

JOHN DEERE
WORLDWIDE COMMERCIAL & CONSUMER
EQUIPMENT DIVISION

SelectSpray
HD200

OMTCU26463D9 D9

OPERATOR'S MANUAL



JOHN DEERE

Original Instruction

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Consumer Equipment Division**

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DCY



OMTCU26463

INTRODUCTION

Introduction

Using Your Operator's Manual

Read this entire operator's manual, especially the safety information, before operating.

This manual is an important part of your machine. Keep all manuals in a convenient location so they can be accessed easily.

Use the safety and operating information in the attachment operator's manual, along with the machine operator's manual, to operate and service the attachment safely and correctly.

If your attachment manual has a section called Preparing the Machine, it means that you will have to do something to your tractor or vehicle before you can install the attachment. The Assembly and Installation sections of this manual provide information to assemble and install the attachment to your tractor or vehicle. Use the Service section to make any needed adjustments and routine service to your attachment.

If you have any questions or concerns with the assembly, installation, or operation of this attachment, see your local John Deere dealer or call the John Deere Customer Contact Center at 1-800-537-8233 for assistance.

Warranty information on this John Deere attachment can be found in the warranty that came with your John Deere tractor or vehicle.

Machine Use

This machine is designed solely for use in customary lawn and turf spraying operations. Use in any other way is considered as contrary to the intended use.

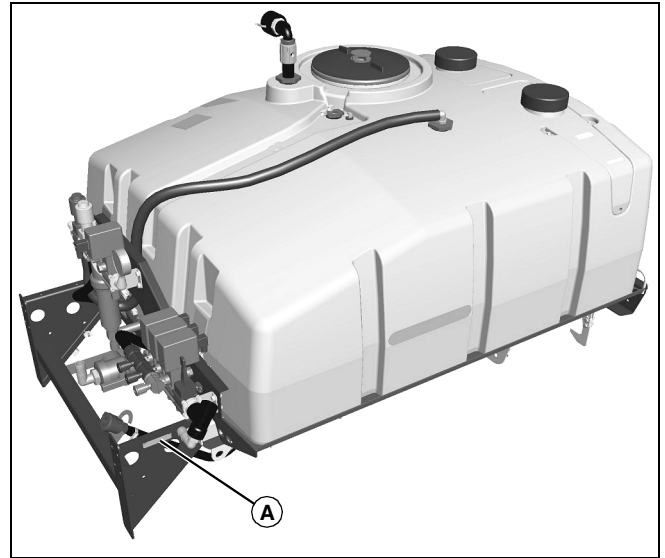
Agricultural applications covered by national environmental protection standards or legal requirements are not allowed with this sprayer. Contact local authorities if the acceptance for the use of the sprayer is not obvious.

The manufacturer accepts no liability for damage or injury resulting from this misuse, and these risks must be borne solely by the user. Compliance with and strict adherence to the conditions of operation, service and repair as specified by the manufacturer also constitute essential elements for the intended use.

This machine should be operated, serviced and repaired only by persons familiar with all its particular characteristics and acquainted with the relevant safety rules (accident prevention). The accident prevention regulations, all other generally recognized regulations on safety and occupational medicine and the road traffic regulations must be observed at all times.

Setting fuel delivery beyond published factory specifications or otherwise overpowering will result in loss of warranty protection for this machine.

Any arbitrary modifications carried out on this machine will relieve the manufacturer of all liability for any resulting damage or injury.



MX42625

DATE OF PURCHASE:

DEALER NAME:

DEALER PHONE:

PRODUCT SERIAL NUMBER (A):

Safety Labels



Pictorial Safety Signs

At several important places on this machine safety signs are affixed intended to signify potential danger. The hazard is identified by a pictorial in a warning triangle. An adjacent pictorial provides information how to avoid personal injury.

These safety signs, their placement on the machine and a brief explanatory text are shown in this Safety section.

Product Identification

Product Compatibility

The HD200 SelectSpray is compatible with ProGator™ utility vehicles.

Record Identification Numbers

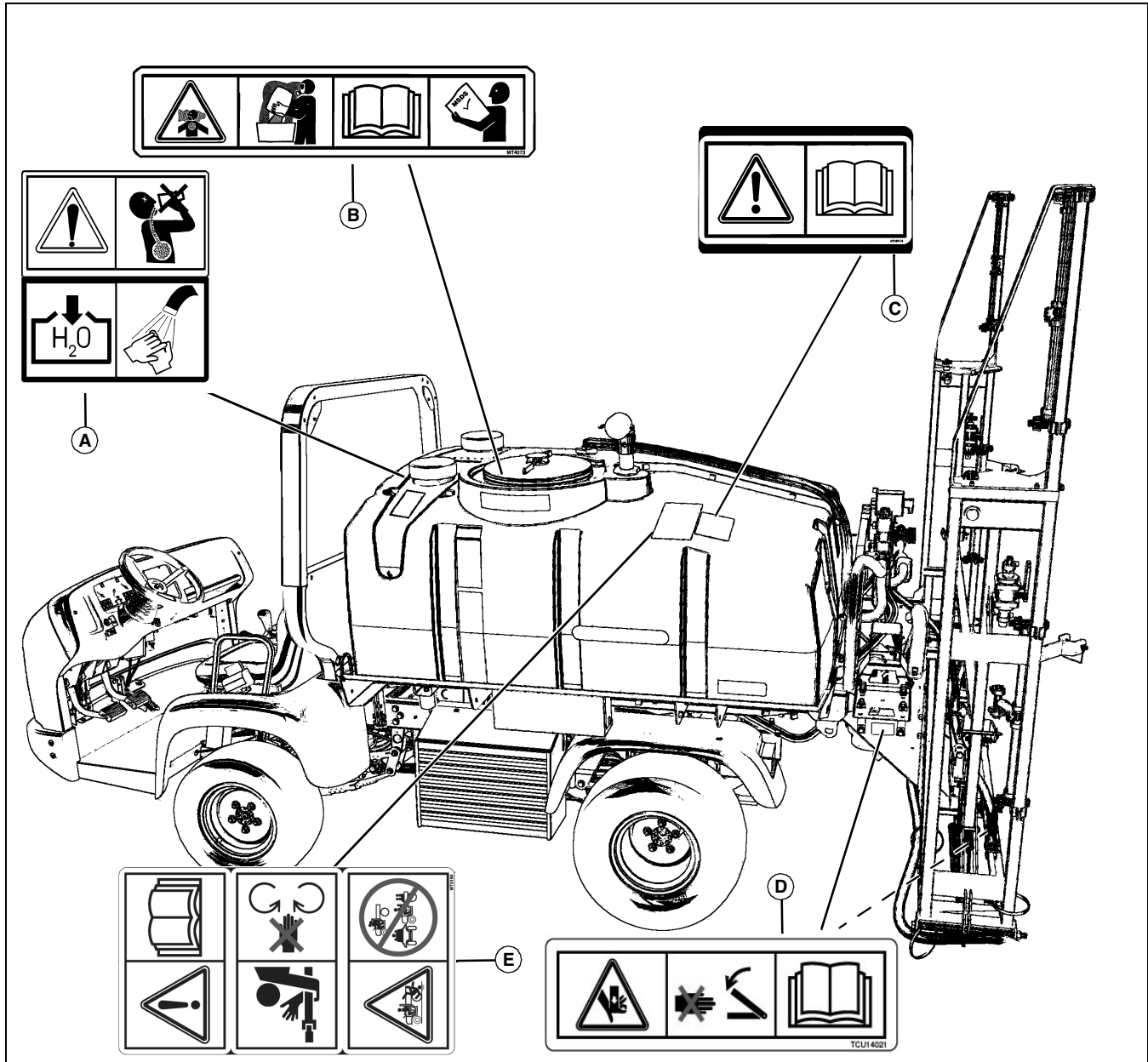
HD200 Serial Number - (050001-)

If you need to contact an Authorized Service Center for information on servicing, always provide the product model and serial number.

You will need to locate the model and serial number for the attachment and record the information in the spaces provided below.

SAFETY LABELS

Safety Labels

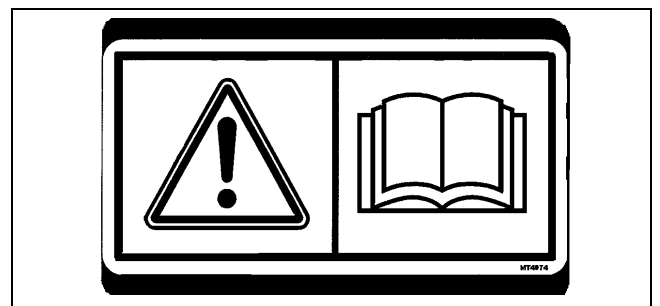


MX42169

Avoid Injury Read Operator's Manual MT4074

Picture Note: Use label number listed in table below to locate complete text of safety label message following this illustration.

- A- DANGER MT4295
- B- WARNING MT4072
- C- AVOID INJURY MT4074
- D- WARNING TCU14021
- E- READ MANUAL MT3190



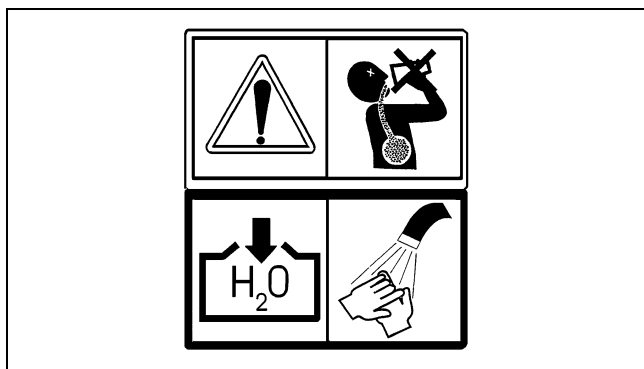
MT4074

- Empty tank before removing attachment.
- Winterize system when finished each day when operating in near freezing conditions.

SAFETY

- Check system is at 0 PSI (0 kPa) before starting.

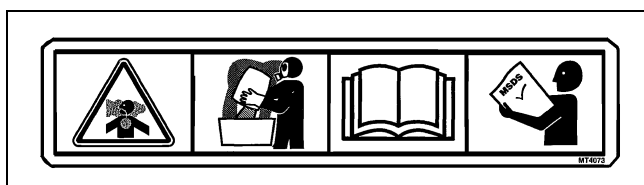
Danger MT4295



MT4295

- To avoid injury, do not drink water from this container. It may be contaminated. Use for rinse/wash purposes only.

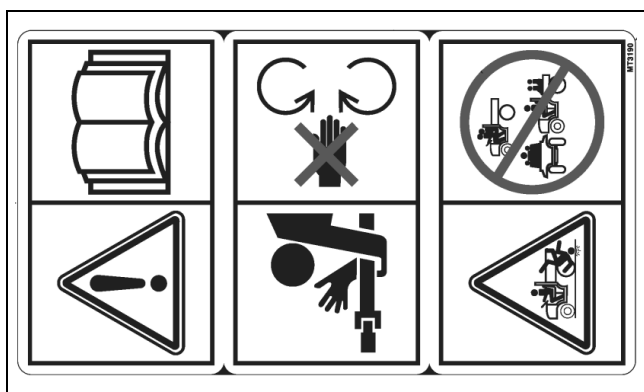
Warning MT4072



MT4072

- To avoid injury from chemical hazards, wear protective clothing. Read and follow chemical manufacturer's labels and instructions.

Read Operator's Manual MT3190

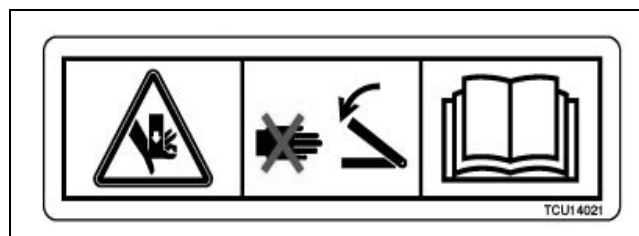


MT3190B

- To avoid injury, read operator's manual.
- Ballast power unit per operator's manual.
- Know location and function of all controls.
- Keep all shields in place.
- Stay clear of power driving parts.
- Never carry riders.
- Keep children and pets a safe distance away from machine.
- Remove attachment from power unit on a level, flat, hard surface.
- Before leaving machine:
 - Stop engine.

- Set park brake.
- Lower or block up machine.
- Remove key.

Warning - Avoid Injury from Pinch Point

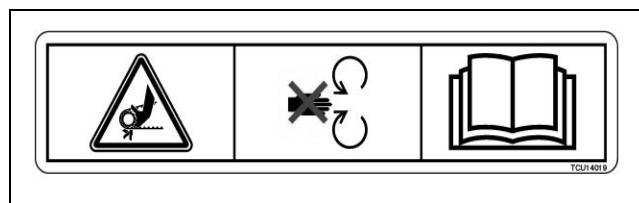


TCU14021

Picture Note: Optional electric actuator kit shown.

- To avoid injury, keep hands and fingers away from this area.

WARNING TCU14019

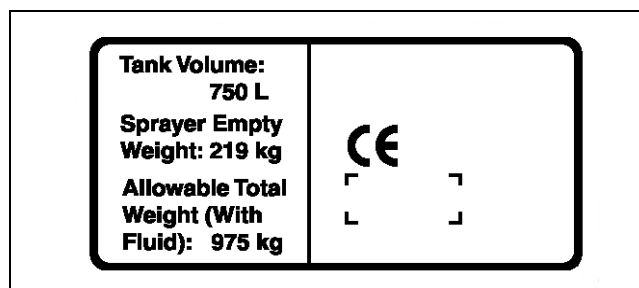


TCU14019

Picture Note: Installed on optional electric hose reel.

- Moving parts can crush and cut. Keep hands clear. Do not operate with guards removed.

CE Certification and Specification Label



TCU18622

- This label on your machine indicates that this model has been certified and is in compliance with European Directive 98/37/EC (89/392EEC) Standards.

Safety

Read Safety in Machine Operator's Manual

Read the general safety operating precautions in your machine operator's manual for additional safety information.

Operate Safely

- Read the machine and attachment operator's manual carefully. Be thoroughly familiar with the controls and the proper use of the equipment. Know how to stop the machine and disengage the controls quickly.
- Do not let children or an untrained person operate machine.

SAFETY

- Make any necessary adjustments before you operate. Never attempt to make any adjustments while the engine is running, unless if recommended in adjustment procedure.
- Take all possible precautions when leaving the machine unattended. Shut off the engine before making any repairs, adjustments, or inspections. Lower the attachment, lock the parking brake, stop the engine, and remove the key.
- Look behind machine before you back up. Back up carefully.
- Do not let anyone, especially children, ride on machine or attachment. Riders are subject to injury such as being struck by foreign objects and being thrown off. Riders may also obstruct the operator's view, resulting in the machine being operated in an unsafe manner.
- Use only attachments and accessories approved by the manufacturer of this product.
- If the machine vibrates abnormally, stop the engine and check immediately for the cause. Vibration is generally a warning of trouble.
- Always refer to the Storage section of the operator's manual for important details if storing this product for a long period of time.
- Keep people and pets out of the work area. Stop machine if anyone enters the area.
- If you hit an object, stop the machine and inspect it. Make repairs before you operate. Keep machine properly maintained and in good working order. Keep all shields and guards in place.
- Always inspect the sprayer completely before and after each use. Before pressurizing the system, check to be sure all fittings and hoses are tightly installed. Be sure guards and shields are in good condition and fastened in place. Make any necessary adjustments before you operate.
- Never use the sprayer during windy conditions.
- Always release pressure in the system before filling, cleaning or servicing the sprayer.
- Do not put nozzle tip or other sprayer parts to your lips to blow out dirt. Use compressed air.
- If the sprayer is mounted to the bed of a utility vehicle, never raise the bed with the sprayer tank filled completely. Drain tank to below lowest fill line before raising for service or other reason.

Parking Safely

1. Stop vehicle on a level surface, not on a slope.
2. Lock park brake.
3. Stop engine.
4. Remove key.
5. Before you leave the operator's seat, wait for engine and all moving parts to stop.
6. Disconnect the negative battery cable or remove the spark plug wire (for gasoline engines) before servicing the machine.

Mix and Handle Chemicals Safely

- It is best to wear full cover clothing and always wear protective goggles and rubber gloves to protect yourself while handling chemicals.
- Follow instructions on chemical container labels.
- Open all chemical containers carefully, using proper tools.
- Open, pour, weigh and mix chemicals in a well-ventilated area.
- Reserve all equipment used for the application of chemicals exclusively for that purpose.

- Prohibit all smoking, drinking and eating food in chemical-handling area.
- It is a good practice to take a soapy shower immediately after the using the sprayer to apply chemicals.
- Wash all clothing worn when using chemicals separately in the laundry after spraying is completed.

Read Chemical Container Label

- Chemicals can be dangerous. Improper selection or use can injure persons, animals, plants, soils or other property. Select the right chemical for the job and handle and apply with care.
- Read the instructions, precautions, and warnings on the container label before opening. Use the product strictly according to label directions for specific applications, in the amounts specified, at the times specified and only when needed.
- Keep the container closed tightly except when preparing the mix.
- Do not remove labels from chemical containers. Store all chemicals in their original containers.
- Do not mix chemicals unless stated on the container label.
- Store chemicals when not in use according to the container label.

Handle Chemical Products Safely

- Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with John Deere equipment include pesticides, herbicides and fungicides.
- A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.
- The MSDS should be obtained from the chemical dealer at the time of the chemical purchase.
- Check the MSDS before beginning any job using a hazardous chemical. Know exactly what the risks are and how to do the job safely. Always wear recommended personal protection equipment.

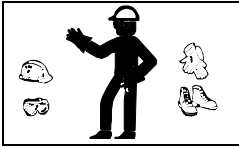
Practice Safe Maintenance

- Only qualified, trained adults should service this machine.
- Understand service procedure before doing work. Keep area clean and dry.
- Do not operate the engine in a confined space where dangerous carbon monoxide fumes can collect.
- Never lubricate, service or adjust the machine or attachment while it is moving. Keep safety devices in place and in working condition. Keep hardware tight.
- Keep hands, feet, clothing, jewelry, and long hair away from any moving parts, to prevent them from getting caught.
- Lower any attachment completely to the ground or to an existing attachment mechanical stop before servicing the attachment. Disengage all power and stop the engine. Lock park brake and remove the key. Let machine cool.
- Disconnect battery or remove spark plug wire (for gasoline engines) before making any repairs.
- Before servicing machine or attachment, carefully release pressure from any components with stored energy, such as hydraulic components and springs.
- Release hydraulic pressure by lowering attachment or cutting units to the ground or to a mechanical stop and move hydraulic control levers.
- Securely support any machine or attachment elements that must be

PREPARING VEHICLE

raised for service work. Use jack stands or lock service latches to support components when needed.

- Never run engine unless park brake is locked.
- Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Replace all worn or damaged safety and instruction decals.
- Check all hardware at frequent intervals to be sure the equipment is in safe working condition.
- Do not modify machine or safety devices. Unauthorized modifications to the machine or attachment may impair its function and safety.



Wear Appropriate Clothing

- Wear close fitting clothing and safety equipment appropriate for the job.
- Certain operating conditions may dictate that the operator and any passenger wear

appropriate safety equipment while operating the vehicle. Be prepared for any existing and potential conditions before operating machine.

- Local safety or insurance regulations may require additional safety equipment such as eye protection or a hard hat.
- Always wear substantial footwear and long trousers. Do not operate the equipment when barefoot or wearing open sandals.
- Wear proper clothing and safety equipment while handling chemicals or using the sprayer. Refer to the MSDS for the chemicals being used to be sure the proper personal protection equipment is being used.



Avoid High Pressure Fluids

- Hydraulic hoses and lines can fail due to physical damage, kinks, age, and exposure. Check hoses and lines regularly. Replace damaged hoses and lines.

- Hydraulic fluid connections can loosen due to physical damage and vibration. Check connections regularly. Tighten loose connections.
- Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.
- Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.
- If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A. Information may be obtained in the United States and Canada only by calling 1-800-822-8262.

Dispose of Chemicals Properly

- Proper disposal of excess spray material is very important. If you have excess tank solution, it is best to dilute it with water and apply it to the area you previously treated.
- Never dump solution into a drain or near a lake or stream.
- Chemicals containers should be triple-rinsed, with the rinse water added to the sprayer tank. Do not burn empty chemical containers. Dispose of containers at recycling centers.

Handling Waste Product and Chemicals

Waste products, such as, used oil, fuel, coolant, brake fluid, and batteries, can harm the environment and people:

- Do not use beverage containers for waste fluids - someone may drink from them.
- See your local Recycling Center or authorized dealer to learn how to recycle or get rid of waste products.
- A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques. The seller of the chemical products used with your machine is responsible for providing the MSDS for that product.

Preparing Vehicle

Preparing the Machine

Machine Requirements

Your machine must be equipped with the Auxiliary Hydraulic Kit for operation of the sprayer pump. If your machine is equipped with a PTO control lever, two quick-couplers at the rear of the machine, an auxiliary tank and oil cooler, the Auxiliary Hydraulic Kit is installed.

Prepare for Assembly

1. Park machine safely.
2. Follow instructions in your machine operator's manual to remove the cargo box.
3. Remove any attachment that uses the hydraulic lift or rear pivots.

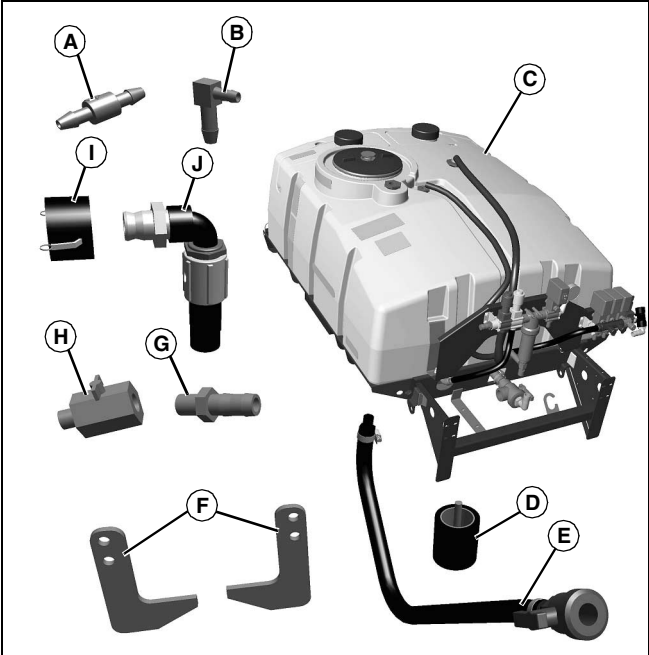
Assembly

Control Box Mounting Components

Qty.	Description
1	Bracket, Upper
1	Bracket, Lower
1	Washer, Wave
1	Pin, Quick-Lock
2	Bolt, M8x55
2	M8, Locknuts
2	Bolt, 1/4-20 x 3/4 in.
2	Washer, 1/4 in.
2	Nut, 1/4-20
1	Pivot, Control Box
1	Bolt, M8x75
2	Nut, M8
2	Washer, Friction

ASSEMBLY

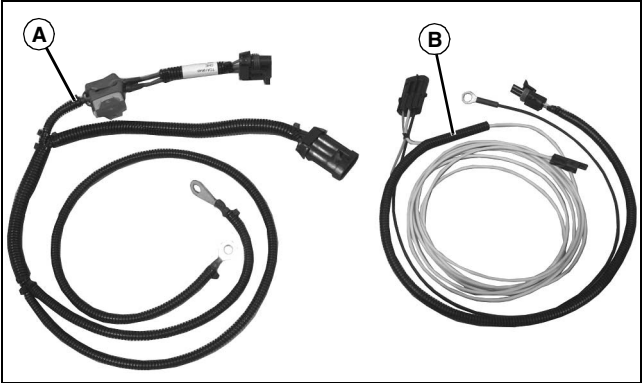
Tank Components



MX42214

Qty	Description
1	Check Valve, 1/4 in. (A)
1	Fitting, Barbed Hose, 1/4 in. (B)
1	Tank Assembly, Sprayer (C)
2	Down Stops (55 mm) (D)
1	Hose Assembly, Tank Drain (E)
2	Clamp, Frame (F)
1	Fitting, Barbed, 1/2 MPT x 3/8 HB (G)
1	Valve (H)
1	Cap, Dust (I)
1	Assembly, Filler (J)
6	Nut, Nylock, M10
6	Capscrew, Hex Head, M10x35
1	Washer, Flat, M26
1	Clamp, Hose, 1/2 in.
1	Elbow, 1/2 FTP x 1/2 MPT
1	Hose, 3/8 in. x 12 in.
1	Hose, Clear
4	Clamp, Hose, 3/8 in.
3	J Clips

Electrical Components



MX42254

Qty	Description
1	Power Harness (A)
1	Console Wire Harness (B)
8	Tie Strap

Pump and Hydraulic Components*

Qty	Description
1	Fitting, Elbow
2	Hose Assembly, Hydraulic
1	Ball Valve, Three-Way
1	Fitting, Check Valve
3	Fitting, Adapter
1	Dust Cap, Red
1	Dust Cap, Yellow
1	Hose, 1 in. dia.
2	Quick Coupler, Male
2	Clamp, Hose

*Pump is included in separate kit.

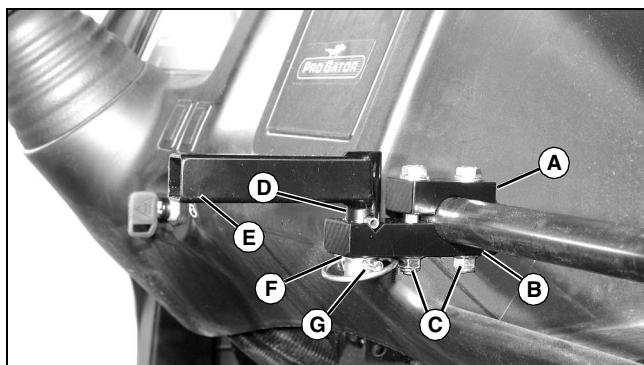
Personal Wash Tank Components

Qty.	Description
1	Elbow
1	Ball Valve
1	Hose Barb
1	Hose
1	Hose Clamp

ASSEMBLY

Install Control Box

Install Mounting Arm

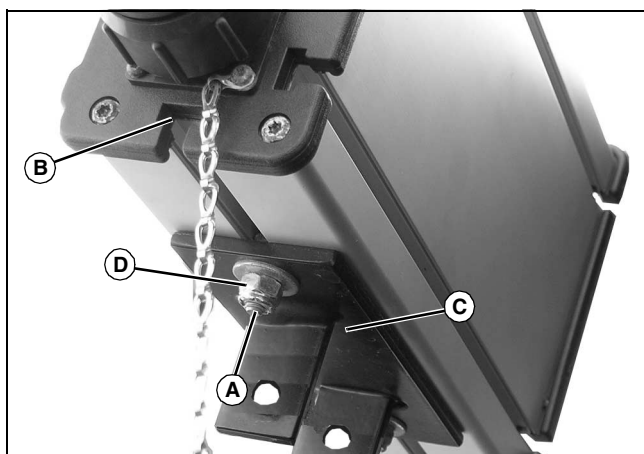


MX42110

1. Loosely install upper (A) and lower (B) mounting brackets to passenger grab bar with two M8x55 hex head bolts and locknuts (C).
2. Install post (D) on mounting arm (E) through lower mounting bracket with washer(s) (F) and quick-lock pin (G).

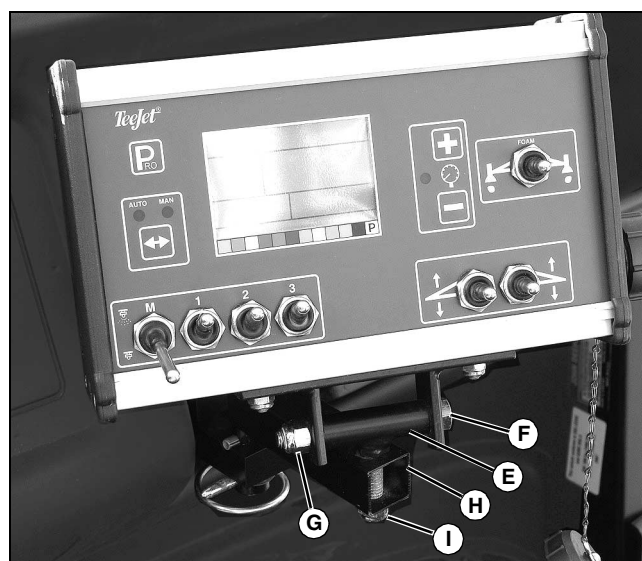
Install Box

NOTE: Control box is included in separate kit.



MX42111

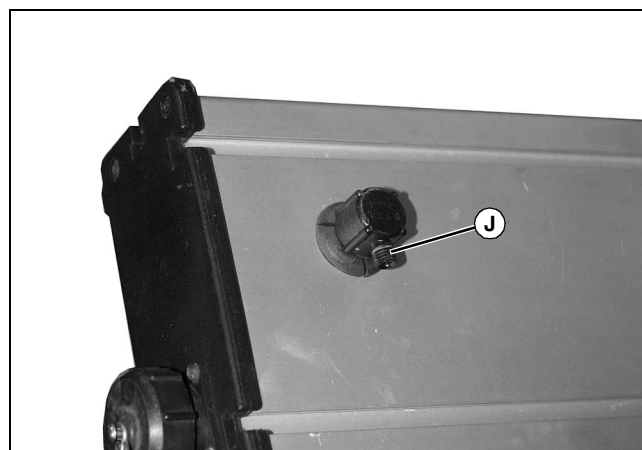
1. Install two 1/4-20 x 3/4 in. bolts (A) into slot (B) at bottom of control box.
2. Install bolts (A) through control box bracket (C) with 1/4 in. washers and 1/4-20 nuts (D).



MX42112

Picture Note: Auto Rate control box shown.

3. Install pivot control box (E) on control box bracket with M8x75 hex head bolt (F) and M8 hex nut (G).
4. Install T connector on mounting arm (H) with friction washers and secure with M8 hex nut (I).
5. Adjust position of control box as desired and tighten all nuts.



MX42183

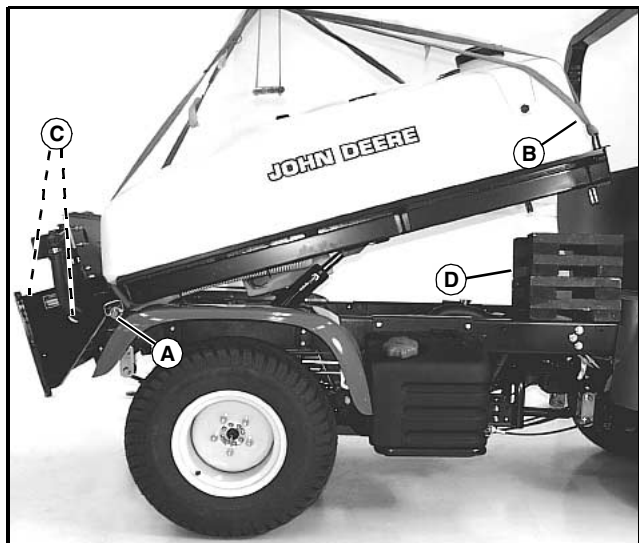
6. Manual control box only: Follow instructions in control box kit to connect pressure line to pressure gauge fitting (J) on back of control box.

ASSEMBLY

Install Sprayer Tank

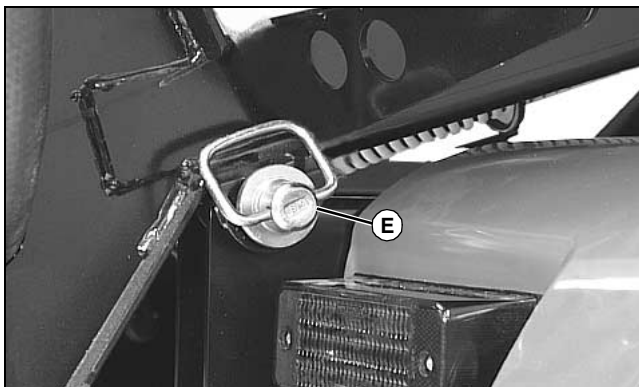


CAUTION: Avoid injury! Machine component or attachment is heavy. Use a safe lifting device with correct load capacity rating to lift, install or remove component or attachment.



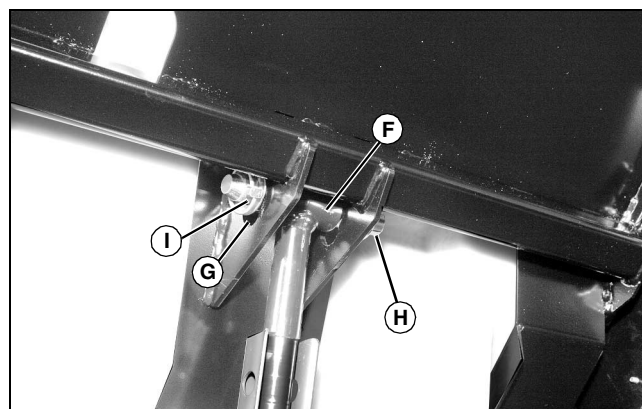
MX2956a

1. Install lift straps or chains to sprayer so unit is balanced upon hoisting. Do not directly connect to rear mounting holes (A).
2. Attach lift strap to lift loops (B) at front of sprayer frame.
3. Secure straps around rear of frame (C).
4. Install safety stand (D) between machine frame and sprayer frame.
5. Lift the tank/frame into position over machine frame as shown.



MX19928

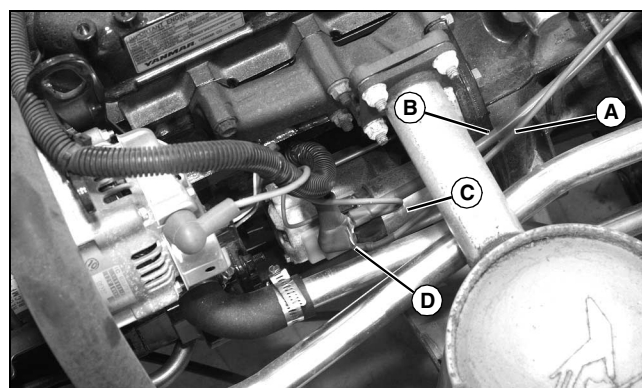
6. Align mounting holes at rear of machine and install pivot pins (E) as shown. Secure pivot pins with quick-lock pins.



MX42247

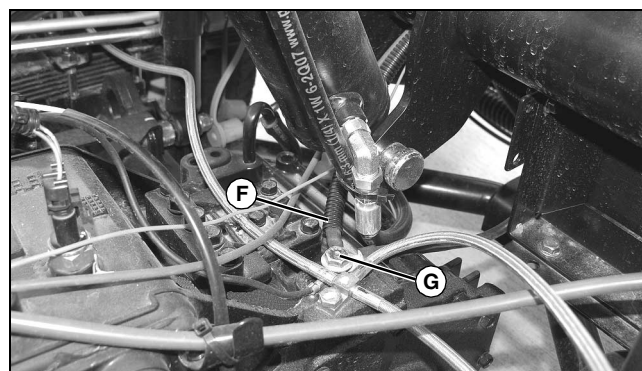
7. Align hole in lift cylinder rod end (F) with hole in frame (G). Install connecting pin (H), and secure with M26 flat washer and spring locking pin (I).
8. Remove safety stand from between tank and machine frame.
9. Disconnect hoist from sprayer and completely lower tank using the lift cylinder lever.

Install Power Harness



MX42107

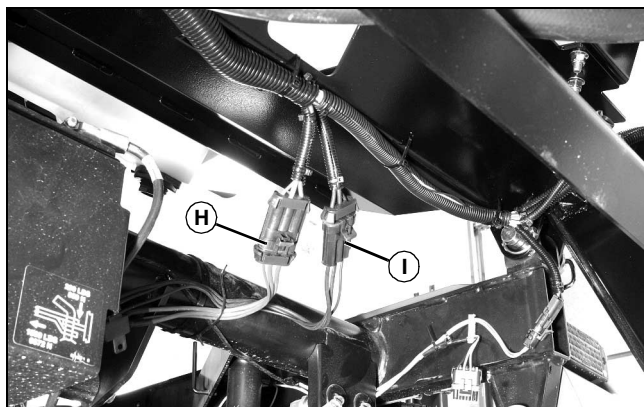
1. Route sprayer power harness red cable (A) along red battery cable (B) to starter solenoid (C). Route cable away from potential sources of damage and secure with retainers.
2. Install ring terminal (D) of red cable to starter solenoid terminal "B".



MX42108

3. Install ring terminal of power harness black ground cable (F) to transaxle ground bolt (G).

ASSEMBLY

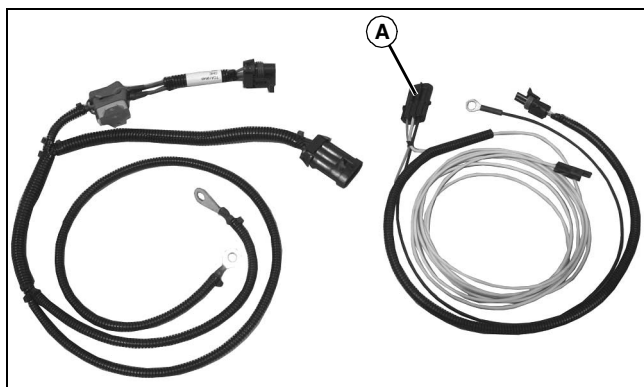


MX42109

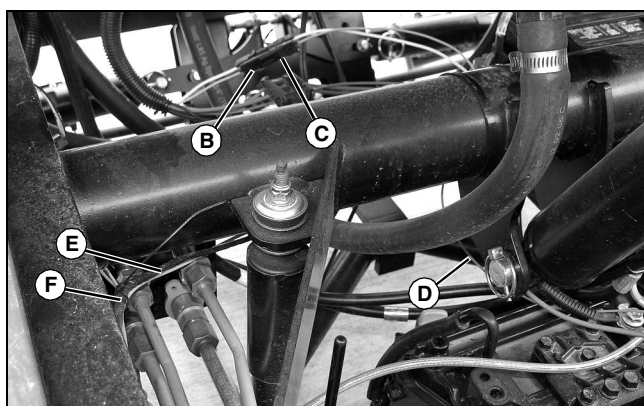
4. Connect male power harness connector (H) and female ground connector (I) to matching connectors on sprayer main harness.

Install Console Wire Harness

NOTE: The three-wire connector (A) on the front harness is for use with optional automatic rate control kit.

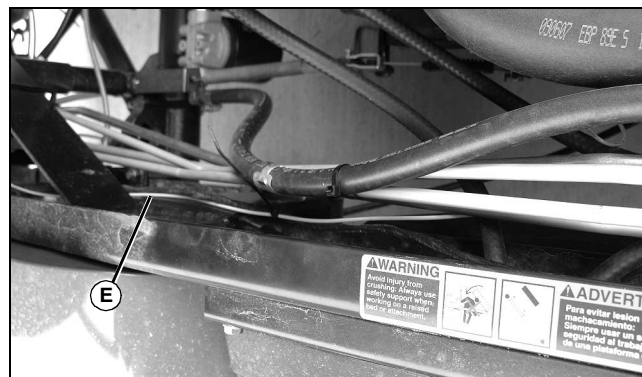


MX42254



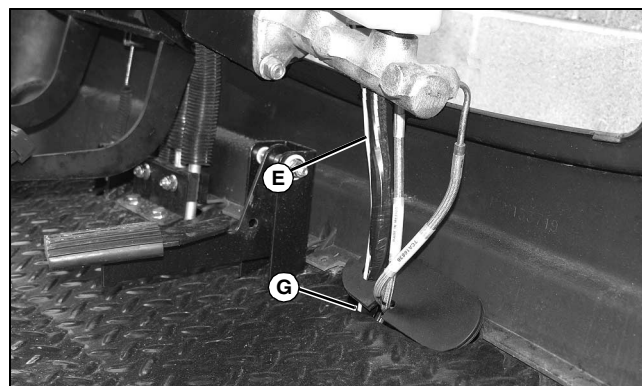
MX42101

1. Connect sprayer main harness pink and yellow wire connector (B) to console harness pink and yellow wire connector (C).
2. Route console harness pink wire (D) over transaxle.
3. Route console harness yellow wire (E) to machine harness (F) along right frame rail.



MX42103

4. Route console harness yellow wire (E) forward along machine harness inside right frame rail.



MX42104

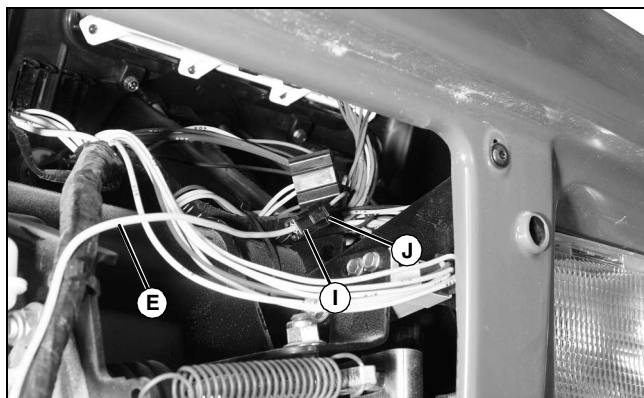
5. Route yellow wire (E) along with machine harness under cab floor and through opening (G) at forward edge of cab floor.



MX42105

6. Grasp grille at tabs (H) and pull outward to remove grille for access to wiring harness.

ASSEMBLY

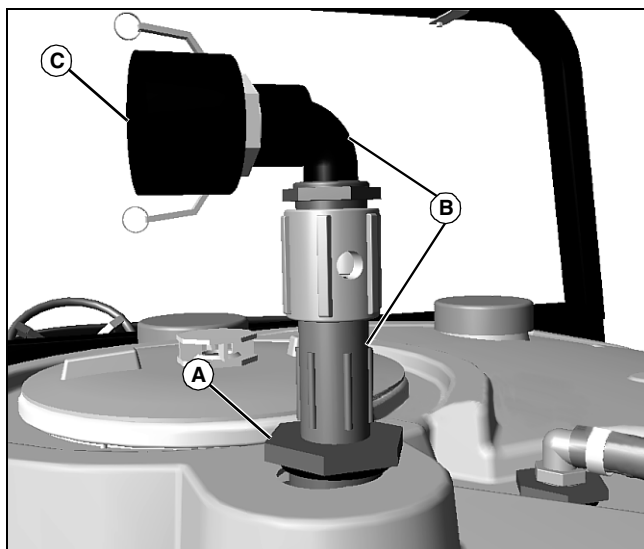


MX42106

7. Route yellow wire (E) upward along machine harness under dashboard.
8. Install connector (I) on yellow wire to machine harness connector (J).
9. Secure installed wires with wire ties.
10. Replace grille.

Install Sprayer Tank Components

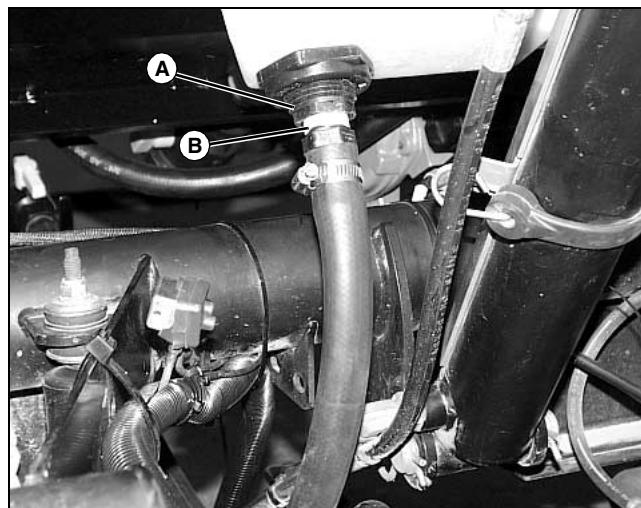
NOTE: For best results, apply a chemical-resistant pipe sealant to all threaded fittings.



MX19970

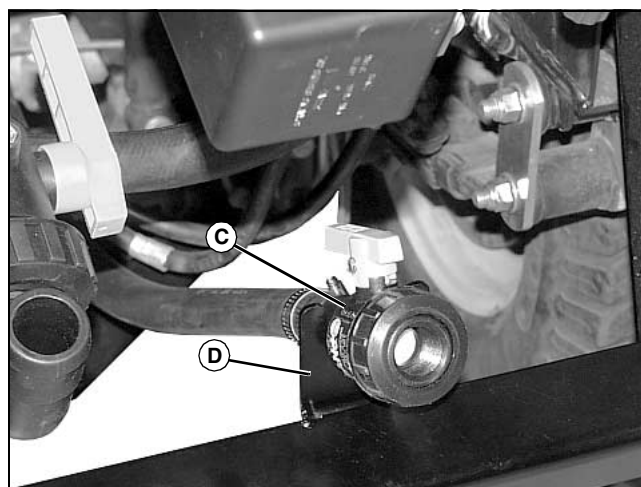
1. Remove and discard plastic protective cap from fill port (A) on top side of tank.
2. Thread filler tube assembly (B) into fill port. Tighten completely, positioning quick-connect opening facing left side of tank as shown.
3. Install dust cap (C).

Trunk Drain Hose



MX19997

1. Raise and properly support tank to access tank drain (A).
2. Locate drain tube assembly and thread male hose end fitting (B) into tank drain until tight.

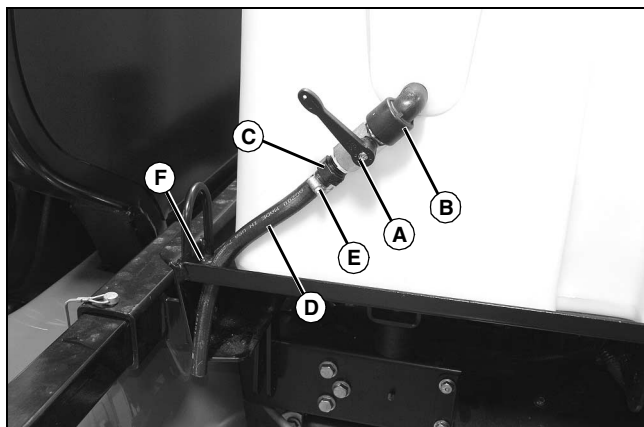


MX19998

3. Route drain hose assembly under machine rear frame crossmember, then up over hitch bracket and set drain valve (C) in cradle (D) as shown.

ASSEMBLY

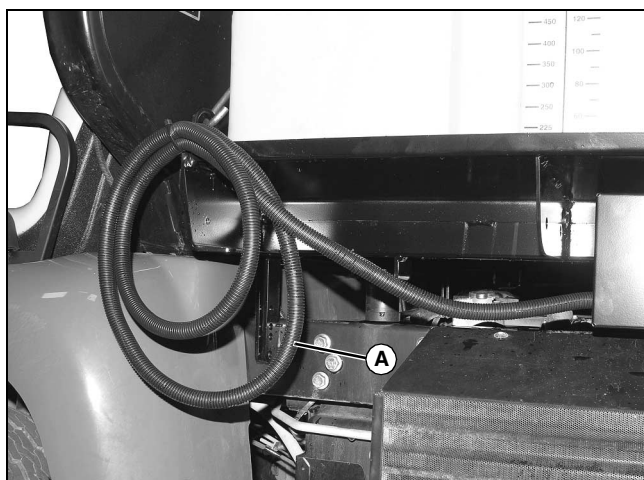
Personal Wash Tank Hose



MX42618

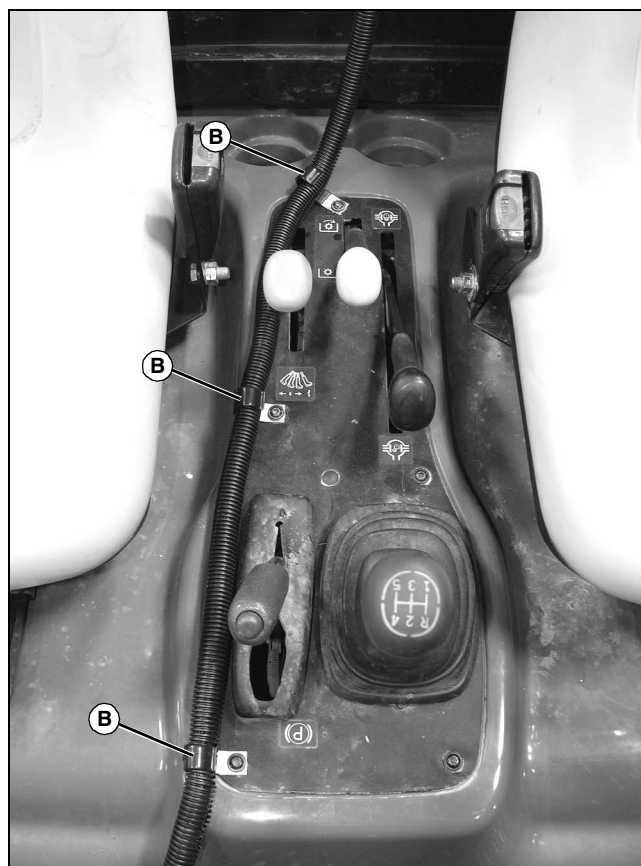
1. Install ball valve (A) onto elbow (B).
2. Install hose barb (C) onto ball valve.
3. Install elbow assembly into threaded hole in left front corner of sprayer wash tank as shown.
4. Install hose (D) onto hose barb with hose clamp (E).
5. Route hose through hole (F) in sprayer frame.

Connect Sprayer Main Harness to Control Box



MX42619

1. Remove tie strap holding section of main sprayer harness (A) to side of sprayer frame.
2. Route harness between sprayer and machine, and over plate in bottom half of ROPS frame.



MX42620

3. Install J-clips (B) on screws in center control panel.
4. Install harness on J-clips and route to front of machine.

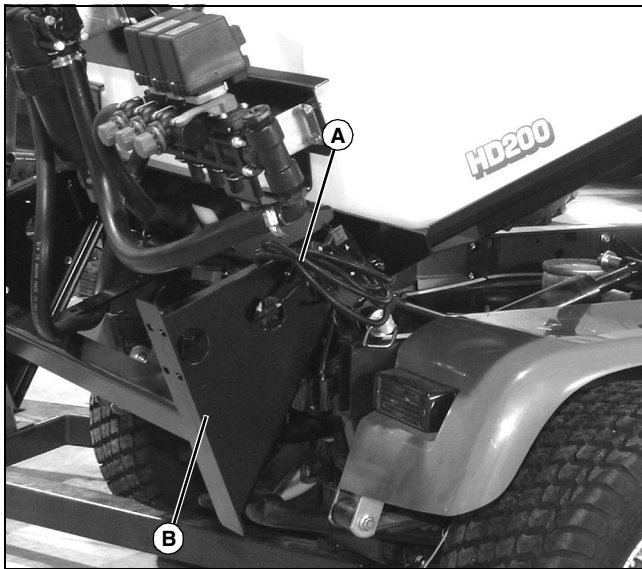


MX42200

5. Connect harness connector (C) to control box (D).

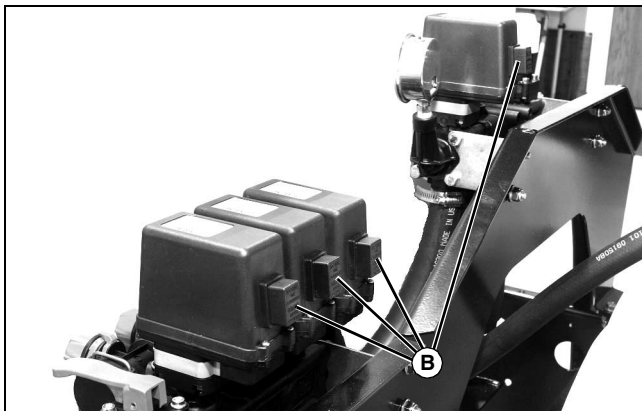
ASSEMBLY

Connect Rear Wiring Harness



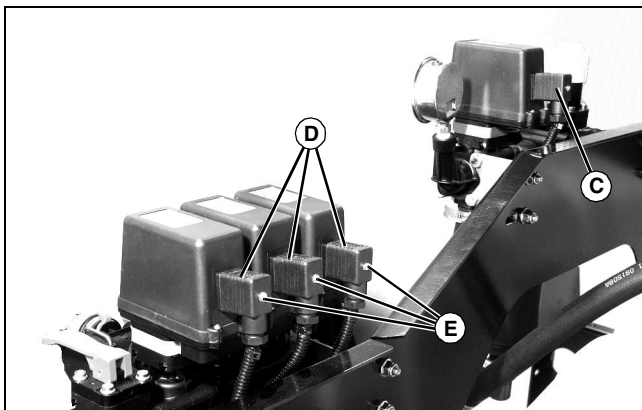
MX42330

1. Cut wire tie securing rear harness bundle (A) to rear corner of sprayer frame.



MX42255

2. Remove protective caps (B) from master and boom solenoid valve covers.



MX42256

3. Connect single harness plug (C) to master solenoid valve.

4. Connect multiple harness plugs (D) to boom solenoid valves in correct order from left to right.

a. Connect the long solenoid lead to the outer solenoid.

b. Connect the middle solenoid lead to the middle solenoid.

c. Connect the short solenoid lead to the inner solenoid.

5. Secure each plug to valve using screws (E).

6. If equipped with optional sprayer equipment, make all necessary electrical and hose connections at this time. See installation instructions provided with your optional equipment.

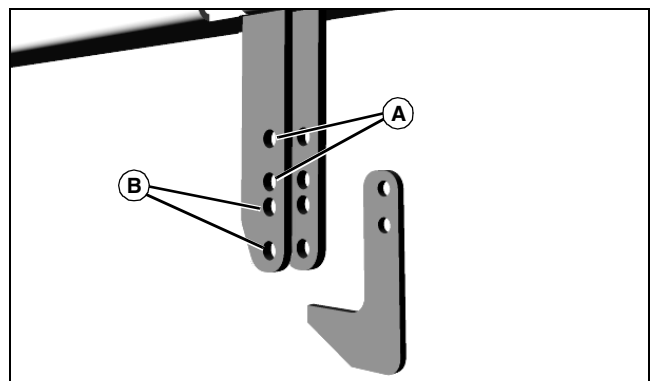
7. If not equipped with optional sprayer equipment, route the excess and unused sprayer harness leads behind back panel below solenoid manifold and secure with tie straps.

Install Frame Clamps

Sprayer can be mounted on earlier and current model ProGators. The difference between models requires the use of different mounting holes on the frame bracket. Use the following illustration as a guide for selecting the appropriate mounting hole for machine:

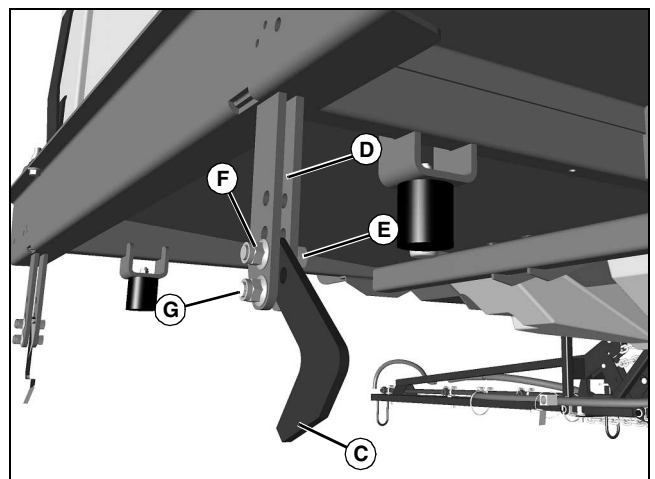
Upper and lower mounting holes (A) for earlier models (2020, 2030).

Upper and lower mounting holes (B) for current models (2020A, 2030A).



MX23109

Installing Frame Clamps to Sprayer



MX42163

Picture Note: Current mounting shown.

1. Place frame clamp (C) onto frame bracket (D); install M10x35 bolt (E) into the appropriate mounting hole. Install M10 locknut (F) onto bolt but do not tighten.

2. Pivot frame clamp up and install M10x35 bolt (G) in appropriate mounting hole. Install locknut onto bolt but do not tighten. The frame

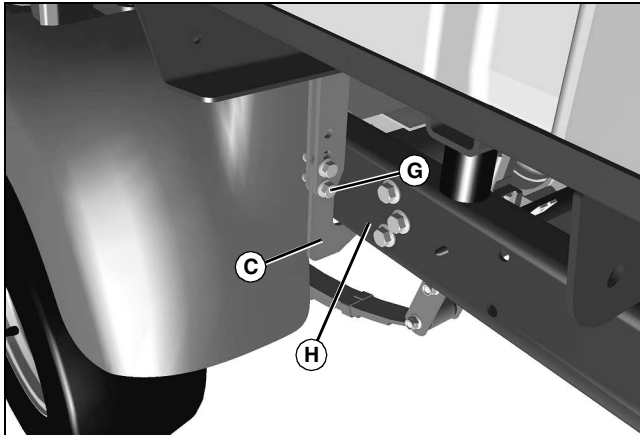
REMOVING AND STORING

clamp should stay in this open position to clear the ProGator frame when lowering sprayer.

Securing Sprayer to Frame

Once sprayer is installed, it should be secured to the ProGator frame before operating.

1. Lower sprayer.



MX42397

2. Remove bottom M10 locknut and M10x35 bolt so frame clamp (C) can pivot down to secure sprayer to ProGator frame (H).
3. Install M10x35 bolt (G) through frame bracket and secure with M10 locknut.
4. Tighten fasteners securely.

Removing and Storing

Prepare Machine for Removal

1. Park machine safely.
2. Ensure sprayer tank is empty to help reduce and balance load.
3. Lock boom wings in upright position.

Disconnect Hydraulic Hoses



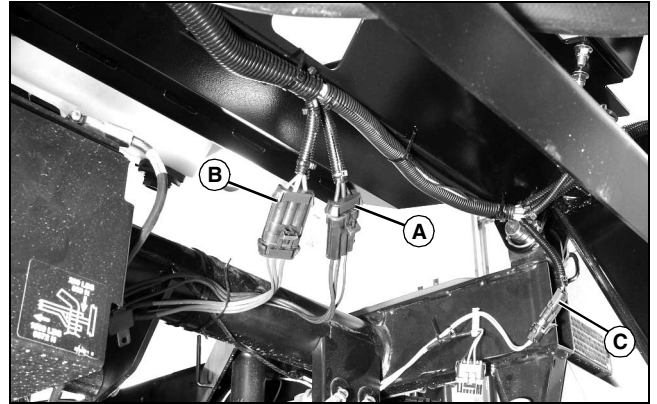
CAUTION: Avoid injury! Escaping fluid under pressure can penetrate skin and cause serious injury, including gangrene.

- Relieve pressure before disconnecting hydraulic or other pressurized lines.
- Use a piece of cardboard to search for leaks. Do not expose hands or body to high pressure fluids.
- Tighten all connections before applying pressure.

1. Disconnect sprayer hydraulic lines from yellow and red female quick-couplers at rear of machine. Leave lift cylinder lines connected.
2. Install dust caps on sprayer hydraulic lines and quick disconnect couplers.

Disconnect Rear Wiring Harness

IMPORTANT: Avoid damage! Disconnect all sprayer auxiliary equipment electrical and hose connections before removing unit from machine.



MX42109

1. Disconnect large harness connector (A) connector (B) on sprayer main harness.
2. Disconnect small harness connector (C) on sprayer main harness.

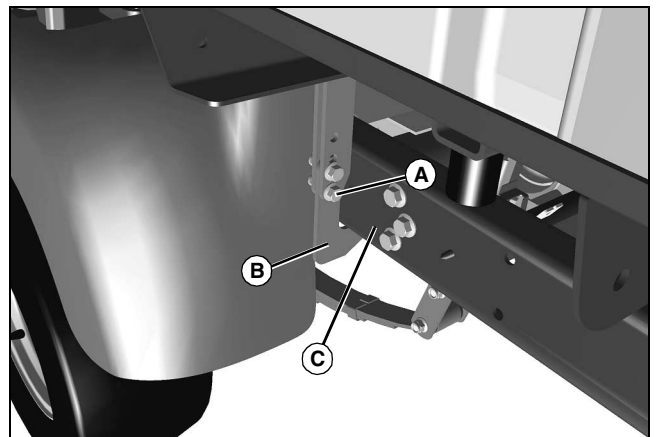
Removing Sprayer Without Support Stands



CAUTION: Avoid injury! The machine can fall or slip from an unsafe lifting device or supports.

- Use a safe lifting device rated for the load to be lifted.
- Lower machine onto jack stands or other stable supports and block wheels before servicing.

1. Position the machine safely near the safe lifting device.
2. Make certain sprayer wiring harness is completely disconnected from sprayer.

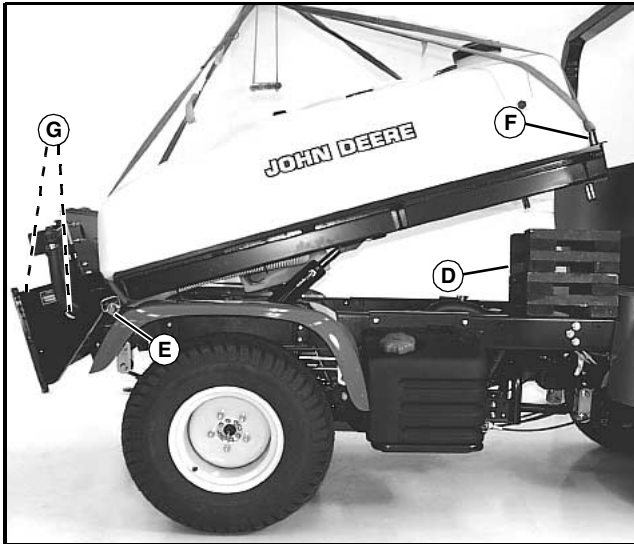


MX42397

3. Remove bottom M10 locknut and M10x35 bolt (A) so frame clamp (B) can pivot open from frame (C). Repeat on opposite side.
4. Pivot clamps upward and install M10x35 bolt (A) and M10 locknut to secure clamps in open position.
5. Using lift cylinder control lever, extend lift cylinder rod approximately 25-30 cm (10-12 in.) to provide access to lift cylinder connecting pin.

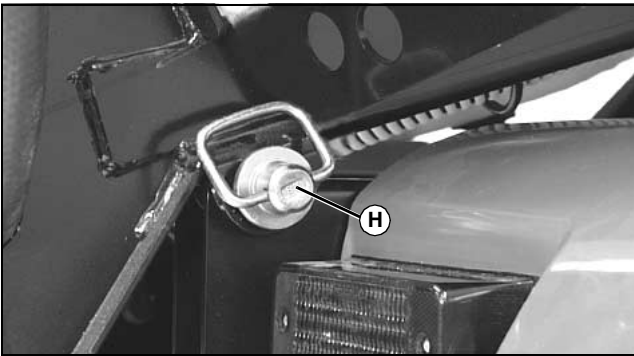
REMOVING AND STORING

6. Stop engine, remove key and set the park brake.



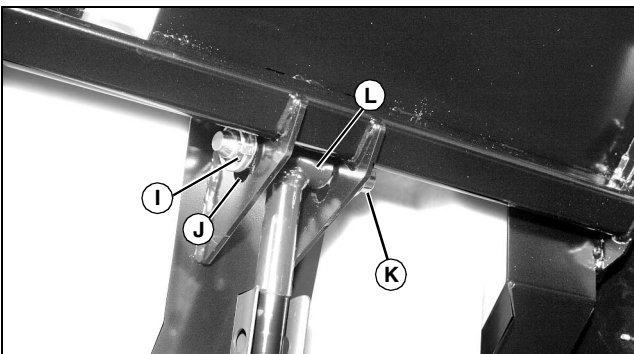
MX2956a

7. Install a safety stand (D) between machine frame and sprayer frame.
8. Install lift straps or chains to sprayer so unit is balanced upon hoisting. Do not directly connect to rear mounting holes (E).
9. Attach lift strap to lift loops (F) at front of sprayer frame.
10. Secure straps around rear of frame (G).



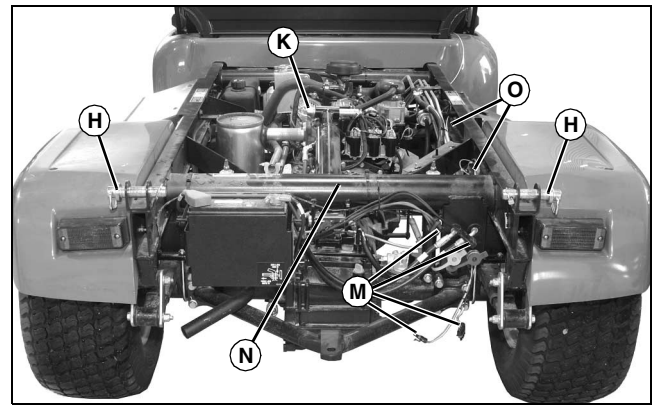
MX2957a

11. Lift sprayer frame slightly and remove quick-lock pins and pivot pins (H) at rear of machine.



MX42247

12. Remove spring locking pin (I), M6 washer (J), and connecting pin (K) at lift cylinder rod end (L).
13. Lift sprayer clear of machine and set on level surface. Remove lifting gear from sprayer.

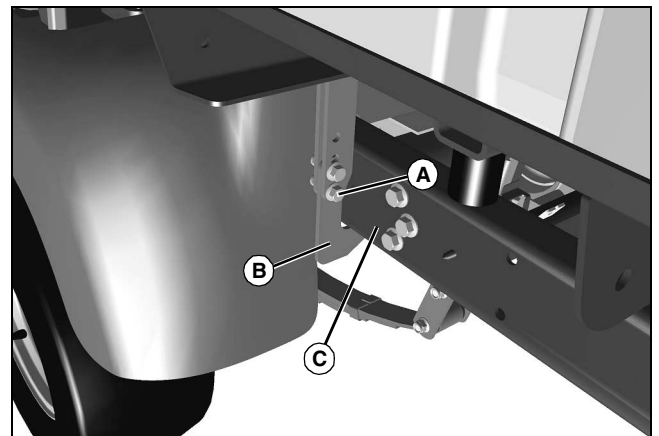


MX42396

14. Install pivot pins (H) at rear of machine for storage.
15. Install connecting pin (K) to lift cylinder rod for storage.
16. Remove safety stand from machine frame.
17. Route excess portion of sprayer wiring harness (M) under frame tube (N) and back toward front of machine along frame (O). Secure with tie straps away from moving parts.

Removing Sprayer With Optional Support Stands

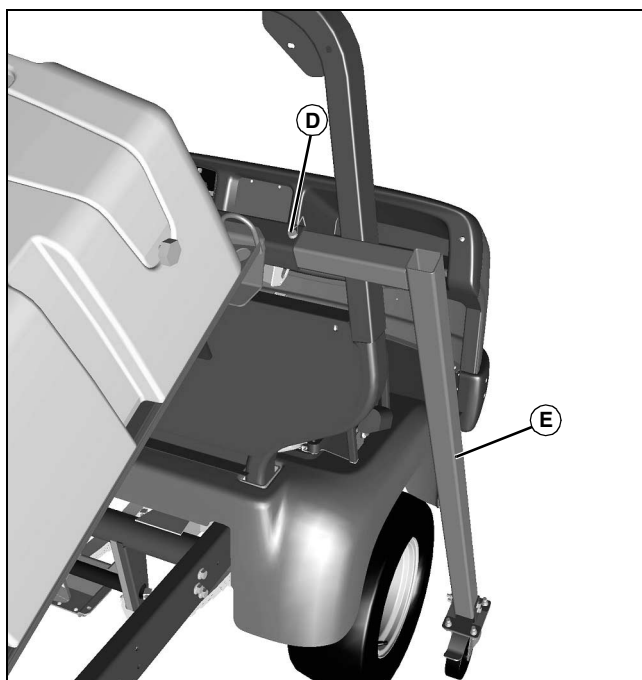
1. Park vehicle safely. (See Parking Safely in the Safety section.)
2. Check to be sure sprayer wiring harness is completely disconnected from sprayer.



MX42397

3. Remove bottom M10 locknut and M10x35 bolt (A) so frame clamp (B) can pivot open from frame (C). Repeat on opposite side.
4. Pivot clamps upward and install M10x35 bolt (A) and M10 locknut to secure clamps in open position.
5. Using machine lift cylinder control lever, extend lift cylinder rod approximately 25-30 cm (10-12 in.) to provide access to lift cylinder connecting pin.
6. Stop engine, remove key and set the park brake.

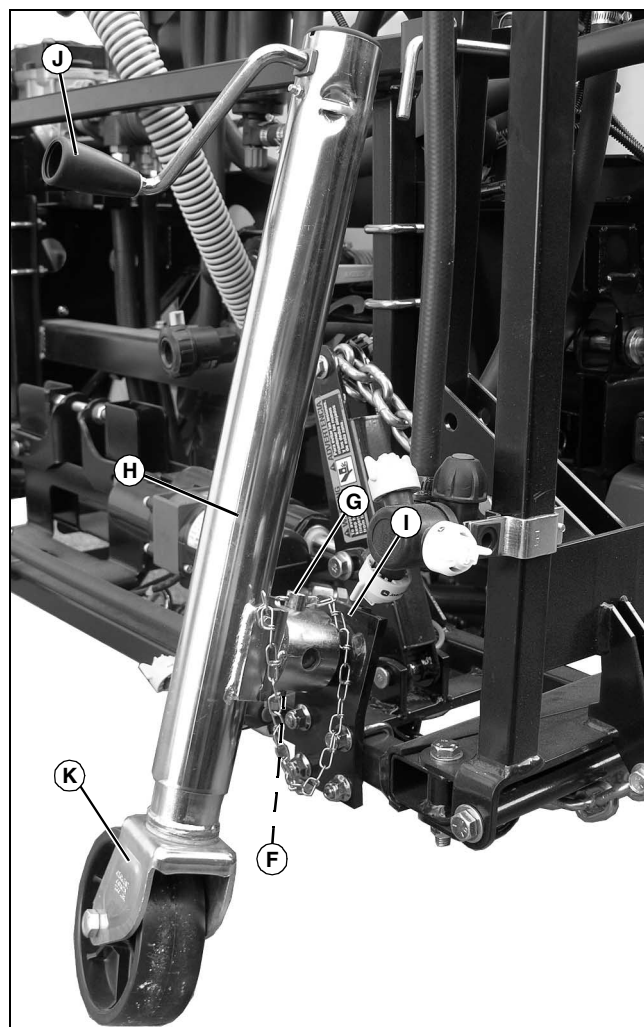
REMOVING AND STORING



MX42622

7. Remove quick-lock pin (D) and rotate front support stand (E) downward. Repeat for opposite side.

8. Lower cargo box just so that front support stands of sprayer rests on level ground.

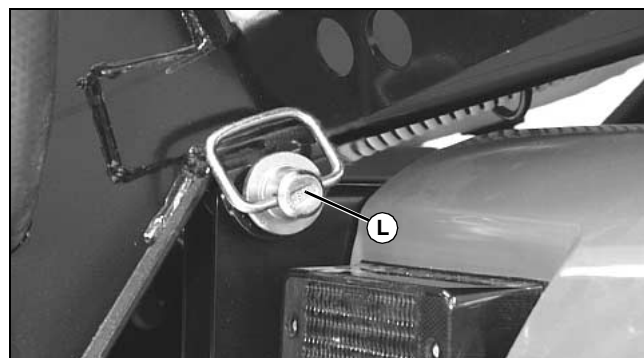


MX42182

Picture Note: Right side shown in supported position.

9. Remove spring locking pin (F) and pin (G) and rotate adjustable jack (H) to a horizontal position. Install pin and spring locking pin back in jack bracket and jack base bracket (I).

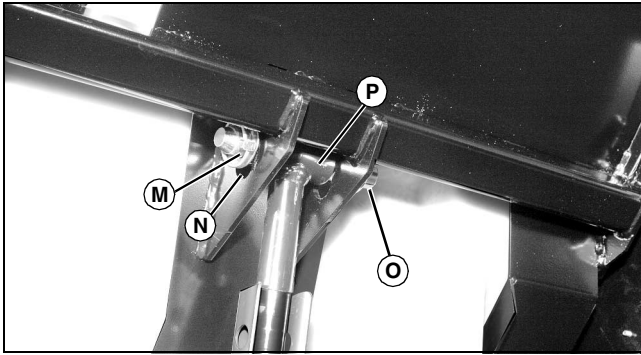
10. Rotate handle (J) to adjust jack wheel (K) downward just so wheel touches level ground. Repeat on opposite side.



MX2957a

11. Remove quick-lock pins and pivot pins (L) at rear of machine.

REMOVING AND STORING

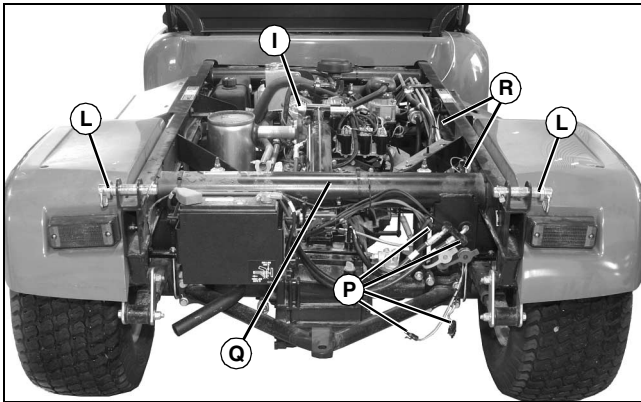


MX42247

12. Remove spring locking pin (M), M6 washer (N), and connecting pin (O) at lift cylinder rod end (P).

13. Rotate each side handle (J) evenly to raise sprayer assembly onto front stands. Make sure the sprayer is raised high enough to clear the drain hose in the bottom of the tank.

14. Drive machine slowly away from sprayer assembly.



MX42396

15. Install pivot pins (L) at rear of machine for storage.

16. Install connecting pin (O) and hardware to lift cylinder rod for storage.

17. Route excess sprayer wiring harness (P) under frame tube (Q) and back toward front of machine along frame (R). Secure with tie straps away from moving parts.

Storing Safety



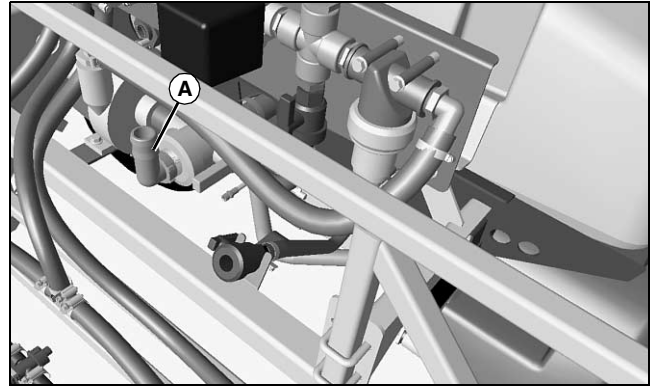
CAUTION: Avoid injury! Fuel vapors are explosive and flammable. Engine exhaust fumes contain carbon monoxide and can cause serious illness or death:

- Run the engine only long enough to move the machine to or from storage.
- Machine fires and structure fires can occur if a machine is stored before allowing it to cool, or if debris is not removed from around the engine and muffler, or if stored near combustible materials.
- Do not store vehicle with fuel in the tank inside a building where fumes may reach an open flame or spark.
- Allow the engine to cool before storing the machine in any enclosure.

Winterization and Storage

Sprayer

1. Dilute and spray excess chemicals to empty tank.
2. Park machine safely.
3. Rinse and drain sprayer tank.



MX19961

4. Turn yellow knob on agitator valve clockwise to the fully closed position.
5. Ensure that elbow nipple (A) on three-way ball valve is pointed up. Rotate if necessary.
6. Turn three-way ball valve so that handle is horizontal and pointing away from tank.
7. Pour RV anti-freeze into elbow nipple until full.
8. Start pump briefly to circulate anti-freeze, then stop pump.
9. Repeat steps 7, 8 to ensure that anti-freeze has circulated through pump and all rear plumbing.
10. Add additional anti-freeze into elbow nipple till full.
11. If equipped, fold and lock boom wing extensions in folded back position.
12. Raise and lock boom wings in upright position.

Foam Marker (If equipped)

To prepare foam marker for storage, perform following steps. When finished, all plumbing and wetted parts will be filled with RV anti-freeze. This is preferred over dry storage.

1. Drain marker tank and clean or replace tank outlet strainer.
2. Install tank strainer and strainer cover.

NOTE: Follow all safety and mixing instructions on RV anti-freeze container label.

3. Fill marker tank with RV anti-freeze.
4. Operate foam marker normally through both sides for two minutes each. This will purge any water/marker agent solution out and fill system with anti-freeze.
5. Clean inside of foam marker cabinet.
6. Clean air pump inlet air filter.

Hose Reel (If equipped)

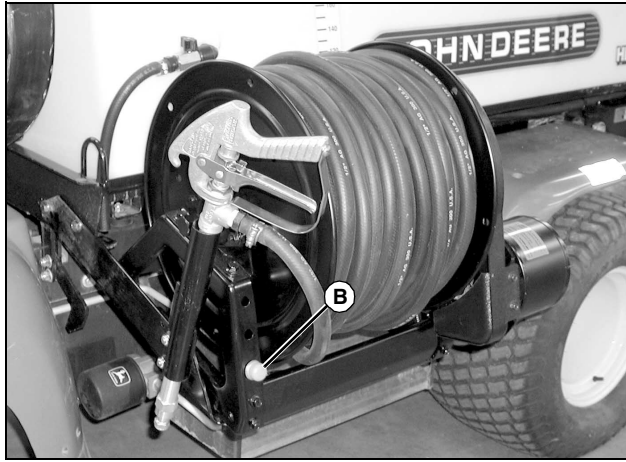
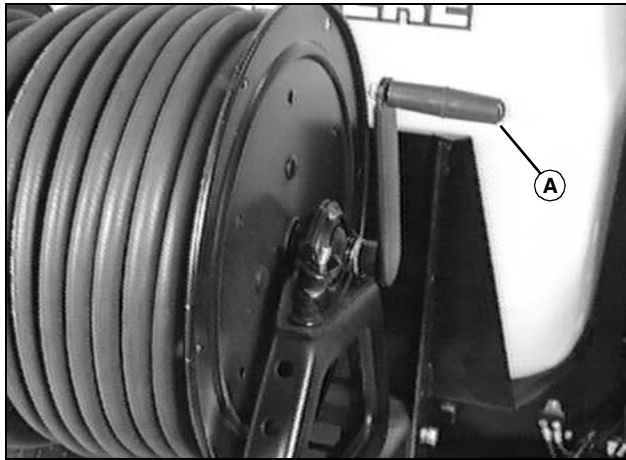
1. Park machine safely.
2. Place hose reel valve lever in OFF position.
3. Operate handgun briefly to remove air pressure from hose.

REMOVING AND STORING



CAUTION: Avoid injury! Moving parts can crush and cut! Keep hands clear. Do not operate with guard removed.

Electric Hose Reel - Manually wind in last 2 m (6.5 ft) to prevent injury from fast-winding hose.



M88221, MX17908

4. Wind hose on reel as follows:

- Manual Hose Reel: Use one hand to help guide hose while manually turning handle (A).
- Electric Hose Reel: Press power switch (B) to start electric motor and automatically wind hose on reel. Keep hand away from drum while guiding hose. Manually wind in last 2 m (6.5 ft) of hose.

5. Place handgun in storage tube.

Personal Wash Tank

To prepare personal wash tank for storage, perform following steps.

1. Drain wash tank and clean as required.
2. Clean and rinse inside of tank as needed.
3. Open spigot and allow all water to drain.
4. Leave spigot open to allow condensation to drain.

Removing From Storage

IMPORTANT: Avoid damage! Some RV anti-freeze solutions can be harmful to the environment. Collect solution in a container and dispose of according to manufacturer's instructions.

Sprayer

1. Partially fill sprayer tank with clean water.
2. Turn handle on three-way ball valve toward sprayer tank.
3. Operate sprayer until RV anti-freeze is cleaned from system.

Foam Marker (If equipped)

1. Drain marker tank, and clean or replace tank outlet strainer.

NOTE: Follow all safety instructions on RV anti-freeze container label.

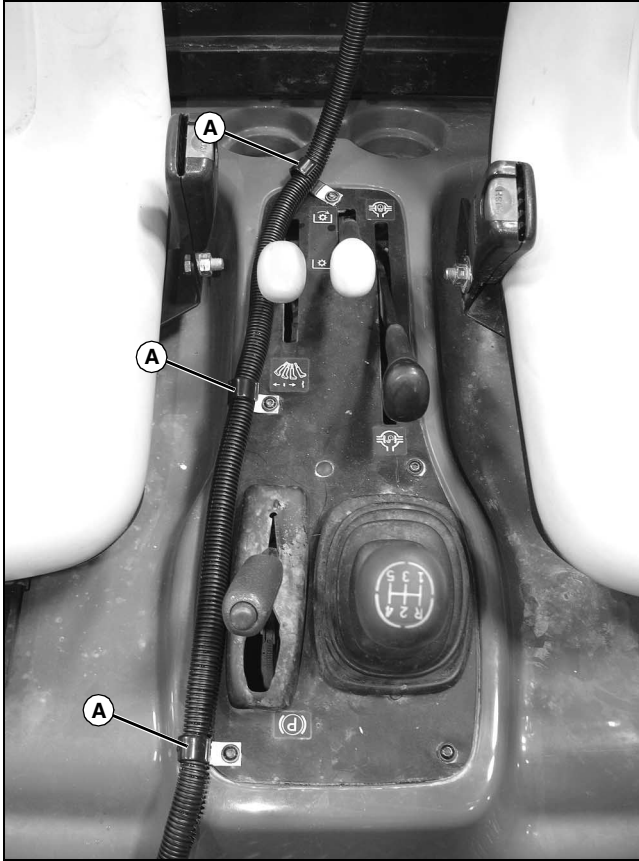
2. Use clean water or any special dilution mixtures, and fill marker tank.
3. Operate foam marker normally through both sides until all traces of anti-freeze are gone.
4. Drain remaining clean water or any special dilution mixtures from marker tank. Make sure tank strainer is clean and installed properly. Install and tighten strainer cover.
5. Clean inside of foam marker cabinet.
6. Fill foam marker tank.
7. Operate foam marker at maximum foam rate until foam appears at foam nozzle. Repeat for other side.
8. Adjust to normal foam rate.

Personal Wash Tank

1. Pour several gallons of clean fresh water into tank and allow to drain. This will rinse out any debris from tank, spigot, and drain hose.
2. Close spigot.
3. Fill tank with clean fresh water.
4. Install and tighten cover.
5. Open spigot and water should drain smoothly from hose. If water drains slowly or not at all, inspect and clean cover vent.

INSTALLING

Remove and Store Control Box



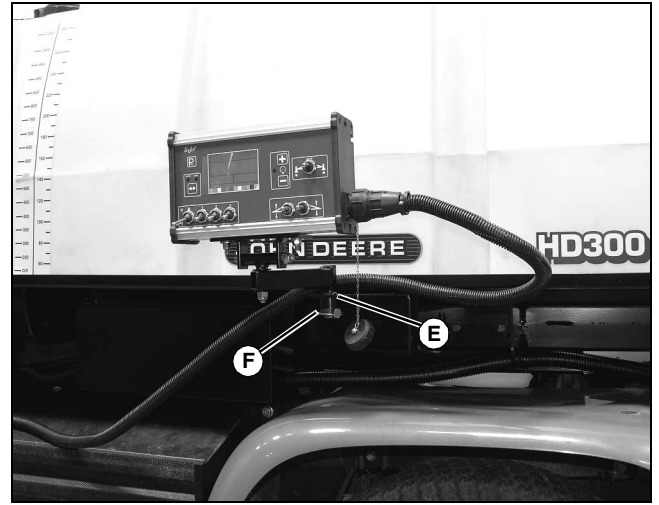
MX42620

1. Remove harness from J-clips (A).



MX42200

2. Remove quick-lock pin (B) and wave washer from control box mounting arm (C).
3. Remove control box and mounting arm assembly from bracket (D).



MX42621

4. Install control box onto controller storage bracket (E) on center frame, and install wave washer and quick-lock pin (F) to secure in place.

Installing

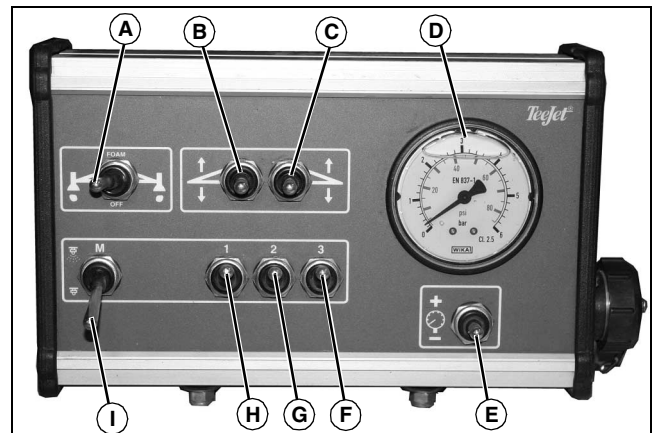
Installing Sprayer on Machine

The initial installation of the sprayer to the machine is covered in the Assembly section. The following checklist is for installing the sprayer on machine after the initial installation.

- ☐ Install sprayer tank on machine frame with safe lifting device or using support stands.
- ☐ Connect the rear wiring harness.
- ☐ Connect the sprayer hydraulic hoses.
- ☐ Secure the sprayer to machine frame with mounting clamps.
- ☐ Verify the boom height and level; adjust if necessary.

Operating - Controls

Manual Control Box



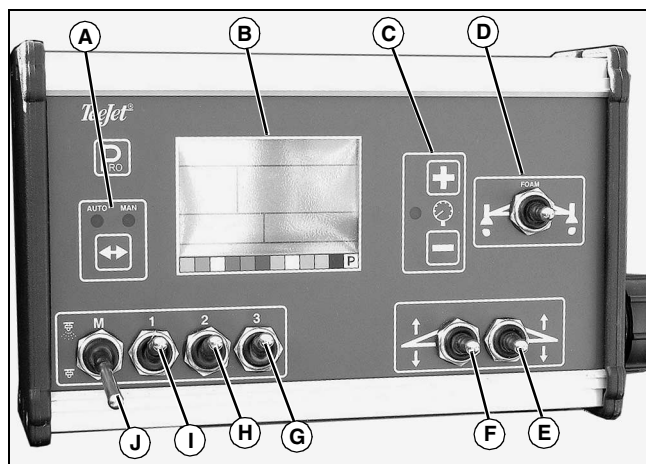
MX42233

- A- Marker Switch
- B- Left Boom Wing Switch
- C- Right Boom Wing Switch

OPERATING

- D- Pressure Gauge
- E- Pressure Control
- F- Right Boom Section Switch
- G- Center Boom Section Switch
- H- Left Boom Section Switch
- I - Boom Master Switch

Automatic Rate Control Box



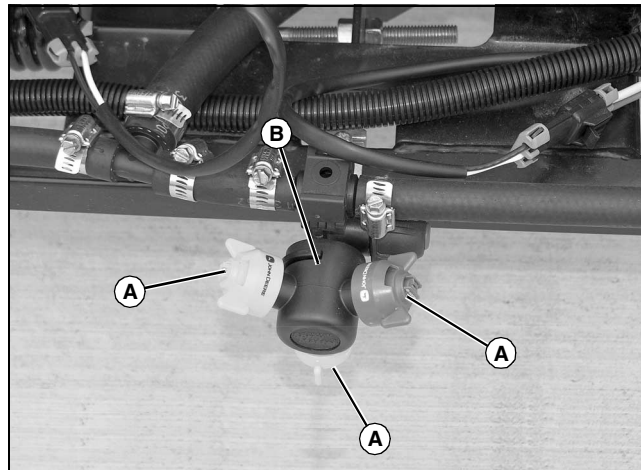
MX42232

- A- Auto/Manual Control
- B- Digital Display Screen
- C- Pressure Control
- D- Marker Switch
- E- Right Boom Wing Switch
- F- Left Boom Wing Switch
- G- Right Boom Section Switch
- H- Center Boom Section Switch
- I - Left Boom Section Switch
- J - Boom Master Switch

Operating

Spray Tip Operation

NOTE: There are three detent positions to place each spray tip in an activated (downward) position. It is not recommended, but three additional detent positions in between downward positions can be used for shutting off individual spray valves.



MX42627

1. Select spray tip nozzle (A) color, and rotate spray tip assembly (B), so that color selected is in the down position.
2. Repeat procedure for color selected for remaining spray tips on boom sections.

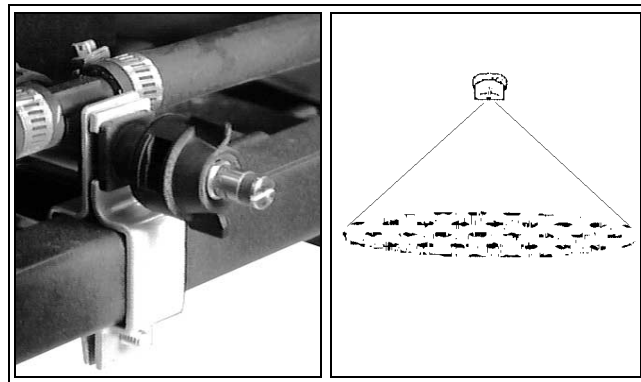
Spray Tip Selection

Examples of spray tips shown are for reference only.

Actual coverate rates must be calculated from spray tip flow rate, machine speed, overlap and operating pressure.

See your John Deere dealer for spray tips and additional information.

Flood Style Spray Tip



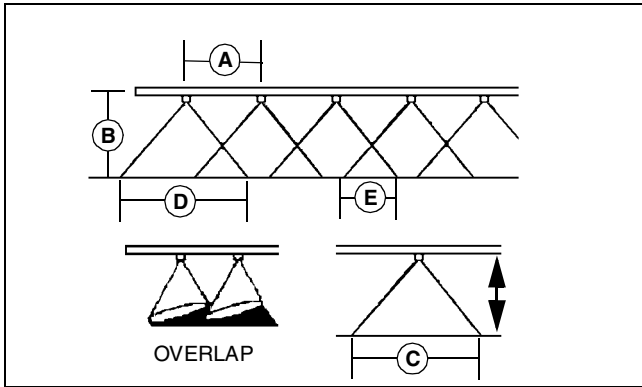
M88228a/M88226

Picture Note: Typical spray pattern shown at right.

This is a wide-angle, flat nozzle for broadcast spraying. A 100% overlap of spray pattern is recommended to assure adequate coverage.

OPERATING

Nozzle Dimensions

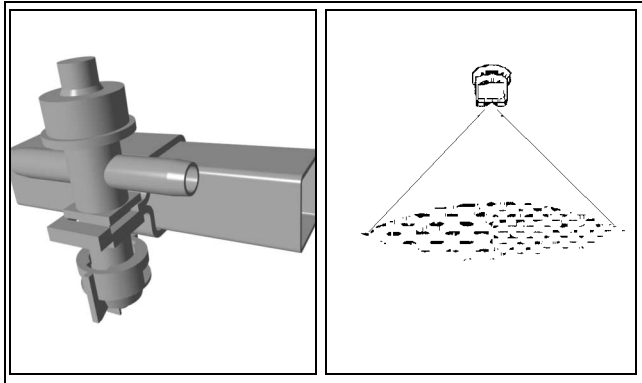


M88227

- Spacing (A) = 508 mm (20 in.)
- Height (B) = 406 mm (16 in.)
- Spray Angle (C) = 115° to 125°
- Spray Coverage (D) = 102 cm (40 in.)
- Overlap (E) = 100%

To change nozzle height, adjust the height of the boom.

Ultra Low-Drift Style Spray Tip

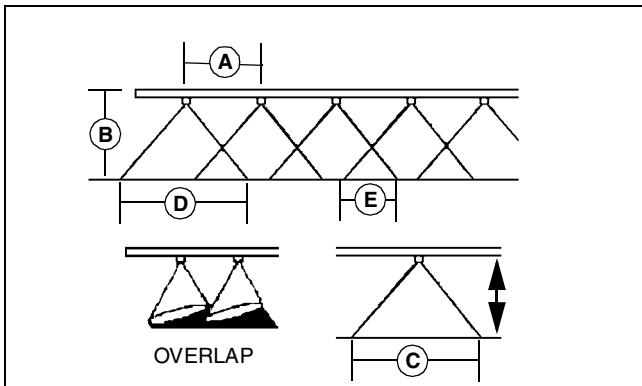


MX15781/M88225

Picture Note: Typical spray pattern shown at right.

This is a wide-angle, flat-fan type nozzle with dual air reduction. It provides a uniform pattern for broadcast spraying.

Nozzle Dimensions



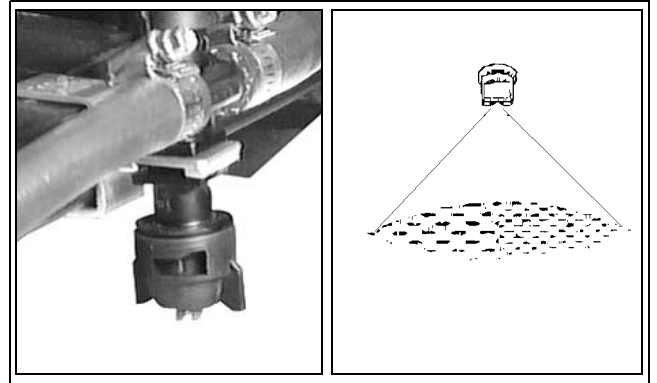
M88227

- Spacing (A) = 508 mm (20 in.)

- Height (B) = 406 mm (16 in.)
- Spray Angle (C) = 120°
- Spray Coverage (D) = 102 cm (40 in.)
- Overlap (E) = 100%

To change nozzle height, adjust the height of the boom.

Flat Fan Style Spray Tip



M88230a/M88225

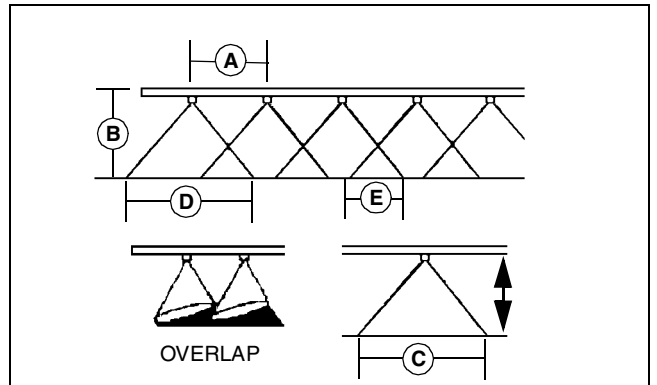
Picture Note: Typical spray pattern shown at right.

This nozzle provides a fan-shaped spray pattern finely tapered at each end. Tapered ends permit offset overlap of spray pattern to assure uniform coverage.

Higher pressures provide increased penetration and finer coverage of smaller particles.

Lower pressures provide larger droplets to reduce the risk of drift.

Nozzle Dimensions



M88227

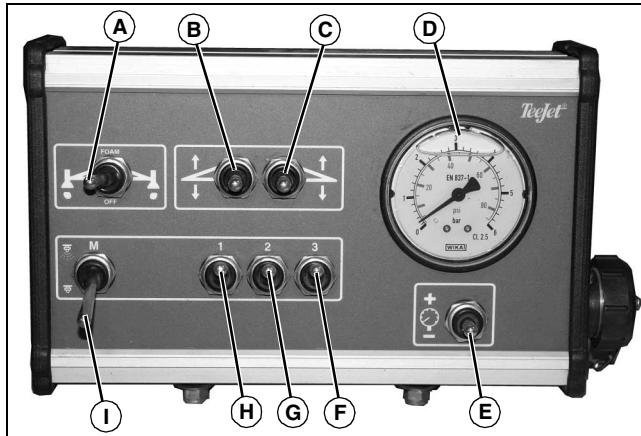
- Spacing (A) = 508 mm (20 in.)
- Height (B) = 457 to 508 mm (18 to 20 in.)
- Spray Angle (C) = 80° to 110°
- Spray Coverage (D) = 762 mm (30 in.)
- Overlap (E) = 50%

To change nozzle height, adjust the height of the boom.

OPERATING

Using Manual Control Box

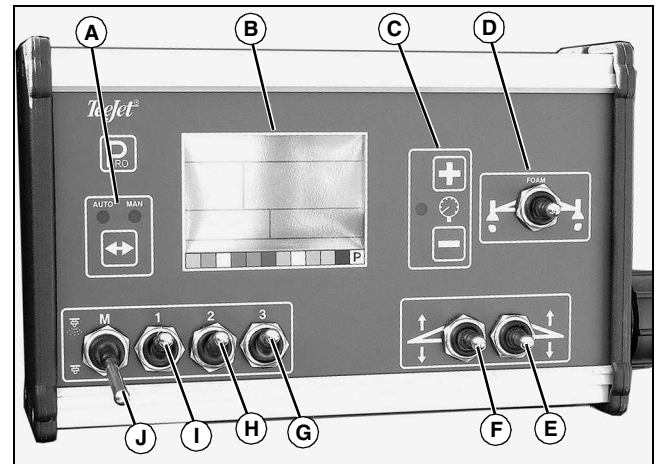
NOTE: The operating control pressure gauge is liquid filled. The liquid is present to dampen indicator movement. Do not attempt to remove liquid from the gauge.



MX42233

- Marker Switch (A) - "FOAM" switch controls the foam marker. With the switch in the center position, no marker foam is released. With the switch in the right position, foam is released from the nozzle at the end of the right spray boom. With the switch in the left position, foam is released from the nozzle at the end of the left spray boom.
- Left Boom Wing Switch (B) - This switch controls the left boom wing lift. Move the switch UP to raise the left boom wing. Move the switch DOWN to lower the left boom wing.
- Right Boom Wing Switch (C) - This switch controls the right boom wing lift. Move the switch UP to raise the right boom wing. Move the switch DOWN to lower the right boom wing.
- Pressure Gauge (D) - The pressure gauge displays sprayer operating pressure, and can be used as an indicator of system performance. While the sprayer is in operation, system should be constant. Any significant change in indicated pressure when in operation is an indication of a system fault to be investigated. (For example: If one or more nozzles were to become plugged, there would be an increase in pressure normally indicated. If a significant leak occurred, or if a nozzle were lost, there would be a decrease from the pressure normally indicated.
- Pressure Control (E) - The "+ -" switch controls fluid pressure delivered to the nozzles.
- Right Boom Section Switch (F) - Switch "3" controls right boom section isolation valve. To allow flow to the right boom section spray nozzles, move switch 3 to the UP position. (Switch M must be in the UP position as well.) To shut off flow to the right boom section spray nozzles, move switch 3 to the DOWN position.
- Center Boom Section Switch (G) - Switch "2" controls center boom section isolation valve. To allow flow to the center boom section spray nozzles, move switch 2 to the UP position. (Switch M must be in the UP position as well.) To shut off flow to the center boom section spray nozzles, move switch 2 to the DOWN position.
- Left Boom Section Switch (H) - Switch "1" controls left boom section isolation valve. To allow flow to the left boom section spray nozzles, move switch 1 to the UP position. (Switch M must be in the UP position as well.) To shut off flow to the left boom section spray nozzles, move switch 1 to the DOWN position.
- Boom Master Switch (I) - Switch "M" controls flow to all boom section valves. To allow flow to all individual boom section isolation valves, move switch M to the UP position. To shut off flow to all individual boom section isolation valves, move switch M to the DOWN position.

Using Automatic Rate Control Box



MX42232

- Auto/Manual Control (A) The "Auto" and "Man" touch pad switches change controller operation between automatic and manual control of sprayer functions. In the auto operating mode, the controller automatically maintains uniform application with changes in operating conditions. In the manual operating mode, rate can be temporarily increased or decreased to suit application requirements.
- Digital Display Screen (B) - The digital display screen shows selectable values for sprayer operating pressure, flow rate, ground speed, and other operational parameters. These values are used to set up the sprayer controller for operation and to monitor operation when in use.
- Pressure Control (C) - The "+" and "-" touch pad switches are used to change nozzle pressure during controller setup or while in operation. Pressing the + switch will increase system pressure (within system limits). Pressing the - switch will decrease system pressure (within system limits).
- Marker Switch (D) - "FOAM" switch controls the foam marker. With the switch in the center position, no marker foam is released. With the switch in the right position, foam is released from the nozzle at the end of the right spray boom. With the switch in the left position, foam is released from the nozzle at the end of the left spray boom.
- Right Boom Wing Switch (E) - This switch controls the right boom wing lift. Move the switch UP to raise the right boom wing. Move the switch DOWN to lower the right boom wing.
- Left Boom Wing Switch (F) - This switch controls the left boom wing lift. Move the switch UP to raise the left boom wing. Move the switch DOWN to lower the left boom wing.
- Right Boom Section Switch (G) - Switch "3" controls right boom section isolation valve. To allow flow to the right boom section spray nozzles, move switch 3 to the UP position. (Switch M must be in the UP position as well.) To shut off flow to the right boom section spray nozzles, move switch 3 to the DOWN position.
- Center Boom Section Switch (H) - Switch "2" controls center boom section isolation valve. To allow flow to the center boom section spray nozzles, move switch 2 to the UP position. (Switch M must be in the UP position as well.) To shut off flow to the center boom section spray nozzles, move switch 2 to the DOWN position.
- Left Boom Section Switch (I) - Switch "1" controls left boom section isolation valve. To allow flow to the left boom section spray nozzles, move switch 1 to the UP position. (Switch M must be in the UP position as well.) To shut off flow to the left boom section spray nozzles, move switch 1 to the DOWN position.
- Boom Master Switch (J) - Switch "M" controls flow to all boom section valves. To allow flow to all individual boom section isolation valves, move

OPERATING

switch M to the UP position. To shut off flow to all individual boom section isolation valves, move switch M to the DOWN position.

Area / Volume Display Feature

With the master boom switch in the “on” position, the controller will measure both the application area and measures the total volume applied.

- The area counter measures treated area and is dependent on the values programmed for the number of tips per boom section and the tip spacing.
- The volume counter is dependent on flow meter pulses.
- The lower right area of the console will alternate between the two measurements every three seconds.
- To clear the counter/volume measure:
 - a. Set the master boom switch to the “off” position
 - b. Press and hold the Auto/Man key for three seconds
 - c. The controller will display a message asking if the field counter should be cleared
 - d. Use the + or – keys to select either “Yes” or “No”
 - e. Press the Pro key to accept the change and return to normal operating mode.

Tank Volume Feature

The console will count down the volume remaining in the tank and alert the operator when the low tank level has been reached.

The low tank level can be programmed by the operator in System Setup Mode.

- To reset the tank volume:
 - a. Master switch must be in the “off” position
 - b. Press + and – keys at the same time, this will display the tank volume indicator and the number will be flashing
 - c. Use + or – keys to change tank volume to the current volume in tank
 - d. Press Pro button to store value
 - e. This process must be repeated every time fluid is added to the tank.

Boost Mode

The controller is capable of boosting the target rate either up or down in 10% increments.

Boost up:

- With the system in operating mode, and the master switch “on”, press the + key to increase the target rate by 10%. Each subsequent pressing of the + key will increase the target rate by 10%.
- The amount the rate is boosted will be displayed for 2 seconds. The target symbol will flash any time the system is in Boost mode.
- To return to the target application rate, press the – key to return in 10% increments. Push the + and – keys simultaneously to return to the target rate immediately.

Boost down:

- With the system in operating mode, and the master switch “on”, press the - key to decrease the target rate by 10%. Each subsequent pressing of the - key will decrease the target rate by 10%.
- The amount the rate is boosted will be displayed for 2 seconds. The target symbol will flash any time the system is in Boost mode.
- To return to the target application rate, press the + key to return in 10% increments. Push the + and – keys simultaneously to return to the target rate immediately.

Sensor Alarms

- Application Alarm – If the controller senses a discrepancy of 10% or more between the Target Application Rate and the Actual Application Rate, the application rate window will flash. This will alert the operator to a problem with the sprayer plumbing, operation, or programming. An audible alarm is activated when this feature is enabled. It will provide three short beeps, indicating High Priority.
- No Speed Alarm – This alarm occurs only if the master boom switch is in the “on” position. If the controller stops receiving pulses from the speed sensor, the speed display tractor symbol will flash at the top of the display. An audible alarm is activated when this feature is enabled. It will provide a steady beep, indicating Medium Priority.
- No Flow Alarm – This alarm occurs only if the master boom switch is in the “on” position. This alarm indicates that the controller has stopped receiving pulses from the flow meter. The turbine symbol will flash at the top of the console. An audible alarm is activated when this feature is enabled. It will provide a steady beep, indicating Medium Priority.
- No Pressure Alarm – This alarm occurs only if the master boom switch is in the “on” position. This alarm indicates that the pressure transducer has failed or lost its connection. An audible alarm is activated when this feature is enabled. It will provide a steady beep, indicating Medium Priority.
- Low Tank Volume Alarm – This alarm occurs when the tank volume reaches the low tank volume set in the System Setup Mode. The tank volume symbol will flash on the display screen.

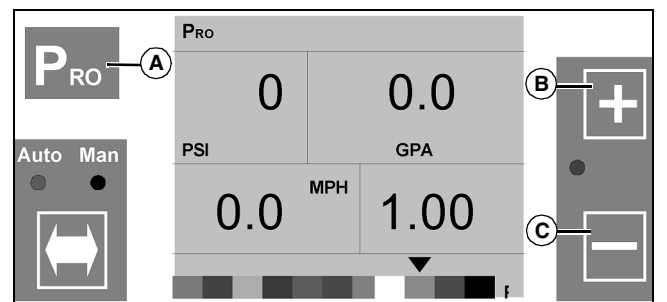
Power On Controller

Power on the Controller – Simply press the Pro key one time to turn on the console. The console will initially display the software version at the top of the screen and the serial number of the console at the bottom of the screen. After approximately 5 seconds, the console will enter into operating mode.

Power Off Controller

Power off the Controller – To power off the console, press and release the – and Pro keys simultaneously with the master boom switch “off”. The console will save new information (area and volume counters) to memory before it powers down.

Configuring Automatic Rate Control Box



1. Press Pro button (A) once to activate rate controller.

After software version has been displayed, and screen goes to Operating screen, press and hold Pro button for three seconds to enter System Setup mode.

2. Press “+” (B) or “-” (C) button to select working units.

Default = U.S. (gallons per acre)

Other options:

- trf - US gallons per 1000 square feet

OPERATING

- INP - Imperial gallons per acre
- LM2 - Liters per meter squared
- Si - metric (l/m, l/ha, km/hr, cm)

NOTE: Press “+” or “-” button to change values in all steps. At any time, hold Pro button three seconds to exit System Setup.

3. Press Pro button for Speed Sensor Calibration.

Default = 980

- Speed sensor must be calibrated to provide proper speed and area readings.
- The value for this step is number of pulses generated by speed sensor in 300 feet.
- Default does not need to be changed as long speed on ProGator dash matches speed displaying on automatic rate controller.

4. Press Pro button for Distance Counter.

- This feature measures distance in feet (meters).
- Can be used to verify Speed Sensor Calibration.

5. Press Pro button for Pressure Sensor Installed selection.

Default = YES

- A digital pressure sensor is installed as standard equipment with this control package.
- Do not change default setting.

6. Press Pro button for Pressure Transducer Low Pressure Calibration (P rEF).

Default = 4.00

- Used to calibrate Zero pressure setting of pressure transducer installed in system.
- Pressure transducer used with this controller reads zero pressure at 4.00 mA.
- Do not change default setting.

7. Press Pro button for Pressure Transducer Maximum Rating (P Hi).

Default = 363 psi

- Used to establish maximum rating of pressure transducer in system.
- Do not change default setting.

8. Press Pro button for Flow Sensor Installed.

Default = YES

- A flow meter is installed as standard equipment with this control package.
- Do not change default setting.

9. Press Pro button for Flow Meter Pulses.

Default = 79.0

- Should match the calibration number on the flow meter decal.
- Do not change default setting.

10. Press Pro button for Flow Sensor Minimum Flow Capacity.

Default = 2.5

- Do not change default setting.
- When both a pressure sensor and flow sensor are installed, this controller determines when flow rate has dropped below capacity of flow meter being used, and automatically switches to pressure based regulation. When flow rate once again reaches an acceptable level for

flow meter to regulate, controller automatically switches back to flow-based regulation.

- Controller uses a 16D flow meter and should be set at 2.5 gpm (9.5 l/min).

11. Press Pro button to base regulation mode on Flow or Pressure.

Default = FLO

- FLO - Flow meter will be used to control flow and the pressure transducer will be used only to display actual pressure.
- Option: PRS - Pressure transducer is used to control flow and display actual pressure.
- Control system can be used with either a flow meter, pressure transducer, or both. This step instructs the console which type of sensor is being used to control regulation.

12. Press Pro button to set Nozzle spacing.

Default = 20 inches

- Nozzle spacing should be recorded in inches (cm in Si mode).

13. Press Pro button to enter Number of Nozzle Tips on Boom Section 1.

Default = 4 for 18 or 21 foot boom

- Change to 2 for 15 foot boom.

14. Press Pro button to enter Number of Nozzle Tips on Boom Section 2.

Default = 3 for 18 foot boom

- Change to 5 for 21 foot boom.

15. Press Pro button to enter Number of Nozzle Tips on Boom Section 3.

Default = 4

- Set the same as Boom Section 1.

16. Press Pro button for Liquid Specific Gravity (Density).

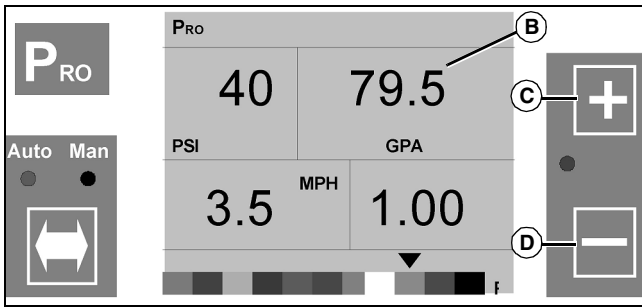
Default = NO

- Change default to YES if entering density
- If yes is selected, after pressing Pro key, a density screen will appear. A “D” will flash at top of console display.
- The default value of 1.00 corresponds with the specific gravity of water and is correct for most pesticide applications. Occasionally, some spray solutions, such as fertilizer, have different densities. If using such a material, a new value should replace default value. Use the following chart to determine specific gravity of other solutions:

Weight of Solution per Gallon	Specific Gravity
7.0 lbs	.84
8.0 lbs	.96
8.34 lbs (water)	1.00
10 lbs	1.20
10.65 lbs (28% N)	1.28
10.85 lbs (30% N)	1.30
11.0 lbs	1.32
12.0 lbs	1.44
14.0 lbs	1.68

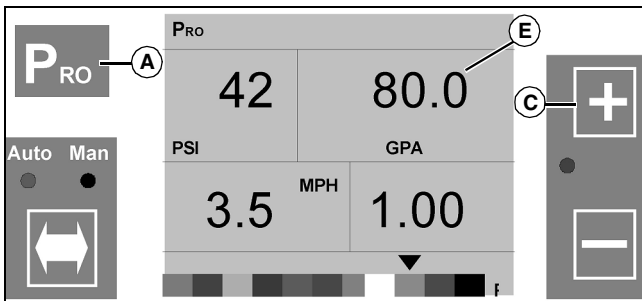
- Use the “+” or “-” key to change value in display. Press Pro key to

OPERATING



MX42334

2. The application rate (B) will flash on the screen, meaning it can now be changed. To change setting, press "+" (C) or "-" (D) button to adjust in 0.01 GPA increments.



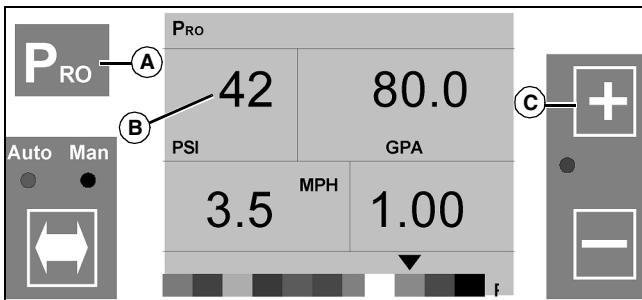
MX42335

3. Press the "+" button (C) to change to 80 GPA (E).

NOTE: The rest of the calculations: pressure, speed, and nozzles are automatically calculated so your application rate is correct. But, you still have the ability to adjust each of these independently. The controller does not store these values, but allows you to look at the rates and change them accordingly.

4. Press Pro button (A) to save the new application rate. This does not store the application rate. To store the application rate, press and hold the Pro button (A) for 2-3 seconds. This stores the application rate and takes you back to the operator screen. Before storing the application rate, follow steps below for verification of settings.

Application Rate Adjustments



MX42335

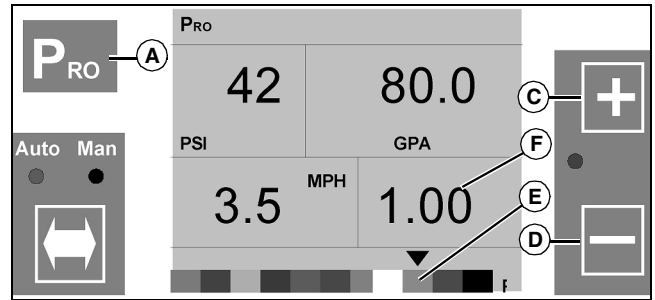
1. Press the Pro button (A) again. You will now see the psi (B) number flashing.

2. You can do the following to verify that your application rate is appropriate:

- Change the pressure to let the controller calculate what speed is required to achieve the desired application rate for a given nozzle and pressure.
- Change the speed to let the controller calculate what pressure is required to achieve the desired application rate for a given nozzle and

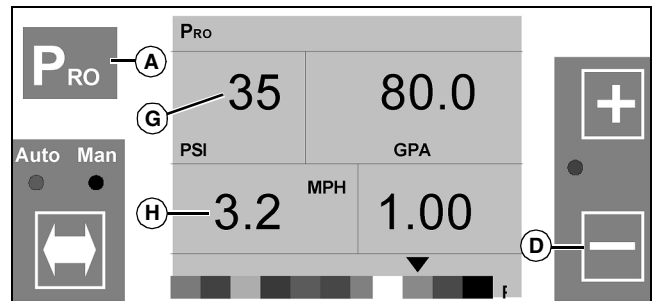
speed.

- Change the nozzle type to determine what pressure is required to achieve the desired application rate for a given speed.



MX42335

3. By pressing the Pro button (A) and the "+" (C) and "-" (D) buttons, you can individually select pressure, speed, or nozzle type to see what must be achieved in each category to reach the desired target application rate. In the example above, we are using the light blue nozzles (E) and 1.00 GPM tips (F).

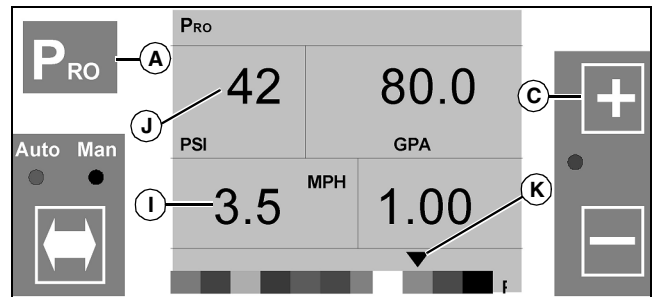


MX42337

4. For example, you may feel that 42 psi is too high of a pressure setting, and you want to change it to 35 psi. While the psi value (G) is flashing, use the "-" button (D) to reduce in 1 psi increments. Notice that the speed (H) also changes as you make this adjustment.

5. You can now press the Pro button (A) to alter machine travel speed. After pressing the Pro button, the machine speed (H) should now be flashing.

NOTE: We have now verified that with a 1.00 GPM light blue nozzle, and 35 psi of spray pressure, you need to slow the machine down to 3.2 mph to apply the correct target rate at the desired pressure. So, as your speed goes up or down, the controller will adjust system pressure accordingly to achieve the target rate.



MX42335

6. Now we will change speed to see its affect on pressure. Press the "+" (C) button adjust speed to 3.5 mph (I). Notice that the pressure (psi) changes to 42 psi (J) as you make this adjustment.

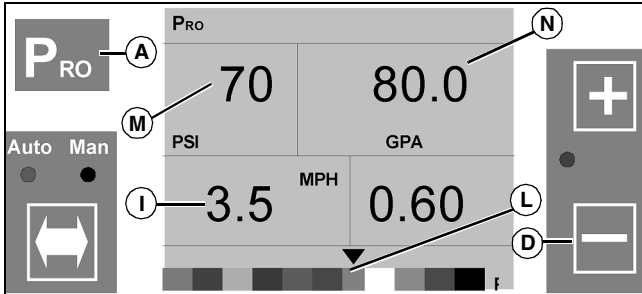
7. Press the Pro button (A) will now allow you to change nozzle type. You should now see the nozzle selector arrow (K) is flashing.

OPERATING

NOTE: We have now verified that with a 1.00 GPM light blue nozzle, and traveling at 3.5 mph, the pressure regulator will need to adjust pressure to 42 psi to apply the correct target rate at the desired speed. If your speed goes up or down, the controller will adjust system pressure to achieve the target rate.

8. Now if you like the 3.5 mph speed, but think the pressure is too low, you have two options: change the application rate or change the nozzle.

NOTE: The nozzle selection setup portion of the setup procedure allows you to determine if you have the correct nozzle for what you are trying to apply.

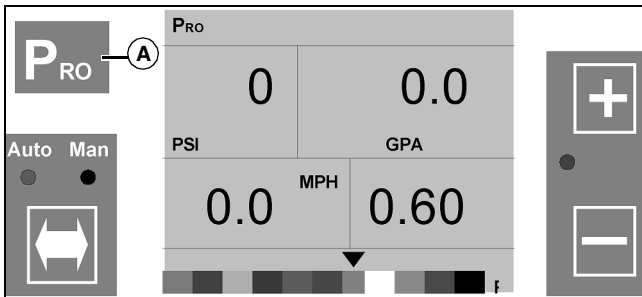


MX42338

9. Use the "-" button (D) to find a nozzle (L) that sprays roughly 70 psi (M) at 3.5 mph (I).

10. Press the Pro button (A) again to go back to the beginning and allow you to adjust your application rate. The application rate (N) should now be flashing.

NOTE: In the operating mode, you will see the actual pressure reading, actual speed reading, and the actual application rate. None of the inputs will be flashing at this time.



MX42336

11. To store your application rate, hold down the Pro button (A) for 2-3 seconds.

Operating the Sprayer

1. If an optional support stand kit is installed, remove the rear jack stand retaining pins and remove the jack stands from the center boom.
2. If an optional eductor kit is installed, close all valves before operating.
3. Turn handle on three-way valve at tank rear to point toward the tank.
4. Fill sprayer tank half full with water.
5. Determine correct travel speed and system pressure for your nozzle type and spray application.
6. Close the inline strainer valve by turning knob counterclockwise.
7. Rotate triple nozzle bodies to select spray tips.
8. Adjust boom height to match spray tip angle, and nozzle to desired spraying angle.
9. Lock ProGator park brake and start engine.
10. Engage ProGator PTO.

11. Set ProGator to desired RPM.
12. Diaphragm pump only: Turn green knob on valve to set relief pressure at 200 psi.
13. Turn yellow knob on agitator valve to adjust tank agitation as desired.
14. Program your application rate with the automatic rate control box.
15. Set automatic rate control box to Manual Control.
16. On the control box, move desired boom section switches to the ON position.
17. Turn control box master boom switch to ON position.
18. Use pressure control on the control box to set system pressure.
19. Adjust throttling valves.
20. Turn control box master boom switch to OFF position.
21. Load chemical in tank manually or by using optional eductor.
22. Fill tank to desired water level.
23. Set automatic rate control box to Auto Control.
24. Maintain proper travel speed.
25. Turn control box master boom switch to ON position.

Stopping the Sprayer

1. Turn master boom switch to OFF position.
2. Disengage ProGator PTO.

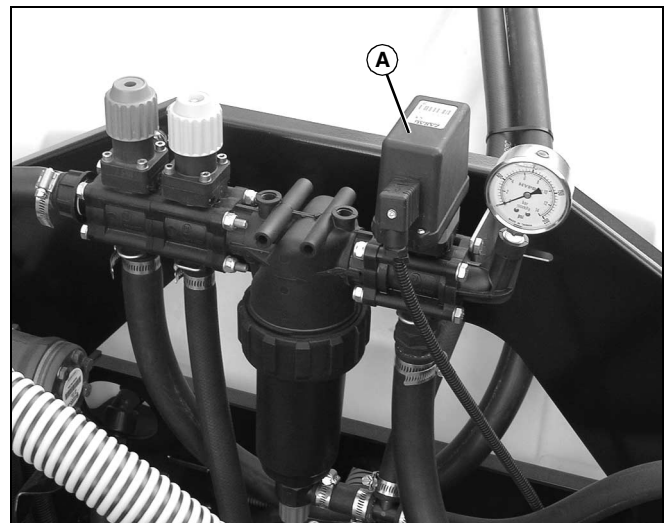
Adjusting System Pressure

For proper performance, system pressure should be adjusted to match nozzle type in use.

When the sprayer is being operated, system pressure will be read on the dash control panel.

Adjust system pressure as needed:

- Press up "+" with pressure control on control panel to increase pressure.
- Press up "-" with pressure control on control panel to decrease pressure.



MX42195

NOTE: If there is no pressure indication or an inaccurate indication on the gauge, the pressure gauge tube and/or isolator may need to be bled.

Pressure regulating valve (A) at rear of sprayer should not be tampered with.

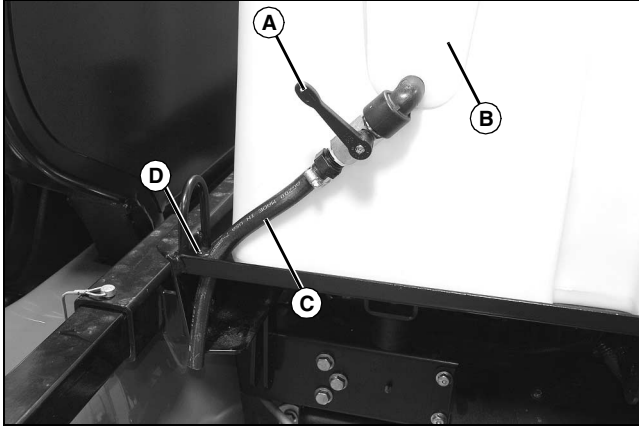
OPERATING

Using the Personal Wash Tank



CAUTION: Avoid injury! Never fill wash tank with anything other than fresh water for rinse/wash purposes.

Do not drink from this container. Fluids contained inside may be contaminated.



MX42618

1. Close spigot valve (A).
2. Clean area around fill cover.
3. Remove fill cover.
4. Fill wash tank (B) with clean water.
5. Install fill cover.
6. Remove hose (C) from hole (D) in sprayer frame.
7. Open spigot valve.
8. Wash as required and close spigot valve.
9. Return hose to hole in sprayer frame.

Filling and Draining Sprayer Tank

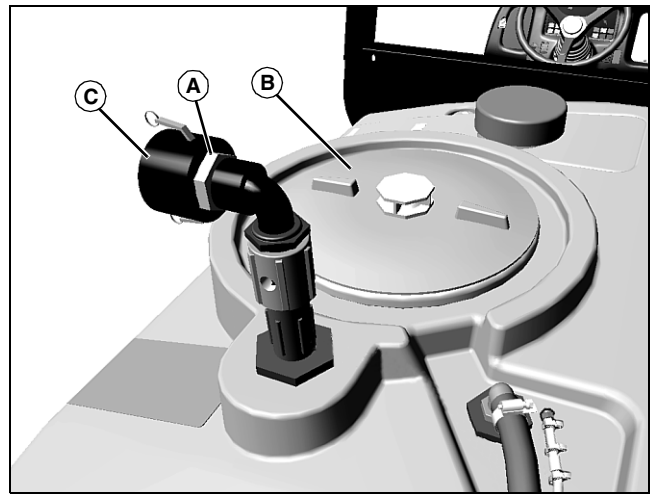
Filling the Tank



CAUTION: Avoid injury! Chemicals can be dangerous. Avoid injury to operator or bystanders:

- Read chemical container label for mixing and handling instructions. A Material Safety Data Sheet (MSDS) should be supplied by the chemical dealer and provides proper safety information.
- Wear proper clothing and safety equipment while handling or applying spray chemicals.
- Wear a full covering of clothing, protective goggles and rubber gloves.
- Prohibit all smoking, drinking, and eating around chemicals.
- When filling tank, never allow end of water hose to contact chemical mixture.

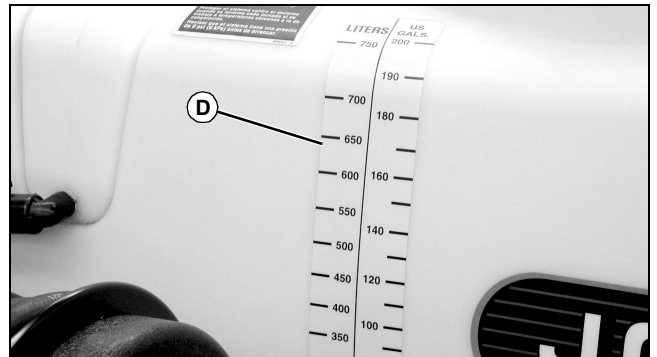
1. Park machine safely.



MX19920

2. Select quick-connect coupler (A) or fill port (B) for filling.
3. Clean the fill area to prevent tank contamination.
4. Remove dust cap (C) from quick-coupler, connect to 1 in. fitting.

NOTE: Follow chemical manufacturer's mixing instructions on container label for proper proportions and application rates.



MX17910

5. Fill tank with proper amount of chemical and mix with clean water. Use fill marks (D) for approximate measurement.

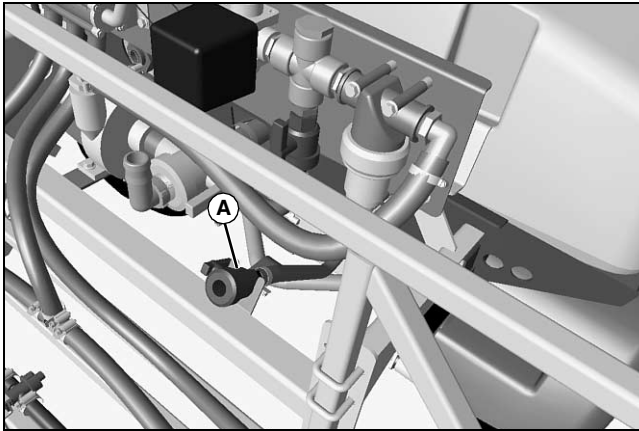
Draining the Tank

IMPORTANT: Avoid damage!

- Proper disposal of excess spray is very important. Dilute it with water and apply it to area previously treated.
- Never dump excess into a storm drain or near a lake or stream.

1. Park machine safely on a surface that can not be damaged by chemicals. Do not park near a storm drain, lake, or stream.
2. Rinse interior of tank as needed.

OPERATING



MX19961

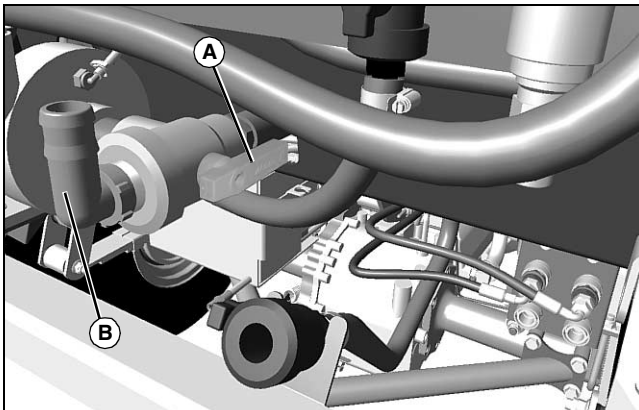
3. Place container under drain hose (A) at the rear of the sprayer.
4. Remove hose from retaining cradle.
5. Turn valve handle to align with hose to open valve.
6. Allow tank to drain completely.

IMPORTANT: Avoid damage! Avoid damage to pump. Turn valve handle so that it faces perpendicular to hose after draining tank.

7. Turn valve handle 90° so handle points perpendicular to hose to close valve.
8. Secure hose in retaining cradle.
9. Properly dispose or rinse water.

Using Three-Way Valve

IMPORTANT: Avoid damage! Before operating sprayer, always make sure that arrow on handle (A) of three-way ball valve is pointing toward tank, as shown. The pump will be severely damaged within a few minutes if it is run dry.



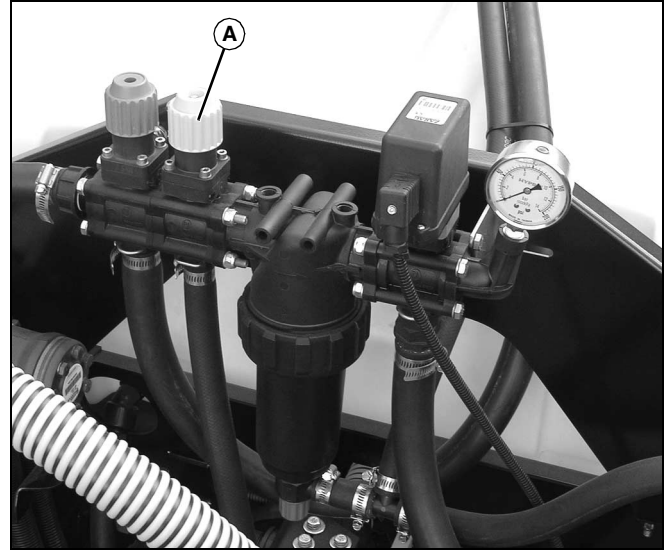
MX19936

- Turn handle (A) so arrow points toward tank to pull liquid from tank when operating the sprayer.
- Turn handle so arrow points away from tank to pull liquid from port (B) when optional rinse tank is installed.
- No liquid is going into pump when three-way valve handle is in the vertical position.

Using the Agitator

The agitator provides continuous agitation to prevent separation of spray tank mixture. It is recommended to use agitator whenever operating sprayer.

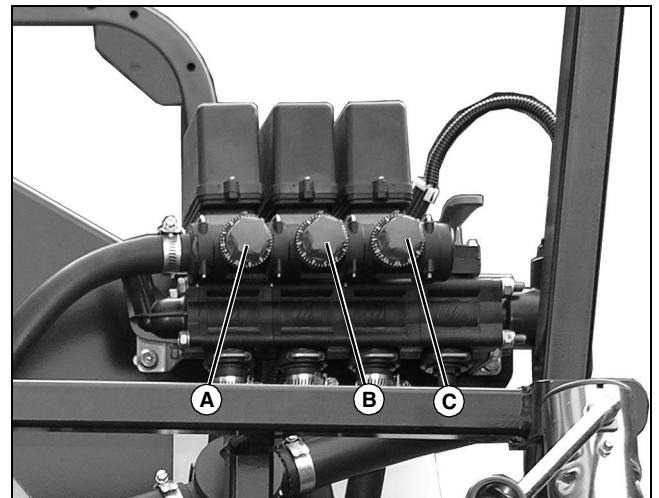
1. Shut sprayer OFF.
2. Park machine safely.



MX42195

3. Turn knob (A) on agitator valve counterclockwise to open and set desired agitation rate.
4. Resume normal spraying operations.
5. To stop agitator:
 - a. Shut sprayer OFF.
 - b. Park machine safely.
 - c. Turn knob on agitator valve clockwise to the closed position.

Adjusting Throttling Valves



MX42194

1. Turn all three throttling valve knobs: left (A), center (B), and right (C) clockwise to "0" (off position).

OPERATING

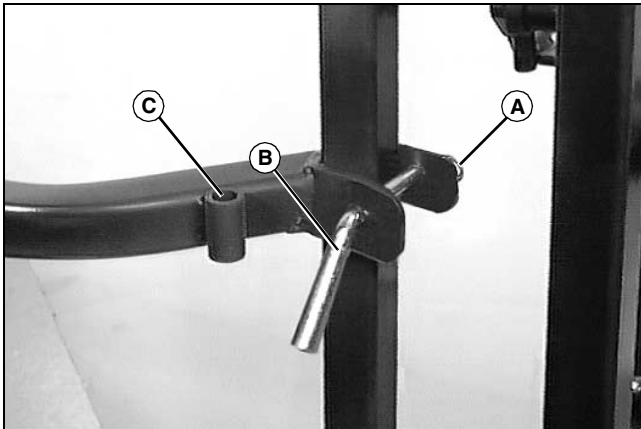
NOTE: If you have an automatic rate control box, you must set that to manual control in order to do this procedure.

2. Go to front of machine and turn all three boom valves on (using the manual control box or automatic rate control box).
3. Turn on master control on (using the manual control box or automatic rate control box).
4. Make note of the operating spray pressure at the control box.
5. At the control box in front, turn off right boom section.

NOTE: When turning off a boom section, operating spray pressure will now increase.

6. Adjust right throttle valve knob (C) to obtain operating spray pressure noted earlier.
7. At the control box in front, turn on right boom section, and turn off the center section.
8. Adjust the center throttle valve knob (B) to obtain operating spray pressure noted earlier.
9. At the control box in front, turn on center boom section, and turn off the left section.
10. Adjust the left throttle valve knob (A) to obtain operating spray pressure noted earlier.
11. After all three boom sections have been turned off and on, you should be able to quickly check each throttling valve setting, by turning off any of the three boom sections and the operating spray pressure should remain the same.

Using Boom Wings



MX30056

1. Remove spring locking pins (A) and drilled pins (B).
2. Secure pins in storage tubes (C).

IMPORTANT: Avoid damage! Do not operate sprayer with boom wings in raised position.

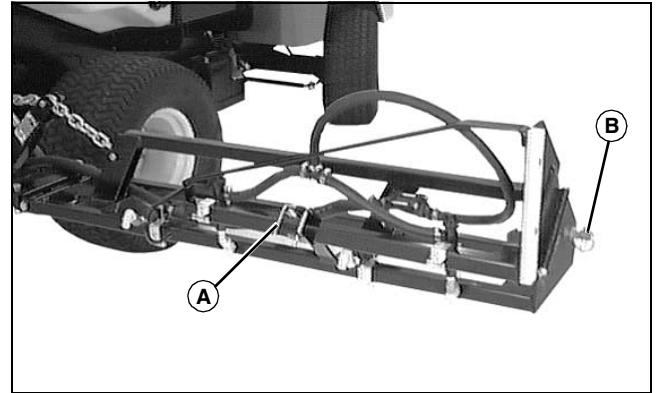
When boom wings are in raised position and ready for transport, make sure drilled pins and spring locking pins are installed to secure wings.

3. Raise or lower boom wings by moving left and right boom wing switches to RAISE or LOWER position until boom wings are at desired height.

Using Boom Wing Extensions (15-21 Foot Boom Only)

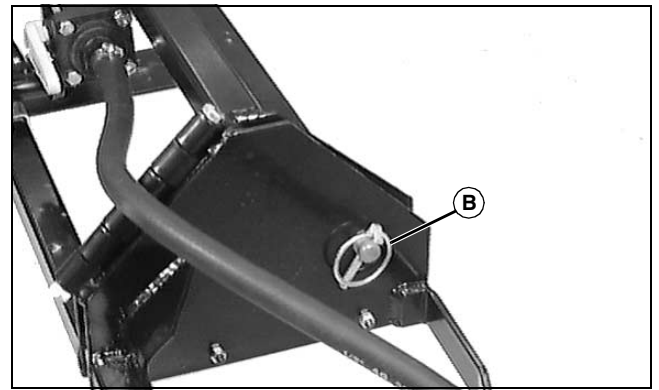
NOTE: When extensions are not in use, secure pins in the original locations and close ball valves.

1. Lower boom wings to operating position.



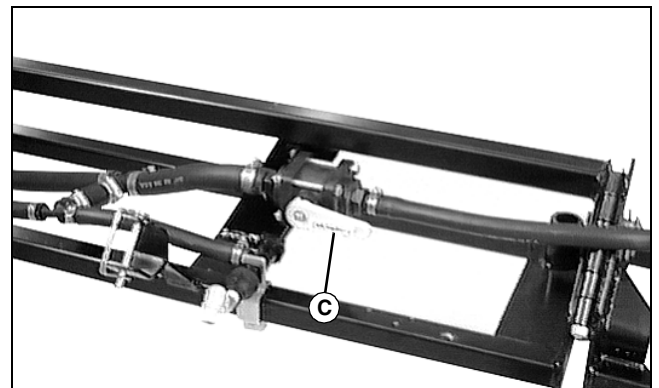
MX19966

2. Remove wire lock pin (A) and quick-lock pin (B).



M88203a

3. Unfold boom wing extension and install quick-lock pin (B).



MX19965

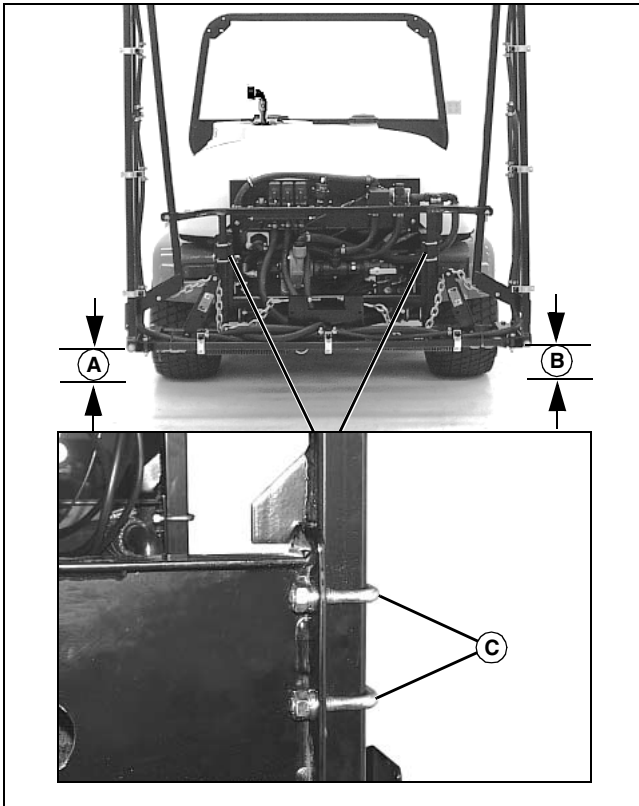
4. Turn ball valve handle (C) to:
 - Horizontal OPEN position for spraying.
 - Vertical CLOSED position when boom wing extensions are folded and not in use.
5. Install wire lock pin (A).

OPERATING

Adjusting Boom Level and Height

NOTE: Machine must be on flat level surface for adjusting boom level and height.

1. Park Machine Safely.
2. Check machine tires for correct and equal pressures.
3. Fold and lock boom wing extensions, if equipped.
4. Raise and lock boom wings.

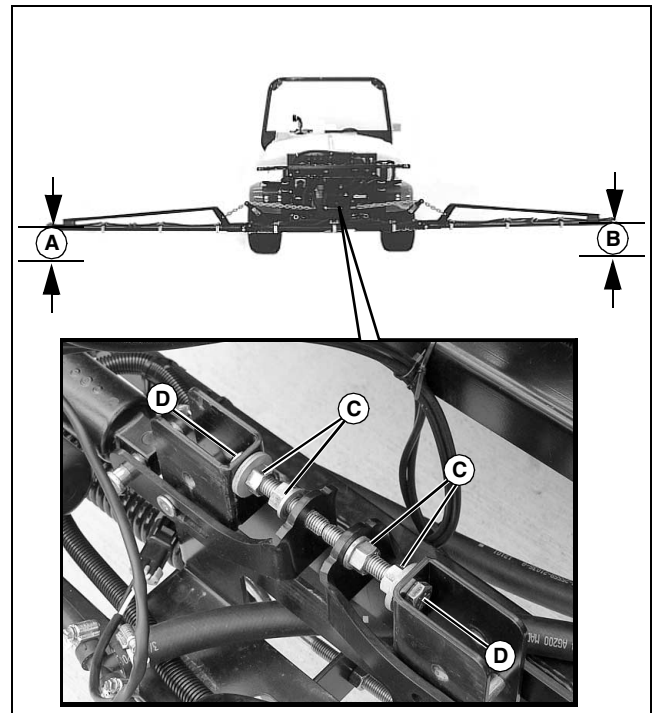


MX19962/MX2965a

5. Measure between ground level and each end of center boom section. Measurements (A) and (B) should be the same and a minimum of 38 cm (15 in.).
6. If ends are not level or height adjustment is desired, adjust boom:
 - a. Support center boom section evenly with a safe hoist or floor jack.
 - b. Loosen four U-bolts (C) and adjust center boom section so each end is at equal height.
7. Tighten four U-bolts completely.
8. Remove lifting device from center boom.
9. Level boom wings. (See Leveling the Boom Wings.)

Leveling the Boom Wings

1. Level center boom section.
2. Lower boom wings to operating position.



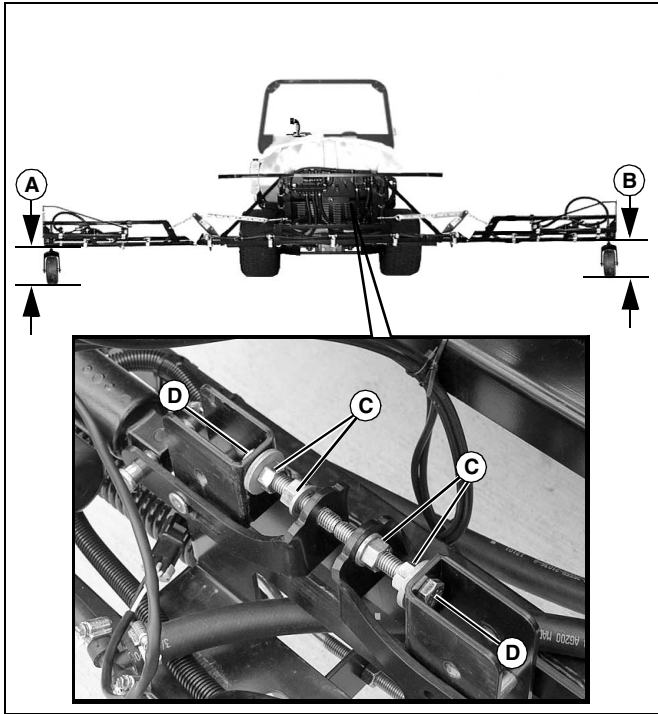
MX19963/MX42624

3. Measure between ground level and end of boom wings. Measurements (A) and (B) should be the same and equal to center boom section measurement.
4. To adjust boom wing level:
 - a. Loosen nuts (C).
 - b. Tighten or loosen bolt (D) to raise or lower end of boom wing.
 - c. Tighten nuts (C) completely.

Leveling Boom Wings with Ground Wheels (If equipped)

1. Level boom.
2. Remove lock pins from booms, and wings, and lower completely.

OPERATING



MX19963/MX42624

3. Measure between ground level and end of boom wings. Measurements (A and B) should be same and equal to center boom section measurement.

4. To adjust boom wing level:

- Loosen nuts (C).
- Tighten or loosen bolt (D) to raise or lower end of boom wing.
- Tighten nuts (C) completely.

Raising and Lowering ProGator Cargo Box

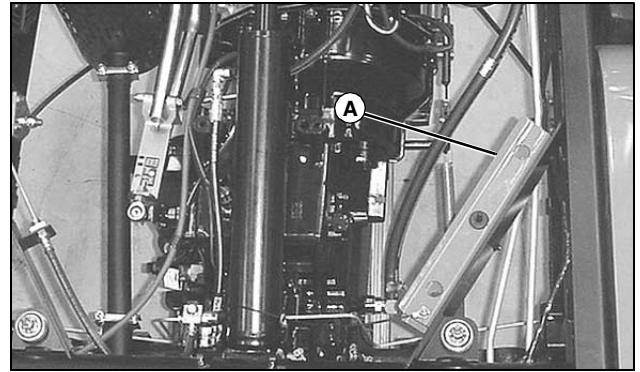
- Park vehicle safely. (See Parking Safely in the Safety section.)
- Follow instructions in Filling and Draining Sprayer Tank to drain the tank fluid to a level below the lowest fill mark on the tank before raising the cargo box.
- Follow instructions in your ProGator Operator Manual to raise and lower the cargo box.



CAUTION: Avoid injury! Attachment is heavy and can crush.

- Support any raised attachment with a mechanical lock or other safe method before servicing.
- Empty all material from any attachment before servicing.

4. Install the machine safety support before servicing:



MX14992

a. Remove safety support (A) from stored position in the rear of the vehicle on the right side.



MX14982

b. Install safety support onto the lift cylinder rod (B). Be sure the lift cylinder rod is seated properly between the safety support rubber grommets (C).

5. Remove the safety support before lowering the cargo box.

Transporting

IMPORTANT: Avoid damage! Be aware of sprayer height and width dimensions at all times during transport.

- If installed, move eductor to transport position.
- To safely empty tank, dilute and spray excess chemicals.
- Park machine safely.
- Rinse and drain sprayer tank.
- If equipped, fold and lock boom wing extensions in folded back position.
- Raise and lock boom wings in upright position.
- Attach caution flags to booms if required.

OPTIONAL ATTACHMENTS & KITS

Optional Attachments & Kits

Using Eductor

Operating and Transport Positions

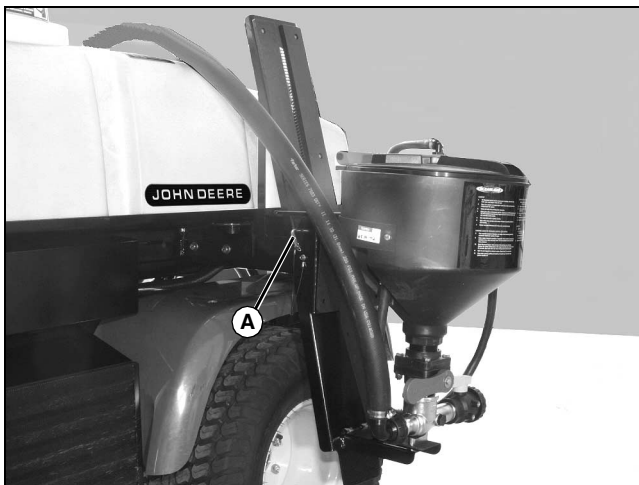
IMPORTANT: Avoid damage! Move eductor to operating position before loading chemical.

Empty chemical from eductor before raising eductor to transport position.



MX42438

1. To move hopper into the operating position, rotate and remove latch lock pin (A).
2. Pull latch (B) toward hopper to release elevating platform from bracket (C) and lower platform to operating position for loading hopper.

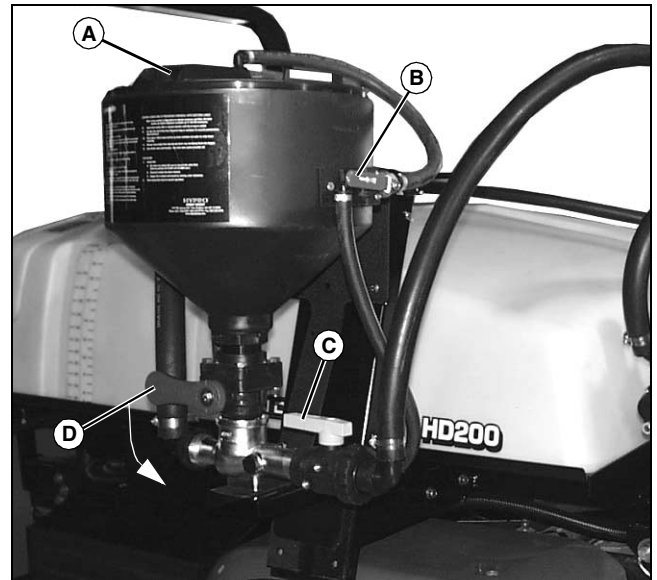


MX42439

3. Store latch lock pin (A) in storage position.
4. When moving or transporting machine, return elevating platform to raised (transport) position and install latch onto bracket and lock into raised position with lock pin.

Startup

NOTE: All valves must be closed prior to starting: inlet valve (C), hopper valve handle (D), and rinse tank valve (A).



MX42192

- A- Tank Lid
- B- Valve, Tank Rinse (Red Handle)
- C- Valve, Inlet (Yellow Handle)
- D- Valve, Hopper (Blue Handle)

1. Open tank lid (A) to check for foreign objects which may hinder performance or contaminate the system.
2. Close and lock lid by turning cover clockwise.
3. Divert pump flow to inlet line, by turning inlet valve handle (C) horizontally. A pressure of 30 psi minimum and 150 psi maximum must be used.
4. Open hopper valve handle (D) by rotating handle downward to the vertical position.
5. Unlock and open lid slowly by turning cover counterclockwise.

Loading Chemicals into Hopper

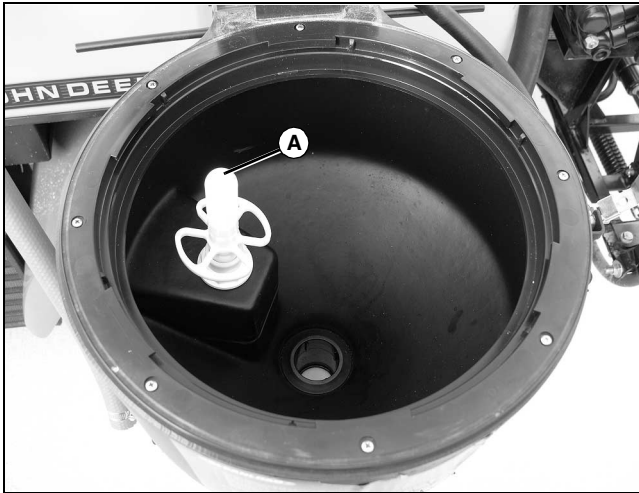


CAUTION: Avoid injury! Chemicals can be dangerous. Avoid injury to operator or bystanders:

- Read chemical container label for mixing and handling instructions. A Material Safety Data Sheet (MSDS) should be supplied by the chemical dealer and provides proper safety information.
- Wear proper clothing and safety equipment while handling or applying spray chemicals.
- Wear a full covering of clothing, protective goggles and rubber gloves.
- Prohibit all smoking, drinking, and eating around chemicals.
- When filling tank, never allow end of water hose to contact chemical mixture.

1. Open tank lid. Pour required amount of chemical into hopper. Avoid splashing liquids or powdered chemicals outside of hopper.

OPTIONAL ATTACHMENTS & KITS



MX42224

2. Rinse empty chemical containers if applicable. Place container opening over container rinse valve (A) and press down. This will activate the rinse valve and rinse container.
3. Rinse the hopper. Close and lock lid by turning cover clockwise. Release the safety locking band on the hopper tank rinse valve (red handle) and turn on for 20 seconds. Close ball valve and return locking band to locked position.
4. Open lid and inspect for chemical residue. Repeat as necessary.
5. Close hopper valve.

Loading Chemical with Optional Suction Lance

NOTE: Lance suction is dependent upon eductor pressure and flow. For best results, use highest pressure available up to 150 psi maximum.

1. Insert lance body with O-ring into eductor until the O-ring is sealed.
2. Use the free end of the lance to pierce bag or container to vacuum powdered or liquid chemical.
3. Rinse lance. Place lance end into a clean container of water to rinse lance assembly.
4. Remove lance body from eductor and drain any remaining fluid into hopper.
5. Close hopper knife valve. Turn inlet ball valve off.

Shutdown

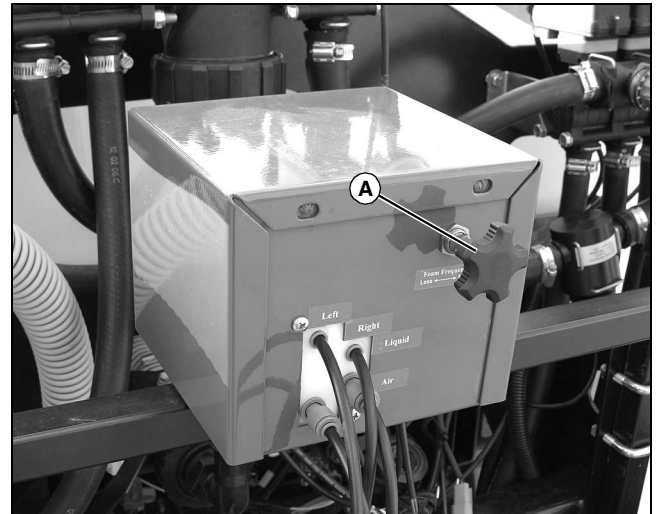
1. Ensure that:
 - All valves are closed. Be sure to close hopper valve first.
 - Chemical residue has been cleaned.
 - Hopper lid is closed and locked by turning cover clockwise.
2. Divert pump flow back to normal operation.

Using Foam Marker

Operating Foam Marker

1. Prepare solution in foam marker tank.
2. If equipped, lower right and left boom wings and extensions.
3. With engine running, move control box foam marker switch to LEFT or RIGHT position. Foam output should appear from foam nozzle on selected side.
4. Move foam marker switch to OFF position when done marking.

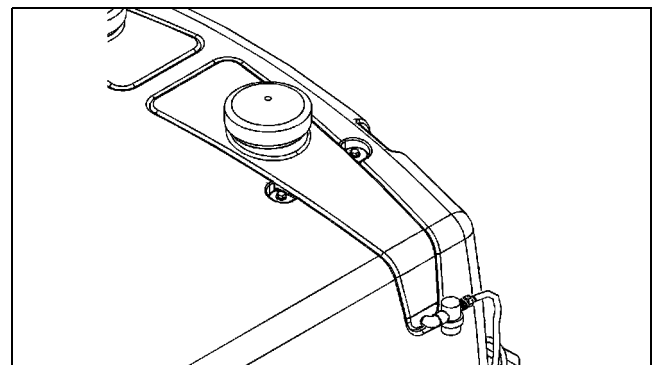
Adjusting Foam Marker



MX42186

Use knob (A) to adjust relative mixture of air and liquid (foam concentrate). This mixture ration will determine size of foam mark being dropped.

Preparing Foam Marker Solution



MX3603

Selecting Concentrate

Always use high quality foam concentrate. Be aware many poor quality foam concentrates are sold. Some concentrates may work well in some conditions but not others. Ask your John Deere dealer for recommendations.

Mixing Solution

NOTE: Mixing solution too strong can result in foam being too stiff. Although foam quality may appear good, the marker may seem to stall with little foam output. If this occurs, dilute mixture with water.

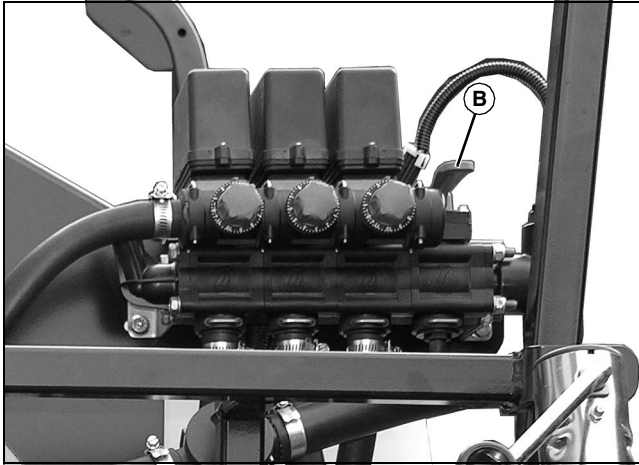
Follow these guidelines when mixing solution:

- Always follow directions on product label.
- Always use clean water. If your water has high mineral content, it is advisable to add a water conditioner.
- Always add concentrate to water and not water to concentrate.
- When topping off foam marker tank with a water hose, place end of hose in under liquid surface to prevent agitation and foam formation in tank.
- If foam appears watery, it may require additional concentrate or a water conditioning agent. Experiment to determine correct mix for your application.

OPTIONAL ATTACHMENTS & KITS

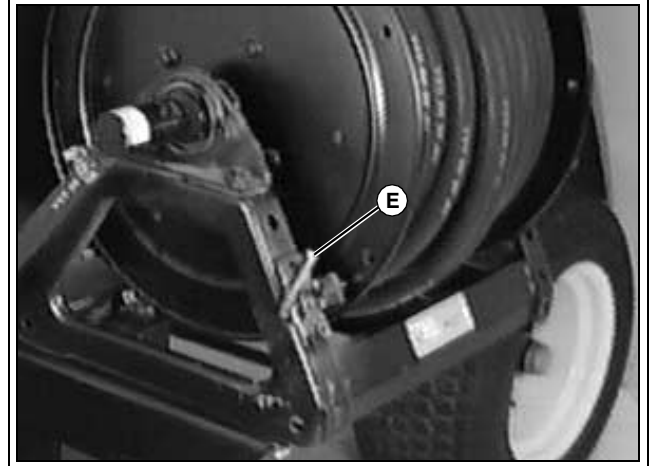
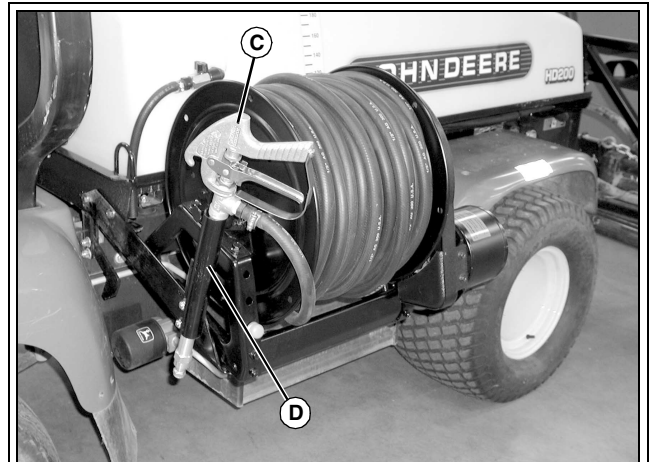
Using Manual and Electric Hose Reels

1. Park machine safely.
2. Move boom master switch down to off position.
3. Move machine PTO control lever to start operation of sprayer pump.
4. Set machine at desired RPM using optional throttle/governor control if installed. If necessary, adjust system pressure using pressure switch on control panel.
5. Leave engine running and dismount machine.



MX42194

6. Place hose reel valve lever (B) at rear of sprayer in ON position:
 - ON position - with lever in raised or upper position, liquid supply to hose reel is turned on.
 - OFF position (shown) - with lever in lower or down position, liquid supply to hose reel is turned off.



MX17908, M92781

Picture Note: Top picture shows electric hose reel, bottom picture shows manual hose reel.

7. Remove handgun (C) from storage tube (D).
8. Remove desired length of hose from reel.
 - Manual Hose Reel: Pull out and move reel lock (E) to UNLOCKED position (shown) so reel spins freely. Pull hose off reel.
 - Electric Hose Reel: Pull hose off reel.

Using Rinse Tank

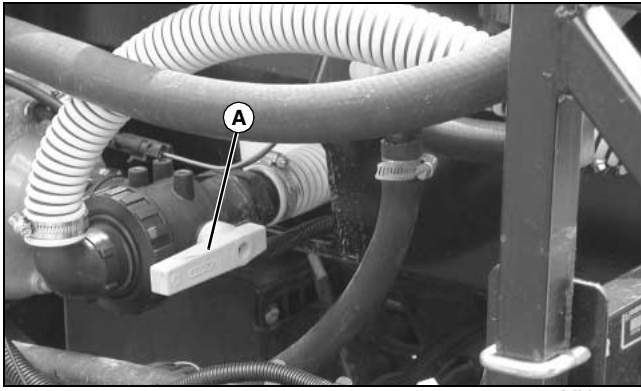
Filling Rinse Tank

1. Make sure the three-way valve handle is in the vertical position.
2. Fill rinse tank with clean water.

Operating

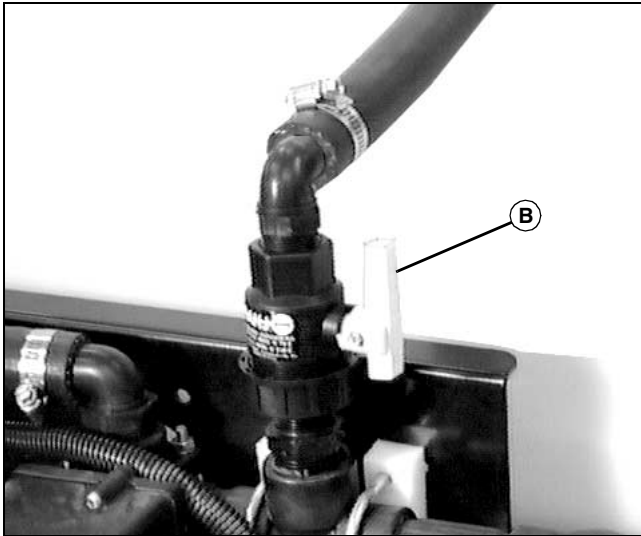
1. Stop machine on a level surface, not a slope.
2. Place gear shift lever in NEUTRAL.
3. Lock machine park brake.

SERVICE



MX17741

4. Move three-way valve handle to the rear position (A). In this position water from the rinse tank will be flowing to the inlet of the pump.



M92238

5. Move ball valve handle (B) to open:

- OPEN position - with ball valve handle in the vertical position, pressurized rinse water will flow to the tank rinser located inside the main sprayer tank.
- CLOSED position - with ball valve handle in the horizontal position, rinse water will not flow.

6. Engage PTO to start pump.

7. Run pump as needed. Do not run pump dry; once all clean water has been used, disengage PTO to stop pump.

Service

Service Intervals - Standard Equipment

Before Each Use

- Check and clean inline strainer.
- Check and clean suction strainer (if equipped).
- Check machine hydraulic fluids.
- Check sprayer tank for damage or internal debris.
- Check connections for leaks.
- Check contents in sprayer tank.

After Each Use

- Drain and rinse tank, boom lines, nozzles, and hose reel (if equipped).

As Needed

- Adjust boom wing flexible joint spring tension.
- Bleed controller pressure gauge and/or isolator.
- Check and clean personal wash tank cover vent.

Annually

- Lubricate boom wing pivot joints.
- Diaphragm pump: replace diaphragms and change oil.
- Inspect and replace nozzles.

Service Intervals - Optional Equipment

After Each Use

- Drain and rinse chemical eductor.

As Needed

- Clean foam marker tank outlet strainer.
- Check and clean foam marker tank cover vent.
- Lubricate manual hose reel tension brake area.
- Lubricate jack stands.

25 Hours

- Lubricate ground wheels.

50 Hours

- Clean foam marker cabinet using compressed air.
- Lubricate hose reel swivel fittings.

Annually

- Replace foam marker pump tube/hose.

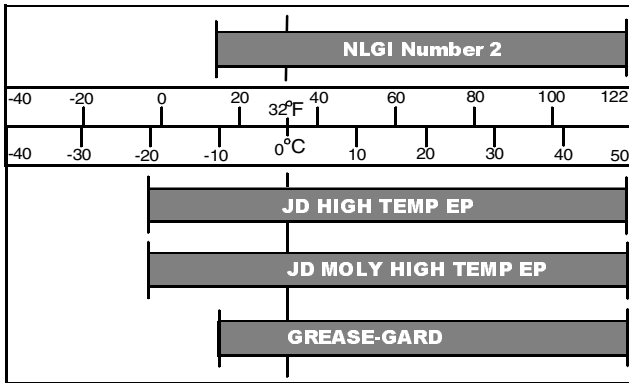
Replacement Parts

ITEM	PART NUMBER
Diaphragm Pump Replacement Kit	TCA19675
Foam Marker Pump Tube/Hose	TCU27170
Extended Range Flat-fan Style Nozzle Package	BM19256
Flood Style Nozzle Package	BM19335
Low Drift Nozzle Kit	VGB10129

(Part numbers are subject to change without notice. Part numbers may be different outside the U.S.A.)

SERVICE

Grease



Use grease based on NLGI consistency numbers and the expected air temperature range during the service interval.

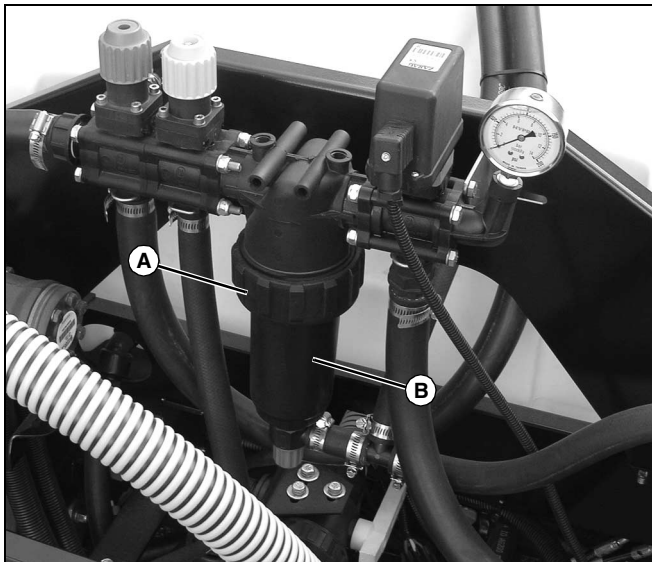
The following greases are preferred:

- John Deere Moly High Temperature EP Grease.
- John Deere High Temperature EP Grease.
- John Deere GREASE-GARD™.

Other greases may be used if they meet the following:

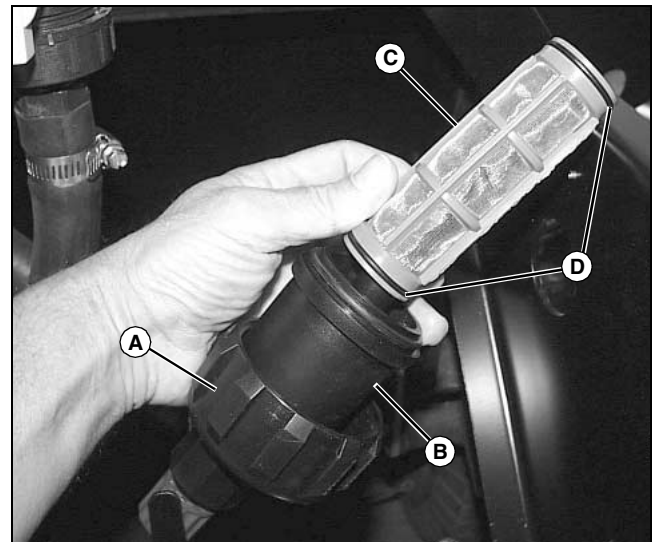
- SAE Multipurpose EP Grease with 3 to 5 percent molybdenum disulfide.
- SAE Multipurpose EP Grease.
- Greases meeting Military Specification MIL-G-10924C may be used as arctic grease.

Servicing the Inline Strainer



MX42195

1. Unscrew large nut (A) and remove canister (B) at rear of sprayer and lower it to access the strainer. Do not disconnect the hose attached to the bottom of the canister.

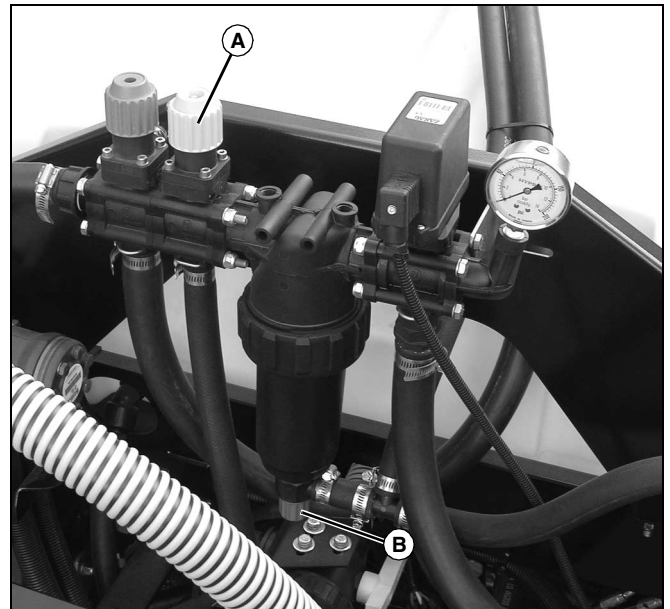


MX19934

2. Remove strainer (C) from canister (B).
3. Clean or replace strainer and O-rings (D) as needed.
4. Install strainer and canister and secure with large nut (A).

Backflushing the Inline Strainer

1. Shut sprayer OFF.
2. Shut OFF all boom switches.



MX42195

3. Turn knob (A) on agitator valve clockwise to the closed position.
4. Open strainer valve by turning knob (B) clockwise.
5. Turn ON sprayer to clean strainer.
6. Shut sprayer OFF and close strainer valve by turning knob counterclockwise.

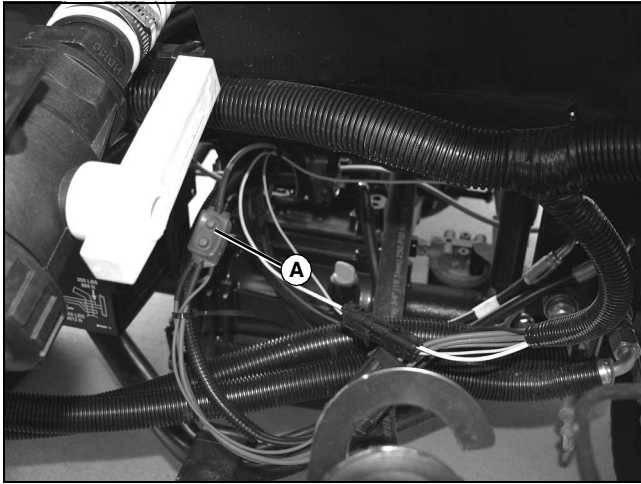
Verifying Sprayer Output

Operate the sprayer at desired pressure and collect flow from at least two spray tips, comparing collected to expected output (gpm).

SERVICE

- Replace spray tips if two or more exceed the expected output by 10% or more.

Checking Main Circuit Breaker



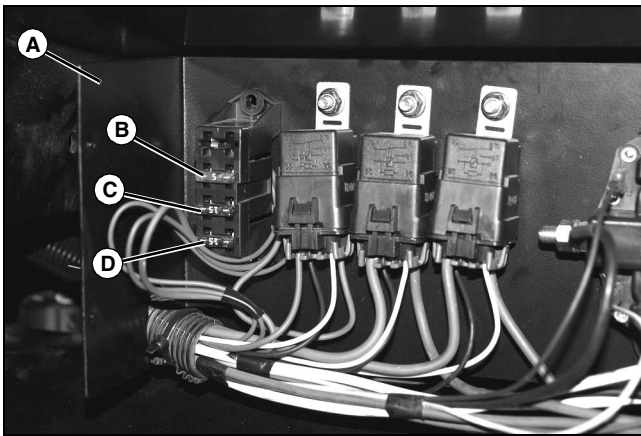
MX42332

The front wiring harness is equipped with 40 amp automatic reset circuit breaker (A) to protect the sprayer electrical system.

In event of electrical overload, the circuit breaker will trip OPEN. It will automatically reset only when electrical load has been removed from circuit.

If circuit breaker does not automatically reset, there is a direct short in main wiring harness. See your John Deere dealer.

Checking Fuses and Boom Wing Actuator Circuit Breaker



MX42331

1. Remove side cover from wiring panel (A).

NOTE: To prevent accidental loss of fuses/circuit breaker during operation, secure to fuse block with a strip of electrical tape or equivalent.

2. Locate fuse block near sprayer control panel.

- (B) 5 Amp (optional accessories)
- (C) 15 Amp (optional foam marker)
- (D) 15 Amp (solenoid valves)

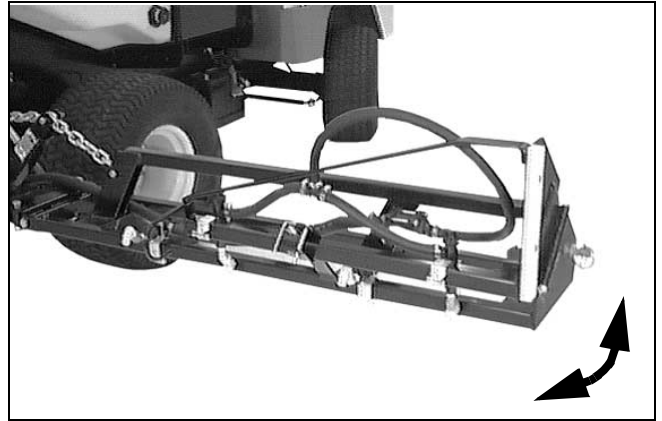
3. Check and replace bad fuses or circuit breaker as needed with new fuses or circuit breaker of same amperage rating. If new fuse or circuit breaker blows, there is a short-to-ground in sprayer wiring harness. See

your John Deere dealer.

Adjusting Boom Wing Spring Tension

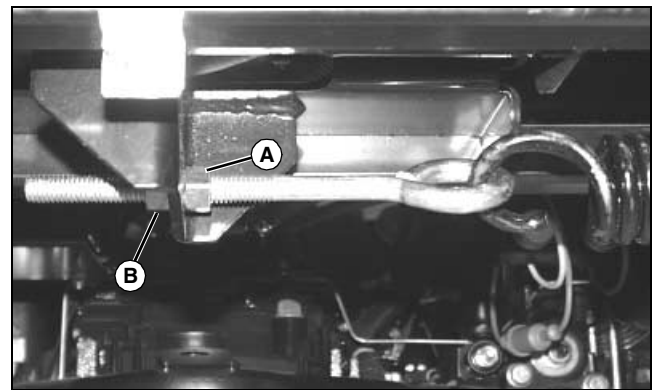
NOTE: More spring tension will be required if optional gage wheels are being used.

1. Ensure boom wing pivot joints are lubricated.
2. Put boom wings in lowered position.



MX19966

3. Move end of right boom wing toward front or rear to simulate hitting an object. Boom wing should firmly snap back to its normal operating position.



MX2971

4. Tighten hex nut (B) until spring coils start to separate creating tension. Then tighten nut (A). This should provide the proper amount of spring tension on boom wing flexible joint. If spring is too tight, booms will be hard to break away correctly. If spring is too loose, booms will vibrate when driving. If more or less spring tension is desired:

- Increase spring tension - Loosen nut (A), then tighten nut (B) completely.
- Decrease spring tension - Loosen nut (B), then tighten nut (A) completely.

5. Repeat for other boom wing.

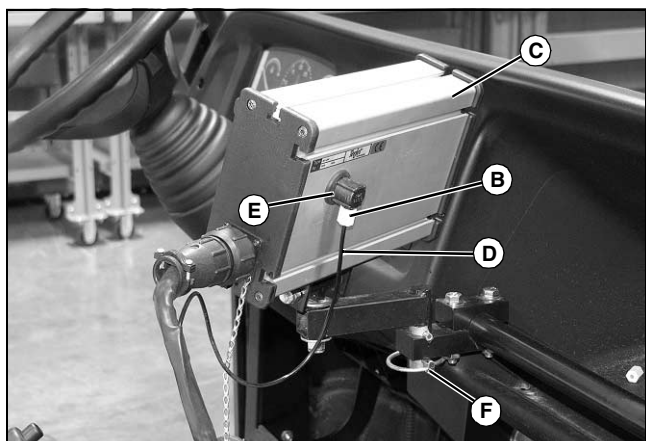
SERVICE

Bleeding the Manual Control Box Isolator and Pressure Gauge Tube



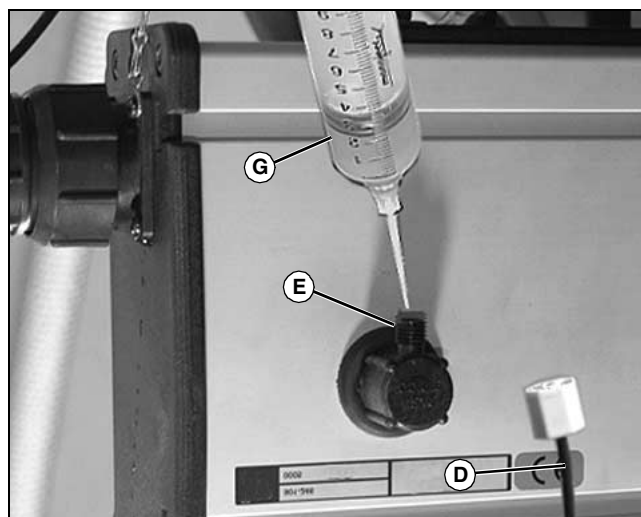
MX42660

1. Loosen isolator bleed screw (A). Do not remove it from the isolator completely.



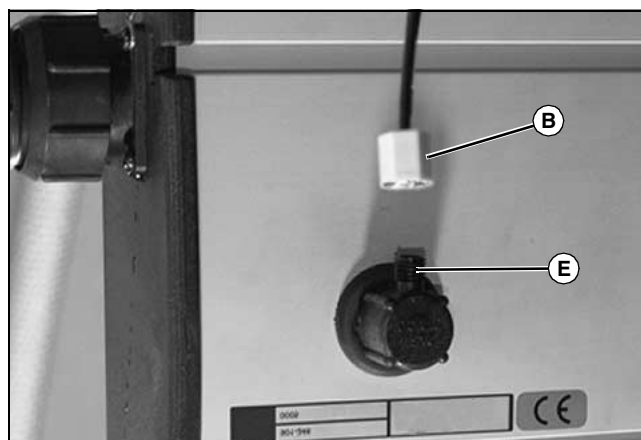
MX42657

2. Loosen the line nut completely (B) on rear of control box (C) and remove the pressure tubing (D) from the gauge port (E).
3. Remove the quick-lock pin (F) and wave washer and lift the control box from its mount.



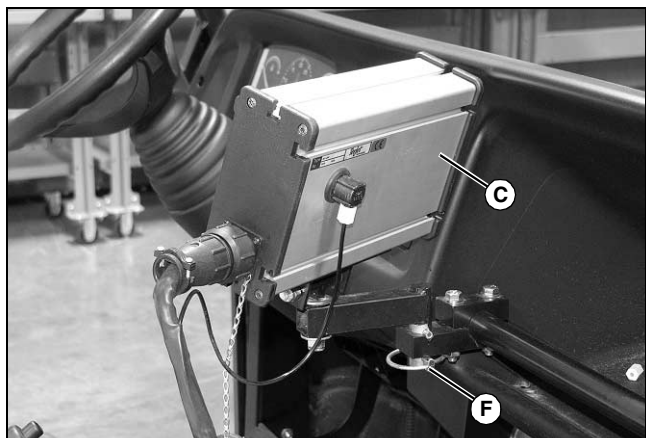
M42661

4. Turn control box upside down. Use a syringe (G) to fill the gauge port (E) with RV antifreeze.
5. Hold the end of the pressure line (D) above the level of the isolator bleed screw (A) on the rear of the unit. Use the syringe to fill the pressure line with RV antifreeze. Add antifreeze until all air is purged from the system.
6. Tighten the bleed screw (A) on the isolator completely.



MX42662

7. Connect the line nut (B) to the gauge port fitting (E) before returning the box to its upright position.



MX42657

8. Install the control box (C) on its mount and secure with wave spring and quick lock pin (F).

Servicing the Diaphragm Pump

Park machine safely on a firm, level surface away from floor drains, ditches, or streams.



CAUTION: Avoid injury! Vapors from solvents can be explosive and flammable. Follow the instructions on the container label for safe use of the solvent:

- Work in a well-ventilated area.
- Wear protective clothing when handling solvent.
- Do not smoke while handling solvents.
- Keep solvent away from flames or sparks.

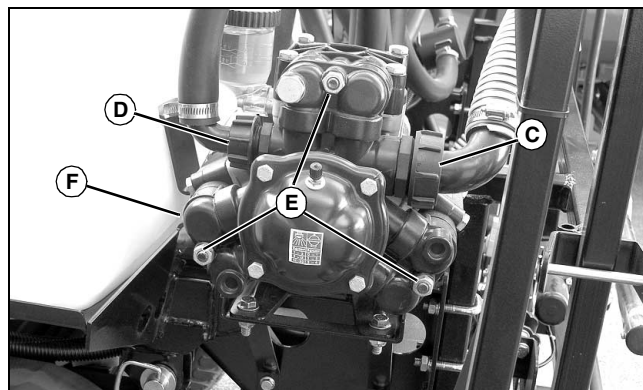
NOTE: This pump requires a high grade non-detergent SAE 30W oil. See your John Deere dealer for oil.

Valve Inspection and Replacement



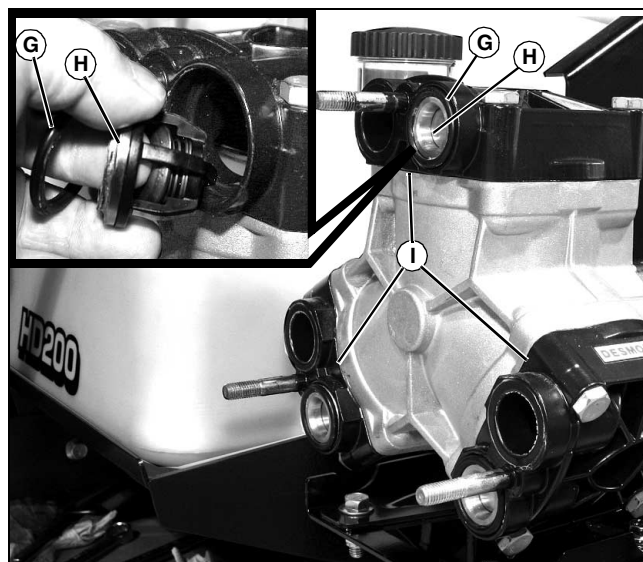
MX42664

1. Close tank valve (A) if product remains in tank. Rotate valve handle 180 degrees to point toward auxiliary inlet (B).
2. Flush pump thoroughly with clear water through auxiliary inlet port. Drain to a properly labeled container.



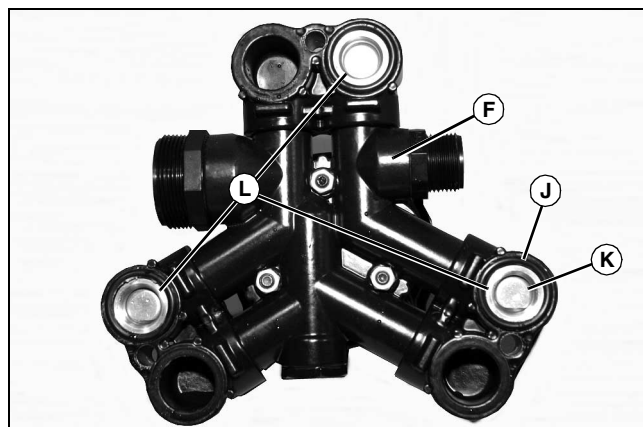
MX42665

3. Loosen pump inlet (C) and outlet (D) elbow nuts and remove hose and elbow assemblies from pump. Secure hoses away from pump.
4. Remove three M10 hex nuts (E) securing manifold assembly (F) to pump heads. Remove manifold assembly.



MX42666

5. Remove O-ring (G) and check valve assembly (H) from three pump heads (I).



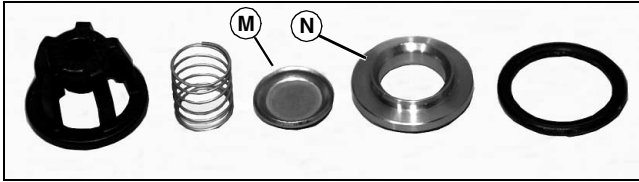
MX42663

6. Remove O-ring (J) and check valve assembly (K) from three areas (L) on pump manifold (F).

SERVICE

NOTE: Remember exact location and position of parts before disassembling.

7. Disassemble valve assemblies to check for damage or trapped debris.



MX42668

8. Clean valve components. Inspect beveled edges of valve (M) and valve seat (N) for wear or damage.

9. Assemble valve components. Make certain that valve spring seat faces valve spring, with valve seat beveled edge facing valve.

10. Lightly coat new valve sealing O-rings with grease in order to make certain of retention during reassembly.

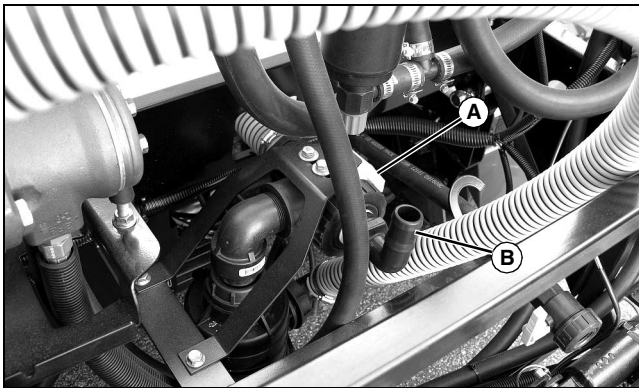
NOTE: Set valve assemblies aside for later installation if further pump disassembly is to be carried out.

11. Install valve assemblies to manifold and heads.

12. Install manifold to pump heads, and secure with three M10 hex nuts. Tighten fasteners evenly.

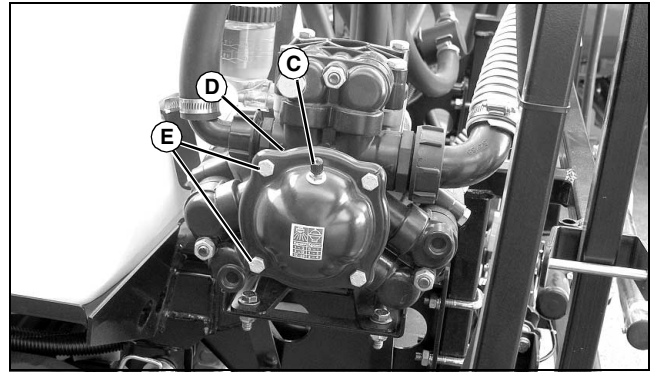
Accumulator Diaphragm Replacement

The accumulator diaphragm should be replaced if a failure is apparent or as required for periodic maintenance. Accumulator diaphragm failure may be indicated by pulsation in pump output pressure. Diaphragm replacement can be carried out with the pump in place.



MX42664

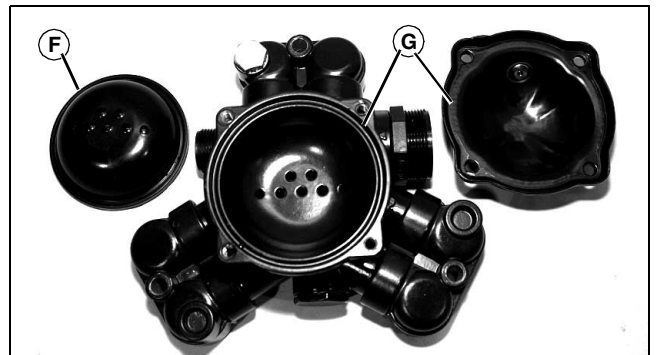
1. Close tank valve (A) if product remains in tank. Rotate valve handle 180 degrees to point toward auxiliary inlet (B).
2. Flush pump thoroughly with clear water through auxiliary inlet port. Drain to a properly labeled container.



MX42665

3. Remove air valve cap (C) and exhaust all air pressure from accumulator air chamber cap (D).

4. Loosen and remove four M8 hex bolts (E) securing air chamber cap to accumulator base.



MX42669

5. Remove cap and diaphragm (F) from accumulator base.

6. Make certain that diaphragm sealing surfaces (G) of air chamber base and cap are clean.

7. Install replacement accumulator diaphragm to manifold body. Check to see that diaphragm edge lies flat.

NOTE: Install air chamber cap to base with the air valve at the top of the cap.

8. Install air chamber cap to manifold and secure with four hex head bolts.

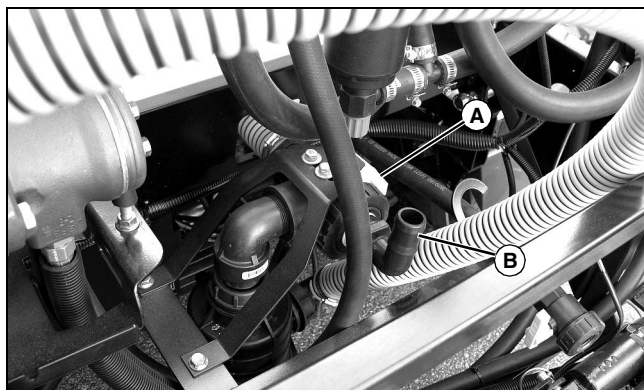
9. Tighten bolts evenly.

10. Charge accumulator air chamber to 20 percent of anticipated pump working pressure.

Pump Diaphragm Replacement

Pump diaphragms should be replaced if a failure is apparent or as required for periodic maintenance. Indications of pump diaphragm failure may include appearance of oil in pump output or a milky appearance of pump lubricating oil. Diaphragm replacement can be carried out with the pump in place.

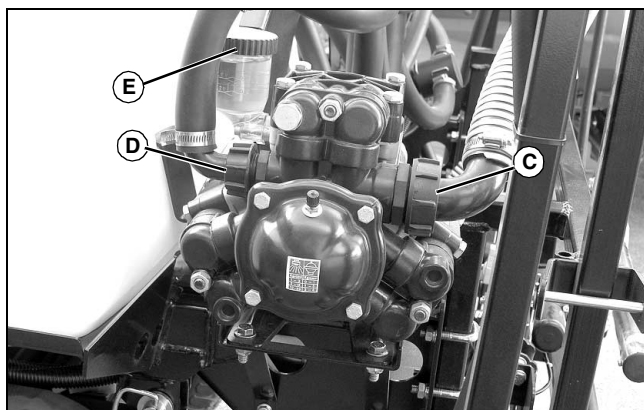
SERVICE



MX42664

1. Close tank valve (A) if product remains in tank. Rotate valve handle 180 degrees to point toward auxiliary inlet (B).

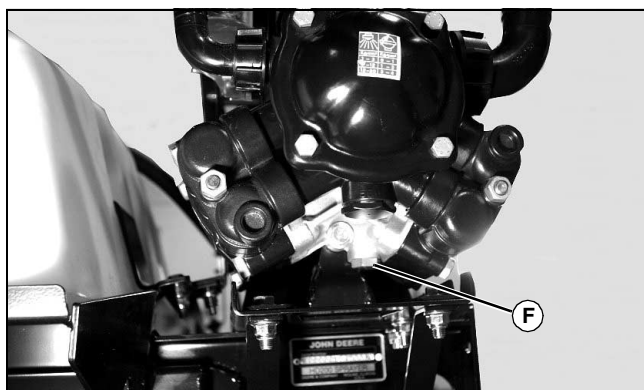
2. Flush pump thoroughly with clear water through auxiliary inlet port. Drain to a properly labeled container.



MX42665

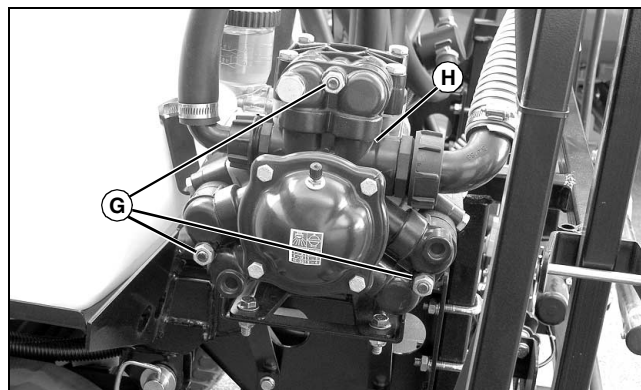
3. Loosen pump inlet (C) and outlet (D) elbow nuts and remove hose and elbow assemblies from pump. Secure hoses away from pump.

4. Remove lubricating oil reservoir cap (E).



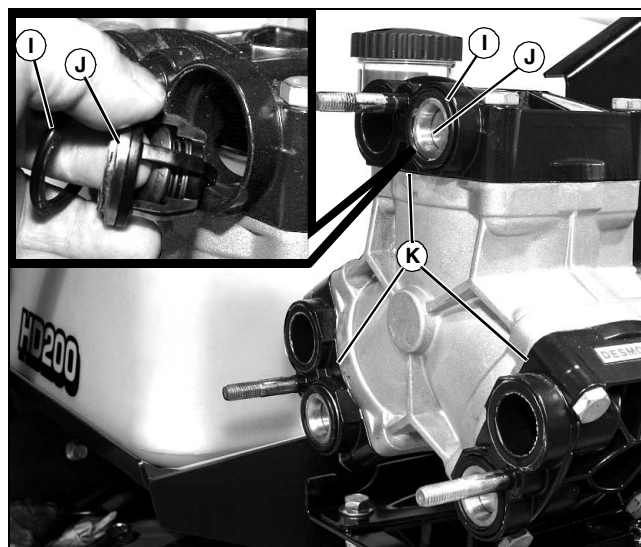
MX42670

5. Remove pump crankcase plug (F) and drain oil into a suitable container. Rotate crankshaft to aid in draining oil.



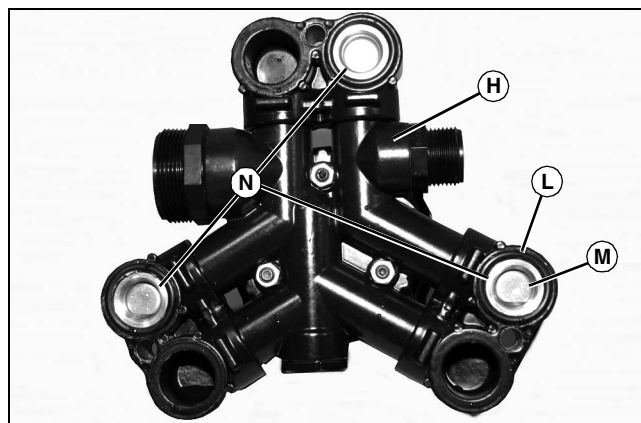
MX42666

6. Remove three M10 hex nuts (G) securing pump manifold assembly (H) to pump heads. Remove manifold assembly from pump.



MX42666

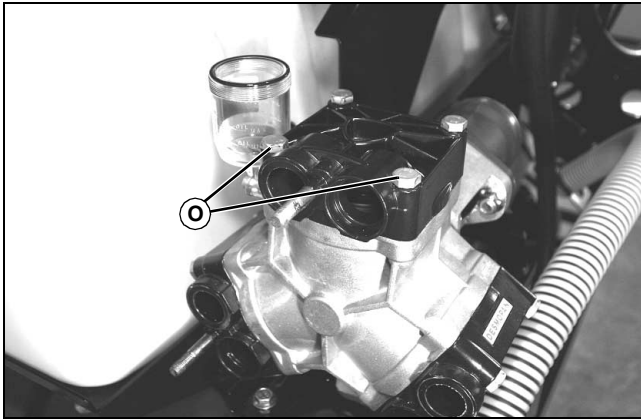
7. Remove O-ring (I) and check valve assembly (J) from three pump heads (K). Set parts aside in a clean location.



MX42663

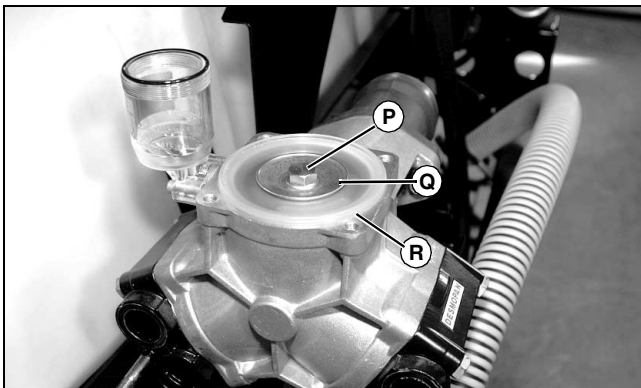
8. Remove O-ring (L) and check valve assembly (M) from three areas (N) on pump manifold (H). Set parts aside in a clean location.

SERVICE



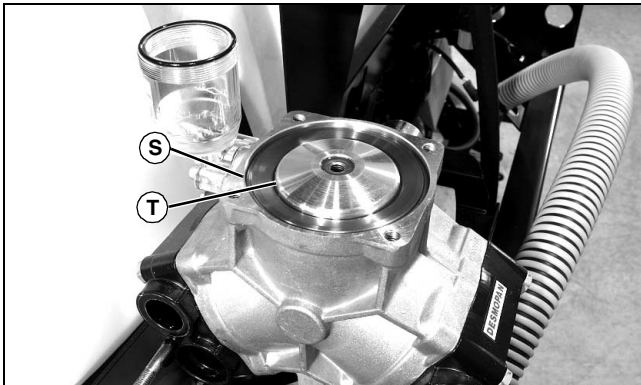
MX42671

9. Remove four M10x55 hex head bolts (O) securing pump heads to pump body. Remove heads and set aside in a clean location.



MX42672

10. Remove M12 diaphragm retaining bolt (P), support washer (Q), and diaphragm (R) from pump piston. Retain bolt and support washer.



MX42673

11. Make certain that diaphragm seating groove (S) of pump body is clean.
12. Rotate pump crankshaft to bring top piston (T) to maximum upward stroke.
13. Install replacement diaphragm to piston with diaphragm support washer and hex head bolt.
14. Rotate crankshaft to seat diaphragm lip in pump body groove. Tighten diaphragm bolt.



MX42672

15. Install head, ensuring that diaphragm sealing lip (U) is correctly inserted in head groove.
16. Secure head to pump body with four hex head bolts. Tighten bolts.
17. Continue rotation of crankshaft to bring next piston to maximum upward stroke.
18. Remove and replace diaphragm and retaining hardware.
19. Rotate crankshaft further, ensuring that diaphragm is properly seated. Tighten bolt.
20. Install head, making certain that diaphragm lip fits properly in head.
21. Secure head to pump.
22. Repeat diaphragm installation procedure for remaining pump cylinder.
23. Install pump manifold assembly to heads, securing with three hex head bolts. Tighten bolts.
24. Rotate pump slowly in both directions, while filling crankcase with lubricating oil through oil sight glass bowl. Fill crankcase with specified quantity of recommended oil. Replace sight bowl cover.
25. Charge accumulator air chamber to 20% of anticipated pump working pressure.

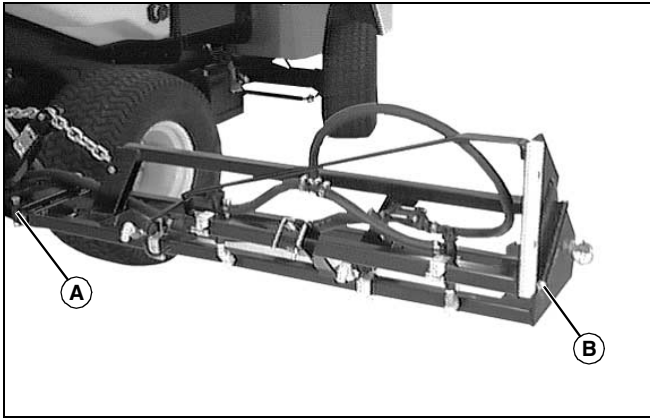
Winterization

If freezing conditions are likely to be encountered, or for Winter storage, the pump should be flushed with RV antifreeze. This flushing process will displace any water base solution in the pump which might cause damage from freezing.

Lubricating Boom Wing Pivots

1. Put boom wings in lowered position and support them with a jack stand or blocks.

SERVICE



MX19966

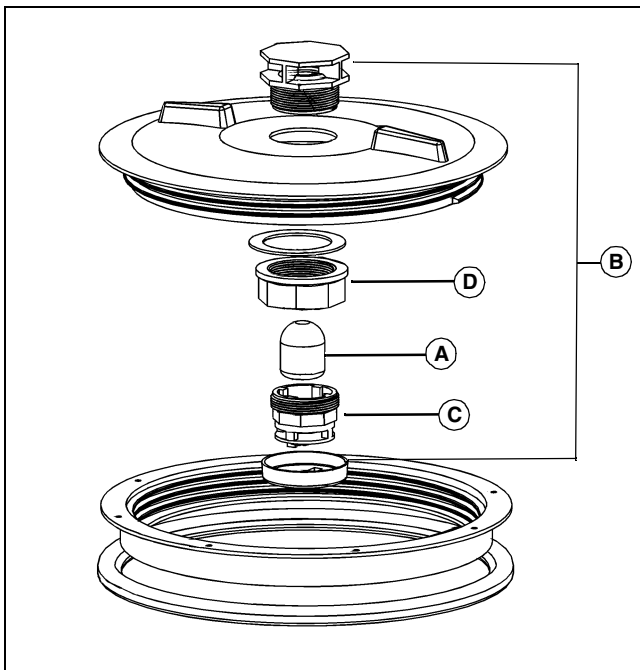
2. Remove boom wing pivot bolts (A) and boom wing extension bolts (B), if equipped.
3. Apply grease to pivot bolts and install.
4. Move end of boom wing toward front or rear to simulate hitting an object. Boom wings should snap back to normal operating position.

Inspecting and Cleaning Vented Fill Covers

The sprayer tank, personal wash tank, and foam marker tank are each equipped with a vented fill cap. Cap vent must be clean and in operable condition to ensure proper tank drainage.

Sprayer Tank Fill Cover

1. Remove fill cover from sprayer tank.



MX3608

2. Turn cover upside down several times and verify float (A) moves freely inside breather assembly (B). If float does not move, breather parts may be dirty or damaged.
3. Loosen and remove float guide (C) from bulkhead nut (D).
4. Remove float from float guide.
5. Clean breather assembly with mild detergent. Rinse thoroughly.

6. Inspect breather parts for damage or deterioration. Replace breather assembly if necessary.
7. Place float in float guide with rounded end facing upward.
8. Tighten float guide to bulkhead nut.
9. Install fill cover to sprayer tank.

Personal Wash and Foam Marker Tanks

1. Remove fill cover from tank.



MX2991/MX2992

2. Clean vent spring area (A) with mild detergent. Rinse thoroughly.
3. Verify vent cap (B) is seated properly against vent hole in cover.
4. Press on vent cap with fingertip. Verify cap moves downward against spring tension and returns to seated position.
5. Replace fill cover if vent is not operating properly.
6. Install fill cover to tank.

Servicing Foam Marker Kit

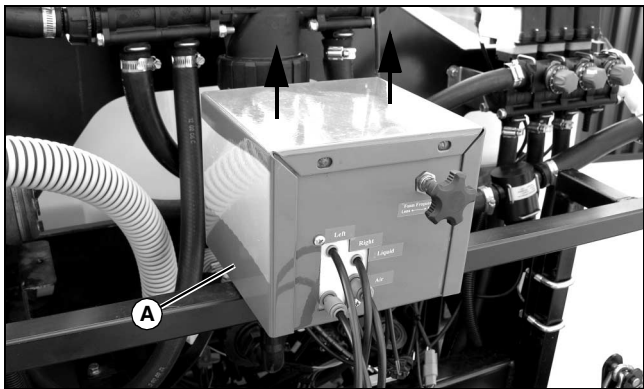


CAUTION: Avoid injury! Vapors from solvents can be explosive and flammable. Follow the instructions on the container label for safe use of the solvent:

- Work in a well-ventilated area.
- Wear protective clothing when handling solvent.
- Do not smoke while handling solvents.
- Keep solvent away from flames or sparks.

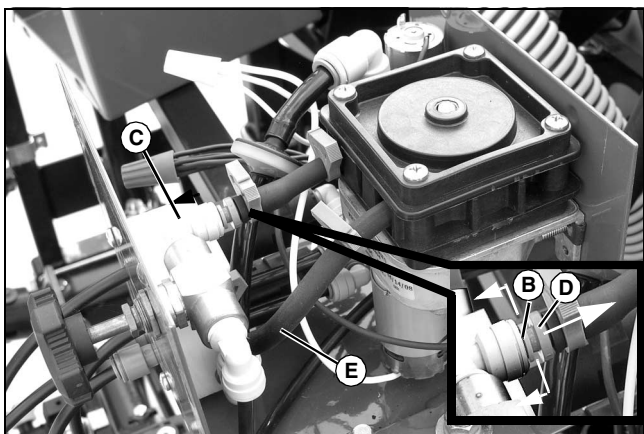
SERVICE

Foam Solution Pump



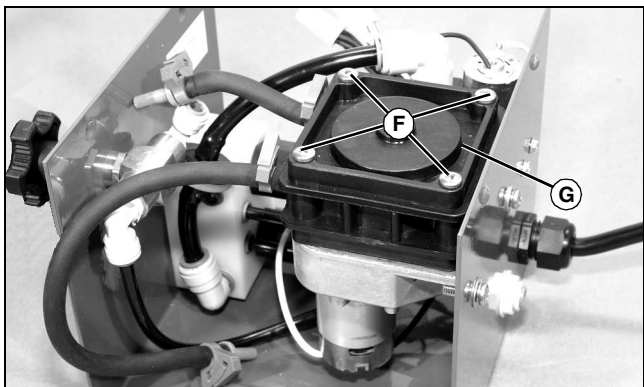
MX42257

1. Lift cover (A) from foam marker pump enclosure for access to foam marker pump.



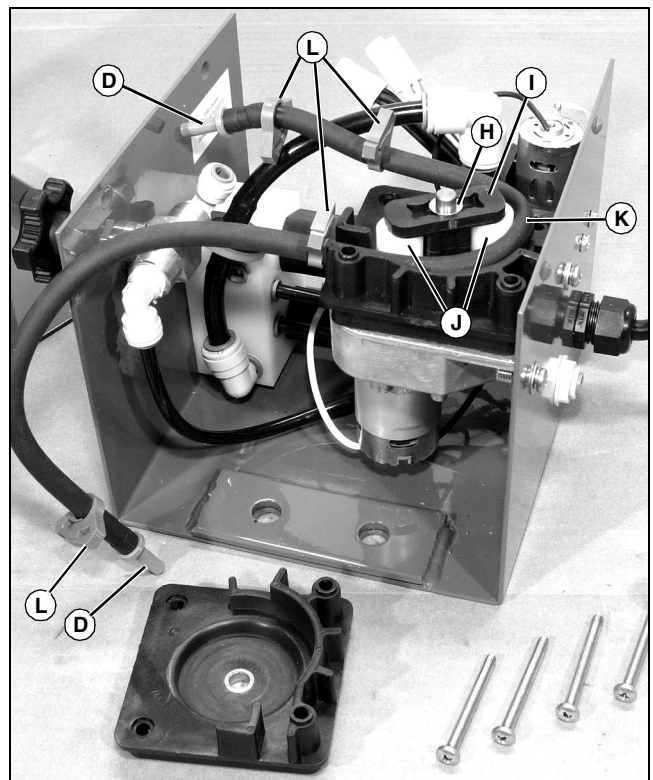
MX42420

2. Pull lock ring (B) toward elbow (C), and pull out hose stem (D) from elbow. Repeat for pump outlet hose (E).



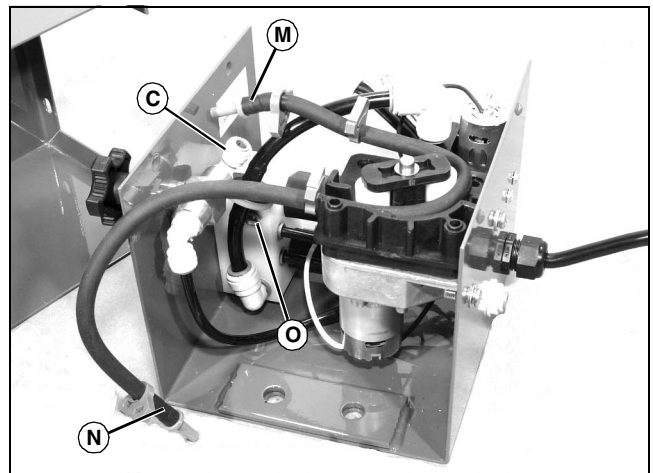
MX42424

3. Remove four #10x3 in. screws (F) securing pump roller cover (G) to foam pump body. Remove cover and set aside with screws.



MX42421

4. Remove and set aside shim washer (H) at top of roller assembly (I).
5. Remove and inspect roller assembly to ensure that rollers (J) are clean and free from damage. Be certain that rollers turn freely.
6. Remove hose (K) from pump body.
7. Release clamps (L) at inlet and outlet hose stems (D) and on hose at pump body. Remove and retain hose clamps and stems.
8. If rollers were removed, install rollers to pump spindle and reinstall to pump body.
9. Install shim washer to spindle at top of roller assembly.
10. Install outlet hose stems to ends of replacement hose. Secure stems with hose clamps.



MX42429

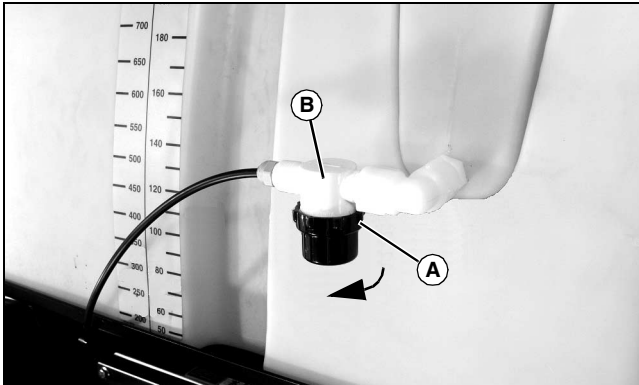
11. Insert hose end (M) stem into elbow (C).
12. Insert hose end (N) stem into valve block fitting (O).

SERVICE

13. Install hose into pump body, ensuring that hose is not pinched and is secured within pump body channel.
14. Install cover to pump body, ensuring that hose is not pinched and is secured within pump cover channel.
15. Secure roller cover to pump body with four #10x3 in. screws. Turn screws in evenly and tighten securely.
16. Reinstall remaining hose clamps at pump body inlet and outlet to retain hose position.

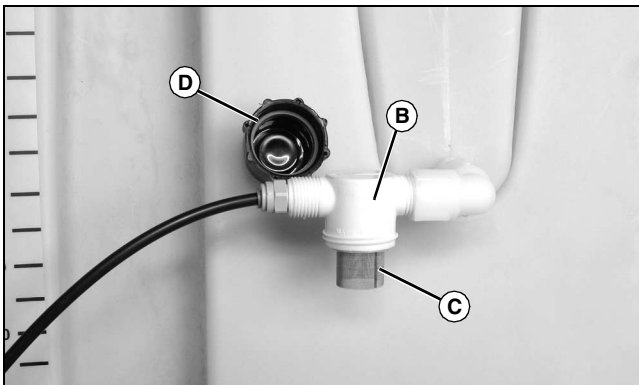
Foam Solution Strainer

NOTE: Removal of the foam solution strainer bowl for strainer inspection or cleaning will allow any solution in the tank to drain.



MX42434

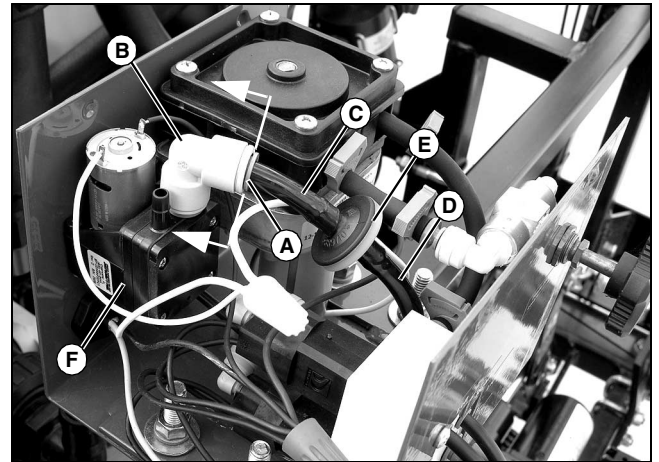
1. Turn strainer bowl (A) to loosen and remove from strainer housing (B).
2. Allow any foam solution remaining in tank to drain to a suitable container.



MX42435

3. Remove screen (C) from strainer housing (B).
4. Remove seal (D) from strainer bowl.
5. Rinse screen and bowl in warm water to loosen deposits. Clean thoroughly, being careful not to damage screen.
6. Inspect screen and seal for damage. Replace if needed.
7. Replace screen in strainer housing.
8. Replace seal in strainer bowl.
9. Reassemble bowl to strainer housing.

Air Line Check Valve



MX42423

1. Press in lock rings (A) toward elbow (B), and remove air supply hose assembly (C) from elbow. Repeat procedure for bottom end of hose (D).
2. Inspect check valve (E) in air supply hose to see that flow is allowed only in the direction away from the compressor (F).
3. Replace check valve if damaged or if there is flow in both directions.

NOTE: If check valve is being replaced, be sure the letters "VAC" (G) on the check valve are faced away from compressor (F).



MX42425

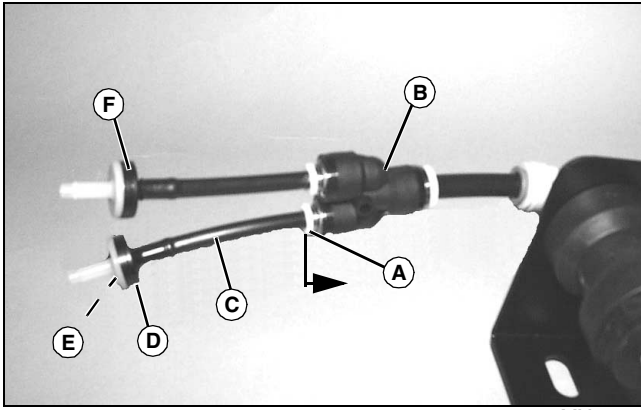
4. Install replacement check valve to air supply hose.
5. Install air supply hose assembly to compressor and valve block elbows.

Foamhead Check Valves



CAUTION: Avoid injury! Do not put nozzle tip or other sprayer parts to your lips to blow out dirt. Use compressed air or clean water.

SERVICE



MX42426

1. Press in lock ring (A) toward connector (B) to release air supply hose (C) from connector (B) at foamhead.

2. Remove check valve (D) from supply hose.

NOTE: The letters "VAC" (E) should appear on the outlet side of the valve body (facing foamhead).

3. Inspect check valve to see that flow is allowed only in one direction through the valve body.

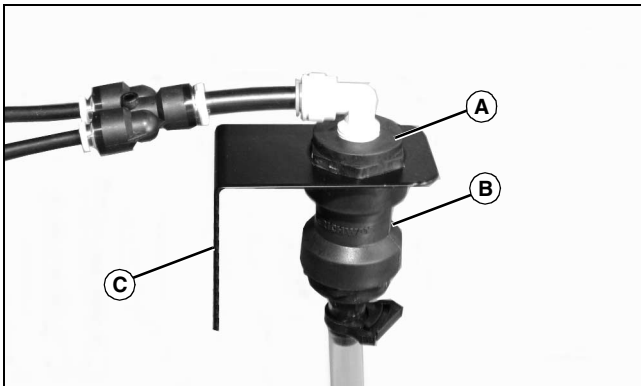
4. Replace check valve if damaged or if there is flow in both directions.

5. Install check valve to system hoses with letters "VAC" on valve body facing foamhead.

6. Repeat inspection and replacement steps for second valve (F).

7. Repeat steps for opposite boom.

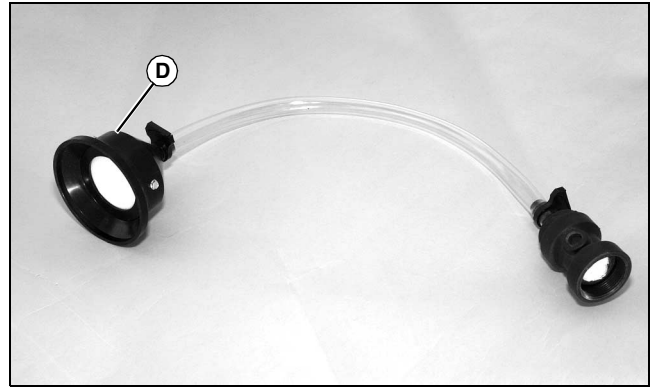
Foamhead Cleaning



MX42427

1. Hold bushing cap (A). Turn foamhead (B) to loosen, and remove foamhead from boom end bracket (C).

2. Remove foamhead, hose, and collector assembly from opposite boom end.



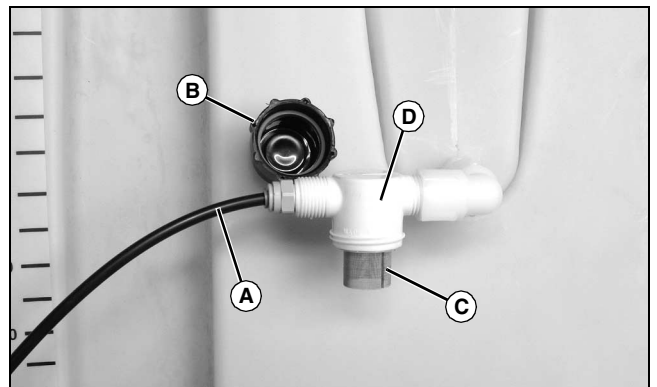
MX42428

3. Rinse and backflush foamhead, hose, and collector assemblies (D) thoroughly with warm water.

4. Apply joint sealing tape to bushing cap threads. Install foamheads through boom end brackets and to bushing caps. Tighten caps.

Winterization

The foam solution tank, valves, and hoses must be drained completely prior to storage or when freezing temperatures may occur. If the solution is allowed to freeze, system components may be damaged.



MX42435

1. Disconnect foam solution hose (A) and drain solution into a suitable container.

2. Remove bowl (B) and screen (C) from strainer housing (D) at tank outlet.

3. Clean strainer screen.

4. Flush foam solution tank with warm water and allow to drain.

5. Replace tank strainer screen and bowl.

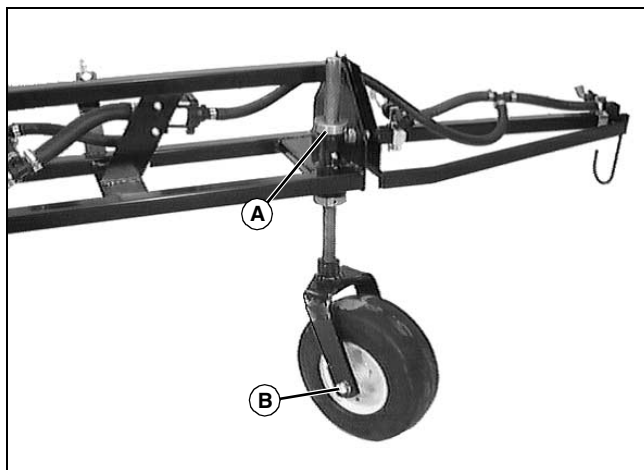
6. Turn on power to foam system and operate until no foam is produced.

7. Add anti-freeze solution such as windshield washer fluid to tank.

8. Turn on power to foam system and run until anti-freeze reaches foamheads.

SERVICE

Lubricating Ground Wheels



M88223a

1. Lubricate ground wheel pivot (A).
2. Lubricate ground wheel axle (B).

Lubricating Support Stands



MX42182

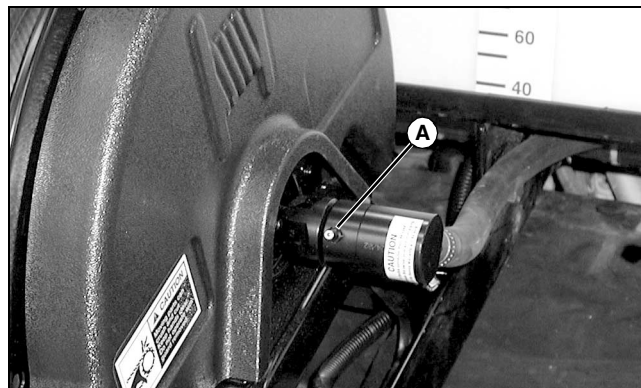
Picture Note: Right side shown in supported position.

1. Lubricate fitting (A) with recommended grease.

Servicing Hose Reel

Lubricating Electric Hose Reel

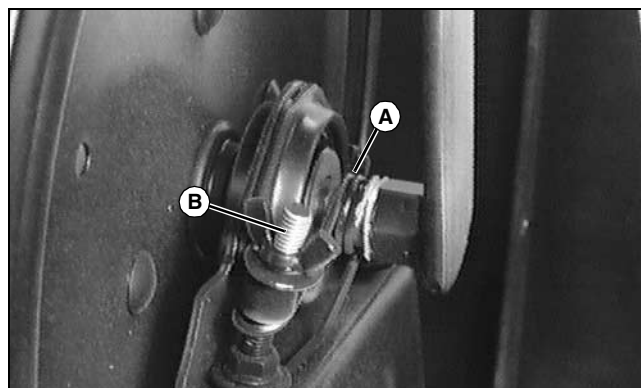
IMPORTANT: Avoid damage! Do not over lubricate reel tension area. Dirt and dust will tend to collect on lubricated parts leading to premature wear.



MX17909

1. Apply small amount of recommended grease to swivel fitting (A).
2. Wipe off excess grease around fitting.

Lubricating Manual Hose Reel



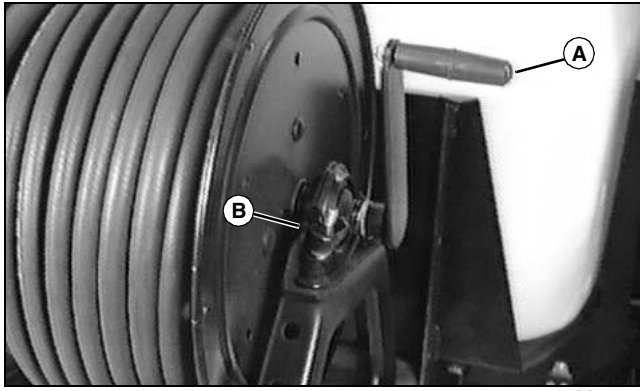
M88222

1. Apply small amount of recommended grease on reel tension brake adjustment area (A).
2. Apply small amount of recommended grease or oil on threads of reel tension brake adjustment bolt (B) to prevent rusting and seizing.

Adjusting Tension Brake

1. Make sure hose reel is properly lubricated prior to adjusting reel tension.

TROUBLESHOOTING



M88221

2. Pull out hose and turn handle (A) to wind hose back on reel. Drag (reel tension) is adjustable using wing nut (B).

3. Adjust reel tension brake.

- Tighten wingnut (B) to increase reel tension.
- Loosen wingnut (B) to decrease reel tension.

Troubleshooting

Using Troubleshooting Chart

If you are experiencing a problem that is not listed in this chart, see your authorized dealer for service.

When you have checked all the possible causes listed and you are still experiencing the problem, see your authorized dealer.

SelectSpray HD200, HD300

If	Check
Pump Will Not Turn On	Sprayer Pump Hydraulic Lines Disconnected Problem with Auxiliary Hydraulic System
Pump On - No Liquid Flowing	Tank Empty Three-Way Ball Valve Turned Off Inline Strainer Plugged Pressure Regulating Valve Problem Solenoid Valve Problem Blown Fuse in Sprayer Wiring Harness Diaphragms damaged - Check if Valves are Stuck
Inadequate or Fluctuating Pressure Reading At Gauge	No Fluid or Low Fluid Level In Tank Air In Pressure Tube - Bleed System Electrical Circuit Failure
Gauge Pressure Does Not Drop To Zero With Pump Off	Too Much Fluid, Pressurizing System - Remove Minimal Fluid From Isolator
Vent Line Not Full of Fluid	Check Valve Is Not Closed Check Valve Installed Incorrectly - Arrow Should Point Toward Front of Machine

If	Check
Agitator Will Not Turn On	Ball Valve Not in Open Position Kinked or Damaged Hose
Agitator Will Not Turn Off	Ball Valve Not in Close Position Ball Valve Failed
Nothing Works	Not Connected to Battery Correctly Automatic Reset Circuit Breaker Tripped (Short-to-Ground in Sprayer Electrical System)
Boom Switches Will Not Work	Check 15 Amp Fuse
Boom Wing Actuators Will Not Work	Check 20 Amp Circuit Breaker
Boom/Wings Will Not Stay Level	Leveling Hardware Loose or Missing
Boom Wings Will Not Flex	Flexible Joint Needs Lubrication Flexible Joint Spring Tension Too Tight
Poor/uneven Spray Pattern	Wrong Nozzles for Application Boom Not Level Boom Wings Not Level Wrong Boom Height for Nozzle Nozzles Not All Same Design Incorrect Pressure Setting
Boom Sections Do Not Correspond With Control Panel Switches	Boom Hoses Not Connected to Correct Solenoid Valves Boom Electrical Connectors Not Connected to Correct Solenoid Valves
Personal Wash Tank Will Not Drain or Drains Slowly	Spigot Plugged Inside Tank Hose Plugged Cap Vent Plugged
Marker Will Not Turn On	Harness Plug Not Plugged In Automatic Reset Circuit Breaker Tripped (Short-to-Ground in Sprayer Electrical System) Check 15 Amp Fuse
Air Pump Runs - Nothing Coming Out	Liquid Pump Shut Off or Not Primed Liquid Pump Tube has Failed Kinked or Damaged Tube Liquid Pump Motor Failed
Nothing Comes Out	Tank Cover Vent is Plugged Kinked or Damaged Tube Tank Outlet Strainer is Dirty or Plugged Needle Valve is Plugged or Closed
Discharge Almost All Water	Kinked or Damaged Tube Air Pump Not Running Air Pump Diaphragm Ruptured, Worn Out, or Valves Failed

SPECIFICATIONS

If	Check
Discharge Foamy But Very Watery	Foam Concentrate Weak Kinked or Damaged Tube Hard Water Liquid Pressure Too High Air Pump Not Operating or Plugged
Good Foam - Not Enough Of It	Adjust Needle Valve
Foam Goes to Wrong Side	Left/Right Hoses Hooked Up Backwards or No Power to Valve Solenoid Stuck or Damaged
Foam Goes to Both Sides	Solenoid Stuck or Damaged
Boom Wings Will Not Float	Plane Wheel Locking Collars Loose
Wheels Will Not Caster	Needs Lubrication
Boom Wings Will Not Maintain Level	Plane Wheel Locking Collars Loose
Hose Reels Out Too Easily	Adjust Tension Brake
Hose Reels Out Too Hard	Adjust Tension Brake
Hose Will Not Fit On Reel	Roll Hose On Evenly
Hose Will Not Reel Out	Brake in Locked Position
Hose Unreels During Transport	Brake in Unlocked Position
Reel Will Not Wind In	Automatic Reset Circuit Breaker Tripped (Short-to-Ground in Sprayer Electrical System) Solenoid Problem Electrical Problem
Boom Wing Actuators Will Not Work	Check 20 Amp Circuit Breaker

Specifications

Standard Equipment

HD200 Specifications:

Sprayer Tank Capacity 757 L (200 gal.)

Shipping Weight (gross weight) 261 kg (576 lb)

Sprayer Weight (net weight) 175 kg (386 lb)

Boom Specifications (18 Foot Boom):

Boom Weight 95 kg (210 lb)

Boom Height (Wings Raised) 228 cm (90 in.)

Boom Width (Wings Raised) 231 cm (91 in.)

Boom Width (Wings Lowered) 514 cm (203 in.)

Boom Specifications (15/21 Foot Boom):

Boom Weight 110 kg (243 lb)

Boom Height (Wings Raised and Extensions Folded) . 178 cm (70 in.)

Boom Height (Wings Raised and Extensions Extended) . 244 cm (96

in.)

Boom Width (Wings Raised) 231 cm (91 in.)

Boom Width (Wings Lowered and Extensions Folded) . . 478 cm (188 in.)

Boom Width (Wings Lowered and Extensions Extended) 615 cm (242 in.)

Personal Wash Tank Specifications:

Tank Capacity 15 L (4 gal.)

Optional Equipment

Foam Marker Specifications:

Tank Capacity 15 L (4 gal.)

Average Foam Output 12.1 L/min. (3.2 gpm)

Average Solution Usage 18.1 L/hr (4.8 gph)

Average Drop Interval 7.7 seconds

Average Drop Distance at 16 km/h (10 mph) 34.1 m (112 ft)

Ground Plane Wheel Specifications:

Tire Inflation 206 kPa (30 psi)

Hose Reel Specifications:

Hose Diameter 13 mm (1/2 in.)

Hose Length 61 m (200 ft)

Getting Quality Service

Service Literature

If you would like a copy of the Parts Catalog or Technical Manual for this machine call:

• **U.S. & Canada:** 1-800-522-7448.

• **All Other Regions:** Your John Deere dealer.

Parts

We recommend John Deere quality parts and lubricants, available at your John Deere dealer.

When you order parts, your John Deere dealer needs the serial number or product identification number (PIN) for your machine or attachment. These are the numbers that you recorded in the Product Identification section of this manual.

Order Service Parts Online

Visit <http://JDParts.deere.com> for your Internet connection to parts ordering and information.

John Deere Quality Continues with Quality Service

John Deere provides a process to handle your questions or problems, should they arise, to ensure that product quality continues with your John Deere dealer's parts and service support.

Follow the steps below to get answers to any questions you may have about your product.

1. Refer to the appropriate attachment, machine or equipment operator manuals.

2. Contact your John Deere dealer with unanswered questions.

3. Call the John Deere Customer Contact Center.

• Call 1-800-537-8233 and provide product serial number and model number.

DECLARATION OF CONFORMITY

Declaration of Conformity

HD200 Sprayer

Manufacturer

Deere & Company
John Deere Road
Moline, IL 61265-8098 USA

Owner of Technical Documentation

Reinhard Frank
Deere & Company
John Deere Werke Mannheim
Windeckstr. 90
Mannheim, Germany D-68163

I, the undersigned:
declare that these machines

Type HD200 Sprayer

Serial Number See Product Identification Page

comply with the applicable requirements of:

Machine Directive 98/37/EC (89/392/EEC)

Done at:

John Deere Turf Care 1 June 2009



PAUL A. MEYER

VICE PRESIDENT, ENGINEERING & SUPPLY MANAGEMENT

