Read this manual before using product. Failure to follow instructions and safety precautions can result in serious injury, death, or property damage. Keep manual for future reference.
This product has been designed and constructed according to general engineering standards\(^\text{a}\). Other local regulations may apply and must be followed by the operator. We strongly recommend that all personnel associated with this equipment be trained in the correct operational and safety procedures required for this product. Periodic reviews of this manual with all employees should be standard practice. For your convenience, we include this sign-off sheet so you can record your periodic reviews.

<table>
<thead>
<tr>
<th>Date</th>
<th>Employee Signature</th>
<th>Employer Signature</th>
</tr>
</thead>
<tbody>
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</tr>
</tbody>
</table>

\(^\text{a}\) Standards include organizations such as the American Society of Agricultural and Biological Engineers, American National Standards Institute, Canadian Standards Association, International Organization for Standardization, EN Standards, and/or others.
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1. INTRODUCTION

Thank you for purchasing a STORM Seed Treater. This equipment will allow safe and efficient operation when you read and follow all of the instructions contained in this manual. With proper care, your STORM Seed Treater will provide you with many years of trouble-free service.

Keep this manual handy for frequent reference and to review with new personnel. A sign-off form is provided on the inside front cover for your convenience. Call your local distributor or dealer if you need assistance or additional information.

This manual should be regarded as part of the equipment. Suppliers of both new and second-hand equipment are advised to retain documentary evidence that this manual was provided with the machine.

Figure 1.1 Serial Number Locations
Always give your dealer the serial number when ordering parts or requesting service or other information.

The serial number plates are located where indicated above by the above arrows. Please mark the number in the space provided for easy reference.

<table>
<thead>
<tr>
<th>Model Number</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Number (Auger)</td>
<td></td>
</tr>
<tr>
<td>Serial Number (Conveyor)</td>
<td></td>
</tr>
<tr>
<td>Serial Number (Control Box)</td>
<td></td>
</tr>
<tr>
<td>Date Purchased</td>
<td></td>
</tr>
</tbody>
</table>

**INTENDED USE CONDITIONS FOR THE STORM SEED TREATER:**

- Seed types that can be treated are wheat, barley, oats, peas, and lentils.
- Seed should be treated only at temperatures warmer than 32°F (0°C).
- Capacity of the STORM should not exceed 30 bu/min (1800 bu/hr) or be less than 15 bu/min (900 bu/hr).
- The STORM may receive seed from a suitable hopper bin or truck hopper.
- The STORM may require a ramp for accessing and positioning on a bin pad.
- Some bins may be too wide to allow positioning of the STORM on the bin pad.

**MISUSE OF THE STORM SEED TREATER:**

- Do not use for any purpose other than treating seed.
- Do not use for treating oilseeds such as canola or soybeans.
- Do not use for normal loading or unloading of grain.
- Do not use the auger as a hoist.

This equipment should be operated, serviced, and repaired only by persons who are familiar with its particular characteristics and who are acquainted with the relevant safety procedures. Any arbitrary modifications carried out on this equipment may relieve the manufacturer of liability for any resulting damage or injury.
1.1. STORM SEED TREATMENT COMPONENTS

The STORM Seed Treater is a grain auger equipped with an electric clutch, reversible auger direction, and specifically designed STORM seed treatment components, listed below:

- Treatment application boot
- Treatment pumps
- Control box

- Conveyor assembly
- Calibration system
- Mover assembly

Figure 1.2 STORM Seed Treatment Components

Table 1.1 STORM Seed Treatment Components

<table>
<thead>
<tr>
<th>Ref #</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Treatment application boot</td>
</tr>
<tr>
<td>2</td>
<td>Conveyor assembly</td>
</tr>
<tr>
<td>3</td>
<td>Mover assembly</td>
</tr>
<tr>
<td>4</td>
<td>Calibration cylinder</td>
</tr>
<tr>
<td>5</td>
<td>Treatment pumps</td>
</tr>
<tr>
<td>6</td>
<td>Control box</td>
</tr>
<tr>
<td>7</td>
<td>Conveyor transport/storage position latch</td>
</tr>
<tr>
<td>8</td>
<td>Towing hitch</td>
</tr>
<tr>
<td>9</td>
<td>Towing safety chains</td>
</tr>
<tr>
<td>10</td>
<td>Cleanout position latch and pin</td>
</tr>
<tr>
<td>11</td>
<td>Mover kit transport position latch</td>
</tr>
</tbody>
</table>
1.1.1. Control Box

The control box contains all electrical control and power supply components, as well as the software and hardware required to run the STORM pumps and conveyor.

One side of the control box contains the control unit touch-screen, a USB port, and a power lamp. All electrical cables (including the plug for 110 VAC power) are located on the opposite side.

The top of the control box features a Pause button and a keyed lock mechanism that prevents user access to the interior of the control box.

Figure 1.3 Control Box Features

Table 1.2 Control Box Features

<table>
<thead>
<tr>
<th>Ref #</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Touch screen</td>
</tr>
<tr>
<td>2</td>
<td>Pause button</td>
</tr>
<tr>
<td>3</td>
<td>USB port</td>
</tr>
<tr>
<td>4</td>
<td>Power lamp</td>
</tr>
<tr>
<td>5</td>
<td>Keyed lock mechanism</td>
</tr>
</tbody>
</table>
**TOUCH SCREEN**

The STORM touchscreen is used to configure and control the STORM through embedded software.

The touchscreen is operated using a single bare finger to tap (or in some cases press and hold) graphical buttons to select options or navigate through the various configuration, operation, and information screens available.

The touchscreen should be cleaned regularly with a soft clean cloth moistened with water.

**PAUSE BUTTON**

The pause button on the top of the control box can be used to pause STORM system software activities, including a job in progress.

To pause, press the button down firmly until it clicks into place. When the button is fully pressed, the pumps and conveyor stop moving and the “Pause Button Activated” message screen appears on the touch screen.

Pulling up on the pause button exits the pause state, and returns the control box screen to the screen that was present when the pause button was pressed. If the system was treating seed when the pause button was pressed, the operator must press “Start” to resume treating. Any other paused activities will proceed automatically (e.g. line flushing).

*Note:* Pressing the pause button does not stop the gasoline engine or auger.

**USB PORT**

A USB port and micro-USB flash drive is located on the front of the control box, protected by a plastic cap. Always ensure that the cap is securely fastened. The USB port is used for software upgrade or data export.

To use the USB port for these purposes, always refer to specific instructions provided.

The flash drive cap is kept in the USB port enclosure, on top of the port. Keep the port cap firmly secured when not in use.

**POWER LAMP**

The power lamp is lit red when power is connected to the system and received by the power supply inside the box. Otherwise the lamp is unlit.

**KEYED LOCK**

The keyed lock prevents the user from opening the control box. This protects the equipment inside the box from a potentially-damaging external environment, and protects users from dangerous high-voltage points inside the control box.

The control box is intentionally provided without the key for the lock, in order to restrict access. Do not attempt to open the control box under any circumstances.
1.2. CONVEYOR ASSEMBLY

The major components of the conveyor assembly are shown in Figure 1.4, and listed in Table 1.3.

Seed fed into the intake hopper is transported by the conveyor to the treatment application boot for treatment and mixing. The intake hopper is made up of a flexible material formed around a rigid upper frame. Before use the intake hopper must be pulled fully up and secured to the dispensing hopper (hopper bin or truck hopper) with support straps.

There are two conveyor assembly clean-out hatches: one on the boot side and one on the hopper side. The hatches must always be closed and latched during operation, and opened only during clean-out or maintenance.

The conveyor is attached to a rotating base on the treatment application boot that allows the assembly to be moved from working to transport/storage position (see Conveyor Positions: Working vs Transport/Storage below).

The observation window on the top of the conveyor assembly provides a clear view of the conveyor belt, which allows the operator to verify that the belt cleats are full of seed. The conveyor belt is chain-driven by an electrical motor located underneath the conveyor.
Figure 1.4 Conveyor Assembly, Working Position

Table 1.3 Conveyor Assembly Features

<table>
<thead>
<tr>
<th>Ref #</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Intake hopper</td>
</tr>
<tr>
<td>2</td>
<td>Observation window</td>
</tr>
<tr>
<td>3</td>
<td>Clean-out hatch</td>
</tr>
<tr>
<td>4</td>
<td>Clean-out hatch</td>
</tr>
<tr>
<td>5</td>
<td>Lifting handle</td>
</tr>
<tr>
<td>6</td>
<td>Conveyor</td>
</tr>
<tr>
<td>7</td>
<td>Drive motor (electric)</td>
</tr>
<tr>
<td>8</td>
<td>Drive motor chain cover</td>
</tr>
</tbody>
</table>
1.2.1. **CONVEYOR POSITIONS: WORKING VS TRANSPORT/STORAGE**

To move the conveyor assembly between the working position and the transport/storage position, use the lifting handle to lift and rotate the conveyor from one position to the other.

The conveyor latch (see Figure 1.5) is used to lock the assembly in transport/storage position. This latch must be operated in order to rotate the assembly between positions.

In storage transport/storage position, the conveyor release handle is latched, and a pin must be inserted in the latching end to ensure that it cannot slip out of position.

**Figure 1.5 Conveyor Assembly, Transport/Storage Position**
1.2.2. TREATMENT APPLICATION BOOT

The major components of the treatment application boot are shown in Figure 1.6 below, and listed in Table 1.4.

The treatment application boot features a hitch for STORM transport, a conveyor rest, a transparent windows into the boot, four internal treatment application nozzles, a clean-out hatch, and an internal auger flighting.

Seed treatment product is applied to the seed by up to four treatment application nozzles as it drops from the conveyor into the boot. The treated seed accumulates and mixes in the boot before it is transported to the auger spout.

Figure 1.6 Treatment Application Boot

Table 1.4 Treatment Application Boot Features

<table>
<thead>
<tr>
<th>Ref #</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Transport hitch</td>
</tr>
<tr>
<td>2</td>
<td>Conveyor rest</td>
</tr>
<tr>
<td>3</td>
<td>Transparent observation windows (secured by flat spring clips)</td>
</tr>
<tr>
<td>4</td>
<td>Treatment application nozzles</td>
</tr>
<tr>
<td>5</td>
<td>Clean-out hatch (secured by latches)</td>
</tr>
<tr>
<td>6</td>
<td>Boot flighting (under hatch)</td>
</tr>
<tr>
<td>P1</td>
<td>Pump 1 treatment line</td>
</tr>
<tr>
<td>P2</td>
<td>Pump 2 treatment line</td>
</tr>
</tbody>
</table>
1.2.3. TREATMENT PUMPS AND CALIBRATION SYSTEM

The major components of the treatment pumps system are shown in Figure 1.7 below, and listed in Table 1.5. See “Calibration System” on page 18 for information about the calibration system.

The STORM has two treatment pumps (and associated, referred to in the software user interface as Pump 1 and Pump 2 (see Figure 1.7).

Calibration is a required step in creating a new treatment Job, but pumps should be calibrated to the treatment fluid to be applied before each use. Calibration ensures accurate metering of treatment fluid, preventing under- or over-treating of the seed.

Figure 1.7 Treatment Pump System

Table 1.5 Treatment Pump Features

<table>
<thead>
<tr>
<th>Ref #</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pump 1</td>
</tr>
<tr>
<td>2</td>
<td>Pump 2</td>
</tr>
<tr>
<td>3</td>
<td>Pressure gauge, pump 1</td>
</tr>
<tr>
<td>4</td>
<td>Pressure gauge, pump 2</td>
</tr>
<tr>
<td>5</td>
<td>Treatment filter, pump 1</td>
</tr>
<tr>
<td>6</td>
<td>Treatment filter, pump 2</td>
</tr>
<tr>
<td>7</td>
<td>Treatment pump tubing element, pump 1</td>
</tr>
<tr>
<td>8</td>
<td>Treatment pump tubing element, pump 2</td>
</tr>
<tr>
<td>9</td>
<td>Treatment calibration hose</td>
</tr>
<tr>
<td>10</td>
<td>Dry-break coupler, pump 1 treatment hose</td>
</tr>
<tr>
<td>11</td>
<td>Dry-break coupler, pump 2 treatment hose</td>
</tr>
<tr>
<td>12</td>
<td>Pump 1 treatment line</td>
</tr>
<tr>
<td>13</td>
<td>Pump 2 treatment line</td>
</tr>
<tr>
<td>14</td>
<td>Quick connect for combined flow (Pump 1 and Pump 2 output) on Pump 1 line when connected to Pump 1 treatment filter.</td>
</tr>
</tbody>
</table>
**TREATMENT PUMPS**

Treatment pumps use a peristaltic design that moves fluid with rollers that squeeze fluid through the tubes in the desired direction (both pumps are reversible). Each pump is controlled separately by control system software. Each pump draws from its own fluid source.

The pumps are designed to deliver a specific amount of product per revolution, but factors such as tube condition, temperature, and treatment product viscosity can affect the accuracy of pump metering. These factors are compensated for by calibration process performed by the operator.

**PRESSURE GAUGES**

Each pump has a separate pressure gauge that indicates the pressure in the hose during treating. The gauges are used primarily to indicate when treatment fluid has reached the nozzles (pressure will spike moderately and hold), but a high sustained operating pressure can also provide indication of a filter or nozzle blockage.

**TREATMENT FILTERS**

Each pump has an separate in-line filter located on the valve assembly. The purpose of the filters is to prevent large particles from reaching and potentially blocking the treatment nozzles.

Disassemble, clean, and reassemble the filters on a weekly basis during regular usage, as well as whenever the treatment product is changed.

**PUMP TUBING ELEMENTS**

Each pump has a separate tubing element that runs from the valve assembly, through its respective pump, and to its treatment container.

Tubing elements are specifically designed for the application. If a tubing elements needs to be replaced, contact your distributor for the correct part.

Before operating the STORM, always ensure that the tubing elements are correctly installed and in good condition.

**TREATMENT APPLICATION NOZZLES**

There are two pairs of nozzles on the boot, located on opposite ends of the boot. In the standard configuration (separate pump flows), each nozzle in a pair are supplied treatment fluid by separate pumps. In the optional combined flow configuration, Pump 1 and Pump 2 outputs are combined onto a single nozzle in each pair, supplied by the Pump 1 line.

**TREATMENT LINES**

Each pump has a treatment line that runs from its associated filter to the nozzles on the boot, and each treatment line splits to supply a nozzle on each side of the boot.

*Note:* The treatment lines can be configured for combined flow to the Pump 1 line (output of both pumps combined on the Pump 1 line) by disconnecting the Pump 2 line quick-connect from the Pump 2 treatment filter and connecting the short line from the Pump 1 line “T” in its place.
1.2.4. **CALIBRATION SYSTEM**

The calibration system (see Figure 1.8 below) is made up of:

- two ball valves (1,2) used to select between treating and calibration positions for their respective pumps,
- a third ball-valve (3) that is selectively used during calibration,
- a calibration cylinder that is connected to the calibration valve assembly with a hose.

**Figure 1.8 Calibration System Features**
During calibration, fluid is pumped by the selected pump through the calibration valve assembly, which diverts the fluid from the treatment nozzles to the calibration cylinder, where it is measured by the operator. This measurement is entered into the calibration screen, and the control unit uses the measurement to adjust the calibration for the pump for the specific treatment fluid used.

Before proceeding with calibration via the control unit software, always:

- set the calibration valves to their appropriate position for calibration of the specific pump to be calibrated.
- move the calibration cylinder from the horizontal storage/treatment position to the vertical calibration position.

Calibration should always be done when a job is first configured as well as before each run is treated.

See “Calibration Procedures” on page 83 for detailed information about calibration.
1.2.5. STORM MOVER ASSEMBLY

The STORM mover assembly is used to:

- move the entire STORM auger short distances to position the unit for receiving seed for treatment,
- raise and lower the conveyor and intake hopper (intake end),
- raise and lower the main auger tube (winch).

The mover assembly is hydraulically powered. The gasoline motor must be on with the hydraulic pump engaged before the controls will function.

Ensure that the main wheel over-center handles are in the engaged position before operating (see Figure 1.12).

**Important:** Always ensure that the latch system for clean out position is latched during clean-out activity.

Figure 1.9 STORM Mover Assembly, Working Position
Figure 1.10 STORM Mover Assembly, Transport Position
Figure 1.11 STORM Mover Assembly, Cleanout Position
Figure 1.12 Wheel Over-Center Handle Positions

**NOTICE**

Ensure that the over-center bolts are tight enough to prevent the handle from disengaging when in use. If they are not tight enough, damage to the gears and motor will result.
2. Safety

2.1. Safety Alert Symbol and Signal Words

This safety alert symbol indicates important safety messages in this manual. When you see this symbol, be alert to the possibility of injury or death, carefully read the message that follows, and inform other operators.

**SIGNAL WORDS:** Note the use of the signal words **DANGER, WARNING, CAUTION,** and **NOTICE** with the safety messages. The appropriate signal word for each message has been selected using the definitions below as a guideline.

- **DANGER** Indicates an imminently hazardous situation that, if not avoided, will result in serious injury or death.
- **WARNING** Indicates a hazardous situation that, if not avoided, could result in serious injury or death.
- **CAUTION** Indicates a hazardous situation that, if not avoided, may result in minor or moderate injury.
- **NOTICE** Indicates a potentially hazardous situation that, if not avoided, may result in property damage.

2.2. Basic Operator Safety and Qualifications

The safety information found throughout the complete Safety Section of the manual applies to all safety practices. Additional instructions specific to a certain safety practice (such as Operation Safety), can be found in the appropriate section.

YOU are responsible for the **SAFE** use and maintenance of your equipment. YOU must ensure that you and anyone else who is going to work around the equipment understands all procedures and related **SAFETY** information contained in this manual.

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. All accidents can be avoided.

- It is the equipment owner, operator, and maintenance personnel's responsibility to read and understand ALL safety instructions, safety decals, and manuals and follow them when assembling, operating, or maintaining the equipment.
- Equipment owners must give instructions and review the information initially and annually with all personnel before allowing them to operate this product. Untrained users/operators expose themselves and bystanders to possible serious injury or death.
- This equipment is not intended to be used by children.
- Use this equipment for its intended purposes only.
- Do not modify the equipment in any way without written permission from the manufacturer. Unauthorized modification may impair the function and/or safety, and could affect the life of the equipment. Any unauthorized modification of the equipment will void the warranty.
2.3. Overhead Power Lines

**DANGER**

- When operating or moving, keep equipment away from overhead power lines and devices.
- This equipment is not insulated.
- Electrocution can occur without direct contact.

2.4. Rotating Flighting

**DANGER**

- KEEP AWAY from rotating flighting.
- DO NOT remove or modify flighting guards, doors, or covers. Keep in good working order. Have replaced if damaged.
- DO NOT operate the equipment without all guards, doors, and covers in place.
- NEVER touch the flighting. Use a stick or other tool to remove an obstruction or clean out.
- Shut off and lock out power to adjust, service, or clean.

2.5. Cleated Conveyor Belt

**WARNING**

- KEEP HANDS AWAY from moving cleated conveyor belt.
- DO NOT remove or modify guards, doors, or covers. Keep in place and in good working order. Have replaced if damaged.
- DO NOT operate the conveyor without all guards, doors, and covers in place.
- Shut off and lock out power to adjust, service, or clean.

2.6. Rotating Parts Safety

**WARNING**

- Keep body, hair, and clothing away from rotating pulleys, belts, chains, and sprockets.
• Do not operate with any guard removed or modified. Keep guards in good working order.

• Shut off and remove key or lock out power source before inspecting or servicing machine.

### 2.7. Work Area Safety

**WARNING**

• Have another trained person nearby who can shut down the equipment in case of accident.

• The work area should be kept clear of bystanders.

• Before raising/lowering/moving the equipment, make sure the area around the equipment is clear of obstructions and/or untrained personnel. Never allow anyone to stand on or beneath the equipment when it is being placed.

• Place equipment on reasonably level ground when raising, lowering, positioning, or operating.

• Chock wheels after placement.

• Lower equipment at completion of operation or when not in use.

• Keep the work area clean and free of debris.

• Keep out from under equipment and undercarriage area.
Hazards associated with handling, sorting, mixing and storage of treated seed can be minimized by following the safety precautions listed below. The below are guidelines only and vary based on the type of seed treatment being used. Consult the seed treatment information sheets for full details.

- Use personal protective equipment as described on the seed treatment product label. This will normally include, safety glasses, chemically resistant gloves, rubber boots, a respirator, and coveralls.

- Use the seed treater only outdoors, do not use inside a building or structure.

- Thoroughly clean the seed treater after use. Some seed treatments are corrosive and others may plug the equipment. Do not run contaminated water into a stream, public sewer, or in a location where it could contaminate the groundwater or come into contact with people or animals.
2.9. EQUIPMENT STABILITY

⚠️ WARNING

- Transport and place equipment on reasonably level ground when raising, lowering, positioning, or operating.
- Chock wheels and anchor intake end after placement.

2.10. Guards Safety

⚠️ WARNING

Proper guards are important to ensure workers are safe.

- Install guards to prevent workers from contacting moving parts.
- Do not operate equipment unless all guards are in place.
- Do not walk or step on guards.
- Lock out power before removing a guard.
- Ensure all guards are replaced after performing maintenance.
2. SAFETY
2.11. TRANSPORT SAFETY

**WARNING**

- Check with local authorities regarding transport on public roads. Obey all applicable laws and regulations.
- Always travel at a safe speed, never exceeding 20 mph (32 km/h). Reduce speed on rough surfaces. Use caution when turning corners or meeting traffic.
- Make sure the SMV (slow moving vehicle) emblem and all the lights and reflectors that are required by local authorities are in place, are clean, and can be seen by all over-taking and oncoming traffic. Always use hazard-warning flashers on tractor/towing vehicle when transporting unless prohibited by law.
- Do not allow riders on the machine, towing vehicle, tractor, or skid steer during transport.
- Stay away from overhead obstructions and power lines when operating and transporting. Electrocut can occur without direct contact.
- Fully lower equipment before transporting, and only raise when next to storage facility.
- Attach to towing vehicle with a pin and retainer. Always attach safety chain(s).
- Do not raise the intake end above drawbar, upending may occur.
- Do not transport on slopes greater than 20°.

2.12. TOWING THE EQUIPMENT

**WARNING**

- Check with local authorities regarding transport on public roads. Obey all applicable laws and regulations.
- Always travel at a safe speed, never exceeding 20 mph (32 km/h). Reduce speed on rough surfaces. Use caution when turning corners or meeting traffic.
- Make sure the SMV (slow moving vehicle) emblem and all the lights and reflectors that are required by local authorities are in place, are clean, and can be seen by all over-taking and oncoming traffic. Always use hazard-warning flashers on tractor/towing vehicle when transporting unless prohibited by law.
• Do not allow riders on the equipment or towing vehicle during transport.
• Attach to towing vehicle with a pin and retainer. Always attach safety chain(s).
• Do not raise the intake end above drawbar, upending may occur.
• Do not transport on slopes greater than 20°.

2.13. Cleanup and Storage Safety

When operation has been completed:

• Clean entire work area
• Remove anchors, supports, and chocks
• Move auger slowly out of “working” position with towing vehicle - not by hand
• If not in “transport” position, lower auger to the “full down” position immediately upon clearance of any obstructions
• Transport to the new work area or storage area. Observe previous transport and placement instructions.

2.14. HYDRAULIC WINCH

**WARNING**

• Keep away from rotating cable drum and winch cable. Do not touch or grab cable while winch is being operated or use hands to guide the cable. Failure to heed could result in serious injury.
• Inspect cable and cable clamps before installing and using hydraulic winch. Replace cable if frayed or damaged. Tighten cable clamps if necessary.
• Do not continue to supply power to hydraulic winch after equipment has reached full up position.
• Do not disconnect hydraulic quick couplers when lines are pressurized.
• Make sure lift cable is seated in cable pulley.
• Always keep a minimum of 3 cable wraps on the cable drum.

2.15. Battery Safety

• Wear safety glasses when working near batteries.
• Make certain the battery or terminal covers are in place and in good working order.
• Keep all sparks and flames away from batteries; gas given off by electrolyte is explosive.
• Avoid contact with battery electrolyte. Wash off any spilled electrolyte immediately.
• Do not tip batteries more than 45° to avoid electrolyte loss.
• To avoid injury from sparks or short circuits, disconnect battery ground cable before servicing any part of an electrical system.
2.16. Tire Safety

- Inflate tires to the recommended pressure on tire sidewall.
- Tires should not be operated at speeds higher than their rated speed.
- Keep wheel lug nuts tightened to manufacturer’s recommendations.
- Never reinflate a tire that has been run flat or seriously under-inflated without removing the tire from the wheel. Have the tire and wheel closely inspected for damage before remounting.
- DO NOT cut or weld to the tire rim with the tire mounted on the rim. This action may cause an explosion which could result in serious injury or death.
- DO NOT attempt to mount a tire unless you have the proper equipment and experience to do the job.
- Failure to follow proper procedures when mounting a tire on a wheel or rim can produce an explosion that may result in serious injury or death.
- Have a qualified tire dealer or repair service perform required tire maintenance.
- When replacing worn tires, make sure they meet the original tire specifications. Never undersize the replacement tire.

2.17. RAISING AND LOWERING EQUIPMENT

**WARNING**

- Before raising/lowering/moving/adjusting the equipment, make sure the area around the equipment is clear of obstructions and/or untrained personnel. Never allow anyone to stand on or beneath the equipment when it is being placed.
- Lower equipment to its lowest position when not in use.
- Empty equipment before raising or lowering.
- Do not get on or beneath equipment when raising or lowering.
- Raise and lower equipment on reasonably level ground only.

2.18. Drives and Lockout Safety

Inspect the power source (drive) before using and know how to shut down in an emergency. Whenever you service or adjust your equipment, make sure you shut down and lock out your power source to prevent inadvertent start-up. Know the procedure(s) that applies to your equipment from the following power sources.
2.18.1. Electric Motor Safety

**WARNING**

**Power Source**

- Electric motors and controls shall be installed and serviced by a qualified electrician and must meet all local codes and standards.
- A magnetic starter should be used to protect your motor.
- You must have a manual reset button.
- Reset and motor starting controls must be located so that the operator has full view of the entire operation.
- Locate main power disconnect switch within reach from ground level to permit ready access in case of an emergency.
- Motor must be properly grounded.
- Guards must be in place and secure.
- Ensure electrical wiring and cords remain in good condition; replace if necessary.

**Lockout**

- The control box and motor should be unplugged during shutdown or whenever maintenance is performed.
- If reset is required, disconnect all power before resetting motor.

2.18.2. Gas Engine Safety

**WARNING**

**Power Source**

- Keep guards in place and secure.
- Properly ventilate surrounding area.
- Never fill the fuel tank while smoking or near an open flame. Always shut down and allow engine to cool before filling with fuel.
- Never overfill the tank or spill fuel. If fuel is spilled, clean it up immediately.
- Be sure to use the correct type and grade of fuel.
- Ground the fuel funnel or nozzle against the filler neck to prevent sparks that could ignite fuel vapors.
- Be sure to replace the fuel fill cap when you are done.
Lockout

- For engines with an electric start, remove the ignition key, the spark plug wire, or the spark plug.
- For engines with a rope or crank start, remove the spark plug wire or the spark plug.

2.18.3. Hydraulic Power Safety

**WARNING**

Power Source

- Refer to the rules and regulations applicable to the power source operating your hydraulic drive.
- Do not connect or disconnect hydraulic lines while system is under pressure.
- Keep all hydraulic lines away from moving parts.
- Escaping hydraulic fluid under pressure will cause serious injury if it penetrates the skin surface (serious infection or toxic reaction can develop). See a doctor immediately if injured.
- Use metal or wood as a backstop when searching for hydraulic leaks and wear proper hand and eye protection.
- Check all hydraulic components are tight and in good condition. Replace any worn, cut, abraded, flattened, or crimped hoses.
- Do not attempt any makeshift repairs to the hydraulic fittings or hoses with tape, clamps, or adhesive. The hydraulic system operates under extremely high pressure; such repairs will fail suddenly and create a hazardous and unsafe condition.

Lockout

- Always place all hydraulic controls in neutral and relieve system pressure before disconnecting or working on hydraulic system.

2.19. Personal Protective Equipment

**Safety Glasses**

- Wear safety glasses at all times to protect eyes from debris.

**Respirator**

- A respirator may be needed to prevent breathing potentially harmful fumes and dust.
2.20. Safety Decals

- Keep safety decals clean and legible at all times.
- Replace safety decals that are missing or have become illegible. See decal location figures that follow.
- Replaced parts must display the same decal(s) as the original part.
- Replacement safety decals are available free of charge from your distributor, dealer, or factory.

2.20.1. Decal Installation/Replacement

1. Decal area must be clean and dry, with a temperature above 50°F (10°C).
2. Decide on the exact position before you remove the backing paper.
3. Align the decal over the specified area and carefully press the small portion with the exposed sticky backing in place.
4. Slowly peel back the remaining paper and carefully smooth the remaining portion of the decal in place.
5. Small air pockets can be pierced with a pin and smoothed out using the sign backing paper.

2.20.2. Safety Decal Locations and Details

Replicas of the safety decals that are attached to the equipment and their messages are shown in the figure(s) that follow. Safe operation of the equipment requires that you familiarize yourself with the various safety decals and the areas or particular functions that the decals apply to, as well as the safety precautions that must be taken to avoid serious injury, death, or damage.

Wheatheart reserves the right to update safety decals without notice. Safety decals may not be exactly as shown.
2.21. Safety Decal Placement

- **DANGER**
  - To prevent death or serious injury:
  - • Shut off and lock out power to adjust, service, or clean.
  - • DO NOT operate with any guard removed or modified. Keep guards in good working order. Have replaced if damaged.

- **WARNING**
  - To prevent serious injury:
  - • Shut off and lock out power to adjust, service, or clean.
  - • DO NOT remove or modify guards, doors, or covers. Keep in good working order. Have replaced if damaged.

- **NOTICE**
  - To prevent damage, lock out power before inspecting or servicing machine.

- **CAUTION**
  - To prevent entanglement hazard:
  - Keep body, hair, and clothing away from rotating pulleys, belts, chains, and sprockets.

- **WARNING**
  - To prevent electrocution:
  - This equipment is not insulated.
  - Electric motors must be grounded. Disconnect power before performing maintenance.

- **WARNING**
  - To prevent hazardous voltage:
  - • To service box, first disconnect main power supply. Components inside box may contain hazardous voltage even after power has been disconnected.
  - • If the control box is not functioning normally, do not open box; contact your authorized dealer.

- **DANGER**
  - To prevent death or serious injury:
  - • To service box, first disconnect main power supply.

- **NOTICE**
  - To prevent serious injury:
  - • To service box, first disconnect main power supply.

Figure 2.2 Safety Decal Locations
2.21. Safety Decal Placement

Figure 2.3 Other Decal Locations

Before operating, check that pump adjustment knob is tight by turning fully clockwise. DO NOT loosen, or metering will not function correctly.

To Calibrate:

To Treat:

To Operate Pumps 1 & 2:

Refer to Operator's Manual for detailed treating information.
2.22. Safety Decal Content

**Rotating Flighting Hazard**

To prevent death or serious injury:

- **KEEP AWAY** from rotating auger flighting.
- **DO NOT** remove or modify auger flighting guards, doors, or covers. Keep in good working order. Have replaced if damaged.
- **DO NOT** operate the auger without all guards, doors, and covers in place.
- **NEVER** touch the auger flighting. Use a stick or other tool to remove an obstruction or clean out.
- **Shut off and lock out power to adjust, service, or clean.**

**Electrocution Hazard**

To prevent death or serious injury:

- When operating or moving, keep equipment away from overhead power lines and devices.
- Fully lower equipment before moving.
- This equipment is not insulated. Electrocution can occur without direct contact.

**Hazardous Voltage**

Can shock, burn, or cause death.

Do not work in here unless you are a qualified electrician.
To prevent serious injury or death:
- Read and understand the manual before assembling, operating, or maintaining the equipment.
- Only trained personnel may assemble, operate, or maintain the equipment.
- Children and untrained personnel must be kept outside of the work area.
- If the manual, guards, or decals are missing or damaged, contact factory or dealer for replacements.
- Lock out power before performing maintenance.
- To prevent equipment collapse, support equipment tube while disassembling certain components.
- Electric motors must be grounded. Disconnect power before resetting overloads.

**Transport Hazard**

To prevent serious injury or death:
- Securely attach equipment to vehicle with correct pin and safety chains.
- Use a tow vehicle to move equipment.

**Missing Guard Hazard**

To prevent serious injury or death, shut off power and reattach guard before operating machine.

**Entanglement Hazard**

To prevent serious injury or death:
- Keep body, hair, and clothing away from rotating pulleys, belts, chains, and sprockets.
- Do not operate with any guard removed or modified. Keep guards in good working order.
- Shut off and remove key or lock out power source before inspecting or servicing machine.
To prevent serious injury or death:
- Keep away from rotating cable drum and winch cable.
- Inspect lift cable periodically; replace if damaged.
- Inspect cable clamps periodically; tighten if necessary.

Hazardous Voltage Inside
To prevent serious injury or death:
- If the control box is not functioning normally, do not open box; contact your authorized dealer.
- To service box, first disconnect main power supply. Components inside box may contain hazardous voltage even after power has been disconnected.

Belt Crush Hazard
To prevent serious injury or death:
- KEEP HANDS AWAY from moving cleated conveyor belt.
- DO NOT remove or modify guards, doors, or covers. Keep in place and in good working order. Have replaced if damaged.
- Shut off and lock out power to adjust, service, or clean.

Crush Hazard
To prevent serious injury, insert pin before clean out of hopper.

Pinch Point Hazard
Keep hands clear.
3. TRANSPORT

WARNING Before continuing, ensure you have read and understand the relevant information in the safety section. Safety information is provided to help prevent serious injury, death, or property damage.

3.1. TRANSPORT PROCEDURE

Follow all safety precautions when transporting the auger and use a proper towing vehicle.

1. If auger is raised, place in full down position. The roller track shoe should be seated against the upper track stop with slight tension on the lift cable.

**Important:** The winch must have a minimum of 3 wraps of cable on drum when auger is in transport position.

2. Ensure STORM conveyor is in the transport/storage position with the conveyor latch fully engaged and the pin in place.

3. Fully raise the wheel move assembly by retracting the hydraulic cylinders. Ensure that the transport latch is engaged.

**Figure 3.1 Transport Position (Conveyor and Mover Kit)**

4. Before transporting, disengage the over-center handle at each wheel (see Figure 1.12 in “STORM Mover Assembly” on page 20).
5. Hitch the STORM to the towing vehicle with clevis-to-tongue connection. If there is a mismatch, convert the towing vehicle clevis to a compatible tongue.

![WARNING]

For proper and safe transport, DO NOT hitch towing vehicle and auger with clevis-to-clevis connection since this type of connection will limit angular movement and will put extremely high load on the pin which can lead to mechanical failure.

6. Place and secure hitch pin through the clevis and tongue. If the towing vehicle has larger pin hole, use the largest pin diameter that will fit through the holes of towing vehicle and the STORM hitch. Ensure the pin will not slip through the larger holes by inserting a heavy-duty large diameter washer on the top and bottom of the pin.

**Important:** Use a type of hitch pin with a load rating that meets or exceeds the carrying capacity of the towing vehicle.

7. Connect the STORM safety chain securely to the towing vehicle. Leave chain slack enough for angular movement.

8. If the distance from the hitch pin to the front or rear chain attachment point is more than 9 inches, attach an intermediate chain support.

**Important:** Choose a safety chain rated with minimum strength at least equal to the gross weight of the STORM unit being towed. Ensure the safety chain is not worn out, stretched or kinked.

![WARNING]

To prevent accidental break away of the auger that could result to death and serious injury or implement damage, DO NOT tow the STORM without securing the hitch pin and without a properly sized and undamaged safety chain.

![WARNING]

If auger wheels are partially or fully buried in snow or grain, failure to clear area around the wheels before moving may cause damage to the auger or result in serious injury.
9. Place belt(s) under tension for transport.

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beware of overhead colour obstructions and electrical wires and devices. The STORM models have minimum clearances from 10’–13’ (3.05 m–3.96 m) in normal transport position.</td>
</tr>
</tbody>
</table>

10. Refer to “Transport Safety” on page 30 and “Towing the Equipment” on page 30 for important safety information before towing.
4. PLACEMENT

WARNING Before continuing, ensure you have read and understand the relevant information in the safety section. Safety information is provided to help prevent serious injury, death, or property damage.

PRE-OPERATION CHECKLIST

- Be sure there is enough clearance from overhead obstructions, power lines, or other equipment to move the machine into its working position.
- Service the machine per the schedule outlined in the Maintenance section.
- Check hydraulic system oil level.
- Ensure that all hydraulic lines are free from damage, and that all fittings are tight.
- Visually inspect the unit for damage to components. Replace or repair any damaged or questionable parts.
- Check work site. Clean up working area to prevent slipping or tripping.

WARNING

Shut off and remove key or lock out power source before inspecting or servicing the machine.

When using the STORM for the first time, some air may still be trapped in the hydraulic system; slowly activate all hydraulic control valves to ensure that all the air is out of the system.

Operators must observe safety procedures at all times and follow the pre-operational checklist before each start-up.
Follow this procedure when placing the machine into its working position:

1. Ensure that the conveyor unit is rotated to working position.
2. With the engine at idle, use the hydraulic controls to fully lower the auger tube before moving the auger into position.
3. Raise the auger intake end off the ground using the hydraulic controls.
4. Ensure that the wheel over-center handles are engaged (see Figure 1.12 in “STORM Mover Assembly” on page 20).
5. Move the STORM intake hopper into place by moving the **wheel move control** forward or backward to control the direction of travel. Steering is accomplished by turning the **handle bar** in the desired direction. Steering is easier if the auger is in motion. When positioning the STORM intake hopper:
   a. Ensure that the STORM conveyor intake is centered between the hopper bin vertical legs so operator has adequate clearance for operation.
   b. Ensure that the STORM unit is positioned to receive the seed to be treated directly into the center of the STORM hopper’s intake grate.
6. Raise the auger spout until it is correctly positioned for transfer of the treated seed into the intended container (e.g. truck container).
7. Raise the STORM conveyor intake and pull the STORM intake hopper up into a fully extended position under the hopper bin slide gate. Properly positioned, the bin or truck hopper slide gate will be slightly lower than the top of the STORM intake hopper, and the STORM conveyor assembly will rest fully on the boot conveyor rest.
8. Use the attached straps to tie the hopper in position by looping the adjustable straps around the hopper bin support tubes or any other bin parts.
   **Important:** *Failure to secure straps may cause a substantial amount of seed to leak. Loose straps will cause poor metering*
9. Ensure that the STORM control unit is plugged in and initialized.
10. Ensure that the conveyor is off, and flood the canvas hopper by opening the hopper bin slide-gate until the hopper is fully flooded with seed. The hopper bin slide-gate should be open sufficient to ensure hopper is completely flooded at maximum intended operation.
Note: If the intake hopper is under-filled, metering will be inaccurate.

Figure 4.1 STORM Unit Positioned for Seed Treatment

11. Ensure that the STORM is on reasonably level ground when raising, lowering, or positioning.

CAUTION

Do not attempt to move the auger on uneven or hilly terrain. The mover will not perform well under these conditions and could damage the machine or injure the operator.

12. Once the STORM is in position, chock wheels on both sides to prevent movement during operation.

WARNING

Never attempt to increase height of auger by positioning wheels on lumber, blocks, or by any other means. To do so will result in damage to equipment and/or personal injury.

13. If required, anchor and/or support the STORM during operation.
4. PLACEMENT STORM SEED TREATER
4.1. PLACEMENT PROCEDURE

WARNING

Do not use auger as a hoist to raise any object regardless of weight. This will create an unsafe condition and will void warranty.
Correct operation of the STORM requires pre-inspection of the drive system, operator knowledge on how to shut down the system, and a general monitoring of the system during operation.

5.1.1. GAS ENGINE

DRIVE SYSTEM INSPECTION
Before starting the motor, ensure that:
1. The gas tank is properly closed.
2. The engine clutch is disengaged.
3. The hydraulic pump is disengaged.
4. The area surrounding the auger is properly ventilated.
5. Pulley shields are in place and secure.

LOCKOUT
1. Shut off the engine.
2. Remove the ignition key, the spark plug wire, or the spark plug.

5.1.2. STORM CONVEYOR DRIVE SYSTEM

CONVEYER DRIVE SYSTEM INSPECTION
Before starting the STORM conveyor electric motor, ensure that:
1. The STORM conveyor unit is in working position.
2. All inspection hatches are closed.
3. The intake hopper is clear of all obstructions except seed to be treated.
4. Chain shields are in place and secure.

LOCKOUT
1. Unplug the control box from the power source.
2. Tag the control box plug to indicate that it is in a lockout state.
5.2. **BREAK-IN PERIOD**

5.2.1. **CONVEYOR BREAK-IN**

Table 5.1 lists the recommended break-in activities for the conveyor assembly.

<table>
<thead>
<tr>
<th>Time</th>
<th>Speed</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 min</td>
<td>70%</td>
<td>Run conveyor unloaded, check for any problems</td>
</tr>
<tr>
<td>10 min</td>
<td>100%</td>
<td>Run conveyor loaded with seed if possible at full speed, but do not run pumps. During this time the auger should be run at the highest speed which still leaves some seed in the boot such that the auger wears in at the same rate as the conveyor.</td>
</tr>
</tbody>
</table>

If any unusual noises or vibrations are encountered, determine the source, shut the auger off, lock out the power source, and adjust. If unsure of the problem, or the procedure to fix it, contact your local dealer.

5.2.2. **PUMP TUBING ELEMENTS BREAK-IN**

The pump tubing elements require a minimum 30 minute break-in period in order to meter consistently. If proper break-in is not performed, the result will be difficulty in calibrating the pump and failed or inaccurate calibrations.

This procedure must be repeated each time that a pump tubing element is changed.

For each new pump tubing element:

1. Set the valves to the calibration positions for the pump.
2. Rotate the calibration cylinder down into the calibration position. Ensure the cylinder is clamped tightly in the bracket and that the top plug is fully inserted in the top of the cylinder.
3. Connect a male coupler to the dry-break coupler of the associated pump, and place the couplers in a suitably large-volume container of water.
4. Route the overflow tube found at the top of the calibration cylinder into the water container. Ensure the tube is fully inserted into the black cap found at the top of the calibration cylinder.
5. On the touch screen, at the main menu screen select **Maintenance — Flush Out**.
6. Ensure that the pump with the tubing element that is intended for break-in is set to “On” and in the “Forward” direction.
7. Ensure that the pump with the tubing element that is not intended for break-in is set to “Off”.
8. Press the **Start** and run the pump for a minimum of 30 minutes circulating water the entire time.
5.3. PRE-OPERATIONAL CHECKS (FIRST 1000 BU)

Following the following pre-operational checklist during the first 1000 bu of operation can add to the reliability and life of your machine.

**PRE-OPERATIONAL CHECKLIST:**

- Read the power source operation manual.
- Inspect motor mounting bolts for tightness.
- Check oil level in the gear box by removing the filler plug. Make sure the gear box is half full (center cross shaft) and free of foreign objects.
- Inspect all belts for alignment, tightness, and abnormal wear. Adjust or replace as required.
- Inspect components for damage and abnormal wear. Replace as required.
- Check that safety decals are installed and legible. Apply new decals if required.
- Check the wheel bolt torque prior to transporting the unit. See “Bolt Torque Values” on page 124 for recommended torque values.
- Check that tires are inflated to the manufacturer’s recommended pressure prior to transporting the unit.
- Check the upper chain drive tension and alignment.

Please refer to the regular maintenance schedule given in “STORM Maintenance Schedule” on page 99 for recommended service intervals after the break-in period.
5.4. STANDARD PRE-OPERATION CHECKS

The following items should be checked before operating the machine each time:

- Visually inspect the machine, check engine oil, and service the PTO drive-line (if applicable).
- Check that the gasoline engine gas cap is in place.
- Ensure that all guards are in place, and secure.
- Check that drive belts are not frayed or damaged, and that they are properly adjusted and aligned.
- Ensure auger wheels are chocked.
- See that the discharge spout and intake area are free of obstructions.
- Ensure that operators are aware of safety precautions.

5.5. CONTROLS

The STORM Auger section has the following mechanical controls:

- engine throttle: variable RPM
- hydraulic pump: engaged/disengaged
- auger flighting (clutch switch): on/off
- auger flighting (forward/reverse)
- auger wheel move: moves and steers the entire STORM auger, raises and lowers the auger tube (see “STORM Mover Assembly” on page 20).
- pause button
- calibration valves

In addition to physical controls, the STORM is also has a touch-screen interface that is used to:

- configure, calibrate, and run jobs
- view job information and system status
- prepare pumps and conveyor for treating
- control pumps and conveyor for clean up
### 5.6. START-UP

#### 5.6.1. GAS ENGINE AND AUGER STARTUP AND SHUTDOWN

**NORMAL START-UP**

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
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<tbody>
<tr>
<td>Foreign objects can cause damage. Remove any obstructions from the intake and discharge areas before operating the unit.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine must be idling before belts are engaged. Engaging belts at high engine speed will result in premature belt wear.</td>
</tr>
</tbody>
</table>

1. Ensure that the hydraulic pump is disengaged.
2. Ensure that the auger direction is set to forward.
3. Start the engine and then engage the belt engaging lever with engine at idle.

<table>
<thead>
<tr>
<th>DANGER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotating Flight Hazard: Keep away from auger intake.</td>
</tr>
</tbody>
</table>

4. Increase the engine speed to achieve the desired augering speed.
5. If everything is operating normally, begin seed treatment.

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auger speed should be proportional to treating rate. Use full throttle only when treating seed at maximum feed rate of 100% and 1/3 throttle when treating at 50%.</td>
</tr>
</tbody>
</table>

**RESTARTING WITH A FULL TUBE**

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always engage belts with engine idling. Engaging belts at high engine speed will result in premature belt wear</td>
</tr>
</tbody>
</table>

The tube may be filled with material if the machine is shut down inadvertently or for an emergency. It is recommended that you restart with the following procedure:
1. With the power source locked out, remove as much of the seed as possible from the tube and intake.
2. Start the engine and run it at half speed. Slowly engage the belt until the auger is brought up to speed.
3. Once the auger has been started, increase the engine speed to achieve the desired augering speed.

**NORMAL SHUTDOWN**

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prolonged operation of an empty auger will cause unnecessary wear.</td>
</tr>
</tbody>
</table>

1. Near the end of the load, reduce the feed of seed and decrease the auger speed (if possible).
2. Run the auger until the tube is empty.
3. When auger is clear of seed, disengage the belt, and stop engine/motor, or disengage the PTO.
4. Shut down, and lock out power source.

**EMERGENCY STOP**

Although it is recommended that the machine be emptied before stopping, in an emergency situation:

1. Stop or shut down the power source immediately.
2. Stop the flow of seed into the STORM intake hopper.

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>The pause button will stop the conveyor and pumps, but the power source should also be disconnected in the event of an emergency stop.</td>
</tr>
</tbody>
</table>

3. Lock out power, and respond to the emergency before resuming work.

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lock out all power before attempting repairs / removing obstructions.</td>
</tr>
</tbody>
</table>
5.6.2. **STORM UNIT STARTUP**

1. Ensure that the STORM conveyor assembly is rotated into the working position.
2. Connect the Control Box to a dedicated 120 VAC 15 A outlet that has a proper ground connection.

   **NOTICE**

   If a generator is used to provide power to the STORM, it must be able to provide 120 VAC at least 1750 Watts to the plug servicing the STORM (equivalent to 120 VAC@15A).

   **NOTICE**

   Do not use a GFIC-protected socket.

   **NOTICE**

   Low supply voltage may result in a tripped circuit breaker. Use a 12 gauge or heavier extension cord (100' maximum length) to help ensure adequate supply voltage.

3. Check the touchscreen, and ensure that the control system initializes fully. When fully initialized, the startup screen appears (see Figure 5.1).
4. Software updates are posted to the STORM website. It is recommended that you register at the web address shown in the startup screen as soon as possible so that you will be alerted to software updates and have access to important information about your STORM seed treater.

**Figure 5.1 Start-up Screen**

For the latest software, register at [www.stormtreaters.com/owners](http://www.stormtreaters.com/owners) or contact AGI at 1-855-662-6689

5. Press **Continue** to proceed to the main menu.
5.7. ELECTRONIC CONTROLS

Note: This manual provides support for STORM system software with the application date 30/03/2015. Updated documentation will be available for future software versions as required.

The STORM treatment application is controlled through the STORM system software. The operator uses a touch-screen interface to configure and control seed treatment options and activities.

Operation of STORM treatment application components is discussed in the appropriate sections that follow, as part of specific operating procedures.

The touch screen must be operated using bare fingers to select graphical “buttons” or enter text in configurable fields.

Figure 5.2 below shows the STORM main menu, which shows the selectable graphical buttons for the four main control sub menus:

- Jobs
- Maintenance
- Alarms
- Setup
- Transfer & Mix

Note: Transfer & Mix functionality requires the Transfer Kit, available through your dealer.

Figure 5.2 STORM Touch Screen Main Menu 2015
5.7.1. TOUCHSCREEN CONVENTIONS

In all procedures in this manual, selectable buttons are shown within other instructions as **bold text**, as seen in the following example:

“To view all currently configured jobs, select Jobs from the main menu.”

More complicated configuration are sometimes compressed into a line of instruction that uses chevrons around italic text (<job>) to indicate when multiple choices are available. When this convention is used, the options are generally clear based on the context, or are explained in a following note, as shown in the example below:

To delete an existing Job:

**Jobs —<job>— Delete Job — <Yes or Cancel>**

where: *job* is one of 12 possible Jobs configured in the system.

### Table 5.2 Command Button Actions

<table>
<thead>
<tr>
<th>Command Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Back</strong></td>
<td>Takes you back one screen or to the last pertinent screen. Won’t save changes to any entry made on the page. Bottom left-hand side of the screen</td>
</tr>
<tr>
<td><strong>Save and Continue</strong></td>
<td>Saves changes to values on the screen and then proceeds to the next screen. Bottom right-hand side of the screen.</td>
</tr>
<tr>
<td><strong>Continue</strong></td>
<td>Acknowledges message and then moves to the next screen. Bottom right-hand side of the screen.</td>
</tr>
<tr>
<td><strong>END</strong></td>
<td>Completes a task. Bottom right-hand side of the screen.</td>
</tr>
<tr>
<td><strong>More</strong></td>
<td>Indicates that there are further choices, similar to Continue. Bottom right-hand side of the screen.</td>
</tr>
</tbody>
</table>
5.8. STORM OPERATING PROCEDURES

The following common procedures are used at various intervals during operation, according to the needs of the operator.

Table 5.3

<table>
<thead>
<tr>
<th>Category</th>
<th>Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>System setup</td>
<td>“View and Configure Current Date and Time” on page 59</td>
</tr>
<tr>
<td></td>
<td>“View Software Version” on page 60</td>
</tr>
<tr>
<td></td>
<td>“View and Configure Pump Setup” on page 61</td>
</tr>
<tr>
<td></td>
<td>“View and Configure Advanced Pump Setup” on page 62</td>
</tr>
<tr>
<td></td>
<td>“View and Configure Conveyor Options” on page 63</td>
</tr>
<tr>
<td>Jobs</td>
<td>“Creating a New Job” on page 64</td>
</tr>
<tr>
<td></td>
<td>“Copy an Existing Job” on page 70</td>
</tr>
<tr>
<td></td>
<td>“Viewing Configured Jobs” on page 70</td>
</tr>
<tr>
<td></td>
<td>“Deleting a Job” on page 71</td>
</tr>
<tr>
<td></td>
<td>“Viewing Job Parameters” on page 71</td>
</tr>
<tr>
<td></td>
<td>“Viewing Total Amounts of Seed Treated (Job Specific)” on page 72</td>
</tr>
<tr>
<td>Treating and calibration</td>
<td>“Viewing Total Amounts of Treatment Used (Job Specific)” on page 73</td>
</tr>
<tr>
<td></td>
<td>“Viewing Treating History (All Jobs)” on page 74</td>
</tr>
<tr>
<td></td>
<td>“Viewing Treating History (Specific Job)” on page 75</td>
</tr>
<tr>
<td>Pump and conveyor controls</td>
<td>“Seed Treatment” on page 76</td>
</tr>
<tr>
<td></td>
<td>“Calibration Procedures” on page 83</td>
</tr>
<tr>
<td></td>
<td>“Cleanup” on page 91</td>
</tr>
<tr>
<td></td>
<td>“Flush Out” on page 93</td>
</tr>
<tr>
<td></td>
<td>“Transfer and Mix” on page 93</td>
</tr>
<tr>
<td>Diagnostics</td>
<td>“View Lifetime Total Use” on page 94</td>
</tr>
<tr>
<td></td>
<td>“View Diagnostics” on page 95</td>
</tr>
<tr>
<td></td>
<td>“Alarms” on page 96</td>
</tr>
</tbody>
</table>
5.9. SYSTEM SETUP

5.9.1. VIEW AND CONFIGURE CURRENT DATE AND TIME

Note: Date and time persist in the STORM control unit memory after power is removed from the system, and generally does not need to be adjusted, with the exception of correcting for time zones and local daylight savings.

From the main menu, select:

Setup — Set Date And Time

• Set the date and time using the touch screen.
• Select Save Changes to save the new settings and return to the Setup menu.
• Select Back to abandon any changes and return to the Setup menu.

Figure 5.3 Set Date and Time

To set the Date and Time, simply touch the appropriate box.
The Hour uses a 24 hour clock.
5.9.2. View Software Version

From the main menu, select:

**Setup — Software Version**

- Select **Back** to return to the Setup menu.

*Figure 5.4 View Software Version*

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run time version</td>
<td>The release number of the operating system that runs the STORM application software.</td>
</tr>
<tr>
<td>Application date</td>
<td>The release date of the currently loaded STORM application software.</td>
</tr>
<tr>
<td>Application build time</td>
<td>The time of day that the current application software was compiled for release.</td>
</tr>
</tbody>
</table>
5.9.3. View and Configure Pump Setup

Pump setup informs the system about what pumps and pump tubing elements are in use, which allows the system to accurately warn the operator when a job is not compatible with the current pump/tubing setup.

A default configuration is pre-programmed with factory settings that are typical for STORM general use. Always update pump setup to reflect actual pump configuration for the job every time the STORM is powered up to perform seed treating.

From the main menu, select:

**Setup — Pump 1 Setup or Pump 2 Setup**

- Select the pump head type and tubing element type to reflect the physical setup of the STORM system, according to the requirements for the treatment to be applied.
- Select **Back** to abandon any changes and return to the Setup menu.
- Select **Save and Continue** to save changes and return to the Setup menu.
- Select **Advanced** to view or make changes to advanced pump setup parameters under the guidance of AGI service staff.

**Figure 5.5 Pump Setup (Pump 1 and Pump 2)**

<table>
<thead>
<tr>
<th>Pump 1</th>
<th>Motor #1</th>
<th>Pump Head Type:</th>
<th>I/P</th>
<th>Position</th>
<th>1A</th>
<th>1B</th>
<th>1C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Position</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Position</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pump 2</th>
<th>Motor #2</th>
<th>Pump Head Type:</th>
<th>I/P</th>
<th>Position</th>
<th>2A</th>
<th>2B</th>
<th>2C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Position</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 5.5 Pump Setup Screen Fields**

<table>
<thead>
<tr>
<th>Items</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump Head Type</td>
<td>Pump type for the motor/pump position as I/P or L/S (setting applies to all pump heads on the motor).</td>
</tr>
<tr>
<td>Motor</td>
<td>Indicates the ganged pump position: #1 or #2 (pump 1 or pump 2)</td>
</tr>
<tr>
<td>Position</td>
<td>Indicates the ganged pump position: 1A, 1B, 1C (for pump 1) or 2A, 2B, 2C (for pump 2).</td>
</tr>
<tr>
<td></td>
<td>“A” indicates the inner pump head, “B” the middle pump head, and “C” the outer pump head.</td>
</tr>
<tr>
<td></td>
<td>The pump tubing element type for each pump position is displayed as one of the following: L/S 15, L/S 24, L/S 35, I/P 26, I/P 73, or NONE. Each tubing element type must match the pump it is used on. NONE indicates that the pump head is not used (and may not actually be installed).</td>
</tr>
</tbody>
</table>
5.9.4. **VIEW AND CONFIGURE ADVANCED PUMP SETUP**

**Important:** Do not adjust any advanced pump parameters unless directed to do so by an AGI service professional.

From the main menu, select:

**Setup — Pump 1 Setup or Pump 2 Setup — Advanced**

- Select and change the low- and high-speed limits according to the direction of an AGI service professional.
- Select **Back** to abandon any changes and return to the Setup menu.
- Select **Save and Continue** to save changes and return to the Setup menu.

**Figure 5.6 Advanced Pump Setup**

```
<table>
<thead>
<tr>
<th>Principal</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump 1 Low Speed Limit</td>
<td>60</td>
</tr>
<tr>
<td>Pump 1 High Speed Limit</td>
<td>330</td>
</tr>
</tbody>
</table>

**IMPORTANT**

Advanced pump parameters should not be adjusted from the defaults unless guided by an AGI Service Professional.

Default is 60 RPM

Default is 330 RPM

**Back**  **Save and Continue**
5.9.5. **View and Configure Conveyor Options**

*Important:* Do not adjust any conveyor parameters unless directed to do so by an AGI service professional.

From the main menu, select:

**Setup — Conveyor Options**

- Select and change the conveyor drive ratio and Conveyor correction value according to the direction of an AGI service professional.
- Select “Back” to abandon any changes and return to the Setup menu.
- Select “Save and Continue” to save changes and return to the Setup menu.

*Note:* Default Conveyor Drive Ratio is 15.33:1. Default for Seed Flow Correction is 1000 (100%) with limits of 900 to 1100 (+ or - 10%).

**Figure 5.7 Conveyor Options**

![Conveyor Options Interface]

- **Conveyor Gear Box Ratio:** 15.33 : 1 (Default is 15.33)
- **Conveyor Correction Factor:** 1000 (Default is 1000)

Consult an AGI service professional before making adjustments. Changing Drive Ratio value is not recommended. Changing Seed Flow Correction value can seriously affect all metering functions of the STORM.
5.10. JOBS

5.10.1. CREATING A NEW JOB

Up to 20 jobs can be configured and stored for use.

A new job can be created either by starting from a job with all parameters blank, or by copying an existing job and either accepting or editing the parameters for that job.

Attempting to configure more than 20 jobs will result in a warning to the operator that proceeding will over-write the oldest configured job in the system.

Although treatment types are provided for specific Bayer CropScience® products, you can also define up to 10 custom treatment types.

SELECT SEED TYPE AND WEIGHT

1. From the main menu, select Jobs — Start New Job
2. On Job Screen 1, enter the job name, seed type, and seed weight.

Important: Seed weight must be the actual test weight sampled from the seed to be treated, measured using the recommended cox-funnel, cup, and striker method (see “Test Weight Procedure” on page 123). If an accurate seed test weight is not used, treatment may be over- or under-applied.

3. Select the Continue to proceed to the initial treatment product selection screen.

Figure 5.8 Job Screen 1

Table 5.6 Job Screen 1 Parameters

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job Name</td>
<td>Input the name for the job (must be unique)</td>
<td>1-30 letters and numbers</td>
</tr>
<tr>
<td>Seed Type</td>
<td>Select type of seed to be treated from drop down menu</td>
<td>wheat, barley, oatsª, peas, lentils</td>
</tr>
<tr>
<td>Seed Weight</td>
<td>Input the actual seed test weight (see “Test Weight Procedure” on page 119).</td>
<td>160-460 g/0.5L</td>
</tr>
</tbody>
</table>
a. If you have select Oats as your seed type, the conveyor will operate at a fixed speed of 80%. To provide further accuracy of metering, it is recommended to run a batch of 1,000 lbs of seed or more and enter the actual weight of seed at the prompt.

**SELECT TREATMENT(S)**

The system will allow up to two treatment products to be used for a job (including water).

The products are selected as products A and B, and are assigned to specific pumps by the system only after product selection is confirmed by pressing **Continue**.

1. Tap on the space next to the “Product A” or “Product B” fields to display the treatment menu.
2. Set the treatment type as either:
   a. **Bayer CropScience®** treatments: a treatment from the available options (see Figure 5.10),
   or:
   b. **Custom treatments**: select **More** to view and select one of the 10 custom treatment slots that can be defined by the operator (see Figure 5.11). For the selected custom treatment slot:
      • enter a treatment name, the treatment label rate, and any dilution amount that will be used (see Figure 5.11). The application rate is calculated by the system.
      • select **“Save and Continue”** to return to the Job screen.

![Figure 5.9 Treatment Product Selection](image)

![Table 5.7 Treatment Product Selection](table)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product (A or B)</td>
<td>Select to choose treatment product.</td>
</tr>
<tr>
<td>Application rate</td>
<td>Select to enter an application rate for the product (10-1000 ml/100 kg).</td>
</tr>
</tbody>
</table>
Table 5.8 Bayer CropScience® Treatment Product Selection

<table>
<thead>
<tr>
<th>Product Brand</th>
<th>Product Name and Dilution</th>
<th>Label Rate</th>
<th>Application Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raxil</td>
<td>Raxil Pro</td>
<td>325 ml/100kg</td>
<td>325 ml/100kg</td>
</tr>
<tr>
<td></td>
<td>Raxil Pro Shield</td>
<td>375 ml/100kg</td>
<td>375 ml/100kg</td>
</tr>
<tr>
<td></td>
<td>Raxil MD plus Stress Shield 480</td>
<td>363 ml/100kg</td>
<td>363 ml/100kg</td>
</tr>
<tr>
<td></td>
<td>Raxil MD plus Stress Shield 600</td>
<td>350 ml/100kg</td>
<td>350 ml/100kg</td>
</tr>
<tr>
<td>Trilex</td>
<td>Trilex AL</td>
<td>370 ml/100kg</td>
<td>370 ml/100kg</td>
</tr>
<tr>
<td></td>
<td>Trilex EverGol, Diluted 100%</td>
<td>41 ml/100kg</td>
<td>82 ml/100kg</td>
</tr>
<tr>
<td></td>
<td>Trilex EverGol, Diluted 600%</td>
<td>41 ml/100kg</td>
<td>287 ml/100kg</td>
</tr>
<tr>
<td></td>
<td>Trilex EverGol, Diluted 500%</td>
<td>41 ml/100kg</td>
<td>246 ml/100kg</td>
</tr>
<tr>
<td></td>
<td>Trilex EverGol, Diluted 700%</td>
<td>41 ml/100kg</td>
<td>328 ml/100kg</td>
</tr>
<tr>
<td>Stress Shield</td>
<td>Stress Shield 600, Cereals, Diluted 100%</td>
<td>50 ml/100kg</td>
<td>100 ml/100kg</td>
</tr>
<tr>
<td></td>
<td>Stress Shield 480, Cereals, Diluted 100%</td>
<td>63 ml/100kg</td>
<td>126 ml/100kg</td>
</tr>
<tr>
<td></td>
<td>Stress Shield 600 (Low rate), Pulses, Diluted 100%</td>
<td>104 ml/100kg</td>
<td>208 ml/100kg</td>
</tr>
<tr>
<td></td>
<td>Stress Shield 600 (High rate), Pulses, Diluted 100%</td>
<td>208 ml/100kg</td>
<td>416 ml/100kg</td>
</tr>
</tbody>
</table>
3. After the treatments are selected, the screen will show the configured treatments and their application rates (see Figure 5.13).

**Figure 5.13 Job Screen, Application Rates**

<table>
<thead>
<tr>
<th>Product A</th>
<th>Application Rate</th>
<th>325 ml/100kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product B</td>
<td>Application Rate</td>
<td>325 ml/100kg</td>
</tr>
</tbody>
</table>

4. Select **Continue** to proceed to view pump assignment and calibrate the pumps.
**VIEW PUMP ASSIGNMENT AND PERFORM CALIBRATION**

After treatment products are selected, the system assigns the treatment product with the highest application rate to the pump with the highest flow capabilities (if a difference in flow capabilities exists). Similarly, the treatment product with the lowest application rate is assigned to the pump with the lowest flow capabilities.

If both pumps have the same flow capabilities (the same pump, and the same tubing elements), Product A is assigned to Pump 1 and Product B is assigned to Pump 2.

The system also determines the treating speed range based on the capabilities of the pumps, under the assumption that the pump can predictably meter the selected product. The range is subject to change after calibration, when the system determines limits based on actual ability to meter the treatment products.

The status message "Invalid" appears if the treating speed cannot be accomplished for the two products selected (e.g. the high speed limit for pump 1 is lower than the low speed limit for pump 2).

1. The system assigns the configured treatments to separate pumps, determining which pump is most appropriate where any differences between pumps exist. Note the pump assignment, and connect the treatment lines to the appropriate treatment containers.

2. Select **Calibrate** for each pump and proceed with calibration (for calibration procedures, see “Calibration Procedures” on page 83).

![Figure 5.14 Jobs Screen 3, Pump Assignment and Calibration](image)

<table>
<thead>
<tr>
<th>Pump 1</th>
<th>AaBbCcDdEeFfGgHhIiJjKkLlMmNn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Rate</td>
<td>324 ml/100kg</td>
</tr>
<tr>
<td><strong>Calibrate</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pump 2</th>
<th>AaBbCcDdEeFfGgHhIiJjKkLlMmNn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Rate</td>
<td>324 ml/100kg</td>
</tr>
<tr>
<td><strong>Calibrate</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treating Speed</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>status</strong></td>
<td>50%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Buttons: Back, Help, Continue
Table 5.10 Job Screen, Pump Assignment and Calibration

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump</td>
<td>Indicates the pump as Pump 1 or Pump 2. Lists the treatment assigned to that pump (&quot;None&quot; indicates that the pump is not in use for the job)</td>
<td>Pump 1 or Pump 2</td>
</tr>
<tr>
<td>Application Rate</td>
<td>The application rate that is used for the specific treatment.</td>
<td>10 to 600 ml/100kg</td>
</tr>
<tr>
<td>Calibration Number</td>
<td>Calibration amount for known treatments. A default value is provided, that is updated whenever calibration is performed.</td>
<td>250-1500 ml</td>
</tr>
<tr>
<td>Treating Speed</td>
<td>The system-determined treating speed, as a percentage of maximum speed</td>
<td>0-100%</td>
</tr>
<tr>
<td>Status</td>
<td>Displays “Invalid” if the treating speed is not allowable for the combination of the two products selected.</td>
<td>blank or “Invalid”</td>
</tr>
</tbody>
</table>

**SAVE JOB AND PROCEED**

*Note:* After a Job has been saved, the only job parameter that can be changed is Calibration Number.

1. Select **Continue** (see Figure 5.15) to proceed. There are three options available:

   - **Save and Start Treating:** Saves the Job configuration, displays allows the operator to prime the pumps, lines, and jog the conveyor, and then begins the seed treating process at “Step 3: Set Batch Parameters and Begin Seed Treatment” on page 79. Do not proceed to treat seed without first reading the full treatment procedure (see “Seed Treatment” on page 76.) and being completely familiar with the overall operating instructions for the STORM (see “Operation” on page 49.)

   - **Save and Return to Job View:** Saves the Job configuration and then displays the Jobs screen that allows you to view all saved Jobs.

   - **Escape Without Save:** Displays a warning that asks for verification of the request to exit. Selecting **Yes** exits the screen without saving any Job configuration. If **Escape Without Save** was selected by mistake, you can select **No** to return to the job and continue to make changes to Job parameters.

**Figure 5.15 Job Screen Finish Tab**

Parameters will be saved to

AaBbCcDdEeFfGgHhIiJjKkLlMmNnOo
5.10.2. COPY AN EXISTING JOB

1. From the main menu, select:
   Jobs — <select job> — Copy Parameters To a New Job

![Figure 5.16 Copy Job Parameters]

2. Provide a name for the new Job (name must be unique).
3. Modify job parameters according to the required parameters of the new job.
4. Select **Continue** to proceed to save the new job (see “Save Job and Proceed” on page 69 for details on option available when saving a job).

5.10.3. VIEWING CONFIGURED JOBS

From the main menu, select **Jobs**.

Jobs are displayed in several pages. Use “More” and “Back” to page through configured jobs.

Newest created jobs will appear highest in the list.

Selecting a job from the list will take you to Job Options Screen

![Figure 5.17 Jobs Screen]
5.10.4. Deleting a Job

From the main screen, select Jobs — <select job> — Delete — Yes

Figure 5.18 Confirm Job Delete

Are you sure you want to delete all parameters and history attached to Job:

YES Cancel

5.10.5. Viewing Job Parameters

From the main screen, select Jobs — <select job> — Start Treating:

The first job parameter screens are the pump configuration screens, which appear only if the current pump configuration (see Figure 5.26 on page 78) are different than those for the selected job.

Select Continue to view the Job parameters Screen 1 (Figure 5.26), and then select Continue again to view Job parameters Screen 2.

Figure 5.19 Job Parameters
5.10.6. **VIEWING TOTAL AMOUNTS OF SEED TREATED (JOB SPECIFIC)**

1. From the main screen, select **Jobs** — <select job> — **View Job Parameters**
2. Select **Continue Job** — **Seed**.
3. Toggle **Entry Amount Treated/Total Amount Treated**.
   - Entry Amount Treated shows the amount of seed treated so far for the batch in progress (in lbs and kg).
   - Total Amount Treated shows the amount of seed treated in the full history of the selected job (in lbs and kg).

**Figure 5.20 Total Amount Treated (Seed Tab)**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job</td>
<td>The name of the job, used to uniquely identify the job from all other configured jobs.</td>
<td>1-30 letters and numbers</td>
</tr>
<tr>
<td>Seed Type</td>
<td>The type of seed configured for the job.</td>
<td>wheat, barley, oats, peas, lentils, other.</td>
</tr>
<tr>
<td>Seed Weight</td>
<td>The configured seed weight for the job.</td>
<td>g/0.5 L</td>
</tr>
<tr>
<td>Treating Speed</td>
<td>The configured conveyor speed for the job.</td>
<td>50-100%</td>
</tr>
<tr>
<td>Seed Flow Correction</td>
<td>Used only for oats. Represents the cumulative seed flow correction for the oats used in the job.</td>
<td>---</td>
</tr>
<tr>
<td>Pump</td>
<td>Indicates the pump for the adjacent information fields, and displays the name of the treatment assigned to the pump.</td>
<td>Pump 1 or Pump 2</td>
</tr>
<tr>
<td>Application Rate</td>
<td>Displays the application rate configured for the job.</td>
<td>10 to 600 ml/100 kg</td>
</tr>
<tr>
<td>Calibration</td>
<td>Displays the current calibration number for the job.</td>
<td>750-1500</td>
</tr>
</tbody>
</table>
5.10.7. **VIEWING TOTAL AMOUNTS OF TREATMENT USED (JOB SPECIFIC)**

1. From the main screen, select **Jobs — <select job> — View Job Parameters**
2. Select **Continue Job — Pumps**
3. Toggle **Entry Amount** button to **Total Amount**:
   - Entry Amount shows the amount of treatment so far applied to the batch in progress (in litres).
   - Total Amount shows the amount of treatment each pump has ever applied in the full history of the selected job (in Litres).

**Figure 5.21 Total Treatment Applied (Pump Tab)**
5.10.8. VIEWING TREATING HISTORY (ALL JOBS)

From the main screen, select Jobs — History:

The treating history maintains the details of the 100 most recent jobs that have been run, as a comma-separated list.

Pressing **Save to USB** saves the history to a micro-USB flash drive installed in the USB port on the front panel. This button turns green then back to grey when the save is complete.

*The STORM system saves the history file to the USB flash drive path “public/projects/magelis/data/alarm/eventgroup1”, with the file name:*

AHyyymmdd#####.CSV

where:

AH is the prefix for all history files

yy is the year

mm is the month

dd is the day

##### is a six-digit number that identifies multiple files saved on the same day.

**Important:** The treating history file is saved in CSV format, which can be opened in common spreadsheet software (e.g. Microsoft Excel).

If the system estimates that there is room for five or fewer more treatment entries, the following warning message is displayed:

- “Treating History is almost full. Please save records to a USB flash drive to prevent loss of treating history.”

When treating history is completely full, the following warning message is displayed:

- “Treating History is FULL. Oldest treating records will be written over. Please save records to a USB flash drive to prevent loss of treating history.”

**Figure 5.22 Treating History**
5.10.9. Viewing Treating History (Specific Job)

From the main screen, select Jobs <select job> — Job History:

The job treating history maintains the details of the last three times that the selected job has been run to batch completion. Treating history also displays the total number of times the job has been used, as well as the seed type and treatment used.

The newest entry is at the top of the list, and the oldest entry is replaced when a new batch is complete.

**Figure 5.23 Job Treating History**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Seed Lbs</th>
<th>Pump 1 Litres</th>
<th>Pump 2 Litres</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>M</td>
<td>Y</td>
<td>1234.56</td>
<td>1234.1</td>
</tr>
<tr>
<td>D</td>
<td>M</td>
<td>Y</td>
<td>1234.56</td>
<td>1234.1</td>
</tr>
<tr>
<td>D</td>
<td>M</td>
<td>Y</td>
<td>1234.56</td>
<td>1234.1</td>
</tr>
</tbody>
</table>

**Totals**: 1234567 1234.1 1234.1

**Table 5.12 Viewing Job Treating History Parameters**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job</td>
<td>The name of the job.</td>
</tr>
<tr>
<td>Date</td>
<td>The date that the job was run.</td>
</tr>
<tr>
<td>Seed Lbs</td>
<td>The estimated weight of seed treated when the job was complete.</td>
</tr>
<tr>
<td>Pump 1 Litres</td>
<td>The amount of treatment fluid used in this instance of treating for Pump 1.</td>
</tr>
<tr>
<td>Pump 2 Litres</td>
<td>The amount of treatment fluid used in this instance of treating for Pump 2.</td>
</tr>
<tr>
<td>Totals</td>
<td>Provides totals for Seed Lbs, Pump 1 Litres, Pump 2 Litres for all uses of the job (not just the totals for the three most recent uses).</td>
</tr>
<tr>
<td>Number of times Job was used</td>
<td>Indicates the number of times the job has run.</td>
</tr>
</tbody>
</table>
5.11. TREATING AND CALIBRATION

5.11.1. SEED TREATMENT

Before treating a batch of seed, you must first have on hand the seed treatment intended for use, in sufficient quantity for the amount of seed to be treated.

Any mixing or dilution must be done in advance.

The general sequence for operating the STORM unit to treat seed is as follows:

• “Step 1: Prepare the STORM Pumps for Seed Treating” on page 76
• “Step 2: Select a Job to Run” on page 77
• “Step 3: Set Batch Parameters and Begin Seed Treatment” on page 79
• “Step 4: Monitor Job Until Complete” on page 81
• “Cleanup” on page 91

STEP 1: PREPARE THE STORM PUMPS FOR SEED TREATING

The STORM supports various options for

• pump type,
• number of ganged pump heads per pump motor,
• pump tubing element type per pump head,
• nozzle/hose configuration (combined vs. separate flow).

These options generally reflect the operational requirements for specific treatment types.

Before treating:

• Ensure that any required mixing or dilution of treatment has been done, and that the treatment is in a container that is compatible with STORM connectors.
• Ensure that the STORM physical pump and pump tubing element configuration is suitable for the job.
• Ensure that the nozzle configuration is set appropriately for the job (combined flow or separate flow)
• Review the pump, hose, and tubing element configuration information using the STORM touch-screen, and ensure that it matches the physical pump, hose, and tubing element configuration for the intended job.
**STEP 2: SELECT A JOB TO RUN**

*Note:* Instead of running an existing job, the operator can instead either create and immediately run a new job (see "Creating a New Job" on page 64) or copy and immediately run a version of an existing job ("Copy an Existing Job" on page 70).

1. Select the appropriate job from the main **Jobs** menu (**Jobs** — **select job**) or start a new job (see “Creating a New Job” on page 64) and then return to this procedure.

   **Figure 5.24 Jobs Menu**

2. From the Job Options screen for that job, select:
   - "**Start Treating**" to run the current job, or
   - "**Copy Parameters to a New Job**" to create a new job based on the current job ("Copy an Existing Job" on page 70) and return to this procedure.

   **Figure 5.25 Job Options**

3. If the current programmed configuration for either pump is different than those for the selected job (see "View and Configure Pump Setup" on page 61), that pump’s configuration screen is displayed, and the operator is
instructed to ensure that the physical pump and pump tubing element configuration matches the configuration for the job.

**Figure 5.26 Pump Configuration Screens (Pump 1 and Pump 2)**

![Pump Configuration Screens](image)

**Table 5.13 Pump Configuration**

<table>
<thead>
<tr>
<th>Objects</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump Head Type</td>
<td>Displays the pump type for the position as I/P or L/S</td>
</tr>
<tr>
<td>Motor</td>
<td>Displays #1 or #2, indicating the pump position (pump 1 or pump 2)</td>
</tr>
<tr>
<td>Position (label)</td>
<td>Indicates the ganged pump position as 1A, 1B, 1C (for pump 1) or 2A, 2B, 2C (for pump 2). 2A indicates the inner pump head, 2B the middle pump head, and 2C the outer pump head.</td>
</tr>
<tr>
<td>Position (block)</td>
<td>The pump tubing element type for each pump position is displayed as one of the following: LS 15, LS 24, LS35, I/P 26, I/P 73, or NONE. Each tubing element type must match the pump it is used on. NONE indicates that the pump head is not used (and may not actually be installed).</td>
</tr>
</tbody>
</table>

4. Select **Continue** to proceed and view further job information, or **Back** to return to the previous screen.

**Figure 5.27 Job Parameters 1**

![Job Parameters](image)

**Note:** Seed Flow Correction is only shown for Oats.
5. On the job parameters screen, make note of the parameters for the job, and ensure that they show the correct treatment. Note the pump usage, and ensure that the STORM pump hoses are set up in the same way, with each pump hose connected to the correct treatment container.

6. From the job parameters screen, perform a calibration check for each pump being used for the selected treatment. See “Select Continue to proceed to save the new job (see “Save Job and Proceed” on page 69 for details on option available when saving a job).” on page 70 for procedures.

Note: *Cal check is an optional step that is used to ensure that changing conditions (tubing element wear over time, temperature change, treatment batch differences) do not affect accuracy of treatment application.*

7. When the calibration check is complete, ensure that the calibration cylinder is placed back in storage position, and the calibration valves are switched from calibration positions to application positions.

8. Select Continue to proceed with the treatment application procedure (see “Step 3: Set Batch Parameters and Begin Seed Treatment” on page 79).

**STEP 3: SET BATCH PARAMETERS AND BEGIN SEED TREATMENT**

1. From the Job Screen, Select Continue to proceed.

2. Read the warning screen that is displayed (see below):
   - ensure that the auger is started, the gearbox is in the forward position, and the mixing flight is engaged and turning;
   - move calibration valves to treatment setting;
   - ensure that it is safe to proceed with treating seed.

Figure 5.29 Treatment Warning
3. From the treatment warning screen, Select **Continue** to proceed.
4. Ensure that the pump hose-end connectors are connected to the treatment container connector(s).
5. Prime the pump(s): Press and hold the **Prime** button for the selected pump(s) until treatment fluid begins to exit the application nozzles (this is most accurately indicated by an increase of pressure shown on the gauge for the pump being primed).

**Figure 5.30 Prime/Empty Screen**

6. Fill the conveyor by holding down **Jog Conveyor** until one full cleat of seed falls into the treatment application boot.

**Important:** If the conveyor is not initially filled, metering will be out slightly.

7. Set job parameters for the batch on the **Seed Rate** tab:
   - **Batch Size**: the number of lbs of seed to be treated in this batch (0-999,999 lbs).
   - **Treating speed**: increases or decreases the number of bushels of seed treated per minute, according to the allowable rates calculated by the system (50%-100%).

**Note:** Setting a batch size of “0” will cause the job to run continuously. Batch size can be changed during treatment to reduce the initial batch size before the batch has been completed.

**Figure 5.31 Seed Rate Tab Screen**
8. Check the Pumps tab to view pump rates for the job.

Figure 5.32 Pumps Tab

9. Ensure that the auger is running, and adjust the auger throttle to between 2/3 and 3/4 of full throttle.

10. Select Start to begin seed treatment by (from either the Seed Rate or Pumps tab). The conveyor will begin to move, and drop seed past the nozzles and into the boot.

11. Slow the auger speed until seed begins to accumulate in the boot. When the seed level in the boot reaches half-full, (roughly half of the boot flight is exposed), and then increase speed until this level is constant.

   **Important:** The boot should be half full when running, with half of the flight exposed to view.

**STEP 4: MONITOR JOB UNTIL COMPLETE**

During seed treatment, you have the following options:

- Select seed rate or pumps tabs to monitor job progress (Seed or Pumps);
- Increase or decrease treating speed;
- Start or stop the job in progress (Start or Stop button);
- Monitor motor RPM and power supply (see Diagnostics screen).

   **Important:** Increasing or decreasing the treatment rate adjusts the pump rate and conveyor speed.

While the STORM is processing a job, it is important to monitor the following:

- **Seed level in Boot:** Always ensure that the boot is always half-full (half the boot flight should be exposed above the seed).
  - If less than half of the boot flight is visible, increase the speed of the auger.
  - If more than half of the boot flight is visible, decrease the speed of the auger.

**WARNING**

Failure to regulate auger speed can result in auger plugging, which can cause damage to equipment and endanger personnel.
- **Seed level in hopper**: Always ensure that the STORM hopper is fully flooded, and that there is enough seed in the supply to complete the job.

- **Treatment fluid level**: Always ensure that there is sufficient supply of treatment fluid on-hand to complete the job, and do not allow the treatment fluid lines run dry during a job. If a treatment container is close to empty, be prepared to pause (**Stop**) the job and switch to a full container. If a container runs dry during a job:
  a. stop the job,
  b. connect a new treatment container,
  c. prime the pump, and
  d. resume the job.

When a batch is complete, the conveyor will stop and a “Treating Complete” screen is displayed. For all seed types except oats, a standard screen is always displayed. For oats, a special screen is presented each time that a job is run.

**Figure 5.33 Treating Complete**

At the standard treatment complete screen, record the displayed treatment information as needed, and select “Return to Job Options” to return to the main Jobs screen. Either proceed to treat more seed, or clean up the STORM for future use.

**Important:** OATS: For a job’s first batch complete screen, enter the actual amount of seed treated (as weighed using a calibrated scale). The system calculates a new seed flow correction value to be used in the next batch. Enter “Continue” to proceed to treat the next batch at an optimized treatment coverage. For all batches that follow, the system calculates and provides an estimate for actual seed treated.

**STEP 5: COMPLETION**

When a job is complete, the operator should use the Flush Out screen functions (**Maintenance — Flush Out**) to run the pumps backward until the treatment fluid in the lines is returned to the treatment container.
5.11.2. CALIBRATION PROCEDURES

Pump tests are used to calibrate the system to ensure that the amount of treatment being applied to the seed is accurate. There are three stages to calibration, as described below:

- Product flow test
- Pump compensation test
- Calibration check test

Accurate calibration is determined by measuring the amount of treatment fluid pumped into the calibration cylinder, and then entering the amount pumped into the STORM calibration system.

**Important:** Before use, the pump tubing element break-in procedure should always be performed once for all new tubing elements (see “Pump Tubing Elements Break-in” on page 50).

**PREPARE SYSTEM FOR CALIBRATION**

1. Set the calibration valves according to the Calibrate position for the specific pump to be calibrated, as shown on the Operating Procedure decal that is located on the STORM valve assembly (see below).

**Figure 5.34 Operating Procedure Decal (Calibration Valve Positions)**

**Important:** If the valves are set incorrectly, damage to equipment may occur when the pump is activated as part of the calibration process.
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2. Unlatch the calibration cylinder and let it hang freely.

Figure 5.35 Unlatching the Calibration Cylinder

STEP 1: PRODUCT FLOW TEST:

1. Ensure that the calibration valves and cylinder are positioned for calibration (see “Prepare System for Calibration” on page 83.)
2. Use the Prime and Empty buttons as required to ensure that the treatment fluid reaches the bottom mark on the cylinder.
3. From the Job screen, select Calibrate or Check Cal for the pump to be calibrated (Pump 1 or Pump 2).

Note: When Check Cal is performed, it uses the calibration number obtained in initial calibration as the starting point for expected results.

Figure 5.36 Select “Calibrate” or “Check Cal”
4. The system will display the first calibration message screen, warning the operator to set the calibration valves correctly for the pump to be calibrated.

**Figure 5.37 Calibration Valves Warning**

![Important](image)

- Confirm connection to the correct pump
- Ensure pump tubing is properly installed
- Make sure liquid system is free of air leaks and flow obstructions
- Set Calibration Valves to the proper positions for the pump being calibrated

Continue

5. Use the **Prime** button to fill the calibration cylinder up to roughly 500 ml to ensure that all air bubbles are removed from the line, then press the **Empty** button to empty the cylinder to the 0 ml mark.

6. Press **Start Test** to begin the product flow test.

**Figure 5.38 Product Flow Test (1A)**

<table>
<thead>
<tr>
<th>Step 1A</th>
<th>Product Flow Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use the Prime and Empty buttons to set the liquid to the zero mark on the calibration cylinder.</td>
<td>Expected Pump RPM</td>
</tr>
<tr>
<td>Prime (Push &amp; Hold)</td>
<td>1234 rpm</td>
</tr>
<tr>
<td>Empty (Push &amp; Hold)</td>
<td>Time of Test</td>
</tr>
<tr>
<td>Back</td>
<td>123.1 Sec</td>
</tr>
<tr>
<td>Start Test</td>
<td></td>
</tr>
</tbody>
</table>

7. The pump will begin filling the calibration cylinder, and will stop after a set amount of time.

8. Enter the amount that was collected by pressing the touchscreen and then using the touchscreen keypad.

**Figure 5.39 Product Flow Test (1B)**

<table>
<thead>
<tr>
<th>Step 1B</th>
<th>Product Flow Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump RPM</td>
<td>Enter the Amount Collected</td>
</tr>
<tr>
<td>1234 rpm</td>
<td></td>
</tr>
<tr>
<td>Time of Test</td>
<td>123.1 Sec</td>
</tr>
<tr>
<td>1234 ml</td>
<td>Continue</td>
</tr>
<tr>
<td>Abort Test</td>
<td></td>
</tr>
</tbody>
</table>
9. Press **Continue** to proceed.
   - If the amount collected is less than 800 ml or more than 1200 ml, the system will declare calibration failure. Empty the calibration cylinder and then press **Continue** to return to the Job screen.

**Figure 5.40 Calibration Failed Message**

![Red IMPORTANT message indicating calibration failed.]

- If the amount collected is between 980 ml and 1020 ml, the flow test is passed, and no further calibration is required for that pump.

**Figure 5.41 Calibration Successful Message**

![Green IMPORTANT message indicating calibration successful.]

- If the amount collected is between 800 ml and 1200 ml, the system will require the operator to proceed with the next calibration step (pump compensation test). Press **Continue** to Step 2 to proceed with further calibration steps.

**Figure 5.42 Product Flow Test Complete (1C)**

![Green screen with ESC and Continue options.]

Step 1C - Product Flow Test for Pump is Complete
STEP 2: PUMP COMPENSATION TEST

During the pump compensation test, the system uses data from the product flow test to compensate for the flow qualities of the treatment product, and adjust pump calibration accordingly.

1. Use the **Prime** and **Empty** buttons as required to ensure that the treatment fluid reaches the 0 ml mark on the cylinder.

2. Select **Start Test** from the Calibration screen.

**Figure 5.43 Pump Compensation Test (2A)**

3. Enter the reading in the field labeled “Enter the Amount Collected”.

**Figure 5.44 Pump Compensation Test (2B)**

4. Press **Continue** to proceed.
   - If the amount collected is less than 900 ml or more than 1100 ml, the system will declare calibration failure. Empty the calibration cylinder and press **Continue** to return to the Job screen.
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Figure 5.45 Calibration Failed Message

**IMPORTANT**

Calibration Failed.
The amount collected in the test is outside of the expected range. The cause may be equipment or product related. Consult the Operation Manual or an AGI Service Professional for next steps.

Please empty the calibration cylinder before proceeding.

- If the amount collected is between 980 ml and 1020 ml, the test is passed, and no further calibration is required for that pump.

Figure 5.46 Calibration Successful Message

**IMPORTANT**

Congratulations!
Calibration Successful!

Please empty the calibration cylinder before proceeding.

- If the amount collected is between 900 ml and 1100 ml, the system will require the operator to proceed with the final calibration step (pump calibration check). Press Continue to Step 3 to proceed with further calibration steps.

Figure 5.47 Compensation Test Complete

Step 2C - Pump Compensation Test for Pump is Complete

Continue to Step 3
**STEP 3: PUMP CALIBRATION CHECK TEST**

The pump calibration check test is the third calibration test for any new job.

During the pump calibration check, the system compares the amount of product pumped during the test to the expected amount (based on previous tests), and the test is passed or failed according to whether or not the amount of product collected is between 980 and 1020 ml.

1. Ensure that the calibration valves and cylinder are positioned for calibration (see “Prepare System for Calibration” on page 83.)
2. Use the **Prime** and **Empty** buttons as required to ensure that the treatment fluid reaches the bottom mark on the cylinder.
3. Select **Start Test** from the Calibration screen.

**Figure 5.48 Pump Calibration Check Test (3A)**

<table>
<thead>
<tr>
<th>Step 3A Calibration Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use the Prime and Empty buttons to set the liquid to the zero mark on the calibration cylinder.</td>
</tr>
<tr>
<td>Expected Pump RPM</td>
</tr>
<tr>
<td>1234 rpm</td>
</tr>
<tr>
<td>Time of Test</td>
</tr>
<tr>
<td>123.1 Sec</td>
</tr>
</tbody>
</table>

4. Enter the reading in the field labeled “Enter Amount Collected”.

**Figure 5.49 Pump Calibration Check Test (3B)**

<table>
<thead>
<tr>
<th>Step 3B Calibration Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump RPM</td>
</tr>
<tr>
<td>1234 rpm</td>
</tr>
<tr>
<td>Enter the Amount Collected</td>
</tr>
<tr>
<td>Time of Test</td>
</tr>
<tr>
<td>123.1 Sec</td>
</tr>
<tr>
<td>1234 ml</td>
</tr>
</tbody>
</table>

5. Press **Continue** to proceed.
   - If the amount collected is less than 980 ml or more than 1020 ml, the system will declare the test failed. Empty the calibration cylinder and press **Continue** to return to the Job screen.
5. OPERATION STORM SEED TREATER
5.11. TREATING AND CALIBRATION OPERATION AND MAINTENANCE MANUAL

Figure 5.50 Calibration Failed Message

IMPORTANT
Calibration Failed.
The amount collected in the test is outside of the expected range. The cause may be equipment or product related. Consult the Operation Manual or an AGI Service Professional for next steps.
Please empty the calibration cylinder before proceeding.

Empty (Push & Hold)  Continue

• If the amount collected is between 980 ml and 1020 ml, the test is passed, and no further calibration is required for that pump.

Figure 5.51 Calibration Successful Message

IMPORTANT
Congratulations!
Calibration Successful!
Please empty the calibration cylinder before proceeding.

Empty (Push & Hold)  Continue

6. Select Continue to return to the Job screen.
7. Perform the test for any untested pump if it is to be used for treatment in the configured job.
8. When both pumps have been fully tested, press the Empty button to fully empty treatment fluid from the lines.
9. Confirm that the calibration cylinder is empty, disconnect the cylinder, rinse it thoroughly, then reconnect it.
10. Move the cylinder to the storage position.

**Figure 5.52 Calibration Cylinder, Storage Position**

11. Switch the calibration valve from the “Calibrate” position to the “Treating” position.

12. On the Job screen, select **Finish**.

### 5.11.3. **Cleanup**

The STORM boot and pump tubing should be thoroughly cleaned:

- after general use,
- between jobs that use different seeds or treatment fluid

Before cleaning out the boot, pump hoses should be flushed (either with water or with an approved cleaning agent).

**Disposal of Rinse Water from Seed Treater**

- Do not discharge rinse fluid to ground, surface water or septic systems.
- Minimize rinse fluid: wash out equipment only when necessary.
- Re-use rinse fluid if possible to dilute the next batch of the same or similar formulation (where applicable), but be aware of the potential for cross contamination if the next formulation used contains different active ingredients. Factor in the potential for increased concentration of active ingredient, if significant amounts of rinse fluid are used.

**Note:** *Treated seed cleaned out of bottom of auger should not be left on the ground. It must be handled in accordance with the product manufacturer’s recommendations.*

**To Flush Hoses:**

1. Ensure that the intake end of the STORM is raised off the ground with a rinse-fluid catch container under the boot.
2. Open the clean-out hatches on the bottom of the boot fully.
3. Prepare and place a pail of rinse fluid (water or some other approved cleaning fluid) within reach of the hoses.

4. Disconnect the treatment lines from the treatment containers, and connect a male half adapter to each hose connector.

5. Place the hose ends into a container of rinse fluid.

6. Select **Maintenance — Flush Out** from the main menu to activate the pumps and flush the lines with rinse fluid.

   **Note:** You can either pump the rinse water through in one direction (forward), or alternate pumping a small volume of water back-and-forth to reduce the amount of rinse water to be disposed.

7. When the lines are determined to be fully flushed, pull the lines out of the pails and position them so that the connectors can drain.

8. Select **Maintenance — Flush Out** from the main menu to activate the pumps and push air through the line for several minutes to displace any remaining rinse water.

9. Disassemble and clean the treatment filters.

10. When the hose connectors are dry, disconnect the female half connectors and store them for future use.

11. Coil the treatment hoses and place the connectors in storage positions.

**To Flush Out the Treatment Application Boot**

1. Ensure that the intake end of the STORM is raised of the ground with a rinse-water catch container under the boot.

2. Close and secure the clean-out hatch on the bottom of the boot.

3. Pour 20 litres of water into the boot through the conveyor top inspection hatch.

4. Run the auger in reverse at idle for 3 to 5 minutes.

5. Open the bottom door to release the rinse water into the catch container.

6. Use a hose to spray any further residue that may remain in the boot, but avoid spraying water on the conveyor.

**Empty Untreated Seed From the Conveyor and Hopper**

Untreated seed that remains in the intake hopper and conveyor can be dumped through the conveyor’s bottom clean-out hatch into a clean catch container.

1. Ensure that the intake end of the STORM is raised of the ground with a clean catch container positioned under the conveyor bottom clean-out hatch.

2. Open the conveyor clean-out hatch.

3. Select **Maintenance — Flush Out** from the main menu, and ensure that both pumps are set to **OFF** and the conveyor is set to **ON**.

4. Set the conveyor direction to **Reverse**.

5. Select **Start** to engage the conveyor and begin emptying the intake hopper and conveyor contents into the catch container.

6. Select **Stop** to stop the conveyor.

7. Remove the catch container of untreated seed, and close and secure the clean-out hatch.
5.12. PUMP AND CONVEYOR CONTROLS

5.12.1. FLUSH OUT

The Flush Out function allows the operator to set pump and the conveyor direction (forward or reverse), and specify the state (on or off) for each when START is pressed.

From the main menu, select:

Maintenance — Flush Out

Set the conveyor direction (forward or reverse) and state (on or off) to reflect the conveyor action when START is selected.

Set the pumps direction (Forward or Reverse, to apply to both pumps) and state (on or off for each pump) to reflect the pump action when START is selected.

- Select START to engage the setting.
- Select STOP to disengage the settings.

Figure 5.53 Flush Out Menu

Use for flushing system with water or cleaning agent and for clearing the conveyor of seed

START

Conveyor
Reverse
On

Forward
On

Pump 1
Off

Pump 2

Back

5.12.2. TRANSFER AND MIX

See the documentation included with the Transfer and Mix kit for further information.
5.13. DIAGNOSTIC INFORMATION

5.13.1. View Lifetime Total Use

Lifetime total use is the amount of time that the STORM has spent actively treating seed, and does not include the amount of time spend powered up but not treating seed.

From the main menu, select Maintenance:

Figure 5.54 Maintenance Menu

Table 5.14 Maintenance Menu Information

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifetime Total Use</td>
<td>Shows the total number of hours the unit has actively treated seeds (0-999999 h).</td>
</tr>
</tbody>
</table>
5.13.2. **View Diagnostics**

- **Pre-operational diagnostics** can be viewed before running a job, and are used to verify that the conveyor and pumps are reporting adequate supply voltages before a job is running.

- **Operational diagnostics** are viewed while a job is running, and can be used to determine if the overall system performance is adequate by providing access information related to system performance under operational load.

To view pre-operational diagnostics, from the main menu select:

**Maintenance**

To view operational diagnostics, select the wrench symbol on any Seed or Pumps screen of a running job.

**Figure 5.55 Diagnostics Screens**

![Diagnostics Screens](image)

**Table 5.15 Pre-operational Diagnostic Information**

<table>
<thead>
<tr>
<th>Items</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains voltage conveyor</td>
<td>The voltage supply measured at the conveyor. Should be between 115 and 130 VAC.</td>
</tr>
<tr>
<td>Mains voltage Pump 1</td>
<td>The voltage supply measured at the Pump 1 motor. Should be between 115 and 130 VAC.</td>
</tr>
<tr>
<td>Mains voltage Pump 2</td>
<td>The voltage supply measured at the Pump 2 motor. Should be between 115 and 130 VAC.</td>
</tr>
<tr>
<td>Conveyor status</td>
<td>Conveyor motor status.</td>
</tr>
<tr>
<td>Pump 1 status</td>
<td>Pump 1 motor status.</td>
</tr>
<tr>
<td>Pump 2 status</td>
<td>Pump 2 motor status.</td>
</tr>
</tbody>
</table>

**Table 5.16 Operational Diagnostic Information**

<table>
<thead>
<tr>
<th>Items</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conveyor</td>
<td>Conveyor speed (belt RPM).</td>
</tr>
<tr>
<td>Conveyor Motor</td>
<td>Conveyor motor speed (RPM).</td>
</tr>
<tr>
<td>Pump 1</td>
<td>Pump 1 motor speed (RPM).</td>
</tr>
<tr>
<td>Pump 2</td>
<td>Pump 2 motor speed (RPM).</td>
</tr>
<tr>
<td>Mains Voltage</td>
<td>Supply voltage, as detected by the control box. Should be between 115 and 130 VAC.</td>
</tr>
<tr>
<td>Total Amps</td>
<td>Total system power draw, as measured by the control box (Amps).</td>
</tr>
</tbody>
</table>
5.13.3. ALARMS

The alarms screen displays the last six control box errors, listed with the newest alarm on the top of the list. When the list is full, the oldest alarm entry is erased as a new alarm is recorded.

VIEWING ALARMS

To view Alarms, select Alarms from the main menu.

Figure 5.56 Alarms Screen

<table>
<thead>
<tr>
<th>Alarms</th>
<th>Date</th>
<th>Time</th>
<th>Error Code</th>
<th>Alarm Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Alarms are service-affecting, and interrupt operator activity with an error screen.

To attempt to clear these alarm, see the alarm descriptions in Table 5.17, and follow any instructions, including those provided on the STORM display. Be prepared to contact an AGI service professional as required.

Figure 5.57 Alarms Declaration Screens

**IMPORTANT**

The Treating Operation did not finish properly, possibly due to a Power Interruption. The STORM Treater will return to the Operations Screen.
### Table 5.17 Alarm Descriptions

<table>
<thead>
<tr>
<th>Alarm #</th>
<th>Error Description</th>
<th>Controller Display (AGI Service Only)</th>
<th>What it means</th>
<th>Action(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>ModBus Communication Error(^a)</td>
<td>SLF1</td>
<td>HMI is unable to communicate with motor controller(s.)</td>
<td>Reboot Controller. Unplug the Control Box and wait for 30 seconds before plugging back in.</td>
</tr>
<tr>
<td>9</td>
<td>OverCurrent Error(^b)</td>
<td>OCF</td>
<td>Motor is drawing too much current. Motor is overloaded.</td>
<td>Let unit cool down. Reduce load by lowering treating speeds if problem persists.</td>
</tr>
<tr>
<td>16</td>
<td>Drive Over-Heat Error(^c)</td>
<td>OHF</td>
<td>Motor Controller has overheated.</td>
<td>Let unit cool down. Reduce load by lowering treating speeds if problem persists.</td>
</tr>
<tr>
<td>17</td>
<td>Motor OverLoad Error(^d)</td>
<td>OLF</td>
<td>Motor is over-loaded.</td>
<td>Let unit cool down. Reduce load by lowering treating speeds if problem persists.</td>
</tr>
<tr>
<td>19</td>
<td>Mains OverVoltage Error</td>
<td>OSF</td>
<td>Input Voltage Fault. Input voltage exceeds 130 Volt limit.</td>
<td>Check power supply. If using a generator check for an over-speed condition.</td>
</tr>
<tr>
<td>20 or 33</td>
<td>Output Phase Loss Error</td>
<td>OPF1 OPF2</td>
<td>Loose Wire on the output side of the motor controller.</td>
<td>Check motor electrical connections. Check motor supply cables for damage. If problem persists, contact an AGI Service Specialist.</td>
</tr>
<tr>
<td>21</td>
<td>Input Phase Loss Error</td>
<td>PHF</td>
<td>Loss of Input power.</td>
<td>If problem persists, contact an AGI Service Specialist.</td>
</tr>
<tr>
<td>22</td>
<td>UnderVoltage Error</td>
<td>USF</td>
<td>Input Voltage Fault - voltage too low. Power source inadequate.</td>
<td>Check power source. Source unable to provide adequate power. Supply cable exceeds recommended maximum length or gauge too high. Power source is not dedicated to STORM.</td>
</tr>
<tr>
<td>23 or 56</td>
<td>Motor Short Circuit Error</td>
<td>SCF1 or SCF5</td>
<td>Motor Shorted. Could be caused by a loose wire or a motor failure.</td>
<td>Check for loose wiring at motor. Replace motor if failed.</td>
</tr>
<tr>
<td>25</td>
<td>AutoTuning Error</td>
<td>tnF</td>
<td>Controller did not initialize properly.</td>
<td>Reboot Controller. Unplug the Control Box and wait for 30 seconds before plugging back in.</td>
</tr>
<tr>
<td>32</td>
<td>Circuit Shorted to Ground Error</td>
<td>SCF3</td>
<td>Supply wires to the motors shorted.</td>
<td>Check motor electrical connections. Check motor supply cables for damage. If problem persists, contact an AGI Service Specialist.</td>
</tr>
</tbody>
</table>

\(^a\) Often occurs when control box is not powered down for 30 seconds after a software upload.

\(^b\) May occur if conveyor or pumps have excessive drag.

\(^c\) May occur if conveyor or pumps have excessive drag.

\(^d\) May occur if conveyor or pumps have excessive drag.
6. STORM Treatment Section Maintenance

WARNING Before continuing, ensure you have read and understand the relevant information in the safety section. Safety information is provided to help prevent serious injury, death, or property damage.

Note: Use only genuine replacement parts or equivalent. Replacement parts such as intake guards, pulley guards, winches and lift cables must meet ASAE standards or serious injury may result. Use of unauthorized parts will void warranty. If in doubt, contact your dealer. Do not modify any auger components.

6.1. MAINTENANCE SCHEDULE

See Table 6.1 for the STORM maintenance schedule.

Table 6.1 STORM Maintenance Schedule

<table>
<thead>
<tr>
<th>ITEM</th>
<th>8 h</th>
<th>Daily</th>
<th>Weekly</th>
<th>Two Weeks</th>
<th>Yearly</th>
<th>Post-Flush</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOTORS (Pump and Conveyor)</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>Clean any dust from fan enclosure with compressed air and ensure fan spins freely.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>Check electrical cables for damage.</td>
</tr>
<tr>
<td>PUMPS</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td>Ensure pump rotors and rollers are spinning free.</td>
</tr>
<tr>
<td>CHAIN</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Clear of debris and spray with chain oil, check tension.</td>
</tr>
<tr>
<td>CONVEYOR BELT</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>Check belt tracking, adjust with tracking bolts on front bearings.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>Check belt tension, adjust if needed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>Inspect belt for cracks and wear on edges, both sides of belt.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td>Remove belt lacing and inspect for damage, replace if needed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Thoroughly clean belt and lacing from outside with high pressure water hosing.</td>
</tr>
<tr>
<td>CONVEYOR ROLLERS</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>Inspect rollers and lagging. Ensure that rollers spin freely. If damaged replace lagging/roller.</td>
</tr>
<tr>
<td>WINDOWS</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Inspect for loosening/cracking, and tighten or replace as required.</td>
</tr>
<tr>
<td>NOZZLES</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>Ensure that nozzles have not rotated or clogged.</td>
</tr>
<tr>
<td>STRAINERS</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>Unscrew cap and rinse residue from strainer, replace same cartridge. Replace cartridge only if damaged.</td>
</tr>
<tr>
<td>ENGINE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Consult Kohler Manual.</td>
</tr>
</tbody>
</table>
6.2. PREPARING FOR STORAGE

See Table 6.3 for a list of activities required to prepare the STORM assembly for seasonal storage. See the operation manual for the equipped auger for auger-specific information.

Table 6.2 Seasonal Storage Activities and Maintenance

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Activity/Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grease points</td>
<td>Check all grease points (bearings, zerks, chains), and ensure they are sufficiently well greased.</td>
</tr>
<tr>
<td>Bolts and rivets</td>
<td>Inspect all bolts and rivets. Tighten loose bolts and replace any rivets that are loose or missing.</td>
</tr>
<tr>
<td>Control Box</td>
<td>Depress emergency stop button.</td>
</tr>
<tr>
<td>Conveyor, belt, and rollers</td>
<td>Check chain for grease condition. Ensure the belt is thoroughly clean. Run conveyor forward and backward: check for tracking problems, unusual noise, and stiff rollers. Inspect edge of lacing with contact cement or cyanoacrylate based adhesive. Place into transport position and lock in place.</td>
</tr>
<tr>
<td>Pumps and hoses</td>
<td>Flush all lines, blow out with compressed air. Disassemble and clean treatment filters. Fill lines with antifreeze. Ensure pump shoe are open to remove pressure on pump tubing elements.</td>
</tr>
<tr>
<td>Storm Components</td>
<td>Cover unit using supplied covers.</td>
</tr>
</tbody>
</table>
See Table 6.2 for a list of activities recommended to prepare the STORM assembly for use after seasonal storage. See the operation manual for the equipped auger for auger-specific information.

Before proceeding to treat seed, it is recommended that the operator also follow the pre-operational checks in “Pre-operational checks (first 1000 bu)” on page 51.

### Table 6.3 Preseason Maintenance

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Activity/Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grease points</td>
<td>Check all grease points (bearings, zerks, chains), and ensure that they are sufficiently well greased.</td>
</tr>
<tr>
<td>Bolts and rivets</td>
<td>Inspect all bolts and rivets. Tighten loose bolts and replace any rivets that are loose or missing.</td>
</tr>
<tr>
<td>Control Box</td>
<td>Release emergency stop button. Check for software updates and upgrade system software if available.</td>
</tr>
<tr>
<td>Conveyor, belt, and rollers</td>
<td>Check chain for grease condition. Ensure the belt is thoroughly clean. Run conveyor forward and backward: check for tracking problems, unusual noise, and stiff rollers. Inspect edge of lacing with contact cement or cyanoacrylate based adhesive</td>
</tr>
<tr>
<td>Pumps and hoses</td>
<td>Drain and collect antifreeze from treatment lines. Store the antifreeze for further use or dispose of safely. Flush all hoses and lines with water, and dispose of rise-water safely (it will contain anti-freeze if proper storage precautions were taken). Check all connectors and hoses for kinks, leaks, or wear. Ensure pump shoes are closed. Run pumps forward and backward, and check for any unusual noise or actions.</td>
</tr>
</tbody>
</table>
7. STORM AUGER SECTION MAINTENANCE

WARNING  Before continuing, ensure you have read and understand the relevant information in the safety section. Safety information is provided to help prevent serious injury, death, or property damage.

The STORM has been designed and manufactured to meet the highest standards, while requiring minimal maintenance. Following a careful service and maintenance program will provide many years of trouble-free service.

When performing adjustments, service, or repairs:

• Always take safety into consideration and note “Maintenance Safety” on page 9.
• Use extra caution when cleaning and servicing augers because flighting edges can become sharp.
• Follow proper procedures when mounting a tire on a rim. If in doubt, have a qualified tire repair service perform the required maintenance.

NOTICE

Do not modify the equipment.
Unauthorized modification may impair the function or safety of the equipment, could affect the life of the equipment, and will void your warranty.

7.1. FLUIDS & LUBRICANTS

ENGINE OIL
Refer to engine operation manual for recommended oil usage.

GEAR OIL
Use SAE approved 90W or equivalent gear oil.

HYDRAULIC OIL
An ISO viscosity 32 heavy duty industrial hydraulic mineral oil is recommended.

GREASE
Use SAE multi-purpose high-temperature grease with extreme pressure (EP) performance or SAE multi-purpose lithium based grease.
7.1.1. Storage & Handling

Always follow manufacturer’s guidelines for the safe and effective storage and handling of lubricants.

Your machine can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture, and other contaminants.

7.2. Maintenance Intervals

Refer to Section 7.3. for details of service.

Table 7.1 Maintenance Intervals

<table>
<thead>
<tr>
<th>Maintenance Procedure</th>
<th>Time Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Daily (8000)BU</td>
</tr>
<tr>
<td>Visually Inspect the Unit</td>
<td>7.3.1.</td>
</tr>
<tr>
<td>Check engine oil level</td>
<td>7.3.7.</td>
</tr>
<tr>
<td>Check Air Filter</td>
<td>7.3.7.</td>
</tr>
<tr>
<td>Service Upper Chain Drive</td>
<td>7.3.2.</td>
</tr>
<tr>
<td>Service Belts</td>
<td>7.3.12.</td>
</tr>
<tr>
<td>Grease Machine</td>
<td>7.3.3.</td>
</tr>
<tr>
<td>Check Gear Box Oil Level</td>
<td>7.3.8.</td>
</tr>
<tr>
<td>Clean Machine</td>
<td>7.3.4.</td>
</tr>
<tr>
<td>Service Engine</td>
<td>7.3.7.</td>
</tr>
<tr>
<td>Repack Wheel Bearings</td>
<td>7.3.5.</td>
</tr>
<tr>
<td>Tighten Wheel Bolts</td>
<td>7.3.6.</td>
</tr>
<tr>
<td>Change Gear Box Oil</td>
<td>7.3.9.</td>
</tr>
<tr>
<td>Change Hydraulic Oil Filter</td>
<td>7.3.10.</td>
</tr>
<tr>
<td>Add or Replace Hydraulic Oil</td>
<td>7.3.11.</td>
</tr>
</tbody>
</table>
7.3. MAINTENANCE PROCEDURES

7.3.1. VISUAL INSPECTION

Before beginning the visual inspection, chock auger wheels and ensure that all operators are aware of safety precautions.

When inspecting look for possible defects, and the following:

- Ensure all guards are in place, and in good working order.
- Examine the auger for damage or unusual wear.
- Inspect the machine for evidence of oil leaks.
- Examine hydraulic hoses and fittings for leaks and cracks.
- Be sure all safety decals are in place and are legible.
- Check that drive belts are not frayed or damaged. Ensure they are properly adjusted and aligned.
- Check that PTO driveline is connected securely (where applicable).
- Check that the discharge spout and intake area are free of obstructions.
- Ensure that intake housing fasteners are properly secured.
- Examine all flighting for damage or unusual wear.
- Examine tires for gashes, uneven wear, or loss of air pressure.
- Inspect auger shaft bushing for unusual wear or discoloration.
- Inspect all truss cables for tension, and possible failure points.
- Inspect winch cable for fraying, kinks, unwinding, or other possible damage.

7.3.2. SERVICING UPPER CHAIN DRIVE

1. Lock out power.
2. Remove cover plate from discharge end of auger.
3. Check chain slack.
   - Chain slack is checked at the midpoint of the longest span. It should be no more than 5/16” (8 mm).

NOTICE

Improper adjustment of chain will result in premature wear.
4. Adjust the chain slack.
   • Remove the connecting link from the chain.
   • Remove a link from the chain; if the chain will not fit with one link removed, add a half link to the chain and replace.
5. Grease the chain with appropriate lubricant (Section 7.1.)
6. Reattach cover plate.

7.3.3. Greasing Machine

**Important:** Original equipment bearings used by Wheatheart are sealed units and will not accept grease.

1. Lockout all power.
2. Use grease recommended in Section 7.1. to grease the upper chain drive grease zerk and the boot auger flight bushing (located under the hitch on the boot).
3. Use only a hand-held grease gun.
4. Wipe grease fitting with a clean cloth before greasing to avoid injecting dirt and grit.
5. If a fitting will not take grease, remove and clean thoroughly. Also clean lubricant passageway. Replace fitting if necessary.
6. Replace and repair broken fittings immediately.

7.3.4. Cleaning Machine

1. Lockout all power.
2. Clean out excess seed from auger tube and intake.
3. Make sure nothing is obstructing the auger intake so water can run out.
4. Wash the tube with a water hose or pressure washer until all dirt, mud, debris, or residue is washed from the auger.
5. Provide sufficient time for the water to drain from the auger.

7.3.5. Repacking Wheel Bearings

1. Block wheels and ensure unit is stable.
2. Remove the wheel bolts and the wheels.
3. Remove the wheel bearing and pack with grease. Refer to Section 7.1. for recommended grease.
7.3.6. **Tightening Wheel Bolts**

1. Clean wheel and hub mounting surfaces to ensure there is no rust or debris.
2. Install the wheel and “finger tighten” the wheel bolts. Inspect to make sure the wheel is sitting flush with the hub.
3. Tighten the wheel bolts with a torque wrench to 80 ft-lb (±10 ft-lb) of torque.

*Note:* Tighten the wheel bolts in a diagonal pattern as in Figure 7.2.

![Figure 7.2 Diagonal Pattern](image)

7.3.7. **Service Engine**

1. See engine operation manual for service requirements.

7.3.8. **Checking Gearbox Oil Levels**

1. Lock out all power.
2. Remove oil filler plug.
3. Make sure the gearbox is half full (center of cross shaft) and free of foreign objects. Gearbox should be level when checking gears.

7.3.9. **Changing Gearbox Oil**

1. Remove guards and gearbox from auger.
2. Place a pan under the drain plug.
3. Use a wrench and remove the drain plug.
4. Loosen the filler plug so air can enter the gearbox and the oil will drain freely.
5. Allow the oil to drain completely.
6. Replace the drain plug.
7. Add oil until the gearbox is half full (center of cross shaft) and replace filler plug. Gearbox should be level when checking or refilling. Do not overfill.
8. Reinstall gearbox and guards.
7.3.10. Changing the Hydraulic Oil Filter

Change the hydraulic oil filter once a year (minimum), and more often according to the number of hours of use specified by the oil filter manufacturer.

**NOTICE**

Failure to replace the oil filter regularly will contribute to wear of hydraulic components, and may decrease the effective life span of the hydraulic fluid.

7.3.11. Adding or Replacing Hydraulic Fluid

You will be required to top up the hydraulic tank occasionally to make up for fluid losses that may occur (e.g. changing the oil filter or other hydraulic components). When adding hydraulic oil to the hydraulic tank, make sure that the oil you are adding is compatible with the oil already in the tank.

**NOTICE**

Topping up the hydraulic tank with an incompatible oil may decrease the post pounder’s performance, and may damage hydraulic components.

After all PTO kit components have been installed correctly, fill the hydraulic tank with hydraulic oil as follows:

1. Remove the hydraulic tank cap.
2. Add hydraulic oil to the hydraulic tank, but do not overfill (leave space at the top of the tank).
3. Slowly extend and retract all hydraulic cylinders until air is displaced from the hydraulic system.
4. Add additional fluid to make up for air displaced from hoses, but do not overfill the tank.
5. Replace and tighten the tank cap.
Drain and replace the hydraulic fluid when it has exceeded its recommended number of hours of usage. The effective lifespan of a hydraulic oil depends on the way the post pounder has been maintained and operated, as well as the specifications of the oil used. Refer to the hydraulic oil manufacturer’s specifications for information about effective oil lifespan.

### NOTICE

Failure to change the hydraulic fluid after it has exceeded its recommended life span will lead to increased wear and damage of hydraulic components.

#### 7.3.12. REPLACING BELTS

1. Lock out all power.
2. Make sure that the belt engaging lever is disengaged.
3. **On motor drive:** Remove pulley shield at motor if necessary (belts may slip past pulley without removing shield). If belts do not come off easily, the engine mounting bolts will have to be loosened and the engine pushed toward the intake end of the auger.
4. The new auger belts can now be put in place. Make sure to route the belt over the idler pulley.
5. Follow the procedure in Section 7.3.13. for the proper belt tension.
6. Re-attach shield.

#### 7.3.13. TIGHTENING BELTS

1. Lock out all power.
2. Engage the belt engaging lever.
3. Loosen the bolts on the engine mount shown in Figure 7.4.

**Figure 7.4 Engine Mount Bolts**

7. Slide the engine back (towards the spout) until there is adequate tension on the belt. If the alignment of the pulleys needs adjustment, slide the engine left or right until the pulleys line up.
8. Re-tighten the engine mount bolts and torque as shown in the tables in Section 9.

9. Minor tension adjustments can be made by sliding the idler up or down. Idler shown in Figure 7.5.

Figure 7.5 Belt Idler
# 8. Troubleshooting

See Table 8.1 for troubleshooting information for problems that relate to the STORM auger section.

For problems related directly to the STORM seed treatment section, see "Seed Treating Section Troubleshooting" on page 114.

## Table 8.1 STORM Auger Section Troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excessive noise or vibration.</td>
<td>Chatter from wooden bearings.</td>
<td>Spray penetrating lubricant between shaft and bearing surface. Bearings will break in over time. *If replacement of a bearing becomes necessary, split bearings are available to avoid having to slide all bearings off drive-shaft.</td>
</tr>
<tr>
<td><em>Remember to follow proper break-in procedures—auger may run rough until tube is polished. If noise is extreme from outset or continuous after several loads of seed are fed, continue with troubleshooting below</em></td>
<td>Truss cables incorrectly adjusted.</td>
<td>Support end of auger and adjust cables so auger is flat or curves slightly upwards. Check the side to side alignment of the truss cables and adjust as necessary.</td>
</tr>
<tr>
<td></td>
<td>Flighting peeled back due to plugging.</td>
<td>Inspect spout end of auger for flight condition. Remove and replace flight sections as necessary.</td>
</tr>
<tr>
<td></td>
<td>Top drive inadequately lubricated.</td>
<td>Fill to appropriate level with grease. Top drive is not designed to be filled with oil.</td>
</tr>
<tr>
<td></td>
<td>Bent flighting sections.</td>
<td>Support auger and remove all flight sections. Check for straightness of flight stubs by rolling across flat concrete section. Straighten stub or replace as necessary. Take care not to bend flighting when reinstalling.</td>
</tr>
<tr>
<td></td>
<td>Obstruction in tube.</td>
<td>Visually inspect for cloth or trash wrapped around flighting, or build-up of gum from oily crops such as flax or canola.</td>
</tr>
<tr>
<td>Drive belts jumping off pulleys.</td>
<td>Motor misaligned.</td>
<td>Ensure drive and driven pulleys are correctly aligned.</td>
</tr>
<tr>
<td></td>
<td>Belts mismatched.</td>
<td>Check manual for correct belt sizes and only replace in pairs.</td>
</tr>
<tr>
<td></td>
<td>Belt tension inadequate.</td>
<td>Maintain correct tension as per Assembly section.</td>
</tr>
</tbody>
</table>
### Table 8.1 STORM Auger Section Troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shear bolts fail repeatedly.</td>
<td>Incorrect shear bolt type.</td>
<td>Replace with correct part number. Westfield shear bolts are specifically designed to provide correct driveline protection.</td>
</tr>
<tr>
<td></td>
<td>Shear bolt hole worn out-of-round.</td>
<td>Frequent use of the incorrect shear bolt size can wear the mounting hole creating a “scissor effect,” which will require replacement of the affected parts.</td>
</tr>
<tr>
<td></td>
<td>Corn spreaders in bin unable to keep up with auger output.</td>
<td>Slow down auger or remove corn spreaders.</td>
</tr>
<tr>
<td></td>
<td>Flighting peeled back as a result of plugging.</td>
<td>Occurs when bin has overfilled, or corn spreaders restrict end of discharge. Inspect flighting at discharge end of auger. If necessary, replace flighting.</td>
</tr>
<tr>
<td></td>
<td>Driveline failure (bearing, gearbox, etc.).</td>
<td>See Maintenance section.</td>
</tr>
<tr>
<td>Premature wear on auger tubes.</td>
<td>Auger being run at low capacity or empty for extended period of time.</td>
<td>Frequently occurs on farms using grain wagons. Auger should not be left unattended when filling bins. Depending on application, a belt conveyor may be more appropriate.</td>
</tr>
<tr>
<td></td>
<td>Bent flighting.</td>
<td>When flighting becomes razor-thin at intake, replacement is critical. Since flight material is double thickness at welded lap joints, high spots on flight occur and can accelerate spot tube wear.</td>
</tr>
<tr>
<td></td>
<td>Flighting allowed to wear beyond normal point of replacement.</td>
<td></td>
</tr>
<tr>
<td>The auger does not turn.</td>
<td>auger is plugged or obstructed</td>
<td>identify and remove obstruction</td>
</tr>
<tr>
<td></td>
<td>drive belt is slipping</td>
<td>adjust the tension of the belt</td>
</tr>
<tr>
<td></td>
<td>a bearing is seized</td>
<td>identify the bearing and replace</td>
</tr>
<tr>
<td></td>
<td>a chain is broken</td>
<td>identify the chain and repair or replace</td>
</tr>
<tr>
<td></td>
<td>gearbox is seized</td>
<td>fix or replace the gearbox</td>
</tr>
<tr>
<td></td>
<td>gearbox coupler bolt is broken or missing</td>
<td>replace the bolt</td>
</tr>
<tr>
<td>The bottom auger will not turn.</td>
<td>center coupler bolt is broken or missing</td>
<td>replace the bolt</td>
</tr>
<tr>
<td>Auger is noisy.</td>
<td>obstruction in the auger</td>
<td>identify and remove obstruction</td>
</tr>
<tr>
<td></td>
<td>auger shaft bolts are loose or damaged</td>
<td>tighten or replace bolts</td>
</tr>
<tr>
<td></td>
<td>auger shaft is bent</td>
<td>repair or replace auger</td>
</tr>
<tr>
<td></td>
<td>flighting is damaged</td>
<td>repair or replace auger</td>
</tr>
<tr>
<td></td>
<td>worn bearing</td>
<td>repair or replace bearing</td>
</tr>
<tr>
<td></td>
<td>low gear oil level</td>
<td>inspect the gearbox, replace if damaged or add oil if not damaged</td>
</tr>
<tr>
<td></td>
<td>upper chain drive loose</td>
<td>tighten the chain as required</td>
</tr>
</tbody>
</table>
### Table 8.1 STORM Auger Section Troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>The auger will not raise or lower.</td>
<td>auger is already at its maximum or minimum height</td>
<td>if at maximum height, lower the auger if at minimum height, raise the auger</td>
</tr>
<tr>
<td></td>
<td>broken cable</td>
<td>replace cable</td>
</tr>
<tr>
<td></td>
<td>obstruction in the slide</td>
<td>clear the obstruction</td>
</tr>
<tr>
<td></td>
<td>winch is seized</td>
<td>consult your local dealer</td>
</tr>
<tr>
<td></td>
<td>the bottom or top of auger is obstructed</td>
<td>clear the obstruction</td>
</tr>
<tr>
<td>Low material augering rate.</td>
<td>engine speed is too slow</td>
<td>increase rpm of the engine</td>
</tr>
<tr>
<td></td>
<td>inadequate material flow from truck or hopper</td>
<td>increase flow of material</td>
</tr>
<tr>
<td></td>
<td>flow into the auger intake is restricted</td>
<td>clear grating of obstructions</td>
</tr>
<tr>
<td></td>
<td>material too wet or heavy</td>
<td>unloading rates are for dry seed</td>
</tr>
<tr>
<td></td>
<td>flighting is worn</td>
<td>repair or replace as required</td>
</tr>
<tr>
<td></td>
<td>belt slipping</td>
<td>identify the belt, adjust or replace as required</td>
</tr>
<tr>
<td>Auger will not hold in elevated position.</td>
<td>malfunctioning or damaged lift mechanism</td>
<td>consult your local dealer</td>
</tr>
</tbody>
</table>
8.1. SEED TREATING SECTION TROUBLESHOOTING

Table 8.2 lists problems related to the STORM seed treatment section, and provides a reference to the.

Table 8.2 Seed Treating Section Problems

<table>
<thead>
<tr>
<th>Common Problems</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed Rates are outside of the expected +/-5%</td>
<td>114</td>
</tr>
<tr>
<td>Pump won’t prime, Pump output is fluctuating</td>
<td>115</td>
</tr>
<tr>
<td>Pump output is inconsistent and outside of the expected +/-5%, or pump is difficult to calibrate</td>
<td>115</td>
</tr>
<tr>
<td>Seed Coverage is Poor</td>
<td>117</td>
</tr>
<tr>
<td>Excessive Build-up in application chamber</td>
<td>117</td>
</tr>
<tr>
<td>Build-up of treatment on metering conveyor belt</td>
<td>118</td>
</tr>
<tr>
<td>System won’t operate at higher conveyor speeds</td>
<td>118</td>
</tr>
</tbody>
</table>

8.1.1. *SEED RATES ARE OUTSIDE OF THE EXPECTED +/-5%*

**CONVEYOR INTAKE WIPER IS OUT OF ADJUSTMENT:**

Check orientation and seating of the wiper, and ensure wiper height is 1-5/8”. The beveled corners of the intake wiper should be directed upwards and the flat of the piece should be resting on the plastic wear strips on either side of the seed flow area.

**CLEATED CONVEYOR BELT IS SLIPPING ON THE DRIVE ROLLERS:**

- Adjust belt tension and tracking. Ensure side bearing mount plates are free to slide as required.
- Ensure that the cleat travel is not being impeded by an object protruding into the seed travel area.

**DRIVE CHAIN IS SLIPPING:**

Check condition of chain and drive sprockets. Adjust chain tension.

**INCONSISTENT FEED RATE TO CONVEYOR:**

- During operation, ensure that the metering conveyor is full across the cleats by checking the inspection window on the top of the conveyor.
- Check for blockage of the conveyor intake grating.
- Ensure that the seed supply gate is fully opened and completely flooding the intake of the conveyor.
- Center the conveyor intake under the seed supply opening.
- In a non-typical situation when the conveyor is not being flood fed, like when supplying the conveyor from a truck with a rear opening, the height of the seed in the intake must be the same as the height of the fully deployed and flooded intake hopper.
**Electronics Not Achieving Proper Conveyor Motor Speeds:**

- Consult Table 8.3 on page 118 for the seed type that is being utilized.
- Check Conveyor Drive ratio. It should be 15.33. If not adjust.
- Ensure that the Conveyor Correction Factor is set at 1000.

### 8.1.2. Pump Won’t Prime, Pump Output is Fluctuating

**Air Leak on Intake:**

Check treatment container connectors for correct fit, damage or manufacturing problems.

**Pump Shoe is Not Fully Engaged:**

Check that the pump lever is fully engaged in the lever catch.

**Pump Occlusion Dial Set Incorrectly:**

Adjust the pump occlusion dial on the top of the pump to 5.

### 8.1.3. Pump Output is Inconsistent and Outside of the Expected +/-5%, or Pump is Difficult to Calibrate

**There is an Air Leak in the Fittings on the Intake Line**

- Check that the dry break couplers are fully engaged. Re-engage if required.
- Check the condition of the pump hose, especially inside of the pump and on the intake side of the pump. Ensure it is not cracked.
- Check for loose connections on the intake side of the pump. Tighten loose fittings and hose clamps. Check for cracked fittings or fittings that may not be have been assembled with pipe thread sealant. Replace and reassemble as necessary.
- Ensure the container attached to the pump is free of air leaks, including the connector assembly and drop tube.

**The Line is Restricted on the Intake or Output Side of the Pump.**

- Check the condition of the pump hose. Ensure it has not collapsed, has become plugged, or is worn-out.
- Check filter and nozzles for plugging.
- If in freezing conditions, check for frozen deposits in the lines.
- If using a slurried product, check for product settling in the lines.

**Pump is Operating at Too High of a Pressure.**

Ensure system is operating at 25 psi or lower. Lower treating parameters, such as treating speed, to reduce system pressure.
PUMP IS OPERATING TOO SLOWLY.

Some application rates, combined with low seed densities and slow treating speeds can result in slow pump operating speeds. Pump speeds under 60 rpm can result in inconsistent flows. If possible, increase product application rate by diluting in order to increase pump speeds.

Increase treating speed to increase pump speed if operating below 100%.

PUMP IS OPERATING TOO FAST.

Viscous (thick) products with high application rates, combined with high seed densities and high treating speeds can result in the pump operating inefficiently. Pump speeds over 330 rpm can result in inconsistent flows. Decrease treating speed to reduce pump speed.

CALIBRATION WAS PERFORMED AT A DIFFERENT TREATING SPEED THAN THE OPERATIONAL SPEED.

Operate the STORM at the same treating speed as the desired treating speed set in the job.

PRODUCT CONDITION IS INCONSISTENT.

• Inadequate mixing may result in product stratification. Ensure that the product has been properly mixed prior to pumping the product with the STORM.
• Over-mixing can cause some products to foam. Consult with the product manufacturer for proper handling recommendations

PRODUCT IS TOO THICK TO METER PROPERLY

• Dilute product, if possible, to reduce viscosity. Recalibrate as required to ensure accuracy of application.
• Some treatment products change in viscosity with temperature. Ensure calibrations are performed for the conditions at the time of treating.

PUMP IS DAMAGED

Pump may be damaged or warped. Test by removing hose and spinning by hand. If hard spot is evident in rotation of rotor or rollers inside the pump, then adjust mounting screws to relieve problem. Replace if required.
8.1.4. Seed Coverage is Poor

Nozzles are Plugged
Check for plugged nozzles, and clean as required.

Nozzle(s) are Misdirected
Ensure nozzles are oriented correctly and spraying the full seed curtain.

Nozzle(s) are Not Creating a Spray Pattern
Excessively low pump flow (800 ml/min or lower per nozzle) can result in a poor spray pattern, depending on the treatment type. Increase treating parameters to gain an improved spray pattern. If product application rates are low, consider combining flows or diluting product to increase flow rate through the nozzles.

Application Rates are Lower than 300 ml/100 kg of Seed
- Consider increasing dilution of treating product or use second pump (if not being utilized) to add water to application.
- Coverage is best for wheat, peas and lentils at application rates of 400 to 600 ml/100kg.
- Coverage is best for barley and oats at application rates of 500 to 700 ml/100kg.

Application Rates are Not Being Obtained
Check seed delivery and pump rates and ensure they are being met.

Seed Condition is Affecting Coverage
Dusty seed, dry seed, and frozen seed can affect coverage of many seed treatments.

Treating Speed is Not Optimal for Mixer Speed
Running the mixer (auger throttle) too quickly can result insufficient mixing and result in poor coverage.

Treatment Product is Too Thick
Thick treatment products may not cover seed adequately. Consult treatment product manufacturer for recommendations and dilute to reduce viscosity if possible.

8.1.5. Excessive Build-up in Application Chamber

Seed Condition is Poor (Dusty, Dry, Etc.)
Dirty or dusty seed will cause build-up. Avoid using excessively dirty or dusty seed.

Treatment Product is Too Thick.
Thick treatment products can increase build-up. Consult treatment product manufacturer and dilute treatment if possible.
8.1.6. BUILD-UP OF TREATMENT ON METERING CONVEYOR BELT

TREATMENT IS FLOWING WHEN SEED IS NOT.
Check for interrupted seed flow. Do not operate the pumps with no seed flow.

SEED IS DUSTY.
Seed treatment will readily bind to the dust in the seed. Airborne particulates may stick to the conveyor belt.

NOZZLE(S) ARE MISDIRECTED.
Ensure nozzles are oriented correctly and spraying the full seed curtain.

8.1.7. SYSTEM WON’T OPERATE AT HIGHER CONVEYOR SPEEDS

PUMP MAX. SPEED LIMIT HAS BEEN MET.
Lower product dilution is possible. Split treatment application to two pumps. Consult with AGI for metering options.

INSUFFICIENT POWER SUPPLY.
Check advanced diagnostics during operation for voltage condition. If low, ensure that the STORM is powered by a dedicated 120 VAC (15A) circuit. Extension cords should be 12 gauge or heavier and should not exceed 150 feet in total length. Use a generator that provides a dedicated 120 VAC outlet rated at 1750 W if power availability is limited.

CONVEYOR OUT OF ADJUSTMENT CAUSING EXCESSIVE DRAG.
An improperly adjusted conveyor can increase power requirements. Adjust conveyor.

8.2. CHARTS

Table 8.3 Expected Conveyor Motor Speeds (RPM)

<table>
<thead>
<tr>
<th>Treating Speed</th>
<th>Wheat (RPM)</th>
<th>Barley (RPM)</th>
<th>Oats (RPM)</th>
<th>Peas (RPM)</th>
<th>Lentils (RPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50%</td>
<td>1323</td>
<td>1316</td>
<td>1285</td>
<td>1379</td>
<td>1309</td>
</tr>
<tr>
<td>60%</td>
<td>1597</td>
<td>1600</td>
<td>1467</td>
<td>1679</td>
<td>1579</td>
</tr>
<tr>
<td>70%</td>
<td>1903</td>
<td>1913</td>
<td>1733</td>
<td>2032</td>
<td>1879</td>
</tr>
<tr>
<td>80%</td>
<td>2242</td>
<td>2256</td>
<td>2084</td>
<td>2440</td>
<td>2211</td>
</tr>
<tr>
<td>90%</td>
<td>2613</td>
<td>2629</td>
<td>2519</td>
<td>2902</td>
<td>2573</td>
</tr>
<tr>
<td>100%</td>
<td>3017</td>
<td>3032</td>
<td>3039</td>
<td>3419</td>
<td>2966</td>
</tr>
</tbody>
</table>
9. APPENDIX A

9.1. TEST WEIGHT PROCEDURE

1. Fill the 0.5 litre measure to overflowing with the grain to be tested.
2. Ensure the slide is inserted into the Cox funnel, then pour the contents of the 0.5 litre measure, plus an extra handful, into the Cox funnel.
3. Place the 0.5 litre measure on a solid base. Position the Cox funnel on top of the 0.5 litre measure so that the notched legs of the Cox funnel fit securely onto the measure’s rim. Remove the slide on the Cox funnel quickly so that the grain drops evenly into the 0.5 litre measure.
4. Carefully remove the Cox funnel from the top of the 0.5 litre measure so as not to disturb the grain. Any jarring of the cup at this point will result in compaction of the grain in the 0.5 litre measure and could produce inaccurate results.
5. Place the hardwood striker on the rim of the 0.5 litre measure and, using three zigzag, equal motions, scalp off the excess grain in the measure.
6. Pour the grain remaining in the 0.5 litre measure into the scale pan. Determine the weight in grams of the grain in the scale pan.

Note: See www.labtronics.ca for further information, including test weight conversion charts.

Figure 9.1 Test Weight Procedure Steps

[Images of the steps]
9.2. UPDATING STORM SOFTWARE

STORM software is available from the STORM owner’s centre website (www.stormtreaters.com).

To register, you need your STORM Control Box serial number and a valid email address.

**Important:** Before downloading STORM software, please ensure that the USB Flash Drive has been formatted by following the instructions listed below. Once you have finished formatting your USB Flash Drive, please continue with the download instructions.

Formatting will erase the entire contents of the USB Flash Drive. Transfer any information, such as treating history that was placed on the USB Flash Drive by using the function “Save to USB”, onto your computer before proceeding.

**TO FORMAT A USB FLASH DRIVE USING A PC:**
1. Put your USB flash drive in the USB port on your computer.
2. Click the start-up icon on the lower left side of the screen
3. Click on computer on the right side
4. Right click on “removable disk” or the name given to your USB flash drive
5. Click format. Ensure that the file system type is selected as fat32 and that quick format has been selected for the formatting option.
6. Click start

**TO FORMAT A USB FLASH DRIVE ON MacOS**
1. Insert the USB flash drive into the USB port on the computer
2. Click finder -> applications -> utilities -> disk utility
3. On the left side, click on your usb flash drive, choose the root folder, not the indented folder below it.
4. Click erase.
5. Click erase again.

**Note:** Formatting can take a few seconds or a few minutes.

**TO DOWNLOAD STORM SOFTWARE TO A FORMATTED USB FLASH DRIVE**

The STORM USB Flash Drive is located under the USB port weather cap on the control box of your STORM unit.

1. Click the Download link on the latest version of the software. Both an executable (.EXE) and a compressed (.ZIP) file are available for your convenience.

**Note:** The executable file is recommended, but use of the file may be blocked by some computer virus firewalls.

Although we can assure you that the files are virus free and safe for download, you may wish to use the compressed file instead. However, with the compressed file you will need to use software to decompress the file for use (e.g. zipeg, which can be downloaded at http://www.zipeg.com).

2. Your browser will automatically download the file to your computer.
3. Load the information into the main area on your USB flash drive, and eject. Please ensure that the software file is not located inside of any other folders or files you may have on the flash drive.

**TO INSTALL THE NEWEST VERSION OF THE STORM SOFTWARE**

After you have downloaded the latest version of the STORM software to a USB flash drive, upload it to your storm seed treater control box to update the STORM software.

**Important:** *Updating software will erase all job information. Manually write down all important information (such as recipes) before completing the steps below.*

1. Plug in and power up the STORM control box. The unit will initialize the software, and when complete, the main screen (Prime/Empty, Jobs, Alarm History, etc.) will be displayed. Plug the STORM flash drive into the USB port and it should light up red.

2. The software update will start automatically. The touchscreen will prompt, “Do you want to install a new project from the USB drive?” Select “Yes” and the software will begin loading.

3. When the Runtime Prompt appears and indicates “Installation Complete,” press “Restart” at the bottom of the screen. The unit will initialize the software again.

4. Once the main screen (Jobs, Maintenance, Transfer & Mix, Alarms, Set-up) is displayed, unplug the control box for 30 seconds.

5. Power up the control box again and make sure that the software loads properly. The main screen (Jobs, Maintenance, Transfer & Mix, Alarms, Set-up) should be displayed if it has loaded properly.

6. Do not remove the flash drive, cover with the weather guard.

If any issue occurs in these steps, please contact AGI at 1-855-662-6609 or storm@aggrowth.com
## 10. APPENDIX B

### 10.1. SPECIFICATIONS

<table>
<thead>
<tr>
<th>Table 10.1 Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAPACITY</strong></td>
</tr>
<tr>
<td>Seed Flow</td>
</tr>
<tr>
<td>Treatment Application Rate</td>
</tr>
<tr>
<td>Treatment Application Coverage Accuracy</td>
</tr>
<tr>
<td>Tube Size</td>
</tr>
<tr>
<td><strong>DIMENSIONS</strong></td>
</tr>
<tr>
<td>Transport</td>
</tr>
<tr>
<td>Length</td>
</tr>
<tr>
<td>Width</td>
</tr>
<tr>
<td>Height</td>
</tr>
<tr>
<td>Discharge Clearance Min</td>
</tr>
<tr>
<td>Max</td>
</tr>
<tr>
<td><strong>TIRES</strong></td>
</tr>
<tr>
<td>Size/Type</td>
</tr>
<tr>
<td>Inflation Pressure</td>
</tr>
<tr>
<td><strong>WEIGHT</strong></td>
</tr>
<tr>
<td>Hitch Tongue Weight</td>
</tr>
<tr>
<td>Total Weight</td>
</tr>
<tr>
<td><strong>POWER REQUIREMENTS</strong></td>
</tr>
<tr>
<td>Gas Engine</td>
</tr>
<tr>
<td>AC Power</td>
</tr>
<tr>
<td><strong>PART SPECIFICATIONS</strong></td>
</tr>
<tr>
<td>Gas Tank Capacity</td>
</tr>
<tr>
<td>Gearbox Oil Capacity</td>
</tr>
<tr>
<td>Belt Size</td>
</tr>
</tbody>
</table>
10.2. BOLT TORQUE VALUES

The tables shown below give correct torque values for various bolts and capscrews. Tighten all bolts to the torque specified in the chart unless otherwise noted. Check tightness of bolts periodically, using the bolt torque chart as your guide. Replace hardware with the same strength bolt.

Table 10.2 Imperial Bolt Torque

<table>
<thead>
<tr>
<th>BOLT DIAMETER</th>
<th>(Nm)</th>
<th>(lb-ft)</th>
<th>(Nm)</th>
<th>(lb-ft)</th>
<th>(Nm)</th>
<th>(lb-ft)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>6</td>
<td>12</td>
<td>9</td>
<td>17</td>
<td>12</td>
</tr>
<tr>
<td>5/16&quot;</td>
<td>13</td>
<td>10</td>
<td>25</td>
<td>19</td>
<td>36</td>
<td>27</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>27</td>
<td>20</td>
<td>45</td>
<td>33</td>
<td>63</td>
<td>45</td>
</tr>
<tr>
<td>7/16&quot;</td>
<td>41</td>
<td>30</td>
<td>72</td>
<td>53</td>
<td>100</td>
<td>75</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>61</td>
<td>45</td>
<td>110</td>
<td>80</td>
<td>155</td>
<td>115</td>
</tr>
<tr>
<td>9/16&quot;</td>
<td>95</td>
<td>60</td>
<td>155</td>
<td>115</td>
<td>220</td>
<td>165</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>128</td>
<td>95</td>
<td>215</td>
<td>160</td>
<td>305</td>
<td>220</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>225</td>
<td>165</td>
<td>390</td>
<td>290</td>
<td>540</td>
<td>400</td>
</tr>
<tr>
<td>7/8&quot;</td>
<td>230</td>
<td>170</td>
<td>570</td>
<td>420</td>
<td>880</td>
<td>650</td>
</tr>
<tr>
<td>1&quot;</td>
<td>345</td>
<td>225</td>
<td>850</td>
<td>630</td>
<td>1320</td>
<td>970</td>
</tr>
</tbody>
</table>

Figure 10.1 Pattern for Tightening Wheel Bolts
10.3. TIGHTENING O-RING FITTINGS

1. Inspect o-ring and seat for dirt or obvious defects.
2. On the angle fittings, back the lock nut off until washer bottoms out at top of groove.
3. Hand-tighten fitting until backup washer or washer face (if straight fitting) bottoms on face and o-ring is seated.
4. Position angle fittings by unscrewing no more than one turn.
5. Tighten straight fittings to torque shown.
6. Tighten while holding body of fitting with a wrench.

Table 10.3 Metric Bolt Torque

<table>
<thead>
<tr>
<th>BOLT DIAMETER</th>
<th>(Nm)</th>
<th>(lb-ft)</th>
<th>(Nm)</th>
<th>(lb-ft)</th>
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<tbody>
<tr>
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<td>0.5</td>
<td>0.4</td>
<td>1.8</td>
<td>1.3</td>
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<td>M4</td>
<td>3</td>
<td>2.2</td>
<td>4.5</td>
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<td>M5</td>
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<td>4</td>
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<td>7</td>
</tr>
<tr>
<td>M6</td>
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<td>M8</td>
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<td>35</td>
<td>26</td>
</tr>
<tr>
<td>M10</td>
<td>50</td>
<td>37</td>
<td>70</td>
<td>52</td>
</tr>
<tr>
<td>M12</td>
<td>90</td>
<td>66</td>
<td>125</td>
<td>92</td>
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<td>148</td>
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<td>M16</td>
<td>225</td>
<td>166</td>
<td>310</td>
<td>229</td>
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<tr>
<td>M20</td>
<td>435</td>
<td>321</td>
<td>610</td>
<td>450</td>
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<tr>
<td>M24</td>
<td>750</td>
<td>553</td>
<td>1050</td>
<td>774</td>
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<td>M30</td>
<td>1495</td>
<td>1103</td>
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<td>M36</td>
<td>2600</td>
<td>1917</td>
<td>3675</td>
<td>2710</td>
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</tbody>
</table>

Torque figures indicated above are valid for non-greased or non-oiled threads and head unless otherwise specified. Therefore, do not grease or oil bolts or cap screws unless otherwise specified in this manual. When using locking elements, increase torque values by 5%.
10.4. TIGHTENING FLARE TYPE TUBE FITTINGS

1. Check flare and flare seat for defects that might cause leakage.
2. Align tube with fitting before tightening.
3. Lubricate connection and hand tighten swivel until snug.
4. To prevent twisting the tube(s), use two wrenches. Place one wrench on the connector body. With the second wrench, tighten the swivel nut to the torque shown.

**Table 10.4 O-Ring Fittings**

<table>
<thead>
<tr>
<th>Tube Size OD (in.)</th>
<th>Nut Size Across Flats (in.)</th>
<th>Torque Values(^a) (Nm)</th>
<th>Torque Values(^a) (Lb-ft)</th>
<th># of Turns to Tighten (Flats)</th>
<th>Turn (After Finger Tightening)</th>
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<tbody>
<tr>
<td>3/8</td>
<td>1/2</td>
<td>8</td>
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<td>2</td>
<td>1/3</td>
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<tr>
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<td>11/16</td>
<td>24</td>
<td>18</td>
<td>2</td>
<td>1/3</td>
</tr>
<tr>
<td>3/4</td>
<td>7/8</td>
<td>46</td>
<td>34</td>
<td>2</td>
<td>1/3</td>
</tr>
<tr>
<td>7/8</td>
<td>1</td>
<td>62</td>
<td>46</td>
<td>1-1/2</td>
<td>1/4</td>
</tr>
<tr>
<td>1-1/16</td>
<td>1-1/4</td>
<td>102</td>
<td>75</td>
<td>1</td>
<td>1/6</td>
</tr>
<tr>
<td>1-3/16</td>
<td>1-3/8</td>
<td>122</td>
<td>90</td>
<td>1</td>
<td>1/6</td>
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<td>105</td>
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<td>140</td>
<td>3/4</td>
<td>1/8</td>
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<td>1/12</td>
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</table>

\( ^a \) The torque values shown are based on lubricated connections as in reassemble.

**Table 10.5 Flare Type Tube Fittings**

<table>
<thead>
<tr>
<th>Tube Size OD (in.)</th>
<th>Nut Size Across Flats (in.)</th>
<th>Torque Values (N-m)(^a)</th>
<th>Torque Values (Lb-ft)(^a)</th>
<th># of Turns to Tighten (Flats)</th>
<th>Turn (After Finger Tightening)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>7/16</td>
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<td>5/16</td>
<td>5/8</td>
<td>16</td>
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<td>1</td>
<td>1/6</td>
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<td>11/16</td>
<td>24</td>
<td>18</td>
<td>1</td>
<td>1/6</td>
</tr>
<tr>
<td>1/2</td>
<td>7/8</td>
<td>46</td>
<td>34</td>
<td>1</td>
<td>1/6</td>
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<td>5/8</td>
<td>1</td>
<td>62</td>
<td>46</td>
<td>1</td>
<td>1/6</td>
</tr>
<tr>
<td>3/4</td>
<td>1-1/4</td>
<td>102</td>
<td>75</td>
<td>3/4</td>
<td>1</td>
</tr>
<tr>
<td>7/8</td>
<td>1-3/8</td>
<td>122</td>
<td>90</td>
<td>3/4</td>
<td>1</td>
</tr>
</tbody>
</table>

\( ^a \) * The torque values shown are based on lubricated connections as in reassemble.
WARRANTY

Westfield Industries warrants products of its manufacture against defects in materials or workmanship under normal and reasonable use for a period of one year after date of delivery to the original purchaser.

Westfield Industries' obligation under this warranty is limited to repairing, replacing, or refunding defective part or parts which shall be returned to a distributor or a dealer of our Company, or to our factory, with transportation charges prepaid. This warranty does not obligate Westfield Industries to bear the cost of labor in replacing defective parts. Any defects must be reported to the Company before the end of the one year period.

This warranty shall not apply to equipment which has been altered, improperly assembled, improperly maintained, or improperly repaired so as to adversely affect its performance. Westfield Industries makes no express warranty of any character with respect to parts not of its manufacture.

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