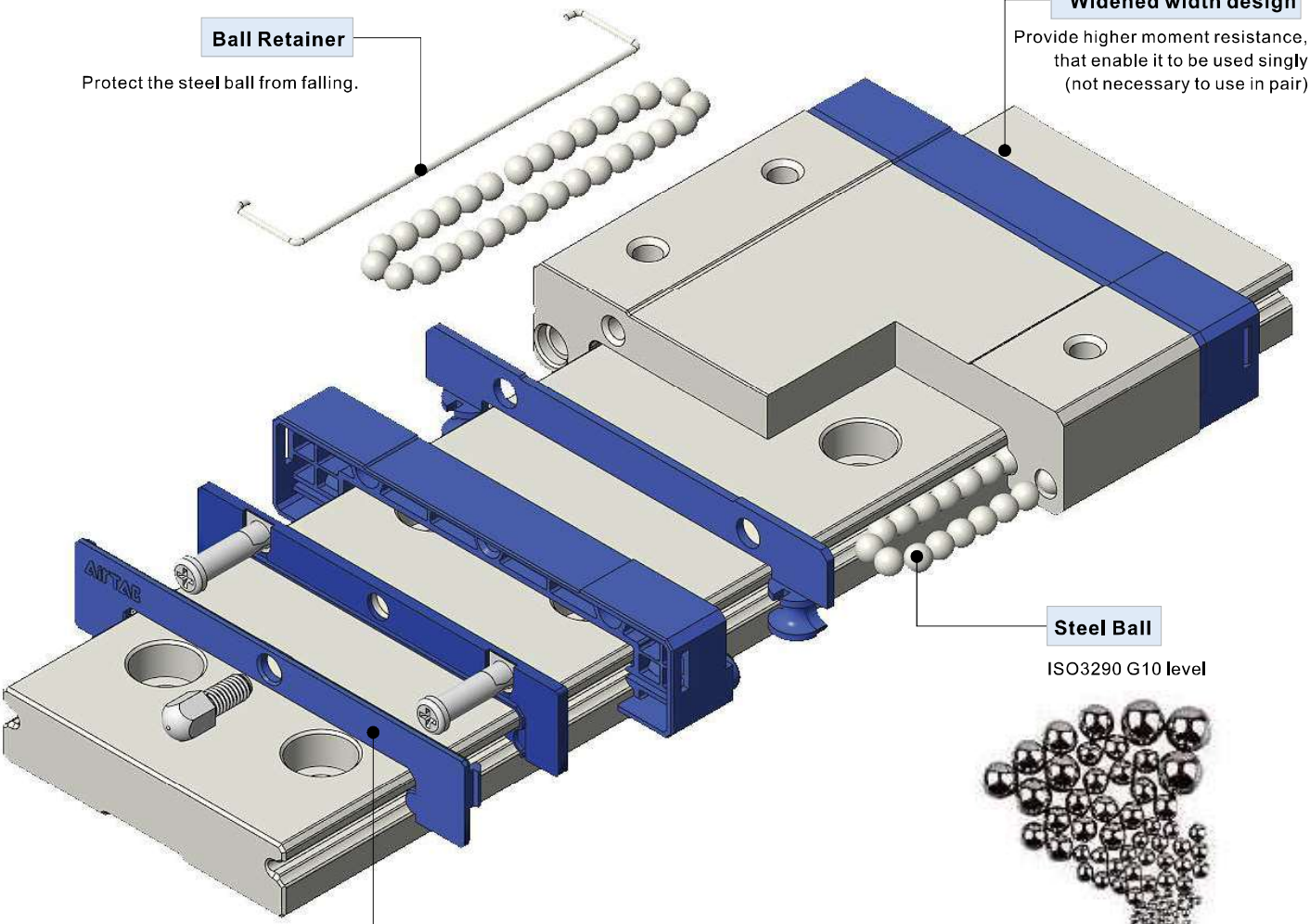
Product Introduction

Ball Retainer

Protect the steel ball from falling.

Widened width design

Provide higher moment resistance, that enable it to be used singly (not necessary to use in pair)

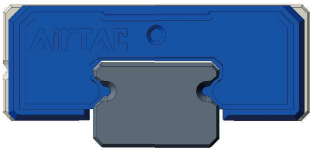


Steel Ball

ISO3290 G10 level

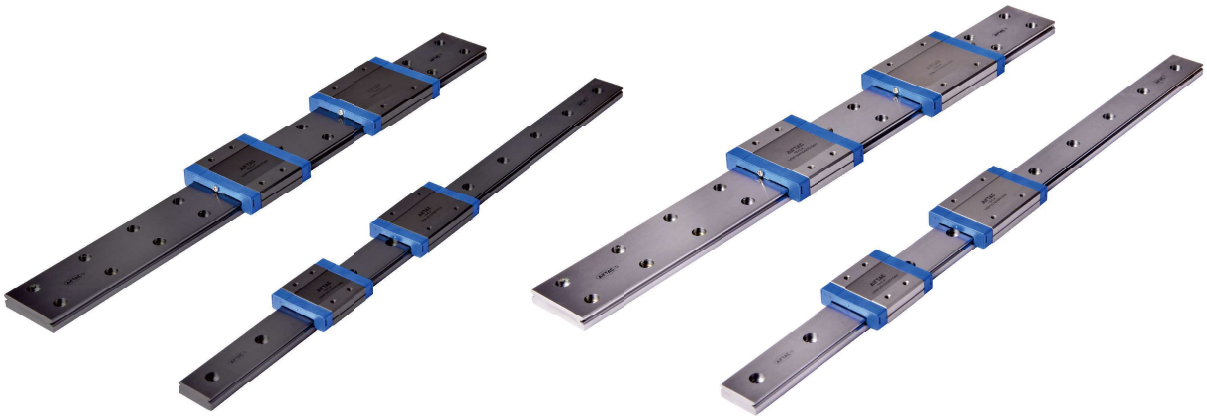
Protection Cover

Good appearance, built-in screws,
Protect the seal from large dust particles.



Miniature Linear Guide (Widened)

LRW Series



Order Information(Combined)

LRW □ 7 N 1 X40 S5 A H T

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

①Model Code	LRW: Miniature Linear Guide (Widened)
②Rail&Block surface treatment	Blank: without additional coating. (natural color) ★BB: Block and rail coated with black chrome
③Rail Width	7: 14mm 9: 18mm 12: 24mm 15: 42mm
④Block type	N: Standard L: Long
⑤Number of Block	1: One 2: Two [Note: Amount of block on a single set of linear guide]
⑥Length of Rail	40: 40mm .....[Defined by customer]
⑦Position of first mounting hole	S□ : Distance from end of rail to the center of first mounting hole (It is recommended to be greater than minimum margin) [Refer to rail spec. Table for details]
⑧Preload	A: Standard clearance B: Light Preload C: Medium Preload
⑨Accuracy	N : Normal H : High P : Precision
⑩Rail type	Blank: Top-mount T: Bottom-mount

Butt-jointed Order Information

LRW □ 7 N 1X1030 T 1030 A H T

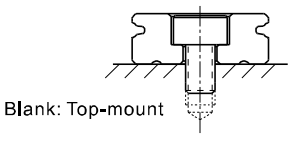
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

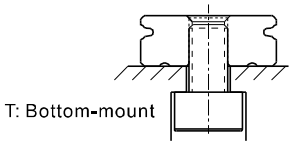
①Model Code	LRW: Miniature Linear Guide (Widened)
②Rail&Block surface treatment	Blank: without additional coating. (natural color) ★BB: Block and rail coated with black chrome
③Rail Width	7: 14mm 9: 18mm 12: 24mm 15: 42mm
④Block type	N: Standard L: Long
⑤Number of Block	1: One 2: Two [Note: Amount of block on a single set of linear guide]
⑥Length of first Rail	1030: 1030mm .....[Defined by customer]
⑦Butt-jointed mark	T: Rail Butt-jointed mark (Butt-jointed end margin:1/2P) [P is the standard hole distance]
⑧Length of second Rail	1030: 1030mm .....[Defined by customer]
⑨Preload	A: Standard clearance B: Light Preload C: Medium Preload
⑩Accuracy	N : Normal H : High
⑪Rail type	Blank: Top-mount T: Bottom-mount

[Note 1] Number of joints cannot be more than 2 times. Customization is needed for joint times more than standard.

[Note2] Customization is needed is the first/last mounting hole position is out of range in 'Rail Specification Table'.

Butt-jointed end margin:1/2P , Position of the first and last hole is defined by customer.





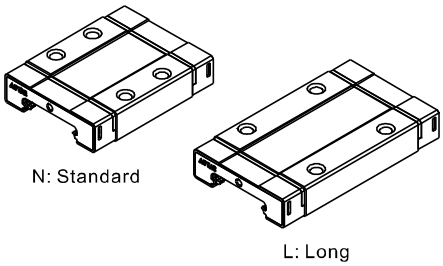
1. Block Order Information

LRW □ 7 BK – N – H – D

① ② ③ ④ ⑤ ⑥ ⑦

[Note1] When selecting rails and bearings, the different pairing codes can change the uints preload. details see"preload pairing chart".

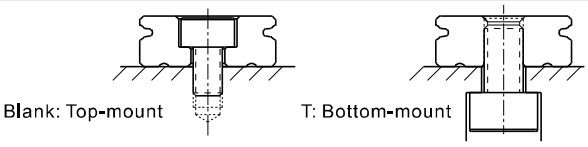
①Model Code	LRW: Miniature Linear Guide (Widened)
② Coating on block	Blank: Block without additional coating. (natural color) ★B: Block coated with black chrome
③Rail Width	7: 14mm 9: 18mm 12: 24mm 15: 42mm
④Block Code	BK: Block
⑤Block type	N: Standard L: Long
⑥Accuracy	N : Normal H : High
⑦Group code	A B C D [Note1]



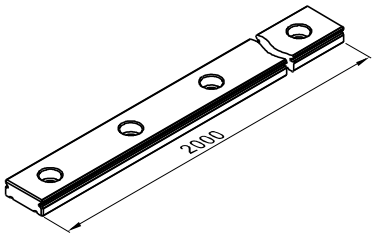
2. Rail(2m) Order Information

LRW □ 7 RLX2000 – H – D – T

① ② ③ ④ ⑤ ⑥ ⑦ ⑧



①Model Code	LRW: Miniature Linear Guide (Widened)			
② Coating on rail	Blank: Rail without additional coating. (natural color) ★B: Rail coated with black chrome			
③Rail Width	7: 14mm	9: 18mm	12: 24mm	15: 42mm
④Rail Code	RL: Rail			
⑤Rail Length	2000: 2000mm			
⑥Accuracy	N : Normal H : High			
⑦Group code	D [Note1]			
⑧Rail type	Blank: Top-mount T: Bottom-mount			



[Note1]When selecting rails and bearings, the different pairing codes can change the uints preload. details see "preload pairing chart".

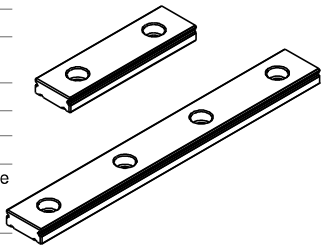
3. Rail Order Information

LRW □ 7 RLX40–S5 – H – D – T

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

[Note1]When selecting rails and bearings, the different pairing codes can change the uints preload. details see "preload pairing chart".

①Model Code	LRW: Miniature Linear Guide (Widened)
② Coating on rail	Blank: Rail without additional coating. (natural color) ★B: Rail coated with black chrome
③Rail Width	7: 14mm 9: 18mm 12: 24mm 15: 42mm
④Rail Code	RL: Rail
⑤Rail Length	40: 40mm .....[Defined by customer]
⑥Position of first mounting hole	S□ : Distance from end of rail to the center of first mounting hole (It is recommended to be greater than minimum margin) [Refer to rail spec. Table for details]
⑦Accuracy	N : Normal H : High
⑧Group code	D [Note1]
⑨Rail type	Blank: Top-mount T: Bottom-mount



4. Accessory(Bolt hole plug)Order Code

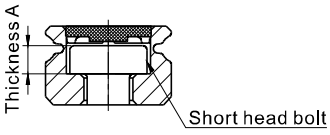
L – BC – M3– 10P

① ② ③ ④

Note: 1. Bolt hole plugs are packed in one bag per 10pcs. EX: When ordering 1pc of "L-BC-M3-10P", it comes with 10pcs plugs;
2."L-BC-M3-10P" is applied to LRW7/9 series, "L-BC-M4-10P" is applied to LRW12/15 series.
3.When mounting plugs for LRW7/12/15 series, short head bolts are required, bolt size is shown in the following figure.

①Accessory	L: Linear Guide Accessories
②Plug Code	BC: Bolt hole plug
③Plug Specification	M3: Used for M3 bolt M4: Used for M4 bolt
④Plug quantity	10P: 10pcs/bag

Model	A
LRW7	≤2
LRW12	≤2.6
LRW15	≤2.6



5. Rail/Block preload pairing chart

When customer orders rail/block, please choose the pairing code of rail/block in accordance with the needed preload of linear guide(combined).
Details please refer to the "preload pairing chart".

Model	Rail pairing code	Block pairing code	Preload grade
LRW7 LRW9	D	A	-
		B	Medium preload
		C	Light preload
		D	Standard clearance

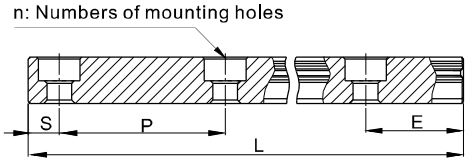
Model	Rail pairing code	Block pairing code	Preload grade
LRW12 LRW15	D	A	Medium preload
		B	Light preload
		C	-
		D	Standard clearance

Rail Specification

1、Please refer to the chart for maximum individual rail length and Edge pitch information.

2、The edge pitch of first mounting hole (S) and last mounting hole (E) should not be greater than 1/2P. Overlong edge may induce unstable installation and affect the accuracy.

n: Numbers of mounting holes

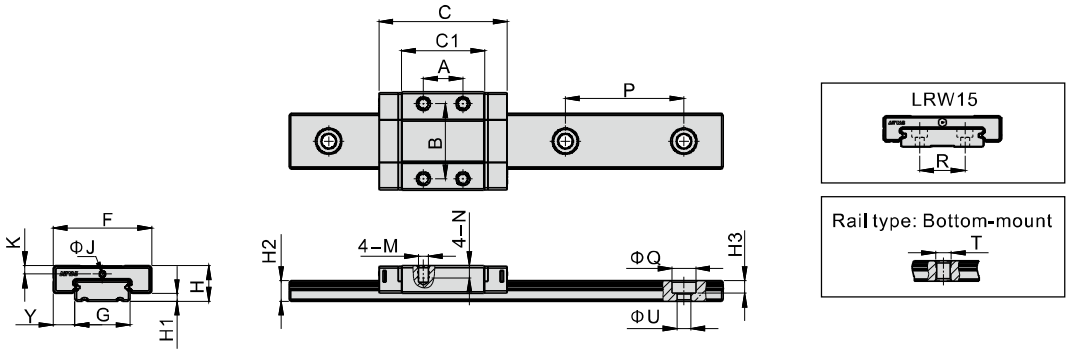


L=(n-1)×P+S+E
L: Total length of rail(mm)
n: Numbers of mounting holes on rail
P: Distance between bolt holes(mm)
S: Edge of first mounting hole(mm)
E: Edge of last mounting hole(mm)

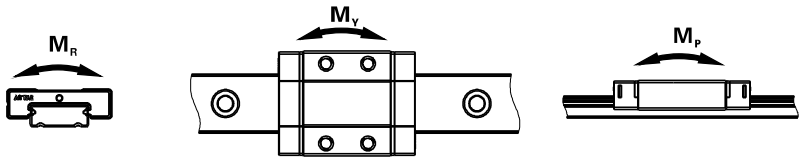
Model	LRW7	LRW9	LRW12	LRW15
Pitch(P)	30	30	40	40
2m Standard Edge Pitch(S)	10	10	15	15
2m Standard Edge Pitch(E)	10	10	25	25
Min. Edge Pitch(S/E min)	4	4	5	5
Max. Edge Pitch(S/E max)	26	26	35	35
Maximum length(Lmax)	2000	2000	2000	2000

Note:
- Joint rail must be chosen if length of rail exceeds the maximum.
- When deciding edge pitch, it should be within the range of above table. There would be risk of broken hole if pitch is out of range.
- Maximum length of rail for standard' means the maximum length of rail can be chosen when both sides of edge pitches are standard.

Specifications and Dimensions



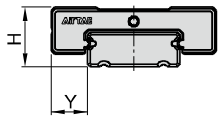
Model\Item	External Dimension (mm)					Block Dimension (mm)							Rail Dimension (mm)							
	H	H1	F	Y	C	C1	A	B	M	N	K	J	G	R	H2	P	ΦQ	ΦU	H3	T
LRW7N	9	1.9	25	5.5	32.5	21	10	19	M3X0.5	3	2.15	1.2	14	-	5.2	30	6	3.5	3.2	M4X0.7
LRW7L	9	1.9	25	5.5	42	30.5	19	19	M3X0.5	3	2.15	1.2	14	-	5.2	30	6	3.5	3.2	M4X0.7
LRW9N	12	3	30	6	40	27.5	12	21	M3X0.5	3	2.85	1.2	18	-	7.3	30	6	3.5	4.5	M4X0.7
LRW9L	12	3	30	6	52	39.5	24	23	M3X0.5	3	2.85	1.2	18	-	7.3	30	6	3.5	4.5	M4X0.7
LRW12N	14	3	40	8	46	31	15	28	M3X0.5	3.5	3.15	1.2	24	-	8.5	40	8	4.5	4.5	M5X0.8
LRW12L	14	3	40	8	61	46	28	28	M3X0.5	3.5	3.15	1.2	24	-	8.5	40	8	4.5	4.5	M5X0.8
LRW15N	16	2.7	60	9	57.5	39.3	20	45	M4X0.7	4.5	3.45	M3	42	23	9.5	40	8	4.5	4.5	M5X0.8
LRW15L	16	2.7	60	9	76.5	58.3	35	45	M4X0.7	4.5	3.45	M3	42	23	9.5	40	8	4.5	4.5	M5X0.8



Model\Item	Mounting Screw	Dynamic Load Rating(kN)	Static Load Rating(kN)	Static Rated Moment (N.m)			Weight	
		C_{100B}	C_0	M_R	M_P	M_Y	Block(kg)	Rail(kg/m)
LRW7N	M3	1.07	1.96	14.92	6.78	6.78	0.022	0.505
LRW7L	M3	1.47	2.98	22.28	14.75	14.75	0.030	0.505
LRW9N	M3	2.03	3.91	38.11	18.01	18.01	0.041	0.933
LRW9L	M3	2.69	5.60	51.81	32.30	32.30	0.055	0.933
LRW12N	M4	3.13	5.31	85.82	26.41	26.41	0.073	1.492
LRW12L	M4	4.08	7.83	97.57	54.50	54.50	0.105	1.492
LRW15N	M4	5.26	8.76	189.37	53.83	53.83	0.154	2.885
LRW15L	M4	6.99	12.71	284.06	116.47	116.47	0.223	2.885

Accuracy

LRW standard type linear guide comes with 3 accuracy levels.



Accuracy Standards (mm)			
Accuracy	N : Normal	H: High	P:Precision
Tolerance of height H	±0.04	±0.02	±0.01
Variation of height ΔH	0.03	0.015	0.007
Tolerance of width Y	±0.04	±0.025	±0.015
Variation of width ΔY	0.03	0.02	0.01

Parallelism of the raceway

Accuracy	Parallelism of theraceway(μm)		
Rail Length(mm)	N	H	P
50 under	12	6	2
50~80	13	7	3
80~125	14	8	3.5
125~200	15	9	4
200~250	16	10	5
250~315	17	11	5
315~400	18	11	6
400~500	19	12	6
500~630	20	13	7
630~800	22	14	8
800~1000	23	16	9
1000~1200	25	18	11
1200~1300	25	18	11
1300~1400	26	19	12
1400~1500	27	19	12
1500~1600	28	20	13
1600~1700	29	20	14
1700~1800	30	21	14
1800~1900	30	21	15
1900~2000	31	22	15
2000-	31	22	16

Preload Level

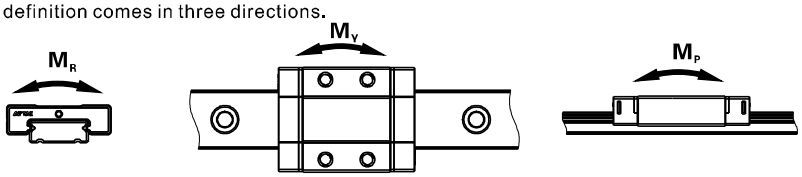
The LRW standard type Linear Guide has three preload categories: A ,B and C.
Choosing suitable preload level will enhance rigidity, precision and torsion resistant performace of the linear guide.

Preload	Code	Radial interference (μm)				Application
		7	9	12	15	
Standard clearance	A	−2~+2	−2~+2	−2~+3	−2~+3	Smooth operation
Light Preload	B	−4~−2	−5~−2	−6~-2	−7~−2	High precision
Medium Preload	C	−7~−3	−8~−4	−9~−5	−10~−6	High rigidity

Load Capacity and Rating Life

1. Basic static load rating (C_0)
It is defined as the static load when the total permanent deformation of the steel ball and the surface of the groove is exactly one ten-thousandth of the diameter of the steel ball under the state of the load direction and size unchanged.

2. Allowable static moment(M_0)
When the steel ball subjected to the maximum stress in the slider reaches a static rated load condition, this loading moment is called the "Static permissible moment". The definition comes in three directions.



3. Static safety factor(f_s)
Impact, vibration and inertial loading during start and stop moment lead to unexpected load on the linear guide way.
Therefore, when calculating the static load, safety factors must be considered.

Load Condition	f_s
Normal Load	1.0~2.0
Load with Impacts or Vibrations	2.0~3.0

$$f_s = \frac{C_0}{P} = \frac{M_0}{M}$$

f_s : Static safety factor
C_0 : Basic static load rating (N)
M_0 : Static permissible moment (N.m)
P : Calculated working load (N)
M : Calculated applying moment (N.m)

4. Load factor(f_w)
The loads acting on a linear guide way include the weight of block, the inertia load at the times of start and stop, and the moment loads caused by overhanging.
Therefore, the load on a linear guide way should be divided by the empirical factor.

Loading condition	Use speed	f_w
No impacts & vibration	V≤15m/min	1~1.2
Small impacts	15m/min<V≤60m/min	1.2~1.5
Normal load	60m/min<V≤120m/min	1.5~2.0
With impacts & vibration	V>120m/min	2.0~3.5

5. Basic dynamic load rating(C_{100B})

C_{100B} : (According to ISO 14728-1) As the direction and magnitude remains the same, C_{100B} is the maximum workload for the product to maintain its nominal life at 100km of operation.

6. Calculation of Nominal Life(L)

Recognizing that nominal life of a linear guide is affected by the actual working loads, the general calculation of the nominal life excluding the environmental factors is carried out as follow: :

$$L=\left(\frac{C_{100B}}{f_w P}\right)^3 \times 10^5$$

L = Nominal Life (m)
C_{100B} = Dynamic Load Rating (N)
f_w: Load Factor
P = Equivalent load (N)

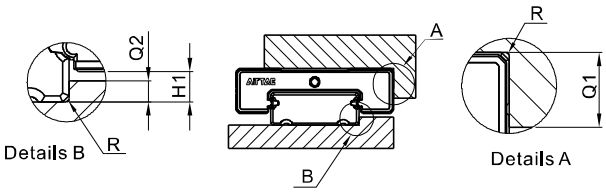
Taking LRW9N for example, its C_{100B} is 2.03kN. Therefore, when the product bears a 1.5kN equivalent load P、 f_w=1, its theoretical rated life can be calculated as follows:

$$L=\left(\frac{C_{100B}}{f_w P}\right)^3 \times 10^5=\left(\frac{2.03}{1\times 1.5}\right)^3 \times 10^5=247865\ m = 247.9\ km$$

Installation Illustration

1. Height and Chamfer of Reference Edge

In order to ensure accurate installation of LRW Linear Guide, the contact space should not exceed the given figures in following table.



Unit : mm

Model	Q1	Q2	H1	R(Max)
LRW7	3	1.6	1.9	0.2
LRW9	3	2.7	3	0.3
LRW12	4	2.7	3	0.4
LRW15	5	2.4	2.7	0.5

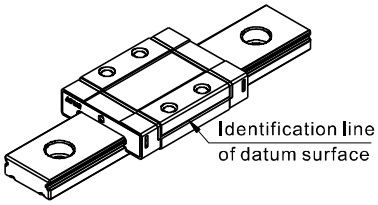
2. Screw Tighten Torque

When installing linear guide, whether the screws are well tighten and surface is well contacted will affect accuracy significantly. Please refer to following table for tightening force to ensure a perfect installation.

Model	Screw size	Tighten Torque(N.cm)		
		Iron	Casting	Aluminum alloy
LRW7	M3	196	127	98
LRW9				
LRW12	M4	412	274	206
LRW15				

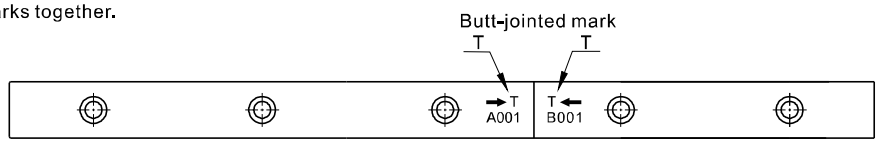
3. Datum plane

- Datum plane for installation must be ground or finely milled to ensure accuracy.
- Both sides of Rail can be used as the datum plane.
- For multi-blocks on a rail, identification line on blocks should be put on the same side to ensure moving accuracy.

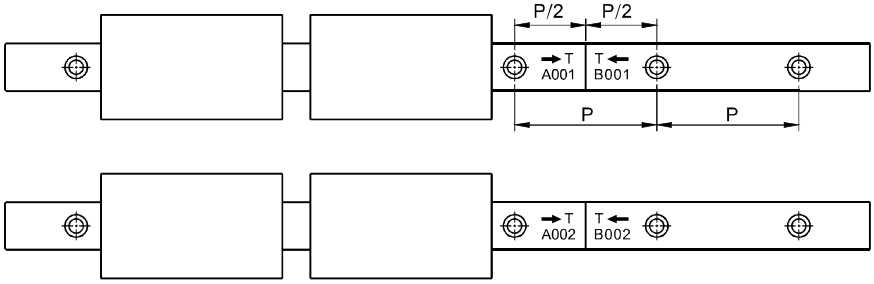


Rail Butt-jointed

- When jointing rails, it must follow group marks on rail to ensure the accuracy of linear guide. These marks are located on the top surface at joint side. Please put the same group marks together.



- Be aware serial number of group mark when assemble. A001 and B001 are in a group, so as to A002 and B002 and so on.
- Be aware the installation direction while assembly, the serial numbers are not upside down and arrows point to each other.



Lubrication method

When a linear guide is well lubricated, it can reduce wear and increase lifespan significantly. Lubrication has the following benefits :

- Reduces friction of the rollers and raceway to minimize wear.
- The grease film between contact surface can prevent roller fatigue.
- Prevent rust.

1. Lubrication method

LRW series linear guide is well lubricated with 'Shell Alvania grease S2' in factory.
Customers are recommended to use identical or the same grade of lubricant.
Refer to table on the right for suggested amount:
In order to be well lubricated, the blocks need to be moved back and forth while lubricating.
Lubrication can be done either by manual or automatic device.

2. Lubrication frequency

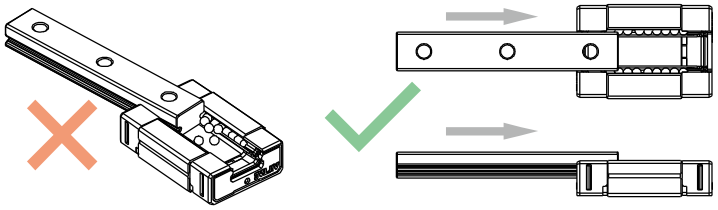
Although the linear guides are well lubricated at the factory and retains grease well, frequent lubrication is still necessary to avoid undesirable wear.
Recommended lubrication period is every 100km of movement or every 3~6 months.
(Refer to table on the right for suggested amount)

Model	Grease amount for the first lubrication(cm^3)	Replenishment amount(cm^3)
LRW7N	0.17	0.09
LRW7L	0.2	0.1
LRW9N	0.27	0.14
LRW9L	0.36	0.18
LRW12N	0.45	0.23
LRW12L	0.6	0.3
LRW15N	0.81	0.41
LRW15L	1.06	0.53

Precautions on use

1. Block disassembly

With ball retainers, normally the balls are prevented from falling out when block is removed from rail.
However, if obliquely insert rail into blocks or quickly assembled or disassembled, there is a risk for balls of falling out.
Please carefully assemble the linear guide or use plastic rails to assist.



2. Caution

- Parts may slide out if linear guide is put unevenly. Please be careful.
- Hitting or dropping linear guide could have huge effect on accuracy and lifespan even though appearance may remain intact. Please be careful.
- Do not dissemble linear guide as external objects may enter blocks and cause accuracy problem.

3. Lubrication

- Linear guide have been treated with anti-rust oil during production. Before use, wipe the rail and treat it with lubrication.
- Do not mix lubricating oil (grease) with different properties.
- After lubrication, move block back and forth for the length of three blocks long and repeat at least 2 times to ensure there is a grease file on rail.

4. Use

- The operating environment temperature should not exceed 80℃, and the maximum temperature should not exceed 100℃.
- Do not separate blocks from rail whenever it is not necessary. If you need to separate them, please use plastic rails to prevent steel balls from falling out.

5. Storage

- When storing blocks, rails or linear guide set, please be sure that anti-rust oil is well applied and product is well sealed as well as placed horizontally. Avoid humidity and high temperatures environment.