Maintenance Schedule for all Triad Trailers All tasks in highlighted cells must be performed as indicated intervals

Item	Function Required	Weekly	3 Months or 3000 Miles	6 Months or 6000 Miles	12 Months or 12000 Miles
Brakes	Test that they are operational.	At Every Use			
Brake Adjustment	Adjust to proper operating clearance.		•		
Brake Magnets	Inspect for wear or current draw.				
Brake Linings	Inspect for wear or contamination.				•
Brake Controller	Check for correct amperage & modulation.				_
Brake Cylinders	Check for leaks, sticking.				•
Brake Lines	Inspect for cracks, leaks, kinks.				
Trailer Brake Wiring	Inspect wiring for bare spots, fray, etc.				
Breakaway System	Check battery charge and switch operation.	At Every Use			
Hub/Drum	Inspect for abnormal wear or scoring.				•
Wheel Bearings & Cups	Inspect for corrosion or wear. Clean & repack.				•
Seals	Inspect for leakage. Replace if removed.			_	•
Springs	Inspect for wear, loss of arch.				•
Suspension Parts	Inspect for bending, loose fasteners, wear.			•	
Hangers	Inspect Welds.				•
Wheel Nuts and Bolts	Tighten to specified torque values.		•		
Wheels	Inspect for cracks, dents or distortion.			•	
Tire Inflation Pressure	Inflate tires to mfg's specifications.	•			
Tire Condition	Inspect for cuts, wear, bulging, etc.		•		

Triad Trailers LLC

DANGER!

The hull support poppet pads are the threaded rod extensions that insert into your Triad Trailer. These hull support poppet pads make contact with the hull of the boat and stabilize the boat while it is sitting on the trailer.

If you plan on transporting the trailer when the boat is not on the trailer, the hull support poppet pads described above must be removed.

Reason being, there is a chance a pad can be ejected from the trailer when the boat is not present. Failure to remove the hull support poppet pads can result in the loss of a poppet pad and may cause personal injury. If you have any questions or would like to speak with a representative of Triad Trailers LLC. please call: 919-782-6007

Triad Trailers LLC

If you believe that your vehicle has a defect which 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 Triad Trailers LLC.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that 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 Triad Trailers LLC.

To contact NHTSA, you may either call the Vehicle Safety Hotline tollfree at 1-888-327-4236 (TTY: 1-800-424-9153) or go to http://www.safercar.gov or write to: Administrator, NHTSA 400 7th Street SW Washington, DC 20590

You can also obtain other information about motor vehicle safety from http://www.safecar.gov

Triad Trailers LLC

Triad Trailers LLC Limited Warranty

TRIAD TRAILERS, LLC. warrants to the owner of this trailer that Triad will provide replacement of any part of this trailer that is defective in materials or workmanship under the following conditions.

- For a period of two (2) years from the date of purchase, Triad Trailers LLC will provide replacement of any part found to be defective in materials or workmanship. This does not include any service or labor charges required to remove that part which is defective nor any transportation or towing charges.
- 2. IN THE EVENT OF A WARRANTY CLAIM, THE OWNER MUST CONTACT IN ADVANCE, TRIAD TRAILERS LLC AT THE ADDRESS PRINTED BELOW. REPLACMENT PARTS WILL BE FURNISHED F.O.B. OUR FACTORY AND WARRANTY CLAIM SERVICE MUST BE PERFORMED AS APPROVED BY TRIAD TRAILERS LLC. Warranty parts will normally be shipped within 48 hours; in any case, warranty parts will be shipped within 45 days.
- 3. The trailer owner is responsible for all handling, transportation and shipping charges on warranty replacement parts from our factory. All defective parts become the property of TRIAD and the trailer owner bears the cost of shipping or postage.
- 4. The warranty period on replacement parts is the unused portion of the original warranty period.
- Damage or failure of the trailer or its components which results from misuse (operation beyond the trailer or its components rated capacity), misapplication or alterations not made by TRIAD, are the owners responsibility completely.
- TRIAD assumes no responsibility for loss of use of the trailer, loss of time, inconvenience, expense for telephone, travel, lodging, or loss of revenue or loss of personal property.

Reviewed and Approved April 2009



Important Safety Notice

Appropriate service methods and proper repair procedures are essential for the safe, reliable operation of all running gear as well as the personal safety of the individual doing the work. This manual provides general directions for performing service and repair work with tested, effective techniques. Following these guidelines will help assure reliability.

There are numerous variations in procedures, techniques, tools, parts for servicing axles, as well as in the skill of the individual doing the work. This manual cannot possibly anticipate all such variations and provide advice or cautions as to each. Anyone who departs from the instructions provided in this manual must first establish that they neither compromise their personal safety nor the vehicle integrity by their choice of methods, tools, or parts.

Refer to your vehicle manufacturer's owners manual for additional procedures, techniques, and warnings prior to performing any maintenance or repairs.

ACAUTION

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

Getting Started - Setup and Adjustment

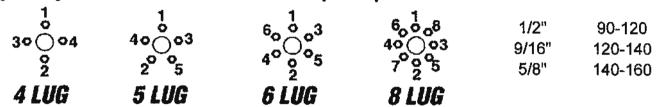
For proper performance, all new axles should have the following checked at the specified intervals:

- Wheel Nut Torque: at 10, 25, and 50 miles
- Brake Adjustment: at 200 and 3,000 miles
- Tire pressure: to manufacturer's requirements
- Brake synchronization: set brake controller per controller manufacturer's directions

Introduction

Typical Lug Nut Torque Specifications

Lug Size Ft/Lbs Torque Tighten Lug Nuts in a Criss-Cross Pattern for Best Equal Torque Distribution.



IMPORTANT NOTICE: As with all types of wheels retorque lug nuts after the first 25 miles & at 100 mile intervals until lug torque is maintained.

How to Measure Bolt Patterns

4-Lug

Middle of two holes directly across from one another.

5-Lug



Back of hole to the center of the second bolt hole.

6-Lug



Same as 4-lug



Same as 4-lug

WHEEL CARE TIPS:

 NORMAL CLEANING – Use mild soap and water. Use a soft towel and hand dry. Only use wheel cleaners recommended for your wheel's surface. Always read and follow instructions. (i.e. NEVER use a chrome cleaner on a polished surface. Most chrome cleaners have an acidic base that will ruin the polished surface).
 MANUFACTURERS WILL NOT WARRANTY WHEELS THAT ARE CHEMICALLY BURNT!! THEY'RE YOURS

To ensure proper care and maintenance of your custom wheels, and to maintain original luster, we recommend quality wheel care products be used on a routine basis.

- 2. CLEAN ONE WHEEL AT A TIME. It is less work. It prevents the cleaner from drying on the wheel, adds to cleaning power, and makes rinsing easier. And, if the wrong product is used, the problem is limited to just one wheel.
- 3. HOT WHEELS. Do not clean wheels when still hot or warm from driving. Elevated temperatures dramatically increase the reactivity of chemical cleaners altering their cleaning characteristics. If wheels are warm let them cool off an hour or two before cleaning. Do not try to cool them down with water spray as you will run the risk of warping your disc brake rotors.
- 4. NEGLECTED WHEELS. Some wheels have been neglected so long they have extreme heavy build-ups of road grime, brake dust, and corrosion. Not even the best cleaners can handle these jobs. Surface agitation with a brush is necessary. For back plate or lug nut areas, a paintbrush or parts cleaning brush (not metal bristle) works well. For surfaces facing to the side (sides of spokes and rims on deep-dish wheels) a bottle cleaning type brush is a good choice. Beware of bristles that are too hard or too stiff. They can scratch the wheels.
- 5. AUTOMATIC CAR WASHES. Tire cleaning equipment at older, automated car washes can be damaging. They often use carbide tipped brushes for cleaning tires. This equipment was designed for older, high profile tires. If you have low profile tires, you may find these brushes can damage the rims instead of cleaning the tires. Also, many tire cleaners are highly alkaline (caustic) and can burn and stain aluminum-particularly polished or anodized surfaces.
- 6. CUSTOM WHEEL STORAGE. Exhaust fumes contain acids that attack many wheel finishes. Cars with side pipes (side exhaust) thus require more frequent cleaning. Wheels stored in a garage should also be covered to prevent exhaust fume corrosion.
- 7. WINTERIZING CHROME AND ALUMINUM WHEELS. If you live in a cold climate or one with high humidity near an ocean, make sure you are familiar with the corrosive effects of salt on chrome and aluminum.

Installation Instructions and Service Manual

For Serial Numbers 16020 and above

Model 66 Actuator* for Trailer Brakes

6600 lbs Capacity

Part #47210/86167 - Drum Brake Ready

Part #47211/86165 - Disc Brake Ready

*US Patent No. 6.375,211



The Model 66 works by the "surge" or "push" of the trailer toward the tow vehicle. This automatically synchronizes the trailer brakes with the tow vehicle axle brakes. When the trailer pushes against the tow vehicle, the actuator telescopes together and applies the force to the master cylinder, supplying hydraulic pressure to the brakes. The built in dampening shock absorber retards the telescoping shock against the hitch ball by depending on the brake fluid in the master cylinder. Low levels of brake fluid will signal the tow vehicle operator to add brake fluid via hitch ball knocking.

Be sure to comply with regulations for brakes in your state. Brake laws sometimes are minimum standards and you may wish to add additional brakes to your trailer.

Head your tow vehicles owner's manual on towing capacity and other towing recommendations before installing brakes or this actuator. The Model 66 Actuator is completely assembled and ready to bolt into place (Tongue sizes: 3"x3", 3"x4" & 3"x5").

- Bolt the actuator to the tongue-using grade 5 bolts 1/2 inch in diameter, 4 inches long. Lightweight tongues, less than 11 gauge, require spacer tubes inside the tongue for reinforcement. Attachment strength should equal or exceed than 1-1/2 times trailer G.V.W.R.
- 2. Hydraulic brake lines should be installed on the trailer as described in the installation manual supplied with the brakes. Note: Some disc brakes require the use of flexible brake lines at the connection POINT on the brake caliper. Follow brake manufacturer instructions.
- 3. Tie Down's actuators feature a shock dampener that uses brake fluid from the master cylinder. The dampener must be primed before bleeding or using trailer. To prime the dampener, fill the master cylinder with DOT 3 brake Fluid. Push the coupler into the housing and slowly pull out 3 times, then refill master cylinder. Failure to do this step will cause actuator problems that could lead to brake failure.
- 4. Use only DOT-3 heavy-duty hydraulic fluid in the Model 66 actuator. Use a pressure type brake bleeder to bleed brakes. (This type of brake bleeder is available at your local automotive jobber.) Follow manufacturer's directions. Or, manually bleed the brakes using a

heavy-duty flat blade screwdriver inserted in the hole provided on top of the actuator near the front. Insert the screwdriver and use a pumping action to activate the master cylinder in order to bleed the brakes. See page 8 for more details.

To bleed master cylinder and brakes, install bleeder hose on first wheel cylinder to be bled; if tandem axle trailer, bleed closest axle first, and the closest brake on that axle first. Use a loose end of hose from the bleeder valve submerged in a glass container of brake fluid to observe bubbling (hose must be submerged into clean brake fluid to keep air from traveling back into the brake cylinder). Loosen the bleeder screw located in the wheel cylinder one turn, the system is now open to the atmosphere. The bleeding operation

instruction #15359



for that brake is complete when bubbling stops. Be sure to tighten bleeder screw securely.

Each wheel cylinder must be bleed until all air is out of the lines. Replenish the brake fluid during the bleeding process so the level does not fall below half full level in the master cylinder reservoir. When bleeding and testing is completed, make sure master cylinder is filled to 3/8" below the top of the reservoir and filler cap is securely in place.

- b. When using drum or disc brakes on tandem axle trailers, both axles must be installed with brakes, Failure to install brakes on both axles will result in loss of braking performance, overheating of brakes & wheel hub, and significantly reduce brake pad life.
- 6. Road test trailer a short distance to activate the actuator several times. This will fill the reservoir of the master cylinders shock dampening system. Check fluid level again. Remember, low brake fluid levels will result in hitch ball knocking.
- 7. When testing is completed, make sure master cylinder is filled to 3/8* below the top of the reservoir and filler cap is securely in place. Road test again to make sure brakes work properly.

RATED CAPACITY: Maximum Actuator Capacity: 6600 lbs. Gross Load, 660 lbs. Maximum Tongue Load

The actual in-service rating is limited to that of the ball and hitch being used or the trailer manufacturer's G.V.W.R. shown on the certification label, whichever is lower (Note: GVWR is the Gross Vehicle Weight Rating which includes the trailer and the load weight as a Total Gross Weight).

HITCHING TRAILER

- 1. The vehicle, towing hitch and ball must have a rating equal to or greater than trailer GVWR.
- 2. Model 66 will accept 2' trailer hitch balls only. Trailer balls larger than 2.00" or out of round will not fit the coupler or may result in coupler failure. Balls smaller than 1.970" can cause shock loading and sudden disconnection. Make certain ball latch is in correct position to retain the hitch ball. Push latch back until safety latch engages plate below latch. Insert safety pin into forward hole as a safety lock for the hitch ball coupler prior to towing. Do not tow trailer if coupler is damaged.
- 3. Connect safety cables or chains using crossed pattern under tongue, or follow trailer manufacturer's directions.
 - Connect actuator breakaway cable S-hook to the tow vehicle only. Do not connect S-hook to the safety cables or chains.

The breakaway system is designed to only operate after the trailer detaches from the tow vehicle and the safety chains have failed. The breakaway is not a parking brake. Do not use as such.

- 6. If the breakaway is accidentally applied while un-hitching, insert a flat bladed screwdriver into the spring clip slotted hole under the actuator and pry down to release.
- 7. Any control devices that restrict operation of the actuator cannot be used. This includes certain sway control devices. The actuator must be free to telescope in response to braking requirements.
- 8. Equalizing or weight distributing hitches may be used, allow six to eight inches free chain length.

 DANGER: Tongue weight beyond rating limits will interfere with performance of actuator, and braking system, and the tow vehicle.
- 9. The actuator is designed for use with Free-Backing trailer brakes. To block braking action, (in order to back up) with other types of brakes, use an electric solenoid. For trailer movement when brakes are not required, place the safety pin in the upper hole on the side of the actuator to block movement of the actuator. DANGER: Failure to remove pin will also prevent forward braking. Pin must be in the lower, forward hole as a safety lock for the hitch ball coupler tatch when towing at all times.

MAINTENANCE

- 1. Always check the brake fluid reservoir before using trailer. Make sure it is at least half full. If not, re-fill to 3/8 inch below the top of the reservoir with DOT 3 brake fluid. Check for leaks and repair as required. Never reuse brake fluid.
- 2. To extend coupler and ball life, coat both with a thin coating of grease. This will also eliminate squeaking. Wipe clean and renew film each time trailer is used.
- 3. Examine the actuator for bent parts or wear each time the trailer is used. Replace parts as necessary.
- 4. There are no user adjustments on the actuator.
- 5. Actuator travel (shown by coupler roller path) over one inch indicates a need to adjust the brakes or add fluid to the reservoir or a need to bleed the brakes and check connections for leaks. Adjust per instructions found in brake installation manual. In general, back-off adjusters on drum brakes from locked position, as required. Adjust Free-Backing brakes by rotating in forward direction only. Failure to adjust may result in loss of braking. Disc brakes do not require adjustment, check for pad wear.

While towing, if the actuator appears to be knocking against the hitch ball while starting or stopping, check brake fluid reservoir and fill if below 3/8" full from the top. Dampening shock absorber requires sufficient brake fluid in order to retard movement against hitch ball during towing.

WARNING - DISC BRAKE USE

When installing disc brakes to use with part #47200/86167 actuator, a check valve inside the actuator must be disabled. See disc rake installation instructions. If you do not properly disable the check valve, pressure will remain in the system causing the disc arakes to drag, overheat and fail. Part #47201/86165 actuator, has a disabled check valve for use on disc brakes - DO NOT use part #47201/86165 on drum brakes.

WARNING

Actuator and brakes should always be flushed with fresh water after using trailer in corrosive conditions. This includes salt water, fertilizers and other corrosive materials. Before storing trailer remove brakes and clean thoroughly. It is also wise to repack the bearings at the same time. Failure to properly and adequately maintain the actuator could cause serious damage, injury or death,

WARNING

The breakaway system is not designed to operate if the trailer does not separate completely from the tow vehicle, or if the tongue goes under the rear of the tow vehicle.

WARNING

In the event that the breakaway system is used, check all system components (cable, S-hooks, etc.) for proper working order. Replace any damaged parts with genuine Tie Down parts only.

WARNING

When re-setting the break a way system keep hands and fingers clear as you re-set the mechanism, hydraulic pressure held in the system may cause the assembly to snap back suddenly.

WARNING

AVOID sharp turns, which can cause the actuator to bind or jackknife against the tow vehicle or cause a bend in the tongue. Either can damage the actuator causing brake failure. AVOID towing trailer across large bumps or dips that may over stress the connection between the trailer and tow vehicle, as this could result in damage to the actuator.

VARNING

DO NOT REUSE BRAKE FLUID. Always use fresh DOT 3 fluid from a fresh container. Failure to maintain proper levels of fluid in the reservoir will cause brake failure.

WARNING

Failure to install the hitch pin before towing can result in accidental opening of the coupler hitch tatch which can lead to the trailer coming off of the hitch ball causing serious damage, injury or death. If pin will not fit into the front lower hole, the coupler is not attached properly. Re-set coupler on hitch ball.

WARNING

A minimum of 5% tongue weight and a maximum 10% tongue weight of the trailer GVWR must be located on the hitch ball. The Trailer tongue should be parallel to the ground. Too much weight can cause premature brake actuation and loss of control of the towing vehicle. To little tongue weight can cause the trailer to fishtail, resulting in loss of control of the tow vehicle and trailer (total trailer weight GVWR includes weight of the trailer plus load).

WARNING

A loose fit between the coupler and hitch ball can cause the actuator and hitch ball to separate, causing serious damage, injury or death. Check coupler every time prior to towing and at each stop on long trips. Always make certain that coupler latch safety pin is securely installed into coupler latch.

WARNING

Brake laws sometimes are minimum standards and you may wish to add additional brakes to your trailer. Read your tow vehicles owner's manual on towing capacity and other towing recommendations before installing brakes or this actuator,

WARNING

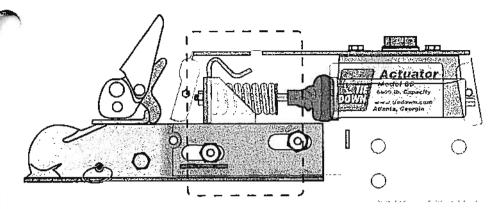
VEVER ALLOW THE COUPLER LATCH SAFETY PIN TO REMAIN IN THE REVERSE LOCKOUT POSITION HOLE.

FIER REVERSE MANEUVERING, ALWAYS INSERT COUPLER LATCH SAFETY PIN BACK INTO COUPLER

LATCH. FAILURE TO REMOVE SAFETY PIN FROM REVERSE LOCK OUT POSITION HOLE WILL PREVENT

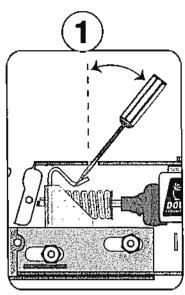
FORWARD MOVEMENT BREAKING WHICH CAN RESULT IN SERIOUS PROPERTY DAMAGE, INJURY OR DEATH.

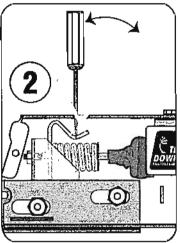
Instructions for Bleeding Tie Downs Model 66, 70 & 80 Actuators

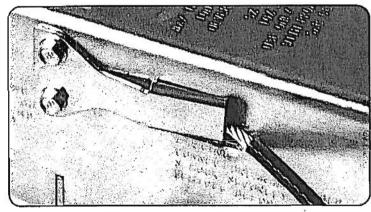


Tie Down's actuators feature a shock dampener that uses brake fluid from the master cylinder. The dampener must be primed before bleeding or using trailer. To prime the dampener, fill the master cylinder with DOT 3 brake Fluid. Push the coupler into the housing and slowly pull out 3 times, then refill master cylinder.

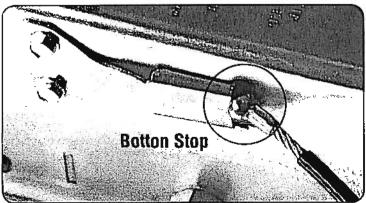
To pump master cylinder, insert a flat tip screwdriver into the round hole near the front of the actuator cover. (picture 1) Screwdriver tip will fit into the slot provided in the emergency brake bracket as shown. Push the screwdriver forward and back to pump the master cylinder. (picture 2).







Normal Operation



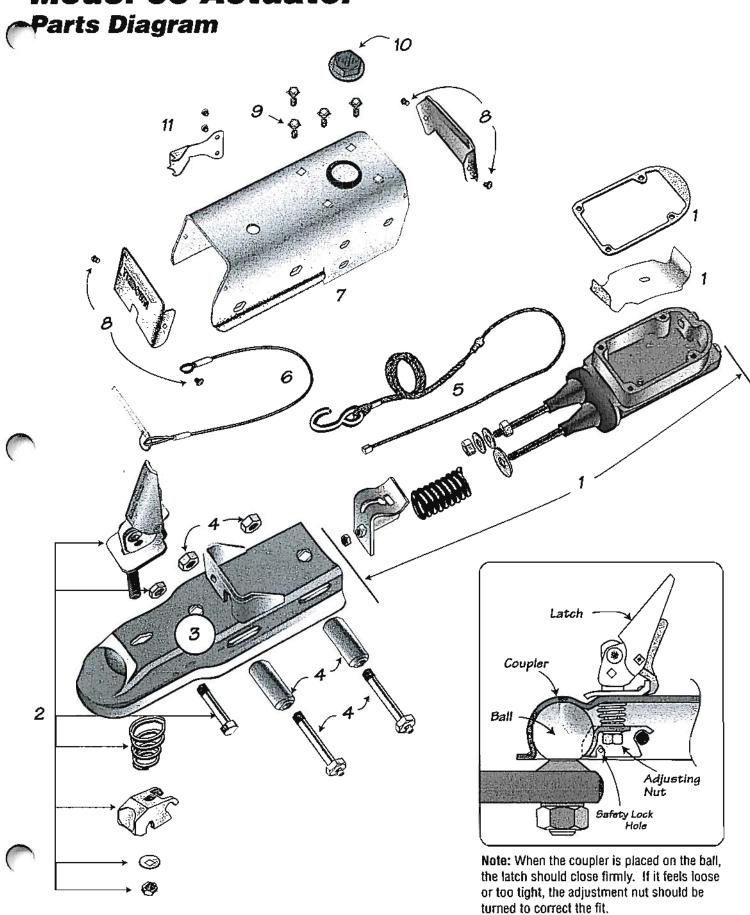
Emergency Stop Position

WARNING: If button stop cable is showing **DO NOT TOW TRAILER**

Release emergency stop cable by prying spring out with a flat blade screw driver.



Model 66 Actuator

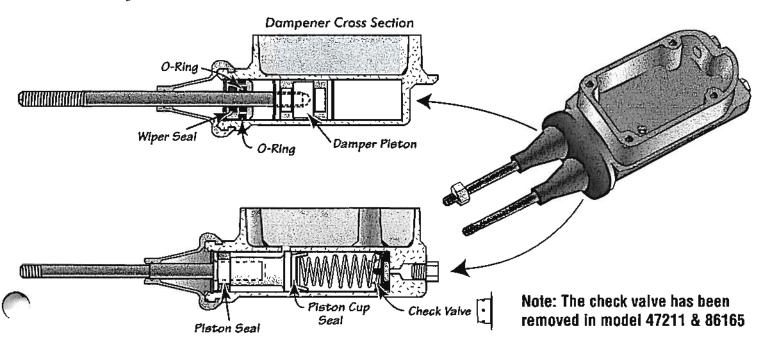


Model 66 Actuator Parts List

Item	Part #	Description	Quantity
1	47260 (Disc*)	Moster Cylinder Assembly - Includes all nuts, baffle,	•
	47268 (Drum)	all seals, O-rings, gaskets & seal	1
		*The check valve has been removed in models 47211 & 86165	
2	47261	Latch Kit Assembly	1
	47262	Latch Kit Assembly (for serial #'s 16020 and below)	1
3	48801-1A	Coupler Housing	1
4	47263	Röller Kit includes:	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		1/2" X 4 Grade 5 Super Lube Bolts (2)	
		1/2" Hex Center Lock Nut (2)	
		Rollers (2)	
5	50305	Cable Assembly (Breakaway) with button stop	1
	50302	Cable Assembly (for serial #'s 16020 and below)	
6	50301	- Safety Pin Cable	1
7	48802	Actuator Assembly Housing	ī
8	47264	Actuator Covers Kit (front & back covers & 4 Screws)	
9	47265	Screw Kit, includes:	1
		1/4" - 20NC X3/4" Hex Bolt (4)	
210°	48804	Master Cylinder Cap with internal bladder	1.1
11	48845	Safety Spring w/screws (for serial #'s 16020 and above)	1

100505,261

Master Cylinder Cross Section



TIE DOWN ENGINEERING LIMITED WARRANTY

Limited Warranty TIE DOWN ENGINEERING Inc ("TIE DOWN") warrants its products to be free from defects in material and workmanship for one year from date of delivery to the original purchaser when properly instaßed, used and maintained by the purchaser.

his warranty does not apply to damage or loss caused by any or all of the following circumstances or conditions:

- · Damage caused during installation.
- Parts, accessories, materials or components used with or replacing any TIE DOWN braking system not obtained from or approved in writing by TIE DOWN.
- Misapplication, misuse and failure to follow the directions or observe cautions and warnings on installation, operation, application, inspection or maintenance specified in any TIE DOWN quotation, acknowledgement, sales literature, specification sheet or installation instruction and service manual ("applicable literature").
- Use of product in any other application other than those described in TIE DOWN's product information materials.

If any TIE DOWN products are found upon TIE DOWN's examination to have been defective when supplied, TIE DOWN will either: credit the purchaer's account for the purchase price of the TIE DOWN product; replace the TIE DOWN product; or repair the product. TIE DOWN has sole discretion in choosing which option to provide. For this LIMITED WARRANTY to apply, TIE DOWN must receive notice of the alleged defect within 30 days of either the discovery of the alleged defect or the expiration of the warranty period, whichever is earlier. Any claim not made within this period shall conclusively be deemed waived.

If requested by TIE DOWN, purchaser shall return the alleged defective product to TIE DOWN for examination at purchasers expense. TIE DOWN will not pay for expenses incurred in returning a product to TIE DOWN without TIE DOWN's prior written authority. TIE DOWN shall not be liable for any other expenses purchaser incurs to remedy any defect. Purchasers waive subrogation on all claims under any insurance.

Limitation of Liability: It is expressly agreed that the liability of Tie DOWN is limited and Tie DOWN does not function as an insurer. The REMEDIES SET FORTH IN THIS WARRANTY SHALL CONSTITUTE THE EXCLUSIVE REMEDIES AVAILABLE TO THE PURCHASER OR USER AND ARE IN LIEU OF ALL OTHER REMEDIES, EXPRESS OR IMPLIED. THE LIABILITY OF TIE DOWN, WHETHER IN CONTRACT, IN TORT, UNDER ANY WARRANTY OR OTHERWISE, SHALL NOT EXCEED THE PURCHASE PRICE OF THE PARTICULAR PRODUCT MANUFACTURED, SOLD OR SUPPLIED BY TIE DOWN.

To Obtain Technical Assistance: To enable TIE DOWN to respond to a request for assistance or evaluation of customer or user operating difficulty, please provide at a minimum the following information by calling 1-800-241-1806:

- Model number, serial number and all other data on the specific component which appears to be involved in the difficulty.
- The date and from whom you purchased your TIE DOWN product.
- State your difficulty, being sure to mention at least the following: Application, Nature of load involved, and Weight of the load.

Field Service If field service at the request of the purchaser is rendered and the difficulty is found not to be with TIE DOWN's product, the purchaser shall pay the time and expense (at the prevailing rate at the time of service) of seller's field representative(s). Charges for service, labor and other expenses that have been incurred by the purchaser, its customer or agent without prior written authorization of TIE DOWN will not be accepted.

TIE DOWN EXTENDS NO WARRANTY, EXPRESS OR IMPLIED, ON PRODUCTS NOT MANUFACTURED BY TIE DOWN OR TO TIE DOWN'S DESIGN SPECIFICATION, INCLUDING BUT NOT LIMITED TO SUCH ITEMS AS NON-TIE DOWN TIRES, BRAKES, ACTUATORS, BEARINGS, HOSE AND TUBING. PURCHASER'S RECOURSE SHALL BE LIMITED TO ANY WARRANTY OF THE RESPECTIVE MANUFACTURERS.

THIS WARRANTY EXCLUDES ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY PURPOSE.

THIS WARRANTY DOES NOT COVER NOR EXTEND TO INCIDENTAL OR CONSEQUENTIAL DAMAGE. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

No representative has authority to make any representation, promise or agreement except as stated in this Limited Warranty.

TIE DOWN reserves the right to make design and other changes upon its products without any obligation to install the same on any previously sold or delivered products.

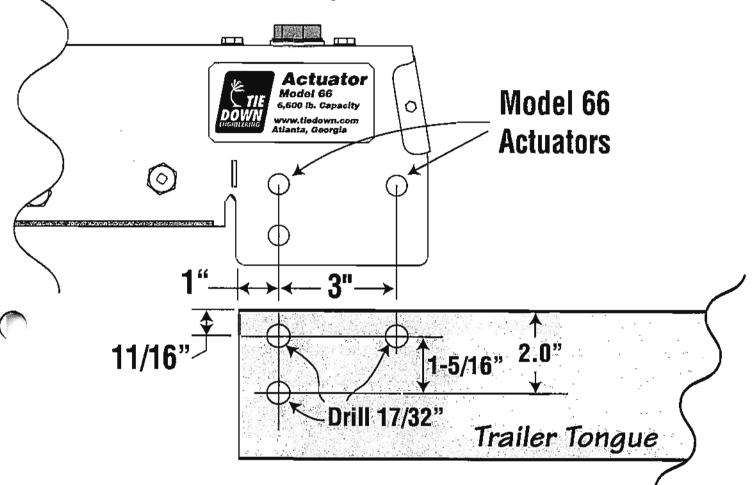
DUE TO THE WIDE VARIATION IN USES TO WHICH TIE DOWN PRODUCTS (WHEELS, HUBS, BRAKES, ETC.) ARE SUBJECTED BY USERS, WE ARE UNABLE TO SPECIFY CARRYING CAPACITIES OR SPEEDS FOR A PARTICULAR APPLICATION. THEREFORE, THE MANUFACTURER MUST TEST HIS EQUIPMENT UNDER THE MOST SEVERE CONDITIONS TO DETERMINE THAT TIE DOWN PRODUCTS ARE SUITABLE.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THOSE DESCRIBED ABOVE. EFFECTIVE JANUARY 2001 THIS WARRANTY SUPERSEDES ALL PRIOR WARRANTIES, WRITTEN OR IMPLIED.



Technical Service Bulletin

Drill Hole Pattern for The Model 66, 70 & 80
Standard Housing Actuators
August 1, 2005



- Model 66 actuators requires 2 1/2" x 4" Grade 5 bolts w/lock washers (not included)
- Model 70 & 80 actuators requires 3 1/2" x 4" Grade 5 bolts w/lock washers (not included)
- All TIE DOWN ENGINEERING standard actuators have the same hole pattern for consistent tongue hole placement

TIE DOWN ENGINEERING 282905,0809

TECHNICAL SERVICE BULLETIN

US Department of Transportation Mandates

- Brake Actuators & Break Away Cables -

The US Department of Transportation mandates that all Trailers that travel on US highways that are equipped with brakes, shall have a method of activating the trailer brakes if the trailer should become detached from the tow vehicle. The length of the break away cable or chain is set by the brake coupler manufacturer and must be used at full length. It is the responsibility of the tow vehicle operator to set the attachment point of the break away cable or chain on the tow vehicle, so that the trailer brakes do not activate during normal towing. This may include lengthening the cable. If the tow vehicle operator connects the break away cable or chain too tightly for the tow vehicle, and trailer to be able to negotiate the turn radius that may be encountered during normal highway travel, or backing up, the trailer hydraulic surge brake coupler may have the break away mechanism activated. If this occurs, partial or full hydraulic activation of the trailer brakes will occur. Many times this parasitic trailer braking load is not noticed by the tow vehicle operator. The results of this can be catastrophic, and will result in damage to the trailer brakes, and possibly the loss of tire and hub as bearings are destroyed due to overheating. This is not the fault of the brake coupler manufacturer, nor the trailer manufacturer. The tow vehicle operator is completely responsible for monitoring the condition of trailer components as it may relate to the safe highway transit of his vehicle. BE SURE to provide adequate length to the break away cable or chain components, as attached to the tow vehicle, so that accidental activation of the break away mechanism does not occur.

NEVER SHORTEN THE BREAK AWAY CABLE!

NOTICE: Damage to brakes or other trailer components that are affected by this condition is NOT A WARRANTY CONDITION!!





Drum Brake Owners Manual



TIE DOWN ENGINEERING, Inc. 5901 Wheaton Drive, Atlanta, GA 30336 www.tiedown.com

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Instruction Sheet #08095

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Hydraulic Drum Brakes

If your trailer is equipped with hydraulic drum brakes, the brakes are activated by the surge actuator/coupler located on the front end of the trailer tongue. When the tow vehicle stops, the trailer pushes into the tow vehicle, compressing the master cylinder that is located inside the actuator. The master cylinder forces brake fluid to the drum brakes. Inside each drum brake is a wheel cylinder that expands with the surge of brake fluid, pushing the brake shoes against the inside of the brake drum.

Drum brakes must be periodically adjusted. Recommended service intervals are after the first 500 miles and then every 1000 miles. Drum brakes also must be flushed when submerged in salt water or towed in road conditions where salting of the roads is done to improve driving conditions.

Many marine and trailer accessory companies offer drum brake flush kits. If you use your trailer in these conditions, it is recommended that you install a flush kit, if your trailer did not come equipped with the flush kit.

To Adjust Your Drum Brakes (Applies to Both Electric & Hydraulic Brakes):

Position the trailer on a stable and LEVEL working surface. If possible, leave the tow vehicle hooked to the trailer in order to limit movement as well as keeping the front end supported and level. If the trailer is not supported on the tow vehicle, it MUST be blocked directly to the ground at the frame/tongue junction.

UNDER NO CIRCUMSTANCES IS THE TRAILER TO BE SUPPORTED BY THE TONGUE JACK WHILE BEING RAISED AT THE WHEELS! Block the wheels opposite the side being worked on both front and rear so that the trailer cannot roll.

NOTE: Using an adequate capacity floor or saissors jack, raise the side of the trailer.

NOTE: Check under frames for brake lines BEFORE lifting. DO NOT position jack in areas that may damage brake lines, etc.

NOTE: A. Tandem and tri-axle trailers should be jacked on the frame between the wheels, or directly under the axle within 8" of the backside of the tire. B. Single axle trailers can be lifted on the frame just behind the axle or directly under the axle within 8" of the backside of the tire (if lifting at the axle).

CAUTION- always support the trailer with adequate capacity support stands. DO NOT rely on the jack as the only means of support.



Initial Adjustment of Brakes (Applies to Both Electric & Hydraulic Brakes) Adjust the brakes before removing the jacks.

- A. With trailer wheel off the ground and tire mounted. Remove the rubber access hole plugs from the rear of the brake backing plate.
- 8. Inserting a brake spoon or flat screwdriver through the access hole(s), tighten the star adjuster while rotating the wheel in the forward direction.
 NOTE: Always spin wheel in the forward direction as if the trailer was traveling forward on the road. Tighten the star adjuster until the wheel reaches a point where the brake shoes start to engage.
- C. Loosen the star adjustor one click at a time while turning the wheel in a forward rotation. Continue adjusting one click at a time until the wheel rotates with little effort.
- D. Replace the rubber access hole plugs.
- E. Repeat this procedure for all braking wheels.

Bleeding the Brake System - Hydraulic Drum Bakes Only

Use only DOT-3 heavy duty fluid. Do not re-use brake fluid. Do not use any other type of brake fluid other than DOT-3. If pressure bleeding equipment is available, follow the manufacturer's instruction in bleeding the system.

Use only DOT-3 heavy-duty hydraulic fluid in the actuator. If using a pressure type brake bleeder to bleed brakes. (This type of brake bleeder is available at your local automotive jobber.) Follow manufacturer's directions. If manually bleeding the brakes using a heavy-duty flat blade screwdriver inserted in the hole provided on top of the actuator near the front. Insert the screwdriver and use a pumping action to activate the master cylinder in order to bleed the brakes.

To bleed master cylinder and brakes, install bleeder hose on first wheel cylinder to be bled; if tandem axle trailer, bleed furthermost axle first, and the furthermost brake on that axle first. Use a loose end of hose from the bleeder valve submerged in a glass container of brake fluid to observe bubbling (hose must be submerged into dean brake fluid to keep air from traveling back into the brake cylinder).

Loosen the bleeder screw located in the wheel cylinder one turn, the system is now open to the atmosphere. The bleeding operation for that brake is complete when bubbling stops. Be sure to tighten bleeder screw securely.

Each wheel cylinder must be bleed until all air is out of the lines. Replenish the brake fluid during the bleeding process so the level does not fall below half full level in the master cylinder reservoir. When bleeding and testing is completed, make sure master cylinder is filled the reservoir and filler cap is securely in place.

When using drum or disc brakes on tandem axle trailers, both axles must be installed with brakes, Failure to install brakes on both axles will result in loss of braking performance, overheating of brakes & wheel hub, and significantly reduce brake pad life.

WARNING

Brakes should always be flushed with fresh water after using trailer in corrosive conditions. This includes salt water, fertilizers and other corrosive materials. Before storing trailer remove brakes and clean thoroughly. It is also wise to repack the bearings at the same time.

WARNING

DO NOT REUSE BRAKE FLUID. Always use fresh DOT 3 fluid from a fresh container. Failure to maintain proper levels of fluid will cause brake failure.

Electric Drum Brake Information

Electric brakes are activated by a brake controller located in the tow vehicle. This is generally an accessory that must be purchased separately. Please research before buying. Some controllers work better with different brand tow vehicles. **Electric drum brakes are not recommended for marine applications**

Electric brakes are individually adjusted in the same way the hydraulic drum brakes are adjusted that is covered in this manual. The electric drum brakes work by an electrical current going to the brakes and activating a magnet. The magnet is then attracted to the inside wall of the drum hub. This drags the magnet and pushes the brake shoes out against the drum hub. The brake controller is generally adjustable to regulate the amount of current given to the magnets/drum brakes. This adjustment controls the amount of braking force applied.

Wires are connected to the brakes by one of two methods:

1. Plug in wires 2. Twist wires with a wire cap cover. There is not a specified positive/negative connection at the brakes



Hydraulic Drum Brake Trouble Shooting

Symptoms

Possible Cause

Noise or brake chatter.

Improper brake adjustment. Brake fluid or grease on lining.

Improperly adjusted or worn wheel bearing.

Drum out of round.

Dirt on drum or lining surface.

Dust in rivet holes. Lining glazed or worn. Scored drum, Loose backing plate.

Weak or broken return springs.

Only one brake is activating.

Improper brake adjustment. (see brake adjustment)

Brake line is restricted.

Improperly adjusted or worn wheel bearing.

Drum out of round. Loose backing plate. Faulty wheel cylinder.

Weak or broken shoe return spring.

Glazed or worn lining.

Loose lining.

Air in hydraulic system. Dirty brake fluid.

All brakes drag.

Faulty actuator.

Mechanical resistance at actuator or shoes.

Brake lines restricted. Dirty brake fluid.

Faulty back up solenoid (if used).

Brakes do not apply.

Leaks or insufficient brake fluid.

Air in hydraulic system. Improper brake adjustment.

Faulty actuator. Lining glazed or worn. Brake fluid or grease on lining.

Dirty brake floid.

Leaking wheel cylinder.

Check and replace wheel cylinder and bleed brakes.

Seized wheel cylinder piston.

Check and replace wheel cylinder and bleed brakes.

Electric Drum Brake Trouble Shooting

Symptoms

Possible Cause

Noise or brake chatter.

Improper brake adjustment. Oil or grease on lining.

Improperly adjusted or worn wheel bearing.

Drum out of round.

Dirt on drum or magnet surface.

Dust in rivet holes. Lining glazed or worn.

Scored drum. Loose backing plate.

Weak or broken return springs.

Only one brake is activating.

Improper brake adjustment. (see brake adjustment)

Improperly adjusted or worn wheel bearing.

Drom out of round.
Laose backing plate.

Weak or broken shoe return spring.

Glazed or worn lining.

Loose lining.

Bad connection at tow vehicle. Broken or disconnected wire.

Bad magnet.

Dirt or grease inside hub surface.

All brakes drag.

Faulty or improperly adjusted brake controller.

Improperly wired brake connection.

Mechanical resistance at actuator or shoes.

Brakes do not apply.

Faulty brake controller.

Improperly adjusted brake controller.

Brake wires not connected to tow vehicle.

Bad Magnets.

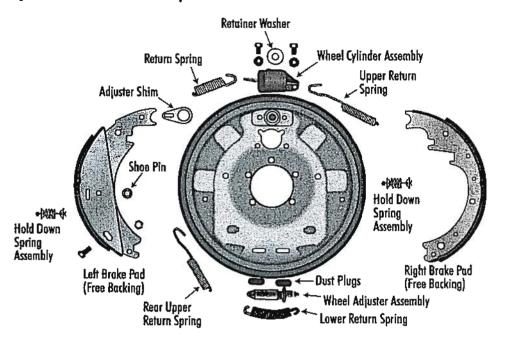
Improper brake adjustment. Lining glazed or worn.

Dirt or grease inside hub surface.

Damaged wiring.



Hydraulic Drum Brake Replacement Parts

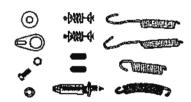




Drum Wheel Cylinder Kit for 10" & 12" Brakes

includes; LH & RH Wheel Cylinder and mounting screws

Part #80994



Drum Replacement Parts Kit

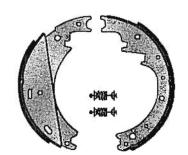
(Freebacking & Uni-Servo) includes all parts shown, excluding pads, back plate and wheel cylinder

10" Parts Kit

Part #81096

12" Parts Kit

Part #81095

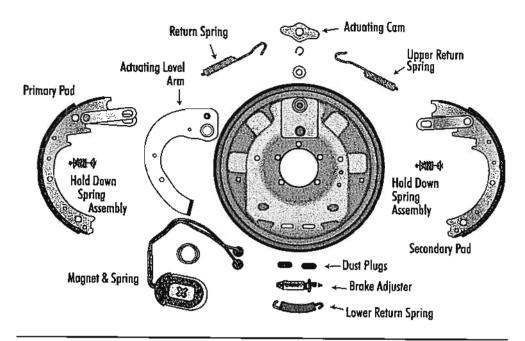


Brake Pad Replacement Kits

Kits include brake pad sets for left and right side brakes

7" Freebacking Shoe (lining) Kit Part #81113
10" Freebacking Shoe (lining) Kit Part #81108
12" Freebacking Shoe (lining) Kit Part #81109
10" Uni-Servo (lining) Kit Part #80995
12" Uni-Servo (lining) Kit Part #80996

Electric Drum Brake Replacement Parts/Kits





Spring/Adjuster Replacement Kit

for 10" & 12" brakes

Part #82075



Magnet, Wiring & Spring Assembly

10" Magnet Assembly

12" Magnet Assembly

Part #82078 Part #82079



Pad Replacement Kits

10" Electric Shoe (lining) Kit 12" Electric Shoe (lining) Kit

Part #82076 Part #82077



DRUM BRAKE INSTALLATION

Position the trailer on a stable and LEVEL working surface. If possible, leave the tow vehicle hooked to the trailer in order to limit movement as well as keeping the front end supported and level. If the trailer is not supported on the tow vehicle, it MUST be blocked directly to the ground at the frame/tongue junction.

UNDER NO CIRCUMSTANCES IS THE TRAILER TO BE SUPPORTED BY THE TONGUE JACK WHILE BEING RAISED AT THE WHEELS! Block the wheels opposite the side being worked on both front and rear so that the trailer cannot roll.

NOTE: Using an adequate capacity floor or scissors jack, raise the side of the trailer. NOTE: Check under frames for brake lines BEFORE lifting. DO NOT position jack in areas that may damage brake lines, etc.

NOTE: A. Tandem and tri-axle trailers should be jacked on the frame between the wheels, or directly under the axle within 8" of the backside of the tire. B. Single axle trailers can be lifted on the frame just behind the axle or directly under the axle within 8" of the backside of the tire (if lifting at the axle).

CAUTION- always support the trailer with adequate capacity support stands. DO NOT rely on the jack as the only means of support.

1. Check Brake Mounting Flange

To mount brakes to an axle, the axle must have brake flange welded to the axle. Tie Down's 10" drum brakes fit standard 4 hole brake flanges and mount with 7/16" grade 5 or better bolts and lock nuts or lock washers. Our 10 drum brakes fit standard 5 hole brake flanges and mount with 3/8" grade 5 or better bolts and lock nuts or lock washers. The brake flange connected to the axle must be square and concentric with the axle spindle. If the brake flange is not properly installed, it will contribute to rapid lining wear and improper brake action. If your axle does not have flanges pre-welded to the axle, see a qualified technician to weld the plates to your axles. Improper welding can weaken the axle causing severe problems.

2. Brakes Installation

Brakes are marked as "RIGHT" and "LEFT". The "LEFT" brake travels on the driver's side of the trailer. Place the brake against brake flange with the hydraulic wheel cylinder at the top. Secure with four 7/16" (grade 5) hex head bolts for the 10" brakes or five 3/8" (grade 5) hex head bolts for the 12" brakes. Use lock washers or lock nuts w/flat washers on the back side of the flange. Torque to 30 ft. lbs.

3. Installing Brake Drum

After the brakes have been correctly assembled to the brake flanges, TAKE NOTE which direction the spoon needs to be moved in order to open the star wheel, mount the brake drum to the spindle. If re-using drum and bearings, check for wear or pitting in the bearings and cup surfaces. Check drum for surface ware. Replace any parts that show wear. Pack the inside bearing with suitable wheel bearing grease. Force grease through and around the rollers. Place the bearing in the hub and install the grease seal flush with the end of the hub using an arbor press or soft mallet. The bearing seal should be lubricated before putting it on the brake drum. Remove excess grease.

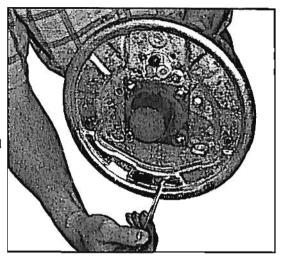


Lubricate and install the outer bearing on spindle. Place thurst washer and new locking tab washer (if aplicable) and castle nut on spindle. Turn the brake drum as you the tighten spindle nut. When a pronounced drag is felt in the bearings, back off the spindle nut one complete slot and install cotter pin or bend tab on locking tooth washer (if aplicable) and dust cap. Caution: Do not over pack hub with grease. Excessive grease may leak into orake drums causing brake failure. Install wheels at this time. Tighten wheel nuts to proper torque as recommended by trailer or wheel manufacturer. Recheck lug torque after first 50 miles. Spin wheel at this time to make sure the wheel rotates freely without wobble or drag.

4. Initial Adjustment of Brakes

Adjust the brakes before removing the jacks.

- A. With trailer wheel off the ground and tire mounted. Remove the rubber access hole plugs from the rear of the brake backing plate.
- B. Inserting a brake spoon or flat screwdriver through the access hole(s), tighten the star adjuster while rotating the wheel in the forward direction. NOTE: Always spin wheel in the forward direction as if the trailer was traveling forward on the road. Tighten the star adjuster until the wheel reaches a point where the brake shoes start to engage.
- C. Loosen the star adjustor one click at a time while turning the wheel in a forward rotation. Continue adjusting one click at a time until the wheel rotates with little effort.
- D. Replace the rubber access hole plugs.
- E. Repeat this procedure for all braking wheels.



5. Connect Hydraulic Lines

The use of double flare steel tubing will assure tight leak proof connections. Anchor all hydraulic lines at two foot intervals to prevent chafing and vibration.

6. Bleeding the Brake System

Use only DOT-3 heavy duty fluid. Do not re-use brake fluid. Do not use any other type of brake fluid other than DOT-3. If pressure bleeding equipment is available, follow the manufacturer's instruction in bleeding the system.

(6a) Use only DOT-3 heavy-duty hydraulic fluid in the actuator. If using a pressure type brake bleeder to bleed brakes. (This type of brake bleeder is available at your local automotive jobber.) Follow manufacturer's directions. If manually bleeding the brakes using a heavy-duty flat blade screwdriver inserted in the hole provided on top of the actuator near the front. Insert the screwdriver and use a pumping action to activate the master cylinder in order to bleed the brakes.

To bleed master cylinder and brakes, install bleeder hose on first wheel cylinder to be bled; if tandem axle trailer, bleed furthermost axle first, and the furthermost brake on that axle first. Use a loose end of hose from the bleeder valve submerged in a glass container of brake fluid to observe bubbling (hose must be submerged into clean brake fluid to keep air from traveling back into the brake cylinder).

Loosen the bleeder screw located in the wheel cylinder one turn, the system is now open to the atmosphere. The bleeding operation for that brake is complete when bubbling stops. Be sure to tighten bleeder screw securely.



Each wheel cylinder must be bleed until all air is out of the lines. Replenish the brake fluid during the bleeding process so the level does not fall below half full level in the master cylinder reservoir. When bleeding and testing is completed, make sure master cylinder is filled the reservoir and filler cap is securely in place.

When using drum or disc brakes on tandem axle trailers, both axles must be installed with brakes, Failure to install brakes on both axles will result in loss of braking performance, overheating of brakes & wheel hub, and significantly reduce brake pad life.

WARNING

Brakes should always be flushed with fresh water after using trailer in corrosive conditions. This includes salt water, fertilizers and other corrosive materials. Before storing trailer remove brakes and clean thoroughly. It is also wise to repack the bearings at the same time.

WARNING

DO NOT REUSE BRAKE FLUID. Always use fresh DOT 3 fluid from a fresh container. Failure to maintain proper levels of fluid will cause brake failure.



Brake Trouble Shooting

Symptoms

Possible Cause

Noise or brake chatter

Improper brake adjustment.

Brake fluid or grease on lining.

Improperly adjusted or worn wheel bearing.

Drum out of round.

Dirt on drum or lining surface.

Dust in rivet holes. Lining glazed or worn.

Scored drum.

Loose backing plate.

Weak or broken return springs.

One brake is activating and the other is not activating.

Improper brake adjustment. (see brake adjustment)

Brake line is restricted.

improperly adjusted or worn wheel bearing.

Drum out of round. Loose backing plate. Faulty wheel cylinder.

Weak or broken shoe return spring.

Glazed or worn lining.

Loose lining.

Air in hydraulic system.

Dirty brake fluid.

All brakes drag.

Faulty actuator.

Mechanical resistance at actuator or shoes.

Brake lines restricted. Dirty brake fluid.

Faulty back up solenoid (if used).

Brakes do not apply.

Leaks or insufficient brake fluid.

Air in hydraulic system. Improper brake adjustment.

Faulty actuator.

Lining glazed or worn.

Brake fluid or grease on lining.

Dirty brake fluid.

Leaking wheel cylinder.

Check and replace wheel cylinder and bleed brakes.

Seized wheel cylinder piston.

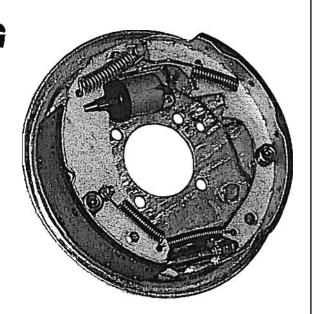
Check and replace wheel cylinder and bleed brakes.



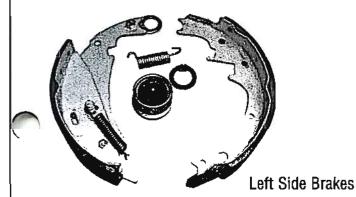
TIE DOWN ENGINEERING Installation Instructions for Replacement Brake Shoes

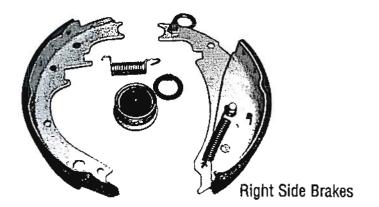
Instruction sheet part # 15368 Revised 06/10/2003

Installation Instructions for Tie Down Brand E-Coat or GalvX Coated Drum Brakes



Replacement Kits Include:





Each kit contains right side and left side primary and secondary brake shoes, replacement primary springs, replacement bearing grease caps and locking tab washer (disregard locking tab washer if your spindle/hub may uses a flat washer and cotter key).

IMPORTANT: Read all the pages of these instructions before starting work on the brakes. Make sure you understand the instructions and have the proper tools, equipment and area to complete the job.

IMPORTANT: Never install new brakes on only one wheel. Uneven braking can occur that will create a dangerous situation.

These instruction pages cover the installation of new brake shoes on **TIE DOWN ENGINEERING** brand brake systems on marine and utility trailers. A qualified and experienced mechanic should perform this work.

Safety Issues: The trailer or boat trailer combination are very heavy. Failure to properly secure or support the weight could result in serious injury or death. Make certain all lifting and supporting equipment has sufficient capacity and is used properly. Follow all manufacturers precautions regarding brake fluid and all petroleum or solvent-based products. Always wear safety glasses. If you are unfamiliar with safe operation of any equipment or you are not certain that you are safe, do not proceed! Left is drivers side, right is passenger side.



Materials required: One brake shoe kit per axle. Each kit contains primary and secondary brake shoes, replacement primary springs, replacement bearing grease caps and spindle nut locking tab washers (disregard locking tab washer if your spindle/hub may uses a flat washer and cotter key). Normal shop supplies include rags, cleaning solvents, marine grade grease and a trash container.

Tools required: A well equipped mechanics tool set plus the following tools for simplified and quicker replacement:

1/2" impact wrench 13/16" impact socket Hydraulic floor jack

Spoon-type brake adjusting tool

Safety goggles 1-1/2" Socket Three jack stands Brake Spring Pliers

Brake hold down spring remover

Spray type brake cleaner Protective dust mask

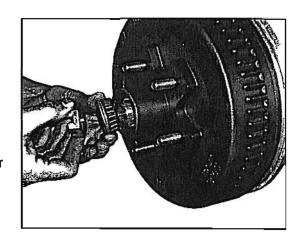
Position the trailer on a stable and LEVEL working surface. If possible, leave the tow vehicle hooked to the trailer in order to limit movement as well as keeping the front end supported and level. If the trailer is not supported on the tow vehicle, it MUST be blocked directly to the ground at the frame/tongue junction.

UNDER NO CIRCUMSTANCES IS THE TRAILER TO BE SUPPORTED BY THE TONGUE JACK WHILE BEING RAISED AT THE WHEELS! Block the wheels opposite the side being worked on both front and rear so that the trailer cannot roll. Do one brake at a time, so the other brake can be used as a guide.

- 1. Using an adequate capacity floor or scissors jack, raise the side of the trailer. NOTE: Check under frames for brake lines BEFORE lifting. DO NOT position jack in areas that may damage brake lines, etc.
- 2. A. Tandem and tri-axle trailers should be jacked on the frame between the wheels, or directly under the axle within 8" of the backside of the tire. B. Single axle trailers can be lifted on the frame just behind the axle or directly under the axle within 8" of the backside of the tire (if lifting at the axle).

CAUTION- always support the trailer with adequate capacity support stands. DO NOT rely on the jack as the only means of support.

- 3. Remove the tire and wheel from the hub to be serviced using a 13/16' socket.
- 4. Remove the hub dust cap by gently tapping it to the side as the brake drum is rotated by hand (walk it off). Using a rag, remove excess grease to expose the castle nut and retainer. Bend open the retainer tab on the locking tab washer, or remove the cotter pin (depending on how the trailer is equipped). Loosen the castle nut and gently remove drum by pulling and rotating. NOTE: The outer (front) tapered roller bearing and thrust washer should be held in place so that they do not fall on the ground and become
- contaminated. It may be necessary on older trailers to remove the rear most rubber plug from the rear of the backing plate and back off the star adjuster wheel. This will be necessary if the hub and drum will not come off easily.



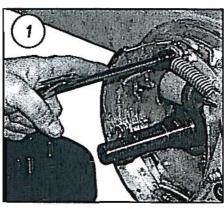
5. Inspect the drum for scoring. Resurface or replace the drum if necessary. Before cleaning and disassembly, it is important to inspect for seal leaks. Look for signs of leakage around the axle seal, wheel seal and wheel cylinder. If leakage is present, replacement or repair of the components is necessary before replacing your brake shoes. After inspecting, clean the backing plate areas and old shoes with a spray brake cleaner. This will remove the pad dust and fibers from the brake assembly. Replace parts as necessary.

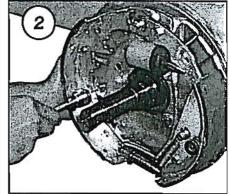
Brake Shoe Replacement (Removal)

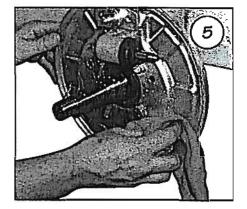
Note: Be certain there is no force pushing on the actuator (ball/hitch) such as the tow vehicle being parked on a slight grade, etc. Even slight pressure in the hydraulic lines could cause the wheel cylinder pistons to be forced out when the shoes are disassembled. If this occurs the brake system must be bled and purged of air.



- Using the spring removal tool, remove the two brake shoe return springs and the flat washer underneath from the anchor pin located at 12 o-clock on the backing plate. Take note that the imary shoe (front) return spring is on top outside, first off, last on).
- 2. Using the proper tool, remove the secondary (rear) shoe-retaining washer, retaining spring and keeper pin.
- 3. Take note of the position of the star adjuster and spanner spring (located at 6 o'clock). Lift the top of
- the secondary shoe off the anchor pin and pull it out slightly and pivot it forward so that the star adjuster and spanner spring can be and set aside.
- 4. Remove the primary (front) shoe retaining spring, keeper pin & washers and carefully pivot the shoe upward (counter clockwise) and away from the wheel cylinder push rod. (see #3).
- 5. Inspect and clean the backing plate and spindle as needed.

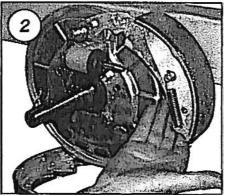


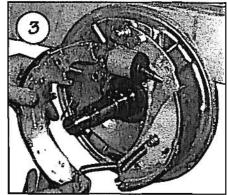




(Reassembly)

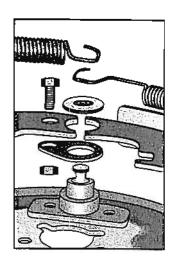
- We suggest you replace the springs (included)
 whenever doing a brake job, as springs lose their
 asion from use and brake heat build up.
 Disassemble, clean and lubricate the brake adjuster.
- 2. Install the primary (forward) shoe assembly (left hand and right hand are different, shoes should be marked RH and LH). Helding the shoe in a horizontal attitude, place the travel limiting link (attached to the primary shoe assembly) around the anchor pin (12 0-clock). Pivot the shoe downward being careful to engage the wheel cylinder push rod. Install the keeper pln, retaining spring and washers.





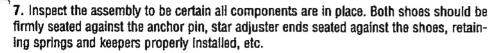
Note: It may be necessary to temporarily remove the free backing return spring.

- 3. Install the spanner spring at the bottom of the primary shoe. Rotate the star adjuster by hand until all the way closed. Make certain it turns freely. Hold the secondary (rear) shoe and install the other end of the spanner spring at its base. Pivot the top of the secondary shoe toward the front of the trailer and install the star adjuster making certain the star wheel is toward the rear of the trailer.
- 4. Pivot the secondary shoe to its normal operating position and seat the upper end against the anchor pin (12 0-clock). Install the keeper pin, retaining spring and washers.
- 5. Place the flat washer over the anchor pin and install the secondary return spring with the installation tool.





6. Install the new primary return spring with the installation tool.

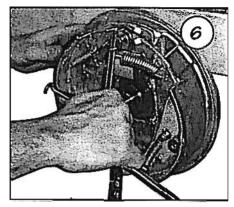


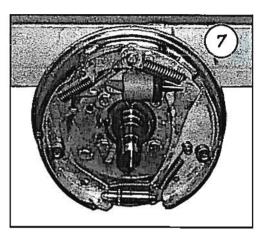
- 8. Remove the rubber dust plug from the rearmost access hole in the backing plate. Insert a brake adjusting spoon or flat screw driver in the access hole and TAKE NOTE which direction the spoon needs to be moved in order to open the star wheel. It is advisable to try the star wheel in both directions so that you are familiar with the adjustments prior to installing the hub and drum.
- 9. Install brake drum on the spindle and be certain the grease seal is seated (push hub in place firmly). Install the outer bearing and thrust washer nut locking tab washer. If applicable, install the castle nut and tighten to approximately 35 ft. lbs. to seat the bearings while rotating the hub in the direction of forward travel. Important: Back off the castle nut and then retighten it to 'HAND TIGHT ONLY'. Bend tab on locking tab washer or install cotter pin if applicable. Bend one of the retainer tabs into the adjacent castle nut openings OR install a new cotter pin (if so equipped).
- A) Install the dust cap by tapping it squarely with a wooden block and hammer.
- B) Install the tire and wheel assembly and tighten the lug nuts to 85-90 foot pounds of torque.

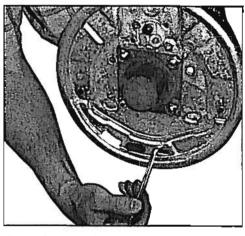
Brake adjustment

- 1. With trailer wheel off the ground and tire mounted. Remove the rubber access hole plugs from the rear of the brake backing plate.
- 2. Using a brake spoon or flat head screwdriver, tighten the star adjuster while rotating the wheel in the forward direction. NOTE: Always spin wheel in the forward direction as if the trailer was traveling forward on the road. Tighten the star adjuster until the wheel reaches a point where the brake shoes start to engage.
- 3. Loosen the star adjustor one click at a time while turning the wheel in a forward rotation. Continue adjusting one click at a time until the wheel rotates with little effort.
- 4. Replace the rubber access hole plugs.
- 5. Repeat this procedure for all braking wheels.

Be certain that the trailer is properly supported with adequate capacity support stands and that the opposite tires are blocked to prevent all movement.



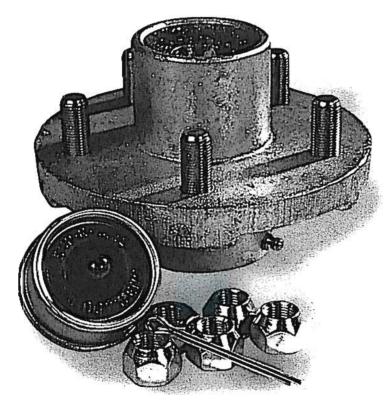








SuperLube Wheel Hub/Spindles Owners Manual



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(404) 344-0000 • Fax (404) 349-0401
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SuperLube Wheel Hub/Spindle Operating Instructions

Your trailer is equipped with TDE wheel hubs/spindles. The hubs are pre-greased and assembled at the factory and should not require any initial adjustments. The UHI hub uses tapered roller bearing cones and cups. This configuration requires a minimal amount of end play that is provided at the time of assembly.

SuperLube Lubrication

Your hub/spindle is equipped with TDE's SuperLube Lubrication System. The bearings can be periodically lubricated without removing the hubs from the axle. The advantage to this system is that new grease saturates the inner bearing and outer bearing while pushing out the old grease, unlike systems that just push new grease on top of old grease.

- 1. Remove the rubber plug from the grease (hub) cap.
- Use a standard grease gun onto the grease fitting located at the end of the spindle, or behind the hub, making sure the grease gun nozzle is engaged on the fitting tightly.
- Pump grease into the fitting, while slowly turning the wheel. Grease will flow out of the hub around the spindle.
- 4. When the grease appears to be the new clean grease, remove the grease gun and wipe off any excess grease.
- 5. Replace the rubber plug in the cap.

Removal/Remounting for the SuperLube Hub

Removing the hub for inspection or maintenance should be done in a safe location away from moving vehicles.

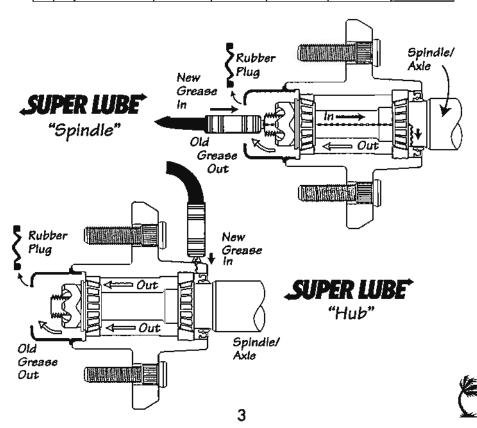
- Elevate the trailer using the manufacturers instructions. Always use jack stands or other solid supports. Do not depend on a jack to support the trailer. Block wheels to keep trailer from rolling.
- 2. Remove the tire/wheel assembly.
- 3. Remove the grease cap from the hub by prying around the edge of the cap.
- 4. Bend the locking tang washer to the "free" position.
- Remove the spindle nut in a counterclockwise direction and remove the spindle washer.
- 6. Remove the hub from the spindle. Be careful not to allow bearings to fall out of the hub.
- 7. Clean bearing and cup surfaces, repack with lithium marine grade grease.
- 8. Place hub on spindle in reverse order as listed above. Rotate the hub while tight ening the spindle nut to approximately 50 ft lbs. This translates into full hand pressure with a 12" long set of pliers or 12" long wrench.

SuperLube Hub/Spindle Operating Instructions

- 9. Loosen the spindle nut to remove the torque, do not rotate hub.
- 10. Finger tighten the spindle nut until snug, backing out only to line up the locking tang washer.
- 11. Bend the locking tang tab in place.
- 12. Replace grease/hub cap.
- 13. Test hub with wheel mounted for excessive play or tightness, readjust if required.

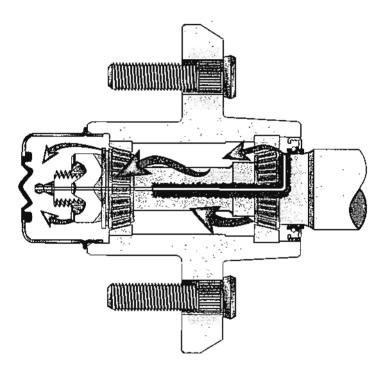
Bearing Reference Chart

		Outer Spindle Q.D.	Outer Hub 1.D.	Inner Bearing Cone No.	Outer Bearing Cone No.	laner Cup No.	Cup No.
SPINDLE	STRAIGHT	3/4' 1' 1-1/16' 1-1/4' 1-3/8'	1.784 1.980 1.980 2.328 1.980	LM11949 L44643 L44649 LM67048 L68149	SAME SAME SAME SAME SAME	LM11910 L44610 L44610 LM67010 L68111	SAME SAME SAME SAME SAME
	STEPPED	1-1/16"X3/4" 1-1/4"X3/4" 1-3/8"X1-1/16" 1-3/8"X1-1/16"	1.781 1.781 1.980 1.980	LM11949 LM11949 L44649 L44649	L44649 LM67048 L68149 L68149	LM11910 LM11910 L44610 L44610	L44610 LM67010 L68111 L68110



SUPER LUBE

THE COMPLETELY SEALED WHEEL BEARING LUBRICATION SYSTEM



Simple is best. Especially when it comes to wheel bearing maintenance.

That's why Tie Down has introduced Super Lube, the hub bearing lubrication system that provides continuous protection by following a fast and easy maintenance program.

Simply attach a conventional grease gun to the grease fitting. As new grease is continually pumped into the system, the old grease is forced out of the bearings and into the dust cap reservoir. Remove all excess grease from the dust cap reservoir, replace the rubber expansion access cap and repacking is completed, with out the expense of a service center.

The Super Lube System provides extended bearing life by thoroughly distributing grease and eliminates the need to disassemble the hubs and repack the wheel bearings.

Simply put, that means peace-of-mind for you.

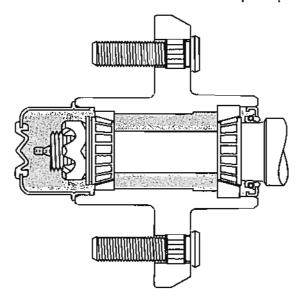
Wheel Hub Kit Instructions

HUB INSTALLATION.

- 1. Remove wheel from hub.
- 2. Remove hub dust cap, cotter key, spindle nut and washer.
- 3. Remove old hub from spindle
- Assemble new hub. Pack bearings as shown. If not already pre-assembled or pre-greased.
- 5. Mount wheel.
- Tighten the spindle nut with a 1/2 inch wrench to approximately 40 ft. lbs. Turn wheel in both directions to be sure wheel turns freely.
- 7. Turn back spindle nut 1/6 to 1/4 turn to the nearest locking hole. Wheel should turn smoothly with no end play or wobble.
- 8. Line up cotter key with nearest locking hole and spread key.
- 9. Install dust cap.

INSTALACION DEL NUCLEO DE RODETE

- Saque la rueda del núcleo de rodete.
- 2. Saque la tapa antipolvo del núcleo de rodete, llave de chaveta de quía, tuerca de jusillo y arandela.
- 3. Saque el núcleo de rodete del husillo.
- 4. Ensamble al núcleo de rodete nuevo al jusillo de eje.
- 5. Monte la rueda.
- 6. Ajuste la tuerca de husillo con una llave ingesa de 1/2 pulgadas hasta aproximadamente las 40 lbs. por pie. Gire la rueda en ambos sentidos para asegurarse que la rueda gire libremente.
- Gire para atrás la tuerca de husillo de un 1/6 a 1/4 de buelta al hoyo de seguridad más próximo.
- La rueda debe gurar suavemente, sin quedar suelta o bamboear al final.
- B. Alinee la llave de chaveta de guía con
- el hoyo de seguridad más próximo y la llave de extensión.
- 9. Instale la tapa antipolvo.



WHEEL BEARING LUBRICATION.

Shading indicates the recomendation for the correct amount of grease in wheel hub. (Fill wheel hub with grease to inside diameter of outer races and also fill hub grease cap.) Never use grease heavier than 265 A.S.T.M. penetration (No. 2 grade). Grease bearing cone by machine or by hand method. Force grease between rollers, cone, and cage. It is not recommended that a pressure grease fitting be installed on the hub.

LUBRICACION DEL COJINETE DE RUEDA

El área sombreada indica la recomendación acerca de la cantidad correcta de grasa en el núcleo de rodete de rueda. (Llene el núcleo de rodete de rueda congrasa hasta el diámetro interior de los aros de rodamiento exteriores y llene también la tapa de grasa del núcleo de rodete). Nunca engrase con más de 265 A.S.T.M. de penetración (Clase No. 2). Engrase el cono del cojinete por el método de máquina o de mano. Fuerce la grasa entre rodillos, cono y estructura. No se recomienda que se intale un adaptador de grasa a preión en el núcleo de rodete.

Instruction #15387



Technical Service Bulletin

Bearing Adjustment

Operation: Torque Adjustment of Tapered Roller Bearings within Spindle/Hub Assemblies.

Objective: To achieve proper & consistent bearing adjustment. Target is .001" - .005" of end-play between spindle & hub.

Procedure:

- Fully assemble end unit with Spindle, Hub w/Bearing Races (cones), Bearing Cups & Oil Seal, Castle Nut, and Washers (Flat washer, D- washer, Tang washer as specified in the BOM for the end unit).
- With Spindle secured at axle mounting end, tighten & torque Castle Nut to 450 to 500 inch pounds while rotating or oscillating (rotating partially back & forth) the hub. A minimum of three (3) complete rotations of the Hub about the spindle is necessary while applying torque to the Castle Nut. This step fully "seats" and aligns the bearings' rollers within the cones and cups.
- 3. Loosen the Castle Nut 1/6 of a turn (1 flat or 1 slot of the Castle Nut). Check that the Hub rotates on the spindle freely, with no obvious internal friction. If internal friction is felt, loosen the Castle Nut 1/6 of a turn more. Check that the cotter pin will pass through the Castle Nut slot and spindle drilling or that the Tang Washer is correctly oriented.
 - If a Castle Nut slot or flat does not align with the cotter pin hole or tang washer tab after loosening 1/6 turn, loosen the Castle nut a little more until it does.
- 4. Check end-play between the spindle & hub by pulling outward on the hub with both hands. There should be no movement detected. If movement is detected, repeat steps 2, 3 & 4.
- Insert the cotter pin and bend the legs around the Castle Nut or Bend the Tang Washer Tabs to lock the Castle Nut.
- If an end unit assembly exhibits end play movement after the second adjustment attempt set it aside for Quality Control to check end-play with a dial indicator.



Dust Cap Installation

Installation is quick and easy but bearings should be cleaned and replaced before installation of the protectors. Questionable bearings should be replaced, and new seals installed.

After replacing bearings and wheel, clean the hub bore using solvent and a clean rag. Use a short length of 2x4 to avoid damaging the bearing protector, place the wood flat against the dust cap and tap the wood/protector into the hub with a hammer. Alternate blows around the end to keep unit square until sealed. Make sure it seats fully; you'll notice a different tone in the sound of the hammer blows when it does.

SUPER LUBE Hubs have a grease fitting on the rear of the hub. Remove center rubber plug on dust cap. Connect grease gun to the grease fitting. Pump grease until clear clean grease comes out of plug hole. Clean excess grease around rubber fitting and dust cap. Replace rubber plug.

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TIE DOWN ENGINEERING • 5901 Wheaton Drive • Atlanta GA, 30336 www.tiedown.com • (404) 344-0000 • FAX (404) 349-0401

TIE DOWN ENGINEERING Axle Limited Warranty

Tie Down Engineering (the Company) extends to the original purchaser only a limited warranty on each Tie Down axle assembly against defects in material or workmanship of a period of one (1) year from the date of purchase. THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXCEPT THAT OF TITLE, WHETHER WRITTEN, ORAL OR IMPLIED, IN FACTOR IN LAW (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.)

A warranty period of five (5) years is extended on ELIMINATOR Torsion Axle suspension, exclusive of hubs, drums, brakes, bearings and seals which are covered for a period of one (1) year from the date of purchase.

- 1. To obtain warranty service, please send the following information to the address listed below:
 - A. Name and mailing address of purchaser.
 - B. Proof of date of purchase.
 - C. Number of miles.
 - D. Name of manufacturer of unit under which axle is mounted.
 - E. Model, year and serial number of unit.
 - F. Name and address of dealer from whom unit was purchased.
 - G. Serial number of axle.
 - H. Description of the defect.
- 2. This warranty does not extend to:
 - A. The connecting of brake wiring to the trailer wiring or trailer wiring to the towing vehicle wiring.
 - B. The attachment of the running gear to the frame.
 - C. Hub imbalance, or any damage caused thereby.
 - D. Parts not supplied by the Company.
 - E. Any damage whatever if caused by or related to any alteration of the axle.
 - F. Use of axle assembly on unit other than that to which it was originally mounted.
 - G. Normal wear.
 - H. Alignment.
- 3. This warranty does not cover defects caused by:
 - A. Improper installation.
 - B. Damage (not resulting from defect or malfunction) while in the possession of the customer.
 - C. Unreasonable use (including failure to provide reasonable and necessary maintenance.)
 - D. Improper wheel nut torque.
 - E. Customer welds on the ELIMINATOR Torsion Axle beam or mounting brackets.
- 4. The exclusive remedy offered under this warranty is repair or replacement of a covered defect and the Company shall determine whether repair or replacement is appropriate. The Company shall not be liable for any incidental or consequential damages, including any towing fees, hotel bills, telephone calls and meals for breach of any express or implied warranty on the running gear.
- 5. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.
- 6. Inquiries regarding this warranty should be sent to the address below:



Policies for Warranty Adjustments

1. Request for adjustment

Necessary Information - The following information should appear on your claim. Any information that is missing will delay the processing of your claim.

- 1. Tailer Service Location Name, address and phone.
- 2. Owner Name, Address and Phone
- 3. Trailer Data:
 - a. Manufacturer
 - b. Type
 - c. Length
 - d. Year of Manufacture
 - e. Date of Purchase

- f. Mileage
- g. Serial Number
- h. Axle Date
- i. Capacity
- i. Serial Number

NOTE: All warranty claims must be received at our factory within 90 days after work is completed. Claims received after this length of time will be returned to the sender. All labor on the claim must be broken down to indicate hours applied to running gear repair.

2. Defective Material

All components or assemblies replace under warranty must be returned along with your claim.

All parts and material must be shipped to TIE DOWN ENGINEERING with the freight prepaid. If material is determined to be defective, freight credit will be added to your claim. No allowance will be given for any type of air freight charges, unless prior approval was obtained. Material returned that is not defective will be held for 30 days awaiting disposition. If the manufacturer has not indicated disposition at the end or 30 days the material will be scrapped.

All returned parts must have TIE DOWN's return authorization number clearly marked in a weatherproof manner on the outside of the package.

Due to our supplier's warranty, some of the components we supply for the brake actuation system must be replaced entirely, instead of repaired. These items include: synchronizing valves, booster, spring brakes, and air chambers.

3. Warranty Labor Rate

TIE DOWN will pay the trailer manufacturer's published hourly shop rate for warranty work.

4. Accounting Procedure

The submission of a request for warranty adjustment does not constitute an invoice and should not be posted on your records as an invoice. It merely serves notice of an anticipated adjustment which, if granted, will result in a credit or check being issued to you.

The favorable disposition of your claim will result in a credit being issued to you within 45 days of receipt of your claim. Deduction from your invoice for warranty claims before the 45 day period will result in a bill back to your account. If your claim is denied, a written explanation from TIE DOWN will be sent to you within 30 days of receipt of your claim.

5. Warranty Claims Communications

All correspondence relating to your claim must have your original authorization number referenced on it.



5790 • 5791 • 5792 • 5793



A-Frame Jack Installation Operation & Maintenance Instructions

Shelby Industries
P.O. Box 308

Industrial Park Shelbyville, Ky. 40066

MOUNTING INSTRUCTIONS

- CAUTION -

THESE JACKS ARE INTENDED FOR MOUNTING TO A-FRAME COUPLERS ONLY. THE USE OF THESE JACKS OTHER THAN LISTED ON THIS SHEET MUST BE APPROVED BY SHELBY INDUSTRIES.

- 1. PLACE JACK IN A-FRAME COUPLER MOUNTING HOLE IN SUCH A MANNER THAT THE HOLES ARE IN LINE.
- 2. INSERT MOUNTING BOLTS: THREE BOLTS THROUGH THE JACK MOUNTING PLATE AND FASTENED SECURELY TO THE COUPLER. (USE 3/8-16 BOLTS GRADE 5 TORQUE 15-20 FT. LBS. ON TAPPED COUPLERS, 3/8-16 NUTS AND LOCK-WASHERS MUST BE USED ON NON-TAPPED COUPLERS.
- 3. IF THE TRAILER TONGUE LOAD EXCEEDS 250
 LBS., SHELBY RECOMMENDS USING A
 BOTTOM SUPPORT PLATE.

JACK OPERATION

<u>WARNING:</u> Never exceed the rated capacity stamped on the jack. When raising and lowering the jack, operator should keep body and feet clear of trailer tongue. The jack should always be fully retracted before towing trailer. Use of blocks for additional ground clearance may create an unsafe

condition and cause injury.

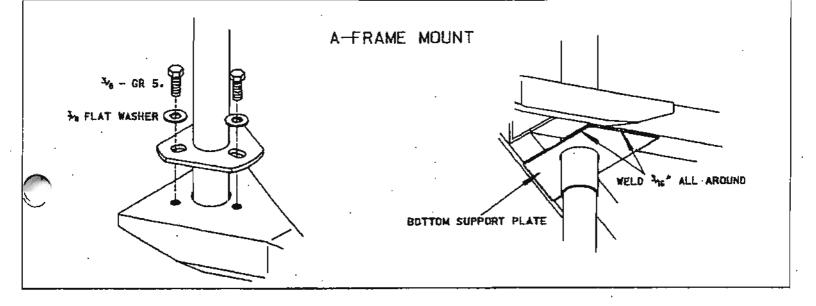
To operate:

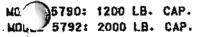
 Turn handle clockwise to raise and counter-clockwise to lower.

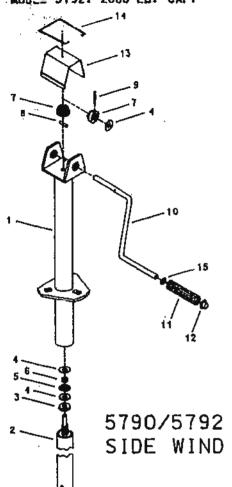
Fully retract jacks before towing.

JACK MAINTENANCE

- Jack should be lubricated in the following manner at least every six months. Extend jack as far as possible and lubricate entire length of outside of inner tube with SAE 30 heavy oil. Clean dirt from jack every six months.
- On side crank models only, remove clip spring and top cover and lubricate gears with wheel bearing grease.
- When jack is lowered, always provide footing such as caster wheel or a jack foot beneath jack to prevent dirt, etc., from getting into center of ram.
- Should jack become difficult to operate, remove – clean and oil, inspect for bent or worn parts. Use only factory supplied parts for replacement.
- 5. If it is not possible to get jack to operate freely, replace jack.

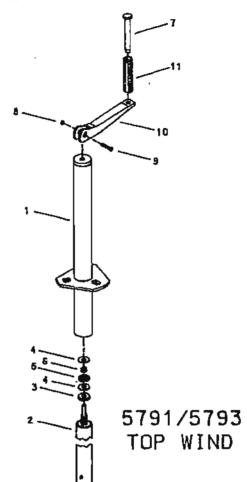




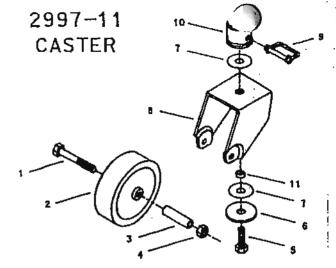


ITEM	DESCRIPTION	PART NO.	
1	UPPER TUBE 5790	2928-04/04Z	1
1	UPPER TUBE 5792	2944-04/04Z	1
2	LOWER TUBE	2992-11	1
3	WASHER	2118-00	1
4	THRUST WASHER	2119-09	2
5	BEARING	2120-09	1
6	SPACER	2121-09	1
7	GEAR	2125-09	2
8	GEAR PIN	2126-03	1
9	GROOVE PIN	2127-09	1
10	HANDLE	2128-03	İ
11	HANDLE GRIP	0919-00	1
12	END CAP	2130-09	1
13	COVER- 1.200 LB.	2123-18	1
13	COVER - 2,000 LB	2123-19	1
14	COVER CLIP	2124-03	1
15	RETAINER	2106-09	1

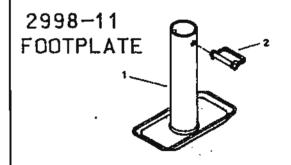
MODEL 5791: 0 LB. CAP. MODEL 5793: __00 LB. CAP.



1 1 2 3 4 5 6 7 8 9	DESCRIPTION UPPER TUBE 5791 UPPER TUBE 5793 LOWER TUBE WASHER THRUST WASHER BEARING SPACER HANDLE PIN 1/4 -20 HEX NUT 1/4-20x 1 CAP SCREI	0572-03	
			1
10 11	HANDLE GRIP	2197-03 0919-00	. 1



DESCRIPTION	PART NO.	QUANTITY:
1/2 x 3-1/4 BOLT	2105-03	1
WHEEL	2103-09	1
SPANNER	2104-03	1
1/2 LOCKNUT		1
BÖLT		1 +
WASHER		1
NYLON WASHER		2
CASTER	2101-03	1
		1
		1
CASTER SPACER	2174-09	1
	WHEEL SPANNER 1/2 LOCKNUT BOLT WASHER NYLON WASHER	## 2 x 3-1/4 BOLT 2105-03 WHEEL 2103-09 SPANNER 2104-03 1/2 LOCKNUT 0129-03 BOLT 2175-03 WASHER 2159-03 NYLON WASHER 2162-09 CASTER 2101-03 CLEVIS PIN 2110-03 WELDED TUBE ASM 2941-07



ITEM	DESCRIPTION	PART NO.	QUANTITY.
1	FOOTPLATE ASM	2948-03	1
2	CLEVIS PIN	2110-03	1

2200-00 BOTTOM SUPPORT PLATE







SHELBY INDUSTRIES, LLC 3 YEAR CONSUMER WARRANTY

THIS THREE (3) YEAR WARRANTY APPLIES TO THE ORIGINAL CONSUMER PURCHASER OF SHELBY USA MADE TRAILER JACKS. THIS WARRANTY APPLIES ONLY TO SHELBY'S RETAIL SALES OF CONSUMER PRODUCTS AS THAT TERM IS DEFINED BY THE MAGNUSON-MOSS WARRANTY ACT (PRODUCTS FOR PERSONAL, FAMILY, OR HOUSEHOLD PURPOSES). ALL OTHER PURCHASERS, PLEASE SEE SHELBY'S COMMERCIAL WARRANTY.

Shelby Industries, LLC, warrants its USA Made Trailer Jack products under normal use to be free from defects in material and workmanship defect to the original purchaser, subject to all the terms and limitations contained herein, for a period of <u>three (3) year</u> from the original purchase date or if that date cannot be established, the date of manufacture. Shelby, at its option, may replace or repair any part or parts when product is returned with proof of purchase to Shelby's manufacturing facility in Shelbyville, Kentucky. The original purchaser shall pay all shipping charges associated with the return of said product, and the returned product shall become the property of Shelby.

This warranty is void if the product was improperly installed, altered, serviced, repaired, maintained or operated contrary to Shelby's printed instructions or instructions stamped on the product itself. This warranty does not assure that the product shall remain useable for the warranty period, since the life of the product is dependent upon the manner and the frequency of use.

THE FOREGOING STATES A SOLE AND EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY OR ANY OTHER CLAIM BASED ON A DEFECT IN OR NON-PERFORMANCE OF, THE PRODUCT, WHETHER SOUNDING IN CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY. SHELBY MAKES NO OTHER EXPRESS WARRANTIES. ALL IMPLIED WARRANTIES, INCLUDING AN IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO A PERIOD OF THREE (3) YEAR FROM THE DATE OF PURCHASE AT RETAIL. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, SHELBY SHALL UNDER NO CIRCUMSTANCES BE HELD LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL LOSS OR DAMAGE WHAT SO EVER ARISING OUT OF, OR IN ANY WAY RELATING TO, ANY SUCH BREACH OF WARRANTY OR CLAIMED DEFECT IN, OR NONPERFORMANCE OF, THE PRODUCTS. THIS LIMITED WARRANTY IS DESIGNED TO FULLY COMPLY WITH THE TERMS AND PROVISIONS OF THE MAGNUSON-MOSS WARRANTY ACT. SOME STATES MAY NOT ALLOW THE LIMITATION OR EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

The above-stated limitations may be waived or modified only by a writing signed by an officer of Shelby Industries and no other representations shall be binding on Shelby.

To obtain your remedy under this warranty, send the product, together with your proof of purchase, to Shelby Industries, LLC, 175 McDaniels Road, Shelbyville, KY 40065, Attn: WARRANTY CLAIM. The purchaser is responsible for shipping costs to Shelby Industries, LLC. For additional information, visit www.shelbyindustries.com, call (502) 633-2040 ext. 406, or email customerservice@shelbyindustries.com.

This warranty is governed by the laws of the State of Kentucky except as modified by the laws of the U.S.A. and is void countries where prohibited.



KENDA/LOADSTAR Limited Warranty – Trailer Tires

This policy applies to KENDA/LOADSTAR trailer tires sold and used within the USA and Canada only.

ELIGIBILITY

You are eligible for the benefits of this warranty (the "Limited Warranty") only if you are the original owner and consumer of new KENDA/LOADSTAR trailer tires, such tires bear the original Department of Transportation (DOT) – prescribed tire identification numbers, and such tires are on the trailer upon which they were originally installed according to the trailer manufacturer's or KENDAS' recommendations.

WHAT IS WARRANTED AND FOR HOW LONG

Subject to the limitations contained in this Limited Warranty, your new KENDA/LOADSTAR tires are warranted under this Limited Warranty against failures due to defective materials and workmanship for a period of four (4) years from the date of tire manufacture or two (2) years from date of purchase, whichever occurs first. Tire manufacture date is determined by the Department of Transportation (DOT) – prescribed tire identification numbers.

- (A) Eligibility: A tire is eligible for warranty coverage under this Limited Warranty only if the tire is presented y the original owner and consumer within four (4) years of the tire manufacture date or two (2) years from date of purchase, whichever occurs first, the tire has a minimum of 2/32nd inch of tire tread depth remaining, and all procedures in this Limited Warranty are followed.
- (B) Free Replacement: Subject to the limitations contained in this Limited Warranty, if a KENDA/LOAD-STAR tire fails due to defective materials or workmanship during the first 10% of treadwear, the tire will be replaced with a new comparable KENDA/LOADSTAR tire without charge.
- (C) Treadwear Prorated Discount: A defective tire that does not qualify for free replacement under (B) above, but that is otherwise eligible for warranty coverage under this Limited Warranty, will entitle you to a discount on the purchase of a new comparable KENDA/LOADSTAR tire. The amount of the discount will be calculated based upon the percentage of tread that remains on the defective tire. For example, if 60% of the original tread remains on the defective tire, you will be entitled to a 60% discount off of the retail price of a new comparable KENDA/LOADSTAR tire. You are responsible for all labor costs for mounting and balancing and for all applicable taxes.

DEFINITION OF COMPARABLE TIRE

A "comparable" new KENDA/LOADSTAR tire may either be the same line of tire or, if the defective tire is out of production or unavailable, a tire of the same basic or equal construction and quality with different sidewall or treadwear configuration. If a higher priced tire is accepted as replacement, you will be responsible for the differnce in price.

COMPUTING TREADWEAR

Treadwear is computed as a percentage of the original usable tread. The original usable tread does not include he last 2/32nd inch of tread depth. KENDA USA shall make all determinations regarding treadwear and eligibility for warranty coverage under this Limited Warranty in its sole discretion.

WHAT IS NOT COVERED BY THE WARRANTY

This Limited Warranty does not apply to:

- (A) Damage, failure, or irregular or premature treadwear caused by, resulting from, or arising out of fire, accident, chemical corrosion, malicious mischief, vandalism, or road hazards. Example of road hazards include, without limitation, nails, glass, rocks, curbs, and other foreign objects and natural and manmade obstructions or obstacles such as excavations, construction, potholes, and chuckholes. Damages caused by road hazards can include, without limitation, cuts, snags, punctures, scuffs, carcass bruises, and impact breaks.
- (B) Damage, failure, or irregular or premature treadwear caused by, resulting from, or arising out of improper operation or maintenance such as, without limitation, misapplication, neglect, misuse, running flat, overloading, under-or-over inflation, excessive speed, improper installation, improper wheel alignment, improper mounting or dismounting, use of puncture sealants, tire plugs, or fillers, noncompliance with safety, usage, or maintenance instructions or parameters, or any alteration to the tire such as, without limitation, grooving bead or sidewall decorative material or the addition of a white inlay (whitewall) to any tire.
- (C) Weather cracking
- (D) Loss of time, inconvenience, loss of use of the trailer, costs of towing or transportation, and/or incidental or consequential damages of any type or nature. Vehicle or trailer damage is not covered.

KENDA USA OBLIGATIONS

Defective tires qualifying for coverage under this Limited Warranty will be replaced either at no charge or at a discount in accordance with the terms of this Limited Warranty.

OWNER'S OBLIGATIONS

In order to claim under this Limited Warranty, you must present the allegedly defective tire to any KENDA/LOADSTAR Tire Distributor or participating dealer in the USA or Canada. To obtain a no charge adjustment for tires, you must present proof of purchase date (such as trailer dealer or tire retailer invoice). You are responsible for payment of all taxes, as well as retailer charges for services that you request but are not covered by the warranty. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

IF THERE IS NO KENDA/LOADSTAR AUTHORIZED TIRE DEALER AVAILABLE

If there is no KENDA/LOADSTAR Authorized Tire Dealer in your area, you must call 1-(800)-225-4714, 9AM-5PM Eastern Time, weekdays for instructions regarding the allegedly defective tire. KENDA USA may require that the tire be delivered by you, freight prepaid, to KENDA USA directly or to a specified KENDA/LOADSTAR Authorized Tire Dealer or other party designated by KENDA USA.

LIMITATION OF WARRANTY

Except as noted in this Limited Warranty and unless otherwise provided by law, THERE IS NO WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, CLEAR TITLE, NONINFRINGE-MENT, OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED. This Limited Warranty is the entire warranty given by KENDA USA and KENDA USAS' complete obligation is as set forth herein. No one has the authority to imply, suggest, agree, represent, warrant, or promise contrary to the terms hereof.

LIMITATION OF REMEDY

REPLACEMENT OF A DEFECTIVE KENDA/LOADSTAR TRAILER TIRE AS SET FORTH HEREIN, EITHER AT NO CHARGE OR AT A DISCOUNTED CHARGE, AS APPLICABLE, CONTITUTES THE SOLE AND EXCLUSIVE OBLIGATION OF KENDA USA AND THE SOLE AND EXCLUSIVE REMEDY AVAILABLE TO YOU IN THE EVENT OF BREACH OF ANY WARRANTY OR OF ANY AGREEMENT BETWEEN YOU AND KENDA USA OR ITS AUTHORIZED DEALERS.

LIMITATION OF LIABILITY

IN NO EVENT SHALL KENDA USA OR ITS AUTHORIZED DEALERS OR DISTRIBUTORS BE LIABLE FOR ANY INCIDENTAL, INDIRECT, SPECIAL CONSEQUENTIAL, PUNITIVE, OR EXEMPLARY DAMAGES OR LIABILITIES (INCLUDING, WITHOUT LIMITATION, INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR LOSS OF TIME, INCONVENIENCE, LOSS OF USE OF TRAILER, TOWING, ROAD SERVICE, OR ANY OTHER CONSEQUENTIAL OR INCIDENTAL LOSS) IN CONNECTION WITH THE PURCHASE, USE, OR OPERATION OF THE TIRE, WHETHER DUE TO A BREACH OF WARRANTY, PREACH OF CONTRACT, OR OTHERWISE, EVEN IF KENDA USA HAS BEEN ADVISED OF THE POSJIBILITY OF SUCH DAMAGE. NOTE: SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGE OR IMPLIED WARRANTIES, SO SUCH EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU.

For warranty questions contact:

American Kenda Rubber Ind. Co., LTD 7095 Americana Parkway Reynoldsburg, OH 43068

800-225-4714 9:00 AM to 5:00 PM Eastern Time

TRAILER SAFETY INDUSTRY COALITION

"Committed to Trailer Safety"

SAFETY TIP #2

Trailers: A Word About Safety

The Trailer Safety Industry Coalition (TSIC) is a coalition of trailer and component manufacturers formed to identify and address issues that can improve the safety of towable equipment. The TSIC is developing a series of safety tips to assist consumers in maintaining their towable equipment.

Trailer Tire Information

Trailer tires may be worn out even though they still have plenty of tread left. This is because trailer tires have to carry a lot of weight all the time, even when not in use. It is actually better for the tire to be rolling down the road than to be idle. During use, the tire releases lubricants that are beneficial to tire life. Using the trailer tires often also helps prevent flat spots from developing.

The main cause of tire failure is improper inflation. Always check the cold tire inflation pressures before each trip and at least once a week during the trip for proper inflation levels. "Cold" means that the tires are at the same temperature as the surrounding air, such as when the vehicle has been parked overnight. Wheel and tire manufacturers recommend adjusting the air pressure to the trailer manufacturer's recommended cold inflation pressure, in pounds per square inch (PSI) stated on the vehicle's Federal Certification Label or Tire Placard when the trailer is loaded. Never load a trailer to a weight greater than its gross vehicle weight rating (GVWR). If the tires are inflated to less than the recommended inflation level or the GVWR of the trailer is exceeded, the ability of the tires to safely carry the load could be dramatically affected. If the tires are inflated to more than the recommended inflation level, handling characteristics of the tow vehicle/trailer combination could be affected. Refer to the owner's manual or talk to your dealer or vehicle manufacturer if you have any juestions regarding proper inflation practices.

Tires can lose air over a period of time. In fact, tires can lose I to 3 PSI per month. This is because molecules of air, under pressure, migrate through the rubber from the inside to the outside. A drop in tire pressure could cause the tire to become overloaded, leading to excessive heat build up. If a trailer tire is under-inflated, even for a short period of time, the tire could suffer internal damage.

High speed towing in hot conditions degrades trailer tires significantly. As heat builds up during driving, the tire's internal structure starts to break down, compromising the strength of the tire. It is recommended to drive at moderate speeds.

Statistics indicate the average life of a trailer tire is about five years under normal use and maintenance conditions. After three years, replacing the trailer tires with new ones should be considered, even if the tires have adequate tread depth. Some experts claim that after five years, trailer tires have degraded to the point that they are considered worn out and should be replaced, even if they have had minimal or no use. This is such a general statement that it may not apply in all cases. It is best to have your tires inspected by a tire supplier to determine if your tires need to be replaced.

If you are storing your trailer for an extended period, make sure the tires are fully inflated to the maximum rated pressure and that you store them in a cool, dry place, such as a garage. Use tire covers to protect the trailer tires from the harsh effects of the sun. It is also a good idea to place a barrier between the trailer tires and a concrete or asphalt surface it is parked on. A thick garbage bag, a piece of carpet or a piece of plywood will do the job. This will prevent possible tire damage from chemicals in the parking surface.

You can learn more about TSIC's efforts, and recommended practices at www.natm.com, www.nita.com, www.nita.com, wwww.nita.com, www.nita.com, <a href

TRAILER TIRE WEAR GUIDE

Tire inflation pressure is one of the most important factors in tire life. Tires should be inflated to the pressure recommended by the manufacturer for the load. Please check the side wall of you tire for the correct PSI ratings. Pressure should always be checked cold before operation. Check inflation pressure weekly during use to insure maximum tire life and monitor tread wear.

If you have any questions, about your tires, performance, appearance, etc, please contact the tire manufacturer. You can find the manufacturer's name on the sidewall of the tire.

Tire Wear Guide

The following Tire Wear Guide will help you identify the causes and solutions of most common tire wear patterns.

WEAR PATTERN		RN	CAUSE	SOLUTION
			OVER INFLATION	Adjust pressure to particular load per tire catalog.
			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. Correction is 3/4 - 1 degree positive camber (top of wheel rim 3/16" further out than bottom.
	TOE WEAR		INCORRECT TOE-IN	Correct toe-in is 0 - 1/2 degree.
		CUPPING	OUT-OF-BALANCE	Check bearing adjustment and balance tires.
		FLAT SPOTS	WHEEL LOCKUP & TIRE SKIDDING	Avoid sudden stops when possible and adjust brakes.

Tire wear should be checked frequently because once a wear pattern becomes firmly established it is difficult to stop, even if the underlying cause is corrected.

NOTE: If your trailer's tires show any unusual signs of wear, contact the tire manufacturer or a tire dealer for recommended corrective procedure.

For tire warranty issues, please contact the tire manufacturer.



Important Safety Notice

Appropriate service methods and proper repair procedures are essential for the safe, reliable operation of all running gear as well as the personal safety of the individual doing the work. This manual provides general directions for performing service and repair work with tested, effective techniques. Following these guidelines will help assure reliability.

There are numerous variations in procedures, techniques, tools, parts for servicing axles, as well as in the skill of the individual doing the work. This manual cannot possibly anticipate all such variations and provide advice or cautions as to each. Anyone who departs from the instructions provided in this manual must first establish that they neither compromise their personal safety nor the vehicle integrity by their choice of methods, tools, or parts.

Refer to your vehicle manufacturer's owners manual for additional procedures, techniques, and warnings prior to performing any maintenance or repairs.

△ CAUTION

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

Getting Started - Setup and Adjustment

For proper performance, all new axles should have the following checked at the specified intervals:

- Wheel Nut Torque: at 10, 25, and 50 miles
- Brake Adjustment: at 200 and 3,000 miles
- Tire pressure: to manufacturer's requirements
- Brake synchronization: set brake controller per controller manufacturer's directions



Suspension Systems

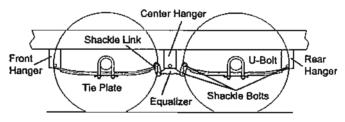
The suspension systems incorporated into Dexter axles are designed to provide the trailer owner three basic functions:

- 1. Attach the axle to the trailer
- 2. Dampen the effects of road shock
- 3. Cushion the cargo or load

All Dexter suspension systems are available in single and multiple axle configurations. The three types most commonly available are double eye leaf spring, slipper spring and Torflex®.

Double Eye Leaf Springs

Double eye springs have eyes formed in each end of the spring with anti-friction bushings fitted for wear resistance. The springs are held to the axle tube using a system of U-bolts and clamp plates and are attached to the trailer as shown.



Underslung Shown

Articulation of this suspension occurs when the spring becomes loaded and consequently lengthens. The double pivot action of the shackle links accommodates this articulation and allows the system to move freely.

In multiple axle installations, the action is the same with the additional movement of the equalizer assembly. This serves to transfer instantaneous loads from one axle to another in an effort to "equalize" the load between the axles.

Wheels

Wheel Selection

Wheels are very important and critical components of your running gear system. When specifying or replacing your trailer wheels it is important that the wheels, tires, and axle are properly matched. The following characteristics are extremely important and should be thoroughly checked when replacement wheels are considered.

- Bolt Circle. Many bolt circle dimensions are available.
 Some vary by so little that it might be possible to attach an improper wheel that does not match the axle hub. Be sure to match your wheel to the axle hub.
- Capacity. Make sure that the wheels have enough load carrying capacity and pressure rating to match the rated load of the tire.
- 3. Offset. This refers to the relationship of the center line of the tire to the hub face of the axle. Care should be taken to match any replacement wheel with the same offset wheel as originally equipped. Fallure to match offset can result in reducing the load carrying capacity of your axle.
- 4. Rim Contour.

A CAUTION

Replacement tires must meet the same specifications as the originals. Mismatched tires and rims may come apart with explosive force and cause personal injury to yourself or others. Mismatched tires and rims can also blow out and cause you to lose control and have an accident which can result in serious injury or death.





A CAUTION

Do not attempt to repair or modify a damaged wheel. Even minor modifications can cause a dangerous failure of the wheel and result in personal injury or death.

Torque Requirements

It is extremely important to apply and maintain proper wheel mounting torque on your trailer axle. Torque is a measure of the amount of tightening applied to a fastener (nut or bolt) and is expressed as length force. For example, a force of 90 pounds applied at the end of a wrench one foot long will yield 90 lbs.-ft. of torque. Torque wrenches are the best method to assure the proper amount of torque is being applied to a fastener.

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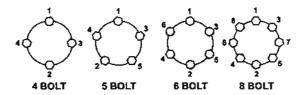
Wheel nuts or bolts must be tightened and maintained at the proper torque levels to prevent loose wheels, broken studs, and possible dangerous separation of wheels from your axle, which can lead to an accident, personal injuries or death.

Be sure to use only the fasteners matched to the cone angle of your wheel (usually 60° or 90°). The proper procedure for attaching your wheels is as follows:

- Start all bolts or nuts by hand to prevent cross threading.
- 2. Tighten bolts or nuts in the sequence shown for Wheel Torque Requirements.
- The tightening of the fasteners should be done in stages. Following the recommended sequence, tighten fasteners per wheel torque chart below.
- 4. Wheel nuts/bolts should be torqued before first road use and after each wheel removal. Check and re-torque after the first 10 miles, 25 miles, and again at 50 miles. Check periodically thereafter.

Wheel Torque Requirements

Wheel Size	1st Stage	Torque Sequence 2nd Stage	3rd Stage
12"	20-25	35-40	50-75
13"	20-25	35-40	50-75
14"	20-25	50-60	90-120
15"	20-25	50-60	90-120
16"	20-25	50-60	90-120
16.5" x 6.75"	20-25	50-60	90-120
16.5" x 9.75"	55-60	120-125	175-225
14.5" Demount. Tighten sequentially to		n sequentially to	85-95
17.5" Hub Pilot 50-60 100-120 Clamp Ring & Cone Nuts			190-210
17.5" Hub Pilot 5/6" Flange Nuts		90-200	275-325







Tires

Before mounting tires onto the wheels, make certain that the rim size and contour is approved for the tire as shown in the Tire and Rim Association Yearbook or the tire manufacturers catalog. Also, make sure the tire will carry the rated load. If the load is not equal on all tires due to trailer weight distribution, use the tire rated for the heaviest wheel position.

Note: The capacity rating molded into the sidewall of the tire is not always the proper rating for the tire if used in a trailer application. Use the following guidelines:

- LT and ST tires. Use the capacity rating molded into the tire.
- 2. Passenger Car Tires. Use the capacity rating molded into the tire sidewall divided by 1.10 for trailer use.

Use tire mounting procedures as outlined by the Rubber Manufacturer's Association or the tire manufacturers.

Tire inflation pressure is the most important factor in tire life. Inflation pressure should be as recommended by the manufacturer for the load. Pressure should be checked cold before operation. Do not bleed air from tires when they are hot. Check inflation pressure weekly during use to insure the maximum tire life and tread wear. The following tire wear diagnostic chart will help you pinpoint the causes and solutions of tire wear problems.

CAUTION

Tire wear should be checked frequently because once a wear pattern becomes firmly established in a tire it is difficult to stop, even if the underlying cause is corrected.

Tire Wear Diagnostic Chart

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. Align at alignment shop.
	Toe Wear	Incorrect toe-in	Align at alignment shop.
	Cupping	Out-of-balance	Check bearing adjust- ment and balance tires.
	Flat Spots	Wheel lockup & tire skidding	Avoid sudden stops when possible and adjust brakes.



Storage

Storage Preparation

If your trailer is to be stored for an extended period of time or over the winter, it is important that the trailer be prepared properly.

- Remove the emergency breakaway battery and store inside, out of the weather. Charge the battery at least every 90 days.
- Jack up the trailer and place jack stands under the trailer frame so that the weight will be off the tires. Follow trailer manufacturer's guidelines to lift and support the unit. Never jack up or place jack stands on the axle tube or on the equalizers.

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Do not lift or support the trailer on any part of the axle or suspension system. Never go under any trailer unless it is properly supported on jack stands which have been rated for the load. Improperly supported vehicles can fall unexpectedly and cause serious injury or death.

- 3. Lubricate mechanical moving parts such as the hitch, and suspension parts, that are exposed to the weather.
- Boat trailer axles are subject to repeated immersion. Before storing, remove brake drums; clean, dry and re-lubricate moving brake components; inspect bearings - clean and relubricate.
- On oil lubricated hubs the upper part of the roller bearings are not immersed in oil and are subject to potential corrosion. For maximum bearing life, it is recommended that you revolve your wheels periodically (every 2-3 weeks) during periods of prolonged storage.

Storage

After Prolonged Storage - Inspection Procedures

Before removing trailer from jack stands:

- Remove all wheels and hubs or brake drums. Note which spindle and brake that the drum was removed from so that it can be reinstalled in the same location.
- 2. Inspect suspension for wear.
- Check tightness of hanger bolt, shackle bolt, and U-bolt nuts per recommended torque values.
- Check brake linings, brake drums and armature faces for excessive wear or scoring.
- Check brake magnets with an ohmmeter. The magnets should check 3.2 ohms. If shorted or worn excessively, they must be replaced.
- Lubricate all brake moving parts using a high temperature brake lubricant (LUBRIPLATE or Equivalent).

CAUTION

Do not get grease or oil on brake linings or magnet face.

- 7. Remove any rust from braking surface and armature surface of drums with fine emery paper or crocus cloth. Protect bearings from contamination while so doing.
- Inspect oil or grease seals for wear or nicks. Replace if necessary.
- Lubricate hub bearings. Refer to procedure in manual.
- Reinstall hubs and adjust bearings per instructions in manual.
- 11. Mount and tighten wheels per instructions in manual.

Trip Preparation Checklist

There are a number of simple rules to follow in caring for your trailer axle assembly that can add to its life and in the case of some of these rules, you may be protecting your own life as well. Using the following checklist before starting a trip with your trailer





is highly recommended. Some of these items should be checked 2-3 weeks prior to a planned trip to allow sufficient time to perform maintenance.

- Check your maintenance schedule and be sure you are upto-date.
- 2. Check hitch. Is it showing wear? Is it properly lubricated?
- Fasten safety chains and breakaway switch actuating chain securely. Make certain the breakaway battery is fully charged.
- 4. Inspect towing hookup for secure attachment.
- Load your trailer so that approximately 10% of the trailers total weight is on the hitch. For light trailers this should be increased to 15%.
- Do Not Overload. Stay within your gross vehicle rated capacity (consult your trailers identification plate).
- Inflate tires according to manufacturer's specifications; inspect tires for cuts, excessive wear, etc.
- Check wheel mounting nuts/bolts with a torque wrench.
 Torque, in proper sequence, to the levels specified in this manual.
- Make certain brakes are synchronized and functioning properly.
- Check tightness of hanger bolt, shackle bolt, and U-bolt nuts per torque values specified in manual.
- 11. Check operation of all lights.
- 12. Check that your trailer is towing in a level position and adjust hitch height if required.

1. TIRE SAFETY INFORMATION

his portion of the User's Manual contains tire safety information as required by 49 CFR 575.6.

Section 2.1 contains "Steps for Determining Correct Load Limit - Trailer".

Section 2.2 contains "Steps for Determining Correct Load Limit - Tow Vehicle".

Section 2.3 contains a <u>Glossary of Tire Terminology</u>, including "cold inflation pressure", "maximum inflation pressure", "recommended inflation pressure", and other non-technical terms.

Section 2.4 contains information from the NHTSA brochure entitled <u>"Tire Safety – Everything Rides On It".</u> This brochure This brochure, as well as the preceding subsections, describes the following items;

- Tire labeling, including a description and explanation of each marking on the tires, and information about the DOT Tire Identification Number (TIN).
- Recommended tire inflation pressure, including a description and explanation of:
 - A. Cold inflation pressure.
 - B. Vehicle Placard and location on the vehicle.
 - C. Adverse safety consequences of under inflation (including tire failure).
 - D. Measuring and adjusting air pressure for proper inflation.
- Tire Care, including maintenance and safety practices.
- Vehicle load limits, including a description and explanation of the following items:
 - A. Locating and understanding the load limit information, total load capacity, and cargo capacity.
 - B. Calculating total and cargo capacities with varying seating configurations including quantitative examples showing / illustrating how the vehicles cargo and luggage capacity decreases as combined number and size of occupants' increases. This item is also discussed in Section 3.
 - Determining compatibility of tire and vehicle load capabilities.
 - D. Adverse safety consequences of overloading on handling and stopping on tires.

1.1. 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.

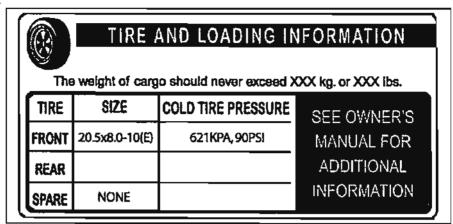
For trailers with living quarters installed, the weight of water and propane also need to be considered. The weight of fully filled propane containers is considered part of the weight of the trailer before it is loaded with cargo, and is not considered part of the disposable cargo load. Water however, 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 stall weight.

Excessive loads and/or underinflation 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.

1.1.1. TRAILERS 10.000 POUNDS GVWR OR LESS



Tire and Loading Information Placard - Figure 1-1

- Locate the statement, "The weight of cargo should never exceed XXX kg or XXX lbs.," on your vehicle's placard. See figure 1-1.
- 2. 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.

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.

1.1.2. <u>Trailers Over 10.000 Pounds GVWR (Note: These trailers are not required to have a tire information placard on the vehicle)</u>

- 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.

1.2. Steps for Determining Correct Load Limit - Tow Vehicle

- Locate the statement, "The combined weight of occupants and cargo should never exceed XXX lbs.," on your vehicle's placard.
- 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.
- 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.

1.3. GLOSSARY OF TIRE TERMINOLOGY

ccessory 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).

Read

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.

ead 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 centerline 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 avity 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.

Innerliner

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

Innerliner separation

. he parting of the innerliner 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.

ight 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-preumatic spare tire assembly

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, ecorations, or protective bands or ribs.

Plv

A layer of rubber-coated parallel cords.

Ply separation

A parting of rubber compound between adjacent plies.

neumatic 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 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.

-

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

his 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.

read rib

A tread section running circumferentially around a tire.

Tread separation

Pulling away of the tread from the tire carcass.

Treadwear indicators (TWI)

he 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.

4.4. 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

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.

1.5. SAFETY FIRST-BASIC TIRE MAINTENANCE

Properly maintained tires improve the steering, stopping, traction, and load-carrying capability of your vehicle.

Inderinflated tires and overloaded vehicles are a major cause of tire failure. Therefore, as mentioned above, to avoid flat es 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.

1.5.1. 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 fire 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.

1.5.2, 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.)

"ecause 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.

1.5.3. 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 underinflation 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.

1.5.4. 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 underinflated.
- 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).

you have been driving your vehicle and think that a tire is underinflated, 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 underinflated 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 underinflated 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.

1.5.5. 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.

1.5.6. <u>TIRE TREAD</u>

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.

1.5.7. 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 djustment maximizes the life of your tires. These adjustments require special equipment and should be performed by a qualified technician.

1.5.8. TIRE REPAIR

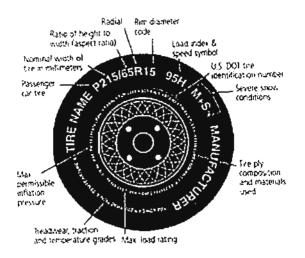
The proper repair of a punctured tire requires a plug for the hole and a patch for the area inside the tire that surrounds the puncture hole. Punctures through the tread can be repaired if they are not too large, but punctures to the sidewall should not be repaired. Tires must be removed from the rim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

1.5.9. 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.

1.5.9.1. Information on Passenger Vehicle Tires

Please refer to the diagram below.



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 R	ating	Speed Rating	
Sec.	Q		99 mph	
	R		106 mph	
	S		112.mph	
	T		118 mph	
	U STATE OF THE STA		124 mph	
	Н		130 mph	
	V Allender		149 mph	
	W		168* mph	
	Here we have the first \mathbf{Y}	产的特别的 ,例如"自然的"的	186* 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.

aximum Permissible Inflation Pressure

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

1.5.9.2. 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

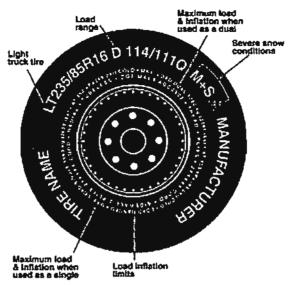
This letter indicates a tire's ability to stop on wet pavement. A higher graded tire should allow you to stop your car on wet roads in a shorter distance than a tire with a lower grade. Traction is graded from highest to lowest as "AA", "A", "B", and "C".

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, underinflation 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".

1.5.9.3. Additional Information on Light Truck 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.

Aax. 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.

1.6. 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.