

SLIDE WAY SLIDE TABLE MINIATURE SLIDE GONIO WAY

SLIDE GUIDE

BALL SPLINE
ROTARY BALL SPLINE
STROKE BALL SPLINE

TOPBALL® PRODUCTS

SLIDE BUSH

SLIDE UNIT

STROKE BUSH
SLIDE ROTARY BUSH

SLIDE SHAFT

SLIDE WAY/GONIO WAY
SLIDE TABLE
MINIATURE SLIDE

ACTUATOR

SLIDE SCREW

SLIDE WAY NV type/NVT type

STUDROLLER system (Rivet Roller Structure)

The **STUDROLLER** system is based on a new concept to provide complete prevention of roller-cage slippage during operation. This system permits usage in all orientations and accommodates extremely high acceleration and deceleration.

The number of effective rollers has been increased to a maximum of 18!

The contact length between the rollers and the raceway surface has been extended 30 to 58%!

When compared with conventional SV types, this increases the load rating from 1.3 to 2.5 times!

Therefore:

Size Reduction

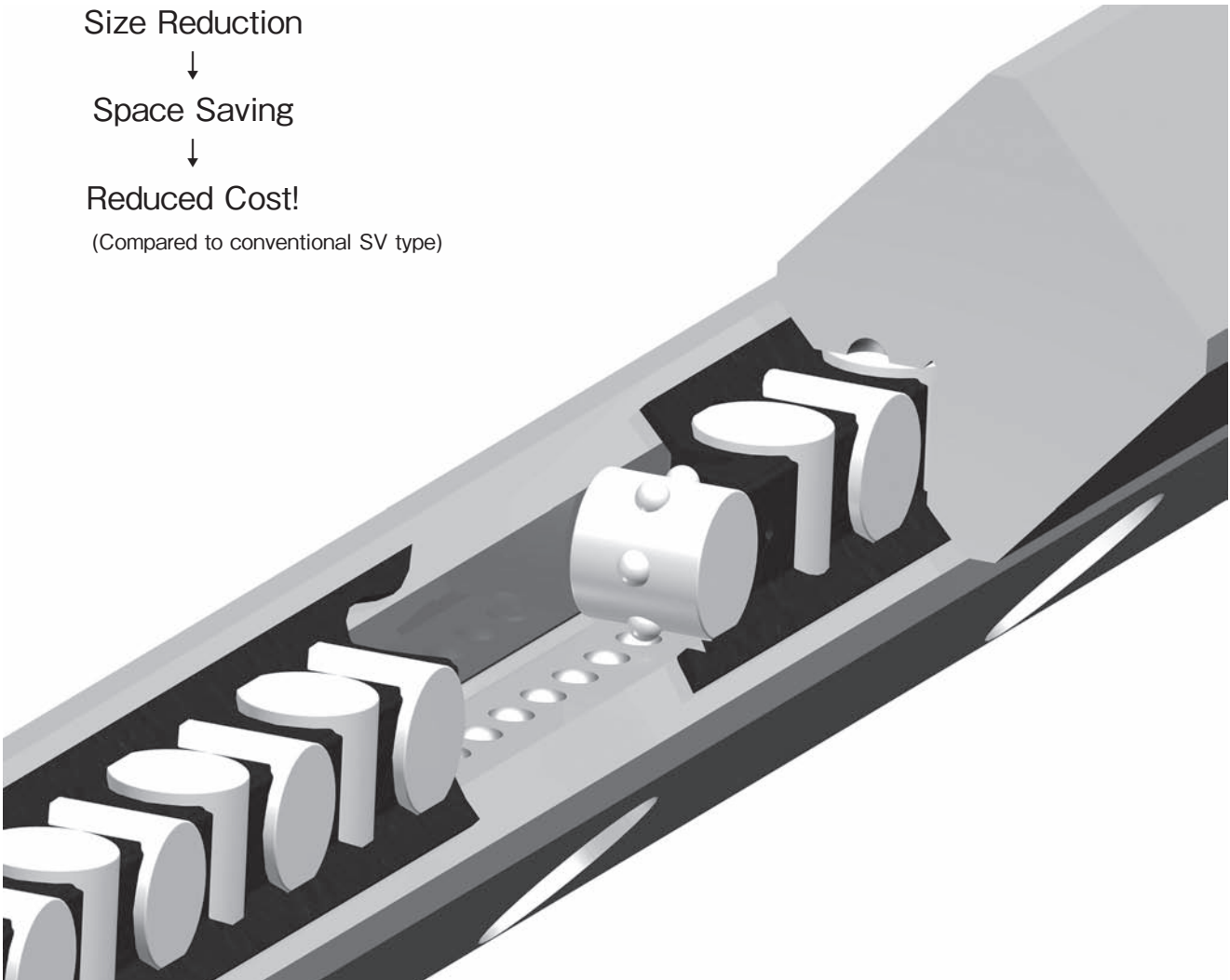


Space Saving



Reduced Cost!

(Compared to conventional SV type)



NB's Slide Way NV and NVT type bearings incorporate **STUDROLLER**, which has been developed based upon a new concept. This next-generation, linear-motion bearings possess smoothness and high accuracy afforded by completely eliminating slippage between the rollers and the raceway surface.

STRUCTURE AND FEATURES

NB's Slide Way NV and NVT types comprise precisely ground rails and R-retainers with built-in **STUDROLLERS**. The rails have been optimally designed so that the **STUDROLLERS** move smoothly, and the **STUDROLLERS** and precision rollers incorporated in the R-retainers enable slip-free operation between the raceway surface and the rollers resulting in motion with minimal frictional resistance.

Non-slip **STUDROLLER** System

The newly-conceived, built-in **STUDROLLER** system completely eliminates slippage inside the product and permits usage in all orientations, and accommodates extremely high acceleration and deceleration.

Compatibility with Conventional Types

The same dimensions as the Slide Way SV type enable complete compatibility between the two series.

Smooth Movement

The optimum design of the roller raceway and the (resin) R-retainers provides a quiet and smooth movement.

This design also results in less lubrication spray than the Slide Way SV type.

High Rigidity, High Load Capacity

Based on the new rail design, the contact length of the rollers and raceway surface is increased by 30 to 58%, and increasing the number of rollers by narrowing the roller pitch allows a load rating that is 1.3 to 2.5 times greater (compared to the conventional SV type).

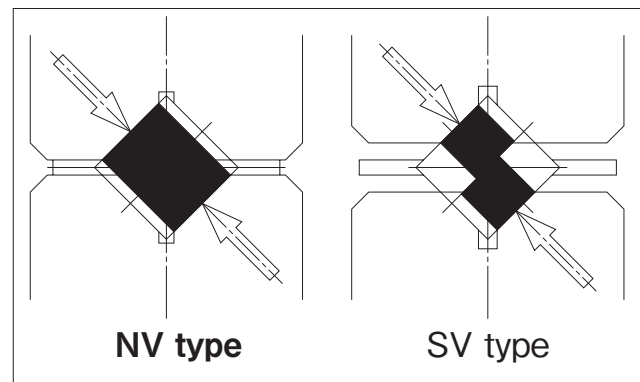
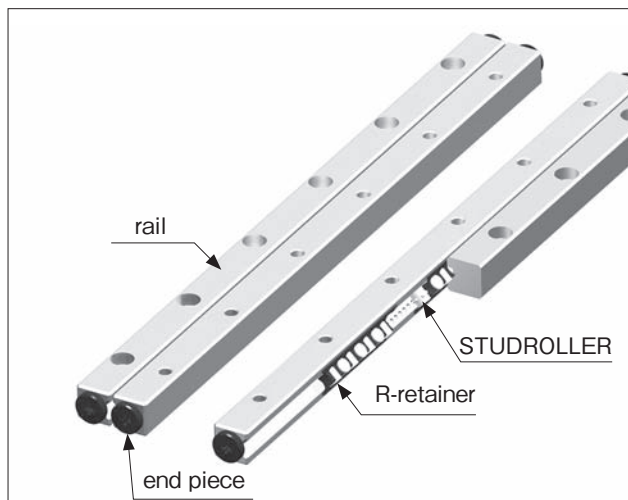
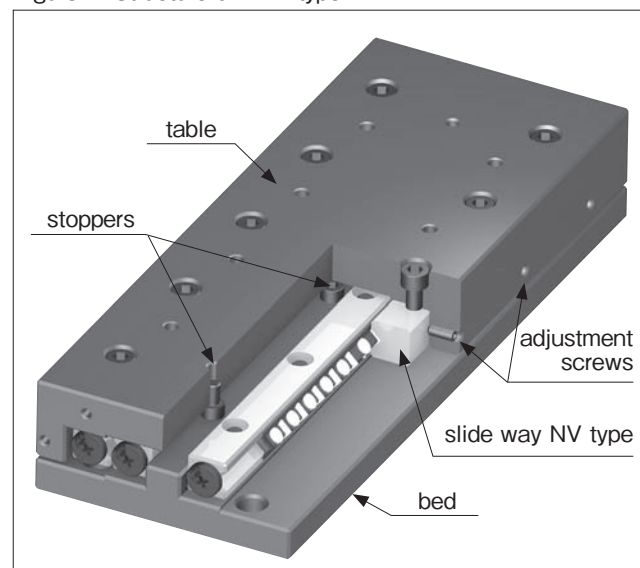


Figure 2. Structure of NVT type

Figure 1. Structure of NV type

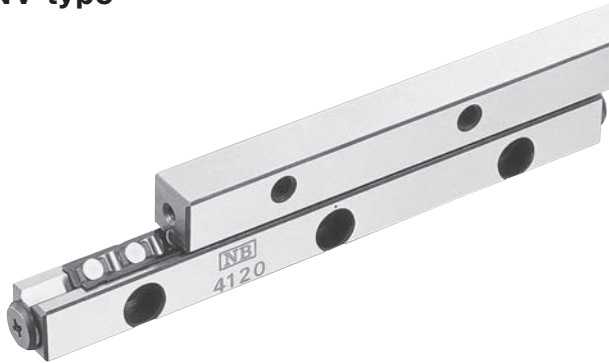


* In the NV type, a fastening plate is attached for the purpose of maintaining the center position of the R-retainer before assembly. Please see Installation Procedure on Page 5 and remove the fastening plate before use.



TYPE

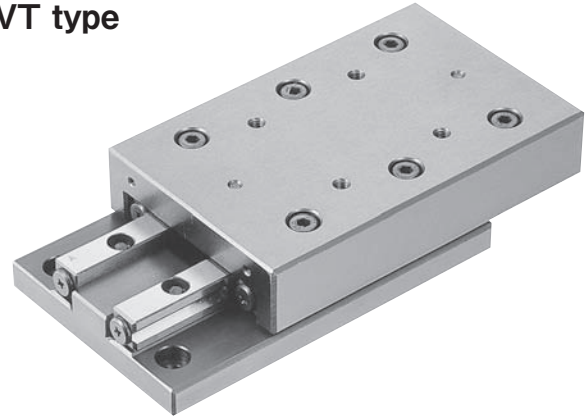
NV type



NV type

This product comprises a set of four rails, two R-retainers, and eight end pieces. It permits flexible design of the table which allows it to be used in a way that will best suit your application.

NVT type



NVT type

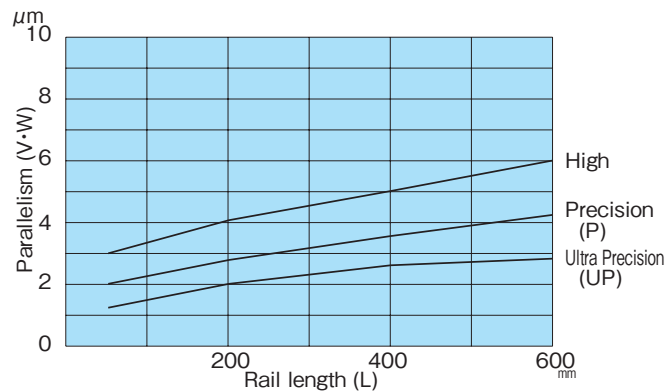
This is a slide table that incorporates the NV type. The table and bed have been precision machined to provide a high degree of accuracy and the product can be used as received, without any need whatsoever for troublesome accuracy or preload adjustments.

ACCURACY

NV type

The accuracy of the Slide Way NV type is represented as parallelism measured across the full length with a method such as shown in Figure 4. It is classified as High (no symbol), Precision (P), or Ultra Precision (UP). Special accuracies can also be accommodated. Please contact NB for details.

Figure 3. Parallelism



NVT type

The motion accuracy of the slide table NVT type is expressed as deviation on the dial indicators attached to the center of the top and side of the table, when the table is moved back and forth without load.

Figure 4. NV type Accuracy Measurement

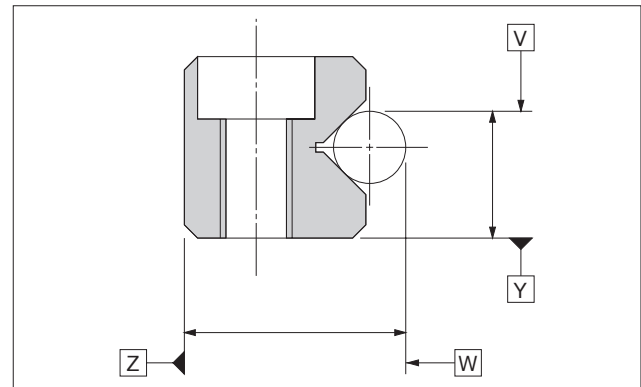
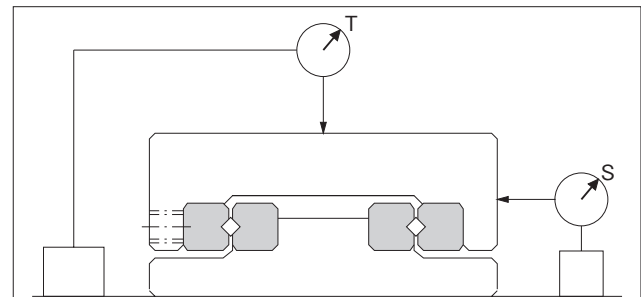


Figure 5. NVT type Accuracy Measurement



LOAD RATING

The load rating of the Slide Way NV and NVT types differs depending on the direction of the load.

Table 1. Change of Load Rating Corresponding to Load Direction

Basic dynamic load rating	Normal vertical direction	$1.0 \times C$
	Horizontal direction	$0.85 \times C$
	Reverse vertical direction	$0.7 \times C$
Basic static load rating	Normal vertical direction	$1.0 \times C_0$
	Horizontal direction	$0.85 \times C_0$
	Reverse vertical direction	$0.7 \times C_0$

* There may be a difference depending on size. Please contact NB for details.

Consideration has been given to holes for STUDROLLERS in the raceway surface, and the load rating in each direction has been determined.

RATED LIFE

The life of the Slide Way or the Slide Table is calculated with the following equations:

Rated Life

$$L = \left[\frac{1}{f_w} \cdot \frac{C}{P} \right]^{\frac{10}{3}} \cdot 50$$

L: rated life (km) f_w : load coefficient C: basic dynamic load rating (N) P: load (N)

Load Coefficient f_w

When calculating the load operating on the Slide Way, in addition to the mass of the object it is necessary to obtain the correct values of many factors including inertial force, and moment, caused by motion speed with various temporal changes. However, linear stroke motion is always accompanied by a repetition of starting and stopping, and there are also uncertain elements such as vibration and impact. This is why correct

LUBRICATION AND DUST PREVENTION

Lubrication

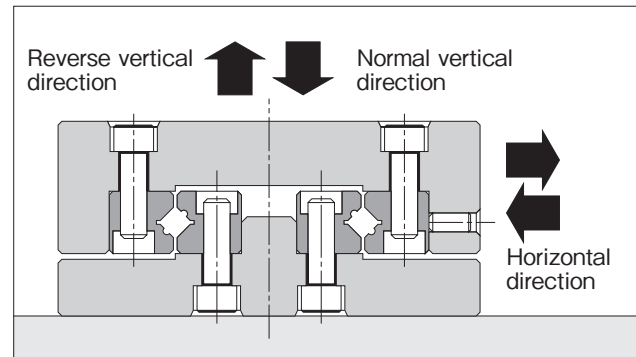
The Slide Way is pre-lubricated with lithium soap-based grease prior to shipment and is therefore ready for immediate use. Make sure to lubricate with a similar type of grease periodically according to the operating conditions.

NB also provides grease for low-dust linear systems. Please contact NB for details.

Dust Prevention

When dirt or dust enters the Slide Way, the accuracy and service life may deteriorate. Therefore, when used in a harsh environment,

Figure 6. Direction of Load



Life Time

$$L_h = \frac{L \cdot 10^3}{2 \cdot \ell_s \cdot n_1 \cdot 60}$$

L_h : life time (hours) ℓ_s : stroke (m) n_1 : Number of cycles per minute (cpm)

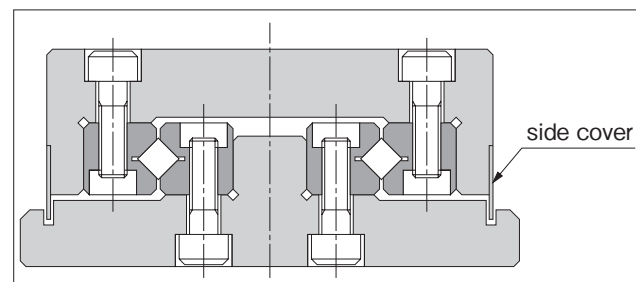
load calculation is difficult. Generally, the load coefficient f_w shown in Table 2 is used to simplify the calculation of life.

Table 2. Load Coefficient f_w

Operating condition		Load coefficient f_w
Load	Speed	
No impact / vibration	15m/min or less	1.0 to 1.5
Low impact / vibration	60m/min or less	1.5 to 2.0
High impact / vibration	60m/min or more	2.0 to 3.5

please protect the Slide Way by providing outside protective covers. (Figure 7)

Figure 7. Example of Dust Prevention Mechanism



MOUNTING NV TYPE

Accuracy of the mounting surface

To maximize the performance of the NB Slide Way, it is recommended that the precision of the mounting surface be finished to be equal to or greater than the degree of parallelism of the Slide Way.

- Parallelism of surface 1 against surface A
- Perpendicularity of surface 2 against surface A
- Parallelism of surface 3 against surface B
- Perpendicularity of surface 4 against surface B
- Parallelism of surface 2 against surface C
- Parallelism of surface 4 against surface C

Installation Procedure

Note: * Provide external mechanical stoppers.
 * Set the movement to be less than the specified stroke.

- (1) Remove burrs, scratches, and dust from the rail mounting surface of the table and bed, and be careful to prevent contamination during assembly.
- (2) Apply low-viscosity oil to the contact surfaces, and align the table and the bed. (Figure 10a)
- (3) Set the reference surface shown in Figure 4 onto the mounting surface with the rails assembled. Set the table in the center position, and tighten the adjustment screws lightly so that almost no gap remains. (Figure 10b)
- (4) Keep the table in the center, tighten the rail mounting bolts lightly, loosen the end pieces of both end faces, and remove the fastening plate. Following this, firmly retighten the end pieces.
- (5) While maintaining the conditions of (4), gently move the assembly through its stroke being certain to check that the specified stroke length has been secured, and that there is no problem with the operation, or any other irregularity.
- (6) Move the table to the center and tighten only the adjustment screws on the R-retainer with the recommended tightening torque as shown in Table 3. (Figure 10c)
- (7) Gently move the table to one stroke end, and check that the table has surely come into contact with the external mechanical stopper. Following this, tighten the adjustment screws on the R-retainer in the same manner as (6). (Figure 10d)
- (8) Move the table to the opposite stroke end, and tighten in the same manner as (6). (Figure 10e)
- (9) Fasten the mounting bolts on rails 1, 2, and 3 by tightening with the recommended torque shown in Table 4. (Figure 10f)
- (10) Set the dial indicators to the center of the table and to the side (reference surface) of the table. (Figure 10g)
- (11) Perform the final preload adjustment. While moving the table back and forth, repeat steps (6) and (7) until the dial indicators show a minimum deviation.
- (12) Finally, securely fasten rail 4, which has been provisionally mounted, using the recommended torque. As with the adjustment screws, successively tighten the mounting bolts on the R-retainer while moving the table.

Figure 8. Accuracy of Mounting Surface

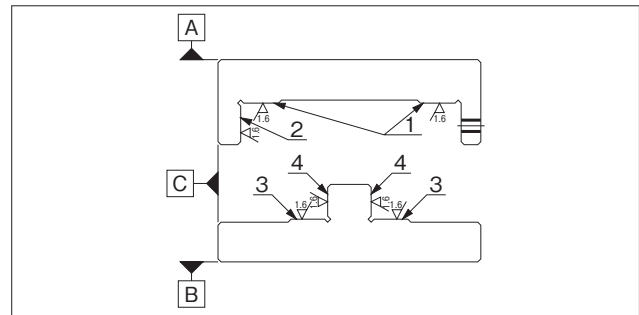


Figure 9. Example of Mounting

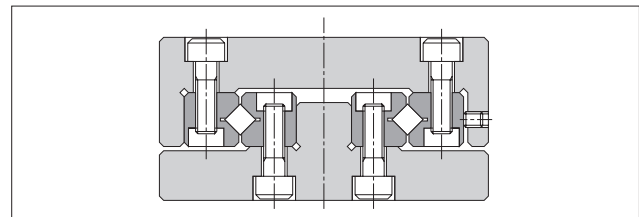


Figure 10. Installation Method

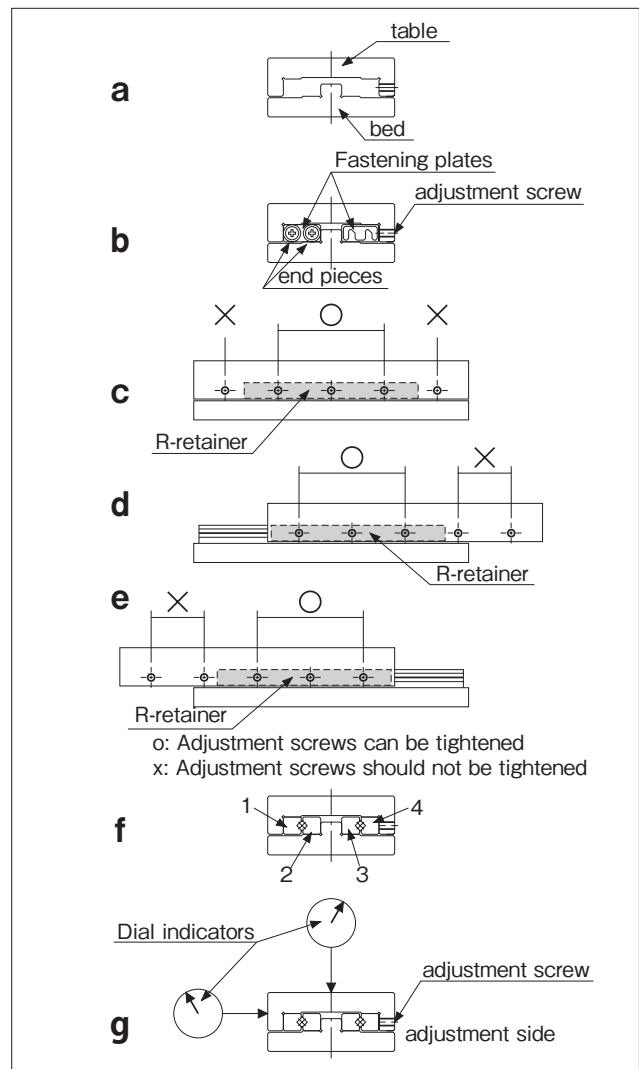


Table 3. Recommended Torque for Adjustment Screws Unit/N·m

Part number	Size of screws	Torque
NV2	M3	0.012
NV3	M4	0.05
NV4	M4	0.08
NV6	M5	0.20
NV9	M6	0.40

SPECIAL MOUNTING BOLT BT TYPE

To mount the Slide Way using its counter bore, use of the BT type of special mounting bolt is recommended.

Table 4. Recommended Torque for Mounting Bolts Unit/N·m

Size of screws	Torque
M3	1.4
M4	3.2
M5	6.6
M6	11.2
M8	27.6

(When using steel alloy bolts)

Figure 11. Special Mounting Bolt

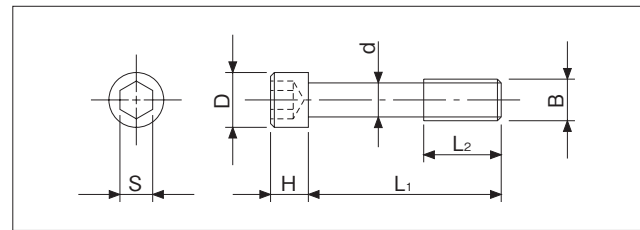


Table 5. Special Mounting Bolt

Part number	B	d mm	D mm	H mm	L ₁ mm	L ₂ mm	S mm	Applicable track rail
BT 3	M3	2.3	5	3	12	5	2.5	NV 3
BT 4	M4	3.1	5.8	4	15	7	3	NV 4
BT 6	M5	3.9	8	5	20	8	4	NV 6
BT 9	M6	4.6	8.5	6	30	12	5	NV 9
BT12	M8	6.25	11.3	8	40	17	6	NV12

PRECAUTIONS FOR USE

Careful Handling:

The NV type is packaged as a set of rails and R-retainers. Do not separate or disassemble until assembly/installation is completed. Dropping this product may cause the rolling elements to make dents in the raceway surface. This will prevent smooth motion and will also affect accuracy. Be sure to handle the product with care.

Stopper:

Exceeding the specified stroke (over-stroke) may cause the raceway surface of the rail to be damaged and the performance of the **STUDROLLER** to drastically deteriorate. Be sure to provide external mechanical stoppers and use the product within the specified allowable stroke.

Adjustment:

Using the product with insufficient accuracy of the mounting surface or before adjusting the preload will cause the motion accuracy of the product to drop and will have a negative influence upon product life and accuracy. Make sure to assemble, install, and adjust the product with care.

Use as a Set:

The accuracy of the rails has been matched within each set. Note that the accuracy may be affected when the rails of different sets are combined.

Operating Temperature:

The product uses resin parts. Avoid using the product in high temperatures; use the product in environments that are lower than 80° C.

Adjustment Screws:

The accuracy and preload of the NVT type Slide Table has been factory-adjusted to the optimal level. Do not touch the adjustment and rail mounting screws.

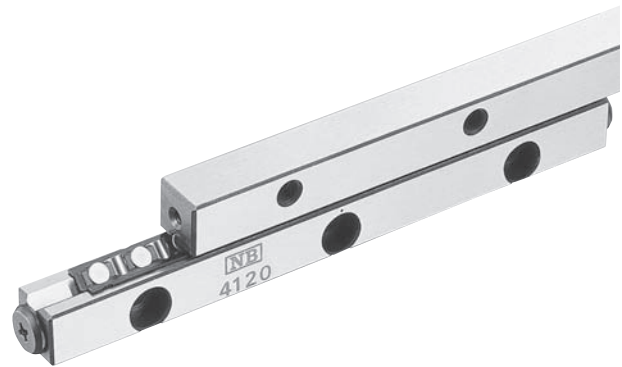
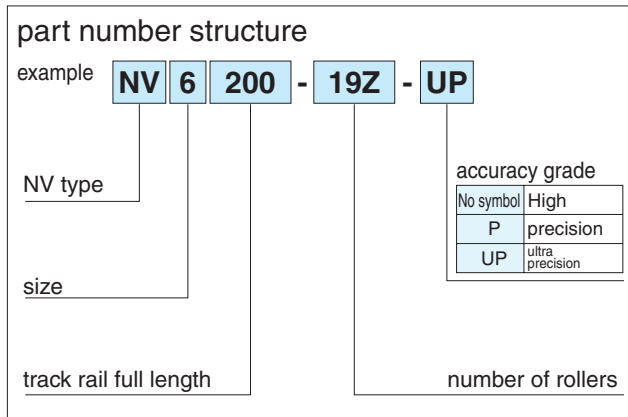
Allowable Load:

The allowable load is the load under which the sum of the elastic deformation of the roller elements and the raceway surface is small on a contact portion where the contact stress of the rolling elements and the rail surface is a maximum, permitting a smooth rolling motion.

Fastening Plates:

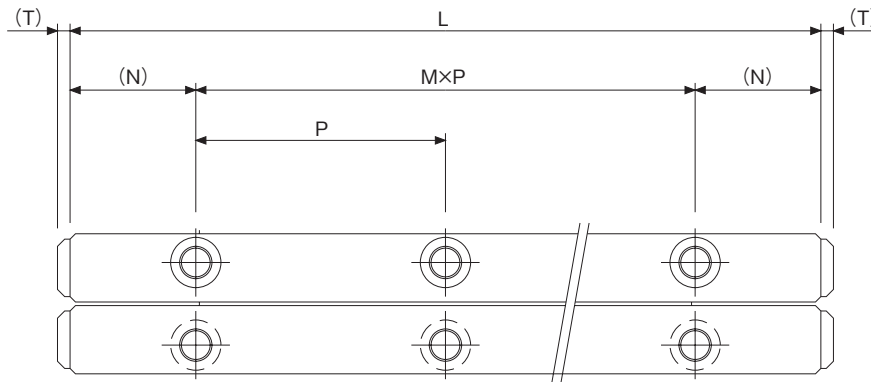
In the NV type, fastening plates are attached at both end faces of the rails to maintain the R-retainer center position prior to assembly. The fastening plates are not required when the NV type is used mounted to a table, bed, or the like; however, when removal of the NV type is necessary such as when it will be reassembled, be sure to return the R-retainer to the proper center position, secure the fastening plates with the end pieces, and then remove the NV type.

NV TYPE

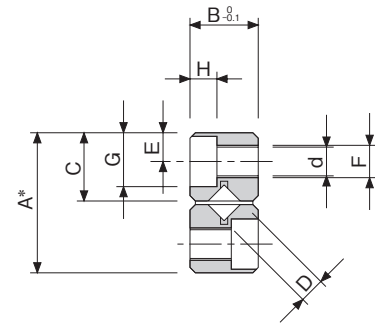


part number	stroke ST mm	roller diameter D mm	number of rollers Z						
				L mm	A mm	B mm	C mm	M × P mm	N mm
NV2030- 5Z	18	2	5	30	12	6	5.7	1 × 15	7.5
NV2045- 9Z	25		9	45				2 × 15	
NV2060-15Z	30		15	60				3 × 15	
NV2075-19Z	40		19	75				4 × 15	
NV2090-23Z	50		23	90				5 × 15	
NV2105-27Z	65		27	105				6 × 15	
NV2120-33Z	70		33	120				7 × 15	
NV2135-37Z	80		37	135				8 × 15	
NV2150-41Z	90		41	150				9 × 15	
NV2165-47Z	95		47	165				10 × 15	
NV2180-51Z	100	3	51	180	18	8	8.65	11 × 15	12.5
NV3050- 9Z	25		9	50				1 × 25	
NV3075-13Z	48		13	75				2 × 25	
NV3100-19Z	60		19	100				3 × 25	
NV3125-23Z	83		23	125				4 × 25	
NV3150-29Z	90		29	150				5 × 25	
NV3175-35Z	103		35	175				6 × 25	
NV3200-41Z	113		41	200				7 × 25	
NV3225-43Z	150		43	225				8 × 25	
NV4080- 9Z	60	4	9	80	22	11	10.65	1 × 40	20
NV4120-17Z	75		17	120				2 × 40	
NV4160-23Z	105		23	160				3 × 40	
NV4200-29Z	130		29	200				4 × 40	
NV4240-37Z	143		37	240				5 × 40	
NV4280-43Z	170		43	280				6 × 40	

The basic static load rating is the value at the center of the stroke.



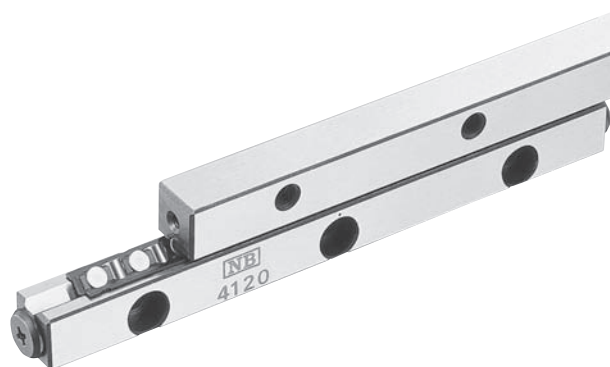
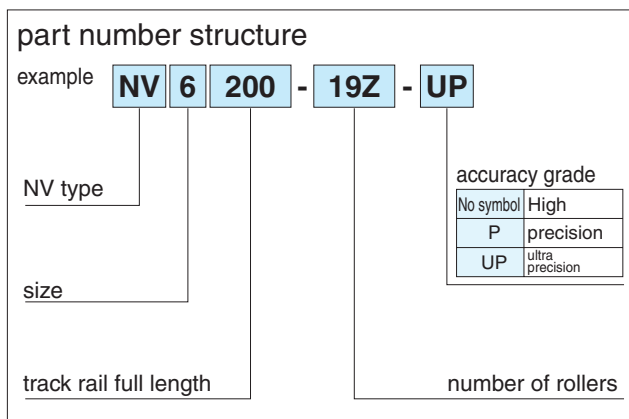
*High grade: A_{0.2} Precision grade (P): A_{0.1} Ultra Precision grade (UP): A_{0.1}
A set consists of 4 rails, 2 R-retainers, and 8 end pieces.



major dimensions						basic load rating		allowable	mass	size
E	F	d	G	H	T	dynamic C N	static Co N	load F N	g	
2.5	M3	2.55	4.4	2	2	1,360	1,520	500	33	2030
						2,330	3,050	1,010	49	2045
						3,990	6,110	2,030	62	2060
						4,740	7,630	2,540	74	2075
						5,460	9,160	3,050	91	2090
						6,160	10,600	3,560	103	2105
						6,830	12,200	4,070	120	2120
						7,490	13,700	4,580	132	2135
						8,130	15,200	5,090	149	2150
						9,370	18,300	6,110	161	2165
3.5	M4	3.3	6	3.1	2	9,970	19,800	6,620	174	2180
						6,150	8,060	2,680	97	3050
						8,440	12,100	4,030	140	3075
						12,500	20,100	6,720	192	3100
						14,400	24,200	8,060	245	3125
						16,300	28,200	9,410	290	3150
						19,800	36,300	12,100	337	3175
						21,500	40,300	13,400	385	3200
4.5	M5	4.3	8	4.2	2	23,200	44,300	14,700	434	3225
						12,100	15,700	5,250	265	4080
						20,700	31,500	10,500	400	4120
						28,500	47,200	15,700	530	4160
						32,100	55,100	18,300	660	4200
						39,000	70,900	23,600	800	4240
						45,600	86,600	28,800	930	4280

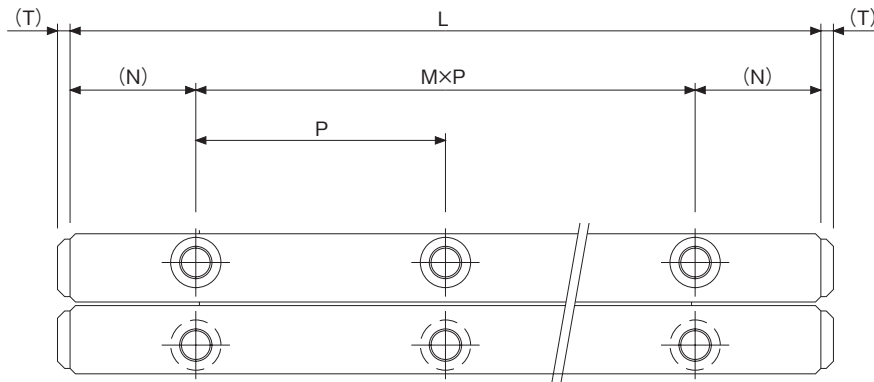
1N ≙ 0.102kgf

NV TYPE

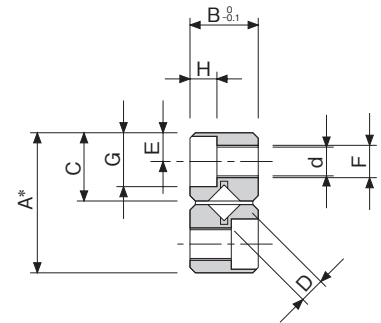


part number	stroke ST mm	roller diameter D mm	number of rollers Z						
				L mm	A mm	B mm	C mm	M × P mm	N mm
NV6100- 9Z	63	6	9	100	31	15	15.15	1 × 50	25
NV6150-15Z	85		15	150				2 × 50	
NV6200-19Z	135		19	200				3 × 50	
NV6250-25Z	158		25	250				4 × 50	
NV6300-31Z	180		31	300				5 × 50	
NV6350-35Z	230		35	350				6 × 50	
NV6400-39Z	275	9	39	400	44	22	21.5	7 × 50	50
NV9200-13Z	120		13	200				1 × 100	
NV9300-21Z	170		21	300				2 × 100	
NV9400-29Z	220		29	400				3 × 100	
NV9500-35Z	300		35	500				4 × 100	
NV12300-15Z	180	12	15	300	58	28	28.5	2 × 100	50
NV12400-21Z	230		21	400				3 × 100	
NV12500-27Z	280		27	500				4 × 100	
NV12600-31Z	380		31	600				5 × 100	

The basic static load rating is the value at the center of the stroke.



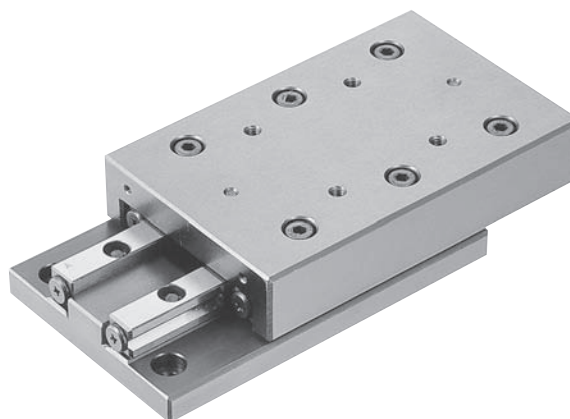
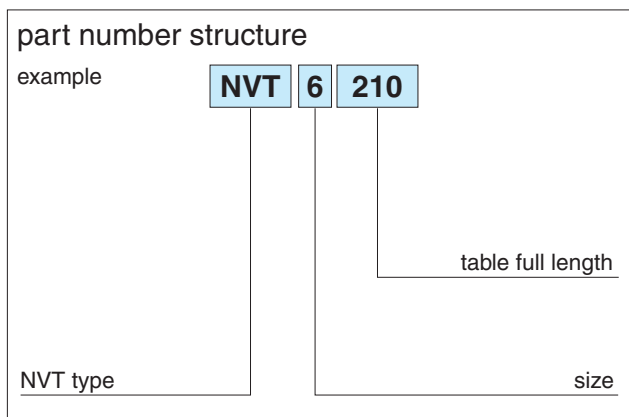
*High grade: A_{0.2} Precision grade (P): A_{0.1} Ultra Precision grade (UP): A_{0.1}
A set consists of 4 rails, 2 R-retainers, and 8 end pieces.



major dimensions						basic load rating		allowable	mass	size
E	F	d	G	H	T	dynamic C N	static Co N	load F N	g	
6	M6	5.2	9.5	5.2	3	29,600	37,500	12,500	650	6100
						50,900	75,100	25,000	970	6150
						60,600	93,900	31,300	1,300	6200
						69,800	112,000	37,500	1,620	6250
						87,000	150,000	50,000	1,940	6300
						95,000	169,000	56,000	2,360	6350
9	M8	6.8	10.5	6.2	4	104,000	187,000	62,000	2,780	6400
						96,000	128,000	42,000	2,720	9200
						143,000	213,000	71,000	4,080	9300
						186,000	298,000	99,000	5,440	9400
12	M10	8.5	13.5	8.2	4	226,000	384,000	128,000	6,790	9500
						228,000	317,000	105,000	6,770	12300
						271,000	396,000	132,000	9,040	12400
						352,000	555,000	185,000	11,300	12500
						391,000	635,000	211,000	13,560	12600

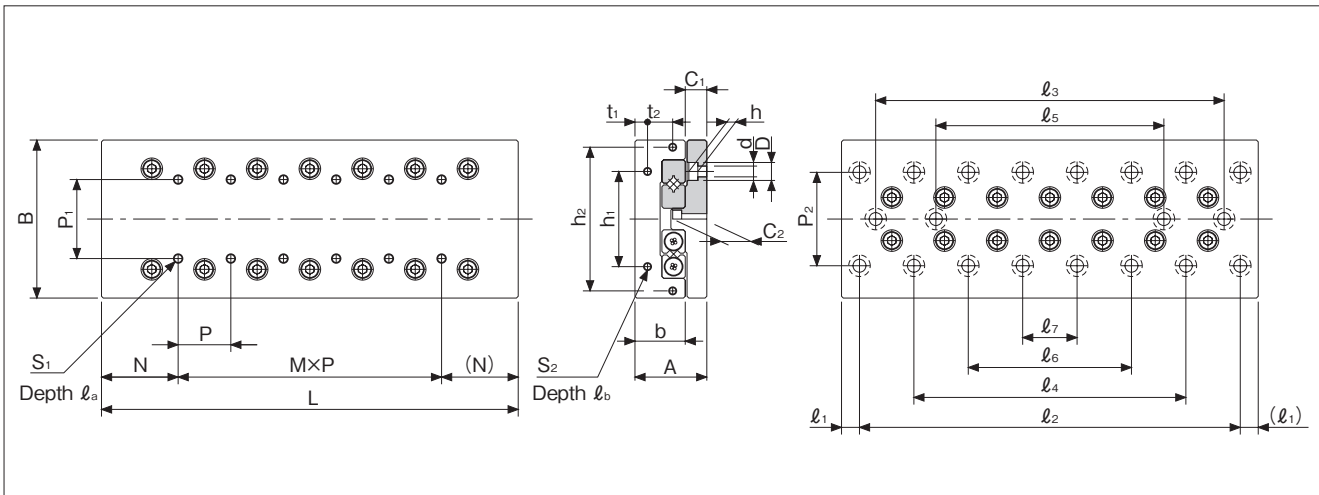
1N ≐ 0.102kgf

NVT TYPE



part number	stroke	dimensions				table-top mounting hole dimensions					table-end mounting hole dimensions						
	ST mm	A mm	B mm	L mm	b mm	P ₁ mm	S ₁	ℓ _a mm	N mm	M × P mm	h ₁ mm	h ₂ mm	t ₁ mm	t ₂ mm	S ₂	ℓ _b mm	P ₂ mm
NVT2035	18	21 ± 0.1	40 ^{+0.2} _{-0.4}	35	14	15	M3	6	17.5	-	16	-	3.4	-	M2	6	30
NVT2050	30			50						1 × 15							
NVT2065	40			65						2 × 15							
NVT2080	50			80						3 × 15							
NTV2095	60			95						4 × 15							
NTV2110	70			110						5 × 15							
NVT2125	80			125						6 × 15							
NVT2140	90			140						7 × 15							
NVT2155	100			155						8 × 15							
NVT2170	110			170						9 × 15							
NVT2185	120			185						10 × 15							
NVT3055	30	28 ± 0.1	60 ± 0.1	55	18.5	25	M4	8	27.5	-	40	-	5.5	-	M3	6	40
NVT3080	45			80						1 × 25							
NVT3105	60			105						2 × 25							
NVT3130	75			130						3 × 25							
NVT3155	90			155						4 × 25							
NVT3180	105			180						5 × 25							
NVT3205	130			205						6 × 25							
NVT3230	155			230						7 × 25							
NVT4085	50			85						-							
NVT4125	75			125						1 × 40							
NVT4165	105	35 ± 0.1	80 ± 0.1	165	24	40	M5	10	42.5	2 × 40	55	-	6.5	-	M3	6	55
NVT4205	130			205						3 × 40							
NVT4245	155			245						4 × 40							
NVT4285	185			285						5 × 40							

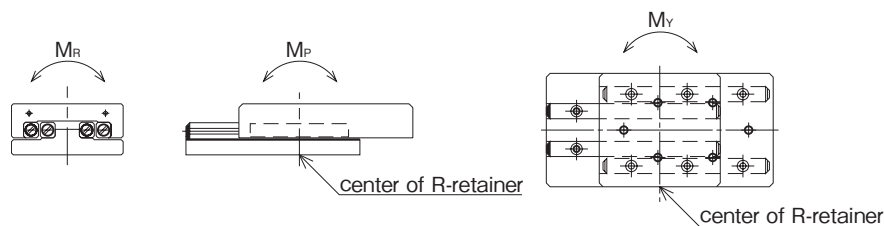
The basic static load rating is the value at the center of the stroke.



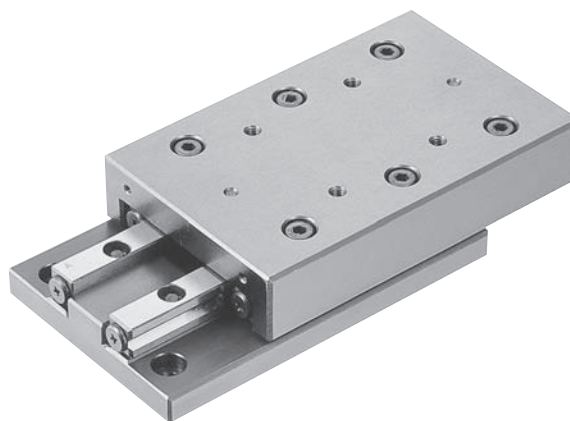
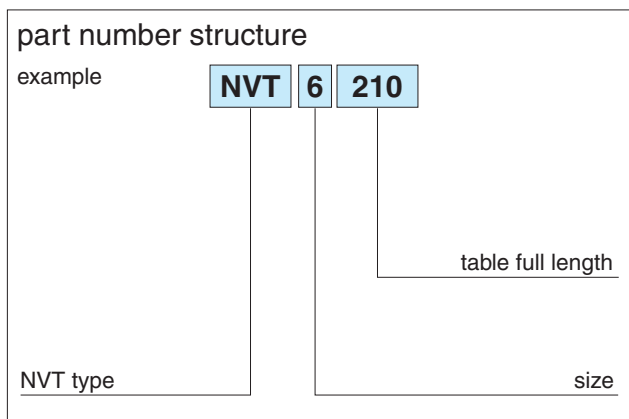
bed-surface mounting hole dimensions										motion accuracy*		basic load rating		allowable load	allowable static moment			mass	size
d × D × h mm	C ₁ mm	C ₂ mm	l ₁ mm	l ₂ mm	l ₃ mm	l ₄ mm	l ₅ mm	l ₆ mm	l ₇ mm	T μm	S μm	dynamic C N	static Co N	F N	M _p N·m	M _v N·m	M _R N·m	g	
35×6.5×3.5	6.5	10.9	5	25	—	—	—	—	—	2	4	1,360	1,520	500	10.1	8.8	13.7	200	2035
				40	—	—	—	—	—	2	4	2,330	3,050	1,010	19.0	18.7	21.2	287	2050
				55	—	—	—	—	—	2	5	3,190	4,580	1,520	36	35	35	377	2065
				70	—	40	—	—	—	2	5	3,990	6,110	2,030	53	53	40	455	2080
				85	—	55	—	—	—	2	5	4,740	7,630	2,540	80	79	53	550	2095
				100	—	70	—	—	—	3	6	5,460	9,160	3,050	104	106	58	640	2110
				115	—	85	—	—	—	3	6	6,160	10,600	3,560	130	135	63	730	2125
				130	—	100	—	70	—	3	6	6,830	12,200	4,070	171	176	77	810	2140
				145	—	115	—	85	—	3	6	7,490	13,700	4,580	217	220	91	890	2155
				160	—	130	—	100	—	3	7	8,130	15,200	5,090	276	289	96	980	2170
				175	—	145	—	115	85	3	7	8,750	16,800	5,600	318	338	101	1,070	2185
4.5×8×4.5	9	15	10	35	—	—	—	—	—	2	5	6,150	8,060	2,680	22.9	36	39	643	3055
				60	—	—	—	—	—	2	5	8,440	12,100	4,030	125	119	152	960	3080
				85	—	—	—	—	—	3	6	10,500	16,100	5,370	188	185	179	1,260	3105
				110	—	—	—	—	—	3	6	14,400	24,200	8,060	301	319	205	1,580	3130
				135	85	—	—	—	—	3	6	16,300	28,200	9,410	425	438	262	1,860	3155
				160	110	—	—	—	—	3	7	18,100	32,200	10,700	628	634	345	2,160	3180
				185	135	85	—	—	—	3	7	19,800	36,300	12,100	760	778	371	2,460	3205
				210	160	110	—	—	—	3	7	21,500	40,300	13,400	903	934	397	2,780	3230
5.5×10×5.4	10.5	18	10	65	—	—	—	—	—	2	5	12,100	15,700	5,250	155	146	274	1,710	4085
				105	—	—	—	—	—	3	6	20,700	31,500	10,500	328	356	352	2,520	4125
				145	—	—	—	—	—	3	7	24,700	39,300	13,100	651	657	587	3,320	4165
				185	105	—	—	—	—	3	7	32,100	55,100	18,300	1,060	1,090	744	4,130	4205
				225	145	—	—	—	—	3	7	35,600	63,000	21,000	1,570	1,580	980	4,930	4245
				265	185	—	—	—	—	3	7	42,400	78,700	26,200	2,090	2,170	1,050	5,730	4285

* For accuracy T and S, see Page 3

1N ≐ 0.102kgf 1N·m ≐ 0.102kgf·m

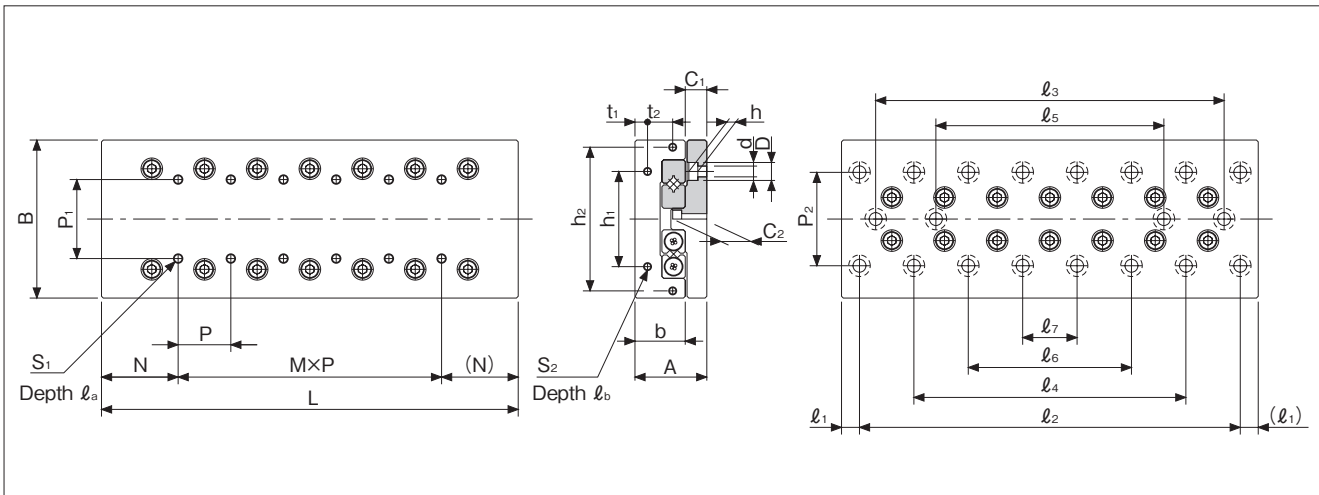


NVT TYPE



part number	stroke	dimensions				table-top mounting-hole dimensions					table-end mounting hole dimensions						
	ST mm	A mm	B mm	L mm	b mm	P ₁ mm	S ₁	ℓ _a mm	N mm	M × P mm	h ₁ mm	h ₂ mm	t ₁ mm	t ₂ mm	S ₂	ℓ _b mm	P ₂ mm
NVT6110	60	45 ± 0.1	100 ± 0.1	110	31	50	M6	12	55	—	60	92	8	15	M4	8	60
NVT6160	95			160						1 × 50							
NVT6210	130			210						2 × 50							
NVT6260	165			260						3 × 50							
NVT6310	200			310						4 × 50							
NVT6360	235			360						5 × 50							
NVT6410	265			410						6 × 50							
NVT9210	130	60 ± 0.1	145 ± 0.1	210	43	85	M8	16	105	—	90	135	11	20	M4	8	90
NVT9310	180			310						1 × 100							
NVT9410	220			410						2 × 100							
NVT9510	300			510						3 × 100							

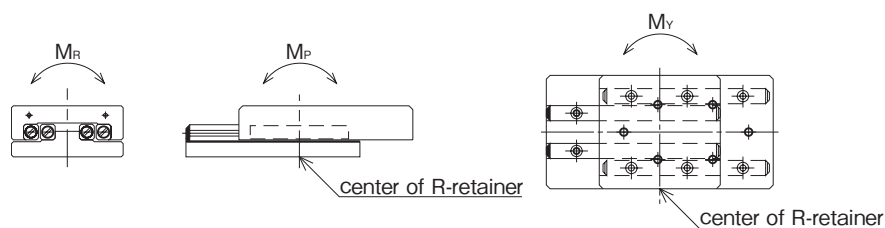
The basic static load rating is the value at the center of the stroke.



bed-surface mounting hole dimensions										motion accuracy*		basic load rating		allowable load	allowable static moment			mass	size
$d \times D \times h$ mm	C_1 mm	C_2 mm	ℓ_1 mm	ℓ_2 mm	ℓ_3 mm	ℓ_4 mm	ℓ_5 mm	ℓ_6 mm	ℓ_7 mm	T μm	S μm	dynamic C N	static C_0 N	F N	M_p N·m	M_y N·m	M_R N·m	g	
7×11.5×7	13	23	10	90	—	—	—	—	—	3	6	29,600	37,500	12,500	542	506	782	3,300	6110
				140	—	—	—	—	—	3	6	40,700	56,300	18,700	947	932	1,020	4,850	6160
				190	90	—	—	—	—	3	7	50,900	75,100	25,000	1,640	1,590	1,440	6,310	6210
				240	140	—	—	—	—	3	7	69,800	112,000	37,500	2,700	2,780	1,680	7,790	6260
				290	190	—	—	—	—	3	7	78,800	131,000	43,800	3,780	3,830	2,100	9,260	6310
				340	240	140	—	—	—	4	8	87,400	150,000	50,100	5,600	5,590	2,770	10,900	6360
				390	290	190	—	—	—	4	8	104,000	187,000	62,600	7,480	7,670	3,000	12,460	6410
9×14×9	16	29	55	100	—	—	—	—	—	3	6	96,000	128,000	42,600	1,720	2,120	2,290	12,550	9210
				200	—	—	—	—	—	3	6	143,000	213,000	71,100	6,560	6,580	5,370	18,000	9310
				300	100	—	—	—	—	3	7	186,000	298,000	99,500	12,700	12,700	7,820	24,010	9410
				400	200	—	—	—	—	3	7	206,000	341,000	113,000	18,700	18,700	10,200	30,100	9510

* For accuracy T and S, see Page 3

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SLIDE WAY

The NB slide way is a non-recirculating linear motion bearing utilizing precision rollers. It is used primarily in optical and measurement equipment where high precision movement is required.

STRUCTURE AND ADVANTAGES

The NB slide way consists of precision ground track bases and caged rollers. Precision rollers are used as the rotating element. Since they do not recirculate, there is less frictional resistance fluctuation. Additionally, there is little or no difference between the static and dynamic frictional resistances.

Suitable for Minute Motion:

Because the frictional resistance is extremely small and there is little or no difference between the static and dynamic frictional resistances, the NB slide way is well suited for minute motion. It can follow minute motion accurately, resulting in highly accurate linear movement.

Low-Speed Stability:

Since the frictional resistance fluctuation is small even under low-load conditions, stable motion is obtained from low to high speeds.

High Rigidity and High Load Capacity:

Since the rollers provide a larger contact area compared with ball elements, there is less elastic deformation. Additionally, since the rollers do not recirculate, the effective number of rotating elements is large, resulting in high rigidity and high load capacity.

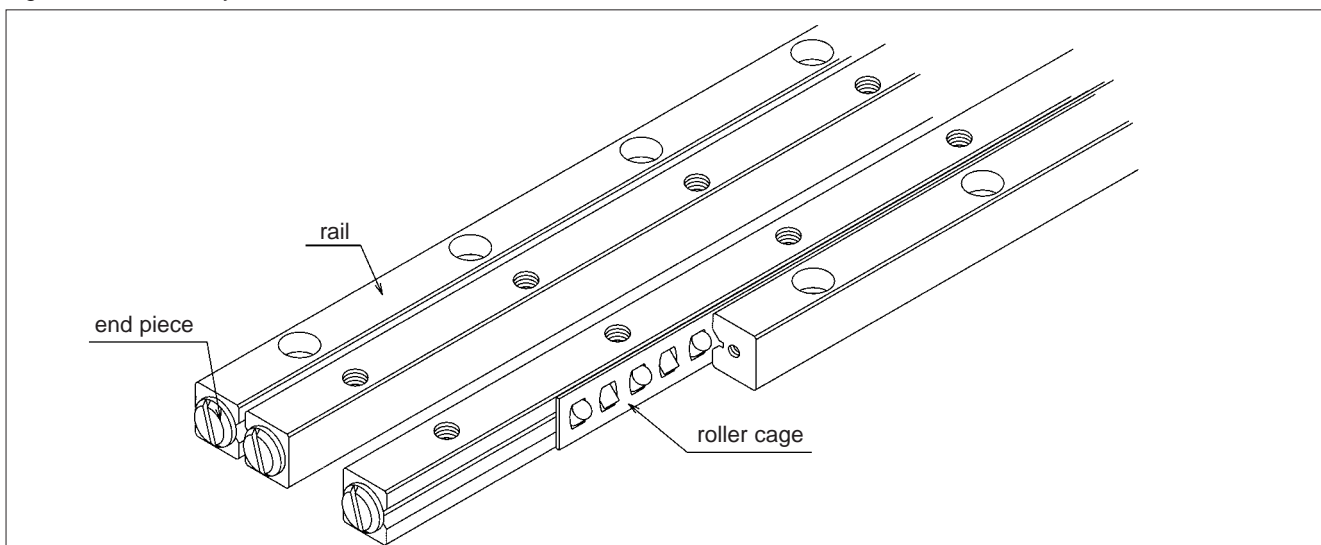
Low Noise:

The use of a roller cage prevents noise from being generated by contact between the rotating elements, resulting in quiet operation.

All Stainless Steel Type Available:

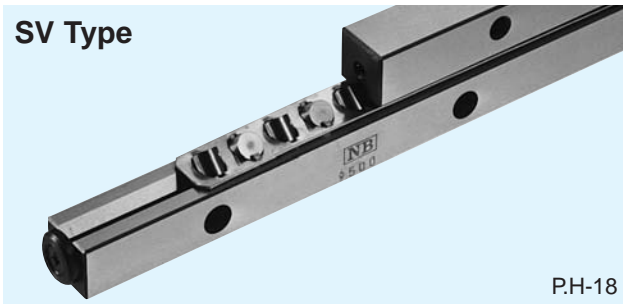
The anti-corrosion SVS/SVWS slide ways have all stainless-steel components, making them ideal for use in clean room applications.

Figure H-14 Slide Way Structure



TYPE

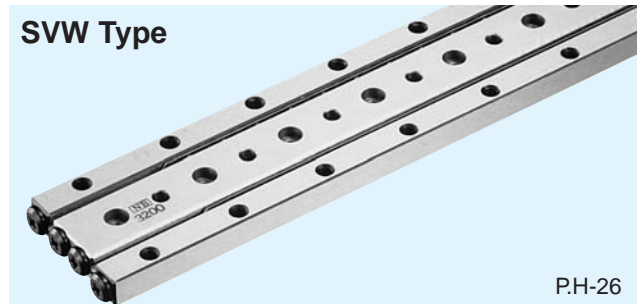
SV Type



P.H-18

The SV type slide way consists of two R type roller cages, which have precision rollers in a cross arrangement and four rails having V-shaped raceway surfaces. The all stainless-steel optional feature makes it suitable for use in corrosive environments.

SVW Type



P.H-26

The SVW type slide way consists of two R type roller cages, two SV-type rails, and one W type rail with V-shaped grooves on both sides. The use of a W-type rail results in a compact design. The SVWS type is also available with all stainless steel components.

ACCURACY AND RATED LIFE

Accuracy:

The accuracy of a slide way is measured along its entire length, as illustrated in Figure H-16, and expressed in terms of parallelism. It is categorized into three levels: high grade (no suffix), precision grade (P), and ultra precision grade (UP).

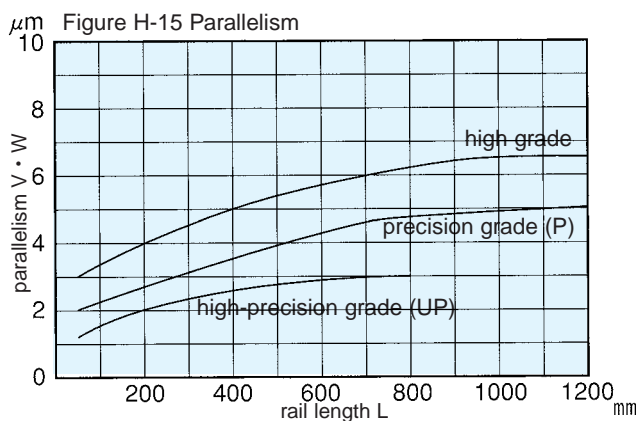
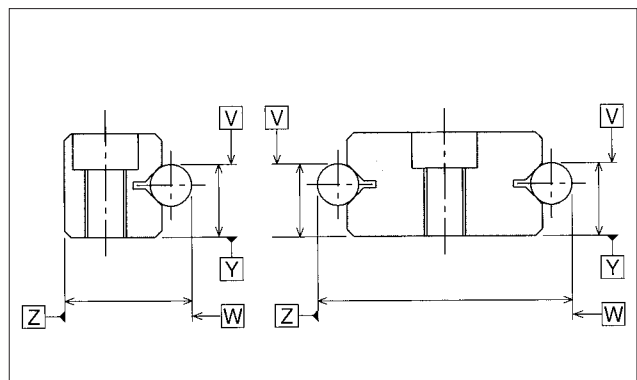


Figure H-16 Accuracy Measurement Method



Ultra precision grade is available for size 1-9

Rated Life:

The life of a slide way is calculated using the following equation:

Travel life:

$$L = \left(\frac{f_T}{f_w} \cdot \frac{C}{P} \right)^{10/3} \cdot 50$$

L : travel life (km) f_T : temperature coefficient
 f_w : load coefficient C : basic dynamic rated load (N)
P : load (N)

※ Refer to page Eng. 5 for coefficients.

Life time:

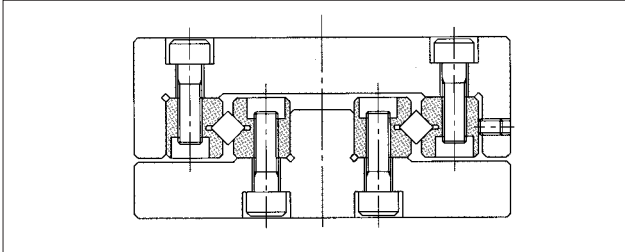
$$L_H = \frac{L \cdot 10^3}{2 \cdot \ell \cdot s \cdot n_1 \cdot 60}$$

L_H : life time (hr) ℓ : stroke length (m)
 n_1 : number of strokes per minute (cpm)

MOUNTING

Example:

Figure H-17 SV Type Slide Way



Accuracy:

The accuracy of the mounting surface must be equal to or better than that of the slide way to ensure good performance.

Parallelism of surface 1 relative to surface A

Perpendicularity of surface 2 relative to surface A

Parallelism of surface 3 relative to surface B

Perpendicularity of surface 4 relative to surface B

Parallelism of surface 2 relative to surface C

Parallelism of surface 4 relative to surface C

Procedure (refer to Figures H-20 and -21):

- (1) Remove burrs, dirt, dust, etc. from mounting surfaces to prevent contamination during assembly.
- (2) Apply low-viscosity oil to contact surfaces. Attach rail ①-③ by tightening bolts to specified torque values (Table H-6, Figure H-20a).
- (3) Temporarily attach adjustable side of rail ④ (Figure H-20b).
- (4) Remove one end-piece. Carefully insert roller cages between rails (Figure H-20c).
- (5) Re-attach end-pieces.

Figure H-18 SVW Type Slide Way

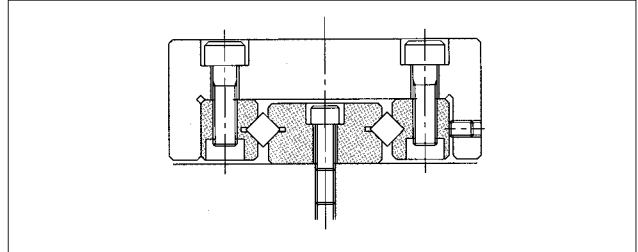


Figure H-19 Accuracy of Mounting Surfaces

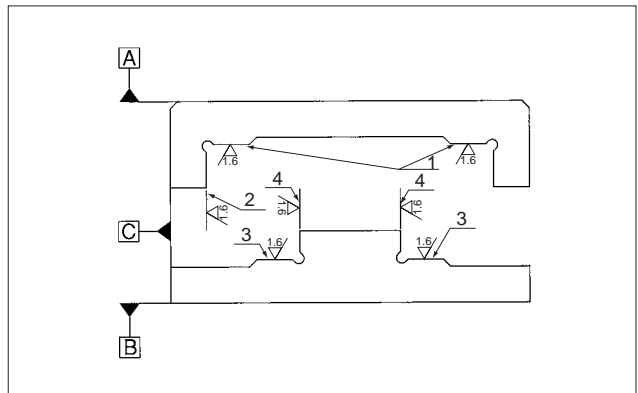
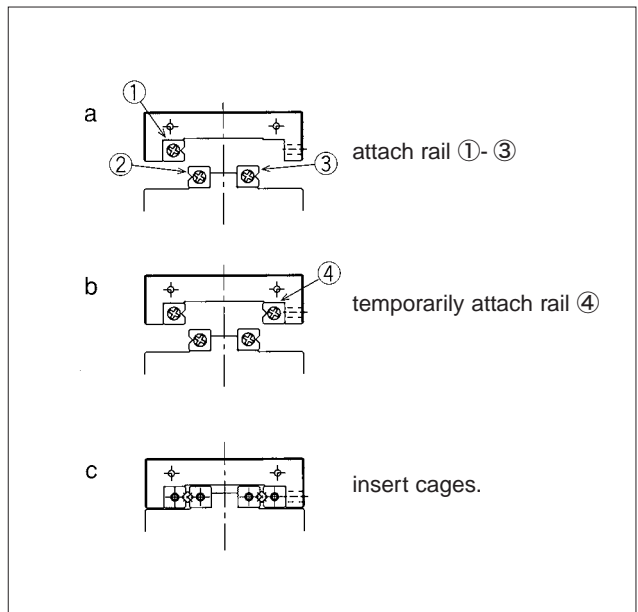


Figure H-20 Installation Method (1)



(6) Move table slowly to the right and left (in the direction of the stroke) to position roller cage at the center of the rail.

(7) Set indicators at the center and the side (reference surface) of the table (Figure H-21d).

(8) Move table to one of the stroke ends. Lightly tighten adjustment screw on roller cage (Figure H-21e).

(9) Move table to the other stroke end. Similarly lightly tighten adjustment screw on roller cage (Figure H-21f).

(10) Move table to the center and lightly tighten center adjustment screw (Figure H-21g).

(11) Repeat steps (8) ~ (10) until there is no clearance around the table. When there is no clearance, the indicator will show a minimum fluctuation value when the table is moved to the right and left. Exercise care not to apply an excessive pre-load.

(12) Make final adjustment of pre-load. Repeat steps (8) ~ (10) and tighten the adjustment screws to the torque values listed in Table H-5.

(13) Fix the rail ④. As done for the adjustment screws, tighten the mounting bolts by moving the table.

Figure H-21 Installation Method (2)

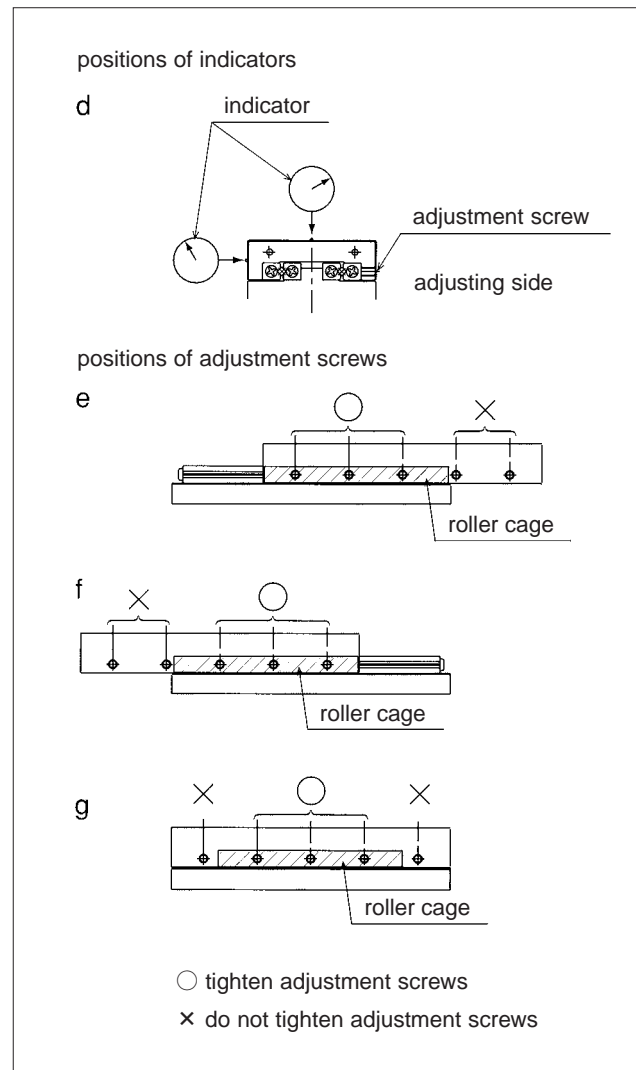


Table H-5 Recommended Torque for Adjustment Screw Unit/N·m

Part Number	Size	Torque
SV1	M2	0.008
SV2	M3	0.012
SV3	M4	0.05
SV4	M4	0.08
SV6	M5	0.20
SV9	M6	0.40

Table H-6 Recommended Torque for Mounting Bolt Unit/N·m

Part number	Size	Torque
SV1	M2	0.4
SV2	M3	1.4
SV3	M4	3.2
SV4	M5	6.6
SV6	M6	11.2
SV9	M8	27.6

SPECIAL BOLT (BT type)

BT type special bolts should be used when using the clearance holes to install a slide way.

Figure H-22 BT type Special Bolt

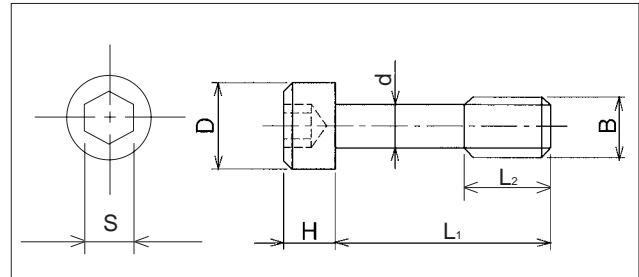


Table H-7 BT type Special Bolt Specifications

Part number	B	d mm	D mm	H mm	L ₁ mm	L ₂ mm	S mm	Applicable tracking base
BT 3	M 3	2.3	5	3	12	5	2.5	SV 3
BT 4	M 4	3.1	5.8	4	15	7	3	SV 4
BT 6	M 5	3.9	8	5	20	8	4	SV 6
BT 9	M 6	4.6	8.5	6	30	12	5	SV 9
BT12	M 8	6.25	11.3	8	40	17	6	SV12

LUBRICATION AND DUST PREVENTION

Lubrication:

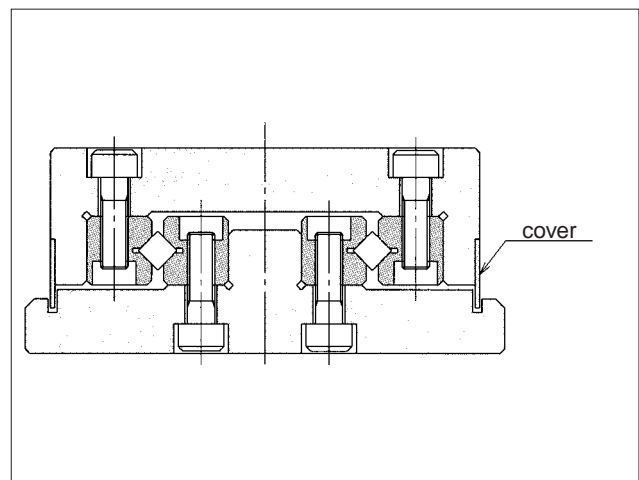
NB slide ways are lubricated using lithium soap grease prior to shipment, so they can be used immediately. Periodic application of a similar type grease is recommended depending on the operating conditions.

NB can also provide special grease for low dust generation requirements. Please refer to page Eng-20 for further details.

Dust Prevention:

Dust and dirt can affect the accuracy and life of a slide way. A slide way used in a hostile environment should be protected with a cover (Figure H-23).

Figure H-23 Use of Cover to Prevent Dust



NOTES ON OPERATION

Pre-load Adjustment:

Inaccurate pre-load adjustment may reduce the motion accuracy, resulting in skewing and shortening of slide way life. The pre-load should be adjusted carefully.

Cage Slippage:

When used under high-speed, unbalanced-load, or vibrational conditions, cage slippage may occur. The stroke distance should be determined with sufficient margin, and an excessive pre-load should not be applied.

End Pieces:

End pieces are attached to each end of the slide way to prevent removal of the cage. Do not use them as a mechanical stopper.

Knock Pin Hole:

When using SVW type knock pin holes to attach a slide way, the holes on the mounting surface should be machined after attaching the W type rail. After machining, remove the chips completely and wash as required.

Careful Handling:

Dropping a slide way may result in scratches or dents on the raceway surface, preventing smooth motion and affecting accuracy. Care should be exercised in handling.

Use as a Set:

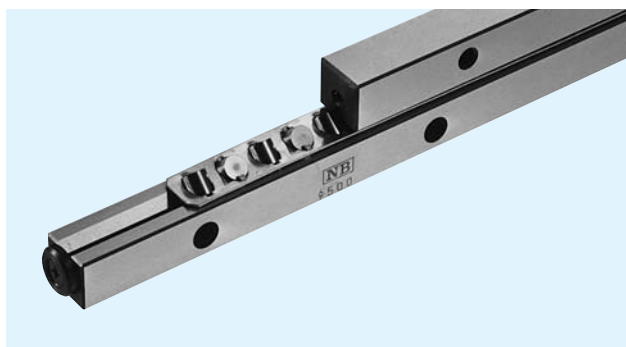
The accuracy tolerance of a slide way is designed to be adjusted within a particular set of components. If components from different sets are used, accuracy may be affected.

Allowable Load

The allowable load is a load under which the sum of elastic deformation of the rolling element and the raceway in the contact area subject to the maximum contact stress is small enough to guarantee smooth rolling movement. Where very smooth and highly accurate liner motion is required, make sure to use the product within the allowable load values.

SV TYPE

— SV1/SV2 —



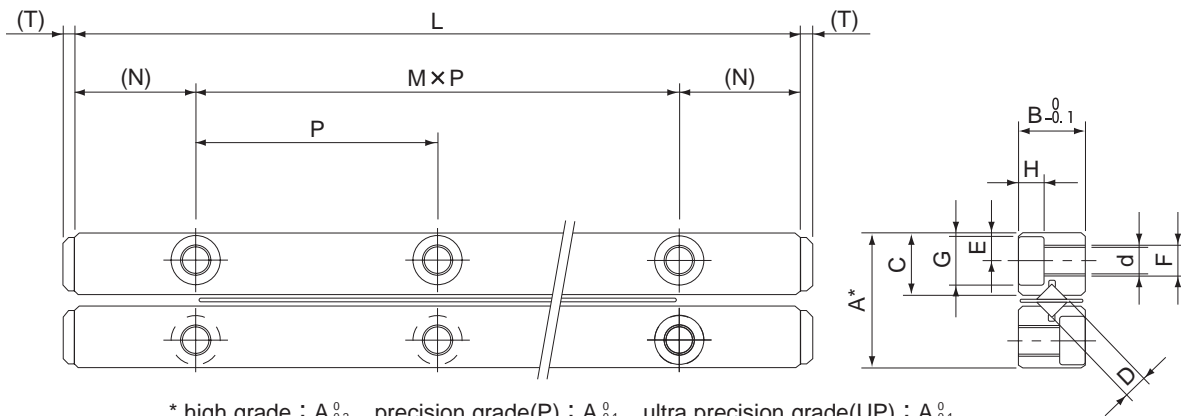
part number structure example			
SVS	6	200	RAS 20Z UP
specification		accuracy grade	
SV	standard	blank	high
SVS	anticorrosion	P	precision
		UP	ultra precision
size		number of rollers	
		cage type	
		blank	standard cage
		RA	aluminum cage standard roller
		RAS	aluminum cage stainless roller
rail length			
※ Refer to page H-29 for information on cage types.			

part number		stroke mm	roller diameter D mm	number of rollers Z				
standard	anticorrosion				L mm	A mm	B mm	C mm
SV1020-5Z	SVS1020-5Z	12	1.5	5	20	8.5	4	3.8
1030-7Z	1030-7Z	20		7	30			
1040-10Z	1040-10Z	27		10	40			
1050-13Z	1050-13Z	32		13	50			
1060-16Z	1060-16Z	37		16	60			
1070-19Z	1070-19Z	42		19	70			
1080-21Z	1080-21Z	50		21	80			
SV2030-5Z	SVS2030-5Z	18	2	5	30	12	6	5.5
2045-8Z	2045-8Z	24		8	45			
2060-11Z	2060-11Z	30		11	60			
2075-13Z	2075-13Z	44		13	75			
2090-16Z	2090-16Z	50		16	90			
2105-18Z	2105-18Z	64		18	105			
2120-21Z	2120-21Z	70		21	120			
2135-23Z	2135-23Z	84		23	135			
2150-26Z	2150-26Z	90		26	150			
2165-29Z	2165-29Z	95		29	165			
2180-32Z	2180-32Z	100		32	180			

Maximum Rail Length (SV type only)

part number	Max.length
SV1	200mm
SV2	450mm

Please contact NB for further details.



* high grade : $A_{0.2}^{0.0}$ precision grade(P) : $A_{0.1}^{0.0}$ ultra precision grade(UP) : $A_{0.1}^{0.0}$

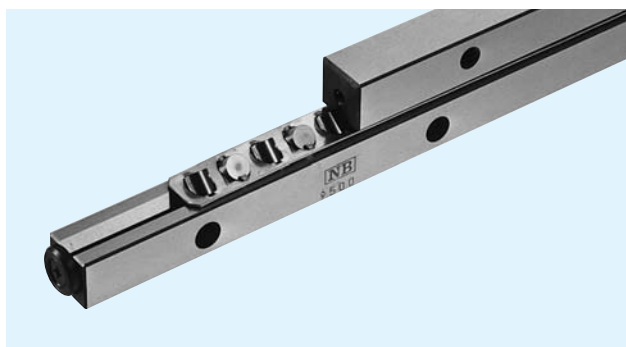
One set of components consists of 2 roller cages, 4 rails, and 8 end-pieces.

major dimensions								basic load rating		allowable	mass	size
M×P	N	E	F	d	G	H	T	dynamic C N	static Co N	load F N	g	
1×10	5	1.8	M2	1.65	3	1.4	0.8	464	476	158	11	1020
2×10								641	714	237	14	1030
3×10								959	1,190	396	18	1040
4×10								1,100	1,420	475	22	1050
5×10								1,380	1,900	633	26	1060
6×10								1,510	2,140	712	30	1070
7×10								1,650	2,380	792	34	1080
1×15	7.5	2.5	M3	2.55	4.4	2	2	1,090	1,170	390	28	2030
2×15								1,900	2,340	780	42	2045
3×15								2,270	2,930	976	55	2060
4×15								2,620	3,510	1,170	69	2075
5×15								3,280	4,680	1,560	83	2090
6×15								3,590	5,270	1,750	96	2105
7×15								3,900	5,860	1,950	110	2120
8×15								4,210	6,440	2,140	123	2135
9×15								4,790	7,610	2,530	137	2150
10×15								5,080	8,200	2,730	151	2165
11×15								5,640	9,370	3,120	165	2180

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SV TYPE

— SV3/SV4 —



part number structure example			
SVS	6	200	RAS
SV	6	200	20Z
SVS	6	200	UP

specification	
SV	standard
SVS	anticorrosion

accuracy grade	
blank	high
P	precision
UP	ultra precision

number of rollers	
blank	standard cage
RA	aluminum cage standard roller
RAS	aluminum cage stainless roller

size	
blank	standard
6	6mm
12	12mm
16	16mm
20	20mm
25	25mm
32	32mm
40	40mm
50	50mm
63	63mm
80	80mm
100	100mm
125	125mm
160	160mm
200	200mm
250	250mm
320	320mm
400	400mm
500	500mm
630	630mm
800	800mm
1000	1000mm

rail length	
blank	standard
7Z	7mm
10Z	10mm
14Z	14mm
17Z	17mm
21Z	21mm
24Z	24mm
28Z	28mm
31Z	31mm
35Z	35mm
38Z	38mm
42Z	42mm
45Z	45mm
49Z	49mm

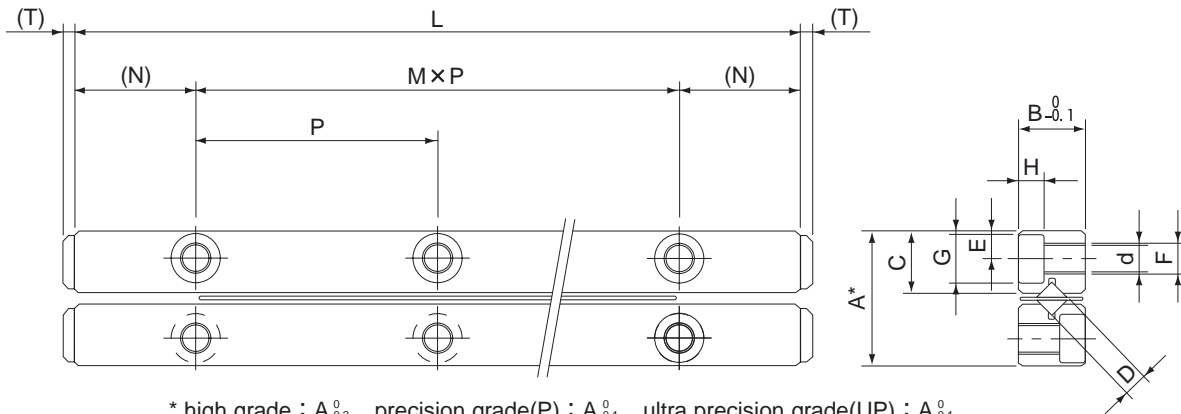
※ Refer to page H-29 for information on cage types.

part number		stroke mm	roller diameter D mm	number of rollers Z				
standard	anticorrosion				L mm	A mm	B mm	C mm
SV3050-7Z	SVS3050-7Z	28	3	7	50	18	8	8.3
3075-10Z	3075-10Z	48		10	75			
3100-14Z	3100-14Z	58		14	100			
3125-17Z	3125-17Z	78		17	125			
3150-21Z	3150-21Z	88		21	150			
3175-24Z	3175-24Z	105		24	175			
3200-28Z	3200-28Z	115		28	200			
3225-31Z	3225-31Z	135		31	225			
3250-35Z	3250-35Z	145		35	250			
3275-38Z	3275-38Z	165		38	275			
3300-42Z	3300-42Z	175		42	300			
3325-45Z	3325-45Z	195		45	325			
3350-49Z	3350-49Z	205		49	350			
SV4080-7Z	SVS4080-7Z	58	4	7	80	22	11	10.2
4120-11Z	4120-11Z	82		11	120			
4160-15Z	4160-15Z	105		15	160			
4200-19Z	4200-19Z	130		19	200			
4240-23Z	4240-23Z	150		23	240			
4280-27Z	4280-27Z	175		27	280			
4320-31Z	4320-31Z	200		31	320			
4360-35Z	4360-35Z	225		35	360			
4400-39Z	4400-39Z	250		39	400			
4440-43Z	4440-43Z	270		43	440			
4480-47Z	4480-47Z	295		47	480			

Maximum Rail Length (SV type only)

part number	Max.length
SV3	700mm
SV4	700mm

Please contact NB for further details.



* high grade : $A_{0.2}^0$ precision grade(P) : $A_{0.1}^0$ ultra precision grade(UP) : $A_{0.1}^0$

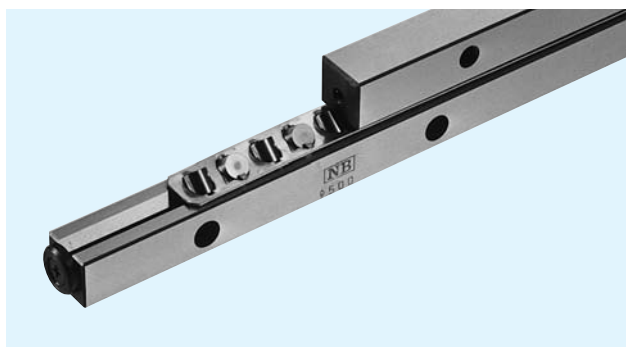
One set of components consists of 2 roller cages, 4 rails, and 8 end-pieces.

major dimensions								basic load rating		allowable	mass	size
M×P	N	E	F	d	G	H	T	dynamic C N	static Co N	load F N	g	
1×25	12.5	3.5	M4	3.3	6	3.1	2	3,490	3,890	1,290	94	3050
2×25								5,230	6,490	2,160	135	3075
3×25								6,810	9,080	3,020	187	3100
4×25								7,560	10,300	3,450	234	3125
5×25								9,000	12,900	4,320	281	3150
6×25								10,300	15,500	5,180	327	3175
7×25								11,700	18,100	6,040	374	3200
8×25								12,300	19,400	6,480	421	3225
9×25								13,600	22,000	7,340	468	3250
10×25								14,800	24,600	8,200	514	3275
11×25								16,000	27,200	9,070	561	3300
12×25								16,600	28,500	9,500	608	3325
13×25								17,800	31,100	10,300	655	3350
1×40	20	4.5	M5	4.3	8	4.2	2	7,110	7,920	2,640	255	4080
2×40								10,600	13,200	4,400	385	4120
3×40								13,800	18,400	6,160	510	4160
4×40								16,800	23,700	7,920	635	4200
5×40								19,700	29,000	9,680	770	4240
6×40								22,400	34,300	11,400	905	4280
7×40								25,100	39,600	13,200	1,020	4320
8×40								27,600	44,800	14,900	1,160	4360
9×40								30,200	50,100	16,700	1,280	4400
10×40								32,600	55,400	18,400	1,410	4440
11×40								35,000	60,700	20,200	1,540	4480

1N≒0.102kgf

SV TYPE

— SV6/SV9 —



part number structure example

SVS

6

200

-RAS

20Z

-UP

specification

SV

standard

SVS

anticorrosion

size

accuracy grade

blank

high

P

precision

UP

ultra precision

number of rollers

cage type

blank

standard cage

RA

aluminum cage standard roller

RAS

aluminum cage stainless roller

rail length

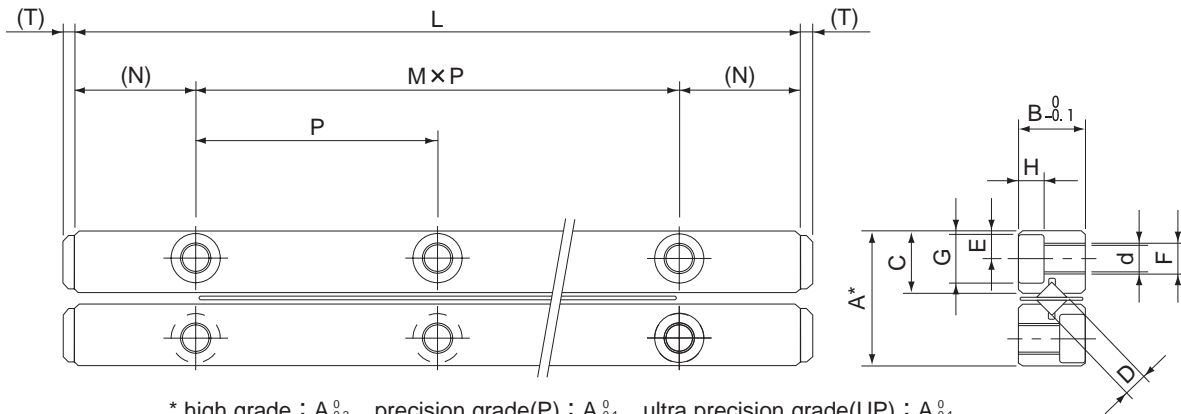
※ Refer to page H-29 for information on cage types.

part number		stroke mm	roller diameter D mm	number of rollers Z				
standard	anticorrosion				L mm	A mm	B mm	C mm
SV6100-8Z	SVS6100-8Z	55	6	8	100	31	15	14.2
6150-12Z	6150-12Z	85		12	150			
6200-16Z	6200-16Z	120		16	200			
6250-20Z	6250-20Z	150		20	250			
6300-24Z	6300-24Z	185		24	300			
6350-28Z	6350-28Z	215		28	350			
6400-32Z	6400-32Z	245		32	400			
6450-36Z	6450-36Z	280		36	450			
6500-40Z	6500-40Z	310		40	500			
6600-49Z	6600-49Z	360		49	600			
SV9200-10Z	—	115	9	10	200	44	22	20.2
9300-15Z	—	175		15	300			
9400-20Z	—	235		20	400			
9500-25Z	—	295		25	500			
9600-30Z	—	355		30	600			
9700-35Z	—	415		35	700			
9800-40Z	—	475		40	800			
9900-45Z	—	535		45	900			
91000-50Z	—	595		50	1,000			

Maximum Rail Length (SV type only)

part number	Max.length
SV6	1000mm

Please contact NB for further details.



* high grade : $A_{0.2}^0$ precision grade(P) : $A_{0.1}^0$ ultra precision grade(UP) : $A_{0.1}^0$

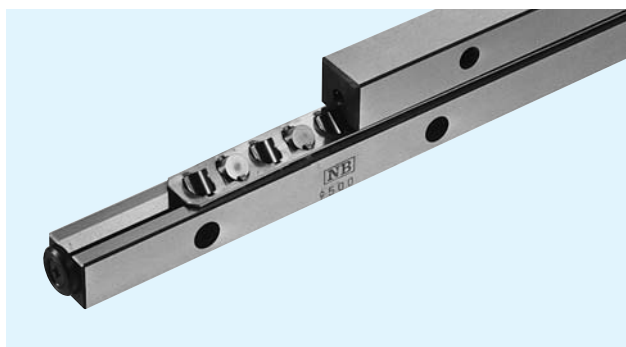
One set of components consists of 2 roller cages, 4 rails, and 8 end-pieces.

major dimensions								basic load rating		allowable	mass	size
M×P	N	E	F	d	G	H	T	dynamic C N	static Co N	load F N	g	
1×50	25	6	M6	5.2	9.5	5.2	3	20,700	23,600	7,880	628	6100
2×50								28,500	35,500	11,800	942	6150
3×50								35,700	47,300	15,700	1,260	6200
4×50								42,500	59,200	19,700	1,570	6250
5×50								49,000	71,000	23,600	1,880	6300
6×50								55,300	82,800	27,600	2,200	6350
7×50								61,400	94,700	31,500	2,510	6400
8×50								67,300	106,000	35,400	2,830	6450
9×50								73,100	118,000	39,400	3,140	6500
11×50								84,200	142,000	47,300	3,770	6600
1×100	50	9	M8	6.8	10.5	6.2	4	60,900	70,700	23,500	2,720	9200
2×100								79,300	98,900	32,900	4,030	9300
3×100								104,000	141,000	47,000	5,380	9400
4×100								120,000	169,000	56,400	6,700	9500
5×100								143,000	212,000	70,500	8,050	9600
6×100								158,000	240,000	79,900	9,230	9700
7×100								180,000	282,000	94,000	10,500	9800
8×100								193,000	311,000	103,000	11,900	9900
9×100								214,000	353,000	117,000	13,000	91000

1N≒0.102kgf

SV TYPE

— SV12 —



part number structure

example

SVS6200-RAS20Z-UP

specification

SV	standard
SVS	anticorrosion

size

accuracy grade

blank	high
P	precision
UP	ultra precision

number of rollers

cage type

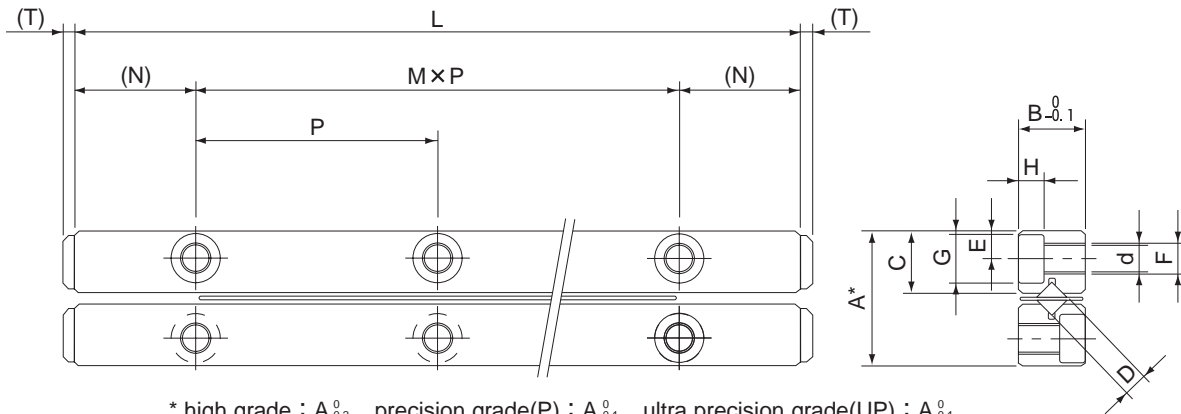
blank	standard cage
RA	aluminum cage standard roller
RAS	aluminum cage stainless roller

rail length

※ Refer to page H-29 for information on cage types.

※ Refer to page H-29 for information on cage types.

part number		stroke mm	roller diameter D mm	number of rollers Z				
standard	anticorrosion				L mm	A mm	B mm	C mm
SV12300-10Z	—	200	12	10	300	58	28	27
12400-14Z	—	240		14	400			
12500-17Z	—	320		17	500			
12600-21Z	—	360		21	600			
12700-24Z	—	440		24	700			
12800-28Z	—	480		28	800			
12900-31Z	—	560		31	900			
121000-34Z	—	640		34	1,000			
121100-38Z	—	680		38	1,100			
121200-42Z	—	720		42	1,200			

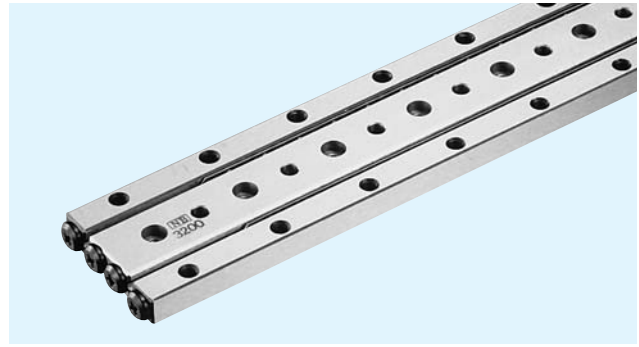


major dimensions								basic load rating		allowable	mass	size
M×P	N	E	F	d	G	H	T	dynamic C N	static Co N	load F N	g	
mm	mm	mm		mm	mm	mm	mm					
2×100	50	12	M10	8.5	13.5	8.2	4	124,000	145,000	48,300	6,880	12300
3×100								162,000	203,000	67,600	9,090	12400
4×100								180,000	232,000	77,200	11,400	12500
5×100								214,000	290,000	96,600	13,700	12600
6×100								247,000	348,000	115,000	15,800	12700
7×100								279,000	406,000	135,000	18,200	12800
8×100								294,000	435,000	144,000	20,500	12900
9×100								324,000	493,000	164,000	22,800	121000
10×100								354,000	551,000	183,000	25,000	121100
11×100								382,000	609,000	202,000	27,300	121200

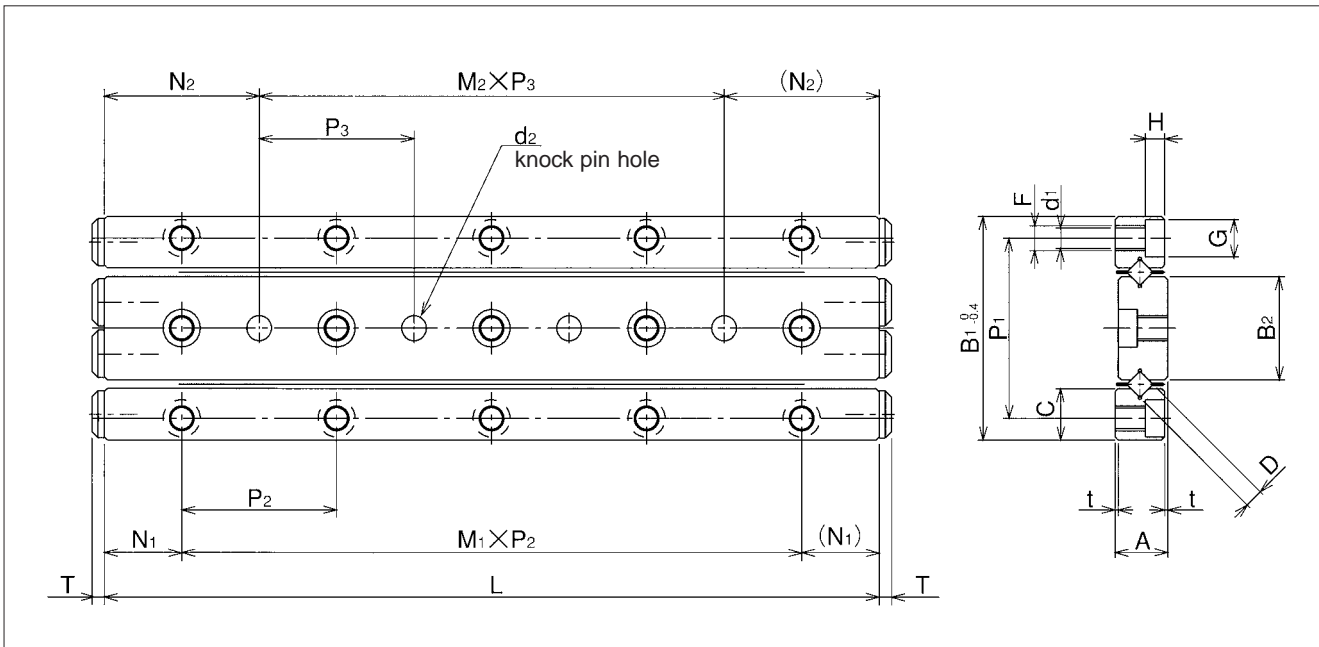
1N≒0.102kgf

SVW TYPE

part number structure			
example			
SVWS		4	200 -RAS 19Z -UP
specification			accuracy grade
SVW	standard		blank high
SVWS	anticorrosion		P precision
			UP ultra precision
			number of rollers
size			cage type
			blank standard cage
			RA aluminum cage standard roller
			RAS aluminum cage stainless roller
rail length			
※ Refer to page H-29 for information on cage types.			



part number		stroke mm	roller diameter D mm	number of rollers Z								
standard	anticorrosion				L mm	A mm	t mm	B ₁ mm	B ₂ mm	C mm	P ₁ mm	M ₁ ×P ₂ mm
SVW1020- 5Z	SVWS1020- 5Z	12	1.5	5	20	4.5	0.5	17	7.6	3.8	13.4	1×10
1030- 7Z	1030- 7Z	20		7	30							2×10
1040-10Z	1040-10Z	27		10	40							3×10
1050-13Z	1050-13Z	32		13	50							4×10
1060-16Z	1060-16Z	37		16	60							5×10
1070-19Z	1070-19Z	42		19	70							6×10
1080-21Z	1080-21Z	50		21	80							7×10
SVW2030- 5Z	SVWS2030- 5Z	18	2	5	30	6.5	0.5	24	11	5.5	19	1×15
2045- 8Z	2045- 8Z	24		8	45							2×15
2060-11Z	2060-11Z	30		11	60							3×15
2075-13Z	2075-13Z	44		13	75							4×15
2090-16Z	2090-16Z	50		16	90							5×15
2105-18Z	2105-18Z	64		18	105							6×15
2120-21Z	2120-21Z	70		21	120							7×15
SVW3050- 7Z	SVWS3050- 7Z	28	3	7	50	8.5	0.5	36	16.6	8.3	29	1×25
3075-10Z	3075-10Z	48		10	75							2×25
3100-14Z	3100-14Z	58		14	100							3×25
3125-17Z	3125-17Z	78		17	125							4×25
3150-21Z	3150-21Z	88		21	150							5×25
3175-24Z	3175-24Z	105		24	175							6×25
3200-28Z	3200-28Z	115		28	200							7×25
SVW4080- 7Z	SVWS4080- 7Z	58	4	7	80	11.5	0.5	44	20.4	10.2	35	1×40
4120-11Z	4120-11Z	82		11	120							2×40
4160-15Z	4160-15Z	105		15	160							3×40
4200-19Z	4200-19Z	130		19	200							4×40
4240-23Z	4240-23Z	150		23	240							5×40
4280-27Z	4280-27Z	175		27	280							6×40



major dimensions									basic load rating		allowable	mass	size
N_1	F	d_1	G	H	$M_2 \times P_3$	N_2	d_2	T	dynamic C N	static C_0 N	load F N	g	
5	M2	1.65	3	1.4	—	10	2	1	464	476	158	11	1020
					1×10				641	714	237	14	1030
					2×10				959	1,190	396	18	1040
					3×10				1,100	1,420	475	22	1050
					4×10				1,380	1,900	633	26	1060
					5×10				1,510	2,140	712	30	1070
					6×10				1,650	2,380	792	34	1080
7.5	M3	2.55	4.4	2	—	15	3	2	1,090	1,170	390	28	2030
					1×15				1,900	2,340	780	42	2045
					2×15				2,270	2,930	976	55	2060
					3×15				2,620	3,510	1,170	69	2075
					4×15				3,280	4,680	1,560	83	2090
					5×15				3,590	5,270	1,750	96	2105
					6×15				3,900	5,860	1,950	110	2120
12.5	M4	3.3	6	3.1	—	25	4	2	3,490	3,890	1,290	94	3050
					1×25				5,230	6,490	2,160	135	3075
					2×25				6,810	9,080	3,020	187	3100
					3×25				7,560	10,300	3,450	234	3125
					4×25				9,000	12,900	4,320	281	3150
					5×25				10,300	15,500	5,180	327	3175
					6×25				11,700	18,100	6,040	374	3200
20	M5	4.3	8	4.2	—	40	5	2	7,110	7,920	2,640	255	4080
					1×40				10,600	13,200	4,400	385	4120
					2×40				13,800	18,400	6,160	510	4160
					3×40				16,800	23,700	7,920	635	4200
					4×40				19,700	29,000	9,680	770	4240
					5×40				22,400	34,300	11,400	905	4280

1N≒0.102kgf

STROKE AND RATED LOAD

When the stroke is changed, the new stroke distance must be determined and the rated load must be re-estimated as follows.

Stroke:

When the slide way moves along the tracking base, the cage moves half the distance traveled by the slide way in the same direction. Therefore, although the applied load may be fixed on the table, the distance between the load center and cage center will change. To achieve stable accuracy, determine the stroke distance and length of the tracking base as follows:

Rail length (L)

When the stroke is 400mm or over

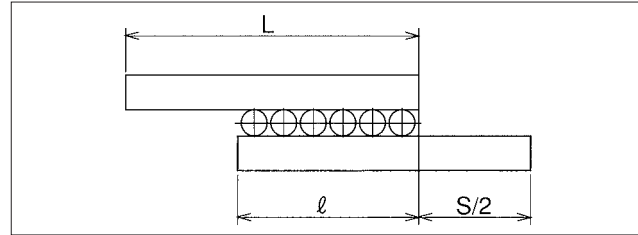
$$S \leq L / 1.5$$

When the stroke is less than 400 mm,

$$S \leq L$$

S : stroke (mm) L : rail length (mm)

Figure H-24 Travel Distance



Cage length (ℓ)

$$\ell \leq L - \frac{S}{2}$$

Number of rollers (Z)

$$Z = \frac{\ell - 2a}{p} + 1$$

a, P : Refer to roller cage dimensions (Page H-29)

Allowable Load

The allowable load is a load under which the sum of elastic deformation of the rolling element and the raceway in the contact area subject to the maximum contact stress is small enough to guarantee smooth rolling movement. Where very smooth and highly accurate liner motion is required, make sure to use the product within the allowable load values.

Rated Load:

The rated load for the slide way is obtained using the equations listed in Table H-8.

Table H-8 Rated Load

condition	single-rail usage	single-rail vertical usage	double-rail parallel usage
direction of load			
basic dynamic load rating C	$C = \left(\frac{Z}{2}\right)^{3/4} \cdot C_1$	$C = \left(\frac{Z}{2}\right)^{3/4} \cdot C_1 \cdot 2^{7/9}$	
basic static load rating Co	$Co = \frac{Z}{2} \cdot Co_1$	$Co = \frac{Z}{2} \cdot Co_1 \cdot 2$	
allowable load F	$F = \frac{Z}{2} \cdot F_1$	$F = \frac{Z}{2} \cdot F_1 \cdot 2$	

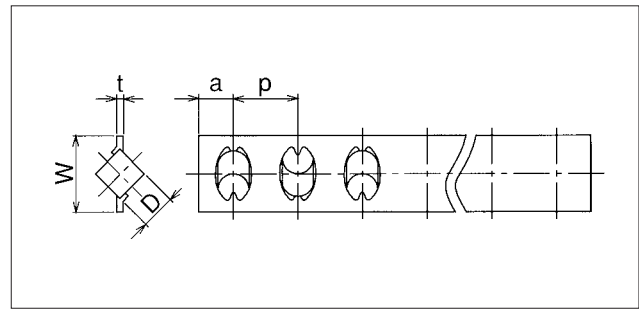
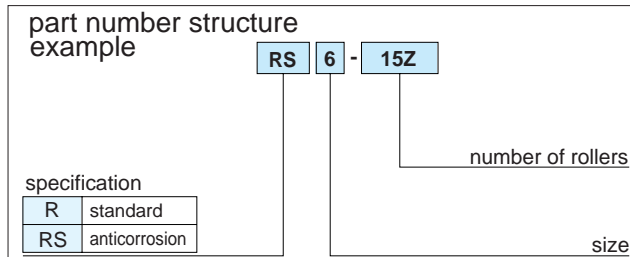
C : basic dynamic load rating (N) Co : basic static load rating (N) F : allowable load (N) C₁ : basic dynamic load rating per roller (N)

Co₁ : basic static load rating per roller (N) F₁ : allowable load per roller (N) Z : number of rollers per cage

Z / 2 : effective roller number (round down to whole number)

R/RS TYPE

— Roller Cage —

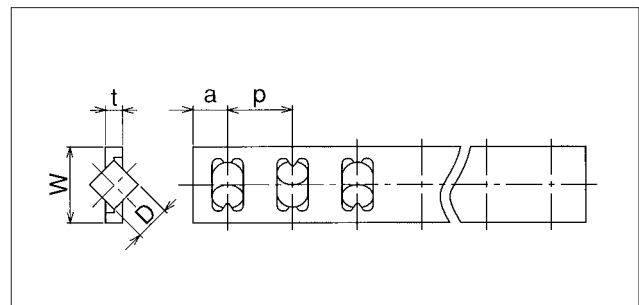
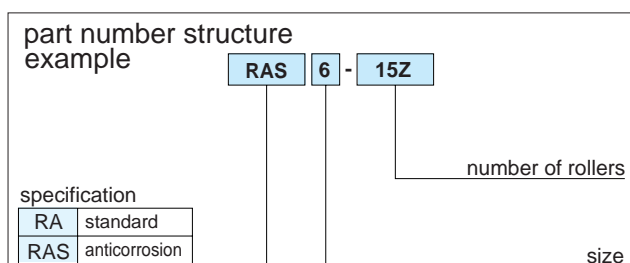


part number		D	t	W	p	a	C ₁	Co ₁	F ₁
standard	anticorrosion	mm	mm	mm	mm	mm	N	N	N
R 1	RS1	1.5	0.2	3.8	2.5	2	154	119	39.8
R 2	RS2	2	0.3	5.6	4	2.5	360	293	97.8
R 3	RS3	3	0.4	7.6	5	3	824	649	216
R 4	RS4	4	0.4	10.4	7	4.5	1,660	1,320	442
R 6	RS6	6	0.7	14	8.5	5.5	3,840	2,690	987
R 9	—	9	0.7	19	14	7.5	9,330	7,070	2,350
R12	—	12	1.0	25	20	10	18,900	14,500	4,840

cage material : stainless steel C₁ : dynamic load rating per roller Co₁ : static load rating per roller F₁ : allowable load per roller (N)

RA/RAS TYPE

— Aluminum Roller Cage —



part number		D	t	W	p	a	C ₁	Co ₁	F ₁
standard	anticorrosion	mm	mm	mm	mm	mm	N	N	N
RA3	RAS3	3	1.2	7.6	5	3	824	649	216
RA4	RAS4	4	1.4	10.4	7	4.5	1,660	1,320	442
RA6	RAS6	6	2.1	14	8.5	5.5	3,840	2,960	987
RA9	—	9	3.0	20	14	7.5	9,330	7,070	2,350

cage material : aluminum C₁ : dynamic load rating per roller Co₁ : static load rating per roller F₁ : allowable load per roller (N)

SLIDE TABLE

The NB slide table is a precision table equipped with a slide way. Its high-precision and low-friction characteristics make it well suited for use in electronics automatic-assembly machines and optical measurement devices.

STRUCTURE AND ADVANTAGES

The NB slide table consists of a slide way sandwiched between an accurately machined table and a bed. Stopper is provided within the table.

High Accuracy:

The mounting surfaces of the table and bed are precision finished to ensure high-precision linear motion, resulting in a high-performance slide way.

Low Friction:

Its non-recirculating mechanism provides stable motion from low to high speeds.

Compact and High Rigidity:

Being designed compactly, the NB slide table holds the high load capacity and high-rigidity characteristics.

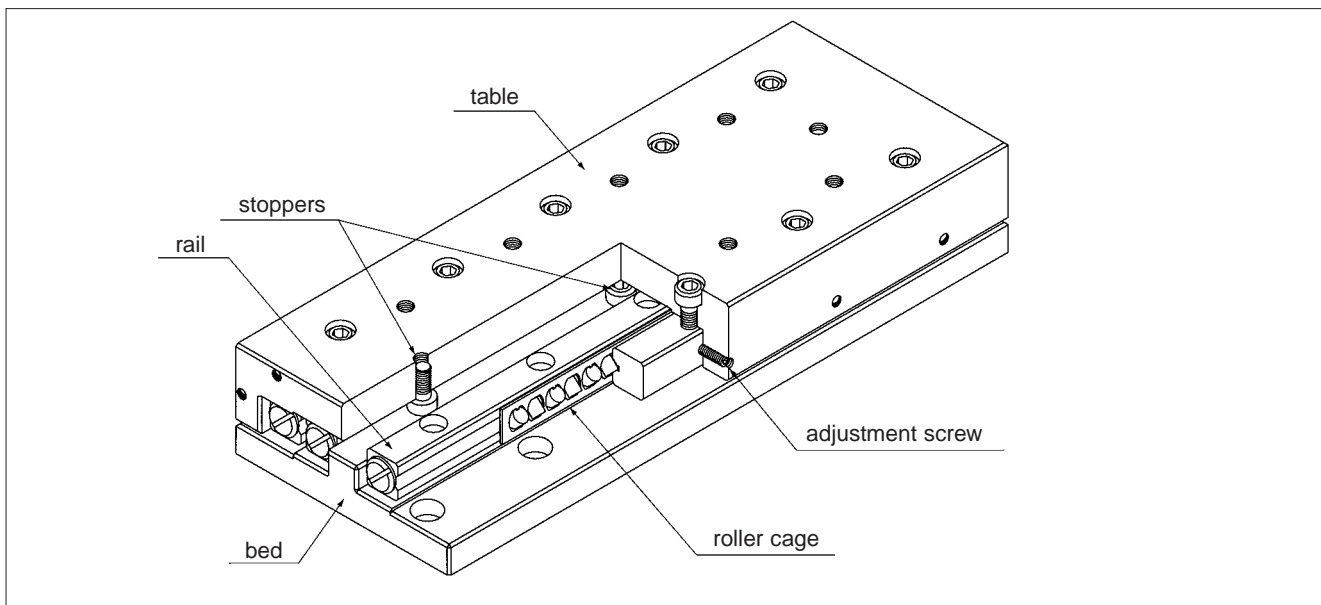
No Need for Adjustment:

The table is carefully assembled so that the accuracy and pre-load are optimized, so it can be used immediately without any further adjustment.

Ease of Mounting:

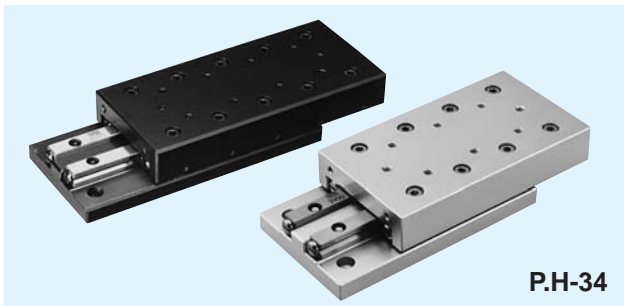
Standardized mounting holes are provided in the table and bed. High-precision linear motion can be achieved simply by mounting.

Figure H-25 Structure of SVT Type Slide Table



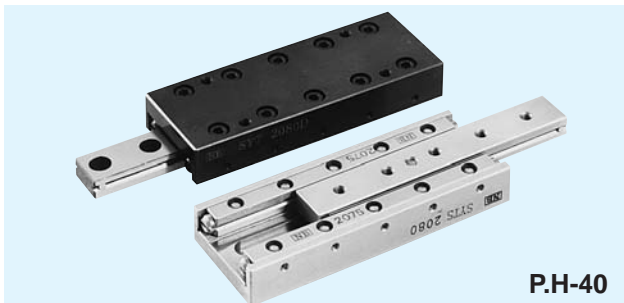
TYPE

SVT·SVTS Type



In the SVT type slide table, the slide way is sandwiched between an accurately machined steel tabletop and bed. In the SVTS type, an anti-corrosion SVS type slide way is sandwiched between an accurately machined aluminum tabletop and bed.

SYT·SYTS Type

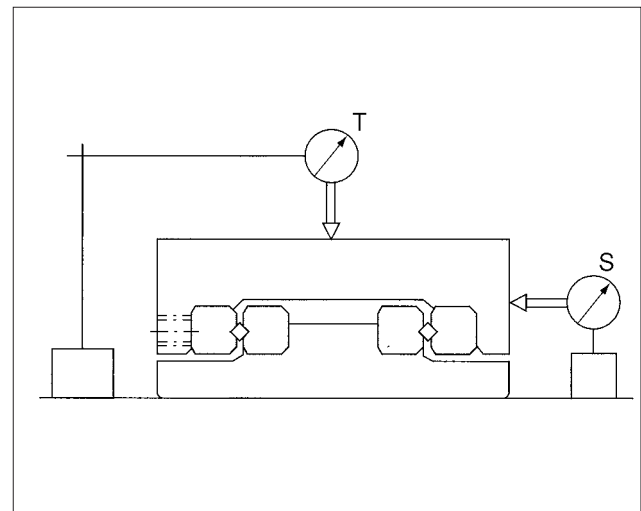


The SYT/SYTS type is a thin, compact slide table. Either tapped or counterbore type is available. The anti-corrosion SYTS type slide table is fabricated with all stainless steel components, making it suitable for use in clean rooms.

ACCURACY

The motion accuracy of a slide table is measured by placing indicators at the centers of the top and side surfaces of the table, as illustrated in Figure H-26. It is expressed in terms of the indicator deflections when the table is moved to the right and left under no-load conditions.

Figure H-26 Accuracy Measurement Method



RATED LIFE

The life of an NB slide table is calculated using the following equations.

Travel life :

$$L = \left(\frac{f_T \cdot C}{f_W \cdot P} \right)^{10/3} \cdot 50$$

L : travel life (km) f_T : temperature coefficient
 f_W : load coefficient
 ※ Refer to page Eng. 5 for the coefficients.

Life time :

$$L_h = \frac{L \cdot 10^3}{2 \cdot \ell \cdot n_1 \cdot 60}$$

L_h : life time (hr) ℓ : stroke length (m)
 n_1 : number of strokes per minute (cpm)

NOTES ON OPERATION

Careful Handling:

Dropping a table may result in scratches or dents on the raceway surface, preventing smooth motion and reducing the life. Care should be exercised when handling a table.

Dust Prevention:

Dust and foreign particles can affect the accuracy and lifetime of a slide table. A slide table used in a hostile environment should be protected with a cover.

Lubrication:

Lithium soap lubrication is applied prior to shipment, so a table can be used immediately upon delivery. Periodic application of a similar lubricant should be necessary depending on the operating conditions.

Cage Slippage:

The cage can slip under high-speed motion, unbalanced-loading, and vibrating conditions. The motion speed of a slide table should be kept under 30 m/min.

Adjustment/Installation Screws:

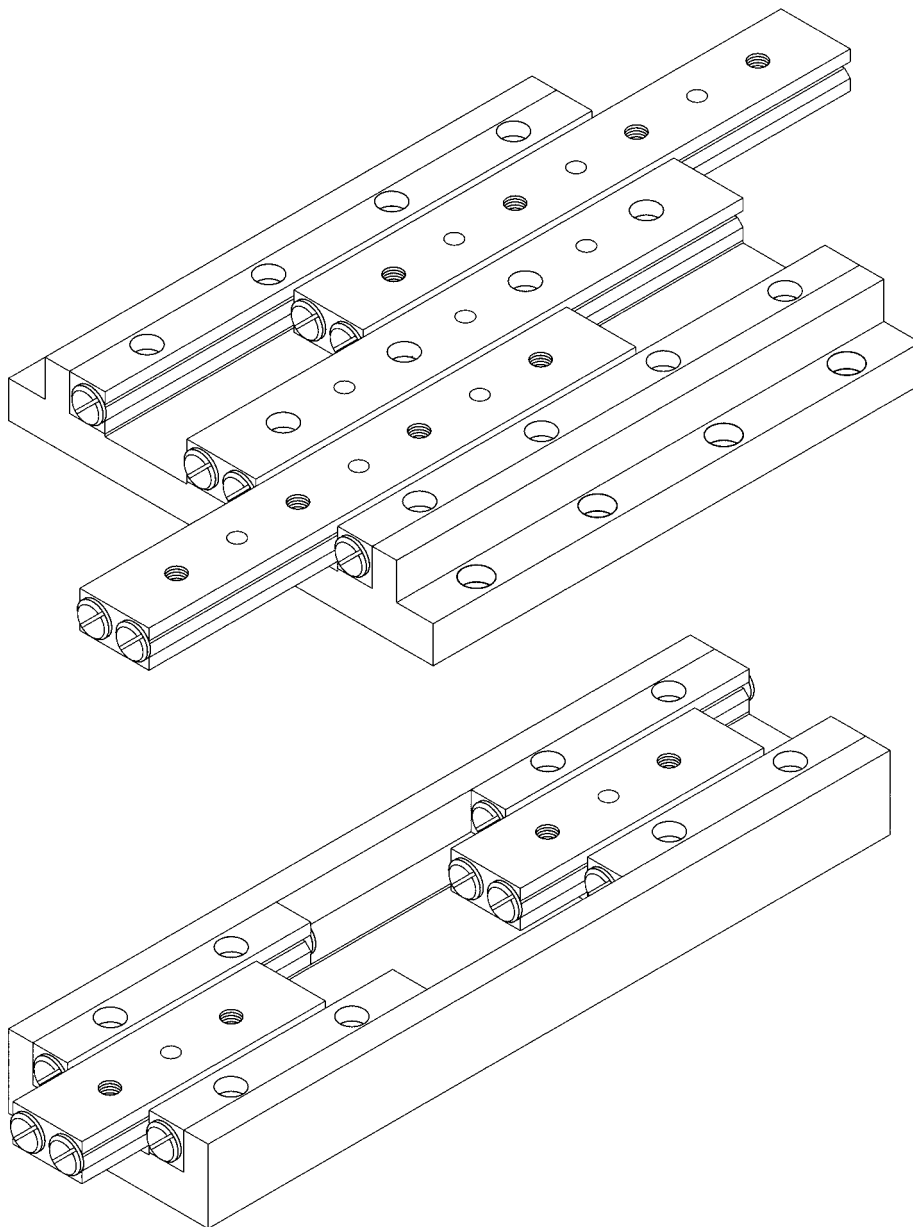
The NB slide table is adjusted to achieve optimum accuracy and pre-load. The adjustment screw and tracking-bed installation screws should not be changed.

Allowable Load

The allowable load is a load under which the sum of elastic deformations of the rolling element and the raceways in the contact area subject to the maximum contact stress is small enough to guarantee smooth rolling movement. Where very smooth and highly accurate liner motion is required, make sure to use the product within the allowable load values.

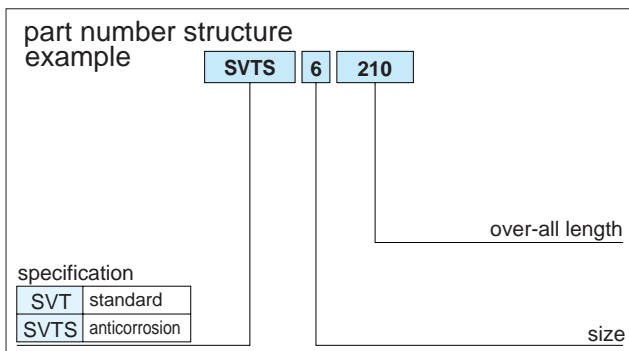
SPECIAL REQUIREMENTS

NB can fabricate tables to meet special requirements, including tables with a micrometer head and tables for projectors. Contact NB for further information.

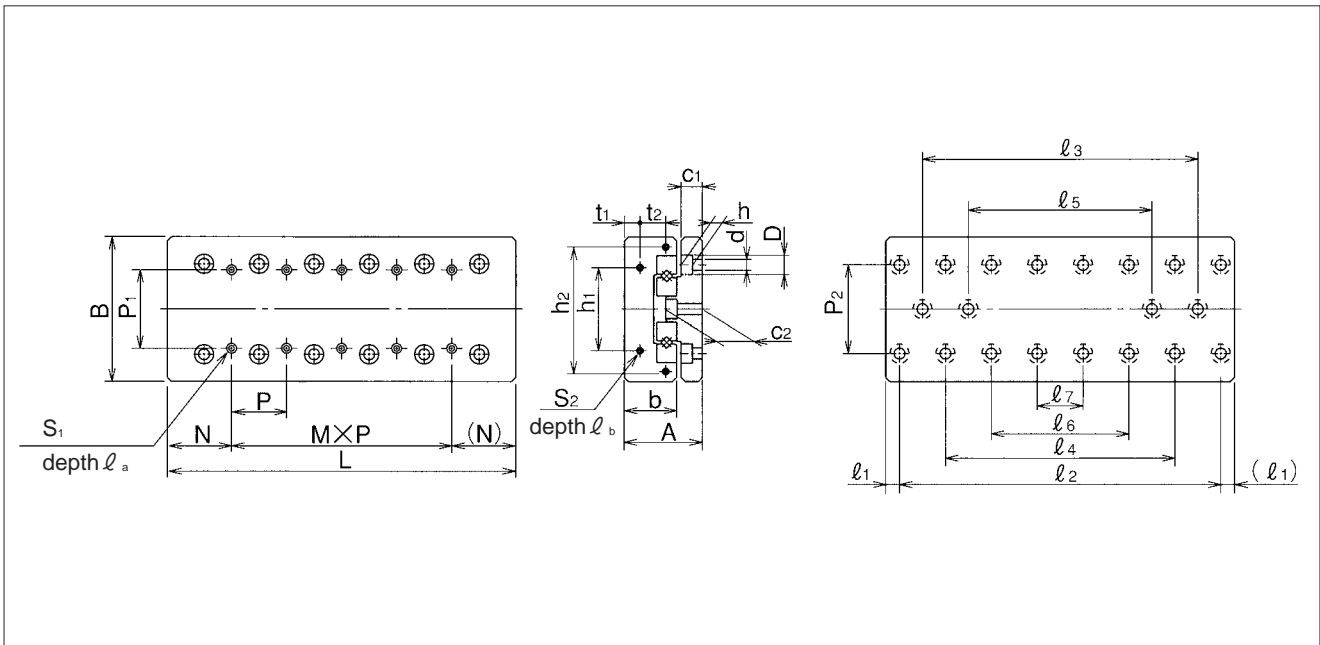


SVT TYPE

— SVT1/SVT2 —



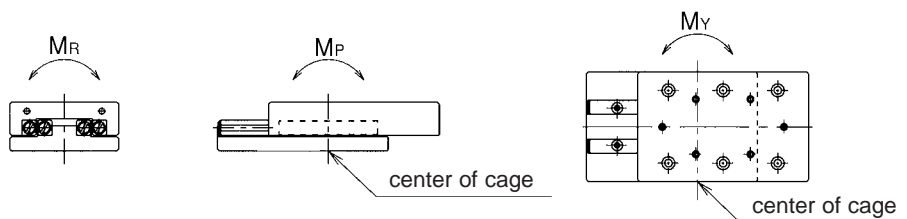
part number		stroke mm	major dimensions				table-top mounting-hole dimensions					table-end mounting-hole dimensions						
standard	anticorrosion		A mm	B mm	L mm	b mm	P ₁ mm	S ₁	ℓ _a mm	N mm	M×P mm	h ₁ mm	h ₂ mm	t ₁ mm	t ₂ mm	S ₂	ℓ _b mm	P ₂ mm
SVT1025	SVTS1025	12			25						—							
1035	1035	18			35						1×10							
1045	1045	25			45						2×10							
1055	1055	32	17 ^{±0.1}	30 ^{-0.2 -0.4}	55	11	10	M2	4	12.5	3×10	12	—	2.5	—	M2	6	22
1065	1065	40			65						4×10							
1075	1075	45			75						5×10							
1085	1085	50			85						6×10							
SVT2035	SVTS2035	18			35						—							
2050	2050	30			50						1×15							
2065	2065	40			65						2×15							
2080	2080	50			80						3×15							
2095	2095	60			95						4×15							
2110	2110	70	21 ^{±0.1}	40 ^{-0.2 -0.4}	110	14	15	M3	6	17.5	5×15	16	—	3.4	—	M2	6	30
2125	2125	80			125						6×15							
2140	2140	90			140						7×15							
2155	2155	100			155						8×15							
2170	2170	110			170						9×15							
2185	2185	120			185						10×15							



bed-surface mounting-hole dimensions										accuracy※		basic load rating		allowable	allowable static moment			mass		size
$d \times D \times h$ mm	c_1 mm	c_2 mm	ℓ_1 mm	ℓ_2 mm	ℓ_3 mm	ℓ_4 mm	ℓ_5 mm	ℓ_6 mm	ℓ_7 mm	T μm	S μm	C N	Co N	F N	M_P N·m	M_Y N·m	M_R N·m	SVT g	SVTS g	
2.5×4.5×2.5	5.5	9	3.5	18	—	—	—	—	—	2	4	464	476	158	1.79	1.47	3.22	82	36	1025
				28	—	—	—	—	—	2	4	805	952	316	3.08	3.5	6.45	120	50	1035
				38	—	—	—	—	—	2	4	959	1,190	396	6.98	6.4	8.06	158	69	1045
				48	—	28	—	—	—	2	5	1,100	1,420	475	9.53	8.81	9.68	190	83	1055
				58	—	38	—	—	—	2	5	1,240	1,660	554	12.4	11.6	11.2	225	98	1065
				68	—	48	—	—	—	2	5	1,510	2,140	712	19.3	18.3	14.5	260	113	1075
				78	—	58	—	—	—	2	5	1,650	2,380	792	23.4	22.3	16.1	295	128	1085
3.5×6.5×3.5	6.5	10.9	5	25	—	—	—	—	—	2	4	1,090	1,170	390	7.04	5.78	10.5	195	90	2035
				40	—	—	—	—	—	2	4	1,510	1,750	585	12.1	10.7	15.8	280	133	2050
				55	—	—	—	—	—	2	5	1,900	2,340	780	19.1	17.1	21.1	370	175	2065
				70	—	40	—	—	—	2	5	2,620	3,510	1,170	27.4	29.6	31.6	450	220	2080
				85	—	55	—	—	—	2	5	2,950	4,100	1,360	37.4	39.9	36.9	540	250	2095
				100	—	70	—	—	—	3	6	3,280	4,680	1,560	61.7	58.1	42.2	630	285	2110
				115	—	85	—	—	—	3	6	3,590	5,270	1,750	76.1	72.1	47.5	720	330	2125
				130	—	100	—	70	—	3	6	4,210	6,440	2,140	92	95.9	58.1	800	360	2140
				145	—	115	—	85	—	3	6	4,500	7,030	2,340	109	113	63.3	880	400	2155
				160	—	130	—	100	—	3	7	4,790	7,610	2,530	148	143	68.6	970	440	2170
				175	—	145	—	115	85	3	7	5,080	8,200	2,730	170	164	73.9	1,060	480	2185

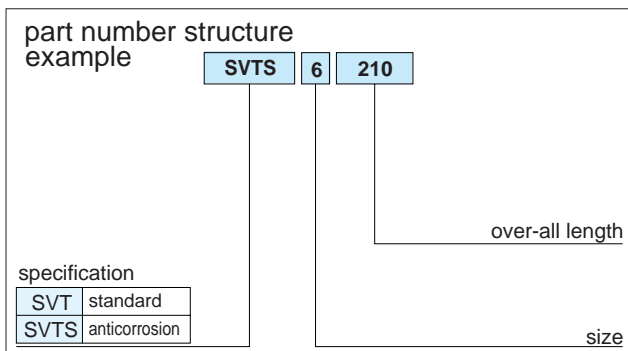
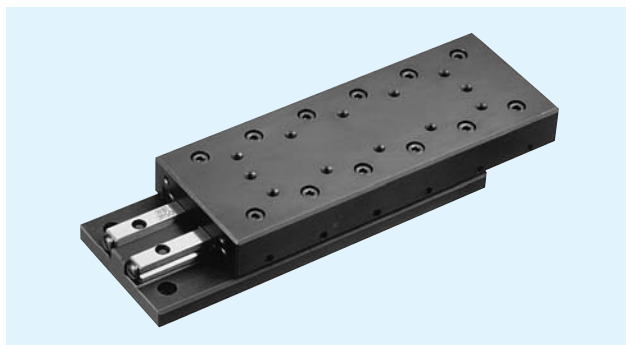
※ Refer to Figure H-26 (page H-31) for accuracy T and S.

1N≒0.102kgf 1N·m≒0.102kgf·m

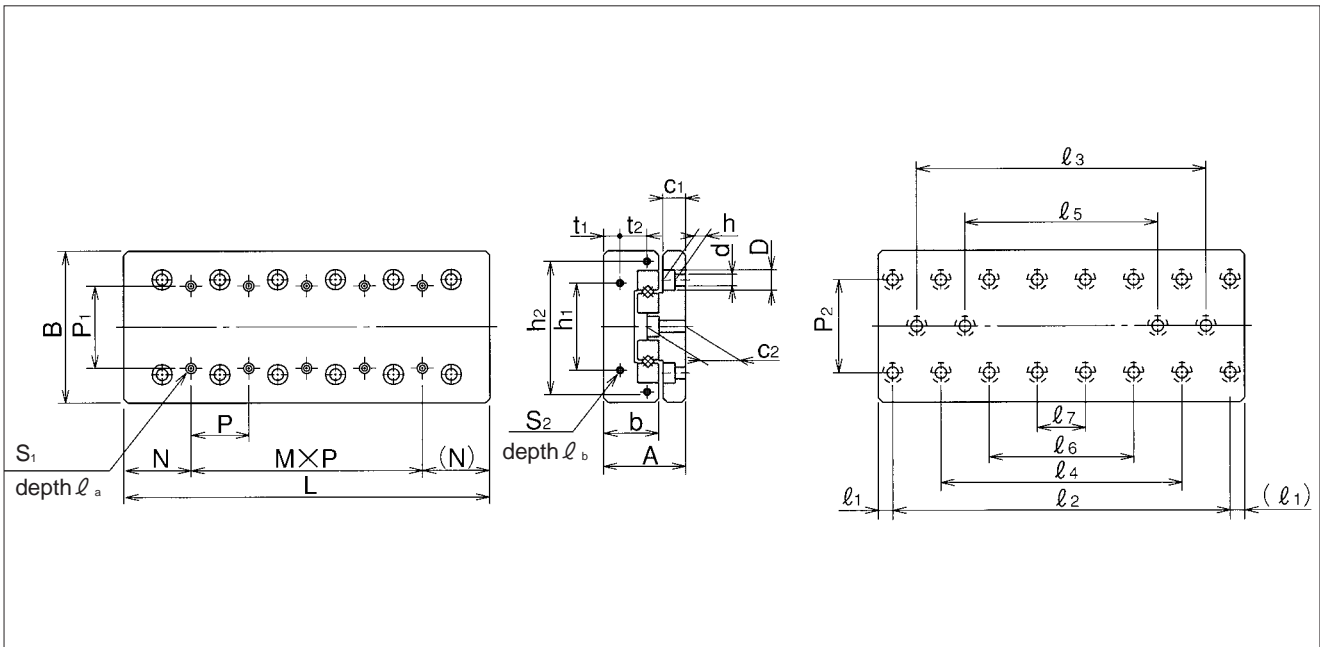


SVT TYPE

— SVT3/SVT4 —



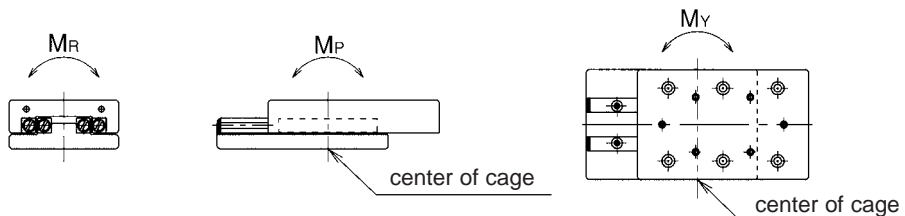
part number		stroke mm	major dimensions				table-top mounting-hole dimensions					table-end mounting-hole dimensions						
standard	anticorrosion		A mm	B mm	L mm	b mm	P ₁ mm	S ₁	ℓ _a mm	N mm	M×P mm	h ₁ mm	h ₂ mm	t ₁ mm	t ₂ mm	S ₂	ℓ _b mm	P ₂ mm
SVT3055	SVTS3055	30			55						—							
3080	3080	45			80						1×25							
3105	3105	60			105						2×25							
3130	3130	75			130						3×25							
3155	3155	90			155						4×25							
3180	3180	105	28 ^{±0.1}	60 ^{±0.1}	180	18.5	25	M4	8	27.5	5×25	40	—	5.5	—	M3	6	40
3205	3205	130			205						6×25							
3230	3230	155			230						7×25							
3255	3255	180			255						8×25							
3280	3280	205			280						9×25							
3305	3305	230			305						10×25							
SVT4085	SVTS4085	50			85						—							
4125	4125	75			125						1×40							
4165	4165	105			165						2×40							
4205	4205	130			205						3×40							
4245	4245	155	35 ^{±0.1}	80 ^{±0.1}	245	24	40	M5	10	42.5	4×40	55	—	6.5	—	M3	6	55
4285	4285	185			285						5×40							
4325	4325	210			325						6×40							
4365	4365	235			365						7×40							
4405	4405	265			405						8×40							



bed-surface mounting-hole dimensions										accuracy※		basic load rating		allowable	allowable static moment			mass		size
d×D×h mm	c1 mm	c2 mm	l1 mm	l2 mm	l3 mm	l4 mm	l5 mm	l6 mm	l7 mm	T μm	S μm	C N	Co N	F N	Mp N·m	My N·m	MR N·m	SVT g	SVTS g	
4.5×8×4.5	9	15	10	35	—	—	—	—	—	2	5	3,490	3,890	1,290	19.4	22.2	54.5	640	300	3055
				60	—	—	—	—	—	2	5	5,230	6,490	2,160	53.0	58.0	90.9	955	440	3080
				85	—	—	—	—	—	3	6	6,030	7,780	2,590	103	95.7	109	1,250	580	3105
				110	—	—	—	—	—	3	6	7,560	10,300	3,450	170	160	145	1,570	715	3130
				135	85	—	—	—	—	3	6	9,000	12,900	4,320	210	220	181	1,850	850	3135
				160	110	—	—	—	—	3	7	10,300	15,500	5,180	302	314	218	2,150	990	3180
				185	135	85	—	—	—	3	7	11,000	16,800	5,610	355	367	236	2,450	1,130	3205
				210	160	110	—	—	—	3	7	11,700	18,100	6,040	472	455	254	2,740	1,270	3230
				235	185	135	—	—	—	3	7	12,900	20,700	6,910	537	552	290	3,040	1,410	3255
				260	210	160	110	—	—	3	7	13,600	22,000	7,340	606	622	309	3,360	1,540	3280
				285	235	185	135	—	—	3	7	14,200	23,300	7,770	757	735	372	3,660	1,680	3305
5.5×10×5.4	10.5	18	10	65	—	—	—	—	—	2	5	7,110	7,920	2,640	96.0	84.9	159	1,700	780	4085
				105	—	—	—	—	—	3	6	10,600	13,200	4,400	217	199	265	2,500	1,140	4125
				145	—	—	—	—	—	3	7	13,800	18,400	6,160	296	316	371	3,300	1,510	4165
				185	105	—	—	—	—	3	7	16,800	23,700	7,920	488	513	477	4,100	1,870	4205
				225	145	—	—	—	—	3	7	19,700	29,000	9,680	729	759	584	4,900	2,240	4245
				265	185	—	—	—	—	3	7	22,400	34,300	11,400	1,010	1,050	690	5,700	2,600	4285
				305	225	145	—	—	—	4	8	25,100	39,600	13,200	1,350	1,390	796	6,500	3,000	4325
				345	265	185	—	—	—	4	8	27,600	44,800	14,900	1,730	1,780	902	7,300	3,300	4365
				385	305	225	—	—	—	4	8	28,900	47,500	15,800	2,160	2,100	955	8,100	3,700	4405

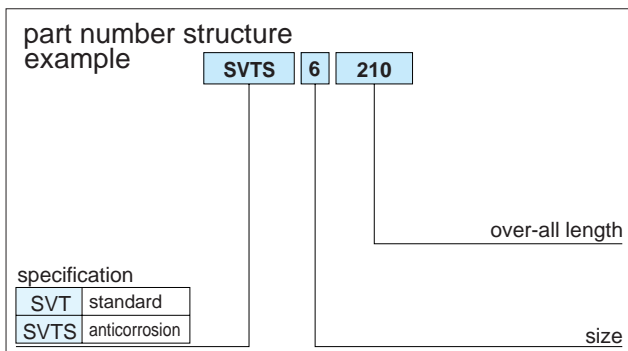
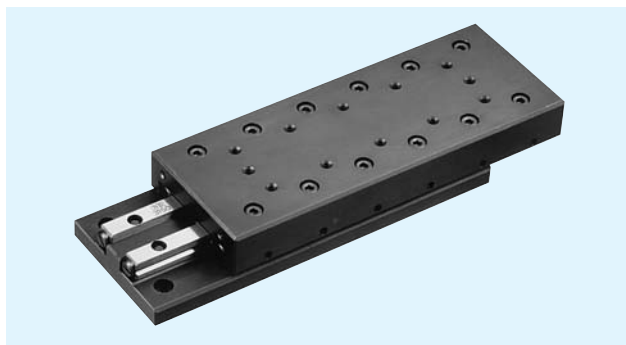
※ Refer to Figure H-26 (page H-31) for accuracy T and S.

1N≒0.102kgf 1N·m≒0.102kgf·m

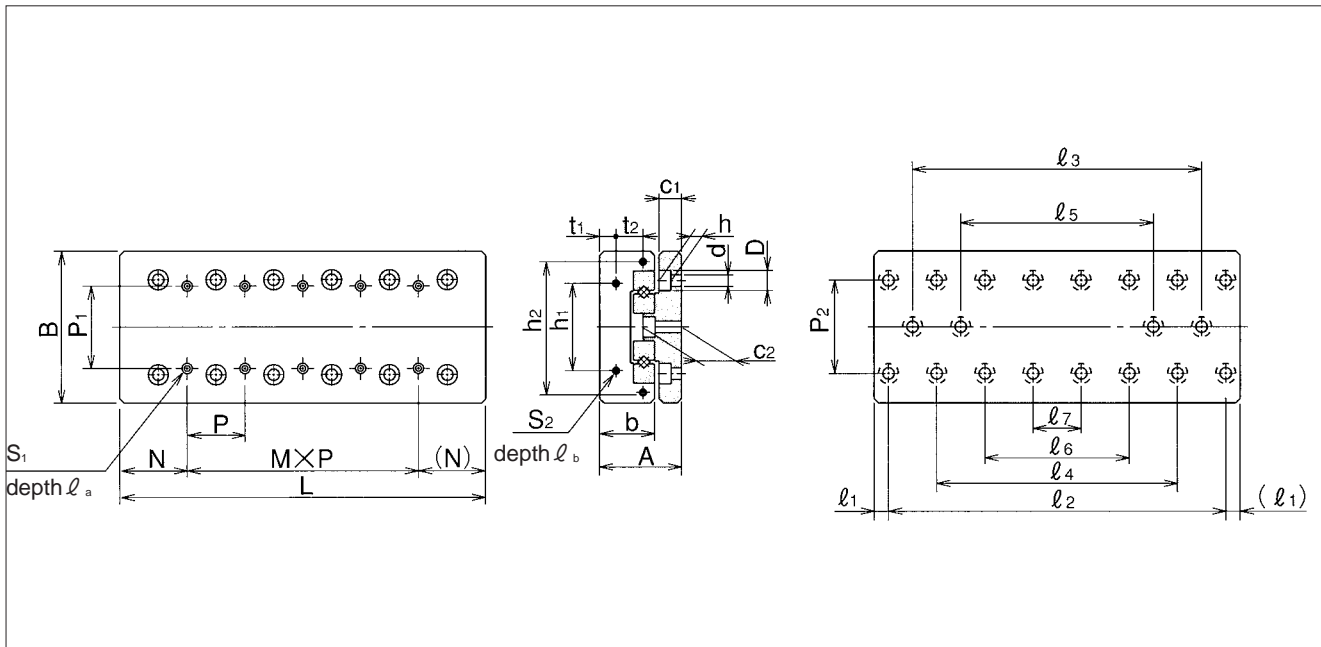


SVT TYPE

— SVT6/SVT9 —



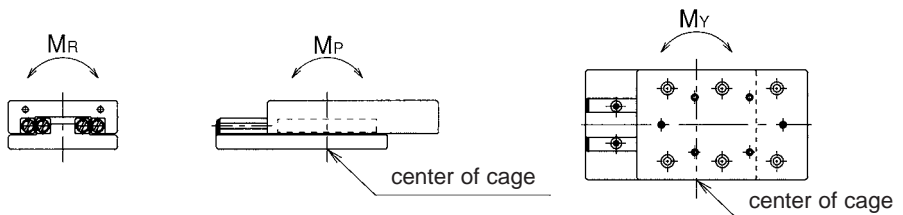
part number		stroke mm	major dimensions				table-top mounting-hole dimensions					table-end mounting-hole dimensions						
standard	anticorrosion		A mm	B mm	L mm	b mm	P ₁ mm	S ₁	ℓ _a mm	N mm	M×P mm	h ₁ mm	h ₂ mm	t ₁ mm	t ₂ mm	S ₂	ℓ _b mm	P ₂ mm
SVT6110	SVTS6110	60	45 ^{±0.1}	100 ^{±0.1}	110	31	50	M6	12	55	—	60	92	8	15	M4	8	60
6160	6160	95			160						1×50							
6210	6210	130			210						2×50							
6260	6260	165			260						3×50							
6310	6310	200			310						4×50							
6360	6360	235			360						5×50							
6410	6410	265			410						6×50							
6460	6460	300			460						7×50							
6510	6510	335			510						8×50							
SVT9210	—	130	60 ^{±0.1}	145 ^{±0.2}	210	43	85	M8	16	105	—	90	135	11	20	M4	8	90
9310	—	180			310						1×100							
9410	—	350			410						2×100							
9510	—	450			510						3×100							
9610	—	550			610						4×100							
9710	—	650			710						5×100							
9810	—	750			810						6×100							
9910	—	850			910						7×100							
91010	—	950			1,010						8×100							



bed-surface mounting-hole dimensions										accuracy※		basic load rating		allowable	allowable static moment			mass		size
d×D×h mm	c1 mm	c2 mm	l1 mm	l2 mm	l3 mm	l4 mm	l5 mm	l6 mm	l7 mm	T μm	S μm	C N	Co N	F N	Mp N·m	My N·m	MR N·m	SVT g	SVTS g	
7×11.5×7	13	23	10	90	—	—	—	—	—	3	6	16,500	17,700	5,910	260	230	400	3,280	1,705	6110
				140	—	—	—	—	—	3	6	24,700	29,600	9,860	588	539	666	4,820	2,480	6160
				190	90	—	—	—	—	3	7	32,200	41,400	13,800	1,040	978	933	6,270	3,255	6210
				240	140	—	—	—	—	3	7	39,200	53,200	17,700	1,630	1,540	1,200	7,740	4,030	6260
				290	190	—	—	—	—	3	7	45,800	65,100	21,600	2,340	2,240	1,460	9,200	4,805	6310
				340	240	140	—	—	—	4	8	52,200	76,900	25,600	2,750	2,850	1,730	10,740	5,580	6360
				390	290	190	—	—	—	4	8	58,400	88,800	29,500	3,660	3,770	2,000	12,190	6,355	6410
				440	340	240	—	—	—	4	8	64,400	100,000	33,500	4,700	4,830	2,260	13,800	7,130	6460
9×14×9	16	29	55	490	390	290	190	—	—	4	8	70,200	112,000	37,400	5,870	6,010	2,530	15,300	7,905	6510
				100	—	—	—	—	—	3	7	51,100	56,500	18,800	1,610	1,440	2,030	12,520	—	9210
				200	—	—	—	—	—	3	7	79,300	98,900	32,900	3,150	3,360	3,560	17,950	—	9310
				300	100	—	—	—	—	4	8	79,300	98,900	32,900	4,110	3,840	3,560	23,950	—	9410
				400	200	—	—	—	—	4	8	96,600	127,000	42,300	6,420	6,080	4,580	30,090	—	9510
				500	300	100	—	—	—	4	9	112,000	155,000	51,700	7,760	8,090	5,600	35,990	—	9610
				600	400	200	—	—	—	4	9	128,000	183,000	61,100	10,800	11,200	6,620	41,890	—	9710
				700	500	300	100	—	—	5	10	136,000	197,000	65,800	14,400	13,900	7,130	47,790	—	9810
				800	600	400	200	—	—	5	10	151,000	226,000	75,200	18,500	17,900	8,140	53,690	—	9910
				900	700	500	300	100	—	5	10	165,000	254,000	84,600	23,100	22,400	9,160	59,590	—	91010

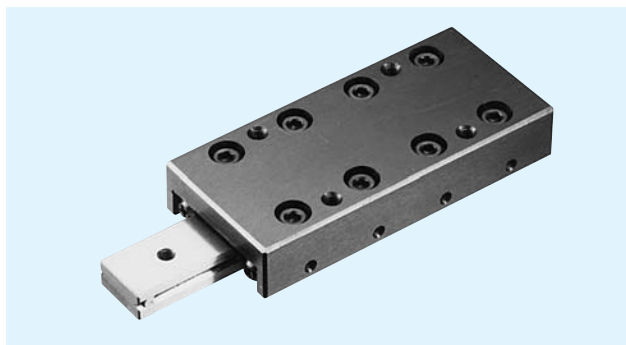
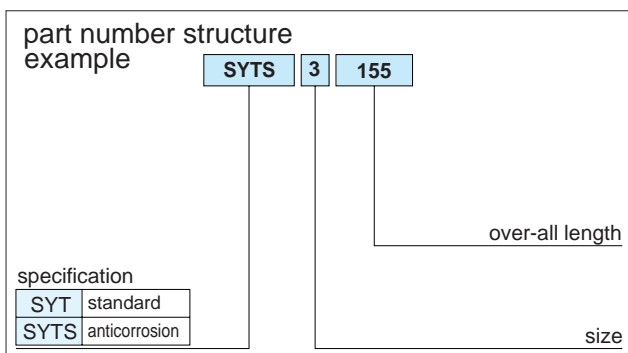
※ Refer to Figure H-26 (page H-31) for accuracy T and S.

1N≒0.102kgf 1N·m≒0.102kgf·m

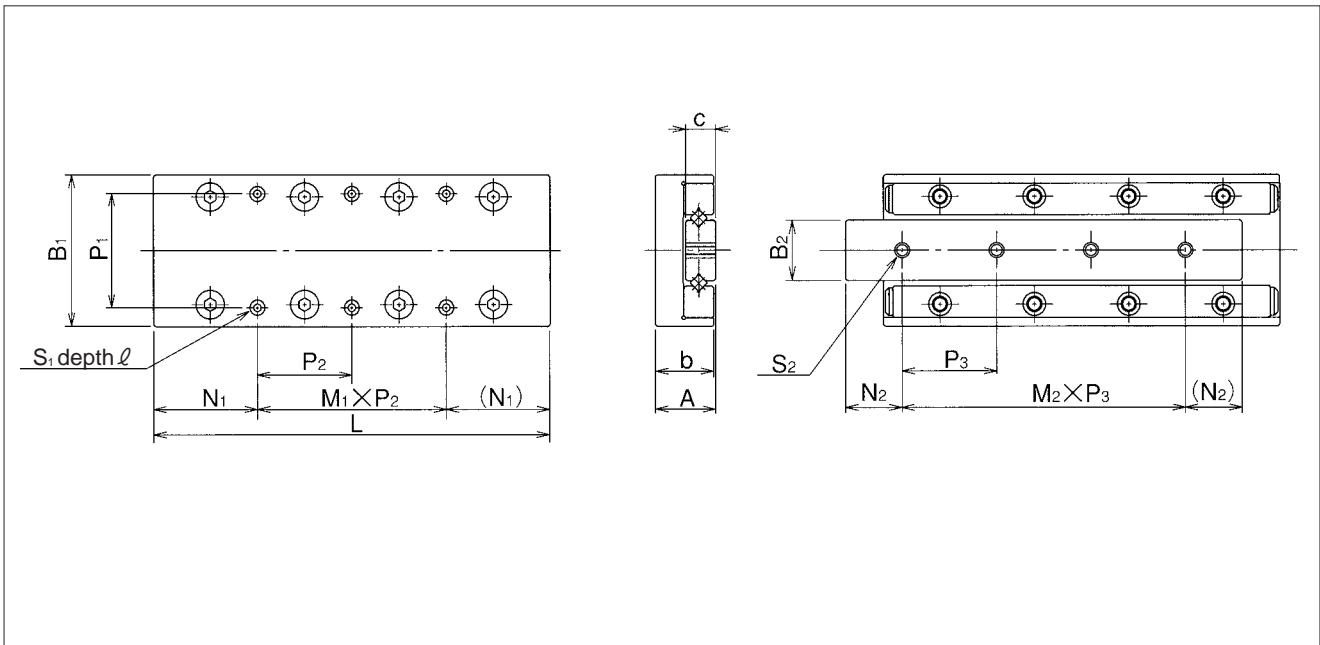


SYT TYPE

— SYT1/SYT2 —



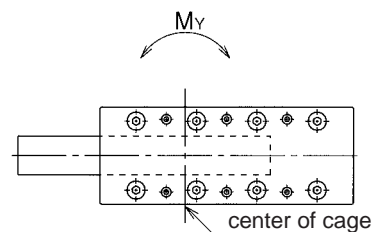
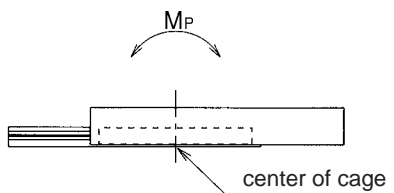
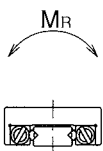
part number		stroke mm	major dimensions						table-top mounting-hole dimensions		
standard	anticorrosion		A mm	B ₁ mm	L mm	b mm	B ₂ mm	c mm	P ₁ mm	S ₁	ℓ mm
SYT1025	SYTS1025	12	8 ^{±0.1}	20 ^{±0.1}	25	7.5	6.6	4	14	M2.6	3.5
1035	1035	18			35						
1045	1045	25			45						
1055	1055	32			55						
1065	1065	40			65						
1075	1075	45			75						
1085	1085	50			85						
SYT2035	SYTS2035	18	12 ^{±0.1}	30 ^{±0.1}	35	11.5	12	6	22	M3	5.5
2050	2050	30			50						
2065	2065	40			65						
2080	2080	50			80						
2095	2095	60			95						
2110	2110	70			110						
2125	2125	80			125						



center rail mounting-hole dimensions					accuracy※		basic load rating		allowable load	allowable static moment			mass	size
N ₁ mm	M ₁ × P ₂ mm	S ₂	N ₂ mm	M ₂ × P ₃ mm	T μm	S μm	C N	Co N	F N	M _P N·m	M _V N·m	M _R N·m	g	
3.5	1 × 18	M2.6	5	2 × 7.5	2	4	464	476	158	1.79	1.47	1.79	22	1025
3.5	1 × 28		7.5	2 × 10	2	4	805	952	316	3.08	3.50	3.58	33	1035
12.5	1 × 20		7.5	3 × 10	2	5	959	1,190	396	6.98	6.40	4.48	42	1045
12.5	1 × 30		7.5	4 × 10	2	5	1,100	1,420	475	9.53	8.81	5.37	52	1055
12.5	2 × 20		7.5	5 × 10	2	5	1,240	1,660	554	12.4	11.6	6.27	63	1065
22.5	1 × 30		7.5	6 × 10	2	5	1,510	2,140	712	19.3	18.3	8.06	72	1075
12.5	2 × 30		7.5	7 × 10	2	5	1,650	2,380	792	23.4	22.3	8.96	83	1085
3.5	1 × 28	M3	7.5	1 × 20	2	4	1,090	1,170	390	7.04	5.78	7.63	79	2035
3.5	1 × 43		10	2 × 15	2	4	1,510	1,750	585	12.1	10.7	11.4	113	2050
17.5	1 × 30		10	3 × 15	2	5	1,900	2,340	780	19.1	17.1	15.2	150	2065
17.5	1 × 45		10	4 × 15	2	5	2,620	3,510	1,170	27.4	29.6	22.8	185	2080
17.5	2 × 30		10	5 × 15	2	5	2,950	4,100	1,360	37.4	39.9	26.7	215	2095
32.5	1 × 45		10	6 × 15	2	5	3,280	4,680	1,560	61.7	58.1	30.5	255	2110
17.5	2 × 45		10	7 × 15	2	5	3,590	5,270	1,750	76.1	72.1	34.3	295	2125

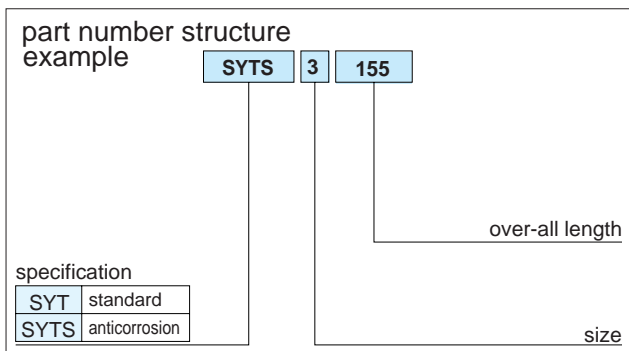
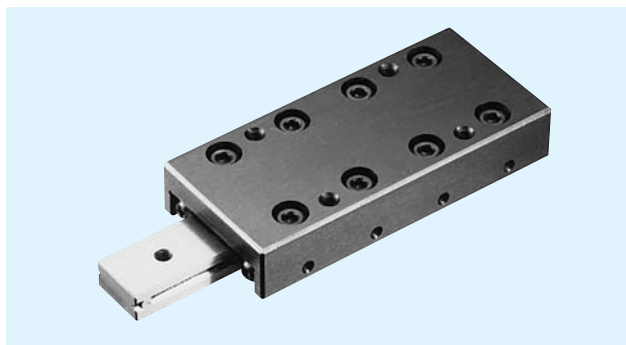
※ Refer to Figure H-26 (page H-31) for accuracy T and S.

1N≒0.102kgf 1N·m≒0.102kgf·m

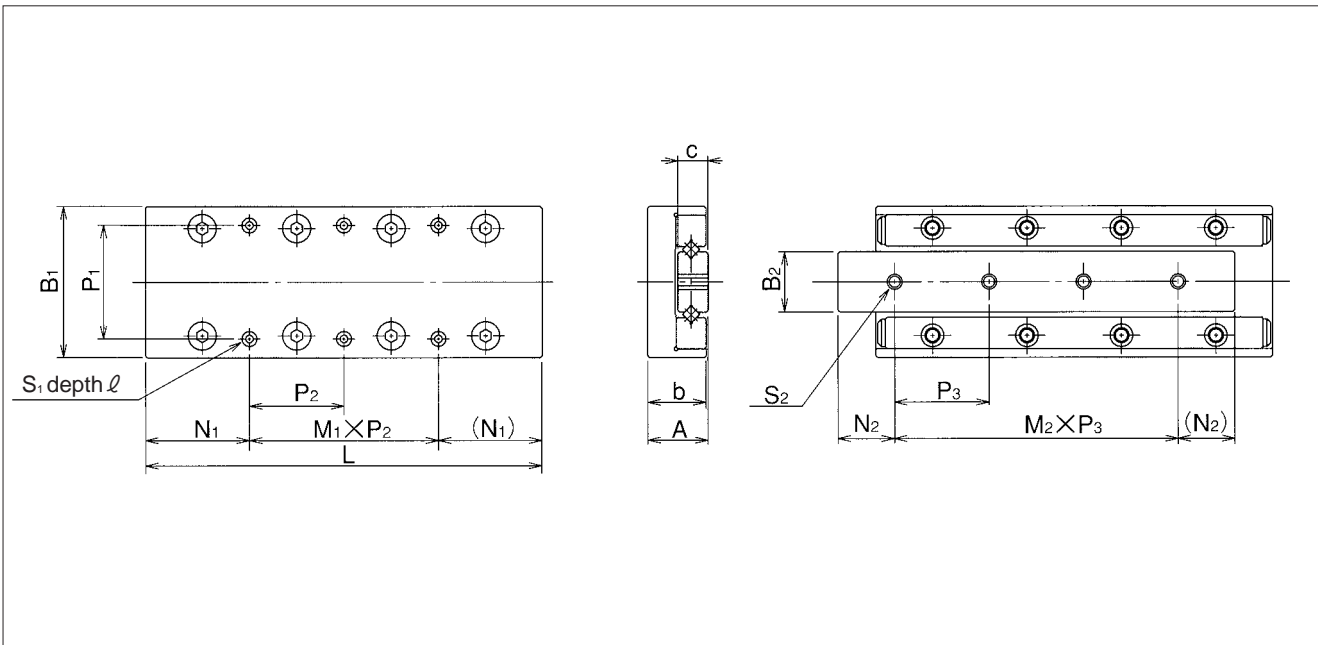


SYT TYPE

— SYT3 —



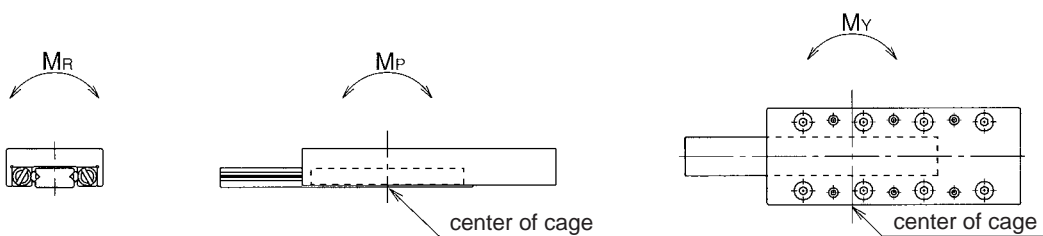
part number		stroke mm	major dimensions						table-top mounting-hole dimensions		
standard	anticorrosion		A mm	B ₁ mm	L mm	b mm	B ₂ mm	c mm	P ₁ mm	S ₁	ℓ mm
SYT3055	SYTS3055	30	16 ^{±0.1}	40 ^{±0.1}	55	15.5	16	8	30	M4	7.5
3080	3080	45			80						
3105	3105	60			105						
3130	3130	75			130						
3155	3155	90			155						
3180	3180	105			180						
3205	3205	130			205						



center rail mounting-hole dimensions					accuracy※		basic load rating		allowable load	allowable static moment			mass	size
N ₁ mm	M ₁ × P ₂ mm	S ₂	N ₂ mm	M ₂ × P ₃ mm	T μm	S μm	C N	Co N	F N	M _P N·m	M _V N·m	M _R N·m	g	
7.5	1 × 40	M4	10	1 × 35	2	5	3,490	3,890	1,290	19.4	22.2	33.8	225	3055
7.5	1 × 65		15	2 × 25	2	5	5,230	6,490	2,160	53.0	58.0	56.4	340	3080
27.5	1 × 50		15	3 × 25	3	5	6,030	7,790	2,590	103	95.7	67.7	440	3105
27.5	1 × 75		15	4 × 25	3	5	7,560	10,300	3,450	170	160	90.3	560	3130
27.5	2 × 50		15	5 × 25	3	5	9,000	12,900	4,320	210	220	112	655	3155
52.5	1 × 75		15	6 × 25	3	5	10,300	15,500	5,180	302	314	135	770	3180
27.5	2 × 75		15	7 × 25	3	5	11,000	16,800	5,610	355	367	146	880	3205

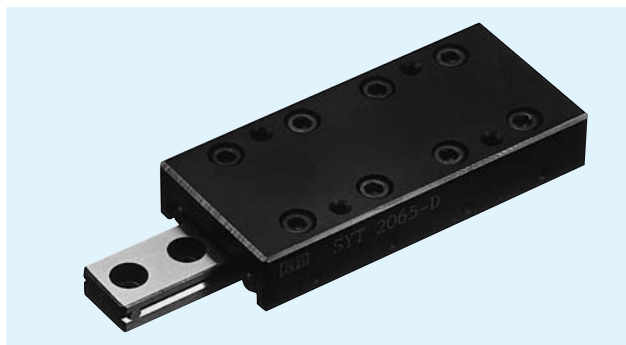
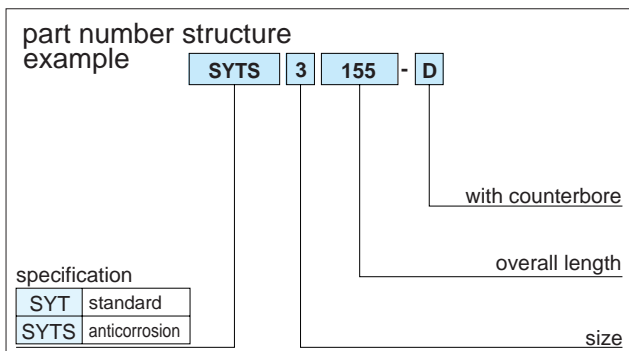
※ Refer to Figure H-26 (page H-31) for accuracy T and S.

1N≒0.102kgf 1N·m≒0.102kgf·m

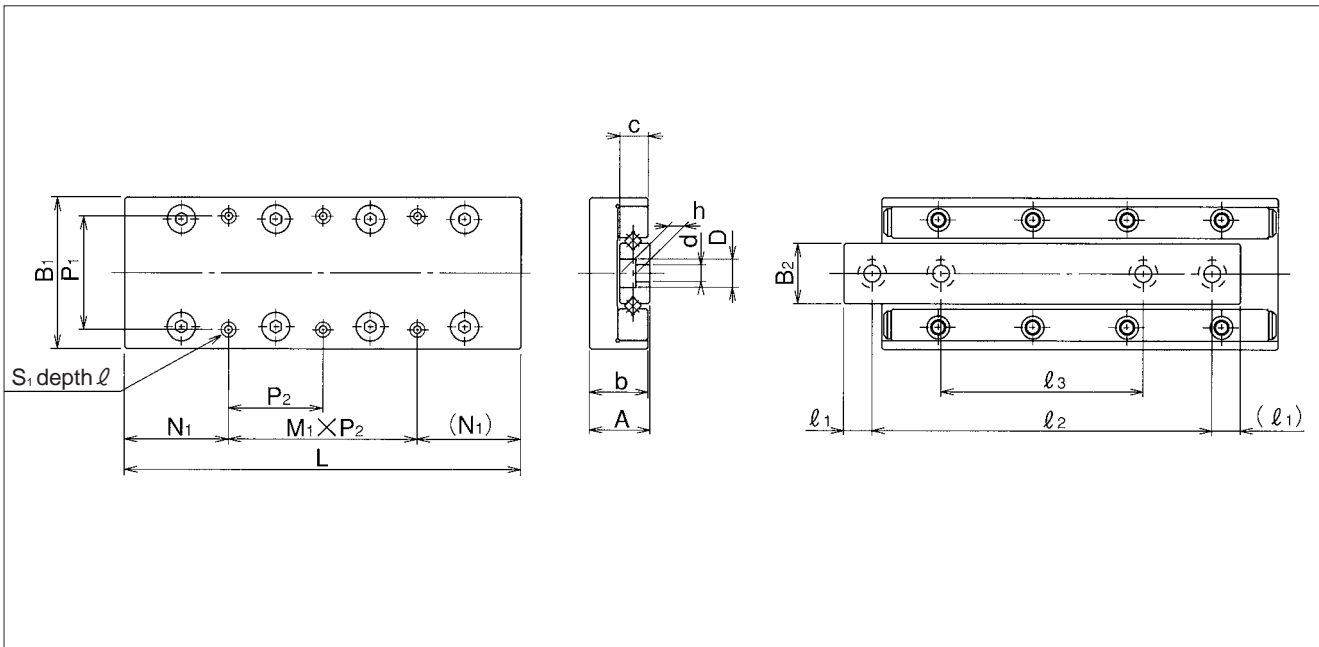


SYT-D TYPE

— SYT1/SYT2 —



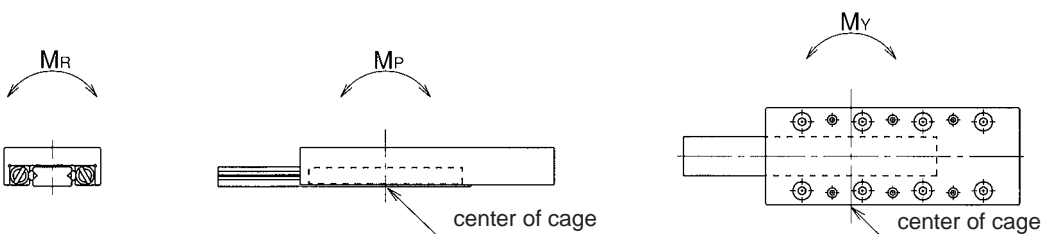
part number		stroke mm	major dimensions						table-top mounting-hole dimensions			
standard	anticorrosion		A mm	B ₁ mm	L mm	b mm	B ₂ mm	c mm	P ₁ mm	S ₁	ℓ mm	N ₁ mm
SYT1025-D	SYTS1025-D	12	8 ^{±0.1}	20 ^{±0.1}	25	7.5	6.6	4	14	M2.6	3.5	3.5
1035-D	1035-D	18			35							3.5
1045-D	1045-D	25			45							12.5
1055-D	1055-D	32			55							12.5
1065-D	1065-D	40			65							12.5
1075-D	1075-D	45			75							22.5
1085-D	1085-D	50			85							12.5
SYT2035-D	SYTS2035-D	18	12 ^{±0.1}	30 ^{±0.1}	35	11.5	12.0	6	22	M3	5.5	3.5
2050-D	2050-D	30			50							3.5
2065-D	2065-D	40			65							17.5
2080-D	2080-D	50			80							17.5
2095-D	2095-D	60			95							17.5
2110-D	2110-D	70			110							32.5
2125-D	2125-D	80			125							17.5



M ₁ × P ₂ mm	center rail mounting-hole dimensions				accuracy※		basic load rating		allowable load F N	allowable static moment			mass g	size
	d × D × h mm	ℓ ₁ mm	ℓ ₂ mm	ℓ ₃ mm	T μm	S μm	C N	Co N		M _p N·m	M _v N·m	M _r N·m		
1 × 18	2.5 × 4.1 × 2.2	3.5	18	—	2	4	464	476	158	1.79	1.47	1.79	22	1025
1 × 28		5	25	—	2	4	805	952	316	3.08	3.50	3.58	33	1035
1 × 20		3.5	38	25	2	5	959	1,190	396	6.98	6.40	4.48	42	1045
1 × 30		3.5	48	29	2	5	1,100	1,420	475	9.53	8.81	5.37	52	1055
2 × 20		5	55	31	2	5	1,240	1,660	554	12.4	11.6	6.27	63	1065
1 × 30		5	65	35	2	5	1,510	2,140	712	19.3	18.3	8.06	72	1075
2 × 30		5	75	40	2	5	1,650	2,380	792	23.4	22.3	8.96	83	1085
1 × 28	3.5 × 6 × 3.3	5	25	—	2	4	1,090	1,170	390	7.04	5.78	7.63	79	2035
1 × 43		7.5	35	—	2	4	1,510	1,750	585	12.1	10.7	11.4	113	2050
1 × 30		5	55	33	2	5	1,900	2,340	780	19.1	17.1	15.2	150	2065
1 × 45		5	70	40	2	5	2,620	3,510	1,170	27.4	29.6	22.8	185	2080
2 × 30		5	85	45	2	5	2,950	4,100	1,360	37.4	39.9	26.7	215	2095
1 × 45		7.5	95	50	2	5	3,280	4,680	1,560	61.7	58.1	30.5	255	2110
2 × 45		7.5	110	55	2	5	3,590	5,270	1,750	76.1	72.1	34.3	295	2125

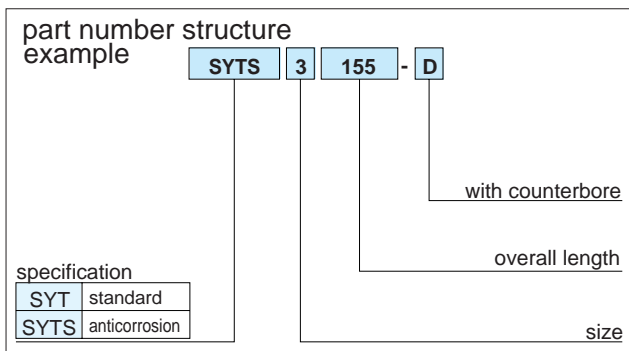
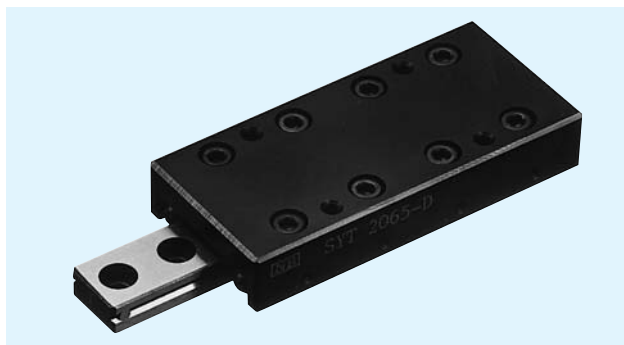
※ Refer to Figure H-26 (page H-31) for accuracy T and S.

1N≒0.102kgf 1N·m≒0.102kgf·m

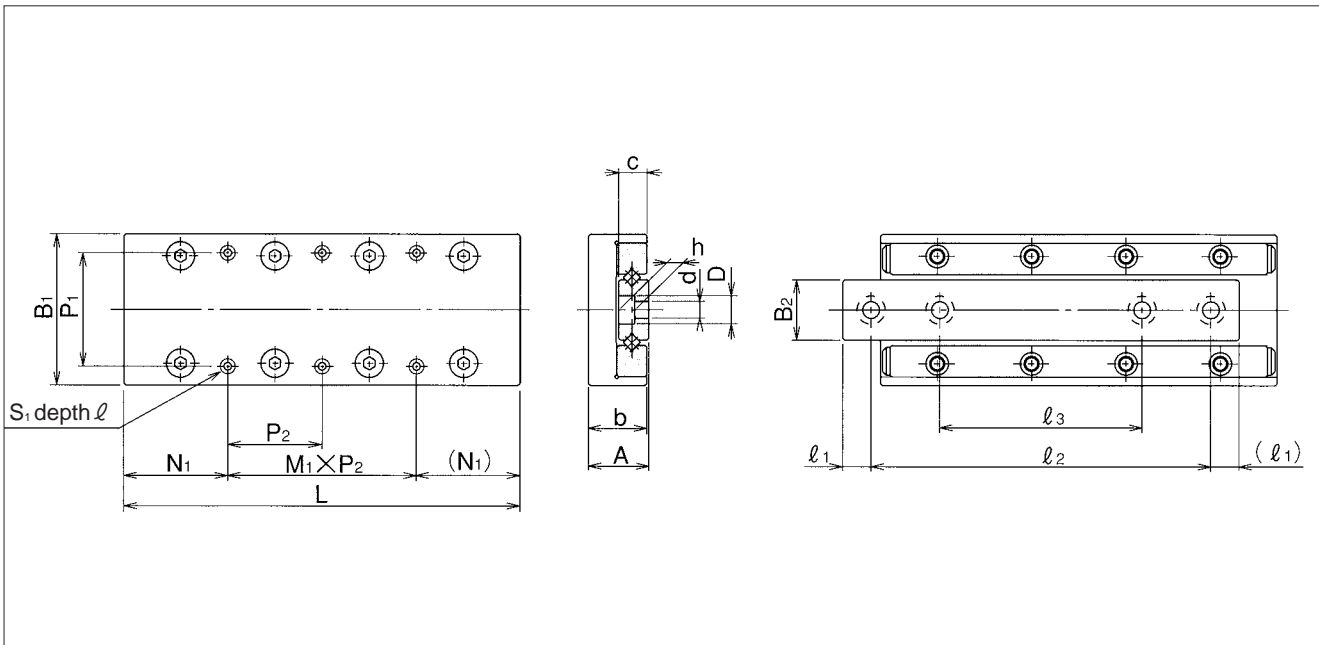


SYT-D TYPE

— SYT3 —



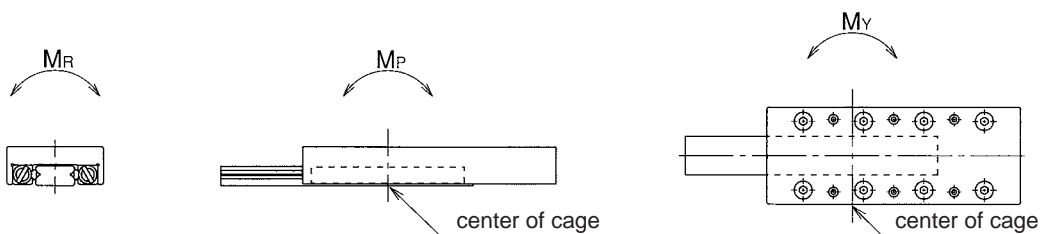
part number		stroke mm	major dimensions						table-top mounting-hole dimensions			
standard	anticorrosion		A mm	B ₁ mm	L mm	b mm	B ₂ mm	c mm	P ₁ mm	S ₁	ℓ mm	N ₁ mm
SYT3055-D	SYTS3055-D	30	16 ^{±0.1}	40 ^{±0.1}	55	15.5	16	8	30	M4	7.5	7.5
3080-D	3080-D	45			80							7.5
3105-D	3105-D	60			105							27.5
3130-D	3130-D	75			130							27.5
3155-D	3155-D	90			155							27.5
3180-D	3180-D	105			180							52.5
3205-D	3205-D	130			205							27.5



$M_1 \times P_2$ mm	center rail mounting-hole dimensions				accuracy※		basic load rating		allowable load F N	allowable static moment			mass g	size
	$d \times D \times h$ mm	l_1 mm	l_2 mm	l_3 mm	T μm	S μm	C N	Co N		M_p N·m	M_v N·m	M_R N·m		
1×40	4.5×7.5×4.3	7.5	40	—	2	5	3,490	3,890	1,290	19.4	22.2	33.8	225	3055
1×65		6	68	43	2	5	5,230	6,490	2,160	53.0	58.0	56.4	340	3080
1×50		7.5	90	55	3	5	6,030	7,780	2,590	103	95.7	67.7	440	3105
1×75		7.5	115	65	3	5	7,560	10,300	3,450	170	160	90.3	560	3130
2×50		7.5	140	95	3	5	9,000	12,900	4,320	210	220	112	655	3155
1×75		7.5	165	85	3	5	10,300	15,500	5,180	302	314	135	770	3180
2×75		7.5	190	95	3	5	11,000	16,800	5,610	355	367	146	880	3205

※ Refer to Figure H-26 (page H-31) for accuracy T and S.

1N≒0.102kgf 1N·m≒0.102kgf·m



Miniature Slide Table SYBS Type

The NB miniature slide table SYBS type is a limited stroke slide with the most compact envelope dimensions, featuring two ball raceway grooves. The SYBS type utilizes ball as the rolling elements. The ultra compact design contributes greatly to the creation of smaller and lighter industrial machinery and equipment of all types.

Structure and Advantages

NB's miniature slide table incorporates a unique integrated ball cage between the table and bed. All components have been produced with high precision machining technologies.

Ultra Compact Design

The table height of the SYBS type is 3.2 ~ 4.5mm and the width is 6 ~ 12mm. This compact envelope when compared with conventional slide tables helps to realize the miniaturization of machinery and equipment.

Low Friction - Low Noise

Since the rolling ball elements do not re-circulate, the frictional resistance will not vary significantly resulting in smooth operation reliable high precision.

Additionally, the caged balls greatly reduce the contact noise of the rolling elements bringing about a low-noise operation.

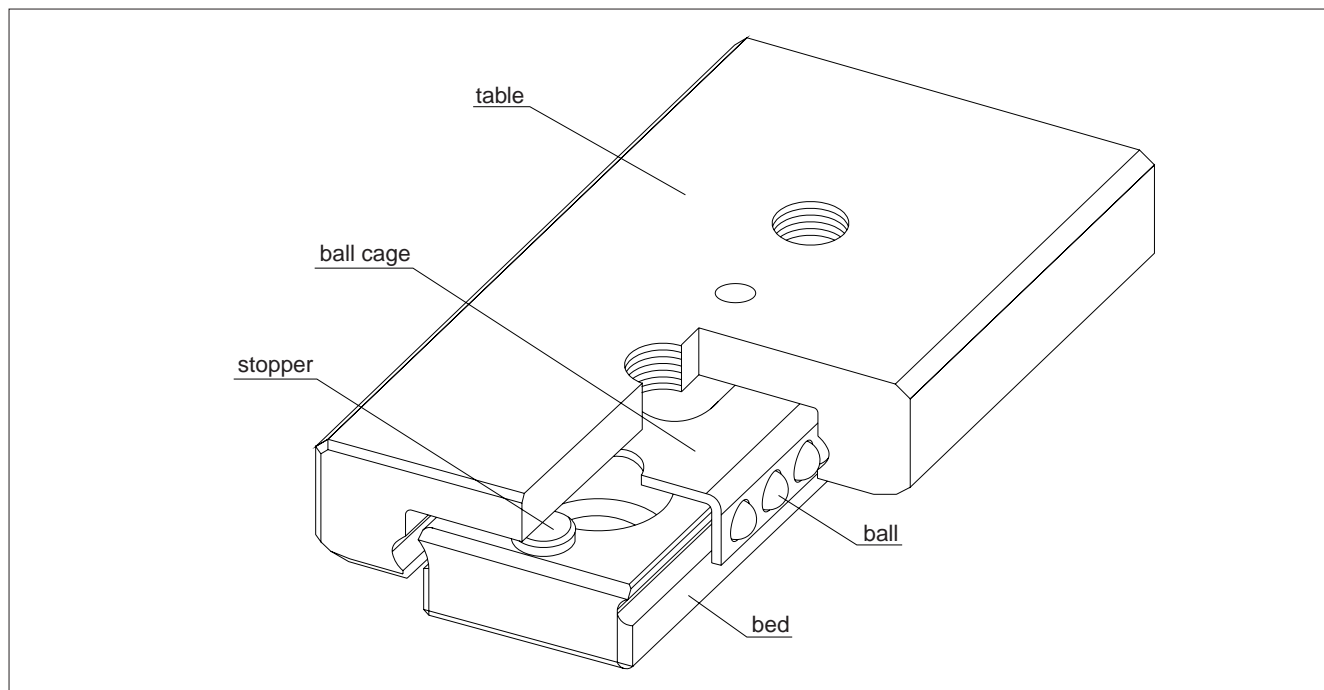
High Accuracy

The ball raceway grooves of the bed and table are processed through simultaneous precision machining resulting in minimal processing errors, and bringing about extremely smooth, precision linear movement.

Stainless Steel Structure

The SYBS type slide table is constructed from only stainless steel materials. This allows for use in corrosive or high temperature applications. The SYBS is a perfect component for vacuum or clean room type environments.

Figure H-27 Structure of SYBS Type Slide Table



Accuracy

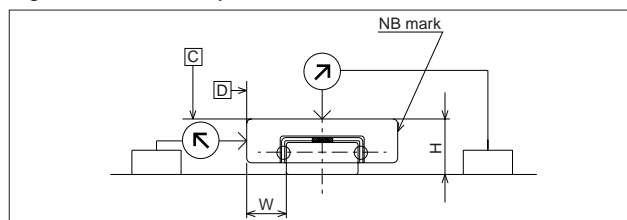
Table H-9 reflects the measured accuracies of the SYBS Miniature Slide Table. The deviation is measured as Figure H-28 illustrates. Dial indicators are placed to the centers of the table's top and side (opposite side from the NB mark) and then the table is moved the full travel distance without any load.

Table H-9 Accuracy

Unit: mm

Item	Tolerance and Acceptable Values
Height (H)	± 0.020
Width (W)	± 0.025
Deviation from Center of Surface C	0.004
Deviation from Center of Surface D	0.006

Figure H-28 Accuracy Measurement Method



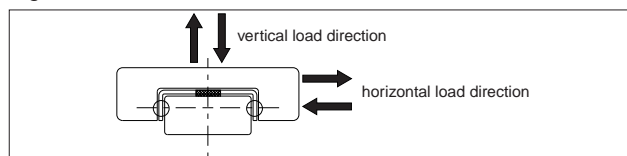
Load Rating

The load capacity of the Miniature Slide Table varies depending upon the direction of the applied load.

Table H-10 Variation of Load Rating vs. Direction of Load

Basic Dynamic Rated Load	Vertical Direction	$1.00 \times C$
	Horizontal Direction	$1.13 \times C$
Basic Static Rated Load	Vertical Direction	$1.00 \times C_0$
	Horizontal Direction	$1.19 \times C_0$

Figure H-29 Direction of Load



Rated Life

The life of an NB miniature slide table can be calculated using the following equations:

Travel life:

$$L = \left(\frac{f_T}{f_w} \cdot \frac{C}{P} \right)^3 \cdot 50$$

L: travel life (km) f_T : temperature coefficient f_w : load coefficient

C: basic dynamic load (N) P: applied load (N)

※Refer to page Eng-5 for the coefficients

Life Time:

$$L_h = \frac{L \cdot 10^3}{2 \cdot \ell_s \cdot n_1 \cdot 60}$$

L_h : life time (hr) ℓ_s : stroke length (m)

n_1 : number of strokes per minute (cpm)

Mounting

Shape of Mounting Surface

In most general installations, the Miniature Slide Table is mounted by pushing the reference planes of the bed and table against a shoulder that is set up on the mounting surface. Machined escape grooves should be used in the corners of the shoulder (as illustrated in Figure H-30) so that the corners will not interfere with the reference corners of the bed and/or table. Table H-11 lists the recommended shoulder heights of the mounting reference planes for the opposing sides.

When installing the Miniature Slide Table without providing machined escape grooves, the corner radius may be realigned as illustrated in Figure H-31. Table H-12 list the values of the corner radius of the mounting surfaces.

Figure H-30 Shape of Mounting Surface -1

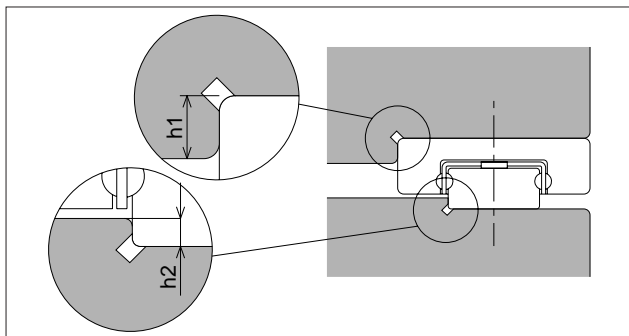


Table H-11 Shoulder Height of Mounting Reference Surfaces Unit: mm

Part Number	Shoulder Height of Table h1	Shoulder Height of Bed h2
SYBS 6	1.0	0.5
SYBS 8	1.2	0.8
SYBS 12	1.5	0.8

Figure H-31 Shape of Mounting Surface -2

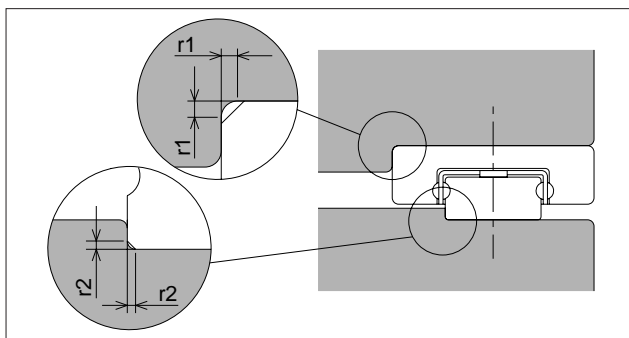


Table H-12 Maximum Corner Radius Unit: mm

Part Number	Mounting Surface of Table	Mounting Surface of Bed
	r1	r2
SYBS 6	0.1	0.05
SYBS 8	0.15	0.1
SYBS 12	0.15	0.1

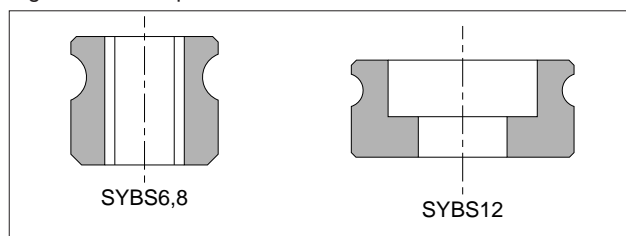
Recommended Torque Values

The bed should be tightened with a consistent torque by using a torque wrench. Table H-13 lists the recommended tightening torque values:

Table H-13 Recommended Torque Value Unit: N•m

Part Number	Nominal Bolt	Recommended Torque
SYBS 6	M1	0.03
SYBS 8	M1.6	0.15
SYBS 12	M2	0.31

Figure H-32 Shape of SYBS Bed



Precautions for Use

Mounting Example and Mounting Screws

All taps used for mounting the SYBS are fully through-hole. Mount the SYBS type as illustrated in Figure H-33 only after considering the size of mounting screw, the maximum penetration depth, and the height of the bed. Make certain that the mounting screws do not interfere with the ball cage; otherwise, the accuracy and travel life of this table will be affected adversely. Special bolts are designed for SYBS type and are available from NB. Please refer to Table H-14 for dimensions of these special mounting screws.

Figure H-33 Mounting Example

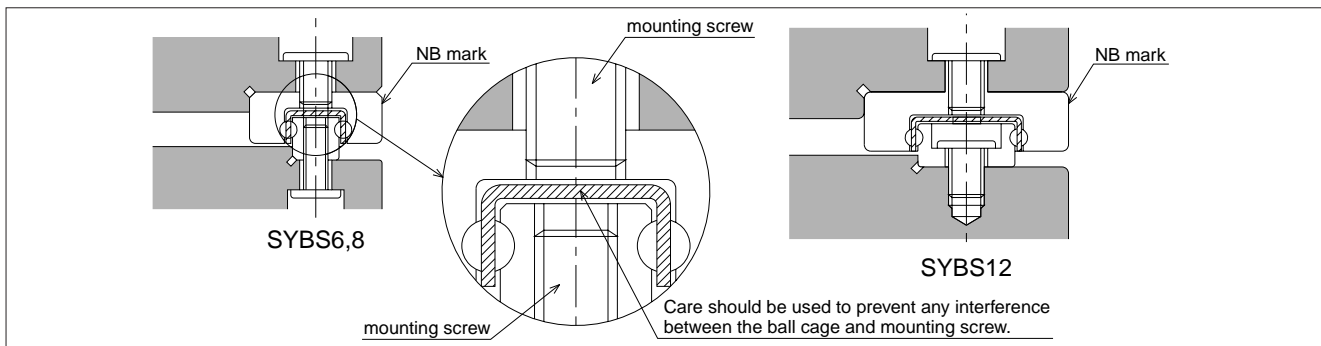


Table H-14 Mounting Screws (Material: Stainless Steel) Unit: mm

M (Nominal Bolt)	D	H	Pitch	L
M1	1.8	0.5	0.25	5
M1.4	2.5	0.5	0.3	6
M1.6	2.3	0.5	0.35	4,5,6
M2	3	0.6	0.4	6

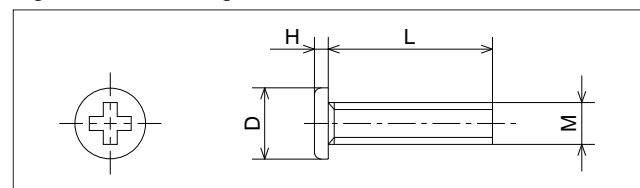
Stopper

On both ends of the SYBS Miniature Slide Table bed section, stopper screws have been attached to prevent the ball cage from escaping. Please note that the screws are designed only to prevent the ball cage from escaping and are not intended for the use as a mechanical stopper. The ball cage may become deformed on contact with the stopper and this will result in a negative affect of the accuracy and rated life of the table.

Lubrication

NB's Miniature Slide Table SYBS Type is supplied with an initial application of lithium soap grease and therefore is ready for immediate use. Periodic application of a similar lubricant should be necessary depending on the operating conditions. For use in clean rooms or vacuum environments, miniature slide tables without grease or with customer specified grease are available. NB also provides low dust generation lubricant. Please refer to page Eng-20 for further details.

Figure H-34 Mounting Screw



Ball Cage Displacement

When a miniature slide table is operated at high speeds; when offset loads or vibrations are present, the ball cage may deviate from the normal position. In general operating conditions this is normal and it is recommended that the table be cycled to perform maximum full stroke travel several times during operation. This will allow the ball cage to be returned to its normal central position.

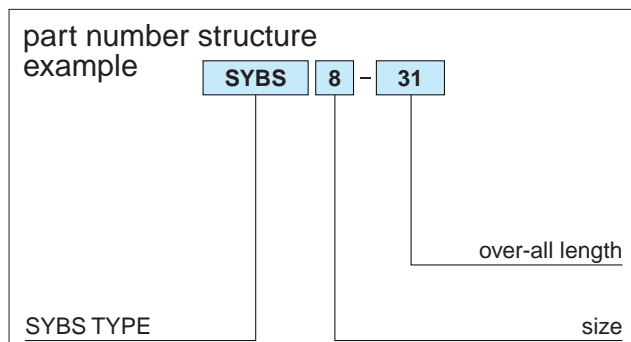
Pre-Load

The SYBS Miniature Slide Table is prepared with only a slight positive-clearance.

Allowable Load

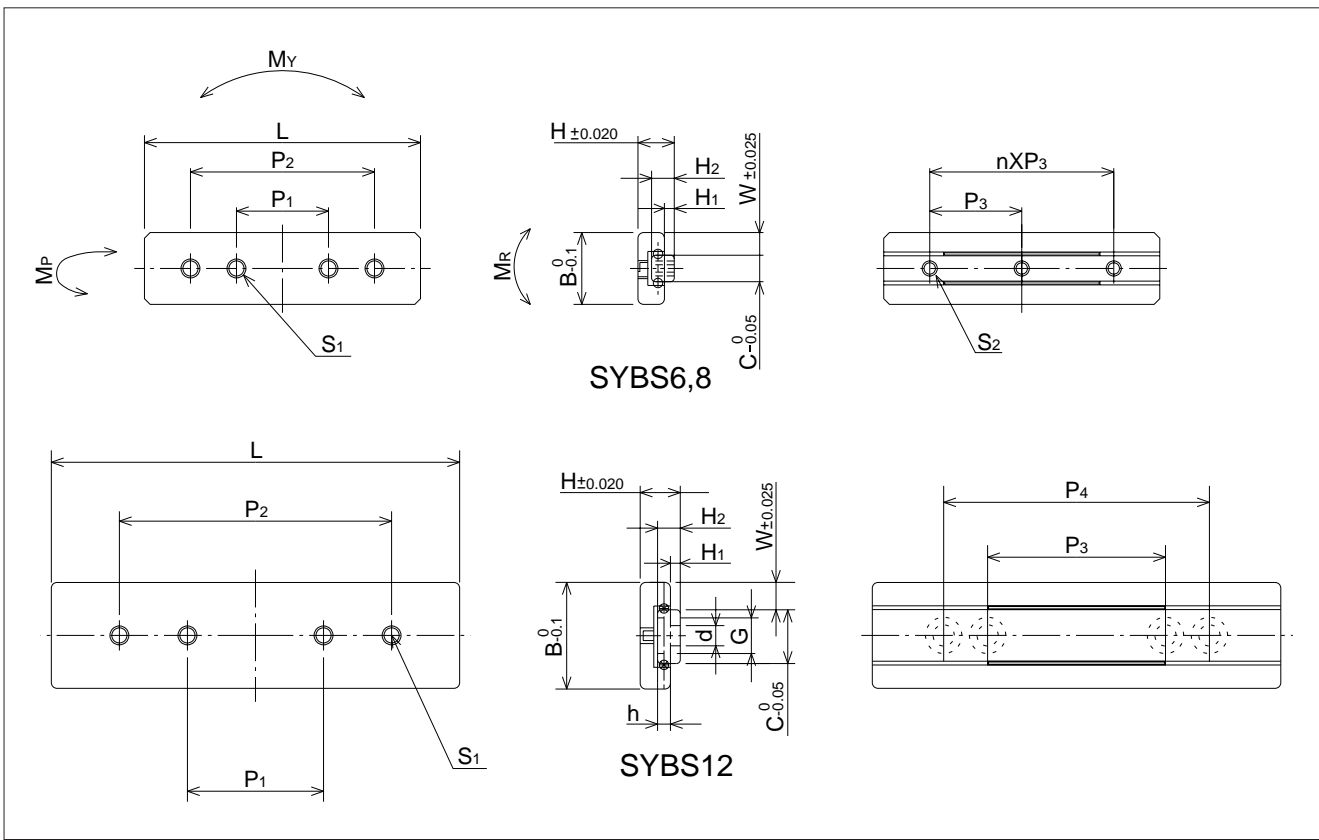
The allowable load is a load under which the sum of elastic deformation of the rolling element and the raceway in the contact area subject to the maximum contact stress is small enough to guarantee smooth rolling movement. Where very smooth and highly accurate liner motion is required, make sure to use the product within the allowable load values.

SYBS TYPE



part number	major dimensions				table-top mounting-hole dimensions					
	H	W	H _i	stroke	B	L	P ₁	P ₂	S ₁	
	mm	mm	mm	mm	mm	mm	mm	mm	maximum screw penetration depth mm	
SYBS 6-13	3.2	2	0.7	5	6	13	6.0	—	M1.4	0.5
SYBS 6-21				12		21	10.0	—		
SYBS 8-11	4	2.5	1	4	8	11	5.5	—	M2	0.7
SYBS 8-21				12		21	10.0	—		
SYBS 8-31				18		31	10.0	21		
SYBS 12-23	4.5	3	1	12	12	23	8.0	—		1.2
SYBS 12-31				18		31	15.0	—		
SYBS 12-46				28		46	15.0	31		

※1:Exclusive mounting screws are provided with the SYBS-12 type only.
Other various sizes are also available. (Please refer to page H-51)



bed-surface mounting-hole dimensions							basic load rating		allowable	allowable static moment			mass	size
H ₂	C	d×G×h	S ₂	P ₃	n	P ₄	dynamic	static	load	M _P	M _V	M _R		
mm	mm	mm		mm		mm	C	C ₀	F	N·m	N·m	N·m	g	
2.0	2	—	M1	7	1	—	154	180	60.1	0.21	0.25	0.21	1.4	6—13
				7	2	—	229	315	105	0.57	0.698	0.37	2.2	6—21
2.6	3	—	M1.6	5	1	—	201	211	70.4	0.23	0.28	0.35	2.0	8—11
				10	1	—	368	493	164	1.02	1.22	0.83	3.7	8—21
				10	2	—	473	704	234	1.97	2.35	1.19	5.5	8—31
2.6	6	※1 2.4×4×1.5	—	15	1	—	404	563	187	1.30	1.55	1.80	7.6	12—23
				15	1	—	473	704	234	1.97	2.35	2.25	10.2	12—31
				20	—	30	658	1,120	375	4.80	5.72	3.60	15.2	12—46

GONIO WAY

RVF type

Nippon Bearing's Gonio Way family has adopted the RVF type with a flat installation surface for easy processing of tables and beds.

NB Gonio Way (RVF type) is a low-friction, non-recirculating curved motion bearing utilizing precision cross-rollers. The RVF type is ideal for changing the gradient or for obtaining an accurate gradient angle without changing the center of rotation. This component is used mainly in optical equipment and measuring devices where high precision is required.

Structure and Advantages

The NB Gonio Way RVF type consists of curved tracking bases with precisely ground V-grooves and flat installation surfaces, as well as a curved roller cage in which cross rollers are fitted. Precision rollers are employed as the rolling elements. Since the rolling elements do not recirculate, the frictional resistance will not vary significantly, providing curved movement with extremely low frictional resistance.

Flat Installation Surface

The flat installation surfaces of the RVF type do not require complicated machining of tables and beds when installing the product. As a result, machining costs can be reduced greatly.

Same Rotation Center

The curved V-grooves, which are finished with a precise grinding process, provide an accurate center of rotation.

Furthermore, the products are composed to provide identical rotation centers when products of each size are installed to two axes. (Refer to Table H-17.)

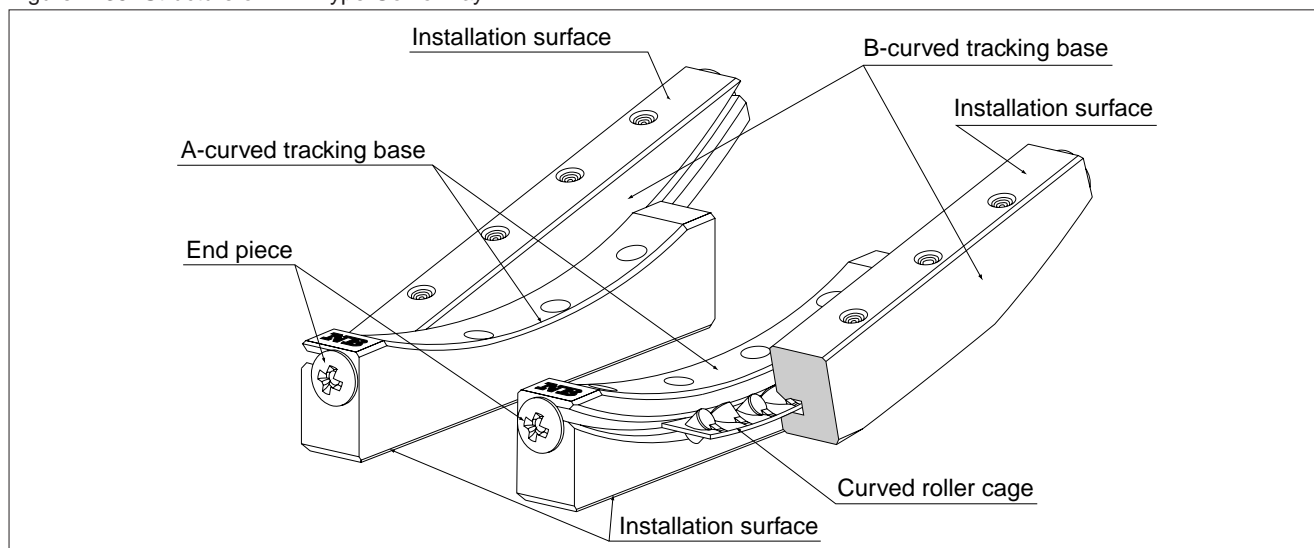
Low Frictional Resistance and Minute Motion

The precision grinding work and curved roller cage allow for extremely low frictional resistance. The negligible difference between starting and dynamic frictions allows the RVF type to follow minute movements accurately, realizing curved movement of high accuracy.

Low Noise

Since NB Gonio Way employs a non-recirculating design, noise will not be generated at the circulating area. In addition, the curved roller cage realizes quiet operation without contact noise between the rolling elements.

Figure H-35 Structure of RVF Type Gonio Way



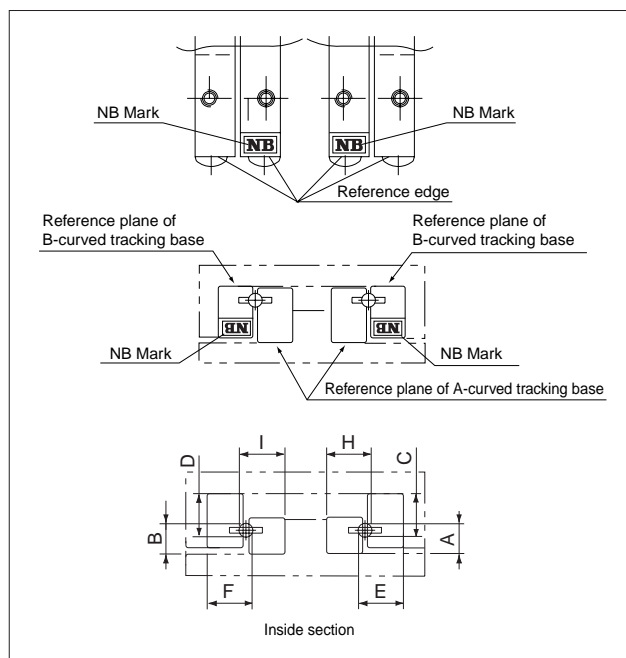
ACCURACY

The accuracies of the Gonio Way RVF type are represented by mutual dimensional errors of four units, which are measured along the overall length using the procedure as shown in Figure H-36.

Table H-15 Accuracy

Part Number	Mutual Error between A and B Mutual Error between C and D	Mutual Error between E and F Mutual Error between H and I
RVF2050- 70	10	10
RVF2050- 87		
RVF2050-103		
RVF2050-120		
RVF3070- 85		
RVF3070-110		
RVF3100-125		
RVF3100-160		

Figure H-36 Measuring Method of Accuracy



LIFE CALCULATION

The life of an NB miniature slide table can be calculated using the following equations:

Travel life:

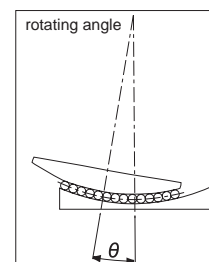
$$L = \frac{90}{\theta} \cdot \left(\frac{f_T}{f_w} \cdot \frac{C}{P} \right)^{\frac{10}{3}}$$

L: travel life (106round trips) θ : rotating angle (degree)
 f_T : temperature coefficient f_w : load coefficient
 C: basic dynamic load (N) P: applied load (N)
 ※Refer to page Eng-5 for the coefficients.

Life Time:

$$L_h = \frac{L \cdot 10^6}{60 \cdot n}$$

L_h : life time (hr) s: stroke length (m)
 n : number of strokes per minute (cpm)

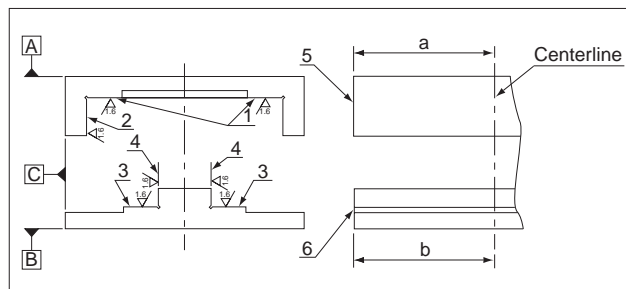


ACCURACY OF MOUNTING SURFACE

To maximize the performance of NB's Gonio Way RVF type, it is important to finish the installation surface with high accuracies.

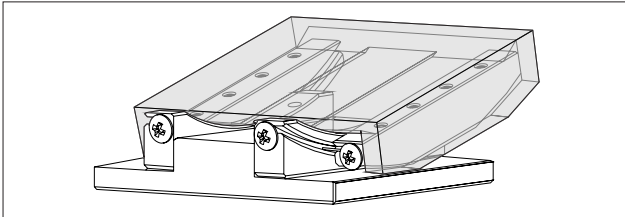
- Parallelism of plane 1 against plane A
- Perpendicularity of plane 2 against plane A
- Perpendicularity of plane 5 against plane A
- Parallelism of plane 3 against plane B
- Perpendicularity of plane 4 against plane B
- Perpendicularity of plane 6 against plane B
- Parallelism of plane 2 against plane C
- Parallelism of plane 4 against plane C
- Mutual error between the size of a and b

Figure H-37 Accuracy of installation surface



INSTALLATION

Figure H-38. Installation Example



Installation Procedure

Setting the curved tracking bases temporarily

- (1) Remove burrs, stains, and dust from the installation surface of the curved tracking bases of tables and beds. Foreign objects must be kept out of the assembly work as well.
- (2) Apply oil of low viscosity to contact surfaces, check the reference edges of an A-curved tracking base and bed, and then tighten the bolts temporarily. (Figure H-39)
- (3) Align the reference edges (NB mark side) of a B-curved tracking base and an A-curved tracking base to the same orientation. Then, insert the curved roller cage between the curved tracking bases at the center area. Make sure that the curved roller cage will not interfere with the curved raceway grooves of the curved roller tracking bases. (Figure H-39b)
- (4) Check the reference edge of the table, set the table over the B-curved tracking base, and then secure the table temporarily. (Figure H-39c)

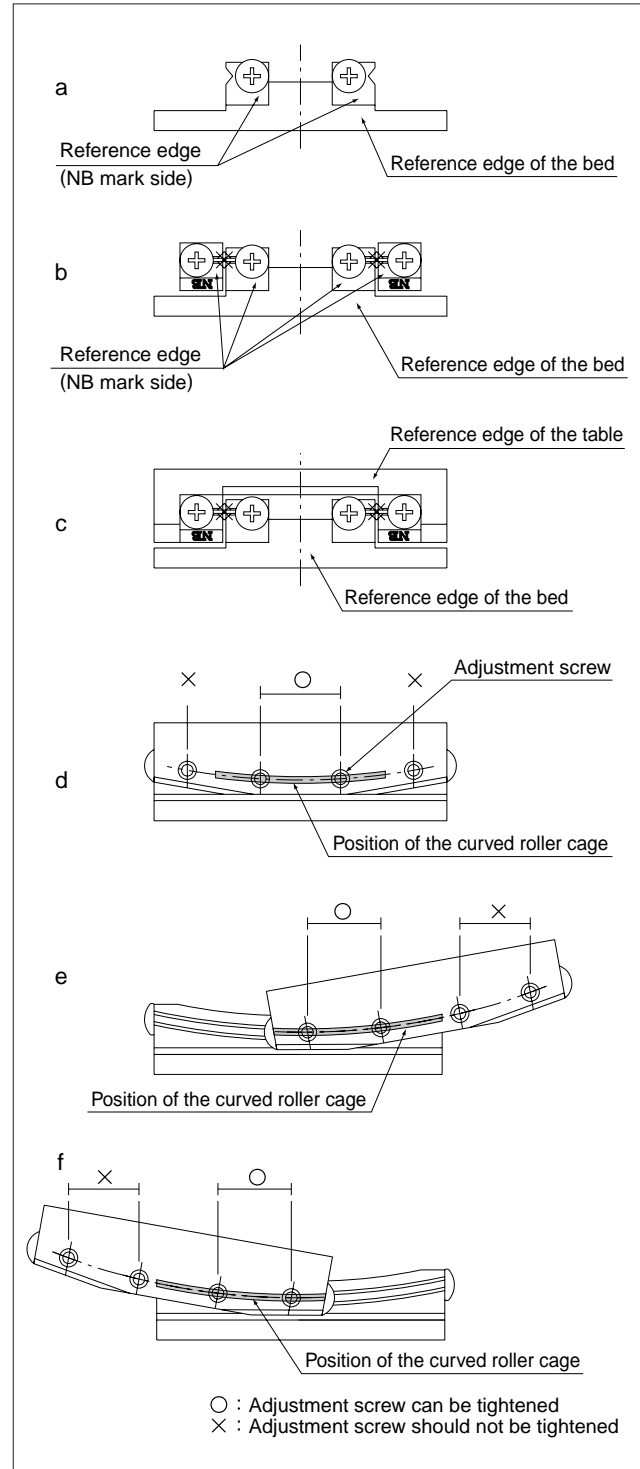
Setting four curved tracking bases in parallel position

- (5) Move the table to the maximum stroke ends of both sides and adjust the setting so that the curved roller cage is positioned at the center of the curved tracking base.
- (6) Move the table to the center position and tighten the adjustment screw with slightly strong torque * by using a torque wrench. (Figure H-39d)

* "Slightly strong torque" here means slightly stronger than the torque at which the oscillation of the test indicator is stabilized at the minimum value when the table is moved right and left, or when pressure is applied to the rolling direction while the test indicator is attached to the side face (reference side) of the table. (Figure H-40i)

- (7) Move the table to the maximum stroke end of one side and tighten the regulating screw on the curved roller cage with the same torque as in step (6). (Figure H-39e)

Figure H-39. Installation Procedure (1)



- (8) Move the table to the maximum stroke end of the other side and tighten the adjustment screw with a torque wrench by repeating the procedure above. (Figure H-39f)

Securing the curved tracking bases

- (9) Mount an edge reference plate between the reference edge of the A-curved tracking base and end piece, press it against the reference edge of the bed, and then tighten only the mounting bolt in the middle. (Figure H-40g)
- (10) Repeat the procedure above to mount an edge reference plate between the reference edge of the B-curved tracking base and the end piece. Press it against the reference edge of the bed, and then tighten only the mounting bolt in the middle. (Figure H-40h) In order to maintain parallelism of curved tracking bases, do not cycle the table during this process and make sure that there is no clearance between the edge of the table and the edge reference plate.
- (11) Secure the rest of the mounting bolts on the curved roller cage one by one while moving the table as instructed in steps (7) and (8).

Adjusting the preload

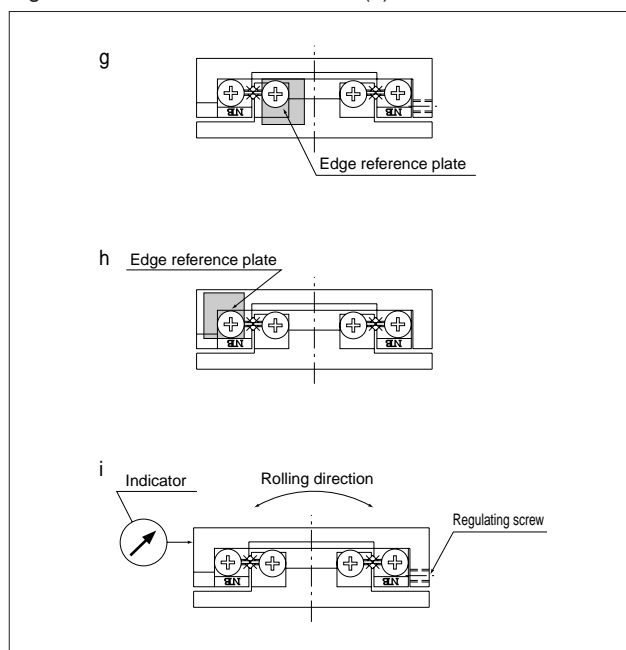
- (12) Move the table to the right and left with the test indicator attached to the side face of the table (reference side). Or, apply pressure in the rolling direction and confirm that the oscillation of the attached indicator is stabilized at the minimum level. (Figure H-40i)
- (13) Return the mounting bolt on the B-curved tracking base at the adjustment screw side to the temporary setting.
- (14) Return the table to the center position, slightly loosen the adjustment screw in the middle, and then gradually loosen the adjustment screws on the curved roller cage while moving the table as instructed in steps (7) and (8). Make sure not to reduce the preload too much.
- (15) Finally, secure the B-curved tracking base at the adjustment screw side, which has been installed temporarily. Secure the mounting bolts on the curved roller cage one by one while moving the table as instructed above.

Table H-16 Recommended Tightening Torque for Mounting Bolts Unit/N·m

Nominal Designation of Screw	Tightening Torque
M2.5	0.5
M3	1.1

(When using stainless-steel screw A2-70 on aluminum seating for tightening)

Figure H-40 Installation Procedure (2)



2-AXES AND CUSTOM SPECIFICATIONS

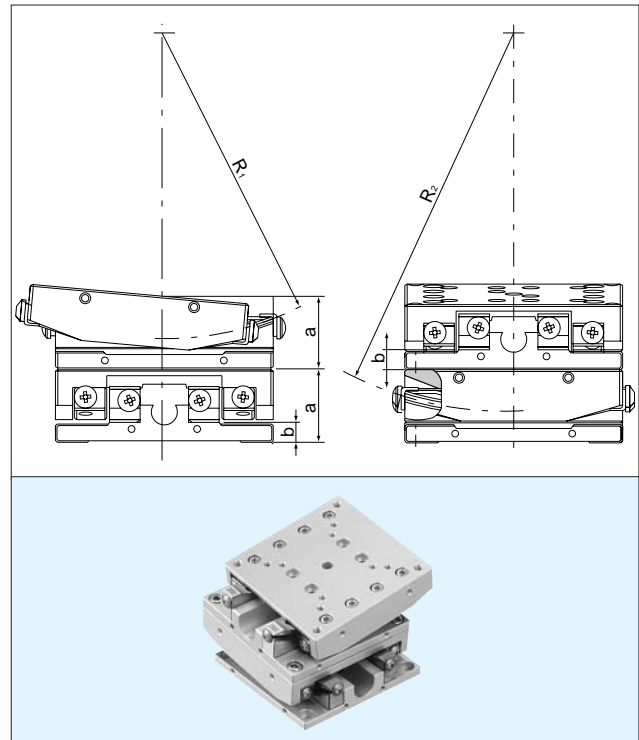
When incorporating RVF type units onto two axes as illustrated in Figure H-41, adjust the height of one lifting axis as instructed in Table H-17. Then, adjust dimension b (the height of the installation surface of the A-curved tracking base) in Figure H-41 to the same dimension in order to obtain the identical rotation center for the two axes. In addition, requests can be made for custom specifications including table units fitted for two axes, non-standard lengths for curved tracking bases, the radius of rotation, the rotation range, and the number of rollers. Contact NB for further information and arrangements.

Table H-17 Two-Axes Specifications

Unit/mm

Model Number Combinations	a	R_1	R_2
RVF2050- 70 RVF2050- 87	17	70	87
RVF2050-103 RVF2050-120	17	103	120
RVF3070- 85 RVF3070-110	25	85	110
RVF3100-125 RVF3100-160	35	125	160

Figure H-41 Two-Axes Specifications



PRECAUTIONS FOR USE

Lubrication:

NB gonio ways are lubricated using lithium soap grease prior to shipment, so they can be used immediately. Periodic application of a similar type grease is recommended depending on the operating conditions.

NB also provides low dust generation grease for the linear system. Please refer to page Eng-20 for further details.

Dust Prevention:

If a foreign matter, such as dust and dirt, enters the inside of the NB gonio way, it may deteriorate the accuracy and life of the system. A gonio way used in a hostile environment should be protected with a cover.

Use Environment:

The recommended operating temperature range of the NB gonio way is -20°C to 110°C.

Adjustment:

Inaccurate adjustment of the accuracy on the mounting surface or pre-load may reduce the motion accuracy, resulting in skewing and shortening of gonio way life. The adjustment should be carried out carefully.

Cage Slippage:

When used under high-speed, unbalanced-load, or vibrational conditions, cage slippage may occur. The stroke distance should be determined with sufficient margin, and an excessive pre-load should not be applied.

End Pieces:

End pieces are attached to each end of the NB gonio way to prevent removal of the curved roller cage. Do not use as a mechanical stopper.

Careful Handling:

Dropping a NB gonio way may result in scratches or dents on the raceway surface, preventing smooth motion and affecting accuracy. Care should be exercised in handling.

Use as a Set:

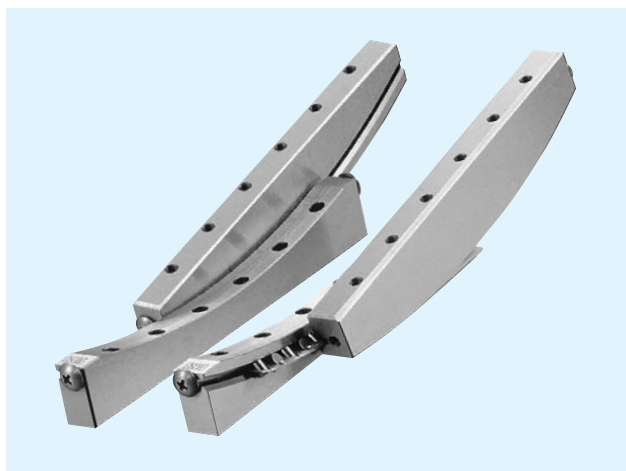
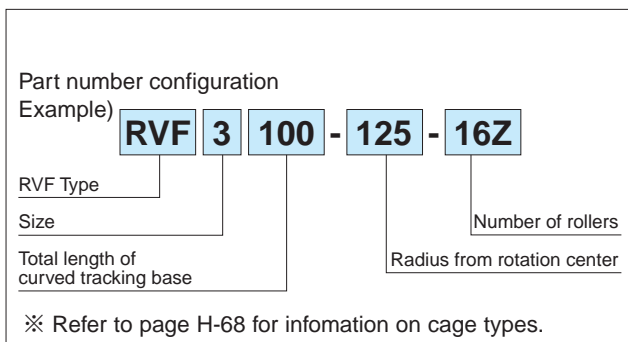
The accuracy tolerance of a gonio way is designed to be adjusted within a particular set of components. If components from different sets are used, accuracy may be affected.

Allowable Load:

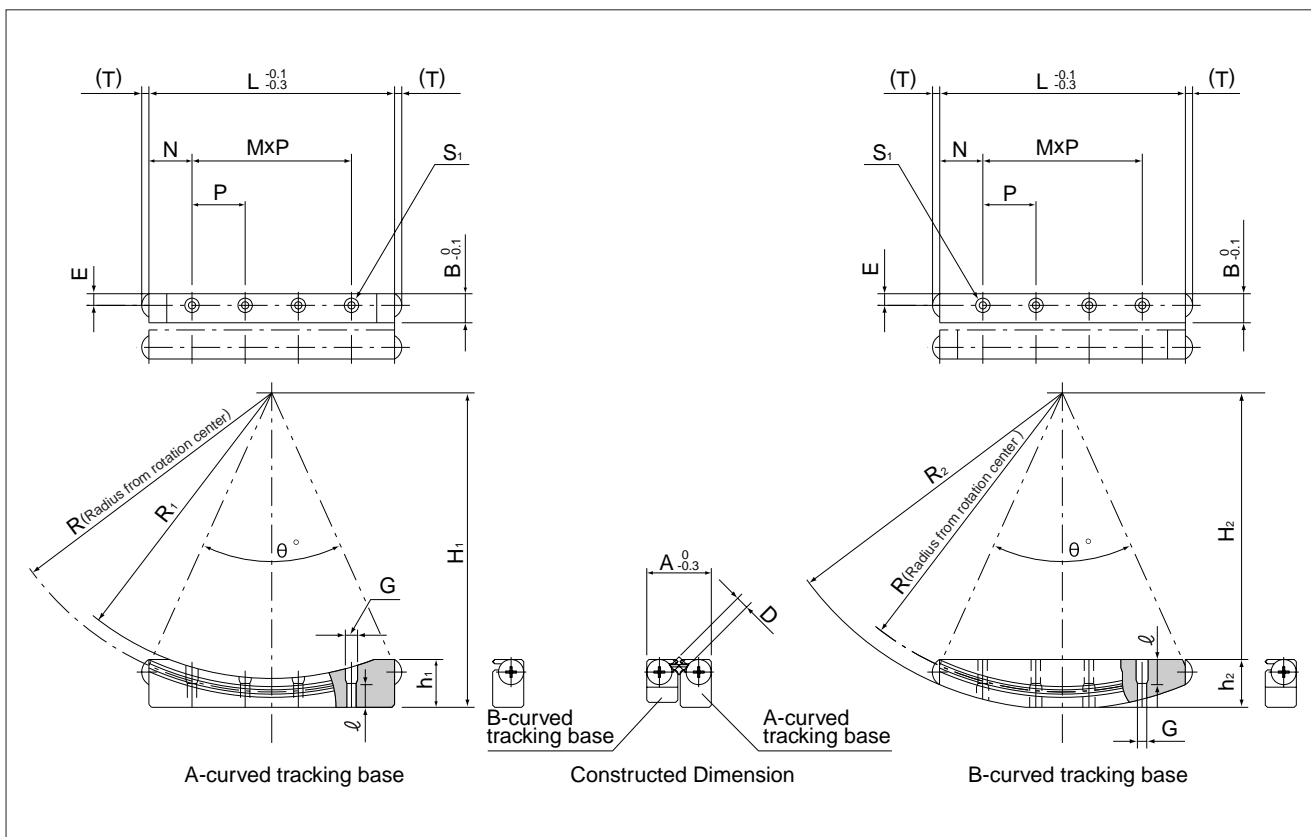
The allowable load is a load under which the sum of elastic deformation of the rolling element and the raceway in the contact area subject to the maximum contact stress is small enough to guarantee smooth rolling movement. Where very smooth and highly accurate liner motion is required, make sure to use the product within the allowable load values.

RVF TYPE

— SVT6/SVT9 —



Part Number	Rotation Range	Roller Diameter D mm	Number of Rollers Z	Major Dimensions							
				L mm	R mm	R ₁ mm	R ₂ mm	H ₁ mm	H ₂ mm	h ₁ mm	h ₂ mm
RVF2050- 70-11Z	±5°	2	10	50	70	67	73	72.5	64.5	7.5	7.5
RVF2050- 87-10Z			10		87	84	89.5	89.5	81.5	7.5	7.5
RVF2050-103-10Z			10		103	100	106	105.5	97.5	7.5	8
RVF2050-120- 9Z			9		120	117	123	122.5	114.5	7.5	8
RVF3070- 85-11Z	±10°	3	10	70	85	81	89	89.5	75.5	14	12.5
RVF3070-110-10Z			10		110	106	114	114.5	100.5	12.8	12.5
RVF3100-125-16Z			16	100	125	121	129	129.5	110.5	17.5	18
RVF3100-160-14Z			14		160	156	164	164.5	145.5	15	18



(One set includes A-curved tracking bases (2), B-curved tracking bases (2), curved roller cages (2), end pieces (8), and installation reference plate (2).)

										allowable	Basic Load Rating		Weight	size
A	B	M×P	N	E	S ₁	ℓ	G	T	θ°	load	Dynamic	Static		
mm	mm	mm	mm	mm		mm	mm	mm		F	C	Co		
										N	N	N	g	
15	7.25	3×12.5	6.25	2.5	M2.5	4	3	2.1	41.8°	800	1,179	1,468	66	2050- 70-10z
									33.3°	810	1,179	1,468	70	2050- 87-10z
		3×13	5.5					2.1	28.0°	815	1,179	1,468	70	2050-103-10z
									24.0°	657	997	1,174	70	2050-120- 9z
18	8.5	3×15	12.5	3	M3	7	3.5	1.9	48.6°	1,840	2,631	3,515	182	3070- 85-10z
									37.1°	1,870	2,631	3,515	182	3070-110-10z
	8.5	5×15	12.5	3	M3	7	3.5	1.9	47.1°	2,950	3,745	5,626	327	3100-125-16z
									36.4°	2,630	3,387	4,921	323	3100-160-14z

GONIO WAY

RV type

The NB Gonio way is a curved SV type slide way. It is a curved motion bearing utilizing low-friction, non-recirculating, precision cross-rollers. It is used when there is a need to change the gradient or obtain an accurate gradient angle without changing the center of rotation in high-precision optical and measurement equipment.

STRUCTURE AND ADVANTAGES

The NB Gonio way consists of hardened curved tracking bases with precisely machined V-grooves and a curved roller cage with cross-rollers. High-precision rollers are used as the rotating elements. Since the rotational elements do not recirculate, there is less friction fluctuation, resulting in a low-frictional curved motion.

Suitable for Minute Motion:

The frictional resistance is extremely small and there is little or no difference between the static and dynamic frictional resistance. The NB Gonio slide way is well suited for minute motion. It can follow minute motion accurately, resulting in highly accurate curved motion.

High Rigidity and High Load Capacity:

The rollers provide a larger contact area than ball elements and there is less elastic deformation. Additionally, since the rollers do not recirculate, the effective number of rotating elements is larger, resulting in high rigidity and high load capacity.

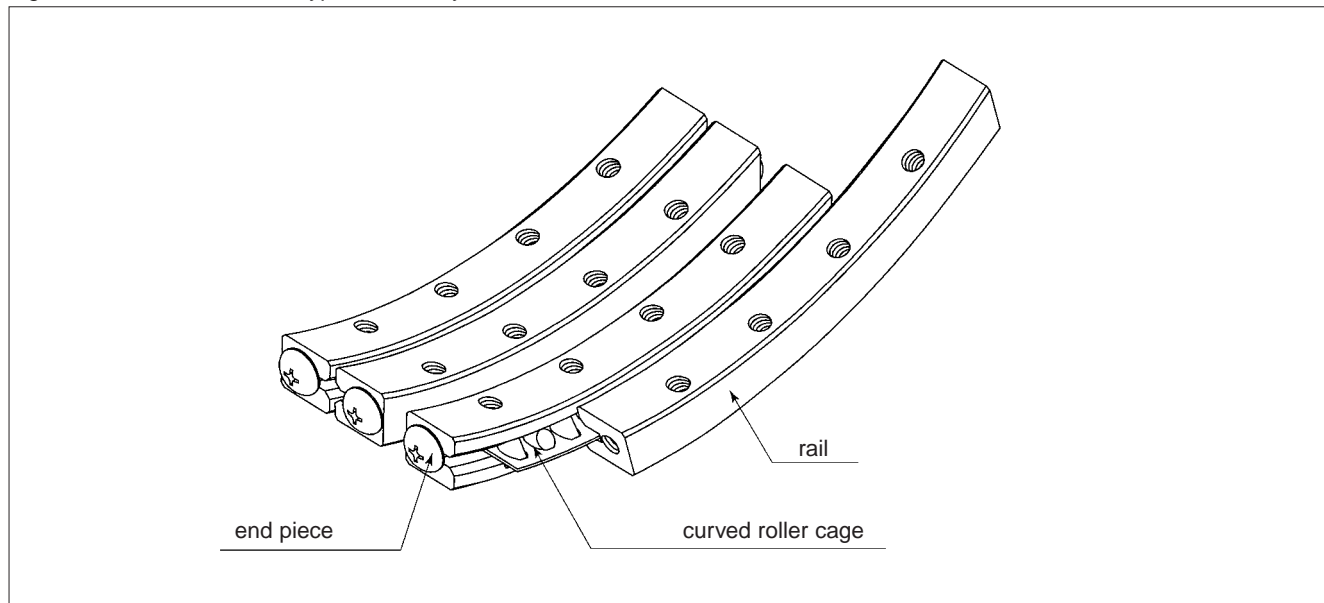
Ease of Assembly and Installation:

The rollers are retained inside a curved roller cage, allowing assembly, installation, and the handling of components simplified. A set of components consists of 4 curved tracking bases, 2 curved roller cages, and 8 end pieces. It can be assembled immediately.

Low Noise:

The use of a roller cage prevents noise from being generated by contact between the rotating elements, resulting in quiet operation.

Figure H-42 Structure of RV Type Gonio Way



ACCURACY

The accuracy of a Gonio way is measured along its over all length, as shown in Figure H-43.

Table H-18 Accuracy

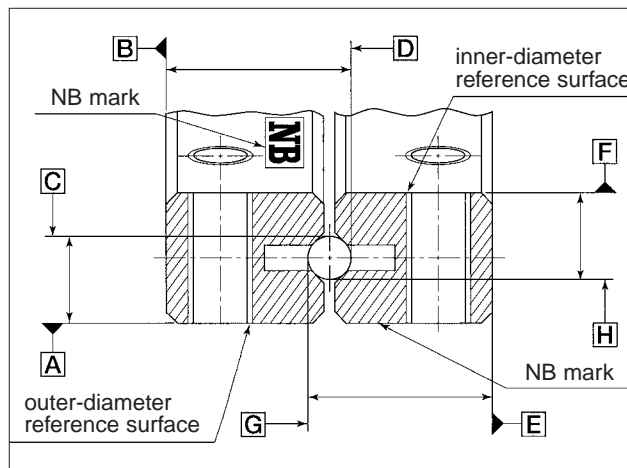
unit/ μm

part number	accuracy
RV2040- 50	10
RV2060- 60	
RV3070- 90	
RV3070-110	
RV3100-160	

The reference surfaces are located on the opposite side of the “NB” mark.

There are inner reference plane and outer reference planes in one set of RV.

Figure H-43 Accuracy Measurement



LIFE CALCULATION

The life of a Gonio way is obtained using the following equations.

Travel life:

$$L = \left(\frac{90}{\theta} \right) \cdot \left(\frac{f_r}{f_w} \cdot \frac{C}{P} \right)^{\frac{10}{3}}$$

L : travel life (10^6 round trips) θ : rotating angle (degree)

f_r : temperature coefficient f_w : load coefficient

C : basic dynamic load rating (N) P : applied load (N)

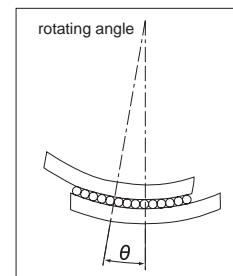
※ Refer to page Eng. 5 for the coefficients.

Life time:

$$L_h = \frac{L \cdot 10^6}{60 \cdot n}$$

L_h : life time (hr)

n : strokes frequency per min. (cpm)

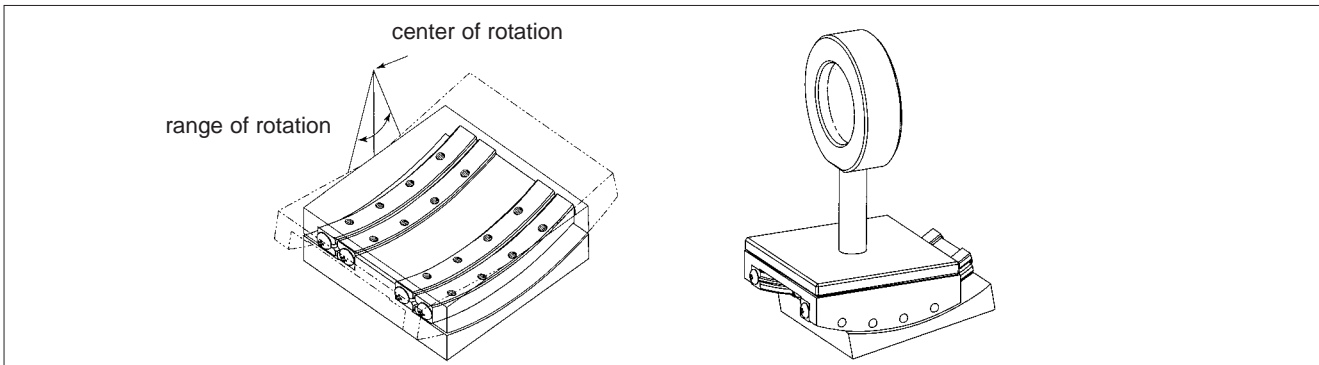


SPECIAL REQUIREMENTS

NB can fabricate Gonio slide ways to meet special requirements, including slide ways with non-standard roller sizes, curved tracking base lengths, rotation center diameters, rotation ranges, and number of rollers. Contact NB for further information.

MOUNTING

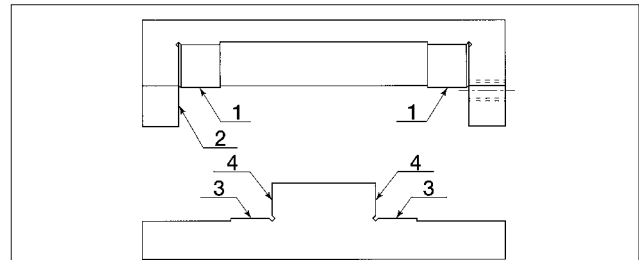
Figure H-44 Example of Mounting



Accuracy of Mounting Surfaces:

The accuracy of the mounting should be maintained as needed for the operation. The accuracy of surfaces 1, 2, 3, and 4 (Figure H-45) directly affect the motion accuracy. They should be sufficient for the intended operation.

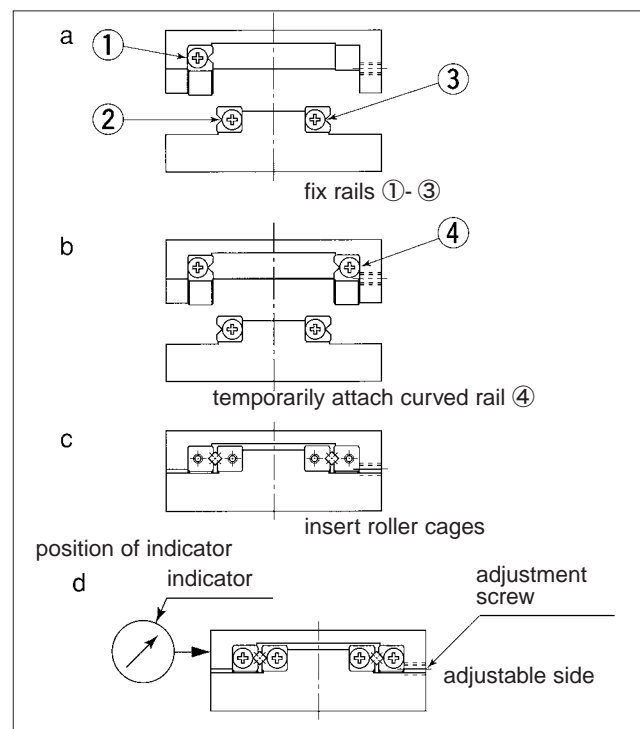
Figure H-45 Accuracy of Installation Surfaces



Procedure:

- (1) Remove burrs, dirt, dust, etc. from the table and the installation surfaces of the bed.
- (2) Apply a low viscosity oil to contact surfaces. Fix the rail ①② and ③ by tightening bolts to specified torque values (Table H-19, Figure H-46a).
- (3) Temporarily attach the rail ④ on curved tracking base to the adjustment side (Figure H-46b).
- (4) Remove the end pieces on one side of the rails and insert roller cages to the center (Figure H-46c).
- (5) Re-attach end-pieces.
- (6) Move table to the right and left (in the direction of the stroke) to position roller cages at the center of the curved rails.
- (7) Set an indicator at the side of the table on the reference surface (Figure H-46d).
- (8) Move table to one of the stroke ends and tighten the adjustment screws slightly. (Figure H-47e).

Figure H-46 Mounting Method (1)

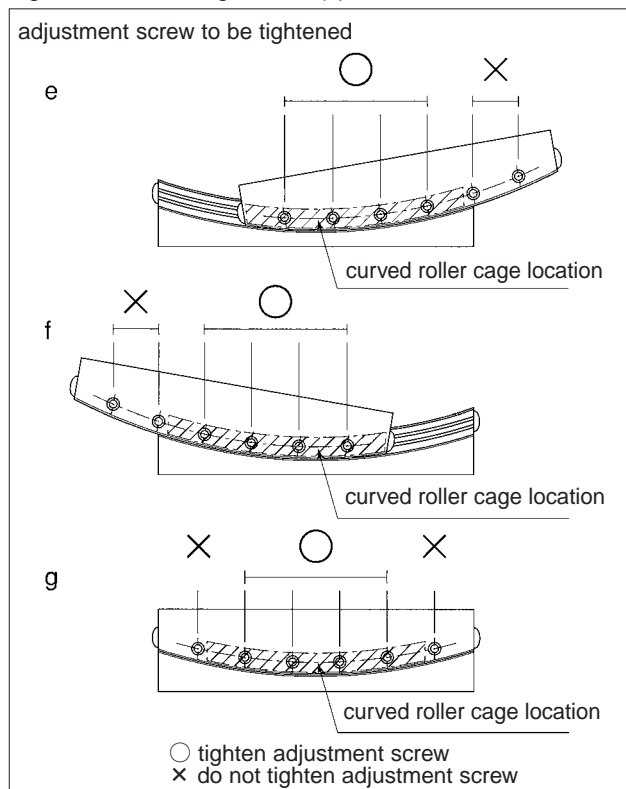


- (9) Move table fully to the other stroke end and tighten the adjustment screws slightly. (Figure H-47f).
- (10) Move the table to the center and lightly tighten adjustment screws (Figure H-47g).
- (11) Repeat steps (8) ~ (10) until there is no clearance around the table. If there is no clearance, the indicator will show a minimum fluctuation value when the table is moved to the right and left. Exercise care so as not to apply an excessive amount of pre-load.
- (12) Repeat steps (8) ~ (10) and tighten the adjustment screws uniformly.
- (13) Fix the rail ④. Tighten the roller cage bolts sequentially by moving the table in the same manner as for tightening the adjustment screws.

Table H-19 Recommended Torque for Installation Bolts unit/N · m

bolt size	torque
M3	1

Figure H-47 Mounting Method (2)



NOTES ON INSTALLATION

Lubrication:

NB Gonio slide ways are pre-lubricated using lithium soap grease prior to shipment, so they can be used immediately. Periodic application of a similar type grease is recommended depending on the operating conditions.

Dust Prevention:

Dust and foreign particles can affect the accuracy and life of a Gonio slide way. A table used in a hostile environment should be protected with a cover.

Operating Temperature:

The operating temperature should be kept between -20°C and 110°C.

Pre-load Adjustment:

Inaccurate pre-load adjustment will reduce the motion accuracy, resulting in skewing and shortening life. Careful adjustment is a requirement.

Cage Slippage:

When used under high speeds, or unbalanced loads, or when vibration condition are present, the roller cage slippage may occur. The rotation range should be determined with a sufficient margin, and an excessive pre-load should not be applied.

End Pieces:

End pieces are attached to each end of the rail to prevent removal of the cage. Do not use them as a mechanical stopper.

Careful Handling:

Dropping a Gonio slide way may result in scratches or dents on the raceway surfaces, preventing smooth motion and affecting accuracy. Care should be exercised in handling.

Use as a Set:

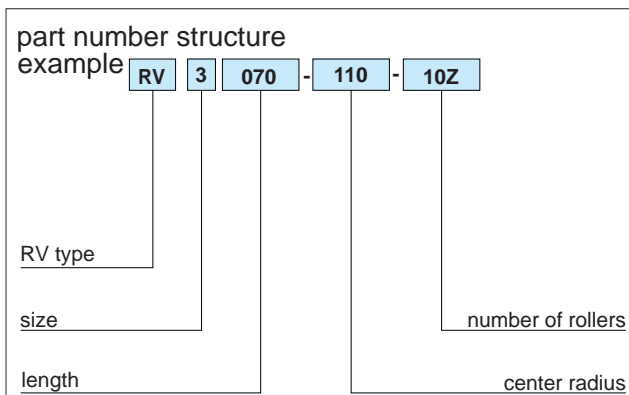
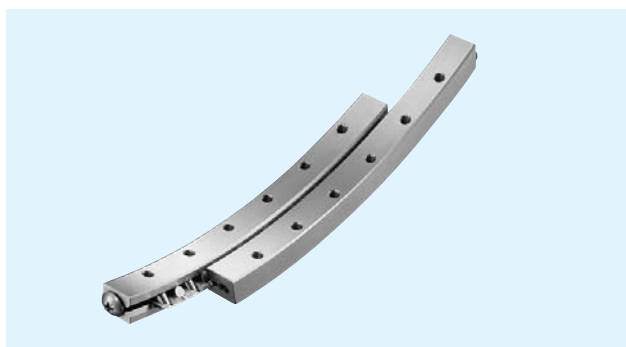
The accuracy tolerance of a Gonio slide way is designed to be adjusted within a particular set of components. If components from different sets are used, the accuracy may be affected.

Allowable Load

The allowable load is a load under which the sum of elastic deformation of the rolling element and the raceway in the contact area subject to the maximum contact stress is small enough to guarantee smooth rolling movement. Where very smooth and highly accurate liner motion is required, make sure to use the product within the allowable load values.

RV TYPE

— Gonio Way —

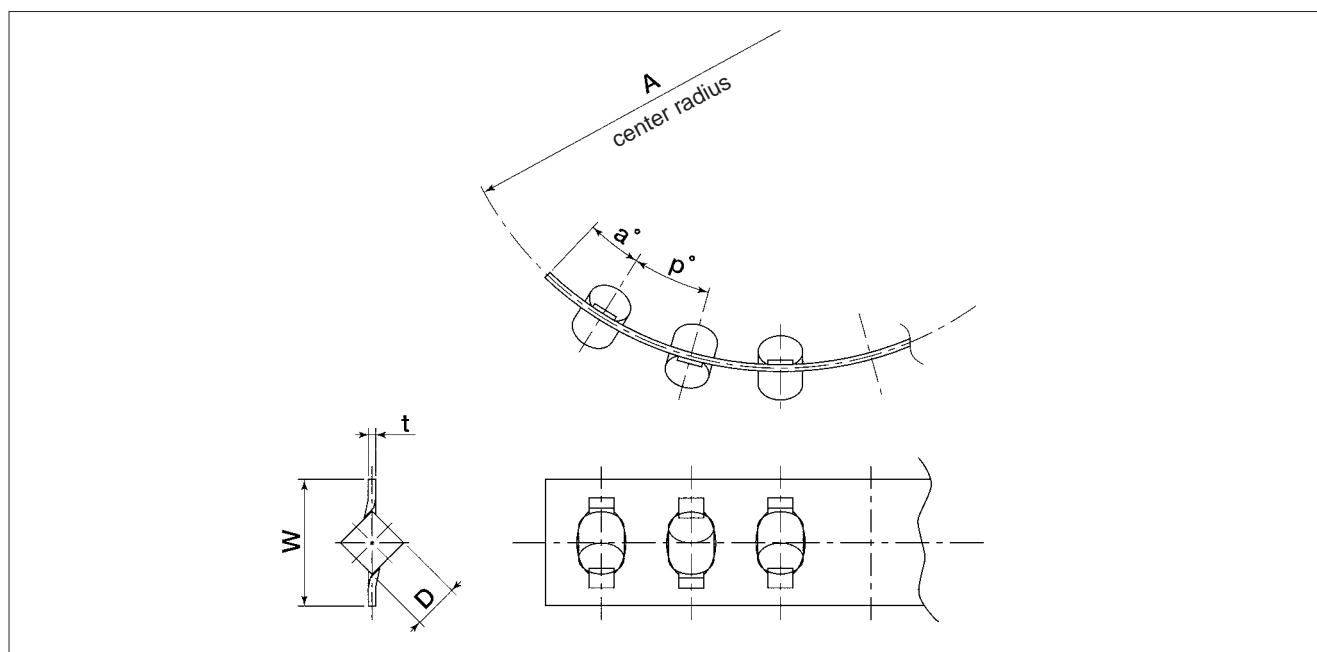
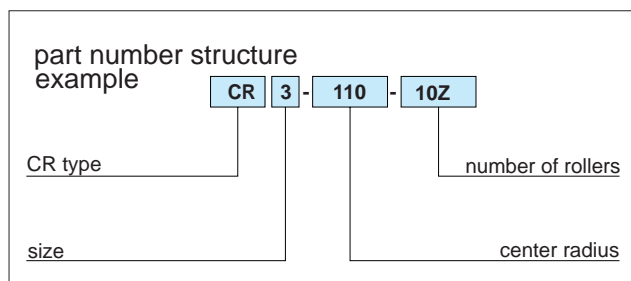
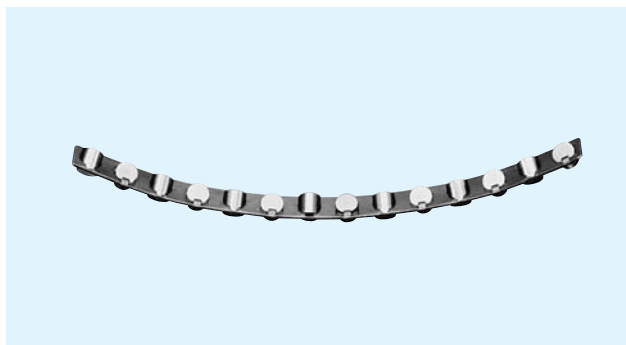


part number	rotation range	roller diameter D mm	No. of rollers Z	major dimensions						
				L mm	R mm	R ₁ mm	R ₂ mm	A mm	B mm	C mm
RV2040- 50- 7Z	±10°	2	7	40	50	53	47	15	6	7.25
RV2060- 60-12Z			12	60	60	63	57			
RV3070- 90-11Z	±10°	3	11	70	90	94	86	18	8	8.5
RV3070-110-10Z			10	70	110	114	106			
RV3100-160-14Z			14	100	160	164	156			

CR TYPE

(Standard Curved Roller Cage)

— CR2/CR3 —



part number	roller diameter D mm	center radius A mm	t mm	w mm	p	a	
CR2- 50- 7Z	2	50	0.3	5.6	4.6°	2.9°	RV type
CR2- 60-12Z		60			3.8°	2.4°	RV type
CR2- 70-10Z		70			3.3°	2.0°	RVF type
CR2- 87-10Z		87			2.6°	1.6°	RVF type
CR2- 103-10Z		103			2.2°	1.4°	RVF type
CR2- 120- 9Z		120			1.9°	1.2°	RVF type
CR3- 85-10Z	3	85	0.4	7.2	3.4°	2.9°	RVF type
CR3- 90-11Z		90			3.2°	1.9°	RV type
CR3-110-10Z		110			2.6°	1.5°	RV type,RVF type
CR3-125-16Z		125			2.3°	1.3°	RVF type
CR3-160-14Z		160			1.8°	1.1°	RV type,RVF type