

Deep Nutrient Trough Hydroponics System Assembly Instructions

(Part No. DNT1)

Important: Read all of the instructions before assembly.

Set-Up

1. Select the location of the DNT system with power source, water supply and water drainage in mind. The system is not designed for outdoor use and should be located away from heavy moisture.
2. The DNT system will arrive in three boxes and one wrapped rail kit. Tools required include a flathead screwdriver and a $\frac{3}{16}$ " Allen wrench.
3. Unpack and lay out each component. Familiarize yourself with each piece, as this will make assembly and installation faster and easier.
 - a. Tray—The growing tray and main stand assembly are packed in one box. The growing tray is one complete molded unit. Components of the main stand assembly include two 48-inch top horizontal bars, two 48-inch bottom horizontal bars with shelf support fittings, two 24-inch bottom crossbars, two 24-inch top crossbars with knob adjuster fittings and one 32-inch by 25-inch bottom shelf.
 - b. Lighting System—The lighting system and hanging accessories are packed together in one box. The contents of this box should be inspected upon delivery, as it contains a glass lens and large metal halide bulb which could be broken during shipping. After inspection leave the contents and accessories inside the box to prevent breakage. Do not touch the glass bulb—oil and dirt can cause the light to burst when turned on.
 - c. Light Rails—The system includes three wrapped aluminum rails. The two 70-inch rails are vertical light rails for hanging the lamp and the 49-inch rail with two eyebolts is the horizontal light rail.
 - d. Sump and Accessories—The nutrient sump holds approximately 16 gallons of nutrient solution when full. A lid is included for the sump. The sump contains the following accessories: submersible pump assembly with timer and eggcrate media support trays.

Assembly

1. *Main Stand Assembly*—Lay out the components and see below for assembly procedures. In each step, the aluminum rails slide into a corresponding metal fitting and are secured in place by tightening the hex bolt located on the side of the fitting (insert the $\frac{3}{16}$ " Allen wrench into the hex bolt and turn it clockwise). Do not overtighten, as this may damage the pipe. Some fittings may need to be loosened, adjusted and retightened during assembly.
 - a. To assemble the main components of the stand, start by assembling both ends first and then connect them with the longer horizontal side rails. Be sure that the tee fittings are located across from each other on the two bottom horizontal rails, as this will be the shelf support.



- b. When the main stand assembly is completed slide the growing tray into the top of the stand. Slight adjustments may be required to ensure a snug fit.
- c. Place the ABS plastic shelf on the bottom of the stand. Position the shelf over the center crossbar and insert a single twist-tie into the holes located on each corner of the shelf. Wrap the tie around the bottom of the pipe, close and tighten each tie and cut off any excess. This shelf is ideal for storing fertilizers, test equipment, media and other accessories.



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2. **Pump Assembly**—The submersible pump provides a means of delivering nutrient solution to the tray. The nutrient delivery assembly screws directly onto the top of the pump. Additional nutrient aeration is not necessary.
 - a. Place the pump and nutrient assembly into the sump and slide the sump under the stand. Place the growing tray into the top of the stand with the large hole over the sump.
 - b. The small vinyl tubing attached to the nutrient pump assembly can now be attached to the small bulkhead barb fitting. Once attached, the tube should be clamped securely. Also, the large vinyl tube can be attached to the large bulkhead and clamped in place.
3. **Light Kit Assembly**—Slide the vertical light rails into the rail holders with knob adjuster fittings. Place the black aluminum elbows on top of each of these bars, facing each other, and tighten. Slide the horizontal bar into the elbow fittings with the eyebolts facing down. Secure the bar in place by tightening elbow bolts. Tighten the knob adjuster fittings to secure the entire light rail assembly. Follow the instructions with the light fixture for assembly and hanging of the light. *Please note: We strongly recommend that two people hang the light fixture, as it is extremely heavy and easily damaged.* Screw in the bulb and glass lens after hanging the light fixture.

Usage Instructions

The DNT system is designed to grow a multitude of vegetables and plants hydroponically. The depth of the tray makes it ideal for growing plants with longer roots, such as tomatoes and peppers.

Although the DNT system can be used as an ebb and flow system (see attached instructions), it can also be used as a simple grow tray. Filling the trough with media such as perlite will provide an ideal growing system for plants. Simply follow the Planting and Seedling Stage instructions and transplant the propagation cubes to the media-filled DNT trays when ready.

Preparing Fertilizer Solutions

1. To prepare the fertilizer solutions please follow the instructions located on the label of each container. The sump holds approximately 12 gallons of water when three-quarters full. Fertilizer concentrations are measured in one of two ways: electrical conductivity (EC), expressed in millisiemens (mS), or total dissolved solids (TDS), expressed in parts per million (ppm). In general, 1 mS = 700 ppm. The only way to accurately determine fertilizer concentration is to use an EC meter or a TDS meter.

Stage	Fruiting Plants		Leafy Plants	
	EC (mS)	TDS (ppm)	EC (mS)	TDS (ppm)
Seedling	1,600-1,800	1,120-1,260	1,400-1,600	980-1,120
Average	2,500	1,750	1,800	1,260
Fruiting	2,400-2,600	1,680-1,820	—	—

2. Plants generally have a higher nutrient requirement during the cooler months and a lower requirement during the warmer months. The nutrient solution should be discarded about once every two weeks. This can be accomplished by draining the sump and refilling it with fresh water and the required amount of fertilizer.
3. In hydroponic systems, the availability of essential nutrients to plants is pH dependent. As pH increases many nutrients and ions become unavailable to plant roots. We recommend that the pH of a nutrient solution be maintained between 5.5 and 6.8. Measurement of pH levels can be accomplished by using pH test kits and/or a pH meter. Adjustment solutions may be used to adjust the pH levels.

Ebb & Flow Technique

The following instructions are guidelines for using the DNT system as a basic ebb and flow growing system. This type of technique is very successful for growing plants such as lettuce, cabbage, spinach and other herb crops. Please remember that these are basic guidelines. As you become more familiar with hydroponics and experienced with growing techniques, you may want to experiment with other techniques, different growing media, varying light levels and various fertilizers.

The following items are suggested when using the DNT system as an ebb and flow system:

Part No.	Description
PC112	Propagation Cubes
TY1	Seedling Tray
G716/G816/G916	Fertilizer
NP13	Net Pot, 3 ¹ / ₄ " Diameter
CA2	Media
PB3	Propagation Block

Assembly

Assemble the DNT system according to the instructions provided.

Planting and Seedling Stage

1. Tear off a strip of about 25 propagation cubes and place them in the seedling tray. Make a stock solution of fertilizer water by adding one teaspoon of fertilizer to one gallon of distilled water. Fill the tray three-quarters full with stock solution and allow the cubes to fully soak for one hour.
2. Insert a single seed into the center hole of each cube, placing the seed about 1/4" deep into the hole. Place the clear dome on top of the seedling tray.
3. Place the seedling tray in the center of the growing tray, directly under the lighting system.
4. Remove the lid and check the solution level each day. It should be maintained between 1/4" to 1/2" deep. A 12- to 15-hour lighting period is ideal at this stage.
5. Cubes need to remain in the seedling tray until the seedling plants emerge. This period can last from one to four weeks.

Transplanting for Growth

1. Once the seedlings emerge, the cubes are ready to be transplanted to either larger net pots or larger propagation cubes.
2. If using the larger cubes, separate the cubes and place them directly into the growing tray. Place the smaller cubes directly into the center hole of the larger cubes for growth.
3. If using net pots, first rinse the pots and thoroughly wash the clay media intended for use.
4. Fill each net pot about one-quarter full of cleaned clay media. It is easier to keep the media in a smaller container so that each net pot may be dipped into the media. "Sift" the smaller pieces of media out of the pot and allow only larger pieces to remain.
5. Position the seedling cube into the center of the net pot and fill the remaining volume with media.

Growth Stages

1. Place the filled net pots or cubes into the growing tray evenly spaced from each other.
2. Fill the nutrient reservoir three-quarters full with fresh water and add approximately 20 teaspoons of fertilizer.
3. Set the pump timer to alternate half-hour irrigation cycles (on for 30 minutes and off for 30 minutes).
4. Plug the timer into the electrical outlet and plug the pump into the timer.
5. Check the nutrient level in the sump and replace any water that has evaporated each day. Remember, an ideal water level is three-quarters full when the pump is turned off.
6. The growing stage has an ideal lighting period of 11–13 hours daily.
7. After about two weeks, drain all of the nutrient solution from the system and replace it with new nutrient solution.

Harvesting

Depending upon which type of crop is grown, harvesting of plants can begin in as little as two weeks. Small leafy plants such as lettuce and herbs will grow much faster than large fruiting plants such as beans and cucumbers.



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