RBX
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Linear motion system

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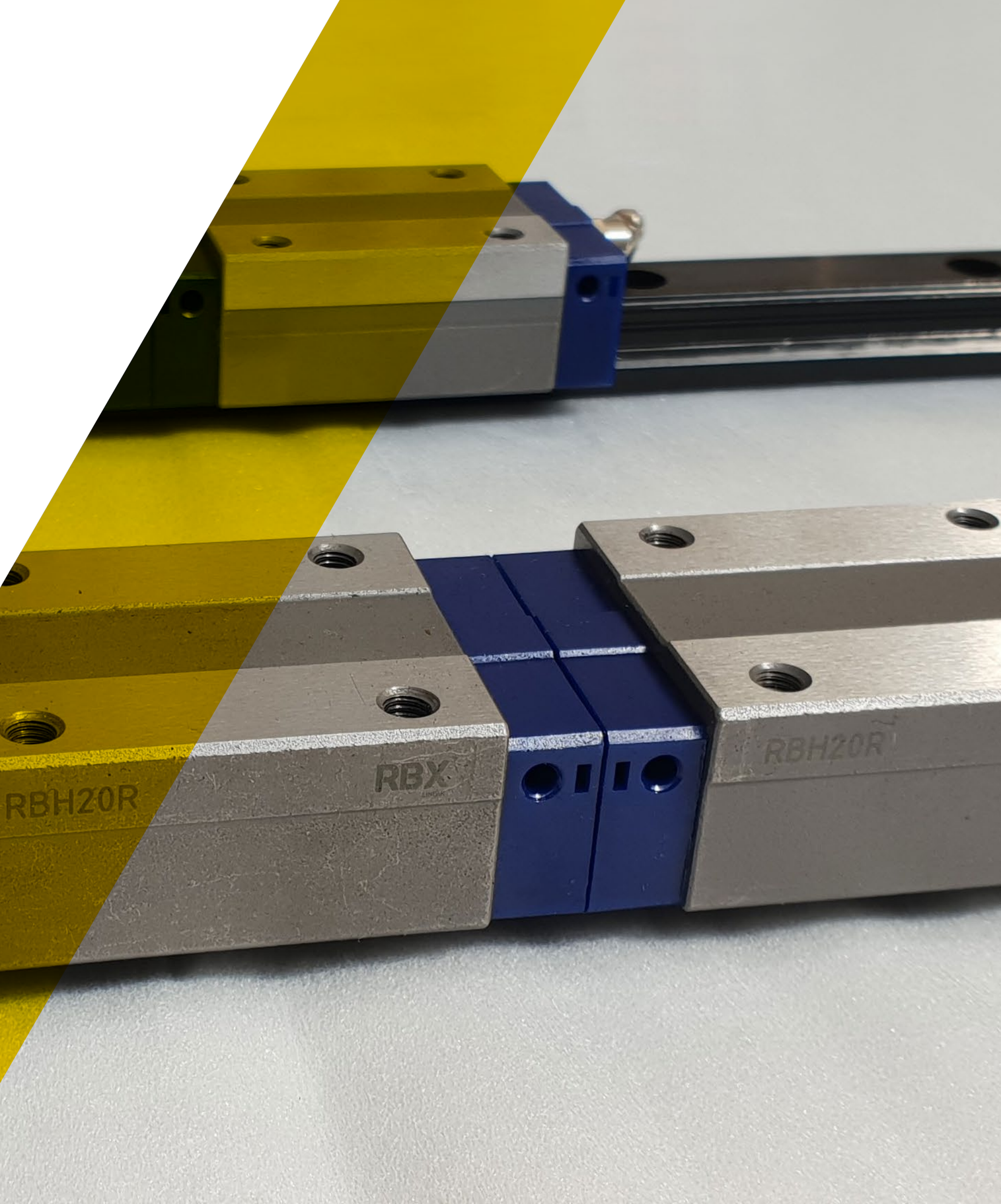

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Contents

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01

Linear Motion Guide

1. Characteristics
2. Strengths
3. Types

1. Characteristics

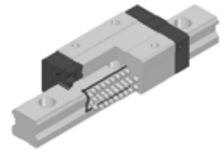
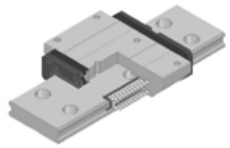
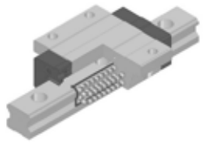
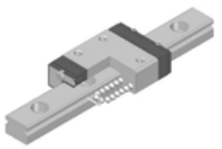
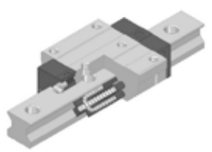
RBX Linear Motion Guide is a straight-line motion bearing with the structure in which rolling elements such as balls or rollers softly circulate the inner part of the block and the block can make an infinite straight-line motion along the raceway surface of a rail.

2. Strengths

1) Able to make a precise positioning
   Since there is less difference between static friction and kinetic friction as well as in speed-induced friction fluctuation, it excellently responds even to micro-migration, alowing precise positioning.
2) Able to maintain accuracy stably for a long time
   Less friction coefficient and wear due to ideal rolling motion allows the stable maintenance of accuracy for a long time.
3) Able to eliminate clearance or increase rigidity by preloading
   It is possible to eliminate clearance by using rolling elements such as a ball or a roller or increase rigidity of Linear Motion Guide by preloading.
4) Lubrication is simple.
   Lubrication is simple but it uses grease or oil which makes it convenient to maintain.
5) Able to compact equipment and save cost for operating electricity
   It can be made into compact miniaturized equipment because friction is low despite highly-rigid high-loading, which saves manufacturing costs and energy.

3. Types

RBX offers various types of Linear Motion guide from miniature types to general ball Linear Motion guide to low-sound linear motion guide to ultra high-rigid roller linear motion guide.
Since each supports different shapes and sizes according to service conditions, you can select the optimal linear motion guide to each usage.

LINEAR MOTION GUIDE		• World standard ball Linear Motion guide • 4-direction equal load type with 40° contact angle • Great error-absorbing ability with D/F combination • High-rigid highly accurate straight-line motion through ideal rolling motion
WIDE LINEAR MOTION GUIDE		• It is a compact highly-rigid 4-direction equal load type with 45 degrees, and suitable for use in a one-axis type since it is wider and lower heights than the general miniature linear motion guide and rigidity increased.
SPACER CHAIN LINEAR MOTION GUIDE		• World standard ball Linear Motion guide • 4-direction equal load type with 45° contact angle • Great error-absorbing ability with D/F combination • Spacer-enabled retainer type with low noise low dust raise straight-line motion device
MINIATURE LINEAR MOTION GUIDE		• Miniature high-rigidity • Various shapes and sizes • Highly-durable and reliable compact straight-line motion device
ROLLER LINEAR MOTION GUIDE		• Roller-enabled ultra-rigid linear motion guide • 4-direction equal load type with 40° contact angle • Able to run reliably for a long time through rolling motion having wide contact surface • High-load, high-rigid, highly accurate straight-line motion

RBX LINEAR

02

Selection of Linear Motion Guide

1. Overview
2. Procedure

1. Overview

To select Linear Motion guide, most of all identify detailed requirements and prioritize the requirements to select the Linear Motion Guide suitable for the service conditions.

2. Procedure

IDENTIFY SERVICE CONDITIONS	Equipment, maintenance structure, installation space, assembly status, functional requirements, service conditions
SELECT THE TYPE OF LINEAR MOTION GUIDE	Select the appropriate type by considering motion condition, load level, rigidity, friction, and assembly
SELECT THE MODEL NUMBER OF LINEAR MOTION GUIDE	Determine the model number and the quantity of blocks by considering the space and load
CALCULATE LOAD	Calculate the load in vertical and horizontal directions and moment
CALCULATE EQUIVALENT LOAD	Calculate each load applied to the block by converting it into equivalent load
CALCULATE MEAN LOAD	Calculate each load applied to the block and variable load during deceleration by converting them into mean load
CALCULATE STATIC SAFETY FACTOR	Calculate the static safety factor identified by basic load rating and max. equivalent load and check if it fits for service condition
CALCULATE LIFE	Check if it fits for service conditions by calculating load rating and life
REVIEW PRELOAD & CLEARANCE	Select the preload and clearance suitable for service conditions
DETERMINE THE CLASS OF PRECISION	Determine the class of precision required by Linear Motion guide while driving
LUBRICATION, DUST PROOF, SURFACE HANDLING	Select lubricant suitable for the environment using grease, oil, and special grease lubrication and select seal for dust proof / determine the method of surface handing for rust prevention and low dust raise
COMPLETE SELECTION	Complete the decision of final specifications of Linear Motion

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03

Life Calculation

1. Load rating and life
2. Load Calculation
3. Service Condition Setting
4. Load Calculation Formula
5. Equivalent Load Calculation
6. Equivalent Load Calculation Formula
7. Static Safety Factor Calculation
8. Mean Load Calculation
9. Rating Life Calculation

1. Load rating and life

(1) Life

If external load is applied to Linear Motion guide while driving, fatigue fracture occurs by stress created as load is repeatedly applied to the raceway surface and rolling elements, and flaking -peeling off in scale- like flake arises. A total driving distance until flaking occurs due to initial fatigue fracture is the life of a linear motion guide.

Defects may occur in Linear Motion guide earlier than when flaking normally occurs due to wear or fatigue in the following cases:

a. Excess load by the imprecise assembly following a difference in temperature or tolerance
b. If Linear Motion guide is contaminated with foreign substance
c. Driving with insufficient lubrication
d. Reciprocating motion in a very short distance in the form of vibration or wave during the halt or drive
e. Excessive load to Linear Motion guide
f. Deformation of plastic end-plate

(2) Rating fatigue life L

Generally Linear Motion guide does not always have same life even though the products are manufactured in the same way because of the difference in scattering of raw material's original fatigue. For this reason, the reference value of life is defined as the rating fatigue life which is a total driving distance that flaking does not occur in 90% of Linear Motion guides in a group when having them run under the same conditions by grouping multiple Linear Motion guides with same specifications into a group.

WHEN USING A BALL

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

WHEN USING A ROLLER

$$L = \left(\frac{f_H \cdot f_T \cdot f_C}{f_W} \cdot \frac{C}{P_C} \right)^{\frac{10}{3}} \times 100$$

(3) Basic dynamic load rating C

Basic dynamic load rating is Linear Motion guide's bearing of load which represents an applicable constant load in direction and magnitude when the rated life is 50KM. The reference value of RBX Linear Motion Guide's basic dynamic load rating is 50KM (ball type) and 100KM (roller type). It is used for calculating Linear Motion guide's life while driving under constant load in magnitude from the center of a block to bottom. Each value of basic dynamic load rating (C) is stated in the catalogue.

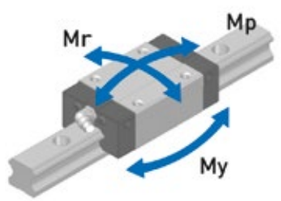
(4) Basic static load rating C_0

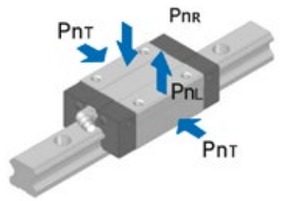
If Linear Motion guide is applied by excessive load or attached instantly by big impact load, a partially permanent deformation occurs between a rolling element and the raceway surface. If deformation reaches to a certain extent, it hinders a smooth driving. Basic static load rating is defined as the constant static load in direction and magnitude with the permanent deformation that occurs between a rolling element like a ball or a roller and the raceway surface of block and rail 0.0001 times bigger than the diameter of the rolling element. In Linear Motion guide, it is the load applied from top to bottom based on the center of the block. Each value of basic static load rating (C_0) is stated in the specification table.

(5) Static allowable moment M_0

Moment load can be applied to Linear Motion guide. Here, a ball or a roller both at the ends is most stressed due to the stress distribution of a ball or a roller which is the rolling element inside Linear Motion guide. Static allowable moment refers to the constant moment load in direction and magnitude when the permanent deformation between a ball or a roller applied with the biggest stress and the raceway surface of a block or a rail is less than 0.0001 of the diameter of the rolling element. Moment values of three directions (Mp, My, Mr) are stated in the specification sheet. Static allowable moment (M_0) and static moment load rating (Mp) can be reviewed by applying safety factor (fs).

DIRECTIONS OF LOAD AND MOMENT





$$f_S = \frac{Mp}{M_0}$$

2. Load Calculation

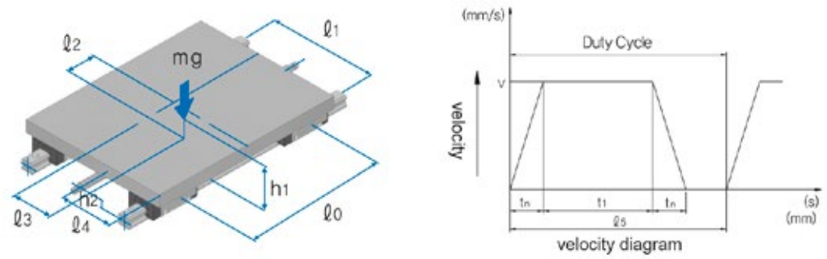
Linear Motion guide bears basic dynamic load rating (C) and basic static load rating (C_0). But compression load applied from top to down due to inertia force created by the center of gravity, positioning thrust, acceleration, cutting force, and deceleration as well as various loads including tensile load, horizontal load, and moment load can be applied to Linear Motion guide depending on the service conditions. In this case, load of Linear Motion guide changes. When selecting Linear Motion guide, it is required to review these conditions and calculate proper load.

3. Service Condition Setting

Service conditions necessary for calculating the load and life of Linear Motion guide:

1 • Mass: m(kg)
2 • Applicable load direction
3 • Point of application: ℓ2, ℓ3, h1(mm)
(center of gravity)
4 • Point of thrust: ℓ4, h2(mm)
5 • Composition of Linear Motion guide: ℓ0, ℓ1(mm)
(No. of block & rail)
6 • Velocity diagram Velocity: V(mm/s)
Time constant: tn(s)
Acceleration: αn(mm/s)
7 • No. of reciprocating motion/second: N1(min-1)
8 • Stroke: Ls(mm)
9 • Avg. velocity: Vm(m/s)
10 • Required life: Lh(h)

FIGURE 1. SERVICE CONDITION

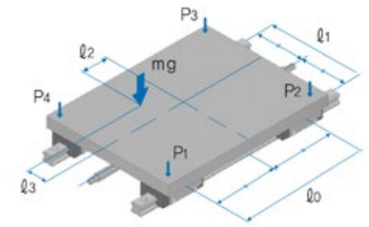
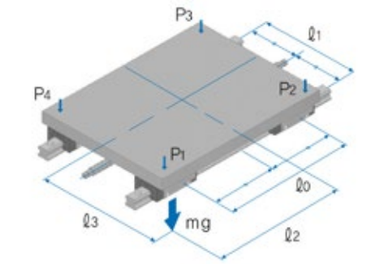
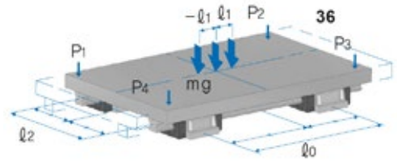
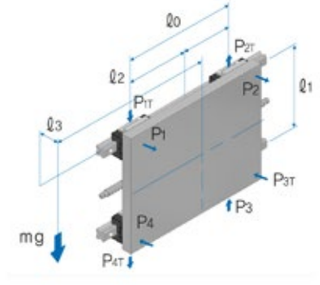


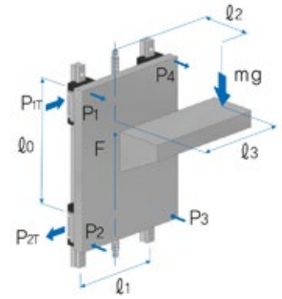
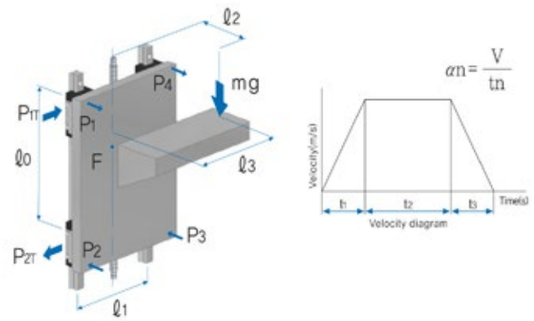
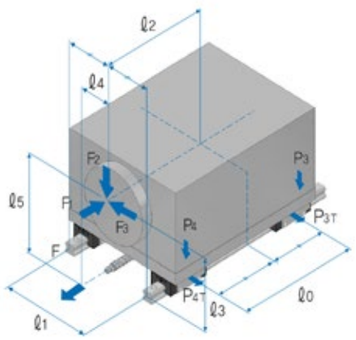
velocity diagram

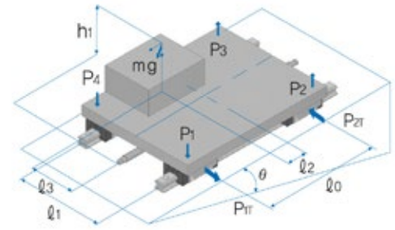
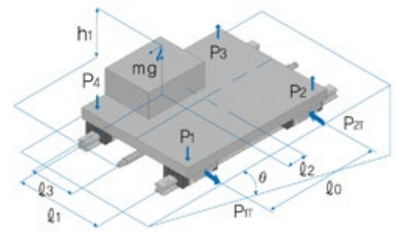
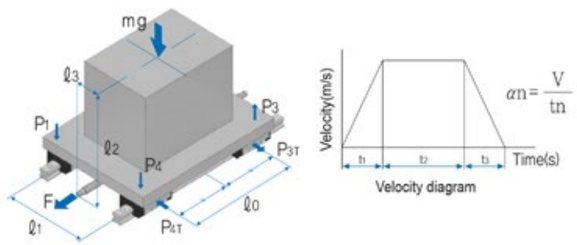
4. Load Calculation Formula

Load applied to Linear Motion guide changes due to external forces such as the center of gravity, position of thrust, acceleration, and cutting resistance. To select Linear Motion guide, you should calculate load applied to the block by fully considering the conditions below.

m: Mass (kg)
ℓn: Distance (mm)
Fn: Thrust (N)
Pn: Load (vertical, reverse-vertical) (N)
PnT: Load (horizontal) (N)
g: Acceleration of gravity(g: 9.8 m/s²) (m/s²)
V: Velocity (m/s)
tn: Time constant (s)
αn: Acceleration (m/s²)

CASE	SERVICE CONDITIONS	LOAD CALCULATION FORMULA
1	**BLOCK MOVE HORIZONTAL/UNIFORM MOTION/HALT** 	$P_1 = \frac{mg}{4} + \frac{mg \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_2 = \frac{mg}{4} - \frac{mg \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_3 = \frac{mg}{4} - \frac{mg \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_4 = \frac{mg}{4} + \frac{mg \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$
2	**BLOCK MOVE OVERHANG-HORIZONTAL/UNIFORM MOTION/HALT** 	$P_1 = \frac{mg}{4} + \frac{mg \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_2 = \frac{mg}{4} - \frac{mg \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_3 = \frac{mg}{4} - \frac{mg \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_4 = \frac{mg}{4} + \frac{mg \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$
3	**RAIL MOVE HORIZONTAL/UNIFORM MOTION/HALT**  E.g.) X or Z axis Loader/unLoader	$P_1 = \frac{mg \cdot \cos\theta}{4} + \frac{mg \cdot \cos\theta \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \cos\theta \cdot \ell_3}{2 \cdot \ell_1} + \frac{mg \cdot \sin\theta \cdot h_1}{2 \cdot \ell_1}$ $P_{1T} = \frac{mg \cdot \sin\theta}{4} + \frac{mg \cdot \sin\theta \cdot \ell_2}{2 \cdot \ell_0}$ $P_2 = \frac{mg \cdot \cos\theta}{4} - \frac{mg \cdot \cos\theta \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \cos\theta \cdot \ell_3}{2 \cdot \ell_1} + \frac{mg \cdot \sin\theta \cdot h_1}{2 \cdot \ell_1}$ $P_{2T} = \frac{mg \cdot \sin\theta}{4} - \frac{mg \cdot \sin\theta \cdot \ell_2}{2 \cdot \ell_0}$
4	**BLOCK MOVE WALL INSTALLATION/UNIFORM MOTION/HALT**  E.g.) Gantry-type device Y-axis drive	$P_1 \sim P_4 = \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_{1T} = P_{4T} = \frac{mg}{4} + \frac{mg \cdot \ell_2}{2 \cdot \ell_0}$ $P_{2T} = P_{3T} = \frac{mg}{4} - \frac{mg \cdot \ell_2}{2 \cdot \ell_0}$

CASE	SERVICE CONDITIONS	LOAD CALCULATION FORMULA
5	**BLOCK MOVE** **VERTICAL/UNIFORM MOTION/HALT**  E.g.) Industrial robot Z-axis Auto-painting spray, lifter	$P_1 \sim P_4 = \frac{mg \cdot \ell_2}{2 \cdot \ell_0}$ $P_{1T} \sim P_{4T} = \frac{mg \cdot \ell_3}{2 \cdot \ell_0}$
6	**BLOCK MOVE** **VERTICAL/MOMENT OF INERTIA**  E.g.) Conveyance robot, LTR robot 2-axis	Accelleration $P_1=P_4 = -\frac{m(g-\alpha_1)\ell_2}{2 \cdot \ell_0}$ $P_2=P_3 = \frac{m(g-\alpha_1)\ell_2}{2 \cdot \ell_0}$ $P_{1T}=P_{4T} = \frac{m(g-\alpha_1)\ell_3}{2 \cdot \ell_0}$ $P_{2T}=P_{3T} = -\frac{m(g-\alpha_1)\ell_3}{2 \cdot \ell_0}$ Uniform motion $P_1=P_4 = -\frac{mg \cdot \ell_2}{2 \cdot \ell_0}$ $P_2=P_3 = \frac{mg \cdot \ell_2}{2 \cdot \ell_0}$ $P_{1T}=P_{4T} = \frac{mg \cdot \ell_3}{2 \cdot \ell_0}$ $P_{2T}=P_{3T} = -\frac{mg \cdot \ell_3}{2 \cdot \ell_0}$ Deceleration $P_1=P_4 = -\frac{m(g-\alpha_3)\ell_2}{2 \cdot \ell_0}$ $P_2=P_3 = \frac{m(g-\alpha_3)\ell_2}{2 \cdot \ell_0}$ $P_{1T}=P_{4T} = \frac{m(g-\alpha_3)\ell_3}{2 \cdot \ell_0}$ $P_{2T}=P_{3T} = -\frac{m(g-\alpha_3)\ell_3}{2 \cdot \ell_0}$
7	**BLOCK MOVE** **CUTTING LOAD/COMPLEX EXTERNAL LOAD**  E.g.) Machine tool, CNC shelf, machining center, NC milling machine	F1 application $P_1=P_4 = -\frac{F_1 \cdot \ell_5}{2 \cdot \ell_0}$ $P_2=P_3 = \frac{F_1 \cdot \ell_5}{2 \cdot \ell_0}$ $P_{1T}=P_{4T} = \frac{F_1 \cdot \ell_4}{2 \cdot \ell_0}$ $P_{2T}=P_{3T} = -\frac{F_1 \cdot \ell_4}{2 \cdot \ell_0}$ F2 application $P_1=P_4 = \frac{F_2}{4} \quad \frac{F_2 \cdot \ell_2}{2 \cdot \ell_0}$ $P_2=P_3 = \frac{F_2}{4} \quad \frac{F_2 \cdot \ell_2}{2 \cdot \ell_0}$ F3 application $P_1=P_4 = -\frac{F_3 \cdot \ell_3}{2 \cdot \ell_1}$ $P_2=P_3 = \frac{F_3 \cdot \ell_3}{2 \cdot \ell_1}$ $P_{1T}=P_{4T} = \frac{F_3}{4} \quad \frac{F_3 \cdot \ell_2}{2 \cdot \ell_0}$ $P_{2T}=P_{3T} = \frac{F_2}{4} \quad \frac{F_3 \cdot \ell_2}{2 \cdot \ell_0}$

CASE	SERVICE CONDITIONS	LOAD CALCULATION FORMULA
8	**BLOCK MOVE** **MOMENT LOAD IN CASE OF APPLICATION TO SIDE SLOPE/ CUTTING LOAD**  E.g.) CNC shelf, reciprocating carriage	$P_1 = \frac{mg \cdot \cos\theta}{4} + \frac{mg \cdot \cos\theta \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \cos\theta \cdot \ell_3}{2 \cdot \ell_1} + \frac{mg \cdot \sin\theta \cdot h_1}{2 \cdot \ell_1}$ $P_{1T} = \frac{mg \cdot \sin\theta}{4} + \frac{mg \cdot \sin\theta \cdot \ell_2}{2 \cdot \ell_0}$ $P_2 = \frac{mg \cdot \cos\theta}{4} - \frac{mg \cdot \cos\theta \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \cos\theta \cdot \ell_2}{2 \cdot \ell_1} + \frac{mg \cdot \sin\theta \cdot h_1}{2 \cdot \ell_1}$ $P_{2T} = \frac{mg \cdot \sin\theta}{4} - \frac{mg \cdot \sin\theta \cdot \ell_2}{2 \cdot \ell_0}$ $P_3 = \frac{mg \cdot \cos\theta}{4} - \frac{mg \cdot \cos\theta \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \cos\theta \cdot \ell_3}{2 \cdot \ell_1} - \frac{mg \cdot \sin\theta \cdot h_1}{2 \cdot \ell_1}$ $P_{3T} = \frac{mg \cdot \sin\theta}{4} + \frac{mg \cdot \sin\theta \cdot \ell_2}{2 \cdot \ell_0}$ $P_4 = \frac{mg \cdot \cos\theta}{4} + \frac{mg \cdot \cos\theta \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \cos\theta \cdot \ell_3}{2 \cdot \ell_1} - \frac{mg \cdot \sin\theta \cdot h_1}{2 \cdot \ell_1}$ $P_{4T} = \frac{mg \cdot \sin\theta}{4} + \frac{mg \cdot \sin\theta \cdot \ell_2}{2 \cdot \ell_0}$
9	**BLOCK MOVE** **MOMENT LOAD IN CASE OF APPLICATION TO FRONT SLOPE/CUTTING LOAD**  E.g.) CNC shelf, tool rest	$P_1 = \frac{mg \cdot \cos\theta}{4} + \frac{mg \cdot \cos\theta \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \cos\theta \cdot \ell_3}{2 \cdot \ell_1} + \frac{mg \cdot \sin\theta \cdot h_1}{2 \cdot \ell_0}$ $P_{1T} = \frac{mg \cdot \sin\theta \cdot \ell_3}{2 \cdot \ell_0}$ $P_2 = \frac{mg \cdot \cos\theta}{4} - \frac{mg \cdot \cos\theta \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \cos\theta \cdot \ell_3}{2 \cdot \ell_1} - \frac{mg \cdot \sin\theta \cdot h_1}{2 \cdot \ell_0}$ $P_{2T} = -\frac{mg \cdot \sin\theta \cdot \ell_3}{2 \cdot \ell_0}$ $P_3 = \frac{mg \cdot \cos\theta}{4} - \frac{mg \cdot \cos\theta \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \cos\theta \cdot \ell_3}{2 \cdot \ell_1} - \frac{mg \cdot \sin\theta \cdot h_1}{2 \cdot \ell_0}$ $P_{3T} = -\frac{mg \cdot \sin\theta \cdot \ell_3}{2 \cdot \ell_0}$ $P_4 = \frac{mg \cdot \cos\theta}{4} + \frac{mg \cdot \cos\theta \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \cos\theta \cdot \ell_3}{2 \cdot \ell_1} + \frac{mg \cdot \sin\theta \cdot h_1}{2 \cdot \ell_0}$ $P_{4T} = \frac{mg \cdot \sin\theta \cdot \ell_3}{2 \cdot \ell_0}$
10	**BLOCK MOVE** **HORIZONTAL APPLICATION/INERTIA FORCE APPLICATION**  E.g.) Industrial robot carriage, LCD test device	Accelleration $P_1=P_4 = \frac{mg}{4} - \frac{m \cdot \alpha_1 \cdot \ell_2}{2 \cdot \ell_0}$ $P_2=P_3 = \frac{mg}{4} + \frac{m \cdot \alpha_1 \cdot \ell_2}{2 \cdot \ell_0}$ $P_{1T} \sim P_{4T} = \frac{m \cdot \alpha_1 \cdot \ell_3}{2 \cdot \ell_0}$ Constant velocity $P_1 \sim P_4 = \frac{mg}{4}$ Deceleration $P_1=P_4 = \frac{mg}{4} + \frac{m \cdot \alpha_3 \cdot \ell_2}{2 \cdot \ell_0}$ $P_2=P_3 = \frac{mg}{4} - \frac{m \cdot \alpha_3 \cdot \ell_2}{2 \cdot \ell_0}$ $P_{1T} \sim P_{4T} = \frac{m \cdot \alpha_3 \cdot \ell_3}{2 \cdot \ell_0}$

5. Equivalent Load Calculation

There are diverse kinds of load applied to Linear Motion guide, such as compression load in vertical direction, tensile load, horizontal load, moment load, etc. There is also combined load of them and sometimes the magnitude and direction of load change. Since it is hard to calculate the variable load when calculating the life of Linear Motion guide, it is required to use equivalent load which is converted to compression load or tensile load in vertical direction in order to produce life or static safety factor.

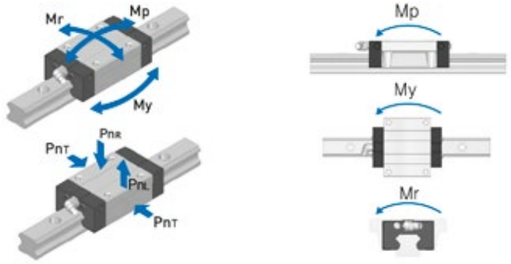
6. Equivalent Load Calculation Formula

If Linear Motion guide bears vertical compression load or tensile load or horizontal load simultaneously, or the magnitude or direction of load changes, equivalent load is calculated using the following formula.

P_E(equivalent load)= $P_n + P_{nT}$

P_n: Compression load
P_{nT}: Horizontal load

FIGURE 2.



P_n: Compression load
P_L: Tensile load
P_{nT}: Horizontal load
M_p: Pitching moment
M_y: Yawing moment
M_r: Rolling moment

7. Static Safety Factor Calculation

Unexpected big load may be applied to Linear Motion guide due to inertia force caused by vibration impact or quick braking and moment load of mechanical structure. When selecting Linear Motion guide, static safety factor must be taken into account to be ready for such load. Static safety factor (fs) is shown in value obtained by dividing basic static load rating by the calculated load. To see the baseline of static safety factor by service condition, please refer to Table 1-1. and Table 1-2.

Table 1-1. Baseline of static safety factor (fs)

TYPE OF ROLLING ELEMENT	SERVICE CONDITION	STATIC SAFETY FACTOR (fs)
BALL	There is no vibration and impact.	1.0 ~ 1.5
	Great travel performance is needed.	1.5 ~ 2.0
	There are moment load, violation, and impact.	2.5 ~ 7.0
ROLLER	There is no vibration and impact.	2.0 ~ 3.0
	Great travel performance is needed.	3.0 ~ 5.0
	There are moment load, violation, and impact.	4.0 ~ 7.0

Table 1-2.

IF COMPRESSION LOAD IS BIG	$\frac{f_H \cdot f_T \cdot f_C \cdot C_0}{P_n} \geqq f_s$
IF TENSILE LOAD IS BIG	$\frac{f_H \cdot f_T \cdot f_C \cdot C_{0L}}{P_L} \geqq f_s$
IF HORIZONTAL LOAD IS BIG	$\frac{f_H \cdot f_T \cdot f_C \cdot C_{0T}}{P_{nT}} \geqq f_s$

f_s: Static safety factor
C_0: Basic static load rating (vertical) (N)
C_{0L}: Basic static load rating (reverse-vertical) (N)
C_{0T}: Basic static load rating (horizontal) (N)
P_n: Calculated load (vertical) (N)
P_L: Calculated load (reverse-vertical) (N)
P_{nT}: Calculated load (horizontal) (N)
f_H: Hardness factor
f_T: Temperature factor
f_C: Contact factor

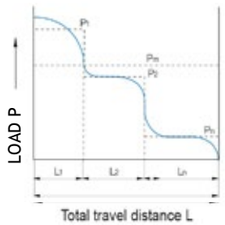
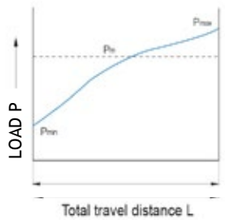
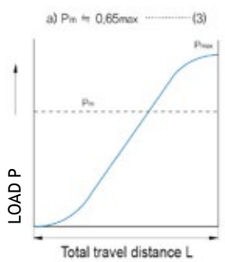
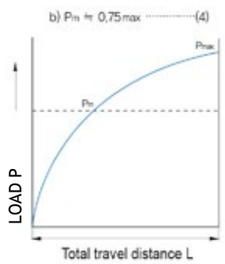
8. Mean Load Calculation

Load applied to the block of Linear Motion guide is not constant, but differs according to service conditions. Here the load that becomes equal to life under variable load is used. This is called mean load. If the load applied to block is changed due to external condition, it is required to calculate life as mean load that includes various conditions as below. If load applied to block varies with different conditions, life should be calculated by including this variable load condition. Mean load (P_m) refers to constant load that becomes equal to life under this variable load when the load applied to block changes with various conditions while traveling.

$$P_m = \sqrt[i]{\frac{1}{L} \cdot \sum_{n=1}^{n} (P_n^i \cdot L_n)}$$

P_m:	Mean load	(N)
P_n:	Variable load	(N)
L:	Total travel distance	(mm)
L_n:	Travel distance by loading P_n	(mm)
i:	Ball - 3, Roller - 10/3	

Note) the formula above or formula (1) below is applied to a ball.

1. CHANGE IN PHASE	2. CHANGE MONOTONOUSLY
$P_m = \sqrt[3]{\frac{1}{L}(P_1^3 \cdot L_1 + P_2^3 \cdot L_2 \cdots + P_n^3 \cdot L_n)} \cdots (1)$	$P_m \fallingdotseq \frac{1}{3}(P_{min} + 2 \cdot P_{max}) \cdots (2)$
P_m: Mean load (N)	P_{min}: Minimum load (N)
P_n: Variable load (N)	P_{max}: Maximum load (N)
L: Total travel distance (mm)	
L_n: Travel distance by loading P_n (mm)	
	
3) CHANGE IN A SINE CURVE	
a) $P_m \fallingdotseq 0{,}65 max \cdots (3)$ 	b) $P_m \fallingdotseq 0{,}75 max \cdots (4)$ 

9. Rating Life Calculation

Rating life needs to be calculated because Linear Motion guide's life differs even under same working conditions. Rating life of Linear Motion guide is the total travel distance that a Linear Motion guide system composed of a certain number of units can drive until flaking does not occur in 90% of the raceway surface or rolling elements after being run under same working conditions. If a ball or a roller is used as a rolling element, rating life can be calculated using the following formula.

Calculation formula of the rating life of ball-enabled Linear Motion guide

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

L:	Rating life	(km)
C:	Basic dynamic load rating	(N)
P_C:	Calculated load	(N)
f_H:	Hardness factor	See Fig. 3
f_T:	Temperature factor	See Fig. 4
f_C:	Contact factor	See Table 2
f_W:	Load factor	See Table 3

Calculation formula of the rating life of roller-enabled Linear Motion guide

$$L = \left(\frac{f_H \cdot f_T \cdot f_C}{f_W} \cdot \frac{C}{P_C}\right)^{\frac{10}{3}} X\ 100$$

L:	Rating life	(km)
C:	Basic dynamic load rating	(N)
P_C:	Calculated load	(N)
f_H:	Hardness factor	See Fig. 3
f_T:	Temperature factor	See Fig. 4
f_C:	Contact factor	See Table 2
f_W:	Load factor	See Table 3

If the length of stroke and the number of reciprocating motion are constant, life time can be calculated using rating life (L) by the formula below.

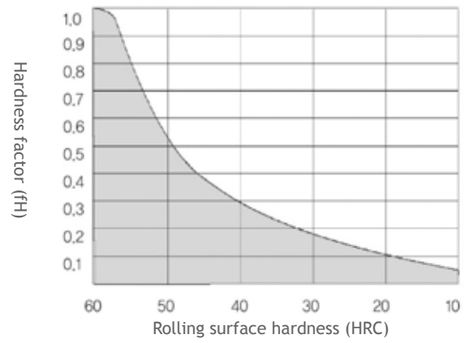
$$L_h = \frac{L\ X\ 10^6}{2\ X\ \ell_s X\ n_1\ X\ 60}$$

L_h:	Life time	(N)
ℓ_s:	Length of stroke	(mm)
n_1:	No. of reciprocating motion per minute	(mm^{-1})

1) Hardness factor (f_H)

To realize the best performance of Linear Motion guide, the proper hardness and depth should be maintained between the block contacting a rolling element (ball or roller) and the raceway surface of rail. RBX Linear Motion guide has HRC58-64 surface hardness, so there is no need to consider hardness factor. But if the hardness is lowered than baseline, Linear Motion guide's load capacity decreases so hardness factor needs to be reflected in calculating life.

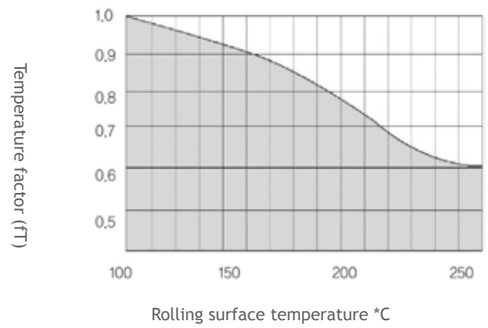
FIGURE 3. HARDNESS FACTOR (FH)



2) Temperature factor (f_T)

If high temperature over 100°C is applied to Linear Motion guide, temperature factor (f_T) needs to be taken into account when selecting Linear Motion guide. RBX Linear Motion guide must be used at less than 80°C. But you have to use it at over 80°C, please use a high-temp Linear Motion guide - RBX's specially customized product.

FIGURE 4. TEMPERATURE FACTOR (FT)



Note) In ambient temperature of over 80°C, materials for seal, end plate, and support plate should be changed to the specifications for high temperature

3) Contact factor (f_C)

If over two blocks of Linear Motion guide are closely assembled, since uniform load may not be applied to blocks due to difference among mounting surfaces, you have to multiply basic static load rating (C) and basic dynamic load rating (C_O) by contact factor shown in Table 2.

Table 2.

NO. OF BLOCKS CONTACTED	CONTACT FACTOR (f_C)
2	0.81
3	0.72
4	0.66
5	0.61
Over 6	0.6
Common use	1.0

4) Load factor (f_W)

Generally the static load applied to the block of Linear Motion guide can be calculated by formula. But the load applied to the block while running the machine tends to come from vibration or impact. Therefore, you have to consider load factor (f_W) shown in Table 3 for the vibration or impact load during the speedy running of the machine. It can be calculated by dividing the basic dynamic load rating of Linear Motion guide by load factor (f_W).

EXTERNAL CONDITION	SERVICE CONDITIONS	LOAD FACTOR (f_W)
Low	There is no external vibration or impact due to the smooth running of machine at mild speed	1.0 ~ 1.3
Moderate	There is moderate external vibration or impact due to the running of machine at low speed	1.2 ~ 1.5
Big	There is strong vibration or impact due to the running of machine at fast speed	1.5 ~ 2.0
Very big	There is strong vibration or impact due to the running of machine at very fast speed	2.0 ~ 4.0

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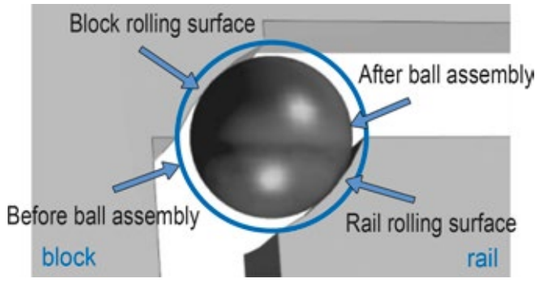
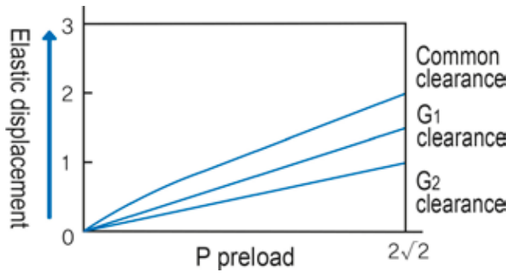
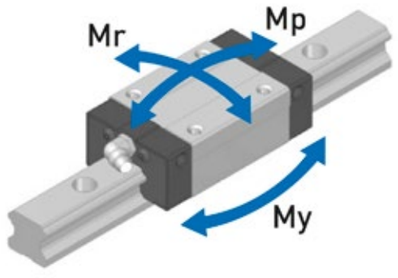
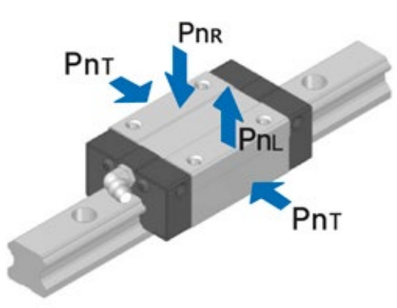
04 Rigidity & Preload

1. Preload
2. Radial Clearance

1. Preload

Linear Motion guide is preloaded in a way that improves mechanical precision by eliminating clearance using the rolling element (ball or roller) inserted into the space between rail and the block or in a way that applies load to the rolling element in advance by inserting the rolling element larger in size than the clearance of raceway between rail and the block. This process will enhance the rigidity of Linear Motion guide and lessen the displacement level caused by external load.

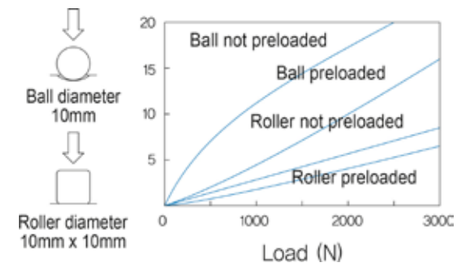
PRELOAD SETTING	DATA OF PRELOAD AND RIGIDITY
	

MOMENT RIGIDITY	RADIAL RIGIDITY
	

2. Radial Clearance

Radial clearance refers to the total travel distance in a radial direction from the center of the block of Linear Motion guide when mild load is applied to the block up and down from the center part of the rail length after the block is assembled in the rail which is then fixed to base. Radial clearance is usually classified into common clearance (no symbol), G_1 clearance (light preload), G_2 clearance (heavy load), and G_s clearance (special preload), and are optional depending on usage. The values are standardized by form.

PRELOAD & ELASTIC DISPLACEMENT



	PRELOAD TYPE	PRELOAD SYMBOL	PRELOAD
H	MODERATE	NO SYMBOL	0 ~ 0.03 x C
	LIGHT	G_1	0.04 ~ 0.08 x C
	HEAVY	G_2	0.09 ~ 0.13 x C
S	MODERATE	NO SYMBOL	0 ~ 0.03 x C
	LIGHT	G_1	0.03 ~ 0.05 x C
	HEAVY	G_2	0.06 ~ 0.08 x C

Table 4. Service condition for radial clearance (preload)

TYPE	PRELOAD STATUS	SYMBOL	SERVICE CONDITIONS	USE
1. MODERATE	Plus-minus clearance	No (1)	•Load is applied in uniform direction and smooth running is needed. •There is almost no vibration or impact and precise running is required.	Welding machine, textile machinery, packaging machinery, various conveyors, medical equipment, woodworking machine, glass cutting machine, takeout robots, ATC, winding machine
2. LIGHT	Minus clearance in small amount	G_1 (2)	•There is a little vibration or impact and moment load. •Light load is applied, yet high precision is required.	Various industrial robots, measuring equipment, inspection equipment, 3D processor, laser processor, PCB drilling machine, various assembling machine, electric spark machine, punching press
3. HEAVY	Minus clearance in large amount	G_2 (3)	•There is mild impact load or overhang load and moment load. Rigidity and high precision are required.	CNC shelf, machining center, milling machine, grinding machine, tapping center, drilling machine, hobbing machine, various special equipment
4. SPECIAL	Minus clearance in small or large amount	G_s (4)	•With smaller clearance than that of G_1 preload, light and precise operation is required.	No preload, ultra-light preload, larger-than-moderate preload, special preload customized to user's conditions, special processing machine for heavyduty cutting

Note (1) No clearance or very small clearance.
(2) Very small minus clearance.
(3) Quiet large minus clearance to enhance rigidity.
(4) Preload below G_1 or over G_2 to meet service conditions.

Table 5. Radial clearance of RBH & RBS & RBHS Series

MODEL NO.			SYMBOL		
			MODERATE	LIGHT PRELOAD	HEAVY PRELOAD
			NO SYMBOL	G1	G2
RBH15	RBS15	-	-4 ~ +2	-12 ~ -4	-
RBH20	RBS20	-	-5 ~ +2	-14 ~ -5	-23 ~ -14
RBH25	RBS25	RBHS25	-6 ~ +3	-16 ~ -6	-26 ~ -16
RBH30	-	RBHS30	-7 ~ +4	-19 ~ -7	-31 ~ -19
RBH35	-	RBHS35	-8 ~ +4	-22 ~ -8	-35 ~ -22
RBH45	-	RBHS45	-10 ~ +5	-25 ~ -10	-40 ~ -25
RBH55	-	RBHS55	-12 ~ +5	-29 ~ -12	-46 ~ -29

Table 6. Radial clearance of RBW Series

MODEL NO.	SYMBOL		
	MODERATE	LIGHT PRELOAD	HEAVY PRELOAD
	NO SYMBOL	G1	G2
RBW17	-3 ~ 0	-7 ~ -3	-
RBW21	-4 ~ +2	-8 ~ -4	-
RBW27	-5 ~ +2	-11 ~ -5	-
RBW35	-8 ~ +4	-18 ~ -8	-28 ~ -18

Table 7. Radial clearance of RM & RMB Series

MODEL NO.		SYMBOL	
		MODERATE	LIGHT PRELOAD
		NO SYMBOL	G1
RM5	RMB5	0 ~ +1.5	-1 ~ 0
RM7	RMB7	-2 ~ +2	-3 ~ 0
RM9	RMB9	-2 ~ +2	-4 ~ 0
RM12	RMB12	-3 ~ +3	-6 ~ 0
RM15	RMB15	-5 ~ +5	-10 ~ 0
RM20	-	-7 ~ +7	-14 ~ 0

Table 8. Radial clearance of RBR Series

MODEL NO.	SYMBOL		
	MODERATE	LIGHT PRELOAD	HEAVY PRELOAD
	NO SYMBOL	G1	G2
RBR35	-2 ~ -1	-3 ~ -2	-5 ~ -3
RBR45	-2 ~ -1	-3 ~ -2	-5 ~ -3
RBR55	-2 ~ -1	-4 ~ -2	-6 ~ -4

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05

Friction

1. Friction
2. Friction Coefficient

1. Friction

Linear Motion guide's friction resistance occurs to the level of 1/20~1/40 compared to existing sliding guide since the rolling element (ball or roller) is assembled between the rail and the block which is the raceway surface. Also starting torque is low because the difference between static friction and kinetic friction is very small. Its low power loss and temperature rise in the part of linear motion are of advantage to speedy operation. Its high conformability and response realize the highly precise positioning.

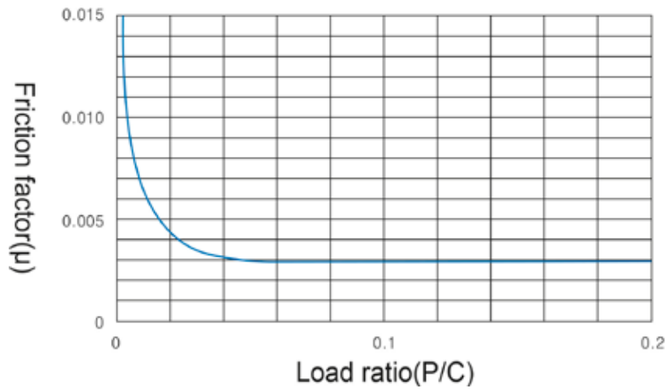
2. Friction Coefficient

Friction resistance of Linear Motion guide relies on the load applied to Linear Motion guide, speed, lubrication or form. In case of light load or high-speedy motion, lubrication or seal is the main cause of friction resistance. In case of heavy load or slow motion, the magnitude of load affects friction resistance.

$$F=\mu P$$

F : Friction resistance (N)
μ : Kinetic friction factor
P : Load (N)

FIGURE 5. RELATION BETWEEN LOAD RATIO AND FRICTION FACTOR



P : Load
C : Basic dynamic load rating

Common friction factors of various operating systems are shown in a table below and applied in case of proper lubrication or assembly and normal load.

TYPE OF OPERATING SYSTEM	MAJOR MODEL NUMBER	FRICTION FACTOR μ
Linear Motion Guide	RBH, RBH-S, RBW RBHS-S, RM, RMB	0.002 ~ 0.003
	RBR	0.001 ~ 0.002
Ball Spline	WLS, WSP	0.002 ~ 0.003
Super Ball Bushing/Linear Ball Bushing	SB, SBE, LM, LME	0.001 ~ 0.003
Cross Roller Guideway	WRG	0.001 ~ 0.0025

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06 Precision

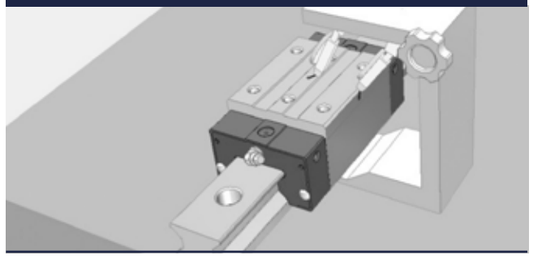
1. Precision Specification
2. Precision Design
3. Dimension Tolerance and Difference
4. Selection of Precision Class

1. Precision Specification

The degree of travel of Linear Motion guide is measured as below. (See Figure 6.)

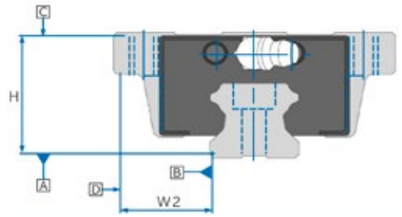
a. Tighten rail to the mounting surface of the bed using a bolt at the prescribed torque.
b. Draw a measuring jig right up against the datum plane of the block as shown in Figure.
c. Measure it by having the block and measuring jig travel the whole section from the starting point to the end point of the rail.
d. The value measured by the measuring jig is the error in the parallelism of motion of the block.

FIGURE 6. PARALLELISM OF MOTION



Measuring the error in the degree of parallelization between the datum plane of block and that of rail.

FIGURE 7. DIFFERENCE OF BLOCK



Difference between the maximum diference and minimum difference of blocks in each height and dimension installed to surface

2. Precision Design

Table 9. Classification of precision

DIMENSION	TERMS
Dimension tolerance of height H	Distance from the base side of rail A to the top side of block C
Difference in height H	Difference in the height of blocks combined from each rail on the same plane
Dimension tolerance of width W_2	Distance between the datum plane of rail B and the reference side of block D
Difference in width W_2	Difference of the reference axis of rail B and the reference side of block D of blocks combined to the rail
Parallelism of motion of C against A	Change in the top side of block C based on the base side of rail A during the motion of block combined to the rail
Parallelism of motion of D against B	Change in the reference side of block D based on the reference side of rail B during the motion of block combined to the rail

3. Dimension Tolerance and Difference

Table 10. Specifications for precision of Linear Motion guide (RBH, RBH-S, RBW, RBHS-S) Unit: mm

DIMENSION	TERMS	HIGH	PRECISION	SUPER PRECISION	ULTRA PRECISION
	NO SYMBOL	H	P	SP	UP
		P6	P5	P4	P3
Dimension tolerance of height H	±0.080	±0.042	±0.020	±0.010	±0.008
Difference in height H	0.025	0.015	0.007	0.005	0.003
Dimension tolerance of width W_2	±0.100	±0.050	±0.025	±0.015	±0.010
Difference in width W_2	0.030	0.020	0.010	0.007	0.003
Parallelism of motion of C against A	See Table 11				
Parallelism of motion of D against B	See Table 11				

Table 11. Length of rail and parallelism of motion of Linear Motion guide (RBH, RBH-S, RBW, RBHS-S) Unit: μm

LENGTH OF RAIL		TERMS				
ABOVE	BELOW	MODERATE	HIGH	PRECISION	SUPER PRECISION	ULTRA PRECISION
		NO SYMBOL	P6	P5	P4	P3
-	50	5	3	2	1.5	1
50	80	5	3	2	1.5	1
80	125	5	3	2	1.5	1
125	200	5	3.5	2	1.5	1
200	250	6	4	2.5	1.5	1
250	315	7	4.5	3	1.5	1
315	400	8	5	3.5	2	1.5
400	500	9	6	4.5	2.5	1.5
500	630	11	7	5	3	2
630	800	12	8.5	6	3.5	2
800	1000	13	9	6.5	4	2.5
1000	1250	15	11	7.5	4.5	3
1250	1600	16	12	8	5	4
1600	2000	18	13	8.5	5.5	4.5
2000	2500	20	14	9.5	6	5
2500	3150	21	16	11	6.5	5.5
3150	4000	23	17	12	7.5	6

Table 12. Specifications for precision of miniature Linear Motion guide (RM, RMB) Unit: mm

MODEL NO.	DIMENSION	MODERATE	HIGH	PRECISION
		NO SYMBOL	P6	P5
5	Dimension tolerance of height H	±0.030	-	±0.015
	Difference in height H	0.015	-	0.005
	Dimension tolerance of width W_2	±0.030	-	±0.015
	Difference in width W_2	0.015	-	0.005
	Parallelism of motion of C against A	See Table 13		
	Parallelism of motion of D against B	See Table 13		
7	Dimension tolerance of height H	±0.040	±0.020	±0.010
9	Difference in height H	0.030	0.015	0.007
12	Dimension tolerance of width W_2	±0.040	±0.025	±0.015
13	Difference in width W_2	0.030	0.020	0.010
15	Parallelism of motion of C against A	See Table 13		
20	Parallelism of motion of D against B	See Table 13		

Table 13. Length of rail and parallelism of motion of miniature Linear Motion guide (RM, RMB) Unit: μm

LENGTH OF RAIL		PARALLELISM OF MOTION		
ABOVE	BELOW	MODERATE	HIGH	PRECISION
		NO SYMBOL	H	P
			P6	P5
-	40	8	4	1
40	70	10	4	1
70	100	11	4	2
100	130	12	5	2
130	160	13	6	2
160	190	14	7	2
190	220	15	7	3
220	250	16	8	3
250	280	17	8	3
280	310	17	9	3
310	340	18	9	3
340	370	18	10	3
370	400	19	10	3
400	430	20	11	4
430	460	20	12	4
460	490	21	12	4
490	520	21	12	4
520	550	22	12	4
550	580	22	13	4
580	610	22	13	4
610	640	22	13	4
640	670	23	13	4
670	700	23	13	5
700	730	23	14	5
730	780	23	14	5
760	790	23	14	5
790	820	23	14	5

LENGTH OF RAIL		PARALLELISM OF MOTION		
ABOVE	BELOW	MODERATE	HIGH	PRECISION
		NO SYMBOL	H	P
			P6	P5
820	850	24	14	5
850	880	24	14	5
880	910	24	14	5
910	940	24	14	5
940	970	24	14	5
970	1000	25	14	5
1000	1030	25	16	5
1030	1060	25	16	5
1060	1090	25	16	6
1090	1120	25	16	6
1120	1150	25	16	6
1150	1180	25	17	6
1180	1210	26	17	6
1210	1240	26	17	6
1240	1270	26	17	6
1270	1300	26	17	6
1300	1330	26	17	6
1330	1360	27	17	6
1360	1390	27	18	6
1390	1420	27	18	6
1420	1450	27	18	7
1450	1480	27	18	7
1480	1510	27	18	7
1510	1540	28	19	7
1540	1570	28	19	7
1570	1800	28	19	7

Table 14. Specifications for precision of roller Linear Motion guide (RBR) Unit: mm

DIMENSION	HIGH	PRECISION	SUPER PRECISION	ULTRA PRECISION
	H	P	SP	UP
	P6	P5	P4	P3
Dimension tolerance of height H	±0.042	±0.020	±0.010	±0.008
Difference in height H	0.015	0.007	0.005	0.003
Dimension tolerance of width W_2	±0.050	±0.025	±0.015	±0.010
Difference in width W_2	0.020	0.010	0.007	0.003
Parallelism of motion of C against A	See Table 15			
Parallelism of motion of D against B	See Table 15			

Table 15. Length of rail and parallelism of motion of roller Linear Motion guide (RBR) Unit: μm

LENGTH OF RAIL					
ABOVE	BELOW	HIGH	PRECISION	SUPER PRECISION	ULTRA PRECISION
		P6	P5	P4	P3
-	50	3	2	1.5	1
50	80	3	2	1.5	1
80	125	3	2	1.5	1
125	200	3.5	2	1.5	1
200	250	4	2.5	1.5	1
250	315	4.5	3	1.5	1
315	400	5	3.5	2	1.5
400	500	6	4.5	2.5	1.5
500	630	7	5	3	2
630	800	8.5	6	3.5	2
800	1000	9	6.5	4	2.5
1000	1250	11	7.5	4.5	3
1250	1600	12	8	5	4
1600	2000	13	8.5	5.5	4.5
2000	2500	14	9.5	6	5
2500	3150	16	11	6.5	5.5
3150	4000	17	12	7.5	6

4. Selection of Precision Class

Table 16. For the selection of precision class of Linear Motion guide by unit, please refer to the table below.

APPLICATION	UNIT	PRECISION CLASS					PRELOAD		
		MODERATE	HIGH	PRECISION	SUPER PRECISION	ULTRA PRECISION	MODERATE	LIGHT PRELOAD	HEAVY PRELOAD
		NO SIGH	H	P	SP	UP	NO SYMBOL	G_1	G_2
			P6	P5	P4	P3			
MACHINE TOOL	CNC shelf		●	●	●				●
	Machining center		●	●	●				●
	NC milling machine		●	●	●				●
	CNC tapping machine		●	●	●				●
	NC boring machine		●	●	●				●
	NC drilling machine		●	●	●				●
	3D engraving machine		●	●	●				●
	Jig boring machine		●	●	●				●
	EDM electric spark machine			●	●	●		●	●
	Grinding machine			●	●	●			●
SEMICONDUCTOR EQUIPMENT	Prober equipment					●		●	●
	Wire bonder				●	●		●	●
	Sliding machine				●	●		●	
	Dicing saw machine				●	●		●	
	IC test handler			●	●			●	
	PCB laser via-hole driller				●			●	
	PCB inspection equipment			●	●			●	
	Laser marker			●				●	
	Chip mounter			●	●			●	
FPD	Mac/Mic inspection equipment				●	●		●	
	Pattern test system				●	●		●	
	Exposure				●	●		●	
	Laser repair			●	●	●		●	
	Lighting test equipment		●	●				●	
	Coder equipment			●	●			●	
	Chip bonding equipment		●	●				●	
	Dispenser equipment		●	●				●	

APPLICATION	UNIT	PRECISION CLASS					PRELOAD		
		MODERATE	HIGH	PRECISION	SUPER PRECISION	ULTRA PRECISION	MODERATE	LIGHT PRELOAD	HEAVY PRELOAD
		NO SIGH	H	P	SP	UP	NO SYMBOL	G1	G2
			P6	P5	P4	P3			
FPD	Scriber		●	●				●	
	Glass edge grinding machine		●	●				●	
	FPD measuring/test equipment			●	●			●	
	Laminating equipment		●	●				●	
	Indentation test equipment								
	Prober equipment								
INDUSTRIAL MACHINE	Punching press		●					●	
	Tire molder	●						●	
	Tire valcanizer	●						●	
	Auto-shearing machine	●						●	
	Auto-welding machine	●					●	●	
	Conveyor	●					●		
	Textile machine	●					●		
	Injection molding machine	●					●	●	
INDUSTRIAL ROBOT	Cartesian coordinated robot	●	●	●				●	
	Gantry robot	●	●					●	
	LTR robot		●	●				●	
	Take-out robot	●						●	
	Cylindrical coordinated robot		●					●	
	Vacuum robot		●	●				●	
	Robot carriage	●						●	
	Linear actuator		●	●	●		●	●	
OTHERS	Office machine	●					●		
	FA transport system	●					●		
	Medical equipment	●					●	●	
	Welding machine	●					●		
	Painting machine	●					●		
	Precision XY table		●	●	●			●	
	UVW stage		●	●				●	
	3D measuring machine			●	●	●		●	

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07 Lubrication

1. Purpose

The purpose of lubricating Linear Motion guide is to create an oil film between rail, the raceway surface of block and a rolling element to avoid the direct contact of metals and reduce friction and wear, preventing the raceway surface and the rolling element from being overheated and melted to be adhered to each other. Moreover, the oil film created between the raceway surface and a ball decreases load-induced contact stress to improve the rolling contact fatigue life and prevent rust. Linear Motion guide is equipped with seal but grease inside the block is leaking little by little during the operation. Therefore it is required to lubricate it at a time and interval appropriate to each service condition.

2. Selection of lubricant

To achieve the best performance of Linear Motion guide, you have to select the lubricant suitable for service conditions. Lubricants used for Linear Motion guide include grease and oil. You can select the lubricant and lubrication method that fit your service conditions, load, operating seed, assembly type, etc.

3. Grease lubrication

Grease is a semisolid lubricant consisting of base oil, thickener, and additives.
In case of using grease for Linear Motion guide, lithium soap grease is commonly used, but grease mixed with extreme-pressure additive is used under high load or according to use. If you want to use Linear Motion guide in a high-vacuum environment or a clean room, it's desirable to choose grease with excellent performance in low evaporation and low dust raise.

1) Refilling of greas
To refill grease to Linear Motion guide, supply a sufficient amount of grease through the nipple until remaining grease is discharged. It is appropriate to fill grease up to 50% of the volume of the block. To reduce rolling resistance which may increase after grease is filled, it is better to take a test run about 20 times prior to the operation.

2) Refill interval
If Linear Motion guide's travel exceeds a certain time, its lubricating performance declines. So it is required to refill an appropriate amount of grease at a proper time depending on service conditions and environment. Usually grease is to be filled when the travel distance reaches 100 KM.

$$T = \frac{100 \times 6000}{Ve \times 60}\ hr$$

T : Oil refilling cycle (time
Ve : Velocity (m/min)

4. Oil lubrication

In case of using oil for Linear Motion guide, it is recommended to use oil lubricant with high viscosity (68mm^2/sec) under higher load while oil lubricant with low-viscosity (13mm^2/sec) at high velocity. It is appropriate to refill 0.3 cm^3 of oil per hour for each one block.

Table 17. Inspection and refilling time of lubricant

TYPE	INSPECTION ITEM	INSPECTION PERIOD	REFILLING TIME
Grease	•Status of mixing with cutting chip, dust, foreign substance •Status of contamination by other substances	3~6 months	•Generally 1-2 times per year •Usually more than once per year if travel exceeds 100km/year •Refill depending on the situation after checking the status of grease
Oil	Lubricant quantity, contamination, foreign substance	3~6 months	•Refill depending on the results of inspection, and determine the optimal amount to refill depending on the capacity of oil tank
	Check oil level (supply oil mist)	Before every operation	•Refill an appropriate amount after identifying the consumption •Standardize the optimal amount after identifying the consumption

• Please do not use oil that may affect synthetic resin which is the material of Linear Motion guide units.

Table 18. Lubricants used for Linear Motion guide

APPLICATION	MAIN USE	PRODUCT NAME	MANUFACTURER	TEMP. IN USE (°C)	BASE OIL	TYPE OF THICKENER
Common use (etreme-pressure additive incl.)	Industrial machine, machine tool	BW EP NO.2	BWC	-20 ~ +105	Mineral oil	Lithium
Common use	Machine tool, electric spark machine, industrial robots, etc.	GADUS S2 V220 00	SHELL	-30 ~ +110	Mineral oil	Lithium
Clean & low dust raise	Semiconductor, FPD equipment	SNG 5050 DEMNUM	NTG DAIKIN	-40 ~ +1200 -50 ~ +300	Synthetic oil	Urea
Eco-friendly	Semiconductor AMOLED process equipment, driving gear in vacuum chamber	FOMBLIN Krytox High vacuum grease	AUSIMONT DuPont Dow Corning	-20 ~ +250	Synthetic oil	Ethylene fluorinate
Machine tool	Excellent in preventing rust and oil film strength Suitable for machine tools because it is hardly emulsified to clearance	VACTRA No.2 SLC DTE Oil	Exxon Mobil	-20 ~ +100	Oil	Way oil Turbine oil
Special use	Corrosion proofin	6459 Grease	SHELL	-20 ~ +100	Mineral oil	Polyurethane

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Surface Treatment

1. Surface Treatment
   2. Types of Surface Treatment

1. Surface Treatment

RBX uses the following methods for the optimal treatment of surfaces of Linear Motion guide in order to prevent rust and enhance appearance.

2. Types of Surface Treatment

1) Electrolytic rust-preventive black coating (black Cr plating)
   This is an industrial black chrome coating which is used to improve the corrosion resistance at low cost. It can achieve better corrosion resistance than martensite stainless steel and be used to enhance appearance and prevent the reflection of light

2) Industrial hard Cr plating
   The film's hardness is over 850HV so its wear resistance is excellent and the corrosion resistance is comparable with that of martensite stainless steel. RBX offers surface treatments such as alkaline coloring or color alumite treatment if a customer requests. If you want use Linear Motion Guide by treating its surface, you have to set the safety factor high.

3) Fluoride low-temperature Cr plating
   It is also called "Raydent". This is a combined surface treatment of black Cr coating with special fluoride resin coating which is used in where corrosion resistance or low dust raise is needed - for instance clean room.

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Dust Proof

1. Dust Proof
2. Types of Dust Proof

1. Dust Proof

To make use of the characteristics and performance of Linear Motion guide, it is important to protect the unit from external foreign substances which are likely to cause abnormal wear or shorten life. If dust or foreign substance is expected to be mixed in, it is required to use the effective sealing or dust-proofing system.

2. Types of Dust Proof

RBX Linear Motion guide is basically equipped with seal but if a customer requests, a metal scraper can be additionally mounted on the unit before shipment.

1) Exclusive seal
   The block is equipped with end seals, side seals and inner seals to protect the bearing from foreign substances.

2) Metal scraper
   A metal scraper is installed outside the end seals and effective in preventing foreign substances such as hot spatter or slag created during a welding process from entering into the unit.

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Measure to Use in Special Environment

RBX Linear Motion guide is useful in various special applications if being used in accordance with service conditions including material, surface treatment, dust proof, grease, etc.

Table 19.

APPLICATION	CONDITIONS OF USE	COUNTERMEASURE	
Clean (clean room) - Semiconductor, FPD, medical equipment -	•If used in a clean environment, dust or particles generated in Linear Motion guide should be minimized.	Lubricant	•For use in a clean environment •Use low dust raise grease
		Rust prevention	•Black Cr coating •Fluoride low-temperature colorimetric Cr plating (Raydent treatment) •Use high-corrosion resistant stainless steel as material
Vacuum - Semiconductor, FPD deposition equipment –	•If used in a vacuum environment, out gas discharged from Linear Motion guide should be tightly controlled to maintain the vacuum status. •Great rust prevention is required since rust-prone parts cannot be used in this environment.	Lubricant	•Use grease for a vacuum environment
		Rust prevention (Out Gas)	•Use high-corrosion resistant stainless steel as material •Use a self oiling agent using special coatings such as fluoroplastic coating •Use ceramic as material
High-temperature environment	•If used in higher temperature than general environment, the material's heat resistance is important and plastic synthetic resin used for parts should be replaced with metal.	Lubricant	•Use grease for high-temperature environments
		Material	•Use an end seal, side seal + double seal •Use a double seal •Use a special seal for high temperature
Dust	•If used in an environment filled with cutting chips, wood dust, and dust, it is required to develop a measure to protect the block from foreign substances.	Seal	•Use a plastic synthetic resin cap •Use a metal cap •Use a metal scraper
		Cap	•Use a plastic synthetic resin cap •Use a metal cap •Use a seal plate
		Holding door	•Use an exclusive holding door •Use an all-in-one sealing holding door
Spatter	•If exposed to a spot welding or arc welding environment, hot spatter could be adhesion on the rail. So effective measures are needed to prevent it.	Spatter	•Fluoride black Cr coating
		Seal	•Use a metal scraper
		Dust proof	•Use a metal cap •Use a seal plate

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Placement and Installation

1. Placement and Structure
2. Mounting and Fixation
3. Design of mounting surface during installation
4. Error tolerance of mounting surface during installation
5. Marking of datum plane during installation
6. Connection of rails
7. Installation of Linear Motion Guide
8. Torque used to fasten bolts during the assembly of Linear Motion guide
9. Directions of bolt fastening by Linear Motion guide type

1. Placement and Structure

To place Linear Motion guide in the equipment, first identify the overall structure of the equipment, then check the size of the base and a transfer table and consider load applied according to mounting directions such as placing vertically, in slope, or in the back as well as required life to make sure Linear Motion guide is optimally installed.

Placement of Linear Motion guide (example)

(1) Assembly of the top side of block, block transfer

(2) Assembly of the back side of block, rail transfer

(3) Assembly of the flank of block, block transfer

(4) Assembly of the flank of block, rail transfer

(5) Assembly of the wall side of block, rail transfer

(6) Assembly of the wall side of block, block transfer

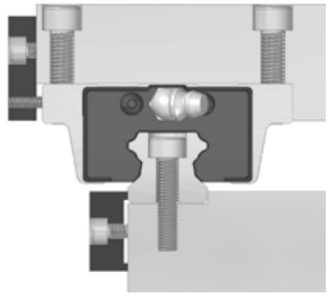
(7) Symmetrical assembly of the top and bottom of block, rail transfer

(8) Symmetrical assembly of the top and bottom of block, block transfer

2. Mounting and Fixation

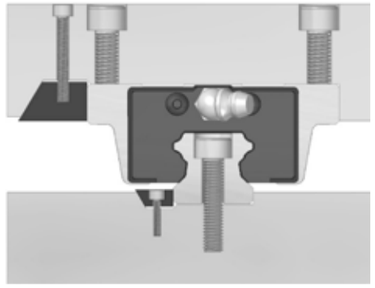
In the structure that vibration or impact is applied or where combined load or moment load is applied, Linear Motion guide should be fixed in a different way from a general method.

FIGURE 8.
PUSHING A PRESSURE PLATE FROM THE FLAN



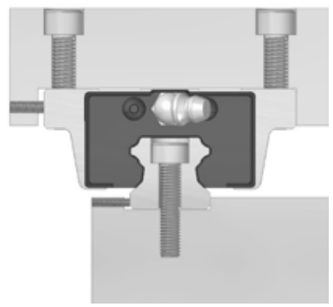
As a widely used method, push a pressure plate from the flank after slightly protruding the block and rail of LM unit.

FIGURE 9.
PUSHING A TAPERED PLATE



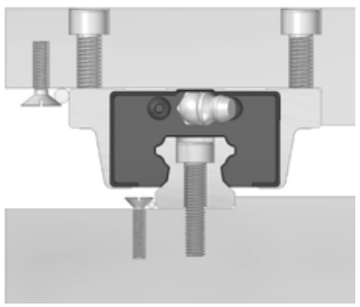
Fasten a tapered fixture with a bolt. Even slight bolting up generates big force in a horizontal direction. If it is bolted up too much, deformation may occur in rail, for instance, which needs to be taken a caution.

FIGURE 10.
PUSHING A BOLT FROM THE FLAN



Need to use miniature bolts due to space constraint when pushing the rail and useful if having many bolts for pushing.

FIGURE 11.
PUSHING A ROLLER



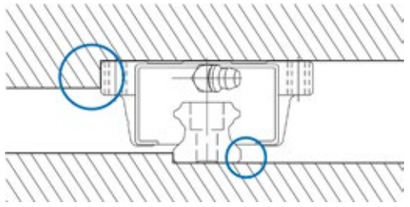
Push a needle roller with the head of a countersunk screw using a roller of the bed. You must be careful to push it to fit the screw.

3. Design of mounting surface during installation

Design and management of mounting surface

The precision of mounting surface of Linear Motion guide and the error in installation generate unexpected load and stress to the unit, therefore it is required to take caution to prevent the harmful effects on the unit's travel and life.

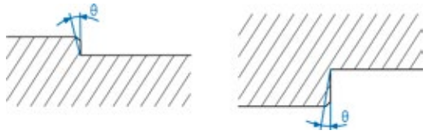
FIGURE 12. SHAPE OF EDGES



Management of vertical angle of datum plane for installation

If the vertical angle of the installation surface and of a rail or a block is inaccurate, it cannot be assembled precisely. So you need to review the vertical angle and error during design.

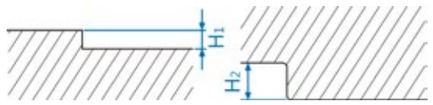
FIGURE 13.



Management of datum plane for assembly

It is important to manage the height and thickness of datum plane during design. If the height is too high or low, a rail or a block cannot be assembled precisely due to its surface attachment. Or the application of eccentric load, horizontal load and moment load may loosen the strength of joint and result infaulty assembly which will be unable to meet the precision requirements. So attention must be paid.

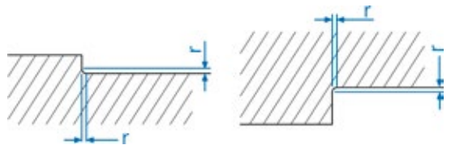
FIGURE 14. VERTICAL ANGLE OF CONTACT DATUM PLANE



Management of the shape of contact corner

If the right-angled corner of a rail or a block installed to the mounting surface of Linear Motion guide is processed in R-shape and R value is bigger than the dimension of the surface of the rail or the block, it may not be assembled precisely to the datum plane. So attention must be paid.

FIGURE 15. DIMENSION OF CONTACT DATUM PLANE



Management of dimensional tolerance between datum plane and bolt during design

If the dimensional tolerance from the contact datum plane to the mounting hole of a rail or a block of Linear Motion guide is too big, precise assembly is impossible so attention must be paid. Generally the dimensional tolerance is ±0.1mm. If the distance tolerance from the assembly datum plane to the assembly bolt roll of a rail and a block is too wide or narrow, precise assembly is impossible. So the tolerance must be W3±0.1mm during design.

FIGURE 16. DIMENSIONAL TOLERANCE BETWEEN CONTACT DATUM PLANE AND MOUNTING HOLE

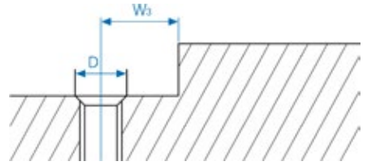
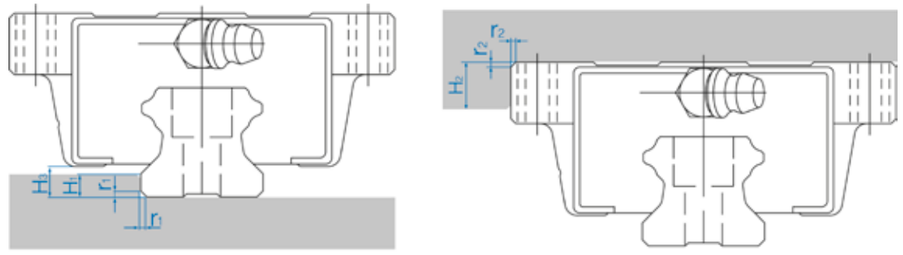


FIGURE 17. HEIGHT OF THE RAISED SPOT OF MOUNTING SURFACE AND RADIUS OF CORNER R



Assembly of rail datum plane

Assembly of block datum plane

- Make a datum plane which can contact the flank in order to secure convenience in assembly of and precision positioning of a rail and a block during the installation of Linear Motion guide.
- The height of the raised spot of contact datum plane or the radius of corner may vary depending on the specifications of Linear Motion guide so please see the table below.
- To prevent deformation of the raised spot by pressing force from above or pushing force from side, sufficient thickness must be secured during design.

RBH Series, RBH-S Series, RBHS-S Series — Unit: mm

Model No.	Radius of corner of the installation to rail r_1(max.)	Radius of corner of the installation to block r_2(max.)	Height of raised spot of the installation to rail H_1	Height of raised spot of the installation to block H_2	H_3
15	0.5	0.5	3	4	4.7
20	0.5	0.5	3.5	5	6
25	1	1	5	5	7
30	1	1	5	5	7.5
35	1	1	6	6	9
45	1	1	8	8	10
55	1.5	1.5	10	10	13

RBW Series

Unit: mm

Model No.	Radius of corner of the installation to rail r_1(max.)	Radius of corner of the installation to block r_2(max.)	Height of raised spot of the installation to rail H_1	Height of raised spot of the installation to block H_2	H_3
17	0.4	0.4	2	4	2.5
21	0.4	0.4	2.5	5	3.3
27	0.4	0.4	2.5	5	3.5
35	0.8	0.8	3.5	5	4

RBS Series, RBS-S Series

Unit: mm

Model No.	Radius of corner of the installation to rail r_1(max.)	Radius of corner of the installation to block r_2(max.)	Height of raised spot of the installation to rail H_1	Height of raised spot of the installation to block H_2	H_3
15	0.5	0.1	2.5	4	4.5
20	0.5	1	4	5	6
25	1	1	5	5	7

RM Series, RMB Series

Unit: mm

Model No.	Radius of corner of the installation to rail r_1(max.)	Radius of corner of the installation to block r_2(max.)	Height of raised spot of the installation to rail H_1	Height of raised spot of the installation to block H_2	H_3
5	0.2	0.2	0.8	2	1
7	0.2	0.2	1.2	2.5	1.5
9	0.2	0.2	1.5	3	2
12	0.2	0.2	2.5	4	3
13	0.2	0.2	3	4.5	4
15	0.2	0.2	3	4.5	4
20	0.2	0.2	4	5	5

RBR Series

Unit: mm

Model No.	Radius of corner of the installation to rail r_1(max.)	Radius of corner of the installation to block r_2(max.)	Height of raised spot of the installation to rail H_1	Height of raised spot of the installation to block H_2	H_3
35	1	1	5	6	6.5
45	1.5	1.5	6	8	8
55	1.5	1.5	8	10	10

4. Error tolerance of mounting surface during installation

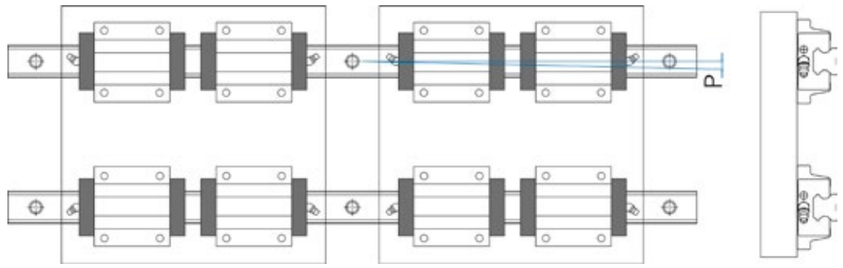
1) Auto-adjusting and error-absorbing abilities

Linear Motion guide has an excellent auto-adjusting ability so that even though the structure to be assembled to a rail is slightly deformed or processing error may occur, the straightness or parallelism of a table after assembly will be better than the precision in processing before assembly and the quite straight-line running is available.

2) Error tolerance of the degree of parallelization when using 2-axis assembly (P1)

The error in the degree of parallelization when using a 2-axis assembly is as shown below.

FIGURE 18. ERROR TOLERANCE OF THE DEGREE OF PARALLELIZATION (P)



RBH Series, RBH-S Series, RBHS-S Series

Unit: μm

Model No.	Common clearance	G_1 clearance	G_2 clearance
15	25	18	-
20	25	20	18
25	30	22	20
30	40	30	27
35	50	35	30
45	60	40	35
55	70	50	45

RBW Series

Unit: μm

Model No.	Common clearance	G_1 clearance	G_2 clearance
17	20	15	-
21	25	18	-
27	30	20	-
35	30	22	20

RBS Series, RBS-S Series — Unit: μm

Model No.	Common clearance	G1 clearance	G2 clearance
15	25	18	-
20	25	20	18
25	30	22	20

RM Series, RMB Series — Unit: μm

Model No.	Common clearance	G1 clearance
5	2	-
7	3	-
9	4	3
12	9	5
13	10	6
15	10	6
20	13	8

RBR Series — Unit: μm

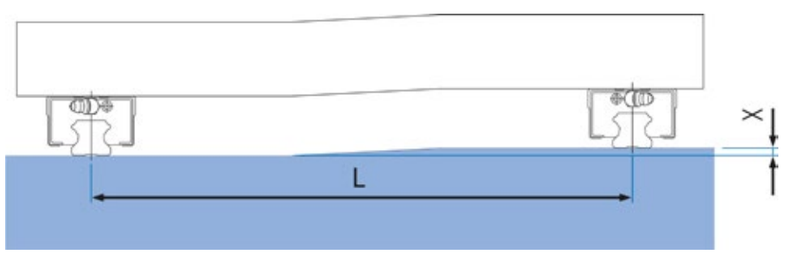
Model No.	Common clearance	G1 clearance	G2 clearance
35	14	10	7
45	17	13	9
55	21	14	11

3) Error tolerance of height during 2-axis assembly (P2)

If the error in height is too big, the block may be distorted and its rigidity may be affected as the raceway groove of the block and the contact angle of a ball or a roller which is the rolling element are altered.

The error tolerance of height level in using 2-axis Linear Motion guides is as follows.

FIGURE 19. ERROR TOLERANCE OF HEIGHT LEVEL IN 2-AXIS (X)



RBH Series, RBH-S Series, RBS Series, RBS-S Series, RBHS-S Series — Unit: μm

Model No.	Common clearance	G1 clearance	G2 clearance
15	0.26L	0.17L	-
20	0.26L	0.17L	0.10L
25	0.26L	0.17L	0.14L
30	0.34L	0.22L	0.18L
35	0.42L	0.30L	0.24L
45	0.50L	0.34L	0.28L
55	0.60L	0.42L	0.34L

RBW Series — Unit: μm

Model No.	Common clearance	G1 clearance	G2 clearance
17	0.13L	0.04L	-
21	0.26L	0.17L	-
27	0.26L	0.17L	-
35	0.26L	0.17L	0.14L

RM Series, RMB Series — Unit: μm

Model No.	Common clearance	G1 clearance
5	0.04L	-
7	0.05L	-
9	0.07L	0.01L
12	0.10L	0.02L
13	0.12L	0.04L
15	0.12L	0.04L
20	0.14L	0.06L

RBR Series — Unit: μm

Model No.	Common clearance	G1 clearance	G2 clearance
35, 45, 55	0.22L	0.17L	0.12L

5. Marking of datum plane during installation

The datum plane of RBX's Linear Motion guide is the ground surface on the opposite side of RBX mark shown in the block.

FIGURE 20.
LINEAR MOTION GUIDE ON THE REFERENCE AXIS

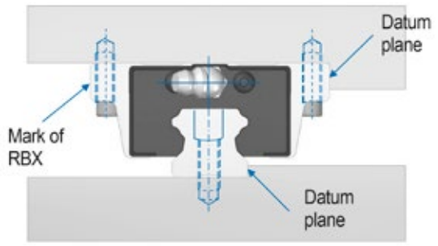
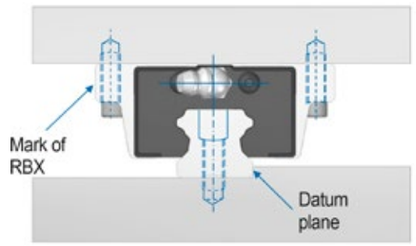


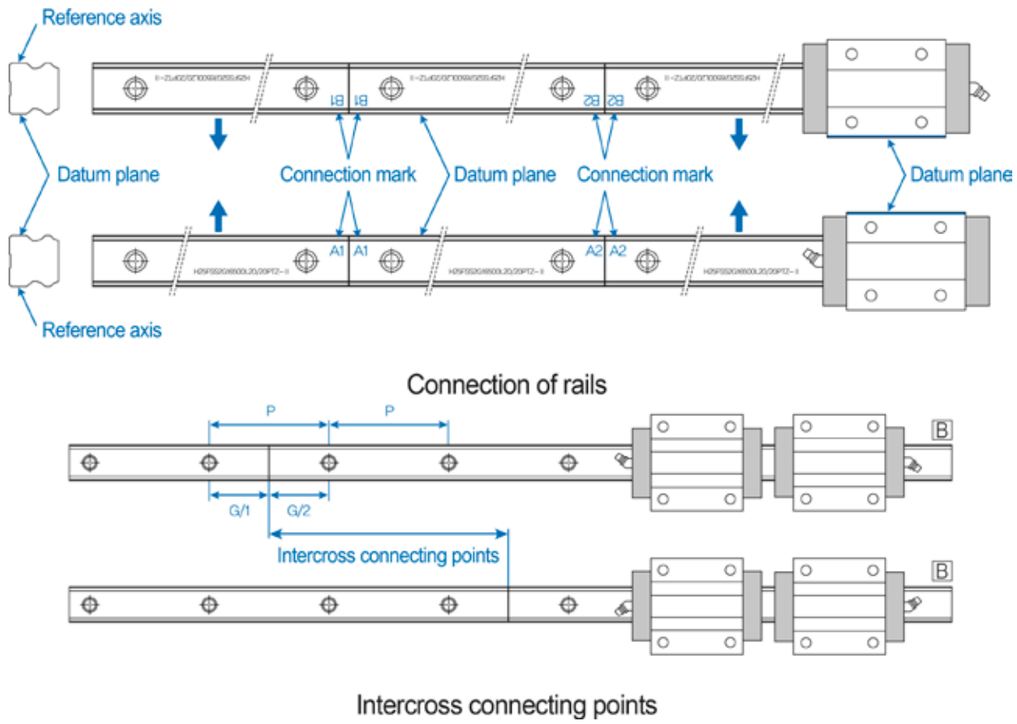
FIGURE 21.
LINEAR MOTION GUIDE ON THE DRIVEN SHAFT



6. Connection of rails

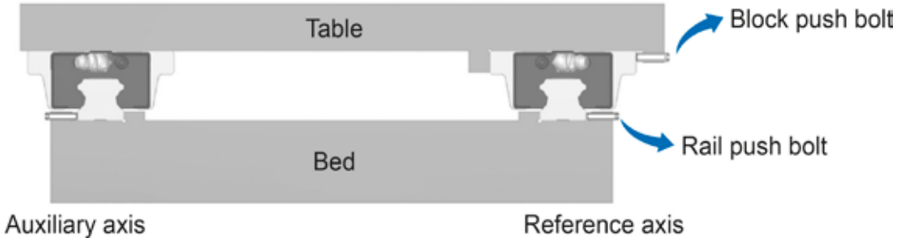
If you need a longer rail than the one supplied, you can connect rails for the purpose of use. The mark on the rail indicates the point where rails should be linked. If the block passes through the connecting points simultaneously, they may affect the unit's travel and cause a delicate hitch. To solve this problem, it is recommended to make sure the connecting points intercrossed.

FIGURE 22. CONNECTION OF RAILS



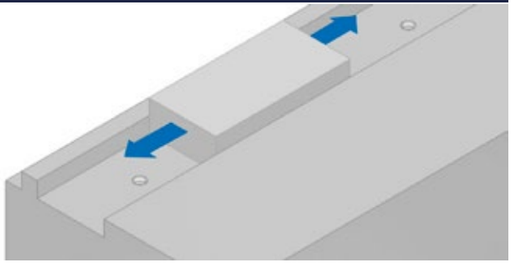
7. Installation of Linear Motion Guide

1. Installation of Linear Motion guide in the equipment exposed to vibration and impact



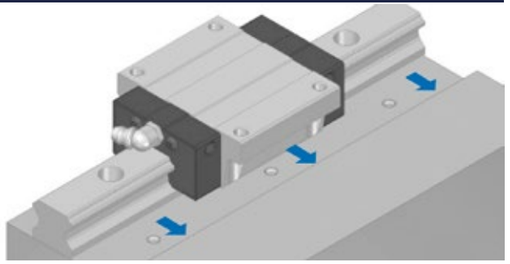
1) Install a rail

STEP 1:
CHECK THE SURFACE TO BE INSTALLED WITH A RAIL



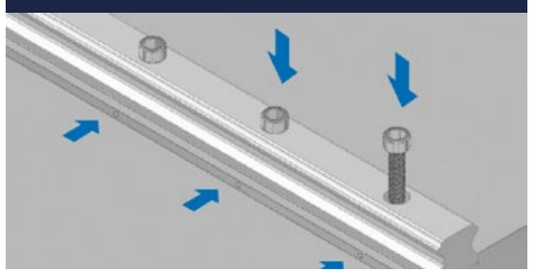
Prior to installation, throughly remove burr, dust, rust preventive oil, etc.

STEP 2:
DRAW A RAIL TIGHTLY TO THE DATUM PLANE



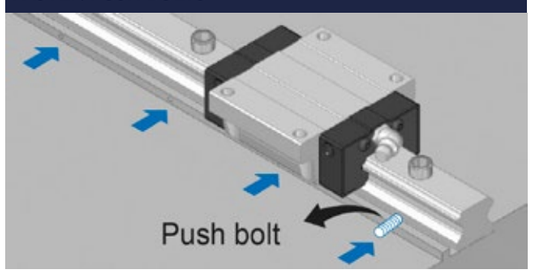
Gently place Linear Motion guide on the bed and push it in the opposite direction of the bed's datum plane

STEP 3:
FASTEN BOLTS TEMPORARILY



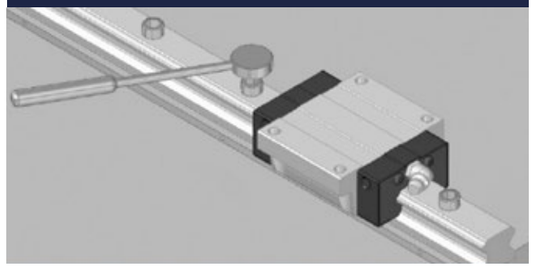
Check the status of bolts and fasten every bolt temporarily

STEP 4:
FASTEN PUSH BOLTS



Fix push bolts to make sure that the rail is parallel with the datum plane of the bed.

STEP 5: FIX AND FASTEN ASSEMBLY BOLTS USING A TORQUE WRENCH

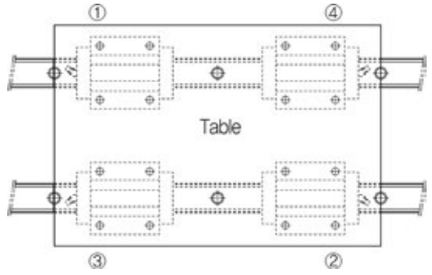


Fasten all bolts using the recommended torque. Fasten the bolt in the center first and then continue fastening each bolt toward both ends in order to maintain the precision of rail during assembly.

STEP 6:
ASSEMBLE AN AUXILIARY AXIS

Repeat the procedure above for the installation of an auxiliary axis

2) Install a block



Step 1: Assembly bolts temporarily

Place a table on the block and fasten all bolts temporarily.

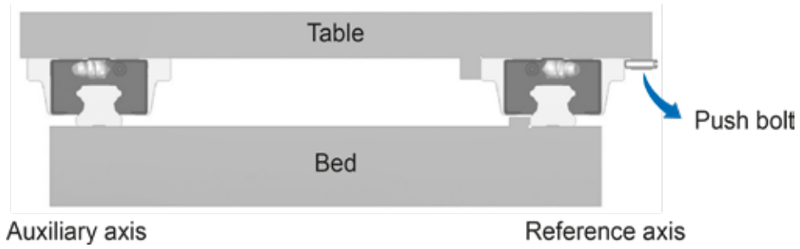
Step 2: Fasten bolts tightly

Fix the main rail block to the opposite side of the table's datum plane using a push bolt and adjust the position of the table.

Step 3: Fix and fasten assembly bolts

Completely fasten all bolts on the datum plane and subsidiary side in the order of 1 to 2.

2. Installation of Linear Motion guide without a push bolt



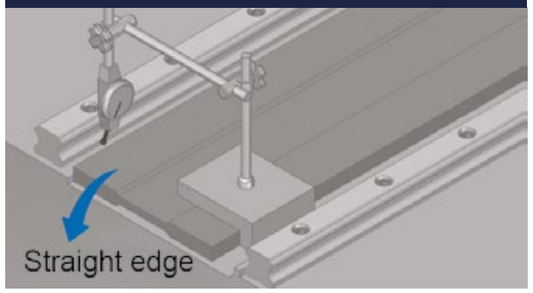
1) Install a master rail

USE A VISE

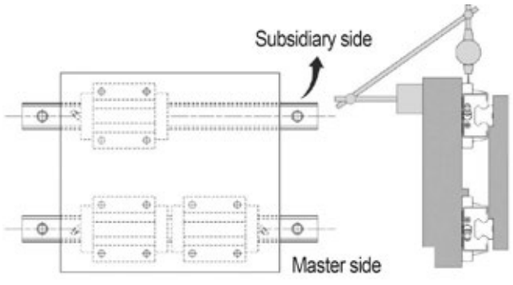
Fasten bolts temporarily and push a master rail toward the datum plane using a C-vise. Fasten the bolts according to the prescribed torque and order.

2) Install an auxiliary rail

STRAIGHT EDGE

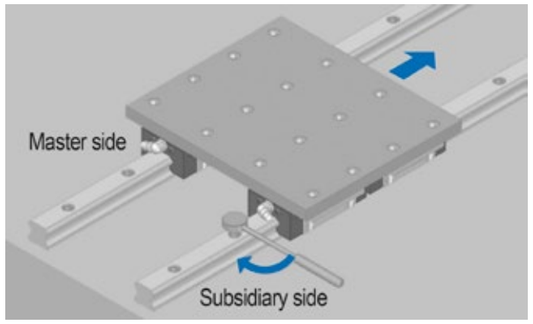


Place a straight edge between two rails and make sure it is parallel with the master rail that is fixed temporarily. Check the degree of parallelism with the dial gauge and adjust the rail if needed. Then, fasten bolts in order.



Assembly using a table

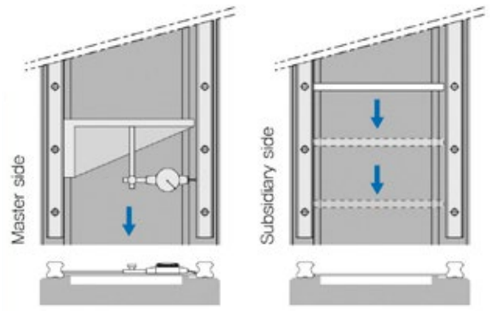
1. Fix two blocks on the datum plane and one block on the subsidiary side to a table.
2. Fix another auxiliary block and rail to the table and bed temporarily.
3. Place a dial gauge on the table and make sure a prober of the gauge contact the subsidiary side of the block.
4. Separate the table from the end of the rail and check the degree of parallelization of the block with the auxiliary rail.
5. Fasten bolts in order.



Assembly using a rail on the datum plane

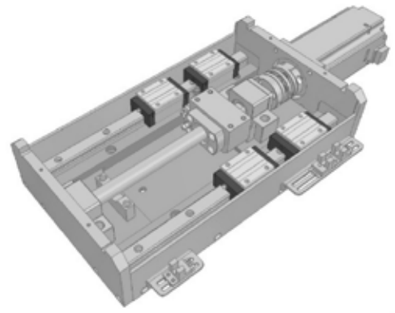
1. Fix two blocks on the datum plane and one block on the subsidiary side to a table.
2. Fix another auxiliary block and rail to the table and bed temporarily.
3. Separate the table from one rail and make an adjustment by considering the rolling resistance during the movement and checking the degree of parallelization of the auxiliary rail.
4. Fasten bolts in order.

ASSEMBLY USING A JIG

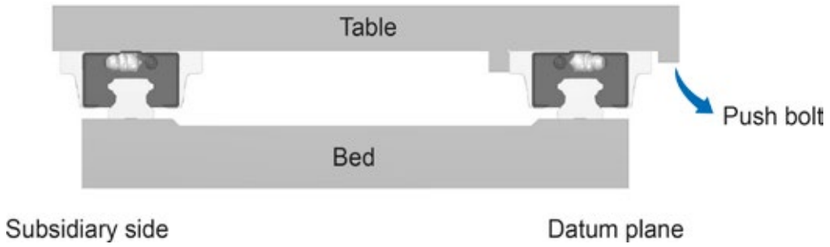


Move the position of a block in every bolt pitch at the end of the rail in consecutive order and fasten bolts in order by adjusting the degree of parallelism between the datum plane of a reference rail and that of an auxiliary rail using a special jig.

INSTALLATION COMPLETION OF LINEAR MOTION GUIDE

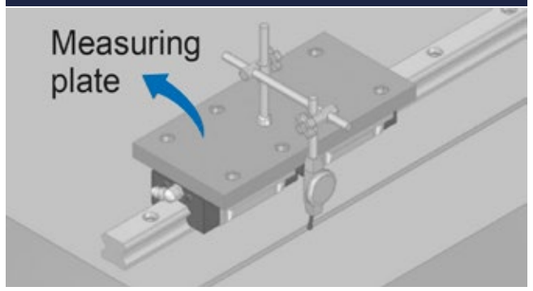


3. Installation of Linear Motion guide without the datum plane for a reference rail



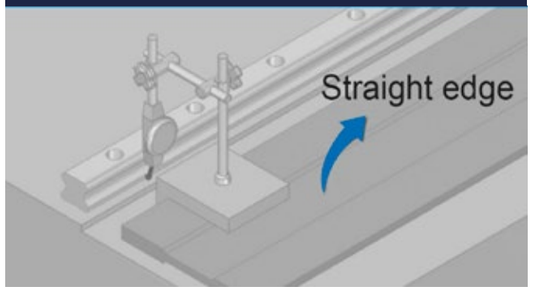
1) Install a reference rail

USE A TEMPORARY DATUM PLANE



Fix two blocks together onto the measuring plate and install the temporary datum plane near the surface where a rail is to be installed on the bed. Then check and adjust the degree of parallelism of the rail and fasten bolts in order.

USE A STRAIGHT EDGE



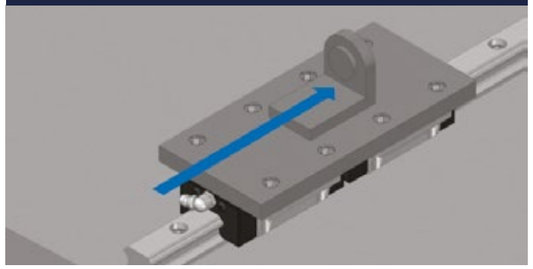
Fix a rail to the bed temporarily and adjust it to be straight using a dial gauge and then fasten bolts in order.

2) Apply the same method when installing the auxiliary block and rail

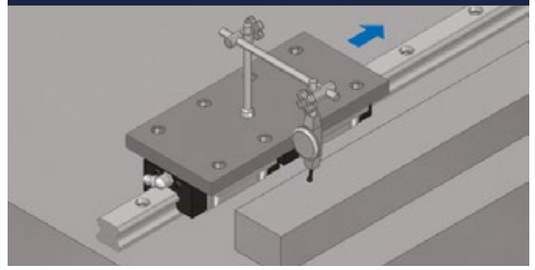
4. Measure precision after installation

You can check the precision of travel by fixing two blocks onto the measuring plate. Use a dial gauge with a straight edge or a laser interferometer to measure the precision.
In case of using a dial gauge, you have to place the straight edge as close to the block as possible in order to accurately measure it.

MEASURE USING A LASER INTERFEROMETER



MEASURE USING A DIAL GAUGE WITH A STRAIGHT EDGE



8. Torque used to fasten bolts during the assembly of Linear Motion guide

1) Select the optimal torque for bolts
For the assembly of the rail of Linear Motion guide, the optimal clamping torque must be used depending on the materials of mounting surface or bolts. Inaccurate clamping torque may affect the mounting precision of the rail so please use a torque wrench.

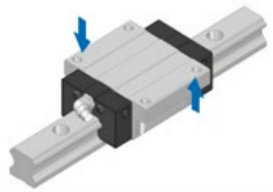
2) Recommended torques by the material of mounting base of Linear Motion guide Unit: N•m

Bolt specification	Torque value (Unit: N·m)		
	Steel	Casting	Aluminium
M3	2	1.3	1
M4	4	2.7	2
M5	8.8	5.9	4.4
M6	13.7	9.2	6.8
M8	30	20	15
M10	68	45	33
M12	120	78	58
M14	157	105	78
M16	196	131	98
M20	382	255	191

3) Recommended torques by the material of bolts Unit: N•m

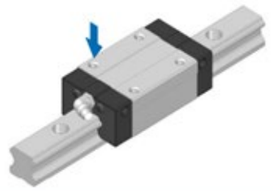
Bolt specification	Clamping torque		Bolt specification	Clamping torque	
	Carbon steel bolt	SCM steel bolt		Carbon steel bolt	SCM steel bolt
M2.3	-	0.4	M12	108	76
M2.5	-	0.6	M14	172	122
M3	1.7	1.1	M16	263	196
M4	4.0	2.5	M18	-	265
M5	7.9	5.1	M20	512	-
M6	13.3	8.6	M22	-	520
M8	32.0	22.0	M24	882	-
M10	62.7	43.0	M30	1750	-

9. Directions of bolt fastening by Linear Motion guide type



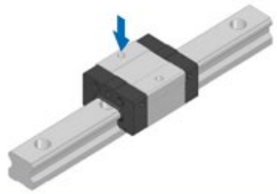
RBH-F, RBH-FL, RBH-SF, RBH-SFL

Since the flange of a block is tapped and the counter bore is processed in the bottom, bolts can be assembled both from bottom to top and from top to bottom as indicated by arrows. But, if bolts are fastened from bottom to top, it is recommended to use one size smaller bolts.



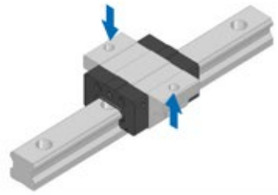
RBH-R, RBH-RL, RBH-SR, RBH-SRL

Since tap is processed in the square body of the block, it is used when bolts are fastened from top to bottom as indicated by arrows.



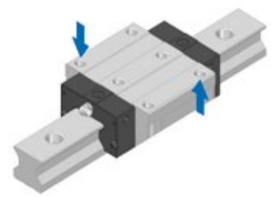
RBS-C, RBS-R, RBS-SC, RBS-SR

Since tap is processed in the rectangular body of the block, it is used when bolts are fastened from top to bottom as indicated by arrows.



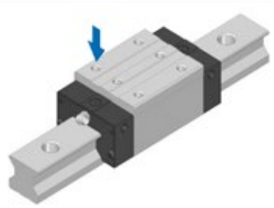
RBS-CF, RBS-F, RBS-SCF, RBS-SF

Since the flange of a block is tapped and the counter bore is processed in the bottom, bolts can be assembled both from bottom to top and from top to bottom as indicated by arrows. But, if bolts are fastened from bottom to top, it is recommended to use one size smaller bolts.



RBR-F, RBR-FL

Since the flange of a block is tapped and the counter bore is processed in the bottom, bolts can be assembled both from bottom to top and from top to bottom as indicated by arrows. But, if bolts are fastened from bottom to top, it is recommended to use one size smaller bolts.



RBR-R,RBR-RL

Since the rectangular body of a block is tapped, it is used when bolts are fastened from top to bottom as indicated by arrows.

RBX
LINEAR

12X

Types of Linear Motion Guide

1. Linear Motion Guide RBH Series
2. Spacer Chain Guide RBH-S Series
3. Slim Linear Motion Guide RBS Series
4. Slim Spacer Chain Linear Motion Guide RBS-S Series
5. Miniature Linear Motion Guide RM Series
6. Wide Miniature Linear Motion Guide RMB Series
7. Roller Linear Motion Guide RBR Series

1. Linear Motion Guide RBH Series

1) Structure of RBH Series

RBX Linear Motion Guide RBH Series has a four-row circular arc-groove structure in the raceway groove of a rail or a block and is a 4-direction equal load type which can bear equal load rating for vertical compression load, tensile load, and horizontal load as the rolling element is combined with balls at 45 degree, which reduces friction resistance to ensure smooth motion and long life.
Also if the ball is preloaded, it can enhance the rigidity of Linear Motion guide and minimize Linear Motion guide's displacement for external load.

2) Features of RBH Series

a. High quality and very effective in realizing high precision and elimination of labor
b. High rigidity and high precision which can realize the stable travel for a long time
c. Great wear resistance and friction resistance which ensures a long life
d. Great auto-adjusting and error-absorbing abilities with the face-to-face duplex structure same to D/F combination of ball bearing
e. Various specifications for easy design
f. Easy to use due to great compatibility between a rail and a block

2. Spacer Chain Guide RBH-S Series

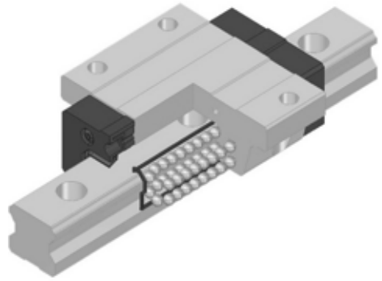
1) Structure of RBH-S Series

Linear Motion Guide RBH-S Series has a 4-direction equal load type which is identical to RBH Series and has an auto-adjusting face-to-face D/F structure. It uses balls as a rolling element and combines a spacer between balls to prevent them from colliding each other during the rolling motion. Therefore it makes less noise and more stable circulating motion than a full-ball type to realize quiet running and the spacer act as the pocket of lubricant to obtain longer life than RBH Series.

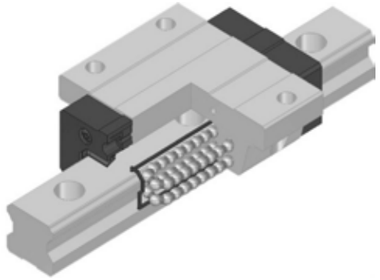
2) Features of RBH-S Series

a. As a spacer-incorporated type which improves frictional properties and prevents the collision of balls, it not only allows stable circulating motion and smooth running but also reduces noise. If special lubricating seal is attached to lengthen life, maintenance-free operations can be achieved.
b. Collision between balls and the loss of oil film are prevented by applying a resin spacer to improve life and generate less particles and dust.
c. High quality in realizing high precision and high velocity so it could create large effect on elimination of power loss.
d. High rigidity and high precision which can realize the stable travel for a long time
e. Great wear resistance and friction resistance which ensures a long life
f. Great auto-adjusting and error-absorbing abilities with the face-to-face duplex structure same to D/F combination of ball bearing
g. Various specifications for easy design
h. Easy to use due to great compatibility between a rail and a block

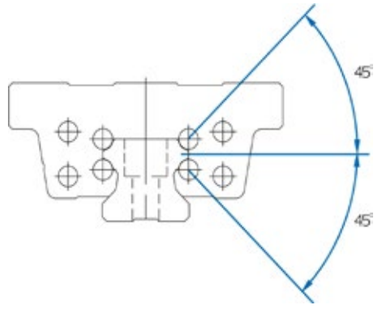
RBH SERIES (FULL-BALL TYPE)



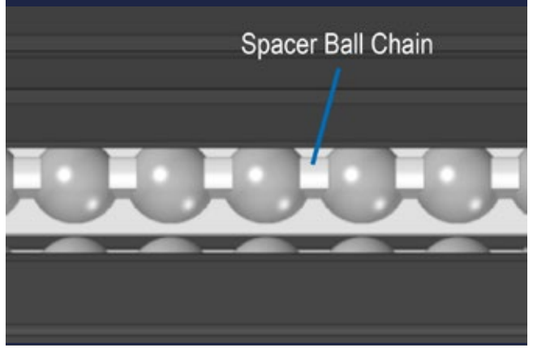
RBH-S SERIES (SPACER CHAIN TYPE)



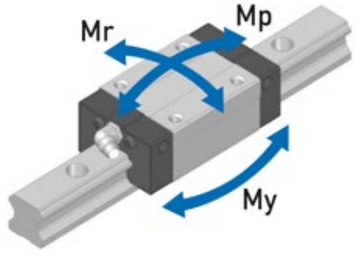
CROSS SECTION



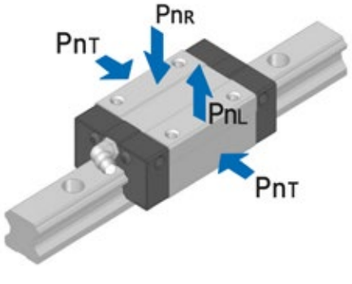
DETAIL OF RACEWAY OF RBH-S SERIES

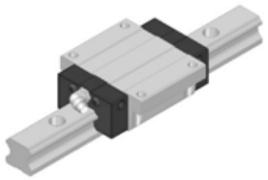
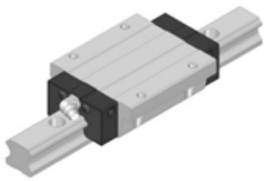
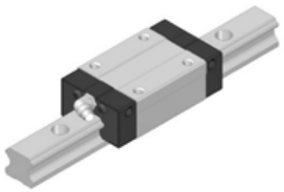
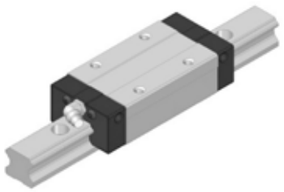


MOMENT RIGIDITY

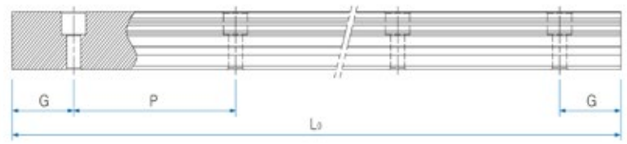


RADIAL RIGIDITY



Category	Type	Shape & Features		
Flange type	RBH-F RBH-SF		•With the tapped flange of a block, a general type which can be assembled both from bottom to top and from top to bottom •A 4-direction equal load type with high rigidity and high load S Series is a low-noise low-dust raise type with improved life due to zero friction between balls since a spacer retainer is applied.	Machine tool X, Y, Z axis, CNC machining center, CNC shelf, CNC tapping center, Electric injection machine, 3D engraving machine, laser processer, milling machine, welder for exclusive use, EDM electric spark machine, automation device, Various transport system, FPD inspection equipment, Industrial robots, ATC, Precision X-Y table, Various industrial machine
	RBH-FL RBH-SFL		•Having the cross section identical to that of H-F Series, it increased load rating by extending the whole length (L1) of Linear Motion guide block •A 4-direction equal load type with high rigidity and high load S Series is a low-noise low-dust raise type with improved life due to zero friction between balls since a spacer retainer is applied.	
Compact type	RBH-R RBH-SR		•With the tapped top side of a block, a compact type that the width of Linear Motion guide block is minimized •A 4-direction equal load type with high rigidity and high load S Series is a low-noise low-dust raise type with improved life due to zero friction between balls since a spacer retainer is applied.	
	RBH-RL RBH-SRL		•Having the cross section identical to that of H-R Series, it increased load rating by extending the whole length (L1) of Linear Motion guide block •A 4-direction equal load type with high rigidity and high load S Series is a low-noise low-dust raise type with improved life due to zero friction between balls since a spacer retainer is applied.	

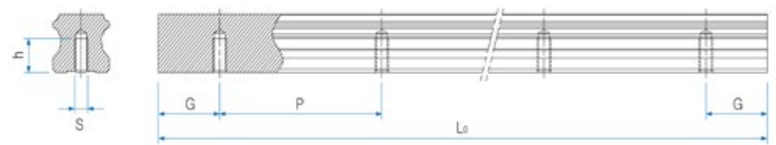
STANDARD AND MAXIMUM LENGTH OF A RAIL



Unit: mm

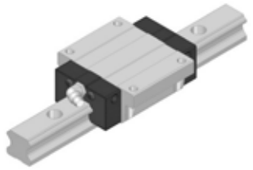
Model No.	RB15R	RB20R	RB25R	RB30R	RB35R	RB45R	RB55R
Standard length	160	160	220	280	440	570	780
	220	220	280	360	520	675	900
	280	280	340	440	600	780	1020
	-	340	400	520	680	885	-
	1360	-	460	600	760	-	2820
	1480	1960	-	-	-	2880	2940
	1600	2080	2200	2520	2680	2985	3060
		2200	2320	2680	2840	3090	
			2440	2840	3000		
				3000			
Standard pitch P	60	60	60	80	80	105	120
G	20	20	20	20	20	22.5	30
Max. length	4000						

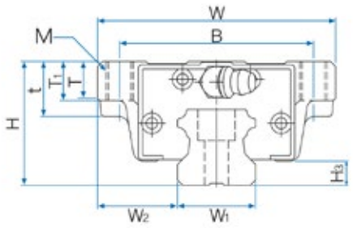
STANDARD TAP HOLE TYPE OF A RAIL



Model No.	S	h(mm)
RB15T	M5	8
RB20T	M6	10
RB25T	M6	12
RB30T	M8	15
RB35T	M8	17
RB45T	M12	24
RB55T	M14	24

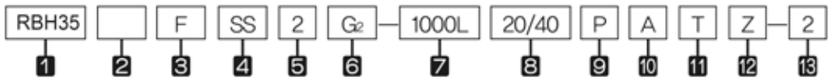
RBH-F Series, RBH-FL Series





Model No.	External dimensions			Dimensions of block										H3
	Height H	Width W	Length L	B	C	M	L1	t	T	T1	N	E	Grease nipple	
RBH15F	24	47	57	38	30	M5	40.8	-	7	11	6	6	A-M4	4.7
RBH15FL	24	47	65.3	38	30	M5	49.1	-	7	11	6	6	A-M4	4.7
RBH20F	30	63	72.7	53	40	M6	53.1	-	9.2	10	7.5	12	B-M6F	6
RBH20FL	30	63	88.6	53	40	M6	69	-	9.2	10	7.5	12	B-M6F	6
RBH25F	36	70	83	57	45	M8	58.3	-	11.5	16	9	12	B-M6F	7
RBH25FL	36	70	102.9	57	45	M8	78.2	-	11.5	16	9	12	B-M6F	7
RBH30F	42	90	97.8	72	52	M10	70.8	-	9.5	18	7.3	12	B-M6F	7.5
RBH30FL	42	90	120	72	52	M10	93	-	9.5	18	7.3	12	B-M6F	7.5
RBH35F	48	100	110	82	62	M10	80.8	-	12.5	21	8	12	B-M6F	9
RBH35FL	48	100	135.4	82	62	M10	106.2	-	12.5	21	8	12	B-M6F	9
RBH45F	60	120	139	100	80	M12	101.9	25	13	15	10	16	B-PT1/8	10
RBH45FL	60	120	170.8	100	80	M12	133.7	25	13	15	10	16	B-PT1/8	10
RBH55F	70	140	163	116	95	M14	117.5	29	19	17	11	16	B-PT1/8	13
RBH55FL	70	140	201.1	116	95	M14	155.6	29	19	17	11	16	B-PT1/8	13

Composition of Model No.



1 Model No. of Linear Motion Guide

2 Type of block: **No symbol**-Full-ball type / **S**-Spacer Chain type

3 Form of block: **R**-Rectangular standard type / **RL**-Rectangular long type / **F**-Flange standard type / **FL**-Flange long type

4 Type of seal: **UU**-End seal / **SS**-End seal + Inside seal / **ZZ**-End seal + Inside seal + metal scraper
UULF-End seal + LF seal / **SSLF**- End seal + Inside seal + LF seal / **ZZLF** - End seal + Inside seal + metal scraper + LF seal **(*1)**

5 Number of blocks combined in 1 rail

6 Symbol of clearance: **No symbol**-Normal preload / **G1**-Light preload / **G2**-Heavy preload / **Gs**-Special preload **(*2)**

7 Length of rail

8 Size of G value: standard G value has no symbol.

9 Symbol of precision: **No symbol**-Moderate precision / **H**-High precision / **P**-Precision / **SP**-Super Precision / **UP**-Ultra Precision **(*3)**

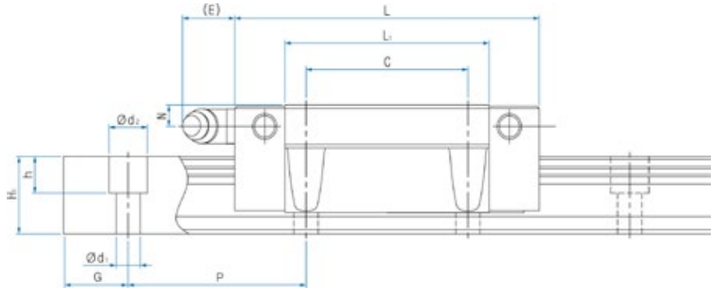
10 **No symbol**-Rail counter bore type (A topside assembly) / **A**- Rail tap hole type (an underside assembly) **(*4)**

11 Connection symbol

12 Special symbol

13 Number of axis used on the same surface

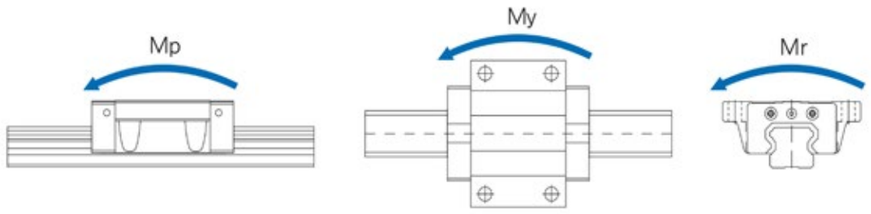
(*1) See P139 Symbol List of Optional Parts
(*2) See P30 Radial Clearance
(*3) See P45 Selection of Precision Class
(*4) See P89 Standard tap hole type of a rail



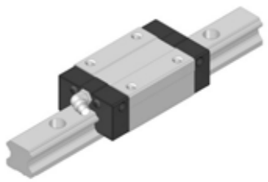
Unit: mm

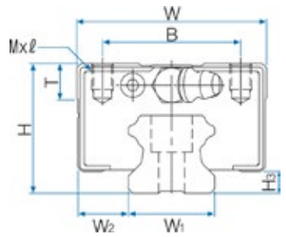
Dimension of Rail						Basic load rating		Static allowance moment kN-m					Mass	
								Mp		My		Mr		
Width W1 ± 0.05	W2	Heigh H1	Value G	Pitch P	d1 x d2 x h	C kN	Co kN	1	2 (contact)	1	2 (contact)	1	Block kg	Rail kg/m
15	16	13	20	60	4.5X7.5X5.3	12.6	16.2	0.115	0.552	0.115	0.552	0.129	0.19	1.3
15	16	13	20	60	4.5X7.5X5.3	14.3	19.3	0.165	0.769	0.165	0.769	0.154	0.24	1.3
20	21.5	16.5	20	60	6X9.5X8.5	18.3	23.9	0.221	1.049	0.221	1.049	0.251	0.41	2.2
20	21.5	16.5	20	60	6X9.5X8.5	21.8	30.7	0.370	1.692	0.370	1.692	0.322	0.54	2.2
23	23.5	20	20	60	7X11X9	27.0	33.1	0.337	1.636	0.337	1.636	0.398	0.61	3.0
23	23.5	20	20	60	7X11X9	32.8	43.6	0.596	2.760	0.596	2.760	0.525	0.82	3.0
28	31	26	20	80	9X14X12	50.4	57.1	0.711	3.384	0.711	3.384	0.828	1.1	4.85
28	31	26	20	80	9X14X12	60.3	73.6	1.203	5.506	1.203	5.506	1.067	1.3	4.85
34	33	29	20	80	9X14X12	67.0	74.6	1.062	5.012	1.062	5.012	1.298	1.6	6.58
34	33	29	20	80	9X14X12	80.2	96.2	1.797	8.172	1.797	8.172	1.674	2.01	6.58
45	37.5	38	22.5	105	14X20X17	108.5	116.4	2.860	9.912	2.860	9.912	2.275	2.83	11.03
45	37.5	38	22.5	105	14X20X17	129.7	150.1	4.533	16.161	4.533	16.161	2.935	3.70	11.03
53	43.5	44	30	120	16X23X20	155.9	161.5	4.654	16.016	4.654	16.016	3.779	4.36	15.26
53	43.5	44	30	120	16X23X20	187.5	210.1	7.468	26.493	7.468	26.493	4.916	5.76	15.26

1N≒0.102kgf



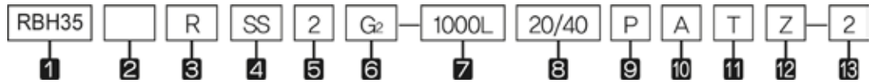
RBH-R Series, RBH-RL Series





Model No.	External dimensions			Dimensions of block								H3
	Height H	Width W	Length L	B	C	M x "	L1	T	N	E	Grease nipple	
RBH15R	28	34	57	26	26	M4X5	40.8	6	10	6	A-M4	4.7
RBH15RL	28	34	65.3	26	26	M4X5	49.1	6	10	6	A-M4	4.7
RBH20R	30	44	72.7	32	36	M5X6	53.1	8	7.5	12	B-M6F	6
RBH20RL	30	44	88.6	32	50	M5X6	69	8	7.5	12	B-M6F	6
RBH25R	40	48	83	35	35	M6X8	58.3	8	13	12	B-M6F	7
RBH25RL	40	48	102.9	35	50	M6X8	78.2	8	13	12	B-M6F	7
RBH30R	45	60	97.8	40	40	M8X10	70.8	8	10.3	12	B-M6F	7.5
RBH30RL	45	60	120	40	60	M8X10	93	8	10.3	12	B-M6F	7.5
RBH35R	55	70	110	50	50	M8X12	80.8	10	15	12	B-M6F	9
RBH35RL	55	70	135.4	50	72	M8X12	106.2	10	15	12	B-M6F	9
RBH45R	70	86	139	60	60	M10X17	101.9	15	20	16	B-PT1/8	10
RBH45RL	70	86	170.8	60	80	M10X17	133.7	15	20	16	B-PT1/8	10
RBH55R	80	100	163	75	75	M12X18	117.5	18	21	16	B-PT1/8	13
RBH55RL	80	100	201.1	75	95	M12X18	155.6	18	21	16	B-PT1/8	13

Composition of Model No.



1 Model No. of Linear Motion Guide

2 Type of block: **No symbol**-Full-ball type / **S**-Spacer Chain type

3 Form of block: **R**-Rectangular standard type / **RL**-Rectangular long type / **F**-Flange standard type / **FL**-Flange long type

4 Type of seal: **UU**-End seal / **SS**-End seal + Inside seal / **ZZ**-End seal + Inside seal + metal scraper
UULF-End seal + LF seal / **SSLF**- End seal + Inside seal + LF seal / **ZZLF** - End seal + Inside seal + metal scraper + LF seal **(*1)**

5 Number of blocks combined in 1 rail

6 Symbol of clearance : **No symbol**-Normal preload / **G1**-Light preload / **G2**-Heavy preload / **Gs**-Special preload **(*2)**

7 Length of rail

8 Size of G value: standard G value has no symbol.

9 Symbol of precision: **No symbol**-Moderate precision / **H**-High precision / **P**-Precision / **SP**-Super Precision / **UP**-Ultra Precision **(*3)**

10 **No symbol**-Rail counter bore type (A topside assembly) / **A**- Rail tap hole type (an underside assembly) **(*4)**

11 Connection symbol

12 Special symbol

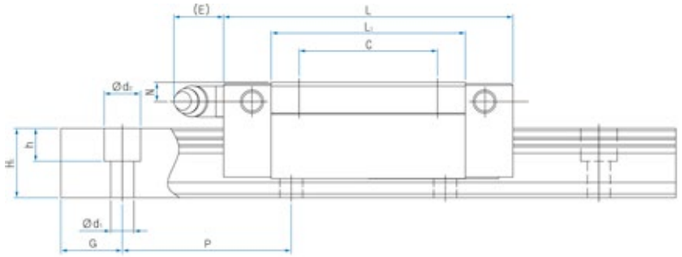
13 Number of axis used on the same surface

(*1) See P139 Symbol List of Optional Parts

(*2) See P30 Radial Clearance

(*3) See P45 Selection of Precision Class

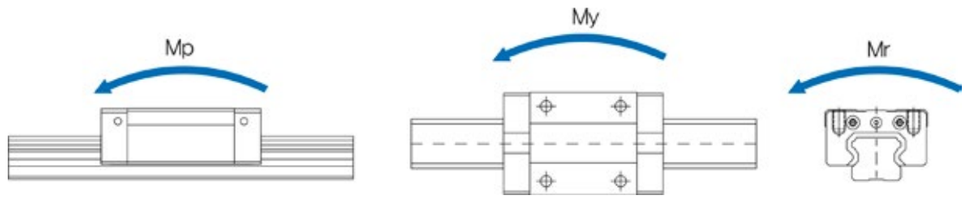
(*4) See P89 Standard tap hole type of a rail



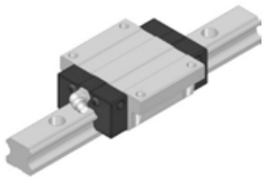
Unit: mm

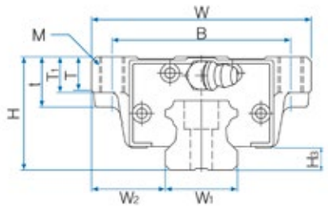
Dimension of Rail						Basic load rating		Static allowance moment kN-m					Mass	
								Mp		My		Mr		
Width W1 ± 0.05	W2	Heigh H1	Value G	Pitch P	d1 x d2 x h	C kN	Co kN	1	2 (contact)	1	2 (contact)	1	Block kg	Rail kg/m
15	9.5	13	20	60	4.5X7.5X5.3	12.6	16.2	0.115	0.552	0.115	0.552	0.129	0.18	1.3
15	9.5	13	20	60	4.5X7.5X5.3	14.3	19.3	0.165	0.769	0.165	0.769	0.154	0.23	1.3
20	12	16.5	20	60	6X9.5X8.5	18.3	23.9	0.221	1.049	0.221	1.049	0.251	0.31	2.2
20	12	16.5	20	60	6X9.5X8.5	21.8	30.7	0.370	1.692	0.370	1.692	0.322	0.41	2.2
23	12.5	20	20	60	7X11X9	27.0	33.1	0.337	1.636	0.337	1.636	0.398	0.53	3.0
23	12.5	20	20	60	7X11X9	32.8	43.6	0.596	2.760	0.596	2.760	0.525	0.71	3.0
28	16	26	20	80	9X14X12	50.4	57.1	0.711	3.384	0.711	3.384	0.828	0.9	4.85
28	16	26	20	80	9X14X12	60.3	73.6	1.203	5.506	1.203	5.506	1.067	1.1	4.85
34	18	29	20	80	9X14X12	67.0	74.6	1.062	5.012	1.062	5.012	1.298	1.5	6.58
34	18	29	20	80	9X14X12	80.2	96.2	1.797	8.172	1.797	8.172	1.674	2.01	6.58
45	20.5	38	22.5	105	14X20X17	108.5	116.4	2.860	9.912	2.860	9.912	2.275	2.89	11.03
45	20.5	38	22.5	105	14X20X17	129.7	150.1	4.533	16.161	4.533	16.161	2.935	3.74	11.03
53	23.5	44	30	120	16X23X20	155.9	161.5	4.654	16.016	4.654	16.016	3.779	4.28	15.26
53	23.5	44	30	120	16X23X20	187.5	210.1	7.468	26.493	7.468	26.493	4.916	5.59	15.26

1N≒0.102kgf



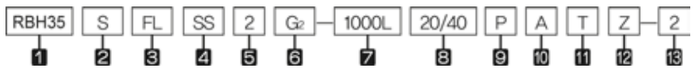
RBH-SF Series, RBH-SFL Series





Model No.	External dimensions			Dimensions of block										H3
	Height H	Width W	Length L	B	C	M	L1	t	T	T1	N	E	Grease nipple	
RBH15SF	24	47	57	38	30	M5	40.7	-	7	11	6	6	A-M4	4.7
RBH15SFL	24	47	65.3	38	30	M5	49.1	-	7	11	6	6	A-M4	4.7
RBH20SF	30	63	72.7	53	40	M6	53.1	-	9.2	10	7.5	12	B-M6F	6
RBH20SFL	30	63	88.6	53	40	M6	69	-	9.2	10	7.5	12	B-M6F	6
RBH25SF	36	70	83	57	45	M8	58.3	-	11.5	16	9	12	B-M6F	7
RBH25SFL	36	70	102.9	57	45	M8	78.2	-	11.5	16	9	12	B-M6F	7
RBH30SF	42	90	97.8	72	52	M10	70.8	-	9.5	18	7.3	12	B-M6F	7.5
RBH30SFL	42	90	120	72	52	M10	93	-	9.5	18	7.3	12	B-M6F	7.5
RBH35SF	48	100	110	82	62	M10	80.8	-	12.5	21	8	12	B-M6F	9
RBH35SFL	48	100	135.4	82	62	M10	106.2	-	12.5	21	8	12	B-M6F	9
RBH45SF	60	120	138.5	100	80	M12	106	25	13	18	10.5	13	B-PT1/8	10
RBH45SFL	60	120	170.2	100	80	M12	137.8	25	13	18	10.5	13	B-PT1/8	10
RBH55SF	70	140	171	116	95	M14	132.6	29	19	21	11	13	B-PT1/8	13
RBH55SFL	70	140	210.6	116	95	M14	172.2	29	19	21	11	13	B-PT1/8	13

Composition of Model No.



1 Model No. of Linear Motion Guide

2 Type of block: **No symbol**-Full-ball type / **S**-Spacer Chain type

3 Form of block: **R**-Rectangular standard type / **RL**-Rectangular long type / **F**-Flange standard type / **FL**-Flange long type

4 Type of seal: **UU**-End seal / **SS**-End seal + Inside seal / **ZZ**-End seal + Inside seal + metal scraper
UULF-End seal + LF seal / **SSLF**- End seal + Inside seal + LF seal / **ZZLF** - End seal + Inside seal + metal scraper + LF seal **(*1)**

5 Number of blocks combined in 1 rail

6 Symbol of clearance : **No symbol**-Normal preload / **G1**-Light preload / **G2**-Heavy preload / **Gs**-Special preload **(*2)**

7 Length of rail

8 Size of G value: standard G value has no symbol.

9 Symbol of precision: **No symbol**-Moderate precision / **H**-High precision / **P**-Precision / **SP**-Super Precision / **UP**-Ultra Precision **(*3)**

10 **No symbol**-Rail counter bore type (A topside assembly) / **A**- Rail tap hole type (an underside assembly) **(*4)**

11 Connection symbol

12 Special symbol

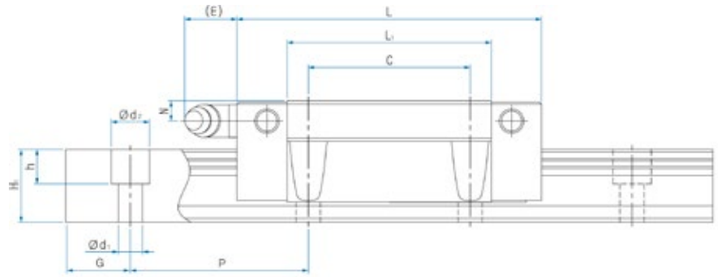
13 Number of axis used on the same surface

(*1) See P139 Symbol List of Optional Parts

(*2) See P30 Radial Clearance

(*3) See P45 Selection of Precision Class

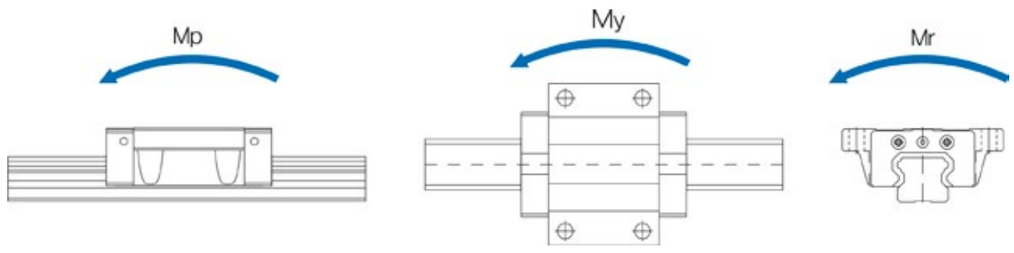
(*4) See P89 Standard tap hole type of a rail



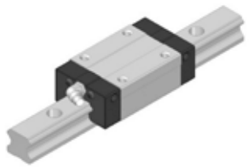
Unit: mm

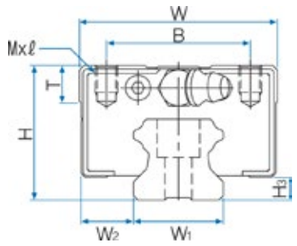
Dimension of Rail						Basic load rating		Static allowance moment kN-m					Mass	
								Mp		My		Mr		
Width W1 ± 0.05	W2	heigh H1	Value G	Pitch P	d1 x d2 x h	C kN	Co kN	1	2 (contact)	1	2 (contact)	1	Block kg	Rail kg/m
15	16	13	20	60	4.5X7.5X5.3	12.1	16.2	0.115	0.552	0.115	0.552	0.129	0.19	1.3
15	16	13	20	60	4.5X7.5X5.3	13.7	19.3	0.165	0.769	0.165	0.769	0.154	0.24	1.3
20	21.5	16.5	20	60	6X9.5X8.5	17.6	23.9	0.221	1.049	0.221	1.049	0.251	0.41	2.2
20	21.5	16.5	20	60	6X9.5X8.5	21.1	30.7	0.370	1.692	0.370	1.692	0.322	0.54	2.2
23	23.5	20	20	60	7X11X9	25.8	33.1	0.337	1.636	0.337	1.636	0.398	0.61	3.0
23	23.5	20	20	60	7X11X9	31.7	43.6	0.596	2.760	0.596	2.760	0.525	0.82	3.0
28	31	26	20	80	9X14X12	48	57.1	0.711	3.384	0.711	3.384	0.828	1.1	4.85
28	31	26	20	80	9X14X12	58	73.6	1.203	5.506	1.203	5.506	1.067	1.3	4.85
34	33	29	20	80	9X14X12	63.7	74.6	1.062	5.012	1.062	5.012	1.298	1.6	6.58
34	33	29	20	80	9X14X12	77.1	96.2	1.797	8.172	1.797	8.172	1.674	2.01	6.58
45	37.5	32	22.5	105	14X20X17	82.9	95.5	1.789	8.251	1.789	8.251	1.992	3.15	9.75
45	37.5	32	22.5	105	14X20X17	99.7	122.5	2.984	13.341	2.984	13.341	2.556	4.07	9.75
53	43.5	38	30	120	16X23X20	133.5	149.2	3.495	16.007	3.495	16.007	3.608	5.30	13.75
53	43.5	38	30	120	16X23X20	160.4	191.4	5.826	25.899	5.826	25.899	4.627	6.84	13.75

1N≒0.102kgf



RBH-SR Series, RBH-SRL Series





Model No.	External dimensions			Dimensions of block								H3
	Height H	Width W	Length L	B	C	Mxℓ	L1	T	N	E	Grease nipple	
RBH15SR	28	34	57	26	26	M4x5	40.7	6	10	6	A-M4	4.7
RBH15SRL	28	34	65.3	26	26	M4x5	49.1	6	10	6	A-M4	4.7
RBH20SR	30	44	72.7	32	36	M5x6	53.1	8	7.5	12	B-M6F	6
RBH20SRL	30	44	88.6	32	50	M5x6	69	8	7.5	12	B-M6F	6
RBH25SR	40	48	83	35	35	M6x8	58.3	8	13	12	B-M6F	7
RBH25SRL	40	48	102.9	35	50	M6x8	78.2	8	13	12	B-M6F	7
RBH30SR	45	60	97.8	40	40	M8x10	70.8	8	10.3	12	B-M6F	7.5
RBH30SRL	45	60	120	40	60	M8x10	93	8	10.3	12	B-M6F	7.5
RBH35SR	55	70	110	50	50	M8x12	80.8	10	15	12	B-M6F	9
RBH35SRL	55	70	135.4	50	72	M8x12	106.2	10	15	12	B-M6F	9
RBH45SR	70	86	138.5	60	60	M10x17	106	15	20.5	13	B-PT1/8	10
RBH45SRL	70	86	170.2	60	80	M10x17	137.8	15	20.5	13	B-PT1/8	10
RBH55SR	80	100	171	75	75	M12x18	132.6	20	21	13	B-PT1/8	13
RBH55SRL	80	100	210.6	75	95	M12x18	172.2	20	21	13	B-PT1/8	13

Composition of Model No.

RBH35 S RL SS 2 G2 — 1000L 20/40 P A T Z — 2

1 2 3 4 5 6 7 8 9 10 11 12 13

1 Model No. of Linear Motion Guide

2 Type of block: **No symbol**-Full-ball type / **S**-Spacer Chain type

3 Form of block: **R**-Rectangular standard type / **RL**-Rectangular long type / **F**-Flange standard type / **FL**-Flange long type

4 Type of seal: **UU**-End seal / **SS**-End seal + Inside seal / **ZZ**-End seal + Inside seal + metal scraper
UULF-End seal + LF seal / **SSLF**- End seal + Inside seal + LF seal / **ZZLF** - End seal + Inside seal + metal scraper + LF seal **(*1)**

5 Number of blocks combined in 1 rail

6 Symbol of clearance : **No symbol**-Normal preload / **G1**-Light preload / **G2**-Heavy preload / **Gs**-Special preload **(*2)**

7 Length of rail

8 Size of G value: standard G value has no symbol.

9 Symbol of precision: **No symbol**-Moderate precision / **H**-High precision / **P**-Precision / **SP**-Super Precision / **UP**-Ultra Precision **(*3)**

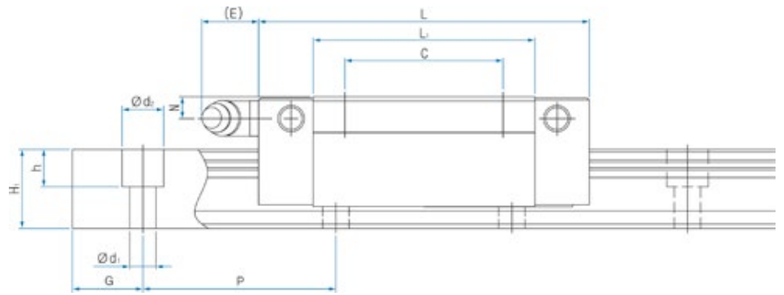
10 **No symbol**-Rail counter bore type (A topside assembly) / **A**- Rail tap hole type (an underside assembly) **(*4)**

11 Connection symbol

12 Special symbol

13 Number of axis used on the same surface

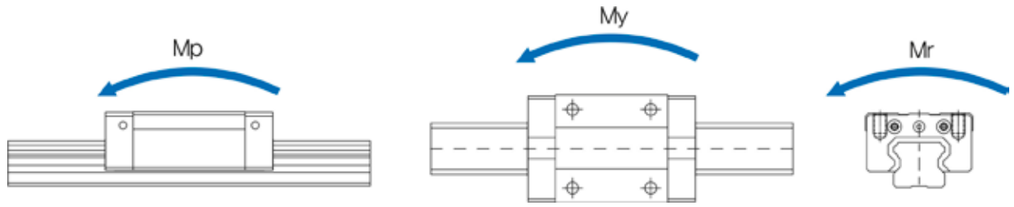
(*1) See P139 Symbol List of Optional Parts
(*2) See P30 Radial Clearance
(*3) See P45 Selection of Precision Class
(*4) See P89 Standard tap hole type of a rail



Unit: mm

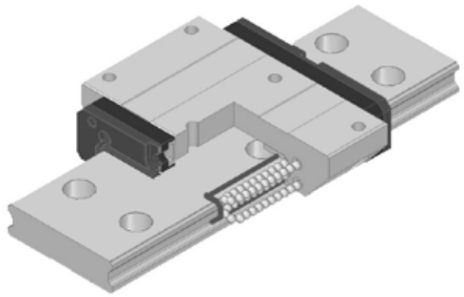
Dimension of Rail						Basic load rating		Static allowance moment kN-m					Mass	
								Mp		My		Mr		
Width W1 ± 0.05	W2	heigh H1	Value G	Pitch P	d1 x d2 x h	C kN	Co kN	1	2 (contact)	1	2 (contact)	1	Block kg	Rail kg/m
15	9.5	13	20	60	4.5X7.5X5.3	12.1	16.2	0.115	0.552	0.115	0.552	0.129	0.18	1.3
15	9.5	13	20	60	4.5X7.5X5.3	13.7	19.3	0.165	0.769	0.165	0.769	0.154	0.23	1.3
20	12	16.5	20	60	6X9.5X8.5	17.6	23.9	0.221	1.049	0.221	1.049	0.251	0.31	2.2
20	12	16.5	20	60	6X9.5X8.5	21.1	30.7	0.370	1.692	0.370	1.692	0.322	0.41	2.2
23	12.5	20	20	60	7X11X9	25.8	33.1	0.337	1.636	0.337	1.636	0.398	0.53	3.0
23	12.5	20	20	60	7X11X9	31.7	43.6	0.596	2.760	0.596	2.760	0.525	0.71	3.0
28	16	26	20	80	9X14X12	48	57.1	0.711	3.384	0.711	3.384	0.828	0.9	4.85
28	16	26	20	80	9X14X12	58	73.6	1.203	5.506	1.203	5.506	1.067	1.1	4.85
34	18	29	20	80	9X14X12	63.7	74.6	1.062	5.012	1.062	5.012	1.298	1.5	6.58
34	18	29	20	80	9X14X12	77.1	96.2	1.797	8.172	1.797	8.172	1.674	2.01	6.58
45	20.5	32	22.5	105	14X20X17	82.9	95.5	1.789	8.251	1.789	8.251	1.992	3.20	9.75
45	20.5	32	22.5	105	14X20X17	99.7	122.5	2.984	13.341	2.984	13.341	2.556	4.10	9.75
53	23.5	38	30	120	16X23X20	133.5	149.2	3.495	16.007	3.495	16.007	3.608	5.16	13.75
53	23.5	38	30	120	16X23X20	160.4	191.4	5.826	25.899	5.826	25.899	4.627	6.61	13.75

1N≒0.102kgf

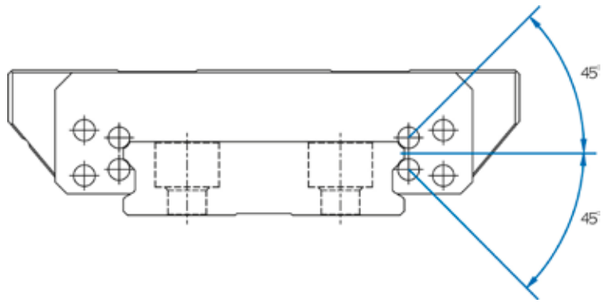


Wide Linear Motion Guide RBW Series

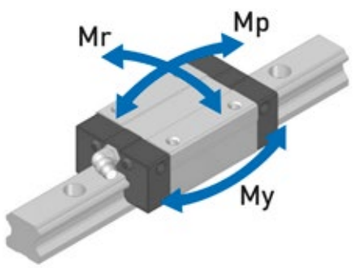
RBW SERIES (FULL-BALL TYPE)



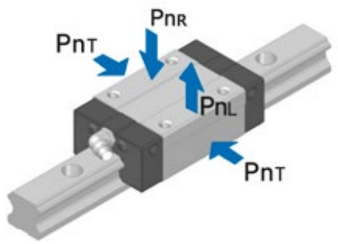
CROSS SECTION



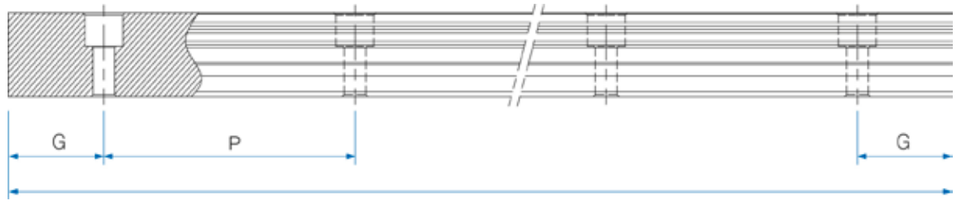
MOMENT RIGIDITY



RADIAL RIGIDITY

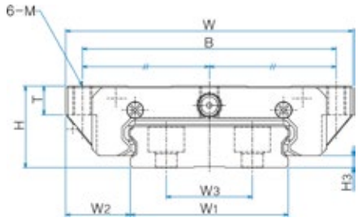


STANDARD TAP HOLE TYPE OF A RAIL



Model No.	RW17	RW21	RW27	RW35
Standard length	110	130	160	280
	230	230	280	440
	350	380	340	680
	470	430	460	840
	550	580	520	1000
	630	630	640	1240
	-	780	700	1480
		-	820	1640
			-	1800
Standard pitch P	40	50	60	80
G	15	15	20	20
Max. length	2000		3000	

RBW-F Series



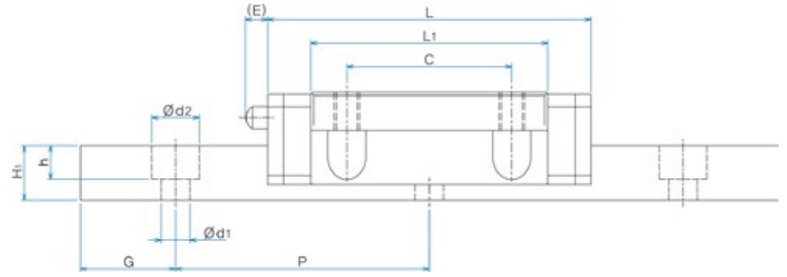
Model No.	External dimensions			Dimensions of block								H3
	Height H	Width W	Length L	B	C	Mxℓ	L1	T	N	E	Grease nipple	
RBW17F	17	60	51	53	26	M4	37.4	6	4	3.5	A-Ø3	2.5
RBW21F	21	68	59	60	29	M5	45.4	8	5	3.5	A-Ø3	3.3
RWB27F	27	80	72.5	70	40	M6	54.7	10	6	10.3	B-M6F	3.5
RBW35F	35	120	105.3	107	60	M8	82.1	14	7.6	10.3	B-M6F	4

Composition of Model No.

RBW17 [1] [2] F [3] UU [4] [5] G2 [6] — 1000L [7] 20/30 [8] P [9] [10] T [11] Z [12] — 2 [13]

1 Model No. of Linear Motion Guide
2 Type of block: **No symbol**-Full-ball type
3 Form of block: **R**-Rectangular standard type / **F**-Flange standard type
4 Type of seal: **UU**-End seal / **SS**-End seal + Inside seal / **ZZ**-End seal + Inside seal + Metal scraper **(*1)**
5 Number of blocks combined in 1 rail
6 Symbol of clearance: **No symbol**-Normal preload / **G1**-Light preload / **G2**-Heavy preload / **Gs**-Special preload **(*2)**
7 Length of rail
8 Size of G value: standard G value has no symbol.
9 Symbol of precision: **No symbol**-Moderate precision / **H**-High precision / **P**-Precision / **SP**-Super Precision / **UP**-Ultra Precision **(*3)**
10 **No symbol**-Rail counter bore type (A topside assembly)
11 Connection symbol
12 Special symbol
13 Number of axis used on the same surface

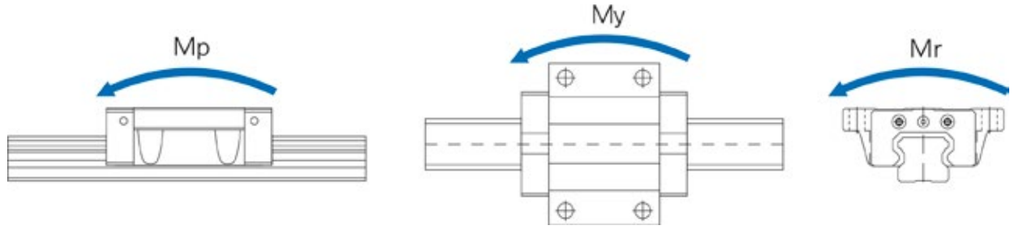
(*1) See P139 Symbol List of Optional Parts
(*2) See P30 Radial Clearance
(*3) See P45 Selection of Precision Class



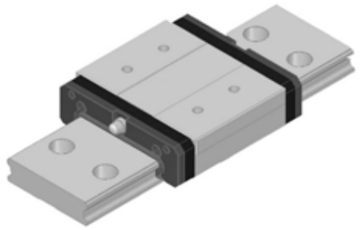
Unit: mm

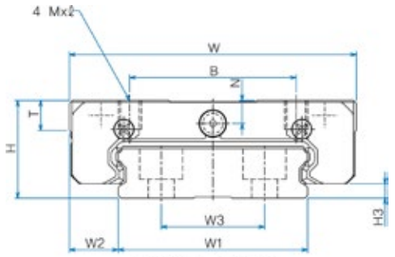
Dimension of Rail							Basic load rating		Static allowance moment kN-m					Mass	
									Mp		My		Mr		
Width W1 ± 0.05	W2	W3	Heigh H1	Value G	Pitch P	d1 x d2 x h	C kN	Co kN	1	2 (contact)	1	2 (contact)	1	Block kg	Rail kg/m
33	8.5	18	8.6	15	40	4.5x7.5x5.3	7.3	12.2	0.081	0.381	0.081	0.381	0.205	0.15	1.9
37	8.5	22	11	15	50	4.5x7.5x5.3	8.4	14.8	0.119	0.547	0.119	0.547	0.278	0.24	2.9
42	10	24	15	20	60	4.5x7.5x5.3	15.3	24.8	0.239	1.114	0.239	1.114	0.527	0.47	4.5
69	15.5	40	19	20	80	7x11x9	33.9	53.2	0.773	3.528	0.773	3.528	1.851	1.40	9.6

1N≒0.102kgf

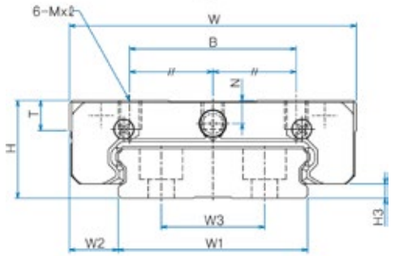


RBW-R Series





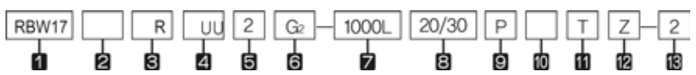
HW17R, HW21R



HW27R, HW35R

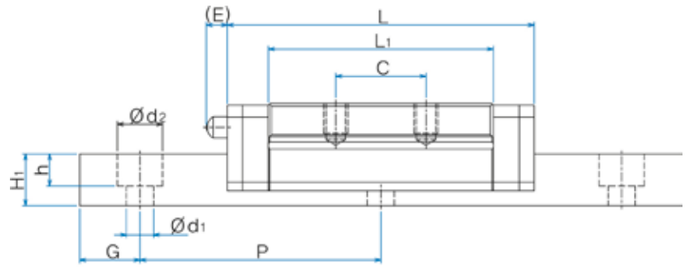
Model No.	External dimensions			Dimensions of block								H3
	Height H	Width W	Length L	B	C	Mxℓ	L1	T	N	E	Grease nipple	
RBW17R	17	50	51	29	15	M4x5	37.4	5.2	4	3.5	A-Ø3	2.5
RBW21R	21	54	59	31	19	M5x6	45.4	8	5	3.5	A-Ø3	3.3
RBW27R	27	62	72.5	46	32	M6x6	54.7	10	6	10.3	B-M6F	3.5
RBW35R	35	100	105.3	76	50	M8x8	82.1	14	7.6	10.3	B-M6F	4

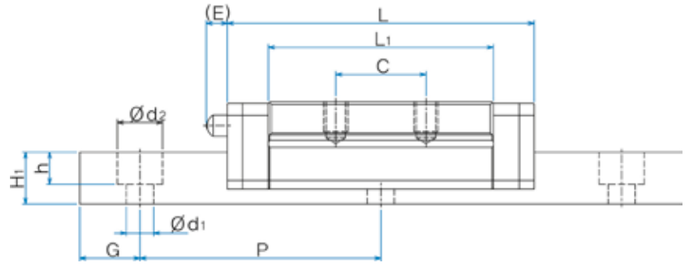
Composition of Model No.



1 Model No. of Linear Motion Guide
2 Type of block: **No symbol**-Full-ball type
3 Form of block: **R**-Rectangular standard type / **F**-Flange standard type
4 Type of seal: **UU**-End seal / **SS**-End seal + Inside seal / **ZZ**-End seal + Inside seal + Metal scraper **(*1)**
5 Number of blocks combined in 1 rail
6 Symbol of clearance: **No symbol**-Normal preload / **G1**-Light preload / **G2**-Heavy preload / **Gs**-Special preload **(*2)**
7 Length of rail
8 Size of G value: standard G value has no symbol
9 Symbol of precision: **No symbol**-Moderate precision / **H**-High precision / **P**-Precision / **SP**-Super Precision / **UP**-Ultra Precision **(*3)**
10 **No symbol**-Rail counter bore type (A topside assembly)
11 Connection symbol
12 Special symbol
13 Number of axis used on the same surface

(*1) See P139 Symbol List of Optional Parts
(*2) See P30 Radial Clearance
(*3) See P45 Selection of Precision Class

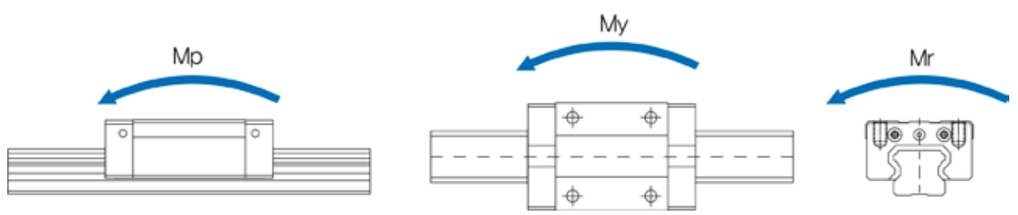




Unit: mm

Dimension of Rail							Basic load rating		Static allowance moment kN-m					Mass	
									Mp		My		Mr		
Width W1 ± 0.05	W2	W3	Heigh H1	Value G	Pitch P	d1 x d2 x h	C kN	Co kN	1	2 (contact)	1	2 (contact)	1	Block kg	Rail kg/m
33	8.5	18	8.6	15	40	4.5x7.5x5.3	7.3	12.2	0.081	0.381	0.081	0.381	0.205	0.13	1.9
37	8.5	22	11	15	50	4.5x7.5x5.3	8.4	14.8	0.119	0.547	0.119	0.547	0.278	0.19	2.9
42	10	24	15	20	60	4.5x7.5x5.3	15.3	24.8	0.239	1.114	0.239	1.114	0.527	0.36	4.5
69	15.5	40	19	20	80	7x11x9	33.9	53.2	0.773	3.528	0.773	3.528	1.851	1.20	9.6

1N≒0.102kgf



3. Slim Linear Motion Guide RBS Series

1) Structure of RBS Series

Linear Motion Guide S Series has a four-row circular arc-groove structure and is a 4-direction equal load type. It also has an auto-adjusting face-to-face D/F structure. It uses balls as a rolling element and is a slim-type guide with a low sectional height as well as high rigidity and less noise.

2) Features of S Series

a. High quality and very effective in realizing high precision and elimination of labor
b. High rigidity and high precision which can realize the stable travel for a long time
c. Great wear resistance and friction resistance which ensures a long life
d. Great auto-adjusting and error-absorbing abilities with the face-to-face duplex structure same to D/F combination of ball bearing
e. Various specifications for easy design
f. Easy to use due to great compatibility between a rail and a block
g. 4-direction equal load and high-rigidity structure
h. Slim shape suitable for horizontal motion to ensure stable running

4. Slim Spacer Chain Linear Motion Guide RBS-S Series

1) Structure of RBS-S Series

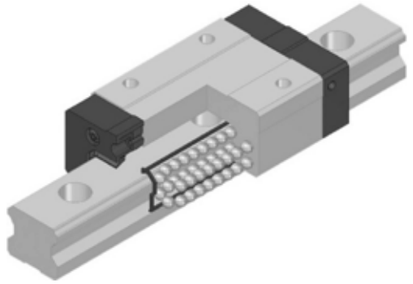
Linear Motion Guide RBS-S Series has a 4-direction equal load type which is identical to S Series and has an auto-adjusting face-to-face D/F structure. It uses balls as a rolling element and combines a spacer between balls to prevent them from colliding each other during the rolling motion.
Therefore it makes less noise and more stable circulating motion than a full-ball type to realize quiet running even in high velocity movement and the spacer act as the pocket of lubricant to obtain longer life than H Series.

2) Features of RBS-S Series

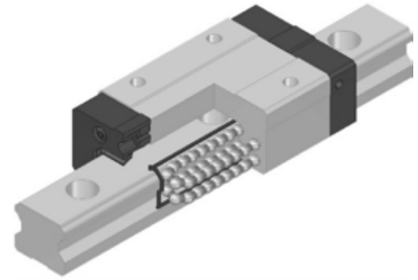
a. As a spacer-incorporated type which improves frictional properties and prevents the collision of balls, it not only allows stable circulating motion and smooth running but also reduces noise. If special lubricating seal is attached to lengthen life, maintenance-free operations can be achieved.
b. Collision between balls and the loss of oil film are prevented by applying a resin spacer to improve life and generate less particles and dust.
c. High quality in realizing high precision and high velocity so it could create large effect on elimination of power loss.
d. High rigidity and high precision which can realize the stable travel for a long time
e. Great wear resistance and friction resistance which ensures a long life
f. Great auto-adjusting and error-absorbing abilities with the face-to-face duplex structure same to D/F combination of ball bearing
g. Various specifications for easy design
h. Easy to use due to great compatibility between a rail and a block

Slim Linear Motion Guide RBS, RBS-S Series

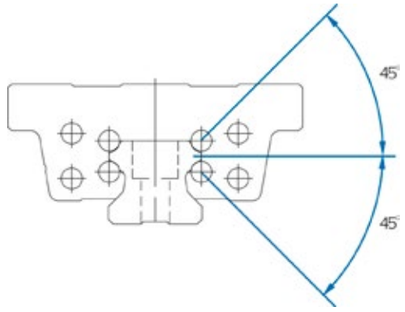
S SERIES (FULL-BALL TYPE)



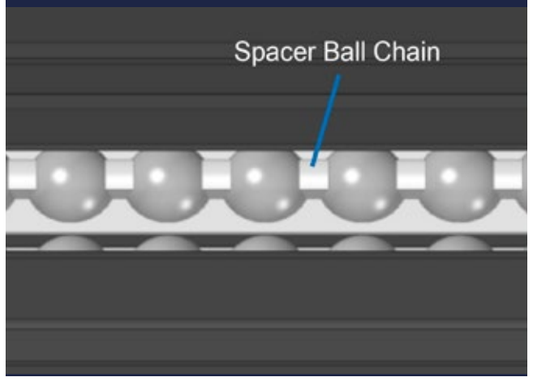
S-S SERIES (SPACER CHAIN TYPE)



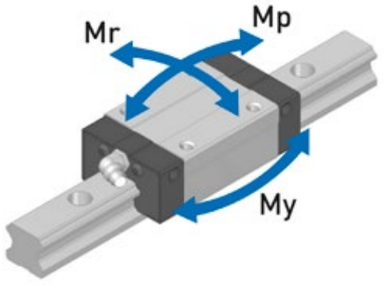
CROSS SECTION



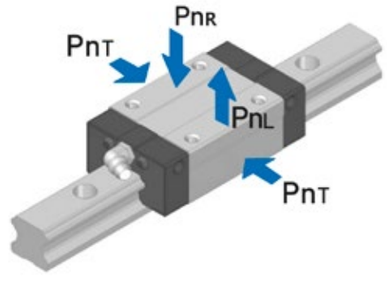
DETAIL OF RACEWAY OF S-S SERIES



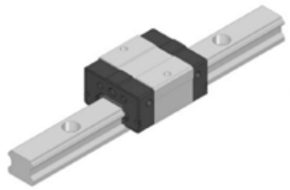
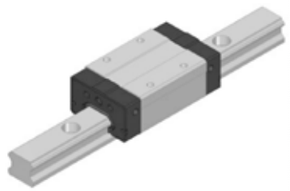
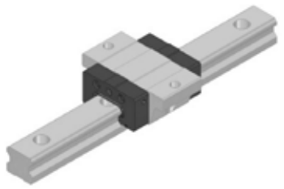
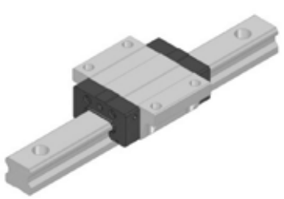
MOMENT RIGIDITY



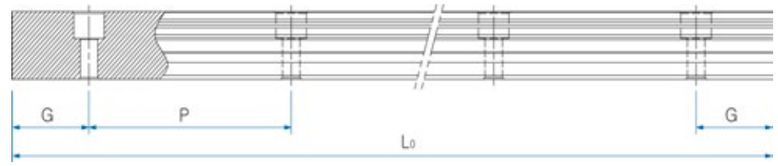
RADIAL RIGIDITY



Types and Features

Category	Type	Shape & Features		
Compact type	RBS-C RBS-SC		•With the tapped flange of a block, a slim compact that the width and length of Linear Motion guide block is minimized •A 4-direction equal load type with 45° contact angle S Series is a low-noise lowdust raise type with improved life due to zero friction between balls since a spacer chain is applied.	Cartesian coordinated robot, linear actuator, automation system, semiconductor/display manufacturing system, LED inspection equipment, dispenser equipment, medical Equipment, high-speed transport system, woodworking machine, take-out robots, small machine tool, laser processor, precision measurement equipment
	RBS-R RBS-SR		•Having the cross section identical to that of S-C Series, a slim compact type that the width and length of Linear Motion guide block is minimized •A 4-direction equal load type with 45° contact angle S Series is a low-noise lowdust raise type with improved life due to zero friction between balls since a spacer chain is applied.	
Flange type	RBS-CF RBS-SCF		•With the tapped flange of a block, a slim compact type that the width and length of Linear Motion guide block is minimized •A 4-direction equal load type with 45° contact angle S Series is a low-noise lowdust raise type with improved life due to zero friction between balls since a spacer chain is applied.	
	RBS-F RBS-SF		•Having the cross section identical to that of S-CF Series, a slim compact type that the width and length of Linear Motion guide block is minimized •A 4-direction equal load type with 45° contact angle S Series is a low-noise lowdust raise type with improved life due to zero friction between balls since a spacer chain is applied.	

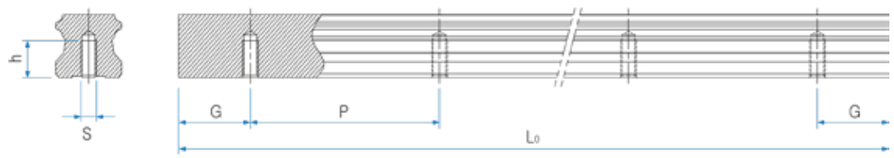
STANDARD TAP HOLE TYPE OF A RAIL



Unit: mm

Model No.	RB15R	RB20R	RB25R
Standard length	160	160	220
	220	220	280
	280	280	340
	-	340	400
	1360	-	460
	1480	1960	-
	1600	2080	2200
		2200	2320
			2440
Standard pitch P	60	60	60
G	20	20	20
Max. length	4000		

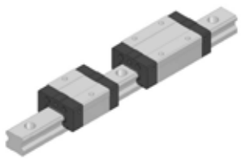
STANDARD TAP HOLE TYPE OF A RAIL

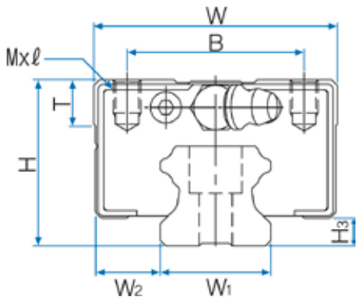


Unit: mm

Model No.	S	h(mm)
RB15T	M5	8
RB20T	M6	10
RB25T	M6	12

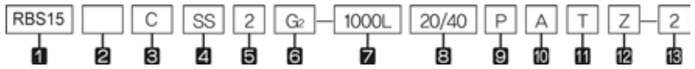
RBS-C Series, RBS-R Series





Model No.	External dimensions			Dimensions of block								H3
	Height H	Width W	Length L	B	C	Mxℓ	L1	T	N	E	Grease nipple	
RBS15C	24	34	40.2	26	-	M4x6	24	6	6	6	A-M4	4.5
RBS15R			56.9		26		40.7					
RBS20C	28	42	47.2	32	-	M5x7	27.6	7.5	5.5	12	B-M6F	6
RBS20R			66.3		32		46.7					
RBS25C	33	48	59.1	35	-	M6x9	34.4	8	6	12	B-M6F	7
RBS25R			83		35		58.2					

Composition of Model No.



1 Model No. of Linear Motion Guide

2 Type of block: **No symbol**-Full-ball type / **S**-Spacer Chain type

3 Form of block: **C**-Rectangular short type / **R**-Rectangular standard type / **CF**-Flange short type / **F**-Flange standard type

4 Type of seal: **UU**-End seal / **SS**-End seal + Inside seal / **ZZ**-End seal + Inside seal + metal scraper
UULF-End seal + LF seal / **SSLF**- End seal + Inside seal + LF seal / **ZZLF** - End seal + Inside seal + metal scraper + LF seal **(*1)**

5 Number of blocks combined in 1 rail

6 Symbol of clearance : **No symbol**-Normal preload / **G1**-Light preload / **G2**-Heavy preload / **Gs**-Special preload **(*2)**

7 Length of rail

8 Size of G value: standard G value has no symbol.

9 Symbol of precision: **No symbol**-Moderate precision / **H**-High precision / **P**-Precision / **SP**-Super Precision / **UP**-Ultra Precision **(*3)**

10 **No symbol**-Rail counter bore type (A topside assembly) / **A**- Rail tap hole type (an underside assembly) **(*4)**

11 Connection symbol

12 Special symbol

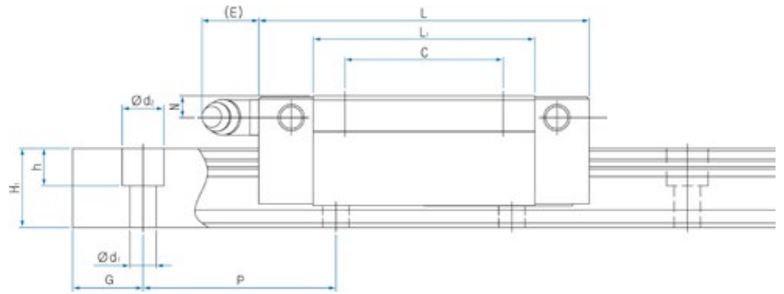
13 Number of axis used on the same surface

(*1) See P139 Symbol List of Optional Parts

(*2) See P30 Radial Clearance

(*3) See P45 Selection of Precision Class

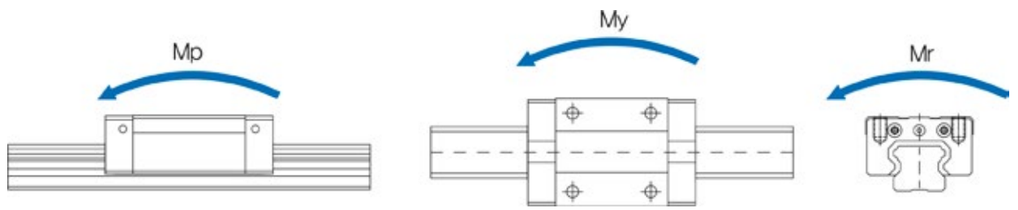
(*4) See P107 Standard tap hole type of a rail



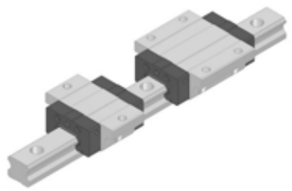
Unit: mm

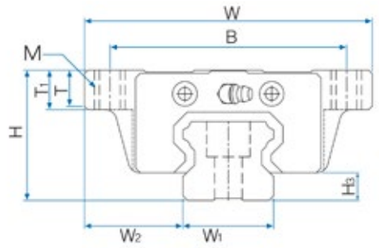
Dimension of Rail						Basic load rating		Static allowance moment kN-m					Mass	
								Mp		My		Mr		
Width W1 ± 0.05	W2	Heigh H1	Value G	Pitch P	d1 x d2 x h	C kN	Co kN	1	2 (contact)	1	2 (contact)	1	Block kg	Rail kg/m
15	9.5	13	20	60	4.5x7.5x5.3	9.0	10.0	0.042	0.224	0.042	0.224	0.079	0.096	1.3
						12.6	16.2	0.115	0.552	0.115	0.552	0.129	0.156	
20	11	16.5	20	60	6x9.5x8.5	12.0	13.1	0.063	0.342	0.063	0.342	0.137	0.153	2.2
						16.8	21.2	0.173	0.838	0.173	0.838	0.223	0.246	
23	12.5	20	20	60	7x11x9	19.2	20.4	0.123	0.670	0.123	0.670	0.246	0.254	3.0
						27.0	33.1	0.337	1.636	0.337	1.636	0.398	0.413	

1N≒0.102kgf



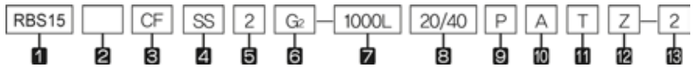
RBS-CF Series, RBS-F Series





Model No.	External dimensions			Dimensions of block									H3
	Height H	Width W	Length L	B	C	M	L1	T	T1	N	E	Grease nipple	
RBS15CF	24	52	40.2	41	-	M5	24	6	7	6	6	A-M4	4.5
RBS15F			56.9		26		40.7						
RBS20CF	28	59	47.2	49	-	M6	27.6	8	9	5.5	12	B-M6F	6
RBS20F			66.3		32		46.7						
RBS25CF	33	73	59.1	60	-	M8	34.4	9	10	6	12	B-M6F	7
RBS25F			83		35		58.2						

Composition of Model No.



1 Model No. of Linear Motion Guide

2 Type of block: **No symbol**-Full-ball type / **S**-Spacer Chain type

3 Form of block : **C**-Rectangular short type / **R**-Rectangular standard type / **CF**-Flange short type / **F**-Flange standard type

4 Type of seal: **UU**-End seal / **SS**-End seal + Inside seal / **ZZ**-End seal + Inside seal + metal scraper
UULF-End seal + LF seal / **SSLF**- End seal + Inside seal + LF seal / **ZZLF** - End seal + Inside seal + metal scraper + LF seal **(*1)**

5 Number of blocks combined in 1 rail

6 Symbol of clearance : **No symbol**-Normal preload / **G1**-Light preload / **G2**-Heavy preload / **Gs**-Special preload **(*2)**

7 Length of rail

8 Size of G value: standard G value has no symbol.

9 Symbol of precision: **No symbol**-Moderate precision / **H**-High precision / **P**-Precision / **SP**-Super Precision / **UP**-Ultra Precision **(*3)**

10 **No symbol**-Rail counter bore type (A topside assembly) / **A**- Rail tap hole type (an underside assembly) **(*4)**

11 Connection symbol

12 Special symbol

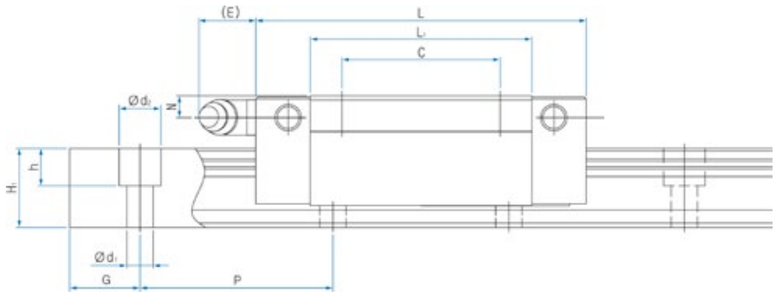
13 Number of axis used on the same surface

(*1) See P139 Symbol List of Optional Parts

(*2) See P30 Radial Clearance

(*3) See P45 Selection of Precision Class

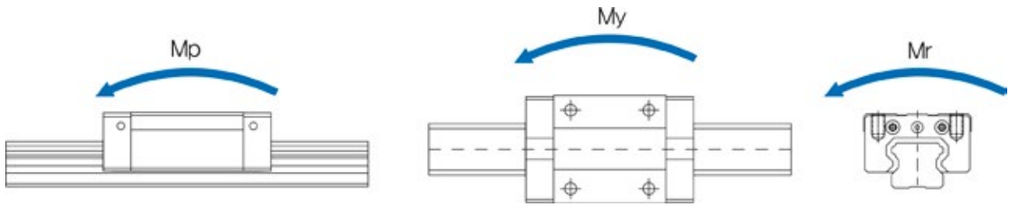
(*4) See P107 Standard tap hole type of a rail



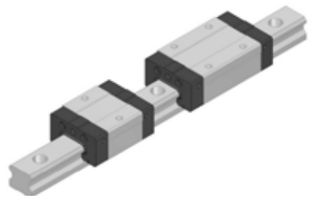
Unit: mm

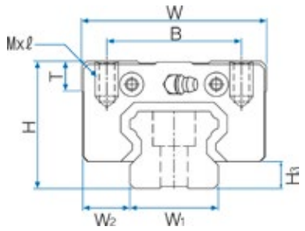
Dimension of Rail						Basic load rating		Static allowance moment kN-m					Mass	
								Mp		My		Mr		
Width W1 ± 0.05	W2	Heigh H1	Value G	Pitch P	d1 x d2 x h	C kN	Co kN	1	2 (contact)	1	2 (contact)	1	Block kg	Rail kg/m
15	18.5	13	20	60	4.5x7.5x5.3	9.0	10.0	0.042	0.224	0.042	0.224	0.079	0.125	1.3
						12.6	16.2	0.115	0.552	0.115	0.552	0.129	0.203	
20	19.5	16.5	20	60	6x9.5x8.5	12.0	13.1	0.063	0.342	0.063	0.342	0.137	0.187	2.2
						16.8	21.2	0.173	0.838	0.173	0.838	0.223	0.301	
23	25	20	20	60	7x11x9	19.2	20.4	0.123	0.670	0.123	0.670	0.246	0.320	3.0
						27.0	33.1	0.337	1.636	0.337	1.636	0.398	0.527	

1N≒0.102kgf



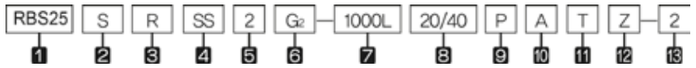
RBS-SC Series, RBS-SR Series





Model No.	External dimensions			Dimensions of block								H3
	Height H	Width W	Length L	B	C	Mxℓ	L1	T	N	E	Grease nipple	
RBS15SC	24	34	40.2	26	-	M4x6	24	6	6	6	A-M4	4.5
RBS15SR			56.9		26		40.7					
RBS20SC	28	42	47.2	32	-	M5x7	27.6	7.5	5.5	12	B-M6F	6
RBS20SR			66.3		32		46.7					
RBS25SC	33	48	59.1	35	-	M6x9	34.4	8	6	12	B-M6F	7
RBS25SR			83		35		58.3					

Composition of Model No.



1 Model No. of Linear Motion Guide

2 Type of block: **No symbol**-Full-ball type / **S**-Spacer Chain type

3 Form of block : **C**-Rectangular short type / **R**-Rectangular standard type / **CF**-Flange short type / **F**-Flange standard type

4 Type of seal: **UU**-End seal / **SS**-End seal + Inside seal / **ZZ**-End seal + Inside seal + metal scraper
UULF-End seal + LF seal / **SSLF**- End seal + Inside seal + LF seal / **ZZLF** - End seal + Inside seal + metal scraper + LF seal **(*1)**

5 Number of blocks combined in 1 rail

6 Symbol of clearance : **No symbol**-Normal preload / **G1**-Light preload / **G2**-Heavy preload / **Gs**-Special preload **(*2)**

7 Length of rail

8 Size of G value: standard G value has no symbol.

9 Symbol of precision: **No symbol**-Moderate precision / **H**-High precision / **P**-Precision / **SP**-Super Precision / **UP**-Ultra Precision **(*3)**

10 **No symbol**-Rail counter bore type (A topside assembly) / **A**- Rail tap hole type (an underside assembly) **(*4)**

11 Connection symbol

12 Special symbol

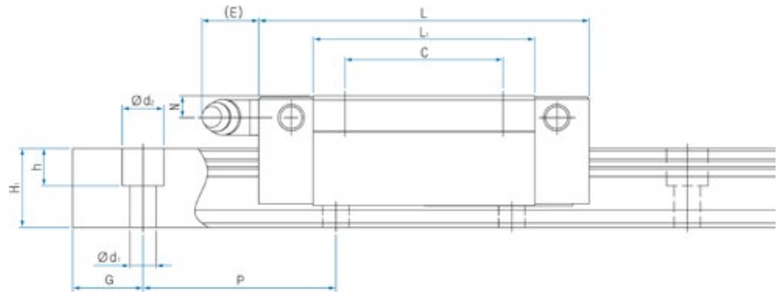
13 Number of axis used on the same surface

(*1) See P139 Symbol List of Optional Parts

(*2) See P30 Radial Clearance

(*3) See P45 Selection of Precision Class

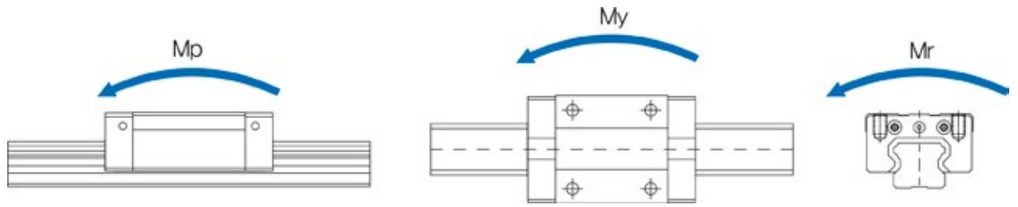
(*4) See P107 Standard tap hole type of a rail



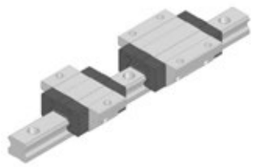
Unit: mm

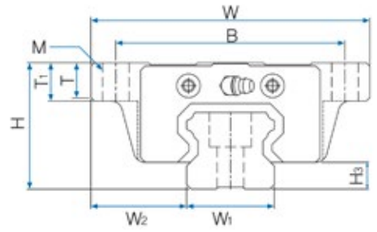
Dimension of Rail						Basic load rating		Static allowance moment kN-m					Mass	
								Mp		My		Mr		
Width W1 ± 0.05	W2	Heigh H1	Value G	Pitch P	d1 x d2 x h	C kN	Co kN	1	2 (contact)	1	2 (contact)	1	Block kg	Rail kg/m
15	9.5	13	20	60	4.5x7.5x5.3	8.3	10.0	0.042	0.224	0.042	0.224	0.079	0.096	1.3
						12.1	16.2	0.115	0.552	0.115	0.552	0.129	0.156	
20	11	16.5	20	60	6x9.5x8.5	11.1	13.1	0.063	0.342	0.063	0.342	0.137	0.153	2.2
						16.1	21.2	0.173	0.838	0.173	0.838	0.223	0.246	
23	12.5	20	20	60	7x11x9	17.9	20.4	0.123	0.670	0.123	0.670	0.246	0.254	3.0
						25.8	33.1	0.337	1.636	0.337	1.636	0.398	0.413	

1N≒0.102kgf



RBS-SCF Series, RBS-SF Series





Model No.	External dimensions			Dimensions of block									H3
	Height H	Width W	Length L	B	C	M	L1	T	T1	N	E	Grease nipple	
RBS 15SCF	24	52	40.2	41	-	M5	24	6	7	6	6	A-M4	4.5
RBS 15SF			56.9		26		40.7						
RBS 20SCF	28	59	47.2	49	-	M6	27.6	8	9	5.5	12	B-M6F	6
RBS 20SF			66.3		32		46.7						
RBS 25SCF	33	73	59.1	60	-	M8	34.4	9	10	6	12	B-M6F	7
RBS 25SF			83		35		58.3						

Composition of Model No.

RBS15 [1] S [2] F [3] SS [4] 2 [5] G2 [6] — 1000L [7] 20/40 [8] P [9] A [10] T [11] Z [12] — 2 [13]

1 Model No. of Linear Motion Guide

2 Type of block: **No symbol**-Full-ball type / **S**-Spacer Chain type

3 Form of block : **C**-Rectangular short type / **R**-Rectangular standard type / **CF**-Flange short type / **F**-Flange standard type

4 Type of seal: **UU**-End seal / **SS**-End seal + Inside seal / **ZZ**-End seal + Inside seal + metal scraper
UULF-End seal + LF seal / **SSLF**- End seal + Inside seal + LF seal / **ZZLF** - End seal + Inside seal + metal scraper + LF seal **(*1)**

5 Number of blocks combined in 1 rail

6 Symbol of clearance : **No symbol**-Normal preload / **G1**-Light preload / **G2**-Heavy preload / **Gs**-Special preload **(*2)**

7 Length of rail

8 Size of G value: standard G value has no symbol.

9 Symbol of precision: **No symbol**-Moderate precision / **H**-High precision / **P**-Precision / **SP**-Super Precision / **UP**-Ultra Precision **(*3)**

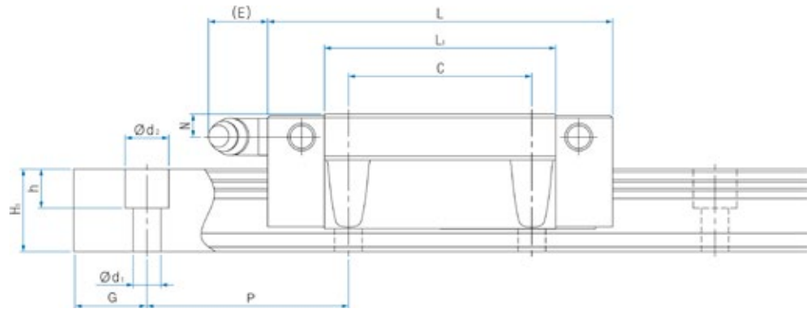
10 **No symbol**-Rail counter bore type (A topside assembly) / **A**- Rail tap hole type (an underside assembly) **(*4)**

11 Connection symbol

12 Special symbol

13 Number of axis used on the same surface

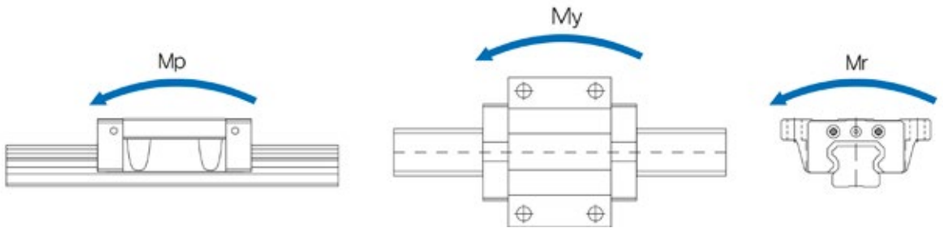
(*1) See P139 Symbol List of Optional Parts
(*2) See P30 Radial Clearance
(*3) See P45 Selection of Precision Class
(*4) See P107 Standard tap hole type of a rail



Unit: mm

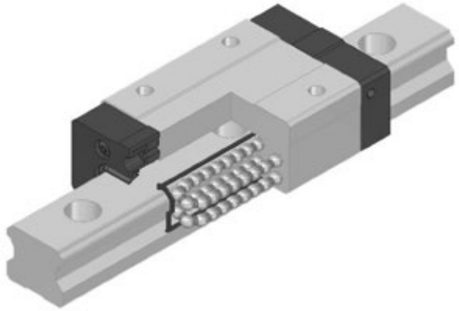
Dimension of Rail						Basic load rating		Static allowance moment kN-m					Mass	
								Mp		My		Mr		
Width W1 ± 0.05	W2	Heigh H1	Value G	Pitch P	d1 x d2 x h	C kN	Co kN	1	2 (contact)	1	2 (contact)	1	Block kg	Rail kg/m
15	9.5	13	20	60	4.5x7.5x5.3	8.3	10.0	0.042	0.224	0.042	0.224	0.079	0.125	1.3
						12.1	16.2	0.115	0.552	0.115	0.552	0.129	0.203	
20	11	16.5	20	60	6x9.5x8.5	11.1	13.1	0.063	0.342	0.063	0.342	0.137	0.187	2.2
						16.1	21.2	0.173	0.838	0.173	0.838	0.223	0.301	
23	12.5	20	20	60	7x11x9	17.9	20.4	0.123	0.670	0.123	0.670	0.246	0.320	3.0
						25.8	33.1	0.337	1.636	0.337	1.636	0.398	0.527	

1N≒0.102kgf

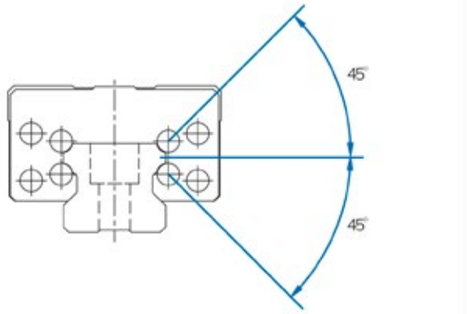


Slim Spacer Chain Linear Motion Guide RBHS-S Series

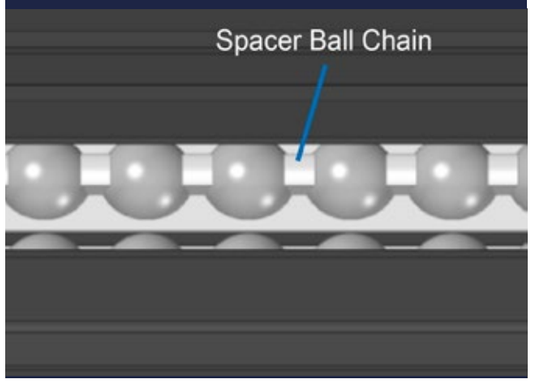
HS-S SERIES (SPACER CHAIN TYPE)



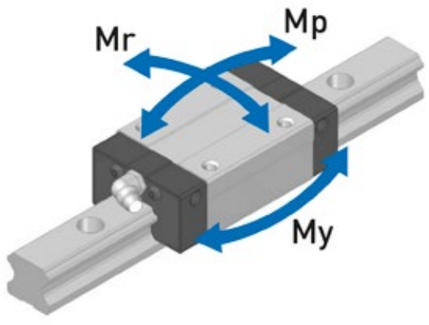
CROSS SECTION



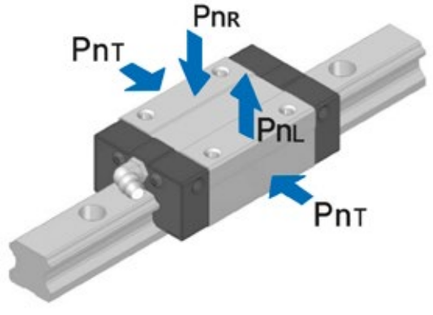
DETAIL OF RACEWAY OF HS-S SERIES



MOMENT RIGIDITY



RADIAL RIGIDITY



STANDARD AND MAXIMUM LENGTH OF A RAIL

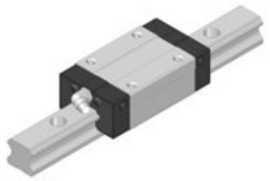
Unit: mm

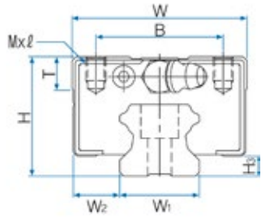
Model No.	RB25R	RB30S	RB35S	RB45R	RB55R
Standard length	220	280	440	570	780
	340	360	520	675	900
	400	440	600	780	1020
	-	520	760	885	-
	2200	-	840	-	2820
	2320	2520	-	2880	2940
	2440	2680	2840	2985	3060
		2840	2920	3090	
			3000		
Standard pitch P	60	80	80	10.5	120
G	20	20	20	22.5	30
Max. length	4000				

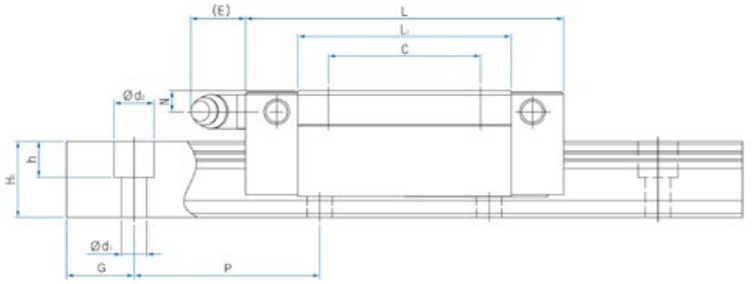
STANDARD TAP HOLE TYPE OF A RAIL

Model No.	S	h(mm)
RB25T	M6	12
RB30T	M8	15
RB35T	M8	17
RB45T	M12	24
RB55T	M14	24

RBHS-SR Series, RBHS-SRL Series







Unit: mm

Model No.	External dimensions			Dimensions of block								H3
	Height H	Width W	Length L	B	C	Mxℓ	L1	T	N	E	Grease nipple	
RBHS 25SR	36	48	83	35	35	M6x6.5	58.3	8	9	12	B-M6F	7
RBHS 25SRL			102.9		50		78.2					
RBHS 30SR	42	60	97.8	40	40	M8x8	70.8	8	7.8	12	B-M6F	7
RBHS 30SRL			120		60		93					
RBHS 35SR	48	70	110	50	50	M8x10	80.8	15	10	12	B-M6F	7.5
RBHS 35SRL			135.4		72		106.2					
RBHS 45SR	60	86	138.5	60	60	M10x15	106	15	10.5	13	B-PT1/8	10
RBHS 45SRL			170.2		80		137.8					
RBHS 55SR	70	100	171	75	75	M12x15	132.6	20	11	13	B-PT1/8	13
RBHS 55SRL			210.6		95		172.2					

Dimension of Rail						Basic load rating		Static allowance moment kN-m					Mass	
								Mp		My		Mr		
Width W1 ± 0.05	W2	Heigh H1	Value G	Pitch P	d1 x d2 x h	C kN	Co kN	1	2 (contact)	1	2 (contact)	1	Block kg	Rail kg/m
23	12.5	20	20	60	7x11x9	25.8	33.1	0.337	1.636	0.337	1.636	0.398	0.53	3.0
						31.7	43.6	0.596	2.760	0.596	2.760	0.525	0.71	
28	16	25.1	20	80	9x14x14.1	48.0	57.1	0.711	3.384	0.711	3.384	0.828	0.9	4.85
						58.0	73.6	1.203	5.506	1.203	5.506	1.067	1.1	
34	18	27	20	80	9x14x13	63.7	74.6	1.062	5.012	1.062	5.012	1.298	1.5	6.58
						77.1	96.2	1.797	8.172	1.797	8.172	1.674	2.01	
45	20.5	32	22.5	105	14x20x17	82.9	95.5	1.789	8.251	1.789	8.251	1.992	2.49	9.75
						99.7	122.5	2.984	13.341	2.984	13.341	2.556	3.18	
53	23.5	38	30	120	16x23x20	133.5	149.2	3.495	16.007	3.495	16.007	3.608	4.15	13.75
						160.4	191.4	5.826	25.899	5.826	25.899	4.627	5.29	

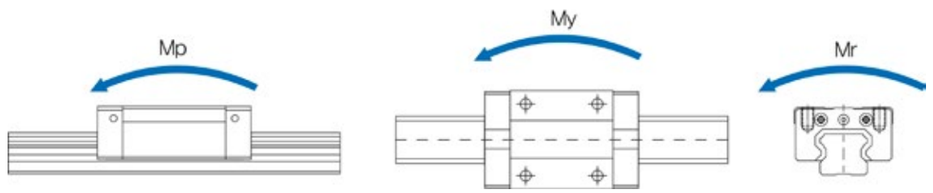
1N≒0.102kgf

Composition of Model No.

RBHS35 | S | RL | SS | 2 | G2 | 1000L | 20/40 | P | A | T | Z | 2
1 2 3 4 5 6 7 8 9 10 11 12 13

1 Model No. of Linear Motion Guide
2 Type of block: **No symbol**-Full-ball type / **S**-Spacer Chain type
3 Form of block: **R**-Rectangular standard type / **RL**-Rectangular long type
4 Type of seal: **UU**-End seal / **SS**-End seal + Inside seal / **ZZ**-End seal + Inside seal + metal scraper
UULF-End seal + LF seal / **SSLF**- End seal + Inside seal + LF seal / **ZZLF** - End seal + Inside seal + metal scraper + LF seal **(*1)**
5 Number of blocks combined in 1 rail
6 Symbol of clearance : **No symbol**-Normal preload / **G1**-Light preload / **G2**-Heavy preload / **Gs**-Special preload **(*2)**
7 Length of rail
8 Size of G value: standard G value has no symbol.
9 Symbol of precision: **No symbol**-Moderate precision / **H**-High precision / **P**-Precision / **SP**-Super Precision / **UP**-Ultra Precision **(*3)**
10 **No symbol**-Rail counter bore type (A topside assembly) / **A**- Rail tap hole type (an underside assembly) **(*4)**
11 Connection symbol
12 Special symbol
13 Number of axis used on the same surface

(*1) See P139 Symbol List of Optional Parts
(*2) See P30 Radial Clearance
(*3) See P45 Selection of Precision Class
(*4) See P117 Standard tap hole type of a rail



5. Miniature Linear Motion Guide RM Series

1) Structure of RM Series

RBX Miniature Linear Motion Guide RM Series has a shape of a gothic-arch groove in the raceway between a rail and a block and a 4-direction equal type structure with 2-row 4-point contact balls at 45 degrees. Even though it is small in size, it provides stable travel and rigidity under the environment where variable load and combined load is applied.

2) Features of RM Series

a. A compact highly-rigid 4-direction equal load type
b. Various specifications for easy design with space and load rating taken into account
c. Balls are maintained during the assembly of a block and a rail since a wire to retain balls is built in the block.
d. Its material is stainless steel which does not rust easily, so it is very suitable for the environment where rust and particle generation should be prevented - clean room, for instance.

6. Wide Miniature Linear Motion Guide RMB Series

1) Structure of RMB Series

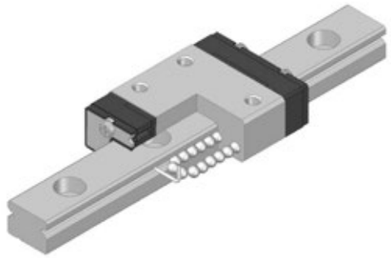
RBX Miniature Linear Motion Guide RMB Series has a 4-direction equal load type which is identical to M Series, and the basic load rating and moment load are significantly improved compared to the general M Series by broadening the width between a rail and a block.

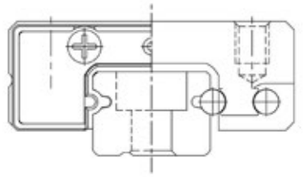
2) Features of RMB Series

a. As the width between a rail and a block is broadened and the number of balls increased, load rating and momen load are improved.
b. Suitable for use in a one-axis type since it is wider than the general miniature Linear Motion guide and rigidity increased.
e. A compact highly-rigid 4-direction equal load type
f. Various specifications for easy design with space and load rating taken into account
g. Balls are maintained during the assembly of a block and a rail since a wire to retain balls is built in the block.
h. Its material is stainless steel which does not rust easily so it is very suitable for the environment where rust and particle generation should be prevented for clean room, for instance. For RMB12 and RMB15 Model Numbers, Bearing Steel material (RMBT12, RMBT15) is ready to produce.

Miniature Linear Motion Guide RM, RMB Series

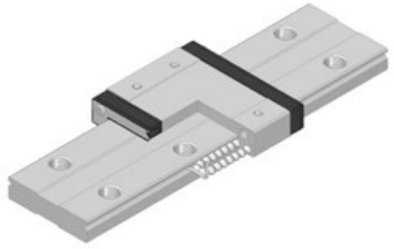
STANDARD

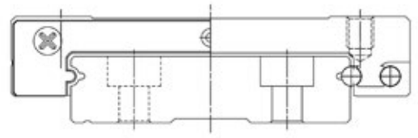




Standard RM Series

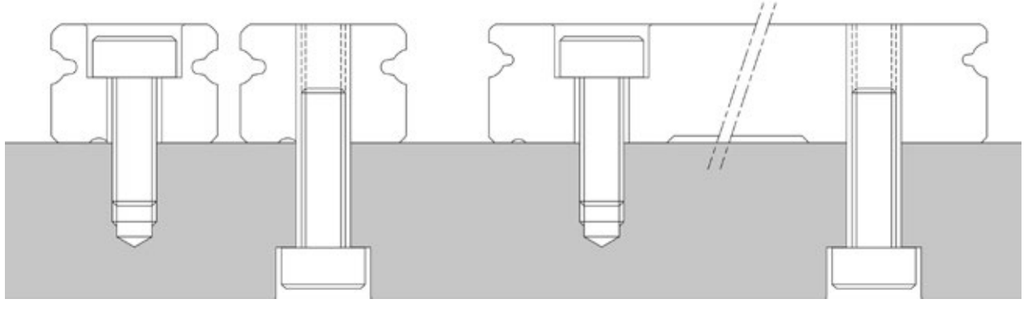
WIDE BODY



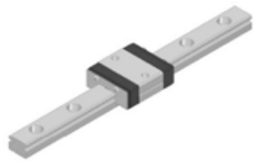
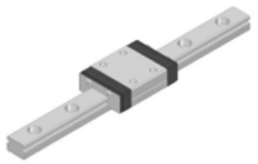
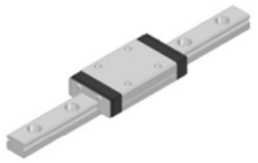
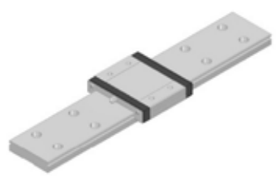
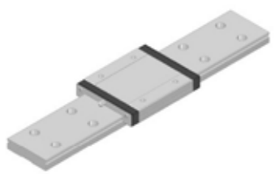


Wide body RMB Series

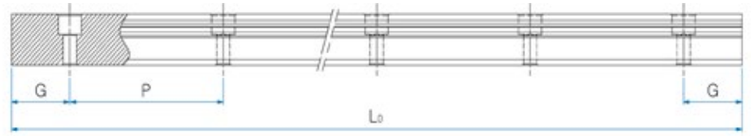
BOLT FASTENING



Types and Features

Category	Type	Shape & Features		
Compact type	RM-C		Standard Miniature Linear Motion Guide Bearing steel material of blocks for the type of RMT12 and RMT15 are available.	Semiconductor test equipment, semiconductor assembly equipment, display test equipment, HEAD-axis LED inspection equipment, pneumatic machinery, table cylinder, automation machinery, medical equipment, smart actuators, Cartesian coordinated robot, UVW stage
	RM-N			
	RM-L			
Wide board	RMB-C RMBT-C		High rigidity is achieved as the block is wider and longer than M Series to increase load rating and allowable moment. Bearing steel material of blocks for the type of RMBT12 and RMBT15 are available.	
	RMB-N RMBT-N			
	RMB-L RMBT-L			

STANDARD AND MAXIMUM LENGTH OF A RAIL

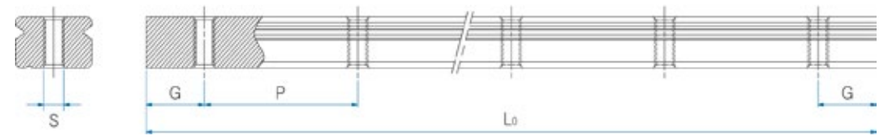


Unit: mm

Model No.	RM5	RM7	RM9	RM12	RMT12	RM15	RMT15	RM20
Standard length	40	40	55	70	70	70	70	220
	55	55	75	95	95	110	110	280
	70	70	95	120	120	150	150	340
	-	-	115	145	145	190	190	460
	100	100	-	170	170	230	230	-
	130	130	275	-	-	-	-	1120
	160	160	375	570	570	670	670	1240
			495	695	695	870	870	1360
				820	820	1070	1070	
Standard maximum length of a rail	1000	1000	995	995	1995	1990	1990	1960
Standard pitch P	15	15	20	25	25	40	40	60
G	5	5	7.5	10	10	15	15	20
Max. length	1000				2000			

Model No.	RMB5	RMB7	RMB9	RMB12	RMBT12	RMBT15	RMB15
Standard length	50	50	50	70	70	110	110
	70	80	80	110	110	150	150
	90	110	110	150	150	190	190
	-	-	140	190	190	230	230
	130	260	-	230	230	270	270
	150	290	500	-	-	-	-
	170	350	710	590	590	750	750
			860	750	750	790	790
				910	910	910	910
Standard maximum length of a rail	990	980	2000	1990	1990	1990	1990
Standard pitch P	20	30	30	40	40	40	40
G	5	10	10	15	15	15	15
Max. length	1000		2000				

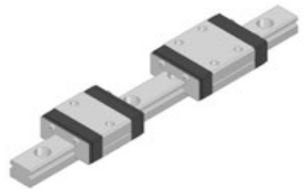
STANDARD TAP HOLE TYPE OF A RAIL

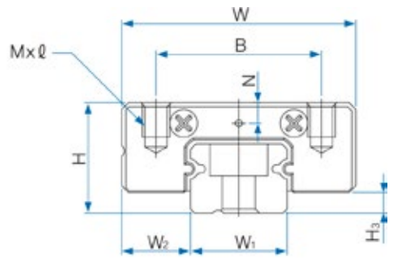


Model No.	S (Thru)
RM5	M2.6
RM7	M3
RM9	M4
RM12 / RMT12	M4
RM15 / RMT15	M4
RM20	M6

Model No.	S (Thru)
RMB5	M3
RMB7	M4
RMB9	M4
RMB12 / RMBT12	M5
RMB15 / RMBT15	M5

RM Series





Model No.	External dimensions			Dimensions of block							H3
	Height H	Width W	Length L	B	C	Mxℓ	L1	N	E	Grease nipple	
RM5C	6	12	17	8	-	M2x1.5	9.4	1.2	-	-	1
RM5N			20				12.4				
RM5NA				-	7	M2.6x1.5					
RM7C	8	17	19.8	12	-	M2x2.5	9.6	1.5	-	-	1.5
RM7N			24.3		8		14.1				
RM7L			31.8		13		21.6				
RM7LA					12						
RM9C	10	20	22.4	15	-	M3x3	11.8	2.2	-	-	2
RM9N			31.3		10		20.7				
RM9L			41.4		16		30.8				
RM9LA					15						
RM12C	13	27	26.4	20	-	M3x3.5	12.8	2.7	-	-	3
RM12N			34.9		15		21.3				
RM12L			45.4		20		31.8				
RM15C	16	32	34.4	25	-	M3x4	17.7	3.1	4	A-M3	4
RM15N			44.4		20		27.7				
RM15L			59.4		25		42.7				
RM20C	20	40	39.8	30	-	M4x6	22.2	4.2	4	A-M3	5
RM20N			51.8		25		34.2				
RM20L			69.8		30		52.2				

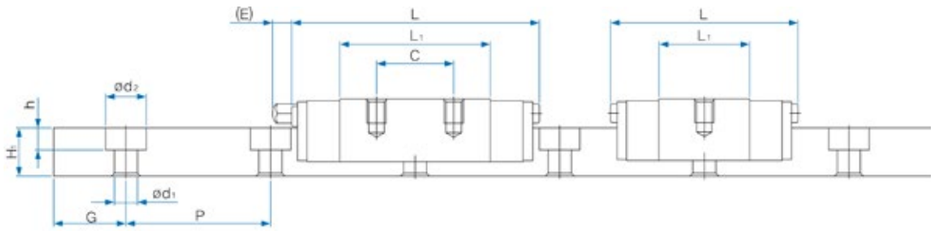
*Bearing steel material of rails for the type of MT12 and MT15 are available

Composition of Model No.

RM12 [1] [2] N [3] UU [4] 2 [5] G1 [6] — 1000L [7] 20/40 [8] P [9] A [10] T [11] Z [12] — 2 [13]

1 Model No. of Linear Motion Guide
2 Type of block: **No symbol**-Full-ball type
3 Form of block : **C**-Rectangular short type / **N**-Rectangular standard type / **L**-Rectangular long type
4 Type of seal : **UU**-End seal / **UULF**-End seal + **LF** seal **(*1)**
5 Number of blocks combined in 1 rail
6 Symbol of clearance : **No symbol**-Normal preload / **G1**-Light preload **(*2)**
7 Length of rail
8 Size of G value: standard G value has no symbol.
9 Symbol of precision : **No symbol**-Moderate precision / **H**-High precision / **P**-Precision **(*3)**
10 **No symbol**-Rail counter bore type (A topside assembly) / **A**- Rail tap hole type (an underside assembly) **(*4)**
11 Connection symbol
12 Special symbol
13 Number of axis used on the same surface

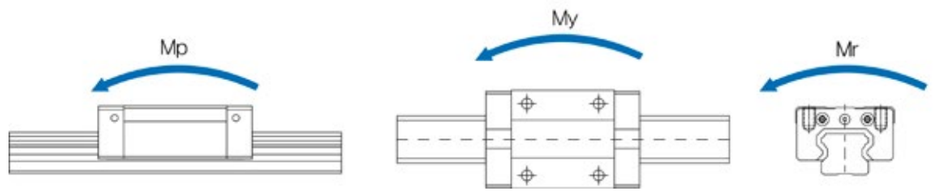
(*1) See P139 Symbol List of Optional Parts
(*2) See P30 Radial Clearance
(*3) See P45 Selection of Precision Class
(*4) See P123 Standard tap hole type of a rail



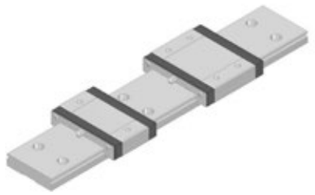
Unit: mm

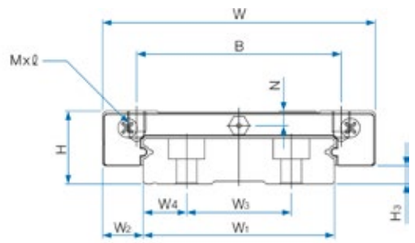
Dimension of Rail							Basic load rating		Static allowance moment N-m						Mass	
									Mp		My		Mr			
Width W1		W2	Heigh H1	Value G	Pitch P	d1 x d2 x h	C N	Co N	1	2 (contact)	1	2 (contact)	1		Block g	Rail g/m
5	0 -0.02	3.5	3.7	5	15	2.4x3.6x0.8	516	757	1.3	7.1	1.3	7.1	2.01		3.1	139
							631	1,009	2.2	11.6	2.2	11.6	2.67		4.0	
7	0 -0.02	5	5	5	15	2.4x4.2x2.3	901	1,136	1.9	11.8	1.9	11.8	4.14		6.4	253
							1,197	1,703	4.2	23.1	4.2	23.1	6.22		9.0	
							1,631	2,650	10.1	50.0	10.1	50.0	9.67		12.6	
9	0 -0.02	5.5	6	7.5	20	3.5x6x3.5	1,180	1,485	3.1	17.9	3.1	17.9	6.90		9.9	391
							1,721	2,545	9.3	46.6	9.3	46.6	11.84		17.1	
							2,375	4,030	21.9	102.8	21.9	102.8	18.74		25.2	
12	0 -0.025	7.5	8	10	25	3.5x6.5x4.5	2,175	2,385	5.4	32.9	5.4	32.9	14.79		19.8	679
							3,023	3,816	14.4	75.8	14.4	75.8	23.66		31.5	
							4,246	6,200	34.8	169.1	34.8	169.1	38.44		45.9	
15	0 -0.025	8.5	10	15	40	3.5x6.5x4.5	3,418	3,895	12.2	71.6	12.2	71.6	29.99		37.8	1071
							4,540	5,842	28.6	148.7	28.6	148.7	44.99		57.6	
							6,492	9,737	73.5	351.2	73.5	351.2	74.98		85.5	
20	0 -0.03	10	11	20	60	6x9.5x5.5	4,512	5,299	20.7	115.9	20.7	115.9	54.05		80.1	1572
							6,191	8,328	50.2	252.7	50.2	252.7	84.94		119.7	
							8,396	12,870	118.6	554.4	118.6	554.4	131.27		176.4	

1N≒0.102kgf



RMB Series





Model No.	External dimensions			Dimensions of block							H3
	Height H	Width W	Length L	B	C	Mxℓ	L1	N	E	Grease nipple	
RMB 5C	6.5	17	21	13	-	M2.5x1.5	13.4	1.4	-	-	1.3
RMB 5N			25		-		17.4		-	-	
RMB 7C	9	25	24	19	-	M3x3	12.6	1.7	-	-	2
RMB 7N			33		10		21.6		-	-	
RMB 7L			43.5		19		32.1		-	-	
RMB 9C	12	30	28.1	21	-	M3x3	16.5	3.2	-	-	3
RMB 9N			40.2		12		28.6		-	-	
RMB 9L			52	23	24		40.4		-	-	
RMB 12C	14	40	31.1	28	-	M3x3.5	17.5	3	-	-	4
RMB 12N			44.5		15		30.9		-	-	
RMB 12L			59.7		28		46.1		-	-	
RMBT 13C	15	50	35.3	35	-	M4x4.5	18.7	3.1	3.5	A-M3	3
RMBT 13N			49.2		18		32.6				
RMBT 13L			68.6		35		52				
RMB 15C	16	60	42.8	45	-	M4x4.5	25.2	3.5	4	A-M3	4
RMB 15N			56.6		20		39				
RMB 15L			75.8		35		58.2				

Composition of Model No.

RMB12 [ ] [N] [UU] [2] [G1] — [1000L] [20/40] [P] [A] [T] [Z] — [2]

1 2 3 4 5 6 7 8 9 10 11 12 13

*Bearing steel material of rails for the type of MBT12 and MBT15 are available

*MB13 is available only with bearing steel

1 Model No. of Linear Motion Guide

2 Type of block: **No symbol**-Full-ball type / **S**-Spacer Chain type

3 Form of block : **C**-Rectangular short type / **N**-Rectangular standard type / **L**-Rectangular long type

4 Type of seal : **UU**-End seal / **UULF**-End seal + **LF** seal **(*1)**

5 Number of blocks combined in 1 rail

6 Symbol of clearance : **No symbol**-Normal preload / **G1**-Light preload **(*2)**

7 Length of rail

8 Size of G value: standard G value has no symbol.

9 Symbol of precision : **No symbol**-Moderate precision / **H**-High precision / **P**-Precision **(*3)**

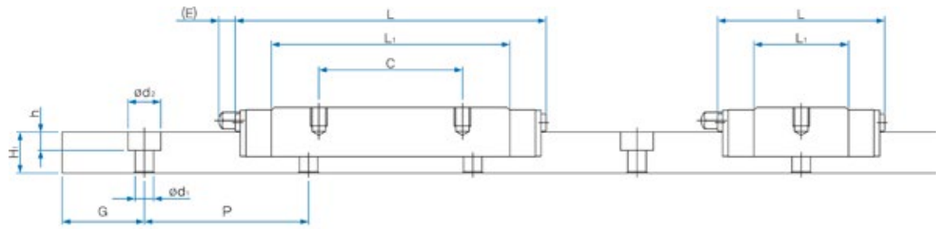
10 **No symbol**-Rail counter bore type (A topside assembly) / **A**- Rail tap hole type (an underside assembly) **(*4)**

11 Connection symbol

12 Special symbol

13 Number of axis used on the same surface

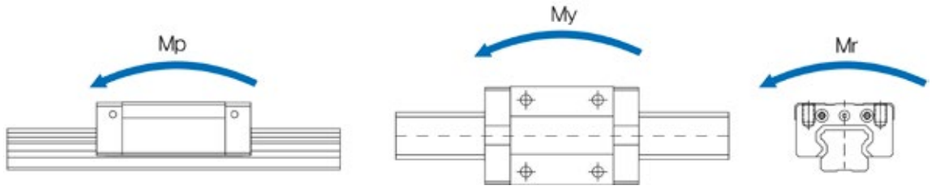
(*1) See P139 Symbol List of Optional Parts
(*2) See P30 Radial Clearance
(*3) See P45 Selection of Precision Class
(*4) See P123 Standard tap hole type of a rail



Unit: mm

Dimension of Rail									Basic load rating		Static allowance moment N-m					Mass	
											Mp		My		Mr		
Width W1		W2	W3	W4	Heigh H1	Value G	Pitch P	d1 x d2 x h	C N	Co N	1	2 (contact)	1	2 (contact)	1	Block g	Rail g/m
10	0 -0.025	3.5	-	-	4	5	20	2.9x4.8x1.6	66,8	1,094	2.6	13.3	2.6	13.3	5.63	5.3	299
									80,6	1,430	4.4	21.4	4.4	21.4	7.36	6.8	
14	0 -0.05	5.5	-	-	5.5	10	30	3.5x6x3.2	1,102	1,514	3.4	19.5	3.4	19.5	10.83	11.7	560
									1,631	2,650	10.1	51.1	10.1	51.1	18.95	18.9	
									2,166	3,975	22.5	106.1	22.5	106.1	28.42	27.9	
18	0 -0.05	6	-	-	7	10	30	3.5x6x4.5	1,515	2,121	6.2	33.4	6.2	33.4	19.41	23.4	912
									2,197	3,606	18.2	87.6	18.2	87.6	33.00	39.6	
									2,878	5,303	37.8	172.9	37.8	172.9	48.52	54.9	
24	0 -0.05	8	-	-	8.5	15	40	4.5x8x4.5	2,753	3,339	10.3	57.3	10.3	57.3	40.73	40.5	1369
									4,015	5,723	31.2	152.2	31.2	152.2	69.83	68.4	
									5,539	9,062	73.8	338.7	73.8	338.7	110.56	99.9	
30	0 -0.05	10	-	-	9	15	40	4.5x8x4.5	3,694	4,351	14.3	82.8	14.3	82.8	66.1	60.0	2086
									5,457	7,599	43.7	219.3	43.7	219.3	115.5	103.8	
									7,576	12,142	111.5	517.4	111.5	517.4	184.6	165.0	
42	0 -0.05	10	23	9.5	9.5	15	40	4.5x8x4.5	4,954	6,056	26.9	145.3	26.9	145.3	128.40	85.5	2886
									6,579	9,085	62.5	306.5	62.5	306.5	192.60	126.0	
									9,076	14,384	147.8	680.6	147.8	680.6	304.94	183.6	

1N≒0.102kgf



7. Roller Linear Motion Guide RBR Series

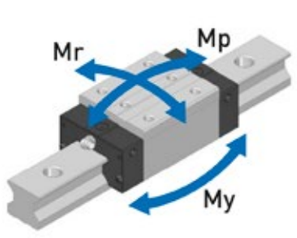
1) Structure of RBR Series

RBX Linear Motion Guide RBR Series uses rollers as a rolling element between the raceway surface of a rail and a block and its four-row cylindrical roller forms a contact angle of 45° which bears equal load for vertical tensile compression load and horizontal load.
A roller used as a rolling element has less elastic displacement than a ball so it has small displacement for external load. Also the contact area with the roller is wide so that it has advantages such as high rigidity, bearing against big load, long life, impact resistance and wear resistance as well as less friction resistance that supports smooth motion and quite running. Moreover if the roller is preloaded, it can enhance the rigidity of Linear Motion guide.

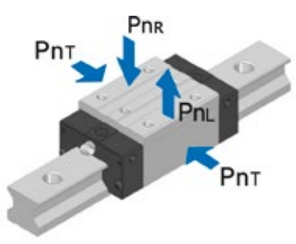
2) Features of RBR Series

a. High quality and very effective in realizing high precision and elimination of labor
b. High rigidity and high precision which can realize the stable travel for a long time
c. Great wear resistance and friction resistance which ensures a long life
d. High rigidity and overload capacity compared to ball types of the same model no.
e. Excellent vibration resistance since it has less displacement against impact load or variable load than ball types and vibration decay time is shorter compared to natural frequency
f. Bigger basic static load rating than ball-type Linear Motion guide with the same specifications allows the compact design using smaller model no. than ball types. If same model no. is used, it achieves longer life due to bigger load rating
g. Various specification for easy design

MOMENT RIGIDITY

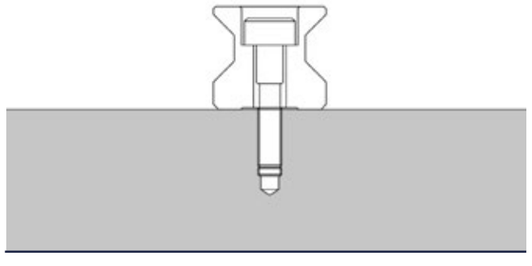


RADIAL RIGIDITY

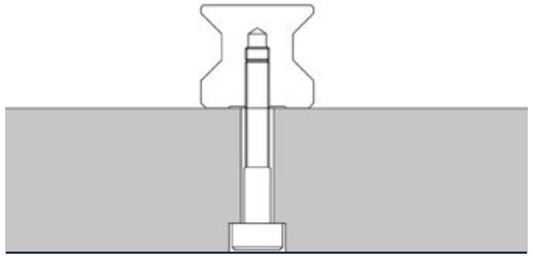


Rail bolt fastening type

RAIL BOLT FASTENING TYPE

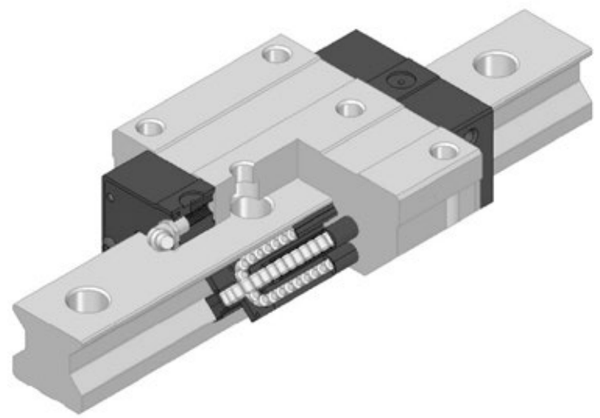


TAP HOLE TYPE (A-TYPE)

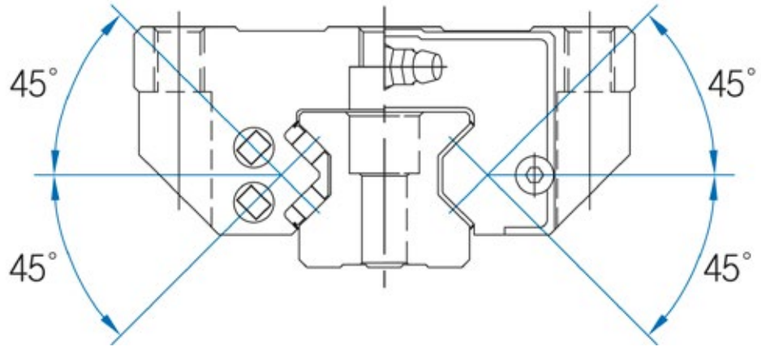


Roller Linear Motion Guide RBR Series

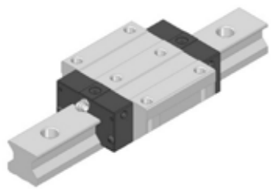
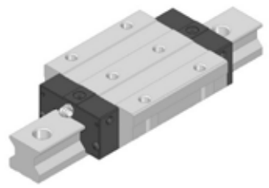
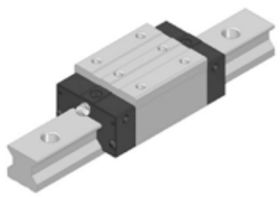
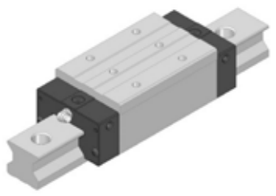
RBR SERIES



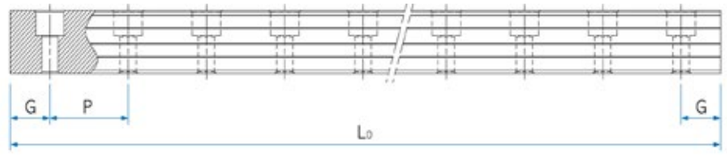
CROSS SECTION



Types and Features

Category	Type	Shape & Features		
Flange type	RBR-F		•With the tapped flange of a lock, it can be assembled both from bottom to top and from top to bottom •A 4-direction equal load type with high rigidity and high load	Machine tool, CNC machining center, CNC tapping center, NC milling machine, boring machine, multiple machining center, planer miller, large injection machine, heavy-duty cutting machine, wire-cut pentahedral processing center, display test equipment
	RBR-FL		•Having the roller contact structure and the cross section identical to those of RBS-F Series, it increased load rating by extending the whole length (L1) of Linear Motion guide •A 4-direction equal load type with high rigidity and high load	
Compact type	RBR-R		•With the tapped top side of a block, a compact type that the width of Linear Motion guide block is minimized •A 4-direction equal load type with high rigidity and high load	
	RBR-RL		•Having the cross section identical to that of RBH-R Series, it increased load rating by extending the whole length (L1) of Linear Motion guide block •A 4-direction equal load type with high rigidity and high load	

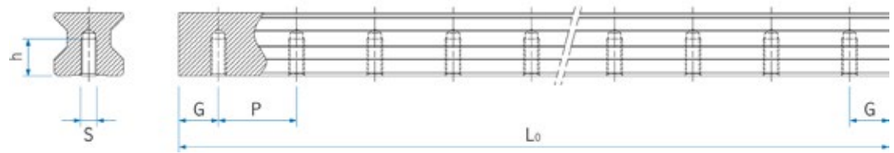
STANDARD AND MAXIMUM LENGTH OF A RAIL



Unit: mm

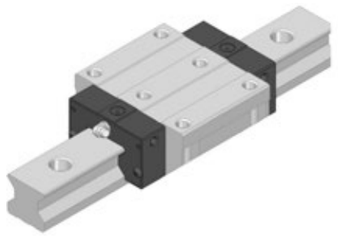
Model No.	35	45	55
Standard length	280	570	780
	520	885	900
	920	1095	1140
	1240	1305	1380
	1400	1515	1620
	-	-	-
	1960	2040	2100
	2360	2460	2580
	2840	2985	3060
		3090	
Standard pitch P	40	52.5	60
G	20	22.5	30
Max. length	4000		

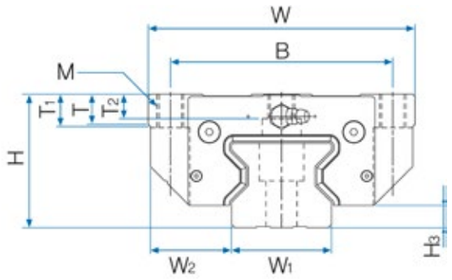
STANDARD TAP HOLE TYPE OF A RAIL



Model No.	S	h(mm)
RR35T	M8	17
RR45T	M12	24
RR55T	M14	24

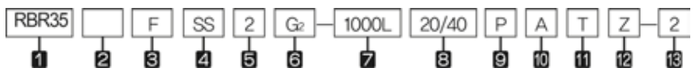
RBR-F Series, RBR-FL Series





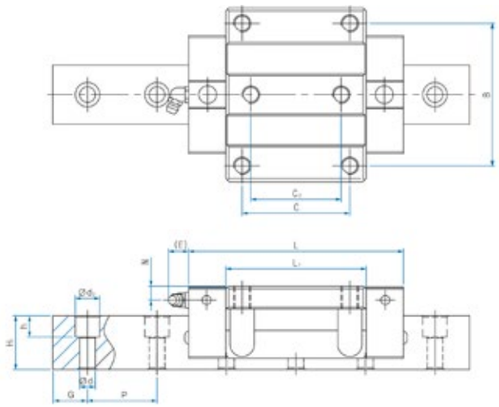
Model No.	External dimensions			Dimensions of block												H3
	Height H	Width W	Length L	B	C	C2	M	S	L1	T	T1	T2	N	E	Grease nipple	
RBR 35F	48	100	125.1	82	62	52	M10	8.5	82.5	12	13	8	8	12	B-M6F	7
RBR 35FL	48	100	152.1	82	62	52	M10	8.5	109.5	12	13	8	8	12	B-M6F	7
RBR 45F	60	120	154.4	100	80	60	M12	10.5	106.6	13.5	15	11	10	16	B-PT 1/8	10
RBR 45FL	60	120	189.4	100	80	60	M12	10.5	141.6	13.5	15	11	10	16	B-PT 1/8	10
RBR 55F	70	140	181.6	116	95	70	M14	12.5	127.8	17.5	18	13.5	11	16	B-PT 1/8	10
RBR 55FL	70	140	229.6	116	95	70	M14	12.5	175.8	17.5	18	13.5	11	16	B-PT 1/8	10

Composition of Model No.



1 Model No. of Linear Motion Guide
2 Type of block: **No symbol**-Full-ball type
3 Form of block: **R**-Rectangular standard type / **RL**-Rectangular long type / **F**-Flange standard type / **FL**-Flange long type
4 Type of seal : **UU**-End seal / **SS**-End seal + Inside seal / **ZZ**-End seal + Inside seal + Metal scraper **(*1)**
5 Number of blocks combined in 1 rail
6 Symbol of clearance : **No symbol**-Normal preload / **G1**-Light preload / **G2**-Heavy preload / **Gs**-Special preload **(*2)**
7 Length of rail
8 Size of G value: standard G value has no symbol.
9 Symbol of precision : **No symbol**-Moderate precision / **H**-High precision / **P**-Precision / **SP**-Super Precision / **UP**-Ultra Precision **(*3)**
10 **No symbol**-Rail counter bore type (A topside assembly) / **A**- Rail tap hole type (an underside assembly) **(*4)**
11 Connection symbol
12 Special symbol
13 Number of axis used on the same surface

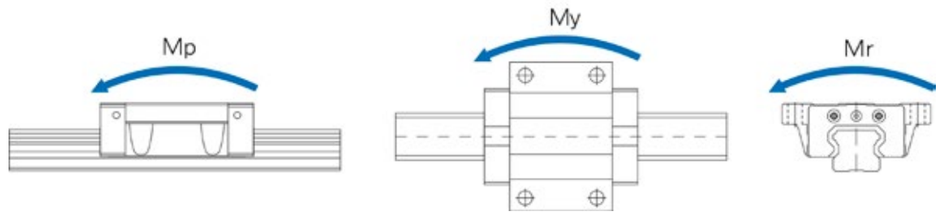
(*1) See P139 Symbol List of Optional Parts
(*2) See P30 Radial Clearance
(*3) See P45 Selection of Precision Class
(*4) See P131 Standard tap hole type of a rail



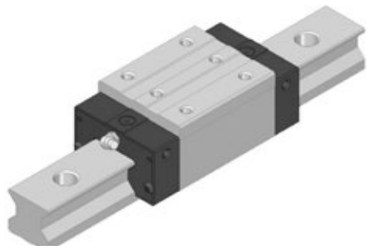
Unit: mm

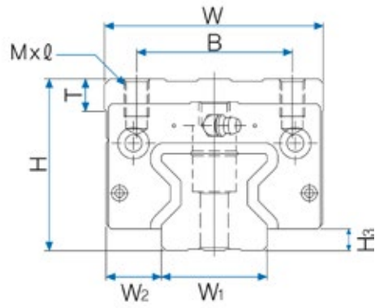
Dimension of Rail						Basic load rating		Static allowance moment kN-m					Mass	
								Mp		My		Mr		
Width W1 ± 0.05	W2	Heigh H1	Value G	Pitch P	d1 x d2 x h	C kN	Co kN	1	2 (contact)	1	2 (contact)	1	Block kg	Rail kg/m
34	33	31	20	40	9x14x12	50.7	121.5	1.772	8.919	1.772	8.919	2.606	1.703	6.27
34	33	31	20	40	9x14x12	63.5	162.0	3.136	14.985	3.136	14.985	3.475	2.263	6.27
45	37.5	38	22.5	52.5	14x20x17	82.3	210.0	3.957	19.380	3.957	19.380	5.652	3.19	10.193
45	37.5	38	22.5	52.5	14x20x17	102.9	280.0	7.009	32.771	7.009	32.771	7.536	4.266	10.193
53	43.5	43.5	30	60	16x23x20	114.8	283.5	6.406	31.061	6.406	31.061	9.364	5.393	13.37
53	43.5	43.5	30	60	16x23x20	147.5	391.6	12.168	56.12	12.168	56.121	12.931	7.5	13.37

1N≒0.102kgf



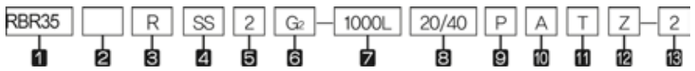
RBR-R Series, RBR-RL Series





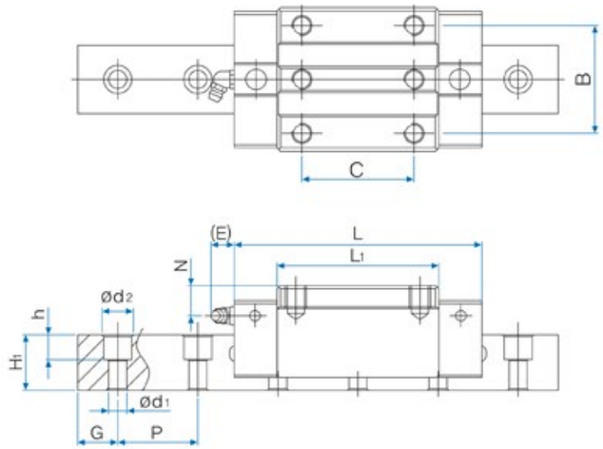
Model No.	External dimensions			Dimensions of block								H3
	Height H	Width W	Length L	B	C	M x ℓ	L1	T	N	E	Grease nipple	
RBR 35R	55	70	125.1	50	50	M8x12	82.5	10.3	15	12	B-M6F	7
RBR 35RL	55	70	152.1	50	72	M8x12	109.5	10.3	15	12	B-M6F	7
RBR 45R	70	86	154.4	60	60	M10x20	106.6	24.5	20	16	B-PT 1/8	10
RBR 45RL	70	86	189.4	60	80	M10x20	141.6	24.5	20	16	B-PT 1/8	10
RBR 55R	80	100	181.6	75	75	M12x18	127.8	27.5	22	16	B-PT 1/8	10
RBR 55RL	80	100	229.6	75	95	M12x18	175.8	27.5	22	16	B-PT 1/8	10

Composition of Model No.



1 Model No. of Linear Motion Guide
2 Type of block: **No symbol**-Full-ball type
3 Form of block: **R**-Rectangular standard type / **RL**-Rectangular long type / **F**-Flange standard type / **FL**-Flange long type
4 Type of seal: **UU**-End seal / **SS**-End seal + Inside seal / **ZZ**-End seal + Inside seal + metal scraper **(*1)**
5 Number of blocks combined in 1 rail
6 Symbol of clearance : **No symbol**-Normal preload / **G1**-Light preload / **G2**-Heavy preload / **Gs**-Special preload **(*2)**
7 Length of rail
8 Size of G value: standard G value has no symbol.
9 Symbol of precision: **No symbol**-Moderate precision / **H**-High precision / **P**-Precision / **SP**-Super Precision / **UP**-Ultra Precision **(*3)**
10 **No symbol**-Rail counter bore type (A topside assembly) / **A**- Rail tap hole type (an underside assembly) **(*4)**
11 Connection symbol
12 Special symbol
13 Number of axis used on the same surface

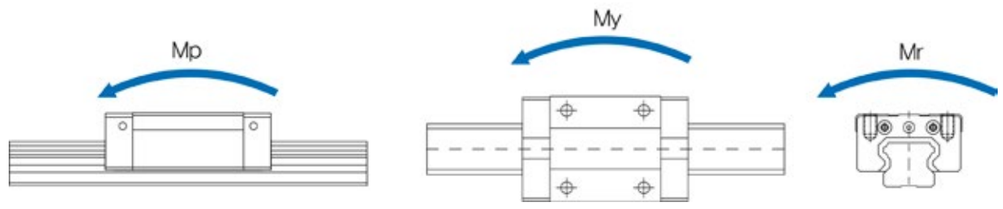
(*1) See P139 Symbol List of Optional Parts
(*2) See P30 Radial Clearance
(*3) See P45 Selection of Precision Class
(*4) See P131 Standard tap hole type of a rail



Unit: mm

Dimension of Rail						Basic load rating		Static allowance moment kN-m					Mass	
								Mp		My		Mr		
Width W1 ± 0.05	W2	Heigh H1	Value G	Pitch P	d1 x d2 x h	C kN	Co kN	1	2 (contact)	1	2 (contact)	1	Block kg	Rail kg/m
34	18	31	20	40	9x14x12	50.7	121.5	1.772	8.919	1.772	8.919	2.606	1.179	6.27
34	18	31	20	40	9x14x12	63.5	162.0	3.136	14.985	3.136	14.985	3.475	2.263	6.27
45	20.5	38	22.5	52.5	14x20x17	82.3	210.0	3.957	19.380	3.957	19.380	5.652	3.103	10.193
45	20.5	38	22.5	52.5	14x20x17	102.9	280.0	7.009	32.771	7.009	32.771	7.536	4.08	10.193
53	23.5	43.5	30	60	16x23x20	114.8	283.5	6.406	31.061	6.406	31.061	9.364	4.723	13.37
53	23.5	43.5	30	60	16x23x20	147.5	391.6	12.168	56.121	12.168	56.121	12.931	6.466	13.37

1N≒0.102kgf



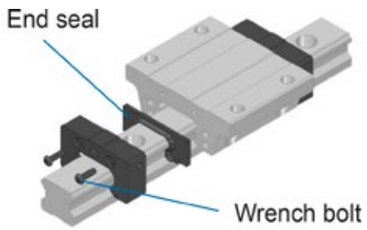
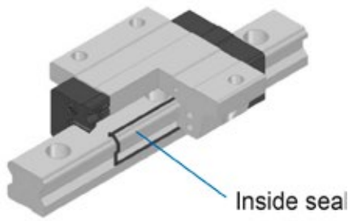
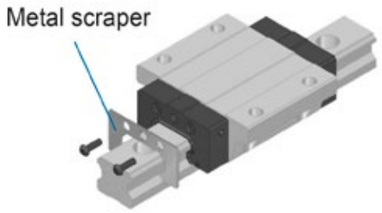
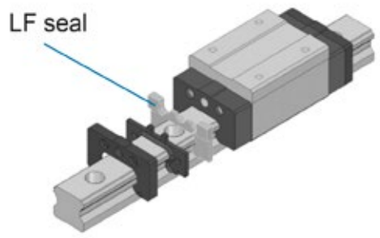
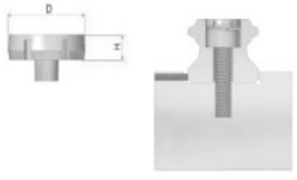
RBX LINEAR

13X

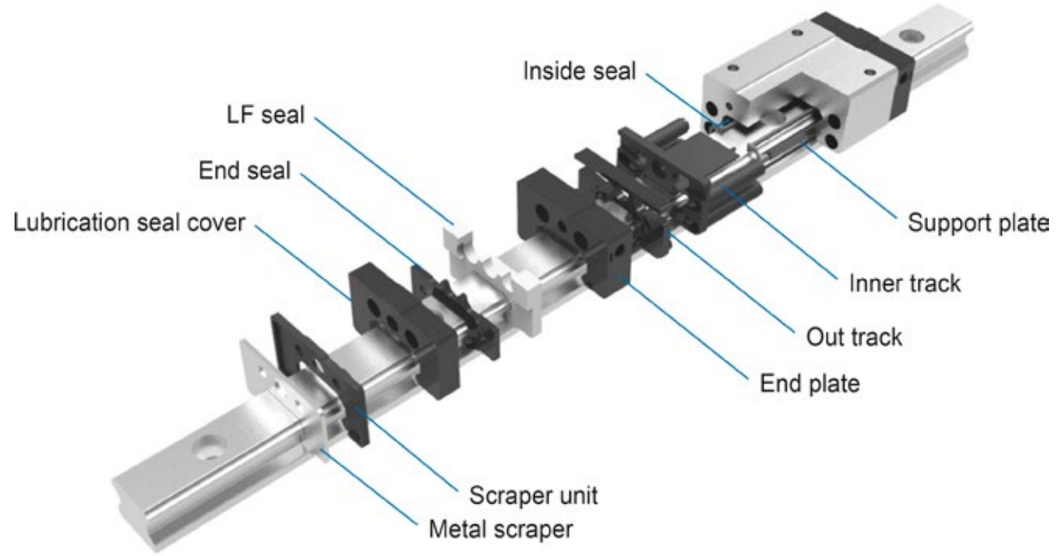
Options

1. Seal and Rail Cap
2. Oil Filler
3. Grease Nipple
4. Connection of oil pipes
5. How to install Linear Motion guide using a support rail

1. Seal and Rail Cap

Item	Place to attach seal	Applications
End seal		•Where dust or particle is frequently generated
Inside seal		•Where foreign substance can be easily accessed from the flank or bottom •Where Linear Motion guide is moving in a vertical, horizontal, and reverse direction •Where a lot of cutting chips or foreign substance present •Where there is a danger in the intrusion of cutting chips or foreign substances into the block
Metal scraper		•Where spatters may arise such as welding slag or metal powers
LF seal		•Use within the maximum operating temperature of 40°C •Avoid contact with organic solvents, such as thinner or milky white oil •During the initial use of the LF-SEAL, the rolling resistance may increase •LF-SEAL (1EA) should use both sides of each block
Rail cap		•If foreign substance enters into the bolt holes in a rail, it may intrude even into the block. A metal or plastic cap is used to prevent i. •C: plastic material railcap •MC: metal material railcap railcap for each part no in the catalog is available

Symbol List of Optimal Part

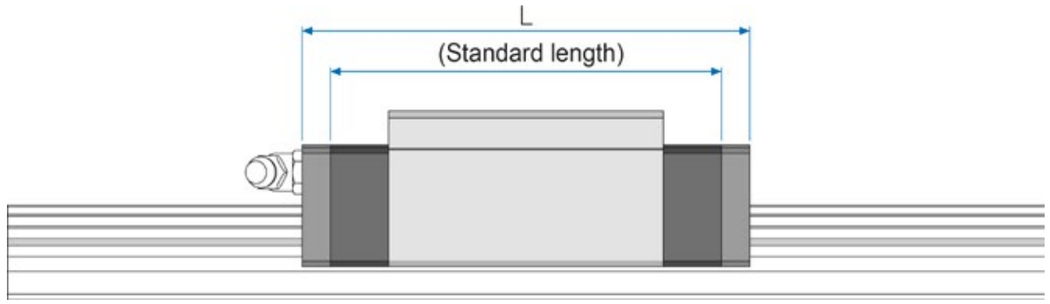


Symbol	Optional parts
UU	End seal
SS	End seal + Inside seal
ZZ	End seal + Inside seal + Metal scraper
UULF	End seal + LF seal
SSLF	End seal + Inside seal + LF seal
ZZLF	End seal + Inside seal + Metal scraper + LF seal

Option Mapping Table by Model No.

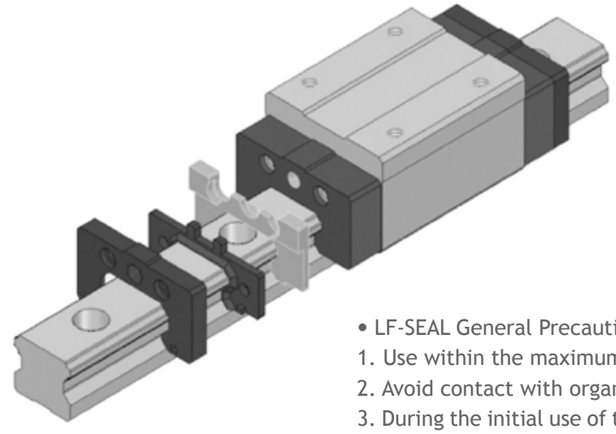
Symbol	Ball Linear Motion Guide	Miniature Linear Motion Guide	Roller Linear Motion Guide
	RBH Series / S Series	RM / RMB Series	RBR Series
UU	O	O	-
SS	O	-	-
ZZ	O	-	O
UULF	O	O	-
SSLF	O	-	-
ZZLF	O	-	-

The installation option table of Linear Motion Guide way



Unit: mm

Symbol		Standard length	L					
			UU	SS	ZZ	UULF	SSLF	ZZLF
RBH	15F/R/SF/SR	57	57	57	63.7	69	69	75.7
	15FL/RL/SFL/SRL	65.3	65.3	65.3	72	77.3	77.3	84
	20F/R/SF/SR	72.7	72.7	72.7	81.4	84.7	84.7	93.4
	20FL/RL/SFL/SRL	88.6	88.6	88.6	97.3	100.6	100.6	109.3
	25F/R/SF/SR	83	83	83	91.7	95	95	103.7
	25FL/RL/SFL/SRL	102.9	102.9	102.9	111.6	114.9	114.9	123.6
	30F/R/SF/SR	97.8	97.8	97.8	107.7	111.8	111.8	121.7
	30FL/RL/SFL/SRL	120	120	120	129.9	134	134	143.9
	35F/R/SF/SR	110	110	110	120	124	124	134
	35FL/RL/SFL/SRL	135.4	135.4	135.4	145.4	149.4	149.4	159.4
	45F/R/SF/SR	139	139	139	148.9	154	154	163.9
	45FL/RL/SFL/SRL	170.8	170.8	170.8	180.7	185.8	185.8	195.7
	55F/R/SF/SR	163	163	163	172.9	179	179	188.9
	55FL/RL/SFL/SRL	201.1	201.1	201.1	211	217.1	217.1	227
RBS	15C/CF/SC/SCF	40.2	40.2	40.2	46.9	52.2	52.2	58.9
	15R/F/SR/SF	56.9	56.9	56.9	63.6	68.9	68.9	75.6
	20C/CF/SC/SCF	47.2	47.2	47.2	55.9	59.2	59.2	67.9
	20R/F/SR/SF	66.3	66.3	66.3	75	78.3	78.3	87
	25C/CF/SC/SCF	59.1	59.1	59.1	67.8	71.1	71.1	79.8
	25R/F/SR/SF	83	83	83	91.7	95	95	103.7
RBHS	25SR	83	83	83	91.7	95	95	103.7
	25SRL	102.9	102.9	102.9	111.6	114.9	114.9	123.6
	30SR	97.8	97.8	97.8	107.7	111.8	111.8	121.7
	30SRL	120	120	120	129.9	134	134	143.9
	35SR	110	110	110	120	124	124	134
	35SRL	135.4	135.4	135.4	145.4	149.4	149.4	159.4



- LF-SEAL General Precautions

1. Use within the maximum operating temperature of 40°C.
2. Avoid contact with organic solvents, such as thinner or milky white oil.
3. During the initial use of the LF-SEAL, the rolling resistance may increase.
4. LF-SEAL (1EA) should use both sides of each block.

Unit: mm

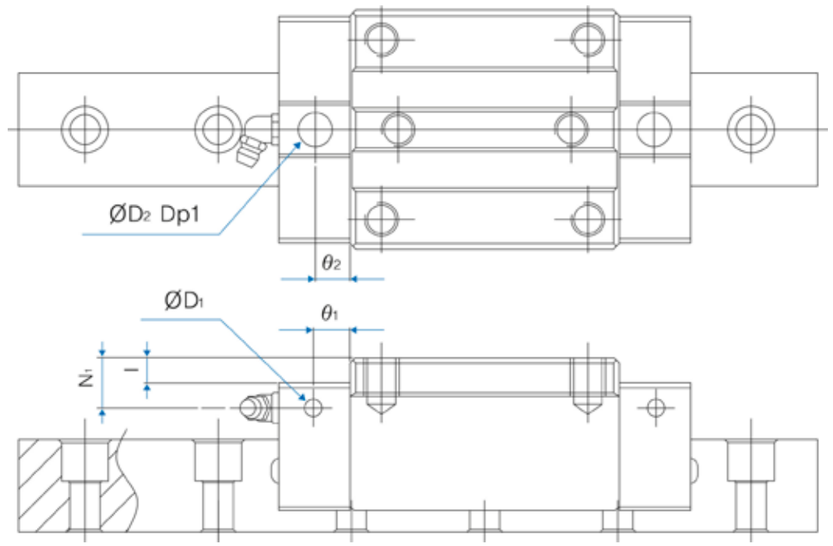
Symbol		Standard length	L	
			UU	UULF
RM	5C	17	17	21.4
	5N	20	20	24.4
	5NA	20	20	24.4
	7C	19.8	19.8	24.8
	7N	24.3	24.3	29.3
	7L	31.8	31.8	36.8
	7LA	31.8	31.8	36.8
	9C	22.4	22.4	27.4
	9N	31.3	31.3	36.3
	9L	41.4	41.4	46.4
	9LA	41.4	41.4	46.4
	12C	26.4	26.4	32.4
	12N	34.9	34.9	40.9
	12L	45.4	45.4	51.4
	15C	34.4	34.4	41.4
	15N	44.4	44.4	51.4
	15L	59.4	59.4	66.4
	20C	39.8	39.8	46.8
	20N	51.8	51.8	58.8
	20L	69.8	69.8	76.8

Unit: mm

Symbol		Standard length	L	
			UU	UULF
RMB	5C	21	21	25.4
	5N	25	25	29.4
	7C	24	24	29
	7N	33	33	38
	7L	43.5	43.5	48.5
	9C	28.1	28.1	33.1
	9N	40.2	40.2	45.2
	9L	52	52	57
	12C	31.1	31.1	37.1
	12N	44.5	44.5	50.5
	12L	59.7	59.7	65.7
	13C	35.3	35.3	42.3
	13N	49.2	49.2	56.2
	13L	68.6	68.6	75.6
	15C	42.8	42.8	49.8
	15N	56.6	56.6	63.6
	15L	75.8	75.8	82.8

2. Oil Filler

Fuelling on the side and top is available in RBR Series. The standard specification does not include the oil filler that penetrates the block of Linear Motion guide to protect it from foreign substance.

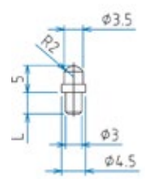
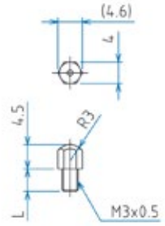
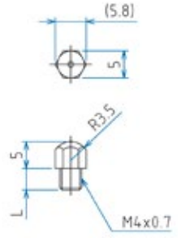
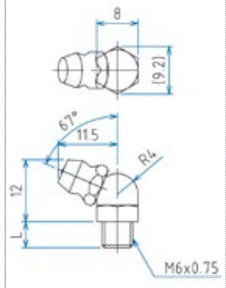
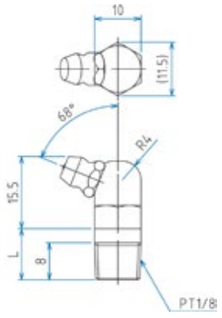


Unit: mm

Model No.		Hole for a side nipple			Top oil filler			
		Θ1	N1	D1	D2	(O-ring)	l	Θ2
RBR	35F(L)	10.4	8	5.2	10.7	S7	0.4	11
	35R(L)	10.4	15	5.2	10.7	S7	7.4	11
	45F(L)	10.4	10	5.2	10.7	S7	0.4	11
	45R(L)	10.4	20	5.2	10.7	S7	10.4	11
	55F(L)	12.5	11	5.2	10.7	S7	0.4	11
	55R(L)	12.5	21	5.2	10.7	S7	10.4	11

3. Grease Nipple

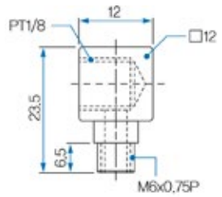
RBX provides various kinds of grease nipple necessary for lubricating the system of Linear Motion guide.

				
A-Ø3	A-M3	A-M4	B-M6F	B-PT1/8
HW 17, 21	M15, 20 MB 15	H 15 S 15	H 20, 25, 30, 35 S 20, 25 R 35	H 45, 55 R 45, 55

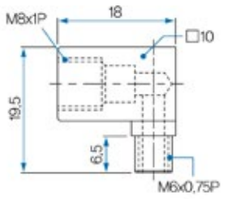
Grease nipple model no.		A - Ø3	A-M3	A-M4	B-M6F			B-PT1/8
Application model no.		RBW 17, 21	RM 15, 20 RMB 13,15	RBH 15 RBS 15	RBH 20,25 RBS 20,25	RBH 30,35	RBW 27,35	RBH 45,55
Thread (L) Length	Standard	4	4.2	4	5	5	5	8
	ZZ	-	-	6	7	7	-	11
	LF	9	7.7	10	10	12	12	15.5
	LF + ZZ	-	-	12	12	14.5	-	18

4. Connection of oil pipes

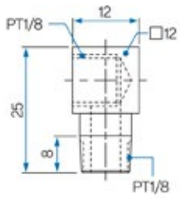
WOL Type



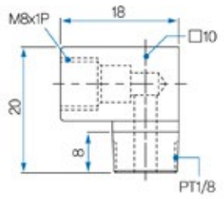
WOL-A



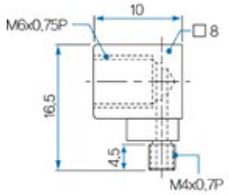
WOL-B



WOL-C

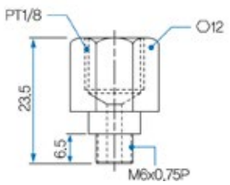


WOL-D

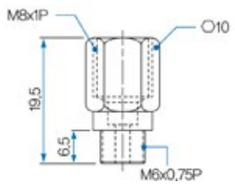


WOL-E

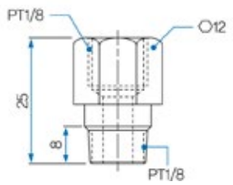
WOS Type



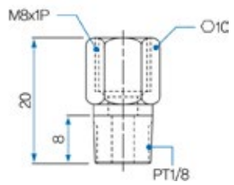
WOS-A



WOS-B



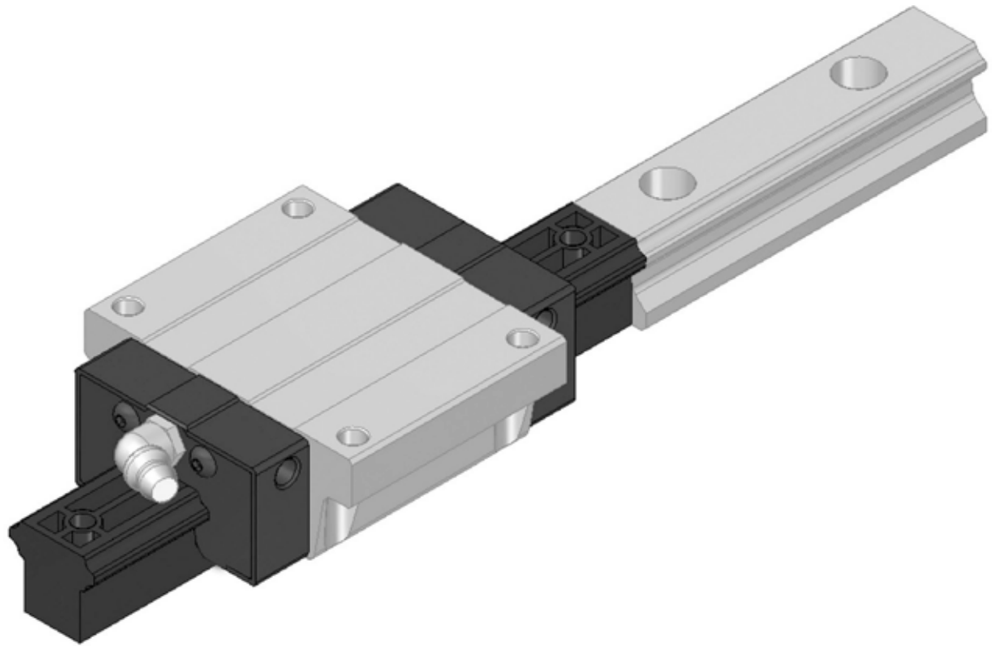
WOS-C



WOS-D

5. How to install Linear Motion guide using a support rail

Linear Motion guide block should be inserted into or removed from the rail using a support rail for safety.
If you install the block in the rail without using the support rail, a rolling element may deviate from the block and damage or destroy the parts inside. If the block without a rolling element is installed, it may significantly shorten the block's life and lead to load reduction and early breakage.
If you use the support rail, do not lean it. Adhere it to the end of the rail and slowly apply force to assemble it.



RBX LINEAR

14X

Instructions for Handling

1. Handling
2. Lubrication
3. Caution for Use
4. Storage

1. Handling

1) The packaged RBX Linear Motion guide is damp-proof after grease removal and cleaning, so please open it just before use.
2) The rail-block compatible product is fitted with a plastic support rail. Please take caution when assembling it with the rail.
3) If you reassemble a block-rail set product or a single block product after dismantling it into pieces, foreign substance may intrude into the block, decreasing performance to make rolling motion unsmooth or damaged. So please do not disassemble it.
4) If either a rail or a block leans to one side, the block or the rail may fall to be damaged. Please take caution and avoid the deviation of the block or the rail.
5) The end plate may be damaged if impact is applied since it is made of plastic material. Please be careful.

2. Lubrication

1) If the product is supplied as it is applied by rust preventive oil, please clean it off thoroughly and fill lubricant prior to use.
2) Do not mix it with other lubricants such as thickener or additive. If so, it may destroy the structure of grease or cause a harmful effect.
3) Viscosity of grease may vary depending on temperature and increase in winter due to low temperature, and the friction resistance of Linear Motion guide may increase.
4) In case of using special lubricant, please contact us in advance.
5) In case of using oil lubricant, it may not reach the hole of raceway depending on the assembly status or direction of a block and a rail, so no lubricating effect may be obtained.

3. Caution for Use

1) After opening the product, please put damp-proof agent inside the dry container for storage.
2) Please handle the product after wearing plastic gloves in a clean place.
3) Please be careful to protect it from foreign substance which may inhibit rolling motion or damage function.
4) Please protect it using a holding door or cover to prevent Linear Motion guide exposed directly to poor environment that may cause corrosion or damage.
5) In case of using standard plastic end plate-based Linear Motion guide, use it at under 80°C. To use it at higher temperature than 80°C, please order a metal end plate which will specially customized.
6) If the rail of Linear Motion guide is fixed at the ceiling or in high place and if the block bears load downwards, the end plate may be destroyed or a ball may come off from the rail resulting in the fall of the block and fixtures. So please take a measure to install a safety device.

4. Storage

Depending on storage conditions, a rail may warp. For storage, place it in a horizontal position in the package box provided by RBX or in a similar box with the flat bottom and avoid the environments where temperature is too high or low and very humid.

Cause and Countermeasure of Damage of Linear Motion Guide Comparison

Condition		Cause	Countermeasures
Fatigue failure on the rolling surface	• Flaking - Caused by rolling fatigue on the rolling surface - Maximum shear stress-induced internal cracks are expressed on the surface.	Damage by life	Change Linear Motion guide
		Overload	Reconsider the model no. selected, use higher model no., lower the load level, reinforce the assembly precision during installation, enhance the rigidity of base and table
		Poor lubrication	Refill lubricant, shorten the refilling interval o lubricant, review the relevance of lubricant in use, improve the lubricant passage
Indentation of the rolling surface	• Indentation - Plastic deformation on the rolling surface due to excessive external load	Impact load or excessive external load	Reconsider the model no. selected, lower the load level, reinforce the assembly precision during installation, use the higher model no.
		Careless handling	Prevent impact and fall during handling Improve handling method and environment
Seizing	• Burn - Rough surface of the rolling surface due to slight burning by friction between a rolling element and the rolling surface - Cause for the discoloration of the rolling surface, weakened hardness, and flakin	Poor lubrication	Refill lubricant, use the optimal lubricant, improve the lubrication method
		Overload	Review the service conditions, lower the load level, use the higher model no. enhance the assembly precision during installation
Cracking	• Cracking - Partial breaking into pieces of a rolling element or rolling surface due to excessive external load	Impact load or excessive external load	Reconsider the model no. selected, use the higher model no. lower the load level, enhance the assembly precision during installation
		Poor raceway circulation of a rolling element	Prevent the intrusion of foreign substance, develop a dust proof measure, refill lubricant, shorten the refilling interval of lubricant, improve the lubrication method
Abnormal wear	• Abnormal wear - Rapid increase in wear as the slippery between a rolling element and the rolling surface - Cause for failure in precision and preload as companied by oxidation wear	Excessive load or excessive eccentric load	Reconsider the model no. selected, use the higher model no., lower the load level, enhance the assembly precision during installation
		Foreign	Complement the performance of seal, develop a dust proof measure
		Substance	Refill lubricant, use the optimal lubricant, improve the lubrication method, improve the lubricant passage
Flatting corrosion	• Vibration - Wear facilitated by the loss of oil film during the running of vibrant stroke and the slippery between a rolling element and the rolling element	Load	Review the service conditions, use the higher model no., enhance the assembly precision during installation
		Vibration	Improve the transport condition, change lubricant, improve the lubrication method, shorten the refilling interval of lubricant
		Foreign substance	Complement the performance of seal, develop a dust proof measure
Rust prevention	• Rust - Caused by the loss of oil film or contact of exposed part to water, acid, alkaline and especially when cooling water enters into the block; cause for early flaking due to concentrated stress	Intrusion of cooling water	Make a rust-preventive treatment onto the surface, complement the performance of seal, change lubricant, change cooling agent, refill lubricant, shorten the refilling interval of lubricant
		High humidity	Make a rust-preventive treatment onto the surface, improve environment
		Poor handling	Improve the condition of storage, reinforce the sealing performance, apply sufficient amount of rust-preventive oil

Comparison table of Full-Ball Type Model No. of Other Manufacturers

1. RBH Series (Standard Type)

RBX	THK	NSK	PMI	HIWIN
RBH 15F RBH 15FL	HSR 15A, B	LH 15EL, EM LH 15GL, GM	MSA 15A	HGW 15CA
RBH 20F RBH 20FL	HSR 20A, B HSR 20LA, LB	LH 20EL, EM LH 20GL, GM	MSA 20A MSA 20LA	HGW 20CA HGW 20HA
RBH 25F RBH 25FL	HSR 25A, B HSR 25LA, LB	LH 25EL, EM LH 25GL, GM	MSA 25A MSA 25LA	HGW 25CA HGW 25HA
RBH 30F RBH 30FL	HSR 30A, B HSR 30LA, LB	LH 30EL, EM LH 30GL, GM	MSA 30A MSA 30LA	HGW 30CA HGW 30HA
RBH 35F RBH 35FL	HSR 35A, B HSR 35LA, LB	LH 35EL, EM LH 35GL, GM	MSA 35A MSA 35LA	HGW 35CA HGW 35HA
RBH 45F RBH 45FL	HSR 45A, B HSR 45LA, LB	LH 45EL, EM LH 45GL, GM	MSA 45A MSA 45LA	HGW 45CA HGW 45HA
RBH 55F RBH 55FL	HSR 55A, B HSR 55LA, LB	LH 55EL, EM LH 55GL, GM	MSA 55A MSA 55LA	HGW 55CA HGW 55HA
RBH 15R RBH 15RL	HSR 15R	LH 15AN, AL LH 15BN, BL	MSA 15S	HGH 15CA
RBH 20R RBH 20RL	HSR 20R HSR 20LR	LH 20AN, AL LH 20BN, BL	MSA 20S MSA 20LS	HGH 20CA HGH 20HA
RBH 25R RBH 25RL	HSR 25R HSR 25LR	LH 25AN, AL LH 25BN, BL	MSA 25S MSA 25LS	HGH 25CA HGH 25HA
RBH 30R RBH 30RL	HSR 30R HSR 30LR	LH 30AN, AL LH 30BN, BL	MSA 30S MSA 30LS	HGH 30CA HGH 30HA
RBH 35R RBH 35RL	HSR 35R HSR 35LR	LH 35AN, AL LH 35BN, BL	MSA 35S MSA 35LS	HGH 35CA HGH 35HA
RBH 45R RBH 45RL	HSR 45R HSR 45LR	LH 45AN, AL LH 45BN, BL	MSA 45S MSA 45LS	HGH 45CA HGH 45HA
RBH 55R RBH 55RL	HSR 55R HSR 55LR	LH 55AN, AL LH 55BN, BL	MSA 55S MSA 55LS	HGH 55CA HGH 55HA

2. RBW Series (Standard Wide body Type)

RBX	THK	NSK	PMI	HIWIN	IKO
RBW 17F	HRW 17CA	LW 17EL	-	WEW 17CC	LWFF 33
RBW 21F	HRW 21CA	LW 21EL	MSG 21E	WEW 21CC	LWFF 37
RBW 27F	HRW 27CA	LW 27EL	MSG 27E	WEW 27CC	LWFF 42
RBW 35F	HRW 35CA	LW 35EL	MSG 35E	WEW 35CC	LWFF 69
RBW 17R	HRW 17CR	-	-	WEH 17CA	LWFF 33
RBW 21R	HRW 21CR	-	MSG 21S	WEH 21CA	LWFF 37
RBW 27R	HRW 27CR	-	MSG 27S	WEH 27CA	LWFF 42
RBW 35R	HRW 35CR	-	MSG 35S	WEH 35CA	-

3. RBS Series (Slim Type)

RBX	THK	NSK	PMI	HIWIN
RBS 15C RBS 15R	SR 15V SR 15W	LS 15CL LS 15AL	MSB 15TS MSB 15S	EGH 15SA EGH 15CA
RBS 20C RBS 20R	SR 20V SR 20W	LS 20CL LS 20AL	MSB 20TS MSB 20S	EGH 20SA EGH 20CA
RBS 25C RBS 25R	SR 25V SR 25W	LS 25CL LS 25AL	MSB 25TS MSB 25S	EGH 25SA EGH 25CA
RBS 15CF RBS 15F	SR 15SB SR 15TB	LS 15EM LS 15JM	MSB 15TE MSB 15E	EGW 15CA EGW 15CB
RBS 20CF RBS 20F	SR 20SB SR 20TB	LS 20EM LS 20JM	MSB 20TE MSB 20E	EGW 20CA EGW 20CB
RBS 25CF RBS 25F	SR 25SB SR 25TB	LS 25EM LS 25JM	MSB 25TE MSB 25E	EGW 25CA EGW 25CB

4. RM Series (Miniature Standard Type)

RBX	THK	NSK	PMI	HIWIN	IKO
RM 5C RM 5N	SRS 5GM SRS 5GN	- LU 05TL	- -	MGN 5C -	LWLC 5 LWL 5
RM 7C RM 7N RM 7L	SRS 7GS SRS 7GM SRS 7GN	- LU 07AL -	- MSC 7M MSC 7LM	- MGN 7C MGN 7H	LWLC 7 LWL 7 LWLG 7
RM 9C RM 9N RM 9L	SRS 9GS SRS 9GM SRS 9GN	- LU 09TL LU 09UL	- MSC 9M MSC 9LM	- MGN 9C MGN 9H	LWLC 9 LWL 9 LWLG 9
RM 12C RM 12N RM 12L	SRS 12GS SRS 12GM SRS 12GN	- LU 12TL LU 12UL	- MSC 12M MSC 12LM	- MGN 12C MGN 12H	LWLC 12 LWL 12 LWLG 12
RM 15C RM 15N RM 15L	SRS 15GS SRS 15GM SRS 15GN	- LU 15AL LU 15BL	- MSC 15M MSC 15LM	- MGN 15C MGN 15H	LWLC 15 LWL 15 LWLG 15
RM 20C RM 20N RM 20L	- SRS 20GM -	- - -	- - -	- - -	LWLC 20 LWL 20 LWLG 20

5. RMB Series (Miniature Wide body Type)

RBX	THK	NSK	PMI	HIWIN	IKO
RMB 5C RMB 5N	SRS 5WGM SRS 5WGN	- LE 05AL	- -	- -	LWLFC 10 LWLF 10
RMB 7C RMB 7N RMB 7L	SRS 7WGS SRS 7WGM SRS 7WGN	- LE 07TL -	- MSD 7M MSD 7LM	- MGW 7C MGW 7H	LWLFC 14 LWLF 14 LWLFG 14
RMB 9C RMB 9N RMB 9L	SRS 9WGS SRS 9WGM SRS 9WGN	- LE 09TL, TR -	- MSD 9M MSD 9LM	- MGW 9C MGW 9H	LWLFC 18 LWLF 18 LWLFG 18
RMB 12C RMB 12N RMB 12L	SRS 12WGS SRS 12WGM SRS 12WGN	- LE 12AL, AR -	- MSD 12M MSD 12LM	- MGW 12C MGW 12H	LWLFC 24 LWLF 24 LWLFG 24
RMB 15C RMB 15N RMB 15L	SRS 15WGS SRS 15WGM SRS 15WGN	- LE 15AL, AR -	- MSD 15M MSD 15LM	- MGW 15C MGW 15H	LWLFC 42 LWLF 42 LWLFG 42

Comparison Table of Spacer Chain type No. of Other Manufacturers

1. RBH-S Series (Standard type)

RBX	THK	NSK	PMI	HIWIN
RBH 15SF RBH 15SFL	SHS 15C SHS 15LC	SH 15FL SH 15HL	SME 15EA SME 15LEA	QHW 15CA -
RBH 20SF RBH 20SFL	SHS 20C SHS 20LC	SH 20FL SH 20HL	SME 20EA SME 20LEA	QHW 20CA QHW 20HA
RBH 25SF RBH 25SFL	SHS 25C SHS 25LC	SH 25FL SH 25HL	SME 25EA SME 25LEA	QHW 25CA QHW 25HA
RBH 30SF RBH 30SFL	SHS 30C SHS 30LC	SH 30FL SH 30HL	SME 30EA SME 30LEA	QHW 30CA QHW 30HA
RBH 35SF RBH 35SFL	SHS 35C SHS 35LC	SH 35FL SH 35HL	SME 35EA SME 35LEA	QHW 35CA QHW 35HA
RBH 45SF RBH 45SFL	SHS 45C SHS 45LC	SH 45FL SH 45HL	SME 45EA SME 45LEA	QHW 45CA QHW 45HA
RBH 55SF RBH 55SFL	SHS 55C SHS 55LC	SH 55FL SH 55HL	- -	- -
RBH 15SR RBH 15SRL	SHS 15R -	SH 15AN SH 15BN	SME 15SA SME 15LSA	QHH 15CA -
RBH 20SR RBH 20SRL	SHS 20V SHS 20LV	SH 20AN SH 20BN	SME 20SA SME 20LSA	QHH 20CA QHH 20HA
RBH 25SR RBH 25SRL	SHS 25R SHS 25LR	SH 25AN SH 25BN	SME 25SA SME 25LSA	QHH 25CA QHH 25HA
RBH 30SR RBH 30SRL	SHS 30R SHS 30LR	SH 30AN SH 30BN	SME 30SA SME 30LSA	QHH 30CA QHH 30HA
RBH 35SR RBH 35SRL	SHS 35R SHS 35LR	SH 35AN SH 35BN	SME 35SA SME 35LSA	QHH 35CA QHH 35HA
RBH 45SR RBH 45SRL	SHS 45R SHS 45LR	SH 45AN SH 45BN	SME 45SA SME 45LSA	QHH 45CA QHH 45HA
RBH 55SR RBH 55SRL	SHS 55R SHS 55LR	SH 55AN SH 55BN	- -	- -

2. RBS-S Series (Slim type)

RBX	THK	NSK	PMI	HIWIN
RBS 15SC RBS 15SR	SSR 15XV SSR 15XW	SS 15CL SS 15AL	SME 15EB SME 15LEB	QEH 15SA QEH 15CA
RBS 20SC RBS 20SR	SSR 20XV SSR 20XW	SS 20CL SS 20AL	SME 20EB SME 20LEB	QEH 20SA QEH 20CA
RBS 25SC RBS 25SR	SSR 25XV SSR 25XW	SS 25CL SS 25AL	SME 25EB SME 25LEB	QEH 25SA QEH 25CA
RBS 15SCF RBS 15SF	- SSR 15XTB	SS 15JM SS 15EM	SME 15SB SME 15LSB	QEW 15SA QEW 15CA
RBS 20SCF RBS 20SF	- SSR 20XTB	SS 20JM SS 20EM	SME 20SB SME 20LSB	QEW 20SA QEW 20CA
RBS 25SCF RBS 25SF	- SSR 25XTB	SS 25JM SS 25EM	SME 25SB SME 25LSB	QEW 25SA QEW 25CA

3. RBHS-S Series (Slim type)

RBX	THK
RBHS 25SR RBHS 25SRL	SHS 25V SHS 25LV
RBHS 30SR RBHS 30SRL	SHS 30V SHS 30LV
RBHS 35SR RBHS 35SRL	SHS 35V SHS 35LV

RBX
LINEAR