

August 2014



TRACKER TECH & HOW-TO

SUPPLIER TECHNICAL INFORMATION

Tie Down Engineering Vortex Hub System

THE FOLLOWING INFORMATION IS PROVIDED BY TIE DOWN ENGINEERING TO PROVIDE FEATURES OF, AS WELL AS WARRANTY AND MAINTENANCE INFORMATION RELATING TO THEIR VORTEX HUB SYSTEM.

THE INFORMATION PROVIDED IS A RESOURCE FOR INSTRUCTION INTENDED AS A GENERAL GUIDE FOR THIS AND OTHER SIMILAR APPLICATIONS.

SPECIFICATIONS ARE ALWAYS SUBJECT TO CHANGE IN THE MANUFACTURING PROCESS SO SOME PORTIONS OF THIS GUIDE MAY NOT DIRECTLY APPLY TO CERTAIN MODELS OR COMPONENTS.



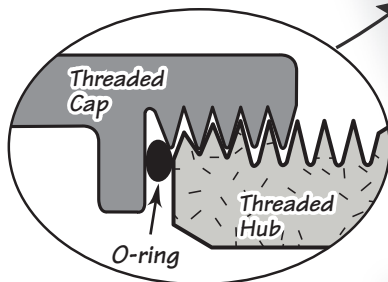
OEM HIGH PERFORMANCE 100,000 MILE LUBRICATION SYSTEM

With **LUCAS OIL** Premium Marine Grease,
A Lithium Complex Fortified Grease with Rust and Oxidation
Inhibitors, High Pressure Additives That Provide a High
Degree of Water Resistance and Washout Properties

Completely sealed lubrication
reservoir chamber permits
maximum lubrication

Internal lubrication channel allows
for maximum flushing of the existing
lubricant while flushing the system
with new lubricant, when the time
comes to change grease

Easily accessible
internal lubrication
port fitting



Threaded cap for easy removal
and easy re-installation

Triple lip spring loaded seal
provides improved sealing over
single & double lip seals

- Easy On & Off Threaded Cap
- No Special Tools Needed
- Reusable Cap is Strong and Unbreakable!

Hub Grease Manufactured
by:



- 100,000 mile or 6 year limited warranty* (no extra cost!)
- "No Touch" lubrication system
- No maintenance/service for lower operating costs
- No need for periodic re-greasing or inspection
- Reusable dust cap is threaded for easy removal should the need occur.

* 1 year on parts/labor, 5 additional years on parts

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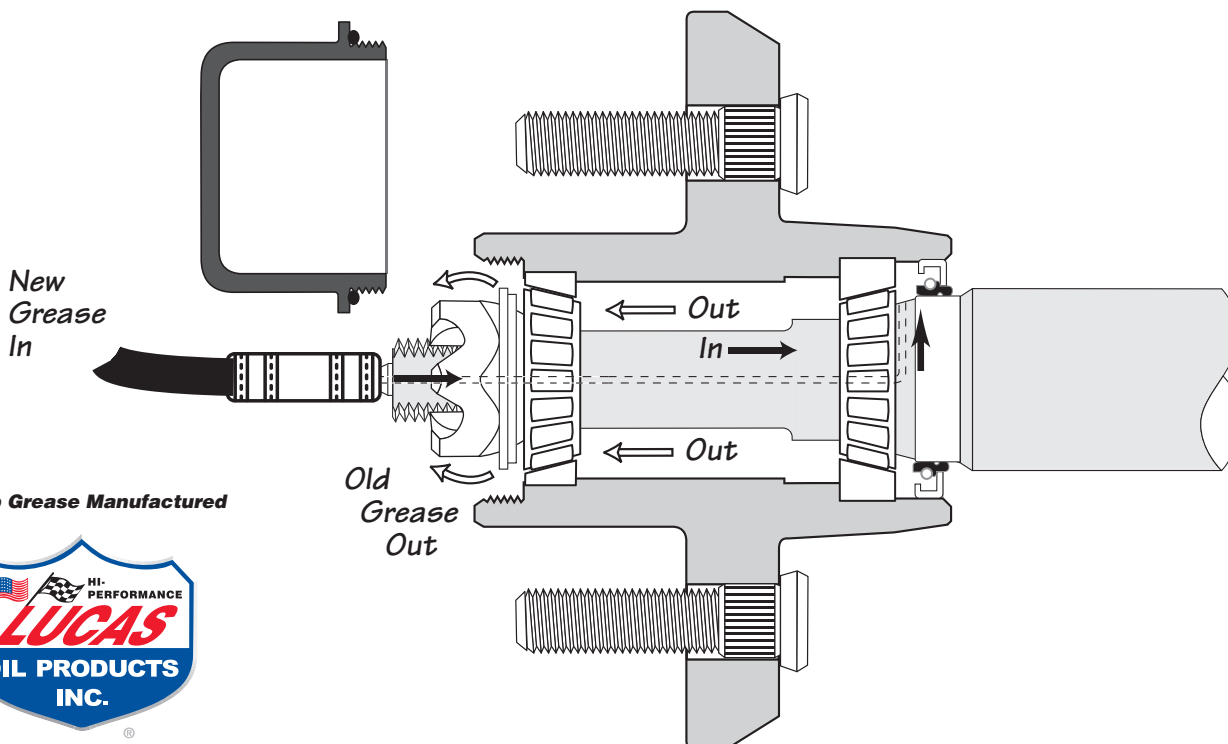
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Vortex Lubrication System

Your hub/spindle is equipped with Tie Down Engineering's Vortex Lubrication System. While the Vortex Lubrication System is designed not to be touched, there could be a time where it will be necessary to change or add new grease. The bearings can be 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 existing grease, unlike systems that just push new grease on top of old grease. This insures that the hub cavity is completely filled with new grease, if ever required.

1. Remove the threaded grease cap.
2. Use a standard grease gun by attaching to the grease fitting located at the end of the spindle confirming the grease gun nozzle is engaged on the fitting tightly.
3. Pump grease into the fitting. 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 screw on cap. When the O-ring and hub meet, turn 1/4 more to secure the cap.
6. To maintain your warranty, should you add or change grease, Marine Grade "Lucas Oil" must be used.



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Vortex Hub Owners Manual



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Vortex Wheel Hub/Spindle Operating Instructions

Simple is best when it comes to Wheel bearing lubrication. Tie Down has adapted the best features of grease and oil lubrication to develop the Vortex hub. The Vortex hub bearing lubrication system provides long term continuous bearing lubrication and ease of service or inspection.

Your trailer is equipped with Vortex hubs/spindles from Tie Down Engineering. The hubs are pre-grease and assembled at the factory and should not require any additional adjustments, The Vortex hub uses tapered roller bearings adjusted to a maximum .006 end play. The twelve sided castle nut easily maintains this maximum .006 end play. The configuration requires a minimal amount of end-play that is factored in at the time of assembly.

Vortex Features:

- Stainless steel wear sleeve on factory assembled spindle/hub units
- Vortex internal through the spindle lubrication system
- Super strong threaded removable grease cap
- Premium grade Lucas Oil Marine grease (100,000 miles)

What makes the Vortex the Best

The rear seal rides on a stainless steel wear sleeve. This provides longer life for the seal as the surface does not corrode. Corroded or rusted seal surfaces act like sandpaper on the seal causing premature failure.

Vortex lubrication makes changing or adding grease easy with no need to remove the hub. The threaded grease cap is easy to remove and replace. No more knocking the cap off with a hammer. Lucas Oil Marine grease is a premium lithium based complex fortified with rust and oxidation inhibitors, high pressure additives and provides a high degree of moisture resistance and washout properties.

These features allow Tie Down Engineering to offer a 6 year, 100,000 mile limited warranty. See separate warranty sheet for details.

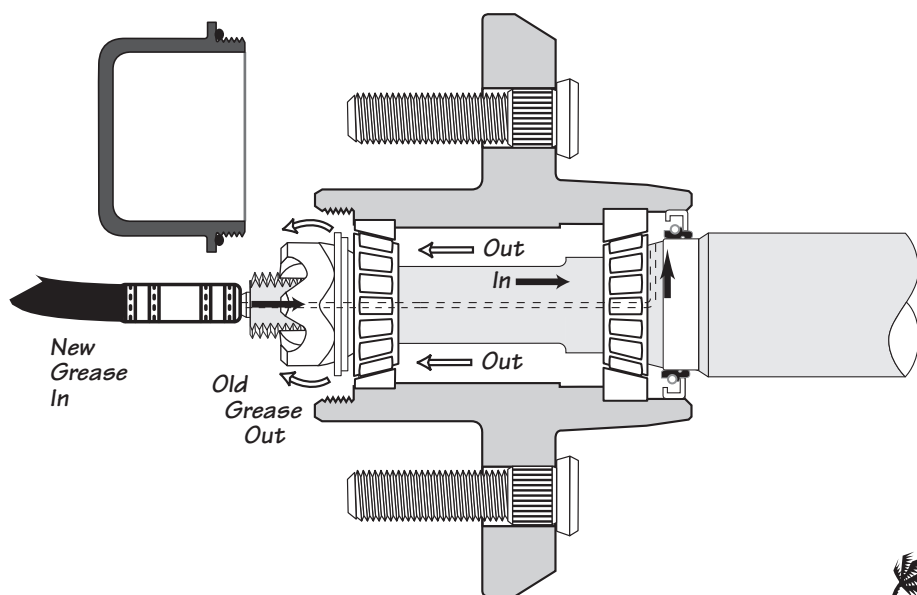
The Vortex hub/spindle is designed to be a no maintenance hub for 6 years. If you should need to add grease or remove the hubs for any reason, follow the instructions listed in this owner's manual.

TO MAINTAIN THE FACTORY WARRANTY, LUCAS OIL MARINE GREASE MUST BE USED WHEN ADDING OR REPLACING GREASE IN THE VORTEX HUB.

Adding or changing Lucas Oil Marine grease in your Vortex hub

Your Vortex hub/spindle is equipped with the Vortex Lubrication System. Should the hub/bearings require additional lubrication for any reason, the Vortex lubrication system allows you to do so without removing the hub or having to re-adjust the bearings. New Lucas Oil Marine grease is pumped into the zerc fitting at the end of the spindle, travels to the rear bearing where the new grease pushes out the old grease through the rear bearing, center of hub and through the front bearing.

1. Remove the Vortex grease cap, un-screwing in a counter clockwise rotation.
2. Use a standard grease gun loaded with Lucas Oil marine grease to pump grease into the zerc fitting located on the end of the spindle.
3. Pump the Lucas Oil Marine grease into the zerc fitting while slowly rotating the wheel. Grease will flow out of the hub around the front bearing.
4. When the grease appears to be the new clean grease, remove the grease gun.
5. Replace the Vortex grease cap. Turn in a clock-wise rotation until the o-ring on the cap is in contact with the hub surface. Turn an additional 1/4 turn to seal the Vortex cap to the hub. (This is similar to installing an oil filter in an automobile)



Removing/Remounting for the Vortex hub

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

1. Elevate the trailer on level ground using the manufacturers instructions. Always use jack stands or other solid supports. Do not rely on a jack to support the trailer. Block wheels to keep the trailer from rolling.
2. Remove the tire/wheel assembly
3. Place a newspaper or cloth on the ground under the hub to keep any parts from falling onto a dirty surface.
4. Remove the Vortex grease cap by un-screwing in a counter clockwise rotation
5. Remove the cotter pin, castle nut (in a counter clockwise rotation) and washer
6. Remove the hub from the spindle. If you have disc brakes, you will need to remove the brake caliper to remove the rotor. Follow separate instructions for disc brake rotor removal
7. Be careful not to allow the bearings to fall out of the hub
8. Clean bearing and cup surfaces
9. To re-install, coat bearings with Lucas Oil Marine grease before re-installing.
10. Install bearings and place hub on spindle in reverse order as listed above. Rotate the hub while applying approximately 50 ft lbs of torque to the spindle nut. This translates into a full hand pressure load with a 12" long wrench. This "seats" the bearings.
11. Loosen the spindle nut to remove the torque applied. **DO NOT ROTATE THE HUB.**
12. Tighten the spindle nut until snug, backing off only enough to line up the cotter pin with the hole in the spindle.
13. Bend the cotter pin into place
14. **LOAD HUB WITH LUCAS OIL MARINE GREASE USING THE INSTRUCTIONS FOR ADDING OR CHANGING GREASE**
15. Replace the Vortex grease cap. Turn in a clock-wise rotation until the o-ring on the cap in contact with the hub surface. Turn an additional 1/4 turn to seal the Vortex cap to the hub. (This is similar to installing an oil filter in an automobile)
16. Replace tire/wheel, torque lug nuts according to wheel manufacturers instructions.
17. Test hub for proper end play by grabbing the tire and pulling the tire from side to side. Readjust if necessary.
18. **VERY IMPORTANT: RE-CHECK LUG NUTS AFTER 25 MILES OF USE.**

Vortex Limited Warranty

OEM

TIE DOWN ENGINEERING, Inc.

("TIE DOWN") warrants the Vortex hub/bearings to be free from defects in material and workmanship for six years or 100,000 miles, whichever comes first, from date of delivery to the original purchaser. First year parts and labor, remaining five years are for parts only (hub assembly). To maintain this limited warranty "LUCAS OIL" Marine Grease must be used when adding or replacing grease in the Vortex Hub.

Should you need a replacement during the six-year warranty period, return the hub with bearings, seal and cap, pre-paid to Tie Down Engineering. Upon proof of purchase, TDE will send you a replacement Vortex hub assembly at no charge. Option for consumer is to call TDE with Credit card info and TDE will send new hub to consumer and credit consumer when old hub is returned.

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

- Damage caused during installation by when not installed by the Tie DOWN ENG. factory.
- Parts, accessories, materials or components used with or replacing any TIE DOWN Eng. component not obtained from or approved in writing by TIE DOWN ENG.
- 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 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 ENG's product information materials.

If any TIE DOWN ENG. products are found upon TIE DOWN ENG's examination to have been defective when supplied, TIE DOWN will either: credit the OEM manufacturer's account for the purchase price of the TIE DOWN product; replace the TIE DOWN ENG. product; or repair the product. TIE DOWN Eng. has sole discretion in choosing which option to provide. For this LIMITED WARRANTY to apply TIE DOWN ENG. 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 ENG., purchaser shall return the alleged defective product to TIE DOWN ENG. for examination at purchaser's expense. TIE DOWN ENG. will not pay for expenses incurred in returning a product to TIE DOWN ENG. without TIE DOWN ENG's prior written authority. TIE DOWN ENG. 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 ENG. is limited and TIE DOWN ENG. 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 ENG., WHETHER IN CONTRACT, IN TORT, UNDER ANY WARRANTY OR OTHERWISE, SHALL NOT EXCEED THE OEM PURCHASE PRICE OF THE PARTICULAR PRODUCT MANUFACTURED, SOLD OR SUPPLIED BY TIE DOWN ENG.

To Obtain Technical Assistance: To enable TIE DOWN ENG. to respond to a request for assistance or evaluation of customer or user operating difficulty, please contact your selling dealer or trailer manufacturer first. Should you need to contact TDE, provide at a minimum the following information by calling 404-344-0000:

- 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 trailer with the TIE DOWN ENG. product installed
- State your difficulty, being sure to mention at least the following: Application, Nature of load involved, and Weight of the load.

Charges for service, labor, towing 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 ENG. 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 that 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 ENG. 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 ENG. PRODUCTS (WHEELS, HUBS, BRAKES, ETC.) ARE SUBJECTED BY USERS, WE ARE UNABLE TO SPECIFY CARRYING CAPACITIES OR SPEEDS FOR A PARTICULAR APPLICATION. THEREFORE, THE TRAILER 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 OCTOBER 2010.

THIS WARRANTY SUPERSEDES ALL PRIOR WARRANTIES, WRITTEN OR IMPLIED.

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