

# Instruction Manual

C15-1953-W0 Magnetic Levitation Track



**NaRiKa** Corporation

2021 July

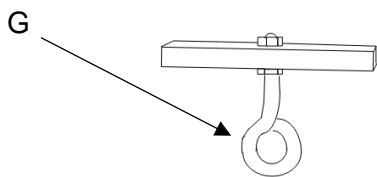
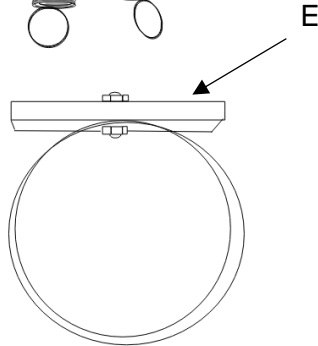
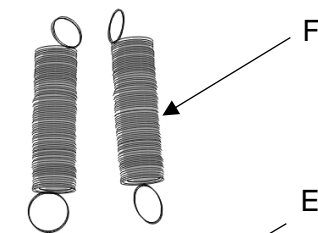
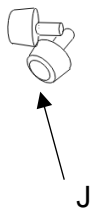
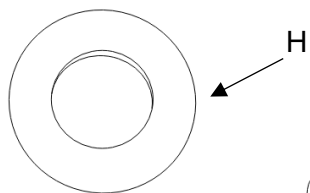
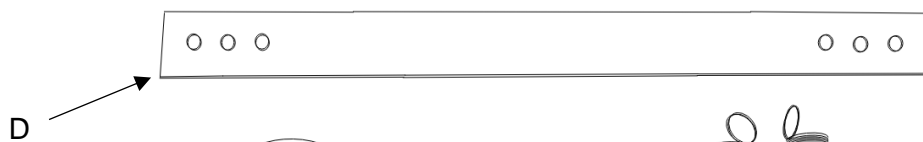
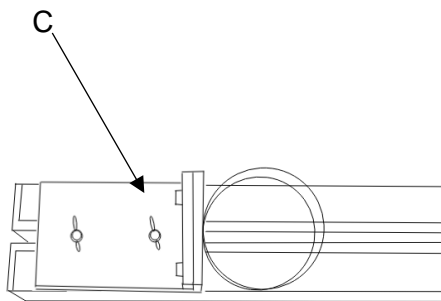
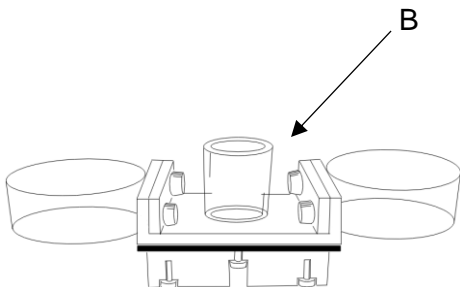
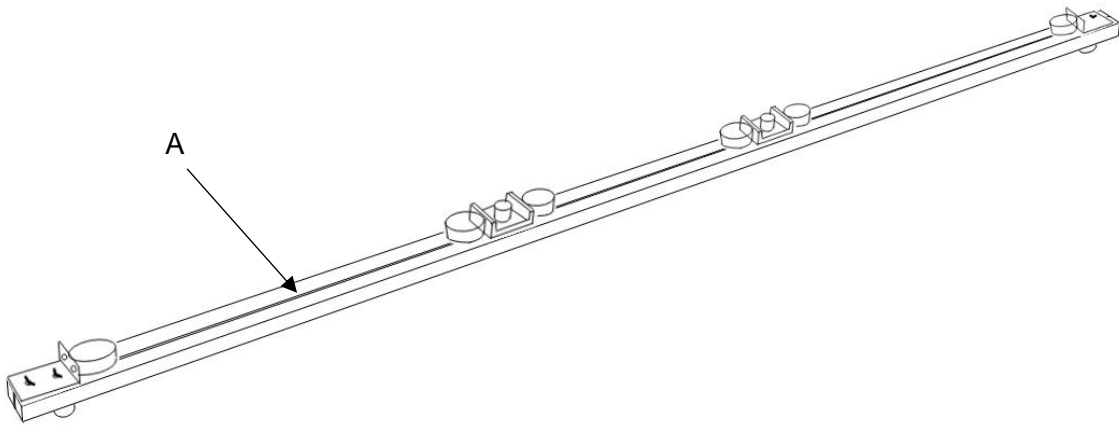
## Safety Precaution

- ⊘ Do not disassemble and remodel this product. This product might stop working and warranty will be void.
- ⊘ When you find that something is broken, please do not repair the product by yourself.
- ⊘ Teacher or trainer must instruct students about the safe ways of conducting experiments with this product before conducting experiments.
- ⊘ Make sure to take measures against felling the product down from the table during experiments. It causes damage to the product.
- ⊘ Keep off the track magnetic cards or precision instrument because Magnetic Levitation Track has magnetic parts that can damage the cards or instrument.

## Component parts and Name of them

### 1. Component parts

	Name		Major specification
A	Magnetic Levitation Track	1	Two-meters whole length, made of aluminum, pair of parallel bases with magnet stuck on the top surface.
B	Sliding cart	2	Made of Acrylic resin with magnets on its bottom and small bearings.
C	Track-end block	3	Made of Acrylic resin with repelling spring.
D	Repelling springs	6	Made of Acrylic resin.
E	Base of repelling springs	6	Acrylic resin.
F	Springs for spring pendulum	2	Spring constant = 5 g/cm
G	Hook & base for spring pendulum	4	Acrylic resin.
H	Ring weights	6	Weight of each ring 44g
J	Knurled screw	16	Urea resin
	Set of screws & nuts		



## Preparation

### 1. Remove spacers from the gap between the rails

To avoid damage to the track and other parts during transportation, three spacers are in the gap of the track to keep its distance. Please remove them from the gap before starting experiments (see Fig. 1).

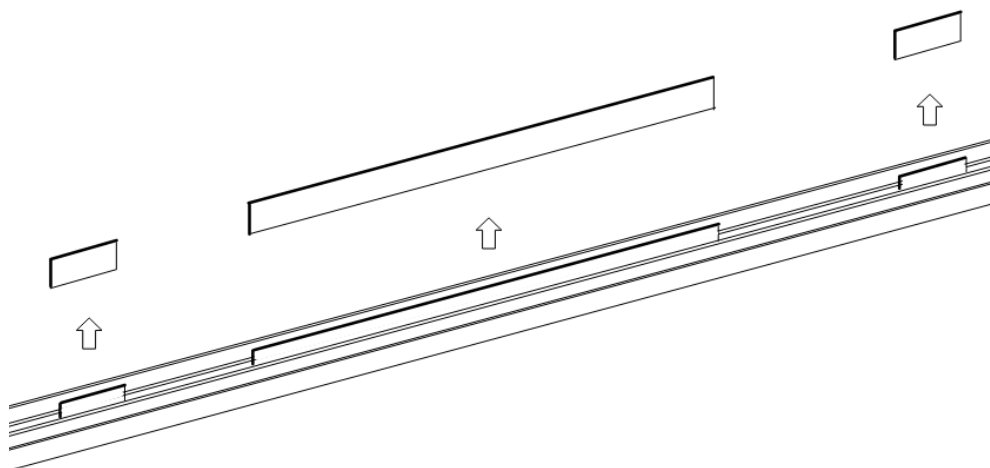


Fig. 1

### 2. Place the Track-end block on the track

Remove the screws, washers, and knurled screws from the track-end block first. Place the track-end blocks on each end of the track (see Fig. 2 and Fig. 3) and screw the track-end block to the track. The track-end blocks are removed from the track during transportation to avoid damage to it.

\* Attach the repelling spring to each track-end block.

\* Additionally attach 2 repelling springs to each cart, based on the diameter of the spring you can adjust the strength of the repelling force.

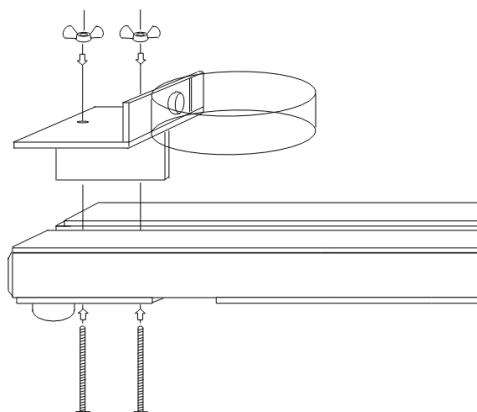


Fig. 2

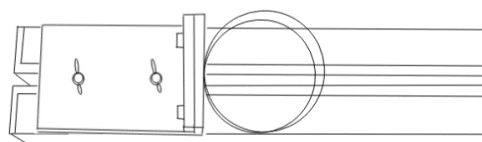


Fig. 3

### 3. Adjustment of horizontal balance

To adjust the horizontal balance of the track, use a sliding cart and place it on the track. When the track is in horizontal balance, the sliding cart does not move. Therefore, if the sliding cart moves, it is not in horizontal balance. If that is so, use an adjustable foot at the end of the backside of the track to adjust its height and to make it in horizontal balance (see Fig. 4).

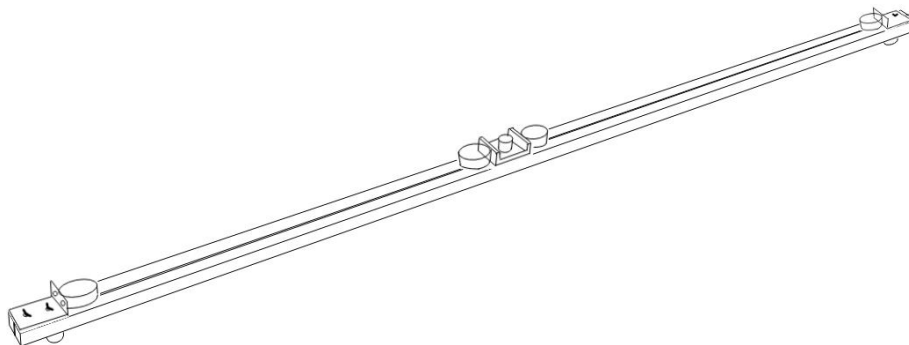


Fig. 4

### 4. Adjustment of the gap

If you find that the sliding cart get stuck on the track, adjustment of the gap is needed. Loosen some of eight (8) screws on the backside of the track, adjust the gap using the spacers, and tighten the screws back. For more information and instructional video please take a look here: <https://global.narika.jp/product/151953w0> and then click on the MOVIE tab.

## Experiment guide

### 1. Uniform Motion

Place one of the sliding carts on the track and push it forward.

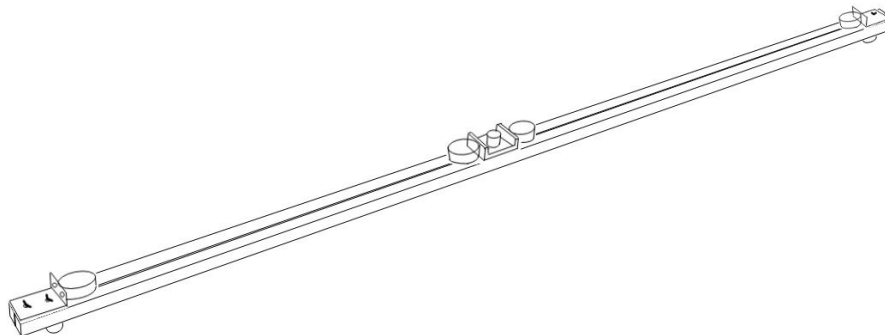


Fig. 5

## 2. Elastic Collisions Motion (conservation of momentum)

Place two sliding carts on the track, one is on the center and another one is on the near end of the track. Push the one at the near end of the track toward another one at the center. Observe the phenomenon of collision motion (see Fig. 6 & Fig. 7).

\* Use enclosed ring weights to change the weight of the carts for more experiments variety.

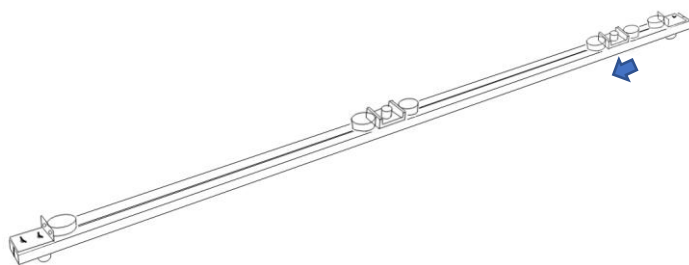


Fig. 6



Fig. 7

## 3. Horizontal spring pendulum (Simple vibration)

- Remove a repelling spring and its base (E) from track-end block (c) at one end of the track.
- Attach a hook & base for the spring pendulum (G) onto the track-end block.
- Place another track-end block on the middle position of the track and screw them (see Fig. 9).
- Remove two repelling springs and their base (E) from one of the sliding carts (B) and attach the hook & bases for the spring pendulum (G) on both ends of the cart.
- Connect two springs for the spring pendulum (F) with the hooks of the carts and connect another side of each spring with hooks of the track-end block (see Fig. 8 & Fig. 9). Move the pendulum cart to the end, or the middle of the track, release the cart. The spring pendulum starts.

\* Again use the ring weights to explore how different weight affects the cycle of the spring pendulum movement.

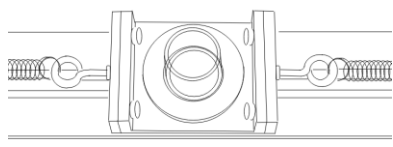


Fig. 8

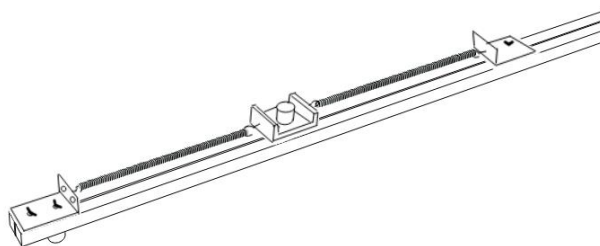


Fig. 9

## Troubleshooting Guide

Problem	Possible Cause	Countermeasure
The cart suddenly stops on the track.	It could be that the gap between the rails of the track became less than 6mm.	Adjust the gap following in Preparation 4 Adjustment of the gap.
The cart suddenly stops on the track.	It could be that there is something between the rails that prevents the cart from moving.	Check the gap for some things stuck there and remove them.
The cart does not move smoothly on the track, even if the gap is not the problem.	It could be the bottom bearings of the cart have been dirty by dust or stains.	Clean the bearings of the cart using chemicals such as Ethanol or Benzene.