

# ***NOTICE***

ANY PICTURES CONTAINED WITHIN THIS OPERATOR'S MANUAL THAT DEPICT SITUATIONS WITH SHIELDS, GUARDS, RAILS, OR LIDS REMOVED ARE FOR DEMONSTRATION ONLY. HAGIE MANUFACTURING STRONGLY URGES THE OPERATOR TO KEEP ALL SHIELDS AND SAFETY DEVICES IN PLACE AT ALL TIMES.



**OPERATOR'S MANUAL  
FOR  
HAGIE 120ft BOOM**

**HAGIE MANUFACTURING COMPANY**

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COVERS 120ft BOOM ATTACHMENT OPTION NUMBERS: U61510

07-09 493487

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# INTRODUCTION

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## A WORD FROM HAGIE MANUFACTURING COMPANY

Congratulations on your selection of a Hagie Model 120ft Boom. We recommend that you study this Operator's Manual and become acquainted with the adjustments and operating procedures before attempting to operate your new sprayer. As with any piece of equipment, certain operating procedures, service, and maintenance are required to keep it in top running condition.

We have attempted herein to cover all of the adjustments required to fit varying conditions. However, there may be times when special care must be considered.

Hagie Manufacturing Company reserves the right to make changes in the design and material of any subsequent sprayer without obligation to existing units.

We thank you for choosing a Hagie sprayer and assure you of our continued interest in its satisfactory operation for you. If we might be of assistance to you, please call us.

We are proud to have you as a customer.

# INTRODUCTION

## TO THE OPERATOR:

The following pages and illustrations will help you operate and service your new 120ft boom attachment. It is the responsibility of the user to read the Operator's Manual and comply with the safe correct operating procedures and lubricate and maintain the product according to the maintenance schedule.

The user is responsible for inspecting the attachment and having parts repaired or replaced when continued use of the product causes damage or excessive wear to other parts.

Keep this manual in a convenient place for easy reference when problems arise. This manual is considered a permanent fixture with this fixture. In the event of resale, this manual should accompany the boom. If you do not understand any part of the manual or require additional information or service, contact the Hagie Customer Support Department:

Hagie Manufacturing Company  
721 Central Avenue West  
Box 273  
Clarion, Iowa 50525-0273  
(515) 532-2861

The following symbols, found throughout this manual, alert you to situations that could be potentially dangerous conditions to the operator, service personnel, or the equipment.



This symbol indicates a hazardous situation which, if not avoided, will result in death or serious injury.



This symbol indicates a potentially hazardous situation, which if not avoided, could result in death or injury.



This symbol 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.

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# SAFETY

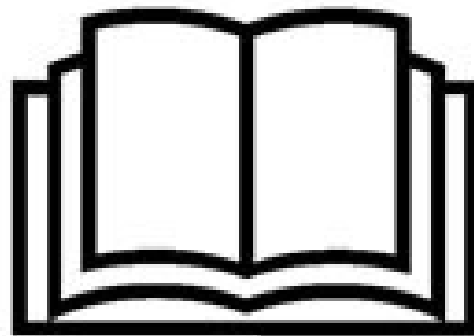
## NOTICE

The purpose of this manual is to guide you in operating the 120ft boom. Please be sure to read this manual along with the sprayer's manual and all other manuals that are included with the machine. This manual is only intended to cover the 120ft boom attachment and any differences in the operation of the sprayer's controls. It will not give complete instruction on the operation of the basic functions that are already discussed in the sprayer's manual.

Most accidents occur as the result of failure to follow simple and fundamental safety rules. For this reason, most accidents can be prevented by recognizing the real cause and doing something about it before the accident occurs.

Many conditions cannot be completely safeguarded against without interfering with efficient operation and/or reasonable accessibility. Therefore, you must study this Operator's Manual and learn how to use the attachment safely. Likewise, do not let anyone operate without instruction.

Do not make modifications such as weldments, add-ons, adaptations, or changes from the original design of attachment. Such changes and/or modifications may become safety hazards to you and to others and will void all warranties.



## NOTICE

Reference to right hand and left hand used throughout this manual refers to the position when seated in the operator's seat facing forward.

Replace missing, faded, or damaged safety signs. See the operator's manual for correct sign and placement.



# SAFETY

## Operating Sprayer Booms

- Cradle booms when leaving sprayer unattended.
- Make sure booms are folded when cradled.
- Select a safe area before unfolding booms. Avoid power lines and overhead structures.



## General Safety

- The hydraulic and electrical control systems are optimized for use with this attachment. Any modification to these systems may lead to unintended or uncontrolled motion. DO NOT install add-on control systems that are not approved by Hagie Manufacturing Company.
- Some conditions can not be completely safeguarded against without interfering with efficient operation of the machine and/or reasonable accessibility. In these cases decals have been installed to provide the operator with information on the hazard. DO NOT remove the decals for any reason. If a decal is damaged, contact Hagie Customer Support Department for a replacement.



# SAFETY

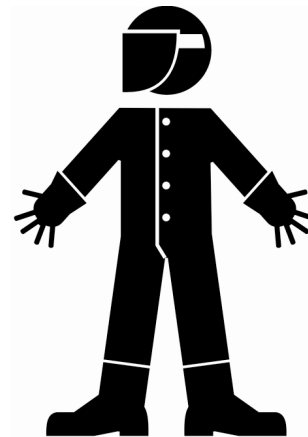
## Boom Leveling System

- Unplug all cylinder sensors before welding on the machine or boom.



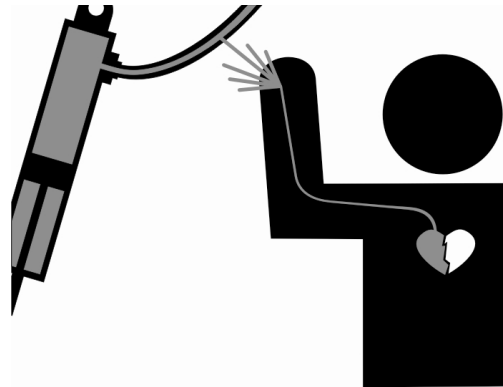
## Wear Protective Clothing

- Do not wear loose fitting clothes that could get caught in moving parts. Wear safety equipment that is appropriate for the job.
- Do not store chemical soaked clothes in the cab. Clean off as much mud and dirt from your shoes as you can before entering the cab.



## Safe Hydraulic Maintenance

- Always practice personal safety when performing service or maintenance on the hydraulic system.
- Use caution when working with hydraulic fluid under pressure. Escaping fluid can have sufficient force to penetrate your skin causing serious injury. This fluid may also be hot enough to burn.
- Always lower the load or relieve the pressure before repairing a hydraulic oil leak.

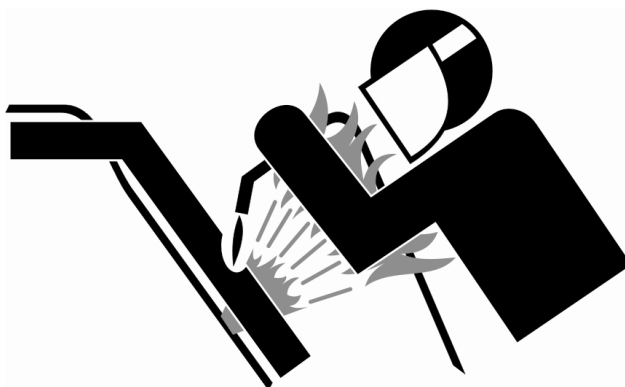




# SAFETY

## Avoid Heating Near Pressurized Lines

- Avoid torching, welding, and soldering near pressurized hydraulic lines. Pressurized lines may accidentally burst when heat goes beyond the immediate flame area.



## Be Prepared

- Be prepared for an emergency. Keep a fire extinguisher handy. Keep a first aid kit and clean water in the cab also.
- Make sure to service the fire extinguisher regularly. Keep an accurate inventory of supplies in the first aid kit and dispose of anything that has expired.



## General Repair/Maintenance Safety

- Turn off sprayer engine before checking, adjusting, repairing, lubricating, or cleaning any part of the attachment.
- Disconnect the battery ground cable and turn the main battery switch off before servicing electrical system or welding on attachment.

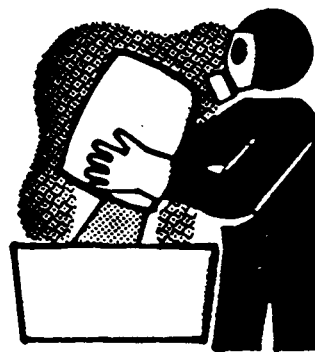
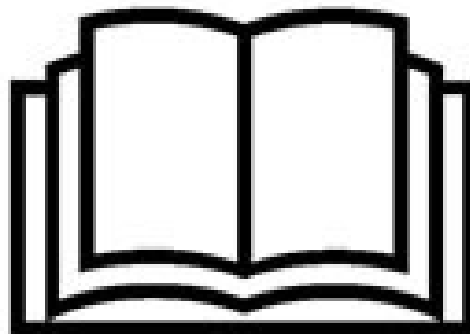


# SAFETY

## Handle Agricultural Chemicals Safely

Agricultural chemicals used in applications can be harmful to your health and the environment if not used carefully.

- Always follow the manufacturer's label directions for use.
- Never allow chemicals to come in contact with your skin or eyes.
- Never pour chemicals into an empty tank, fill tank half full of water first.
- Dispose of empty chemical containers properly.
- Wash spilled chemicals or spray residue from the sprayer to prevent corrosion and deterioration.
- Select a safe area to fill, flush, calibrate, and clean sprayer where chemicals will not run off to contaminate people, animals, vegetation, or water supply.
- Never place a spray nozzle to your lips in an attempt to unclog it.
- Do not spray when wind is in excess of chemical manufacturer's recommendation.
- Store chemicals in their original containers with the label intact.
- Store chemicals in a separate, locked building.
- Wear protective equipment as recommended by chemical manufacturer.



# SAFETY

## Power Lines

The 120ft boom is longer than any other boom offered by Hagie Manufacturing Company, we can no stress enough that extreme caution must be observed when operating the equipment around power lines! Be absolutely sure that there is more than sufficient clearance when transporting, opening the boom, or spraying around power lines!



## Disabling the Norac System

When using the Norac boom leveling system in auto mode it can be disabled to avoid a potentially hazardous situation. To disable the Norac system you can toggle the AUTO switch on the Norac console to manual or you can press any one of the following Hagie boom control switches: 90ft vertical extension switch, Lift (transom raise/ lower), or the left or right level up/down. For more information on the Hagie switches, refer to your sprayer manual. For more information on the Norac switches, refer to your Norac manuals. For detailed information on trouble shooting, refer to the Norac manual.



# SAFETY

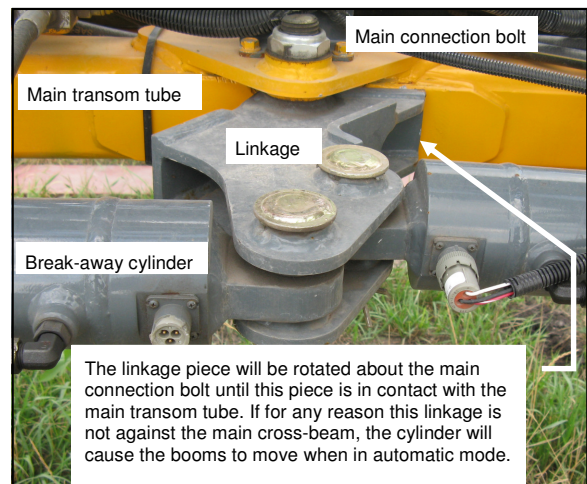
## Oil Over Air Scenarios

Initially when a new cylinder is run on the machine, it should NEVER be connected to the booms on both ends. Only one end should be connected and then the air should be bled out of the cylinder by activating the cylinder in both directions to completion at least two times. Then when initially connecting the cylinder to allow full operation of the boom, be aware of the changes that have taken place and be ready for possible rapid movement if some air would possibly still be trapped in the cylinder. **DO NOT ALLOW PEOPLE TO BE STANDING IN LOCATIONS WHERE THE BOOM COULD STRIKE THEM!**



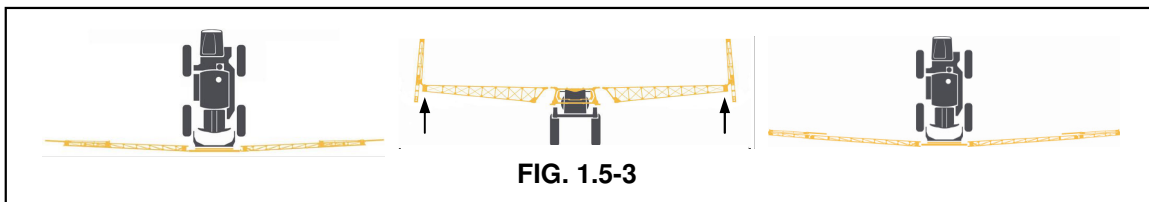
## Center Break-Away Cylinder On Recharge

The center cylinder is set up to be a break-away cylinder only, so it recharges automatically when told to do so through the program only after being enabled through the system. **THIS SITUATION ALSO REQUIRES THE OPERATOR TO BE VERY ATTENTIVE TO THEIR SURROUNDINGS– MAKE SURE THAT NO ONE IS IN THE WAY OF THE BOOMS!**



picture shows the right side only

# SAFETY



## Cold Oil Scenarios

If the oil temperature is less than 50°F, the operator could experience some significant control loss on the 90ft fold cylinders. These cylinders are the main cylinders affected by over-running loads (see figure) due to the weight rotation of the boom during fold in/out situations. When the oil is cold, the valve response is not as fast or as accurate. So when having to lift the weight the cylinder will move slower, but in trying to suspend the weight, the weight may cause faster movement because the valve is not dampening the flow like it normally would. THIS SITUATION ALSO REQUIRES THE OPERATOR TO MAKE SURE NO ONE IS AROUND THE BOOM DURING OPERATION!



## Boom Height During Transport

The fully up transport height of the boom on the tractor with the 120ft design allows the boom to be higher than the rest of the machine. To remedy this, the wings MUST be raised, then the transom lowered to the boom below the highest point of the cab, and then the wings lowered back into the cradles.



# DECALS

## Warning Decals

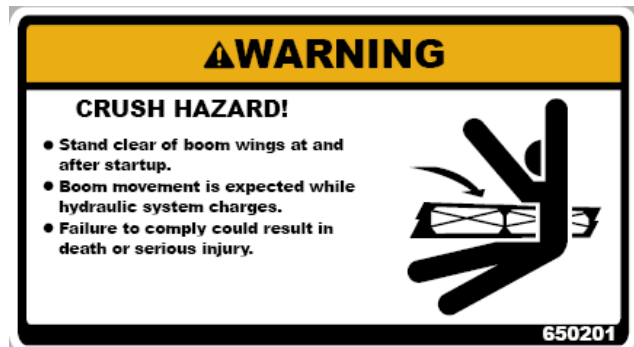
Decals warning you of avoidable danger are located on various parts of the attachment. They are there for your personal safety and protection. DO NOT attempt to remove them. They will fracture upon attempted removal and therefore must be replaced.

Following are locations of important safety decals. Replace them if they are torn or missing. All warning decals and other instructional Hagie decals may be purchased through Hagie Customer Support Department. To replace decals, decide on exact position before you remove the backing paper.



## 650201

(2) One on each 70ft. fold section.



# DECALS

650202

(2) One on each side of transom.



650203

(1) On the front of the rolling transom, left of the center valve.



# DECALS

650204

(4) One at each folding section along the boom.



650208

(1) On the Norac level valve.



650210

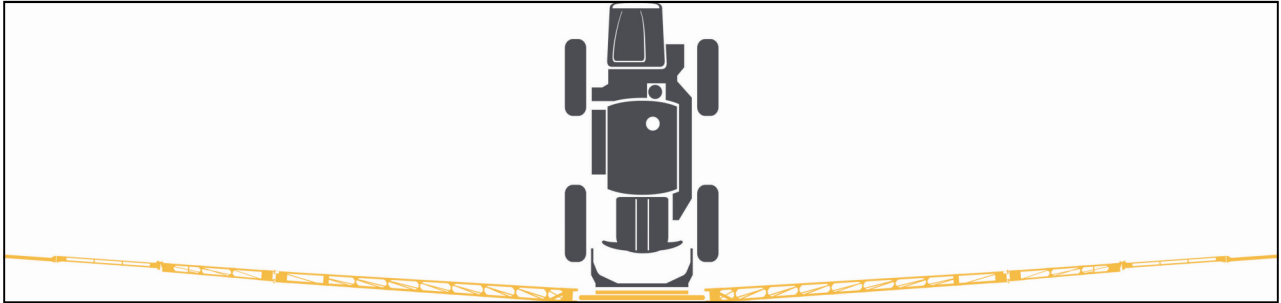
(5) One on each Norac sensor.



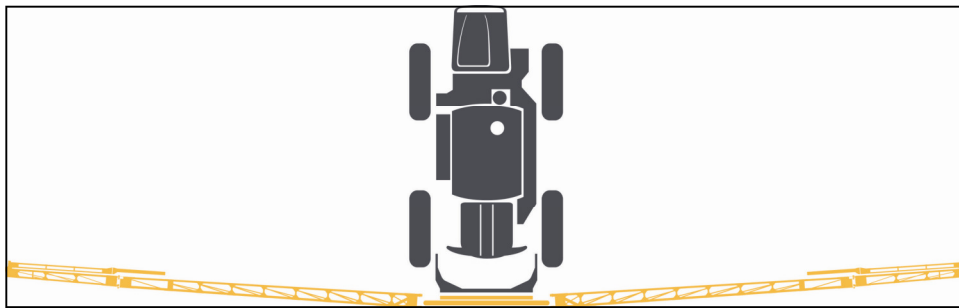


# SPECIFICATIONS

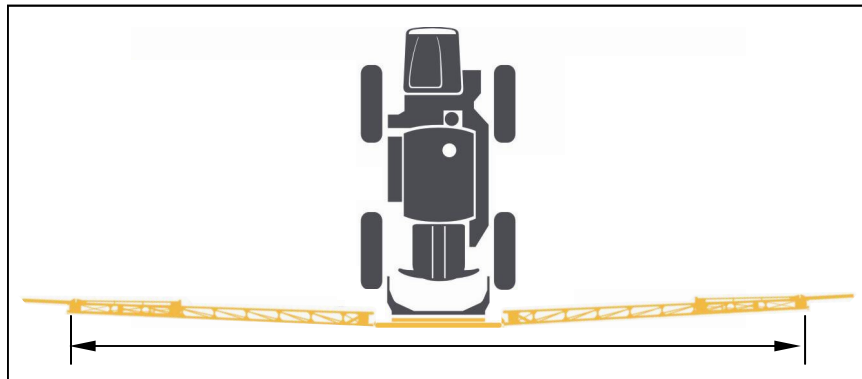
## Boom Widths



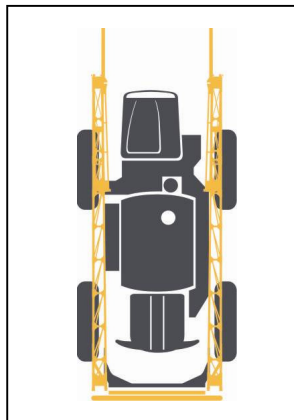
120ft spray width with boom fully extended\*



90ft spray width with boom folded at the 90/120 extension fold\*



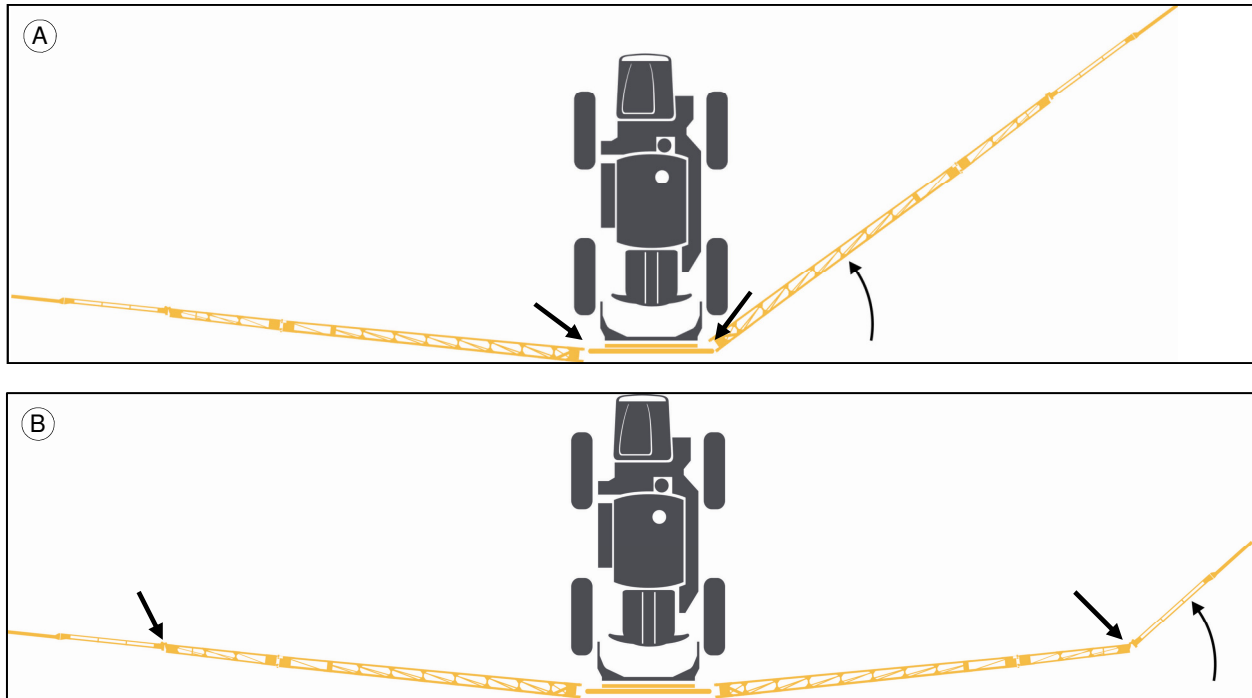
70ft width with boom folded at the 70ft extension fold



Transport width

\*Recommended spray width

# SPECIFICATIONS



## Break-Away Locations

The main pivot break-away (A) is also the accumulator circuit protection. That means that not only do you have structural protection at that point in the event that you catch something with the boom, but you also have protection from the boom's continued

forward motion during a sudden or unexpected stop.

Figure B shows the break-away at the 90/120ft fold giving you protection if you were to catch the tip of the boom.

# SPECIFICATIONS

ITEM	SPECIFICATION
<b>GENERAL</b>	
Type	Dry with variable row spacing (optional wet)
Standard	90/120ft (9 spray sections)
Controls	Electro-hydraulic: fold/lift/level
Outer Boom Tip Hydraulic Break-Away	Self-actuated, auto-reset hydraulic
Main Pivot Break-Away	Self-actuated, auto reset hydraulic
Pressure Gauge	100 PSI glycerin filled (2)
Fence Row Nozzles	Two position, remote activated
Lift Shock Absorber	Gas charged accumulators (3)
Break-Away Accumulators	Gas charged accumulators (4)
Transoms	Active roll and fixed
<b>ELECTRICAL SYSTEM</b>	
Auto-leveling Sensors	Norac sensors (2)
Proximity Sensors	(8)
Position Sensors	(6)
Highway Lights	Trapezoid glass (2)
Boom Indicator Lights*	Oval red LED (2)
Level Console	Norac UC4
Solution Valves	Electric ball valves

\* In addition to the standard machine lights

# OPERATOR'S STATION

## Norac Console

The Norac console is mounted to the right of the Raven Spray console. The Norac console controls the automatic boom leveling system. Read the Norac manual for complete operator instruction and trouble shooting information.



## Boom Solution Valve Switches

In the cab of a machine with the 120ft boom, there are nine spray section switches. The operation of these switches is not different from the operation of the switches in a machine set up with a 80/90ft boom.

The switches operate the valves that control the flow of the solution through the boom. The boom is divided into nine spray sections that can be individually turned on or off.



## 120ft Boom Extension Switch

The 120ft boom has another extension switch. It controls the extension cylinder at the 90/120ft vertical fold.

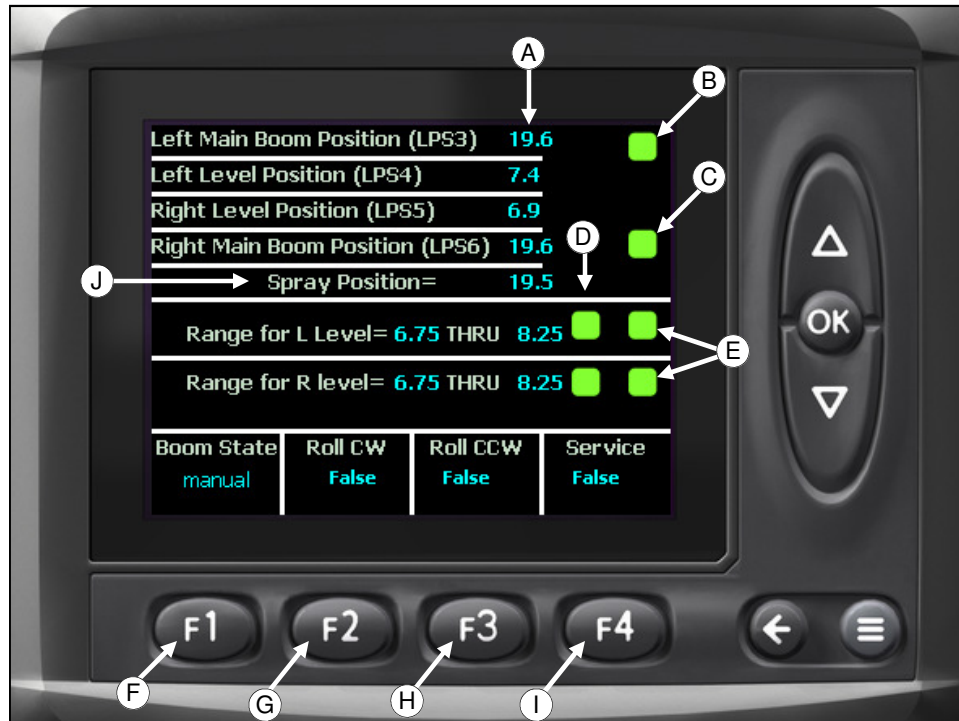
This switch controls both the left and right boom and allows them to extend at the same time reducing the chance of an unbalanced load on the transom.



**NEVER activate this function if you are near to overhead hazards such as power lines!**



# MD3



- A. LPS 3-6 position status
- B. LPS3 spray position indicator light
- C. LPS6 spray position indicator light
- D. LPS4 and LPS5 range indicator light (cradling booms)
- E. LPS4 and LPS5 range indicator light (folding 90ft boom extension)
- F. F1- non-functional button on this page
- G. F2- clockwise roll button
- H. F3- counterclockwise roll button
- I. F4- service button
- J. Spray position set point

# MD3

## 120 Boom Page

Machines with the 120ft boom option installed have a specific page (A) that is the main control for roll functions of the Norac system and that shows the status of the various sensors. To get to this page use the DOWN ARROW button to scroll through the pages.

The green lights along the right hand side indicate that the boom's various cylinders are in proper position for various functions. If the light is not on, the cylinder is not in proper position and the system will not allow certain functions to be carried out.

The information on this page only pertains to the 120 boom and the page will not show information if the boom is not connected.

The Left Main Boom Position sensor (LPS3 as marked on the harness plug) is the status of the left horizontal extension cylinder (B).

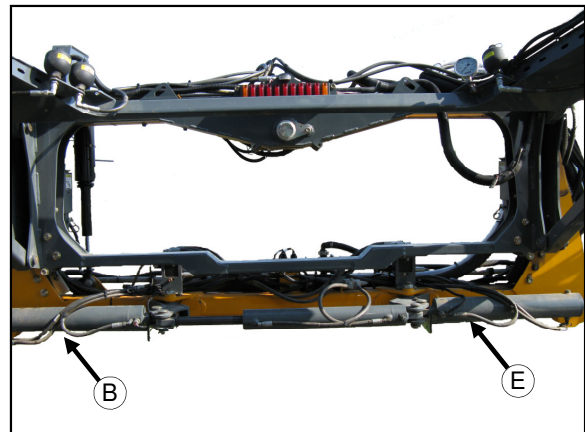
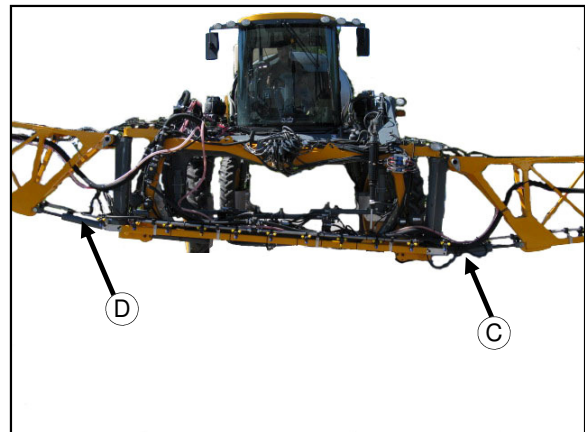
The Left Level Position (LPS4) is the status of the left level cylinder (C).

The Right Level Position (LPS5) is the status of the right level cylinder (D).

The Right Main Boom Position (LPS6) is the status of the right horizontal extension cylinder (E).

The Spray Position is the position the horizontal extension cylinders (B, E) must be in before the remainder of the boom sections can be unfolded. The amount of extension that needs to be present for the boom to be in spray position is 19.5 inches.

The range for the left and right level cylinders (C, D) is between 6.75 and 8.25 inches. This ensures that the tip of the boom will not drag the ground during the unfolding process.



continued on next page

# MD3

The right and left level cylinders must also be within range to cradle the booms. If the cylinders are not within the given range, the green light immediately right of the range specifications will not be lit (A). If the light is not illuminated and the main horizontal extension button is pushed a message will appear reminding the operator to raise the level cylinders to within the specific range (B).



## Break-away Warning (center cylinder)

This warning will appear immediately after the engine is engaged. Once the F2 (OK) button has been pressed the boom will automatically cycle the break-away cylinder. Make sure before pressing this button that there are no obstructions or persons in the way of the boom movement.



# MD3

## Spray Position Warning

This warning is similar to the warning that appears at start-up in that they both indicate that the main break-away cylinder needs to cycle. This one however, will appear anytime the boom moves too far out past the spray position. If the lights next to the LPS3 and LPS6 are lit, this message should not appear.



## Level Cylinder Position (cradle) Warning

This message will appear if the level cylinders are not within range when the main booms are folded in. This is set up to make sure the boom is in the proper position for being placed in the boom cradles and avoiding accidental contact with any other part of the machine.

Move the level cylinders into position using the buttons on the hydrostatic lever. Once the cylinders are in range, the first light behind the LPS4 and the LPS5 will be illuminated and the main fold function will no longer be restricted.



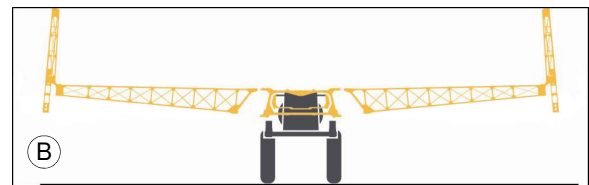


# MD3

## 90ft Boom Fold Warning

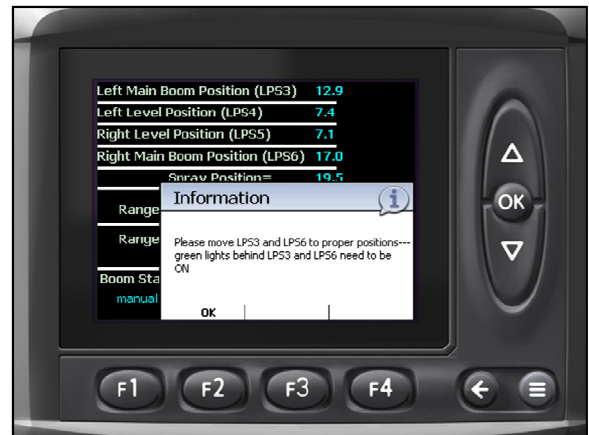
This warning (A) is to alert the operator that the booms are not high enough to prevent damage during the folding/unfolding of the 90ft extension.

The 120ft extension protrudes past the end of the 90 ft extension (B) and could scrape the ground if the booms are not above 6.75 inches when the function is performed.



## Main Boom Extension Warning

This warning alerts the operator that the main boom fold was not completed and the 90ft extension fold is not safe to complete. Make sure that the main boom opened out until the green lights behind the LPS 3 and LPS6 sensors are illuminated.



# THE BOOM

## Pivot (Rolling) Transom

The pivot transom houses the Norac control valve, 2 work lights, 2 pivot valve, 1 solution valve, the center Norac Sensor, the center boom stands, the horizontal extension and break-away cylinders, 4 accumulators, the roll cylinder, and the center hydraulic manifold.



## Fixed Transom and Lift Arm

The fixed transom and lift arm house the flow meter, lift cylinders, 2 pressure gauges, 3 accumulators, the boom indicator light assembly, roll lock, and 4 modules.



## Level Cylinders

The level cylinders, located on the left and right side of the transom, are responsible for the up and down movements of the boom when the level controls are activated. They are present on a 90/100ft boom although they are located at the top of the transom. Read the sprayer manual for more information on the level cylinder functions.



# THE BOOM

## Throttling Valve

The throttling valve is required to maintain back-pressure on the pump and keep the flow meter full if spraying at low flow rates and to aid in issues with precise flow control at low flow rates. If you require more assistance, contact Hagie Customer Service Department.



## Roll Locks

The roll locks, located on both the left and right side of the transom, are used to allow (or not) the active roll of the pivot transom.

The fully extended position (locked) should only be used during maintenance and storage situations. The fully retracted (active roll/ unlocked) position is the only position the roll locks should be in during the operation of the 120ft boom. Failure to retract the roll locks prior to operation may result in damage to the boom and auto-leveling system.



## Main Pivot/ Break-Away Cylinders

The main pivot/ break-away cylinders are responsible for the horizontal extension of the booms to the spray position. They also provide the break-away protection of the boom.



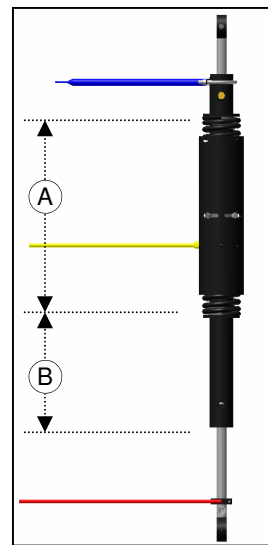
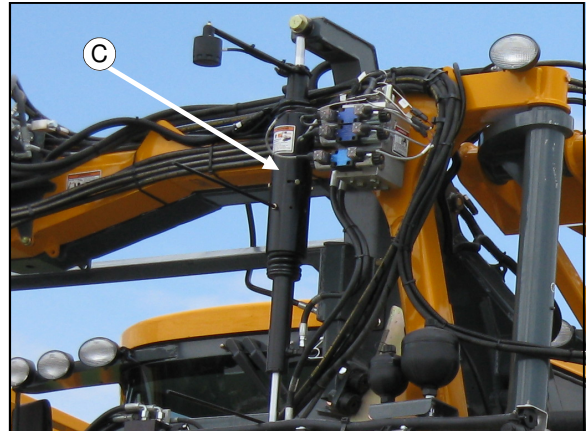
# THE BOOM

## Roll Cylinder

The roll cylinder (C) extends and retracts to provide the “roll” functions of the Norac system.

The roll cylinder is activated automatically when the Norac is in the auto mode or when the operator manually activates the roll functions through the Hagie controls.

The top portion of the cylinder (A) provides the spring and shock functions. The bottom portion of the cylinder (B) is the active portion.



## Proximity Sensors

There are external proximity sensors located at the 70/90ft vertical fold and the 90/120ft fold. The motions of the boom (folding and unfolding) are guided by the measured position of the different cylinders.

The sensors are positioned at the factory and should not require any calibration. If you experience any issues with boom positioning, contact Hagie Customer Service for assistance.



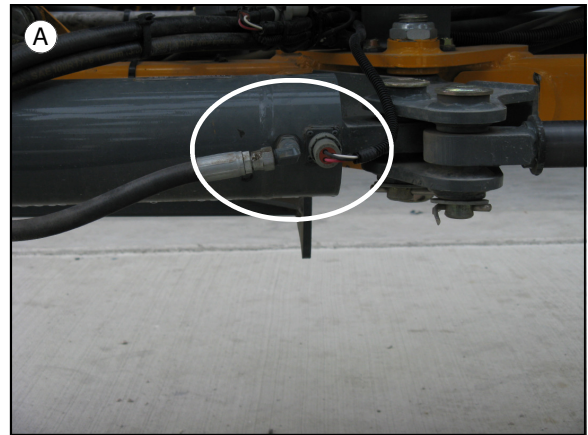
# THE BOOM

## Position Sensors

The main pivot/break-away cylinders, 90ft fold cylinders, and level cylinders are equipped with internal position sensors (A). The sensors measure the position of the rod inside of the cylinder and provide the system with position information to aid the operator in making sure that the boom is in the correct position to perform many of its functions. This allows the machine control system to achieve a much finer degree of control over boom motion. The information can be viewed on the MD3, 120 boom page (B).

The required specific motions exist to provide smooth, efficient operation. The programmed positions help prevent mechanical damage to the boom due to severe imbalance, unintended contact with the ground, or improper fold sequence.

The sensors are positioned at the factory and should not require any calibration. If you experience issues with the positioning of the boom, contact Hagie Customer Service for assistance.



# THE BOOM

## 90/120ft Break-Away

There is a hydraulic break-away at the 90/120ft fold section. The break-away provides protection to the boom by allowing the boom to fold if it were to come into contact with another object.



## Highway Lights

The work lights that are located on the quick mounts for a 90ft or 100ft boom are mounted onto the 120ft boom. They are located on the rolling transom. These lights come on when the HIGHWAY LIGHT switch is activated on the steering console.



## Norac Sensors

The boom is equipped with five Norac sensors that track the boom's position to the ground. They send signals to the hydraulic system allowing for position corrections to keep the boom parallel to the ground and the crop giving you a more consistent spray pattern.



# OPERATING INSTRUCTIONS



# DANGER

Before proceeding, check the area around the machine for by-standers, overhead objects, or power lines. Failure to do so will result in serious injury or death.

## Unfolding the Booms From a Cradled Position

1. The hydrostatic lever must be in the neutral position.
2. Make sure the transom is all the way up (B).  
To raise the transom, press the RAISE on the square rocker switch on the hydrostatic lever (C).



# OPERATING INSTRUCTIONS

3. Raise both level cylinders up (A) with the level controls on the hydrostatic lever (B) until motion stops (this will be within the range shown on the MD3 display for each side and the inside green light (C) will illuminate showing you are within range). Following this step ensures that the level cylinders are in the correct position to unfold the 90ft boom later in your sequence. Note: While moving the level cylinders, you can view their position on the MD3 display.





# OPERATING INSTRUCTIONS

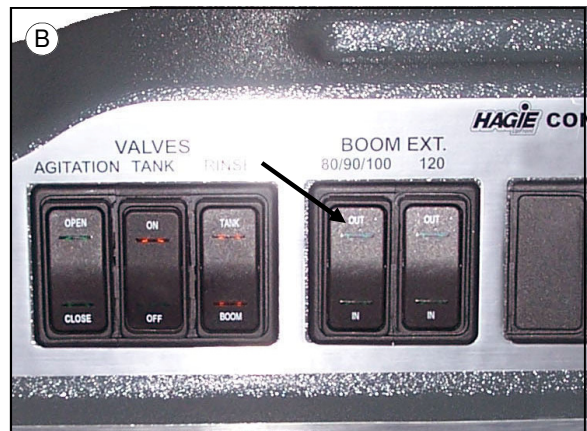
4. Unfold both the left and right main boom sections (A) using the horizontal extension switches on the hydrostatic lever (B). It is important that both booms are unfolded at the same time to prevent an unbalanced load on the transom. NOTE: Boom motion slows near the end of travel, make sure the boom has stopped moving completely (full extension should be 19 to 20 inches of cylinder extension) to ensure the boom stops in the “spray position”. You can view the position of the booms on the MD3, 120 Boom Page same as you could with the level positions.



# OPERATING INSTRUCTIONS

5. Unfolding the 90ft section (A) requires that the following conditions be met.

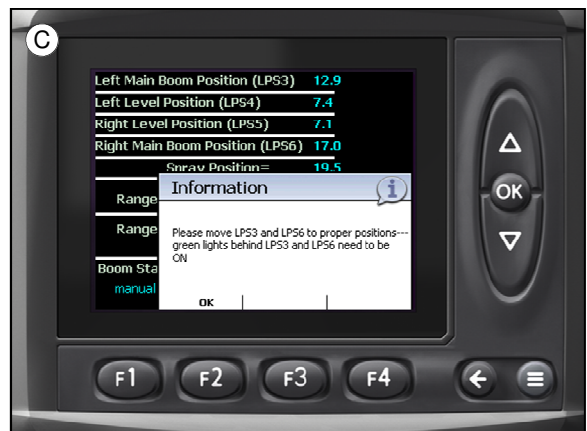
- Push the 90ft BOOM EXTENSION button on the side console (B).
- The main booms are fully extended past 15 inches on LPS3 and LPS6 (see step 4).
- Both boom level cylinders are extended past 6.75 inches (see step 3).
- The outside set of green lights (C) must be illuminated before folding the 90ft boom section. This tells you that the LPS4 and LPS5 are above the minimum level to fold/unfold the 90ft booms.
- The 120ft sections are fully folded in.
- The power line message (D) on the MD3 has been acknowledged.



# OPERATING INSTRUCTIONS

6. Unfold the 120ft section (A) by pressing OUT on the 120 BOOM EXTENSION switch on the side console (B). Continue to press until the boom is completely unfolded.

If the 90ft boom is not folded all the way out a message will appear on the MD3 saying that the LPS3 and LPS6 position sensors need to be moved to their proper positions before the function can be completed. If the sensors are in the proper position, there should be green lights along the right hand side of the MD3 display screen.

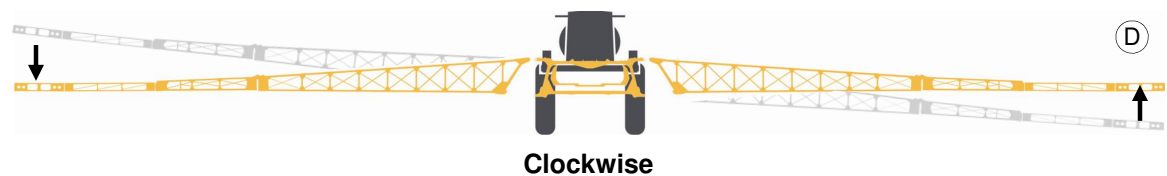
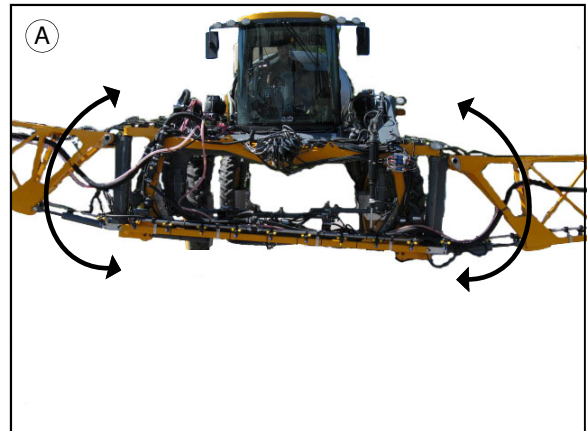


# OPERATING INSTRUCTIONS

## Cradling the Booms

1. The hydrostatic lever must be in neutral.
2. If you are coming from the field, try to be on level ground before de-activating the Norac system. If you notice that the transom rolled one way or the other (A) you will need to manually roll the transom back before continuing. To manually roll the transom follow these steps:

- make sure you are away from power lines or any overhead obstructions.
- Raise both level cylinders to above 10 inches. The MD3 will guide you.
- From the 120 Boom page, press the F2 or F3 buttons on the MD3 (B). The F2 button will roll the transom clockwise (D) and the F3 button will roll the transom counterclockwise (D).



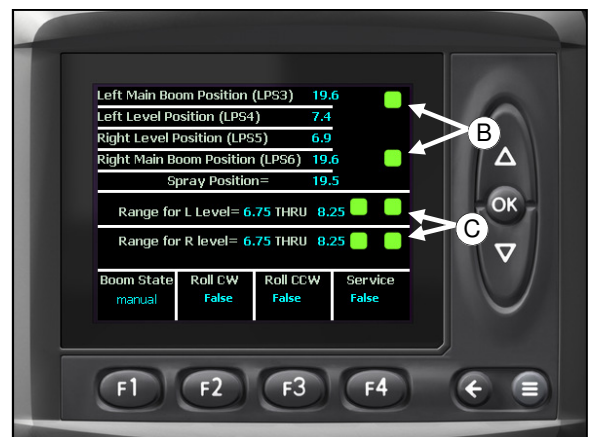
# OPERATING INSTRUCTIONS

3. Fold the 120ft section by pressing IN on the 120 BOOM EXTENSION (A) switch on the side console. Continue to hold the switch until the boom section is all the way in (B).



# OPERATING INSTRUCTIONS

4. Raise your left and right levels to they are within the ranges set on the MD3. (Both sets of lights must be illuminated before folding the 90ft section– see illustration C) Fold the 90ft section (D) in by pressing IN on the 80/90/100 BOOM EXTENSION switch (A) and holding until they are all the way in. NOTE: the booms must be past 15 inches on the LPS3 and LPS6 (B) to fold the 90ft section. BE SURE that you are not around any power lines before the message (E) is acknowledged in the MD3 by pressing F2 (ACK).



(D)

# OPERATING INSTRUCTIONS

5. Raise the transom all the way up (A).
6. Fold both main boom sections in by pressing IN on the hydrostatic lever (B). Be sure that they are being folded in at the same time to keep a balanced load on the transom (A).
  - Movement may stop during this process if earlier steps were not followed. The ranges have to be met for each respective side to fold.



# OPERATING INSTRUCTIONS

7. Once the boom is against its respective cradle (A), lower each level cylinder until the movement stops and the boom is sitting in the cradle (B).





# NORAC OPERATING INSTRUCTIONS

1. Lower the transom into the range of the desired spray height. The booms should be fairly level (A).
2. Turn the Norac controller ON and engage the control by toggling the auto/manual switch to AUTO. **PAY ATTENTION!** the system will move the booms to the programmed spray height and level the booms!
3. Auto boom control can be cancelled by selecting manual on the Norac controller or activating any of the boom hydraulic functions using the Hagie control switches on the hydrostatic lever. To restart auto control, repeat step 2.



## NOTICE

Make sure the roll locks are out of the locked position (B) before trying to use the Norac controller. Refer to the Norac operating manual for initial controller set-up.



# QUICK-TACH

The boom can be removed for various reasons including, but not limited to maintenance or attaching to another Hagie manufactured attachment. The fol-

lowing steps must be followed when removing the boom from the machine to prevent personal injury or damage to the machine.

## 1. Locate the boom on a level, flat, hard surface.

To prevent stress on the boom frame and joints, it is best that the boom be placed on a surface that is fairly level and flat. To prevent the boom from sinking into the ground the surface should be solid.

Remember that the boom must be partially open while off the machine! Choose an area that will not be an inconvenience to get around and still protect the boom from the damage.



## 2. Remove the boom extensions from the cradles.

The booms only need to be opened far enough to be able to lower them, they do not need to be fully opened into the spray position.



## 3. Position the boom extensions slightly open.

The main extensions need to be opened between 7 and 12 inches of cylinder stroke viewable on the MD3. This is the best position for the boom to be in while it is not attached to the machine because it provides the necessary support while conserving space.



# QUICK-TACH

## 4. Lower the boom to access the boom stands (at the bottom of the rolling transom) and the roll locks.

Lower the boom to access the boom stands (at the bottom of the rolling transom) and the roll locks. The transom must be close to the ground when you disengage the quick-tach lock pins later in the process.



## 5. Extend the roll locks.

This step is extremely important! NEVER attempt to remove the boom or perform any maintenance on the boom without extending the roll locks to the “locked” position. Failure to do this step may result in injury or damage to the boom.



## 6. Remove the fastener and pivot leg stands 90° to lower.

Remove the bolt to allow the leg stands to pivot. Re-insert the bolt through the lower hole to keep the leg stand from folding back up.



# QUICK-TACH

## 7. Lower the legs to the ground.

If necessary, place blocks under the stands where the legs will rest on the ground. This will help to keep them from sinking into a soft surface such as grass or soil.



## 8. Lower the LH and RH wings onto an elevated object.

Use the right and left level functions to lower the wings to an elevated object such as a pallet (A) or timber (B).



# QUICK-TACH

## 9. Turn OFF the shut off valves on the level cylinders.

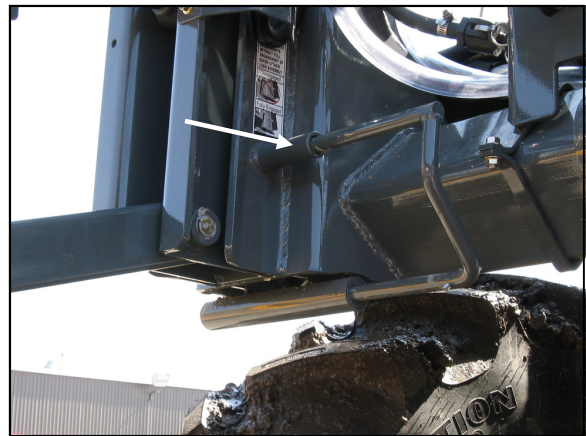
The level cylinders are equipped with valves that keep the hydraulic fluid from leaking out of the cylinder. They must be turned so that they are perpendicular to the valve.



## 10. Open the quick-tach lock assemblies.

If you have followed the previous steps, your boom should already be located in position to unlock the quick-tach lock assemblies. **DO NOT** open the lock assemblies with the boom in the air!

To open the assemblies, simply pull the handle (A) toward the center of the machine. Be sure that they do not re-lock while attempting to remove the boom in the next step.



## 11. Lower the transom to raise the quick-tach hooks off of the quick-tach pins.

Lower the transom until the hooks have cleared the pins.

You may notice a “bounce back” effect when the weight of the boom has been relieved from the machine. Once the airbags have cycled the machine will adjust to the new weight.



# QUICK-TACH

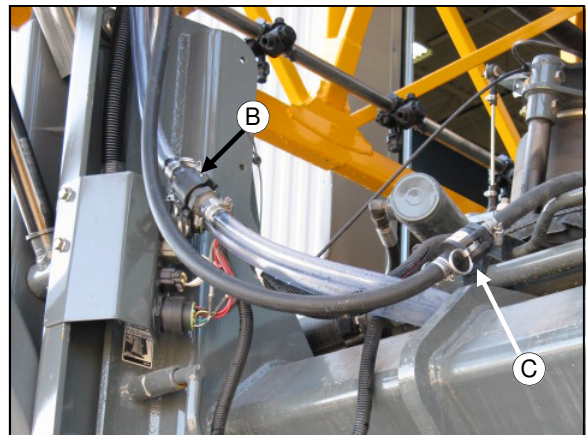
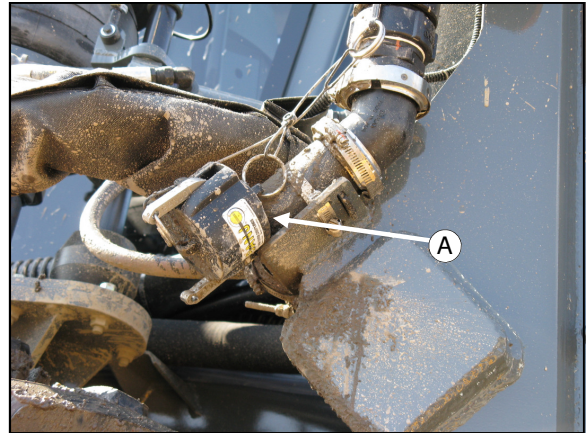
## 12. Disconnect solution and foam marker hoses.

Disconnect the solution hose (A) on the right side of the machine. Disconnect the foam marker hoses (B) and the rear nozzles (C) at the right of the machine.

Be sure to cap the hoses with the supplies caps. If the caps are missing, cover the opening with plastic and tape until a replacement can be obtained from Hagie Customer Service.

The foam marker hoses are capable of being connected to each other. Do not attempt to connect hoses from different systems together.

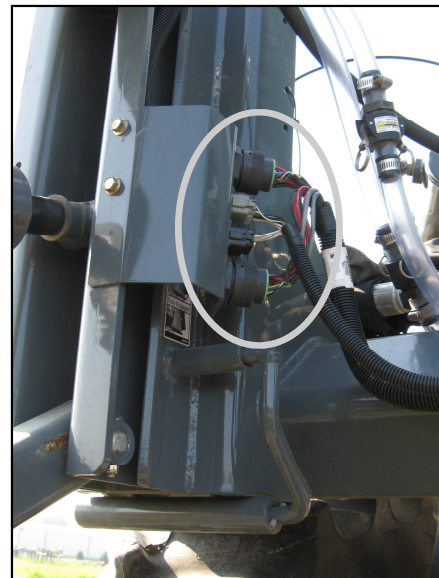
NOTE: If there is too much tension on the hoses when trying to disconnect them at this point, they can be disconnected while shutting off the level cylinders or unlocking the quick-tach lock assemblies.



## 13. Disconnect the electrical connections at the right front of the machine.

Disconnect the electrical pigtails at the right front of the machine. Check the pigtails for any damage such as broken connectors or loose wires.

Make sure that the harness is not left in a position that it could be damaged while the boom is not connected.



# QUICK-TACH

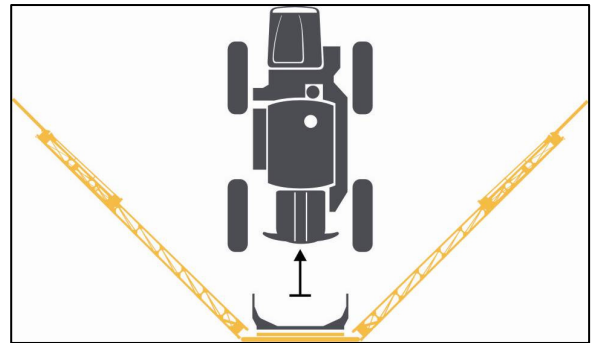
## 14. Disconnect the hydraulic connection on the left front of the machine.

The hydraulic lines equipped with quick couplers do not have caps. Care must be taken when reconnecting the hoses to ensure that no foreign material enters the hydraulic system.



## 15. Slowly back the machine away from the boom attachment.

Once all the connections have been disconnected, you may back away from the attachment.



# QUICK-TACH

To re-connect the boom, everything is done in reverse from taking it off. Make sure that before you lift the boom from the ground, all of the hydraulic connectors are securely fastened and so are the quick-

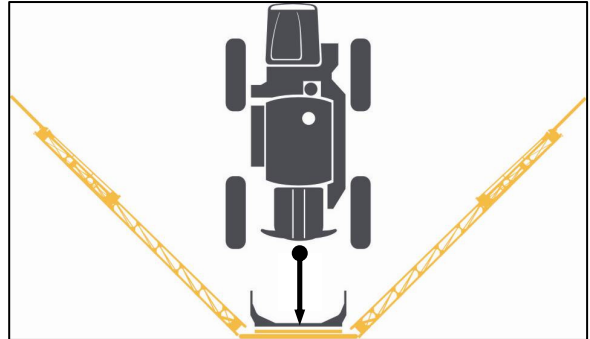
tach lock pins. If attaching anything other than the 120 boom, make sure to read the operator manual for the attachment before attaching or using it.

## 1. Pull squarely into the boom attachment.

Slowly pull into the boom attachment until the quick-tach hooks are in line above the quick-tach pins.

The machine may be too high to fit under the quick-tach hooks. In this case you need to release air from the air bags. If your machine is not equipped with relief valves, you may order them from Hagie Customer Service.

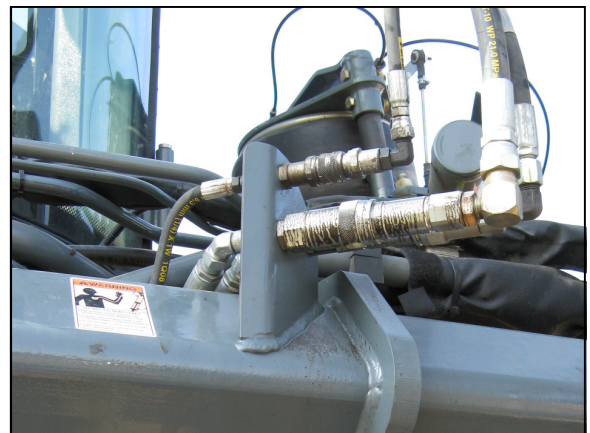
NOTE: You may find it easier to use the speed control knob instead of the hydrostatic lever when trying to control your movement into the boom attachment.



## 2. Connect the hydraulic hoses on the left front of the machine.

Before connecting the hydraulic hoses, check to see that all openings on both the machine and the boom are clean. Pull the coupler's collar back to inspect for foreign material also.

The introduction of foreign material to the hydraulic system can cause filters and orifices to become plugged and disrupt oil flow.



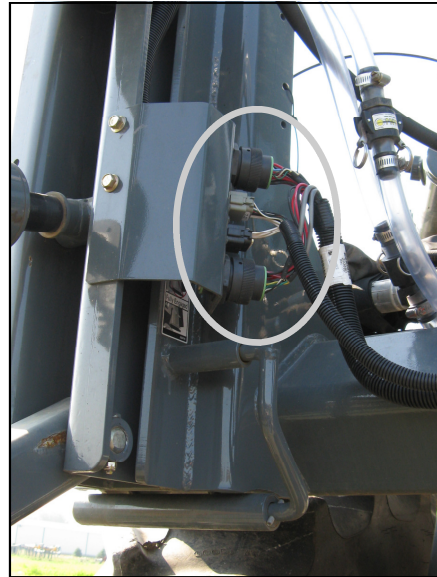


# QUICK-TACH

## 3. Connect the electrical pigtails on the right front of the machine.

Inspect the pins, wires, and ports before connecting the electrical pigtails. Using an electrical connector that is damaged may result in erratic functions or a fire. Call Hagie Customer Service for replacement of damaged parts.

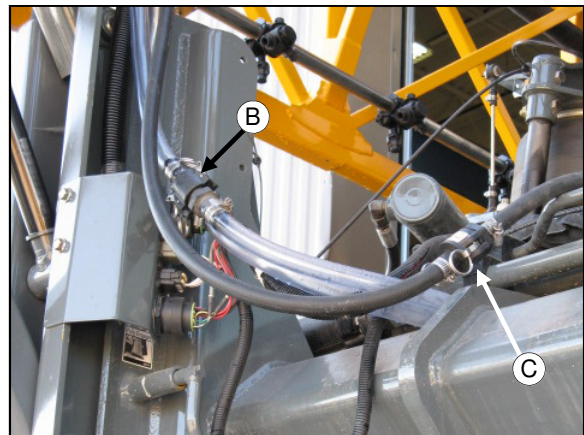
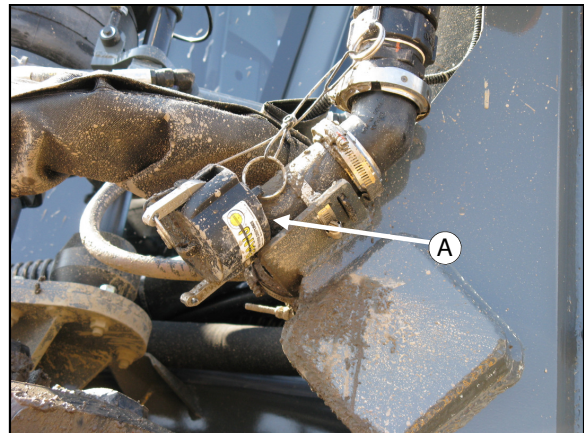
NOTE: The hydraulic hoses and electrical lines must be connected before proceeding.



## 4. Connect the solution and foam marker hoses.

Connect the solution hose (A) on the right side of the machine. Connect the foam marker hose (B) and the rear nozzle hose (C) at the front of the machine.

NOTE: If there is not enough slack in the hoses, they can be connected after the boom is completely on the machine.



# QUICK-TACH

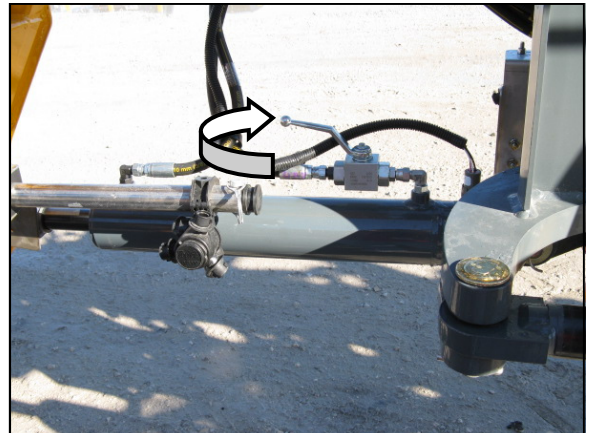
## 5. Open the quick-tach lock assemblies.

Make sure that the quick-tach lock assemblies are open before you proceed with connecting the boom attachment. Pull the lock assembly out until it is fully extended and it stays open.



## 6. Turn ON the shut off valves on the level cylinders.

Turn the valves so that they are parallel with the cylinders.



## 7. Raise the transom so that the quick-tach hooks engage the lock pins.

Raise the transom only high enough that the hooks go over the pins. DO NOT raise the transom all the way up until you have checked to see that the quick-tach lock assemblies are fully engaged.



# QUICK-TACH

## 8. Close the lock assemblies.

Be sure that the lock assemblies are closed all the way before proceeding with attachment process.



## 9. Raise the right hand and left hand extensions to level.

Rise the extensions using the level switches on the hydrostatic lever.

## 10. Raise the transom to allow the leg stands to be folded up.

Remove the fastener from the lower hole and fold the leg up. Replace the fastener in the upper hole.



# QUICK-TACH

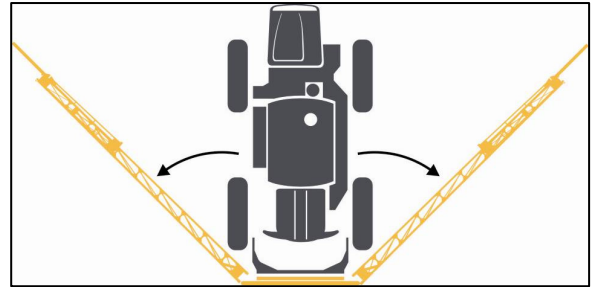
## 11. Retract the roll locks.

Do not engage the Norac leveling functions until you have completed this step.



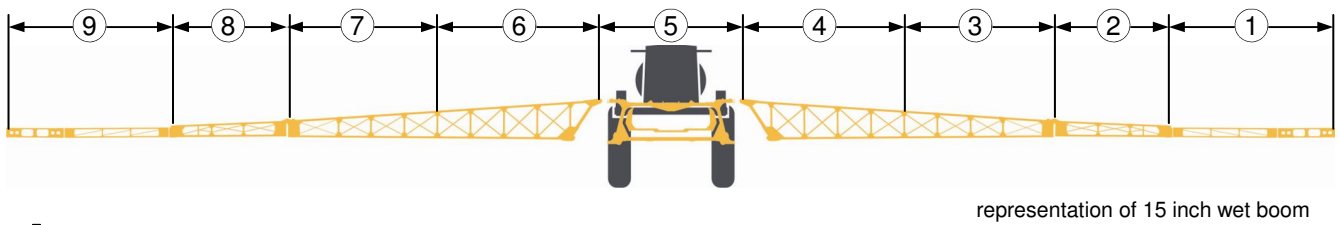
## 12. Fold the boom either in or out to allow the position sensors to readjust.

The horizontal fold will need to be activated in either direction to reset the position sensors and the main pivot break-away.

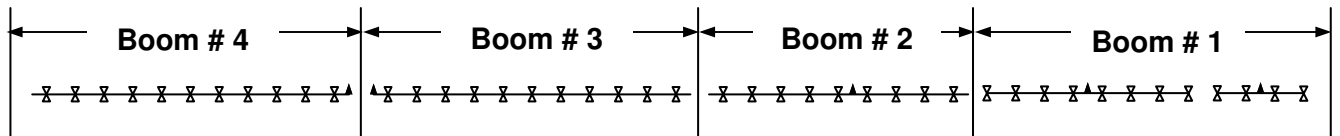
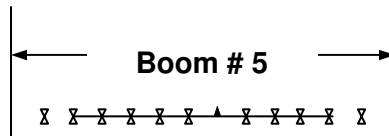
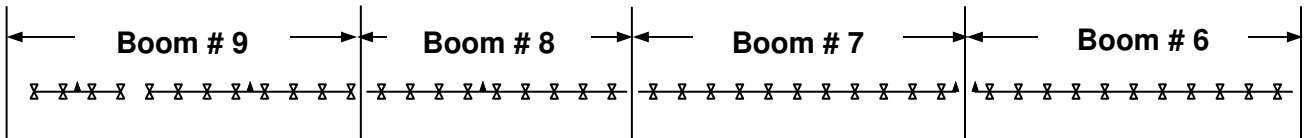


# CALIBRATION

Follow the instructions in the Hagie sprayer operator's manual to calibrate the wet boom. There are just a few things different in the set up: the boom lengths and the number of boom sections. The diagram shows how the 120ft boom is broke down into sections.



- X nozzle body
- ^ feeder hose



# NORAC CALIBRATION

From time to time it may become necessary to recalibrate or “re-tune” the hydraulic parameters of the Norac system. This will not calibrate the Norac sensors.

Read all operating material provided with this system. If you have any problems or questions, call Hagie Customer Service Department of assistance.

## Re-Tune

1. Level the booms at normal working height. It is not necessary to have the booms at 35 inches from the ground when performing a “re-tune”.
2. Toggle the AUTO (YES) switch to continue.
3. Hold the AUTO (YES) switch to begin sensor detect sequence. Continue to hold the switch until the sequence is complete. If you let the switch go, simply toggle and hold again to continue procedure.
4. The system will activate each section in both the up and down direction starting with the left side, right side, main (center), and finishing with the roll function. When the system is complete “done” will appear on the screen and you may release the switch.

## NOTICE

Stay clear of the Norac sensors when approaching the boom. Walking too close to the sensors may cause unexpected movement.



# NORAC CALIBRATION

Calibrating the Norac sensors is necessary to maintain an accurate working height. Detailed instructions can be found in the Norac operating manual.

If you continue to have problems with your systems, contact Hagie Customer Service for assistance.

## Calibrating the Norac Sensors

1. Unfold the booms into spray position. Make sure that the sensors are over bare soil or gravel— do not conduct this calibration over standing crop or tall grass.
2. Position the boom at normal working height.
3. Use a tape measure to measure the distance from the bottom of the spray nozzle closest to the sensor to the ground. Round to the nearest half inch.
4. On the console, get to the main prompt “LOht” as described in the Norac manual.
5. If the height displayed is not the same as the measurement you just took, adjust it using the “+/-” switch.
6. Repeat steps 3 through 5 for each of the sensors on the boom.
7. Return to the normal operating screen by toggling the SETUP (NO) switch and holding it for two seconds.



# TRANSPORTING

## Driving the Machine

When driving the sprayer on a public roadway or highway, always have the boom cradled. For the purpose of driving on a roadway or elsewhere, be aware of any situations that the sprayer will be passing under an object. The design of the 120ft boom allows the transom to be lifted above the height of the cab, and remain higher than the cab when cradled. Follow the procedure on the next page to lower the boom below the highest point of the cab.



# WARNING

**NEVER** operate the machine on a public roadway with solution in the tank!



# WARNING

**DO NOT** operate the machine at speeds exceeding 20 mph with solution in the tank. Operating at speeds exceeding 20 mph with a fully loaded tank may result in tire blow out or wheel hub damage and void the warranty.



Hagie Manufacturing does not recommend any form of transportation other than driving the sprayer. Loading a sprayer on a trailer may result in sprayer tip-over.



# TRANSPORTING

## Trailer

If the sprayer must be transported on a trailer, the transom will have to be lowered to below the maximum height. Be sure to read and understand the trailer manufacturer's operating and loading instructions and follow these steps to lower the transom below the cab:

1. Raise the boom wings off their cradles.
2. Lower the transom to the desired position.
3. Reposition the boom wings back into their cradles.

DO NOT leave the boom wings in their cradles when lowering the transom— damage will occur!



Hage Manufacturing does not recommend any form of transportation other than driving the sprayer. Loading a sprayer on a trailer may result in sprayer tip-over.

# SERVICE

Page	Service Point	Daily	As Req	50 hrs	500 hrs*
65-2	Grease zerk for main pivot pin (1)	•			
65-2	Grease zerks for rollers (6– 3 each side)	•			
65-4	Clean Norac sensor foam pads	•			
65-4	Check friction pads for wear	•			
65-4	Replace Norac sensor pads		•		
65-4	Replace worn friction pads		•		
65-3	Grease zerks 90/120ft break-away fold (2-1 each side)			•	
65-3	Grease zerks main pivot tubes (2-1 each side)			•	
65-2	Grease zerks level pivot tube (2-1 each side)			•	
65-4	Change Norac manifold hydraulic filter				•

\* 500 hours or yearly whichever comes first.

# SERVICE

## Main Pivot Pin

The main pivot pin, located at the top center of the transoms, has a grease zerk on the bottom side of the cross member. The zerk needs to be greased daily.

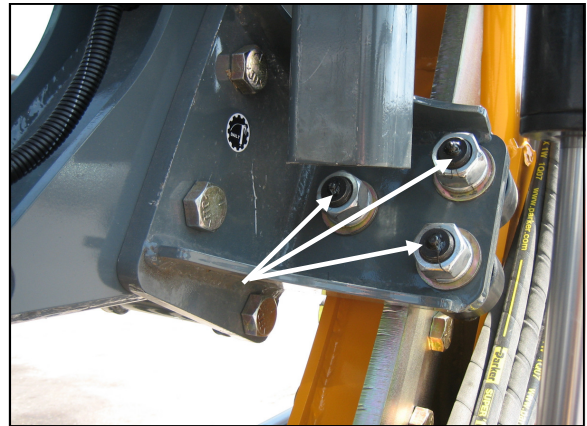
DAILY



## Rollers

Each roller has a zerk in the middle of the bolt that needs to be greased daily. Failure to keep the rollers properly lubed may result in roller seizure.

DAILY



## Level Pivot Tube

The level pivot tube has a grease zerk that needs to be greased weekly. Failure to grease this zerk may result in reduced ability of the level functions.

WEEKLY



# SERVICE

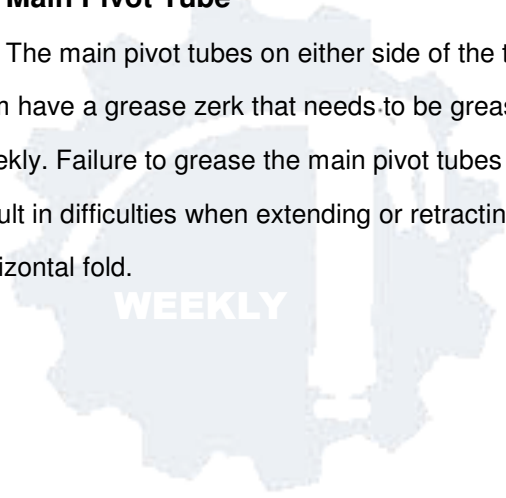
## 90/120ft Break-away

The 90/120ft break-away pivot needs to be greased weekly. Failure to grease this zerk may reduce the functionality of the break-away.



## Main Pivot Tube

The main pivot tubes on either side of the transom have a grease zerk that needs to be greased weekly. Failure to grease the main pivot tubes may result in difficulties when extending or retracting the horizontal fold.



# SERVICE

## Friction Pads

The friction pads, located in the upper corners between the fixed transom and the rolling transom, need to be checked daily. Check the pads for uneven wear and other damage. The pads must be replaced immediately if they are damaged. Failure to replace the pads may cause the boom to catch during roll functions and cause serious damage to the system.



## Norac Sensor Foam Pads

Inspect the foam insert of each sensor daily. Remove the foam from the sensor and blow it out with an air compressor and reinsert. Foam pads should be replaced as necessary. Replacement pads can be ordered through Hagie Customer Service Department.

DO NOT blow the foam pad out while it is still on the sensor. To avoid damage, always remove the foam pad before cleaning. (693063– Hagie replacement part number for foam pad)



## Norac Hydraulic Manifold Filter

The hydraulic manifold filter needs to be changed at the end of every season to maintain peak performance by the Norac system.

To access the filter, remove the connection from the “P” port. Take every precaution to ensure that there is no contamination of the hydraulic system.



# STORAGE

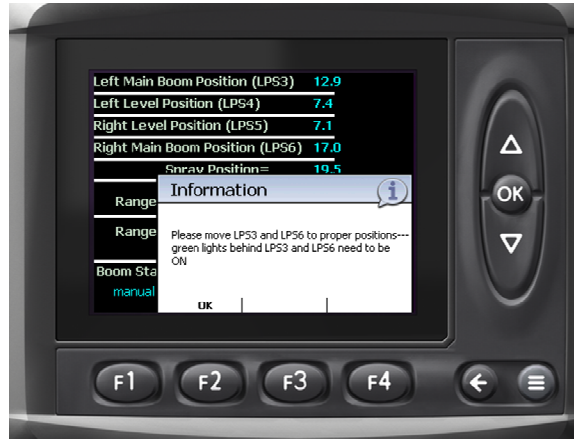
## Preparing for Storage

1. Perform daily and weekly lubrication and maintenance inspections as required.
2. With the engine at normal operating temperature, cycle all the hydraulic functions.
3. Thoroughly rinse the spray system. To winterize the spray system, it is recommended that you use an environmentally safe type of antifreeze and water mixture that will give you adequate protection to  $-30^{\circ}$ . Drain any remaining solution in the spray system and run the antifreeze mixture through the system until it comes out all boom openings. Repeat the above procedure with the foam marker and the rinse systems.
4. Refer to the Raven manual for detailed information on storage procedures for the monitor and flow meters.
5. Thoroughly wash the boom and touch up any chipped or damaged paint. For touch up paint recommendations, contact Hagie Customer Service.
6. Replace any damaged or missing decals. Warning decals and all other Hagie decals are available through Hagie Customer Service.
7. Use multi-purpose grease to coat exposed hydraulic cylinder rods.
8. If the boom will be stored separately from the sprayer, be sure that all hole openings are capped or covered with a suitable covering.

## Removing from Storage

1. Remove any dried grease from cylinder rods and reapply if necessary.
2. Completely clean the booms.
3. Carefully unseal any openings that were sealed in the storage process.
4. Attach boom to sprayer and manually cycle the hydraulics 2 or 3 times to thoroughly lubricate components. Test the Norac system and all of its functions according to the Norac manual.

# TROUBLE SHOOTING



PROBLEM	POSSIBLE CAUSE	SUGGESTED REMEDY
The 90ft section will not fold or unfold	<ul style="list-style-type: none"> <li>The level cylinders are not above 6.75in.</li> <li>Boom is not past 15in. on both LPS3 and LPS6</li> </ul>	<ul style="list-style-type: none"> <li>Raise the level cylinders to above 6.75in.</li> <li>The horizontal extension was not completed, MD3 should read approx. 19-20in. for full extension</li> </ul>



PROBLEM	POSSIBLE CAUSE	SUGGESTED REMEDY
This message appears on the MD3	<ul style="list-style-type: none"> <li>The boom shifted too far forward and is no longer in a safe position</li> </ul>	<ul style="list-style-type: none"> <li>Reset the booms by folding the booms in to approximately 12 inches according to the MD3 and then folding the booms out until motion stops.</li> </ul>

# TROUBLE SHOOTING

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NOTES:



# WARRANTY

## **Hagie Manufacturing Company Product Warranty**

Hagie Manufacturing Company warrants each new Hagie (including Vammas by Hagie) product to be free under normal use and service from defects in workmanship and materials for a period of lesser of: two (2) years or 1000 hours from the date of delivery on all Agricultural Products and two (2) years or 2000 hours on all Vammas By Hagie Snow Removal Equipment (SRE). Hagie Manufacturing Company makes this warranty from the original delivery date and is transferable to a purchaser from the original purchaser of this equipment, given there is remaining time left under the year and hour warranty standard stated above. This warranty shall be fulfilled by repairing or replacing free of charge any part that shows evidence of defect or improper workmanship, provided the part is returned to Hagie Manufacturing Company within thirty (30) days of the date that such defect or improper workmanship is discovered, or should have been discovered. Labor to repair said items will be covered by standard labor time rates. Freight charges of defective parts are not covered by this warranty and are the responsibility of the purchaser. No other express warranty is given and no affirmation of Hagie Manufacturing Company, by words or action, shall constitute a warranty.

Hagie Manufacturing Company limits its warranty to only those products manufactured by Hagie Manufacturing Company (including Vammas by Hagie) and does not warrant any part or component not manufactured by Hagie Manufacturing Company (including Vammas by Hagie), such as parts or components being subject to their manufacturer's warranties, if any. Excluded from this warranty are parts subjected to accident, alteration, or negligent use or repair. This warranty does not cover normal maintenance such as engine tune ups, adjustments, inspections, nor any consumables such as tires, rubber products, solution system valves, wear parts, wiper blades, etc.

Hagie Manufacturing Company shall not be responsible for repairs or replacements which are necessitated, in whole or in part; by the use of parts not manufactured by or obtainable from Hagie Manufacturing Company nor for service performed by someone other than Hagie authorized personnel, unless authorized by Hagie Manufacturing Company. Customer acknowledges that it is not relying on Hagie Manufacturing Company's skill or judgment to select finish goods for any purpose and that there are no warranties which are not contained in this agreement.

In no event shall Hagie Manufacturing Company's tort, contract, or warranty liability exceed the purchase price of the product. The foregoing limitation will not apply to claims for personal injury caused solely by Hagie Manufacturing Company's negligence.

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