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Assembling Algal Shaker

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ABSTRACT

This protocol described the final assembly steps to complete the illuminated orbital shaker and its testing. The steps involve fixing the transparent platform to the orbital shaker, placing the LED illuminator underneath, and electrically connecting the parts to the mains supply.

This document is the final part of the Illuminated Orbital Shaker for Microalgae Culture project:

- Procuring Parts for Algal Shaker
- Assembling LED Controller Electronics
- 3D Printing Case for LED Controller
- Assembling Cooled LED Illuminator
- Cutting and Drilling Clear Acrylic Sheet
- Assembling Algal Shaker *(this document)*

EXTERNAL LINK

https://app.labstep.com/sharelink/926153b8-b516-4835-b384-a7a10be6f712

GUIDELINES

This is the last protocol describing the building of the illuminated orbital shaker for algal cultures. It describes the final assembly steps:

- Position the cooled LED illuminator on the orbital shaker platform.
- Attach the clear acrylic sheet and antislip mat to the orbital shaking platform using metal stand-offs and screws.
- Program a 24-hour timer for day-night cycling of illumination.
- Power up the orbital shaker, set the shaking speed and power up the cooled LED illuminator.

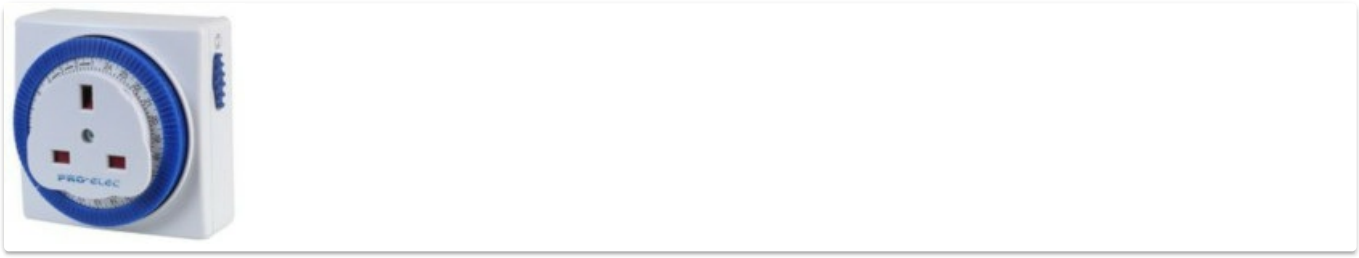
MATERIALS TEXT

Orbital shaker

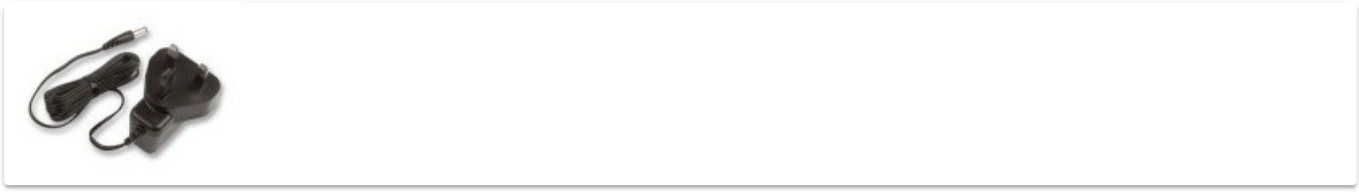
Cooled LED illuminator

Acrylic sheet

24 h time switch



30V/1A power supply



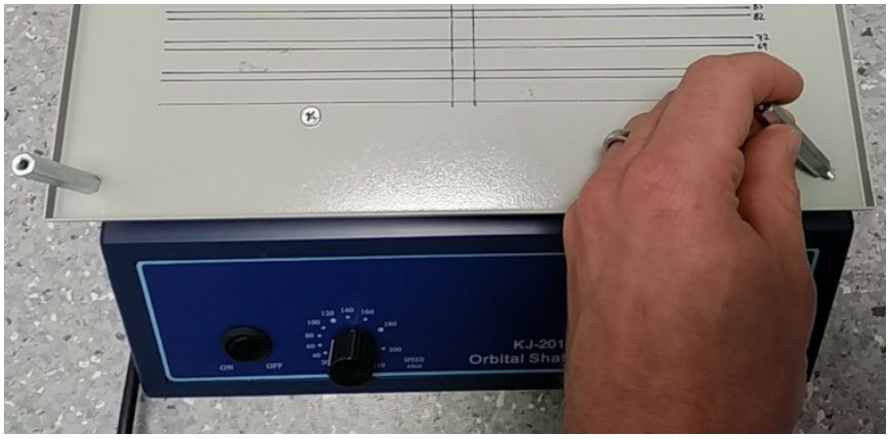
- Four M4×50 mm male-female stand-offs *(#8-32×2")*
- Four M4×12 mm *(#8-32 UNC×1/2")* screws, nuts and washers
- Screwdriver, a couple of adjustable wrenches or pliers.
- Needle or sharp knife or a blade.

SAFETY WARNINGS

The steps in this protocol require working with electrically powered components. Electrical faults can lead to injury and fire hazard. All local and national rules on operating electrical equipment must be observed. Equipment must be tested regularly, as required by these rules. To ensure safe operation, make sure that cables and connections are away from potential spill areas, should the liquid cultures topple and fall. Make sure that electrical cables are kept away from the shaking platform to prevent the rubbing of the platform against the cable insulation potentially causing its breach. Regularly check the integrity of the operating orbital shaker to spot any failures early.

1 Prepare a tidy workbench with sufficient space and illumination to minimize risk of accidents.

2 Fix the four M4×50 mm male-female standoffs to the orbital shaker platform using nuts and washers.
Where Imperial threads are preferred, use #8-32×2" stand-offs instead.



Fix stand-offs to the holes in each corner of the orbital shaker platform using nuts and washers.

Use wrenches snd/or pliers to fasten the stand-offs by tightening the nuts.

3 Lay the cooled LED illuminator onto the orbital shaker platform, between the standoffs.

Lay the LED illuminator onto the shaker platform between the four stand-offs.

4 Place the clear acrylic sheet over the standoffs.

Align the clear acrylic sheet mounting holes with the stand-offs.

5 Place the antislip mat delivered with the orbital shaker over the clear acrylic sheet. Orient it with the antislip face facing up. Pierce small holes through the antislip mat using a needle or a sharp blade in the locations of the mounting holes.

Pierce the antislip mat at the positions of the mounting holes.

6 Use M4×12 mm screws and washers to fix the clear acrylic sheet with the antislip mat to the orbital shaker platform.

Where Imperial screws are preferred, use #8-32 UNC×1/2" screws and washers instead.

Fix the acrylic sheet with the antislip mat on top using screws and washers.

7 Program the 24 hour timer to the desired day/night cycle. In our case the day starts at 6 AM and finishes at 8PM. Set the current time on the 24 hour timer.

Program the 24-hour timer. Different timers will look differently. The manual ones, like in this picture, are programmed by pushing in or raising the switches along the dial. Digital ones will be programmed on the screen, according to manufacturer's instructions.

8 Connect the 30V/1A power supply into the LED controller power input and plug it into the 24 hour timer.

Plug the orbital shaker and the 24 hour timer to the mains socket.

Plug the orbital shaker into one mains socket. Plug the 30 V power supply into the 24-hour timer and plug that timer into another socket.

9 Turn on the LED to the desired power setting using the toggle switch and the rotary switch on the LED controller. This may require temporarily pulling out the cooled LED illuminator to reach these switches. Set the spin speed on the orbital shaker to the desired speed (100 rpm, in our case) and turn it on.

The assembled an working illuminated orbital shaker.

10 With the above steps complete, the orbital shaker should keep shaking 24-hours a day and cycle the light with the interval set on the 24 hour timer.

11 ## Summary

This protocol finished the assembly of the illuminated orbital shaker for microalgae culture. The cooled LED illuminator has been installed onto the shaker platform and a new light-transmissive antislip platform was built over the illuminator.

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