

Optical Water Tank (LED) RT-100Y

Cat No. D20-1291-W0



Thank you very much for purchasing Optical Water Tank.

Read all these instructions before use.

The Optical Water Tank is specially designed for school experiments.

Safety Precautions

- ⊘ Do not disassemble, repair and remodel this product. This product might stop working and warranty will be void.
- ⊘ Do not use the product for an experiment on an uneven surface.
- ⊘ Do not let students to conduct experiments without the presence of teacher or trainer.
- ! Teacher or trainer must instruct students about the safe ways of conducting experiments with this product before conducting experiments.
- ! When you find that something is broken, please do not repair the product by yourself.
- ! Keep the product dry and away from water, especially the power supply or dry cell batteries. If exposed to water this product can be damaged and not work properly.
- ! Be careful not to connect incorrect AC adaptor, because it might cause damage to the product.
- ! Do not insert any small or thin objects like metal wire or pin into the light unit's slit of the product. It may cause damage to the light unit.
- ! Stop using the product if you find that are some problems with it.
- ! Dry the water tank thoroughly after finishing experiments, especially if you plan not to use it for long time. Not drying the water tank thoroughly might cause the surface of the tank to get stains.

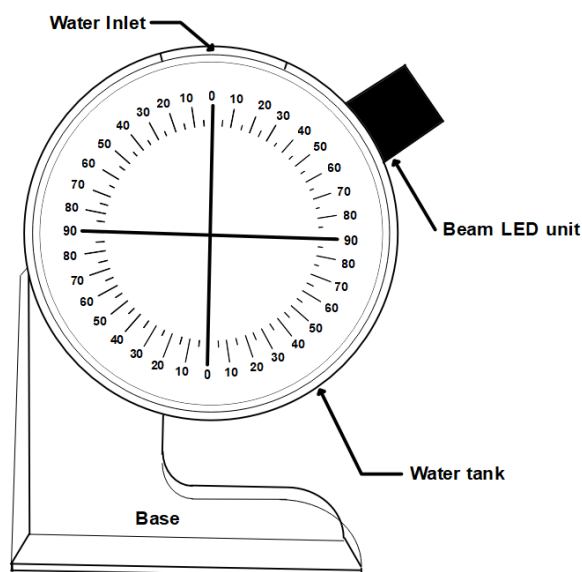
Introduction

This is a circular water tank equipped with a light source unit called Beam LED which emits a linear ray from the outer circumference of the tank. Behavior of reflection and refraction of light rays at a border between water and air in the water tank is easily observed by the light rays emitted from the light unit in any angle from outer circumference of the tank. The light unit is specially designed to emit linear light rays using a high brightness LED.

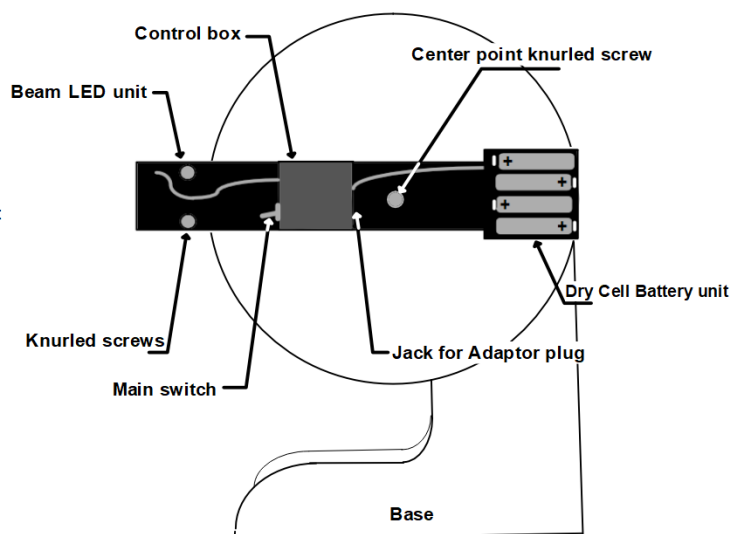
[What is Beam LED]

A filament of incandescent lamp was traditionally used to get parallel rays for optical experiments in school classrooms or laboratories, but the lamp brightness was not sufficient enough. Since high brightness LED was developed, new light sources that could be used instead of the incandescent lamp were developed too. Unfortunately, as a size of LED element is bigger than a filament, it is difficult to emit parallel rays. Unique structure of light source using high brightness LED was developed to emit a parallel high brightness light. It was named Beam LED.

Name of each part



Front side



Back side

Note

In case that AC adaptor is used for Beam LED, keep the dry cell batteries inside the Dry cell battery unit as a weight to keep the balance of the Beam LED and Dry cell battery unit.

Description of each part and unit

* Water Tank

Suitable amount of water is approximately 1 L which is enough to make the water surface at center of the water tank. Adjust water level to the center at 90 degrees line by using a pipette in order to make the best condition for experiments. Remove Beam LED and battery unit, when pouring water to the water tank in order to keep the unit dry and from damage.

* Beam LED unit

Beam LED unit can be adjusted to suitable optical axis by knurled screws on back side of Beam LED unit.

* Dry cell battery unit (sold separately)

The unit is for AA x 4 dry cell batteries.

* Beam LED and Dry cell battery unit

Both units work as balance weight for smooth set of Beam LED to target position on the outer circumference of the tank.

* Jack for AC Adaptor plug (AC adaptor sold separately)

Beam LED works with either AC adaptor or dry cell batteries. This jack is for connection with AC adaptor. When AC adaptor is connected to the jack, a circuit from the dry cell batteries is automatically switched off.

Adjustment of the optical axis of Beam LED

1. Pour 1 L water to the water tank and adjust water level to 90 degrees line in the tank with a pipette.
2. Loose the knurled screws on the back side of the Beam LED unit (do not completely remove them, see fig. 1 below).
3. Switch on the Beam LED.
4. Adjust the optical axis angle by aiming the Beam LED unit with your hands toward to a center of the tank.
5. Tight the knurled screws after adjustment of the optical axis angle is finished.

Knurled screws

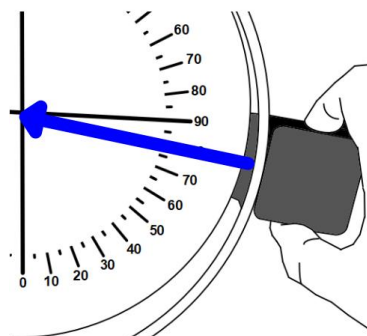
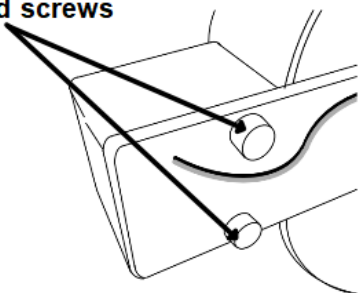


Fig. 1

Dry cell battery (not included) and AC adaptor (not included)

Beam LED can be powered either by AC adaptor or by dry cell batteries. The jack in the middle of the back part is for connection with AC adaptor. If AC adaptor is connected, the circuit from dry cell batteries automatically switch off.

Neither AC adaptor nor dry cell batteries are included with this product. Please prepare them by yourself. 4 pcs of dry cell battery type AA are needed. Or if you would like to use AC adaptor, follow the specification below. Please be careful, if you use adaptor with wrong specifications the Beam LED will be damaged.

Specification of AC adaptor

Output: DC 5 V and 2.2 A

Plug: Center-plus (center positive)

Beam LED unit's moving range

Range of Beam LED unit's moving is 270 degrees (see fig. 2 on the right).

Note: the remaining area (90 degrees) is out of range and the Beam LED unit cannot reach the area. Do not push the beam LED unit into the area. It might break.

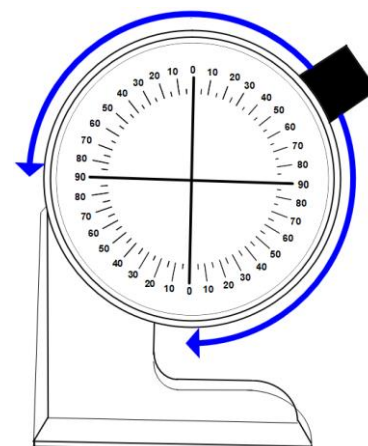
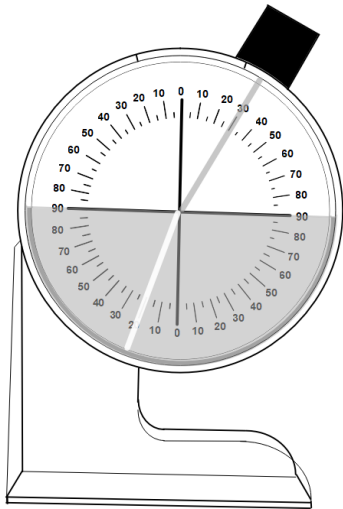
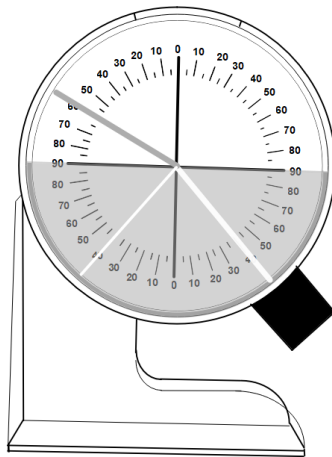


Fig. 2

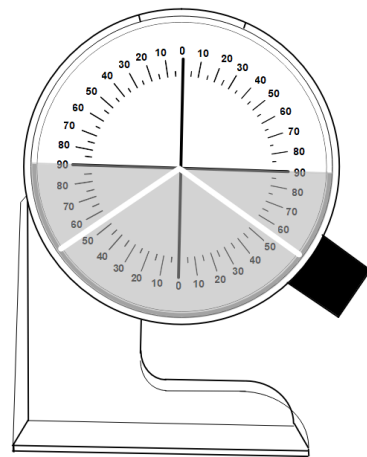
Examples of Experiments



(a)



(b)



(c)

(a) Refraction of light from air to water.

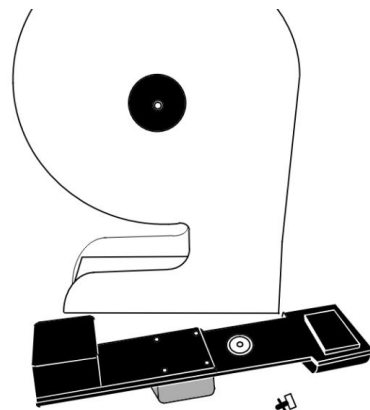
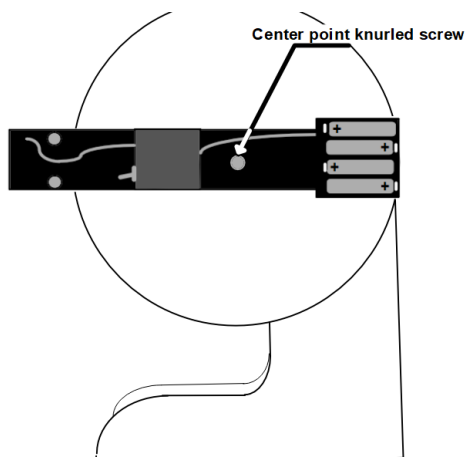
(b) Refraction and reflection of light from water to air.

(c) Total reflection of light from water to air.

Removing the Back Unit Wit Beam LED and Battery

When filling water in or filling water out from the water tank, remove the back unit with Beam LED and battery to avoid damage to the unit by water. **Note: Be careful not lose small parts, especially the knurled screw.**

1. Remove the center point knurled screw.
2. Put away the back unit from the water tank.
3. Fill in or pour out water from the water tank.
4. Put back the back unit on the water tank with the knurled screw.



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