

OPERATOR'S MANUAL

BLUMHARDT 500 GALLON TRAIL MASTER II SPRAYER

P.O. Box 1030 Wahpeton, ND 58074
(701) 642-2621

WARRANTY

The only warranty Wil-Rich gives and the only warranty the dealer is authorized to give is as follows:

We warrant products sold by us to be in accordance with our published specifications or those specifications agreed to by us in writing at time of sale. Our obligation and liability under this warranty is expressly limited to repairing, or replacing, at our option, within 12 months after date of retail delivery, any product not meeting the specifications. ***We make no other warranty, express or implied and make no warranty of merchantability or of fitness for any particular purpose.*** Our obligation under this warranty shall not include any transportation charges or costs or installation or any liability for direct, indirect or consequential damage or delay. If requested by us, products or parts for which a warranty claim is made are to be returned transportation prepaid to our factory. Any improper use, operation beyond rated capacity, substitution of parts not approved by us, or any alteration or repair by others in such manner as in our judgement affects the product materially and adversely shall void this warranty. ***No employee or representative is authorized to change this warranty in any way or grant any other warranty.***

Wil-Rich reserves the right to make improvement changes on any of our products without notice.

When warranty limited or not applicable: Warranty on hoses, cylinders, hubs, spindles, engines, valves, pumps or other trade accessories are limited to the warranties made by the respective manufacturers of these components. Rubber tires and tubes are warranted directly by the respective tire manufacturer only, and not by Wil-Rich.

Warranty does not apply to any machine or part which has been repaired or altered in any way so as in our judgement to affect its reliability, or which has been subject to misuse, negligence or accident.

A Warranty Validation and Delivery Report form must be filled out and received by Wil-Rich to initiate the warranty coverage.

WARRANTY CLAIMS PROCEDURE

1. The warranty form must be returned to Wil-Rich within fifteen (15) working days from the repair date.
2. Parts returned to Wil-Rich without authorization will be refused. The parts must be retained at the dealership for ninety (90) days after the claim has been filed. If the Service Department would like to inspect the parts, a packing slip will be mailed to the dealer. The packing slip must be returned with the parts. The parts must be returned prepaid within thirty (30) days of receiving authorization. After the parts are inspected and warranty is verified, credit for the return freight will be issued to the dealer.
3. Parts that will be scrapped at the dealership will be inspected by a Wil-Rich Sales Representative, District Sales Manager or Service Representative within the ninety (90) day retaining period.



BLUMHARDT

The right way to spray

TO THE OWNER

It is the responsibility of the user to read the Operator's Manual and comply with the safe and correct operating procedures as pertains to the operation of the product and to lubricate and maintain the product according to the information outlined in the Operator's Manual.

The user is responsible for inspecting his machine, and for having parts repaired or replaced when continued use of the product would cause damage or excessive wear to the other parts.

The word NOTE is used to convey information that is out of context with the manual; special information such as specifications, techniques, reference information, safety practices and other information of supplementary nature.

BLUMHARDT EQUIPMENT	
Model No.	<input type="text"/>
Serial No.	<input type="text"/>
ASHLEY, ND 58413	

When in need of parts, always specify the model and the serial number. Write this number in the spaced provided. The serial number plate is located on each boom.

CONTENTS

Safety	1-2
Preparation	3-4
Booms	
Boom Lift Circuitry	4
Boom Installation	4-5
Boom Arms	6
Boom Extensions	7
Rigging the Booms	8-9
BoomLatch Assembly	10
Unfolding & Folding	11-12
Sprayer Height Adjustment	13
Feedline Hook-Up	14
Application Rates	15

Calibration	15-16
Flood Tip Calibration	17
Calibration Charts	18-19
Operation	
General	20
Tank, Pumps & Control Panel	21-23
Wiring	24-25
Foamer Wiring	26
Hydraulic Pump Drive	26
Center Lift Hydraulics	27
Hyd Boom Lift Cylinder	28
Hydraulics	29
PTO	30-32
Maintenance	33-34
Trouble Shooting	25
Components	
500 Gallon Main Frame Assembly	36
Single Axle & Hitch Assembly	37
Walking Tandem & Hitch Assembly	38
Sprayer Height Adjustment	39
Trail Master Rigid Mount	40
Clean Water & Foamer Assembly	41
Boom Lift	42
Boom Post Assembly	43
16' Boom Assembly	44
21' Boom Assembly	45
Boom Hinge	46
500 Gallon TM II Tank Assembly	47
Plumbing	
TM - Hydraulic Drive	48
TM - PTO Drive	49
RC-1B - Hydraulic Drive	50
RC-1B - PTO Drive	51
Boom Manifolds	52
Nozzle & Manifold Placement	53-56
Optional Wheel Spacings	57
Pole Dimensions	58
Safety	59
Specifications	60
Metric Conversions	61

Personal safety is important!

All personnel involved with the assembly and/or operation of this equipment must be informed of proper safety procedures. Operator's and assembly manuals provide the necessary information. If a manual is lost for a particular implement, order a replacement at once. Operator's and assembly manuals are available at no charge upon request.

Address inquires to:

Wil-Rich

P.O. Box 1030

Wahpeton, ND 58074

PH (701) 642-2621 FAX (701) 642-3372

SAFETY

Safety decals appear at various locations on your machine. These decals are provided for your safety and must be kept clean. Replace any decal that becomes worn, damaged, painted over or otherwise difficult to read. Replacement decals are available through your Blumhardt dealer.

Hydraulic fluid escaping under pressure can have enough force to penetrate the skin. Hydraulic fluid may also infect a minor cut or opening in the skin. If injured by escaping fluid, see a doctor at once. Serious infection or reaction can result if medical treatment is not given immediately. Make sure all connections are tight and that hoses and lines are in good condition before applying pressure to the system. Relieve pressure before disconnecting the lines or performing other work on the hydraulic system. To find a leak under pressure use a small piece of cardboard or wood. *Never use your hands.!*

BEFORE OPERATING

Use extreme care when making adjustments. When hitching the sprayer to the tractor, do not allow anyone to get between the tractor and the sprayer.

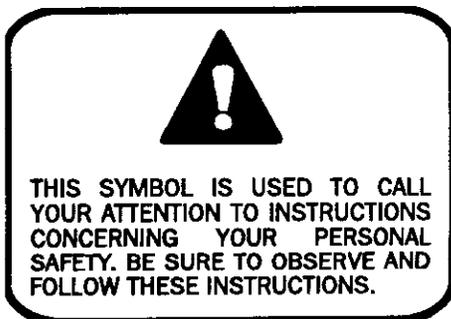
When lubricating or working on the sprayer, make sure it is resting on the ground. If it is in a raised position, the sprayer should have proper supports under the tool bar to prevent the machine from falling.

After servicing, make sure all tools, parts, and servicing equipment has been removed from the sprayer.

Make sure that there is no one near the machine just before operating and during operation.



Keep all shields and guards in place.



DURING OPERATION

Reduce speed when cornering on field ends and when operating on or across dead furrows. Do not attempt to remove any obstruction while the sprayer is in motion.

Use extreme care when operating close to ditches, fences or on hillsides.

No one other than the operator should ride on the tractor. Before and during operation be sure no one is on or around the implement. Serious injury can result from improper use.

Always set the jack stand on a firm surface before unhitching the implement from the tractor.

Use safe operating practices at all times.

HIGHWAY OPERATION

Be sure all safety lights and/or reflectors are wiped clean before transporting.

The implement must always be placed in the transport position and the booms locked when traveling on public roads.

NOTE: Use extreme caution when working around overhead power transmission lines.

Always place the machine in the transport position.

Comply with your state and local laws governing highway safety when moving machinery on a highway.

Reduce road speed on corners.

Drive at a reasonable speed to maintain complete control of the machine at all times.

A S.M.V. emblem must be used at all times while traveling on public roads.



CI-78132



CI-78133

PREPARATION

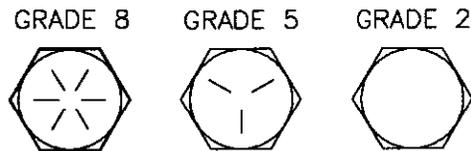
Before using the Blumhardt Sprayer, a careful inspection must become routine. A check must be made to insure that all hardware is securely tightened and moving parts are properly lubricated.

Tighten all loose nuts and bolts and replace any bent or broken parts.

When tightening bolts, they must be torqued to the proper number of foot-pounds as indicated in the table unless otherwise specified. It is important that all bolts be kept tight.

On new machines, all nuts and bolts must be rechecked after a few hours of operation.

When replacing a bolt use only a bolt of the same grade or higher.



TORQUE IN FOOT POUNDS

BOLT DIA	3/8	1/2	5/8	3/4	7/8	1
HEX HEAD	9/16	3/4	15/16	1-1/8	1-5/16	1-1/2
UNC GRADE	2	18	45	89	160	320
	5	30	68	140	240	544
	8	40	100	196	340	792
UNF GRADE	2	21	51	102	178	368
	5	32	70	168	264	572
	8	48	112	216	368	840

CI-75623

Bolts with no markings are grade 2.

Grade 5 bolts furnished with the machine are identified by three radial lines on the head.

Grade 8 bolts furnished with the machine are identified by six radial lines on the head.

All U-bolts are grade 5.

TIRE INFLATION

The use of the proper air pressure is the most important factor in satisfactory performance and maintenance of implement tires. Underinflation will damage the cord body of the tire and causes a series of diagonal breaks in the fabric in the sidewall area.

If the tire buckles or wrinkles, the air pressure must be increased to the point where the sidewalls remain smooth while operating.

Check the air pressure every two or three weeks and do not allow the pressure to drop to a point where buckling or wrinkling of the tire may be possible.

NOTE: Do not overinflated tires.

WHEEL BOLTS

It is recommended that all wheel bolts be checked for tightness before using and again after one day of use. Paint or rust can work out causing the wheel to become loose. Check periodically to be sure the wheel bolts are tight.

BEARING ASSEMBLIES

IMPORTANT - The spindle nut on all hub and spindle assemblies is preset at the factory. Road transport and field working will seat the bearing and may require additional adjustment. After 20 hours of machine operation, remove the grease cap and check the bearing tightness of all hub and spindles. Remove the cotter pin and rotate the tire while tightening the spindle nut. Tighten until the drag on the tire assembly stops the tire rotation. Locate the cotter pin hole in the spindle and loosen the spindle nut enough to allow insertion of the cotter pin. Replace the cotter pin and the grease cap.

LUBRICATION

Make sure the sprayer is properly lubricated. (See maintenance, pages 33 & 34.)

HYDRAULICS

If used, check cylinders for proper alignment and operation. On new machines check that the hydraulic system has been properly charged and purged.

BOOM LIFT CIRCUITRY

TRACTOR PREPARATION

Refer to the operator's manual furnished with your tractor for recommended adjustments and weight distribution.

When using a sprayer, the tractor drawbar must always be pinned in the center to allow for more stability.

NOTE: Check your tractor's hydraulic fluid level after cycling hydraulics and filling new cylinders and lines. Refill if necessary.

HITCHING

After backing your tractor into position, attach the sprayer hitch to the tractor drawbar, using a hitch pin of adequate strength for the tractor/sprayer combination. Lock the pin in place to prevent loss (particularly when transporting). It is recommended that a safety chain be used for road transport.

Connect the sprayer's hydraulic hoses to the proper couplers on your tractor.

TRANSPORTING

A S.M.V. (Slow Moving Vehicle) emblem must be used at all times while traveling on public roads.

Never transport the sprayer unless it is in the transport position. Booms must be locked in the latch assembly (figure 10) and add-on stop collars added to the hydraulic lift cylinder. (See figure 10, page 10.) Never depend on your tractor's hydraulic system to carry the weight of the booms while transporting.

NOTE: Use extreme caution when working around overhead power transmission lines.

Reduce speed when cornering and when traveling over rough and/or uneven ground. Drive at a reasonable speed to maintain complete control of the machine at all times.

Comply with your state and local laws governing highway safety when moving machinery on a highway.

Blumhardt Sprayers have an optional hydraulic cylinders to lift the boom tips for leveling or clearing obstacles, and an option for adjusting the sprayer boom height. See pages 27-29 for hydraulic plumbing options.

BOOM INSTALLATION

BOOM LIFT OPTIONS

Insert stub into 4" center frame until it stops at the tab of the stub and lock in place.

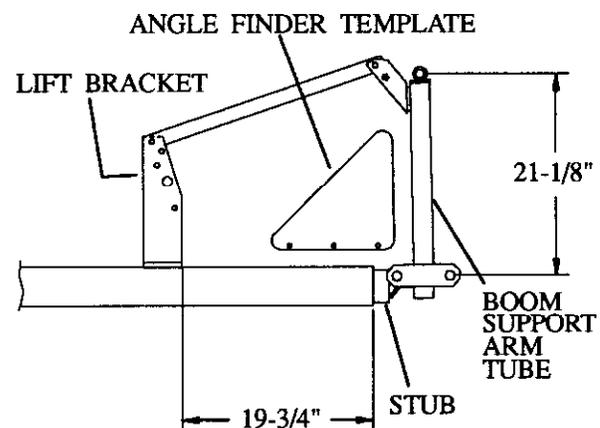
Reference dimensions are shown for the different lift bracket and boom support arm tube combinations. An angle finder template is supplied to find an exact boom post setting. (See figure 1.) (Always set with the cylinder or actuator fully extended.)

The lift bracket should be positioned so the boom support arm is angled slightly inward. An angle finder template (provided) is used as a guide between the center tube and the boom support arm. The boom support arm should then be tilted inward until it matches the angle finder template. (See figure 1.)

When the correct angle is found, tighten the U-bolt on the lift bracket.

The following dimensions are for reference only and are only used to get all components in the general area before final measurements.

16' BOOM SUPPORT ARM STRAIGHT BRACE



CI-78005B

Figure 1

**16' BOOM SUPPORT ARM
HYDRAULIC**

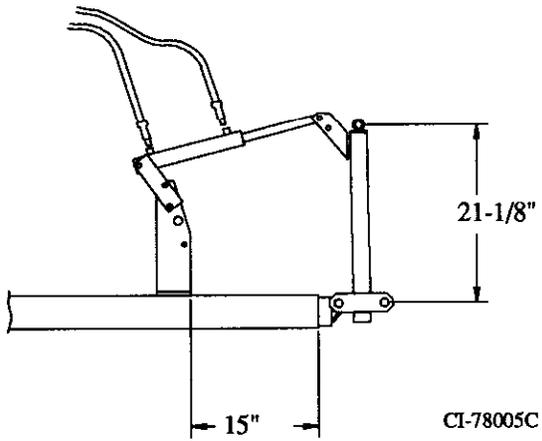


Figure 2

CI-78005C

**21' BOOM SUPPORT ARM
STRAIGHT BRACE**

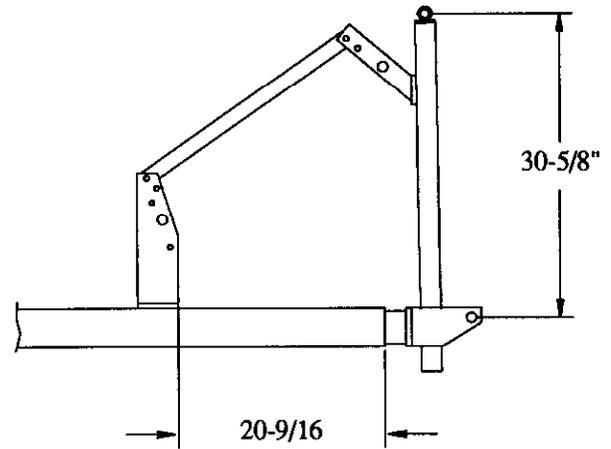


Figure 5

CI-78005

**21' BOOM SUPPORT ARM
ELECTRIC ACTUATOR**

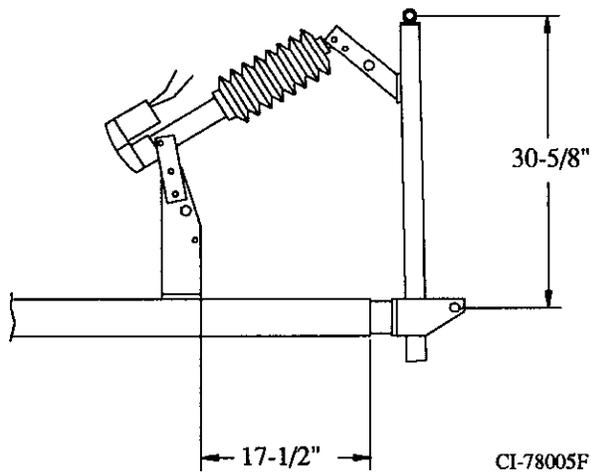


Figure 3

CI-78005F

**21' BOOM SUPPORT ARM
HYDRAULIC**

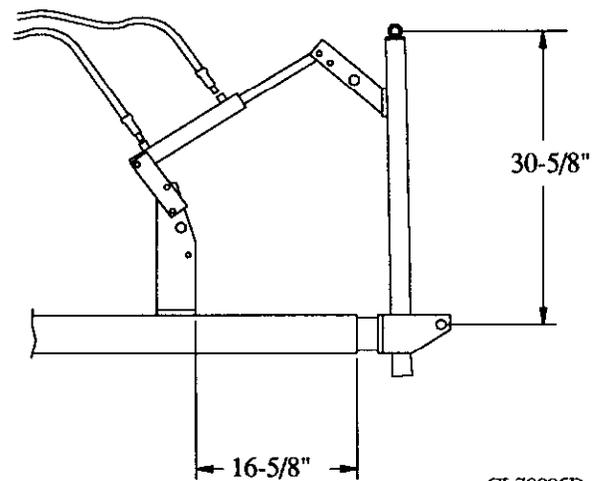


Figure 6

CI-78005D

**16' BOOM SUPPORT ARM
ELECTRIC ACTUATOR**

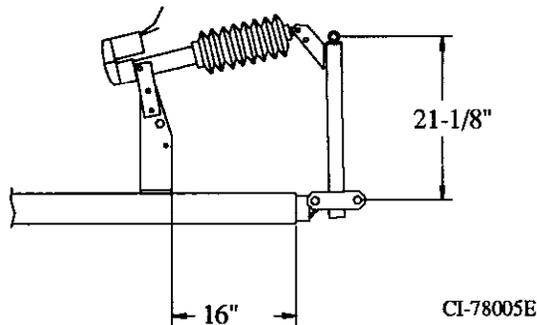


Figure 4

CI-78005E

BOOM ARMS

Blumhardt has 2 sizes of boom arm available for the 500 gallon Trail Master II sprayers. They are the 16' and 21' parallel flotation booms. The sizes stated are for the main boom/outrigger assembly and do not include the boom extensions.

The center section is measured from the center of the left boom post to the center of the right boom post. (See figure 7.)

The booms are measured from the center of the boom post to the end of the outrigger. (See figure 8.)

NOTE: All boom lengths are given in approximate lengths.

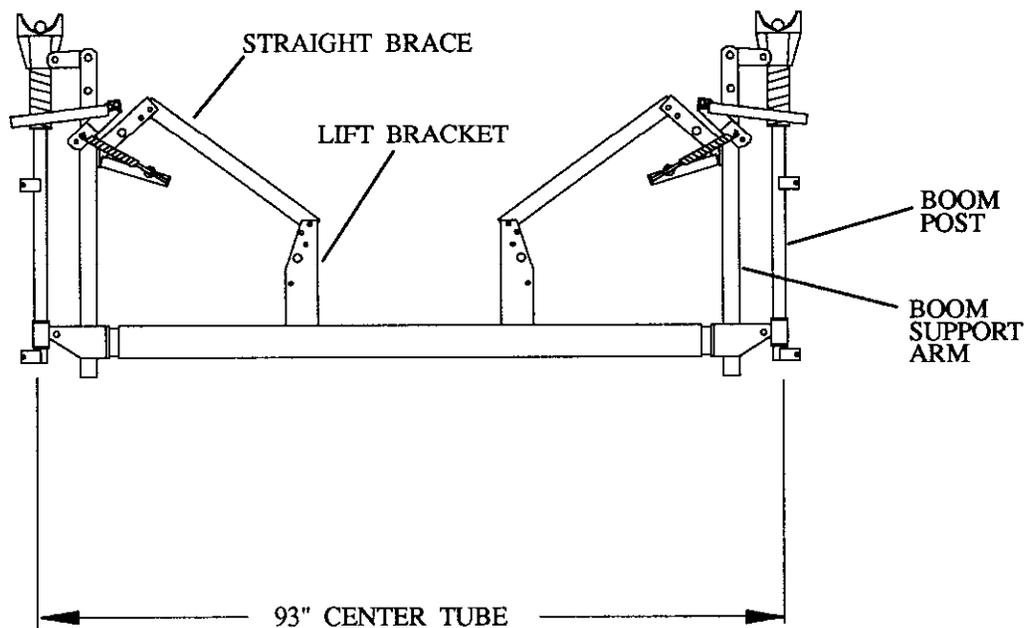


Figure 7

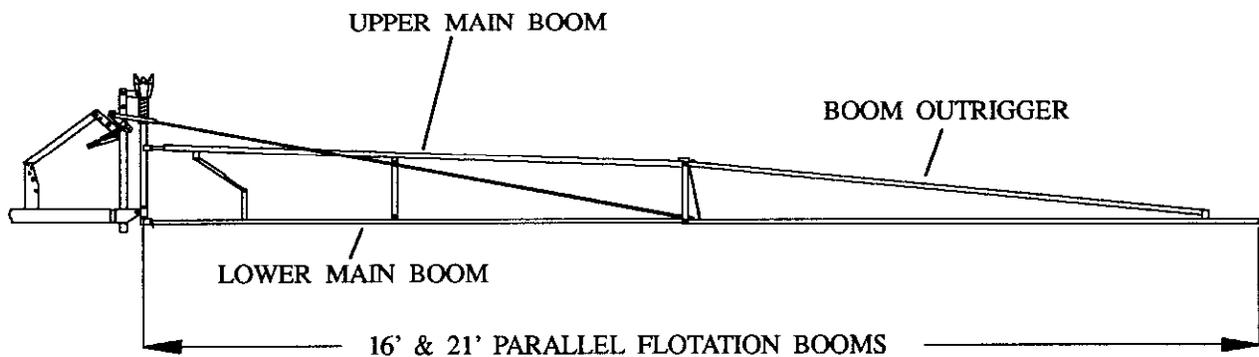


Figure 8

CI-78060

BOOM EXTENSION

NOTE: Extension tubes may be added on all booms. The extension tube is adjustable out to 5 feet beyond the outrigger.

Mount nozzle assemblies onto the extension tube 2" in from the end of the tube with the hose barb facing toward center as shown.

Install extension tube into the boom far enough to obtain proper spacing of nozzles. Tighten the boom extension locking bolt securely.

NOTE: Boom extension tube must be inserted a minimum of 12 inches.

The manifold on the end of the outrigger has unused hose barbs for nozzles on the extension.

Remove 1"FSPT cap from the tee on the manifold assembly and replace with a hose barb adapter.

Install 1/4" tubing from the manifold assembly to the nozzle assembly. Cut the tubing to length, so that there is no slack. Secure the tubing to the booms with 9" nylon ties.

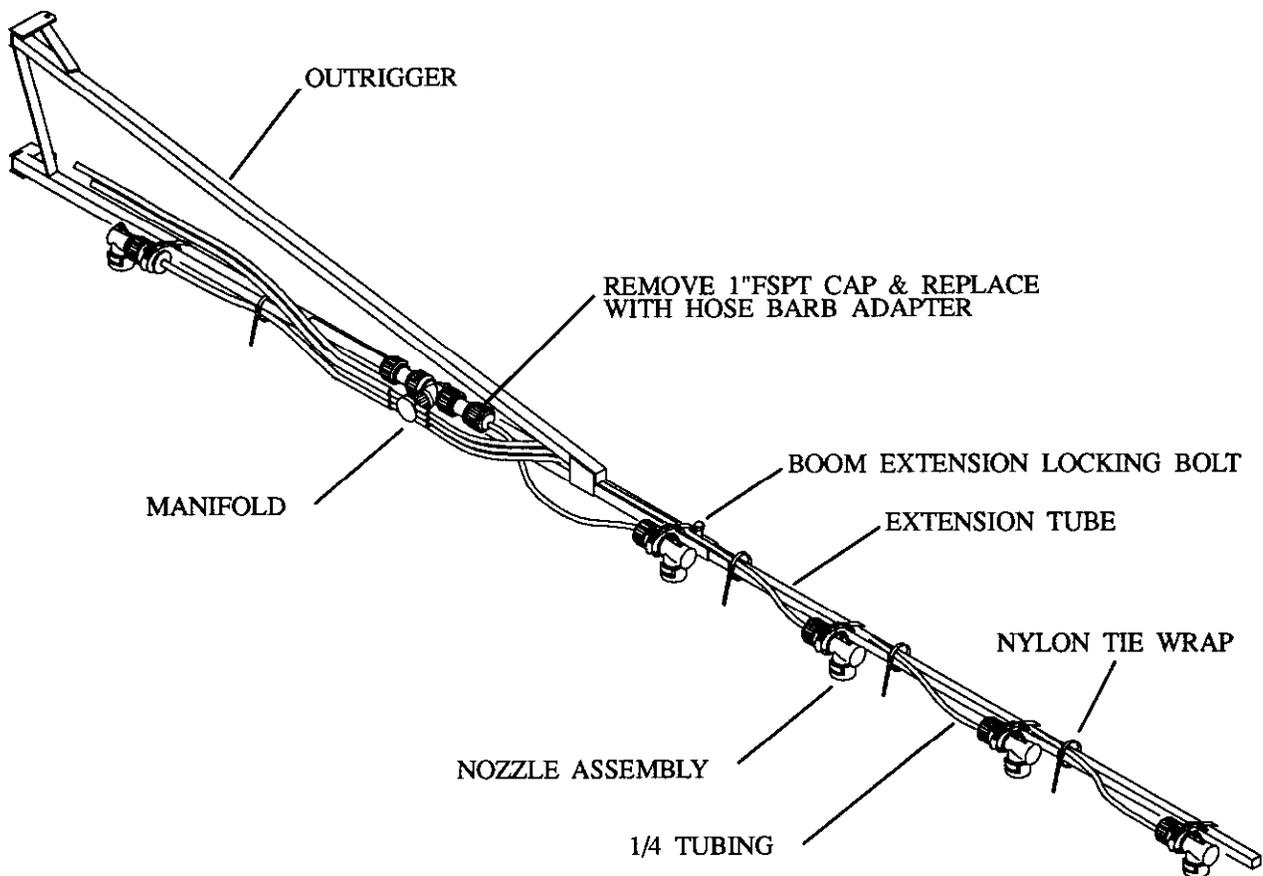


Figure 9

CI-78001

NOTE: When using extensions, care must be taken when booms are in a folded position. The extension will stick out behind the sprayer, which can be dangerous when backing up.

RIGGING THE BOOMS

Before starting adjustments, be sure all joints are well lubricated and are moving freely.

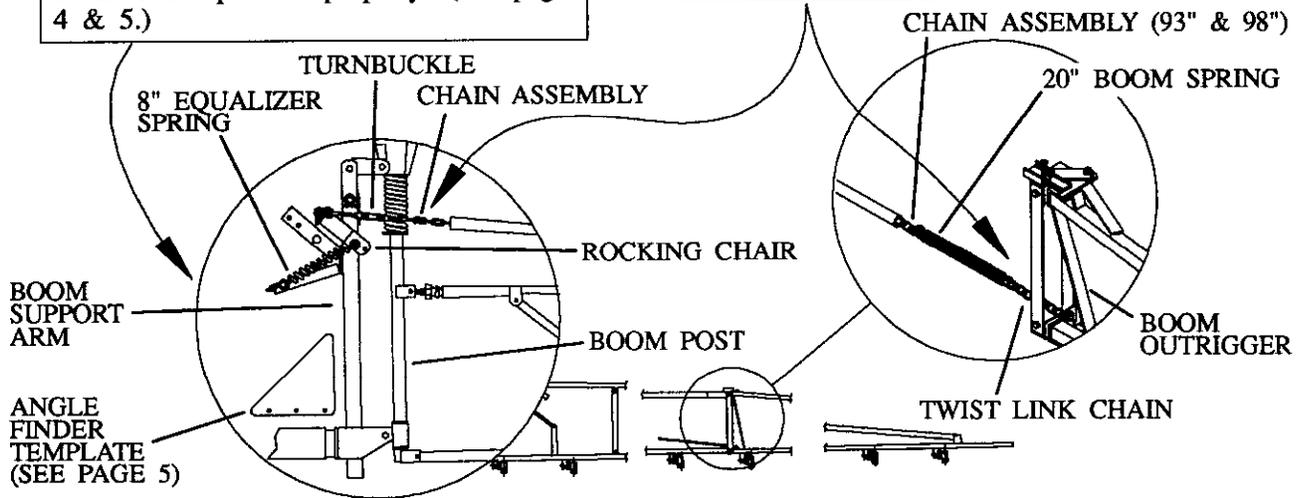
Follow numerical steps below and on the next page to rig the booms.

1. The sprayer is setting on level ground. Is the boom post set properly? (See pages 4 & 5.)

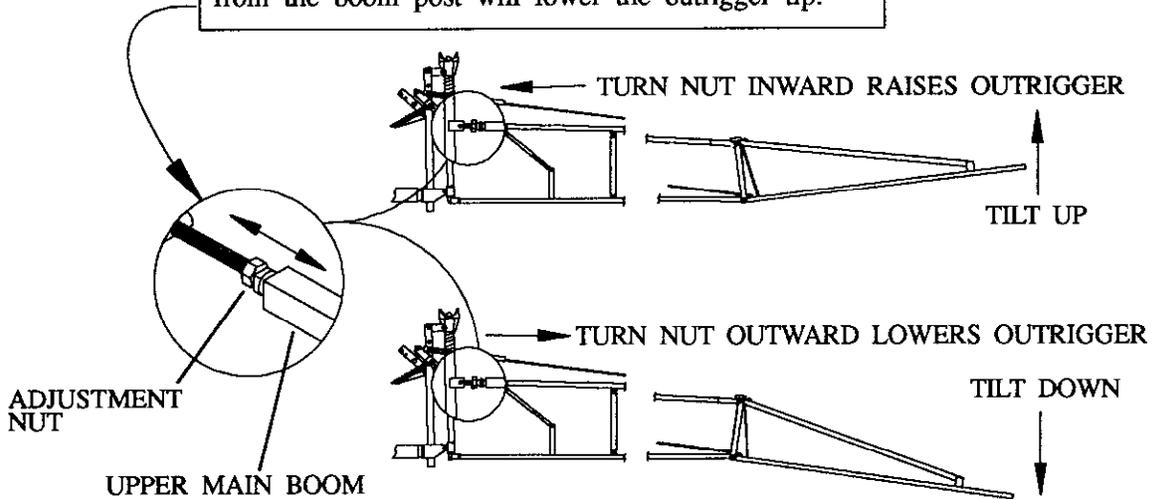
2. Install chain assemblies from the rocking chair mechanism to the 20" boom spring.

Loosen chain turnbuckles so that no threads are showing in the turnbuckle body.

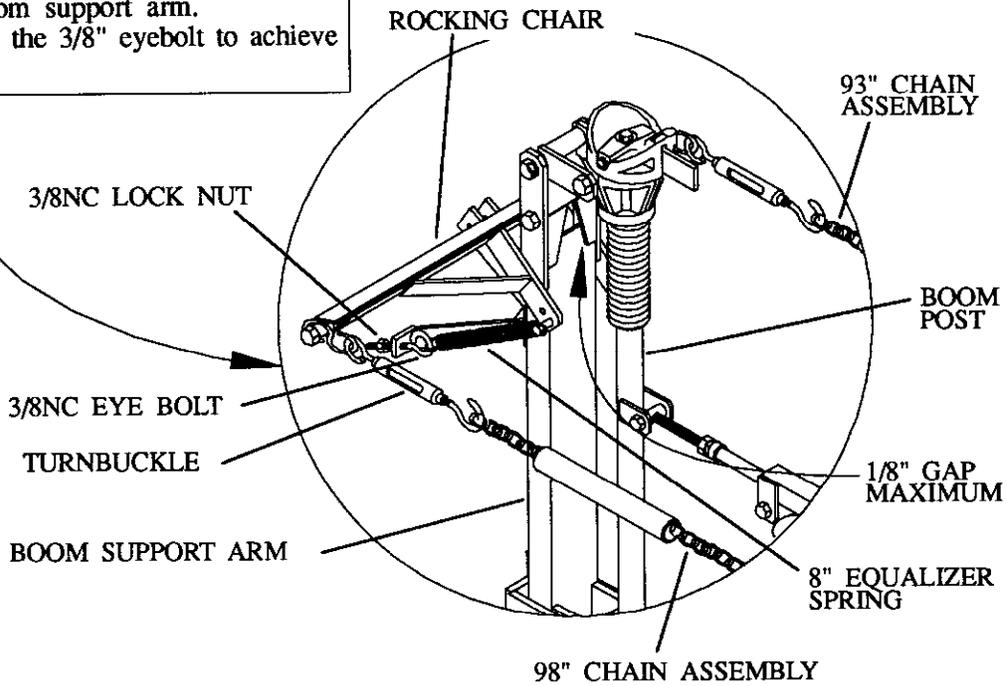
Mount the chain so it holds the boom level or slightly downward.



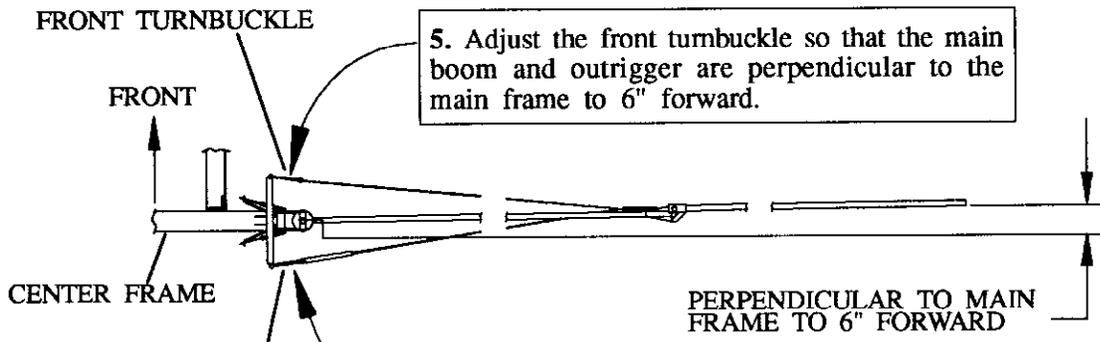
3. Adjust the boom outrigger so it is parallel with the first section of the main boom by adjusting the nut on the upper main boom. Turning the nut towards the boom post will raise the outrigger tip. Turning the nut away from the boom post will lower the outrigger tip.



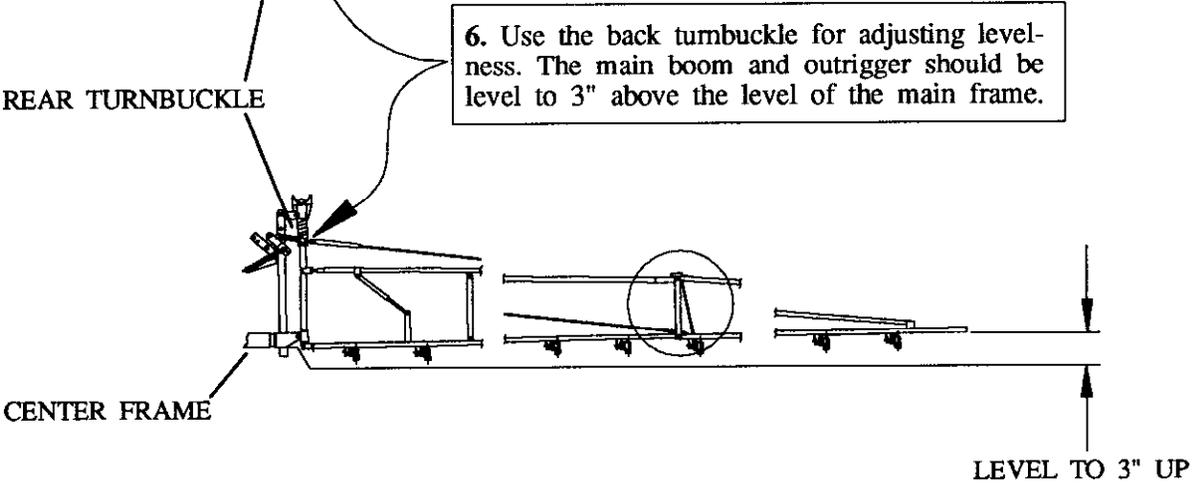
4. Adjust the 8" equalizer spring so there is approximately 1/8" gap between the rocking chair and the boom support arm. Tighten or loosen the 3/8" eyebolt to achieve the 1/8" gap.



5. Adjust the front turnbuckle so that the main boom and outrigger are perpendicular to the main frame to 6" forward.



6. Use the back turnbuckle for adjusting levelness. The main boom and outrigger should be level to 3" above the level of the main frame.



BOOM LATCH ASSEMBLY

The boom latch assembly is set 4 inches higher than the folded boom. The boom must be lifted and locked in the latch assembly. Care must be taken to avoid interference with nozzles and other plumbing components.

The latch can slide forward or rearward and telescope up and down on the saddle frame to provide adjustment for clearing sprayer components.

NOTE: Different boom sizes require different latch assembly locations.

After all requirements have been met, retighten all set screws.

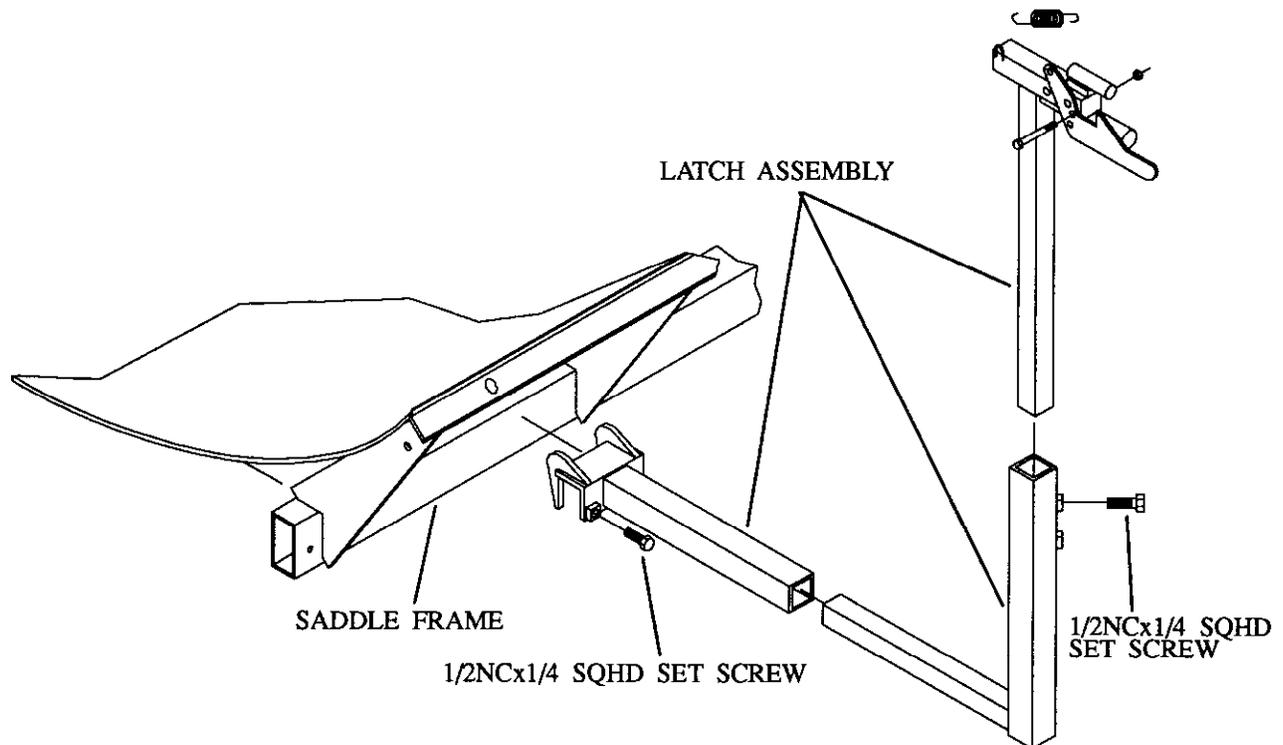


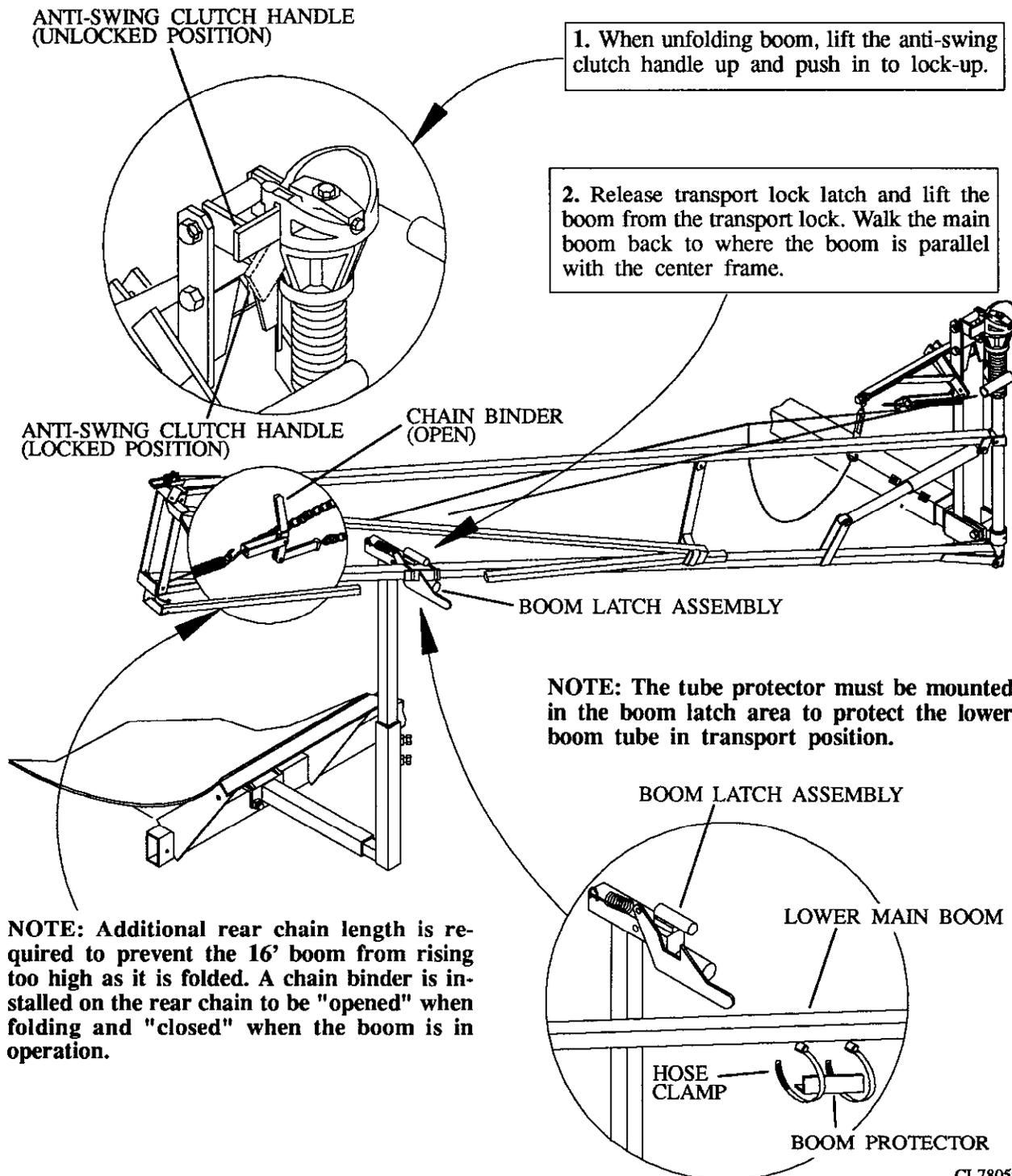
Figure 10

CI-78575

FOLDING & UNFOLDING

NOTE: When folding make sure feed lines are not kinked and sprayer nozzles don't hit the boom or other nozzles being folded into them.

NOTE: During transport, the boom must be locked into the boom latch assembly and be parallel to the frame with the anti-swing clutch handle in the locked position.

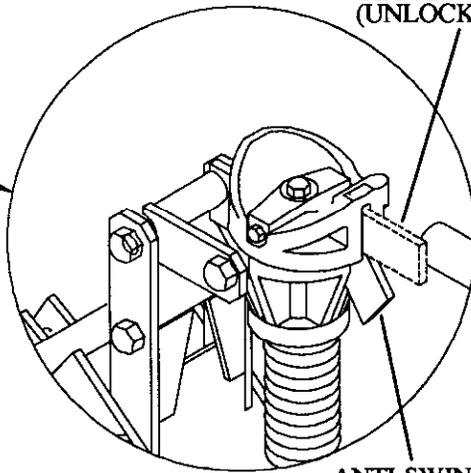


CI-78059

3. When boom is parallel to the center frame, pull out anti-swing clutch handle and swing down into the lock position.

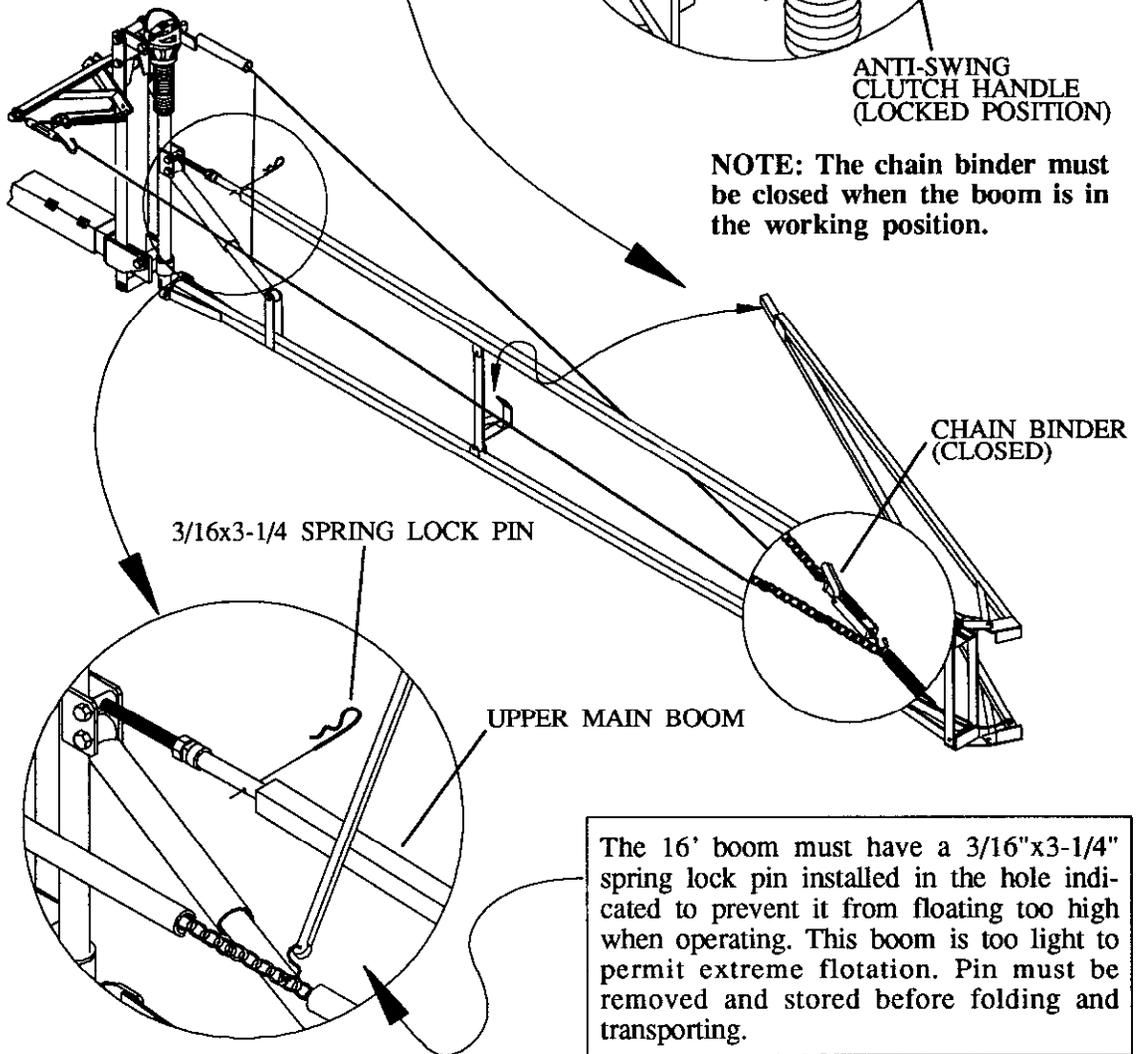
ANTI-SWING CLUTCH HANDLE (UNLOCK POSITION)

4. With main boom locked in place, lift the outrigger away from the main boom and walk the outrigger around until the outrigger locks in place.



ANTI-SWING CLUTCH HANDLE (LOCKED POSITION)

NOTE: The chain binder must be closed when the boom is in the working position.



The 16' boom must have a 3/16"x3-1/4" spring lock pin installed in the hole indicated to prevent it from floating too high when operating. This boom is too light to permit extreme flotation. Pin must be removed and stored before folding and transporting.

NOTE: For folding reverse the previous steps.

SPRAYER HEIGHT ADJUSTMENT

The sprayer height adjustment on the Blumhardt Sprayer is regulated by a screw stop cylinder located on the rear center of the sprayer.

The cylinder has an adjustable mechanical depth stop collar. The stop collar is rotated on the cylinder rod to vary the retracted length of the cylinder, providing a means of boom height adjustment. An add-on stop collar is also supplied and can be used to set the booms in a higher range. (See figure 11.)

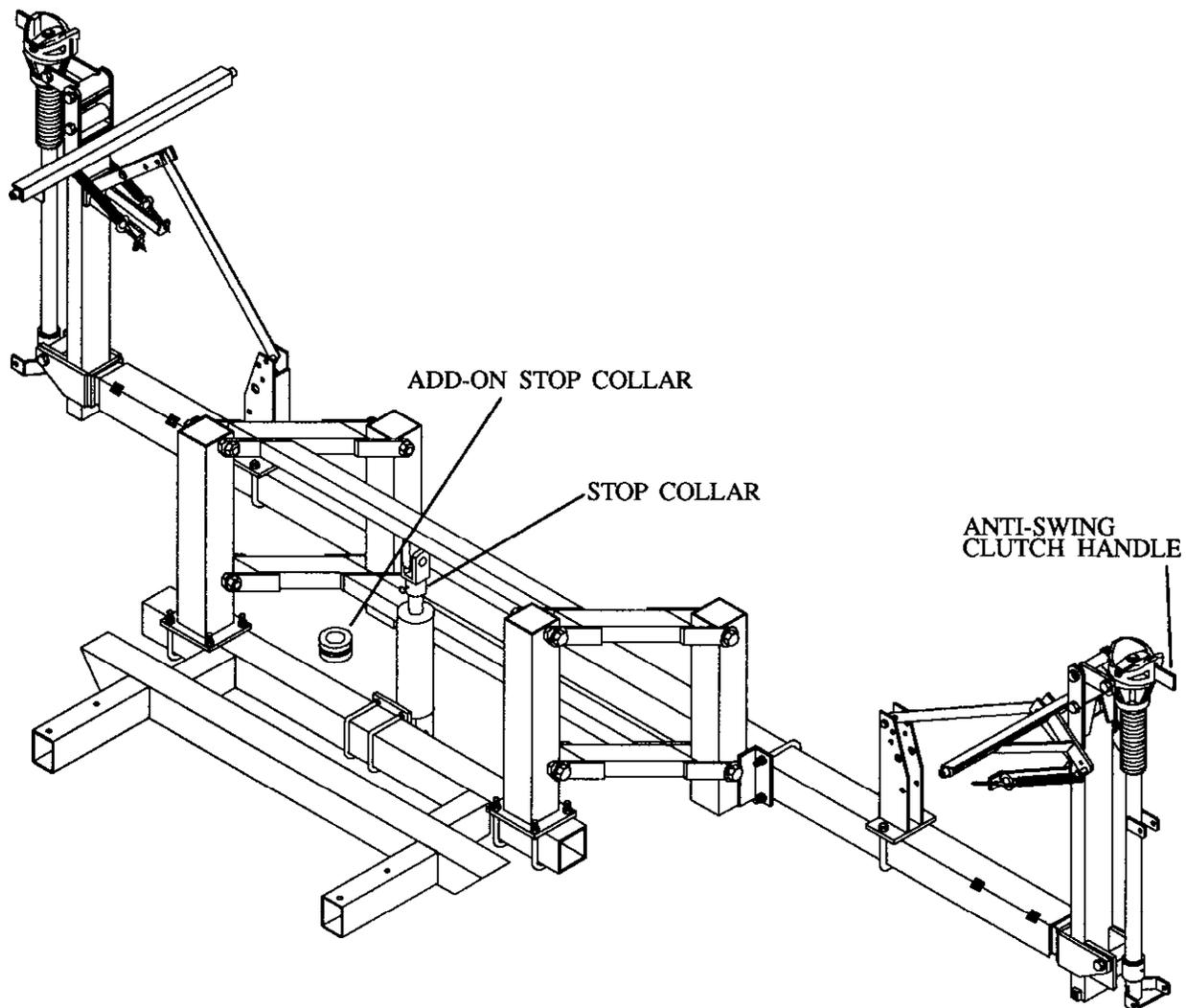


Figure 11

CI-78117

FEED LINE HOOK UP

2 SOLENOID

Each solenoid feed a boom and splits the center section. (See figure 12.)

NOTE: The optimum setting would be to have each solenoid feed an equal number of nozzles.

3 SOLENOIDS

Each solenoid feeds a specific area of the boom. The left solenoid feeds the outer section of the left boom. The center solenoid feeds the center section and inside section of the left and right booms. The right solenoid feed the outer section of the right boom. (See figure 13.)

NOTE: There are many different layouts of manifolds, feed lines and nozzles lines. These all depend on the number of solenoids, nozzle spacing and size of the total boom assembly.

2 SOLENOID

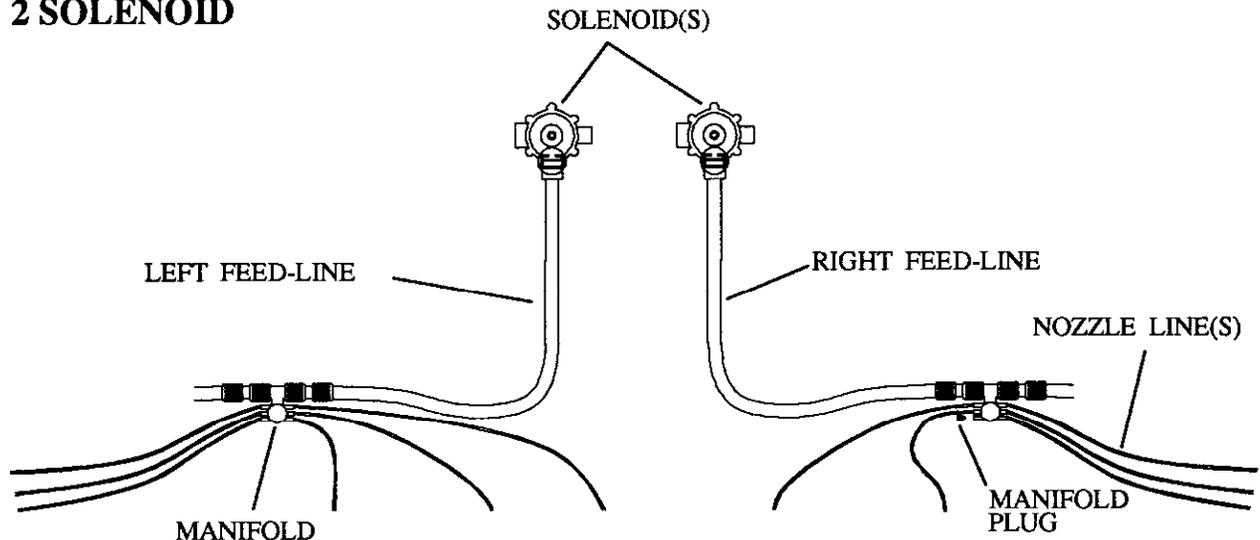


Figure 12

CI-77978

3 SOLENOIDS

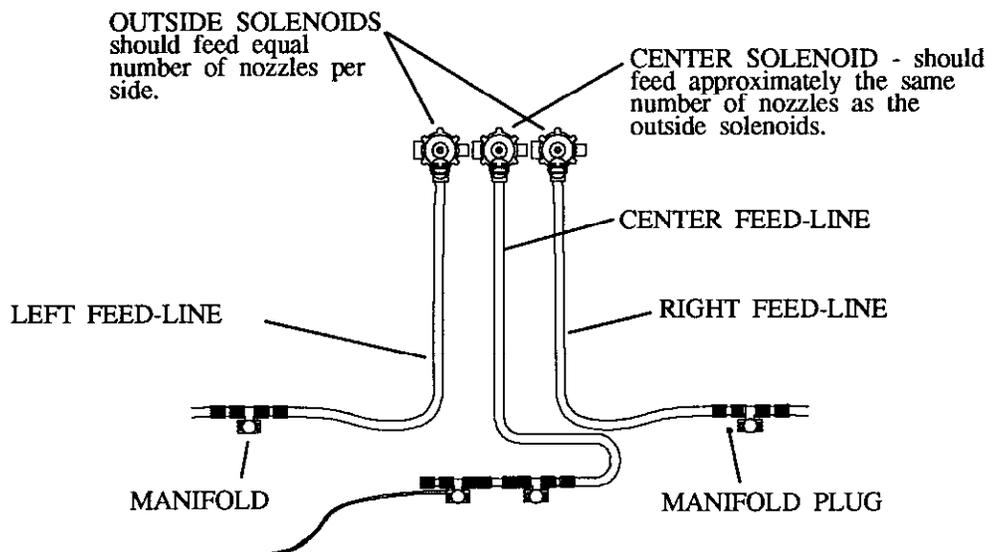


Figure 13

CI-77978A

APPLICATION RATES

The Application Rate Charts on pages 18 and 19 are based on water at 8.3lbs per gallon and 20 and 30 inch nozzle spacings. When spraying solutions that are heavier or lighter than water, multiply the tabulated gallon figure from the chart by the appropriate factor shown below.

Weight of Solution	Conversion Factors
7.0 lbs. per gallon	1.09
8.0 lbs. per gallon	1.02
8.34 lbs. per gallon - water	1.00
9.0 lbs. per gallon	.96
10.0 lbs. per gallon	.91
11.0 lbs. per gallon	.87

NOTE: This table is based on theoretical solution densities only and may vary in actual practice because of differing solution characteristics.

Recommended Spray Heights	
20" Spacing	30" Spacing
20" to 40"	30" to 40"

CALIBRATION

Pre Calibration Check: Be sure that all sprayer parts are free of foreign material and are functioning properly. Inspect nozzle tips and internal parts for obvious wear, defects, proper size and type. Check the flow rate of each nozzle using water at the planned operating pressure for uniform output, and uniform appearance of spray pattern. Replace any nozzle tips having flow 5 percent more or less than the average of the other nozzles checked and/or having obviously different patterns. Check the flow rate of new nozzles.

This engineering practice provides information on the calibration of boom type field sprayers used for broadcast, band, or row applications.

This engineering practice sets forth guidelines for those who prepare field sprayer calibration procedure. The purpose is to encourage practices that will improve uniformity, accuracy and safety of pesticide application with field sprayers.

Never use chemical to calibrate the sprayer. Always use clean water.

Use water alone to calibrate the sprayer unless the flow rate of the actual spray mixture varies more than 5 percent from the flow rate of water.

Calibration with actual spray mixture.

Wear suitable, approved safety equipment and protective clothing. Avoid contact with the spray.

Avoid contamination of area. Calibrate only when wind speed is below 8km/h (5mph).

General Calibration Information

The volume of spray material applied to a given area depends on nozzle flow rate, ground speed of the sprayer and the sprayed width per nozzle. Each variable must be determined when developing a specific calibration procedure.

Nozzle flow rate. Nozzle flow rate varies with nozzle capacity, nature of the fluid and fluid pressure.

Nozzle Capacity. Select the nozzle that will best fit the requirements of application volume, pressure and ground speed.

Nature of the fluid. If the spray mixture will be altered considerably by the addition of adjuvants, compare the flow rate of the spray mixture to that of water. If the rate difference is 5 percent or more, adjust the actual spray mixture in the calibration.

Fluid pressure. A constant pressure must be maintained to achieve uniform application. Flow rate is generally proportional to the square root of the pressure drop across the nozzle.

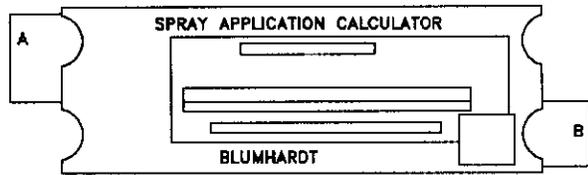
Ground speed of sprayer. Spray volume has an inverse relationship to the ground speed. Ground speed is the easiest factor to change for minor corrections in application rate. Ground speed must be constant for uniform application.

(Reference: ASAE Standard ASAE EP 367.1 Guide for Preparing Field Sprayer Calibration Procedures.)

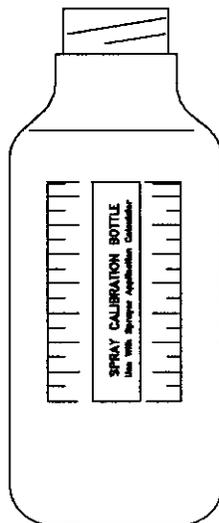
NOTE: Calibration is not a one time occurrence! Sprayers should be periodically calibrated during the season, particularly when changing chemicals. You can calibrate during application if field dimensions are accurately known.

SPRAYER CALIBRATION

The tip charts should be used to get an approximate application rate for choosing proper tip size. Once you have the desired tip installed in the sprayer, it will be necessary to calibrate the sprayer to get an exact rate. Use the calibration bottle and spray application calculator, (figure 14), if not available use the method described below.



CI-78013



CI-78013A

Figure 14

CALIBRATION INSTRUCTIONS WITHOUT BLUMHARDT BOTTLE AND CALCULATOR

Equipment: A bottle with 1 ounce graduations on it, a watch with a second hand, pencil and paper or calculator.

PROCEDURE: Determine desired gallons per acre and speed in miles per hour. Choose a level in graduated bottle, any level can be used, however greater accuracy exists by using a higher level. Figure from the equation the amount of seconds it should take to fill the bottle to the desired number of ounces. Adjust the sprayer pressure accordingly to fill the bottle to the desired number of ounces. Adjust the sprayer pressure accordingly to fill the bottle to desired level in the proper amount of time.

EQUATION:

$$\text{Seconds} = \frac{2589 \times \text{Level (Liquid ounces)}}{\text{MPH} \times \text{Gallons Per Acre} \times \text{Nozzles Spacing}}$$

Example: Determine 10 gallons per acre, 5 miles per hour speed of travel, 30" nozzle spacing and 8 ounces to be collected.

$$\frac{2598 \times 8}{5 \times 10 \times 30} = 13.808 \text{ seconds}$$

It should take 13.8 seconds to fill the bottle to 8 ounces.

