Read the operator manual entirely. When you see this symbol, the subsequent instructions and warnings are serious - follow without exception. Your life and the lives of others depend on it!

Illustrations may show optional equipment not supplied with standard unit.
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Important Safety Information

Look for Safety Symbol

The SAFETY ALERT SYMBOL indicates there is a potential hazard to personal safety involved and extra safety precaution must be taken. When you see this symbol, be alert and carefully read the message that follows it. In addition to design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel involved in the operation, transport, maintenance and storage of equipment.

Be Aware of Signal Words

Signal words designate a degree or level of hazard seriousness.

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations, typically for machine components that, for functional purposes, cannot be guarded.

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Be Familiar with Safety Decals

▲ Read and understand “Safety Reflectors and Decals” starting on page 8, thoroughly.

▲ Read all instructions noted on the decals.

Avoid High Pressure Fluids

▲ Escaping fluid under pressure can penetrate the skin, causing serious injury. If hydraulic fluid penetrates the skin under pressure, immediate medical attention is required. See a physician familiar with this type of injury.

▲ Avoid the hazard by relieving pressure before disconnecting hydraulic lines.

▲ Use a piece of paper or cardboard, NOT BODY PARTS, to check for suspected leaks.

▲ Wear protective gloves and safety glasses or goggles when working with hydraulic systems.
Wear Protective Equipment

Great Plains advises all users of chemical pesticides or herbicides to use the following personal safety equipment.

- Waterproof, wide-brimmed hat
- Waterproof apron.
- Face shield, goggles or full face respirator.
- Goggles with side shields or a full face respirator is required if handling or applying dusts, wettable powders, or granules or if being exposed to spray mist.
- Cartridge-type respirator approved for pesticide vapors unless label specifies another type of respirator.
- Waterproof, unlined gloves. Neoprene gloves are recommended.
- Cloth coveralls/outer clothing changed daily; waterproof items if there is a chance of becoming wet with spray
- Waterproof boots or foot coverings
- Do not wear contaminated clothing. Wash protective clothing and equipment with soap and water after each use. Personal clothing must be laundered separately from household articles.
- Clothing contaminated with certain pesticides must be destroyed according to state and local regulations. Read chemical label for specific instructions.
- Wear clothing and equipment appropriate for the job. Avoid loose-fitting clothing.
- Prolonged exposure to loud noise can cause hearing impairment or loss. Wear suitable hearing protection such as earmuffs or earplugs.
- Avoid wearing entertainment headphones while operating machinery. Operating equipment safely requires the full attention of the operator.
Handle Chemicals Properly

▲ Read and follow chemical manufacturer’s instructions.
▲ Wear protective clothing.
▲ Handle all chemicals with care.
▲ Agricultural chemicals can be dangerous. Improper use can seriously injure persons, animals, plants, soil and property.
▲ Inhaling smoke from any type of chemical fire is a serious health hazard.
▲ Store or dispose of unused chemicals as specified by the chemical manufacturer.
▲ Before adding chemical to the tank, make sure tank is at least half full. Do not pour concentrate into an empty tank.
▲ Never leave fill hose attached to the sprayer after filling tank. Chemicals in tank can siphon out of tank and contaminate freshwater source.
▲ Always keep handwash tank filled with clean water and have soap available in case of an emergency. Immediately and thoroughly flush any area of the body that is contaminated by chemicals.
▲ Do not touch sprayer components with mouth or lips.
▲ If chemical is swallowed, carefully follow the chemical manufacturer’s recommendations and consult with a doctor.
▲ If persons are exposed to a chemical in a way that could affect their health, consult a doctor immediately with the chemical label or container in hand. Any delay could cause serious illness or death.
▲ Dispose of empty chemical containers properly. By law rinsing of the used chemical container must be repeated three times. Puncture the container to prevent future use. An alternative is to jet-rinse or pressure rinse the container.
▲ Wash hands and face before eating after working with chemicals. Shower as soon as spraying is completed for the day.
▲ Spray only with acceptable wind conditions. Wind speed must be below 5 mph. Make sure wind drift of chemicals will not affect any surrounding land, people or animals.
▲ Never wash out the sprayer tank within 100 feet (30m) of any freshwater source or in a car wash.
▲ Rinse out the tank. Spray rinse water on last field sprayed.
Confined Space

Once used for hazardous fertilizers, or seeds with hazardous treatments, your tank may become a “permit-required confined space” under applicable statutes, regulations, insurance rules or business policy.

▲ When hazardous fumes are present, you can be quickly overcome even with the tank lid open.
▲ Do not enter a tank for material loading, material unloading, tank cleaning or valve maintenance.
▲ Clean tank by power washing from outside the tank top.
▲ Perform valve maintenance by removing meters from bottom of empty tank.
▲ If obstruction removal or repair requires tank entry, have the work performed by a team trained in confined space procedures.

Use A Safety Chain

▲ Use a safety chain to help control drawn machinery should it separate from tractor drawbar.
▲ Use a chain with a strength rating equal to or greater than the gross weight of towed machinery.
▲ Attach chain to tractor drawbar support or other specified anchor location. Allow only enough slack in chain to permit turning.
▲ Replace chain if any links or end fittings are broken, stretched or damaged.
▲ Do not use safety chain for towing.

Keep Riders Off Machinery

▲ Riders obstruct the operator’s view. Riders could be struck by foreign objects or thrown from the machine.
▲ Never allow children to operate equipment.
▲ Keep all bystanders away from machine during operation.

Use Safety Lights and Devices

▲ Slow-moving tractors and towed implements can create a hazard when driven on public roads. They are difficult to see, especially at night.
▲ Use flashing warning lights and turn signals whenever driving on public roads.
▲ Use tractor lights and lights provided with implement.
Check for Overhead Lines

⚠️ DANGER ⚠️

Sprayer booms contacting overhead electrical lines can introduce lethal voltage levels on sprayer and tractor frames. A person touching almost any metal part can complete the circuit to ground, resulting in serious injury or death. At higher voltages, electrocution can occur without direct contact.

▲ Avoid overhead lines during sprayer operations.

Transport Machinery Safely

▲ Maximum transport speed for implement is 20 mph (32 kph). Some rough terrains require a slower speed. Sudden braking can cause a towed load to swerve and upset.

▲ Do not exceed 20 mph (32 kph). Never travel at a speed which does not allow adequate control of steering and stopping. Reduce speed if towed load is not equipped with brakes.

▲ Comply with state and local laws.

▲ Do not tow an implement that, when fully loaded, weighs more than 1.5 times the weight of towing vehicle.

▲ Carry reflectors or flags to mark Front Fold Boom Sprayer in case of breakdown on the road.

▲ Keep clear of overhead power lines and other obstructions when transporting. Refer to transport dimensions under “Specifications and Capacities” on page 49.

▲ Do not fold or unfold the Front Fold Boom Sprayer while the tractor is moving.

Shutdown and Storage

▲ Fold Front Fold Boom Sprayer, put tractor in park, turn off engine, and remove the key.

▲ Secure Front Fold Boom Sprayer using blocks and supports provided.

▲ Detach and store Front Fold Boom Sprayer in an area where children normally do not play.
Practice Safe Maintenance

▲ Understand procedure before doing work. Use proper tools and equipment. Refer to this manual for additional information.
▲ Work in a clean, dry area.
▲ Fold the Front Fold Boom Sprayer, put tractor in park, turn off engine, and remove key before performing maintenance.
▲ Make sure all moving parts have stopped and all system pressure is relieved.
▲ Allow Front Fold Boom Sprayer to cool completely.
▲ Disconnect battery ground cable (-) before servicing or adjusting electrical systems or before welding on Front Fold Boom Sprayer.
▲ Inspect all parts. Make sure parts are in good condition and installed properly.
▲ Remove buildup of grease, oil or debris.
▲ Remove all tools and unused parts from Front Fold Boom Sprayer before operation.

Prepare for Emergencies

▲ Be prepared if a fire starts.
▲ Keep a first aid kit and fire extinguisher handy.
▲ Keep emergency numbers for doctor, ambulance, hospital and fire department near phone.

Tire Safety

▲ Tire changing can be dangerous and should be performed by trained personnel using correct tools and equipment.
▲ When inflating tires, use a clip-on chuck and extension hose long enough for you to stand to one side—not in front of or over tire assembly. Use a safety cage if available.
▲ When removing and installing wheels, use wheel-handling equipment adequate for weight involved.
Safety At All Times

▲ Thoroughly read and understand the instructions in this manual before operation. Read all instructions noted on the safety decals.

▲ Be familiar with all Front Fold Boom Sprayer functions.

▲ Operate machinery from the driver’s seat only.

▲ Do not leave Front Fold Boom Sprayer unattended with tractor engine running.

▲ Do not dismount a moving tractor. Dismounting a moving tractor could cause serious injury or death.

▲ Do not stand between the tractor and Front Fold Boom Sprayer during hitching.

▲ Keep hands, feet and clothing away from power-driven parts.

▲ Wear snug-fitting clothing to avoid entanglement with moving parts.

▲ Watch out for wires, trees, etc., when folding and raising Front Fold Boom Sprayer. Make sure all persons are clear of working area.

▲ Do not turn tractor too tightly, causing Front Fold Boom Sprayer to ride up on wheels. This could cause personal injury or equipment damage.

▲ Use only water without pesticides added to calibrate the sprayer. Do not exceed the calibrated sprayer speed and pressure when operating.

▲ When using a PTO pump, be sure that PTO shield is in place on the tractor, PTO coupler bolts are torqued to the correct specification, and torque bar is properly chained to tractor drawbar.

▲ Spray with the boom in the unfolded position only.

▲ The boom has many pinch points during field operation and folding. Keep all bystanders away.

▲ Never use tank for potable water.
Safety Reflectors and Decals

Your sprayer comes equipped with all safety reflectors and decals in place. They were designed to help you safely operate your sprayer.

▲ Read and follow decal directions.
▲ Keep all safety decals clean and legible.
▲ Replace all damaged or missing decals. Order new decals from your Great Plains dealer. Refer to this section for proper decal placement.
▲ When ordering new parts or components, also request corresponding safety decals.

To install new decals:

1. Clean the area on which the decal is to be placed.
2. Peel backing from decal. Press firmly on surface, being careful not to cause air bubbles under decal.

Slow Moving Vehicle Reflector
818-055C

Center section of boom, facing to rear; 1 total

Red Reflectors (Frame)
(3P-FF600 S/N A1009J-)
(3P-FF800/3P-FF900 S/N A1014H-)
818-230C

On rear face of tubes on both ends of frame; 2 total
Red Reflectors (Boom)
(3P-FF600 S/N A1009J-)
(3P-FF800/3P-FF900 S/N A1014H-)

838-266C

On rear center section of boom, both ends; 2 total

Red Reflectors (Boom)
(3P-FF600 S/N A1010J+)
(3P-FF800/3P-FF900 S/N A1015H+)

838-266C

On center section of boom, rear face of lower tube on each side of SMV;
On rear face of each light bracket; 4 total

Amber Reflectors (Frame)
(3P-FF600 S/N A1009J-)
(3P-FF800/3P-FF900 S/N A1014H-)

818-229C

On front face of tubes on both ends of frame;
on outside end face of tubes on both ends of frame; 6 total
Amber Reflectors (Boom)
(3P-FF600 S/N A1009J-)
(3P-FF800/3P-FF900 S/N A1014H-)
838-265C

On center section of boom, outside ends, front face of nozzle tube and front face of front tube; 4 total

Amber Reflectors (Boom)
(3P-FF600 S/N A1010J+)
(3P-FF800/3P-FF900 S/N A1015H+)
838-265C

On front face and outside face of each light bracket; 4 total

Daytime Reflectors
(3P-FF600 S/N A1009J-)
(3P-FF800/3P-FF900 S/N A1014H-)
838-267C

On rear center section of boom, both ends;; 2 total
Daytime Reflectors
(3P-FF600 S/N A1010J+)
(3P-FF800/3P-FF900 S/N A1015H+)
838-267C

On rear face of each light bracket;
2 total

Danger: Agricultural Chemicals
818-323C

On left side of 3-point hitch (1);
On rear of center section of boom (1);
2 total
Danger: Electrocution Hazard

818-367C

On front face of frame (1);

3P-FF600 - on rear of center section of boom (1);

3P-FF800/3P-FF900 - on rear of center section of boom (1);

2 total
Danger: Crushing Hazard
818-864C

On rear face of frame (1);

On front face of center section of boom (2);

3P-FF600 - on rear of center section of boom (1);

3P-FF800/3P-FF900 - on rear of center section of boom (1);

4 total
Warning: Chemical Overflow (Option) 818-303C

Outside face of inductor tank; 1 total

Warning: High Pressure Fluids 818-339C

On center tube at rear of center section of boom; 1 total

Warning: Overhead Boom Hazard 818-467C

On front of each inner wing section of boom; 2 total

Warning: Falling Boom Hazard 818-647C

On front face of boom mount; 1 total
Warning: Pinch Point

818-798C

Rear facing on each center section pivot tubes (2);

at front and rear of hinge on each inner wing section of boom (4);

3P-FF600 (shown) - on front and rear faces of each boom breakaway section, and inside faces of end plates at boom breakaway sections (8)

3P-FF800/3P-FF900 - on front and rear faces of each outer fold boom section, and inside faces of end plates at boom breakaway sections (12);

14 total (3P-FF600)
18 total (3P-FF800/FF900)
Caution: Hitching Sprayer
818-466C

⚠️ CAUTION

To Avoid Injury or Machine Damage:
- Lower hydraulic control before lifting
- Lower sprayer to ground before walking

On left side of 3-point hitch; 1 total
Great Plains welcomes you to its growing family of new product owners. This Front Fold 3-Point Sprayer has been designed with care and built by skilled workers using quality materials. Proper setup, maintenance and safe operating practices will help you get years of satisfactory use from the machine.

**Introduction**

**Document Family**

| 500-643M | Operator Manual |
| 500-643P | Parts Manual |

**Description of Unit**

The 3P-FF600, 3P-FF800 and 3P-FF900 sprayers are capable of spraying at either 60 foot or the full 80 foot - 90 foot depending on your application needs. The level float boom is fully suspended starting with vertical spring suspension in a 42-inch hydraulic elevator which provides a wide range of boom height adjustment along with gas shocks that provide side-to-side stability.

**Intended Usage**

Use these booms as part of a pressurized sprayer system to apply liquid pesticides, herbicides or fertilizers to production-agriculture crops only. Do not modify sprayer for use with attachments other than those approved by Great Plains.

**Models Covered**

| 3P-FF600-3620  | 3-Point Sprayer 60 foot 20 inch spacing |
| 3P-FF600-2530  | 3-Point Sprayer 60 foot 30 inch spacing |
| 3P-FF800-4820  | 3-Point Sprayer 80 foot 20 inch spacing |
| 3P-FF800-3330  | 3-Point Sprayer 80 foot 30 inch spacing |
| 3P-FF900-5420  | 3-Point Sprayer 90 foot 20 inch spacing |
| 3P-FF900-3730  | 3-Point Sprayer 90 foot 30 inch spacing |

**Using This Manual**

This manual will familiarize you with safety, assembly, operation, adjustments, troubleshooting and maintenance. Read this manual and follow the recommendations to help ensure safe and efficient operation.

The information in this manual is current at printing. Some parts may change to assure top performance.

**Definitions**

The following terms are used throughout this manual.

Right-hand and left-hand as used in this manual are determined by facing the direction the machine will travel while in use unless otherwise stated.

**NOTICE**

Paragraphs in this format present a crucial point of information related to the current topic. Read and follow the directions to:
- remain safe,
- avoid serious damage to equipment and
- ensure desired field results.

**NOTE:**

Paragraphs in this format provide useful information related to the current topic.
Owner Assistance

If you need customer service or repair parts, contact a Great Plains dealer. They have trained personnel, repair parts and equipment specially designed for Front Fold Boom Sprayer products.

Refer to Figure 1

Your machine’s parts were specially designed and should only be replaced with Great Plains parts. Always use the serial and model number when ordering parts from your Great Plains dealer. The serial-number plate is located on the front of the main frame as shown.

Record your sprayer model and serial number here for quick reference:

Model Number: __________________________
Serial Number: ________________________

Further Assistance

Great Plains Manufacturing, Inc. and your Great Plains dealer want you to be satisfied with your new product. If for any reason you do not understand any part of this manual or are otherwise dissatisfied, please take the following actions first:

1. Discuss the matter with your dealership service manager. Make sure they are aware of any problems so they can assist you.
2. If you are still unsatisfied, seek out the owner or general manager of the dealership.

If your dealer is unable to resolve the problem or the issue is parts related, please contact:

Great Plains Service Department
1525 E. North St.
P.O. Box 5060
Salina, KS 67402-5060

Or go to www.greatplainsag.com and follow the contact information at the bottom of your screen for our service department.
Preparation and Setup

Before You Start

Read and understand the owners manual for your sprayer. A basic understanding of how the sprayer works will aid in the assembly, setup and operation of your sprayer.

Perform these checks before setting up your front-fold boom.

- Read and understand “Important Safety Information” starting on page 1.
- Check that all working parts are moving freely, bolts are tight, and cotter pins are spread.
- Check that all grease fittings are in place and lubricated. Refer to “Lubrication” starting on page 45.
- Check that all safety decals and reflectors are correctly located and legible. Replace if damaged. Refer to “Safety Reflectors and Decals” starting on page 8.

Hitching Tractor to Sprayer

⚠️ WARNING

Loss of Control Hazard:
Be certain that tractor lift capacity is adequate and that tractor is weighted to maintain steering control. Failure to do so may cause loss of vehicle control.

Refer to tractor specifications for tractor lift capacity and see “Specifications and Capacities” on page 49, for required lift capacity. Consult the tractor operator’s manual for tractor weighting recommendations.

⚠️ DANGER

Crushing Hazard:
You may be severely injured or killed by being crushed between the tractor and sprayer. Do not stand or place any part of your body between sprayer and moving tractor. Stop tractor engine and set park brake before installing the hitch pin.

⚠️ DANGER

Electrocution Hazard:
To prevent serious injury or death from electric shock, keep clear of overhead power lines when transporting, folding or unfolding boom. Boom is not grounded. Electrocution can occur without direct contact.
Refer to Figure 2

1. Determine the pin and spacer orientation needed for the tractor, and securely fasten the hitch pins.

2. Mount the 3-point sprayer to a tractor with the correct pin mountings determined from instruction step 1. Make sure that the sprayer frame is level so that after the boom is assembled, it will not hit the tractor cab when the boom is folded or raised.

**NOTICE**

The category 4 narrow hitch (CAT IV-N) spacers are not standard parts supplied with the 3-Point Sprayer. Order 501-011S from a Great Plains dealer for the Cat IV-N spacers.

Be sure that the top 3-point link is adjusted correctly so that the frame is level in operating position but will not hit the cab in transport. The tractor 3-point arms should be adjusted to keep the sprayer level from side to side with lift arm rigid.

Hydraulic Pump Hook-Up

The hydraulic motor used on all liquid pumps is a 7 gpm motor. If the tractor used on the sprayer does not have the capabilities to adjust the remotes down to this flow, then a hydraulic flow divider kit must be installed so that flow can be controlled and to prevent operating the pump at excessive speeds. See a Great Plains dealer.

To hook up the pump:

1. Connect the pressure hose coming out of the tractor remotes to the motor inlet port ("I" on current pumps; "A" on older pumps, Base end on hose label). Connect the return line to the motor outlet ("O" on current pumps, "B" on older pumps, Rod end on hose label).

2. Before operating, place a stop in the neutral position for the tractor hydraulics so that the hydraulic lever can only be moved to the float and down positions. Refer to the tractor operator’s manual or tractor dealer on information for the neutral stop.

**NOTICE**

Do not move the hydraulic lever into the neutral position while the hydraulic pump is running. To do so may cause damage to the hydraulic pump.
Setting Pump Rate

3. To determine the correct setting of the flow rate, start out with the hydraulic flow control valve at minimum flow for the outlets that operate the pump.

4. With water in the sprayer tank and in the pump, place the hydraulic lever in the float position.

5. Open up the sprayer flow control valve to its maximum setting.

6. Start the tractor and engage the pump by placing the hydraulic lever in the down (forward) position.

7. Once the system builds pressure, close the agitation valve, shut off the boom section switches, and close the throttling valves (if applicable).

8. The pump is now at dead head pressure and the hydraulic control valve must be adjusted so that the spray pressure reaches 80 psi maximum on the nozzle pressure gauge. This process should be done with the tractor throttle set at normal operating speed. Mark this setting on the hydraulic control valve for future reference.

9. Open up the agitation valve.

Ace Pump Flow Limiter (Option)

The flow limiter (Great Plains part number 829-125C) is a hydraulic device designed to shut off the flow of hydraulic oil when a specified flow is exceeded. On tractors with load sensing closed center hydraulic systems, this device limits the flow of oil to the Ace motor and prevents failures due to misapplication.

Newer Case-IH, John Deere, New Holland, and CAT tractors, present a great potential to turn the motors beyond their rated speeds. Flows out of the hydraulic valves can exceed 20 gpm while the motors are rated at 4-11 gpm. The flow limiter protects the Ace motor by shutting off when hydraulic flows exceed the motor’s capacity.

The flow limiter should not be used on open center or pressure compensating closed center hydraulic systems. The flow limiter should not be used with a restrictor orifice.

Flow Limiter Installation

1. Install the flow limiter in the inlet port of the Ace motor.

2. Shut off boom and agitation valves on the sprayer to deadhead the sprayer pump flow.

3. Adjust the flow control on the tractor to the minimum flow setting (typically a “turtle” icon).

4. Move the hydraulic lever to the lower/retract position.

5. Adjust the flow control on the tractor until the sprayer system deadhead pressure is 80 psi.

   If the flow limiter stops the flow of oil to the motor:

   a. Move the hydraulic lever to the neutral position. This removes the oil pressure from the flow limiter and allows it to reset.

   b. Adjust the flow control to a lower flow position.

   c. Repeat step 4 and step 5.
Electrical Connections

Lights

Refer to Figure 5

The lights and harness are standard, and pre-installed on the sprayer, but require the common SAE J560B 7-pin receptacle on the tractor. If your tractor does not have this connector, your dealer can assist you with the installation of one.

Hydraulic Valve Control

The Fasse controller requires a connection to the tractor battery. Use the 6-foot, two-wire red and black cable to connect the hydraulic controls. Connect the red wire from each cable to the positive terminal and the black wire from each cable to the negative terminal.

Foam Marker Control

The foam marker control option includes a separate installation and operation manual.

Use the 6-foot gray cable to connect the foam marker control.

Raven SCS 450 and 440

The Raven SCS 450 and 440 (Sprayer Control System) are designed to improve the uniformity of spray applications. Its performance relies on the installation and preventive maintenance of the complete sprayer. An installation and service manual are provided with this sprayer. It is important to read and understand this manual before operating the system.

The SCS 450 and 440 systems consist of a computer-based control console, a speed sensor, a turbine type flow meter and a motorized control valve.

- The console mounts directly in the cab of the tractor for easy operator use.
- The radar speed sensor is mounted to the frame of the tractor or sprayer. Wheel drive and speedometer drive speed sensors are also available.
- The motorized control valve and flow meter mount to the framework supporting the boom valves. Appropriate cabling is furnished for field installation.

The operator sets the target volume per area to be sprayed and the SCS 450 and 440 automatically maintains the flow regardless of vehicle speed or gear selection. A manual override switch allows the operator to manually control flow for system check-out and spot spraying. Actual volume per area being applied is displayed at all times. The SCS 450 and 440 additionally function as an area monitor, speed monitor, and volume totalizer.

To connect the Raven 440/450 controller to the tractor battery, see the Raven Installation and Service Manual.
Spraying Setup

1. Securely attach the sprayer to the tractor. Make sure the sprayer is adjusted so that the sprayer is level.
2. Fill sprayer tank 1/2 full with water for calibrating purposes. (Tanks are not provided with the sprayer)
3. Hook-up the pump to the tractor. Engage the pump slowly and check for any leaks.
4. Set the deadhead pressure of the pump at 80 psi depending on how the pump is driven.
5. Calibrate sprayer.

Hydraulic Pump Setup

1. To determine the correct flow rate to the hydraulic motor, start out with the hydraulic control valve set at a minimum flow, and the hydraulic lever in the float position.
2. Open up the sprayer control valve to its maximum setting. (On the Raven 450 monitor, with the power switch on, the rate switch must be placed in the manual position, and the increase/decrease switch must be pushed to increase for 10-12 seconds.)
3. Start the tractor and engage the pump by placing the hydraulic lever in the down position. Once the system builds pressure on the nozzle pressure gauge, speed up the tractor throttle to normal operating speed. Shut off the boom section switches and close the agitation valve.
4. The pump is now at deadhead pressure and the hydraulic control valve must be adjusted up until the spray pressure reaches 80 psi maximum on the nozzle pressure gauge. Mark this setting on the hydraulic control valve for future reference.
5. Open up the agitation valve.

Sprayer Calibration

Sprayer calibration prepares your sprayer for operation, and diagnoses nozzle wear. This will give you optimum performance from your nozzles and ensure accurate application.

Equipment needed:
- Calibration container
- Calculator
- Stopwatch or wristwatch with second hand.

Speed Calibration

For a sprayer with a Raven controller, perform the speed calibration procedure from the Raven manual.

For a sprayer without a Raven controller, use the following steps:

1. Measure off a 200 foot course in the area to be sprayed or in an area with similar surface conditions.
2. Select the engine throttle setting and gear that will be used when spraying. The starting post should be far enough away to permit your tractor/sprayer to reach desired spraying speed.
3. Hold that speed as you approach the start marker, and check the time required to travel through the course to the end marker.
4. Repeat the above procedure, and average the times that were recorded. Use the following equation to determine the exact ground speed.

\[
\text{speed (mph)} = \frac{\text{distance (ft)} \times 60}{\text{time (seconds)} \times 88}
\]

Example:

\[
\frac{200 \times 60}{27 \times 88} = \frac{12000}{2376} = 5.05
\]
Rate Calibration

1. Determine the application rate at which your chemical should be sprayed. In determining which spray nozzles to use with your sprayer, you must know:
   a. Nominal application pressure ____ psi
   b. Target application rate ____ gpa
   c. Target speed ____ mph
   d. Nozzle spacing ____ w (in)

2. Using this information, calculate the volume per minute, per nozzle as follows:

   \[ gpm = \frac{gpa \times mph \times w(\text{nozzle spacing})}{5940} \]

   Example:
   a. Nominal application pressure 30 psi
   b. Target application rate 20 gpa
   c. Target speed 5.0 mph
   d. Nozzle spacing 20 w (in)

   \[ gpm = \frac{20 \times 5 \times 20}{5940} = 0.34 \]

   Using gpm 0.34 and pressure 30 psi, you would select a nozzle from your nozzle chart that comes closest to providing the desired output.

3. Turn on your sprayer and adjust the pressure.

4. Operate the sprayer at desired pressure and catch the discharge in the calibration container for one minute. Divide 128 into the number of ounces caught to determine gallons per minute (gpm) per nozzle. (128 fluid ounces equals one gallon.)

   \[ \text{nozzlegpm} = \frac{\text{Ounces Per Minute}}{128} \]

   Example:
   Sample - 44 ounces in 1 minute

   \[ \text{nozzlegpm} = \frac{44}{128} = 0.34 \]

5. Check the area rate. You need:
   the nozzle spacing from the sprayer = 20 inches
   the intended field speed = 5.05 mph
   the nozzle gpm = 0.34

   Example:

   \[ gpa = \frac{gpm(\text{per nozzle}) \times 5940}{mph \times w(\text{nozzle spacing})} \]

   \[ gpa = \frac{0.34 \times 5940}{5.05 \times 20} = \frac{2020}{101} = 20 \]

The above information will assure you of a check for accurate application in the event there is an error in the gauge, nozzle spacing, nozzle height, tractor speed or nozzle wear.

Since all tabulations are based on spraying water, conversion factors must be used when spraying solutions which are heavier or lighter than water. Consult the material supplier documents for assistance.

**CAUTION**

*Do not calibrate with actual agricultural chemicals. There is extreme hazard in sample collection, and excess material would be applied where the sprayer is parked. Instead, rely on the Rate Controller monitoring, and observed tank consumption rate over the acres applied.*

If the sprayer is equipped with a Raven 450 or 440 Automatic Rate Controller, this calibration procedure will also work for verifying speed and proper nozzle output.

All Raven 450 and 440 Control Systems require either wheel drive speed sensor magnets or a radar speed sensor. Calibration procedures for the speed sensor magnets can be found in the Raven 450 or 440 manual. Calculation procedures for radar speed sensors are included with each radar unit dependent on make and model.

Make sure to follow initial programming instructions of the Raven manual to select either SP1-(wheel drive sensor), or SP2-(radar sensor).
Operating Instructions

Basic Sprayer Operating Procedures

Read and follow chemical manufacturer’s instructions. Some chemicals can cause serious burns, lung damage and even death.

1. Lubricate the sprayer as needed. Refer to “Lubrication” starting on page 45.
3. When transporting the sprayer, DO NOT exceed 20 mph and DO NOT transport with chemical in the tank.
4. NEVER allow anyone to ride on the sprayer.
5. Make sure all tank shut off valves are turned on.
6. Calibrate sprayer with water only, not chemical and water. Calibrate with the sprayer tank half full of water. Refer to the calibration procedures in the Application Guide.
7. Adjust the boom height required for the nozzles and spacing to be used. (Refer to nozzle tables in the Application Guide.)
8. Check and clean pump, nozzles, and Whirlfilters®, if necessary.
9. Check the sprayer initially and periodically for loose bolts, pins and hose clamps. Check the hoses, pumps, valves and fittings for leaks.
10. Make sure that the hand wash tank is full of clean water.
11. When calibrating, filling the tank, or working around chemicals, wear protective clothing that covers the body. Refer to page 2. Have soap and clean water available to wash any exposed areas. Never open a container with your bare hands.
12. When filling the sprayer, it is better to mix the chemical in the field where it is to be applied. Position the sprayer 100 feet from any well or other water source before mixing the chemical.
13. By law, you must repeat the rinsing of the chemical container 3 times. The container should then be punctured to prevent future use. An alternative is to jet-rinse or pressure rinse the container.
14. Apply spray when the wind is 5 mph or less. Minimize drift by using nozzle tips with the largest practical openings and by operating the sprayer boom at the lowest practical height and lowest practical pressure.
15. Drive at the same speed you used in your calibration. Refer to Application Guide. Keep your sprayer calibrated.
16. If possible work crosswise to the wind, starting from the downwind side of the field. Do this so you will not ever be heading directly into chemical fumes.
17. Take note of adjoining crops, houses, gardens, people, etc.
18. Check the condition of hoses and connections frequently. Release system pressure before working on the sprayer by shutting off the pump and flipping the individual boom section switches on the control box. Always wear rubber gloves when making repairs or adjustments.
19. When turning at the end of a field, make sure you are correct on the rows so that the boom will not overlap on crop previously sprayed.
20. When you are finished spraying, empty the tank and flush the sprayer with water, including the pump, the nozzles and the bypass line from the throttling valves. Properly store the chemical emptied from the tank or dispose of it by the recommendations on its label.

Make sure to read the label on the chemical compound that is to be applied. It is the law.

11. When calibrating, filling the tank, or working around chemicals, wear protective clothing that covers the body. Refer to page 2. Have soap and clean water available to wash any exposed areas. Never open a container with your bare hands.
12. When filling the sprayer, it is better to mix the chemical in the field where it is to be applied. Position the sprayer 100 feet from any well or other water source before mixing the chemical.
13. By law, you must repeat the rinsing of the chemical container 3 times. The container should then be punctured to prevent future use. An alternative is to jet-rinse or pressure rinse the container.
Operating Checklist

Each time the sprayer is used, check the following:

- Check tire pressure, wear and overall condition.
- Check the tractor’s brakes to make sure they operate properly.
- Make sure all lights and turn signals are working properly.
- Lubricate sprayer as needed.
- Booms must be locked in place before transporting.
- Inspect tank. Make sure the hitch is adjusted so that the solution drains to the sump.
- Use safety equipment as listed on page 2.
- Fill with water and calibrate sprayer BEFORE adding chemical to the tank.
- Check the position of the ball valves in the plumbing to see if they are in the correct position.
- Check hoses, pumps and valves for any leaks.
- Check nozzle pattern for streaks and non-uniformity.
- Check the sprayer initially and periodically for loose bolts and pins.
- Follow “Important Safety Information” starting on page 1 of this manual.
- Make sure the handwash tank is full of clean water.

Plumbing Overview

Refer to Figure 6 on next page

The basic plumbing diagram is shown for the sprayer. A basic knowledge of how the sprayer is plumbed will help you to understand how to operate your sprayer. Throughout this manual, the components on this diagram will be described with the terminology labeling these components.

Fluid is drawn out of the sump in the tank and passes through the pump. From the pump it passes through the solution Whirlfilter® and filters out or grinds up all undissolved chemical and solid particles. The fluid then passes through either the control butterfly valve or the flow meter.

The control butterfly valve controls how much fluid goes to the boom. This is regulated by the Raven SCS 450 or 440 controller. The fluid passes through the flow meter and proceeds to the 3 or 5-way boom manifold valves. If a boom valve is on, the fluid passes to its perspective boom section and is sprayed out the individual nozzles.

The agitation can be set by adjusting the agitation pressure valve while the pump is at operating speed. Refer to Application Guide to adjust the agitation.
Figure 6
Plumbing Diagrams Polyethylene Tank
Using Handwash Tank

In the event of an accidental spill of chemicals on skin or in eyes, use the handwash tank to flush away chemicals.

1. Make sure all persons working with or near the sprayer know where the tank is located and how to use it. In the event of a spraying accident, it may be necessary to find and operate the wash line with impaired vision.

2. Open the tank valve and use the hose to direct the clean water on all contaminated areas. Wash all areas of skin that has been contaminated with soap and water. To flush your eyes, point the hose and water stream upward while you lower your eye into the stream of flowing water.

3. Close the tank valve and refill the handwash tank with fresh water when you are finished.

4. Periodically refill the handwash tank with fresh water. Always keep the handwash tank clean.

Hydraulic Pump Operation

To operate the hydraulic pump, first make sure that the hydraulic hoses are routed correctly so that the pump turns in the correct direction. See the “Hydraulic Pump Hook-Up” on page 20, for more details. To run the pump, push the hydraulic lever in the down position. When you want to stop the pump, push the hydraulic lever in the float position.

**NOTICE**

Do not move the hydraulic lever to the neutral position while the hydraulic pump is running. To do so may cause damage to the hydraulic pump.

Agitation

*Refer to Figure 7*

To adjust the agitation, adjust the agitation valve shown. Refer to the agitation gage to set a reference pressure for the agitation.
Boom Operations

2007+ Sprayer Hydraulics

On newer sprayers, the hydraulics use a live system. The tractor hydraulic pump may be left on during sprayer operations. This requires 5-to-8 gpm flow.

The console toggle switches move up and down from center off, and are auto-return. They must be held up or down until an operation is complete.

2006- Sprayer Hydraulics

The tractor circuit is engaged only during the operation, and the tractor lever determines the direction of cylinder movement.

The console switches move only up, are detented, and remain in the selected position until moved. The switch may be operated before or after lever movement.

Refer to Figure 8

The live hydraulic controls come standard to operate with closed center tractor hydraulics.

To be used with an open center system a conversion kit must be purchased (part no. 833-427C). To install the conversion kit, remove the plug (14) from the end of the valve block located on the top of the center boom section. Install the conversion valve and coil into this location. Plug the electrical cable into the open plug on the valve harness and the conversion is complete.

Elevator Raising/Lowering

The elevator lifts and lowers the center section of the boom, which raises and lowers the entire boom.

Refer to Figure 9

Lifting is performed by a hydraulic cylinder controlled by a solenoid valve, which in turn is controlled by an up-down/center-stop switch (1) on the boom control panel in the tractor cab.

The elevator is fully raised for folding.

Lowering is by gravity retraction of the cylinder. When the switch is toggled down, the hydraulic circuit is put in float. Lifting and lowering speeds may differ.

Boom Height

After calibrating the sprayer for the specific nozzle to be used at a desired pressure and tractor speed, the main field adjustment is the boom height.

Depending on which type of nozzle is being used, set the boom height so that the correct overlap for that specific nozzle is achieved.

If the crop canopy is taller in some fields than others, adjust the boom height accordingly. Refer to the Nozzle Charts in the Application Guide to determine the height of the boom. Also, see “Boom Height” on page 36

In center-off, the elevator stays at the current position. In normal field operations, the elevator is set to the desired height, and left there for the field. Typically this is about 20 inches (51cm) above the crop canopy.

As necessary, wings are raised and lowered at turns by the operator, and adjusted to accommodate uneven terrain.
Boom Folding Procedure
The front folding boom is hydraulically operated, and is controlled by a single valve block. There are controls for the vertical elevation, left and right boom tilt, left and right inner fold, and left and right outer fold.

Boom Folding
1. Raise elevator to top position.
2. Fold left and right outer booms 180°. Make sure outer booms snap into locks.
3. Raise left and right tilt to uppermost position. Make sure lock plunger moves up, locking boom in place.
4. Fold left and right inner booms 90°.
5. Lower left and right tilt so the booms rest on the transport supports.

NOTE: Outer booms will not lock if booms are tilted.

Boom Unfolding
1. Raise left and right tilt to uppermost position.
2. Unfold left and right inner booms 90°.
3. Lower left and right tilt to lowest position. Make sure lock plunger lowers out of the way.
4. Unfold left and right outer booms 180°.
5. Lower elevator to proper spraying height.

Normal boom use may shift the outer boom support locks along the inner section. When properly adjusted, the outer arm plate will snap into the gap between the lock plates, and the holes line up. Loosen the U-bolts and reposition brackets as necessary. Adjust cable tension so the plunger is out of the way when boom is unfolded.

Make sure outer boom cylinder pressure is released and lock plunger is free to move up and down before unfolding boom.
Locking System

Refer to Figure 10
The 3P-FF600, 3P-FF800 and 3P-FF900 have a locking system for automatic boom locking during folding and transport. For proper folding, the boom-lock cable must be tight enough that the lock arms (1) just clear their stops when unfolded and rest secure against the stop when folded.

Refer to Figure 11
To adjust the tension on the boom-lock cable, loosen jam nut and turn clevis.

Break Away Spring

Refer to Figure 8
Periodically check that break-away springs are compressed to 5 1/2 inches. Adjust spring by turning mounting nut under spring.
Boom Leveling

**WARNING**

*Pinch point hazard. Your fingers, hands or arms could be seriously injured or severed if caught in the folding boom sections. Shut off tractor and remove key before adjusting shims.*

**NOTE:**

The boom sections must be level across the span for even spraying.

**Refer to Figure 13**

To adjust the inner arm place supports under boom and loosen bolts holding plate at the top of the pivot. Add or remove shims as necessary and retighten bolts.

**60 Foot Spraying for 80 and 90 Foot Booms**

The 3P-FF800 and 3P-FF900 sprayers are capable of spraying at 60 feet as well as 80/90 feet. The conversion may be done starting from a folded configuration, or with booms unfolded.

**Conversion From Folded Position**

1. Raise left and right lilt to uppermost position.
2. Unfold left and right inner booms 90°.
3. Lower elevation to a position where the end of the boom is easily accessible.
4. Remove the pin connecting the 60 ft. boom to the main boom and manually swing the 60 ft. boom out 180° until it locks in position.
5. Unhook cable from lock plunger ring and hook to stationary ring so plunger remains in up position.

**Conversion From Unfolded Position**

1. Remove the pin connecting the 60 ft. boom to the main boom.
2. Hydraulically fold the outer boom 180°.
3. Replace pin in the main boom.
4. Unhook cable from lock plunger ring and hook to stationary ring so plunger remains in up position.

**NOTE:**

For 60 foot spraying the outer two booms (1 and 5) should be turned off. Only use the middle three booms.

**Conversion to Full Width**

1. Unhook the lock cable from the stationary ring and hook to plunger ring.
2. Fold 60 foot boom and replace pin to tie booms together.

**NOTICE**

While converted to 60-foot operation, do not attempt to unfold the outer boom sections with the hydraulics. Machine damage will occur.
Inductor (Option)

The chemical inductor provides a safe and easy way to put chemical into the tank, which keeps an operator from having to climb up on the walkboard and dispense the chemical into the tank from the tank lid. Placing the chemical into the inductor tank allows it to transfer the chemical into the sprayer tank.

To induct chemical into the tank:

Refer to Figure 14

![Figure 14: Product Valve and Inductor Valve](image)

**WARNING**

**Chemical Overflow Hazard:**
To prevent serious injury or death from chemical overflow, keep inductor tank valve closed when not in use. Run pump when inductor is in use.

1. Fill the main sprayer tank with the carrier needed and transport the sprayer to the field where the sprayer will be used.
2. Make sure the boom section switches are all off and operate the pump.
3. Turn the agitation valve to AGITATION, the tank valve to MAIN TANK, and the operation valve to SPRAY. Be sure the valve to the tank is open.
4. Turn the product valve from OFF to INDUCT.
5. Add chemical to inductor tank.
6. Turn inductor valve from INDUCTOR OFF to INDUCTOR ON.
7. Add additional chemical as needed into the inductor tank.
8. When finished, turn inductor valve from INDUCTOR ON to INDUCTOR OFF, rotate product valve from INDUCT to OFF, and turn off pump in that order.

**Transporting**

**DANGER**

**Electrocution Hazard:**
Contact with electrical power lines can cause death by electrocution.

1. Park your sprayer in an open area where you will not hit power lines, buildings, etc. when the boom is folded.
2. **Never** allow riders when transporting the sprayer.
3. When transporting your sprayer, be sure to watch the height clearances of your folded boom to prevent damage to the boom and possible injury.
4. **Do not** exceed 20 mph transporting your sprayer.
5. **Do not** transport sprayer while filled with chemical mixture.
Parking

**WARNING**

**Crushing Hazard:**
The parked boom could fall and cause serious injury or death. Always park boom in unfolded position. Always secure parking stands under three-point mount and boom when parking boom.

**Refer to Figure 15**

To park a three-point boom, follow these steps:

1. Flush sprayer with water in last field sprayed. Flush pump, nozzles and bypass line from valves. Store or dispose unused chemicals as recommended by the chemical manufacturer.
2. Park boom on a level, flat area that is protected from wind gusts and direct sunlight. Park boom in an area where children do not play. If possible, store boom inside for longer machine life.
3. Unfold boom.
4. Position parking stands under three-point mount and center section of boom frame. Make sure parking stands are positioned over level, firm ground so boom will be stable from front to rear. If the ground is soft, place boards under parking stands to increase ground-contact area.
5. Lower tractor hitch so mount and boom rest on parking stands. Secure stands to mount and boom with wire pins.
6. Unhook PTO pump or unplug hydraulic lines from hydraulic pump.
7. Unhook cam-lock connectors and hydraulic hoses from boom and position on frame.
8. Remove three-point pins from tractor. Pull away from boom.

![Figure 15: Position Stands Under Parked Boom](22904)
Storage

1. Empty solution from the tank, clean the chemical inductor (if included), and store or dispose of the chemical as recommended by the manufacturer’s chemical label.
2. Flush the entire sprayer system with clean water.
4. Circulate 3 - 5 gallons of antifreeze (Great Plains strongly recommends the use of recreational vehicle antifreeze) through the system including the pump, hoses and nozzles. Drain the sprayer and properly dispose of antifreeze. It is advisable to remove the pump and store it in a warm, dry environment during the winter.

**CAUTION**

*Regular antifreeze is harmful or fatal to animals and humans. Use carefully according to the label’s instructions. We strongly recommend the use of recreational vehicle (RV) antifreeze which does not exhibit these harmful side effects.*

5. Remove nozzles, disconnect the control box, and place them indoors with the pump.
6. Change filters in the tractor cab after finished.
7. Wash off the exterior of the sprayer thoroughly using a safe solvent or soap and water.
8. Inspect all parts of the sprayer for wear and rust. Repair and paint parts as necessary.
9. Store the sprayer in a dry area away from direct sunlight.
Adjustments

Boom Height
After calibrating your sprayer for the specific nozzle you will use at a desired pressure and tractor speed, the main field adjustment is the boom height. Depending on which type of nozzle you are using, you need to set your boom height so that you achieve the correct overlap for that specific nozzle.

If the crop canopy is taller in some fields than others, you will need to adjust the boom height accordingly. Refer to the nozzle charts located in Application Guide to determine the height of the boom needed. Use the elevator gauge as a height reference.

EXAMPLE: A 2.5 MeterCone nozzle at 20 inch spacing is being used. From the nozzle chart (refer to the Application Guide), a height of 19 to 21 inches above the top of the crop is required. If the crop is 6 inches off the ground, the boom height should be set to 25 to 27 inches off the ground.

Nozzle Pressure
Another area that will need some field adjustments is the nozzle pressure. As your tank level decreases, you may have to adjust the boom pressure to keep the pressure at the same magnitude for what the sprayer was calibrated for if your sprayer is not equipped with a monitor. Watch your pressure gauge and be aware of changes in the pressure.
Elevator Slide Adjustment

Refer to Figure 13

The polyethylene slides on the elevator can be adjusted to take out any side-to-side play. Periodically check the slide pads (A) for wear. As the pads wear, tighten 1/2-inch bolts (B) on both sides of elevator frame (C) until pads just touch frame.

Tighten the slides so that there is a minimal amount of play in the elevator.

**NOTICE**

When tightening the slides be sure to keep the elevator slide centered in the elevator mount. If the elevator is adjusted to one side there can be an interference.

Cycle the elevator a few times to ensure there is no binding and that the slides are sufficiently tightened.
## Troubleshooting

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<th>Problem Area</th>
<th>Specific Checks</th>
<th>Solutions</th>
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</thead>
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<td>Between gauge and liquid supply</td>
<td>Pump wearing</td>
<td>Rebuild or replace pump</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plugged suction or pump to pressure head hose</td>
<td>Clean hose and reduce cause of clogging</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plugged Whirlfilter</td>
<td>Clean out Whirlfilter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plugged gauge</td>
<td>Remove the quick disconnect fitting and flush gauge protector</td>
</tr>
<tr>
<td><strong>Pressure fluctuating</strong></td>
<td>Between pump outlet and liquid</td>
<td>Check suction hose &amp; fittings for air leaks</td>
<td>Remove obstruction from clogged area</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vortex in tank suction</td>
<td>Align agitators properly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cracked pump housing</td>
<td>Replace pump housing</td>
</tr>
<tr>
<td><strong>Pressure increasing</strong></td>
<td>Between gauge and nozzle</td>
<td>Nozzle screens clogged</td>
<td>Clean screens</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nozzle orifices plugged</td>
<td>Remove material with soft brush or air</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Boom hoses becoming clogged</td>
<td>Remove obstruction from clogged area</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Boom hoses pinched</td>
<td>Use cable ties to position hose so it will not kink</td>
</tr>
<tr>
<td><strong>Pressure cannot increase</strong></td>
<td>Pump or electric ball valve</td>
<td>From nozzle charts check liquid demand against pump capacity (nozzle requirement + agitation requirement)</td>
<td>Reduce swath width by nozzle reduction; install smaller nozzles and drive at a lower rate of speed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Electric ball valve or gauge not functional</td>
<td>Replace or repair</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pressure adjust switch faulty</td>
<td>Test switch &amp; replace if faulty</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fuse is out in control box</td>
<td>Replace fuse</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manual pressure adjustment valve not all the way open</td>
<td>Open the manual pressure valve all the way and allow the electric ball valve to govern the pressure</td>
</tr>
<tr>
<td><strong>No pressure</strong></td>
<td>Plumbing</td>
<td>Tank shut-off valves off</td>
<td>Make sure all tank shut-off valves are open</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Loose fittings</td>
<td>Tighten fittings so pump can prime</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Collapsed suction hose to pump</td>
<td>Replace hose</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Obstruction in suction hose or tank</td>
<td>Remove obstruction</td>
</tr>
<tr>
<td><strong>No pressure</strong></td>
<td>Pump</td>
<td>Hydraulic pump running in the wrong direction</td>
<td>Switch hydraulic hoses in the tractor outlet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PTO pump coupler loose</td>
<td>Tighten PTO coupler</td>
</tr>
<tr>
<td><strong>Pressure cannot decrease</strong></td>
<td>Pump or electric ball valve</td>
<td>Tank agitation restricted</td>
<td>Check that the agitator valve is open and that the liquid is being agitated</td>
</tr>
</tbody>
</table>
### Troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Problem Area</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid will not induct</td>
<td>Chemical Inductor</td>
<td>Make sure the valve below the inductor tank is open</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Make sure the pump is in operation and has prime</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Make sure the venturi bypass valve is open</td>
</tr>
<tr>
<td>Inductor overflow</td>
<td>Chemical Inductor</td>
<td>Close valve below inductor tank until pump is running, has pressure and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>venturi valve is open</td>
</tr>
<tr>
<td>Boom will not fold</td>
<td>Hydraulic block</td>
<td>Check electrical connections</td>
</tr>
<tr>
<td></td>
<td>assembly</td>
<td>Check for leakage at the valve and at the cylinders</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check fold switch at ends of center section</td>
</tr>
<tr>
<td>Multiple turret nozzle bodies will not</td>
<td>Wet boom</td>
<td>Spray silicone based lubricant into open turret and work loose. DO NOT</td>
</tr>
<tr>
<td>turn</td>
<td></td>
<td>use petroleum base lubricant as this will cause seals to swell and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>rotation will become impossible</td>
</tr>
</tbody>
</table>

### Firing Diagram for Fasse 700-0807-4208  Great Plains 833-423C

<table>
<thead>
<tr>
<th>Switch No.</th>
<th>Boot Color</th>
<th>Switch Position</th>
<th>Hot Wires</th>
<th>Pin Out Location</th>
<th>Pressure Ports</th>
<th>Tank Ports</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Long</td>
<td>White</td>
<td>Center (off)</td>
<td>Red &amp; Wht 4 Cond</td>
<td>D-4WP, A-4WP</td>
<td>Off</td>
<td></td>
<td>Left Foam Marker</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Right Foam (stat)</td>
<td>Red &amp; Grn 4 Cond</td>
<td>D-4WP, C-4WP</td>
<td></td>
<td></td>
<td>Right Foam Marker</td>
</tr>
<tr>
<td>2 Long</td>
<td>Red</td>
<td>Up (mom)</td>
<td>Red/Blk &amp; Grn</td>
<td>5-12P, 10-12P</td>
<td>C5</td>
<td></td>
<td>Left Tilt Up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Center (off)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Down (mom)</td>
<td>Red/Blk &amp; Grn &amp; Blk/Wht</td>
<td>5-12P, 10-12P, 9-12P</td>
<td>C5</td>
<td></td>
<td>Left Tilt Down</td>
</tr>
<tr>
<td>3 Long</td>
<td>White</td>
<td>Up (mom)</td>
<td>Org/Blk &amp; Grn</td>
<td>6-12P, 10-12P</td>
<td>C4</td>
<td></td>
<td>Center Up</td>
</tr>
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<td></td>
<td>Center (off)</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Down (mom)</td>
<td>Org/Blk &amp; Grn &amp; Blk/Wht</td>
<td>6-12P, 10-12P, 9-12P</td>
<td>C4</td>
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</tr>
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<td>4 Long</td>
<td>Blue</td>
<td>Up (mom)</td>
<td>Wht/Blk &amp; Grn</td>
<td>7-12P, 10-12P</td>
<td>C3</td>
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<td></td>
<td></td>
<td>Down (mom)</td>
<td>Wht/Blk &amp; Grn &amp; Blk/Wht</td>
<td>7-12P, 10-12P, 9-12P</td>
<td>C3</td>
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<td>Right Tilt Down</td>
</tr>
<tr>
<td>5 Short</td>
<td>Green</td>
<td>Up (mom)</td>
<td>Grn/Wht &amp; Blu/Wht &amp; Grn</td>
<td>A-3P, B-3P, 10-12P</td>
<td>C7</td>
<td>C14</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Down (mom)</td>
<td>Grn/Wht &amp; Blu/Wht &amp; Grn &amp; Blk/Wht</td>
<td>A-3P, B-3P, 10-12P, 9-12P</td>
<td>C7</td>
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<td>Left Outer Unfold</td>
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<td>6 Short</td>
<td>Yellow</td>
<td>Up (mom)</td>
<td>Grn/Blk &amp; Red/Wht &amp; Grn</td>
<td>12-12P, C-3P, 10-12P</td>
<td>C6</td>
<td>C13</td>
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<tr>
<td></td>
<td></td>
<td>Down (mom)</td>
<td>Grn/Blk &amp; Red/Wht &amp; Grn &amp; Blk/Wht</td>
<td>12-12P, C-3P, 10-12P, 9-12P</td>
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<td>Wht &amp; Blu &amp; Grn</td>
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<td>C2</td>
<td>C9</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Down (mom)</td>
<td>Wht &amp; Blu &amp; Grn &amp; Blk/Wht</td>
<td>3-12P, 8-12P, 10-12P, 9-12P</td>
<td>C9</td>
<td></td>
<td>Right Inner Unfold</td>
</tr>
<tr>
<td>8 Short</td>
<td>Red</td>
<td>Up (mom)</td>
<td>Red &amp; Org &amp; Grn</td>
<td>1-12P, 2-12P, 10-12P</td>
<td>C1</td>
<td>C8</td>
<td>Right Outer Fold</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Down (mom)</td>
<td>Red &amp; Org &amp; Grn &amp; Blk/Wht</td>
<td>1-12P, 2-12P, 10-12P, 9-12P</td>
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<td>Right Outer Unfold</td>
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<td>Blk (zip)</td>
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<td></td>
<td></td>
<td></td>
<td>Ground</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blu/Blk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ground</td>
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<tr>
<td></td>
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<td>Blk</td>
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<td>Ground</td>
</tr>
</tbody>
</table>

8/29/2017
Maintenance and Lubrication

Proper servicing and adjustment is the key to the long life of any farm implement. With careful and systematic inspection, you can avoid costly maintenance, time and repair.

**WARNING**

Before working on, servicing or making adjustments on sprayer, always disengage power, shut off tractor engine, make sure all moving parts have stopped, and all pressure in the system is relieved.

▲ Always wear rubber gloves when making repairs or adjustments.

▲ Make sure all safety equipment mentioned on page 2 are stored in an easily accessible place but protected from potential contamination from dust or chemicals.

**Sprayer/Boom Maintenance**

1. After several hours of operation, check sprayer and boom for loose bolts, pins and hose clamps.
2. Check hoses, pumps, valves and fittings for leaks. Always wear rubber gloves when making repairs and adjustments.
3. Keep elevator slide pads properly adjusted. Lubricating slide pads with grease may cause dirt accumulation that jams elevator. If necessary, use silicone spray on slide pads.
4. For lubrication points and intervals refer to “Lubrication” starting on page 45.
5. Wash sprayer and boom daily using a safe solvent, or soap and water.
6. If equipped with a foam marker, clean the air filter on the air pump no less than once a week, even more often in extreme conditions.

**Equipment Cleanup**

**DANGER**

Read and follow chemical manufacturer’s instructions. Some chemicals cause serious burns, lung damage and even death.

Nozzles should be cleaned with a low pressure (less than 30 psi) air hose, and periodically replaced. Haul a supply tank of water so you can clean the spray tank and applicator out in the field. Never wash tank out in the yard or at a car wash.

Dispose of leftover chemical in the same manner described on the manufacturer’s label of the chemical last used in the sprayer. Rinse out the tank and spray the rinse water on the last field that was sprayed.

Flush the sprayer with fresh water and spray the water in the field that was last sprayed. While the sprayer is being flushed at the field, turn the boom section switches on to flush the nozzles, then turn them off to flush out the throttling valves and bypass lines (if equipped). Repeat this procedure several times.

**General Information**

If equipment is to be used in freezing or near freezing conditions, protect pump and plumbing system by thoroughly draining liquid and pumping antifreeze (Great Plains strongly recommends the use of recreational vehicle antifreeze) solution through the plumbing system.

**CAUTION**

Regular antifreeze is harmful or fatal to animals and humans. Use carefully according to the label’s instructions. We strongly recommend the use of recreational vehicle (RV) antifreeze which does not exhibit these harmful side effects.

Check the conditions of hoses and connections frequently. Release the system pressure before working on the sprayer. To release the pressure flip the boom section switches on and off without the pump running.

Inspect all parts of the sprayer for wear and rust. Repair and paint parts as necessary.

**Whirlfilter® Maintenance**

There is one Whirlfilter® on your sprayer. The Whirlfilter® filters the chemical solution being sprayed.

To clean-out the solution Whirlfilter®:

1. Fill the sprayer tank with water and turn the pump on.
2. With the pump running, slowly open the clean-out valve and allow the grit to flow out into a bucket. Clean out the solution Whirlfilter® only when the sprayer tank is filled with water and no chemical has been added.
3. Close the clean-out valve and turn off the pump.
4. Dispose of the grit and water in the same manner described on the manufacturer’s label of the latest chemical used in the sprayer.

Flush the sprayer with fresh water and spray the water in the field that was last sprayed. While the sprayer is being flushed at the field, turn the boom section switches on to flush the nozzles, then turn them off to flush out the throttling valves and bypass lines (if equipped). Repeat this procedure several times.
Pump Maintenance and Repair
Scott and Ace Pumps
The centrifugal pump is designed for long life and service. Through the years, there may be a need to replace the mechanical seal or service some component of the pump. A mechanical seal may weep slightly, but if it starts to drip, the pump will have to be disassembled. Before disassembling the pump, be sure to wash it out with fresh water.

If the pump is leaking, before removing it from the sprayer, run the pump with adequate water in the tank to diagnose the actual pump problem.

Ace Hydraulic Pump Seal Replacement
Refer to Figure 17

Disassembly
1. Remove four 5/16-inch hex head cap screws (19) from rear of motor (18). Remove motor (18) and coupler.
2. Remove rear internal bearing snap ring (11).
3. Remove four 3/8 x 3/4-inch hex head cap screws (9) from mounting frame (8). Remove volute (2).
4. Remove 3/8-inch lock nut (3) from shaft (16). Insert flat file into impeller vane to hold stationary.

**NOTICE**
Excess torque may damage plastic impellers.
5. Press shaft (16) out of impeller using one 5/16-inch hex head cap screw from step 1. Remove impeller (5), key (15), and rotating seal member (6).
6. Press shaft/bearing assembly out of frame.
7. Remove stationary seal member (7) by prying out with screwdriver or pressing out from motor end of pump housing.
8. Remove o-ring (20) from shaft groove.
   If replacing only the pump seal:
   a. Press the shaft/bearing assembly into frame.
   b. Reinstall rear internal bearing snap ring.
   c. Skip to Assembly step 8.
10. Remove forward internal bearing snap ring (11).
Assembly
1. Install forward internal bearing snap ring (11) in mounting frame (8).
2. Press in forward bearing (12) from rear side of mounting frame (8) to snap ring (11).
3. Install two external shaft retainer rings (13) with spacer (14) between on shaft (16).
4. Press shaft assembly through forward bearing (12) until forward shaft snap ring (13) rests against inner face of forward bearing (12).
5. Press rear bearing (12) over shaft (16).
6. Insert rear internal bearing snap ring (11).
7. Slide rubber slinger (10) over shaft (16) and push back to front bearing (12).
8. Clean old sealant from mounting frame seal bore.
9. Install o-ring (20) in shaft groove.
10. Apply non-hardening Type 2 Permatex or similar under stationary seal flange.
11. Place stationary portion of seal (17) over shaft and press into seal bore cavity. Use 1 3/8-inch ID pipe or PTO adapter to press seal flange evenly on all sides.
12. Install rotating portion of seal (6) over shaft (16) and o-ring (20) by hand. The two polished seal faces should face each other. Avoid contacting polished seal faces.
13. Insert key (15) in keyway (5) and install impeller (5) on shaft (16).
14. Place lock washer (4) and 3/8-inch lock nut (3) on shaft (16). Tighten nut (3).
15. Replace volute o-ring or gasket (7), volute (2), and four 3/8 x 3/4-inch cap screws (9).
16. Position coupler in pump shaft slot and fill cavity surrounding coupler with grease.
17. Install motor (18) by aligning motor tang and coupler slot. Rotate motor (18) until nameplate faces up.
18. Install four 5/16-inch cap screws (19).
Scott Pump Seal Replacement

Refer to Figure 19

The following are instructions for how to reassemble the pump after it has been disassembled and repaired. Refer to the parts manual for the components of the pump.

If seal replacement is required:

1. Disassemble pump and clean all components.
2. Assemble the ceramic ring seat of the mechanical seal (3) into the adapter (4) of the pump. Make sure the ceramic seat is positioned square into the volute housing.
3. Clean off any grease or dirt from the pump sleeve (1) and dry the sleeve so the rubber bellows on the mechanical seal will adhere to the sleeve properly when assembled.
4. Assemble the seal (2) with its spring, on the sleeve by pushing on the inside rubber portion of the seal using water as the lubrication. Make sure to align the notches in the mechanical seal with the notches in the sleeve. Assemble the mechanical seal/sleeve assembly on the pump shaft. The graphite seal face should touch the white ceramic seat face.
5. Assemble the impeller, being careful not to jar the mechanical seal that has been positioned on the pump shaft.
6. Assemble the rest of the pump.
Shear Bolt Replacement

Your Great Plains sprayer is equipped with shear bolts to help prevent excessive damage to the booms. These are located at the inner boom pivot posts at the ends of the center section. When the boom encounters an obstruction, both bolts on that side fail, allowing the boom to swing back.

If the shear bolts breaks replace it with a 5/8 x 3 1/2-inch grade 5 bolt for 80 and 90 foot booms, or a 1/2 x 3-inch grade 5 bolt for 60 foot boom.

Using a lower grade/class bolt causes nuisance shears. Using a higher grade/class bolt may result in serious equipment damage.

It is recommended to replace these bolts at the start of the spraying season every year to insure the bolts have not been weakened through use or rusting.

Stock a spare nut for each spare shear bolt, as the nut end of the sheared bolt commonly falls away and is difficult to locate.
Lubrication

End Wing Weldment and Breakaway Boom

![Image](30)

2 grease fittings each side; 4 total
Type of Lubrication: Grease
Quantity: Until resistance is felt

Swing Arm Weldment

![Image](10)

2 grease fittings each side; 4 total
Type of Lubrication: Grease
Quantity = Until resistance is felt

Inner Pivot Tube

![Image](30)

2 grease fittings each side (top and bottom); 4 total
Type of Lubrication: Grease
Quantity = Until resistance is felt
Inner Fold Section Base Pivot

1 grease fitting each side; 2 total
Type of Lubrication: Grease
Quantity = Until resistance is felt

Outer Fold Section Base Pivot

2 grease fittings each side; 4 total
Type of Lubrication: Grease
Quantity = Until resistance is felt

Breakaway Base Pivot

2 grease fittings each side; 4 total
Type of Lubrication: Grease
Quantity = Until resistance is felt
Options

Chemical Inductor
The chemical inductor provides a safe and easy way to put chemical into the tank. Placing the chemical into the inductor tank allows it to transfer the chemical into the sprayer tank.

To order the option, contact your Great Plains dealer.

<table>
<thead>
<tr>
<th>Option Packages</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Inductor Assembly</td>
<td>502-154A</td>
</tr>
</tbody>
</table>

Foam Marker
The High Volume Foam Marker is specifically for extreme residue conditions. It can be adjusted to produce a continuous stream of foam.

To order the option, contact your Great Plains dealer.

<table>
<thead>
<tr>
<th>Option Packages</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foam Marker Kit 90 ft.</td>
<td>502-150A</td>
</tr>
<tr>
<td>Foam Marker Kit 60 ft.</td>
<td>502-137A</td>
</tr>
<tr>
<td>Foam Marker Kit 90/60 ft.</td>
<td>502-155A</td>
</tr>
</tbody>
</table>
Pumps

The standard 3P-FF600, 3P-FF800, and 3P-FF900 does not include a pump. Optional hydraulic or PTO pumps are available.

**Ace Hydraulic Pump**

If ordered with a new 3P-FF600, 3P-FF800, and 3P-FF900 (Option 35), the pump is pre-installed prior to delivery.

<table>
<thead>
<tr>
<th>Description</th>
<th>Option</th>
<th>Part Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUMP - TS HIGH VOL HYD</td>
<td>35</td>
<td>507-105A</td>
</tr>
</tbody>
</table>

For operation, see “Hydraulic Pump Operation” on page 28.

Pump kit weight: 40 lbs (18 kg)

**Ace Flow Limiter**

On tractors with load sensing closed center hydraulic systems, this device limits the flow of oil to the Ace motor and prevents failures due to misapplication. Your Great Plains dealer can assist with installation of the flow limiter.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Numbers</th>
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</thead>
<tbody>
<tr>
<td>FLOW LIMITER VALVE - ACE PUMP</td>
<td>829-125C (2006-)</td>
</tr>
<tr>
<td>FLOW LIMITER VALVE - ACE PUMP</td>
<td>829-131C (2007+)</td>
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</tbody>
</table>

For use, see “Ace Pump Flow Limiter (Option)” on page 21.
## Appendix - Reference Information

### Specifications and Capacities

<table>
<thead>
<tr>
<th></th>
<th>3P-FF600</th>
<th>3P-FF800</th>
<th>3P-FF900</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Boom Width</strong></td>
<td>60 foot</td>
<td>60 foot 80 foot</td>
<td>60 foot 90 foot</td>
</tr>
<tr>
<td><strong>Nozzle Spacing</strong></td>
<td></td>
<td>20-inch or 30-inch</td>
<td></td>
</tr>
<tr>
<td><strong>Number Of Nozzles</strong></td>
<td>36 (20-inch spacing)</td>
<td>48 (20-inch spacing)</td>
<td>54 (20-inch spacing)</td>
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<td>25 (30-inch spacing)</td>
<td>33 (30-inch spacing)</td>
<td>37 (30-inch spacing)</td>
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<tr>
<td><strong>Approx. Weight</strong></td>
<td>4410 lbs</td>
<td>5500 lbs</td>
<td>5550 lbs</td>
</tr>
<tr>
<td><strong>Working Width</strong></td>
<td>63 feet</td>
<td>83 feet</td>
<td>93 feet</td>
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<tr>
<td><strong>Transport Width</strong></td>
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<td>13 feet</td>
<td>13 feet</td>
</tr>
<tr>
<td><strong>Transport Height</strong></td>
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<td>13 feet</td>
<td></td>
</tr>
<tr>
<td><strong>Depth</strong></td>
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<td>82 inches</td>
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<tr>
<td><strong>Lift Capacity</strong></td>
<td>8000 lbs</td>
<td>10,200 lbs</td>
<td>10,300 lbs</td>
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*a. Behind lower link point  
b. At 24 inches behind lower lift-arm balls*
## Torque Values

<table>
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<tr>
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<th>Bolt Head Identification</th>
<th>N-m</th>
<th>ft-lb</th>
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<td>5/16-20</td>
<td>Grade 2</td>
<td>7.4</td>
<td>5.6</td>
</tr>
<tr>
<td>5/16-28</td>
<td>Grade 2</td>
<td>8.5</td>
<td>6.3</td>
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<tr>
<td>5/16-24</td>
<td>Grade 5</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>5/16-24</td>
<td>Grade 8</td>
<td>17</td>
<td>13</td>
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<tr>
<td>5/8-16</td>
<td>Grade 5</td>
<td>27</td>
<td>20</td>
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<td>5/8-24</td>
<td>Grade 8</td>
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<td>22</td>
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<td>7/16-14</td>
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<td>Grade 8</td>
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<td>1/2-12</td>
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<td>750</td>
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<td>M5 X 0.8</td>
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<td>M6 X 1</td>
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<td>12</td>
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<td>M8 X 1.25</td>
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<td>24</td>
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<td>M10 X 0.75</td>
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- **a.** in-tpi = nominal thread diameter in inches-threads per inch
- **b.** N-m = newton-meters
- **c.** mm x pitch = nominal thread diameter in mm x thread pitch
- **d.** ft-lb = foot pounds

Torque tolerance + 0%, -15% of torqueing values. Unless otherwise specified use torque values listed above.
Warranty

Great Plains (a division of Great Plains Manufacturing, Inc.) warrants to the original purchaser that this Great Plains unit will be free from defects in material and workmanship for a period of one year from the first use date when used as intended and under normal service and conditions for personal use; ninety days for custom/commercial or rental use. This Warranty is limited to the replacement of any defective part by Great Plains and the installation by the dealer of any such replacement part. Great Plains reserves the right to inspect any equipment or part which are claimed to have been defective in material or workmanship.

The following items and/or conditions are not covered under warranty: failures resulting from abuse or misuse of the equipment, failures occurring as a result of accidental damage or acts of God, failures resulting from alterations or modifications, failures caused by lack of normal maintenance as outlined in the operator’s manual, repairs made by non-authorized personnel, items replaced or repaired due to normal wear (such as wear items and ground engaging components), repeat repair due to improper diagnosis or repair by the dealer, temporary repairs, service calls and/or mileage to and from customer location, overtime premium, or unit hauling expenses. The warranty may be voided if the unit is towed at speeds in excess of 20 miles per hour (32 kilometers per hour), or is used in soils with rocks, stumps, or other obstructions.

Great Plains reserves the right to make changes in materials or design of the product at any time without notice. The warranty shall not be interpreted to render Great Plains liable for damages of any kind, direct or consequential or contingent to property. Furthermore, Great Plains shall not be liable for damages resulting from any cause beyond its control. This warranty does not extend to crop loss, losses caused by planting or harvest delays or any expense or loss of labor, supplies, rental machinery, or for any other reason.

No other warranty of any kind whatsoever express or implied, is made with respect to this sale; and all implied warranties of merchantability and fitness for a particular purpose which exceed the obligations set forth in this written warranty are hereby disclaimed and excluded from this sale.

This warranty is not valid unless the unit is registered with Great Plains within 10 days from the date of the original purchase.