



Trailer Sprayer TR-30



Operators Manual

Locke Turf

307 Highway 52E, Opp, Alabama, 36467, (334) 493-1300

.CONGRATULATIONS

You have invested in the best implement of its type on the market today.

The care you give your Locke Turf implement will greatly determine your satisfaction with its performance and its service life. We urge a careful study of this manual to provide you with a thorough understanding of your new implement before operating, as well as suggestions for operation and maintenance.

If your manual should become lost or destroyed, Locke Turf will be glad to provide you with a new copy. Order from Locke Turf, 307 Highway 52E, Opp, Alabama 36467.

As an Authorized Locke Turf dealer, we stock genuine Locke Turf parts which are manufactured with the same precision and skill as our original equipment. Our trained service personnel are well informed on methods required to service Locke Turf equipment, and are ready and able to help you.

Should you require additional information or assistance, please contact us.

YOUR AUTHORIZED
LOCKE TURF DEALER

BECAUSE LOCKE TURF MAINTAINS AN ONGOING PROGRAM OF PRODUCT IMPROVEMENT, WE RESERVE THE RIGHT TO MAKE IMPROVEMENTS IN DESIGN OR CHANGES IN SPECIFICATIONS WITHOUT INCURRING ANY OBLIGATION TO INSTALL THEM ON UNITS PREVIOUSLY SOLD.

BECAUSE OF THE POSSIBILITY THAT SOME PHOTOGRAPHS IN THIS MANUAL WERE TAKEN OF PROTOTYPE MODELS, PRODUCTION MODELS MAY VARY IN SOME DETAIL. IN ADDITION, SOME PHOTOGRAPHS MAY SHOW SHIELDS REMOVED FOR PURPOSES OF CLARITY. **NEVER OPERATE** THIS IMPLEMENT WITHOUT ALL SHIELDS IN PLACE.

TRAILER SPRAYER

Operator's Manual

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RETAIL CUSTOMER'S RESPONSIBILITY

UNDER THE LOCKE TURF INC. WARRANTY

It is the Retail Customer and /or Operator's responsibility to read the Operator's Manual, to operate, lubricate, maintain, and store the product in accordance with all instructions and safety procedures. Failure of the operator to read the Operator's Manual is a misuse of this equipment.

It is the Retail Customer and/or Operator's responsibility to inspect the product and to have any part(s) repaired or replaced when continued operation would cause damage or excessive wear to other parts or cause a safety hazard.

It is the Retail Customer's responsibility to deliver the product to the authorized Locke Turf distributor from whom he purchased it, for service or replacement of defective parts that are covered by warranty. Repairs to be submitted for warranty consideration must be made within fort-five (45) days of failure.

It is the Retail Customer's responsibility for any cost incurred by the Dealer for traveling to or hauling of the product for the purpose of performing a warranty obligation or inspection.

UNDERSTAND SIGNAL WORDS

DANGER: Indicates an imminently Hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the Most extreme situations.

WARNING: Indicates a potentially hazardous situation which, if not Avoided, could result in death or serious injury.

CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in minor or Moderate injury. It may also be Used to alert against unsafe Practices.

IMPORTANT FEDERAL LAWS AND REGULATIONS* CONCERNING EMPLOYERS, EMPLOYEES AND OPERATIONS.

*(This section is intended to explain in broad terms the concept and effect of the following federal laws and regulations. It is not intended as a legal interpretation of the laws and should not be considered as such.)

U.S. Public Law 91-596 (The Williams-Steiger Occupational and Health Act of 1970) OSHA

This Act Seeks:

"...to assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources..."

DUTIES

Sec. 5 (a) Each employer-

- (1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazard that are causing or are likely to cause death or serious physical harm to his employees;
- (2) shall comply with occupational safety and health standards promulgated under this Act.
 - a. Each employee shall comply with occupational safety and health standards and all rules, regulations and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA Regulations

Current OSHA regulations state in part: "At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee in the safe operation and servicing of all equipment with which the employee is or will be involved." These will include (but are not limited to) instructions to:

Keep all guards in place when the machine is in operations:

Permit no riders on equipment;

Stop engine, disconnect the power source and wait for all machine movement to stop before servicing, adjusting, cleaning or unclogging the equipment, except where the machine must be running to be properly serviced or maintained, in which case the employer shall instruct employees as to all steps and procedures which are necessary to safely service or maintain the equipment.

Make sure everyone is clear of machinery before starting the engine, engaging power or operating the machine.

EMPLOYEE TRACTOR OPERATING INSTRUCTIONS:

1. Securely fasten your seat belt if the tractor has a ROPS row ends, on roads and around trees.
2. Where possible avoid operating the tractor near Ditches, embankments and holes.
3. Reduce speed when turning, crossing slopes and on rough, slick or muddy surfaces
4. Stay off slopes too steep for safe operation manufacturers
5. Watch where you are going especially at
6. Do not permit others to ride.
7. Operate the tractor smoothly – jerky turns starts or stops
8. Hitch only to the drawbar and hitch points recommended by tractor
9. When tractor is stopped, set brake securely and use park lock if available

Child Labor Under 16 Years Old

Some regulations specify that no one under the age of 16 (sixteen) may operate power machinery. It is your responsibility to know what these regulations are in your own area or situation. (Refer to U.S. Dept. of Labor, Employment Standard Administration, Wage & Home Division, Child Labor Bulletin #102.)

DEALER PREPARATION CHECK LIST

Trailer Sprayer

BEFORE DELIVERING MACHINE- The following check list should be completed. Use the Operator's Manual as a guide.

- 1. Assembly completed.
- 2. All Appropriate locations lubricated.
- 3. All shields in place and in good condition.
- 4. All fasteners torqued to specifications given in Torque Chart.
- 5. All decals in place and readable. (See decal page.)
- 6. Overall condition good (i.e. paint, welds)
- 7. Operator's manual has been delivered to owner and he has been instructed on the safe and proper use of the trailer sprayer.

Dealer's Signature _____

Purchaser's Signature _____

THIS CHECKLIST IS TO REMAIN IN OWNER'S MANUAL
It is the responsibility of the dealer to complete the procedures listed above before delivery of this implement to the customer.

For your safety and to develop a better understanding of your equipment, thoroughly read the Operator's Sections of this manual before operation.

Safety Notations

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

Watch for the following Safety Notation throughout your Operator's Manual:



Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations.



Indicates a potentially hazardous situation which, if not avoided, **could** result in death or serious injury.



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

Safety Rules

These rules and instructions must be reviewed at least annually by all operators!

Most accidents are the result of negligence and carelessness, caused by failure of the operator to follow safety precautions. Even though your implement has been designed with built-in safety features, the following precautions are mandatory to prevent such accidents.

Make sure everyone that uses this machine has read the Operator's Manual and understands how to operate it safely.

This Operator's Manual is considered a part of the implement and should remain with it when loaded or sold.

Prior to Operation

1. Do not allow anyone to operate this machine who has not been properly trained in its safe operation.
2. Never leave your fill hose attached to the sprayer after filling the tank. Although your sprayer is equipped with an anti-siphon device, if the vent holes are covered or become plugged, siphoning can occur. Chemicals in the tank can siphon out of the tank

3. Use only water to calibrate and test the sprayer.
4. Always check the hand wash tank before taking the sprayer to the field to be sure it is filled with clean water.
5. Do not transport sprayer (by loading the vehicle and sprayer on a trailer or other vehicle) when the tank is filled with chemicals.
6. Agricultural chemicals can be dangerous. Always select the correct chemical for the job. Improper use of fertilizers, fungicides, herbicides, insecticides and pesticides could cause injury to all living things.
7. Always read instructions supplied by the manufacturers before opening chemical containers. Read and follow instructions supplied by the chemical manufacturer carefully before each use.
8. Inform anyone who may come in contact with chemicals or an implement with chemicals of any potential hazards or safety precautions that should be observed.
9. Store or dispose of all unused chemicals as specified by the chemical manufacturer.
10. Always wear personal protective equipment. Refer to "**Personal Safety Equipment**" section on page 3.
11. Always read chemical labels before using.

During Operation

1. Always be aware of any people that may be in the area. Farmers, other maintenance personnel and others may be on the course. It is the operator's responsibility to operate the sprayer and vehicle in a safety manner!
2. Never dismount from a moving vehicle.
3. Do not leave the vehicle unattended with the engine running.
4. Do not exceed the calibrated spraying speed and pressure when operating sprayer.
5. Spray only with acceptable wind conditions, below 5 mph. Carefully note outlying areas of the area to be sprayed. Make sure wind drift of chemicals will not affect any surrounding property, people or animals.
6. Be alert to traffic when crossing or operating near roadways. Always maintain complete control of the machine. Know your state and local laws concerning highway safety and regulations. Comply with these laws when driving the sprayer on any public thoroughfare.
7. Do not exceed 20 mph. Drive slowly over rough terrain and use caution when traveling over hilly areas, especially when the tank is full.



This sprayer can be dangerous and can cause bodily harm if not properly used or guarded. Stay away from the pump, drive shaft, electric clutch and drive belt when in operation.

After Operation

1. Never wash the sprayer tank out within 100 feet of any fresh water source or in a car wash. Dispose of leftover chemical in the manner described on the manufacturer's label of the chemical used in the sprayer. Rinse out the tank and spray the rinse water on the last field that was sprayed.

- Do not wear contaminated clothing. Wash protective clothing and equipment with soap and water after each use. Personal clothing worn during use must be laundered separately from household articles. Clothing heavily contaminated with certain crop protectant agents (read the label), must be destroyed according to state and local regulations.
- Wash your hands and face before eating when working with chemicals. Shower as soon as you have completed your spraying for the day.

During Maintenance

- Keep all guards and shields in place. If removed for repair or adjustment, replace them before operating sprayer. If the sprayer is left with guards removed, tag the unit so it is not used by others until it is repaired.
- Before working on, servicing or making adjustments on the sprayer, always disengage power, shut off engine, make sure all moving parts have stopped and all pressure in the system is relieved.
- Do not work on the hoses, nozzles or plumbing components (with the exception of the throttling

Valve) while the pump is running or the hoses are pressurized. Shut off the pump and release system pressure by turning the boom section switches on before working on individual components.

- Do not grease or oil implement while it is in use.
- After repairing or adjusting, make sure all tools have been removed from the implement before attempting to operate it.
- Never use or store chemicals where children or pets could be exposed.



WARNING

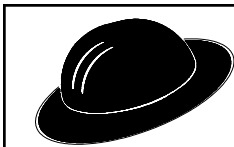


Do not touch the sprayer components with your mouth or lips. Never start a siphon hose by mouth. Chemical ingestion can lead to illness and if untreated, death. If the chemical is swallowed, carefully follow the chemical manufacturer's recommendations and immediately consult your doctor.

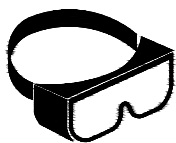
7. If you are exposed to a chemical in a way that could affect your health, contact a physician immediately with the chemical label or container in hand. Any delay could cause serious illness or death.

Personal Safety Equipment

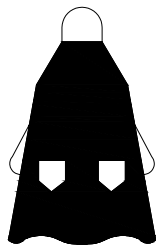
Locke Turf advises all users of chemical pesticides or herbicides to use the following personal safety equipment. Always follow the chemical label instructions; your safety and the effectiveness of the product depends upon your actions.



Waterproof, wide-brimmed hat.



Face shield, goggles or full face respirator. Goggles with side shields or a full face respirator is required if handling or applying dusts, wettable powders or granules or if being exposed to spray mist.



Waterproof apron.



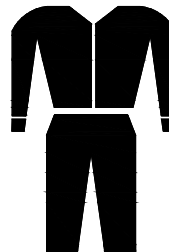
Waterproof boots or foot coverings.



Waterproof, unlined gloves. Neoprene gloves are recommended.



Cartridge-type respirator approved for pesticide vapors unless label specifies another type of respirator.



Cloth coveralls/ outer clothing changed daily; waterproof items if there is a chance of becoming wet with spray.

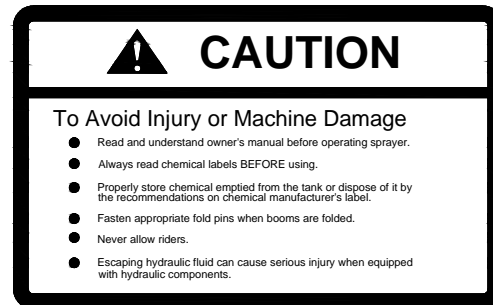
SAFETY DECALS

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

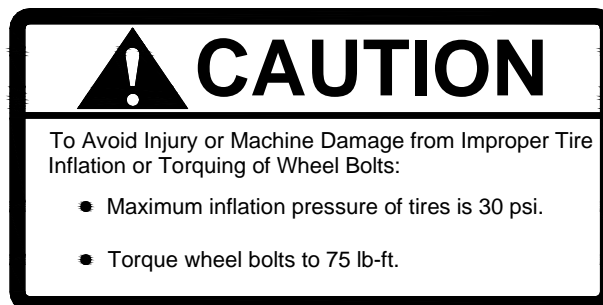
1. Keep safety decals clean and legible.
2. Replace all damaged or missing safety decals. To order new safety decals go to you Locke Turf Dealer.
3. General Decal Application: Replace these decals whenever they become worn or unreadable. To install new safety decals:
 - a. Clean the area the decal is to be placed.
 - b. Peel backing from the decal. Press firmly onto surface being careful not to cause air bubbles under the decal.



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Locke Turf welcomes you to the growing family of new product owners. This implement has been designed with care and built by skilled workers using quality materials. Proper assembly, maintenance and safe operating practices will help you get years of satisfactory use from the machine.

Description of Unit

The Locke Turf TR-20 and TR-30 trailer sprayers are tow behind units designed to be pulled by tractors or large utility vehicles.

The sprayers are equipped with 200 or 300 gallon polyethylene tanks.

A variety of booms are available to be used with the trailer sprayers, either electric or manual lift controls, wet or dry booms.

The TR models are equipped with Hy Pro PTO pumps or optional engine drive Hy Pro pumps.

A selection of controls, either Tee Jet 744 economy control or Tee Jet 844A deluxe controls are available for these sprayers.

An electrically operated pressure control valve and three solenoid-type directional control valves control the flow of liquid between the tank and the three boom sections. Excess system pressure returns liquid to the tank for continuous agitation through the bypass section of the solenoid valves (on standard control units only). The liquid is constantly filtered through an in-line Tee Jet filter.

Features Include:

- Heavy duty frame built from 14 gauge formed steel.
- Rugged, low profile 200 or 300 gallon polyethylene tank.
- A two inch diameter anti-siphon fill kit with anti-spill knife gate valve and fill tube extending to the bottom of the tank to prevent foaming.
- Hy Pro pump with air blow-out valve to easily clean plumbing lines and purge plumbing system for winter storage.
- Tee Jet nozzle bodies.
- In-Line Tee Jet filter.
- Electric pressure regulating valve (Standard control units only).
- Electrically-operated three-way solenoid directional control valves with throttling valves to maintain constant spraying pressure when one or two sections of the boom are shut off (Standard control units only).
- Agitation line pressure gauge to monitor the fourport hydraulic stainless steel agitator head.
- Control box with Master, Pressure Adjust and

Boom Section control switches, with mounting bracket for attachment or Magnetic Gauge Mount Assembly.

- A 3-1/2" glycerine-filled pressure gauge in 2 lb. increments to 100 PSI and stainless steel oil-filled Gauge Protector attached on a Magnetic Gauge Mount.

Available Options Include:

- Deluxe Tee Jet Control and Monitor.
- Foam Marker Assembly
- Hose Reel (electric or manual)
- Walker Boom
- Hand Gun

Contact your Locke Turf dealer to purchase any of these options.

Using this Manual

This Operator's Section is designed to help familiarize you with safety, assembly, operation, adjustments, trouble-shooting and maintenance. Read this manual and follow the recommendations to help ensure safe and efficient operation.

NOTE

The warranty sheet should be filled out by the owner and dealer at the time of purchase. After completion give the dealer the white copy and send the pink copy to Locke Turf. Keep your copy in the manual for use when corresponding with the dealer.

To order a new Operator's or Parts Manual contact your authorized dealer or write to the address listed below in the Owner Assistance paragraph. Include the model and serial numbers of your unit.

The information contained within this manual was current at the time of printing. Some parts may change slightly to assure you of the best performance.

Terminology

"Right" or "Left" as used in this manual is determined by facing the direction the machine will travel while in use unless otherwise stated.

NOTE: A special point of information related to its preceding topic. Read and note this information before continuing.

IMPORTANT: Information, related to its preceding topic, that the author feels would be of use.

Owner Assistance

If customer service or repair parts are required contact your local Locke Turf dealer. They have trained personnel, repair parts and the equipment needed to service your implement.

These parts have been specially designed and should only be replaced with genuine Locke Turf parts.

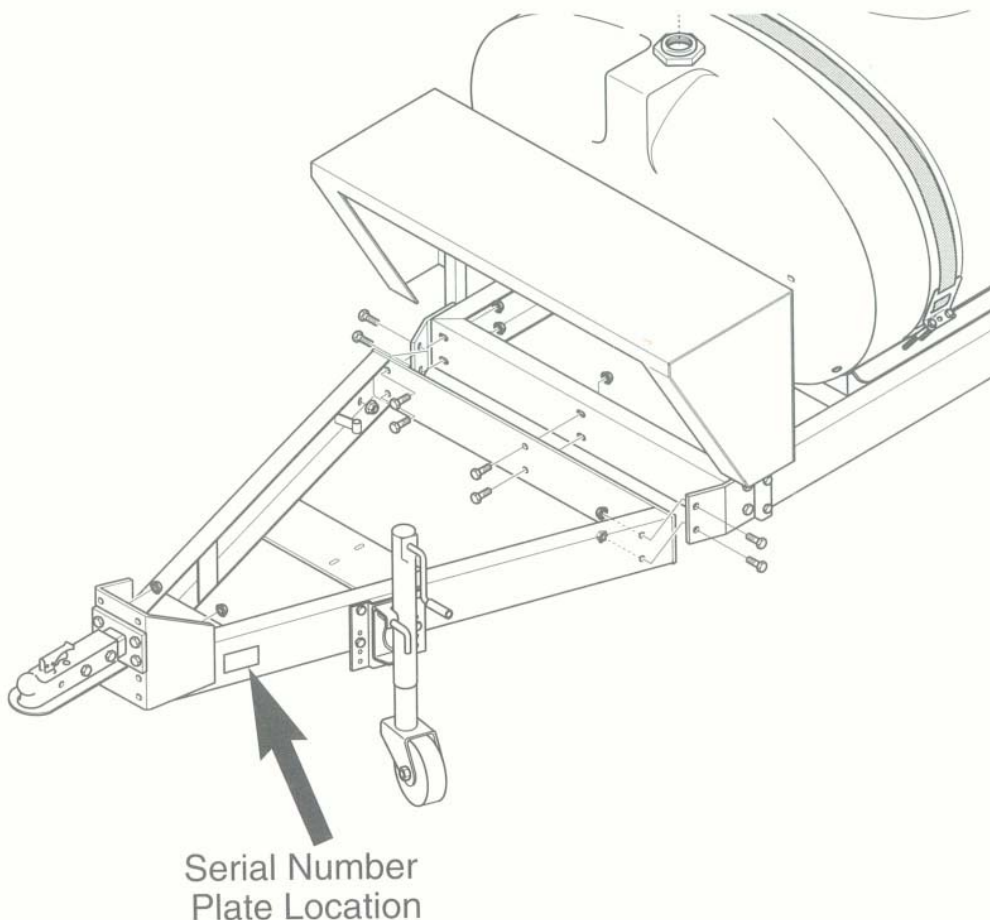
Serial Number Plate - Refer to the Figure below for the location of your serial number plate. For prompt service always use the serial number and model number when ordering parts from you Locke Turf dealer. Be sure to include your serial number and model number in correspondence also.

Your dealer wants you to be satisfied with your new machine. If for any reason you are not

Satisfied with the service received, the following actions are suggested:

1. First, discuss the matter with your dealership service manager. Make sure he is aware of any problems you may have and that they have had the opportunity to assist you.
2. If you are still not satisfied, seek out the owner or General Manager or the dealership and explain the problem and request assistance.
3. For further assistance beyond that provided by your dealer, you may contact:

Locke Turf Inc. - Customer Service
307 Highway 52E
Opp, AL 36467
www.locketurf.com



Assembling The Sprayer

Tools and Equipment Needed:

- Hoist or Floor jack rated for at least 2,000 lbs.
- SAE wrenches
- A helper to assist in moving the sprayer

Refer to Figure 1-1

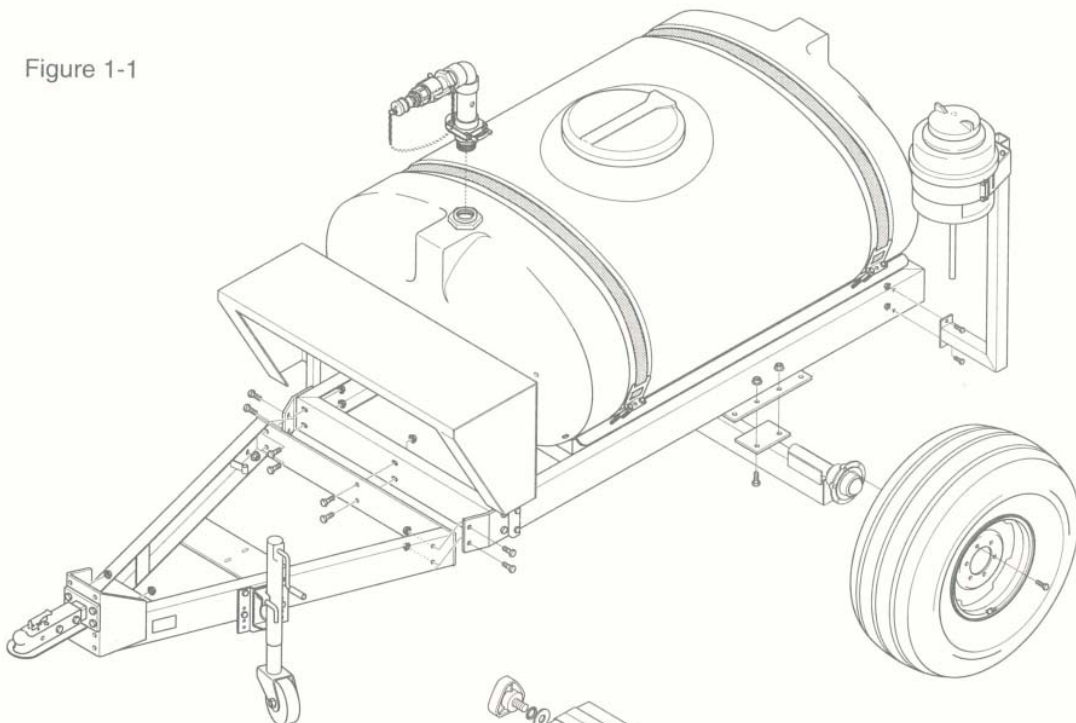


Figure 1-1

Mounting the Control Box

Refer to Figure 1-2

The magnet mount should be attached to a convenient location on the towing vehicle (fender, hood, etc.).

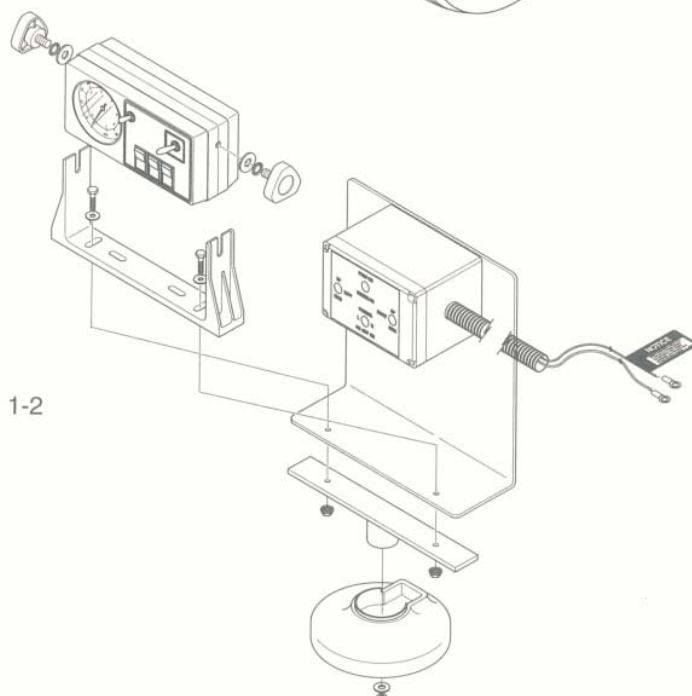
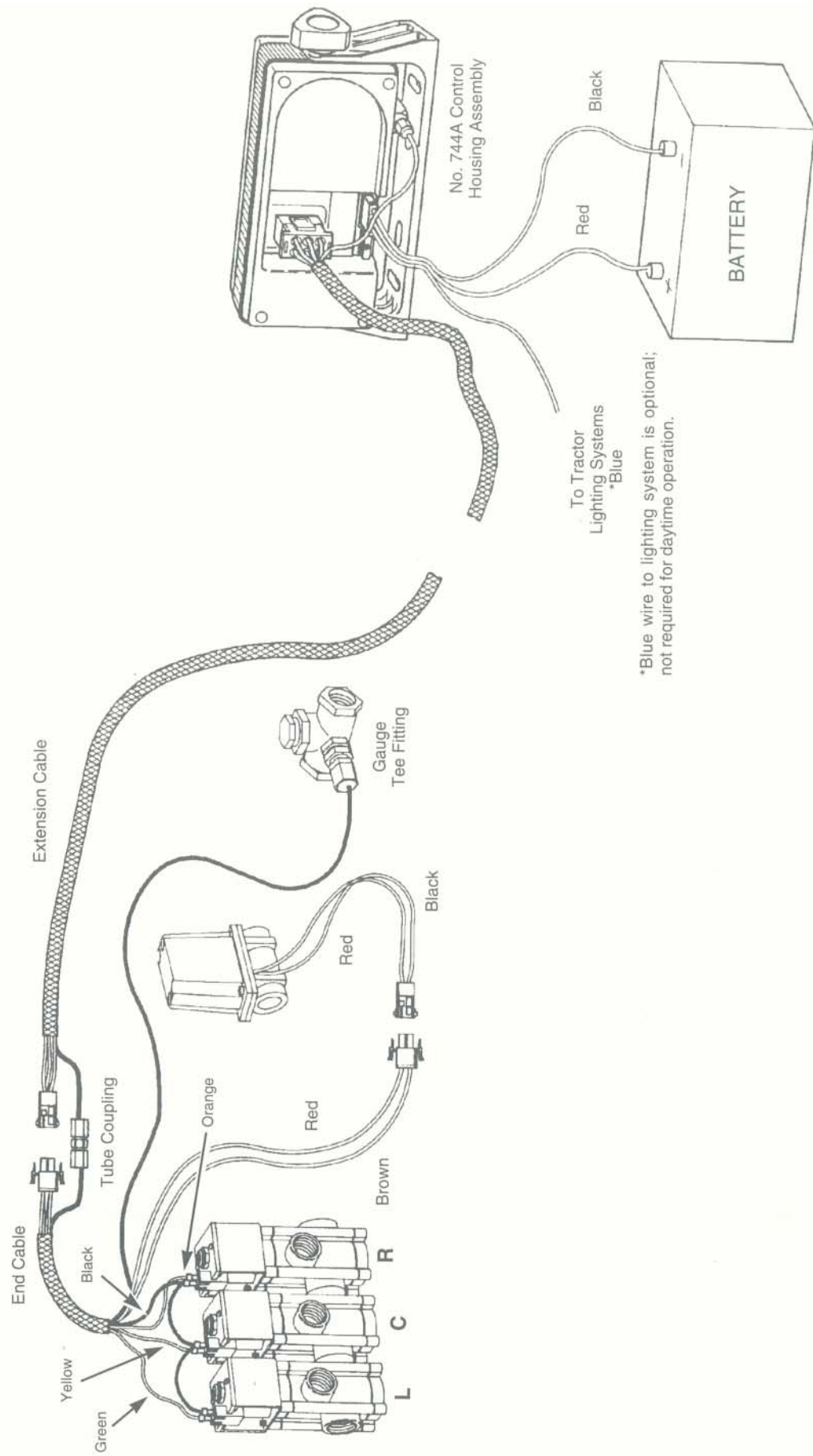


Figure 1-2

Control Box Wiring Diagram

Figure 1-3



This section describes the workings of the sprayer components and provides guidelines on their use. More detailed information can be found in *Preparing the Sprayer* in "General Operations" section starting on page 21.

Basic Sprayer Operating Guidelines

1. Make sure to read the label on the chemical compound that is to be applied; it is the law!
2. Consider how the chemical will be stored and how you will dispose of the chemical, according to the chemical label. Planning in advance may save much trouble later.
3. When calibrating, filling the tank or working around chemicals, wear protective clothing that covers the body. Refer to *Personal Safety Equipment* in the "Important Safety Information" section. Have soap and clean water available to wash any exposed areas. Never open a container with your bare hands.
4. Fill the hand wash tank on the sprayer with fresh water before handling any chemicals.
5. Fill the sprayer and mix the chemicals at an appropriate mixing site.
6. By law, you must repeat the rinsing of the chemical container three times. The container should then be punctured to prevent future use. An alternative is to jet-rinse or pressure rinse the container.

IMPORTANT: Any washing or mixing that produces contaminated liquid should take place at an appropriate mixing site. Chemically contaminated liquid should be captured in a holding tank for proper disposal and not be allowed to run off where it may contaminate fresh water sources.

7. Check the condition of hoses and connections frequently. Release system pressure before working on the sprayer by shutting off the pump and flipping the individual boom section switches on the control box. Always wear rubber gloves

when making repairs or adjustments to the spraying components.

8. If your sprayer boom is equipped with a level-float pin, remove it before operating the sprayer. The boom will float over the contours of the ground more effectively and minimize stress on the boom.
9. Apply spray when the wind is 5 mph or less. Minimize drift by using nozzle tips with the largest practical openings and by operating the sprayer boom at the lowest practical pressure.
10. Drive at the same speed you used in your calibration. Refer to *Miles Per Hour Calibration* in the Tee Jet manual.
11. If possible work crosswise to the wind, starting from the downwind side of the area to be sprayed. Do this so you won't ever be heading directly into chemical fumes.
12. As you operate the sprayer, be aware of all things that may be affected by the chemicals, such as adjoining property, houses, gardens, people, etc. Do not operate the sprayer if damage can occur.
13. When you are finished spraying, empty the tank and flush the sprayer with water, including the pump, the nozzles and the bypass line from the solenoids. Properly store the chemical emptied from the tank or dispose of it by the recommendations on its label.
14. When turning at the end of a run, make sure that the boom will not overlap on areas previously sprayed.

Plumbing Operations (Manual Control System Only)

Refer to Figure 2-1

An understanding of how the sprayer works will help you to operate your Locke Turf Sprayer. The basic operation of the sprayer as follows.



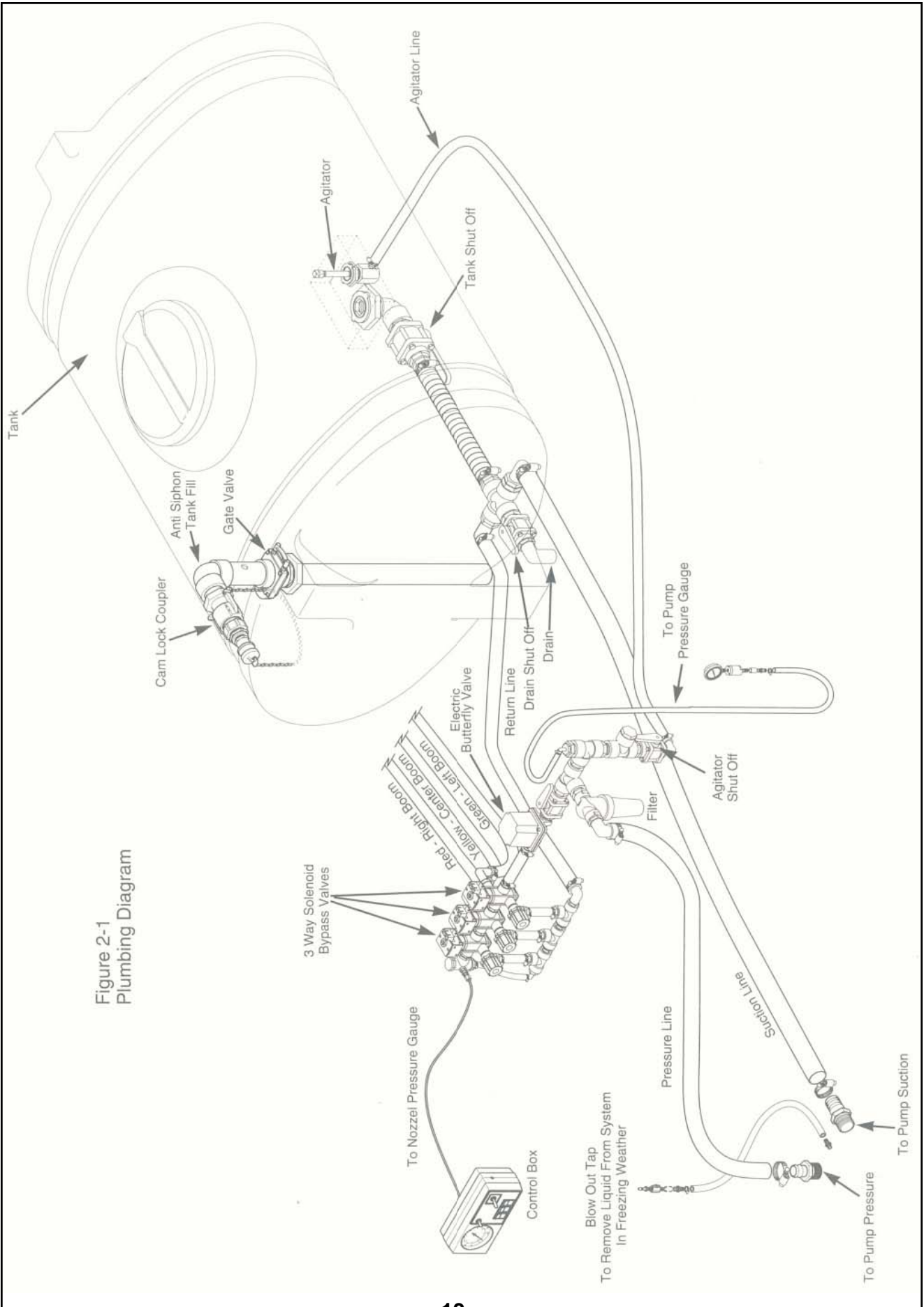


Figure 2-1
Plumbing Diagram

Fluid is drawn out of the tank sump and passes through the pump. From the pump the solution passes through the filter and filters out or grinds up most undissolved chemical and solid particles. The fluid then passes through the agitation valve and returns to the tank via the agitator head or proceeds through the pressure control valves. If the fluid passes through the electric pressure control valve, it proceeds to the 3-way solenoid valves. If a solenoid is on, its coil is energized and the connected valve is open. The fluid will pass through the valve and travel to the specific boom section (left, center or right) and is delivered to the area to be treated through the sprayer boom nozzles. If the particular switch is off, the solenoid is de-energized and the connected valve is closed. In this case, the fluid travels through the bypass and returns to the tank sump.

You can monitor the nozzle pressure gauge and adjust the pressure to the booms by adjusting the pressure adjust switch on the control box. The pressure adjust switch operates the electric pressure control valve. To set this valve, see *Pre-setting the Pressure Control Valves* in the next column. This will decrease the amount of flow to the electric pressure control valve and reduce its sensitivity.

There are tank shut off valves at every tank outlet so that if there is a leak, the contents of the tank can be secured and a chemical spill avoided. These valves (except for the tank drain valve) need to be fully open when the sprayer is in use.

Pressure Adjustment Valves

NOTE:

Refer to *Sprayer Parts Manual* if you need help identifying specific sprayer components.

The plumbing system is equipped with two pressure adjustment valves, electric and manual. The two valves work together and understanding how they work is important to proper sprayer operation.

The Electric Pressure Control Valve

The primary purpose of this valve is to allow the operator to adjust boom pressure while spraying. The electric pressure control is a 12 volt DC operated butterfly type valve. It is controlled by the pressure adjust switch on the control box. When the switch is engaged, electric current travels through the gearbox controlling the valve, causing the butterfly mechanism to move. The valve has no stops and can be adjusted a full 360 degrees.

The Manual Pressure Control Valve

The main purpose of this valve is to reduce the sensitivity of the electric pressure control valve so that small

movements of the butterfly valve mechanism won't result in uncontrollable changes in boom pressure. Without the manual pressure control valve, toggling the pressure adjust switch just a few times will result in fast pressure changes in boom pressure, adversely affecting application rates. This manual valve restricts the amount of flow to the electric pressure control valve, thus narrowing the range of pressure.

Pre-setting the Pressure Control Valves (Manual Control Systems Only)

NOTE:

Before beginning this procedure make sure your throttling valves are adjusted. Refer to *Calibrating the Throttling Valves* in General Operations starting on page 19.

To adjust the pressure control valves and achieve a desirable adjustment range at the control box, do the following:

1. Open the electric control valve (by toggling the pressure switch at the control box) until the valve is fully open.
2. Turn the boom sections off so that the liquid is traveling through the bypass line and returning to the tank.
3. Operate the pump at the same RPM you would when spraying.
4. Adjust the manual pressure control valve until the boom pressure as indicated on the pressure gauge by the control box is 10 to 20 PSI greater than the maximum application pressure.

The Drive Pump

IMPORTANT: The Hy Pro pump supplied with your sprayer is not designed for use with every application. Materials containing solvents, paints or solutions containing abrasives will damage the pump. If you are unsure of your chemicals, consult your dealer for suitability of your application.

IMPORTANT: Always use the MASTER on/off switch to control spraying action.

PTO Drives

The pump on this type of drive is powered by the vehicle's PTO shaft. The PTO shaft is manually operated by the driver and once engaged, turns regardless of gear selection. The speed of the PTO is directly proportional to engine speed. Higher engine RPM results in higher PTO (and pump) speed, and ultimately higher system pressure (70 lbs. PSI Max.) for spraying.

IMPORTANT: Do not use the vehicle's PTO control to control the spraying action. When the PTO is disengaged, the pump stops turning, all agitation of the chemical stops and the sprayer loses system pressure. Use the MASTER on/off switch of the boom section switches to control spraying action.

Anti-Siphon Fill Assembly



When filling the sprayer tank, make sure that the anti-siphon holes in the side of the tube are clear and open. The anti-siphon device prevents the solution in the tank from infiltrating into the fresh water source and contaminating it.

Your Locke Turf Sprayer tank is filled from the top through a standard 1-1/2" Cam-Lock coupler.

1. To fill the tank, first make sure that the tank drain valve is closed. Open the knife valve on the fill assembly.
2. Connect the fresh water hose to the quick-fill camlock coupler. Make sure that the anti-siphon holes in the side of the fill tube are clear and open.
3. Turn the water on and fill the tank. Do not allow the tank to fill unattended. When filled, close the knife valve.
4. Clean and fill the handwash tank.

Adding Chemicals to the Tank



Read the manufacturer's label carefully before handling chemicals. When you add the chemical, follow the manufacturer's instructions for mixing the spray solution in order to achieve the desired application rate. Always wear required protective gear.

1. Before adding chemical to the tank, make sure the tank is at least half full and the pump and agitation is operating. The concentrate should not be poured into an empty tank as this may clog the tank lines.
2. Keep the spray solution from skin. Wear protective clothing and goggles. If the solution comes in contact with the body, wash off the contaminated area with soap and water.
3. Keep chemical containers low when pouring.
4. Do not smoke while handling chemicals.

Using Handwash Tank

In the event when an accident occurs and chemical comes in contact with skin or eyes, use the handwash tank to flush away the chemical.

1. Open the tank valve and use the hose to direct the clean water on all contaminated areas. Wash all areas of skin that have been contaminated with soap and water. To flush out eyes, point the hose and water stream upward while lowering eyes into the stream of following water.
2. Close the tank valve and refill the handwash tank with fresh water.
3. Clean and refill the handwash tank with fresh water each time the sprayer is used. Always keep the handwash tank clean.

Operating the Filter

Your Locke Turf Sprayer is equipped with a Tee Jet filter to remove unwanted particles from the system and prevent the hoses from becoming clogged. The filter is located on the output line of the centrifugal pump and before the manual pressure adjustment valve. It filters the chemical solution being sprayed.

To clean out the filter, unscrew the main body, remove screen and clean with clear water.

Driving and Parking

1. Park your sprayer in an area where you will not hit power lines, building, etc. when boom is folded.



Contact with electrical power lines can cause death by electrocution.

2. Don't leave the sprayer unattended in an area where unauthorized persons may tamper with the sprayer, tank contents or controls.
3. Don't leave a filled sprayer without tagging or somehow identifying the contents. Someone may mistake a chemical filled tank for water and spray unwanted areas. Do not exceed 20 mph transporting your sprayer.
4. Do not unnecessarily transport sprayer while filled with chemical mixture.

Sprayer Pre-Calibrations

General Guidelines

1. Wear proper protective clothing as described in *Personal Safety Equipment* on page 6.
2. From the chemical manufacturer's label and field conditions, select a spray application rate and an operating speed.

IMPORTANT: If you are unsure of what you are doing, get help. Do not guess at application rates.

3. Be familiar with the type of chemical you are using. Completely read the label before starting.
4. Have all equipment ready before starting your sprayer calibrations.
5. Make sure all spray parts are free from foreign material and are functioning properly. Carefully inspect nozzles and internal parts for wear, defects, proper size and type.
6. Fill spray tanks with water at least one quarter full and preferably half full.
7. Use only water to calibrate the sprayer.
8. With the sprayer stationary, operate the pump at the desired spraying pressure. Check for leaks and improper spray patterns from the nozzles.
9. Read the following pages to determine which method of calibration you will use and have a clear understanding of how the procedure works.

Calibration Method #1

This method calibrates the sprayer and checks to make sure the nozzles are within specifications.

1. Select your desired application rate, either in gallons per thousand square feet or gallons per acre.
2. Select your desired gear or RPM setting for an appropriate spraying speed. Calibrate your speed to verify that the vehicle's speedometer is accurate. Refer to the following table *Miles Per Hour Calibration* for calibration values.
3. Find your desired application rate in the nozzle charts in this section. For every application rate there will be at least two nozzles that will yield the desired application. For applications that require **foliar coverage**, select the nozzle requiring higher pressure. This will produce smaller droplets. For **less drift** of for

chemicals that need to reach the oil surface, select the nozzle that uses lower pressure. This will produce larger droplets. For example, your desired gallon per thousand square feet (GPT) application rate is 1.01 GPT at 4 miles per hour. Refer to the nozzle charts in the Tee Jet manual.

4. Find the ounces per minute output for the nozzles to be used. See the Tee Jet manual.
5. With water in the sprayer, catch the nozzle output at the desired pressure for one minute. For large nozzles, catch the output for 30 seconds and multiply the amount by two.
6. If the nozzle is not within the \pm limit, check for obstructions or wear in the orifices of the nozzle. Take the cap off the nozzle, clean the orifices with a toothpick or brush and retest. If several nozzles test the same, but are not within \pm limits, a faulty gauge may be the problem. If two or more nozzles are outside the limit, it is a good indication that all of your nozzles may be worn. In this case, it would be advisable to replace all the nozzles with new nozzles.

Miles Per Hour Calibration

To determine true ground speed use the following table *Miles per Hour Calibration*, with the sprayer half-filled with water.

When measuring the speed of your vehicle, always simulate current spraying conditions as close as possible.

Miles Per Hour Calibration			
mph	Seconds to Travel 200 feet	mph	Seconds to Travel 200 feet
2.5	55	7.0	19
3.0	45	8.0	17
3.5	39	9.0	15
4.0	34	10.0	14
4.5	30	11.0	12.5
5.0	27	12.0	11.5
6.0	23		

Calibration Method #2

This method calibrates the sprayer, but does not check for worn nozzles.

This method gives you the distance driven to cover 1/128 acre (because there are 128 ounces per gallon). The time required to drive that distance is measured first and then volume of spray in ounces caught in the time you measured is your application rate in gallons per acre. From the chart below, determine the distance to drive in the field (three runs are suggested) to obtain your average time in seconds.

1. Determine your nozzle size, spacing (20" is standard on all Locke Turf Booms) and pressure to achieve your desired rate from the flow charts on the following pages.
2. Measure the nozzle spacing on your boom and determine the distance to drive to calibrate your sprayer.
3. Mark off the distance with two markers and time how many seconds it takes to drive this distance at the desired spraying speed. Make sure you are at spraying speed when you cross both marks. Two or more runs are suggested with the sprayer half full.
4. With the sprayer filled with water (no chemical added). Park in an appropriate area with the booms unfolded. Prepare to collect samples at the individual nozzles. Turn on the pump and run it at the operation pressure. If applicable, correctly set the solenoid throttling valves. Refer to *Calibrating the Throttling Valves* in "General Operations" section starting on page 21. Flip on the boom section switch on the control box and catch the water being sprayed out of the nozzle you are calibrating.
5. Measure the volume of the sample in ounces over the time it took to travel the distance in step #3. The number of ounces caught is the exact number of gallons per acre you will apply with that nozzle.

Distance for Each Nozzle to Spray 1/128 Acre

Average Nozzle Spacing (Inches)	Distance (Feet)	Average Nozzle Spacing (Inches)	Distance (Feet)
6	681	22	186
8	510	24	170
10	408	30	136
12	340	36	113
14	292	38	107
15	272	40	102
16	255	42	97
18	227	48	85
20	204		

Calibration Method #3

To double check the accuracy of your sprayer, the following instructions provide another method of calibration:

1. Measure 200 feet and determine the number of seconds required to travel this distance under field conditions with implements in working condition.
2. Place graduated container or pre-weighed container under one nozzle and catch the discharge for 1 minute. Divide 128 into the number of fluid ounces caught. 128 fluid ounces equals one gallon. EXAMPLE: 1 nozzle every 20" (standard for all turf booms).

EXAMPLE:

$$\text{Gallons per acre} = \frac{5940 \times \text{Gallon per minute}}{\text{Nozzle spacing in inches} \times \text{Miles per Hour}}$$

$$\text{GPA} = \frac{5940 \times .50}{20 \times 5}$$

$$\text{GPA} = \frac{2970}{100}$$

$$\text{GPA} = 29.7$$

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

Useful Formulas & Conversions

GPM TO OPM CONVERSIONS
 GPM (GALLONS PER MINUTE) X 128 = OPM (OUNCES PER MINUTE)
 EXAMPLE: 0.5 GPM X 128 = 64 OPM

OPM O GPM CONVERSIONS
 OPM (OUNCES PER MINUTE) ÷ 128 = GPM (GALLONS PER MINUTE)
 EXAMPLE: 32 OPM ÷ 128 = 0.25 GPM

AREA COVERAGE
 A 20' WIDE BOOM (STANDARD FOR TURF SPRAYERS) COVER
 2.4 ACRES PER 1 MILE OF TRAVEL

GALLONS PER HOUR TO GALLONS PER MINUTE CONVERSION:

$$\text{GPM} = \frac{\text{GPA} \times \text{MPH} \times \text{W}^*}{5940}$$
 W* = NOZZLE SPACING IN INCHES

GALLONS PER MINUTE TO GALLONS PER HOUR CONVERSION

$$\text{GPA} = \frac{5940 \times \text{GPM (PER NOZZLE)}}{\text{MPH} \times \text{W}^*}$$
 W* = NOZZLE SPACING IN INCHES

Spraying Solutions Other Than Water

The calculations in this section are based on spraying water, which weighs 8.34 pounds per U.S. gallon. The conversion factors in the table must be used when spraying solutions which are heavier or lighter than water. In order to determine the proper size nozzle for the solution to be sprayed, multiply the desired GPM or GPA of solution by the water rate conversion factor. Then use the new converted GPM or GPA rate to select the proper size nozzle.

Density Conversion Table

Weight of Solution (lbs./Gal.)	Solution Specific Gravity	Conversion Factor
7.00	.84	.92
7.50	.90	.95
8.00	.96	.98
8.34 (Water)	1.00	1.00
8.50	1.02	1.01
9.00	1.08	1.04
9.50	1.14	1.06
10.00	1.20	1.10
10.50	1.26	1.12
10.65 (Nitrogen 28%)	1.28	1.13
11.00	1.32	1.15
11.50	1.38	1.18
12.00	1.44	1.20
14.00	1.68	1.30

EXAMPLE Calculation for spraying nitrogen:

It is desired to apply 34 GPA (gallons per acre) of nitrogen in 20" rows. (28% N, density if 10.65 lb/gal from the chart above)

From the Density Conversion Table, we find the conversion factor for 28% nitrogen is 1.13.

GPA (Solution) x Conversion Factor = GPA
 (34 gal/acre) (1.13) = 38.42 gal/acre on the nozzle charts.



Boom Height

The boom height should be 24" as measured from the nozzle to the ground surface. This is the standard boom height for all turf booms. This distance is set during assembly and should not be changed. Any change in this height will affect the spraying coverage. At a boom height of 24" the overlap of the nozzles is 100%.

Tank Straps

The tank straps that wrap around the sprayer tank may become loose after the first few hours of operation. This occurs when the tank settles in the saddle. Polyethylene tanks are especially susceptible to this. Retighten the tank straps to secure tank.

Pump Mount

Check the hardware mounting the pump to the sprayer frame after the first few hours of operation. Tighten if necessary.

Solenoids & Throttling Valves (Manual Control System Only)

The electrical solenoids used to turn on the individual boom sections are three way valves. These valves route the product flow to the boom sections or back to the tank sum, depending on whether the boom section switches on the control box are turned on or off.

When a boom section switch is turned to the off position, the electric solenoid is de-energized and the valve is closed, diverting the flow back into the tank sum. To insure that the flow going to the boom section and the flow going back to the tank's sump are the same, a throttling valve is used to adjust the flow returning to the suction inlet of the pump. If the throttling valves are not set equally, their flows are not equal and every time the boom section switch is flipped, the pressure will either rise or decrease in the other boom sections, causing the sprayer to over or under apply chemical in those boom sections.

To set the three solenoid throttling valves, refer to *Calibrating the Throttling Valves* in "**General Operations**" section starting on page 21.

Pressure Adjustments (Manual Control System Only)

One of the most important areas of controlling the sprayer accuracy is to have the proper pressure when spraying. Refer to *Pre-setting the Pressure Control Valves* in "**General Operations**" section starting on page 21.

The pressure is determined when the sprayer is calibrated. Refer to *Calibration Method #1* in the "**Turf Application Guide**" section starting on page 16.

The electric pressure control valve is used to adjust the pressure to the booms. It is controlled with the

Pressure adjust switch on the control box. The boom pressure is displayed by the boom pressure gauge. To adjust the pressure, hold the pressure adjust toggle switch up for more pressure, down for less pressure.

When the manual pressure adjustment valve is fully opened, the pressure adjust switch is very sensitive. To decrease the sensitivity of the pressure adjust. Set the manual pressure adjustment valve.

To set the manual pressure adjustment valve, fully open the electric pressure control valve with the pressure adjustment switch. Close the manual pressure adjustment valve so the pressure is about 20 psi greater than the desired application pressure. With this valve set, it will decrease the flow through the electric pressure control valve and reduce the sensitivity of the pressure adjustment switch.

Solenoid Valve Adjustment

Refer to Figure 4-1:

NEVER REMOVE THE THROTTLING VALVE FROM THE VALVE BODY WITH CHEMICAL IN THE SPRAYER. DOING SO WILL CAUSE A CHEMICAL SPILL AND WILL EXPOSE YOU TO THE CHEMICALS, CAUSING PERSONAL INJURY AND DAMAGE TO SURROUNDING VEGETATION AND/OR PROPERTY.

The solenoid valves must be properly adjusted in order for the valve to stay open for long periods of time while spraying. Also, if the solenoid is out of adjustment, the valve may leak through the bypass port.

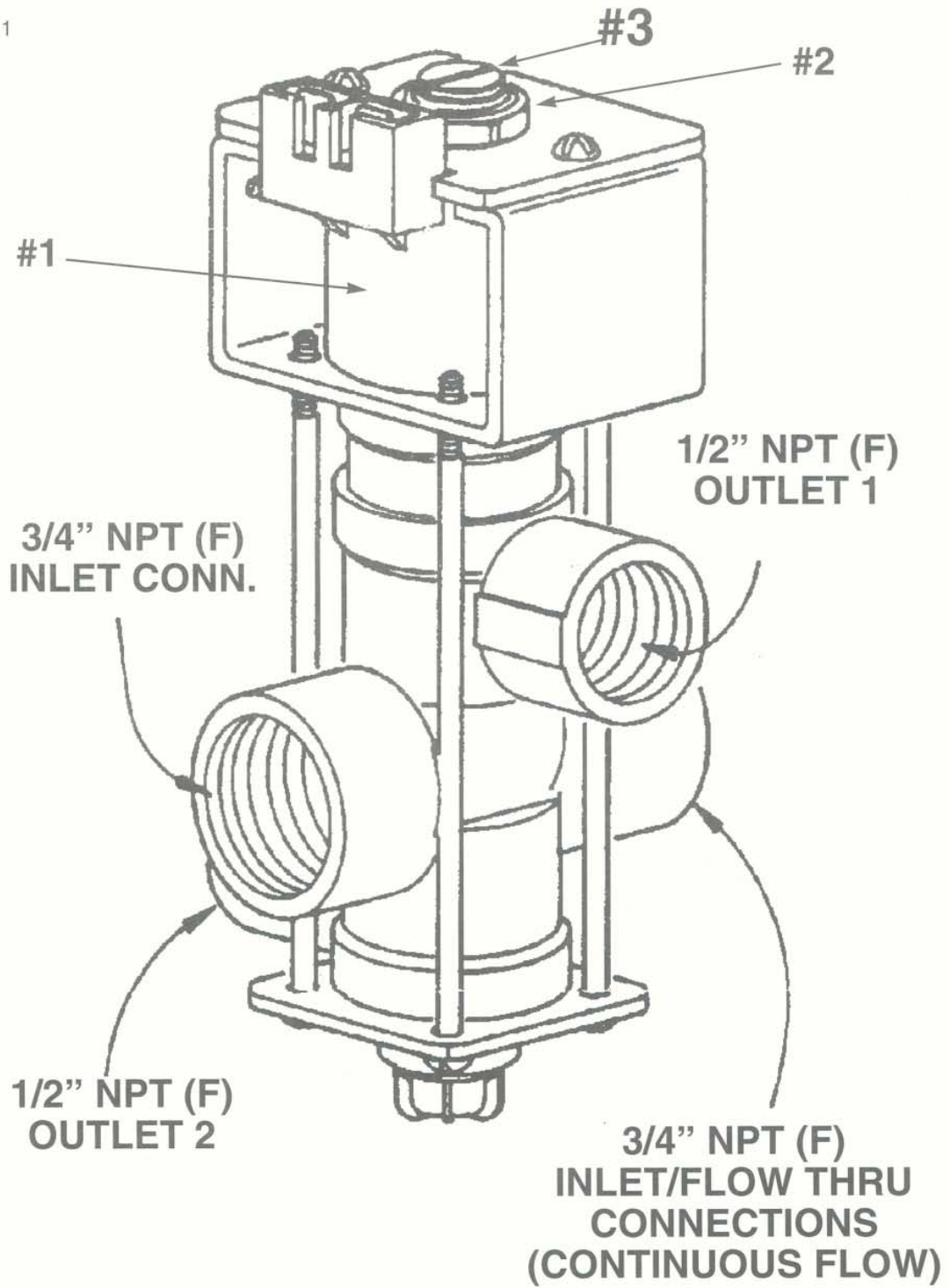
If sections of the boom switch off by themselves during spraying and the coil (#1) is hot, the valve is out of adjustment. This can be corrected by adjusting the armature stop.

Valve Adjustment Procedure

1. Make sure that the Boom Control Switches are in the "off position before continuing.
2. Loosen the jam nut (#2) with a box-end wrench.
3. While holding Jam Nut #2, turn the armature stop (#3) clockwise with a large standard screwdriver 1/4 turn.
4. Now turn on corresponding switch and listen for a "click" indication coil is energized.
5. Repeat step 4 until a "solid" contact sound is heard. This adjustment is necessary only if you have problems with the solenoid.
6. After adjustment is made, tighten jam nut.

SOLENOID VALVE

Figure 4-1



General Notes for Field Operation

1. Lubricate the sprayer as needed. Refer to “**Maintenance and Lubrication**” section starting on page 24.
 2. When transporting the sprayer, do not exceed 20 mph and do not unnecessarily transport with chemical in the tank. Fasten the level-float pin in the lock position (if applicable) before folding the boom and transporting it.
 3. Make sure all tank shut off valves (except the tank drain) are opened.
 4. Calibrate sprayer with water only. Calibrate with the sprayer tank half full of water. Refer to Tee Jet Manual.
 5. Adjust throttling valves on the solenoids and the manual pressure adjustment valve.
 6. Inspect and clean, if necessary, pump nozzles and filter.
 7. Make sure the material you wish to apply can be used in your sprayer without causing damage to the pump seal.
2. Open tank and inspect interior for contaminating materials.
 3. If the sprayer is equipped with a pump drive engine (in addition to the vehicle’s engine), check fuel and oil levels.
 4. Perform an electrical system check on the boom solenoids and pressure control switch. The solenoid switches will emit an audible click when the switch is opened or closed. The pressure control valve will make noise when the pressure control adjustment switch is engaged. If any part fails, refer to “Troubleshooting” section starting on page 26. Turn all switches off when finished with this step.
 5. Open the pump suction valve.
 6. Open the agitation valve. Refer to Figure 5-1 if you are not sure whether a valve is open or closed.

Figure 5-1 Valve Position Identification

IMPORTANT

The Hy Pro pump supplied with your sprayer is not designed for use with every application. Materials containing solvents, paints or solutions containing abrasives will damage the pump. If you are unsure of your chemicals, consult your dealer for suitability or your application.

8. Safely and carefully add the chemical to the sprayer tank. Always wear protective equipment when handling chemicals. See *Personal Safety Equipment* in “**Important Safety Information**” section starting on page 5. By law, chemical containers must be rinsed three times. The container should then be punctured to prevent future use. An alternative is to jet-rinse or pressure rinse the container. Follow chemical manufacturer’s recommendations for safe handling of chemicals.
9. Check the sprayer initially and periodically for loose bolts, pins and hose clamps. Check the hoses, pumps, valves and fittings for leaks.
10. Make sure that the hand wash tank is full of clean water.

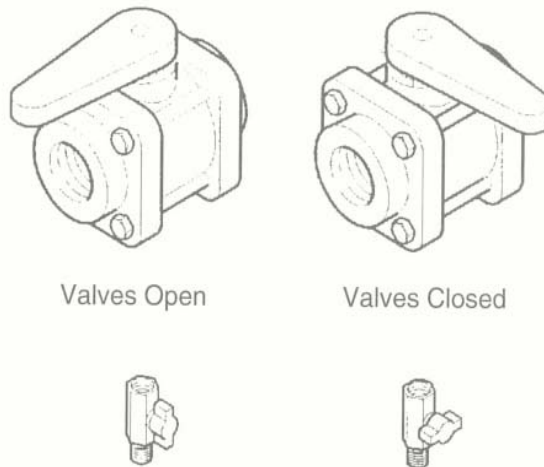
Preparing the Sprayer

NOTE

Refer to Plumbing Diagram on page 13 if you need help identifying specific sprayer components.

1. Close drain valve, air clean out valve and filter clean out valve.

Figure 5-1 Valve Position Identification



7. Open the manual pressure control valve located next to the electric pressure control valve.
8. Extend the boom sections. Check with the Boom Operator’s manual if you are unfamiliar with the operation of the boom. If using a level float boom, remove the locking pin.
9. Some booms are equipped with a ball valve at each nozzle. If so equipped, open these valves.
10. To operate the turf boom at a 15’ width, fold the outer sections of the boom and close the ball valves in front of the nozzles in the outer sections. Note: this option is not present on all booms.
11. Attach water hose to the anti-siphon fill assembly. Make sure the knife valve is open and fill the tank at least 1/3 full, more if performing complete systems check.

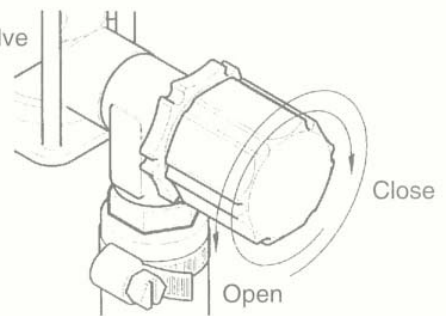
12. Start the vehicle's engine (and pump engine if so equipped), turn the master switch on (turning on the pump) and set the throttle to maintain a minimum of 50 PSI on the agitation gauge. If agitation pressure does not rise immediately, prime the pump by bleeding air through the air clean out valve. Open the air clean out valve and insert sharp object on the air valve core to let air escape for ten seconds or until water is seen at the valve. Close the air clean out valve. An alternative method is to slightly open the filter clean out valve, closing it once water is seen at the valve.
13. Visually inspect hoses and all connections for leaks.
14. Refer to Tee Jet manual to determine pressure and speed for desired chemical application rates.
15. Turn the boom section switches on and adjust the manual pressure control valve to 10-20 PSI above the desired operating pressure. This reduces the sensitivity of the electric pressure control valve and allows more precise adjustment from the control box.
16. Calibrate throttling valves as described in the next section. Calibration is not necessary every time the sprayer is used but must be performed after chemical changes and to ensure the system is operating properly. It does not harm the system to recalibrate the throttling valves each time the sprayer is used.
17. Remove the nozzles from the check valve bodies and flush the boom feed lines briefly by turning the boom sections on. This will remove any debris that may accumulate in the feed lines. Turn the boom sections off, inspect the check valves and diaphragms and replace the nozzles.
18. Visually inspect nozzle spray patterns for streaking or plugged nozzles. Clean or replace worn or damaged nozzles as needed. Set the nozzle angle at 20 degrees rearward.

Calibrating The Throttling Valves

Refer to Figure 5-2:

1. Start by closing all three gray throttling valves by loosening the jam nut and tightening the knobs all the way down and then backing off each knob one complete turn. Do not use excessive pressure.
2. Start the engine and turn the master switch on.
3. Turn on all three boom section switches at the control box.
4. Adjust the pressure adjust switch on the control box until the nozzle pressure measures 20 PSI as indicated on the large gauge at the control box.
5. Turn the left boom section off. Leave the other two sections on. This will cause the boom pressure to increase at the other two boom sections.

Figure 5-2
Throttling Valve



6. Adjust the gray knob on the left throttling valve until the pressure again measures 20 PSI on the large gauge. Firmly lock the gray jam nut against the knob to hold the knob's position.
7. Turn the left boom section on and off several times. If the pressure does not stay at 20 PSI, readjust the gray knob.
8. When finished with the left boom section, proceed to the center boom section. Turn the left boom section on, the center boom section off and the right boom section on. Adjust the center throttling valve in the same manner as the one just completed.
9. When finished with the center boom section, adjust the right boom section. Turn the right section off, the center and left boom sections on and calibrate the right valve in the same manner.

All three throttling valves are now set to maintain constant boom pressure regardless of which boom sections are turned on.

When spraying at high gallon rates or extremely viscous spray solutions you may see the pressure rise when all three sections of the boom are turned off. This condition is caused by too much fluid trying to bypass back to the tank agitation. As long as the boom pressure returns to the desired gauge pressure when one or more boom sections are on, there are no adverse effects on spraying accuracy.

Adding the Chemicals

NOTE

These procedures are general guidelines for mixing chemicals. Carefully follow the manufacturer's instructions and use these steps in addition when applicable.

IMPORTANT

If you have not calibrated your sprayer, do so before starting this section.

1. If using a wettable powder, make a slurry in a separate container by adding water to the chemical, in accordance with the manufacturer's instructions.

2. Add the slurry to the sprayer tank with the pump running and the agitation valve open. The agitation pressure should be at 50 PSI and all boom sections should be off.
3. Add other fertilizers or chemicals once the original slurry is circulating throughout the system. Continue filling the tank with water (or other specified liquid carrier). Do not leave the sprayer unattended.
4. Let the sprayer run for 5-10 minutes before spraying the chemicals to allow adequate mixing.
5. See manufacturer's recommendations to determine the application rate for the desired chemical and Tee Jet to determine the specific application pressure and travel speed for your application.
6. Turn the boom on when the vehicle is moving to prevent over-applying the chemical in any one spot. Operate the pressure adjust switch on the control box to adjust boom pressure while spraying.

Emptying the Tank after Spraying

1. Empty the tank while spraying whenever possible. Closing the agitation valve when the tank is nearly empty will allow you to almost completely empty the tank on the field.
2. Use the drain hose to empty the tank.

NOTE

If you have access chemical remaining in the tank, it must be handled and disposed of in an EPA approved method. Consult the manufacturer's label. Do not empty chemicals into drains, sewers or onto the ground as it can contaminate nearby water sources!

3. If you are changing chemicals or preparing the sprayer for storage, the entire system, including pump, hoses and boom sections needs to be emptied and cleaned.

Cleaning the Sprayer

1. After emptying the sprayer tank, add clean water to the sprayer and allow it to circulate through the system. Spray this rinse water onto the field that was last sprayed. While the sprayer is being flushed on the field, turn the boom sections on to flush out the boom sections, check valves and nozzles and turn them off to flush out the throttling valves and bypass lines. Repeat this step several times. Make sure the solenoid and throttling valves are thoroughly cleaned. See *Cleaning the Solenoid and Throttling Valves* in next column.
2. The boom pressure gauge is equipped with a ball valve that is used to clean out any chemical that has built up under the gauge protector. With clean water in the sprayer tank and the pump running

open the ball valve and allow the discharge from the hose to flow into a bucket. After the liquid turns clear, close the valve and return the contents of the bucket into the tank.

Using the Air Cleanout Valve

1. Open all valves including drain valve. Allow the tank to drain completely.
2. Open the air cleanout ball valve and attach a shop air line (30 PSI maximum, safety clip type recommended) to the air valve.
3. Close the pump suction valve located under the tank. The air will force out any water in the agitator line, agitator head and the line connected to the boom pressure gauge.
4. Close all valves except the manual pressure control valve. Turn on the master, left, center and right control switches. Allow the air to blow out all boom feed lines, manifolds, nozzle lines, check valves and nozzles. A whistling sound will be heard at each nozzle when it is clear.
5. Disconnect the air line and close the valves.
6. Open the filter drain valve and allow any liquid and foreign material in a safe and responsible manner.

Cleaning the Solenoid and Throttling Valves

Solenoid and throttling valves must be flushed with clean water daily to assure proper valve operation.

1. With the pump running and the master switch on, turn on the three boom sections to flush out sprayer nozzles.
2. Turn all boom sections off to force water through the throttling valves and bypass line. Repeat several times.
3. Periodically clean each throttling valve by unscrewing its gray knob until it stops. Allow the valve to thoroughly flush with water.
4. Recalibrate the throttling valves as described in the previous section before using sprayer again.

IMPORTANT

When finished with the sprayer, make sure all switches on the control box are off.

Protecting the Sprayer from Freezing

If the sprayer is to be stored in freezing or near-freezing conditions, protect the pump and plumbing system by draining and cleaning the system and pumping RV anti-freeze solution through the plumbing system.

NOTE

Locke Turf strongly recommends the use of recreational vehicle anti-freeze.

Maintenance

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

Equipment Clean Up

Cleaning your sprayer is one of the most important parts of a regular maintenance program.

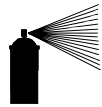
Nozzles should be cleaned with a low pressure air hose and replaced when out of tolerance. Have a source of water near by so you can clean the spray tank and applicator out in a suitable location. Never wash tank out in the yard or at a car wash.

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

While the sprayer is being flushed at the field, turn the boom section switches on to flush the nozzles, then turn them off to flush out the throttling valves and bypass lines. Repeat this procedure several times. Periodically clean each throttling valve by unscrewing the adjustment knob until it stops. Flush it with the fresh water by operating the pump with the boom section switches off. Reset the solenoid throttling valves as described in *Solenoids & Throttling Valves* on page 19.

The boom pressure gauge has a ball valve that is used to clean out any chemical that has built up under the gauge protector. With the sprayer tank full of water and the pump running, open the ball valve and allow the water to run in a bucket. After the liquid coming out of the hose turns clear, turn off the ball valve and dump the contents of the bucket into the sprayer tank.

Lubrication Legend



Multipurpose
Spray/Lube



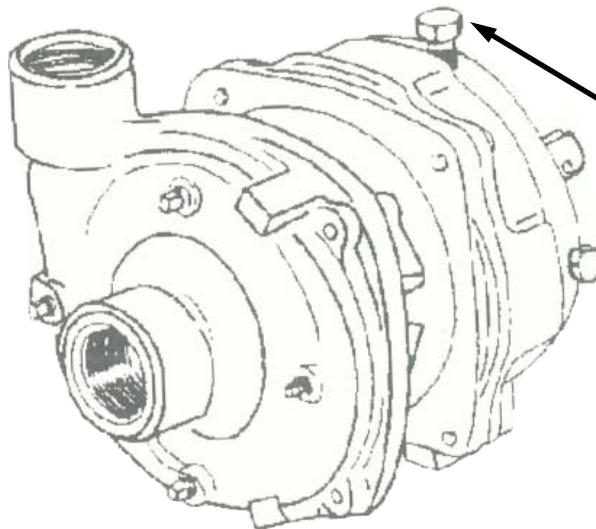
Multipurpose
Grease Lube



Multipurpose
Oil Lube



Intervals At Which
Lubrication is Required



GEAR CASING

(on models equipped with PTO pump only)

IMPORTANT - Replace oil plug with vented plug before operating pump for proper ventilation.

Side plugs are not oil level indicators. Gear case operating capacity is 6 oz. Phillube SAE 80W90 or equivalent. Overfilling may cause gear case damage.

General Maintenance Information



BEFORE SERVICING OR MAKING ADJUSTMENTS ON THE SPRAYER, ALWAYS DISENGAGE POWER, SHUT OFF THE ENGINE, MAKE SURE ALL MOVING PARTS HAVE STOPPED AND ALL PRESSURE IN THE SYSTEM IS RELIEVED.

Check the conditions of hoses and connections frequently. Release the system pressure before working on the sprayer. To release the pressure. Flip the boom section switches on and off without the pump running. Always wear rubber gloves when making repairs or adjustments. Make sure all personal Safety Equipment (gloves, goggles, etc.) listed in page 6, is stored in an easily accessible place but protected from potential contamination from dust or chemicals.

Check the sprayer for any loose bolt, pins and hose clamps. Check the straps holding the tank in place and tighten when necessary.

Check the hoses, pumps, valves and fittings for any leaks.



NEVER USE FINGERS, HANDS OR ANY PART OF YOUR BODY TO INSPECT THE SPRAYER! IF YOU SUSPECT A LEAK, USE A PIECE OF THICK PAPER, CARD STOCK OR CARDBOARD INSTEAD OF YOUR FINGERS TO FIND THE LEAK. MAKE SURE YOU ARE WEARING ADEQUATE EYE PROTECTION WHEN VISUALLY INSPECTING FOR LEAKS. HIGH PRESSURE LIQUID CAN EASILY PENETRATE SKIN!

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

Pump Maintenance & Repair

The Hy Pro pump (also refer to Hy Pro Pump Manual) is designed for long life and service. Eventually, there may be a need to replace the mechanical seal or service some component of the pump. A mechanical seal may weep slightly but if it starts to drip, the pump will have to be disassembled. Before you disassemble the pump, be sure to wash it out with fresh water.

If the pump is leaking, before you remove it from the sprayer, run the pump with adequate water in the tank to diagnose the actual pump problem. If fluid leaks out between the suction housing and the pump volute housing, the housing gasket may be dried out. Give the gasket adequate time to absorb moisture and swell up. If necessary, retighten the volute housing by alternating on opposite sides until all nuts are torqued to 16—18 ft.lbs. It is a good practice to apply grease to both sides of the gasket to prevent shrinkage.

If the pump seal is leaking causing a drip between the volute housing and aluminum bearing housing, the seal may be covered with gritty chemical residue. If the ceramic part of the seal is cracked, the pump may have been run dry. If the pump seal spring does not firmly attach to the impeller during assembly it will come out of alignment and cause the seal to leak. In this case the impeller will need replacement. Any damage to the pinion shaft may cause pump leakage.

If the pump is not leaking it can be pressure tested by closing the agitation valve and the manual pressure control valve to build up maximum pump pressure. At high engine speed, the pump pressure should register 70—80 psi on the agitation gauge. If pressure fluctuates, the impeller may be loose or clogged with debris. The impeller can be opened and cleaned by removing six screws in the back side of the impeller.

Carefully inspect the fiberglass housing for cracks, especially around the webs and bolt holes. Air leaks will prevent the pump from building up pressure.

SPECIFICATIONS AND CAPACITIES

Type of Sprayer	Trailer Sprayer
Model Number	TR20 (200 gallon poly) TR30 (300 gallon poly)
Weight, Empty, without boom	
Weight, Filled w/water, without boom	
Available Booms	20' Level Float Boom (Manual Fold) or 20' Electric Fold Boom
Tank, Poly	200 gallon or 300 gallon low profile oval w/ 16" hinged lid, fill basket, 2" anti-siphon fill assembly w/ quick disconnect
Boom Nozzle Height	24"
Nozzle Spacing	20"
Nozzles	TeeJet Nozzles
Controls	Manually operated electrically controlled (standard) TeeJet 744A One 3-1/2" 0-100 psi liquid filled gauge One 2-1/2" 0-100 psi liquid filled gauge TeeJet 844
Pump	Hy Pro
Drive	Vehicle PTO driven Engine Drive (optional)

Quick Troubleshooting

Use this chart to help diagnose problems with the sprayer.

Problem	Solution
Pressure Decreasing	Rebuild or replace pump
	Clean hose and reduce cause of clogging
	Clean out or replace filter
	Open gauge clean-out valve and flush gauge protector
Pressure Fluctuating	Remove obstruction from clogged area
	Align agitators properly
	Replace pump housing
Pressure Increasing	Remove material with soft brush or air
	Remove obstruction from clogged area
	Use cable ties to position hose so it will not kink
Pressure Cannot Increase	Reduce swath width by nozzle reduction; install smaller Nozzles & drive at a lower rate of speed
	Replace or repair
	Test switch and replace if faulty
	Replace fuse
	Open the manual pressure valve all the way and allow the electric ball valve to govern the pressure.
No Pressure	Make sure all tank shut-off valves are open
	Tighten fittings so pump can prime
	Replace hose
	Remove obstruction
Pressure Cannot Decrease	Switch hydraulic hoses in the pump outlet
	Tighten PTO coupler
	Check that the agitator valve is open and that the liquid is being agitated

Detailed Troubleshooting - Pressure Problems

Use the charts in this section for specific diagnosis of sprayer problems. When troubleshooting, try the solutions in the order presented. If the first step does not solve the problem, continue until the problem is solved. If none of the steps solve the problem, call your dealer for help.

Problem	Solution
<p>1. No Pressure Reading on agitation gauge after starting engine.</p>	<ul style="list-style-type: none"> a. Make sure there is fluid in the tanks (Yes, it has happened!) b. Make sure that agitation valve, manual pressure control valve, pump suction valve and bypass valve are open. c. On electric clutch units, check drive belt. Tighten if necessary. d. On PTO drive units, check coupler between engine and pump. Tighten if necessary. e. Make sure that gauge cleanout, air cleanout valve, filter drain valve and tank drain valve are closed. f. Check for obstructions in bottom of tank and in suction hose and fittings. g. Tighten all ball valves, hose clamps and fittings on suction side of pump to stop any air leaks that prevent pump from priming. h. Check for collapsed suction hose. i. If unit is equipped with an electric clutch, check for power to clutch. j. On hydraulic units, make sure vehicle's hydraulic PTO is engaged. k. Hydraulic lines may be disconnected or connected backwards.
<p>2. Pump is primed, but very low pressure registers at agitation or control box gauge</p>	<ul style="list-style-type: none"> a. Clean filter. b. If filter is clean, check for chemical buildup under rubber diaphragm in gauge protector or at gauge inlet hole if diaphragm is broken. Replace diaphragm if broken, clean hose leading to agitation gauge if necessary. c. With pump operating, clean hose leading to control box gauge by using ball valve located on remote magnet mount. d. Check for cracked pump suction housing and volute housing. Replace if necessary.
<p>3. Pressure gauge on control box fluctuates while spraying.</p>	<ul style="list-style-type: none"> a. Pump could be losing prime. Tighten all hose clamps, fittings and valves on suction side of pump. b. Check that the air clean out valve is closed. c. With pump operating, clean hose leading to control box gauge by using ball valve located on remote magnet mount. d. If fluctuation occurs only when tank level is low, problem could be caused by vigorous agitation or whirlpools in tank. Turn agitation head so jets are aimed toward corners of tank. e. To empty tank completely while spraying, turn off agitation ball valve while spraying the last few gallons. f. Fluctuations in engine speed will cause pressure to change. Make sure that engine speed is constant. g. If a filter is installed on suction side of pump, clean this filter. h. Check for foreign matter blocking the tank or floating inside of pump suction line. i. On hydraulic drive units, check hydraulic fluid level. Add fluid if needed.

Problem	Solution
<p>4. Agitation gauge registers pressure but control box gauge reads zero or is very sluggish after nozzles are turned off.</p>	<ul style="list-style-type: none"> a. On PTO drive units, check coupler between engine and pump. Tighten if necessary. b. With pump operating, clean hose leading to control box gauge by using ball valve located on remote magnet mount. c. Check gauge protector to see that it is filled with oil to within 1/8" of top of threaded hole. d. Swap agitation gauge and control box gauge to check for faulty gauge. e. Inspect electric solenoid valves to see that they are opening and closing properly. Solenoid valves require 12 volts to open properly. Valves may need cleaning, adjustment, repair kit or new coil. <i>Low voltage or a weak battery will result in valves not opening completely.</i>
<p>5. Moving the pressure adjust switch on the control box does not change nozzle pressure but both gauges show some pressure.</p>	<ul style="list-style-type: none"> a. Check that manual pressure control valve is open. b. Turn sprayer and engine off, hold the pressure adjust switch and listen at the electric pressure control valve for whirring sound which indicates that the motor is turning the valve. c. With the engine running, visually inspect the nozzles to see if the pressure is changing. If pressure is changing, clean hose leading to control box gauge by using ball valve located on remote magnet mount. If problem persists, swap agitation gauge and control box gauge to check for faulty gauge. d. If whirring sound is not heard, check electrical connections and fuse in the control box. e. If fuse is good, check with 12 volt tester to see if pressure adjust switch is receiving current from fused wire and sending signal to the electric pressure control valve. Replace switch if faulty. f. If current is good, check with 12 volt tester to see if pressure adjust switch is receiving current from fused wire and sending signal to the electric pressure control valve. Replace valve if faulty.
<p>6. Nozzle pressure cannot be reduced below 20-30 psi.</p>	<ul style="list-style-type: none"> a. Check electric pressure control valve operation as follows: With unit spraying, hold the pressure adjust switch up. The pressure on the control box gauge should increase to a maximum pressure, remain high for about 10 seconds and then drop to minimum pressure. Check wire connections, valve operation and voltage to switch and valve. Replace valve if necessary. b. Tank agitation may be restricted. Check that agitation valve is open and agitator head has four jet streams shooting out. c. Relieve excess pressure on electric pressure control valve. Open electric pressure control valve to maximum pressure, then close the manual control valve unit control gauge reads 15-20 psi above desired nozzle pressure.
<p>7. During calibration control box gauge reads about 30 psi. Nozzles are spraying about 10 psi. When catching flow of nozzles, there is a large pressure drop.</p>	<ul style="list-style-type: none"> a. Check application guide for flow rate and catch nozzle flow to determine pressure drop. b. Swap agitation gauge and control box gauge to check for faulty gauge. c. Check for clogged or pinched boom feed lines from solenoids. d. Inspect electric solenoid valves to see that they are opening and closing properly (Page 19). Solenoid valves require 12 volts to open properly. Valves may need cleaning, adjustment, repair kit or a new coil. <i>Low voltage or a weak battery will result in valves not opening completely.</i>

Problem	Solution
<p>8. Suspect faulty control box gauge because pressure changes when turning off boom sections.</p>	<p>a. Throttling valves are becoming plugged. Open gray throttling valve with nozzles turned off and allow flow to flush out valves for about 15 seconds per valve. Reset throttling valves.</p>
<p>9. After correctly setting the throttling valves, boom pressure will not stay constant when a section of the boom is turned off.</p>	<p>a. Throttling valves are becoming plugged. Unscrew gray knob on throttling valve with boom sections turned off and allow to flow to flush out valves for at least 15 seconds per valve. Reset the throttling valves when finished.</p> <p>b. Look for a restriction in the bypass line between the throttling valves and the tank. If nozzle pressure returns to normal when one or more boom sections are turned on, spraying accuracy is unaffected.</p>
<p>10. Cannot increase boom pressure to desired setting although pump and plumbing systems are set and operating correctly</p>	<p>a. Check GPM flow to be sure that pump has the capacity to spray the desired volume.</p> <p>b. Change to smaller size nozzles.</p> <p>c. Reduce flow to agitation by partially closing agitation valve. Make sure that there is still adequate agitation after adjusting.</p> <p>d. Check to be sure that manual pressure control valve is open.</p> <p>e. Increase engine RPM to increase pump output.</p>
<p>Plumbing Problems</p>	
<p>11. Flow to one boom section is different than flow to other boom sections (as confirmed by catching flows of each nozzle).</p>	<p>a. Low Flow: Check the boom feed line for that boom section for blockage or kinks. Inspect check valves, nozzles, metered manifold and electric solenoid valves for obstructions and chemical buildup. Remember, <i>low voltage or a weak battery will result in valves not opening completely.</i> Check hose length leading to manifold. If hose length is considerably longer than other sections, cut hose length to match length of other boom sections.</p> <p>b. High flow: Check the boom feed line for that boom section for length. If feed line is much shorter than other boom sections, replace with longer line. Check to see that all nozzles are the same size.</p>
<p>12. Too much material is being applied; rate is not as calibrated.</p>	<p>a. Recheck calibration.</p> <p>b. Ground speed is slower than calibrated speed. Recheck speed using method in application guide.</p> <p>c. Check to make sure all nozzles are correct and the same size. One oversized nozzle will result in over-application.</p> <p>d. Check nozzle spacing.</p> <p>e. Check control box gauge.</p> <p>f. Overlap of rows may be too great causing double application in some area.</p> <p>g. Check levels in tank. Less than calculated amount would falsely indicate over application.</p> <p>h. Check for worn nozzles. Nozzles should be within 10% of specs. Replace if necessary.</p> <p>i. Check for possible wheel slippage.</p>

Problem	Solution
<p>13. Not enough material is being applied; rate is not as calibrated.</p>	<ul style="list-style-type: none"> a. Recheck calibration. b. Ground speed is faster than calibrated speed. Recheck speed using method in application guide. c. Nozzle size smaller than size used for calibration. d. If the pressure at the manifolds and nozzles is less than pressure at the control box gauge (#3), feed lines to booms may need to be cleaned. e. Check for worn nozzles. Nozzles should be within 10% of specs. Replace if necessary. f. Check the travel pattern. Not enough overlap during spraying may result in under-application by leaving areas unsprayed. g. Check control box gauge. IF actual rate is less than gauge indicates, suspect a faulty gauge. h. Check levels in tank. IF tank level was more than amount calculated, a false underapplication condition occurs. i. Check for filter screen blockage. j. Check for loose pump impeller bolt. k. Check for clogged impeller channels. (Requires pump disassembly; try all other options first.)
<p>14. Nozzle flows across boom are inconsistent and vary several ounces high or low.</p>	<ul style="list-style-type: none"> a. Check nozzles for obstructions in feed holes. Clean nozzles with toothbrush or suitable brush. Steel picks, nails, etc. will damage the nozzle. b. Inspect the check valve in front of each nozzle. Clean and inspect rubber diaphragms. The correct rubber viton diaphragm is marked with a "v". EPDM rubber diaphragms will become swollen and <i>will not work</i>. c. Check hose barbs screwed into the metered manifolds. If hose barbs are screwed too far into the manifold, flow can be restricted.
<p>15. Diaphragm check valves at nozzles will not stay open while spraying.</p>	<ul style="list-style-type: none"> a. Disassemble diaphragm cap from body and check that the cap spring moves freely. b. Inspect the diaphragm. Clean or replace if necessary. c. Increase spraying pressure. About 15 psi is required at the check valve to hold it open. d. Check the control box gauge for faulty reading.
<p>16. Nozzles continue to spray or dribble after boom is turned off.</p>	<ul style="list-style-type: none"> a. Clean diaphragm in check valve at nozzle. Look for debris or nicks which would allow leakage. b. If problem still appears, check solenoid valve for that section for proper adjustment of foreign matter on the seat washers in the valve. Replace washers and seals with valve repair kit if necessary.

Problem	Solutions
<p>17. Nozzle shows streaking or a collapsed pattern; nozzle drips while spraying.</p>	<ul style="list-style-type: none"> a. Angle nozzles 20 degrees rearward. b. Nozzle cap is obstructed or scratched. Clean nozzle gently with water or solvent, using a toothbrush to clean the orifice hole in the cap. Use a pipe cleaner to clean the metering feed hole in the body. Steel picks, nails, etc. will damage the nozzle. c. Disable the nozzle and clean inside surfaces, threads and any sealing surfaces where the cap meets the body. Carefully inspect the cap and body for any nicks, wear or chemical buildup. Tighten nozzle cap firmly with torque wrench to 30 ft.lbs. d. If nozzle output is high, the metering feed hole or internal cavity is worn. Replace the nozzle. e. Check nozzle spacing for correct overlap. Use 20" spacing on turf booms. f. Make sure that windy conditions are not affecting the spray pattern. g. Check boom height.
<p>18. Throttling valves must be readjusted after each tank sprayed.</p>	<ul style="list-style-type: none"> a. Debris catching in throttling valves. Open gray throttling valve with nozzles turned off and allow flow to flush out valves for about 15 seconds per valve. Reset throttling valves. b. If problem continues, replace filter screen with 50 mesh screen.
<p>19. Liquid leaks out around tank lid while spraying.</p>	<ul style="list-style-type: none"> a. Check for proper lid fit.
<p>20. Chemicals will not stay in suspension.</p>	<ul style="list-style-type: none"> a. Make sure agitation valve is open. b. Check for obstructions or kinks on the agitation line. c. Inspect agitator head for plugged holes. d. Increase flow and pressure to agitation by increasing pump seed. <i>Do not exceed 4000 RPM or 90 psi.</i> e. Make sure chemicals were mixed properly. Do not allow chemicals to settle in tank. f. Agitate longer before spraying.
<p>21. Pump leaks.</p>	<ul style="list-style-type: none"> a. Check housing for cracks. b. Housing gasket may be dried out and leaking. Allow gasket time to absorb moisture and retighten bolts around housing in an even manner. c. Seal leaking, causing drip between pump and bearing housing. If pump has been run dry, seal may be cracked. Replace seal. d. Pinion shaft may be damaged at sealing surfaces. Replace.
<p>22. Ball valve leaks.</p>	<ul style="list-style-type: none"> a. Loosen end caps, then retighten equally to keep internal parts from shifting. b. If still leaking, disassemble valve and check that o-rings are in good condition. Replace if necessary.

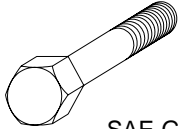
Electrical Problems

Problem	Solution
<p>23. Solenoid valves shut off or partially close while spraying.</p>	<p>a. Check electrical connections and battery charge. Valves may need cleaning, armature stop adjustment, repair kit or new coil. <i>Low voltage or a weak battery will result in valves not opening completely.</i></p> <p>b. Check output of alternator or battery. (See vehicles owner's manual)</p>
<p>24. Solenoid valve will not click open but has adequate power (checked by switching wires to adjacent solenoids.)</p>	<p>a. Solenoid plunger is not functioning. Plunger may be seized up or coil may be bad.</p> <p>b. Physically cycle solenoid valve by pushing up at bottom of solenoid several times. If it will manually open and close, check electrical switching.</p> <p>c. Clean inside of solenoid if some movement occurs when electrically operating valve.</p> <p>d. Clean terminals on solenoid coil.</p> <p>e. Test coil by exchanging it with working coil from adjacent solenoid valve.</p> <p>f. Replace coil.</p> <p>g. Install solenoid seal repair kit.</p>
<p>25. Control box switches operate the wrong boom sections.</p>	<p>a. Check boom section feed lines to see that they are connected to the correct boom sections.</p> <p>b. Switch wires on top of solenoid valves to correct order.</p>
<p>26. Control box blows fuse.</p>	<p>a. Check to see that fuse is correct size. (15-20 amps)</p> <p>b. Check for short circuit between switch terminals inside control box. Carefully separate touching wires.</p> <p>c. Inspect wiring harness for bare wires, rub points or any damage.</p>
<p>27. Vehicle battery low.</p>	<p>a. Check battery terminals. Clean if necessary.</p> <p>b. Check water level in battery. Add distilled water and charge if necessary. (See vehicle owner's manual)</p> <p>c. Sprayer components depleting vehicle battery. Allow vehicle to idle briefly after spraying (with all pumps, foam markers, etc. off) to allow battery to fully charge.</p> <p>d. Weak battery. Test and replace if necessary.</p>
<p>Mechanical Problems</p>	
<p>28. Sprayer makes chattering noise when pump is turned on.</p>	<p>a. Driveshaft out of alignment. Realign shaft.</p>

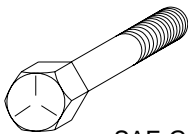
TORQUE SPECIFICATIONS

Proper torque for American fasteners used on Locke Turf equipment.
Recommended Torque in Foot Pounds (Newton Meters). *

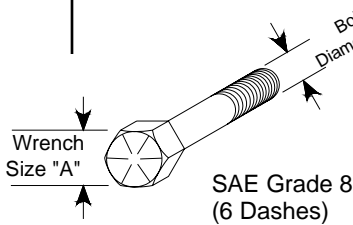
AMERICAN Bolt Head Markings



SAE Grade 2
(No Dashes)



SAE Grade 5
(3 Dashes)

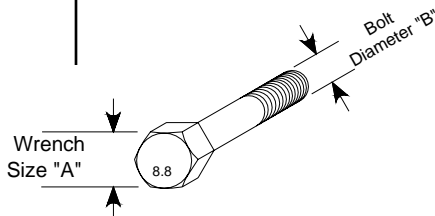


SAE Grade 8
(6 Dashes)

WRENCH SIZE (IN.) "A"	BOLT DIAMETER (IN.) "B" AND THREAD SIZE	SAE GRADE 2	SAE GRADE 5	SAE GRADE 8
7/16	1/4 -20 UNC	6 (7)	8 (11)	12 (16)
7/16	1/4 -28 UNF	6 (8)	10 (13)	14 (18)
1/2	5/16 - 18 UNC	11 (15)	17 (23)	25 (33)
1/2	5/16 - 24 UNF	13 (17)	19 (26)	27 (37)
9/16	3/8 - 16 UNC	20 (27)	31 (42)	44 (60)
9/16	3/8 - 24 UNF	23 (31)	35 (47)	49 (66)
5/8	7/16 - 14 UNC	32 (43)	49 (66)	70 (95)
5/8	7/16 - 20 UNF	36 (49)	55 (75)	78 (106)
3/4	1/2 - 13 UNC	49 (66)	76 (103)	106 (144)
3/4	1/2 - 20 UNF	55 (75)	85 (115)	120 (163)
7/8	9/16 - 12 UNC	70 (95)	109 (148)	153 (207)
7/8	9/16 - 18 UNF	79 (107)	122 (165)	172 (233)
15/16	5/8 - 11 UNC	97 (131)	150 (203)	212 (287)
15/16	5/8 - 18 UNF	110 (149)	170 (230)	240 (325)
1-1/8	3/4 - 10 UNC	144 (195)	266 (360)	376 (509)
1-1/8	3/4 -16 UNF	192 (260)	297 (402)	420 (569)
1-5/16	7/8 - 9 UNC	166 (225)	430 (583)	606 (821)
1-5/16	7/8 - 14 UNF	184 (249)	474 (642)	668 (905)
1-1/2	1 -8 UNC	250 (339)	644 (873)	909 (1232)
1-1/2	1 - 12 UNF	274 (371)	705 (955)	995 (1348)
1-1/2	1 - 14 UNF	280 (379)	721 (977)	1019 (1381)
1-11/16	1-1/8 - 7 UNC	354 (480)	795 (1077)	1288 (1745)
1-11/16	1-1/8 - 12 UNF	397 (538)	890 (1206)	1444 (1957)
1-7/8	1-1/4 - 7 UNC	500 (678)	1120 (1518)	1817 (2462)
1-7/8	1-1/4 - 12 UNF	553 (749)	1241 (1682)	2013 (2728)
2-1/16	1-3/8 - 6 UNC	655 (887)	1470 (1992)	2382 (3228)
2-1/16	1-3/8 - 12 UNF	746 (1011)	1672 (2266)	2712 (1992)
2-1/4	1-1/2 - 6 UNC	870 (1179)	1950 (2642)	3161 (4283)
2-1/4	1-1/2 - 12 UNF	979 (1327)	2194 (2973)	3557 (4820)

Proper torque for American fasteners used on Locke Turf equipment.
Recommended Torque in Foot Pounds (Newton Meters). *

METRIC



Numbers appearing on bolt heads
Indicate ASTM class.

*Use 75% of the specified torque value
for plated fasteners. Use 85% of the
specified torque values for lubricated
fasteners.

WRENCH SIZE (mm) "A"	BOLT DIA. (mm) "B"	ASTM 4.6	ASTM 8.8	ASTM 9.8	ASTM 10.9
8	5	1.8 (2.4)		5.1 (6.9)	6.5 (8.8)
10	6	3 (4)		8.7 (12)	11.1 (15)
13	8	7.3 (10)		21.1 (29)	27 (37)
16	10	14.5 (20)		42 (57)	53 (72)
18	12	25 (34)	74 (100)	73 (99)	93 (126)
21	14	40 (54)	118 (160)	116 (157)	148 (201)
24	16	62 (84)	167 (226)	181 (245)	230 (312)
30	20	122 (165)	325 (440)		449 (608)
33	22		443 (600)		611 (828)
36	24	211 (286)	563 (763)		778 (1054)
41	27		821 (1112)		1138 (1542)
46	30	418 (566)	1119 (1516)		1547 (2096)



Locke Turf

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