

DUO LIFT[®]

Manufacturing Company, Inc.

BLUE MULE[™]



OWNER'S MANUAL AND PARTS BOOK **DUO STEER SERIES WAGONS**

**MODELS DS1000, DS1200, DS1600,
DS1212CB, DS2000, DS2200, & DS2600**

Read and understand the manual. This manual provides information and procedures to safely operate and maintain the Duo Steer Wagon.



DUO LIFT MANUFACTURING CO. INC.
DUO STEER WAGONS

WARRANTY REGISTRATION FORM & INSPECTION REPORT

WARRANTY REGISTRATION (please print)

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

Customer's Name _____	Dealer Name _____
Address _____	Address _____
City, State, Zip Code _____	City, State, Zip Code _____
Phone Number (____) _____	Phone Number (____) _____
Contact Name _____	Check One:
Serial Number _____	Farm Use <input type="checkbox"/>
Delivery Date _____	Commercial Use <input type="checkbox"/>

DUO STEER WAGON MODELS:						
DS1000	DS1200	DS1600	DS2000	DS2200	DS2600	DS1212CB
DS1750E	DS1200A	DS1600A	DS2000A	DS2200A	DS2600A	DS3200A

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

Date _____ Dealer's Rep. Signature _____

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

Date _____ Owner's Signature _____

DUO LIFT MFG.	DEALER	CUSTOMER

(MAKE COPIES AND CHECK APPROPRIATE BOX)

Cut Here to Remove Page or Make Copies of This Page

Dealer / Buyer Inspection Report	
✓ or NA	Task
	Hitch Assembly
	Safety chains are properly attached and have a certification tag. Chains are in good working condition. "4.2.14 Safety Chains" on page 28.
	An OEM drawbar pin and retainer clip is used for towing and must be in good working condition. Do not use homemade or shop-made drawbar pins when towing this wagon. "4.2.5 Hardened Drawbar Pin" on page 23.
	Standard heavy-duty extendable hitch moves in and out. Make sure hitch extension does not pull completely out of the hitch. The latch should lock extension from pulling forward when in the towing position. "4.2.12 Extendable Hitch" on page 26, "6.2.1.2 Connecting the Hitch" on page 38.
	Tongue Assembly
	Tongue assembly is properly attached to wagon frame and securely attached with lock nuts. "5.2.1 Connecting Tongue to Frame" on page 30.
	Wiring harness wire from tongue assembly to the wagon frame is routed properly. "6.2.1 On-Road Towing" on page 38.
	Wiring harness plug is plugged into socket at the front of the wagon. "5.3 Pre-Operation Checklist" on page 31.
	Wheels and Axles
	Wheel nuts are tightened to proper torque specifications on all wheels. "10.2.3 Wheel Nut Torque" on page 55
	Tire pressure is correct on all tires. "See correct pressures on tire".
	Front rocker pin retainer bolts are in place and tight. Rear back axle pin retainer bolt is in place and installed. "8.12.4 Rocker Arm and Front Axle Pin Inspection" on page 51.
	Make sure the Duo Steer E-Z Lock mechanism is functioning properly. "4.2.6 Duo Steer E-Z Lock System; Engage/Disengage" on page 23, "5.6 Selecting Mode of Operation for Duo Steer (4-Wheel Steer) Tracking Wheels" on page 34.
	If equipped with removable spindles, make sure the retaining bolt is tight. The bolt should be tightened to 150 ft.lbs. (203 N·m).
	Adjustable axle set bolts and jam nuts are tight. Tie plate bolts are tight. "4.2.13 Adjustable Axle Components" on page 26.

✓ or NA	Task
	Frame
	All grease points are lubricated. "8.4 Greasing" on page 44.
	All fasteners are tightened to proper specifications. "10.2 Bolt Torque" on page 55.
	Make sure the tank bands securing the tank to the frame are tight. "8.6 Tank Replacement" on page 47.
	SMV or SIS sign, if applicable, is installed (not supplied by Duo Lift).
	All decals are legible and properly installed. "3.1 General Information" on page 19.
	All pins are equipped with retainer clips.
	On Duo Purpose wagon make sure locks are engaged to secure tank frame to wagon frame. "4.1 Machine Components" on page 21.
	Wiring and Lighting
	Make sure lights are in working order.
	Wagon tongue wiring harness plug is in working condition and fits into wagon frame receptacle.
	Wiring harness plug to tow vehicle is in working condition and fits into tow vehicle's receptacle.
	Documentation Review
	All sections of Owner/Operator manual have been reviewed and understood by the owner.
	All safety signs and instructional labels have been reviewed and understood by the owner.
	Manual is given to owner.
	Final Checks Prior to Towing
	Tow vehicle is large enough to safely tow the wagon.
	OEM drawbar pin and retainer clip are properly installed. (Customer supplied)
	Safety chains are attached to tow vehicle and crisscrossed for added protection.
	Wiring harness is connected and all wagon lights are working properly.
	Brakes, if equipped, are working properly.
	Make sure the Duo Steer Safety Lock is inserted into the lock plate. The location of the pin is dependent on being in either duo steer or standard steer mode. Before towing on the road, place wagon in "standard steer mode".
	Owner is instructed to check wheel bolt/nut torque at 5, 10, 25, and 50 miles; then check annually.
	Duo steer is functioning correctly.
	Cap on lid of tank is securely closed.

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Warranty Statement

DUO LIFT[®] Manufacturing Company, Inc.

Warranty

This is to certify that we warrant to the original purchaser equipment manufactured by Duo Lift Manufacturing Company, Inc., identified and recorded by serial number, to be free of defects in material and workmanship under normal use and service to replace, free of cost, to the original purchaser any part or parts of said equipment that in our judgement shows evidence of such defects; and provide further that the said part or parts shall be returned to the factory, freight prepaid, within five years of shipping date. Manufacturer agrees to replace or repair during this period of no charge any defective part or parts returned to the factory, and deemed defective by authorized factory inspection. Should it become impractical to return said parts to the factory, the manufacturer shall not be liable for any labor costs, or any other costs encountered, in repairing or replacing any part or parts involved, but will be obligated to supply only the necessary repair and/or replacement items.

Duo Lift Manufacturing Company, Inc., as the manufacturer shall not be liable for any other damage, whether direct or consequential.

No representative or other person is authorized or permitted to make any other warranty or assume for his company any liability not strictly in accordance with the foregoing. This limited warranty is in lieu of all warranties expressed or implied and of all other obligations on the part of the factory.

This limited warranty shall not apply to any item which shall have been operated in a manner not recommended by the Company nor which shall have been repaired, altered, neglected or used in any way which in the Company's opinion adversely affects its performance and results.

This limited warranty shall not apply to any equipment which has been tampered with in any way or which has been subject to misuse, neglect or accident, or which has the serial number altered, defaced, or removed.

This limited warranty does not apply to exterior finishes, tire, bearings, springs, jacks, couplers or any such items not directly manufactured by Duo Lift Manufacturing Company, Inc., except to the extent of their individual manufacturer's guarantee.

1. INTRODUCTION

1.1 Welcome Statement

Congratulations on your choice of a Duo Lift Manufacturing Inc. Duo Steer Wagon to compliment your operation. This equipment has been designed and manufactured to meet the needs of a discerning agricultural industry.

The Duo Steer Wagon is designed to move and apply anhydrous ammonia or non-flammable, liquid crop treatment chemicals or herbicides in tank(s) to the field. Several optional mounting designs are available to accommodate different tank styles.

The rear axle of these wagons can be locked in the duo steer mode which results in the rear tires following in the front tire tracks. By tracking together, crop damage is minimized. The locking mechanism is located in the center of the rear axle.

An optional adjustable axle is also available on some models to allow the tires to be centered at any position between 120 and 144 inches (305 to 366 cm).

Many features incorporated into this wagon are the result of suggestions made by customers like you. Read this manual carefully to learn how to operate the wagon safely and how to set it to provide maximum field efficiency. By following the operating instructions in conjunction with a good maintenance program, your Duo Steer Wagon will provide many years of trouble-free service.

This manual covers Duo Steer Wagon models:

✓	Model	✓	Model
	DS1000		DS2200
	DS1200		DS2600
	DS1600		DS3200
	DS2000		



DS2600 Duo Steer Wagon



DS2600 Duo Steer Wagon with Optional 400 Gallon Front Mounted Tank



DS2200 Duo Steer Wagon with Anhydrous Tanks



DS1200 Duo Steer Wagon with Round Cone Bottom Tank.



DS2600A Duo Steer Wagon with Optional Fresh Water Wash Tank.



Duo Steer Wagon with 14' (4.3 M) Tongue

1.2 Safe Operation

Safe, efficient, and trouble-free operation of your Duo Lift Mfg. Co. Inc. Duo Steer Wagon requires that you, and anyone else who will be using or maintaining the Duo Steer Wagon, read and understand the information contained within the Operator's Manual.

Use this manual for frequent reference and to pass on to new operators or owners.

! WARNING



Read And Understand Manual

To prevent personal injury or even death, be sure you read and understand all of the instructions in this manual and other related OEM equipment manuals! The Duo Steer Wagon, if not used and maintained properly, can be dangerous to users unfamiliar with its operation. Do not allow filling, towing, maintaining, adjusting, or cleaning of this wagon until the user has read this manual and has developed a thorough understanding of the safety precautions and functions of the wagon.

This wagon is designed for the specific purpose of the moving and application of anhydrous ammonia or non-flammable, liquid crop treatment chemicals or herbicides used in agricultural applications. **DO NOT** modify or use this wagon for any application other than which it was designed.

Wagons filled or operated improperly or by untrained personnel can be dangerous; exposing the user and/or bystanders to possible serious injury or death.

1.3 Intended Usage

Do not use this wagon for any other purpose than its intended use; moving non-flammable, liquid crop treatment chemicals or herbicides used in agricultural applications.

! DANGER



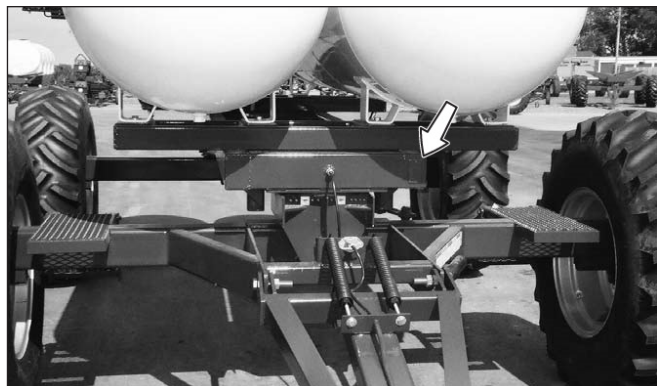
Fire / Explosive Hazard

DO NOT haul any type of flammable or corrosive liquids in this tank. An accident involving this type of liquid will cause serious damage. Only use this wagon to transport non-flammable, liquid crop treatment chemicals or herbicides used in agricultural applications.

1.4 Operator Orientation

The directions left, right, front, and rear, as mentioned throughout this manual, are as seen from the vehicle driver's seat and facing in the direction of travel.

1.5 Serial Number Locations (typical)



DS2200 Duo Steer Wagons.



DS1000 Duo Steer Wagons.



Model Number _____

Serial Number _____

Production Year _____

1.6 Disposal of Equipment at End of Useful Life

The Duo Lift Duo Steer Wagon has been designed for the specific purpose of transporting non-flammable, liquid crop treatment chemicals or herbicides used in agricultural applications on country roads, and on agricultural farm land. When this unit is no longer capable of doing its designed purpose, it should be dismantled and scrapped. Do not use any materials or components from this unit for any other purpose.

1.7 Unanswered Questions

If you have any questions not answered in this manual or require additional copies or the manual is damaged, please contact your dealer or:

Duo Lift Mfg. Co. Inc.
2810 38th Street
Columbus, NE 68601

Phone: (402) 564-8023
Fax: (402) 564-5385
Toll Free: 1-800-243-2583

2. Safety

2.1 General

Safety of the operator and bystanders is one of the main concerns in designing and developing a new piece of equipment. Designers and manufacturers build in as many safety features as possible. However, every year many accidents occur which could have been avoided by a few seconds of thought and a more careful approach to handling the equipment.

Most work related accidents are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. As you assemble, load, tow, operate, or maintain the wagon (unit), you must be alert to potential hazards. You should also have the necessary training, skills, and tools to perform any assembly or maintenance procedures.

Improper operation and maintenance of this unit could result in a dangerous situation that could cause injury or death.

If you have any questions not answered in this manual or require additional copies or the manual is damaged, please contact your dealer or Duo Lift Mfg. Co. Inc., 2810 38th Street, Columbus, Nebraska 68601, Phone: (402) 564-8023, Fax: (402) 564-5385, Toll Free: 1-800-243-2583.

WARNING



Do not load or tow the unit until you read and understand the information contained in this manual.



Safety precautions and warnings are provided in this manual and on the unit. If these hazard warnings are not heeded, bodily injury or death could occur to you or to other persons.

Duo Lift Manufacturing Company, Inc. cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this manual and on the unit are, therefore, not all-inclusive. If a method of installation or operation not specifically recommended by us is used, you must satisfy yourself that it is safe for you and for others. You should also ensure that the unit will not be damaged or be made unsafe by the methods that you choose.

The information, specifications, and illustrations in this manual are based on the information that was available at the time this material was written and can change at any time without notice.

2.2 Safety Alert Symbols



This is the safety alert symbol (triangle) and will be accompanied with a descriptive pictorial. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

This manual contains DANGERS, SAFETY INSTRUCTIONS, CAUTIONS, IMPORTANT NOTICES, and NOTES which must be followed to prevent the possibility of improper service, damage to the equipment, personal injury, or death. The following key words call the readers' attention to potential hazards.

Hazards are identified by the "Safety Alert Symbol" and followed by a signal word such as "DANGER", "WARNING", or "CAUTION".

DANGER

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

WARNING

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

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

Indicates that equipment or property damage can result if instructions are not followed.

SAFETY INSTRUCTIONS













Safety instructions (or equivalent) signs indicate specific safety-related instructions or procedures.

Note: Contains additional information important to a procedure.

2.3 Safety Icon Nomenclature

Pictorial icons signal a type of hazard and warn of personal protection issues, prohibited actions, and hazard avoidance.

2.3.1 Personal Protection/ Important Information


-  Read the manual
-  Maintenance procedure
-  Damaged hazard label
-  Do not ride
-  Eye protection
-  Fire extinguisher
-  First aid kit
-  Hand protection
-  Head protection
-  Water repellent clothing
-  Hearing protection
-  Inspect equipment
-  OEM parts only
-  Protective shoes
-  Remove key
-  Set parking brake
-  Stop engine
-  Think safety
-  Transmission in park
-  Use proper support

-  Use proper tools
-  Use two people when lifting heavy objects
-  Visibility
-  Wear seat belt
-  Weight rating
-  Chemical flushing kit

2.3.2 Prohibited Actions

-  Do not alter or modify
-  Use proper tools
-  Do not weld
-  No alcohol
-  No drugs
-  No young children

2.3.3 Hazard Avoidance

-    Crush hazard
-  Crush hazard (chock wheels)
-  Crush hazard (foot)
-  Defective or broken part
-  Entanglement hazard
-  Explosive force hazard
-  Fall hazard

-  Lifting hazard
-  Maximum weight limit
-  Pinch point hazard
-  Projectile hazard
-  Rollover protection
-  Safety alert symbol
-  Safety shields
-  Sharp object hazard
-  Slipping injury
-  Tire pressure
-  Tripping injury

2.4 General Safety Instruction

The owner/operator is responsible for the SAFE use and maintenance of the Duo Lift Manufacturing Co. Inc. (Duo Lift) Duo Steer Wagon. Make sure anyone who is towing, loading, maintaining, or working around the Duo Steer Wagon is familiar with the operating and maintenance procedures and related SAFETY information contained in this manual. This manual will take you step-by-step through your working day and alerts you to all good safety practices that should be used while using the Duo Steer Wagon.

In addition to the design features of the Duo Steer Wagon, including safety signs, accident prevention is dependent upon the awareness, concern, prudence, and proper training of the people involved in the loading, use, towing, maintenance, and storage of the wagon.

In addition to this safety section, refer also to safety messages and instructions in each of the appropriate sections of the wagon manual.

These general safety instructions apply to the overall use and maintenance of the Duo Steer Wagon.

More specific instructions on safety are found in the towing, loading, maintenance, and storage sections of this manual. Refer to these sections before performing any of these tasks.

WARNING

The following safety instructions can and will result in serious injury and possibly even death if they are not understood and followed.



Read And Understand Manual

To prevent personal injury or even death, be sure you read and understand all of the instructions in this manual and other related OEM equipment manuals! The Duo Steer Wagon, if not used and maintained properly, can be dangerous to users unfamiliar with its operation. Do not allow filling, towing, maintaining, adjusting, or cleaning of this wagon until the users have read this manual and have developed a thorough understanding of the safety precautions and functions of the wagon.

This wagon is designed for the specific purpose of the moving and application of anhydrous ammonia or non-flammable, liquid crop treatment chemicals or herbicides used in agricultural applications. DO NOT modify or use this wagon for any application other than which it was designed.

Wagons loaded or operated improperly or by untrained personnel can be dangerous; exposing themselves and/or bystanders to possible serious injury or death.



Provide User with Literature

Duo Steer Wagon owners must provide operating instructions to anyone before using the wagon, and at least annually thereafter.



Stay Clear

Clear the area of people, especially small children, before using the wagon. Under no circumstances should young children be allowed to work with or around the Duo Steer Wagon.



Impaired User Hazard

Do not attempt to load, tow, or use this wagon under the influence of drugs or alcohol. Consult your doctor before using this wagon while taking prescription medications.



Crush Hazard

Do not allow anyone to ride on the wagon. Falling or crushing hazards can result in severe injuries or death.



Falling Hazard

Do not allow riders on the hitch, frame, or tank at any time. Do not climb on the wagon. This wagon is not designed for ingress or egress. Falling can result in severe injuries or death.

⚠️ WARNING



Roll Away Hazard

Before filling the wagon, make sure the engine of the tow vehicle is stopped, the transmission is placed in park, the key is removed, and the parking brake is set.



The weight of a fully filled tank, plus the wagon, if it rolls onto a person, can cause serious crushing injury or death. Make sure the wagon is securely attached to the tow vehicle when filled or being filled.



If the wagon is not attached to a tow vehicle, chock (block) the wheels to prevent unanticipated movement.



No Unauthorized Modifications

Do not modify the wagon or safety devices. Do not weld on the unit. Unauthorized modifications may impair its function and safety. Personal injury or death can result from unauthorized modifications.

If the wagon has been altered in any way from the original design, Duo Lift does not accept any liability for injury or warranty.



Damaged Parts Hazard

Do not use the wagon if any parts are damaged. If the wagon has a defect, immediately stop using it and remedy the problem before continuing.

⚠️ DANGER



Fire / Explosive Hazard

DO NOT move any type of flammable or non-agricultural corrosive liquids in this wagon. An accident involving this type of liquid will cause serious damage. Only use this wagon to transport non-flammable, liquid crop treatment chemicals or herbicides used in agricultural applications.



If a spill occurs, clean it up immediately and contact local authorities for additional instructions.

⚠️ CAUTION

The following safety instructions are provided to help prevent potential injury. Not following these instructions may lead to injury.

Personal Protection Equipment

When using this wagon, wear appropriate personal protective equipment. This list may include, but is not limited to:



- A hard hat
- Protective shoes with slip resistant soles
- Protective goggles, glasses, or face shield
- Protective clothing and gloves
- Hearing protection



Ear Protection

Wear suitable ear protection during prolonged exposure to excessive noise.



Hearing Loss

Prolonged Exposure To Loud Noise May Cause Permanent Hearing Loss!

Working environments with noise-producing equipment can cause partial to permanent hearing loss. We recommend using hearing protection any time noise levels exceed 80 decibels (dB). Noise levels over 85 dB, on a long-term basis, can cause severe hearing loss. Noise levels over 90 dB over a period of time can cause permanent and even total hearing loss.

Hearing loss from loud noise is cumulative over a lifetime without hope of natural recovery.



Crush Hazard

If the tow vehicle is a tractor, it should be equipped with a Roll Over Protective Structure (ROPS) and a seat belt. A crushing hazard can occur if the driver is ejected from the seat while the tractor is in motion. Fasten the seat belt whenever the tractor is moving.

SAFETY INSTRUCTIONS

The following safety instructions are provided to help prevent injury or limit equipment damage.



Safety Signs

Replace any missing or hard-to-read safety signs or instructional labels. Use care when washing or cleaning the wagon.

Replacement safety sign locations and part numbers are provided in this manual and are available from an authorized dealer parts department or the factory.



First Aid Kit

Have a first aid kit available should the need arise and know how to use it.



Fire Extinguisher

Have a fire extinguisher available for use should the need arise and know how to use it.



Think SAFETY!

Work SAFELY!



Overloading Hazard

Never exceed the limits of this wagon. Be aware of weight capacity, towing speed, and all other limiting factors of the wagon.

2.9 Maintenance

Refer to the Maintenance Section 9 for safety recommendations related to maintaining the wagon. All applicable safety recommendations in other sections should also be followed.

2.10 Tire Safety

Refer to the Maintenance Section 9 for safety recommendations related to tire safety on the wagon. All applicable safety recommendations in other sections should also be followed.

2.5 User Training

Refer to the Operation Section 5 for safety recommendations related to using the wagon. All applicable safety recommendations in other sections should also be followed.

2.6 Loading

Refer to the Loading Section 6 for safety recommendations related to loading the wagon. All applicable safety recommendations in other sections should also be followed.

2.7 Towing

Refer to the Towing Section 7 for safety recommendations related to towing the wagon. All applicable safety recommendations in other sections should also be followed.

2.8 Storage

Refer to the Storage Section 8 for safety recommendations related to storing the wagon. All applicable safety recommendations in other sections should also be followed.

2.11 Anhydrous Ammonia

Duo Lift supplies a wagon with two tanks for transporting anhydrous ammonia. It is the responsibility of the dealer, distributor, or owner to plumb the machine appropriate for the specific application. The dealer, distributor, or owner must review and follow all the requirements and specifications for each component in the system and how it is assembled.

Anhydrous Ammonia should be stored in a cool, well ventilated area, away from sources of heat or ignition, water supplies, and foodstuffs. Do not puncture container, and check cylinders regularly for leaks. Close valve after each use and when tank is empty. Dispose of product in accordance with appropriate Federal, State, and local regulations.

In case of accidental release, contact emergency personnel immediately. Shut off gas supply if this can be done safely and isolate area until gas is dispersed, and keep unnecessary personnel away. Fatalities can occur as a result of the explosive nature of ammonia gas; shut off all possible sources of ignition. Fine water spray is to be used for extinguishing measures: DO NOT HOSE LIQUID AMMONIA, AND DO NOT SPRAY WATER DIRECTLY ON LEAK OR AMMONIA CONTAINER. DO NOT BREATHE FUMES. If contamination of sewer or waterways has occurred, contact emergency services and State Department of Agriculture immediately.

Conform to the regulations from the following agencies before handling or plumbing anhydrous ammonia:

American National Standards Institute (ANSI K61.1-1999)
1819 L Street NW
Washington, DC 20036
Phone: (202) 293-8020
Fax: (202) 293-9287
Website: <http://www.ansi.org>
Email: ansionline@ansi.org

Compressed Gas Association, Inc. (CGA G-2.1-1999)
4221 Walney Road, 5th Floor
Chantilly, VA 20151
Phone: (703) 788-2700
Fax: (703) 961-1831
Website: <http://www.cganet.com>
Email: cga@cganet.com

Note: Regulations and standards for the safe handling of anhydrous ammonia may change from time to time due to the advancement of technology and equipment. Review all current regulations and standards semi annually to always be informed of the most recent information possible.

DANGER

Anhydrous Ammonia causes severe respiratory tract, eye, and skin burns. Avoid skin and eye contact, and do not breathe in vapors. Keep away from children.

Eye Damage



Severely corrosive to the eyes, exposure to liquid splashes, spray, or gas form can cause corneal burns, frostbite and result in permanent injury.



Gas tight goggles and respirator which seals between face and frame should be worn to avoid liquid splashes and harmful vapors. A full face shield may be worn to supplement the protective eye wear.



In case of contact, check and remove any contact lenses, immediately flush eyes with water for a minimum of 15 minutes, occasionally lifting upper and lower eyelids. Seek medical attention immediately.

Skin Damage



Severely corrosive to the skin, exposure to liquid splashes, spray, or gas form will result in severe irritation and may cause burns or frostbite and result in permanent injury.



Personal protection equipment (PPE) should be worn before and during handling this product. PPE consists of chemical resistant, impervious gloves, water repellent clothing which covers arms and legs, and rubber boots.



In case of contact, immediately flush skin with lukewarm water for at least 15 minutes; DO NOT USE HOT WATER. Remove any contaminated clothing. Where applicable, skin and hair should be washed with soap and water until advised to stop by Poison Control Center or a doctor. If frost bite is present, flush area with lukewarm water for at least 15 minutes and cover with clean, dry dressing. Seek medical attention immediately.

Contaminated clothing and boots must be thoroughly cleaned before reuse.

Lung Damage



Severely corrosive to the respiratory system and mucous membranes, exposure to concentrations above the Exposure Standard of 25 ppm will result in irritation, and may cause permanent injury. The fumes will attach to the walls of the respiratory system and create a strong acid. The resulting acid will destroy the respiratory system. Exposure to higher concentrations may cause breathing difficulty, chest pain, bronchospasm, pink frothy sputum and pulmonary edema, leading to acute bronchitis, pneumonia and possibly death.



Always wear a respirator whenever working around anhydrous or other agricultural chemicals to prevent breathing the fumes. Properly fitted, air purifying respirator or self contained breathing apparatus (SCBA) must be worn when handling this product.



In case of exposure, move person to fresh air, loosen clothing, removing any contaminated clothing, taking care not to expose yourself to contamination. Allow person to remain in a comfortable position and keep warm and at rest until fully recovered. If person has difficulty breathing, displays a bluish discoloration (suggestive of a lack of oxygen) or respiratory arrest occurs, provide artificial respiration or oxygen. Mouth-to-mouth resuscitation may be dangerous to person providing aid. Seek medical attention immediately.

Ingestion

Severely corrosive to the throat and stomach. Swallowing liquid will result in freeze burns of the mouth, throat, and stomach, resulting in severe irritation, permanent injury, and even death.

A face mask may be worn to supplement personal protection equipment. **DO NOT INGEST LIQUID.**

If swallowed, **DO NOT INDUCE VOMITING**, drink water and seek medical attention immediately.

WARNING



Stay Clear

Using components or assembly techniques that do not comply with an anhydrous application can lead to substandard performance, leaks, failures, and potentially serious injuries to the operator and / or bystanders.



Personal Protective Equipment (PPE)

Anhydrous ammonia is one of the most dangerous and toxic chemicals used in agriculture, and Personal Protective Equipment (PPE) must be worn and used by anyone around the wagon. This list includes but is not limited to:



Hard hat



Protective chemical splash goggles



Neoprene gloves



Rubber boots



Water repellent clothing



Respirator

SAFETY INSTRUCTIONS



Always keep a container of clean water next to the working area to be used to flush anything that becomes contaminated with anhydrous, as required by Safety Standard Regulations.



Read and follow the chemical manufacturers' instructions on the handling, storage and disposal of chemicals before starting.



Anhydrous and other agricultural chemicals are extremely toxic substances. Minute quantities can contaminate clothing, machinery, the workplace, and the environment. Follow the chemical manufacturers' instructions exactly.

2.12 Agricultural Chemicals

WARNING



Caustic Substance Hazard

Do not breathe, touch, or ingest chemicals. Always wear protective clothing and follow safe handling practices.

Duo Lift Mfg. Co., Inc. follows the general Safety Standards specified by the American Society of Agricultural and Biological Engineers (ASABE) and the American National Standards Institute (ANSI). Anyone who will be using and/or maintaining the Fuel Hauler™ must read and clearly understand ALL safety, usage, and maintenance information presented in this manual.

Make periodic reviews of SAFETY and OPERATION of the fuel hauler a standard practice for all of your equipment. An untrained operator is not qualified to use this fuel hauler.

[illegible]

3. SAFETY SIGNS AND INSTRUCTIONAL LABELS

3.1 General Information

The types of safety signs (hazard labels) and instructional labels along with their locations on the equipment are shown in the following illustrations. Good safety practices require that you familiarize yourself with the various safety signs, the type of warning, and the area or particular operation related to that area that requires your SAFETY AWARENESS.



Think SAFETY!

Work SAFELY!

Pay close attention to the safety signs and instructional labels attached to the tow vehicle and the wagon. Duplicate safety signs, which are attached to the wagon, can also be found in this section. If the wagon is missing a label or one is unreadable, replace the label before using the wagon.

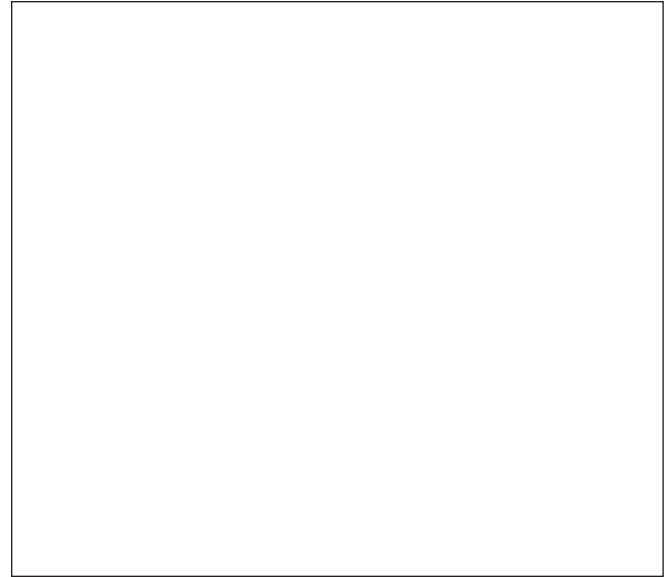
SAFETY INSTRUCTIONS



Safety Signs and Instructional Labels

1. Keep safety signs or instructional labels clean and legible at all times.
2. Replace any missing or hard-to-read safety signs or instructional labels.
3. Use care when washing or cleaning the equipment not to remove or damage the labels.
4. Locations for the labels and replacement part numbers are shown in this section.
5. Replacement parts must have replacement labels attached during installation and/or before the wagon is used.
6. Labels are available from your authorized dealer or from Duo Lift at no charge.

3.2 Safety Signs



Safety Sign Locations.

⚠ WARNING

Wheel Detachment

Wheel nuts are prone to loosen after being first assembled due to metal creep between rim and nuts/bolts.

Inadequate wheel nut torque can cause rim to loosen resulting in a wheel separating from trailer.

To prevent serious injury or death:

- Verify wheel nuts are tight before each tow.
- Check wheel nut torque for tightness initially, and after re-mounting a wheel after 5, 10, 25, and 50 miles.

Tighten:
5/8" to 100 ft.lbs. (135 N·m)
3/4" to 260 ft.lbs. (352 N·m)

DE000061b

⚠ WARNING

Travel Speed

Duo Steer Wagons are NOT capable of highway speeds.
Loss of control, at any speed, can result in serious injury or death.

When loaded, travel speed must be limited to less than 25 mph (40 kph) and per road conditions in order to provide reasonable control of tow vehicle and trailer.

If travel speed is less than 25 mph (40 kph), an SMV sign must be attached to back of load.

If empty travel speed is 25 to 40 mph (40 to 64 kph), an SIS and SMV sign must be attached to back of load. DE0000-4

⚠ WARNING

To prevent serious injury or death:

1. Read and understand Owner's Manual and Parts Book before starting.
2. Always refer to towing vehicle owner's manual to determine vehicle's towing capacity to ensure compatibility and maximum safety.
3. Attach wagon and tow vehicle using an OEM hardened hitch pin with a retainer. Do not use homemade pins. Attach safety chains to tow vehicle.
4. Before filling, make sure engine of tow vehicle is stopped, transmission is placed in park, key is removed, and parking brake is set.
5. Install lights, reflectors, SMV, and/or SIS signs required by highway authorities before transporting. Make sure lights are working correctly.
6. Never exceed a safe travel speed.
7. Shift towing vehicle to a lower gear before going down steep downgrades to use engine as a retarding force. Keep towing vehicle in gear at all times.
8. Inspect all components on wagon for damage. Repair any damage before using wagon.
9. Make sure all hardware is properly tightened to specified torque.
10. Do not drink and drive.
11. Maintain proper wagon brake adjustment, if equipped.
12. Place certified safety stands under frame before working on tires or running gear and check the tires.
13. Check tire air pressure, and adjust if needed.
14. Do not allow riders on wagon or towing vehicle.
15. Make sure driver is in compliance with all regulations regarding transporting equipment on public roads.
16. Review safety instructions annually.

DE0000-4

LOCKING INSTRUCTIONS

* ROAD USE *

TO LOCK REAR AXLE IN FIXED POSITION

- SWING SPRING LOADED **ENGAGEMENT LEVER** INTO FORWARD POSITION AGAINST STOP
- MOVE TRAILER FORWARD TO ALLOW **LEVER LOCK** TO ALIGN AND SNAP INTO LOCKING POSITION
- RELEASE PULL PIN **SAFETY LOCK** FROM NEUTRAL POSITION WHEN **LEVER LOCK** IS SECURE. BE SURE PULL PIN IS COMPLETELY ENGAGED IN LOCKING PLATE TO INSURE ROAD SAFETY.

* DOU STEER USE *

TO LOCK REAR AXLE IN STEERING POSITION

- PULL AND TWIST PULL PIN **SAFETY LOCK** INTO NEUTRAL POSITION
- SWING SPRING LOADED **ENGAGEMENT LEVER** REARWARD AGAINST STOP BLOCK
- MOVE TRAILER FORWARD TO ALLOW **LEVER LOCK** TO ALIGN AND SNAP INTO DOU STEER POSITION



3.3 How to Install Replacement Safety Signs

1. Clean and dry the installation area.
- Note:** Do not install the signs if the temperature is below 50°F (10°C).
2. Determine the exact position before you remove the backing paper.
3. Remove the backing paper.
4. Align the sign over the specified area and carefully press the sign to the part/frame.

Note: Small air pockets can be pierced with a pin and smoothed out using the piece of backing paper.

⚠ WARNING

CHEMICAL HAZARD

Agricultural chemicals can be dangerous, causing serious injury and death. These chemicals can seriously injure persons, animals, plants, soil, or other property.

- Select the right chemical for the job.
- Handle it with care.
- Follow the instructions on the container label and instructions from the manufacturer.

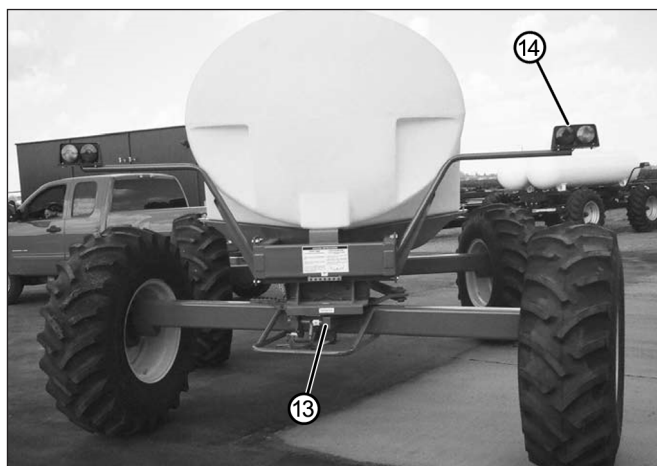
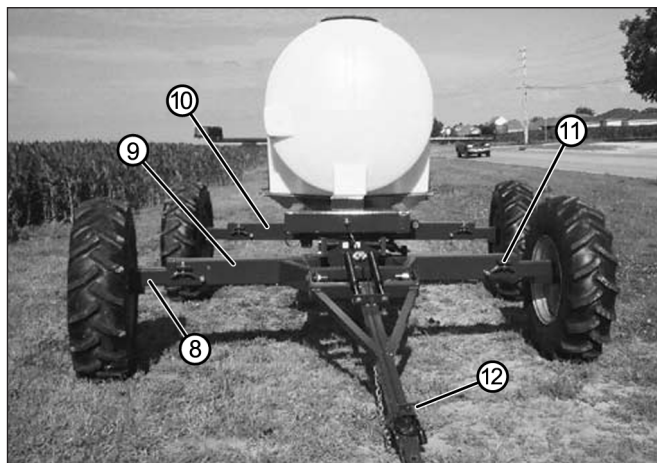
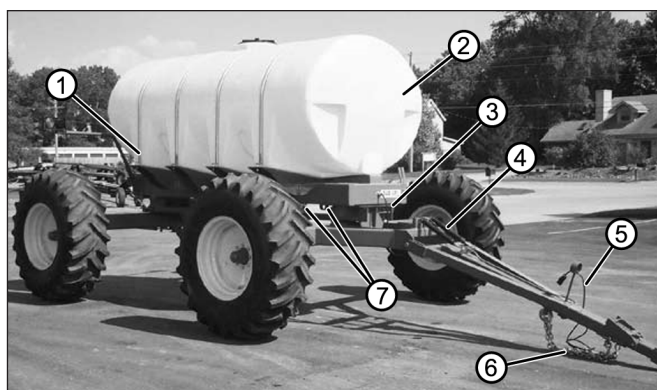
TW-101-WCIL

4. Machine Applications And Components

4.1 Machine Components

The Duo Lift Manufacturing Inc. Duo Steer Wagon is designed to move and apply anhydrous ammonia or non-flammable, liquid crop treatment chemicals or herbicides in liquid tanks to the field. Several optional mounting designs are available to accommodate different tank styles.

The rear axle can be locked to the front axle and the rear tires will follow in the front tire tracks. By tracking together, crop damage is minimized. The locking mechanism is located in the center of the rear axle. An optional adjustable axle is available to allow the tires to be centered between 120 and 144 inches (305 and 366 cm).



Item	Description
1	Tank Bands
2	Liquid Tank
3	Lubrication Grease Banks
4	Tongue Lift Assist Springs
5	Wiring Plug for Lights
6	Towing Safety Chains and 7-way RV Plug
7	Plumbing Routing Rings
8	Strut
9	Front Axle
10	Rear Axle
11	Adjustable Axle, 120 to 144 in. (304.8 to 365.8 mm.
12	Extension Tongue
13	Duo Steer E-Z Lock Mechanism
14	Ag Lights
15	Anhydrous Tank Hold-Down Bolts
16	Non-Adjustable Axle
17	Engagement Lever

Note: If the trailer is towed with a combine or a tractor, then an RV to ATA wiring harness convertor is required to allow the lights to function correctly. Contact Duo Lift to obtain a convertor.

4.2 Equipment Matching

To ensure the safe and reliable operation of the Duo Steer Wagon, it is necessary that the wagon, tank, and anhydrous or liquid chemical be matched and function as a complete unit. Use the following list as a guide in selecting the tank, wagon, and towing vehicle to use with the unit.



4.2.1 Towing Vehicle

Always review the “controls” section of the tractor operator’s manual to be familiar with the location, settings, and function of the tractor controls. Be familiar with all controls before using this equipment.

1. Tractor

The tractor used to tow the wagon should be matched to the combined weight of the wagon, tank, and contents when the container is completely filled. As a general rule, the tractor weight should be equal to or greater than the weight of the fully loaded wagon. This will ensure adequate stability during transport and sufficient traction in hilly terrain or soft field conditions.

2. Truck (empty tank only)

It is recommended that only 3/4 ton or larger capacity trucks be used for towing on the road when the tank is empty. This size of truck, plus careful driving, will provide the recommended stability and control when transporting.

WARNING



Vehicle Owner/Operator Manual

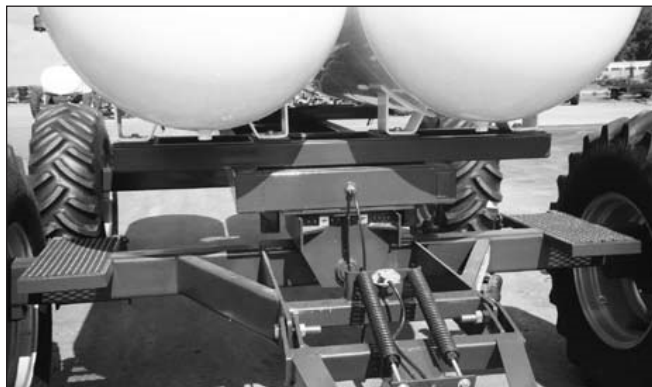
Always refer to the towing vehicle owner’s manual trailer towing section to determine the vehicle’s towing capacity and to ensure compatibility and maximum safety.

4.2.2 Weight Capacity

The frame and running gear are designed to handle the weight of a specific tank filled with anhydrous ammonia or liquid. Check with the factory before adding a larger tank or another tank to prevent over-loading the frame. Use only Duo Lift approved tanks.

4.2.3 Container Attachment

Several tank mounting systems are available, as shown, to match the container/tank that will be used. If using a non-factory supplied tank it must be approved by Duo Lift. Check with your dealer or distributor for an attachment system best suited for your application. Check the mounting hardware daily to ensure that it is kept tight.



Anhydrous Tanks.



Single Tank.



Dual Tank.



Round Cone Bottom Tank.

SAFETY INSTRUCTIONS

Check all fasteners before each use to be sure they are tight. All tank band hardware uses lock nuts to minimize or eliminate the chance of loosening. Never use standard nuts in these areas due to the potential loosening of the tank band straps.

4.2.4 Lighting and Marking

It is the responsibility of the owner/user to know the lighting and marking requirements of the local highway authorities and to install and maintain the equipment to provide compliance with these regulations.

Use standard ag light package on wagon when transporting at night or during periods of limited visibility.

4.2.5 Hardened Drawbar Pin

Use only OEM front and rear hardened drawbar pin that has provisions to mechanically hold it in position. A tension-lock, pin-lock, or snap-lock pin is acceptable.

NOTICE

If towing the wagon with a drawbar, use only a certified, hardened drawbar pin with a retainer clip. Do not use homemade pins, bolts, or any other type of retaining device. Always install the retainer clip, making sure the hitch and wagon are securely fastened to the tow vehicle.

Using a pin not intended for this type of towing can result in unexpected separation of the wagon from the tow vehicle, resulting in equipment damage and personal injury.

When towing on a roadway the engagement lever must be in the Road Use position. Do not tow wagon on a roadway in the Duo Steer Use mode.

4.2.6 Duo Steer E-Z Lock System; Engage/Disengage

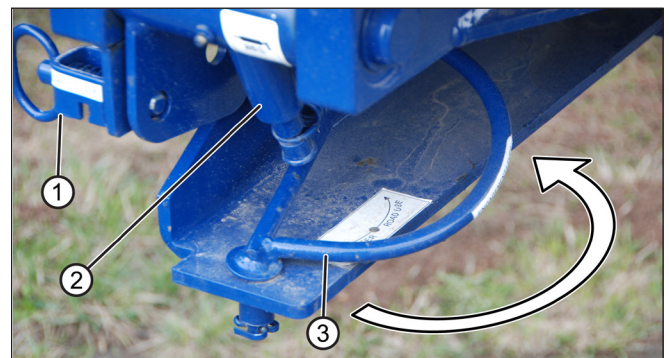
The rear axle can act as a traditional solid axle or as a bolster that allows the rear tires to follow in the track of the front tires.

This Duo Steer feature, when engaged, allows the rear tires to follow in the same track that is set by the front tires. Both front and rear axles are designed to work together, resulting in rear tires matching the tracks of the front tires. This feature minimizes the damage to crops.

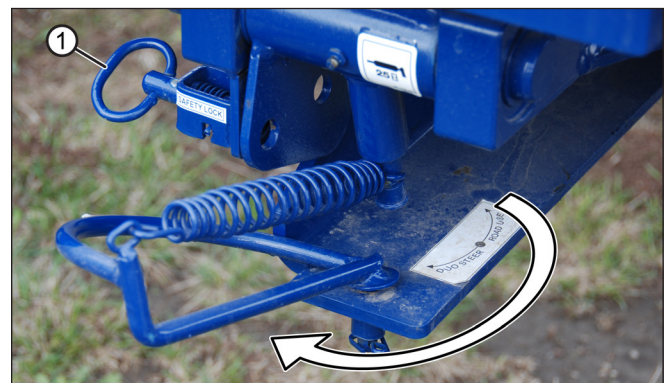
The E-Z LOCK mechanism is designed with a transport safety lock pin that keeps the axle in its desired configuration.

An engagement lever on the back of the rear axle controls the Engage/Disengage function of the rear axle bolster.

1. Swing lever (3) forward to place it in the traditional rigid axle configuration (Road Use).



2. Swing lever (3) back until it goes over center to lock the rear axle into its tracking configuration (Duo Steer Use).



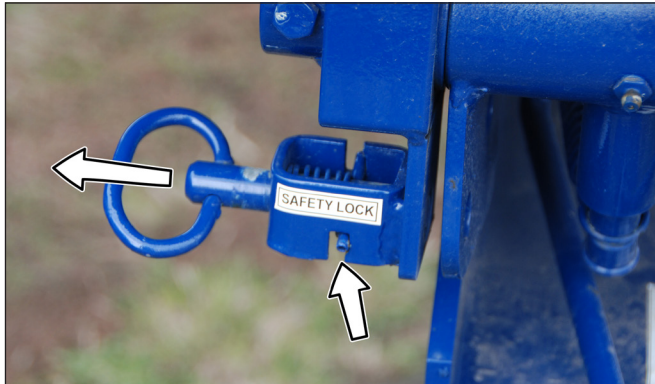
Note: If safety lock pin (1) is not fully engaged after the lever is moved into either position, the operator must drive straight forward until lever lock (2) is fully engaged. This may take from 3 to 10 seconds of straight forward driving. When the pin engages it makes a loud noise, this is normal.

4.2.7 Axle Safety Lock Pin

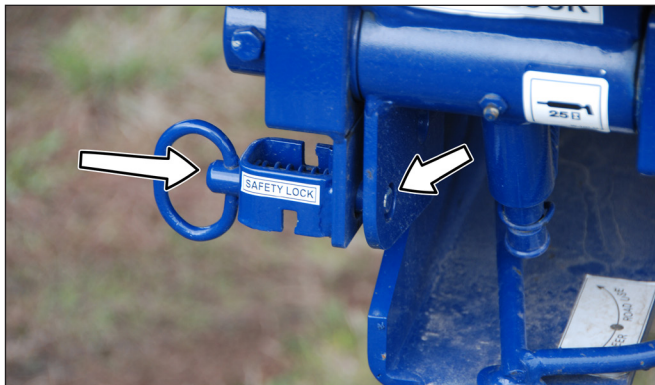
Use the axle safety lock pin in conjunction with the engagement lever when transporting.

This spring-loaded pin will lock or unlock the axle.

1. Pull the pin out and turn slightly to place the roll pin in the detent to release the lever lock.



2. Turn the pin back to center and move it out of the detent to release it. The spring will engage the transport pin when all the internal plates line up.



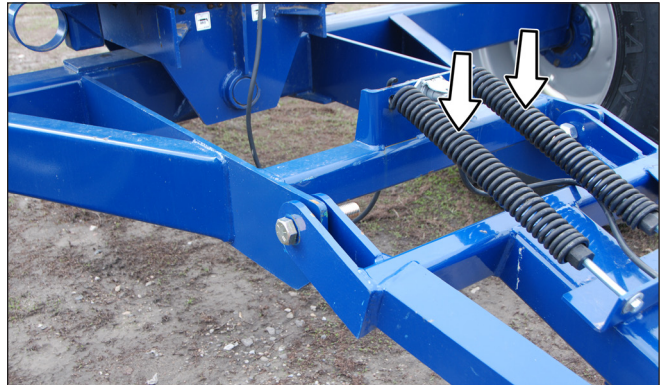
4.2.8 Owner Operator Manual Storage

Always store the Owner/Operator manual and other operating materials in the documentation storage tube.



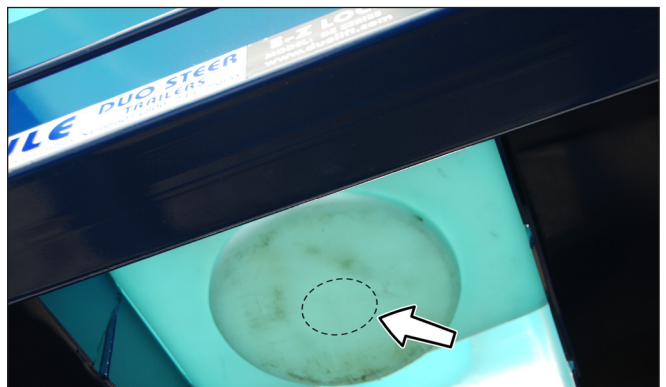
4.2.9 Tongue Lift Assist Springs

A pair of lift assist springs, attached from the main frame to the tongue, will assist or enable the user to easily lift the tongue assembly when attaching it to the tow vehicle.



4.2.10 Tank Hoses or Pipes

Wagons are shipped from the factory without plumbing. It is the responsibility of the owner and/or the dealer to supply and properly install any required fittings and/or hoses.

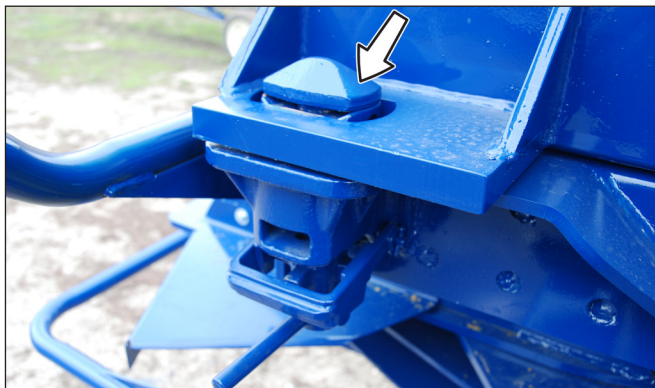


A hole in the bottom of the tank must be drilled to accommodate desired plumbing.

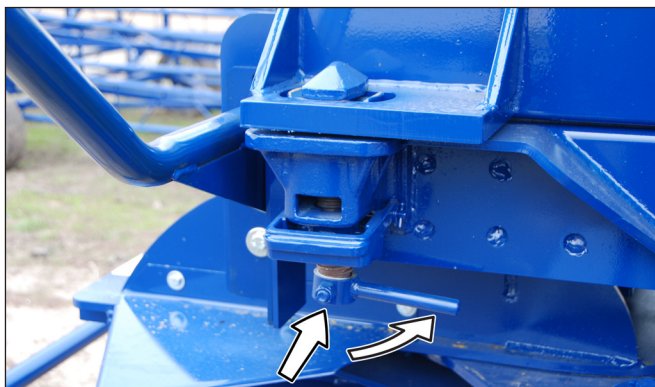
4.2.11 Optional Duo Purpose Removable Tank Frame

An optional removable frame is available for applications that use multiple tanks. Using this option allows one wagon to be fitted with an unlimited number of easily exchangeable tanks [ag chemical or anhydrous ammonia tank(s)].

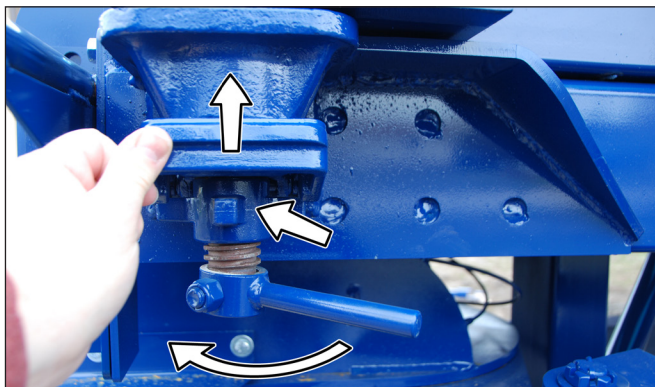
1. Place the removable frame over the locking pins.



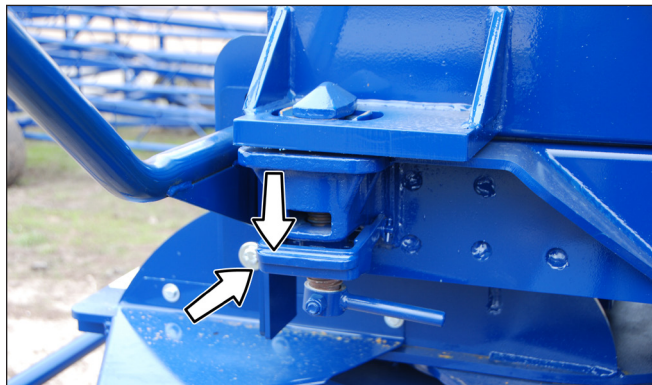
2. Rotate the locking pin lever to turn the locking pin 90 degrees.



3. Raise the ratchet assembly locking bar and then turn the ratchet counterclockwise to tighten the lock pin against the removable frame.



4. Make sure the ratchet assembly locking bar is in the down position and the ratchet assembly is locked in place.



WARNING



Crush Hazard

Do not use the wagon if the locking pins are loose. Tanks that become disconnected from the frame can cause personal injury and/or property damage. Tighten or, if necessary, replace the locking pins, making sure the tank and removable frame are securely fastened to the main frame before using the wagon.

5. Make sure the frame is securely locked onto the wagon frame before every use. Due to the weight, recheck the locks after filling the tank.



WARNING



Fumes and Chemical Burns Hazard

Make sure the fittings and hoses connected to the tank are properly installed and tightened to prevent leakage. Leakage of some chemicals can be dangerous and cause skin burns, inhalation problems, serious health issues, and possibly even death.

4.2.12 Extendable Hitch

Each hitch is designed with an extendable feature that extends up to 18 inches (46 cm) to assist in attaching the wagon to an applicator or the tow vehicle. This feature allows one person to more easily attach the wagon to the tow vehicle.

When attaching the wagon, always use a hardened pin with a mechanical retainer as well as the safety chain.

Raise the latch, extend the clevis frame, and attach to the tow unit. Simply back up to reengage latching mechanism and drive away.



Do not tow wagon with the hitch in the extended position.

4.2.13 Adjustable Axle Components

Optional adjustable axles are available that will allow the tire center line to be set from 120 to 144 inches (305 to 366 cm) wide and will fit any crop spacing within the specified range.

Turn stop spacers (3) need to be configured against the frame so as the track widens, the tires will not make contact with each other. To relocate the spacers, remove the two nuts, lock washers, washers, and bolts securing the spacer plates to the frame.



To set or adjust the spacing, follow this procedure.

CAUTION



Stay Clear

Clear the work area of all unnecessary people and/or obstructions to prevent personal injury.

1. Raise the end of an axle until the tire clears the ground.

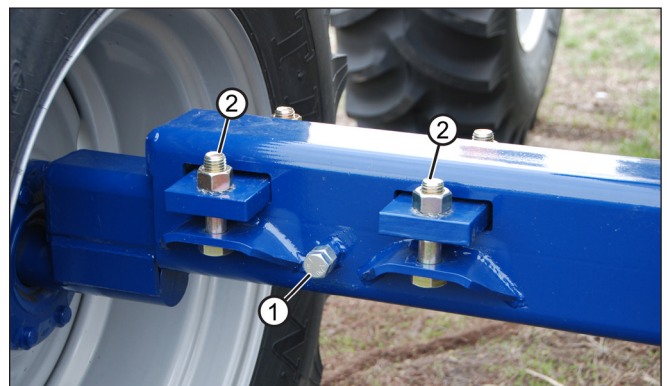
WARNING



Crush Hazard

Chock the wheels to prevent the machine from rolling, causing personal injury.

2. Loosen jam bolt (1) and two tie down plate bolts (2) on the outer axle tube until the inner axle tube is free to move.



⚠ WARNING



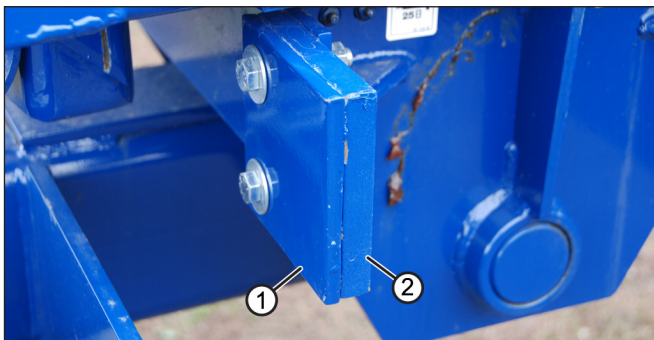
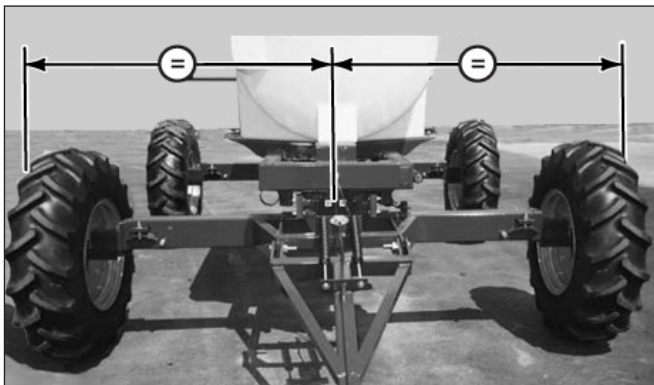
Lifting Hazard

To prevent injury, use two people or a moving device whenever moving components weighing more than 50 lbs. (23 kg), such as the tire and strut assembly.

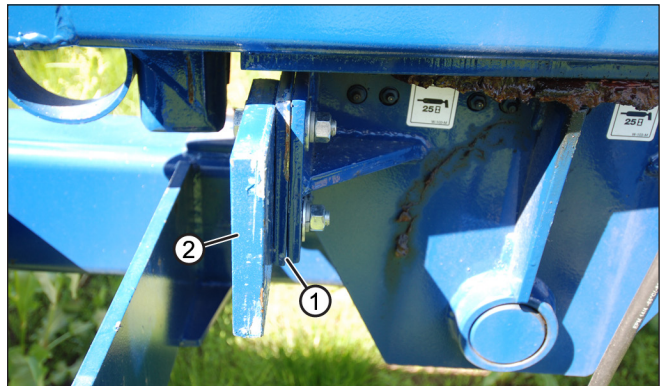
3. Move the wheel/strut assembly to desired position.
4. Use a tape measure to verify the dimension from the tire center line to the machine frame center line.



5. Retighten tie-down plate.
6. Repeat with other three wheels
7. Measure and verify the tire-to-tire center line spacing is the same on both axles and the spacing is centered on the frame. Install the spacer plates, as shown.

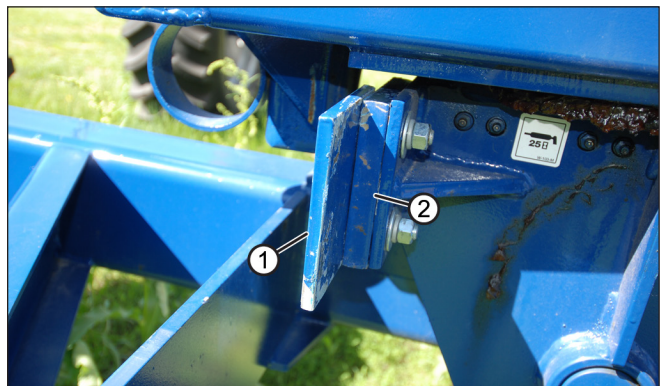


120 inch (305 cm) Spacing Uses No Spacers (1 or 2) in Storage Position.



132 inch (335 cm) Spacing Uses Thin Spacer (1) Against Wagon Frame.

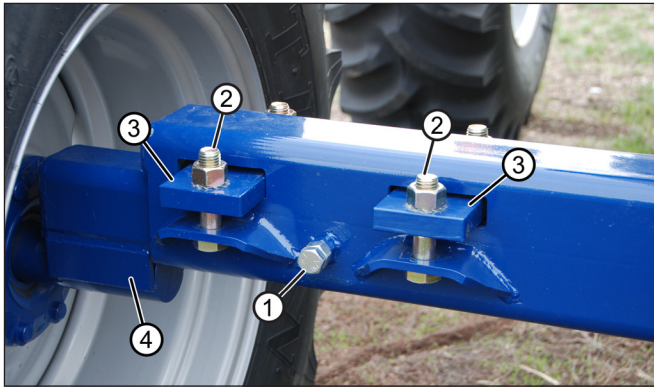
Note: 3/8" spacer (2) is in the storage position.



144 inch (366 cm) Spacing Uses Thick Spacer (2) Against Wagon Frame.

Note: 1/2" spacer (1) is in the storage position. Start with spacer closest to the one specified and make a test turn. Tow the wagon onto a hill or ramp.

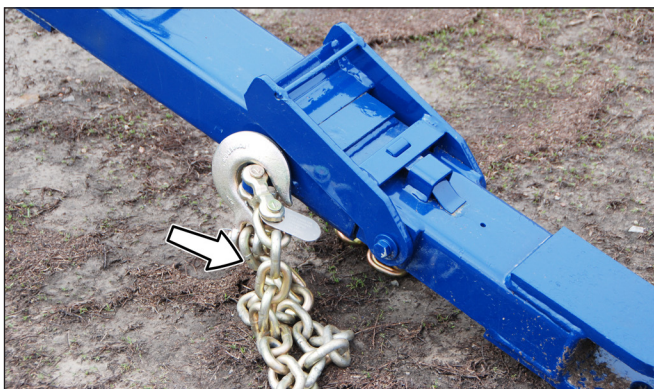
8. Retighten jam bolt (1) in each axle. Tighten to 80 ft.lbs. (110 N·m) 1/2-13 Grade 5 bolt. Then tighten the jam nut against the frame. Tighten before lowering to ground.



9. Tighten all axle clamp bolts (2) 200 ft.lbs. (271 N·m) 3/4-10 Grade 8.
10. Test steer wagon to verify tires do not contact each other during a full turn. Verify the new track width does not interfere with the tank supports or other frame members. Fix any problems.
Note: tracking distance may need to be changed slightly to work in your particular application.

4.2.14 Safety Chains

Safety chains are a vital part of towing safety. Duo Steer Wagons are equipped with certified safety chains. Each chain has a certification tag attached to it.



4.3 Reduced Height Wagon (Optional)

5. Operation

5.1 User Safety Training

WARNING



Read And Understand Manual

To prevent personal injury or even death, be sure you read and understand all of the instructions in this manual and other related OEM equipment manuals before using the Duo Steer Wagon. The Duo Steer Wagon, if not used properly, can be dangerous to users unfamiliar with its operation. Do not allow towing or adjusting of this wagon until the users have read this manual and have developed a thorough understanding of the safety precautions and functions of the wagon.

This wagon was designed for a specific application; transporting non-flammable, liquid crop treatment chemicals or herbicides used in agricultural applications. DO NOT modify or use this wagon for any application other than which it was designed.

Wagons filled or operated improperly or by untrained personnel can be dangerous; exposing themselves and/or bystanders to possible serious injury or death.



Read and Follow MSDS Sheets

Read and follow the chemical manufacturers' warnings, instructions, and/or procedures before filling or using the wagon.

Personal Protection Equipment

Always wear personal protective clothing (PPE) and follow all safe handling procedures.



Wear tight goggles and/or face shield to protect eyes.



Wear neoprene gloves, rubber boots, and water repellent clothing to protect the body.



Wear a respirator with a supply of fresh air to prevent breathing anhydrous fumes.

Note: Refer to section 2.11 for complete safety instructions on anhydrous ammonia.

WARNING



Roll Away Hazard

Before filling the wagon, make sure the engine of the tow vehicle is stopped, the transmission is placed in park, the key is removed, and the parking brake is set.



The weight of a fully filled tank, plus the wagon, if it rolls onto a person, can cause serious crushing injury or death. Make sure the wagon is securely attached to the tow vehicle when filled or being filled.



If the wagon is not attached to a tow vehicle, chock the wheels to prevent unanticipated movement.

SAFETY INSTRUCTIONS

The following safety instructions are provided to help prevent injury or limit equipment damage.



Train Unfamiliar Users

It is the wagon owner's responsibility to make sure any person using the wagon, especially if it is loaned or rented, has been thoroughly trained on its proper and safe use.

Train all new users and review instructions semi-annually with existing users.

Be certain only physically able persons will use the wagon.

Users who have not read and understood all operating and safety instructions are not qualified to use the wagon.

Untrained users expose themselves and bystanders to possible serious injury or death.

If the elderly are assisting with the work, their physical limitations need to be recognized and accommodated.

Do not tow on a roadway in Duo Steer (4-wheel steer) mode.

5.2 Initial Set-up

5.2.1 Connecting Tongue to Frame

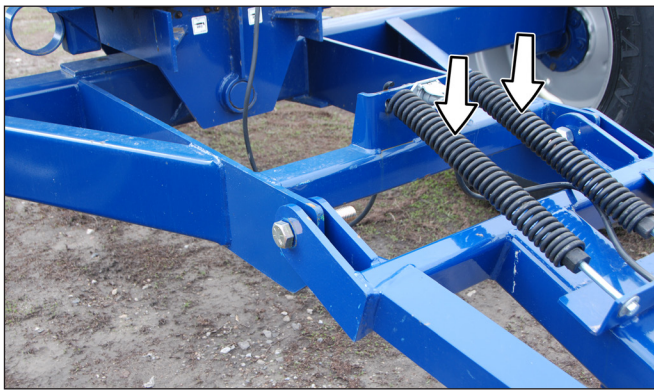
WARNING



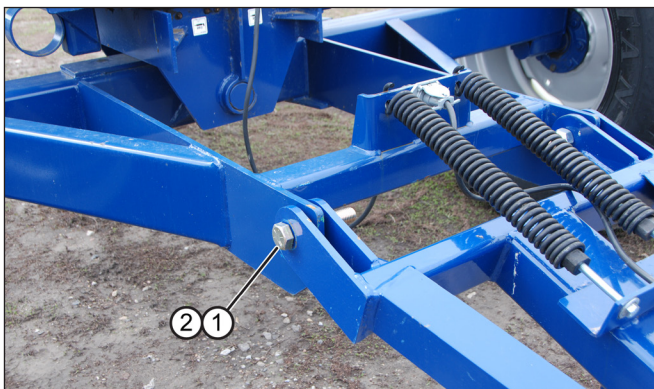
Flying Object Hazard

The tongue assist lifting springs are under tension, especially when the tongue is lowered to the ground. Do not remove the bolts without first releasing tension by following the procedure.

1. Chock the wheels.
2. Lift the tongue assembly and place the ears of the tongue into the frame brackets.

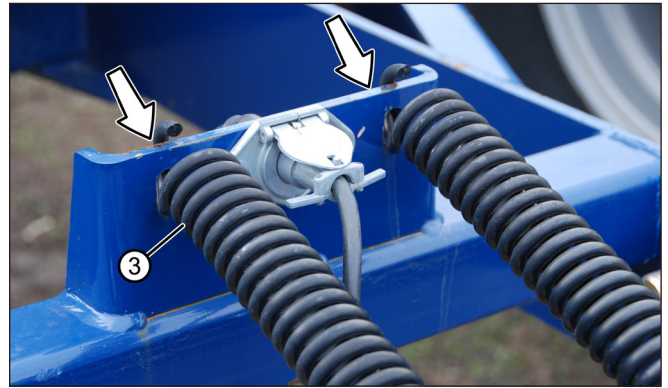


3. Install two 3/4-10 Grade 8 Bolts (1) and lock nuts (2). Tighten the lock nuts enough to eliminate any side play while still allowing the tongue to freely move up and down.

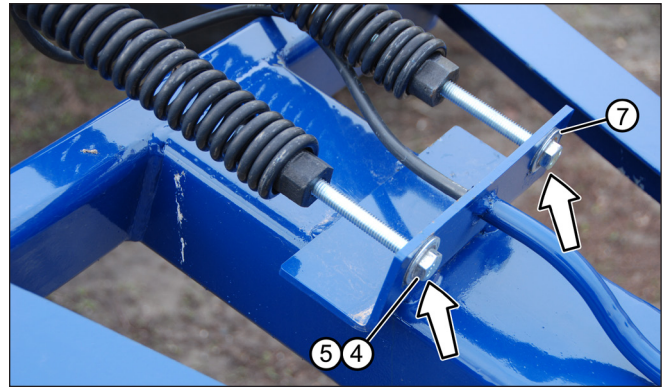


4. Raise the end of the tongue until it is parallel to the ground and support it with certified safety stands.

5. Hook the two lift assist springs (3) into the holes in the wagon frame. Hooks must be seated over plate.



6. Install the two long spring bolts (4) and flat washers (5).
7. Tighten the bolts until they just touch the frame member (7) to ensure proper spring tension.



8. Lower the tongue to the ground.
9. The purpose of the lift assist springs is for one person to safely lift the tongue assembly. Raise and lower the tongue to verify the tongue can be easily lifted. Adjust as needed to achieve this condition.

Note: The tongue should be parallel to the ground whenever adjusting the spring tension. The springs should never be tightened to the point where the tongue will not lower completely to the ground.

5.2.2 Hooking Up Hoses/Pipes to Tank

Wagons are shipped from the factory without plumbing. It is the responsibility of the owner and/or the dealer to properly install any required fittings and/or hoses.



A hole in the bottom of the tank must be drilled to accommodate desired plumbing.

WARNING



Fumes and Chemical Burns Hazard

Make sure the fittings and hoses connected to the tank are properly installed and tightened to prevent leakage. Leakage of some chemicals can be dangerous and cause skin burns, inhalation problems, serious health issues, and possibly even death.

5.2.3 Hose Routing

To prevent possible equipment damage, route all hoses, wiring, or other connections through the hose rings.





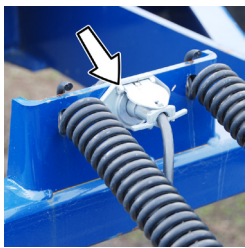


5.2.4 Selecting Standard or 4-Wheel Steer Mode



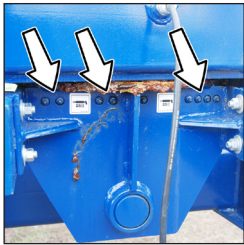



Refer to the Operation Section for complete instructions.

5.3 Pre-Operation Checklist

Efficient and safe operation of the Duo Lift Mfg. Co. Inc. Duo Steer Wagon requires that every user read and understand the operational instructions and all related safety instructions outlined in this manual.

This pre-operation checklist is provided for the user/owner. It is important for both the personal safety and to maintain the mechanical condition of the wagon that this checklist is followed.

Initial Set-Up Checklist (prior to using for the first time)		
✓	Location	Task
		Make sure the hitch is properly installed. "6.2.1.2 Connecting the Hitch" on page 38.
		Make sure the safety chains are securely attached and the extension hitch is functioning properly. "4.2.14 Safety Chains" on page 28, "4.2.12 Extendable Hitch" on page 26.
		Plug the lighting extension cable into the frame. "6.2.1 On-Road Towing" on page 38.
		Check the container (tank) and accessory equipment. Make sure all components are in good condition and working properly. Make sure lid is completely tightened onto tank.
		Make sure the tank bands securing the tank to the frame are tight. An air gap is normal, do not overtighten. "8.6 Tank Replacement" on page 47.

Initial Set-Up Checklist (prior to using for the first time)		
✓	Location	Task
		<p>Check the tires and ensure they are inflated to the specified pressure. Refer to the specifications on tires.</p> <p>Check wheel nut or bolt torque on all wheels. Ensure they are tightened to the specified torque. "5.3 Pre-Operation Checklist" on page 31.</p>
		Check wheel bolt or lug nut torque on all wheels.
	 	<p>Lubricate all grease points using the front and rear grease banks. Refer to the Maintenance section. "8.5.2 25 Hours or Weekly" on page 46.</p>
		Make sure the Duo Steer E-Z Lock mechanism is functioning properly. "4.2.6 Duo Steer E-Z Lock System; Engage/Disengage" on page 23, "5.6 Selecting Mode of Operation for Duo Steer (4-Wheel Steer) Tracking Wheels" on page 34.
		Make sure the Duo Steer Safety lock pin is inserted into the lock plate. The location of the pin is dependent on being in either Duo Steer or Standard Steer mode. "4.2.7 Axle Safety Lock Pin" on page 24.

Initial Set-Up Checklist (prior to using for the first time)		
✓	Location	Task
		Make sure the tie down plate bolts are in place and securely tightened. "4.2.13 Adjustable Axle Components" on page 26.
		If equipped with removable spindles, make sure the retaining bolt is tight. The bolt should be tightened to 150 ft. lbs. (203 N·m).
		On Duo Purpose Wagons make sure the tank frame locks are tight. "4.2.11 Optional Duo Purpose Removable Tank Frame" on page 25.
		Make sure all lights, reflectors, and SMV emblem required by local authorities are installed, clean, and in good working condition.
		Install and inspect all chemical lines, hoses, fittings, and couplers for leaks. Tighten any leaking fitting. "10.3.1 Tightening Flare Type Tube Fittings" on page 56.
		Make sure wagon will not cause interference while turning. If interference is a problem install longer optional tongue or contact OEM implement manufacturer.

Before each use of the Duo Steer Wagon, the following areas should be checked.

Checklist Before Each Use	
✓	Task
	Inspect wiring harness and 7-way RV plug for damage. Do not use wagon if damage is found.
	Make sure the wagon is positively hitched to towing vehicle using an OEM hardened drawbar pin and retainer clip.
	Attach safety chains from the wagon to the tow vehicle. Crisscross chains under the hitch to support it should an unplanned separation occur.
	Use only an empty truck, or tractor of adequate power and weight to pull the filled wagon.
	Check inflation pressure on all tires. Correct under-inflation or over-inflation pressures. "See correct pressures on tire".
	Make sure wheels are securely fastened to axles.
	Check tank bands. Be sure tank is securely attached to the wagon. "8.6 Tank Replacement" on page 47.
	Make sure the Duo Steer mechanism is placed into one of its two modes; standard or Duo Steer. "5.6 Selecting Mode of Operation for Duo Steer (4-Wheel Steer) Tracking Wheels" on page 34.
	Make sure the hitch extension is locked in place before towing. "6.2.3 Connecting the Wagon" on page 40.
	Make sure lights, reflectors, and SMV emblem required by local highway authorities are installed.
	Clean and make sure lights are working properly.
	Inspect the overall wagon and its attachment(s) for potential problems or damage. Do not use the wagon if it needs repairs of any type.

5.4 Machine Break-In

Although there are no operational restrictions on the Duo Steer Wagon when used for the first time, it is recommended that the following mechanical items be checked:

1. After 1/2 hour or 5 miles (8 km) of operation:
 - a. Re-torque all wheel bolts. 9/16" - 115 ft.lbs. (155 N·m), 5/8" - 100 ft.lbs. (135 N·m), 3/4" - 260 ft.lbs. (352 N·m).
 - b. Tighten all fasteners if necessary.
 - c. Make sure no electrical or brake wires are being pinched or crimped. Repair if damaged.
 - d. Inspect wiring harness. Check all lubrication lines, hoses, fittings, and connectors for leaks. Tighten any leaking fittings. Repair any damage.
 - e. Lubricate all grease fittings. Do not lubricate wheel bearings.
2. After 1 hour or 10 miles (16 km) of operation, re-torque all wheel bolts.
3. After 2-1/2 hours or 25 miles (40 km) of operation, re-torque all wheel bolts.
4. After 5 hours or 50 miles (80 km) of operation:
 - a. Re-torque all wheel bolts, fasteners, and tighten tank bands.
 - b. Inspect all electrical wiring. Check all brake and lubrication lines, hoses, fittings, and connectors for leaks. Tighten any leaking fitting.
5. After 10 hours or 200 miles (320 km) of operation:
 - a. Re-torque all wheel bolts, fasteners, and tank bands.
 - b. Inspect all electrical wiring. Check all brake and lubrication lines, hoses, fittings, and connectors for leaks. Tighten or repair any leaks.
 - c. Go to the normal servicing and maintenance schedule, as defined in the Maintenance Section.

5.5 Operation Checklist

Although the Duo Steer Wagon is easy to use, each operator should review this section to familiarize themselves with the detailed safety and operating procedures. When using this machine, follow this procedure:

1. Clear the area of bystanders, especially small children.
2. Read and follow the OEM chemical manufacturer's warnings, instructions, and procedures on the specific chemical being used.
3. Attach the wagon to the tow vehicle.
4. Review and follow the Pre-Operation Checklist. "5.4 Pre-Operation Checklist" on page 33
5. Move the wagon to the field in the 2 wheel mode and position it behind the applicator.
6. Unhook the wagon from the tow vehicle. Attach the wagon to the specific applicator and then chose 2 or 4 wheel mode depending on application.
7. Always follow the OEM instructions for the use of pumps or other components used to pump chemicals from the tank. Since there is such a wide variety of possible plumbing designs, it is the owner/operator's responsibility to make sure this OEM equipment is being used safely.
8. Go back 2-wheel mode for road movement.

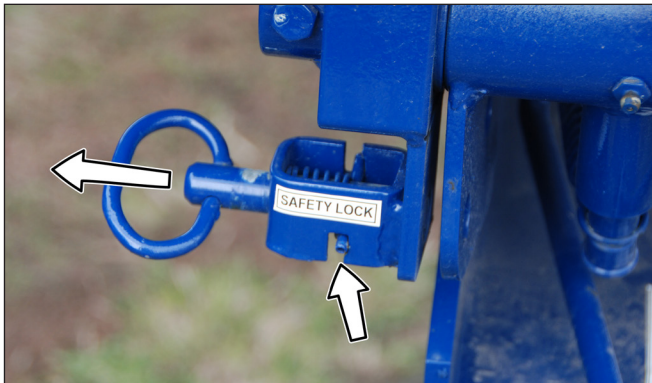
5.6 Selecting Mode of Operation for Duo Steer (4-Wheel Steer) Tracking Wheels

NOTICE

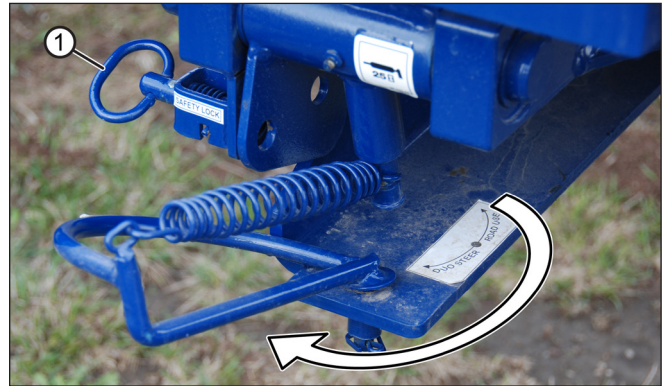
When switching between two and four wheel steer make sure the mechanism is working correctly. If it does not work properly, discontinue towing and contact Duo Lift. Recheck the operation after 5 and 10 hours of use.

To utilize the Duo Steer (4-Wheel Steer) feature, follow this procedure:

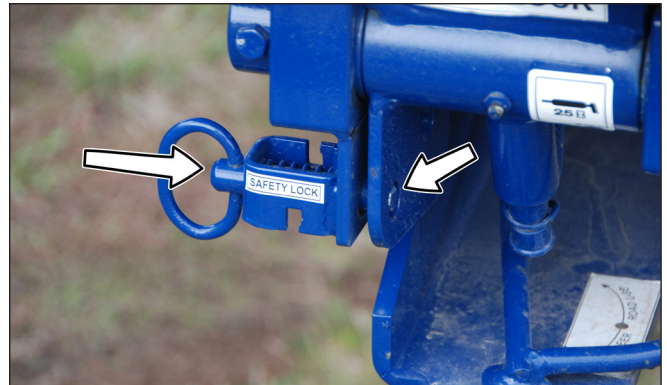
1. Retract the safety lock pin and put it into its detent.



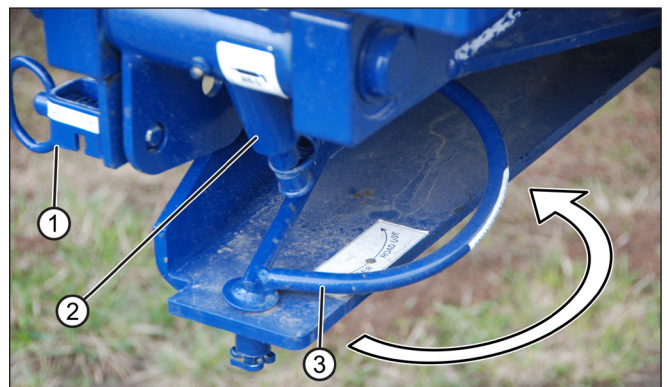
2. Pull the engagement lever backwards over-center to place in the Duo Steer (4-Wheel Steer) Use tracking position.



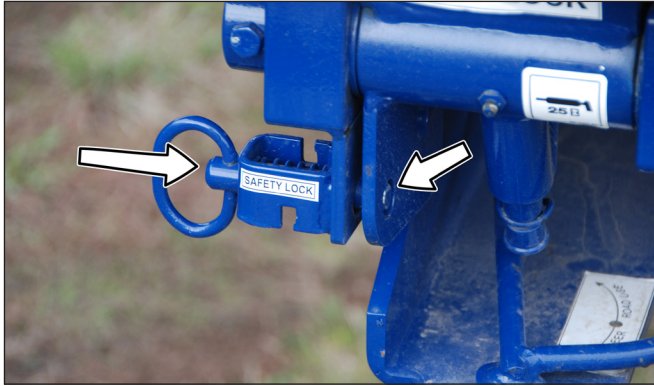
3. Release the safety lock and drive forward while turning slightly. Once the holes in the locking plates are aligned, the pin will snap into position.



4. To return to the standard Road Use application, release the safety lock pin and move the engagement lever forward.



5. Release the axle lock pin and drive straight forward. Once the holes in the locking plates are aligned, the pin will snap into position.



6. Ensure Safety lock pin is fully engaged.

6. Towing

6.1 Towing Safety (Road)

WARNING

The following safety instructions can and will result in serious injury and possibly even death if they are not understood and followed.



Vehicle Owner/Operator Manual

Always refer to the towing vehicle owner's manual trailer towing section to determine the vehicle's towing capacity and to ensure compatibility and maximum safety.



Operating the Tow Vehicle

Before attaching the wagon to the tow vehicle, be familiar with its controls and how to stop it quickly in the event of an emergency. Read and understand this manual and the one provided with your tow vehicle before towing the wagon.



Hitch and Retainer Pins

Attach wagon and tow vehicle using a OEM hardened hitch pin with a retainer. Do not use homemade pins.



Crush Hazard

Under no circumstances should young children be allowed to work with or around the Duo Steer Wagon. When moving the wagon, make sure all bystanders, especially small children, stay clear of the working area.



Fall and Crush Hazard

Do not allow riders on wagon or tow vehicle.



Maximum Towing Speed

Do not exceed a maximum safe road speed, which may be lower than the recommended or posted speed. Slow down for corners and rough terrain. Do not tow the wagon on the road when it is in the Duo Steer (4-wheel) mode.



Descending Hills

Shift towing vehicle to a lower gear before going down steep downgrades to use engine as a retarding force. Keep towing vehicle in gear at all times.



Visibility

Clean reflectors, SMV or SIS sign, and lights before towing. Make sure all the lights and reflectors required by highway and transport authorities are in place and can be seen clearly by all overtaking and oncoming traffic.

WARNING



Regulations

Make sure all local, state, and federal regulations, regarding the transport of equipment on public roads and highways, are met. Check with the local authorities regarding pulling the wagon on public roads. Obey all applicable laws and regulations.

SAFETY INSTRUCTIONS

The following safety instructions are provided to help prevent injury or limit equipment damage.



Do Not Exceed Safe Travel Speed

When towing with a tractor, never travel faster than 20 mph (33 kph). The ratio of tractor weight to the wagon and container weight plays an important role in defining safe travel speed. The chart summarizes the weight ratio to travel speed. Use it as a guide to determine a safe travel speed.

Road Speed	Weight of fully loaded wagon relative to weight of towing vehicle
Up to 20 mph (33 kph)	1 to 1 or less (33 kph)
Up to 10 mph (16 kph)	2 to 1 or less (16 kph)
Do not tow	More than 2 to 1



Drive Safely

Be a safe and courteous driver. Anticipate what other drivers will do and drive accordingly.



Tow Vehicle Brake Safely

Apply the brakes carefully to prevent jack-knifing.



Allow Extra Distance

Apply brakes early. Leave extra distance between your vehicle and the one(s) ahead to provide adequate stopping space. Extra distance will be required to stop the vehicle.



Make Wide Turns

Make wide turns when going around corners as the wagon, in Road Use mode, will not follow in the tracks of the towing vehicle.



Do Not Connect Two Wagons

Do not connect two wagons together.

6.1.1 Preparation (Inspection)

SAFETY INSTRUCTIONS

The following safety instructions are provided to help prevent injury or limit equipment damage.



Hitch Rating

Make sure the hitch and hitch pin on the towing vehicle are rated equal to, or greater than, the wagon's "gross vehicle weight rating" (GVWR).



Inspect Hitch and Coupling

Inspect the hitch and hitch pin for wear or damage. Make sure the hitch and coupling are compatible. DO NOT tow the wagon using a defective hitch or coupling.



Hitch Attachment

Be sure the wagon is securely attached to the tow vehicle and in good operating condition before using.



Crisscross Safety Chains

Connect and crisscross the chains under the hitch to support the hitch should an unplanned separation occur.



Tire Pressure

Check tires for low pressure, cuts, bubbles, damaged rims, or missing lug nuts. Do not use the wagon if any damage is found.



Working Taillights

Make sure lights on the wagon are connected and working properly.

SAFETY INSTRUCTIONS



Additional Lighting

For wagon without lights, install additional lights on the rear of the wagon to safeguard against rear-end collisions. Daybreak and dusk are particularly dangerous and rear pilot vehicles are recommended.

Wagons without light package should be towed on public roads only during daylight hours

6.1.2 Towing Vehicle Specifications

SAFETY INSTRUCTIONS

The following safety instructions are provided to help prevent injury or limit equipment damage.

6.1.2.1 Truck (Empty Wagon Only)



Truck Capacity

A 3/4 ton or larger capacity trucks should be used for towing empty wagons on the road.

6.1.2.2 Tractor (Filled Wagon)



Rollover Protection

If the tow vehicle is a tractor, it should be equipped with a Roll Over Protective Structure (ROPS) and a seat belt.



Hazard Flashers

Use hazard flashers on the tractors when towing unless prohibited by law.



Right-of-Way

When towing below the posted speed limit. Keep to the right and yield the right-of-way to allow faster traffic to pass.

6.2 Attaching/Unhooking

Follow this procedure when attaching the wagon to a truck or tractor.

WARNING



Crush Hazard

Under no circumstances should young children be allowed to work with or around the wagon. To prevent personal injury when moving the wagon, make sure all bystanders, especially small children, stay clear of the working area.

SAFETY INSTRUCTIONS



Clear Vision

Remove all objects from the area that would prevent clear vision of the complete work area or would present an obstacle when moving the wagon.

SAFETY INSTRUCTIONS

Connect the wiring harness to the tow vehicle if transporting on a public road. Be sure to secure it to the hitch and provide sufficient slack for turning. Make sure the wagon lights are functioning correctly.



WARNING



Unexpected Separation Hazard

If the safety chains do not have a current certification tag, do not use the wagon until properly certified chains are installed. Substandard safety chains could allow the wagon to separate from the tow vehicle, resulting in equipment damage and personal injury.

6.2.1 On-Road Towing

SAFETY INSTRUCTIONS

Make sure the rear axle Duo Steer E-Z Lock mechanism is placed in the Road Use (2-wheel steer) mode. Ensure the safety lock pin is engaged before towing.

6.2.1.1 Travel Speed

Do not travel faster than 20 mph (33 kph) when the tank(s) are loaded during road transport. Only tow using a tractor. Always slow down for rough terrain and when cornering.



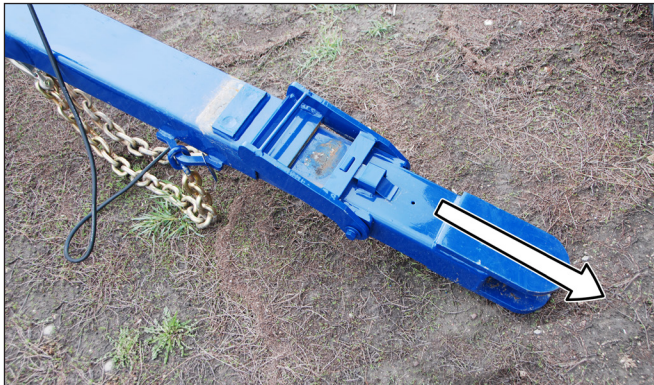
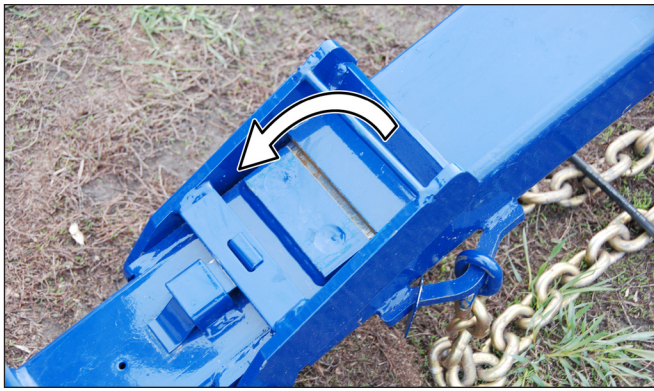
6.2.1.2 Connecting the Hitch

Follow this procedure when attaching the Duo Steer Wagon to a tractor or implement in the field:

Note: Use the hitch lift assist springs to lift the hitch.



1. Position the tow vehicle to within 12" (30 cm) of the wagon.
2. Lift the latch on the end of the hitch. Extend the hitch to align the holes for the pin.



NOTICE

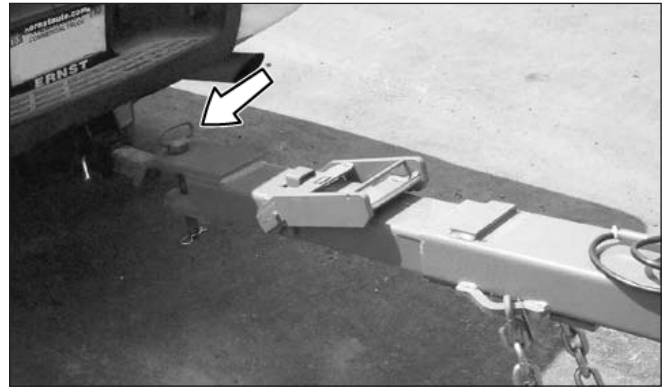
If towing the wagon with a drawbar, use only a certified, hardened drawbar pin with a retainer clip. Do not use homemade pins, bolts, or any other type of retaining device. Always install the retainer clip, making sure the hitch and wagon are securely fastened to the tow vehicle.

Using a pin not intended for this type of towing can result in unexpected separation of the wagon from the tow vehicle, resulting in equipment damage and personal injury.

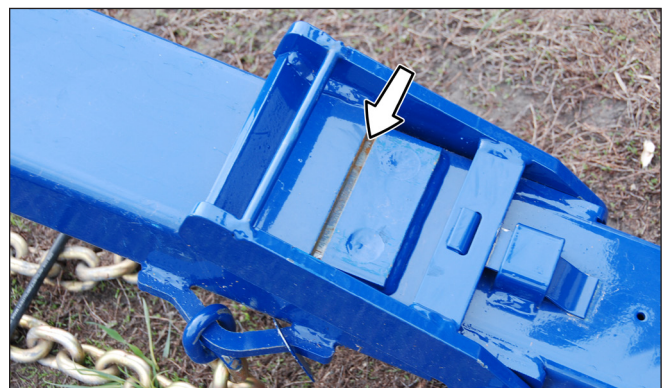
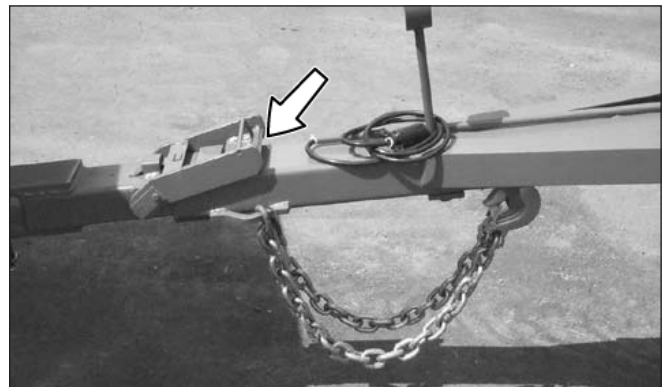
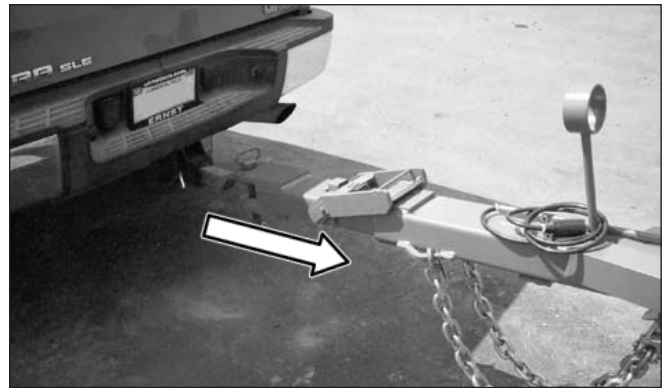
When equipped with a 14' long tongue use the jack to assist in lifting the tongue. Place in jack in the storage mode prior to towing.

Never tow the wagon with a truck when it is filled, use only a tractor to pull a filled wagon.

3. Connect the hitch to the tow vehicle and install a hardened drawbar pin and the retainer.

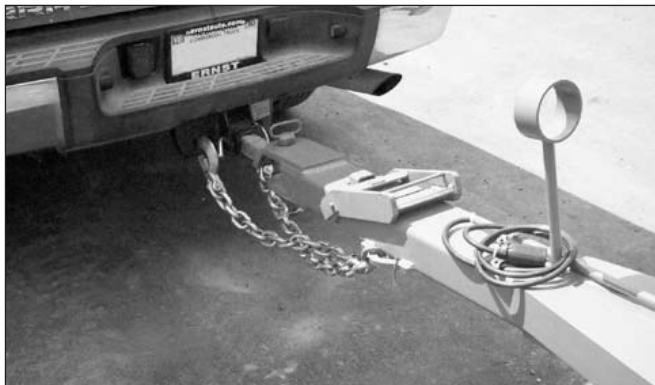


4. Back up to lock extension back into retracted position.



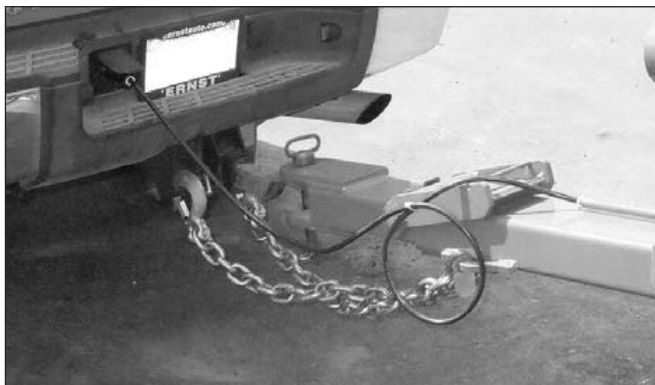
Note: Be sure the lock handle is fully engaged into the locked position before moving forward.

5. Attach the safety chains to tow vehicle to prevent unexpected separation. Be sure to crisscross the chains under the hitch.



6. Connect the 7-way RV wiring harness to the towing vehicle. Be sure to secure it to the hitch and provide sufficient slack for turning.

Note: If the trailer is towed with a combine or a tractor, then an RV to ATA wiring harness convertor is required to allow the lights to function correctly. Contact Duo Lift to obtain a convertor.



SAFETY INSTRUCTIONS

1. Make sure the wagon lights and brakes (if equipped), are working properly. If the wagon's electrical equipment is not functioning properly, it may be due to incompatible or crossed wiring from the tow vehicle to the wagon.
2. If equipped with hitch-activated brakes, make sure the wagon brakes apply when the brake pedal is depressed.
3. Reverse the above procedures when unhooking from tractor, truck, or tool bar.

6.2.2 Field Towing

SAFETY INSTRUCTIONS

Once in the field, the rear axle Duo Steer E-Z Lock mechanism can be placed in the Duo Steer use (4-wheel) mode. Ensure the safety lock pin is engaged before towing.

6.2.2.1 Field Operation Speed

Do not exceed 10 mph (16 kph) when operating in the field to minimize overloading from rough terrain conditions.



6.2.3 Connecting the Wagon

The hook up for towing is the same as the on-road with the exception of connecting the liquid lines to the implement.

1. Use a clean cloth or paper towel and clean any dirt or build-up from around the couplers.
2. Connect the line and lock it in place by pushing the clamps over center.

WARNING



Hose Separation Hazard

Hoses that unintentionally separate can cause severe chemical burns to the skin or lung injury if fumes are inhaled. Be sure the hose clamps are locked in place and the hose will not separate.



NOTICE

Be sure the hose(s) do not drag on the ground or get pinched when turning. Provide sufficient slack for turning.

3. With the valve closed, pull and turn the wagon to make sure the lines are loose enough for turning without dragging on the ground.

WARNING



Stay Clear

Clear the area of people, especially small children, before using the wagon. Under no circumstances should young children be allowed to work with or around the Duo Steer Wagon.

4. Plug in the wiring harness, if applicable. If it is not necessary to use the wiring harness, secure the cord and plug to prevent damage.
5. If the hoses are secure and function properly, open the valve and begin using the wagon.

7. STORAGE

7.1 Storage Safety

At the end of the season, the wagon should be thoroughly inspected and prepared for storage. Repair or replace any worn or damaged components to prevent any unnecessary down time at the beginning of the next season.

CAUTION



Personal Injury Hazard

Store the wagon in an area away from human activity. To prevent the possibility of serious injury, do not permit children to play on or around the stored wagon.



Crush Hazard

Chock the wheels to prevent the wagon from rolling, causing personal injury.

NOTICE

To prevent damage to the wagon, store it in a dry, level area.

7.2 Placing In Storage

Follow this procedure before storing:

1. Place the machine into its Road Use mode (2 wheel steer).
2. Remove all entangled vegetation.
3. Thoroughly wash the wagon with a pressure washer or water hose to remove all dirt, mud, or debris.
4. Inspect all anhydrous or liquid chemical hoses, couplers, and fittings. Tighten any loose fittings. Replace any hose that is cut, nicked, broken, abraded, or is separating from the crimped end of a fitting. Tighten or replace any leaking fittings. Always wear Personal Protective Equipment (PPE) when working on this equipment.
5. Lubricate all grease points. Make sure all grease cavities have been filled with grease to remove any water residue from washing.
6. Touch up all paint nicks and scratches to prevent rusting.
7. Select an area that is dry, level, and free of debris.
8. Move the wagon to its storage area (inside a building is ideal).
9. Place chocks in front of and behind a rear tire.
10. Do not leave the tow vehicle attached to the wagon.

7.3 Removing From Storage

When removing this wagon from storage, follow this procedure:

1. Attach the wagon to the tow vehicle.
2. Check:
 - a. Electrical wiring harness connections and components.
 - b. All hardware. Tighten as required.
 - c. Tire pressure.
 - d. All anhydrous or liquid lines, fittings, and connections. Tighten as required.
3. Lubricate all grease fittings.
4. Replace any worn or defective parts.
5. Follow the pre-operation checklist.

8. SERVICE AND MAINTENANCE

8.1 Maintenance Safety

WARNING

The following safety instructions can and will result in serious injury and possibly even death if they are not understood and followed.



Personal Protection Equipment

Wear personal protection equipment (PPE), which may include hard hat, safety glasses, safety shoes, gloves, etc. appropriate for the work site and working conditions.



Damaged Parts Hazard

Do not use the wagon if any parts are damaged. If the wagon is believed to have a defect which could cause it to work improperly, immediately stop using it and remedy the problem before continuing.



No Unauthorized Modifications

Do not modify the wagon or safety devices. Do not weld on the unit. Unauthorized modifications may impair its function and safety and will void the warranty.

If the wagon has been altered in any way from the original design, Duo Lift does not accept any liability for injury or warranty.



Crush Hazard (Chock Wheels)

Always chock the wagon wheels when performing maintenance.



Good Working Condition

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts.



Replacement Parts

If replacement parts are necessary, genuine factory replacement parts must be used to restore the unit to its original specifications. Duo Lift will not accept responsibility for damages as a result of the use of unapproved parts.



Safety Shields and Devices

When completing a maintenance or service function, make sure all safety shields and devices are installed before placing the wagon in service.

SAFETY INSTRUCTIONS

The following safety instructions are provided to help prevent injury or limit equipment damage.



Safety Equipment

A fire extinguisher and first aid kit should be readily accessible while performing maintenance on this equipment.



Clean Work Area

Do not leave tools lying around the work area. Follow good shop practices. Keep service area clean and dry. Be sure electrical outlets and tools are properly grounded. Use adequate light.



Use the Right Tools

Use the correct tools, jacks, hoists or other tools that have the capacity for the job.



Proper Support

Use certified safety stands rated to support the load when working beneath the wagon, or performing repairs, service or maintenance.

8.2 Tire Safety

WARNING

The following safety instructions can and will result in serious injury and possibly even death if they are not understood and followed.



Explosive Force Hazard

Explosive separation of a tire from the rim can cause serious injury or death.

Tire replacement, repair, and/or maintenance should be done by a qualified tire dealer or qualified repair service. Do not attempt to install a tire without proper equipment and experience to perform the job.

Failure to follow proper procedures, when installing a tire on a wheel or rim or adding air to the tire, can produce an explosive force that will result in serious injury or death.

Do not substitute tires with a lesser road rating and/or capacity for the original equipment tires.



Stand to Side of Tire When Inflating

Inflated tires can explode. When inflating tires, use a clip-on chuck and extension hose.

Always stand to the side of the tire when inflating and NOT in front of or over the tire assembly.



Maintain Correct Tire Pressure

Always maintain the correct tire pressure. Do not inflate the tires above the recommended pressure.



No Welding

Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure,

resulting in a tire explosion. Welding can structurally weaken or deform the wheel.

SAFETY INSTRUCTIONS

The following safety instructions are provided to help prevent injury or limit equipment damage.



Separation Hazard

To prevent injury due to possible dangerous separation of wheels from the axle, the wheel nuts must be maintained at the proper torque levels. Properly tightened wheel nuts prevent loose wheels and broken studs.

8.3 Lubricants

Use an SAE multipurpose high-temperature grease with extreme pressure (EP) performance. Also acceptable is an SAE multipurpose lithium base grease.

8.4 Greasing

Use the Maintenance Checklist provided to keep a record of all scheduled maintenance.

1. Use a handheld grease gun for all greasing.
2. Wipe grease zerks with a clean cloth before greasing to avoid injecting dirt and grit.
3. Replace and repair broken grease zerks immediately.
4. If any grease zerk will not take grease, remove and clean it thoroughly. Also clean the lubricant passageway. Replace the zerk if necessary.
5. To re-pack the wheel bearings, wash and completely flush out the old grease in between the rollers using proper solvents.
6. Use a bearing packer to ensure proper placement of grease inside the bearing.
7. Wheel bearing grease seals should be replaced each time the bearing is repacked using OEM seals.
8. If the wagon is equipped with a grease fitting in the hub, apply grease until new grease can be seen coming out of the hub.

8.5 Servicing Intervals

The period recommended is based on normal operating conditions. Severe or unusual conditions may require more frequent lubrication or oil changes.

8.5.1 10 Hours or Daily

1. Check torque of tank bands hardware.





2. Check the torque on all of the other component fasteners.
3. Check wheel bolt torque after 5 miles (8 km), 10 miles (16 km), 25 miles (40 km), and 50 miles (80 km) when the wagon is new (either from the factory or when a tire is changed).
Tighten 5/8 wheel nuts to 100 ft.lbs (135 N·m)
Tighten 3/4 wheel nuts to 260 ft.lbs. (352 N·m)

NOTICE

Over-tightening the wheel nuts will deflect the inner bevel of the wheel. This will damage the wheel and cause the bolts to continually loosen.

SAFETY INSTRUCTIONS

It is important that the bolts be tightened to their specified torque. Once the wagon is moved a few miles with loose bolts, the bolt holes can become elongated. From that time on, the bolts seldom stay tight. The best way to correct this problem is to replace the rim. Prevent this costly repair by keeping the wheel bolts tight.

WARNING

Wheel Detachment

Wheel nuts are prone to loosen after being first assembled due to metal creep between rim and nuts/bolts.

Inadequate wheel nut torque can cause rim to loosen resulting in a wheel separating from trailer.

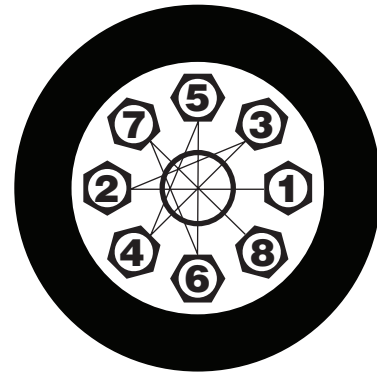
To prevent serious injury or death:

- Verify wheel nuts are tight before each tow.
- Check wheel nut torque for tightness initially, and after re-mounting a wheel after 5, 10, 25, and 50 miles.

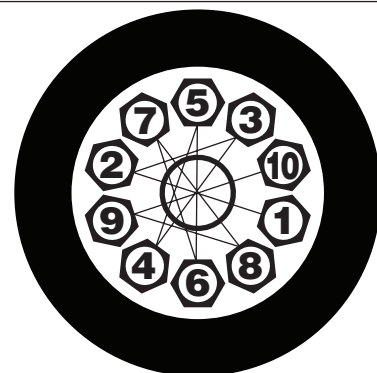
Tighten:
5/8" to 100 ft.lbs. (135 N·m)
3/4" to 260 ft.lbs. (352 N·m)

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Note: Always tighten the wheel bolts in an alternating pattern to pull the wheel evenly to the hub, as shown.



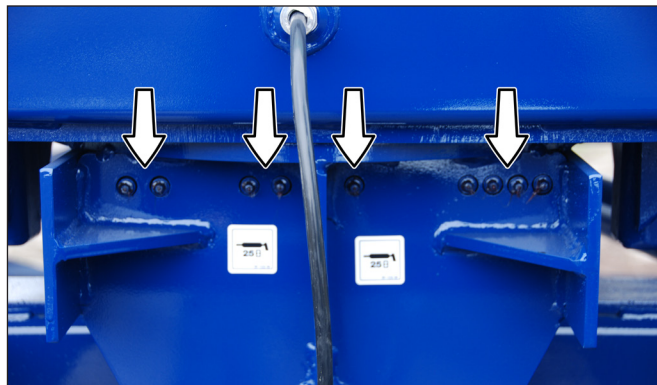
Eight Bolt Tightening Pattern



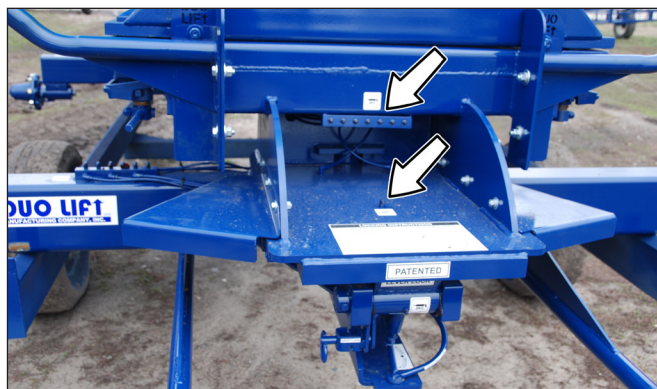
Ten Bolt Tightening Pattern.

8.5.2 25 Hours or Weekly

1. Grease front axle grease banks.



2. Grease rear axle grease banks.



3. Check inflation pressure on all tires. Refer to the tire sidewall for correct pressure.
4. Make sure all pins are equipped with hair pin retainer clips.

8.5.3 Annually

1. Re-pack standard wheel bearings or lubricate the E-Z Lube bearings.



2. Grease all lubrication points.

3. Make sure axle-to-frame bolts are properly tightened.
4. Make sure safety chains are properly attached and have a certification tag. Make sure chains are not worn or damaged in any way that would hinder their function.
5. Make sure an OEM drawbar pin and retainer clip are being used for towing and are in good condition. **Do not use homemade or shop-made drawbar pins when towing this wagon.**
6. If equipped, make sure the heavy duty extension tongue moves in and out. Also, make sure it does not pull completely out of the hitch. The latch handle should lock the tongue from pulling forward when in the pull position.
7. Make sure the tongue assembly is properly attached to the wagon frame and locked in place.
8. Make sure the wiring harness wire from tongue assembly to the wagon frame is routed and working properly.
9. Make sure all lights are working and that all safety signs and reflective tape are legible and properly installed.
10. Clean and wash the machine.



11. Inspect tank and tank lid for cracks, weathering, wear, deep gouges or other damage.

8.6 Tank Replacement

1. Use only OEM replacement tanks. Other manufactured tanks may not fit properly and could disconnect from the wagon causing property damage, personal injury, or death.



2. Tighten tank bands with equal gap of both sides. Tighten the nut until snug, then tighten one additional full turn. If both sides are tightened against the frame, make sure the tank is securely held to the wagon frame.



WARNING



Crush Hazard

Do not use the wagon if the tank bands are loose. Tanks that become disconnected from the frame can cause personal injury and/or property damage. Tighten or replace the tank bands and/or bolts, making sure the tank is securely fastened to the frame before using the wagon.

8.7 Duo Steer E-Z Lock Mechanism

Due to the complex nature of the Duo Steer turning mechanism, the axle should only be replaced by a qualified dealer or returned to the factory for replacement.

8.8 Bolt-On Axle Spindle

Some models have bolt-on axle spindles. Use the following procedure to replace the hub.

WARNING



Crush Hazard (Chock Wheels)

Always chock the front and rear of the wagon wheels when servicing. Make sure the wagon is completely stable before servicing.

1. If the tank is filled with liquid, empty it before lifting the axle.
2. Raise the axle enough to remove the wheel.



WARNING



Crush Hazard

Support the wagon, using either certified safety stands, or an overhead lifting device. Whichever method is chosen for support, make sure it will safely support the weight of the wagon. Crush injuries, resulting in possible death, will occur if the wagon falls on someone.

3. Securely support the wagon to prevent it from falling.
4. Remove hub from spindle to reduce weight.
5. Remove the bolt and lock washer retaining the spindle assembly.
6. Reinsert the bolt and drive out the spindle.

7. Visually inspect the housing for damage. Repair any damage or replace the axle before installing the new hub.
8. Install the new spindle.
9. Install the washer, locknut and bolt. Tighten the bolt to 150 ft.lbs (203 N·m).
10. Reinstall the hub and wheel. Tighten the wheel nuts to the specified torque.
11. Remove the supporting devices and lower the wagon to the ground.

8.9 Wheel Bolt Torque Requirements

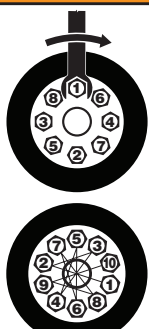
It is extremely important to apply and maintain proper wheel mounting torque on your trailer axle. Use a torque wrench to assure the proper amount of torque is being applied to the fastener.

Note: Wheel nuts and bolts must be installed and maintained at the proper torque levels to prevent loose wheels, broken studs, and possible dangerous separation of wheels from your axle.

Be sure to use the fasteners matched to the cone angle of your wheel.

- a. Start all bolts or nuts by hand to prevent cross threading.
- b. Tighten bolts or nuts in the following sequence.
- c. The tightening of the fasteners should be done in stages. Following the recommended sequence, tighten the fasteners per the wheel torque requirements diagram.

⚠ WARNING



Wheel Detachment

Wheel nuts are prone to loosen after being first assembled due to metal creep between rim and nuts/bolts.

Inadequate wheel nut torque can cause rim to loosen resulting in a wheel separating from trailer.

To prevent serious injury or death:

- Verify wheel nuts are tight before each tow.
- Check wheel nut torque for tightness initially, and after re-mounting a wheel after 5, 10, 25, and 50 miles.

Tighten:
5/8" to 100 ft.lbs. (135 N·m)
3/4" to 260 ft.lbs. (352 N·m)

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- d. Wheel nut/bolts should be torqued before first road use and after each wheel removal. Check and re-torque at 5, 10, 25, 50, and 100 miles. Check annually thereafter.

8.10 Welding Repairs



Before performing any type of welding repair to the wagon, contact Duo Lift for approval.

Repair welding must be done with care and with procedures that may be beyond the capabilities of the ordinary welder.

⚠ WARNING



Personal Injury Hazard

Repairs or modifications to the wagon, wagon tongue, or wagon hitch can result in serious injury or death should these repairs fail.

NOTICE

Anyone performing a welding repair should be certified in accordance to the American Welding Society (AWS) standards.

8.11 Service Record

Copy this page to continue record.

Hours and Serviced By														
Maintenance														
25 Hours of Operation														
Grease all lubrication points.														
Check tire pressure on all wheels.														
Make sure wheel nuts/bolts are tightened to proper torque on all wheels.														
Make sure all pins are equipped with hair pin retainer clips.														
Annually														
Re-pack standard wheel bearings or lubricate the bearings.														
Grease all lubrication points.														
Make sure axle-to-frame bolts are properly tightened.														
Check tie rods for damage.														
Make sure safety chains are properly attached and have a certification tag. Make sure chains are not worn or damaged in any way that would hinder their function.														
Make sure an OEM drawbar pin and retainer clip are being used for towing and are in good condition. Do not use homemade or shop-made drawbar pins when towing this wagon.														
If equipped, make sure the extendable tongue moves in and out. Also, make sure it does not pull completely out of the hitch. The latch handle should lock the extendable tongue from pulling forward when in the towing position.														
Make sure the tongue assembly is properly attached to the wagon frame and locked in place.														
Make sure the safety chains are installed.														
Make sure the wiring harness wire from tongue assembly to the wagon frame is routed through attached wiring clamp clip and working properly.														
Make sure all lights are working and that all safety signs and reflective tape are legible and properly installed.														
Wash the wagon.														

8.12 Maintenance

By following a careful service and maintenance program for your machine, you will enjoy many years of trouble-free service.

8.12.1 Wheel Hub Bearing Repacking Instructions

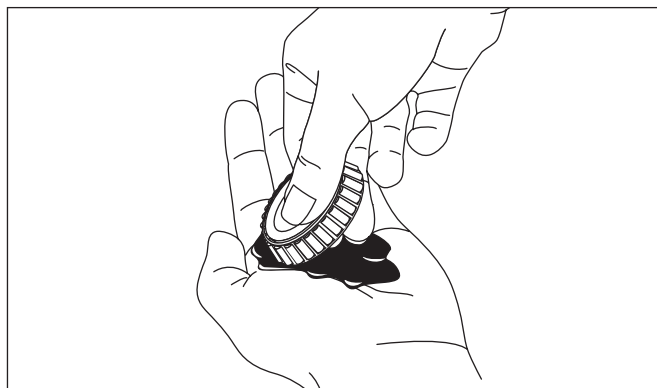


NOTICE

Do not mix Lithium, calcium, sodium or barium complex greases due to possible compatibility problems. When changing from one type of grease to another, it is necessary to ensure all the old grease has been removed.

Along with bearing adjustment, proper lubrication is essential to the proper function and reliability of your wagon axle. Bearings should be lubricated every 12 months or 12,000 miles. The method to repack bearing cones is as follows:

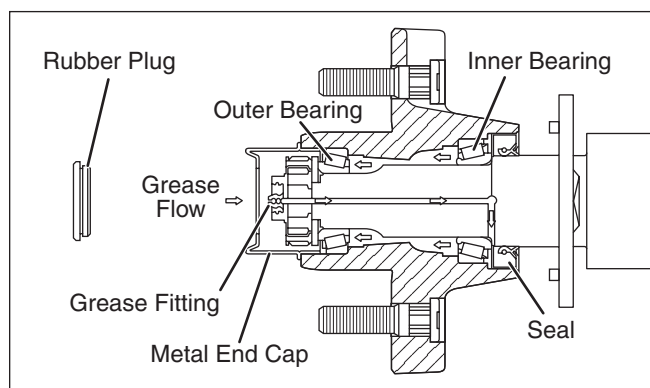
1. The use of a bearing packer to repack the bearings is recommended. Follow the OEM instructions for the proper use of the bearing packer.
2. If a bearing packer is not available, place a quantity of grease into the palm of your hand.



3. Press or pull a section of the bearing rollers and cage through the grease, forcing grease into the interior of the bearing.
4. Rotate the bearing and repeat the process from roller to roller.
5. Continue this process until the entire bearing is completely filled with grease.
6. Before reinstalling the bearing cone, apply a light coat of grease on the bearing cup.

8.12.2 Hub and Bearing Installation

1. Press the cup of the inner and outer bearings into the hub assembly.
2. Install the cone of the inner bearing. Coat the inner surface of the cup with a thin coat of grease before installing the cone.
3. Install the double lip seal in the hub assembly.
4. Clean the spindle with a clean cloth.



5. Slide the hub onto the spindle. Use care not to damage the lip of the seal when installing the hub assembly.

Note: The inside surface of the bearing cones and the spindle shaft are machined to a very close tolerance. If either the bearing cone or spindle is damaged or dirty, the hub will not slide easily onto the spindle. Also, if the rear bearing cup is not seated squarely in the hub, it may not slide on the spindle.

6. Once the hub is seated against the back of the spindle, install the outer bearing cone. Make sure the taper of the cone is seated in the bearing cup (do not install the bearing cone backwards).
7. Install the spindle washer and castle nut. Hand tighten the castle nut.
8. Follow the procedure in the Wheel Bearing Preload Adjustment section.

8.12.3 Wheel Bearing Preload Adjustment

Whenever new hubs or new bearings are installed, the bearings must be preloaded.

Preloading the bearings ensures the bearing cups are completely seated in the hub. Improperly installed bearings will cause the hub to wobble.

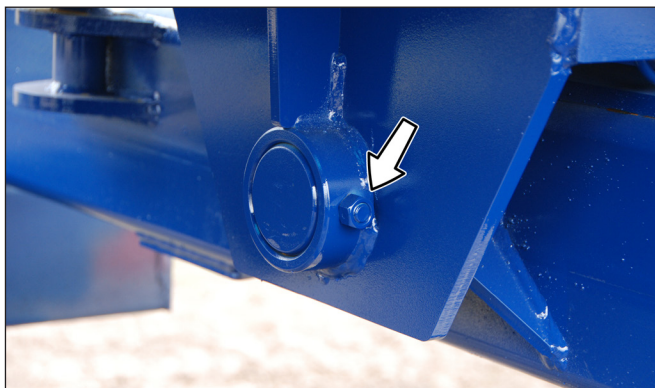
1. Tighten the wheel nut using a wrench until hub barely turns. Do not overtighten the nut.
2. Turn the hub five to ten revolutions to fully seat the bearings.
3. Loosen the castle nut.
4. Hand tighten the castle nut.
5. Tighten the castle nut additionally until the next castle nut slot is aligned with the cotter pin hole in the spindle.
6. Install the cotter pin and bend the tabs around the castle nut.

NOTICE

Do not tow the wagon when the spindle nut is too tight; this will cause the bearings to overheat. Never tow the wagon with bearings too loose. A very slightly loose spindle nut will run adequately, but too loose and the rollers may come apart inside the bearings, causing the hub to fracture.

8.12.4 Rocker Arm and Front Axle Pin Inspection

Make sure the axle pin retainer bolt is installed with the locknut completely tightened.

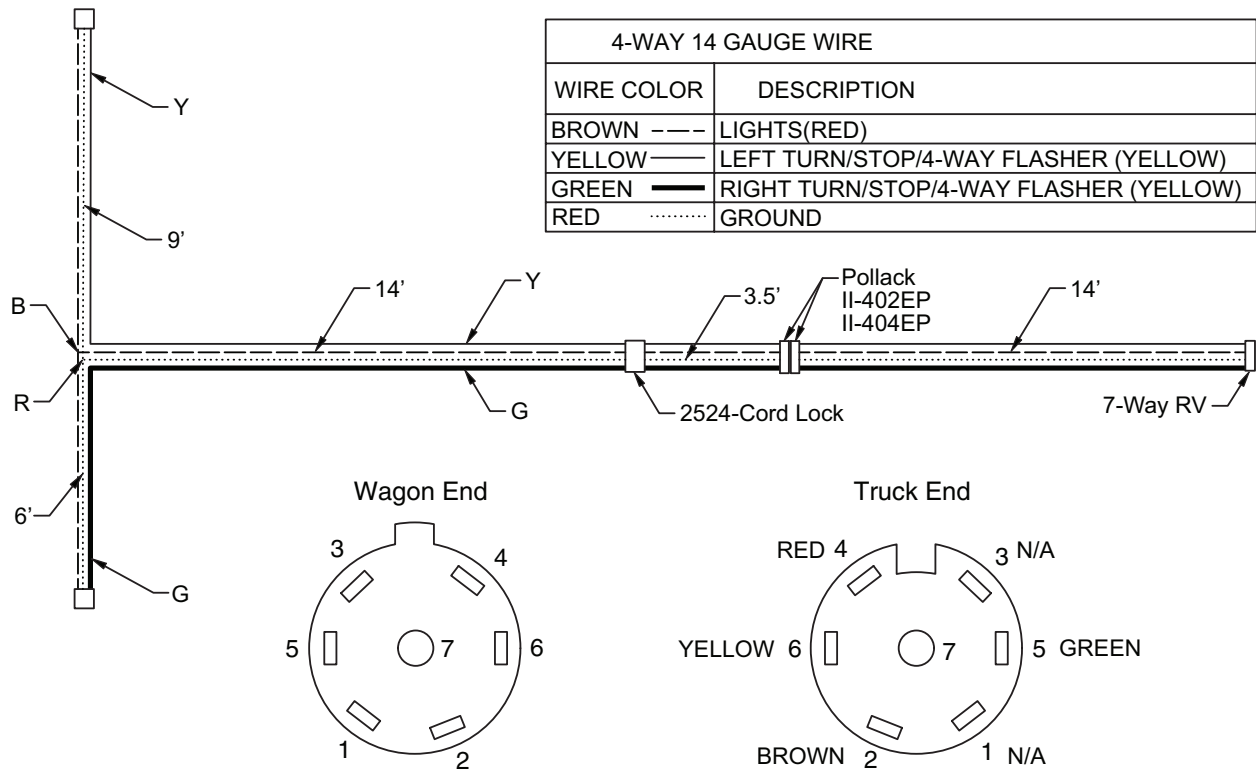


8.12.5 Tie Rods

The tie rods are factory preset and should not be adjusted. Contact Duo Lift for assistance.



8.13 Wiring Harness Diagram



9. TROUBLESHOOTING

In the following section, we have listed many of the problems, causes, and solutions to the situations that you may encounter.

If you encounter a problem that is difficult to solve, even after having read through this troubleshooting section, please call your local distributor or dealer. Before you call, please have this Operator's Manual from your unit and serial number ready.

PROBLEM	CAUSE	SOLUTION
Wagon sways when being pulled down the road.	Low tire pressure.	Inflate tire to correct pressure. Check all tires. "See proper pressure on side of tire".
	Axle is bent or out of alignment.	Repair or replace axle (Contact Duo Lift).
	Unit is in Field Mode (4 wheel steer).	Convert unit to Road Use Mode (2 wheel steer). "5.6 Selecting Mode of Operation for Duo Steer (4-Wheel Steer) Tracking Wheels" on page 34.
	Bent wheel rim.	Replace rim.
Wagon pulls to one side when being towed.	One tire has low pressure.	Inflate tire to correct pressure. "See proper pressure on side of tire".
	Axle(s) out of alignment.	Realign, repair, or replace axle(s).
	Tie rod length is out of adjustment.	Adjust tie rod to align wheels. "8.12.5 Tie Rods" on page 51
	Bent wheel rim.	Replace rim.
The tow vehicle has difficulty in stopping.	Travelling too fast.	Slow to appropriate speed.
	Towing vehicle too light-weight.	Use appropriate tow vehicle. "4.2.1 Towing Vehicle" on page 22
	Bad road conditions.	Slow to appropriate speed for conditions.
Tires are experiencing excessive wear.	Axle bent or out of alignment.	Repair or replace axle.
	Bent spindle.	Replace spindle.
	Travelling too fast.	Slow to appropriate speed.
	Bad road conditions.	Slow to appropriate speed for conditions.
	Tire(s) exceeding recommended air pressure.	Adjust to recommended air pressure. "See proper pressure on side of tire"
Brakes are not operational.	Broken or damaged wire.	Inspect wiring and replace.
	Brakes out of adjustment.	Brake pads are too far away from the drum. Adjust pads so they do not touch drum when disengaged but provide adequate braking when engaged.
	Excessive wear on brakes.	Brakes worn out. Brakes adjusted too close.
Lights do not work.	Wiring harness is damaged.	Inspect wiring and replace, if necessary.
	Wiring harness plug is incorrectly wired or incompatible with tow vehicle.	Rewire or use RV to ATA adapter. "8.13 Wiring Harness Diagram" on page 52
	Lights are burned out.	Replace lights.
	Blown fuse.	Replace with proper fuse.
Wagon not tracking properly.	Applicator bar is not in the hitch.	Center drawbar hitch.
Wagon side-drifting on hills.	Incorrect tire air pressure.	Adjust to recommended air pressure. "See proper pressure on side of tire".
	Wagon in 2-wheel steer.	Change to 4-wheel steer. "5.6 Selecting Mode of Operation for Duo Steer (4-Wheel Steer) Tracking Wheels" on page 34
	Field speed too fast.	Reduce field speed.
	Hitch off center.	Center hitch
	Too much weight.	Reduce weight.

10. SPECIFICATIONS

10.1 Mechanical Specifications

Dimensions	DS1000 DS1000A	DS1200 DS1200A	DS1600 DS1600A	DS2000 DS2000A	DS2200 DS2200A	DS2600 DS2600A	DS3200 DS3200A
Field Length	265" (673 cm)	255" (648 cm)	272" (691 cm)	272" (691 cm)	272" (691 cm)	272" (691 cm)	272" (691 cm)
Wheel Base	10' (305 cm)	10' (305 cm)	10' (305 cm)	10' (305 cm)	10' (305 cm)	10' (305 cm)	10' (305 cm)
Empty Weight	4,000 lbs (1,814 kg)	4,580 lbs (2,077 kg)	4,680 lbs (2,123 kg)	4,835 lbs (2,193 kg)	8,840 lbs (4,010 kg)	5,400 lbs (2,449 kg)	5,400 lbs (2,449 kg)
Tanks Size	1,000 gal (3785 L)	1,200 gal (4,542 L)	1,600 gal (6,057 L)	2,000 gal (7,571 L)	2,200 gal (8,328 L)	2,600 gal (9,824 L)	3,200 gal (12,113 L)
Wagon Capacity GVWR	14,000 lbs (6,350 kg)	19,000 lbs (8,618 kg)	32,000 lbs (14,515 kg)	32,000 lbs (14,515 kg)	32,000 lbs (14,515 kg)	48,000 lbs (21,772 kg)	48,000 lbs (21,772 kg)
Wheel Hub	8-Bolt	8-Bolt	8-Bolt	8-Bolt	8-Bolt	10-Bolt	10-Bolt

Specifications subject to change without notice.

A denotes adjustable axle option.

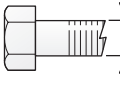



10.2 Bolt Torque

10.2.1 Checking Bolt Torque

Torque figures indicated in the charts are used for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or capscrews unless otherwise specified in this manual. When using locking elements, increase torque values by 5%.

The tables shown below give correct torque values for various bolts and capscrews. Tighten all bolts to the torques specified in the charts unless otherwise noted. Check tightness of bolts periodically, using the bolt torque chart as a guide. Always replace hardware with the same Grade bolt.

10.2.2 Standard Hardware English Torque Values

 Bolt Diameter	English Bolt Torque Specifications*					
	Grade 2  No Marking		Grade 5  3 Radial Lines		Grade 8  6 Radial Lines	
	N·m	ft.lbs.	N·m	ft.lbs.	N·m	ft.lbs.
1/4"	8	6	12	9	17	12
5/16"	13	10	25	19	36	27
3/8"	27	20	45	33	63	45
7/16"	41	30	72	53	100	75
1/2"	61	45	110	80	155	115
9/16"	95	60	155	115	220	165
5/8"	128	95	215	158	305	220
3/4"	225	165	390	290	540	398
7/8"	230	170	570	420	880	650
1"	345	225	850	630	1320	970

*Specifications subject to change without notice

10.2.3 Wheel Nut Torque

Tighten 5/8 wheel nuts to 100 ft.lbs (135 N·m)

Tighten 3/4 wheel nuts to 260 ft.lbs. (352 N·m)

WARNING



EQUIPMENT FAILURE

The torque value for bolts and capscrews are identified by their head markings. Replacing higher "Grade" bolts (Grade 8) with lower Grade bolts will lead to equipment failure and can result in injury or death. Always use replacement bolts with the same Grade markings as the removed bolt.

10.3 Hydraulic Fitting Torque

10.3.1 Tightening Flare Type Tube Fittings

1. Check flare and flare seat for defects that might cause leakage.
2. Align tube with fitting before tightening.
3. Lubricate connection and hand tighten swivel nut until snug.
4. To prevent twisting the tube(s), use two wrenches. Place one wrench on the connector body and with the second tighten the swivel nut to the torque shown.
5. The torque values shown are based on lubricated connections as in reassembly.

10.3.2 Flare Type Tube Torque Values

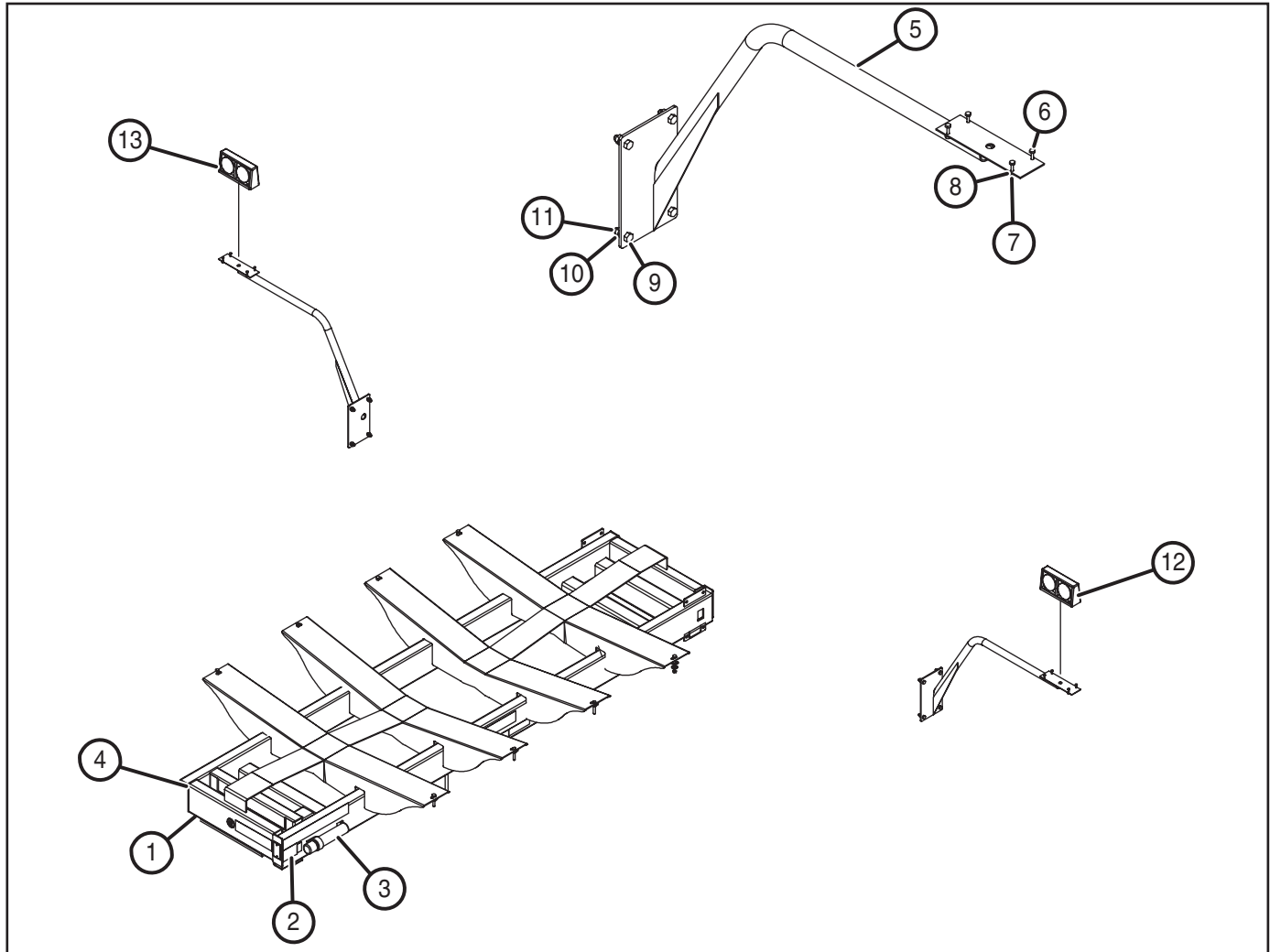
Tube Size OD (in.)	Nut Size Across Flats (in.)	Torque Value• (N·m) (ft.lbs.)		Recommended Turns To Tighten (After Finger Tightening) (Flats) (Turn)	
1/4	9/16	12	9	1	1/6

11. Parts

Replacement parts are available from your authorized Dealer Parts Department.

The following pages contain a list of serviceable parts for the Duo Steer Wagon.

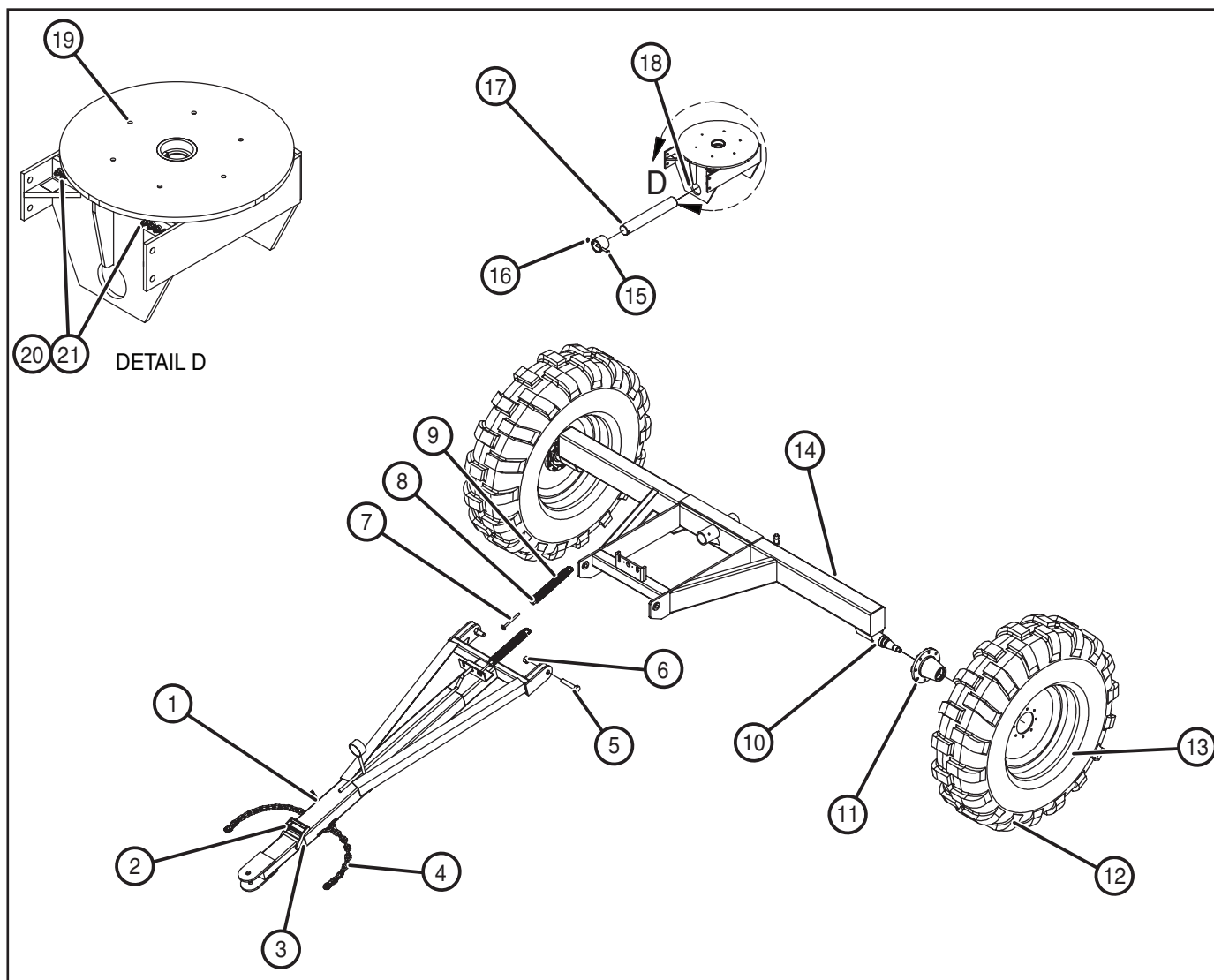
11.1 Frame Weldment, Lights, and Wiring



Item	Part Number	Description	Qty.
1	800711	Frame Weldment, DS1600 and DS1600A	1
	800750	Frame Weldment, DS2000	
	800675	Frame Weldment, DS2600	
2	800718	Decal Kit, Includes	1
3	DE000053	Manual Canister	1
4	800705	Wear Blocks, Fixed Axle Position (01310000)	1
	800706	Wear Blocks, Duo Steer Position (0131000)	
5	800672	Bracket, Ag Light, per side	1
6		Bolt, 1/4-20 x 1" Lg	8

Item	Part Number	Description	Qty.
7		Nut, 1/4-20	8
8		Lock Washer, 1/4"	8
9		Bolt, 1/2-13 x 1-1/2 Lg	1
10		Lock Washer, 1/2	8
11		Nut, 1/2-13	8
12	LT000322	Light, Left Side	1
13	LT000323	Light, Right Side	1
NS	LT000310	Connector, 4-Pin Wiring, Male end, for Rear of Tongue	—
	LT000106	Connector, 4-Pin Wiring, Female end, for Rear of Tongue	
	LT000223	Plug, 7-Way RV Style	

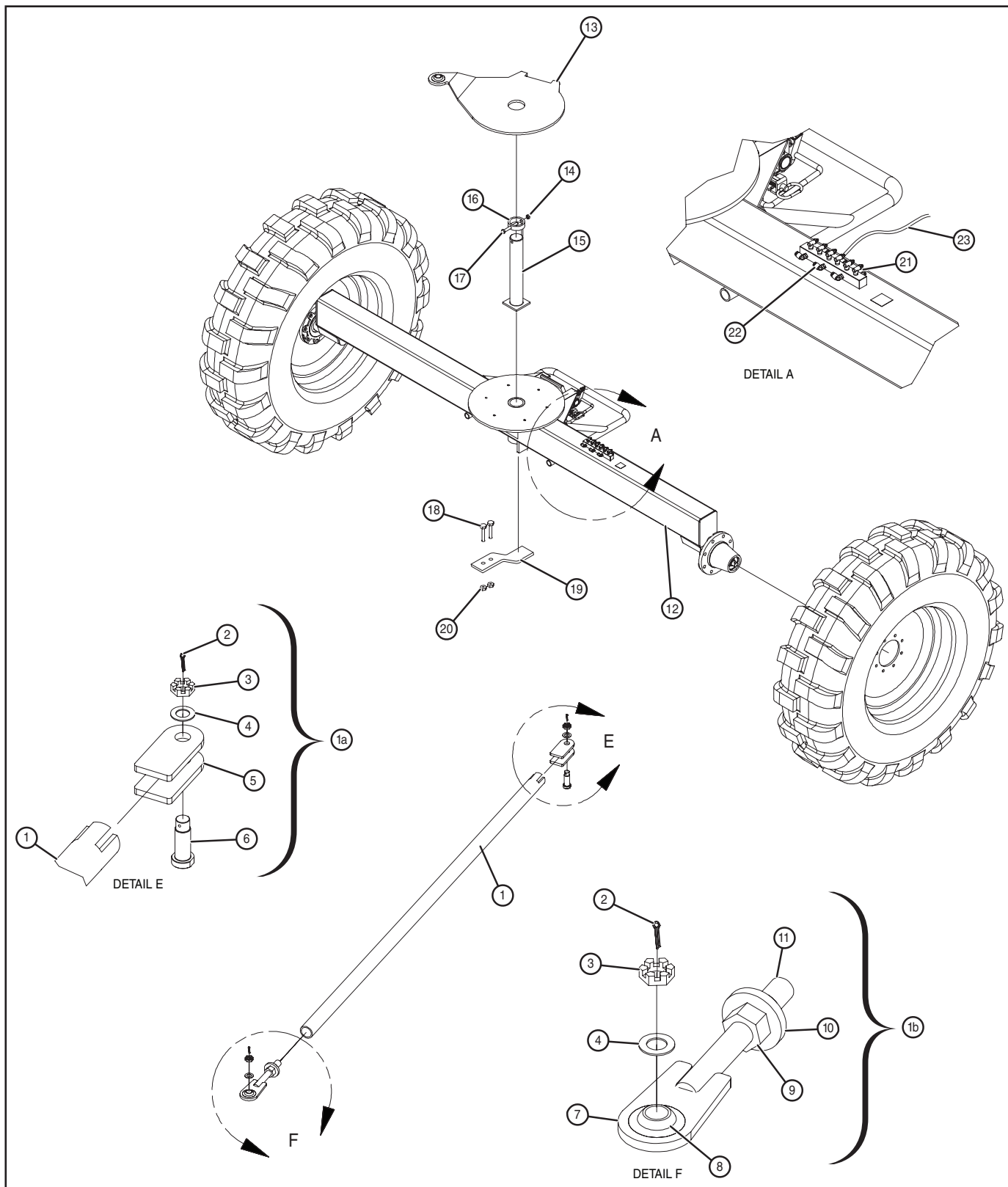
11.2 Tongue and Front Axle Assembly



Item	Part Number	Description	Qty.
1	800674	Tongue, Non-Adjustable, with Two 1/2" x 40" Safety Chains	1
	800715	Tongue, Adjustable (6' Longer), with Two 1/2" x 40" Safety Chains	
2	MI000161	Safety Lock (Spring Latch)	1
3	ET000008	Latch Spring, Extendible Tongue	1
4	CH000044	Safety Chain Hook Only with Pin and Cotter Pin	1
	800243	Safety Chain, 1/2" x 40" with Slip Hook, Latch, and Mounting Bracket	1
5	800720	Tongue Bolt, 1" Bolt with Nut	1
6		Nut, 1-14	1
7	800719	Bolt Only with Washer for Spring Lift Assist	1
8		Nut	1
9	SG000043	Spring Only with Nut Insert for Spring Lift Assist	1
	800138	Spring Lift Assist (Double) for Extension Tongue, Assembly Kit	
10	800712	Spindle 886, 3" dia x 14" Lg	1
	SL000013	Spindle Only, Weld-On, Fixed / Adjustable Axle, 886	
	SL000138	Spindle Only, Weld-on, Fixed / Adjustable Axle, 871	
11	SL000013	Hub, 886 8 Bolt	1
	HB000011	Hub, 886, 8 Bolt Complete	
	HB000050	Hub, 871, 10 Bolt Complete, (Used on 400 Gallon Front Tank Option)	
12		Tire 18.4 x 26, 8-Ply	1
		Tire 18.4 x 26, 10-Ply	

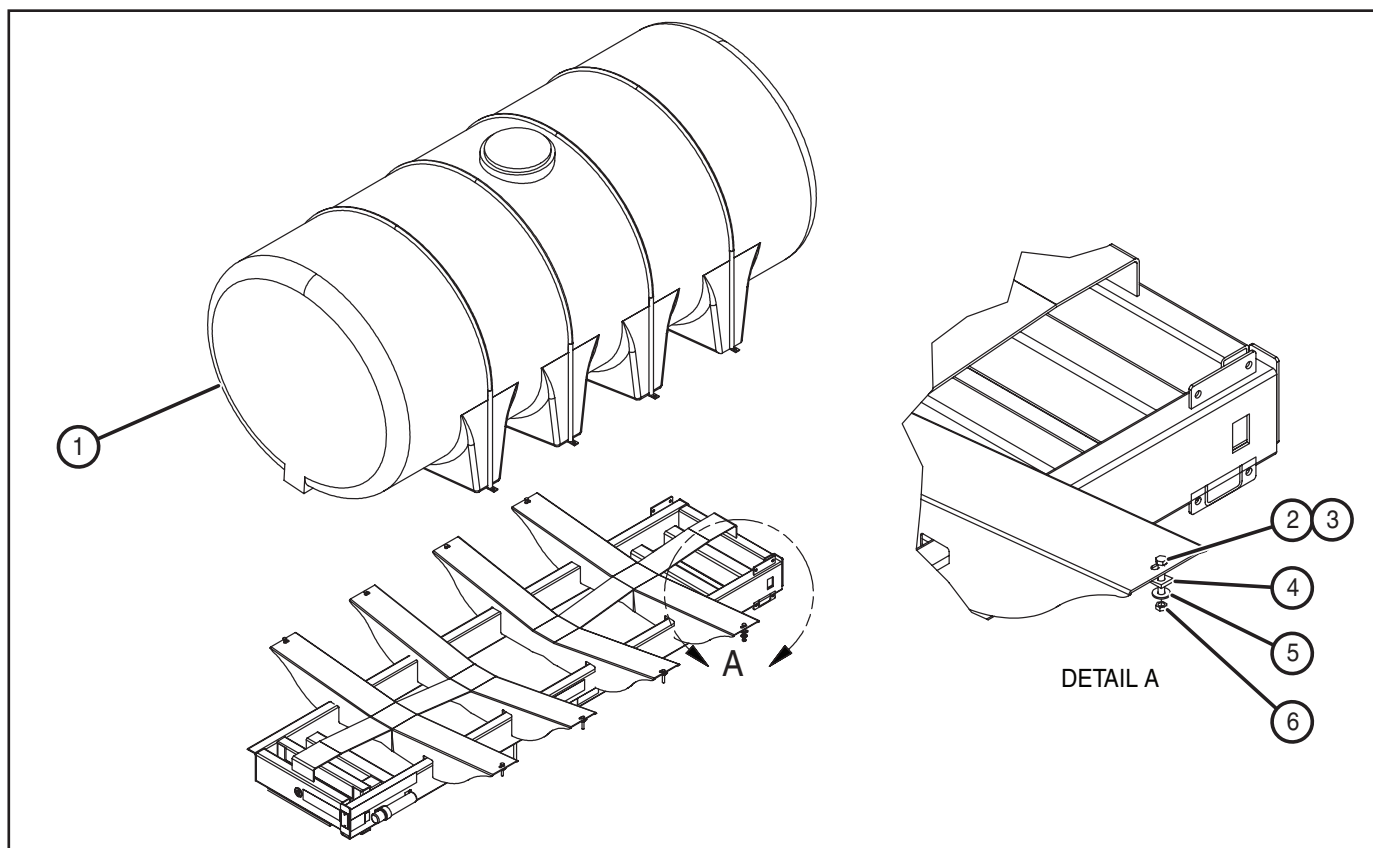
Item	Part Number	Description	Qty.
13	WT000109	Wheel, 8-Bolt, with 18.4 x 26 Tire 8-Ply	1
	WT000110	Wheel, 10-Bolt, with 18.4 x 26 Tire 10-Ply	
14	800668	Front Axle, Adjustable Track with 886 Spindle/Hub	1
	800712	Front Axle, Non-Adjustable Track with 886 Spindle/Hub	
	800717	Front Axle, Adjustable Track Strut with Spindle, Less Hub, 120 / 132 / 144 Spacing	
	800744	Front Axle, Adjustable Track with 871 Spindle/Hub	
	800745	Front Axle, Non-Adjustable Track with 871 Spindle/Hub	
	800748	Front Axle, Adjustable Track Strut with Spindle, Less Hub, 120 / 132 / 144 Spacing, 871	
	800752	Front Axle, Adjustable Track Strut with Spindle, Less Hub, 120 / 132 / 144 Spacing, 871	
15		Bolt, 1/2-13 x 4" Lg	1
16		Lock Nut, 1/2-13	1
17	800546	Rocker Pin, Bolt, and Nut	1
18	800434	Rocker Box Assembly	1
19	HY000184	Grease Tube Fitting, Hose to Bank, 18 NPT x 14, 90 Degree Elbow, Swivel	1
20	HY000185	Zerk Fitting, 18 NPT	1
21	ZK00001	Grease Zerk, Straight	1

11.3 Tie Rod and Rear Axle Assembly



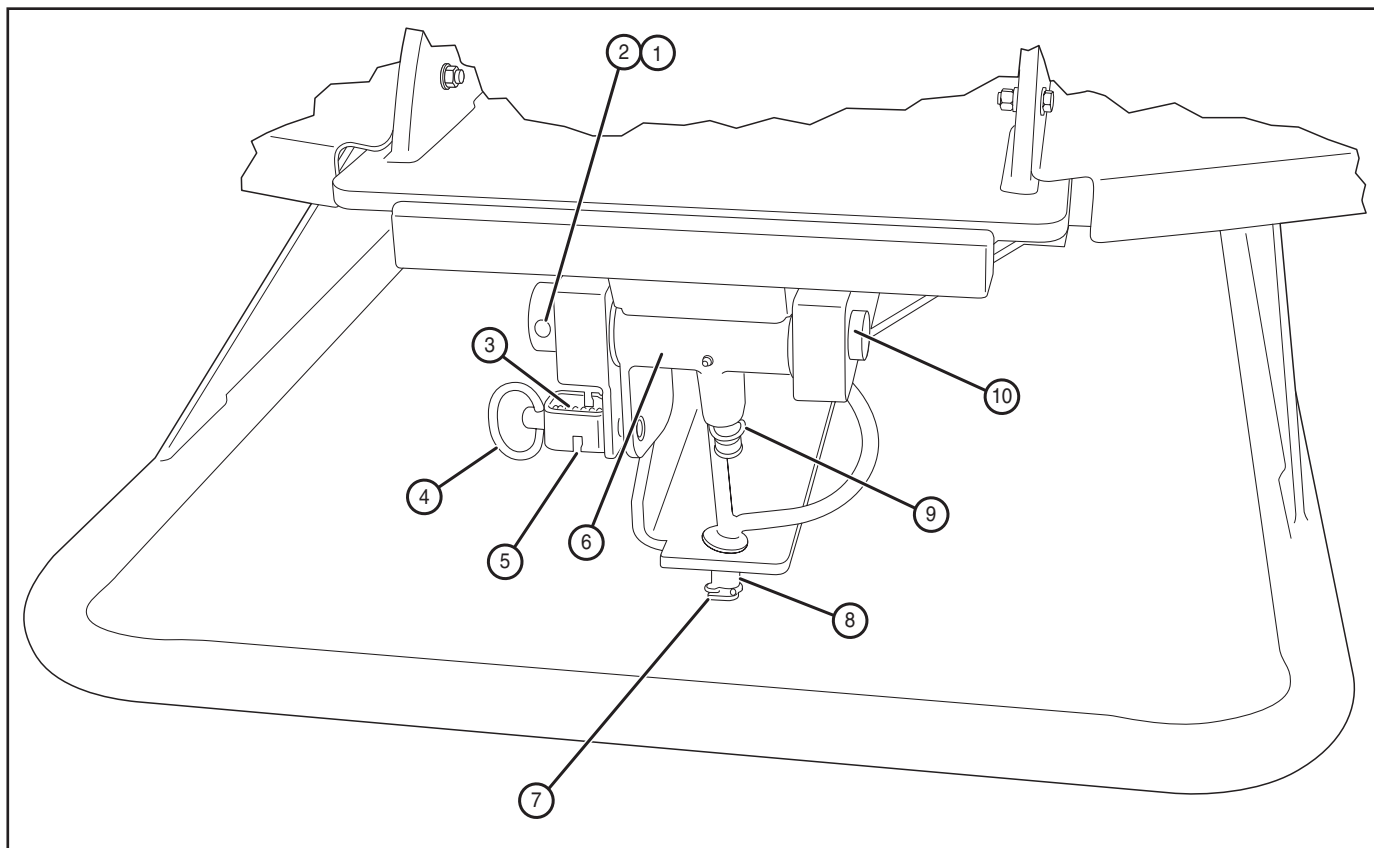
Item	Part Number	Description	Qty.
1	HY000184	Tie Rod Assembly	1
1a	800713	Tie Rod Assy. Front Side, Screw-in with Ball Joint	1
1b	800673	Tie Rod Assy, Rear Side, with 2.5" Pole	1
2		Cotter Pin, 2"	1
3		Castle Nut, 1"	1
4	800673	Washer 1"	1
5		Plate	1
6		Pin, 1.125" x 3.813" with 1.626" Collar	1
7		Plate	1
8		2-3/4" OD x 1" ID Bearing	1
9		Nut	1
10		Tie Rod Plug, 3.44: x 1" Lg	1
11		Rod, 1-1/4" x 10" Lg	1
12	800669	Adjustable Track w/ 886 Spindle/Hub	1
	800713	Back Axle, Non Adjustable Track w/ 886 Spindle/Hub	
	800746	Back Axle, Adjustable Track with 871 Spindle/Hub	
	800747	Back Axle, Non-Adjustable Track with 871 Spindle/Hub	
13	800716	Back Axle Middle Plate Assembly, Fits All Wagons	1
14		Nut, 1/2-13	1
15	800670	Back Axle Pin, Bolt, and Nut	1
16		Bearing, 3.5" OD x 2.5" ID x 1" Lg	1
17		Bolt, 1/2-13 x 4" Lg	1
18		Bolt	1
19		Retainer Plate	1
20		Lock Nut	1
21	HY000196	Grease Zerk to Grease Line Connector, 1/8" NPT	1
	HY000185	Grease Tube Fitting, Hose to Bank, 18 NPT x 14, Straight	
22	ZK000004	Grease Zerk with 90 Degree Elbow	1
23	HY000187	Grease Tube, Per Foot	1

11.4 Tanks



Item	Part Number	Description	Qty.
1a	TK000095	Tank, 1610 Elliptical with Tank Bands	1
	TK000038	Lid, 1600 Gallon Tank	1
	TK000082	Bands for 1610 Elliptical Tank	1
1b	TK000095	Tank, 1600 Gallon Tank, Blue	1
	TK000038	Lid, 1600 Gallon Tank	1
	TK000082	Tank Bands, for 1600 Gallon Tank	1
1c	TK000110	Tank, 400 Gallon, Without Bands	1
	TK000121	Lid, 400 Gallon Tank	1
	TK000120	Tank Bands, for 400 Gallon Tank	1
1d	TK000108	Tank, 2600, Gallon Tank, Blue	1
	TK000123	Lid for 2600 Gallon Tank	1
	TK000109	Tank Bands, 2600 Gallon Tank	1
2	BT000010	Bolt, 1/2-13 x 3.5" for Tank Bands	1
3	800721	Bolt, Washer, and Nut for 400 Gallon Tank Bands	1
4	WA000002	Bevel Washer, Tank Bands	1
5	WA000003	Flat Washer, 1/2"	1
6	NT000004	Lock Nut, 1/2-13	1

11.5 Duo Steer Mechanism



Item	Part Number	Description	Qty.
1		Bolt, 1/2-13 x 4" Lg	1
2		Lock Nut, 1/2-13	1
3		Spring	1
4		Pin	1
5		Roll Pin	1
6	800707	Wear Collars For Lever Lock	1
7		Pin	1
8	800709	Lever Lock Engagement Handle Assy	1
9	SG000067	Lever Lock Spring Only, 7/8" x 6" x 0.091"	1
10	800710	Pivot Pin, Lever Lock	1

11.6 Hubs & Spindles (8-Bolt Ag) 886 Non-Braked and 886B Braked Hub

Item	Part Number	Description	Qty.
1	HB000011	886 Braked or Non-Braked Hub, Complete with all Parts, Less Spindle (8 bolt) Includes: Wheel Studs Loose and Wheel Nuts	1
2	HB000128	Inner Bearing (387AS)	1
3	HB000129	Outer Bearing (2793)	1
4	HB000140	Inner Cup (382A)	1
5	HB000170	Outer Cup (2720)	1
6	HB000078	Seal (P602201)	1
7	HB000171	Dust Cap, 3.153" OD (P502001)	1
8	HB000121	Wheel Stud Bolt, Drive-In, 5/8-18 x 2-1/2" Lg (P151403)	1
9	HB000132	Wheel Nut, 5/8-18 (P201601)	1

Item	Part Number	Description	Qty.
10	800512	Spindle, 3" Dia. x 18" Long with Castle Nut, Washer, and Brake Flange (S886-1144)	1
11	800539	Spindle, 3" Dia. x 18" Long with Castle Nut, Washer, and Cotter Pin Without Brake Flange	1
12	800538	Spindle with Braked Flange Only	1
13	SL000013	Spindle Only	1
14	SL000016	Castle Nut	1
15	SL000019	Washer	1
16	SL000014	Cotter Pin	1
17	BR000010	Brake Flange	1

11.7 Hubs & Spindles (10-Bolt Ag) 871 Hub

Item	Part Number	Description	Qty.
1	HB000050	871 Hub, Complete with all Parts, Less Spindle (10 bolt) Includes: Wheel Studs Loose and Wheel Nuts	
2	HB000923	Inner Bearing	
3	HB000925	Outer Bearing	
4	HB000922	Inner Cup	
5	HB000924	Outer Cup	
6	HB000926	Seal	
7	HB000927	Dust Cap	
8	HB000928	Wheel Stud Bolt, Drive-In	
9	HB000929	Wheel Nut, Flanged, 3/4-16 Grade 8	
10	800753	Spindle, 3" Dia. x 18" Long with Castle Nut, Washer, and Cotter Pin	
11	SL000138	Spindle Only	
12	NT000062	Castle Nut	
13	WA000065	Washer	
14	SL000134	Cotter Pin	

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