VIKING SPECIALIZED TRAILERS

INFORMATION

Model Number:________________

Serial Number:_______________

Date of Purchase:___________

Dealer:_______________________

Company and Owner Name:________________________

Address: _____________________

Phone: _______________

City, State, & Zip code: _________________________

Suspension Type:______________

Paint: ____________

Air Brake Type:_______________

Flooring: ________________

Tires: _____________________

THANK YOU FOR MAKING Viking Specialized Trailers

YOUR NUMBER ONE TRAILER SOURCE!

call (936) 564-8370 (800) 562-0730
CONGRATULATIONS

On your purchase of a Quality Viking Specialized Trailer and Thank you for selection Viking Specialized Trailers as your trailer source.

Introduction

Thank you for purchasing your new Viking Specialized Trailer. This Owner's manual is provided so that you can become familiar with your Viking Specialized Trailer and components. It also includes maintenance information and safety guidelines for operating your trailer.

The life of a trailer can be increased with proper and regular maintenance. Developing an organized trailer maintenance program will ensure maximum service from your trailer. The department of Transportation requires that maintenance records be kept on every commercial highway vehicle. It is your responsibility to maintain these maintenance records.

IMPORTANT NOTICE

Vehicles manufactured by Viking Specialized Trailers are designed to be operated in accordance with the gross axle weight rating (GAWR) shown on the certification label and legal highway speeds in the service for which they were intended.

GENERAL INFORMATION

Maintenance should be performed by a Viking Specialized Trailers Dealer, or by other qualified service facilities that provide such service. For questions, contact your Viking Specialized Trailers sales representative.

IMPORTANT NOTICE

Alterations to a Viking Specialized Trailer should not be made without first consulting the Viking Specialized Trailers Engineering Department. Alterations could affect the structural integrity of the trailer and void the warranty. Welding or other alterations should never be made to any air reservoir, wheel, rim, air chamber, spring, or mainframe.

The gross axle weight rating (GAWR) that is stamped on the certification plate is the structural capacity of the lowest-rated component of the suspension, springs, hubs, drums, wheels, rims, bearings, brakes, axles, and tires. If components are substituted that affect GAWR that are of less capacity than those originally installed, the GAWR on the certification plate must be lowered to the corresponding lower capacity by adding the "Altered Vehicle" label. If components are substituted that are of equal or greater capacity than those originally installed, then GAWR labels need not be changed.
Introduction (continued)

The equipment appearance is important to the trucking industry. It can favorably project the public image of your company. Maintaining its appearance also adds to their physical condition and ultimate trade-in value. Protective paints and other coatings are necessary to prevent corrosion and protect the metal and wood surfaces.

USE OF CORROSIVE CLEANERS

Be sure to use a cleaner that will not corrode or change the integrity of the finish of your trailer. Corrosive cleaners can change, discolor, or remove the topcoat finish of your trailer and cause corrosion and rust, especially in areas that are hard to wash clean and neutralize the cleaner/cleaners being used.

Trailers that operate in environments that are conducive to severe corrosion may require more or different protective coatings than those usually applied as standard. Check with your Viking Specialized Trailers representative for recommendations.

SAFETY NOTICE

There are "WARNING" and "CAUTION" decals prominently displayed on all trailers. All personnel operating the vehicle should follow these. If the person operating the vehicle is unsure or unaware of a safety procedure, Please call your nearest Viking Specialized Trailers dealer for assistance.

REPORTING SAFETY DEFECTS

If you believe your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform your DEALER as well as Viking Specialized Trailers warranty or engineering department at the numbers below.

VIKING SPECIALIZED TRAILERS / WARRANTY DEPT.
1730 S. W. Stalling Dr., Suite 101
Nacogdoches, TX 75964
(936) 564-8370 or 844-815-6210

This manual will help you become familiar with your Viking Specialized Trailer. It is important to know the components, maintenance and safety of the vehicle you are operating. Remember to read and fill out the Viking Specialized Trailers warranty and vehicle information page located in this manual. It is important to read the warranty for this vehicle. Understanding the terms and conditions of the warranty will help in reporting warranty issues to your DEALER and Viking Specialized Trailers. The information page will serve as a quick reference for the important information related to your Viking Specialized Trailer.
VIKING SPECIALIZED TRAILERS WARRANTY

Model NO:__________________        Serial NO:__________________

Viking Specialized Trailers warrants to all original purchasers, subject to the exceptions and upon the conditions below, that the product shall be free from defects in material and workmanship, for a period of one (1) year. Five (5) years on Highway Flats & Drop Decks) from delivery date to purchaser.

Condition No. 1
All claims made against this warranty shall be submitted on the proper form provided by the dealer. The form shall be submitted by the dealer to Viking Specialized Trailers Warranty Department. Exceptions can be made by an officer of the Company.

Condition No. 2
Viking Specialized Trailers reserves the right to repair or replace any part or parts of the product at their discretion.

Condition No. 3
This warranty does not cover parts or component parts not manufactured by Viking Specialized Trailers. These parts are covered under warranties by the respective manufacturer, and must be filed by the dealer or Viking Specialized Trailers.

Condition No. 4
This warranty form must be filled out and filed with Viking Specialized Trailers within 30 days by the dealer in order for the said warranty to be valid.

Condition No. 5
This warranty shall be Void if, in the judgement of Viking Specialized Trailers, the cause of the failure is due to the following: alterations made by the customer or dealer, misuse, negligence, operation at speeds above legal limits, or exceeding the load rating of the trailer.

Condition No. 6
In no event shall Viking Specialized Trailers be liable for bodily Injury, incidental or consequential damages, or commercial losses.

Condition No. 7
Viking Specialized Trailers is not responsible for any failures due to negligence regarding the scheduled maintenance in the owners manual.

I understand the following warranty conditions and warranty.

PLEASE PRINT:
Company:___________________________ Owner Name:________________________________
Signature:___________________________ Phone No: __________________________
Address: ____________________________ City: _________________State:_______Zip:_______
Dealer: _____________________________ Signature of Dealer:________________________
Address:____________________________ City: _________________State:_______Zip:_______
Date Sold: __________________________

Section 1 - 5
WARRANTY FILING PROCEDURE

If warranty is requested on Viking Specialized Trailers Product, please read the following guidelines and follow the filing procedures stated below.

Viking Specialized Trailers warrants the material, labor and workmanship for a period of one (1) year on all equipment trailers and five (5) years on highway trailers. Warranty will be granted or denied only after Inspection of the Failure. If Viking Specialized Trailers supplies repair parts for undetermined warranty repairs. The parts will be billed to the customer and credited back if the warranty is determined valid.

1. Please notify Viking Specialized Trailers prior to any repair concerning a possible warranty claim.
2. All areas of the warranty claim must be properly filled out with the correct information. Failure to provide accurate and correct information will void the warranty claim and warranty consideration will be denied.
3. To process the warranty claim, Viking Specialized Trailers will need to know the following:
   a. The Complaint: What is the nature of the failure? What has happened?
   b. The Cause: All necessary information that can be helpful in determining what has caused the failure or what series of events led to the failure.
   c. The Correction: Viking Specialized Trailers will consider all information provided and information gathered by Viking Specialized Trailers in the repair process for warranty consideration/denial. This information is necessary to make a good complete repair.
4. Responsibility for the repair will be determined prior to the start of the work.
5. Once responsibility for the repair has been determined, there will be no changes or considerations.
6. Viking Specialized Trailers will request written documentation and photographs to assist in warranty determination.
7. Failed parts must be returned for inspection prior to warranty approval. If repair parts have been sent for a warranty repair the old parts must be returned to receive a parts credit.
8. Viking Specialized Trailers reserves the right to grant or deny any repair or warranty repair.
9. Viking Specialized Trailers reserves the right to deny any repair that violates any safety or engineering margins in which the product was manufactured under.
10. Please send all information to:
    Viking Specialized Trailers, L.L.C. Phone# (936) 564-8370 (844) 815-6210
    Att: Warranty Administrator Fax# 936-205-9171
    1730 S. W. Stalling Dr., Suite 101
    Nacogdoches, TX 75964
# Warranty Claim Form

## Owner Information
- **Owner:**
- **Contact:**
- **Address:**
- **City:**
- **State:**
- **Zip:**

## Claim Details
- **Claim #____________**
- **R.G.A.# __________**

## Information on Failed Unit:
- **Serial Number**
- **Mfg. & Model**
- **Hours on Unit**

## Failed Unit is Installed In:
- **Serial Number**
- **Mfg. & Model**
- **Hours on unit at time of installation**

## Description of Complaint
- **Description of key part that caused failure:**
- **Part no. and description of key part that caused failure:**

## Manufacturer's Parts Used

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Part #</th>
<th>Description</th>
<th>Price Ea.</th>
<th>Total Price</th>
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## Other Parts and Charges

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Part #</th>
<th>Description</th>
<th>Price Ea.</th>
<th>Total Price</th>
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## Labor Hours

<table>
<thead>
<tr>
<th>Labor Hours</th>
<th>Description</th>
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## Claim Summary
- **Total Manufacturer's Parts Used $**
- **Total Other Parts & Charges $**
- **Total Labor Hours @ $ = $**
- **Claim Total $**

---

**Signature of person filing claim ----Sign______________________Print Name_______________________**

---

1. Use this form when requesting warranty consideration. Fill in form completely. Lack of information will delay action. Must be submitted within 10 days of repair.

2. Retain a copy of this form for your records. Retain defective parts for warranty consideration. Parts that are returned to the factory must be shipped freight prepaid and properly tagged with identification of unit serial number, part number and returned goods authorization number.
<table>
<thead>
<tr>
<th><strong>Manufacturer’s Parts Used</strong></th>
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<tbody>
<tr>
<td><strong>Quantity</strong></td>
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<thead>
<tr>
<th><strong>Other Parts &amp; Charges</strong></th>
<th>(Attach Receipts.)</th>
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<tbody>
<tr>
<td><strong>Quantity</strong></td>
<td><strong>Part #</strong></td>
<td><strong>Description</strong></td>
<td><strong>Price Ea.</strong></td>
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**REMARKS**

---

**Factory Use Only**

**Material Disposition Instructions**

**Approval Signature**

**Ship circled items indicating RGA#________________**

**Date ______________________________**

---

**Action** | **Date** | **Warranty Parts Credit** | **Approvals**

| Receiving Report |  | Original Parts Invoice Amount……………… | Credits _____ | Charges ____ |
| Return to Vendor P.O. |  | Additional Credits or Charges…………… | Approved _____ | Disapproved _____ |
| Repair Work Order |  | Approved Credit Amount……………… | By: _____ Date _____ |
| Returned to Customer |  | Repaired Parts Charges……………… | Remarks: |
| Returned to Stock Report |  | Repair Charges |  |
| Scrap Report |  | Total Amount |  |

---

**Warranty Claim Form**

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SECTION 1

Decals

Warning

&

Informational
Item Part # 360-00120

MADE IN U.S.A.

Viking Specialized Trailers
(936)564-8370

NACOGDOCHES, TX
PremiumDesignsLLC, Timpson, TX

Item Part # 097-00471

MADE WITH PRIDE BY

VIKING SPECIALIZED TRAILERS LLC
TEXAS, USA
INFORMATIONAL & WARNING Decals

Introduction

Trailer Decals

There are many important decals on your Viking Specialized Trailer. These decals serve several different purposes, including maintenance information, safety information, and information about state and federal regulations. If a decal becomes unreadable or missing, please contact Viking Specialized Trailers for a replacement. Please become familiar with the decals on your trailer so that regulations and safe practices can be followed.

Item Part # 360-00046

D.O.T. Reflective Tape to Cover 50% of Side of Trailer
On Back on Top 94”
On Back Bottom (2) 47” Strips

Red / White Continuous Reflective Tape
Item part # 850-00034

Red / White Kiss Cut Reflective Tape
Item part # 850-00082
Item Part # 360-00045

Caution Decals

![Caution Decal](image1)

Item Part # 360-00077

![Caution Decal](image2)

Before Towing This Trailer:
1) Make a visual check to assure that the fifth wheel locking lever is in the locked position.
2) Make sure you are coupled by first locking the trailer brakes and then pulling forward on the king pin hard enough to overcome the friction between the fifth wheel and King Pin plate. If towing this trailer with a dolly perform the coupling test with the brake locked on the rear axle of the trailer and brakes released on the dolly, lead trailer and tractor.
Performs these tests on dry finished roadway surfaces, not on gravel, wet, or slippery surfaces.
3) Make sure legs are cranked up.
Stay Clear Decals

Item Part # 360-00063

![Stay Clear Decal Image]

Item Part # 360-00105

![Warning Sign Image]
Safety / Brake winch / Item Part # 360-00052

**IMPORTANT SAFETY INFORMATION**

- This brake winch is built for multi-purpose hauling and lifting operations. It is not to be used as a hoist for lifting, supporting or transporting people, or for loads over areas where people could be present.
- Respect this winch. High forces are created when using this winch, creating potential safety hazards. It should be operated and maintained in accordance with instructions. Never allow children or anyone who is not familiar with the operation of the winch to use it. A winch accident could result in personal injury.
- Check winch for proper operation on each use. Do not use if damaged. Seek immediate repairs.
- Never exceed rated capacity. Excess load may cause premature failure and could result in serious personal injury. This winch is rated with one layer of cable on the hub.
- Never apply load on winch with cable fully extended. Keep at least three turns of cable on the spool.
- Secure load properly. When winching operation is complete, do not depend on winch to support load.
- Operate with hand power only. This winch should not be operated with a motor of any kind. If the winch cannot be cranked easily with one hand, it is probably over-loaded.

Pinch Point / Item Part # 360-00027
Loading Logs Correctly

Loading Logs / Item Part # 360-00057
Locking Pins Caution

Item Part # 360-00028

CAUTION

ALL LOCKING PINS MUST BE IN PLACE BEFORE MOVING THE EQUIPMENT!!!

Item Part # 360-00050

Important!

suspension bolts must be checked at the intervals and torque specified by the decals located at the suspension.

Failure to do so will void your warranty and may result in serious injury or death.
ABS Notice

Item Part Come from Manufacturer (Merito Wabco)
Item Part # 730-00006

NOTICE:

If the ABS indicator lamp comes on and stays on when you apply the brakes to a moving vehicle, the trailer ABS is not working properly. The ABS must be serviced as soon as possible upon completion of your trip to ensure full anti-lock braking capability.

TP-95172 MERITOR WABCO Rev. 7/01

Item Part # 360-00071

WARNING

BE SURE THE SUPPORT LEG IS SECURED IN THE PROPER POSITION FOR USE IN TRANSPORTING OR PARKING BY USE OF THE ATTACHED PIN. DO NOT ATTEMPT ANY OPERATION OF THE LEG UNLESS THE TRAILER IS PROPERLY SUPPORTED BY THE TRACTOR OR OTHER SOLID DEVICE.
Hutch Torque Requirements Decal

Item Part # 360-00094

![Hutchens Suspension Torque Requirements Decal](image)

**WARNING**

SAFETY ALERT! (1) FOLLOW ALL TORQUE REQUIREMENTS. (2) DO NOT USE ANY COMPONENT WITH VISIBLY WORN OR DAMAGED THREADS. FAILURE TO FOLLOW THESE SAFETY ALERTS CAN LEAD TO LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE, SERIOUS PERSONAL INJURY OR DEATH.

**Hutchens Suspension Torque Requirements**

9600-9700 Series (Decal Part Number 16086-01 Rev. J)

After an initial break-in period, approximately 1000 miles, and at least every 4 months periodically thereafter, ALL bolts and nuts should be checked to insure that recommended torque values are being maintained.

Oiled torque values listed are for new fasteners with lubricated threads. It is recommended that new installations be performed with oiled fasteners. For dry threads which have been in service, use the higher torque values which are noted below.

<table>
<thead>
<tr>
<th>1 1/8-7 (9600 / 9700 Rocker Bolt)</th>
<th>OILED</th>
<th>DRY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-14 or 1-8 (9700 Radius Rod Bolt)</td>
<td>590 lb-ft</td>
<td>790 lb-ft</td>
</tr>
<tr>
<td>7/8-14 (Axle U-Bolts &amp; 9600 Radius Rod Bolt)</td>
<td>540 lb-ft</td>
<td>720 lb-ft</td>
</tr>
<tr>
<td>3/4-16 (Axle U-Bolts)</td>
<td>350 lb-ft</td>
<td>470 lb-ft</td>
</tr>
<tr>
<td>5/8-18 (Radius Rod Clamp Bolt)</td>
<td>310 lb-ft</td>
<td>420 lb-ft</td>
</tr>
<tr>
<td>5/8-18 (Spring Retainer Bolt)</td>
<td>130 lb-ft</td>
<td>170 lb-ft</td>
</tr>
</tbody>
</table>

Item Part # 360-00095

![Hutchens Suspension Torque Requirements Decal](image)

**WARNING**

SAFETY ALERT! (1) FOLLOW ALL TORQUE REQUIREMENTS. (2) DO NOT USE ANY COMPONENT WITH VISIBLY WORN OR DAMAGED THREADS. FAILURE TO FOLLOW THESE SAFETY ALERTS CAN LEAD TO LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE, SERIOUS PERSONAL INJURY OR DEATH.

**Hutchens Suspension Torque Requirements**

900 Series (Decal Part Number 16087-01 Rev. A)

After an initial break-in period, approximately 1000 miles, and at least every 4 months periodically thereafter, ALL bolts and nuts should be checked to insure that recommended torque values are being maintained.

Oiled torque values listed are for new fasteners with lubricated threads. It is recommended that new installations be performed with oiled fasteners. For dry threads which have been in service, use the higher torque values which are noted below.

<table>
<thead>
<tr>
<th>1 1/8-12 UNF</th>
<th>OILED</th>
<th>DRY</th>
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<tbody>
<tr>
<td>1 1/4 UNF</td>
<td>6/10 lb-ft</td>
<td>900 lb-ft</td>
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<tr>
<td>3/4-18 UNF</td>
<td>540 lb-ft</td>
<td>730 lb-ft</td>
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<tr>
<td>5/8-18 UNF</td>
<td>220 lb-ft</td>
<td>340 lb-ft</td>
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<tr>
<td>3/4-18 UNF</td>
<td>130 lb-ft</td>
<td>180 lb-ft</td>
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</tbody>
</table>
Watson & Chalin Torque Requirements Decal

Item Part # 360-00097

Watson & Chalin Manufacturing

Watson Suspension Systems

Bolts must be tightened and torqued using a cross pattern sequence. Tighten #1 & #4 to partial torque then partial torque #2 & #3. Using the same sequence fully torque U-Bolts Nuts.

TORQUE REQUIREMENTS
(non Plated) CLEAN LUBRICATED THREADS

<table>
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<tr>
<th>Size</th>
<th>3/8&quot;</th>
<th>1/2&quot;</th>
<th>5/8&quot;</th>
<th>3/4&quot;</th>
<th>7/8&quot;</th>
<th>1&quot;</th>
<th>1 1/8&quot;</th>
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<tbody>
<tr>
<td>U-BOLT MIN FOOT LBS</td>
<td>15</td>
<td>40</td>
<td>120</td>
<td>200</td>
<td>400</td>
<td>650</td>
<td>800</td>
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<tr>
<td>U-BOLT MAX FOOT LBS</td>
<td>20</td>
<td>60</td>
<td>150</td>
<td>250</td>
<td>450</td>
<td>750</td>
<td>900</td>
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<tr>
<td>Capscrew - Bolt Size</td>
<td>3/8&quot;</td>
<td>1/2&quot;</td>
<td>5/8&quot;</td>
<td>3/4&quot;</td>
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<tr>
<td>MIN FOOT LBS</td>
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<td>MAX FOOT LBS</td>
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<td>75</td>
<td>200</td>
<td>350</td>
<td>550</td>
<td>800</td>
<td>1000</td>
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</tbody>
</table>

Torque Values DO NOT apply to spring, or low grade fasteners.

Watson & Chalin Mfg. Co., Mckinney, TX

Item Part Come from Manufacturer (Hendrickson)

HT/HS/HK SERIES TORQUE SPECIFICATIONS

1) QUÍK-ALIGN Pivot Connection
2) Welded Pivot Connection

CAUTION

Do not apply additional lubricant; it can cause overclamping or fastener failure.

IMPORTANT: For QUÍK-ALIGN® pivot connections, a torque wrench is not required when installing a new shear-head pivot bolt and a prevailing-torque nut. During tightening, the bolt’s shear-head feature will shear after achieving proper torque. Use two (S-24579) QUÍK-ALIGN pivot bolt kits per axle during a realignment.

Hendrickson Trailer Suspension Systems

2370 Industrial Plaza SE
Canton, Ohio 44708 USA
Phone 330-692-7669
Fax 330-692-0103

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Section 1 - 23
Hendrickson / Torque Spec. & Safety Inspection Decals

Item Part Come from Manufacturer (Hendrickson)

Item Part # 360-00066

Item Part # 360-00067
SECTION 2

AXLE MAINTENANCE
AXLE MAINTENANCE

1.1 The axle and its attached parts; bearings, hubs, oil seals, brakes, camshaft and slack adjusters, are all assembled and are engaged in mechanical motion and require frequent maintenance.

WHEEL BEARING ADJUSTMENT

1.2 To correctly check and adjust wheel bearings the axle must be supported so wheels clear the floor and are free to roll.
   - Remove hubcaps, outer spindle nut, star lock washer and bearing adjusting nut lock washer. See figure #2.1
   - Tighten inner nut to 50 ft.-lbs torque while rotating wheel in both directions, or if torque wrench is not available tighten until wheel stops rotation due to no end play in bearings.
   - Back off 1/4 to 2/3 turn.
   - Assemble bearing adjusting nut lock washer, star lock washer and outer spindle nut on spindle.
   - Give final check on end play, bend at least two tabs of the star washer over the outer spindle nut.
   - Be sure there is proper clearance between the brake shoe and hub so the drag will not interfere with adjustment.

OIL SEALS

1.3 Check oil level on plastic hub caps, do not overfill.
   - Check oil level before each trip and inspect for oil leaks.
   - It is recommended that any time the hub is removed a new oil seal is installed.
   - Use gear oil, SAE 90, for temperatures below freezing and SAE140 for temp. above freezing.
   - Change oil and inspect bearings, and clean parts at every 50,000 miles.
“Maintenance should be performed by Qualified Personnel.”

WARNING!
Improper bearing maintenance and adjustment can result in overheating and wheel lock up and possibly causing loss of control of trailer and death.

Figure #2.1

![Diagram showing bearing components]
- Star washer
- Bend two tabs over nut
- Inner spindle nut
- Outer spindle nut
- Washer, wheel nut
Guardian Hub-Seal Installation Procedure

1.1 Step 1
Remove all burrs from hub bore and spindle. Thoroughly clean entire wheel cavity. Apply a thin layer of STEMCO SEALER 2 to the O.D. of the axle shoulder. Place the seal assembly on the spindle so the words “OIL - BEARING SIDE” are exposed to the oil.

WARNING: DO NOT INSTALL INTO THE HUB BORE.

Step 2
Put the recommended STEMCO axle tool over the spindle. Drive the seal assembly on until the tool bottoms against the shoulder. Rotate the tool and tap several times to insure that the ring is properly positioned. Wipe away all excess sealant.

Step 3
Pre-lube the inner bearing and place on the spindle. Apply a light coating of oil to the rubber O.D. of the seal and to the seal bore of the wheel.

Step 4
With the wheel mounted on a wheel dolly, carefully push the wheel onto the spindle until it contacts the seal. Dip the outer bearing in oil and place it on the spindle and into the bearing cup.

Step 5
Assemble the inner nut and tighten it to 59#ft/lbs. Rotate the hub several turns, then back off nut 1/4 turn. Make final bearing adjustment to bearing manufacturer’s specifications.

Step 6
Install hub cap with new gasket and fill cavity with oil until proper oil level is indicated on window.

No. 2 sealer is required for some installation to overcome damaged shoulders or shoulders having rough surface finish. Apply a light coating of sealant to the spindle shoulder.

Oil Flow with wheel rotation provides positive lubrication to bearings and spindle.

A BATH OF LIQUID OIL dissipated heat and provides instant lubrication in all weather.

RELIABILITY -- STEMCO Hub-Seals are designed specifically for wheel application with any type oil.

Corresponding Standard set with Axle Ring

Proper Lubrication allows the bearing cone to creep on a film of oil and distribute the wear and load for the FULL life of bearing.

TYPICAL TRAILER AXLE APPLICATION

GUARDIAN SEAL

No. 2 SEALER

SPINDLE

SHOULDER
SECTION 3

Air Brake Adjustment & Maintenance
Automatic Slack Adjusters (ASA)

1.1 The brakes were properly adjusted on your VIKING SPECIALIZED TRAILER before delivery.

1.2 Automatic slack adjusters are required by law, effective on all trailers produced since December 1993. Depending on the brand of slack adjuster used, the operating and adjusting procedures may vary.

1.3 Arvin Meritor automatic Slack Adjusters Link to Vendor File

1.4 After a short break-in period it is recommended that the brakes be readjusted. This is due to linkage seating and linings wearing in.
   1. To properly adjust brakes the wheel should be raised to clear the ground.
   2. Rotate the hex extension clockwise until the brake linings contact the brake drums. Back off the automatic slack by rotating the hex counter clockwise 1/2 turn.
   3. Using a ruler, measure the distance from the face of the air chamber to the center of the large pin in the clevis (A). Make an 85psi brake application and allow the chamber push rod to travel its maximum stroke. Measure to the center of the large pin (B). The difference between A and B is the push rod stroke. VIKING Trailers are equipped with 30 Type Chambers. The maximum stroke is 2”.
   4. Free stroke is the amount of movement of the slack arm required to move the brake shoes against the drum. With brakes released, measure from the face of the chamber to the center of the clevis pin. Use a lever to measure the movement of the slack adjuster until the brake shoes contact the drum. The difference between the released and applied measurements is the free stroke. The free stroke should be 3/8” - 5/8”. If the free stroke is good but the applied stroke is too long, there is a problem with the foundation brake. Check the foundation for missing or worn components, cracked brake drum or improper lining to drum contact. If the free stroke is greater than 3/8” - 5/8”, a function test of the slack adjuster should be performed. If the Stroke is less than 3/8”, a dragging brake can occur. Manually readjust the slack adjuster.
BRAKE AIR ACTUATION MANITENANCE (service brakes)

1.5 The air system on your trailer is the system that actuates and releases the brakes on the trailer. The system is composed of one actuation valve and four chambers. The brake system must be provided with clean air to prevent clogging the valve. The prevention of freeze ups is also important. The use of air dryer, filter, and alcohol evaporator is recommended. The following items should be checked on a regular basis.

1. The air system must be kept free of leaks. Check seal on glad hands every time they are connected. Check hoses and fittings on a regular basis.

2. Drain the air reservoir daily.

SPRING BRAKES

1.6 Spring brakes have parking and emergency brake ability over service brakes. The preceding instructions also apply to spring brakes with a few additions.

1. The air system should be checked while the system is charged at 100 psi.

2. Anti-compounding two-way check valve on top of the spring brake valve can be checked by charging the service and emergency lines then disconnect each line one at a time with the other charged. There should not be any bleed back on either line. If so the valve is malfunctioning.

3. The relay valve should not have a continuous flow of air from the exhaust or the “O” ring seal on the push rod of the spring brake chamber is bad and allowing air to be discharged through the service chamber and out the relay valve exhaust port. To check this, the system must be charged, parking and service brakes off, then disconnect the service hose at service brake chamber. If air is escaping form the service brake hose, the exhaust valve in the relay is malfunctioning. Repair “O” ring seal or exhaust valve or replace complete part. Caging tools are supplied with trailer and are on a bracket attached to the trailer frame near the spring brake chamber.

4. Drain air reservoir daily.
Parking brake application will begin after air pressure falls below 55 psi and application increases as air pressure drops.

Parking brakes will start releasing after the system pressure reaches 55 psi and should be fully released when pressure reaches 70 psi.

Parking brakes may be disengaged in an emergency by manually caging the spring in each brake chamber using the tool provided. Do not operate the vehicle except in emergency as there are no emergency brakes when the spring brakes are caged.

Caution!
The following precautions should be observed when working on or around air brake systems and components:

1. Stop vehicle and block wheels. Depleting air system may cause the vehicle to roll. Keep clear of chamber push rods and slack adjusters; they may automatically apply as system pressure drops.
2. Deplete all air pressure from the system before disconnecting a hose, plug or components.
3. Do not look into air jets or direct them at anybody. Always wear safety glasses when working with air pressure as contaminants may be expelled and cause bodily harm.
4. Always read and understand recommended procedures before disassembling any component. Warning and caution notices should be followed as some components contain powerful springs and injury can result.
### Typical Brake Schematic Plumbing

**PORT LEGEND**

<table>
<thead>
<tr>
<th></th>
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<th>B</th>
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<tr>
<td>1</td>
<td>GLAD HANDS</td>
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</tr>
<tr>
<td>2</td>
<td>30-30 CHAMBERS</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>AIR TANKS</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>SPRING BRAKED VALVE</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>SERVICE BRAKE VALVE</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>1/2” NYLON TUBING</td>
<td>50</td>
</tr>
</tbody>
</table>

- **C**: Control
- **D**: Delivery
- **E**: Emergency
- **SER**: Service
- **S**: Supply
Trailer ABS System

MERITOR WABCO

Easy-Stop™ Trailer ABS

Maintenance Manual No. 33
Revised 4-98

• 2S/1M (Basic and Standard), 2S/2M, 4S/2M and 4S/3M Systems
Vendor Information - Meritor WABCO

Important Information

This manual contains maintenance procedures for Meritor WABCO’s Easy-Stop™ Trailer Anti-Lock Braking System (ABS). The information contained in this manual was current at time of publication and is subject to change without notice or liability.

You must follow company procedures and understand all procedures and instructions before you begin to service or repair a unit. Some procedures require the use of special tools for safe and correct service. Failure to use special tools when required can cause serious personal injury to service personnel, as well as damage equipment and components.

Meritor WABCO uses the following notations to warn the user of possible safety issues and to provide information that will prevent damage to equipment and components.

⚠️ WARNING
A WARNING indicates that you must follow a procedure exactly. Otherwise, serious personal injury can occur.

⚠️ CAUTION
A CAUTION indicates that you must follow a procedure exactly. Otherwise, damage to equipment or components can occur. Serious personal injury can also result, in addition to damaged or malfunctioning equipment or components.

NOTE
A NOTE indicates an operation, procedure or instruction that is important for proper service. A NOTE can also supply information that can help to make service quicker and easier.

⚠️ TORQUE
This symbol indicates that you must tighten fasteners to a specific torque value.

Also Available from Meritor WABCO

Training Videos

ABS Tips (Available at no charge)
- Driver Tips (SP-93161).*
- How to Brake with ABS audio cassette (SP-94126).*
- Driver Tips for Trailer ABS Warning Lamps (TP-97132).

- Service Tips for Trailer ABS Warning Lamp (TP-97133)
- Trailer ABS Service and Support Reference Card (TP-8803)
- Trailer ABS Technical Service Support Reference Card (TP-9604)

*For Spanish version, add SP to the item number. For French version, add FR to the item number.

How to Order
Order items from Meritor Literature Distribution Center, c/o Vispac, Inc., 35000 Industrial Road, Livonia, MI 48150. For videos, include a purchase order or check (payable to Meritor Automotive) for $20 for each video. Phone orders are also accepted at 248-435-8669.
Vendor Information - Meritor WABCO

**ASBESTOS FIBER WARNING**

The following procedures for servicing brakes are recommended to reduce exposure to asbestos fiber dust, a cancer and lung disease hazard. Material Safety Data Sheets are available from Meritor.

**Hazard Summary**

Because some brake linings contain asbestos, workers who service brakes must understand the potential hazards of asbestos and precautions for reducing risks. Exposure to airborne asbestos dust can cause serious and possibly fatal diseases, including asbestosis (a chronic lung disease) and cancer, principally lung cancer and mesothelioma (a cancer of the lining of the chest or abdominal cavities). Some studies show that the risk of lung cancer among persons who smoke and who are exposed to asbestos is much greater than the risk for non-smokers. Symptoms of these diseases may not become apparent for 15, 20 or more years after the first exposure to asbestos.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to asbestos dust follow. Consult your employer for more details.

**Recommended Work Practices**

1. **Separate Work Areas.** Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons. OSHA has set a maximum all able level of exposure for asbestos of 0.1 f/cc as an 8-hour time-weighted average and 1.0 f/cc averaged over a 30-minute period. Scientists disagree, however, to what extent adherence to the maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling asbestos dust. OSHA requires that the following sign be posted at the entrance to areas where exposures exceed either of the maximum allowable levels:

   **DANGER: ASBESTOS CANCER AND LUNG DISEASE HAZARD AUTHORIZED PERSONNEL ONLY RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA**

2. **Respiratory Protection.** Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA for use with asbestos at all times when servicing brakes, beginning with the removal of the wheels.

3. **Procedures for Servicing Brakes.**
   a. Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.
   b. As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
   c. If an enclosed vacuum system or brake washing equipment is not available, employers may adopt their own written procedures for servicing brakes, provided that the exposure levels associated with the employer's procedures do not exceed the levels associated with the enclosed vacuum system or brake washing equipment. Consult OSHA regulations for more details.
   d. Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.
   e. **NEVER** use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA filter when cleaning brake parts or assemblies. **NEVER** use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.
   f. **Cleaning Work Areas.** Clean work areas with a vacuum equipped with a HEPA filter or by wet wiping. **NEVER** use compressed air or dry sweeping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos. When you replace a HEPA filter, wet the filter with a fine mist of water and dispose of the used filter with care.
   g. **Worker Clean-Up.** After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.
   h. **Waste Disposal.** Dispose of discarded linings, used rags, cloths and HEPA filters with care, such as in sealed plastic bags. Consult applicable EPA, state and local regulations on waste disposal.

**Regulatory Guidance**

References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.
NON-ASBESTOS FIBER WARNING
The following procedures for servicing brakes are recommended to reduce exposure to non-asbestos fiber dust, a cancer and lung disease hazard. Material Safety Data Sheets are available from Meritor.
Hazard Summary
Most recently manufactured brake linings do not contain asbestos fibers. These brake linings may contain one or more of a variety of ingredients, including glass fibers, mineral wool, aramid fibers, ceramic fibers and silica that can present health risks if inhaled. Scientists disagree on the extent of the risks from exposure to these substances. Nonetheless, exposure to silica dust can cause silicosis, a non-cancerous lung disease. Silicosis gradually reduces lung capacity and efficiency and can result in serious breathing difficulty. Some medical experts believe other types of non-asbestos fibers, when inhaled, can cause similar diseases of the lung. In addition, silica dust and ceramic fiber dust are known to the State of California to cause lung cancer. U.S. and international agencies have also determined that dust from mineral wool, ceramic fibers and silica are potential causes of cancer. Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to non-asbestos dust follow. Consult your employer for more details.

Recommended Work Practices
1. Separate Work Areas. Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons.
2. Respiratory Protection. OSHA has set a maximum allowable level of exposure for silica of 0.1 mg/m3 as an 8-hour time-weighted average. Some manufacturers of non-asbestos brake linings recommend that exposures to other ingredients found in non-asbestos brake linings be kept below 1.0 f/cc as an 8-hour time-weighted average. Scientists disagree, however, to what extent adherence to these maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling non-asbestos dust. Therefore, wear respiratory protection at all times during brake servicing, beginning with the removal of the wheels. Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA, if the exposure levels may exceed OSHA or manufacturers' recommended maximum levels. Even when exposures are expected to be within the maximum allowable levels, wearing such a respirator at all times during brake servicing will help minimize exposure.
   a. Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.
   b. As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
   c. If an enclosed vacuum system or brake washing equipment is not available, carefully clean the brake parts in the open air. Wet the parts with a solution applied with a pump-spray bottle that creates a fine mist. Use a solution containing water, and, if available, a biodegradable, non-phosphate, water-based detergent. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
   d. Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.
   e. NEVER use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA filter when cleaning brake parts or assemblies. NEVER use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.
4. Cleaning Work Areas. Clean work areas with a vacuum equipped with a HEPA filter or by wet wiping. NEVER use compressed air or dry sweeping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA, if the exposure levels may exceed OSHA or manufacturers' recommended maximum levels. When you replace a HEPA filter, wet the filter with a fine mist of water and dispose of the used filter with care.
5. Worker Clean-Up. After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.
6. Waste Disposal. Dispose of discarded linings, used rags, cloths and HEPA filters with care, such as in sealed plastic bags. Consult applicable EPA, state and local regulations on waste disposal.

Regulatory Guidance
References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further...
Vendor Information - Meritor WABCO / Overview

Overview

This manual describes how Meritor WABCO’s Easy-Stop™ Trailer Anti-Lock Braking System (ABS) works; answers some basic ABS questions; outlines procedures on how to adjust, test, remove and install ABS components, as well as how to test for faults in the system by using Blink Code Diagnostics; and illustrates ABS components and wiring and plumbing installation diagrams. This manual does not contain Original Equipment Manufacturer (OEM) installation instructions. New installations require the following documentation:

- Easy-Stop™ Basic (2S/1M without external diagnostics): TP-97145
- Easy-Stop™ Standard (2S/1M, 2S/2M, 4S/2M with external diagnostics): TP-97147
- Easy-Stop™ Standard (4S/3M with external diagnostics): TP-97153

Scope of Blink Code Diagnostics in This Manual

This manual contains blink code diagnostics information and instructions for most of the ECU/Valve Assemblies listed in Table A — Scope of Blink Code Diagnostics. The serial and part numbers are located on the ECU/Valve Assembly. Refer to Figure 1.1.

Table A — Scope of Blink Code Diagnostics

<table>
<thead>
<tr>
<th>ECU/Valve Assembly Part Number</th>
<th>Blink Code Diagnostics</th>
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<tbody>
<tr>
<td>472 600 001 0</td>
<td>Contact Meritor WABCO for blink code diagnostics information.</td>
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</table>
Vendor Information - Meritor WABCO / Over view

Easy-Stop™ Trailer ABS Parts

Parts book PB-36133 lists Meritor WABCO Easy-Stop™ replacement parts. To obtain a copy, contact the Meritor Customer Support Center at 800-535-5560.

What Is Meritor WABCO’s Easy-Stop™ Trailer ABS?

Meritor WABCO’s Easy-Stop™ Trailer ABS is an electronic, self-monitoring system that works with standard air brakes. The major components of the system are the Electronic Control Unit (ECU)/Valve Assembly, ABS relay (modulator) valve, tooth wheel and wheel speed sensor. Refer to Figure 1.2.

ECU Part Numbers 472 500 001 0, 472 500 012 0 and 472 500 013 0 have an external diagnostics connector for use with a special diagnostic tool. These models are also compatible with an MPSI Pro-Link® 9000 diagnostic tool and Meritor WABCO cartridge. ECU/Valve Assembly 472 500 011 0 does not have a diagnostic connector port. Diagnostic procedures for all of these ECUs are detailed.

The ABS configuration defines the number of wheel speed sensors and ABS relay valves used in a system. For example, a 2S/1M configuration includes two wheel sensors and one ABS relay valve. A 2S/2M configuration includes two wheel sensors and two relay valves. A 4S/2M configuration includes four wheel sensors and two ABS relay valves.

How Trailer ABS Works

Meritor WABCO ABS is an electronic system that monitors and controls wheel speed during braking. The system works with standard air brake systems.

ABS monitors wheel speeds at all times and controls braking during wheel lock situations. The system improves vehicle stability and control by reducing wheel lock during braking.

The ECU receives and processes signals from the wheel speed sensors. When the ECU detects a wheel lockup, the unit activates the appropriate modulator valve, and air pressure is controlled.

In the event of a malfunction in the system, the ABS in the affected wheel(s) is disabled; that wheel still has normal brakes. The other wheels keep the ABS function.

An ABS warning lamp lets drivers know the status of the system.

---

Figure 1.2

![Diagram of ABS components]

1. ECU/Valve Assembly
2. External ABS Relay Valve (not used in 1M configurations)
3. Tooth Wheel
4. Wheel Speed Sensor

1002071c
Vendor Information - Meritor WABCO / ABS Warning Lamp

The Electronic Control Unit (ECU)

How do you activate the ECU?

In a constant-powered system, the ECU activates and then begins a self-diagnostic check of the system when you turn the ignition ON. In a stoplight-powered system, the ECU activates when you apply the brakes. All trailers manufactured on or after March 1, 1998 will be equipped with ABS that has constant power capability with stoplight power as back-up.

What if the ECU finds a fault in an ABS component during normal operation?

If the ECU senses a fault in the system (with an ABS valve, for example), the ECU turns the trailer ABS warning lamp on and returns the wheel controlled by that valve to standard braking. Or, if the ECU finds a fault with one wheel speed sensor in a system that has four sensors on a tandem axle, the ECU uses information from the other sensor on the same side of the tandem to ensure continuous ABS function. The ECU continues to provide full ABS function to the wheels unaffected by system faults. However, the ECU will turn the trailer ABS warning lamp on to tell the driver a fault has been detected in the system.

How does the ECU respond to a wheel approaching lock-up?

The ECU directs the ABS relay valve to function as a modulator valve and adjust air pressure to the chambers up to five times a second. This pressure adjustment allows a wheel (or wheels) to rotate without locking.

The ABS Warning Lamp

What is the function of the warning lamp?

The warning lamp enables a driver to monitor the ABS at all times. Refer to the OEM operating manual for the mounting location of the warning lamp.

How does the warning lamp operate?

How the warning lamp operates depends on whether the ABS is powered by stoplight or constant power:

- If the trailer was manufactured prior to February 28, 1998, or was manufactured outside of the United States, the ABS may be either stoplight or constant powered.
- If the trailer was manufactured March 1, 1998 or later — and was manufactured in the United States — it will have constant power capability. This is mandated by Federal Motor Vehicle Safety Standard (FMVSS) 121.

Check your vehicle specification sheet to determine the type of ABS power. Table B — Stoplight Power and Table C — Constant Power, in this section, illustrate warning lamp operation on stoplight and constant powered ABS systems.

Table B — Stoplight Power

<table>
<thead>
<tr>
<th>Brakes</th>
<th>Fault in System</th>
<th>Vehicle Speed</th>
<th>Warning Lamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Released</td>
<td>N.A.</td>
<td>N.A.</td>
<td>OFF</td>
</tr>
<tr>
<td>Applied</td>
<td>NO</td>
<td>Less than 4 mph</td>
<td>ON for 3 seconds, then goes OFF.</td>
</tr>
<tr>
<td>Applied</td>
<td>NO</td>
<td>Greater than 4 mph</td>
<td>Flashes once, then stays OFF for remainder of stop.</td>
</tr>
<tr>
<td>Applied</td>
<td>YES</td>
<td>N.A.</td>
<td>ON</td>
</tr>
</tbody>
</table>
Vendor Information - Meritor WABCO / Overview

Table C — Constant Power

<table>
<thead>
<tr>
<th>System Is Powered When Ignition Is Switched ON</th>
<th>Brake Status</th>
<th>Ignition Status</th>
<th>Fault in System</th>
<th>Vehicle Speed</th>
<th>Warning Lamps (Trailer and Dash)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Released</td>
<td>OFF</td>
<td>N.A.</td>
<td>N.A.</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>Released</td>
<td>ON</td>
<td>NO</td>
<td>Less than 4 mph</td>
<td>ON for 3 seconds, then go OFF.</td>
<td></td>
</tr>
<tr>
<td>Released</td>
<td>ON</td>
<td>NO</td>
<td>Greater than 4 mph</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>Released</td>
<td>ON</td>
<td>YES</td>
<td>N.A.</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>Applied</td>
<td>OFF</td>
<td>NO</td>
<td>Less than 4 mph</td>
<td>ON for 3 seconds, then go OFF.</td>
<td></td>
</tr>
<tr>
<td>Applied</td>
<td>OFF</td>
<td>NO</td>
<td>Greater than 4 mph</td>
<td>Flash once, then stay OFF for remainder of stop.</td>
<td></td>
</tr>
<tr>
<td>Applied</td>
<td>OFF</td>
<td>YES</td>
<td>N.A.</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>Applied</td>
<td>ON</td>
<td>NO</td>
<td>Less than 4 mph</td>
<td>ON for 3 seconds, then go OFF.</td>
<td></td>
</tr>
<tr>
<td>Applied</td>
<td>ON</td>
<td>NO</td>
<td>Greater than 4 mph</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>Applied</td>
<td>ON</td>
<td>YES</td>
<td>N.A.</td>
<td>ON</td>
<td></td>
</tr>
</tbody>
</table>

An ECU with part number 472 500 001 0 manufactured prior to September 1997 requires all sensed wheels to detect a 4 mph signal to shut off the ABS warning lamp. Do not confuse this with a faulty ABS system. If the warning lamp stays on when the brakes are applied to a moving vehicle, service the ABS system.

Most trailers manufactured prior to February 1999 require that the brakes be applied to operate the ABS warning lamp. If the warning lamp stays on when the brakes are applied to a moving vehicle, service the ABS system.

What does the trailer ABS warning lamp mean to service personnel?

The trailer ABS warning lamp indicates the status of the trailer ABS. If it comes ON and stays ON when you apply the brakes to a moving vehicle, there is an ABS malfunction. It is normal for the lamp to come ON and go OFF to perform a bulb check, but it should not stay ON when the vehicle is moving above 4 mph. As with any safety system, it is important not to ignore this warning. If the warning lamp indicates a malfunction, the vehicle can be operated to complete the trip, but it is important to have it serviced as soon as possible using the appropriate maintenance manual to ensure proper braking performance and that the benefits of ABS remain available to your drivers. Typical ABS warning lamp mounting locations are illustrated in Figure 3.1.

![Figure 3.1](image.png)

1. Prior to March 1, 1998
2. On or after March 1, 1998

Typical ABS Warning Lamp Mounting Locations

For more information, call the Meritor Customer Support Center, 800-535-5560.
Vendor Information - Meritor WABCO / Overview

Can you continue to operate a vehicle when the warning lamp indicates a fault?

Yes. When a fault exists in the ABS, standard braking returns to the affected wheel, and the ABS still controls other monitored wheels. This lets you complete the trip. You should not ignore the warning lamp and should have the vehicle serviced as soon as possible after the lamp comes ON and stays ON.

Types of Faults

What is a “fault” in the system?

A fault in the system is a problem that can exist in the ABS or in the system’s components. Faults can be either existing faults or intermittent stored faults.

What is an existing fault?

An existing fault is a problem that exists currently in the system. For example, a damaged sensor cable is an existing fault that the ECU will detect and store into memory until you identify the cause, repair the cable and clear the fault from the ECU.

What is an intermittent fault?

An intermittent fault is a problem that usually occurs only under certain driving conditions. For example, the ECU may detect a loose cable or wire or receive an erratic signal from a wheel sensor. Since intermittent faults can be unpredictable and may only happen periodically, you can use information stored in ECU memory to find and correct the loose cable or wire.

Is an intermittent fault difficult to locate and repair?

It can be, because you may not be able to easily see the cause of the problem. Meritor WABCO recommends that you write down intermittent faults to help you isolate a fault that recurs over a period of time.

Can the ECU store more than one fault in memory?

Yes. And the ECU retains existing and intermittent faults in memory even when you turn OFF the power to the ECU.

NOTE

For part number information, refer to PB-96133. Copies are available from the Meritor Customer Support Center, 800-535-5560.
Vendor Information - Meritor WABCO -2S / 1M ABS Configuration

2S/1M Trailer ABS Configuration Without External Diagnostics Capability
Installation Diagram

For direct tank-mounted installations, see “How to Install the ECU/Valve Assembly,” in Section 6, "Component Replacement".

**Typical Application:**
- Single-Axle Dolly
- Single- and Tandem-Axle Semi-Trailer

**NOTE**
Sensors may be installed on either axle, depending upon suspension and other vehicle characteristics.
Vendor Information - Meritor WABCO - 4S / 2M ABS Configuration

4S/2M Trailer ABS Configuration Installation Diagram

For direct tank-mounted installations, see “How to Install the ECU/Valve Assembly” in Section 6, "Component Replacement".

Typical Application:
- Tandem and Tri-Axle Semi-Trailer
Vendor Information - Meritor WABCO - 4S / 2M ABS Configuration

4S/2M Trailer ABS Configuration Diagram for Lift Axle Applications (Forward Lift Axle Installation Diagram)

For direct tank-mounted installations, see “How to Install the ECU/Valve Assembly” in Section 6, “Component Replacement”.

**Typical Application:**

- Tandem and Tri-Axle Semi-Trailer
Vendor Information - Meritor WABCO - 4S / 2M ABS Configuration

4S/2M Trailer ABS Configuration Diagram for Lift Axle Applications
(Rear Lift Axle Installation Diagram)

Figure 4.6

A - Service/Control Lines
B - Sensor Cables
C - Service to Brake Lines (Delivery Lines)
D - Air Supply/Emergency Lines

1 - ECU/Valve Assembly (YE)
2 - External Valve (BU)
3 - Air Tanks
4 - Fixed Axle
5 - Lift Axle

For direct tank-mounted installations, see "How to Install the ECU/Valve Assembly" in Section 6, "Component Replacement".

Typical Application:
- Tandem and Tri-Axle Semi-Trailer
Vendor Information - Meritor WABCO - 4 or 5 Wire Schematic

Power Cable Wiring Diagrams

Figure 4.8

4 or 5 Wire Schematic
P/N 449 315 XX0 0 or 894 60X XXX 0 (Industry Standard Cable)

ECU Internal Ground (5 Wire Cable Only)

White and Yellow
White
(Ground)

Blue
(Constant Power)

Red
(Stop Lamp)
Green and White

Trailer ABS Warning Lamp

7 Way

+ Power Source

Ground

Trailer ABS Warning Lamp

ECU Power Connector

Trailers produced March 1, 1998 or later.

Figure 4.9

Constant Power/Stoplight Power Circuit
P/N 449 312 XX0 0
4 Conductor Cable

Switched 12 Volts DC from Tractor

Connect to Easy-Stop™

Trailers produced prior to March 1, 1998.
Tractors produced during 1997 model year and later have the blue wire of the 7-way (SAE J569) connector wired to provide constant power to trailer ABS.
Vendor Information - Meritor WABCO - Wiring Diagrams

Power Cable Wiring Diagrams

**Figure 4.10**

Stoplight Power Circuit  
P/N 894 604 19X 2  
3 Conductor Cable

Trailers produced prior to March 1998  
Warning Lamp

![Stoplight Power Circuit Diagram](image1)

**Figure 4.11**

Stoplight Power Circuit  
P/N 449 312 XXX 0  
4 Conductor Cable

Trailers produced prior to March 1998  
Warning Lamp

![Stoplight Power Circuit Diagram](image2)
Vendor Information - Meritor WABCO - Blink Code Diagnostics

WARNINGS

⚠️ To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

⚠️ The ABS is an electrical system. When you work on the ABS, take the same precautions that you must take with any electrical system to avoid serious personal injury. As with any electrical system, the danger of electrical shock or sparks exists that can ignite flammable substances. You must always disconnect the battery ground cable before working on the electrical system.

Introduction

Blink code diagnostic procedures in this section cover:

- ECU Part Number 472 500 011 0
  Meritor WABCO Basic ECU without an external diagnostic connector

- ECU Part Number:
  472 500 010 0
  472 500 012 0
  472 500 013 0

Meritor WABCO ECUs with external diagnostic connectors

This section covers Normal Mode diagnostics (Codes for system faults that cause the ABS warning lamp to come on and stay on when the vehicle is in operation.)

NOTE

For ECU Part Numbers 472 500 012 0 and 472 500 013 0 ONLY:

If you do not have a diagnostic blink code tool, follow the procedure given for ECU 472 500 011 0 (see “Using the Blink Code” in this section), but use Table E — Normal Mode Fault Code Table to identify the fault codes.

For additional diagnostic procedures refer to:

Appendix A  Expert Mode Diagnostics
(ECU P/Ns 472 500 001 0, 472 500 012 0, 472 500 013 0)
This mode is used to identify intermittent faults, such as a loose connector.

Appendix B  Reconfigure Mode. Use only as indicated in the reconfiguration table in Appendix B.

Appendix C  Warning Lamp Diagnostics
(ECU P/Ns 472 500 011 0, 472 500 012 0, 472 500 013 0)

Blink Code Diagnostics

To use blink code diagnostics you need to know whether or not the ECU has an external diagnostic connector. See Section 2, “System Components” in this manual for details. If you are unable to make this determination, contact the Meritor Customer Support Center at 800-535-5560 for assistance.

On-Site Assistance

Meritor WABCO has provided an ABS Trailer warning label that illustrates possible system fault locations. This label should be mounted on the trailer near the ABS warning lamp. If there is no ABS warning label on the trailer, let your supervisor know. Labels are available from Meritor WABCO. Ask for Part Number TP-95172.
Vendor Information - Meritor WABCO - Using the Blink Code

Using the Blink Code

For ECU Part Number 472 500 011 0 without diagnostic connector:

1. Make sure the vehicle is stationary:
   - Emergency brake ON
   - Wheels properly chocked
2. Provide 12 volts DC power (9.5 to 14 volts is acceptable range) to the ECU/Valve Assembly.
3. Check the ABS warning lamp on the trailer. If:
   - The warning lamp comes ON briefly, then goes OFF: There is no fault in system.
   - The warning lamp comes ON and stays ON: There is an existing fault. Go to Step 4.
4. Check the blink code lamp on the ECU. See Figure 5.1.
   - If blink code lamp is OFF, there is no system fault.

If the blink code lamp is flashing, count the number of flashes to identify the fault. Check Table D — ECU Part Number 472 500 011 0 Blink Codes to determine the problem. Follow the suggested corrective action.

Figure 5.1

1 Blink Code Lamp

Table D — ECU Part Number 472 500 011 0 Blink Codes

<table>
<thead>
<tr>
<th>Blink Code</th>
<th>Problem Area</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Sensor YE1 (curbside sensor)</td>
<td>Check sensor installation and connections. Verify proper sensor resistance and air gap. Make necessary repairs.</td>
</tr>
<tr>
<td>10</td>
<td>ECU/Valve Assembly</td>
<td>Verify proper installation. Make sure all connections are secure. If code continues, contact Meritor WABCO for assistance.</td>
</tr>
<tr>
<td>14</td>
<td>Power Supply</td>
<td>Verify proper electrical installation and connections. Check power supply. Make necessary corrections.</td>
</tr>
<tr>
<td>15</td>
<td>ECU Failure</td>
<td>Verify proper installation. If code continues, contact Meritor WABCO for assistance.</td>
</tr>
</tbody>
</table>
### Table E — Normal Mode Fault Code Table

<table>
<thead>
<tr>
<th>Blink Code</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No Faults</td>
</tr>
<tr>
<td>3</td>
<td>Sensor BU1</td>
</tr>
<tr>
<td>4</td>
<td>Sensor YE1</td>
</tr>
<tr>
<td>5</td>
<td>Sensor BU2</td>
</tr>
<tr>
<td>6</td>
<td>Sensor YE2</td>
</tr>
<tr>
<td>7</td>
<td>Ext. Modulator (Red) 4S/3M Only</td>
</tr>
<tr>
<td>9</td>
<td>Ext. Modulator (BU)</td>
</tr>
<tr>
<td>10</td>
<td>ECU Modulator (YE)</td>
</tr>
<tr>
<td>14</td>
<td>System Configuration/Power Supply</td>
</tr>
<tr>
<td>15</td>
<td>ECU Failure</td>
</tr>
</tbody>
</table>

#### Figure 5.5

3 Flashes = Existing Fault = Sensor BU1

- Power ON; ECU activated
- $S =$ Second(s)

1002095a
SECTION 4

Tires
TIRES -GENERAL INFORMATION

1.1 Tire -General information

1. Inflation: Over and under inflation are the greatest causes of tire damage. Over inflation does not compensate for overloading. Rapid tire wear is the result of under and over inflation and only appears in different places on the tire. Always keep tires inflated to proper pressure as stamped on the tire.

2. Be Sure tire and rim base are matched according to size.

3. Place in safety cage and inflate to 10 psi., recheck for proper assembly. If assembly is not correct deflated and reassemble. Never hammer on a partially inflated tire. If assembly is proper at 10 psi, continue to inflate to fully seat the tire bead. Never sit or stand in front of a tire and rim assembly that is being inflated.

4. Always deflate a tire by removing the valve core prior to removal from the vehicle. Never inflate a tire that has been run flat or seriously under inflated without removing and checking for damage.
Vendor Information - Tire & Rim Safety Tips

SAFETY TIPS
TRUCK TIRE AND RIM MOUNTING SERVICES

DANGER

Property damage, serious injury or death may result from:

- **TIRE FAILURE DUE TO UNDERINFLATION/OVERLOADING.**
  Follow the vehicle owner’s manual or tire placard in vehicle.
- **EXPLOSION OF TIRE/RIM ASSEMBLY DUE TO IMPROPER MOUNTING.**
  Only specially-trained persons should mount tires.
- **FAILURE TO MOUNT RADIAL TIRES ON APPROVED RIMS.**
- **FAILURE TO DFLATE SINGLE OR DUAL ASSEMBLIES COMPLETELY BEFORE DEMOUNTING.**
- **TIRE SPINNING.**
  On slippery surfaces such as snow, mud, ice, etc., do not spin tires in excess of 35 mph (55 kph), as indicated on the speedometer. Personal injury and severe damage may result from excessive wheel spinning, including tire disintegration or axle failure.

READ, UNDERSTAND AND COMPLY WITH FEDERAL REGULATIONS ISSUED BY THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) OF THE DEPARTMENT OF LABOR, (29 CFR PART 1910), AND PUBLICATIONS OF THE RUBBER MANUFACTURERS ASSOCIATION (RMA) ON SERVICING OF TIRES, RIMS AND WHEELS.

SOME OF THE MOST IMPORTANT SAFETY TIPS ARE LISTED BELOW.

1. Always deflate ALL air from tire assembly before attempting to remove the tire or any rim component, as follows:
   a. Always remove valve cores.
   b. Check to be sure all air is out of the tires. The tire should be soft.
   c. If not soft, check valve stems to be sure they are not plugged by running a wire through the valve stem opening.

2. Check rim components for fatigue cracks. Replace all cracked, badly worn, damaged or severely rusted components.

3. Make sure correct parts are being assembled. Check with your distributor or the manufacturer if you have any doubts.

4. Double check to make sure all components are properly seated prior to inflation.

5. Always inflate using a safety cage.

6. Don’t seat rings by hammering while the tire is inflated. Don’t hammer on an inflated or partially inflated tire/rim assembly.
SECTION 5

Wheels & Rims
WHEELS AND RIMS

WHEELS & RIMS (Budd Type Disc Wheels)

1. It is important that the inner and outer dual nuts be tightened independently to the recommended torque ratings. Install the inner dual wheel and then the inner dual nuts, tighten all ten nuts to 450-500 foot pounds, tightened in crisis cross pattern. Install outer dual and nuts torque to 450-500 foot pounds. Nuts should be retrograde after the first trip to take care of seating. Loose nuts will cause wheel cracking, stud breakage, and ball seat damage. If rust streaks appear at ball seats usually indicates insufficient torque.

2. If heavy duty studs and dual nuts are used such as 15/16” inner and 1 5/16” outer nuts. the torque rating should be 750-900 foot lbs.

3. Torque valves given are for clean dry threads. Do not lubricate. Clean by wire brushing.

4. HUB PILOTED WHEELS: TORQUE RATIING 400 - 500 ft. lbs.

RIM AND WHEEL MAINTENANCE

1. Inspect rims and wheels for corrosion, cracks and damage. Thoroughly remove rust, dirt, and other foreign materials from all surfaces.

2. Brush and spray paint where corrosion existed with a fast drying metal primer.

3. Replace all parts damaged or cracked.

TORQUE IN ORDER SHOWN

![Wheel and Nuts Diagram]
SECTION 6

Landing Gears
LANDING GEAR - GENERAL

Warning

DO NOT COUPLE OR UNCOUPLE TRAILER WITHOUT WHEELS BEING CHOCKED OR BRAKED

DO NOT LOAD OR UNLOAD WITHOUT TIRES BEING CHOCKED

DO NOT MOVE TRAILER WITHOUT LOWER LEG FULLY RETRACTED

DO NOT DROP TRAILER ON LANDING GEAR

DO NOT PARK ON SOFT GROUND, ASPHALT, OR UNLEVEL GROUND.

LANDING GEAR MAINTENANCE & Vendors Information

See suppliers list Section 12 in back. Also below

Jost
1770 Hayes Street
Grand Haven, MI 49417
(616) 846-7700  (800) 253-5105
www.jostinternational.com

Holland Type Mark V
1950 Industrial Blvd.
P.O. Box 425
Muskegon, MI 49443-0424
(888) 396-6501
www.thehollandgroupinc.com
OPERATION AND MAINTENANCE PROCEDURES FOR A-400 AND A-401 LANDING GEAR

WARNING: Before attempting to operate the landing gear, you must read and understand the following procedures:

- Perform all procedures in lighted area clear of obstacles and other personnel.
- Always grip the crank handle securely with both hands.
- Maintain proper footing at all times.
- Never attempt to shift the landing gear while under load.
- Lifting and lowering of the trailer must always be done in LOW GEAR.
- DO NOT ATTEMPT TO LIFT OR LOWER TRAILER WITH LANDING GEAR IN HIGH GEAR, AS SERIOUS PERSONAL INJURY COULD OCCUR.
- Always secure the crank handle when not in use.

OPERATING INSTRUCTIONS

- Push crank handle in for high gear.
- Pull crank handle out for low gear.
- Turn crank: Counterclockwise - Retract
  Clockwise - Extend

FIGURE 1

Note: Both inside and outside mounts crank the same.
COUPLING INSTRUCTIONS

STEP 1
Inflate tractor air suspension and back up close to the trailer centering the kingpin with the throat of the fifth wheel and STOP! DO NOT ATTEMPT TO COUPLE UNTIL STEPS 2 THROUGH 4 ARE COMPLETED.

STEP 2
1. Chock trailer wheels.
2. Connect brake lines and light cord.
3. Support slack in lines to prevent interference.
4. Set trailer brakes.

STEP 3
Make sure that the landing gear is in low gear (see figure 1) and engage crank handle.

STEP 4
Adjust trailer height so that the fifth wheel will lift the trailer.

STEP 5
Couple and verify that there is no gap between fifth wheel and trailer and that the kingpin is inside the lock.

STEP 6
While still in low gear, retract landing gear until pads just come off the ground.

STEP 7
Switch to high gear and fully retract, secure crank handle.
**UNCOUPLING INSTRUCTIONS**

**STEP 1**
Position the tractor and trailer on level ground, clear of persons and obstacles.

**STEP 2**
1. Set trailer brakes. Slowly back tractor tightly against trailer.
2. Set tractor brakes.
3. Chock trailer wheels.

**STEP 3**
Shift landing gear to high gear (see figure 1) and engage crank handle.

**STEP 4**
Extend landing gear until pads just touch the ground.

**STEP 5**
Switch to low gear and crank an additional 4-8 turns minimum. Secure crank handle.

**STEP 6**
1. Pull fifth wheel release handle.
2. Disconnect air lines and light cord.
3. Release tractor brakes and slowly drive away from trailer.
MAINTENANCE PROCEDURES

These procedures must be performed, as needed depending upon application but at least every 3 months.

Lubricate at least every 3 months and more frequently in applications where the landing gear are exposed to excessive moisture, water spray, dust, or if they are not used for extended periods. Lubricate with the trailer securely coupled to a tractor (see coupling instructions).

Employ a lubricant compatible with the original type of grease used:
- Low temperature – Arctic-grade, all weather white grease

INSTRUCTIONS:
1. Fully retract the landing gear, then using high gear extend 6-8 turns.
2. Lubricate through the grease fittings as shown.
3. Extend and retract the landing gear to apply grease to the entire length of the screw.

INSPECT HARDWARE:
- Tighten or replace mounting bolts as necessary.
- Inspect the mounting bracket for cracks or other signs of damage.
- Repair or replace any broken or damaged parts of the landing gear assembly or mounting structure.
- Inspect the crank handle bolt and lock nut. Tighten or replace as necessary (the crank handle bolt must be loose enough to allow free engagement).
- Cross shaft connection bolts and lock nuts should be secure, but allow side-to-side play in the cross shaft.
- Check for proper crank shaft engagement in both high and low gear.
- Landing gear with excessive play should be rebuilt or replaced.

INSPECT ALIGNMENT:
Using a square, check that both landing gear legs are square with the trailer and parallel with each other as shown. Bent or damaged legs are an indication of possible damage to the lift screw, lift nut or other internal components and should be replaced.

TROUBLE-SHOOTING POINTS

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard to crank landing gear</td>
<td>1. Turning crank in wrong direction.</td>
<td>1. See figure 1 on page 1 for proper crank handle rotation.</td>
</tr>
<tr>
<td></td>
<td>2. Attempting to raise or lower trailer in high gear.</td>
<td>2. Shift to low gear (see figure 1). DO NOT ATTEMPT TO LIFT OR LOWER IN HIGH GEAR.</td>
</tr>
<tr>
<td></td>
<td>3. Legs are already fully extended or retracted.</td>
<td>3. Turn crank in opposite direction to retract or extend.</td>
</tr>
<tr>
<td></td>
<td>4. Cross shaft binding: - over-tightened bolts. - cross shaft bent or too long.</td>
<td>4. Inspect cross shaft bolts. Back off bolts to allow lateral (side-to-side) movement of cross shaft. Use self-locking type nuts only.</td>
</tr>
<tr>
<td></td>
<td>5. Mis-aligned landing gear legs.</td>
<td>5. Legs must be parallel and extend and retract evenly. Remove cross shaft; adjust landing gear legs to same height.</td>
</tr>
<tr>
<td></td>
<td>7. Damaged lift screw or lift nut.</td>
<td>7. Check landing gear for signs of impact (accident) damage.</td>
</tr>
<tr>
<td></td>
<td>8. Interference between powder metal bushing and trailer mounting surface.</td>
<td>8. Disconnect cross shaft and crank legs individually to determine which leg is damaged. Replace damaged leg.</td>
</tr>
<tr>
<td>Shaft turns but legs do not operate</td>
<td>1. Broken shaft or shaft bolt.</td>
<td>1. Replace broken bolt(s) and shaft as needed.</td>
</tr>
<tr>
<td></td>
<td>2. Broken pinion gear or bevel gear or gear pins.</td>
<td>2. Replace broken gear(s) or pin.</td>
</tr>
<tr>
<td>Shaft does not turn</td>
<td>1. Broken gear teeth.</td>
<td>1. Replace broken gear(s).</td>
</tr>
<tr>
<td></td>
<td>2. Damaged lift screw.</td>
<td>2. Replace inner leg or entire landing gear leg.</td>
</tr>
<tr>
<td></td>
<td>3. Seized lift screw or nut</td>
<td>3. Replace inner leg or entire landing gear leg.</td>
</tr>
<tr>
<td></td>
<td>4. Bent inner or outer leg tube.</td>
<td>4. Replace bent inner leg or outer leg, or entire landing gear leg.</td>
</tr>
<tr>
<td>Crank shaft skips when cranking</td>
<td>1. Broken gear teeth.</td>
<td>1. Replace broken gear(s).</td>
</tr>
</tbody>
</table>
Vendor Information - Holland Mark V

LANDING GEAR
OPERATING, MAINTENANCE
AND REPAIR PROCEDURES

Do not deviate from these instructions. Any changes or deviations will void all warranties, expressed or implied, unless written consent is first obtained from the factory.

OPERATION OF HOLLAND MARK V LANDING GEARS:

CAUTION:
— Always grip crank handle securely.
— Always grip crank handle securely with both hands before shifting.
— Never shift landing gear under load.
— Never leave the gears in neutral or the crank unsecured.

NOTE: HOLLAND MARK V, 2-speed gearbox has high, neutral and low range gears. High range is to be used only for rapid traverse up and down and is not intended to lift any load. All lifting must be done using low gear. See Holland publication “Fifth Wheel Operating Instructions” (form no. FW-TE-14B) for additional information.

TO EXTEND:
On outside mounted landing gears, engage the crank with the crankshaft and turn the crank clockwise. Inside mounted landing gears are extended by turning the crank counterclockwise. Using high gear, lower the landing gear until the pads make contact with the ground. To reduce the load on the fifth wheel, shift to low gear and crank an additional 4 to 8 turns. Leave the landing gear engaged in low gear and store the crank handle in the holder provided.

TO RETRACT:
On outside mounted landing gears, engage crank with crankshaft and turn the crank counterclockwise. Inside mounted landing gears are retracted by turning the crank clockwise. Retract the landing gear using low gear until unloaded. Then shift to high gear and continue cranking until fully retracted. Leave the landing gear in high gear and store the crank handle in the holder provided. NOTE: If the crank handle cannot be stored in the holder when fully retracted, turn the crank handle in the opposite direction (lowering the leg) until it can be properly stored.

MAINTENANCE:

LUBRICATION:
Although Mark V’s were adequately greased and packed with high quality lubricants when manufactured, it may be necessary to periodically supplement this lubrication to maintain satisfactory performance for your particular application.
1. Lube both legs through grease fittings provided in the legs two times a year or as required.
2. Lube 2-speed gears through the grease fitting in the gearbox two times a year or as required.

TROUBLE SHOOTING—HARD TURNING LANDING GEARS—CHECK THE FOLLOWING:
1. Binding cross shaft. Bolts in the cross shaft must not be overtightened to prevent lateral movement of the cross shaft.
2. To determine which leg turns hard, remove the cross shaft and operate each leg individually.
3. Alignment - legs must be parallel and extend and retract evenly.
4. Legs and gearbox may need additional lubrication. Insert oil into top of casing; remove lower grease fitting and apply grease directly on to the elevating screw. For more information see Holland Service Bulletin No. 22.
5. If crankshaft holder or extension is used, check for alignment with crankshaft.
6. If a through-axle is used, check for binding where the axle goes through the legs.
7. Examine nut and screw assembly for damage caused by dropping of the trailer.

TROUBLE SHOOTING—GENERAL:
Follow the dismantling and assembly instructions in this manual.
1. Crankshaft is jammed - examine nut and screw assembly for damage caused by dropping the trailer.
2. Crankshaft jams or skips while turning - examine parts (18 & 21) and all gearbox gears for worn, broken or missing teeth.
3. Will not stay in gear while cranking - check condition of shifter spring (13) and grooves in crankshaft (1).
Before attempting to operate the landing gear, you must read and understand the following procedures:

- Perform all procedures in a lighted area clear of obstacles and other personnel.
- Always grip the crank handle securely with both hands.
- Maintain proper footing at all times.
- Never attempt to shift the landing gear while under load.
- Lifting and lowering of the trailer must always be done in LOW GEAR.
- DO NOT ATTEMPT TO LIFT OR LOWER TRAILER WITH LANDING GEAR IN HIGH GEAR, AS SERIOUS PERSONAL INJURY COULD OCCUR.
- Always secure the crank handle when not in use.

**OPERATING INSTRUCTIONS**

Before operating, identify the mounting style of your landing gear — Inside or Outside Mount (See figures below).

**Outside Mount**
- Push crank handle in for **low** speed.
- Pull crank handle out for **high** speed.
- Turn crank:
  - **counterclockwise** = retract
  - **clockwise** = extend

**Inside Mount**
- Push crank handle in for **high** speed.
- Pull crank handle out for **low** speed.
- Turn crank:
  - **counterclockwise** = extend
  - **clockwise** = retract
COUPLING INSTRUCTIONS

STEP 1
Inflate tractor air suspension and back up close to the trailer, centering the kingpin with the throat of the fifth wheel and **STOP! DO NOT ATTEMPT TO COUPLE UNTIL STEPS 2 THROUGH 4 ARE COMPLETED.**

**TRAILER (TOP)**

**KINGPIN**

STEP 2
Chock trailer wheels.
Connect brake lines and light cord.
Support slack in lines to prevent interference.
Set trailer brakes.

**STEP 3**
Make sure that the landing gear is in low speed *(see Figure 1)* and engage crank handle.

**STEP 4**
Adjust trailer height so that the fifth wheel will lift the trailer.

**STEP 5**
Couple and verify that the fifth wheel locks are properly closed around the kingpin.

**STEP 6**
While still in low gear, retract landing gear until pads just come off the ground.

**STEP 7**
Switch to high gear, fully retract and secure crank handle.
UNCOUPLING INSTRUCTIONS

STEP 1
Position the tractor and trailer on level ground, clear of persons and obstacles.

STEP 2
Set trailer brakes.
Slowly back tractor tightly against trailer.
Set tractor brakes.
Chock trailer wheels.

STEP 3
Shift landing gear to high speed and engage crank handle.

STEP 4
Extend landing gear until pads just touch the ground.

STEP 5
Switch to low gear and crank an additional 4-8 turns. Secure crank handle.

STEP 6
• Pull fifth wheel release handle.
• Disconnect air lines and light cord.
• Release tractor brakes and slowly drive away from trailer.

MAINTENANCE PROCEDURES

LUBRICATION
Lubrication should be performed at least every six months and more frequently in applications where the landing gear are exposed to excessive moisture, waterspray, dust, or if they are not used for extended periods. Lubricate with the trailer securely coupled to a tractor (see coupling instructions). Employ a lubricant compatible with the original type of grease used:

Standard = Lithium base EP-2
Low Temperature = Lubriplate aero-grade

1. Fully retract the landing gear, then using high gear extend 2-3 turns.
2. Lubricate through the grease fittings as shown.
3. Extend and retract the landing gear to apply grease to the entire length of the screw.
LANDING GEAR LUBRICATION IS IMPORTANT

Although your landing gear was adequately greased and packed with high quality lubricants when manufactured, it will be necessary to periodically supplement this lubrication to maintain satisfactory performance for your particular application. Relubrication should be part of your preventative maintenance program and should be done every six months or more often, if required.

Lubricate as follows: (see FIGURE 1)

1. Fully retract the landing gear, then using high gear, lower the leg 2-3 turns and lubricate the lift-screw assembly through grease fitting “A” (see FIGURE 1 below). Distribute the lubrication by extending and retracting the leg several times.

2. Lubricate the gearbox, using grease fitting “B”.

3. Lubricate the bevel gear using grease fitting “C”.

For moderate temperature operations (20° F to 150° F) use an anhydrous calcium extreme pressure grease. For low temperature operations (under 20° F) use an anhydrous calcium extreme pressure grease that operates down to -65°F. For cold weather operations, it is also recommended to only fill the gearbox approximately 3/4 full with grease. This helps minimize moisture accumulation, which can freeze, causing hard gear cranking.
SECTION 7

Fifth Wheels
FIFTH WHEELS

Fifth wheels are usually mounted on the tractor and is the connection link to the trailer. After connecting the trailer to the fifth wheel, lock wheels or lock brakes on trailer and pull against king pin to check for complete lock. Caution! always visually check coupling.

FIFTH WHEEL MAINTENANCE

1. Lubricate all moving parts with number 2 diesel oil or comparable lubricant.
2. Check lock guard operation. Make sure lock guard is between jaws before coupling.
3. Check for proper locking and unlocking with free moving plunger. If jaws do not open and close properly, check for foreign matter between jaws and jaw guides. Foreign matter will prevent complete opening and closing.
4. Replace all cracked or missing parts.
5. Lubricate top plate with wheel bearing grease.
6. King pin should be replaced when it has worn 1/8"
SECTION 8

Suspensions
Suspensions

There are several types of trailer suspensions available for today’s applications. The suspension is the assembly that connects the axles to the trailer frame and absorbs shock loads and braking loads through the leaf springs or air springs (air bags). Therefore it is important that it be maintained. Please refer to the suspension packet located in with your owner’s manual. This information will help you to better understand the purpose, type and parts associated with the suspension on your ViKing Specialized Trailer.

Your new Viking Specialized Trailer has been manufactured using one of the following suspensions. These suspensions are standard on Viking Specialized Trailer models.

1. Watson & Chalin Single point Suspension
2. Hendrickson-Turner HT250US air Ride Suspension
3. Hutch 9700 Series Spring Suspension
5. Hutch 9600 Series Spring Suspension

Be sure to carefully read the information on suspensions associated with your Viking Specialized Trailer. This information will allow you to understand the suspension and the Suspension Warranty in the event that a manufacturing defect should arise.

All of the fasteners on your suspension were torqued properly from the factory during Manufacturing. Due to vibration and shock loads it is necessary after a break-in period of 1,000 miles or three months, and every six months thereafter to tighten all nuts and bolts to the recommended torque. Always check the torque on the nut and not on the head of the bolt. Do not lubricate the threads unless values are given for lubricated threads.

Identifying Your Model

It is important that you know what model number has been assigned to your assembly in case you need to contact the vendor.
IDENTIFICATION PLATE

Each assembly has an identification plate located near the spring cap of the suspension (see below), on the driver’s side of the vehicle, which identifies it. The plate includes the model number, serial number, and capacity in pounds for the assembly. It is important to record the model number for future reference.

Torque values
AIR SPRING SUSPENSION INFORMATION

Regular preventive maintenance checks on air spring suspensions are the same as on leaf spring suspensions with the addition of the air bags and air components. With the air pressure above 65 psi, the height between axle and frame should be within 1/4" of the same height at all air bags. If not, it may be an indication of air loss at one or more air bags, air leaks at fittings, or malfunctioning leveling valves. Leveling valves should have proper clearance to permit leveling arm to actuate freely and not be bent or twisted. Do not grease leveling valves. There is a time delay of 2 to 6 seconds before the leveling valve will add or exhaust air to the air springs. The proper position of the valve actuating lever is in the center or neutral. Lever up will add air; lever down will exhaust air. Check leveling valve lever for being in proper position while trailer is connected to tractor in drive away condition.

In the event of failure in one or more air springs, it is recommended the height control valve linkage be disconnected and the lever arm be rotated to a vertical down position. This will exhaust air from the bags, allowing load to be carried on internal rubber stops within the bags. This procedure is intended for temporary operation only. See Figure 1.
LEADERSHIP IN SUSPENSION TECHNOLOGY

SINGLE POINT SUSPENSION
DESIGNED FOR ON & OFF ROAD APPLICATIONS

- 5 Year Warranty
  - 5 Year Parts and Labor on Straddle Mount Against Trunnion
  - Tube Breakage
  - 5 Year on Polyurethane Bushings & Pads
- Straddle Mount or Trunnion Mount
- Severe Duty Straddle Plate Available for 60,000, 70,000 or 80,000 lbs.
- Optional Trunnion Lengths Available
- Capacity: 44,000 lbs. thru 80,000 lbs.

LEADERSHIP IN SUSPENSION TECHNOLOGY
Identifying Your Model

It is important that you know what model number has been assigned to your assembly in case you ever need to contact Watson & Chalin.

Identification Plate

Each assembly has an identification plate located near the spring cap of the suspension (see below), on the driver’s side of the vehicle, which identifies it. The plate includes the model number, serial number, and capacity in pounds for the assembly. It is important to record the model number for future reference.

Figure 1: Identification Plate

Parts List

The following section shows exploded views of various SP Series suspensions and corresponding parts lists that describe each of the numbered parts. Some Single Point series models also have an additional table that corresponds to the main parts list. The exploded views of the Single Point, the parts lists and the corresponding tables are intended to help you identify parts and part numbers that may need to be replaced.
Vendor Information - WATSON & CHALIN - SP Series

SP Series

Note
Some part numbers need more explanation; therefore, references have been given as a link to lead you to more details. Click the link to jump to the information or go to the page that contains the referenced information.

Figure 2: Exploded View–TS Single Point

Table 1 TS Single Point Parts List

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SP Series

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Chart 1

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Chart 1A

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SP Series

Figure 5: Exploded View–US Single Point

Table 4 US Single Point Parts List

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Vendor Information - WATSON & CHALIN - SP Series

SP Series

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Chart 3

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<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>LWUS50</td>
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<td>SP-0061</td>
<td>SP-00084</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<td>N/A</td>
<td>N/A</td>
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</table>

Chart 3A

<table>
<thead>
<tr>
<th>Clamp Stand Height</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.5&quot;</td>
<td>SP-0009</td>
</tr>
<tr>
<td>6.5&quot;</td>
<td>SP-0010</td>
</tr>
<tr>
<td>4.5&quot;</td>
<td>SP-0011</td>
</tr>
<tr>
<td>2.5&quot;</td>
<td>SP-0012</td>
</tr>
</tbody>
</table>
Vendor Information - WATSON & CHALIN - SP Series

SP Series

Figure 8: Exploded View–TSR Single Point

Table 7 TSR Single Point Parts List

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>Quantity</th>
<th>Part #</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Polyurethane Pad</td>
<td>4</td>
<td>SP-0193</td>
</tr>
<tr>
<td>2</td>
<td>Washer Flat 4.12X6.00X.12</td>
<td>4</td>
<td>SP-0038</td>
</tr>
<tr>
<td>3</td>
<td>Trunnion Tube</td>
<td>1</td>
<td>Part number depends on spring centers</td>
</tr>
<tr>
<td>4</td>
<td>Trunnion Clamp Stand</td>
<td>1</td>
<td>See Chart 6A</td>
</tr>
<tr>
<td>5</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>U-bolt</td>
<td>4</td>
<td>See Chart 6</td>
</tr>
<tr>
<td>7</td>
<td>Spring Cap</td>
<td>2</td>
<td>SP-0177</td>
</tr>
<tr>
<td>8</td>
<td>Spring</td>
<td>2</td>
<td>See Chart 6</td>
</tr>
<tr>
<td>9</td>
<td>Trunnion Cap/Spring Seat</td>
<td>2</td>
<td>SP-0001</td>
</tr>
<tr>
<td>10</td>
<td>Trunnion Cap</td>
<td>2</td>
<td>SP-0171</td>
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### Chart 6

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>Quantity</th>
<th>Part #</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>High Nut 1.125 UNF</td>
<td>8</td>
<td>10003</td>
</tr>
<tr>
<td>12</td>
<td>Cap-spring End</td>
<td>4</td>
<td>See Chart 6</td>
</tr>
<tr>
<td>13</td>
<td>Capscrew .625 UNF</td>
<td>16</td>
<td>See Chart 6</td>
</tr>
<tr>
<td>14</td>
<td>Axle Seat/Spring Pin Assembly</td>
<td>4</td>
<td>See Chart 6</td>
</tr>
<tr>
<td>15</td>
<td>Lock Nut .625 UNF Grade 8</td>
<td>32</td>
<td>10029</td>
</tr>
<tr>
<td>16</td>
<td>U-bolt</td>
<td>8</td>
<td>See Chart 6</td>
</tr>
<tr>
<td>17</td>
<td>Polyurethane Bushing</td>
<td>2</td>
<td>SP-0193</td>
</tr>
<tr>
<td>18</td>
<td>Washer 1.125 Hardened</td>
<td>32</td>
<td>10045</td>
</tr>
<tr>
<td>19</td>
<td>Washer .625 Hardened</td>
<td>32</td>
<td>10032</td>
</tr>
<tr>
<td>20</td>
<td>Shim Spacer .25&quot; End Cap</td>
<td>8</td>
<td>See Chart 6</td>
</tr>
<tr>
<td>21</td>
<td>Capscrew .75 X 5.0 UNF Grade 8</td>
<td>4</td>
<td>10033</td>
</tr>
<tr>
<td>22</td>
<td>Washer .75</td>
<td>12</td>
<td>10043</td>
</tr>
<tr>
<td>23</td>
<td>Lock Nut .75 UNF Grade 8</td>
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### Chart 6A

<table>
<thead>
<tr>
<th>Item 4</th>
<th>Item 6</th>
<th>Item 8</th>
<th>Item 12</th>
<th>Item 13</th>
<th>Item 14</th>
<th>Item 16</th>
<th>Item 20</th>
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<tr>
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<td>Model</td>
<td>Item 6</td>
<td>Item 8</td>
<td>Item 12</td>
<td>Item 13</td>
<td>Item 14</td>
<td>Item 16</td>
</tr>
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<td></td>
<td>HDTSR44</td>
<td>SP-0023</td>
<td>SP-0056</td>
<td>SP-0007</td>
<td>10034</td>
<td>SP-0036</td>
<td>SP-0048</td>
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<tr>
<td></td>
<td>HDTSR50</td>
<td>SP-0022</td>
<td>SP-0057</td>
<td>SP-0007</td>
<td>10034</td>
<td>SP-0036</td>
<td>SP-0048</td>
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<tr>
<td></td>
<td>HDTSR60</td>
<td>SP-0022</td>
<td>SP-0060</td>
<td>SP-0007</td>
<td>10034</td>
<td>SP-0036</td>
<td>SP-0048</td>
</tr>
<tr>
<td></td>
<td>LWTSR44</td>
<td>SP-0023</td>
<td>SP-0058-01</td>
<td>SP-0016</td>
<td>10034</td>
<td>SP-0036</td>
<td>SP-0048</td>
</tr>
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<td></td>
<td>LWTSR50</td>
<td>SP-0023</td>
<td>SP-0061</td>
<td>SP-0016</td>
<td>10396</td>
<td>SP-0036</td>
<td>SP-0048</td>
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<tr>
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<td>LWTSRPAR50</td>
<td>SP-0249</td>
<td>SP-0056</td>
<td>SP-0007</td>
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<td>SP-0036</td>
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### Chart 6A

<table>
<thead>
<tr>
<th>Item 4</th>
<th>Part No.</th>
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<tbody>
<tr>
<td>8.5&quot;</td>
<td>SP-0009</td>
</tr>
<tr>
<td>6.5&quot;</td>
<td>SP-0010</td>
</tr>
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<td>4.5&quot;</td>
<td>SP-0011</td>
</tr>
<tr>
<td>2.5&quot;</td>
<td>SP-0012</td>
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Table 8  USR Single Point Parts List

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>Quantity</th>
<th>Part #</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Polyurethane Pad</td>
<td>4</td>
<td>SP-0193</td>
</tr>
<tr>
<td>2</td>
<td>Trunnion Tube</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Trunnion Clamp Stand</td>
<td>2</td>
<td>SP-0177</td>
</tr>
<tr>
<td>4</td>
<td>U-bolt</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Lower Spring Cap (USR)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Spring</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Trunnion Cap/Spring Seat</td>
<td>2</td>
<td>SP-0001</td>
</tr>
<tr>
<td>8</td>
<td>Trunnion Cap (USR Model)</td>
<td>2</td>
<td>SP-0171</td>
</tr>
<tr>
<td>9</td>
<td>High Nut 1.125 UNF Grade 8</td>
<td>8</td>
<td>10003</td>
</tr>
<tr>
<td>10</td>
<td>U-bolt 1.00-14X11 Grade 8</td>
<td>8</td>
<td>SP-0020</td>
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Vendor Information - WATSON & CHALIN - SP Series

**SP Series**

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>Quantity</th>
<th>Part #</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Axle Seat/Spring End Cap</td>
<td>4</td>
<td>See Chart 7</td>
</tr>
<tr>
<td>12</td>
<td>Bottom Plate / Pin Assembly</td>
<td>4</td>
<td>SP-0029</td>
</tr>
<tr>
<td>13</td>
<td>High Nut 1.00 UNF</td>
<td>16</td>
<td>10031</td>
</tr>
<tr>
<td>14</td>
<td>Washer Flat 1.06X1.75 Hardened</td>
<td>16</td>
<td>17099-01</td>
</tr>
<tr>
<td>15</td>
<td>Polyurethane Bushing</td>
<td>2</td>
<td>SP-0192</td>
</tr>
<tr>
<td>16</td>
<td>Capscrew .75 UNF 2.50 Long Hardened</td>
<td>8</td>
<td>10896-01</td>
</tr>
<tr>
<td>17</td>
<td>Washer .75 Hardened</td>
<td>12</td>
<td>10043</td>
</tr>
<tr>
<td>18</td>
<td>Lock Nut .75 UNF Grade 8</td>
<td>12</td>
<td>10028</td>
</tr>
<tr>
<td>19</td>
<td>Washer 1.125 Hardened</td>
<td>8</td>
<td>10045</td>
</tr>
<tr>
<td>20</td>
<td>Capscrew .75 X 5.0 UNF Grade 8</td>
<td>4</td>
<td>10033</td>
</tr>
<tr>
<td>21</td>
<td>Washer Flat 4.12X6.00X.12</td>
<td>2</td>
<td>SP-0038</td>
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**Chart 7**

<table>
<thead>
<tr>
<th>Model</th>
<th>Item 4</th>
<th>Item 6</th>
<th>Item 11</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5&quot; Rd Axle</td>
<td>5&quot; Sq Axle</td>
<td></td>
</tr>
<tr>
<td>HDUSR44</td>
<td>SP-0023</td>
<td>SP-0056</td>
<td>SP-0013</td>
</tr>
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<td>HDUSR50</td>
<td>SP-0023</td>
<td>SP-0057</td>
<td>SP-0013</td>
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<td>HDUSR60</td>
<td>SP-0022</td>
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**Chart 7A**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Clamp Stand Height</td>
<td></td>
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<tr>
<td>8.5&quot;</td>
<td>SP-0009</td>
</tr>
<tr>
<td>6.5&quot;</td>
<td>SP-0010</td>
</tr>
<tr>
<td>4.5&quot;</td>
<td>SP-0011</td>
</tr>
<tr>
<td>2.5&quot;</td>
<td>SP-0012</td>
</tr>
</tbody>
</table>
Vendor Information - W&C- SP Series - Torque Requirements

SP Series

Final Checking

- Check all welding to ensure proper welds at all locations indicated on drawings.
- Check all nuts and bolts for proper tightness. (Make sure that all parts are tightened metal to metal.)
- Install tires. Unit is ready to run.

Torque Requirements

Torque specifications listed below are applied to a nut, not the capscrew. A tolerance of + or - 5% is acceptable. All torque requirements are for lubricated threads only. A lubricated thread is defined as a bolted connection that has some form of friction modifier or lubricant applied to the thread surfaces which provides a lower torque requirement. Torque values do not apply to low grade fasteners.

### Capscrew/Bolt (Grade 8 UNF) Torque Requirements

<table>
<thead>
<tr>
<th>Capscrew/Bolt Size</th>
<th>3/8&quot;</th>
<th>1/2&quot;</th>
<th>5/8&quot;</th>
<th>3/4&quot;</th>
<th>7/8&quot;</th>
<th>1&quot;</th>
<th>1 1/8&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque minimum ft./lbs.</td>
<td>25</td>
<td>50</td>
<td>150</td>
<td>300</td>
<td>500</td>
<td>700</td>
<td>900</td>
</tr>
<tr>
<td>Torque maximum ft./lbs.</td>
<td>35</td>
<td>75</td>
<td>200</td>
<td>350</td>
<td>550</td>
<td>800</td>
<td>1000</td>
</tr>
</tbody>
</table>

### U-bolt Torque Instructions

To retorque u-bolts:

1. Partially tighten bolts #1 and #4 according to figure 17.

### Figure 17: U-Bolt Torque Pattern

2. Partially tighten bolts #2 and #3.
3. Using the same sequence, torque to the proper torque as specified below.

### U-Bolt (Non-Plated Clean Lubricated Thread) Torque Requirements

<table>
<thead>
<tr>
<th>UNF Grade 8 Size</th>
<th>3/8&quot;</th>
<th>1/2&quot;</th>
<th>5/8&quot;</th>
<th>3/4&quot;</th>
<th>7/8&quot;</th>
<th>1&quot;</th>
<th>1 1/8&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>U-bolt minimum ft./lbs.</td>
<td>15</td>
<td>40</td>
<td>120</td>
<td>200</td>
<td>400</td>
<td>650</td>
<td>800</td>
</tr>
<tr>
<td>U-bolt maximum ft./lbs.</td>
<td>20</td>
<td>60</td>
<td>150</td>
<td>250</td>
<td>450</td>
<td>750</td>
<td>900</td>
</tr>
</tbody>
</table>

### Re-Torquing Guidelines

All fasteners have been previously torqued, but should be re-torqued according to the following schedule.

- after 5 days
- after 30 days
- after 60 days
- every 6 months thereafter
Suspensions: Vendor Information - Hutch
After all these years, it is still the most versatile trailer suspension on the road today.

The Hutch 9700 Series remains the leader in our long and distinguished line of trailer suspension systems. Hutch Suspensions incorporate innovative thinking that results in a durable and reliable system that not only extends service life, reduces downtime and protects your cargo – but also provides a smooth and comfortable ride.

The 9700 Series can be assembled in single, tandem or multi-axle configurations. In addition, mounting heights from 6" to 20+" are easily achieved. The 9700 Series offers axle spacings from 42" to 121" and comfortably adapts to round, square or rectangular axles. A wide variety of springs offer suspension capacities from 22,400 up to 25,000 lbs/axle. All 9700 Series suspensions are available with either fabricated (shown here) or cast steel spring hangers and rockers. These hangers come in a wide variety of styles designed to fit numerous mounting requirements. Whether your frame is tubular, I-beam, C-channel or a G-rail, Hutchens has a spring hanger configuration to meet your needs.

We also have a package specifically designed for tank trailer applications that utilizes cast rockers and cast torque arm eye-ends.
Hutch 9700 Series

In addition to the standard overslung configuration, an underslung configuration is available for reduced mounting heights. (Mounting height (Mtg/ht) is the distance from the center line of the axle to the top of the spring hangers.)

Overslung w/ Standard U-Bolt Configuration

Underslung

1/2" wear pads in hangers and equalizers.

Huck “lockbolt” fastening system that is virtually maintenance-free.

Million Mile Rocker Bushing that virtually eliminates bushing fatigue and failure.

Wrapped fabricated torque arm eye-ends prevent separation under extreme conditions.

The standard 9700 Series suspensions have U-bolts that point downward (threads and nuts below the axle). However, a model is available with inverted U-bolts (threads and nuts above the axle).

Inverted U-Bolt Configuration

Widespread configurations (axle spacings greater than 49") are available through 121”.

H and CH-9700 TWS 54.5

H and CH-9700 US TWS 54.5

H and CH-9700 TWS 61 through 81

H and CH-9700 US TWS 61 through 81

H and CH-9700 TWS 97 through 121

H and CH-9700 US TWS 97 through 121
Suspensions: Hutch 9700 Series
Hutch 7700/9700 4 Spring Maintenance Procedures

9700
4-Spring Suspension Series

Maintenance Procedures

Advancing the Practical Application of Suspension Technology
Springfield, MO • (800) 654-8824 • (417) 862-5012
Fax (417) 862-2317 • www.hutchensindustries.com
Warning

We strongly emphasize that each of the maintenance procedures that we will discuss have a significant safety purpose. Failure to maintain proper torque values on each of the suspension components can result in a failure of suspension components. Further, use of any visibly worn component can result in a failure. Any of these failures can result in loss of vehicle control and personal injury or death. Safety is the number one concern at Hutchens Industries. We urge you to follow the maintenance procedures set out in our video and in these written instructions.

The first maintenance check should be performed after an initial break-in period of about 1,000 miles. A visual inspection of all suspension components and attachment welds should be performed to reveal any obvious problems, such as cracks or unexpected wear.

During this "walk-around" it is essential to also check the torque on all suspension fasteners. In the course of the initial "shake down" period in which the components of the suspension "seat-in," as much as 25% of the original clamp load on the bolted joints can be lost. After the parts of the suspension have worked together for a very short period of time, re-torquing the bolts is necessary to ensure that undue movement - which results in excessive suspension wear - does not occur.

During the first maintenance check, the trailer's axle alignment should be examined and adjusted to comply with the Truck Trailer Manufacturers Association (TTMA) Recommended Practice #71-05. Alignment should also be checked following any maintenance or repair procedure performed on the suspension. Visual inspections and re-torquing are maintenance procedures that are performed every four months throughout the life of the trailer.

Begin each inspection with a review of the Hutchens torque decal (shown below) for the appropriate torque values for each suspension fastener. The oiled torque values in the first column are for new fasteners with lubricated threads. When you are installing new components, we recommend you lubricate the threads and use the torque values in this column. For maintenance checks on fasteners that have been in service, use the higher torque values in the dry thread column. It is important that you check all bolts and nuts to ensure that the recommended torque values are being maintained.

You cannot rely on your visual inspection to detect loose fasteners. USE A TORQUE WRENCH!

| SAFETY ALERT! (1) FOLLOW ALL TORQUE REQUIREMENTS. (2) DO NOT USE ANY COMPONENT WITH VISIBLY WORN OR DAMAGED THREADS. FAILURE TO FOLLOW THESE SAFETY ALERTS CAN LEAD TO LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE, SERIOUS PERSONAL INJURY OR DEATH. |

Hutchens Torque Decal Part No. 16086-01

This decal should be installed on the side of the trailer in a visible location.

Decals can be obtained free of charge by contacting Hutchens Industries, Inc.
ies - Maintenance Procedures

Now let’s look closely at the maintenance requirements for each of the suspension’s main component groups.

**Axle Clamp Group and Springs**

1. Check the torque on the U-bolt nuts by alternately tightening opposing corners of the clamp assembly. See Figure 1.
   a. When using 7/8\(”\) – 14 U-bolts, the nuts should be torqued to a dry level of 470 lb-ft.
   b. When using 3/4\(”\) – 16 U-bolts, the nuts should be torqued to a dry level of 420 lb-ft.

![Fig. 1](image1)

Always carefully inspect the spring and axle clamp components for any signs of wear or cracks, and replace if visible wear or cracks are present.

**Radius Rods**

2a. The 1\(”\) – 14 radius rod attachment bolts at the hangers and spring seats should be tightened to a dry level of 720 lb-ft of torque on both the adjustable and non-adjustable radius rods. See Figure 2.

![Fig. 2](image2)

Loose operation of this bolt can result in wear requiring that new components be installed to avoid structural damage. During your visual inspection, if you observe any visible wear or loosening in the bushing, it is imperative that you immediately replace the radius rod bushing and bolt. Failure to replace these components will result in damage to the hanger, spring seat, and/or radius rod.

2b. Next check the 1/2\(”\) – 20 radius rod clamp bolt, which should be tightened to a dry level of 85 lb-ft of torque. The 5/8\(”\) – 18 radius rod clamp bolt should be tightened to a dry level of 170 lb-ft of torque. See Figure 2. If the clamp bolt has not been properly maintained, then wear between the radius rod screw and the eye end may be observed. If so, then the entire radius rod must be replaced. Simply retightening or replacing the clamp bolt will not correct the problem.
Rocker Bushings

3. The recommended torque values for the rocker bushing clamp bolts are different for each model.
   a. If you are working on the 7700 model suspension, the 5/8" - 18 rocker step bolts should be tightened to a **dry** level of 170 lb-ft of torque. See Figure 3a.
   b. If you are working on the 9700 model suspension, the single 1 1/8" - 7 rocker bolt should be tightened to a **dry** level of 790 lb-ft of torque. See Figure 3b.

Fig. 3a
5/8"-18 rocker step bolts
Tighten to a dry level of 170 lb-ft of torque

Fig. 3b
1 1/8" rocker bolt
Tighten to a dry level of 790 lb-ft of torque

During your check, if the bolts are loose a detailed inspection of the rocker is important to ensure that no structural damage has occurred. One way this can be done is by raising the trailer until the trailer weight is taken off the springs. If the rocker is displaced or if the joint is loose, then the rocker should be removed and the rocker and/or rocker bushing be replaced. Again, visually inspect the condition of all rocker/rocker hanger assembly components and replace if visible wear is present.

Hangers

4. Check all of the spring retainer bolts found in the rockers and rear hangers. A **dry** value of 50 lb-ft of torque should be maintained on all of these bolts. See Figure 4.

Fig. 4
Spring retainer bolts
Tighten to a dry level of 50 lb-ft of torque

Loose fasteners that are allowed to operate for any period of time will result in irreversible suspension damage and possible loss of vehicle control. **Retightening a worn fastener will not correct a situation created by loose operation!**
HUTCHENS SUSPENSION WARRANTY

WARRANTY COVERAGE
Hutchens Industries, Inc. ("Hutchens") warrants, except with respect to leaf springs, to the first purchaser only, that parts, suspension components and units sold by Hutchens will be free from defects in material and workmanship under normal use and service and proper operation for a period of five (5) years from the date of shipment. With respect to leaf springs, Hutchens shall have no liability or duty except to assign to the Buyer any claim which Hutchens may have against the manufacturer thereof. THIS WARRANTY SHALL NOT APPLY AND NO WARRANTY OF ANY KIND SHALL EXIST AS TO ANY PRODUCT WHICH HAS BEEN SUBJECT TO ABUSE, MISUSE, NEGLECT OR ACCIDENT OF ANY TYPE OR CAUSE OR WHICH HAS BEEN REPAIRED, REPLACED, SUBSTITUTED OR USED WITH PARTS OTHER THAN GENUINE PARTS OF HUTCHENS OR ALTERED BY ANYONE. In addition, Hutchens is not responsible for and shall have no liability with respect to damages resulting from improper installation or operations beyond design capability. Hutchens, in its sole discretion, shall determine whether or not any Product is defective or otherwise covered or not covered by this Warranty. No action for breach of this Warranty may be commenced more than one (1) year after the occurrence of the alleged breach. This Warranty is not transferable.

WARRANTY AND DAMAGE DISCLAIMERS
HUTCHENS SHALL NOT BE LIABLE FOR THE LOSS OF USE OF ANY PRODUCT, LOSS OF TIME, INCONVENIENCE, COMMERCIAL LOSS OR ANY OTHER INDIRECT, CONSEQUENTIAL, SPECIAL, PUNITIVE OR INCIDENTAL DAMAGES OF ANY KIND OR NATURE ARISING FROM A CLAIM UNDER THIS WARRANTY OR ANY OTHER FAILURE TO COMPLY WITH THE TERMS OF THE CONTRACT BETWEEN HUTCHENS AND THE BUYER WHETHER SUCH LIABILITY IS ASSERTED ON THE BASIS OF CONTRACT, TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY) OR OTHERWISE, EVEN IF THE BUYER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH LOSS OR DAMAGE. HUTCHENS MAKES NO WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, OTHER THAN AS HEREIN EXPRESSLY PROVIDED, AND HUTCHENS SPECIFICALLY DISCLAIMS AND BUYER EXPRESSLY WAIVES ALL SUCH WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

EXCLUSIVE REMEDY
The Buyer’s exclusive remedy for breach of Hutchens’ warranty is limited to repair or replacement, at Hutchens’ sole discretion, of any part not in compliance with Hutchens’ warranty. In the event the buyer makes any claim under Hutchens’ warranty, Hutchens reserves the right to require any Products to be returned for inspection, at the Buyer's expense, to Hutchens' facility in Springfield, Missouri.

Hutchens Industries, Inc.
215 North Patterson
P.O. Box 1427
Springfield, Missouri 65801-1427
IDENTIFICATION GUIDE — TRAILER SUSPENSION SYSTEMS

HOW TO IDENTIFY A MODEL

STEP 1. Find the identification tag on the suspension model by referencing the following chart for tag location.

STEP 2. If no tag is found, contact the trailer manufacturer with the necessary information (i.e. trailer serial number) to determine what suspension model is on the trailer.

STEP 3. If no suspension model can be obtained by completing steps 1 and 2, refer to the following pages to help determine what suspension model is on the trailer. See instructions on page 4.

WHERE TO FIND ID TAG

<table>
<thead>
<tr>
<th>SUSPENSION MODEL</th>
<th>TAG LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>T Primary Suspension</td>
<td>Front of roadside frame bracket</td>
</tr>
<tr>
<td>HT Primary Suspension</td>
<td>Front of roadside frame bracket or inside of curbside beam</td>
</tr>
<tr>
<td>INTRAAX® Primary Suspension System</td>
<td>Inside of curbside beam</td>
</tr>
<tr>
<td>HS Slider with HT Suspensions</td>
<td>Front cross member on HS box</td>
</tr>
<tr>
<td>INTRAAX-SP Slider Suspension System</td>
<td>On roadside front frame bracket gusset</td>
</tr>
<tr>
<td>HK Slider Suspension</td>
<td>On roadside slider box side rail above front frame bracket</td>
</tr>
<tr>
<td>VANTRAAX® Slider Suspension System</td>
<td>On roadside slider box side rail above front frame bracket; also has blank INTRAAX tag on inside of curbside beam</td>
</tr>
</tbody>
</table>
Identification Guide

**IDENTIFICATION GUIDE — TRAILER SUSPENSION SYSTEMS**

General guidelines for interpreting the descriptions:

**MODEL: INTRAAX.2345**

DESCRIPTION: **AANT 23K 14RH L77N X7SHD**

- **Narrow Pivot Connection**
- **Suspension Capacity**
- **Axle Style / Track**
- **Brake Size**
- **Slack / Hub / Drums (if equipped)**

**MODEL: INTRAAX.6789**

DESCRIPTION: **AAEDL 30K 9RH S71P X7SHD**

- **Extreme Duty**
- **Low-Ride/ Liftable**
- **Suspension Capacity**
- **Axle Style / Track**
- **Brake Size**
- **Slack / Hub / Drums (if equipped)**

**MODEL: VANTRAAX.1234**

DESCRIPTION: **HKANT 40K 9 16RH L77N X7SHD**

- **K-2® Style Slider Box**
- **Narrow Pivot Connection**
- **Slider System Capacity**
- **Axle Spread**
- **Ride Height**
- **Spindle Type**
- **Brake Size**
- **Slack / Hub / Drums (if equipped)**

**MODEL: VANTRAAX.5678**

DESCRIPTION: **HKARL 46K 9 17RH S77N X7SHD**

- **Ramp Ready K-2 Style Slider Box**
- **Low-Ride**
- **Slider System Capacity**
- **Axle Spread**
- **Ride Height**
- **Spindle Type**
- **Brake Size**
- **Slack / Hub / Drums (if equipped)**

*Please note this is not an all-inclusive representation of the possible description values and that all model numbers may not represent the specific model descriptor.*
IDENTIFICATION GUIDE — TRAILER SUSPENSION SYSTEMS

SUSPENSION IDENTIFICATION GUIDE

INSTRUCTIONS

STEP 1. Determine if unit is a primary or slider suspension.

STEP 2. If it is a slider, use the following illustrations to determine the slider box type and the suspension model.
   If it is a primary, use the illustrations beginning on page 8 to determine the suspension model.

SLIDER BOXES — VAN / REEFER APPLICATIONS

Hendrickson van/reefer slider boxes are manufactured in two designs. In order to determine the box type, check to see if the cross members are in a ladder orientation or if the orientation forms two K's (see illustrations). If the orientation forms a ladder, refer to the illustration below. If the cross members form the "K" orientation, use the dimensions provided on pages 5 and 6 to determine which model that you have.

HS Slider Box
• HS190 / 230 Tandem

---

Cross member ladder orientation

Box height is 10"
IDENTIFICATION GUIDE — TRAILER SUSPENSION SYSTEMS

HKANT VANTRAAX® Slider Box
- HKANT 23K Single
- HKANT 40K Tandem
- HKANT 46K Tandem
- HKANT 46K 121” Wide Spread Tandem

HKAT VANTRAAX Slider Box
- HKAT 46K Tandem
- HKAT 50K Tandem (K-brace Reinforced)
- HKAT 69K23 Tridem
- HKAT 69K25 Tridem

HK Series Slider Box
- HK190/230 Tandem
IDENTIFICATION GUIDE — TRAILER SUSPENSION SYSTEMS

HKAL and HKARL VANTRAAX® Slider Box
- HKAL 46K Tandem
- HKARL 46K Ramp Ready Tandem

HTHKR Slider Box
- HTHKR 200U Ramp Ready Tandem

Box height is 8"
Bottom width of frame rail is 7.69"
Integrated ramp bay (Ramp Ready models only)
HKARL 46K Shown
"K" bracing
Hanger width is 7.25"
IDENTIFICATION GUIDE — TRAILER SUSPENSION SYSTEMS

SLIDER BOXES — PLATFORM APPLICATIONS

Hendrickson platform slider boxes feature a "Z-rail" style box that is designed to fit between the trailer I-beams with the locking pins engaging through the holes in the web of the beams. Refer to the illustrations below to determine if you have a top mount or low-ride model.

AAZL INTRAAX®-SP Slider Box
- AAZL 23K Single
- AAZL 46K Tandem

Box height is 6.06"

Bottom width of frame rail is 6.06"

Hanger width is 7.25"

(AAZL 46K Shown)

AAZNT INTRAAX-SP Slider Box
- AAZNT 23K Single
- AAZNT 46K Tandem

Box height is 6.06"

Bottom width of frame rail is 6.06"

Hanger width is 4.12"

(AAZNT 46K Shown)
IDENTIFICATION GUIDE — TRAILER SUSPENSION SYSTEMS

TOP MOUNT SUSPENSIONS

Top mount suspensions are those with the beam assembly on top of the axle. The illustrations show the distinguishing characteristics of the various Hendrickson top mount suspensions. In order to determine the suspension model, find the illustration with the same identifying characteristics.

HT190 and HT230 Top-Mount

HT250T Top-Mount
IDENTIFICATION GUIDE — TRAILER SUSPENSION SYSTEMS

HT300 Top-Mount

T Top-Mount
IDENTIFICATION GUIDE — TRAILER SUSPENSION SYSTEMS

UNDERSLUNG SUSPENSIONS

Underslung suspensions are those with the beam assembly under the axle. The illustrations show the distinguishing characteristics of the various Hendrickson underslung suspensions. In order to determine the suspension model, find the illustration with the same identifying characteristics.

**HT190U Underslung**

- Upper shock bracket mounts in frame cross member (remote shock)
- Single stud air spring
- Straight beam

**HT250U Underslung**

- Upper shock bracket mounts to frame bracket
- Single stud air spring
- Curved beam

8", 10" or 13.19"

6.19", 8", 10" or 13.19"
IDENTIFICATION GUIDE — TRAILER SUSPENSION SYSTEMS

HT250US Underslung

- Upper shock bracket mounts to frame bracket
- Single stud air spring
- Straight beam
- 4.5”, 8”, 10”, 12” or 14”

HT300U Underslung

- Upper shock bracket mounts to frame bracket
- Double stud air spring
- Curved beam
- 10”, 13.19”, 14.69” or 17.69”

T Underslung

- Double stud air spring
- Upper shock bracket mounts to air spring plate
- Curved beam
- 4.75”, 7.25” 9” or 11”
IDENTIFICATION GUIDE — TRAILER SUSPENSION SYSTEMS

INTRAAX® SUSPENSIONS

Hendrickson’s INTRAAX suspensions have an integrated axle and beam assembly. The illustrations show the distinguishing characteristics of the various models. In order to determine the suspension model, find the illustration with the same identifying characteristics.

INTRAAX Top-Mount
• AAT 23K / 25K / 30K

INTRAAX Top-Mount
• AANT 23K

Standard axle (5”)

Integrated axle and beam assembly

Spring seat located above the axle

Hanger width is 7.25”

5.75” long lower shock bolt

Large-Diameter Axle™ (5.75”)

Integrated axle and beam assembly

Spring seat located above the axle

Hanger width is 4.12”

5.75” long lower shock bolt
IDENTIFICATION GUIDE — TRAILER SUSPENSION SYSTEMS

INTRAAX® Low Ride / Liftable
• AAL 23K/25K/30K

INTRAAX. Low-Ride
• AANLS 20K
• AANL 23K

Hanger width is 7.25"

Standard axle (5")

Dropped air spring seat located behind the axle

Integrated axle and beam assembly

7" long lower shock bolt

Hanger width is 4.12"

20K - Standard axle (5")
23K - Large-Diameter Axle™ (5.75")

Pivot bolt to center of axle distance
20K - 17.8"
23K - 19.5"

Integrated axle and beam assembly

20K - 9.5" long lower shock bolt
23K - 5.75" long lower shock bolt

Dropped air spring seat located behind the axle
IDENTIFICATION GUIDE — TRAILER SUSPENSION SYSTEMS

INTRAAX® Extreme-Duty Top-Mount

• AAEDT 30K

Hanger width is 7.25"

7" long lower shock bolt

Standard axle (5")

Integrated axle and beam assembly

Spring seat located above the axle

INTRAAX Extreme Duty Low-Ride / Liftable

• AAEDL 30K

Hanger width is 7.25"

7" long lower shock bolt

Standard axle (5")

Integrated axle and beam assembly

Dropped air spring seat located behind the axle
TABLE OF CONTENTS

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COVERAGE .................................................................................... 2
WARRANTY CLAIM CONSIDERATIONS ........................................ 3
  Filing Warranty Claims ............................................................. 3
LABOR ALLOWANCES ................................................................... 4
COVERAGE TABLE ......................................................................... 10
ADDITIONAL WARRANTY COVERAGE INFORMATION............... 17
COMPREHENSIVE WARRANTY STATEMENT

WARRANTY CONDITIONS
Hendrickson Trailer Suspension Systems (Hendrickson) warrants that all trailer suspensions, listed on the following pages, shall be free of defects in material or workmanship. This warranty coverage only applies to those suspensions that have been properly assembled and installed by a trailer original equipment manufacturer (OEM), properly maintained (as described in all applicable Hendrickson publications) and used in the recommended application and within the rated capacities (as described in the Hendrickson Application Guide, publication L707). All non-recommended suspension applications must receive written approval from Hendrickson in order to be covered under this warranty. This warranty is subject to the conditions, exclusions and limitations listed below.

- Please contact the Hendrickson technical services department to receive warranty authorizations and/or to obtain warranty claim numbers (800-455-0043 in the United States or 800-668-5360 in Canada). Note that the terms and coverages in this warranty document apply only to the United States and Canada. If you need warranty information for Mexico, contact Hendrickson Mexicana at +52 (81) 8156-1300.

- Prior to the warranty repair or replacement of suspension systems or parts (by a dealer or other service provider authorized by the OEM of the subject trailer), the warranty claim must first be approved by the Hendrickson technical services department. Trailer dealers should inspect all suspensions involved in a warranty claim and then contact Hendrickson for assistance.

- Parts to be returned under a warranty claim must be accompanied by an RGO (returned goods order), RGA (returned goods authorization) or the warranty claim number issued by the Hendrickson technical services department.

- Parts returned under a warranty claim number must be sent prepaid. Hendrickson will reimburse the customer for the freight charges if the returned parts are confirmed to be defective or non-functioning.

- Only genuine Hendrickson parts, or parts sold through Hendrickson, may be used to repair Hendrickson suspension systems. Our warranty also applies only to genuine Hendrickson parts.

- Refer to the labor allowances on pages four through seven for a listing of typical repairs. Contact the Hendrickson technical services department to discuss allowances for anything not listed.

- Hendrickson has the sole discretion and authority to approve or disapprove a warranty claim, authorize the repair or replacement of non-functioning systems and authorize the repair or replacement of parts.

- Replacement parts provided under warranty are not warranted, they simply inherit the remainder of the suspension warranty. Goodwill or giveaway (sales policy) parts provided at no charge have no warranty.

When contacting the technical services department to receive warranty authorization, costs and procedures will be determined (see labor allowance chart for a listing of typical repairs). Hendrickson will pay a specified labor allowance, determined by the Hendrickson technical services department for the authorized repair or replacement of any defective component. Hendrickson is not responsible for any additional costs that may be incurred when replacement parts or materials are not acquired through Hendrickson.

COVERAGE
The Hendrickson suspension warranty coverage begins when the vehicle is put into service and ends when the time period specified in the warranty-coverage table (pages 10 through 15) is reached.

The warranty shall not apply to or include any repair or replacement as a result of the following conditions:
• Accident, fire or other casualty
• Misuse or negligence including, but not limited to, overloading
• Lack of reasonable and proper maintenance
• Repairs improperly performed or replacements improperly installed
• Use of component parts, replacement or otherwise, that are not manufactured or distributed by Hendrickson
• Modifications not recommended or approved by Hendrickson (in writing)
• Uses other than those intended by Hendrickson and the trailer OEM
• Normal wear and deterioration occasioned by the use of the suspension system
COMPREHENSIVE WARRANTY STATEMENT

- Any damage or failure caused by or otherwise attributed to any vehicle or trailer components, systems or equipment that are not manufactured or distributed by Hendrickson

The liability of Hendrickson under this warranty is limited solely to the repair or replacement of defective material or workmanship by an authorized party. Hendrickson shall not be liable for repairs performed by any unauthorized parties. This warranty does not include any expense of or related to transportation of the parts to or from the place where the repair is to be performed or compensation for inconvenience or loss of use while the suspension system is being repaired. Hendrickson shall not be liable for any expense, loss or damage (direct, incidental, consequential or exemplary — including, but not limited to, towing expenses, downtime expenses, cargo damage, incidental charges or any other losses arising in connection with the sale, use or inability to use the suspension system) resulting from the warranty-covered part found to be defective.

No expressed warranty is given by Hendrickson with respect to its suspension systems and products except as specifically set forth herein. Any warranty implied by law, including any warranty of merchantability or fitness for a particular purpose, is limited to the expressed warranty term provided in the warranty-coverage table (pages 10 through 15).

WARRANTY CLAIM CONSIDERATIONS
- SYSTEM PROBLEMS OR PARTS FAILURES THAT RESULT FROM IMPROPER INSTALLATION ARE THE RESPONSIBILITY OF THE INSTALLER OF THE SUSPENSION. These are not warranted by Hendrickson.

- THE HENDRICKSON TECHNICAL SERVICES DEPARTMENT MUST AUTHORIZE REPAIRS PRIOR TO THEM BEING PERFORMED. When authorizing repairs or services, the warranty administrator will determine the costs and procedures (see the labor allowances on pages four through seven for a listing of typical repairs). Failure to receive Hendrickson authorization may result in partial or complete loss of warranty coverage.

- DO NOT DESTROY THE PARTS BEING CONSIDERED FOR WARRANTY! All parts in question must be returned to Hendrickson for evaluation. Failure to return such parts may result in partial or complete loss of warranty coverage.

- "SHOP SUPPLY" REIMBURSEMENT MAXIMUM. The maximum amount to be considered for miscellaneous supply, shop supply, or job supply reimbursement is 4 percent of invoiced labor charges, up to a maximum of $20.

FILING WARRANTY CLAIMS
1. Review warranty coverage for the component(s).
   If the component complies with the stated time period for warranty coverage, continue with step two.
2. Locate, record and provide to Hendrickson the following information:
   - Hendrickson suspension model number
   - Hendrickson model serial number
   - Type of vehicle, name of vehicle manufacturer and VIN (vehicle identification number)
   - Approximate number of suspension miles
   - Model’s in-service date
   - Description of the system problem and/or the part number of the non-functioning part
   - Special application approval documentation (if applicable)
3. Contact the proper authority:
   A. IF YOU ARE AN END USER (OWNER) OR DEALER: Report the problem to the trailer manufacturer or the suspension installer. If the problem is not related to installation, the manufacturer or installer will contact Hendrickson to file the warranty claim.
   B. IF YOU ARE A TRAILER MANUFACTURER: Contact the Hendrickson Trailer technical services department at 800-455-0043 (in the United States) or at 800-668-5360 (in Canada) and provide the information recorded in step two. If operating in Mexico, please refer to Hendrickson publication LB269P, Póliza de Garantía - México for warranty information.
      The technical services department will issue an RGO, RGA or warranty claim number for each submitted claim. All parts to be returned to Hendrickson or its vendors must be labeled with this claim number and shipped within 60 days for timely processing of the warranty claim.
COMPREHENSIVE WARRANTY STATEMENT

4. Submit a work order job description with your RSO, RGA or warranty claim number describing what is to be repaired or replaced (refer to the standard repair times listed on pages four through seven). This work order job description should be as itemized and detailed as possible for prompt processing and maximum consideration.

<table>
<thead>
<tr>
<th>COMPONENT DESCRIPTION</th>
<th>TIME (HOURS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRI-FUNCTIONAL® Bushings</td>
<td>4.0 (per axle)</td>
</tr>
<tr>
<td>- Removal and replacement of:</td>
<td></td>
</tr>
<tr>
<td>- TRI-FUNCTIONAL Bushings*</td>
<td></td>
</tr>
<tr>
<td>- Bushing tube spacers</td>
<td></td>
</tr>
<tr>
<td>- Pivot connection hardware*</td>
<td></td>
</tr>
<tr>
<td>- Axle alignment*</td>
<td></td>
</tr>
<tr>
<td>Bushing tube spacers</td>
<td>1.5 (per axle)</td>
</tr>
<tr>
<td>- Removal and replacement of:</td>
<td></td>
</tr>
<tr>
<td>- Bushing tube spacers</td>
<td></td>
</tr>
<tr>
<td>- Pivot connection hardware*</td>
<td></td>
</tr>
<tr>
<td>- Axle alignment*</td>
<td></td>
</tr>
<tr>
<td>Air spring/piston</td>
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</tr>
<tr>
<td>Each air spring (up to three)</td>
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<tr>
<td>Each additional air spring</td>
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<tr>
<td>Center lift air spring</td>
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<tr>
<td>Shock absorber</td>
<td>0.5</td>
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<tr>
<td>Shock bracket (upper)</td>
<td></td>
</tr>
<tr>
<td>Weld-on</td>
<td>1.5</td>
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<tr>
<td>Bolt-on</td>
<td>1.0</td>
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<tr>
<td>Shock bracket (lower)</td>
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</tr>
<tr>
<td>AAL, AAEDT and AAEDL rear-mount only</td>
<td>1.0</td>
</tr>
<tr>
<td>Frame bracket (welded)</td>
<td>4.0</td>
</tr>
<tr>
<td>- Removal and replacement of:</td>
<td></td>
</tr>
<tr>
<td>- Pivot connection hardware*</td>
<td></td>
</tr>
<tr>
<td>- Axle alignment*</td>
<td></td>
</tr>
<tr>
<td>Axle alignment (dual axles with QUIK-ALIGN®)</td>
<td>1.0</td>
</tr>
<tr>
<td>- Each additional axle .5</td>
<td></td>
</tr>
<tr>
<td>- Removal and replacement of:</td>
<td></td>
</tr>
<tr>
<td>- QUIK-ALIGN pivot connection hardware*</td>
<td></td>
</tr>
<tr>
<td>Axle alignment (dual axles with welded collars)</td>
<td>1.5</td>
</tr>
<tr>
<td>- Each additional axle .8</td>
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<tr>
<td>- Removal and replacement of:</td>
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</tr>
<tr>
<td>- Pivot connection hardware*</td>
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<tr>
<td>Frame bracket (bolt-on)</td>
<td>3.0</td>
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<td>- Removal and replacement of:</td>
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<tr>
<td>- Pivot connection hardware*</td>
<td></td>
</tr>
<tr>
<td>- Axle alignment*</td>
<td></td>
</tr>
<tr>
<td>Beam and axle seat assembly for HT and T suspensions</td>
<td>4.0</td>
</tr>
<tr>
<td>Air reservoir</td>
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</tr>
</tbody>
</table>
SECTION 9

Component Parts
COMPONENT PARTS

If you have any questions about the components or component parts that have been used in the mfg. of your New Viking Specialized Specialized Trailer. Please refer to the Related areas of the owner’s Manual for the component parts list and how to Obtain these parts. If you need assistance with the identification of component Parts and how to for ordering Viking Specialized Trailers will be happy to help. You will find component manufacturing numbers located with the component information in the sections of the manual pertaining to that component.
Vendor Information Dutton-Lainson Brake Winches

Item Part # 850-00007

4 Bunk or Plantation Trailers

BRAKE WINCHES
DECLARATION OF CONFORMITY - Dutton-Lainson Company, Hastings, NE 68902-0729 U.S.A. manufactures and declares that this winch is in conformity with the essential health and safety requirements specified in The Supply of Machinery (Safety) Regulations 1992 and the provisions of The Machinery Directive (89/392EEC). This declaration does not apply to other machinery using this winch.
WARNING

FAILURE TO READ AND FOLLOW INSTRUCTIONS PROVIDED WITH THIS PRODUCT COULD RESULT IN SERIOUS OR FATAL INJURY.

Replacement Instructions
Can Be Obtained From
Dutton-Lainson Company,
Hastings, NE 68902-0729

LIMITED FIVE (5) YEAR WARRANTY

Dutton-Lainson Company provides the following five (5) year limited warranty to the ORIGINAL CONSUMER PURCHASER of D-L® ratchet winches, brake winches and worm gear winches:

Dutton-Lainson Company will, at its option, repair or replace free-of-charge any part or parts found to be defective in material or workmanship under normal use for the period of five (5) years from the original purchase date or, if that date cannot be established, the date of manufacture. This includes a warranty against operational failure for the same five year period due to rust or corrosion of the TUFFPLATE® finish. This warranty is void if the product is not installed and used in accordance with the operating instructions, has been subject to alteration or damage, or is defective due to service or repair. This warranty does not assure that the product shall remain usable for the five (5) year warranty period since the life of the product is dependent upon the manner and the frequency of use.

Repair or replacement is the purchaser's sole remedy under this or any other warranty on the product, whether express or implied. Dutton-Lainson Company shall not be liable for any incidental or consequential damages of any kind. Dutton-Lainson Company expressly disclaims any implied warranty of merchantability or fitness for particular purpose after the five (5) year warranty period. Some states do not allow the exclusion or limitation of incidental or consequential damages and some states do not allow limitation on how long an implied warranty lasts, so the above exclusions and limitations may not apply to you.

To make a claim, contact Dutton-Lainson Company, Hastings, Nebraska 68902-0729, identify the product, and follow the instructions for return, which will be provided. Repair or replacement of the product, if found to be defective, will normally be completed within sixty (60) days after receipt. The purchaser will be responsible for shipping costs to the Company. This warranty gives you specific legal rights, and you may have other rights which vary from state-to-state. This warranty is governed by the laws of the State of Nebraska except as modified by the laws of the U.S.A. ana is void in countries where prohibited.

2041980 8/02
WARNING

WARNING READ INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING TO INSTALL, OPERATE OR SERVICE THIS WINCH. FAILURE TO COMPLY WITH INSTRUCTIONS COULD RESULT IN SERIOUS OR FATAL INJURY. RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE.

IMPORTANT SAFETY INFORMATION

"This brake winch is built for multi-purpose hauling and lifting operations. It is not to be used as a hoist for lifting, supporting or transporting people, or for loads over areas where people could be present.

"Respect this winch. High forces are created when using a winch, creating potential safety hazards. It should be operated and maintained in accordance with instructions. Never allow children or anyone who is not familiar with the operation of the winch to use it. A winch accident could result in personal injury.

"Check winch for proper operation on each use. Do not use if damaged. Seek immediate repairs.

"Never exceed rated capacity. Excess load may cause premature failure and could result in serious personal injury. This winch is rated on first layer of cable on the hub. Using more layers of cable increases the load on the winch.

"Never apply load on winch with cable fully extended. Keep at least three full turns of cable on the reel.

"Secure load properly. When winching operation is complete, do not depend on winch to support load.

"Operate with hand power only. This winch should not be operated with a motor of any kind. If the winch cannot be cranked easily with one hand, it is probably over-loaded."
**Vendor Information - Assembly / Operating Instructions**

**ASSEMBLY** - Thread the handle onto the winch drive shaft and be certain that a clicking noise is produced when the handle is turned clockwise. Install the spring and locknut (Items E and G) on the end of the drive shaft as shown on parts drawing.

**WINCH MOUNTING AND CABLE ATTACHMENT** - For maximum strength and safety, this winch should be mounted with three ¥a" bolts (M10), washers and lock washers. (See parts drawing). Using fewer bolts or alternate locations will result in damage to the winch reel.

**OPERATING INSTRUCTIONS**

Wind cable on winch reel by turning winch handle in clockwise direction. This should produce a loud, sharp, clicking noise. The load will remain in position when the handle is released. Wind cable off the winch reel by turning winch handle counterclockwise (no noise will be produced). The load will remain in position when the handle is released, but for extra security it is recommended that the handle be turned clockwise until at least two clicks are heard. This will add extra tightness to the brake mechanism. Always satisfy yourself that the winch is holding the load before releasing the winch handle.

The minimum operating load requirement is 50 lb (23 kg) for Models DLB350A, DLB350AG, DLB800A, DLB800AG, DLB1200A and DLB1200AG, 75 lb (34 kg) for DLB1500A and DLB1500AG, 175 lb (80 kg) for DLB2000A and DLB2000AG.

Models DLB805A, DLB1205A, & DLB1505A, are equipped with a lockout lever for the purpose of 'freewheeling' cable out when there is no load on the winch. To 'freewheel' cable out, simply turn the handle counterclockwise until lockout lever can be engaged behind handle hub. In this condition cable can be easily pulled from the winch drum.

A WARNING: Never put winch in

**WINCH MAINTENANCE** - In order to insure maximum performance, a periodic inspection for any necessary preventive maintenance should be made. Check at least once annually and more frequently when the winch is exposed to an environment which is particularly

An occasional drop of oil on the drive shaft bearings is also recommended. **NOTE:** Do not oil or grease brake mechanism. Keep winch in good working order. Damaged or severely-worn parts

Not For the movement of human beings
SECTION 10

Wiring & Electrical
ELECTRICAL WIRING

Your Viking Specialized Specialized Trailer is equipped with a sealed wiring harness from USA Harness Inc.

1- WHITE= GROUND BACK TO THE TRACTOR
2- BLACK= CLEARANCE, SIDE MAKER AND ID LAMPS
3- YELLOW= LEFT HAND TURN SIGNAL AND HAZARDS
4- RED= STOP LAMPS
5- GREEN= RIGHT HAND TURN AND HAZARDS
6- BROWN= TAIL, CLEARANCE, AND LICENSE LAMP
7- BLUE= AUXILLARY (ABS AFTER MARCH 98)

PARTS LIST ELECTRICAL
1- FEMALE 7 PIN PLUG
4- 4” STOP, TURN, MAKER LIGHTS
13- 2 1/2’ MARKER CLEARANCE LIGHTS
2- MID TURN SIGNAL
1- LICENSE LAMP
1- WIRING HARNESS

Vendor Information - USA HARNESS

All Trailers are equipped with: USA HARNESS / Item Part # 190-00194 kit 313

USA Harness is the industry leader in delivering superior wiring products to the specialized transportation industries worldwide.

USA Harness designs and manufactures the most efficient, highest quality, longest lasting electrical wiring harness systems available today. From our state of the art assembly plant in East Texas, dedicated workers combine innovative manufacturing techniques, industry leading custom designs, and a keen knowledge of our industry to achieve a history of unparalleled quality, reliability, and service support.
Our industry leading **product designs** includes:

- Cable jacketing resists oils, acids, alkalis, sunlight, heat, weathering and abrasion.
  - ² Splice joints are sonically welded and provide positive contact while minimizing current loss.
  - ² All wires and cables are in a double insulated jacket for improved sealing, resistance, and extended life.
  - ² All terminals are machine applied and female moldments are filled with corrosion preventative dielectric grease.
  - ² Every harness assembly and system is tested electronically to ensure conductivity and proper loading before it leaves our facility.
  - ² Compatibility with every lamp manufacturers’ products, both incandescent and LED.
  - ² Products that exceeds all SAE installation, design, and performance requirements.
  - ² A patented color pin locking design (USA Plus) that exceeds the best warranties in the industry

² USA Harness Web site: [www.usaharness.com](http://www.usaharness.com)

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**Circuit**  | **Function**  
--- | ---  
Black  | Auxiliary  
Blue  | ABS Primary/Auxiliary  
Brown  | Marker/I.D./License/Tail  
Green  | Bright Turn  
Yellow  | Left Turn  
White  | Return/Ground  

---

**Circuit**  | **Function**  
--- | ---  
BCC-001  | Socket Adapter  
BCC-007  | R/S Front Marker  
BCC-008  | C/S Front Marker  
BCC-028  | C/S Marker  
BCC-029  | R/S Marker  
BCC-030  | R/S MKR/Turn  
BCC-031  | C/S MKR/Turn  
BCC-028  | C/S Marker  
BCC-028  | C/S Marker  
BCC-004  | C/S Pigtail  
BCC-006  | I.D./UC  
BCC-003  | Rear Sill  
BCC-005  | R/S Pigtail  
BCC-027  | ABS Main  
BCC-028  | C/S Marker  
BCC-029  | R/S Marker  
BCC-029  | R/S Marker  
BCC-029  | R/S Marker  
BCC-024  | ABS Warn, Light  
BCC-028  | C/S Marker  
BCC-004  | C/S Pigtail  

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**Revision Record**

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**USA Harness**

1201 E. Lake Rd.
Winfred, TX 75694
800.334.3767

Customer: BRIGHT COOP, INC.

Description: ABS HARNESS KIT OVERLAY

Part#: BCC-KIT-312

Date: 05/23/06

DRAWN: BM  APP: REV: -
SECTION 11

Rear Impact Guard
REAR IMPACT GUARD
REAR IMPACT GUARD

Effective on January 26, 1997, all Trailers are to be equipped with a rear impact guard.

The bumper assembly on your Viking Specialized Specialized Trailer has been tested and label attached that certifies that it meets all the requirements of FMVSS 223 and 224.

Caution!

The law requires that the bumper/rear impact guard on your Viking Specialized Specialized Trailer meet certain strength requirements. It is important that it remain in a structurally sound condition. Should it become damaged it is advised that it be replaced to restore its original strength and compliance.

Your new Viking Specialized Specialized Trailer is equipped with a rear under ride guard or rear Impact guard. The rear under ride guard is designed and engineered to help in the event of a rear impact if an accident occurs. This guard will not prevent an accident if it occurs, It will only help prevent the degree of the accident and Damage involved. If your trailer does not have a rear under ride guard it is because the tires of the rear axle are located no more than 12 inches from the rear of the trailer. In this situation the tires become the rear under ride guard.

There are three types of rear impact prevention that your trailer can be equipped with.
1. The tires of the rear axle are located no more than 12 inches from the rear of the Trailer.
2. The rear under ride guard that is engineered in the body of the trailer to meet DOT requirements.
3. A bolt on certified rear under ride guard that is engineered to complement the Engineering of the trailer to meet DOT requirements.
SECTION 12

Supplier’s List
SUPPLIER’S LIST

The following names, addresses and phone numbers will provide a second source when there are questions:

Section 1:
WARNING LABLES & INFORMATIONAL DECALS
Viking Specialized Trailers
Division of Bright Coop, Inc
803 West Seale Street
Nacogdoches, Texas 75964
(936) 564-8378 (800) 562-0730
www.vikingtrailers.com

JOST
1770 Hayes Street
Grand Haven, MI 49417
(616) 846-7700 (800) 253-5105
www.jostinternational.com

Section 2:
AXLES:
Hub-Seals
STEMCO Inc.
P.O. Box 1998
Longview, Texas 75606
(214) 758-9981
Telex No. 73-5433
WATS 1-800-527-8492

Section 3:
BRAKE COMPONENTS
ROCKWELL WABCO
Vehicle Control Systems
2135 West Maple Road
Troy, MI 48084 U.S.A.
(800) 535-5560

Section 4:
TIRES
YOKOHAMA
Listings for participation dealers may be found on line at http:www.yokohamatire.com, or in the yellow pages of your telephone book.
For Consumer Affairs assistance: (800) 722-9888

Section 4:
TIRES
Goodyear
For service assistance or information:
1. First contact the nearest authorized Good- year Commercial Truck Tire Retailer.
2. If additional assistance is required:
   Write to Goodyear Customer Assistance Cen- ter
   Department 703

Section 6:
LANDING GEARS
SUPPLIER’S LIST

The following names, addresses and phone numbers will provide a second source when there are questions:

1144 East Market St.
Akron, OH 44316
Or visit our Web site-
www/goodyear.com/truck

LANDING GEARS

HOLLAND
1950 Industrial Blvd.
P.O. Box 425
Muskegon, MI 49443-0424
(888) 396-6501
www.thehollandgroupinc.com

Section 8:
Suspensions
WASON & CHALIN INC.
Watson Suspension Systems
2060 Couch Drive
McKinney, Texas 75069
(972) 547-6020
Wats 1-800-445-0736

HENDRICKSON
Trailer suspension Systems
2070 Industrial Place SE
Canton, OH 44707-2641 USA
(866) airride (743-3247)
330 489-0045

Section 9
Component Parts
Brake Winches
DUTTON-LAINSON COMPANY
451 West 2nd St.
Hastings, NE 68902-0729
(402) 462-4141
www.dutton-lainson.com

Section 10:
Wiring & Electrical
USA Harness
1201 E. Coke RD.
Winnsboro, TX. 75494
(903) 342-3767
www.usaharness.com

Section 11:
REAR IMPACT GUARD
Forklift Kits:

Kingpins:

Miscellaneous:

Wheel end components:

Suspensions
Hutchens Industries
Springfield, MO
(417) 862-5012 (800) 654-8824
www.hutchensindustries.com

Sections 10:
LAWS, REGULATIONS AND INDUSTRY STANDARDS

Dept. of Transportation, National Highways Traffic Safety Administration

Federal Motor Vehicle safety Standards

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Recommended practices and tech bulletin:

Truck Trailer Manufacturers Association
Alexandria, VA
(703) 549-3010
www.ttmanet.org

American Trucking Association
The Maintenance Council
Washington D. C.
(703) 838-1763
www.truckline.com

Society of Automotive Engineers
Warrendale, PA
(724) 776-4841
www.sae.org

American Society for Testing and Materials (ASTM)
West Conshohocken, PA
(610) 832-9585
www.astm.org