

■ 2-4-3 Operating Conditions and Determination of the Preload Level

Table 2.4.1 presents guidelines for determining the appropriate clearance in the rotational direction for different operating environment. The rotational clearance of the Ball Spline significantly affects the accuracy and rigidity of the Spline nut. Therefore, it is critical to select the clearance best suited to the intended uses of the Ball Spline. Normally, the Ball Spline is preloaded. When it is subjected to repeated swiveling and reciprocal linear motion, the system receives heavy vibration and impact. In such an environment, preload prolongs the service life and improves accuracy.

Table 2.4.1 Guidelines for Determining an Appropriate Ball Spline Clearance according the Rotational Direction.

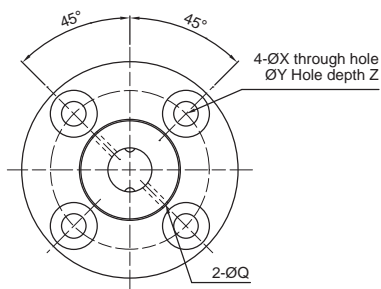
Clearance in the Rotational Direction	Preload	Operating conditions	Applications
	Medium Preload P2	<ul style="list-style-type: none"> High rigidity is required. Vibration and impact are severe. The moment load must be borne by a single spline nut. 	<ul style="list-style-type: none"> Construction-work-vehicle steering shaft. Spot-welding-machine shaft. Automatic-lathe-tool rest indexing shaft.
	Light Preload P1	<ul style="list-style-type: none"> Hanging loads and moments are applied. High position accuracy is required. Alternate loads are applied. 	<ul style="list-style-type: none"> Industrial robot arm Various automatic loaders. Automatic-painting-machine guideshaft. Electric-discharge-machine spindle. Press die-set guideshaft. Drilling-machine spindle.
	No Preload P0	<ul style="list-style-type: none"> Smooth movement should be achieved with only a low magnitude of force. Torque is continually applied in a given direction. 	<ul style="list-style-type: none"> Various measuring instruments. Automatic drafting machine. Shape-measuring instrument. Dynamometer. Wirewinder. Automatic arccutter. Honing-machine spindle. Automatic packing machine.

Table 2.4.2

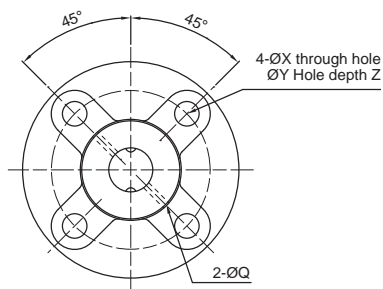
Preload Nominal Diameter					No Preload P0	Slight Preload P1	Medium Preload P2
6	8	10	12	13	-2 ~ +1	-6 ~ -2	-
15		16	20		-2 ~ +1	-6 ~ -2	-9 ~ -5
25			30		-3 ~ +2	-10 ~ -4	-14 ~ -8
40		50			-4 ~ +2	-16 ~ -8	-22 ~ -14

3-1 Nominal Model Code of Ball Spline SLF Series

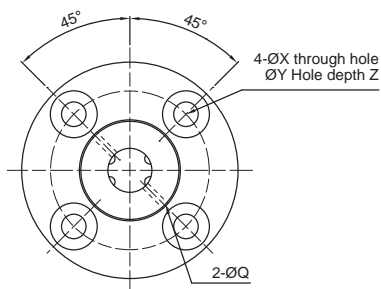
SLF Series Specifications



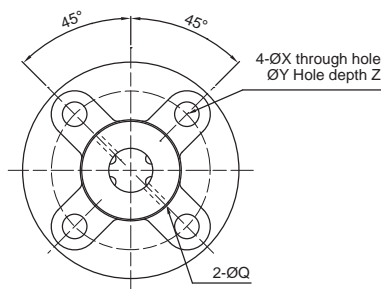
【Two Starts】 Type : 06、10、13



【Two Starts】 Type : 08、16、20

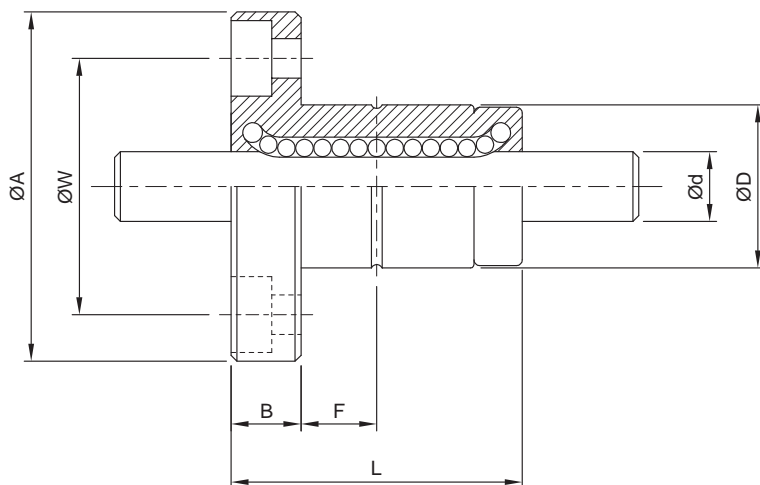


【Four Starts】 Type : 40、50



【Four Starts】 Type : 25、30

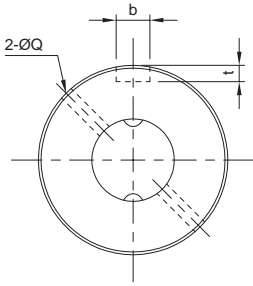
Model No.	Diameter		Spline Nut Dimension									
	d	Row	D	L	A	B	F	Oil Hole	W	Mounting Hole		
	h7							Q		X	Y	Z
SLF006	6	2	14	25	30	6	7.5	1	22	3.4	6.5	3.5
SLF008	8	2	16	27	32	8	7.5	1.5	24	3.4	6.5	4.5
SLF010	10	2	21	33	42	9	10.5	1.5	32	4.5	8	4
SLF013	13	2	24	36	44	9	11	1.5	33	4.5	8	4.5
SLF016	16	2	31	50	51	10	18	2	40	4.5	8	6
SLF020	20	2	35	56	58	10	18	2	45	5.5	9.5	5.4
SLF025	25	4	42	71	65	13	26.5	3	52	5.5	9.5	8
SLF030	30	4	47	80	75	13	30	3	60	6.6	11	8
SLF040	40	4	64	100	100	18	36	4	82	9	14	12
SLF050	50	4	80	125	124	20	46.5	4	102	11	17.5	12



Model No.	Basic Load Rating		Basic Torsion		Static Permissible Moment		Mass	
	C	C ₀	C _T	C _{0T}	M _{A1}	M _{A2}	Spline Nut	Spline Shaft
	kgf	kgf	kgf · m	kgf · m	kgf · m	kgf · m	g	kg/m
SLF006	137	225	0.46	0.76	0.39	3.48	36.7	0.22
SLF008	137	225	0.60	0.99	0.39	3.82	47	0.39
SLF010	285	397	1.62	2.25	0.95	8.53	100	0.60
SLF013	396	540	2.89	3.94	1.50	12.46	117	1.03
SLF016	545	849	4.77	7.43	3.71	26.09	226	1.56
SLF020	724	1109	7.90	12.09	5.53	38.00	303	2.44
SLF025	1003	1593	21.99	43.01	10.35	68.59	458	3.80
SLF030	1160	1980	30.26	62.93	15.68	93.27	633	5.49
SLF040	2972	4033	105.37	176.05	36.59	246.34	1430	9.69
SLF050	4086	5615	179.89	304.35	51.58	428.72	2756	15.19

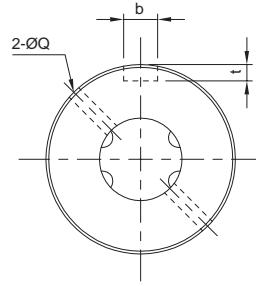
3-1 Nominal Model Code of Ball Spline SL Series

SLT Series Specifications



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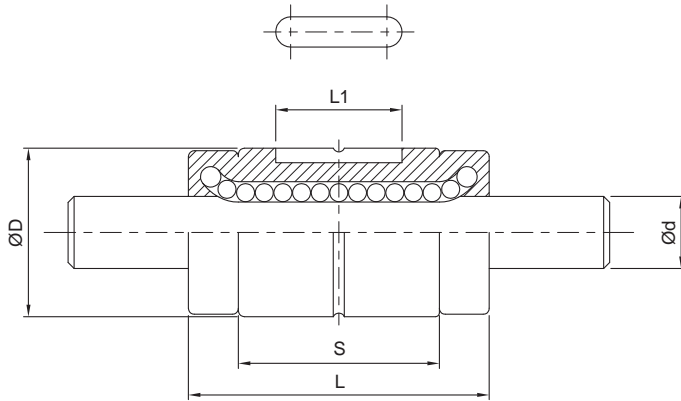
Shaft diameter $d \leq 20$



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Shaft diameter $d \geq 25$

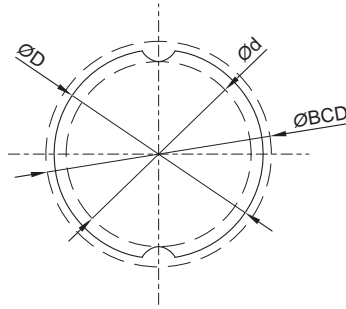
Model No.	Diameter		Row	Spline Nut Dimension				Keyway Dimensions		
	d	h7		D	L	S	L1	Oil Hole	b	t
								Q	H8	+0.05 ~0
SLT006	6		2	14	25	16.7	10.5	1	2.5	1.2
SLT008	8		2	16	27	15.7	10.5	1.5	2.5	1.2
SLT010	10		2	21	33	20	13	1.5	3	1.5
SLT013	13		2	24	36	23	15	1.5	3	1.5
SLT016	16		2	31	50	34	17.5	2	3.5	2
SLT020	20		2	35	56	39.7	29	2	4	2.5
SLT025	25		4	42	71	50.3	36	3	4	2.5
SLT030	30		4	47	80	60	42	3	4	2.5
SLT040	40		4	64	100	70	52	4	6	3.5
SLT050	50		4	80	125	91	58	4	8	4



Model No.	Basic Load Rating		Basic Torsion		Static Permissible Moment		Mass	
	C	C ₀	C _T	C _{0T}	M _{A1}	M _{A2}	Spline Nut	Spline Shaft
	kgf	kgf	kgf · m	kgf · m	kgf · m	kgf · m	g	kg/m
SLT006	137	225	0.46	0.76	0.39	3.48	14	0.22
SLT008	137	225	0.60	0.99	0.39	3.82	16	0.39
SLT010	285	397	1.62	2.25	0.95	8.53	37	0.60
SLT013	396	540	2.89	3.94	1.50	12.46	52	1.03
SLT016	545	849	4.77	7.43	3.71	26.09	130	1.56
SLT020	724	1109	7.90	12.09	5.53	38.00	188	2.44
SLT025	1003	1593	21.99	43.01	10.35	68.59	285	3.80
SLT030	1160	1960	30.26	62.93	15.68	93.27	395	5.49
SLT040	2972	4033	105.37	176.05	36.59	264.34	843	9.69
SLT050	4086	5615	179.89	304.35	51.58	428.72	1758	15.19

3-2 Nominal Model Code of Ball Spline SO Series

SOF, SOT Spline Shaft Cross-Sectional Shape



Solid Spline Shaft

Table 3.2.1 Solid Spline Shaft Cross-Sectional Shape

Unit : mm

Nominal Diameter	8	10	12	15	20	25
Stats						
Inner Diameter $\varnothing d$	7	8.9	10.9	11.6	15.7	19.4
Outer Diameter $\varnothing D$ h7	8	10	12	13.6	18.2	22.6
Mass(kg/m)	0.39	0.605	0.875	1.11	2.02	3.1
Ball Center $\varnothing BCD$	9.3	11.6	13.6	15	20	25
Tolerance μm	0 -15	0 -18	0 -18	0 -18	0 -21	0 -21