HIWIN®
Motion Control & Systems

BALL SPLINE

Feature /

HIWIN Ball Spline is a rolling guide element, mainly composed of nuts, screws, steel balls and retainers. By the steel ball between the nut and the screw, the rolling of the infinite cycles allows the nut to move linearly along the screw with high precision. The ball contact point in ball spline is angular contact structure, which can withstand both radial and torque load. With the integrated design between nuts and bearings, it makes the ball spline achieve high payload with compact structure.

The ball spline has three sets of loaded balls, where the balls are under face-to-face angular contact and held by the retainer. The optimized retainer design provides the high speed, acceleration and deceleration guiding movement as well as hold the balls firmly without falloff when taking out the shaft.

- Transmission of torque

  Compared with the linear bearing, the balls rolling on the groove with the angular contact offer the relative movement between the nut and the screw in order to achieve the function of the torque transmission.

- Integral structure

  With the integration of the nut and support bearings, the ball spline can achieve high precision and the compact structure design.

- Easy installation

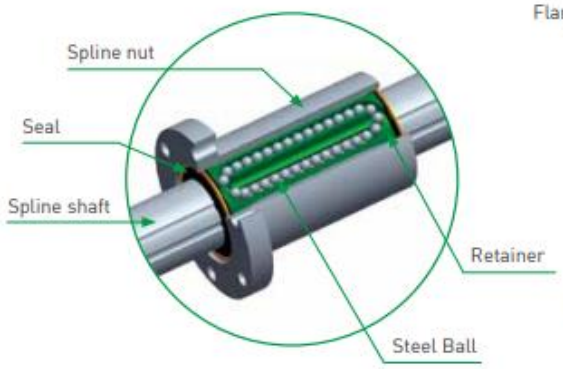
  With the optimized retainer design, the spline shaft can easily be removed without having the balls falloff from the nut.

- Lubricant path

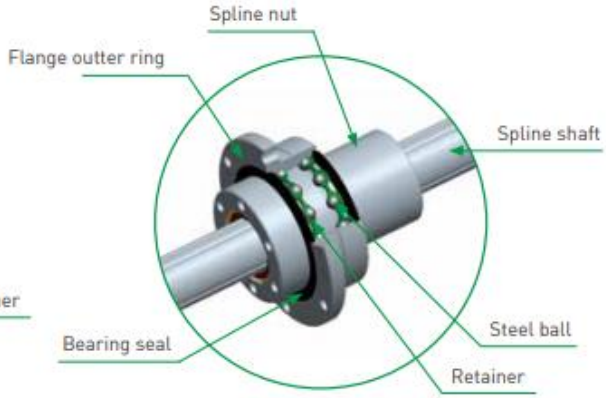
  With the optimization of the lubricant path, the grease will be directly guided to the ball track to improve the lubrication effect and enhance the service life.

FS, FSR Type

Structure /



FS Type



FSR Types

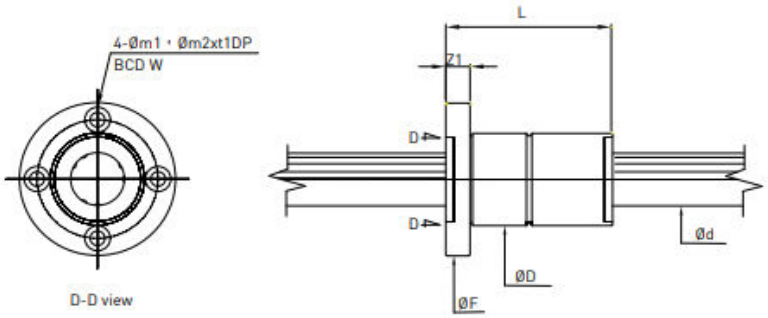
Specification Coding /

SP 20 - FS - 400 - 500 - H - H

- SP: Ball spline
- 20: Nominal shaft diameter
- FS: Nut type (FS: Flange, FSR:Rotation)
- 400: Ditch length
- 500: Total length
- H: Precision (C:Normal, H:High, P:Precise)
- H: None: Solid shaft, H:Hollow shaft

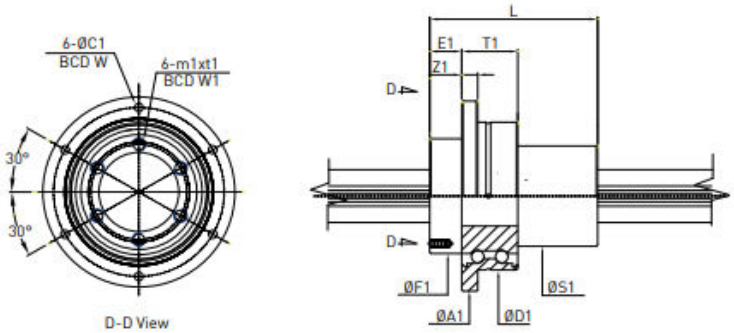
Size table /

FS Type



Nominal Diameter	FS Type										
	Basic rated load		Basic rated torque		Permissible static moment	Diameter	Flange diameter	Length	W	m1	m2xt1
	C (kN)	Co (kN)	C_T (N-m)	C_{oT} (N.m)	MA (N.m)	D	F	L			
16	7.2	13.5	32.1	34.4	67.6	31	51	50	40	4.5	8x4.4
20	10.4	19.9	57.8	63.25	118	35	58	63	45	5.5	9.5x5.4
25	15.4	27.5	106.5	108.8	210	42	65	71	52	5.5	9.5x5.4

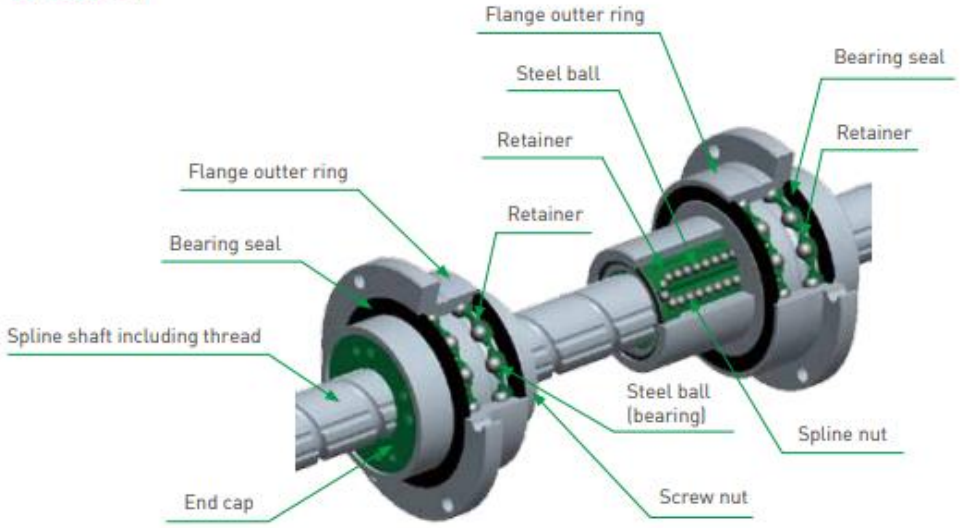
FSR Type



Nimonal diameter	FSR Type																	Support bearing basic rated load	
	Basic rated load		Basic rated torque		Permissible static moment	Diameter	Flange diameter	Total length	F1	S1	T1	E1	Z1	W	W1	m1xt1	C1		
	C (kN)	Co (kN)	C_T (N-m)	C_{oT} (N.m)	MA (N.m)	D	A1	L										Ca (kN)	Coa (kN)
16	7.2	13.5	32.1	34.4	67.6	48	64	50	36	31	21	10	6	56	30	M4x6	4.5	7.1	12.6
20	10.4	19.9	57.8	63.25	118	56	72	63	43.5	35	21	12	6	64	36	M5x8	4.5	11	20.4
25	15.4	27.5	106.5	108.8	210	66	86	71	52	42	25	13	7	75	44	M5x8	5.5	12.5	26

FBR Type

Structure /



Ballscrew nut **Ball spline nut**

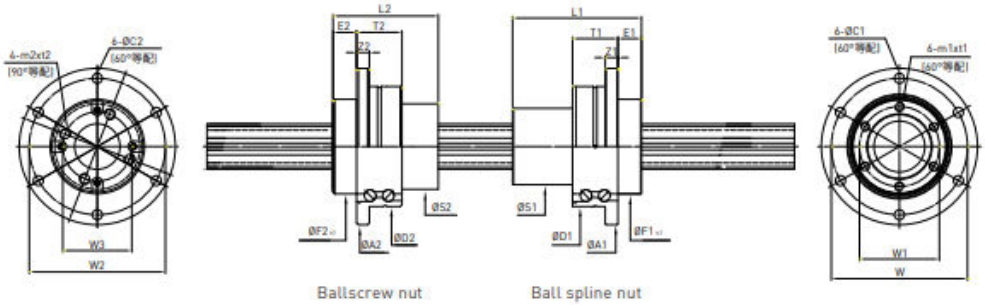
Specification Coding /

SP 20 - FBR - 400 - 500 - H

- SP: Ball spline
- 20: Nominal diameter
- FBR: Nut type (FBL:Left thread, FBR:Right thread)
- 400: Ditch length
- 500: Total length
- H: None:Solid shaft, H:Hollow shaft

Size table /

FBR Type

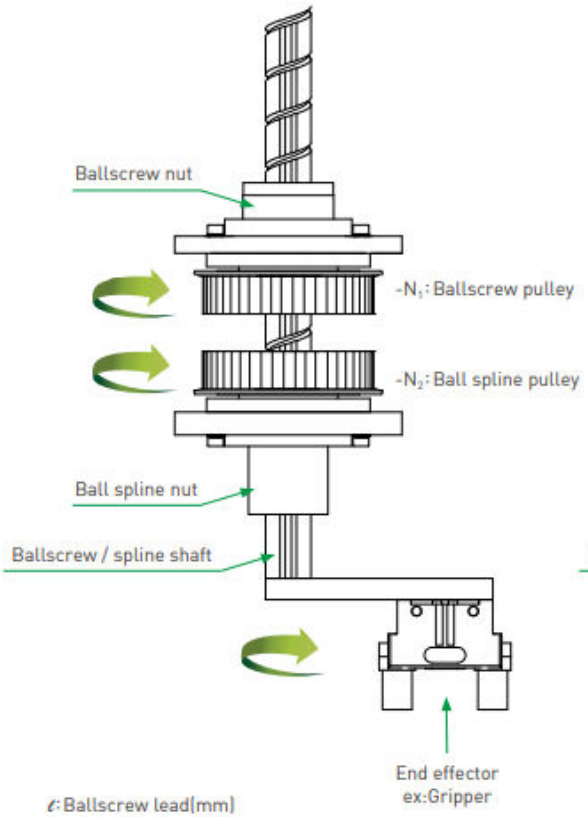


Unit:mm

Model no	Specification			Ballscrew nut														Support bearing basic rated load	
	Nominal outter diameter	Nominal inner diameter	Lead	Basic rated load		Diameter D2 g6	Flange diameter A2	Total length L2	F2	S2	T2	E2	Z2	W2	W3	m2xt2	C2		
				Ca(kN)	Coa(kN)													Ca(kN)	Coa(kN)
16	16	11	16	5.6	11.1	48	64	40	36	32	21	10	6	52	25	M4x8	4.5	7.1	12.6
20	20	14	20	6.3	14	56	72	48	43.5	39	21	11	6	64	31	M5x7.5	4.5	11	20.4
25	25	18	25	9.5	21.8	66	86	58	52	47	25	13	7	75	38	M5x12	5.5	12.5	26

Model no	Ball spline nut																	Support bearing basic rated load	
	Basic rated load		Basic rated torque		Permissible static moment	Diameter D1	Flange diameter A1	Total length L1	F1	S1	T1	E1	Z1	W	W1	m1xt1	C1		
	C(kN)	Co(kN)	C_t(N.m)	C_{ot}(N.m)	Ma(N.m)													Ca(kN)	Coa(kN)
16	7.2	13.5	32.1	34.4	67.6	48	64	50	36	31	21	10	6	56	30	M4x6	4.5	7.1	12.6
20	10.4	19.9	57.8	63.25	118	56	72	63	43.5	35	21	12	6	64	36	M5x8	4.5	11	20.4
25	15.4	27.5	106.5	108.8	210	66	86	71	52	42	25	13	7	75	44	M5x8	5.5	12.5	26

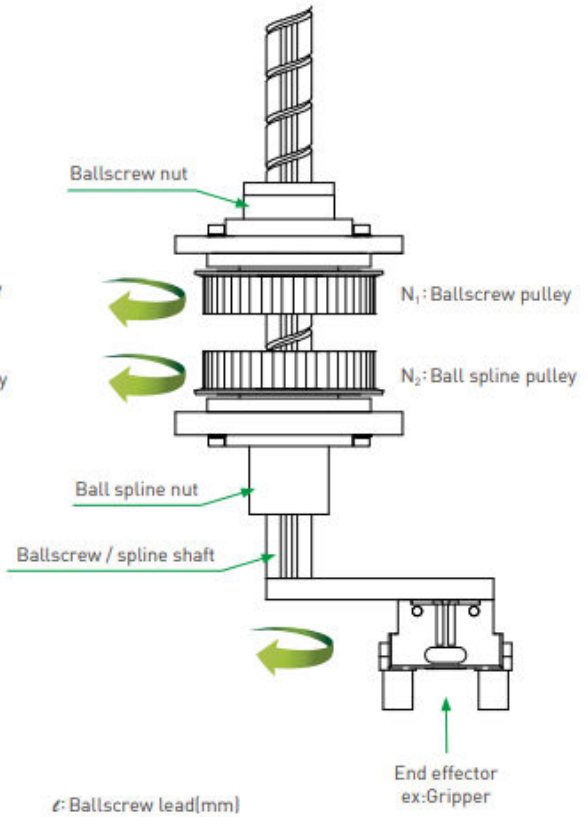
FBR Type Ball Spline Working Mode /



ℓ: Ballscrew lead(mm)

-N_1 : Ballscrew pulley rotating speed (counterclockwise)(min^{-1})

-N_2 : Ball spline pulley rotating speed (counterclockwise)(min^{-1})



ℓ: Ballscrew lead(mm)

N_1 : Ballscrew pulley rotating speed (counterclockwise)(min^{-1})

N_2 : Ball spline pulley rotating speed (counterclockwise)(min^{-1})

GAMB power transmission

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