Individual Fish Counter Instruction Manual
Software Version 1.1

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Need help? If you have questions, problems or comments about using the Individual Fish Counter, please call +1 (360) 764-8850 or email techsupport@nmt.us.

1. Introduction

The Individual Fish counter is designed for counting fish when they are being processed by hand, such as for fin clipping or vaccinating. The counter will accommodate fish as small as 0.5 grams. The counter consists of one Main Control System and up to 12 Individual Counting Stations. The fish are placed one at a time into the Counting Station funnels and sensors detect passing fish. The Control System tallies the individual counts per station and the total count. In addition, the operator can set a target count that trips an alarm when reached. This feature is particularly useful for populating ponds.

The Control System can be mounted on a wall near the fish handling operation. The Individual Counting Stations can be integrated into most fish handling equipment. All operator interaction occurs at the Main Control System.

Main Control System

Individual Counting Station

2. Set Up

Mounting Individual Counting Stations

Each Counting Station has two mounting brackets and two acorn nuts for attachment (Figure 1).

Due to the variety of locations that the stations will be mounted in, some customization by the customer will be necessary to suit your needs. Bend your mounting bracket to hold the funnel in the channel where you will be putting the fish.

After bending the brackets, attach them to the slotted holes in the fish counter station using the acorn nuts (Figure 2). The slotted holes allow for height adjustments in the water channel. Adjust the height so that the bottom end of the funnel is just in or very slightly above the water surface.
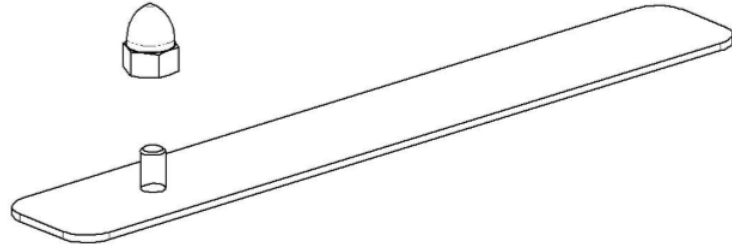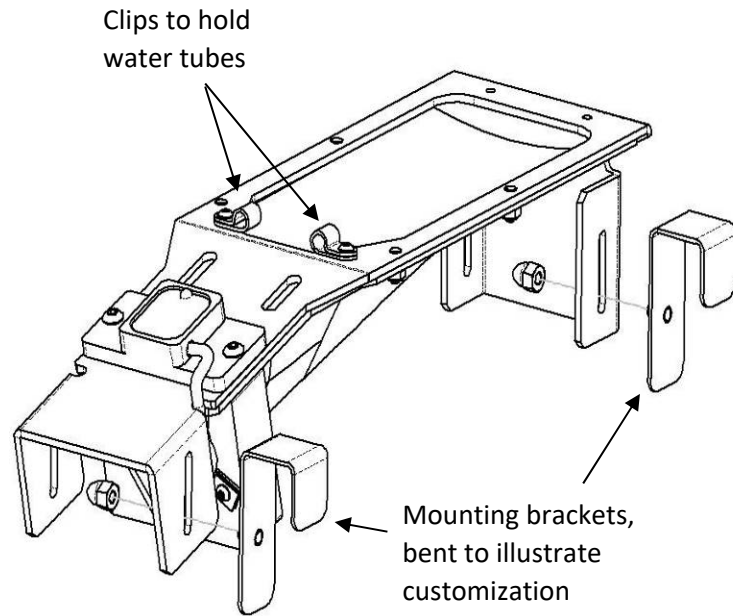

Figure 1: Mounting bracket

Clips to hold water tubes

Mounting brackets, bent to illustrate customization

Figure 2: Mounting bracket attachment

Water Hook-up

Two water manifolds are provided with each Main Control System (Figure 3). Each manifold can be attached to a standard garden hose, and will support up to six Individual Counting Stations. The manifolds come with plugs to fill unused ports. Once installed, plugs can be removed from the manifold by holding down the collar while pulling up on the plug.

Each system includes 100 feet of tubing and clips for routing the tubing and cabling. The tubing will need to be cut and routed from the manifold(s) to the clips on each of the Counting Stations.
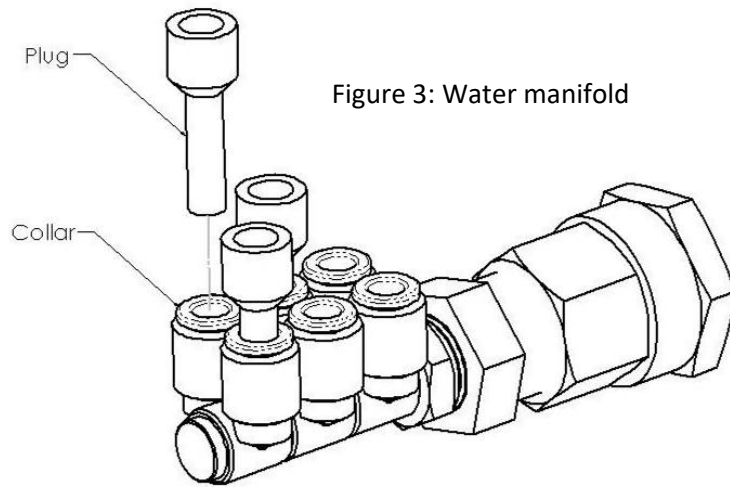
Figure 3: Water manifold

Counting Station Connection

Connect the orange cable from each of the Counting Stations to one of the connectors on the bottom of the Main Control System. The connectors on the Main Control System are arranged in three groups of four connectors.

3. Operation

Once all the Counting Stations are in place and connected to the Main Control System, turn on the Main Control System by pressing the button on the right side of the unit.

Main Screen

When the counter is turned on, the main screen will be displayed. It shows the total count for all stations as well as the number of stations currently attached to the Main Control System (Figure 4).

Figure 4. Main Screen

This screen is always available by canceling out of whatever you are doing, using the **Cancel** key on the keypad (Figure 5).

The system will increment the total count each time a fish passes the sensor in any counting station attached to the Main Control System.

Figure 5. Keypad

Menu Button Functions

Station Calibration

Ensure the sensors in the funnels are adjusted properly to avoid erroneous counts or missed fish. Once all Counting Stations are connected and have a normal amount of water flowing through them, they can all be calibrated together. The sensors don't need regular calibration, but it is necessary when Counting Stations are added or are relocated to different connectors on the Main Control System, if the water flow changes significantly, or if there is a problem with the internal battery which would cause the unit to reset all counts and sensor settings.

To access the sensor screen, first select **Menu**, which displays the screen shown in Figure 6.

Figure 6: Menu Screen

Using the arrow keys to move the asterisk, select "Adjust Sensors" with the **Enter** key. This will display the Sensor Screen (Figure 7).

Figure 7. Sensor Screen

Each of the 12 possible sensors are displayed as either a "1" if no Counting Station is connected or a "0" if a Counting Station is connected. The 12 sensors are in three groups of 4, and correspond to the three groups of four connectors on the Main Controller. In this example, a Counting Station is connected in position 2, and it is selected for calibration.

On this screen, the left and right arrow keys will toggle through the Counting Stations, or you can select "All" to automatically calibrate all of the stations at once. Press **Enter** to start the calibration. During the calibration period, the sensitivity is automatically adjusted to account for the water flowing through the funnel. Do not drop any objects through the funnel during calibration.

To calibrate a single Counting Station, select the station using the left and right arrow keys. The sensitivity of that sensor will be displayed (in this example, Station 2 is selected, and the sensitivity is set at 22). Press **Enter** on this screen to automatically calibrate the sensor that you have selected.

Sensors can be calibrated manually if the automatic calibration does not accurately count fish. Examples of situations where this may be needed are when counting very small fish, or when water flow is high.

Select the Counting Station to be adjusted and use the up and down keys to increase or decrease the sensitivity ("Sens"), respectively. Do not press **Enter** after inputting the value – just use the keypad to move to the next action.

Fish will continue to be counted in any sensor funnel that is not currently calibrating. This way, any individual sensor can be calibrated while the others are still being used to count fish.

Toggle Backlight

The backlight display can be toggled on or off. To do this, first select **Menu**, which displays the screen in Figure 6. Using the arrow keys to move the asterisk, select "Toggle Backlight" with the **Enter** key to turn the backlight on or off.

Individual Counts

Individual counts for each station are available by pressing the **Show Counts** button on the keypad. The first time this feature is requested, a password is required. That password is the button sequence **Show Counts** then **Enter** then **Show Counts.** Once this password has been entered, and until the unit is turned off, the individual station counts are available by pressing the **Show Counts** key at any time. Use the up and down arrow keys to scroll through the individual station counts.

Manual Adjustments

The counts for any station can be manually adjusted, which in turn affects the total count. Pressing the **Adjust Count** key displays the screen in Figure 8.

Use the left and right arrow keys to select the Counting Station you would like to adjust. Use the up and down arrow keys to increase or decrease the count. To effect the change, enter the password by pressing the keys **Adjust Counts** then **Enter** then **Adjust Counts.**
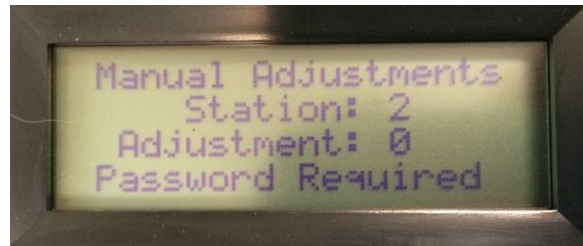

Figure 8. Manual Adjustment

Reset

Reset will return the total count and counts for each individual station to 0. This action cannot be undone. Press the **Reset** key and enter the password when prompted (Figure 9) by pressing the keys **Reset** then **Enter** then **Reset.**
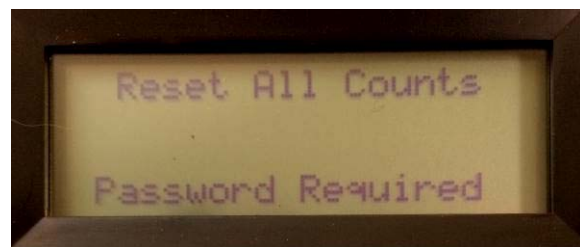

Figure 9. Reset

Setting a Target Count

The Fish Counter allows the setting of a target count. To set the target count, press the **Set Target** key. The screen in Figure 10 will then be displayed. Use the left and right arrow keys to move the cursor and use the up and down arrow keys to adjust the number at the cursor location. Press **Enter** to affect the change and **Cancel** to leave the target unchanged.
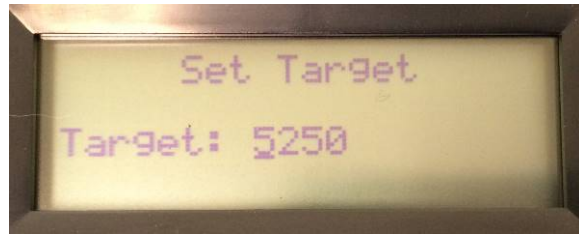

Figure 10. Set Target

Once the target count has been reached, the blue LED lights on the top of all the sensor funnels will flash rapidly indicating that the target has been reached. To clear the alarm, press the **Ack Alarm** (Acknowledge Alarm) key, and then change the target count to a higher number, or reset the total count.

4. Maintenance

Batteries

The Fish Counter has an internal battery which allows it to save counts and settings during power loss or shutdown. This coin cell battery should last several years, and when needed, a replacement can be purchased at an electronics stores. Use a BR2032 (Best) or CR2032 battery. XX2025 batteries can also be used, but they are thinner and it is important to make sure the battery connector is tight. If the battery becomes low or is not installed, a "Battery Low" warning will be shown on the Main Screen. The low battery should still continue to work for some time once this warning shows up. Without the battery, or if the battery becomes completely discharged, the unit will reset all counts and sensor calibration settings each time the unit is turned off and back on. Unless you install a fresh battery, you will need to recalibrate the sensors every time you turn the unit on.

Cleaning and Disinfecting

There are two separate cleaning issues. One is with regard to maintaining the equipment properly, the other is the minimizing the transfer of disease between locations.

The funnels are mostly plastic with corrosion–resistant aluminum. Saltwater and organic material should be removed after each use to reduce corrosion. Water, soap and water, or 91% isopropyl alcohol may be used, applied as a gentle spray or with a sponge, cloth or soft brush. Iodine based disinfectants are also acceptable, provided they are mixed to the proper dilution. Thoroughly rinse the funnels after cleaning.

The Main Control System is water resistant when closed, but should not be immersed or sprayed directly. Wipe with a damp cloth or disinfectant as needed.

Strong solvents may damage the equipment. We recommend Sudbury Bilge Cleaner and Bio-Clean from VWR for cleaning. Follow the directions provided with the product. Contact NMT for ordering information if you are unable to find these products.

Chlorine solutions are recommended for disinfecting the counters. Common sources of chlorine are calcium hypochlorite ("HTH") and solutions of sodium hypochlorite ("bleach"). Household bleach comes in a concentration of about 5%, so to achieve the desired solution of 200 ppm, dilute one ounce (2 tablespoons, 1/8 cup, or 32 ml) of bleach in 2 gallons (8 liters) of water (a ratio of 1:250). Stronger chlorine solutions may be available at fish rearing facilities and will require greater dilution.

Calcium hypochlorite and sodium hypochlorite ("bleach") are both highly toxic to fish but excess solution can be neutralized for disposal by adding sodium thiosulfate or sodium sulfite to the solution. As a "rule of thumb," if a five percent solution of these chlorine compounds is used as a disinfectant, adding an equal weight of either sodium thiosulfate or sodium sulfite can neutralize them.