LIBERTY
WHEEL END LLC

Enjoy your travel experience

with Liberty Wheel End

axles for every application!

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Service Manual
Operation & Maintenance

Trailer Axles
400-7000 pound axle capacity

* Utility * Cargo * Boat

* Live Stock * Construction

* Equestrian * Government

* Concession * Generator

* Air-Compressor * Lighting

* Military * Recreational

All applications to Meet your needs!

Seal Inspection

A. With the proper seal removal tool, remove the inner seal. Never drive out the bearing with the inner bearing. This will damage both, bearing and seal.

B. Clean the seal and inspect the inner surface area. Look for any cracks, grooves or damage. Replace the seal as necessary.

C. If the seal is in good condition, it is recommended to apply a sealant to the outside edge of the seal and re-install with a seal insertion tool or equivalent insertion process. This keeps the seal flat and inserts it at the correct flat angle and prevents seal damage.

D. Seal sealant needs to be high temp. Silicone gasket material: Permatex or equivalent.

Bearing installation and Adjustment

A. After all inspections are completed and re-assembly takes place, place the hub/drum back on the spindle after installing the bearings, seals. Be sure to have the washer and spindle nut clean and ready to put on. Slowly rotate the hub/drum while tightening the spindle castle nut. With a torque wrench set at 50 ft. pounds, tighten the castle nut.

B. After torque, loosen the spindle castle nut to one castellation or 1/4 turn. Just a small turn to loosen.

C. Finger tighten the castle spindle nut and line up the cotter pin hole in the castle nut. Install cotter pin.

D. Do not forget to bend the cotter pin over the castle nut.

E. The nut can only move back and forth slightly within the castle nut when finished.

Axle Installation with suspension

The trailer manufacturer is responsible for proper alignment of the axle on the main rails of the trailer frame. The axle must be parallel to the drive axles of the tow vehicle. This allows for necessary control while being towed on the road surface.

Good axle alignment will also reduce tire wear and eliminates any dog tracking. This happens when the trailer is not in alignment with the tow vehicle.

Triangulation is when you measure both sides of the axle to the center of the trailer hitch ball area or king pin. Drivers side and passenger side of the axle should not be more than 1/16 of an inch different from one side to the other, to the hitch ball coupler center.

If you have tandem or two axles, the measurement of the back axle to the front axle on both sides should not be off in measurement more than 1/8 of an inch.

Once the front axle is in the correct position, the second axle can be measured to the front axle.

Axle spacing, attaching hardware, hangers, equalizers, spring shackle links are all determined by the trailer manufacturer. Axle spacing is different by trailer type and size.

You may have spring axles or rubber torsion axles depending on the desired ride and load requirements desired.

Wheel nut Installation and Tension

A-Safety Notice:
Having the correct wheel torque is essential. This prevents having a wheel come off during operation. Under torque can cause stud and wheel damage as the wheel can come off causing injury or death.

B-Safety Notice: Over torque can cause stud and wheel damage and the same results can happen.

Wheel torque requirements

All torque is measured in foot pounds with a torque wrench.
Stud size 1/2"-20 thread
60 degree cone wheel nut
Tire size, 14", 15", 16" both 545, 655, 865 bolt patterns
You Must tighten you lug or wheel nuts in 3 stages
1st up to 25 ft. pounds
2nd up to 40 ft. pounds
3rd and final up to 100 to 120 ft. pounds.
When tightening, you must move your torque wrench in a star pattern back and forth on the wheel until torque specs are reached. Do not start and go in a circle pattern. This causes an uneven torque value on the wheel.

Important

After each wheel removal or tire change you must inspect and re-torque after the first 10 miles, 25 miles and once again at 50 miles. Check tires and wheels and or walk around your trailer, kicking or bumping your wheels and tires to be sure the wheel nuts are tight.

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Bearing & Cup inspection continued….

Inside the hub/drum, perform the same cleaning and inspection process on the bearing cup or races. Outer and inner. Look for the same wear and replace as necessary. These cups or races are press fit. Replacing the drum with a new one may be necessary if you do not have the right equipment to remove and press in the new cups or races.

Bearing Lubrication and Greasing

Bearing must be lubricated every 12 months or 12,000 mile.
If the trailer is used at its maximum capacity at all times, you will need to lubricate every 6 months or 6,000 miles.
Lubrication is essential to the life of your axles.
Re-packing your bearings after inspection must be completed in the proper way. If you do not have a grease pressurized packing machine, you will have to do it manually.

A. Place a golf ball size amount of grease on to the palm of your hand.
B. Force the grease into the outside edge of the bearing or the widest part of it. Force the bearing into the grease over and over until the grease is completely covering every bearing inside and out.
C. Place a light coating of grease on the bearing cup or race before installing the cone bearing back in place.
D. Your grease should have a dropping point of 215 degrees Celsius, or 419 degrees Fahrenheit.
Lithium complex, EP, Corrosion & Oxidation Inhibitors
The viscosity Index must me 80 minimum.

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Idler Hubs, Brake Drums and Bearings continued……..

Hub/Drum inspection and removal

A. Properly and safely raise your trailer to where the tires can rotate freely.

B. Remove tire and wheel.

C. You will notice a grease cap, carefully remove it while prying around the caps rim. If cap is damaged, you will need to replace it.

D. You will notice a cotter pin through the castle nut. Bend it straight and pull it out.

E. Un-screw the castle spindle nut and take it off. Remember how you took off the parts and do not lose any of them. They will need to go back on the same way they were removed.

F. Remove the hub/drum. Do not allow the bearings to fall to the ground and get gravel, sand or dirt on them. You will have to clean and re-pack the bearing.

G. Inspects all parts. Replace as necessary.

H. Inspect the hub/drum carefully. Look for any wear or scuffing, scoring or marks of any kind. If you see any wear in the brake surface or magnet armature surface area that is not normal, replace the drum. Surfaces should be smooth and without grooves or cracks.

I. Inside diameters should be inspected at this time. 10 inch and 12 inch drums should not exceed .020 inch over their 10" and 12" interior size. Replace the drum if they are over .020 in wear.

Cone shaped Bearing & Cup inspection

Clean all grease off the cone bearing. Use the correct solvent for cleaning. After dried and clean, inspect the bearing cage for cracks and every bearing for wear. (Do not blow compressed air and spin the bearing) This can cause damage to the bearing. Look for any scoring, marks pitting, corrosion of any kind.

Replace as necessary.

Schedule of Maintenance

	12 Months OR 12000 miles		6 months OR 6000 miles	3 months OR 3000 miles
Tire inflation	Check on every use			
Wheels			X	
Tire condition	Check on every use			
Wheel nuts				X
Hangers	X			
Equalizers Bolts Nuts				X
Suspension & Links			X	
Bearing/cups	X			
Seals	X			
Hub/Drums	X			
Breakaway	Check battery charge every use			
Brake wiring	X			
Brake controller			X	
Brake linings	X			
Brake magnets			X	
Brake adjustment				X
Brakes Operation	Check on every use			
Springs wear	X			

24 Hour Call Center

There are times when you may have a warranty or service need surrounding the axles on your trailer.

Do not hesitate to use our 24 hour service and warranty number to address your needs.

24 hours a day, Toll Free, call center phone number

1-888-583-5116

When you call, you will be given instructions to leave a detailed message explaining exactly what your warranty or service need is.

It is very important to leave a very comprehensive message. The information that is shared will help us to address your precise need.

Important information:

1. Date of the call.
2. Location of the unit. Address, city and State.
3. With the best description possible, what is the exact need?
4. Return phone number, email and address.
5. The name of the caller must be the owner of the trailer.
6. Serial number off of the trailer and the axle.
7. The warranty card from the trailer purchase will need to be on file with the Trailer Manufacturer.
8. The warranty of the trailer is not transferable to a second owner and the age of the unit will not be considered.
9. Please review your warranty in detail before any warranty calls are made to the call center.
10. Refer to the Warranty for a new trailer and first owner.

24 hours a day, Toll Free, call center phone number

1-888-583-5116

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Brake Adjustment to Controller

With your brake controller in operation, choose a safe, dry, paved or concrete road. No gravel or sand; from 15 to 20 MPH, make some hard stops. If your brakes apply and your tires slide, adjust your brake controller to a lower setting. You want your brakes to apply without sliding. Tires sliding are very unsafe and also cause flat spots to appear on the tires and this spot will cause a bumping sound felt while pulling your trailer. Pre-mature tire wear will also occur and this is not only un-safe, it is costly. This will force you to replace your tires. Loss of control of your trailer can be catastrophic when it is sliding because of an over braking setting on your brake controller.

Your brake controller mfg. instructions will explain how to have your trailer brakes to apply slightly before your tow vehicles brake apply. When the proper setting is achieved, you will have smooth braking without a jerking or tugging sensation.

Brake Maintenance

A. Properly and safely raise up the trailer to where your tires can rotate freely.
B. While spinning each tire, apply your trailer brakes. Check each tire to make sure it stops abruptly. This will let you know if each of your brakes are working. You may need some assistance to help.
C. On the back of the brake backer plate, there is a slotted hole(may be a cap on it to be removed) take a screw driver or brake adjuster tool and rotate the slotted wheel adjuster inside. Adjust the brakes to increase to decrease the pressure of the shoes on the drum (For drop spindles, you may need a modified tool) while moving the adjuster up or down.

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Brake types continued……..

You want the brake shoe to make a slight dragging sound as you rotate the tire or drum. Repeat these steps until the desired dragging sound is achieved. Do not have the brakes dragging on the drum so loud that it is hard to turn the tire or drum. If the brakes are dragging to a point where it is hard to turn, this will cause the brake to get hot while rubbing without applying the breaks. You want a very slight dragging sound without slowing the rotation of the tire or drum. Repeat this on all tires and drums. Replace the slotted hole cover when finished.

Remember. Every 3000 miles the brakes need inspected. Clean brake dust, inspect all components, inspect the grease and keep everything in proper condition. Your qualified service technician will instruct you on what needs to be serviced. **Avoid breathing any brake dust, take every precaution to not grind on or alter the brake shoes. The lining may contain asbestos dust. Do not blow off this dust in any way. Take all precautions. Keep oil and grease off of the magnets, linings and drums.

Idler Hubs, Brake Drums and Bearings

We use the Lubed spindles on all of our axles. This allows for the greasing of the hubs and drums without removing the cap and hub/drum assembly. You simply remove the rubber cap on the center of the metal grease cap on the hub/drum. There is grease zerk inside. While the tire is raised, spin the tire while greasing. At the first sign of grease movement inside the cap, stop greasing. Make sure your grease zerk is free of dirt or debris. If the grease will not flow through the zerk, replace the grease zerk. With lubed spindles, both inner and outer bearing are greased at the same time. Do not over fill. This will push out the inner grease seal and cause bearing eventual bearing failure.

Axle Warranty

Liberty Wheel End, Limited Warranty

Liberty Wheel End(LWE)
Products Covered
Liberty Wheel End axles, after Sept. 1, 2019.

1 Year Limited Warranty
After strictly following Liberty Wheel ends maintenance. Instructions regarding grease, oil and lug nut tension, there is a one year limited warranty to the original purchaser from the date of the sale. Grease seals oil are not included.

2 year limited Warranty
LWE warrants to the original purchaser that its electric/ hydraulic brake actuators shall be free from defects in parts workmanship for a period of 2 years from the date of the trailer sale.

5 year limited Warranty
LWE warrants to the original purchaser that its axles, suspension system and original replacement components shall be free from defects in parts workmanship for a period of (5) years from the date of the trailer sale.

Warranty Action
LWE will, at its option, correct or replace the components of the axle, correct or swap out or send another axle to care for the defect axle or refund the lower amount of original price. This will be done in a reasonable period of time. All of this is based on response times of the end user. All warranty's must be approved by LWE.

How to handle Warranties
A. Warranty clam must be created.
B. Original trailer purchaser must be established by using the vin number and certificate of origin.
C. Prompt notification of axle issue, axle serial number, samples of parts may be necessary to establish original parts are not tampered with.
D. All Axle components must have been maintained according to industry standards for greasing, oiling, checking lug nut, backer plate and U-bolt tensions.

Liberty Wheel End, Limited Warranty

What is excluded

Warranties do not cover defects caused by:

1. Attachment of axle to the frame
2. Brake wire connection to the axle
3. Alterations in any way
4. Non LWE parts
5. Axles switched or on different units
6. Normal use wear and tear
7. Poor installation
8. Poor alignment
9. Incorrect torque specs of all attached components.
10. Industry standard maintenance and torque specs must be followed.
11. Appearance finish or corrosion.

Limitations explained

A. In every case/claim, LWE has the right to satisfy the responsibility within the Limited Warranty by refunding the lower amount of purchase price. This includes discontinued components.
B. LWE can offer substitutions for discontinued components.
C. All warranty is nontransferable.

Summary

1. Warranties are exclusive. No other warranties supersede this axle warranty.
2. Warranty legal rights vary from state to state.
3. LWE excludes any incidental and Consequential damages, including towing fees, Utilities, Phone or power, meals, lodging, loss of time, stress or aggravations or any breach of any expressed or implied warranty.
4. Again, each state can be different on the legal handling of limited warranties.
5. All requirements of warranty need to be sent to: Liberty Wheel End, LLC
   57800 Beech Road
   Mishawaka, IN 46516
   Libertywheelend.com

1. **Manual adjust electric brakes**
2. **Auto adjust electric brakes**
3. **Electric brakes with parking brake option.**

***Manual adjust electric brake must be manually adjusted during the life of the brakes.**
***Auto adjust electric brakes automatically adjust every time you stop going forward or backward. As the brake shoes wear, a gap is created. This gap is noticed by the adjuster and the mechanism closes this gap during and when the brakes are applied.**
***Parking brake option is installed on the trailer so you can apply the parking brake with a parking lever arm. There is a cable attached to the parking lever that is run to the brakes. When this lever is moved, it pulls the cable that is attached to the pivot pin and cam assembly. This creates the force to the brake shoes and the trailer unit will sit with the brakes applied.**
Do not use these brakes on a hill and assume the trailer will not roll down the hill. Wheel chocks must always be used behind all tires and a trailer must never be left on a hill of any kind un-attended.

For all brakes types, electric or hydraulic, as you have your brakes inspected every 3000 miles, you will notice the shoes will show wear and will need to be adjusted. Eventually you will need to replace your brake shoes. Your service technician will notify you when this needs to take place. Do not wait until your brakes fail. Replace your shoes well in advance.
Obviously, trailer brake failure severely effects your stopping distance and can result in injury, death and serious equipment damage.

Brake Adjustment continued…..

As you continue to apply the brakes within the first 5 miles, you will begin to feel the brakes grab harder and harder as the drums nest to the brake shoes. Never drive away with a new trailer and trust that the brakes are 100% effective. Test them, be careful, operate your vehicle as if your brakes may not be working until you know and feel them doing their job.
Brakes must be inspected in the first 200 miles and every 3000 miles after that. This will insure optimum performance is being met. Set you brake controller per the manufacturers instructions.

Electric Brakes

Electric brakes are exactly what they sound like. They use electricity to flow in and through a brake magnet that creates magnetivity. The magnet grabs the surface of the brake drums interior surface. This motion moves the brake arm and advances the brake shoes to the interior surface area of the brake drum. It is crucial that the trailers electrical system is in perfect order for the electric brake to function correctly.
Always look for wiring issues, and apply your brakes at and on every trip.

There are two brake shoes within your brake drum.
A primary brake shoe and a secondary brake shoe.
The primary applies first and then the secondary moves into position and applies after. As the pressure increases, your brakes increase until you reach your stop.

Always test your brakes as you travel. This will insure your stop distances will be achieved.

Notes

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Safety Notice

When having your trailer axles serviced in any way, it is very important to take the time and select a certified and professional technician that understands the important procedures and specifications of proper equipment, parts or components, grease, torque specs, service and repair processes of every aspect of maintenance and servicing of your trailer axles. Serious injury or death can follow if the correct steps are not followed.

Wheel nut Torque

There are painted surfaces, mill oils and particles that can get on the surfaces when installation of the tires and wheels are installed. Wheel nut torque must be inspected and adjusted within the first miles of your unit.

They must be inspected and adjusted within:

*** 10, 25 and 50 miles of the first travel mile.**

Tire Pressure

***Tire pressure can change at any time. We suggest inspecting the tires at all times during travel and at every stop along the days travel. Always fill the tires to each manufacturers requirement.**

Brake Adjustment

Inspect and always use your brake controller to check to see if your trailer brakes are working on every trip.

*** Use your brakes aggressively on a new trailer within the first 5 miles. Apply the brake controller multiple times to burnish or heat up your brakes. This will dry all mill oils that may be on the brake drums from the manufacturing process.**

Introduction

This manual is provided to help you operate and maintain your axles so you can achieve the best possible results, both short and long term as you travel across the country with our axles supporting your trailer.

All of Liberty Wheel ends components have been vigorously tested to stand up to the conditions that trailer axles encounter every day as they are used in hundreds of various applications.

Our testing and quality systems in place stand up to ISO 9001:2019 and CSA standards. In addition, our product performance is equal to and in many cases finishes far ahead of our competition.

Visit our site at www.libertywheelend.com

We would appreciate hearing from you!

Notes

Notes

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Table of Contents Page #