

NOTICE

ANY PICTURES CONTAINED WITHIN THIS OPERATOR'S MANUAL THAT DEPICT 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 STS NITROGEN TOOLBAR (NTB)**



HAGIE MANUFACTURING COMPANY

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COVERS MACHINE SERIAL NUMBERS: U6911101001 THROUGH U6911101100
U6921101001 THROUGH U6921101100
U6951101001 THROUGH U6951101100
U6961101001 THROUGH U6961101100

INTRODUCTION



A WORD FROM HAGIE MANUFACTURING COMPANY

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

We have attempted herein to cover all of the adjustments required to fit varied conditions. However, there may be times when special care is needed.

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

We thank you for choosing a Hagie Nitrogen Toolbar and assure you of our continued interest in the satisfactory operation of the unit.

If we might be of assistance to you, please contact Hagie Manufacturing Company at your convenience.

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 Nitrogen Toolbar. It is the responsibility of the user to read the Operator's Manual and comply with the safe operating procedures and the proper lubrication and maintenance schedules.

The user is responsible for inspecting the attachment, 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 attachment. In the event of resale, this manual should accompany the unit. 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 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.

TABLE OF CONTENTS

INTRODUCTION	i-ii
TABLE OF CONTENTS.....	iii
SAFETY.....	1-4
DECALS	5
SPECIFICATIONS	6-8
OPERATING INSTRUCTIONS - UNFOLD.....	9-10
APPLICATION SYSTEM	11-12
OPERATING INSTRUCTIONS - FOLD.....	13-14
ATTACHMENT SYSTEM.....	15-18
TRANSPORTING	19
SERVICE	20-21
STORAGE	22
WARRANTY.....	23
INDEX.....	24

SAFETY

NOTICE

The purpose of this manual is to guide you in operating the Nitrogen Toolbar (NTB). Please be sure to read this manual along with the sprayer manual and all other manuals that are included with the unit. This manual is ONLY intended to cover the NTB attachment and any differences in the operation of the sprayer's controls. Complete instruction on the operation of the basic sprayer function is discussed in the sprayer manual.

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



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 potential danger of 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 others and will void all warranties.



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

SAFETY

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 cannot 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 hazard information. Do NOT remove decals for any reason. If a decal is damaged, contact Hagie Customer Support Department for a replacement.

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.



Be Prepared

- Be prepared for an emergency. Keep a fire extinguisher handy. Keep a first aid kit and clean water in the cab.
- 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

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



Oil Over Air Scenarios

At initial startup of NTB operation, be ready for possible rapid movement if some air would possibly be trapped in the cylinders. **DO NOT ALLOW PEOPLE TO BE STANDING IN LOCATIONS WHERE THE NTB COULD STRIKE THEM!**



Open and close right and left toolbars 2 times simultaneously to force out any air in the system.

DO NOT ALLOW PEOPLE IN STRIKING PATH OF NTB!



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 for proper 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 residue away to prevent corrosion and deterioration.
- Select safe areas to fill, flush, calibrate, and clean sprayer where chemicals will cause contamination to 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 exceeds 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.



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. Replace missing decals if necessary.

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.



650219

(2) One on each lower lift arm weld

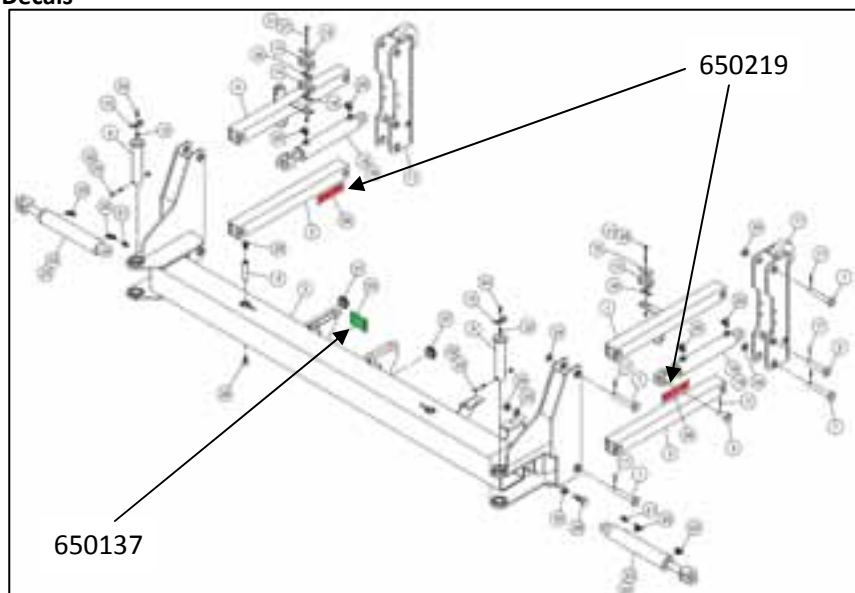


650137

(1) One in middle of electric box cover



Center Section with Decals



SPECIFICATIONS



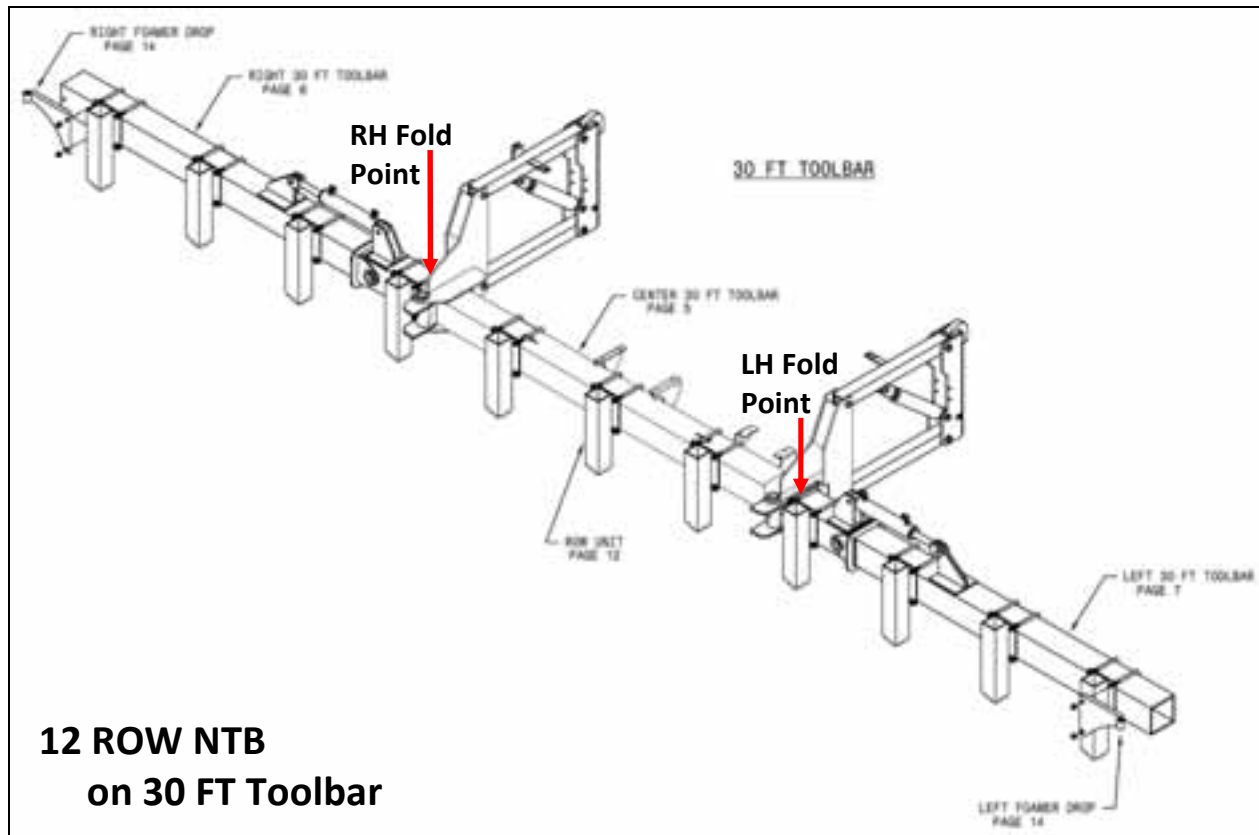
HAGIE MANUFACTURING Company offers its NTB nitrogen toolbar in 12-row and 16-row configurations. In either case, the 6-ft. clearance allows growers to side-dress nitrogen later in the growing season — in some cases after tassels have topped. NTB units are set for 30" rows but can accommodate 20", 22" or 36" rows. They are capable of applying 80 to 100 lbs. of nitrogen at 14 to 16 mph, which is about twice the speed of tractor-pulled units.

12 Row NTB	
ITEM	SPECIFICATION
Standard	11 coulter row units
Controls	Electro-hydraulic: fold/lift/level
Main toolbar fold	Self-actuated, auto-reset hydraulic
Pressure gauge	100 PSI glycerin filled

16 Row NTB	
ITEM	SPECIFICATION
Standard	15 coulter row units
Controls	Electro-hydraulic: fold/lift/level
Main toolbar fold	Self-actuated, auto-reset hydraulic
Outer toolbar tip fold	Self-actuated, auto-reset hydraulic
	100 PSI glycerin filled

SPECIFICATIONS

Fold Points for 30-foot Nitrogen Toolbar



The diagram above shows the 30-foot toolbar used for Hagie's 12 row nitrogen toolbar.

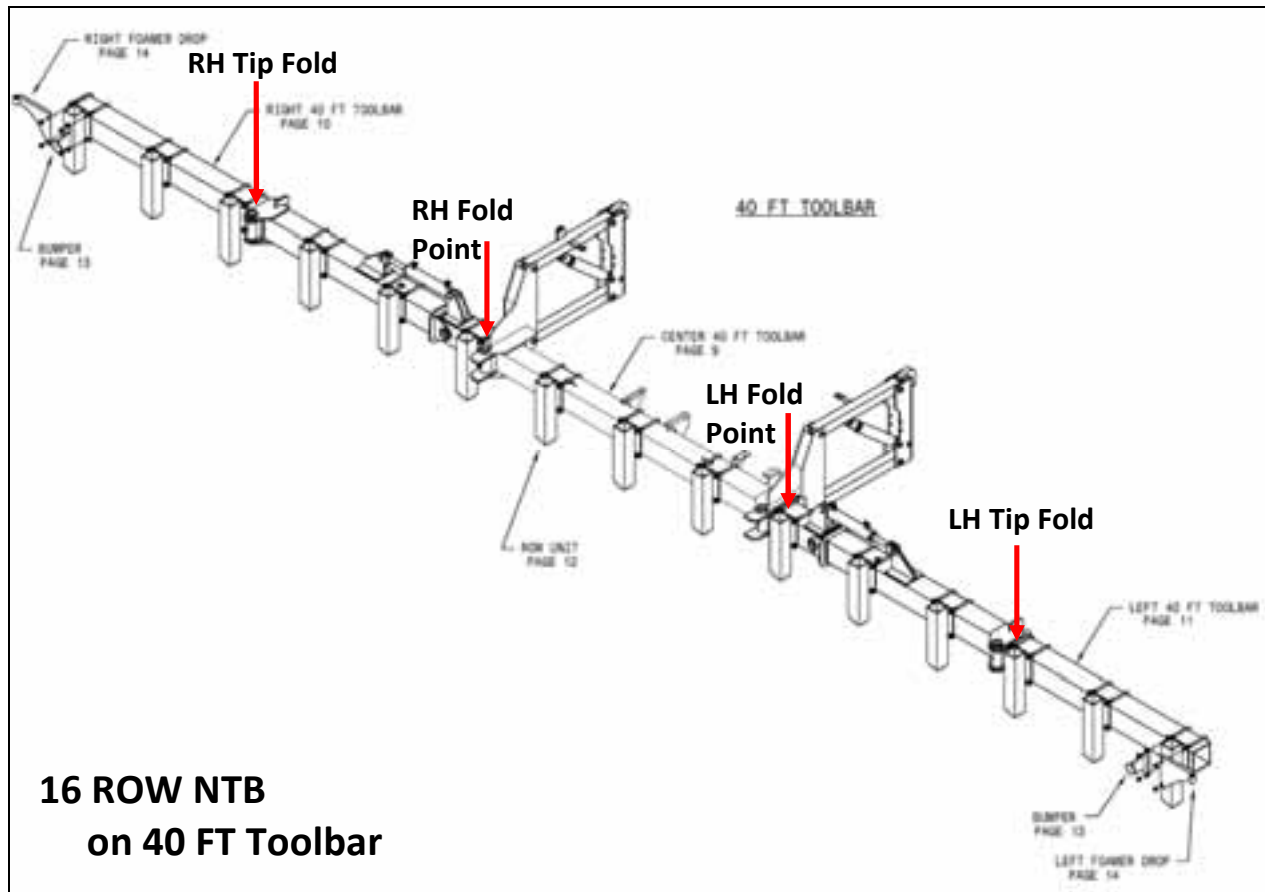
Toolbar fold points are specified by the red arrows and pictured below in Figure 1.



Figure 1: Folded position for 12 row NTB

SPECIFICATIONS

Fold points for 40-foot Nitrogen Toolbar



The diagram above shows the 40-foot toolbar used for Hagie's 16 row nitrogen toolbar.

Toolbar fold points are specified by the red arrows and pictured below in Figure 17.



Figure 2: Folded position for 16 row NTB

OPERATING INSTRUCTIONS - UNFOLD

Unfold the Nitrogen Toolbar from Storage position

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.

1. Hydrostatic handle must be in neutral position (Figure 3)
2. Raise attachment up off of ground for unfolding procedure

*Make sure coultter units clear the ground

- Figure 4 shows how to raise entire lift arm with attachment pushing up on RAISE control on hydrostatic handle
- Figure 6 shows how to raise and lower each toolbar arm using BOOM controls on hydrostatic handle
 - Push up to RAISE
 - Push down to LOWER



Figure 4: Raise liftarm and attachment



Figure 3: Hydrostatic lever



Figure 5: Raise/lower toolbars

OPERATING INSTRUCTIONS

3. Open up nitrogen toolbar pressing BOOM controls to the OUT position on the hydrostatic handle (Figure 6)
4. Unfold secondary toolbar tip if 40' toolbar is equipped, using side console BOOM EXT 80/90/100 switch (Figure 7)
 - Hold down OUT until toolbar is completely open



Figure 6: Open up NTB



Figure 7: Side console switches

APPLICATION SYSTEM

INTRODUCTION

The spraying system is a constantly monitored and continuously adjusted computer-controlled system. The cab mounted digital console receives information from various inputs to help determine GPM (gallons per minute) and GPA (gallons per acre).

This section explains the components of the spray system. Please read the entire section before operating the spray system. This section is not designed to replace the Raven manual and numbers used may not reflect your specific situation.

Read all manuals before operating the equipment.

Spray System

Please refer to Operator's Manual equipped with the machine being used to operate the NTB for detail on the following:

- Solution system
- Rinse system
- Foam marker system



The RAVEN console or other solution console will need to be programmed for the NTB before operating!

NOTICE

Never attempt to operate the spray system without solution in the spray tank. Operating the spray system with no solution in the tank will cause severe damage and void the warranty.

APPLICATION SYSTEM

NTB Application:

1. Calibrate the spray system console for NTB.
2. Check the quantity of solution in the tank.
3. Start the engine.
4. Open the tank valves; if desired activate the agitation system.



5. Press the F1 switch on the MD3 until the machine's drive state reads "field".



Figure 8: MD3 monitor

6. Turn on the main spray power.



Figure 9: Master spray switch

7. Place the individual boom solution valve switch or switches for the NTB to the ON position.

* Number of sections will depend on number of section valves on the NTB.

** 1 section is standard.



Figure 10: Spray section switches

8. Slowly move the hydrostatic lever forward to obtain the desired ground speed.

9. Frequently observe the pressure gauge.

*When pressure drops to zero or spray pattern deteriorates, shut off the main spray power, solution pump and agitation system and refill solution.

OPERATING INSTRUCTIONS - FOLD

Fold the Nitrogen Toolbar into Storage position



1. Hydrostatic handle must be in neutral position (Figure 3)
2. Raise attachment up off of ground for folding procedure

*Make sure coulter units clear the ground

- Figure 4 shows how to raise entire lift arm with attachment pushing up on RAISE control on hydrostatic handle
- Figure 6 shows how to raise and lower each toolbar arm using BOOM controls on hydrostatic handle
 - Hold up to RAISE
 - Hold down to LOWER



Make sure to fold in toolbar tips before folding in arms to prevent damage being done to NTB during folding procedure!

OPERATING INSTRUCTIONS

3. Fold in secondary toolbar tip if 40' toolbar is equipped, using side console BOOM EXT 80/90/100 switch (Figure 11)
 - Hold down IN until toolbar tip is completely folded in (Figure 12)



Figure 11: Side console switches



Figure 12: 16 row NTB with tips folded in

4. Fold nitrogen toolbar arms in holding BOOM controls to the IN position on the hydrostatic handle (Figure 13)



Figure 13: Fold in NTB

ATTACHMENT SYSTEM

Detach NTB from Machine

FOLLOW THESE STEPS:

1. Determine proper storage location to place the NTB once it is unhooked from the machine.

WHERE TO STORE IT? - When choosing a place to store the attachment, there are three important things to keep in mind.

First of all, is the ground **level**? The ground must be level to help prevent damage caused to attachment by falling over. Level ground will also minimize stress on the frame of the attachment while in storage and ease of attachment hook-up.

Second, is there enough **space**? The NTB attachment is folded up for it to stand properly but be aware of the room that is needed for the attachment and adequate space to travel around it safely.

If you are storing the boom in a building, make sure that you have adequate room around it to safely pass by.

Third, is it **accessible**? The NTB attachment needs to be positioned so you can connect to the attachment easily.

If temporarily storing the attachment on a soft surface, such as grass, you may want to put blocks or wood under the coulters to prevent the attachment from sinking into the ground. It is NOT recommended to store an NTB attachment on a soft surface for an extended period of time due to the risk of settling soil even when blocks are used.

2. Lower the NTB down to the level storage location.
*NTB attachment should be in the folded position.



Figure 14: Folded position for 12 and 16 row NTB

ATTACHMENT SYSTEM

3. Disengage the quick attach lock assemblies.

To disengage the lock assembly, pull the pin out as far as it will go until it is in the lock-out position.
*Lock-out position prevents re-locking while attaching or detaching NTB.

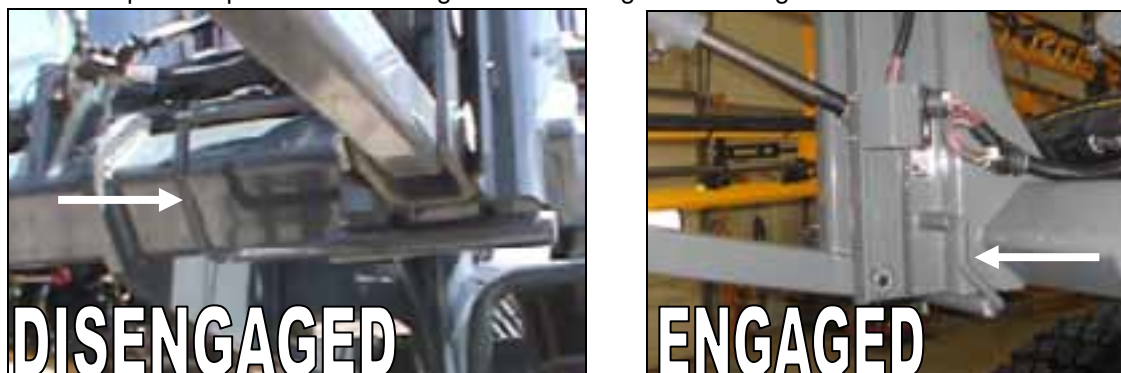


Figure 15: Engaged/disengaged position for quick attach lock assembly

4. Lower the front of the machine until the hooks are clear the machine lock pins.

-To lower the front end of the machine, turn air-dump valve on left-front leg and lower front airbags.



Figure 16: Airdump valve

5. Unhook the hydraulic, electrical, solution and foamer lines (if equipped), being careful not to leave the ends in a place that they may get damaged or contaminated.

*Make sure the solution valves are OFF and engine is turned OFF before disconnecting any hoses or electrical lines.

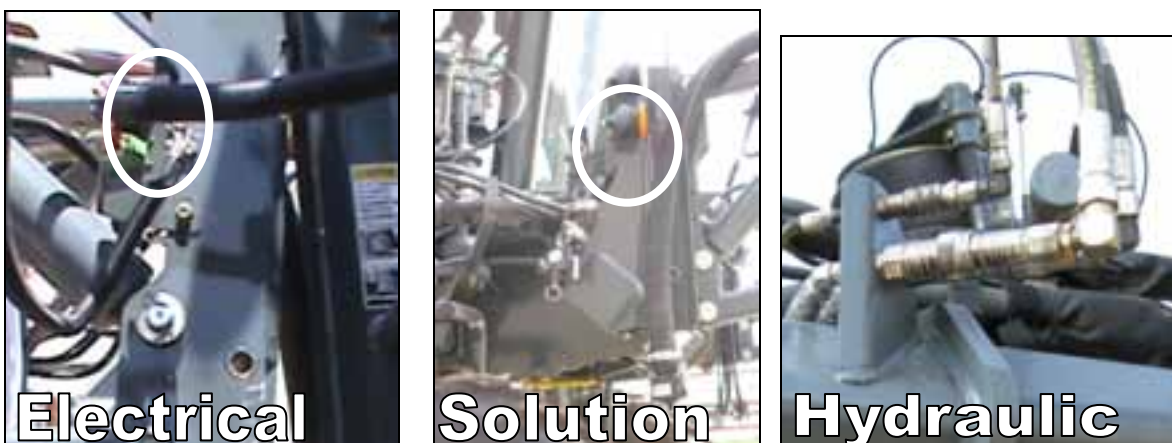


Figure 17: Connect electrical and solution on RH side

ATTACHMENT SYSTEM

6. Re-lock the quick attach lock assembly to keep it safe from damage if no other attachment is going to be installed.

*Be sure to unlock quick attach when installing an attachment.

7. Start the machine and slowly back away from the attachment.

* Alarms may sound notifying you of modules being offline but accept the warnings.



Figure 18: Back machine away from the attachment

8. Turn air-dump valve on left-front leg to fill front airbags.

ATTACHMENT SYSTEM

Attach NTB to Machine

FOLLOW THESE STEPS:


1. Disengage quick attach lock assemblies to lock-out position.



2. Lower the front of the machine by turning the air-dump valve on left-front leg and lower front airbags. See Figure 19.
3. Square machine up to NTB attachment and pull up to attachment hooks **slowly**.
4. Continue to pull machine up to attachment until hook openings are high enough to clear the lock pins. See Figure 20.
5. Turn air-dump valve on left-front leg to fill front airbags. See Figure 19.

*Make sure attachment hooks lock onto lock pins and quick attach holes line up.

6. Turn the engine OFF.



WARNING

Turn the engine OFF before disconnecting any hoses or electrical lines! Failure to do so may result in serious injury or death.

7. Engage quick attach lock assemblies. See Figure 15.



8. Connect hydraulic, electrical, solution and foamer lines (if equipped). See Figure 17.
9. Start machine and raise attachment off level surface.
10. Slowly and carefully back machine with attachment out of storage location.



Figure 19: Front leg airdump valve



Figure 20: Attachment clearing machine lock pins

TRANSPORTING

Driving the Machine with an Attachment

For the purpose of driving on a roadway or elsewhere, be aware of any situation where the sprayer will be passing under an object with a clearance lower than the transporting height of the machine attachment.



Hagie Manufacturing recommends only driving the machine for transporting. Loading a machine on a trailer may result in an accident and/or damage to the machine.



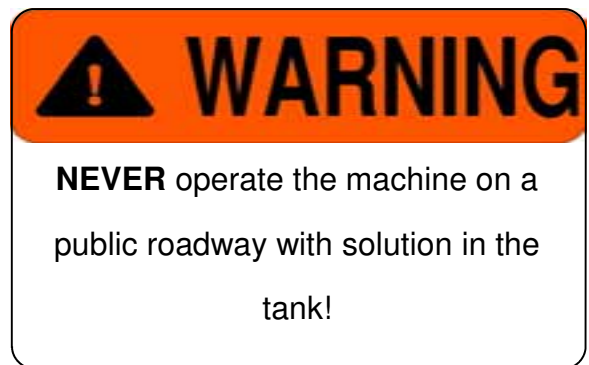
WARNING

Stopping the sprayer on trailer ramps may result in sprayer tip over!



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.



WARNING

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

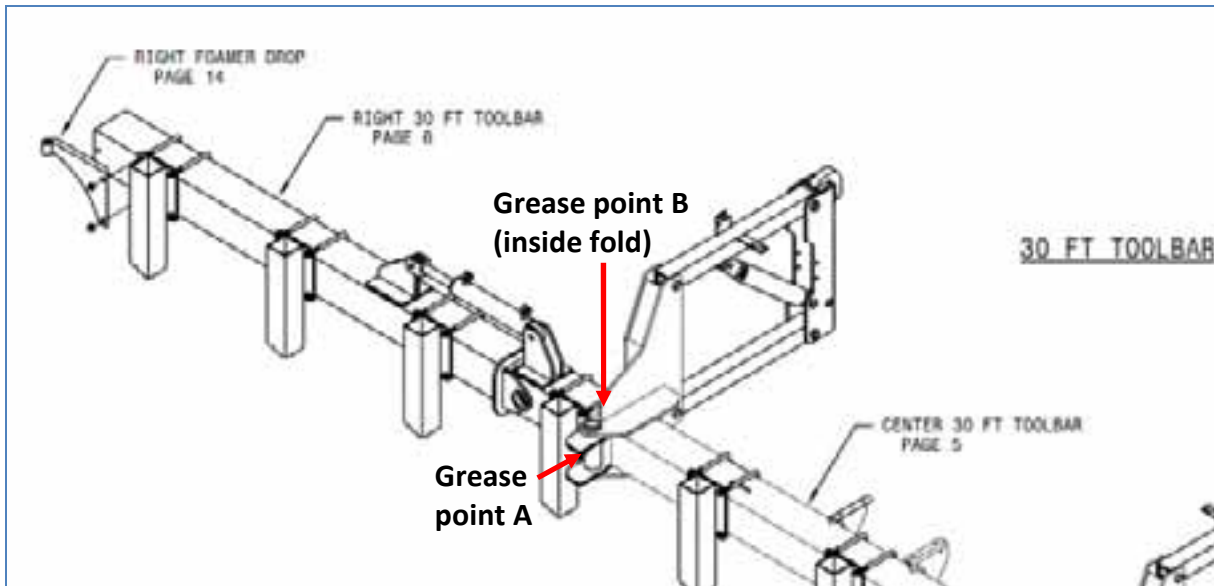
SERVICE

Grease Point	Service Point	Daily*	As Required	50 hrs	500 hrs**
A	Grease zerk at main toolbar fold	•			
B	Grease zerk inside main fold	•			
C***	Grease zerk at toolbar tip fold	•			

* 10 hours or daily – whichever comes first

** 500 hours or yearly – whichever comes first

*** Grease point C ONLY for 40' NTBs



30 foot

Figure 21: 30 ft toolbar has 4 grease points - 2 per side



Figure 22: Grease point A -main toolbar fold



Figure 23: Grease point B – grease point inside main fold

SERVICE

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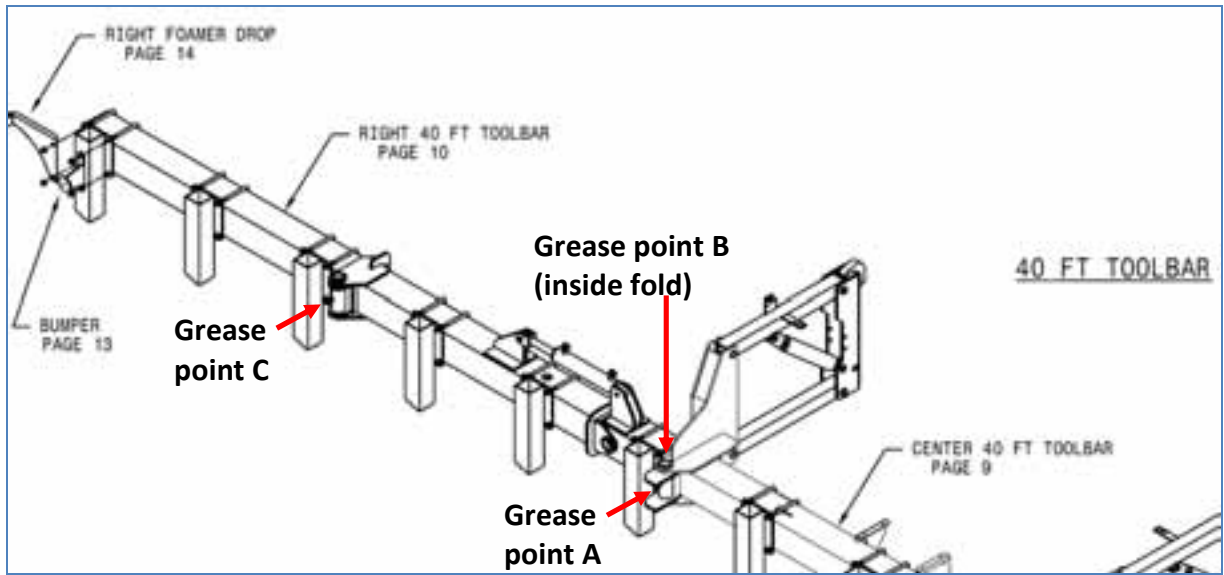


Figure 24: 40 ft toolbar has 6 grease points - 3 per side

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° . Drain any remaining solution in the spray system and run the antifreeze mixture through the system until it comes out all attachment openings. Repeat the above procedure with the foam marker (if equipped) 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 NTB attachment will be stored separately from the sprayer, be sure that all open ends 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 NTB attachment.
3. Carefully unseal any openings that were sealed for storage.
4. Attach NTB to sprayer and manually cycle the hydraulics 2 or 3 times to thoroughly lubricate components.

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 during a two (2) year life period 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 honors this warranty from the original delivery date and is transferable to a new purchaser from the original purchase, given there is remaining time left under the warranty period stated above. This warranty shall be fulfilled by repairing or replacing any parts, free of charge, that show evidence of defective or improper workmanship, provided the part is returned to Hagie Manufacturing Company within thirty (30) days of the date when defective or improper workmanship was discovered or should have been discovered.

Labor to repair said items will be covered by standard labor time rates. Freight charges on 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 subjected to their manufacturer's warranties, if any. Excluded from this warranty are parts subjected to accident, alteration, 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 neither from Hagie Manufacturing Company nor service performed by someone other than Hagie authorized personnel, unless authorized by Hagie Manufacturing Company. The customer acknowledges that it is not relying on Hagie Manufacturing Company's skill or judgment to select after-market products for any purpose and 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.

Hagie Manufacturing Company shall not be liable for damages including special, incidental or consequential damages or injuries (damage and repairs of equipment itself, loss of profits, rental or substitute equipment, loss of good will, etc.) arising out of or in connection with performance of the equipment or its use by customer. Hagie Manufacturing Company shall not be liable for any special, incidental or consequential damages arising out of or in connection with Hagie Manufacturing Company's failure to perform its obligation hereunder.

HAGIE MANUFACTURING COMPANY'S ENTIRE LIABILITY AND THE CUSTOMER'S EXCLUSIVE REMEDY SHALL BE REPAIR OR REPLACEMENT OF PARTS COVERED UNDER THIS WARRANTY. THIS WARRANTY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

INDEX

A	R
Air-dump valve18, 19, 20 APPLICATION SYSTEM iii, 11, 12 Attach NTB 20, 24	Rinse systemSee Operator's Manual for machine
B	S
C	Service..... iii, 22, 23 Solution system.....See Operator's Manual for machine
D	SPECIFICATIONSiii, 6, 7, 8 Storing..... iii, 24 Storage location 16, 20
Decals5 Detach NTB.....16	T
E	Transporting..... 21
F	U
Foam marker system..... See Operator's Manual for machine Fold the Nitrogen Toolbar13	Unfold the Nitrogen Toolbar..... 9
G	V
Grease point22	W
H	WARRANTY iii, 25
I	X
J	Y
K	Z
L	
M	
N	
O	
P	
Q	
Quick attach lock assemblies18, 20	