

LINEAR MOTION

Precision Linear Roller Way - Steel

Super X Series - Roller Retained - 4 Rows of Cylindrical Rollers

Preload

(varies depending on factory manufacture performance - can be supplied with specified preload but this may affect delivery)

Preload class \ Item	Symbol	Preload amount (N)	Application
Standard preload	none	0 §	<ul style="list-style-type: none">• Smooth and precise motion• Load is equally balanced• Minimum vibration
Light preload	T1	0.02 Co	<ul style="list-style-type: none">• Medium vibration• Medium overhung load
Medium preload	T2	0.05 Co	<ul style="list-style-type: none">• Vibration and/or shocks• Overhung load
Heavy preload	T3	0.08 Co	<ul style="list-style-type: none">• Vibration and/or shocks• Large overhung load• Heavy cutting

Average amount of preload is show in the table above.

In case high rigidity and/or damping are needed, the preload amount is recommended to be ½ of the external force. However, excessive preload will cause short life.

§ Zero or minimal amount of preload

Co = basic static load rating

Load Factor

Conditions	<i>fw</i>
Smooth operation free from vibration and/or shocks	1.0 ~ 1.2
Normal operation	1.2 ~ 1.5
Operation with shock loads	1.5 ~ 3.0

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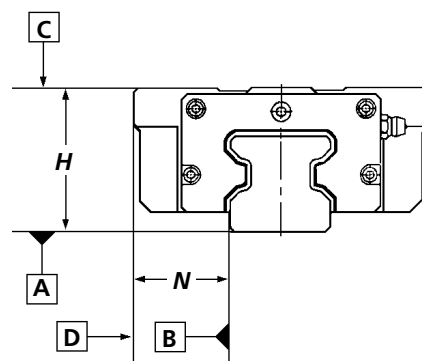
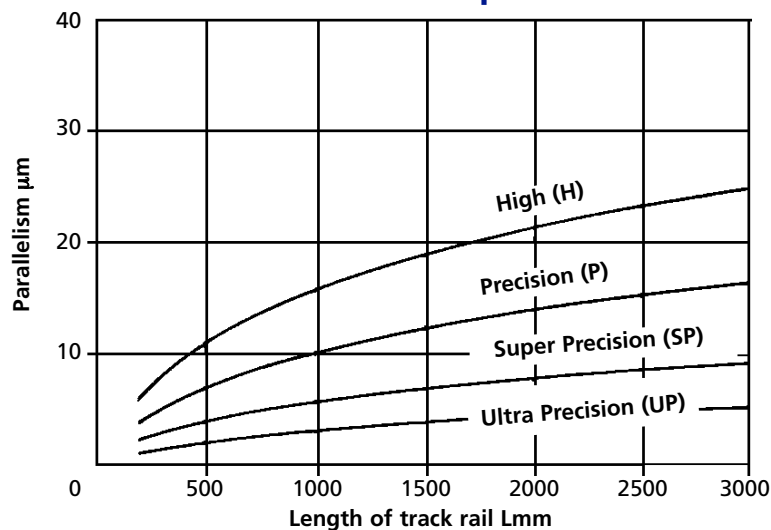
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	(STANDARD) HIGH (H)	PRECISION (P)	SUPER PRECISION (SP)	ULTRA PRECISION (UP)
Dim. H tolerance	± 0.040	± 0.020	± 0.010	± 0.008
Dim. N tolerance ⁽³⁾	± 0.050	± 0.025	± 0.015	± 0.010
Dim. variation of H ⁽¹⁾	0.015	0.007	0.005	0.003
Dim. variation of N ⁽²⁾ ⁽³⁾	0.020	0.010	0.007	0.003
Parallelism in operation of $\square C$ to $\square A$	See Graph			
Parallelism in operation of $\square D$ to $\square B$				

Parallelism in Operation



Note:

- (1) Dimensional variation of dimension H means the size variation between slide units mounted on the same track rail or on matched track rails when the dimension H is measured at the specified position of track rail.
- (2) Dimensional variation of dimension N means the size variation between slide units mounted on the same track rail when the dimension N is measured at the specified position of track rail.
- (3) These values also apply to the Linear Roller Way Super X series which have opposite reference surface arrangements.

All of the above figures are applicable when the dimensions are measured at the centre of each slide unit assembled with a track rail fixed onto a flat base.

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HIGH RIGIDITY

Rigidity of linear motion rolling guideways has a large influence on the performance of machines or equipment in which they are assembled. High rigidity of *Linear Roller Way Super X* has been achieved by incorporating a large number of rollers, which give a smaller amount of elastic deformation under load compared with balls.

WELL-BALANCED STRUCTURE

Four rows of rollers are arranged in good balance to take loads in any directions. The load ratings in upward, downward and lateral directions are equal. Also, this structure offers superior rigidity against a moment load, because the distance between the roller rows to take the moment load is made as large as possible.

SUPERIOR DAMPING CHARACTERISTIC

As the rigidity of *Linear Roller Way Super X* is high, deformation under repeated fluctuating loads is extremely small. Furthermore, damping characteristic is also superior.

HIGH LOAD CAPACITY

As the contact between the roller and the raceway is large compared with that between the ball and the raceway, the load capacity of roller type is larger than that of the ball type. A large number of rollers are incorporated to achieve very high load capacity.

SMOOTH AND QUIET MOTION

As an epoch-making structure for roller recirculating path is adopted, a small and quiet motion can be obtained.

REFERENCE MOUNTING SURFACE

The reference mounting surface of a slide unit of IKO Linear Roller Way Super X series is always the side surface opposite to the IKO mark. The reference mounting surface of track rail is identified by locating the IKO mark etched on the top surface of the track rail. The reference mounting surface is always the side surface pointed by the arrows besides the IKO mark. See **Diagram 1**.

LONG LIFE AND HIGH ACCURACY

The raceways are finished by precision grinding therefore, high accuracy and long life can be obtained. As the number of load carrying rollers is large, the minute deflection during operation can be minimised.

Table 1 - Rated life

SERIES NAME	RATED LIFE
LWL/CLWL LRX BSP/BSPG/BSR LSAG LBE	50 x 10 ³ m
CRW	100 x 10 ³ m

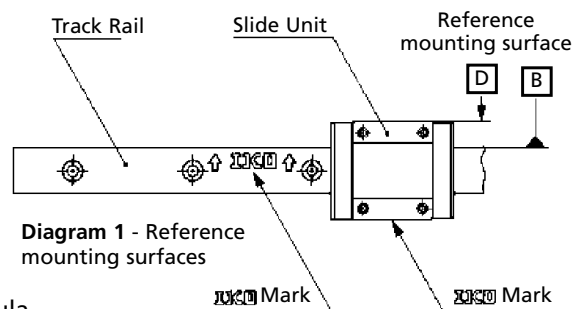


Table 2 - Applicable life calculation formula

Series Name	RATED LIFE		Symbols
	Unit : 10 ³ m	Unit : hours	
LWL/CLWL BSP/BSPG/BSR LSAG LBE	$L = 50 \left(\frac{C}{P}\right)^3 \dots\dots\dots(1)$	$L_h = \frac{10^6 L}{25n_1 \times 60} \dots\dots\dots(3)$	L : Rated life, 10 ³ m C : Basic dynamic load rating, kgf P : Applied load (dynamic equivalent load), kgf L _h : Rated life in hours, h S : Stroke length, mm n ₁ : Number of strokes per minute, cpm
LRX	$L = 50 \left(\frac{C}{P}\right)^{10/3} \dots\dots\dots(2)$		
CRW	$L = 100 \left(\frac{C}{P}\right)^3 \dots\dots\dots(3)$		

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LUBRICATION & DUST PROTECTION

The primary purpose of lubrication for linear motion rolling guides is to keep raceways, rolling elements and cages from direct metal-to-metal contact, thereby reducing wear and friction. The lubrication also reduces the development of wear and friction from a little sliding such as differential slip, skewing, spin, etc., and thereby prevents the heat generation or burning of rolling guides.

Since the performance of rolling guides will be influenced by the lubricant and lubrication method, it is necessary to select an adequate lubricant and adequate lubrication method in accordance with the type of guide, load, operating speed, etc. However, compared with conventional plain guides, the necessary amount of lubricant for rolling guides is much smaller and the interval between lubrication periods can be much longer - substantially reducing the cost and manpower for maintenance. Rolling guides may use either grease or oil for lubrication.

For grease lubrication, a lithium-soap base grease is commonly used. For rolling guides operating under heavy load, a grease containing extreme pressure additive is recommended. For oil lubrication, heavier loads require a higher viscosity oil. Higher operation speed requires lower viscosity.

For operation under heavy loads or high moment loads, a lubricating oil of around 68 cSt may be successfully used. For lighter loads or higher operation speed, or where extremely smooth movement is required, a lower viscosity oil around 13 cSt may be employed.

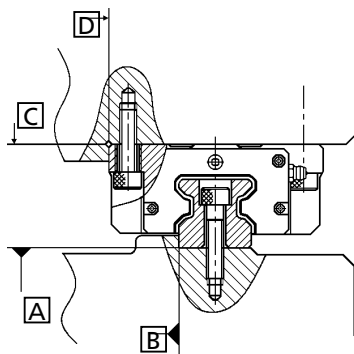


Diagram 2 - Mounting example

PRECAUTIONS FOR USE

When using multiple slide units in close distance to each other, the actual load may be greater than the calculated load depending on the accuracy of the mounting surface and the reference mounting surface of the machine. It is suggested in such cases to assume a greater actual load into consideration.

EXAMPLE OF MOUNTING IN GENERAL APPLICATION

As shown in the **Diagram 2** below mounting surfaces B and D and the mounting surfaces A and C are precisely finished by grinding. Therefore, a stable linear motion of high accuracy will be obtained by precise finishing of the mounting surfaces of the machine and correct mounting on those surfaces. It is recommended to make a relieved fillet at the corner of the mating reference mounting surfaces as shown in **Diagram 6**. However, the corner radius somewhat less than R values can also be used.

MOUNTING BOLT TIGHTENING TORQUE

According to the material of mating parts and the magnitude and direction of external forces, increase the amount of tightening torque.

OPERATING TEMPERATURE

A continuous operation is possible at temperatures up to 100°C.

CAUTION IN HANDLING

When handling *Linear Roller Way Super X series*, handle them with care. Especially when the slide unit is stroked. Do not put fingers into the mounting holes of track rail which may give rise to serious trouble.

STATIC RATED MOMENT

The static rated moment is defined as a static moment load, see **Diagram 3** that gives a prescribed constant contact stress at the centre of the contact area between rolling elements and raceways receiving maximum load.

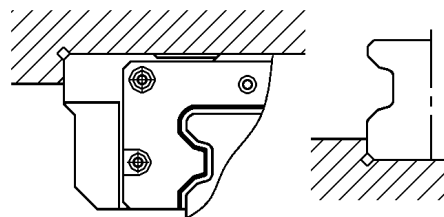


Diagram 3 - Relieved fillet at the corner of the mating reference mounting surfaces