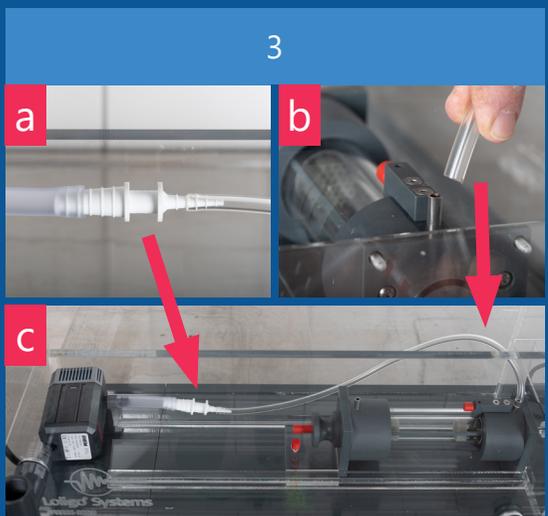
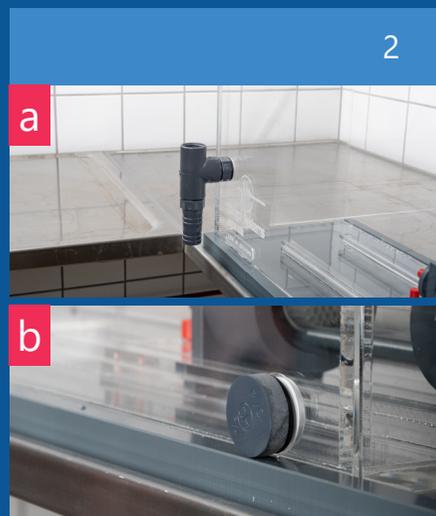


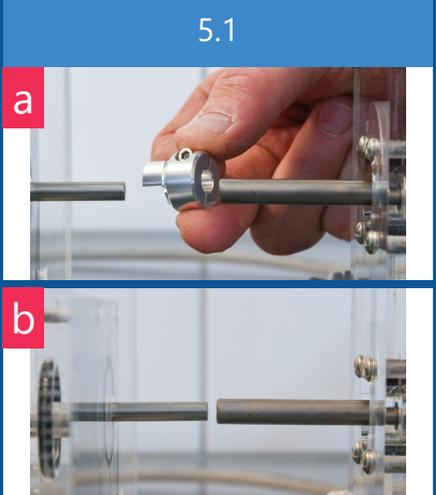
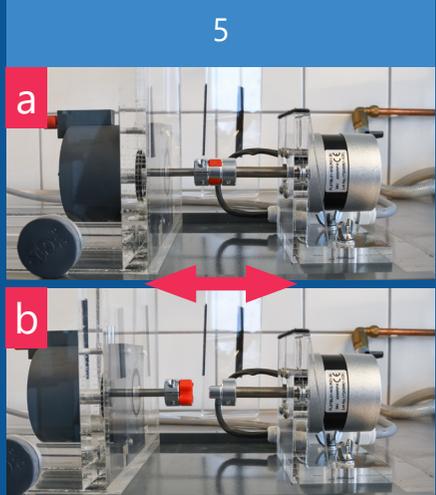
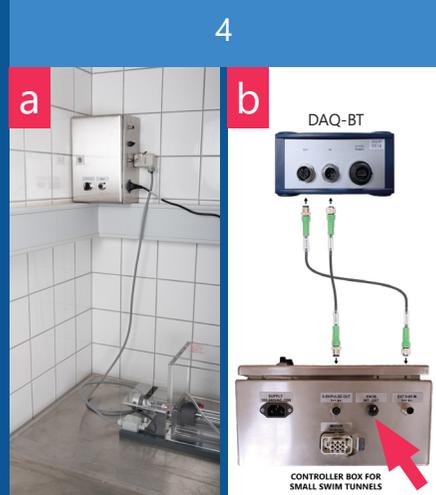
TUBING AND FITTINGS SETUP

- The mini swim tunnel comes partly assembled. Please check that all components are intact before use. Now place the ambient tank with the swim tunnel and motor on a firm and level surface. Remove any protective film from the tank walls.
- Attach PVC T-fitting (2a) and stopper (2b) onto water bath. If needed, connect outlet tubing (red) and inlet tubing (blue, connected to pump in bucket) to recirculate water from the water bath and to a pump sump below, e.g., for temperature control and/or purification (2c).
- Place the Eheim pump sideways in the water bath and connect tubing (3b) and tube reduction fitting (3a) between pump and flush inlet (3c). Ensure that all tubing is submerged for constant temperature control. Attach tubing to flush outlet and make sure that tube end will be above the water surface.



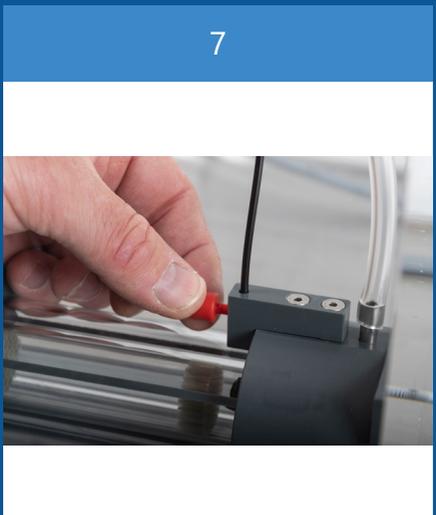
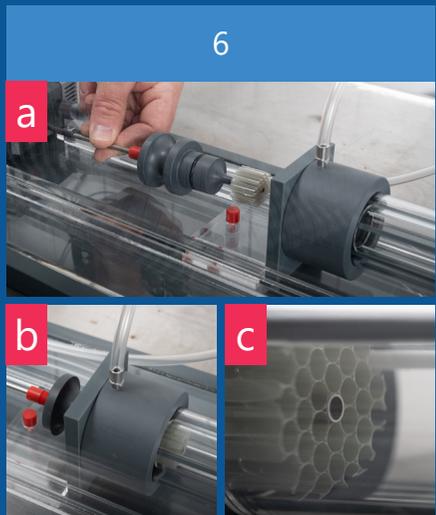
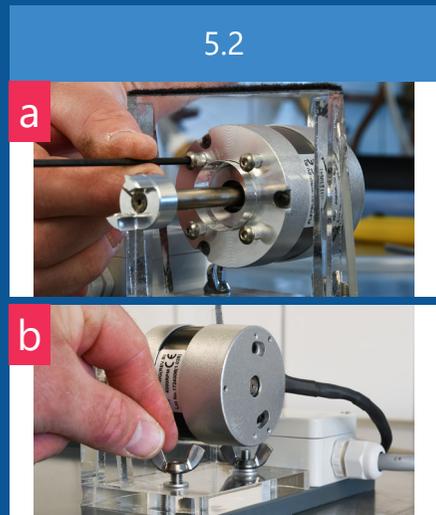
MOTOR SETUP AND ALIGNMENT

- Place motor control box above the swim tunnel and away from any electrical devices (4a). Turn direction knob to clockwise. Connect SUPPLY and MOTOR cables to the motor control box. For software control of motor speed, connect green data cables between the motor control box and DAQ-BT and turn control knob (red arrow) towards EXT (4b). INT will allow for manual control of motor speed using the front dial.
- The **motor shaft must be aligned with the propeller shaft** to avoid unwanted noises and vibrations during operation. The latter can damage ball bearing and shaft sealings causing water leaks. To check the alignment, pull the two shafts away from each other (5a+b), remove shaft joints (5.1a), and push the shafts together again for a visual alignment check (5.1b). If the two shafts are not perfectly aligned, then change the motor position accordingly by adjusting the four motor screws (5.2a) and/or motor base bolts (5.2b).



OXYGEN SENSOR SETUP

- A 200 mm oxygen dipping probe can be used for oxygen measurements inside the swim tunnel chamber. To mount the dipping probe, remove the PVC stopper from the swim chamber using a twist and a pull action. Untighten the (red) threaded piece and replace the metal pin with the dipping probe. Then tighten the threaded piece again to hold the probe in place (6a). Place the piece of honeycomb material near the tip of the dipping probe. Push and twist the PVC stopper back into place (6b). The tip of the dipping probe should align with the honeycomb edge inside the swim tunnel chamber (6c).
- Alternatively, mount an oxygen sensor spot inside the outer glass tube directly underneath the fiber optic cable holder opening (near the flush inlet). Then attach a fiber optic cable into the cable holder. Make sure that the fiber optic cable touches the outer surface of the outer glass tube. Fix the fiber optic cable in place by tightening the (red) plastic screw (7). **DO NOT OVERTIGHTEN!**

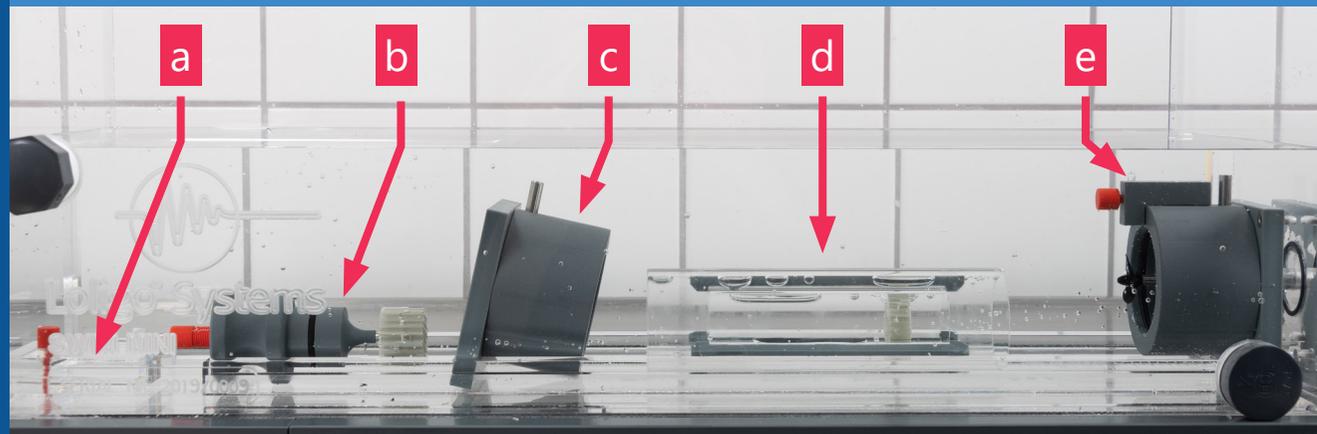


REMOVING AIR BUBBLES

Fill the water bath with water until the water is covering the entire swim tunnel (8) and keep entire swim tunnel system at desired temperature for 30-45 min. before trials to avoid air bubbles forming due to temperature changes forcing gasses out of solution.

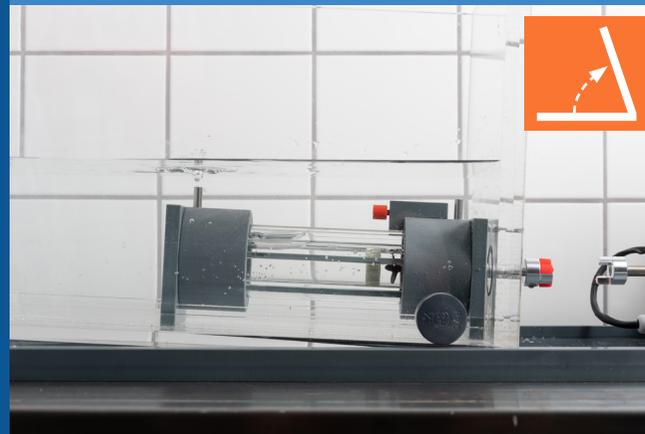
1. To take apart the swim tunnel, slide away the transparent acrylic block (a) holding the end cap (c) in place, remove the PVC stopper (b) and pull and twist the outer glass tube (d) to remove it from the propeller end cap (e).
2. Gently brush off air bubbles from the different parts. Alternatively, use the Eheim pump with a piece of tubing to flush out air bubbles caught inside the honeycomb material and tubes.
3. Assemble the swim chamber again and pull the water bath away from the external motor using the handle so that the two shafts are no longer connected (8.1). Tilt the swim tunnel upwards using the handle to release any air bubbles from inside the swim chamber.
4. Attach flush tubing to the swim chamber inlet (8.2). Adjust the length of the flush outlet tubing, so that it is placed just above the water surface. Flush entire swim tunnel for a few seconds using the Eheim pump before starting an experiment.
5. Keep entire swim tunnel system at desired temperature for 30-45 min. before trials to avoid air bubbles forming due to temperature changes.
6. Disassembly/Assembly of the swim tunnel components should be performed **only while keeping components wet!** If the fit is tight, apply some of the toxic free silicone grease from the maintenance kit to the black o-rings inside the end caps and on PVC stopper.

8

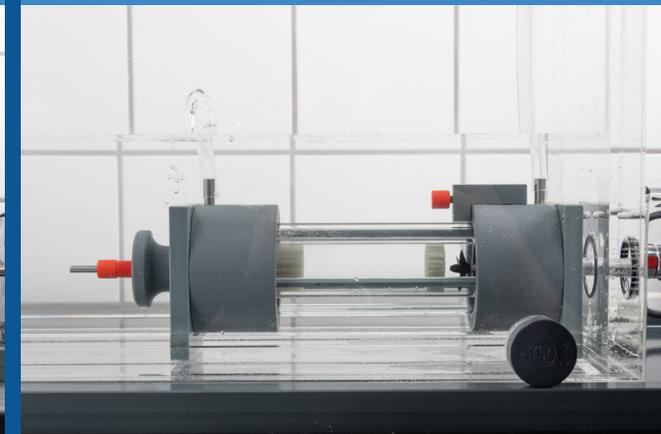


8

8.1



8.2



ADDING ANIMAL TO CHAMBER

The animal can be introduced to the inner swim chamber using a short piece of tubing.

Place the animal inside the water-filled tubing. Insert the tube end into the inner glass tube and slowly tilt the tubing until the animal is inside the chamber (9). If possible, introduce the animal tail first as the animal will be swimming away from the propeller. *Note: Some animals can turn around inside the inner chamber.*

When the animal has been introduced, quickly insert the PVC stopper again using a twisting and pushing motion. Be careful not to harm the animal during entire procedure.

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CLEANING AND MAINTENANCE

The mini swim tunnel is made of non-corroding parts. However, we recommend frequent cleaning (use a mild detergent) and flushing of all parts with tap water to avoid problems with corrosion and wear of seals and bearings – especially if using warm full-strength sea water.

IMPORTANT: Do not use alcohol on any acrylic surfaces as it will cause cracks.

Shaft bearings and packing seals will eventually wear down with use. We therefore recommend an annual check for any backlash due to wearing of bearings and pressure seals. Also, check the shaft and the propeller for any damage! We offer replacement parts, if needed.

Remove water from the water bath and dry off all parts before storing the swim tunnel between trials.

IMPORTANT: Never run the motor/propeller without water in the bath/tunnel as the mechanical shaft sealing will be destroyed in a matter of seconds without water for lubrication!

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