

# NSK LINEAR GUIDES™ NH SERIES, NS SERIES

# NSK

New series delivers world's highest load rating with more than twice the operating life.



Patent Pending

With state-of-the-art technology, the standard in NSK Linear Guides™ has been reborn.

## Features of NH and NS Series

### 1. Excellent durability

#### Super-long life, twice as long compared to conventional series

NH and NS series have a load rating 1.3 times greater and a lifespan two times longer than LH and LS Series\*1. These features enable you to design a machine with a longer life and/or downsize the machine.

\*1: Based on the representative values of each series.

#### Maintenance-free

Installing NSK K1™ lubrication unit (optional) ensures a long-term, maintenance-free operation, saving cost. Environmental protection can also be achieved.

#### What is "NSK K1™" lubrication unit?

NSK K1™ is a lubrication device which combines oil and resin in a single unit. The porous resin contains a large amount of lubrication oil. As the linear guide operates, the NSK K1™ provides fresh oil to the contacting surfaces.

### 2. Easy-to-use "Standard Linear Guides"

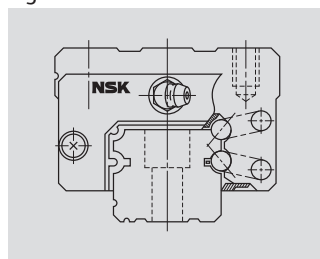
#### Random-matching (interchangeable) type is available

The rails and ball slides can be selected in many combinations. All NH/NS models can be interchanged with LH and LS Series, respectively. Free combination of different ball slide types, accuracy grades, and preload can be made.

#### Robust design to absorb mounting errors

The DF combination results in a high self-aligning capability. This increases the capacity to absorb errors in installation, and will demand less work to achieve precision in mounting the linear guide.

Fig. 1



#### Options

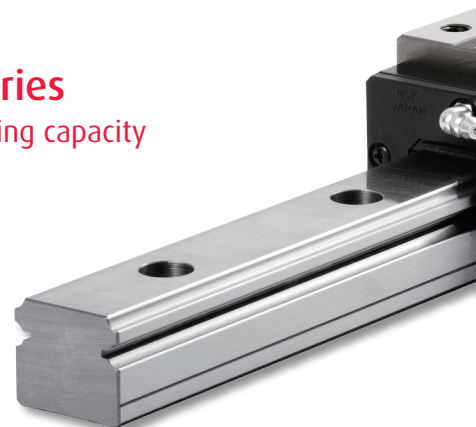
Accessory options are available, including NSK K1™ lubrication units, double seals, protectors, surface treatments, etc.

#### Mounting dimensions are the same as the LH and LS Series

NH and NS are completely interchangeable with LH and LS and can be used without making any design modifications.

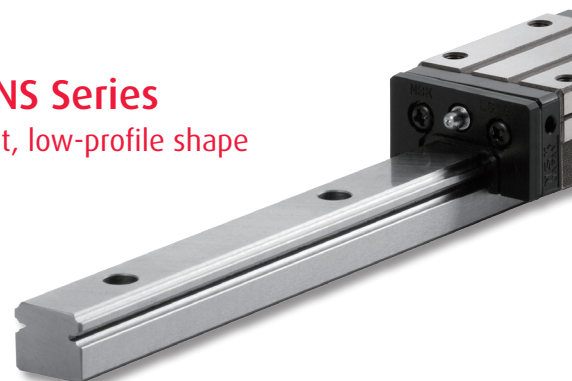
### NH Series

Larger load rating capacity

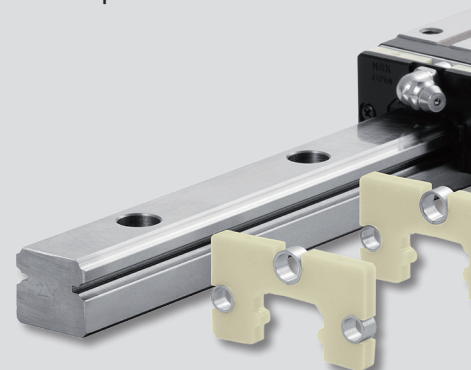


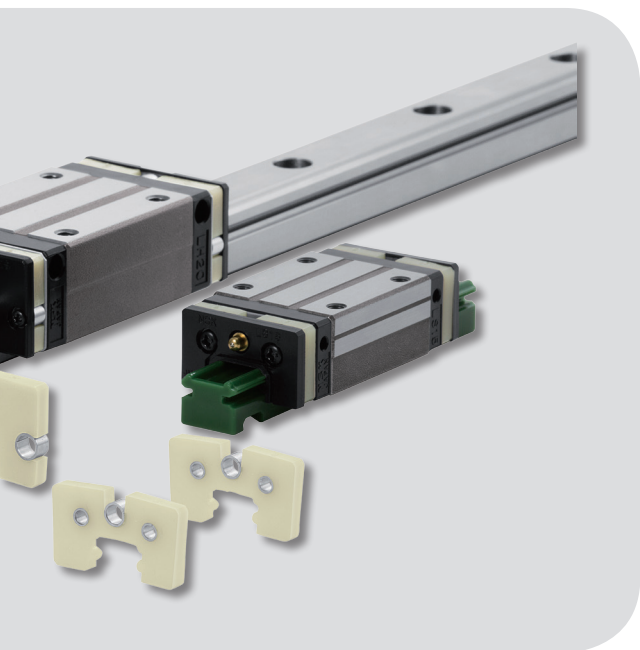
### NS Series

Compact, low-profile shape



By mounting a NSK K1™ lubrication unit (optional), a long-term, maintenance-free operation can be achieved.





## Produced through state-of-the-art technology

Based on the LH/LS Series, which have achieved exceptional results in numerous application areas since their debut in 1989, the new NH/NS Series are created as the focal point of NSK's cumulated state-of-the-art design and manufacturing technologies.

LH/LS Series with reliability and performance

+

NSK's state-of-the-art design/manufacturing technologies

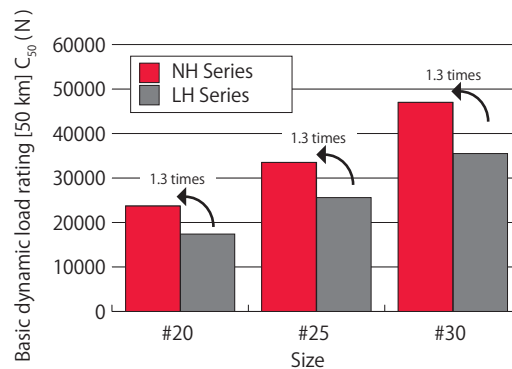
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New series of standard linear guides:  
the NH Series and NS Series

## Ball groove geometry contributing to long life

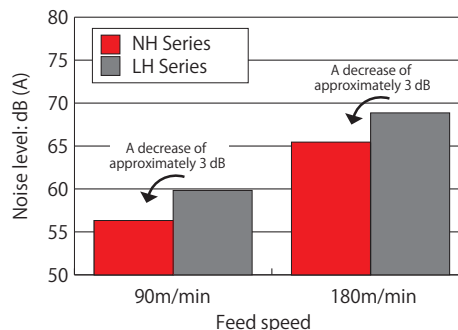
New ball groove geometry is introduced, which has been developed by utilizing NSK's state-of-the-art tribological and analytical technologies. Due to the optimized distribution of contact surface pressure, the rating life has dramatically increased. As compared with the LH/LS Series, the load rating capacity of the new series has increased 1.3 times, while the life span has increased two times<sup>\*1</sup>.

<sup>\*1</sup>: Representative values of each series.



## Ball circulating groove with excellent high-speed capability

By re-examining the design for the ball circulation path, we have attained smoother ball circulation and a reduced noise level. The new NH/NS series are well suited for high-speed applications.



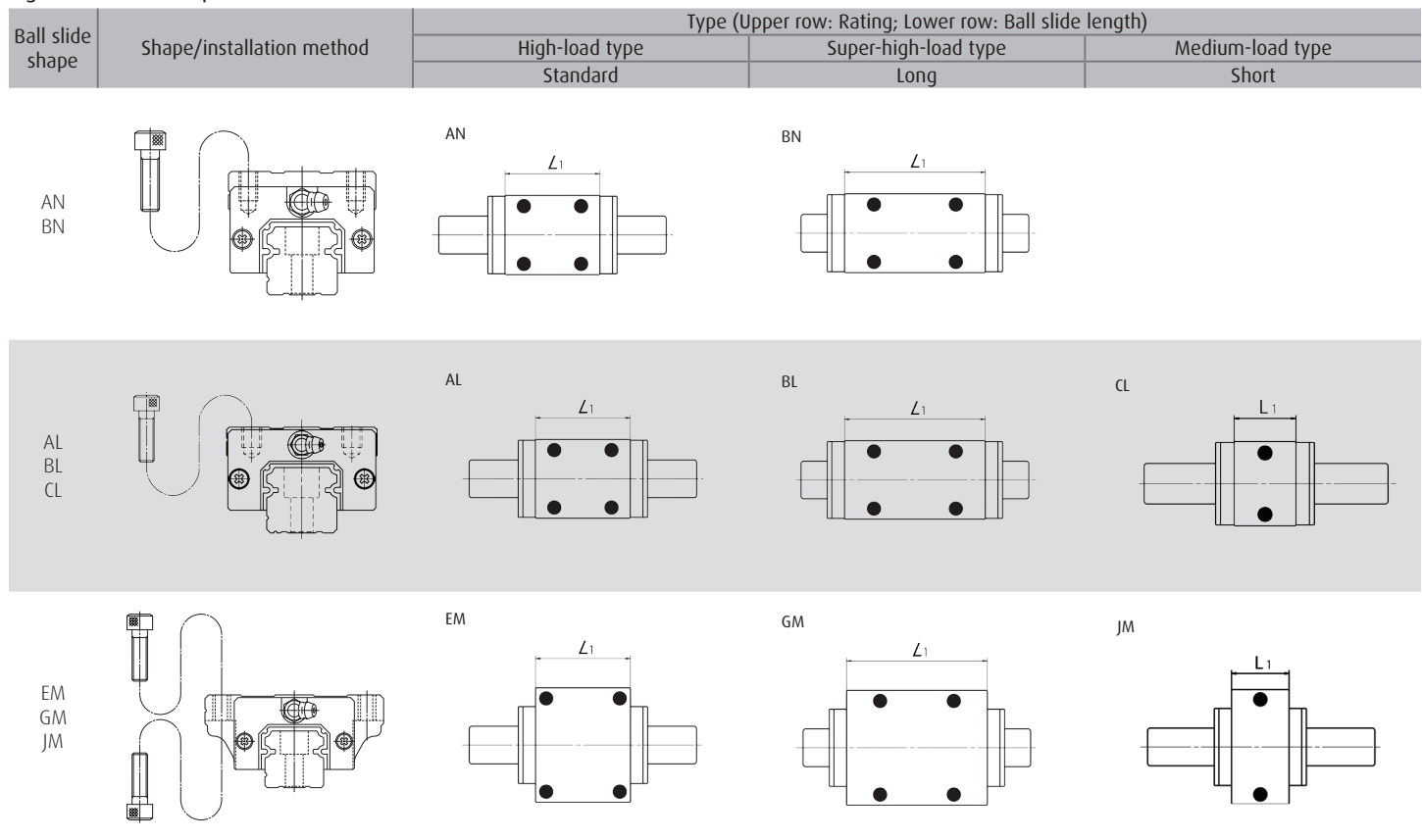
<sup>\*</sup>Measurement results are obtained from the size #25 linear guide alone.  
Microphone position: 500 mm above the top of the specimen  
The noise level varies depending on the microphone position.

# Specifications

## 1. Ball Slide Shape

- Two types of ball slides are available: square type with tapped holes and mounting flange type.
- A compact, square type, low-profile model is also available.
- On the mounting holes of the flange type, the tapped part is used to fix the ball slide from the top surface, while the minor diameter can be used as a bolt hole for mounting from the bottom. This enables mounting from either direction, top or bottom.
- The ball slide length is available in three lengths: standard high-load, long super-high load or short medium-load. The available ball slide length differs depending on the type. Please refer to the dimension table.

Fig. 2 Ball slide shape



## 2. Maximum Rail Length

- Table 1 shows the limitations of rail length (maximum length).
- Depending on the required accuracy grade, the available maximum rail length might be shorter than that shown in Table 1.

Table 1 Length limitations of rails

Unit: mm

| Series | Material \ Size           | 15    | 20    | 25    | 30    | 35    | 45    | 55    | 65    |
|--------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| NH     | Special high carbon steel | 2 980 | 3 960 | 3 960 | 4 000 | 4 000 | 3 990 | 3 960 | 3 900 |
|        | Stainless steel           | 1 800 | 3 500 | 3 500 | 3 500 |       |       |       |       |
| NS     | Special high carbon steel | 2 920 | 3 960 | 3 960 | 4 000 | 4 000 |       |       |       |
|        | Stainless steel           | 1 700 | 3 500 | 3 500 | 3 500 | 3 500 |       |       |       |

Note: Rails can be butted if user requirement exceeds the rail length shown in the table. Please consult NSK.

### 3. Accuracy

- › The setting of the accuracy grade differs depending on whether the required type is of the preloaded assembly or the interchangeable type.
- › For the preloaded assembly, different accuracy grades are available: Ultra precision P3, Super precision P4, High precision P5, Precision P6, and Normal PN grades.
- › The interchangeable type has High Precision PH and Normal PC grade.

Table 2 Tolerance of preloaded assembly

Unit:  $\mu\text{m}$

| Characteristics                                                                                | Accuracy grade | Ultra precision P3           | Super precision P4 | High precision P5 | Precision grade P6 | Normal grade PN |
|------------------------------------------------------------------------------------------------|----------------|------------------------------|--------------------|-------------------|--------------------|-----------------|
| Mounting height H                                                                              |                | $\pm 10$                     | $\pm 10$           | $\pm 20$          | $\pm 40$           | $\pm 80$        |
| Variation of H<br>(All ball slides on a set of rails)                                          |                | 3                            | 5                  | 7                 | 15                 | 25              |
| Mounting width $W_2$ or $W_3$                                                                  |                | $\pm 15$                     | $\pm 15$           | $\pm 25$          | $\pm 50$           | $\pm 100$       |
| Variation of $W_2$ or $W_3$<br>(All ball slides on reference rail)                             |                | 3                            | 7                  | 10                | 20                 | 30              |
| Running parallelism of surface C to surface A<br>Running parallelism of surface D to surface B |                | Refer to Fig. 3 and Table 4. |                    |                   |                    |                 |

Table 3 Tolerance of interchangeable type

Unit:  $\mu\text{m}$

| Characteristics                                                                                | Accuracy grade | High precision grade PH              |            | Normal grade PC                      |            |
|------------------------------------------------------------------------------------------------|----------------|--------------------------------------|------------|--------------------------------------|------------|
|                                                                                                | Model No.      | NH15,20,25,30,35<br>NS15,20,25,30,35 | NH45,55,65 | NH15,20,25,30,35<br>NS15,20,25,30,35 | NH45,55,65 |
| Mounting height H                                                                              |                | $\pm 20$                             | $\pm 30$   | $\pm 20$                             | $\pm 30$   |
| Variation of mounting height H                                                                 |                | 15                                   | 20         | 15                                   | 20         |
| Mounting width $W_2$ or $W_3$                                                                  |                | $\pm 30$                             | $\pm 35$   | $\pm 30$                             | $\pm 35$   |
| Variation of mounting width $W_2$ or $W_3$                                                     |                | 20                                   | 20         | 25                                   | 30         |
| Running parallelism of surface C to surface A<br>Running parallelism of surface D to surface B |                | Refer to Fig. 3 and Table 4.         |            |                                      |            |

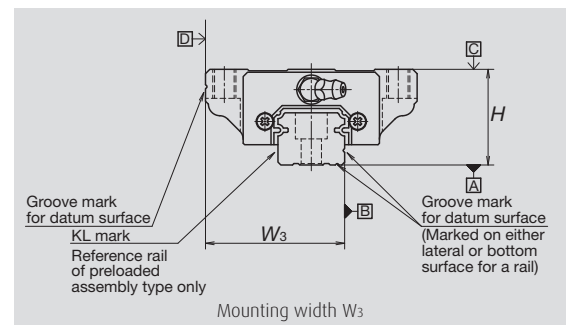
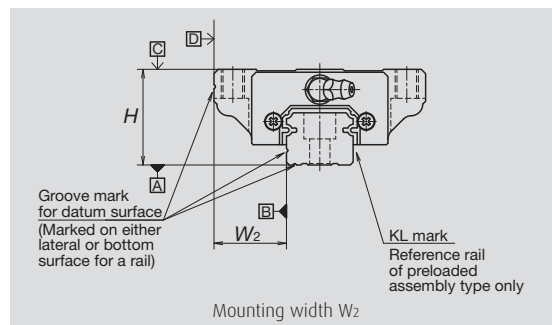
Note: Variation in the interchangeable products means the variation among the values taken at the same position on the same rail.

Table 4 Running parallelism of ball slide

Unit:  $\mu\text{m}$

| Rail length (mm)  | Preload assembly   |                    |                   |                    |                 | Interchangeable type |                 |
|-------------------|--------------------|--------------------|-------------------|--------------------|-----------------|----------------------|-----------------|
|                   | Ultra precision P3 | Super precision P4 | High precision P5 | Precision grade P6 | Normal grade PN | High precision PH    | Normal grade PC |
| Over ~ 50 or less | 2                  | 2                  | 2                 | 4.5                | 6               | 2                    | 6               |
| 50 ~ 80           | 2                  | 2                  | 3                 | 5                  | 6               | 3                    | 6               |
| 80 ~ 125          | 2                  | 2                  | 3.5               | 5.5                | 6.5             | 3.5                  | 6.5             |
| 125 ~ 200         | 2                  | 2                  | 4                 | 6                  | 7               | 4                    | 7               |
| 200 ~ 250         | 2                  | 2.5                | 5                 | 7                  | 8               | 5                    | 8               |
| 250 ~ 315         | 2                  | 2.5                | 5                 | 8                  | 9               | 5                    | 9               |
| 315 ~ 400         | 2                  | 3                  | 6                 | 9                  | 11              | 6                    | 11              |
| 400 ~ 500         | 2                  | 3                  | 6                 | 10                 | 12              | 6                    | 12              |
| 500 ~ 630         | 2                  | 3.5                | 7                 | 12                 | 14              | 7                    | 14              |
| 630 ~ 800         | 2                  | 4.5                | 8                 | 14                 | 16              | 8                    | 16              |
| 800 ~ 1 000       | 2.5                | 5                  | 9                 | 16                 | 18              | 9                    | 18              |
| 1 000 ~ 1 250     | 3                  | 6                  | 10                | 17                 | 20              | 10                   | 20              |
| 1 250 ~ 1 600     | 4                  | 7                  | 11                | 19                 | 23              | 11                   | 23              |
| 1 600 ~ 2 000     | 4.5                | 8                  | 13                | 21                 | 26              | 13                   | 26              |
| 2 000 ~ 2 500     | 5                  | 10                 | 15                | 22                 | 29              | 15                   | 29              |
| 2 500 ~ 3 150     | 6                  | 11                 | 17                | 25                 | 32              | 17                   | 32              |
| 3 150 ~ 4 000     | 9                  | 16                 | 23                | 30                 | 34              | 23                   | 34              |

Fig. 3 Specifications of accuracy



## 4. Preload and Rigidity

- Preload setting differs between the preloaded assembly and interchangeable types.
- For the preloaded assembly, Medium preload Z3, Slight preload Z1 and Fine clearance Z0 are available.
- For the interchangeable type, Medium preload ZH, Slight preload ZZ and Fine clearance ZT are available.
- Possible combinations between the accuracy and preload grades are shown in Table 9.

Table 5 Preload and rigidity of preloaded assembly  
(1) NH Series

| Model No.       | Preload (N)       |                   | Rigidity (N/μm)    |                   |                   |                   |
|-----------------|-------------------|-------------------|--------------------|-------------------|-------------------|-------------------|
|                 |                   |                   | Vertical direction |                   | Lateral direction |                   |
|                 | Slight preload Z1 | Medium preload Z3 | Slight preload Z1  | Medium preload Z3 | Slight preload Z1 | Medium preload Z3 |
| NH15 AN, EM     | 78                | 490               | 137                | 226               | 98                | 186               |
| NH20 AN, EM     | 147               | 835               | 186                | 335               | 137               | 245               |
| NH25 AL, AN, EM | 196               | 1 270             | 206                | 380               | 147               | 284               |
| NH30 AL, AN     | 245               | 1 570             | 216                | 400               | 157               | 294               |
| NH30 EM         | 294               | 1 770             | 265                | 480               | 186               | 355               |
| NH35 AL, AN, EM | 390               | 2 350             | 305                | 560               | 216               | 390               |
| NH45 AL, AN, EM | 635               | 3 900             | 400                | 745               | 284               | 540               |
| NH55 AL, AN, EM | 980               | 5 900             | 490                | 910               | 345               | 645               |
| NH65 AN, EM     | 1 470             | 8 900             | 580                | 1 070             | 400               | 755               |
| NH15 BN, GM     | 98                | 685               | 196                | 345               | 137               | 284               |
| NH20 BN, GM     | 196               | 1 080             | 265                | 480               | 196               | 355               |
| NH25 BL, BN, GM | 245               | 1 570             | 294                | 560               | 216               | 400               |
| NH30 BL, BN, GM | 390               | 2 260             | 360                | 665               | 265               | 480               |
| NH35 BL, BN, GM | 490               | 2 940             | 430                | 795               | 305               | 570               |
| NH45 BL, BN, GM | 785               | 4 800             | 520                | 960               | 370               | 695               |
| NH55 BL, BN, GM | 1 180             | 7 050             | 635                | 1 170             | 440               | 835               |
| NH65 BN, GM     | 1 860             | 11 300            | 805                | 1 480             | 550               | 1 040             |

Note: Clearance for Fine clearance Z0 is 0 to 3 μm. Therefore, preload is zero. However, Z0 of PN grade is 0 to 15 μm.

Table 7 Preload and rigidity of preloaded assembly  
(2) NS Series

| Model No.   | Preload (N)       |                   | Rigidity (N/μm)    |                   |                   |                   |
|-------------|-------------------|-------------------|--------------------|-------------------|-------------------|-------------------|
|             |                   |                   | Vertical direction |                   | Lateral direction |                   |
|             | Slight preload Z1 | Medium preload Z3 | Slight preload Z1  | Medium preload Z3 | Slight preload Z1 | Medium preload Z3 |
| NS15 AL, EM | 69                | 390               | 127                | 226               | 88                | 167               |
| NS20 AL, EM | 88                | 540               | 147                | 284               | 108               | 206               |
| NS25 AL, EM | 147               | 880               | 206                | 370               | 147               | 275               |
| NS30 AL, EM | 245               | 1 370             | 255                | 460               | 186               | 345               |
| NS35 AL, EM | 345               | 1 960             | 305                | 550               | 216               | 400               |
| NS15 CL, JM | 49                | 294               | 78                 | 147               | 59                | 108               |
| NS20 CL, JM | 69                | 390               | 108                | 186               | 78                | 137               |
| NS25 CL, JM | 98                | 635               | 127                | 235               | 88                | 177               |
| NS30 CL, JM | 147               | 980               | 147                | 275               | 108               | 206               |
| NS35 CL, JM | 245               | 1 370             | 186                | 335               | 137               | 245               |

Note: Clearance for Fine clearance Z0 is 0 to 3 μm. Therefore, preload is zero. However, Z0 of PN grade is 0 to 15 μm.

Table 6 Clearance and preload of interchangeable type  
(1) NH Series

| Model No. | Fine clearance ZT | Slight preload ZZ | Medium preload ZH |
|-----------|-------------------|-------------------|-------------------|
| NH15      | -4 ~ 15           | -4 ~ 0            | -3 ~ -7           |
| NH20      |                   | -5 ~ 0            | -3 ~ -8           |
| NH25      |                   | -5 ~ 0            | -4 ~ -9           |
| NH30      |                   | -7 ~ 0            | -5 ~ -12          |
| NH35      | -5 ~ 15           | -7 ~ 0            | -5 ~ -12          |
| NH45      |                   | -7 ~ 0            | -7 ~ -14          |
| NH55      |                   | -9 ~ 0            | -9 ~ -18          |
| NH65      |                   | -9 ~ 0            | -10 ~ -19         |

Note: Minus sign denotes a value is an amount of preload (elastic deformation of balls).

Table 8 Clearance and preload of interchangeable type  
(2) NS Series

| Model No. | Fine clearance ZT | Slight preload ZZ | Medium preload ZH |
|-----------|-------------------|-------------------|-------------------|
| NS15      | -4 ~ 15           | -4 ~ 0            | -3 ~ -7           |
| NS20      | -4 ~ 15           | -4 ~ 0            | -3 ~ -7           |
| NS25      | -5 ~ 15           | -5 ~ 0            | -4 ~ -9           |
| NS30      | -5 ~ 15           | -5 ~ 0            | -4 ~ -9           |
| NS35      | -5 ~ 15           | -6 ~ 0            | -4 ~ -10          |

Note: Minus sign denotes a value is an amount of preload (elastic deformation of balls).

Table 9 Combinations of accuracy and preload

|                                             |                                             | Accuracy grade  |                 |                |                 |              |                |              |
|---------------------------------------------|---------------------------------------------|-----------------|-----------------|----------------|-----------------|--------------|----------------|--------------|
|                                             |                                             | Ultra precision | Super precision | High precision | Precision grade | Normal grade | High precision | Normal grade |
| Without NSK K1™ Lubrication unit            |                                             | P3              | P4              | P5             | P6              | PN           | PH             | PC           |
| With NSK K1™ Lubrication unit               |                                             | K3              | K4              | K5             | K6              | KN           | KH             | KC           |
| With NSK K1™ for food and medical equipment |                                             | F3              | F4              | F5             | F6              | FN           | FH             | FC           |
| Preload                                     | Fine clearance Z0                           | ■               | ■               | ■              | ■               | ■            |                |              |
|                                             | Slight preload Z1                           | ■               | ■               | ■              | ■               | ■            |                |              |
|                                             | Medium preload Z3                           | ■               | ■               | ■              | ■               |              |                |              |
|                                             | Interchangeable type with fine clearance ZT |                 |                 |                |                 |              |                | ■            |
|                                             | Interchangeable type with slight preload ZZ |                 |                 |                |                 |              | ■              | ■            |
|                                             | Interchangeable type with medium preload ZH |                 |                 |                |                 |              | ■              | ■            |

## 5. Basic Load Rating and Rating Life

The basic load rating used for expressing the load capacity of the linear guide is determined by ISO standards (ISO14728-1, 14728-2). The load rating applied to NSK Linear Guides complies with the ISO standards. The basic dynamic load rating is the non-fluctuating load which acts on the center of the ball slide from above, and under which the rating fatigue life of 100 km or 50 km is expressed. When load  $F$  is only applied to the ball slide in the up/down direction, its rating fatigue life,  $L$  can be calculated using the following equation, where  $C_{100}$  means a basic dynamic load rating for 100 km rating fatigue life and  $C_{50}$  means a basic dynamic load rating for 50 km rating fatigue life respectively.

The basic static load rating is the static load which generates a contact stress of 4 200 MPa at the center of the contact area between the rolling element subjected to the maximum stress and the raceway surface. In this most heavily stressed contact area, the sum of the permanent deformation of the rolling element and that of the raceway is nearly 0.0001 times the rolling element's diameter.

The basic load rating values are written in the dimension table. In NH and NS series, the contact angle is set at 50 degrees, and thus increasing load carrying capacity in vertical direction. Each basic load rating in the down, up and lateral load direction is shown at Table 11.

- ▶ Please note that the equation used here for calculating the product life is different from the one used for the linear guides for which rollers are used as rolling elements.
- ▶ The load factor is expressed as "fw". Select the best-suited load factor, referring to the values given in Table 10, according to the potential vibration or impact loads in the machine onto which the linear guide is to be mounted.

$$L = 100 \times \left( \frac{C_{100}}{fw \cdot F} \right)^3 \quad \text{or} \quad L = 50 \times \left( \frac{C_{50}}{fw \cdot F} \right)^3 \quad [\text{km}]$$

The loads applied to the linear guide (i.e., ball slide loads) range from loads in the up/down or right/left direction to moment loads. Sometimes, more than one type of load is applied simultaneously or the volume and direction of the load may vary.

Varying loads cannot be used for the life calculation of the linear guide as they are. Therefore, it is necessary to use a hypothetical constant load applied to the ball slide, which would generate a fatigue life equivalent to the actual fatigue life. This is called the dynamic equivalent load. To calculate the dynamic equivalent load, use the loads provided in Table 12.

Table 12 Loads in the arrangement of linear guides

| Pattern | Arrangement of linear guide                                                         | Loads necessary to calculate dynamic equivalent load |                      |             |          |        | Dynamic equivalent load                                                                                                                                                                                                                                                                                          |
|---------|-------------------------------------------------------------------------------------|------------------------------------------------------|----------------------|-------------|----------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                                                                                     | Load                                                 |                      | Moment load |          |        |                                                                                                                                                                                                                                                                                                                  |
|         |                                                                                     | Up/down (vertical)                                   | Right/left (lateral) | Rolling     | Pitching | Yawing |                                                                                                                                                                                                                                                                                                                  |
| 1       |  | Fr                                                   | Fs                   | Mr          | Mp       | My     | <div>Fr = Fr</div> <div>Fse = Fs • tan α</div> <div>Fre = εr • Mr</div> <div>Fpe = εp • Mp</div> <div>Fye = εy • My</div> <div>α : Contact angle ( =50° )</div> <div>Dynamic equivalent coefficients</div> <div>εr : Rolling direction</div> <div>εp : Pitching direction</div> <div>εy : Yawing direction</div> |
| 2       |  | Fr                                                   | Fs                   | Mr          |          |        |                                                                                                                                                                                                                                                                                                                  |
| 3       |  | Fr                                                   | Fs                   |             | Mp       | My     |                                                                                                                                                                                                                                                                                                                  |
| 4       |  | Fr                                                   | Fs                   |             |          |        |                                                                                                                                                                                                                                                                                                                  |

The formula is determined by the relationship of loads in terms of volume. A full dynamic equivalent load can be easily obtained by using each coefficient.

After obtaining the dynamic equivalent load of the necessary load direction from Table 13, use the formulas below to calculate full dynamic equivalent loads.

- When  $F_r$  is the largest load:  $F_e = F_r + 0.5F_{se} + 0.5F_{re} + 0.5F_{pe} + 0.5F_{ye}$
- When  $F_{se}$  is the largest load:  $F_e = 0.5F_r + F_{se} + 0.5F_{re} + 0.5F_{pe} + 0.5F_{ye}$
- When  $F_{re}$  is the largest load:  $F_e = 0.5F_r + 0.5F_{se} + F_{re} + 0.5F_{pe} + 0.5F_{ye}$
- When  $F_{pe}$  is the largest load:  $F_e = 0.5F_r + 0.5F_{se} + 0.5F_{re} + F_{pe} + 0.5F_{ye}$
- When  $F_{ye}$  is the largest load:  $F_e = 0.5F_r + 0.5F_{se} + 0.5F_{re} + 0.5F_{pe} + F_{ye}$

For the values of each dynamic equivalent load in the formulas above, disregard load directions and take the absolute value.

Table 10 Load factor fw

| Impact/vibration                        | Load factor |
|-----------------------------------------|-------------|
| No external impact/vibration            | 1.0 ~ 1.5   |
| There is impact/vibration from outside. | 1.5 ~ 2.0   |
| There is significant impact/vibration.  | 2.0 ~ 3.0   |

Table 11 Basic load rating by load direction

| Load rating               | Direction | Downward | Upward    | Lateral   |
|---------------------------|-----------|----------|-----------|-----------|
| Basic dynamic load rating |           | C        | C         | 0.84C     |
| Basic static load rating  |           | $C_0$    | $0.78C_0$ | $0.65C_0$ |

Fig. 4 Load directions

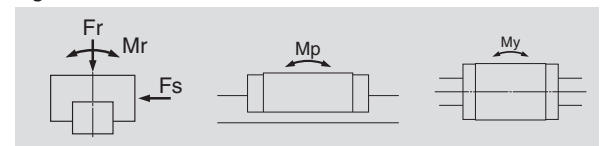


Table 13 Dynamic equivalent coefficients

| Model          | Dynamic equivalent coefficients (1/m) |              |              |
|----------------|---------------------------------------|--------------|--------------|
|                | $\epsilon_r$                          | $\epsilon_p$ | $\epsilon_y$ |
| NH15AN, EM     | 188                                   | 111          | 132          |
| NH15BN, GM     | 188                                   | 72           | 86           |
| NH20AN, EM     | 142                                   | 81           | 97           |
| NH20BN, GM     | 142                                   | 57           | 68           |
| NH25AL, AN, EM | 123                                   | 68           | 81           |
| NH25BL, BN, GM | 123                                   | 51           | 61           |
| NH30AL, AN     | 98                                    | 70           | 83           |
| NH30EM         | 98                                    | 58           | 69           |
| NH30BL, BN, GM | 98                                    | 44           | 52           |
| NH35AL, AN, EM | 78                                    | 51           | 61           |
| NH35BL, BN, GM | 78                                    | 36           | 43           |
| NH45AL, AN, EM | 60                                    | 38           | 45           |
| NH45BL, BN, GM | 60                                    | 30           | 36           |
| NH55AL, AN, EM | 51                                    | 31           | 37           |
| NH55BL, BN, GM | 51                                    | 25           | 30           |
| NH65AN, EM     | 43                                    | 27           | 32           |
| NH65BN, GM     | 43                                    | 20           | 24           |
| NS15AL, EM     | 177                                   | 116          | 138          |
| NS15CL, JM     | 177                                   | 174          | 208          |
| NS20AL, EM     | 127                                   | 94           | 112          |
| NS20CL, JM     | 127                                   | 136          | 162          |
| NS25AL, EM     | 111                                   | 70           | 83           |
| NS25CL, JM     | 111                                   | 108          | 129          |
| NS30AL, EM     | 94                                    | 63           | 75           |
| NS30CL, JM     | 94                                    | 102          | 121          |
| NS35AL, EM     | 76                                    | 54           | 64           |
| NS35CL, JM     | 76                                    | 87           | 104          |

## 6. Dust-proof parts and Lubrication accessories

### (1) Standard specification

- Standard specification can be readily used as they have a dust protection means for normal conditions. As standard equipment, the ball slides have end seals and bottom seals.
- Dust-proof parts are available, as shown in Table 14. Select the best-suited one according to the environment.

Table 14 Optional dust-proof parts

| Name                     | Purpose                                                                                           |
|--------------------------|---------------------------------------------------------------------------------------------------|
| NSK K1™ lubrication unit | Made of oil impregnated resin. Enhances lubricating functions.                                    |
| Double seal              | It combines two end seals for enhancing sealing function.                                         |
| Protector                | Protect the end seal from hot and hard contaminants.                                              |
| Rail cap                 | Prevents foreign matters generated in cutting operation from clogging the rail-mounting holes.    |
| Inner seal               | Installed inside a slide, and prevents foreign matters from entering the rolling contact surface. |
| Bellows                  | Covers the linear guide.                                                                          |

Note: Inner seals can be selected for NH20-65 and NS20-35.

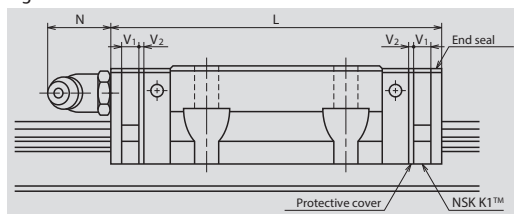
### (2) Mounting position of the lubrication accessories

- The standard position of grease fittings is the end face of ball slide. We mount them on a side of end cap for an option. (Fig. 6).
- Please consult NSK for installation of grease or tube fittings to the ball slide body or side of end cap.

### (3) NSK K1™ Lubrication unit

Table 15 shows the dimensions of the linear guides equipped with the NSK K1™ lubrication unit.

Fig. 7



## 7. Rust Prevention

### (1) Stainless steel

Stainless steel material can be selected for the parts made of carbon steel. The models which can be made with stainless steel are NH15-30 and NS15-35. However, the high precision (PH) grade and the medium preload (ZH) type of the interchangeable type can not be made from stainless steel.

### (2) Surface treatment

Regarding surface treatment, NSK recommends low temperature chrome plating or fluoride low temperature chrome plating. Please consult NSK for other surface treatment.

Table 16 Material/surface treatment code

| Code | Description                                      |
|------|--------------------------------------------------|
| C    | Special high carbon steel (NSK standard)         |
| S    | Stainless steel                                  |
| D    | Special high carbon steel with surface treatment |
| H    | Stainless steel with surface treatment           |
| Z    | Other, special                                   |

Fig. 5

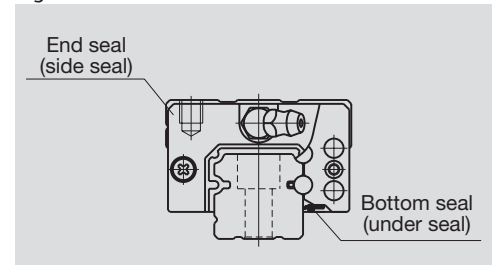


Fig. 6 Mounting position of lubrication accessories

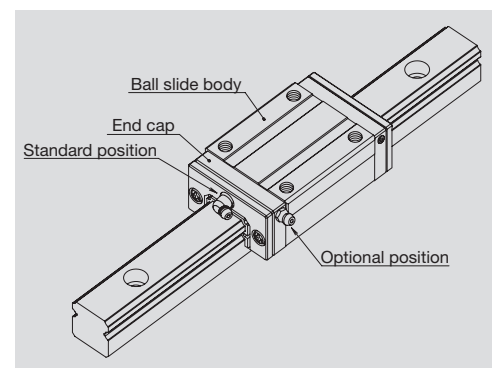


Table 15

| Model No. |            | Standard ball slide length | Ball slide length installed with two NSK K1™ L | Per NSK K1™ thickness V <sub>1</sub> | Protective cover thickness V <sub>2</sub> | Protruding area of the grease fitting N |
|-----------|------------|----------------------------|------------------------------------------------|--------------------------------------|-------------------------------------------|-----------------------------------------|
| NH15      | AN, EM     | 55                         | 65.6                                           | 4.5                                  | 0.8                                       | (5)                                     |
|           | BN, GM     | 74                         | 84.6                                           |                                      |                                           |                                         |
| NH20      | AN, EM     | 69.8                       | 80.4                                           | 4.5                                  | 0.8                                       | (14)                                    |
|           | BN, GM     | 91.8                       | 102.4                                          |                                      |                                           |                                         |
| NH25      | AL, AN, EM | 79                         | 90.6                                           | 5                                    | 0.8                                       | (14)                                    |
|           | BL, BN, GM | 107                        | 118.6                                          |                                      |                                           |                                         |
| NH30      | AL, AN     | 85.6                       | 97.6                                           | 5                                    | 1                                         | (14)                                    |
|           | EM         | 98.6                       | 110.6                                          |                                      |                                           |                                         |
| NH35      | BL, BN, GM | 124.6                      | 136.6                                          | 5.5                                  | 1                                         | (14)                                    |
|           | AL, AN, EM | 109                        | 122                                            |                                      |                                           |                                         |
| NH45      | AL, AN, EM | 139                        | 154                                            | 6.5                                  | 1                                         | (15)                                    |
|           | BL, BN, GM | 171                        | 186                                            |                                      |                                           |                                         |
| NH55      | AL, AN, EM | 163                        | 178                                            | 6.5                                  | 1                                         | (15)                                    |
|           | BL, BN, GM | 201                        | 216                                            |                                      |                                           |                                         |
| NH65      | AN, EM     | 193                        | 211                                            | 8                                    | 1                                         | (16)                                    |
|           | BN, GM     | 253                        | 271                                            |                                      |                                           |                                         |
| NS15      | AL, EM     | 56.8                       | 66.4                                           | 4                                    | 0.8                                       | (5)                                     |
|           | CL, JM     | 40.4                       | 50                                             |                                      |                                           |                                         |
| NS20      | AL, EM     | 65.2                       | 75.8                                           | 4.5                                  | 0.8                                       | (14)                                    |
|           | CL, JM     | 47.2                       | 57.8                                           |                                      |                                           |                                         |
| NS25      | AL, EM     | 81.6                       | 92.2                                           | 4.5                                  | 0.8                                       | (14)                                    |
|           | CL, JM     | 59.6                       | 70.2                                           |                                      |                                           |                                         |
| NS30      | AL, EM     | 96.4                       | 108.4                                          | 5                                    | 1                                         | (14)                                    |
|           | CL, JM     | 67.4                       | 79.4                                           |                                      |                                           |                                         |
| NS35      | AL, EM     | 108                        | 121                                            | 5.5                                  | 1                                         | (14)                                    |
|           | CL, JM     | 77                         | 90                                             |                                      |                                           |                                         |

Notes:

(1) NSK K1™ for food and medical equipments are available for NH15-35 and NS15-35.

(2) Ball slide length equipped with NSK K1™ = (Standard ball slide length) + (Thickness of NSK K1™, V<sub>1</sub> x Number of NSK K1™) + (Thickness of the protective cover, V<sub>2</sub> x 2)

## 8. Installation

### (1) Permissible values of mounting error

Mounting errors may result in harmful effects, such as shortened operating life, deteriorated motion accuracy and/or friction variation. Using those mounting errors shown in Figures 8 and 9 as representative errors, Tables 17 and 18 show the mounting tolerances.

Fig. 8

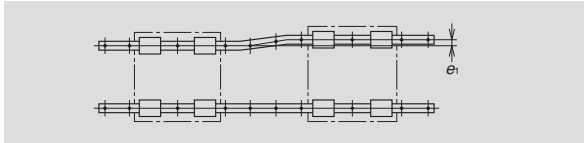


Fig. 9

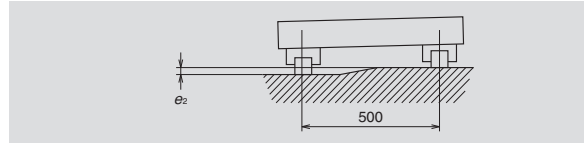


Table 17

| Value                                                        | Preload        | Model No.         |      |      |      |      |      |      |      |
|--------------------------------------------------------------|----------------|-------------------|------|------|------|------|------|------|------|
|                                                              |                | NH15              | NH20 | NH25 | NH30 | NH35 | NH45 | NH55 | NH65 |
| Permissible values of parallelism in two rails $e_1$         | Z0, ZT         | 22                | 30   | 40   | 45   | 55   | 65   | 80   | 110  |
|                                                              | Z1, ZZ         | 18                | 20   | 25   | 30   | 35   | 45   | 55   | 70   |
|                                                              | Z3, ZH         | 13                | 15   | 20   | 25   | 30   | 40   | 45   | 60   |
| Permissible values of parallelism(height) in two rails $e_2$ | Z0, ZT         | 375 $\mu$ m/500mm |      |      |      |      |      |      |      |
|                                                              | Z1, ZZ, Z3, ZH | 330 $\mu$ m/500mm |      |      |      |      |      |      |      |

Unit:  $\mu$ m

Table 18

| Value                                                        | Preload        | Model No.         |      |      |      |      |
|--------------------------------------------------------------|----------------|-------------------|------|------|------|------|
|                                                              |                | NS15              | NS20 | NS25 | NS30 | NS35 |
| Permissible values of parallelism in two rails $e_1$         | Z0, ZT         | 20                | 22   | 30   | 35   | 40   |
|                                                              | Z1, ZZ         | 15                | 17   | 20   | 25   | 30   |
|                                                              | Z3, ZH         | 12                | 15   | 15   | 20   | 25   |
| Permissible values of parallelism(height) in two rails $e_2$ | Z0, ZT         | 375 $\mu$ m/500mm |      |      |      |      |
|                                                              | Z1, ZZ, Z3, ZH | 330 $\mu$ m/500mm |      |      |      |      |

Unit:  $\mu$ m

### (2) Shoulder height and corner radius of the mounting surface

When horizontally fixing a rail or ball slide by pushing it to the shoulder (the riser portion of the mounting surface) of the bed or table, refer to the shoulder height and corner radius specified in Fig. 10 and 11 and Table 19 as well.

Shoulder height of the mounting surface and corner radius  $r$

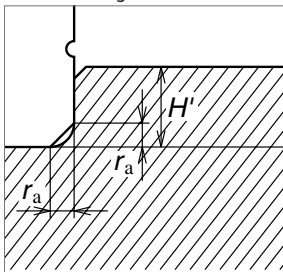


Fig. 10 Shoulder for the rail datum surface

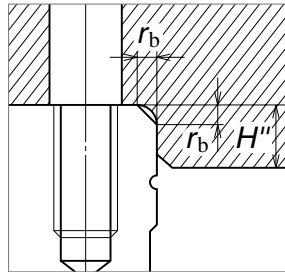


Fig. 11 Shoulder for the ball slide datum surface

Table 19

| Model No. | Corner radius (maximum) |       | Shoulder height |     |
|-----------|-------------------------|-------|-----------------|-----|
|           | $r_a$                   | $r_b$ | H'              | H'' |
| NH15      | 0.5                     | 0.5   | 4               | 4   |
| NH20      | 0.5                     | 0.5   | 4.5             | 5   |
| NH25      | 0.5                     | 0.5   | 5               | 5   |
| NH30      | 0.5                     | 0.5   | 6               | 6   |
| NH35      | 0.5                     | 0.5   | 6               | 6   |
| NH45      | 0.7                     | 0.7   | 8               | 8   |
| NH55      | 0.7                     | 0.7   | 10              | 10  |
| NH65      | 1.0                     | 1.0   | 11              | 11  |
| NS15      | 0.5                     | 0.5   | 4               | 4   |
| NS20      | 0.5                     | 0.5   | 4.5             | 5   |
| NS25      | 0.5                     | 0.5   | 5               | 5   |
| NS30      | 0.5                     | 0.5   | 6               | 6   |
| NS35      | 0.5                     | 0.5   | 6               | 6   |

Unit: mm

## 9. Maximum allowable speed

An indication of the standard maximum allowable speed aiming at 10,000km operation with linear guide under normal conditions is shown in Table 20. However, the maximum allowable speed can be affected by accuracy of installation, operating temperature, external load, etc.

If the operation is made exceeding the permissible distance and speed, please contact NSK.

Table 20 Maximum allowable speed

| Series | Size | 15 | 20 | 25  | 30 | 35 | 45  | 55 | 65  |
|--------|------|----|----|-----|----|----|-----|----|-----|
| NH     |      |    |    | 300 |    |    | 200 |    | 150 |
| NS     |      |    |    | 300 |    |    | —   |    | —   |

Unit: m/min

## 10. Handling Precautions

- (1) Beating a slide or hitting it against an object may cause damage.
- (2) Operating temperature should be less than 80°C. If exceeding this temperature, the plastic parts might be damaged.
- (3) If using NSK K1™, maximum temperature in use: 50°C (momentary maximum temperature in use: 80°C). Do not leave NSK K1™ lubrication unit in organic solvent, white kerosene such as hexane, thinner which removes oil, and rust prevention oil which contains white kerosene.
- (4) Regarding the handling of interchangeable products.
  - a) Slides of interchangeable type are assembled on a provisional rail (an inserting tool) when it is delivered.
  - b) When a slide is installed to the rail, make certain to use a provisional rail.
  - c) Do not remove slides from the provisional rail, except installation to the rail.

## Dimensions

NH-AN (High-load type/standard, square type)

NH-BN (Super-high-load type/long, square type)

(1) Reference number for assembly

|                    |             |                         |                                                            |                                                                                                                                              |                                       |                                                                |                                              |                                                                                                |
|--------------------|-------------|-------------------------|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------------|
| <b>NH</b>          | <b>30</b>   | <b>1200</b>             | <b>AN</b>                                                  | <b>C</b>                                                                                                                                     | <b>2</b>                              | <b>-***</b>                                                    | <b>P5</b>                                    | <b>3</b>                                                                                       |
| <b>SERIES NAME</b> | <b>SIZE</b> | <b>RAIL LENGTH (MM)</b> | <b>BALL SLIDE SHAPE CODE</b><br>(refer to Fig 2 on page 4) | <b>MATERIAL/SURFACE TREATMENT CODE</b><br>(refer to Table 16 on page 8)<br>C: Special high carbon steel (NSK standard)<br>S: Stainless steel | <b>NUMBER OF BALL SLIDES PER RAIL</b> | <b>DESIGN SERIAL NUMBER</b><br>(Added to the reference number) | <b>ACCURACY CODE</b> (refer to page 5 and 6) | <b>PRELOAD CODE</b><br>(refer to page 6)<br>0: Z0<br>1: Z1<br>3: Z3<br>T: ZT<br>Z: ZZ<br>H: ZH |

(2) Reference number for interchangeable type

Ball slide

|                                                                                            |             |                                                         |                                                                                                 |                                                                                          |                                                                                                                              |
|--------------------------------------------------------------------------------------------|-------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>NAH</b>                                                                                 | <b>30</b>   | <b>AN</b>                                               | <b>S</b>                                                                                        | <b>Z</b>                                                                                 | <b>-K</b>                                                                                                                    |
| <b>INTERCHANGEABLE BALL SLIDE SERIES CODE</b><br>NAH: NH Series Interchangeable Ball Slide | <b>SIZE</b> | <b>BALL SLIDE SHAPE CODE</b> (refer to Fig 2 on page 4) | <b>MATERIAL CODE</b><br>No code: Special high carbon steel (NSK standard)<br>S: Stainless steel | <b>PRELOAD CODE</b><br>No code: Fine clearance<br>Z: Slight preload<br>H: Medium preload | <b>OPTION CODE</b><br>-K: Equipped with NSK K1™<br>-K2: Two K1™ Lubrication Units<br>-D: Double Seals<br>-P: Protector Plate |

Rail

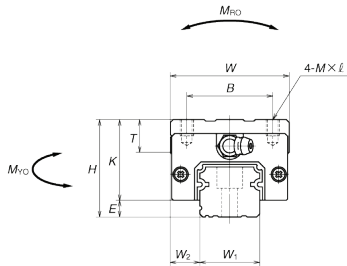
|                                                                                |             |                         |                                                                                                 |                                          |
|--------------------------------------------------------------------------------|-------------|-------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>N1H</b>                                                                     | <b>30</b>   | <b>1200</b>             | <b>S</b>                                                                                        | <b>Z</b>                                 |
| <b>INTERCHANGEABLE RAIL SERIES CODE</b><br>N1H: NH Series Interchangeable Rail | <b>SIZE</b> | <b>RAIL LENGTH (MM)</b> | <b>MATERIAL CODE</b><br>No code: Special high carbon steel (NSK standard)<br>S: Stainless steel | <b>PRELOAD CODE</b><br>Z: Slight preload |

| Model No.        | Assembly |     |                | Ball slide |               |               |           |             |                |      |    |                |                |     |                |                |  |
|------------------|----------|-----|----------------|------------|---------------|---------------|-----------|-------------|----------------|------|----|----------------|----------------|-----|----------------|----------------|--|
|                  | Height   |     |                | Width      | Length        | Mounting hole |           |             |                |      |    | Grease fitting |                |     |                |                |  |
|                  |          |     |                |            |               |               |           |             |                |      |    | Hole size      |                |     |                |                |  |
|                  | H        | E   | W <sub>2</sub> | W          | L             | B             | J         | M×Pitch×ℓ   | L <sub>1</sub> | K    | T  |                | T <sub>1</sub> | N   | W <sub>1</sub> | H <sub>1</sub> |  |
| NH15AN<br>NH15BN | 28       | 4.6 | 9.5            | 34         | 55<br>74      | 26            | 26        | M4×0.7×6    | 39<br>58       | 23.4 | 8  | ∅3             | 8.5            | 3.3 | 15             | 15             |  |
| NH20AN<br>NH20BN | 30       | 5   | 12             | 44         | 69.8<br>91.8  | 32            | 36<br>50  | M5×0.8×6    | 50<br>72       | 25   | 12 | M6×0.75        | 5              | 11  | 20             | 18             |  |
| NH25AN<br>NH25BN | 40       | 7   | 12.5           | 48         | 79<br>107     | 35            | 35<br>50  | M6×1×9      | 58<br>86       | 33   | 12 | M6×0.75        | 10             | 11  | 23             | 22             |  |
| NH30AN<br>NH30BN | 45       | 9   | 16             | 60         | 85.6<br>124.6 | 40            | 40<br>60  | M8×1.25×10  | 59<br>98       | 36   | 14 | M6×0.75        | 10             | 11  | 28             | 26             |  |
| NH35AN<br>NH35BN | 55       | 9.5 | 18             | 70         | 109<br>143    | 50            | 50<br>72  | M8×1.25×12  | 80<br>114      | 45.5 | 15 | M6×0.75        | 15             | 11  | 34             | 29             |  |
| NH45AN<br>NH45BN | 70       | 14  | 20.5           | 86         | 139<br>171    | 60            | 60<br>80  | M10×1.5×17  | 105<br>137     | 56   | 17 | Rc1/8          | 20             | 13  | 45             | 38             |  |
| NH55AN<br>NH55BN | 80       | 15  | 23.5           | 100        | 163<br>201    | 75            | 75<br>95  | M12×1.75×18 | 126<br>164     | 65   | 18 | Rc1/8          | 21             | 13  | 53             | 44             |  |
| NH65AN<br>NH65BN | 90       | 16  | 31.5           | 126        | 193<br>253    | 76            | 70<br>120 | M16×2×20    | 147<br>207     | 74   | 23 | Rc1/8          | 19             | 13  | 63             | 53             |  |

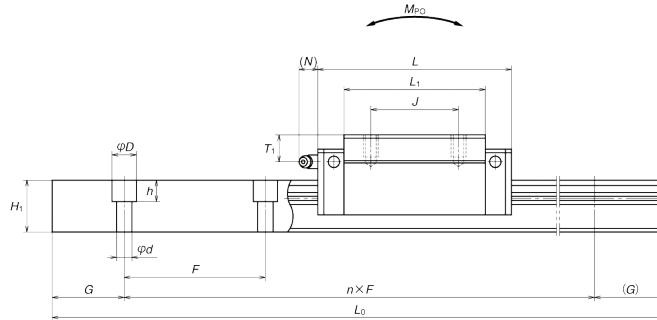
Notes: 1) External appearance of stainless steel ball slides differs from those of carbon steel ball slides.

## Assembly (Preloaded assembly, interchangeable type)

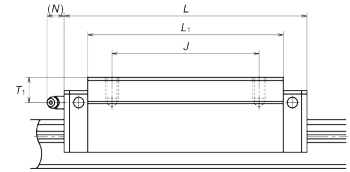
Front view of AN and BN types



Side view of AN type

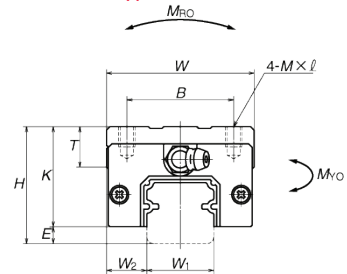


Side view of BN type

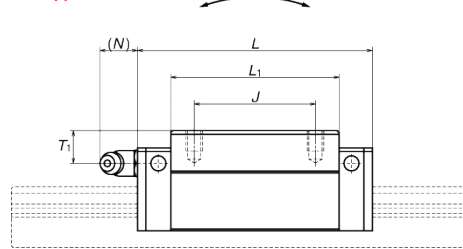


## Ball slide of interchangeable type

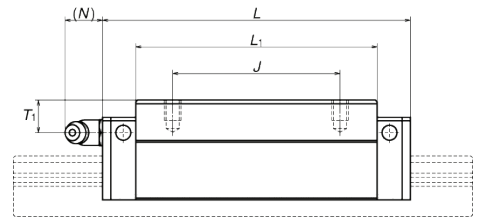
AN and BN types



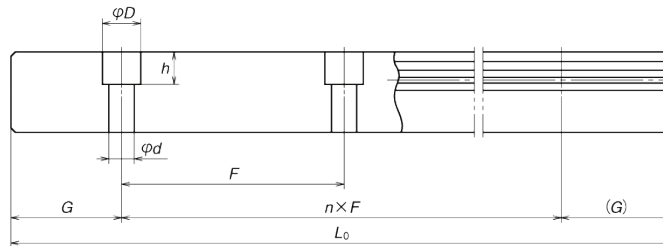
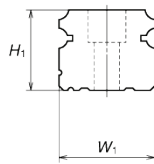
AN type



BN type



## Rail of interchangeable type



Unit: mm

| Rail       |                                |                  |                                                       | Basic load rating             |                                 |                                 |                 |                     |                  |                 |                  | Weight             |                |
|------------|--------------------------------|------------------|-------------------------------------------------------|-------------------------------|---------------------------------|---------------------------------|-----------------|---------------------|------------------|-----------------|------------------|--------------------|----------------|
| Pitch<br>F | Mounting<br>bolt hole<br>d×D×h | G<br>(reference) | Max. length<br>L <sub>0max</sub><br>( ) for stainless | 2)Dynamic                     |                                 | Static<br>C <sub>0</sub><br>(N) | M <sub>Ro</sub> | Static moment (N·m) |                  |                 |                  | Ball slide<br>(kg) | Rail<br>(kg/m) |
|            |                                |                  |                                                       | [50km]<br>C <sub>50</sub> (N) | [100km]<br>C <sub>100</sub> (N) |                                 |                 | M <sub>PO</sub>     |                  | M <sub>YO</sub> |                  |                    |                |
|            |                                |                  |                                                       |                               |                                 | (One slide)                     |                 | (Two slides)        | (One slide)      | (Two slides)    |                  |                    |                |
| 60         | 4.5×7.5×5.3                    | 20               | 2 980<br>(1 800)                                      | 14 200<br>18 100              | 11 300<br>14 400                | 20 700<br>32 000                | 108<br>166      | 94.5<br>216         | 575<br>1 150     | 79.5<br>181     | 480<br>965       | 0.18<br>0.26       | 1.6            |
| 60         | 6×9.5×8.5                      | 20               | 3 960<br>(3 500)                                      | 23 700<br>30 000              | 18 800<br>24 000                | 32 500<br>50 500                | 219<br>340      | 185<br>420          | 1 140<br>2 230   | 155<br>355      | 955<br>1 870     | 0.33<br>0.48       | 2.6            |
| 60         | 7×11×9                         | 20               | 3 960<br>(3 500)                                      | 33 500<br>45 500              | 26 800<br>36 500                | 46 000<br>71 000                | 360<br>555      | 320<br>725          | 1 840<br>3 700   | 267<br>610      | 1 540<br>3 100   | 0.55<br>0.82       | 3.6            |
| 80         | 9×14×12                        | 20               | 4 000<br>(3 500)                                      | 41 000<br>61 000              | 32 500<br>48 500                | 51 500<br>91 500                | 490<br>870      | 350<br>1 030        | 2 290<br>5 600   | 292<br>865      | 1 920<br>4 700   | 0.77<br>1.3        | 5.2            |
| 80         | 9×14×12                        | 20               | 4 000                                                 | 62 500<br>81 000              | 49 500<br>64 500                | 80 500<br>117 000               | 950<br>1 380    | 755<br>1 530        | 4 500<br>8 350   | 630<br>1 280    | 3 800<br>7 000   | 1.5<br>2.1         | 7.2            |
| 105        | 14×20×17                       | 22.5             | 3 990                                                 | 107 000<br>131 000            | 84 500<br>104 000               | 140 000<br>187 000              | 2 140<br>2 860  | 1 740<br>3 000      | 9 750<br>15 600  | 1 460<br>2 520  | 8 150<br>13 100  | 3.0<br>3.9         | 12.3           |
| 120        | 16×23×20                       | 30               | 3 960                                                 | 158 000<br>193 000            | 125 000<br>153 000              | 198 000<br>264 000              | 3 600<br>4 850  | 3 000<br>5 150      | 16 300<br>26 300 | 2 510<br>4 350  | 13 700<br>22 100 | 4.7<br>6.1         | 16.9           |
| 150        | 18×26×22                       | 35               | 3 900                                                 | 239 000<br>310 000            | 190 000<br>246 000              | 281 000<br>410 000              | 6 150<br>8 950  | 4 950<br>10 100     | 27 900<br>51 500 | 4 150<br>8 450  | 23 400<br>43 500 | 7.7<br>10.8        | 24.3           |

2) The basic load rating comply with the ISO standard. (ISO14728-1 and ISO14728-2)

C<sub>50</sub>: the basic dynamic load rating for 50 km rating fatigue life, C<sub>100</sub>: the basic dynamic load rating for 100 km rating fatigue life

# NH-AL (High-load type/standard, square low-profile type)

## NH-BL (Super-high-load type/long, square low-profile type)

### (1) Reference number for assembly

|                    |             |                         |                                                            |                                                                                                                                              |                                       |                                                                |                                              |                                                                                                |
|--------------------|-------------|-------------------------|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------------|
| <b>NH</b>          | <b>30</b>   | <b>1200</b>             | <b>AL</b>                                                  | <b>C</b>                                                                                                                                     | <b>2</b>                              | <b>-***</b>                                                    | <b>P5</b>                                    | <b>3</b>                                                                                       |
| <b>SERIES NAME</b> | <b>SIZE</b> | <b>RAIL LENGTH (MM)</b> | <b>BALL SLIDE SHAPE CODE</b><br>(refer to Fig 2 on page 4) | <b>MATERIAL/SURFACE TREATMENT CODE</b><br>(refer to Table 16 on page 8)<br>C: Special high carbon steel (NSK standard)<br>S: Stainless steel | <b>NUMBER OF BALL SLIDES PER RAIL</b> | <b>DESIGN SERIAL NUMBER</b><br>(Added to the reference number) | <b>ACCURACY CODE</b> (refer to page 5 and 6) | <b>PRELOAD CODE</b><br>(refer to page 6)<br>0: Z0<br>1: Z1<br>3: Z3<br>T: ZT<br>Z: ZZ<br>H: ZH |

### (2) Reference number for interchangeable type

#### Ball slide

|                                                                                            |             |                                                         |                                                                                                 |                                                                                          |                                                                                                                              |
|--------------------------------------------------------------------------------------------|-------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>NAH</b>                                                                                 | <b>30</b>   | <b>AL</b>                                               | <b>S</b>                                                                                        | <b>Z</b>                                                                                 | <b>-K</b>                                                                                                                    |
| <b>INTERCHANGEABLE BALL SLIDE SERIES CODE</b><br>NAH: NH Series Interchangeable Ball Slide | <b>SIZE</b> | <b>BALL SLIDE SHAPE CODE</b> (refer to Fig 2 on page 4) | <b>MATERIAL CODE</b><br>No code: Special high carbon steel (NSK standard)<br>S: Stainless steel | <b>PRELOAD CODE</b><br>No code: Fine clearance<br>Z: Slight preload<br>H: Medium preload | <b>OPTION CODE</b><br>-K: Equipped with NSK K1™<br>-K2: Two K1™ Lubrication Units<br>-D: Double Seals<br>-P: Protector Plate |

#### Rail

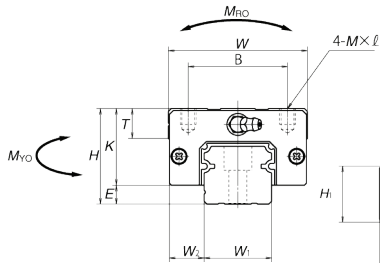
|                                                                                |             |                         |                                                                                                 |                                          |
|--------------------------------------------------------------------------------|-------------|-------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>N1H</b>                                                                     | <b>30</b>   | <b>1200</b>             | <b>S</b>                                                                                        | <b>Z</b>                                 |
| <b>INTERCHANGEABLE RAIL SERIES CODE</b><br>N1H: NH Series Interchangeable Rail | <b>SIZE</b> | <b>RAIL LENGTH (MM)</b> | <b>MATERIAL CODE</b><br>No code: Special high carbon steel (NSK standard)<br>S: Stainless steel | <b>PRELOAD CODE</b><br>Z: Slight preload |

| Model No.        | Assembly |     |                | Ball slide |               |               |          |             |                |      |    |                |                |    |       |    |  |
|------------------|----------|-----|----------------|------------|---------------|---------------|----------|-------------|----------------|------|----|----------------|----------------|----|-------|----|--|
|                  | Height   | E   | W <sub>2</sub> | Width      | Length        | Mounting hole |          |             | L <sub>1</sub> | K    | T  | Grease fitting |                |    | Width |    |  |
|                  |          |     |                |            |               | B             | J        | M×Pitch×ℓ   |                |      |    | Hole size      | T <sub>1</sub> | N  |       |    |  |
| NH25AL<br>NH25BL | 36       | 7   | 12.5           | 48         | 79<br>107     | 35            | 35<br>50 | M6×1×6      | 58<br>86       | 29   | 12 | M6×0.75        | 6              | 11 | 23    | 22 |  |
| NH30AL<br>NH30BL | 42       | 9   | 16             | 60         | 85.6<br>124.6 | 40            | 40<br>60 | M8×1.25×8   | 59<br>98       | 33   | 14 | M6×0.75        | 7              | 11 | 28    | 26 |  |
| NH35AL<br>NH35BL | 48       | 9.5 | 18             | 70         | 109<br>143    | 50            | 50<br>72 | M8×1.25×8   | 80<br>114      | 38.5 | 15 | M6×0.75        | 8              | 11 | 34    | 29 |  |
| NH45AL<br>NH45BL | 60       | 14  | 20.5           | 86         | 139<br>171    | 60            | 60<br>80 | M10×1.5×10  | 105<br>137     | 46   | 17 | Rc1/8          | 10             | 13 | 45    | 38 |  |
| NH55AL<br>NH55BL | 70       | 15  | 23.5           | 100        | 163<br>201    | 75            | 75<br>95 | M12×1.75×13 | 126<br>164     | 55   | 15 | Rc1/8          | 11             | 13 | 53    | 44 |  |

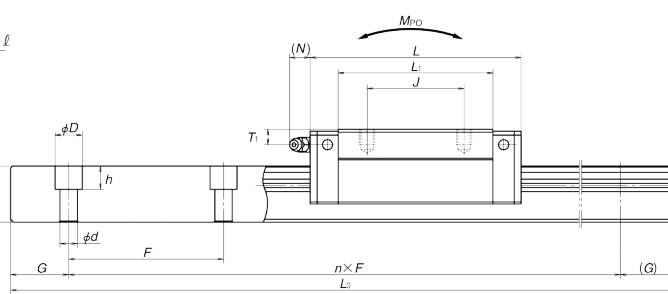
Notes: 1) External appearance of stainless steel ball slides differs from those of carbon steel ball slides.

## Assembly (Preloaded assembly, interchangeable type)

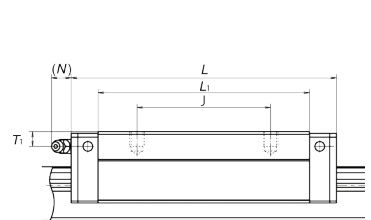
Front view of AL and BL types



Side view of AL type

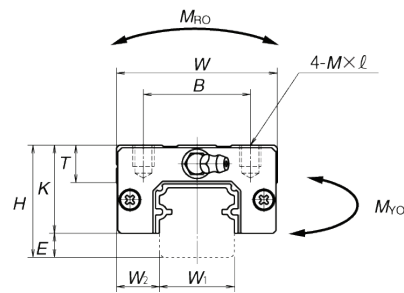


Side view of BL type

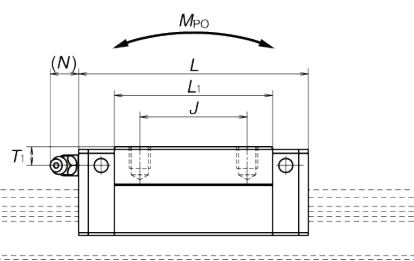


## Ball slide of interchangeable type

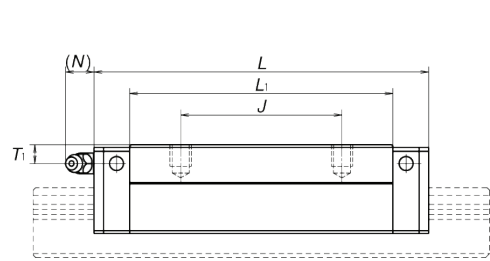
AL and BL types



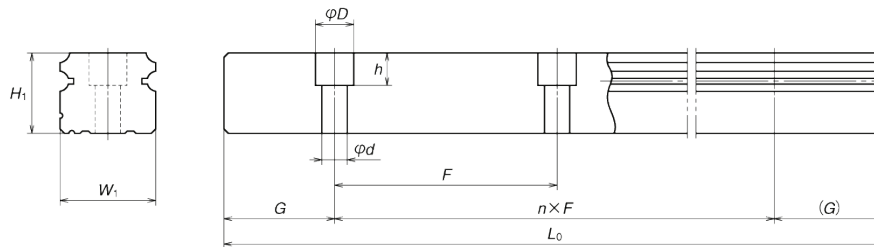
AL type



BL type



## Rail of interchangeable type



Unit: mm

| Rail  |                                |      |                                                       | Basic load rating             |                                 |                                 |                 |                     |                  |                 |                  | Weight             |                |
|-------|--------------------------------|------|-------------------------------------------------------|-------------------------------|---------------------------------|---------------------------------|-----------------|---------------------|------------------|-----------------|------------------|--------------------|----------------|
| Pitch | Mounting<br>bolt hole<br>d×D×h | G    | Max. length<br>L <sub>0max</sub><br>( ) for stainless | 2)Dynamic                     |                                 | Static<br>C <sub>0</sub><br>(N) | M <sub>RO</sub> | Static moment (N·m) |                  |                 |                  | Ball slide<br>(kg) | Rail<br>(kg/m) |
| F     |                                |      |                                                       | [50km]<br>C <sub>50</sub> (N) | [100km]<br>C <sub>100</sub> (N) |                                 |                 | M <sub>PO</sub>     |                  | M <sub>YO</sub> |                  |                    |                |
|       |                                |      |                                                       |                               |                                 | (One slide)                     |                 | (Two slides)        | (One slide)      | (Two slides)    |                  |                    |                |
| 60    | 7×11×9                         | 20   | 3 960<br>(3 500)                                      | 33 500<br>45 500              | 26 800<br>36 500                | 46 000<br>71 000                | 360<br>555      | 320<br>725          | 1 840<br>3 700   | 267<br>610      | 1 540<br>3 100   | 0.46<br>0.69       | 3.6            |
| 80    | 9×14×12                        | 20   | 4 000<br>(3 500)                                      | 41 000<br>61 000              | 32 500<br>48 500                | 51 500<br>91 500                | 490<br>870      | 350<br>1 030        | 2 290<br>5 600   | 292<br>865      | 1 920<br>4 700   | 0.69<br>1.16       | 5.2            |
| 80    | 9×14×12                        | 20   | 4 000                                                 | 62 500<br>81 000              | 49 500<br>64 500                | 80 500<br>117 000               | 950<br>1 380    | 755<br>1 530        | 4 500<br>8 350   | 630<br>1 280    | 3 800<br>7 000   | 1.2<br>1.7         | 7.2            |
| 105   | 14×20×17                       | 22.5 | 3 990                                                 | 107 000<br>131 000            | 84 500<br>104 000               | 140 000<br>187 000              | 2 140<br>2 860  | 1 740<br>3 000      | 9 750<br>15 600  | 1 460<br>2 520  | 8 150<br>13 100  | 2.2<br>2.9         | 12.3           |
| 120   | 16×23×20                       | 30   | 3 960                                                 | 158 000<br>193 000            | 125 000<br>153 000              | 198 000<br>264 000              | 3 600<br>4 850  | 3 000<br>5 150      | 16 300<br>26 300 | 2 510<br>4 350  | 13 700<br>22 100 | 3.7<br>4.7         | 16.9           |

2) The basic load rating comply with the ISO standard. (ISO14728-1 and ISO14728-2)  
C<sub>50</sub>: the basic dynamic load rating for 50 km rating fatigue life, C<sub>100</sub>: the basic dynamic load rating for 100 km rating fatigue life

# NH-EM (High-load type/standard, flange type)

## NH-GM (Super-high-load type/long, flange type)

### (1) Reference number for assembly

|                    |             |                         |                                                            |                                                                                                                                              |                                       |                                                                |                                              |                                                                                                |
|--------------------|-------------|-------------------------|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------------|
| <b>NH</b>          | <b>30</b>   | <b>1200</b>             | <b>EM</b>                                                  | <b>C</b>                                                                                                                                     | <b>2</b>                              | <b>-***</b>                                                    | <b>P5</b>                                    | <b>3</b>                                                                                       |
| <b>SERIES NAME</b> | <b>SIZE</b> | <b>RAIL LENGTH (MM)</b> | <b>BALL SLIDE SHAPE CODE</b><br>(refer to Fig 2 on page 4) | <b>MATERIAL/SURFACE TREATMENT CODE</b><br>(refer to Table 16 on page 8)<br>C: Special high carbon steel (NSK standard)<br>S: Stainless steel | <b>NUMBER OF BALL SLIDES PER RAIL</b> | <b>DESIGN SERIAL NUMBER</b><br>(Added to the reference number) | <b>ACCURACY CODE</b> (refer to page 5 and 6) | <b>PRELOAD CODE</b><br>(refer to page 6)<br>0: Z0<br>1: Z1<br>3: Z3<br>T: ZT<br>Z: ZZ<br>H: ZH |

### (2) Reference number for interchangeable type

#### Ball slide

|                                                                                            |             |                                                         |                                                                                                 |                                                                                          |                                                                                                                              |
|--------------------------------------------------------------------------------------------|-------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>NAH</b>                                                                                 | <b>30</b>   | <b>EM</b>                                               | <b>S</b>                                                                                        | <b>Z</b>                                                                                 | <b>-K</b>                                                                                                                    |
| <b>INTERCHANGEABLE BALL SLIDE SERIES CODE</b><br>NAH: NH Series Interchangeable Ball Slide | <b>SIZE</b> | <b>BALL SLIDE SHAPE CODE</b> (refer to Fig 2 on page 4) | <b>MATERIAL CODE</b><br>No code: Special high carbon steel (NSK standard)<br>S: Stainless steel | <b>PRELOAD CODE</b><br>No code: Fine clearance<br>Z: Slight preload<br>H: Medium preload | <b>OPTION CODE</b><br>-K: Equipped with NSK K1™<br>-K2: Two K1™ Lubrication Units<br>-D: Double Seals<br>-P: Protector Plate |

#### Rail

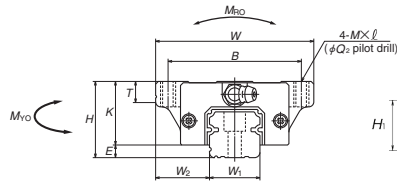
|                                                                                |             |                         |                                                                                                 |                                          |
|--------------------------------------------------------------------------------|-------------|-------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>N1H</b>                                                                     | <b>30</b>   | <b>1200</b>             | <b>S</b>                                                                                        | <b>Z</b>                                 |
| <b>INTERCHANGEABLE RAIL SERIES CODE</b><br>N1H: NH Series Interchangeable Rail | <b>SIZE</b> | <b>RAIL LENGTH (MM)</b> | <b>MATERIAL CODE</b><br>No code: Special high carbon steel (NSK standard)<br>S: Stainless steel | <b>PRELOAD CODE</b><br>Z: Slight preload |

| Model No.        | Assembly |     |                | Ball slide |               |               |     |                              |                |                |      |            |                |                |     | Width          |                | Height |  |
|------------------|----------|-----|----------------|------------|---------------|---------------|-----|------------------------------|----------------|----------------|------|------------|----------------|----------------|-----|----------------|----------------|--------|--|
|                  | Height   | E   | W <sub>2</sub> | Width      | Length        | Mounting hole |     |                              |                | L <sub>1</sub> | K    | T          | Grease fitting |                |     |                |                |        |  |
|                  |          |     |                |            |               | B             | J   | M×Pitch×ℓ                    | Q <sub>2</sub> |                |      |            | Hole size      | T <sub>1</sub> | N   | W <sub>1</sub> | H <sub>1</sub> |        |  |
| NH15EM<br>NH15GM | 24       | 4.6 | 16.0           | 47         | 55<br>74      | 38            | 30  | M5×0.8×7                     | 4.4            | 39<br>58       | 19.4 | 8          | ∅3             | 4.5            | 3.3 | 15             | 15             |        |  |
| NH20EM<br>NH20GM | 30       | 5   | 21.5           | 63         | 69.8<br>91.8  | 53            | 40  | M6×1×9.5                     | 5.3            | 50<br>72       | 25   | 10         | M6×0.75        | 5              | 11  | 20             | 18             |        |  |
| NH25EM<br>NH25GM | 36       | 7   | 23.5           | 70         | 79<br>107     | 57            | 45  | M8×1.25×10<br>(M8×1.25×11.5) | 6.8            | 58<br>86       | 29   | 11<br>(12) | M6×0.75        | 6              | 11  | 23             | 22             |        |  |
| NH30EM<br>NH30GM | 42       | 9   | 31.0           | 90         | 98.6<br>124.6 | 72            | 52  | M10×1.5×12<br>(M10×1.5×14.5) | 8.6            | 72<br>98       | 33   | 11<br>(15) | M6×0.75        | 7              | 11  | 28             | 26             |        |  |
| NH35EM<br>NH35GM | 48       | 9.5 | 33.0           | 100        | 109<br>143    | 82            | 62  | M10×1.5×13                   | 8.6            | 80<br>114      | 38.5 | 12         | M6×0.75        | 8              | 11  | 34             | 29             |        |  |
| NH45EM<br>NH45GM | 60       | 14  | 37.5           | 120        | 139<br>171    | 100           | 80  | M12×1.75×15                  | 10.5           | 105<br>137     | 46   | 13         | Rc1/8          | 10             | 13  | 45             | 38             |        |  |
| NH55EM<br>NH55GM | 70       | 15  | 43.5           | 140        | 163<br>201    | 116           | 95  | M14×2×18                     | 12.5           | 126<br>164     | 55   | 15         | Rc1/8          | 11             | 13  | 53             | 44             |        |  |
| NH65EM<br>NH65GM | 90       | 16  | 53.5           | 170        | 193<br>253    | 142           | 110 | M16×2×24                     | 14.6           | 147<br>207     | 74   | 23         | Rc1/8          | 19             | 13  | 63             | 53             |        |  |

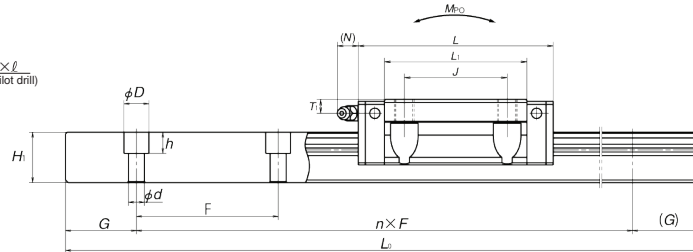
Notes: 1) Parenthesized dimensions are for items made of stainless steel.  
2) External appearance of stainless steel ball slides differs from those of carbon steel ball slides.

## Assembly (Preloaded assembly, interchangeable type)

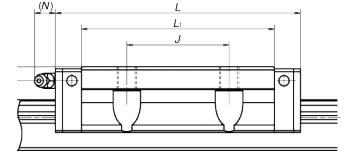
Front view of EM and GM types



Side view of EM type

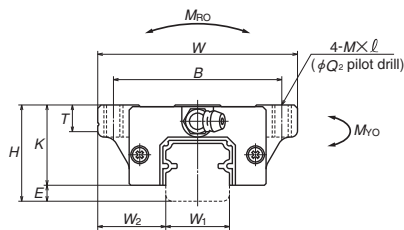


Side view of GM type

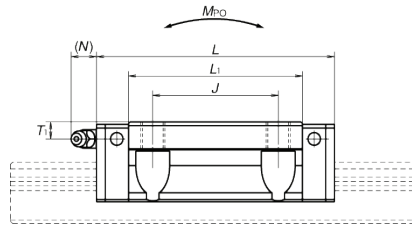


## Ball slide of interchangeable type

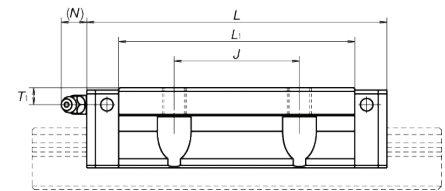
EM and GM types



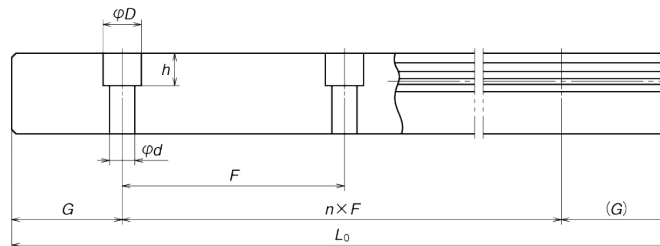
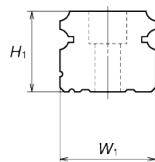
EM type



GM type



## Rail of interchangeable type



Unit: mm

| Rail  |                                |      |                                                       | Basic load rating             |                                 |                                 |                     |                 |             |                 |            | Weight         |      |
|-------|--------------------------------|------|-------------------------------------------------------|-------------------------------|---------------------------------|---------------------------------|---------------------|-----------------|-------------|-----------------|------------|----------------|------|
| Pitch | Mounting<br>bolt hole<br>d×D×h | G    | Max. length<br>L <sub>0max</sub><br>( ) for stainless | 3)Dynamic                     |                                 | Static<br>C <sub>0</sub><br>(N) | Static moment (N·m) |                 |             |                 | Ball slide | Rail<br>(kg/m) |      |
| F     |                                |      |                                                       | [50km]<br>C <sub>50</sub> (N) | [100km]<br>C <sub>100</sub> (N) |                                 | M <sub>RO</sub>     | M <sub>PO</sub> |             | M <sub>YO</sub> |            |                |      |
|       |                                |      |                                                       |                               |                                 | (One slide)                     |                     | (Two slides)    | (One slide) | (Two slides)    | (kg)       |                |      |
| 60    | 4.5×7.5×5.3                    | 20   | 2 980                                                 | 14 200                        | 11 300                          | 20 700                          | 108                 | 94.5            | 575         | 79.5            | 480        | 0.17           | 1.6  |
|       |                                |      | (1 800)                                               | 18 100                        | 14 400                          | 32 000                          | 166                 | 216             | 1 150       | 181             | 965        | 0.25           |      |
| 60    | 6×9.5×8.5                      | 20   | 3 960                                                 | 23 700                        | 18 800                          | 32 500                          | 219                 | 185             | 1 140       | 155             | 955        | 0.45           | 2.6  |
|       |                                |      | (3 500)                                               | 30 000                        | 24 000                          | 50 500                          | 340                 | 420             | 2 230       | 355             | 1 870      | 0.65           |      |
| 60    | 7×11×9                         | 20   | 3 960                                                 | 33 500                        | 26 800                          | 46 000                          | 360                 | 320             | 1 840       | 267             | 1 540      | 0.63           | 3.6  |
|       |                                |      | (3 500)                                               | 45 500                        | 36 500                          | 71 000                          | 555                 | 725             | 3 700       | 610             | 3 100      | 0.93           |      |
| 80    | 9×14×12                        | 20   | 4 000                                                 | 47 000                        | 37 500                          | 63 000                          | 600                 | 505             | 3 150       | 425             | 2 650      | 1.2            | 5.2  |
|       |                                |      | (3 500)                                               | 61 000                        | 48 500                          | 91 500                          | 870                 | 1 030           | 5 600       | 865             | 4 700      | 1.6            |      |
| 80    | 9×14×12                        | 20   | 4 000                                                 | 62 500                        | 49 500                          | 80 500                          | 950                 | 755             | 4 500       | 630             | 3 800      | 1.7            | 7.2  |
|       |                                |      |                                                       | 81 000                        | 64 500                          | 117 000                         | 1 380               | 1 530           | 8 350       | 1 280           | 7 000      | 2.4            |      |
| 105   | 14×20×17                       | 22.5 | 3 990                                                 | 107 000                       | 84 500                          | 140 000                         | 2 140               | 1 740           | 9 750       | 1 460           | 8 150      | 3.0            | 12.3 |
|       |                                |      |                                                       | 131 000                       | 104 000                         | 187 000                         | 2 860               | 3 000           | 15 600      | 2 520           | 13 100     | 3.9            |      |
| 120   | 16×23×20                       | 30   | 3 960                                                 | 158 000                       | 125 000                         | 198 000                         | 3 600               | 3 000           | 16 300      | 2 510           | 13 700     | 5.0            | 16.9 |
|       |                                |      |                                                       | 193 000                       | 153 000                         | 264 000                         | 4 850               | 5 150           | 26 300      | 4 350           | 22 100     | 6.5            |      |
| 150   | 18×26×22                       | 35   | 3 900                                                 | 239 000                       | 190 000                         | 281 000                         | 6 150               | 4 950           | 27 900      | 4 150           | 23 400     | 10.0           | 24.3 |
|       |                                |      |                                                       | 310 000                       | 246 000                         | 410 000                         | 8 950               | 10 100          | 51 500      | 8 450           | 43 500     | 14.1           |      |

<sup>3)</sup> The basic load rating comply with the ISO standard. (ISO14728-1 and ISO14728-2)

C<sub>50</sub>: the basic dynamic load rating for 50 km rating fatigue life, C<sub>100</sub>: the basic dynamic load rating for 100 km rating fatigue life

# NS-CL (Medium-load type/short, square low-profile type)

## NS-AL (High-load type/standard, square low-profile type)

### (1) Reference number for assembly

|                    |             |                         |                                                            |                                                                                                                                              |                                       |                                                                |                                              |                                                                                                |
|--------------------|-------------|-------------------------|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------------|
| <b>NS</b>          | <b>30</b>   | <b>1200</b>             | <b>AL</b>                                                  | <b>C</b>                                                                                                                                     | <b>2</b>                              | <b>❖❖</b>                                                      | <b>P5</b>                                    | <b>3</b>                                                                                       |
| <b>SERIES NAME</b> | <b>SIZE</b> | <b>RAIL LENGTH (MM)</b> | <b>BALL SLIDE SHAPE CODE</b><br>(refer to Fig 2 on page 4) | <b>MATERIAL/SURFACE TREATMENT CODE</b><br>(refer to Table 16 on page 8)<br>C: Special high carbon steel (NSK standard)<br>S: Stainless steel | <b>NUMBER OF BALL SLIDES PER RAIL</b> | <b>DESIGN SERIAL NUMBER</b><br>(Added to the reference number) | <b>ACCURACY CODE</b> (refer to page 5 and 6) | <b>PRELOAD CODE</b><br>(refer to page 6)<br>0: Z0<br>1: Z1<br>3: Z3<br>T: ZT<br>Z: ZZ<br>H: ZH |

### (2) Reference number for interchangeable type

#### Ball slide

|                                                                                            |             |                                                            |                                                                                                 |                                                                                          |                                                                                                                              |
|--------------------------------------------------------------------------------------------|-------------|------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>NAS</b>                                                                                 | <b>30</b>   | <b>AL</b>                                                  | <b>S</b>                                                                                        | <b>Z</b>                                                                                 | <b>-K</b>                                                                                                                    |
| <b>INTERCHANGEABLE BALL SLIDE SERIES CODE</b><br>NAS: NS Series Interchangeable Ball Slide | <b>SIZE</b> | <b>BALL SLIDE SHAPE CODE</b><br>(refer to Fig 2 on page 4) | <b>MATERIAL CODE</b><br>No code: Special high carbon steel (NSK standard)<br>S: Stainless steel | <b>PRELOAD CODE</b><br>No code: Fine clearance<br>Z: Slight preload<br>H: Medium preload | <b>OPTION CODE</b><br>-K: Equipped with NSK K1™<br>-K2: Two K1™ Lubrication Units<br>-D: Double Seals<br>-P: Protector Plate |

#### Rail

|                                                                                |             |                         |                                                                                     |                                                                                                 |                                          |
|--------------------------------------------------------------------------------|-------------|-------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>N1S</b>                                                                     | <b>30</b>   | <b>1200</b>             | <b>L</b>                                                                            | <b>S</b>                                                                                        | <b>Z</b>                                 |
| <b>INTERCHANGEABLE RAIL SERIES CODE</b><br>N1S: NS Series Interchangeable Rail | <b>SIZE</b> | <b>RAIL LENGTH (MM)</b> | <b>RAIL SHAPE CODE</b><br>L: Standard<br>T: The rail mounting bolt hole M4 for NS15 | <b>MATERIAL CODE</b><br>No code: Special high carbon steel (NSK standard)<br>S: Stainless steel | <b>PRELOAD CODE</b><br>Z: Slight preload |

| Model No.        | Assembly |      |                | Ball slide |              |               |         |            |                |      |    |                |                |    | Width          |      | Height |
|------------------|----------|------|----------------|------------|--------------|---------------|---------|------------|----------------|------|----|----------------|----------------|----|----------------|------|--------|
|                  | Height   | E    | W <sub>2</sub> | Width      | Length       | Mounting hole |         |            | L <sub>1</sub> | K    | T  | Grease fitting |                |    |                |      |        |
|                  |          |      |                |            |              | B             | J       | M×Pitch×ℓ  |                |      |    | Hole size      | T <sub>1</sub> | N  | W <sub>1</sub> |      |        |
| NS15CL<br>NS15AL | 24       | 4.6  | 9.5            | 34         | 40.4<br>56.8 | 26            | —<br>26 | M4×0.7×6   | 23.6<br>40     | 19.4 | 10 | ∅3             | 6              | 3  | 15             | 12.5 |        |
| NS20CL<br>NS20AL | 28       | 6    | 11             | 42         | 47.2<br>65.2 | 32            | —<br>32 | M5×0.8×7   | 30<br>48       | 22   | 12 | M6×0.75        | 5.5            | 11 | 20             | 15.5 |        |
| NS25CL<br>NS25AL | 33       | 7    | 12.5           | 48         | 59.6<br>81.6 | 35            | —<br>35 | M6×1×9     | 38<br>60       | 26   | 12 | M6×0.75        | 7              | 11 | 23             | 18   |        |
| NS30CL<br>NS30AL | 42       | 9    | 16             | 60         | 67.4<br>96.4 | 40            | —<br>40 | M8×1.25×12 | 42<br>71       | 33   | 13 | M6×0.75        | 8              | 11 | 28             | 23   |        |
| NS35CL<br>NS35AL | 48       | 10.5 | 18             | 70         | 77<br>108    | 50            | —<br>50 | M8×1.25×12 | 49<br>80       | 37.5 | 14 | M6×0.75        | 8.5            | 11 | 34             | 27.5 |        |

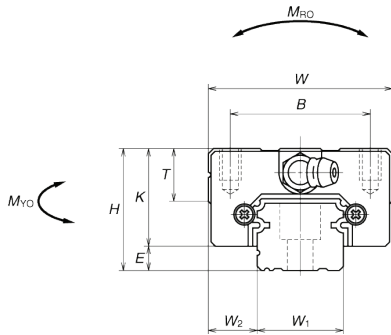
Notes: 1) External appearance of stainless steel ball slides differs from those of carbon steel ball slides.

2) The basic load rating comply with the ISO standard. (ISO14728-1 and ISO14728-2)

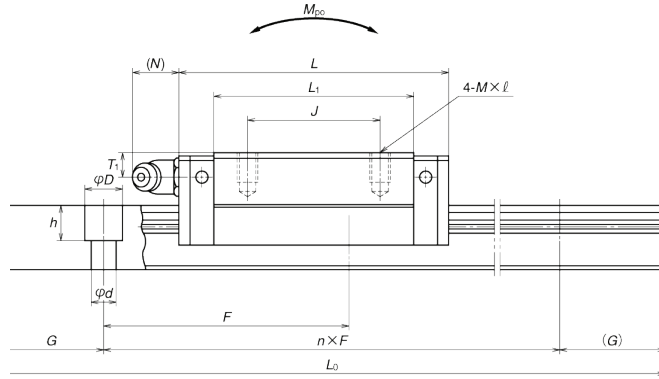
C<sub>90</sub>: the basic dynamic load rating for 90 km rating fatigue life, C<sub>100</sub>: the basic dynamic load rating for 100 km rating fatigue life

## Assembly (Preloaded assembly, interchangeable type)

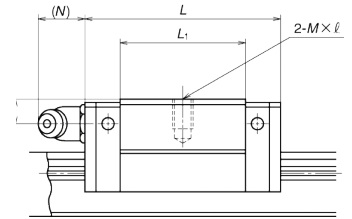
Front view of AL and CL types



Side view of AL type

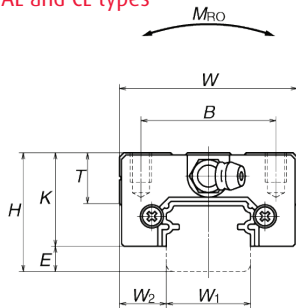


Side view of CL type

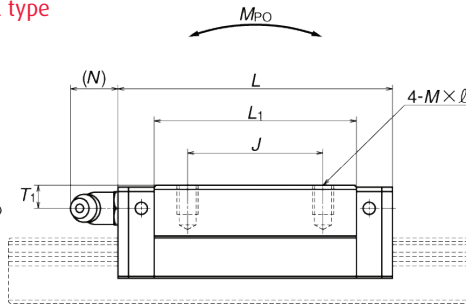


## Ball slide of interchangeable type

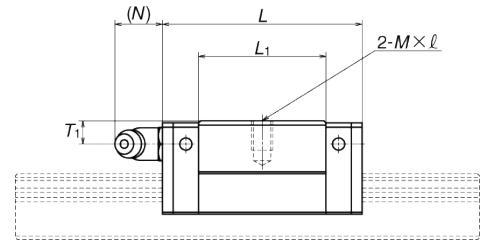
AL and CL types



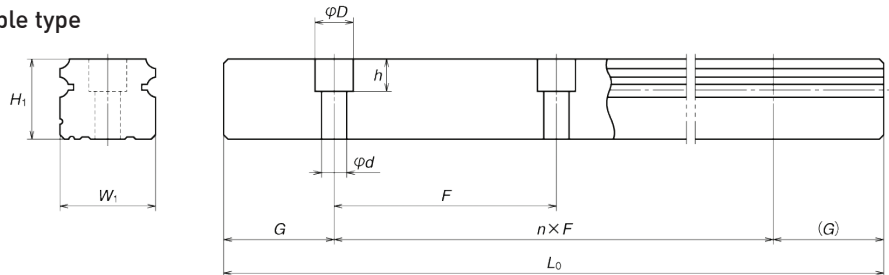
AL type



CL type



## Rail of interchangeable type



Unit: mm

| Rail  |                           |             |                                                 | Basic load rating          |                              |                    |                     |                 |                |                 |                | Weight       |        |
|-------|---------------------------|-------------|-------------------------------------------------|----------------------------|------------------------------|--------------------|---------------------|-----------------|----------------|-----------------|----------------|--------------|--------|
| Pitch | Mounting bolt hole d×D×h  | G           | Max. length L <sub>0max</sub> ( ) for stainless | 2)Dynamic                  |                              | Static             | Static moment (N-m) |                 |                |                 | Ball slide     | Rail         |        |
| F     |                           | (reference) |                                                 | [50km] C <sub>50</sub> (N) | [100km] C <sub>100</sub> (N) | C <sub>0</sub> (N) | M <sub>RO</sub>     | M <sub>PO</sub> |                | M <sub>YO</sub> |                |              |        |
|       |                           |             |                                                 |                            |                              |                    |                     | (One slide)     | (Two slides)   | (One slide)     | (Two slides)   | (kg)         | (kg/m) |
| 60    | *3.5×6×4.5<br>4.5×7.5×5.3 | 20          | 2 920<br>(1 700)                                | 7 250<br>11 200            | 5 750<br>8 850               | 9 100<br>16 900    | 45.5<br>84.5        | 24.5<br>77      | 196<br>470     | 20.5<br>64.5    | 165<br>395     | 0.14<br>0.20 | 1.4    |
| 60    | 6×9.5×8.5                 | 20          | 3 960<br>(3 500)                                | 10 600<br>15 600           | 8 400<br>12 400              | 13 400<br>23 500   | 91.5<br>160         | 46.5<br>133     | 330<br>755     | 39<br>111       | 279<br>630     | 0.19<br>0.28 | 2.3    |
| 60    | 7×11×9                    | 20          | 3 960<br>(3 500)                                | 17 700<br>26 100           | 14 000<br>20 700             | 20 800<br>36 500   | 164<br>286          | 91<br>258       | 655<br>1 470   | 76<br>217       | 550<br>1 230   | 0.34<br>0.51 | 3.1    |
| 80    | 7×11×9                    | 20          | 4 000<br>(3 500)                                | 24 700<br>38 000           | 19 600<br>30 000             | 29 600<br>55 000   | 282<br>520          | 139<br>435      | 1 080<br>2 650 | 116<br>365      | 905<br>2 220   | 0.58<br>0.85 | 4.8    |
| 80    | 9×14×12                   | 20          | 4 000<br>(3 500)                                | 34 500<br>52 500           | 27 300<br>42 000             | 40 000<br>74 500   | 465<br>865          | 220<br>695      | 1 670<br>4 000 | 185<br>580      | 1 400<br>3 350 | 0.86<br>1.3  | 7.0    |

\*) Standard rail mounting bolt hole for NS15 is specified as hole for M3 (3.5 x 6 x 4.5).  
Please contact NSK to request a different hole for M4 (4.5 x 7.5 x 5.3).

# NS-JM (Medium-load type/short, flange type)

## NS-EM (High-load type/standard, flange type)

### (1) Reference number for assembly

|                    |             |                         |                                                            |                                                                                                                                              |                                       |                                                                |                                              |                                                                                                |
|--------------------|-------------|-------------------------|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------------|
| <b>NS</b>          | <b>30</b>   | <b>1200</b>             | <b>EM</b>                                                  | <b>C</b>                                                                                                                                     | <b>2</b>                              | <b>❖❖❖</b>                                                     | <b>P5</b>                                    | <b>3</b>                                                                                       |
| <b>SERIES NAME</b> | <b>SIZE</b> | <b>RAIL LENGTH (MM)</b> | <b>BALL SLIDE SHAPE CODE</b><br>(refer to Fig 2 on page 4) | <b>MATERIAL/SURFACE TREATMENT CODE</b><br>(refer to Table 16 on page 8)<br>C: Special high carbon steel (NSK standard)<br>S: Stainless steel | <b>NUMBER OF BALL SLIDES PER RAIL</b> | <b>DESIGN SERIAL NUMBER</b><br>(Added to the reference number) | <b>ACCURACY CODE</b> (refer to page 5 and 6) | <b>PRELOAD CODE</b><br>(refer to page 6)<br>0: Z0<br>1: Z1<br>3: Z3<br>T: ZT<br>Z: ZZ<br>H: ZH |

### (2) Reference number for interchangeable type

#### Ball slide

|                                                                                            |             |                                                         |                                                                                                 |                                                                                          |                                                                                                                              |
|--------------------------------------------------------------------------------------------|-------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>NAS</b>                                                                                 | <b>30</b>   | <b>EM</b>                                               | <b>S</b>                                                                                        | <b>Z</b>                                                                                 | <b>-K</b>                                                                                                                    |
| <b>INTERCHANGEABLE BALL SLIDE SERIES CODE</b><br>NAS: NS Series Interchangeable Ball Slide | <b>SIZE</b> | <b>BALL SLIDE SHAPE CODE</b> (refer to Fig 2 on page 4) | <b>MATERIAL CODE</b><br>No code: Special high carbon steel (NSK standard)<br>S: Stainless steel | <b>PRELOAD CODE</b><br>No code: Fine clearance<br>Z: Slight preload<br>H: Medium preload | <b>OPTION CODE</b><br>-K: Equipped with NSK K1™<br>-K2: Two K1™ Lubrication Units<br>-D: Double Seals<br>-P: Protector Plate |

#### Rail

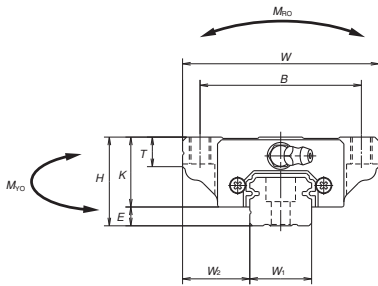
|                                                                                |             |                         |                                                                                     |                                                                                                 |                                          |
|--------------------------------------------------------------------------------|-------------|-------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>N1S</b>                                                                     | <b>30</b>   | <b>1200</b>             | <b>L</b>                                                                            | <b>S</b>                                                                                        | <b>Z</b>                                 |
| <b>INTERCHANGEABLE RAIL SERIES CODE</b><br>N1S: NS Series Interchangeable Rail | <b>SIZE</b> | <b>RAIL LENGTH (MM)</b> | <b>RAIL SHAPE CODE</b><br>L: Standard<br>T: The rail mounting bolt hole M4 for NS1S | <b>MATERIAL CODE</b><br>No code: Special high carbon steel (NSK standard)<br>S: Stainless steel | <b>PRELOAD CODE</b><br>Z: Slight preload |

| Model No.        | Assembly |      |      | Ball slide |              |               |         |                              |                |            |      |            |                |                |    |    |      | Width | Height |
|------------------|----------|------|------|------------|--------------|---------------|---------|------------------------------|----------------|------------|------|------------|----------------|----------------|----|----|------|-------|--------|
|                  | Height   |      |      | Width      | Length       | Mounting hole |         |                              |                |            |      |            | Grease fitting |                |    |    |      |       |        |
|                  |          |      |      |            |              | B             | J       | M×Pitch×ℓ                    | Q <sub>2</sub> |            |      |            | Hole size      | T <sub>1</sub> | N  |    |      |       |        |
| NS15JM<br>NS15EM | 24       | 4.6  | 18.5 | 52         | 40.4<br>56.8 | 41            | —<br>26 | M5×0.8×7                     | 4.4            | 23.6<br>40 | 19.4 | 8          | ∅3             | 6              | 3  | 15 | 12.5 |       |        |
| NS20JM<br>NS20EM | 28       | 6    | 19.5 | 59         | 47.2<br>65.2 | 49            | —<br>32 | M6×1×9<br>(M6×1×9.5)         | 5.3            | 30<br>48   | 22   | 10         | M6×0.75        | 5.5            | 11 | 20 | 15.5 |       |        |
| NS25JM<br>NS25EM | 33       | 7    | 25   | 73         | 59.6<br>81.6 | 60            | —<br>35 | M8×1.25×10<br>(M8×1.25×11.5) | 6.8            | 38<br>60   | 26   | 11<br>(12) | M6×0.75        | 7              | 11 | 23 | 18.0 |       |        |
| NS30JM<br>NS30EM | 42       | 9    | 31   | 90         | 67.4<br>96.4 | 72            | —<br>40 | M10×1.5×12<br>(M10×1.5×14.5) | 8.6            | 42<br>71   | 33   | 11<br>(15) | M6×0.75        | 8              | 11 | 28 | 23.0 |       |        |
| NS35JM<br>NS35EM | 48       | 10.5 | 33   | 100        | 77<br>108    | 82            | —<br>50 | M10×1.5×13<br>(M10×1.5×14.5) | 8.6            | 49<br>80   | 37.5 | 12<br>(15) | M6×0.75        | 8.5            | 11 | 34 | 27.5 |       |        |

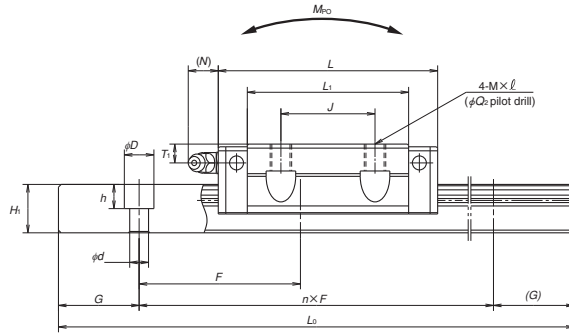
Notes: 1) External appearance of stainless steel ball slides differs from those of carbon steel ball slides.  
2) Parenthesized dimensions are for items made of stainless steel.

## Assembly (Preloaded assembly, interchangeable type)

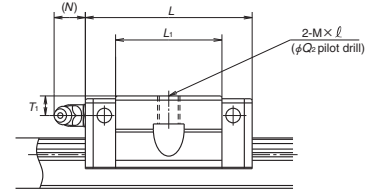
Front view of EM and JM types



Side view of EM type

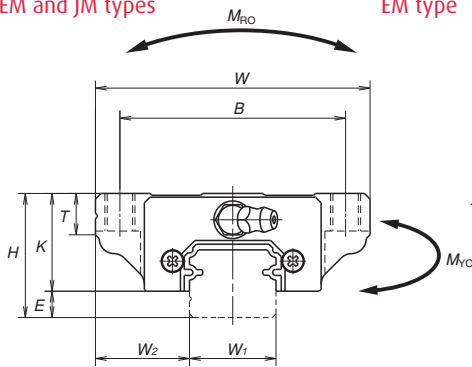


Side view of JM type

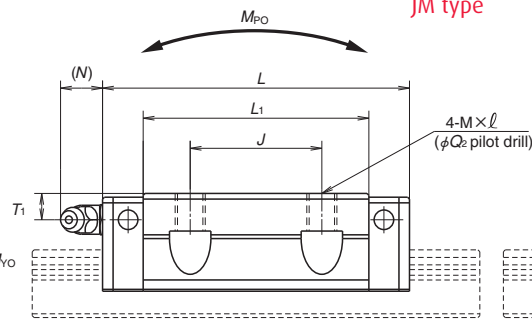


## Ball slide of interchangeable type

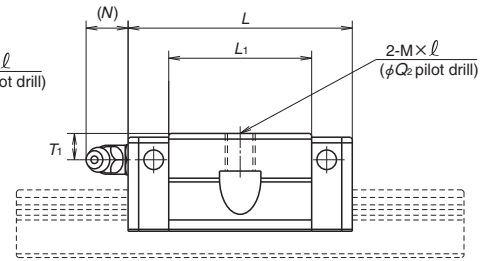
EM and JM types



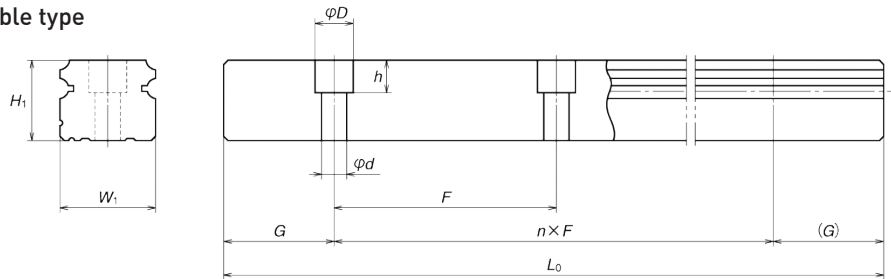
EM type



JM type



## Rail of interchangeable type



Unit: mm

| Rail  |                                |                      |                                                       | Basic load rating             |                                 |                                 |                 |                     |                |                 |                | Weight                 |                    |
|-------|--------------------------------|----------------------|-------------------------------------------------------|-------------------------------|---------------------------------|---------------------------------|-----------------|---------------------|----------------|-----------------|----------------|------------------------|--------------------|
| Pitch | Mounting<br>bolt hole<br>d×D×h | G<br><br>(reference) | Max. length<br>L <sub>0max</sub><br>( ) for stainless | ³)Dynamic                     |                                 | Static<br>C <sub>0</sub><br>(N) | M <sub>RO</sub> | Static moment (N·m) |                |                 |                | Ball slide<br><br>(kg) | Rail<br><br>(kg/m) |
| F     |                                |                      |                                                       | [50km]<br>C <sub>50</sub> (N) | [100km]<br>C <sub>100</sub> (N) |                                 |                 | M <sub>PO</sub>     |                | M <sub>YO</sub> |                |                        |                    |
|       |                                |                      |                                                       |                               |                                 | (One slide)                     |                 | (Two slides)        | (One slide)    | (Two slides)    |                |                        |                    |
| 60    | *3.5×6×4.5<br>4.5×7.5×5.3      | 20                   | 2 920<br>(1 700)                                      | 7 250<br>11 200               | 5 750<br>8 850                  | 9 100<br>16 900                 | 45.5<br>84.5    | 24.5<br>77          | 196<br>470     | 20.5<br>64.5    | 165<br>395     | 0.17<br>0.26           | 1.4                |
| 60    | 6×9.5×8.5                      | 20                   | 3 960<br>(3 500)                                      | 10 600<br>15 600              | 8 400<br>12 400                 | 13 400<br>23 500                | 91.5<br>160     | 46.5<br>133         | 330<br>755     | 39<br>111       | 279<br>630     | 0.24<br>0.35           | 2.3                |
| 60    | 7×11×9                         | 20                   | 3 960<br>(3 500)                                      | 17 700<br>26 100              | 14 000<br>20 700                | 20 800<br>36 500                | 164<br>286      | 91<br>258           | 655<br>1 470   | 76<br>217       | 550<br>1 230   | 0.44<br>0.66           | 3.1                |
| 80    | 7×11×9                         | 20                   | 4 000<br>(3 500)                                      | 24 700<br>38 000              | 19 600<br>30 000                | 29 600<br>55 000                | 282<br>520      | 139<br>435          | 1 080<br>2 650 | 116<br>365      | 905<br>2 220   | 0.76<br>1.2            | 4.8                |
| 80    | 9×14×12                        | 20                   | 4 000<br>(3 500)                                      | 34 500<br>52 500              | 27 300<br>42 000                | 40 000<br>74 500                | 465<br>865      | 220<br>695          | 1 670<br>4 000 | 185<br>580      | 1 400<br>3 350 | 1.2<br>1.7             | 7                  |

3) The basic load rating comply with the ISO standard. (ISO14728-1 and ISO14728-2)

C<sub>50</sub>: the basic dynamic load rating for 50 km rating fatigue life, C<sub>100</sub>: the basic dynamic load rating for 100 km rating fatigue life

\*) Standard rail mounting bolt hole for NS15 is specified as hole for M3 (3.5 x 6 x 4.5).

Please contact NSK to request a different hole for M4 (4.5 x 7.5 x 5.3).

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