Product Introduction

Rail

High rigidity, corrosion resistance.
Rails are common to different types of blocks

Ball Retainer

Sufficiently keep the balls in place.
Easy to install.

Steel Ball

High precision roundness and
wear resistance (ISO 3290 G10)
Manufactured in Japan.

Double-lipped Design

High lubricant sustaining
and dust resisting performance.

Provide slick appearance

Protect the product from large dust particles.

Order Information

LRM	7	N	1	X40	S5	A	H	T
①	②	③	④	⑤	⑥	⑦	⑧	⑨

① **Model Code**		LRM : Miniature Linear Guide
② **Rail Width**		5：5mm 7：7mm 9：9mm 12：12mm 15：15mm
③ **Block type**		N: Standard L: Long
④ **Number of Block**		1: One 2: Two [Note: Amount of block on a single set of linear guide]
⑤ **Length of Rail**		40：40mm……… [Refer to rail spec. table for detail]
⑥ **Starting rail mounting hole positions**		S□ : Distance from the center of the starting hole to the edge （ It is recommended not to be less than the minimum margin value ） [Refer to rail spec. table for detail specifications and standard hole margins.]
⑦ **Preload**		A: Standard clearance B: Light Preloaded C: Middle Preloaded
⑧ **Accuracy**		H : High P : Precision
⑨ **Rail type**		Blank : Up locked T : Down locked

Butt-jointed Order Information

LRM	7	N	1	X 705	T	705	A	H	T
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩

① **Model Code**		LRM : Miniature Linear Guide
② **Rail Width**		5：5mm 7：7mm 9：9mm 12：12mm 15：15mm
③ **Block type**		N: Standard L: Long
④ **Number of Block**		1: One 2: Two [Note: Amount of block on a single set of linear guide]
⑤ **Length of first Rail**		705：705mm …………[Defined by the customer]
⑥ **Butt-jointed mark**		T: Rail Butt-jointed mark(Butt-jointed end margin:1/2P) [P is the standard hole distance]
⑦ **Length of tail Rail**		705：705mm …………[Defined by the customer]
⑧ **Preload**		A: Standard clearance B: Light Preloaded C: Middle Preloaded
⑨ **Accuracy**		H : High P : Precision
⑩ **Rail type**		Blank : Up locked T : Down locked

Butt-jointed end margin:1/2P ,
The margin of the
head and tail holes is
defined by the customer.

[Note 1] This Butt-jointed is limited to two-stage Butt-jointed. If the number of Butt-jointed is exceeded, non-standard order is required.

[Note 2] If the length of the first section/tail section of the rail exceeds the maximum customized length of the "Rail Specification Table", it must be customized.
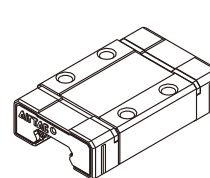

Blank : Up locked   T : Down locked

AirTAC
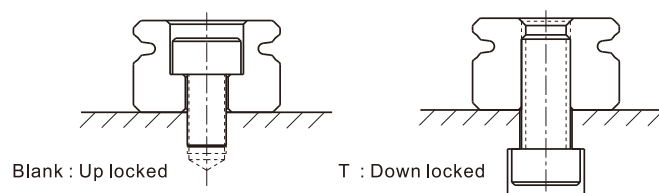
1. Single Block Ordering Information

LRM 7   BK – N – H – D

① ② ③ ④ ⑤ ⑥

① Model Code	LRM : Miniature Linear Guide
② Width of rail	7：7mm 9：9mm 12：12mm 15：15mm
③ Block code	BK: Block
④ BlockType	N: Standard L: Long
⑤ Accuracy	H : High
⑥ Group code	D
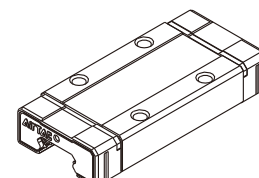
N: Standard   L: Long

2. Uncut Rail Order Information
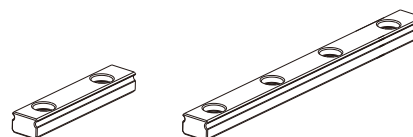
LRM 7 RL X 985 – H – D – T

① ② ③   ④   ⑤ ⑥ ⑦
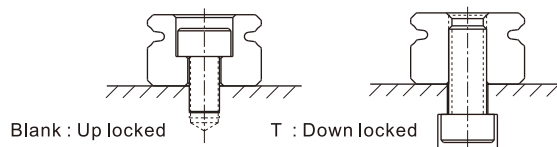
Blank : Up locked   T : Down locked

① Model Code	LRM: Miniature Linear Guide			
② Width of rail	7:7mm	9:9mm	12:12mm	15:15mm
③ Rail Code	RL: Rail			
④ Length of Rail	985:985mm	995:995mm	995:995mm	990:990mm
⑤ Accuracy	H : High			
⑥ Group code	D			
⑦ Rail Type	Blank : Up locked T : Down locked			

Length of Uncut Rail
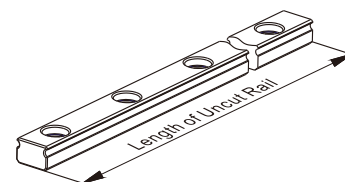
3. Rail Ordering Information

LRM 7 RLX40 – S5 – H – D – T

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

| ① Model Code	LRM: Miniature Linear Guide
② Width of rail	7：7mm 9：9mm 12：12mm 15：15mm
③ Rail Code	RL: Rail
④ Length of Rail	40:40mm……… [Refer to rail spec. table for detail]
⑤ Starting rail mounting hole positions	S□ : Distance from the center of the starting hole to the edge (It is recommended not to be less than the minimum margin value) [Refer to rail spec. table for detail specifications and standard hole margins.]
⑥ Accuracy	H : High
⑦ Group code	D
⑧ Rail Type	Blank : Up locked T : Down locked

Rail Specification

When the customer chooses the length of the slide rail, the size of the starting hole margin "S" and the end hole margin "E" should not be greater than 1/2P.
Excessive may cause the instability of the rear end of the slide rail assembly, And even affect the accuracy of the slide rail.
n: Number of bolt holes for rail mounting
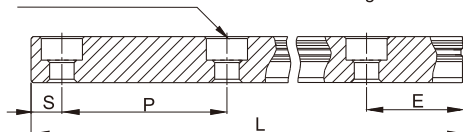
$L=(n-1)×P+S+E$

L: Total length of rail(mm)
n: Number of bolt holes
P: Distance between bolt holes(mm)
S: Starting hole margin(mm)
E: End hole margin(mm)

Model	Standard rail length(L) (mm)												Maximum length
LRM5	40	55	70	85	100	115	130	145					490
LRM7	40	55	70	85	100	115	130	145	160	175	190	205	985
	220	235	250										
LRM9	55	75	95	115	135	155	175	195	215	235	255	275	995
	295	315	335	355	375	395							
LRM12	70	95	120	145	170	195	220	245	270	295	320	345	995
	370	395	420	445	470	495							
LRM15	70	110	150	190	230	270	310	350	390	430	470	510	990

| Model	Pitch(P)	Standard rail mounting hole position	Min. rail mounting hole position(S/E min)	Max. rail mounting hole position(S/E max)
LRM5	15	5	3	10
LRM7	15	5	3	10
LRM9	20	7.5	4	15
LRM12	25	10	4	20
LRM15	40	15	4	35

Note:
● When the maximum length of the rail is exceeded, the Butt-jointed method must be used.
● It is recommended to select the margin of the customized product according to the margin limit of the above table. If it exceeds the range, there will be the risk of the installation hole breaking.

Specifications and Dimensions

LRM5N/LRM5L

Rail type：Down locked
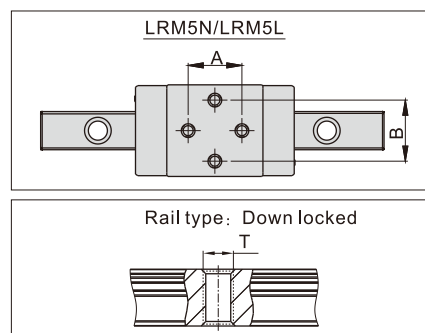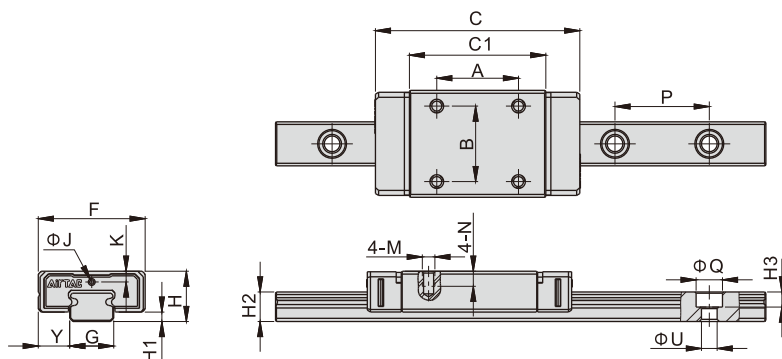
Model\Item	External Dimension（mm）					Block Dimension（mm）							Rail Dimension（mm）						
	H	H1	F	Y	C	C1	A	B	M	N	K	ΦJ	G	H2	P	ΦQ	ΦU	H3	T
LRM5N	6	1.5	12	3.5	18.2	10	7	8	M2X0.4	1.5	1.3	0.7	5	3.5	15	3.5	2.2	1.1	M3X0.5
LRM5L	6	1.5	12	3.5	21.2	13	7	8	M2X0.4	1.5	1.3	0.7	5	3.5	15	3.5	2.2	1.1	M3X0.5
LRM7N	8	1.5	17	5	24.3	13.5	8	12	M2X0.4	2.3	1.7	0.7	7	4.7	15	4.2	2.4	2.4	M3X0.5
LRM7L	8	1.5	17	5	32.5	21.7	13	12	M2X0.4	2.3	1.7	0.7	7	4.7	15	4.2	2.4	2.4	M3X0.5
LRM9N	10	2	20	5.5	31	18.9	10	15	M3X0.5	2.8	2.2	1	9	5.6	20	6	3.5	3.4	M4X0.7
LRM9L	10	2	20	5.5	42.1	30	16	15	M3X0.5	2.8	2.2	1	9	5.6	20	6	3.5	3.4	M4X0.7
LRM12N	13	3	27	7.5	37.6	21.7	15	20	M3X0.5	4	3	1.5	12	7.5	25	6	3.5	4.4	M4X0.7
LRM12L	13	3	27	7.5	48.4	32.5	20	20	M3X0.5	4	3	1.5	12	7.5	25	6	3.5	4.4	M4X0.7
LRM15N	16	3.5	32	8.5	48	28	20	25	M3X0.5	4	3.7	M3	15	9.5	40	6	3.5	4.4	M4X0.7
LRM15L	16	3.5	32	8.5	65	45	25	25	M3X0.5	4	3.7	M3	15	9.5	40	6	3.5	4.4	M4X0.7
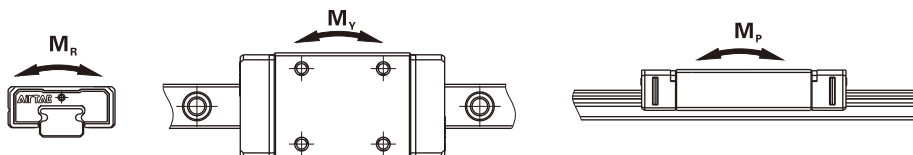
Model\Item	Mounting Screw	Dynamic Load Rating(kN)	Static Load Rating(kN)	Static Rated Moment (N.m)			Weight	
		C_{100B}	C_0	M_R	M_P	M_Y	Block(kg)	Rail(kg/m)
LRM5N	M2	0.33	0.55	1.68	0.99	0.99	0.0035	0.114
LRM5L	M2	0.48	0.9	2.4	2.08	2.08	0.004	0.114
LRM7N	M2	1.02	1.53	5.42	3.17	3.17	0.009	0.22
LRM7L	M2	1.43	2.45	9.27	7.96	7.96	0.014	0.22
LRM9N	M3	1.97	2.6	11.84	8.19	8.19	0.018	0.315
LRM9L	M3	2.61	4.11	19.73	18.94	18.94	0.027	0.315
LRM12N	M3	3.04	3.86	23.63	12.57	12.57	0.037	0.602
LRM12L	M3	3.96	5.9	40.96	32.57	32.57	0.053	0.602
LRM15N	M3	4.27	5.7	45.05	23.05	23.05	0.054	0.981
LRM15L	M3	6.53	9.53	70.08	63.69	63.69	0.088	0.981

Accuracy Classes

LRM miniature linear guide comes with 2 kinds of accuracy levels.

Accuracy Standards		(mm)
Accuracy classes	H: High	P:Precision
Dimensional tolerance of H	±0.02	±0.01
Variation of heights ΔH	0.015	0.007
Dimensional tolerance of Y	±0.025	±0.015
Variation of widths ΔY	0.02	0.01

Parallel accuracy of the block relative to the reference plane of the rail
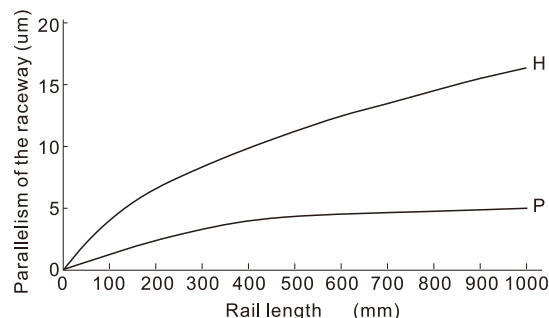
Preload Classes

The LRM Miniature Linear Guide has three preload categories: A ,B and C.
Adding appropriate preload levels would enhance rigidity, precision and torsion resistant performace of the linear guide.

| Preload Level	Code	Preload Clearance (μm)					Application
		5	7	9	12	15	
Clearance	A	−1~+2	−2~+2	−2~+2	−2~+3	−2~+3	Smooth operation
Light Preloaded	B	−3~-1	−4~−2	−5~−2	−6~−2	−7~−2	High Precision
Middle Preloaded	C	−6~−2	−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. Static Permissible 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.

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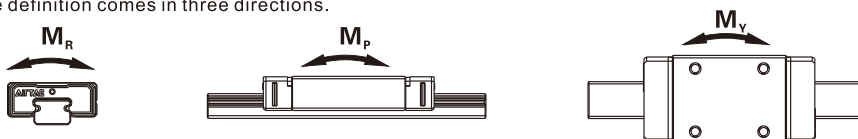
3. Static Safety Factor(f_s)
Impact, vibration and inertial loading during start and stop moment lead to unexpected load on the linear guide way.
Therefore, when calculating the static load, safety factors must be considered.

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 permiddible moment (N.m)
P : Calculated working load (N)
M : Calculated appling 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 empircal factor.

Loading condition	Service 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. Dynamic Load Rating(C_{100B})
C_{100B} : (According to ISO 14728-1) As the direction and magnitude remains the same, C100B 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: :

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

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

Taking LRM9N for example, its C_{100B} is 1.97kN. Therefore, when the product bears a 1.5kN equivalent load P、 f_w=1, its theoretical rated life can be calculated as follows:

$$L= \left(\frac{C_{100B}}{f_w \times P} \right)^3 \times 10^5 = \left(\frac{1.97}{1 \times 1.5} \right)^3 \times 10^5 = 226529 \text{ m} = 226.5 \text{ km}$$
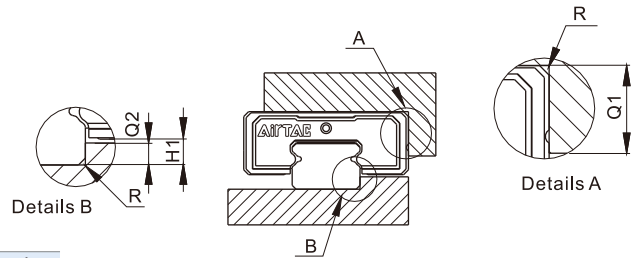
Installation Illustration

1. Height and Chamfer of Reference Edge

In order to ensure accurate assembly of LRM Linear Guide system, the corners of the datum edges can not exceed the recommended value in the following table.

Unit：mm

Model	Q1	Q2	H1	R(Max)
LRM5	1.4	1.2	1.5	0.2
LRM7	5.5	1.2	1.5	0.2
LRM9	7	1.7	2	0.3
LRM12	9	2.7	3	0.4
LRM15	10	3.2	3.5	0.5

Details B

Details A

2. Screw Fastening Torque

| Model	Screw size	Screw fastening torque(N.cm)		
		Iron	Casting	Aluminum alloy
LRM5	M2	58.8	39.2	29.4
LRM7				
LRM9	M3	196	127	98
LRM12				
LRM15				

3. Datum plane

● The datum plane should be grounded or finely milled to ensure the promised accuracy.
● Rail   : Both sides can be used as the datum plane.
● Block : Both sides can be used as the datum plane.
● In order to better achieve the walking accuracy, working with the same datum plane is recommended when mounting more than one blocks onto the rail

The identification line of the Datum
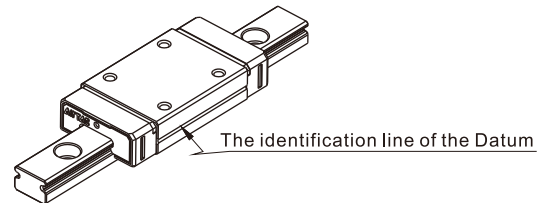
Rail Butt-jointed

● When Butt-jointed and installing rails, they must be installed in the order of the Butt-jointed marks to ensure the accuracy of the linear slide rails. The Butt-jointed marks are on the upper surface of the Butt-jointed end. Please connect the two ends of the same Butt-jointed mark together.

Butt-jointed mark
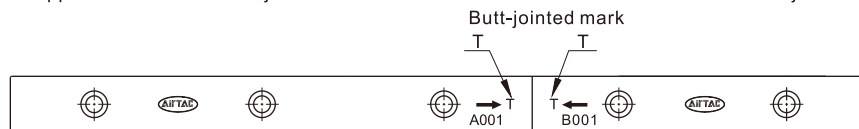
A001   B001

● Please pay attention to the serial number of the laser carving when installing, A001, B001 are a group, A002, B002 are a group, and so on.
● When joining the two rails, pay attention to the installation direction, so that the letter direction is consistent and the arrow symbols are aligned adjacently.

P/2   P/2

A001   B001

P   P

A002   B002
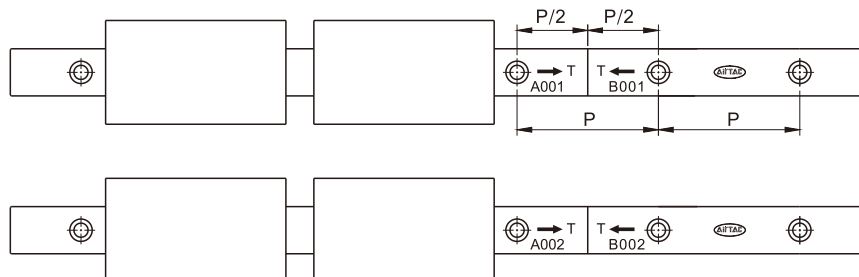
Miniature Linear Guide
LRM Series

Lubrication Method

When the linear guide works in a good state of lubrication, it can reduce wear significantly and increase the rating life. Lubricants have the following effects :
● Reduce the friction between the rolling element and the contact surface to minimize the wear.
● The formation of oil film between the contact surfaces can extend the rolling fatigue life.
● Prevent rust.

1. Lubrication Method
LRM series miniature linear slides are pre-injected into the slide block with
"Synergy Grease PS NO.2" when they leave the factory. It is recommended
that customers use the same brand grease or the same performance grease
to lubricate the miniature linear slides.
Please refer to the right table for the amount of oil:
When adding lubricant, the slider needs to run back and forth while filling the oil.
When lubricating, you can directly lubricate the rail by hand or automatic lubrication.

2. Lubrication frequency
Each group of miniature linear slides has been lubricated with the ball groove and
return hole at the factory. Although the grease is not easy to lose, but in order to
avoid insufficient lubrication due to lubrication loss, it is recommended that customers
replenish the grease every 100km or every 3-6 months.
(See the table on the right for the amount of lubrication)

Model	Initial lubrication (cm^3)	Lubricant supplement (cm^3)
LRM5N	0.02	0.01
LRM5L	0.03	0.015
LRM7N	0.1	0.05
LRM7L	0.13	0.07
LRM9N	0.2	0.1
LRM9L	0.28	0.14
LRM12N	0.34	0.17
LRM12L	0.45	0.23
LRM15N	0.72	0.36
LRM15L	1.0	0.50

Precautions on use

1. Block disassembly
Under normal circumstances, the LRM block is equipped with a retainer, so it can prevent the steel ball from falling off after leaving the track. However,
if the rail is inserted into the block obliquely or the block is quickly disassembled, there is still a risk of the steel ball falling, So please operate carefully or use
false rails to assist installation.
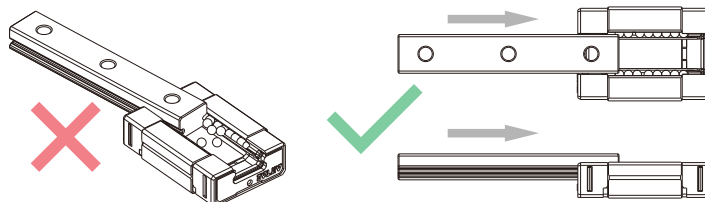
2. Take
● The linear slide rail may slide down due to its own weight after the linear slide rail is tipped. Please be careful.
● Knocking or dropping the slide rail, even if the block is not damaged in appearance, it may have a greater impact on its accuracy and life. Please be careful.
● Do not disassemble the block by yourself, as it may cause foreign objects to enter or the assembly accuracy may not meet the requirements,
   which will affect the performance accuracy of the block.

3. lubricating
● The slide rail has been treated with rust prevention before leaving the factory. Please wipe the surface of the slide rail with anti-rust oil before using it.
● Do not mix lubricating oil (grease) with different properties.
● When adding lubricant, the block needs to run back and forth while filling oil at the same time, and confirm whether the surface of the rail is evenly covered
   by the oil film.

4. Use
● The operating environment temperature should not exceed 80℃, and the instantaneous temperature should not exceed 100℃.
● Do not detach the block from the rail when it is not necessary. If you need to detach, please use the fake rail to assist in disassembly and assembly to
   prevent the steel ball from falling.

5. Store
● When storing the finished linear slide rails, single rail, and single block, please make sure that the rust-preventing oil is evenly applied and sealed in the
   designated envelope, and placed horizontally to avoid high temperature and humidity.