

RH15 / RH18 - 15m / 18m

ROTARY HOE

OWNER'S MANUAL





Table of Contents

Section	Page
Table of Contents	3
Warranty Registration	8
<i>Warranty Inspection Report</i>	<i>8</i>
Inspections	10
<i>Pre-Delivery</i>	<i>10</i>
<i>Delivery</i>	<i>11</i>
<i>After-Sale</i>	<i>12</i>
Owner Register	13
Foreword to the Owner	14
INTRODUCTION	16
SAFETY	17
<i>Safety Alert Symbols and Signal Words</i>	<i>17</i>
<i>General Safety</i>	<i>18</i>
Prepare for Emergencies	<i>18</i>
Wear Protective Clothing	<i>18</i>
Protect Against Noise	<i>18</i>
Practice Safe Maintenance	<i>18</i>
Support Raised Equipment	<i>19</i>
Avoid Heating Near Pressurized Fluid Lines	<i>19</i>
Avoid High-Pressure Fluids	<i>19</i>
Inspect Lift Circuit Hoses	<i>20</i>
Store Attachments Safely	<i>20</i>
Electrical	<i>20</i>
Service Tires Safely	<i>20</i>
Dispose of Waste Properly	<i>21</i>
Handle Agricultural Chemicals Safely	<i>21</i>
Reduce risk of exposure and injury:	<i>21</i>
Handle Chemical Products Safely	<i>22</i>
Operate Hydraulics Safely	<i>22</i>
Use Safety Lights and Devices	<i>23</i>
Keep Riders Off Machine	<i>23</i>
Observe Maximum Transport Speed	<i>23</i>
EC Compliance Notification	<i>24</i>
Use a Signal Person	<i>24</i>
Use a Safety Chain	<i>24</i>
Tow Loads Safely	<i>24</i>



Avoid Overhead Power Lines	25
Prepare for Transport.....	25
Transport Safely	26
Park Safely.....	26
<i>Replace Safety Signs.....</i>	<i>27</i>
Hitch.....	27
Wing.....	28
Main Frame	28
Wheel and Tracks	28
<i>Safety Features.....</i>	<i>29</i>
<i>Sign-Off Form</i>	<i>30</i>
SPECIFICATIONS	31
<i>Tractor Power, Size Recommendation</i>	<i>31</i>
<i>Hydraulic System Requirements</i>	<i>31</i>
<i>Machine Dimensions & Specifications.....</i>	<i>31</i>
PREPARING THE MACHINE	32
<i>Use the Tractor Operator’s Manual.....</i>	<i>32</i>
<i>Pre-Operation Checklist.....</i>	<i>32</i>
AXLES, TIRES, and TRACKS	33
<i>Setting Axle Width.....</i>	<i>33</i>
<i>Checking Tire Pressure</i>	<i>34</i>
<i>Checking Wheel Nuts</i>	<i>35</i>
ATTACHING and DETACHING	36
<i>Attach the Machine Safely.....</i>	<i>36</i>
<i>Attach the Machine to the Tractor</i>	<i>36</i>
<i>Attach Safety Chain to Tractor.....</i>	<i>37</i>
<i>Attach Warning Light Plug.....</i>	<i>37</i>
<i>Make Proper Hose Connections.....</i>	<i>38</i>
<i>SCV Identification Chart.....</i>	<i>39</i>
<i>Detach Machine from Tractor</i>	<i>40</i>
<i>Adjust Hitch Height.....</i>	<i>40</i>
TRANSPORTING	41
<i>Following Safe Transport Procedures</i>	<i>41</i>
<i>Preparing the Machine for Transport.....</i>	<i>41</i>
Fold Toolbar for Transport.....	41
Transport Notes and Checks	42



<i>Transporting the Machine</i>	42
Using Warning Lights	42
Keep Riders Off the Machine	42
<i>Caution for All Machines</i>	43
<i>Unfolding/Extending the Toolbar</i>	43
HYDRAULIC FLOW	44
<i>Tractor SCV Functions</i>	44
ADJUST DEPTH CONTROL	45
<i>Row Depth Adjustment</i>	45
<i>Center Section Depth Adjustment</i>	45
ADJUST GROUND SPEED	46
LUBRICATION & MAINTENANCE	47
<i>Lubricating and Maintaining the Machine Safely</i>	47
<i>Lubricant Storage</i>	47
<i>Grease</i>	47
Greases for Air Temperature Ranges	47
Alternative and Synthetic Lubricants	47
<i>Lubrication and Maintenance Intervals</i>	48
Before and After Each Season	48
Each 50 Hours or Weekly	48
Each 10 hours or Daily	49
SERVICE	50
<i>Practice Safe Maintenance</i>	50
<i>Work in a Clean Area</i>	50
<i>Service Machines Safely</i>	50
<i>Support the Machine Properly</i>	51
<i>Avoid High-Pressure Fluids</i>	51
<i>Preventing Hydraulic System Contamination</i>	51
<i>Replace Hydraulic Hoses</i>	52
<i>Inspect Hoe Teeth</i>	52
<i>Tightening Hardware</i>	52
PREPARING FOR STORAGE	53
<i>Removing from Storage</i>	53
TROUBLESHOOTING	54

TIGHTENING HARDWARE 56

Metric Bolt and Screw Torque Values 56

Unified Inch Bolt and Screw Torque Values 57

Face Seal Fittings Assembly & Installation - All Pressure Applications 58

 Face Seal O-Ring to Stud End Installation 58

 Face Seal Adjustable Stud End O-Ring Installation 58

 Face Seal Straight Stud End O-Ring Installation 58

 Fitting Installation 58

 Assembly Torque 58

SAE Face Seal and O-Ring Stud End Fitting Torque Chart 59





Limited Warranty

Fast Ag Solutions warrants to the buyer that the new machinery is free from defects in material and workmanship.

This warranty is only effective as to any new machinery which has not been altered, changed, repaired or treated since its delivery to the buyer, other than by Fast Ag Solutions or its authorized dealers or employees, and does not apply to accessories, attachments, tools or parts, sold or operated with the new machinery, if they have not been manufactured by Fast Ag Solutions.

Fast Ag Solutions shall only be liable for defects in the materials or workmanship attributable to faulty material or bad workmanship that can be proved by the buyer, and specifically excludes liability for repairs arising as a result of normal wear and tear of the new machinery or in any other manner whatsoever, and without limiting the generality of the foregoing, excludes application or installation of parts not completed in accordance with this Operator's Manual, specifications, or printed instructions.

Written notice shall be given by registered mail, to the Manufacturer within seven (7) days after the defect shall have become apparent or the repairs shall have become necessary, addressed as follows:

Fast Ag Solutions
4130 Commerce Boulevard
Windom, MN 56101

This warranty shall expire one (1) year after the date of delivery of the new machinery.

If these conditions are fulfilled, Fast Ag Solutions shall at its own cost and at its own option either repair or replace any defective parts provided that the buyer shall be responsible for all expenses incurred as a result of repairs, labor, parts, transportation or any other work, unless Fast Ag Solutions has authorized such expenses in advance.

The warranty shall not extend to any repairs, changes, alterations, or replacements made to the new equipment other than by Fast Ag Solutions or its authorized dealers or employees.

This warranty extends only to the original owner of the new equipment.

Rubber parts (including tires, hoses, grommets) are not warranted.

This warranty is limited to the terms stated herein and is in lieu of any other warranties whether express or implied, and without limiting the generality of the foregoing, excluded all warranties, express or implied or conditions whether statutory or otherwise as to quality and fitness for any purpose of the new equipment. The Manufacturer disclaims all liability for incidental or consequential damages.

This Rotary Hoe is subject to design changes and Fast Ag Solutions shall not be required to retrofit or exchange items on previously sold units except at its own option.

Warranty void if not registered.



FAST ROTARY HOE

Warranty Registration

This form must be filled out by the dealer and signed by both the dealer and the customer at the time of delivery.

Customer Name					
Address					
City		State		Zip	
Phone					

Dealer Name					
Address					
City		State		Zip	

Rotary Hoe Model					
Serial Number					
Delivery Date					

Warranty Inspection Report

DEALER INSPECTION REPORT

- All Fasteners Tight
- Wheel Bolts Torqued
- Hydraulic Hoses and Fittings Free and Tight
- Wheel Drive Turns Freely
- Lubricate Machine
- Check Tire Pressure
- Frame and Wings Level
- Monitors and Controllers Function
- Wiring Harness Connected

SAFETY

- Safety Chain Installed
- All Guards Installed
- All Safety Signs Installed
- Reflectors, SMV, and Lights Clean
- Review Operating and
- Safety Instructions

I have thoroughly instructed the buyer on the above-described equipment which review included the Operator's Manual content, equipment care, adjustments, safe operation, and applicable warranty policy.

Date _____

Dealer's Rep. Signature _____

The above equipment and Operator's Manual have been received by me, and I have been thoroughly instructed as to care, adjustments, safe operation, and applicable warranty policy.

Date _____

Owner's Signature _____

White - FAST
Yellow - Dealer
Pink - Customer



FAST RH15 / RH18 Series Rotary Hoe

ROTARY HOE SERIAL NUMBER _____

DATE PURCHASED _____ / _____ / _____

WIDTH (CIRCLE ONE) **15m** **18m**

Inspections

Pre-Delivery

After the machine has been completely assembled, inspect it to be sure it is in good running order before delivering it to the customer. Ensure each item is found satisfactory or proper adjustment to the item(s) is made.

The following checklist is a reminder of points to inspect. It is neither an exclusive nor an exhaustive list of points to inspect. See the [Warranty Inspection Report](#) for a formal list.

- **SMV** emblem is installed, protective **shipping tape** is removed from reflectors, and **lights** are installed.
- All **grease fittings** are lubricated (see [LUBRICATION and MAINTENANCE](#) section in this Manual.)
- Inspect to be sure all **nuts** are tightened to proper torque and all **cotter pins** are spread.
- The **tires** are properly inflated (see [SPECIFICATIONS](#)).
- **Wheel bolts** are tightened to their specified torque(s).
- Warning **lights** are properly installed and operational.
- All customer-ordered **attachments** are installed or are available for delivery.
- Any parts scratched in shipment are touched up with **paint**.
- All **shipping decals** are removed.
- **Transport pins** are inserted in the transport holes.

This machine has been thoroughly checked and to the best of my knowledge is ready for delivery to the customer.

Signed: _____

Date: _____



Delivery

The following checklist is a reminder of information which should be conveyed directly to the customer at the time the machine is delivered.

Check off each item as it is fully relayed to the customer.

- Tell the customer to use proper tools.
- Explain to the customer that the life expectancy of this or any other machine depends on regular lubrication as directed in Operator's Manual.
- Make the customer aware of all safety precautions that must be followed while using this machine.
- When the machine is transported on a road or highway at night or during the day, accessory lights and devices should be used for adequate warning to Operators of other vehicles. For this matter, tell the customer to check local governmental regulations.
- Give the Operator's Manual to the customer and explain all operating adjustments.

To the best of my knowledge, this machine has been delivered ready for field use, and the customer has been fully informed as to its proper care and operation.

Signed: _____

Date: _____

After-Sale

The following is a suggested list of items to be checked at a dealer-customer mutually agreeable time during the first operating season.

- Check with the customer as to performance of machine. Make certain proper operating adjustments are understood.
- If possible, operate the machine to see that it is functioning properly.
- Acquaint the customer with any special attachment which will help do a better job.
- Go over the entire machine for loose or missing hardware.
- Check for broken or damaged parts.
- Ask the customer if recommended periodic lubrication has been performed.
- Review the Operator's Manual with the customer and stress the importance of proper lubrication and safety precautions.

Signed: _____

Date: _____



Owner Register

Model Number	P.I.N. Number
--------------	---------------

Name		
Address		
County	State	Date Purchased

Name		
Address		
County	State	Date Purchased

Name		
Address		
County	State	Date Purchased

Name		
Address		
County	State	Date Purchased

Foreword to the Owner



READ THIS MANUAL carefully to learn how to operate and service your machine correctly. Failure to do so could result in personal injury or equipment damage. This Manual and safety signs on your machine may also be available in other languages.

THIS MANUAL SHOULD BE CONSIDERED a permanent part of your machine and should remain with the machine when you sell it.

MEASUREMENTS in this Manual are given in both metric and customary U.S. unit equivalents. Use only correct replacement parts and fasteners. Metric and inch fasteners may require a specific metric or inch wrench.

RIGHT-HAND AND LEFT-HAND sides are determined by facing in direction that the implement will travel when going forward.

WRITE PRODUCT IDENTIFICATION NUMBERS (P.I.N.) in the [Specification](#) section and in the [Owner Register](#). Accurately record all numbers to help in tracing your machine should it be stolen. Your dealer also needs these numbers when you order parts. File identification numbers in a safe place off-machine.

BEFORE DELIVERING THIS MACHINE, your dealer performed a pre-delivery inspection.

THIS ROTARY HOE IS DESIGNED SOLELY for use in customary agricultural or similar operations for the purpose of removing small weeds and loosening crusted or compacted soil to aid in crop emergence (“Intended Use”). Use in any other way is considered as contrary to the



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

THIS ROTARY HOE SHOULD BE OPERATED, serviced, and repaired only by persons familiar with all its particular characteristics and acquainted with the relevant safety rules (Accident Prevention). The Accident Prevention regulations, all other generally recognized regulations on safety and occupational medicine and the road traffic regulations must be observed at all times.

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

THIS DOCUMENT outlines the specific design and performance requirements for the use of a Fast Ag Solutions Rotary Hoe assembly. The word “must” in this document indicates a mandatory requirement. The use of “should” indicates a recommendation of that which is advised but not required.

WARRANTY is provided as part of Fast Ag Solutions' support program for customers who operate and maintain their equipment as described in this Manual. The warranty is explained on the warranty certificate which you should have received from your dealer.

This warranty provides you with assurance that Fast Ag Solutions will back its products where defects appear within the warranty period. In some circumstances, Fast Ag Solutions also provides field improvements, often without charge to the customer, even if the product is out of warranty. Should equipment be abused or modified to change its performance beyond original factory specifications, the warranty will become void and field improvements may be denied.

TIRE MANUFACTURER'S warranty applicable to your machine may not apply outside U.S.

If you are not the original owner of this machine, it is in your interest to contact your local Fast Ag Solutions dealer to inform them of this unit's serial number. This will help Fast Ag Solutions notify you of any issues or product improvements.

INTRODUCTION



Read this Manual carefully before operating your FAST equipment. The information presented will prepare you to safely operate and service your machine.

All Operators are required to read this Manual carefully and be acquainted with all the operating and adjustment procedures before attempting to operate. Failure to follow the information in this Manual and on decals may result in personal injury or equipment damage.

This Manual should be considered a permanent part of this equipment and should remain with the equipment when you sell it. Replacement manuals can be obtained from your Fast Ag Solutions dealer.

This equipment has been engineered and manufactured to provide dependable and satisfactory use. Like all mechanical products, it will require cleaning and upkeep. Inspect your equipment before putting it into service. Your authorized Fast Ag Solutions dealer has trained mechanics, genuine FAST service parts, and the necessary tools and equipment when service is needed. Use only genuine FAST parts for service or repairs. Substitute parts will void the warranty and may not meet standards for safe and satisfactory operation.

Warranty is provided as part of Fast Ag Solutions' support program for customers who operate and maintain their equipment as described in this Manual. The warranty is explained on the warranty certificate you should have received from your dealer. This warranty provides you with the assurance that Fast Ag Solutions will back its products where defects appear within the warranty period. Should the equipment be abused or modified to change its performance beyond the original factory specifications, the warranty will become void.

These instructions have been compiled from field experience and engineering data. Some information may be general in nature due to unknown and varying operating conditions. However, through experience and these instructions, you should be able to develop procedures suitable to your particular situation.

.....

The illustrations and data used in this Manual were current at the time of printing. However, due to possible in-line production changes, your machine may vary slightly in detail. We reserve the right to redesign and change the machines as necessary without notification.

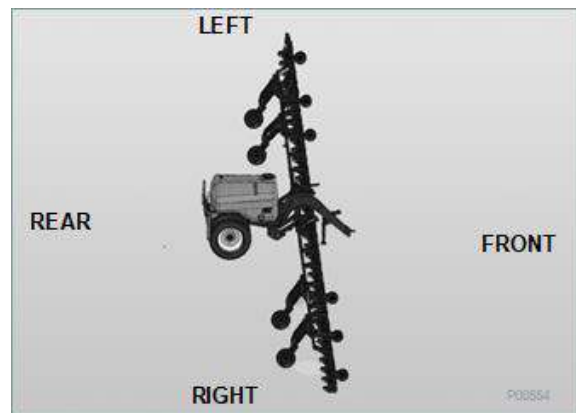


Figure 1: Orientation is viewed from behind the machine

SAFETY

The most important safety device on this equipment is a safe Operator. It is the Operator's responsibility to read and understand and follow all safety and operating instructions in this Manual.

As the Operator, you are responsible for the safe operation and maintenance of this equipment. You must ensure that you and anyone else who is going to operate, maintain or work around the machine is familiar with the operating and maintenance procedures and related safety information contained in this Manual.

You are the key to safety. Good safety practices protect you and the people around you. Be certain that everyone operating this equipment is familiar with the recommended operating and maintenance procedures and follows all safety precautions. Do not risk injury or death by ignoring good safety practices.

Safety Alert Symbols and Signal Words



This is a Safety Alert Symbol. When you see this symbol on your machine or in this Manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.

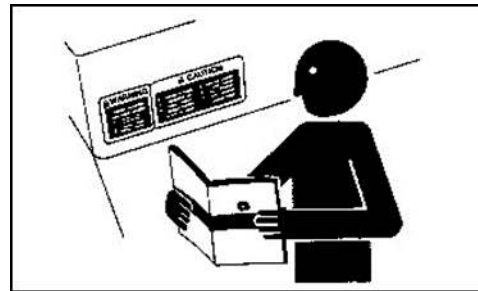
Understand Signal Words

Throughout this Manual, the terms *CAUTION*, *WARNING*, and *DANGER* are used along with the Safety Alert Symbol to indicate the degree of personal safety hazard. The term *IMPORTANT* is used to indicate that failure to observe the hazard can cause damage to the equipment.



DANGER identifies the most serious hazards. DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this Manual.

Follow Safety Instructions



Carefully read all safety messages in this Manual and on your machine's safety signs. Keep safety signs in good condition.

Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from your Fast Ag Solutions dealer. There can be additional safety information contained on parts and components sourced from suppliers that is not reproduced in this Operator's Manual.

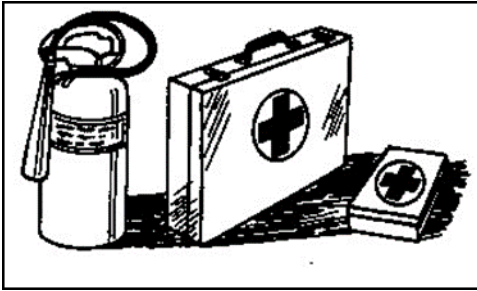
Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.

Keep your machine in proper working condition. Unauthorized modifications to the machine may impair the function and/or safety and affect machine life.

If you do not understand any part of this Manual and need assistance, contact your Fast Ag Solutions dealer.

General Safety

Prepare for Emergencies

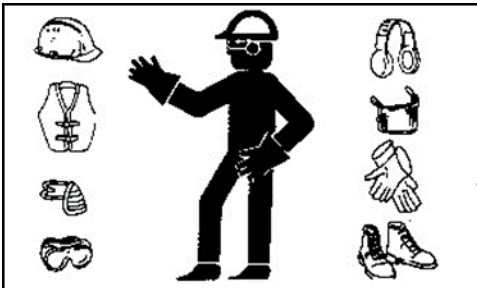


Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for the poison control center, doctors, ambulance service, hospital, and fire department near your telephone.

Wear Protective Clothing



Wear close-fitting clothing and safety equipment appropriate to the job.

Operating equipment safely requires the full attention of the Operator. Do not wear radio or music headphones while operating the machine.

Protect Against Noise



Prolonged exposure to loud noise can cause impairment or loss of hearing.

Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.

Practice Safe Maintenance



Understand service procedures before doing work. Keep the area clean and dry.

Never lubricate, service, or adjust the machine while it is moving. Keep hands, feet, and clothing away from power-driven parts. Disengage all power and operate controls to relieve pressure. Lower equipment to the ground. Stop the engine. Remove the key. Allow machine to cool. Securely support any

machine elements that must be raised for service work.

Keep all parts in good condition and properly installed. Fix any damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.

On self-propelled equipment, disconnect the battery ground cable (-) before making any adjustments on electrical systems or welding on the machine.

On towed implements, disconnect wiring harnesses from tractor before servicing electrical system components or welding on the machine.

Support Raised Equipment



Always use a safety support when working on, under, or around the machine. Transport/Service locks can be used for this purpose.

Shut off the tractor's engine and remove the key when working on the machine.

If air has been allowed to enter hydraulic hoses or cylinders, bleed the hydraulic system before use. If there is a failure in the hydraulic system, unsupported or raised equipment could suddenly lower, causing serious personal injury or death.

If support is not available, completely lower wings and frame, relieve hydraulic pressure and disconnect hoses from tractor.

Avoid Heating Near Pressurized Fluid Lines



Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can accidentally burst when heat goes beyond the immediate flame area.

Avoid High-Pressure Fluids



Inspect hydraulic hoses periodically – at least once per year – for leakage, kinking, cuts, cracks, abrasion, blisters, corrosion, exposed wire braid, or any other signs of wear or damage.

Replace worn or damaged hose assemblies immediately with Fast Ag Solutions approved replacement parts.

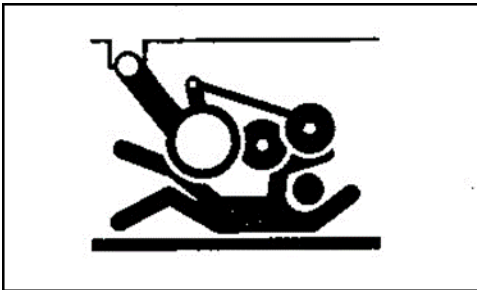
Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids.

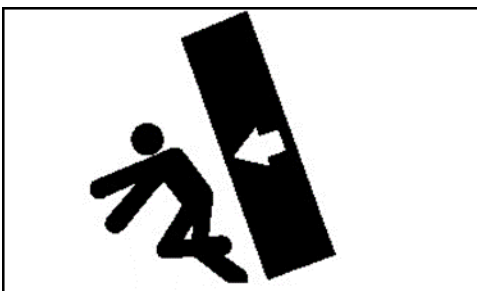
If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source.

Inspect Lift Circuit Hoses



Avoid serious injury or death while working under a raised implement. Hydraulic hoses between the lift cylinders and hydraulic lock-up valves should be inspected frequently for leakage, kinking, cuts, cracks, abrasion, blisters, corrosion, exposed wire braid, or any other signs of wear or damage. Worn or damaged hose assemblies can fail during use and should be replaced immediately. See your Fast Ag Solutions dealer for replacement hoses.

Store Attachments Safely



Stored attachments such as dual wheels can fall and cause serious injury or death. Securely store attachments and implements

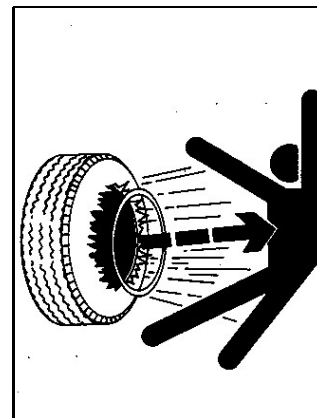
to prevent falling. Keep playing children and bystanders away from storage area.

Electrical



Check all electrical wiring and connections for damage. Keep the battery terminals clean and tight. Repair or replace any damaged part or wires that are loose or frayed.

Service Tires Safely



CAUTION: Explosive separation of a tire and rim parts can cause serious injury or death.

Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job.

Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure resulting in a tire explosion. Welding can structurally weaken or deform the wheel.

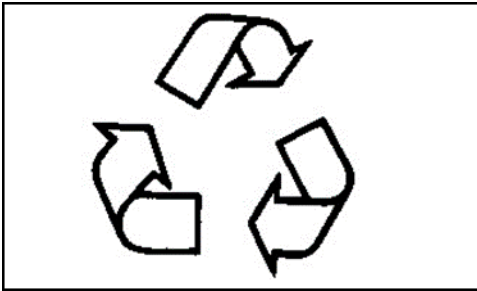
Always maintain the correct tire pressure. Do not inflate the tires above the recommended pressure. Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure resulting in a tire explosion.

Welding can structurally weaken or deform the wheel.

When inflating tires, use a clip-on chuck and extension hose long enough to allow you to stand to one side and NOT in front of or over the tire assembly. Use a safety cage if available.

Check wheels for low pressure, cuts, bubbles, damaged rims, or missing lug bolts and nuts. Replace as necessary.

Dispose of Waste Properly



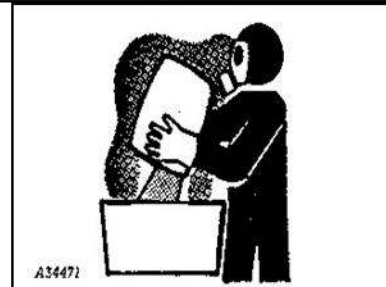
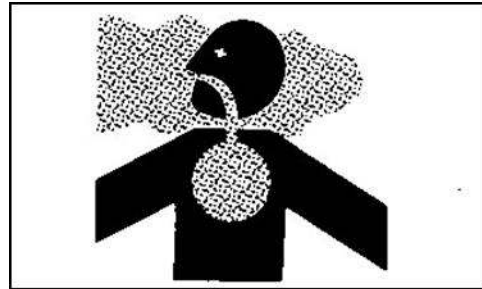
Improperly disposing of waste can threaten the environment and ecosystem. Potentially harmful waste used with equipment includes such items as oil, fuel, coolant, brake fluid, filters, and batteries.

Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

Do not pour waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.

Handle Agricultural Chemicals Safely



Chemicals used in agricultural applications such as fungicides, herbicides, insecticides, pesticides, rodenticides, and fertilizers can be harmful to your health or the environment if not used carefully.

Always follow all label directions for effective, safe, and legal use of agricultural chemicals.

Reduce risk of exposure and injury:

Wear appropriate personal protective equipment as recommended by the manufacturer. In the absence of manufacturer's instructions, follow these general guidelines:

Chemicals labeled 'Danger' (Most toxic) generally require use of goggles, respirator, gloves, and skin protection.

Chemicals labeled 'Warning' (Less toxic) generally require use of goggles, gloves, and skin protection.

Chemicals labeled 'Caution' (Least toxic) generally require the use of gloves and skin protection.

Avoid inhaling vapor, aerosol, or dust.

Always have soap, water, and a towel available when working with chemicals. If a chemical contacts skin, hands, or face, wash

immediately with soap and water. If chemical gets into eyes, flush immediately with water.

Wash hands and face after using chemicals and before eating, drinking, smoking, or urination.

Do not smoke or eat while applying chemicals.

After handling chemicals, always bathe or shower and change clothes. Wash clothing before wearing it again.

Seek medical attention immediately if illness occurs during or shortly after use of chemicals.

Keep chemicals in original containers. Do not transfer chemicals to unmarked containers or to containers used for food or drink.

Store chemicals in a secure, locked area away from human or livestock food. Keep children away.

Always dispose of containers properly. Triple rinse empty containers and puncture or crush containers and dispose of properly.

Handle Chemical Products Safely



Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with FAST equipment include such items as lubricants, coolants, paints, and adhesives.

A Material Safety Data Sheet (M/SDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.

Check the M/SDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow the procedures with the recommended equipment.

Operate Hydraulics Safely



Before operating, make sure air has been bled from wing-fold hydraulic system.

Be sure the area around the machine is clear before raising or lowering the machine's frame or wings.

Do not operate with wings folded.

Do not operate close to the edge of a ditch, creek, gully, or steep embankment. Avoid holes, ditches, and obstructions which may cause the tractor, machine, or towed equipment to roll over, especially on hillsides.

Avoid sharp turns on hillsides.

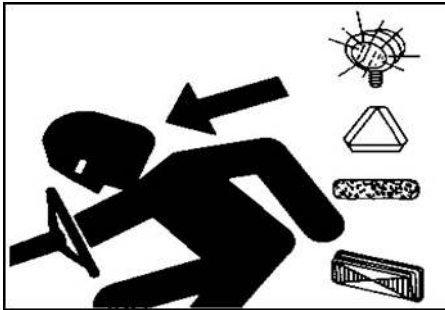
Slow down when turning, traveling over rough ground, or when turning on inclines.

Always shut off tractor and shift to PARK or set brakes when leaving tractor. Remove key when leaving tractor unattended.

Always have the tractor stop on level ground when raising or lowering wings. Operate the machine from tractor seat only. If chemicals are used, follow the manufacturer's recommendations for handling and storage.

Tow the machine behind a properly equipped tractor only.

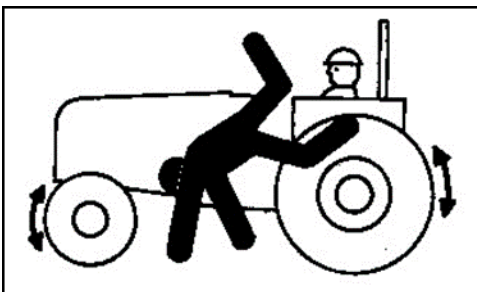
Use Safety Lights and Devices



Prevent collisions between other road users, slow moving tractors with attachments or towed equipment, and self-propelled machines on public roads. Frequently check for traffic from the rear, especially in turns, and use turn signal lights.

Use headlights, flashing warning lights, and turn signals during both day and night. Follow local regulations for equipment lighting and marking. Keep lighting and marking visible, clean, and in good working order. Replace or repair lighting and marking that has been damaged or lost.

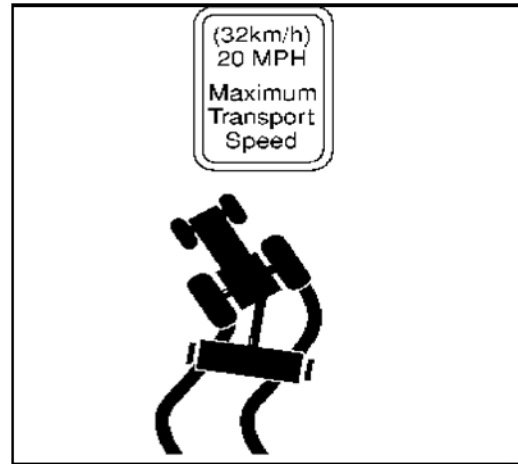
Keep Riders Off Machine



Only allow the Operator on the machine. Keep riders off.

Riders on the machine are subject to injury such as being struck by foreign objects and being thrown off of the machine. Riders also obstruct the Operator's view resulting in the machine being operated in an unsafe manner.

Observe Maximum Transport Speed



⚠ CAUTION: Be sure all bystanders are clear of Rotary Hoe.

This implement is not equipped with service or parking brakes. The maximum transport speed for this implement is 20 mph (32 km/h).

Some tractors are capable of operating at speeds that exceed the maximum transport speed of this implement. Regardless of the maximum speed capability of the tractor being used to tow this implement, do not exceed the implement's maximum transport speed.

Exceeding the implement's maximum transport speed can result in:

- Loss of control of the tractor/implement combination.
- Reduced or no ability to stop during braking.
- Implement tire failure.
- Damage to the implement structure or its components.

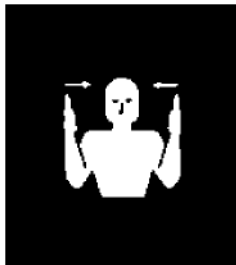
Use additional caution and reduce speed when towing under adverse surface conditions, when turning, and when on inclines. For transport, the weight of the Rotary Hoe must not be more than 1.5 times the weight of the tractor. The minimum towing tractor weight for the Rotary Hoe is 9000 lbs. (4082 kg).

Never tow this implement with a motor vehicle. Tow only with a properly ballasted tractor.

EC Compliance Notification

**MACHINE DOES NOT COMPLY WITH
MACHINERY DIRECTIVE 2006/42/EC
NOT FOR EUROPEAN MARKET**

Use a Signal Person



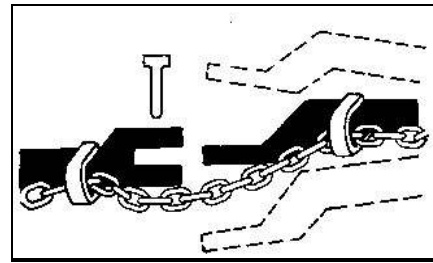
Use a signal person to direct movement of the tractor / implement combination, whenever the tractor operator's view is obstructed.

Designate one individual as THE signal person. Always have the signal person stand in clear view. Be sure the signal person stays a safe distance away from the machine when it is moving.

Prior to starting the tractor, discuss hand signals and what each signal means to avoid misunderstandings and confusion which could result in a serious injury or fatal accident for someone.

Keep all bystanders away whenever the machine is moved.

Use a Safety Chain



A safety chain will help control drawn equipment should it accidentally separate from the drawbar.

Using the appropriate adapter parts, attach the chain to the tractor drawbar support or other specified anchor location. Provide only enough slack in the chain to permit turning.

Tow Loads Safely



Stopping distance increases with speed and weight of towed loads and on slopes. Towed loads with or without brakes that are too heavy for the tractor or are towed too fast can cause loss of control. Consider the total weight of the equipment and its load.

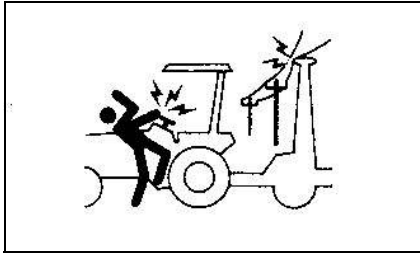
Observe these recommended maximum road speeds or local speed limits which may be lower:

If towed equipment does not have brakes, do not travel more than 32 km/h (20 mph) and do not tow loads more than 1.5 times the tractor weight.

Ensure the load does not exceed the recommended weight ratio. Add ballast to the recommended maximum for the tractor, lighten the load, or get a heavier towing unit.

The tractor must be heavy and powerful enough with adequate braking power for the towed load. Use additional caution when towing loads under adverse surface conditions, when turning, and on inclines.

Avoid Overhead Power Lines



⚠ WARNING: Keep away from overhead power lines. Serious injury or death may result.

Proceed cautiously under overhead power lines and around utility poles. Know the transport height of your machine. Electrocutation can occur without direct contact with overhead electrical lines.

Prepare for Transport

⚠ CAUTION: Avoid serious injury or death to your or others.

Never tow the machine behind a truck or other motor vehicle. This machine is designed only to be towed with a properly sized and ballasted tractor.

Use a tractor large enough to maintain control. Properly ballast tractor for towing your machine. Refer to tractor Operator's Manual and this Manual to ensure that machine can be safely transported with your tractor.

Be aware of height and width restrictions to avoid a collision with overpasses or other road users.

Always fold wings fully. If wing fold cylinders are removed, chain wings together to

prevent accidental lowering. Fully raise frame, close hydraulic lock-up valve (if equipped) and install Transport/Service locks before transporting. Latch the tractor brakes together.

Attach a properly sized safety chain for the load being towed. Refer to [Use a Safety Chain](#).

⚠ IMPORTANT: Do not transport on a roadway unless the machine is equipped with proper functioning lights and reflective markings or emblems.

Ensure that the lights and reflective markings or emblems are clean and visible. Contact your Fast Ag Solutions dealer for lights and lighting harnesses.

Always follow local and national regulations for equipment size, lighting and marking before driving on public roadways. You are responsible for understanding and complying with all requirements regarding roadway transport. Refer to [Use Safety Lights and Devices](#).

Transport Safely



- ⚠ CAUTION:** When transporting, always travel at a reasonable and safe speed which permits adequate control of steering and stopping.

Reduce speed considerably when traveling over rough ground. Be certain everyone is clear of the machine.

Do not exceed weight and speed guidelines. Refer to [Observe Maximum Transport Speed](#).

Towed loads can swerve and upset or cause loss of control. Refer to [Tow Loads Safely](#). Shift tractor into a lower gear when transporting down steep slopes or hills; never coast. Stop slowly.

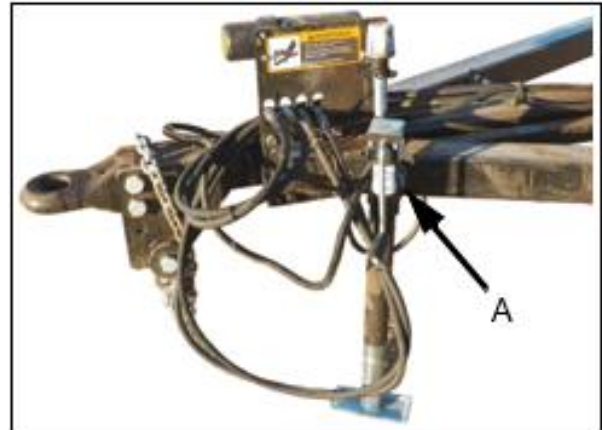
Wide turns may be required with the machine in tow. Use caution in traffic and in congested areas.

To improve stability when traveling through the field, wings should be unfolded from transport position as soon as possible after leaving the roadway.

- ▲ IMPORTANT:** When transporting the machine on a roadway, **ALWAYS USE** appropriate lamps and devices for adequate warning to operators of other vehicles.

Refer to [Use Safety Lights and Devices](#).

Park Safely

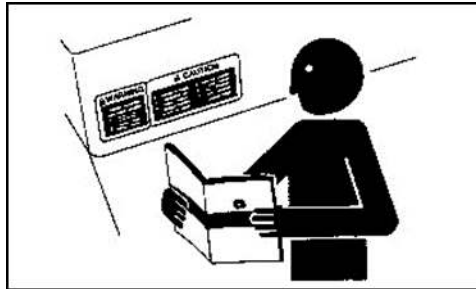


Parked Jack Position

A - Pin

Park the machine on a level surface, lower the jack, and retain it with pin (A). Block implement wheels.

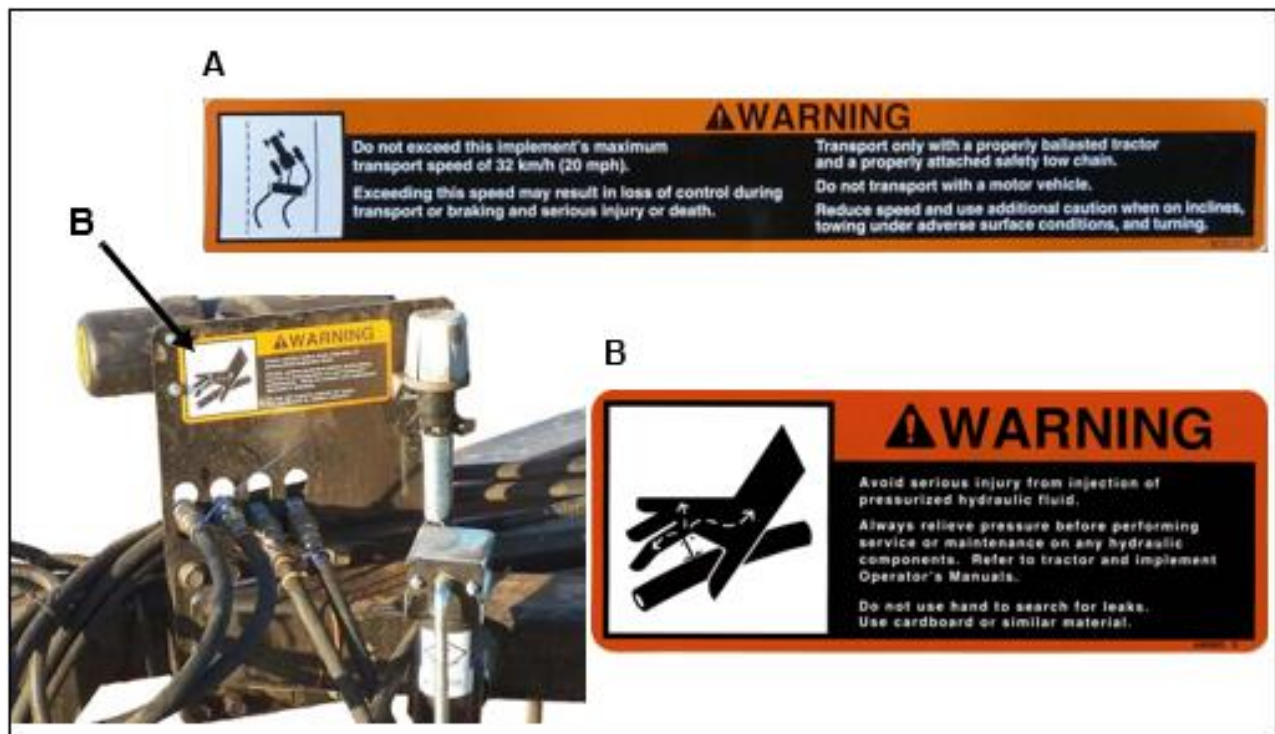
Replace Safety Signs



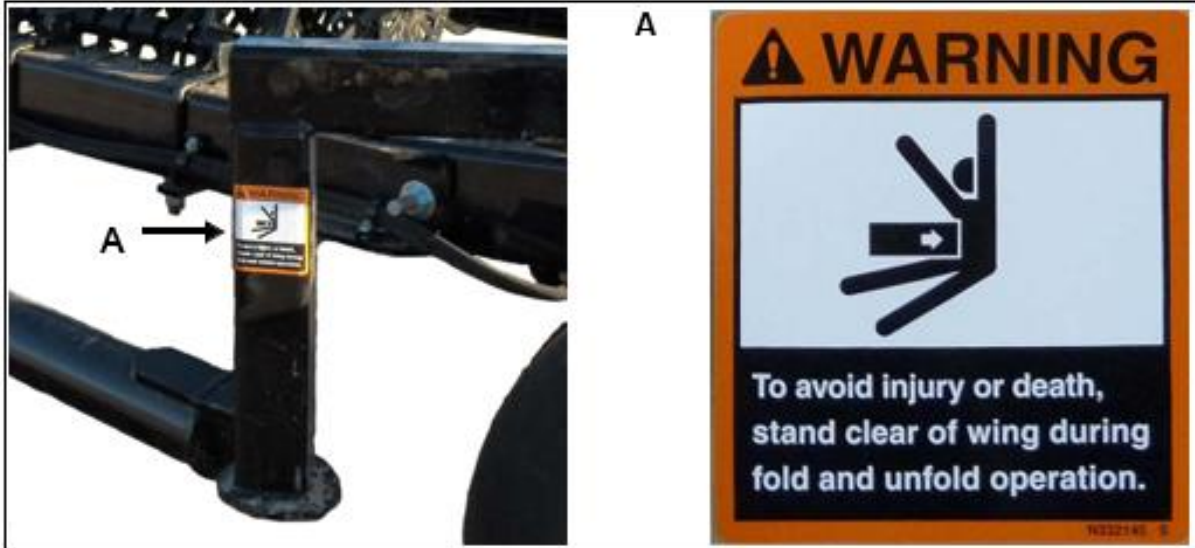
Replace missing or damaged safety signs. Use this Operator's Manual for correct safety sign placement.

There can be additional safety information contained on parts and components sourced from suppliers that is not reproduced in this Operator's Manual.

Hitch



Wing



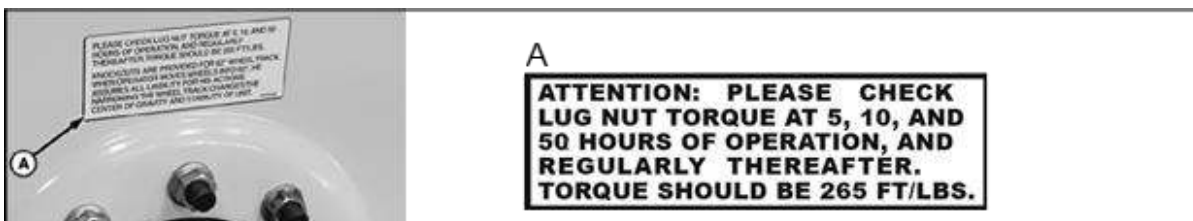
Main Frame

ROW UNIT DEPTH ADJUSTMENT
 2 TURNS = 3/8" AT THE GROUND
 CLOCKWISE TO LOWER
 COUNTERCLOCKWISE TO RAISE

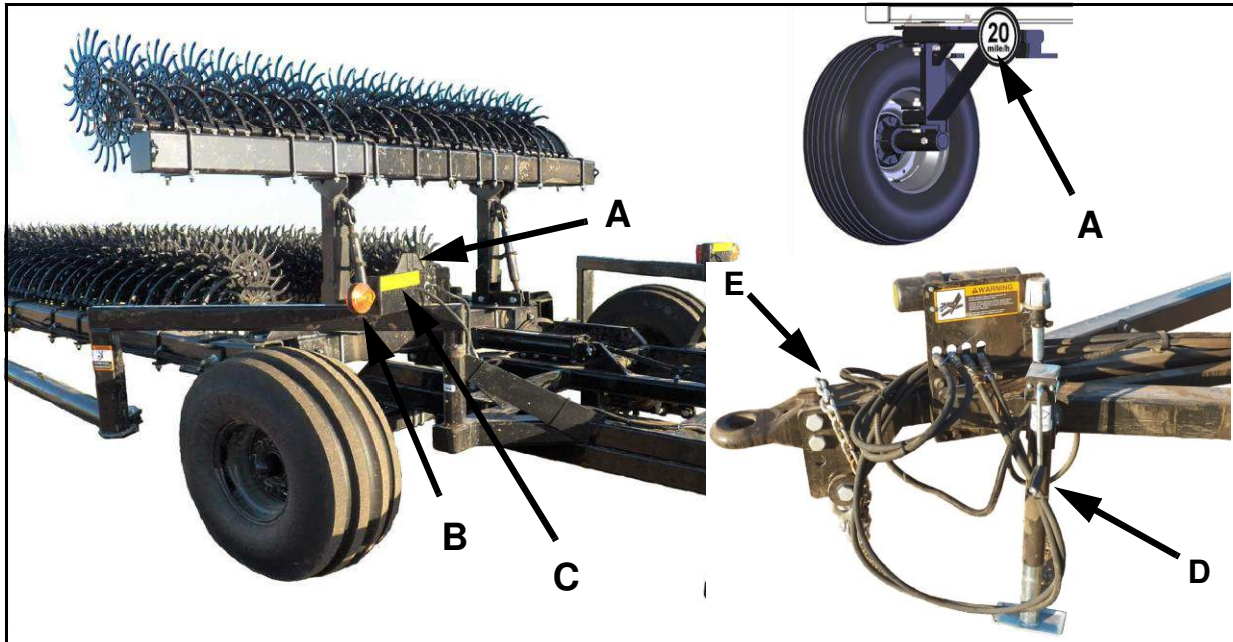
CAUTION
 WINGS MUST BE OPEN WHEN
 PARKING UNLESS IMPLEMENT IS
 EQUIPPED WITH REAR STORAGE
 STANDS

IMPORTANT
 -- RAISE IMPLEMENT OFF GROUND
 BEFORE FOLDING OR UNFOLDING
 -- NEVER BACK ROTARY HOE WITH HOE
 WHEEL TOUCHING GROUND.

Wheel and Tracks



Safety Features



- A. SMV & SIS Emblem
 - i. Identifies slow-moving equipment and alerts traffic approaching from the rear.
- B. Warning Lights
 - i. Alert other drivers to the machine's presence and width of slow-moving machinery on roadways and signal turns.
- C. Reflectors
 - i. Alert other drivers to the machine's presence and width of slow-moving machinery on roadways.
- D. Jack
 - i. Prevents the machine from falling when in storage.
- E. Safety Chain
 - i. Will help control the machine should it accidentally separate from tractor drawbar.

In addition to the safety features shown here, other components, systems, safety signs on the machine, safety messages, and instructions in the Operator's Manual contribute to the safe operation of this machine when combined with the care and concern of a capable Operator.

The construction of this implement may not meet all local or national requirements for transport on a public roadway. In regions or countries that have national certification requirements for roadway transport, it may be impossible for this implement to be approved for such roadway transport. The customer is responsible for understanding and complying with all local, regional, and national requirements regarding roadway transport.



Sign-Off Form

Fast Ag Solutions follows the general Safety Standards specified by the American Society of Agricultural Engineers (ASAE) and the Occupational Safety and Health Administration (OSHA). Anyone who will be operating and/or maintaining the FAST Rotary Hoe must read and clearly understand ALL Safety, Operating, and Maintenance information presented in this Manual.

Do not operate or allow anyone else to operate this equipment until such information has been reviewed. Annually review this information before season start-up.

A sign-off sheet is provided as a template for your records to show that all personnel who will be working with the equipment (Operators) have read and understand the information in this Manual and have been instructed in the safe operation, service, and maintenance of the equipment.

Date	Employee's Signature	Employer's Signature

SPECIFICATIONS

Tractor Power, Size Recommendation

Use the machine with a tractor providing drawbar power in the following ranges:

Machine size, m (ft)	Tractor Power, kW (HP)	Min. Tractor Weight, kg (lbs.)
15 (43.67)	89 – 119 (120 – 160)	3236 (7333)
18 (53.67)	112 – 130 (150 – 175)	4082 (9000)

Hydraulic System Requirements

A tractor hydraulic system with ISO hydraulic couplers is required.

Five tractor Selective Control Valves (SCV) at the listed flowrates and pressure are required for following:

Circuit	SCV Function	Flowrate	Pressure
1	Field Latch / Wing Wheels	30 LPM (8 GPM)	20,684 kPa (206.8 bar) (3000 psi)
2	Raise & Lower the Toolbar	38 LPM (10 GPM)	20,684 kPa (206.8 bar) (3000 psi)

Machine Dimensions & Specifications

Model	RH15	RH18
Transport Height	2.54m (8ft-4in)	
Transport Width	3.51m (11ft-6in)	
Transport Overall Length	15m (43ft-9in)	18m (53ft-9in)
Transport Pin-to-Axle Length	5.04m (16ft-7in)	
Toolbar Size(s)	15m (43ft-9in)	18m (53ft-9in)
Toolbar Tube Size	17.8cm x 17.8cm (7in x 7in) Rectangular	
Weight, shipped	4989 kg (11000 lbs.)	5442 kg (12000 lbs.)
Standard Gauge Tires	9.5L 15 SL	
Standard Main Frame Tires	14L 16.1 SL	

PREPARING THE MACHINE

Use the Tractor Operator's Manual

Always refer to tractor operator's manual for specific detailed information regarding operation of equipment.



Pre-Operation Checklist

Efficient and safe operation of the machine requires that each Operator reads and understands operating procedures and all related safety precautions outlined in this section. A pre-operational checklist is provided for the Operator. It is important for both personal safety and maintaining the good mechanical condition of the Rotary Hoe that this checklist be followed.

Before operating the Rotary Hoe, check the following items:

1. Lubricate machine per the schedule outlined in the [LUBRICATION and MAINTENANCE](#) section.
2. Use only a tractor of adequate power and weight to operate the Rotary Hoe. See the [SPECIFICATIONS](#) section for recommendations.
3. Be sure that the machine is properly attached to the tractor. Be sure that a mechanical retainer is installed through the drawbar and that a pin and safety chain are installed.
4. Inspect all hydraulic lines, hoses, fittings, and couplers for tightness. See [Tightening Hardware](#) for break-in period recommendations.
5. **IMPORTANT:** Extend the axles out of the shipping width setting and set the track or tire width for your application. The unit is shipped with axles to the narrowest setting using the shipping holes for shipping purposes only. See [SETTING AXLE WIDTH](#).
6. Check tires and verify they are inflated to the specified pressure. See [Checking Tire Pressure](#)
7. Check all wheels for straightness (within 1/4" (6.35mm) of Runout). Replace if necessary.
8. Straighten or replace any bent hoe teeth.
9. Level the Rotary Hoe if at the start of the season by adjusting its turnbuckles.
10. Check the condition and routing of all fluid hoses and lines. Be sure that all lines are routed in large arcs. Replace any that are damaged. Re-route those that are rubbed, pinched, or crimped. See [Replace Hydraulic Hoses](#).
11. Check placement components. Remove and replace any that are worn.
12. Remove all entangled material.

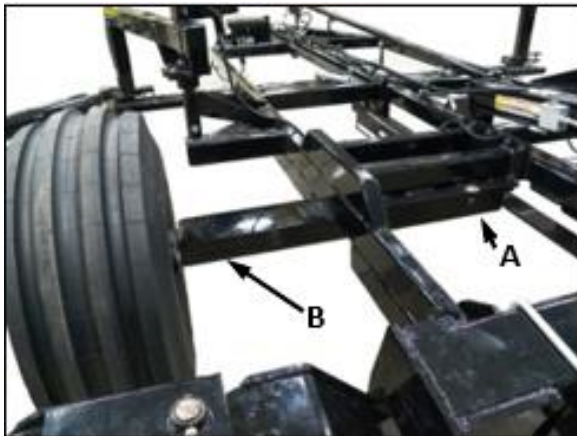
AXLES, TIRES, and TRACKS

Setting Axle Width

▲ **IMPORTANT:** Adjust axles out of the shipping width before transporting or application. Set axles to the widest setting possible to match row width. Use only the holes with measurements.

▲ **IMPORTANT:** Adjust Wing Wheels shipping position before transporting or to match row width before operating.

3. Reinstall all axle hardware (A).
4. Torque to 216 N-m (159 ft-lbs.)
5. Repeat for the other side.



1. Properly raise and support the frame with jack stands.
2. Remove bolts (A) and move the axle (B) to the desired axle width to match row width. Axles (B) must be moved out from shipping position for machine stability. Set both axles to the same width.

Checking Tire Pressure

Check tire pressure and inflate as necessary.

⚠ CAUTION: Avoid loss of vehicle control during transport from failure of overloaded tires which could cause serious injury or death to you or others.

Equal pressure in all tires is necessary for even penetration. A low tire will cause deeper penetration on one side than the other. Increased penetration on one side will result in side-draft of the machine. Inflate tires to shown specification.

Tire Size	Pressure
95L 15 SL (Wing Wheel 2019)	331 kPa (3.30 bar) (48 psi)
11L 15 SL (Wing Wheel 2020)	248 kPa (2.48 bar) (36 psi)
14 L 16.1 SL (Main Frame Wheel)	221 kPa (2.21 bar) (32 psi)
9.5L 15 SL (Gauge Wheel)	303 kPa (3.03 bar) (44 psi)

⚠ NOTE: Tire pressure is directly linked to its Load Rating (LR###). Make sure of the load rating of the tire before adding any air to the tire.

Checking Wheel Nuts



- A. Main Frame Wheel Nut (8-bolt)
- B. Gauge Wheel Nut (6-bolt)

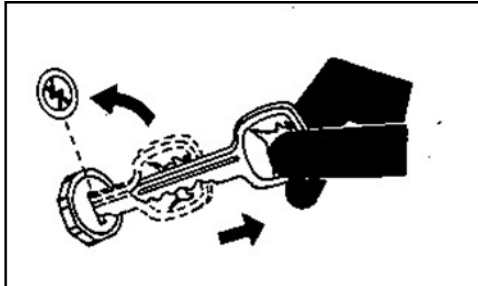
Check tightness of all wheel nuts (A) and (B) during the first week of operation and periodically after that.

Tighten all wheel bolts to specification.

Item	Specification
(A) Main Frame Wheel Nut	175 N-m (130 ft-lbs.)
(B) Gauge Wheel Nut	135 N-m (100 ft-lbs.)

ATTACHING and DETACHING

Attach the Machine Safely



- ⚠ **CAUTION:** Prevent personal injury caused by unexpected movement of the machine. Engage the tractor's parking brake and/or place transmission in **PARK**, shut off the engine, and remove the ignition key before working around the hitch.

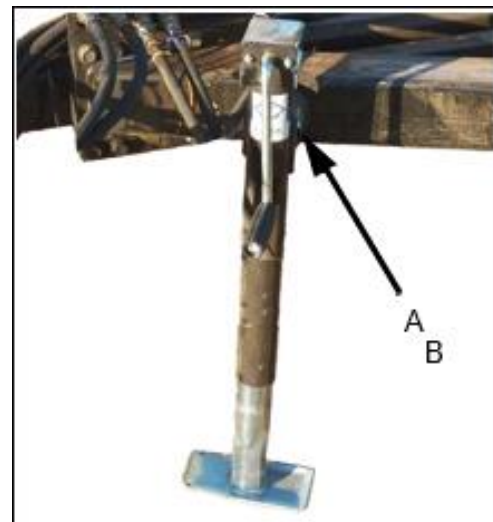
Attach the Machine to the Tractor

- ⚠ **CAUTION:** Make sure that all bystanders are clear of the working area.
1. Make sure there is enough room and clearance to safely back up to the machine.
 2. Slowly back the tractor until holes on the hitch and drawbar are aligned.
 3. Install drawbar pin and retainer.
 4. Attach safety chain (see [Attach Safety Chain to Tractor](#)) securely around tractor drawbar cage to prevent unexpected separation.
 5. Check that the Rotary Hoe hydraulic system is compatible with the tractor's hydraulics: [Hydraulic System Requirements](#). Change the choice of Rotary Hoe model if required. Do not operate unless tractor and implement hydraulics are compatible.
 6. Connect Hydraulics



- ⚠ **WARNING:** Prevent serious injury or death. Relieve hydraulic system pressure before connecting hydraulic hoses.

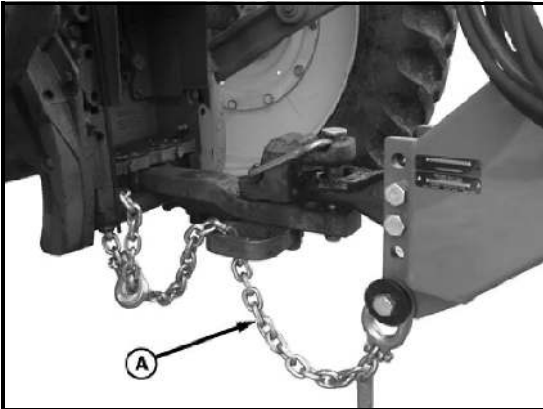
- a. Use a clean rag or paper towel to clean dirt from couplers on hose ends and tractor couplers.
 - b. Relieve pressure in the hydraulic system.
 - c. Route hoses over the hitch and connect hoses to tractor couplers. Verify couplers are securely seated. See [SCV Identification Chart](#) for hose connections.
 - d. Be sure to provide slack for turning.
7. Route electrical lines over the hitch and connect to the tractor's electrical connectors. Be sure to provide slack for turning.



A - Pin
B - Hole

- Pull pin (A) out and pivot the jack frame forward into its stowed position. Insert pin in hole (B) to secure the jack.

Attach Safety Chain to Tractor



A - Safety Chain

- CAUTION:** A safety chain (A) will help control drawn equipment should it accidentally separate from the drawbar while transporting. A runaway machine can cause serious injury or death to you or others. Using appropriate adapter parts, attach the chain to the tractor's drawbar support. Provide only enough slack in chain to permit turning.

See your Fast Ag Solutions dealer for a safety chain with a strength rating equal to or greater than the gross weight of towed machine.

Prior to operating the implement, ensure all electrical harnesses, hydraulic hoses, and safety chain are routed properly to avoid damage.

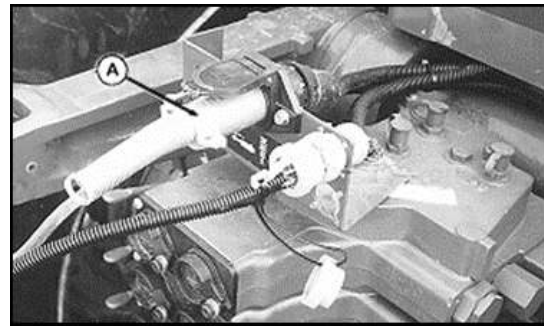
When storing the machine, keep the safety chain up off the ground and hook it to the machine support assembly on the hitch. Always replace a safety chain if one or more links or end fittings are broken, stretched, or otherwise damaged.

Verify all chains for towed implements are adequately sized for safe transport.

Attach Warning Light Plug

- CAUTION:** When transporting the machine on a road or highway at night or during the day, use warning lights and devices for adequate warning to operators of other vehicles. For this matter, check local governmental regulations.

Various safety lights and devices are available from your Fast Ag Solutions dealer.



A. 7-Pin Connector Warning Light Plug

Attach a warning light plug (A) to the tractor's outlet socket.

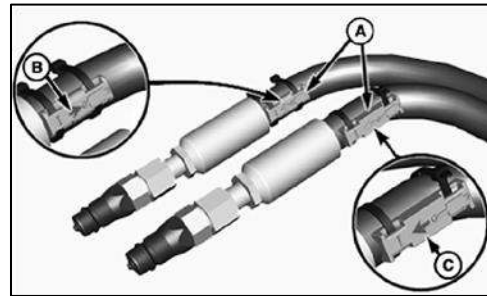
Be sure warning lights, reflectors, and SMV emblem(s) are clean.

Make Proper Hose Connections

⚠ WARNING: Escaping fluid under pressure can penetrate the skin and cause serious injury. Avoid the hazard by relieving pressure before disconnecting any hydraulic or other pressurized lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected in the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

- ⚠ IMPORTANT:** Hydraulic hoses can fail due to physical damage, kinks, age, and exposure. Check hoses regularly. Replace damaged hoses.
- ⚠ IMPORTANT:** All hydraulic couplers must be clear of debris, dust, and sand. Use protective caps on fluid openings until ready to make connection. Foreign material can damage the hydraulic system.

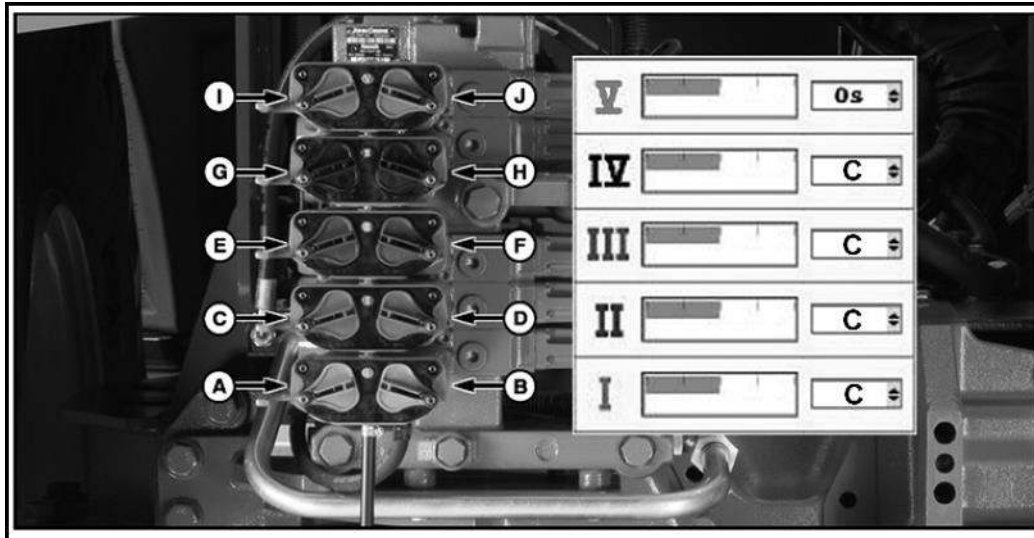


- A. SCV Marker
- B. Pressure Marking
- C. Return Marking

Identify the SCV marker color (A) and then use the pressure (B) and return (C) markings to connect to the correct SCV outlet. (See [SCV Identification Chart](#))

Make sure the quick couplers are fully engaged. If the quick couplers do not fully engage, check to see that the couplers are the same size and type.

SCV Identification Chart

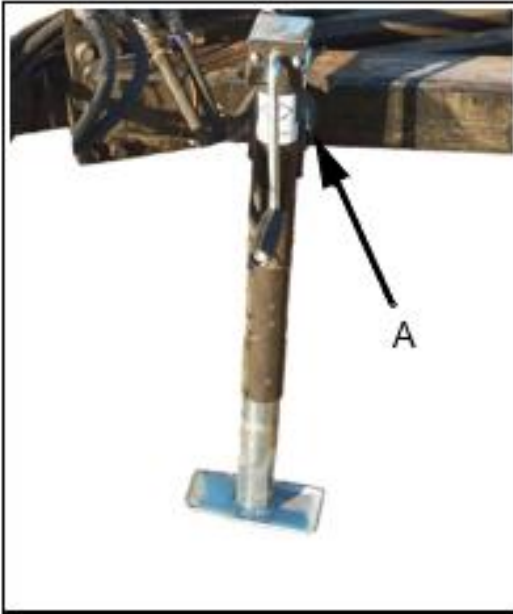


Legend	SCV ID	Tractor Flow Type	Hose Color	SCV Function
A	I	Pressure	Purple	Toolbar Raise/Lower Pressure
B	I	Return	Brown	Toolbar Raise/Lower Return
C	II	Pressure	Grey	Field Latch / Wing Wheels Pressure
D	II	Return	Orange	Field Latch / Wing Wheels Return
E	III	Return	Yellow	-
F	III	Pressure	Red	-
G	IV	Return	Black	-
H	IV	Pressure	White	-
I	V	Return	-	-
J	V	Pressure	-	-

▲ IMPORTANT: Hose colors do not match SCV color

See [Hydraulic System Requirements](#) for system compatibility.

Detach Machine from Tractor



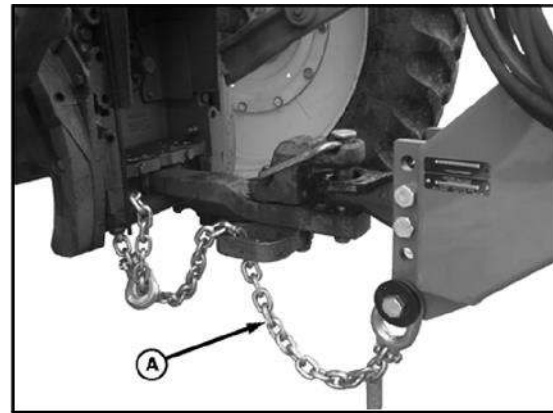
A - Pin

1. Secure jack as shown using pin (A).



Figure 2: Wiring Harness and Hoses in Storage Position

2. Disconnect wiring harness and place in storage position.
- ▲ WARNING: Prevent serious injury or death. Relieve hydraulic system pressure before disconnecting hydraulic hoses.**
3. Disconnect hydraulic hoses and place them in their storage position.

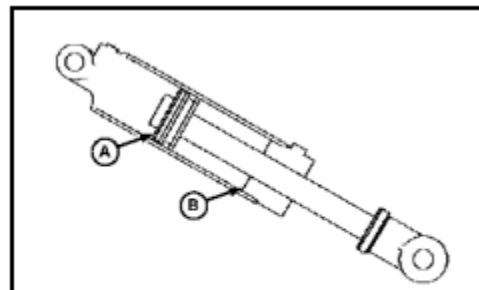


A - Safety Chain

4. Disconnect safety chain (A).

Adjust Hitch Height

Verify machine is parked safely before performing hitch adjustment to avoid injury or death caused by uncontrolled machine movement.



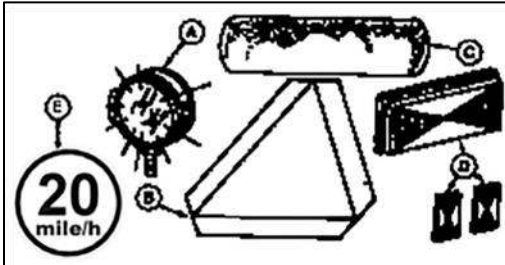
A - Piston

B - Rod Guide

1. Remove and retain cap screws.
2. Lower hitch assembly and retain using existing cap screws.
3. Tighten the cap screws to 873 N-m (644 ft-lbs.)

TRANSPORTING

Following Safe Transport Procedures



- A. Lights
- B. SMV Emblem
- C. Reflector Tape
- D. Reflectors
- E. SIS Emblem

⚠ CAUTION: When transporting the machine on a road or highway at night or during the day, use warning lights and devices for adequate warning to operators of other vehicles.

Check local governmental regulations.

Various safety devices are available from your Fast Ag Solutions dealer. Keep safety items in good condition. Replace missing or damaged items.

Upward force on hitch may cause instability when transporting. Add BALLAST to tractor as required.

BEWARE of overhead wires and narrow gates. KNOW the transport height and width of your machine. (See [Machine Dimensions & Specifications](#).)

Travel at a reasonable and safe speed; REDUCE speed over rough or uneven terrain, slopes, and when turning. See [Observe Maximum Transport Speed](#).

BE SURE SMV emblem, reflectors, and warning lights are clean, visible, and in good condition.

BE SURE your safety chain has a strength rating greater than the gross weight of the machine.

Preparing the Machine for Transport

Fold Toolbar for Transport

- ⚠ CAUTION:** Be sure all bystanders are clear of the Rotary Hoe.
- ⚠ CAUTION:** See [Observe Maximum Transport Speed](#) in the Safety section for towing information.
- ⚠ IMPORTANT:** Raise the Rotary Hoe off the ground before folding or unfolding.
- ⚠ IMPORTANT:** Never back the Rotary Hoe with the hoe wheel touching the ground.

Lock the wings together with the crossbar tube (A) for BACKING UP ONLY. Do not use the lock bar tube for transporting in the forward direction.



Figure 3: Tube in Storage Position

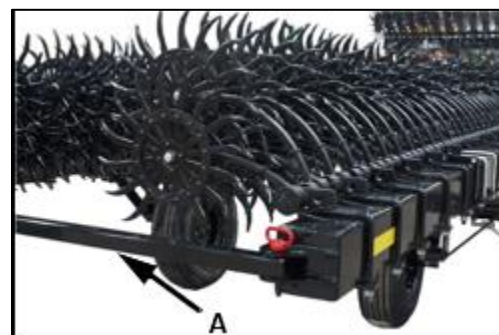


Figure 4: Tube installed for backing up only

1. Push SCV I forward to raise toolbar and fold toolbar in.
2. While backing up, hold SCV I until wings are fully folded.
3. Continue backing up, and push both SCV I and SCV II until transport latches fully engage and toolbar wheels are able to rotate freely.
4. Disengage SCV I and SCV II.

Transport Notes and Checks

Be sure that the Rotary Hoe is properly connected to the tractor. Always attach a safety chain between the Rotary Hoe and the tractor and install a retainer through the drawbar pin.

Ensure that the hitch/tongue latch is fully engaged.

Install cylinder locks (A) on main lift cylinders before transporting.

- ▲ **NOTE: Add more spacers if needed to ensure the tool bar is fully raised and stays fully raised.**

Transporting the Machine

Using Warning Lights

- ▲ **CAUTION: When transporting the machine on a road or highway at night or during the day, use accessory lights and devices for adequate warning to operators of other vehicles. Check local governmental regulations.**

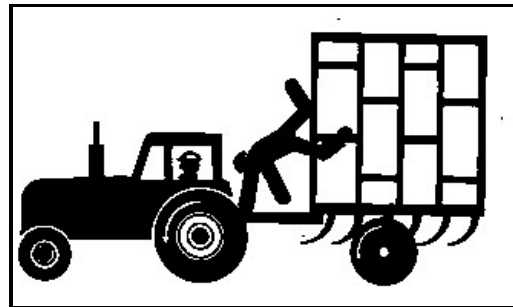
Various safety lights and devices are available from Fast Ag Solutions dealer. Keep safety items in good condition. Replace missing or damaged items.

During periods of limited visibility, use pilot vehicles and use extra lights on the machine.

During normal transport, both amber warning lights will flash in unison at high intensity and both red lamps will illuminate steadily at low intensity.

When a turn is signaled, red and amber tail lamps in the direction of turn will flash at high intensity and in unison. On the opposite side, amber and red lamps will illuminate steadily at high intensity.

Keep Riders Off the Machine



Riders are subject to injury such as being struck by foreign objects and being thrown off the machine. Riders obstruct the Operator's view resulting in the machine being operated in an unsafe manner.

Caution for All Machines

⚠ CAUTION: When transporting the machine on a smooth surface road, do not exceed the maximum transport speed of 32 km/h (20 MPH). Reduce speed considerably when traveling over rough ground.



Reduce speed when turning. Do not uncouple tractor brake pedals and apply individually in an attempt to make a tighter turn.



Serious injury or death can result from contact with electric lines. Use care when moving or operating this machine near electric lines to avoid contact. Know transport height and width of machine. Check local regulations before transporting. (See [Machine Dimensions & Specifications](#) for transport height and width of machine.)

Transport with wings fully folded. Never raise or lower the center section or wings when moving. After folding, ALWAYS place the fold valve(s) in the neutral position for transport.

If wing-fold cylinders are removed or damaged, chain wings together to prevent injury or death caused by accidental falling of wings on you or others.

Unfolding/Extending the Toolbar



- ⚠ WARNING:** Prevent serious injury or death. The machine coming near or contacting power lines can cause electrocution. Electrocution can occur without contact. Fully lower wings before moving or transporting.
- ⚠ IMPORTANT:** Raise the Rotary Hoe off the ground before folding or unfolding.
- ⚠ IMPORTANT:** Never back the Rotary Hoe with the hoe wheel touching the ground.

1. Remove crossbar from rear of wings and place in Storage Position.
2. Pull SCV II backward to release field latches. Stop before the wing wheels begin to turn.
3. While backing up, pull backward SCV I and SCV II and hold until wings are unfolded. Stop when wings are fully extended and latched and wheels are straight.
4. Disengage SCV I and SCV II.

HYDRAULIC FLOW

Tractor SCV Functions

See [SCV Identification Chart](#) for connections.

▲ **NOTE:** The illustrations in this Manual are for explanatory purposes only. Your control system may differ in appearance and function.

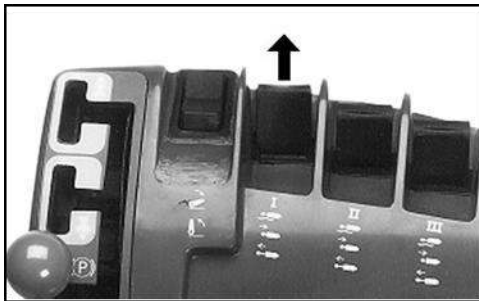


Figure 5: SCV I Pushed Forward

When the tractor's SCV I is pushed forward, the following functions are enabled:

1. Supplies hydraulic oil flow to toolbar raise functions.
2. Supplies hydraulic oil flow to the main toolbar cylinder.
3. Once folding is complete, tractor SCV I may be returned to neutral position.

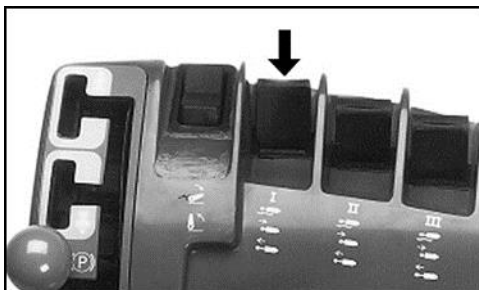


Figure 6: SCVI Pulled Backward

When the tractor's SCV I is pulled backward, the following functions are enabled:

1. Supplies hydraulic oil flow to lower toolbar.
2. Supplies hydraulic oil flow to the main toolbar cylinder.

3. Once unfolding is complete, tractor SCV I may be returned to neutral position.

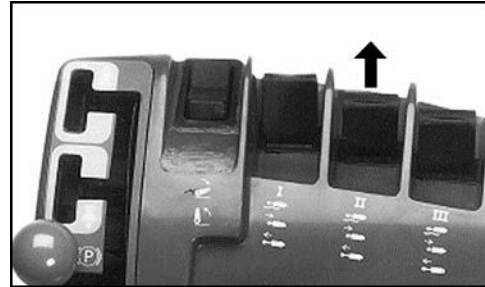


Figure 7: SCV II Pushed Forward

When the tractor's SCV II is pushed forward, the following functions are enabled:

1. Closes field latches.
2. Rotates toolbar wheels.

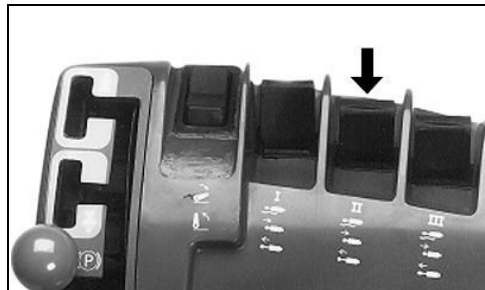


Figure 8: SCV II Pulled Backward

When the tractor's SCV II is pulled backward, the following functions are enabled:

1. Opens field latches.
2. Rotates toolbar wheels.

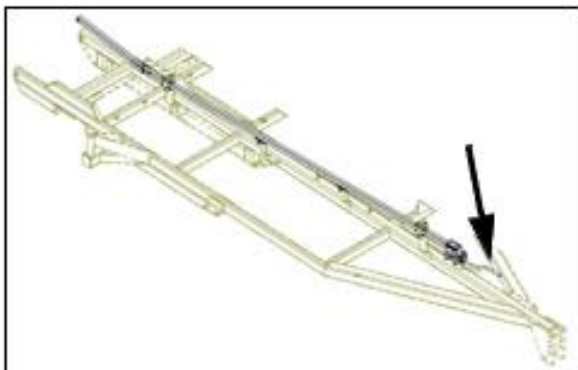


https://www.youtube.com/watch?v=-8I_EfO9xwY

ADJUST DEPTH CONTROL

Row Depth Adjustment

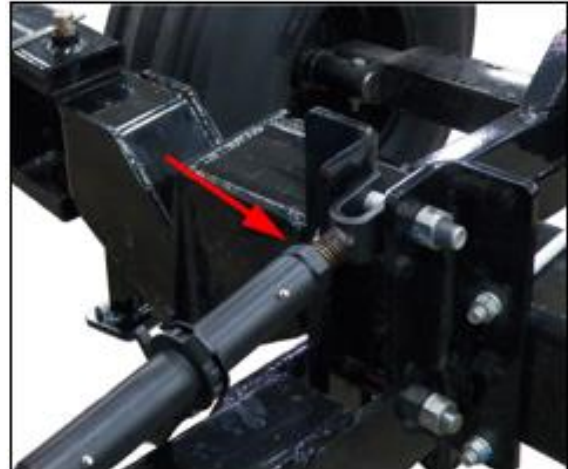
- 2 Turns = 9.53mm (3/8 in.) change in depth at the ground
- Turn clockwise to lower.
- Turn counterclockwise to raise.



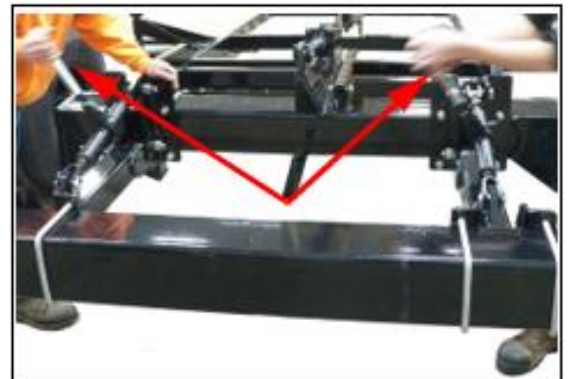
ROW UNIT DEPTH ADJUSTMENT
2 TURNS = 3/8" AT THE GROUND
CLOCKWISE TO LOWER
COUNTERCLOCKWISE TO RAISE

Center Section Depth Adjustment

1. Loosen the jam nut.



2. Using the turnbuckle ratchets, adjust to penetrate the ground equally.



3. Torque the jam nuts against the adjustment sleeves to 340 N-m (250 ft-lbs.)

ADJUST GROUND SPEED

It will be necessary to establish a travel speed that gives the desired effectiveness. Always run at the established travel speed.

However, the best results are obtained when the ground speed is 12 - 16 kph (7 - 10 mph). Ground speed variations in the field will automatically be compensated. Higher speeds tend to increase the teeth's ground penetration.

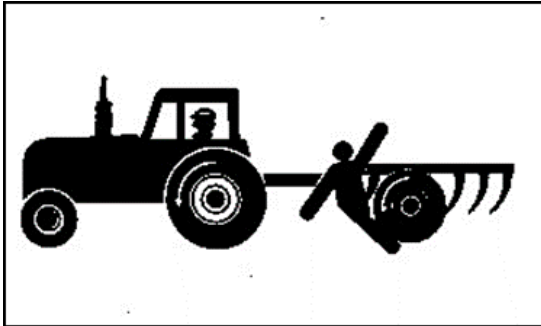
Always operate at a comfortable speed. Do not operate so quickly that the toolbar bounces while going through the field.

Effective results require that the teeth are used at a consistent depth in a consistent manner. Machine bouncing will prevent this required consistency.

- ▲ **IMPORTANT: Never back up with Rotary Hoe in the ground.**
- ▲ **IMPORTANT: Never turn with the Rotary Hoe in its down position.**
- ▲ **IMPORTANT: When turning on the headlands, only raise the toolbar enough to clear the soil surface and crops. Excessive gauge wheel scrubbing and soil berming will occur if the toolbar is raised too high when turning on headlands.**

LUBRICATION & MAINTENANCE

Lubricating and Maintaining the Machine Safely



⚠ CAUTION: To help prevent serious injury or death to you or others caused by unexpected movement, be sure to service machine on a level surface.

If the machine is connected to a tractor, engage the tractor's parking brake, place the tractor's transmission in PARK, shut off the engine, and remove its key. If the machine is detached from the tractor, block wheels and use safety stands to prevent movement.

Lubricant Storage

Equipment can operate at top efficiency only when clean lubricants are used.

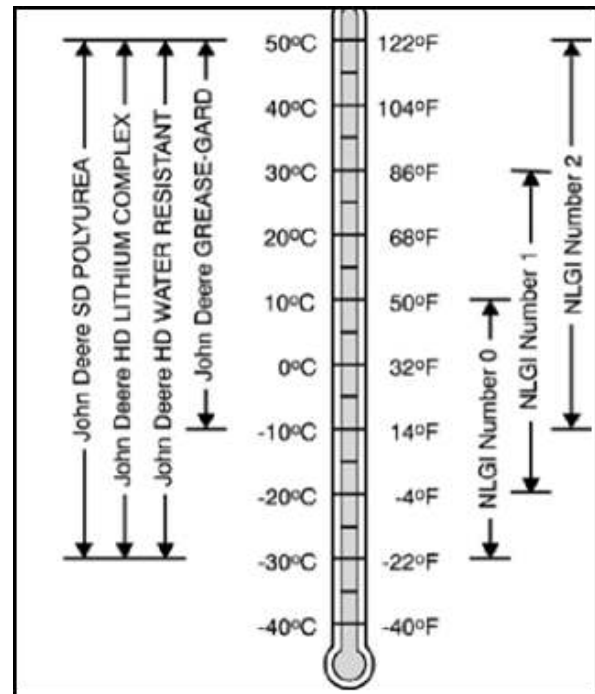
Use clean containers to handle all lubricants.

Whenever possible, store lubricants and containers in an area protected from dust, moisture, and other contamination. Store containers on their side to avoid water and dirt accumulation.

Make certain all containers are properly marked to identify their contents.

Properly dispose of all old containers and any residual lubricant they may contain.

Grease



Greases for Air Temperature Ranges

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

⚠ IMPORTANT: Some types of grease thickeners are not compatible with others. Consult your grease supplier before mixing different types of grease.

Alternative and Synthetic Lubricants

Conditions in certain geographical areas may require lubricant recommendations different from those printed in this Manual. Synthetic lubricants may be used if they meet the performance requirements as shown in this Manual.

The temperature limits and service intervals shown in this Manual apply to both conventional and synthetic lubricants.

Re-refined base stock products may be used if the finished lubricant meets the performance requirements.

Lubrication and Maintenance Intervals

Perform each lubrication and service illustrated in this section.

Before and After Each Season

- Grease the Pivot Joints.



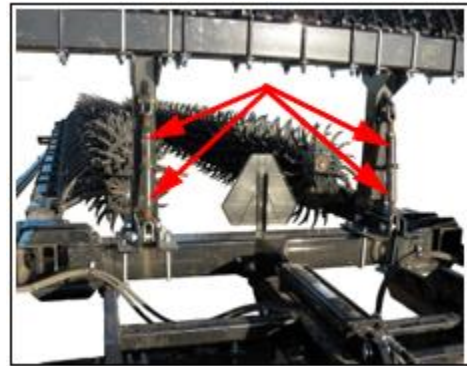
- Grease the Wing Wheel Bearings



- Grease the Main Wheel Bearings

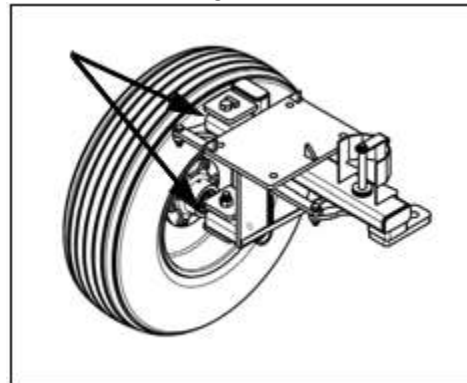


- Grease the Turnbuckles



Each 50 Hours or Weekly

- Grease the Wing Wheel pivots



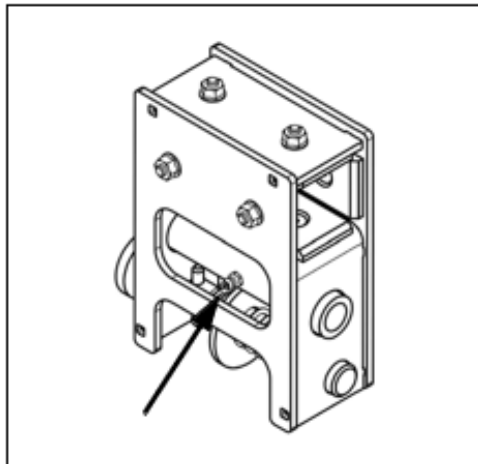
- Grease the Fold Latches

Each 10 hours or Daily

- Grease the Wing Fold Joints
- Grease the Flex Joints



- Grease the Wing Fold Cylinders
- Grease the Bump Adjust



SERVICE**Practice Safe Maintenance**

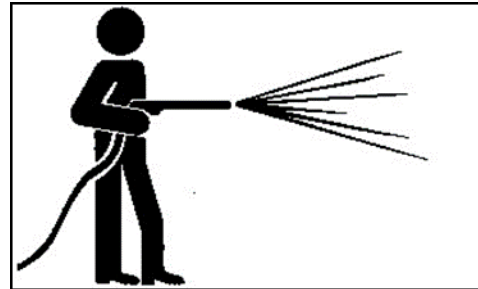
Understand all service procedures before doing work. Keep the area clean and dry.

Never lubricate, service, or adjust the machine while it is moving. Keep hands, feet, and clothing away from power-driven parts. Disengage all power and operate controls to relieve pressure. Lower equipment to the ground. Stop the engine. Remove the key. Allow the machine to cool. Securely support any machine elements that must be raised for service work.

Keep all parts in good condition and properly installed. Fix any damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.

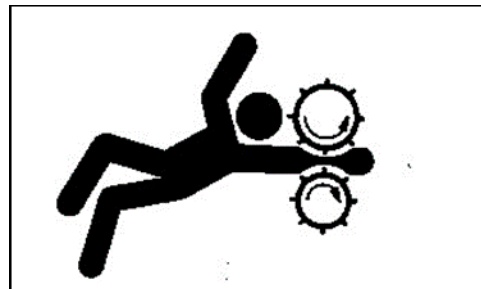
On self-propelled equipment, disconnect the battery ground cable (-) before making adjustments on any electrical systems or welding on the machine.

On towed implements, disconnect its wiring harnesses from the tractor before servicing any electrical system components or welding on the machine.

Work in a Clean Area

Before starting a job:

- Clean the work area and the machine.
- Make sure you have all the necessary tools to do your job.
- Have the right parts on-hand.
- Read all instructions thoroughly; do not attempt shortcuts.

Service Machines Safely

Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.

Support the Machine Properly



Always lower the attachment or implement to the ground before you work on the machine. If the work requires that the machine or attachment be lifted, provide secure support for them. If left in a raised position, hydraulically supported devices can settle or leak down.

Do not support the machine on cinder blocks, hollow tiles, or props that may crumble under continuous load. Do not work under a machine that is supported solely by a jack. Follow the recommended procedures in this Manual.

When implements or attachments are used with a machine, always follow safety precautions listed in the implement or attachment's Operator's Manual.

Avoid High-Pressure Fluids



Inspect hydraulic hoses periodically – at least once per year – for leakage, kinking, cuts, cracks, abrasion, blisters, corrosion, exposed wire braids, or any other signs of wear or damage.

Replace worn or damaged hose assemblies immediately with Fast Ag Solutions approved replacement parts.

Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids.

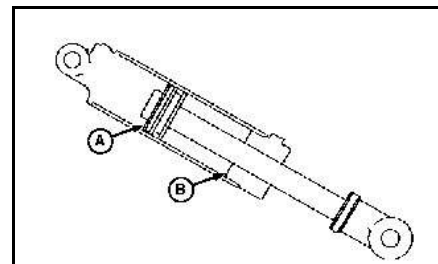
If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source.

Preventing Hydraulic System Contamination

▲ IMPORTANT: Cleanliness is very important when working on a hydraulic system. Prevent contamination by assembling cylinders, hoses, couplers, and valves in a clean area of the shop.

Leave protective caps on fluid openings until you are ready to make a connection. When charging the system, use a tractor or other source that contains clean oil free of abrasive materials.

Keep couplers clean. Abrasive particles, like sand or metal fragments, can damage seals, barrels, and pistons causing internal leakage.



- A. Piston
- B. Rod Guide or Gland

- ▲ **IMPORTANT:** To help keep couplers clean, always place them in a storage position when they are not attached to the tractor.
- ▲ **IMPORTANT:** To prevent contaminants from entering the hydraulic system, filters must be installed at the tip of a supply hose. Additional filters are not recommended as they will restrict oil flow and adversely affect cylinder actuation time due to pressure drop.

Without a filter, large dirt particles can enter the cylinder and settle against the top side of piston (A) where they can cut the piston seal as the cylinder retracts.

Replace Hydraulic Hoses

- ▲ **WARNING:** Avoid hazards due to escaping fluid under pressure. See [Avoid High-Pressure Fluids](#).

Hydraulic hoses between the lift cylinders and hydraulic lock-up valve should be inspected frequently for leakage, kinking, cuts, cracks, abrasion, blisters, corrosion, exposed wire braids, or any other signs of wear or damage.

Worn or damaged hose assemblies can fail during use and should be replaced immediately.

See your Fast Ag Solutions dealer for replacement hoses.

- ▲ **CAUTION:** If an incorrectly rated hose is used, machine damage, injury, or death could occur.

If hoses are to be fabricated, ensure that the hoses are rated at no less than 82,737 kPa (827 bar) (12,000 psi) burst pressure according to SAE Standard J517, 100R17 hose specification.

Incorrect hose length or routing can increase the chance of hose wear or damage. Use the

old hose as a guide for length and hose routing.

Incorrect fittings can damage mating parts or cause leaks. Make sure to use steel fittings approved for use by the hose's manufacturer. Use the correct size and thread.

Make sure hydraulic hoses and harnesses do not interfere with moving parts. Relocate hoses and harnesses and retain them with clamps.

Inspect Hoe Teeth

Rotary Hoe Wheels are used for removing small weeds and loosening crusted or compacted soil to aid in crop emergence.

To control Rotary Hoe Wheel depth, see [Row Depth Adjustment](#).

Inspect hoe teeth frequently if operating in rocky conditions. Bent, chipped, or broken hoe teeth will not penetrate the soil properly.

Always remove entangled material from any component.

Tightening Hardware

Tighten all bolts to torques specified in [TIGHTENING HARDWARE](#) section unless otherwise noted.

Check tightness of hardware periodically.

PREPARING FOR STORAGE

⚠ CAUTION: Store the unit in an area away from human activity. Do not permit children to play on or around the stored Rotary Hoe.

At the end of the season, thoroughly inspect and prepare the Rotary Hoe for storage. Repair or replace any worn or damaged components to prevent any unnecessary downtime at the beginning of next season.

1. Thoroughly wash the machine using a pressure washer to remove all dirt, mud, debris, and residue to protect against corrosion.
2. Lubricate all grease points. Make sure all grease cavities have been filled with grease to remove any water residue from washing.
3. Inspect all hydraulic hoses, couplers, and fittings. Tighten any loose fittings. Replace any hose that is damaged or is separating from the crimped end of a fitting.
4. Touch up all paint nicks and scratches to prevent rusting.
5. Fold inner and outer wings to the transport configuration.
6. Install spacers on the lift cylinder rams.
7. Move the machine to a storage position.
8. Select an area that is dry, level, and free of debris.
9. Place planks under the jack for added support if required.
10. Unhook Rotary Hoe from tractor.

Removing from Storage

1. Clear the area of bystanders, especially small children, and remove foreign objects from the machine and working area.
2. Attach the tractor to the Rotary Hoe.
3. Check:
 - a. Hoe Tooth Wheels.
 - b. All hardware. Tighten as required.
 - c. Tire pressure.
 - d. All hydraulic lines, fittings, and connections. Tighten as required.
4. Lubricate all grease fittings.
5. Replace any defective parts.
6. Follow the [Pre-Operation Checklist](#) before using.

TROUBLESHOOTING

Problem	Cause	Solution
Premature bearing failure.	Excessive strain on the hoe wheel bearings.	Don't turn with rotary hoe wheels on the ground.
		Store the rotary hoe inside to help protect the bearings from freezing weather, moisture, blowing sand, and dirt.
		Keep all wheel bolts tight. Check rotary hoe wheels for loose rivets and bent teeth. Check for bent arm castings.
Rotary hoe arm bending or breaking.	Excessive strain on the arms and wheels.	Don't turn with the rotary hoe wheels on the ground.
		Don't back the rotary hoe with wheels on the ground.
Wings float up.	Air in system.	Check for air in hydraulic system and purge system.
	Gauge wheels not properly adjusted.	Check proper adjustment of wing gauge wheels.
	Wing deflection not properly adjusted.	Maintain center tool bar height above or parallel with outer wings.
	Hinge levers not properly installed.	Check assembly of hinge levers.
Hydraulic cylinders fail to operate properly.	Hydraulic system improperly installed.	Check for correct assembly of the hydraulic system.
	Air in system.	Check for air in the hydraulic system and purge system.
	Blocked restrictors.	Check restrictors for malfunctions.
Rotary hoe wheels plug with trash materials.	Excessive trash conditions.	Decrease operating depth of hoe wheels and increase ground speed to create momentum so the hoe wheels may clean themselves.
		On softer, mellow soils, decrease operating depth so that hoe wheels do not pick up trash material.
Hoe wheels won't penetrate.	Hard soil conditions.	Lower tool bar to maximize aggressiveness of rotary hoe.
		Lengthen center link on tractor to tilt tool bar back to increase spring tension.

Problem	Cause	Solution
Rotary hoe wheels are too aggressive.	Rotary hoe wheels running too fast.	Slow tractor ground speed.
	Rotary hoe wheels running too deep.	Decrease operating depth of rotary hoe wheels.

TIGHTENING HARDWARE

Check the tightness of ALL BOLTS, U-BOLTS, and CAP SCREWS after the first 10-15 hours of operation and again at end of the first week (50 hours) of operation. Tighten all bolts to torques specified unless otherwise noted. Check tightness of hardware periodically.

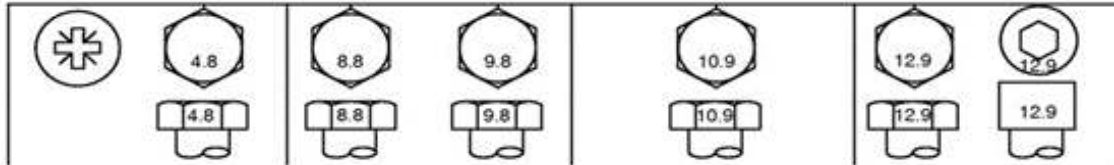


Figure 9: Common metric bolt grade markings

Metric Bolt and Screw Torque Values

Screw Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated ¹		Dry ²		Lubricated ¹		Dry ²		Lubricated ¹		Dry ²		Lubricated ¹		Dry ²	
	N-m	lb.-in.	N-m	lb.-in.	N-m	lb.-in.	N-m	lb.-in.	N-m	lb.-in.	N-m	lb.-in.	N-m	lb.-in.	N-m	lb.-in.
M6	4.7	42	6	53	8.9	79	11.3	100	13	115	16.5	146	15.5	137	19.5	172
									N-m	lb.-ft.	N-m	lb.-ft.	N-m	lb.-ft.	N-m	lb.-ft.
M8	11.5	102	14.5	128	22	194	27.5	243	32	23.5	40	29.5	37	27.5	47	35
			N-m	lb.-ft.	N-m	lb.-ft.	N-m	lb.-ft.								
M10	23	204	29	21	43	32	55	40	63	46	80	59	75	55	95	70
	N-m	lb.-ft.														
M12	40	29.5	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	46	80	59	120	88	150	110	175	130	220	165	205	150	260	190
M16	100	74	125	92	190	140	240	175	275	200	350	255	320	235	400	300
M18	135	100	170	125	265	195	330	245	375	275	475	350	440	325	560	410
M20	190	140	245	180	375	275	475	350	530	390	675	500	625	460	790	580
M22	265	195	330	245	510	375	650	480	725	535	920	680	850	625	1080	800
M24	330	245	425	315	650	480	820	600	920	680	1150	850	1080	800	1350	1000
M27	490	360	625	460	950	700	1200	885	1350	1000	1700	1250	1580	1160	2000	1475
M30	660	490	850	625	1290	950	1630	1200	1850	1350	2300	1700	2140	1580	2700	2000
M33	900	665	1150	850	1750	1300	2200	1625	2500	1850	3150	2325	2900	2150	3700	2730
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2770	4750	3500

Torque values listed are for general use only, based on the strength of the bolt or screw. DO NOT use these values if a different torque value or tightening procedure is given for a specific application. For stainless steel fasteners or for nuts on U-bolts, see the tightening instructions for the specific application. Tighten plastic insert or crimped steel type lock nuts by turning the nut to the dry torque shown in the chart, unless different instructions are given for the specific application.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class. Replace fasteners with the same or higher property class. If higher property class fasteners are used, tighten these to the strength of the original. Make sure fastener threads are clean and that you properly start thread engagement. When possible, lubricate plain or zinc plated fasteners other than lock nuts, wheel bolts, or wheel nuts, unless different instructions are given for the specific application.

¹ "Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or M20 and larger fasteners with JDM F13C, F13F or F13J zinc flake coating.

² "Dry" means plain or zinc plated without any lubrication, or M6 to M18 fasteners with JDM F13B, F13E or F13H zinc flake coating.

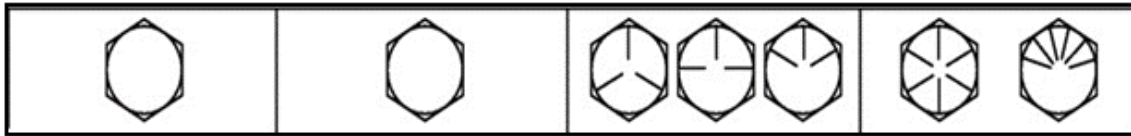


Figure 10: Common imperial bolt grade markings

Unified Inch Bolt and Screw Torque Values

Screw Size	SAE Grade 1				SAE Grade 2 ³				SAE Grade 5, 5.1 or 5.2				SAE Grade 8 or 8.2			
	Lubricated ⁴		Dry ⁵		Lubricated ⁴		Dry ⁵		Lubricated ⁴		Dry ⁵		Lubricated ⁴		Dry ⁵	
	N-m	lb.-in.	N-m	lb.-in.	N-m	lb.-in.	N-m	lb.-in.	N-m	lb.-in.	N-m	lb.-in.	N-m	lb.-in.	N-m	lb.-in.
1/4	3.7	33	4.7	42	6	53	7.5	66	9.5	84	12	106	13.5	120	17	150
													N-m	lb.-ft.	N-m	lb.-ft.
5/16	7.7	68	9.8	86	12	106	15.5	137	19.5	172	25	221	28	20.5	35	26
									N-m	lb.-ft.	N-m	lb.-ft.				
3/8	13.5	120	17.5	155	22	194	27	240	35	26	44	32.5	49	36	63	46
			N-m	lb.-ft.	N-m	lb.-ft.	N-m	lb.-ft.								
7/16	22	194	28	20.5	35	26	44	32.5	56	41	70	52	80	59	100	74
	N-m	lb.-ft.														
1/2	34	25	42	31	53	39	67	49	85	63	110	80	120	88	155	115
9/16	48	35.5	60	45	76	56	95	70	125	92	155	115	175	130	220	165
5/8	67	49	85	63	105	77	135	100	170	125	215	160	240	175	305	225
3/4	120	88	150	110	190	140	240	175	300	220	380	280	425	315	540	400
7/8	190	140	240	175	190	140	240	175	490	360	615	455	690	510	870	640
1	285	210	360	265	285	210	360	265	730	540	920	680	1030	760	1300	960
1-1/8	400	300	510	375	400	300	510	375	910	670	1150	850	1450	1075	1850	1350
1-1/4	570	420	725	535	570	420	725	535	1280	945	1630	1200	2050	1500	2600	1920
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2140	1580	2700	2000	3400	2500
1-1/2	990	730	1250	930	990	730	1250	930	2250	1650	2850	2100	3600	2650	4550	3350
Torque values listed are for general use only, based on the strength of the bolt or screw. DO NOT use these values if a different torque value or tightening procedure is given for a specific application. For plastic insert or crimped steel type lock nuts, for stainless steel fasteners, or for nuts on U-bolts, see the tightening instructions for the specific application. Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.									Replace fasteners with the same or higher grade. If higher grade fasteners are used, tighten these to the strength of the original. Make sure fastener threads are clean and that you properly start thread engagement. When possible, lubricate plain or zinc plated fasteners other than lock nuts, wheel bolts, or wheel nuts, unless different instructions are given for the specific application.							

³ Grade 2 applies for hex cap screws (not hex bolts) up to 6 in. (152 mm) long. Grade 1 applies for hex cap screws over 6 in. (152 mm) long, and for all other types of bolts and screws of any length.

⁴ "Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or 7/8 in. and larger fasteners with JDM F13C, F13F or F13J zinc flake coating.

⁵ "Dry" means plain or zinc plated without any lubrication, or 1/4 to 3/4 in. fasteners with JDM F13B, F13E or F13H zinc flake coating.

Face Seal Fittings Assembly & Installation - All Pressure Applications

Face Seal O-Ring to Stud End Installation

1. Inspect the fitting surfaces. They must be free of dirt and defects.
2. Inspect the O-ring. It must be free of damage and defects.
3. Lubricate the O-rings and install them into the groove using petroleum jelly to hold them in place.
4. Push the O-ring into the groove with petroleum jelly so that the O-ring is not displaced during assembly.
5. Index any angle fittings and tighten by hand, pressing the joint together to ensure that the O-ring remains in place.
6. Tighten the fitting or nut to the torque value shown on the chart per dash size stamped on the fitting. DO NOT allow hoses to twist when tightening fittings.

Face Seal Adjustable Stud End O-Ring Installation

1. Back off the lock nut (jam nut) and washer to fully expose turned down section of the fitting.
2. Install a thimble over the fitting threads to protect the O-ring from nicks.
3. Slide the O-ring over the thimble into the turned down section of the fitting.
4. Remove thimble.

Face Seal Straight Stud End O-Ring Installation

1. Install a thimble over the fitting threads to protect the O-ring from nicks.
2. Slide the O-ring over the thimble into the turned down section of the fitting.
3. Remove thimble.

Fitting Installation

1. Install the fitting by hand until it is snug.
2. Position adjustable fittings by unscrewing the fitting no more than one turn.
3. Apply with an assembly torque per table.

Assembly Torque

1. Use one wrench to hold the connector body and one wrench to tighten the nut.
2. For a hydraulic hose, it may be necessary to use three wrenches to prevent twist: one on the connector body, one on the nut, and one on the body of the hose fitting.

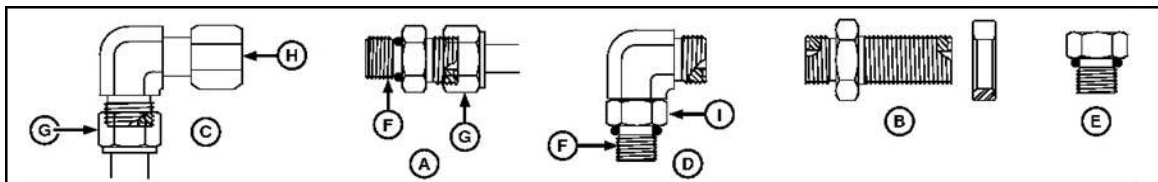


Figure 11: Common hydraulic fitting shapes and components

- | | |
|---|---------------|
| A. Stud Straight and Tube Nut | G. Tube Nut |
| B. Bulkhead Union and Bulkhead Lock Nut | H. Swivel Nut |
| C. 90° Swivel Elbow and Tube Nut | I. Lock Nut |
| D. 90° Adjustable Stud Elbow | |
| E. Port Plug | |
| F. Stud End | |



TIGHTENING HARDWARE

SAE Face Seal and O-Ring Stud End Fitting Torque Chart

SAE Face Seal and O-Ring Stud End Fitting Torque Chart - Standard Pressure-Below 27.6 MPA (4,000 PSI)																	
Nominal Tube OD Hose ID				O-Ring Face Seal/ Tube Swivel Nut				Bulkhead Jam Nut Torque			O-Ring Straight, Adjustable, and External Port Plug Stud Ends ⁶						
Metric Tube OD	Inch Tube OD			Thread Size	Swivel Nut Hex Size	Tube Nut Swivel Nut Torque		Jam Nut Hex Size	Jam Nut Torque		Thread Size	Straight Hex Size ⁷	Adj Lock Nut Hex Size	Steel or Gray Iron Torque		Aluminum or Brass Torque ⁸	
	mm	Dash Size	in.	mm	in.	N-m	lb.- ft		N-m	lb.- ft	in.	in.	in.	N-m	lb.- ft	N-m	lb.-ft
5	-3	0.188	4.78	—	—	—	—	—	—	—	3/8-24	5/8	9/16	12	9	8	6
6	-4	0.250	6.35	9/16-18	11/16	16	12	13/16	32	24	7/16-20	5/8	5/8	16	12	11	8
8	-5	0.312	7.92	—	—	—	—	—	—	—	1/2-20	3/4	11/16	24	18	16	12
10	-6	0.375	9.53	11/16-16	13/16	24	18	1	42	31	9/16-18	3/4	3/4	37	27	25	18
12	-8	0.500	12.70	13/16-16	15/16	50	37	1-1/8	93	69	3/4-16	7/8	15/16	50	37	33	25
16	-10	0.625	15.88	1-14	1-1/8	69	51	1-5/16	118	87	7/8-14	1-1/16	1-1/16	69	51	46	34
20	-12	0.750	19.05	13/16-12	1-3/8	102	75	1-1/2	175	129	11/16-12	1-1/4	1-3/8	102	75	68	50
22	-14	0.875	22.23	13/16-12	—	102	75	—	175	129	13/16-12	1-3/8	1-1/2	122	90	81	60
25	-16	1.000	25.40	17/16-12	1-5/8	142	105	1-3/4	247	182	15/16-12	1-1/2	1-5/8	142	105	95	70
32	-20	1.25	31.75	1-11/16-12	1-7/8	190	140	2	328	242	1-5/8-12	1-3/4	1-7/8	190	140	127	93
38	-24	1.50	38.10	2-12	2-1/4	217	160	2-3/8	374	276	1-7/8-12	2-1/8	2-1/8	217	160	145	107
50.8	-32	2.000	50.80	—	—	—	—	—	—	—	2-1/2-12	2-3/4	2-3/4	311	229	207	153

⁶ Tolerance is +15%/-20% of mean tightening torque unless otherwise specified.

⁷ The straight hex wrench sizes listed apply to connectors only and may not be the same as the corresponding plug of the same thread size.

⁸ These torques were established using steel plated connectors in aluminum and brass.



Fast Ag Solutions
4130 Commerce Boulevard
Windom, MN 56101

1-800-772-9279 Toll Free

1-507-427-3861 Voice

1-507-427-3030 Fax

<https://fastagsolutions.com/>