



An Oshkosh Corporation Company

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# ***Operation & Safety and Service Manual***

## ***Triple-L™ Trailers***

3121224

October 11, 2012

***ANSI***



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An Oshkosh Corporation Company



## **FOREWORD**

This manual is a very important tool! Keep it with the machine at all times.

The purpose of this manual is to provide owners, users, operators, lessors, and lessees with the precautions and operating procedures essential for the safe and proper trailer operation for its intended purpose. It is important to stress proper trailer usage at all times. All information in this manual must be read and understood before any attempt is made to operate the trailer.

Because the manufacturer has no direct control over trailer operation and application, proper safety practices are the responsibility of the owners, users, operators, lessors, and lessees.

All instructions in this manual are based upon the use of the trailer under proper operating conditions, with no deviations from the original design. Any alteration or modification of the trailer is strictly forbidden without written approval from JLG Industries, Inc.

Due to continuous product improvements, JLG Industries, Inc. reserves the right to make specification changes without prior notification. Contact JLG Industries, Inc. for updated information.

## **SAFETY ALERT SYMBOLS AND SAFETY SIGNAL WORDS**



This is the Safety Alert Symbol. It is used to alert you to the potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death

The Safety Alert Symbol will be used with the appropriate Safety Signal Word of “DANGER” “WARNING” or “CAUTION” to a potential hazard and designate a level of seriousness. The Safety Signal Words are inserted throughout this manual in Black/White. On the machine, the Safety Signal Words will have either a Red, Orange, or Yellow background as part of a safety sign or decal. The “DANGER”, “WARNING”, and “CAUTION” Safety Signal Words, definitions, and associated colors are as follows:

### **⚠ DANGER**

INDICATES AN IMMINENTLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN SERIOUS INJURY OR DEATH. THIS SIGNAL WORD IS USED IN THE MOST EXTREME CASES. WHEN INSTALLED ON THE TRAILER, THIS SIGNAL WORD WILL HAVE A RED BACKGROUND AS PART OF A DECAL.

### **⚠ WARNING**

INDICATES A POTENTIALITY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN SERIOUS INJURY OR DEATH. WHEN INSTALLED ON THE TRAILER, THIS SIGNAL WORD WILL HAVE AN ORANGE BACKGROUND AS PART OF A DECAL.

### **⚠ CAUTION**

INDICATES A POTENTIALITY HAZARDOUS SITUATION WHICH IF NOT AVOIDED, MAY RESULT IN MINOR OR MODERATE INJURY. IT MAY ALSO BE USED TO ALERT AGAINST UNSAFE PRACTICES. WHEN INSTALLED ON THE TRAILER, THIS SIGNAL WORD WILL HAVE A YELLOW BACKGROUND AS PART OF A DECAL.

The “IMPORTANT” Safety Signal Word may also appear in this manual or on the machine. This Safety Signal Word typically will not appear with the Safety Alert Symbol, but contains important information that must be followed for safe and proper operation, The “IMPORTANT” Safety Signal Word definition and associated color is as follows.

### **NOTICE**

INDICATES INFORMATION OR A COMPANY POLICY THAT RELATES DIRECTLY OR INDIRECTLY TO THE SAFETY OF PERSONNEL OR PROTECTION OF PROPERTY.

**⚠ WARNING**

ALL SAFETY-RELATED BULLETINS MUST BE ACCOMPLISHED ON THIS PRODUCT. JLG INDUSTRIES, INC. MAY HAVE ISSUED SAFETY-RELATED BULLETINS FOR THIS JLG PRODUCT. CONTACT JLG INDUSTRIES, INC. OR THE LOCAL AUTHORIZED JLG DEALER FOR INFORMATION REGARDING SAFETY-RELATED BULLETINS WHICH MAY HAVE BEEN ISSUED FOR THIS PRODUCT.

**NOTICE**

FOR THE PURPOSE OF RECEIVING SAFETY-RELATED BULLETINS, IT IS IMPORTANT THAT THE CURRENT OWNER OF THIS UNIT ENSURES JLG INDUSTRIES, INC. HAS UPDATED OWNERSHIP INFORMATION. CONTACT JLG INDUSTRIES, INC. TO ENSURE THAT THE CURRENT OWNER RECORDS ARE UPDATED AND ACCURATE.

**NOTICE**

JLG INDUSTRIES, INC. MUST BE NOTIFIED IMMEDIATELY IN ALL INSTANCES WHERE JLG PRODUCTS HAVE BEEN INVOLVED IN AN ACCIDENT INVOLVING BODILY INJURY OR DEATH OF PERSONNEL OR WHEN SUBSTANTIAL DAMAGE HAS OCCURRED TO PERSONAL PROPERTY OR THE JLG PRODUCT.

**FOR :**

- Accident Reporting
- Product Safety Publications
- Current Owner Updates
- Questions Regarding Product Safety
- Standards and Regulations Compliance Information
- Questions Regarding Special Product Applications
- Questions Regarding Product Modifications

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McConnellsburg, PA 17233

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877-554-7233

E-mail: ProductSafety@JLG.com

**FOREWORD**

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<b>TRAILER IDENTIFICATION</b>			
<b>TRAILER NUMBER</b>	<b>MODEL NUMBER</b>	<b>SERIAL NUMBER</b>	<b>VIN NUMBER</b>
1			
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## NEW PRODUCT WARRANTY

1. **WARRANTY.** JLG Industries, Inc. ("Manufacturer") warrants each new product made by it to be free from defects in material or workmanship for twelve months from the date of initial sale, lease, rental, or other disposition of such product. Manufacturer further warrants the structural elements of each new product made by it, as defined in its then current warranty policies and procedures, to be free from defects in material or workmanship for one year from the date of initial sale, lease, rental or other disposition of such product. Manufacturer agrees only to repair or replace at its own expense, F.O.B. the place or places of manufacturer, any part or parts of the product found to be defective in material or workmanship, provided Manufacturer is notified of such defect or defects within the applicable warranty period and given a reasonable time to correct the defect. In no case shall any warranty extend to defects in materials, components, or services furnished by third parties or to the erection or installation of the product performed by third parties. Defects caused by chemical action or the presence of abrasive materials and defects arising following the operation beyond rated capacity or the improper use or application of any products shall not be considered defects within the scope of the above mentioned warranty. If any repairs or alterations are made or any parts are replaced during the periods covered by any warranty above mentioned by other than an authorized Manufacturer's Distributor in accordance with authorized Manufacturer's service manuals or with other than parts, accessories, or attachments authorized by Manufacturer for use in its products, customer shall pay for such repairs or parts without recourse against Manufacturer, and Manufacturer shall be relieved of responsibility for fulfillment of the above mentioned warranty with respect to parts or components for all repairs, alterations, or replacements so made. Manufacturer's obligations under this warranty shall at all times be subject to its then current warranty policies and procedures. The above mentioned warranty shall not apply to replacement or service parts made by and sold by Manufacturer, with any obligation of the Manufacturer to such parts governed solely by Manufacturer's then current warranty policies and procedures.
2. **DISCLAIMER AS TO CONSEQUENTIAL OR SPECIAL DAMAGES.** Under no circumstances shall Manufacturer be liable for any consequential or special damages which any person firm, corporation, or other entity may suffer or claim to suffer or incur or claim to incur as a result of any defect in the product or in any correction or alteration thereof made or furnished by Manufacturer or others. "Consequential"

or "special damages" as used herein includes but is not limited to costs of transportation, lost sales, lost orders, lost profits, lost income, increased overhead, labor and material costs, and costs of manufacturing variances and operational inefficiencies.

3. **MAXIMUM LIABILITY.** The maximum liability of Manufacturer under the exclusive warranty set forth herein shall be the amount paid to Manufacturer with respect to the product to which such warranty applies.
4. **EXCLUSIVE AND ENTIRE WARRANTY.** This warranty constitutes Manufacturer's entire warranty as to the product and it is expressly agreed that the remedies of customer and those claiming under customer as stated in this warranty are exclusive. Manufacturer does not assume (and has not authorized any other person to assume on its behalf) any other warranty or liability in connection with any product covered by this warranty.

**NOTE:** *Manufacturer expressly disclaims any and all other warranties of any kind whatsoever as to the product furnished hereunder, including but not limited to express or implied warranties as to merchantability, fitness for particular purposes sold, description or quality of the product furnished hereunder.*

5. **NOTICE OF OCCURRENCE.** This warranty shall be void if, upon the occurrence of any incident involving any product made by Manufacturer and resulting in any personal injury or property damage, customer shall fail to notify Manufacturer within 48 hours of such occurrence or permit Manufacturer and its representatives to have immediate access to such product and all records of or within the control of customer relating to the product and occurrence.
6. **LIMITATION OF LIABILITY.** The limitation of liability provisions herein shall apply to any and all claims or suits brought against Manufacturer including any claim based upon negligence, breach of contract, breach of warranty, strict liability, or any other legal theories upon which liability may be asserted against Manufacturer.

**NOTE:** *Manufacturer may at any time amend the foregoing form of warranty without prior notice.*

## **REVISION LOG**

Original Issue - May 23, 2003

Revised - August 7, 2003

Revised - March 3, 2004

Revised September 30, 2004 (Edited to 0010598 Rev 7, 0010599 Rev 9, 0010600 Rev 6, 0010601 Rev 9, 0010602 Rev 10)

Revised - October 4, 2004

Revised - February 25, 2005

Revised - June 27, 2005

Revised - August 22, 2005

Revised - May 24, 2006

Revised - August 28, 2006

Revised - December 5, 2007

Revised - January 17, 2008

Revised - December 21, 2010

Revised - October 11, 2012

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## SECTION 1. SAFETY PRECAUTIONS

### 1.1 SAFETY INFORMATION

#### Safety Information, Alert Symbols, and Signal Words

An owner's manual that provides general trailer information cannot cover all of the specific details necessary for the proper combination of every trailer, tow vehicle and hitch. Therefore, you must read, understand and follow the instructions given by the tow vehicle and trailer hitch manufacturers, as well as the instructions in this manual.

Triple-L™ Trailers are built with components produced by various manufacturers. Some of these items have separate instruction manuals that were originally shipped with the product. Where this manual indicates that you should read another manual, and you do not have that manual, call JLG to obtain a copy.

The safety information in this manual is denoted by the safety alert symbols and signal words listed below:

#### **DANGER**

INDICATES AN IMMINENTLY HAZARDOUS SITUATION. IF NOT AVOIDED, WILL RESULT IN SERIOUS INJURY OR DEATH. THIS DECAL WILL HAVE A RED BACKGROUND.

#### **WARNING**

INDICATES A POTENTIALLY HAZARDOUS SITUATION. IF NOT AVOIDED, COULD RESULT IN SERIOUS INJURY OR DEATH. THIS DECAL WILL HAVE AN ORANGE BACKGROUND.

#### **CAUTION**

INDICATES A POTENTIALLY HAZARDOUS SITUATION. IF NOT AVOIDED, MAY RESULT IN MINOR OR MODERATE INJURY. IT MAY ALSO ALERT AGAINST UNSAFE PRACTICES. THIS DECAL WILL HAVE A YELLOW BACKGROUND.

#### **NOTICE**

INDICATES PROCEDURES ESSENTIAL FOR SAFE OPERATION. THIS DECAL WILL HAVE A GREEN BACKGROUND.

### 1.2 LOCAL AND NATIONAL REGULATIONS

In many regions, a trailer is considered a motor vehicle. As such, there are regulations (height, width, brakes etc.) that must be followed by the owner and operator. It is the responsibility of the trailer owner and operator to determine which regulations apply and to comply with these requirements.

### 1.3 MAJOR HAZARDS

Safe and proper usage of the trailer is essential to avoid accidents. Unsafe use; separation of trailer from tow vehicle; and loss of control of the trailer or trailer/tow vehicle combination can result in death or serious injury. Common causes for trailer accidents include:

- a. Driving too fast for conditions
- b. Failure to adjust handling while towing a trailer
- c. Trailer improperly coupled to the hitch
- d. Incorrect use of safety chains
- e. Incorrect use of breakaway brake
- f. Mismatch of trailer and hitch
- g. Unsafe tires, lug nuts or wheels
- h. Overload
- i. Unsafe load distribution
- j. Shifting cargo
- k. Inappropriate cargo
- l. Inoperable brakes, lights or mirrors
- m. Modifying the trailer
- n. Inadequate tow vehicle or towing hitch
- o. Not properly maintaining the trailer structure.

#### Driving too Fast for Conditions

With ideal road conditions, the maximum speed when safely towing a trailer is 55 mph. If you drive too fast, the trailer tires will overheat and possibly blowout. As your speed increases, you are more likely to suddenly lose control. Never exceed 55 mph while towing the trailer.

#### **WARNING**

DECREASE YOUR SPEED AS ROAD, WEATHER AND LIGHTING CONDITIONS DETERIORATE.

#### Failure to Adjust Handling While Towing a Trailer

When towing a trailer, your tow vehicle will have decreased acceleration, increased stopping distance, and increased turning radius (which means you must make wider turns to keep from hitting curbs, vehicles, and anything else that is on the inside corner). In addition, you will need a longer distance to pass, due to slower acceleration and increased length.

Be alert for slippery conditions. You are more likely to be affected by slippery road surfaces when driving a tow vehicle with a trailer, than driving a tow vehicle without a trailer.

## SECTION 1 - SAFETY PRECAUTIONS

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Anticipate the trailer “swaying.” Swaying is the trailer reaction to the air pressure wave caused by passing trucks and busses. Continued pulling of the trailer provides a stabilizing force to correct swaying. Do not apply the brakes to correct trailer swaying.

Check rear view mirrors frequently to observe the trailer and traffic.

Use lower gear when driving down steep or long grades. Use the engine and transmission as a brake. Do not ride the brakes, as they can overheat and become ineffective.

Be aware of your trailer height, especially when approaching roofed areas and when around trees.

Hitting a bump or depression in the road surface or running off the shoulder of the road, and then returning to the road surface, can adversely affect the stability of the trailer or towing vehicle.

Rounding a corner or curve at excessive speed can adversely affect the stability of the trailer or towing vehicle.

### Trailer Improperly Coupled to the Hitch

It is critical that the trailer be securely coupled to the hitch, and that the safety chains are correctly attached. Uncoupling could result in death or serious injury.

#### **WARNING**

**DO NOT MOVE THE TRAILER UNTIL THE COUPLER IS SECURED AND LOCKED TO HITCH, THE SAFETY CHAINS ARE SECURED TO THE TOW VEHICLE AND THE TRAILER JACK(S) ARE FULLY RETRACTED.**

**DO NOT TOW THE TRAILER ON THE ROAD UNTIL THE TIRES AND WHEELS ARE CHECKED, THE TRAILER BRAKES ARE CHECKED, THE BREAKAWAY CABLE IS CONNECTED TO THE TOW VEHICLE, THE LOAD IS SECURED TO THE TRAILER AND THE TRAILER LIGHTS ARE CONNECTED AND CHECKED.**

### Incorrect Use of Safety Chains

If your trailer comes loose from the hitch for any reason, safety chains are provided so that control of the trailer can still be maintained. The chains originally supplied with the trailer are of proper size. Be sure the chains are not allowed to drag while towing. If links become worn, replace with proper size chain. Always check that the chains are attached to the tow vehicle before towing.

#### **WARNING**

**FASTEN CHAINS ONLY TO FRAME OF TOW VEHICLE. DO NOT FASTEN CHAINS TO ANY PART OF THE HITCH UNLESS THE HITCH HAS HOLES OR LOOPS SPECIFICALLY FOR THAT PURPOSE. CROSS CHAINS UNDERNEATH HITCH AND COUPLER WITH ENOUGH SLACK TO PERMIT TURNING AND TO HOLD TONGUE UP, IF THE TRAILER COMES LOOSE.**

### Incorrect Use of Breakaway Brake

When equipped with brakes, a breakaway brake system applies the brakes on your trailer if your trailer comes loose from the hitch for any reason. The safety chains and breakaway brake system must be in good condition and properly rigged to be effective.

#### **WARNING**

**THE BREAKAWAY CABLE MUST BE CONNECTED TO THE TOW VEHICLE; AND NOT TO ANY PART OF THE HITCH. BEFORE TOWING THE TRAILER, TEST THE FUNCTION OF THE BREAKAWAY BRAKE SYSTEM. IF THE BREAKAWAY BRAKE SYSTEM IS NOT WORKING, DO NOT TOW THE TRAILER; HAVE IT SERVICED OR REPAIRED.**

### Mismatch of Trailer and Hitch

The use of a Weight Carrying Hitch instead of a Weight Distributing Hitch can place too much tongue load on the rear end of the towing vehicle. This combined loading can cause the rear end of the towing vehicle to sag downward and the forward end to be raised upward, causing steering problems and towing vehicle sway at other than slow speeds.

#### **DANGER**

**BE SURE YOUR HITCH AND TOW VEHICLE ARE RATED FOR THE GROSS VEHICLE WEIGHT RATING OF YOUR TRAILER.**

### Unsafe Tires, Lug Nuts or Wheels

**NOTE:** Reference Section 4 - Service and Maintenance, Section 4.12, Tire and Wheel Maintenance, and Section 4.13, TIRE SAFETY INFORMATION for complete tire maintenance and safety information.

It is essential to visually inspect the trailer tires and wheels before each tow.

If a tire has a bald spot, bulge, cuts, is showing any cords, or is cracked, replace the tire before towing. If a tire has uneven tread wear, take the trailer to a dealer or service center for diagnosis. Uneven tread wear can be caused by tire imbalance, axle misalignment or incorrect inflation.

Tires with too little tread will not provide adequate tracking on wet roadways and could result in loss of control, leading to death or serious injury.

Improper tire pressure may cause an unstable trailer and could result in a tire blowout and loss of control. Tires must be inspected and inflated in accordance with section 4 of this manual.

**⚠ WARNING**

TRAILER TIRES WILL BE INFLATED TO HIGHER PRESSURES THAN PASSENGER VEHICLE TIRES. UNDER-INFLATED FRONT TIRES ON THE TOWING VEHICLE COULD CAUSE STEERING PROBLEMS. LOW PRESSURE IN THE REAR TIRES OF THE TOWING VEHICLE COULD CAUSE THE VEHICLE TO SWAY.

Trailer wheels and lug nuts are subjected to significant side loads during tow. Before each tow, visually inspect the lug nuts for loosening. Lug nuts must be tightened to the proper torque in accordance with section 4 of this manual.

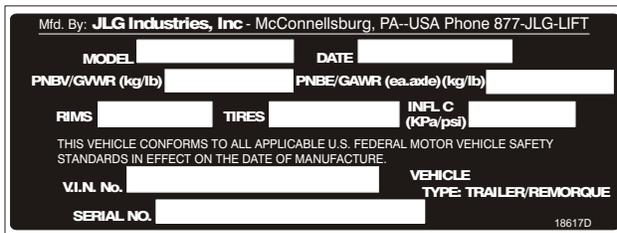
**Overload**

The total weight of the load you put in or on the trailer, plus the empty weight of the trailer itself, must not exceed the trailer's Gross Vehicle Weight Rating (GVWR). If you do not know the empty weight of the trailer, you must measure it at a scale.

Determining the load limits of a trailer includes more than understanding the load limits of the tires alone. On all trailers there is a VIN (Vehicle Identification No.) label and Tire Information Label that is located on the forward half of the left (road) side of the unit. VIN Label indicates the trailer's Gross Vehicle Weight Rating (GVWR). This is the most weight the fully loaded trailer can weigh. It will also provide the Gross Axle Weight Rating (GAWR). This is the most a particular axle can support. If there are multiple axles, the GAWR of each axle will be provided.

**Steps for Determining Correct Load Limit**

- Locate the statement, "The weight of cargo should never exceed XXX kg or XXX lbs.," on your vehicle's placard.
- This figure equals the available amount of cargo and luggage load capacity.
- Determine the combined weight of luggage and cargo being loaded on the vehicle. That weight may not safely exceed the available cargo and luggage load capacity.



VIN Label

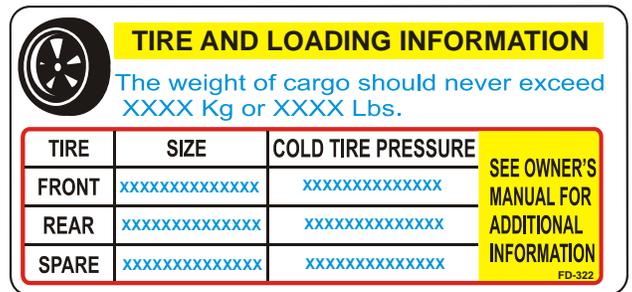
**NOTE:** Refer to production options and accessory weight Table 2-2 for weights of various trailer options.

**⚠ WARNING**

DO NOT LOAD A TRAILER SO THAT THE WEIGHT EXCEEDS THE TRAILER GROSS VEHICLE WEIGHT RATING (GVWR) OR GROSS AXLE WEIGHT RATING (GAWR).

The Tire Information Label provides tire and loading information and a statement regarding maximum cargo capacity. Inspect this label.

**NOTE:** Refer to Figure 1-1. for Tire Information Label and VIN Label location.



Tire Information Label

Excessive loads and/or under-inflation cause tire overloading and, as a result, abnormal tire flexing occurs. This situation can generate an excessive amount of heat and lead to tire failure. It is the air pressure that enables a tire to support the load, so proper inflation is critical. The proper air pressure may be found on the VIN label and/or on the Tire Information Label. This value should never exceed the maximum cold inflation pressure stamped on the tire.

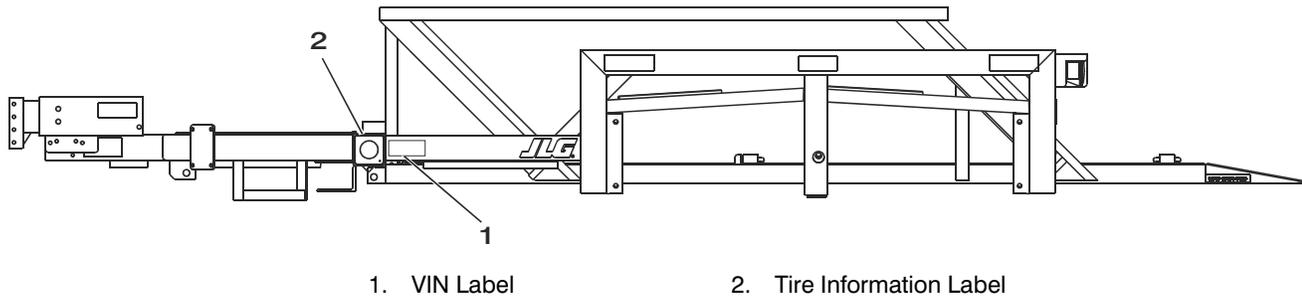


Figure 1-1. VIN Label & Tire Information Label

## Unsafe Load Distribution

Uneven load distribution can cause tire, wheel, axle or structural failure. Be sure your trailer is properly loaded. A proper weight distribution is equal, right to left; and creates a tongue weight that is in the proper range for stable trailer handling (between 10-15% of the total weight of the cargo and the trailer). Towing stability also depends on keeping the center of gravity as low as possible. Load heavy items on the floor and over the axles, but do not exceed the axle load rating (GAWR). When loading additional items, be sure to maintain even side-to-side weight distribution and proper tongue weight.

### **⚠ WARNING**

**MAKE CERTAIN THAT THE TONGUE WEIGHT IS WITHIN THE ALLOWABLE RANGE. BE SURE TO DISTRIBUTE THE LOAD FRONT-TO-REAR TO PROVIDE PROPER TONGUE WEIGHT, DISTRIBUTE THE LOAD EVENLY, RIGHT AND LEFT, TO AVOID TIRE OVERLOAD AND KEEP THE CENTER OF GRAVITY LOW.**

## Shifting Cargo

Since the trailer “ride” can be bumpy and rough, you must secure your cargo so that it does not shift while the trailer is being towed.

### **⚠ WARNING**

**TIE DOWN ALL LOADS WITH PROPER SIZED FASTENERS, ROPES, STRAPS, ETC. IF YOUR TRAILER IS ENCLOSED OR EQUIPPED WITH AN OPTIONAL TAILGATE, THE DOORS OR TAILGATE MUST BE SECURELY LATCHED BEFORE TOWING THE TRAILER.**

## Inappropriate Cargo

If your trailer is designed for specific cargo, only carry that cargo in the trailer. A utility trailer must not be used to carry certain items, such as people, containers of hazardous substances or containers of flammable substances.

### **⚠ WARNING**

**DO NOT TRANSPORT PEOPLE ON OR INSIDE THE TRAILER. THE TRANSPORT OF PEOPLE PUTS THEIR LIVES AT RISK AND MAY BE ILLEGAL.**

**DO NOT TRANSPORT FLAMMABLE, EXPLOSIVE, POISONOUS OR OTHER DANGEROUS MATERIALS IN YOUR TRAILER. EXCEPTIONS: FUEL IN THE TANKS OF EQUIPMENT BEING HAULED; FUEL STORED IN THE TANK OF AN ON-BOARD GENERATOR**

## Inoperable Brakes, Lights or Mirrors

Be sure that all of the lights on your trailer are functioning properly before towing your trailer. Lights on a trailer are controlled via a connection to the tow vehicle, generally a multi-pin electrical connector. Check the trailer taillights by turning on your tow vehicle headlights. Check the trailer brake lights by having someone step on the tow vehicle brake pedal while you look at the trailer lights. Have someone activate the tow vehicle’s turn signals to check the trailer’s turn signal lights.

If your trailer has electric brakes, your tow vehicle must have an electric brake controller that sends power to the trailer brakes. Before towing the trailer on the road, you must operate the brake controller while trying to pull the trailer in order to confirm that the electric brakes operate. While towing the trailer at less than 5 mph, manually operate the electric brake controller in the tow vehicle cab. You should feel the operation of the trailer brakes.

### **⚠ WARNING**

**BEFORE EACH TOW CHECK THAT THE TAILLIGHTS, BRAKE LIGHTS AND TURN SIGNALS WORK AND CHECK THAT THE ELECTRIC BRAKES WORK BY OPERATING THE BRAKE CONTROLLER INSIDE THE TOW VEHICLE.**

Standard mirrors usually do not provide adequate visibility for viewing traffic to the sides and rear of towed trailer. You must provide mirrors that allow you to safely observe approaching traffic.

## Modifying the Trailer

Essential safety items can be damaged by altering your trailer. Even simply driving a nail or screw to hang something can damage an electrical circuit, hydraulic line or other feature of the trailer.

Before making any alteration to your trailer, contact your dealer or JLG at 1-877-JLG-SAFE (554-7233) between the hours of 8:00 AM and 4:45 PM Eastern Standard time and describe the alteration you are contemplating. Alteration of the trailer structure or modification of mechanical, electrical, hydraulic or other systems on your trailer must be approved by JLG and performed only by qualified technicians who are familiar with the system as installed on your trailer.

## Inadequate Tow Vehicle or Towing Hitch

It is essential for the tow vehicle and towing hitch to have a rated towing capacity equal or greater than the trailer Gross Vehicle Weight Rating (GVWR). Vehicle manufacturers will provide you with the maximum capacities of their various models. The hitch ball size must be the same as the coupler size. The height of the hitch ball must equal that of the trailer coupler. If the hitch ball is too small, too large, is underrated, is loose or is worn, the trailer could come loose from the tow vehicle, and could cause death or serious injury.

### WARNING

**BE SURE THE HITCH LOAD RATING IS EQUAL TO OR GREATER THAN THE LOAD RATING OF THE COUPLER. BE SURE THE HITCH SIZE MATCHES THE COUPLER SIZE. OBSERVE THE HITCH FOR WEAR, CORROSION AND CRACKS BEFORE COUPLING. REPLACE WORN, CORRODED OR CRACKED HITCH COMPONENTS BEFORE COUPLING THE TRAILER TO THE TOW VEHICLE. BE SURE THE HITCH COMPONENTS ARE TIGHT BEFORE COUPLING THE TRAILER TO THE TOW VEHICLE.**

## Not Properly Maintaining the Trailer Structure

Proper maintenance is essential for all trailer structural components to operate properly. Structural components can consist of the trailer deck assembly, deck latching mechanism, suspension, and axle components. To ensure safe and proper operation of the trailer, make sure that the proper maintenance and inspections are performed.

## 1.4 REPORTING SAFETY DEFECTS

If you believe that your vehicle has a defect that could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying JLG Industries, Inc.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or JLG Industries, Inc.

To contact NHTSA, you may either call the Auto Safety Hotline toll-free at 1-888-327-4236 (TTY: 1-800-424-9153); go to <http://www.safercar.gov>; or write to:

Administrator  
NHTSA  
1200 New Jersey Avenue S.E.  
Washington, DC 20590

Further information about motor vehicle safety can also be obtained from <http://www.safercar.gov> or from the JLG PS&R Hotline at 1-877-JLG-SAFE (554-7233) between the hours of 8:00 AM and 4:45 PM Eastern Standard time.

## 1.5 SAFETY WARNING LABELS ON YOUR TRAILER

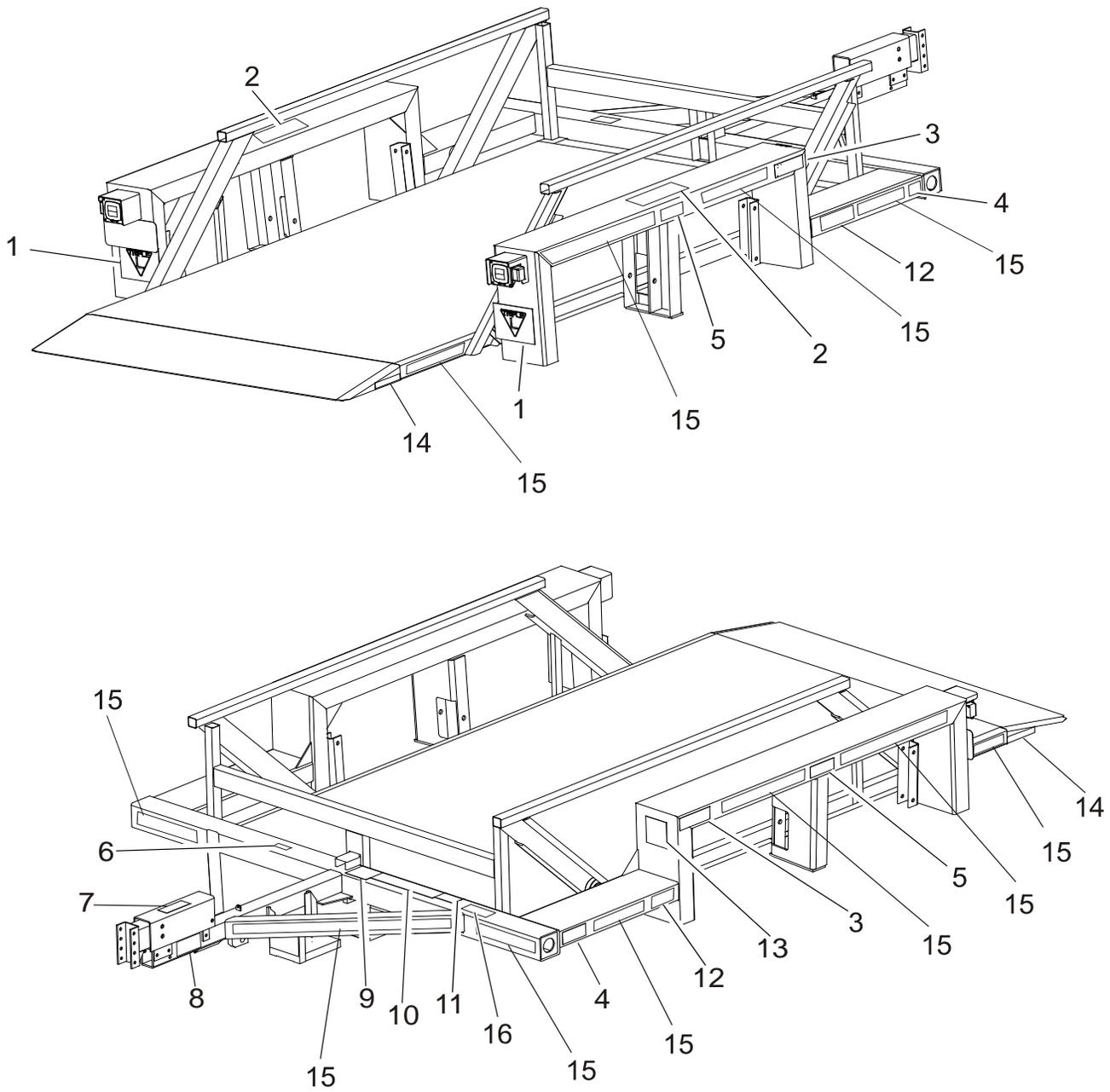
All decals and safety warning labels are placed on the trailer for a reason. Read, understand, and follow the directions of all the decals. Should the decals become worn or defaced, replace them immediately. Use the appropriate part number and order from your local dealer or direct from the trailer manufacturer.

### WARNING

**ALL OF THE LABELS MUST BE ON THE TRAILER AND MUST BE LEGIBLE. REPLACE ANY MISSING OR ILLEGIBLE LABELS. (SEE FIGURE 1-2., DECAL LOCATION).**

**SECTION 1 - SAFETY PRECAUTIONS**

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**Figure 1-2. Decal Location**

**Table 1-1. Decal Location Legend**

<b>Item Number/Model</b>	<b>Decal Number</b>
1	1705809
2	1705782
3 Model UT610 Model UT612 Model UT614 Model EC-10 Model EC-12 Model EC-14 Model 248 Model UT28 Model 449 Model UT49 Model 4610 Model UT4610 Model 1012 Model 1014 Model UT912 Model UT914 Model 7910 Model 7612 Model 7614 Model 7616	1705761 1705762 1705763 1705764 1705765 1705766 1705767 1705768 1705769 1705770 1705771 1705772 1705773 1705774 1705775 1705776 1705777 1705778 1705779 1705780
4	1705810
5	70319
6	70327
7 all except Model 449 & UT49	1707075 1707076
8 Model 449 & UT49 only	70322 1001105881
9	70325
10	70323
11	27611
12	1705783
13	70230
14	70317
15*	1705817
16	1706687

\*Note: These decals are only available on the following models; 1012/1014/UT912/UT914/EC10/EC12/EC14.



## SECTION 2. TRAILER OPERATION

### 2.1 TRAILER MODELS

Triple-L™ Trailers employ a unique trailer deck design to make loading and unloading easier. The trailer deck can be lowered to the ground while remaining level, allowing equipment to be rolled or driven directly onto the trailer deck.

**Table 2-1. Trailer Model Specifications**

MODEL	DECK SIZE (in)	VEHICLE CAPACITY WEIGHT (lbs)	AXLE	STANDARD BRAKE CONFIGURATION	LIFT	GVWR
248	52 x 96	2200	Single	Optional	Hand Winch	3600 lbs (1633 kg)
449	52 x 108	5000	Single	Electric	Hydraulic	6810 lbs (3089 kg)
4610	72 x 120	4500	Single	Electric	Hydraulic	6537 lbs (2965 kg)
7610	70 x 120	7000	Tandem	Electric - 1 Axle	Hydraulic	9574 lbs (4343 kg)
7612	70 x 144	7000	Tandem	Electric - 1 Axle	Hydraulic	9750 lbs (4423 kg)
7614	70 x 168	7000	Tandem	Electric - 1 Axle	Hydraulic	9950 lbs (4513 kg)
7616	70 x 192	6500	Tandem	Electric - 1 Axle	Hydraulic	9700 lbs (4400 kg)
1012	70 x 144	10,000	Tandem	Electric - 2 Axles	Hydraulic	13,102 lbs (5943 kg)
1014	70 x 168	10,000	Tandem	Electric - 2 Axles	Hydraulic	13,342 lbs (6052 kg)
UT28	52 x 96	2000	Single	Optional	Hand Winch	3790 lbs (1719 kg)
UT49	52 x 108	4500	Single	Electric	Hydraulic	6460 lbs (2930 kg)
UT410	70 x 120	4000	Single	Electric	Hydraulic	6800 lbs (3085 kg)
UT610	70 x 120	6000	Tandem	Electric - 1 Axle	Hydraulic	9740 lbs (4418 kg)
UT612	70 x 144	6000	Tandem	Electric - 1 Axle	Hydraulic	9903 lbs (4492 kg)
UT614	70 x 168	6000	Tandem	Electric - 1 Axle	Hydraulic	9720 lbs (4409 kg)
UT912	70 x 144	9000	Tandem	Electric - 2 Axles	Hydraulic	13,268 lbs (6018 kg)
UT914	70 x 168	9000	Tandem	Electric - 2 Axles	Hydraulic	13,570 lbs (6155 kg)
EC10	68 x 120	6000	Tandem	Electric - 2 Axles	Hydraulic	9600 lbs (4345 kg)
EC12	68 x 126	6000	Tandem	Electric - 2 Axles	Hydraulic	9800 lbs (4445 kg)
EC14	68 x 150	6000	Tandem	Electric - 2 Axles	Hydraulic	10,320 lbs (4681 kg)

## SECTION 2 - TRAILER OPERATION

### Production Option and Accessory Weights

Any time a trailer is equipped with a production option or accessory or one of these components is added to a trailer, the weights listed in the following table must be subtracted from the rated vehicle capacity weight.

**NOTE:** The specified options and accessories must be considered part of cargo weight.

The single axle electric brake and battery are part of the base weight of the single axle trailer and double axle trailer models 248 and UT28.

The dual electric brake and battery are part of the base weight of the 1012 and 1014 models.

**Table 2-2. Production Option and Accessory Weights**

MODEL	HYDRAULIC BRAKE (single axle)	HYDRAULIC BRAKE (dual axle)	ELECTRIC BRAKE (dual axle)	SPARE TIRE	TIRE MOUNT	WINCH	RAILS (12 IN)	RAILS (24 IN)	GATE
248	19 lbs	--	--	50 lbs	20 lbs	45 lbs	--	--	--
449	19 lbs	--	--	60 lbs	20 lbs	45 lbs	--	--	--
4610	19 lbs	--	--	60 lbs	20 lbs	45 lbs	--	--	--
7610	34 lbs	145 lbs	102 lbs	60 lbs	20 lbs	45 lbs	--	--	--
7612	34 lbs	145 lbs	102 lbs	60 lbs	20 lbs	45 lbs	--	--	--
7614	34 lbs	145 lbs	102 lbs	60 lbs	20 lbs	45 lbs	--	--	--
7616	34 lbs	145 lbs	102 lbs	60 lbs	20 lbs	45 lbs	--	--	--
1012	--	48 lbs	--	60 lbs	20 lbs	45 lbs	--	--	--
1014	--	48 lbs	--	60 lbs	20 lbs	45 lbs	--	--	--
UT28	19 lbs	--	--	50 lbs	20 lbs	45 lbs	90 lbs	108 lbs	38 lbs
UT49	19 lbs	--	--	60 lbs	20 lbs	45 lbs	90 lbs	108 lbs	38 lbs
UT410	19 lbs	--	--	60 lbs	20 lbs	45 lbs	100 lbs	117 lbs	49 lbs
UT610	34 lbs	--	--	60 lbs	20 lbs	45 lbs	100 lbs	117 lbs	49 lbs
UT612	34 lbs	--	--	60 lbs	20 lbs	45 lbs	111 lbs	129 lbs	49 lbs
UT614	34 lbs	--	--	60 lbs	20 lbs	45 lbs	123 lbs	141 lbs	49 lbs
UT912	--	48 lbs	--	60 lbs	20 lbs	45 lbs	111 lbs	129 lbs	49 lbs
UT914	--	48 lbs	--	60 lbs	20 lbs	45 lbs	123 lbs	141 lbs	49 lbs
EC10	34 lbs	--	--	60 lbs	20 lbs	45 lbs	--	--	--
EC12	34 lbs	--	--	60 lbs	20 lbs	45 lbs	--	--	--
EC14	34 lbs	--	--	60 lbs	20 lbs	45 lbs	--	--	--

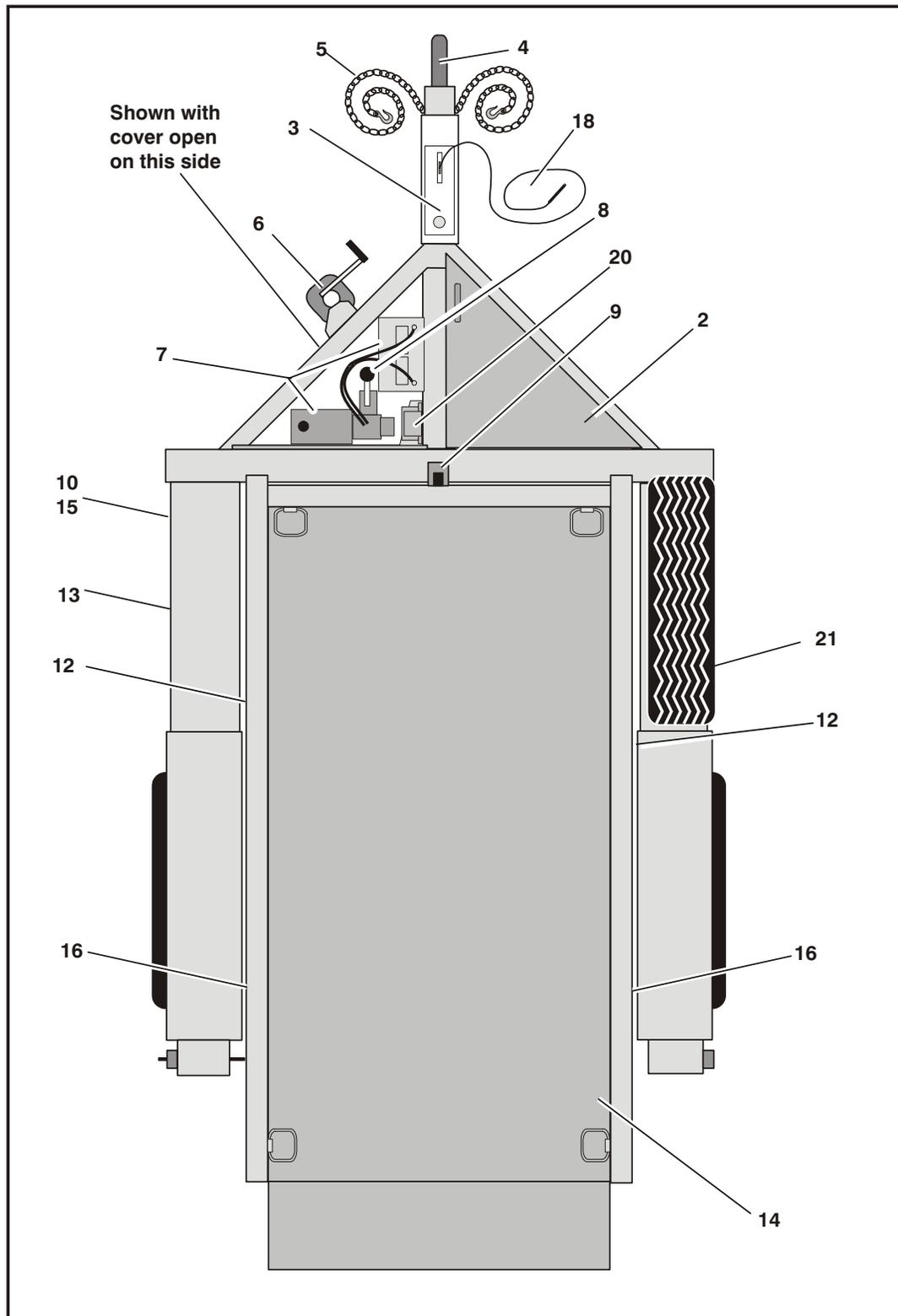


Figure 2-1. Trailer Features

## SECTION 2 - TRAILER OPERATION

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### 2.2 TRAILER FEATURES

1. Rails (Not Shown) - These surround the front and sides of the deck and provide a means to aid in the proper placement of cargo.
2. Storage - This compartment is used to secure the owners manual, tools and other items.
3. Actuator - A device on the tongue of the trailer that activates the optional hydraulic (surge) brake system.
4. Coupler - A device on the tongue of the trailer that connects to the hitch on the tow vehicle.
5. Safety Chains - If the coupler connection comes loose, the safety chains can keep the trailer attached to the tow vehicle. With properly rigged safety chains, it is possible to keep the tongue of the trailer from digging into the road pavement, even if the coupler-to-hitch connection comes apart.
6. Tongue Jack - A device on the trailer that is used to raise and lower the coupler to aid in coupling and uncoupling the trailer. The jack is sometimes called the "landing gear."
7. Motor/Pump Battery - This compartment holds the motor/pump and battery. The battery provides the electrical power for raising and lowering the trailer deck and the power for the electrically operated breakaway brake system. The pump/motor provides hydraulic fluid to the cylinder that raises the deck into place for transport.
8. Up/down Control - The control lever used to activate the hydraulic system to lower or elevate the deck.
9. Travel Latch - A mechanism that prevents the deck from lowering to the ground unintentionally.
10. Identification Plate - This placard contains the Vehicle Identification Number (VIN) and weight ratings for the trailer.
11. Deck Bearing (Not Shown) - This component is attached to the chassis and guides the bearing channel when the trailer deck is being raised or lowered.
12. Bearing Channel - This component is part of the trailer deck and rides on the deck bearing when the deck is being raised or lowered.
13. Chassis - This is the structural frame work of the trailer.
14. Deck - This is the surface where cargo is placed for transport. It can be lowered for loading and raised for transport.
15. Serial Number - This is a 17 digit number, also referred to as the Vehicle Identification Number (VIN), that can be found on the identification plate and stamped on the frame of the trailer.
16. Suspension - The system that allows the trailer wheels to absorb bumps in the travel surface.
17. Trailer Lighting (and braking) connector (not shown) - A device that connects electrical power from the tow vehicle to the trailer. Electricity is used to turn on brake lights, running lights, and turn signals as required. In addition, if you trailer has a separate braking system, the electrical connector will also supply power to the brakes from the tow vehicle.
18. Breakaway Cable - If the coupler connection comes loose, the breakaway cable can actuate emergency electrical brakes on the trailer. The breakaway cable must be rigged to the tow vehicle with appropriate slack that will activate the brakes if the coupler connection comes loose.
19. Hitch (Not Shown) - A device on the tow vehicle that supports the weight of the trailer tongue and pulls the trailer. The coupler attaches to the hitch.
20. Descent Alarm - An alarm on the trailer that sounds anytime the trailer is lowered.
21. Spare Tire (accessory) - A spare tire is mounted on the side of the trailer.

#### **WARNING**

**DO NOT MOVE THE TRAILER UNTIL THE COUPLER IS SECURED AND LOCKED TO HITCH, THE SAFETY CHAINS ARE SECURED TO THE TOW VEHICLE AND THE TRAILER JACK(S) ARE FULLY RETRACTED.**

**DO NOT TOW THE TRAILER ON THE ROAD UNTIL THE TIRES AND WHEELS ARE CHECKED, THE TRAILER BRAKES ARE CHECKED, THE BREAKAWAY CABLE IS CONNECTED TO THE TOW VEHICLE, THE LOAD IS SECURED TO THE TRAILER AND THE TRAILER LIGHTS ARE CONNECTED AND CHECKED.**

## 2.3 GENERAL

### Trailer VIN Information

The Trailer Features figure shows the location of the Trailer Identification Plate on your trailer.

Mfd. By: <b>JLG Industries, Inc</b> - McConnellsburg, PA--USA Phone 877-JLG-LIFT			
MODEL	DATE		
PNBV/GVWR (kg/lb)	PNBE/GAWR (ea.axle) (kg/lb)		
RIMS	TIRES	INFL C (KPa/psi)	
THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE.			
V.I.N. No.	VEHICLE TYPE TRAILER/REMORQUE		
SERIAL NO.	18617D		

Figure 2-2. Vehicle Identification Plate

The Trailer Identification Plate contains the following critical safety information for the use of your trailer.

- GVWR:** The maximum allowable gross weight of the trailer and its contents. The gross weight of the trailer includes the weight of the trailer and all of the items within it (such as cargo, water, food and other supplies). GVWR is sometimes referred to as GTWR (Gross Trailer Weight Rating), or MGTW (Maximum Gross Trailer Weight). GVWR, GTWR and MGTW are all the same rating.
- GAWR:** The maximum gross weight that an axle can support. The sum total of the GAWR for all trailer axles may be less than the GVWR for the trailer, because some of the trailer load is to be carried by the tow vehicle, rather than by the trailer axle(s). The total weight of the cargo and trailer must not exceed the GVWR, and the load on an axle must not exceed its GAWR.
- RIMS** - Specification of rims equipped on the trailer.
- TIRES** - Size and load rating of tires equipped on the trailer.
- INFLC:** The tire pressure (Pounds per Square Inch) measured when Cold.
- VIN:** The Vehicle Identification Number is a 17 digit serial number located on the trailer identification plate.
- SERIAL NO** - JLG manufacturing number. Use this number when conducting business with JLG.

## 2.4 COUPLER

A coupler connects to a ball that is located on or under the rear bumper of tow vehicle. This system of coupling a trailer to a tow vehicle is sometimes referred to as “bumper pull.”

The trailer is equipped with a ball hitch coupler that is suitable for the size and weight of the trailer. Your trailer may be equipped with a 2" or a 2-5/16" coupler. The load rating of the coupler and the necessary ball size are listed on the trailer tongue. Do not change the coupler to a smaller size. You must provide a hitch and ball for your tow vehicle, where the load rating of the hitch and ball is equal to or greater than that of your trailer. The ball size must be the same as the coupler size. If the hitch ball is too small, too large, is underrated, is loose or is worn, the trailer can come loose from the tow vehicle, and may cause death or serious injury.

### **⚠ WARNING**

**THE TOW VEHICLE, HITCH AND BALL MUST HAVE A RATED TOWING CAPACITY EQUAL TO OR GREATER THAN THE TRAILER GVWR (GROSS VEHICLE WEIGHT RATING).**

**IT IS ESSENTIAL THAT THE HITCH BALL BE OF THE SAME SIZE AS THE COUPLER.**

## 2.5 BRAKES

Governmental regulations may contain various brake requirements. Some of these regulations may require the use of electric brakes only or require brakes on all wheels of a tandem axle trailer.

**NOTE:** *It is the responsibility of the owner to meet the requirements of all governmental regulations in his area.*

### Electric Brakes (Option)

The electric brakes on this trailer are similar to the drum brakes on an automobile. The basic difference is that the automotive brakes are actuated by hydraulic pressure while electric trailer brakes are actuated by an electromagnet. The brakes are applied by a brake controller installed on the tow vehicle.

### Hydraulic Brakes - Surge Brakes (Option)

The hydraulic brakes (surge brakes) on the trailer are actuated by a master cylinder. The hydraulic fluid from the master cylinder is used to actuate the hydraulic wheel cylinder which, in turn applies force against the brake shoes and drum. A surge tongue actuator is required for a trailer with hydraulic brakes.

## 2.6 BATTERY (OPTION)

### Battery

The battery is carried on the trailer and is used for powering the motor running the hydraulic pump. If the trailer has electric brakes, this same battery is used for power to the break-away switch.

Batteries are considered an optional item which can be purchased with the trailer or obtained locally. The battery should be a 12 volt deep cycle.

12V

Deep Cycle



Switch is mounted directly to the starter solenoid located under the deck control lever. The switch is activated when the deck control lever is moved to the "down" position.

The switch has mounting adjustment to allow precise timing of the alarm.

**NOTE:** The Alarm has a fixed decibel rating.

### Testing System

Alarm should sound immediately when moving deck control lever to "down" position. If the alarm does not sound; check the following:

1. When the spring trigger on the switch is depressed, the alarm is off and when it is fully released, the alarm is on.
2. The switch has an adjustable mounting bracket. With the deck control lever in the neutral position, set the switch just close enough to press on the spring trigger, shutting off the alarm. It should then release the trigger and operate correctly when you move the deck control lever to the "down" position.
3. If alarm does not sound when spring trigger on switch is released- check wiring to ensure that current is flowing to the alarm.

## 2.7 DECK ALARM SYSTEM

The deck alarm is designed to give intermittent beeps as the deck is lowered. The operator is responsible to see that all personnel are clear of the deck when lowering. The deck alarm is only intended to assist in giving additional warning.



The alarm should sound automatically when the deck control lever is moved to the "down" position

## 2.8 TOW VEHICLE AND HITCH INFORMATION

Follow all of the safety precautions and instructions in this manual and the manuals of the tow vehicle and the hitch to ensure safety of persons, cargo, and satisfactory life of the trailer.

If the vehicle or hitch is not properly selected and matched to the Gross Vehicle Weight Rating (GVWR) of your trailer, you can cause an accident that could lead to death or serious injury. If you already have (or plan to buy) a tow vehicle, make certain your trailer rating (GVWR) is equal to or less than the towing capacity and hitch rating of the tow vehicle.



**BE SURE YOUR HITCH AND TOW VEHICLE ARE RATED FOR THE GROSS VEHICLE WEIGHT RATING OF YOUR TRAILER.**

### Tow Vehicle and Hitch

When equipping a vehicle to tow your trailer, ask the vehicle dealer for advice on how to properly outfit the towing vehicle. Discuss the following information and equipment with the vehicle dealer.

### Overall Carrying and Towing Capacity of Vehicle

Vehicle manufacturers will provide you with the maximum capacities of their various models. No amount of reinforcement will give a 100 horsepower, 2,500 pound truck the towing capacity that a 300 horsepower, 5,000 pound truck has.

### Towing Hitch

The towing hitch attached to your tow vehicle must have a capacity equal to or greater than the load rating of the trailer you intend to tow. The height of the hitch ball must equal that of the trailer coupler. The hitch capacity must also be matched to the tow vehicle capacity. Only your vehicle dealer can provide and install the proper hitch on your tow vehicle.



**THE UNDERSIDE OF THE TRAILER TONGUE MUST BE BETWEEN 17" AND 19" ABOVE LEVEL GROUND BEFORE TOWING. ADJUST THE COUPLER OR TOW VEHICLE HITCH TO ACHIEVE THIS HEIGHT.**

### Coupler Height Adjustment

Remove the bolts securing the coupler to the mounting bracket. Move the coupler up or down to desired height. Secure with the bolts. For the Pintle Hitch Coupler, torque the two bolts to 225 ft lb (305 Nm). For the Ball Couplers, torque the four bolts to 150 ft lb (203 Nm).

### Hitch Ball

The coupler on the trailer connects to the ball attached to the hitch on the tow vehicle. The coupler, ball and hitch transfer the towing forces between the tow vehicle and the trailer.

### Suspension System

Sway bars, shock absorbers, heavy duty springs, heavy-duty tires and other suspension components must be able to sufficiently serve the size and weight of the trailer that is going to be towed.

### Brake Controller

The brake controller is part of the tow vehicle and is essential in the operation of trailers equipped with electric brakes. The brake controller is not the same as the safety breakaway brake system that may be equipped on the trailer.

### Side View Mirrors

The size of the trailer that is being towed and your state law regulations determine the size of the mirrors. However, some states prohibit extended mirrors on a tow vehicle, except while a trailer is actually being towed. In this situation, detachable extended mirrors are necessary. Check with your dealer or the appropriate state agency for mirror requirements.

### Heavy Duty Flasher

A Heavy Duty Flasher is an electrical component that may be required when your trailer turn signal lights are attached to the tow vehicle flasher circuit.

### Electrical Connector

An Electrical Connector connects the light and brake systems on the trailer to the light and brake controls on the towing vehicle.

### Heavy Duty Engine Oil Cooling System

The tow vehicle engine works harder when a trailer is being towed. Depending on the size of the trailer, you may need to install a separate engine oil cooler. Inadequate cooling may result in sudden engine failure. Ask the tow vehicle dealer if it is necessary to install a heavy duty cooling system.

## Automatic Transmission Oil Cooler

The automatic transmission of a towing vehicle handles more power when a trailer is being towed. Inadequate cooling will shorten transmission life, and may result in sudden transmission failure. Ask the tow vehicle dealer if it is necessary to install a separate oil cooler for the automatic transmission.

## Fire Extinguisher

A fire extinguisher should be carried in the tow vehicle.

## Emergency Flares and Emergency Triangle Reflectors

Carry these warning devices when towing a trailer because the hazard flashers of your towing vehicle will not operate for as long a period of time when the battery is running both the trailer lights and tow vehicle lights.

## 2.9 COUPLING AND UNCOUPLING THE TRAILER

The trailer must be properly and securely coupled to the hitch of the tow vehicle.

### **⚠ WARNING**

UNCOUPLING OF THE TRAILER DURING TRANSPORT MAY RESULT IN DEATH OR SERIOUS INJURY.

## Before Coupling the Trailer to the Tow Vehicle

Be sure the size and rating of hitch ball match the size and rating of the coupler. Hitch balls and couplers are marked with their size and rating.

Wipe the hitch ball clean and inspect it visually and by feel for flat spots, cracks and pits.

### **⚠ WARNING**

BEFORE EACH TOW, INSPECT THE HITCH BALL FOR WEAR, CORROSION AND CRACKS BEFORE COUPLING TRAILER. REPLACE WORN OR DAMAGED HITCH BALL.

**NOTE:** Rock the hitch ball in all directions to make sure it is tight to the hitch, and visually check that the hitch ball nut is solid against the lock washer and hitch frame.



Figure 2-3. Coupler

## Prepare the Coupler and Hitch

Lubricate the hitch ball and the inside of the coupler with a thin layer of automotive bearing grease to reduce wear and ensure proper operation. If your trailer is equipped with a tongue jack, raise the coupler above the ball height.

### **⚠ WARNING**

BEFORE EACH TOW, BE SURE THE HITCH BALL IS TIGHT TO THE HITCH BEFORE COUPLING THE TRAILER.

1. Wipe the inside and outside of the coupler clean and inspect it visually for cracks and deformations; feel the inside of the coupler for worn spots and pits. Be sure the coupler is tight to the tongue of the trailer. All coupler fasteners must be visibly solid against the trailer frame.

2. Raise the bottom surface of the coupler to be above the top of the hitch ball. Use the tongue jack if one is provided; otherwise, use wood or concrete blocks to support the trailer tongue.
3. As seen in Figure 2-3., Coupler, slide the collar on the hitch toward the trailer until it opens up to accept the ball from the tow vehicle.
4. Once the hitch on the trailer is open, align the tow vehicle up with the trailer hitch.
5. Using the tongue jack, lower the entire weight of the trailer on to the ball hitch of the tow vehicle.
6. Slide the collar on the hitch toward the tow vehicle to lock into place.
7. Insert the pin into the hole behind the collar to lock the collar into place.
8. Be sure the coupler is all the way on the hitch ball and the collar/locking mechanism is engaged. A properly engaged locking mechanism will allow the coupler to raise the rear of the tow vehicle. Using the tongue jack, test to see that you can raise the rear of the tow vehicle by 1 inch, after the coupler is locked to the hitch.

### NOTICE

**OVERLOADING CAN DAMAGE THE TONGUE JACK. DO NOT USE THE TONGUE JACK TO RAISE THE TOW VEHICLE MORE THAN 1 INCH.**

**NOTE:** *If the coupler cannot be secured to the hitch ball, do not tow the trailer.*

9. Retract the tongue jack until it is fully retracted.

## Rig the Safety Chains

Visually inspect the safety chains and hooks for wear or damage. Replace worn or damaged safety chains and hooks before towing.

Rig the safety chains so that they:

- a. Cross each other underneath the coupler.
- b. Loop around a frame member of the tow vehicle or to holes provided in the hitch system (DO NOT attach them to an interchangeable part of the hitch assembly).
- c. Have enough slack to permit tight turns, but not be close to the road surface, so if the trailer uncouples, the safety chains can hold the tongue up above the road.

### ⚠ WARNING

**FASTEN CHAINS TO FRAME OF TOW VEHICLE. DO NOT FASTEN CHAINS TO ANY PART OF THE HITCH UNLESS THE HITCH HAS HOLES OR LOOPS SPECIFICALLY FOR THAT PURPOSE.**

**CROSS CHAINS UNDERNEATH HITCH AND COUPLER WITH ENOUGH SLACK TO PERMIT TURNING AND TO HOLD TONGUE UP, IF THE TRAILER COMES LOOSE.**

## Attach and Test Electric Breakaway Brake System

### ⚠ WARNING

**BEFORE TOWING, CONNECT THE BREAKAWAY CABLE TO THE TOW VEHICLE; AND NOT TO THE HITCH, BALL OR SUPPORT. TEST THE FUNCTION OF THE BREAKAWAY BRAKE SYSTEM. IF THE BREAKAWAY BRAKE SYSTEM IS NOT WORKING, DO NOT TOW THE TRAILER. HAVE IT SERVICED OR REPAIRED.**

If the coupler or hitch fails, a properly connected and working breakaway brake system will apply electric brakes on the trailer. The safety chains will keep the tow vehicle attached and as the brakes are applied at the trailer's axles, the trailer/tow vehicle combination will come to a controlled stop.

The breakaway brake system includes a battery, a switch with a pullpin, and a breakaway brake controller. Read and follow the instructions here as well as the instructions that have been prepared by the breakaway brake controller manufacturer. If you do not have these instructions, call JLG to obtain a copy.

The breakaway brake system may be fitted with a charging facility that draws power from the tow vehicle. If the electrical system on your tow vehicle does not provide power to the breakaway brake battery, you must periodically charge the battery to keep the breakaway brake system in working order.

1. Connect the pull pin cable to the tow vehicle so that the pullpin will be pulled out before all of the slack in the safety chains is taken up. Do **not** connect the pullpin cable to a safety chain or to the hitch ball or hitch ball assembly. This would keep the breakaway brake system from operating when it is needed.
2. Remove the pullpin from the switch and test tow the trailer, at less than 5 m.p.h. You should feel the trailer resisting being towed, but the wheels will not necessarily be locked. If the brakes do not function, do not tow the trailer until the brakes are repaired.
3. Immediately replace the pullpin. The breakaway brake system battery discharges rapidly when the pullpin is removed.

### **⚠ WARNING**

**TO AVOID POSSIBLE INJURY DO NOT TOW THE TRAILER WITH THE PULLPIN REMOVED AND THE BREAKAWAY BRAKE SYSTEM ON BECAUSE THE BRAKES WILL OVERHEAT WHICH CAN RESULT IN PERMANENT BRAKE FAILURE.**

If you do not use your trailer for three or more months, or during winter months:

- a. Store the battery indoors
- b. Charge the battery every three months.

Replace the breakaway brake battery according to the intervals specified by the battery manufacturer.

### **Attach and Test Hydraulic Breakaway Brake System**

If the coupler or hitch fails, a properly connected and working breakaway brake system will apply the hydraulic (surge) brakes on the trailer. The safety chains will keep the tow vehicle attached and as the brakes are applied at the trailer's axles, the trailer/tow vehicle combination will come to a controlled stop.

The breakaway brake system includes a cable attached to an activation lever. Read and follow the instructions here as well as the instructions that have been prepared by the breakaway brake controller manufacturer.

Connect the breakaway cable to the tow vehicle so that the activation lever will be pulled before all of the slack in the safety chains is taken up. Do **not** connect the breakaway cable to a safety chain or to the hitch ball or hitch ball assembly. This would keep the breakaway brake system from operating when it is needed.

Manually pull the activation lever and test tow the trailer, at less than 5 m.p.h. You should feel the trailer resisting being towed, but the wheels will not necessarily be locked. If the brakes do not function, do not tow the trailer until the brakes are repaired.

Reset the activation lever prior to towing.

### **⚠ WARNING**

**CONNECT THE BREAKAWAY CABLE TO THE TOW VEHICLE; AND NOT TO THE HITCH, BALL OR SUPPORT. BEFORE TOWING THE TRAILER, TEST THE FUNCTION OF THE BREAKAWAY BRAKE SYSTEM. IF THE BREAKAWAY BRAKE SYSTEM IS NOT WORKING, DO NOT TOW THE TRAILER. HAVE IT SERVICED OR REPAIRED.**

**NOTE:** Do **not** tow the trailer with the breakaway brake system ON because the brakes will overheat which can result in permanent brake failure.

### **Connect the Electrical Cables**

Connect the trailer lights to the tow vehicle's electrical system using the electrical connectors.

Check all lights for proper operation:

- a. Clearance and Running Lights (Turn on tow vehicle headlights).
- b. Brake Lights (Step on tow vehicle brake pedal).
- c. Turn Signals (Operate tow vehicle directional signal lever).
- d. Backup Lights (Put tow vehicle gear shift into reverse).

Check electric brakes for proper operation.

If your trailer has electric brakes, your tow vehicle must have an electric brake controller that sends power to the trailer brakes. Before towing the trailer on the road, you must operate the brake controller while trying to pull the trailer in order to confirm that the electric brakes operate. While towing the trailer at less than 5 mph, manually operate the electric brake controller in the tow vehicle cab. You should feel the operation of the trailer brakes.

### **⚠ WARNING**

**BEFORE EACH TOW CHECK THAT THE TAILLIGHTS, BRAKE LIGHTS AND TURN SIGNALS WORK. CHECK THAT THE ELECTRIC BRAKES WORK BY OPERATING THE BRAKE CONTROLLER INSIDE THE TOW VEHICLE.**

### **Uncoupling the Ball Hitch Trailer with Tongue Jack**

Follow these steps to uncouple your ball hitch trailer from the tow vehicle:

1. Block or chock trailer tires to prevent the trailer from rolling, before jacking the trailer up.
2. Disconnect the electrical connector.
3. Disconnect the breakaway brake switch cable. For an electric breakaway break system, promptly replace the pullpin in the switchbox.
4. Disconnect the safety chains from the tow vehicle.
5. Unlock the coupler and open it.
6. Before extending the tongue jack, make certain the ground surface below the jack pad will support the tongue load.
7. Rotate the jack handle (or crank) clockwise. This will slowly extend the tongue jack and transfer the weight of the trailer tongue to the jack.

## 2.10 LOADING THE TRAILER

Improper trailer loading causes many accidents and deaths. To safely load a trailer, you must consider:

- Overall load weight
- Load weight distribution
- Proper tongue weight
- Securing the load properly

To determine that you have loaded the trailer within its rating, you must consider the *distribution* of weight, as well as the total weight of the trailer and its contents. The trailer axles carry most of the total weight of the trailer and its contents (Gross Vehicle Weight, or "GVW"). The remainder of the total weight is carried by the tow vehicle hitch. It is essential for safe towing that the trailer tongue and tow vehicle hitch carry the proper amount of the loaded trailer weight, otherwise the trailer can suddenly sway at towing speed. Read the "Tongue Weight" section below.

Towing stability also depends on keeping the center of gravity as low as possible. Load heavy items on the floor and over the axles. When loading additional items, be sure to maintain even side-to-side weight distribution and proper tongue weight. The total weight of the trailer and its contents must never exceed the total weight rating of the trailer (Gross Vehicle Weight Rating, or "GVWR").

### **⚠ WARNING**

**DO NOT LOAD A TRAILER SO THAT THE WEIGHT ON ANY TIRE EXCEEDS ITS RATING. DO NOT EXCEED THE TRAILER GROSS VEHICLE WEIGHT RATING (GVWR) OR AN AXLE GROSS AXLE WEIGHT RATING (GAWR).**

## Tongue Weight

It is critical to have a portion of the trailer load carried by the tow vehicle. The trailer tongue must exert an appropriate downward force on the hitch. This is necessary for two reasons. The proper amount of tongue weight is necessary for the tow vehicle to be able to maintain control of the tow vehicle/trailer system. If there is not enough weight on the tongue, the tongue exerts an upward pull on the hitch, the rear wheel of the tow vehicle can lose traction or grip and cause loss of control or the trailer can suddenly become unstable at high speeds.

If there is too much tongue weight, the front wheels of the tow vehicle can be too lightly loaded and cause loss of steering control and traction, as well, if the front wheels are driving.

Tongue weight is necessary to insure that the trailer axle(s) do not exceed their Gross Axle Weight Rating (GAWR).

For a ball hitch trailer the tongue weight should be between 10% and 15% of the total trailer weight, including the cargo. For example, a trailer, with a loaded weight of 4,000 pounds, should have 10-15% of 4,000 pounds on the tongue. That is, the trailer would have 400 to 600 pounds on its tongue.

### **⚠ WARNING**

**MAKE CERTAIN THAT TONGUE WEIGHT IS WITHIN THE ALLOWABLE RANGE. BE SURE TO DISTRIBUTE THE LOAD FRONT-TO-REAR TO PROVIDE PROPER TONGUE WEIGHT, DISTRIBUTE THE LOAD EVENLY, RIGHT AND LEFT, TO AVOID TIRE OVERLOAD; AND KEEP THE CENTER OF GRAVITY LOW.**

## Checking Tongue Weight

To check the tongue weight, the tow vehicle and trailer must be on level ground, as they will be when the trailer is being towed.

If you know the weight on your tow vehicle axles when you are not towing a trailer, trailer tongue weight can be determined with the use of a truck axle scale.

The recommended method of checking tongue weight is to use an accessory called a "tongue weight scale." Contact your dealer to check on the availability of a tongue weight scale.

If necessary, the tongue weight may also be determined through the use of a personal scale. When using a personal scale, the loaded trailer must be on a smooth and level surface and the front and rear of the trailer wheels must be blocked. If the tongue weight exceeds the personal scale capacity, a lever arrangement will be required to determine the tongue weight.

### **⚠ WARNING**

**BEFORE CHECKING TONGUE WEIGHT, BLOCK TRAILER WHEELS, FRONT AND REAR.**

The tongue weight can also be checked at an axle weighing scale.

## Tongue Height

Proper tongue height is critical to maintaining stability during towing. After the trailer is loaded, check the tongue height and ensure that the underside of the tongue is 17"-19" above the ground.

### **⚠ WARNING**

**THE UNDERSIDE OF THE TRAILER TONGUE MUST BE BETWEEN 17" AND 19" ABOVE LEVEL GROUND BEFORE TOWING. ADJUST THE COUPLER OR TOW VEHICLE HITCH TO ACHIEVE THIS HEIGHT.**

### **⚠ WARNING**

DO NOT TRANSPORT FLAMMABLE, EXPLOSIVE, POISONOUS OR OTHER DANGEROUS MATERIALS IN YOUR TRAILER. EXCEPTIONS ARE: FUEL IN THE TANKS OF EQUIPMENT BEING HAULED, FUEL STORED IN THE TANK OF AN ON-BOARD GENERATOR.

## Preparing the Trailer for Loading

Before loading cargo onto the trailer:

Chock wheels on the left and right sides of the trailer to prevent movement to the front or rear while loading.

Inspect the deck of the trailer (and the interior, if trailer is enclosed) for corrosion or damage, and inspect the hold down openings, "D"-rings and/or track system used to secure loads. Hold down openings must be sturdy with no visible cracks or kinks. D-rings and track systems must be tight and must not be bent.

If the deck or any required hold-down is damaged, do not load the cargo. Bring the trailer to your dealer or a competent repair service before using it to carry cargo.

### **⚠ WARNING**

INSPECT "D"-RINGS, AND TEST THEM FOR LOOSENESS BEFORE LOADING CARGO. DO NOT USE A DAMAGED OR LOOSE "D"-RING TO SECURE CARGO.

## Loading the Trailer

Triple L trailers are equipped with a hydraulically lowered deck instead of ramps. The lowering deck feature allows for easier loading and unloading.

When loading the trailer:

- Read all trailer decals before loading.
- Be sure all personnel are clear when raising or lowering the deck.
- Never exceed the capacity of the trailer.
- Always center the load side-to-side and load to the proper tongue weight.
- Confirm correct coupler height when loaded.
- Never allow "rear-heavy" loads. This will cause sway and loss of control.
- After raising the deck, make sure the travel latch is engaged and locked.
- Be sure the cargo is securely tied to the deck. Do not tie to the outer frame.

### **⚠ WARNING**

DO NOT TRANSPORT PEOPLE ON OR INSIDE THE TRAILER. THE TRANSPORT OF PEOPLE PUTS THEIR LIVES AT RISK AND MAY BE ILLEGAL.

The hydraulically lowered trailer deck is fitted with a travel latch that keeps the trailer in the driving (up) position. After the trailer is loaded, the cargo is secured with hold-downs, and the deck has been raised to the travel position, be sure the travel latch has locked the trailer deck into place.

Couple the trailer securely to the tow vehicle before attempting to unlock the deck and load the trailer. Be sure all personnel are clear when lowering deck.

Unlatch and hold the travel latch. Move the "up/down" control handle to the "down" position. Move the control handle slowly to "feather" or control the speed of lowering. The travel latch may be released once the deck starts to lower.

The deck alarm is designed to give intermittent beeps as the deck is lowered. The alarm should sound automatically when the deck control lever is moved to the "down" position.

If equipped, open the gate or door of the trailer. After the trailer deck has been lowered to the ground, the trailer may be loaded. Ensure that the load is centered side-to-side and forward to where approximately 10% - 15% of the total load is positioned at the trailer tongue.

Secure the properly positioned load by tying it to the trailer deck using appropriate straps and tensioning devices. Be sure you secure to the deck only and not to the outer trailer chassis. There are tie down locations along both sides as well as the front rail. Since the trailer "ride" can be bumpy and rough, secure the load so that it does not shift while the trailer is being towed.

After securing the load, close and latch the gate or door of the trailer, if equipped.

Ensure all personnel are clear and raise the deck to the travel position by simply moving the "up/down" control handle to the "up" position. Stop when the deck is all the way up (continuing to hold the control will cause the fluid to be pumped through the by-pass relief valve). At this "up" position, the spring loaded travel latch will automatically lock into place. Visually check that the travel latch locks the deck into position.

**NOTE:** Be sure that the deck is lowered to seat the weight of the deck on the latch and not the cylinder.



**⚠ WARNING**

BEFORE TOWING THE TRAILER, ENSURE THAT THE TRAVEL LATCH HAS PROPERLY LATCHED INTO PLACE.

**⚠ WARNING**

TIE DOWN ALL LOADS WITH PROPER SIZED FASTENERS, ROPES, STRAPS, ETC. IF YOUR TRAILER IS ENCLOSED OR EQUIPPED WITH AN OPTIONAL TAILGATE, THE DOORS OR TAILGATE MUST BE SECURELY LATCHED BEFORE TOWING THE TRAILER.

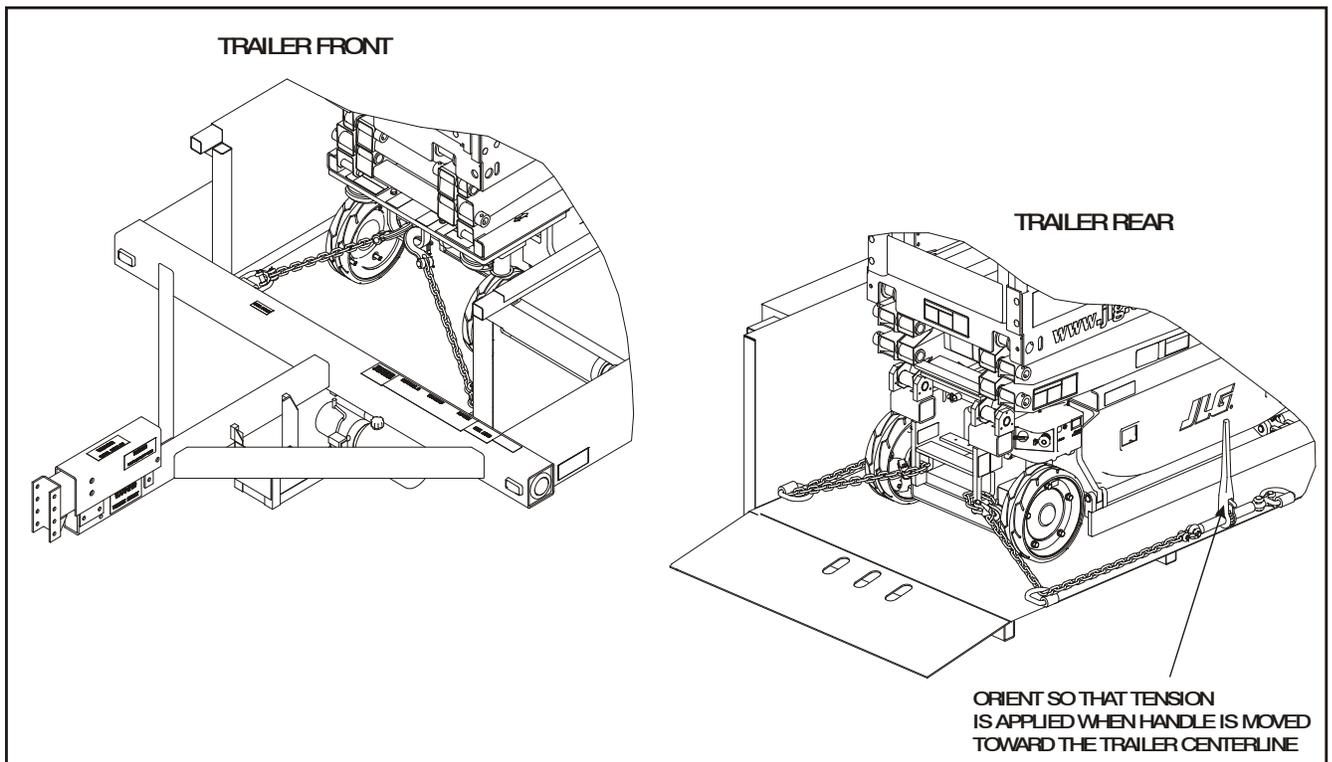


Figure 2-4. Lift Tie Down

### 2.11 LIFT TIE DOWN PROCEDURE

The tie downs at the front of the trailer are a fixed length and remain attached to the D-rings in the front corners of the deck.

1. Move the lift onto the trailer and pull forward until the front chains can be attached to the designated tie down points on the lift.

#### CAUTION

**THERE SHOULD BE 15 INCHES FROM THE INSIDE FRONT OF THE TRAILER WALL BACK TO THE CENTER OF THE FRONT WHEEL OF THE LIFT.**

2. Once the chains are attached, lift should be moved back to apply tension to forward chains.
3. The rear tie downs are attached to ratchet chain binders, anchored to the D-rings at the middle of the trailer deck and pass through the D-ring at the rear of the deck.

**NOTE:** *The chain should be routed through the top of the D-ring at the rear of the deck for easier ratcheting once attached to lift.*

4. Pass the hooks through the designated tie down locations at the rear of the lift and secure to chain link.
5. Chain tension should be adjusted with the ratchet binder. (See Figure 2-4., Lift Tie Down).

### 2.12 TOWING OPERATIONS

#### Trailer Maneuvering

Driving a vehicle with a trailer in tow is vastly different from driving the same vehicle without a trailer in tow. Acceleration, maneuverability and braking are all diminished with a trailer in tow. It takes longer to get up to speed; you need more room to turn and pass, and more distance to stop when towing a trailer. You will need to spend time adjusting to the different feel and maneuverability of the tow vehicle with a loaded trailer. Because of the significant differences in all aspects of maneuverability when towing a trailer, the hazards and risks of injury are also much greater than when driving without a trailer. You are responsible for keeping your vehicle and trailer in control, and for all the damage that is caused if you lose control of your vehicle and trailer.

When learning to drive with a trailer in tow, find an open area with little or no traffic to practice trailering. Before you start towing the trailer, you must follow all of the instructions for inspection, testing, loading and coupling. Also adjust the mirrors so you can see the trailer as well as the area to the rear of it.

Drive slowly at first, 5 mph or so, and turn the wheel to get the feel of how the tow vehicle and trailer combination responds. Next, make some right and left hand turns. Watch in your side mirrors to see how the trailer follows the tow vehicle. Turning with a trailer attached requires more room.

Stop the tow vehicle (with the trailer coupled) a few times from speeds no greater than 10 m.p.h. If your trailer is equipped with electric brakes, try using different combinations of trailer brake and tow vehicle brake. Note the effect that the trailer brakes have when they are the only brakes used. When properly adjusted, electric trailer brakes will come on just before the tow vehicle brakes.

It will take practice to learn how to drive a tow vehicle in reverse with a trailer attached. Take it slow. Before backing up, get out of the tow vehicle and look behind the trailer to make sure that there are no obstacles. Some drivers place their hands at the bottom of the steering wheel, and while the tow vehicle is in reverse, “think” of the hands as being on the top of the wheel. When the hands move to the right (counter-clockwise, as you would do to turn the tow vehicle to the left when moving forward), the rear of the trailer moves to the right. Conversely, rotating the steering wheel clockwise with your hands at the bottom of the wheel will move the rear of the trailer to the left, while backing up. Be careful not to allow the trailer to turn too much, because it will hit the rear of the tow vehicle. To straighten, either pull forward, or turn the steering wheel in the opposite direction.

### Safe Trailer Towing Guidelines

- Recheck the load tie downs to make sure the load will not shift during towing.
- Before towing, check coupling, safety chain, safety brake, tires, wheels and lights.
- Check the lug nuts or bolts for tightness.
- Check coupler tightness after towing 50 miles.
- When equipped with electric brakes, adjust the brake controller to engage the trailer brakes before the tow vehicle brakes. Your dealer can assist you by making this adjustment.
- Be aware of the width of the trailer, which, in most cases will be wider than the tow vehicle. This is especially important when turning, passing, and pulling next to a curb.
- Be sure your rear view mirrors are adjusted properly. Use your mirrors to verify that you have room to change lanes or pull into traffic.
- Use your turn signals well in advance.
- Increase speed slowly when starting the tow. Carefully watch the trailer and if you observe any trailer sway, stop and reposition the load.
- Allow plenty of stopping space for your trailer and tow vehicle.
- Do not drive so fast that the trailer begins to sway due to speed. Never drive faster than 55 m.p.h.
- Allow plenty of room for passing. A rule of thumb is that the passing distance with a trailer is 4 times the passing distance without a trailer.
- Shift your automatic transmission into a lower gear for city driving.
- Use lower gears for climbing and descending grades.
- Do not ride the brakes while descending grades; they may get so hot that they stop working. Then you will potentially have a runaway tow vehicle and trailer.
- To conserve fuel, don't use full throttle to climb a hill. Instead, build speed on the approach.
- Slow down for bumps in the road. Take your foot off the brake when crossing the bump.
- Do not brake while in a curve unless absolutely necessary. Instead, slow down before you enter the curve and power through the curve. This way, the towing vehicle remains "in charge."
- Do not apply the brakes to correct extreme trailer swaying. Continued pulling of the trailer, and even slight acceleration, will provide a stabilizing force.
- Make regular stops after every 50 miles or about once each hour. Confirm that:
  - a. The coupler is secure to the hitch and is locked.
  - b. Electrical connectors are made.
  - c. There is appropriate slack in the safety chains.
  - d. There is appropriate slack in the breakaway switch cable.
  - e. The tires are not visibly low on pressure.
  - f. Cargo is secure and in good condition.

## SECTION 2 - TRAILER OPERATION

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### 2.13 PRE-TOW INSPECTION

Prior to each tow, a Pre-Tow Inspection must be performed. Check each item as specified in the checklist below.

#### **NOTICE**

**DO NOT OVERLOOK VISUAL INSPECTION OF CHASSIS UNDERSIDE. CHECKING THIS AREA OFTEN RESULTS IN DISCOVERY OF CONDITIONS WHICH COULD CAUSE EXTENSIVE MACHINE DAMAGE.**

**NOTE:** *On each item, make sure there are no loose or missing parts, that they are securely fastened, and that no visible damage exists in addition to any other criteria mentioned.*

*Refer to Wheel Torque Chart in section three for proper torque values on the lug nuts.*

1. Tire Pressure - Inflate to pressure indicated on tire.
2. Brakes - Reservoir level full (hydraulic brakes only). Proper operation and adjustment.
3. Wheel and Tires - Tighten to specified torque rating.
4. Wheel Lugs - Lug nuts must be tight. Retighten when new and at first 10, 25, and 50 miles.
5. Trailer Coupler - Secured, locked, and in proper operating condition.
6. Tow Vehicle Coupler Ball - Secured and in proper operating condition.
7. Safety Chains - Check that the chains are properly rigged to tow vehicle, not to detachable hitch components.
8. Emergency Breakaway Cables - Check that the cables are properly rigged to tow vehicle, not to detachable hitch components.
9. Lights and Signals - Check clearance lights, tail lights, stop lights, turn signals, and backup lights for proper operation. Replace or repair inoperative lights.
10. Trailer Battery - Charged and capable of raising trailer deck.
11. Hydraulic Pump - Free of Leaks. Reservoir level full. Proper operation.
12. Deck Descent Alarm - Activates when deck is lowered.
13. Cargo - Properly loaded, balanced, and secured.
14. Transport Latch - Deck is up and fully secured by the transport latch.
15. Tongue Jack - Retracted.
16. Tongue Weight - Between 10-15% of the total weight of the cargo and the trailer.
17. Tongue Height - Underside of tongue must be 17"-19" above level ground.
18. Doors and Gates (If Equipped) - Latched and secure.
19. Vehicle Identification Tag - Installed and legible.
20. License Plate - Secured to mounting.
21. Deck Rollers - Free of debris and damage.
22. Suspension - Springs undamaged.
23. Welds - No visible weld cracks or separations.

#### **NOTICE**

**OBSERVE ALL LOCAL AND NATIONAL MOTOR VEHICLE REGULATIONS PERTAINING TO THE OPERATION OF TRAILERS.**

## 2.14 BREAKING-IN A NEW TRAILER

### Retighten Lug Nuts at First 10, 25 & 50 Miles

Wheel lugs can shift and settle quickly after being first assembled, and must be checked after the **first** 10, 25 and 50 miles of driving. Failure to perform this check could result in a wheel coming loose from the trailer, causing a crash leading to death or serious injury.

#### **WARNING**

**CHECK LUG NUTS FOR TIGHTNESS ON A NEW TRAILER OR WHEN WHEEL(S) HAVE BEEN REMOUNTED AFTER THE FIRST 10, 25 AND 50 MILES OF DRIVING. REFER TO SECTION 4 FOR TORQUE SEQUENCE AND TORQUE VALUES.**

### Adjust Brake Shoes at First 200 Miles

Brake shoes and drums experience a rapid initial wear. The brakes must be adjusted after the first 200 miles of use, and each 3,000 miles thereafter. The brakes are adjusted manually. (Refer to section 4 for manual brake adjustment).

## Synchronizing the Brake Systems

Trailer brakes are designed to work in synchronization with the brakes on the tow vehicle. Do not use either brake system alone to stop the combined tow vehicle and trailer.

When the tow vehicle and trailer braking systems are synchronized, both braking systems contribute to slowing, and the tongue of the trailer will neither dive nor rise sharply.

#### **WARNING**

**ROAD TEST THE BRAKES IN A SAFE AREA AT NO MORE THAN 30 M.P.H. BEFORE EACH TOW.**

To ensure safe brake performance and synchronization, read and follow the axle/brake and the brake controller manufacturers' instructions. If you do not have these instructions, call your dealer or JLG to obtain a copy.

A hard stop is used to:

- a. Confirm that the brakes work.
- b. Confirm that the trailer brakes are properly synchronized with the tow vehicle brakes.



## SECTION 3. ACCESSORIES

### 3.1 ACCESSORIES

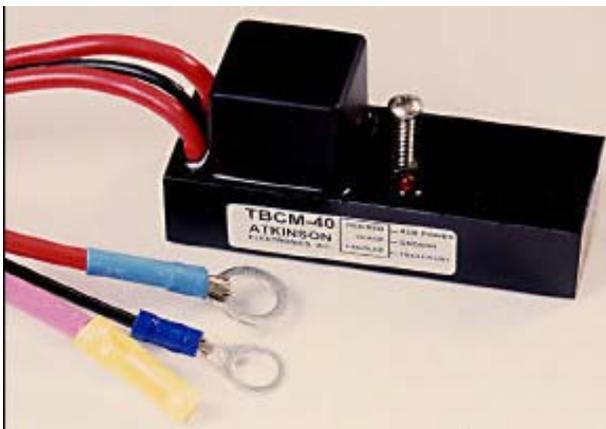
This section provides some basic information for the safe operation of several accessories. For many accessories, the manufacturer of the accessory has also provided instructions. You must read and follow these instructions before using the accessory. If you are uncertain whether you have all of the instructions, call JLG before operating the accessory.

#### Onboard Charger



- 1.5 Amp
- Fully automatic - turns on and off as needed
- LED indicators for showing "power on" and "charged"
- To be used as "trickle charge" only.

#### Trailer Battery Charging Module



- Disconnects trailer battery from vehicle's charge wire when not charging, (engine is not running) preventing two dead batteries.

- Power: 9 to 15 V DC from vehicle's battery
- Current Consumption: Sleep mode  $< \text{or} = 2\text{mA}$   
Charge mode  $< \text{or} = 120\text{mA}$
- Threshold: On @ 13.5 V DC  $\pm 0.1\text{V}$  DC  
Off @ 12.9 V DC  $\pm 0.1\text{V}$  DC
- Indication: LED indicates charge mode
- Capacity: Up to 40 Amps (VF4-41F11 relay rated @40 Amps)
- Thermal Protection: In-operative above 85°C (185°F)
- Temperature: -30 to 75°C (-22 to 167°F)

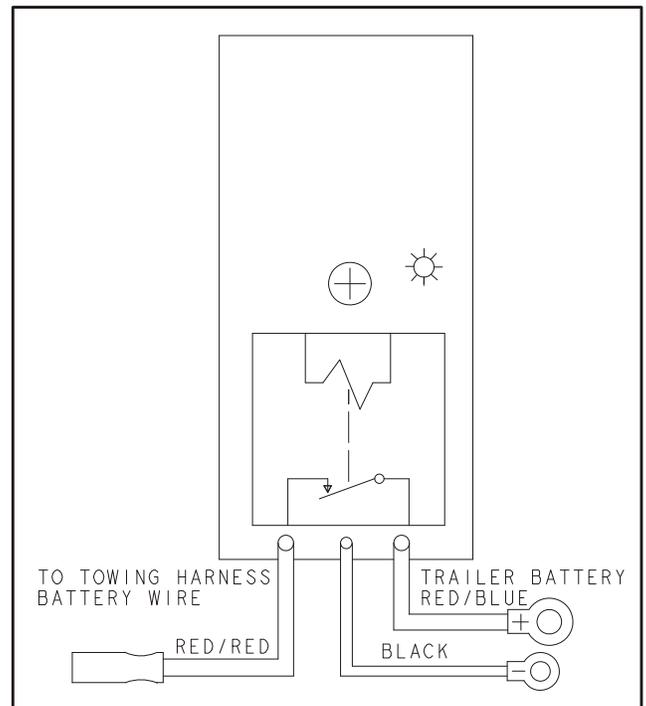


Figure 3-1. Battery Charger Diagram

### Electric Winch



- 12 Volt
- Freespooling clutch
- Power In & Out
- 12 ft. Remote Control
- 50 ft. Steel Cable
- 4500 lbs. Rated Line
- 5100 lbs Stall Load
- Front Trailer Rail Mounting

### Spare Tire Mounting

If your trailer is equipped with the spare tire bracket option, use the following instructions to mount the spare tire to the bracket.

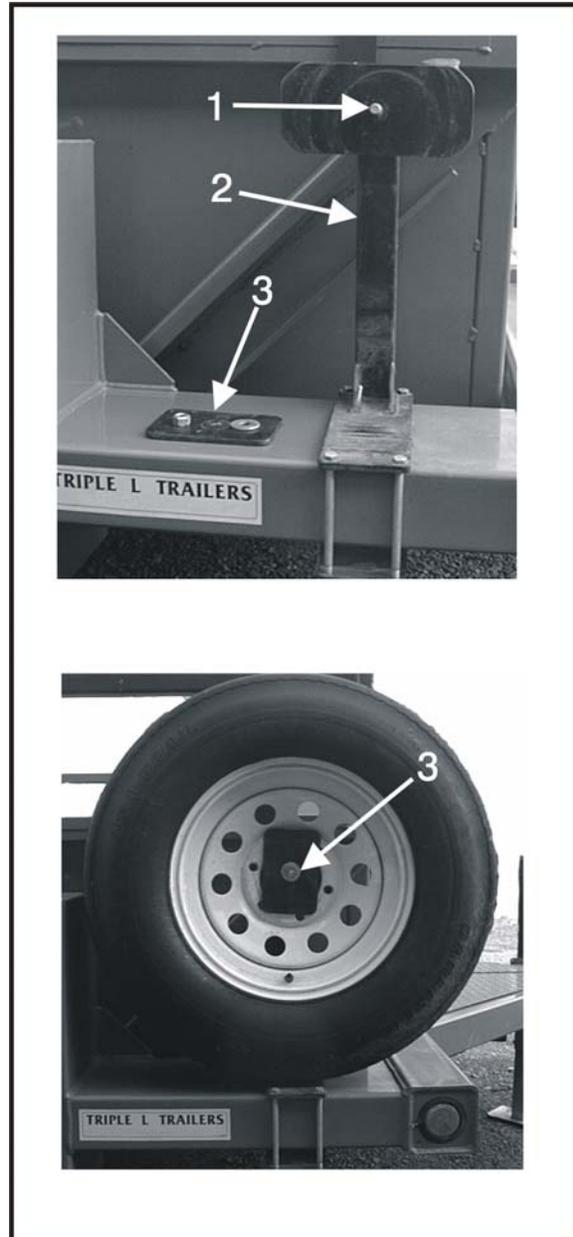
1. Locate the spare tire bracket on the right side of the trailer near the front.
2. Place the tire on the frame tube with the threaded stud on the spare tire bracket through the center hole of wheel.
3. Adjust the wheel as close to center over the threaded stud located on the spare tire bracket.
4. Place the plate in front of the wheel and over the threaded stud
5. Place the washer onto the threaded stud in front of the plate.
6. Thread the nut onto the threaded stud and using a 3/4" socket, tighten the nut.

**NOTICE**

**AFTER MOUNTING IS COMPLETE, ENSURE THAT TIRE IS RESTING ON THE FRAME TUBE, FIRMLY GRASP AND TRY AND MOVE THE SPARE TIRE TO ENSURE IT IS PROPERLY TIGHTENED.**

### Spare Tire Bracket

This bolt on bracket attaches directly to the chassis frame. The spare tire is carried neatly over the frame.



1. Threaded Stud
2. Spare Tire Bracket
3. Plate, Washer and 3/4" Nut

### 3.2 SCISSOR LIFT CHOCKS (IF EQUIPPED)

The scissor lift chocks may be pre-installed by the factory in certain trailer models to accommodate certain lifts manufactured by JLG Industries, Inc. (JLG). The Model UT49 or Model 449 are designed to haul a JLG Model 1932E2 Scissor Lift.

The scissor lift chocks are designed to properly position a JLG scissor lift within the trailer in order to achieve the proper tongue weight. The chocks are mounted to the

trailer floor and provide a means of positioning the scissor lift in the left/right and front/rear directions.

#### **NOTICE**

**THE SCISSOR LIFT CHOCKS ARE INTENDED FOR USE ONLY FOR SPECIFIED SCISSOR LIFTS THAT ARE MANUFACTURED BY JLG INDUSTRIES INC.**

**NOTE:** *When unloading, the trailer deck must be fully lowered onto the ground. The means of securing the scissor lift must be removed and the scissor lift must be carefully driven off the trailer deck.*

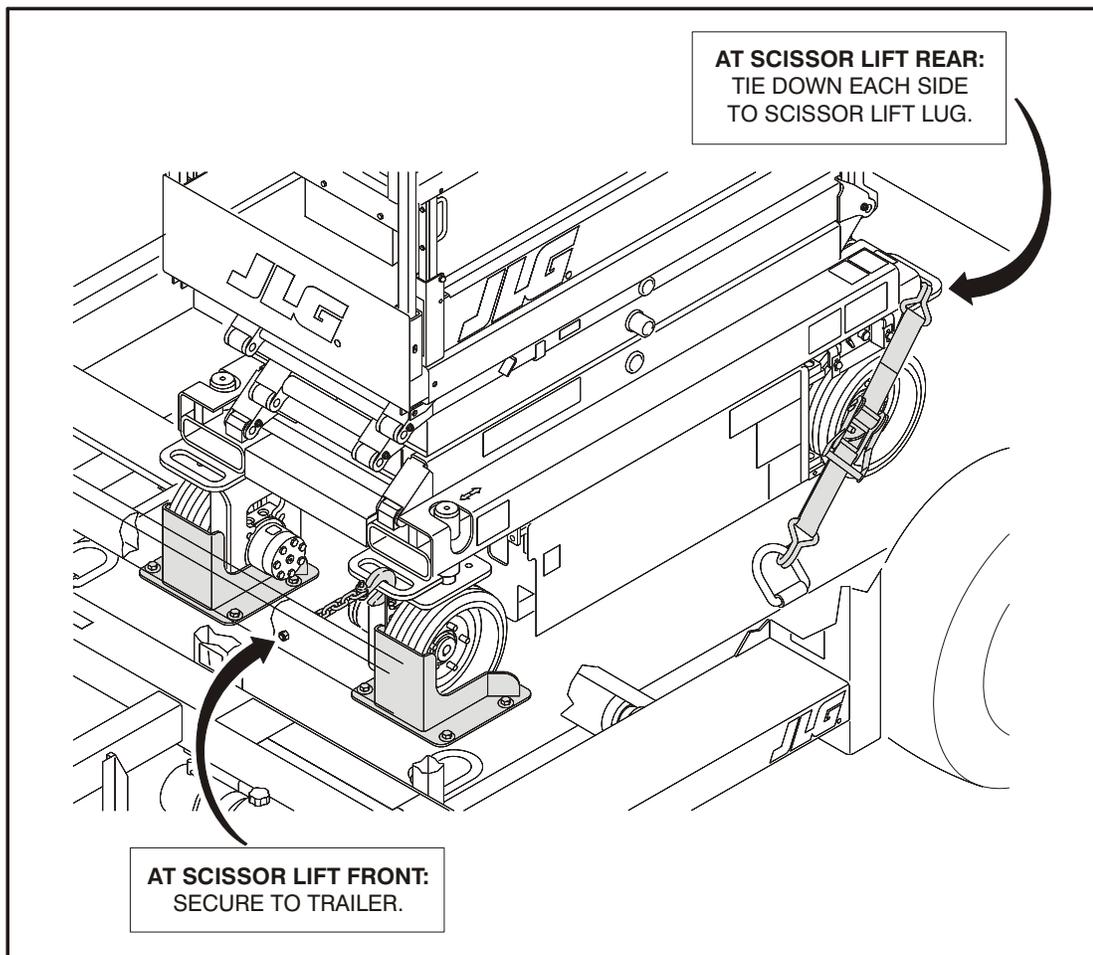


Figure 3-2. Tie Down Attach Points

**Inspection**

In addition to the trailer inspection requirements noted in this manual, the chocks must be inspected prior to each loading of the scissor lift for structural discrepancies and loose or missing fasteners. Any discrepancies discovered during this inspection must be corrected before using the chocks.

**Loading/Unloading and Securing the Scissor Lift**

Scissor lifts must only be loaded or unloaded when the trailer is positioned on a firm level surface that is capable of bearing the weight of the trailer and its load. The chocks must be properly positioned to achieve the required tongue weight (10-15% of load) for the JLG scissor lift.

**⚠ WARNING**

**TO AVOID INSTABILITY, THE SCISSOR LIFT MUST NEVER BE ELEVATED WHEN LOADING, UNLOADING, OR POSITIONED UPON THE TRAILER.**

When loading, the trailer deck must be fully lowered onto the ground. The scissor lift must be carefully driven forward into (and against) the chocks with the chassis of the scissor lift centered within the trailer. Once both front wheels of the scissor lift are firmly positioned against the chock, the front and rear of the scissor lift must be properly secured to the designated tie-down points on the trailer deck using suitable tie-down equipment. Refer to

Figure 3-2. Before moving the trailer, ensure that the trailer deck is fully raised and the travel latch is locked into position.

**Removal and Installation of Chocks (If Equipped)**

JLG discourages removal of the scissor chocks. In cases where removal and reinstallation is required, the chocks must be installed as follows:

1. Position the chocks in the original mounting locations as specified in Figure 3-3., Chock Location.

**NOTICE**

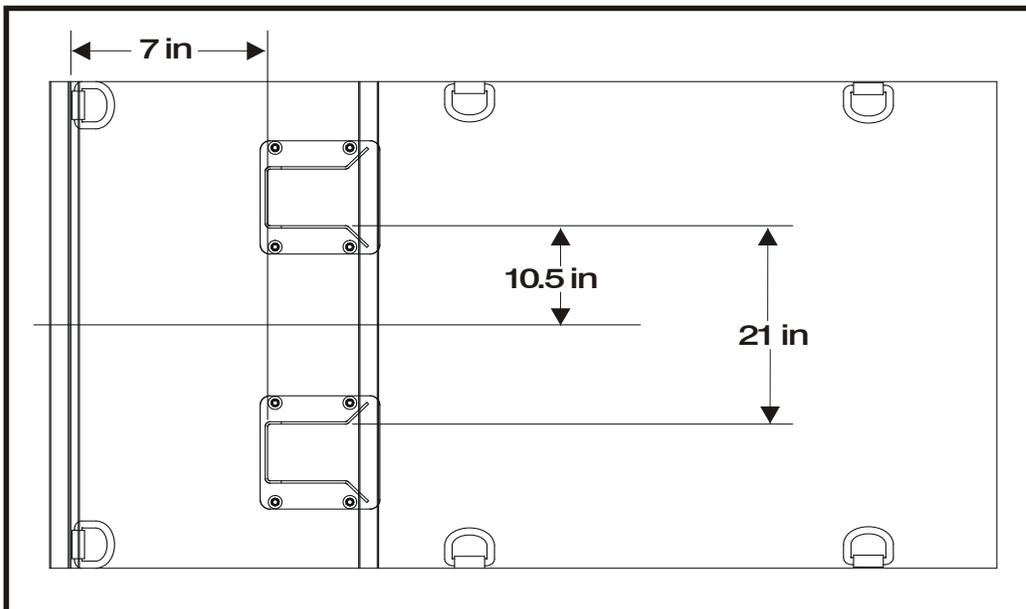
**THE ORIGINAL FASTENERS CANNOT BE REUSED.**

*NOTE: Purchase new fasteners as referenced in the table below.*

**Table 3-1. Chock Parts**

Part Number	Description	Size	Quantity
0641810	hex head cap screw	0.5-13 x 1.25	8
3311805	hex locknut	0.5-13	8
4751800	washer	0.5	16

2. Apply loctite #242 to the fasteners and install the chocks into position. (See Figure 3-3., Chock Location).
3. Torque the bolt/nut assemblies to 85 ft lbs.



**Figure 3-3. Chock Location**

## SECTION 4. SERVICE AND MAINTENANCE

### 4.1 INTRODUCTION

This section of the manual provides additional necessary information to the operator for proper operation and maintenance of the trailer.

#### Other Publications Available Specific to this Machine:

Illustrated Parts Manual..... 3121226

### 4.2 INSPECTIONS, SERVICE & MAINTENANCE

**NOTE:** In addition to this manual, also check the relevant component manufacturer's manual

You must inspect, maintain and service your trailer regularly to insure safe and reliable operation. If you cannot or are unsure how to perform the items listed here, have your dealer do them.

Table 4-1. Maintenance Schedule

DESCRIPTION		INTERVAL			
Item/Function	Method	Break-In	Every 3000 Miles or 3 Months	Every 6000 Miles or 6 Months	Every 12,000 Miles or 1 year
Wheel Lugs <sup>1</sup>	Tighten to specified torque rating	X	X		
Coupler Ball	Check for unusual wear		X		
Safety Chains	Check for unusual wear in links		X		
Brakes <sup>2</sup>	Check general operation and proper adjustment	X	X		
Brake Fluid <sup>3</sup>	Check reservoir		X		
Breakaway	Check cable and all components		X		
Suspension	Check for worn components or broken springs		X		
Welds	Check welds for cracks or separations			X	
Floor, hinges, door and dividers	Wash both sides. Wash floor. Inspect - repair or replace damaged, worn or broken parts.		X		
Tires	<b>Rotate every 6000 miles</b> Refer to Section 4.11, Tire and Wheel Maintenance			X	
Brakes, electric Magnets Controller (in tow vehicle)	Check wear and current draw Check power output (amperage) and modulation			X	
Roof vents, windows	Clean dirt buildup, lubricate hinges and slides			X	
Brakes - All types	Check for scoring and wearing				X
Jack, drop leg	Grease gears at top				X
Frame members/ welds	Inspect all frames members, bolts and rivets. repair or replace damaged worn or broken parts Inspect all welds. repair as needed				X
Wheels - Sealed bearings (hubs), Unsealed bearings, Rims	Check and confirm free running. Replace if not. (sealed bearings are not serviceable) Disassemble/inspect/assemble and repack. replace promptly, if immersed in water. Inspect for cracks and dents. Replace as needed.				X
Axle attachment bolts	Check by dealer				X

**NOTE:** 1 = Retighten when new and at the first 10, 25 and 50 miles  
 2 = Adjust after first 200 miles, 3000 mile intervals or as use requires.  
 3 = 1000 miles or 1 month when used in hot and dry environment.

### 4.3 INSPECTION AND SERVICE INSTRUCTIONS

#### Axle Bolts, Frame, Suspension, & Structure

**⚠ WARNING**

HAVE TRAILER INSPECTED ANNUALLY AND AFTER ANY IMPACT.

To perform many of the inspection and maintenance activities, you must jack up the trailer. Figure 4-1., Jacking Points indicates the general areas where jacks and jack stands may be applied.

When jacking and using jack stands, place them so as to clear wiring, brake lines, and suspension parts (springs, torsion bars, etc.). Place jacks and jack stands inside of the perimeter strip on the supporting structure to which the axles are attached.

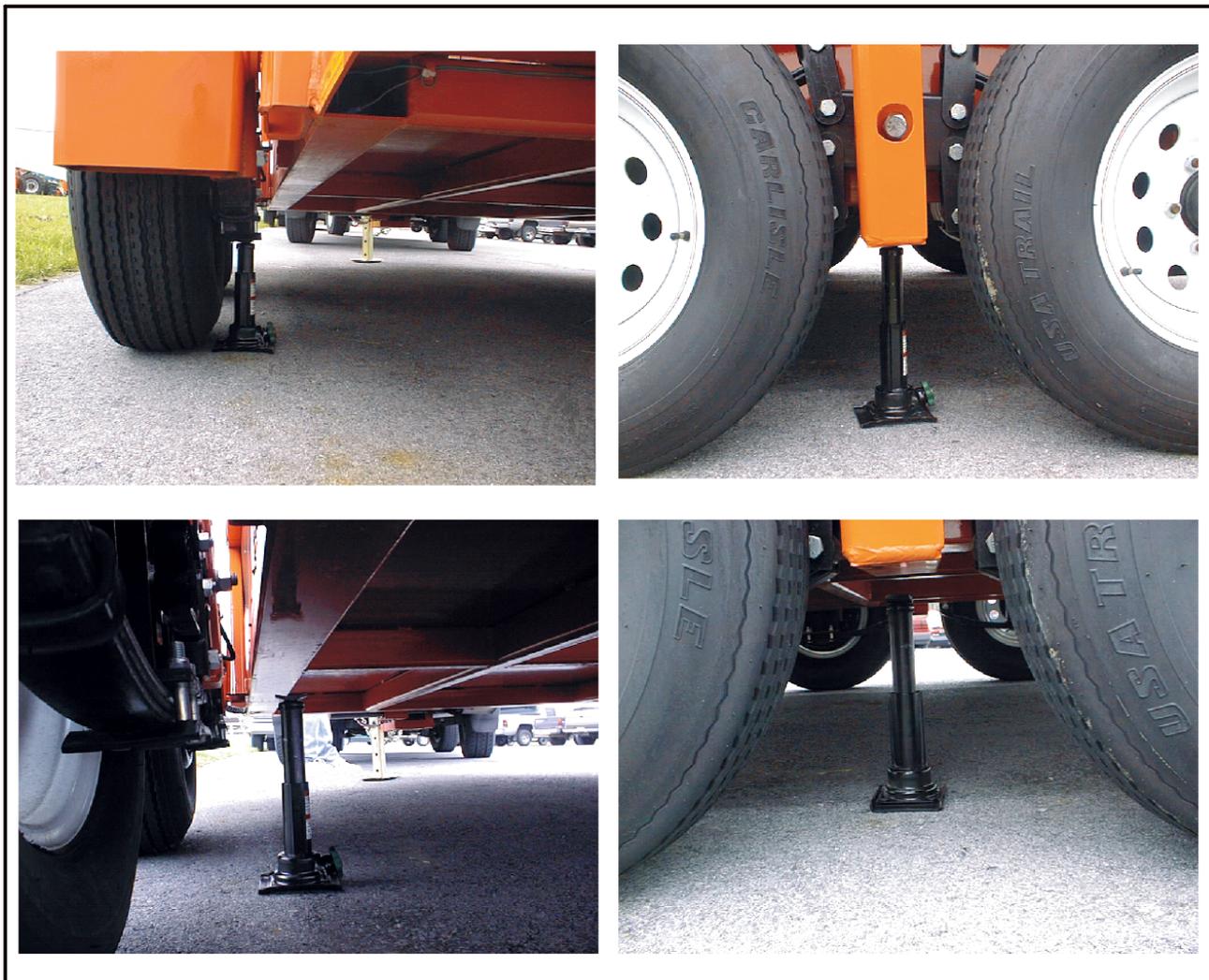


Figure 4-1. Jacking Points

**⚠ WARNING**

NEVER CRAWL UNDER YOUR TRAILER UNLESS IT IS ON FIRM AND LEVEL GROUND AND RESTING ON PROPERLY PLACED AND SECURED JACK STANDS.

## Trailer Structure

Because the trailer floor receives the most abuse, it will most likely corrode before any other part of the structure.

Using a power washer and a detergent solution, wash the floor and walls of the trailer. Rinse the trailer floor and walls.

## Fasteners and Frame Members

Inspect all of the fasteners and structural frame members for bending and other damage, cracks, or failure. Repair or replace any damaged fastener and repair the frame member. If you have any questions about the condition or method of repair of fasteners or frame members, get the recommendation of, or have the repair done by, your dealer.

The various fastener types used on your trailer are:

- Bolts, which are used mainly for attaching door and gate hinges to the trailer body.
- Buck Rivets, which are used to attach the sides and roof panels of the body to each other, and to the frame of the trailer.
- Huck Bolts may be at various locations on the sub-frame. Huck bolts are not user serviceable. If you detect a loose huck bolt fastener, do not tow the trailer. Call your dealer for instructions.

### **⚠ WARNING**

**INSPECT FOR BROKEN OR DAMAGED FASTENERS, WELDS OR OTHER DAMAGED PARTS AT LEAST ONCE A YEAR AND HAVE ALL DAMAGED PARTS REPAIRED OR REPLACED.**

## Welds

All welds can crack or fail when subjected to heavy loads or movement of cargo that was not properly tied to prevent movement. Any time that you know or suspect that the trailer has been subjected to heavy loads or movement of cargo, immediately inspect the welds and fasteners for damage. To prevent severe damage to your trailer, inspect all of the welds for cracks or failure at least once a year.

### **⚠ WARNING**

**DO NOT REPAIR CRACKED OR BROKEN WELDS, CONTACT JLG.**

## Hydraulic Cylinder

The cylinder is a single acting cylinder designed to bleed fluid back to the tank during the lowering of the trailer deck. The air breather relieves vacuum buildup during the extend stroke. Routine maintenance of the cylinder should not be required however the seals can be replaced should a leak ever occur.

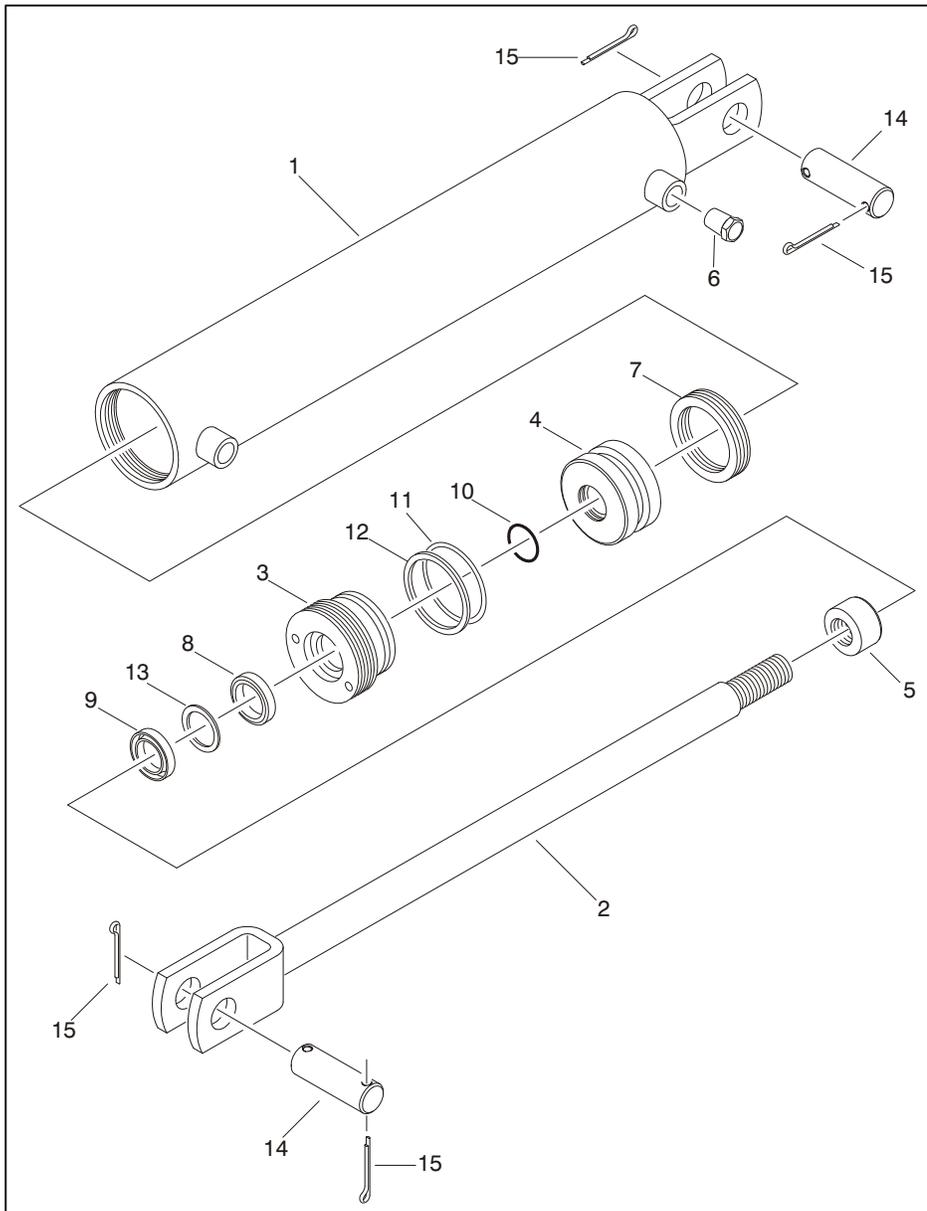
**NOTE:** *When the deck is lowered (cylinder extended) the reservoir is at it's highest level. The oil level should be checked at this point. The oil level should be within 1/2 inch of the top when the deck is fully lowered.*



Air Breather  
Part # 70122

Pump Port  
Part # 27601

## SECTION 4 - SERVICE AND MAINTENANCE



1. Cylinder Barrel
2. Cylinder Rod
3. Cylinder Head
4. Piston
5. Nut, Grade 8
6. Breather
7. Seal
8. Seal
9. Rod Wiper
10. O-Ring
11. O-Ting
12. Back-up Ring
13. Back-up Ring
14. Clevis Pin
15. Cotter Pin

Figure 4-2. Hydraulic Cylinder

**NOTE:** Torque Cylinder Head (3) to 250 - 300 ft lb (339 - 407 Nm).

Torque Nut (5) to 180 - 200 ft lb (244 - 407 Nm).

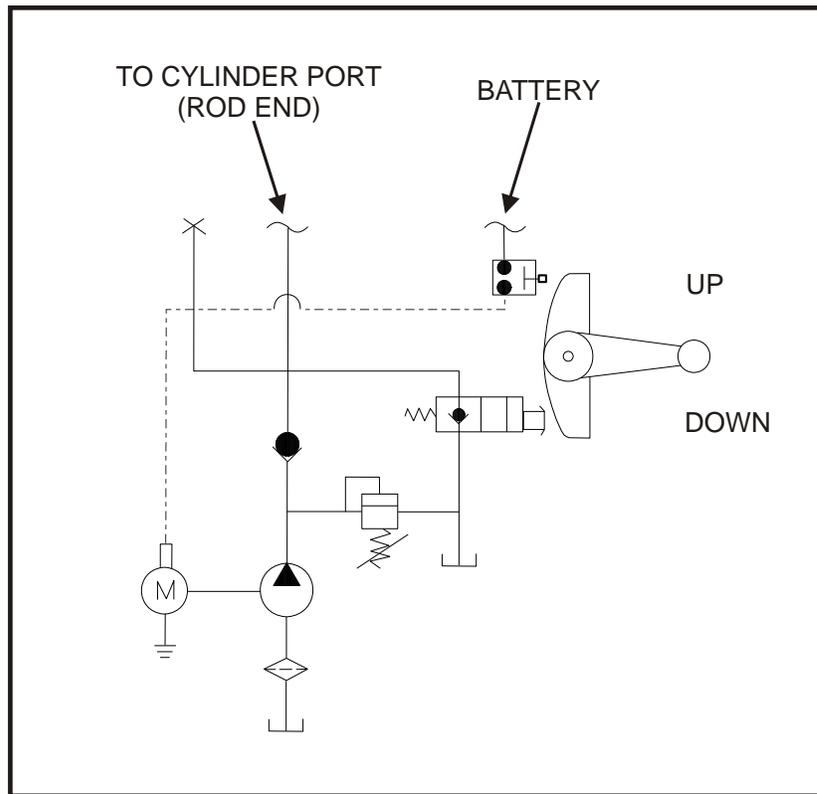


Figure 4-3. Hydraulic Schematic

### Hydraulic Pump/Motor

This unitized motor/pump package should be inspected periodically for any fluid leaks and tank oil level.



#### Specifications:

**Motor** - 12 Volts

**Tank Capacity** - 3 Quarts

**Pressure Relief Setting** - 1900 psi

**Displacement** - 0.138 in<sup>3</sup>/rev

**Full Tank Level** - 1" below fill cap when trailer deck is lowered.

**Fluid Type** - DEXTRON II ATF (automatic transmission fluid).

Table 4-2. Motor/Pump Amperage Draw (No Load in Trailer)

PSI	Pump Motor Amperage Draw	Pump GPM Flow Rate
At Start up	100 Amps	3.5 GPM
1000 PSI	160 Amps	2 GPM
1900 to 2000 PSI or at Relief	225 Amps	1.25 GPM

**NOTE:** You should get approximately 3 to 4 load deck cycles out of a single charge of the battery. This will vary depending on deck load.

## SECTION 4 - SERVICE AND MAINTENANCE

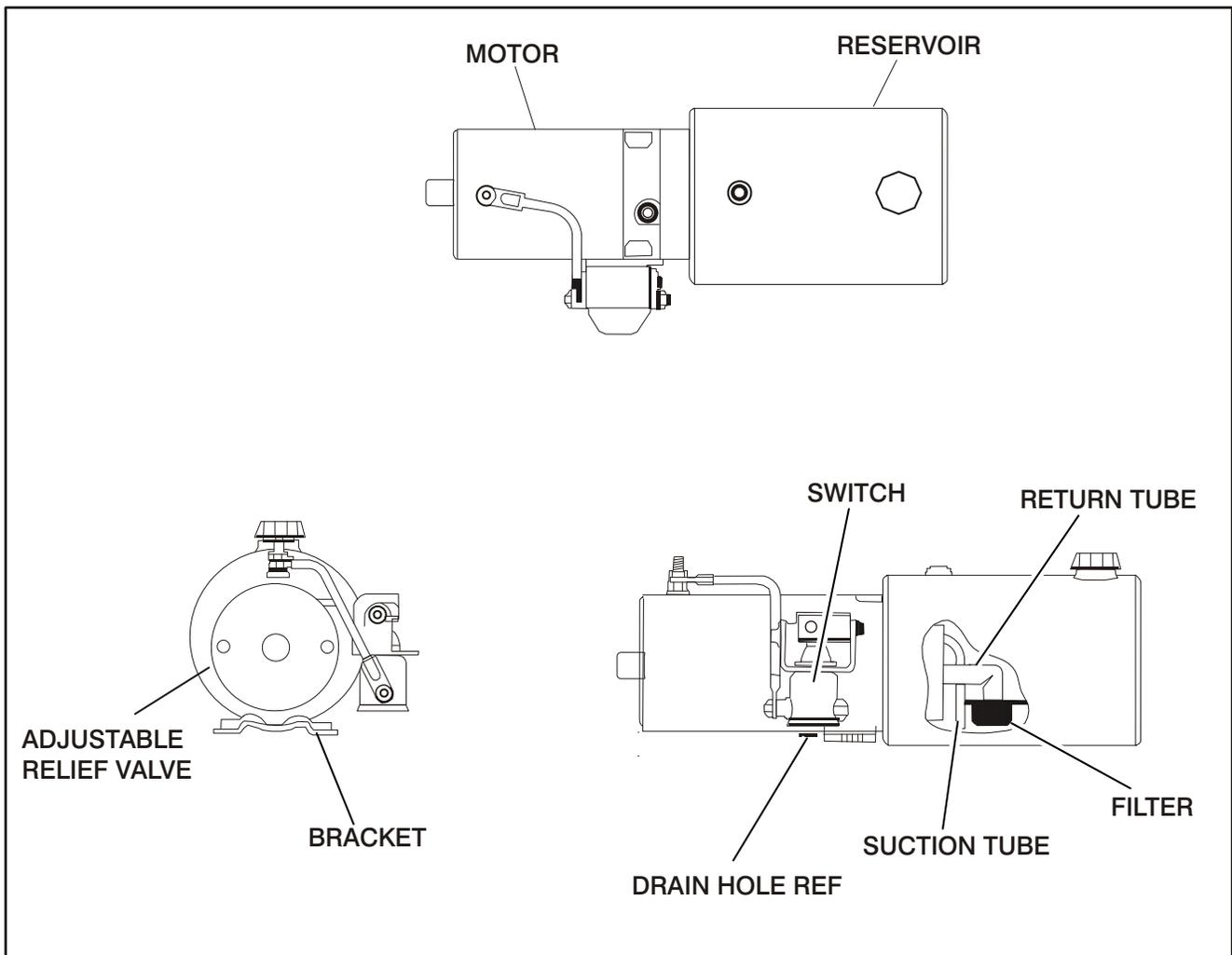


Figure 4-4. 12 Volt Motor/Pump Parts

### Relief Valve Adjustment:

1. Loosen Jam Nut
2. Adjust Pressure
  - a. Turn screw clockwise to increase pressure.
  - b. Turn screw counter clockwise to decrease pressure.

**NOTE:** Outlet Port (Pressure) flow must be blocked to make relief valve operate while adjusting.

3. Tighten Jam Nut

## Brake Shoes and Drums

Properly functioning brake shoes and drums are essential to ensure safety. You must have your dealer inspect these components at least once per year, or each 12,000 miles.

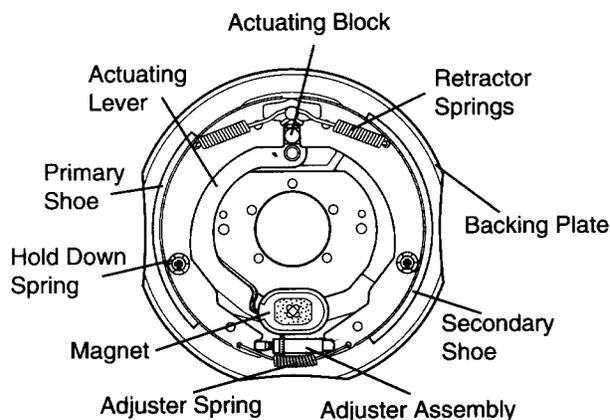
The brakes should be adjusted (1) after the first 200 miles of operation when the brake shoes and drums have "seated," (2) at 3000 miles intervals, (3) or as use and performance requires.

## Manually Adjusting Brake Shoes

The manually adjusted brakes should be adjusted in the following manner:

1. Jack up the trailer and secure it on adequate capacity jack stands.
2. Be sure the wheel and brake drum rotate freely.
3. Remove the wheel and brake drum. Because of the special stub axle arrangement, adjustment cannot be made through the backing plate.
4. With a screwdriver or standard adjusting tool, rotate the starwheel of the adjuster assembly to expand the brake shoes. Adjust the brake shoes out until the pressure of the linings against the drum produces a slight drag.
5. Remount the wheel and brake drum.
6. Repeat the above procedure on all brakes.

Lower the trailer to the ground.



## ELECTRIC BRAKES (OPTIONAL)

(See Figure 4-5.)

The electric brakes on a trailer are similar to the drum brakes on an automobile. The basic difference is that the automotive brakes are actuated by hydraulic pressure while electric trailer brakes are actuated by an electromagnet. With all of the brake components connected into the system, the brake will operate as follows:

When the electrical current is fed into the system by the controller, it flows through the electromagnets in the brakes. The high capacity electromagnets are energized and are attracted to the rotating armature surface of the drums, which moves the actuating levers in the direction that the drums are turning.

The resulting force causes the actuating block at the shoe end of the lever to push the primary shoe out against the inside surface of the brake drum. The force generated by the primary shoe acting through the adjuster assembly then moves the secondary shoe out into contact with the brake drum.

Increasing the current flow to the electromagnet causes the magnet to grip the armature surface of the brake drum more firmly. This results in increasing the pressure against the shoes and brake drums until the desired stop is accomplished.

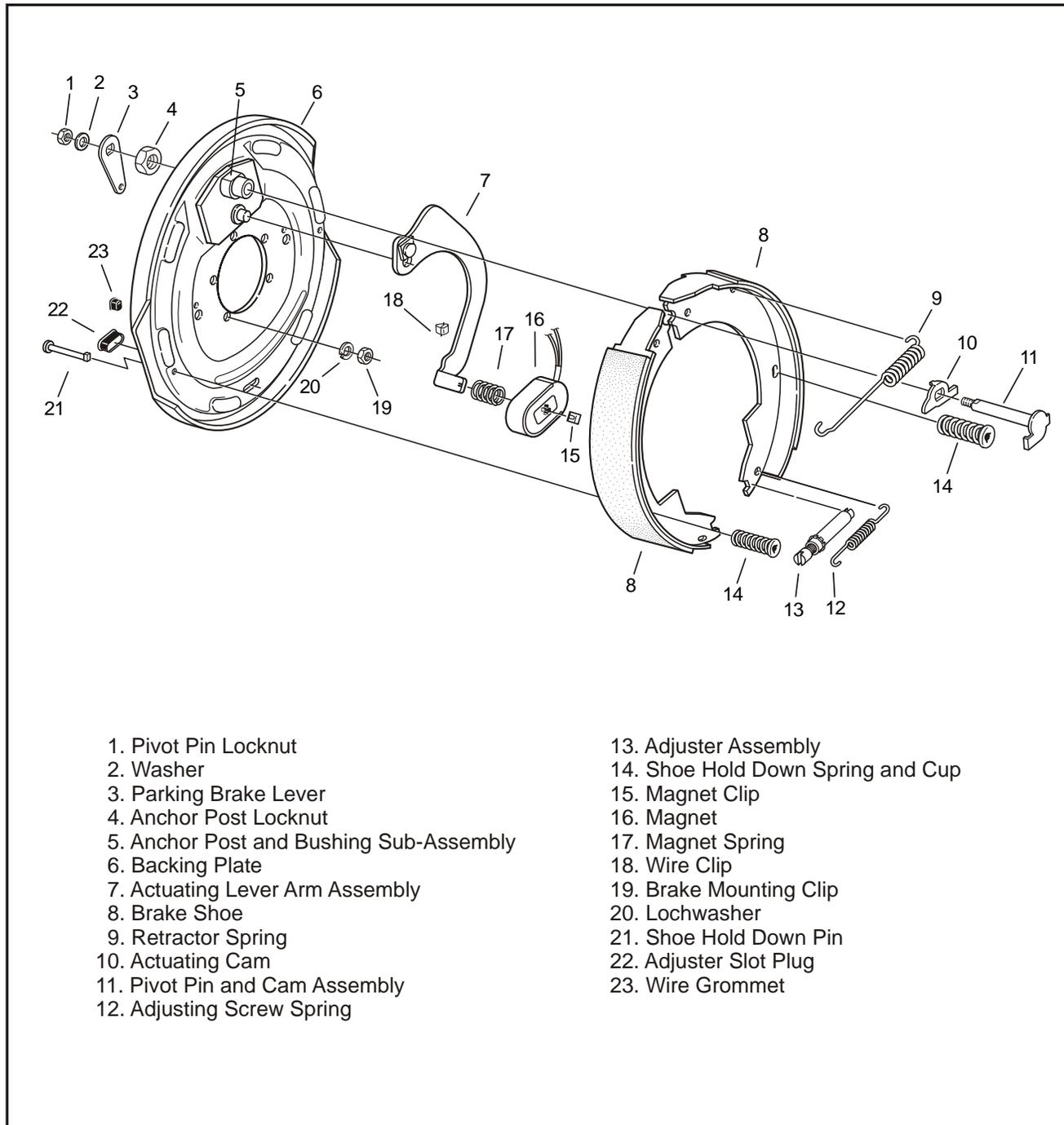
**Brake Controller** - A tow vehicle brake controller is required. These controllers have gain control to vary the amount of current to the brakes, and a level control which sets the controller's inertia sensor to sense deceleration. The level adjustment also can be used to vary when the trailer braking is felt. The gain or output control adjustment usually controls the maximum amount of amperage available to the brakes. This can be adjusted for varying trailer loads.

The electric brakes that operate in conjunction with the tow vehicle brakes must be "synchronized" so that braking is properly distributed to the tow vehicle brakes and the trailer brakes. For proper operation and synchronization, read and follow the axle/brake and the brake controller manufacturers' instructions.

**Brake Cleaning and Inspection** - Your trailer brakes must be inspected and serviced at yearly or 12,000 miles intervals or more often as use and performance requires. Magnets and shoes must be changed when they become worn or scored thereby preventing adequate vehicle braking. Clean the backing plate, electromagnet, and brake shoes. Make certain that all the parts removed are replaced in the same brake and drum assembly. Inspect the magnet arm for any loose or worn parts. Check shoe retractor springs, hold down springs, and adjuster springs for stretch or deformation and replace if required.

**Shoes and Linings** - A simple visual inspection of your brake linings will tell if they are usable. Replacement is necessary if the lining is worn (to within 1/16" or less), contaminated with grease or oil, or abnormally scored or gouged. It is important to replace both shoes on each brake and both brakes of the same axle. This is necessary to retain the "balance" of your brakes.

**SECTION 4 - SERVICE AND MAINTENANCE**



**Figure 4-5. Electric Brakes with Parking Brake Feature**

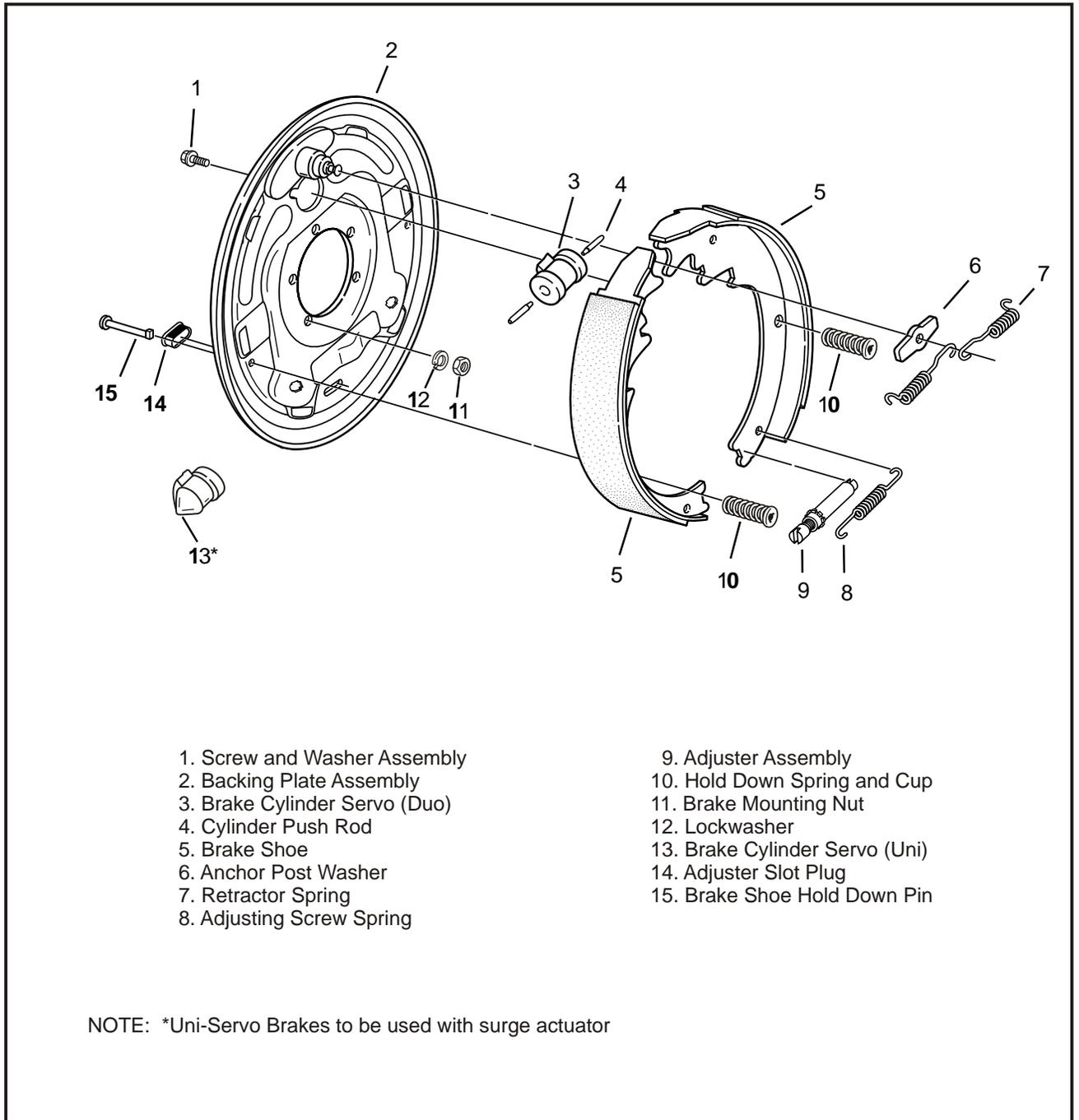


Figure 4-6. Hydraulic Brakes

**Hydraulic (Surge) Brakes (Option)**

(See Figure 4-6.)

If your trailer has hydraulically-operated brakes, they function the same way the hydraulic brakes do on your tow vehicle. The hydraulic fluid from a master cylinder is used to actuate the hydraulic wheel cylinder, which, in turn, applies force against the brake shoes and drum. The main differences between automotive hydraulic brakes and hydraulic trailer brakes are the actuation systems that transfer the braking signal from the tow vehicle to the brake. A surge tongue actuator is required for a trailer with hydraulic brakes. The hydraulic braking system must be inspected by a dealer, at least as often as the brakes on the tow vehicle, but no less than once per year. This inspection includes an assessment of the condition and proper operation of the wheel cylinders, brake shoes, brake drums and hubs.

You must check the fluid level in the master cylinder reservoir at least every three months. If you tow your trailer an average of 1,000 miles per month in a hot and dry environment, you must check the brake fluid level once a month. The brake fluid reservoir is located on the tongue of the trailer. Fill with DOT 3 or 4 brake fluid.

**Brake Adjustment**

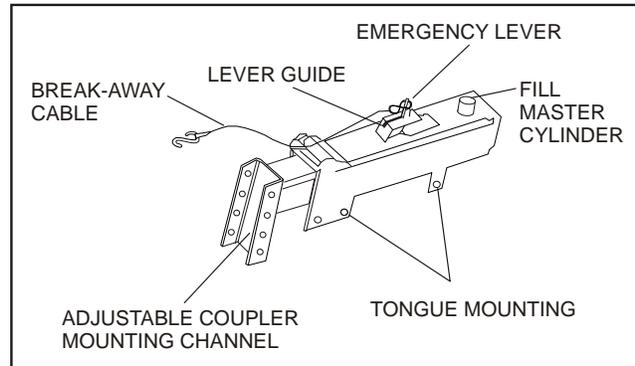
Brakes should be adjusted (1) after the first 200 miles of operation when the brake shoes and drums have "seated," (2) at 3000 miles intervals, (3) or as used and performance requires.

1. Jack up trailer and secure on adequate capacity jack stands. check that the wheel and drum rotate freely.
2. Because of the special stub axle arrangement, adjustment cannot be made through the backing plate. Remove the wheel and brake drum, and with the starwheel on the adjuster assembly move the brakes shoes outward. remount the brake drum and wheel and rotate the wheel. Adjust until only a very slight brake shoe drag is felt.

- Wheel Cylinders - Inspect for leaks and smooth operation. Clean with brake cleaner and flush with fresh brake fluid. Hone or replace as necessary.
- Brake Lines - Check for cracks, kinks, or blockage. Flush with fresh brake fluid. Bleed system to remove all air. Replace as necessary.
- Shoes and linings - Inspect visually. Replace if the lining is worn (to within 1/16" or less), contaminated with grease or brake fluid, or abnormally scored or gouged. Replacement brake shoes part number 70131 (two wheels).

- Hardware - Check all hardware. Check shoe retractor spring, hold down springs, and adjuster springs for stretch or wear. Replace as required.
- Drums - Check drums for scoring, cracking, or uneven wear. Turn drum smooth only if under maximum diameter. Replace as necessary.

**Brake Actuator (Surge Tongue Actuator)**



**Bleeding Surge Brakes**

Fill the Master Cylinder with DOT 3 or 4 brake fluid.

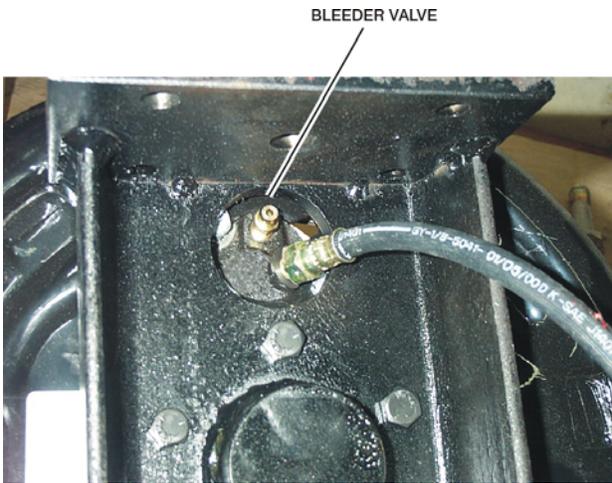
Bleed the brake system using a pressure-type brake bleeder or manually, as follows:

1. Remove the two 5/16" x 1/2" Bolts and Lock Washers that hold the Lever Guide, and the Flat Emergency Lever Spring.
2. Remove the Lever Guide, and the Emergency Lever Spring.
3. Using short strokes, pull forward on the Emergency Lever, pumping the Master Cylinder until the brake fluid within the Master Cylinder stops bubbling.

**NOTE:** Check the fluid level in the master cylinder frequently while bleeding the brakes (every 4 or 5 strokes). Refill as necessary to keep the level above half full.

4. When the bubbles stop close the valve.
5. Move to the next wheel and repeat steps 1 - 4.
6. Once bleeding is completed, refill the master cylinder and attach the cap securely.
7. Replace the emergency lever spring, the lever guide, the lock washers and the hex head bolts.
8. Test the brakes by pulling the emergency lever forward until it locks into the second notch position. The lever should be approximately straight up.

9. Attempt to rotate the wheels in a forward direction. If any of the wheels rotate, the brakes must be adjusted.



## 4.4 TRAILER CONNECTION TO TOW VEHICLE

### Coupler and Ball

The coupler on the trailer connects to the ball attached to the hitch on the tow vehicle. The coupler, ball and hitch transfer the towing forces between the tow vehicle and the trailer. Before each tow, coat the ball with a thin layer of automotive bearing grease to reduce wear and ensure proper operation; and check the locking device that secures the coupler to the ball for proper operation.

See the coupler manufacturer's manual for other inspection and maintenance activities. If you do not have this manual, contact a JLG representative at 1-877-JLG-SAFE (554-7233) between the hours of 8:00 AM and 4:45 PM Eastern Standard time.

If you see or feel evidence of wear, such as flat spots, deformations, pitting or corrosion, on the ball or coupler, immediately have your dealer inspect them to determine the proper action to prevent possible failure of the ball and coupler system. All bent or broken coupler parts must be replaced before towing the trailer.

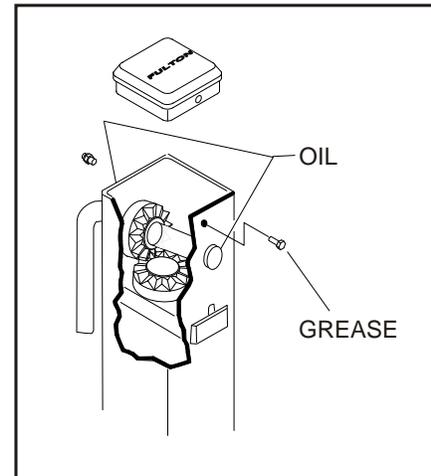
The coupler must operate properly and automatically snap into the latched position. Oil the pivot points, sliding surfaces, and spring ends with SAE 30W motor oil. Keep the ball pocket and latch mechanism clean. Dirt or contamination can prevent proper operation of the latching mechanism.

When replacing a ball, the load rating must match or exceed the GVWR of the trailer.

## 4.5 TONGUE JACK

### Operating

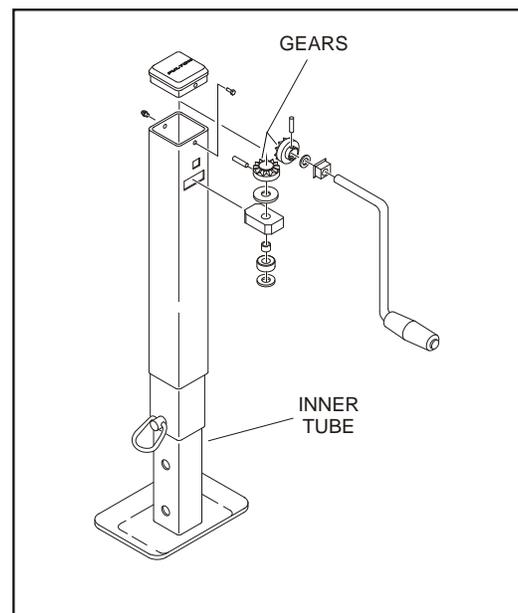
Rotate the jack handle clockwise to raise the jack, or counterclockwise to lower the jack.



**Drop Foot Operation** - Pull the hitch pin, lower or raise drop foot to desired position, return the hitch pin making sure it is fully inserted through both the inner tube and the drop tube before using the jack.

### Maintenance

The internal gearing and bearings of the jack must be kept lubricated. Using a grease gun, apply automotive grease to the gears. Rotate the jack handle to distribute the grease evenly. Lightly grease the inner tube of the jack using the same type of grease. A light weight oil must be applied to the handle unit at both sides of the tube.



## SECTION 4 - SERVICE AND MAINTENANCE

### 4.6 LIGHTS AND SIGNALS

Before each tow, check the trailer taillights, stoplights, turn signals and any clearance lights for proper operation.

#### **⚠ WARNING**

**IMPROPER OPERATING TAILLIGHTS, STOPLIGHTS AND TURN SIGNALS CAN CAUSE COLLISIONS. CHECK ALL LIGHTS BEFORE EACH TOW.**

### 4.7 TRAILER CONNECTIONS

Before each tow, verify that the proper trailer connections have been made.

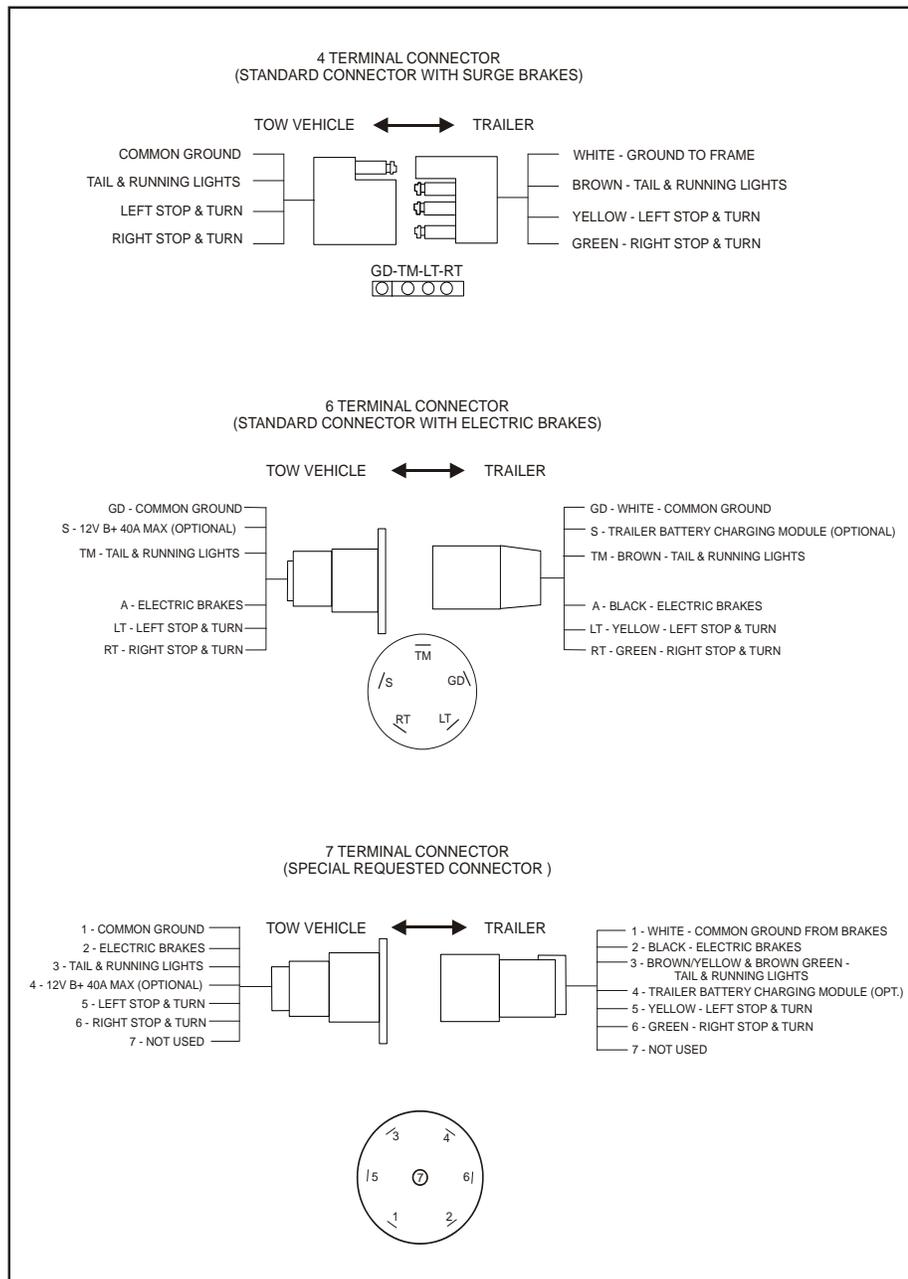
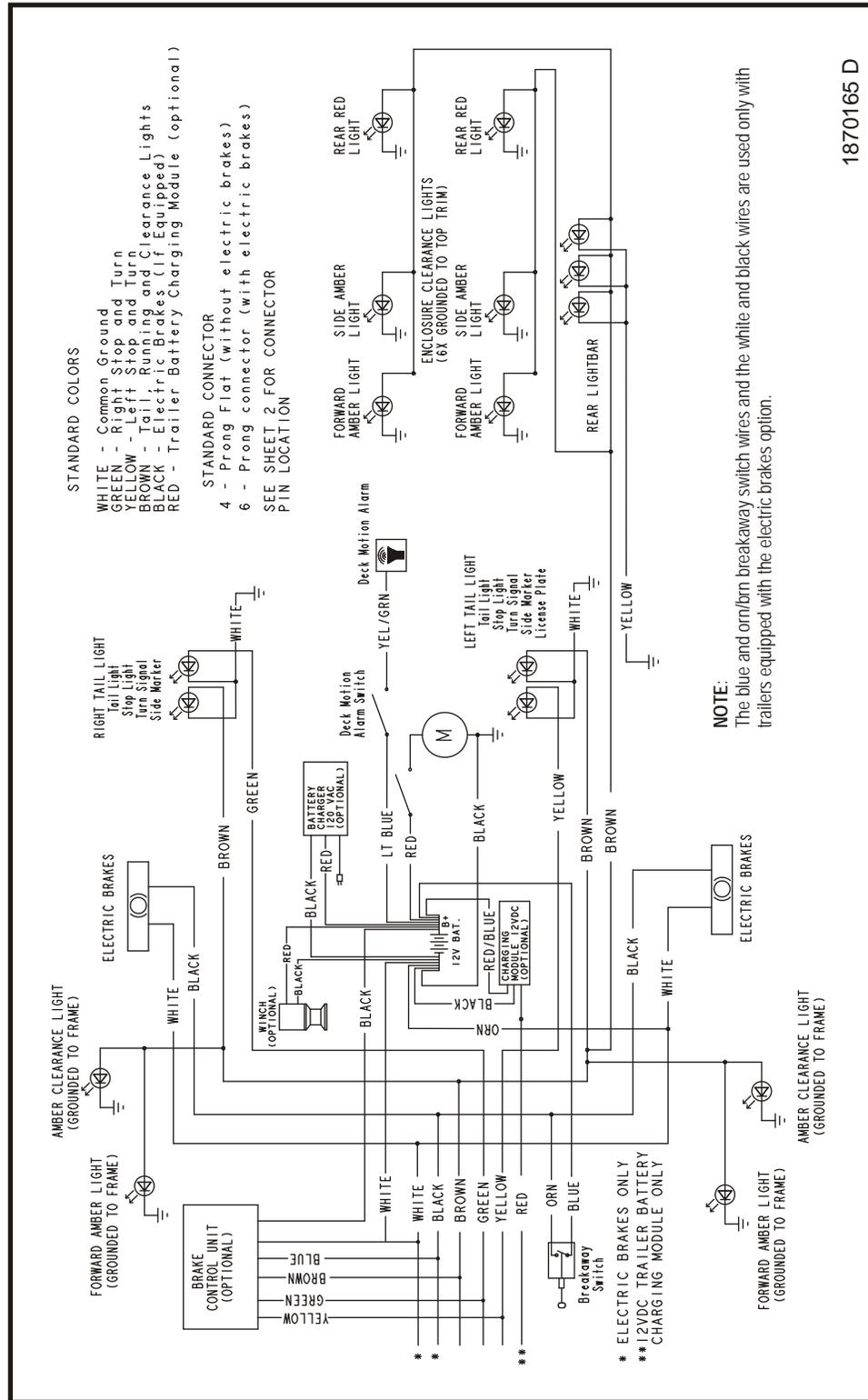


Figure 4-7. Trailer Connections



1870165 D

Figure 4-8. Trailer Wiring Diagram

## **Battery (Option)**

A battery operates the hydraulic pump motor that lowers and raises the trailer bed. If the trailer has electric brakes, this same battery supplies the power to operate the trailer brakes if the trailer uncouples from the tow vehicle activating the breakaway brake switch. The battery may be kept charged either by the tow vehicle or by an available trickle charger. Be sure to check, maintain and replace the battery according to the battery manufacturers instructions.

Disconnect the accessory battery when you do not plan to be using the trailer for an extended period, such as seasonal storage. The accessory battery must be kept in a charged condition during storage. The battery could freeze and break if it becomes discharged.

## **4.8 WHEEL ALIGNMENT**



To check wheel alignment, position a straight edge at the center line of the wheels and see that all sidewalls are in alignment. Because of movement of tandem axles when turning, be sure trailer has been pulled in a straight line before checking. If correction is needed, loosen the 8 spring pad bolts (4 at top and 4 at the bottom spring) and then reposition wheel. Once corrected, retighten all bolts. Torque to specified ft. lbs. (Refer to Table 4-5, Wheel Torque Chart).

## **4.9 SUSPENSION**

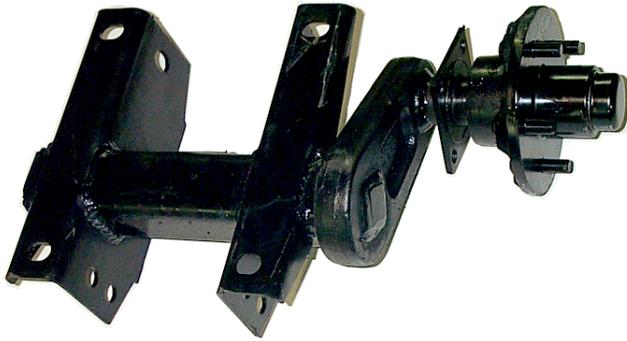
There are two types of suspension used on various trailer models.



**Figure 4-9. Dual, Quadra Spring Suspension**

Slight wheel alignment can be made with the 8 bolts loosened on the springs.

1. Lower deck and jack wheels off ground.
2. From the inside loosen the 8 bolts.
3. Do not remove wheels when aligning.



**Figure 4-10. Flex Ride Suspension**

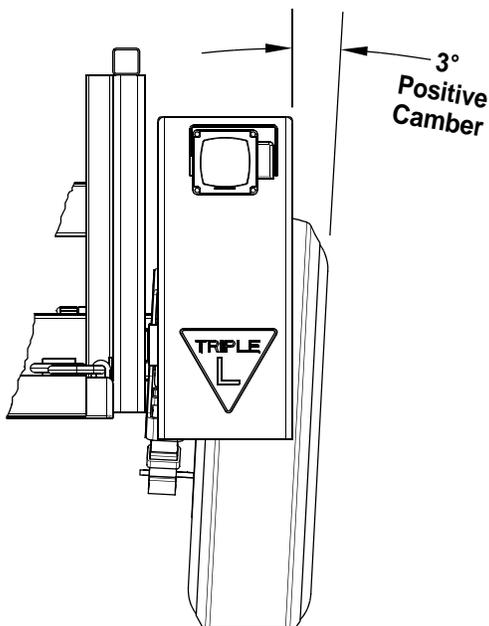
Model 248 Torsion

Model 4610 Spring

Model 7610 Spring

Model 7612 Spring

The suspension/tires on all series Triple L trailers are set at the factory with a fixed 3° (degree) POSITIVE camber with NO LOAD in the trailer.



**Figure 4-11. Suspension Camber Setting (Fixed)**

## 4.10 UNSEALED BEARINGS (HUBS)

If your trailer has unsealed axle bearings, they must be inspected and lubricated once a year or 12,000 miles to insure safe operation of your trailer.

If a trailer wheel bearing is immersed in water, it must be replaced.

If your trailer has not been used for an extended amount of time, have the bearings inspected and packed more frequently, at least every six months and prior to use.

## Wheel Bearings

A loose, worn or damaged wheel bearing is the most common cause of brakes that grab.

To check your bearings, jack trailer and check wheels for side-to-side looseness. If the wheels are loose, or spin with a wobble, the bearings must be serviced or replaced.

Most trailer axles are built with sealed bearings that are not serviceable. Sealed bearings must be replaced as complete units. Inspect every year.

## Wheel Bearing Disassembly

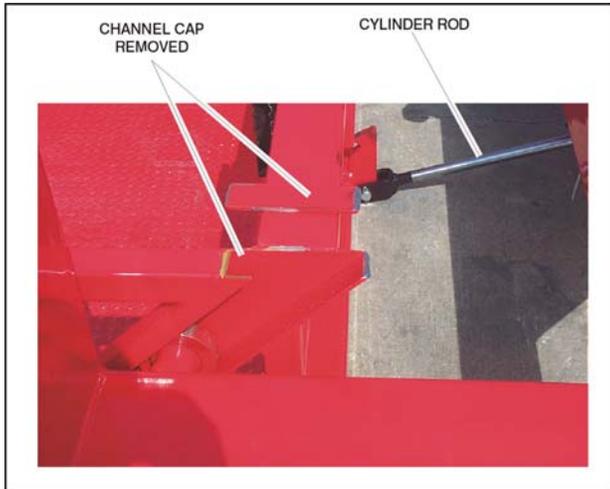
1. After removing the grease cap, cotter pin, spindle nut and spindle washer, remove the hub and drum to inspect the bearings for wear and damage.
2. Replace bearings that have flat spots on rollers, broken roller cages, rust or pitting. Always replace bearings and cups in sets. The inner and outer bearings are to be replaced at the same time.
3. Replace seals that have nicks, tears or wear.
4. Lubricate the bearings with a high quality EP-2 automotive wheel bearing grease.

Every time the wheel hub is removed and the bearings are reassembled, follow the steps below to check the wheel bearings for free running and adjust.

1. Turn the hub slowly, by hand, while tightening the spindle nut, until you can no longer turn the hub by hand.
2. Loosen the spindle nut just until you are able to turn it (the spindle nut) by hand. Do not turn the hub while the spindle nut is loose.
3. Put a new cotter pin through the spindle nut and axle.
4. Check the adjustments. Both the hub and the spindle nut should be able to move freely (the spindle nut motion will be limited by the cotter pin).

**4.11 DECK BEARING REPLACEMENT**

- 5. In a clear flat area, lower the deck completely to the ground.



- 6. A cap may be tack welded on the top of each bearing channel. If so, grind the welds loose and remove all (4) caps.
- 7. Remove the cylinder rod pin at the deck.



- 8. Using the "up/down" control, collapse the cylinder just enough to free it from the deck. Tie up the cylinder so that it will not fall to the ground when lifting the frame. Do not collapse the cylinder any more than necessary to be free from the deck since you will need to manually extend the cylinder when reassembling.



- 9. Using a fork lift or hoist, slowly lift the chassis up to allow the bearings to lift out of the bearing channels. If you do not have extended forks to reach the full width of the trailer, chain the far side of the trailer to the fork lift mask so as to hold the chassis level while lifting. Use extreme caution when lifting to ensure everyone's safety!
- 10. Once the chassis is lifted above the channel all bearings will be easily accessible. Remove snap ring and slip off existing bearing. Replace with new bearing.



- 11. Slowly lower the chassis, aligning the bearings into the channels. Pull out the cylinder rod and reattach to the trailer deck. (Have someone hold the cylinder control in the "down" position while manually pulling out the cylinder rod.
- 12. The top channel cap was originally installed for appearance. It may be left off if so desired. (If left off, be sure to grind or file all sharp burrs).

## 4.12 TIRE AND WHEEL MAINTENANCE

### Glossary of Tire and Loading Terminology

1. **Cold Inflation Pressure** - The pressure in the tire before you drive. The term cold does not relate to the outside temperature. Rather, a cold tire is one that has not been driven on for at least three hours.
2. **Gross Axle Weight Rating** - The maximum weight that any axle can support, as published on the VIN label on the front left side of the trailer. Actual weight determined by weighing each axle on a public scale, with the trailer attached to the towing vehicle.
3. **Gross Vehicle Weight Rating** - The maximum weight of the fully loaded trailer, as published on the VIN label. Actual weight determined by weighing trailer on a scale, without being attached to the towing vehicle.
4. **Maximum Permissible Inflation Pressure** - The maximum cold inflation pressure to which a tire may be inflated. Reference VIN Label for this value.
5. **Production Options or Accessory Weight** - Weight of options or accessories not included in the base weight of the trailer. Reference section 2.
6. **Recommended inflation pressure** - This is the inflation pressure provided by the vehicle manufacturer on the Tire Information label and on the VIN Label. Reference.
7. **Vehicle Capacity Weight** - The maximum cargo weight the trailer is designed to carry.

### Basic Tire Maintenance

Properly maintained tires improve the stopping, traction, and load-carrying capability of your vehicle. Under inflated tires and overloaded vehicles are a major cause of tire failure. Therefore, to avoid flat tires and other types of tire failure, you should maintain proper tire pressure, observe tire and vehicle load limits, avoid road hazards, and regularly inspect your tires.

### Checking Tire Pressure

It is important to check your vehicle's tire pressure at least once a month for the following reasons:

- Most tires may naturally lose air over time.
- Tires can lose air suddenly if you drive over a pothole or other object or if you strike the curb when parking.
- With radial tires, it is usually not possible to determine under inflation by visual inspection.

The recommended tire inflation pressure that vehicle manufacturers provide reflects the proper psi when a tire is cold. When you drive, your tires get warmer, causing the air pressure within them to increase. Therefore, to get an accurate tire pressure reading, you must measure tire pressure when the tires are cold or compensate for the extra pressure in warm tires.

Table 4-3. Tire Inflation Pressures

Models	Tire(s) Used (Load Range)	Cold Inflation Pressure
248 7610 7612 7614 7616 UT28 UT610 UT612 UT614 EC10 EC12 EC14	ST225/75D15; ST225/75D15(D)	65 PSI (450 KPa)
449 1012 1014 UT49 UT912 UT914	LT235/85R16(E); ST235/85R16(D); ST235/85R16(E)	see note
4610 UT410	8-14.5LT(G)	110 PSI (760 KPa)
<b>NOTE:</b> Machines prior to S/N 0050002096 (Use load range E tires only)		80 PSI (550 KPa)
S/N 0050002096 to S/N 0050003746 (Use load range D or E tires)		65 PSI (450 KPa)
S/N 0050003747 to Present (Use load range E tires only)		80 PSI (550 KPa)

**Tire Wear**

Replace the tire before towing the trailer, if the tire treads have less than 1/16-inch depth or the telltale bands are visible. The following tire wear diagnostic chart will help you pinpoint the causes and solution of tire wear problems.

The following tire wear diagnostic chart will help you pinpoint the causes and solution of tire wear problems.

A bubble, cut or bulge in a sidewall can result in a tire blowout. Inspect both sidewalls of each tire for any bubble, cut or bulge; and replace a damaged tire before towing the trailer.

**NOTE:** *Tire wear is not covered under warranty!*

**⚠ WARNING**

**WORN, DAMAGED OR UNDER-INFLATED TIRES CAN CAUSE LOSS OF CONTROL, RESULTING IN DAMAGE, SERIOUS INJURY AND POSSIBLY DEATH. INSPECT TIRES BEFORE EACH TOW.**

**Table 4-4. Tire Wear**

Wear Pattern	Cause	Action	
	Center Wear	Over Inflation	Adjust Pressure to particular load per tire catalog
	Edge Wear	Under Inflation	Adjust Pressure to particular load per tire catalog
	Side Wear	Loss of camber or overloading	Make sure load doesn't exceed axle rating. Check alignment and align if necessary.
	Toe Wear	Incorrect toe-in	Needs alignment
	Cupping	Out of balance	Check bearing adjustment and balance tires
	Flat Spots	Wheel lockup and tire skidding	Avoid sudden stops when possible and adjust brakes.

**Tire Repair**

The proper repair of a punctured tire requires a plug for the hole and a patch for the area inside the tire that surrounds the puncture hole. Punctures through the tread can be repaired if they are not too large, but punctures to the sidewall must be repaired. Tires must be removed from the rim to be properly inspected before being plugged and patched.

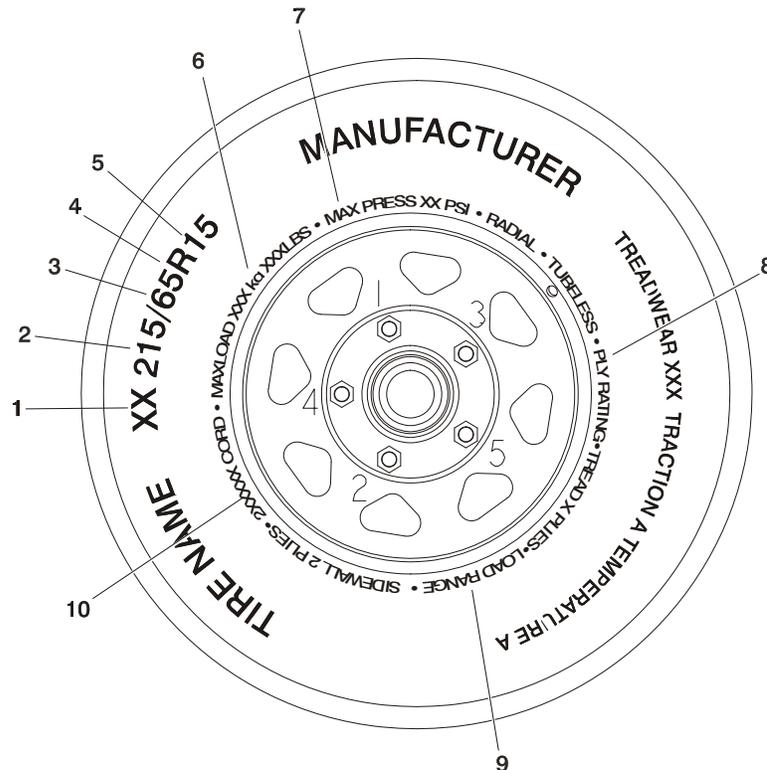
**Tire Replacement**

A replacement tire must be the same size, ply rating and load range as originally installed on the trailer. Please refer to the VIN Label/Tire Information Label for correct tire information.

**Tire Fundamentals**

Tire manufacturers are required to place standardized information on the sidewall of all tires. This information identifies and describes the fundamental characteristics of the tire and also provides a tire identification number for safety standard certification and in case of a recall.

## Information on Trailer Tires



1. **Tire Application** - This letter identifies the tire by application.
  - LT = Light Trucks or Trailers
  - ST = Trailer use only
2. **Tire Width** - This three-digit number gives the width in millimeters of the tire from sidewall edge to sidewall edge. In general, the larger the number, the wider the tire.
3. **Aspect Ratio** - This two-digit number, known as the aspect ratio, gives the tire's ratio of height to width. Numbers of 70 or lower indicate a short sidewall for improved steering response and better overall handling on dry pavement.
4. **Radial** - The "R" stands for radial. Radial ply construction of tires has been the industry standard for the past 20 years.
5. **Wheel Diameter** - This two-digit number is the wheel or rim diameter in inches. If you change your wheel size, you will have to purchase new tires to match the new wheel diameter.
6. **Maximum Load Rating** - This number indicates the maximum load in kilograms and pounds that can be carried by the tire.
7. **Maximum Permissible Inflation Pressure** - This number is the greatest amount of air pressure that shall ever be put in the tire under normal driving conditions.
8. **Ply Rating** - The term "Ply Rating" is used to identify a given tire with its maximum load when used in a specific type of service. It is an index of tire strength and does not necessarily represent the number of cord plies in the tire.
9. **Load Range** - A letter (A,B,C etc.) used to identify a given size tire with its load and inflation limits when used in a specific type of service.
10. **Tire Ply Composition and Materials Used** - The number of plies indicates the number of layers of rubber-coated fabric in the tire. In general, the greater the number of plies, the more weight a tire can support. Tire manufacturers also must indicate the materials in the tire, which include steel, nylon, polyester, and others.

Figure 4-12. Tire Information

## SECTION 4 - SERVICE AND MAINTENANCE

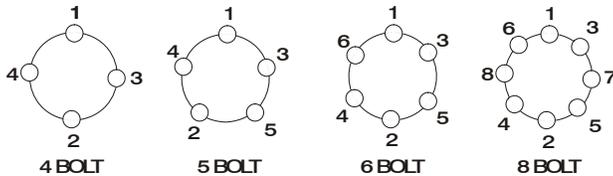
### Lug Nuts

It is extremely important to apply and maintain proper wheel mounting torque on the trailer axle. Torque wrenches are the best method to ensure the proper amount of torque is being applied to a nut.

**NOTE:** *Wheel nuts must be installed and maintained at the proper torque to prevent loose wheels, broken studs, and possible dangerous separation of wheel from the axle. Be sure to use only the nuts matched to the cone angle of the wheel.*

Tighten the lug nuts to the proper torque for the axle size on your trailer, to prevent wheels from coming loose. Use a torque wrench to tighten the fasteners. If you do not have a torque wrench, tighten the fasteners with a lug wrench as much as you can, then have a service garage or dealer tighten the lug nuts to the proper torque. Over-tightening will result in breaking the studs or permanently deforming the mounting stud holes in the wheels. Be sure to use only the nuts matched to the cone angle of the wheel. The proper procedure for attaching wheels is as follows:

1. Start all nuts by hand to prevent cross threading.
2. Tighten nuts in the following sequence:



3. The tightening of the nuts should be done in stages. Following the recommended sequence, tighten nuts per wheel torque chart.

**Table 4-5. Wheel Torque Chart**

TORQUE SEQUENCE (ft lbs)			
WHEEL SIZE	1st Stage	2nd Stage	3rd Stage
12 inch	20-25	35-40	50-75
13 inch	20-25	35-40	50-75
14.5 Inch	20-25	35-40	90-120
15 Inch	20-25	50-60	90-120
16 Inch	20-25	50-60	90-120

4. Wheel nuts should be torqued before first road use and after each wheel removal. Check and torque after the first 10 miles, 25 miles, and again at 50 miles. Check periodically thereafter. Lug nuts may loosen right after a wheel is mounted to a hub. When driving on a remounted wheel, check to see if the lug nuts are tight after the first 10,

25 and 50 miles of driving and visually inspect before each tow thereafter.

### **⚠ WARNING**

**CHECK LUG NUTS FOR TIGHTNESS ON A NEW TRAILER OR WHEN WHEEL(S) HAVE BEEN REMOUNTED AFTER THE FIRST 10, 25 AND 50 MILES OF DRIVING.**

**METAL CREEP BETWEEN THE WHEEL RIM AND LUG NUTS WILL RESULT IN A WHEEL COMING OFF, LEADING TO DEATH OR SERIOUS INJURY.**

### Wheels

If the trailer has been struck, or impacted, on or near the wheels, or if the trailer has struck a curb, inspect for damage (i.e. being out of round); and replace any damaged wheel. Inspect the wheels for damage every year, even if no obvious impact has occurred.

### 4.13 TIRE SAFETY INFORMATION

**NOTE:** This portion of the User's Manual contains tire safety information as required by 49 CFR 575.6.

#### Steps For Determining Correct Load Limit – Trailer

Determining the load limits of a trailer includes more than understanding the load limits of the tires alone. On all trailers there is a Federal certification/VIN label that is located on the forward half of the left (road) side of the unit. This certification/VIN label will indicate the trailer's Gross Vehicle Weight Rating (GVWR). This is the most weight the fully loaded trailer can weigh. It will also provide the Gross Axle Weight Rating (GAWR). This is the most a particular axle can weigh. If there are multiple axles, the GAWR of each axle will be provided.

If your trailer has a GVWR of 10,000 pounds or less, there is a vehicle placard located in the same location as the certification label described above. This placard provides tire and loading information. In addition, this placard will show a statement regarding maximum cargo capacity. Cargo can be added to the trailer, up to the maximum weight specified on the placard. The combined weight of the cargo is provided as a single number. In any case, remember: the total weight of a fully loaded trailer can not exceed the stated GVWR.

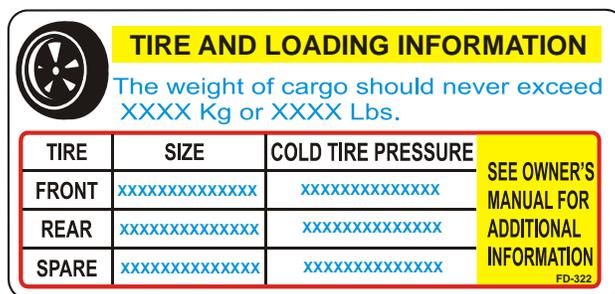
For trailers with living quarters installed, the weight of water and propane also need to be considered. The weight of fully filled propane containers is considered part of the weight of the trailer before it is loaded with cargo, and is not considered part of the disposable cargo load. Water however, is a disposable cargo weight and is treated as such. If there is a fresh water storage tank of 100 gallons, this tank when filled would weigh about 800 pounds. If more cargo is being transported, water can be off-loaded to keep the total amount of cargo added to the vehicle within the limits of the GVWR so as not to overload the vehicle. Understanding this flexibility will allow you, the owner, to make choices that fit your travel needs.

When loading your cargo, be sure it is distributed evenly to prevent overloading front to back and side to side. Heavy items should be placed low and as close to the axle positions as reasonable. Too many items on one side may overload a tire. The best way to know the actual weight of the vehicle is to weigh it at a public scale. Talk to your dealer to discuss the weighing methods needed to capture the various weights related to the trailer. This would include the weight empty or unloaded, weights per axle, wheel, hitch or king-pin, and total weight.

Excessive loads and/or under-inflation cause tire overloading and, as a result, abnormal tire flexing occurs. This situation can generate an excessive amount of heat within the tire. Excessive heat may lead to tire failure. It is the air

pressure that enables a tire to support the load, so proper inflation is critical. The proper air pressure may be found on the certification/VIN label and/or on the Tire Placard. This value should never exceed the maximum cold inflation pressure stamped on the tire.

#### Trailers 10,000 Pounds GVWR Or Less



Tire and Loading Information Placard

1. Locate the statement, "The weight of cargo should never exceed XXX kg or XXX lbs.," on your vehicle's placard. See Tire and Loading Information Placard above.
2. This figure equals the available amount of cargo and luggage load capacity.
3. Determine the combined weight of luggage and cargo being loaded on the vehicle. That weight may not safely exceed the available cargo and luggage load capacity.

The trailer's placard refers to the Tire Information Placard attached adjacent to or near the trailer's VIN (Certification) label at the left front of the trailer.

#### Trailers Over 10,000 Pounds GVWR

**NOTE:** These Trailers Are Not Required To Have A Tire Information Placard On The Vehicle

1. Determine the empty weight of your trailer by weighing the trailer using a public scale or other means. This step does not have to be repeated.
2. Locate the GVWR (Gross Vehicle Weight Rating) of the trailer on your trailer's VIN (Certification) label.
3. Subtract the empty weight of your trailer from the GVWR stated on the VIN label. That weight is the maximum available cargo capacity of the trailer and may not be safely exceeded.

### Steps For Determining Correct Load Limit – Tow Vehicle

1. Locate the statement, “The combined weight of occupants and cargo should never exceed XXX lbs.,” on your vehicle’s placard.
2. Determine the combined weight of the driver and passengers who will be riding in your vehicle.
3. Subtract the combined weight of the driver and passengers from XXX kilograms or XXX pounds.
4. The resulting figure equals the available amount of cargo and luggage capacity. For example, if the “XXX” amount equals 1400 lbs. and there will be five 150 lb. passengers in your vehicle, the amount of available cargo and luggage capacity is 650 lbs. (1400-750 (5 x 150) = 650 lbs.).
5. Determine the combined weight of luggage and cargo being loaded on the vehicle. That weight may not safely exceed the available cargo and luggage capacity calculated in Step # 4.
6. If your vehicle will be towing a trailer, load from your trailer will be transferred to your vehicle. Consult the tow vehicle’s manual to determine how this weight transfer reduces the available cargo and luggage capacity of your vehicle.

### Tire Safety - Everything Rides On It

The National Traffic Safety Administration (NHTSA) has published a brochure (DOT HS 809 361) that discusses all aspects of Tire Safety, as required by CFR 575.6. This brochure is reproduced in part below. It can be obtained and downloaded from NHTSA, free of charge, from the following web site:

[http://www.nhtsa.dot.gov/cars/rules/TireSafety/ridesonit/tires\\_index.html](http://www.nhtsa.dot.gov/cars/rules/TireSafety/ridesonit/tires_index.html)

Studies of tire safety show that maintaining proper tire pressure, observing tire and vehicle load limits (not carrying more weight in your vehicle than your tires or vehicle can safely handle), avoiding road hazards, and inspecting tires for cuts, slashes, and other irregularities are the most important things you can do to avoid tire failure, such as tread separation or blowout and flat tires. These actions, along with other care and maintenance activities, can also:

- Improve vehicle handling
- Help protect you and others from avoidable breakdowns and accidents
- Improve fuel economy
- Increase the life of your tires.

This booklet presents a comprehensive overview of tire safety, including information on the following topics:

- Basic tire maintenance
- Uniform Tire Quality Grading System
- Fundamental characteristics of tires

Tire safety tips.

Use this information to make tire safety a regular part of your vehicle maintenance routine. Recognize that the time you spend is minimal compared with the inconvenience and safety consequences of a flat tire or other tire failure.

## **Safety First – Basic Tire Maintenance**

Properly maintained tires improve the steering, stopping, traction, and load-carrying capability of your vehicle. Under-inflated tires and overloaded vehicles are a major cause of tire failure. Therefore, as mentioned above, to avoid flat tires and other types of tire failure, you should maintain proper tire pressure, observe tire and vehicle load limits, avoid road hazards, and regularly inspect your tires.

### **Finding Your Vehicle's Recommended Tire Pressure And Load Limits**

Tire information placards and vehicle certification labels contain information on tires and load limits. These labels indicate the vehicle manufacturer's information including:

Recommended tire size  
Recommended tire inflation pressure  
Vehicle capacity weight (VCW—the maximum occupant and cargo weight a vehicle is designed to carry)  
Front and rear gross axle weight ratings (GAWR—the maximum weight the axle systems are designed to carry).

Both placards and certification labels are permanently attached to the trailer near the left front.

### **Understanding Tire Pressure And Load Limits**

Tire inflation pressure is the level of air in the tire that provides it with load-carrying capacity and affects the overall performance of the vehicle. The tire inflation pressure is a number that indicates the amount of air pressure—measured in pounds per square inch (psi)—a tire requires to be properly inflated. (You will also find this number on the vehicle information placard expressed in kilopascals (kpa), which is the metric measure used internationally.)

Manufacturers of passenger vehicles and light trucks determine this number based on the vehicle's design load limit, that is, the greatest amount of weight a vehicle can safely carry and the vehicle's tire size. The proper tire pressure for your vehicle is referred to as the "recommended cold inflation pressure." (As you will read below, it is difficult to obtain the recommended tire pressure if your tires are not cold.)

Because tires are designed to be used on more than one type of vehicle, tire manufacturers list the "maximum permissible inflation pressure" on the tire sidewall. This number is the greatest amount of air pressure that should ever be put in the tire under normal driving conditions.

### **Checking Tire Pressure**

It is important to check your vehicle's tire pressure at least once a month for the following reasons:

Most tires may naturally lose air over time. Tires can lose air suddenly if you drive over a pothole or other object or if you strike the curb when parking. With radial tires, it is usually not possible to determine under-inflation by visual inspection.

For convenience, purchase a tire pressure gauge to keep in your vehicle. Gauges can be purchased at tire dealerships, auto supply stores, and other retail outlets.

The recommended tire inflation pressure that vehicle manufacturers provide reflects the proper psi when a tire is cold. The term cold does not relate to the outside temperature. Rather, a cold tire is one that has not been driven on for at least three hours. When you drive, your tires get warmer, causing the air pressure within them to increase. Therefore, to get an accurate tire pressure reading, you must measure tire pressure when the tires are cold or compensate for the extra pressure in warm tires.

### **Steps For Maintaining Proper Tire Pressure**

- **Step 1:** Locate the recommended tire pressure on the vehicle's tire information placard, certification label, or in the owner's manual.
- **Step 2:** Record the tire pressure of all tires.
- **Step 3:** If the tire pressure is too high in any of the tires, slowly release air by gently pressing on the tire valve stem with the edge of your tire gauge until you get to the correct pressure.
- **Step 4:** If the tire pressure is too low, note the difference between the measured tire pressure and the correct tire pressure. These "missing" pounds of pressure are what you will need to add.
- **Step 5:** At a service station, add the missing pounds of air pressure to each tire that is under-inflated.
- **Step 6:** Check all the tires to make sure they have the same air pressure (except in cases in which the front and rear tires are supposed to have different amounts of pressure).

If you have been driving your vehicle and think that a tire is under-inflated, fill it to the recommended cold inflation pressure indicated on your vehicle's tire information placard or certification label. While your tire may still be slightly under-inflated due to the extra pounds of pressure in the warm tire, it is safer to drive with air pressure that is slightly lower than the vehicle manufacturer's recommended cold inflation pressure than to drive with a significantly under-inflated tire. Since this is a temporary fix, don't forget to recheck and adjust the tire's pressure when you can obtain a cold reading.

### **Tire Size**

To maintain tire safety, purchase new tires that are the same size as the vehicle's original tires or another size recommended by the manufacturer. Look at the tire information placard, the owner's manual, or the sidewall of the tire you are replacing to find this information. If you have any doubt about the correct size to choose, consult with the tire dealer.

**Tire Tread**

The tire tread provides the gripping action and traction that prevent your vehicle from slipping or sliding, especially when the road is wet or icy. In general, tires are not safe and should be replaced when the tread is worn down to 1/16 of an inch. Tires have built-in treadwear indicators that let you know when it is time to replace your tires. These indicators are raised sections spaced intermittently in the bottom of the tread grooves. When they appear "even" with the outside of the tread, it is time to replace your tires. Another method for checking tread depth is to place a penny in the tread with Lincoln's head upside down and facing you. If you can see the top of Lincoln's head, you are ready for new tires.

**Tire Balance And Wheel Alignment**

To avoid vibration or shaking of the vehicle when a tire rotates, the tire must be properly balanced. This balance is achieved by positioning weights on the wheel to counterbalance heavy spots on the wheel-and-tire assembly. A wheel alignment adjusts the angles of the wheels so that they are positioned correctly relative to the vehicle's frame. This adjustment maximizes the life of your tires. These adjustments require special equipment and should be performed by a qualified technician.

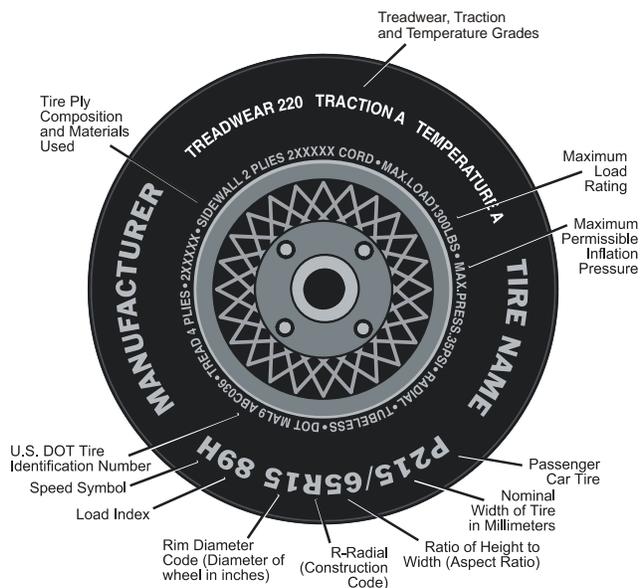
**Tire Repair**

The proper repair of a punctured tire requires a plug for the hole and a patch for the area inside the tire that surrounds the puncture hole. Punctures through the tread can be repaired if they are not too large, but punctures to the sidewall should not be repaired. Tires must be removed from the rim to be properly inspected before being plugged and patched.

**Tire Fundamentals**

Federal law requires tire manufacturers to place standardized information on the sidewall of all tires. This information identifies and describes the fundamental characteristics of the tire and also provides a tire identification number for safety standard certification and in case of a recall.

**Information On Passenger Tires**



**P**

The "P" indicates the tire is for passenger vehicles.

**Next Number**

This three-digit number gives the width in millimeters of the tire from sidewall edge to sidewall edge. In general, the larger the number, the wider the tire.

**Next Number**

This two-digit number, known as the aspect ratio, gives the tire's ratio of height to width. Numbers of 70 or lower indicate a short sidewall for improved steering response and better overall handling on dry pavement.

**R**

The "R" stands for radial. Radial ply construction of tires has been the industry standard for the past 20 years.

**Next Number**

This two-digit number is the wheel or rim diameter in inches. If you change your wheel size, you will have to purchase new tires to match the new wheel diameter.

**Next Number**

This two- or three-digit number is the tire's load index. It is a measurement of how much weight each tire can support. You may find this information in your owner's manual. If not, contact a local tire dealer. Note: You may not find this information on all tires because it is not required by law.

**M+S**

The "M+S" or "M/S" indicates that the tire has some mud and snow capability. Most radial tires have these markings; hence, they have some mud and snow capability.

**Speed Rating**

The speed rating denotes the speed at which a tire is designed to be driven for extended periods of time. The ratings range from 99 miles per hour (mph) to 186 mph. These ratings are listed below. Note: You may not find this information on all tires because it is not required by law.

LETTER RATING	SPEED RATING
Q	99 mph
R	106 mph
S	112 mph
T	118 mph
U	124 mph
H	130 mph
V	149 mph
W	168 mph *
Y	188 mph *

\* For tires with a maximum speed capability over 149 mph, tire manufacturers **sometimes use** the letters ZR. For those with a maximum speed capability over 186 mph, tire manufacturers **always use** the letters ZR.

**U.S. DOT Tire Identification Number**

This begins with the letters "DOT" and indicates that the tire meets all federal standards. The next two numbers or letters are the plant code where it was manufactured, and the last four numbers represent the week and year the tire was built. For example, the numbers 3197 means the 31st week of 1997. The other numbers are marketing codes used at the manufacturer's discretion. This information is used to contact consumers if a tire defect requires a recall.

**Tire Ply Composition and Materials Used**

The number of plies indicates the number of layers of rubber-coated fabric in the tire. In general, the greater the number of plies, the more weight a tire can support. Tire manufacturers also must indicate the materials in the tire, which include steel, nylon, polyester, and others.

**Maximum Load Rating**

This number indicates the maximum load in kilograms and pounds that can be carried by the tire.

**Maximum Permissible Inflation Pressure**

This number is the greatest amount of air pressure that should ever be put in the tire under normal driving

**UTQGS Information**

**Treadwear Number**

This number indicates the tire's wear rate. The higher the treadwear number is, the longer it should take for the tread to wear down. For example, a tire graded 400 should last twice as long as a tire graded 200.

**Traction Letter**

This letter indicates a tire's ability to stop on wet pave-

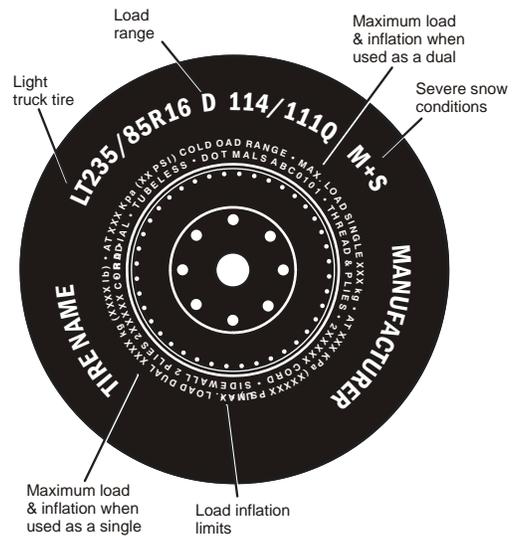
ment. A higher graded tire should allow you to stop your car on wet roads in a shorter distance than a tire with a lower grade. Traction is graded from highest to lowest as "AA", "A", "B", and "C".

**Temperature Letter**

This letter indicates a tire's resistance to heat. The temperature grade is for a tire that is inflated properly and not overloaded. Excessive speed, under-inflation or excessive loading, either separately or in combination, can cause heat build-up and possible tire failure. From highest to lowest, a tire's resistance to heat is graded as "A", "B", or "C".

**Additional Information on Light Truck and Trailer Tires**

Please refer to the following diagram.



Tires for light trucks have other markings besides those found on the sidewalls of passenger tires.

**LT**

The "LT" indicates the tire is for light trucks or trailers.

**ST**

An "ST" is an indication the tire is for trailer use only.

**Max. Load Dual kg (lbs) at kPa (psi) Cold**

This information indicates the maximum load and tire pressure when the tire is used as a dual, that is, when four tires are put on each rear axle (a total of six or more tires on the vehicle).

**Max. Load Single kg (lbs) at kPa (psi) Cold**

This information indicates the maximum load and tire pressure when the tire is used as a single.

**Load Range**

This information identifies the tire's load-carrying capabilities and its inflation limits.

### Tire Safety Tips

#### Preventing Tire Damage

- Slow down if you have to go over a pothole or other object in the road.
- Do not run over curbs or other foreign objects in the roadway, and try not to strike the curb when parking.

#### Tire Safety Checklist

- Check tire pressure regularly (at least once a month), including the spare.
- Inspect tires for uneven wear patterns on the tread, cracks, foreign objects, or other signs of wear or trauma.
- Remove bits of glass and foreign objects wedged in the tread.
- Make sure your tire valves have valve caps.
- Check tire pressure before going on a long trip. Do not overload your vehicle.
- Check the Tire Information and Loading Placard or User's Manual for the maximum recommended load for the vehicle.

### Glossary Of Tire Terminology

#### Accessory Weight

The combined weight (in excess of those standard items which may be replaced) of automatic transmission, power steering, power brakes, power windows, power seats, radio and heater, to the extent that these items are available as factory-installed equipment (whether installed or not).

#### Bead

The part of the tire that is made of steel wires, wrapped or reinforced by ply cords and that is shaped to fit the rim.

#### Bead Separation

This is the breakdown of the bond between components in the bead.

#### Bias Ply Tire

A pneumatic tire in which the ply cords that extend to the beads are laid at alternate angles substantially less than 90 degrees to the center-line of the tread.

#### Carcass

The tire structure, except tread and sidewall rubber which, when inflated, bears the load.

#### Chunking

The breaking away of pieces of the tread or sidewall.

#### Cold Inflation Pressure

The pressure in the tire before you drive.

#### Cord

The strands forming the plies in the tire.

#### Cord Separation

The parting of cords from adjacent rubber compounds.

#### Cracking

Any parting within the tread, sidewall, or inner liner of the tire extending to cord material.

#### CT

A pneumatic tire with an inverted flange tire and rim system in which the rim is designed with rim flanges pointed radially inward and the tire is designed to fit on the underside of the rim in a manner that encloses the rim flanges inside the air cavity of the tire.

#### Curb Weight

The weight of a motor vehicle with standard equipment including the maximum capacity of fuel, oil, and coolant, and, if so equipped, air conditioning and additional weight optional engine.

#### Extra Load Tire

A tire designed to operate at higher loads and at higher inflation pressures than the corresponding standard tire.

#### Groove

The space between two adjacent tread ribs.

**Gross Axle Weight Rating**

The maximum weight that any axle can support, as published on the Certification / VIN label on the front left side of the trailer. Actual weight determined by weighing each axle on a public scale, with the trailer attached to the towing vehicle.

**Gross Vehicle Weight Rating**

The maximum weight of the fully loaded trailer, as published on the Certification / VIN label. Actual weight determined by weighing trailer on a public scale, without being attached to the towing vehicle.

**Hitch Weight**

The downward force exerted on the hitch ball by the trailer coupler.

**Inner-Liner**

The layer(s) forming the inside surface of a tubeless tire that contains the inflating medium within the tire.

**Inner-Liner Separation**

The parting of the inner-liner from cord material in the carcass.

**Intended Outboard Sidewall**

The sidewall that contains a white-wall, bears white lettering or bears manufacturer, brand, and/or model name molding that is higher or deeper than the same molding on the other sidewall of the tire or the outward facing sidewall of an asymmetrical tire that has a particular side that must always face outward when mounted on a vehicle.

**Light Truck (LT) Tire**

A tire designated by its manufacturer as primarily intended for use on lightweight trucks or multipurpose passenger vehicles.

**Load Rating**

The maximum load that a tire is rated to carry for a given inflation pressure.

**Maximum Load Rating**

The load rating for a tire at the maximum permissible inflation pressure for that tire.

**Maximum Permissible Inflation Pressure**

The maximum cold inflation pressure to which a tire may be inflated.

**Maximum Loaded Vehicle Weight**

The sum of curb weight, accessory weight, vehicle capacity weight, and production options weight.

**Measuring Rim**

The rim on which a tire is fitted for physical dimension requirements.

**Pin Weight**

The downward force applied to the 5th wheel or gooseneck ball, by the trailer kingpin or gooseneck coupler.

**Non-Pneumatic Rim**

A mechanical device which, when a non-pneumatic tire assembly incorporates a wheel, supports the tire, and attaches, either integrally or separably, to the wheel center member and upon which the tire is attached.

**Non-Pneumatic Spare Tire Assembly**

A non-pneumatic tire assembly intended for temporary use in place of one of the pneumatic tires and rims that are fitted to a passenger car in compliance with the requirements of this standard.

**Non-Pneumatic Tire**

A mechanical device which transmits, either directly or through a wheel or wheel center member, the vertical load and tractive forces from the roadway to the vehicle, generates the tractive forces that provide the directional control of the vehicle and does not rely on the containment of any gas or fluid for providing those functions.

**Non-Pneumatic Tire Assembly**

A non-pneumatic tire, alone or in combination with a wheel or wheel center member, which can be mounted on a vehicle.

**Normal Occupant Weight**

This means 68 kilograms (150 lbs.) times the number of occupants specified in the second column of Table I of 49 CFR 571.110.

**Occupant Distribution**

The distribution of occupants in a vehicle as specified in the third column of Table I of 49 CFR 571.110.

**Open Splice**

Any parting at any junction of tread, sidewall, or innerliner that extends to cord material.

**Outer Diameter**

The overall diameter of an inflated new tire.

**Overall Width**

The linear distance between the exteriors of the sidewalls of an inflated tire, including elevations due to labeling, decorations, or protective bands or ribs.

**Ply**

A layer of rubber-coated parallel cords.

**Ply Separation**

A parting of rubber compound between adjacent plies.

**Pneumatic Tire**

A mechanical device made of rubber, chemicals, fabric and steel or other materials, that, when mounted on an automotive wheel, provides the traction and contains the gas or fluid that sustains the load.

**Production Options Weight**

The combined weight of those installed regular production options weighing over 2.3 kilograms (5 lbs.) in excess of those standard items which they replace, not previously considered in curb weight or accessory weight, including

## SECTION 4 - SERVICE AND MAINTENANCE

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heavy duty brakes, ride levelers, roof rack, heavy duty battery, and special trim.

### **Radial Ply Tire**

A pneumatic tire in which the ply cords that extend to the beads are laid at substantially 90 degrees to the centerline of the tread.

### **Recommended Inflation Pressure**

This is the inflation pressure provided by the vehicle manufacturer on the Tire Information label and on the Certification / VIN tag.

### **Reinforced Tire**

A tire designed to operate at higher loads and at higher inflation pressures than the corresponding standard tire.

### **Rim**

A metal support for a tire or a tire and tube assembly upon which the tire beads are seated.

### **Rim Diameter**

This means the nominal diameter of the bead seat.

### **Rim Size Designation**

This means the rim diameter and width.

### **Rim Type Designation**

This means the industry of manufacturer's designation for a rim by style or code.

### **Rim Width**

This means the nominal distance between rim flanges.

### **Section Width**

The linear distance between the exteriors of the sidewalls of an inflated tire, excluding elevations due to labeling, decoration, or protective bands.

### **Sidewall**

That portion of a tire between the tread and bead.

### **Sidewall Separation**

The parting of the rubber compound from the cord material in the sidewall.

### **Special Trailer (ST) Tire**

The "ST" is an indication the tire is for trailer use only.

### **Test Rim**

The rim on which a tire is fitted for testing, and may be any rim listed as appropriate for use with that tire.

### **Tread**

That portion of a tire that comes into contact with the road.

### **Tread Rib**

A tread section running circumferentially around a tire.

### **Tread Separation**

Pulling away of the tread from the tire carcass.

### **Treadwear Indicators (TWI)**

The projections within the principal grooves designed to give a visual indication of the degrees of wear of the tread.

### **Vehicle Capacity Weight**

The rated cargo and luggage load plus 68 kilograms (150 lbs.) times the vehicle's designated seating capacity.

### **Vehicle Maximum Load On The Tire**

The load on an individual tire that is determined by distributing to each axle its share of the maximum loaded vehicle weight and dividing by two.

### **Vehicle Normal Load On The Tire**

The load on an individual tire that is determined by distributing to each axle its share of the curb weight, accessory weight, and normal occupant weight (distributed in accordance with Table I of CRF 49 571.110) and dividing by 2.

### **Weather Side**

The surface area of the rim not covered by the inflated tire.

### **Wheel Center Member**

In the case of a non-pneumatic tire assembly incorporating a wheel, a mechanical device which attaches, either integrally or separably, to the non-pneumatic rim and provides the connection between the non-pneumatic rim and the vehicle; or, in the case of a non-pneumatic tire assembly not incorporating a wheel, a mechanical device which attaches, either integrally or separably, to the non-pneumatic tire and provides the connection between tire and the vehicle.

### **Wheel-Holding Fixture**

The fixture used to hold the wheel and tire assembly securely during testing.

**CALIFORNIAN PROPOSITION 65  
BATTERY WARNING**

Battery posts, terminals  
and related accessories  
contain lead and lead  
compounds, chemicals  
known to the State of  
California to cause cancer  
and reproductive harm.

Batteries also contain other  
harmful chemicals known  
to the State of California.

**WASH HANDS  
AFTER HANDLING!**



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