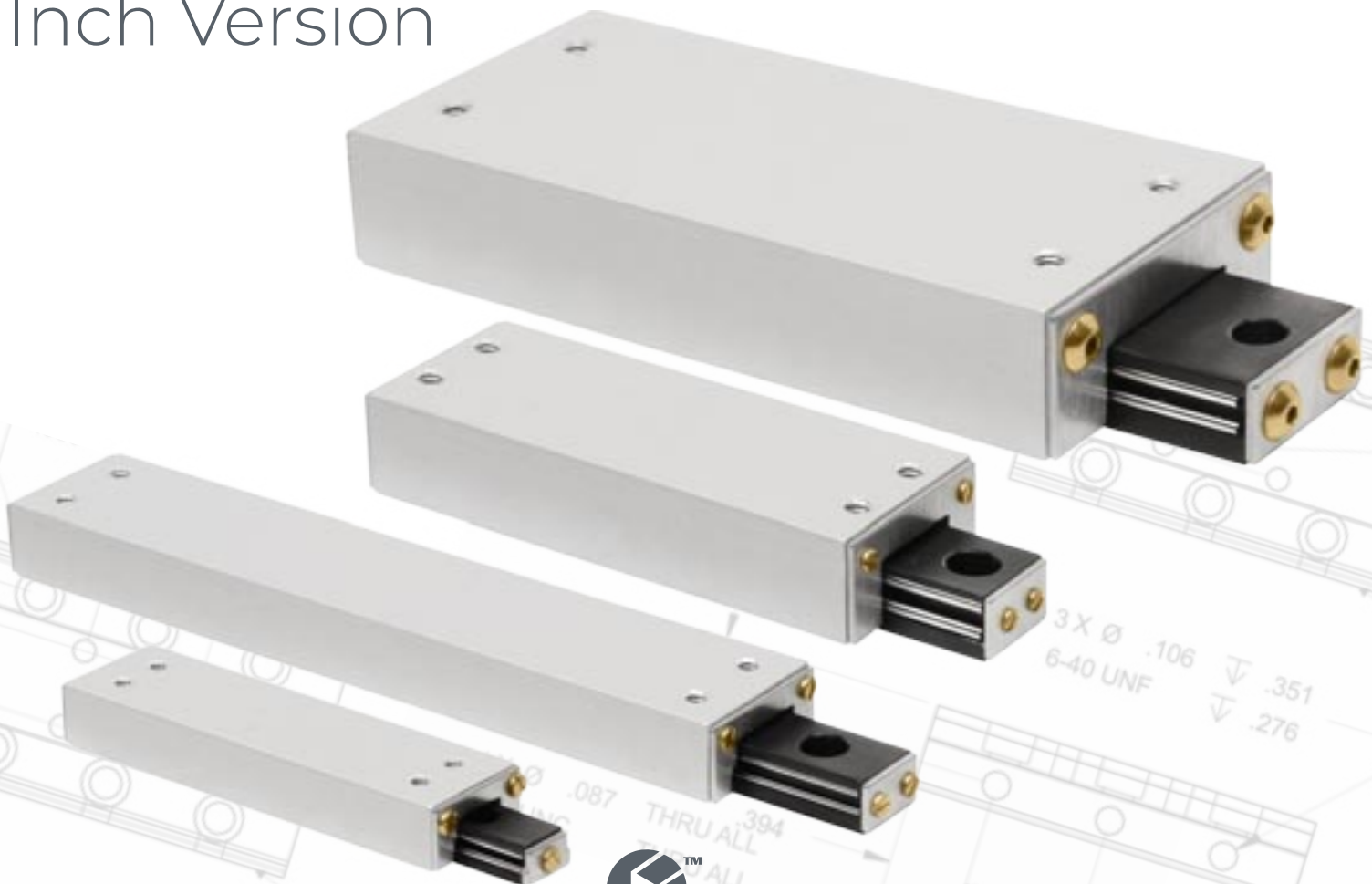


Precision Linear Motion Components

NMS Series **Ball Slide Assemblies**

Non-Magnetic Ball Slides

Inch Version



Del-Tron Precision, Inc.

Non-Magnetic Linear Slides

6 Reasons to choose Del-Tron® Non-Magnetic Ball Slides



1. **Non-Magnetic lightweight design.**
2. **Silicon nitride ceramic ball bearings, titanium shafts, aluminum carriage and base, brass fasteners.**
3. **Factory preload minimizes side play and provides low friction.**
4. **Self cleaning ball bearing design offers long life and requires no lubrication.**
5. **Standard mounting holes simplify installation.**
6. **Mounting surfaces, parallel to the line of motion, provide straight line accuracy to 0.0005"/" of travel.**

Del-Tron® Ball Slides

Load Ratings and Life Estimates

The rated load capacity of Del-Tron® ball slides may be a mass load on a horizontal slide, or a force load normal to the mounting surface in any position. The rated load must be centered and distributed over the slide, and the base must be fully supported on a flat mounting surface so that the ball slide does not act as a beam subject to concentrated or distributed bending forces. Loads supported by protruding arms reduce accuracy and load capacity by acting as levers or ratio arms, and should be avoided even when load forces are small.

When used at the rated load capacity and moderate speeds, a life of 10 million inches of travel can be expected. The expected life at one half the rated load is 100 million inches.

Friction and Lubrication

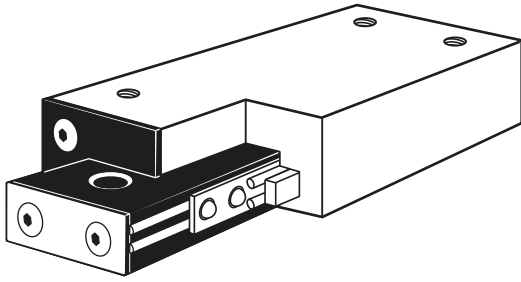
The coefficient of friction is lower for linear ball bearings than for rotary bearings, where the peripheral track is shorter on the inner race than on the outer race, causing the ball to skid on one or the other. The balls run exactly equal distances on the pair of tracks in linear bearings, permitting the ball to run without friction, wear, or skidding at any preload. The typical coefficient of friction for Del-Tron® ball slides is 0.003.

Lubrication is recommended for speeds above 1800 inches/min, and is advisable at lower speeds where high loads are applied in continuous duty applications.

Mounting and Accuracy

The mounting surfaces of the ball slide are machined flat and smooth, and parallel to each other and the line of motion. They must be mounted on smooth, flat supports that will not deflect under load. Especially with long slides of small cross section, binding may be caused by distortion of the bottom member when mounted on irregular surfaces. If so, round shims or spacers may be placed over the mounting screws to raise the slide above the surface asperities. Bedding in epoxy resin is also recommended.

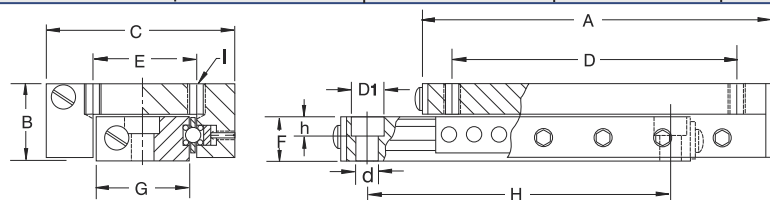
The specified accuracy for all standard Del-Tron ball slides is .0005inch/inch of travel. This is measured by comparison of the line of travel to a master straight edge, using a gage or indicator mounted on the slide.

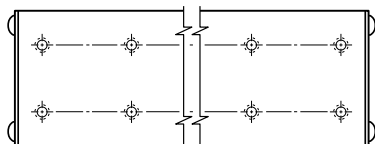


Non-Magnetic Linear Ball Slides

*Travel is 1/2 distance from center in either direction.											
MODEL	TRAVEL*	LOAD CAPACITY LB	WEIGHT OZ	LENGTH A	HEIGHT B	WIDTH C	CARRIAGE HOLE SPACING		BASE DIMENSIONS		
							D	E	HEIGHT F	WIDTH G	HOLE SPACING H
D-1-NMS	.50	1.2	.30	1.06	.32	.56	.625	.218	.187	.250	.750
D-2-NMS	1.00	2.4	.50	2.06	.32	.56	1.625	.218	.187	.250	1.375
D-3-NMS	2.00	3.6	.80	3.06	.32	.56	2.625	.218	.187	.250	2.375
D-4-NMS	3.00	4.2	1.1	4.06	.32	.56	3.625	.218	.187	.250	3.375
D-5-NMS	4.00	4.8	1.2	5.06	.32	.56	4.625	.218	.187	.250	3.500
D-6-NMS	5.00	5.4	1.5	6.06	.32	.56	5.625	.218	.187	.250	4.500
E-1-NMS	.50	2.4	.40	1.06	.41	.75	.625	.375	.250	.375	.750
E-2-NMS	1.00	3.0	.90	2.06	.41	.75	1.625	.375	.250	.375	1.375
E-3-NMS	2.00	3.6	1.3	3.06	.41	.75	2.625	.375	.250	.375	2.375
E-4-NMS	3.00	4.2	1.7	4.06	.41	.75	3.625	.375	.250	.375	3.375
E-5-NMS	4.00	4.8	2.1	5.06	.41	.75	4.625	.375	.250	.375	3.500
E-6-NMS	5.00	5.4	2.5	6.06	.41	.75	5.625	.375	.250	.375	4.500
M-1-NMS	.50	3.0	1.2	1.56	.50	1.00	1.250	.437	.250	.500	1.250
M-2-NMS	1.00	3.6	1.7	2.56	.50	1.00	2.250	.437	.250	.500	2.250
M-2.5-NMS	1.50	3.9	1.9	3.06	.50	1.00	2.750	.437	.250	.500	2.750
M-3-NMS	2.00	4.5	2.2	3.56	.50	1.00	3.250	.437	.250	.500	3.250
M-4-NMS	3.00	5.4	5.0	4.56	.50	1.00	4.250	.437	.250	.500	4.250

SERIES	D	E	M	N	S1	S2	S3
CARRIAGE 4 HOLES (I)	2-56 UNC-2B THREAD	4-40 UNC-2B THREAD	6-32 UNC-2B THREAD	6-32 UNC-2B THREAD	6-32 UNC-2B THREAD	6-32 UNC-2B THREAD	10-32 UNF-2B THREAD
BASE HOLE d	.101	.125	.125	.157	.157	.157	.204
BASE HOLE D ₁	.144	.198	.198	.244	.244	.244	.328
BASE HOLE h	.100	.125	.125	.150	.150	.150	.205
COUNTER BORE SCREW SIZE	#2	#4	#4	#6	#6	#6	#10





MODEL	# OF HOLES
S3-6	** 6
S3-9	** 8
S3-12	** 10

SPECIFICATIONS:

Straight Line Accuracy

.0005"/inch of travel

Coefficient of Friction

0.003 typical

Positional Repeatability

.0002"

Construction

Silicon nitride ceramic ball bearings, titanium shafts, aluminum carriage base and end caps, brass fasteners.

Finish

Clear anodize carriage and black anodize base. Other finishes on request.

*Travel is 1/2 distance from center in either direction.

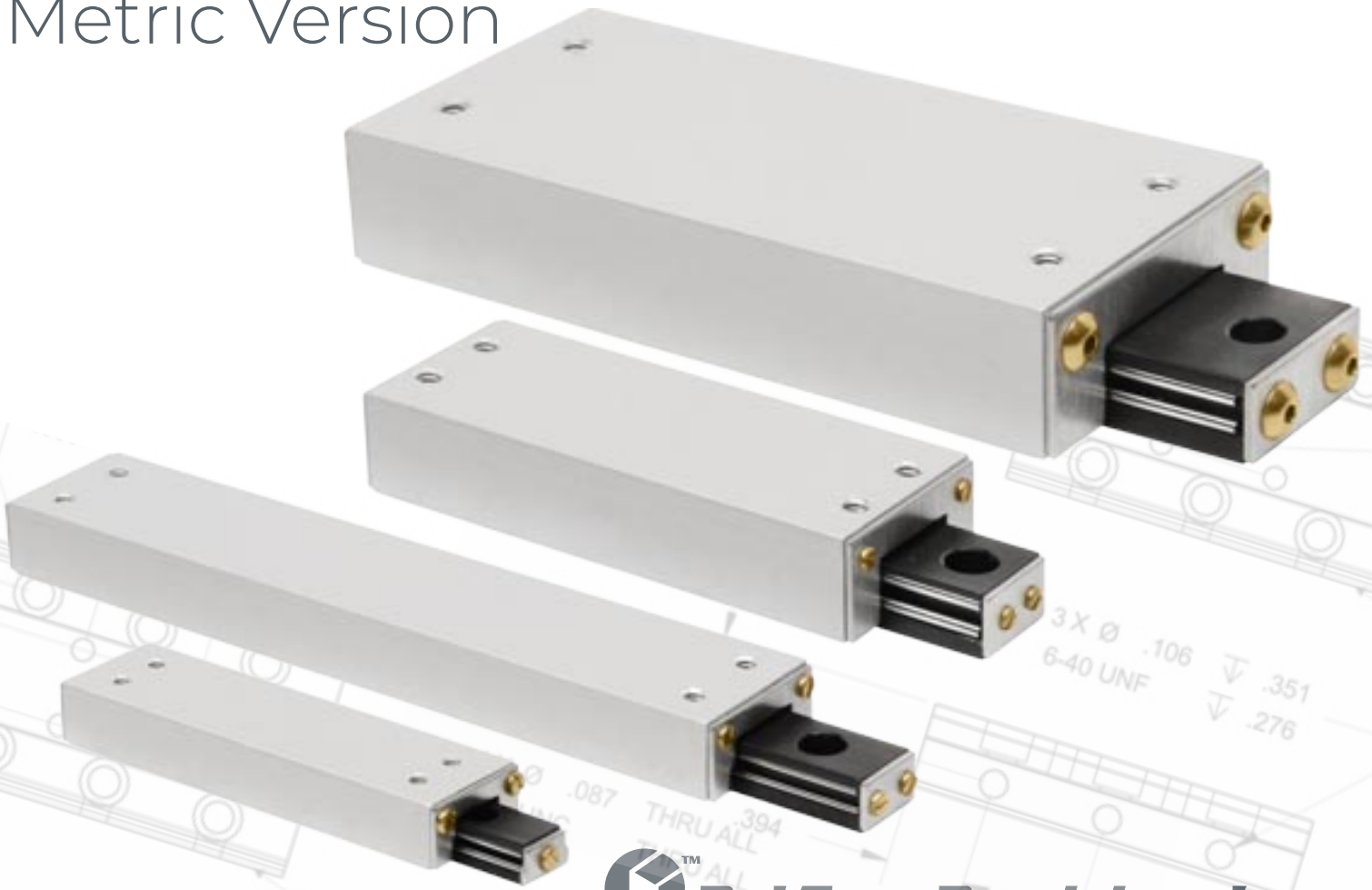
MODEL	TRAVEL*	LOAD CAPACITY LB	WEIGHT OZ	LENGTH A	HEIGHT B	WIDTH C	CARRIAGE HOLE SPACING		BASE DIMENSIONS		
							D	E	HEIGHT F	WIDTH G	HOLE SPACING H
N-1-NMS	.75	4.5	1.3	1.56	.53	1.06	1.250	.437	.312	.500	1.125
N-2-NMS	1.50	5.4	2.3	2.56	.53	1.06	2.250	.437	.312	.500	2.125
N-3-NMS	2.00	6.0	3.0	3.56	.53	1.06	3.250	.437	.312	.500	3.125
N-4-NMS	3.00	7.5	5.2	4.56	.53	1.06	4.000	.437	.312	.500	3.250
N-6-NMS	4.00	9.0	6.0	6.00	.53	1.06	5.500	.437	.312	.500	4.000
N-8-NMS	6.00	10.5	7.0	8.00	.53	1.06	7.500	.437	.312	.500	5.000
N-10-NMS	8.00	12.0	8.0	10.00	.53	1.06	9.500	.437	.312	.500	7.000
S1-1-NMS	1.00	4.5	2.9	2.00	.62	1.50	1.375	.625	.340	.750	1.500
S1-2-NMS	2.00	6.0	4.3	3.00	.62	1.50	2.375	.625	.340	.750	2.500
S1-3-NMS	3.00	7.5	6.0	4.00	.62	1.50	3.375	.625	.340	.750	3.500
S1-3.5-NMS	3.50	9.0	6.7	5.00	.62	1.50	4.375	.625	.340	.750	3.500
S1-4-NMS	4.00	10.5	8.2	6.00	.62	1.50	5.375	.625	.340	.750	4.000
S1-6-NMS	6.00	13.5	9.2	8.00	.62	1.50	7.375	.625	.340	.750	5.000
S1-8-NMS	8.00	16.5	11.5	10.00	.62	1.50	9.375	.625	.340	.750	7.000
S2-1-NMS	1.00	6.0	4.0	2.00	.75	1.75	1.375	.875	.400	.875	1.625
S2-1.5-NMS	1.50	9.0	6.0	2.75	.75	1.75	2.125	.875	.400	.875	2.250
S2-2-NMS	2.00	12.6	6.5	3.25	.75	1.75	2.625	.875	.400	.875	2.750
S2-3-NMS	3.00	15.6	8.0	4.00	.75	1.75	3.375	.875	.400	.875	3.500
S2-4-NMS	4.00	18.0	11.8	6.00	.75	1.75	5.500	.875	.400	.875	4.000
S2-6-NMS	6.00	22.5	15.7	8.00	.75	1.75	7.500	.875	.400	.875	5.000
S2-8-NMS	8.00	27.0	19.5	10.00	.75	1.75	9.500	.875	.400	.875	7.000
S3-1-NMS	1.00	9.0	10.0	2.62	1.00	2.62	2.125	1.250	.625	1.500	2.125
S3-1.5-NMS	1.50	10.5	10.0	2.62	1.00	2.62	1.625	1.250	.625	1.500	1.875
S3-2-NMS	2.00	18.6	15.0	4.00	1.00	2.62	3.000	1.250	.625	1.500	3.375
S3-3-NMS	3.00	26.4	20.8	5.00	1.00	2.62	4.000	1.250	.625	1.500	4.375
S3-4-NMS	4.00	35.4	27.2	6.00	1.00	2.62	5.000	1.250	.625	1.500	5.375
S3-5-NMS	5.00	40.5	31.0	8.00	1.00	2.62	7.000	1.250	.625	1.500	7.375
S3-6-NMS	6.00	45.0	35.2	9.00	1.00	2.62	**3.000	1.250	.625	1.500	7.000
S3-9-NMS	9.00	55.5	46.5	12.00	1.00	2.62	**3.000	1.250	.625	1.500	10.000
S3-12-NMS	12.00	61.5	58.0	15.00	1.00	2.62	**3.000	1.250	.625	1.500	13.000

Precision Linear Motion Components

NMS Series **Ball Slide Assemblies**

Non-Magnetic Ball Slides

Metric Version



Del-Tron Precision, Inc.

Non-Magnetic Linear Slides

6 Reasons to choose Del-Tron® Non-Magnetic Ball Slides



1. **Non-Magnetic lightweight design.**
2. **Silicon nitride ceramic ball bearings, titanium shafts, aluminum carriage and base, brass fasteners.**
3. **Factory preload minimizes side play and provides low friction.**
4. **Self cleaning ball bearing design offers long life and requires no lubrication.**
5. **Standard mounting holes simplify installation.**
6. **Mounting surfaces, parallel to the line of motion, provide straight line accuracy to .013mm/25mm of travel.**

Del-Tron® Ball Slides

Load Ratings and Life Estimates

The rated load capacity of Del-Tron® ball slides may be a mass load on a horizontal slide, or a force load normal to the mounting surface in any position. The rated load must be centered and distributed over the slide, and the base must be fully supported on a flat mounting surface so that the ball slide does not act as a beam subject to concentrated or distributed bending forces. Loads supported by protruding arms reduce accuracy and load capacity by acting as levers or ratio arms, and should be avoided even when load forces are small.

When used at the rated load capacity and moderate speeds, a life of 25 million cm of travel can be expected. The expected life at one half the rated load is 250 million cm.

Friction and Lubrication

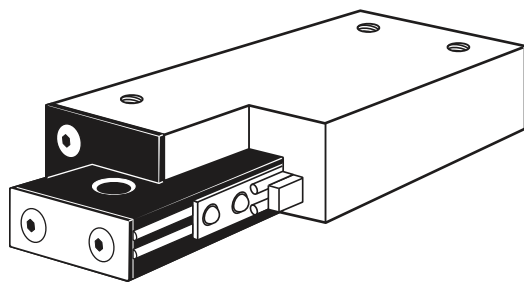
The coefficient of friction is lower for linear ball bearings than for rotary bearings, where the peripheral track is shorter on the inner race than on the outer race, causing the ball to skid on one or the other. The balls run exactly equal distances on the pair of tracks in linear bearings, permitting the ball to run without friction, wear, or skidding at any preload. The typical coefficient of friction for Del-Tron® ball slides is 0.003.

Del-Tron® ball slides are self cleaning in normal service. Lubrication is recommended for speeds above 4500 cm/min, and is advisable at lower speeds where high loads are applied in continuous duty applications.

Mounting and Accuracy

The mounting surfaces of the ball slide are machined flat and smooth, and parallel to each other and the line of motion. They must be mounted on smooth, flat supports that will not deflect under load. Especially with long slides of small cross section, binding may be caused by distortion of the bottom member when mounted on irregular surfaces. If so, round shims or spacers may be placed over the mounting screws to raise the slide above the surface asperities. Bedding in epoxy resin is also recommended.

The specified accuracy for all standard Del-Tron® ball slides is .013mm/25mm of travel. This is measured by comparison of the line of travel to a master straight edge, using a gage or indicator mounted on the slide.

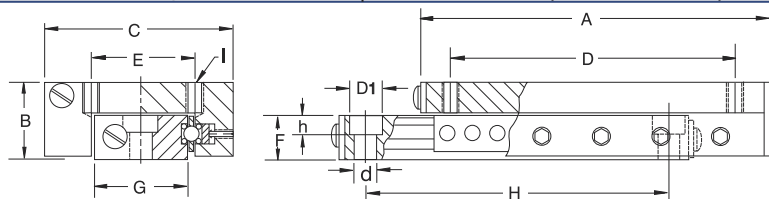


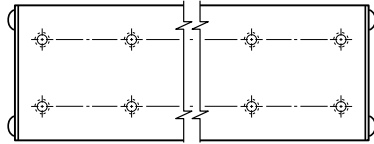
Non-Magnetic Linear Ball Slides

*Travel is 1/2 distance from center in either direction.

MODEL	TRAVEL*	LOAD CAPACITY KG	WEIGHT G	LENGTH A	HEIGHT B	WIDTH C	CARRIAGE HOLE SPACING		BASE DIMENSIONS		
							D	E	HEIGHT F	WIDTH G	HOLE SPACING H
DA-1-NMS	13	.54	9	27.0	8.0	14.2	15.0	6.0	4.7	6.4	19.0
DA-2-NMS	25	1.1	14	52.0	8.0	14.2	41.0	6.0	4.7	6.4	35.0
DA-3-NMS	50	1.6	23	78.0	8.0	14.2	66.0	6.0	4.7	6.4	60.0
DA-4-NMS	75	1.9	31	103.0	8.0	14.2	92.0	6.0	4.7	6.4	86.0
DA-5-NMS	100	2.1	34	128.0	8.0	14.2	117.0	6.0	4.7	6.4	89.0
DA-6-NMS	127	2.5	43	154.0	8.0	14.2	142.0	6.0	4.7	6.4	114.0
EA-1-NMS	13	1.1	11	27.0	10.4	19.0	15.0	9.0	6.3	9.5	19.0
EA-2-NMS	25	1.4	26	52.0	10.4	19.0	41.0	9.0	6.3	9.5	35.0
EA-3-NMS	50	1.6	37	78.0	10.4	19.0	66.0	9.0	6.3	9.5	60.0
EA-4-NMS	75	1.9	48	103.0	10.4	19.0	92.0	9.0	6.3	9.5	86.0
EA-5-NMS	100	2.1	60	128.0	10.4	19.0	117.0	9.0	6.3	9.5	89.0
EA-6-NMS	127	2.5	71	154.0	10.4	19.0	142.0	9.0	6.3	9.5	114.0
MA-1-NMS	13	1.4	34	40.0	12.7	25.4	32.0	10.0	6.3	12.7	32.0
MA-2-NMS	25	1.6	48	65.0	12.7	25.4	57.0	10.0	6.3	12.7	57.0
MA-2.5-NMS	38	1.7	54	78.0	12.7	25.4	65.0	10.0	6.3	12.7	65.0
MA-3-NMS	50	2.0	62	90.0	12.7	25.4	82.0	10.0	6.3	12.7	82.0
MA-4-NMS	75	2.5	142	116.0	12.7	25.4	108.0	10.0	6.3	12.7	108.0

SERIES	DA	EA	MA	NA	SA1	SA2	SA3
CARRIAGE 4 HOLES (I)	M2 THREAD	M3 THREAD	M4 THREAD	M4 THREAD	M4 THREAD	M4 THREAD	M5 THREAD
BASE HOLE d	2.2	3.5	3.5	4.6	4.6	4.6	5.8
BASE HOLE D ₁	4.0	6.1	6.1	8.1	8.1	8.1	10
BASE HOLE h	2.2	3.4	3.4	4.4	4.4	4.4	5.3
COUNTER BORE SCREW SIZE	M2	M3	M3	M4	M4	M4	M5





MODEL
SA3-6
SA3-9
SA3-12

OF HOLES
** 6
** 8
** 10

SPECIFICATIONS:

Straight Line Accuracy
.013mm/25mm of travel

Coefficient of Friction
0.003 typical

Positional Repeatability
.005mm

Construction
Silicon nitride ceramic ball bearings, titanium shafts, aluminum carriage base and end caps, brass fasteners.

Finish
Clear anodize standard
Black anodize available at no extra cost.

*Travel is 1/2 distance from center in either direction.

MODEL	TRAVEL *	LOAD CAPACITY KG	WEIGHT G	LENGTH A	HEIGHT B	WIDTH C	CARRIAGE HOLE SPACING		BASE DIMENSIONS		
							D	E	HEIGHT F	WIDTH G	HOLE SPACING H
NA-1-NMS	19	2.0	37	40.0	13.4	26.9	32.0	10.0	7.9	12.7	28.0
NA-2-NMS	38	2.5	65	65.0	13.4	26.9	57.0	10.0	7.9	12.7	54.0
NA-3-NMS	50	2.7	85	90.0	13.4	26.9	82.0	10.0	7.9	12.7	79.0
NA-4-NMS	75	3.4	147	116.0	13.4	26.9	102.0	10.0	7.9	12.7	82.0
NA-6-NMS	100	4.1	170	152.0	13.4	26.9	140.0	10.0	7.9	12.7	102.0
NA-8-NMS	150	4.8	198	203.0	13.4	26.9	190.0	10.0	7.9	12.7	127.0
NA-10-NMS	200	5.5	227	254.0	13.4	26.9	240.0	10.0	7.9	12.7	178.0
SA1-1-NMS	25	2.0	82	51.0	15.8	38.0	35.0	16.0	8.6	19.0	37.0
SA1-2-NMS	50	2.7	122	76.0	15.8	38.0	60.0	16.0	8.6	19.0	60.0
SA1-3-NMS	75	3.4	170	102.0	15.8	38.0	85.0	16.0	8.6	19.0	85.0
SA1-3.5-NMS	88	4.1	190	127.0	15.8	38.0	110.0	16.0	8.6	19.0	85.0
SA1-4-NMS	100	4.8	232	152.0	15.8	38.0	136.0	16.0	8.6	19.0	100.0
SA1-6-NMS	150	6.1	261	203.0	15.8	38.0	186.0	16.0	8.6	19.0	128.0
SA1-8-NMS	200	7.5	326	254.0	15.8	38.0	238.0	16.0	8.6	19.0	178.0
SA2-1-NMS	25	2.7	113	51.0	19.0	44.0	35.0	20.0	10.2	22.2	38.0
SA2-1.5-NMS	38	4.1	170	70.0	19.0	44.0	55.0	20.0	10.2	22.2	55.0
SA2-2-NMS	50	5.7	184	83.0	19.0	44.0	65.0	20.0	10.2	22.2	65.0
SA2-3-NMS	75	7.1	227	102.0	19.0	44.0	85.0	20.0	10.2	22.2	85.0
SA2-4-NMS	100	8.2	335	152.0	19.0	44.0	140.0	20.0	10.2	22.2	100.0
SA2-6-NMS	150	10.2	445	203.0	19.0	44.0	190.0	20.0	10.2	22.2	126.0
SA2-8-NMS	200	12.3	553	254.0	19.0	44.0	240.0	20.0	10.2	22.2	178.0
SA3-1-NMS	25	4.1	283	67.0	25.4	66.5	54.0	35.0	15.9	38.1	54.0
SA3-1.5-NMS	38	4.8	283	67.0	25.4	66.5	42.0	35.0	15.9	38.1	42.0
SA3-2-NMS	50	8.5	425	102.0	25.4	66.5	75.0	35.0	15.9	38.1	75.0
SA3-3-NMS	75	12.0	590	127.0	25.4	66.5	100.0	35.0	15.9	38.1	100.0
SA3-4-NMS	100	16.1	771	152.0	25.4	66.5	125.0	35.0	15.9	38.1	125.0
SA3-5-NMS	127	18.4	879	203.0	25.4	66.5	175.0	35.0	15.9	38.1	187.0
SA3-6-NMS	150	20.5	498	229.0	25.4	66.5	**75.0	35.0	15.9	38.1	178.0
SA3-9-NMS	228	25.2	1318	305.0	25.4	66.5	**75.0	35.0	15.9	38.1	254.0
SA3-12-NMS	304	28.0	1644	381.0	25.4	66.5	**75.0	35.0	15.9	38.1	330.0