



## Whole Bay Dutch Bucket System



*PolyMax® Dutch Buckets*

\*Actual system may differ.

*Versatile PolyMax® Dutch Buckets are ideal for both small- and large-scale hydroponic growing.*

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WARNING: Cancer and Reproductive Toxicity - P65Warnings.ca.gov

STK#	DIMENSIONS	STK#	DIMENSIONS
113596	30' W x 48' L	113599	30' W x 84' L
113597	30' W x 60' L	113600	30' W x 96' L
113598	30' W x 72' L	113601	30' W x 128' L

Revision date: 02.19.24

# Important Information

## READ THIS DOCUMENT BEFORE YOU BEGIN TO ASSEMBLE YOUR DUTCH BUCKET SYSTEM.

This guide provides helpful hints and important information needed to safely assemble and properly maintain the Dutch bucket system. Read and understand this guide before you begin.


### SAFETY PRECAUTIONS

- Apply PVC cement in a well-ventilated area. Follow all instructions on the PVC container.
- Use a portable GFCI (Ground Fault Circuit Interrupter) when working with electric power tools and cords. Use battery-powered tools if possible.
- Exercise caution when using all tools.
- Wear gloves and eye protection when drilling and cutting.

### SAMPLE ASSEMBLY PROCEDURE

The steps outlining the sample assembly are as follows:

1. Verify that all parts are included in the shipment. Notify customer service for questions or concerns.
2. Read these instructions and all additional documentation included with the shipment **before** you begin.
3. Gather the tools and assistants needed to assemble the product.

 **WARNING:** CONSULT THE SERVICES OF A QUALIFIED ELECTRICIAN TO ADEQUATELY AND SAFELY CONNECT THE PUMP TO A POWER SUPPLY AND TO WIRE THE CONTROL PANEL OF THE FEED PUMP STATION.

ALL ELECTRICAL CIRCUITS SHALL BE DESIGNED IN ACCORDANCE WITH LOCAL AND REGIONAL BUILDING CODES AND STANDARDS.

### TOOLS

The following list identifies the tools needed to assemble the feed pump station and Dutch bucket system described within this guide. Additional hand tools may be needed depending on the application.

- Tape measure and gloves.
- Marker to mark locations on board.
- Variable speed drill (cordless with extra batteries works best) and drill bits.
- Saw or tool to cut pvc tubing.
- 1" hole saw bit.
- Wrench and socket and ratchet set.
- 3/16" hex (Allen) wrench
- Adjustable pliers.
- Level to level feed pump station frame.



### UNPACK AND IDENTIFY PARTS

The following steps will ensure that you have all the necessary parts *before* you begin assembly.

1. Unpack the contents of the shipment and place where you can easily inventory the parts. Refer to the Bill of Materials/Spec Sheets.
2. Verify that all parts listed on the Bill of Materials/Spec Sheets are present. If anything is missing or you have questions, contact Customer Service.

### BASIC CARE AND MAINTENANCE

Proper care and maintenance of your system is important. Check the following items periodically to properly maintain your Dutch bucket system.

- Check connections to verify that they remain tight.
- Verify that the pump is working properly.
- Check and clean all filters to optimize performance.
- Clean the reservoir periodically to prevent unwanted contamination of solution.
- Monitor temperatures (room and solution) to maximize plant growth.



**ATTENTION:** Install fittings so they are fully inserted into 3/4" tubing. Use a hair dryer or hot water to gently heat tubing for easier installation. Do not overheat! Tube will melt!

Use pliers to gently squeeze ratchet clamps around tubing.

## Important Information

### PICTORIAL GUIDE

Use the following graphics and photos to identify the parts of the system.  
Consult the Quick Start Guide for additional details and diagrams.



AC2804



110743  
3mm Punch



110410  
Woodpecker Drippers



111698 Ratchet  
Clamp



110407  
Dripper Stake



MH1123



Dutch Bucket  
\*Color may vary



Siphon Elbow



WF6692



111074



110729  
Elbow

**ATTENTION:** This is a drain-to-waste Dutch bucket system. As such, it requires a drain or tank to capture the nutrient solution that drains from each Dutch bucket.

Disposal of nutrient solution may be regulated in your area. Consult the services of a professional familiar with local and regional codes to ensure proper disposal of waste solution.

**WARNING: DO NOT ALLOW THE PUMP TO RUN WHILE TANK IS EMPTY. DAMAGE TO PUMP WILL OCCUR. MONITOR FLUID LEVEL AT ALL TIMES.**

#### CUSTOMER-SUPPLIED MATERIALS:

Customer must supply all additional materials and fittings to connect the feed pump station to the individual Dutch bucket zones/rows. System is setup to use 1" pvc that runs from each outlet of the 5-zone manifold to each row of Dutch buckets.



110408  
1/8" White Polyethylene Tubing



111627  
3/4" White Polyethylene Tubing

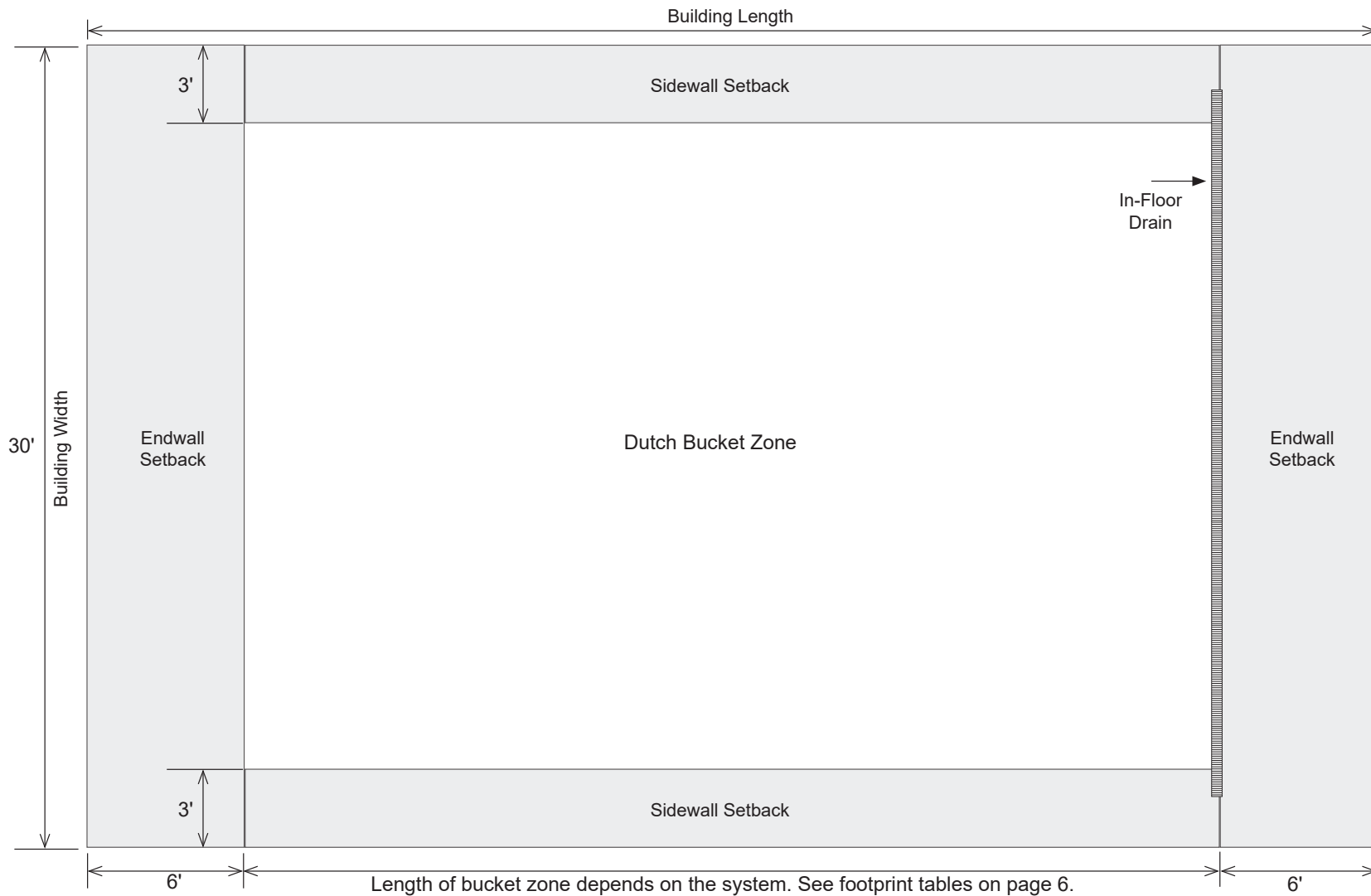


Plastic Pipe & Tube Cutter

# Basic Dutch Bucket System Assembly

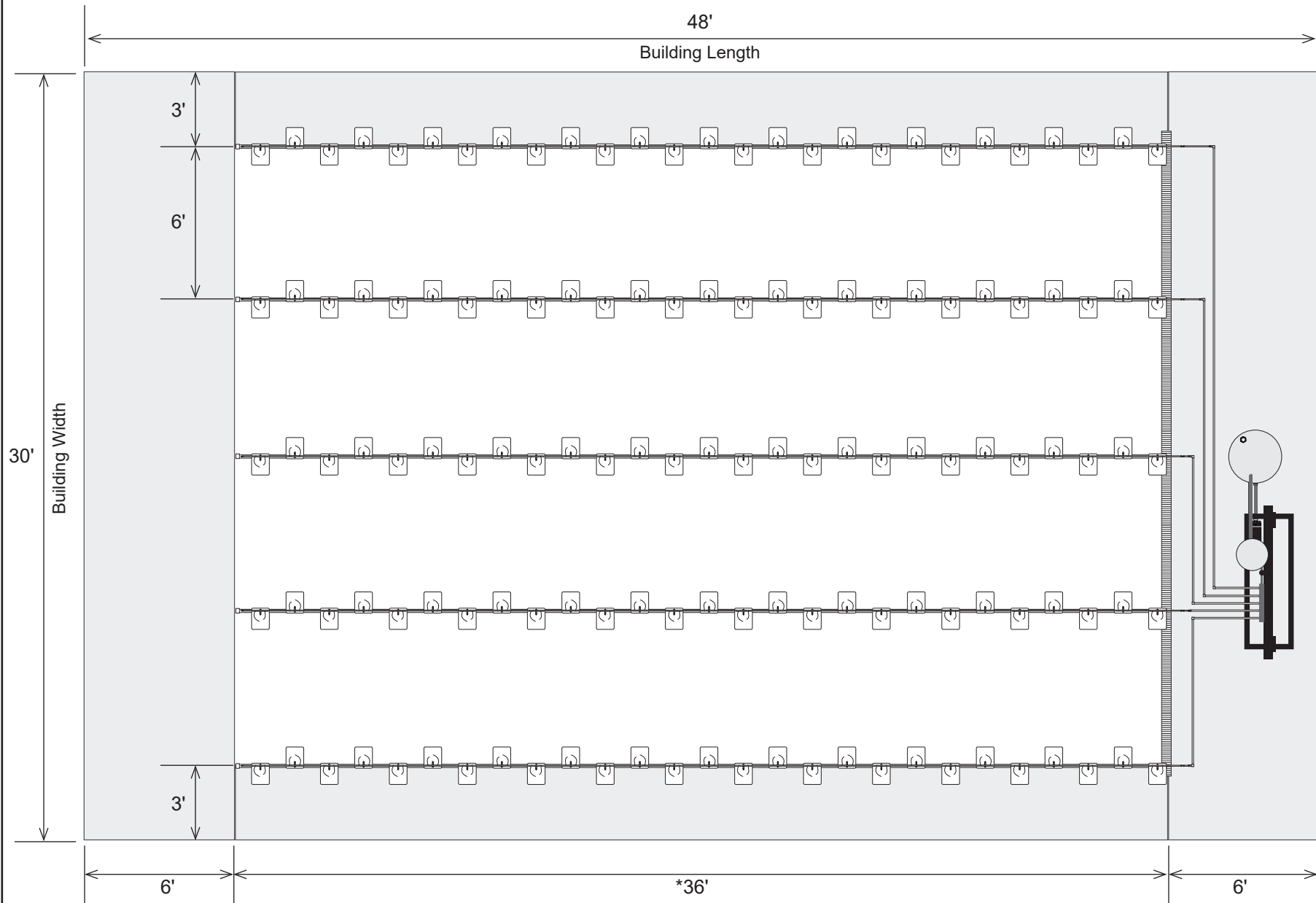
Assembly procedures can occur simultaneously if assistants are available. Read this guide before you begin. Typical procedures include:

1. Identify setbacks, the area for Dutch buckets, and position of feed pump station. See below and diagrams on the following pages.
2. Assemble the 113114 feed pump station and set it in the desired position. See instructions included with 113114 Feed Pump Station or **Procedure 5** in this guide. Allow room for maintenance and connections. **Customer supplies all materials to connect feed pump station to each Dutch bucket row/zone.**
3. Construct Dutch bucket drain tubes and supply tubes; assemble Dutch buckets and set in place.
4. Connect Dutch bucket supply tubes to the feed pump station.
5. Set the controls according to the 5-Zone Control System documentation.



# Basic Dutch Bucket System Layout

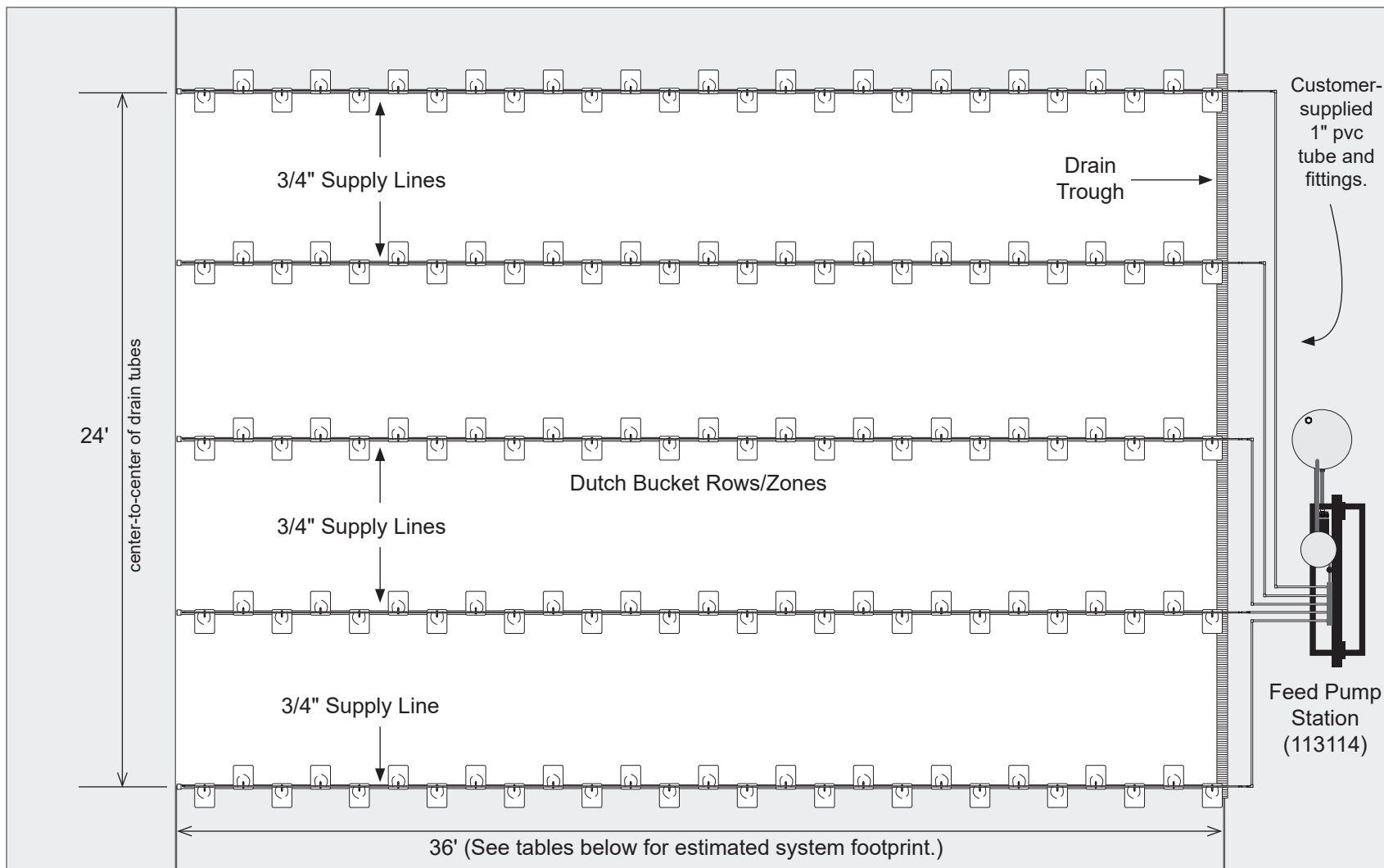
Diagram shows a typical Dutch bucket system layout. Minor changes depend on the available space and position of drain. In this example, the outlet of each 1-1/2" pvc drain tube is positioned at the feed pump end. Systems assembled in a greenhouse with a trough floor drain are setup as shown. If a single floor drain is used, additional pvc tube and fittings may be needed to route each drain tube to the floor drain. **Example shows a 30' x 48' Dutch bucket system.** The 6' end setbacks and 3' side setbacks are typical for all building sizes. Space Dutch bucket rows at 6' center-to-center.



\*Actual length of bucket zone depends on the system. See footprint tables on page 6.

# Basic Dutch Bucket System Estimated Footprint

Diagram below identifies the typical parts of the whole bay Dutch bucket system. Example below shows a Dutch bucket system for a 30' x 48' building. Dutch bucket system footprint (without the outer buckets of outer rows) is approximately 24' x 36' as shown.



**ATTENTION:** Shaded areas identify standard setbacks for all building sizes. See diagram on previous page for dimensions.

Dutch Bucket System Footprint	Number of Buckets per Row/Zone
113596 (24' x 36')	27
113597 (24' x 48')	36
113598 (24' x 60')	45

Dutch Bucket System Footprint	Number of Buckets per Row/Zone
113599 (24' x 72')	54
113600 (24' x 84')	63
113601 (24' x 96')	87

## Assembly Instructions—Drain Tube Preparation

# 1

### ASSEMBLE DRAIN TUBES; MARK AND DRILL BUCKET DRAIN HOLES

#### Required Tools:

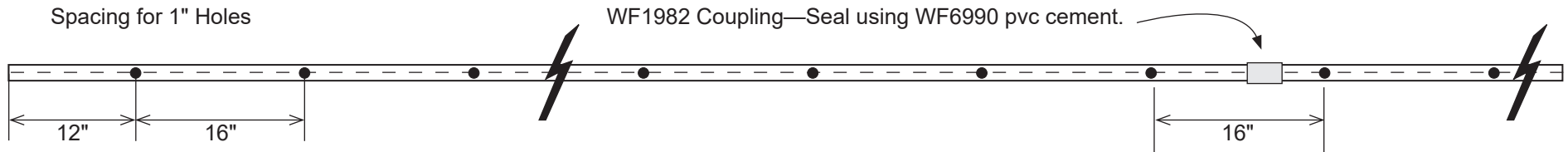
- Drill with a 1" hole saw. Example shows using a step bit. Keep holes aligned and uniform.
- Marker, chalk line, and tape measure

Complete these steps:

1. Connect WF4140 1-1/2" pvc using WF1982 couplings. **Dry fit only at this time.** The number of pvc tubes for each drain tube assembly depends on system length. There are five (5) drain tubes of equal length for the Dutch bucket system.

**ATTENTION:** The length of each drain tube assembly is the length of the Dutch bucket system footprint. See the tables on the previous page. For example, the 113596 system has a footprint of approximately 24' W x 36' L. Each drain tube will be approximately 36' long. Cut last tube in the assembly as needed to achieve required drain tube length for your system.

Spacing for 1" Holes



2. With assistance, snap a chalk line along the top from end-to-end of the pvc drain tube. Next, measure 12" in from one end and mark the position on the chalk line. From the 12" mark, continue marking hole locations at 16" intervals working toward the other end of the drain tube assembly.
3. Take a 1" hole saw and drill the drain holes in pvc drain tube. Keep all holes aligned and centered on chalk line. See tables for number of buckets/holes. Disassemble the drain tube if needed to drill holes. Mark the order of tubes to ensure assembly in the same order.



Example shows using a step bit to drill drain holes in drain tube for Dutch buckets.



4. Clean all debris from inside the drain tube and from around the drain holes.
5. Reassemble the drain tube and secure the tube joints at each WF1982 coupling using the pvc cement. (Follow all instructions on cement container.)
6. Slid a slip cap (MH1123) over one end of the drain tube assembly. Position this capped end opposite the floor drain when tubes are set in place.
7. Repeat these steps to create the remaining four (4) drain tube assemblies.

## 2

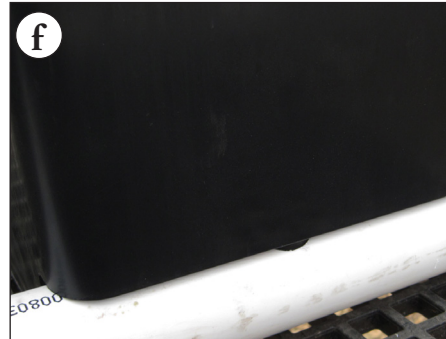
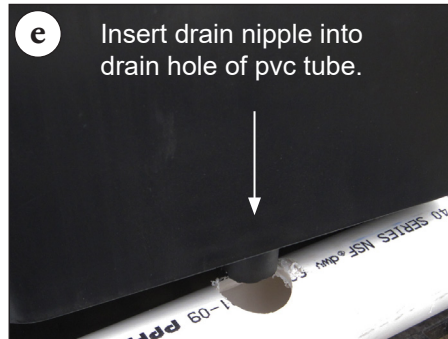
### ASSEMBLE AND INSTALL SIPHON ELBOWS

Complete these steps:

1. Position the drain tubes on the floor of the growing area for your system. Use the layout diagrams (pages 4-5) for spacing. Position open end of each tube so tubes empty into the floor drain. (Additional pvc may be needed for a different drain type.)
2. Assemble the siphon elbows as shown. Two (2) elbows are used for each assembly.
3. Take the elbow assembly and install one inside each Dutch bucket.
4. Set each Dutch bucket in place on the drain tubes. Verify that each bucket drain nipple is inserted in the drain hole of the pvc drain tube.
5. Continue with the next procedure.



Siphon Elbow





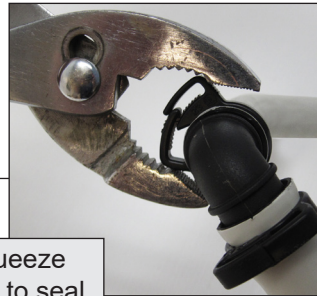
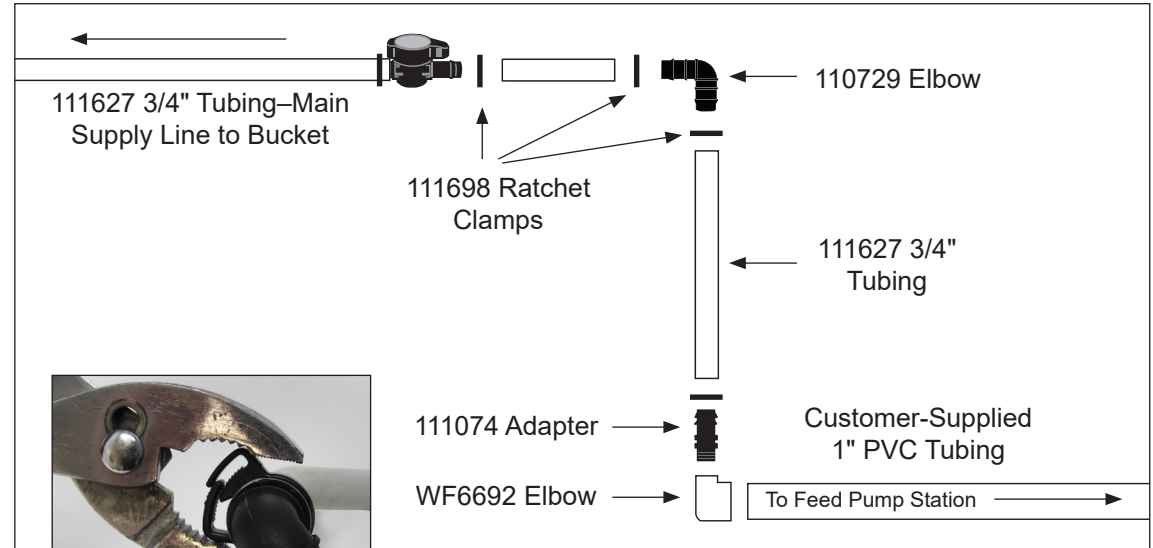
# Assembly Instructions—Prepare the 3/4" Supply Lines for Each Dutch Bucket Zone

# 3

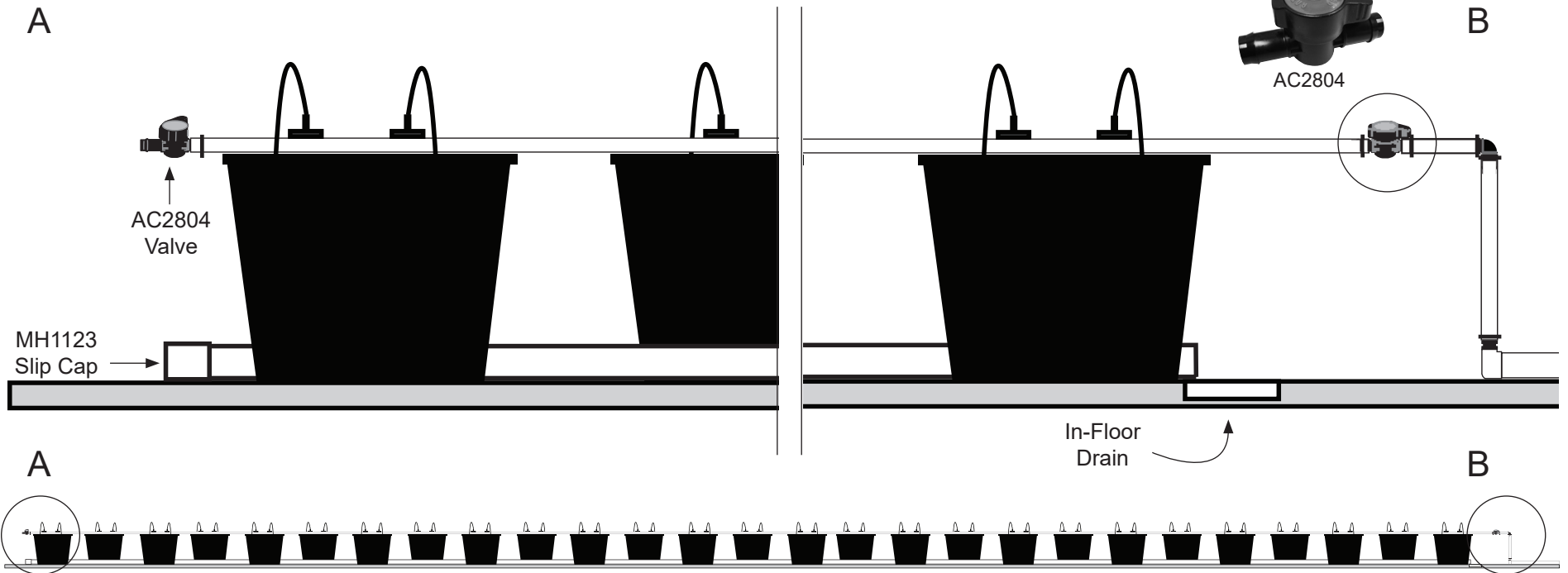
## ASSEMBLE SUPPLY LINES FOR EACH ROW

Complete these steps:

1. Rollout enough 3/4" tubing (111627) to stretch from one end of one Dutch bucket row to the other. Allow extra for connections.
2. Use the diagrams to install the fittings and valves. Secure all connections using the 111698 ratchet clamps.
3. Repeat steps to create the supply lines for the remaining rows of Dutch buckets.
4. Continue with the next procedure.



Gently squeeze with pliers to seal.



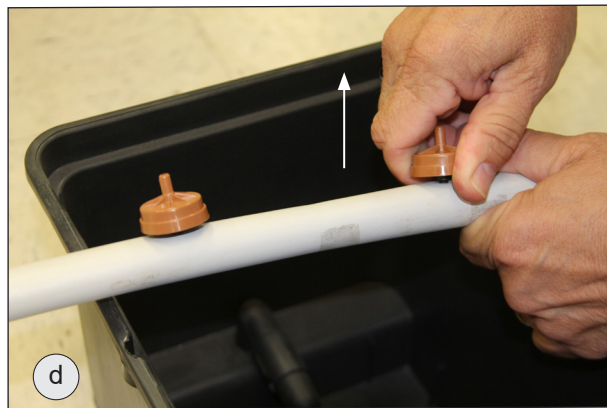
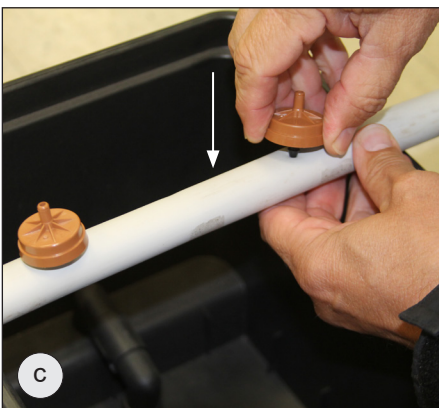
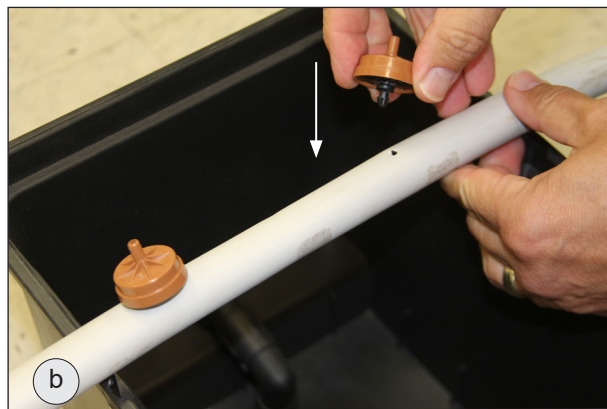
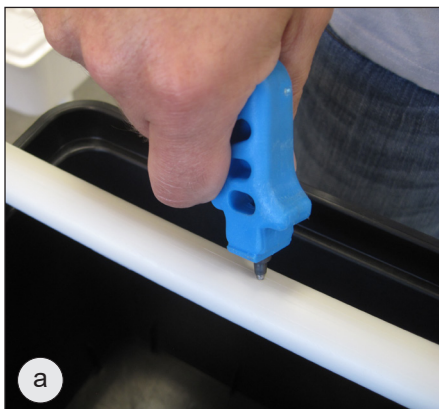
4

**INSTALL DRIPPERS, LINES, AND STAKES**

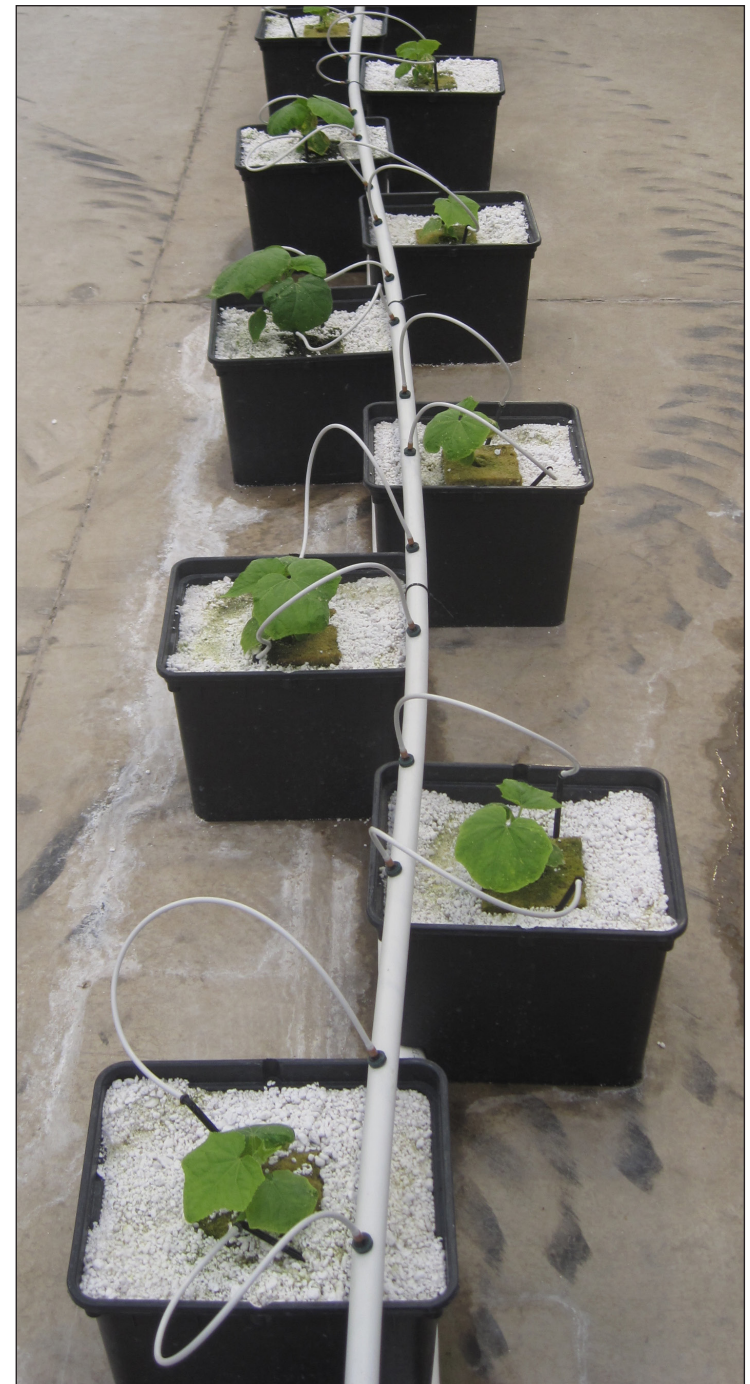
Complete these steps:

1. With buckets and supply lines in position, use the 110743 punch to punch holes in the supply line for each 110410 dripper. Position holes where you want drippers installed. **There are two (2) drippers per Dutch bucket.**

**NOTE:** See the information in Step 4 for maximum length of the 1/8" feeder tubes before you punch holes for the drippers.



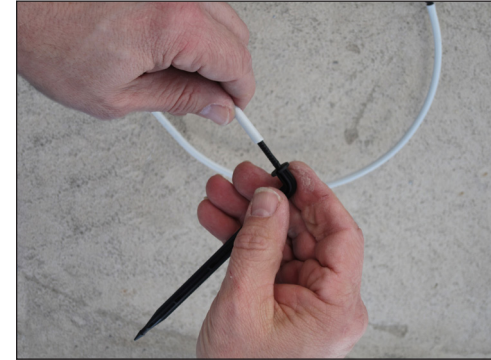
2. Take dripper and push tapered end into a hole until end snaps into tube. Gently pull back on the dripper (as if to remove) to seat it in place. Do not pull too hard. Do not pull dripper out of hole.
3. Repeat to install all remaining drippers.



4

INSTALL DRIPPERS, LINES, AND STAKES—continued

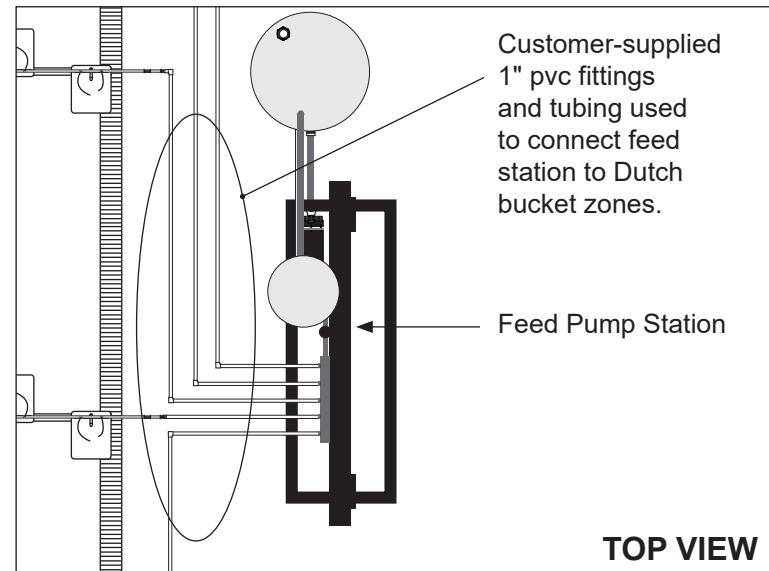
4. Cut the 1/8" tubing to connect dripper stakes to drippers. **Do not exceed 12" for each 1/8" tube. Tubes can be shorter if desired.**



5. Gently slide one dripper stake onto each 1/8" tube. Wet the tube or dripper end for easier assembly.

**ATTENTION:** Dripper ends are fragile! Do not bend or break them.

6. After connecting a tube to each dripper stake, move to the Dutch buckets and slide one tube and dripper stake assembly onto each installed dripper.



7. Continue by connecting each 3/4" supply line to the assembled feed pump station using customer-supplied 1" pvc fittings and tubing. See diagram above. (Assemble the feed pump station if needed. See Procedure 5 that follows.)

# Assemble the 113114 Dutch Bucket Feed Pump Station

5

ASSEMBLE THE FEED PUMP STATION




# Important Information

## READ THIS DOCUMENT BEFORE YOU BEGIN TO ASSEMBLE YOUR DUTCH BUCKET FEED PUMP STATION.

This guide provides helpful hints and important information needed to safely assemble and properly maintain the feed pump station. Read and understand this guide before you begin.

### SAFETY PRECAUTIONS

- Apply PVC cement in a well-ventilated area. Follow all instructions on the PVC container.
- Use a portable GFCI (Ground Fault Circuit Interrupter) when working with electric power tools and cords. Use battery-powered tools if possible.
- Exercise caution when using all tools.
- Wear gloves and eye protection when drilling and cutting.

 **WARNING:** CONSULT THE SERVICES OF A QUALIFIED ELECTRICIAN TO ADEQUATELY AND SAFELY CONNECT THE PUMP TO A POWER SUPPLY AND TO WIRE THE CONTROL PANEL OF THE FEED PUMP STATION.

ALL ELECTRICAL CIRCUITS SHALL BE DESIGNED IN ACCORDANCE WITH LOCAL AND REGIONAL BUILDING CODES AND STANDARDS.

### BASIC CARE AND MAINTENANCE

Proper care and maintenance of your system is important. Check the following items periodically to properly maintain the system.

- Check connections to verify that they remain tight.
- Verify that all pumps are working properly.
- Check and clean all filters to optimize performance.
- Monitor temperatures (room and solution) to maximize plant growth.

**ATTENTION:** Install fittings so they are fully inserted into 3/4" tubing. Use a hair dryer or hot water to gently heat tubing for easier installation. Do not overheat! Tube will melt!

Use pliers to gently squeeze ratchet clamps around tubing.



# Important Information – Parts

## PICTORIAL GUIDE

The following graphics and photos will help you identify the different parts of the system. Consult the details and diagrams throughout this guide for additional part information. (Some parts are not shown.)



WR4067



Plastic Pipe & Tube Cutter



WF6990 (1)  
PVC Cement



WR1095  
Tape



100441 Nut Setter



111697 & 111698  
Ratchet Clamps



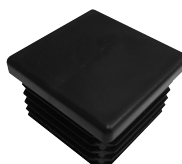
109258 Air Pump



110721 Pump



113583 Pump



112770  
Finishing Cap



112772  
Flathead Bolts



113725 Pipe  
Hanger



111074



110729



WR1300 Valve



111627 3/4" White PE  
Tubing

## REPAIR BROKEN ADAPTER

In rare cases, the 109242 adapters in the 113127 injector tube may become damaged. Use the 110829 tap and drill combo to remove the broken adapter. Use the WF4790 to install the new 109242 adapter.

**ATTENTION:** Adapters are fragile. Do not overtighten. Once slight resistance is felt during the installation, stop.



110829 Tap & Drill  
Combo



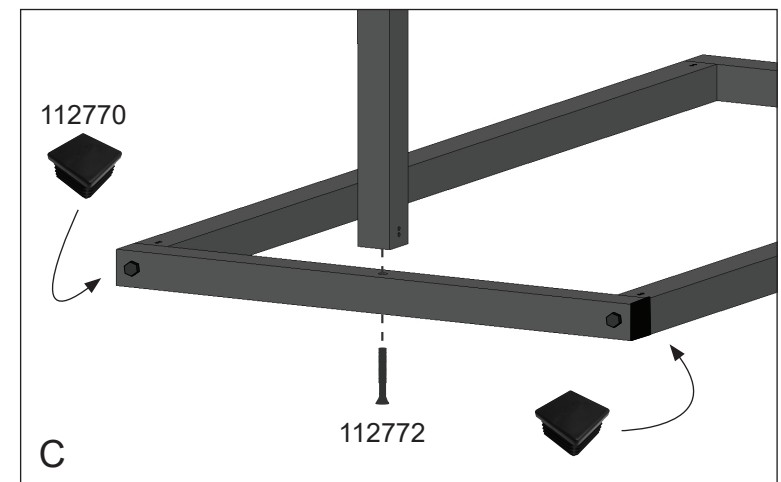
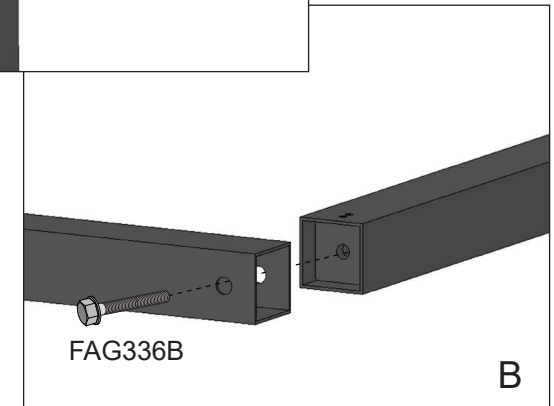
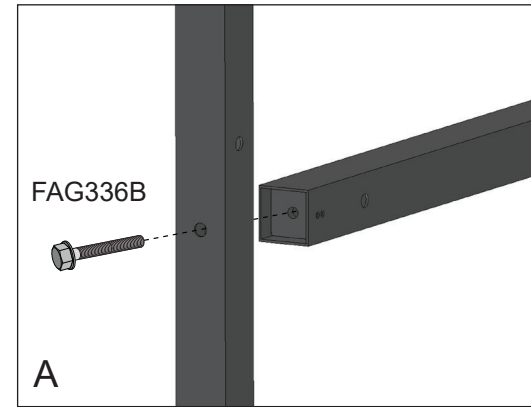
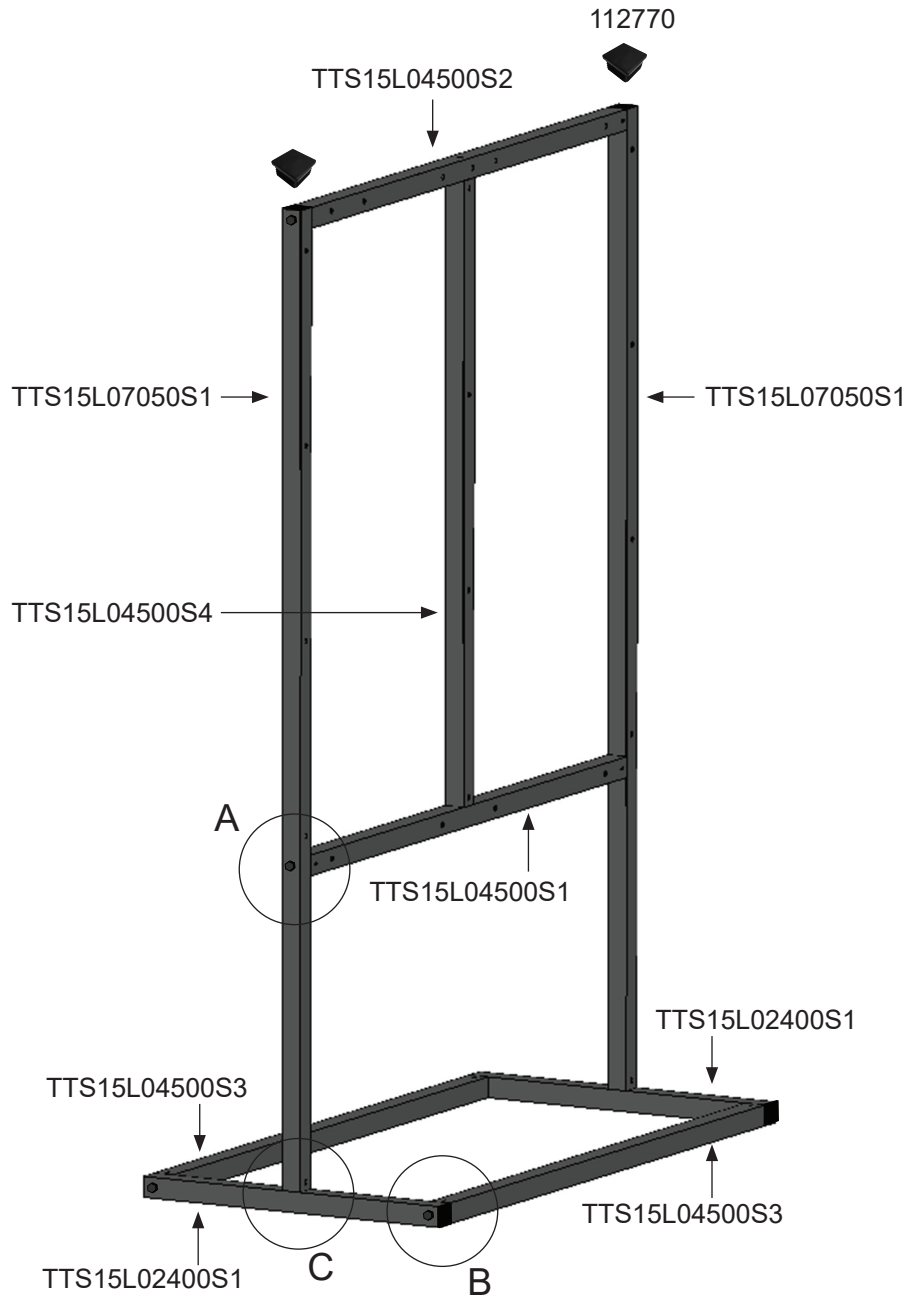
109242



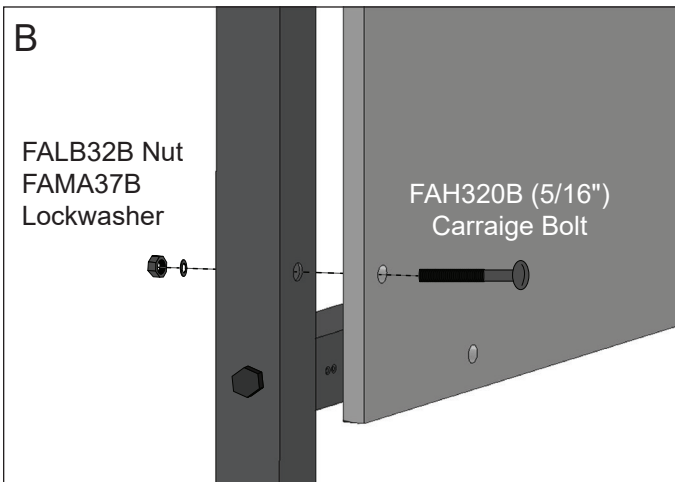
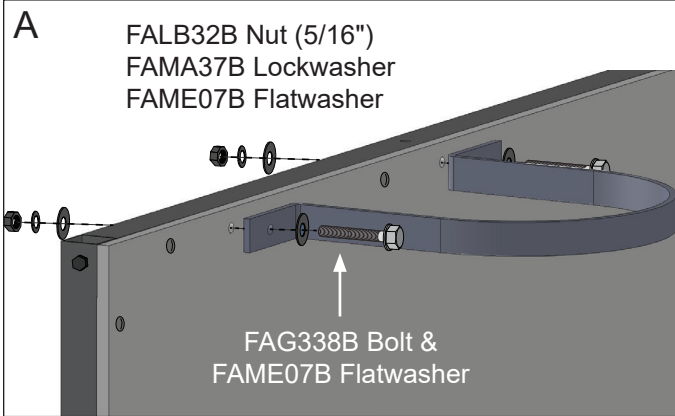
WF4790  
Punch

# Feed Pump Station Frame Assembly

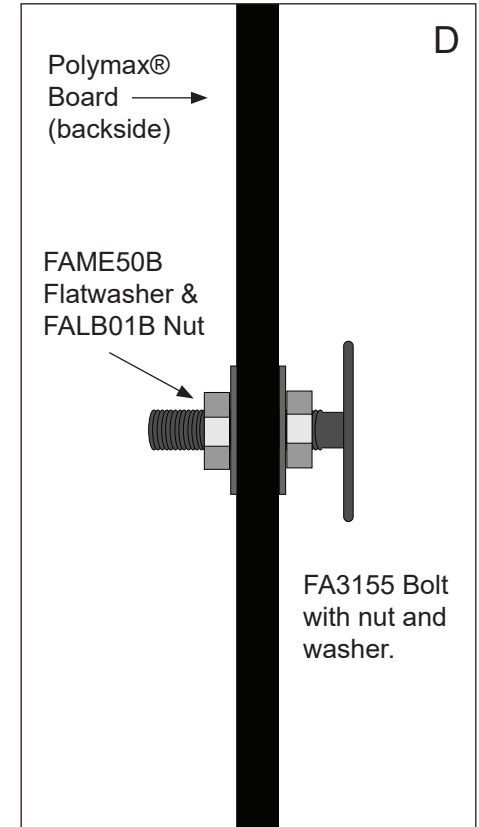
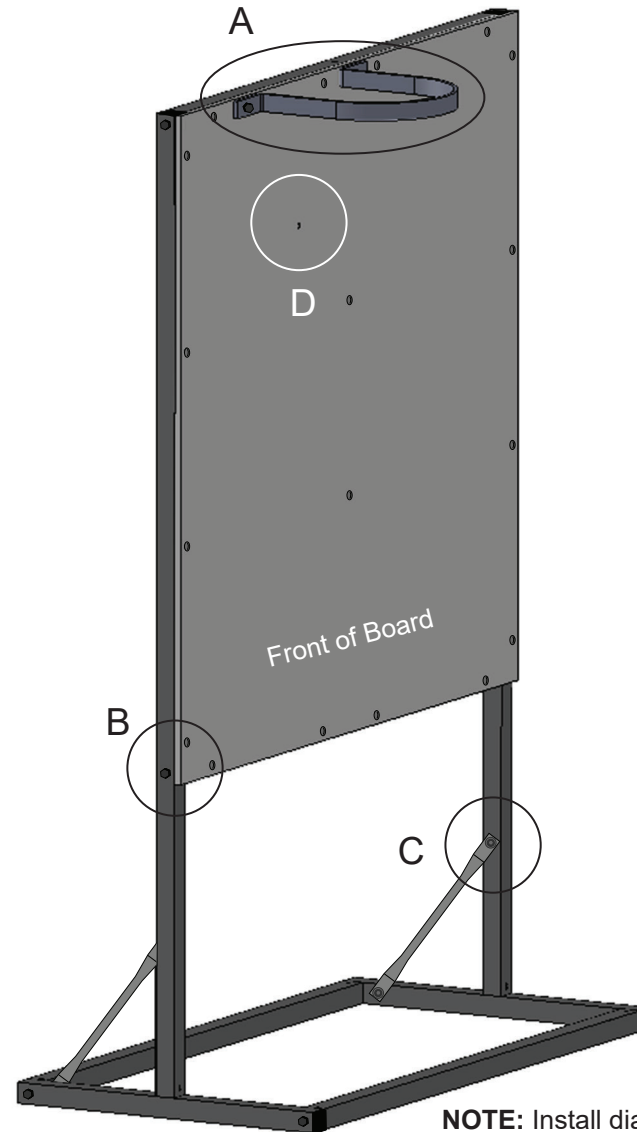
Use the diagrams and information on this page to assemble the frame and attach the Polymax® board. Tighten all bolts until snug. After assembly, set the frame in place where it will be used and level the frame. After frame is assembled, install the 112770 end caps in the locations shown below.



# Feed Pump Station Frame Assembly



**ATTENTION:** When attaching the board to the assembled frame, match the holes with those in the frame. Top of board includes predrilled holes for the tank bracket and support bolt for the bottom of the tank. Install the FA3155 support bolt for the tank *before you install the tank*. See Detail D below. Hole for this bolt is predrilled in the board.



This bolt stabilizes the lower end of the small tank when installed. Adjust bolt as needed once tank is slide down through bracket and seated in place. Tank should hang straight when bolt is properly adjusted. See D in the diagram for location. Adjust bolt as needed to set tank position.

**NOTE:** Install diagonal struts to the back of the pump station frame.

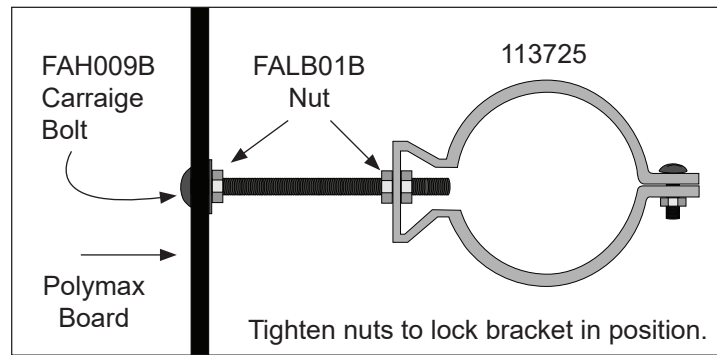


# Assemble the 113714 Dutch Bucket 5 Zone Control System Manifold

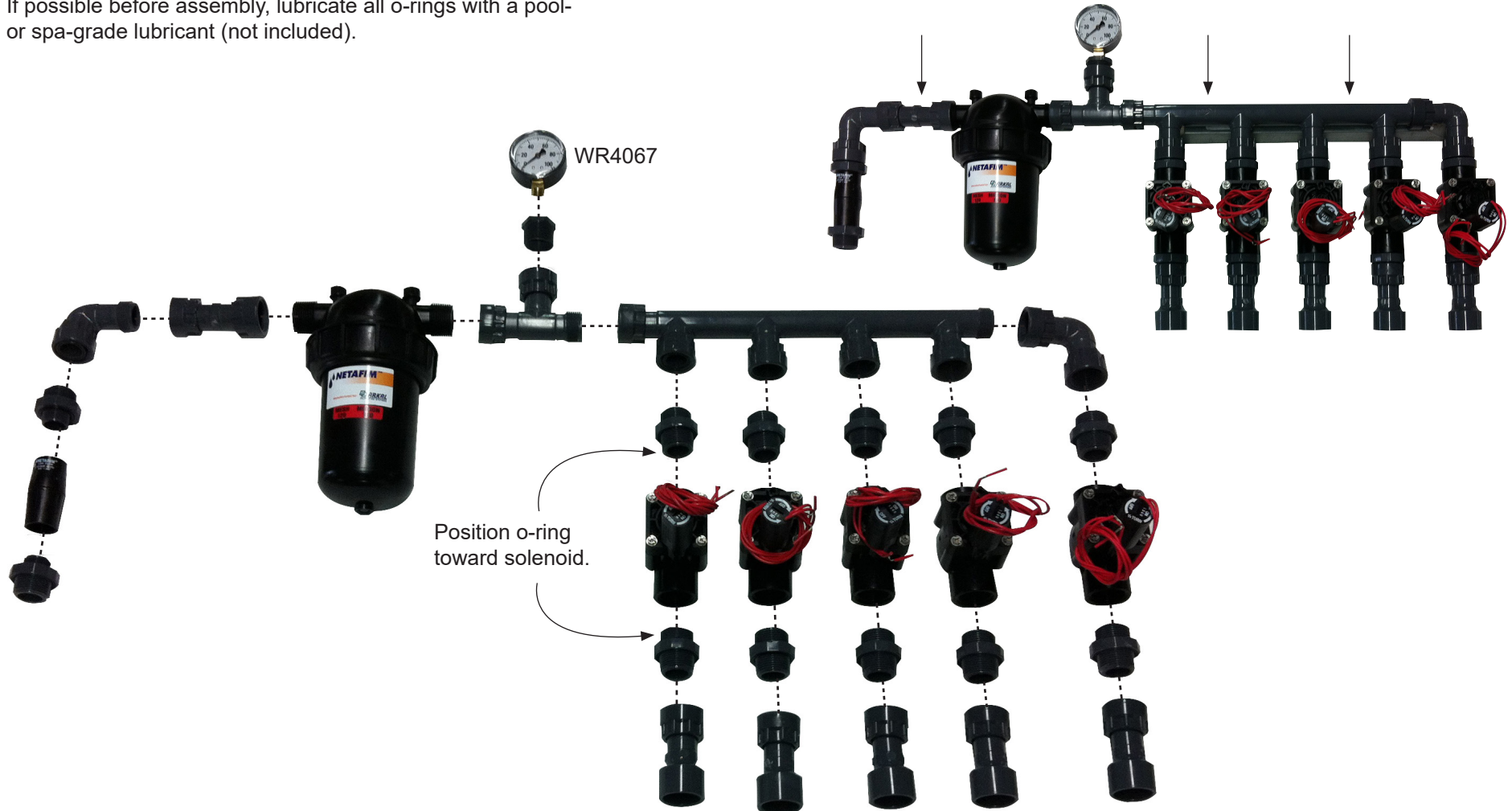
Open the box containing the 113714 5-Zone Control system and assemble as shown below. *Do not use pipe thread tape* for any connection except to install the pressure gauge. All remaining connections include o-rings and do not require thread tape.

**IMPORTANT:** Never seat two o-rings together. Hand tighten connections until snug. Do not tighten with a wrench or pliers. If leaks are detected during operation, gently tighten leaky fitting with a pliers. Do not crush fittings.

If possible before assembly, lubricate all o-rings with a pool- or spa-grade lubricant (not included).



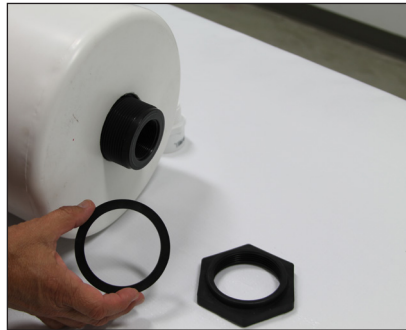
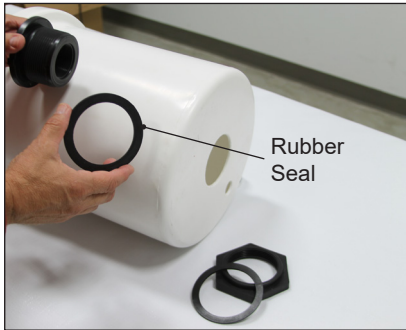
**ATTENTION:** When attaching the manifold to the board, position the mounting brackets in the areas shown below. See arrows. Holes to attach brackets are drilled by the installer.



# Prepare Sample Pot

Complete these steps to assemble the sample pot:

1. Install 112965 bulkhead fitting. Position rubber seal inside tank. Install hex nut and hard seal ring outside tank. Tighten until snug to prevent leaks. Tighten fitting by turning counterclockwise.



112965

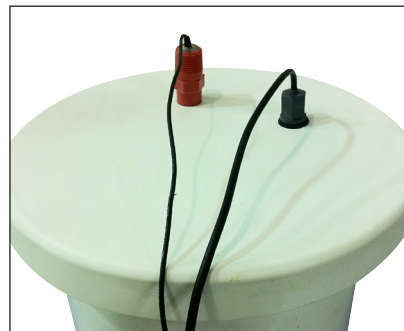
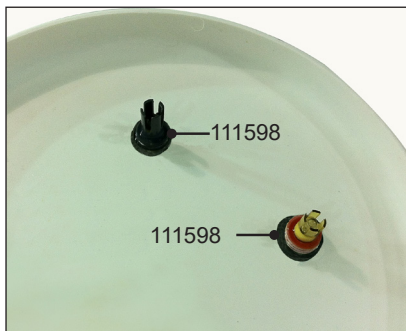
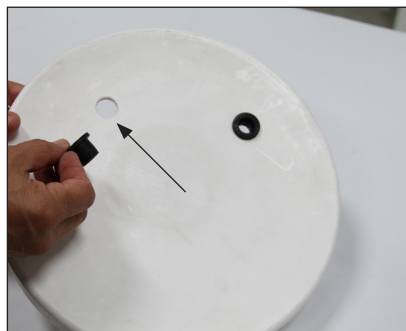


111598  
Grommet

2. Press one 111598 grommet into small hole in tank bottom. Press the 111599 take-off fitting into installed grommet. Wet fitting for easier installation. Use a piece of flat stock placed onto fitting if needed. Insert end with tabs into grommet. Seat fitting against fitting collar.



3. Press one 111598 grommet into each hole drilled in the pot lid.
4. Install grommets and sensors in lid from 113709 fertigation unit as shown. Coat grommets with mild soap and gently press sensors into grommets. Locknuts included with the sensors are not used with grommets.



5. Set lid aside and continue with the next procedure.

# Prepare Sample Pot Stand Pipe & Install

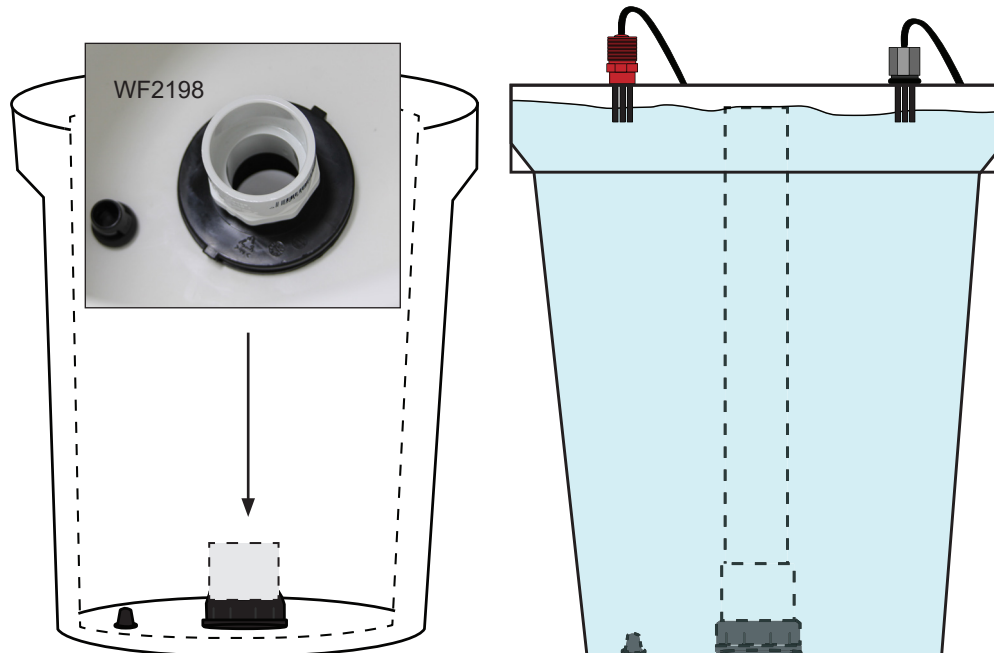
The length of the standpipe determines solution level inside the tank. Level must be high enough to touch/submerge the end of each sensor installed in lid.

Complete these steps:

1. Install the WF2198 adapter in bulkhead fitting. Hand tighten until snug.
2. Cut a section of pvc from the WF4140Z5 (1-1/2") for the standpipe. Use the photos and diagrams on this page to determine length.

**REMEMBER:** Length of pipe determines solution level in pot. Solution level must submerge ends of sensors in lid. **Do not glue standpipe to the WF2198 fitting. Adjustments to the standpipe length may be needed once the system is in operation. Do not cut too short.**

3. Continue with the next procedure.

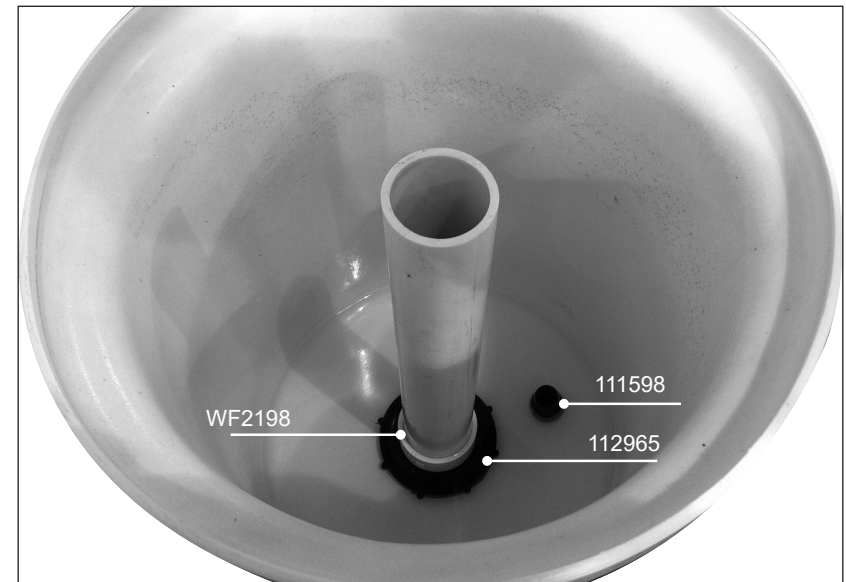


**ATTENTION:** Diagram (right) shows standpipe at a length allowing sensors to remain in solution once tank is filled and system is in operation.

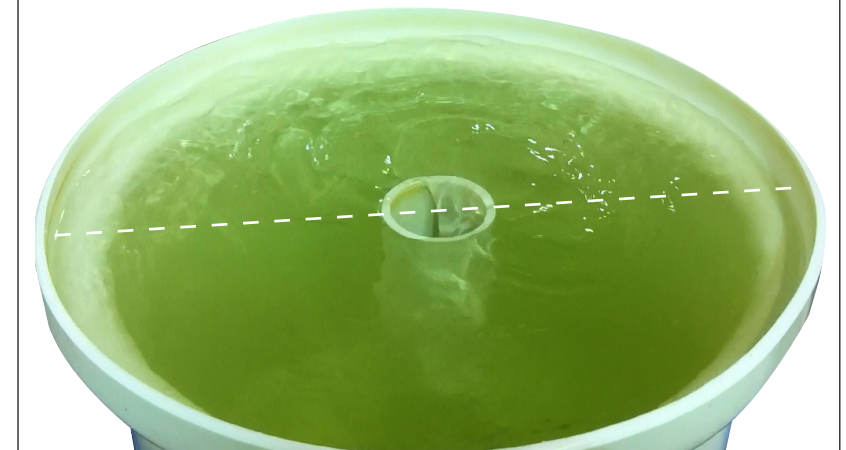
If length is too long, pot may overflow. If length is too short, the sensors may not be submerged and will not function.



1-1/2" Standpipe—Cut to length on site.



Dashed line indicates top of standpipe and solution level.

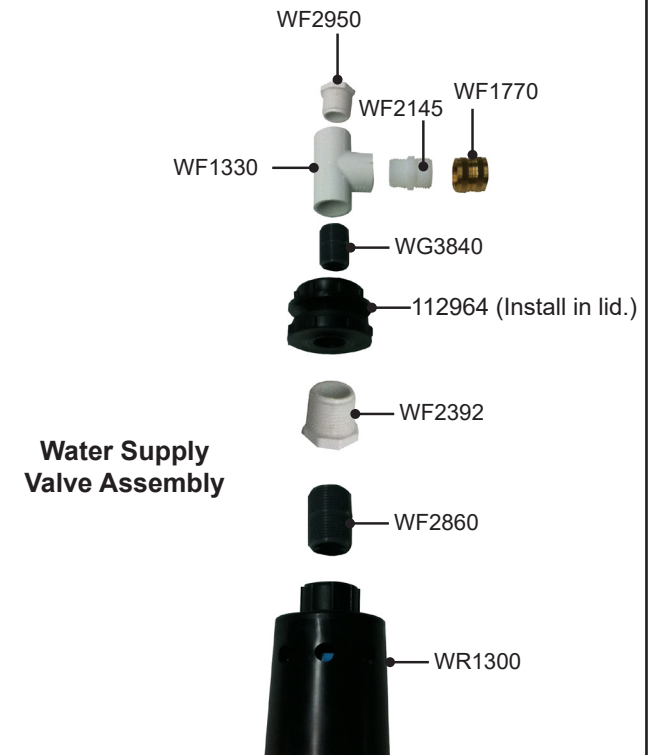
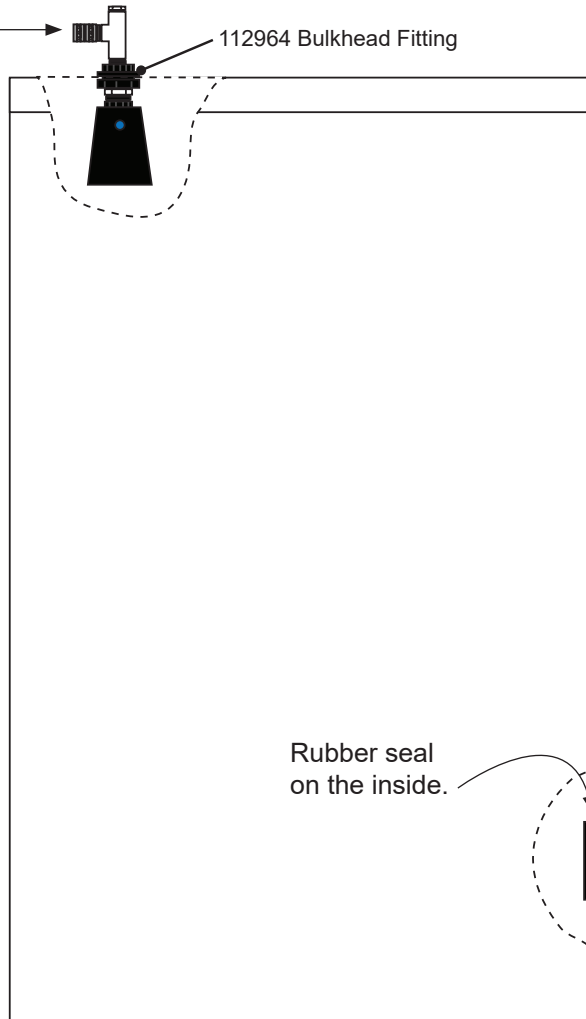


# Prepare Large Tank & Lid

Complete these steps to prepare the large mixing tank and lid:

1. Install the WF8582 bulkhead fitting in the hole near the bottom of the tank. This is the outlet for the main pump. Position rubber seal inside and the hex nut and hard seal ring outside. Tighten fitting until snug using a large set of adjustable pliers.
2. Install the 112964 bulkhead fitting in the predrilled lid. Rubber seal is to the inside; hex nut and hard seal ring is outside or on top of the lid.
3. Assemble the remaining parts as shown and attach to the bulkhead fitting in lid.

Connect water supply hose here.



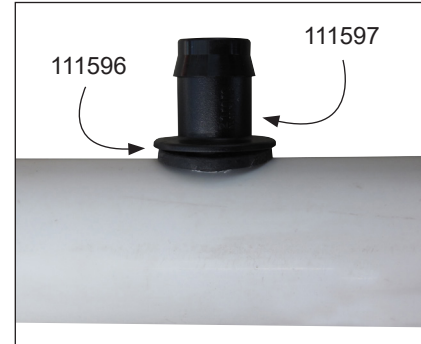
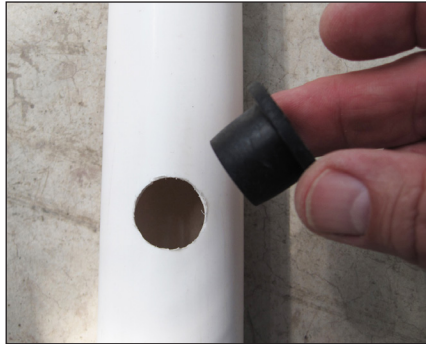
**Water Supply Valve Assembly**

**ATTENTION:** Wrap all threaded fittings with tread tape before assembly.

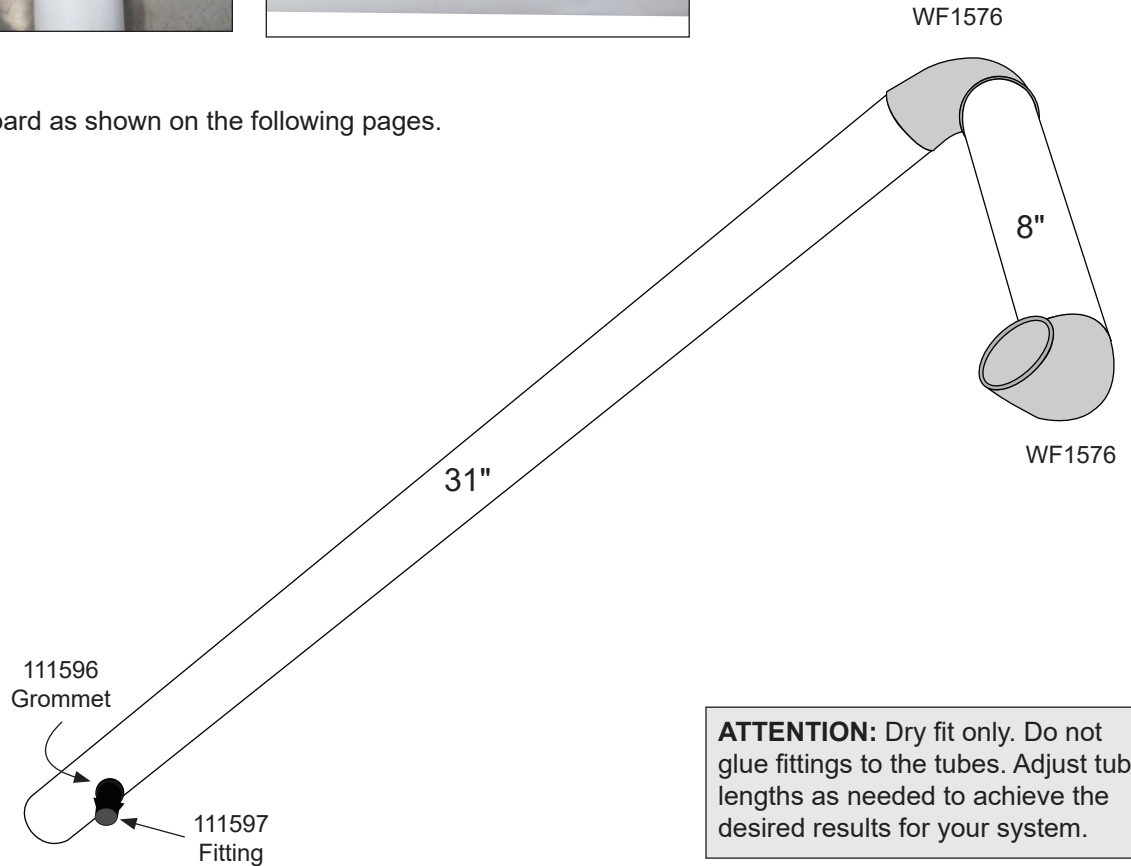
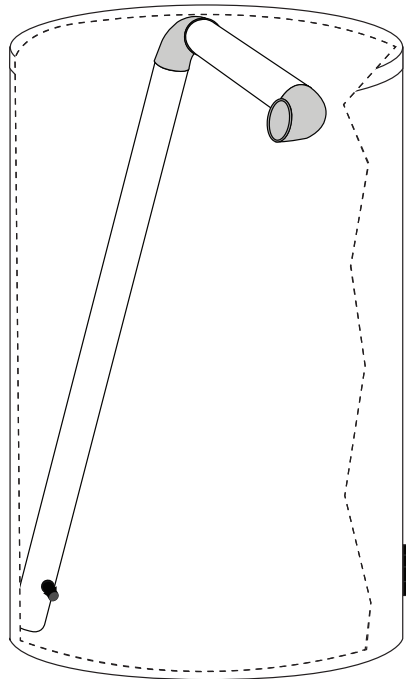
# Prepare Lift Tube

Complete these steps to assemble the lift tube:

1. Take the 113122 air lift tube and cut it to 31" as shown.
2. Cut an 8" tube from the remaining pvc.
3. Install the 111596 grommet and 111597 fitting in the 31" tube.



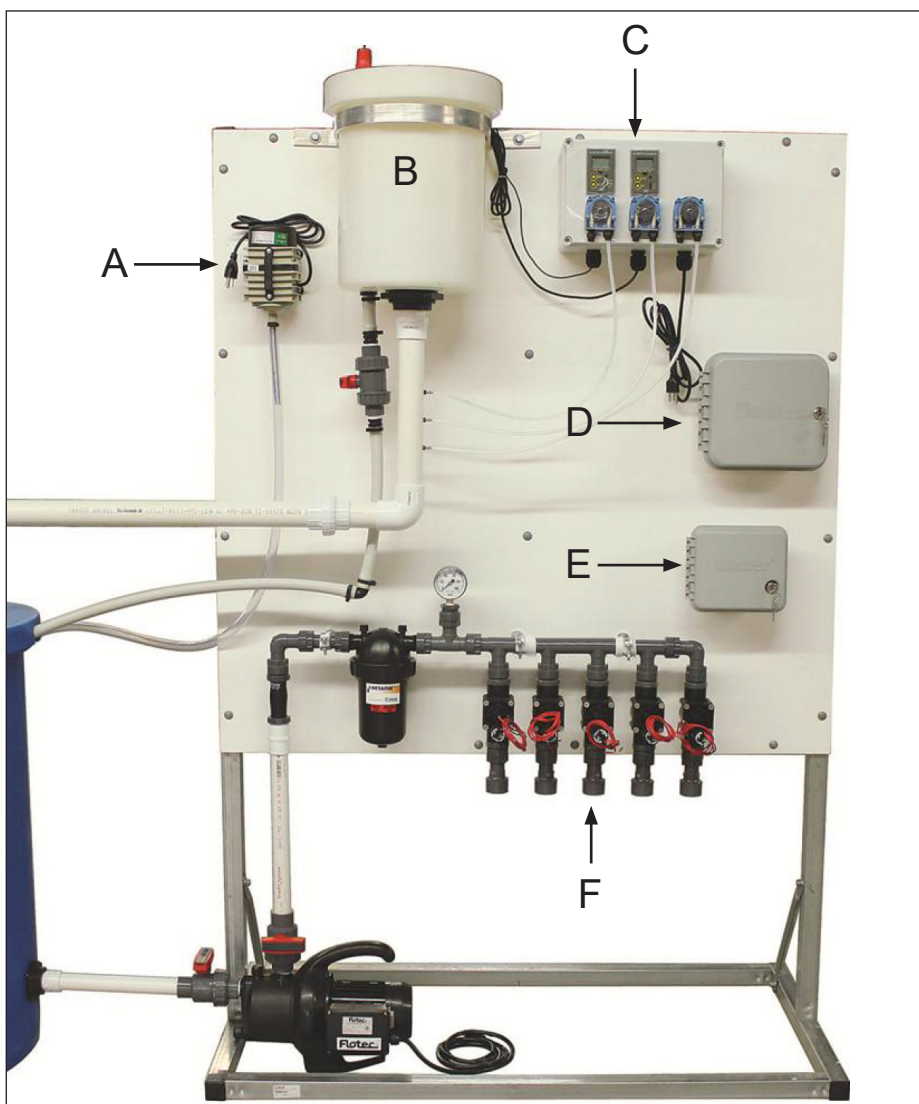
4. Assemble tube as shown and set aside until needed.
5. Continue by attaching components to the feed station board as shown on the following pages.



**ATTENTION:** Dry fit only. Do not glue fittings to the tubes. Adjust tube lengths as needed to achieve the desired results for your system.

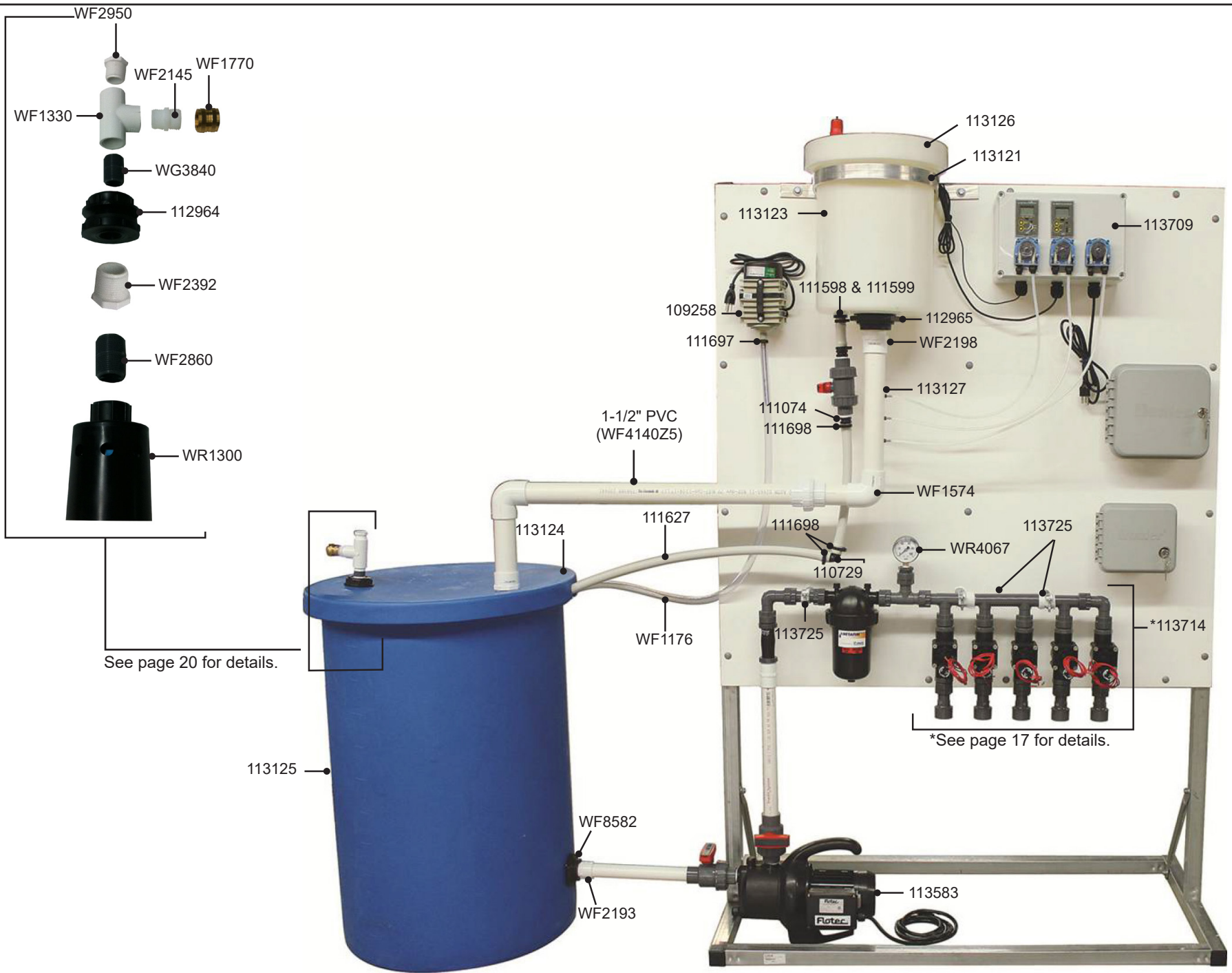
# Fastener Identification & Placement

Use the information below to attach the feed pump station components to the Polymax® mounting board. Only the mounting holes for the small tank bracket are drilled in the board and through the upper frame tube. **All other holes are drilled by the installer during assembly.** Position components as shown. Minor differences in position will not affect assembly.



Component	Fastener	Quantity
A	FAG130 (5/16" x 1") Hex Cap Bolt	4
	FAME17B (5/16") Flatwasher	4
	FALF17B (5/16") Locknut	4
B	FAG338B (5/16" x 3") Hex Cap Bolt	2
	FAME07B (5/16") Flatwasher	4
	FAMA37B (5/16" Lockwashers	2
	FALB32B (5/16") Nuts	2
C	FAG108B (1/4" x 2") Hex Cap Bolt	2
	FALF15B (1/4") Locknut	2
	*Install at top corner and opposite bottom corner.	
D	Use the fasteners included with the unit.	3
E	FAF33PB (#10 x 3/4") Screw	2
F	113725 (1" Pipe Hanger**)	3
	FAH009B (1/4" x 4") Carriage Bolt	3
	FALB01B (1/4") Nut	9
	FAME50B (1/4") Flatwasher	3
	**Position hangers so mounting bolts do not conflict with frame tubes. Do not drill through frame tubes.	

# Component Layout



# Install Main Pumps and Plumbing

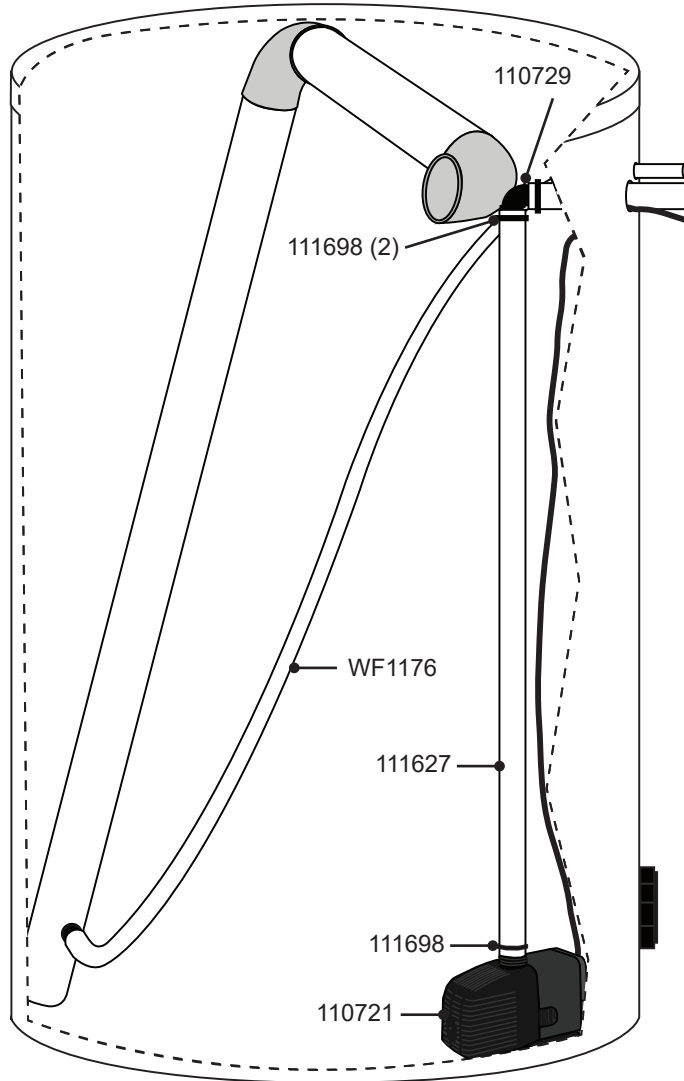
After attaching the different components to the feed pump station board, continue by setting the tank in place, installing the pumps, and connecting pumps to board components.

**NOTE:** Tank position depends on the lengths of the pvc tubing that remain. Alternative position may require the purchase of additional tubing and fittings.

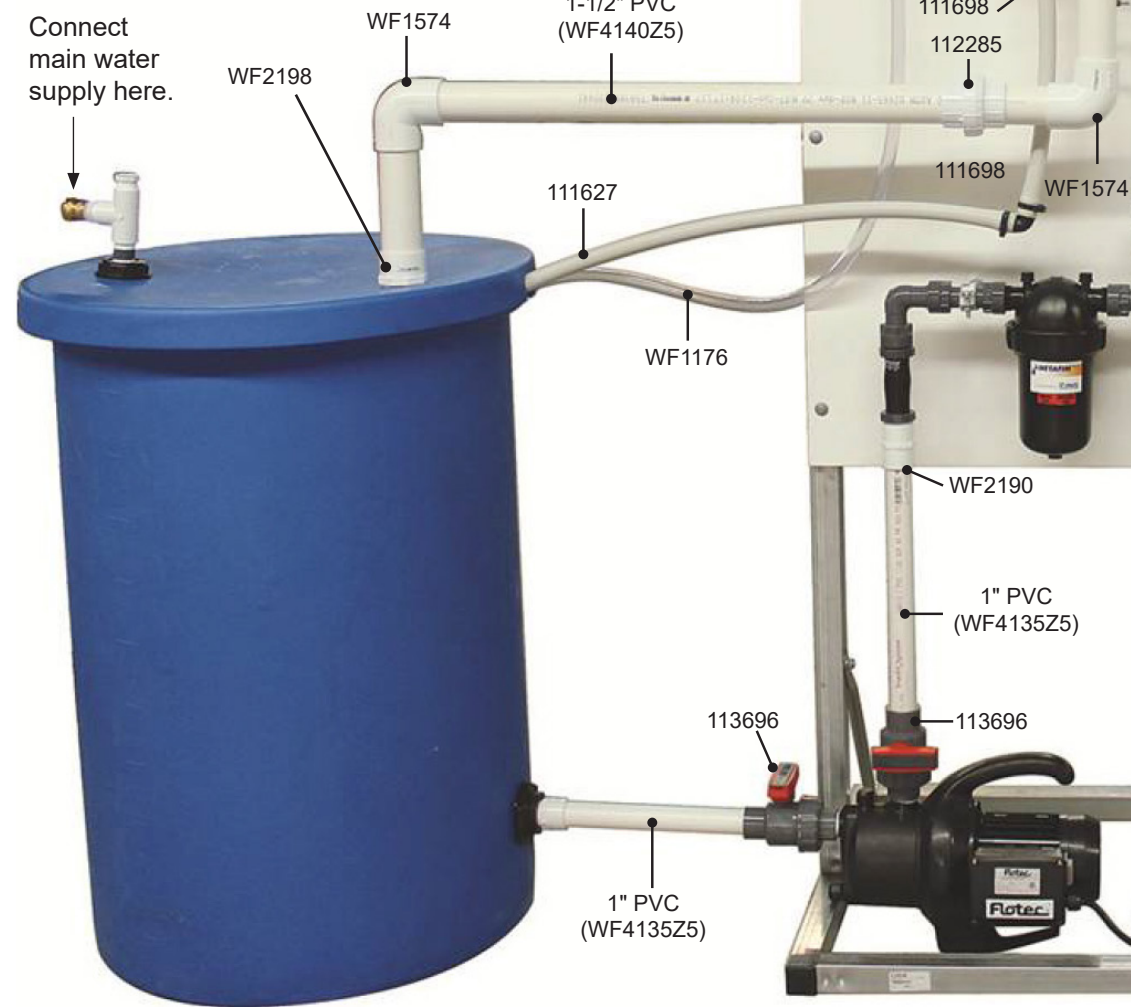
Use the diagrams that follow to set the tank and connect the pumps.



Gently squeeze with pliers to seal.



Connect main water supply here.



See notes on next page to install the WF1176 air tube.



# Install Main Pumps and Plumbing



Step 1

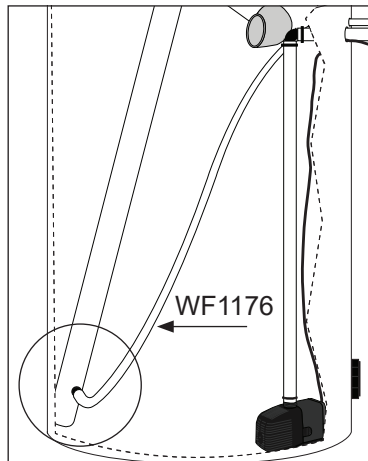
To install the WF1176 clear tubing that connects the air pump to the fitting on the air lift tube, complete these steps:

1. Attach the short piece of braided tubing (included with the pump) to the pump fitting.



Step 2

2. Next, slide the WF1176 clear tube over the braided tube over the pump outlet.
3. Secure using a ratchet clamp.
4. Cut clear tube to the required length and attach free end to the fitting at the bottom of air lift tube.



Gently squeeze with pliers to seal.

5. Secure using a ratchet clamp.
6. Continue by wiring the system components. Consult all documentation included with the different systems first.

**ATTENTION:** All wiring to be completed according to local codes and by an competent, licensed electrician.

# Electrical Wiring and Getting Started

## CONNECT THE FEED PUMP STATION TO DUTCH BUCKET ZONES

After the feed pump station is completely assembled and before you enlist the services of an electrician to wire the system, connect the feed pump station to the assembled Dutch bucket system.

Connect each zone of the Dutch bucket system to an outlet of the 5-zone control system manifold using customer-supplied 1" pvc and fittings.

Once each zone is connected to the feed pump station, complete the electrical wiring.

### ELECTRICAL

Read and understand all documentation included with the 113709 Hanna 2500 EC Fertigation unit and the 113714 Dutch bucket 5-Zone Control System before you begin.

**ATTENTION:** Enlist the services of a competent and licensed electrical contractor familiar with fertigation systems to wire, connect, and set the different controls of this feed pump station.

**WARNING:** CONSULT THE SERVICES OF A QUALIFIED ELECTRICIAN TO ADEQUATELY AND SAFELY CONNECT THE PUMPS TO A POWER SUPPLY AND TO WIRE THE CONTROL PANELS OF THE FEED PUMP STATION.

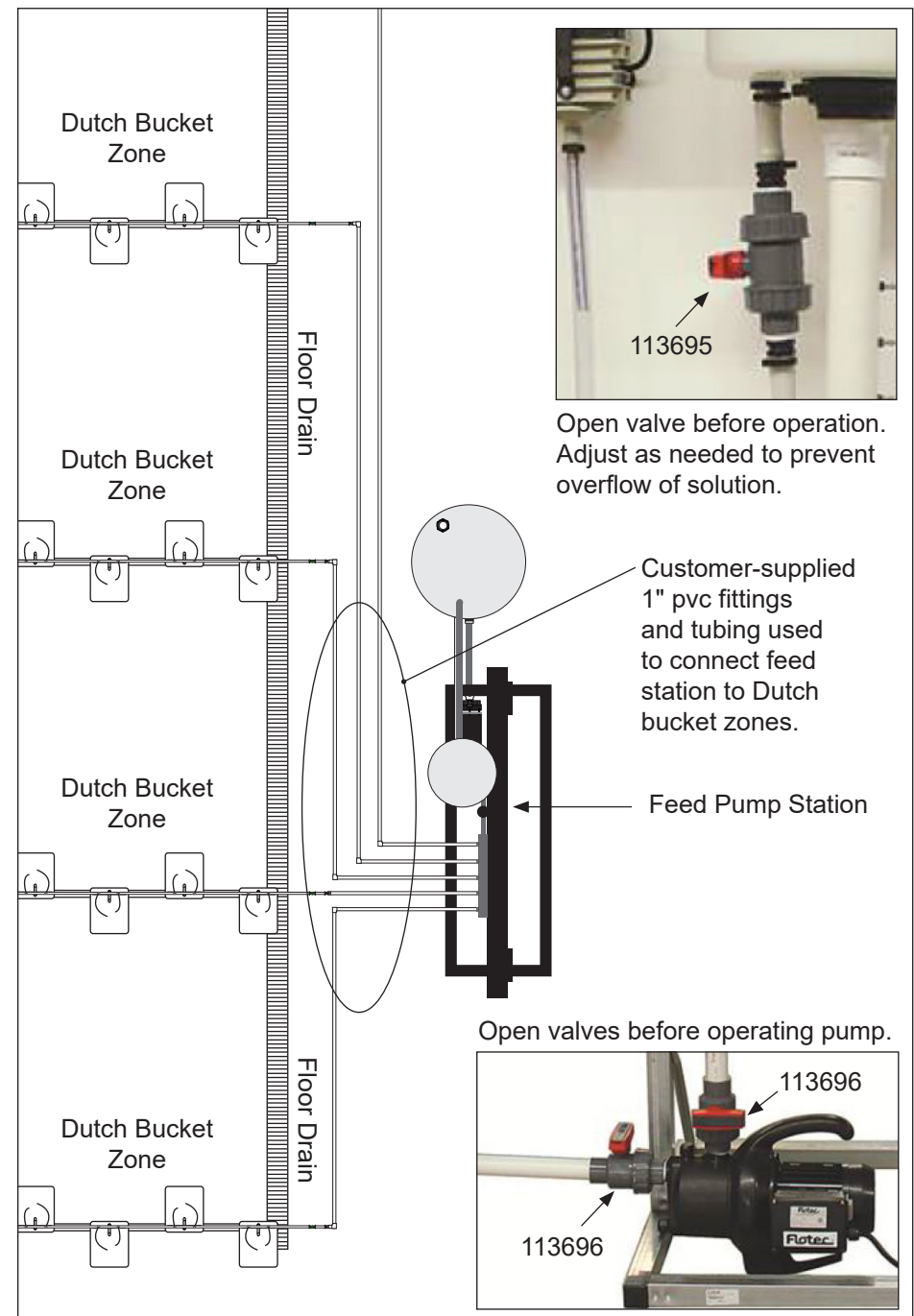
ALL ELECTRICAL CIRCUITS SHALL BE DESIGNED IN ACCORDANCE WITH LOCAL AND REGIONAL BUILDING CODES AND STANDARDS.

After the system is wired and connected to power, add water to the large tank and prime the main water pump as described in the documentation included with the Flotec pump.

Check all pumps to ensure they are working properly. Check all plumbing connections for leaks.

**ATTENTION:** Do not run the water pumps with the valves closed. See photo to the right. Adjust valves as needed to control flow.

**Wire the air pump and in-tank water pump (110721) to run continuously when system is in operation. Wire the main water pump to cycle with the set waterings of the different Dutch bucket zones.**



Open valve before operation. Adjust as needed to prevent overflow of solution.

Open valves before operating pump.

### **Zone Cycle and Soak Feature**

The Cycle and Soak feature is how the zone stations for the Dutch Bucket system are programmed. This feature allows for a very simplistic programming method without having the tedious task of programming every on/off cycle for every zone station.

### **Feature Definitions**

Cycle Time: The Cycle Time is the duration that you wish each zone to water for. ***Each zone must have a cycle time programmed.***

Soak Time: The Soak Time is the duration that you wish the zone to be “at rest”. ***Each zone must have a soak time programmed.***

Start Time: The Start Time is the time you wish to activate the irrigation program. Unlike the previous, the Start Time only has to be entered once on Zone Station 1. Once Zone Station 1 is activated, all other zones will follow according to the programmed Cycle/Soak times.

**IMPORTANT:** If you manually turn the system off or lose power, you will need to restart the irrigation cycle by programming a new Start Time. If you lose power, you ***will not*** lose your Cycle/Soak programming.

**NOTE:** Based on the type of plants you have in a zone, each zone can be set to a different Cycle/Soak time.

### **Example**

Let's say we are growing cucumbers. Based on the environment and plants age, you have decided to water the plants for 10 minutes every 2 hours. Program the Cycle time to be 10 minutes; program the Soak time to be 1 hr 50min. If each zone requires the same irrigation parameters, then set these durations for each zone station.

**NOTE:** You only have to program the Cycle and Soak times once for each station. The controller's internal brain will extrapolate out all the On/Off times for the twenty-four hour period and then repeat daily.

### Programming Zone Cycle and Soak Feature

Accessing the Cycle and Soak Menu: To access the Cycle and Soak feature, place dial in the **RUN** position. Press and hold the **plus (+)** button for 3 seconds. While holding the **plus (+)** button, rotate the dial to the **RUN TIME** dial position and release the **plus (+)** button. Once entering this function, your controller screen will display Station 1 in the Cycle mode – Fig. 1.

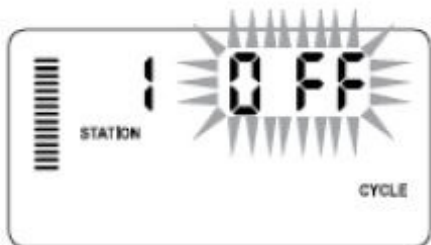


Figure 1 - Example of Cycle screen upon entering.

Setting the Cycle Time: Initially Station 1 will be displayed. To access other stations, press the **←** or **→** button. Once the desired station is displayed, press the **plus (+)** and **minus (-)** buttons to increase or decrease the Cycle time. You can set the time from 1 minute to 4 hours in 1 minute increments, or to **OFF** if no Cycle is desired.

Before one (1) hour, only minutes are displayed (e.g., 10) – Fig. 2. At one (1) hour or greater, display will change to include the hour digit (e.g., 4:00) – Fig. 3.



Figure 2 - Example of Cycle screen with only minutes.

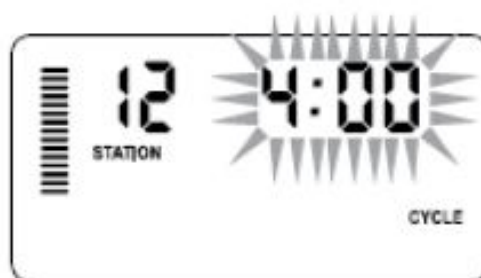


Figure 3 - Example of Cycle screen with hours and minutes.

### Setting the Soak Time

Accessing the Soak Menu: Once the desired Cycle times for each station have been programmed, the Cycle time can be accessed by pressing the **PRG** button. The station will remain the same as was previously displayed under the Cycle time (i.e., if station 2 is displayed in the Cycle menu, then Station 2 will be displayed upon pressing the **PRG** button).

**IMPORTANT:** The Soak menu *cannot* be accessed without a programmed Cycle time.

Once the desired station is displayed, press the **plus (+)** and **minus (-)** buttons to increase or decrease the soak time. Set the time from one (1) minute to four (4) hours in one (1) minute increments. Less than one (1) hour, only minutes are displayed (e.g., 3). At one (1) hour or greater, the display changes to include the hour digit (e.g., 1:20) – Fig. 5.

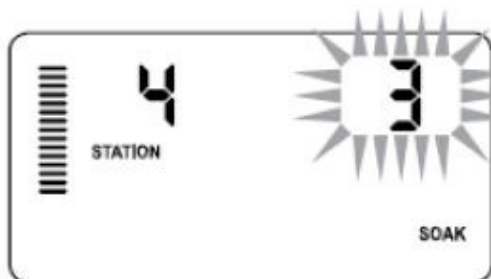


Figure 4 - Example of Soak screen with only minutes.



Figure 5 - Example of Soak screen with hours included.

Once all stations have been programmed with the Cycle and Soak times, turn the system dial to the **START TIMES** position and follow the instructions in the owner's manual on **Page 21**.

### Recovery Time Delay

**Important:** Although the mixing tank is rated as 52 gallons, due to equipment in the tank displacing water and the fact that we are not filling the tank to the upmost level, it can be assumed that the tank will hold approximately 45-48 gallons at any one time. If your incoming water dilutes the nutrient solution and the fertigation unit cannot keep it close to your set point before the next zone activates, you will need to program a “recovery time delay” between zone cycles. It can be assumed that if one zone consumes a minimum of 25% to a maximum of 33% of the mixing tank volume, then a “recovery time” is necessary and should be set between zone cycles.

To determine whether or not your pump station needs a delay between zones depends on some key factors:

1. Flow rate of incoming water. (The float valve supplies approximately 80% of your incoming water flow rate.)
2. Strength of your EC or TDS.
3. The pH of the incoming water. If the pH of the incoming water is high, it may require more time for the fertigation unit to acid dose the water down to the acceptable pH level.
4. The amount of nutrient solution dosed per zone. (This could be affected by the number of drippers in the zone, the duration of the cycle, or a combination of these.)

**NOTE:** To determine #4 (above), use the following formula:

Number of drippers in one zone multiplied by the GPM flow rate of the dripper multiplied by the duration of zone cycle equals gallons consumed by that zone during the zone cycle.

$$\# \text{ of drippers in one zone} \times \text{the GPM flow rate of the dripper} \times \text{the duration of zone cycle} = \text{gallons used by that zone during the zone cycle}$$

### Example #1:

Use a one (1) gallon per hour dripper. One (1) GPH divided by 60 minutes = .0167 GPM flow rate. Set the zone cycle time to 5 minutes. Assume 45 gallons in the tank prior to distribution to zone.

- 27 drippers x .0167 GPM = .4509 GPM zone flow rate.
- .4509 GPM flow rate x 5 minute cycle duration = 2.2545 gallons consumed during Zone 1 cycle.
- 2.2545 gallons divided by 45 gallons is approximately 5% mixing tank volume usage.

Conclusion: This example indicates that we do not need to program any recovery times.

### Example #2:

Use a one (1) gallon per hour dripper. One (1) GPH divided by 60 minutes = .0167 GPM flow rate. Set the zone cycle time to 10 minutes. Assume 45 gallons in tank prior to distribution to zone.

- 87 Drippers x .0167 GPM = 1.4529 GPM zone flow rate.
- 1.4529 GPM flow rate x 10 minute cycle duration = 14.529 gallons consumed during Zone 1 cycle.
- 14.529 gallons divided by 45 gallons is approximately 32.3% mixing tank volume usage.

Conclusion: This example indicates that a recovery time between zone cycles is needed and should be programmed.

**Rule of Thumb about Programming Recovery Times:** It never hurts to program recovery times. If you are not sure your system needs them, program them. It can be detrimental to the plants if recovery times are needed and you have not programmed them.

### Programming Recovery Times Between Stations

This feature allows you to program a delay between when one station (zone) turns off and the next station (zone) turns on. This is necessary on systems that operate near maximum flow, or that have slow mixing tank recovery and dosing times.

Complete these steps: Start with the dial in the **RUN** position.

1. Press and hold the **minus (-)** button while turning the dial to the **SET STATION RUN TIMES** position.
2. Release the **minus (-)** button. The blinking display shows a delay time for all stations in seconds. The **DELAY** icon is also lit.
3. Press the **plus (+)** and **minus (-)** buttons to increase or decrease the delay time between 0 and 59 seconds in one (1) second increments and then in one (1) minute increments up to four (4) hours. An **Hr** will display when the delay changes from seconds to minutes and hours.

**NOTE:** To remove a delay between stations, press the **minus (-)** button to change the delay time to **SEC: 00**. The delay will no longer be active.

4. Return the dial to the **RUN** position.

**NOTE:** The Master Valve/Pump Start circuit will operate during the first 15 seconds of any programmed delay to aid in the closing of the valve and to avoid unnecessary cycling of the pump.

# ADDITIONAL INFORMATION

## DRIPPER STAKES—GETTING STARTED

The easy-to-use 110407 stakes are perfect for even and consistent nutrient delivery.

After filling the buckets with the selected growing medium, determine what nutrient solution is needed for your plants and mix this according to the instructions on the mixture. Mixture will be specific to system, the reservoir size, and the plants grown.

**ATTENTION:** Water quality affects the nutrient solution. Testing the water supply is strongly recommended *before* you mix the nutrient solution. In some instances and for best results, it may be necessary to treat the water supply. Consult the services of a water quality professional to determine the condition of the water and how to treat it (if necessary) *before* you begin.

Add your desired plants to the buckets.

Set the stakes inside each bucket and turn on the circulation pump. Check each stake to ensure that water flows freely from each. Turn off the pump.

Gently push the stake into the growing medium.





## OPTIONAL ACCESSORIES—ADDITIONAL PURCHASE REQUIRED

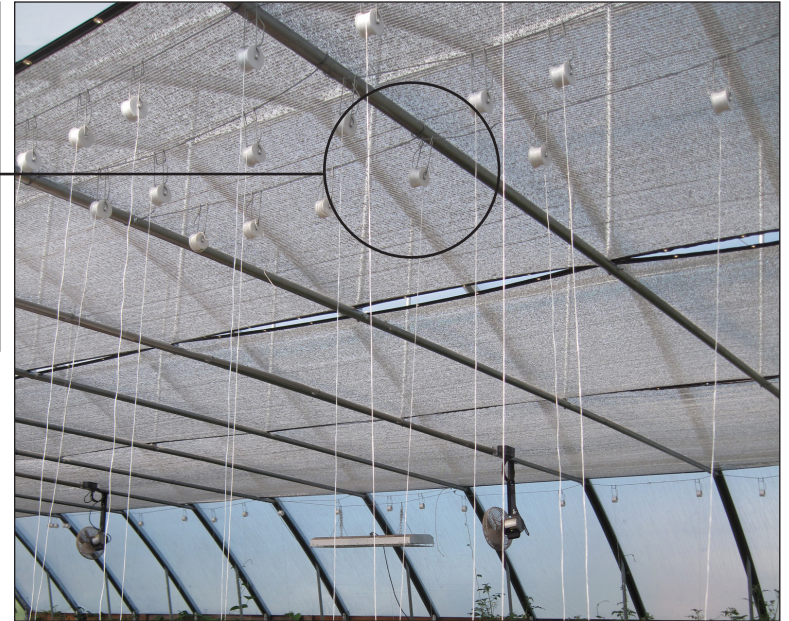
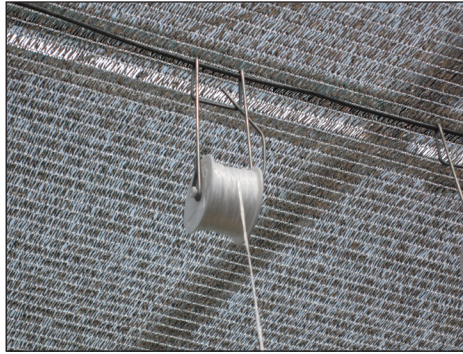
### OPTIONAL ACCESSORIES\*

Depending on the plant and application, using 110010 Tomato RollerHook® Assemblies and the 110006 or 110007 clips can save time and labor.

The RollerHook® components are easily assembled by slipping the spool between the wire ends of the hanger. Position the spool so the lock is next to the lowest part of the wire spring. See the photos below.

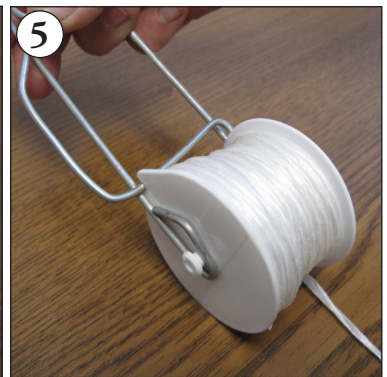
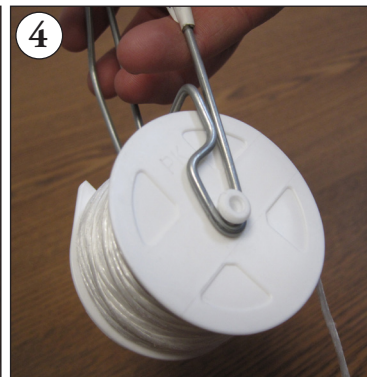
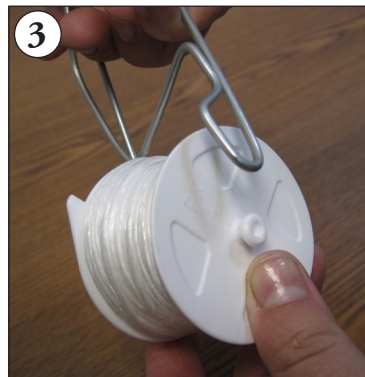
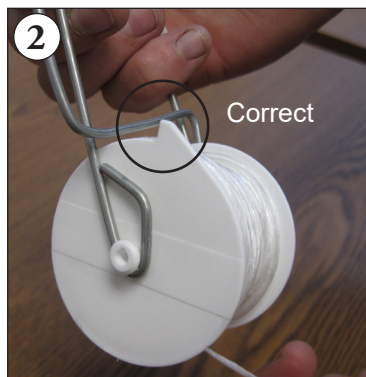
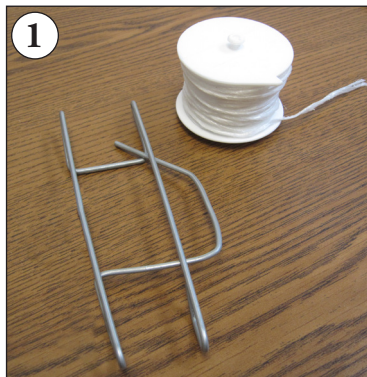
After assembling each, consult the following page to view installation photos using the 110010 assemblies and the 110006/110007 clips.

\*Additional purchase required: Contact your sales representative to purchase Tomato RollerHook® Assemblies for your Dutch bucket recovery system.



**ATTENTION:** Photo to the right shows the spool incorrectly installed in the wire hanger.

When installed this way, the spool lock slides under the lock spring of the handle. As a result, the cord will unravel from the spool. **The installation steps below show the correct orientation.**



## OPTIONAL ACCESSORIES—ADDITIONAL PURCHASE REQUIRED

### INSTALLING THE 110010 TOMATO ROLLERHOOK® ASSEMBLY\*

As plants mature, it may become necessary to provide adequate support. The 110010 Tomato RollerHook® Assembly used with the 110006 or 110007 tomato clips provide the perfect support system, saving you time and money.

1. Hang the assembled RollerHook® from a wire, cable, or frame member above the Dutch bucket system.
2. Pull cord from the spool so it reaches the desired Dutch bucket.
3. Take one 110006 or 110007 clip, wrap it around the stem of the plant, feed the cord into the hinged part of the clip, and snap the clip closed to lock cord in place.
4. Move back to the cord spool and tighten to remove slack. To prevent plant damage, do not overtighten. As the plant grows, add additional clips as needed for support.

\*Additional purchase required: Contact your sales representative to purchase Tomato RollerHook® Assemblies for your Dutch bucket recovery system.



***OPTIONAL ACCESSORIES—ADDITIONAL PURCHASE REQUIRED***

Photo shows using the 110010  
RollerHook® Assembly.

