

2025-07-25 Zebra fish breeding tank instruction manual

General controller and tank features overview

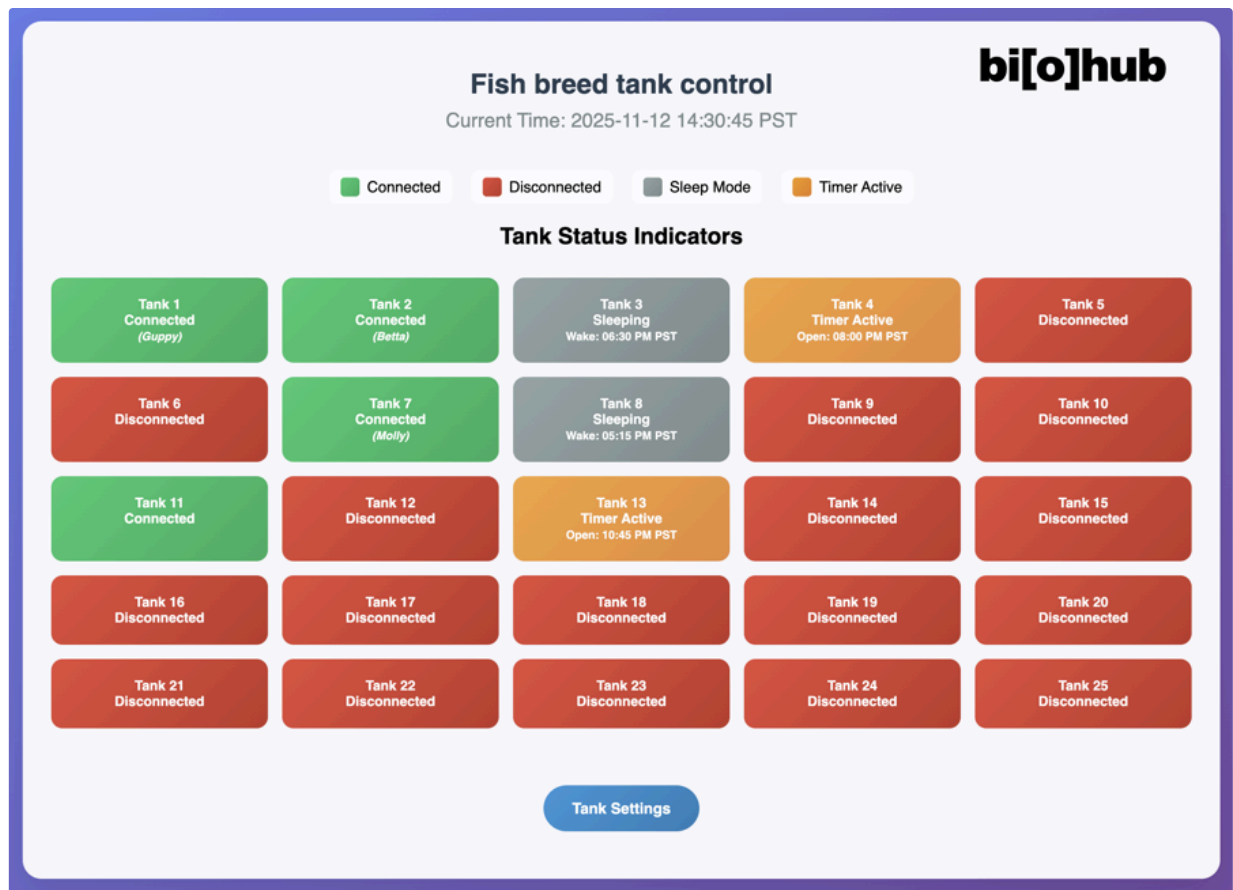
Details of the controller:

The controller hardware is attached locally in vicinity of the fish hotels (do not place it inside the hotels due to temperature and humidity), it is magnetic and will attach to a standard bench. It is powered by the supplied 5 volt USB-C power supply on the right hand side, the wire should be strain relieved so not to pull on the housing and connector:



The display is powered during the day, in the evening it switches off to preserve the lifespan of the OLED display. To access the webpage for control, go to 'fishbreedtanks.local' (or the IP address) preferably using Safari on mac (google chrome may have some issues displaying the webpages) note that you must be connected to the 'BHN-Guest' WIFI to access the controller. The controller connects to the local public Biohub wifi, which it uses to synchronize time/date and to allow PC/MAC/phone devices to access the webpages it hosts. There is no user ID or password required. Note the tanks do not connect to the general WIFI like the controller; they have direct wireless connections to the controller so the distance between the tanks and the controller should not be too great. 15-25 feet should be ok accounting for objects interfering with the signal.

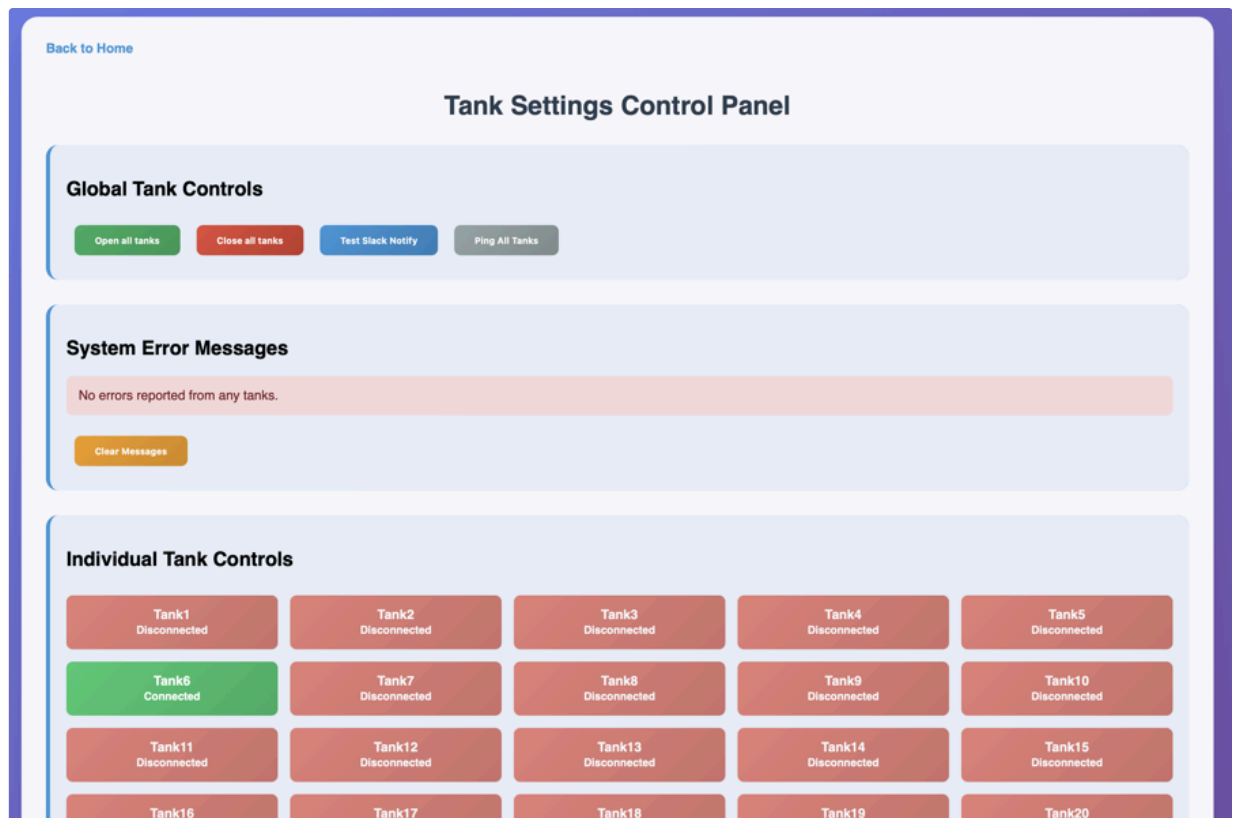
The main home page should look similar to this:



The current time and date should be auto defined from the web and update every 24 hours to stay current. The colored tiles represent each tank and show the status of the tanks, up to 25 tanks per controller.

- Green - the tank is connected between the controller and the tank, the tank is awake. It is not in sleep mode or timed open mode. Note that when the tank is in this state the battery drainage is highest and will exhaust a fully charged cell in 2.5-3 days. If the tank has been named in the control page; the tank name will be displayed.
- Grey - the tank is asleep, sleep mode is used to dramatically reduce the battery consumption. In sleep mode a fully charged cell can last up to around 18 days before it is exhausted. The status tile shows the time when the tank will awaken from sleep.
- Orange - the tank is in timed open mode. The time when the tank will open is displayed on the tile.

To access the individual tank settings and properties, click the blue 'Tank settings' button on the bottom. Which will open the following page:



Here there are two buttons to test all the connected tanks. Open all tanks will open all the connected (not asleep or on timed open) tanks and close all tanks will close them. There is a test slack message which should send a check message to the 'fish_breeding_tank_notifications' channel.

System error messages is used to display any error messages from the tanks.

To access each individual tank settings page, the blue tiles are numbered with each tank value. Click them to access the settings page.

The upper part of the tank settings page(s) will look as follows:

[Back to Tank Settings](#)

Tank 6 Control Panel

Tank Status

Battery Level:	82%
MAC Address:	10:B4:1D:CD:87:1C
Open or Closed:	closed
Connection:	Connected

Fish Type

Fish type (max 20 characters): Save Fish Type

Tank Controls

Auto Sleep Cycle: After opening, tank automatically enters a power-saving cycle: 4 hours sleep -> 5 minutes awake -> repeat

Test Close Test Open

Open Delay Timer

Note: Tank enters sleep mode immediately after starting timer and cannot be cancelled.

Open at (date & time): Start delay now

The status shows the battery level remaining. Note this % is the normalized energy level in the battery and should be fairly linear (it is not battery voltage which is not the same thing). The MAC address of the tank device is shown, as is the open or closed status. Note that if the tank has been assembled *without* cycling the door, the status at this point will not be valid (because upon assembly it is unlikely the door is in either the exact closed or open position). In order for the settings open or closed status to be correct it must be manually set on the first time the tank is assembled (during connection).

There are buttons similar to the global open/close tanks but for the actual tank (shown here Tank 1) to open and close the tank, either to test it or to set it up. Note once the open or close button is used the code will blank them out for a number of seconds until the action has completed; this is to avoid too many rapid actions on the door.

The lower portion of the settings page is as follows:

Open Delay Timer

Note: Tank enters sleep mode immediately after starting timer and cannot be cancelled.

Open at (date & time):

12/08/2025, 12:30 PM

Start delay now

Dec 2025

Su	Mo	Tu	We	Th	Fr	Sa
30	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3
4	5	6	7	8	9	10

Delay Running: NO

Sleep Timer

Sleep until (date & time):

12/08/2025, 12:30 PM

Go sleep now

There are two main timing sections here.

Open delay timer defines the time and date that the tank will open (to allow the fish breeding), using the drop down menu. When the correct time and date has been defined pressing the blue 'Start delay now' button will put the tank to sleep; the tank controller will awaken every 2 hours to update information such as the battery percentage, then go back to sleep. 5 minutes before the tank is due to open the tank controller will awaken and stay awake until the open tank is complete. Once the tank has opened the tank controller will go back to sleep to save power.

Sleep timer has the same drop down menu as the above. It is used to just put the controller to sleep (without a full power off) to conserve the battery. To initiate the sleep, the blue button is pushed after the wake up time and date is set.

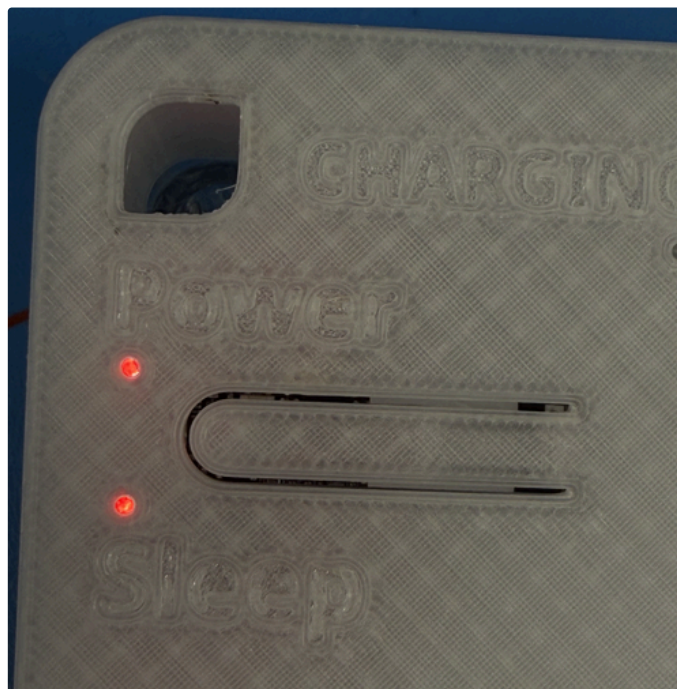
Details of the tank hardware:

The tank cover(the upper lid) is held in place by a single yellow thumbscrew; removing this will expose the electronics and battery.



On the lid are 4 status lights, a press button and a slide power switch:

- Power - the unit is turned on, the slide switch is in the on position and the battery has charge
- Sleep - the status of the controller, if it is in sleep or awake. Note when the light is ON the unit is awake, when the light is OFF the unit is asleep



- Charging - if the micro USB connector is plugged into the power board of the tank with a suitable PSU; the tank battery will charge. The light will indicate charging
- Low battery - if the voltage of the battery is around 2.5v this light will be ON. Note at this voltage the battery can be damaged so the unit must be charged or turned off immediately, preferably before the cell gets discharged to this level

The lid momentary button is used to reset the microcontroller in the tank (see in the image above between the two lights). This might be for various reasons; most likely is the tank is asleep and the user wishes to manually wake it up before the time is up on the webpage. Press gentle down until a click is felt; hold for 2 seconds and release. The tank microcontroller will reboot; note it may take 1-3 minutes for the tank to connect and show its green status tile on the home page after a reboot.

At the bottom of the lid is the main power slide switch; this controls the battery to the rest of the unit electronics. In the off position the tank will be completely powered off, use this when the tank is not in use. In the on position the battery power will be consumed (rate dependent on awake/sleep setting).

At the side of the main auto tank lid assembly are 2 access points. On the side this provides access to the USB-C connector for the tank microcontroller for flashing updates.

At the end of the assembly is access to a micro USB female connector. This is the tank charge point, if a suitable USB charger is plugged in this location it will charge the internal battery. Note that the power slide switch must be ON for this to charge.

Overview of the use of the system

Charging and loading of the battery(s)

The batteries are lithium ion 21700 sized cells. They can be charged in 2 ways:

- In situ - leaving the cell in the tank; the micro USB connector can be plugged in to charge the tank. Note the slide power switch on the tank should be ON to charge
- Battery charger - an external 8 cell battery charger is provided; the cells can be parallel charged here and loaded into the tanks

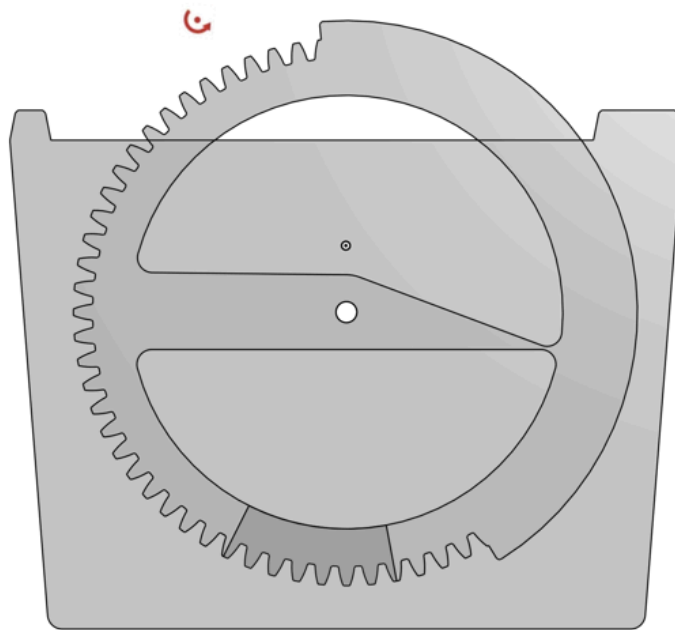
Warning: do not mis-handle the cells, do not short circuit the cells. Discharging the cells below 2.8 volts can lead to cell damage and loss of capacity; it is preferable to charge the cells when they drop to 10% capacity

If the batteries are charged on the charger; to install them simply undo the yellow thumbscrew, open the lid. Note the +/- orientation on the battery PCB, load the cell as you would a normal

alkaline battery with the negative terminal on the coil spring end. Snap the cell in place; install the lid and tighten the yellow thumbscrew

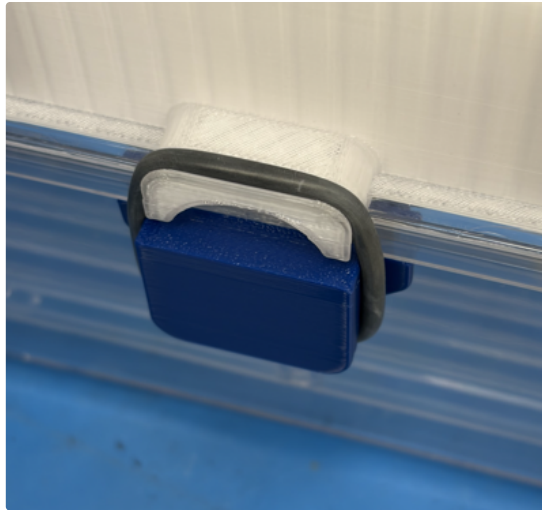
Loading the setting up with the fish

With the battery charged/installed and the tank switched on (and confirmed connected to the controller). Confirm the battery % energy remaining is adequate for use. Make sure the correct tank divider is in place, it should be in the closed position as shown, note the images carefully, the position of the rotor should be closed by not too far closed. There is a section of the edge which is blank with no teeth, if the rotor is moved to the wrong location the lid and gear will not interface to the rotor on the door. Also note the two top tabs on either side, the tank lid has two notches that match these to prevent the incorrect orientation of the door relative to the electronic lid.



With water and fish in place; place the lid assembly onto the tank.

Hook the O-rings in place to secure the lid together with the base. See pic below:



In the controller webpage; open up the settings page for the tank you have setup with fish. Enter the fish name or type in the text box to store it.

Using the 'Open timer delay' drop down box, set the date and time you want the tank to open. When this is confirmed click the blue 'Start delay now' button. Check the tank that was just programmed, the sleep LED should be OFF as shown:



Go back to the home page to confirm the tank you are using has the correct information on the tile. It should have the correct tank number, fish type/name and the time when the tank will open.

The setup is complete. Repeat this for other tanks in the same way.

