

# STROKE BUSH SLIDE ROTARY BUSH

## STROKE BUSH

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## SLIDE ROTARY BUSH RK TYPE

|                          |      |
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# STROKE BUSH

The NB stroke bush is a linear and rotational motion mechanism utilizing the rotational motion of ball elements between an outer cylinder and a shaft. It is compact and can withstand high loading.

The retainer is made of a light metal alloy with high wear resistance. Smooth motion is achieved under high-speed and high-acceleration conditions.

Although the linear motion is limited to a specific stroke length, the combined rotation and stroke motion is achieved with very little frictional resistance. The NB stroke bush can be conveniently used in a variety of applications.

## STRUCTURE AND ADVANTAGES

The retainer in the NB stroke bush positions the ball elements in a zigzag arrangement. The inner surface of the outer cylinder is finished by precision grinding, resulting in smooth motion of the ball elements. Each of the ball elements is held in a separate hole and smooth motion is achieved for both rotational motion and linear motion. The retainer moves half the length of the linear motion, therefore, the stroke length is limited to approximately twice the length the retainer can travel within the outer cylinder.

### High Precision

High-carbon chromium bearing steel is used for the outer cylinder. It is heat treated and ground to achieve high rigidity and accuracy.

### Ease of Mounting and Replacement

The highly accurate fabrication of the NB stroke bush results in uniform dimensions, facilitating parts replacement and housing fabrication.

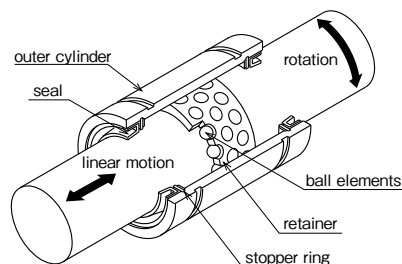
### Light Weight and Space Saving

The use of an aluminum alloy for the retainer and the thin-wall outer cylinder makes the NB stroke bush light weight and compact.

### Lubrication

One lubrication hole is provided on each oil groove of the outer cylinder, making it easy to lubricate the SR stroke bush.

Figure E-1 Structure of SR Stroke Bush



## TYPE

Table E-1 Type

| Standard Type                                                                                                  | Double Retainer Type                                                                                             |
|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>SR TYPE</b><br><br>P.E-6 | <b>SR-B TYPE</b><br><br>P.E-8 |

## ALLOWABLE SPEED FOR COMBINED ROTATION AND STROKE MOTION

The allowable speed for combined rotation and stroke motion is obtained from the following equation:

The value of DN is given as follows depending on the lubrication method.

$$DN \geq dm \cdot n + 10 \cdot S \cdot n_1$$

|                        |            |
|------------------------|------------|
| for oil lubrication    | DN=600,000 |
| for grease lubrication | DN=300,000 |

note.....n≤5,000 S·n<sub>1</sub>≤50,000

## RATED LOAD AND RATED LIFE

The relationship between the rated load and life of the stroke bush is expressed as follows:

$$L = \left( \frac{f_H \cdot f_T \cdot f_C \cdot C}{f_W \cdot P} \right)^3 \times 10^6$$

L: rated life f<sub>H</sub>: hardness coefficient  
f<sub>T</sub>: temperature coefficient f<sub>C</sub>: contact coefficient  
f<sub>W</sub>: applied load coefficient  
C: basic dynamic load rating (N)  
P: applied load (N)

※Refer to page Eng-5 for the coefficients.

●For combined rotation and stroke motion

$$L_h = \frac{L}{60 \sqrt{(dm \cdot n)^2 + (10 \cdot S \cdot n_1)^2} / dm}$$

●For stroke motion

$$L_h = \frac{L}{600 \cdot S \cdot n_1 / (\pi \cdot dm)}$$

L<sub>h</sub>: life time (hr) S: stroke length (mm)  
n: revolutions per min. (rpm)  
n<sub>1</sub>: number of cycles per minute (cpm)  
dm: ball pitch diameter (mm) ≅ 1.15 dr

## FIT

The fits generally used between the shaft and the housing are listed in Table E-2. The inner contact diameters of the SR stroke bush are listed in the dimension tables. The shaft diameter tolerance should be selected to achieve the desired amount of radial clearance (see Table E-3). Please pay attention that high-speed linear motion can cause the retainer to slip due to inertial force. In selecting a shaft, please take note of:  
Hardness: 58HRC or more (refer to hardness coefficient on page Eng-5) recommended  
Surface Roughness: less than Ra0.4 recommended

Table E-2

| normal operating condition |         | vertical use or highly accurate case |         |
|----------------------------|---------|--------------------------------------|---------|
| shaft                      | housing | shaft                                | housing |
| k5,m5                      | H6,H7   | n5,p6                                | J6,J7   |

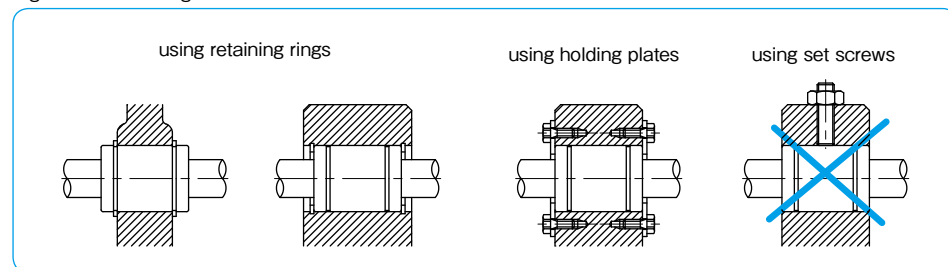
Table E-3 Radial Clearance Negative Limit

| part number | limit (μm) |
|-------------|------------|
| 6           | − 2        |
| 8~10        | − 3        |
| 12~16       | − 4        |
| 20~30       | − 5        |
| 35~50       | − 6        |
| 60~80       | − 8        |
| 100         | − 10       |

## MOUNTING

Examples of mounting methods of Stroke Bush are shown in Figure E-2. To avoid deformation, do not fix outer cylinder by using set screw.

Figure E-2 Mounting Method



## LUBRICATION

Appropriate lubrication is needed to ensure the accuracy of NB Stroke Bush and to maintain bearing life. Anti-rust oil is applied to NB Stroke Bush prior to shipment. The NB selected anti-rust oil has a little to no effect on lubricants, however, please apply lubricant only after cleaning Stroke Bush with kerosene, etc.

### Grease Lubricant

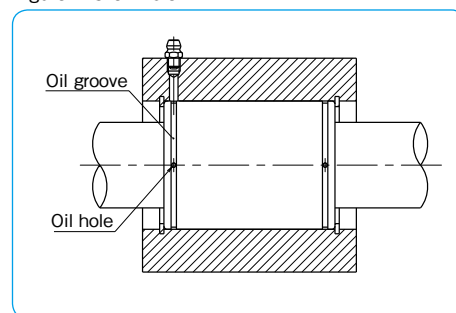
Prior to usage, please apply grease, and re-lubricate periodically according to the operating conditions. (Lithium soap-based grease is recommended.) Relubrication can be done by directly applying grease inside the ball bush or by using oil hole as Figure E-3 shows.

A special low dust generation grease is optional for clean room application. Please refer to page Eng-40.

### Oil Lubricant

Prior to usage, please apply oil directly to the shaft surface or by using oil hole as Figure E-3 shows. Turbine oil (ISO standard VG32-68) is recommended.

Figure E-3 Oil hole



## USE AND HANDLING PRECAUTIONS

### Maximum Stroke

The maximum stroke in the dimension table is the stroke limit.

### Retainer Slippage

The retainer can slip under high-speed motion, vertical application, unbalanced-loading, and vibrating conditions. It is suggested that the stroke to be set as a 80% of the maximum stroke in the dimension table. It is also recommended that the bush be cycled to perform the maximum stroke several times, so that the retainer returns to its central position.

### Accuracy

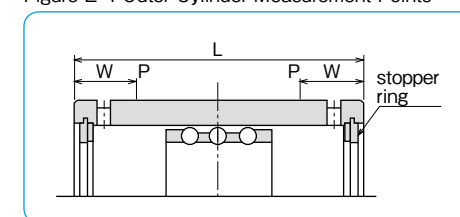
The accuracies of the SR stroke bush are stated in the dimension tables. Since the outer cylinder deforms due to tension from the retaining ring, the dimension of the outer cylinder is an average value at points P, where calculated using the following equation:

$$W = 4 + \frac{L}{8}$$

W: the distance from the end of the outer cylinder to measurement point P

L: the length of the outer cylinder

Figure E-4 Outer Cylinder Measurement Points



### Operating Temperature Range

The operating temperature is ranging from -20 °C to 110°C. In case of operation at temperature outside this range, please contact NB.

### Dust Prevention

Dust and other contaminations affect the bush's lifetime and accuracy if dust or particle enter into inside of bush. Although seals work under a normal environment, in a harsh environment, it is necessary to attach protective covers.

## SR TYPE

—Standard Type—

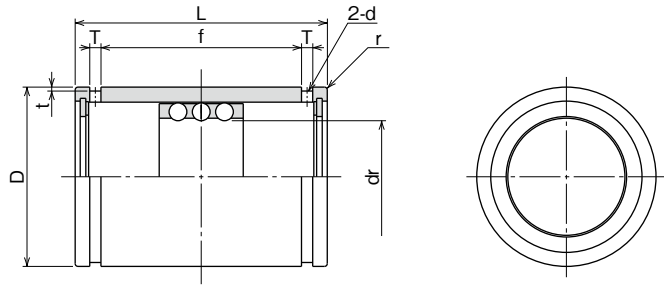


## part number structure

example **SR 20**

SR type

inner contact diameter (dr)



| part number | maximum stroke<br>mm | number of rows | major dimensions                       |                                       |                                       |         |         |         |         |         |                   |                   | basic load rating |  | mass<br>g |
|-------------|----------------------|----------------|----------------------------------------|---------------------------------------|---------------------------------------|---------|---------|---------|---------|---------|-------------------|-------------------|-------------------|--|-----------|
|             |                      |                | dr<br>mm<br>tolerance<br>$\mu\text{m}$ | D<br>mm<br>tolerance<br>$\mu\text{m}$ | L<br>mm<br>tolerance<br>$\mu\text{m}$ | f<br>mm | T<br>mm | t<br>mm | d<br>mm | r<br>mm | dynamic<br>C<br>N | static<br>Co<br>N |                   |  |           |
| SR 6        | 19                   | 3              | 6<br>+22                               | 12<br>-11                             | 20<br>24                              | 11.3    | 1.1     | 0.5     | 1       | 0.5     | 216               | 147               | 8.9               |  |           |
| SR 8        | 24                   | 3              | 8<br>+13                               | 15<br>-11                             | 24                                    | 17.1    | 1.5     | 0.5     | 1.2     | 0.5     | 343               | 245               | 15.6              |  |           |
| SR 10       | 30                   | 3              | 10<br>+13                              | 19<br>0                               | 30                                    | 22.7    | 1.5     | 0.5     | 1.2     | 0.5     | 637               | 461               | 28.8              |  |           |
| SR 12       | 32                   | 3              | 12<br>+27                              | 23<br>-13                             | 32                                    | 24.5    | 1.5     | 0.5     | 1.2     | 0.5     | 1,070             | 813               | 42                |  |           |
| SR 16       | 40                   | 3              | 16<br>+16                              | 28<br>-13                             | 37                                    | 29.1    | 1.5     | 0.7     | 1.3     | 0.5     | 1,180             | 990               | 71                |  |           |
| SR 20       | 50                   | 3              | 20<br>+33                              | 32<br>0                               | 45                                    | 35.8    | 2       | 0.7     | 1.5     | 0.5     | 1,260             | 1,170             | 99                |  |           |
| SR 25       | 50                   | 3              | 25<br>+20                              | 37<br>-16                             | 45                                    | 35.8    | 2       | 0.7     | 1.6     | 1       | 1,330             | 1,330             | 117               |  |           |
| SR 30       | 82                   | 3              | 30<br>+45                              | 65<br>-19                             | 70                                    | 53.5    | 2.5     | 1       | 2       | 1       | 2,990             | 3,140             | 205               |  |           |
| SR 35       | 92                   | 3              | 35<br>+52                              | 70<br>0                               | 70                                    | 58.5    | 2.5     | 1       | 2       | 1.5     | 3,140             | 3,530             | 329               |  |           |
| SR 40       | 108                  | 3              | 40<br>+60                              | 80<br>-0.3                            | 80                                    | 68.3    | 2.5     | 1       | 2       | 1.5     | 4,120             | 4,800             | 516               |  |           |
| SR 50       | 138                  | 3              | 50<br>+72                              | 100<br>-19                            | 100                                   | 86.4    | 3       | 1       | 2.5     | 1.5     | 5,540             | 6,910             | 827               |  |           |
| SR 60       | 138                  | 3              | 60<br>+85                              | 100<br>0                              | 100                                   | 86.4    | 3       | 1       | 2.5     | 2       | 5,980             | 8,230             | 1,240             |  |           |
| SR 80       | 132                  | 3              | 80<br>+110                             | 110<br>-22                            | 100                                   | 86      | 3       | 1.5     | 2.5     | 2       | 7,840             | 12,200            | 2,050             |  |           |
| SR100       | 132                  | 3              | 100<br>+130                            | 130<br>0/-25                          | 100                                   | 86      | 3       | 1.5     | 2.5     | 2       | 8,430             | 14,700            | 2,440             |  |           |

1N $\approx$ 0.102kgf

## SR-UU TYPE

—Standard Type with Seals—



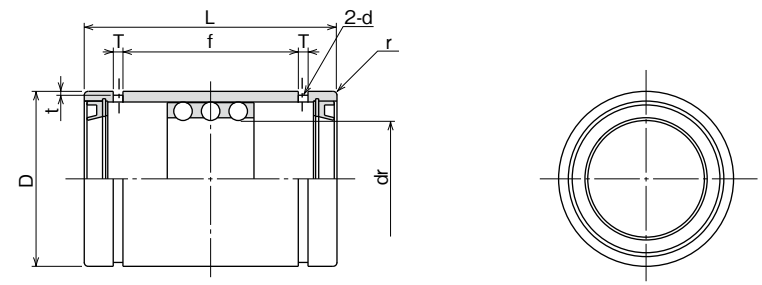
## part number structure

example **SR 20 UU**

SR type

inner contact diameter (dr)

seals on both sides



| part number | maximum stroke<br>mm | number of rows | major dimensions                       |                                       |                                       |         |         |         |         |         |                   |                   | basic load rating |  | mass<br>g |
|-------------|----------------------|----------------|----------------------------------------|---------------------------------------|---------------------------------------|---------|---------|---------|---------|---------|-------------------|-------------------|-------------------|--|-----------|
|             |                      |                | dr<br>mm<br>tolerance<br>$\mu\text{m}$ | D<br>mm<br>tolerance<br>$\mu\text{m}$ | L<br>mm<br>tolerance<br>$\mu\text{m}$ | f<br>mm | T<br>mm | t<br>mm | d<br>mm | r<br>mm | dynamic<br>C<br>N | static<br>Co<br>N |                   |  |           |
| SR 8UU      | 14                   | 3              | 8<br>+22                               | 15<br>0/-11                           | 24                                    | 12.3    | 1.5     | 0.5     | 1.2     | 0.5     | 343               | 245               | 15.6              |  |           |
| SR 10UU     | 16                   | 3              | 10<br>+13                              | 19<br>0                               | 30                                    | 15.5    | 1.5     | 0.5     | 1.2     | 0.5     | 637               | 461               | 28.8              |  |           |
| SR 12UU     | 18                   | 3              | 12<br>+27                              | 23<br>-13                             | 32                                    | 17.1    | 1.5     | 0.5     | 1.2     | 0.5     | 1,070             | 813               | 42                |  |           |
| SR 16UU     | 26                   | 3              | 16<br>+16                              | 28<br>-13                             | 37                                    | 21.1    | 1.5     | 0.7     | 1.3     | 0.5     | 1,180             | 990               | 71                |  |           |
| SR 20UU     | 36                   | 3              | 20<br>+33                              | 32<br>0                               | 45                                    | 26.8    | 2       | 0.7     | 1.5     | 0.5     | 1,260             | 1,170             | 99                |  |           |
| SR 25UU     | 36                   | 3              | 25<br>+20                              | 37<br>-16                             | 45                                    | 26.8    | 2       | 0.7     | 1.6     | 1       | 1,330             | 1,330             | 117               |  |           |
| SR 30UU     | 68                   | 3              | 30<br>+45                              | 65<br>-19                             | 70                                    | 45.1    | 2.5     | 1       | 2       | 1       | 2,990             | 3,140             | 205               |  |           |
| SR 35UU     | 76                   | 3              | 35<br>+52                              | 70<br>0                               | 70                                    | 50.1    | 2.5     | 1       | 2       | 1.5     | 3,140             | 3,530             | 329               |  |           |
| SR 40UU     | 91                   | 3              | 40<br>+25                              | 80<br>-19                             | 80                                    | 59.9    | 2.5     | 1       | 2       | 1.5     | 4,120             | 4,800             | 516               |  |           |
| SR 50UU     | 116                  | 3              | 50<br>+72                              | 100<br>-19                            | 100                                   | 77.4    | 3       | 1       | 2.5     | 1.5     | 5,540             | 6,910             | 827               |  |           |
| SR 60UU     | 117                  | 3              | 60<br>+85                              | 100<br>0                              | 100                                   | 77.4    | 3       | 1       | 2.5     | 2       | 5,980             | 8,230             | 1,240             |  |           |
| SR 80UU     | 110                  | 3              | 80<br>+110                             | 110<br>-22                            | 100                                   | 77      | 3       | 1.5     | 2.5     | 2       | 7,840             | 12,200            | 2,050             |  |           |
| SR100UU     | 110                  | 3              | 100<br>+130                            | 130<br>0/-25                          | 100                                   | 77      | 3       | 1.5     | 2.5     | 2       | 8,430             | 14,700            | 2,440             |  |           |

1N $\approx$ 0.102kgf

## SR-B TYPE

–Double Retainer Type–



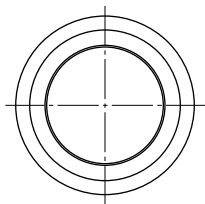
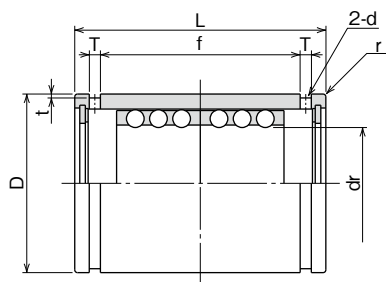
## part number structure

example **SR 20 B**

SR type

inner contact diameter (dr)

double retainer



| part number | maximum stroke<br>mm | number of rows | major dimensions      |                      |                      |      |     |     |     |     |                   |                   | basic load rating |  | mass<br>g |
|-------------|----------------------|----------------|-----------------------|----------------------|----------------------|------|-----|-----|-----|-----|-------------------|-------------------|-------------------|--|-----------|
|             |                      |                | dr<br>tolerance<br>μm | D<br>tolerance<br>μm | L<br>tolerance<br>mm | f    | T   | t   | d   | r   | dynamic<br>C<br>N | static<br>Co<br>N |                   |  |           |
| SR 8B       | 8                    | 6              | 8 +22                 | 15 0/-11             | 24                   | 17.1 | 1.5 | 0.5 | 1.2 | 0.5 | 549               | 490               | 16.8              |  |           |
| SR 10B      | 8                    | 6              | 10 +13                | 19 0                 | 30                   | 22.7 | 1.5 | 0.5 | 1.2 | 0.5 | 1,030             | 931               | 31.2              |  |           |
| SR 12B      | 8                    | 6              | 12 +27                | 23 -13               | 32                   | 24.5 | 1.5 | 0.5 | 1.2 | 0.5 | 1,720             | 1,630             | 46                |  |           |
| SR 16B      | 16                   | 6              | 16 +16                | 28 0                 | 37                   | 29.1 | 1.5 | 0.7 | 1.3 | 0.5 | 1,910             | 1,980             | 75                |  |           |
| SR 20B      | 20                   | 6              | 20 +33                | 32 0                 | 45                   | 35.8 | 2   | 0.7 | 1.5 | 0.5 | 2,060             | 2,320             | 106               |  |           |
| SR 25B      | 20                   | 6              | 25 +20                | 37 -16               | 45                   | 35.8 | 2   | 0.7 | 1.6 | 1   | 2,170             | 2,670             | 125               |  |           |
| SR 30B      | 44                   | 6              | 30 +41                | 45 0                 | 65                   | 53.5 | 2.5 | 1   | 2   | 1   | 4,800             | 6,270             | 220               |  |           |
| SR 35B      | 54                   | 6              | 35 +25                | 52 -19               | 70                   | 58.5 | 2.5 | 1   | 2   | 1.5 | 5,050             | 7,060             | 346               |  |           |
| SR 40B      | 66                   | 6              | 40 +25                | 60 -19               | 80                   | 68.3 | 2.5 | 1   | 2   | 1.5 | 6,710             | 9,560             | 540               |  |           |
| SR 50B      | 88                   | 6              | 50 +49                | 72 0                 | 100                  | 86.4 | 3   | 1   | 2.5 | 1.5 | 8,970             | 13,800            | 862               |  |           |
| SR 60B      | 88                   | 6              | 60 +30                | 85 -22               | 100                  | 86.4 | 3   | 1   | 2.5 | 2   | 9,700             | 16,500            | 1,290             |  |           |
| SR 80B      | 76                   | 6              | 80 +58/+36            | 110 0/-25            | 100                  | 86   | 3   | 1.5 | 2.5 | 2   | 12,700            | 24,300            | 2,110             |  |           |
| SR100B      | 76                   | 6              | 100                   | 130                  | 100                  | 86   | 3   | 1.5 | 2.5 | 2   | 13,700            | 29,400            | 2,520             |  |           |

1N≒0.102kgf

## SR-BUU TYPE

–Double Retainer Type with Seals–



## part number structure

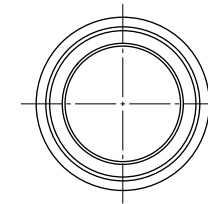
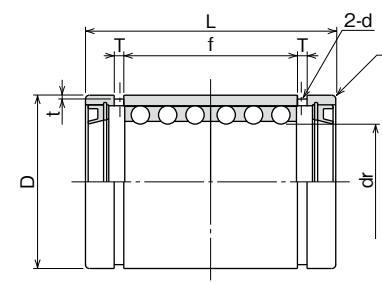
example **SR 30 B UU**

SR type

inner contact diameter (dr)

seals on both sides

double retainer



| part number | maximum stroke<br>mm | number of rows | major dimensions      |                      |                      |      |     |     |     |     |                   |                   | basic load rating |  | mass<br>g |
|-------------|----------------------|----------------|-----------------------|----------------------|----------------------|------|-----|-----|-----|-----|-------------------|-------------------|-------------------|--|-----------|
|             |                      |                | dr<br>tolerance<br>μm | D<br>tolerance<br>μm | L<br>tolerance<br>mm | f    | T   | t   | d   | r   | dynamic<br>C<br>N | static<br>Co<br>N |                   |  |           |
| SR 30BUU    | 30                   | 6              | 30 +33/+20            | 45 0/-16             | 65                   | 45.1 | 2.5 | 1   | 2   | 1   | 4,800             | 6,270             | 220               |  |           |
| SR 35BUU    | 38                   | 6              | 35 +41                | 52 0                 | 70                   | 50.1 | 2.5 | 1   | 2   | 1.5 | 5,050             | 7,060             | 346               |  |           |
| SR 40BUU    | 49                   | 6              | 40 +25                | 60 -19               | 80                   | 59.9 | 2.5 | 1   | 2   | 1.5 | 6,710             | 9,560             | 540               |  |           |
| SR 50BUU    | 66                   | 6              | 50 +49                | 72 0                 | 100                  | 77.4 | 3   | 1   | 2.5 | 1.5 | 8,970             | 13,800            | 862               |  |           |
| SR 60BUU    | 67                   | 6              | 60 +30                | 85 -22               | 100                  | 77.4 | 3   | 1   | 2.5 | 2   | 9,700             | 16,500            | 1,290             |  |           |
| SR 80BUU    | 54                   | 6              | 80 +58/+36            | 110 0/-25            | 100                  | 77   | 3   | 1.5 | 2.5 | 2   | 12,700            | 24,300            | 2,110             |  |           |
| SR100BUU    | 54                   | 6              | 100                   | 130                  | 100                  | 77   | 3   | 1.5 | 2.5 | 2   | 13,700            | 29,400            | 2,520             |  |           |

1N≒0.102kgf

SLIDE ROTARY BUSH SRE SERIES

The NB Slide Rotary Bush SRE Series provides rotary and linear motion functions. Linear motion with unlimited stroke and rotary motion are merged into a single bush resulting in great space saving compared with a combination of any conventional bearings. There are three types; standard, flange, and unit type with sizes ranging from 6 to 40.

STRUCTURE AND ADVANTAGES

NB Slide Rotary Bush features a special retainer fitted into cylindrical steel outer cylinder and is designed to guide steel balls for smooth circulation in its retainer. The retainer is also designed to rotate freely towards radial direction and offers smooth linear and rotary motions.

Smooth Operation

The inner surface of the outer cylinder allows smooth operation of linear and rotary motions while maintaining a uniform load distribution.

High Load Capacity

The use of comparatively large diameter steel balls enhances the load capacity.

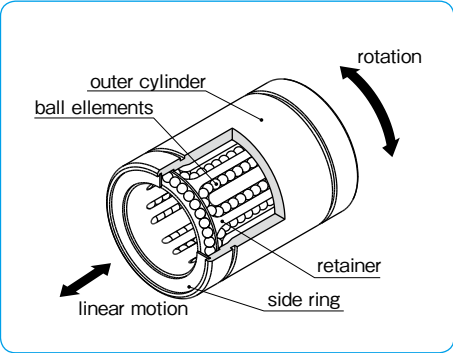
Smooth Rotation

The positioning of the steel balls in a cylindrical formation inside the retainer enables a smooth rotational motion regardless of the installation direction.

Complete Interchangeability

NB Slide Rotary series is completely interchangeable with SM type Slide Bush, SMK type Flanged Slide Bush and SMA(W) type, AK(W) type and SMP type.

Figure E-5 Structure of Slide Rotary Bush SRE type



TYPE

Table E-4 Type

| Standard Type                                                                                          | Square Flange Type                                                                                     |
|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| SRE TYPE  P.E-16    | SREK TYPE  P.E-18   |
| Unit                                                                                                   |                                                                                                        |
| Block Type                                                                                             | Double-Wide Block Type                                                                                 |
| SMA-R TYPE  P.E-20  | SMA-RW TYPE  P.E-21 |
| AK-R TYPE  P.E-22   | AK-RW TYPE  P.E-23  |
| SMP-R TYPE  P.E-24 |                                                                                                        |

## RATED LOAD AND RATED LIFE

The rated life and load rating are defined as follows.

### Rated Life

When a group of slide rotary bearings of the same type are used under the same conditions, the rated life is defined as the total number of rotations made without causing flaking by 90% of the bearings.

### Basic Dynamic Load Rating

The basic dynamic load rating is defined as the load with a constant magnitude and direction at which a rated life of  $10^6$  rotations can be achieved.

### Basic Static Load Rating

The basic static load rating is defined as the load with a constant direction that would result in a certain contact stress at the mid-point of the rolling element and tracking surface that are experiencing the maximum stress.

Equation (1) gives the relation between the applied load and the rated life of the slide rotary bush.

$$L = \left( \frac{f_H \cdot f_T \cdot f_C}{f_W} \cdot \frac{C}{P} \right)^3 \times 10^6 \dots\dots\dots (1)$$

L: rated life (rotations)  $f_H$ : hardness coefficient  
 $f_T$ : temperature coefficient  $f_C$ : contact coefficient  
 $f_W$ : applied load coefficient C: basic dynamic load rating (N)  
 P: applied load (N)  
 ※Refer to page Eng-5 for the coefficients.

Since the slide rotary bush is used in applications with combined linear and rotary motions, the life time is obtained using Equations (2) and (3).

●When linear and rotary motions are combined

$$L_h = \frac{L}{60\sqrt{(dm \cdot n)^2 + (10 \cdot S \cdot n_1)^2} / dm} \dots\dots\dots (2)$$

●When only linear motion is involved

$$L_h = \frac{L}{600 \cdot S \cdot n_1 / (\pi \cdot dm)} \dots\dots\dots (3)$$

$L_h$ : life time (hr) S: stroke length (mm) n: revolutions per minute (rpm)  $n_1$ : number of cycles per minute (cpm)  
 $dm$ : ball pitch diameter (mm)  $\approx 1.15dr$  (dr is the inner contact diameter of the SRE series)

## Calculation Example

The life of SRE20 type NB slide rotary bush is calculated based on the following conditions.

### ●Conditions

Motion: Linear and rotational combined Load:  $P=30N$  Stroke:  $S=200mm$

Revolutions per minute:  $n=15rpm$  Number of cycles per minute:  $n_1=10cpm$

Shaft surface hardness: greater than 58 HRC

Operating temperature: room temperature Other: single shaft with single bush

### ●Calculation

Basic dynamic load rating:  $C=647 N$

Based on the above conditions, the life is calculated using the following coefficient values.

Hardness coefficient  $f_H=1$ , Temperature coefficient  $f_T=1$ , Contact coefficient  $f_C=1$

Applied load coefficient,  $f_W=1.5$

Rated life

$$L = \left( \frac{f_H \cdot f_T \cdot f_C}{f_W} \cdot \frac{C}{P} \right)^3 \times 10^6$$

$$= \left( \frac{1 \times 1 \times 1}{1.5} \cdot \frac{647}{30} \right)^3 = 2,972 \times 10^6 \text{ (rotations)}$$

Life (in hours)

$$L_h = \frac{L}{60\sqrt{(dm \cdot n)^2 + (10 \cdot S \cdot n_1)^2} / dm}$$

$$= \frac{2,972 \times 10^6}{60\sqrt{(1.15 \times 20 \times 15)^2 + (10 \times 200 \times 10)^2} / (1.15 \times 20)}$$

$$= 56,900 \text{ (h)}$$

## FIT

### Shaft

In order to ensure high accuracy motion of Slide Rotary Bush SRE type, it is essential to select a high quality shaft. In selecting a shaft, please take note of:

Outer diameter tolerance: g6 recommended

Surface hardness: 58HRC or higher

For a shaft with surface hardness less than 58HRC, make a correction in life calculation by adding hardness coefficient.

Surface roughness: lower than Ra0.4 or better

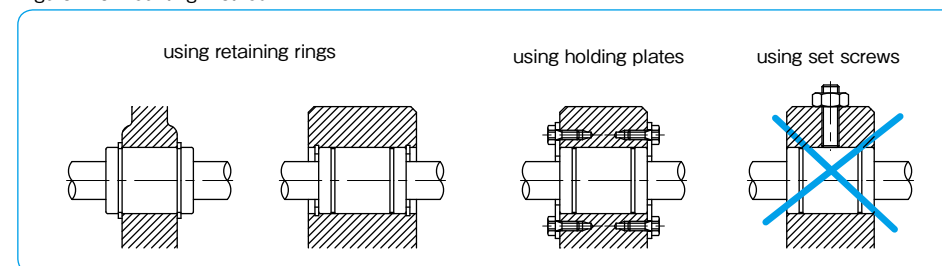
### Housing

Inner diameter tolerance: H7 recommended

## MOUNTING

Examples of mounting methods are shown in Figure E-6. Please do not fix outer cylinder by using set screw to avoid deformation.

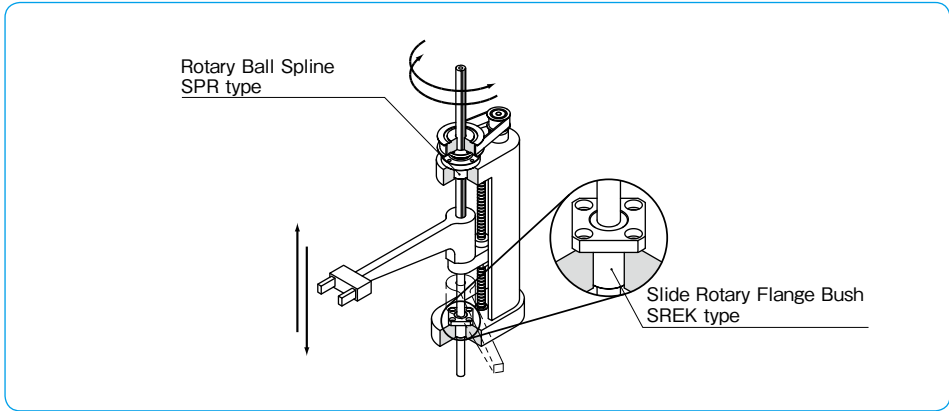
Figure E-6 Mounting Method



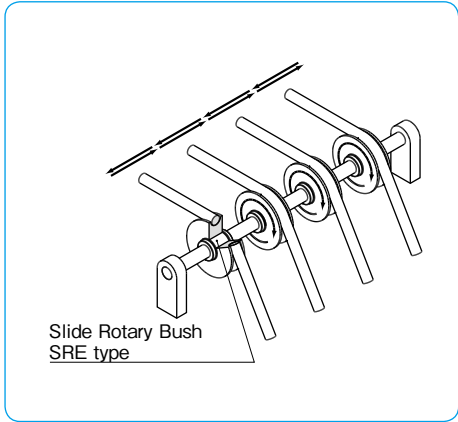


APPLICATION EXAMPLES

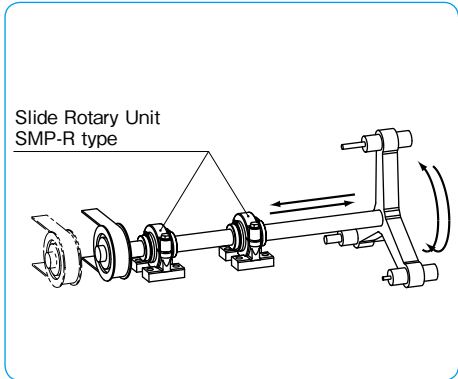
Application Example 1 Vertical Shaft Robot Arm



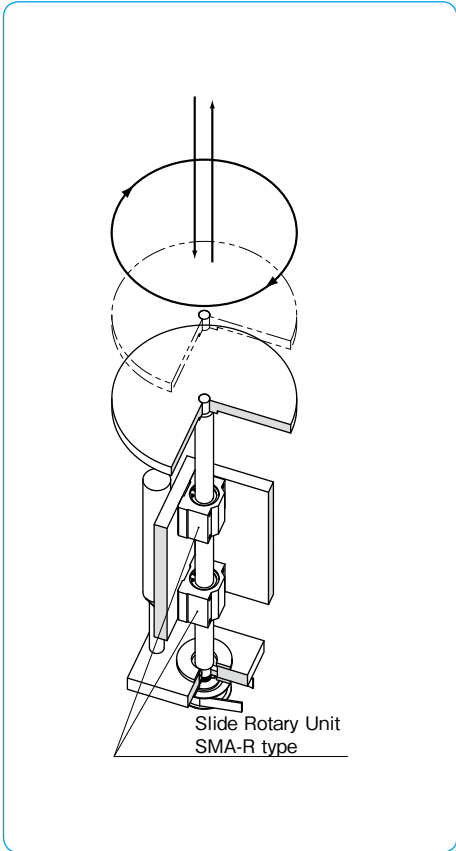
Application Example 2 Multiple Gearing Idler



Application Example 3 Tool Changer



Application Example 4 Turntable



USE AND HANDLING PRECAUTIONS

Lubrication

Lubrication is needed (1) to prevent heat fusing by reducing friction between the rolling elements and the tracking surface, (2) to reduce wear of the structural elements, and (3) to prevent rusting. Lubrication affects both the performance and life of the bush. A lubrication method and a lubrication agent appropriate to the operating conditions should be selected. For oil lubrication, turbine oil (ISO standard VG32-68) is recommended. For grease lubrication, lithium soap based grease No. 2 is recommended. The replenishment interval depends on the operating conditions.

Dust Prevention

Dust and other contaminants affect the bush's lifetime and accuracy. Appropriate prevention methods are thus important.

Operating Temperature Range

The operating temperature is ranging from  $-20^{\circ}\text{C}$  to  $110^{\circ}\text{C}$ . In case of operation at a temperature outside this range, please contact NB.

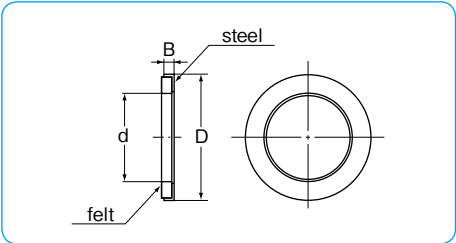
Retainer Material

The standard material of SRE Retainer is stainless steel. When requiring other material, please contact NB.

FELT SEAL

A felt seal FLM strengthens lubrication characteristics and extends relubrication period of the slide rotary bush.

Figure E-7 Felt Seal



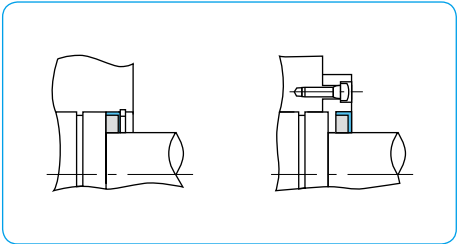
Installation

The felt seal does not work as a retaining ring. Figure E-8 shows how to install the felt seal.

Table E-4 Felt Seal Dimensions

| part number | major dimensions (mm) |    |   | applicable slide rotary bush |
|-------------|-----------------------|----|---|------------------------------|
|             | d                     | D  | B |                              |
| FLM 6       | 6                     | 12 | 2 | SRE 6                        |
| FLM 8       | 8                     | 15 | 2 | SRE 8                        |
| FLM 10      | 10                    | 19 | 3 | SRE 10                       |
| FLM 12      | 12                    | 21 | 3 | SRE 12                       |
| FLM 13      | 13                    | 23 | 3 | SRE 13                       |
| FLM 16      | 16                    | 28 | 4 | SRE 16                       |
| FLM 20      | 20                    | 32 | 4 | SRE 20                       |
| FLM 25      | 25                    | 40 | 5 | SRE 25                       |
| FLM 30      | 30                    | 45 | 5 | SRE 30                       |
| FLM 40      | 40                    | 60 | 5 | SRE 40                       |

Figure E-8 Example of Installation





## SRE TYPE

— Standard type —

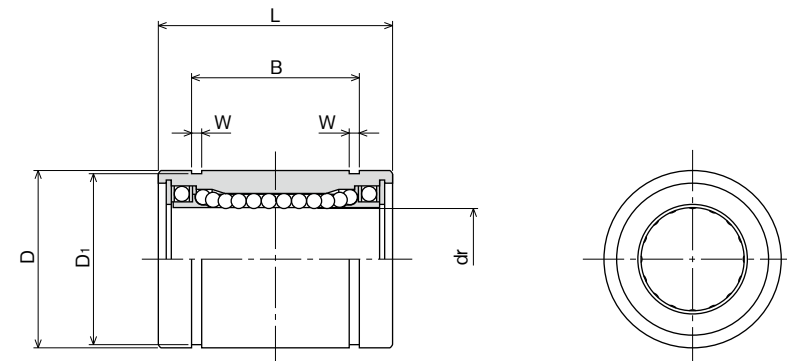


## part number structure

example **SRE 25**

SRE type

inner contact diameter (dr)



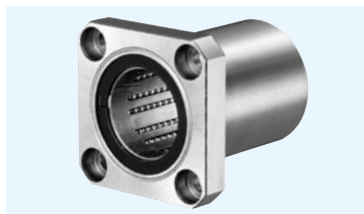
| part number  | major dimensions |                                  |         |                            |         |                 |         |                 |
|--------------|------------------|----------------------------------|---------|----------------------------|---------|-----------------|---------|-----------------|
|              | mm               | dr<br>tolerance<br>$\mu\text{m}$ | D<br>mm | tolerance<br>$\mu\text{m}$ | L<br>mm | tolerance<br>mm | B<br>mm | tolerance<br>mm |
| <b>SRE 6</b> | 6                | +4<br>-5                         | 12      | 0                          | 19      | 0<br>-0.2       | 13.5    | 0<br>-0.2       |
| <b>SRE 8</b> | 8                |                                  | 15      | -11                        | 24      |                 | 17.5    |                 |
| <b>SRE10</b> | 10               |                                  | 19      | 0<br>-13                   | 29      |                 | 22      |                 |
| <b>SRE12</b> | 12               | +3<br>-6                         | 21      |                            | 30      |                 | 23      |                 |
| <b>SRE13</b> | 13               |                                  | 23      |                            | 32      |                 | 23      |                 |
| <b>SRE16</b> | 16               |                                  | 28      |                            | 37      |                 | 26.5    |                 |
| <b>SRE20</b> | 20               | +3<br>-7                         | 32      | 0<br>-16                   | 42      | 0<br>-0.3       | 30.5    | 0<br>-0.3       |
| <b>SRE25</b> | 25               |                                  | 40      |                            | 59      |                 | 41      |                 |
| <b>SRE30</b> | 30               |                                  | 45      |                            | 64      |                 | 44.5    |                 |
| <b>SRE40</b> | 40               | +3/-8                            | 60      | 0/-19                      | 80      |                 | 60.5    |                 |

※If the inner contact diameter exceeds 40 mm, please contact NB.

| W    | D <sub>1</sub> | basic load rating |                               | allowable<br>revolutions<br>per minute<br>rpm | mass<br>g | part number  |
|------|----------------|-------------------|-------------------------------|-----------------------------------------------|-----------|--------------|
|      |                | dynamic<br>C<br>N | static<br>C <sub>0</sub><br>N |                                               |           |              |
| 1.1  | 11.5           | 78                | 176                           | 300                                           | 10        | <b>SRE 6</b> |
| 1.1  | 14.3           | 137               | 314                           | 300                                           | 20        | <b>SRE 8</b> |
| 1.3  | 18             | 157               | 372                           | 300                                           | 39        | <b>SRE10</b> |
| 1.3  | 20             | 274               | 588                           | 300                                           | 42        | <b>SRE12</b> |
| 1.3  | 22             | 323               | 686                           | 300                                           | 56        | <b>SRE13</b> |
| 1.6  | 27             | 451               | 882                           | 250                                           | 97        | <b>SRE16</b> |
| 1.6  | 30.5           | 647               | 1,180                         | 250                                           | 133       | <b>SRE20</b> |
| 1.85 | 38             | 882               | 1,860                         | 250                                           | 293       | <b>SRE25</b> |
| 1.85 | 43             | 1,180             | 2,650                         | 200                                           | 371       | <b>SRE30</b> |
| 2.1  | 57             | 1,960             | 4,020                         | 200                                           | 778       | <b>SRE40</b> |

1N≒0.102kgf

– Square Flange type –

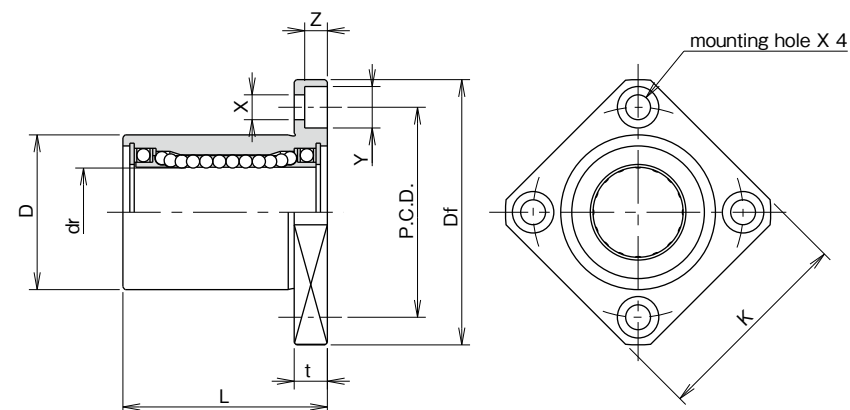


example **SREK** **25**

SREK type

inner contact diameter (dr)

| part number   | dr |                 | D  |                 | major dimensions |          |         |                   |
|---------------|----|-----------------|----|-----------------|------------------|----------|---------|-------------------|
|               | mm | tolerance<br>μm | mm | tolerance<br>μm | L<br>±0.3<br>mm  | Df<br>mm | K<br>mm | flange<br>t<br>mm |
| <b>SREK 6</b> | 6  | +4<br>−5        | 12 | 0               | 19               | 28       | 22      | 5                 |
| <b>SREK 8</b> | 8  |                 | 15 | −13             | 24               | 32       | 25      | 5                 |
| <b>SREK10</b> | 10 |                 | 19 |                 | 29               | 40       | 30      | 6                 |
| <b>SREK12</b> | 12 | +3<br>−6        | 21 | 0               | 30               | 42       | 32      | 6                 |
| <b>SREK13</b> | 13 |                 | 23 | −16             | 32               | 43       | 34      | 6                 |
| <b>SREK16</b> | 16 |                 | 28 |                 | 37               | 48       | 37      | 6                 |
| <b>SREK20</b> | 20 | +3<br>−7        | 32 | 0               | 42               | 54       | 42      | 8                 |
| <b>SREK25</b> | 25 |                 | 40 | −19             | 59               | 62       | 50      | 8                 |
| <b>SREK30</b> | 30 |                 | 45 |                 | 64               | 74       | 58      | 10                |



|              |             | perpendicularity<br><br>μm | basic load rating |                   | allowable<br>revolutions<br>per minute<br>rpm | mass<br><br>g | part number   |
|--------------|-------------|----------------------------|-------------------|-------------------|-----------------------------------------------|---------------|---------------|
| P.C.D.<br>mm | X×Y×Z<br>mm |                            | dynamic<br>C<br>N | static<br>Co<br>N |                                               |               |               |
| 20           | 3.5×6×3.1   | 12                         | 78                | 176               | 300                                           | 21            | <b>SREK 6</b> |
| 24           | 3.5×6×3.1   |                            | 137               | 314               | 300                                           | 33            | <b>SREK 8</b> |
| 29           | 4.5×7.5×4.1 |                            | 157               | 372               | 300                                           | 61            | <b>SREK10</b> |
| 32           | 4.5×7.5×4.1 |                            | 274               | 588               | 300                                           | 67            | <b>SREK12</b> |
| 33           | 4.5×7.5×4.1 |                            | 323               | 686               | 300                                           | 83            | <b>SREK13</b> |
| 38           | 4.5×7.5×4.1 |                            | 451               | 882               | 250                                           | 126           | <b>SREK16</b> |
| 43           | 5.5×9×5.1   | 15                         | 647               | 1,180             | 250                                           | 178           | <b>SREK20</b> |
| 51           | 5.5×9×5.1   |                            | 882               | 1,860             | 250                                           | 355           | <b>SREK25</b> |
| 60           | 6.6×11×6.1  |                            | 1,180             | 2,650             | 200                                           | 483           | <b>SREK30</b> |

$$1\text{ N} \doteq 0.102\text{ kgf}$$

## SMA-R TYPE

-Block type-

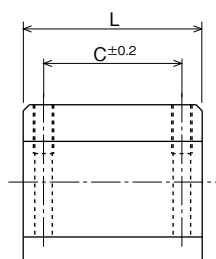
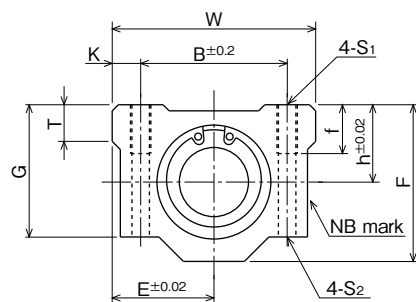


## part number structure

example **SMA 25 R**

SMA-R type

inner contact diameter



| part number | inner contact diameter |          | major dimensions |    |    |     |      |      |    |                     |    |      |                |     |                |       | basic load rating |        | allowable<br>revolutions<br>per minute | mass  |
|-------------|------------------------|----------|------------------|----|----|-----|------|------|----|---------------------|----|------|----------------|-----|----------------|-------|-------------------|--------|----------------------------------------|-------|
|             |                        |          | outer dimensions |    |    |     |      |      |    | mounting dimensions |    |      |                |     |                |       | dynamic           | static |                                        |       |
|             | tolerance              |          | h                | E  | W  | L   | F    | G    | T  | B                   | C  | K    | S <sub>1</sub> | f   | S <sub>2</sub> | C     | Co                |        |                                        |       |
|             | mm                     | μm       | mm               | mm | mm | mm  | mm   | mm   | mm | mm                  | mm | mm   | mm             | mm  | mm             | N     | N                 | rpm    | g                                      |       |
| SMA 6R      | 6                      | +4<br>-5 | 9                | 15 | 30 | 25  | 18   | 15   | 6  | 20                  | 15 | 5    | M4             | 8   | 3.4            | 78    | 176               | 300    | 33                                     |       |
| SMA 8R      | 8                      |          | 11               | 17 | 34 | 30  | 22   | 18   | 6  | 24                  | 18 | 5    | M4             | 8   | 3.4            | 137   | 314               | 300    | 55                                     |       |
| SMA10R      | 10                     |          | 13               | 20 | 40 | 35  | 26   | 21   | 8  | 28                  | 21 | 6    | M5             | 12  | 4.3            | 157   | 372               | 300    | 93                                     |       |
| SMA12R      | 12                     | +3<br>-6 | 15               | 21 | 42 | 36  | 28   | 24   | 8  | 30.5                | 26 | 5.75 | M5             | 12  | 4.3            | 274   | 588               | 300    | 104                                    |       |
| SMA13R      | 13                     |          | 15               | 22 | 44 | 39  | 30   | 24.5 | 8  | 33                  | 26 | 5.5  | M5             | 12  | 4.3            | 323   | 686               | 300    | 128                                    |       |
| SMA16R      | 16                     |          | 19               | 25 | 50 | 44  | 38.5 | 32.5 | 9  | 36                  | 34 | 7    | M5             | 12  | 4.3            | 451   | 882               | 250    | 216                                    |       |
| SMA20R      | 20                     |          | 21               | 27 | 54 | 50  | 41   | 35   | 11 | 40                  | 40 | 7    | M6             | 12  | 5.2            | 647   | 1,180             | 250    | 286                                    |       |
| SMA25R      | 25                     | +3<br>-7 | 26               | 38 | 76 | 67  | 51.5 | 42   | 12 | 54                  | 50 | 11   | M8             | 18  | 7              | 882   | 1,860             | 250    | 645                                    |       |
| SMA30R      | 30                     |          | 30               | 39 | 78 | 72  | 59.5 | 49   | 15 | 58                  | 58 | 10   | M8             | 18  | 7              | 1,180 | 2,650             | 200    | 824                                    |       |
| SMA40R      | 40                     |          | +3/-8            | 40 | 51 | 102 | 90   | 78   | 62 | 20                  | 80 | 60   | 11             | M10 | 25             | 8.7   | 1,960             | 4,020  | 200                                    | 1,719 |

1N≒0.102kgf

## SMA-RW TYPE

-Double-Wide Block type-



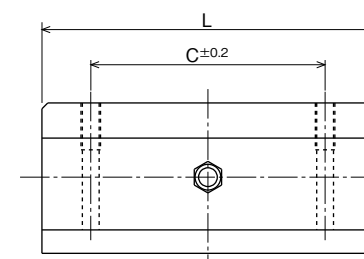
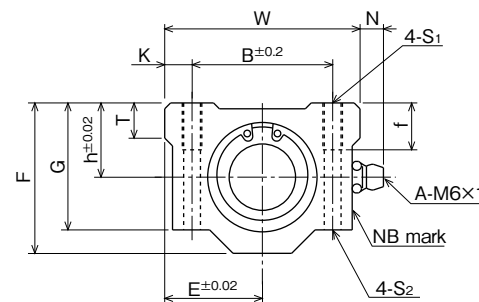
## part number structure

example **SMA 25 R W**

SMA-R type

double type

inner contact diameter



| part number | inner contact diameter |    | major dimensions |    |    |     |     |      |      |    |                     |      |     |                |     |                | basic load rating |        | allowable<br>revolutions<br>per minute | mass |       |
|-------------|------------------------|----|------------------|----|----|-----|-----|------|------|----|---------------------|------|-----|----------------|-----|----------------|-------------------|--------|----------------------------------------|------|-------|
|             |                        |    | outer dimensions |    |    |     |     |      |      |    | mounting dimensions |      |     |                |     |                | dynmic            | static |                                        |      |       |
|             | tolerance              |    | h                | E  | W  | L   | F   | G    | T    | N  | B                   | C    | K   | S <sub>1</sub> | f   | S <sub>2</sub> | C                 | Co     |                                        |      |       |
|             | mm                     | μm | mm               | mm | mm | mm  | mm  | mm   | mm   | mm | mm                  | mm   | mm  | mm             | mm  | mm             | N                 | N      |                                        |      | rpm   |
| SMA 6RW     | 6                      |    | +4               | 9  | 15 | 30  | 48  | 18   | 15   | 6  | 7                   | 20   | 36  | 5              | M4  | 8              | 3.4               | 126    | 352                                    | 300  | 68    |
| SMA 8RW     | 8                      |    | -5               | 11 | 17 | 34  | 58  | 22   | 18   | 6  | 7                   | 24   | 42  | 5              | M4  | 8              | 3.4               | 222    | 628                                    | 300  | 113   |
| SMA10RW     | 10                     |    |                  | 13 | 20 | 40  | 68  | 26   | 21   | 8  | 7                   | 28   | 46  | 6              | M5  | 12             | 4.3               | 254    | 744                                    | 300  | 188   |
| SMA12RW     | 12                     |    | +3               | 15 | 21 | 42  | 70  | 28   | 24   | 8  | 6.5                 | 30.5 | 50  | 5.75           | M5  | 12             | 4.3               | 444    | 1,180                                  | 300  | 210   |
| SMA13RW     | 13                     |    | -6               | 15 | 22 | 44  | 75  | 30   | 24.5 | 8  | 6.5                 | 33   | 50  | 5.5            | M5  | 12             | 4.3               | 523    | 1,370                                  | 300  | 254   |
| SMA16RW     | 16                     |    |                  | 19 | 25 | 50  | 85  | 38.5 | 32.5 | 9  | 6                   | 36   | 60  | 7              | M5  | 12             | 4.3               | 731    | 1,760                                  | 250  | 431   |
| SMA20RW     | 20                     |    | +3               | 21 | 27 | 54  | 96  | 41   | 35   | 11 | 7                   | 40   | 70  | 7              | M6  | 12             | 5.2               | 1,050  | 2,360                                  | 250  | 568   |
| SMA25RW     | 25                     |    | -7               | 26 | 38 | 76  | 130 | 51.5 | 42   | 12 | 4                   | 54   | 100 | 11             | M8  | 18             | 7                 | 1,430  | 3,720                                  | 250  | 1,282 |
| SMA30RW     | 30                     |    |                  | 30 | 39 | 78  | 140 | 59.5 | 49   | 15 | 5                   | 58   | 110 | 10             | M8  | 18             | 7                 | 1,910  | 5,300                                  | 200  | 1,638 |
| SMA40RW     | 40                     |    | +3/-8            | 40 | 51 | 102 | 175 | 78   | 62   | 20 | 5                   | 80   | 140 | 11             | M10 | 25             | 8.7               | 3,180  | 8,040                                  | 200  | 3,419 |

1N≒0.102kgf

## AK-R TYPE

—Compact Block type—

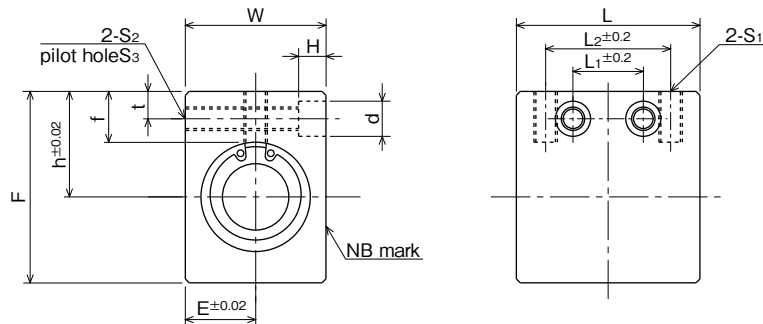


## part number structure

example **AK 25 R**

AK-R type

inner contact diameter



| part number | inner contact diameter |                 | major dimensions |    |    |                |                |                     |                |      |                |                |     |     |    |    |       | basic load rating |        | allowable<br>revolutions<br>per minute | mass |
|-------------|------------------------|-----------------|------------------|----|----|----------------|----------------|---------------------|----------------|------|----------------|----------------|-----|-----|----|----|-------|-------------------|--------|----------------------------------------|------|
|             |                        |                 | outer dimensions |    |    |                |                | mounting dimensions |                |      |                |                |     |     |    |    |       | dynamic           | static |                                        |      |
|             | h                      | E               | W                | L  | F  | L <sub>2</sub> | S <sub>1</sub> | f                   | L <sub>1</sub> | t    | S <sub>2</sub> | S <sub>3</sub> | d   | H   | C  | Co |       |                   |        |                                        |      |
|             | mm                     | tolerance<br>μm | mm               | mm | mm | mm             | mm             | mm                  | mm             | mm   | mm             | mm             | mm  | mm  | mm | N  | N     | rpm               | g      |                                        |      |
| AK 6R       | 6                      | +4              | 14               | 8  | 16 | 27             | 22             | 18                  | M4             | 8    | 9              | 5              | M4  | 3.5 | 6  | 5  | 78    | 176               | 300    | 27                                     |      |
| AK 8R       | 8                      | -5              | 16               | 10 | 20 | 32             | 26             | 20                  | M5             | 8.5  | 10             | 5              | M4  | 3.5 | 6  | 5  | 137   | 314               | 300    | 48                                     |      |
| AK10R       | 10                     |                 | 19               | 13 | 26 | 39             | 32             | 27                  | M6             | 9.5  | 15             | 6              | M5  | 4.5 | 8  | 6  | 157   | 372               | 300    | 94                                     |      |
| AK12R       | 12                     | +3              | 20               | 14 | 28 | 40             | 34             | 27                  | M6             | 9.5  | 15             | 6              | M5  | 4.5 | 8  | 6  | 274   | 588               | 300    | 105                                    |      |
| AK13R       | 13                     |                 | 25               | 15 | 30 | 42             | 43             | 28                  | M6             | 13.5 | 16             | 7              | M6  | 5.2 | 9  | 7  | 323   | 686               | 300    | 151                                    |      |
| AK16R       | 16                     |                 | 27               | 18 | 36 | 47             | 49             | 32                  | M6             | 13   | 18             | 7              | M6  | 5.2 | 9  | 7  | 451   | 882               | 250    | 238                                    |      |
| AK20R       | 20                     | +3              | 31               | 21 | 42 | 52             | 54             | 36                  | M8             | 15   | 18             | 8              | M8  | 7   | 11 | 8  | 647   | 1,180             | 250    | 328                                    |      |
| AK25R       | 25                     |                 | 37               | 26 | 52 | 69             | 65             | 42                  | M10            | 17   | 22             | 9              | M10 | 8.9 | 14 | 10 | 882   | 1,860             | 250    | 669                                    |      |
| AK30R       | 30                     |                 | 40               | 29 | 58 | 74             | 71             | 44                  | M10            | 17.5 | 22             | 9              | M10 | 8.9 | 14 | 10 | 1,180 | 2,650             | 200    | 856                                    |      |

1N≒0.102kgf

## AK-RW TYPE

—Double-Wide Compact Block type—



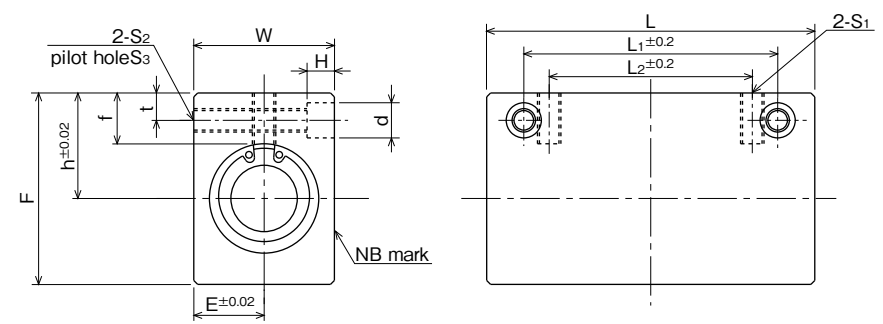
## part number structure

example **AK 25 R W**

AK-R type

double type

inner contact diameter



| part number | inner contact diameter |                 | major dimensions |    |    |                |                |                     |                |      |                |                |     |     |    |    |       | basic load rating |        | allowable<br>revolutions<br>per minute | mass |
|-------------|------------------------|-----------------|------------------|----|----|----------------|----------------|---------------------|----------------|------|----------------|----------------|-----|-----|----|----|-------|-------------------|--------|----------------------------------------|------|
|             |                        |                 | outer dimensions |    |    |                |                | mounting dimensions |                |      |                |                |     |     |    |    |       | dynamic           | static |                                        |      |
|             | h                      | E               | W                | L  | F  | L <sub>2</sub> | S <sub>1</sub> | f                   | L <sub>1</sub> | t    | S <sub>2</sub> | S <sub>3</sub> | d   | H   | C  | Co |       |                   |        |                                        |      |
|             | mm                     | tolerance<br>μm | mm               | mm | mm | mm             | mm             | mm                  | mm             | mm   | mm             | mm             | mm  | mm  | mm | N  | N     |                   |        |                                        |      |
| AK 6RW      | 6                      | +4<br>-5        | 14               | 8  | 16 | 46             | 22             | 20                  | M4             | 8    | 30             | 5              | M4  | 3.5 | 6  | 5  | 126   | 352               | 300    | 48                                     |      |
| AK 8RW      | 8                      |                 | 16               | 10 | 20 | 56             | 26             | 30                  | M5             | 8.5  | 42             | 5              | M4  | 3.5 | 6  | 5  | 222   | 628               | 300    | 89                                     |      |
| AK10RW      | 10                     |                 | 19               | 13 | 26 | 68             | 32             | 36                  | M6             | 9.5  | 50             | 6              | M5  | 4.5 | 8  | 6  | 254   | 744               | 300    | 175                                    |      |
| AK12RW      | 12                     | +3<br>-6        | 20               | 14 | 28 | 70             | 34             | 36                  | M6             | 9.5  | 50             | 6              | M5  | 4.5 | 8  | 6  | 444   | 1,180             | 300    | 196                                    |      |
| AK13RW      | 13                     |                 | 25               | 15 | 30 | 74             | 43             | 42                  | M6             | 13.5 | 55             | 7              | M6  | 5.2 | 9  | 7  | 523   | 1,370             | 300    | 281                                    |      |
| AK16RW      | 16                     |                 | 27               | 18 | 36 | 84             | 49             | 52                  | M6             | 13   | 65             | 7              | M6  | 5.2 | 9  | 7  | 731   | 1,760             | 250    | 450                                    |      |
| AK20RW      | 20                     | +3<br>-7        | 31               | 21 | 42 | 94             | 54             | 58                  | M8             | 15   | 70             | 8              | M8  | 7   | 11 | 8  | 1,050 | 2,360             | 250    | 626                                    |      |
| AK25RW      | 25                     |                 | 37               | 26 | 52 | 128            | 65             | 80                  | M10            | 17   | 100            | 9              | M10 | 8.9 | 14 | 10 | 1,430 | 3,720             | 250    | 1,299                                  |      |
| AK30RW      | 30                     |                 | 40               | 29 | 58 | 138            | 71             | 90                  | M10            | 17.5 | 110            | 9              | M10 | 8.9 | 14 | 10 | 1,910 | 5,300             | 200    | 1,662                                  |      |

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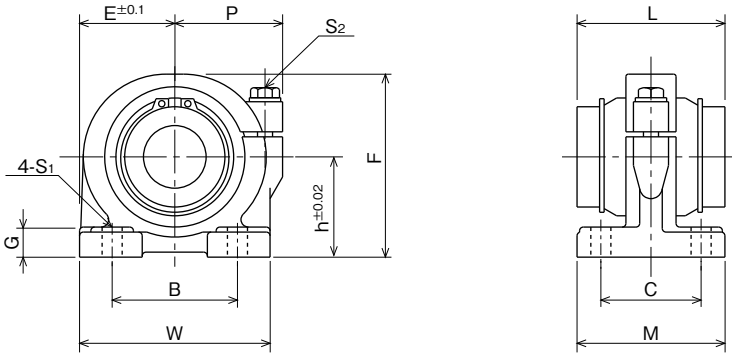
SMP-R TYPE  
—Pillow Block type—

part number structure

example **SMP 25 R**

SMP-R type  
inner contact diameter

| part number | major dimensions       |                  |         |         |         |         |         |         |         |
|-------------|------------------------|------------------|---------|---------|---------|---------|---------|---------|---------|
|             | inner contact diameter | outer dimensions |         |         |         |         |         |         |         |
|             | mm                     | tolerance<br>μm  | h<br>mm | E<br>mm | W<br>mm | L<br>mm | F<br>mm | G<br>mm | M<br>mm |
| SMP13R      | 13                     | +3               | 25      | 25      | 50      | 32      | 46      | 8       | 36      |
| SMP16R      | 16                     | −6               | 29      | 27.5    | 55      | 37      | 53      | 10      | 40      |
| SMP20R      | 20                     | +3               | 34      | 32.5    | 65      | 42      | 62      | 12      | 48      |
| SMP25R      | 25                     | −7               | 40      | 38      | 76      | 59      | 73      | 12      | 59      |
| SMP30R      | 30                     |                  | 45      | 42.5    | 85      | 64      | 84      | 15      | 69      |
| SMP40R      | 40                     | +3/−8            | 60      | 62      | 124     | 80      | 112     | 18      | 86      |



| mounting dimensions |         |         |                      | adjustment<br>screw size | basic load rating |                               | allowable<br>revolutions<br>per minute<br>rpm | mass<br>g | part number |
|---------------------|---------|---------|----------------------|--------------------------|-------------------|-------------------------------|-----------------------------------------------|-----------|-------------|
| P<br>mm             | B<br>mm | C<br>mm | S <sub>1</sub><br>mm |                          | dynamic<br>C<br>N | static<br>C <sub>0</sub><br>N |                                               |           |             |
| 30                  | 30      | 26      | 7 (M5)               | M5                       | 323               | 686                           | 300                                           | 266       | SMP13R      |
| 32                  | 35      | 29      | 7 (M5)               | M5                       | 451               | 882                           | 250                                           | 369       | SMP16R      |
| 37                  | 40      | 35      | 8 (M6)               | M6                       | 647               | 1,180                         | 250                                           | 690       | SMP20R      |
| 43                  | 50      | 40      | 8 (M6)               | M6                       | 882               | 1,860                         | 250                                           | 970       | SMP25R      |
| 49                  | 58      | 46      | 10 (M8)              | M8                       | 1,180             | 2,650                         | 200                                           | 1,420     | SMP30R      |
| 68                  | 76      | 64      | 12 (M10)             | M10                      | 1,960             | 4,020                         | 200                                           | 3,585     | SMP40R      |

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# SLIDE ROTARY BUSH RK TYPE

NB's RK type slide rotary bush is a highly accurate and high load capacity bearing providing smooth continuous linear and rotational motions. Its structure imposes no constraints on linear and rotational motions. It is much more compact than a standard slide bush with separate rotational bearing.

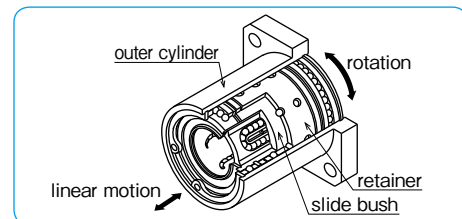
## STRUCTURE AND ADVANTAGES

The RK type slide rotary bush uses a retainer similar to that used in the SR type stroke bush. This retainer gives a smooth motion in a high rotational application.

SM type slide bush is incorporated, providing the stable and smooth linear motion.

Relatively large ball elements are used for high load capacity.

Figure E-9 Structure of RK Slide Rotary Bush



## FIT

### Shaft

In order to ensure high accuracy motion of Slide Rotary Bush RK type, it is essential to select a high quality shaft. In selecting a shaft, please take note of:

Outer diameter tolerance: h5 recommended

Surface hardness: 58HRC or higher

For a shaft with surface hardness less than 58HRC, make a correction in life calculation by adding hardness coefficient.

Surface roughness: lower than Ra0.4 or better

## Life Calculation

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

L: rated life (km)  $f_H$ : hardness coefficient  
 $f_T$ : temperature coefficient  $f_C$ : contact coefficient  
 $f_W$ : applied load coefficient  
 C: basic dynamic load rating (N) P: applied load (N)  
 ※Refer to page Eng-5 for the coefficients.

1. A smooth unlimited linear and rotational motion is obtained.
2. There is no need to machine separate housing.
3. High accuracy is ensured for extended period of usage.
4. Its high compatibility eliminates replacement problems.
5. High rigidity enables it to withstand an unbalanced load and large load.

※For best performance, please select tolerance of h5 for the shaft.

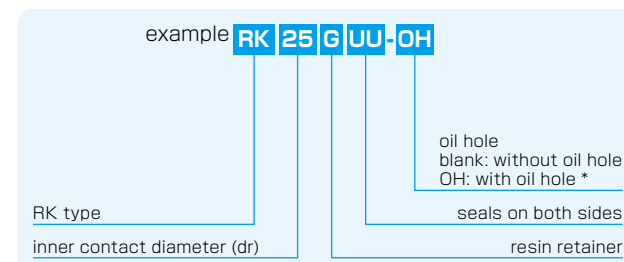
### Housing

Inner diameter tolerance is not requested. Please insert into an installation bore which is slightly larger than the outer cylinder.

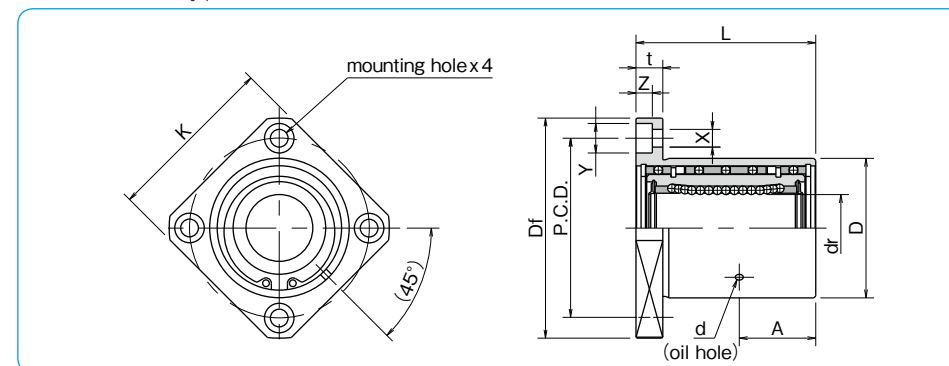
## RK TYPE



### part number structure



\*Oil hole is for rotary-portion lubrication.



| part number | major dimensions |                 |    |                 |    |      |      |   |        |    |    |              | basic load rating |        | allowable<br>revolutions<br>per minute | mass |         |
|-------------|------------------|-----------------|----|-----------------|----|------|------|---|--------|----|----|--------------|-------------------|--------|----------------------------------------|------|---------|
|             | dr               |                 | D  |                 | L  | A    |      | d | flange |    |    |              | dynamic           | static |                                        |      |         |
|             | mm               | tolerance<br>μm | mm | tolerance<br>μm |    | mm   | mm   |   | mm     | mm | t  | P.C.D.<br>mm | X×Y×Z<br>mm       | C<br>N |                                        |      | Co<br>N |
| RK12GUU     | 12               | 0               | 32 | 0               | 36 | ±0.3 | 15   | 2 | 54     | 42 | 8  | 43           | 5.5×9×5.1         | 510    | 784                                    | 500  | 180     |
| RK16GUU     | 16               | − 9             | 40 | −25             | 45 |      | 19.5 | 2 | 62     | 50 | 8  | 51           | 5.5×9×5.1         | 774    | 1,180                                  | 500  | 280     |
| RK20GUU     | 20               | 0               | 45 | 0               | 50 |      | 21.5 | 3 | 74     | 58 | 10 | 60           | 6.6×11×6.1        | 882    | 1,370                                  | 400  | 420     |
| RK25GUU     | 25               | −10             | 52 | 0               | 67 |      | 28.5 | 3 | 82     | 64 | 10 | 67           | 6.6×11×6.1        | 980    | 1,570                                  | 400  | 680     |
| RK30GUU     | 30               |                 | 60 | −30             | 74 |      | 31   | 3 | 96     | 75 | 13 | 78           | 9×14×8.1          | 1,570  | 2,740                                  | 400  | 990     |

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