## Eco-friendly specification

### Eco-friendly

Consumption of precious oil resource is minimized! And elimination of oil feeder and its piping reduces the initial cost!

**Contributes to reduction of total cost and environmental loads!!**

### Oil usage reduction effect

- **Maintenance free**
  - Endures running over 20,000 km without oil feeding!
  - Troublesome lubrication maintenance process is reduced!!

- **Compactness**
  - The space consuming oil feeder is eliminated to save the space!
  - Freedom of machine designing is expanded for user!!

### Efficient use of space

#### U.S. PATENTED

<table>
<thead>
<tr>
<th>Linear Way L</th>
<th>Linear Way L</th>
<th>Linear Way L</th>
<th>Linear Way L</th>
<th>Linear Way L</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 7672784</td>
<td>76732675</td>
<td>6727251</td>
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<td>6727251</td>
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<td>6727251</td>
<td>6727251</td>
</tr>
</tbody>
</table>

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*Image: IKO Gentle to the Earth*
Long term maintenance free is realized with oil impregnated with C-Lube only!!

Maintenance free

This endures over 20,000 km without oil feeding with lubrication oil in the C-Lube only. Furthermore, grease is pre-packed in the slide unit so long-term maintenance free can be realized.

Maintenance free is achieved until the end of device life!

Eco-friendly

As lubrication oil in C-Lube is supplied by the amount necessary to maintain lubrication performance of the rolling guide, the consumption of lubrication oil is reduced and lubrication performance is maintained even when it runs for a long period.

Eco-friendly specification reducing usage of lubrication oil!

Compact

As C-Lube Linear Way and C-Lube Linear Roller Way are integrated with lubrication part C-Lube, their slide units are not long unlike types with external lubrication parts. Replacement of conventional parts is easy free from constraints of mounting space and stroke length.

Compact design taking into account compactness!

Smooth

C-Lube Linear Way and C-Lube Linear Roller Way do not generate slide resistance unlike lubrication parts external to the slide unit that make contact with the track rail. Driving force follow-up property is superior and energy is saved by improvement of accuracy and reduction of friction loss.

Light and smooth motion is achieved!
Ultimate Interchangeable pursuit of elimination

**Accuracy interchangeability**

Three accuracy classes are available! Height variation can be controlled with multiple assembled sets!

High accuracy of the device can be maintained in the multiple-use environment!!

**Unit interchangeability**

Many type of slide units are available! Every slide unit is interchangeable with the same track rail!

It is easily added or replaced!!

**Short delivery products**

Separate delivery of slide unit and track rail!

You may order what you need by any quantity at any time!!

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**Q** I dropped the Linear Way unit by mistake, and the unit is damaged. Can I replace it?

**A**

If you use Linear Way of interchangeable specification, you may need to replace only slide unit.

**Q**

I need to increase the rigidity of the unit because of sudden specification change.

**A**

The rigidity can be improved easily by increasing the unit length.

**Q** I carelessly forgot to arrange some parts, but I need them urgently. Can it be delivered soon?

**A**

Interchangeable parts are available for short delivery, they can be delivered quickly with our perfect inventory system. Slide unit and track rail can be ordered individually.

**Q** Calculated accuracy cannot be achieved after assembly of the device?

**A**

Accuracy interchangeability, preload interchangeability

How do you like to use accuracy higher by one class or higher preload type?

As accuracy of the interchangeable products is controlled strictly by parts, setting can be modified.
Features of Interchangeable Specification

Free combination is enabled for model, accuracy, preload!!

Ultimate interchangeable system

Interchangeable specification

Interchangeable specification realizes:
- Wish to prepare for a sudden design change
- Wish to select freely the combination of high accuracy and preload
- Slide unit and track rail are separately handled
- Free combination of slide unit and track rail can be selected
- Compactness-independent storing of slide units and track rails

Requirements of:
- Wish to improve the rigidity and life of machines
- Wish to improve the accuracy of machines
- Wish to replace the slide unit immediately
- The number of slide units is in short
- Wish to replace the track rail immediately
- The length of track rail is not sufficient
- Wish to store only the slide units in stock for emergency

Select the products as many as you wish.

<table>
<thead>
<tr>
<th>Slide unit</th>
<th>Track rail</th>
<th>Set condition</th>
</tr>
</thead>
</table>

Unit interchangeability

A wide variety of slide unit models with different sectional shape and length are provided, for free replacement on the same track rail.

Interchangeability of track rail

Interchangeability of slide unit

Interchangeability of track rail

Accurancy interchangeability

Three accuracy classes of Ordinary, High and Precision class are provided, to support even high traveling accuracy purposes. In addition, as height variation of multiple assembled sets is managed with high accuracy, you may use parallel track rails at ease.

It allows the accuracy improvement of units without design changes!

Preload interchangeability

The high accuracy dimensions management utilizing the simple structure achieved the interchangeability of preloaded slide units. It supports the applications requiring the rigidity of one higher rank.

High preload setting is possible thanks to high accuracy dimensions control

It allows the rigidity improvement of units without design changes!

Maintenance free is achieved only by replacing the slide unit!

By replacing the interchangeable Linear Way or Linear Roller Way slide unit with C-Lube Linear Way or C-Lube Linear Roller Way slide unit, maintenance free is achieved while using the same track rail.

Free selection is possible for slide units and track rails!
IKO's excellent features realized by contact in two-row raceways

Two-row four-point contact type simple structure
IKO adopts two-row four-point contact type for every Linear Way series. Thanks to our design know how and production technologies having been fostered for long time, high accuracy and smooth motion are realized in the micro series. In addition, load in every direction can be received evenly and therefore stable high accuracy and rigidity can be achieved even in applications where load has variable direction and size or complex load is applied.

Simple two-row four-point contact structure

Essential for micro sizing!

Micro Linear Way L realized by simple structure
Micro Linear Way L for further needs of miniaturization produced by original small size technology. Wide variety of track rail width from 1 mm to 6 mm is available and high accuracy of micro positioning mechanism is realized.

Track rail width
1 mm

World's smallest size!
- High accuracy even with the smallest size of 1 mm
- Even the smallest size of 1 mm can be securely mounted and fixed
- Even the smallest size of 1 mm can ensure stable operation
LWL1 can be used for further super miniaturization of machines and devices with free-minded thinking.

interchangeable
The simple structure of four-contact in two-row raceway yields small manufacturing errors or accuracy measurement errors, allowing the maintenance of each raceway in the high dimensions accuracy.

This technology realizes interchangeable specification and high interchangeable system in every series!

Variety of models and size variations
A wide variety of models and sizes, such as super miniature size of only 1 mm track rail width, is provided for your selection to meet each requirement.

<table>
<thead>
<tr>
<th>Series</th>
<th>Model</th>
<th>Size</th>
<th>Track rail width Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-Lube Linear Way ML</td>
<td>ML</td>
<td>20</td>
<td>3 ~ 42 mm</td>
<td></td>
</tr>
<tr>
<td>Linear Way L</td>
<td>LWL</td>
<td>22</td>
<td>1 ~ 42 mm</td>
<td></td>
</tr>
<tr>
<td>C-Lube Linear Way MLV</td>
<td>MLV</td>
<td>1</td>
<td>7 ~ 12 mm</td>
<td></td>
</tr>
<tr>
<td>Linear Way MV</td>
<td>MV</td>
<td>1</td>
<td>20 ~ 30 mm</td>
<td></td>
</tr>
<tr>
<td>C-Lube Linear Way ME</td>
<td>ME</td>
<td>1</td>
<td>15 ~ 45 mm</td>
<td></td>
</tr>
<tr>
<td>Linear Way E</td>
<td>LWE</td>
<td>6</td>
<td>15 ~ 45 mm</td>
<td></td>
</tr>
<tr>
<td>C-Lube Linear Way MH</td>
<td>MH</td>
<td>17</td>
<td>8 ~ 45 mm</td>
<td></td>
</tr>
<tr>
<td>Linear Way H</td>
<td>LWH</td>
<td>19</td>
<td>8 ~ 65 mm</td>
<td></td>
</tr>
<tr>
<td>Linear Way F</td>
<td>LWF</td>
<td>4</td>
<td>33 ~ 90 mm</td>
<td></td>
</tr>
<tr>
<td>C-Lube Linear Way MUL</td>
<td>MUL</td>
<td>1</td>
<td>25 ~ 30 mm</td>
<td></td>
</tr>
<tr>
<td>Linear Way U</td>
<td>LWU</td>
<td>1</td>
<td>40 ~ 86 mm</td>
<td></td>
</tr>
</tbody>
</table>
**Ultimate high performance produced by world's first roller guide structure of IKO**

**Super high load capacity**

The Linear Roller Way Super X has a large contact area with the way and a number of cylindrical rollers with excellent load capacity, which allows to achieve larger load rating.

**Comparison of basic dynamic load rating**

<table>
<thead>
<tr>
<th>Size</th>
<th>MXH and LMK</th>
<th>MXM and LMW</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>12</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>15</td>
<td>150</td>
<td>150</td>
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<td>18</td>
<td>180</td>
<td>180</td>
</tr>
<tr>
<td>20</td>
<td>200</td>
<td>200</td>
</tr>
</tbody>
</table>

**Comparison of basic static load rating**

<table>
<thead>
<tr>
<th>Size</th>
<th>MXH and LMK</th>
<th>MXM and LMW</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>12</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>15</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>18</td>
<td>180</td>
<td>180</td>
</tr>
<tr>
<td>20</td>
<td>200</td>
<td>200</td>
</tr>
</tbody>
</table>

**Size smaller by one size than the ball type can be used!**

**Super high rigidity**

The rigidity of linear motion rolling guide significantly affects properties of machines and devices to be incorporated.

The Linear Roller Way Super X achieves high rigidity as a number of small cylindrical rollers with smaller elastic deformation relative to load than that of balls are incorporated in the slide unit.

**Comparison of elastic deformation**

<table>
<thead>
<tr>
<th>Load (N)</th>
<th>MXH (ball type)</th>
<th>MXG (roller type)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5000</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>10000</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>15000</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>20000</td>
<td>40</td>
<td>8</td>
</tr>
</tbody>
</table>

**Well-balanced high rigidity is realized in every direction!**

**Long life**

**(Roller Type) MXG45**

- **C = 124 000 N**
- **C = 223 000 N**

**(Ball Type) MHG45**

- **C = 95 200 N**
- **C = 114 000 N**

**Roller type has large basic dynamic load rating C and long life due to the different "index"!**

**Life calculation example**

**Roller Type**

\[ L = 50 \left( \frac{C}{P} \right)^{10/3} \]

Applied load in case of 10000 N

- \[ L = 220 000 \text{ km} \]

**Ball Type**

\[ L = 50 \left( \frac{C}{P} \right)^{3} \]

- \[ L = 43 000 \text{ km} \]

**Significant increase!**
Vibration characteristics

The Linear Roller Way Super X has high rigidity relative to ball types of the same size, so deformation amount is low relative to repeated fluctuating load, natural frequency is high and vibration damping time is short.

**Positioning time can be shortened!**

allows accurate positioning with excellent frictional characteristic

The Linear Roller Way Super X prevents skew of cylindrical roller and achieves smooth motion by adopting unique retaining method to accurately guide cylindrical roller ends with retaining plate. The Linear Roller Way Super X has good response characteristics to micro-feeding and allows for accurate positioning, thanks to small frictional resistance against preload and load and excellent frictional characteristics relative to plain guides and ball type linear motion rolling guide.

**High follow-up property is ensured even for micro-feeding!**

High running accuracy

Optimal design based on analysis of re-circulation behavior of cylindrical roller circulation realizes smooth and quiet motion. In addition, load is applied to many cylindrical rollers and therefore the micro deflection during running is minimized.

Extra long unit is optimal for applications requiring higher running accuracy. (For details, see page 21)

| Deflection amount during running \( \mu \)m | MXD30(1) preload 0.12 |

Stable running accuracy is achieved!

Corresponding to compactification

Roller type with significantly higher load capacity than the ball type. The Linear Roller Way Super X, allows for downsizing from many size variations for compactification of devices.

Downsizing and increased load capacity!

Compatible ball type and mounting dimensions

The Linear Roller Way Super X has mounting dimensions compatible with the ball type Linear Way H. Replacement with roller type is possible without significant design change to machine or device.
A variety of models and size variations

**Ball Type Miniature Series**

**C-Lube Linear Way ML**

**C-Lube Linear Way MLV**

**Linear Way L**

Thanks to the structure with two rows of balls to contact with the way at four points, stable accuracy and rigidity can be achieved even in applications where load has variable direction and size or complex load is applied, despite its very small body.

**Micro Linear Way L**

As the lineup of track rail width from 1 mm to 6 mm is available, you can select an optimal product for the specifications of your machine and device. For LWL1, world’s smallest size is realized: track rail width of 1 mm, side unit width of 4 mm and assembly height of 2.5 mm.

**Ball Type Low Profile/Light Weight Series**

**C-Lube Linear Way MV**

Despite its extra low profile and extra light weight, this linear motion guide has the maximum load rating among the ball types while achieving high load capacity.

**Ball Type Compact Series**

**C-Lube Linear Way ME**

**Linear Way E**

**Low Decibel Linear Way E**

Versatile linear motion rolling guide that has achieved utility pursuing compactness in every aspect. Low decibel types with resin separator to prevent direct contact between balls are also available.

**Ball Type High Rigidity Series**

**C-Lube Linear Way MH**

**Linear Way H**

High rigidity linear motion rolling guides designed to evenly support high load capacity by incorporating large-diameter balls. Stable accuracy and rigidity can be achieved even in applications where load with variable direction and size and complex load are applied.
Models and Size Variations

A variety of models and size variations

Ball Type Wide Type Series

Linear Way F

As wide track rail is used and the distance between the load points is long, this is a linear motion rolling guide suitable to single-row use due to the structure resistant to across-the-width moment load. It is also resistant to complex load.

<table>
<thead>
<tr>
<th>Flange type mounting from top / bottom</th>
<th>Block type mounting from top</th>
<th>Length of slide unit</th>
<th>No symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>LWHF</td>
<td>LWFS</td>
<td>Standard</td>
<td>40, 60, 80</td>
</tr>
<tr>
<td>LWFF</td>
<td></td>
<td>MXX</td>
<td>33, 37, 42, 69</td>
</tr>
<tr>
<td>LWFS</td>
<td></td>
<td>LXK</td>
<td>33, 37, 42</td>
</tr>
</tbody>
</table>

Roller Type

C-Lube Linear Roller Way Super MX

Linear motion rolling guide that has achieved the highest level of performance in all characteristics utilizing the roller's superior characteristics, such as rigidity, load capacity, running accuracy and vibration damping property. With extra long unit with the maximum slide unit length, load capacity and rigidity are improved and running performance with super high accuracy is realized.

<table>
<thead>
<tr>
<th>Flange type mounting from top / bottom</th>
<th>Block type mounting from top</th>
<th>Compact block type mounting from top</th>
<th>Low profile flange type mounting from top</th>
<th>Low profile block type mounting from top</th>
</tr>
</thead>
<tbody>
<tr>
<td>MXX(?)</td>
<td>MXXD</td>
<td>MXX5</td>
<td>MON</td>
<td>MOONS</td>
</tr>
<tr>
<td>LXK(?)</td>
<td>LKXD</td>
<td>LKXS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note (1) Size 2D series allows only for mounting from top and model mounting from bottom is MON and LXK5.

Ball Type U-Shaped Track Rail Series

C-Lube Linear Way MUL

Linear motion rolling guide of the structure with way inside the track rail of U-shaped section and slide unit therein. With the U-shaped track rail, rigidity against the track rail moment load and torsion is significantly improved.

<table>
<thead>
<tr>
<th>Small type</th>
<th>Standard type</th>
<th>Length of slide unit</th>
<th>No symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUL</td>
<td>LWU</td>
<td>Standard</td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Size</td>
<td>Size</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MUL</td>
<td>25, 30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LWU</td>
<td>60, 60, 60, 66</td>
</tr>
</tbody>
</table>

Four-row roller guide of world's smallest size Track rail width of 10 mm

Super high rigidity
Super high load capacity
High running performance
Excellent frictional characteristics

Stainless steel made

LRXD10...SL
Features of extra long unit

C-Lube Linear Roller Way Super MX

Length of slide unit is 1.4 to 1.5 times longer than that of standard unit

Further improvement of running accuracy

Load capacity and rigidity are significantly improved!!

Load capacity of machine or device is improved

As its basic dynamic load rating and basic static load rating are larger than those of Long type by 158% and 122%, respectively, life and margin safety of machine or device are improved.

Comparisons of basic dynamic load rating

Increased to 158% relative to standard unit!
Increased to 122% relative to long unit!

(In case of MXL45L)

Comparisons of basic static load rating

Increased to 181% relative to standard unit!
Increased to 129% relative to long unit!

(In case of MXL45S)

Super accurate feeding mechanism is realized

As running accuracy is as low as a half of that of long unit, feeding mechanism with super high accuracy can be realized.

Test conditions

<table>
<thead>
<tr>
<th>Test position</th>
<th>MXD645</th>
<th>T, M preload</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Test position</th>
<th>MXD645</th>
<th>T, M preload</th>
</tr>
</thead>
</table>

High accuracy running performance is realized

without major change of machine or device design

Note: Position of the side unit mounting hole is changed.

Contributing to improvement of machine or device rigidity

Elastic deformation relative to load is small in comparison with long unit, device rigidity is improved, accuracy is improved, and resonance can be avoided.

Comparisons of elastic deformation under downward load

Rigidity increased to 155% relative to standard unit!
Rigidity increased to 117% relative to long unit!

(With displacement of 10 μm for size 45)

Comparisons of elastic deformation under upward load

Rigidity increased to 152% relative to standard unit!
Rigidity increased to 113% relative to long unit!

(With displacement of 10 μm for size 45)