

A-3-6 Dust Proof

(1) Standard Specification

- To keep foreign matters from entering inside the slide, NSK linear guide has an end seal on both ends, an bottom seal at the bottom, and an inner seal inside the slide.
- Table 6.1 shows seals for standard specification for each series.
- Seal friction per standard slide is shown in the dust proof item of each series.

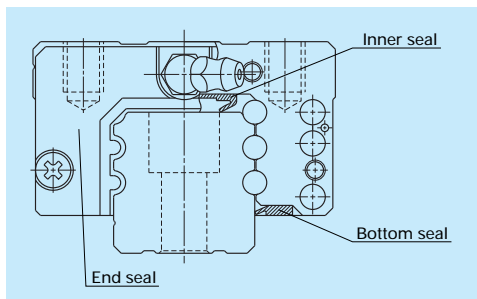


Fig. 6.1

Table 6.1 Standard seals

		End seal	Bottom seal	Inner seal
SH Series	SH15	○	○	-
	SH20, SH25, SH30, SH35, SH45, SH55	○	○	△
SS Series	SS15	○	○	-
	SS20, SS25, SS30, SS35	○	○	△
LH Series	LH08, LH10	○	-	-
	LH12, LH15	○	○	-
	LH20, LH25, LH30, LH35, LH45, LH55, LH65	○	○	△
LS Series	LS15	○	○	-
	LS20, LS25, LS30, LS35	○	○	△
VH Series	VH15	○	○	-
	VH20, VH25, VH30, VH35, VH45, VH55	○	○	△
LW Series	LW17, LW21, LW27, LW35, LW50	○	○	-
TS Series	TS15, TS20, TS25, TS30, TS35	○	○	○
RA Series	RA15, RA20	○	○	△
	RA25, RA30, RA35, RA45, RA55, RA65	○	○	○
LA Series	LA25, LA30, LA35, LA45, LA55, LA65	○	○	△
PU Series	PU05, PU07, PU09, PU12, PU15	○	-	-
PE Series	PE05, PE07, PE09, PE12, PE15	○	-	-
LU Series	LU05, LU07, LU09	△	-	-
	LU12, LU15	○	-	-
LE Series	LE05, LE07, LE09, LE12, LE15	○	-	-
HA Series	HA25, HA30, HA35, HA45, HA55	○	○	○
HS Series	HS15, HS20, HS25, HS30, HS35	○	△	-

○ : Installed as standard

△ : Installed on request

(2) Dust proof components

- NSK has the following items. Select a suitable type for the operating environment.

Table 6.2 Optional dust proof components

Name	Purpose	Reference page
NSK K1 lubrication unit	Made of oil impregnated resin. Enhances lubricating functions.	A38 – 41
Double seal	Combines two end seals, enhancing sealing function.	A53
Protector	Protect end seal from hot and hard contamination.	A54
Rail cap	Prevents foreign matters such as swarf generated in cutting operation from clogging the rail-mounting hole.	A54
Inner seal	Installed inside a slide, and prevents foreign matters from entering the rolling contact surface.	A55
Bellows	Covers linear guide.	A55
Rail cover *)	Covers top of rail, and prevents foreign matters such as cutting dust from collecting in the rail mounting holes.	A258

*) Rail cover is applicable to RA25 to 65 of RA series.

1. Double seal

- A combination of two end seals to enhance seal function.
- When a double seal is installed, the end seal section becomes thicker than the standard item. Please pay attention to the increase in a slide length when designing the mounting dimension of slide and the table stroke. Please refer to the section of dust proof components for the dimensional increase in the length direction of each series due to fitting of double seal.
- Double-seal set: Can be installed to a completed standard item later on request. It comprises two end seals, a collar, and a screw for installation (Fig. 6.2). The product reference numbers of each series are described on the section of dust proof parts.
- When attaching a grease fitting to the end cap after the double seal is equipped, you require a connector shown in Figure 6.2. Please specify the connector set when ordering linear guides.
- For VH, RA, LA, HA, and HS Series, double-seal set can be installed only before shipping from the factory.

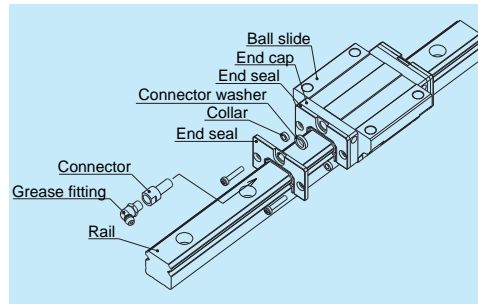


Fig. 6.2 Double seal

2. Protector

- A protector is usually installed outside the end seal to prevent high-temperature fine particles such as welding spatter and other hard foreign matters from entering the slide.
- Same as the case with a double seal, when a protector is installed, the slide becomes longer. Please pay attention to the increase in a slide length when designing the mounting dimensions of slide and the table stroke. The dimensional increase in the slide length because of protector is described on the section of dust proof components.
- Protector can be installed to a completed item later. The reference number for order shown in dust proof components of each series.
- When attaching a grease fitting to the end cap after the protector is equipped, you require a connector shown in Figure 6.3. Please specify the connector set when ordering linear guides.
- For VH, RA, LA, HA, and HS Series, protector can be installed only before shipping from the factory.

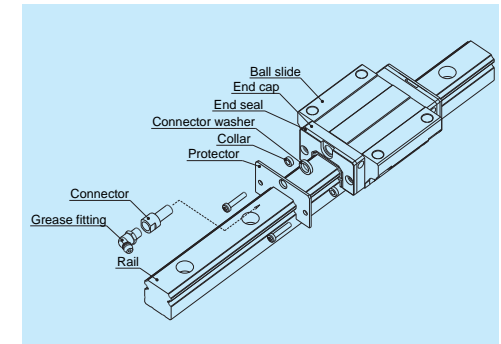


Fig. 6.3 Protector

3. Cap to cover the bolt hole for rail mounting

- After the rail is mounted to the machine base, a cap is used to cover the bolt hole to prevent foreign matters from clogging up the hole or from entering into the slide (Fig. 6.4).
- The cap for the bolt hole is made of synthetic resin which is superb in its resistance to oil and wear.
- The size of rail mounting bolts and bolt hole caps are shown on the section of dust proof components in each series.
- To insert a cap into the rail bolt hole, use a flat tool (Fig. 6.5). Pound the cap gradually until its height becomes flush with the rail top face.
- You can reorder extra bolt hole caps. The size of rail mounting bolts and reference numbers of bolt hole caps are shown on the section of dust proof components.

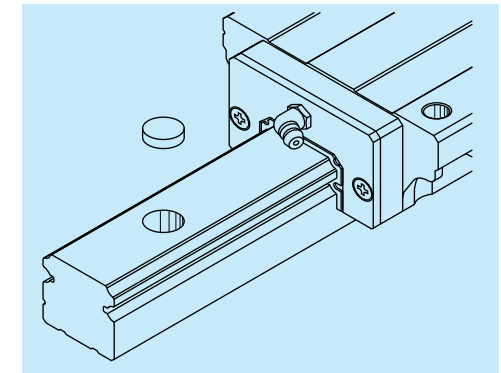


Fig. 6.4

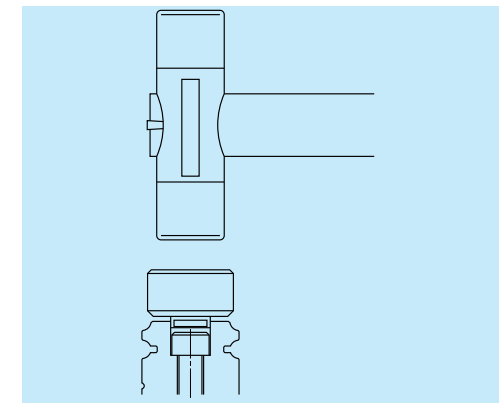


Fig. 6.5

4. Inner seal

- The end seal installed on both ends of the slide cannot arrest entire foreign matters, though the missed amount is negligible. An inner seal protects the rolling contact surface from such foreign matters which entered inside the slide (Fig. 6.6).
- Inner seal is installed inside the slide. Therefore, the appearance in size and the shape are the same as standard slide. (Inner seal is already installed before shipped from the factory.)
- It is strongly recommended to use a bellows and a double seal, along with an inner seal, to maintain precision of the linear guide.
- Refer to Table 6.1 for availability of inner seal.

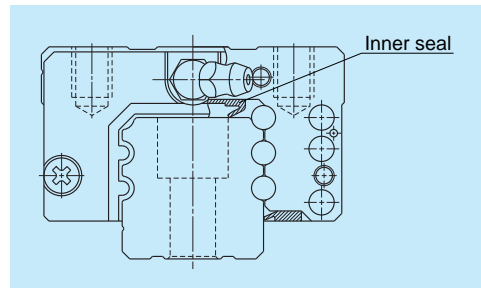


Fig. 6.6 Inner seal when installed

5. Bellows

- Bellows covers entire linear guide. It has been used widely as a way of protection in an environment where foreign matters are prevalent.
- NSK has bellows exclusively for LH (SH), LS (SS), LA and LW Series. They have a middle bellows and a bellows at both ends. For LH Series, there are low and high type bellows which are in compliance with their slide types.
- The high type is used for AN and BN types. The low type is used for FL, EL, EM, HL, GL, GM, AL and BL types. By combining, the top of the bellows is slightly lower than the top face of the slide.
- When a high type bellows is installed to the slide with the height code L (such as FL), the top of the bellows becomes higher than the slide. However, it is advantageous for stroke because the pitch of the bellows becomes larger.
- Special bellows are required for installing the linear guide vertically, or hanging it from a ceiling. Please consult NSK.
- When a bellows is used, please be advised that we cannot put a grease fitting on the end of slide to which the bellows is attached. If you require the grease fitting, it shall be put on the side of end cap or slide body. Consult NSK for details.
- For the dimension of bellows, please refer to the section of dust proof parts of each series.

① Installation of bellows SH, SS, LH and LS Series

* Installation in the ball slide (Fig. 6.7)

- Remove two machine screws (M_2) which secure the end seals to the end of the slide (Fig. 6.7). For LS15, hold the end cap by hand. Otherwise, the end cap is detached from the ball slide, and the balls inside may spill out.
- Then place a spacer to the hole for securing end seal. Fasten the mounting plate at the end of the bellows to the slide with a slightly longer machine screw (provided with the bellows).

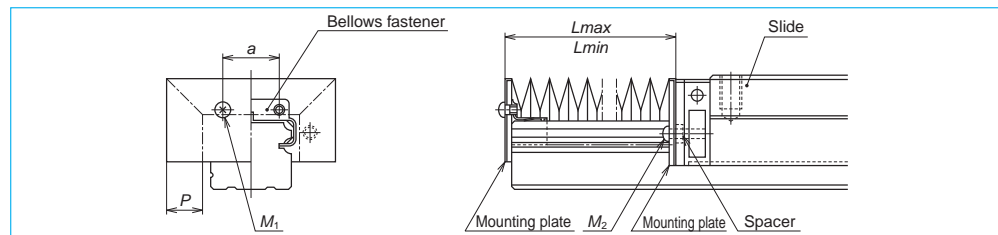


Fig. 6.7

* Installation in the rail

- To install bellows for SH, SS, LH and LS Series, lightly knock a fastener exclusively for bellows to the end of the rail (Fig. 6.7). Then secure the mounting plate at the end of the bellows through the tap hole of the fastener.
- As described above, a bellows can be easily installed in the end of the rail without creating a tap hole on the end of the rail.

② LA and LW Series

* Installation in the ball slide (Fig. 6.8 and Fig. 6.9)

- Remove two machine screws which secure the end seal. (For LW17 and 21, hold the end cap by hand. Otherwise, the end cap is detached from the slide, and the balls inside may spill out.)
- Place a spacer in the securing hole of the end seal, fasten the mounting plate on the end of the bellows using a slightly longer machine screw (provided with the bellows).

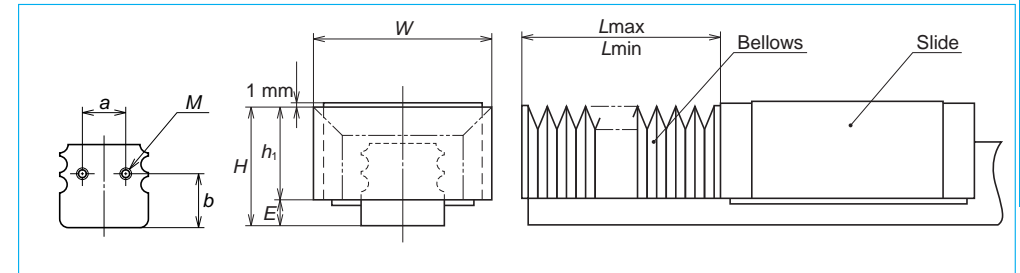


Fig. 6.8

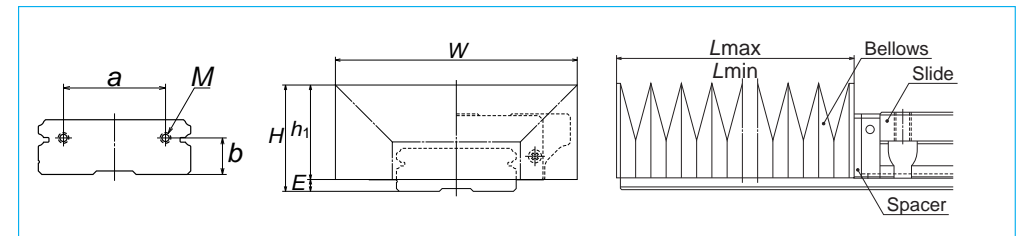


Fig. 6.9

Calculating length of bellows

- Formula is as follows.
- A bellows forms one block (BL) with six folds as shown in Fig. 6.10. Stroke is determined by multiplying by an integer of this BL.
- Length when stretched to maximum size :

- Length when contracted to minimum size : $L_{max} = 7 \times P \times \text{Number of BL}$
- Stroke : $L_{min} = 17 \times \text{Number of BL}$
- P and the number of BL are shown in bellows dimension table in each series.

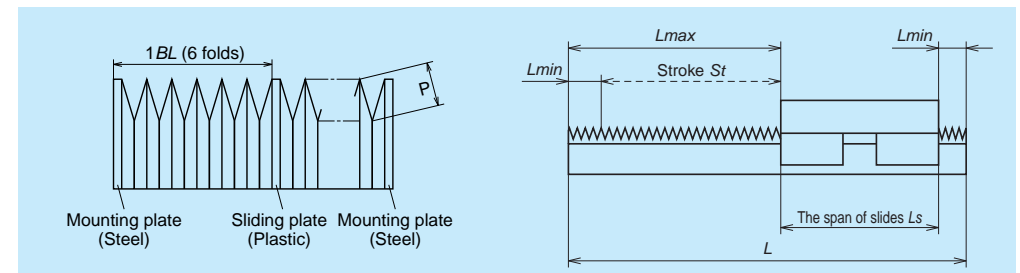


Fig. 6.10