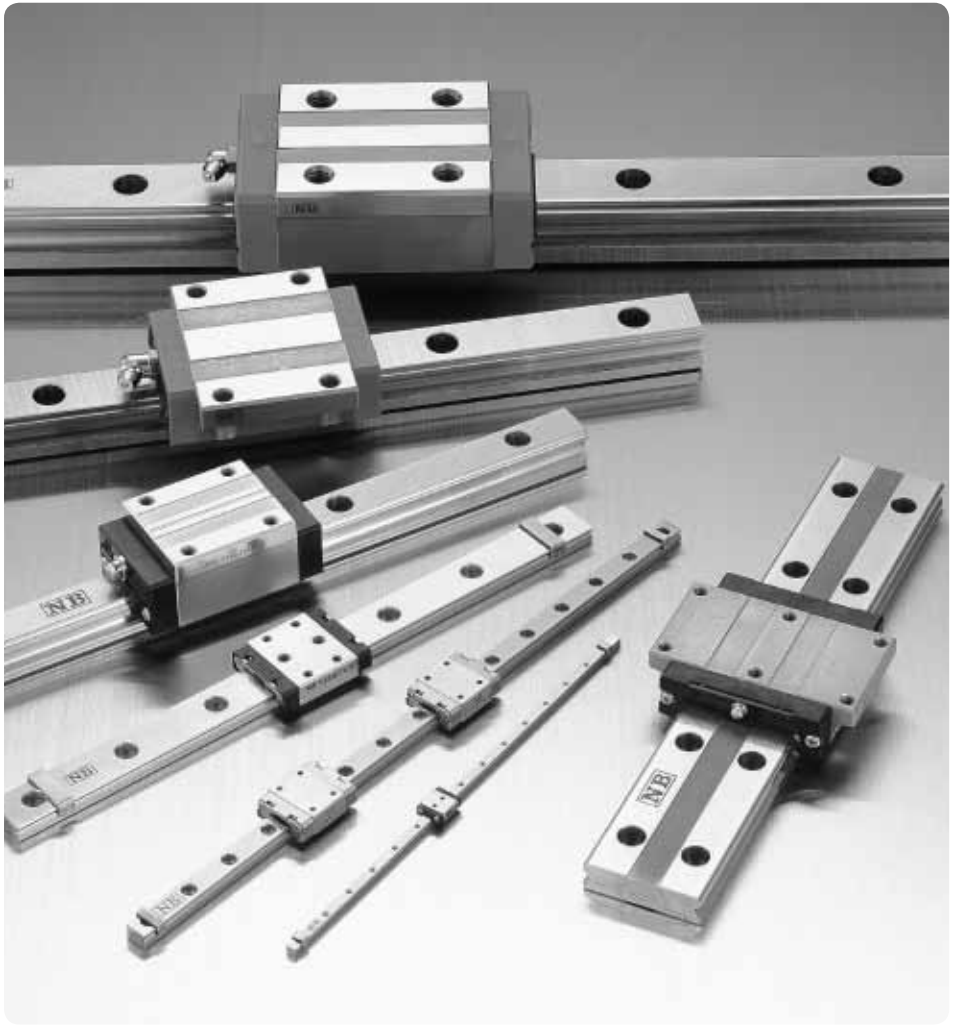
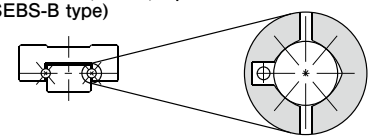
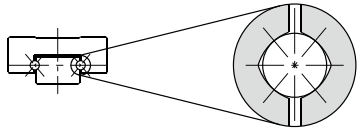
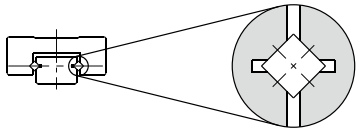
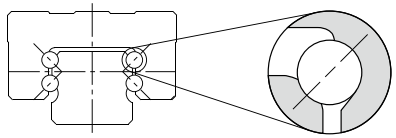
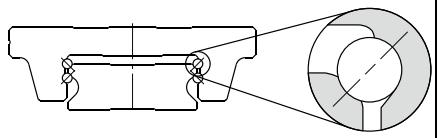
SLIDE GUIDE

NB slide guides are high-precision and high-rigidity linear bearings designed to utilize the motion of rolling elements. They have numerous advantageous characteristics including low friction, no stick-slip, and smooth linear motion even under high load conditions. Since they can maintain their high-efficiency and high-functionality characteristics for an extended period of time, they meet a wide range of needs, from general industrial to precision machinery.



TYPES

Table A-1 Types

	rolling element	cross section and contact structure	advantages	page
miniature type	ball	retained ball, 2-row, 4-point contact (SEBS-B type) 	● retained ball type ● available with all stainless steel components ● 2-row, compact ● small, light, cost effective	P.A-20
	ball	2-row, 4-point contact (SEB-A type) 	● 2-row, compact ● small, light, cost effective ● available in various types ● available in stainless steel	P.A-20
	roller	cross roller (SER type) 	● miniature roller guide ● cross roller, high precision ● available with all stainless steel components	P.A-42
high-rigidity type	ball	4-row, 2-point contact (SGL type) 	● high self-centering characteristics ● high load capacity due to relatively large ball elements ● high dust preventive control with side-seals and under-seals ● available in stainless steel	P.A-50
	ball	4-row, 2-point contact (SGW type) 	● high-moment resistant ● low-height design ● smooth motion due to large number of effective balls ● high dust preventive control with side-seals and under-seals	P.A-72

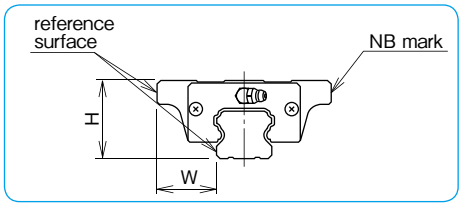
ACCURACY MEASUREMENT METHOD

The accuracy of slide guides is measured by fixing the rail to the reference base. The accuracy is expressed in terms of the average value at the center portion.

Dimensional Tolerance and Paired Difference

The accuracy of the slide guide is obtained by measuring the height H, and width W, as shown in Figure A-1. The dimensional tolerance is measured for each of the blocks attached to the rail and is expressed in terms of the deviation from the basic dimension. The paired difference is obtained by measuring the blocks attached to the rail and is expressed in terms of the difference between the maximum and minimum values.

Figure A-1 Accuracy Measurement

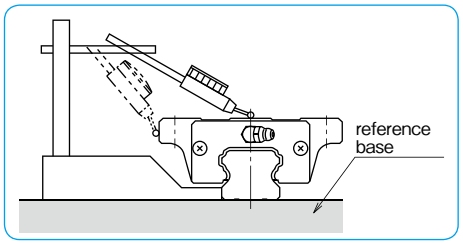


Motion Accuracy

The rail is first fixed to the reference base. The motion accuracy is obtained by measuring the difference in the indicator readings when the block is moved along the entire span of the rail.

Note: Gauge head is placed on the center of the block reference surface.

Figure A-2 Measurement Method for Motion Accuracy



Notation for Number of Axes and Paired Difference

When more than one rail is used in parallel, the dimensional difference must be measured on more than one block on more than one rail. For measuring the paired difference for height H, please specify the number of axes (W2, W3) as the part number example shows. For measuring the paired difference for width W, please contact NB.

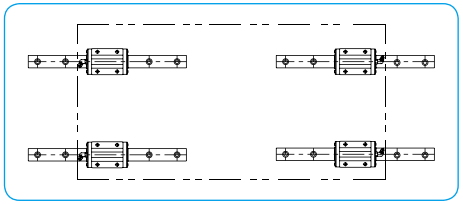
Note : When four rails are used as illustrated in Figure A-3, W4 should be specified in the part number. Please indicate the number of axes when ordering.

part number example

SGL25TF2-350/W2

symbol for number of axes
W2: 2 parallel axes
W3: 3 parallel axes

Figure A-3 4 Parallel Axes



RIGIDITY AND PRELOAD

The rolling elements of the slide guide deform elastically due to the applied load. The amount of deformation depends on the type of rolling element. It is proportional to the 2/3rd power for ball elements. For rollers, it is proportional to the 0.9th power. In either case, the rate of deformation decreases as the applied load increases. Greater rigidity is achieved by applying a preload.

A preload causes internal stress within the slide guide block, resulting in some reduction in lifetime. However, when the guide is used under shock or vibration loading conditions, a preload will absorb the load and will actually help lengthen the life time. Because the preload causes elastic deformation of the rolling elements, it becomes less tolerable to the installation dimensional errors. Extreme care should be exercised in machining the installation surface.

Four levels of preload are available: clearance, standard, light, and medium. This allows the user to select the appropriate level for the application.

Figure A-4 Elastic Deformation of Rolling Elements

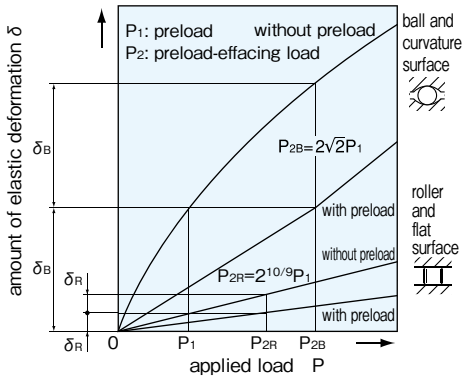


Table A-2 Level of Preload

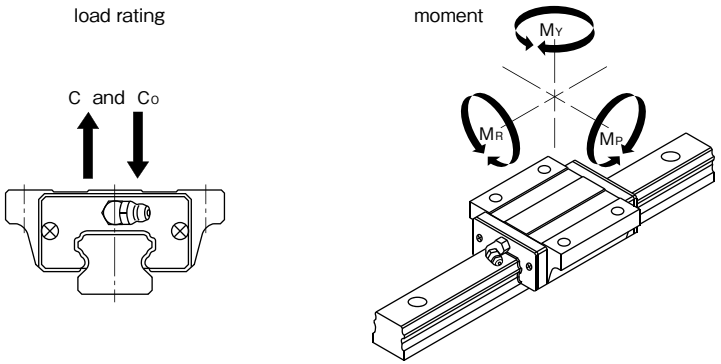
preload	symbol	effect of preload: vibration absorption ability	self-aligning ability	lifetime	rigidity	frictional resistance	operating conditions	applicable part number
clearance	T0						light motion is required. installation errors to be absorbed.	SEB
standard	blank						minute vibration is applied. accurate motion is required. moment is applied in a given direction.	SEB,SGL SGW
light	T1						light vibration is applied. light torsional load is applied. moment is applied.	SEB,SGL SGW
medium	T2	increases	reduces	reduces	increases	increases	shock and vibration are applied. over-hang load is applied. torsional load is applied.	SGL,SGW

LOAD RATING AND RATED LIFE

Loading Direction and Load Rating

A slide guide experiences load and moment, as shown in Figure A-5. For each load and moment, the basic load ratings and allowable static moments are defined.

Figure A-5 Direction of Load



Rated Life Calculation

Two types of rolling elements are used in NB slide guides: ball and roller elements. There is a different equation for calculating the rated life of each type.

For ball elements
(SEB, SGL, and SGW types), the equation is

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

For roller elements
(SER type), the equation is

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

L: rated life (km) f_C: contact coefficient
f_T: temperature coefficient f_W: applied load coefficient
C: basic dynamic load rating (N) P: applied load (N)
※ Refer to page Eng-5 for the coefficients.
※ The contact coefficient is applied when two or more blocks are used in close contact.

If the stroke length and cycles are constant, life can be expressed in terms of time, the equation is

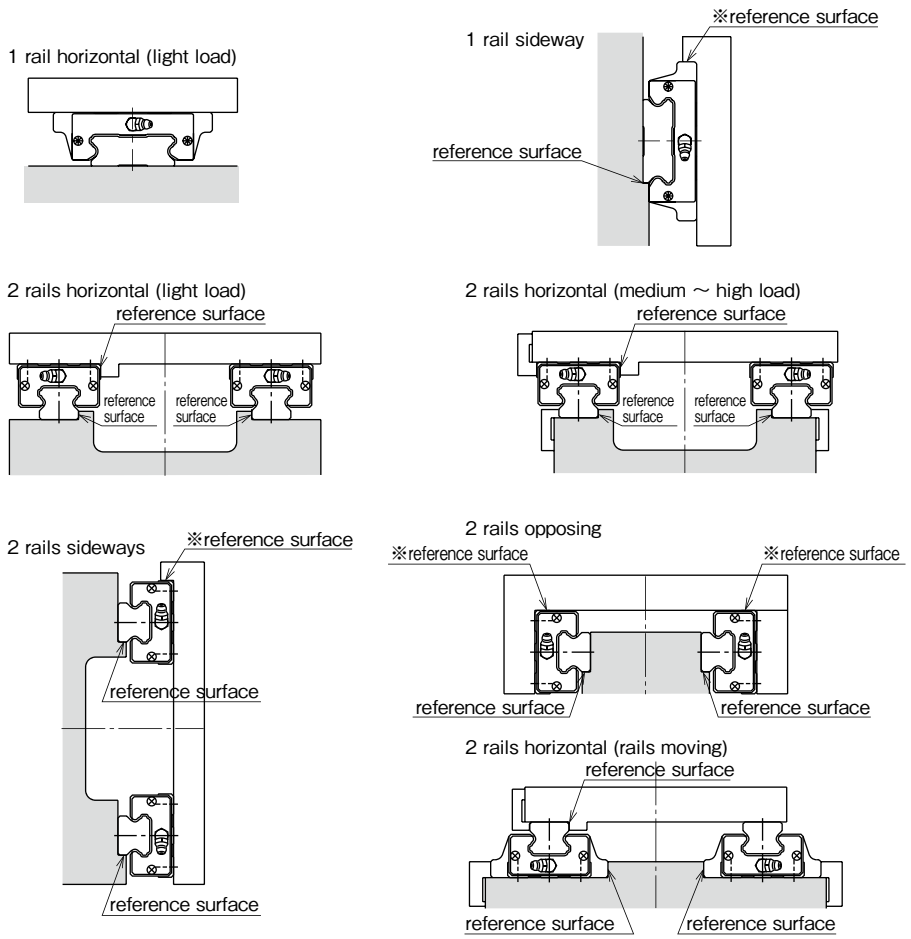
$$L_h=\frac{L \cdot 10^3}{2 \cdot \ell_S \cdot n_1 \cdot 60}$$

L_h: life time (hr) ℓ_S: stroke length (m)
L: rated life (km) n_1: number of cycles per minute (cpm)

MOUNTING

Slide guides have high load ratings in spite of their compact size. They can be used in various types of machinery and other equipment in various configurations. Figure A-6 shows some typical slide guide arrangements.

Figure A-6 Slide Guide Arrangements



Refer to the next page for the surface indicated by "※".

Mounting Surface and Accuracy

NB slide guides are designed and fabricated to achieve high accuracy after mounting them to a machined mounting base. One typical way is to provide a shoulder on the mounting surface and align the reference surface of the rail or block against the shoulder (Figure A-7). To avoid corner interference, an undercut should be provided at the shoulder corner. Alternatively, the radius of the shoulder corner should be smaller than the radius of the slide guide block/rail corner.

The accuracy of the rail mounting surface affects the accuracy of the machinery or equipment along with the slide guide motion accuracy.

The accuracy of the mounting surface should be equivalent to that of the slide guide motion accuracy. The specified preload may not be achieved due to deformation of the block, for example, the mounted block surface is not flat (Figure A-8). Careful attention should therefore be given to achieve the specified flatness.

Note: Please contact NB for the rail straightness in case the mounting shoulder cannot be provided or the rigidity of the mounting surface is not enough.

Figure A-7 Profile of Mounting Reference Surface

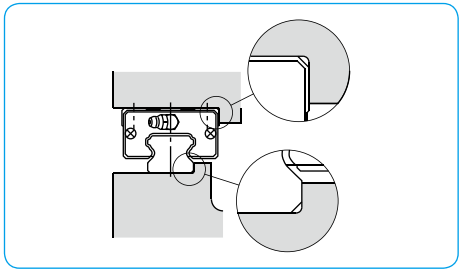
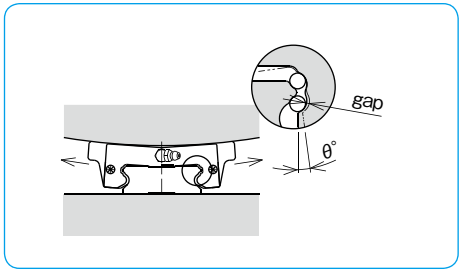


Figure A-8 Effect of Flatness

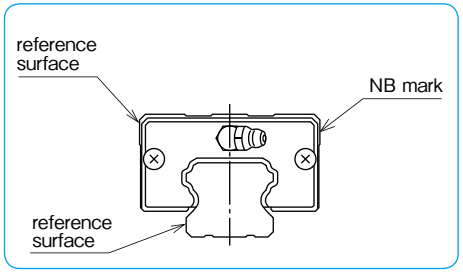


Reference Surface Indication

Reference surfaces are provided to enable accurate and simplified mounting. They are located on the same side, as shown in Figure A-9, opposite to the NB mark.

Depending on the mounting arrangement, the standard reference surface may not ensure mounting accuracy (for example, 1 rail sideway or 2 rails opposing, Figure A-6, page A-7). In such cases, NB can provide a reference surface on the opposite side. Please specify the side when ordering.

Figure A-9 Reference Surface



Mounting

In general, slide guides are used with 2 rails in parallel. In that case, one rail is on the so-called reference side and the other is on the so-called adjustable side.

- Applications where shock/vibration and high load are involved/high accuracy is required. The effect of shock and vibration on accuracy is eliminated by using side pieces such as side plates (Figure A-10), tightening set screws (Figure A-11), or tapered gibs (Figure A-12).

Figure A-11 Using Tightening Set Screw

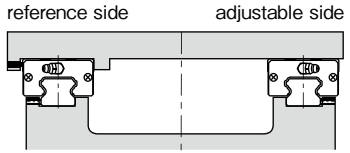
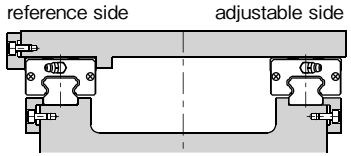
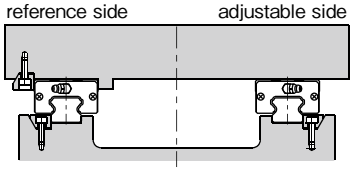


Figure A-10 Using Side Plate



Provide an undercut in the side plate, and fix the table and rail from the side.

Figure A-12 Using Tapered Gib



- Applications where light load and low speed are involved.
  Figures A-13~15 show the mounting methods when high accuracy is not required or the load capacity of the slide guide is sufficient due to a light load or low speed. In these cases, side pieces or reference surface may not be required.

Figure A-14 No Reference Surface on Adjustable Side

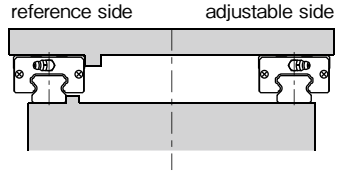


Figure A-13 Without Side Piece

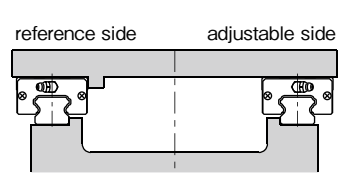
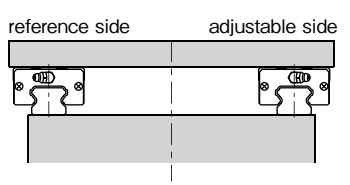


Figure A-15 Without Reference Surface



Mounting Procedure

When reference surfaces are provided for both the table and the base, please follow the following procedure to mount the slide guide.

1. Remove burrs, scratches, dust, etc. from the base and table. Apply a low viscosity oil to the base and the table. Place the slide guide on the base carefully. Temporarily fix the rail mounting screws. (Figure A-16a)

2. Tighten the screw for the side piece so that the installation reference surface and the rail reference surface are in close contact. (Figure A-16b) If a side piece is not provided, use a C clamp to position the mounting reference surface and the rail reference surface so that they contact each other. (Figure A-16d)

3. Tighten the mounting screws to the specified torque, and complete the mounting of the rail. The rail is designed so that its accuracy is optimum when the screws are tightened to the specified value. Please refer to the recommended torque table for each product type. (Figure A-16c)

4. Repeat steps 2 and 3 for the rail on the adjustable side.

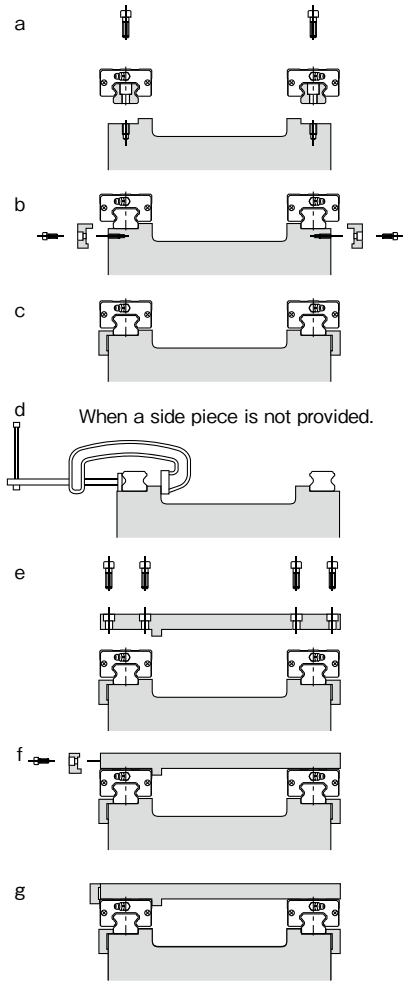
5. Move the blocks at the mounting location of the table, and place the table gently. Then slightly tighten the screws. (Figure A-16e)

6. Fix the reference surface of the block against the table by the side piece. Tighten the mounting screws in a diagonal sequence. (Figure A-16f)

7. In the same manner, tighten the mounting screws for the blocks on the adjustable side. (Figure A-16g)

8. Finally, move the table through the stroke length to check if thrust is even. Please repeat 5 and 6 (2 to 6 when necessary) if thrust is not even. If thrust is even, please do final tightening of the screws.

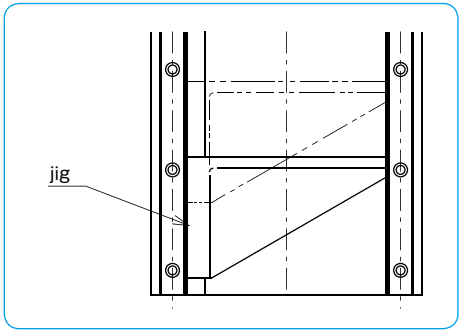
Figure A-16 Mounting Method



When Reference Surface is Not Provided on Adjustable Side

When a reference surface is not provided on the adjustable side, mount the 2 rails in parallel by using a jig, as mounted in Figure A-17. After mounting the reference-side guide, install the adjustable-side guide by moving the table to achieve parallelism.

Figure A-17 Using a Jig



When Reference Surface is Not Provided on Reference Side

When a reference surface is not provided on the reference side, mount the 2 rails by using a reference surface close to the slide guide.
Temporarily fix the slide guide to the base, and mount an indicator on a measurement plate. Please fix the measurement plate on two or more blocks. (Figure A-18)
Place the indicator against the reference surface of the base. Tighten the screws from one end of the rail to ensure straightness.
If there is no reference surface close-by, use a straight edge to achieve straightness. (Figure A-19)

Figure A-18 Using Base Reference Surface

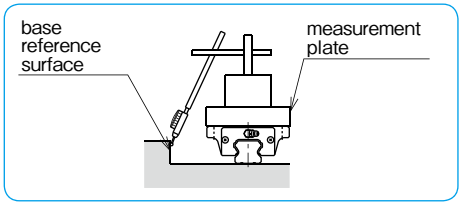
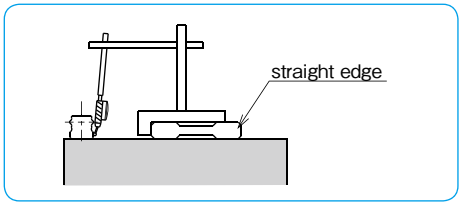


Figure A-19 Using a Straight Edge

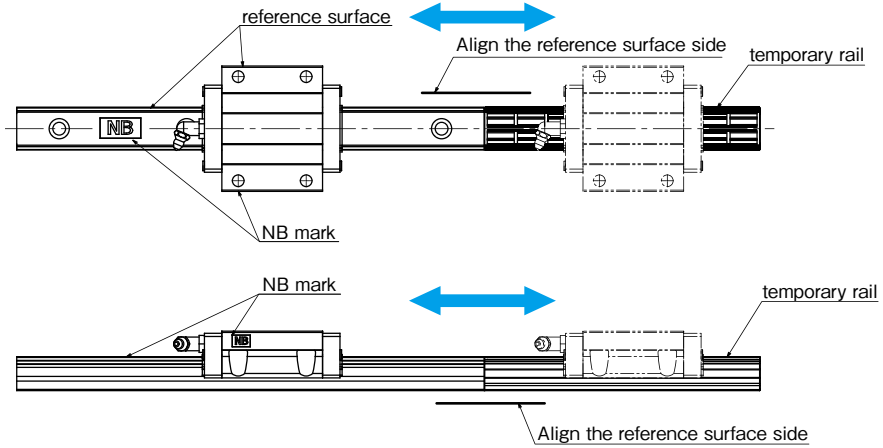


NOTES ON HANDLING AND USE

NB Slide Guides are accurately tuned precision components. Please pay special attention to the following notes.

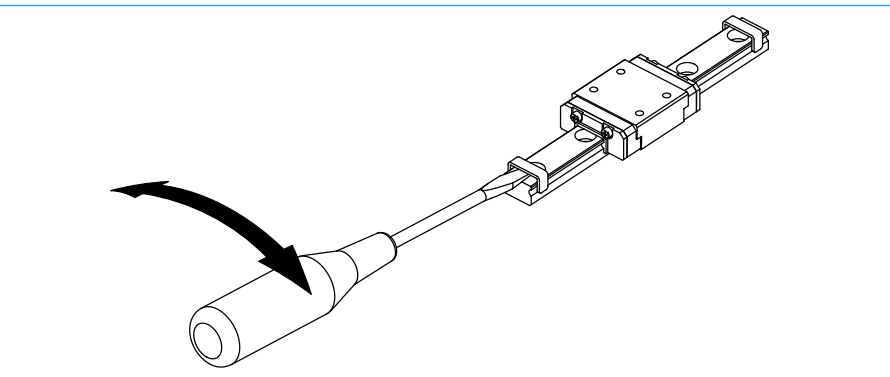
- Please install the Slide Guide as a set. It is not recommended to remove the block for installation.
- When block removal is necessary, please use a temporary (plastic dummy) rail to prevent balls from dropping out.
- To put a guide block on the rail, as the pictures below show, align the reference surface and the height between the rail and a temporary rail. It is very important to maintain the original combination of block(s) and rail.

Figure A-20 How to Put Guide Block on



- Please do not turn around a block on the rail to change the grease-fitting orientation. Relocate fitting to the opposite end by removing red plug, and re-insert red plug to where fitting was originally.
- Never try to disassemble the block. This will most assuredly void warranty of the product.
- Please remove burrs, dust, or any other debris from the base and table before installation.
- Slide Guides are pre-lubricated for immediate use. Please relubricate with a similar type of grease regularly. Special lubricants must be matched with the same type of grease to prevent contamination.
- The SEB(S) and SER(S) Slide Guides have metal clip stoppers (picture below) to avoid a block fall-out during shipment and assembly. Please remove the stoppers only after installation is finished with a screwdriver as these clips should not be used as 'mechanical' stoppers.

Figure A-21 How to Take Off Metal Clip

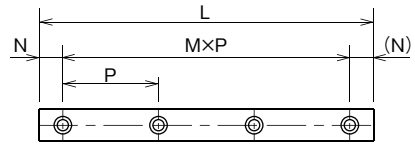


RAIL LENGTH

Guide Rail Length

Please refer to the maximum rail length for each type and size on the dimension table. Unless otherwise specified, the distance from one end of the rail to the first hole center (referred to as dimension "N") is within the range specified in the N dimension tables, satisfying the following equation. Please specify the N dimensions when out of the range.

Figure A-22 Rail



$$L=M\cdot P+2N$$

L: length (mm) P: hole pitch (mm)
N: distance from the end of the rail to the first hole center (mm)
M: number of pitches.

JOINT RAILS

Rails can be joined together to obtain a length which exceeds the maximum length. There are two ways to do this.

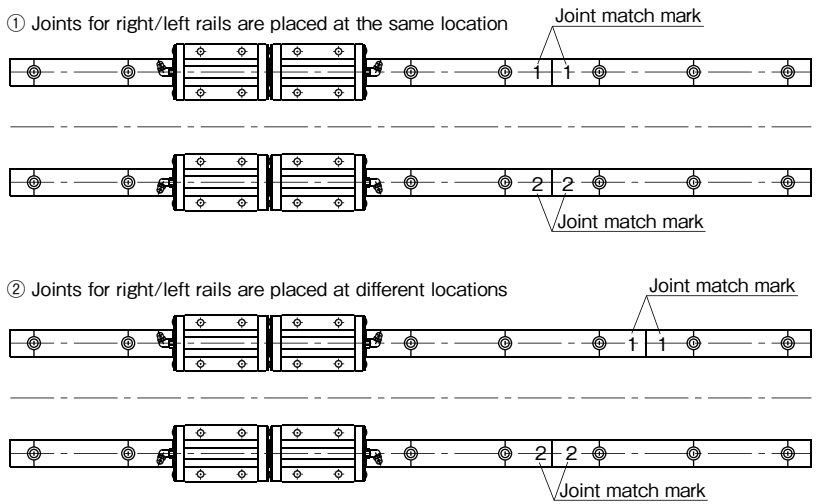
- Place the joints at the same location for the right and left rails so as to make the design and maintenance simple (Figure A-23 ①).
- Place the joints for the right and left rails at different locations so that the block does not move over the two joints at the same time so as to minimize the effect of the joint on accuracy (Figure A-23 ②).

Please keep the following points in mind when using joint rails.

- To avoid dislocation at joints due to shock loading, provide a shoulder at the joint on the installation side.
- If a shoulder cannot be provided, make sure that any excess load does not change the rail position.
- Use the joint marks provided for installation.
- Tightly butt the rails to be joined so that there is no gap between them.
- Make sure the reference surface side of the joint rails to be aligned.

Note: Joined rails are available for SGL and SGW series with standard grade, high grade, and with standard preload. For joined rails on SEB series, please contact NB. Joined rails are not available for SER series.

Figure A-23 Examples of Joined Guide Rails



DUST PREVENTION

Seals

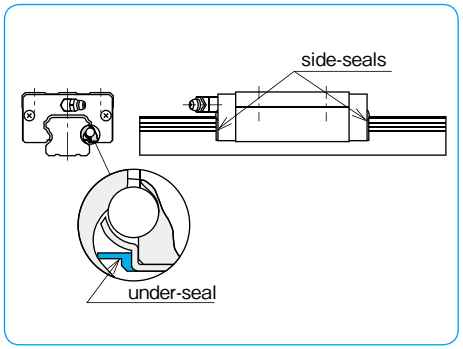
Side-Seal (Series: SEB, SER, SGL, and SGW)

The side-seals prevent foreign particles and dust from entering the guide block in order to retain the motion accuracy, resulting in a long life time.

Under-Seal (Series: SGL and SGW)

Slide guides with side and under-seals are used in harsh environments or to prevent dust entering from below.

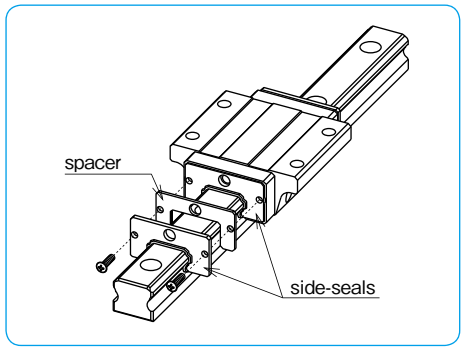
Figure A-24 Side-Seal and Under-Seal



Double Side-Seal Option (Series: SGL)

With this option, the prevention against dust is greatly improved. Ideal for use in applications where bellows or covers are not able to be fitted over the slide guide system.

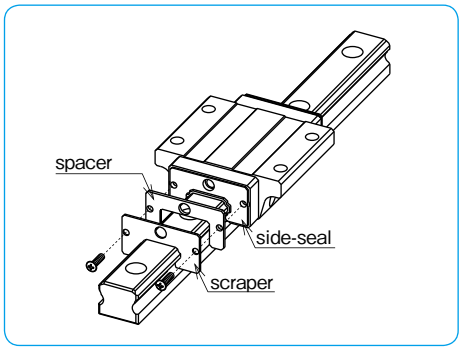
Figure A-25 Double Side-Seal



Scraper Option (Series: SGL)

When the application environment has unfavorable foreign matter or debris such as welding splatter or cutting debris, the scraper option provides an effective protective measure for the slide guide system.

Figure A-26 Scraper



No Side-Seal (Series: SEB and SER)

When the presence of dust or debris is extremely low and only minor motion resistance is desired, a no side-seal option is available. Be aware that, with this option, dust prevention can not be expected.

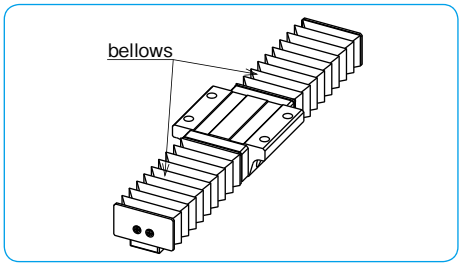
Double Side-Seal + Scraper Option (Series: SGL)

Double side-seal plus scraper is also optional.
Please contact NB for details.

Bellows Option (Series: SGL)

This option fully covers the guide rail preventing dust, debris, and other foreign particles from disrupting the smooth linear motion. (Refer to page A-18 for further details)

Figure A-27 Bellows



Special Cap

For SGL and SGW guides, special rail mounting caps are available to prevent dust from entering the mounting holes.
These caps are installed, after the rail is fixed to the base, by using a jig and slowly inserting them into the holes until their top surface is flush with the rail surface.

Figure A-28 Special Cap

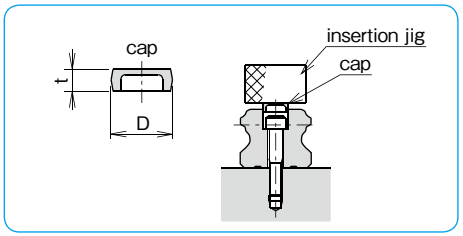


Table A-3 Special Cap

part number	dimensions D mm	dimensions t mm	applicable part number SGL-F,E, TF,TE	applicable part number SGL-HTF,HYF HTE,HYE,HTEX	applicable part number SGW
F 3	6.1	1.3	15	–	–
F 4	7.6	1.1	15D	15	17,21,27
F 5	9.7	2.5	20	20	–
F 6	11.2	2.7	25,30	25	35
F 8	14.3	3.65	35	30,35	–
F12	20.3	4.65	–	45	–

ANTI-CORROSION

For anti-corrosion, the SEB/SER series and SGL-F/TF types are available in stainless steel material. Low temperature black chrome treatment can be specified for the SGL and SGW series. This treatment (LB) is suitable for applications where corrosion resistance is a requirement.

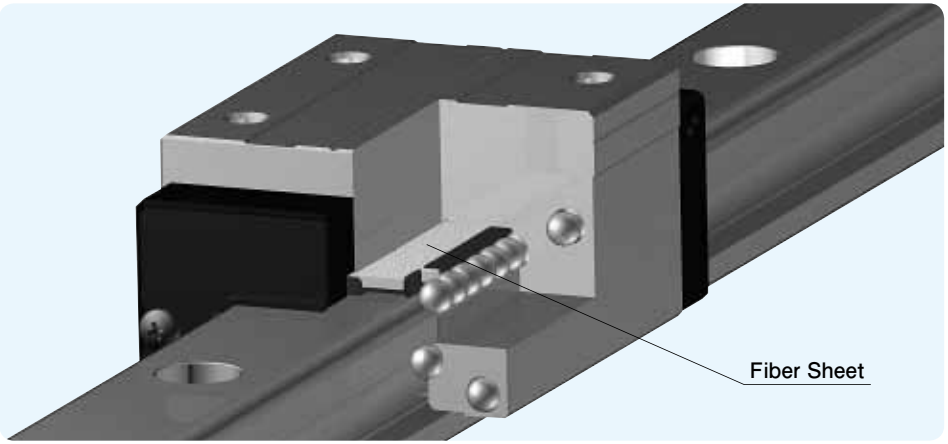
LUBRICATION

Lithium soap based grease is applied to NB slide guides prior to shipment for immediate use. Please relubricate with a similar type of grease periodically depending on the operating conditions.
The **Fiber Sheet** and Reverse-Seal are available which significantly extends relubrication period (refer to page A-16, A-17).
For use in clean rooms or vacuum environments, slide guides without grease or slide guides with customer specified grease are also available. Please contact NB.
NB also provides low dust generation grease. Please refer to page Eng-39 for details.

FIBER SHEET

The Fiber Sheet for the SGL and SGW types, significantly extends lubricant replenishment intervals and has an excellent durability even under harsh conditions with dust and debris that absorb lubricant. Embedded in a block body, as shown in Figure A-29, it does not change the length of the block. In addition, the Fiber Sheet does not require any change in mounting dimensions, which allows replacement with existing products without a design change.

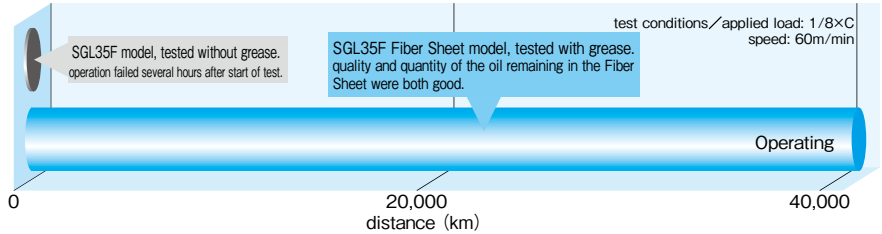
Figure A-29 Magnified View of the Fiber Sheet



Simplified Lubrication Management

NB's Fiber Sheet is a fiber material with a porous structure containing the lubricant oil. The oil is supplied to the ball elements at the proper time and with the proper amount by the principle of capillarity, greatly increasing the relubrication period.

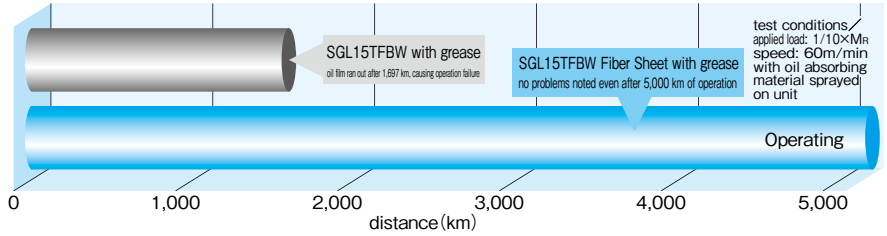
Figure A-30 Durability Test



Outstanding Durability Even Under Poor Operating Conditions

An acceleration test was performed with oil absorbing material sprayed on the units to validate the SGL type's lubrication performance and durability even under poor operating conditions.

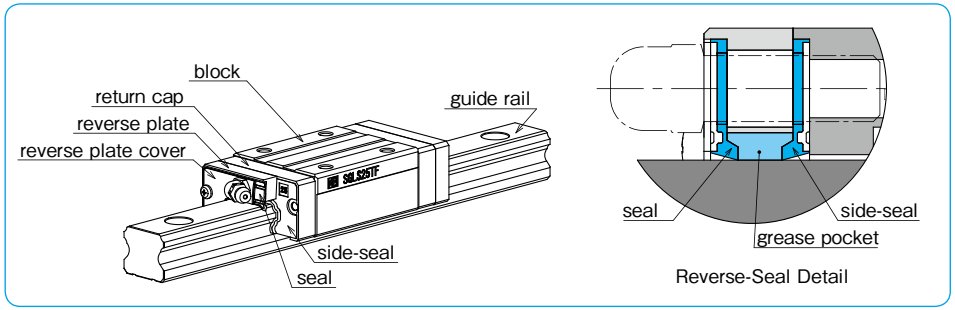
Figure A-31 Lubrication Acceleration Test



REVERSE-SEAL

NB's Reverse-Seal is a seal unit that consists of revserse plate, seal, and cover.
This seal unit has another side-seal in the reverse orientation to the block, which achieves maintenance free by reducing grease loss.

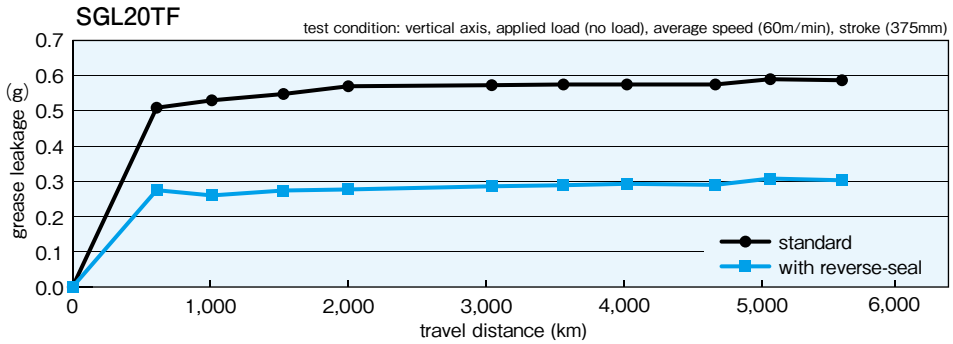
Figure A-32 Reverse-Seal



Reducing Grease Leakage

The space between two seals holds grease to minimize a grease leakage from the block.

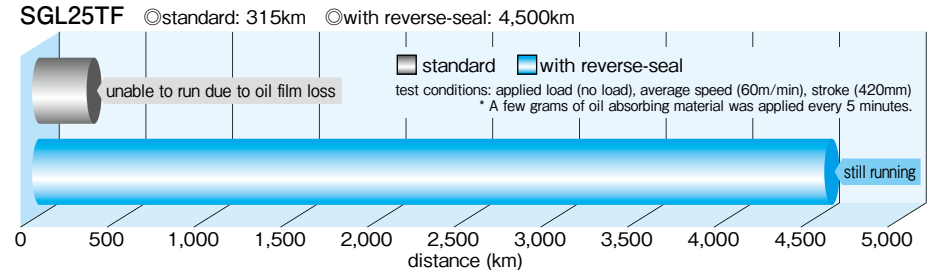
Figure A-33 Grease-leak Test Data



Maintenance Free

Reverse-seal makes a "Grease Pocket" between two seals that realizes maintenance free by reducing grease leakage and loss.

Figure A-34 Grease Dry-up Test Data



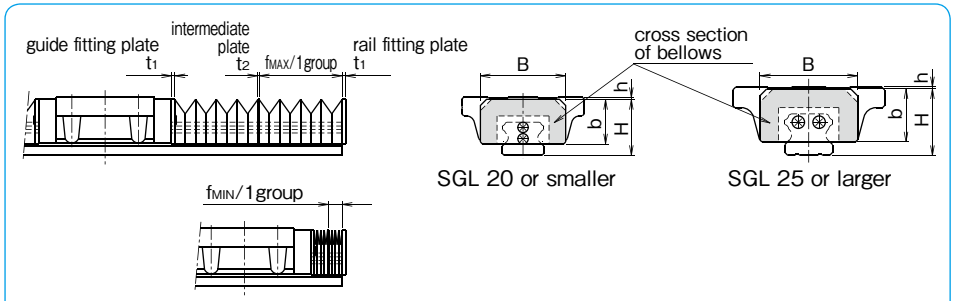
Applicable Part Number

Reverse-Seal (BR option) is available on SGL15,20, and 25.

BELLOWS

By protecting the entire length of the guide rail, the dust prevention is greatly enhanced.
Please refer to Figure A-35 for dimensions. External dimensions and the stroke length of slide guide will change with use of bellows.

Figure A-35 Dimensions of Slide Guide with Bellows



Note: Please do not unfasten the guide fitting plate screws. The slide guide becomes unfunctional if the guide fitting plate is removed.

part number	B	H	h	b	t1	t2	fMAX/1group	fMIN/1group
SGL15F/TF/E/TE	33	23	1	19	1.5	1.0	32	6.5
SGL15HTE/HYE/HTEX								
SGL15HTF/HYF			5					
SGL20F/TF/E/TE	41	27	1	21.5			40	
SGL20HTF/HYF/HTE/HYE/HTEX			3					
SGL25F/TF/E/TE	47	32	1	25.5			44	
SGL25HTF/HYF			8					
SGL25HTE/HYE/HTEX			4					
SGL30F/TF/E/TE	58	40	2	31			56	
SGL30HTE/HYE/HTEX								
SGL30HTF/HYF			5					
SGL35F/TF/E/TE	68	46	2	37			68	
SGL35HTE/HYE/HTEX								
SGL35HTF/HYF			9					
SGL45HTE/HYE/HTEX	84	59	1	50	2.0		72	
SGL45HTF/HYF			11					

Note: 1 group indicates the minimum unit of bellows. Please specify the required stroke length.
When bellows are fitted to the guide block, the grease fitting cannot be installed.
The allowable temperature is up to 60℃ if the system has a bellows option.
Please contact NB for details on the installation of bellows, as well as for special application usage.

Calculation Method of Length of Bellows and Slide Guide Rail

Example: In this case, one(1) piece of SGL15TE guide block is mounted on a rail with bellows; the required stroke is 440mm.

Number of groups required for a stroke of 440mm is calculated as follows.

$$\frac{\text{Stroke}}{f_{MAX}-f_{MIN}}=\frac{440}{32-6.5}=17.2\fallingdotseq 18 \text{ groups (round up)}$$

When 18 groups of bellows are fitted, the maximum length f_1 is calculated:

f_1 =guide fitting plate+1group f_{MAX}×number of groups+Intermediate plate× (number of groups−1)
=1.5+32×18+1.0× (18−1) =594.5

When 18 groups of bellows are fitted, the minimum length f_2 is calculated:

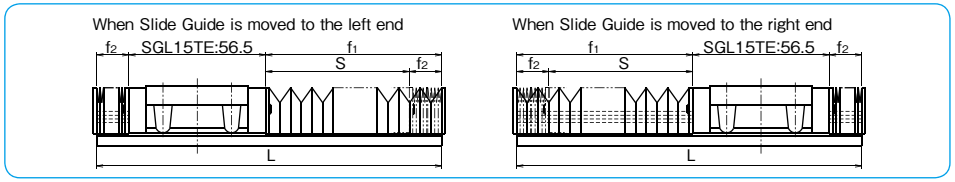
f_2=guide fitting plate+1group f_{MIN}× number of groups+intermediate plate× (number of groups−1)
=1.5+6.5×18+1.0× (18−1) =135.5

With these calculation results, stroke limit (S) and length of the guide rail needed (L) are obtained as follows:

S= f_1− f_2=594.5−135.5=459

L= f_1+ f_2+SGL15TE block=594.5+135.5+56.5=786.5≒787 (round up)

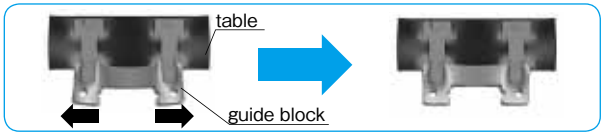
Figure A-36 External Diagram of Slide Guide with Bellows Attached



SEB TYPE AD PROFILE (Anti-Deforming)

The AD profile guide block can dissipate possible deformation by improved installation plane profile.

Figure A-37 SEB type AD profile



Note:

When NB's unique AD Profile type miniature guide block is selected, the following precautions should be taken into consideration to perform to its utmost advantage.

- To obtain maximum AD (Anti-Deforming) effect, flatness of the mounting surface should be finished the same as motion accuracy of the slide guide.
- When the table is designed with one guide block on one guide rail, the utmost AD effect is anticipated.
- All screws on the slide guide block should be tightened to the equal torque value.
- The AD profile type guide block is available only with standard preload.
- AD profile type guide blocks are available only with following part numbers of slide guide block.

Applicable Part Number

Table A-4 AD profile Applicable Part Number

part number			
SEBS 7B SEBS 7BY	SEBS 7BM SEBS 7BYM	—	SEBS 7A SEBS 7AY
SEBS 9B SEBS 9BY	SEBS 9BM SEBS 9BYM	SEB 9A SEB 9AY	SEBS 9A SEBS 9AY
SEBS12B SEBS12BY	SEBS12BM SEBS12BYM	SEB12A SEB12AY	SEBS12A SEBS12AY
SEBS15B SEBS15BY	SEBS15BM SEBS15BYM	SEB15A SEB15AY	SEBS15A SEBS15AY
SEBS20B SEBS20BY	SEBS20BM SEBS20BYM	SEB20A SEB20AY	SEBS20A SEBS20AY

part number structure

SEBS 15B UU 2-589 N P AD

AD profile

※Please contact NB for details.

SLIDE GUIDE SGW Type

The NB slide guide SGW type is a linear motion bearing utilizing the rotational motion of ball elements along four rows of raceway grooves. Its low height and wide profile makes it suitable for single-rail applications.

STRUCTURE AND ADVANTAGES

The NB slide guide SGW type consists of a rail with four precisely machined raceway grooves and a block assembly. The block assembly consists of the main body, ball elements, retainers, and return caps.

High Load Capacity and Long Life

The raceway grooves are machined to a radius close to that of the ball elements. The larger contact area resulting in a high load capacity and a long travel life.

High Allowable Moment

Its wide profile enables it to sustain high moment loads, making it suitable for single-rail applications.

Omni-Directional Load Capacity

The ball elements are positioned at 45° contact angle so that the load capacity is equal in four directions (above, below, right and left).

Smooth Motion

The large number of effective ball elements produce a smooth rolling motion.

Anti-Corrosion Specification

The rail and block assembly can be treated with low temperature black chrome treatment to increase the corrosion resistance. This treatment is standardized with the symbol "LB", and suitable for use in clean room applications.

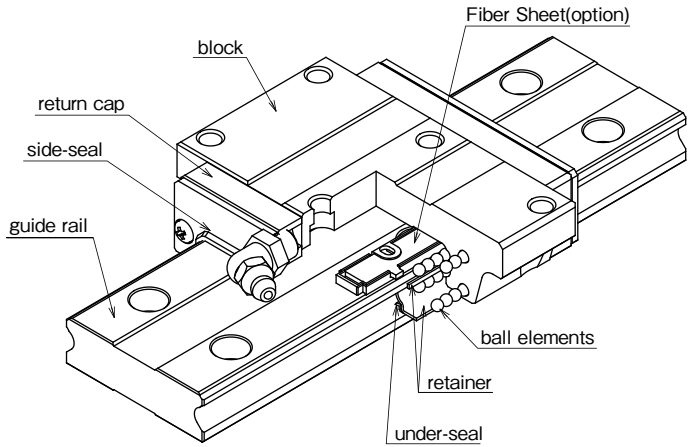
Dust Prevention

Side-seals are provided as standard. To improve the dust prevention characteristics, under-seals and rail mounting caps are also available.

Extension of Relubrication Period by Fiber Sheet

A lubricant-containing Fiber Sheet incorporated in the block supplies appropriate amount of lubricant to the raceway grooves, which significantly extends the lubricant replenishment interval. (refer to page A-16)

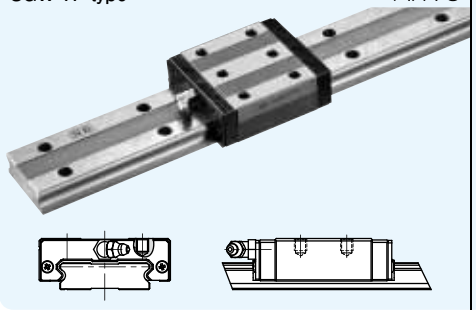
Figure A-60 Structure of SGW type Slide Guide



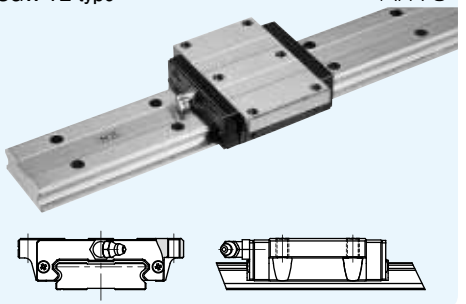
BLOCK TYPES

Two SGW block types are available depending on the mounting space and desired mounting method.

SGW-TF type P.A-76



SGW-TE type P.A-78



ACCURACY

Three accuracy grades are available: standard grade (blank), high grade (H), and precision grade (P).

Table A-29 Accuracy unit／mm

part number	SGW17,21			SGW27,35		
accuracy grade	standard	high	precision	standard	high	precision
accuracy symbol	blank	H	P	blank	H	P
allowable dimensional tolerance for height H	±0.1	±0.03	−0.03~0	±0.1	±0.04	−0.04~0
paired difference for height H	0.02	0.01	0.006	0.02	0.015	0.007
allowable dimensional tolerance for width W	±0.1	±0.03	−0.03~0	±0.1	±0.04	−0.04~0
paired difference for width W	0.02	0.01	0.006	0.03	0.015	0.007
Running parallelism of surface C to surface A Running parallelism of surface D to surface B	refer to Figure A-61,62					

Figure A-61 Motion Accuracy

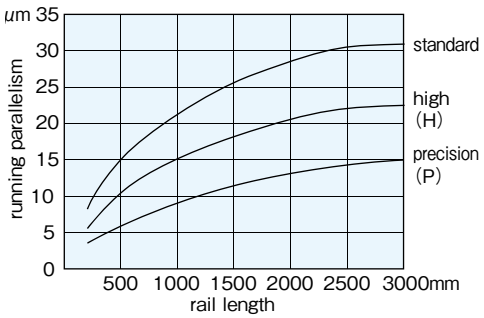
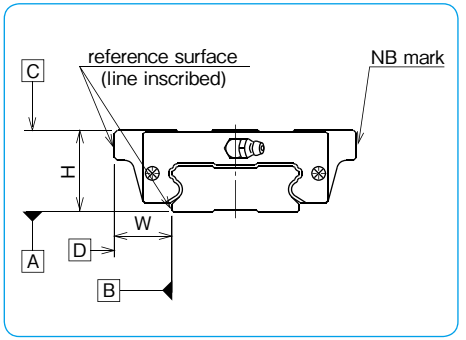


Figure A-62 Accuracy



PRELOAD

Three levels of preload are available for SGW slide guides: standard (blank), light (T1), and medium (T2).

Table A-30 Preload Call Out and Radial Clearance unit／μm

preload	standard	light	medium
symbol	blank	T1	T2
SGW17	−3～+2	− 7～−3	−
SGW21	−4～+2	− 8～−4	−
SGW27	−5～+2	−11～−5	−
SGW35	−8～+4	−18～−8	−28～−18

Table A-31 Operating Conditions and Preload

preload	symbol	operating conditions
standard	blank	minute vibration is applied. accurate motion is required. moment is applied in a given direction.
light	T1	light vibration is applied. light torsional load is applied. moment is applied.
medium	T2	shock and vibration are applied. over-hang load is applied. torsional load is applied.

RAIL LENGTH

Slide guides with most commonly used lengths are available as standard. For slide guides with a non-standard length, unless otherwise specified, the distance from one end of the rail to the first hole center (N) will be within the range listed in Table A-32, satisfying the following equation.

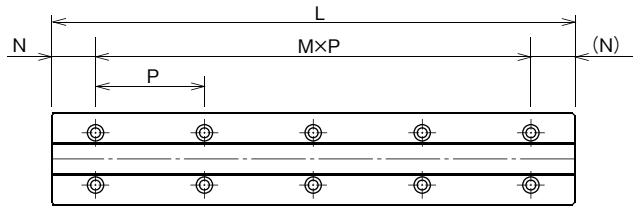
$$L=M\cdot P+2N$$

L: length (mm) M: number of pitches P: hole pitch (mm)
N: distance from the end of the rail to the first hole center (mm)

Table A-32 N Dimension unit/mm

part number	N and over	N less than	L max.
SGW17	8	28	2,000
SGW21		33	
SGW27		38	3,000
SGW35	12	52	

Figure A-63 Rail



MOUNTING

Slide guides are generally mounted by pushing the reference surface of the rail and block against the shoulder of the mounting surface. To avoid interference between the shoulder and the corner of the rail or block, the recommended dimensions are listed in Table A-34.
The screws to fasten the rail should be tightened to an equal torque using a torque wrench in order to secure the motion accuracy. The recommended torque values are given in Table A-33. Please adjust the torque depending on the operating conditions.

Figure A-64 Mounting Reference Surface Profile

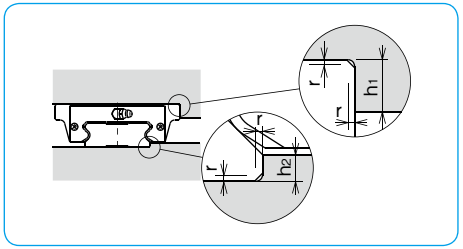


Table A-33 Recommended Torque unit／N・m

size	M4	M6
recommended torque	3.2	11.2

(for alloy steel screw)

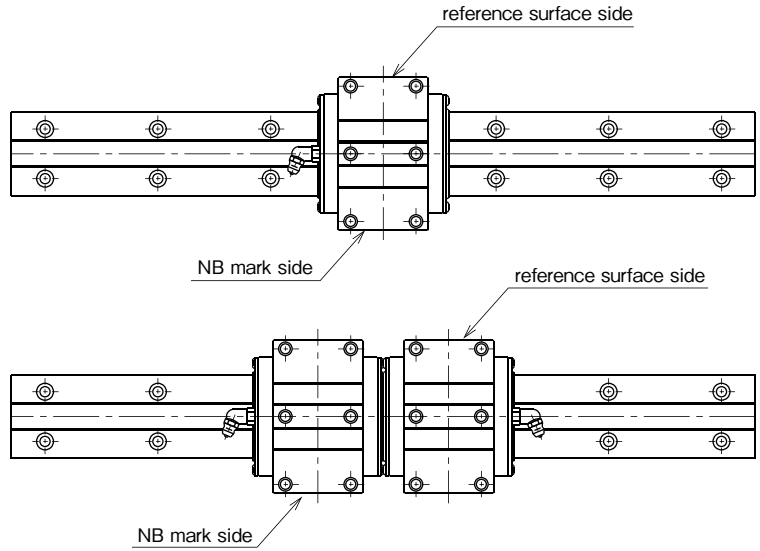
Table A-34 Shoulder Height and Radius Dimensions unit/mm

part number	h_1	h_2	$r_{max.}$
SGW17	4	2	0.4
SGW21	5	2.5	
SGW27			
SGW35		3.5	0.8

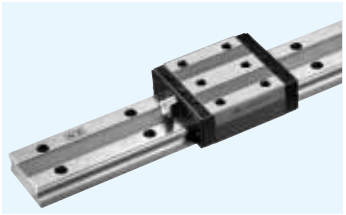
GREASE FITTING

A grease fitting is attached to the return cap of SGW type guide block for lubrication purposes. Unless otherwise specified, the orientation of the grease fitting is as shown in Figure A-65. When more than 2 blocks are used on one rail, please specify the grease fitting orientation.

Figure A-65 Grease Fitting Orientation



SGW-TF TYPE



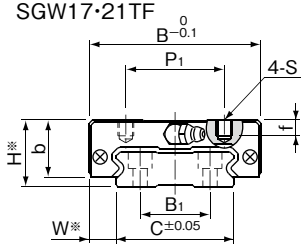
part number structure

example **SGW 21 TF B 2 T1 - 589 P / W2 FS LB F - KGL**

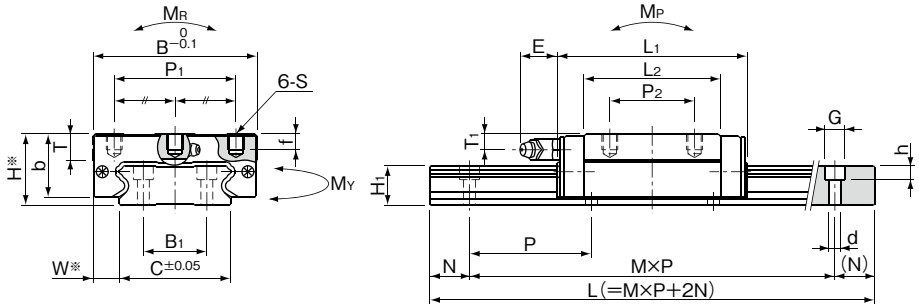
- SGW type
- size
- TF typeblock
- seal (refer to page A-14)
  blank: with side-seals
  B: with side-seals + under-seals
- number of blocks attached to one rail
- preload symbol
  blank: standard
  T1: light
  T2: medium
- total length of rail
- accuracy grade
  blank: standard
  H: high
  P: precision
- symbol for number of axes※
  blank: single axis
  W2: 2 parallel axes
  W3: 3 parallel axes
- with Fiber Sheet
- with low temperature black chrome treatment
- with rail mounting hole caps
- symbol for grease
  blank: standard grease
  KGL: lithium-based grease
  KGU: urea-based grease
  KGF: anti-fretting grease
  GK: K-grease
  refer to page Eng-39～

※The symbol for the number of axes does not mean the number of rails ordered.

SGW17·21TF



SGW27·35TF



※Please refer to page A-73 for accuracy.

M: number of pitches

part number	assembly dimensions H mm	W mm	block dimensions B mm	L1 mm	L2 mm	P1 mm	P2 mm	S	f mm	T mm	b mm	E mm	T1 mm	grease fitting
SGW17TF	17	8.5	50	51	33.6	29	15	M4	4	—	14.5	2.5	4	pressed fitting
SGW21TF	21	8.5	54	58	40	31	19	M5	5	—	18	12	4.5	B-M6F
SGW27TF	27	10	62	71.8	51.8	46	32	M6	6	10	24		6	
SGW35TF	35	15.5	100	106.6	77.6	76	50	M8	8	14	31		8	

part number	guide rail dimensions H1 mm	C mm	B1 mm	d×G×h mm	N mm	P mm	basic load rating dynamic C kN	static Co kN	allowable static moment MP MP2 N・m	MY MY2 N・m	MR N・m	mass block kg	guide rail kg/m	block size
SGW17TF	9	33	18	4.5×7.5×5.3	15	40	4.82	8.56	42.8 / 261	42.8 / 261	160	0.13	2.05	**17**
SGW21TF	11	37	22			50	7.01	12.1	72.3 / 418	72.3 / 418	253	0.20	2.84	**21**
SGW27TF	15	42	24		20	60	12.9	21.5	171 / 931	171 / 931	496	0.38	4.43	**27**
SGW35TF	19	69	40	7×11×9		80	30.6	48.5	578 / 3,100	578 / 3,100	1,850	1.16	9.32	**35**

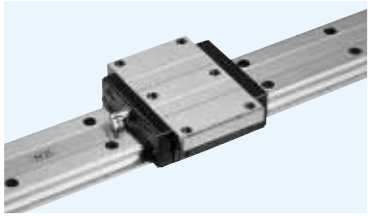
MP2 and MY2 are allowable static moments when two blocks are used in close contact. 1kN≒102kgf 1N・m≒0.102kgf・m

part number	standard rail length L mm										maximum length mm
SGW17	110	150	190	230	270	310	350	390	430	510	590
SGW21	130	180	230	280	330	380	430	480	530	630	730
SGW27	160	220	280	340	400	460	520	640	760	880	1,000
SGW35	280	360	440	520	600	680	760	920	1,080	1,240	1,400

Rails exceeding the maximum specified length may be fabricated if joints are used. Please contact NB for assistance.

							maximum length mm
670	750	830	950	1,070	1,190	1,310	2,000
830	930	1,030	1,180	1,330	1,480		2,000
1,180	1,360	1,540	1,720	1,900			3,000
1,640	1,880	2,120					3,000

SGW-TE TYPE

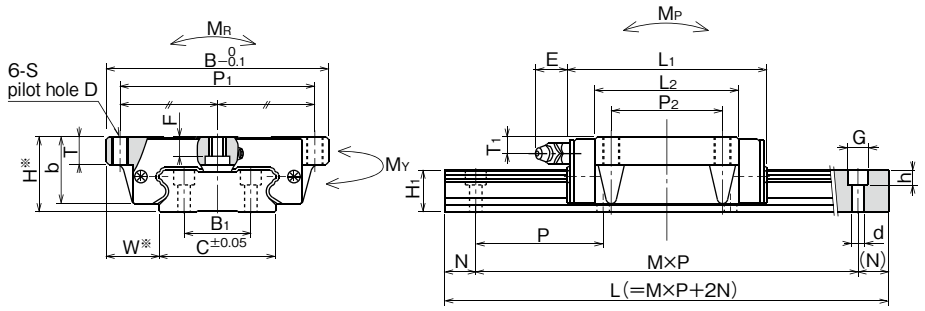


part number structure

example **SGW 21 TE B 2 T1 - 589 P / W2 FS LB F - KGL**

- SGW type
- size
- TE typeblock
- seal (refer to page A-14)
  blank: with side-seals
  B: with side-seals + under-seals
- number of blocks attached to one rail
- preload symbol
  blank: standard
  T1: light
  T2: medium
- total length of rail
- accuracy grade
  blank: standard
  H: high
  P: precision
- symbol for number of axes※
  blank: single axis
  W2: 2 parallel axes
  W3: 3 parallel axes
- with Fiber Sheet
- with low temperature black chrome treatment
- with rail mounting hole caps
- symbol for grease
  blank: standard grease
  KGL: lithium-based grease
  KGU: urea-based grease
  KGF: anti-fretting grease
  GK: K-grease
  refer to page Eng-39～

※The symbol for the number of axes does not mean the number of rails ordered.



M: number of pitches

※Please refer to page A-73 for accuracy.

part number	assembly dimensions H mm	W mm	block dimensions B mm	L1 mm	L2 mm	P1 mm	P2 mm	S	D mm	F mm	T mm	b mm	E mm	T1 mm	grease fitting
SGW17TE	17	13.5	60	51	33.6	53	26	M4	3.3	3.2	6	14.5	2.5	4	pressed fitting
SGW21TE	21	15.5	68	58	40	60	29	M5	4.4	3.7	8	18	12	4.5	B-M6F
SGW27TE	27	19	80	71.8	51.8	70	40	M6	5.3	6	10	24		6	
SGW35TE	35	25.5	120	106.6	77.6	107	60	M8	6.8	8	14	31		8	

guide rail dimensions H1 mm	C mm	B1 mm	d×G×h mm	N mm	P mm	basic load rating dynamic C kN	static Co kN	allowable static moment MP MP2 N・m	MY MY2 N・m	MR N・m	mass block kg	guide rail kg/m	block size
9	33	18	4.5×7.5×5.3	15	40	4.82	8.56	42.8 261	42.8 261	160	0.14	2.05	**17**
11	37	22			50	7.01	12.1	72.3 418	72.3 418	253	0.23	2.84	**21**
15	42	24		20	60	12.9	21.5	171 931	171 931	496	0.46	4.43	**27**
19	69	40	7×11×9		80	30.6	48.5	578 3,100	578 3,100	1,850	1.35	9.32	**35**

MP2 and MY2 are allowable static moments when two blocks are used in close contact. 1kN≒102kgf 1N・m≒0.102kgf・m

part number	standard rail length L mm											maximum length mm
SGW17	110	150	190	230	270	310	350	390	430	510	590	670	750	830	950	1,070	1,190	1,310	2,000
SGW21	130	180	230	280	330	380	430	480	530	630	730	830	930	1,030	1,180	1,330	1,480		2,000
SGW27	160	220	280	340	400	460	520	640	760	880	1,000	1,180	1,360	1,540	1,720	1,900			3,000
SGW35	280	360	440	520	600	680	760	920	1,080	1,240	1,400	1,640	1,880	2,120					3,000

Rails exceeding the maximum specified length may be fabricated if joints are used. Please contact NB for assistance.