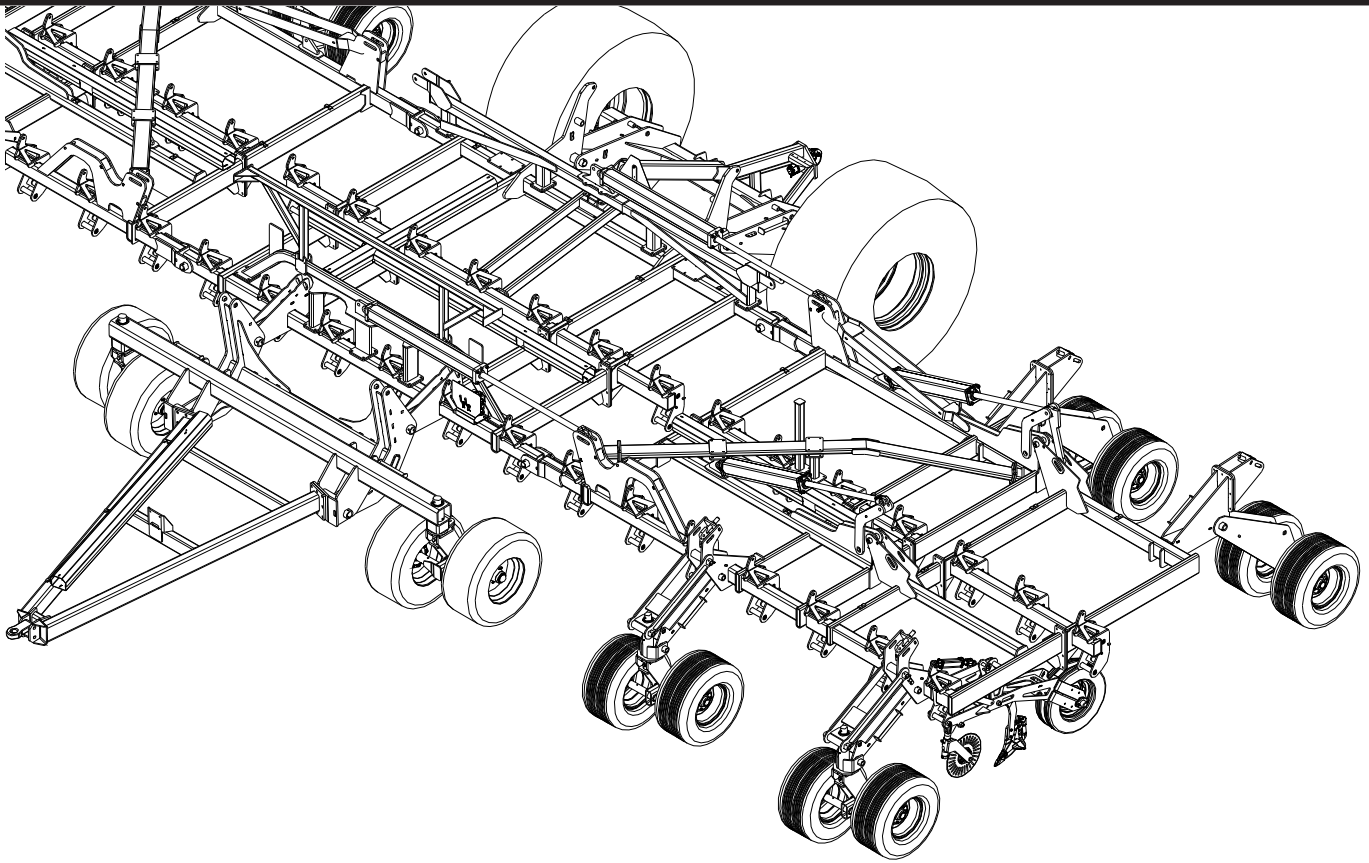


Amity



OPERATORS MANUAL



PRECISION SHANK DRILL

AGCO-Amity JV LLC LIMITED WARRANTY TERMS AND CONDITIONS – UNITED STATES AND CANADA

EFFECTIVE FOR EQUIPMENT RETAILED AND DELIVERED AFTER JANUARY 1, 2018

WHAT IS WARRANTED AGCO Amity JV warrants its new equipment to be free of defects in material and workmanship at time of delivery to the first retail purchaser, renter, or lessee. These terms apply to all Wishek, Wil-Rich, and Amity brands of new equipment originally marketed in the United States and Canada.

WARRANTY PERIOD

- 12 Months from the date of delivery to the first retail purchaser, renter or lessee.
- Field Cultivator and Disk Cultivators: 3 years on main frames, wing frames, and shank assemblies
- Precision Shank Drill: 3 years on main frame, wing frame, and rockshafts.

EXCEPTIONS FROM THIS WARRANTY

- **Freight Charges** - This warranty does not cover freight charges.
- **Improvements, Changes, or Discontinuance** AGCO Amity JV reserves the right to make changes and improvements in design or changes in specifications at any time to any product without incurring any obligations to owners of products previously sold.
- **Repairs and Maintenance Not Covered Under Warranty** - This warranty does not cover conditions resulting from misuse, natural calamities, use of non-AGCO-Amity JV parts, negligence, alteration, accident, use of unapproved attachments, usage which is contrary to the intended purposes, or conditions caused by failure to perform required maintenance. Replacement of Wear or Maintenance items (unless defective) such as but not limited to, filters, hoses, belts, lubricants, light bulbs, wheel alignment, tightening of nuts, belts, bolts, and fittings, service tune-up, computer parameter adjustments and general adjustments which may from time to time be required are not covered.
- **Rubber Tire Warranty** - Rubber tires are warranted directly by the respective manufacturer only and not by AGCO Amity JV.
- **Satellite Outages** - Interruptions in satellite interfaces and satellite communications are outside the control of this product and are not covered by this warranty. The company is not responsible for issues or degradation of system performance resulting from such interruptions in satellite interfaces and satellite communications where the issues are not related to defects in this product.

OWNER'S OBLIGATION

It is the responsibility of the Owner to transport the equipment or parts to the service shop of an authorized AGCO Amity JV Dealer or alternatively to reimburse the Dealer for any travel or transportation expense involved in fulfilling this warranty. This Warranty does NOT cover rental of replacement equipment during the repair period, damage to products which have been declared a total loss and subsequently salvaged, overtime labor charges, freight charges for replacement parts, or special handling requirements (such as, but not limited to, the use of cranes).

EXCLUSIVE EFFECT OF WARRANTY AND LIMITATION OF LIABILITY

THIS WARRANTY IS IN LIEU OF ALL WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PURPOSE OR OTHER REPRESENTATIONS, WARRANTIES OR CONDITIONS, EXPRESSED OR IMPLIED. The remedies of the Owner set forth herein are exclusive. The Company neither assumes nor authorizes any person to assume for it any other obligation or liability in connection with the sale of covered machines. Correction of defects, in the manner and for applicable period of time provided above, shall constitute fulfillment of all responsibilities of AGCO Amity JV to the Owner, and AGCO Amity JV shall not be liable for negligence under contract or in any manner with respect to such machines. IN NO EVENT SHALL THE OWNER BE ENTITLED TO RECOVER FOR INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES SUCH AS BUT NOT LIMITED TO, LOSS OF CROPS, LOSS OF PROFITS OR REVENUE, OTHER COMMERCIAL LOSSES, INCONVENIENCE OR COST OF RENTAL OR REPLACEMENT EQUIPMENT.

Some States or Provinces do not permit limitations or exclusions of implied warranties or incidental or consequential damages, so the limitations or exclusions in this warranty may not apply.

"AGCO Amity JV" AS REFERRED TO HEREIN WITH RESPECT TO SALES IN: UNITED STATES and CANADA: AGCO Amity JV LLC
PO Box 1030
Wahpeton, ND 58074

Additional Warranty Information

New Equipment Warranty - Equipment is eligible for warranty service only if it qualifies under the provisions of the New Equipment Warranty. The selling dealer will deliver this Warranty to the original retail purchaser at the time of sale, and the dealer will register the sale and Warranty with AGCO Amity JV LLC.

Subsequent Owners - This Warranty covers the first retail purchaser and all subsequent owners of the equipment during the specified warranty period. Should the AGCO Amity JV Dealer sell this equipment to a subsequent owner, the Dealer must deliver the warranty document to the subsequent owner so the subsequent owner can register ownership with AGCO Amity JV and obtain the remaining warranty benefits, if available, with no intermission in the Warranty Period. Subsequent Owner Procedure will apply. It is the responsibility of the subsequent owner to transport the equipment to the service shop of an authorized AGCO Amity JV Dealer or alternatively to reimburse the Dealer for any travel or transportation expense involved in fulfilling this warranty. This Warranty does NOT cover charges for rental or replacement equipment during the repair period, products which have been declared a total loss and subsequently salvaged, overtime labor charges, freight charges for replacement parts, or units sold at auction.

Warranty Service - To be covered by Warranty, service must be performed by an authorized AGCO Amity JV Dealer. It is recommended that you obtain warranty service from the Dealer who sold you the equipment because of that Dealer's continued interest in you as a valued customer. In the event this is not possible, warranty service may be performed by any other authorized AGCO Amity JV Dealers in the United States or Canada. It is the responsibility of the Owner to transport the equipment to the service shop of an authorized AGCO Amity JV Dealer or alternatively to reimburse the Dealer for any travel or transportation expense involved in fulfilling this warranty.

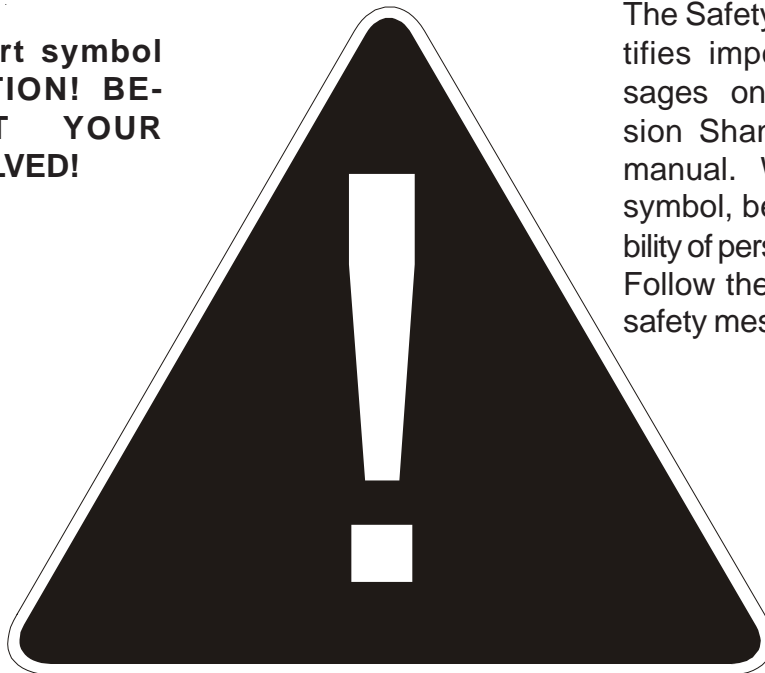
Maintenance Service - The Owner's Manual furnished to you with the equipment at the time of delivery contains important maintenance and service information. You must read the manual carefully and follow all the maintenance and service recommendations. Doing so will result in greater satisfaction with your equipment and help avoid service and warranty problems. Please remember that failures due to improper maintenance of your equipment are not covered by warranty.

Maintenance Inspections - To insure the continued best performance from your agricultural equipment, we recommend that you arrange to make your equipment available to your selling Dealer for a maintenance inspection 30 days prior to warranty expiration.

PERSONAL SAFETY IS IMPORTANT!

ALL PERSONNEL INVOLVED WITH THE ASSEMBLY AND/OR OPERATION OF THIS EQUIPMENT MUST BE INFORMED OF PROPER SAFETY PROCEDURES. OPERATOR'S/ ASSEMBLY MANUALS PROVIDE THE NECESSARY INFORMATION. IF THE MANUAL IS LOST FOR A PARTICULAR IMPLEMENT, ORDER A REPLACEMENT AT ONCE. OPERATOR'S AND ASSEMBLY MANUALS ARE AVAILABLE AT NO CHARGE UPON REQUEST.

This Safety Alert symbol means **ATTENTION! BECOME ALERT YOUR SAFETY IS INVOLVED!**



The Safety Alert symbol identifies important safety messages on the Amity Precision Shank Drill and in this manual. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

Why is SAFETY important to you?

3 Big Reasons

Accidents Disable and Kill
Accidents Cost
Accidents Can Be Avoided

SIGNAL WORDS:

Note the use of the signal words **DANGER**, **WARNING** and **CAUTION** with the safety messages. The appropriate signal word for each message has been selected using the following guidelines:

DANGER

An immediate and specific hazard which **WILL** result in severe personal injury or death if the proper precautions are not taken.

WARNING

A specific hazard or unsafe practice which **COULD** result in severe personal injury or death if the proper precautions are not taken

CAUTION

Unsafe practices which **COULD** result in personal injury if proper practices are not taken, or as a reminder of good safety practices.

ADDRESS INQUIRIES TO: AGCO Amity JV LLC
2800 7th Avenue North
Fargo, ND 58102
PH (701) 232-4199 FAX (701) 234-1716

Precision Shank Drill

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1. Safety

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1.1 Introduction

1.1.1 Safety alert symbol

The safety alert symbol means Attention! Become Alert! Your Safety Is Involved!

Look for the safety alert symbol both in this manual and on safety signs on this machine. The safety alert symbol will direct your attention to information that involves your safety and the safety of others.



Fig. 1

1.1.2 Safety messages

The words DANGER, WARNING or CAUTION are used with the safety alert symbol. Learn to recognize these safety alerts and follow the recommended precautions and safety practices.



DANGER:

Indicates an imminently hazardous situation that, if not avoided, will result in **DEATH OR VERY SERIOUS INJURY**.



WARNING:

Indicates a potentially hazardous situation that, if not avoided, could result in **DEATH OR SERIOUS INJURY**.



CAUTION:

Indicates a potentially hazardous situation that, if not avoided, may result in **MINOR INJURY**.



Fig. 2

1.1.3 Informational messages

The words important and note are not related to personal safety, but are used to give additional information and tips for operating or servicing this equipment.

IMPORTANT: *Identifies special instructions or procedures which, if not strictly observed, could result in damage to or destruction of the machine, process, or its surroundings*

NOTE: *Identifies points of particular interest for more efficient and convenient repair or operation.*

1.1.4 Safety signs



WARNING:

Do not remove or obscure safety signs. Replace any safety signs that are not readable or are missing. Replacement signs are available from your dealer in the event of loss or damage. The actual location of the safety signs is illustrated at the end of this section.

Keep signs clean by wiping off regularly. Use a mild soap and water solution if necessary.

If parts have been replaced or a used machine has been purchased, make sure all safety signs are present and in the correct location and can be read. Illustrations of safety sign locations are located at the rear of this section.

Replace any safety signs that can not be read, are damaged, or are missing. Clean the machine surface thoroughly with a mild soap and water solution before replacing signs. Replacement safety signs are available from your dealer.

1.1.5 A word to the operator

It is your responsibility to read and understand the safety section in this manual and the manual for all attachments before operating this machine. Remember you are the key to safety. Good safety practices not only protect you, but also the people around you.

Study the content in this manual and make the content a working part of your safety program. Keep in mind that this safety section is written only for this type of machine. Practice all other usual and customary safe working precautions, and above all remember - safety is your responsibility. You can prevent serious injury or death.

This safety section is intended to point out some of the basic safety situations that may be encountered during the normal operation and maintenance of your machine. This section also suggests possible ways of dealing with these situations. This section is not a replacement for other safety practices featured in other sections of this manual.

Personal injury or death may result if these precautions are not followed.

Learn how to operate the machine and how to use the controls properly.

Do not let anyone operate the machine without instruction and training.

For your personal safety and the personal safety of others, follow all safety precautions and instructions found in the manuals and on safety signs affixed to the machine and all attachments.

Use only approved attachments and equipment.

Make sure your machine has the correct equipment needed by the local regulations.

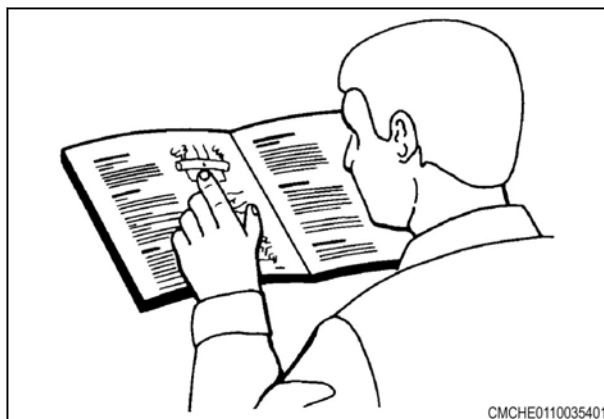


Fig. 3



WARNING:

An operator should not use alcohol or drugs which can affect their alertness or coordination. An operator on prescription or 'over the counter' drugs needs medical advice on whether or not they can properly operate machines.



CAUTION:
If any attachments used on this equipment have a separate Operator Manual, see that manual for other important safety information.

1.1.6 This manual

This manual covers general safety practices for this machine. The operator manual must always be kept with the machine.

Right-hand and left-hand, as used in this manual, are determined by facing the direction the machine will travel when in use.

The photos, illustrations, and data used in this manual were current at the time of printing, but due to possible in-line production changes, your machine can vary slightly in detail. The manufacturer reserves the right to redesign and change the machine as necessary without notification.



WARNING:
In some of the illustrations and photos used in this manual, shields or guards may have been removed for clarity. Never operate the machine with any shields or guards removed. If the removal of shields or guards is necessary to make a repair, they must be replaced before operation.

1.2 Operation

1.2.1 Prepare for operation

Read and understand all operating instructions and precautions in this manual before operating or servicing the machine.

Make sure you know and understand the positions and operations of all controls. Make certain all controls are in neutral and the park brake is applied before starting the machine.

Make certain all people are well away from your area of work before starting and operating the machine. Check and learn all controls in an area clear of people and obstacles before starting your work. Be aware of the machine size and have enough space available to allow for operation. Never operate the machine at high speeds in crowded places.

Emphasize the importance of using correct procedures when working around and operating the machine. Do not let children or unqualified persons operate the machine. Keep others, especially children, away from your area of work. Do not permit others to ride on the machine.

Make sure the machine is in the proper operating condition as stated in the Operator Manual. Make sure the machine has the correct equipment required by local regulations.

1.2.2 General information

When parking, park the machine and the tractor on a solid level surface. put all controls in neutral and apply the tractor park brake. Stop the tractor engine and take the key with you.

Make sure the tractor and implement are in the proper operating condition according to the operator manuals. Make sure the tractor brakes and the machine brakes are adjusted correctly.

The tractor must have enough weight and braking capacity, especially when operating on roads and terrain that is not even. Use a tractor of recommended size and weight to tow the machine. See the machine specifications for the minimum tractor size and weight.

Tractor must be equipped with rollover protective structure (ROPS) and a seat belt. use seat belt during operation.

Do not dismount from moving machinery.

Always operate the machine with the terminal turned on.

Never start the tractor with the PTO engaged or terminal turned on.

Stay off slopes too steep for operation.

Where possible avoid operating the machine near ditches, embankments, and holes. Reduce ground speed when operating on rough, slippery, or muddy surfaces and when turning or crossing slopes.

Be aware of the size of the machine and have enough space available to allow for operation.

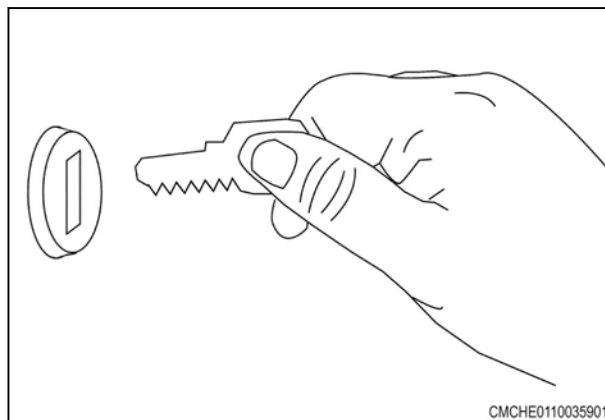


Fig. 4

1. Safety

Always lower the machine when not in use and relieve the pressure in the hoses and cylinders.

Do not stand between the tractor and the implement to install the hitch pin when the tractor engine is running.

Avoid contact with electrical power lines. Contact with electrical power lines can cause electrical shock, resulting in very serious injury or death.

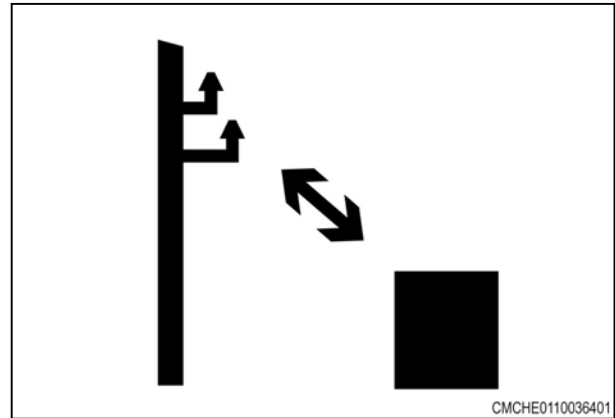


Fig. 5

1.2.3 Personal protective equipment

Wear all personal protective equipment (PPE) and protective clothing issued to you or called for by job conditions and country/local regulations. PPE includes, but is not limited to, equipment to protect eyes, lungs, ears, head, hands and feet when operating, servicing, or repairing equipment.

Always keep hands, feet, hair, and clothing away from moving parts. Do not wear loose clothing, jewelry, watches, or other items that could entangle in moving parts. Tie up long hair that can also entangle in moving parts.

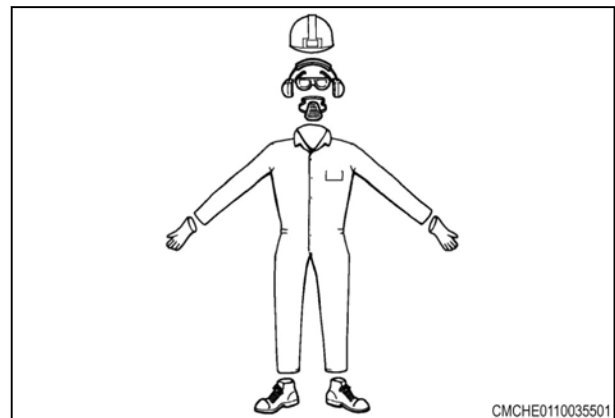


Fig. 6

1.2.4 Seat instructions

Securely fasten the seat belt before operating the machine. Always remain seated and have the seat belt fastened while operating the machine. Replace the seat belts when they become worn or broken.

Never wear a seat belt loosely or with slack in the belt system. Never wear the seat belt in a twisted condition or pinched between the seat structural members.

When using the instructional seat, if equipped, securely fasten the seat belt. The instructional seat is to be used only to train new operators or diagnose a problem. The instructional seat is only intended for short periods of use. Extra riders, especially children, are not permitted on the machine.

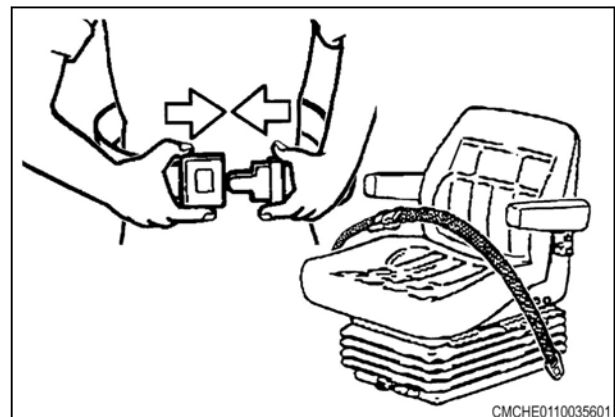


Fig. 7

When the instructional seat is used the machine must be driven at a slower speed and on level ground. Avoid quick starts, stops, and sharp turns. Avoid driving on highways or public roads.

1.2.5 Shield and guards

All shields and guards must be in the correct operating position and in good condition.

Do not open, remove, or reach around shields while the engine is operating. Entanglement in rotating belts and components can cause serious injury or death. Stay clear of rotating components.

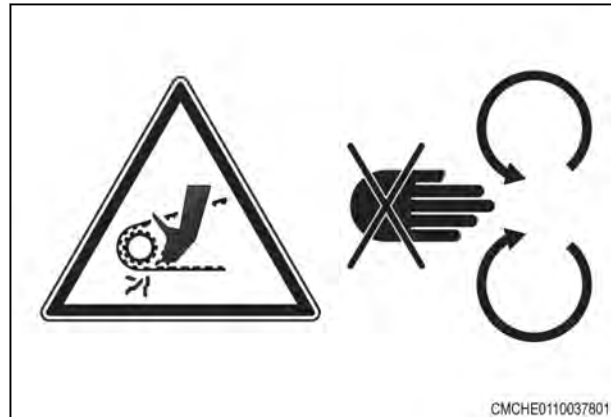


Fig. 8

Do not operate the machine with the drive shaft shields open or removed. Entanglement in rotating drive shafts can cause serious injury or death. Stay clear of rotating components.

Make sure rotating guards turn freely.



Fig. 9

1.2.6 Exhaust warning

Never operate the engine in a closed building unless the exhaust is vented outside.

Do not tamper with or modify the exhaust system with unapproved extensions.

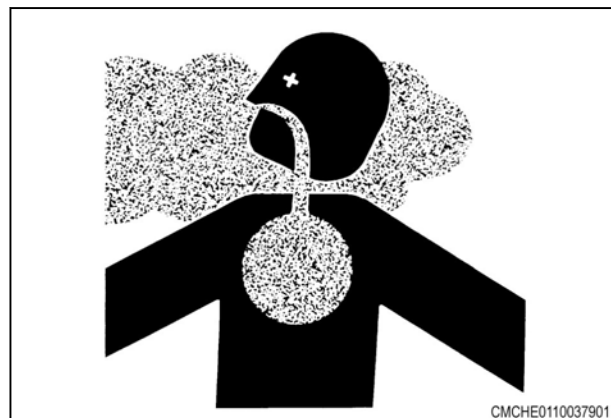


Fig. 10

1.2.7 Flying debris



WARNING:
Be careful when operating along the side of a road or building. Rocks or other debris can be thrown from the machine during operation possibly resulting in injury.

Never stand near the machine during operation. Debris can be thrown from the machine during operation possibly resulting in injury.



Fig. 11

1.2.8 Agricultural chemicals

Agricultural chemicals can be very hazardous. Improper use of fertilizer, fungicides, herbicides, insecticides and pesticides can injure people, plants, animals, soil and other people's property.

Always read and follow all manufacturers' instructions before opening any chemical container.

Even if you think you know the instructions, read and follow instructions each time you use a chemical.

Use the same precautions when adjusting, servicing, cleaning or storing the machine as used when installing chemicals into the hoppers or tanks.

Inform anyone who comes in contact with chemicals of the potential hazards involved and the safety precautions required.

Stand upwind and away from smoke from a chemical fire.

Store or dispose of all unused chemicals only in a manner as specified by the chemical manufacturer.

1.3 Travel on public roads

Make sure you understand the speed, brakes, steering, stability, and load characteristics of this machine before you travel on public roads.

Use good judgment when traveling on public roads. Maintain complete control of the machine at all times. Never coast down hills.

The maximum speed of farm equipment is governed by local regulations. Adjust travel speed to maintain control at all times.

Familiarize yourself with and obey all road regulations that apply to your machine. Consult your local law enforcement agency for local regulations regarding movement of farm equipment on public roads. Use head lamps, flashing warning lamps, tail lamps and turn signals, day and night, unless prohibited by local law.

Make sure all the flashers are operating prior to driving on the road. Make sure reflectors are correctly installed, in good condition, and wiped clean. Make sure the Slow Moving Vehicle (SMV) emblem is clean, visible, and correctly mounted on the rear of the machine.

Lock brake pedals together (if equipped with dual brake pedals) so both wheel brakes will be applied at the same time.

Raise implements to transport position and lock in place. Place all implements into narrowest transport configuration.

Disengage the power take-off and differential lock.

With towed implements, use a proper hitch pin with a clip retainer and safety transport chain.

Be aware of other traffic on the road. Keep well over to your own side of the road and pull over, whenever possible, to let faster traffic pass.

Be aware of the overall width, length, height, and weight of the machine. Be careful when transporting the machine on narrow roads and across narrow bridges.

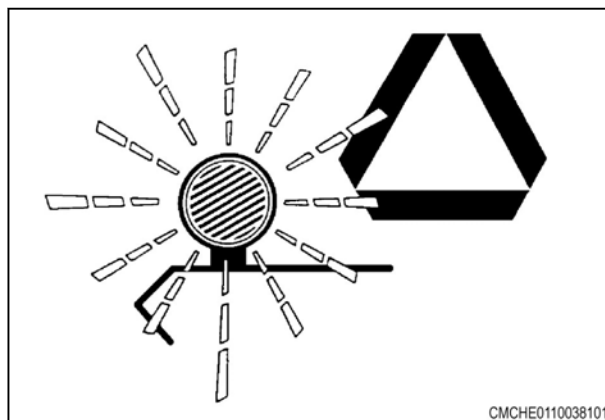


Fig. 12

1. Safety

Watch for overhead wires and other obstructions. Avoid contact with electrical power lines. Contact with electrical power lines can cause electrical shock, resulting in very serious injury or death.

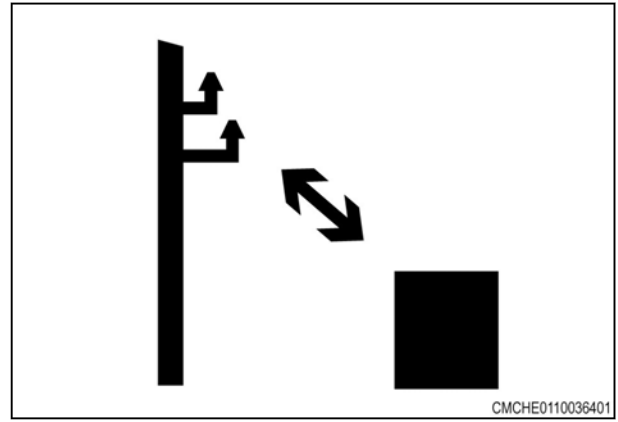


Fig. 13

1.4 Maintenance

1.4.1 General maintenance information

Before doing any unplugging, lubricating, servicing, cleaning, or adjusting:

- Park the machine on a solid level surface.
- Make sure all controls are in the neutral position and apply the park brake.
- Make sure all implements and attachments have been lowered to the ground.
- Stop the engine and take the key with you.
- Look and Listen! Make sure all moving parts have stopped.
- Put blocks in front of and behind the wheels of the machine before working on or under the machine.

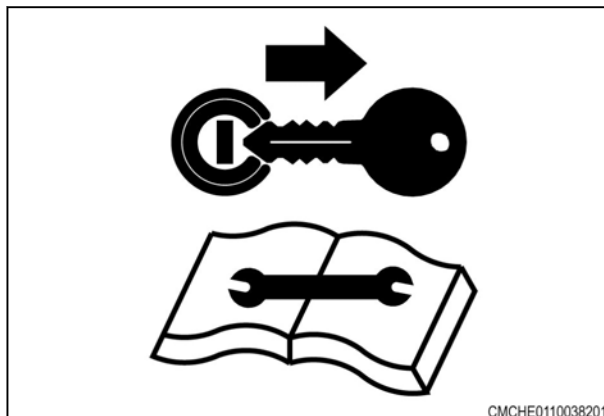


Fig. 14

Do not leave the tractor or implement unattended with the engine running.

Do not pull crop or any other object from the machine while the machine engine is running. Moving parts can pull you in faster than you can move away.

Check all nuts and bolts periodically for tightness, especially wheel mounting hardware.

Do not attempt to service or adjust the machine until all moving parts have stopped.

Check all nuts and bolts periodically for tightness, especially wheel mounting hardware.

Be aware of the size of parts when doing service work. Never stand under or near a part being moved with lifting equipment.

After unplugging, lubricating, servicing, cleaning, or adjusting the machine make sure all tools and equipment have been removed.

Make sure electrical connectors are clean and free of dirt or grease before connecting.

Check for loose, broken, missing, or damaged parts. Make sure the machine is in good repair. Make sure all guards and shields are in position.

Always raise implement, shut off tractor engine, apply the parking brake, shift to park position (or neutral) remove the key and install the cylinder stops channels before working around the machine.

Avoid working under the machine. However, if it becomes unavoidable to do so, make sure the machine is securely blocked and the cylinder lockup channels are in position.

When working around discs or shanks, be careful to not get cut on sharp edges.

Never service, check or adjust drive chains or belts while the engine is running.



Fig. 15

1. Safety

Do not operate the machine with the drive shaft shields open or removed. Entanglement in rotating drive shafts can cause serious injury or death.

Stay clear of rotating components.

Make sure rotating guards turn freely.

A loose yoke can slip off a shaft and result in injury to persons or damage to the machine.

When installing a quick disconnect yoke, the spring activated locking pins must slide freely and be seated in the groove on the shaft. Pull on the driveline to make sure the quick disconnect yoke can not be pulled off the shaft.

Remove spilled oil, antifreeze or fuel immediately from the steps, platform, and other access areas.

Keep all access areas clean and free of obstructions.



Fig. 16



Fig. 17

1.4.2 Fire prevention and first aid

Be prepared for emergencies.

Keep a first aid kit handy for treatment of minor cuts and scratches.

Always carry one or more fire extinguishers of the correct type. Check fire extinguishers regularly as instructed by the manufacturer. Make sure fire extinguishers are properly charged and in operating condition.

Due to the nature of the crops this machine will operate in, the risk of fire is of concern. Use a water type fire extinguisher or other water source for a fire in crop.

For fires involving anything other than crop, such as oil or electrical components, use a dry chemical fire extinguisher with an ABC rating.

Mount fire extinguishers within easy reach of where fires can occur.

Frequently remove accumulated crop material from the machine and check for overheated components. Check the machine daily for any noises that are not normal. Such noises could indicate a failed component that can cause excess heat.



Fig. 18

If any flame cutting, welding, or arc welding is to be done on the machine or attachments, make sure to clear any crop material or debris from around the area. Make sure the area below the work area is clear of any flammable material as falling molten metal or sparks can ignite the material.

If fire occurs stand upwind and away from smoke from the fire.

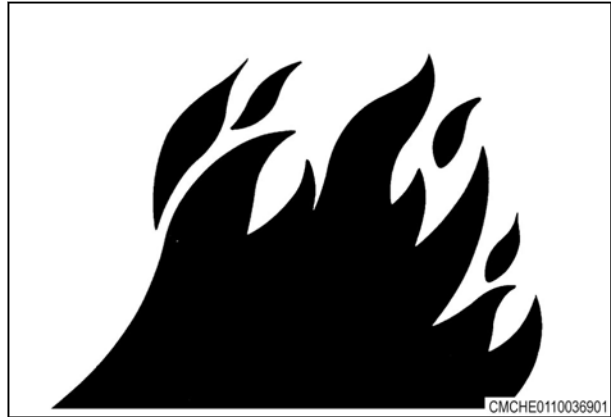


Fig. 19

1.4.3 High pressure leaks

Fluid leaking from the hydraulic system or the fuel injection system under high pressure can be very hard to see. The fluid can go into the skin causing serious injury.

Fluid injected into the skin must be surgically removed within a few hours. If not removed immediately, serious infection or reaction can develop. Go immediately to a doctor who knows about this type of injury.



Fig. 20

Use a piece of cardboard or wood to search for possible leaks. Do not use your bare hand. Wear leather gloves for hand protection and safety goggles for eye protection.

Relieve all pressure before loosening any hydraulic lines. Relieve the pressure by lowering raised equipment, shutting off accumulator valve, if equipped, and shutting off the engine. Tighten all connections securely before applying pressure.

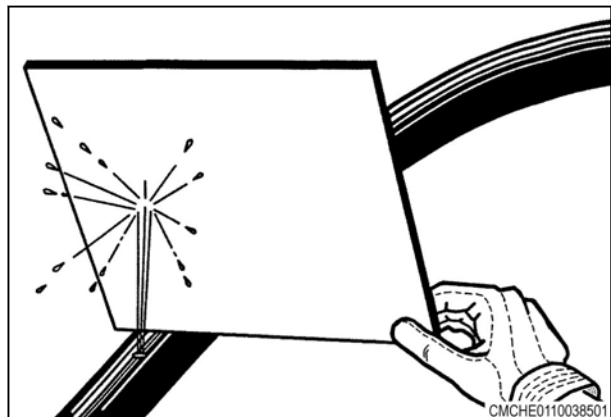


Fig. 21

1.4.4 Tire safety

Check tires for cuts, bulges, and correct pressure. Replace worn or damaged tires. When tire service is needed, have a qualified tire mechanic service the tire. Tire changing can be very hazardous and must be done by qualified tire mechanic using proper tools and equipment. See the Specifications Section for the correct tire size.

Tire explosion and/or serious injury can result from over inflation. Do not exceed the tire inflation pressures. See the Specifications Section for the correct tire pressure.

Do not inflate a tire that is seriously under inflated or has been run flat. Have the tire checked by qualified tire mechanic.

Do not weld on the rim when a tire is installed. Welding will make an air/gas mixture that can cause an explosion and burn with high temperatures. This danger applies to all tires, inflated or deflated. Removing air or breaking the bead is not enough. The tire must be completely removed from the rim prior to welding.

When preparing a calcium chloride solution for fluid ballast the tractor tires, never pour water onto the calcium chloride. A chlorine gas can be generated which is poisonous and explosive. This can be avoided by slowly adding calcium chloride flakes to water and stirring until they are dissolved.

When seating tire beads onto rims, never exceed 2.4 bar (35 psi) or the maximum inflation pressure specified on the tire. Inflation beyond this maximum pressure may break the bead, or even the rim, with explosive force.



Fig. 22

1.4.5 Replacement parts

Where replacement parts are necessary for periodic maintenance and servicing, genuine replacement parts must be used to restore your equipment to original specifications.

The manufacturer will not accept responsibility for installation of unapproved parts and/or accessories and damages as a result of their usage.

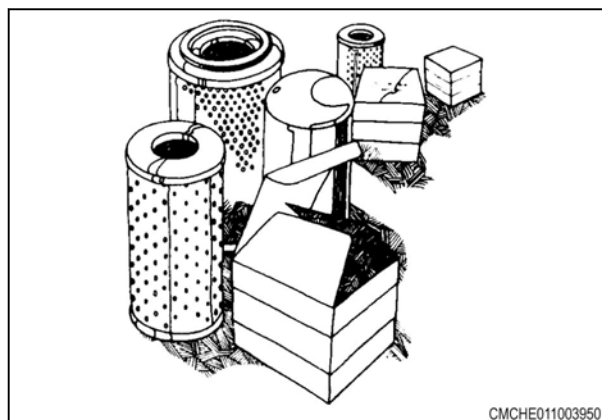
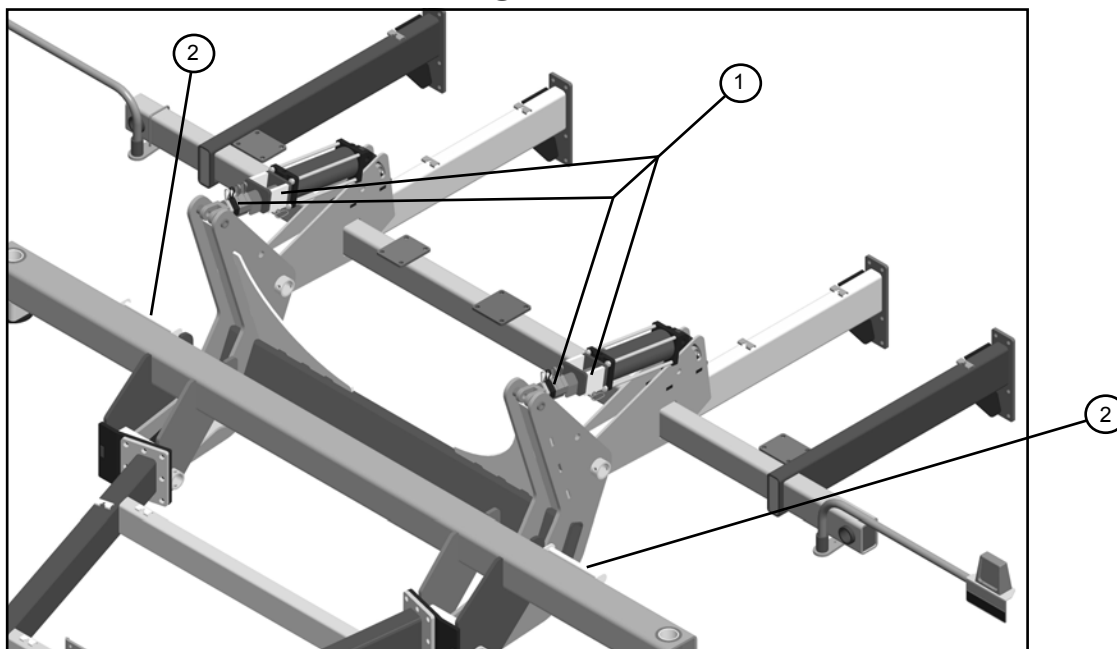


Fig. 23

1.5 Transport locks

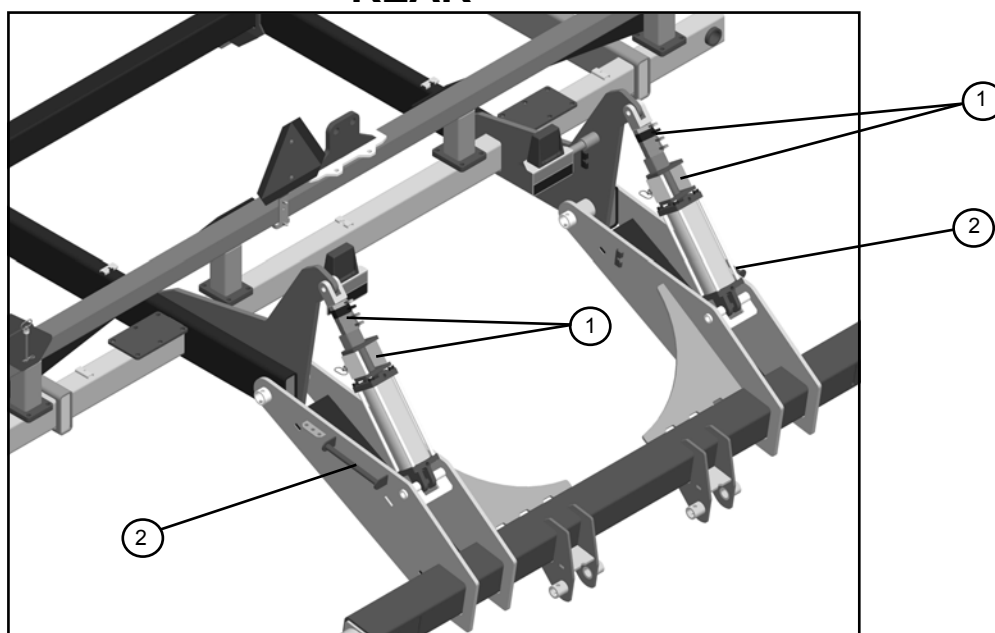
The machine is equipped with transport locks and depth stop collars. Use the transport locks and depth stop collars in the operating position (1) when moving the machine on roads. When not in use, keep the transport locks and depth stop collars in the storage position (2).

FRONT



701304

REAR



701303

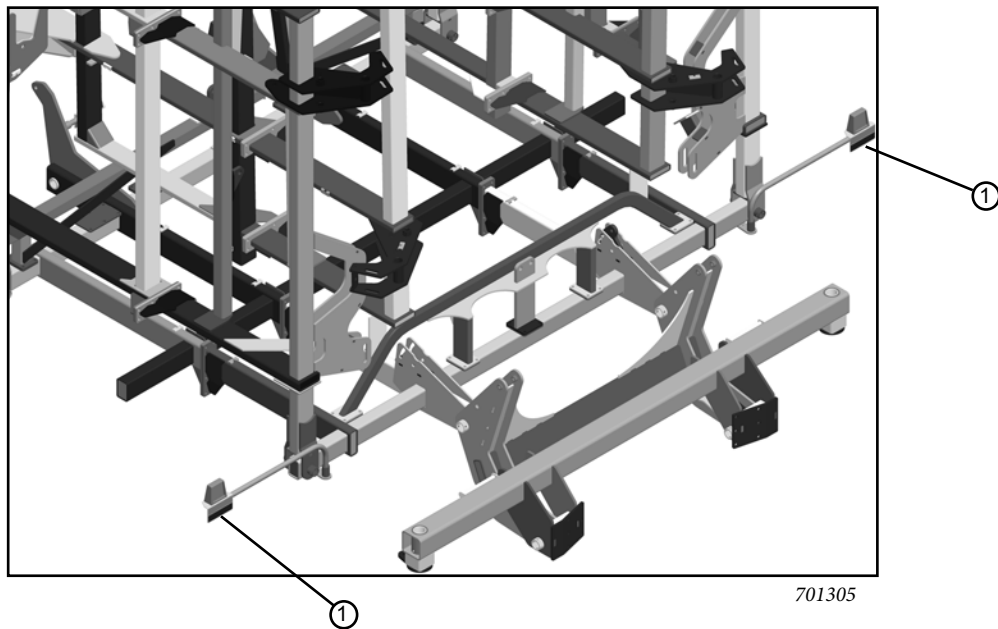
1.6 Marker lamps

The machine has marker lamps that must be used when moving the machine in the folded position on roads.

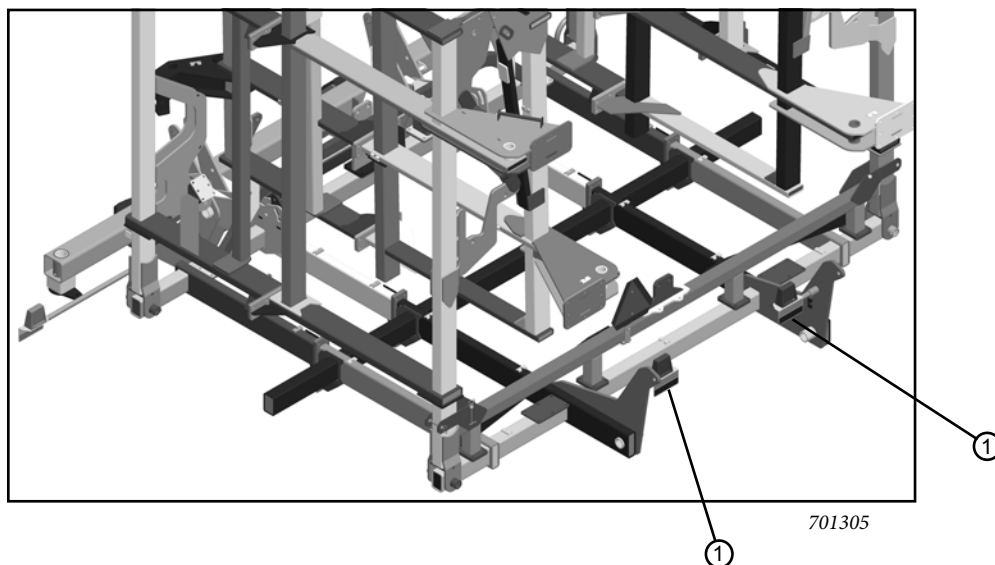
The machine is equipped with two red lamps (1) located toward the rear center of the machine.

The machine is equipped with two amber lamps (1) located at the front outside edges of the folded machine.

FRONT



REAR



1.7 Safety sign location

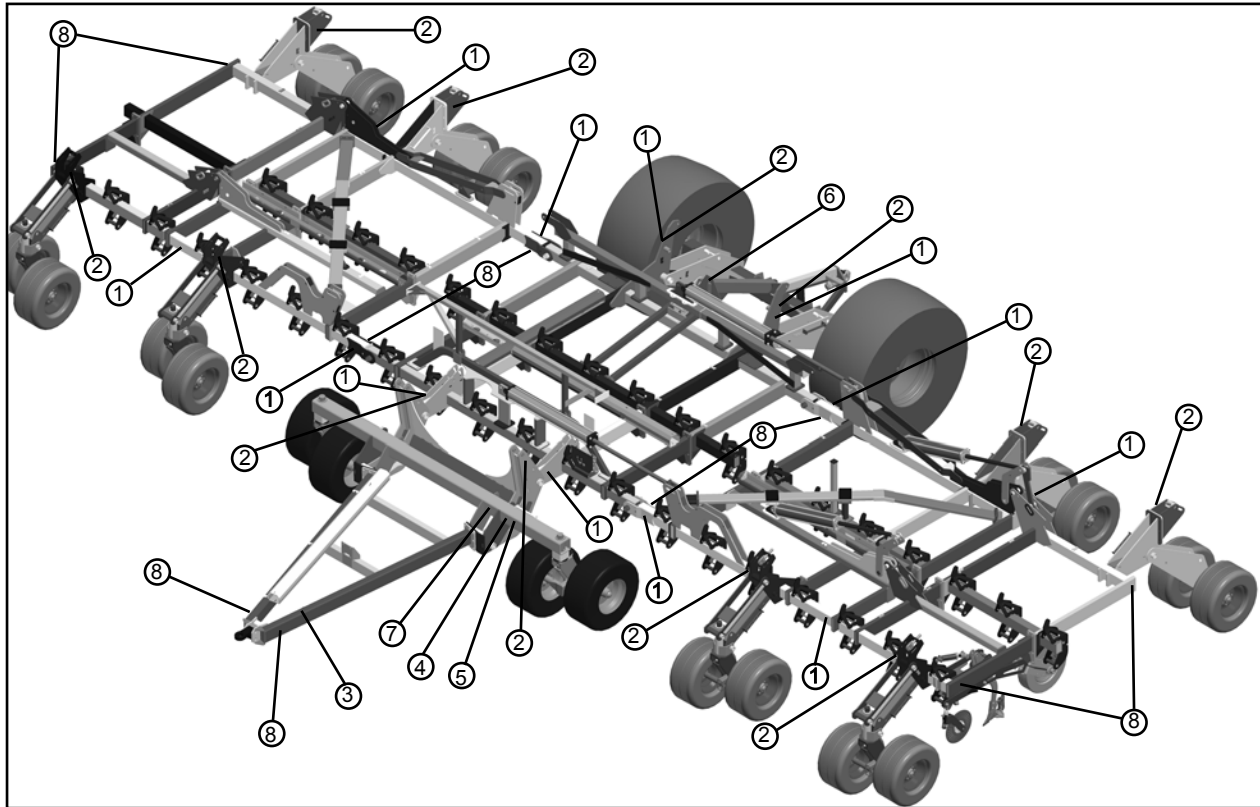


Fig. 26

- (1) Danger/Folding Wings
- (2) Warning/Lockout
- (3) Safety Decal Set
- (4) Warning/Read Operator Manual
- (5) Danger/High Line
- (6) Slow Moving Vehicle
- (7) Maximum Speed
- (8) Reflector/Amber

(1) Danger/folding wings

Hazard (A): Overhead crushing hazard from lowering or falling wing.

Avoidance (B): Stay clear of this area while engine and machine are operating. For service work, install the wing lock pins before getting under the wing.

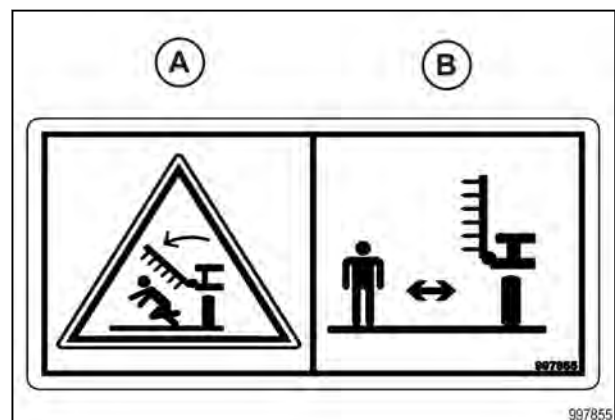


Fig. 27

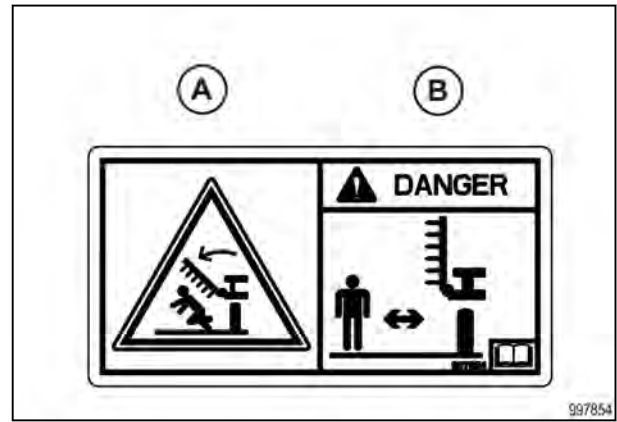


Fig. 27

(2) Warning/lockout

Hazard (A): Crushing hazard.

Avoidance (B): Stay clear of this area while engine and machine are operating. For service work, install the wing lock pins before getting under the wing.

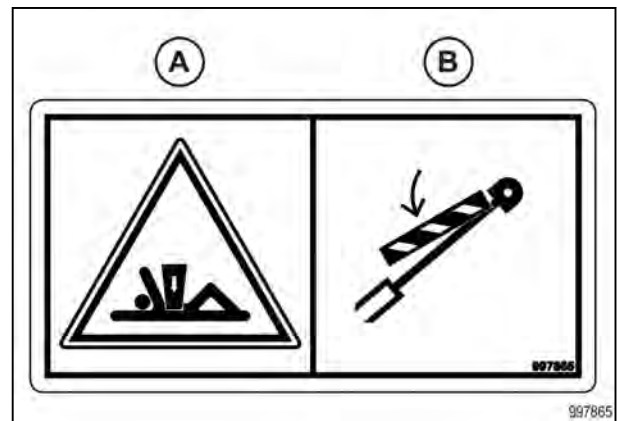


Fig. 28

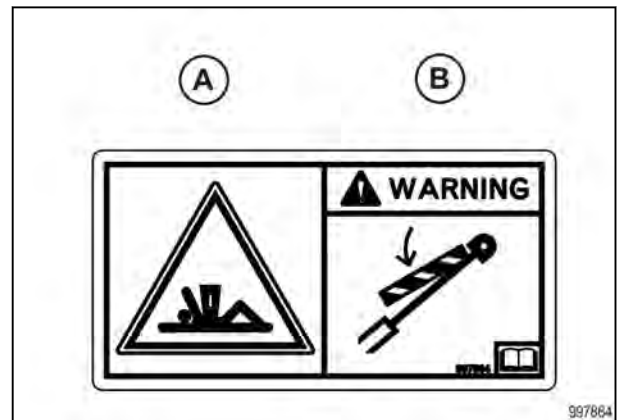


Fig. 28

(3) Caution/safety chains

Hazard (A): Loss of machine control.

Avoidance (B): Install the safety chains when connecting the machine to the tractor. Read the operators manual for safety information and the operating instruction before operating the machine.

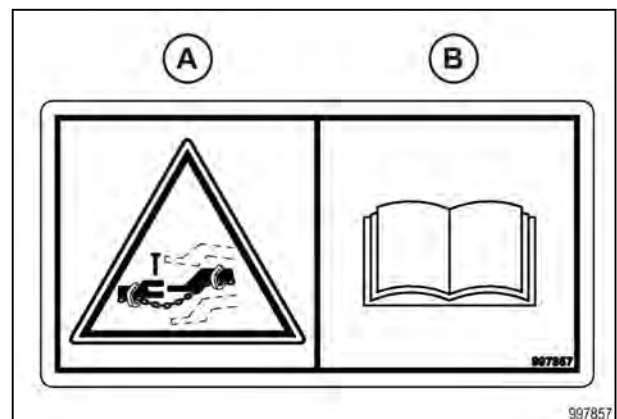


Fig. 29

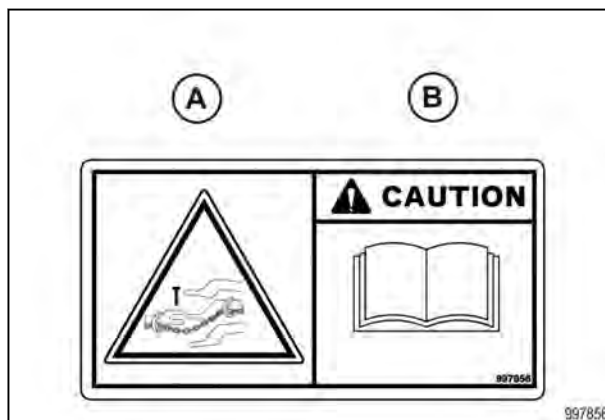


Fig. 29

(4) Warning/negative tongue weight

Hazard (A): Negative tongue weight will cause the tongue to rise immediately when disconnecting the machine.

Avoidance (B): Stay clear of the tongue when disconnecting the machine from the tractor. Read the operators manual for safety information and operating the instructions before operating the machine.

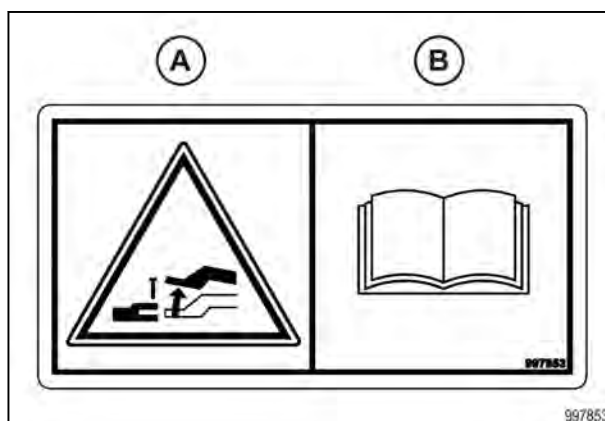


Fig. 30

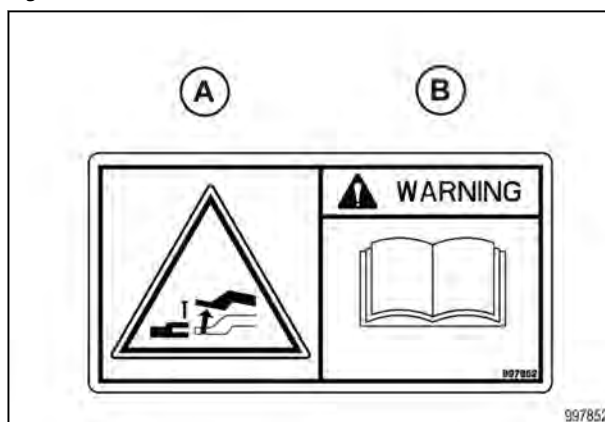


Fig. 30

(5) Warning/remove key

Hazard (A): General safety alert.

Avoidance (B): Turn off the machine and remove the key before maintenance or repair.

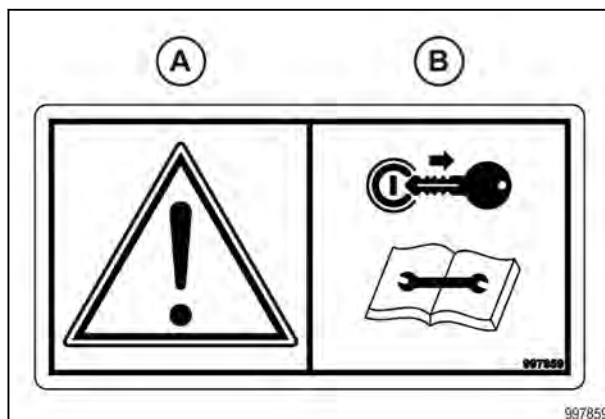


Fig. 31

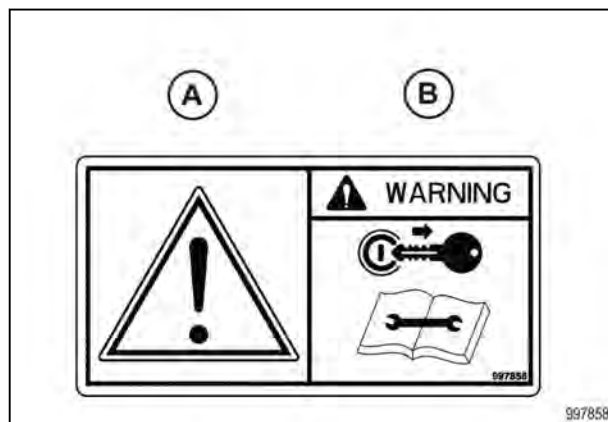


Fig. 31

(6) Warning/read operators manual

Hazard (A): General safety alert.

Avoidance (B): Read and understand the operators manual before operating the machine.

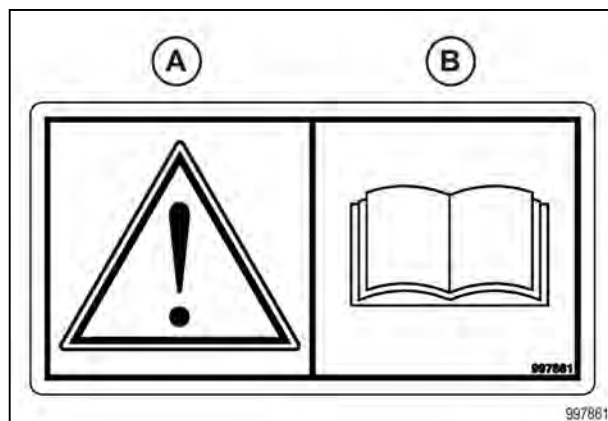


Fig. 32

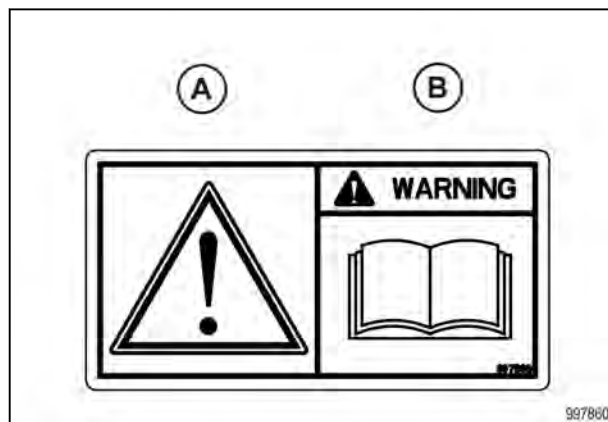


Fig. 32

(7) Danger/high line

Hazard (A): Electrical shock hazard - risk of personal injury and component damage.

Avoidance (B): Keep the correct distance away from electrical power lines.

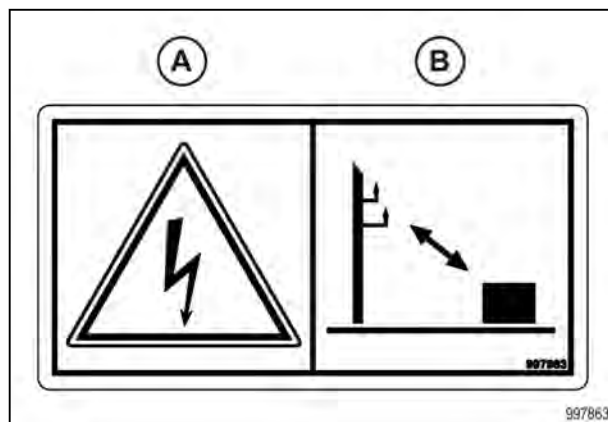


Fig. 33

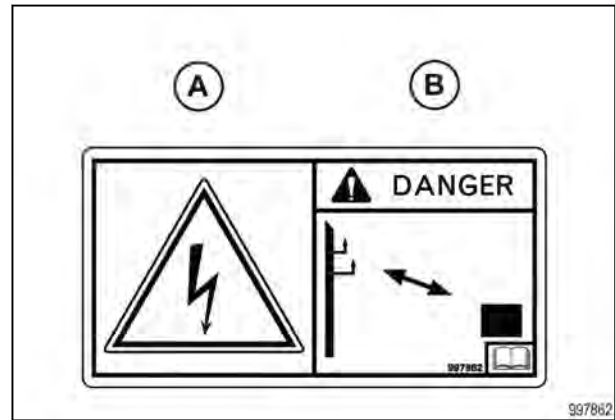


Fig. 33

(8) Warning/hydraulic fluid pressure

Hazard (A): Injection hazard into skin - escaping fluid under high pressure.

Avoidance (B): Turn off the engine, remove the key, relieve the pressure before maintenance or repair. Refer to the operator manual for the correct service procedures.

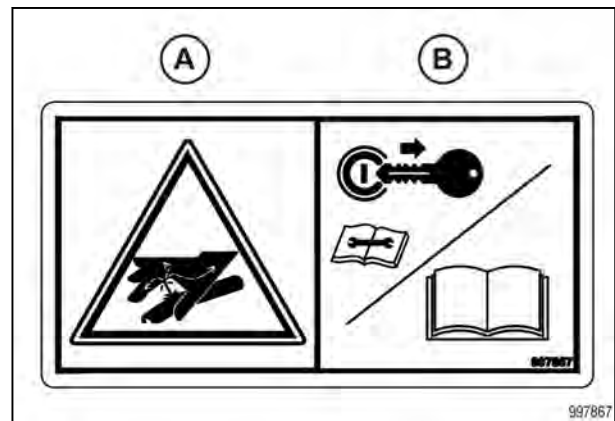


Fig. 34

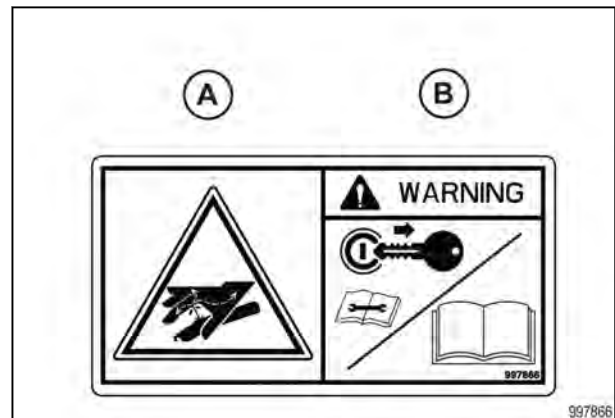


Fig. 34

(9) Maximum speed

The maximum speed safety sign displays the maximum speed to transport the machine.



Fig. 35

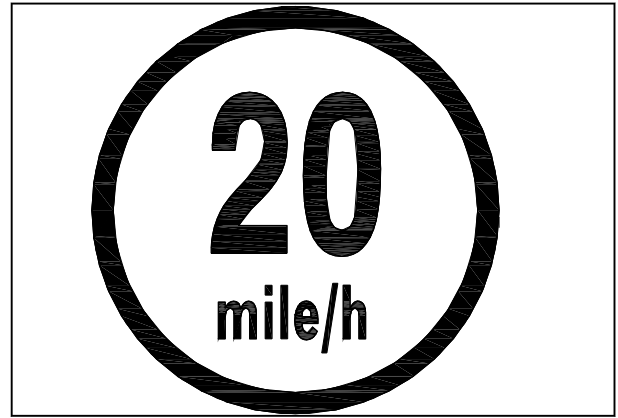


Fig. 35

(10) Reflector/yellow

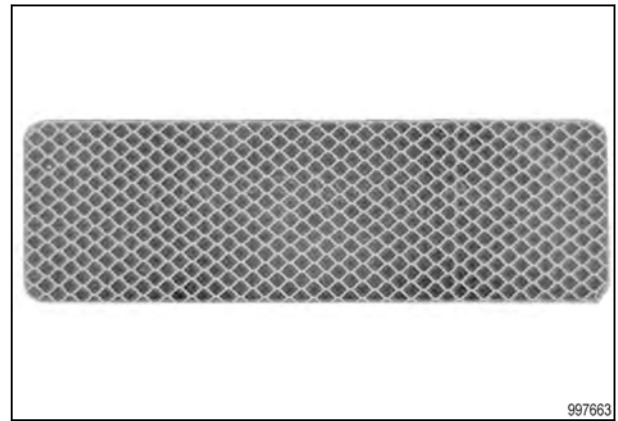


Fig. 36

2. Introduction

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2.1 Introduction



CAUTION:

In some of the illustrations used in this Operator Manual, panels or guards may have been removed for clarity. Never operate the tractor with these panels and guards removed. If the removal of a shield is necessary to make a repair, it must be replaced before operation.



CAUTION:

Read this book in its entirety prior to operating machine. Use only genuine replacement parts for repairs and/or replacement.

This manual gives the operator the proper instructions needed for operation and maintenance. Read, understand, and follow these instructions for best machine performance and life. With proper maintenance and operation procedures, the machine will have better overall performance. Use normally available tools for maintenance on this machine.

All operators must read and understand this manual before operating this machine. Where possible, operators who have not operated the machine must receive instruction from an operator who has operated this machine. Your dealer can give instruction in machine operation. Keep this manual with the machine for future reference. If the original manual is damaged, order a replacement from your dealer.

See your dealer in for any service problems and adjustments. The dealer is equipped for all service work and to help with specific applications of the tractor in local conditions.

Left-hand and right-hand are determined by facing the direction the machine will travel when in use.

2.1.1 Units of measurement

Measurements are given in metric units followed by the equivalent in US units. Hardware sizes are given in millimeters for metric hardware and inches for US hardware.

2.1.2 Replacement parts

To receive prompt efficient service, remember to have the following information:

- Correct part description and part number
- Model number of the machine
- Serial number of the machine

2.1.3 Intended use

This machine is designed solely for use in customary agricultural operations.

Do not use this machine for any application or purpose other than those described in this manual. The manufacturer accepts no liability for damage or injury resulting from misuse of this machine.

Compliance with the conditions of operation, service and repair as specified by the manufacturer constitute essential elements for the intended use of this machine.

This machine should be operated, serviced and repaired only by qualified persons familiar with its characteristics and familiar with the relevant safety rules and procedures.

All generally recognized safety regulations and road traffic regulations must be obeyed at all times.

Any unauthorized modifications performed on this machine will relieve the manufacturer of all liability for any resulting damage or injury.

2.1.4 Proper disposal of waste

Improper disposal of waste can pollute the environment and ecology. A few examples of potentially harmful equipment waste can include, but not limited to, items such as oil, fuel, coolant, brake fluid, filters, battery chemicals, tires, etc.

Use leak proof containers when draining fluids. Do not use food or beverage containers to collect waste fluids, as food or beverage container(s) may mislead someone into drinking from them.

Do not pour or spill 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.

Inquire with local environmental or recycling center on the proper way to recycle or dispose waste.

2.2 Machine identification

Each machine is identified by a model and a serial number.

Record these numbers in the spaces given.

Give the model number and serial number to your dealer when parts or service are required.

Machine model number: _____

Machine serial number: _____

Date of delivery: _____

Dealer name: _____

Dealer address: _____

Dealer telephone number: _____

Dealer e-mail address: _____

Dealer fax number: _____

2.2.1 Serial number plate location

The serial number plate (1) is located on the side of the main frame tube.

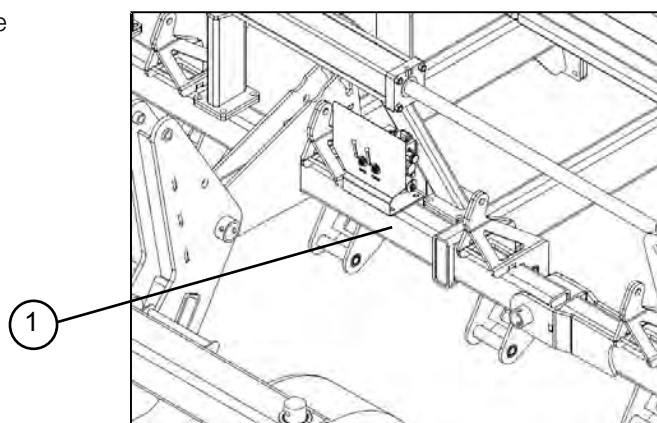


Fig. 1

2.2.2 Serial number description

Description of the serial number for model year 2010 and up.

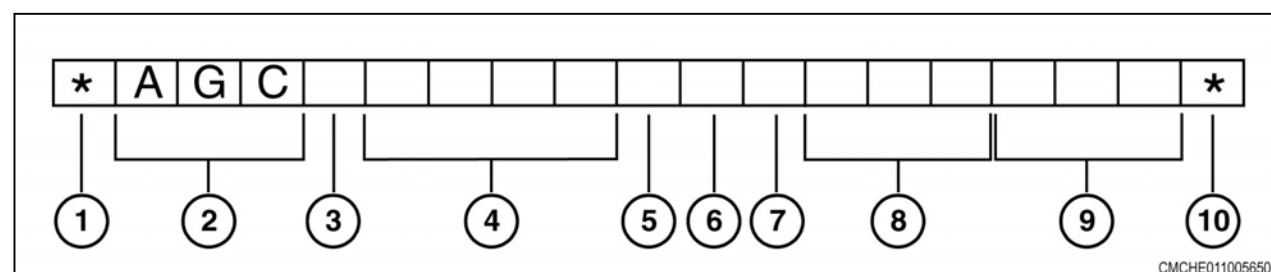


Fig. 2

- | | |
|-------------------------------------|---|
| (1) Beginning symbol | (5) Check letter (0 or used if model identifier is five digits) |
| (2) World manufacturer code | (6) Model year code (A=2010, B=2011, C=2012, and on) |
| (3) Brand code | |
| (4) Model identifier (model number) | |

(7) Plant code
(8) Family code

(9) Unit number for the year
(10) Ending symbol

2.3 PRECISION SHANK DRILL

Use the Precision Shank Drill for Spring seeding and applying Spring and Fall fertilizer.

The Precision Shank Drill is equipped with shanks that place the seed and fertilizer at a precise depth by following the contour of the ground.

2.3.1 Floating hitch

The floating hitch pivots between the tractor and the main frame. This pivot point lets the unit to follow the contour of the ground. The front castering gauge wheels support the front of the main frame and wings. These gauge wheels are mechanically synchronized to the rear axle, keeping the unit at the same level working depth from front to rear.

2.4 Major components

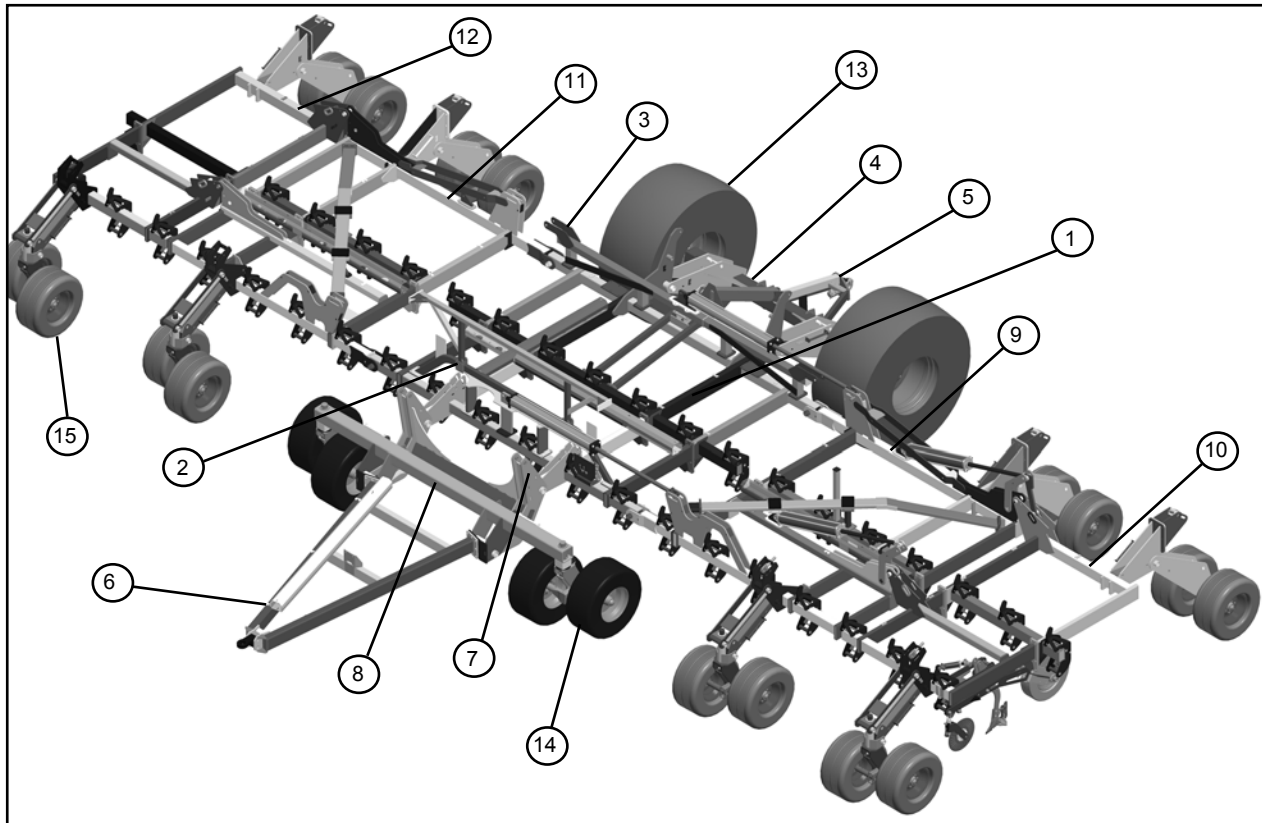


Fig. 3

- | | |
|------------------------|------------------------------|
| (1) Mainframe | (9) Inner wing - LH |
| (2) Front wing rest | (10) Outer wing - LH |
| (3) Rear wing rest | (11) Inner wing - RH |
| (4) Rear lift axle | (12) Outer wing - RH |
| (5) Rear hitch | (13) Rear mainframe tire |
| (6) Front pull hitch | (14) Front mainframe tire |
| (7) Front hitch pivot | (15) Inner & outer wing tire |
| (8) Front caster mount | |

2.5 Operator manual storage

The Operator Manual is located in the container (1) on the machine.

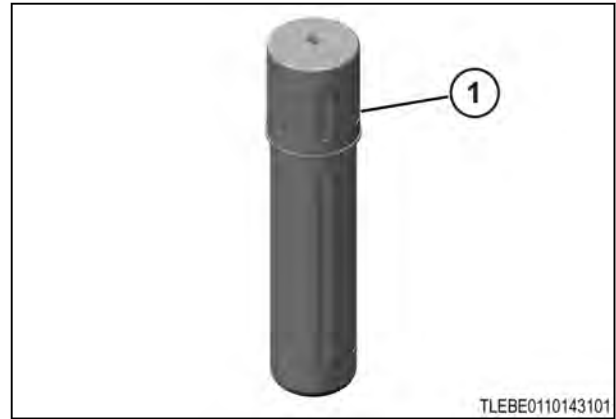
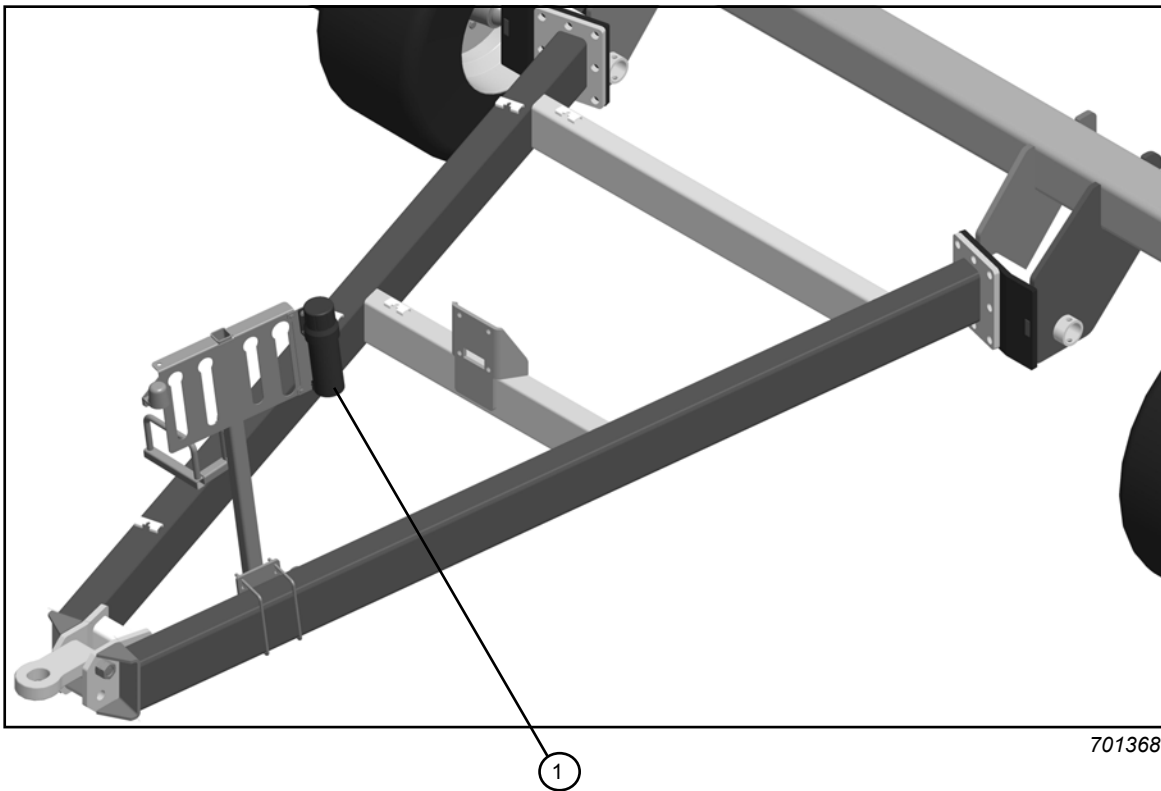


Fig. 4



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3.1 Connecting the machine to the tractor

Procedure

1. Make sure there are no persons, or obstructions between the tractor and the machine.

figure 1

2. Use the hitch jack (1) on the front hitch of the machine to adjust the height of the hitch (2).
3. Slowly reverse the tractor toward the hitch of the machine. Align the hitch on the tractor with the hitch on the machine when backing.
4. Stop the tractor when the hole of the tractor drawbar aligns with the hole in the machine hitch.
5. Stop the engine, apply the park brake, and take the key with you.

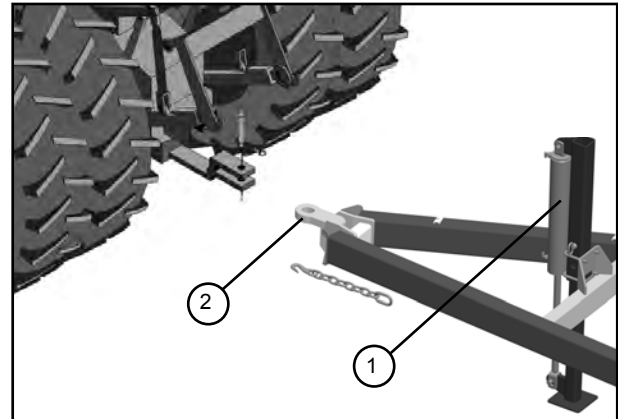


Fig. 1

701368E

figure 2

6. Install the hitch pin (1) through the holes in the tractor draw bar (2) and the machine hitch. Install the keeper pin (3) in the hitch pin.
7. Connect the safety chain (4) from the front hitch of the machine to the tractor.

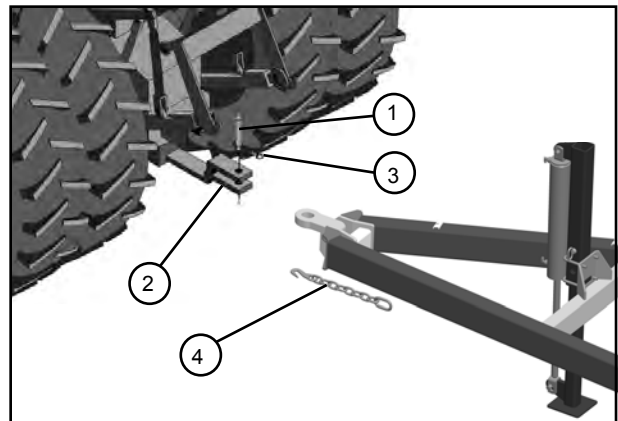


Fig. 2

701368E

figure 3

8. Retract the hitch jack. Move the hitch jack to the storage position (1) and fasten with pin.

NOTE:

The location and position of the storage location of the hitch jack can vary.

9. Clean the ends of the hydraulic connections on the machine and the tractor.
10. Make the following connections between the tractor and the machine.
 - Lift cylinder hydraulic hoses
 - Wing fold cylinder hydraulic hoses
 - Down pressure cylinder hydraulic hoses
 - Marker lamp harness
11. Start the tractor. Use the tractor hydraulics to lift the machine to the highest position.
12. If the wing frames were down during storage, connect the wing cylinders to the wing frames.
13. Use the tractor hydraulics to fully lift the wing frames.
14. Stop the engine, apply the park brake, and take the key with you.
15. Remove the wheel chocks or blocks from in front of and behind the support tires.
16. Make sure all persons and obstructions are clear before moving the tractor and machine.

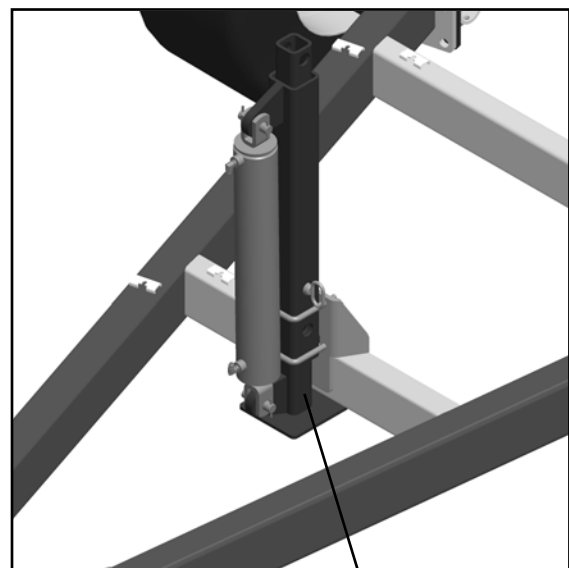


Fig. 3

701368

3.2 Disconnecting the machine from the tractor

NOTE: Lower the wing frames for storage when possible.

Procedure

1. Park the tractor and the machine on a solid level surface.
2. Use the tractor hydraulics to lower the wings to the ground if possible.
3. Stop the engine, apply the park brake, and take the key with you.
4. Install wheel chocks or blocks in front of and behind the support wheels.

figure 4

5. Move the hitch jack to the operating position (1) on the front hitch. Use the hitch jack to support the front hitch of the machine.

6. Disconnect the following connections from the tractor:
 - Lift cylinder hydraulic hoses
 - Wing fold cylinder hydraulic hoses
 - Down pressure cylinder hydraulic hoses
 - Marker lamp harness

7. Clean the hydraulic connections between the machine and the tractor.

8. Install each of the hydraulic hose connections in the hose holder
9. Install the connector for the marker lamp harness in the plug holder.

figure 5

10. Remove the safety chain (4) from the tractor.
11. Remove the keeper pin (3) from the hitch pin (1). Remove the hitch pin from the hitch and drawbar (2).

IMPORTANT:

Make sure there are no connections between the tractor and the machine.

12. Make sure all persons and obstructions are clear of the tractor and machine.
13. Move the tractor away from the machine.

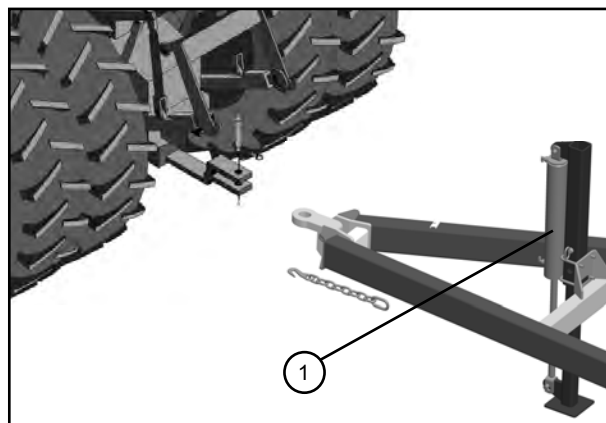


Fig. 4

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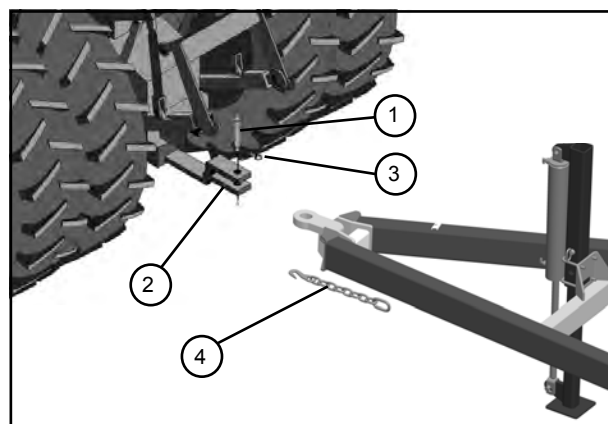


Fig. 5

701368E

3.3 Bleeding air from the hydraulic lift system

Before starting the procedure



WARNING:

Leaking fluid under pressure can enter the skin causing serious injury. Release pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles which eject fluids under high pressure. Wear correct hand and correct eye protection when looking for leaks. Use a piece of cardboard or paper instead of your hand. Any fluid injected into the skin can cause gangrene. The fluid must be removed by a doctor familiar with this type of injury.



WARNING:

Be careful of sweeps or blades when folded to prevent serious injury. Never keep the machine with the wings in the folded position.

To bleed the air from the hydraulic lift system, connect the machine to a tractor that is the correct size to operate the machine. See the information for minimum tow vehicle weight.

Total volume of oil required to fill the lift system is 16 gallons(estimated).

Completely bleed the hydraulic system of air when:

The lift system is filled with hydraulic oil for the first time.

Air has entered the hydraulic system through a leak or through repair of the hydraulic system.

Procedure

1. Park the machine on a flat, level surface that is large enough for the machine when unfolded.
2. Set the tractor hydraulic flow to less than 75.7 L/min (20 gal/min).
IMPORTANT: *If the hydraulic flow is set to more than 75.7 L/min (20 gal/min) the hydraulics will not operate correctly.*
3. Connect the lift system hoses to the tractor.
4. Make sure the tractor reservoir is full of the hydraulic oil required by the manufacturer.
IMPORTANT: *Do not loosen any hydraulic fittings to bleed air from the system.*
5. Raise the machine. Continue to hold the tractor lever to let oil bypass and fill each wing lift cylinder.
6. Engage the hydraulics to remove any hydraulic transport locks if equipped.
7. Stop the engine, apply the park brake and take the key with you.
8. Remove the transport locks when all lift cylinders are fully extended.
9. Lower the unit.
Make sure the cylinders move at the same time through the cycle.
10. Hold the hydraulic lever with the cylinders fully extended.
11. If the cylinders are not operating together, cycle the cylinders to remove the remaining air.
IMPORTANT: *Do not loosen any hydraulic fittings to bleed air from the system.*
12. Stop the engine, apply the park brake, and take the key with you.
13. Check the tractor hydraulic oil reservoir to make sure the hydraulic oil is still within operating limits.
14. Make sure all lift cylinders are operating together before starting any field operation.
15. Fully raise the machine when making turns during field operation.
This will make sure that the cylinders are operating together and keep the machine level during operation.

3.4 Bleeding air from the hydraulic fold system

Before starting the procedure



WARNING:

Leaking fluid under pressure can enter the skin causing serious injury. Release pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles which eject fluids under high pressure. Wear correct hand and correct eye protection when looking for leaks. Use a piece of cardboard or paper instead of your hand. Any fluid injected into the skin can cause gangrene. The fluid must be removed by a doctor familiar with this type of injury.



WARNING:

Be careful of sweeps or blades when folded to prevent serious injury. Never keep the machine with the wings in the folded position.

IMPORTANT: Do not fold or unfold the fold system before bleeding air from the fold system.

To bleed the air from the hydraulic fold system, connect the machine to a tractor that is the correct size to operate the machine. See the information for minimum tow vehicle weight.

Total volume of oil required to fill the fold system is 24 gallons(estimated).

Completely bleed the hydraulic system of air when:

The fold system is filled with hydraulic oil for the first time.

Air has entered the hydraulic system through a leak or through repair of the hydraulic system.

Procedure

1. Set the tractor hydraulic flow to less than 75.7 L/min (20 gal/min).

IMPORTANT: If the hydraulic flow is set to more than 75.7 L/min (20 gal/min), the hydraulics will not operate correctly.

NOTE: Restrictors are installed in the fold cylinders to prevent falling of the wings. Never remove the restrictors, or the machine will not fold correctly.

2. Stop the engine, apply the park brake, and take the key with you.
3. Connect the fold system hoses to the tractor.
4. Make sure the tractor reservoir is full of the hydraulic oil required by the manufacturer.

IMPORTANT: Do not loosen any hydraulic fittings to bleed air from the system.

5. Remove the pins from the rod ends of the fold cylinders.
6. Make sure the rod ends of the fold cylinders will not come into contact with any obstructions.
If a blockage is present, lift the rod ends of the fold cylinders.
7. Use the remote lever in the tractor to fully extend and retract the fold cylinders.
Extend and retract multiple times.
8. If the fold cylinders are not operating together, cycle the fold cylinders to remove the remaining air.

IMPORTANT: Do not loosen any hydraulic fittings to bleed air from the system.

9. Stop the engine, apply the park brake, and take the key with you.
10. Check the tractor hydraulic oil reservoir to make sure the hydraulic oil reservoir is still within operating limits.
11. Connect the rod ends of the fold cylinders to the machine.
12. Find an area large enough for the machine when unfolded.
13. Park the machine on a solid, level surface. Stop the engine, apply the park brake, and take the key with you.
14. With the tractor at a low idle, slowly engage the hydraulics to fold and unfold the machine.
15. Fully extend the fold cylinders to let the wings flex freely.

3.5 Preparing the machine for transport

Before starting the procedure

Stop the tractor before preparing the machine for transport.

IMPORTANT:

Secure the transport locks and pins in the correct position on the center frame lift cylinders before transporting the machine to the field.

Procedure

1. Use the tractor hydraulics to lift the frame of the machine to the highest position.
2. Retract row units fully up and lock valve.
3. Install Grey transport locks to front and rear main frame hydraulic lift cylinders.
4. Retract hydraulic cylinders to the transport locks.

Note: No stop collars should be located on the outside of the transport locks as this will prevent wings from fully folding.

5. Use the tractor hydraulics to completely fold the machine.
6. Stop the engine, apply the park brake, and take the key with you.
7. Make sure the SMV emblem is installed and can be seen from the rear of the machine.
8. Make sure the rear facing lamps and reflectors are free of dust and are operating correctly.

3.5 Preparing the machine for transport

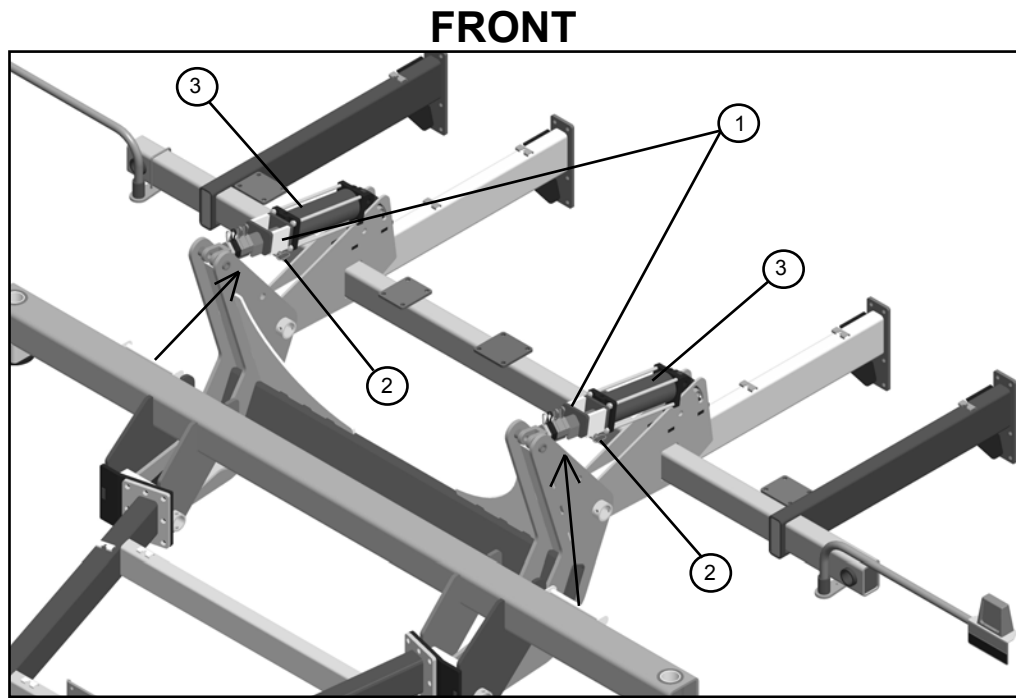


Fig. 1

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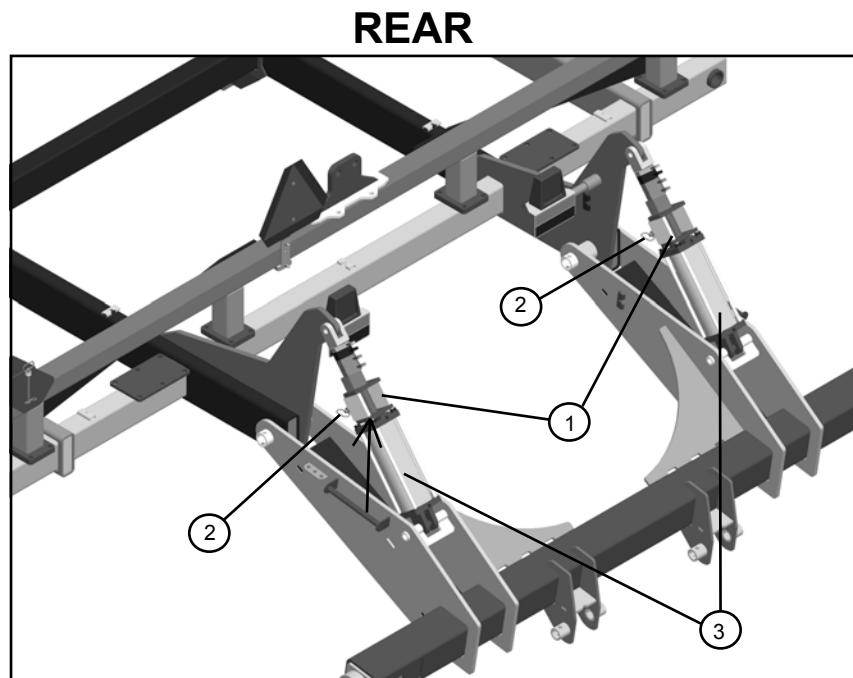


Fig. 2

701303

3.6 Preparing the machine for field operation

Adjust the machine according to field conditions, before taking the machine to the field.

Before starting the procedure



WARNING:

Avoidance hazard. Clearance. Serious personal injury can occur. Make sure all persons are clear of the area before operating the machine.

IMPORTANT:

Remove and put the transport locks and pins in the storage position before operating the machine in the field.

The machine must be connected to a tractor that is the correct size for operation. Make sure there is enough area around the machine to completely lower the wings.

Procedure

1. Follow all safety instructions.
2. Set the tractor hydraulic flow to less than 75.7 L/min (20 gal/min).
IMPORTANT: *If the hydraulic flow is set to more than 75.7 L/min (20 gal/min) the hydraulics will not operate correctly.*
3. Make sure the area below the machine is clear of persons and obstructions.
4. With the machine on the transport locks, use the tractor hydraulics to completely unfold the machine.
5. Unlock the row unit valves.

Note: 51ft units - Hydraulic manifold towers will sequence up after wings are completely unfolded and down before wings will start to fold up.

Note: 61ft units - Hydraulic manifold towers are sequenced with the row unit hydraulics. Towers will raise up as the row units are lowered. Towers will lower as the row units raise. **Towers must be in the lowered position for all folding operations or damage will occur.**

6. Use the tractor hydraulics to lift the frame of the machine to the highest position.
7. Stop the engine, apply the park brake, and take the key with you.
8. Remove the transport locks (1) and pins (2) from the center frame cylinders(see figure one and two on the following page).
9. Put the transport locks in the storage location (3) and fasten with pins.
NOTE: *The typical storage location is shown.*
8. Bleed any air from the lift and the fold cylinders.
9. Lubricate the machine at all points shown in the Maintenance Section .
10. Check tires for correct air pressure.
11. Make adjustments and service the machine according to the Operation Section of this manual.
12. Adjust the finishing attachment if necessary.
13. Level the machine from front to rear.
Level at or near ground height.
14. Lower the machine to the desired operating depth.
15. Adjust the stroke control for machine depth.
16. Level the wings to the center frame.
17. Adjust the gauge wheel to correct depth.

3.6 Preparing the machine for field operation

Adjust the machine according to field conditions, before taking the machine to the field.

FRONT

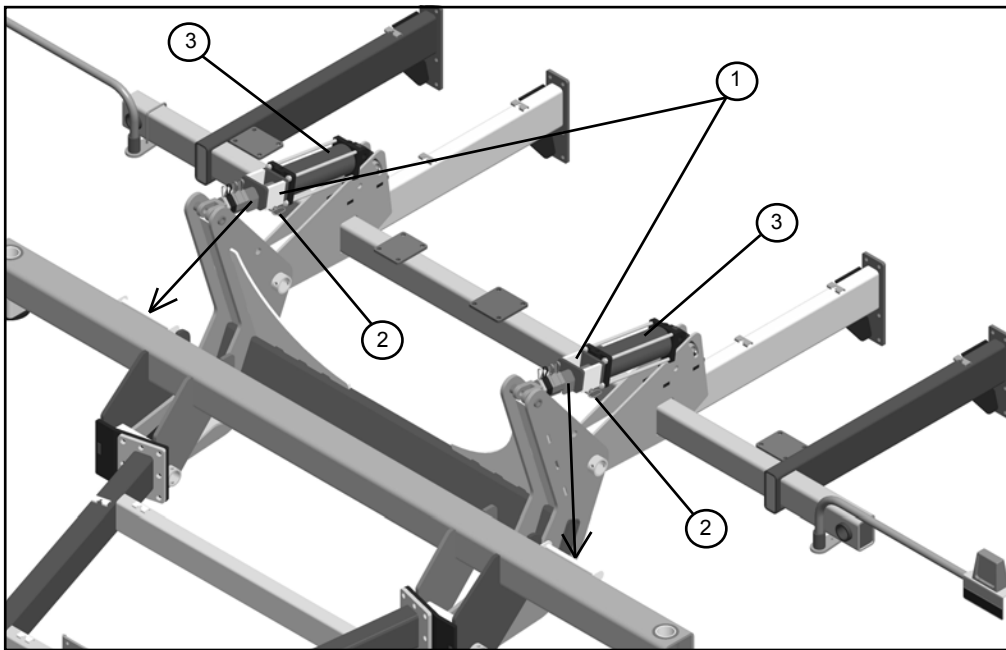


Fig. 1

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REAR

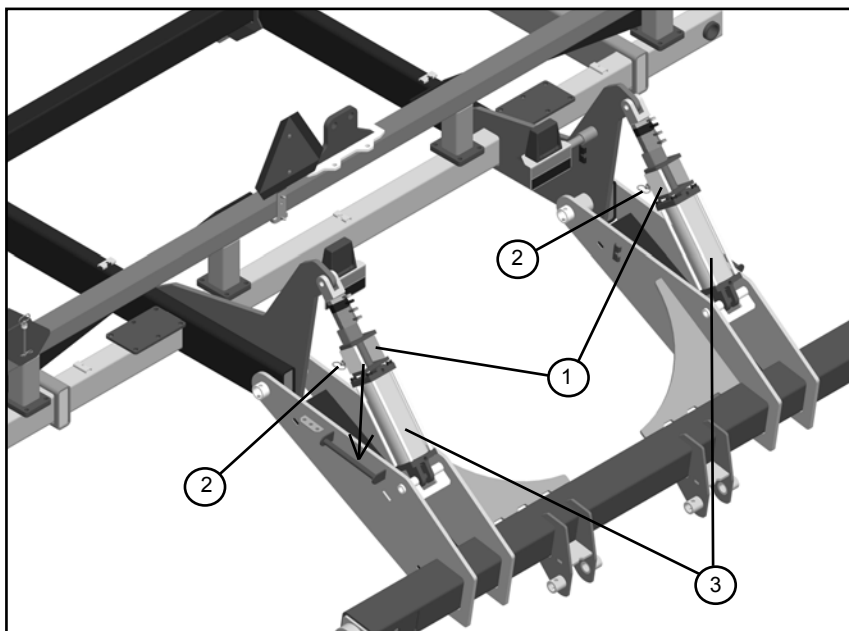
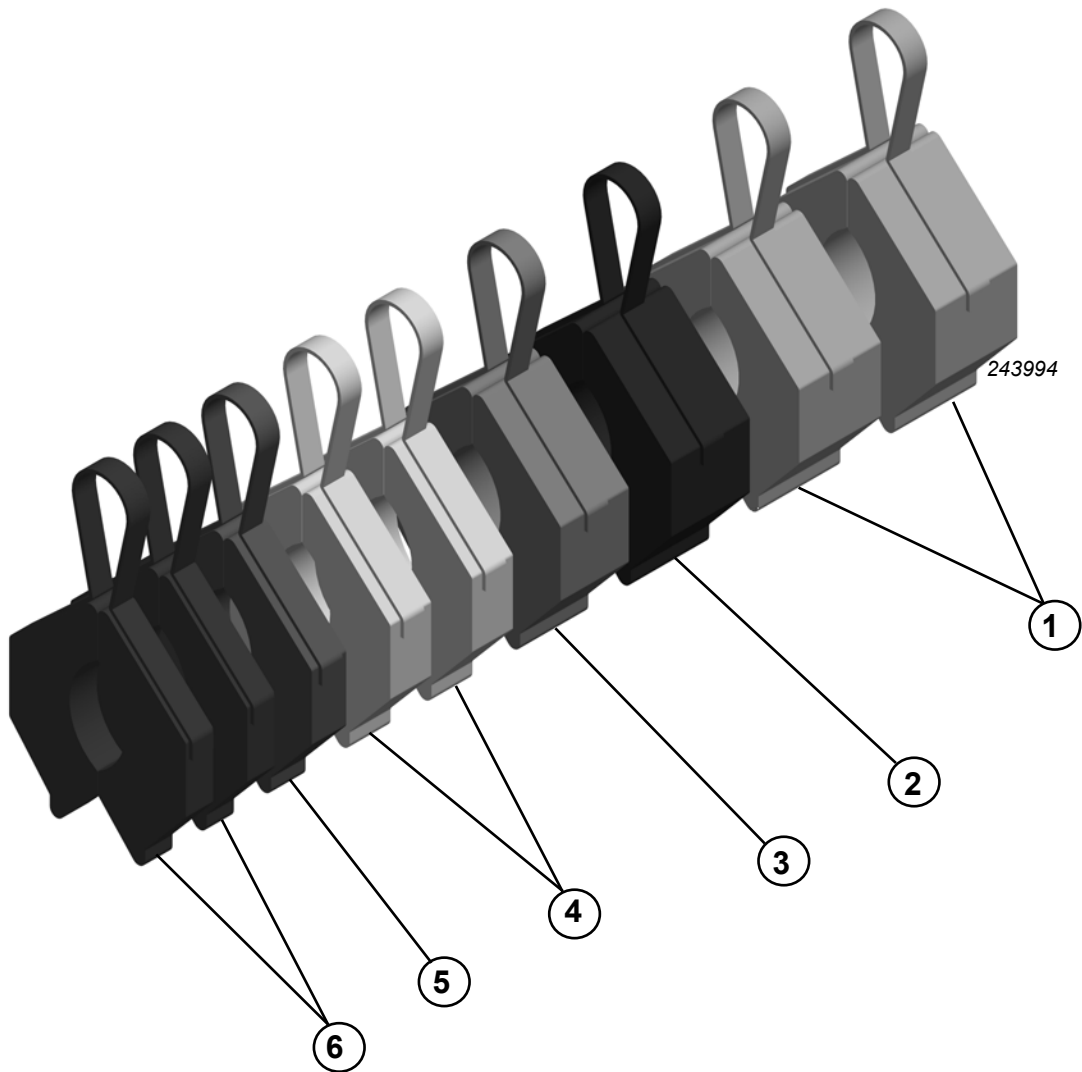


Fig. 2

701303

3.7 HYDRAULIC STOP COLLAR KIT



DESCRIPTION	PART NUMBER	QTY/KIT
Painted stop collar kit	243994 CONTAINS THE FOLLOWING ITEMS	
(1) 1-1/2IN CYLINDER STOP (GRAY)	241469	2
(2) 1-7/16 IN CYLINDER STOP (BLUE)	244586	1
(3) 1-1/4 IN CYLINDER STOP (GREEN)	244586	1
(4) 3/4IN CYLINDER STOP (YELLOW)	241647	2
(5) 5/8IN CYLINDER STOP (ORANGE)	241646	1
(6) 1/2IN CYLINDER STOP (RED)	241645	2

3.7.1 Stop collar chart

STOP COLLAR COMBINATIONS

TOTAL SPACER WIDTH	TOTAL SPACER WIDTH					TOTAL SPACER WIDTH					TOTAL SPACER WIDTH				
1	R	R				R	R	Y	Y	B	R	Y	Y	B	GY
1.12	R	O				R	R	Y	Y	GY	R	Y	Y	GY	GY
1.25	R	Y				R	O	Y	Y	B	O	Y	Y	B	GY
1.38	O	Y				R	O	Y	Y	GY	O	Y	Y	GY	GY
1.44	B					R	B	GR			R	R	GN	B	GY
1.5	Y	Y				R	GY	GY			R	R	GN	GY	GY
1.62	R	R	O			O	B	GY			R	R	O	Y	B
1.75	R	G				O	GY	GY			R	R	O	Y	GY
1.88	R	O	Y			Y	B	GY			R	R	Y	Y	GY
1.94	R	B				Y	GY	GY			R	R	Y	Y	GY
2	R	GR				R	R	O	Y	B	R	R	O	Y	B
2.06	O	B				R	R	O	Y	GY	R	O	Y	Y	GY
2.12	O	GY				R	R	B	GY		R	O	Y	Y	GY
2.18	Y	N				R	R	GY			R	Y	Y	B	GY
2.25	Y	GY				R	O	B	GY		R	R	O	GN	B
2.38	R	O	GN			R	O	GY			R	R	O	GN	GY
2.44	R	R	B			GN	N	GY			R	R	Y	GN	GY
2.5	R	R	GY			GN	GY	GY			R	R	Y	GN	GY
2.56	R	O	B			O	Y	B	GY		R	R	O	Y	B
2.62	R	O	GY			O	Y	GY			R	R	O	Y	GY
2.69	R	Y	B			Y	Y	B	GY		R	Y	Y	GN	B
2.75	R	Y	GR			Y	Y	GY			R	Y	Y	GN	GY
2.81	O	Y	B			R	O	O	B	GY	O	Y	Y	GN	B
2.88	O	Y	GY			R	R	O	GY		O	Y	Y	GN	GY
2.94	B	GY				R	R	Y	GY		Y	GN	B	GY	GY
3	GY	GY				R	R	Y	GY		O	Y	Y	B	GY
3.06	R	R	O	B		R	O	Y	Y	B	R	Y	Y	B	GY
3.12	R	R	O	GY		R	O	Y	Y	GY	R	Y	Y	B	GY

GREEN	GN	1.25
BLUE	B	1.438
GRAY	GY	1.5

RED	R	0.5
ORANGE	O	0.625
YELLOW	Y	0.75

3.7.2 Stop collar decal

The decal shown to the right is color coded and follows the chart on the previous page. This decal is located close to the serial tag area(front left hand mainframe). Each row indicates 1/16" increments. The amount of vertical movement(up and down) is a one to one ratio between the hydraulic cylinder stroke and the shanks. Example: 1.00" depth stop = 1.00" of vertical movement on the shanks(boot openers).



3.8 Leveling the machine

3.8.1 Leveling a machine with the floating hitch front to rear

Before starting the procedure

The machine must be connected to a tractor that is the correct size for operation. See the information for the minimum tow vehicle weight.

Procedure

1. Find a solid, level surface large enough for the machine when unfolded.
2. Unfold the machine and fully raise the machine. Continue holding the hydraulic lever to let the oil cycle through the lift system.
3. Hold the lift cylinder hydraulic lever in the raised position for one to five minutes to make sure all cylinders are bled of air and fully extended.
4. Stop the tractor engine, apply the park brake, and take the key with you.
5. Remove the transport locks and pins from the center frame cylinders.
6. Put the transport locks in the storage location and fasten with pins.
7. Remove the stop collars from all of the main lift cylinders.
8. Use the tractor hydraulics to lower the machine so the front shovels or the spikes are 25 to 51 mm (1 to 2 in) above the ground.
9. Measure and record the frame height at the front corners from the ground to the bottom of the frame tube.
10. Measure and record the frame height at the rear corners from the ground to the of the frame tube.
11. Compare the front and rear measurements.
12. Set front frame height to the same as the rear frame height.
 - a) If the front of the machine is higher than the rear, remove shims shown in figure 8
 - b) If the front of the machine is lower than the rear, add shims shown in figure 8
 - c) Make sure both front adjustable cylinder anchors have the same number and thickness of shims.
 - d) The gauge wheels will carry the weight of the machine.
13. Check the measurements again and adjust as necessary.
14. Tighten the nut and bolt holding shims.
15. Check the machine level in the operating position and adjusted as necessary.

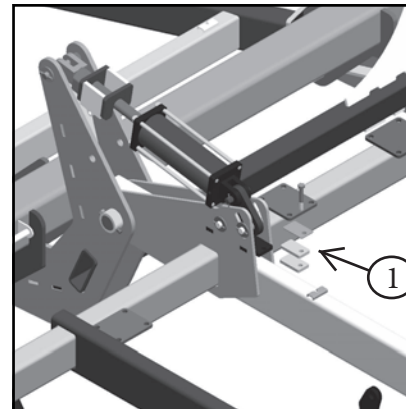


figure 8

701300

3.8.2 Leveling the wings to the center frame

Before starting the procedure

The machine must be connected to a tractor that is the correct size for operation. See the information for the minimum tow vehicle weight.

The wheels of the machine must always be in contact with the ground during field operation to operate correctly.

Procedure

1. Find a solid, level surface large enough for the machine when unfolded.
2. Unfold the machine and fully raise the machine. Continue holding the hydraulic lever to let the oil cycle through the lift system.
3. Hold the lift cylinder hydraulic lever in the raised position for one to five minutes to make sure all cylinders are bled of air and fully extended.
4. Stop the tractor engine, apply the park brake, and take the key with you.
5. Remove the transport locks.
6. Measure and record the height from the ground to the bottom of the wing frame tubes on the front and rear of the wing.
7. Compare the measurements of wing to the main frame.

If the measurement for the wing is:

- more than the main frame measurement, lower the wing
- less than the main frame measurement, raise the wing.

figure 1

8. Adjust the adjusting screw (1) to raise or lower the wing.
 - a) To raise the wing, loosen the jam nut (2) and tighten jam nut (3).
 - b) To lower the wing, loosen the jam nut (3) and tighten jam nut (2).
9. Follow the same procedure for the wing on the other side.

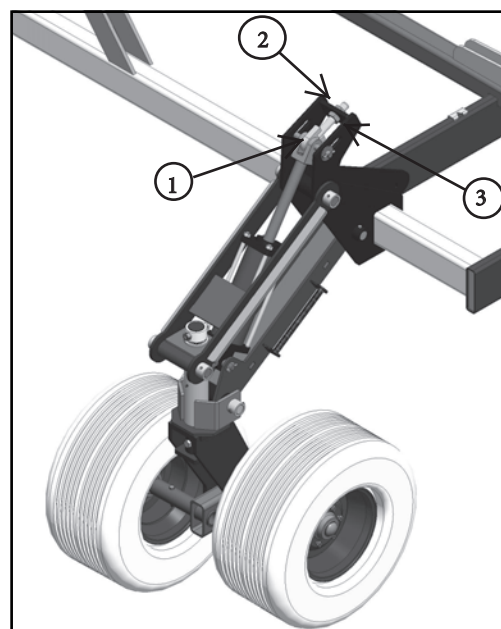


Fig. 1

FRONT

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Procedure

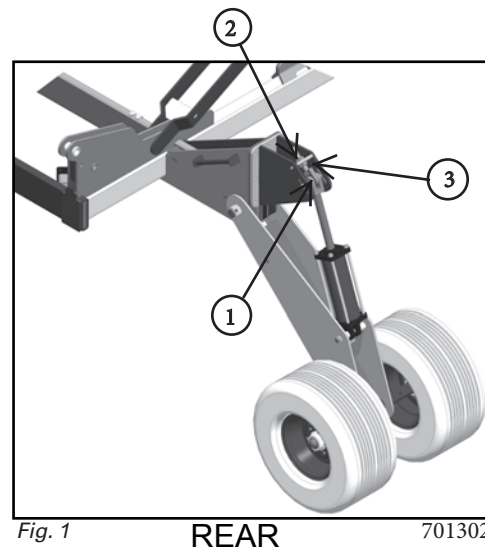
1. Find a solid, level surface large enough for the machine when unfolded.
2. Unfold the machine and fully raise the machine. Continue holding the hydraulic lever to let the oil cycle through the lift system.
3. Hold the lift cylinder hydraulic lever in the raised position for one to five minutes to make sure all cylinders are bled of air and fully extended.
4. Stop the tractor engine, apply the park brake, and take the key with you.
5. Remove the transport locks.
6. Measure and record the height from the ground to the bottom of the wing frame tubes on the front and rear of the wing.
7. Compare the measurements of wing to the main frame.

If the measurement for the wing is:

- more than the main frame measurement, lower the wing
- less than the main frame measurement, raise the wing.

figure 1

8. Adjust the adjusting screw (1) to raise or lower the wing.
 - a) To raise the wing, loosen the jam nut (2) and tighten jam nut (3).
 - b) To lower the wing, loosen the jam nut (3) and tighten jam nut (2).
9. Follow the same procedure for the wing on the other side.

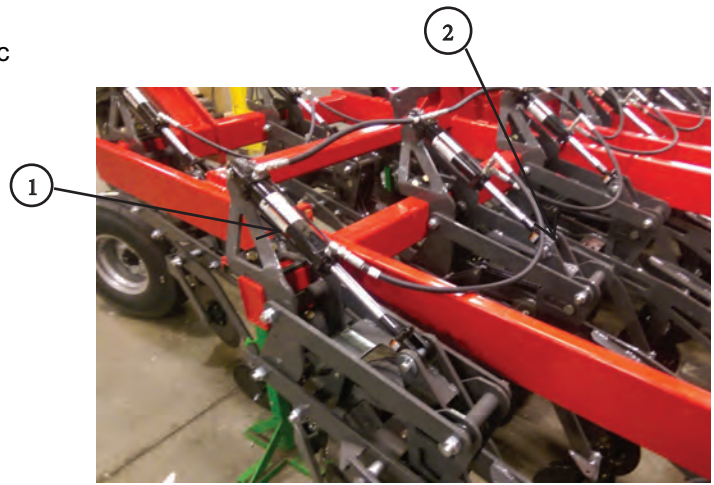


3.8.3 Row unit down pressure

A hydraulic cylinder (1) applies row unit down pressure on each row unit (2). The cylinders apply a constant down pressure through the full range of movement of the row unit. An active hydraulic circuit maintains uniform pressure to each hydraulic cylinder.

Use the row unit down pressure control box to set the row unit down pressure. The row unit down pressure can be adjusted from 1034 to 17237 kPa (150 to 2500 psi). Set the row unit down pressure high enough for correct cutting coulter and shank opener penetration and correct soil compaction. The row unit down pressure adjustment will change with field conditions, seed depth, soil type, and ground speed.

Operate the tractor hydraulic remote that the row unit down pressure is connected to at full output or fully open. Operating the hydraulic remote at full output reduces the back pressure on the row unit down pressure return lines.



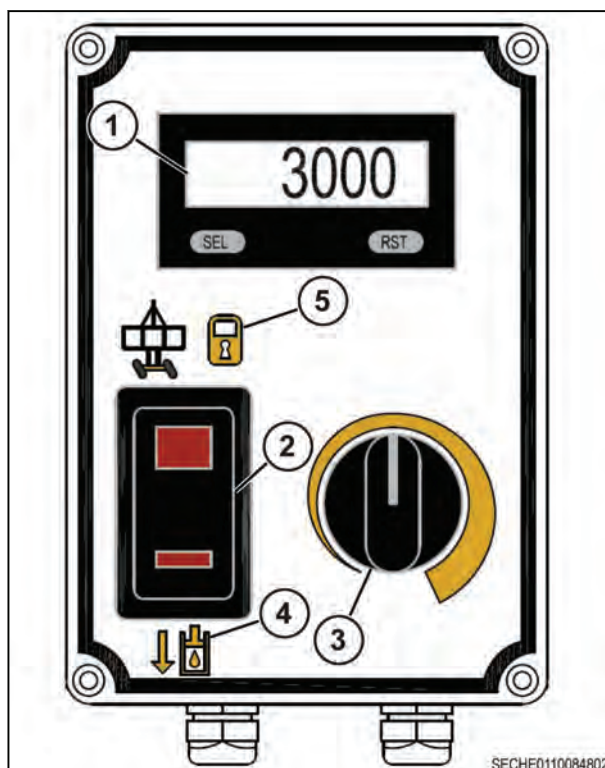
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3.8.3 DOWN PRESSURE CONTROL BOX Use the down pressure control box

to adjust the down pressure on each of the row units.

Find the following components on the down pressure control box.

- **LCD read out (1)** The LCD readout displays the row unit down pressure in pounds per square inch (psi) system hydraulic pressure.
- **Mode switch (2)** The mode switch is a three position switch. The mode switch is used as a power switch and to switch between setting down pressure on (4) and off (2 & 5).
- **Adjustment knob (3)** The adjustment knob is used to set the row unit down pressure.



3.8.3 Setting the row unit down pressure

The row unit down pressure is set in the field. Before the row unit down pressure can be set, transport the drill to the field and prepare the drill to plant.

Check the row unit down pressure before seeding with the drill.

1. Operate the drill in the field.
2. Stop the tractor. Stop the engine, apply the tractor parking brake, and take the ignition key with you.
3. At the rear of the drill, inspect the tracks made by the packing tires.
 - If the track is very light or not present, increase the row unit down pressure.
 - If the track is too deep and the soil is too compacted, decrease the row unit down pressure.

Adjust the down pressure in the operator cab with the row unit down pressure control box.

4. Operate the drill in the field and check the results of the adjustment. Continue to adjust the row unit down pressure until the packing tire compacts the soil correctly.

3.8.4 Hydraulic lock-out valves

The hydraulic lock-out valve is on the front of the frame, on the left-hand side of the front hitch.

The row unit lock-out valve (1) is installed on all drills. The row unit lock-out valve is used to hydraulically lock the toolbars in the transport or raised position.



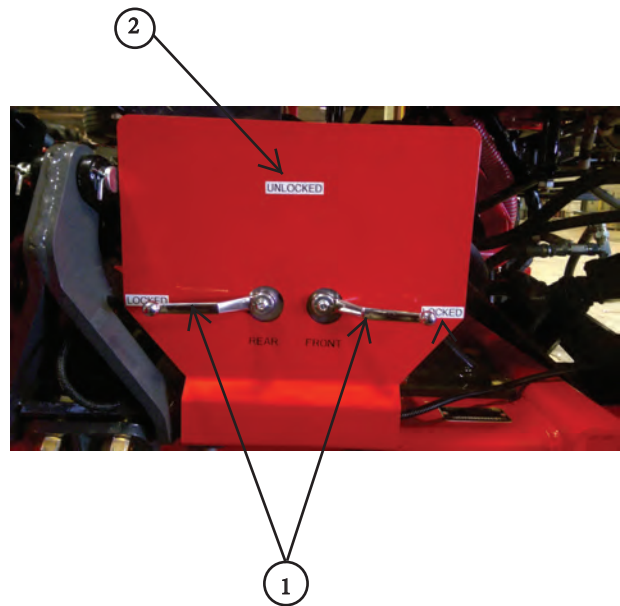
WARNING:

The row units can drop to the ground when the toolbar lock-out valve is opened. Make sure the area below the row units is clear of people and obstructions before opening the row unit lock-out valve.

Move the valve handle so the handle is vertical to the frame to put the lock-out valve in the open position (2). In the open position hydraulic pressure can flow through the valve.

Move the valve handle down to put the lock-out valve in the closed position (1). In the closed position the hydraulic pressure will not flow through the valve.

IMPORTANT: *Open the valve when seeding and close the valve when transporting the drill.*



3.9 Beginning field operation

Procedure

1. Operate machine to run straight back and forth.
2. Raise the unit completely when making turns.
NOTE: *Failure to raise the unit when turning will cause increased side loads on the row units.*
3. Monitor the ground seeded by the machine and make sure the machine is operating level.
4. Adjust the machine to acquire the proper seed depth.

3.9.1 Items to check after first operation

- Check all nuts and bolts, tighten if necessary.
- Check the lug nuts, tighten if necessary.
- Make sure the nuts on the hubs and spindles have the correct torque.
- Make sure all grease fittings are lubricated.
- Make sure the tire pressure is correct.

Row Unit Operation

3.9.2 MAIN ROW UNIT PARTS

- (1) 2X8 hydraulic cylinder - down pressure
- (2) Upper parallel arm
- (3) Lower parallel arm
- (4) Rear packer tire
- (5) Rear packer mount
- (6) Coulter
- (7) Spring - coulter pressure
- (8) Shank
- (9) Boot
- (10) Shank pivot arm

figure 1

The Precision Shank Drill row unit follows the contour of the ground with the parallel arm linkage system. Once the frame height is set the rear packer tire(4) controls the depth of the seed boot. The hydraulic cylinder puts constant down pressure on the packer tire and allows the shank to pivot to the rear in the event of an obstruction.

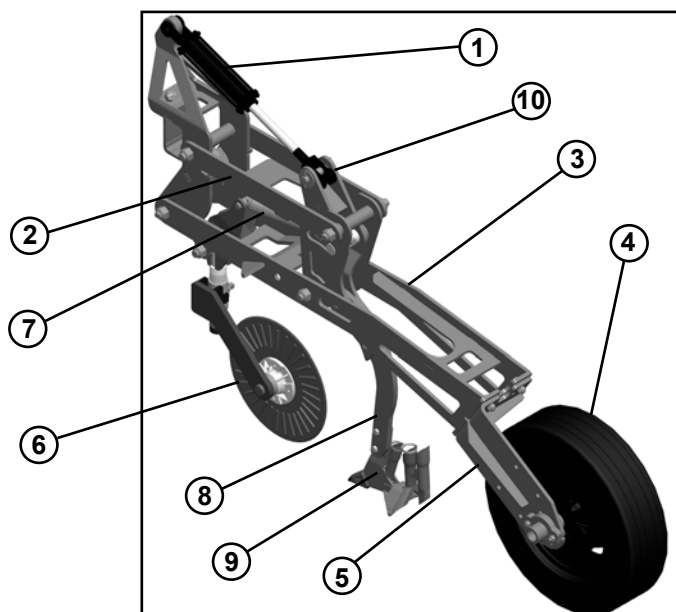


figure 1

701374

3.9.3 Adjusting coulter pressure

figure 2

The coulter(1) cuts material and allows it to flow around the shank(2) and boot(3) assembly. The spring assembly(4) applies constant down pressure to the coulter blade.

Before making any adjustments to the machine:

- 1) Make sure the area below and around the machine is clear of persons and obstructions.
- 2) Use the tractor hydraulics to lift the frame of the machine to the highest position.
- 3) Stop the tractor engine, apply the brake, and take the key with you.
- 4) Make sure the transport locks are in the correct position to hold the frame in its highest position.

figure 2

The spring pressure can be adjusted by removing the 1/2" x 7-1/2" bolt(5) and placing bushings(6) either in front or to the rear of the inner sleeve(7). Replace item (5) to hold the bushings(6) in place.

figure 2

The coulter depth can be adjusted by:

- 1) Removing the 3/8"x2-1/2" hex bolt(8)
- 2) Loosen 5/8" jam nut(9)
- 3) Support coulter arm & blade from falling
- 4) Loosen 5/8"x1-1/2" set screw(10)
- 5) Arrange spacers(11) on top & bottom of coulter arm to set the coulter to the proper height
- 6) Install bushing with thru hole(12) last on the bottom
- 7) Insert 3/8"x2-1/2" hex bolt(8) and tighten nut
- 8) Tighten 5/8"x1-1/2" set screw(10) and jam nut

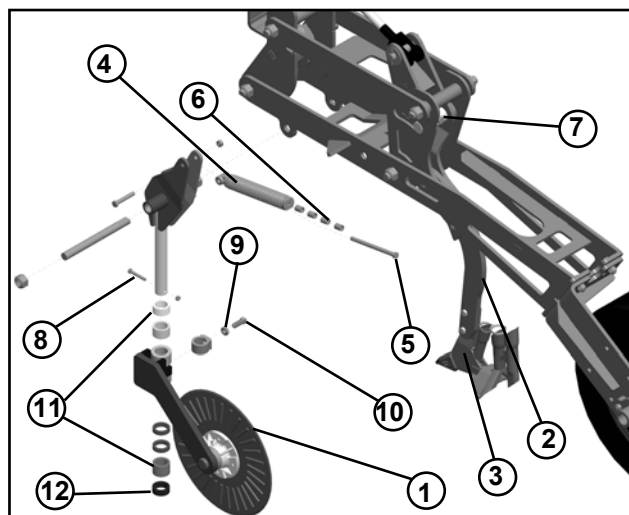


figure 2

701374 COULTER

3.9.4 Adjusting closing coulters

figure 3

The closing coulter(1) takes material (blow out) from the boot and moves it back over the seed for the packer tire to firm up.

The angle of the closing disc can be adjusted by loosening the 1/2" x 1-1/2" hex bolts(2) and rotating the closing discs on each pivot bolt to obtain the desired angle. Tighten 1/2"x1-1/2" hex bolts(2) when finished.

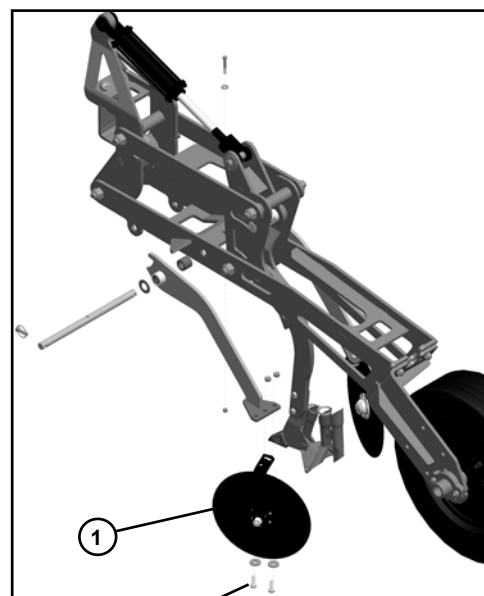


figure 3

701376

Row Unit Operation

3. Operation

3.9.5 ADJUSTING THE PACKER MOUNT

figure 1

The rear packer mount(1) can be set in one of three positions to either increase or decrease seeding depth. The factory setting is in the middle position (shown) in figure 1. The upper and lower settings are 3/4" above and below the factory setting(middle) shown with the mounting bolts.

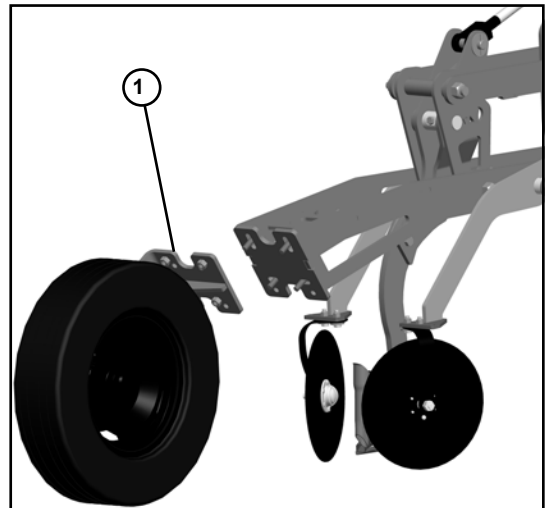


figure 1

701376packermount

3.9.6 SETTING THE PACKER TIRE POSITION

Position 1 shown in figure 2

In this position the packer tire will run completely straight when no scrubbing is required(dry conditions). In this position the spacer plate(1) is placed with the narrow end facing the rear. The spindle tube assembly(2) is placed so the 2.5 degree angles cancel each other so angle ends up at zero degrees(tire runs straight).

Position 2 shown in figure 3

In this position the tire angle is set at 2.5 degrees. This position setting does not require the spacer plate(1) to be used and is placed on the opposite side of the packer mount plate(3). The spindle tube assembly(2) is bolted to the outside surface of the packer mount plate(3).

Position 3 shown in figure 4

In this position the spacer plate(1) is placed with the wide end facing the rear. The spindle tube assembly(2) is placed so the 2.5 degree angles work together to place the tire at 5 degrees.

THE FRONT OF THE TIRE SHOULD ALWAYS BE FACING AWAY FROM THE PACKER TIRE MOUNTING PLATE WHETHER IT IS A RIGHT HAND OR LEFT HAND ASSEMBLY.

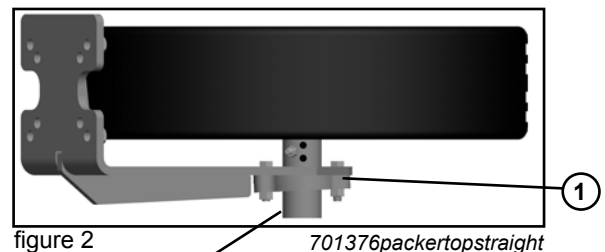
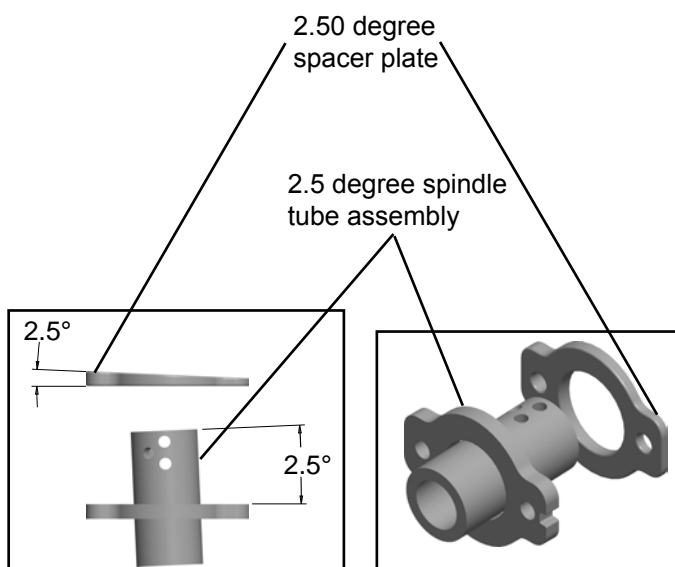


figure 2

701376packertopstraight

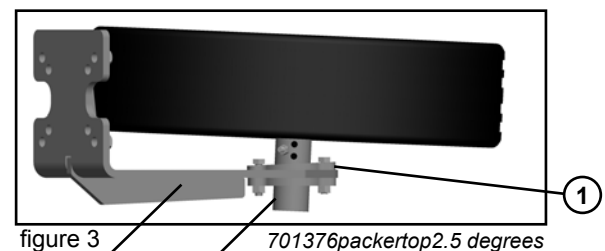


figure 3

701376packertop2.5 degrees

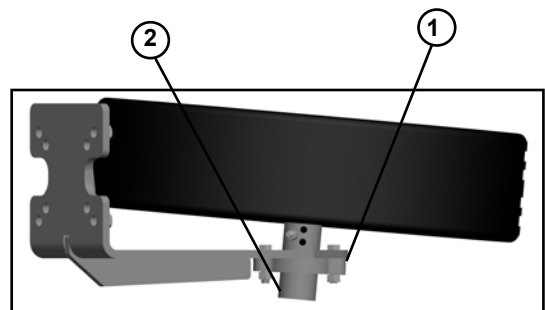
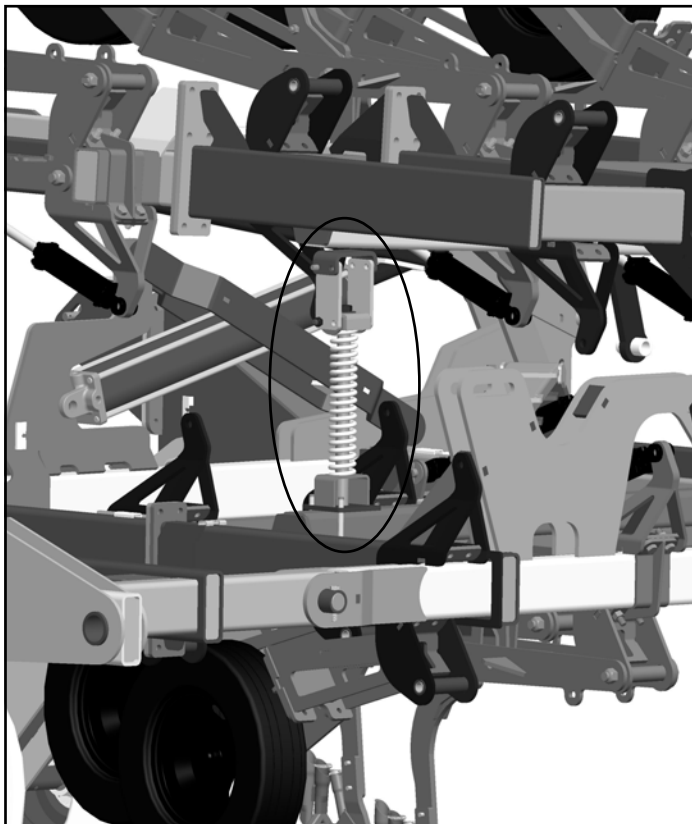


figure 4

701376packertop5degrees

3. Operation **3.9.7 PSD 61FT OUTER WING REST**



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The spring loaded wing rest puts an upward force on the outer wing to assist with the unfolding process. This wing rest will compress down 5.50" before reaching its retracted length. Make sure hydraulic hoses and product distribution hoses are clear of the wing rest for proper operation.

3.9.8 OUTER WING LATCH SYSTEM

3. Operation

- (1) Latch
- (2) Latch pin
- (3) Spring
- (4) Latch stop

Figure 1 shows the latch system with the outer wing unfolded. Make sure items 1 thru 4 are bolted tightly and secured before folding and unfolding the outer wing. The purpose of the latch system is to make sure the outer wing folds and unfolds smoothly without any abrupt changes in the folding speed during the fold process.



figure 1

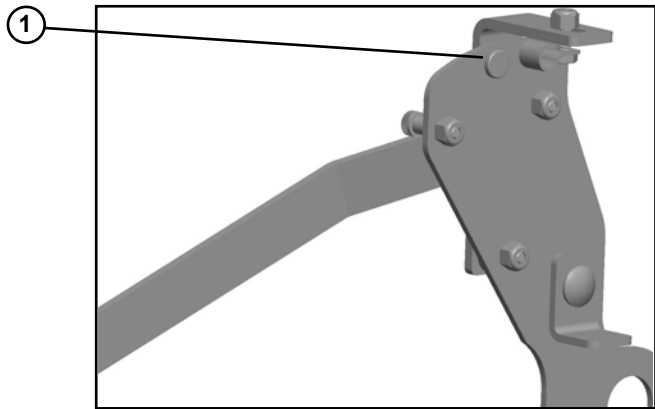
Figure 2 shows the outer wing and latch system in the folded position.



figure 2

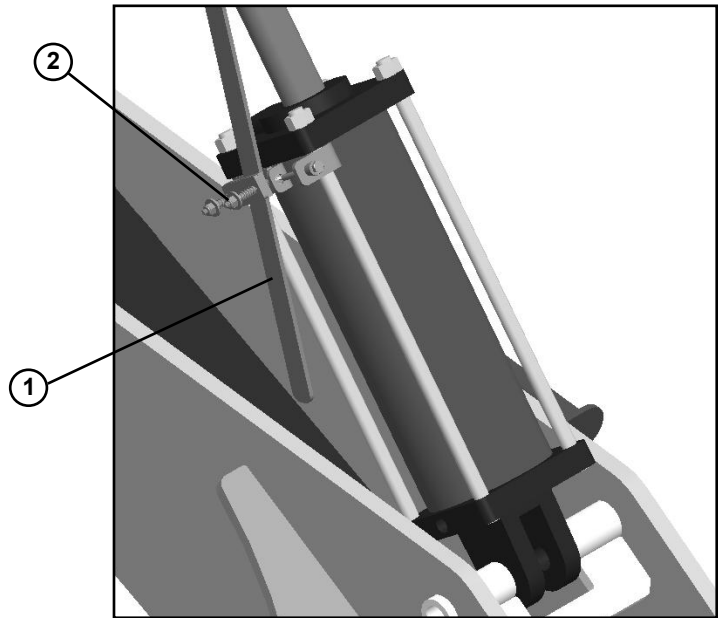
3.9.9 LIFT SWITCH SYSTEM

1. Apply the magnet (1) as shown, centered under the work switch sensor c-clip (2). Install the sensor (not shown) into c-clip (2) at a distance of 1/8" (3mm) from the surface of the magnet.



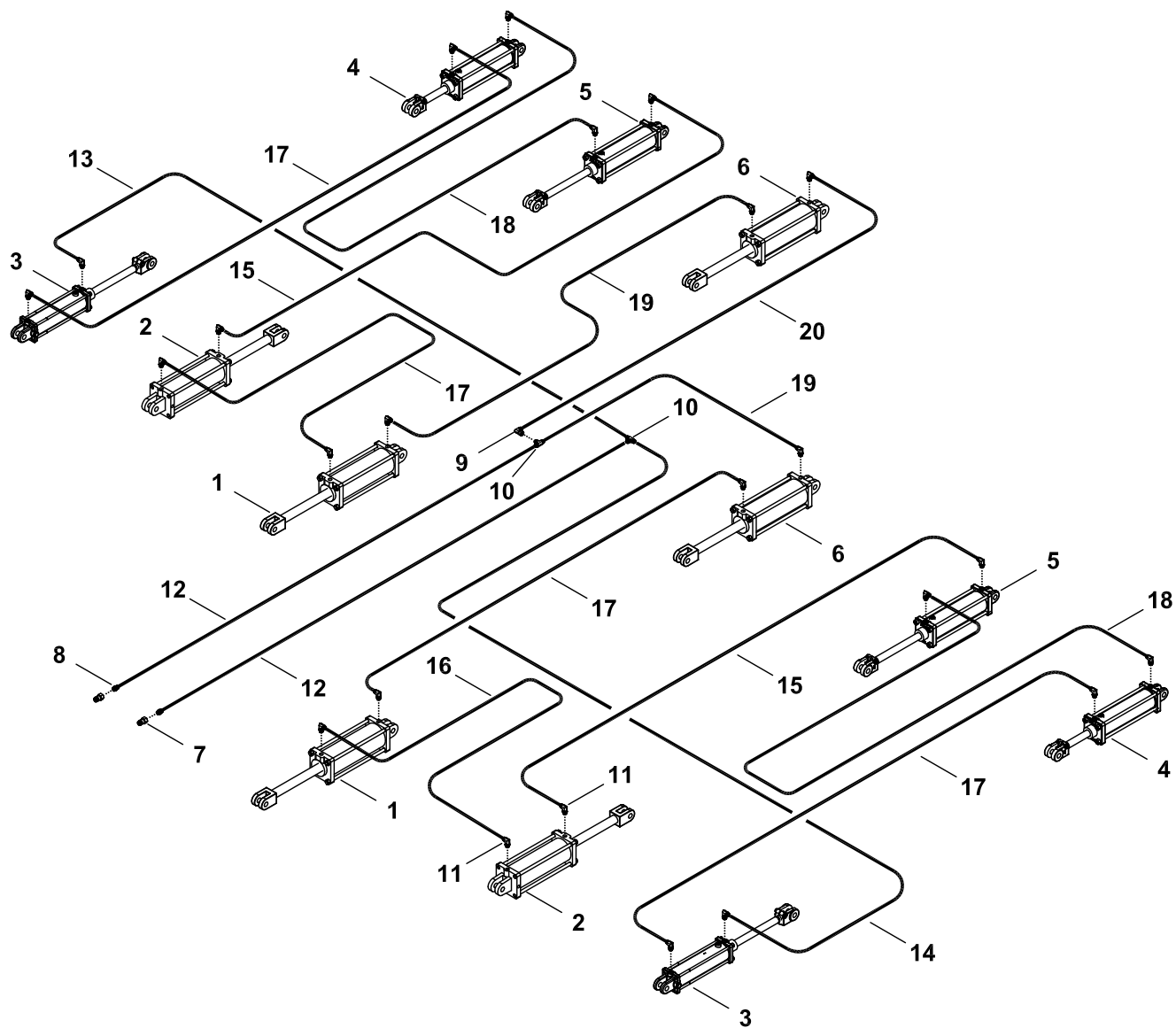
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2. Adjust tension on the rod (1) by adjusting tension on the nuts. (2)



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3.9.9.1 51 & 61FT LIFT HYDRAULICS

3. Operation

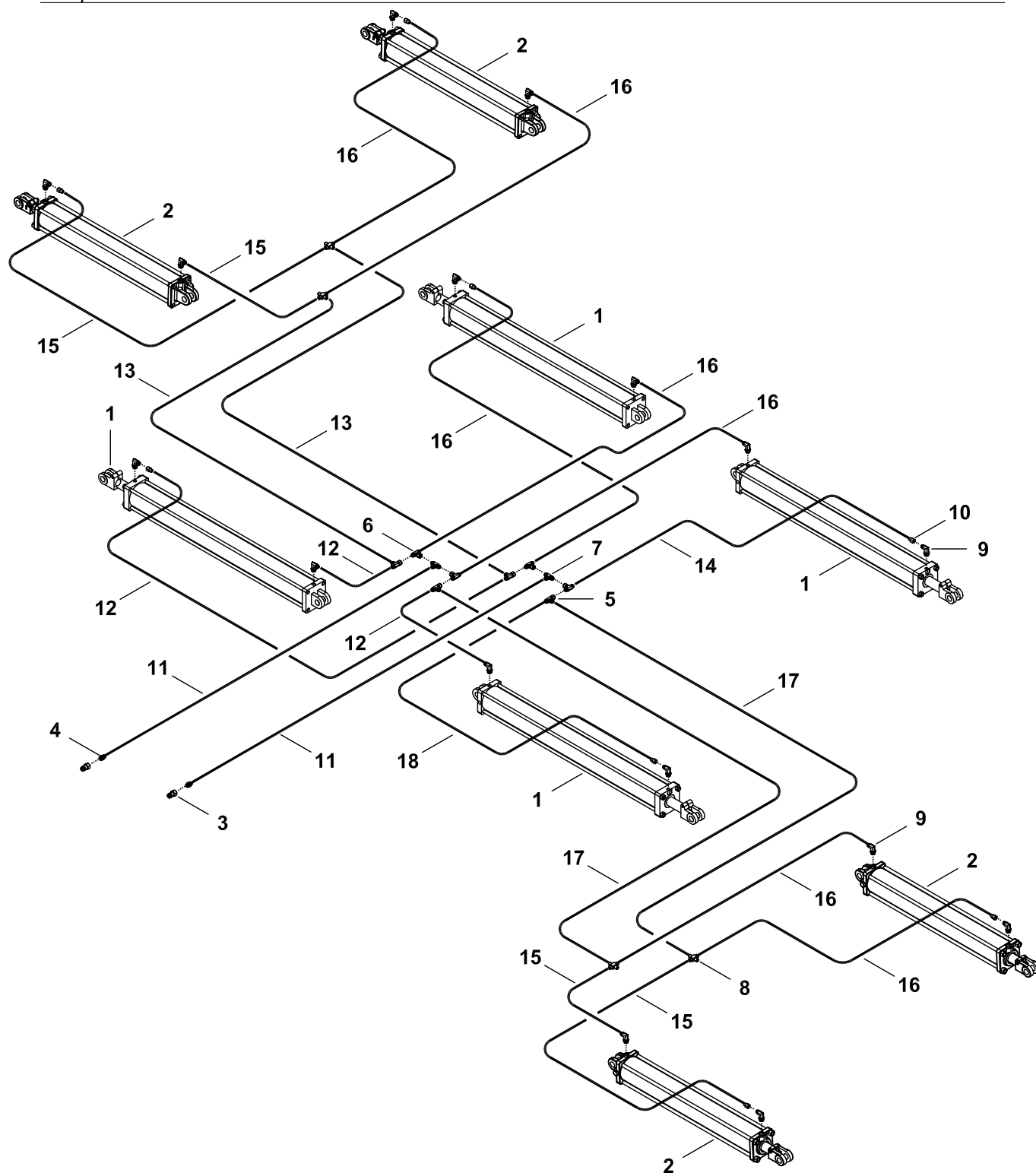
LIFT CYLINDER HYDRAULICS - 51'

ITEM	PART NO.	QTY	DESCRIPTION
1	235968	2	HYD CYL 4-3/4 X 12 (AM-2540)
2	235969	4	HYD CYL 4-1/2 X 12 (AM-2546)
3	358312	2	3-1/2 X 12 HYD CYLINDER ASSEMBLY
4	358313	2	3-3/4 X 12 HYD CYLINDER ASSEMBLY
5	358314	4	4 X 12 HYD CYLINDER ASSEMBLY
6	235967	2	HYD CYL 5 X 12 (AM-2534)
7	247425	2	QUICK COUPLER 8 ORB
8	24024	2	ADP 8MORB X 8MJ
9	25591	1	ELB 8MJ X 8FJX
10	13238	2	TEE 8MJ X 8MJ X 8MJ
11	25580	24	ELB 8MORB X 8MJ
12	241494	2	HSE 3KPSI 1/2X276 8FJX-8FJX
13	240609	1	HSE 3KPSI 3/8X324 8FJX-8FJX
14	247432	1	HSE 3KPSI 3/8X400 8FJX-8FJX
15	247431	2	HSE 3KPSI 3/8X232 8FJX-8FJX
16	67576	2	HSE 3KPSI 3/8X276 8FJX-8FJX
17	240604	3	HSE 3KPSI 3/8X300 8FJX-8FJX
18	247432	2	HSE 3KPSI 3/8X400 8FJX-8FJX
19	234947	2	HSE 3KPSI 3/8X194 8FJX-8FJX
20	235386	1	HSE 3KPSI 3/8X137 8FJX-8FJX

LIFT CYLINDER HYDRAULICS - 61'

ITEM	PART NO.	QTY	DESCRIPTION
1	235968	2	HYD CYL 4-3/4 X 12 (AM-2540)
2	235969	2	HYD CYL 4-1/2 X 12 (AM-2546)
3	358312	2	3-1/2 X 12 HYD CYLINDER ASSEMBLY
4	358313	2	3-3/4 X 12 HYD CYLINDER ASSEMBLY
5	358314	2	4 X 12 HYD CYLINDER ASSEMBLY
6	235967	2	HYD CYL 5 X 12 (AM-2534)
7	247425	2	QUICK COUPLER 8 ORB
8	24024	2	ADP 8MORB X 8MJ
9	25591	1	ELB 8MJ X 8FJX
10	13238	2	TEE 8MJ X 8MJ X 8MJ
11	25580	24	ELB 8MORB X 8MJ
12	241494	2	HSE 3KPSI 1/2X276 8FJX-8FJX
13	240611	1	HSE 3KPSI 3/8X360 8FJX-8FJX
14	247427	1	HSE 3KPSI 3/8X440 8FJX-8FJX
15	247431	2	HSE 3KPSI 3/8X232 8FJX-8FJX
16	67576	2	HSE 3KPSI 3/8X276 8FJX-8FJX
17	240604	3	HSE 3KPSI 3/8X300 8FJX-8FJX
18	238618	2	HSE 3KPSI 3/8X420 8FJX-8FJX
19	234947	2	HSE 3KPSI 3/8X194 8FJX-8FJX
20	235386	1	HSE 3KPSI 3/8X137 8FJX-8FJX

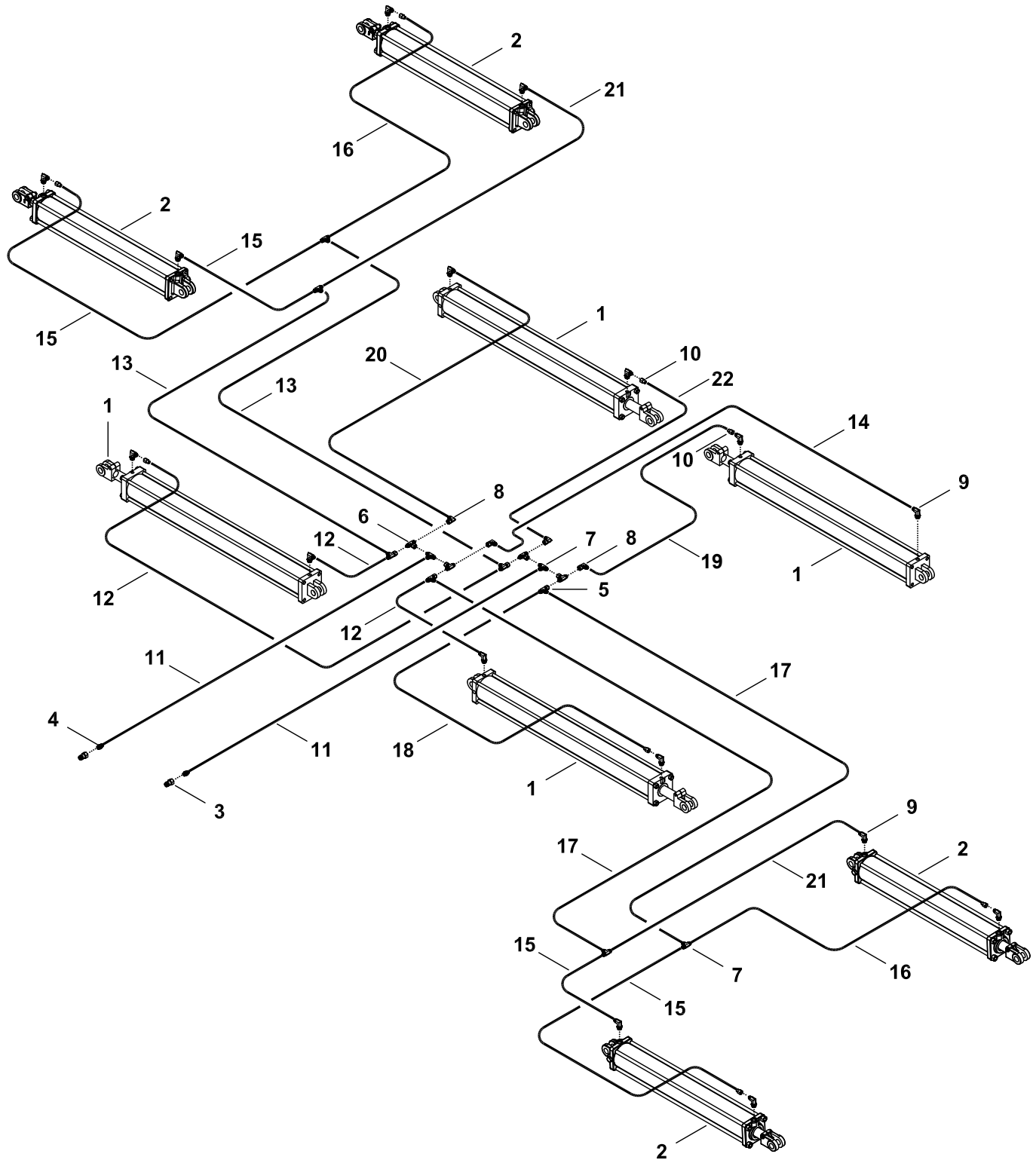
3. Operation 3.9.9.2 51FT WING FOLD HYDRAULICS



3.9.9.2 51FT WING FOLD HYDRAULICS

3. Operation

ITEM	PART NO.	QTY	DESCRIPTION
1	357897	4	HYD CYL, 5 X 48 (PRINCE B500480ACDDA07B)
2	247829	4	HYD CYL, 5X36 TIE ROD (PRINCE)
3	247425	2	QUICK COUPLER 8 ORB
4	24024	10	ADP 8MORB X 8MJ
5	A63015	4	TEE 8MJ X 8FJX X 8MJ
6	69080	4	TEE 8MJ X 8MJ X 8FJX
7	13238	2	TEE 8MJ X 8MJ X 8MJ
8	15910	4	CROSS 8MJ X 8MJ X 8MJ X 8MJ
9	A65901	16	ELB10MB-8MJ-90 (354405)
10	358980	8	RSTR ADP 8FJ-8MJ .075
11	241494	2	HSE 3KPSI 1/2X276 8FJX-8FJX
12	25603	3	HSE 3KPSI 3/8X75 8FJX-8FJX
13	235386	2	HSE 3KPSI 3/8X137 8FJX-8FJX
14	59909	1	HSE 3KPSI 3/8X168 8FJX-8FJX
15	25597	4	HSE 3KPSI 3/8X40 8FJX-8FJX
16	13482	7	HSE 3KPSI 3/8X108 8FJX-8FJX
17	238204	2	HSE 3KPSI 3/8X210 8FJX-8FJX
18	67634	1	HSE 3KPSI 3/8X132 8FJX-8FJX

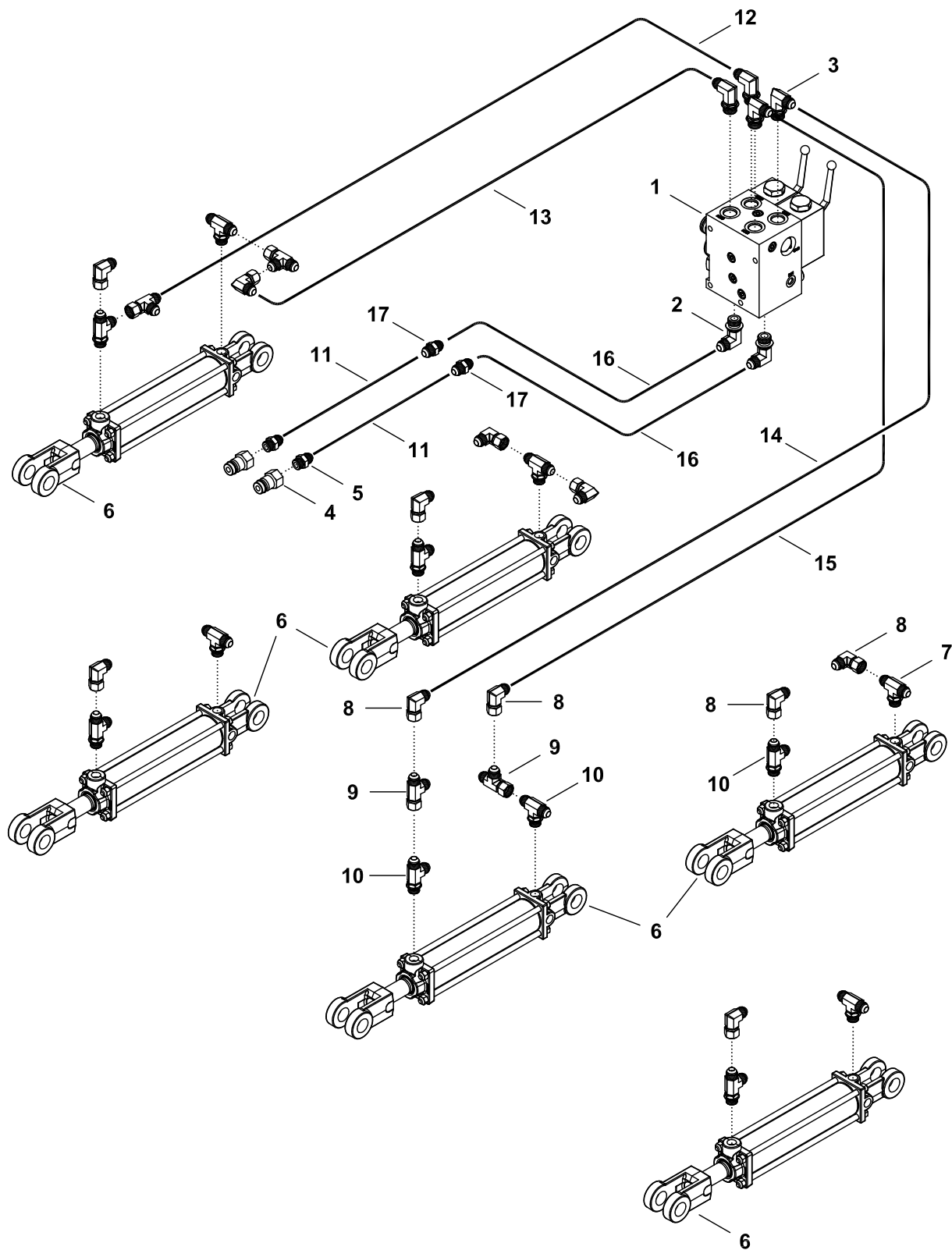


3.9.9.3 61FT WING FOLD HYDRAULICS

3. Operation

ITEM	PART NO.	QTY	DESCRIPTION
1	357897	4	HYD CYL, 5 X 48 (PRINCE B500480ACDDA0HYD
2	247829	4	CYL, 5X36 TIE ROD (PRINCE)
3	247425	2	QUICK COUPLER 8 ORB
4	24024	2	ADP 8MORB X 8MJ
5	A63015	4	TEE 8MJ X 8FJX X 8MJ
6	69080	4	TEE 8MJ X 8MJ X 8FJX
7	13238	6	TEE 8MJ X 8MJ X 8MJ
8	25591	4	ELB 8MJ X 8MJX
9	A65901	16	ELB10MB-8MJ-90 (354405)
10	358980	8	RSTR ADP 8FJ-8MJ .075
11	241494	2	HSE 3KPSI 1/2X276 8FJX-8FJX
12	25603	3	HSE 3KPSI 3/8X75 8FJX-8FJX
13	13484	2	HSE 3KPSI 3/8X156 8FJX-8FJX
14	240611	1	HSE 3KPSI 3/8X360 8FJX-8FJX
15	25597	4	HSE 3KPSI 3/8X40 8FJX-8FJX
16	13482	2	HSE 3KPSI 3/8X108 8FJX-8FJX
17	234939	2	HSE 3KPSI 3/8X220 8FJX-8FJX
18	67634	1	HSE 3KPSI 3/8X132 8FJX-8FJX
19	247432	1	HSE 3KPSI 3/8X400 8FJX-8FJX
20	240604	1	HSE 3KPSI 3/8X300 8FJX-8FJX
21	13483	1	HSE 3KPSI 3/8X120 8FJX-8FJX
22	240609	1	HSE 3KPSI 3/8X324 8FJX-8FJX

3. Operation **3.9.9.4 DOWN PRESSURE HYDRAULICS DP BLOCK**

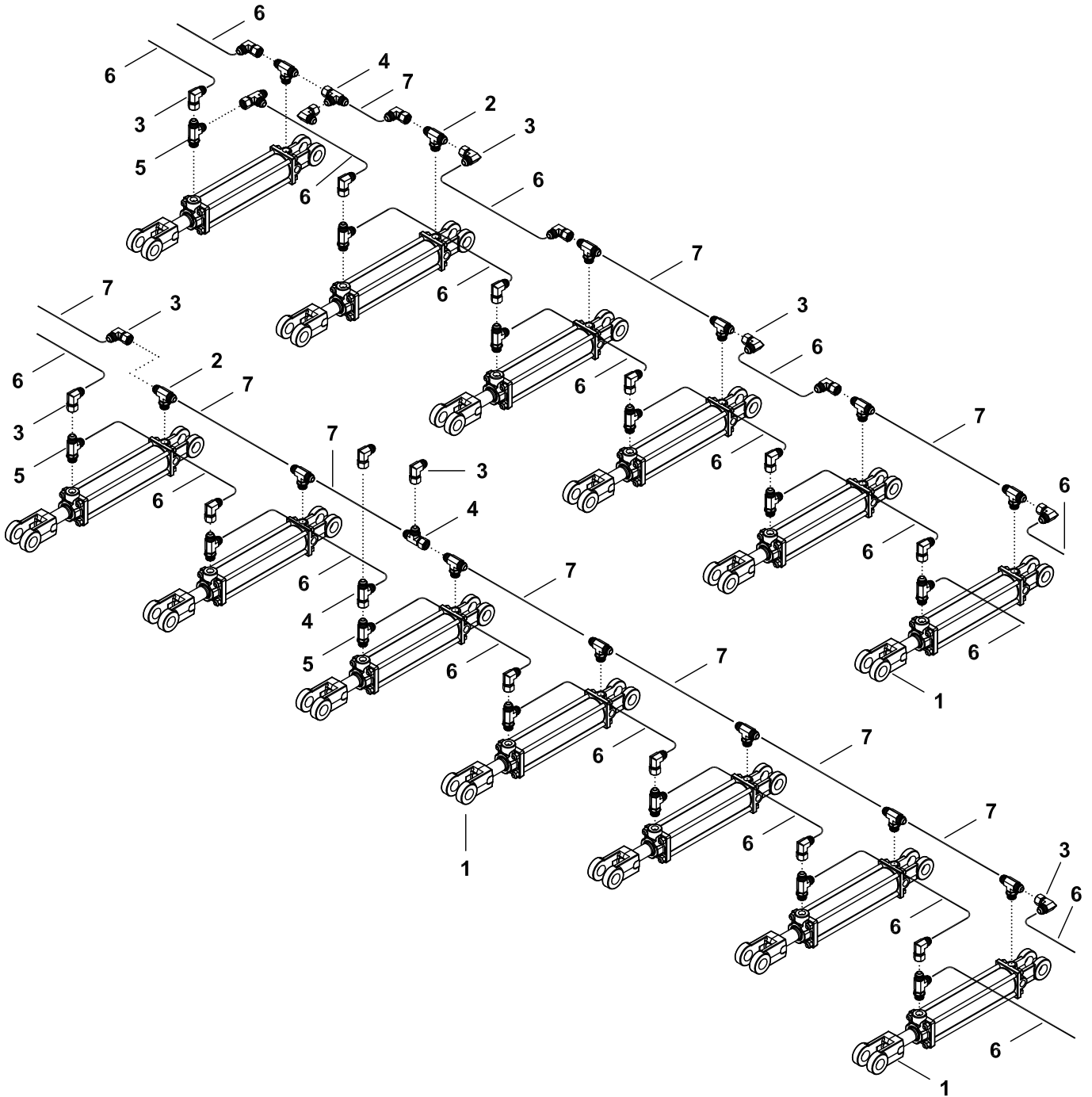


3.9.9.4 DOWN PRESSURE HYDRAULICS DP BLOCK

3. Operation

ITEM	PART NO.	QTY	DESCRIPTION
1	358905	1	DOWN PRESSURE REGEN VLAVE PS-00505-VVA-01
2	A65901	2	ELB10MB-8MJ-90 (354405)
3	25580	8	ELB 8MORB X 8MJ
4	247425	2	QUICK COUPLER 8 ORB
5	24024	2	ADP 8MORB X 8MJ
6	321936	6	HYD CYL 2 X 8
7	56534	6	TEE 8MJ X 8MJ X 8MORB
8	25591	12	ELB 8MJ X 8FJX
9	A63015	1	TEE 8MJ X 8FJX X 8MJ
10	A63016	6	TEE 8MORB X 8MJ X 8MJ
11	235237	2	HSE 3KPSI 1/2X132 8FJX-8FJX
12	A36314	1	HSE 3KPSI 1/2X23 8FJX-8FJX
13	A36314	1	HSE 3KPSI 1/2X23 8FJX-8FJX
14	233250	1	HSE 3KPSI 1/2X80 8FJX-8FJX
15	233250	1	HSE 3KPSI 1/2X80 8FJX-8FJX
16	241494	2	HSE 3KPSI 1/2X276 8FJX-8FJX
17	13239	2	UNION 8MJ X 8MJ

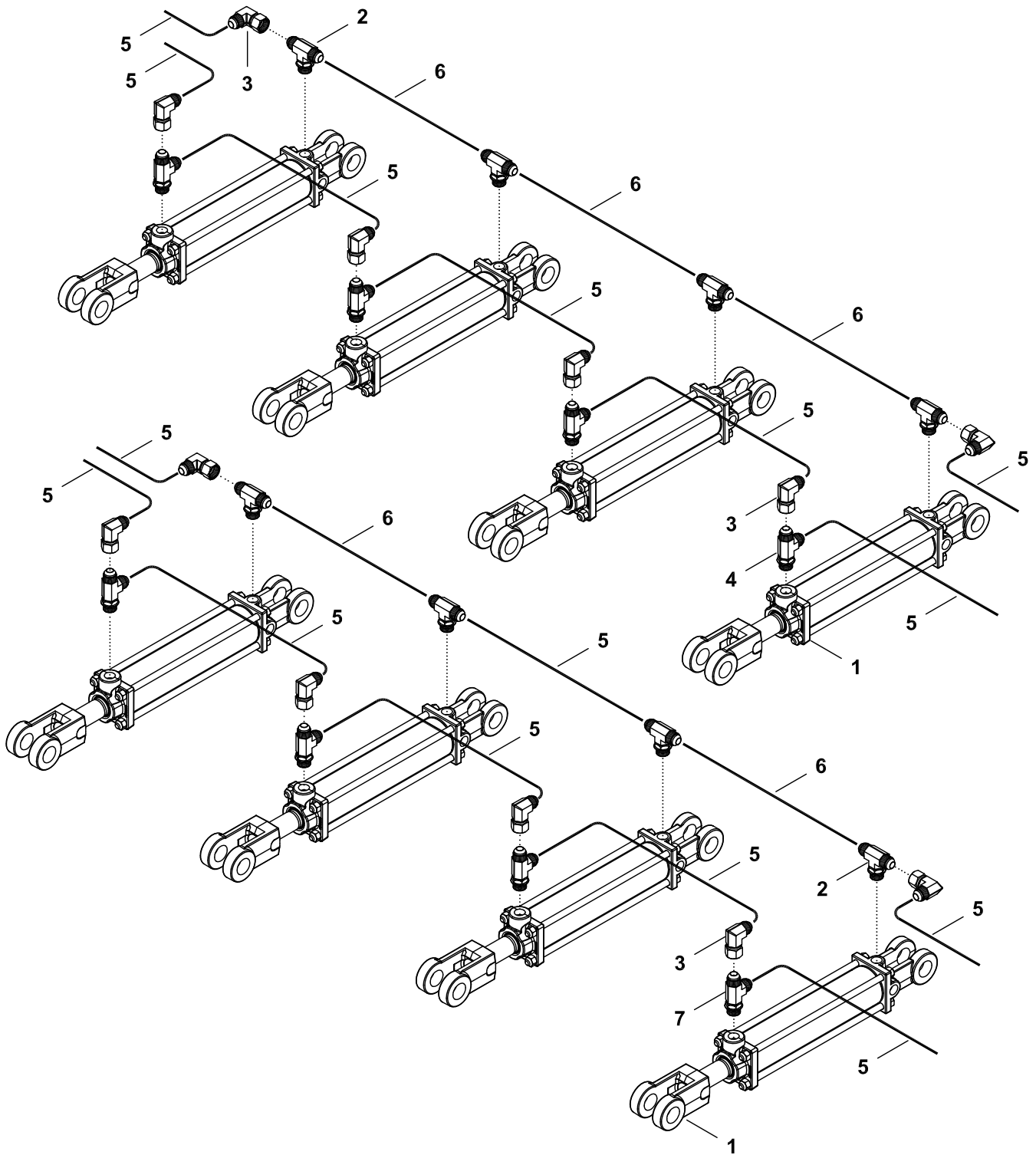
3. Operation 3.9.9.5 DOWN PRESSURE HYDRAULICS CENTER FRAME



ITEM	PART NO.	QTY	DESCRIPTION
1	321936	13	HYD CYL 2 X 8
2	56534	13	TEE 8MJ X 8MJ X 8MORB
3	25591	23	ELB 8MJ X 8FJX
4	A63015	4	TEE 8MJ X 8FJX X 8MJ
5	A63016	13	TEE 8MORB X 8MJ X 8MJ
6	A66606	21	HOSE: .50 X 046 8FJX-8FJX
7	A66607	9	HOSE: .50 X 029 8FJX-8FJX

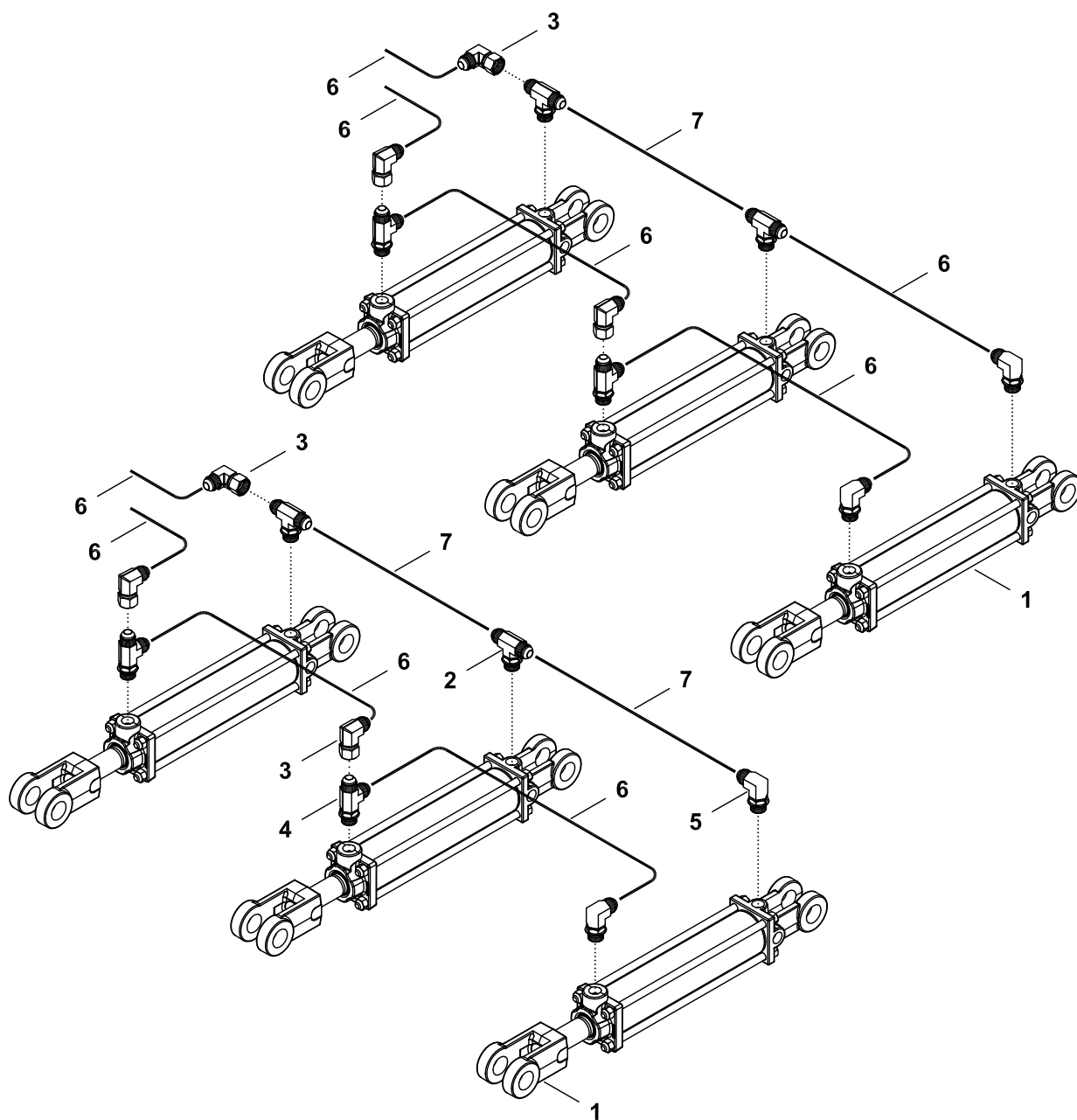
3.9.9.6 DOWN PRESSURE HYDRAULICS INNER WING

3. Operation



ITEM	PART NO.	QTY	DESCRIPTION
1	321936	8	HYD CYL 2 X 8
2	56534	8	TEE 8MJ X 8MJ X 8MORB
3	25591	12	ELB 8MJ X 8FJX
4	A63016	4	TEE 8MORB X 8MJ X 8MJ
5	A66606	15	HOSE: .50 X 046 8FJX-8FJX
6	A66607	5	HOSE: .50 X 029 8FJX-8FJX
7	A63015	4	TEE 8MJ X 8FJX X 8MJ

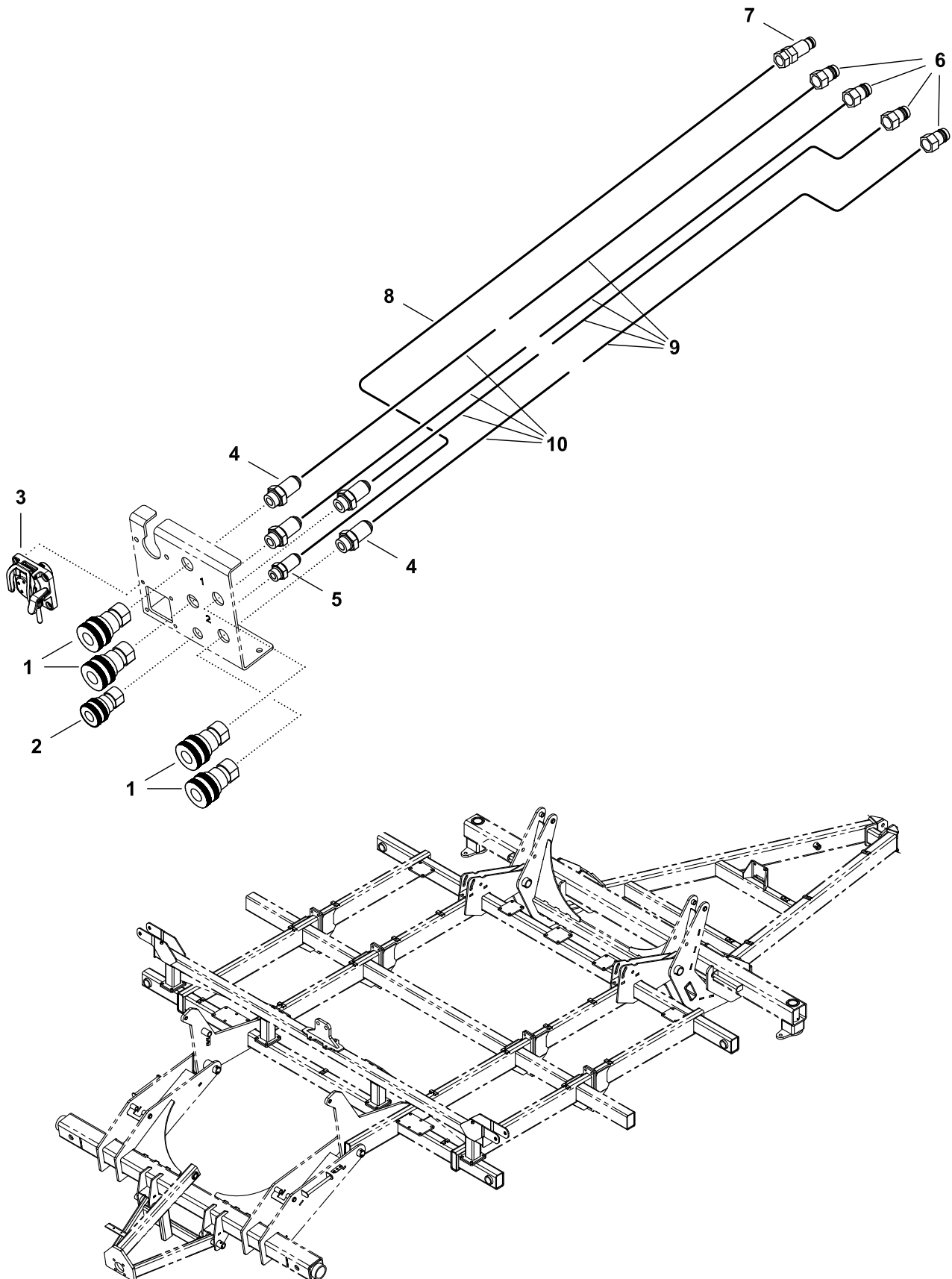
3. Operation 3.9.9.7 DOWN PRESSURE HYDRAULICS OUTER WING



ITEM	PART NO.	QTY	DESCRIPTION
1	321936	6	HYD CYL 2 X 8
2	56534	4	TEE 8MJ X 8MJ X 8MORB
3	25591	5	ELB 8MJ X 8FJX
4	A63016	4	TEE 8MORB X 8MJ X 8MJ
5	25580	4	ELB 8MORB X 8MJ
6	A66606	8	HOSE: .50 X 046 8FJX-8FJX
7	A66607	3	HOSE: .50 X 029 8FJX-8FJX

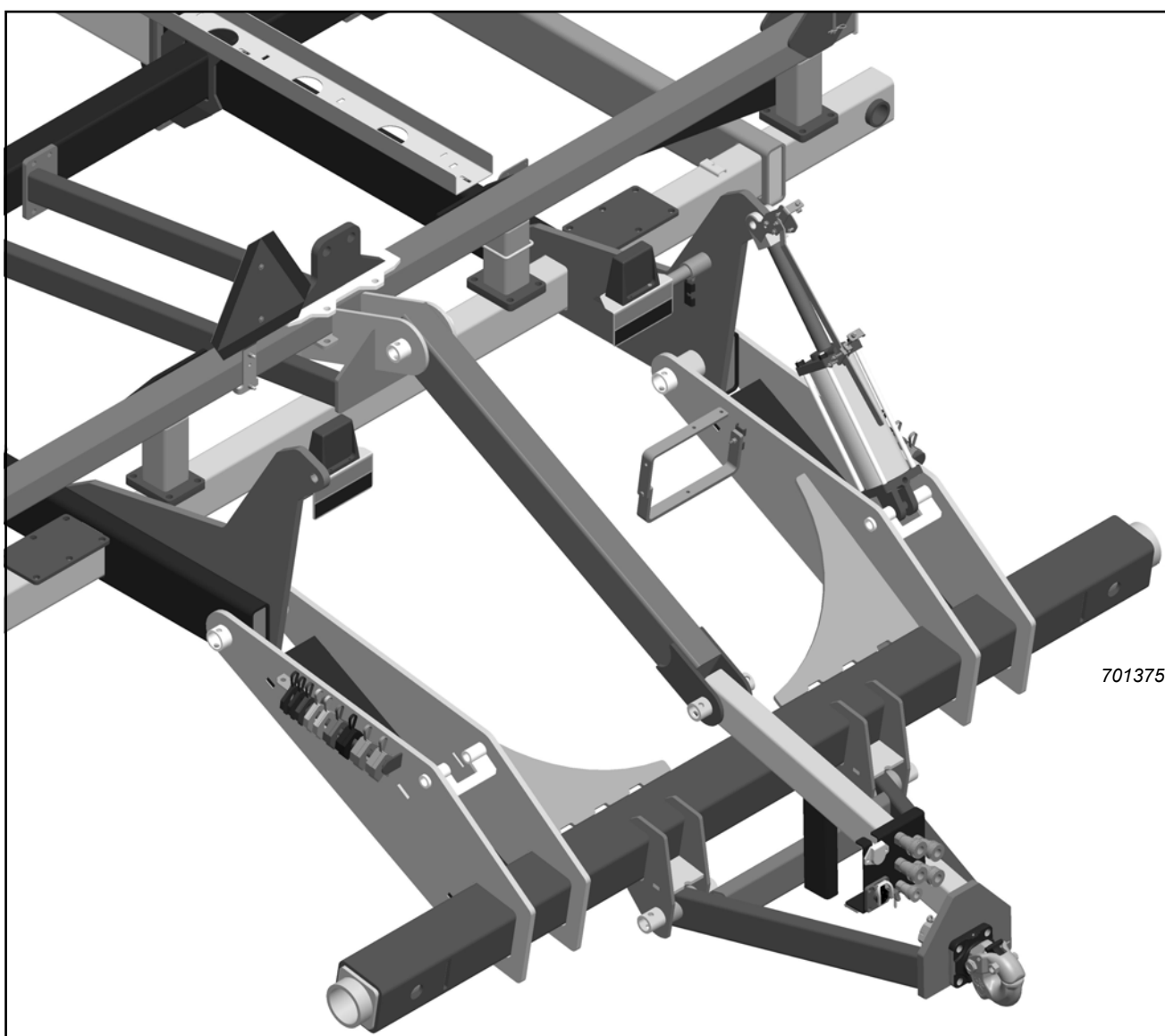
3.9.9.8 REAR HITCH HYDRAULICS

3. Operation



3. Operation **3.9.9.8 REAR HITCH HYDRAULICS**

ITEM	PART NO.	QTY	DESCRIPTION
1	A37066	4	QUICK COUPLING-FEMALE -12-12 ORB
2	A37067	1	QUICK COUPLING-FEMALE -10-8 ORB
3	320196	1	CONNECTOR-ISO BOX IBBC (SLAVE)
4	A36190	4	FTG-BULKHEAD: 12MB-12MJ
5	A36191	1	FTG-BULKHEAD: 10MB-10MJ
6	A36291	4	QUICK COUPLER 8010-16P (#10 ORB)
7	A69119	1	FTG-CASE DRAIN 3/8 FLAT FACE
8	A36221	1	HOSE: .50 X 500 8MB-10FJX (8AX)
9	A36219	4	HOSE: .75 X 290 10MB-12MJ
10	A36220	4	HOSE: .75 X 210 12FJX-12FJX



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4. Maintenance

4.1 Lubrication points	75
4.1.1 Lubrication and maintenance chart	75
4.1.2 Lubrication fitting locations	76
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4.4.1 Preparing the machine for storage	80
4.4.2 Preventing corrosion of extended hydraulic cylinders	81
4.4.3 Removing the machine from storage	81

4.1 Lubrication points

See the machine specification for the correct lubricant.

Do not let grease build up on or around parts, especially when operating in sandy soil.

Make sure to clean the lubrication fittings fully before connecting the grease gun.

Watch each lubrication point while lubricating to make sure the lubricant applies correctly.

Check for any loose, missing, or worn parts when lubricating the machine.

Check the lubrication service schedule for the correct lubrication interval.

4.1.1 Lubrication and maintenance chart

See the specifications for the correct type of lubricant.

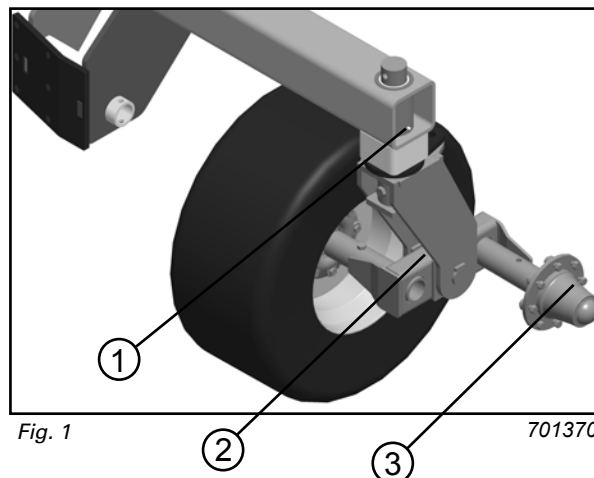
10 hours or daily	50 hours or weekly	1000 hours or yearly	
X			Lubricate the main caster wheel pivots .
	X		Lubricate the wheel hubs . One lubrication fitting is standard on each wheel hub .
	X		Lubricate the walker axle bearings, one lubrication fitting per walker axle .
	X		Lubricate the coulter hub . One lubrication fitting is standard on each coulter hub .
	X		Lubricate the packer wheel hub . One lubrication fitting is standard on each packer hub .
	X		Inspect all hardware installed on the machine for the correct torque.
	X		Inspect all wheel lug bolts and nuts for the correct torque.
	X		Check air pressure of all tires. Inflate tire to correct pressure.
	X		Clean any dirt or grease from moving parts.
		X	Remove and clean the bearings from each hub assembly. Fill the bearings and hubs with new grease.
		X	Remove and clean the bearings from each walking tandem. Fill the bearings with new grease.
		X	Inspect all hydraulic hoses and fittings for cracks or leaks. Replace any hoses or fittings as necessary.

4.1.2 Lubrication fitting locations

FRONT MAINFRAME CASTER WHEELS

Find the lubrication fitting

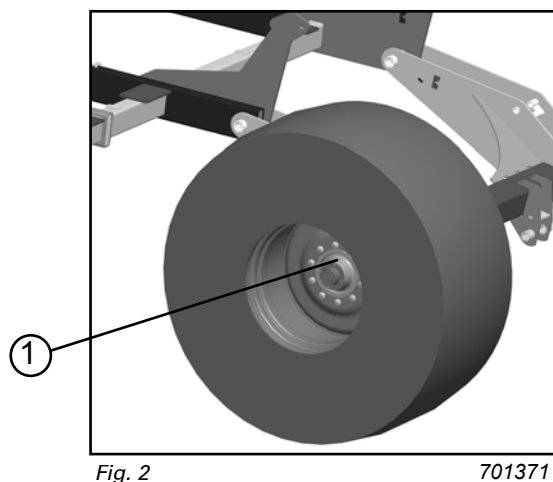
- 1) Main caster pivot
- 2) Walker pivot
- 3) Wheel hubs



REAR MAINFRAME CARRY TIRES

Find the lubrication fitting

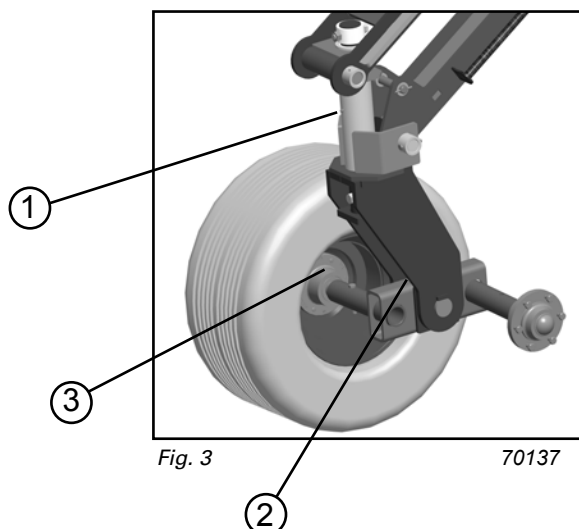
- 1) Main hubs



FRONT INNER & OUTER WING CASTER WHEELS

Find the lubrication fitting

- 1) Main caster pivot
- 2) Walker pivot
- 3) Wheel hubs



4.1.2 Lubrication fitting locations

REAR FRAME LIFT INNER & OUTER WING

Find the lubrication fitting

- 1) Wheel hubs

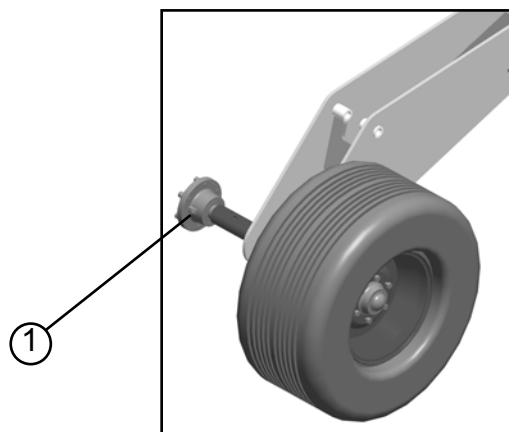


Fig. 4

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ROW UNIT

Find the lubrication fitting

- 1) Coulter hub
- 2) Packer wheel hub

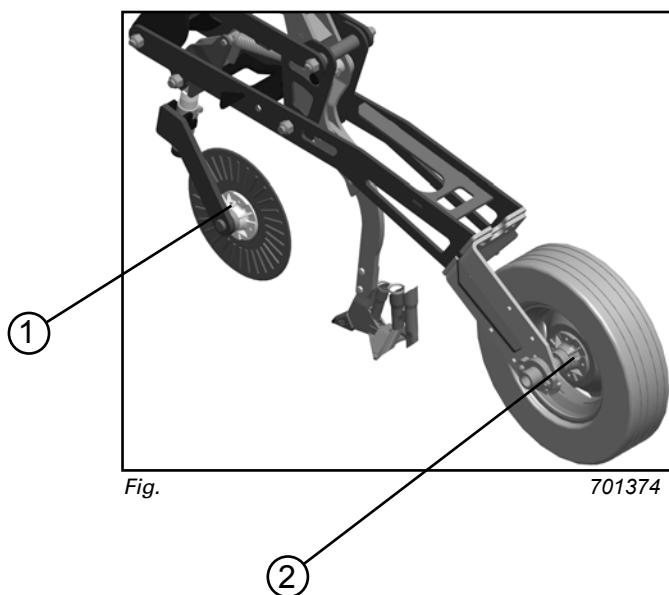


Fig.

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4.2 Servicing the wheel bearings

Each wheel hub is equipped with a grease fitting and must be lubricated every 50 hours of use. Apply grease to the hubs until grease pushes out through the seal. The triple lip seal lets the grease through without damaging the seal.

Clean and fill the wheel hubs yearly. Cleaning and filling the hubs removes all dirt and supplies fresh grease. The following procedure is necessary to correctly install the triple lip seal. The seal lips must be showing away from the hub if dirt is to be kept out.

Procedure

1. Remove the dust cap, cotter pin, nut and washer.
2. Remove the hub and clean the bearing and bearing cavity.
3. Replace any damaged or worn parts.
4. Fill the hubs with grease.
5. Install the seal on the spindle shaft.
Do not try to put the hub on the spindle with the seal in the hub.
6. Replace the hubs with inner bearings in position.
7. Replace the outer bearing, washer and nut on the wheel spindle.
8. Adjust the bearings by tightening the nut until there is a resistance to turning.
9. Loosen the nut until the hub can turn freely by hand without end play.
10. Put the cotter pin through the spindle and nut and replace the dust cap.
11. Slide the seal (1) down the spindle. Turn the seal on the spindle so the seal lips will point away from the hub.
12. Install the seal in the hub.

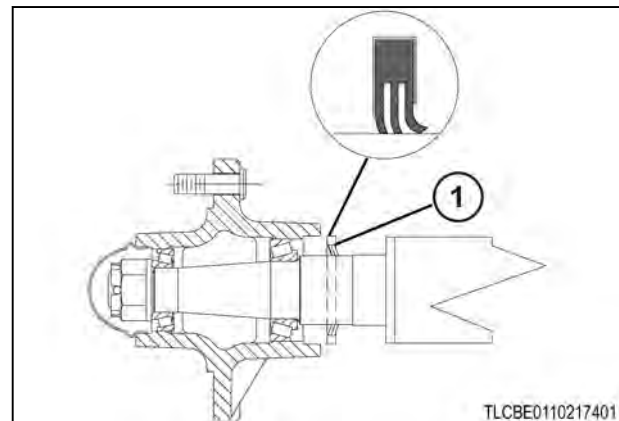


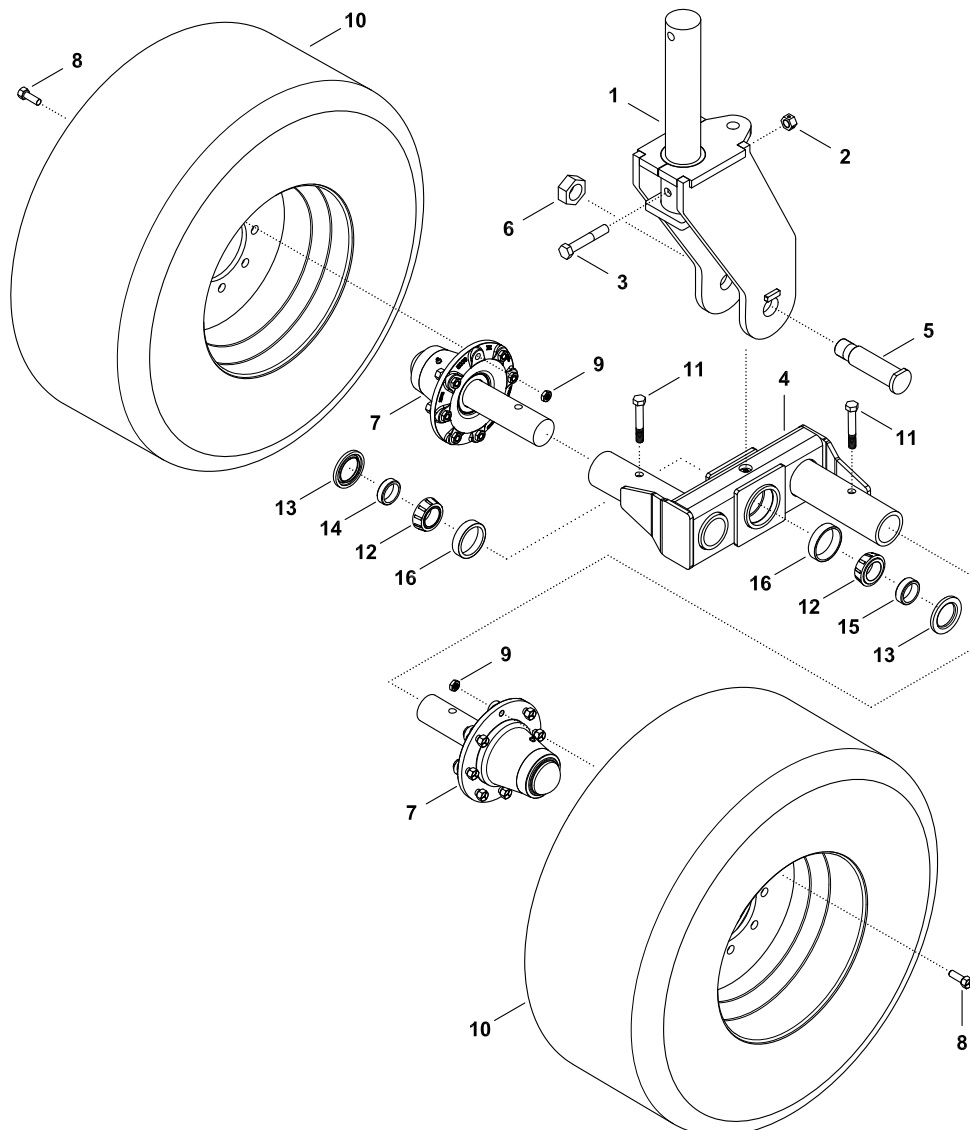
Fig. 4

4.3 Servicing the tandem pivot bearings

Clean and fill pivot bearings yearly. Cleaning and filling the bearings removes all dirt and supplies fresh grease. The following procedure is necessary to correctly fill the bearings.

Procedure

1. Remove the wheels and the tandem axle spindles.
2. Remove the seals and bearings from the pivot hub.
3. Clean the parts and hub cavity to remove all dirt.
4. Fill the bearings with a good grade wheel bearing grease.
5. Replace the bearings in the hubs in the correct sequence.
6. Apply grease around the outside of the inner bearings.
Apply enough quantity to fill the space between the inner bearings and the grease seals after assembly.
7. Install seals in the hubs.
The metal side must be on the outside of the hub.
8. Install the tandem axle spindle and replace the pivot.
9. Tighten the nuts until there is medium to heavy drag to still rotate under load. Loosen the nuts until the cotter pins can be installed.
10. Replace the wheels.



4.4 Storage

4.4.1 Preparing the machine for storage

Prepare the machine for storage at the end of each season. When possible, store the machine in a covered location with the wings lowered. Preventing rust will lengthen the life and assist in performance.

Procedure

1. Park the machine on a solid, level surface, away from other machines.
2. Use the tractor hydraulics to lower the wings of the machine.
3. Clean the machine of any dirt, grease, or other materials.
4. Put a protective layer of heavy oil or grease on all earth engaging parts to prevent rust.
5. Paint any damaged surfaces, surfaces with paint removed, or surfaces with rust.
6. Inspect the machine for any loose parts or hardware.
 - a) Replace any worn parts.
 - b) Tighten any loose hardware.
7. Lubricate all components of the machine.
8. Raise the machine and transport the machine to the area where the machine is to be kept. The area must be level and away from other machines.
9. Use the tractor hydraulics to lower the wings of the machine.
10. Stop the engine, apply the park brake, and take the key with you.
11. Remove the hardware that fastens the cylinder rod (1) of the wing lift cylinders to the wing frame. If equipped with folding wing extensions, remove the pins fastening the rod end of the wing lift cylinders to the wing extension frame.
12. Put boards under the gangs or shanks.
13. Start the tractor. Use the tractor hydraulics to retract the wing lift cylinders.
14. Stop the engine, apply the park brake, and take the ignition key with you.
15. Block up the machine to remove the weight from the tires.
16. Use the front hitch jack (1) to support the front hitch of the machine.
17. Disconnect the machine from the tractor. See the information for disconnecting the machine from the tractor.
18. Apply grease to the surfaces of the cylinder rods that are still showing.

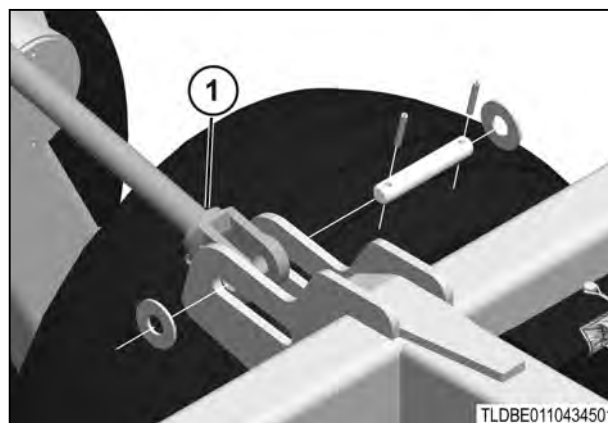


Fig. 5

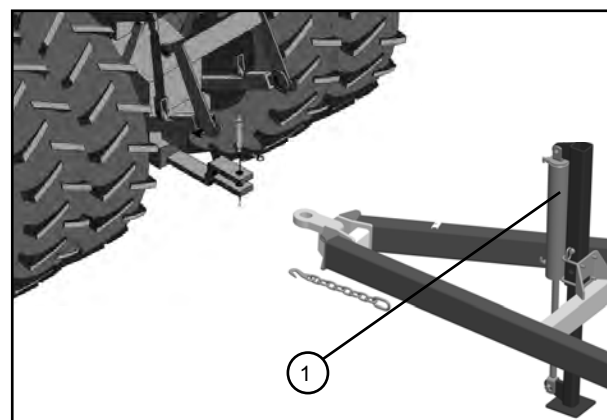


Fig. 4

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4.4.2 Preventing corrosion of extended hydraulic cylinders

Store the machine with the cylinders in the retracted position. If the machine is stored with cylinders in the extended position, periodically cycle the cylinder. If a cylinder must be stored in the extended position without being cycled, the following corrosion prevention must be done.

Procedure

1. Use a dry cloth or cloth with solvent to clean any dirt from the cylinder shaft.
2. Prepare a mixture of 60 percent oil based rust inhibitor and 40 percent Kerosene.
3. Use a cloth to apply a thin layer of this mixture to the surface of the chrome plated shaft.
Number one fuel oil can be replaced with Kerosene. A good grade purpose made product can be used for this procedure.
4. Follow manufacturer instructions for applying purpose made products.
5. Inspect and apply the mixture again at three to six month intervals.

4.4.3 Removing the machine from storage

Complete the following steps to remove the machine from storage.

Procedure

1. Connect the machine to the tractor.
2. Use the tractor hydraulics to extend the wing fold cylinders. Extend the wing fold cylinders until the holes in the end of the wing fold cylinders align with the holes in the mounts.
3. Stop the engine, apply the tractor park brake, and take the key with you.
4. Install the cylinder rod (1) of the wing fold cylinders to the mount on the wing frames. Use the existing hardware to fasten the wing fold cylinders.
5. Check the air pressure in all the tires.
6. Inspect all the hydraulic hoses and the connections for leaks and repair as necessary.
7. Make sure the safety signs are visible and not damaged.

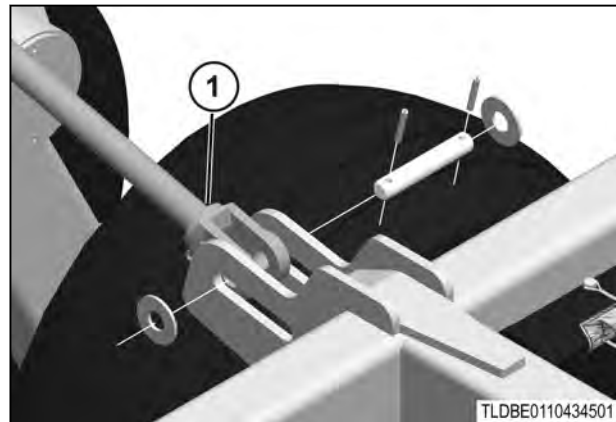


Fig. 7

5. Troubleshooting

5.1 Troubleshooting	82-84
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5.1 Troubleshooting

The lift cylinders are not in phase.	
Cause(s)	Solution(s)
The system is not bled of air	Bleed the system of air
The cylinders are not installed correctly	The wing cylinders must be smaller than the center frame cylinders. The cylinders must be connected in series. Start with the largest and reduce in diameter. The cylinders must point up so the air can release through the ports.
Hydraulic hoses are not installed correctly	Correctly install the hydraulic hoses

The wing lift cylinders are losing pressure and permitting the wings to lower.	
Cause(s)	Solution(s)
Pressure is flowing past the pistons in the cylinders	Install a new seal kit in the leaking cylinder

The lift cylinders are losing pressure and permitting the wings to lower.	
Cause(s)	Solution(s)
Pressure is flowing past the pistons in the cylinders	Install a new seal kit in the leaking cylinder

The machine is not pulling evenly.	
Cause(s)	Solution(s)
The depth is not even	Level the wings to the center frame
Shank location is not correct	Check the shanks for correct location

The depth is not even.	
Cause(s)	Solution(s)
The machine is not level when under power in the field	Level the machine from front to rear

The wing(s) are bouncing.	
Cause(s)	Solution(s)
The machine is operating too fast	Reduce speed
The outer end of the wing is operating too deep	Adjust the wing wheels to reduce depth
The gauge wheel is not supporting the wing	Lower the gauge wheel

The machine is not cutting into the soil.	
Cause(s)	Solution(s)
The machine is not level	Level the machine front to rear and side to side
The wheels are not in contact with the ground	Level the disc and/or set the depth adjustment
The gauge wheels are adjusted too deep	Adjust the gauge wheels
Shovel points are worn	Adjust stop collar of the main lift cylinder(s) for wear. Replace shovels if wear is severe
Sweep stem angle is not correct	Use 50 degree sweeps
Leveling adjustments are not correct on the main frame or the wings	See the information for leveling the implement
	Make sure the wing fold cylinders are fully extended
Hydraulic malfunction - air in the lines, cylinder or hoses leaking or not installed correctly.	Check for leaks in the cylinders, hoses, and fittings. Make sure all cylinders and hoses are correctly installed.

6. Specifications

6.1 Specifications	86
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6.1 Specifications

		51 PSD	61 PSD
Working width		51.5 ft.	61.5 ft.
Transport width		21 ft.	21 ft.
Transport height		15 ft.	16.5ft
Weight		50,600	60,180
Shank spacing		15	15
Trip pressure		Operator controlled	
Row spacing		Paired row or ribbon	
Tires	Main frame front	440/55R18	
	Front Wing caster	IF320/70R15	
	Rear wing	IF320/70R15	
	Rear main	IF900/60R32CFO	
	Packer	26/7.75X15	
Tractor HP requirement		450-550	500-600
Shank degree		85	85
# of seed openers		41	49
Packer scuff angel		0-5 deg	0-5 deg
Packing pressure		Operator controlled	
Opener Lubrication points		0	0
Coulter diameter		18	18

6.3 Minimum tow vehicle weight

Model	Machine weight	Minimum tow vehicle weight
PSD 51	22 680 kg (50 000 lb)	17 944 kg (39 560 lb)
PSD 61	27 216 kg (60 000 lb)	22 487 kg (49 575 lb)

6.4 Maximum transport speed

Maximum speed:

20 MPH

6.5 Lubrication specifications

Model	Lubrication fitting
All	No. 2 multi-purpose lithium grease

6.6 Tire air pressure



WARNING:

Serious injury or death can result from tire failure because of misapplication, incorrect inflation, overloading, or exceeding the maximum speed.

Tire size	Ply/load rating	Maximum air pressure
IF900/60R32CFO		241 kPa (35 psi)
440/55R18		503 kPa (73 psi)
IF320/70R15		482 kPa (70 psi)
26/7.75X15	4	69 kPa (10 psi)

7.22 Checklists

7.22.1 Delivery checklist

1	Make arrangements for dealer personnel to be present when starting the machine in the field. Confirm all systems are working correctly. Review the Operator's Manual to confirm the machine is set up correctly.
2	Explain the Warranty of the machine to the owner. Complete the Warranty Registration form and list the serial number of the machine. The dealer and the owner must both sign the form.
3	Review the Safety Section with the machine operator. Review various warning decals for dangerous operating procedures or conditions. Instruct the owner of the machine to review the operator manual with each operator of the machine.
4	If required, review with operator how to adjust, connect, or disconnect other attachments to the machine.
5	Review with the operator the locations and functions of the controls. Refer to the Operation section.
6	Inform the operator about the adjustments for varying field conditions.
7	Inform the operator about the importance of proper lubrication and servicing. Refer to the Lubrication and Maintenance Section.
8	Review with the operator the use the lighting system when operating a machine on the road at night and during the day. The tail lamps, warning lamps, and SMV (Slow Moving Vehicle) emblem must be used for warning operators of other vehicles. Inform the customer to check local government regulations that deal with movement of slow and over width vehicles.
9	Give the Operator's Manual to the owner. Make sure the owner will review all sections of the manual.

