

DUO LIFT[®]

Manufacturing Company, Inc.

FUEL HAULER[™]



OPERATOR'S MANUAL AND PARTS BOOK FUEL HAULER TRAILER

**MODELS: FH500, FH500D, FH750, FH750D,
FH990, FH990D**

Read and understand the manual. This manual provides information and procedures to safely operate and maintain the Fuel Hauler Trailer.



DUO LIFT MANUFACTURING CO., INC.
FUEL HAULER TRAILERS

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"/>

FUEL HAULER TRAILER MODELS:

FH500	FH500D	FH750	FH750D	FH990	FH990D

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.

Refer to the pump and engine Operator's Manuals for maintenance and service of these components.

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. "6.2.3 Attaching to a Truck" on page 26.
	An OEM drawbar pin and retainer clip must be used for towing and must be in good working condition. Do not use homemade or shop-made drawbar pins when towing this fuel hauler. "6.2.3 Attaching to a Truck" on page 26.
	Wheels and Axles
	Wheel nuts/bolts are tightened to proper torque on all wheels. "9.4.3 Wheel Bolt Torque Requirements" on page 52.
	Tire pressure is correct on all wheels.
	Axle-to-frame bolts are installed and properly tightened.
	Frame
	All grease points are lubricated. "9.6 Service Record Chart" on page 55
	All fasteners are tightened to proper specifications.
	Reflector tape is installed. "4.5 Lights and Reflective Tape for Off-Road Identification" on page 20 and "4.8 Department of Transportation (DOT) Compliant Fuel Haulers" on page 21.
	SMV or SIS sign, if applicable, is installed (not supplied by Duo Lift). "3.3 How to Install Replacement Safety Signs" on page 17.
	All decals are legible and properly installed. "3.3 How to Install Replacement Safety Signs" on page 17.
	All pins are equipped with retainer clips.
	Wiring and Lighting (if equipped)
	Brake lights are in working order.
	Signal lights are in working order.
	Wiring harness plug is in working condition and fits into tow vehicle's receptacle.
	Breakaway Brake System (if equipped)
	Breakaway cable is supplied with fuel hauler. "6.2.3 Attaching to a Truck" on page 26.
	Battery is charged and in good working order. "9.8.2 Charging the Breakaway Battery" on page 56.

✓ or NA	Task
	DOT Models Only
	"4.8 Department of Transportation (DOT) Compliant Fuel Haulers" on page 21.
	Side clearance lights are working.
	Federal Annual Inspection tag is attached to frame and up-to-date.
	Fenders and mud flaps are installed.
	License plate lights are operating.
	Turn signal lights are operating.
	Brake lights are operating.
	Diesel and DEF Tanks
	No visible diesel fuel or DEF leaks.
	All fittings and hose clamps are tightened to proper specifications.
	Fill cap and vent are properly installed.
	Diesel and DEF tank shutoff valves function properly (close for transportation and open for fueling).
	Documentation Review
	All sections of Operator's Manual and Parts Book have been reviewed and understood by the owner.
	All safety and instructional signs 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 fuel hauler. "6.1 Towing Safety" on page 24.
	OEM drawbar pin and retainer clip are properly installed. "6.2.2 Couplers" on page 26.
	Safety chains are attached to the tow vehicle and crossed under the hitch for added protection. "6.2.1 Trailer Safety Chains" on page 25.
	Wiring harness is connected and all fuel hauler lights are working properly.
	Brakes, if equipped, are working properly.
	Breakaway Brake System is functioning properly.
	Owner is instructed to check wheel bolt/nut torque at 5, 10, 25, and 50 miles; then check annually. "9.4.3 Wheel Bolt Torque Requirements" on page 52.
	1993 Diesel Fuel Placards are installed on all four sides of fuel hauler. "3.4 Installing 1993 Diesel Fuel Placards" on page 18

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.

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1 INTRODUCTION

1.1 Welcome Statement

Keep Your Equipment Moving

Congratulations on your choice of a Duo Lift Mfg. Co., Inc. Fuel Hauler™ to complement your harvest operation. This equipment has been designed and manufactured to meet the needs of a discerning agricultural industry.

Operators cannot afford downtime. The Fuel Hauler™ is a heavy-duty fuel hauler designed to transport diesel fuel and diesel exhaust fluid (DEF) to your equipment. Six models are available with 500, 750, and 990 gallon capacities to meet your fueling requirements.

The rugged design and features, such as a heavy-duty frame with tandem axles and highway rated hubs, wheels, and tires, ensure you get to the fueling location quicker and fuel the equipment faster.

Each size of fuel hauler also comes in an Off-Road version or an on-highway DOT compliant version.

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



FH750D Diesel Fuel Hauler with Open Platform.



FH750 Off-Road Diesel Fuel Hauler with an Optional 50 gallon Diesel Exhaust Fluid (DEF) Tank.



FH750D Fuel Hauler with Front Enclosure.

This manual covers Fuel Hauler models:	
✓	Model
	FH500
	FH500D
	FH750
	FH750D
	FH990
	FH990D

1.2 Safe Operation

Safe, efficient, and trouble-free operation of your Duo Lift Mfg. Co., Inc. Fuel Hauler™ requires that you, and anyone else who will be using or maintaining the fuel hauler, 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.

⚠ DANGER



Explosion/Fire Hazard

The Fuel Hauler™ is only intended for use with diesel fuel or non-hazardous liquids such as diesel exhaust fluid (DEF). DO NOT use this fuel hauler with any flammable liquid, such as gasoline or kerosene. Transporting any other flammable or combustible liquid could result in a fire and explosion causing serious injury or death.

⚠ 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 Fuel Hauler™, 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 fuel hauler until the user has read this manual and has developed a thorough understanding of the safety precautions and functions of the fuel hauler.

This fuel hauler was designed for a specific application; transporting diesel fuel and diesel exhaust fluid (DEF). DO NOT modify or use this fuel hauler for any application other than which it was designed.

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

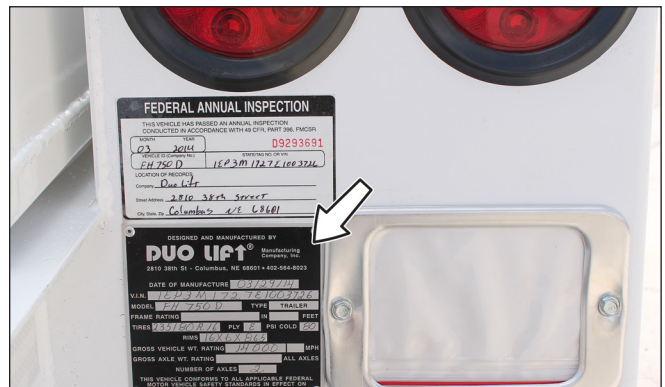
1.3 Operator Orientation

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.

1.4 Serial Number Locations



Serial Number Stamped on Off-Road Model Fuel Hauler.



VIN (Vehicle Identification Number) Plate on DOT Model Fuel Hauler.

1.5 Disposal of Equipment at End of Useful Life

The Duo Lift Fuel Hauler™ has been designed for the specific purpose of transporting diesel fuel and diesel exhaust fluid (DEF) to your equipment using country roads, local highways, 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.

1.6 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, Nebraska 68601, Phone: (402) 564-8023, Fax: (402) 564-5385, Toll Free: 1-800-243-2583.

2 SAFETY

2.1 General Safety Instructions

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 fill, tow, operate, or maintain the fuel hauler (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 fill 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 Mfg. Co., 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 Duo Lift Mfg. Co., Inc. 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 Icons

-  Read the manual
-  Damaged safety signs
-  Eye protection
-  Fire extinguisher
-  First aid kit
-  Hand protection
-  Head protection
-  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
-  Visibility
-  Weight rating

2.3.2 Prohibited Actions Icons

-  Do not alter or modify
-  Do not ride
-  Do not weld
-  No alcohol
-  No drugs
-  No young children

2.3.3 Hazard Avoidance Icons

-    Crush hazard
-  Crush hazard (chock wheels)
-  Defective or broken part
-  Entanglement hazard
-  Explosive force hazard
-  Fall hazard
-  Maximum weight limit
-  Projectile hazard
-  Rollover protection
-  Safety alert symbol
-  Safety shields
-  Slipping hazard
-  Tire pressure (maintain)
-  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) Fuel Hauler™. Make sure anyone who is towing, filling, maintaining, or working around the Fuel Hauler™ is familiar with the operating and maintenance procedures and related SAFETY information contained in this manual. This manual has step-by-step instructions and alerts you to all good safety practices that should be used while using the Fuel Hauler™.

In addition to the design features of the Fuel Hauler™, including safety signs, accident prevention is dependent upon the awareness, concern, prudence, and proper training of the people involved in the filling, use, towing, maintenance, and storage of the fuel hauler.

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

These general safety instructions apply to the overall use and maintenance of the Fuel Hauler™.

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

WARNING

Failure to comply with 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 Fuel Hauler™, 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 fuel hauler until the users have read this manual and have developed a thorough understanding of the safety precautions and functions of the fuel hauler.

This fuel hauler was designed for a specific application; transporting diesel fuel and diesel exhaust fluid (DEF). DO NOT modify or use this fuel hauler for any application other than which it was designed.

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

WARNING



Provide User with Operator's Manual
Fuel Hauler™ owners must provide operating instructions to anyone using the fuel hauler.



Stay Clear

Under no circumstances should young children be allowed to work with or around the Fuel Hauler™.



Impaired User Hazard

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

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 fuel hauler, 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 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.

SAFETY INSTRUCTIONS

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



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!

2.5 User Training Safety

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

2.6 Towing Safety

Refer to Towing Section 6 for safety recommendations related to towing the fuel hauler. All applicable safety recommendations in other sections should also be followed.

2.7 Filling Safety

Refer to Operation Section 7 for safety recommendations related to filling the fuel hauler as well as filling a machine. All applicable safety recommendations in other sections should also be followed.

2.8 Storage Safety

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

2.9 Maintenance Safety

Refer to Service and Maintenance Section 9 for safety recommendations related to service and maintenance of the fuel hauler. All applicable safety recommendations in other sections should also be followed.

2.10 Tire Safety

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

2.11 Sign-Off Form

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.

Do not use or allow anyone else to use this fuel hauler until all information has been reviewed. Annually review this manual before the season start-up.

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.

This sign-off sheet is provided for your recordkeeping to show that all personnel who will be working with the equipment have read and understand the information in this Owner's Manual and Parts Book and have been instructed in the operation of the equipment.

[illegible]

3 SAFETY SIGNS AND INSTRUCTIONAL LABELS

3.1 General Information for Safety Signs

The types of safety signs (hazard labels) and instructional labels 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 and instructional signs attached to the tow vehicle and the fuel hauler. Duplicate safety signs, which are attached to the fuel hauler, can also be found in this section. If the fuel hauler is missing a sign or one is unreadable, replace the sign before using the fuel hauler.

SAFETY INSTRUCTIONS



Safety and Instructional Signs

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

3.2 Safety Signs

3.2.1 Safety Signs Off-Road Models

⚠ 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 on a new trailer, and after re-mounting a wheel after 5, 10, 25, and 50 miles. Tighten: 1/2" to 80 ft.lbs. (110 N·m) 9/16" to 115 ft.lbs. (155 N·m)

DE000061

⚠ WARNING	
	Travel Speed Fuel Hauler Trailers are capable of highway speeds. Loss of control, at any speed, can result in serious injury or death.
When filled with fuel, travel speed must be limited per road conditions and also 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 travel speed is 25 to 40 mph (40 to 64 kph), an SIS and SMV sign must be attached to back of load.

DE000062

WARNING

To prevent serious injury or death:

1. Read and understand Owner's Manual and Parts Book before starting.
2. Match capacity of tow vehicle with weight of loaded trailer.
3. Always refer to towing vehicle owner's manual to determine vehicle's towing capacity and ensure compatibility and maximum safety.
4. Attach trailer and tow vehicle using the standard ball hitch or an OEM hardened hitch pin with a retainer. Do not use homemade pins. Attach safety chains to tow vehicle.
5. Before loading trailer, make sure engine of tow vehicle is stopped, transmission is placed in park, key is removed, and parking brake is set.
6. Do not service, adjust, or repair a loaded trailer.
7. Securely tie down load before moving trailer.
8. On Off-Road models, install SMV and/or SIS signs required by highway authorities before transporting. Make sure lights are working correctly.
9. Never exceed a safe travel speed.
10. 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.
11. Inspect all components on trailer for damage. Repair any damage before using trailer.
12. Make sure all hardware is properly tightened to specified torque.
13. Do not drink and drive.
14. Maintain proper trailer brake adjustment, if equipped.
15. Place certified safety stands under frame and chock tires before working on tires or running gear.
16. Do not allow riders on trailer or towing vehicle.
17. Make sure driver is in compliance with all regulations regarding transporting equipment on public roads.
18. Review safety instructions annually.
19. Make sure all pins and reetainer clips are in place before towing.

DE000060

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.

3.4 Installing 1993 Diesel Fuel Placards

SAFETY INSTRUCTIONS



Before transporting fuel, make sure the diesel fuel placards are displayed on all four sides of the fuel hauler. It is the responsibility of the owner to properly install and display these placards.

Fuel haulers are shipped with four diesel fuel placards that are not installed. Federal regulations require that the placards be installed before filling the tank with diesel fuel.

Install one placard on each of the four sides.

Note: Install the placards prior to filling the fuel tank with diesel fuel. Fuel haulers that have never been filled with fuel do not require the placards in order to be towed.



Diesel Fuel Placard.



Typical Fuel Placard Placement Locations.

4 MACHINE APPLICATIONS AND COMPONENTS

4.1 Fuel Hauler Applications

The Duo Lift Mfg. Co., Inc. Fuel Hauler™ is designed to carry and transport diesel fuel and diesel exhaust fluid (DEF) if equipped with the optional DEF tank. On-Road and Off-Road versions of the three sizes are available. All fuel hauler models, whether On-Road or Off-Road, are capable of transporting fuel into the field or construction site where it's needed.



On-Road Diesel Fuel Hauler™ (DOT compliant).



Off-Road Diesel Fuel Hauler™ with an Optional Diesel Exhaust Fluid (DEF) Tank.

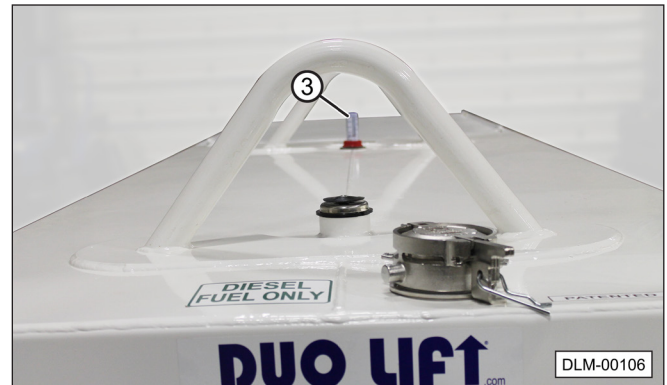
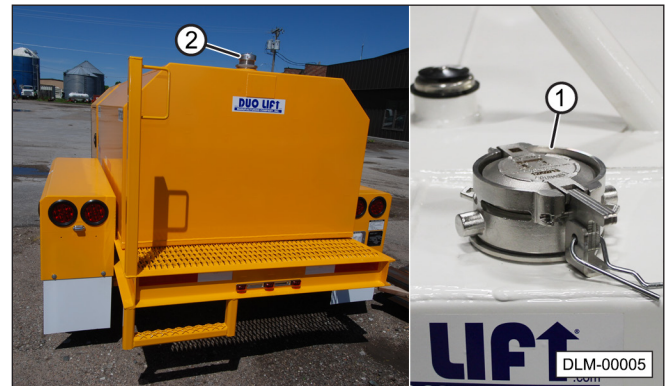


DOT Compliant On-Road Fuel Hauler™.

4.2 Diesel Fuel Tank

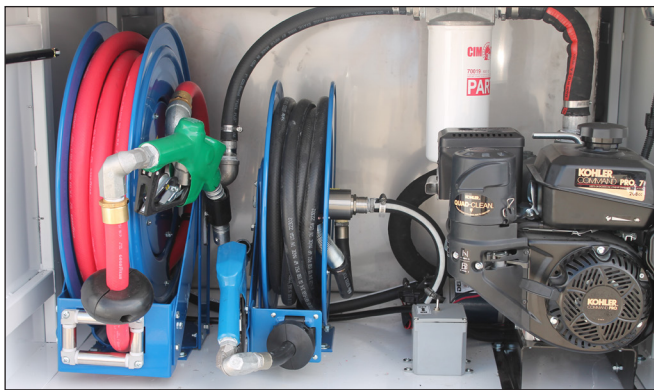
There are three sizes of diesel fuel tanks, depending on the requirements of the user; 500, 750, or 990 gallons (1890, 2840, or 3745 liters).

Each tank is equipped with an All-in-1 vent/fill cap (1), breather port (2), and fuel level gauge (3). The cap provides a fill point, pressure relief, vacuum relief, a fusible vent, and rollover protection.

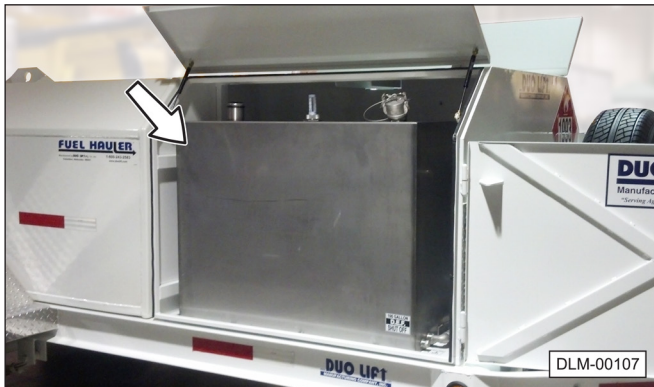


4.3 Fuel Pump; Gasoline or Electric

Each fuel hauler is equipped with either a direct-drive, gasoline engine and pump, or a 12 Volt electric pump.



4.4 Diesel Exhaust Fluid (DEF) Tank



All fuel hauler models can be equipped with the optional 50 gallon or 100 gallon Diesel Exhaust Fluid (DEF) tank. DEF is a solution used with all newer diesel engine ag equipment to meet emission standards. It is a highly purified solution of urea in water which allows SCR (Selective Catalytic Reduction) engines to meet clean air standards. DEF is a clear liquid similar in appearance to water.

DEF is safe to handle and use; it is not explosive, flammable, toxic, or subject to any hazardous product regulations.

4.5 Lights and Reflective Tape for Off-Road Identification

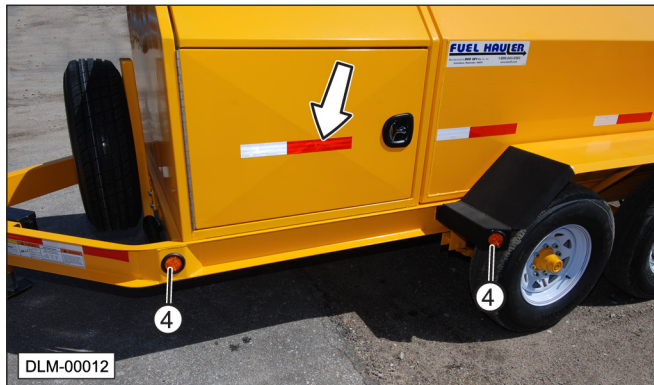
Off-Road Fuel Haulers™ have red and orange reflective tape on the back bumper and amber tape on the sides. To meet the standards for road transportation, an optional light package can be added.



DOT style Fuel Haulers™ are equipped with DOT compliant running lights (1), brake lights and turn signals (2) for use on public roads. A bank of three red lights (3) is also installed in the middle of the back bumper. Red and white reflective tape is also installed.



Yellow side lights (4) are installed at the front of the fuel hauler frame and on the fenders. DOT compliant fuel haulers are also equipped with red and white reflective tape on all sides of the fuel hauler.



The left-side fender is also equipped with a license plate light.



4.6 Axles and Springs

The FH500 model has a single 6000 pound axle and the FH500D model has tandem 3500 pound axles. The FH750(D) and FH990(D) models are equipped with 7,000 pound axles and underslung slipper springs for suspension to improve handling performance when towing.



4.7 Breakaway Brake System

The breakaway brake system is standard on all DOT models and optional on Off-Road models. This system will apply the brakes automatically and immediately 1) if the breakaway cable is properly attached to the tow vehicle; and 2) if the fuel hauler separates from the tow vehicle.

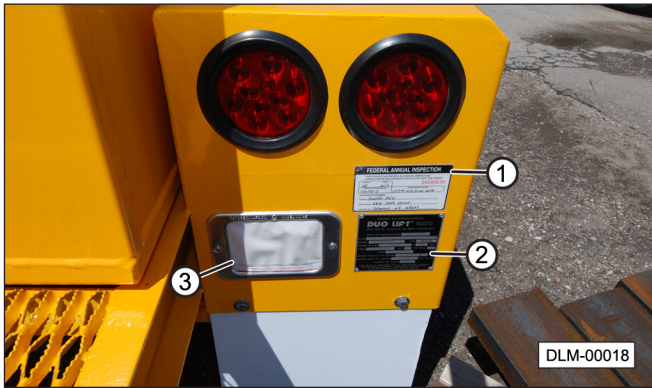


4.8 Department of Transportation (DOT) Compliant Fuel Haulers

The DOT Compliant Package includes: four wheel electric brakes, flat top fenders with rubberized coating on the front of each fender, splash guards, red/white reflective tape, highway lighting package, rear fuel hauler bumper, fusible vent, and a vacuum and fill cap rollover guard on the diesel tank.



4.8.1 DOT Compliant Items



1. Federal Annual Inspection Tag.
2. VIN (Vehicle Identification Number) Plate.
3. Holder for Registration and Insurance Information.

4.9.2 Power Port and Dome Light (Optional)



Operator's Manual Canister.

4.9 Optional Equipment

These items are available as options from Duo Lift Mfg. Co., Inc.

4.9.1 Vinyl Spare Tire Cover (Optional)



5 SPECIFICATIONS

5.1 Fuel Hauler Specifications

MODEL DIMENSIONS	FH500 Off Road*/FH500D**	FH750 Off Road*/FH750D**	FH990 Off Road*/FH990D**
Overall Length in Longest Configuration	14' 9"	16' 11"	19' 9"
Overall Width	8'6"	8'6"	8'6"
Capacity in Gallons	500	750	990
GVWR	7,000	12,000	14,000
Empty Weight	1700/3100	2960/3780	3480/4300
Tires Size	225/75R15	235/80R16	235/80R16
Tire Pressure	65 psi	80 psi	80 psi
Load Range	D	E	E
Hubs	6 Bolt	8 Bolt	8 Bolt
Number of Axles	1 or 2	2	2
Wheel Nut Torque	1/2" - 80 ft. lbs. (110 N·m)	9/16" - 115 ft. lbs. (155 N·m)	
DEF Tank			

Specifications subject to change without notice.

* OFF ROAD Models are Equipped with Open Front Platform, 12 Volt Powered Diesel Pump System and Hose Stand

** D.O.T. Complaint Models are Equipped with Front Enclosure, 50 or 100 Gallon D.E.F. System, Gas Engine Powered Diesel Pump System, Diesel Hose Reel, D.E.F. Hose Reel, Spare Tire and Spare Tire Carrier

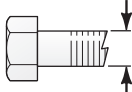
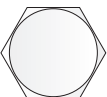


5.2 Bolt Torque

5.2.1 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 strength bolt.

5.2.2 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	lb·ft	N·m	lb·ft	N·m	lb·ft
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	160	305	220
3/4"	225	165	390	290	540	400
7/8"	230	170	570	420	880	650
1"	345	225	850	630	1320	970

6 TOWING

6.1 Towing Safety

WARNING

Failure to comply with 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 fuel hauler towing section to determine the vehicle's towing capacity and to ensure compatibility and maximum safety.



Operating the Tow Vehicle

Before attaching the fuel hauler 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 fuel hauler.



Hitch and Retainer Pins (Off-Road Models)

Attach the fuel hauler and tow vehicle using a ball coupler, eye hitch, or hardened hitch pin with a retainer and safety chains. Do not use homemade pins.



Hitch and Retainer Pins (On-Road Models)

Attach the fuel hauler and tow vehicle using a standard ball coupling and hitch, and safety chains.



Crush Hazard

Under no circumstances should young children be allowed to work with or around the Fuel Hauler™. When moving the fuel hauler, make sure all bystanders, especially small children, stay clear of the working area.



Fall and Crush Hazard

Do not allow riders on the fuel hauler or tow vehicle.



Maximum Towing Speed

Do not exceed a maximum safe travel speed, which may be lower than the recommended or posted speed. Slow down for corners and rough terrain.



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.

WARNING



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.



Close all Shutoff Valves

Before towing, close shutoff valves on diesel tank and DEF tank.



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 fuel hauler transport on public roads. Obey all applicable laws and regulations.

6.1.1 Towing Preparation (Inspection)

SAFETY INSTRUCTIONS

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



Hitch Rating (Off-Road Models)

Make sure the hitch and hitch pin on the towing vehicle are rated greater than the fuel hauler's "gross vehicle weight rating" (GVWR). Inspect the hitch and hitch pin for wear or damage. DO NOT use a home made pin.



Inspect Hitch and Coupling (On-Road Models)

Make sure the hitch and coupling device are compatible. DO NOT tow the fuel hauler using a defective hitch or coupling.



Hitch Attachment

Be sure the fuel hauler 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.



Breakaway Brake System

If equipped, attach the breakaway cable to the rear of the towing vehicle. Do not attach the cable to the fuel hauler hitch.

**SAFETY
INSTRUCTIONS**



Tire Pressure

Check the tires for high/low pressure, cuts, bubbles, damaged rims, or missing lug nuts.

Do not use the fuel hauler if any damage is found.



Working Taillights and Signal Lights

Make sure the directional and brake lights on the fuel hauler are connected and working properly.



Highway Safety Devices

On Department of Transportation (DOT) models, make sure all highway safety devices, such as fenders, mud flaps, and lighting, are properly installed and in working condition before using the fuel hauler.



Additional Lighting

Install additional lights on the rear of the fuel hauler to safeguard against rear-end collisions. Daybreak and dusk are particularly dangerous and pilot vehicles are recommended.

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



Truck Capacity

A 3/4 ton or larger capacity truck should be used for towing.

6.1.2.2 Tractor



Rollover Protection

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



Hazard Flashers

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



Right-of-Way

Keep to the right and yield the right-of-way to allow faster traffic to pass. Drive on the road shoulder, if permitted by law.

6.2 Attaching/Unhooking Trailer

Follow this procedure when attaching the Fuel Hauler™ to a tow vehicle.

WARNING



Crush Hazard

Under no circumstances should young children be allowed to work with or around the Fuel Hauler™. When moving the fuel hauler, make sure all bystanders, especially small children, stay clear of the working area.

6.2.1 Trailer Safety Chains

Safety chains connecting the tow vehicle to the fuel hauler are a vital part of highway towing safety. Fuel Hauler™ are equipped with certified safety chains from the factory. Each chain has a certification tag attached to it.



WARNING



Unexpected Separation Hazard

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

6.2.2 Couplers

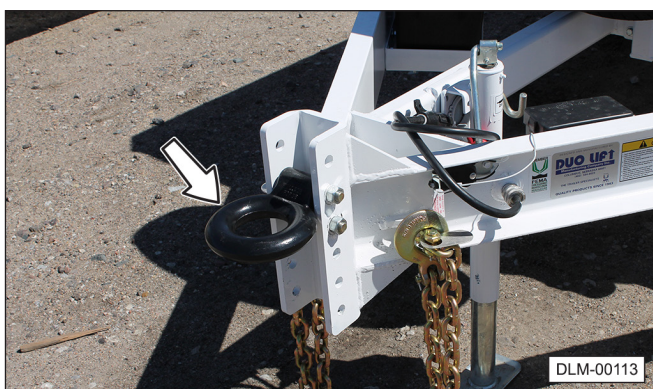
The Off-Road Fuel Hauler™ may be equipped with a clevis for a hardened hitch pin with retainer, a standard ball hitch, or a lunette eye hitch. The On-Road Fuel Hauler™ is equipped with a 2-5/16" ball coupler.



Hardened Hitch Pin with Retainer.



2-5/16" Ball coupler.



Lunette Eye Hitch.

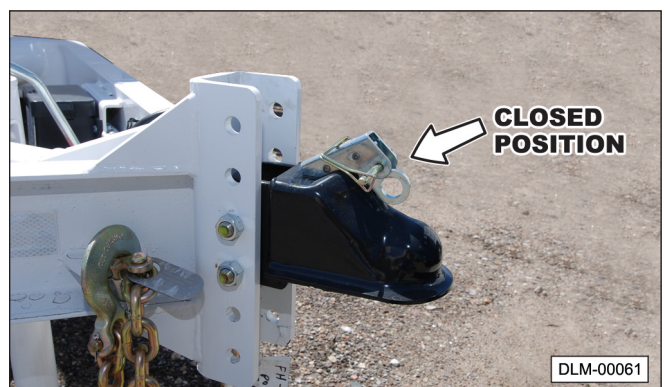
6.2.3 Attaching to a Truck

For fuel haulers equipped with brakes, the tow vehicle must have a functional brake controller.

1. Slowly back the tow vehicle up to the fuel hauler until the clevis or ball coupler and hitch are aligned.



2. Install the hardened drawbar pin and retainer or connect the ball coupler, depending on the style of hitch assembly.

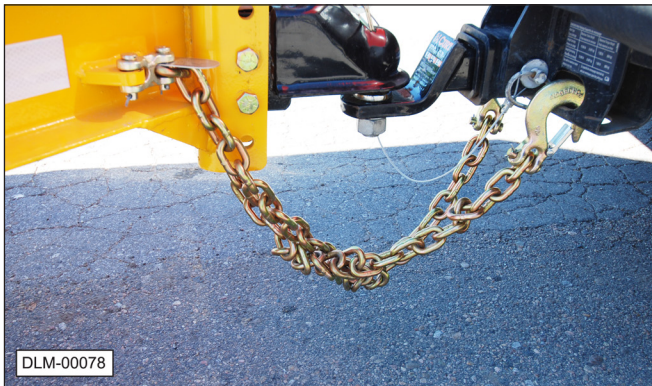


NOTICE

If towing the fuel hauler 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 fuel hauler are securely fastened to the tow vehicle.

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

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

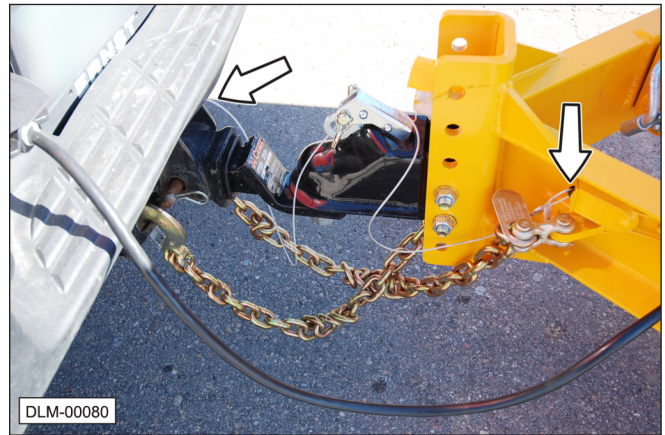


Note: The safety chains can be twisted in order to shorten their length and prevent them from dragging on the ground.



4. If equipped, attach the breakaway brake cable to the frame of the tow vehicle.

Note: The breakaway key must be inserted into the socket and the cable hooked to the tow vehicle.



5. Raise the jack. Pull the retaining pin, rotate the jack 90° into the storage position, and reinsert the retaining pin.



6. If equipped, connect the seven pin wiring harness to the truck. Provide sufficient slack for turning.



7. Before towing, follow these Safety Instructions.

***SAFETY
INSTRUCTIONS***

1. Make sure the fuel hauler lights and brakes, if equipped, are working properly. If the fuel hauler's electrical equipment is not functioning properly, it may be due to incompatible or crossed wiring from the tow vehicle to the fuel hauler.

2. Make sure the fuel hauler brakes apply when the brake pedal is depressed.

3. If equipped with a breakaway brake system, make sure it activates and applies brakes when cable key is pulled from its socket.

4. Always verify the diesel fuel tank shutoff valve is in the CLOSED position before towing. Some shutoff valves on the diesel fuel tank may be in the OPEN position when the handle is perpendicular to the valve body, which is typically the CLOSED position.

7 OPERATION

7.1 Operating Safety

7.1.1 Operator 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 Fuel Hauler™. The Fuel Hauler™ Fuel hauler, if not used properly, can be dangerous to users unfamiliar with its operation. Do not allow filling, towing, or adjusting of this fuel hauler until the users have read this manual and have developed a thorough understanding of the safety precautions and functions of the fuel hauler.

This fuel hauler was designed for a specific application; transporting diesel fuel and diesel exhaust fluid (DEF). DO NOT modify or use this fuel hauler for any application other than which it was designed.

Fuel haulers that are filled or operated improperly or by untrained personnel can be dangerous; exposing the operators and/or bystanders to possible serious injury or death.

SAFETY INSTRUCTIONS

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



Train Unfamiliar Users

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

Train all new users and review instructions frequently with existing users.

Be certain only physically able persons will use the fuel hauler.

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

7.1.2 General Operating Safety

WARNING

Failure to comply with 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

Never fill the fuel hauler without reading and completely understanding this manual and the OEM instructions from the manuals and on the combine and/or header.



Follow All Applicable Safety Codes

Know and follow applicable national, state, and local safety codes pertaining to installing and operating electrical equipment for use with flammable liquids.

Know and follow all safety precautions when handling petroleum based fuels. Ensure that all equipment operators have access to adequate instructions concerning safe operating and maintenance procedures. Observe all safety precautions concerning safe handling of petroleum fuels.



Crush Hazard (Bystander)

When filling the fuel hauler, make sure all bystanders, especially small children, stay clear of the working area.



Crush Hazard (Chock Wheels)

Always block (chock) the front and rear of the fuel hauler wheels when filling the fuel hauler. Make sure the fuel hauler is securely attached to the tow vehicle before filling.



Tow Vehicle

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

⚠ CAUTION

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



Fall Hazard

Serious injury or even death could result from falling. Do not climb onto the fuel hauler or use it for a platform.



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.



Entanglement Hazard

Do not fuel equipment when parts are rotating. Make sure any rotating parts are completely stopped before adding fuel.

SAFETY INSTRUCTIONS

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



Maximum Weight Limit

Never exceed the weight limits of this fuel hauler. Refer to the Specifications section in this manual for maximum load ratings.

NOTICE

To prevent pump damage, always open the diesel tank shutoff valve prior to starting the gasoline engine pump. Make sure the shutoff valve is closed once fueling is complete.

7.1.3 Gasoline Engine Pump Safety (if equipped)

Know how to stop the engine quickly and understand the operation of all controls. Never permit anyone to operate the engine without proper instructions.



⚠ DANGER



Read and Understand the OEM Manual(s)

Internal combustion engines present special hazards during operation and fueling. Failure to follow the safety guidelines described in this section could result in severe injury or death. Read and follow all safety warnings described in this and the engine operator's manual. A copy of the engine manual was supplied with the unit when it was shipped from the factory.



Fire Hazard

Gasoline is a highly combustible fuel. The improper use, handling, or storage of gasoline can be dangerous. Burns or other serious injuries can result from improper handling of fuel. Never touch or fill a hot engine. **DO NOT** fill the engine's fuel tank near an open flame while smoking, or while engine is running. **DO NOT** fill a tank in an enclosed area with poor ventilation. Clean up fuel spills immediately.



Static Electricity Hazard

An ignition source is always a concern in refueling. Gasoline for the gas powered engine is very explosive, especially the fumes. A flame or spark can easily ignite gasoline vapors. The most common source of electrostatic discharge (spark) is from the operator. The person refueling the equipment should always make a point of touching something nearby to ground and discharge themselves before refueling the gas engine. This is especially important in winter months.

DANGER



Explosive Fuel Hazard

Always store gasoline in an approved container. If any fuel is spilled, make sure the area is dry before starting the engine.



Chemical Skin Burn Hazard

Avoid prolonged skin contact with gasoline. Use protective goggles, gloves, and aprons in case of splashing or spills. Change saturated clothing and wash skin promptly with soap and water.



Burn Hazard

Hot surface. The engine gets very hot during operation. Do not touch engine surfaces. Keep children away. Allow the engine to cool before moving it indoors.



Hot Surface Burn Hazard

DO NOT touch or lean against hot exhaust pipes or engine cylinders. The muffler becomes very hot during operation and remains hot even after stopping the engine. Be careful not to touch the muffler while it is hot. Let the engine cool before storing it indoors.



Equipment Malfunction Hazard

Improperly maintaining the gas engine, or failure to correct a problem before operation, can cause a malfunction in which you can be seriously hurt or killed.

WARNING



No Child Operators

To prevent serious injury to the operator, as well as bystanders, do not allow children to operate the engine.



Carbon Monoxide Hazard

DO NOT operate the engine indoors or in an area with poor ventilation unless exhaust hoses are used. Engine exhaust contains carbon monoxide, a deadly, odorless and colorless gas which, if inhaled, can cause nausea, fainting, or death. Make sure engine exhaust cannot seep into closed rooms or ventilation equipment.

SAFETY INSTRUCTIONS

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



Make sure the engine is off before you begin any maintenance or repairs.



DO NOT operate the engine with the fuel tank cap loose or missing.



DO NOT clean engine air filter with gasoline or other types of low flash point solvents.



DO NOT operate the unit without a functional exhaust system. Prolonged exposure to sound levels in excess of 85 dBA can cause permanent hearing loss. Wear hearing protection when working around a running engine.



Keep hands, feet, and loose clothing away from moving parts on the engine.



Keep area around exhaust free of debris to reduce the chance of an accidental fire.



Do not operate the gas engine if any of the following conditions exist during operation:

1. Noticeable change in engine speed.
2. Sparking occurs.
3. Engine misfires or there is excessive engine vibration.

NOTICE

Open the diesel fuel tank shut off valve prior to starting the gasoline engine to prevent damage to the pump.

Always close the shut off valve after fueling is complete.

7.1.4 Electric Pump (12 Volt) Safety

Use the following safety instructions if the trailer is equipped with a 12 Volt pump.



NOTICE

The duty cycle of the 12 Volt pump is 30 minutes ON and 30 minutes OFF. Allow the pump to cool for 30 minutes before using again.

SAFETY INSTRUCTIONS



The 12 Volt electric pumps are designed for use only with diesel fuel. Do not use the pumps for dispensing any fluids other than those for which it was designed. Misuse may damage the pump components and will void the warranty.

NOTICE

Open the diesel fuel tank shut off valve prior to starting the 12 Volt electric pump to prevent damage to the pump.

Always close the shut off valve after fueling is complete.

7.2 Diesel Fuel Safety

7.2.1 Inhalation Hazard (Diesel Fuel)

! DANGER



Fumes and Inhalation Hazard

Always avoid breathing fuel vapors or mists which may cause dizziness, drowsiness, moderate eye irritation, and/or skin irritation (rash). Excessive exposure may cause irritations to the nose, throat, lungs, and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

In case of inhalation, remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

7.2.2 Fire and Explosion Hazards (Diesel Fuel)

! WARNING



Diesel fuel presents a moderate fire hazard. Vapors may be ignited rapidly when exposed to heat, spark, open flame, or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

7.2.3 Ingestion (Diesel Fuel)

WARNING



The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure, and even death. Ingestion will cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

In case of ingestion **DO NOT INDUCE VOMITING**. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties.

Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

7.2.4 Eye Protection (Diesel Fuel)

WARNING



Safety glasses or goggles are recommended where there is a possibility of splashing or spraying. Contact with liquid or vapor may cause mild irritation.

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 minutes. Hold eyelids open to ensure adequate flushing. Seek medical attention.

7.2.5 Skin Protection (Diesel Fuel)

CAUTION



Contact with diesel fuel may cause skin irritation with prolonged or repeated contact. Wearing gloves constructed of nitrile, neoprene, or PVC are recommended when in close contact with diesel fuel. Chemical protective clothing should also be worn. Long-term, repeated exposure to diesel fuel may cause skin cancer.

In case of contact with skin, remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

7.2.6 Storage Precautions (Diesel Fuel)

CAUTION



Keep away from flame, sparks, excessive temperatures, and open flame. Keep fuel hauler fill port closed because an empty tank may contain explosive vapors. Do not pressurize, cut, heat, weld, or expose tanks to sources of ignition.



Store the fuel hauler in a well-ventilated area. Avoid storage near incompatible materials.

7.2.7 U.S. Federal, State, and Local Regulatory Information (Diesel Fuel)

SAFETY INSTRUCTIONS



Diesel fuel is on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product may also be subject to other regulations at the state and/or local level. Always consult the regulations applicable to your area prior to operation.

7.3 Battery Safety

7.3.1 General Hazards for Batteries

SAFETY INSTRUCTIONS



Wear protective eye wear and gloves.

DO NOT attempt to recharge a frozen battery. Remove the battery from the vehicle/equipment, bring it into a warm room and let it thaw before charging or testing.

Inspect the battery cables to make sure they are free of rust and corrosion and have no exposed wires. Never use electrical tape to cover exposed wires.

Automotive lead-acid batteries contain sulfuric acid in the electrolyte. The acid inside the battery is highly corrosive and can burn your skin if it leaks out of the battery and gets on your skin. Acid may leak out of the battery if the case is cracked or damaged.

**SAFETY
INSTRUCTIONS**



Maintenance-free batteries should always remain in an upright position (do not turn it sideways or upside down).

On equipment with a battery designed into the fuel hauler, it is usually a good idea to disconnect the battery before doing electrical repairs. Disconnect the negative battery cable from the battery to prevent accidental damage to onboard electronics or wiring to prevent a short circuit.

7.3.2 Ventilation Hazard for Batteries

**SAFETY
INSTRUCTIONS**



Whenever servicing a battery, work in a well ventilated area to prevent gas buildup.

7.3.3 Shock Hazards for Batteries

**SAFETY
INSTRUCTIONS**



Batteries only produce 12 Volts so there is NO danger of being shocked. However, 12 Volt batteries can generate several hundred amps of current, which is roughly the amount of current used by a welding arc. Do not short the battery by touching the positive or negative terminals with a metal tool. This current is capable of damaging tools, equipment, and causing personal injury. It can also cause the battery to explode.

Before working around a battery, remove all jewelry, particularly rings and necklaces. The electrical charge from a battery can be transmitted through a metal tool and into a metal ring or watch.

NEVER disconnect a battery when the ignition is ON in the tow vehicle, or while the engine is idling or running, as this can damage electrical and/or electronic components in the tow vehicle.

7.3.4 Explosion Hazards for Batteries

**SAFETY
INSTRUCTIONS**



Always remove the battery's ground cable (black) before removing the positive (red). If the negative cable is removed first, it will not be possible to inadvertently complete a circuit, thus causing electrical shock.

A short circuit can occur if the positive terminal is connected to the battery and the person working with the battery comes into contact with a grounded object. Always remove the ground cable first.

Do not smoke around a battery, or use anything that produces an open flame or spark.

Batteries can explode. Batteries give off hydrogen gas, which is flammable and can explode if a spark occurs near the battery (as when connecting a jumper cable).

7.4 Fire Extinguisher

A fire extinguisher is provided with the Fuel Hauler™.

The extinguisher bracket should be mounted in an accessible location on the fuel hauler. Do not install the fire extinguisher onto the diesel fuel tank.

Follow the manufacturer's instructions to periodically check and maintain the fire extinguisher.






7.5 Pre-Operation Checklist




Efficient and safe operation of the Duo Lift Mfg. Co., Inc. Fuel Hauler™ 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 personal safety and to maintain the mechanical condition of the fuel hauler that this checklist is followed.



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 or towing the diesel fuel hauler.

Initial Setup Checklist (prior to using for the first time)	
Item	Task
	<p>Make sure the hitch assembly will positively attach to the tow vehicle. A retainer pin or clip must be installed to prevent accidental release of the hitch from the tow vehicle. "6.2 Attaching/Unhooking Trailer" on page 25.</p> <p>The height of the hitch is adjustable, make sure the fuel hauler is level.</p>
	<p>Make sure the safety chains are securely attached to the fuel hauler frame and are without wear or damage. If the certification tag is missing, do not use the fuel hauler until the certified chains have been replaced and installed. "6.2 Attaching/Unhooking Trailer" on page 25.</p>
	<p>Make sure the wiring harness is connected to the tow vehicle and that all the lights and the electric brakes are functioning correctly. "6.2 Attaching/Unhooking Trailer" on page 25.</p>
	<p>If equipped, make sure the breakaway brake system is functioning properly by pulling the breakaway cable pin and making sure the brakes apply. Re-install the pin. "9.8 Breakaway Brake Systems" on page 56.</p>
	<p>Check the tire pressure.</p> <p>Check wheel nut torque on all wheels. Check again at 5, 10, 25, and 50 miles.</p>
	<p>Make sure splash guards are installed on DOT models.</p>

	<p>Make sure the Diesel Tank Shutoff Valve is in the closed position before towing.</p>
	<p>Make sure the DEF Tank Shutoff Valve is in the closed position before towing.</p>
	<p>Final check before towing:</p> <ol style="list-style-type: none"> 1. Safety chains are attached to tow vehicle. 2. Breakaway brake system cable is attached to tow vehicle. 3. Hitch is securely attached and retainer pin or clip is installed. 4. Make sure the jack is in the raised (stored) position. 5. Diesel Fuel Safety Placards are installed.

7.6 Trailer Break-In

Although there are no operational restrictions on the Fuel Hauler™ 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.
 - b. Re-torque all fasteners.
 - c. Inspect all electrical cables and hoses.
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 tie-down hardware.
 - b. Inspect all electrical cables and hoses.
5. After 10 hours or 200 miles (320 km) of operation:
 - a. Re-torque all wheel bolts, fasteners, and tie-down hardware.
 - b. Inspect all electrical cables and hoses.
 - c. Start the normal servicing and maintenance schedule, as defined in the Service and Maintenance Section 9.

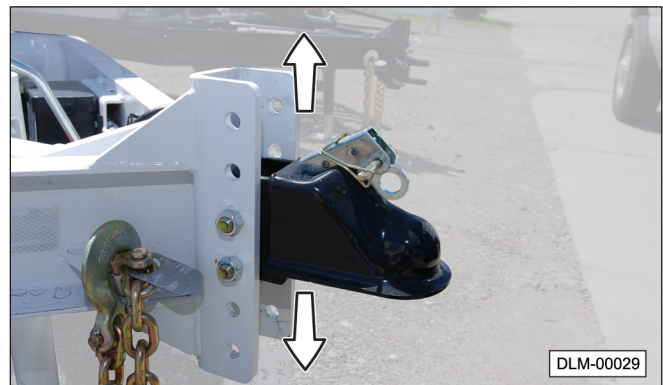
7.7 Checklist Prior to Each Use

Before each use of the Fuel Hauler™, the following areas should be checked.

Checklist Before Each Use	
✓	Task
	Use only a truck or tractor of adequate power and weight to pull the fuel hauler.
	Make sure the fuel hauler is positively hitched to the towing vehicle.
	Attach safety chains from the fuel hauler to the tow vehicle. Cross chains under the hitch to support it should an unplanned separation occur.
	Inspect wiring harness and plug for damage. Do not use fuel hauler if damage is found.
	Check inflation pressure on all tires. Correct under-inflation or over-inflation pressures. The specified inflation pressure is on the tires.
	Make sure the wheels are securely tightened to the hubs.
	On Off-Road models, make sure lights, reflectors, and SMV/SIS emblem required by local highway authorities are installed.
	Clean and make sure taillights and signal lights are working properly. Also check all side lights on DOT models.
	Inspect all diesel fuel and DEF solution fittings, hoses and valves for proper operation and leakage. Correct any problems prior to towing.

7.8 Initial Setup Procedure

If necessary, adjust the height of the hitch assembly so the fuel hauler rides level with the tow vehicle. Refer to "5.2.2 English Torque Values" on page 23 for the proper tightening torque.



6. Attach the fuel hauler to the tow vehicle.
7. If not already installed, attach the diesel fuel placards.

8. Connect the breakaway brake cable to the tow vehicle, and make sure the plug is completely pushed into the socket.



Note: A gasoline engine or a 12 Volt power source is used to power the diesel fuel pump. Depending on the power source, follow the appropriate steps.

WARNING

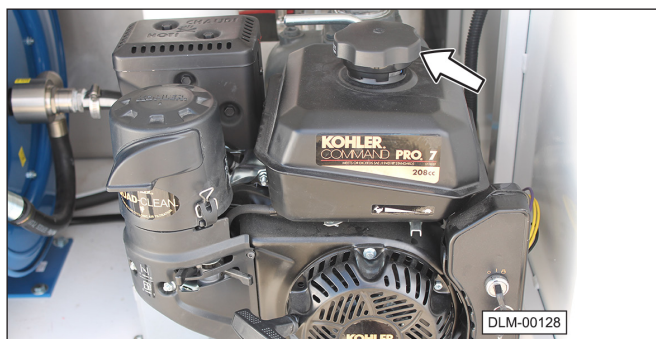


Flammable Fuel Hazard

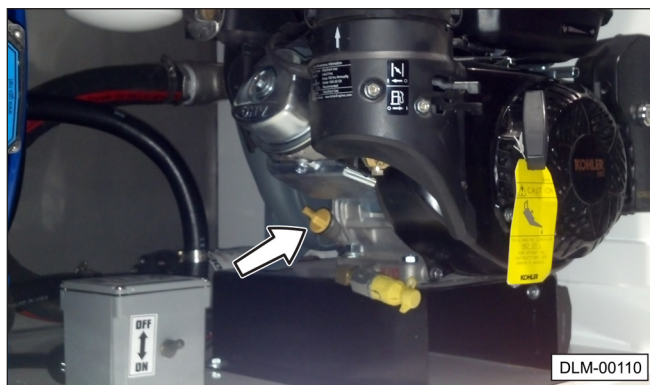
Gasoline is a highly flammable fuel. The improper use, handling, or storage of gasoline can be dangerous. Never fill a hot engine. DO NOT fill the engine's fuel tank near an open flame while smoking, or while engine is running. DO NOT fill tank in an enclosed area with poor ventilation. Clean up any gasoline spills immediately.

9. For gasoline engine models:

- To comply with Federal Transportation Regulations, the gasoline engines are shipped without gasoline or oil in the engine.
- Fill the engine's gas tank with clean, fresh unleaded gasoline. Replace and securely tighten the gas cap after filling.



- Fill the engine with SAE 10W-30 oil to the proper level.



Note: Before checking or refilling with engine oil, make sure the engine is stopped and the fuel hauler is on a level surface.

10. For a 12 Volt external power source:

- Make sure the pump switch is in the OFF position.

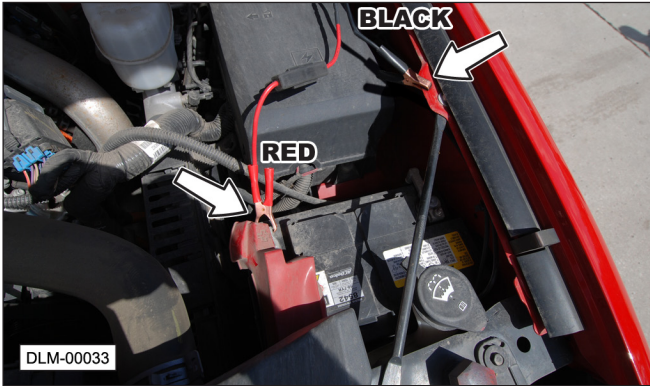


- Connect the battery cables to the towing vehicle or a stand alone battery.

NOTICE

Make sure the external electrical source is 12 Volts. Some farm or construction machines may use a 24 Volt system, which will damage the pump.

- Connect the red cable to the positive terminal of the supply battery.
- Connect the black cable to the negative terminal of the battery or a heavy metal ground on the frame of the tow vehicle.

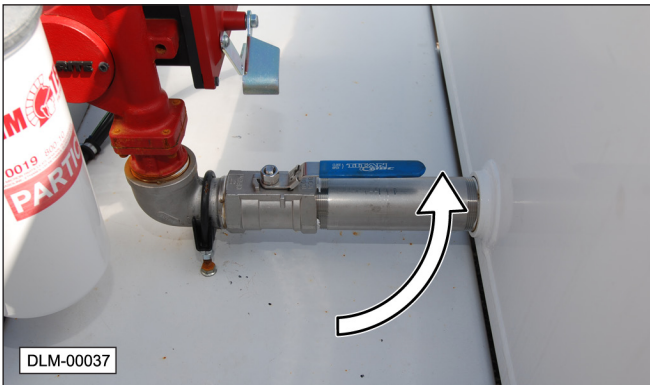


- e. There will now be power to the pump switch.
 - f. Place the pump switch in the ON position.
11. Fill the fuel hauler with diesel fuel. Refer to "7.9.1 Filling the Fuel Hauler™ with Diesel Fuel" on page 39.
 12. Prime the fuel pump.

NOTICE

Follow these instructions before the initial use or after whenever the tank has been completely emptied to ensure the pump is primed. If the pump runs without diesel fuel in it, seal and pump damage will occur and void the warranty.

- a. Open the fuel tank valve.



- b. Place the nozzle of the fuel hose into the fill port of the equipment being filled.
- c. Start the gasoline or electric pump. Operate the gas engine at low idle.
- d. Open the fuel nozzle to allow the air to purge from the pump and hose.
- e. Operate the pump for no more the 30 seconds. The air should be purged from the lines and diesel fuel should begin to flow.
- f. If diesel fuel does not flow within 20 to 30 seconds, quickly shut off the pump. Make sure all the equipment is working properly. Check the pump for possible damage.

7.9 Diesel Fuel Tank Break-In

7.9.1 Filling the Fuel Hauler™ with Diesel Fuel

1. Follow all the safety recommendation, such as attaching the fuel hauler to the tow vehicle, placing the fuel hauler on a level surface, block both sides of the wheels to prevent unexpected movement, etc.

DANGER

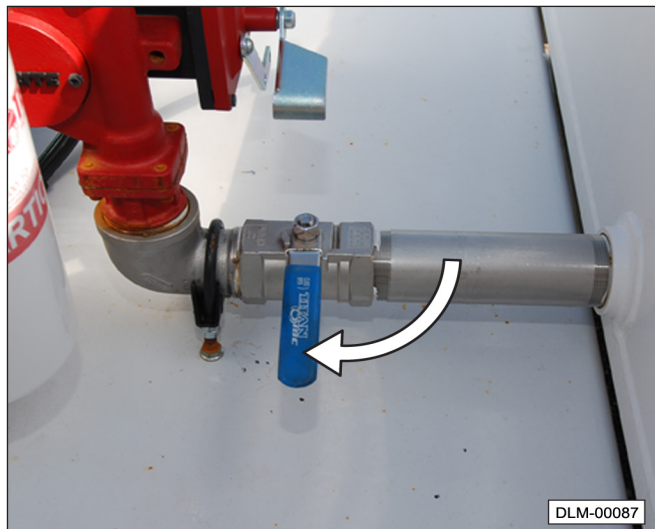


Explosive Fuel Hazard

Never use the fuel hauler for transporting gasoline which is highly explosive. This fuel hauler is only intended to transport diesel fuel.



2. Make sure the fuel shutoff valve is closed.



3. Fill the Fuel Hauler™ no more than 1/4 full of diesel fuel and check for tank and fitting leaks. After the tank, all fittings, and hoses have been checked for leaks, fill the tank to the desired level.



Note: To fill the fuel hauler to maximum capacity, make sure it is on level ground.

4. Replace and securely tighten the fuel hauler fuel cap.

7.9.2 Filling Equipment with Diesel Fuel

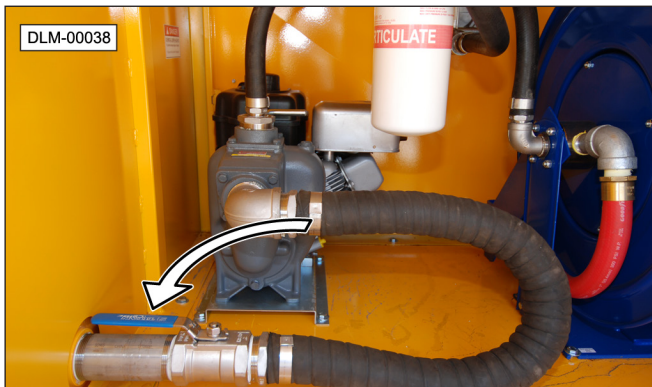
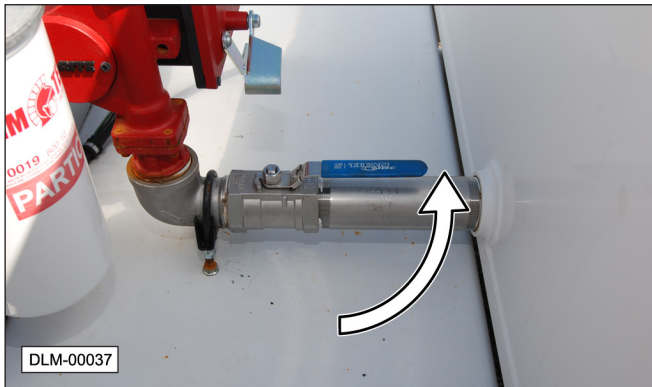
WARNING



Fall Hazard

Do not use the fuel tank as a work platform. Do not stand on the fenders. Do not ride on the fuel hauler or allow others to ride on the fuel hauler.

1. Position the fuel hauler near the equipment being serviced. Open the shut off valve on the tank, as shown.

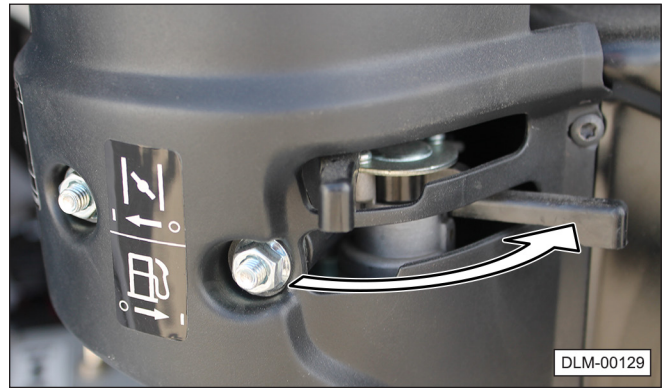


2. Start the pump. For gasoline engine powered pumps, proceed with Step 3 For 12 Volt electric pumps, proceed to Step 4.

3. Start the gasoline engine.



- a. Turn the engine fuel lever to the ON position.



- b. To start a cold engine, move the choke lever to the ON position. In warm weather, start the engine with the choke in the middle. To restart a hot engine, move the choke lever to the OFF position.



- c. Move the throttle lever away from the SLOW position, about midway to the FAST position.



- d. Turn the key switch to the START position.
When the engine starts, release the switch.



- e. If the choke lever is in the CHOKE position, gradually move it to the OPEN position as the engine starts to warm up.



- f. Operate the engine at idle speed before moving the throttle lever to the desired position.

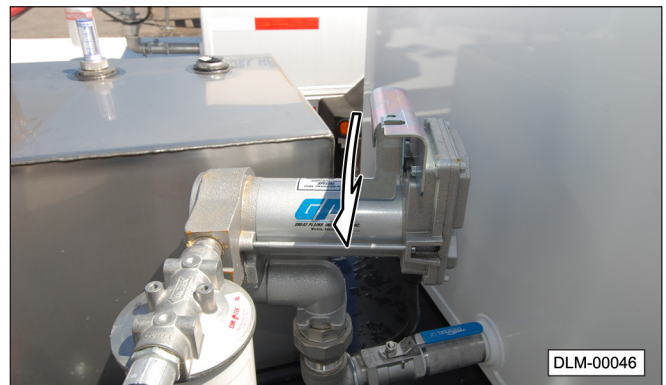


4. Start the 12 Volt pump:

NOTICE

Make sure the external electrical system you are using is a 12 Volt system. Some equipment may use a 24 Volt system which would cause damage to the pump, if connected.

- Connect the red cable to the positive terminal of the supply battery.
- Connect the black cable to the negative terminal of the supply battery or a heavy metal ground on the tow vehicle.
- Move the lever to the ON position.



5. Remove the fuel nozzle from its holder



NOTICE

To avoid fuel contamination and possible nozzle malfunction, keep the fuel nozzle clean. Always store the nozzle in the nozzle holder when not it use.

6. Extend enough hose to easily reach the fill opening of the equipment being serviced.



Note: When the pump is running, the fuel hose is pressurized and squeezing the handle on the fuel nozzle will begin pumping diesel fuel.

7. If using the optional electronic fuel meter, press the DISPLAY button on the face of the meter. With TTL1 showing on the display screen, hold the DISPLAY button down for three seconds to zero the batch total.

Note: The fuel meter will turn on automatically when it senses fuel flow. It can be manually turned on by pressing the DISPLAY button ("DISPLAY"). The meter will show the total from its last use. The meter turns off automatically if not used for approximately one minute.

Note: Briefly pressing the DISPLAY button switches the display screen between TTL1 (batch total) and TTL2 (cumulative total).

Note: Refer to the OEM manual for further information.



NOTICE

To avoid overfilling the receiving tank, always keep the fuel nozzle clean, and do not leave the fuel nozzle unattended during fueling. Be prepared to manually shut off fuel flow at the nozzle, if necessary.

8. Place the fuel nozzle into the receiving tank and squeeze the handle to start fuel flow. When the tank is full, the nozzle will automatically shut off the flow. If an electronic fuel meter is attached to the hose, a specific amount of fuel can be added.
9. Turn off the power supply.
Turn the pump OFF.
To turn OFF a gas engine pump, refer to Step 10.
To turn OFF an electric pump, refer to Step 11.

Note: When filling equipment from the Fuel Hauler™, never allow the pump to run dry.

10. To turn OFF the gasoline engine pump:

Note: To stop the engine in an emergency, simply turn the key switch to the OFF position.

- a. Under normal conditions, move the throttle lever to the SLOW position. Allow the engine to run at idle for 30-60 seconds.



- b. Turn the key switch to the OFF position.

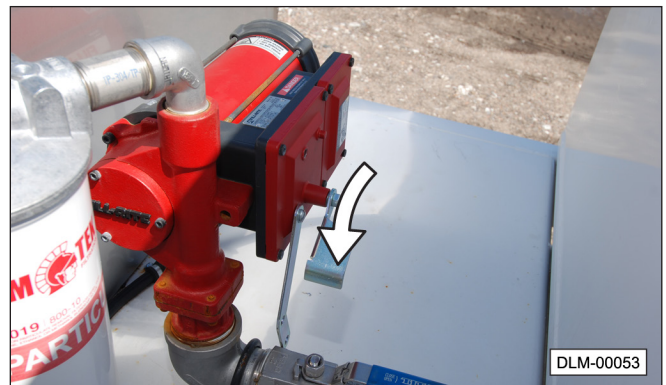


- c. Turn the fuel valve lever to the OFF position.

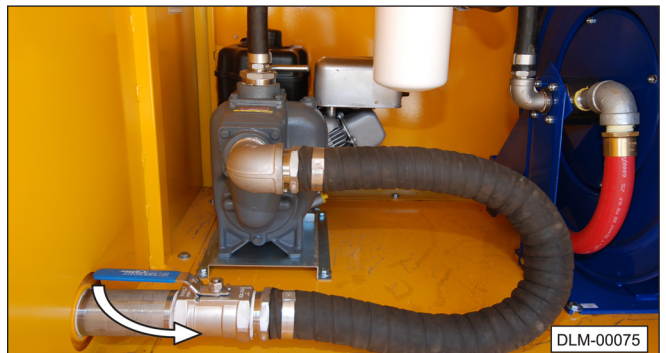
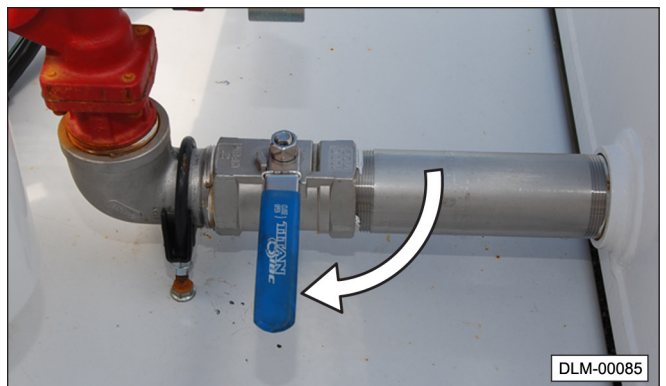


11. To turn OFF the electric pump:

- a. Place the ON/OFF lever in the OFF position.
- b. Remove the black battery cable first, and then remove the red cable.



12. Close the fuel shutoff valve on the tank (vertical to the pipe).



13. When fueling is complete, rewind the fuel hose on the hose reel or hose stand.

Note: Refer to the OEM manual for hose reel operation and maintenance.

14. Place the nozzle back into the nozzle holder.

15. Close and latch the doors, if equipped.

7.10 DEF Solution

The information concerning DEF provided in this manual has been obtained from sources considered technically accurate and reliable. Review the safety information concerning potential product hazards. Since the actual product use is beyond our control, it is assumed that the user has been fully trained to meet any local, state, or federal regulations.

7.10.1 DEF Solution Safety Practices

SAFETY INSTRUCTIONS



Respiratory protection is not usually required. If significant spray or mist occurs, wear a NIOSH approved or equivalent dust respirator.



The use of gloves impermeable to the specific material handled is advised to prevent skin contact, possible irritation, or absorption.



Approved eye protection to safeguard against potential eye contact, irritation, or injury is recommended. Depending on the conditions of use, a face shield may be necessary.



A source of clean water should be available in the work area for flushing eyes and skin. Impervious clothing should be worn, as needed.

7.10.2 DEF Solution First Aid Measures

Eye: If irritation or redness develops, move away from exposure and into fresh air. Flush eyes with clean water immediately for at least 15 minutes. If symptoms persist, seek medical attention.

Skin: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water. If irritation or redness develops and persists, seek medical attention.

Inhalation (Breathing): If respiratory conditions develop, move away from source of exposure and into fresh air. If symptoms persist, seek medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion (Swallowing): First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

7.10.3 DEF Solution General Information

1. DEF has not been shown to be harmful to humans or animals.
2. DEF is not explosive, does not burn, and will not aid in combustion.
3. DEF is non-toxic. If you get it on your skin or clothes, rinse with plenty of water.
4. DEF is a colorless liquid. However, it is best to avoid spilling on clothing or vehicle upholstery as it may leave a stain.

IMPORTANT NOTICE

DEF is very corrosive to certain types of material. Care should be taken when filling the fuel hauler or the equipment.

7.10.4 DEF Solution Storage

1. Keep DEF containers tightly closed.
2. To avoid solidification, do not store DEF at temperatures below 23°F (-5°C). Solidified DEF, which has been warmed up carefully at temperatures not exceeding 86°F (30°C), will not be impaired in quality and can be used as soon as the warmed up solution is free from solids. Frozen DEF can be thawed and used without concerns of product degradation; however, damage to the container or equipment will likely occur.
3. To avoid freezing, a DEF heating system is available as an option from Duo Lift Mfg. Co., Inc.
4. Store only in approved containers.
5. Protect containers against physical damage.

6. In order to prevent decomposition of the urea, as well as the evaporation of water in the case of vented containers, prolonged transportation or storing above 77°F should be avoided. (See Table Below).

Constant Ambient Storage Temperature (°F)	Minimum Shelf Life (Months)
≤50	36
≤77*	18
≤86	12
≤95	6
>95	**
*To prevent decomposition of DEF, prolonged transportation or storage above 77 °F should be avoided	
**Significant loss of shelf life: check every batch before use	

Source: ISO 22241-3:2008(E)

7.10.5 Using DEF

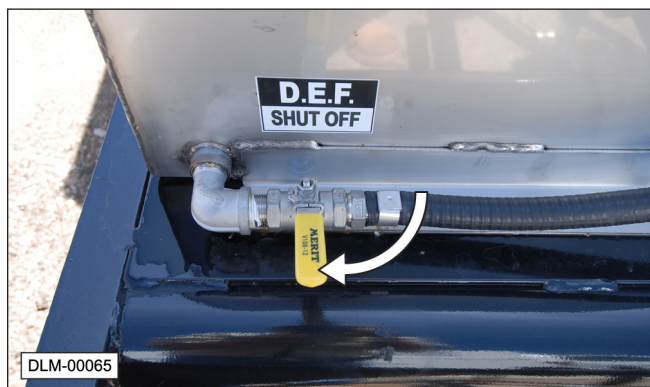
1. Only fill the DEF tank with ISO certified DEF that has been delivered in dedicated, sealed DEF packages.
2. Wear appropriate protective clothing and equipment, such as safety glasses, gloves, etc. while pumping DEF.
3. Wash thoroughly after handling DEF.
4. Never add DEF into the diesel fuel tank.
5. Never add diesel fuel into the DEF tank.
6. Avoid contact with DEF on eyes, skin, and clothing.
7. If spilled, rinse the area with water.
8. Do not use DEF that has been diluted with water or other substances.

7.10.6 DEF Disposal

For proper disposal of waste DEF, as a non-hazardous liquid waste, it should be solidified with stabilizing agents such as sand, fly ash, or clay absorbent, so that no free liquid remains before disposal in an industrial waste landfill.

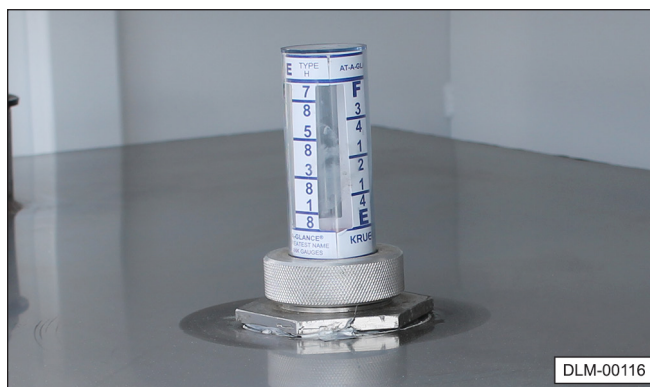
7.10.7 Filling Fuel Hauler's DEF Tank

1. Make sure the DEF tank shut off valve is in the OFF position.



2. Fill the DEF tank using the filler spout. Use the fluid level indicator to determine when the tank is full.

Note: To prevent contamination of the DEF fluid, keep the DEF nozzle and the fill port on the tank clean and free of dust and dirt.



NOTICE

Do not overfill tank.

7.10.8 Filling the DEF Tank on Machinery

1. Connect the electrical cables for the DEF pump to a 12 Volt power source.

- a. Connect the end of the RED jumper cable to the POSITIVE (+) post on the battery (power source). Make sure the NEGATIVE (-) cable is not touching a grounded surface.

Note: In many cases the POSITIVE battery post is slightly larger than the NEGATIVE post and will be marked with a PLUS (+) sign. There may also be a RED plastic protective cover over the positive battery post.

- b. Connect the end of the BLACK jumper cable NEGATIVE (-) to a heavy metal ground on the frame of the tow vehicle.

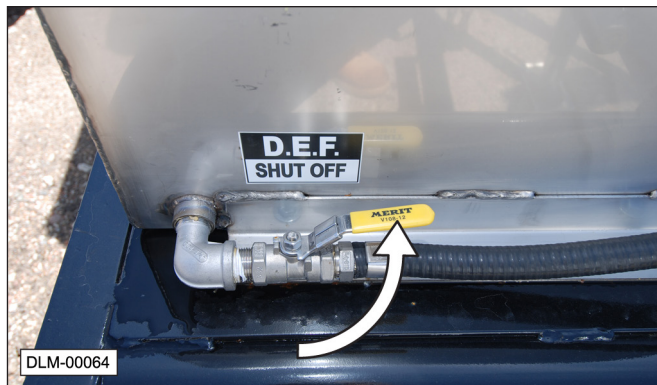
SAFETY INSTRUCTIONS

If the cable must be connected to the NEGATIVE (-) post on the battery itself, be extremely careful to prevent any sparks that can ignite hydrogen fumes around or on top of the dead battery, causing it to explode.

IMPORTANT NOTICE

To avoid contaminating the DEF and possible nozzle malfunction, keep the nozzle clean. Always store the nozzle in the nozzle holder when not in use.

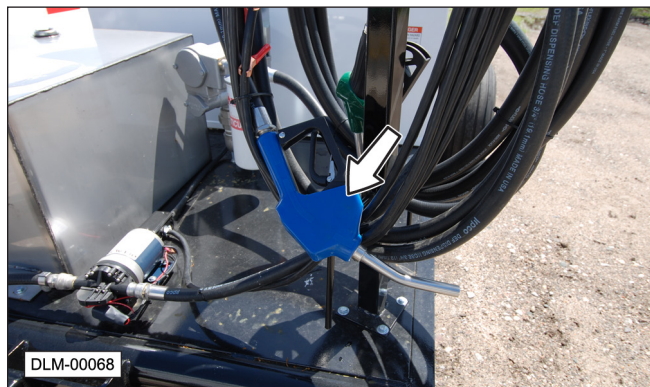
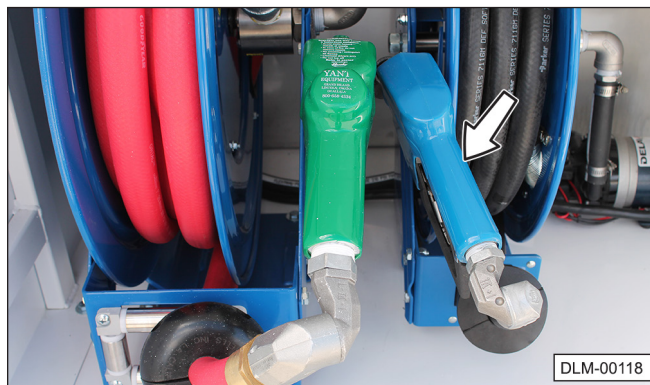
2. Open the DEF tank shutoff valve.



3. Turn the DEF power switch to ON to energize the DEF pump.



4. Use the blue handled nozzle to fill the DEF tank on the equipment.



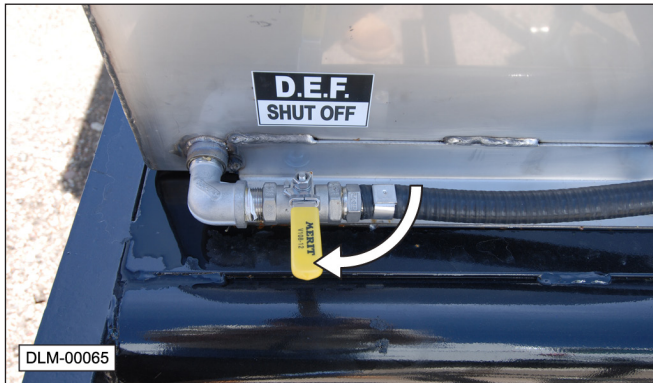
NOTICE

To avoid overfilling the DEF receiving tank, do not leave the nozzle unattended during filling. Be prepared to manually shut off flow at the nozzle, if necessary.

5. Fill the equipment's DEF tank.

Note: When the pump is running, the DEF hose is pressurized and squeezing the handle on the nozzle will begin pumping DEF fluid.

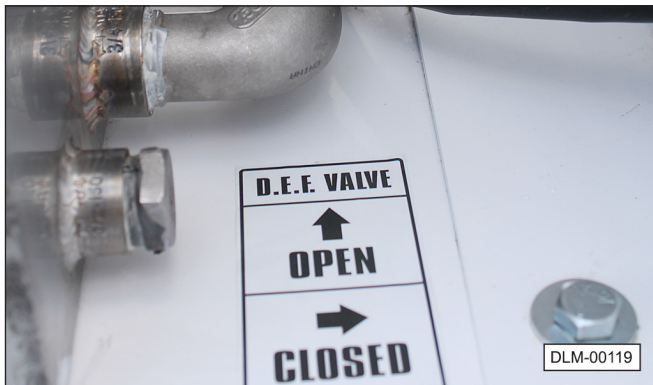
6. Turn off the DEF pump switch and replace the nozzle in its holder.
7. Place the shut off valve for the DEF tank in the closed position.



8. Remove the battery cables..
 - a. Remove the BLACK cable NEGATIVE (-) from the metal ground on the frame of the tow vehicle.
 - b. Remove the RED jumper cable from the POSITIVE (+) post on the battery (power source). Make sure the NEGATIVE (-) cable is not touching a grounded surface.

7.10.9 Winterizing DEF System

Since the majority of the DEF solution is water, freezing of this solution can cause damage to the components of the DEF system. It is recommended that the solution be removed from the DEF tank and stored in a DEF compatible container.



NOTICE

Do not allow DEF fluid to freeze in the tank. Warranty is void if freezing occurs.

If the fuel hauler will be in a location where temperatures go below freezing, remove the DEF solution from the tank, pump, and hose.

8 STORAGE

8.1 Storage Safety

After use or when the Fuel Hauler™ will not be used for a period of time, completely inspect the fuel hauler frame, tires, and axles. Replace or repair any worn or damaged components to prevent unnecessary downtime at the beginning of the next season.

CAUTION



Personal Injury Hazard

Store the fuel hauler 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 fuel hauler.



Crush Hazard

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

NOTICE

To prevent damage to the fuel hauler, store it in a dry, level area. Place planks under the tires for support, if desired.

8.2 Placing Trailer In Storage

After use, the fuel hauler should be thoroughly inspected and prepared for storage. Repair or replace any worn or damaged components to prevent any unnecessary downtime at the beginning of the next season.

Follow this procedure before storing:

1. Remove any entangled vegetation.
2. Thoroughly wash the fuel hauler with a pressure washer or water hose to remove all dirt, mud, or debris.
3. Touch up all paint nicks and scratches to prevent rusting.
4. Move the fuel hauler to its storage area (inside a building is ideal).
5. Select an area that is dry, level, and free of debris.
6. Winterize the DEF system if the fuel hauler is stored in an area where temperatures go below freezing.
7. Close the fuel tank shutoff valve.

8. If the gasoline engine will not be used for two months or more, the fuel system must be completely emptied, or the gasoline treated with a stabilizer.
9. It is not required to drain the diesel fuel tank for storage. Should it become necessary to drain the diesel fuel tank, a port is provided for this purpose.



10. Place chocks in front of and behind a rear tire.
11. Do not leave the tow vehicle attached to the fuel hauler.

8.3 Removing Trailer From Storage

When removing this fuel hauler from storage, follow this procedure:

1. Attach the fuel hauler to the tow vehicle.
2. Check:
 - a. Electrical wiring harness connections and components.
 - b. All hardware. Tighten as required.
 - c. Tire pressure.
 - d. Wheel nuts/bolts.
3. Replace any worn or defective parts.
4. Fill the diesel tank and prime the diesel pump, if necessary.
5. Fill the DEF tank and prime the DEF pump, if necessary.
6. Follow the pre-operation checklist before using the fuel hauler.

9 SERVICE AND MAINTENANCE

9.1 Maintenance Safety

WARNING

Failure to comply with 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 fuel hauler if any parts are damaged. If the fuel hauler 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 fuel hauler or safety devices. Do not weld on the unit. Unauthorized modifications may impair its function and safety.

If the fuel hauler 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 block the fuel hauler 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

When completing a maintenance or service function, make sure all safety shields and devices are reinstalled before placing the fuel hauler 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 used 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 support blocks or safety stands rated to support the load when changing tires, working beneath the fuel hauler, or performing maintenance.

9.2 Tire Safety

WARNING

Failure to comply with 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.

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 attempt to install a tire without proper equipment and experience to perform the job.

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.



Explosive Force Hazard

To prevent injury due to possible dangerous separation of the 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.

9.3 Lubricants

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

Use the Service Record checklist provided to keep a record of all scheduled maintenance.

1. Use a handheld grease gun for all greasing.
2. Wipe grease fitting with a clean cloth before greasing to avoid injecting dirt and grit.
3. Replace and repair broken fittings immediately.
4. If fittings will not take grease, remove and clean it thoroughly. Also clean the lubricant passageway. Replace fittings if necessary.
5. To repack 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 fuel hauler is equipped with a grease fitting in the hub, apply grease until new grease can be seen coming out of the hub.

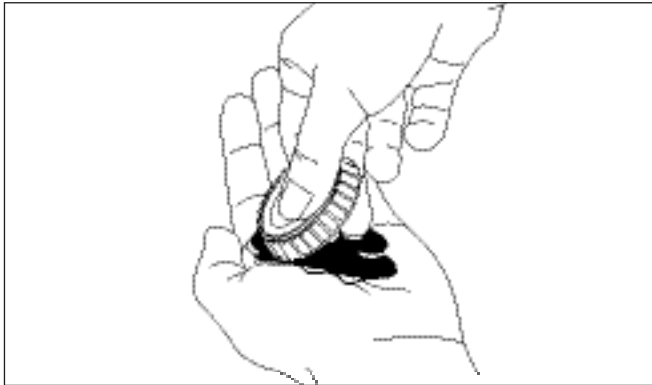
9.4 Wheel Hub Bearing Repacking Instructions

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 fuel hauler 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 strongly 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.

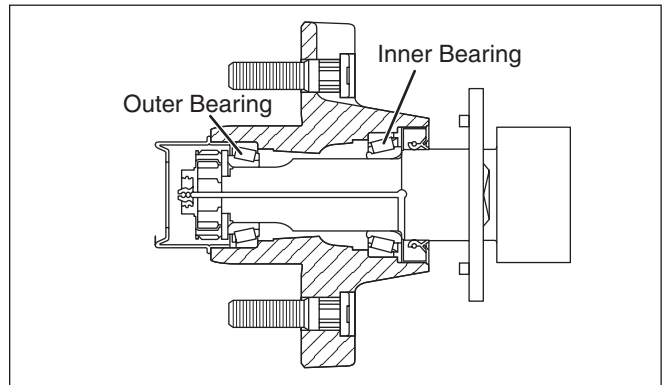


3. Press or pull a section of the bearing rollers and cage through the grease, forcing grease into the interior of the bearing.
4. Rotate the bearing and repeat the process from roller-to-roller.
5. Continue this process until the entire bearing is completely filled with grease.
6. Before reinstalling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

9.4.1 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.

9.4.2 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 the 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 fuel hauler when the spindle nut is too tight; this will cause the bearings to overheat. Never tow the fuel hauler 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.

9.4.3 Wheel Bolt Torque Requirements

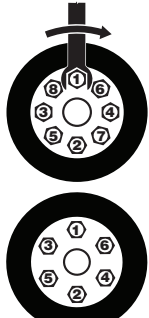
It is extremely important to apply and maintain proper wheel mounting torque on your fuel hauler axle. Use a torque wrench to assure the proper amount of torque is being applied to the fastener.

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 on a new trailer, and after re-mounting a wheel after 5, 10, 25, and 50 miles.

Tighten:
1/2" to 80 ft.lbs. (110 N·m)
9/16" to 115 ft.lbs. (155 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.

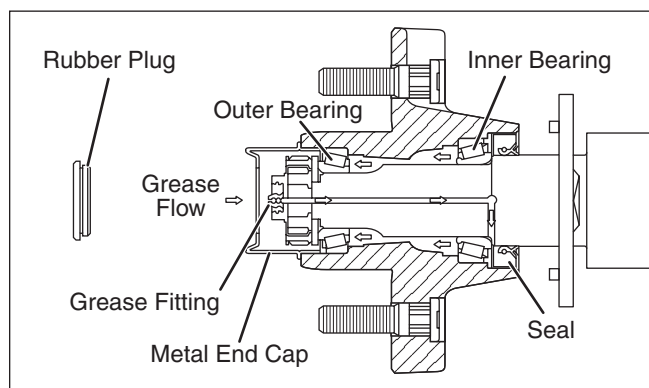
9.4.4 E-Z Lube® Lubrication

The procedure is as follows:

1. Remove the rubber plug from the end of the grease cap.
2. Place a standard manual grease gun onto the grease fitting located on the end of the spindle. Make sure the grease gun nozzle is fully engaged on the fitting.
3. While rotating the hub, pump grease slowly into the fitting. The old, displaced grease will begin to flow back out the cap around the grease gun nozzle.
4. When the new, clean grease is observed, remove the grease gun, wipe off any excess, and replace the rubber plug in the cap.
5. Rotate hub or drum while adding grease.

Note: If hubs are removed from an axle with the E-Z Lube® feature, it is imperative that the seals be replaced BEFORE bearing lubrication. Otherwise, the chance of grease getting on the brake linings is greatly increased.

Note: It is strongly recommended not to use pneumatic powered grease guns as these can inject grease too fast and force grease past the seal, or in rare cases dislodge the seal.



9.5 Servicing Intervals

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

9.5.1 Diesel Fuel Filter Replacement

1. Replace the diesel fuel filter after the first 2000 gallons are pumped or after 6 months, whichever comes first.



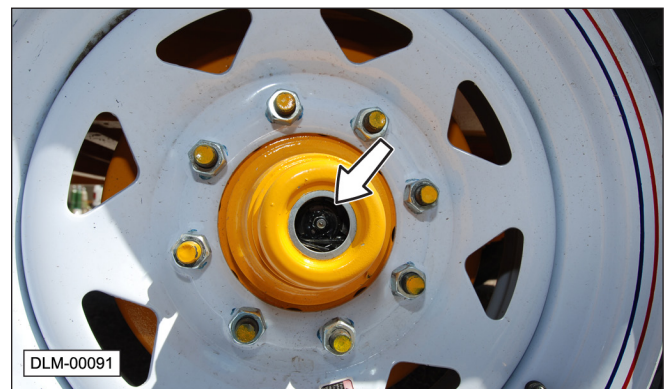
2. Thereafter, replace the diesel fuel filter after every 10,000 gallons are pumped or every 6 months, whichever comes first.

9.5.2 25 Hours or Weekly Inspection

1. Check the hitch assembly and make sure it will securely attach the fuel hauler to the tow vehicle.
2. Check the tire pressure on all the wheels.
3. Make sure the wheel nuts/bolts are tightened to the proper torque on all the wheels.
4. If equipped, make sure the battery for the breakaway brake system is fully charged and that the system functions correctly.

9.5.3 Annual Inspection

1. Repack the standard wheel bearings or lubricate the EZ Lube bearings. Standard wheel bearing axles have a metal cap on the hub, while the EZ lube axle has a rubber cap which is removed to access the grease fitting.



2. If equipped, service the gasoline engine, following the instructions in the OEM manual.
3. Make sure the axle-to-frame bolts are properly tightened.

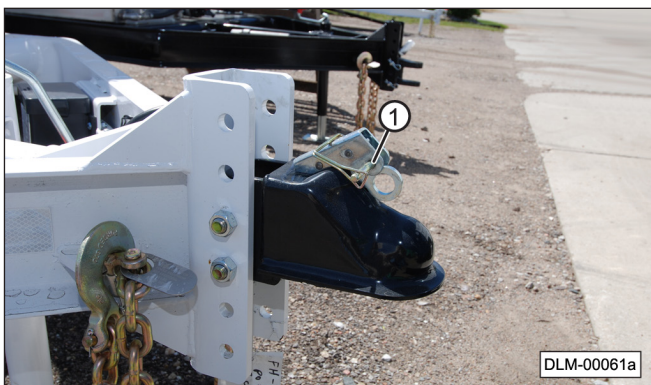
4. Make sure the safety chains are properly attached and have a certification tag. Make sure the chains are not worn or damaged in any way that would hinder their function.



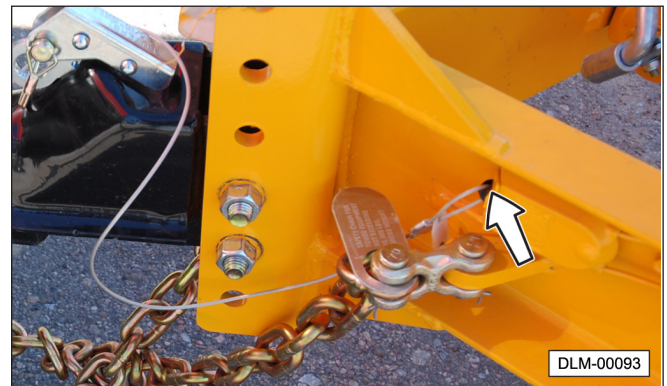
5. Depending on the style of hitch, make sure an OEM drawbar pin and retainer clip are being used for towing and are in good condition. **Do not use homemade or shop-made drawbar pins when towing this fuel hauler.**



6. If equipped with a ball and coupling style hitch, make sure it is functioning correctly. Also make sure retainer pin (1) is installed before towing the fuel hauler.



7. Make sure the wiring harness and seven-pin connector are not damaged and working properly.
8. Make sure the breakaway cable and key are connected to the fuel hauler. Make sure the battery is charged and in good working order.



9. Make sure all lights are working and that all safety signs and reflective tape are legible and properly installed.
10. Wash the fuel hauler to prevent possible contamination of the diesel fuel and/or DEF solution.

9.6 Service Record Chart

See this section for details of service. Copy this page to continue record.

Hours and Served By														
Maintenance														
25 Hours of Operation														
Check the hitch assembly and make sure it will securely attach the fuel hauler to the tow vehicle.														
Check the tire pressure on all the wheels.														
Make sure the wheel nuts/bolts are tightened to the proper torque on all the wheels.														
If equipped, make sure the battery for the breakaway brake system is fully charged and that the system functions correctly.														
Make sure all pins are equipped with hair pin retainer clips.														
Every 6 Months														
Replace the diesel fuel filter.														
Annually														
Repack the standard wheel bearings or lubricate the EZ Lube bearings.														
Make sure the axle-to-frame bolts are properly tightened.														
Make sure the safety chains are properly attached and have a certification tag. Make sure the chains are not worn or damaged in any way that would hinder their function.														
If equipped, 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 fuel hauler.														
If equipped with a ball and coupling style hitch, make sure it is functioning correctly.														
Make sure the wiring harness and seven-pin connector are not damaged and working properly.														
Make sure the breakaway cable and key are connected to the fuel hauler. Make sure the battery is charged and in good working order.														
Make sure all lights are working and that all safety signs and reflective tape are legible and properly installed.														
Wash the fuel hauler.														
If equipped with a 12 Volt battery for the DEF pump, inspect the battery for cracks or corrosion. If any damage is found, replace the battery immediately to avoid serious injury or additional equipment damage.														
If equipped with an electric pump, clean or replace the pump screen.														

9.7 Welding Repairs



Repair welding must be done with care and with procedures that may be beyond the capabilities of the ordinary welder. Before performing any type of welding repair, contact Duo Lift Mfg. for approval.

WARNING



Personal Injury Hazard
Repairs or modifications to the fuel hauler, fuel hauler tongue, or fuel hauler 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.

9.8 Breakaway Brake Systems



9.8.1 Testing the Breakaway Battery

1. Disconnect the wiring harness plug from the tow vehicle; otherwise, you are testing the tow vehicle's battery.

NOTICE

If the battery is weak or dead (even after charging), the battery must be replaced.

2. Test the system by pulling the pin out of the breakaway switch. The battery should activate the brakes. (**Note:** Do not use this kit as a parking brake). The battery should be charged and tested prior to each use of the fuel hauler.

9.8.2 Charging the Breakaway Battery

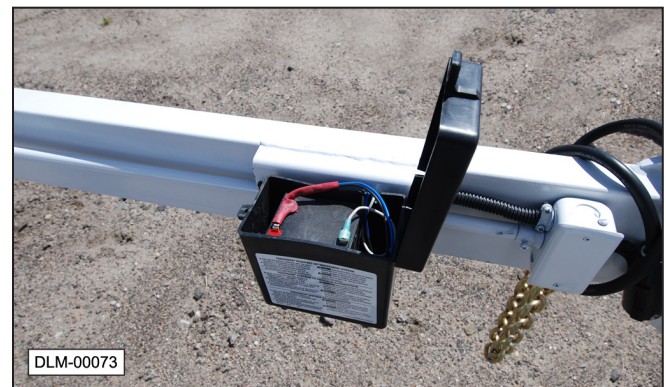
The battery in the breakaway system is rechargeable. If the battery will not hold a charge, replace the battery.

9.8.3 Replacing the Breakaway Battery

Refer to the Parts section in this manual for a replacement battery.

NOTICE

Make sure the battery is replaced with the same type or compatible battery. Also make sure the wiring leads are correctly connected to the battery.



10 TROUBLESHOOTING

The Duo Lift Mfg. Co., Inc. Fuel Hauler™ is a fuel hauler that is used to transport diesel fuel and diesel exhaust fluid (DEF) to your equipment.

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

If you encounter a problem that is difficult to solve, even after having read through this troubleshooting guide, please call your local distributor or dealer. Before you call, please have this Owner's Manual and the serial number from your fuel hauler.

WARNING



EQUIPMENT FAILURE

The torque value for bolts and capscrews are identified by their head markings. Replacing higher "Grade" bolts (Grade 8 or 10.9) with lower Grade bolts (Grade 5 or 8.8) 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.

PROBLEM	CAUSE	SOLUTION
Fuel hauler sways when being pulled down the road.	Low tire pressure.	Inflate tire to correct pressure. Check all tires.
	Axle is bent or out of alignment.	Repair or replace axle.
Fuel hauler pulls to one side when being towed.	One tire has low pressure.	Inflate tire to correct pressure.
	Axle(s) out of alignment.	Realign, repair, or replace axle(s).
The tow vehicle has difficulty stopping.	Travelling too fast.	Slow to appropriate speed.
	Towing vehicle too light-weight.	Use appropriate tow vehicle.
	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.
	Travelling too fast.	Slow to appropriate speed.
	Bad road conditions.	Slow to appropriate speed for conditions.
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.
	Lights are burned out.	Replace lights.
Gasoline engine is not working.	Refer to the OEM service manual.	Refer to the OEM service manual.
Electric motor/pump for DEF system is not working.	DEF tank shutoff valve is closed.	Open the valve.
	Pump was not winterized and has been damaged due to freezing.	Winterize the system prior to winter or store the fuel hauler in a climate controlled building.
Fuel is not being pumped from the tank.	Fuel tank shutoff valve is closed.	Open the valve.
	Fuel filter is dirty.	Change the filter.
	Electric fuel pump inlet strainer is dirty.	Clean or replace the strainer.
	Fuel pump is not working properly.	Repair or replace the pump.

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