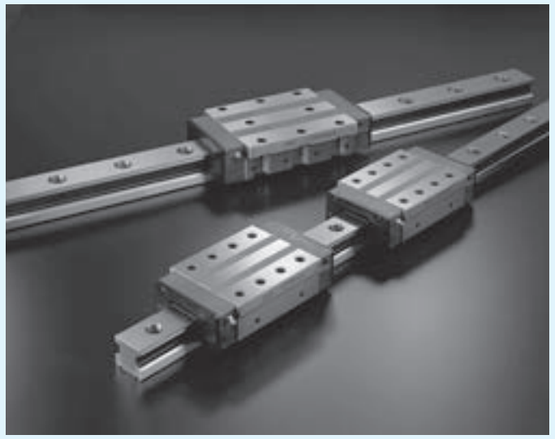
# Linear Way Module



# Linear Way Module

# LWLM


## Points

### ● Compact module type

1 Compact linear motion rolling guides consisting of a set of track rail and slide member which forms the smallest unit of linear motion mechanism.

### ● Available Models

2 Two models are available: LWLM which uses balls for the rolling elements; and LRWM which uses rollers.

### ● Stainless steel selections for excellent corrosion resistance

3 LWLM is made of stainless steel of excellent corrosion resistance. They are suitable for applications where rust prevention oil is not preferred, such as in cleanroom environment.



# Identification Number and Specification

## Example of an identification number

The specification of Linear Way Module series is indicated by the identification number. Indicate the identification number, consisting of a model code, dimensions, a part code, a classification symbol, and any supplemental codes for each specification to apply.

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Assembled set | LRWM | 3 | M2 | R660 | SP | /W2 |

1 **Model** — Model code Page Ⅱ－235

2 **Size** — Dimensions Page Ⅱ－235

3 **Number of slide members** — Part code Page Ⅱ－235, Page Ⅱ－236

4 **Length of track rail**

5 **Accuracy class** — Classification symbol Page Ⅱ－237

6 **Special specification** — Supplemental Code Page Ⅱ－238



1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

# Identification Number and Specification —Model · Size · Number of Slide Member—

## 1 Model

Linear Way Module

Linear Way LM (1) : LWLM
Linear Roller Way M (1) : LRWM

For applicable models and sizes, see Table 1.1 and 1.2.

Note (1) This model has no built-in C-Lube.

## 2 Size

7, 9, 11
2, 3, 4, 5, 6

For applicable models and sizes, see Table 1.1 and 1.2.

## 3 Number of slide members

: M○

Indicates the number of slide members assembled on a track rail.

*Table 1.1 Model and sizes of LWLM series*

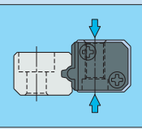
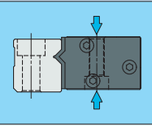
| Shape | Model | Size | | |
|---|---|---|---|---|
| | | 7 | 9 | 11 |
|  | LWLM | ○ | ○ | ○ |

*Table 1.2 Model and sizes of LRWM series*

| Shape | Model | Size | | | | |
|---|---|---|---|---|---|---|
| | | 2 | 3 | 4 | 5 | 6 |
|  | LRWM | ○ | ○ | ○ | ○ | ○ |

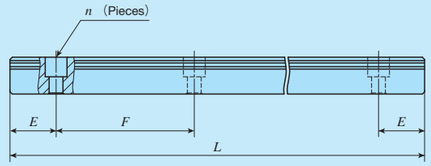
## —Length of Track Rail—

## 4 Length of track rail

: R○

Indicate the length of track rail in mm.
For standard and maximum lengths, see Table 2.

*Table 2 Standard and maximum lengths of track rail*




unit: mm

| Item \ Identification number | | LWLM7 | LWLM9 | LWLM11 |
|---|---|---|---|---|
| Standard length $L$ ($n$) | | 60 ( 3)<br>80 ( 4)<br>120 ( 6)<br>160 ( 8) | 100 ( 4)<br>150 ( 6)<br>200 ( 8)<br>275 (11) | 160 ( 4)<br>240 ( 6)<br>320 ( 8)<br>440 (11) |
| Pitch of mounting holes $F$ | | 20 | 25 | 40 |
| $E$ | | 10 | 12.5 | 20 |
| Standard $E$ dimensions | or higher | 4.5 | 5 | 5.5 |
| | below | 14.5 | 17.5 | 25.5 |
| Maximum length (1) | | 240<br>(500) | 350<br>(900) | 520<br>(1 000) |

| Item \ Identification number | | LRWM2 | LRWM3 | LRWM4 | LRWM5 | LRWM6 |
|---|---|---|---|---|---|---|
| Standard length $L$ ($n$) | | 480 ( 8)<br>660 (11)<br>840 (14) | 480 ( 8)<br>660 (11)<br>840 (14) | 800 (10)<br>1 040 (13)<br>1 200 (15) | 800 ( 8)<br>1 200 (12)<br>1 500 (15) | 1 200 (10) |
| Pitch of mounting holes $F$ | | 60 | 60 | 80 | 100 | 120 |
| $E$ | | 30 | 30 | 40 | 50 | 60 |
| Standard $E$ dimensions | or higher | 8 | 9 | 10 | 12 | 13 |
| | below | 38 | 39 | 50 | 62 | 73 |
| Maximum length | | 1 800 | 1 860 | 1 920 | 1 600 | 1 200 |

Note (1) Length up to the value in ( ) can be produced. If needed, please contact IKO.
Remark: If not directed, $E$ dimensions for both ends will be the same within the range of standard $E$ dimensions. To change the dimensions, indicate the specified rail mounting hole positions "/E" of special specification. For more information, see page Ⅲ−30.



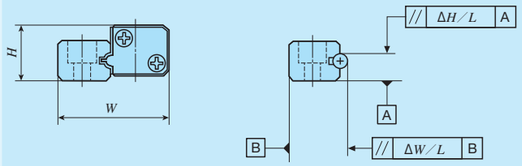


1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

## 5 Accuracy class

| | | |
|---|---|---|
| High | : H | For details of accuracy class, see Table 3. |
| Precision | : P | |
| Super precision | : SP | |

*Table 3 Tolerance and allowance*




unit: mm

| Item \ Class (classification symbol) | High (H) | Precision (P) | Super precision (SP) |
|---|---|---|---|
| Dim. $H$ tolerance | ±0.040 | ±0.020 | ±0.010 |
| Dim. $W$ tolerance | ±0.050 | ±0.025 | ±0.015 |
| Dim. variation of $H$(1) | 0.015 | 0.007 | 0.005 |
| Dim. variation of $W$(1) | 0.020 | 0.010 | 0.007 |
| Track rail parallelism $\Delta H$ | See Fig. 1.1 and Fig. 1.2 | | |
| Track rail parallelism $\Delta W$ | See Fig. 1.1 and Fig. 1.2 | | |

Note (1) It means the size variation between slide members mounted on the same track rail.

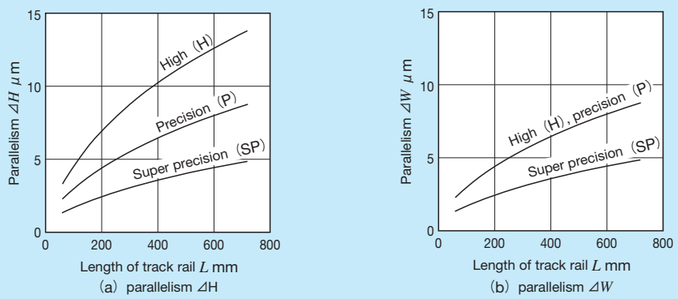



*Fig.1.1 Track rail parallelism for LWLM*

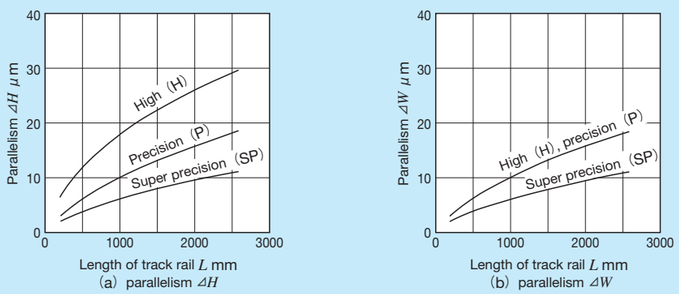



*Fig.1.2 Track rail parallelism for LRWM*





## 6 Special specification

| | |
|---|---|
| /A, /E, /F, /I, /L○, /LF○, /MN, /W○, /Y○ | For applicable special specifications, see Table 4. For combination of multiple special specifications, see Table 5. For details of special specifications, see page Ⅲ—29. |

*Table 4 Application of special specifications*

| Special specification | Supplemental code | Model and size | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | LWLM | | | LRWM | | | | |
| | | 7 | 9 | 11 | 2 | 3 | 4 | 5 | 6 |
| Butt-jointing track rails | /A | × | × | × | ○ | ○ | ○ | ○ | ○ |
| Specified rail mounting hole positions | /E | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Caps for rail mounting holes | /F | × | × | × | ○ | ○ | ○ | ○ | ○ |
| Inspection sheet | /I | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Black chrome surface treatment | /L○ | × | × | × | ○ | ○ | ○ | ○ | ○ |
| Fluorine black chrome surface treatment | /LF○ | × | × | × | ○ | ○ | ○ | ○ | ○ |
| Without track rail mounting bolt | /MN | ○ | ○ | ○ | ○(1) | ○(1) | ○(1) | ○(1) | ○(1) |
| A group of multiple assembled sets | /W○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Specified grease | /Y○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note (1) None of mounting bolts for slide member and track rail are appended.

*Table 5 Combination of supplemental codes*

| | A | E | F | I | L | LF | MN | W |
|---|---|---|---|---|---|---|---|---|
| E | – | | | | | | | |
| F | ○ | ○ | | | | | | |
| I | ○ | ○ | ○ | | | | | |
| L | ○ | ○ | ○ | ○ | | | | |
| LF | ○ | ○ | ○ | ○ | – | | | |
| MN | ○ | ○ | ○ | ○ | ○ | ○ | | |
| W | ○ | – | ○ | ○ | ○ | ○ | ○ | |
| Y | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Remarks 1. The combination of "–" shown in the table is not available.
2. When using multiple types for combination, please indicate by arranging the symbols in alphabetical order.

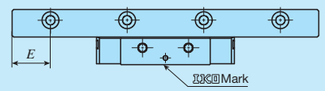



*Fig.2 Specified rail mounting hole positions (Supplemental code /E)*

Remark: For details of specified rail mounting hole positions (supplemental code /E), see page Ⅲ—30.



1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

# Lubrication

Lithium-soap base grease with extreme-pressure additive (Alvania EP Grease 2 [Shell Lubricants Japan K.K.]) is pre-packed in Linear Way Module series.
Though grease nipples are not appended to Linear Way Module series, oil holes are provided to slide member so that the grease or lubrication oil supplied from machines / devices is directly guided to the rolling elements recirculation route. Lubrication is easily conducted by providing the supply route in the machines / devices as shown in Fig. 3.

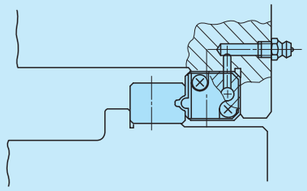


*Fig. 3 Example of lubrication method*

# Dust Protection

The slide members of Linear Way Module series are equipped with end seals as standard for dust protection. However, if large amount of contaminant or dust are floating, or if large particles of foreign substances such as chips or sand may adhere to the track rail, it is recommended to cover the whole unit with bellows or telescope type shield, etc.

# Precaution for Use

### ❶ Mounting surface, reference mounting surface and typical mounting structure

When mounting the Linear Way Module series, properly align the reference mounting surfaces B and D of the track rail and slide member with the reference mounting surface of the table and bed and fix them. (See Fig. 4)
The reference mounting surfaces B and D and mounting surfaces A and C are precisely ground. Machining the mounting surface of the table and bed, such as machine or device, to high accuracy and mounting them properly will ensure stable linear motion with high accuracy.

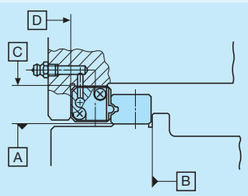



*Fig. 4 Reference mounting surface and typical mounting structure*

### ❷ Fixing the slide member

Typical mounting structure of Linear Way Module series is shown in Fig. 5. As a convenient means to eliminate play or to give preload in linear motion rolling mechanism, preload adjusting screws are often used.
Set the preload adjusting screws at the positions of fixing bolts of slide member and in the middle of the height of slide member, and then press the slide member by tightening the screw.
For mounting the slide member of Linear Way Module LWLM, it is recommended to fix the slide member from the table side, because the allowance for the preload adjustment in the bolt hole of slide member is small. In this case, the bolt hole and the counterbore in the table should be made larger to give the adjustment allowance.

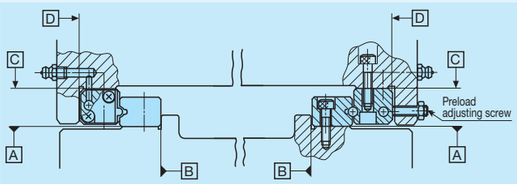



*Fig.5 Mounting by preload adjusting screws*

Preload amount varies depending on operational conditions of your machine and device. However, as excessive preload may lead to short life and damage on the raceway, it is typically ideal to adjust to zero clearance or slight preload state.

### ❸ Shoulder height and corner radius of the reference mounting surface

For the opposite corner of the mating reference mounting, it is recommended to have relieved fillet as indicated in Fig. 6. Recommended value for the shoulder height and corner radius on the mating side is indicated in Table 7.1, Table 7.2 and Table 7.3.

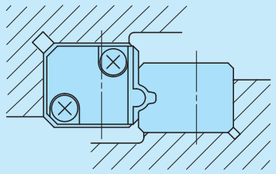


*Fig. 6 Corner of the mating reference mounting*

### ❹ Tightening torque for fixing screw

Typical tightening torque for mounting of Linear Way Module series to the steel mating member material is indicated in Table 6. When vibration and shock of the machine or device are large, fluctuating load is large, or moment load is applied, fix it by using the torque 1.2 to 1.5 times larger than the value indicated in the table as necessary. If the mating member material is cast iron or aluminum alloy, reduce the tightening torque depending on the strength characteristics of the mating member material.

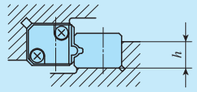
*Table 6 Tightening torque for fixing screw*

| Bolt size | Tightening torque N・m | |
|---|---|---|
| | High carbon steel-made screw | Stainless steel-made screw |
| M 2.6×0.45 | – | 0.7 |
| M 3 ×0.5 | 1.8 | 1.1 |
| M 4 ×0.7 | 4.1 | – |
| M 5 ×0.8 | 8.0 | – |
| M 6 ×1 | 13.6 | – |
| M 8 ×1.25 | 32.7 | – |
| M10 ×1.5 | 63.9 | – |
| M12 ×1.75 | 110 | – |

Remark: The tightening torque is calculated based on strength division 12.9 and property division A2-70.



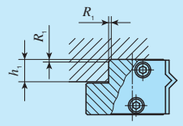
*Table 7.1 Shoulder height of the reference mounting surface for LWLM*



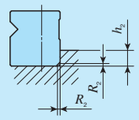

unit: mm

| Size | Mounting part of track rail shoulder height $h$ |
|---|---|
| 7 | 4 |
| 9 | 5 |
| 11 | 6 |

*Table 7.2 Shoulder height and corner radius of the reference mounting surface for LRWM*




Mounting part of slide member



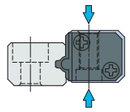

Mounting part of track rail

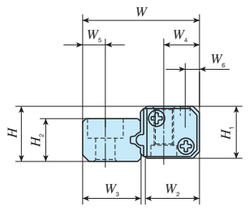
unit: mm

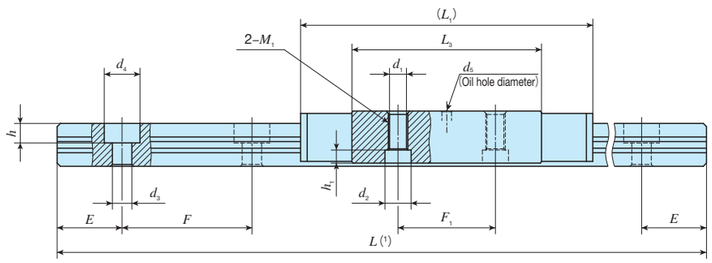
| Size | Mounting part of slide member | | Mounting part of track rail | |
|---|---|---|---|---|
| | Shoulder height $h_1$ | Corner radius $R_1$ (Maximum) | Shoulder height $h_2$ | Corner radius $R_2$ (Maximum) |
| 2 | 7 | 1 | 5 | 1 |
| 3 | 8.5 | 1 | 6 | 1 |
| 4 | 10.5 | 1.5 | 6 | 1 |
| 5 | 12.5 | 1.5 | 8 | 1 |
| 6 | 14.5 | 2 | 8 | 1.5 |



1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

| Linear Way LM | | | |
|---|---|---|---|
| Shape | LWLM  | | |
| Size | 7 | 9 | 11 |

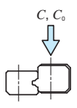



| Identification number | Mass (Ref.) | | Dimensions of assembly mm | | Dimensions of slide member mm | | | | | | | | | | | | | Dimensions of track rail mm | | | | | | | | Appended mounting bolt for track rail (2) | Basic dynamic load rating (3) | Basic static load rating (3) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Linear Way Module series (No C-Lube) | Slide member g | Track rail g/m | $H$ | $W$ | $H_1$ | $W_2$ | $W_4$ | $W_6$ | $L_1$ | $L_3$ | $F_1$ | $d_1$ | $d_2$ | | $h_1$ | $M_1$ | $d_5$ | $H_2$ | $W_3$ | $W_5$ | $d_3$ | $d_4$ | $h$ | $E$ | $F$ | Bolt size× ℓ | $C$ N | $C_0$ N |
| LWLM 7* | 10 | 210 | 7 | 15 | 6.6 | 7.8 | 5 | 2.5 | 38 | 24 | 12 | – | – | | – | M2.6 | 1 | 4.8 | 6.8 | 3.3 | 3 (4) | – (4) | – (4) | 10 | 20 | M2.6×8 (4) | 1 730 | 2 020 |
| LWLM 9* | 16 | 390 | 8.5 | 18 | 8 | 8.6 | 5.5 | 2.2 | 45 | 29.2 | 15 | – | – | | – | M3 | 1.5 | 6.6 | 9 | 3.5 | 3 | 5.5 | 3 | 12.5 | 25 | M2.6×8 | 2 780 | 3 150 |
| LWLM 11* | 32 | 590 | 11 | 23 | 10 | 11.8 | 7 | 3 | 52 | 32.8 | 15 | 2.55 | 5 | | 3 | M3 | 2 | 8 | 10.8 | 5 | 3.5 | 6 | 4.5 | 20 | 40 | M3×8 | 4 080 | 4 240 |

Notes (1) Track rail lengths $L$ are shown in Table 2 on page Ⅱ−236.
(2) The appended mounting bolts are stainless steel hexagon socket head bolts equivalent to JIS B 1176.
(3) The direction of basic dynamic load rating ($C$) and basic static load rating ($C_0$) are shown in the sketch below.
(4) Track rail mounting holes have no counterbore.
When the appended track rail mounting bolts are used, the height from track rail bottom surface to bolt head is 7.4 mm.

Remarks 1. Slide member mounting bolts are not appended.
2. The identification numbers with * are our semi-standard items.




## Example of identification number of assembled set

| Model code | Dimensions | Part code | | Classification symbol | Supplemental code |
|---|---|---|---|---|---|
| LWLM | 9 | M2 | R200 | P | /W2 |
| ① | ② | ③ | ④ | ⑤ | ⑥ |

① Model

| | |
|---|---|
| LWLM | Linear Way LM |

② Size

7, 9, 11

③ Number of slide member (2)

④ Length of track rail (200 mm)

⑤ Accuracy class

| | |
|---|---|
| H | High |
| P | Precision |
| SP | Super precision |

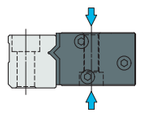
⑥ Special specification

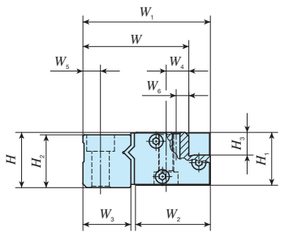
E, I, MN, W, Y

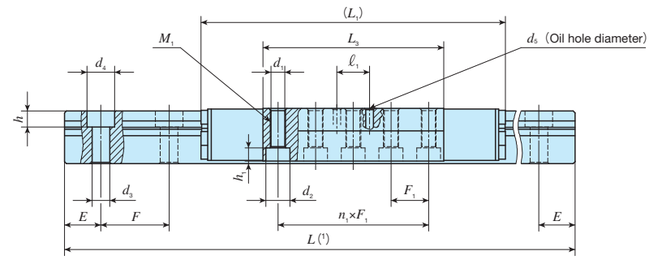


1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

## Linear Roller Way M

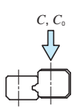
| | | | | | |
|---|---|---|---|---|---|
| Shape | LRWM  | | | | |
| Size | 2 | 3 | 4 | 5 | 6 |




| Identification number | Mass (Ref.) | | Dimensions of assembly mm | | | Dimensions of slide member mm | | | | | | | | | | | | | | Appended mounting bolt for slide member (2) | Dimensions of track rail mm | | | | | | | | Appended mounting bolt for track rail (2) | Basic dynamic load rating (3) | Basic static load rating (3) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Linear Way Module series (No C-Lube) | Slide member kg | Track rail kg/m | $H$ | $W$ | $W_1$ | $H_1$ | $H_3$ | $W_2$ | $W_4$ | $L_1$ | $L_3$ | $n_1 \times F_1$ | $M_1$ | $d_1$ | $d_2$ | $h_1$ | $W_6$ | $\ell_1$ | $d_5$ | Bolt size× $\ell$ | $H_2$ | $W_3$ | $W_5$ | $d_3$ | $d_4$ | $h$ | $E$ | $F$ | Bolt size× $\ell$ | $C$ N | $C_0$ N |
| LRWM 2* | 0.26 | 1.98 | 19 | 33 | 39.6 | 18 | 7.5 | 22.9 | 8 | 105 | 63 | 4×12 | M 5 | 4.4 | 8 | 4.1 | 4 | 10 | 3 | M4×20 | 18 | 15 | 6 | 6 | 9.5 | 5.4 | 30 | 60 | M 5×20 | 9 700 | 10 800 |
| LRWM 3* | 0.46 | 2.92 | 22 | 42 | 50.6 | 21 | 9 | 29.8 | 9 | 122 | 72 | 4×15 | M 6 | 5.4 | 9.5 | 5.2 | 5 | 13 | 3 | M5×25 | 21 | 19 | 7 | 7 | 11 | 6.5 | 30 | 60 | M 6×25 | 18 500 | 20 300 |
| LRWM 4* | 0.98 | 4.64 | 28 | 56 | 65.6 | 27 | 11 | 39.4 | 13 | 157 | 96 | 5×16 | M 8 | 6.8 | 11 | 6.2 | 6 | – | 3 | M6×32 | 27 | 24 | 9 | 9 | 14 | 8.6 | 40 | 80 | M 8×32 | 36 500 | 39 800 |
| LRWM 5* | 2.03 | 6.85 | 33 | 70 | 81.6 | 32 | 13 | 49.1 | 16 | 212 | 140 | 5×24 | M10 | 8.6 | 14 | 8.2 | 7 | – | 3 | M8×35 | 32 | 30 | 12 | 11 | 17.5 | 10.8 | 50 | 100 | M10×35 | 67 900 | 75 500 |
| LRWM 6* | 3.42 | 9.25 | 38 | 83 | 96.6 | 37 | 15 | 58.6 | 21 | 256 | 168 | 6×25 | M10 | 8.6 | 14 | 8.2 | 8 | 28 | 3 | M8×40 | 37 | 35 | 14 | 14 | 20 | 13 | 60 | 120 | M12×40 | 99 800 | 109 000 |

Notes (1) Track rail lengths $L$ are shown in Table 2 on page Ⅱ−236.
(2) The appended mounting bolts are hexagon socket head bolts equivalent to JIS B 1176.
(3) The direction of basic dynamic load rating ($C$) and basic static load rating ($C_0$) are shown in the sketch below.
Remark: The identification numbers with * are our semi-standard items.




### Example of identification number of assembled set

| Model code | Dimensions | Part code | | Classification symbol | Supplemental code |
|---|---|---|---|---|---|
| LRWM | 3 | M2 | R660 | P | /W2 |
| ① | ② | ③ | ④ | ⑤ | ⑥ |

① Model

| | |
|---|---|
| LRWM | Linear Roller Way M |

② Size

2, 3, 4, 5, 6

③ Number of slide member (2)

④ Length of track rail (660 mm)

⑤ Accuracy class

| | |
|---|---|
| H | High |
| P | Precision |
| SP | Super precision |

⑥ Special specification

A, E, F, Ⅰ, L, LF
MN, W, Y



1N=0.102kgf=0.2248lbs.
1mm=0.03937inch