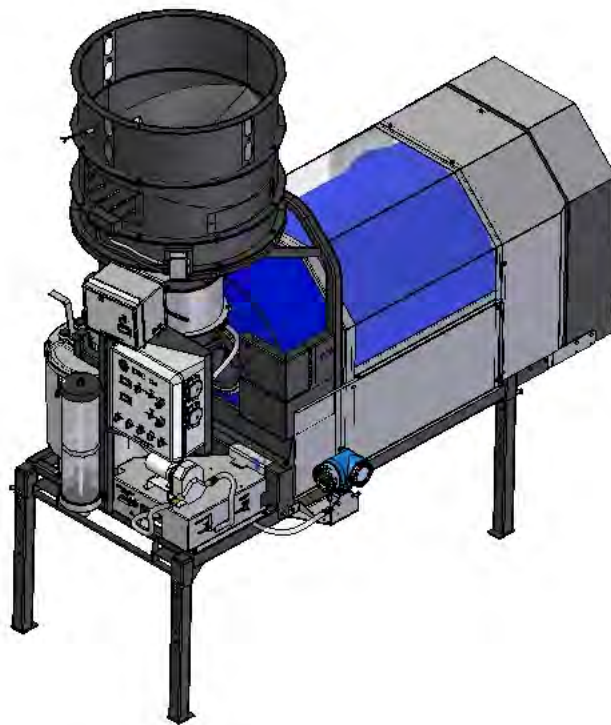




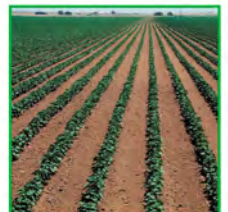
Seed Treating **Solutions**

# LP2000 SEED TREATER with Seed Wheel



**2011**

## Operators Manual & Training DVD



# **INTRODUCTION**

Thank you for choosing USC, LLC for your equipment needs. We appreciate your business and will work diligently to ensure that you are satisfied with your choice.

## **OVERVIEW**

The purpose of this manual is to provide you with the basic information needed to operate and maintain the LP2000. It does not hold USC, LLC liable for any accidents or injuries that may occur.

## **OPERATOR RESPONSIBILITIES**

As the purchaser/owner/operator of this equipment and control system, you have an obligation to install, operate, and maintain the equipment in a manner that minimizes the exposure of people in your care to any potential hazards inherent in using this equipment. It is critical that the owner of this equipment:

- Has a clear and documented understanding of the process this machine is being used in and of any resulting hazards or special requirements arising from this specific application.
- Allow only properly trained and instructed personnel to install, operate, or service this equipment.
- Maintain a comprehensive safety program involving all who work with this machine and other associated process equipment.
- Establish clear areas of staff responsibility (e.g. operation, setup, sanitation, maintenance, and repairs).
- Provide all personnel with necessary safety equipment.
- Periodically inspect the equipment to insure that the doors, covers, guards, and safety devices are in place and functioning, that all safety instructions and warning labels are intact and legible, and that the equipment is in good working order.
- In addition to the operating instructions, observe and enforce the applicable legal and other binding regulations, national and local codes.

As the person with the most to gain or lose from working safely, it is important that you work responsibly and stay alert. By following a few simple rules, you can prevent an accident that could injure or kill you or a co-worker.

- Do not operate, clean, or service this equipment until you have read and understood the contents of this manual. If you do not understand the information in this manual, bring it to the attention of your supervisor, or call your local USC dealer for assistance.
- Any operator who is known or suspected to be under the influence of alcohol or drugs should not be allowed to operate the equipment.
- Understand and follow the safety practices required by your employer and this manual.
- **PAY ATTENTION** to what you and other personnel are doing and how these activities may affect your safety.
- **Failure to follow these instructions may result in serious personal injury or death.**

### **RECEIVING YOUR EQUIPMENT**

As soon as the equipment is received, it should be carefully inspected to make certain that it has sustained no damage during shipment and that all items listed on the packing list are accounted for. If there is any damage or shortages, the purchaser must immediately notify your USC dealer. Ownership passes to purchaser when the unit leaves the USC, LLC. premises. The purchaser is responsible for unloading and mounting all components of the equipment.

Document the serial numbers of the machine for future reference. The seed treater serial number is located on the upper right corner of the main control panel mounting bracket. And the seed wheel serial number is located under the front guard.

*Seed Treater Serial Number*



*Seed Wheel Serial Number*



**SEED TREATER SERIAL NUMBER:** \_\_\_\_\_

**SEED WHEEL SERIAL NUMBER:** \_\_\_\_\_

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**LEGEND**

Throughout this manual there are small icons located in the left margin. They indicate special information that may apply to your seed treater model. As the legend below indicates, there is 1 icon, each of which represent a different seed treater setup. If you have a Cotton/Rice treater, please take note when one of these pictures is shown because it provides pertinent information.

**LEGEND**

Represents information specific to treaters designed to treat Cotton and Rice seed

**SECTION  
A****SAFETY INSTRUCTIONS**

Every year accidents in the work place maim, kill, and injure people. Although it may be impossible to prevent all accidents, with the right combination of training, operating practices, safety devices, and operator vigilance, the number of accidents can be significantly reduced. The purpose of this section is to educate equipment users about hazards, unsafe practices, and recommended hazard avoidance techniques.

**SAFETY WORDS AND SYMBOLS**

It is very important that operators and maintenance personnel understand the words and symbols that are used to communicate safety information. Safety words, their meaning and format, have been standardized for U.S. manufacturers and published by the American National Standards Institute (ANSI). The European Community (E.C.) has adopted a different format based on the International Standards Organization (I.S.O.) and applicable machinery directives. Both formats are presented below. Graphic symbols are not standardized, but most manufacturers will use some variation of the ones seen in this manual.



Indicates an imminently hazardous situation which, if not avoided, **will** result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, **could** result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, **may** result in minor or moderate injury and/or property damage.



Provides additional information that the operator needs to be aware of to avoid a potentially hazardous situation.



**Mandatory Lockout Power Symbol.** Disconnect, lockout, and tagout electrical and other energy sources before inspecting, cleaning, or performing maintenance on this panel.



**International Safety Alert Symbol.** The exclamation point (!) surrounded by a yellow triangle indicates that an injury hazard exists. However, it does not indicate the seriousness of potential injury. The exclamation point (!) is also used with the DANGER, WARNING, and CAUTION symbols so the potential injury is indicated.



**Electrocution Hazard Symbol.** This symbol indicates that an electrocution hazard exists. Serious injury or death could result from contacting high voltage.



**International Electrocution Hazard.** This symbol indicates that an electrocution hazard exists. Serious injury or death could result from contacting high voltage.



**Mandatory Read Manual Action Symbol.** (I.S.O. format) This symbol instructs personnel to read the Operators Manual before servicing or operating the equipment.



**Mandatory Read Manual Action Symbol.** This symbol instructs personnel to read the Operators Manual before servicing or operating the equipment.

**NOTICE**

Notice is used to notify people of important installation, operation, or maintenance information which is not hazard related.

## **LOCKOUT / TAGOUT PROCEDURES**

Lockout/Tagout is the placement of a lock/tag on an energy isolating device in accordance with an established procedure. When taking equipment out of service to perform maintenance or repair work, always follow the lockout/tagout procedures as outlined in ANSI Z344.1 and/or OSHA Standard 1910.147. This standard “requires employers to establish a program and utilize procedures for affixing appropriate lockout devices or tagout devices to energy isolating devices and to otherwise disable machines or equipment to prevent unexpected energizing, start-up, or release of stored energy in order to prevent injury to employees.”

## **CONTROLLED STOP**

This is the stopping of machine motion by reducing the electrical command signal to 0 (zero) once the stop signal has been recognized.

## **HAZARD REVIEW**



### **Electrocution Hazard**



Electrocution accidents are most likely to occur during maintenance of the electrical system or when working on or near exposed high voltage wiring. This hazard does not exist when the electrical power has been disconnected, properly locked, and tagged out.



### **Automatic Start Hazard**



This seed treating system is usually controlled by an automated system and may start without warning. Failure to properly disconnect, lockout, and tagout all energy sources of remotely controlled equipment creates a very hazardous situation and could cause injury or even death. PLEASE STAY CLEAR AND BE ALERT.

**YOU** are responsible for the **SAFE** operation and maintenance of your USC, LLC Seed Treating System. **YOU** must ensure that you and anyone else who is going to operate, maintain, or work around the Seed Treating System be familiar with the operating and maintenance procedures and related **SAFETY** information contained in this manual. This manual will take you step-by-step through your working day and alert you to good safety practices that should be adhered to while operating the Seed Treating System.

Remember, **YOU** are the key to safety. Good safety practices not only protect you, but also the people around you. Make these practices a working part of your safety program. Be certain that **EVERYONE** operating this equipment is familiar with the recommended operating and maintenance procedures and follows all the safety precautions. Most accidents can be prevented. Do not risk injury or death by ignoring good safety practices.

- LP Series Seed Treater owners must give operating instructions to operators or employees before allowing them to operate the machine, and at least annually thereafter per OSHA (Occupational Safety and Health Administration) regulation 1928.57.
- The most important safety device on this equipment is a **SAFE** operator. It is the operator's responsibility to read and understand **ALL** Safety and Operating instructions in the manual and to follow them. All accidents can be avoided.
- A person who has not read and understood all operating and safety instructions is not qualified to operate the machine. An untrained operator exposes himself and bystanders to possible serious injury or death.
- Do not modify the equipment in any way. Unauthorized modification may impair the function and/or safety and could affect the life of the equipment.
- Think SAFETY! Work SAFELY!

### **GENERAL SAFETY**

1. Read and understand the Operator's Manual and all safety signs before operating, maintaining, adjusting or unplugging the LP Series Seed Treater.
2. Only trained persons shall operate the seed treater. An untrained operator is not qualified to operate the machine.
3. Have a first-aid kit available for use should the need arise, and know how to use it.





4. Provide a fire extinguisher for use in case of an accident. Store in a highly visible place.
5. Do not allow children, spectators or bystanders within hazard area of machine.
6. Wear appropriate protective gear. This includes but is not limited to:



- A hard hat
- Protective shoes with slip resistant soles
- Protective goggles
- Heavy gloves
- Hearing protection
- Respirator or filter mask



7. Place all controls in neutral or off, stop motor, and wait for all moving parts to stop. Then disable power source before servicing, adjusting, repairing, or unplugging.
8. Review safety related items annually with all personnel who will be operating or maintaining the LP Series Seed Treater.



### **OPERATING SAFETY:**

1. Read and understand the Operator's Manual and all safety signs before using.
2. Disconnect and disable electrical supply completely and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
3. Clear the area of bystanders, especially children, before starting.
4. Be familiar with the machine hazard area. If anyone enters hazard area, shut down machine immediately. Clear the area before restarting.
5. Keep hands, feet, hair and clothing away from all moving and/or rotating parts.
6. Stay away from overhead obstructions and power lines during operation and transporting. Electrocution can occur without direct contact.
7. Do not operate machine when any guards are removed.
8. Inspect welds and repair if needed.

### **PLACEMENT SAFETY**

1. Move only with the appropriate equipment
2. Stay away from overhead power lines when moving Seed Treating System. Electrocution can occur without direct contact.
3. Be familiar with machine hazard area. If anyone enters hazard areas, shut down machine immediately. Clear the area before restarting.
4. Operate the Seed Treater on level ground free of debris. Anchor the Seed Treater to prevent tipping or upending.



Before placement of the Seed Treater, be sure that ground is reasonably level. The Seed Treater may topple or work improperly if the ground is too uneven, damaging the equipment and/or causing personal injury.

### **MAINTENANCE SAFETY**

1. Review the Operator's Manual and all safety items before working with, maintaining or operating the Seed Treating System.
2. Place all controls in neutral or off, stop motors, disable power source, and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
3. Follow good shop practices:  
Keep service area clean and dry.  
Be sure electrical outlets and tools are properly grounded.  
Use adequate light for the job at hand.
4. Keep hands, feet, hair and clothing away from all moving and/or rotating parts.
5. Clear the area of bystanders, especially children, when carrying out any maintenance and repairs or making any adjustments.
6. Before resuming work, install and secure all guards when maintenance work is completed.
7. Keep safety signs clean. Replace any sign that is damaged or not clearly visible.



## **SAFETY SIGNS**

1. Keep safety signs clean and legible at all times.
2. Replace safety signs that are missing or have become illegible.
3. Replaced parts that displayed a safety sign should also display the current sign.
4. Safety signs are available from your Authorized Dealer.

### **How to Install Safety Signs:**

- Be sure that the installation area is clean and dry.
- Be sure temperature is above 50°F (10°C).
- Decide on the exact position before you remove the backing paper.
- Remove the smallest portion of the split backing paper.
- Align the sign over the specified area and carefully press the small portion with the exposed sticky backing in place.
- Slowly peel back the remaining paper and carefully smooth the remaining portion of the sign in place.
- Small air pockets can be pierced with a pin and smoothed out using the piece of sign backing paper.

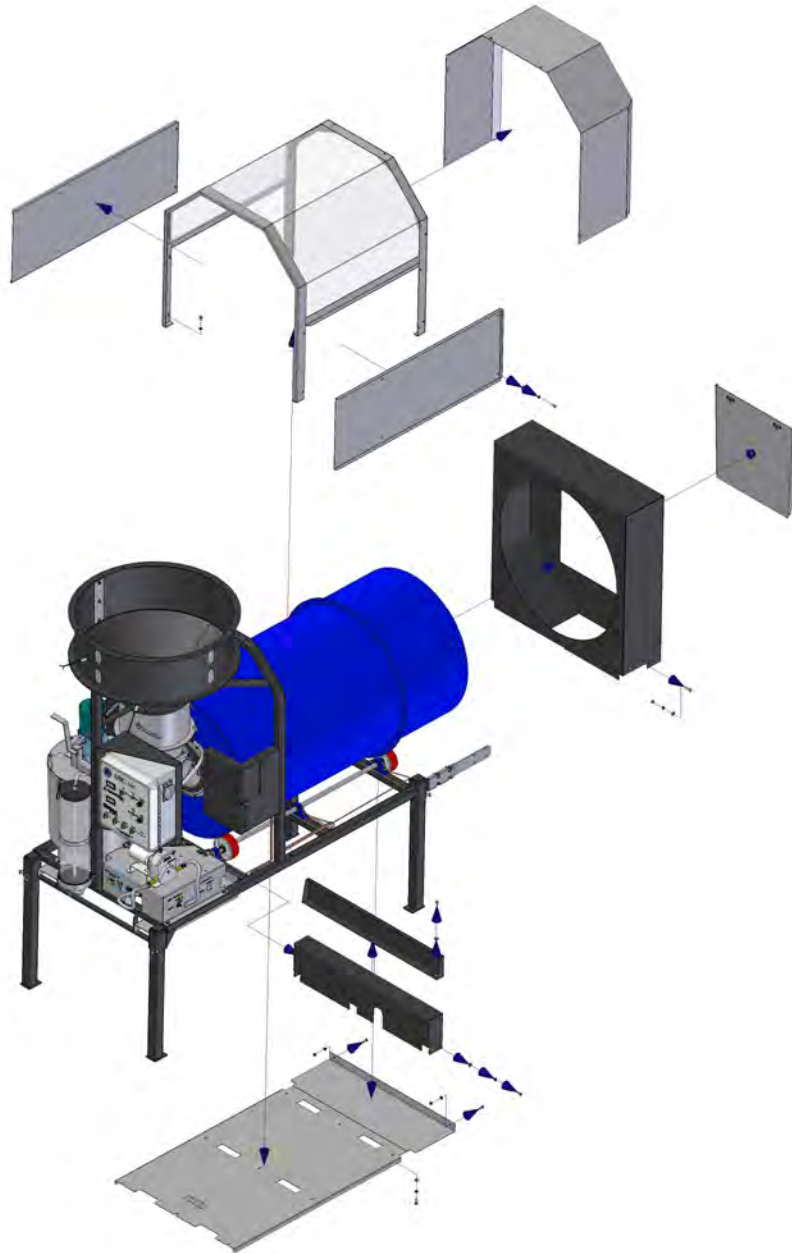


Located on the USC equipment you will find safety labels.  
Always be sure to read and follow all directions on the labels.





Guards provided with USC Seed treater are to remain in place during operation.



**SECTION  
B**

# **INSTALLATION**



**HIGH VOLTAGE ~** Always disconnect the power source before working on or near the control panel or lead wires.



**HIGH VOLTAGE ~** Use insulated tools when making adjustments while the controls are under power.

## **NOTICE**

Permanent installation may require additional electrical cords, liquid hose, and air lines, since each installation is unique.

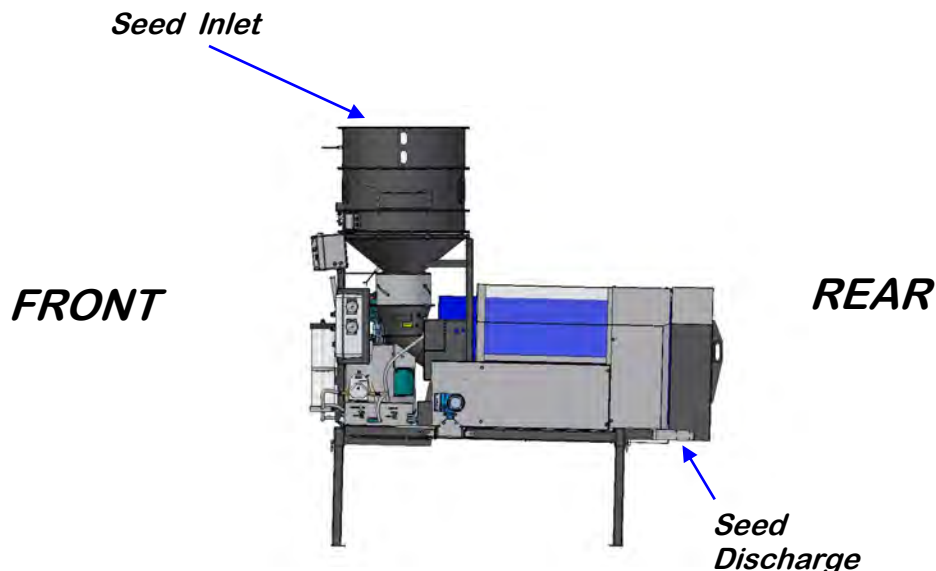
### **SET-UP**

The following steps outline the initial set-up of your USC Seed Treating system:

1. Clear the area of bystanders, especially small children, before moving.
2. Be sure there is enough clearance from overhead obstructions and power lines or other equipment to move the machine into its working position.
3. Using a forklift, place the seed treater in the desired position on a level surface.

## **NOTICE**

USC highly recommends that the seed treater be set up inside a building or any covered structure to protect the machine from weathering.





4. Remove any boxes and the front leg from the drum of the treater.
5. Install the four legs provided and set up on a level surface, preferably concrete. When all four legs are mounted in the same pin hole, the seed treater has a slight slope to allow seed to travel through the machine. The pin holes are approximately 2" apart.

**NOTICE** If more slope is desired, the rear legs can be dropped an additional pin hole.

6. Anchor the seed treater in position to prevent the machine from moving during operation.
7. Inspect machine thoroughly for screws, bolts, fittings, etc. which may have come loose during shipping.
8. Remove the calibration tube from the box and install on the left side of the control panel using the pins. Once the calibration tube is set in place, connect the two chemical lines.
9. Remove the filter body from the control panel and install on the front of the treater. The filter is shipped in the control panel to avoid damage in shipping.
10. If the treater is utilizing a flow meter, the flow meter will need to be installed. Remove the flow meter from the box and mount it on the right hand side of the seed treater (seed picture below). Connect the front and back tubing to the flow meter. After the flow meter has been installed, connect the cord from the flow meter to the receptacle (page 31) located on the bottom of the seed treater control panel.
11. Check and tighten all hose connections.



*Calibration Tube*



*Filter*



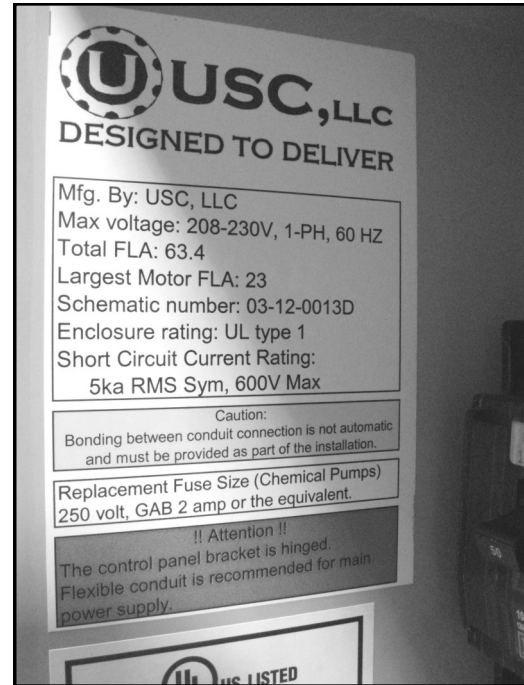
12. Connect any conveyors into the seed treater control panel. Ensure that the conveyors being used are the same power ratings as the seed treater.

**NOTICE** The starters and overloads located in the seed treater panel are rated for 5 HP motors. Do NOT plug any conveyor into the seed treater that exceeds 5 HP.

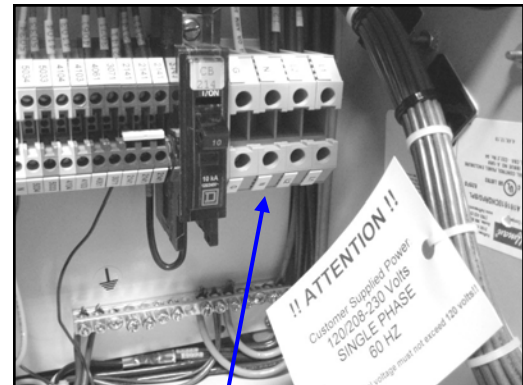
13. Have a certified electrician provide power to the seed treating system. Provide convenient shutdown switches and comply with local electrical codes. The USC system must be connected to the same electrical requirements as specified in the main control panel on the power requirement tag (right), or the electrical schematic shipped with the piece of equipment. This will power the USC system except the seed wheel.

**NOTICE** Control panel bracket is hinged to allow access to the atomizer chamber. Flexible conduit is recommended for main power supply.

14. Connect the Seed Wheel to a 120 volt power source.
15. Open the adjustable seed gate to its most wide open position. If the seed gate is not open fully, seed flow will be diminished and may even back up into the seed wheel.
16. Reverse the previous steps when removing the machine from its working position.



***Power Requirements Tag***



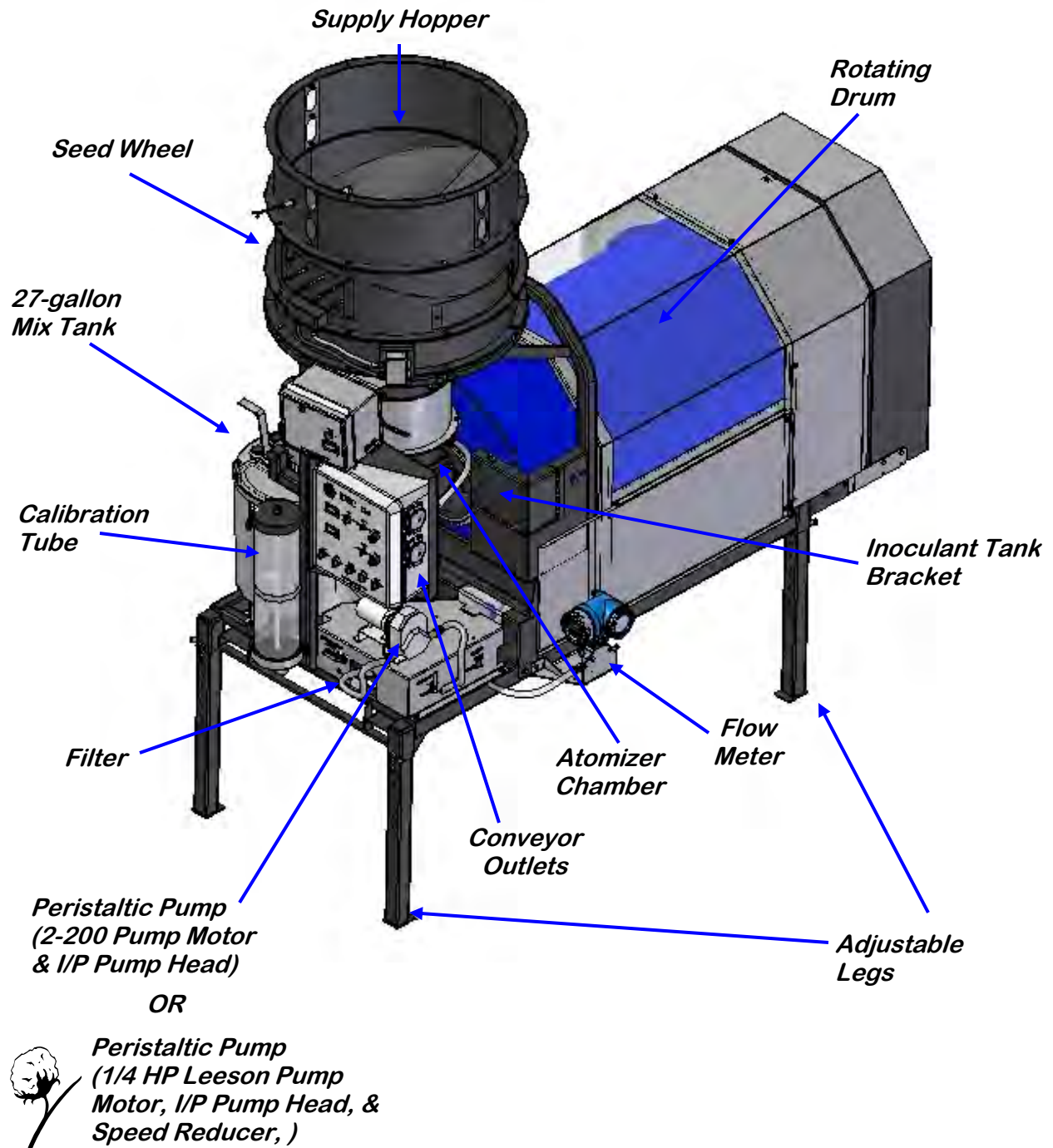
***Incoming Power Connected To These Terminals***

**NOTES**

**SECTION  
C**

# **MECHANICAL OPERATION**

## **SYSTEM OVERVIEW**



## **SUPPLY HOPPER**

The supply hopper has a capacity of approximately 7 units of seed. The hopper supplies seed to the atomizing chamber where seed first comes in contact with the treatment.

The seed flow is controlled by the seed wheel. The adjustable seed gate is not used when using the seed wheel. The seed gate should be set to its most wide open position. Refer to “Section E: Calibration”, for instructions on calibrating and setting the seed wheel.

**NOTICE** Different seed types may be treated with this equipment. It is imperative to note that re-calibration of the seed wheel will be required with each new seed type.

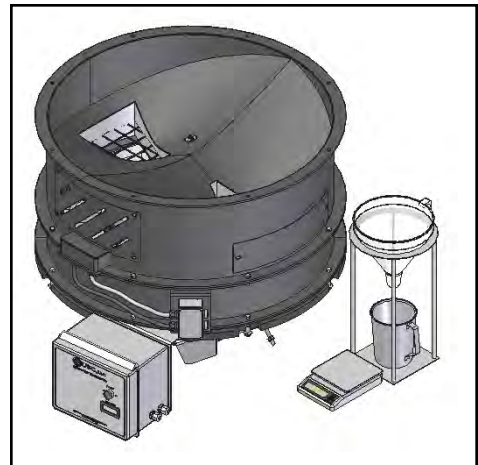
The hopper is equipped with three proximity switches. The top proximity switch controls the automatic start and stop of the inlet conveyor, so the supply hopper does not overflow. This proximity switch is not used on Tower Units or when the treater is being fed with an overhead hopper. The lower proximity switches, which are located in the seed wheel, control the automatic shut-off of the pump(s). When the seed wheel runs out of seed the pump(s) will automatically shut-off. Refer to “Control Panel” in Section D, and Section F: Troubleshooting; “Proximity Switch Adjustment Guide” for more in-depth information on these proximity switches.

The distribution cone creates a curtain of seed which wraps around the atomizer head, ensuring that every seed is applied with treatment. (see page 45)

## **SEED WHEEL**

The Seed Wheel is designed to simplify and increase seed flow calibration accuracy. A rotating wheel is driven by a variable speed motor, which is set prior to treating the seed. This is mounted above the atomizer. The wheel consists of 8 identical pockets approximately 4 inches deep. As it rotates, the wheel captures a certain amount of seed in each pocket. After the seed is caught, the wheel continues rotation and dispenses the seed into the atomizer chamber. With the constant turn of the wheel, there is a consistent amount of seed always sent through the atomizer.

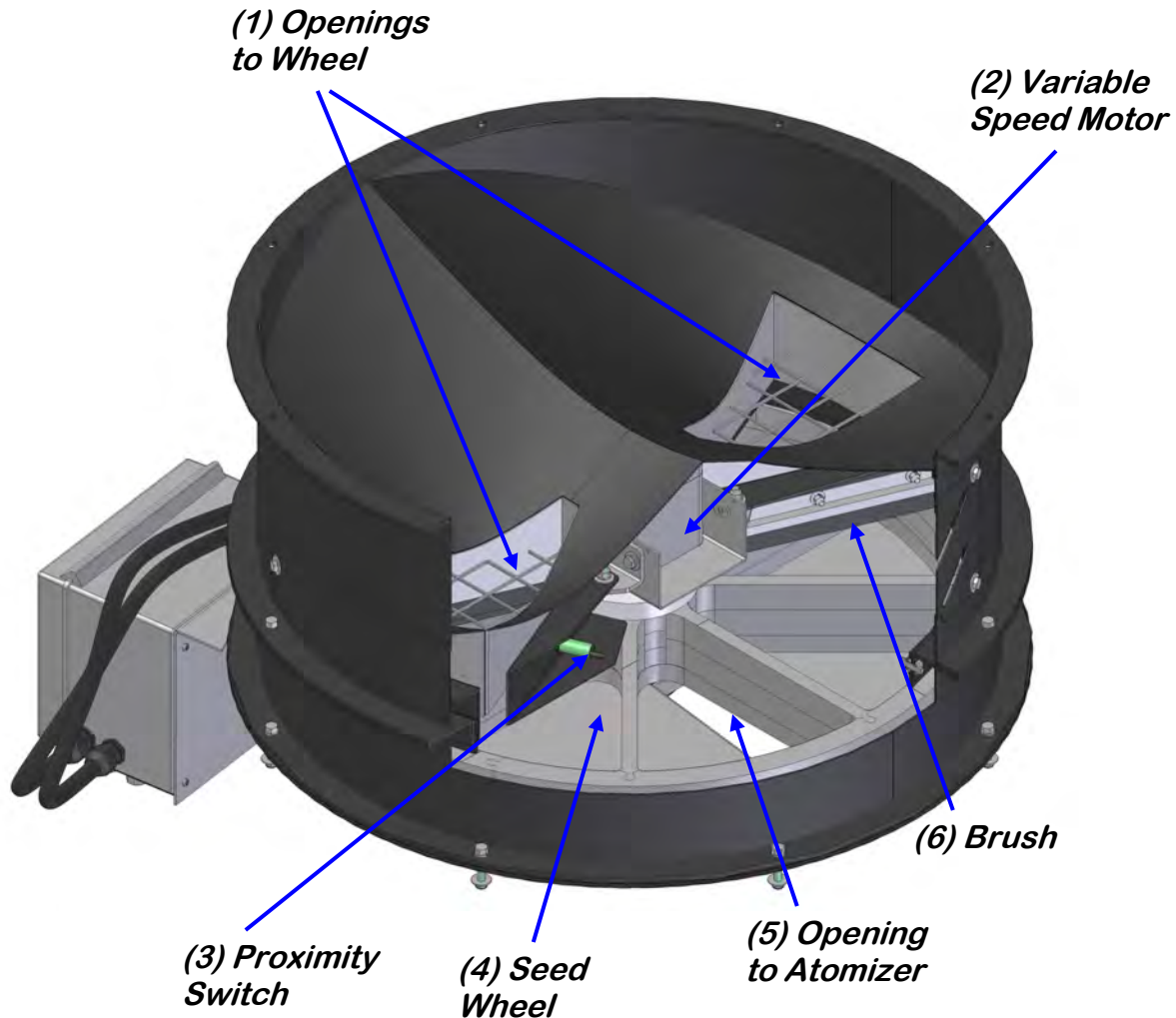
A cup is used to represent a certain percentage of one of the wheels pockets. To calibrate the seed flow, take a sample of the seed to be treated using the cup and weigh it. From the weight of the seed sample and by also knowing the RPM of the wheel, you can determine how fast that seed type will pass through the seed treater.





## LP2000 WITH SEED WHEEL

The purpose of the seed wheel is to simplify calibration and make seed flow calibration more accurate. The seed wheel saves time when switching to different seed sizes and seed types, and can be mounted to most LP800 and LP2000 models.



**1. Openings to Wheel:** This is where the seed is dispensed into the wheel pockets.

**2. Variable Speed Motor:** Drives the wheel and the speed can be adjusted to fit your desired seed flow.

**3. Proximity Switch:** Controls when the pump(s) turn on and off when the pump switch on the seed treater is in the Automatic position. When seed is covering this sensor and the pump switch is in Auto, the pump(s) will run. When seed is no longer covering this sensor, the pump(s) will shut off.

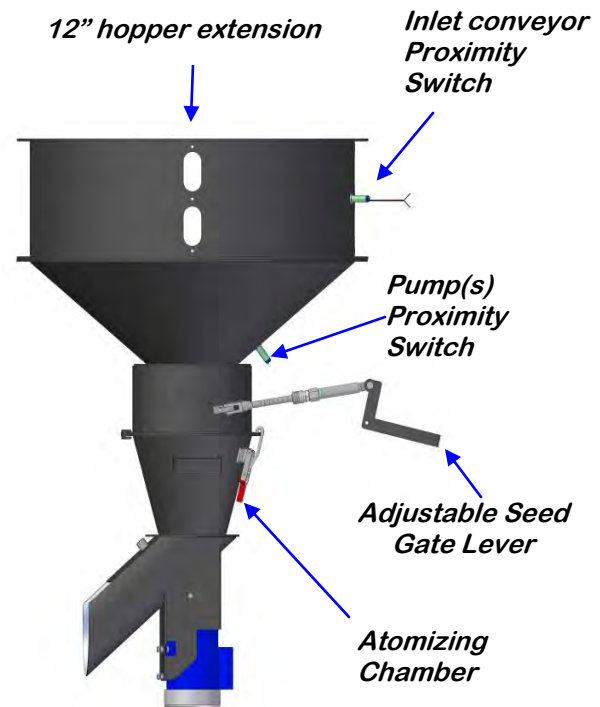
**4. Seed Wheel Pocket:** Catches the seed as the wheel rotates. Approximately 7 to 9 pounds are held in each pocket, depending on the type and size of seed.

**5. Opening to Atomizer:** This is where the seed is dispensed from the pockets into the atomizer chamber.

**6. Brush:** The brush levels off the top of each pocket as the wheel rotates to ensure each pocket contains the same amount of seed.

### **ATOMIZER CHAMBER**

The Atomizer chamber consists of a patented design which disperses treatment evenly to each seed. A motor drives the atomizer head at approximately 1725 RPM's. As treatment is being pumped into the atomizer chamber, it drops into the atomizer head. The centrifugal force of the spinning head forces the treatment to be sprayed out through a screen covering in all 360 degrees. Meanwhile, seed flows down out of the supply hopper, down on top of the distribution cone which disperses the seed down around the atomizer head. (see page 45)



### **ROTATING DRUM**

The rotating drum accepts treated seed through the opening on the hopper end. As seed passes through the length of the drum it is tumbled, producing accurate and uniform seed coating. The seed then exits the seed treater out the discharge end of the machine.



Never allow exposure of persons or clothing to the drive shaft, idler wheels, or the drum during operation. Always have the safety shields in place during operation.

### **PUMP #1 LIQUID SYSTEM**

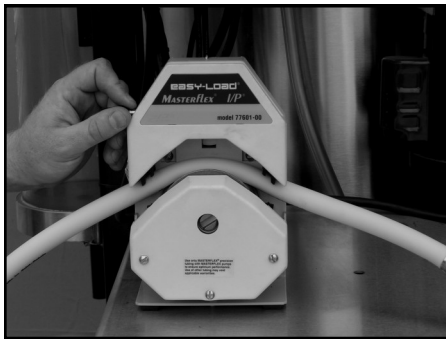
The USC seed treater is equipped with a 27-gallon mix tank with an electric drive liquid agitator to keep chemicals mixed and in suspension. The agitator should be running at all times when treatment is present in the mix tank. The tank is equipped with a shut-off, drain plug, and drain valve located on the bottom. The top of the tank also includes 3 extra ports which the operator can use to direct fill into the tank (see below).



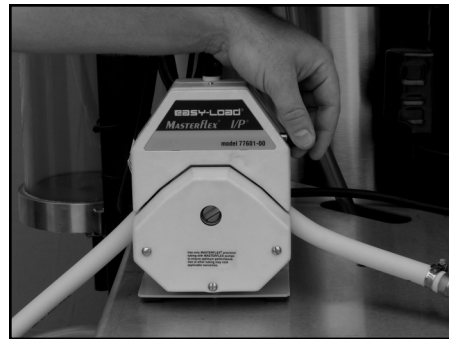
Pump #1 liquid system is also equipped with a calibration tube, which is used to determine the liquid flow rate. The calibration tube measures in ounces on a 0-340 scale. Three-way valves direct liquid from different areas to keep all liquid contained.

Pump #1 Liquid System utilizes a variable speed peristaltic pump and special norprene pump tubing for liquid metering. Liquid will only come into contact with the inside diameter of the pump tubing and not the pump. This allows for easy cleanup and less maintenance of the pump.

To open the pump head, turn lever to the left. Place pump tubing in pump head so it fits inside the notches and above the rollers. Turn lever back to the right to close the pump head, clamping the tubing inside the head. Wear or fatigue of the tubing due to usage and compression is normal. When tubing becomes worn or liquid rates begin to slow down, open the pump head and move the tubing to a different position. When the entire piece of tubing becomes worn, simply replace with a new section of tubing. When not using the machine for a few days or when storing, open the pump head and remove the tubing to prevent any unnecessary compression during the off-season.



*Pump Head Open*



*Pump Head Closed*

### Pump #1 Valves Explained

**Seed Treatment Source:** This valve controls where pump #1 is drawing liquid from.



*Pump #1 Drawing from bottom of Mix Tank*

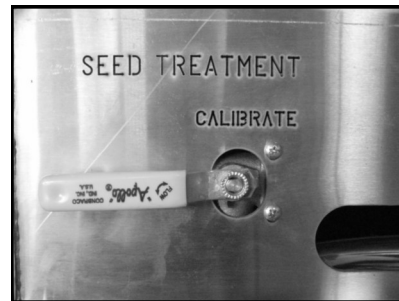


*Pump #1 Drawing from bottom of Calibration Tube*

**Seed Treatment:** This valve controls the direction of the liquid coming from pump #1.



*Pump #1 pumping liquid to valve on top of mix tank.*



*Pump #1 pumping liquid to atomizer. Used when treating seed.*

**Valve on Mix Tank:** This valve directs the liquid coming from the Calibrate side of the Seed Treatment Valve.



*Pump #1 pumping liquid into the top of the mix tank when Seed Treatment Valve is in Calibrate.*



*Pump #1 pumping liquid into the top of the calibration tube when Seed Treatment Valve is in Calibrate.*

Proper calibration of the liquid system is critical to achieve a proper granular/chemical mixture. Use the calibration procedure on page 38 to determine liquid flow rate.

Emptying the remaining liquid can be done by using the reverse function on the control panel. This will pump liquid back into the mix tank. Then drain the remaining liquid into a suitable container. Clean water should be pumped through the calibration tube and mix tank when finished.



Always dispose of chemical or diluted chemical according to your local, state, and federal regulations.



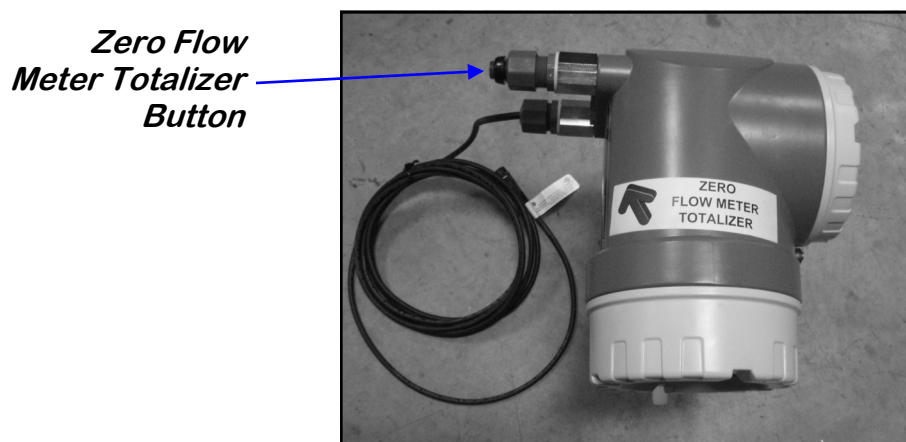
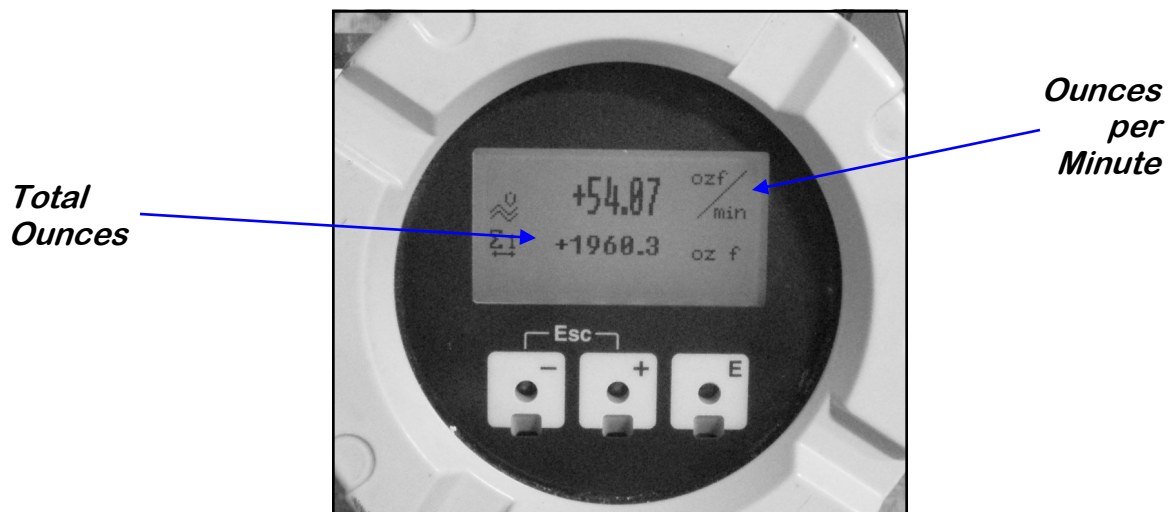
Only you, the operator, can determine the length of time required to completely rinse all chemical residue from the tank and plumbing system.



### **FLOW METER (optional)**

The volumetric flow meter is programmed at USC to display ounces per minute and total ounces. Metric units can also be displayed if specified during ordering. The front part of the flow meter display is a touch screen. If you need to clean the screen, be sure to disconnect power to the flow meter before cleaning. This will avoid accidentally changing any parameters.

Ounces per Minute (ozf/min) and Total Ounces (ozf) are both displayed on the same screen of the volumetric flow meter. To “Zero” out the total ounces used, you simply push the “ZERO FLOW METER TOTALIZER” button located on the left side of the flow meter.

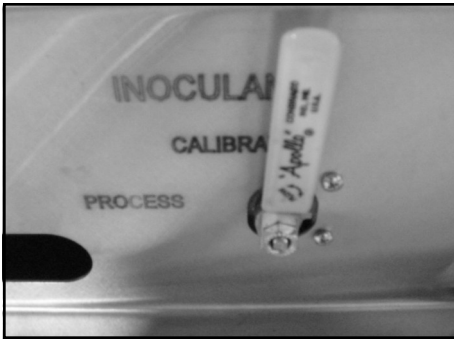


## **PUMP #2 LIQUID SYSTEM**

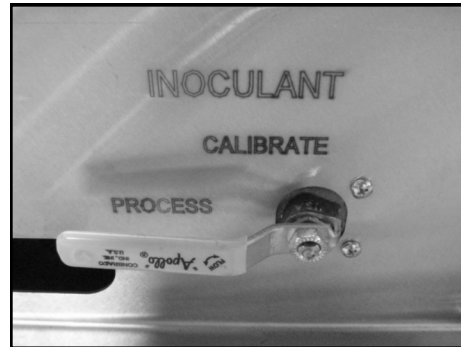
The Pump #2 Liquid System or Inoculant Kit includes an additional variable speed peristaltic pump, 2 three way valves, plumbing, and a 5 gallon poly tank. The pump is tied to the pump #2 controls which are pre-wired into the main control panel. (see page 40)

### **Pump #2 Valves Explained**

**Inoculant:** This valve controls the direction of the liquid coming from the tank.



*Pump #2 Pumping Liquid to Calibration Valve*



*Pump #2 Pumping Liquid to the Atomizer*

**Calibration Valve:** This valve directs liquid which comes from the calibrate side of the Inoculant valve.



*Directs liquid to the hose to the right of the valve to check calibration*



*Directs Liquid back into the top of the 5 gallon tank*

**NOTES**

**SECTION  
D**

# **ELECTRICAL OPERATION**



**HIGH VOLTAGE** ~ Always disconnect the power source before working on or near the control panel or lead wires.



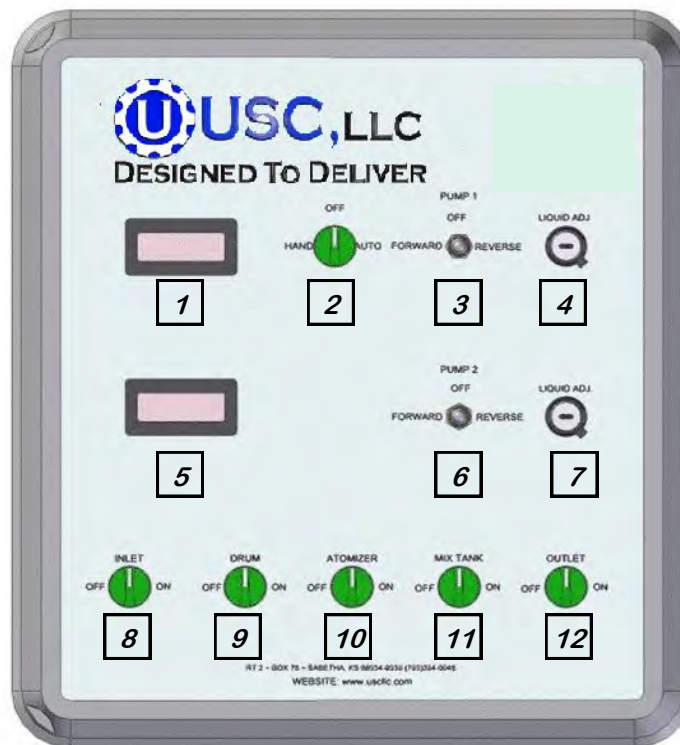
**HIGH VOLTAGE** ~ Use insulated tools when making adjustments while the controls are under power.



**AUTHORIZED PERSONNEL** only shall work on the control panel. Never allow anyone who has not read and familiarized themselves with the owner's manual to open or work on the control panel.

## **SEED TREATER CONTROL PANEL**

Refer to the control panel and the electrical schematic for proper voltage and amperage of the machine. All green switches will illuminate when activated. The bottom row of switches are spring return to center. The control panel controls the following functions:



## Controls Explained

**1. Pump #1 Voltmeter:** Displays the DC voltage for pump #1. As pump #1 speed is increased or decreased, this number will also increase or decrease.

**2. Hand/Off/Auto Switch (for Pump #1 & #2):** This switch controls pump #1, pump #2, and any device connected to the auxiliary port. This switch must be activated before either pump will operate in forward or reverse.

- When this switch is placed in “Hand”, the pump(s) will run only when you have turned the pump(s) switch to forward or reverse, and the speed has been adjusted.
- When the switch is placed in “AUTO”, the pump(s) will only run when the the proximity switches located in the seed wheel are covered and the atomizer is running. The proximity switches determine when seed is present in the seed wheel. When the proximity switches do not detect seed, a timer relay located inside the control panel will automatically shut off the pump(s) a pre-determined amount of time after the hopper has emptied. The timer relay (right) located in the control panel is set to Mode “D” and has an adjustable knob with settings from 0-6. Each number represents the number of seconds from the time the hopper empties until the pumps will shut off. The time delay allows all seed that passes through the atomizer to have equal coverage.



**3. Pump #1 Direction:** This switch allows the operator to change the pump direction between forward and reverse. It has a safety feature that will not allow the operator to switch from forward to reverse or vice-versa without momentarily stopping and releasing the switch in the center position.

**4. Liquid Adj. Pump #1:** This dial allows the operator to adjust the speed of pump #1. The setting should be chosen in relation to the application rate for the treatment being applied to the seed.

**5. Pump #2 Voltmeter:** Displays the DC voltage for pump #2. As pump #2 speed is increased or decreased, this number will also increase or decrease.

**6. Pump #2 Direction:** This switch allows the operator to change the pump direction between forward and reverse. It has a safety feature that will not allow the operator to switch from forward to reverse or vice-versa without momentarily stopping and releasing the switch in the center position.

**7. Liquid Adj. Pump #2:** This dial allows the operator to adjust the speed of pump #2. The setting should be chosen in relation to the application rate for the treatment being applied to the seed.

**8. Inlet Conveyor Switch:** This switch controls the inlet conveyor in conjunction with a timer relay. When the switch is turned on, the conveyor will run until seed covers the proximity switch mounted near the top of the supply hopper, at which time the conveyor will turn off automatically. The inlet conveyor will remain off until seed has dropped below the proximity switch. A timer relay (right) will turn the conveyor back on after a pre-determined time. The timer relay located inside the control panel is set to Mode "A" and has an adjustable knob with settings from 0-6. Each number represents the number of seconds from the time the proximity switch is uncovered to when the conveyor will turn back on. The time delay prevents the conveyor from turning on and off too quickly.



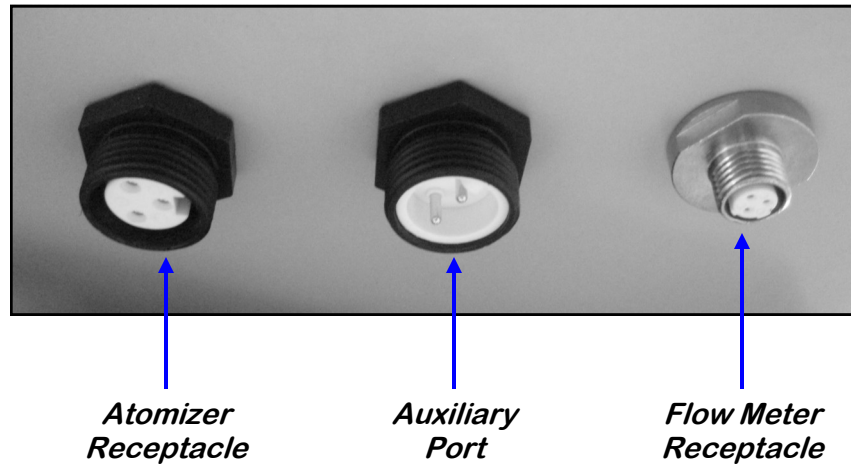
**9. Drum:** This switch allows the operator to turn the drum on or off.

**10. Atomizer:** This switch allows the operator to turn the rotary driven atomizer on or off for primary distribution of product on the seed. This switch must be turned on before the seed treating process begins and before the pump(s) will operate in "Auto".

**11. Mix Tank:** This switch allows the operator to turn the chemical mixer/agitator on or off to allow for a perfectly mixed application of the seed treatment.



**Bottom of Control Panel**



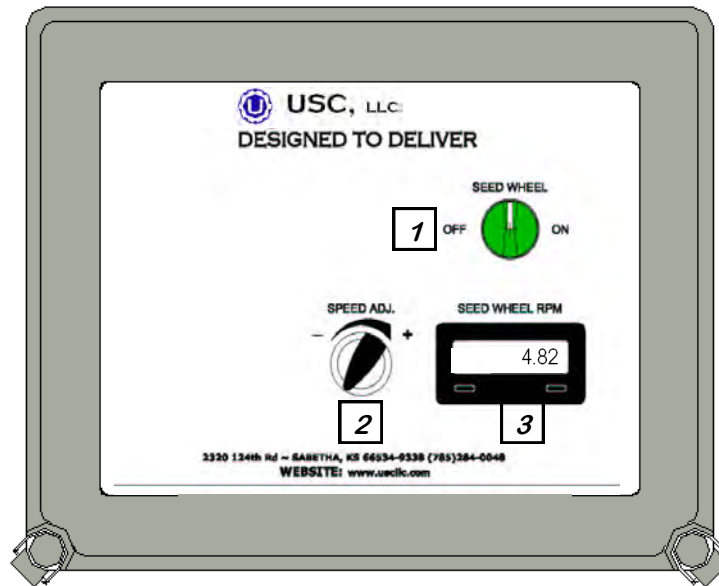
**Atomizer Receptacle:** This receptacle is where the motor that runs the atomizer is plugged in to. The atomizer can be unplugged so it can be removed for service and clean-up.

**Auxiliary Port:** This port is will allow an additional liquid system or dry additive feeder to tie in with the Automatic shut-off function. The Hand/Off/Auto switch will control the secondary system. This port does not supply power to a secondary unit.

**Flow Meter Receptacle:** If a flow meter is added to the machine, power is supplied to meter through this receptacle. This receptacle is supplied on the control panel regardless if the machine is pre-ordered with a flow meter. This will allow for easy installation if a flow meter is added later.

## **SEED WHEEL CONTROL PANEL**

Refer to the control panel and the electrical schematic for proper voltage and amperage of the machine. The control panel requires a [120V single-phase power supply with neutral](#). The green switch is spring return to center. The control panel controls the following functions:



**1. Seed Wheel:** Allows the operator to turn the seed wheel on or off.

**2. Speed Adjustment:** Controls the speed of the motor which drives the seed wheel.

**3. RPM Indicator:** Displays the RPM of the seed wheel. Maximum RPM of Seed Wheel. Maximum RPM of Seed Wheel is 13.0.

**NOTES**

**SECTION  
E****CALIBRATION**

Calibration of both the seed flow and liquid portions of the equipment is necessary for accurate treatment of seed.

**NOTICE** If you prefer metric measurements, please refer to the conversion chart on page 48.

**SEED FLOW CALIBRATION**

The following steps illustrate how to calibrate the seed flow for a LP series seed treater with seed wheel.

1. Set the empty seed calibration cup on the scale and zero the out the weight of the cup.
2. Place the funnel and stand in the seed to be treated. This will help to avoid any unnecessary clean-up while filling and leveling the top of the seed calibration cup.
3. Place your hand under the bottom of the funnel and fill the funnel up with seed.
4. Place the calibration cup under the funnel stand and remove your hand from the bottom of the funnel, and allow the cup to be filled. (figure 1)
5. After the cup has been filled, strike off the top of the calibration cup with a straight edge. (figure 2)

**NOTICE** Do not shake the cup.

6. Weigh the sample of seed. (figure 3)

**NOTICE** A typical weight of the sample of seed will be anywhere between 2.8 to 4.0 lbs. Anything over or under this range could be caused by not zeroing out the weight of the cup, or the scale may be set to the wrong units.

7. Take the weight of the seed sample and use it in the formula on page 35, or into the “Seed Wheel Calibration 09-10” worksheet found on the USC Seed Wheel Calibration CD.
8. At this time, ensure that the seed gate is set to its most wide open position.

Seed Type	Cup Percentage
CORN	0.38080
COTTON	0.38153
PEAS	0.38979
RICE	0.37936
SOYBEANS	0.38501
WHEAT	0.36527
OTHER	0.38029



*Figure 1*



*Figure 2*



*Figure 3*

### **SEED FLOW CALCULATIONS**

The following steps illustrate how to determine the RPM for your desired seed flow rate. Different seed types will fill the pocket differently. When figuring your seed flow rate, be sure to use the chart below for the type of seed.

1. Determine a seed flow rate.

**EXAMPLE:** *Desired Seed Flow Rate = 700 lbs./min.*

2. Determine the number of pounds per wheel revolution which will be dispensed through the seed wheel. This can be found by dividing the desired seed flow rate by the number of pockets dispensed per revolution.

**EXAMPLE:** Seed Flow Rate = 700 lbs./min.  
 $700 / 16 = 43.75$  lbs.  
***43.75 lbs. per wheel revolution.***

3. Find the weight of seed in each pocket. This can be done by taking a sample of the seed to be treated (follow the steps on page 30). Divide the weight of the sample by the Cup Percentage for the type of seed you are treating. Use the chart on Page 28 to find the Cup Percentage.

**EXAMPLE:** Weight of seed in cup = 3.58  
 Cup Percentage for Soybeans = 0.38501  
 $3.58 / 0.38501 = 9.298$   
***9.298 lbs. per wheel pocket.***

4. Determine the RPM of the Seed Wheel to match your desired seed flow rate. Take the lbs per wheel revolution and divide it by the lbs per wheel pocket. Then add in a 0.04 factor to compensate for the drop in wheel RPM under a load of seed.

**EXAMPLE:** Pounds per wheel revolution = 43.75  
 Pounds per wheel pocket = 9.298  
 $43.75 / 9.298 = 4.71$   
 $4.71 + 0.04 = 4.75$   
***4.75 RPM is the number the seed wheel needs to be set at to match your desired seed flow rate.***

## USING SEED WHEEL WORKSHEET

The following steps illustrate how to use the seed wheel calibration worksheet found on the CD in the back of this manual. The worksheet will simplify calibration of the seed wheel. The worksheet uses “Excel format and is named: “Seed Wheel Calibration 09-10”. Below is a screen shot of the actual worksheet.

**USC SEED WHEEL CALIBRATION WORKSHEET**

**PLEASE FOLLOW ALL STEPS!**

**STEP #1: Enter Data in the Yellow Cells Below**  
**STEP #2: Set the Seed Wheel RPM located in the Orange cells**  
**STEP #3: Treat the first batch of seed and time.**  
**STEP #4: If Actual Time differs from Estimated Time, then [CLICK HERE](#)**

Seed Type	Total Pounds to be Treated	Weight of Seed in Cup (Pounds)	Desired Seed Flow (Pounds per Minute)	Ounces per cwt.	Set Seed Wheel RPM to:	Estimated Time in Seconds	Estimated Time, Hr:Min:Sec	Estimated Ounces per Minute	Total Ounces	Seed Wheel Factor
CORN					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
COTTON					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
PEAS					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
RICE					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
SOYBEANS					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
WHEAT					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
OTHER					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%

Seed Wheel Worksheet (Standard) | Seed Wheel Worksheet (Metric) | Seed Wheel Factor (Standard) | Seed Wheel Factor (Metric)

*A seed type to be treated that is not on the list can be typed into this cell*

*Select Standard or Metric Worksheet based on the desired units of measurement*



1. Select the type of seed to be treated. **EXAMPLE: SOYBEANS**
2. Enter the total number of pounds to be treated. **EXAMPLE: 2500**
3. Enter in the weight of seed in the cup (follow the steps on page 34).  
**EXAMPLE: 3.58**
4. Enter in the desired seed flow rate. This is a number that is determined by the operator. Minimum seed flow rate is approximately 300 lbs per minute. The maximum seed flow rate is 800 lbs per minute for an LP800 and 1900 lbs per minute for an LP2000. **EXAMPLE: 700**
5. Enter in the ounces to be applied per hundred pounds(cwt). **EXAMPLE: 5.00**


Microsoft Excel - Seed Wheel Calibration 09-10.xls

File Edit View Insert Format Tools Data Window Help

Type a question for help

C10 fx Arial 11

A B C D E F G H I J K L M N


1  **USC SEED WHEEL CALIBRATION WORKSHEET**

2 **PLEASE FOLLOW ALL STEPS!**

3 **STEP #1: Enter Data in the Yellow Cells Below**  
**STEP #2: Set the Seed Wheel RPM located in the Orange cells**  
**STEP #3: Treat the first batch of seed and time.**

4 **STEP #4: If Actual Time differs from Estimated Time, then**  
**CLICK HERE**

Seed Type	Total Pounds to be Treated	Weight of Seed in Cup (Pounds)	Desired Seed Flow (Pounds per Minute)	Ounces per cwt.	Set Seed Wheel RPM to:	Estimated Time in Seconds	Estimated Time, Hr:Min:Sec	Estimated Ounces per Minute	Total Ounces	Seed Wheel Factor
CORN					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
COTTON					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
PEAS					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
RICE					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
SOYBEANS	2,500	3.580	700	5.00	4.75	214	0:03:34	35.0	125.0	100.0%
WHEAT					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
OTHER					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%

12 

Seed Wheel Worksheet (Standard) Seed Wheel Worksheet (Metric) Seed Wheel Factor (Standard) Seed Wheel Factor (Metric)

Draw AutoShapes

6. Set the Seed Wheel RPM using the number in the orange colored cell found in the same row as the seed type to be treated. **EXAMPLE: 4.75**
7. After the Seed Wheel RPM has been set, the first batch of seed can be treated. Double check the accuracy by timing the first batch of seed as it passes through the atomizer of the seed treater.

## **PUMP #1 CALIBRATION**

The following steps illustrate how to calibrate pump #1 on an LP series seed treater. A stop watch will be needed in the calibration process.

**NOTICE** If the seed treater is equipped with a flow meter, refer to the Flow Meter operator's manual for pump calibration instructions.

1. Lock down the pump tubing in the Pump #1 pump head (page 23) and set the dial above the pump head to the "3" setting.
2. Premix enough liquid for the amount of seed you will be treating and pour into the 27 gallon stainless steel tank. It's always a good practice to mix up 20% extra slurry to help fill all the lines. Turn on the mix tank and allow liquid to mix.
3. Turn the "SEED TREATMENT SOURCE" valve to the "MIX TANK" position, the "SEED TREATMENT" valve to the "CALIBRATE" position, and the valve on top of the mix tank to "MIX TANK".
4. Turn the pump #1 direction switch to "FORWARD".
5. Turn the "Hand/Off/Auto" switch to the "Hand" position and set the Pump #1 liquid adjust dial (right) to about "500" or half speed. The liquid should begin re-circulating from the bottom of the mix tank, through the pump, and back into the top of the mix tank.
6. Allow pump to re-circulate liquid for approximately 15 minutes to ensure all air has been removed from the liquid lines. This will also help "break-in" the pump tubing, which is critical before checking pump calibration.
7. After you have allowed the liquid to re-circulate you are ready to calibrate the pump. Determine the number of ounces needed in one minute.



**EXAMPLE:** The seed treatment slurry rate is 4 ounces per cwt.  
 Seed Flow Rate = 12.24 cwt/min. x 4 oz./cwt. = 49 oz./min.  
 49 oz. is the rate the pump should be pumping in one minute.

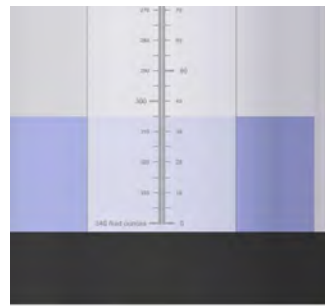
8. Set the Liquid Adjustment Dial . You can use the chart on page 42 to find a starting point.

**EXAMPLE:** The ounces needed in one minute = 49 oz/min. Assume we are using a 2-200 Masterflex pump. An approximate starting point is 31.8 volts.

9. Using the stop watch, determine the pump flow rate. Keeping the pump running, position the valve on top of mix tank to "CALIBRATION TUBE". When liquid reaches 0 (zero) or an even number, begin timing for one minute. (see Figure 1, below)
10. As soon as one minute is up, position valve on top of mix tank to "MIX TANK". Read the level on the side of the calibration tube (see Figure 2, below). This number should equal the number of ounces needed to flow through the pump in one minute. If the ounces needed per minute have not been met, re-adjust the pump speed up or down accordingly and repeat steps 9 & 10 until the liquid flow rate has been matched.



**Figure 1**  
*Liquid at 0 oz.*



**Figure 2**  
*Liquid at 35 oz.*

### **PUMP CALIBRATION WITH FLOW METER**

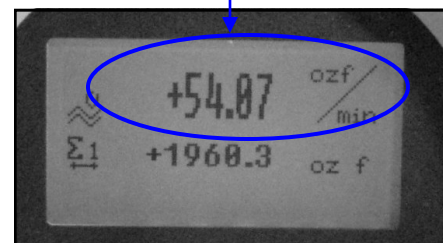
The following steps illustrate how to calibrate a pump with a flow meter on an LP series seed treater.

1. Follow steps 1 through 6 on page 38.
2. After you have allowed the liquid to re-circulate you are ready to calibrate the liquid flow. Determine the number of ounces needed in one minute.

**EXAMPLE:** The seed treatment slurry rate is 5 ounces per cwt.  
 Seed Flow Rate = 10.8 cwt/min. x 5 oz./cwt. = 54 oz./min.  
 54 oz. is the rate the pump should be pumping in one minute.

3. Set the Liquid Flow Rate. Using the Liquid Adj. dial. Increase or decrease the pump speed until the liquid flow rate has been matched.
4. Once the flow rate is set you can begin the seed treating process. The flow rate can still be adjusted during the treating process.

**Flow Rate**



## **PUMP #2 CALIBRATION**

The following steps illustrate how to calibrate pump #2 on an LP series seed treater. A stop watch and measuring cup will be needed in the calibration process.

1. Lock down the pump tubing in the Pump #2 pump head. (page 23)
2. Premix enough liquid for the amount of seed you are treating and pour into the 5 gallon poly tank. It's always a good practice to mix up 20% extra slurry to help fill all the lines.
3. Turn the "INOCULANT" valve to the "CALIBRATE" position, and position the Calibration Valve to "RECIRCULATE".
4. Turn the pump #2 direction switch to "FORWARD".
5. Turn the "Hand/Off/Auto" switch to the "Hand" position and set the Pump #2 liquid adjustment dial (right) to about "500" or half speed. Liquid should begin circulating from the bottom of the mix tank, through the pump, and back into the top of the tank.
6. Allow pump to re-circulate liquid for approximately 15 minutes to ensure all air has been removed from the liquid lines. This will also help "break-in" the pump tubing, which is critical before checking pump calibration.
7. After you have allowed the liquid to circulate you are ready to calibrate the liquid flow. Determine the number of ounces needed in one minute.



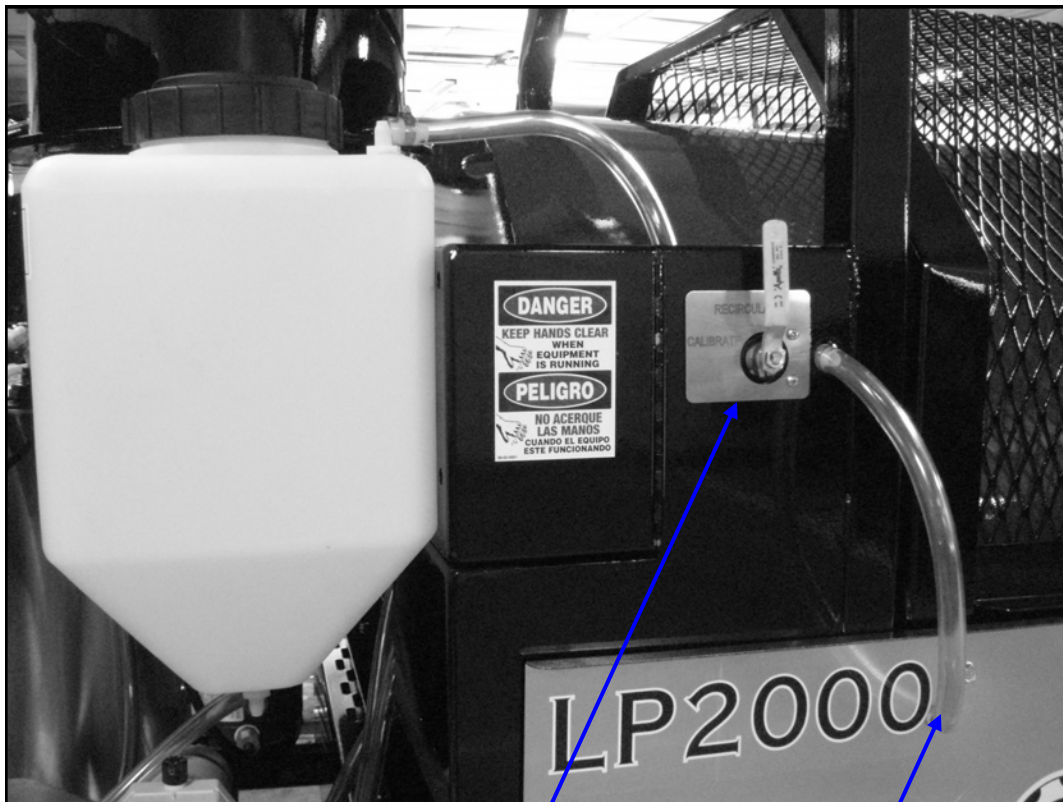
**EXAMPLE:** The seed treatment slurry rate is 5 ounces per cwt.  
 Seed Flow Rate = 12.24 cwt/min. x 5 oz./cwt. = 61.2 oz./min.  
 61.2 oz. is the rate the pump should be pumping in one minute.

8. Set the Liquid Adjustment Dial . You can use the chart on page 42 to find a starting point.

**EXAMPLE:** The ounces needed in one minute = 61.2 oz/min. Assume we are using a 2-200 Masterflex pump. A good starting point is approximately 33.9 volts.

9. Using the stop watch and measuring cup, determine the pump flow rate. Hold the measuring cup under the calibration hose next to the Side Valve.
10. Keeping the pump running, position the Calibration Valve to "CALIBRATE". When liquid begin timing for one minute as soon as liquid begins flowing into the measuring cup.

11. As soon as one minute is up, position the Calibration Valve back to “RECIRCULATE”. Read the level on the side of the measuring cup. This number should equal the number of ounces needed to flow through the pump in one minute. If the ounces needed per minute have not been met, adjust the pump speed up or down accordingly and repeat steps 9,10, & 11 until the liquid flow rate has been matched.



*Calibration Valve*

*Calibration Hose*



## Standard Data

Below are two charts that show the potential volts and oz./min of two different pumps at different dial settings.

**NOTICE** *All calibrations were done using water. Numbers are not exact; only use these numbers as a starting point or for troubleshooting.*

### 2-200 RPM Motor & I/P Pump Head, with Masterflex I/P 82 Pump Tubing

<u>Volts</u>	<u>OZ./Min.</u>
10.0	12.7
14.1	19.3
18.2	25.8
22.3	32.4
26.3	39.0
30.4	45.5
34.5	52.1
38.6	58.7
42.7	65.2
46.8	71.8
50.8	78.4
54.9	84.9
59.0	91.5
63.1	98.1
67.2	104.7
71.3	111.2
75.3	117.8
79.4	124.4
83.5	130.9
87.6	137.5

### 1725 RPM Motor, 3.1:1 Reducer, & I/ P Pump Head with Masterflex I/P 82 Pump Tubing

<u>Volts</u>	<u>OZ./Min.</u>
9.2	23.0
13.3	41.9
17.5	60.9
21.6	79.8
25.8	98.8
29.9	117.7
34.1	136.7
38.2	155.6
42.3	174.6
46.5	193.5
50.6	212.5
54.8	231.4
58.9	250.4
63.0	269.3
67.2	288.3
71.3	307.2
75.5	326.2
79.6	345.1
83.8	364.0
87.9	383.0





**Metric Data**

Below are two charts that show the potential volts and ml./min of two different pumps at different dial settings.

**NOTICE**

*All calibrations were done using water. Numbers are not exact; only use these numbers as a starting point or for troubleshooting.*

**2-200 RPM Motor  
& I/P Pump Head, with  
Masterflex I/P 82 Pump Tubing**

<u>Volts</u>	<u>ml./Min.</u>
10.5	375
14.6	569
18.8	764
22.9	958
27.0	1,152
31.2	1,347
35.3	1,541
39.4	1,736
43.6	1,930
47.7	2,124
51.8	2,319
55.9	2,512
60.1	2,707
64.2	2,901
68.3	3,096
72.5	3,290
76.6	3,484
80.7	3,679
84.9	3,872
89.0	4,067

**1725 RPM Motor, 3.1:1 Reducer,  
& I/ P Pump Head with  
Masterflex I/P 82 Pump Tubing**



<u>Volts</u>	<u>ml./Min.</u>
9.2	680
13.3	1,240
17.5	1,801
21.6	2,362
25.8	2,922
29.9	3,483
34.1	4,043
38.2	4,604
42.3	5,164
46.5	5,724
50.6	6,285
54.8	6,845
58.9	7,406
63.0	7,966
67.2	8,527
71.3	9,087
75.5	9,648
79.6	10,208
83.8	10,769
87.9	11,329

## **TREATING SEED**

1. Prime the line going to the atomizer by turning the Atomizer switch to "ON" and turn the "SEED TREATMENT" valve to "PROCESS". Next turn the pump direction switch to "FORWARD" and the "Hand/Off/Auto" switch to "Hand". Liquid should begin pumping up to the atomizer. After the line has been primed, turn the "Hand/Off/Auto" switch to "Auto". Additional liquid can be pumped up into the atomizer and into the drum to guarantee coverage of the first seed that passes through the machine.



Do NOT pump liquid into the atomizing chamber when the atomizer is "OFF".

2. Position the "SEED TREATMENT SOURCE" valve to "MIX TANK".

### **NOTICE**

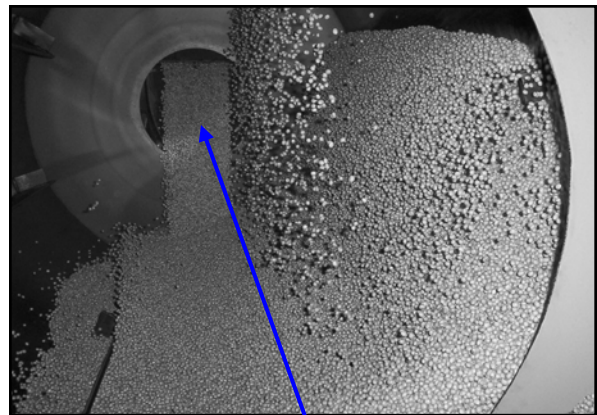
If you desire to check the total ounces used per batch of seed. Fill the calibration tube with the amount needed for the batch of seed (about 10 ounces extra is a good practice). Then position the "SEED TREATMENT SOURCE" valve to "CALIBRATION TUBE" and go on to step 3.

3. Begin feeding seed into the seed wheel until the supply hopper is full. This will ensure that the first pockets are full when the wheel is turned on. At this time, ensure the seed gate on the seed treater is wide open.
4. Turn the switches to "ON" for the Drum, Atomizer, and any Conveyors being used.
5. Turn the "Hand/Off/Auto" switch to the "AUTO" position and then turn the Seed Wheel to "ON", this will begin the seed treatment process.

### **NOTICE**

You may notice the RPM will run at a lower RPM under the load of seed. Do not adjust the RPM back up. The program already has figured in the factor for the drop in RPM.

6. As you are treating the first batch of seed, time the seed as it is begins flowing out the atomizer chute (right).
7. Once all the seed has passed through the seed wheel and atomizer, stop timing. The pump(s) will automatically shut off.

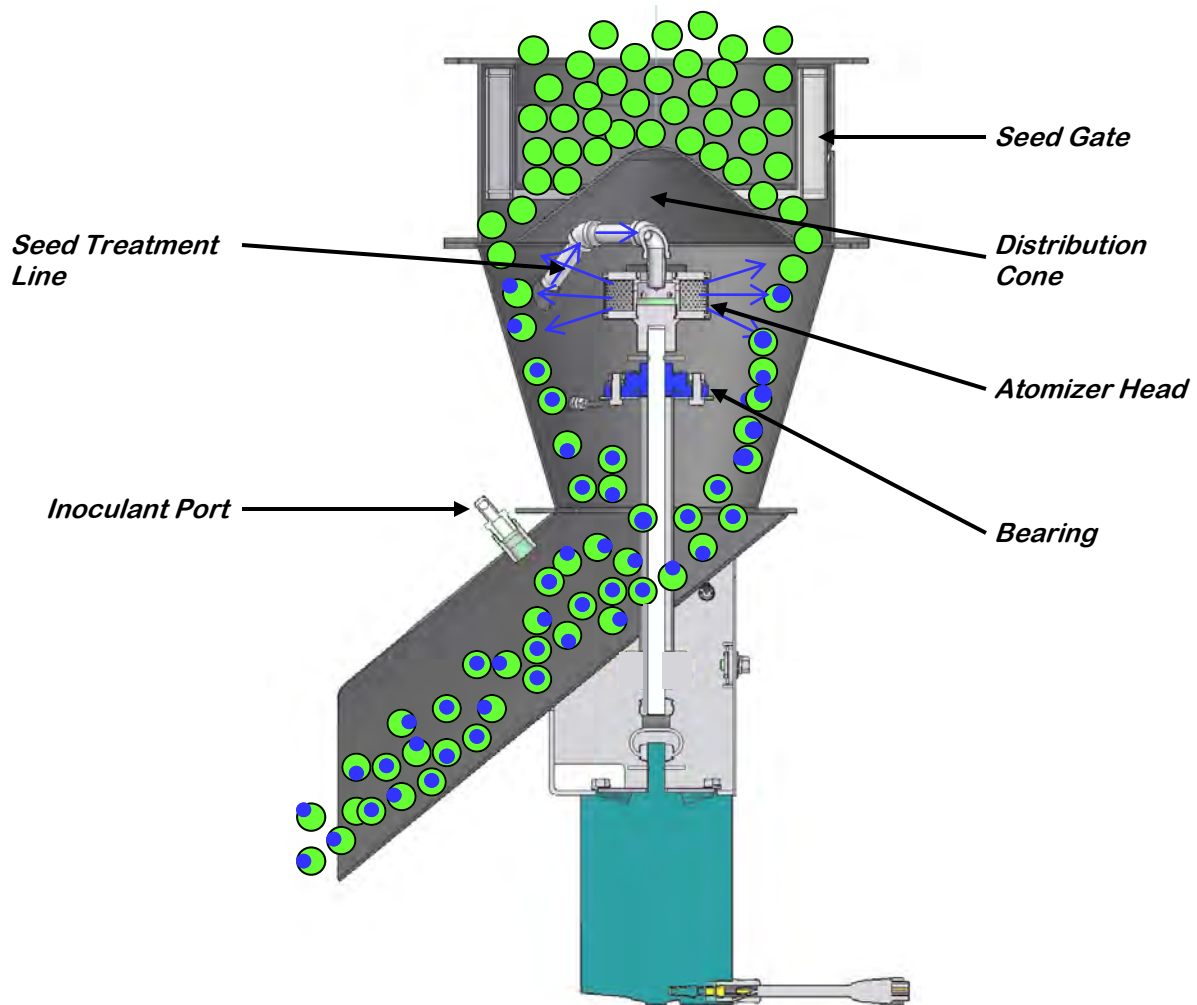


*Begin timing when seed starts flowing out this chute*



## LP2000 WITH SEED WHEEL

The Illustration below shows how seed passes through the atomizing chamber. The blue represents treatment being dispensed to the seed as it passes through the chamber. After the seed passes through the atomizer, it goes into the drum where the coating process is completed.



8. If the actual time it takes to treat the batch of seed differs from the estimated time shown in the spreadsheet, then use your mouse to click on the “[CLICK HERE](#)” phrase. This will advance you to another screen where you will enter the actual time (page 47).

*Estimated Time to treat the batch of seed in total seconds*

*Estimated Time to treat the batch of seed in minutes*

*Click the mouse button here if the estimated time differs from the actual time it took to treat the batch of seed.*

**USC SEED WHEEL CALIBRATION WORKSHEET**

PLEASE FOLLOW ALL STEPS!

STEP #1: Enter Data in the Yellow Cells Below  
 STEP #2: Set the Seed Wheel RPM located in the Orange cells  
 STEP #3: Treat the first batch of seed and time.

STEP #4: If Actual Time differs from Estimated Time, then [CLICK HERE](#)

Seed Type	Total Pounds to be Treated	Weight of Seed in Cup (Pounds)	Desired Seed Flow (Pounds per Minute)	Ounces per cwt.	Set Seed Wheel RPM to:	Estimated Time in Seconds	Estimated Time, Hr:Min:Sec	Estimated Ounces per Minute	Total Ounces	Seed Wheel Factor
CORN					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
COTTON					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
PEAS					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
RICE					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
SOYBEANS	2.500	3.580	700	5.00	4.75	214	0:03:34	35.0	125.0	100.0%
WHEAT					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
OTHER					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%

Seed Wheel Worksheet(Standard) | Seed Wheel Worksheet (Metric) | Seed Wheel Factor (Standard) | Seed Wheel Factor (Metric)

9. Enter the actual time in seconds that it took to run the batch of seed into the formula on the following page. The actual time in minutes will display and a Accuracy Rate Percentage will display.

**EXAMPLE:** Actual Time = 3:39 minutes or 219 seconds.

10. You will use the Accuracy Rate Percentage for that type of seed, and enter this number into the Seed Wheel Factor cell on the main screen. Use your mouse to click on the "[SEED WHEEL CALIBRATION WORKSHEET, CLICK HERE](#)" phrase. This will send you back to the main screen.

Microsoft Excel - Seed Wheel Calibration 09-10.xls

File Edit View Insert Format Tools Data Window Help

Type a question for help

D9 219

### Finding Seed Wheel Factor

**STEP #5: Enter your actual time (seconds) in this column after treating the first batch of seed.**

**STEP #6: Enter the Accuracy Rate Percentage for the Type of Seed into the Seed Wheel Factor box located on the SEED WHEEL CALIBRATION WORKSHEET, [CLICK HERE](#)**

Seed Type	Estimated Time in Seconds	Actual Time in Seconds	Actual Time in Minutes	Accuracy Rate Percentage
CORN	#DIV/0!		0:00:00	100.0%
COTTON	#DIV/0!		0:00:00	100.0%
PEAS	#DIV/0!		0:00:00	100.0%
RICE	#DIV/0!		0:00:00	100.0%
SOYBEANS	214	219	0:03:39	102.2%
WHEAT	#DIV/0!		0:00:00	100.0%
OTHER	#DIV/0!		0:00:00	100.0%
<b>Overall Average</b>				102.2%

Seed Wheel Worksheet(Standard) Seed Wheel Worksheet (Metric) **Seed Wheel Factor (Standard)** Seed Wheel Factor (Metric)

Draw AutoShapes



11. Enter the Accuracy Rate Percentage into the Seed Wheel Factor box that is in the same row as the seed that is being treated. Because all seed wheel pockets are slightly different in depth, this number is used to adjust your seed wheel program to increase accuracy the next time you treat seed.
12. After you have entered in the Accuracy Rated Percentage, the RPM of the seed wheel will have to be changed. This will allow you to maintain your desired seed flow rate.
13. You will need to adjust the RPM on the seed wheel to the new RPM to maintain the desired speed in pounds per minute. Be sure and save the file after entering in the seed wheel factor.

Microsoft Excel - Seed Wheel Calibration 09-10.xls

File Edit View Insert Format Tools Data Window Help

Type a question for help

M9 102.2%

A B C D E F G H I J K L M N

**USC SEED WHEEL CALIBRATION WORKSHEET**

**PLEASE FOLLOW ALL STEPS!**

**STEP #1: Enter Data in the Yellow Cells Below**  
**STEP #2: Set the Seed Wheel RPM located in the Orange cells**  
**STEP #3: Treat the first batch of seed and time.**

**STEP #4: If Actual Time differs from Estimated Time, then [CLICK HERE](#)**

Seed Type	Total Pounds to be Treated	Weight of Seed in Cup (Pounds)	Desired Seed Flow (Pounds per Minute)	Ounces per cwt.	Set Seed Wheel RPM to:	Estimated Time in Seconds	Estimated Time, Hr:Min:Sec	Estimated Ounces per Minute	Total Ounces	Seed Wheel Factor
CORN					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
COTTON					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
PEAS					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
RICE					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
SOYBEANS	2,500	3,580	700	5.00	4.85	214	0:03:34	35.0	125.0	102.2%
WHEAT					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%
OTHER					#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	100.0%

**STEP #7: Verify & Re-adjust Seed Wheel RPM Accordingly to Maintain Desired Seed Flow & Save File**

Seed Wheel Worksheet (Standard) Seed Wheel Worksheet (Metric) Seed Wheel Factor (Standard) Seed Wheel Factor (Metric)

### Conversion Chart

1 ounce = 29.58 milliliters

1 gallon = 3.79 Liters

1 kilogram = 2.2 pounds

1 unit = 50 lbs or 22.73 kg

1 cwt = 100 lbs or 45.45 kg





**NOTES**

**SECTION  
F**
**TROUBLESHOOTING**

Below is a table describing the most frequent problems and solutions with the USC Seed Treater. For further assistance, contact your local USC dealer.

Problem	Possible Cause	Solution
Inlet Conveyor will not turn on.	<ol style="list-style-type: none"> <li>1. Inlet Conveyor Proximity Switch is activated.</li> <li>2. Inlet Conveyor Proximity Switch is too sensitive.</li> <li>3. Overload is tripped</li> <li>4. Conveyor is plugged into wrong outlet on seed treater panel.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean Proximity Switch</li> <li>2. Adjust the inlet conveyor Proximity Switch sensitivity by turning the adjustment screw counter-clockwise (page 53)</li> <li>3. Hit reset button on Inlet Conveyor Overload.</li> <li>4. Check to make sure the inlet conveyor is plugged into the inlet conveyor receptacle.</li> </ol>
Pump will not turn off in "AUTO" when seed runs out.	<ol style="list-style-type: none"> <li>1. Proximity Switch is dirty</li> <li>2. Proximity Switch is set too sensitive.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean Proximity Switch</li> <li>2. Adjust the pump Proximity Switch sensitivity by turning adjustment screw counter-clockwise (page 53).</li> </ol>
Pump will not turn on in "AUTO"	<ol style="list-style-type: none"> <li>1. Proximity Switch is not staying covered</li> <li>2. Atomizer is not on</li> <li>3. Proximity Switch is not sensitive enough</li> </ol>	<ol style="list-style-type: none"> <li>1. Make sure Proximity Switch is staying covered with seed</li> <li>2. Turn on Atomizer. Atomizer must be on to run pump #1 <u>and</u> #2 in Auto.</li> <li>3. Adjust pump Proximity Switch sensitivity by turning the adjustment screw clockwise (page 53).</li> </ol>
Inlet conveyor won't shut off when hopper is full.	<ol style="list-style-type: none"> <li>1. Seed is not hitting proximity switch.</li> <li>2. Proximity Switch is not set sensitive enough.</li> <li>3. Inlet Conveyor is plugged into wrong receptacle.</li> </ol>	<ol style="list-style-type: none"> <li>1. Make sure seed is hitting Proximity switch.</li> <li>2. Adjust the inlet conveyor Proximity Switch by turning the adjustment screw clockwise (page 53).</li> <li>3. Make sure Inlet Conveyor is plugged inlet conveyor receptacle.</li> </ol>

LP2000 WITH SEED WHEEL

Problem	Possible Cause	Solution
Pump is Fluctuating	<ol style="list-style-type: none"> <li>1. Restriction in tubing</li> <li>2. Tubing was not broken-in properly before calibrating.</li> <li>3. DC Pump circuit board is going bad.</li> </ol>	<ol style="list-style-type: none"> <li>1. Flush tubing and check filter for any restrictions.</li> <li>2. Allow pump to recirculate for 15 minutes before checking calibration.</li> <li>3. Watch pump voltmeter for any fluctuations. The pump board may have to be replaced.</li> </ol>
Pump will not turn on.	<ol style="list-style-type: none"> <li>1. Blown Fuse</li> <li>2. Bad HP Resistor</li> <li>3. Bad DC Pump Board</li> </ol>	<ol style="list-style-type: none"> <li>1. Check fuses</li> <li>2. Check HP Resistor</li> <li>3. Change the DC Pump Board Part #: (03-01-0007)</li> </ol>
Seed Calibration is fluctuating	<ol style="list-style-type: none"> <li>1. Seed Treater surge hopper is not staying full.</li> <li>2. Restriction in the supply hopper.</li> <li>3. Build-up in the atomizing chamber.</li> </ol>	<ol style="list-style-type: none"> <li>1. Make sure the supply hopper is staying full. May have to slow down seed wheel in order to have a consistant flow of seed.</li> <li>2. Check supply hopper for any debris, and remove.</li> <li>3. Remove atomizing housing and clean out any build-up of material.</li> </ol>
Drum is slipping and seed is coming out the inlet side of the drum.	<ol style="list-style-type: none"> <li>1. Drum is wet</li> <li>2. The seed treater is set too level</li> <li>3. Chains are too loose</li> </ol>	<ol style="list-style-type: none"> <li>1. Dry off any moisture that may have collected on the outside of the drum.</li> <li>2. Adjust the slope of the seed treater to at least a 3" drop from front to back. If desired, more slope can be applied.</li> <li>3. Check and tighten the drive chains. Also check the chain alignment.</li> </ol>
Certain motors will not turn on.	<ol style="list-style-type: none"> <li>1. Overload is tripped</li> <li>2. Incoming power is incorrect or has been disconnected.</li> <li>3. Cord has been cut or is disconnected.</li> </ol>	<ol style="list-style-type: none"> <li>1. Hit reset button on Overload inside control panel</li> <li>2. Test incoming power.</li> <li>3. Check cord to motor.</li> </ol>

LP2000 WITH SEED WHEEL

Problem	Possible Cause	Solution
Seed Wheel will not turn on.	<ol style="list-style-type: none"> <li>1. Incorrect incoming power.</li> <li>2. Loose wire connection</li> <li>3. VFD has a fault</li> </ol>	<ol style="list-style-type: none"> <li>1. Check incoming power</li> <li>2. Check all wire connections.</li> <li>3. Check VFD for faults</li> </ol>
Seed Wheel keeps shutting off	<ol style="list-style-type: none"> <li>1. Seed Wheel drawing too many amps.</li> <li>2. Seed Wheel is binding.</li> <li>3. Seed Wheel is incorrectly mounted.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check motor amperage</li> <li>2. Check to make sure nothing is pressing down on the seed wheel.</li> <li>3. Loosen up the seed wheel from the seed treater and check again.</li> </ol>
Chemical rates are off; I am applying to much or not enough chemical.	<ol style="list-style-type: none"> <li>1. Pockets in seed wheel are not staying full</li> <li>2. Calculations are off</li> </ol>	<ol style="list-style-type: none"> <li>1. Ensure that the pockets are staying full while treating.</li> <li>2. Re-check calculations. If this is the first batch treated, you may have to adjust your numbers in the formula.</li> </ol>
Seed is backing up into the seed wheel	<ol style="list-style-type: none"> <li>1. Seed gate on treater is closed down</li> <li>2. Seed wheel is turning too fast</li> <li>3. Restriction above seed gate.</li> </ol>	<ol style="list-style-type: none"> <li>1. Open seed gate wide open</li> <li>2. Slow down the seed wheel to accommodate your seed treater</li> <li>3. Remove restriction</li> </ol>
Flow Meter is fluctuating	<ol style="list-style-type: none"> <li>1. Pump is sucking air.</li> <li>2. Restriction in the line.</li> <li>3. Flow meter is not full of liquid</li> </ol>	<ol style="list-style-type: none"> <li>1. Check and tighten all hose connections.</li> <li>1. Check filter to see if gasket is missing or cracked.</li> <li>2. Clean out filter and lines to check for any debris.</li> <li>3. The meter will fluctuate if there is nothing pumping and there is some liquid left in the meter. Drain out liquid.</li> </ol>
Flow Meter is reading too low or too high.	<ol style="list-style-type: none"> <li>1. Restriction in Flow Meter or in line.</li> <li>2. Air in treatment. This can cause the flow meter to read lower than calibrating it using a measuring cup.</li> <li>3. Seed flow has changed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Flush the flow meter with water or use compressed air and blow air backwards through the meter.</li> <li>2. Check and tighten all hose connections.</li> <li>2. Check filter to see if gasket is missing or cracked.</li> <li>3. Recheck seed flow rate.</li> </ol>

Problem	1. Possible Cause	2. Solution
Flow meter won't turn on	<ol style="list-style-type: none"> <li>1. Improper power going to flow meter.</li> <li>2. Loose connection.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check incoming power to flow meter.</li> <li>2. Check connections inside the control panel and inside the flow meter.</li> </ol>
Flow meter will not zero	<ol style="list-style-type: none"> <li>1. Improper wiring</li> <li>2. Wrong parameter programmed into flow meter</li> </ol>	<ol style="list-style-type: none"> <li>1. Check wiring schematic</li> <li>2. Check flow meter parameters. Call local dealer.</li> </ol>

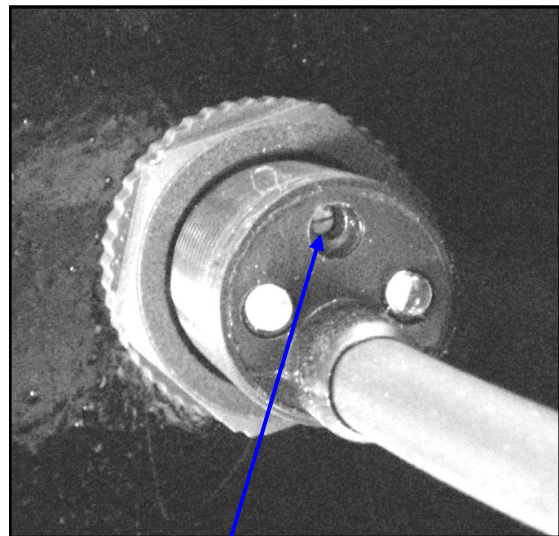
### **PROXIMITY SWITCH ADJUSTMENT GUIDE**

The proximity switches mounted in the extension ring and in the seed wheel of the seed treater detect when seed is present.

The proximity switch located in the extension ring is used to automatically shut off the inlet conveyor when the surge hopper is full. This proximity switch is not present on Tower systems.

The proximity switches mounted in the seed wheel automatically shut off the pump(s) when all seed has left the hopper.

Sometimes these proximity switches do not properly work. This can be caused from wear, dust, or even moisture. The first step is to clean the lens of the proximity switch. If this does not solve the problem, the next step would be to adjust the sensitivity of the proximity switch.



***Sensitivity Adjustment Screw***



***Proximity Switch Screwdriver***

Using the small screwdriver provided inside the control panel, you can adjust the proximity switch by turning the adjusting screw on the back of the proximity switch.

- Turn Clockwise to make the proximity switch more sensitive.
- Turn Counterclockwise to make the proximity switch less sensitive.

**SECTION  
G****MAINTENANCE**

Proper maintenance of the USC seed treater is critical for peak performance, reliability and accuracy of this system. The following is a guideline for the type of maintenance and servicing that should be performed on this unit. Your environment and uses may require additional maintenance and service beyond this list to assure a reliable and safe unit. The operator of this unit has ultimate responsibility to identify areas of concern and rectify them before they become a hazard or safety issue. There is no substitute for a trained, alert operator.



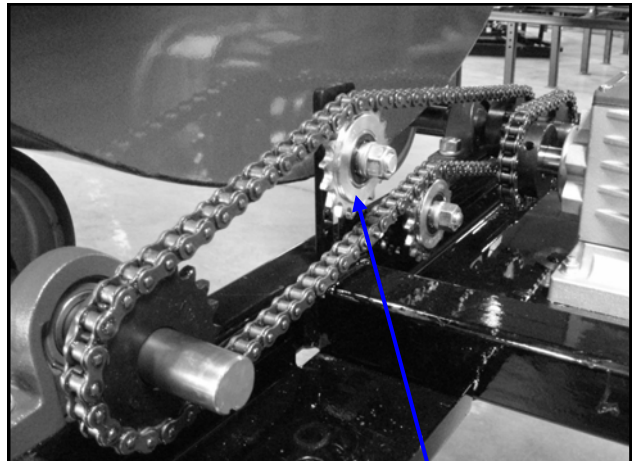
Do not put this unit into operation with any questionably maintained parts. Poor performance or a hazard may occur.

**DRIVE AND DRUM**

- Inspect all welds and structural components on frame
- Check drum for bends, cracks and damage.
- Remove shields to inspect bearings and tighten set screws.
- Inspect drive wheels for unordinary wear, and set screws for tightness.
- Inspect and adjust the Neoprene guide wheels located near back of drum.
- Tighten and lubricate chains.
- Inspect and re-align sprockets.



*Remove these 2  
guards to access  
chains*



*Use this sprocket to  
tighten chain*

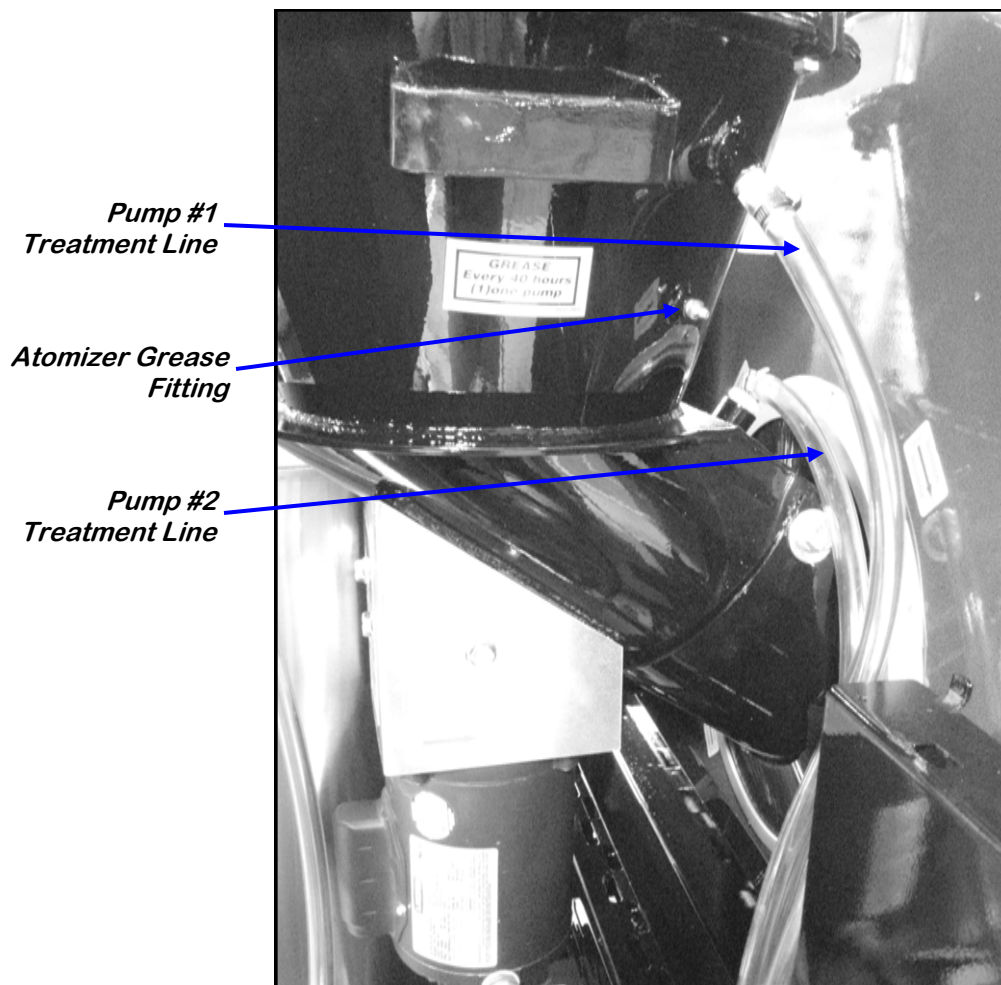


### **PUMPS AND PLUMBING**

- Check pump in forward and reverse.
  - Check and adjust pump voltage
  - Inspect brushes in motors.
  - Make sure pump head opens and closes smoothly.
  - Inspect tubing and valves.
  - Tighten hose clamps and check filter.
- 

### **ATOMIZER**

- Remove atomizer from treater, grease bearing (40 hrs), and clean any build-up.
- Check for any play in the atomizer shaft.
- Make sure the atomizer spins smoothly.



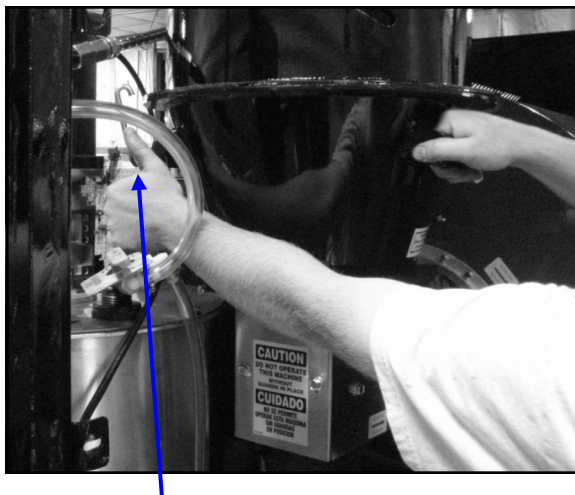
### **Removing Atomizer Housing**

Below are instructions and pictures that illustrate how the atomizer is removed and where the bearing is located.

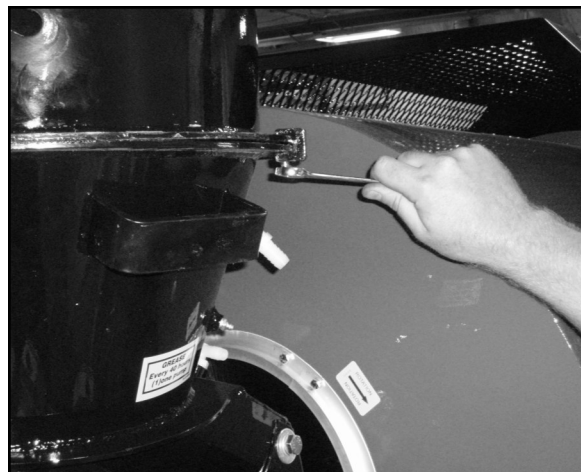
1. Remove the two bolts that secure the control panel in place, and swing out the control panel. The inoculant tank can also be swung open at this time.



2. Release the red-handled clamp and remove the small shipping bolt. Also loosen the two 5/16" bolts, located towards the front of the atomizer. This holds the top atomizer flange tight against the adjustable seed gate flange (below right).



*Red-Handled Clamp*



3. Slide the atomizer straight back and drop down to access the atomizer head and bearing (below). To completely remove the housing from the treater, unplug the motor from the control panel and disconnect the treatment lines.

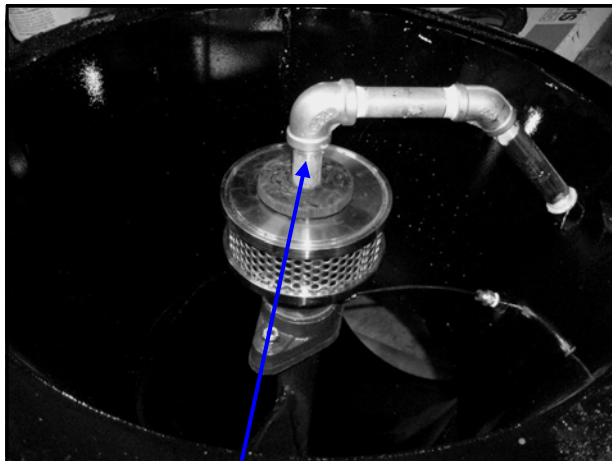


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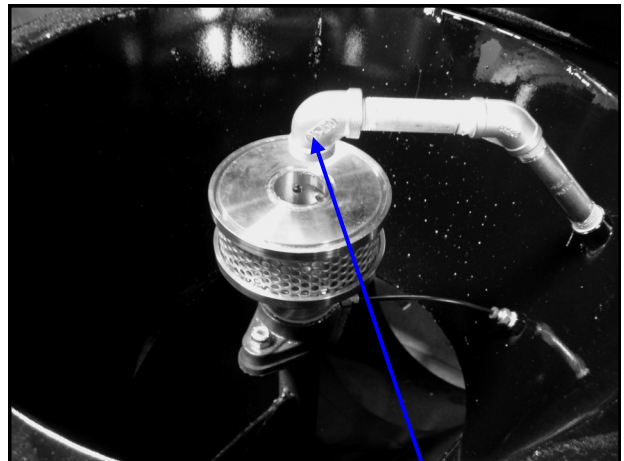
### **Removing Atomizer Head**

Below are instructions and pictures that illustrate how the atomizer head is removed and where the bearing is located.

1. Remove the small nipple that leads down into the atomizer head. The nipple is threaded only into the 90 degree elbow fitting.



*Small nipple*



*90 degree elbow*

2. Remove the rest of the plumbing in one piece. A wrench may be used to loosen the plumbing.



3. Use a 3/16" allen wrench and loosen the set screw located on the bottom of the atomizer head. Next remove the head from the shaft.



4. The atomizer head is threaded together. Unscrew the head for better access to cleaning.





### **MIX TANK**

- Check motor.
  - Check for any play in the mix tank shaft.
  - Check valves, fittings, and plug on bottom of tank.
- 

### **CONTROL PANEL**

- Check and tighten wire connections.
  - Check starters and overloads.
  - Check timers and relays.
  - Check the front of the panel; switches, voltmeter, potentiometer, etc.
  - Inspect fuses and breakers.
  - Check and set the proximity switches.
- 

### **SEED WHEEL**

- Inspect all welds and structural components for bends, cracks and damage.
  - Remove shields to inspect wheel, brushes and proximity switches.
  - Use compressed air to blow out any seeds and excess build-up that may have occurred during operation.
  - Inspect RPM indicator.
- 

### **SEED WHEEL CONTROL PANEL**

- Check and tighten wire connections.
- Check starters and overloads.
- Check timers and relays.
- Check the front of the panel: switches and RPM indicator.
- Inspect breakers.
- Check and set the proximity switches.
- Check the VFD .

**STORAGE****SECTION  
H**

When storing the USC seed treater for long periods of time, the following procedure must be followed to reduce the chance of rust, corrosion and fatigue of the treater. You can also use these steps when storing the machine for the winter.



A dust mask and protective rubber gloves shall be used when cleaning the machine.

**SUPPLY HOPPER**

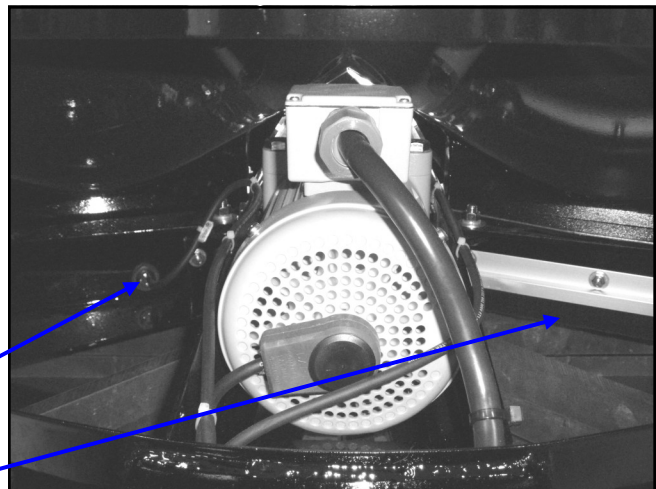
1. Clean out the supply hopper of any debris (compressed air can be used).
2. Wipe the proximity switches clean.
3. Tarp or cover the hopper to keep out any unwanted pests.

**SEED WHEEL**

1. Disconnect Power
2. Remove shields from the seed wheel and remove any debris or build-up. Compressed air can be used to blow out any foreign material.
3. Re-connect power and run seed wheel to help remove any additional debris. Compressed air can be used to blow out any foreign material.
4. Check brushes (below)
5. Wipe off and clean the lens of the proximity switches (below).
6. Disconnect Power and mount all guard back in place.
7. Tarp or cover the seed wheel to keep out any dirt or unwanted pests.

*Proximity Switch*

*Brush*





### **ATOMIZER CHAMBER**

1. Remove and clean the atomizer housing.
2. Remove the atomizer head and stainless steel plumbing. The atomizer head is removed by removing the stainless steel plumbing and then loosening the set screw found on the bottom side of the atomizer head. The atomizer head can then be disassembled (below), for easier cleaning. It is threaded together and can simply be unscrewed.
3. Reinstall the atomizer head and plumbing. Grease the bearing and spin the atomizer head a few times to ensure all grease has been worked into the bearings.



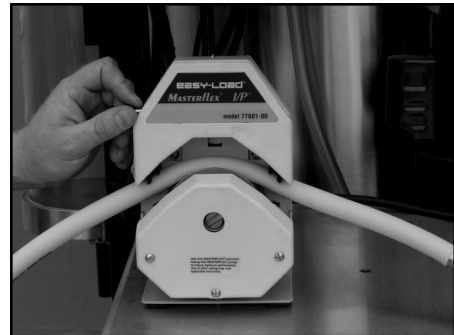
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### **ROTATING DRUM**

1. Remove the shields and clean out any seed that may have fallen underneath the drum.
2. Lubricate the chain to keep from corroding in storage.

### **LIQUID SYSTEM**

1. Make certain the inside of the tank is completely drained of chemical residue and thoroughly flush the inside of the tank with clean water.
2. Remove and clean the filter.
3. Pump clean water through all areas of the plumbing including the mix tank, calibration tube, and valves.
4. Open all drain points, valves, and filter to let as much of the liquid drain as possible.
5. If the seed treater will be exposed to possible freezing temperatures, the final flush of the system should be made with a non freezable liquid. Or use compressed air to blow the lines out from any moisture.
6. Release pump head (right) and remove tubing to prevent any unnecessary wear.



---

### **FINAL**

1. Store the machine inside a protective building to keep it from being exposed to the weather.
2. Disconnect power to the machine.

# MECHANICAL DRAWINGS

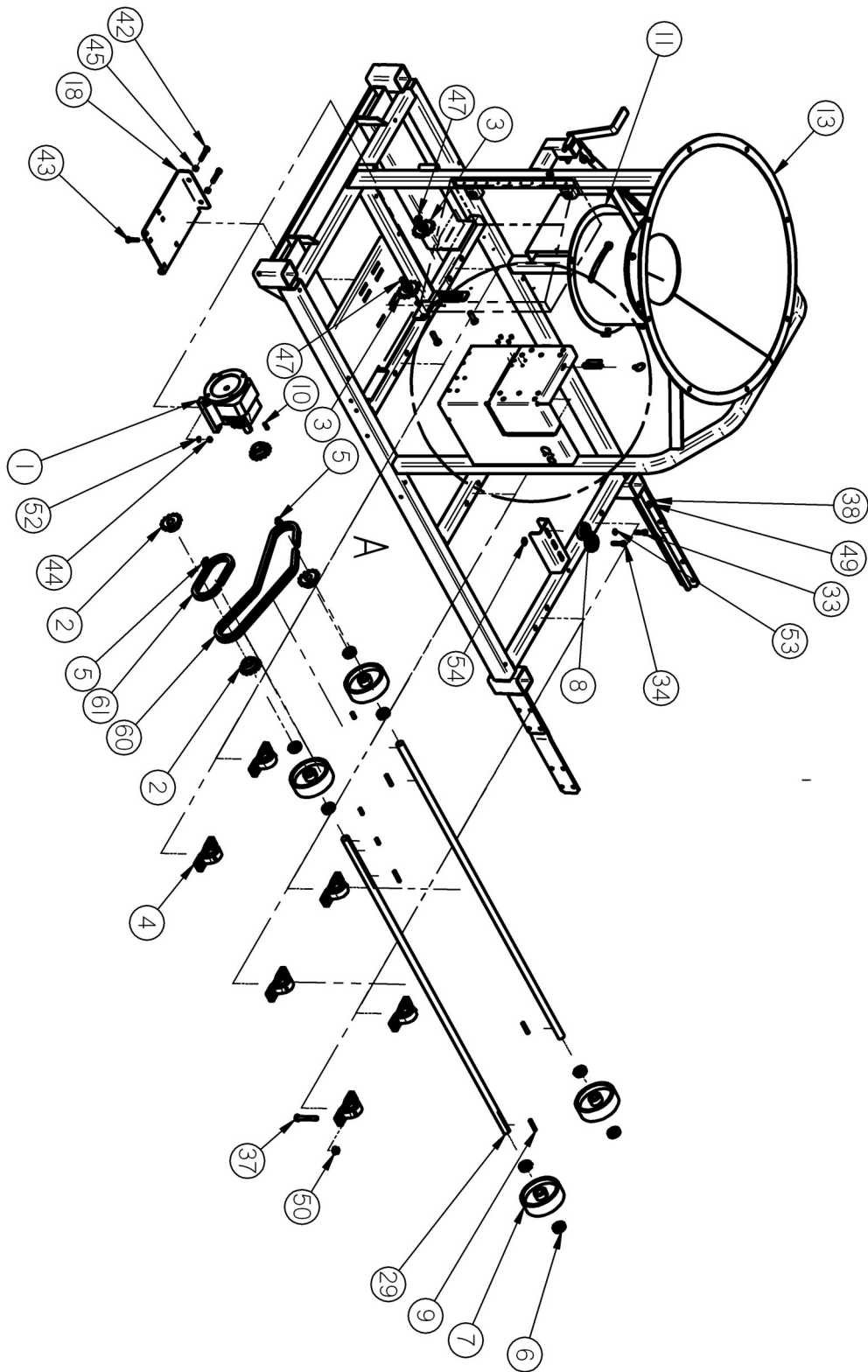
## SECTION I

The following pages show the parts of your seed treater. Please have the part number ready when ordering parts.

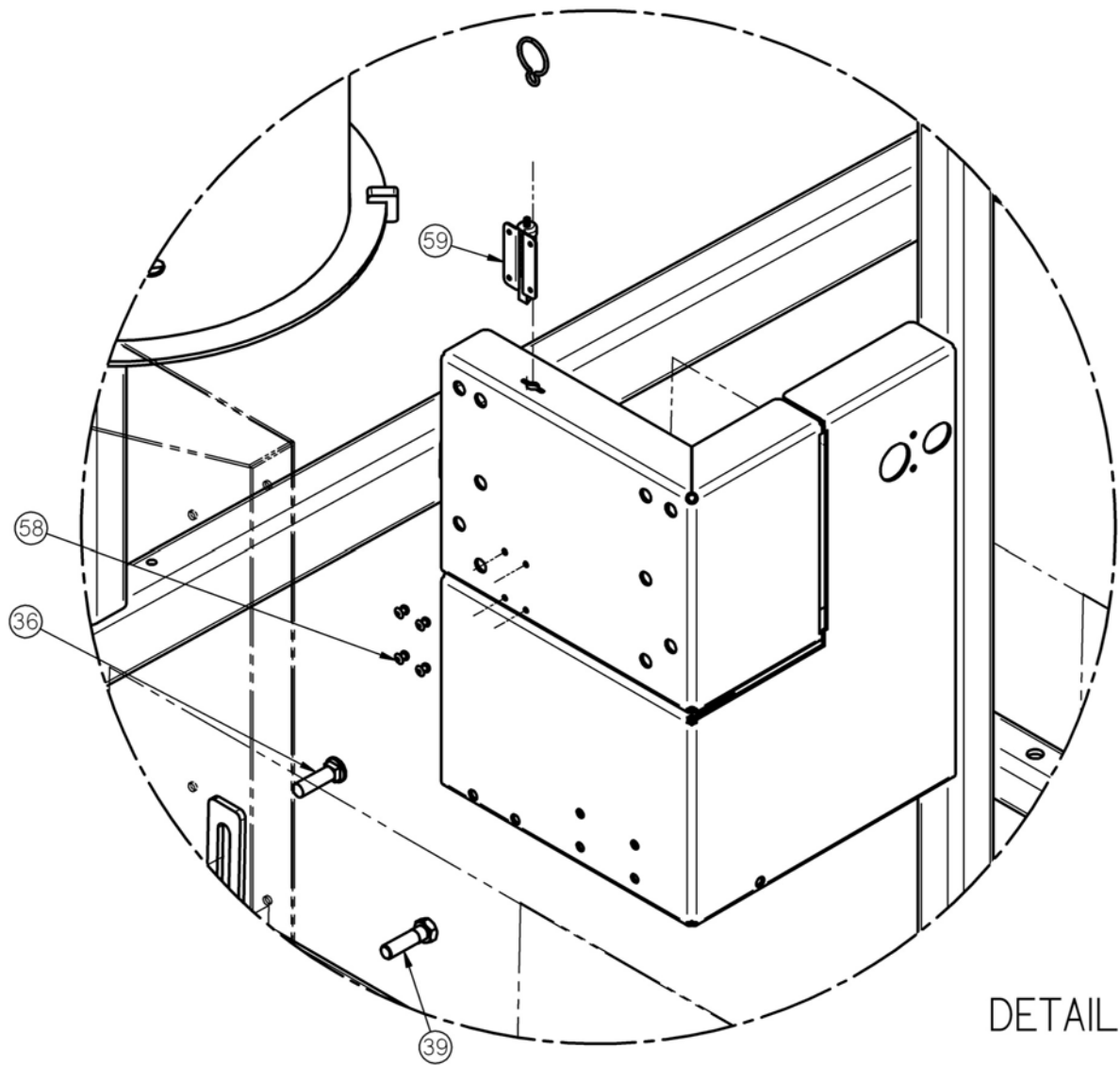
**NOTICE** SOME PARTS FOR COTTON/RICE TREATERS ARE DIFFERENT. IF YOU HAVE A COTTON/RICE SEED TREATER, LOOK FOR THE COTTON SYMBOL IN THE PARTS LIST BEFORE ORDERING.

<u>Item</u>	<u>Page #</u>
Mechanical Drawings & Parts List.....	64
Electric Control Panel & Parts .....	88

**LP2000 Drum Drive & Guards**



**LP2000 Drum Drive & Guards**



DETAIL A





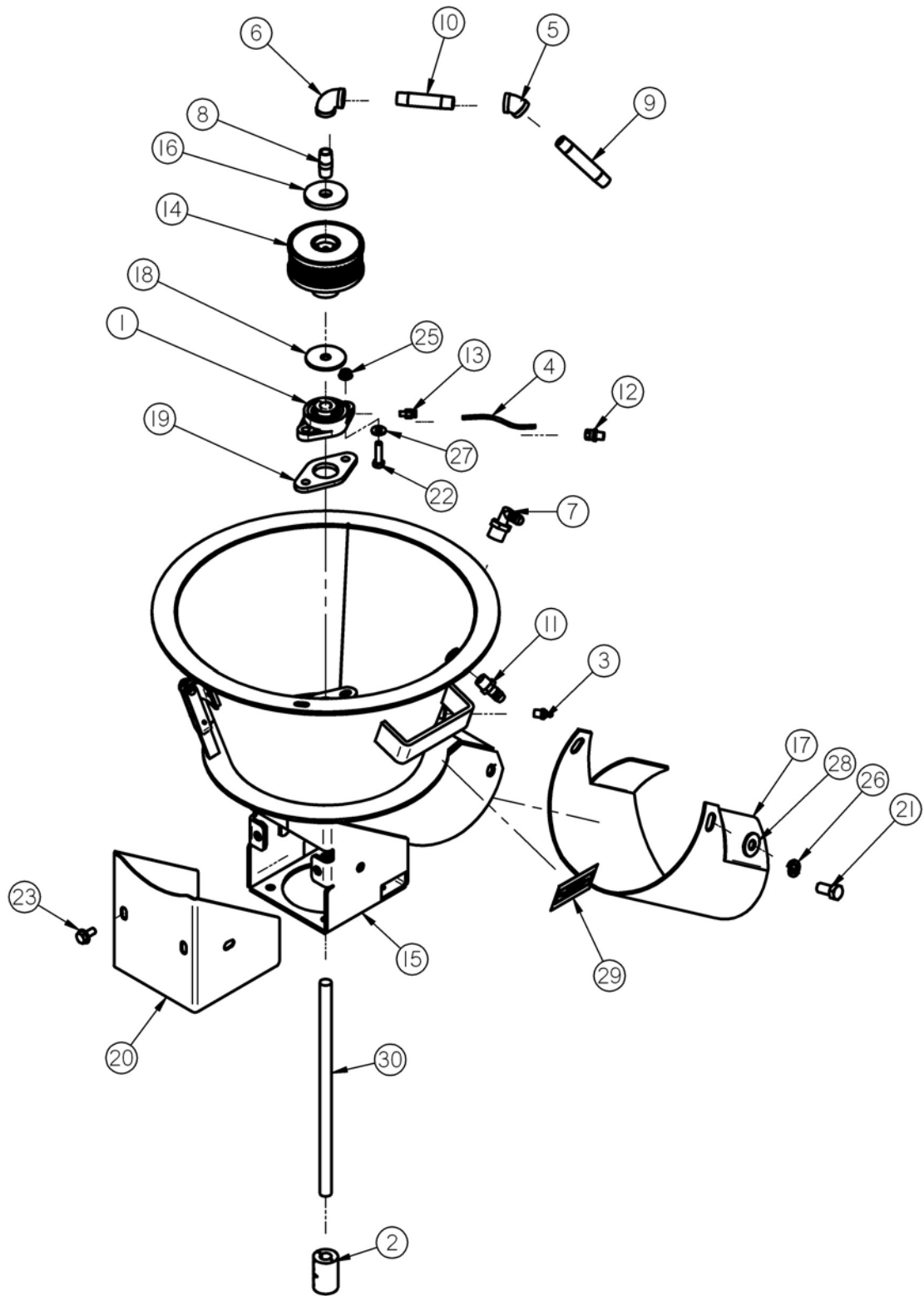
**LP2000 Drum Drive & Guards Parts List**

Item #	PART #	Title	Qty
1	01-01-0101	GBOX IL 56C 16.2:1 GR B1 FOOT MNT	1
2	01-02-0093	SPROCKET, 50BS14H, 1" BORE	4
3	01-02-0095	SPKT 17 T 50P .500 ID IDLER	2
4	01-03-0036	BRG PLW 1.00ID STSC SEALED	6
5	01-04-0005	#50 CNTG LINK	2
6	01-05-0008	SHAFT CLR 1.00ID SPLIT	8
7	01-06-0002	WHL DRV 6 X 2 X 1.00ID .250KWY	4
8	01-06-0004	WHL GUIDE .375ID X 2.50 X .875 NPRN	2
9	01-10-0003	KEY .250 X 2.00 CS	4
10	01-10-0004	KEY .250 X 1.00 CS	4
11	04-05-0002	ASSY BOLT ON ADJ CHAMBER LP2000	1
12	05-02-0004	WDMT, LP2000 DRUM	1
13	05-03-0141	WDMT FRAME LP800/LP2000	1
14	05-03-0144	CHUTE ADAPTER LP2000	2
15	05-03-0422	WDMT DSCHG CHUTE SUPP BRKT LP2000	1
16	05-04-0012	WDMT FLOW SLV ROD END TUBE	1
17	05-04-0023	WDMT FLOW SLV HNDL LP2000	1
18	05-04-0067	WDMT DRUM DRV ADJ PLT	1
19	05-06-0013	WDMT DRUM GRD LP800/LP2000	1
20	05-07-0018	ASSY END CHUTE DOOR CS	1
21	05-07-0049	WDMT,END CHUTE LP2000	1
22	05-10-0150	GRD DRUM INLET LOWER	1
23	05-10-0156	CHAIN GEAR GUARD	1
24	05-10-0875	GRD DRUM SIDE LP800/LP2000	2
25	05-10-0877	GRD DRUM EXT LP2000	1
26	05-10-1899	GRD DRM BTTM LP2000 EXT	1
27	05/10/2366	GRD DRUM BTM RIGHT	1
28	05/10/2367	GRD DRUM BTM LEFT	1
29	05-11-0003	DRIVE SHAFT, 60"	2
30	05-11-0029	CPLG QCK CONNECT MACH	1

**LP2000 Drum Drive & Guards Parts List**

Item #	PART #	Title	Qty
31	05-11-0034	ROD FLOW STOP ADJ - 10"	1
32	06-01-0006	BOLT .250-20 X .750 ZP GR5	8
33	06-01-0018	BOLT .375-16 X 1.50 ZP GR5	5
34	06-01-0019	BOLT .375-16 X 1.75 ZP GR5	1
35	06-01-0025	BOLT .500-13 X 1.50 ZP GR5	1
36	06-01-0026	BOLT CRG .500-13 X 2.00 ZP GR5	1
37	06-01-0029	BOLT .500-13 X 3.25 ZP GR5	12
38	06-01-0053	BOLT .375-16 X 1.25 ZP GR5	4
39	06-01-0054	BOLT .500-13 X 1.75 ZP GR5	1
40	06-01-0102	BOLT .313-18 X 1.25 ZP GR5	1
41	06-01-0124	BOLT, FLG .375-16 UNC ZP GRADE 5; 3/4" LG	43
42	06-01-0137	BOLT .375-16 X 2.00 ZP GR5 FULL THRD	2
43	06-01-0172	BOLT CRG .313-18 X 1.75 ZP GR5	4
44	06-02-0002	NUT FULL .313-18 ZP GR5	5
45	06-02-0003	NUT FULL .375-16 ZP GR5	2
46	06-02-0015	NUT JAM .500-20 ZP GR5	1
47	06-03-0004	NUT,LOCK, .500-13 ZP SS NYLON INSERT	2
48	06-03-0006	NUT NYL LOCK .438-14 ZP GR5	1
49	06-03-0014	NUT,LOCK, FLG .375-16 ZP SERRATTED	10
50	06-03-0015	NUT,LOCK, FLG .500-13 ZP SERRATTED	13
51	06-04-0001	WSHR LOCK SPLT .250 ZP	8
52	06-04-0002	WSHR LOCK SPLT .313 ZP	4
53	06-04-0003	WSHR LOCK SPLT .375 ZP	1
54	06-05-0004	WSHR FLAT .375 ZP	1
55	06-10-0018	36" DIA BRUSH SEAL	2
56	06-12-0008	CLVS .500-20 X .500	1
57	06-12-0009	PIN CLIP SPRING .500	1
58	06-12-0011	RIVET POP .188 X .750 GRIP SS	4
59	06-12-0018	SPRING BOLT CHAIN RELEASE	1
60	13-05-0156	#50 CHAIN 84LINKS	1
61	13-05-0157	#50 CHAIN -- 32 LINKS	1

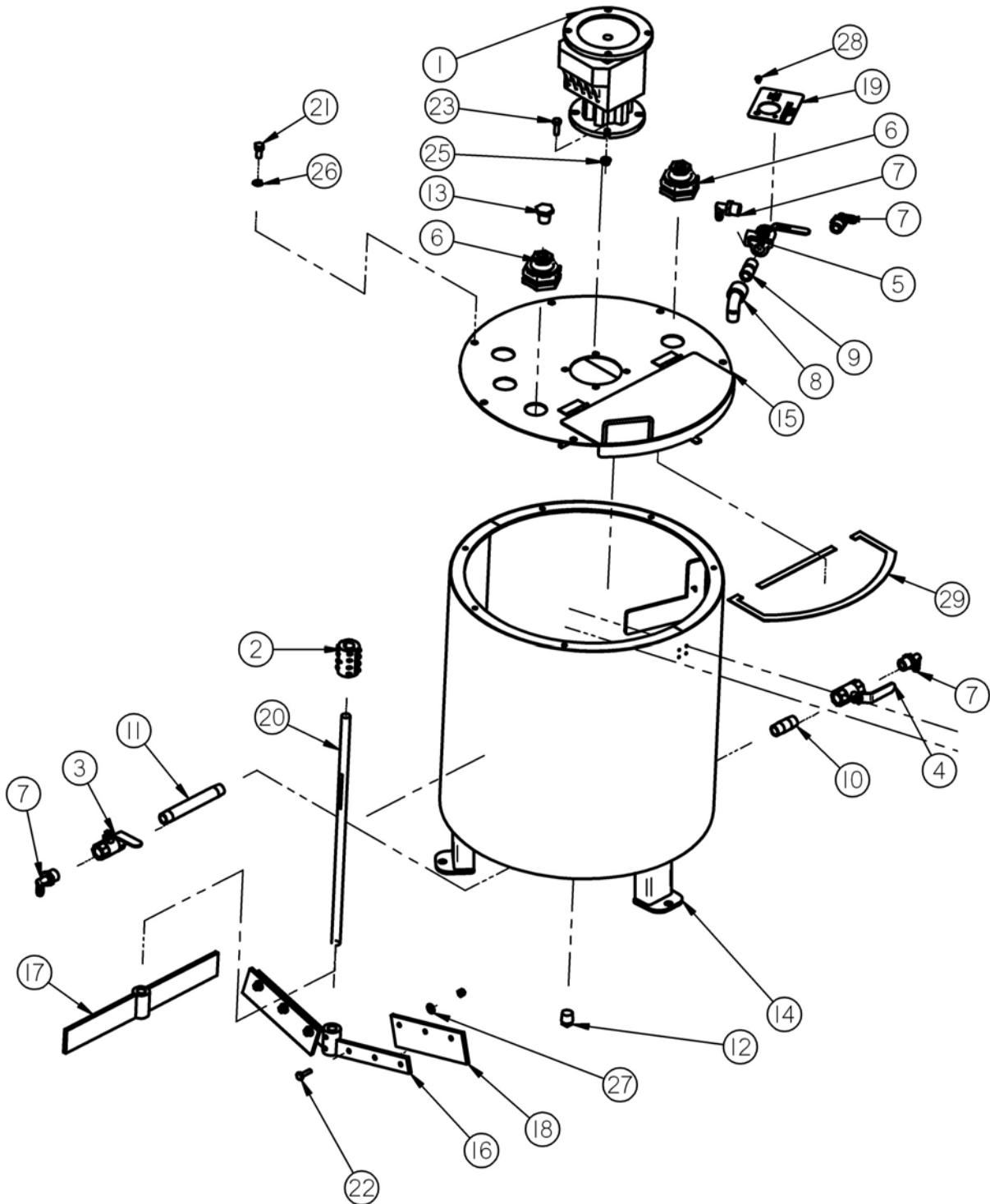
**LP2000 Atomizer**



**LP2000 Atomizer Parts List**

Item #	PART #	Title	Qty
1	01-03-0002	BRG FLG MNT .625ID 3.875 BASE	1
2	01-07-0027	CPLG CLPN .625 X .625 SPLT CS	1
3	01-11-0002	FTTG GRS STGHT .125 PTF	1
4	02-03-0039	TBG .125 OD POLYE COMP	1
5	02-06-0007	ELBOW, .375-18 NPT, 45 DEG. SS	1
6	02-06-0008	FTTG 90 DEG .375NPT FM SS	1
7	02-06-0010	FTTG 90 DEG .500HB X .500NPT ML NYL	1
8	02-07-0002	FTTG NIP .375 NPT X 1.50 TBE SS	1
9	02-07-0005	PIPE, .375-18 NPT STRAIGHT, 3.500 SS	1
10	02-07-0020	NIPPLE, 3/8-18 NPT X 3.00 SS	1
11	02-08-0006	FTTG STGHT .500HB X .375NPT ML NYL	1
12	02-16-0038	FTTG PUSH .125 OD X .125 NPT ML	1
13	02-16-0039	FTTG COMP .125 OD X .250-28	1
14	04-02-0003	ASSY ATMZR HEAD STD	1
15	05-03-0037	WLDMT,ATOMIZER CHUTE LP2000	1
16	05-10-0360	DISC STD ATMZR HEAD CVR	1
17	05-10-0366	LP2000 ATMZR EXT CHUTE FOR BRUSH	1
18	05-10-0805	DISK ATOMIZER MOTOR	1
19	05-10-2462	SEAL RBBR .625 FLG BRG	1
20	05-10-2816	LP2000 MTR GUARD FLEX CPLG	1
21	06-01-0069	BOLT, .500-13 X 1 UNC ZP GRADE 5	2
22	06-01-0102	BOLT .313-18 X 1.25 ZP GR5	2
23	06-01-0124	BOLT, FLG .375-16 UNC ZP GRADE 5; 3/4" LG	4
24	06-01-0138	BOLT, FLG .315-18 UNC ZP GRADE 5; 3/4" LG	3
25	06-03-0019	NUT LOCK FLG .3125-18 ZP GR5	2
26	06-04-0004	WSHR LOCK SPLT .500 ZP	2
27	06-05-0001	WASHER, FLAT .250	2
28	06-05-0005	WSHR FLAT .500 ZP	2
29	09-02-0004	ATWK LBL GRS 40HRS	1
30	11-07-0077	ROD, .625 DIA., SS - 14 3/8"	1

**LP2000 27 Gallon Mix Tank**



**LP2000 27 Gallon Tank Parts List**

Item #	PART #	Title	Qty
1	01-01-0039	GBOX IL 61.8:1 56C OTP 56C INP	1
2	01-07-0015	CPLG CLPN .625 X .750 X 1.50OD SS	1
3	02-02-0006	.500-14 NPT X 2-WAY VALVE	1
4	02-02-0006	VLV BALL .500 NPT 2WAY BRSS	1
5	02-02-0007	.500-14 NPT 3-WAY VALVE	1
6	02-05-0028	FTTG .500 NPT DBL THD PPE BULKHEAD	4
7	02-06-0010	FTTG 90 DEG .500HB X .500NPT ML NYL	4
8	02-06-0017	1/2-14 NPT,SL 90 DEG. BP	1
9	02-07-0009	FTTG NIP .500 NPT X 1.75 TBE BLK	1
10	02-07-0010	PIPE, .500-14 NPT SCH.40, 2.0 304 SS	1
11	02-07-0015	FTTG NIP .500 NPT X 6.00 TBE SS	1
12	02-14-0001	FTTG PLUG SQHD .500 NPT SS	1
13	02-14-0002	1/2-14 NPT,PLUG BP	3
14	05-03-0028	WDMT,CHEM. TANK BASE	1
15	05-03-0029	WDMT,REMOVABLE TOP 27 GAL	1
16	05-04-0005	WDMT,CHEMICAL MIXING TANK ARM	1
17	05-04-0011	WDMT,MIDDLE STIR ARM	1
18	05-10-0799	STIR PAD, NEOPRENE RUBBER	2
19	05-10-2080	LBL TRTR MIX TANK	1
20	05-11-0041	ROD, .625 SS - 19 1/4" LONG	1
21	06-01-0042	BOLT, .375-16 X .750 18-8 SS	6
22	06-01-0051	BOLT .250-20 X 1.00 SS 316	6
23	06-01-0083	BOLT .313-18 X 1.00 SS 18-8	4
24	06-03-0007	NUT,LOCK, .250-20 316 SS NYLON INSERT	6
25	06-03-0019	NUT LOCK FLG .3125-18 ZP GR5	4
26	06-04-0008	WSHR LOCK SPLT .375 SS 18-8	6
27	06-05-0002	WSHR FLAT .250 X .625OD SS 18-8	6
28	06-06-0008	SCRW MACH 10-24 X .250 PHLP PHD ZP	2
29	06-10-0001	SEAL,CHARCAOL TANK	1





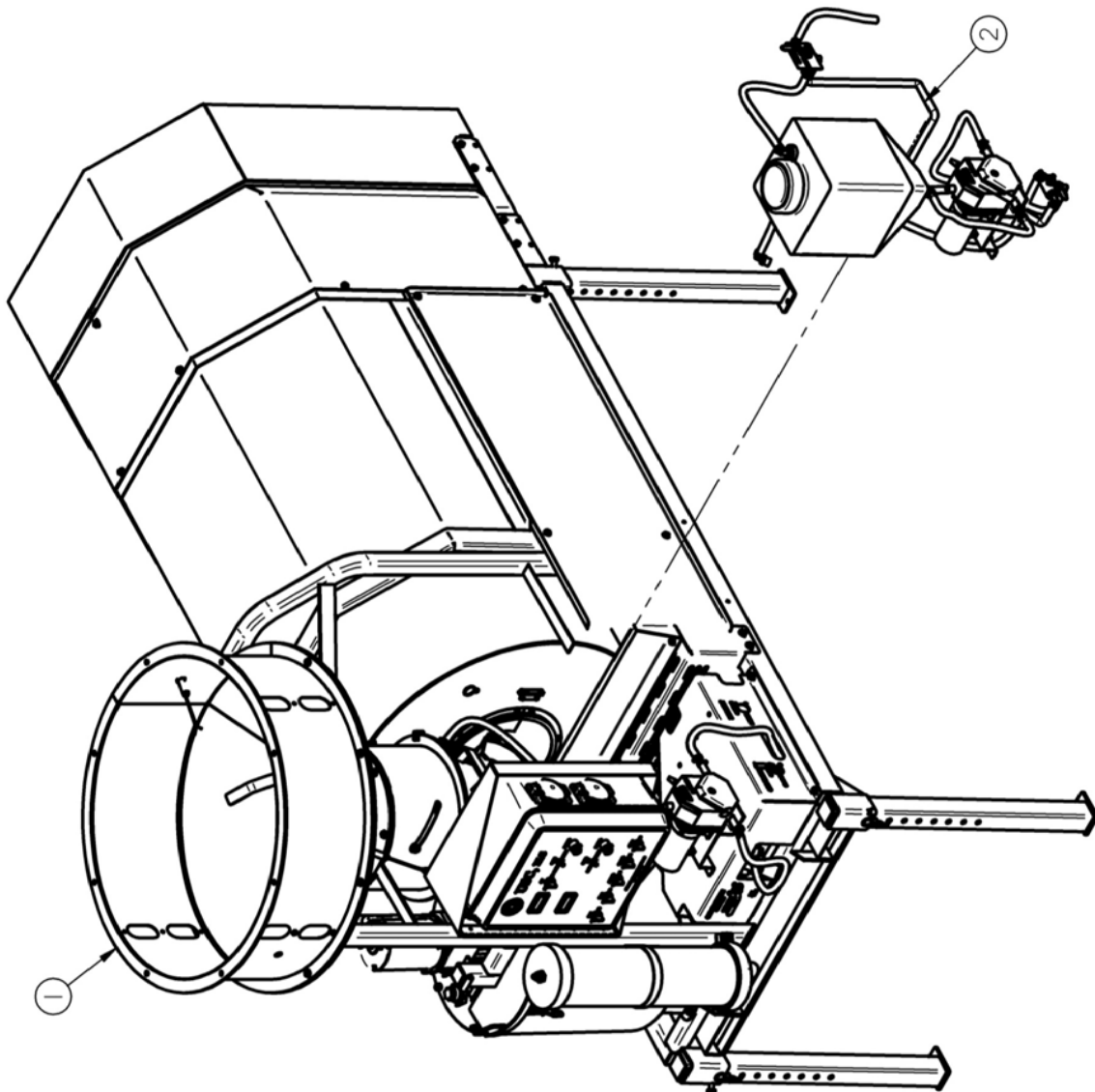
**LP2000 Seed Treater Parts List**

Item #	PART #	Title	Qty
1	01-01-0011	MTR .1HP 2-200RPM 90VDC	1
2	02-01-0004	PUMP HEAD PRST MF IP 200RPM	1
3	02-05-0003	FTTG CPLG .500 HB NYL	2
4	03-10-0051	SENS PROX 24-240 AC AB 875CPG8N18A2	2
5	03-12-0013	L-SERIES PANEL - STANDARD	1
6	03-20-0002	KIT 220 1PH CNTL	1
7	04-01-0009	ASSY ATMZR LP2000 STD	1
8	04-03-0001	ASSY, 27gal. CHEMICAL TANK LP2000	1
9	05-05-0001	WDMT ADJ TREATER LEG	4
10	05-07-0008	WDMT INLET HOPP EXT	1
11	05-10-0362	PLT HOPP EXT VIEW	3
12	05-10-0806	BRKT PUMP MNT LP800/LP2000 SS	1
13	06-01-0006	BOLT .250-20 X .750 ZP GR5	10
14	06-01-0012	BOLT .313-18 X 1.00 ZP GR5	2
15	06-01-0024	BOLT .500-13 X .750 ZP GR5	4
16	06-01-0090	SCRW MACH 10-32 X .750 ZP PHLP RND	4
17	06-01-0124	BOLT, FLG .375-16 UNC ZP GRADE 5; 3/4" LG	20
18	06-01-0189	BOLT, FLG .375-16 UNC ZP GRADE 5; 1-1/4" LG	8
19	06-02-0001	NUT FULL .250-20 ZP GR5	9
20	06-03-0002	NUT NYL LOCK .313-18 ZP GR5	2
21	06-03-0013	NUT,LOCK, FLG .250-20 ZP SERRATTED	1
22	06-03-0014	NUT,LOCK, FLG .375-16 ZP SERRATTED	8
23	06-04-0001	WSHR LOCK SPLT .250 ZP	9
24	06-05-0001	WASHER, FLAT .250	9
25	06-05-0017	WSHR FLAT #10 ZP	4
26	06-07-0006	CLMP HOSE .500 TO .906 X .313W ZP	5
27	06-09-0002	PIN CLIP HITCH 3.063 SIZE 9 ZP	4
28	06-09-0005	PIN CLVS .500 X 3.50 PLN	4
29	13-04-0005	ASSY,CALIBRATION TUBE, 10,000 ML	1
30	13-05-0023	HOSE .500 YEL MF 20IN	4

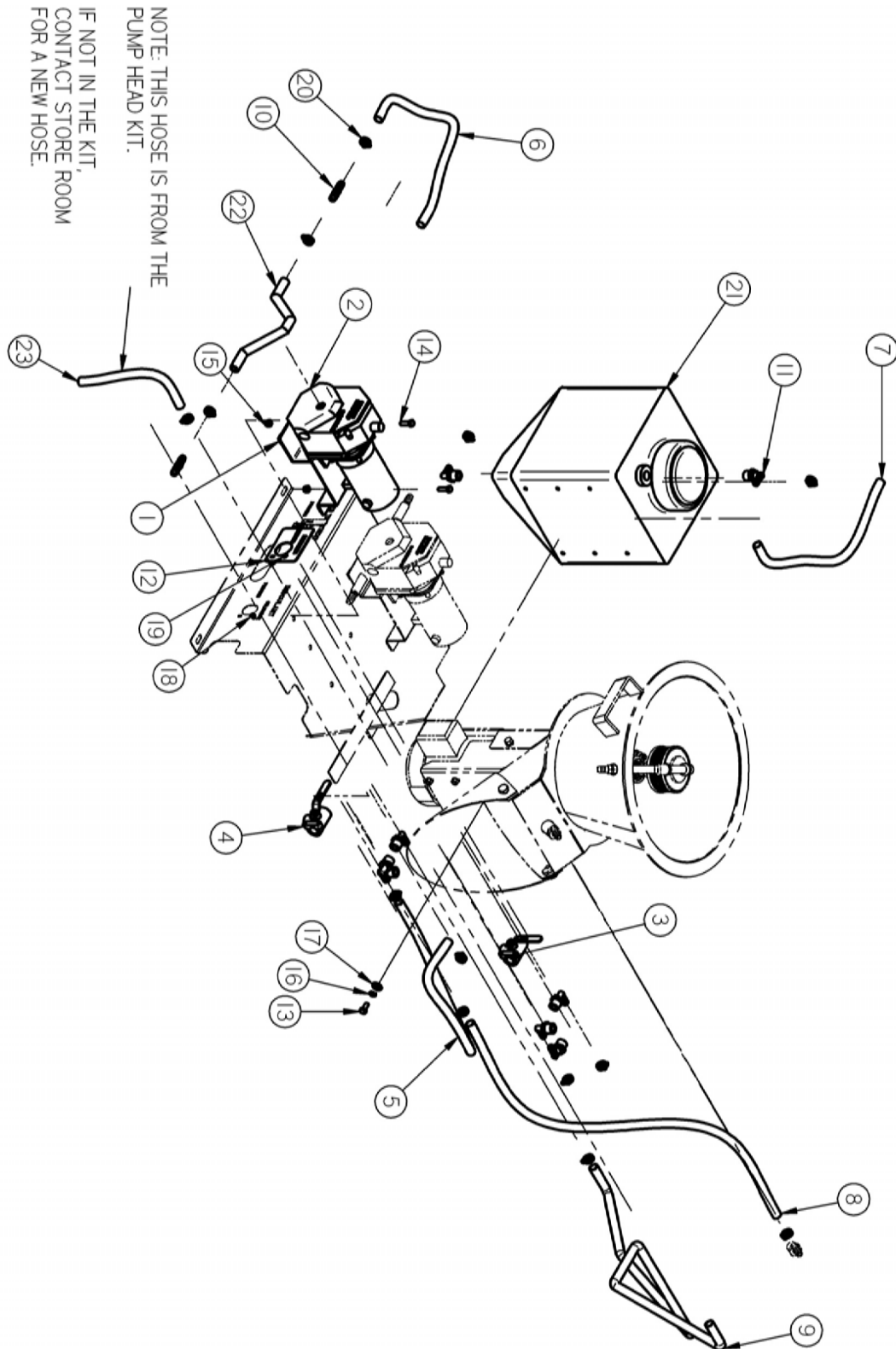
**LP2000 Seed Treater Parts List**

Item #	PART #	Title	Qty
31	13-05-0027	HOSE .500 RNT 24IN	1
32	13-05-0027	HOSE .500 RNT 24IN	1
33	13-05-0039	KIT VLV ST SOURCE	1
34	13-05-0040	KIT VLV ST PROCESS	1
35	13-11-0009	ASSY BASE LP2000 TRTR	1

**LP2000 Inoculant Kit (Pump #2)**



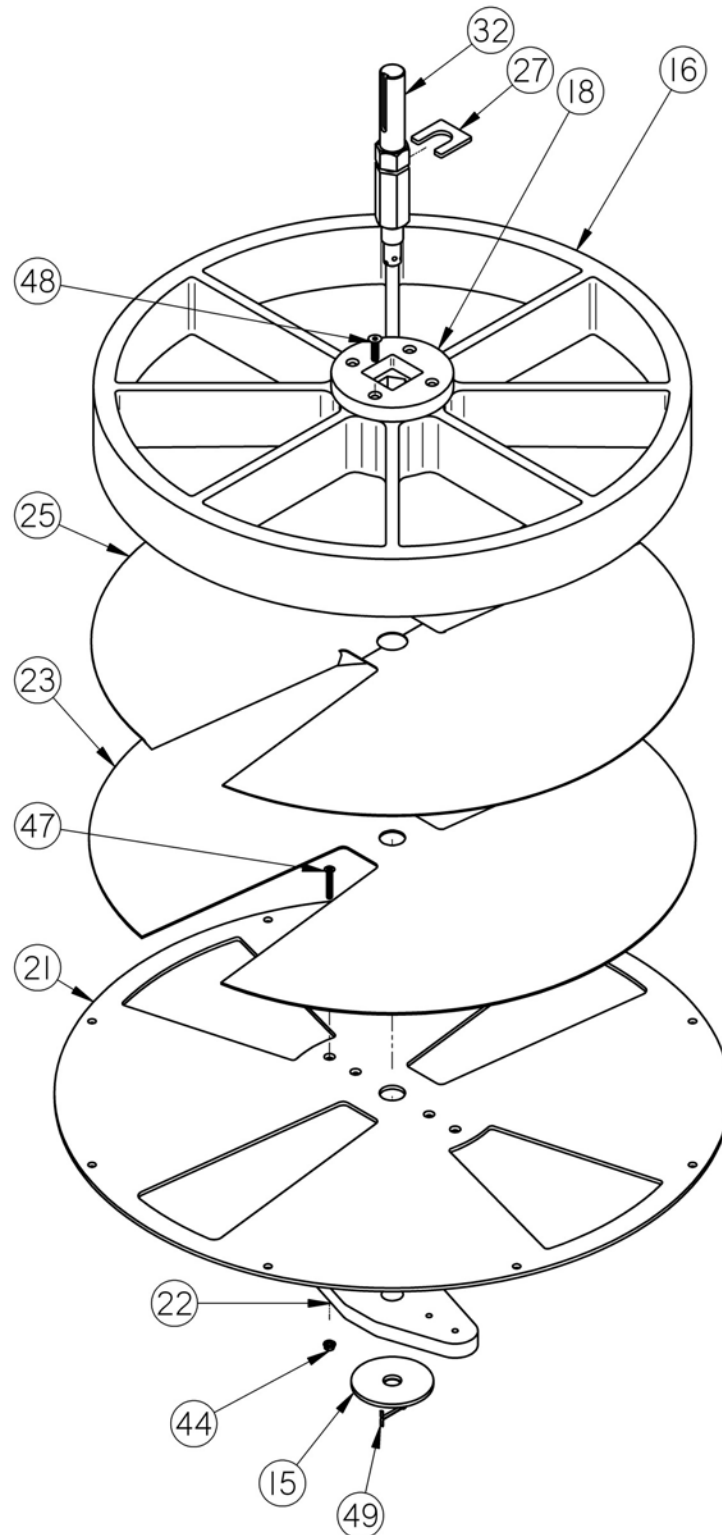
**LP2000 Inoculant Kit (Pump #2)**



**LP2000 Inoculant Kit (Pump #2) Parts List**

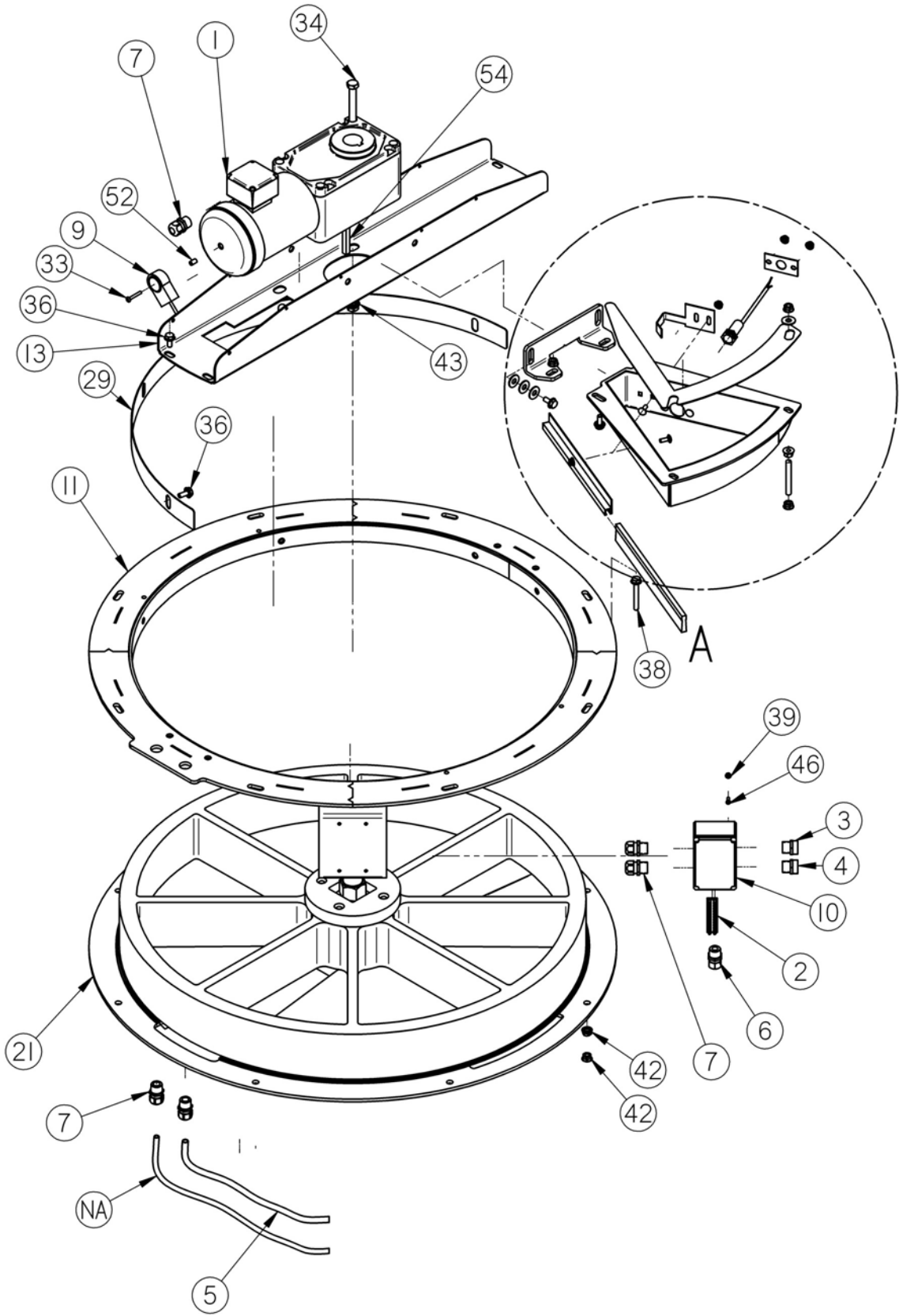
Item #	PART #	Title	Qty
1	01-01-0011	MTR .1HP 2-200RPM 90VDC	1
2	02-01-0004	PUMP HEAD PRST MF IP 200RPM	1
3	02-02-0007	.500-14 NPT 3-WAY VALVE	1
4	02-02-0007	VLV BALL .500 NPT 3WAY BRSS	1
5	02-03-0005	.5 RNT TUBING 14" LG	1
6	02-03-0005	.5 RNT TUBING 20" LG	1
7	02-03-0005	.5 RNT TUBING 20" LG	1
8	02-03-0005	.5 RNT TUBING 47" LG	1
9	02-03-0005	.5 RNT TUBING 52" LG	1
10	02-05-0003	FTTG CPLG .500 HB NYL	2
11	02-06-0010	FTTG 90 DEG .500HB X .500NPT ML NYL	9
12	05-10-2820	PLT, LBL INOC VALVE	1
13	06-01-0010	BOLT .313-18 X .750 ZP GR5	6
14	06-01-0012	BOLT .313-18 X 1.00 ZP GR5	2
15	06-03-0002	NUT NYL LOCK .313-18 ZP GR5	2
16	06-04-0002	WSHR LOCK SPLT .313 ZP	6
17	06-05-0003	WSHR FLAT .313 ZP	6
18	06-06-0008	SCRW MACH 10-24 X .250 PHLP PHD ZP	2
19	06-06-0029	SCRW MACH 10-24 X .375 PHLP PHD ZP	2
20	06-07-0006	CLMP HOSE .500 TO .906 X .313W ZP	13
21	07-02-0016	TNK 5GAL 5.00 LID X .500 PLAS RECT	1
22	13-05-0023	HOSE .500 YEL MF 20IN	4
23	N/A	TUBE FROM PUMP HEAD KIT	1

LP2000 WITH SEED WHEEL

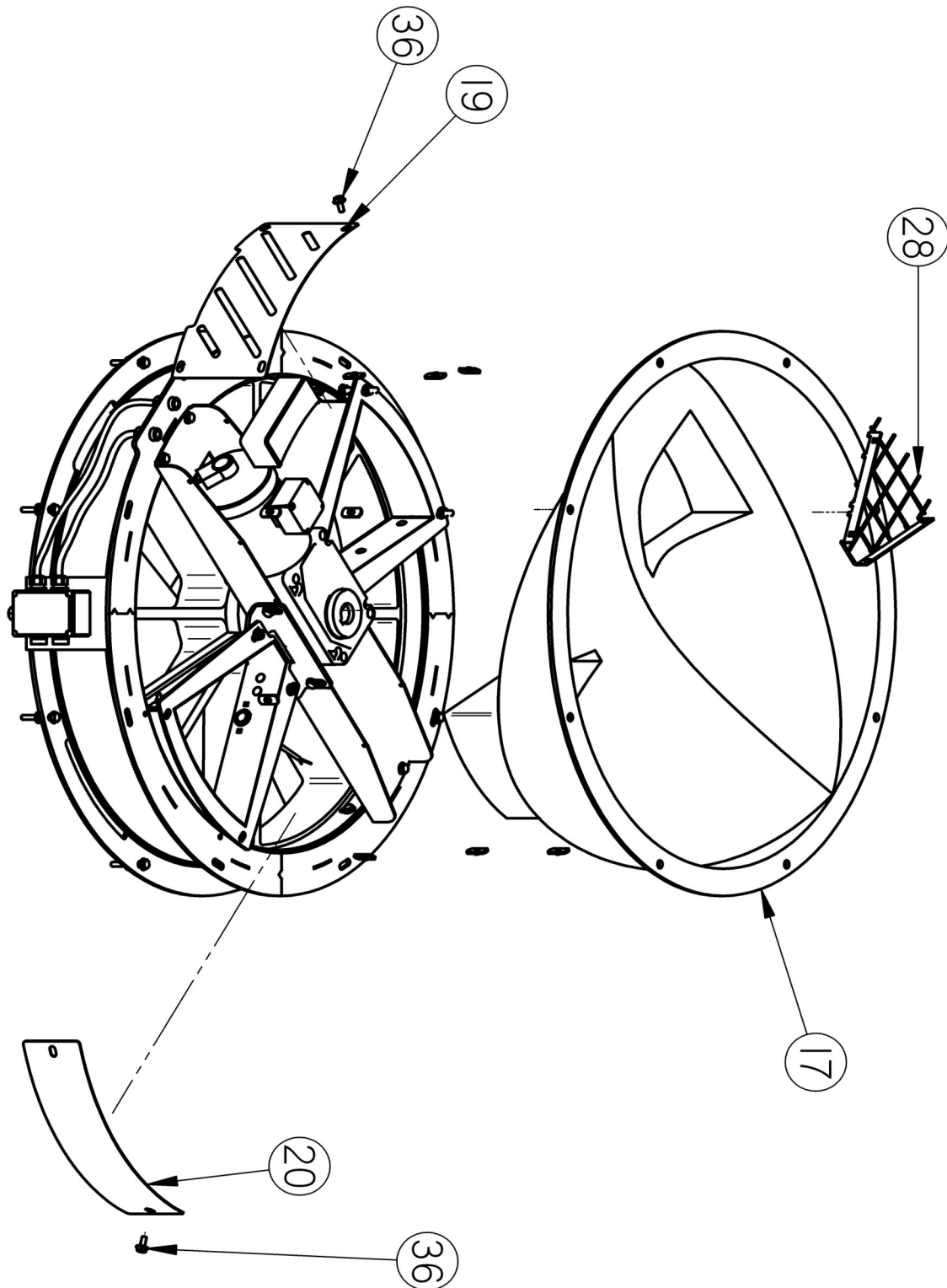


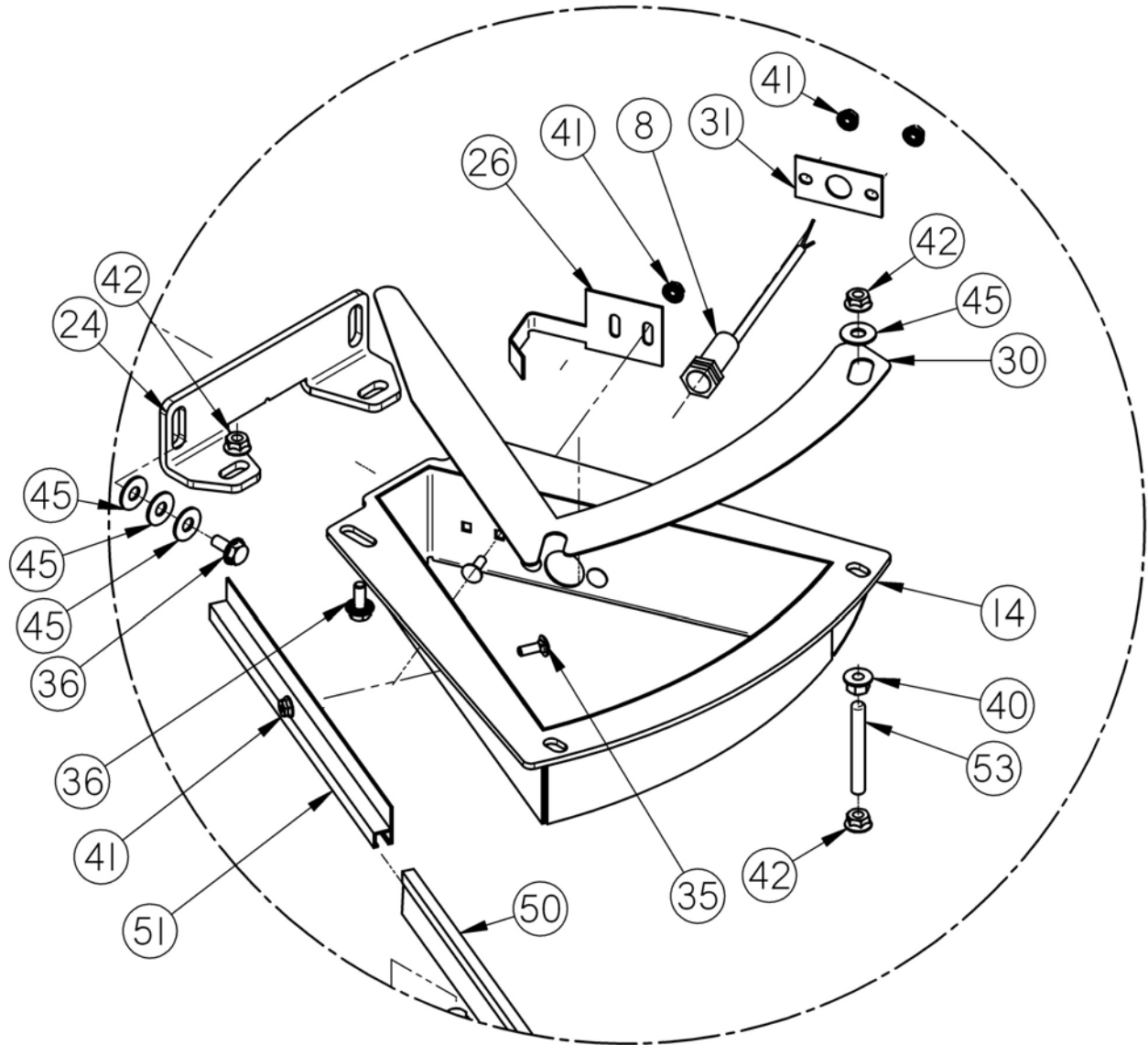


## LP2000 WITH SEED WHEEL

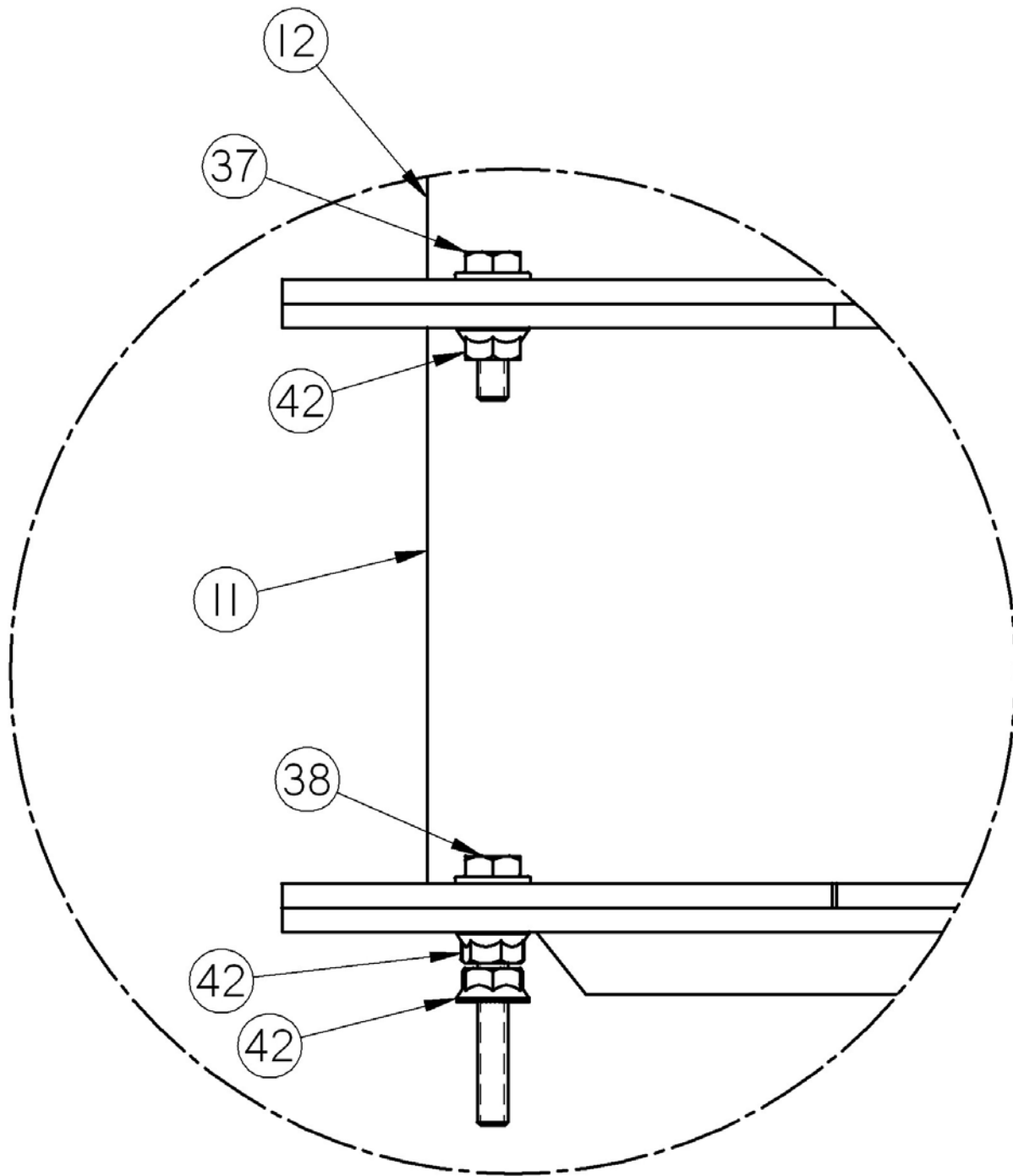


LP2000 WITH SEED WHEEL





DETAIL A



DETAIL C

LP2000 WITH SEED WHEEL

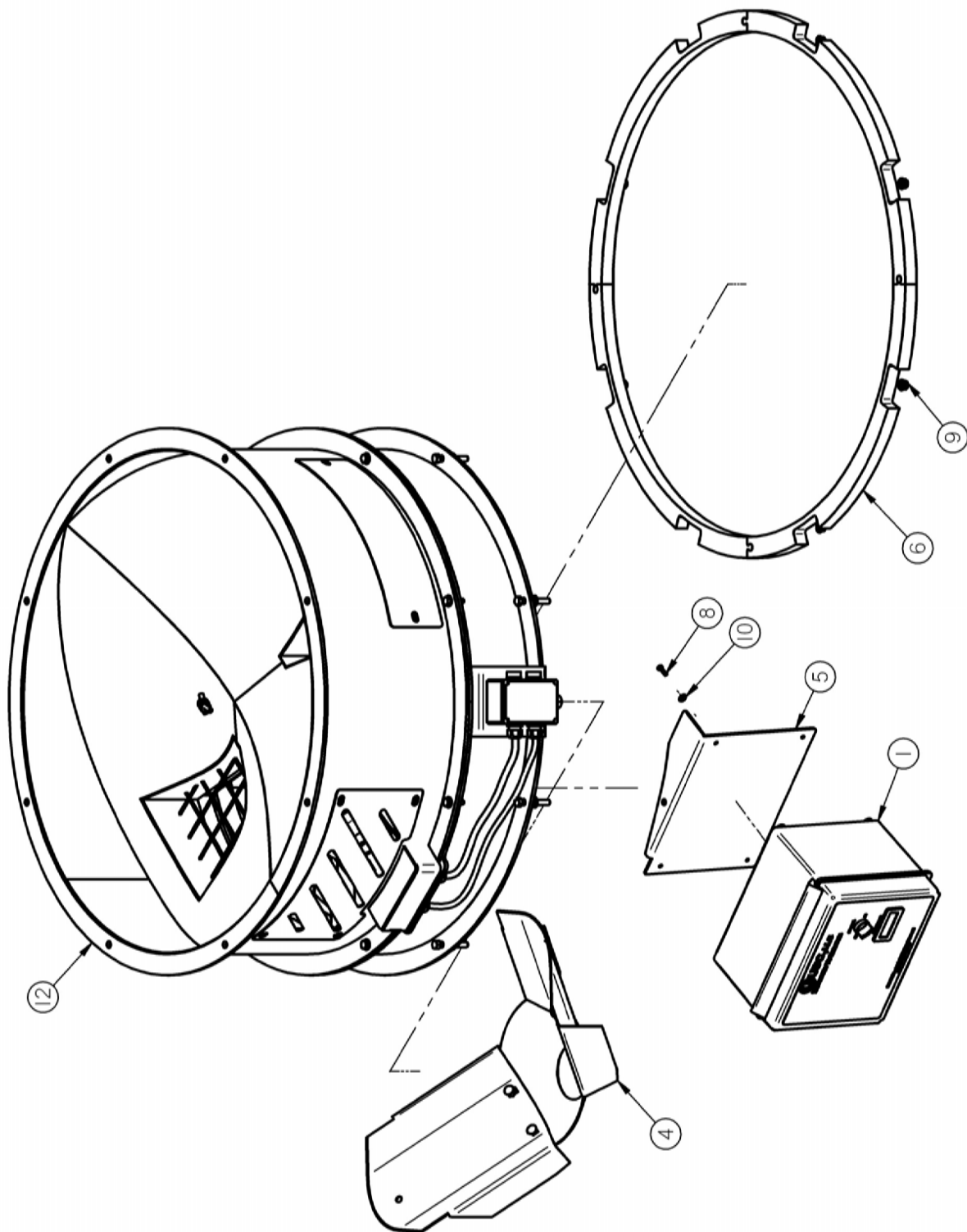
Item Number	USC Part Number	Description	Quantity
1	01-01-0096	GMTR RA .50 HP 11RPM 3PH HLLW SHAFT	1
2	03-05-0042	TMNL BARRIER STRIP IDEAL 89-608	1
3	03-06-0039	RECP 4PL ML PIN HBMS04501	1
4	03-06-0059	RECP 8PL ML PIN HBMS08501	1
5	03-07-0063	CORD 4COND 16AWG SHLD V16016 ALPHA	1
6	03-08-0134	LPCG503 ARLINGTON 1/2NPT RANGE:.100/.300	1
7	03-08-0138	CONN CG PLAS 0.5NPT .375-.750	5
8	03-10-0051	SENS PROX 24-240 AC AB 875CPG8N18A2	2
9	03-10-0086	RTRY PULSE GEN PU-40E WITH CBL	1
10	03-11-0081	ENCL 4.5X3X2 POLY HOF Q1286PCD	1
11	05-03-0164	WDMT SEED METER BODY EXTEN	1
12	05-03-0169	WDMT SEED METER EXTENSION	1
13	05-03-0232	WDMT SMW UPPER BRG BRKT	1
14	05-03-0240	WDMT SMW BRSH PCKT	2
15	05-04-0049	WDMT SEED WHEEL SHAFT NUT	1
16	05-07-0196	MOLDED SEED WHEEL INSERT	1
17	05-07-0197	HPPR SMW DUAL DSCHG ROTO-MLDD	1
18	05-07-0203	MOLDED SEED WHEEL INSERT TOP	1
19	05-10-0890	CVR #1 SEED METER	2
20	05-10-0891	CVR #2 SEED METER	2
21	05-10-0893	PLATE SUPPORT SEED METER STEEL	1
22	05-10-1213	SUPP BTM BRG UHMW SEED METER	1
23	05-10-1306	PAD SEED WHL FOAM RBBR FLOATING	1
24	05-10-1392	BRKT SMW BRSH PCKT HLDR	2
25	05-10-1426	14GA WEAR SPLATE HALF	2
26	05-10-1449	PLT SMW CTR HUB WIPER	2
27	05-10-1588	PLT SHAFT CLIP SMW	1

LP2000 WITH SEED WHEEL

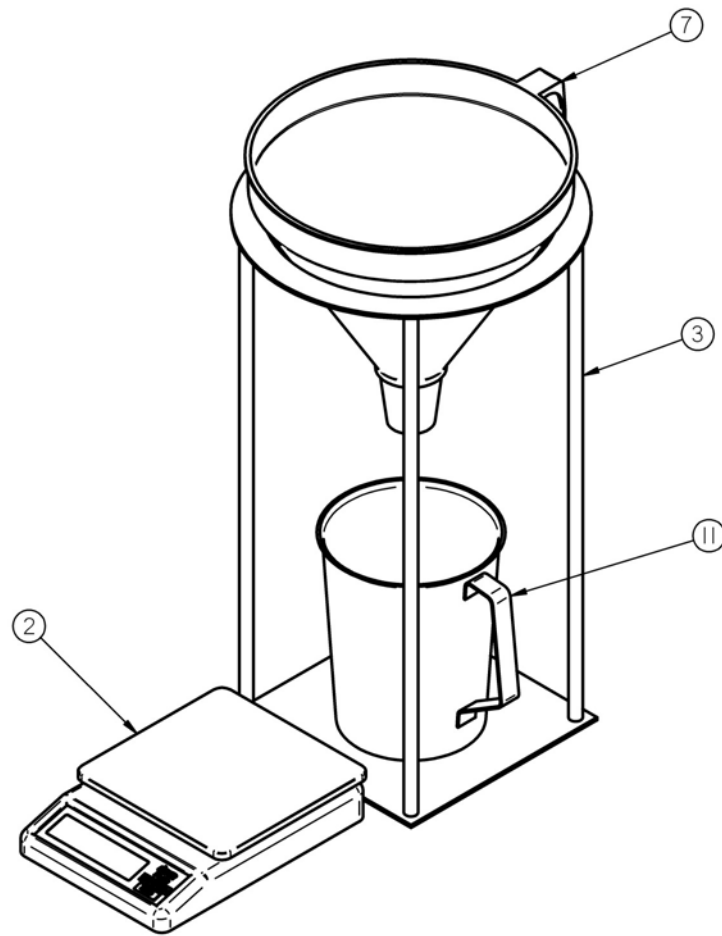
Item Number	USC Part Number	Description	Quantity
28	05-10-1872	GRD SMW INLET HOPP PCKT	2
29	05-10-1876	RING PERIMETER SEED WHEEL SS	2
30	05-10-2166	CVR TEST	2
31	05-10-3316	SMW PROX SW HOLDER	2
32	05-11-0075	DRIVE SHAFT 1.4375 SHAFT	1
33	06-01-0091	SRCW, PAN HD, 10-32 X 1.25 ZP	1
34	06-01-0106	BOLT .500-13 X 5.50 ZP GR5	4
35	06-01-0122	BOLT, CARRIAGE, .250-20x.75 G5 ZP	18
36	06-01-0124	BOLT, FLG .375-16 UNC ZP GRADE 5; 3/4" LG	32
37	06-01-0189	BOLT, FLG .375-16 UNC ZP GRADE 5; 1-1/4" LG	8
38	06-01-0204	BOLT, FLG .375-16 UNC ZP GRADE 5; 2-1/2" LG	8
39	06-02-0034	NUT 8-32 K-LOCK ZP	4
40	06-02-0071	.375-16 FLANGE TOP LOCKNUT G5 ZP	4
41	06-03-0013	NUT,LOCK, FLG .250-20 ZP SERRATTED	22
42	06-03-0014	NUT,LOCK, FLG .375-16 ZP SERRATTED	36
43	06-03-0015	NUT,LOCK, FLG .500-13 ZP SERRATTED	4
44	06-03-0019	NUT LOCK FLG .3125-18 ZP GR5	4
45	06-05-0004	WSHR FLAT .375 ZP	10
46	06-06-0004	SCRW MACH 8-32 X .500 PHLP RDHD ZP	4
47	06-06-0046	SCRW .313-18 X 2.0 ZP FLAT HD PHLP	4
48	06-06-0070	SCRW MACH .375-16 X 1.50 SH FLHD BO	4
49	06-09-0023	PIN CTTR .188 X 2.00 ZP	1
50	06-10-0019	SEAL BRSH 12.75 OAL 1IN EXP LG	2
51	06-10-0020	12 IN LG BRUSH HOLDER	2
52	06-12-0021	SPCR .192ID X .3125OD X .500 LG ZP	1
53	06-14-0013	.375-16 THD RD CS	4
54	11-13-0004	KEYSTOCK 3/8 X 3/8 CS	1



LP2000 WITH SEED WHEEL



LP2000 WITH SEED WHEEL



Item #	PART #	Title	Qty
1	03-12-0039	PNL CNTL MNL ST SW	1
2	03-19-0020	SCL 6.5 X 6.5 10 LBS	1
3	05-03-0248	WDMT CAL CUP FILL FRM	1
4	05-07-0119	LP800 SEED WHEEL FLOW BALANCER	1
5	05-10-1059	SEED WHEEL PANEL MOUNT PLATE	1
6	05-10-2463	SEAL BETWEEN FLANGES SMW TO TRTR	4
7	05-11-0123	FUNNEL SMW CALB CUP FILL	1
8	06-01-0090	SCRW MACH 10-32 X .750 ZP PHLP RND	4
9	06-03-0014	NUT,LOCK, FLG .375-16 ZP SERRATED	8
10	06-05-0017	WSHR FLAT #10 ZP	4
11	07-02-0008	CUP MEASURE 64OZ SS GRADUATED	1
12	13-04-0065	ASSY SEED METER LX2000	1

### Electric Control Panel Parts List

An electrical wiring diagram is located in the control panel of the seed treater at the time of shipment. The diagram located in the panel shows the exact electrical schematic for that model of seed treater. If you have any questions about the diagram, please call your local USC dealer.



Item Number	Part Number	Part Description	Quantity
1	03-01-0008	DC VOLTMETER	2
2	03-10-0008	3-POSITION PANEL SWITCH, MAINTAIN	1
3	03-10-0001	FORWARD-BRAKE-REVERSE SWITCH	2
4	07-01-0001	COUNTING DIAL	2
5	03-10-0055	3-POSITION PANEL SWITCH, SPRING RETURN TO CENTER	4 to 5

**LIMITED WARRANTY****SECTION  
J**

USC, LLC, (Manufacturer) warrants its seed treating equipment as follows:

1. **Limited Warranty:** Manufacturer warrants that the Products sold hereunder will be free from defects in material and workmanship for a period of 12 months from date of shipment. If the Products do not conform to this Limited Warranty during the warranty period, Buyer shall notify Manufacturer in writing of the claimed defects and demonstrate to Manufacturer satisfaction that said defects are covered by this Limited Warranty. If the defects are properly reported to Manufacturer within the warranty period, and the defects are of such type and nature as to be covered by this warranty, Manufacturer shall, at its expense, furnish replacement Products or, at Manufacturer's option, replacement parts for the defective products. Shipping and installation of the replacement Products or replacement parts shall be at the Buyer's expense.

2. **Other Limits:** THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Manufacturer does not warrant against damages or defects arising from improper installation (where installation is by persons other than Manufacturer), against defects in products or components not manufactured by Manufacturer, or against damages resulting from such non-Manufacturer made products or components. Manufacturer passes on to the Buyer the warranty it received (if any) from the maker of such non-Manufacturer made products or components. This warranty also does not apply to Products upon which repairs and/or modifications have been effected or attempted by persons other than pursuant to written authorization by Manufacturer. Manufacturer does not warrant against casualties or damages resulting from misuse and/or abuse of product(s), acts of nature, effects of weather, including effects of weather due to outside storage, accidents, or damages incurred during transportation by common carrier.

3. **Exclusive Obligation:** THIS WARRANTY IS EXCLUSIVE. The sole and exclusive obligation of Manufacturer shall be to repair or replace the defective Products in the manner and for the period provided above. Manufacturer shall not have any other obligation with respect to the Products or any part thereof, whether based on contract, tort, strict liability or otherwise. Under no circumstances, whether based on this Limited Warranty or otherwise, shall Manufacturer be liable for incidental, special, or consequential damages.

4. **Other Statements:** Manufacturer's employees or representatives' oral or other written statements do not constitute warranties, shall not be relied upon by Buyer, and are not a part of the contract for sale or this limited warranty.

5. **Return Policy:** Approval is required prior to returning goods to USC, LLC. A restocking fee will apply.

6. **Entire Obligation:** This Limited Warranty states the entire obligation of Manufacturer with respect to the Products. If any part of this Limited Warranty is determined to be void or illegal, the remainder shall remain in full force and effect.