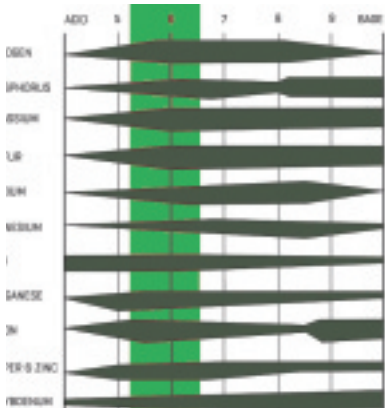
Plants require adequate amount of water adjusted in the correct range of pH 5.2 ~ 6.5 to optimize nutrient availability and maximize nutrient absorption that results in lush growth. Solution pH values within this range ensure that the nutrients are kept in suspension and are able to be delivered to the plant. At pH values above or below this range some nutrients precipitate out of the solution and become unavailable to the plants.



This is called nutrient LOCK OUT.

The pH value of the reservoir water must stay within the required range to maximize nutrient availability and absorption, and maximize lush growth. Water with high alkalinity or salt content can cause nutrient imbalances and poor plant growth.

4. Equipment Troubleshooting - *During the hot summer months*, a hydroponic system will lose large quantities of water through plant respiration. If there is an interruption in the water supply, the plants will recover slowly and production will be reduced even after the proper moisture level has been restored.

a. Pumps and Power Adapters

INSPECT the pump intake regularly for restrictions. If you notice the water flow is reduced, check the pump ASAP. Clean the pump thoroughly using pressured water from the faucet. Never pull or carry the pump by the cord.

It is good practice to keep a spare pump ready in case your system pump fails.

If your pump is experiencing problems, the troubleshooting steps below will help you quickly identify and solve the problem with a failed pump.

INSPECT the pump. Is it completely stopped, or is there a hum, or a loud *noise? Follow these steps until the problem is found:*

i. A loud noise from the pump:

Possible vibration against the side of the reservoir. Place a foam mat under the pump stop the vibration.

Possible debris around the pump impeller or the impeller itself may be broken. Inspect the intake area thoroughly.

ii. A hum coming from the pump but no water flow:

Possible clog in the intake or in the discharge pipe.

INSPECT the pump intake to ensure that it is free from debris. If clean and the problem persists, try placing the pump in a tub of water with no pipe attached and see if it works. If so, you will need to clean your plumbing lines.

Possible vapor lock (air in the pump). Vapor locks can be common when reinstalling a pump after cleaning it. Tilt the pump on its side and back and forth while submerged. You may see bubbles rise from the pump. If possible, do this with the pump on.

Possible capacitor failure. The pump will need to be replaced.

A loud grinding sound. Possible bearing failure. The pump will need to be replaced.

iii. The pump does nothing:

The thermal overload protection may have engaged. Most submersible pumps feature a thermal overload protection to minimize damage to the pump should it overheat. When it cools off it can restart. Give the pump time to cool down, this may take up to an hour. Then try again, ensuring that the pump stays submerged. Repeated engagement of the thermal overload protection can damage the pump.

iv. Power and Switch problems:

No electricity to pump. Check the outlet with another electrical device and/or check the pump on another outlet that uses a different circuit.

The pump liquid level switch may fail to turn on because the switch has shifted inside the reservoir and has become lodged against the side of the reservoir;

A piece of debris is interfering with the movement of the level switch.

INSPECT the level switch to CONFIRM the level switch and float arm assembly move freely.

New Age Urban Garden

Taiwan Hydroponics Development Co., Ltd. (THDC)

www.taiwanhydroponics.com
info@taiwanhydroponics.com
粉絲網頁：台灣水耕發展有限公司
Taipei Head Office: +886-2-28851159

Welcome To The NEW AGE URBAN GARDEN!

Congratulations on your purchase of a Vertical Hydroponic GrowTube™ System from Taiwan Hydroponics Development Co., Ltd. (THDC) – a new idea for growing vegetables, herbs and flowers in urban environments.

Please check our online information at www.taiwanhydroponics.com for additional resources.

QUICK START GUIDE

SAFETY PRECAUTIONS

Please read and follow all instructions in this manual. When in doubt, please have a professional inspect your installation. This manual classifies precautions into Warnings and Cautions. Be sure to follow all precautions listed below. They are important to avoid use injury, prevent damage to the system and assure proper system operation.

WARNING – ***Confirm system is properly assembled and level before operating.***

WARNING – ***Confirm system is properly anchored or sheltered from wind and extreme weather.***

WARNING – ***Confirm electrical connections are properly connected, grounded and sheltered from water before starting the system.***

WARNING – ***Properly drain the top feeder tank and unhang the GrowTubes™ before attempting to move the system or mounting rack.***

WARNING – ***Wear Protective Gloves and Eyeware when handling Chemicals.***

CAUTION – ***Check & Confirm Water Levels*** in the system is at proper levels to prevent system from running dry and harming the pump.

CAUTION – ***Periodically Check Hoses, Connections and Filters*** to confirm plumbing is connected and free of obstructions. Especially confirm bottom drain connections and hoses are free of obstructions.

CAUTION – ***Keep Plants Trimmed and Properly Rooted*** to prevent leakage from the system.

1. System Preparation and Maintenance

i. For New Installations: The grow fiber in new GrowTube™ assemblies should be flushed and buffered before nutrients are added to the system to insure that excess salt and phosphorus is removed and that the system pH values stay in an acceptable 5.2 ~6.5 range. If GrowTube™ assemblies are not properly conditioned before using may cause pH to fluctuate. We recommend flushing the system for 1 week after installation with reservoir water changes every two days. The reservoir water will have a brownish peaty color when circulation starts. After a few days, the water will clear.

When the reservoir water clears, the system is ready for planting and nutrient adjustment.
ii. Pick The Right Plants for your THDC Vertical Hydroponic GrowTube™ System. Many varieties of herbs, leafy vegetables and flowers will grow in a Vertical Hydroponic GrowTube™ System including basil, mint, sesame leaf, lettuce, water spinach, gyruna, basella and similar plants. Some reliable annual flowers are alyssum, cosmos, marigolds, and zinnias. Perennials include Shasta daisies, columbines, and hollyhocks.

iii. Daily:
INSPECT: solution levels to make sure system has enough water for sable operation;
INSPECT: for solution leakage around front planting face and bottom caps – trim plants as necessary to assure smooth water flow;
OBSERVE: one system cycle to confirm pump shut off is operating correctly, all hoses and connectors are secure and water is flowing as desired;

iv. Every three days:
INSPECT: plants for signs of insect infestation.
TEST: water properties including pH, EC, etc.
INSPECT: plants for signs of insect infestation;
INSPECT: connections and manifolds to confirm there are no restricted or blocked hoses, connectors;

v. Every week:
INSPECT: tanks for debris.
CONFIRM: plants are properly trimmed and water is not escaping the system.
CONFIRM: spare nutrient amount on hand.

vi. Every two weeks:
CHANGE: reservoir solution –
*disconnect power and allow all solution to drain to bottom reservoir tank;

*remove feeder hook from top feeder tank and position near drain;
*connect power and allow nutrient solution to run to drain;
*when reservoir tank is empty, fill with tap water and add appropriate amount of nutrients;
*insert feeder hook in top feeder tank;
INSPECT: grow tube bottom fiber filters for overgrown roots in return hoses;
*connect power and allow top feeder tank to fill;
OBSERVE: one system cycle to CONFIRM proper operation.
vii. Every crop cycle before replanting:
*Remove all old plants and debris from the system;
*Clean dead plant fiber from the grow tube planting ports;
*Wash tanks and hoses with water. Avoid using a sterilizing agent (bleach) unless the system has bacterial problem;
INSPECT: grow fiber and replace fiber strips in tubes that have lost rigidity.

viii. Water flow control
Water flow can be controlled by turning the red valves on the water distribution manifold a the top of the system.
- Decrease water flow when starting new cuttings to help prevent root rot.
- Decrease water flow during winter or cooler weather to help prevent general root rot.
- Decrease water flow during hot weather to help prevent root rot on certain types of crops such as Basella.

2. HydroLush® Hydroponic Nutrients

Mixing the Nutrient Solution
ALWAYS MIX NUTRIENTS INTO A FULL RESERVOIR TANK OF WATER
NEVER COMBINE CONCENTRATED NUTRIENTS TOGETHER BEFORE MIXING INTO THE RESERVOIR TANK.

HydroLush®	***MicroNutrients***	***1ml per 1L reservoir water***
HydroLush®	***Green***	***4ml per 1L reservoir water***
HydroLush®	***Red***	***3ml per 1L reservoir water***

Steps for Mixing Nutrients:
First: Fill your Reservoir Tank with Water.
Second: Add HydroLush® Micro-Nutrients:
1ml per 1 Liter of reservoir water
This contains Calcium, Boron, Copper, Iron, Manganese and Zinc and some Nitrogen for general purpose vegetative growth. Shake the bottle vigorously, measure into a cup and pour into the reservoir tank water. Stir well. Rinse the measuring cup in the tank water.
Stir the Solution Well
Third: Add HydroLush® Green growth component:
4ml per 1 Liter of reservoir water
This contains nitrogen and potassium. Shake the bottle vigorously, measure into a cup and pour into the reservoir tank water. Stir well. Rinse the measuring cup in the tank water.

Stir the Solution Well
Fourth: Add HydroLush® Red stimulating component:
3ml per 1 Liter of reservoir water
This contains phosphate, potassium, soluble magnesium and sulfur. Shake the bottle vigorously, measure into a cup and and pour into the reservoir tank water. Stir well. Rinse the measuring cup in the tank water.
Stir the Solution & Wait 15 minutes
Finally: Check Solution pH Value and adjust as needed
Reservoir tank water pH should be in the to pH 5.2~ 6.5 range for optimal nutrient availability to the plants. check and adjust if necessary. One of the best pH additives for adjusting ph down is phosphoric acid, H_3PO_4. ***Don't add pH adjusters directly to your nutrient solution.*** The sudden drop or rise in pH can cause elements to precipitate out.
*Best practice is to make a diluted solution of pH adjuster with some water. Making up a dilute solution not only makes this process a lot safer but it's also easier to fine-tune the pH of your nutrient solution.
Keep adding, bit by bit, stirring, and re-testing the pH until it falls within the desired range.
*Always wear gloves as pH adjusters are corrosive and can damage your skin.
*Ensure your nutrient solution is at the right temperature. 17° to 19°C.
Water should be tepid. Plants don't like cold roots. If the nutrient solution is too warm, dissolved oxygen levels will be too low.

3. Water chemistry
a. pH (Potential Hydrogen) - The pH value of water is measured on a scale of 0 to 14 with extreme acidity being 0 and extreme alkaline being 14.