

Boome^{ang}TM
basket system

A product of Greenhouse Technology Inc.



Boomerang System Specifications

	<u>ST - Boomerang (Standard)</u>	<u>HD – Boomerang (Heavy Duty)</u>
Drum Sizes	30" or 40"	30" or 40"
Drum Assembly Design	Enhanced Low Friction EZ – Maintenance	Enhanced Low Friction EZ – Maintenance
Pully Design	Heavy Duty	Heavy Duty Low Friction W/ Double Sealed Bearings
Hook Design	Heavy Duty 20 Lb Capacity	Heavy Duty 20 Lb Capacity
System Tensioning	Quick Tensioning Design	Quick Tensioning Design
Crimp Design	Swaged – Hydraulic Application (Sure Grip Design)	Swaged - Hydraulic Application (Sure Grip Design)
Motor(s)	Baldor ¼ HP AC	Baldor ¼ HP or 1/3 HP DC
Basket Sizes Supported	6", 8", 10"	6", 8", 10" or 12"
Basket Spacing Supported	Customer Defined	Customer Defined
# of Basket Layers Supported	1, 2	1, 2, 3
Standard Extension Hanger Lengths	14", 20" or 24"	14", 20", 24, 40" and 48"
Maximum System Length	275'	500'

Boomerang System Specifications (Continued)

	<u>ST - Boomerang (Standard)</u>	<u>HD - Boomerang (Heavy Duty)</u>
Controller	Boomerang - AC	Boomerang - DC
Operation	Fixed Speed 13 FPM (Feet Per Minute)	Variable Speed 2 - 20 FPM (Feet Per Minute)
Irrigation Method	Start/Stop	Constant
Irrigation Assembly	Fully Adjustable Life Time Design	Fully Adjustable Life Time Design
<u>Options:</u>		
Irrigation Option	Gravity Fed W/ Funnel, Drain Tube And Single Dosing Station	Gravity Feed W/ Funnel, Drain Tube And <u>Double</u> Dosing Station
Irrigation Option	Center Isle Irrigation N/C	Center Isle Irrigation N/C
Master Controller Option	GO-1 Controller Up To 32 Boomerangs Up To 4 Crops Per Boomerang Full Programmability Water Manually, By Time Or VPD Watering Control (Vapor Pressure Deficit) 16 Crop Aging Models 16 Crop Disable Models Alarming Features	GO-1 Controller Up To 32 Boomerangs Up To 4 Crops Per Boomerang Full Programmability Water Manually, By Time Or VPD Watering Control (Vapor Pressure Deficit) 16 Crop Aging Models 16 Crop Disable Models Alarming Features
Hook Counting Option	Used for Watering Cycle, Cropping and System Alarm	Used for Watering Cycle, Cropping and System Alarm

Boomerang Improvements to ECHO Design

Friction has a cumulative effect

Friction is the enemy of a basket system. Friction places more strain on system components and is a pre-cursor to wear. The boomerang includes several friction fighting features including the ample use of sealed bearings. Ample use of industrial grade sealed flange bearings and thrust bearings in the drum assemblies and miniature sealed bearings in all of the pulley wheels assure maximum friction reduction. Even the hook and clip assemblies incorporate a parabolic curve design for maximum friction reduction when going over the pulley wheels.

DC (2 – 20 ft. per minute) Verses AC (13 Ft. per minute)

The DC motor allows the Boomerang to 24 different speeds. In watering mode the system does not stop. At 4 ft. per minute a 10" basket can see 6 – 8 seconds of irrigation while the system is running continuously. You have to study the system to see that it is in fact moving when running at such low speeds. When shipping, loading, taking cuttings, ect. The speed appropriate for the task is available. *No, One speed does not fit all.*

Most important, constant starting and stopping between baskets causes basket systems to shake, shudder, rock and roll. Some growers have considered the effect on baskets at times like doing the wave. Plant blooms drop to the ground below affecting the quality of plant material below. The effect on system reliability, wear and long term reliability is obvious. Stopping and starting 600 – 800 times for each watering cycle can over time damage electronics, motor, chain and sprockets not to mention a growers psyche.

A welcome new irrigation feature

A second watering option allows for a variant on the watering theme. For the extremely quality conscious grower, or growers specializing in the hard to water baskets like geraniums, a watering funnel was developed. Each basket has a funnel clipped to the hook above with a drain line into the basket. Using a low travel speed the Boomerang doses the funnel at up to (2) locations eliminating irrigation of the plant foliage directly like the traditional water breaker approach.

Enhanced Watering Breaker Assembly

A common complaint previously was the use of copper tubing or plastic lock line tubing for the watering assembly. Both methods have deficiencies in ease of adjustment initially and long term plus long term durability. This assembly has been upgraded to offer a life time design with easy adjustability.

EZ- System Tensioning

One of the big complains about basket systems is the time it takes to tension the cable during peak growing season. The boomerang takes approximately 1/6th the time to tension compared to what growers are currently familiar with. Our drum assembly design requires that only – 2 - nuts need to be turned to tension instead of unbolting the entire drum assembly to move it and then re-tightening it.

Let the Light In

The Boomerang allows 120% more light pass through the drum when compared to the ECHO. Every piece of equipment in the greenhouse should be designed to allow the maximum amount of light to pass through to reach the plants below.

Isn't a Crimp Just a Crimp

GTI has gone to extremes to provide the best quality crimps attached to the cable. We use a hydraulic crimping system instead of an air drive system in order to deliver up to 60 tons of force to place crimps on the cable. The crimp goes on and stays in position.

Installation Cost in Time and Material Reduced

The general design of the controls reduces the involvement of an electrician by 50% in terms of time and materials.

Systems of approximately 200' or less can be installed with less support tubing and installation time for a overall cost savings of 15% or more.

Heavy Duty Parts

Plastic components including the wheels, hooks, and tabs used in the Boomerang are of a more substantial in size and weight by comparison to those in the ECHO system and are constructed of Nylon 66 (70%) and glass (30%) for a higher degree of strength, wear ability and UV resistance. Hooks go together and stay together. Super Glue is NOT required.

Hook Counting

The ability to count hooks offers some key benefits:

Multiple crops – Growers will be able to setup multiple crops defining their locations by a range of hooks. This gives smaller growers a real benefit in terms of zoning different crops for irrigation. (Fall 2004)

Alarming – If the cable is not moving for some reason like a possible mechanical malfunction the counter won't see hooks and will stop and go into alarm mode instead of continuing to run.

of Hooks – The system knows how many hooks were originally on the system when new and how many currently on the system. This is useful for production staff and maintenance personnel.

Boomerang Controller

Simplified user interface allows the grower to learn and teach other how to use the system in minutes. Programming of the Boomerang Controller is essentially bi-lingual. (English/Spanish)

Less maintenance on controller due to elimination of keypad and display which tend to wear and require maintenance over time

Individual programming of layers. You can have 1 layer watered longer than another.

GO-1 Network

System Approach – For the first time, larger installations of automated basket systems can be managed as a system instead of individual machines. Up to 32 Boomerang systems can be connected to our GO-1 VPD controller via RS485. This affords a central programming point with a large easy to read display for enhanced ease of use. Boomerangs can also be locally programmed without the need for the GO-1.

Scheduled Watering – Growers will be able to schedule Boomerangs to start at various times of the day to conserve on available water or to guarantee that the baskets will be watered unless they are taken off the schedule.

VPD Watering with Crop Aging – We use the patented technology developed by Bob Oglevee on Oglevee, Ltd for irrigation. The GO-1 uses optional VPD sensors to monitor light, temperature and relative humidity levels in the greenhouse to determine when to water baskets. Additionally, crop aging takes into account the growing irrigation needs of the basket as it moves toward marketability. Growers can setup 16 different models and attach these models to crops on the various Boomerang systems.

Individual crops on a Boomerang can have different VPD and aging targets for customized irrigation.

Alarm Call-out – If a Boomerang triggers an alarm, the GO-1 will log the alarm and call the grower through an alarm output tied to a sensaphone auto-dialer.









