed.

Miniature Ball Guide Sets / Shafts for Miniature Ball Guides

With Retaining Ring Straight

■ Features: Retaining rings in the bushings prevent the ball sliders from falling out.

Miniature Ball Guide Sets - With Retaining Rings

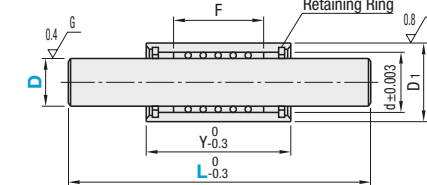
Parts	Material	Hardness	Parts	Material	Hardness
Shafts	EN 1.3505	58HRC~	Ball Retainer	EN CW614N Equiv.	-
Bushing	EN 1.3505 Equiv.	58HRC~	Balls	EN 1.3505 Equiv.	58HRC~
			Retaining Ring	Spring Steel	44HRC~

Accuracy Standards

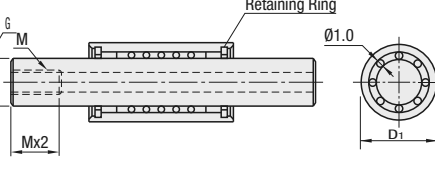
① Overall Length	L	30~120	121~150
Dimension Tolerance	Tolerance	±0.3	±0.5

② Circularity of Part D0.004 or Less (Except Annealed Range)

Shaft: Straight Type
BGSTZ



Shaft: One End Tapped Hollow
BGSTA



Part Number		L 1mm Increment	Y	F	D1	M (Coarse)	d	Maximum Stroke mm	Unit Price					
Type	D Shaft Dia. Tolerance								BGSTZ			BGSTA		
BGSTZ BGSTA	5	40~90	17	6	10	M3	7	13						
	6		19	7	11	M3	8	15						
	8	40~150	25	8	13	M4	10	24						
	10		30	10	16	M5	12	30						
12		32	11	18	M6	14	32							

■ Features: Most economical products for use with Shaft Supports, or use in plate mounting applications.

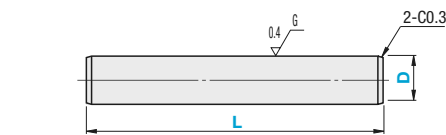
Shafts for Miniature Ball Guides - Straight

Type	Material	Hardness
Straight	BGZP	EN 1.3505 Equiv. 58HRC~

Accuracy Standards

① Overall Length	L	30~120	121~150
Dimension Tolerance	Tolerance	±0.3	±0.5

② Circularity of Part D0.004 or Less (Except Annealed Range)



Part Number		L 1mm Increment	d	Unit Price		
Type	D Shaft Dia. Tolerance			L30~50	L51~100	L101~150
BGZP	2	30~50	-	-	-	
	3	40~70	-	-	-	
	4	40~90	2.5	-	-	
	5			-	-	
	6	40~150	3.3	-	-	
	8			-	-	
10	-			-		
12		5				

Ordering Example: Part Number BGZP5 - L 72

Shafts for Miniature Ball Guides

One End Machined / Both Ends Machined

■ Features: "One end machined" products are applicable to various application requirements.

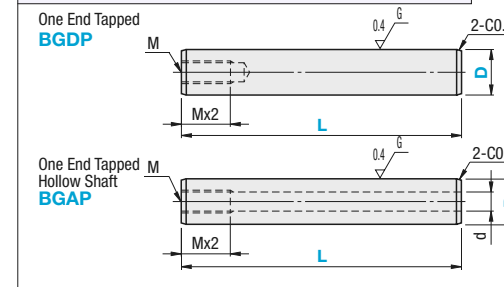
One End Machined



Type	Material	Hardness
One End Tapped	BGDP	EN 1.3505 Equiv. 58HRC~
One End Tapped Hollow	BGAP	EN 1.3505 Equiv. 58HRC~
One End Threaded	BGEP	EN 1.3505 Equiv. 58HRC~

Concentricity of D and P: 0.1 or less

$$6.3 / \left(\sqrt[0.4]{G} \right)$$



Accuracy Standards

① Overall Length	L	30~120	121~150
Dimension Tolerance	Tolerance	±0.3	±0.5

② Circularity of Part D0.004 or Less (Except Annealed Range)

Part Number		L 1mm Increment	F	B	M (Coarse)	d	Unit Price								
Type	D Shaft Dia. Tolerance						BGDP			BGEP					
BGDP BGEP BGAP	5	40~90	4	6	M3	2.5	L40-50	L51-100	L101-150	L40-50	L51-100	L101-150	L40-50	L51-100	L101-150
	6														
	8	40~150	5	8	M4	3.3									
	10														
12				12	M6	5									

■ Features: "Both ends machined" products are applicable to various application requirements.

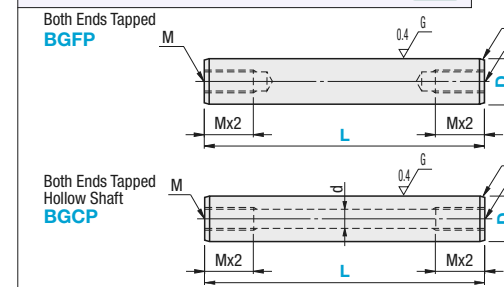
Both Ends Machined



Type	Material	Hardness
Both Ends Tapped	BGFP	EN 1.3505 Equiv. 58HRC~
Both Ends Tapped Hollow	BGCP	EN 1.3505 Equiv. 58HRC~
One End Threaded and One End Tapped	BGHP	EN 1.3505 Equiv. 58HRC~

Concentricity of D and P: 0.1 or less

$$6.3 / \left(\sqrt[0.4]{G} \right)$$



Accuracy Standards

① Overall Length	L	30~120	121~150
Dimension Tolerance	Tolerance	±0.3	±0.5

② Circularity of Part D0.004 or Less (Except Annealed Range)

Part Number		L Selection	F	B	M (Coarse)	d	Unit Price			
Type	D Shaft Dia. Tolerance						BGFP · BGHP		BGCP	
BGFP BGCP BGHP	5	40 50 60 70 80 90	4	6	M3	2.5	L40, 50	L60~	L40, 50	L60~
	6									
	8	40 50 60 70 80 90 100	5	8	M4	3.3				
	10									
12				12	M6	5				

Ordering Example: Part Number BGFP5 - L 70

Bushings for Miniature Ball Guides

Standard / Compact

= For customers using industry standard products =
 The part enclosed in the red frame is as per industry standard specifications (EN 1.3505 Equiv. material, Straight Bushings).
 Select from the specifications here.

Features: Most common type of bushings for miniature ball guides.

Industry Standard



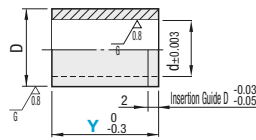
RoHS

Type		Material	Hardness
Standard	Compact		
Straight	Shouldered	EN 1.3505 Equiv.	58HRC~
BGB	BGH		
SSBGB	SSBGH	EN 1.4125 Equiv.	56HRC~

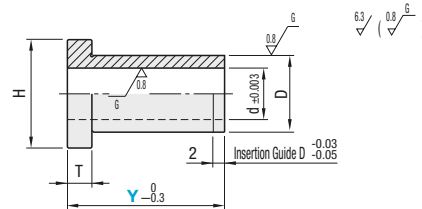
- Use Ball Slider Compact Type (BYS) in combination with Compact Type; Ball Sliders Standard Type (BGS, SSBGS) with Standard Type.
- Loctite is recommended to fix bushings.

Standard

BGB
SSBGB

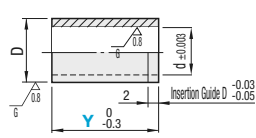


BGH
SSBGH

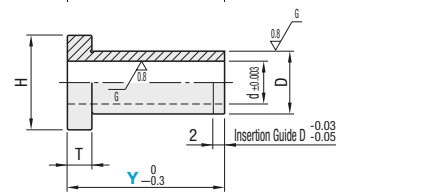


Compact

Straight
BYB



Shouldered
BYH



Standard

Part Number Type	No.	Y Selection	D O.D. Tolerance	T	H	d	W	B	D1	Unit Price				
										BGB	SSBGB	BGH	SSBGH	
BGB SSBGB BGH SSBGH	3	10	7	2.5	9	5	-	-	-					
		20												
		30												
	4	10	8	0 -0.006	3	10	6	-	-	-				
		20												
		30												
	5	10	10	0 -0.011	4	12	7	-	-	-				
		20												
		30												
	6	20	11	0 -0.011	4	13	8	1.1	-	-				
		30												
		40												
8	20	12	0 -0.011	4	14	10	1.1	-	-					
	30													
	40													
10	30	16	0 -0.011	4	18	12	1.1	-	-					
	40													
	50													
12	30	18	0 -0.011	4	20	14	1.3	-	-					
	40													
	50													

Ordering Example

Part Number	-	Y
BYB5	-	20
BGB5	-	20
BGH10	-	40

Compact

Part Number Type	No.	Y Selection	D O.D. Tolerance	T	H	d	Unit Price				
							BYB	SSBYB	BYH	SSBYH	
BYB BYH	2	10 15 20	5	2.5	7	3.2					
		10 20									
	3	30	6	0 -0.006	3	8	4.2				
		10 20									
	4	30	7	0 -0.006	3	9	5.2				
		10 20									
	5	30	8	0 -0.011	4	10	6.2				
		10 20									
	6	20 30 40	9	0 -0.011	4	11	7.2				
		20 30 40									
	8	20 30 40	11	0 -0.011	4	13	9.2				
		30 40									
10	30 40	14	0 -0.011	4	16	12					
	50										
12	30 40	16	0 -0.011	4	18	14					
	50										

Bushings for Miniature Ball Guides / Ball Sliders

Compact / Standard

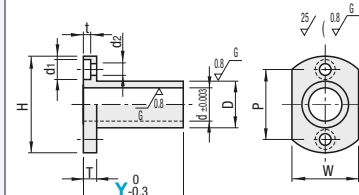
Features: The flanges can be screw mounted for convenient assembly.

Flanged

BGHT (Mounting Hole)



RoHS



Material: EN 1.3505 Equiv.
 Hardness: 58HRC ~

Part Number Type	No.	Y Selection	D O.D. Tolerance	H	W	P	T	d	d1	d2	t	Unit Price	
BGHT	5	20	10	25	16	17	4	7	6	3.5	2.2		
		30											
	6	20 30 40	12	28	18	20	4	8	10	14	4.5	3	
		20 30 40											
	8	20 30 40	14	34	22	25	5	12	7.5	4.5	3		
		20 30 40											
10	30 40	16	40	25	29	5	14	14	14	14	3		
	50												
12	30 40	19	40	25	29	5	14	14	14	14	3		
	50												

Use in combination with Ball Sliders Standard Type (BGS, SSBGS).

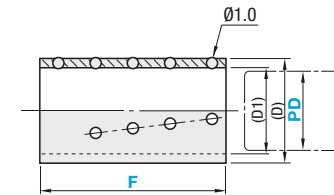
Features: Most common specification in ball sliders for miniature ball guides.

Ball Sliders - Standard

Type	Material		Hardness
	Ball Retainer	Balls	
BGS	EN CW614N Equiv. (RoHS Compliant)	EN 1.3505 Equiv.	58HRC~
SSBGS	EN CW614N Equiv. (RoHS Compliant)	EN 1.4125 Equiv.	56HRC~



RoHS



Part Number Type	PD	F Selection	(D)	(D1)	Unit Price	
					BGS	SSBGS
BGS SSBGS	3	10 15 20	4.8	3.2		
					5	
	4	15 20 30	7.8	6.2		
					8	
	10	20 30 40	11.8	10.2		
					12	

Use in combination with Bushings for Miniature Ball Guides Standard Type (BGB, SSBGB, BGH, SSBGH, BGHT).
 Basic Load Rating P_{361}

= For customers using industry standard products =
 The part enclosed in the red frame is as per industry standard specifications.
 Select from the specifications here.

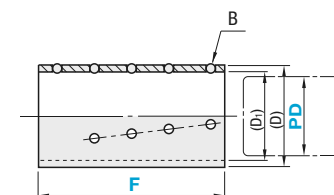
Features: As compared to the Standard Type, O.D. (D dimension) is 1mm compact.

Ball Sliders - Compact

Type	Material		Hardness
	Ball Retainer	Balls	
BYS	EN CW614N Equiv. (RoHS Compliant)	EN 1.3505 Equiv.	58HRC~



RoHS



Part Number Type	PD	F Selection	(D)	(D1)	B	Unit Price	
BYS	2	10 15 20	3.1	2.1	0.6		
						3	
	4	15 20 30	6.1	5.1		1.0	
							5
	10	20 30 40	11.8	10.2		1.0	
							12

Use in combination with Bushings for Miniature Ball Guides Compact Type (BYB, BYH).
 Basic Load Rating P_{361}

Ordering Example

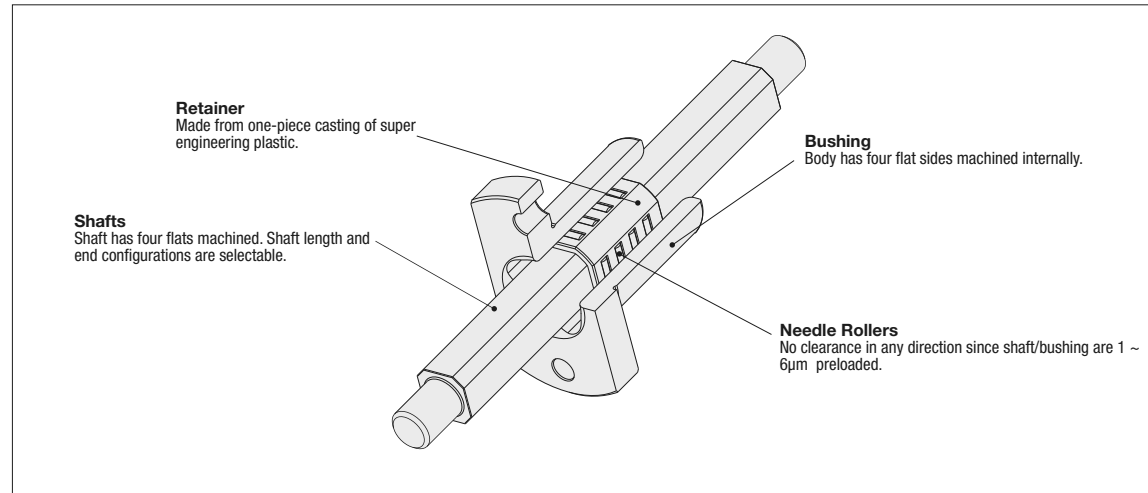
Part Number	-	Y, F
BGHT5	-	20
BGS5	-	15

High Rigidity Needle Guide Sets

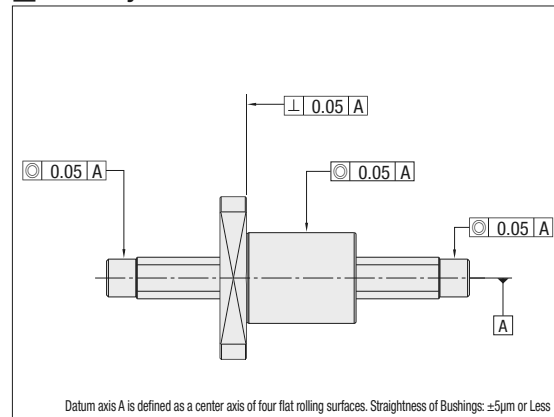
Overview

Features

High accuracy needle rollers are arranged in four directions against the square shafts. Shafts/bushings are designed to be 1 ~ 6µm preloaded. Widely used in parts of semiconductor, liquid crystal manufacturing equipment and inspection device, lift/slide stages, robotic systems, press machines and transfer mechanism as the guide with high rigidity, straightness and high speed. Capable of torque loading without rotation due to square cross section with low yawing and pitching, maintaining smooth rotation and stable accuracy.

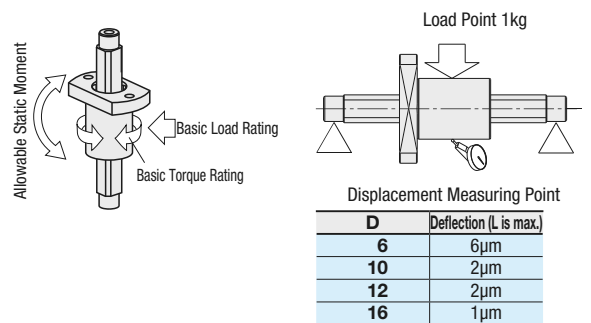


Accuracy Standards

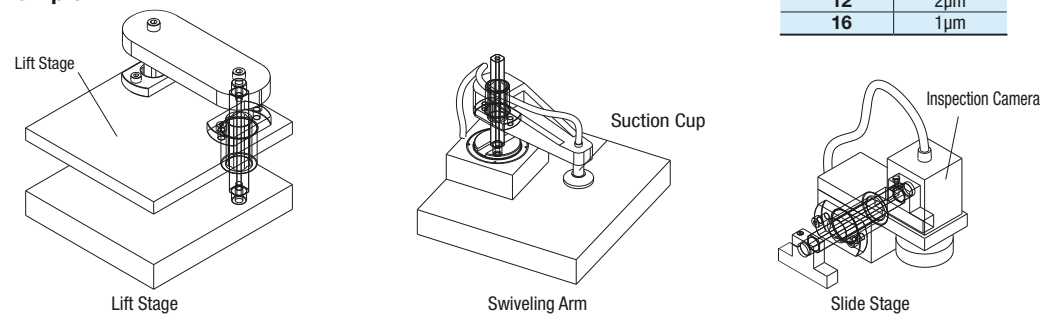


Load Rating Table

D	Basic Rated Torque		Basic Load Rating		Allowable Static Moment
	CT Dynamic (N·m)	CoT Static (N·m)	C Dynamic (kN)	Co Static (kN)	
6	12.3	21.0	3.4	5.0	10.6
10	48.7	84.4	6.8	10.0	23.0
12	91.3	162.9	11.9	17.4	76.4
16	115.7	212.0	11.9	17.4	83.6



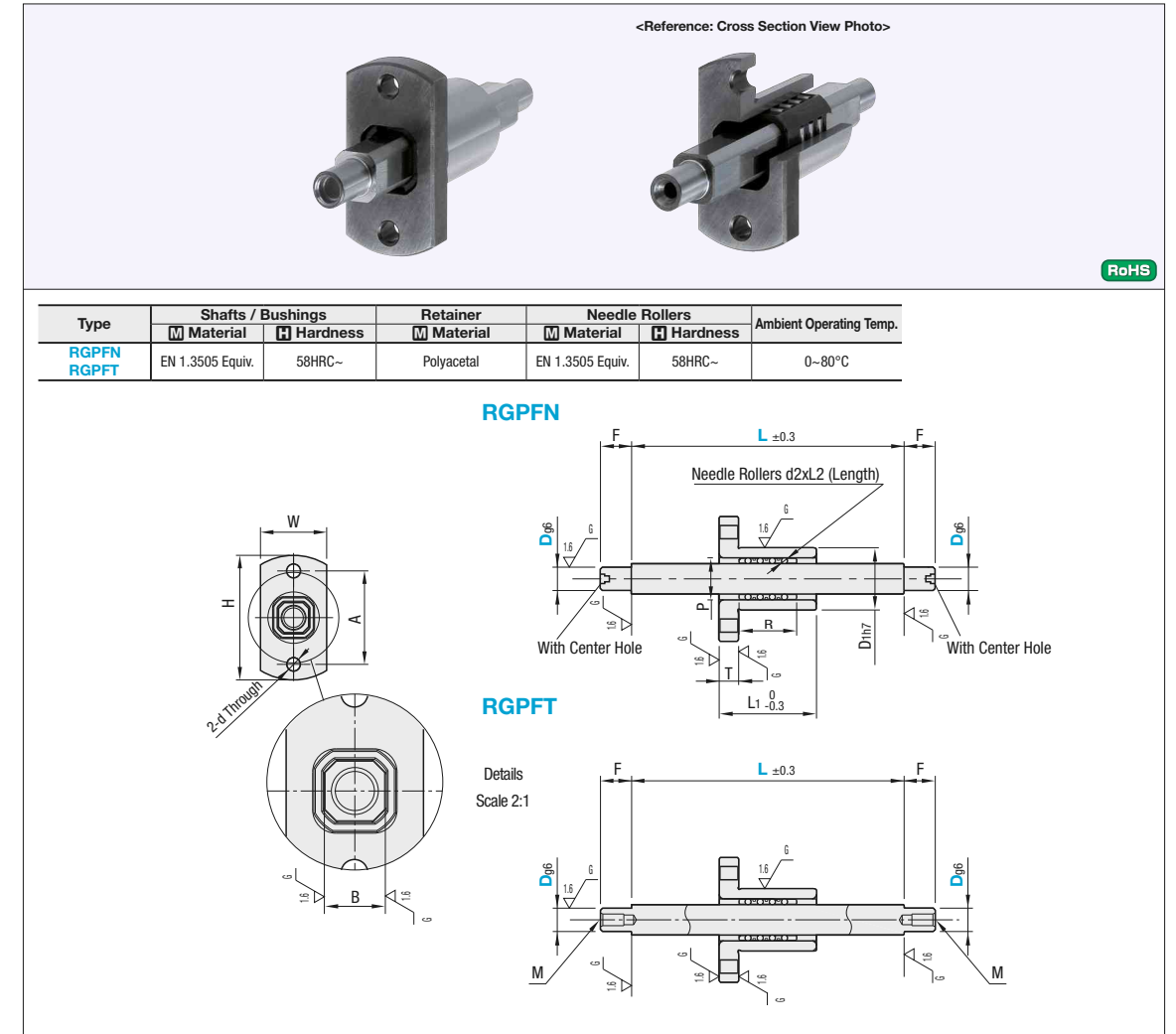
App. Example



Notes on handling

- Anti-rust oil is applied to the products when they are shipped. Administer lubrication maintenance with high-pressure grease (AFC Grease by THK), etc. as needed.
- When designing, position the bushing where the retainer does not fall out from the bushing at stroke ends.
- As a preload is applied, assemble slowly without any prying when inserting retainers. (It may cause damages to the retainers as well as damages on the rolling surfaces).
- Use covers, etc. if any foreign objects or dust may fall on the rolling surfaces.
- Avoid using in high temperature environments, keep below 80°C.
- Do not cold shrink fit the bushings and shafts. Residual austenite will transform into martensite and will expand I.D./O.D. of bushings and shafts, rendering them unusable.

High Rigidity Needle Guide Sets



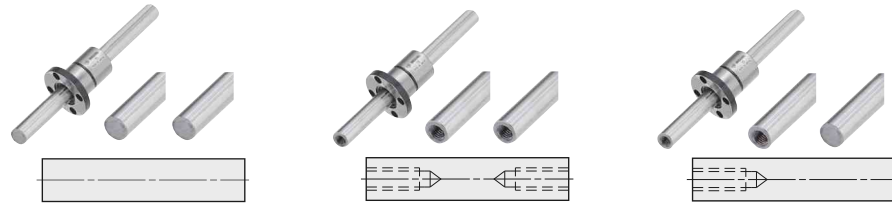
Type	Part Number		Effective Stroke (Reciprocating)	Shafts			Bushing						Retainer						
	Dg6	L 10mm Increment		F	B	M	D1	L1	T	H	W	P	d	A	R	d2	L2 (Length)	Needle Quantity	
RGPFN RGPFT	6	-0.004 -0.012	50~70	20	8	7.8	M3x 6	16	25	5	32	17	10.8	3.4	24	15	1.5	4.8	14
	10	-0.005 -0.014	60~80	30	8	11.0	M5x10	24	36	7	43	25	15.0	4.5	33	19	2	4.8	20
	12	-0.006 -0.017	90~120	40	10	14.6	M6x12	31	50	7	50	32	18.6	5.5	40	30	2	6.8	24
	16	-0.006 -0.017	100~130	50	10	18.9	M8x16	32	60	7	55	33	22.9	6.6	43	33	2	6.8	24

Ordering Example: Part Number - L
RGPFN10 - 60

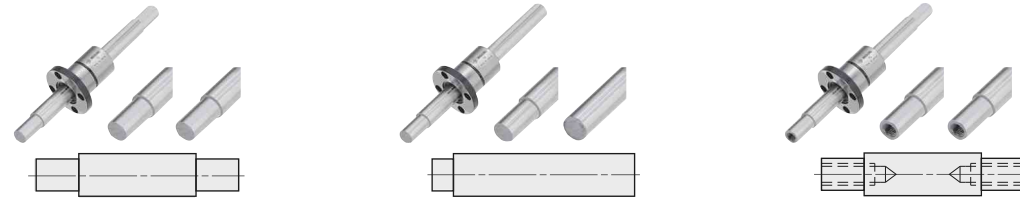
Type	Part Number		Unit Price 1 ~ 10 pc(s).	Volume Discount Rate 11~20
	D	L 10mm Increment		
RGPFN	6	50~70		
	10	60~80		
	12	90~120		
	16	100~130		
RGPFT	6	50~70		
	10	60~80		
	12	90~120		
	16	100~130		

Ball Splines / Miniature Ball Guides

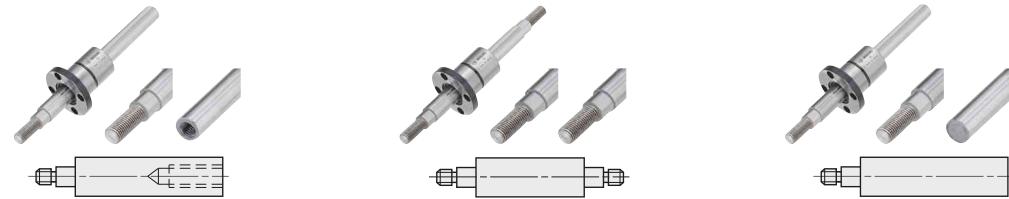
Ball Splines



Product Name	Ball Splines - Standard	Both Ends Tapped	One End Tapped
Page	341	343	345



Product Name	Both Ends Stepped	One End Stepped	Both Ends Stepped and Tapped
Page	347	349	351



Product Name	One End Stepped and Threaded, One End Tapped	Both Ends Stepped and Threaded	One End Stepped and Threaded
Page	353	355	357

Miniature Ball Guides



Product Name	Miniature Ball Guide Sets - Compact	Standard	With Retaining Ring
Page	362	361	363



Product Name	Shafts for Miniature Ball Guides - Straight	One End Machined / Both Ends Machined	Bushings for Miniature Ball Guides	Ball Sliders
Page	363	364	365	366

High Rigidity Needle Guide Set



Product Name	Needle Guide Set
Page	368

Characteristics Comparison List

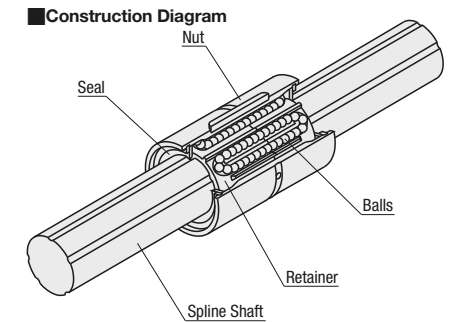
Product Name	Torque Transmission	Rotary Motion	Feature
Ball Splines P.341~	○	×	Single shaft-based ball splines are useful in many machine applications requiring transmission of linear motion / rotational torque and movement free from misalignment toward rotary motion for space saving, cost, weight, parts reduction advantages.
Miniature Ball Guides P.361~	×	○	Since balls are aligned in a staggered arrangement, Miniature Ball Guides are useful for linear/rotary compounded motion.

○: Available ×: Unavailable

Ball Splines - Overview

Features

- 1 Capable of Highly Accurate Linear Motion**
Shafts and nuts are offered as sets. This ensures accuracy with rotational clearance adjustment allowing for highly accurate linear motion.
- 2 Capable of Transmission of Torque**
Rotary motion of balls on grooves fine-grinding machined into spline shaft in R Shape makes ball spline capable of linear motion while transmitting torque.
- 3 Enables Compact Designs**
Rotary motion of balls along the line of groove allows for linear motion of ball spline without generating misalignment of nuts toward rotary motion even based on a single shaft.
- 4 High Load Capability and Long Life**
High load capacity and long running life due to presence of R-shaped grooves of splines tailored to ball dia. on the rolling surface where loads are applied.



Ⓢ Balls do not fall out even if the spline shaft is pulled out.

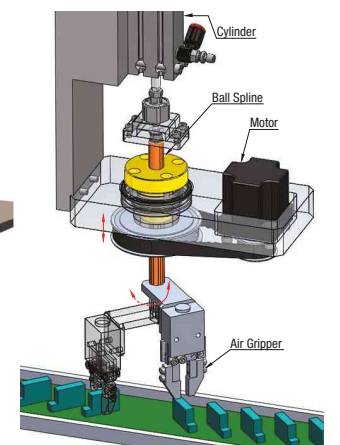
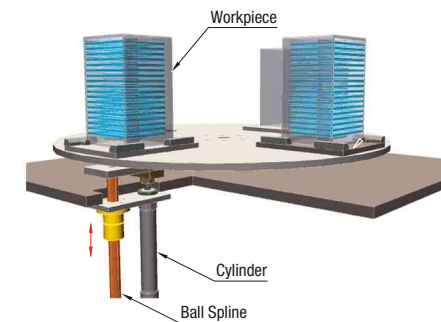
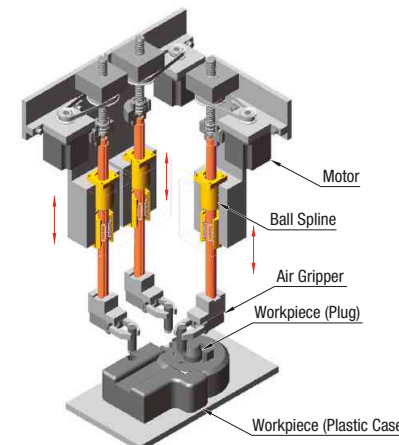
Lineup

27 variations (3 Nut Shapes x 9 Machined Shaft End Shapes)

Nut Shape	Shaft End Shape	Shaft End Shape		
		Straight (P.341)	One End Tapped (P.345)	Both Ends Tapped (P.343)
Straight	[Diagram]	[Diagram]	[Diagram]	[Diagram]
		One End Stepped (P.349)	Both Ends Stepped (P.347)	Both Ends Stepped and Threaded (P.351)
Round Flange	[Diagram]	One End Stepped and Threaded (P.357)	One End Stepped and Threaded, One End Tapped (P.353)	Both Ends Stepped and Threaded (P.355)
		Compact Flange	[Diagram]	[Diagram]

Application Examples

- 1 Pick and Place Application Unit**
When linear motion on each axis is needed in limited spaces, ball splines that can be used in single shaft configuration are effective.
- 2 Magazine Lifter Mechanism**
Space saving is enabled as there is no misalignment of nuts toward rotary motion even based on a single shaft.
- 3 Pick and Place Application Unit**
Since ball splines can also provide torque transmission, linear motion and rotary motion in one axis is enabled by providing rotation mechanism.



In addition, ball splines are used in many machines, such as coil winders, honing machines, optical measuring instruments, loaders, automatic filling machines, industrial robot arms, etc.

Ball Splines - Overview

Overview of Ball Spline Alterations / Grease Application Services

Accuracy

■ Spline Shaft: Raceway Twist Tolerance (Max.)
Unit: μm

Material	Tolerance
EN 1.3505 Equiv.	13
EN 1.4125 Equiv.	33

Spline groove twist is measured at an arbitrary 100mm section of the effective shaft length. If the length to be evaluated is longer or shorter than 100mm, proportionally add or subtract from the standard values in the table.

Note: Supporting portion is the part to mount the bearing and support the spline shaft.

■ Rotational Clearance Unit: μm

No.	Standard Preload	EN 1.3505 Equiv.	EN 1.4125 Equiv.
6	-2~+1	-	-1~+4
8	-	-3~+1	-
10	-	-	-2~+5
13	-	-	-
16	-	-	-
20	-	-	-
25	-4~+2	-	-
30	-	-	-

Ⓜ Values in () are for EN 1.4125 Equiv.

■ Tolerance (Max) of Accuracies against Spline Shaft Supporting Sections Unit: μm

No.	① Spline Section Perpendicularity of End Face of the Shafts	② Flange Mounting Surface Perpendicularity
6	9(22)	11(27)
8	-	13(33)
10	-	-
13	11(27)	16(39)
16	-	-
20	-	-
25	13	19
30	-	-

Ⓜ Values in () are for EN 1.4125 Equiv.

③ Max. Runout of Spline Axis Line

No.	-200	201~	316~	401~	501~	631~	801~	1001~
6	46(72)	89	126	163	-	-	-	-
8	-	-	-	-	-	-	-	-
10	36(59)	54(83)	68(103)	82	102	-	-	-
13	-	-	-	-	-	-	-	-
16	34(56)	45(71)	53(83)	62	75	-	-	-
20	-	-	-	-	-	-	-	-
25	32	39	44	50	57	68	83	102
30	-	-	-	-	-	-	-	-

Ⓜ Values in () are for EN 1.4125 Equiv.

④ Max. Runout of Spline Nut Outer Surface

No.	11(27)	13(33)	16(39)	19
6	11(27)	-	-	-
8	-	13(33)	-	-
10	-	-	16(39)	-
13	-	-	-	19
16	-	-	-	-
20	-	-	-	-
25	-	-	-	-
30	-	-	-	-

Ⓜ Values in () are for EN 1.4125 Equiv.

Calculation of Life

Running Life

● Radial Load

$$L = \left(\frac{ft \cdot fh \cdot fp \cdot C}{fw \cdot F} \right)^3 \cdot L_0$$

● Torque Load

$$L = \left(\frac{ft \cdot fh \cdot Ct}{fw \cdot T} \right)^3 \cdot L_0$$

L: Running Life (km)
ft: Temperature Factor
fh: Hardness Factor
fp: Ratio of Rated Load
fw: Load Factor
L0: Rated Life (50km)
C: Basic Dynamic Load Rating (N)
F: Applied Radial Load (N)
Ct: Basic Dynamic Torque (N · m)
T: Applied Torque (N · m)

Lh = $\frac{106 \cdot L}{120 \cdot St \cdot n}$
Lh: Running Time (hr)
L: Running Life (km)
St: Stroke Length (mm)
n: Reciprocating Cycles per Minute (cpm)

Ⓜ For values and factors, see below.

■ Temperature Factor (ft)

■ Hardness Factor (fh)

■ Ratio of Rated Load (fp)

Distributed Load

No.	No.6, 8	No.10, 13	No.16, 20, 25, 30
fp	1	1	1

Direct Download

No.	No.6, 8	No.10, 13	No.16, 20, 25, 30
fp	1	0.71	0.68

■ Load Factor (fw)

Conditions of Use	Load Factor (fw)
Minimal vibrations / shocks (Low speed 15m/min. or less)	1~2
Some vibrations / shocks (Medium speed 60m/min. or less)	2~3
Significant vibrations / shocks (High speed over 60m/min.)	3 or more

■ Load Rating

No.	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Cross Sectional Moment of Inertia mm ⁴
	Dynamic Ct N · m	Static Cot N · m	Dynamic C kN	Static Co kN	Mo1 N · m	Mo2 N · m	
6	3.8	7	1.2	2.1	5	36	6.2x10 ³
8	4.8	8.7	1.2	2.1	5	36	1.97x10 ⁴
10	19(11)	34(21)	3.8(2.4)	6.9(4.3)	26(15)	181(102)	5.57x10 ⁴
13	28(20)	52(37)	4.6(3.3)	8.3(5.9)	36(22)	251(148)	1.55x10 ⁵
16	51	93	6.2	11.1	56	386	3.61x10 ⁵
20	85	154	8.5	15.3	83	611	8.74x10 ⁵
25	193	348	15.4	27.7	173	1248	2.13x10 ⁶
30	272	490	18.5	33.3	212	1581	4.37x10 ⁶

Ⓜ Values in () are for EN 1.4125 Equiv.

Ⓜ If the number of nuts is 1, check the Mo1 column; if the said number is 2, check the Mo2 column.

Operating Temp.

Plastic components are used in ball spline assemblies. Avoid using in high temperature environments, keep below 80°C.

Alteration Overview

■ Dimensions of Keyways on the Shaft Ends (P and Q)

P, Q	b	Tolerance (N9)	t	Tolerance
8, 10	3	-0.004 -0.029	1.8	-
12	4	0	2.5	+0.1 0
13~16	5	-0.030	3.0	0
20	6	-	3.5	-
25	8	0 -0.036	4.0	+0.2 0

■ Dimensions of the Retaining Ring Grooves on the Shaft Ends (P and Q)

P, Q	Tolerance	m	Tolerance	d	Tolerance	Applicable Retaining Ring
3	0 -0.010	0.5	+0.05 0	2	+0.06 0	JIS E Type 2
4	-	-	-	3	0	JIS E Type 3
5	0 -0.012	0.7	+0.1 0	4	+0.075 0	JIS E Type 4
6	-	-	-	5.05	6.05	JIS E Type 5
8	0 -0.015	0.9	-	6.05	0 -0.09	JIS E Type 6
10	-	-	-	9.6	0	JIS C Type 10
12	-	-	-	11.5	0	JIS C Type 12
13	0 -0.018	1.15	+0.14 0	12.4	0	JIS C Type 13
15	-	-	-	14.3	-0.11	JIS C Type 15
16	-	-	-	15.2	-	JIS C Type 16
20	0 -0.021	1.35	-	19	0	JIS C Type 20
25	-	-	-	23.9	-0.21	JIS C Type 25

Lubrication

Ball splines are shipped greased. Administer lubrication maintenance with lithium soap based grease (Alvania Grease S2 by Showa Shell Sekiyu K.K), etc. for a mileage of 100km.

Various Grease Application Services

The Lubricant used for Ball Splines can be changed to any of the following Special Greases. Service is provided to apply grease on nuts and shafts. For performance of each grease, refer to the table below.

Type	Grease Product Name	Main Features
L Type	ET-100K (Made by Kyodo Yushi)	High heat resistance and oxidation stability. Also high adhesion and cohesion with limited splash or leakage.
G Type	LG2 (Made by NSK Ltd.)	Suitable for clean environment due to low particle generation grease. Highly resistant to corrosion.

Precautions for Use

- For Particle Generation Amount upon grease application, refer to the "Comparison of Particle Generation (Experimental Values)" section of "Linear Bushings." P304
- If G Type grease, Low Miscible Consistency grease, is applied onto the small dia. portion (No. 6, 8, or 10), resistance may be increased, and thus, sliding motion may be degraded.

Annealing Range

Spline Shafts are already hardened, and must be annealed before machining. Annealing may lower hardness on the machined area +10mm fore and aft. (See the examples below). Furthermore, the annealing portions are out of the guaranteed range of O.D. Tolerance. When calculating stroke, count out the dimensions of annealing portions.

(Ex.)

Annealing may lower hardness of the following sections:

- Threaded Ends
- Stepped Parts
- Tapped Ends
- Wrench flats, set screw flats, retaining ring grooves, tap alteration

Ordering Example

Part Number

- BSSS8L-300** (L Type Greased)
- BSSS8G-300** (G Type Greased)

Please add L or G after part number of Regular Type when placing an order.

Add the price in the table below to the unit price of applicable standard product.
 <Price Calculation Example> BSSS8G-300 (Standard)
 (Standard Type Unit Price) + (Unit Price in the Table Below) = (Total)

■ Grease Application Service Charges Table

Part Number (No.)	Unit Price (Add to the price of Standard Type)	
	Nut 1 pc.	Nut 2 pcs.
6 ≤ No. ≤ 13		
16 ≤ No. ≤ 30		

Alterations

Part Number: BSFS10G - L - M - (SC, FC...etc.)
 BSFS10G - 350 - M5 - SC15

Confirm the details of alterations on each page.

Ball Splines

Standard

Standard

Standard: **Spline Shafts** \square Spline Shaft EN 1.3505 Equiv. \square EN 1.7242 Equiv. \square Hardness: 58HRC~
Spline Shaft, Nut \square Material: EN 1.4125 Equiv. \square Hardness: 58HRC~

Standard	Nut 1 pc.		Nut 2 pcs.		Nut 1 pc.	
	L Dimension Selectable	L Dimension Configurable	L Dimension Selectable	L Dimension Configurable	L Dimension Selectable	L Dimension Configurable
With Round Flange Nut	BSSM	BHSM	BSS2M	BHS2M	BESKFS	BASKFS
With Compact Flange Nut	BSSN	BHSN	BSS2N	BHS2N	-	-
With Straight Nut	BSSS	BHSS	BSS2S	BHS2S	-	-

A Dimension of Included Key

Accuracy \square P339 \square For the included nut, please select a shape from below.

Round Flange Nuts
No. 6, 8 (3-d Lube Hole)
No. 10, 13 (4-d Lube Hole)
No. 16, 20, 25, 30 (5-d Lube Hole)

Compact Flange Nuts
No. 6, 8 (2-Mounting Holes, 3-d Lube Hole)
No. 10 (2-Mounting Holes, 4-d Lube Hole)

Straight Nuts
No. 6, 8 (3-d Lube Hole)
No. 10, 13 (4-d Lube Hole)
No. 16, 20, 25, 30 (5-d Lube Hole)

Flanged Nut Orientation:
- 1 Nut Type
- 2 Nut Type

* Please refrain from machining the nuts as it may have adverse effects on the accuracy.

Spline Shaft L dim. Selectable Type

Part Number	Type	No.	L Selection (mm)											D	Mass (kg/m)
BSSM	BSSM	6	150*	200*	300*	400*	6	0.23							
BSSN		8	150*	200*	300*	400*	8	0.39							
BSSS	BSSS	10	150	200*	300*	400*	500	600	10.4	0.65					
BSS2M		13	150	200*	300*	400*	500	600	13.4	1.11					
BSS2N	BSS2N	16	150	200*	300*	400*	500	600	16.6	1.65					
BSS2S		20	150	200	300	400	500	600	700	20.6	2.57				
BESKFS	BESKFS	25	150	200	300	400	500	600	700	800	900	25.8	4.04		
		30	150	200	300	400	500	600	700	800	900	1000	1150	30.8	5.85

Spline Shafts L Dimension Configurable

Part Number	Type	No.	L 1mm Increment		D	Mass (kg/m)
BHSM	BHSM	*6	60~400(200)	60~400	6	0.23
BHSN		*8	60~400(200)	60~400	8	0.39
BHSS	BHSS	*10	60~600(400)	90~600	10.4	0.65
BHS2M		*13	60~600(400)	100~600	13.4	1.11
BHS2N	BHS2N	*16	70~600(400)	110~600	16.6	1.65
BHS2S		20	80~700	130~700	20.6	2.57
BASKFS	BASKFS	25	90~900	150~900	25.8	4.04
		30	100~1150	170~1150	30.8	5.85

Only * marked sizes are available for BESKFS.
For BSSN and BSS2N, only No. 6, 8 and 10 are available.
For BSSM and BSS2M, only * marked sizes are available, and the Max. L dimension is in ().
For BHSM and BHS2M, only No. 6, 8 and 10 are available.
For BHSN and BHS2N, only No. 6, 8 and 10 are available.

Round Flange Nuts, Compact Flange Nuts

No.	D(h6)	L	Df	H	P.C.D.	d1	d2	h	W	d	B	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)
												Dynamic C _i (N·m)	Static C _o (N·m)	Dynamic C _i (kN)	Static C _o (kN)	M _{o1} (N·m)	M _{o2} (N·m)	
6	14	25	30	6	22	3.5	6	3.1	6.5	1.5	18	3.8	7	1.2	2.1	5	36	0.03
8	16		32	6	24					21	4.8	8.7	1.2	2.1	5	36	0.04	
10	21	40(33)	42(41)	6(8)	32(30)		4.4(5.3)	14(8.5)	15(10)	25	19(11)	34(21)	3.8(2.4)	6.9(4.3)	26(15)	181(102)	0.09	
13	24	44(36)	44(45)	7(8)	33(34)	4.5	8			28(20)	52(37)	4.6(3.3)	8.3(5.9)	36(22)	251(148)	0.11		
16	31	50	51	7	40		4.4	18		51	93	6.2	11.1	56	386	0.2		
20	35	63	58	9	45	5.5	9.5	22.5		85	154	8.5	15.3	83	611	0.3		
25	42	71	65	9	52		26.5			193	348	15.4	27.7	173	1248	0.4		
30	47	80	75	10	60	6.6	11	30	2.5	272	490	18.5	33.3	212	1581	0.57		

Dimensions in () are for EN 1.4125 Equiv. Allowable static moment M_{o1} is a value measured when a single nut is used, and M_{o2} is a value measured when two nuts are used.

Straight Nuts

No.	D (h6)	L	b	Tolerance	t	+0.05	d	α	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)	Dimensions of Key (Included)			
									Dynamic C _i (N·m)	Static C _o (N·m)	Dynamic C _i (kN)	Static C _o (kN)	M _{o1} (N·m)	M _{o2} (N·m)		M _{o1} (kN)	M _{o2} (kN)	B	Tolerance
6	14	25	2.5	+0.014	1.2	1.5	15°	3.8	7	1.2	2.1	5	36	0.012	2.5	2.5	0	10.5	1.25
8	16						25°	4.8	8.7	1.2	2.1	5	36	0.013	3	3	0	10.5	
10	21	40(33)	3	0	1.5	1.5	-	19(11)	34(21)	3.8(2.4)	6.9(4.3)	26(15)	181(102)	0.06	3	3	-0.025	17(14)	
13	24	44(36)						28(20)	52(37)	4.6(3.3)	8.3(5.9)	36(22)	251(148)	0.07	4	4	0	17(14)	
16	31	50	3.5					51	93	6.2	11.1	56	386	0.15	3.5	3.5		18	1.75
20	35	63						85	154	8.5	15.3	83	611	0.2	4	4	0	29	
25	42	71	4	+0.018	2.5	2		193	348	15.4	27.7	173	1248	0.29	4	4	-0.030	33	
30	47	80						272	490	18.5	33.3	212	1581	0.37	4	4		42	

Dimensions in () are for EN 1.4125 Equiv. Allowable static moment M_{o1} is a value measured when a single nut is used, and M_{o2} is a value measured when two nuts are used.

L dim. Selectable Type

Part Number	Type	No.	Unit Price												
			L150	L200	L300	L400	L500	L600	L700	L800	L900	L1000	L1150		
BSSM BSS2M	BSSM	6					-	-	-	-	-	-	-	-	-
		8					-	-	-	-	-	-	-	-	-
		10					-	-	-	-	-	-	-	-	-
		13					-	-	-	-	-	-	-	-	-
		16					-	-	-	-	-	-	-	-	-
		20					-	-	-	-	-	-	-	-	-
BSSN BSS2N	BSSN	6					-	-	-	-	-	-	-	-	
		8					-	-	-	-	-	-	-	-	
		10					-	-	-	-	-	-	-	-	
		13					-	-	-	-	-	-	-	-	
		16					-	-	-	-	-	-	-	-	
		20					-	-	-	-	-	-	-	-	
BSSS BSS2S	BSSS	6					-	-	-	-	-	-	-	-	
		8					-	-	-	-	-	-	-	-	
		10					-	-	-	-	-	-	-	-	
		13					-	-	-	-	-	-	-	-	
		16					-	-	-	-	-	-	-	-	
		20					-	-	-	-	-	-	-	-	

Price of BSS2M = BSSM + Additional price shown below
Price of BSS2N = BSSN + Additional price shown below
Price of BSS2S = BSSS + Price in the List

Part Number	Type	No.	L150	L200	L300	L400
BESKFS	BESKFS	6				
		8				
		10				
		13				
		16				

L Dimension Configurable

Part Number	Type	No.	Unit Price												
			Min. L -150	L151 -200	L201 -300	L301 -400	L401 -500	L501 -600	L601 -700	L701 -800	L801 -900	L901 -1000	L1001 -1150		
BHSM BHS2M	BHSM	6					-	-	-	-	-	-	-	-	-
		8					-	-	-	-	-	-	-	-	-
		10					-	-	-	-	-	-	-	-	-
		13					-	-	-	-	-	-	-	-	-
		16					-	-	-	-	-	-	-	-	-
		20					-	-	-	-	-	-	-	-	-
BHSN BHS2N	BHSN	6					-	-	-	-	-	-	-	-	
		8					-	-	-	-	-	-	-	-	
		10					-	-	-	-	-	-	-	-	
		13					-	-	-	-	-	-	-	-	
		16					-	-	-	-	-	-	-	-	
		20					-	-	-	-	-	-	-	-	
BHSS BHS2S	BHSS	6					-	-	-	-	-	-	-	-	
		8					-	-	-	-	-	-	-	-	
		10					-	-	-	-	-	-	-	-	
		13					-	-	-	-	-	-	-	-	
		16					-	-	-	-	-	-	-	-	
		20					-	-	-	-	-	-	-	-	

Price of BHS2M = BHSM + Additional price shown below
Price of BHS2N = BHSN + Additional price shown below
Price of BHS2S = BHSS + Additional price shown below

Part Number	Type	No.	Unit Price						
			Min. L -100	L101 -150	L151 -200	L201 -250	L251 -300	L301 -350	L351 -400
BASKFS	BASKFS	6							
		8							
		10							
		13							
		16							

No.	Additional Price for 2-Nut Type		
	Round Flange Nuts	Compact Flange Nuts	Straight Nuts
6			
8			
10			
13			
16			
20			
25			
30			



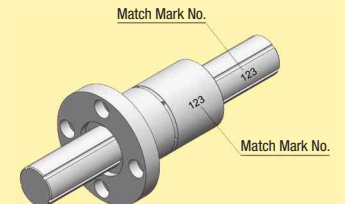
Ordering Example

Part Number	-	L
BHS2M10	-	555
BSSS8	-	300
BHS2M10G	-	555
BSSS8L	-	300

Alternative grease types available.
For Days to Ship, Price and Performance, see \square P340

Cautions for Ball Spline Assembly

- Check Assembly Position**
Match Mark No.'s are entered on nuts and spline shafts (see diagram on right).
When re-assembling, match the character orientations of Match Mark No.'s, and positional relationship.
- Tolerance for Mating Bores**
An H7 tolerance is recommended for mating bores for the spline nuts.
- For Customers machining the shaft ends**
In order to facilitate easy nut insertions, chamfer the machined shaft ends, and remove burrs on the edges of the spline groove with a round file.



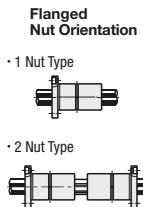
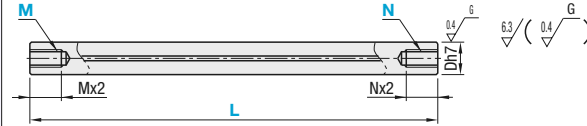
Ball Splines

Both Ends Tapped

Both Ends Tapped

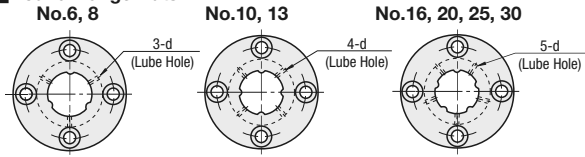


Both Ends Tapped	Spline Shafts \square EN 1.3505 Equiv. Nut \square EN 1.7242 Equiv. \square Hardness: 58HRC-		Spline Shaft, Nut \square Material: EN 1.4125 Equiv. \square Hardness: 58HRC-
	Nut 1 pc.	Nut 2 pcs.	Nut 1 pc.
With Round Flange Nut	BSHM	BSH2M	BASBFS
With Compact Flange Nut	BSHN	BSH2N	
With Straight Nut	BSHS	BSH2S	

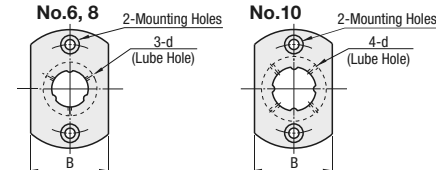


When selecting Overall Length (L Dimension), check the Annealing Range. \square P.340
Accuracy \square P.339 For the included nut, please select a shape from below.

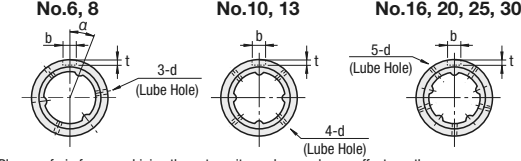
Round Flange Nuts



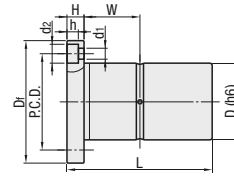
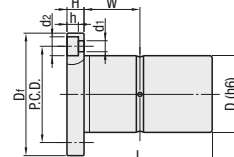
Compact Flange Nuts



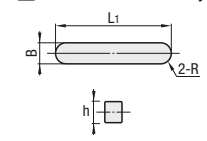
Straight Nuts



* Please refrain from machining the nuts as it may have adverse effects on the accuracy.



Dimension of Included Key



Spline Shafts

Part Number	Type	No.	L 1mm Increment		M (Coarse) / N (Coarse) Selection	D	Mass (kg/m)
			1-Nut Type	2-Nut Type			
BSHM BSHN BSHS BSH2M BSH2N BSH2S BASBFS		*6	60-400(190)	60-400	3	6	0.23
		*8	60-400(190)	60-400	3 4	8	0.39
		*10	60-600(390)	90-600	3 4 5	10.4	0.65
		*13	60-600(390)	100-600	4 5 6	13.4	1.11
		*16	70-600(390)	110-600	4 5 6 8	16.6	1.65
		20	80-700	130-700	5 6 8 10	20.6	2.57
		25	90-900	150-900	5 6 8 10 12	25.8	4.04
		30	100-1150	170-1150	6 8 10 12 16	30.8	5.85

For BASBFS, only * marked sizes are available, and the Max. L dimension is in ().

For BSHN and BSH2N, only No. 6, 8 and 10 are available.

Round Flange Nuts, Compact Flange Nuts

No.	D(h6)	L	Df	H	P.C.D.	d1	d2	h	W	d	B	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)
												Dynamic C _t (N·m)	Static C _t (N·m)	Dynamic C _r (kN)	Static C _r (kN)	M ₀₁ (N·m)	M ₀₂ (N·m)	
6	14	25	30	6	22	3.5	6	3.1	6.5	1.5	18	3.8	7	1.2	2.1	5	36	0.03
8	16		32	6	24						21	4.8	8.7	1.2	2.1	5	36	0.04
10	21	40(33)	42(41)	6(8)	32(30)			4.4(5.3)	14(8.5)	2.5	25	19(11)	34(21)	3.8(2.4)	6.9(4.3)	26(15)	181(102)	0.09
13	24	44(36)	44(45)	7(8)	33(34)	4.5	8		15(10)		28(20)	52(37)	4.6(3.3)	8.3(5.9)	36(22)	251(148)	0.11	
16	31	50	51	7	40			4.4	18		51	93	6.2	11.1	56	386	0.2	
20	35	63	58	9	45	5.5	9.5	5.4	22.5	2	85	154	8.5	15.3	83	611	0.3	
25	42	71	65	9	52			26.5			193	348	15.4	27.7	173	1248	0.4	
30	47	80	75	10	60	6.6	11	6.5	30	2.5	272	490	18.5	33.3	212	1581	0.57	

Dimensions in () are for EN 1.4125 Equiv. Allowable static moment M₀₁ is a value measured when a single nut is used, and M₀₂ is a value measured when two nuts are used.

Straight Nuts

No.	D(h6)	L	b	Tolerance	t	+0.05	0	d	α	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)	Dimensions of Key (Included)						
										Dynamic C _t (N·m)	Static C _t (N·m)	Dynamic C _r (kN)	Static C _r (kN)	M ₀₁ (N·m)	M ₀₂ (N·m)		M ₀₁ (kN)	M ₀₂ (kN)	B	Tolerance	h	Tolerance	L1
6	14							1.2	15°	3.8	7	1.2	2.1	5	36	0.012	2.5	+0.016	2.5	0		10.5	1.25
8	16	25	2.5	+0.014	1.2				25°	4.8	8.7	1.2	2.1	5	36	0.013						10.5	
10	21	40(33)	3	0	1.5	1.5				19(11)	34(21)	3.8(2.4)	6.9(4.3)	26(15)	181(102)	0.06		+0.006	3	-0.025		17(14)	1.5
13	24	44(36)								28(20)	52(37)	4.6(3.3)	8.3(5.9)	36(22)	251(148)	0.07						17(14)	
16	31	50	3.5		2					51	93	6.2	11.1	56	386	0.15					3.5	18	1.75
20	35	63		+0.018						85	154	8.5	15.3	83	611	0.2					4	29	
25	42	71	4	0	2.5	2				193	348	15.4	27.7	173	1248	0.29		+0.024	4	0		33	2
30	47	80			2.5					272	490	18.5	33.3	212	1581	0.37		+0.012		-0.030		42	

Dimensions in () are for EN 1.4125 Equiv. Allowable static moment M₀₁ is a value measured when a single nut is used, and M₀₂ is a value measured when two nuts are used.

Part Number	Type	No.	Unit Price														
			Min. L ~150	L151 ~200	L201 ~300	L301 ~400	L401 ~500	L501 ~600	L601 ~700	L701 ~800	L801 ~900	L901 ~1000	L1001 ~1150				
BSHM BSH2M		6															
		8															
		10															
		13															
		16															
		20															
BSHN BSH2N		6															
		8															
		10															
		13															
BSHS BSH2S		6															
		8															
		10															
		13															
		16															
		20															

Part Number	Type	No.	Unit Price					Additional Price for 2-Nut Type				
			Min. L ~150	L151 ~200	L201 ~250	L251 ~300	L301 ~350	L351 ~390	No.	Round Flange Nuts	Compact Flange Nuts	Straight Nuts
BASBFS		6										
		8										
		10										
		13										
		16										
		20										

Alterations Part Number - L - M - N - (SC, FC)
BSHN10 - 270 - M5 - N5 - SC15

Ordering Example Part Number - L - M - N
BSHS8 - 270 - M4 - N4
BSHS8G - 270 - M4 - N4
BSHS8L - 270 - M4 - N4

Alterations	Wrench Flats	Set Screw Flat
	SC	FC

When selecting multiple alteration additions, more than 2 mm is needed between each feature to be added.

Cautions for Ball Spline Assembly

Check Assembly Position
Match Mark No.'s are entered on nuts and spline shafts (see diagram on right).
When re-assembling, match the character orientations of Match Mark No.'s, and positional relationship.

Tolerance for Mating Bores
An H7 tolerance is recommended for mating bores for the spline nuts.