



products are available from: **MARYLAND METRICS**

phones: (410)358-3130 (800)638-1830 faxes: (410)358-3142 (800)872-9329

P.O.Box 261 Owings Mills, MD 21117 USA URL: <http://mdmetric.com> E-mail: sales@mdmetric.com

Miniature Stroke Rotary Bushing

STS

CAT-57118

Micro size with a shaft diameter of 2 mm is newly introduced!



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



IKO

Miniature Stroke Rotary Bushing

STS



STSI 2

***Micro size
and super precision***

The smallest size is newly introduced!

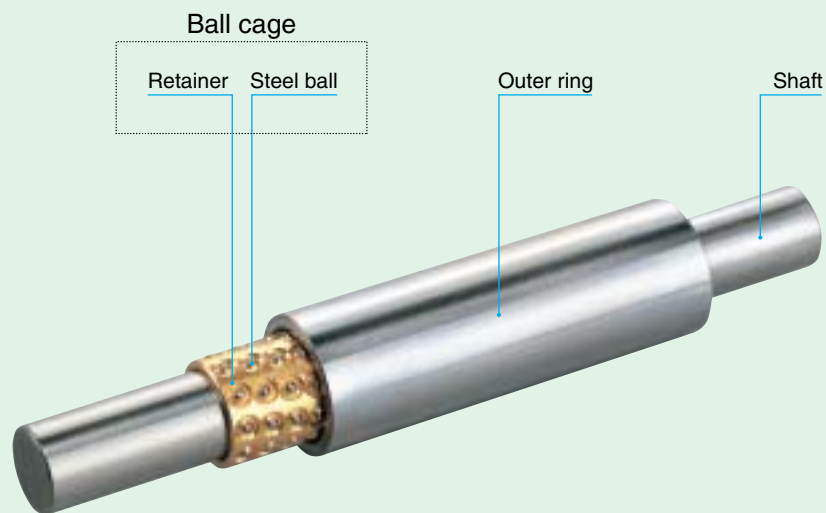
***Shaft diameter 2 mm!
Outer ring outside diameter 5 mm!***



High reliability super precision

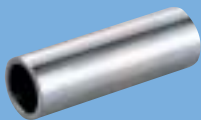
IKO Miniature Stroke Rotary Bushing is a very compact linear motion rolling guide with a low sectional height, and can achieve both rotary motion and reciprocating motion in the axial direction at the same time.

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)

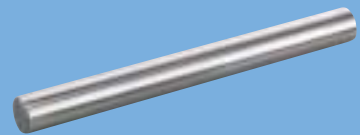
Outer ring : OR...A



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

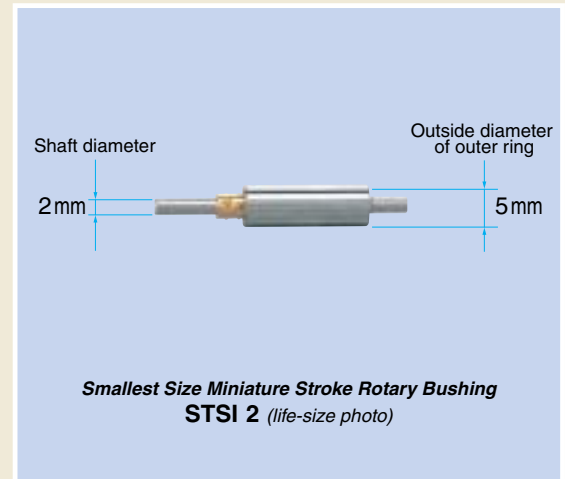
The outer ring and shaft are precisely super-finished after heat treatment. The assembled set, which consists of an outer ring, shaft and very precise steel balls held in a retainer, is set to zero or minimal preload. So extremely accurate operation can be achieved both in rotary and linear motion.

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.



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

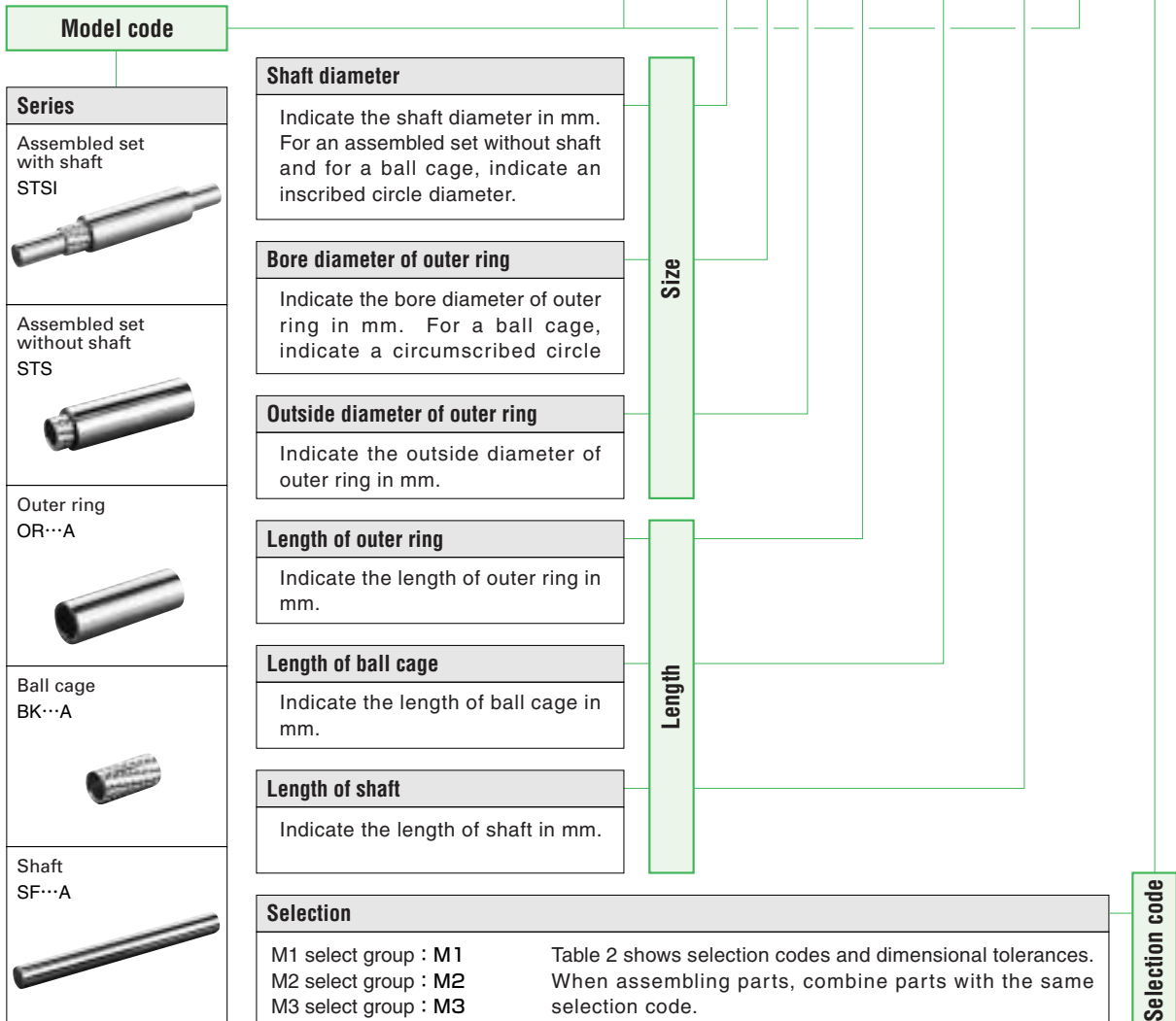


Identification Number

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



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

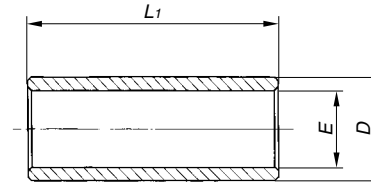
Miniature Stroke Rotary Bushing is set to minimal preload condition to obtain high operating accuracy. For Miniature Stroke Bushing with shaft, a slight clearance fit between the outer ring and the housing is recommended to avoid any undesirable influence on the inscribed circle diameter. Also, when 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

- ① The 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.
- ② For 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.
- ③ When 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.
- ④ Miniature 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			Identification number	Mass (Ref.) g	
				E	D	L ₁			
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	5.4
		OR 14 20 35 A	44.0					35	6.1
		OR 14 20 40 A	50.3					40	

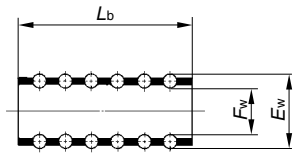
Note (!): This figure shows the static load rating when the steel balls assembled in a retainer do not escape the raceway of outer ring and the balls equally share an applied load.

Remark: "L₁", "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.

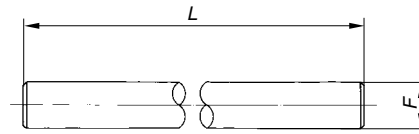
IKO products are available from: **MARYLAND METRICS**

phones: (410)358-3130 (800)638-1830 faxes: (410)358-3142 (800)872-9329

P.O.Box 261 Owings Mills, MD 21117 USA URL: <http://mdmetric.com> E-mail: sales@mdmetric.com



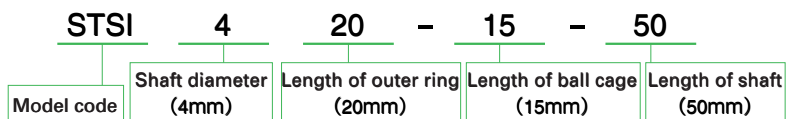
Ball cage



Shaft

Nominal dimensions mm			Basic static load rating (1) C ₀ N	Shaft			Model number of the assembled set with shaft	Shaft diameter mm		
F _w	E _w	L _b		Identification number	Mass (Ref.) g	Nominal dimensions mm F L				
2	3.2	5	10.5	SF 2 20 A	0.5	2	20	STSI 2 L₁-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 L₁-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 L₁-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 L₁-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 L₁-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 L₁-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 L₁-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 L₁-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



Linear Way L
LWLF 4



Miniature Type Cam Follower
CFS 2



Linear Way L
LWL 2



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