IKO

Miniature Stroke Rotary Bushing

STS

CAT-57118

Very smooth rotation and reciprocating linear motion in axial direction at the same time!

IKO

Miniature Stroke Rotary Bushing

STS

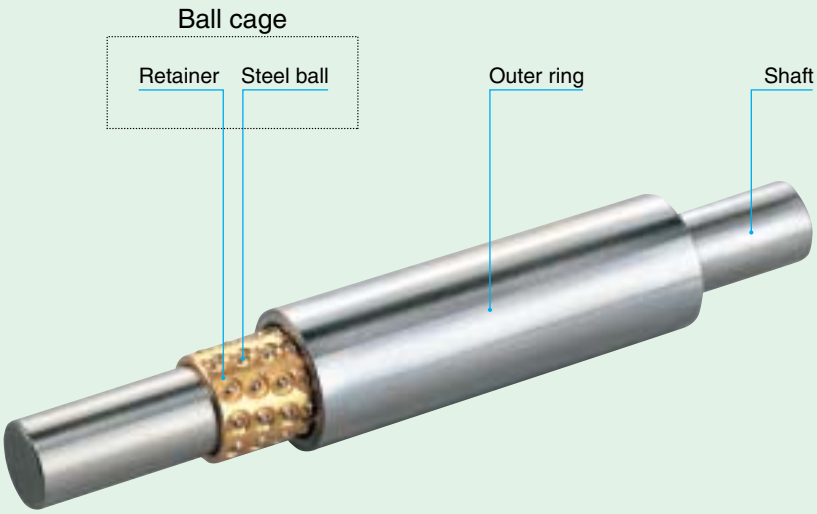
Micro size and super precision

The smallest size is newly introduced!

Shaft diameter 2 mm!
Outer ring outside diameter 5 mm!

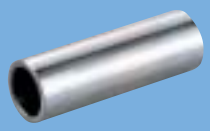
High reliability super precision

IKO Miniature Stroke Rotary Bushing is a very compact linear motion rolling guide with a low sectional height, and can achieve both rotary motion and reciprocating motion in the axial direction at the same time.
Including the smallest model having a shaft diameter of 2 mm, this series features smooth motion with low frictional resistance, and is used in micro mechanisms of machines and equipment requiring precise rotation and linear motion such as measuring instruments, IC manufacturing machines, and precision equipment.



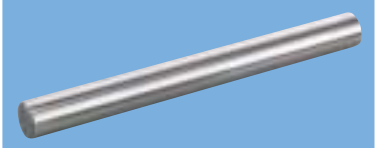
Structure of Miniature Stroke Rotary Bushing (STSI)

Outer ring : OR···A



Ball cage : BK···A

Shaft : SF···A



Miniature Stroke Rotary Bushing

Rotary and linear motion

Steel balls held in a retainer are assembled into an outer ring having a cylindrical bore raceway, so linear motion as well as rotary movement can be achieved.

Extremely accurate

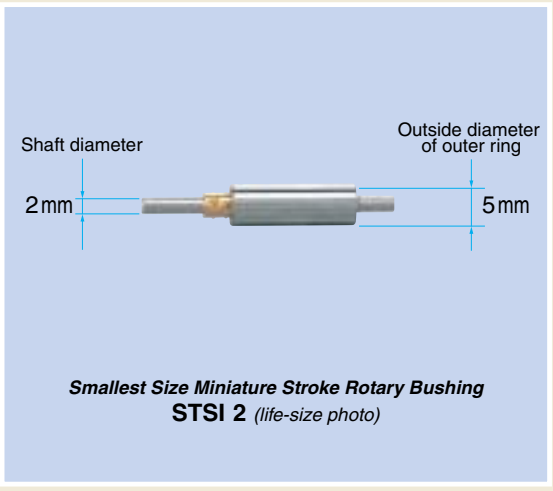
The outer ring and shaft are precisely super-finished after heat treatment. The assembled set, which consists of an outer ring, shaft and very precise steel balls held in a retainer, is set to zero or minimal preload. So extremely accurate operation can be achieved both in rotary and linear motion.

Very smooth movement

All parts are precisely finished and assembled to obtain an optimal preload. This series offers very smooth and stable movement as well as high accuracy with low frictional resistance.

Extremely compact size

Very small diameter steel balls are assembled in a very thin walled outer ring. So the assembled set is extremely compact in sectional height. The smallest size model has a shaft diameter of 2 mm and an outside diameter of outer ring of 5 mm.



Smallest Size Miniature Stroke Rotary Bushing
STSI 2 *(life-size photo)*

■ *(Application example)* **STSI used for a digital gage**

Identification Number

The specification of Miniature Stroke Rotary Bushing is indicated by the identification number, consisting of a model code, a size, a length, and a selection code.

Assembled set

With shaft →	STSI	4		20	–	15	–	50	
Without shaft →	STS	4		20	–	15			／M1

Parts

Outer ring →	OR		6	8	20				A	／M1
Ball cage →	BK	4	6			15			A	
Shaft →	SF	4					50	A	／M1	

Model code

Series

Assembled set with shaft
STSI

Assembled set without shaft
STS

Outer ring
OR···A

Ball cage
BK···A

Shaft
SF···A

Size

Shaft diameter
Indicate the shaft diameter in mm. For an assembled set without shaft and for a ball cage, indicate an inscribed circle diameter.

Bore diameter of outer ring
Indicate the bore diameter of outer ring in mm. For a ball cage, indicate a circumscribed circle

Outside diameter of outer ring
Indicate the outside diameter of outer ring in mm.

Length

Length of outer ring
Indicate the length of outer ring in mm.

Length of ball cage
Indicate the length of ball cage in mm.

Length of shaft
Indicate the length of shaft in mm.

Selection code

Selection

M1 select group : M1
M2 select group : M2
M3 select group : M3

Table 2 shows selection codes and dimensional tolerances. When assembling parts, combine parts with the same selection code.

Accuracy

The accuracy of Miniature Stroke Rotary Bushing is shown below.

Table 1 Accuracy

Outside diameter of outer ring mm		Tolerance of outside diameter of outer ring μm		Maximum radial runout of outside diameter of outer ring μm	Tolerance of length of outer ring and shaft mm
over	incl.	high	low		
3	6	0	−5	8	±0.1
6	10	0	−6		
10	18	0	−8		
18	30	0	−9	9	

Table 2 Selection codes and dimensional tolerances

unit: μm

Selection code	Tolerance of outer ring bore		Tolerance of inscribed circle diameter		Tolerance of shaft diameter	
	high	low	high	low	high	low
M1	−1	−3	−1	−3	0	−1
M2	−2	−4	−2	−4	−1	−2
M3	−3	−5	−3	−5	−2	−3

Basic static load rating

The basic static load rating is defined as the static radial load that gives a prescribed constant contact stress at the center of the contact area between the rolling element and raceway receiving the maximum load.
The load rating of Miniature Stroke Rotary Bushing is given for the case when the steel balls assembled in a retainer are positioned within the outer ring raceway without escaping from it and equally share an applied load.

Fit

Miniature Stroke Rotary Bushing is set to minimal preload condition to obtain high operating accuracy. For Miniature Stroke Bushing with shaft, a slight clearance fit between the outer ring and the housing is recommended to avoid any undesirable influence on the inscribed circle diameter.
Also, when assembling the outer ring, ball cage and shaft, select the outer ring and shaft which have the same selection code and match them to a ball cage.

Precaution for Use

❶The outer ring should have a clearance fit in the housing. When the outer ring must be fixed in the axial direction to the housing, use a stop ring, etc. at the end of the outer ring or use synthetic adhesive.

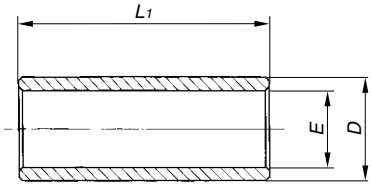
❷For assembly, the outer ring is fixed in the housing bore at first, then the shaft is inserted into the ball cage. As the shaft is inserted, the ball cage moves in the axial direction in the outer ring. The ball cage must be located at the correct position after assembly. A convenient way of locating the ball cage is to shift the position of the ball cage prior to assembly to the inserting direction for the distance of 1/2 of the inserting distance of the shaft.

❸When inserting the shaft into a ball cage, be careful not to damage the steel balls and raceways by twisting the shaft or applying a shock load.

❹Miniature Stroke Rotary Bushing can be used with oil or grease lubrication. When lubricating with grease, the grease is usually lightly smeared on the raceways of the shaft and outer ring. A good quality lithium-soap base grease is recommended.

IKO Miniature Stroke Rotary Bushing

STSI、STS、OR···A、BK···A、SF···A

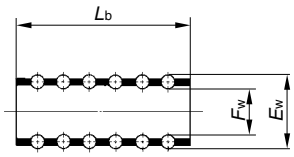


Outer ring

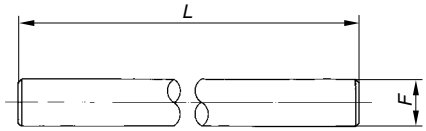
Shaft diameter mm	Model number of the assembled set without shaft	Outer ring					Ball cage	
		Identification number	Mass (Ref.) g	Nominal dimensions mm E	D	L_1	Identification number	Mass (Ref.) g
2	STS 2 L_1-L_b	OR 3 5 10 A	0.9	3.2	5	10	BK 2 3 5 A	0.1
		OR 3 5 15 A	1.3			15	BK 2 3 10 A	0.3
3	STS 3 L_1-L_b	OR 5 7 10 A	1.5	5	7	10	BK 3 5 10 A	0.7
		OR 5 7 20 A	2.9			20	BK 3 5 15 A	1.1
		OR 5 7 30 A	4.4			30	BK 3 5 20 A	1.4
4	STS 4 L_1-L_b	OR 6 8 10 A	1.7	6	8	10	BK 4 6 10 A	0.9
		OR 6 8 20 A	3.4			20	BK 4 6 15 A	1.3
		OR 6 8 30 A	5.2			30	BK 4 6 20 A	1.8
5	STS 5 L_1-L_b	OR 7 10 10 A	3.1	7	10	10	BK 5 7 10 A	1.0
		OR 7 10 20 A	6.3			20	BK 5 7 15 A	1.6
		OR 7 10 30 A	9.4			30	BK 5 7 20 A	2.0
6	STS 6 L_1-L_b	OR 8 11 20 A	7.0	8	11	20	BK 6 8 10 A	1.2
		OR 8 11 30 A	10.5			30	BK 6 8 15 A	1.8
		OR 8 11 40 A	14.1			40	BK 6 8 20 A	2.3
8	STS 8 L_1-L_b	OR 10 13 20 A	8.5	10	13	20	BK 8 10 10 A	1.6
		OR 10 13 30 A	12.7			30	BK 8 10 15 A	2.4
		OR 10 13 40 A	17.0			40	BK 8 10 20 A	3.2
10	STS 10 L_1-L_b	OR 12 18 20 A	22.2	12	18	20	BK 10 12 15 A	2.8
		OR 12 18 30 A	33.3			30	BK 10 12 20 A	3.8
		OR 12 18 43 A	47.7			43	BK 10 12 25 A	4.8
12	STS 12 L_1-L_b	OR 14 20 25 A	31.4	14	20	25	BK 12 14 20 A	4.3
		OR 14 20 30 A	37.7			30	BK 12 14 25 A	5.4
		OR 14 20 35 A	44.0			35	BK 12 14 30 A	6.1
		OR 14 20 40 A	50.3			40		

Note (1): This figure shows the static load rating when the steel balls assembled in a retainer do not escape the raceway of outer ring and the balls equally share an applied load.

Remark: "L_1", "L_b", and "L" in the model number of the assembled set - either with shaft or without shaft - indicate "length of outer ring", "length of ball cage" and "shaft length" respectively.



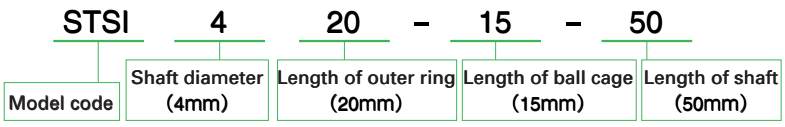
Ball cage



Shaft

Nominal dimensions mm F_w	Nominal dimensions mm E_w	Nominal dimensions mm L_b	Basic static load rating (1) C_0 N	Shaft: Identification number	Shaft: Mass (Ref.) g	Shaft: Nominal dimensions mm F	Shaft: Nominal dimensions mm L	Model number of the assembled set with shaft	Shaft diameter mm
2	3.2	5	10.5	**SF 2 20 A**	0.5	2	20	**STSI 2 L_1-L_b-L**	**2**
		10	21.0	**SF 2 30 A**	0.7		30		
3	5	10	38.4	**SF 3 50 A**	2.8	3	50	**STSI 3 L_1-L_b-L**	**3**
		15	57.7	**SF 3 60 A**	3.3		60		
		20	76.9						
4	6	10	59.5	**SF 4 50 A**	4.9	4	50	**STSI 4 L_1-L_b-L**	**4**
		15	89.3	**SF 4 60 A**	5.9		60		
		20	119						
5	7	10	81.0	**SF 5 50 A**	7.7	5	50	**STSI 5 L_1-L_b-L**	**5**
		15	121	**SF 5 80 A**	12.3		80		
		20	162						
6	8	10	103	**SF 6 50 A**	11.1	6	50	**STSI 6 L_1-L_b-L**	**6**
		15	154	**SF 6 80 A**	17.7		80		
		20	206						
8	10	10	105	**SF 8 50 A**	19.7	8	50	**STSI 8 L_1-L_b-L**	**8**
		15	157	**SF 8 80 A**	31.5		80		
		20	209	**SF 8 90 A**	35.5		90		
10	12	15	191	**SF 10 80 A**	49.3	10	80	**STSI 10 L_1-L_b-L**	**10**
		20	254	**SF 10 100 A**	61.6		100		
		25	318	**SF 10 120 A**	74.0		120		
12	14	20	341	**SF 12 80 A**	71.0	12	80	**STSI 12 L_1-L_b-L**	**12**
		25	427	**SF 12 100 A**	88.8		100		
		30	512	**SF 12 120 A**	106.5		120		

Example of identification number (assembled set with shaft)

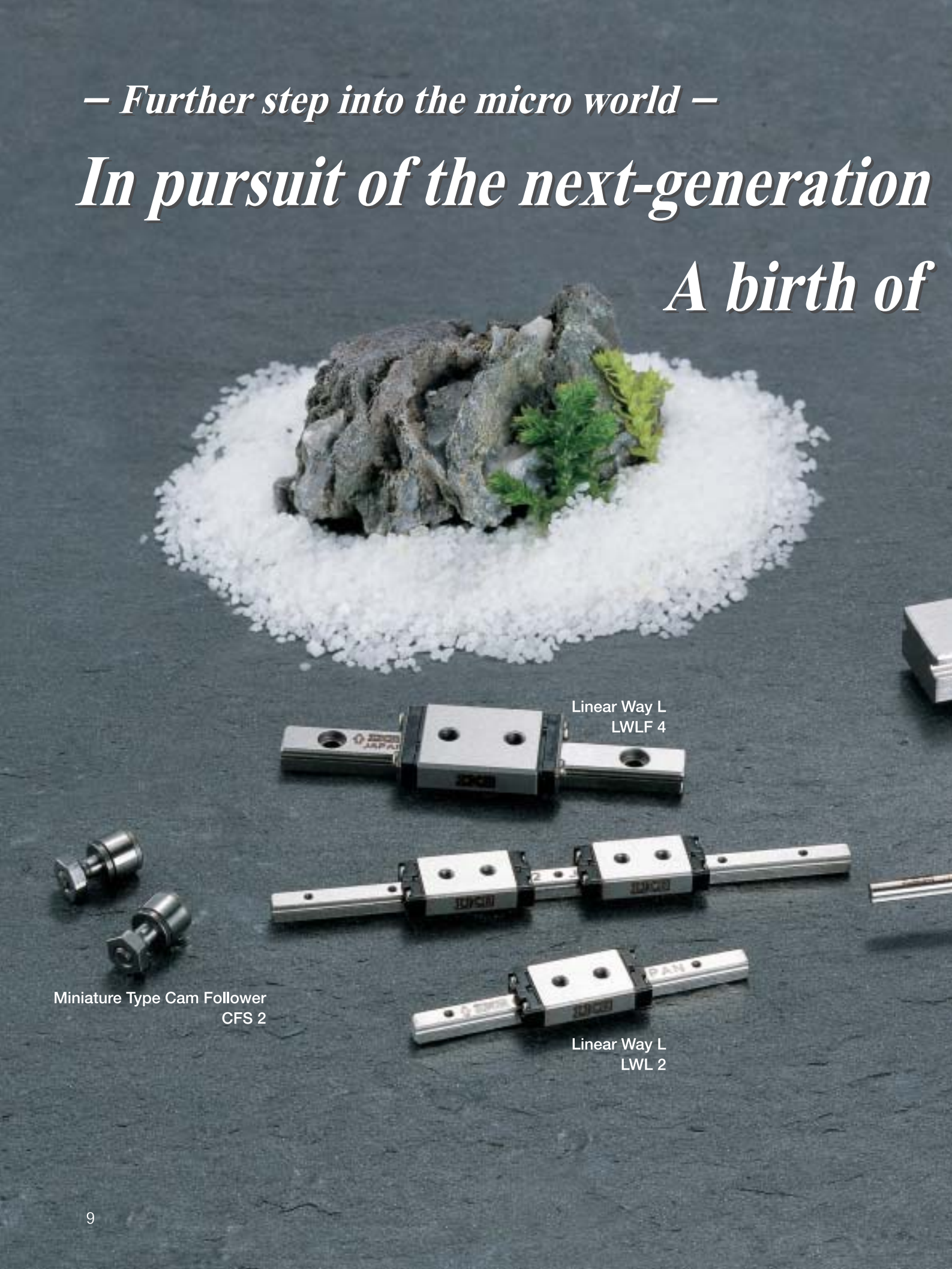


1N = 0.102kgf = 0.2248lbs.
1mm = 0.03937inch

– Further step into the micro world –

In pursuit of the next-generation

A birth of



technology

the ultimate micro models

(Four types)

Linear Ball Spline G
LSAGF 2

Linear Ball Spline G
LSAG 2

Miniature Stroke Rotary Bushing
STSI 2

STS

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