

WALINGA[®] INC.



Semi



Truck and Pup

BAG/BULK UNIT OPERATOR'S MANUAL



WALINGA[®]
INC.

Head Office:
RR#5
Guelph, Ontario, N1H 6J2
PHONE (888) 925-4642
FAX (519) 824-5651
www.walinga.com

FACTORY DISTRIBUTION AND SERVICE CENTRES:

IN CANADA:

- 70 3rd Ave. N.E. Box 1790 Carman, Manitoba Canada R0G 0J0
Tel (204) 745-2951 Fax (204) 745-6309

IN USA:

- 1190 Electric Ave. Wayland, MI. USA 49348
Tel (800) 466-1197 Fax (616) 877-3474
- 579 4th Street NW
Sioux Center, Iowa USA 51250
Tel (800) 845-5589 Fax (712) 722-1128

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Bag Bulk Operators Manual
OM PART# 34-18158-6



WHEEL NUT INSPECTION REPORT

Customer/Driver: This form must be filled out and returned to Walinga immediately upon delivery.

**CHECK WHEEL NUT TORQUE
AFTER FIRST 50-100 MILES OF SERVICE!
TORQUE TO 500 FT-LBS**

I have read this notice and I understand the importance of the instruction.

Customer Name: _____

Address _____

City, Prov./State _____

Date: ____ ____ ____

Driver/Customer Signature: _____

Walinga employee or delivery personnel:

- 1) Instruct driver or customer to sign Walinga Copy and Customer Copy
- 2) Return the Walinga Copy to Walinga.

In the US return to Walinga USA Inc. 1190 Electric Ave., Wayland, MI 49348
In Canada return to Walinga Inc, 5656 Highway 6N, Guelph, ON N1H 6J2

Walinga Copy



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In Canada return to Walinga Inc, 5656 Highway 6N, Guelph, ON N1H 6J2

Customer Copy

BAG BULK BULK FEED UNIT

Warranty Registration Form & Inspection Report

WARRANTY REGISTRATION (3 part form - please print)	
<i>This form must be filled out by the dealer and signed by both the dealer and the customer at the time of delivery.</i>	
<i>Delivery Date: mm / dd / yyyy</i>	
<i>COMPANY / CUSTOMER NAME</i>	<i>DEALER NAME</i>
<i>Phone</i>	<i>Phone</i>
<i>Mobile phone</i>	<i>Mobile phone</i>
<i>Email : @</i>	<i>Email : @</i>
<i>Street Address</i>	<i>Street Address</i>
<i>City Prov/State</i>	<i>City Prov/State</i>
<i>Postal/Zip Country</i>	<i>Postal/Zip Country</i>
<i>Truck Model</i>	<i>VIN Number</i>
DEALER INSPECTION REPORT	
<input type="checkbox"/> Airlock and Blower Turn Freely <input type="checkbox"/> Landing Gear Moves Freely and Crank Stowed <input type="checkbox"/> Air & Hydraulic Lines Properly stowed (no leaks) <input type="checkbox"/> Electrical Connections Stowed <input type="checkbox"/> Tires at Specified Pressure <input type="checkbox"/> Rims & Tires Torqued <input type="checkbox"/> Brakes Adjusted Properly	<b style="text-align: center;">SAFETY <input type="checkbox"/> Safety Signs Installed <input type="checkbox"/> Operator's Manual Supplied <input type="checkbox"/> All Reflectors Installed & Clean <input type="checkbox"/> All Lights Functioning <input type="checkbox"/> Brakes Release at Proper Pressure <input type="checkbox"/> Review Operating and Safety Instructions
<p>I have thoroughly instructed the buyer on the above described equipment which review included the Operator's Manual content, equipment care, adjustments, safe operation and applicable warranty policy.</p> <p>Date _____ Dealer's Rep. Signature _____</p>	
<p>The above equipment and Operator's Manual have been received by me and I have been thoroughly instructed as to care, adjustments, safe operation and applicable warranty policy.</p> <p>Date _____ Owner's Signature _____</p>	
<small>199 05132016</small>	

*3 Part Form
Please Print*

WHITE	YELLOW	PINK
WALINGA	DEALER	CUSTOMER

Walinga Inc. Warranty Terms

Engineered Transportation Equipment

Walinga Inc. is committed to providing a quality product that will meet or exceed your expectations for many years to come. Our warranty terms and our warranty claim process has been designed to ensure that each warranty claim will be resolved in an orderly, fair and timely manner.

The Warranty

Walinga Inc. ("Walinga") warrants that all new engineered transportation products sold by Walinga Inc. will be free from defects in material and workmanship (the "Walinga Warranty").

Warranty Period

The warranty period for the Walinga Warranty shall expire one (1) year after the date of delivery to the original customer.

Limitations of and exclusions from the Walinga Warranty

- The Walinga Warranty applies to material and workmanship only.
- With respect to any component parts that are supplied or manufactured by others, the warranty coverage on such component parts will be strictly limited to the warranties of the manufacturers of such component parts.
- The Walinga Warranty shall only be for the benefit of the original purchaser of the transportation equipment.
- A Walinga Warranty may be transferable by the original purchaser to a third party for the balance of the warranty period then remaining, provided that Walinga consents in writing to such transfer of warranty.
- The Walinga Warranty is conditional upon proper storage, installation, use, maintenance, operation and compliance with any applicable recommendations of Walinga.

Warranty Claim Procedure

Should you encounter any difficulties with your unit within its warranty period, please contact your local Walinga dealer or sales representative, your local Walinga Service department or Walinga's Warranty Department to submit a warranty claim application.

To speak with a Walinga Warranty Coordinator, contact:

- Canada 1-888 - WALINGA (ext 258)
International +1-519-824-8520 (ext 258)
Email – warranty.canada@walinga.com
- USA 1-800-466-1197 (ext 8)
Email – warranty.usa@walinga.com
- Australia 07-4634-7344
Email – mail@customvac.com.au

Required Warranty Claim information

The following information must be provided to Walinga in order for us to properly process and consider your warranty application:

- Customer name and contact information (email if available).
- The equipment serial number and/or Vehicle Identification Number (if applicable).
- Date of claimed failure.
- Equipment mileage at the time of claimed failure.
- Details, description and photos (upon request) of the claimed failure and the corrective repairs attempted.

Warranty Conditions

- **Equipment must be registered within 30 days of being received by the buyer. It will be within the sole and unfettered discretion of Walinga as to whether it will honour its warranty on non-registered equipment.**
See over for page 2 -->
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(continued from page 1)

- The buyer is responsible for promptly notifying Walinga of any defects to the equipment. The buyer is also responsible for making the equipment available to Walinga or its authorized repair facility for evaluation and repair.
- Prior to making any repairs or parts replacements, a warranty application and any estimated associated costs must be approved with the issuance of a claim number by an authorized Walinga representative. Undertaking any work prior to receiving warranty authorization may result in a partial or complete loss of warranty coverage.
- At Walinga's discretion, warranty repairs may be authorized to be completed at a repair facility convenient to the buyer. In such situations the estimated labour time must be approved by Walinga prior to undertaking any work. Labour hours will be reimbursed at the facilities posted hourly labour rate.
- At Walinga's request, parts in question must be returned to the nearest Walinga service facility for evaluation. In such situations a Returned Goods Authorization (RGA) number will be provided to the buyer. The returning shipment must be clearly labeled with the assigned RGA number and include a copy of the RGA form. Unless otherwise arranged, these parts are to be returned to Walinga within 30 days to ensure timely processing of your warranty claim. Failure to return such parts may result in partial or complete loss of warranty coverage.
- Replacement parts provided under warranty are covered for the remainder of the original equipment warranty period.
- Walinga reserves the right to use new, remanufactured or refurbished components when performing warranty repairs and replacements.
- Walinga is entitled to a reasonable amount of time and a reasonable number of attempts to assess the claim, diagnose the problem, and perform any necessary repairs.
- The warranty offered on used or refurbished equipment is limited to that specified on the purchase contract. Where a warranty period has not been stipulated on the purchase contract, and where such equipment is "used", then such equipment is considered by Walinga to be sold "as is, where is" without the Walinga Warranty.

Without limitation, Walinga reserves the right to reject a warranty claim or for any one or more of the following reasons:

- The warranty claim information provided is insufficient.
- The product evaluation does not substantiate the claim.
- The unit has been operated above and beyond its capacity or not maintained or serviced properly, resulting in damages incurred to major components.
- It is apparent that the operator's manuals have not been followed
- The equipment is not registered

Without limitation, Walinga's Warranty does not cover:

- Damage or deterioration due to lack of reasonable care or maintenance.
- Damage caused or affected by unapproved modifications to the equipment.
- Damage caused by negligence or misuse of the equipment.
- Damage caused by using the equipment for purposes for which it was not designed or intended.

Walinga's liability under this warranty, whether in contract or tort, is limited to the repair, replacement or adjustment of defective materials and workmanship. In no event will Walinga be responsible for any direct, indirect, loss of time, incidental or consequential expenses including, but not limited to, equipment rental expenses, towing, downtime, inconvenience, or any losses resulting from the inability to use the equipment. Further, Walinga shall not be liable for any damages or inconvenience caused by any delay in the supply or delivery of any equipment or component parts thereof.

The selling Dealer/Sales Person makes no warranty of its own and has no authority to make any representation or promise on behalf of Walinga, or to modify the terms or limitations of the Walinga Warranty in any way.

Punitive, exemplary or multiple damages may not be recovered unless applicable law prohibits their disclaimer.

Warranty related claims may not be brought forward as a class representative, a private attorney general, a member of a class of claimants or in any other representative capacity.

The Walinga Warranty and all questions regarding its enforceability and interpretation are governed by the law of the country, state or province in which you purchased your Walinga equipment. The laws of some jurisdictions limit or do not allow the disclaimer of consequential damages. If the laws of such a jurisdiction apply to any claim against Walinga, the limitations and disclaimers contained here shall be to the greatest extent permitted by law.

Dear Customer:

Thank you for choosing **WALINGA TRANSPORTATION EQUIPMENT**. For your convenience, should you require any information related to Parts, Service or Technical Engineering, please contact one of the following Walinga Personnel:

CANADIAN CUSTOMERS: 1-888 925-4642

TECHNICAL - ENGINEERING:

Janus Droog - Technical Field Support (ext: 259).....email:jad@walinga.com

WARRANTY CLAIMS:

Gary Nijenhuis: (ext:258)..... email:gary.nijenhuis@walinga.com

SERVICE MANAGER:

Andy Nijenhuis (ext:228)..... .email:andy@walinga.com

PARTS MANAGER:

Jack Lodder (ext: 224).....email: jel@walinga.com

Parts Department Fax: (519) 824-0367

CUSTOMERS IN USA: 1-800-466-1197

Fax (616) 877-3474

WARRANTY CLAIMS:

Jonathan Medemblik: (ext: 8).....email:jtm@walinga.com

PARTS MANAGER:

John VanMiddelkoop (ext: 3).....email: jvm@walinga.com

SERIAL NUMBER LOCATION:

The serial number plate is located on the Drivers Side of the unit, at the front of the body on the truck, and on the landing gear on trailers. Please mark the serial number and the date of manufacture of the body in the space provided for easy reference.

DATE OF MANUFACTURE: _____ / _____ / _____

SERIAL NUMBER: _____

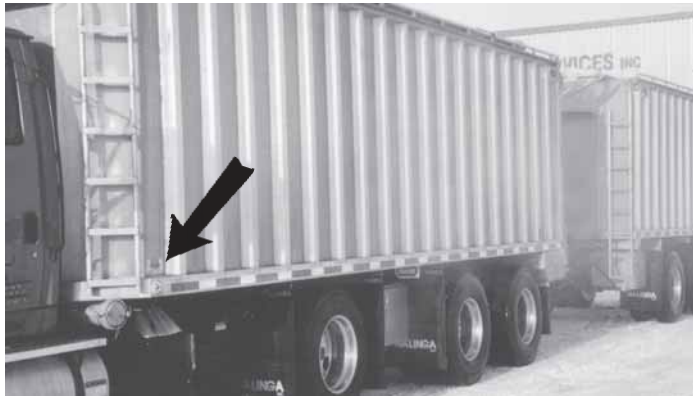
V.I.N. PLATE LOCATION

Always give your dealer the V.I.N. (Vehicle Identification Number) of your Walinga Bulk Feed unit when ordering parts or requesting service or other information. Also provide the serial number of the blower and airlock as well.

The plate is located where indicated. Please mark the number in the space provided for easy reference. Also obtain and mark down the Model Number, Production Year and other pertinent information of your Trailer unit in the spaces provided.



Trailer (V.I.N. Plate)



Truck Serial Number



Pup Serial Number



Airlock Serial Number



Blower Serial Number

SERIAL NUMBER LOCATION

V.I.N. Number _____

Model Number _____

Length _____

Suspension _____

Axles _____

Wheels _____

Tires _____

Blower S/N _____

Airlock S/N _____

Date Purchased _____

Dealer Purchased From _____

Address _____

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1 INTRODUCTION

Walinga appreciates your patronage and trust this unit will give you many years of trouble-free use. We are pleased to have you join a growing number of people operating Walinga Bag/Bulk units.

We take pride in building products to meet the demands of discriminating buyers in the transporting industry. We have sought to anticipate your needs with respect to safety, convenience, design and engineering for your unit. Walinga provides information and service support to its customers through its distributor and dealer network. Contact them at once should you need assistance.

Safe, efficient and trouble free operation of your Bag/Bulk unit requires that you and anyone else who will be operating or maintaining the unit, read this manual carefully and understand the Safety, Operation, Maintenance and Trouble Shooting information contained within the Operator's Manual. Failure to read and follow the manual could lead to serious injuries or costly repairs.



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Although some of the diagrams and pictures may not apply to all units, we have tried to show details of common adjustments and features that are on standard production units.

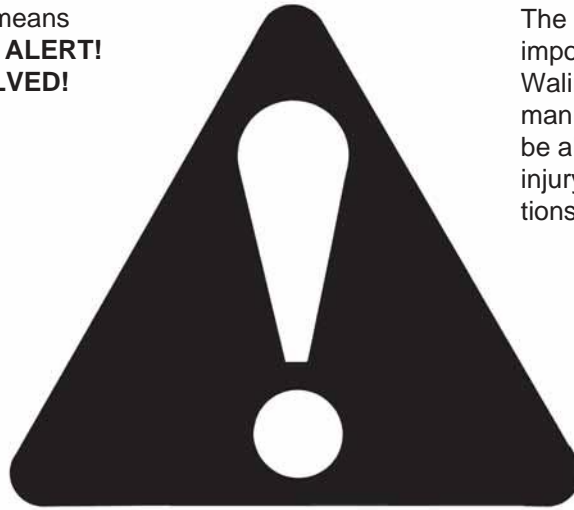
Use the Table of Contents or Index as a guide in locating the specific information applicable to your unit. Keep this manual handy for frequent reference and to pass on to new operators or owners.

OPERATOR ORIENTATION - The directions left and right as mentioned throughout this manual, are taken as if the operator was in the driver's seat and facing in the direction of travel.

2 SAFETY

SAFETY ALERT SYMBOL

This Safety Alert symbol means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**



The Safety Alert symbol identifies important safety messages on the Walinga Bag/Bulk unit and in the manual. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

Why is SAFETY important to you?

3 Big Reasons

Accidents Disable and Kill
Accidents Cost
Accidents Can Be Avoided

SIGNAL WORDS:

Note the use of the signal words **DANGER**, **WARNING** and **CAUTION** with the safety messages. The appropriate signal word for each message has been selected using the following guide-lines:

DANGER - Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations, typically for machine components that, for functional purposes, cannot be guarded.

WARNING - Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

CAUTION - Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

SAFETY

YOU are responsible for the **SAFE** operation and maintenance of your Walinga Bag/Bulk unit. **YOU** must ensure that you and anyone else who is going to operate, maintain or work around the unit be familiar with the operating and maintenance procedures and related **SAFETY** information contained in this manual.

Remember, **YOU** are the key to safety. Good safety practices not only protect you but also the people around you. Make these practices a working part of your safety program. Be certain that **EVERYONE** operating this equipment is familiar with the recommended procedures and follows all the safety precautions. Remember, most accidents can be prevented. Do not risk injury or death.

- Remember the difference between being just a driver and an efficient operator. Drivers may only drive but an operator is a very safe, cost efficient and professional person.
- Bag/Bulk unit owners must give operating instructions to operators or employees before allowing them to operate the equipment, and at least annually thereafter.
- The most important safety feature on this equipment is a **SAFE** operator. It is the operator's responsibility to read and understand **ALL** Safety and Operating instructions in the manual and to follow these. All accidents can be avoided.
- Walinga feels that a person who has not read, understood and been trained to follow all operating and safety instructions is not qualified to operate the equipment. An untrained operator exposes himself and bystanders to possible serious injury or death.
- Do not modify the equipment in any way. Unauthorized modification may impair the function and/or safety of the equipment and affect Trailer life.
- Think **SAFETY!** Work **SAFELY!**

2.1 GENERAL SAFETY

1. Read and understand the Operators Manual and all safety signs before operating, maintaining or adjusting the unit.



2. Only trained competent persons shall operate the unit. An untrained operator is not qualified to operate the unit.

3. Have a first-aid kit available for use should the need arise and know how to use it.



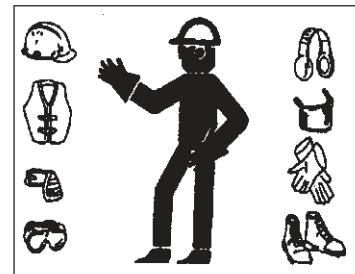
4. Do not allow riders outside the cab.

5. Have a fire extinguisher available for use should the need arise and know how to use it.

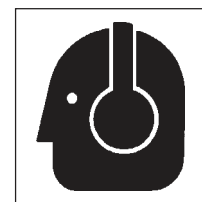


6. Wear appropriate protective gear. This list includes but is not limited to:

- A hard hat
- Protective shoes with slip resistant soles
- Heavy gloves
- Hearing protection



7. Wear appropriate hearing protection when operating for long periods of time.



8. Place all controls in neutral, disengage PTO clutch, stop engine, set park brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting or repairing.

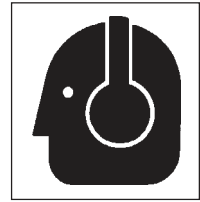
9. Do not drink and drive.

2.2 OPERATING SAFETY

1. Read and understand all the Operator's Manual and all safety signs before operating or adjusting the Walinga Bag/Bulk unit.
2. Perform circle check before driving.
3. Do not allow riders outside the cab during road or highway travel.
4. Drive very carefully when negotiating hilly or uneven terrain.
5. Keep hands, feet, clothing and hair away from all moving parts. Use special care around open airlock and when next to moving cross auger.
6. Place all controls in neutral, disengage PTO clutch, stop the engine, set park brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing or maintaining.
7. Stay away from power lines when operating hoist or climbing on top of the unit. Electrocutation can occur without direct contact.
8. Use care when climbing on ladder(s) and/or platform(s) to prevent falling.
9. Maintain running gear in good condition at all times. In addition, on trailers, maintain kingpin and fifth wheel assembly in good condition.
10. Clear the area of all bystanders, especially children, before starting up and operating the units.
11. Make sure that all lights and reflectors that are required by the local highways and transport authorities are in place, clean and can be seen clearly by all overtaking and oncoming traffic.
12. Do not operate unit with spring brakes caged or brakes disabled. Block wheels if unhooked.
13. Before disconnecting the tractor from the trailer unit(s) make sure that the tractor and trailer are on level ground and that the trailer wheels are securely blocked. Lower landing gear and provide extra support if the ground is soft. Deflate air ride if so equipped prior to uncoupling.
14. Do not unload unless all axles are on a firm level surface.
15. Do not go under or within tipping arc of trailer box frame when hoist is operating. Keep others away.
16. Review safety items with all personnel annually.

2.3 UNLOADING SAFETY

1. Position unit on a firm level surface before raising hoist or unloading. Soft or uneven terrain can result in frame tipping when raising hoist.
2. Do not raise hoist unless there is a firm level surface under all tires and each axle.
3. On semi units, position tractor and trailer in a straight line to provide maximum stability when raising hoist.
4. On semi units, lower stabilizer legs before raising hoist (If so equipped).
5. Do not go under or within tipping arc of box frame when hoist is operating. Keep others away.
6. Stay away from power lines when raising hoist. Electrocutation can occur without direct contact.
7. Use care when on ladder or on top of unit to prevent falling. Stay away from power lines to prevent electrocutation.
8. Stay out of tank compartments when unloading, when cross auger is running and when engine is running.
9. Lower box to the frame before releasing the latches on the bottom of the divider(s).
10. Do not raise hoist in high wind conditions.
11. Do not move unit unless box is fully down.
12. Do not park unit with box in the raised position.
13. Do not use the cylinder as a stabilizer when the hoist is raised. The cylinder is strictly a lifting device and is not a structural member of the unit.
14. Have parking brakes set before raising hoist.
15. Stay at controls while using the hoist or unloading. Lower hoist immediately if shifting or leaning of the box occurs.
16. Feather the unit down slowly to avoid a high-pressure build-up in the cylinder when the box stops suddenly.
17. Always wear hearing protection when working with a blower. Prolonged exposure to loud ambient noise can produce long term hearing loss.



2.4 MAINTENANCE SAFETY

1. Read and understand all the information in the Operator's Manual regarding maintenance, adjusting and servicing the Bag/Bulk unit.
2. Place all controls in neutral, disengage PTO clutch, stop the engine, remove ignition key and set the park brake before adjusting, servicing or maintaining any part of the Bag/Bulk unit.
3. Block or support the box before servicing or maintaining any components on truck frame or running gear.
4. Follow good shop practices:

- Keep service area clean and dry.
- Be sure electrical outlets and tools are properly grounded.
- Use adequate light for the job at hand.

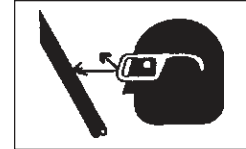


5. Block wheels before de-activating brakes.
6. Maintain air system and brake components in top condition at all times.
7. Maintain fasteners in running gear systems at their specified torque at all times.
8. Lower box to the frame, disconnect hydraulic lines and relieve pressure before working on hoist.
9. Establish and maintain a Trailer Preventative Maintenance (TPM) program on your equipment. Some jurisdictions require this program and the maintenance of records on every commercial vehicle on the road for future reference.

2.5 HYDRAULIC SAFETY

1. Always place hydraulic controls in neutral and relieve pressure before disconnecting from tractor or working on hydraulic system.
2. Make sure that all components in the hydraulic system are kept in good condition and are clean.
3. Replace any worn, cut, abraded, flattened or kinked hoses or lines.
4. Do not attempt any makeshift repairs to the hydraulic fittings or hoses by using tape, clamps or cements. The hydraulic system operates under extremely high pressure. Such repairs will fail suddenly and create a hazardous and unsafe condition.

5. Wear proper hand and eye protection when searching for a high-pressure hydraulic leak. Use a piece of wood or cardboard as a backstop instead of hands to isolate and identify a leak.



6. If injured by a concentrated high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop from hydraulic fluid piercing the skin surface.

2.6 TRAVEL SAFETY

1. Read and understand all the information in the operator's manual regarding procedures and safety when operating the Bag/Bulk unit on the road.
2. Make sure all the lights and reflectors that are required by the local highway and transport authorities are in place, are clean and can be seen clearly by all overtaking and oncoming traffic.
3. Drive carefully and defensively at all times and especially when negotiating uneven or hilly terrain.
4. Do not allow riders outside the cab during road and highway travel.
5. Make sure you are in compliance with all local regulations regarding transporting on public roads and highways. Consult your local law enforcement agency for further details.

2.7 TIRE SAFETY

1. Failure to follow proper procedures when mounting a tire on a wheel or rim can produce an explosion which may result in serious injury or death.
2. Do not attempt to mount a tire unless you have the proper equipment and experience to do the job.
3. Have a qualified tire dealer or repair service perform required tire maintenance.

2.8 SAFETY SIGNS

1. Keep safety signs clean and legible at all times.
2. Replace safety signs that are missing or have become illegible.
3. Replaced parts that displayed a safety sign should also display the current sign.
4. Safety signs are available from your Distributor or the factory.

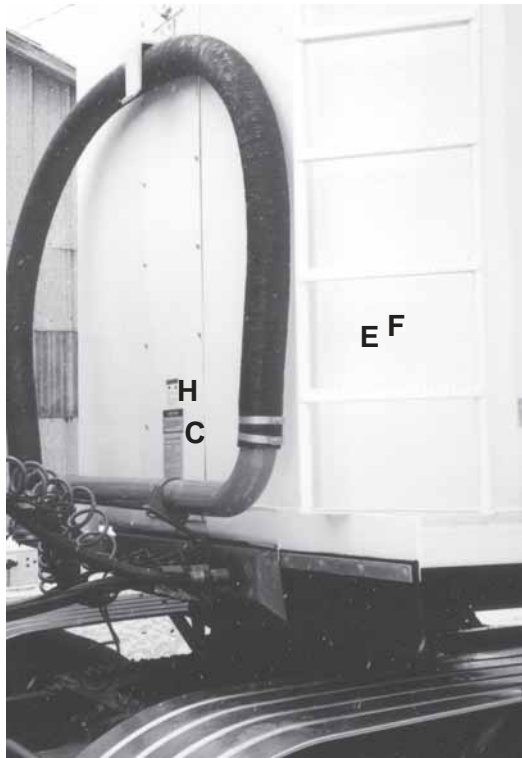
How to Install Safety Signs:

- Be sure that the installation area is clean and dry.
- Be sure temperature is above 50°F (10°C).
- Decide on the exact position before you remove the backing paper.
- Remove the smallest portion of the split backing paper.
- Align the sign over the specified area and carefully press the small portion with the exposed sticky backing in place.
- Slowly peel back the remaining paper and carefully smooth the remaining portion of the sign in place.
- Small air pockets can be pierced with a pin and smoothed out using the piece of sign backing paper.


3 SAFETY SIGN LOCATIONS

The types of safety signs and locations on the equipment are shown in the illustration below. Good safety requires that you familiarize yourself with the various safety signs, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!



A



CAUTION

1. Read Operator's Manual and safety signs before operating.
2. Do not load trailer in excess of the gross vehicle weight rating shown on the certification plate.
3. Do not allow riders on the trailer.
4. Keep hands, feet, clothing and hair away from all moving parts.
5. Place all controls in neutral, stop the engine, set park brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing or maintaining.
6. Maintain king pin, fifth wheel assembly and all running gear components in good condition at all times.
7. Make sure that all lights and reflectors are clean and working when transporting on public roads.
8. Do not operate unit with spring brakes caged or brakes disabled. Block wheels if unhooked.
9. Keep all hydraulic lines, fittings and hoses tight, free of leaks and in good condition at all times.
10. Stay away from overhead power lines when raising box to prevent electrocution.
11. Do not go under or within tipping arc of trailer box frame when hoist is operating. Keep others away.
12. Raise box only when unit is on firm, level ground and evenly loaded.
13. Do not unhook trailer if it is loaded.
14. Do not load trailer unless it is attached to a towing unit.
15. Review safety items with all personnel annually.

B



DANGER




ROTATING AUGER HAZARD KEEP AWAY

To prevent serious injury or death from rotating auger:

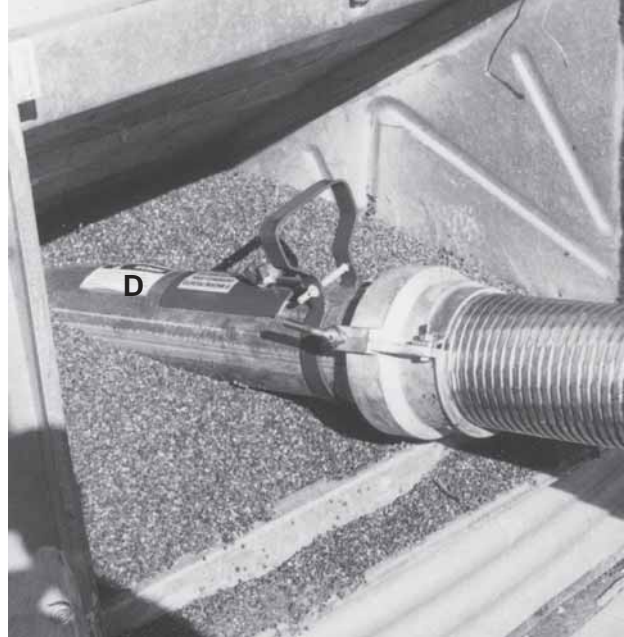
1. Place all controls in neutral, stop engine, set park brake, remove ignition key and wait for all moving parts to stop before servicing, repairing, adjusting or unplugging.
2. Do not operate with the auger guards removed.
3. Do not stand near augers when operating. Keep others away.

53-17705-6

REMEMBER - If safety signs have been damaged, removed, become illegible or parts replaced without signs, new signs must be applied. New signs are available from your authorized dealer or factory direct.

The types of safety signs and locations on the equipment are shown in the illustration below. Good safety requires that you familiarize yourself with the various safety signs, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!



C

DANGER

OVERHEAD HAZARD

Truck box could drop suddenly or tip unexpectedly during operation.

To prevent serious injury or death:

1. Do not go under or within tipping arc of truck box frame when hoist is operating. Keep others away.
2. Never leave a partly raised vehicle.
3. Always securely prop or block box frame before working under body.
4. Do not raise unit unless vehicle is on firm level ground.

D

DANGER

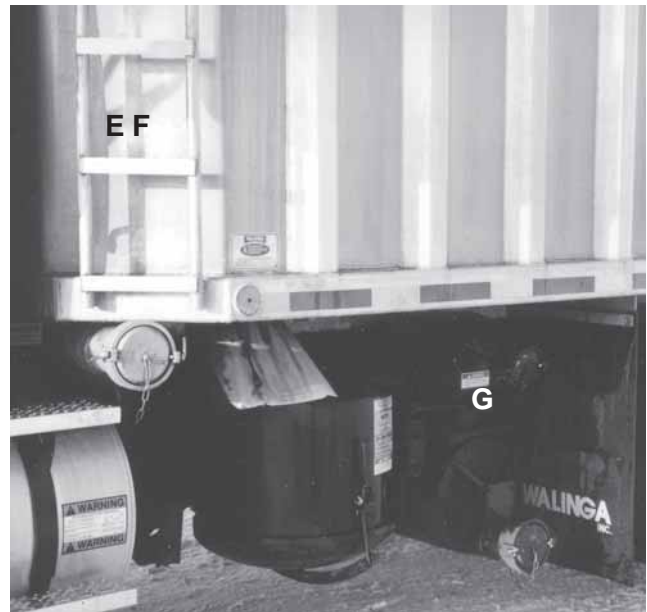
Do not place intake tube near feet when standing on top of grain. Sufficient material can be removed to draw operator and intake tube into grain. Submersion in grain can cause suffocation.

53-15639-6

REMEMBER - If safety signs have been damaged, removed, become illegible or parts replaced without signs, new signs must be applied. New signs are available from your authorized dealer or factory direct.

The types of safety signs and locations on the equipment are shown in the illustration below. Good safety requires that you familiarize yourself with the various safety signs, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!



E

WARNING
FALLING HAZARD

To prevent serious injury or death from falling:

1. Use care when climbing ladder or working on platform.
2. Keep unauthorized people off machine.
3. Do not allow riders.

53-17702-6

F

DANGER
ELECTROCUTION HAZARD

To prevent serious injury or death from electrocution:

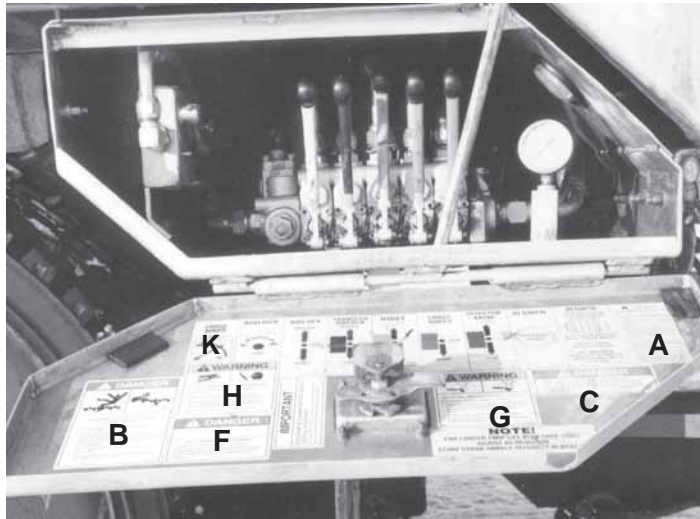
- Stay away from power lines when transporting and raising or lowering truck box.
- Electrocution can occur without contacting power lines.

53-17701-6

REMEMBER - If safety signs have been damaged, removed, become illegible or parts replaced without signs, new signs must be applied. New signs are available from your authorized dealer or factory direct.

The types of safety signs and locations on the equipment are shown in the illustration below. Good safety requires that you familiarize yourself with the various safety signs, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!




REMEMBER - If safety signs have been damaged, removed, become illegible or parts replaced without signs, new signs must be applied. New signs are available from your authorized dealer or factory direct.

The types of safety signs and locations on the equipment are shown in the illustration below. Good safety requires that you familiarize yourself with the various safety signs, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!

J



1. Position unit on a firm level surface before raising hoist or unloading. Soft or uneven terrain can result in frame tipping when raising hoist.
2. Do not raise hoist unless there is a firm level surface under all tires and each axle.
3. On semi units, position tractor and trailer in a straight line to provide maximum stability when raising hoist.
4. On semi units, lower stabilizer legs before raising hoist.
5. Do not go under or within tipping arc of box frame when hoist is operating. Keep others away.
6. Stay away from power lines when raising hoist. Electrocutation can occur without direct contact.
7. Use care when on ladder or on top of unit to prevent falling. Stay away from power lines to prevent electrocutation.
8. Stay out of tank compartments when unloading, when cross auger is running and when engine is running.
9. Lower box to the frame before releasing the latches on the bottom of the divider(s).
10. Do not raise hoist in high wind conditions.
11. Do not move unit unless box is fully down.
12. Do not park unit with box in the raised position.
13. Do not use the cylinder as a stabilizer when the hoist is raised. The cylinder is strictly a lifting device and is not a structural member of the unit.
14. Have parking brakes set before raising hoist.
15. Stay at controls while using the hoist or unloading. Lower hoist immediately if shifting or leaning of the box occurs.
16. Feather the unit down slowly to avoid a high-pressure build-up in the cylinder when the box stops suddenly.
17. Always wear hearing protection when working with an air pump. Prolonged exposure to loud ambient noise can produce long term hearing loss.

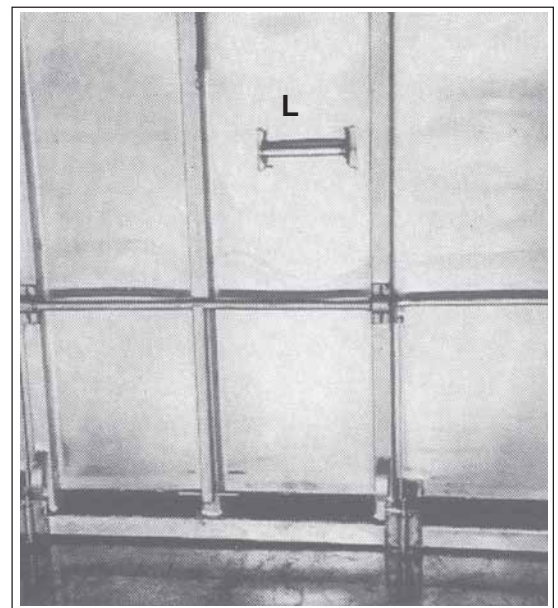
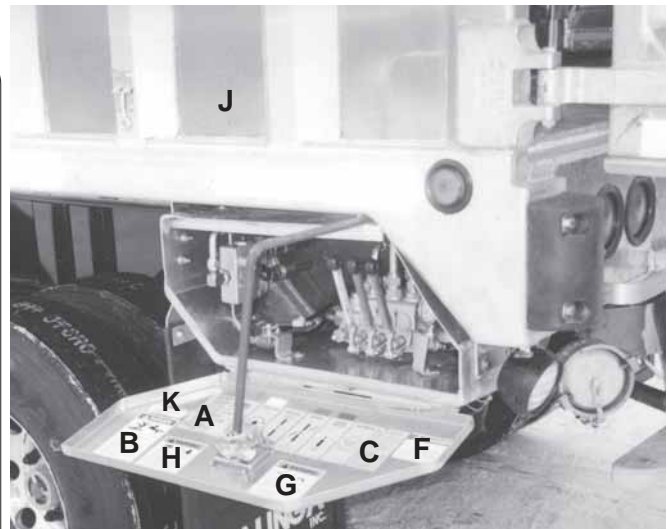


Fig. 3-1 Inside Shot at Unit Showing Divider

K



DANGER

ELECTRO-STATIC HAZARD

To prevent serious injury or death:

1. Make sure conveying lines and work area are dust and fire hazard free.
2. Use Original Equipment / Hoses Only.
3. Do not use plastic hoses and / or piping, unless those are properly grounded.

53-18290-6

L



CAUTION

Maximum load to be placed in front of load divider is 6 tonne

53-17159-6

REMEMBER - If safety signs have been damaged, removed, become illegible or parts replaced without signs, new signs must be applied. New signs are available from your authorized dealer or factory direct.

4 OPERATION GUIDELINES



OPERATING SAFETY

1. Read and understand all the Operator's Manual and all safety signs before operating or adjusting the Walinga Bag/Bulk unit.
2. Perform circle check before driving.
3. Do not allow riders outside the cab during road or highway travel.
4. Drive very carefully when negotiating hilly or uneven terrain.
5. Keep hands, feet, clothing and hair away from all moving parts. Use special care around open airlock and when next to moving cross auger.
6. Place all controls in neutral, disengage PTO clutch, stop the engine, set park brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing or maintaining.
7. Stay away from power lines when operating hoist or climbing on top of the trailer. Electrocutation can occur without direct contact.
8. Use care when climbing on ladder(s) and/or platform(s) to prevent falling.
9. Maintain running gear in good condition at all times. In addition, on trailers, maintain kingpin and fifth wheel assembly in good condition.
10. Clear the area of all bystanders, especially children, before starting up and operating the units.
11. Make sure that all lights and reflectors that are required by the local highways and transport authorities are in place, clean and can be seen clearly by all overtaking and oncoming traffic.
12. Do not operate unit with spring brakes caged or brakes disabled. Block wheels if unhooked.
13. Before disconnecting the tractor from the trailer unit(s) make sure that the tractor and trailer are on level ground and that the trailer wheels are securely blocked. Lower landing gear and provide extra support if the ground is soft. Deflate air ride if so equipped prior to uncoupling.
14. Do not unload unless all axles are on a firm level surface.
15. Do not go under or within tipping arc of trailer box frame when hoist is operating. Keep others away.
16. Review safety items with all personnel annually.

4.1 TO THE NEW OPERATOR OR OWNER

The Walinga Bag/Bulk units combine light weight construction methods combined with high strength materials to become a safe, reliable and efficient feed, grain or bulk material hauling unit. Be sure to familiarize yourself with the unit by reading this Operator's Manual, the Safety Alerts and any other material provided with the unit before attempting to operate it. With careful use and a good maintenance schedule, the unit will give many years of trouble-free use.

It is the responsibility of the owner and operator to be familiar with the weight and loading of your trailer. Trailer weight and loading requirements vary from jurisdiction to jurisdiction. Be familiar with yours and any that you will be travelling through.

4.2 TERMINOLOGY

The Walinga Bag/Bulk unit is available as a semi-trailer, a straight frame truck or a pup trailer. High strength aluminium is used for the body and structural components to minimize weight and maximize payload.

A hydraulically powered cross auger is used to move the material from the back corners of the box to the centre of the box for unloading. The material can be unloaded directly through the unloading door in the rear doors or dropped into the airlock for air unloading. A sliding gate controls the flow of material to the airlock.

The controls for all systems are located in the box on the left rear corner. Each truck or tractor unit must be equipped with hydraulic power to provide oil flow to the hydraulic motors and.

The semi-trailer can be equipped with stabilizer legs for added stability when raising the hoist.

Moveable pivoting dividers can be used to form individual compartments in the box. Retract the bottom pins to allow the divider to swing out of the way for unloading.

- A** Body
- B** Grain Chute
- C** Cross Auger
- D** Divider
- E** Air Lock
- F** Blower
- G** Control Box
- H** Pre-Cleaner
- J** Pup Trailer
- K** Air Line (Jumper Line)
- L** Delivery Line Storage
- M** Hoist
- N** Stabilizer Legs

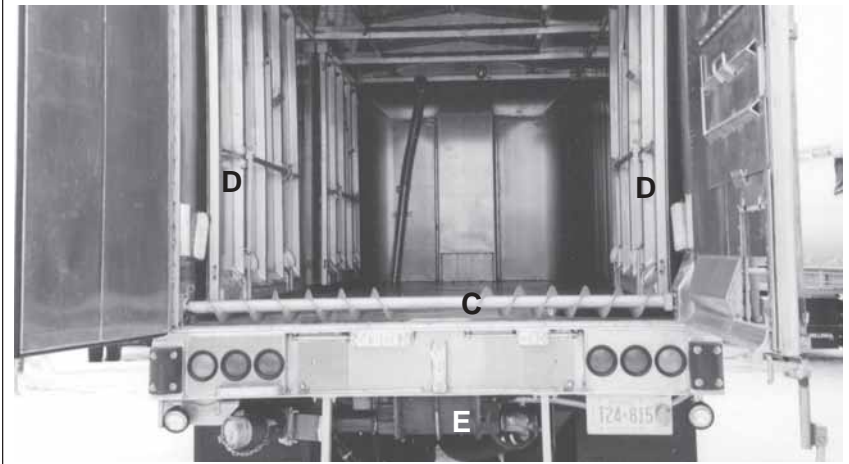
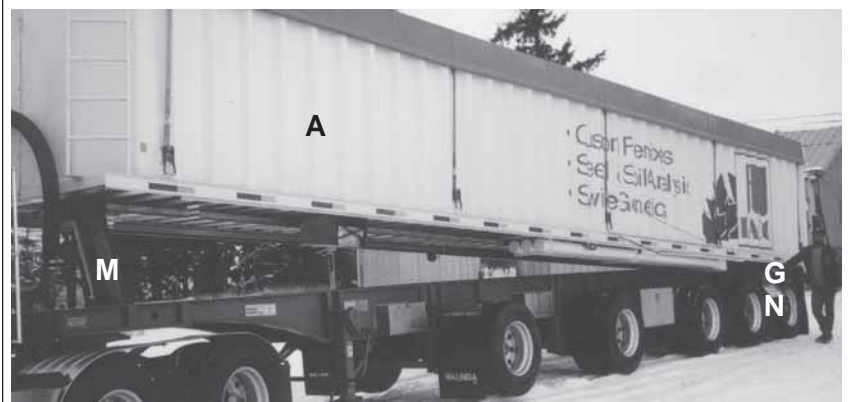


Fig. 4-1 PRINCIPLE SYSTEMS

4.3 BREAK-IN

Break-in is the most important time in a Truck or a Trailer's life. It is critical that the unit be checked frequently during the first 5000 miles to be sure that all components and systems are properly adjusted and performing as required.

The following inspection schedule is provided as a guide for normal operating conditions. More frequent inspections are recommended in severe or extreme conditions.

Inspect at:

50-100 miles, 1-2 hours

500 miles, 8-10 hours

1500 miles, 25-30 hours

5000 miles, 100 hours:

1. Brakes

It takes a few weeks of operation for the brake shoes to mate with the drum contour and burnish the surface. During this period of time, the operator should check the brakes every day. After the first month, inspection of the brakes every 2 weeks or every 10,000 miles is required. Check the function and adjustment of the brakes on each axle. All brakes should apply evenly. No shoes should drag on the drum when the brakes are not applied.

2. Tires

Tires are designed to provide maximum life and performance when maintained at their specified inflation pressure. Although the tires are inflated to their specified pressure at the factory, the pressure can change before going into service. Always use an accurate gauge to check the pressure when the tire is cold.

3. Wheels/Rims

Although lug bolts and rim fasteners are always tightened to their specified torque at the factory, it is normal for them to lose some of their torque during the first few miles of operation. Always retorque lug bolts and rim fasteners to be sure that they stay tight. Then go to the retorquing interval defined in the Maintenance section of every 25,000 miles. Keep all fasteners tightened to their specified torque to prevent damaging any components.

Whenever a wheel is removed from an axle, the above retorquing procedure must be followed to be sure that the wheel is secured to the axle. If any component is damaged due to loose fasteners, it will have to be replaced.

4. Axles

Each wheel bearing is assembled at the factory with the required end play (refer to Section 8.5). This end play should be checked to insure proper axle and bearing function. Check the temperature of the hub by hand after 10 to 15 miles (15 to 25 km) during the first trip. A hot hub must have the bearing end play reset before continuing.

Jack the axle up and support it on a stand. Turn the wheel by hand. The wheel should turn freely. If it does not, check if the brakes are dragging or if the bearing has too much end play. If either of these conditions exist, correct before proceeding.

Move the wheel laterally on the axle shaft. If the wheel wobbles, the bearing has lost its proper end play. Tighten bearing and set end play before continuing.

5. Hub Lubricant Levels

a. Oil Bath:

Oil bath hubs are used on some trailers and are filled at the factory. Check hubs frequently (at least daily) during the first few weeks of operation. Always check when the oil is cold and the trailer is on the level. Use the level mark on the hub face when checking oil level. Replace seals and gaskets if hub has an oil leak. Do not operate without oil in the hub.

b. Grease Packed:

Grease packed hubs are used on some trailers and do not require servicing unless the wheel end is being serviced or removed.

4.3 BREAK-IN (cont'd)

6. Suspension

A suspension system connects the axles to the frame. All fasteners must be maintained at their specified torque to ensure that all clamping and anchoring forces remain intact. If these forces are not maintained, components can shift or move and affect the performance and component life. Refer to Maintenance Section for the list of required torque values for all fasteners in suspension system. Any loosening can lead to component shifting, misalignment and/or twisting. Any of these items can cause erratic handling, broken components or rapid tire wear. Always tighten the nut end of fastener. Specified torque values apply only to nut end torquing.

7. Axle Alignment

Axle alignment is properly set at the factory when the unit is new and will remain aligned unless fasteners loosen or components wear. Use a steel measuring tape to check the alignment. Refer to Maintenance Section for alignment checking procedure. Axles that are out of alignment can cause erratic handling characteristics, broken components and accelerated tire wear.

8. Fifth Wheel Assembly Components

The king pin, anchor frame and upper and lower fifth wheel assemblies must be inspected to check for mechanical integrity of all components. All components and systems must be kept in good condition to safely and reliably transmit the accelerating, braking and side loads between the trailer, fifth wheel and towing vehicle.

a. King Pin:

Check the king pin for cracks, chips, or whether it is bent. Check that there are no cracks or distortions between the king pin and its anchor frame. If any defects are found, replace the king pin and its anchor frame before resuming work.

b. Fifth Wheel Assembly:

The fifth wheel assembly consists of the king pin locking mechanism, surface plate, frame, pivot and anchor system. Check that the king pin locking mechanism locks and unlocks easily and that all moving surfaces are coated with grease. Check that the surface plate is free of grit and coated with grease.

Check the surface plate and anchor frame for cracks, bends or distortions. Replace any damaged components. Retorque fasteners to maintain the proper clamping forces on all components. Loose fasteners can cause components to move or bend and create mechanical or safety problems during operation.

9. Electrical, Hydraulic and Air Lines

Electrical, hydraulic and air lines extend from the front of the unit to each electrical, hydraulic and air operated component. Although they are all anchored along their routing pathways from the factory, they occasionally do come loose and will sag. Inspect all lines. Use plastic ties to secure line to frame if any are loose and sag. Replace if any are pinched, kinked, cut or abraded. Extra care should be taken in cold or extreme operating conditions. Ice, mud or brush can pull lines loose from their anchors and cause damage. Clean components, repair damage, re-anchor and install protectors if appropriate. Do not operate with damaged components.

4.4 PRE-OPERATION VEHICLE INSPECTION PROCEDURE

The safe and trouble-free use of a Walinga Bag/Bulk Unit requires the operator to maintain the unit in good operating condition. To assist the operator, a pre-operation checklist is provided that should be followed each time before the unit is used.

NOTE

The tractor items, part of the Department of Transport (D.O.T.) walk around sequence, have been omitted.

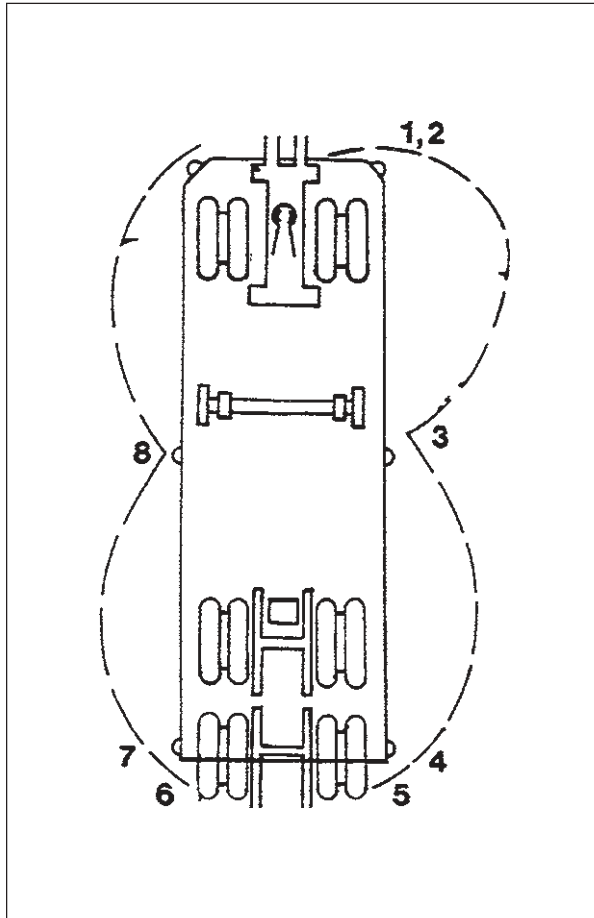


Fig. 4-2 WALKAROUND SEQUENCE

WALK AROUND SEQUENCE

Step 1 - Trailer Frontal Area

1. **Air, Hydraulic and Electrical Connections**
 - a. Glad hands properly mounted, free of damage, not leaking and not worn.
 - b. Electrical line receptacle properly mounted, free of damage, plug adequately seated and safety catch engaged to prevent accidental disconnection.
 - c. Hydraulic couplers properly seated and tightened, no leaks and properly secured against tangling, snagging and chafing, with sufficient slack for turning.
 - d. Air, electrical and hydraulic lines properly secured against tangling, snagging and chafing with sufficient slack for turns.
2. **Lights and Reflectors**
 - a. Front trailer clearance and identification lights - should be clean, operating and proper color.
 - b. Reflectors and conspicuity tape clean and proper color.

Step 2 - Coupling System Area

1. **Fifth Wheel (Lower)**
 - a. Securely mounted to frame.
 - b. No missing or damaged parts.
 - c. No visible space between upper and lower fifth wheel.
 - d. Locking jaws around the shank and not the head of kingpin.
 - e. Release lever properly seated and safety latch lock engaged.
2. **Fifth Wheel (Upper)**
 - a. Kingpin not worn, bent or damaged.
 - b. Anchor frame not cracked, bent, worn or damaged.
3. **Air, Hydraulic and Electric Lines Visible From This Point**
 - a. Should be secure from dangling, snagging and chafing.
 - b. Should be free from damage and clean.

4.4 PRE-OPERATION VEHICLE INSPECTION PROCEDURE (cont'd)

Step 3 - Right Side of Trailer Area

1. **Front Trailer Support (Landing Gear)**
 - a. Fully raised and secured, no missing parts, not bent or otherwise damaged.
 - b. Crank handle present and secured (typically on left side).
2. **Spare Tires**
 - a. Carrier or rack not damaged.
 - b. Tire and/or wheel securely mounted in the rack.
 - c. Tire and wheel condition adequate. Proper spare tire size, correctly inflated.
3. **Lights and Reflectors**
 - a. Trailer side clearance lights clean, operating and proper color.
 - b. Reflectors and conspicuity tape clean and proper color.
4. **Frame and Body**
 - a. Frame and cross members not bent, cracked, damaged or missing.
 - b. Body parts not damaged or missing.
5. **Air Tank**
 - a. Drain moisture from air tank(s). Pull on cable attached to drain valve. Hold cable until the tank moisture is drained.

NOTE

In cold weather, it is best to drain the moisture from the tanks at the end of the day to prevent ice build-up in the tanks.

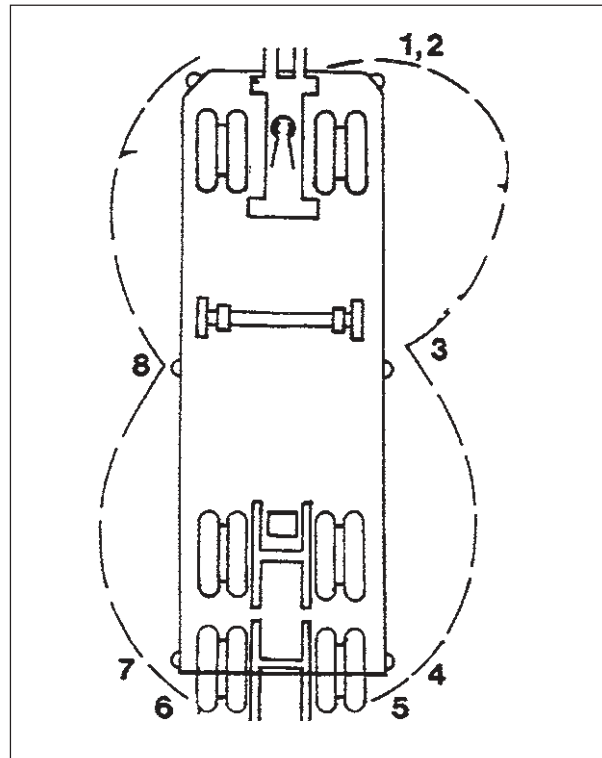


Fig. 4-3 WALKAROUND SEQUENCE

Step 4 - Right Rear Trailer Wheel Area

1. **Dual Wheels**
 - a. Condition of wheels and rims, no cracked or bent rims, broken spacers, studs, clamps or lugs.
 - b. Condition of tires - properly inflated, valve stems not touching wheel rims or brake drums, valve caps in place, no serious cuts, bulges, tread wear or any signs of misalignment and no debris stuck between the tires.
 - c. Tires all same type e.g. do not mix radial and bias types on the same axles.
 - d. Wheel bearings and hub - no obvious leaking.
 - e. Mud flaps in place and in good condition.
2. **Tandem or Triaxles**
 - a. Repeat wheel and tire inspection as above.
 - b. Flexible air lines not cracked, cut, crimped or otherwise damaged, secured against tangling, dragging or chafing.
 - c. Sliding axle anchor pins locked in place.
3. **Suspension**
 - a. **Mechanical:**
Condition of spring(s), spring hangers, equalizers and U-bolts.
 - b. **Air:**
Condition of air bag(s), axle clamping bolts, pivot arm and height control valve.
 - c. Check that air suspension is inflated and at proper ride height.
4. **Box Pivot (Body Hinge)**
 - a. Hinge shaft should go through pivot frame brackets.
 - b. All pivot frame brackets and adjacent frame should be in good condition.

Step 5 - Brakes

1. **Brakes**
 - a. Condition of brake drum(s).
 - b. Condition of hoses, lines and valves.
 - c. Check slack adjusters.
 - d. Check air chamber mounting.
 - e. Check spring brakes (if so equipped).
 - f. Drain moisture from air tank with cable.

Step 6 - Rear of Trailer

1. **Lights and Reflectors**
 - a. Rear clearance and identification lights, clean and operating and proper color.
 - b. Reflectors and conspicuity tape clean and proper color.
 - c. Tail-lights clean, operating and proper color.
2. **Check Unloading Systems**
Check that rear doors and unloading door are closed and secured, compartment gates are stowed and secured, airlock slide closed, delivery lines in their storage compartment, compartment covers are closed, control box door closed and secured, and all guards in place and secured.

Step 7 - Left Rear Trailer Wheel Area

Check all items as done on right side (Step 4 "Right Rear Trailer Wheel Area").

Step 8 - Left Side of Trailer Area

1. Check all items as done on right side (Step 3 "Right Side of Trailer Area").
2. **Air System**
 - a. Check that all air line plugs are installed and secured.
 - b. Open and clean pre-cleaner.
 - c. Check that the cleaner cover is closed and secured.

Step 9 - Trailer Functional Check (Tractor Attached)

1. Check for proper connection of the air brake glad-hands, hydraulic system couplers and secure contact of electrical connection.
2. Start engine.
3. Build up air pressure in the tractor-trailer systems.
4. Turn on lights and inspect for proper function of:
 - a. Clearance lights.
 - b. Identification lights.
 - c. Turn signals and 4-way flasher.
 - d. Sidemarker lights.
 - e. Tail lights.
 - f. Stop lights.
5. Check the function of brakes.
 - a. Apply service brakes.
 - b. Apply parking/emergency brakes.
 - c. Stop engine.
 - i. Release trailer emergency brakes.
 - ii. Apply service brakes
Air loss should not exceed
3 psi per minute on single vehicles.
4 psi per minute on combination.

4.5 HOOKING UP/UNHOOKING TRAILER OR PUP

Special care should be taken when hooking up or unhooking trailer or pup to be sure the equipment is in good condition and all systems are functioning as required.

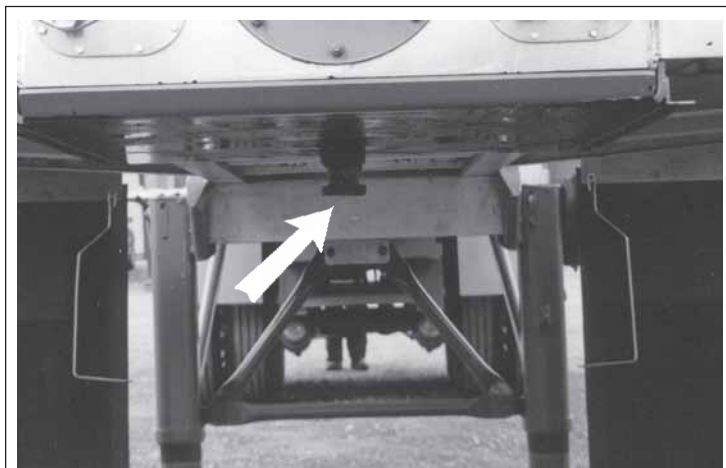
4.5.1 HOOKING UP

4.5.1.1 TRAILER

Follow this procedure when hooking up the trailer to tractor:

1. Back the tractor up in a straight line to the trailer and align the fifth wheel opening with the trailer king pin.
2. Stop before the fifth wheel makes contact with the trailer and apply the towing vehicle parking brake.
3. Inspect all the coupling components before hooking up:
 - a. Inspect trailer coupling components. Check that king pin is not broken, bent or chipped. Check that the anchor frame is not distorted or cracked. If problems found, correct before proceeding.
 - b. Inspect fifth wheel coupling components. Check that the fifth wheel assembly is securely anchored to the tractor frame. Check that the structure of the frame, pivot and fifth wheel is not bent, broken or cracked. Check that the jaws of the lock are open. If problems found, correct before proceeding.
 - c. Be sure that the fifth wheel plate is cleaned and greased.
4. Check that the trailer is at the required height to slide onto the fifth wheel.
 - a. Use the crank on the landing gear to raise or lower the trailer as required.
 - b. Put the blocks or chocks in front of and behind wheels.

The trailer frame should contact the fifth wheel just behind the pivot point as the tractor backs under the trailer. Put the blocks or chocks in front of and behind wheels.



King Pin



Fifth Wheel

Fig. 4-4 COUPLING COMPONENTS

5. Connect brake and electrical lines. Route the lines so they do not get pinched.
6. Back slowly under trailer keeping the king pin centered in the fifth wheel jaws.

7. Back up until the fifth wheel coupler locks on the trailer king pin.

8. Move the towing vehicle forward sharply while the trailer brakes are engaged to check that the jaws have locked around the king pin.

9. Set tractor parking brake, stop engine and dismount.

10. Visually check that the coupler jaws are securely locked around the king pin and the coupler release lever is in the locked position. Release and hook up again if the jaws are not securely locked around the king pin.

11. Check that the trailer frame is resting on the fifth wheel.

12. Check brake application by applying and releasing brakes. If brakes do not release, air lines may be crossed. Do not continue unless brakes are functioning properly.

13. Connect and secure the pressure and return hydraulic lines. Start hydraulic pump and check that there are no leaks.

14. Check that all electrical circuits are completed and that all lights are working.

15. Route the electrical, hydraulic and air lines to prevent snagging, dragging and pinching.

16. Raise the landing gear. Use the crank to raise the legs. Place drive gear in low ratio and stow crank.

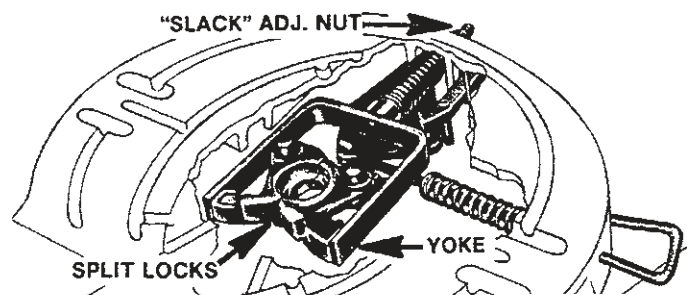
17. Check that air ride bags are inflated to proper height.

18. Remove blocks or chocks from the wheels.

19. Perform Pre-Operation Inspection before starting.



5th Wheel



TYPE "B" LOCK

Lock

Fig. 4-5 COUPLER LOCKS

4.5 HOOKING UP/UNHOOKING TRAILER OR PUP (cont'd)

4.5.1.2 PUP

Follow this procedure when hooking up a pup to a truck:

1. Back the tractor up in a straight line to the pup and align the ball with the hitch.

2. Stop as the ball nears the hitch and apply the truck parking brake.

3. Inspect all the hitch components before hooking up:

- a. Inspect truck frame anchor components. Check that ball is clean and free of mud and debris. Check that ball is not damaged or bent. Be sure anchor frame is not bent, distorted or cracked. Correct problems before hooking up.



Fig. 4-6 PUP

- b. Inspect hitch/tongue components. Check that hitch pocket, linkage and wedge are open, clean and move freely. Check that the hitch is not bent, distorted or cracked. Be sure the 2 safety chains are in place and their hooks are in good condition. Correct problems before hooking up.
 - c. Clean the hitch ball and apply a light coating of grease to the ball.
4. Check that the hitch is at the required height to clear the ball as the unit moves into position. Use the jack to set the hitch height as required.
 5. Connect the brake and electrical line. Route the lines so they do not get pinched.
 6. Back slowly under hitch aligning the ball under the pocket. Stop when they are aligned.
 7. Set tractor parking brake, stop engine and dismount.
 8. Lower the hitch jaws over the ball until the jack raises slightly off the ground.
 9. Move the wedge against the ball and secure. Release the air from pup and check for ball tightness.

IMPORTANT

Be sure the wedge is positioned snugly up against the ball to prevent jerking or disconnecting.

10. Pull the pup forward sharply to pull the ball to the front of the jaws. Check the wedge again to be sure that it is snug against the ball. Adjust if required.

11. Check brake application by applying and releasing brakes. If brakes do not release, air lines may be crossed. Do not proceed unless brakes are functioning properly.

12. Connect and secure the pressure and return hydraulic lines. Start hydraulic pump and check that there are no leaks.

13. Attach the safety chains to their anchors. Be sure to cross them under the hitch.

14. Raise the jack to its fully up position and stow the crank.

15. Give the hitch grease fitting on top of the ball 10 shots of grease to lubricate the ball/jaws for turning.

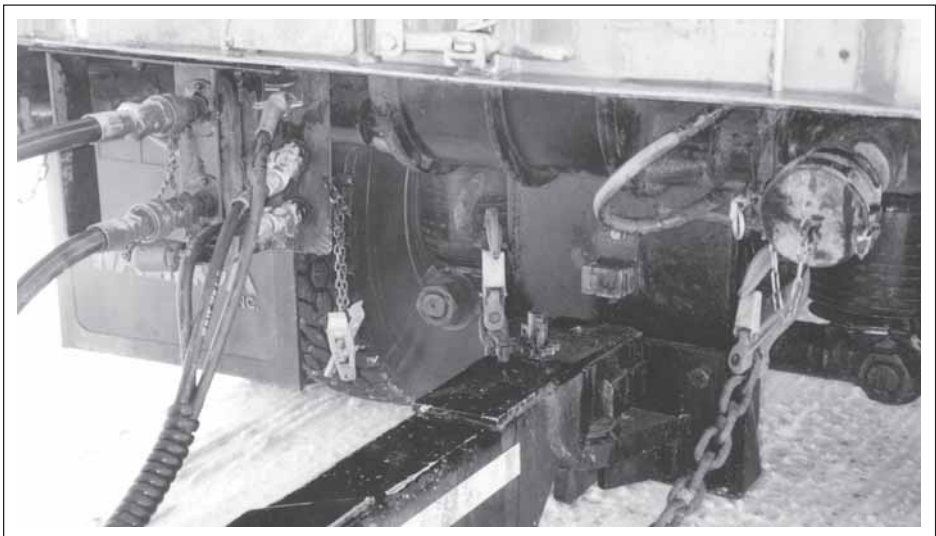


Fig. 4-7 ATTACHED

16. Check that all the electrical circuits are completed and that all the lights are working.

17. Route the electrical, hydraulic and air lines to prevent snagging, dragging and pinching.

18. Check that the air ride bags (if so equipped) are inflated to proper height.

19. Remove blocks or chocks from the wheels. (See page 4-8).

20. Perform Pre-Operation Inspection before starting.



Fig. 4-8 TRAIN

4.5.2 UNHOOKING

4.5.2.1 TRAILER

1. Position tractor and trailer in a straight line on a clear, level and firm surface.
2. Apply the trailer brakes and the parking brakes on the tractor before dismounting.
3. Place blocks or chocks in front of and behind trailer wheels on any level or unlevel surface.
4. Check that the surface under the landing pads can support the trailer. Support with blocks or planks if required. This is particularly important if the trailer is loaded or will be loaded while unhooked.
5. Deflate air suspension system.
6. Lower landing gear.

NOTE

Don't load the front on a short trailer supported only on landing gear legs.

7. Unhook fifth wheel coupler.
8. Release tractor parking brake and pull slowly forward until the trailer frame just slides down the fifth wheel ramp. Stop.
9. Set the parking brake on the tractor before dismounting.
10. Disconnect air and hydraulic lines and electrical connect.
11. Install glad hands on dead end connectors if so equipped.
12. Drive tractor away from trailer.
13. Drain air tanks if operating in cold temperatures to eliminate ice build-up.
14. Inspect the equipment. Document problems found so they can be corrected before the unit will be used the next time. Record problems and repairs for your files.



Fig. 4-9 LANDING GEAR



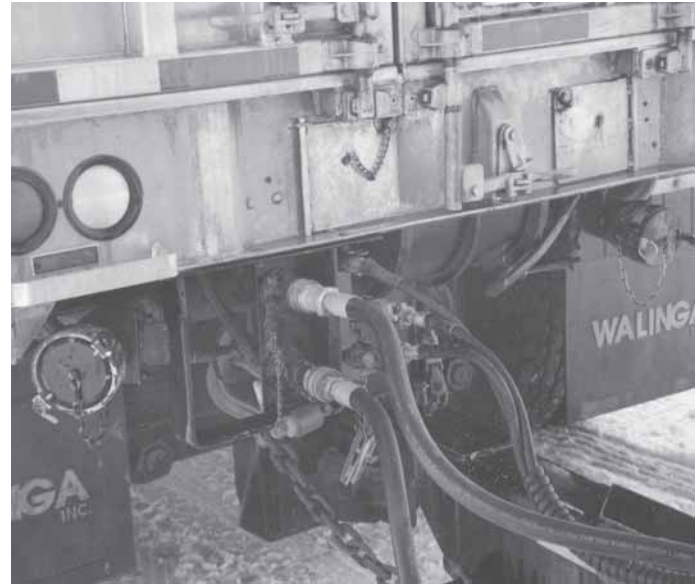
Fig. 4-10 CONNECTIONS

4.5.2.2 PUP

1. Position tractor and pup in a straight line on a clear, level and firm surface.
2. Apply pup brakes and the truck parking brakes before dismounting.
3. Place blocks or chocks in front of and behind wheels if not on a level surface.
4. Check that the surface under the jack can support the weight of the front of the pup. Support with blocks or planks if required. This is particularly important if the unit is loaded.
5. Deflate air suspension system (if so equipped).
6. Lower hitch jack until the hitch weight starts to come off the ball.
7. Disconnect and stow the safety chains.
8. Open hitch clamping jaws by sliding wedge away from the ball.
9. Resume lowering jack until the hitch lifts off and clears the ball.
10. Be sure the air unload air line is disconnected from the truck and stowed on the pup.



Attached



Hitch

Fig. 4-11 PUP

11. Disconnect the air and electrical lines.
12. Install glad hands on dead end connectors if so equipped.
13. Relieve the pressure in the hydraulic system and disconnect the pressure and return lines.

IMPORTANT

Stop hydraulic pump and move a control lever back and forth several times to relieve system pressure. Jiggle the levers on the Pup before unhooking the hydraulic lines. Don't do this with the hydraulic landing gear leg if so equipped.

14. Drive truck away from pup.
15. Drain air tanks if operating in cold temperatures to eliminate ice build-up.
16. Inspect the equipment. Document problems found so they can be corrected before the unit will be used the next time. Record problems and repairs for your files.



Fig. 4-12 UNHOOKED

4.6 CONTROLS

Before starting to work, all operators should familiarize themselves with the location and function of all controls. Each unit is controlled by the controls in the box on the left rear corner of the machine.

1. Control Box :

a. Air Dump Valve:

This 2 position valve is located in the dump line for the air suspension air system. Move the handle toward the back of the unit to close the dump line. The valve must be in this position to re-inflate the air suspension. Move the handle at right angles to the truck to dump the air from the suspension.

b. Airlock Speed:

This flow control valve controls the amount of oil flowing to the airlock drive circuit. Turn the knob clockwise (in) to close the valve and slow the speed and counter-clockwise (out) to increase the speed.

c. Airlock:

This 3 position hydraulic valve controls the operation of the airlock. Pull the lever forward to run the airlock in the forward direction for unloading. Place the lever in its centre position to stop the airlock. Push the lever in its back position to run in the reverse direction. The reverse direction is normally used only momentarily to assist in unplugging.

d. Left Stabilizer:

This spring-loaded to neutral centre 3 position hydraulic valve controls the operation of the left hand stabilizer at the rear axles. Push the lever in and hold to lower the left stabilizer. To stop stabilizer, release the lever and the centring spring will return it to its centred neutral position. Pull the lever and hold to raise the stabilizer. Release the lever for it to return to its centred neutral position.

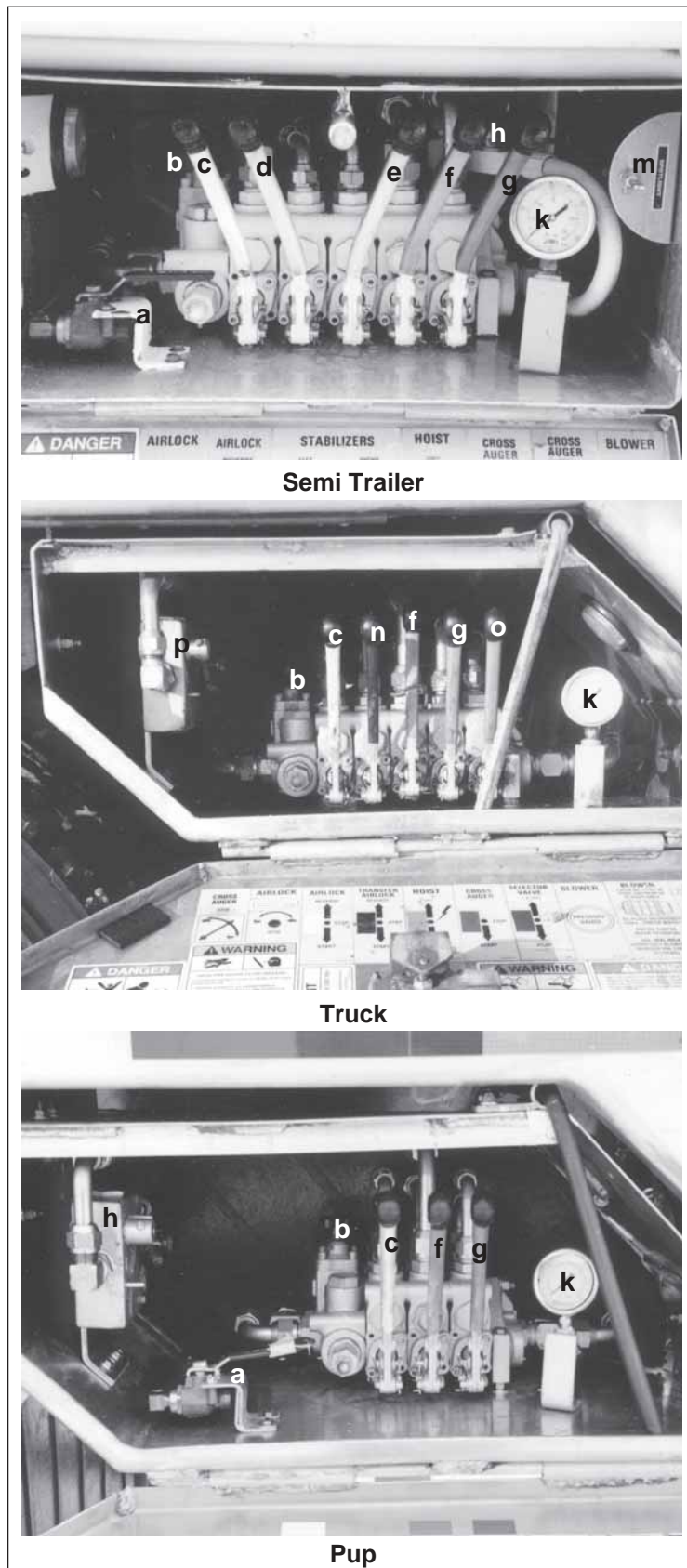


Fig. 4-13 CONTROL BOX

1. **Control Box (cont'd):**

e. **Right Stabilizer:**

This spring-loaded to neutral centre 3 position hydraulic valve controls the operation of the right hand stabilizer at the rear axles. Push the lever in and hold to lower the right stabilizer. To stop stabilizer, release the lever and the centring spring will return it to its centred neutral position. Pull the lever and hold to raise the stabilizer. Release the lever for it to return to its centred neutral position.

f. **Hoist:**

This spring-loaded to neutral centre 3 position hydraulic valve controls the flow of oil to the hoist on the front of the frame. Push the lever in and hold to lower the hoist or box. Feather the valve while lowering to reduce the shock loads encountered when stopping suddenly. To stop hoist movement, release the lever and the centring spring will return it to its centred neutral position. Pull the lever and hold to raise the hoist and lift the box. Release the lever for it to return to its centred neutral position.

g. **Cross Auger:**

This 3 position hydraulic valve controls the flow of oil to the cross auger. Push the lever into stop the flow of oil and the cross auger. Pull out to run the cross auger.

h. **Cross Auger Speed:**

This flow control valve controls the amount of oil flowing through the cross auger drive circuit. Turn the knob clockwise (in) to close the valve and slow the speed and counter-clockwise (out) to increase the speed.

k. **Blower Pressure Gauge:**

This pressure gauge monitors and displays the pressure in the air unload system. Normally this pressure will range from 8 to 10 psi (54 to 68 kPa).

m. **Spotlight:**

This 2 position toggle switch controls the power to the rear working light. Move the switch up to turn the light ON and down for OFF.

n. **Transfer Airlock:**

This 3 position hydraulic valve controls the operation of the transfer airlock. Pull the lever out to run the transfer airlock in the forward or working direction. Place the lever in its centred position to stop the airlock. Push the lever in its back position to run in the reverse direction. The reverse direction is normally used only momentarily to assist in unplugging.

o. **Selector Valve:**

This 3 position selector valve controls the flow of oil to the cylinder to the pup unit. Pull the lever out to supply pup. Push the lever in to supply lead.

p. **Manual Flow Control:**

This manual flow control valve controls the amount of oil flowing to the cross auger. Set the pointer between 0 and 10 on the scale to adjust the speed ratio between 0 and 100% of the available speed.

r. **Air Lock Access Cover (Airlock Slide):**

This push pull rod sets the position of the plate covering the airlock in the back center of the box. Turn the handle as required so it clears the frame and pull it to slide the plate over and open the airlock. Push in to cover and close the airlock. Be sure the handle clears the frame so the control box cover can be closed.

4.6 CONTROLS (cont'd)

- p. **Manual Flow Control:**
This manual flow control valve controls the amount of oil flowing to the cross auger. Set the pointer between 0 and 10 on the scale to adjust the speed ratio between 0 and 100% of the available speed.

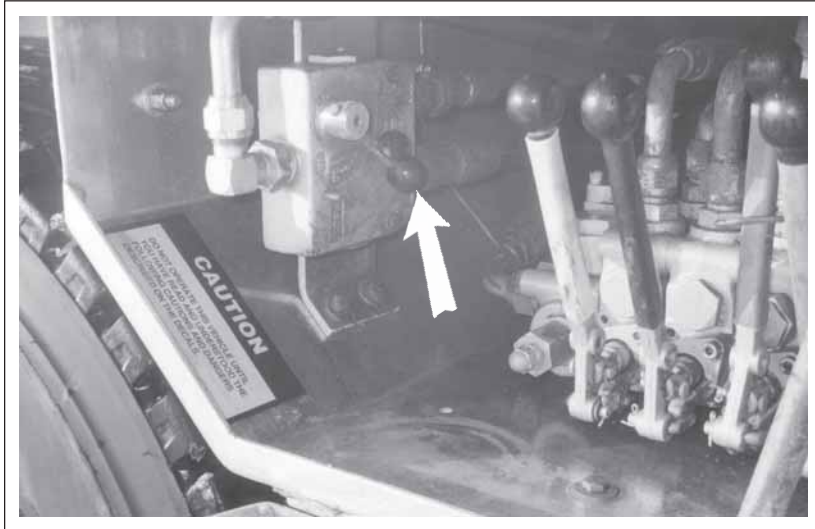


Fig. 4-14 FLOW CONTROL

- r. **Airlock Slide Access Cover:**
This push pull rod sets the position of the plate covering the airlock in the back center of the box. Turn the handle as required so it clears the frame and pull it to slide the plate over and open the airlock. Push in to cover and close the airlock. Be sure the handle clears the frame so the control box cover can be closed.



Handle Opened



Airlock Slide Open

Fig. 4-15 AIRLOCK ACCESS

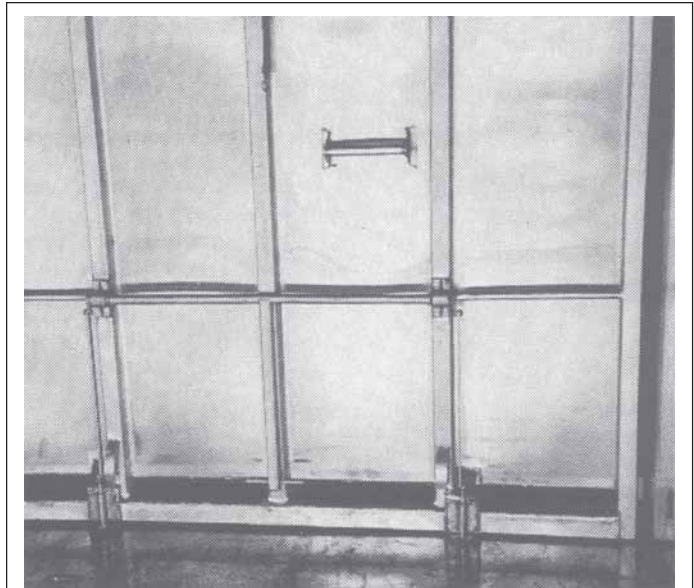
2. **Divider Anchor Pins:**

All the units can be equipped with one or more dividers in the box to allow transport of multiple materials. Each divider hangs on pivot pins on the upper corners of the divider and is anchored with pins in the lower corners. The center handle controls the position of the anchor pins. Lift and latch the handle to retract the anchor pins. Lower the handle to extend the pins and anchor the divider. Be sure the pins are aligned with the holes when anchoring the divider. Step back from the divider when retracting anchor pins to allow the divider to move.



NOTE

When the anchor pins release, the force from the material behind the divider will move the bottom of the divider into the open area. Keep your feet away from the divider to allow it to move.



Handle Down



Handle Up

Fig. 4-16 ANCHOR PINS

4.6 CONTROLS (cont'd)

3. Cab Controls:

Each tractor or power unit must be equipped with an auxiliary hydraulic system to provide pressurized oil to operate the unit and blower to supply pressurized air for unloading. Both systems are powered through the dual PTO drive system with the control box located in the doorway to the left of the driver. Each drive system is labelled.

Pull the yellow collar up and move the red knob forward to engage the PTO and drive the auxiliary system. Push down to disconnect the drive and stop the system. The front knob controls the hydraulic system and the back one the air pump. Most systems are not "live" and cannot be engaged and disengaged without depressing the master clutch.

NOTE

Put the truck transmission in gear first to stop transmission clash when engaging PTO. Then shift transmission into neutral again when PTO engaged.

4. Jumper Hose Y-Valve:

Each lead unit is designed with an air discharge line at the right rear corner that is used for air unloading. The line is equipped with a valve that opens and closes the line.

Move the lever at right angles to the line to close the valve and parallel to the line to open it.



Fig. 4-17 PTO CONTROLS

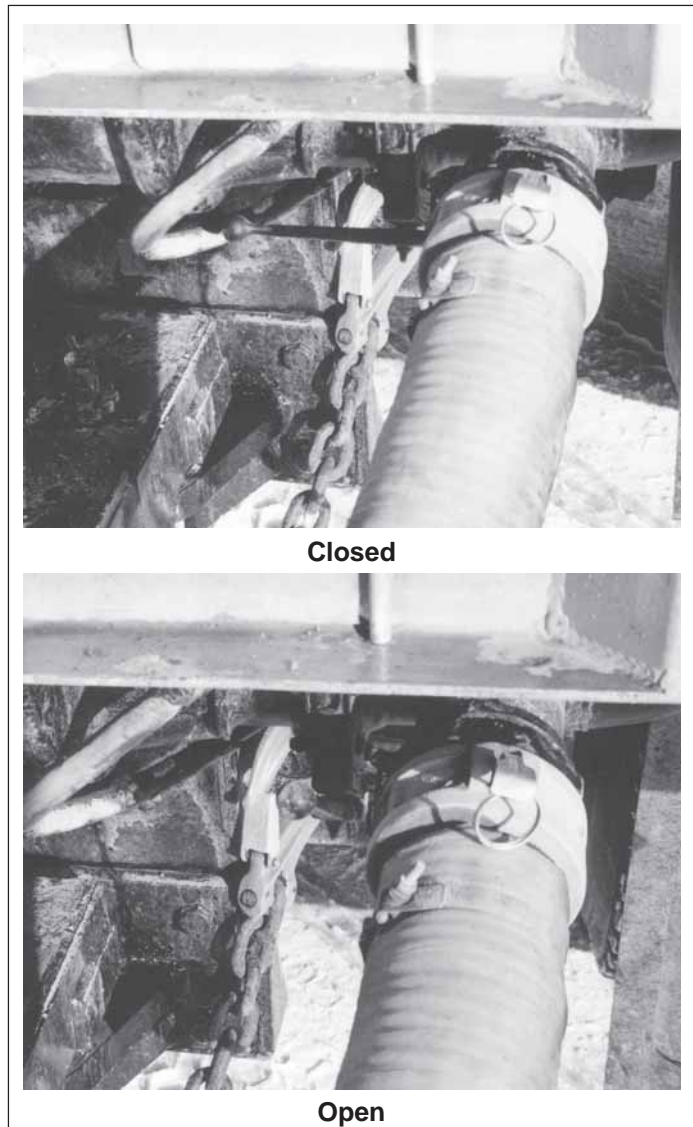


Fig. 4-18 JUMPER HOSE Y VALVE

4.7 MACHINE PLACEMENT

Each Bag/Bulk unit must be properly placed prior to unloading to obtain the optimum performance. When positioning the machine, follow this procedure:

1. Clear the area of bystanders, especially small children, before moving the machine into position.
2. Inspect the parking or unloading position to be sure the surface is firm and level.
3. Drive the unit into its approximate unloading position with the tractor and trailer in a straight line and stop.
4. Do not position the unit on a surface that is not level or is so soft that one set of wheels can sink while the unit is being unloaded.

IMPORTANT

Be sure the unit is on level ground during positioning or unloading to prevent tipping.

5. Do not position the unit where any component will be closer than 30 feet (10 m) to overhead power lines when climbing on the unit, unloading or raising the box.
6. Set the parking brakes before dismounting.
7. Deflate air suspension if so equipped.
8. Lower stabilizer legs on the semi trailer units. Be sure each leg is sitting firmly on the surface.

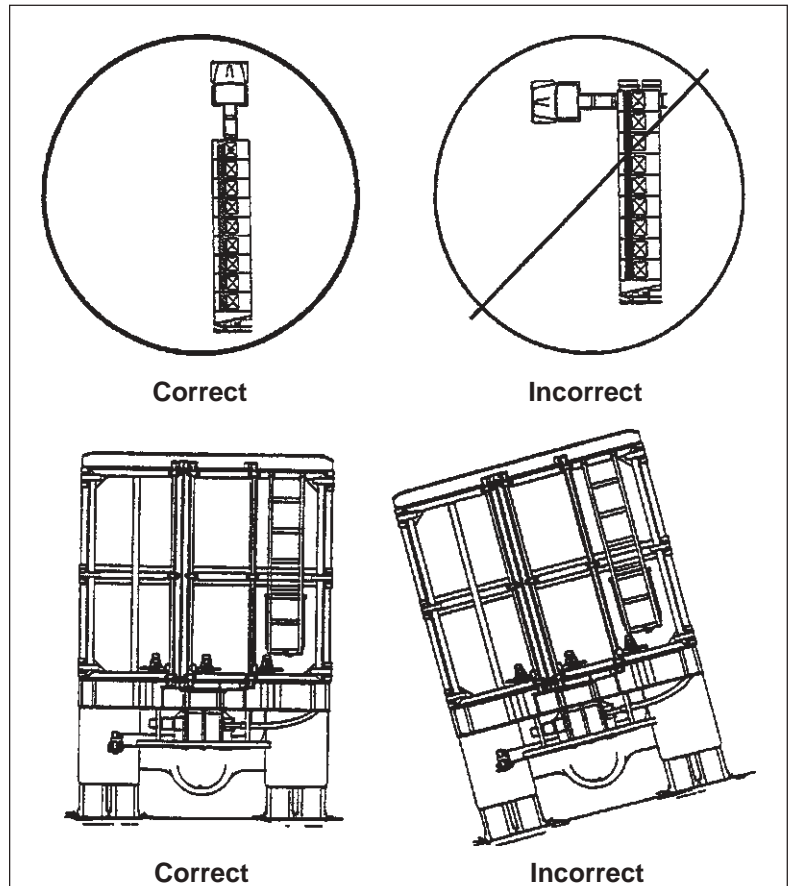


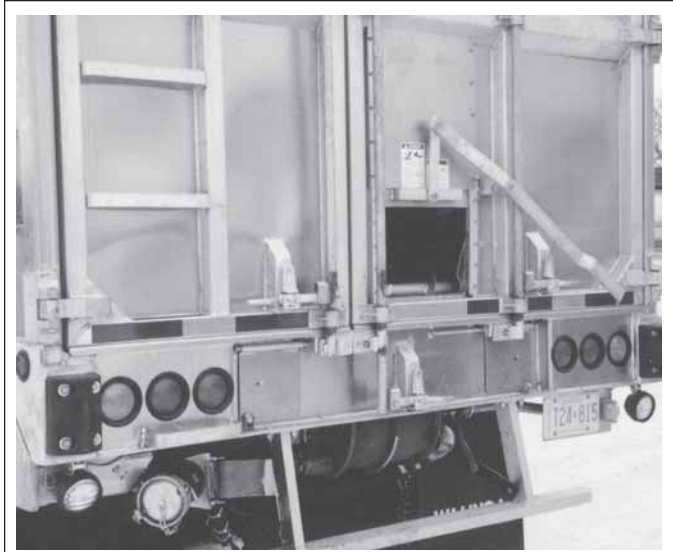
Fig. 4-19 PLACEMENT



Fig. 4-20 STABILIZER LEG (TYPICAL)

9. **Rear Door:**

- a. Position the rear discharge door over the conveyor or pit.



Discharge Door

- b. Remove the sock from its stowed position.



Sock Storage

- c. Mount and secure the sock over the discharge door.



Sock Installed

Fig. 4-21 UNLOADING

10. **Air Unload:**

- a. Position the unit next to the unloading area.
- b. Open the air line storage cabinet and remove the required air lines.

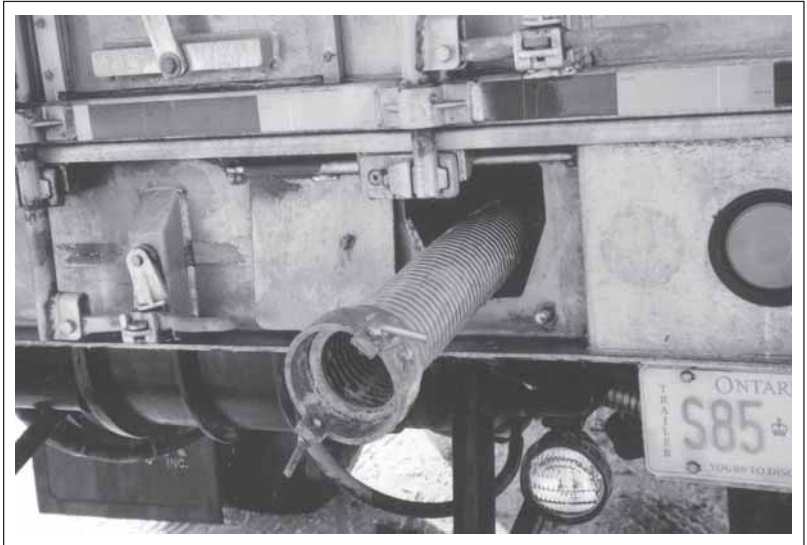


Fig. 4-22 AIR LINE STORAGE

- c. Attach the male end to the airlock outlet and secure with anchor bolts.

NOTE

Coupling style may vary from unit to unit.

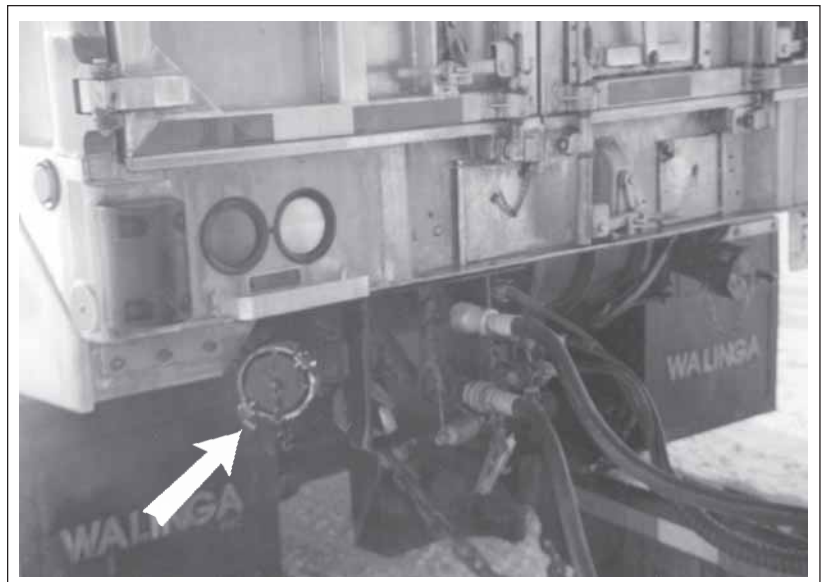


Fig. 4-23 ANCHOR BOLTS

10. **Air Unload (cont'd):**

- d. Attach the other end to the storage facility fill pipe.
- e. Open the roof covers. Stay away from power lines.

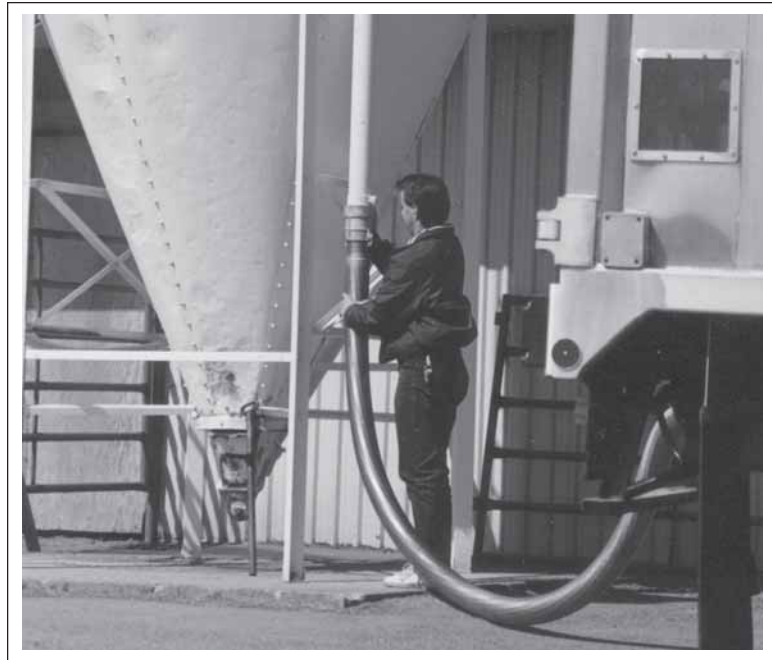


Fig. 4-24 ATTACHED

	<p>! DANGER</p> <p>ELECTROCUTION HAZARD</p> <p>To prevent serious injury or death from electrocution:</p> <ul style="list-style-type: none">• Stay away from power lines when transporting and raising or lowering truck box.• Electrocution can occur without contacting power lines.
--	--

11. Then proceed to Section 4.8 Operation for the unloading procedure.

12. Reverse the above procedure when unloading is finished and unhooking the air lines.



Fig. 4-25 UNLOADING

4.8 OPERATION



OPERATING SAFETY

1. Read and understand all the Operator's Manual and all safety signs before operating or adjusting the Walinga Bag/Bulk unit.
2. Perform circle check before driving.
3. Do not allow riders outside the cab during road or highway travel.
4. Drive very carefully when negotiating hilly or uneven terrain.
5. Keep hands, feet, clothing and hair away from all moving parts. Use special care around open airlock and when next to moving cross auger.
6. Place all controls in neutral, disengage PTO clutch, stop the engine, set park brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing or maintaining.
7. Stay away from power lines when operating hoist or climbing on top of the trailer. Electrocutation can occur without direct contact.
8. Use care when climbing on ladder(s) and/or platform(s) to prevent falling.
9. Maintain running gear in good condition at all times. In addition, on trailers, maintain kingpin and fifth wheel assembly in good condition.
10. Clear the area of all bystanders, especially children, before starting up and operating the units.
11. Make sure that all lights and reflectors that are required by the local highways and transport authorities are in place, clean and can be seen clearly by all overtaking and oncoming traffic.
12. Do not operate unit with spring brakes caged or brakes disabled. Block wheels if unhooked.
13. Before disconnecting the tractor from the trailer unit(s) make sure that the tractor and trailer are on level ground and that the trailer wheels are securely blocked. Lower landing gear and provide extra support if the ground is soft. Deflate air ride if so equipped prior to uncoupling.
14. Do not unload unless all axles are on a firm level surface.
15. Do not go under or within tipping arc of trailer box frame when hoist is operating. Keep others away.
16. Review safety items with all personnel annually.

Follow these operating procedures to obtain maximum performance and long life:

1. Review and follow pre-operation inspection and checklist before operating.
2. Review the location and function of all controls.

4.8 OPERATION (cont'd)

3. Loading Unit:

A. Preparation:

- a. Be sure the inside of the unit is clean to prevent contaminating the next load.
- b. Close airlock slide.
- c. Install false gate, if so equipped, over cross auger if not required or mount it in its upper storage position.



Fig. 4-26 AUGER UPPER STORAGE POSITION

- d. Install dividers at their required position and secure with upper pivot and lower anchor pins.
- e. Open top covers.

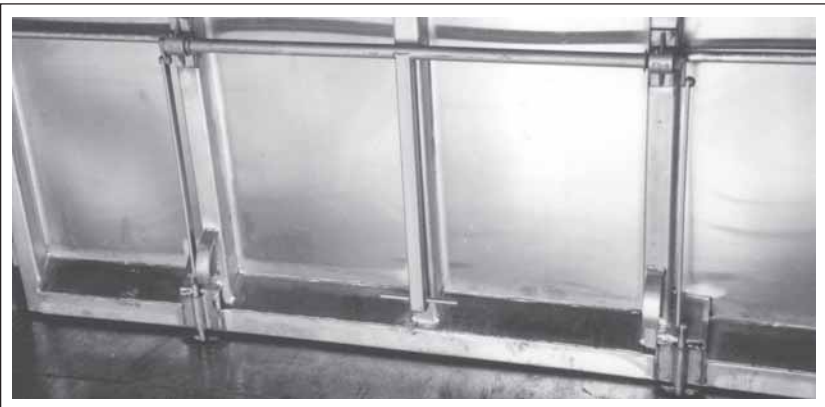


Fig. 4-27 DIVIDER INSTALLED (TYPICAL)

- f. Be sure both rear main doors are closed and latched on both the top and bottom.



Fig. 4-28 REAR MAIN DOORS

- g. Be sure both PTO's are disengaged and in neutral.

3. **Loading Unit (cont'd):**

B. **Gravity/Conveyor Loading:**

- a. Drive the unit into position under the hopper or conveyor.
- b. Set park brakes.
- c. Open top covers.



Lids



Canvas

Fig. 4-29 COVERS

- d. Start loading system and fill the unit.
- e. Close and secure covers when unit has been filled.

4.8 OPERATION (cont'd)

3. Loading Unit (cont'd):

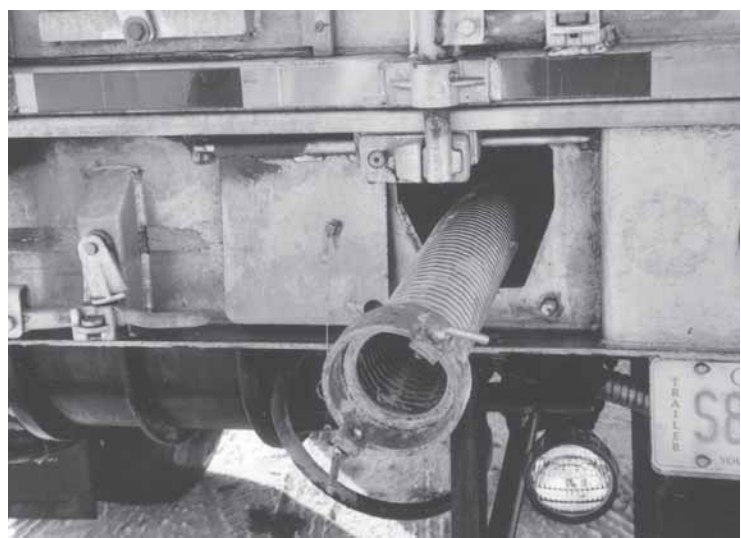
C. Pneumatic Loading:

- a. Drive the unit into position next to the storage or feed facility. Position to minimize the required length for hose and to minimize the need for elbows or sharp turns.
- b. Place all controls in neutral or OFF.
- c. Remove flex jumper hose from its stowed position and install on side-mounted airlock outlet. Secure with anchor bolts.

IMPORTANT

On trucks and pups, raising the front of the box 6 feet (2 m) above the ground this allows the flex jumper hose to form a large arc between the airlock and the box intake to minimize restrictions.

- d. Install and secure hose to front inlet pipe of body.
- e. Place switch valve in suction, loading position.



Storage



Mounted

Fig. 4-30 JUMPER HOSES

- f. Be sure the dust collector has been cleaned and check that the dust collector lid is securely closed.

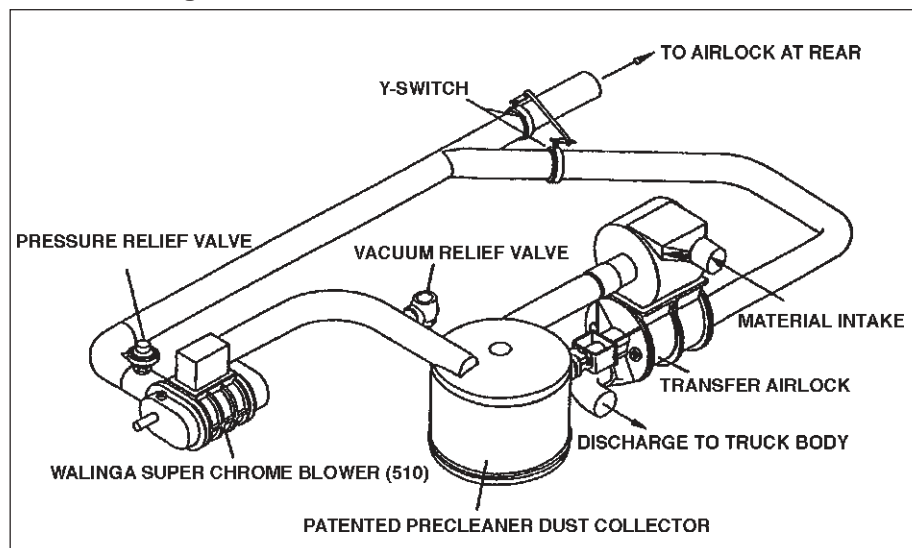


Fig. 4-31 PNEUMATIC LOADING COMPONENTS

- g. Be sure that the material screen has been cleaned and has been secured to the intake canister.
- h. Connect the suction hose with suction nozzle to the receiver inlet and secure. Lay the suction nozzle on top of the grain or feed and open the air slide all the way.
- i. Be sure that at least one roof lid is open or the tarp is open part way to allow the body to vent itself during loading.
- j. Engage PTOs and bring engine to rated PTO RPM (Refer to step #6 b "Engaging PTOs" for proper procedure).
- k. Start transfer airlock and run at 65-75 RPM.
- l. Place suction nozzle into the grain. Slowly close the air slide until the hose/unit begins to pulsate. Open air slide until the pulsations stop.



Fig. 4-32 MATERIAL SCREEN



Fig. 4-33 VENTING

4.8 OPERATION (cont'd)

3. Loading Unit (cont'd):

- m. Do not place the suction nozzle between your feet and draw material from under you. Sufficient material can be drawn into the nozzle to submerge the operator. Submersion in feed or grain can lead to suffocation.

DANGER

Do not place intake tube near feet when standing on top of grain. Sufficient material can be removed to draw operator and intake tube into grain. Submersion in grain can cause suffocation.



Fig. 4-34 LOADING

- n. **Loading From Silo:**
Never walk on top of the grain in a silo when loading your trailer as the grain is removed from the bottom, a column of grain moves downward. The downward movement of the grain will actually draw you deeper into the silo and you will be powerless to do anything to save yourself. Suffocation will take a matter of minutes. Keep out of silo when unloading from the bottom.

DANGER

Do not enter top of silo when unloading from the bottom to prevent suffocation. Keep others out.

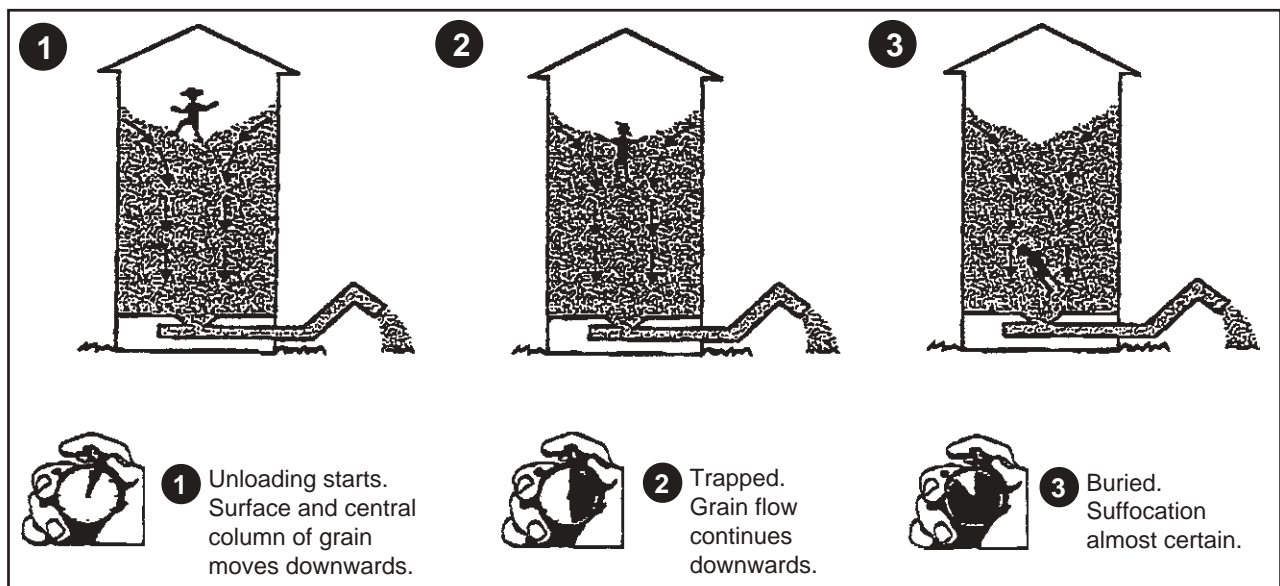


Fig. 4-35 SILO SUFFOCATION

3. Loading Unit (cont'd):

C. Pneumatic Loading (cont'd):

- m. Slow the blower as the box fills to minimize crackage and breakage of the material.
- n. Remove intake nozzle from the feed or grain and wait until all the material has moved through the machine.
- o. Slow the engine to low idle and disengage PTO clutch to the blower.
- p. Unhook and stow intake hose and nozzle, receiver inlet and flex jumper hose.
- q. Lower box to the frame.
- r. Clean out dust collector.



Fig. 4-36 DUST COLLECTOR

IMPORTANT

Be sure to empty the dust collector after each load. An overfilled dust collector can dislodge dust clumps into the system causing a decrease in system capacity and premature wear on key components.

- s. Close lid(s) or tarp prior to moving.
- t. Retract the ram on the switch valve cylinder to prevent road salt or dirt damage during transport.

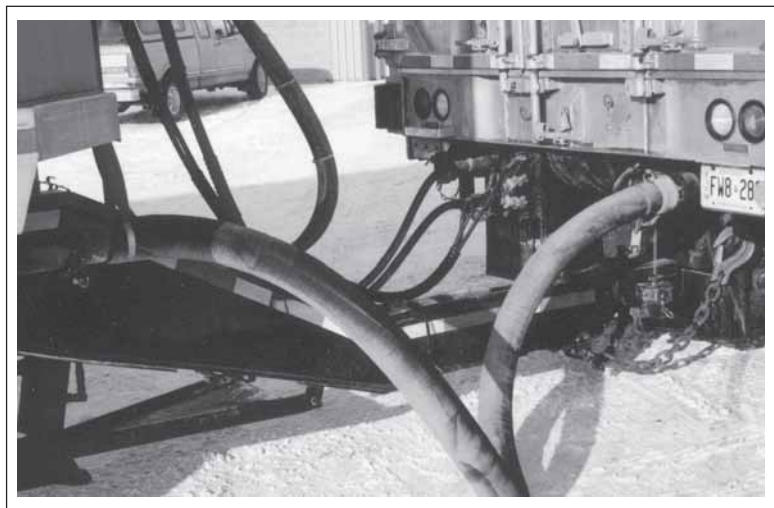


Fig. 4-37 PUP LOADING

- u. Attach the flex jumper hose to the pup when loading the pup.
 - v. Follow the same loading instructions as for the truck box.
 - w. Install and secure plugs into the lines when the hoses and lines have been removed and stowed.
4. Transport to the unloading area.
 5. Position the unit per Section 4.7. Stay away from power lines and be sure the unit is on firm level ground.
 6. **Starting:**



Fig. 4-38 LOADED

- a. Open control box door and place all controls in neutral or OFF/STOP position.
- b. **Engaging PTOs:**
 - Start engine and run at low idle (1000 RPM or less).
 - Depress clutch and shift transmission into gear.
 - Pull up on collar and move levers forward.
 - Shift transmission into neutral.
 - Release clutch to start blower and hydraulic pump.
- c. Set engine speed at "speed posted on the dash" to provide sufficient oil flow to the hoist, airlock drive motor and air flow to unload.



Fig. 4-39 PTO CLUTCH

- d. Use hydraulic control lever to start the airlock if pneumatically unloading.
- e. Open the slide over the airlock if pneumatically unloading.
- f. Refer to step 9 "Unloading" for the recommended unloading procedure.

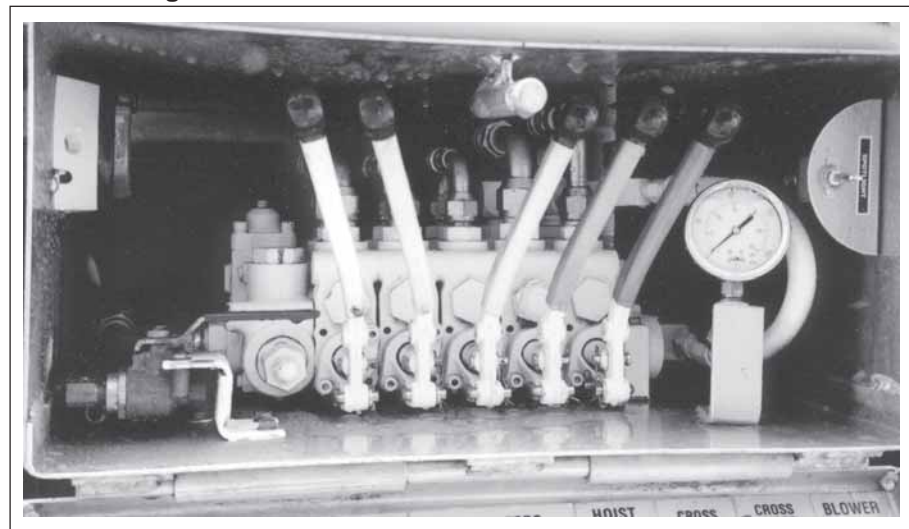
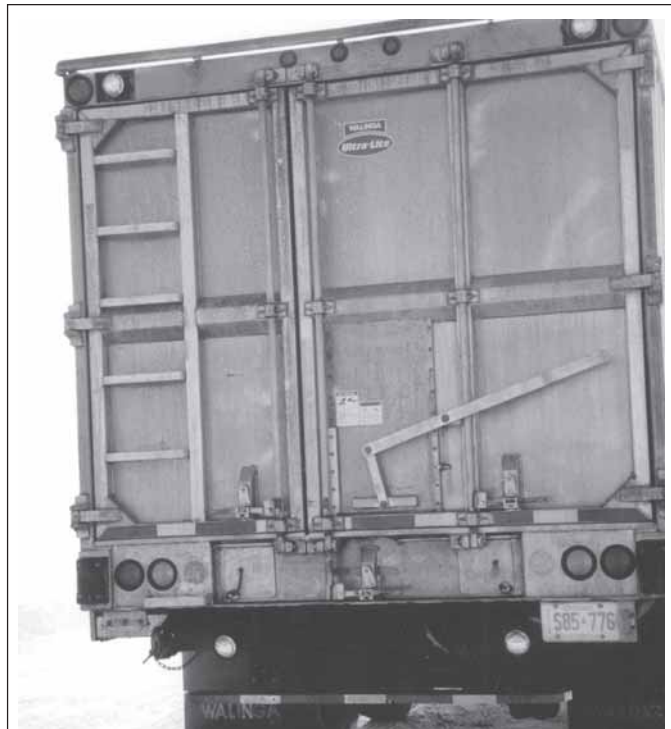


Fig. 4-40 CONTROLS
51

4.8 OPERATION (cont'd)

7. Stopping:

- a. Close rear unload door or close slide over airlock if pneumatically unloading.
- b. Place all controls in OFF, neutral or stop.
- c. Reduce engine speed to low idle.
- d. Depress clutch and disengage PTO



Rear Door



Airlock Slide

Fig. 4-41 STOPPING

8. Emergency Stopping:

If an emergency occurs that requires immediate machine shut down, close rear unload chute or close slide over airlock to stop the unloading process. Place all controls in OFF, neutral or stop and disengage PTO.

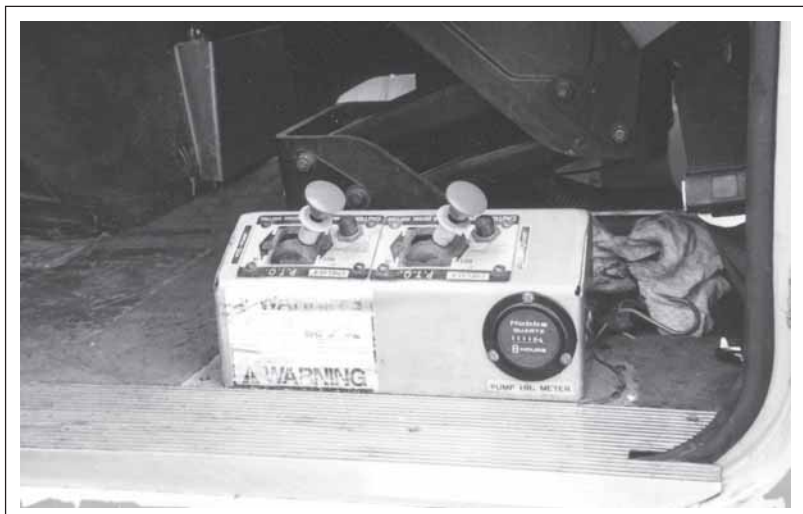


Fig. 4-42 PTO SWITCHES

9. Gravity Unloading:

- a. Position the unit on a firm, level surface with all axles on the ground. On the semi units, be sure the tractor is pointed straight ahead. Do not position the unit(s) where there are overhead obstructions or near overhead power lines.
- b. Position the back of the unit over an unloading pit or conveyor.
- c. Attach and secure sock over rear discharge chute.

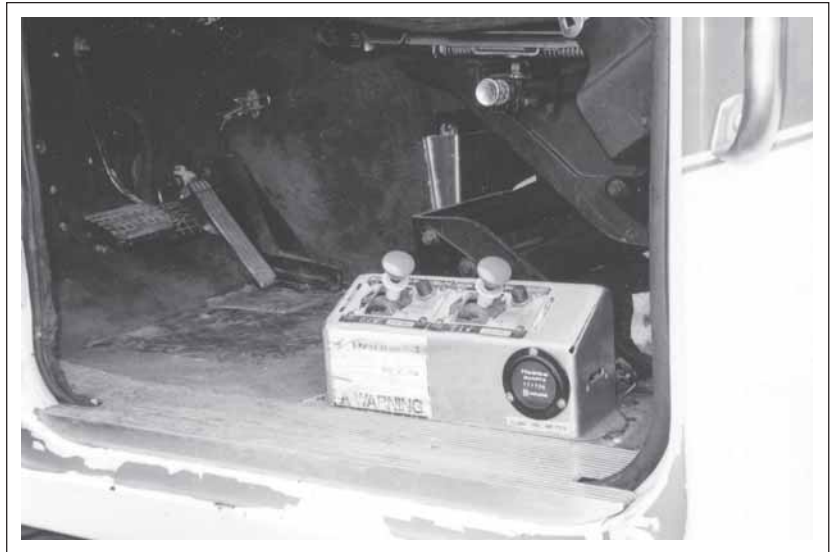


Fig. 4-43 PTO CONTROL

- d. Engage PTO to the hydraulic pump and set engine RPM at speed indicated on the dash.
- e. Exhaust the air from the air suspension system if so equipped.
- f. On the semi units, lower the stabilizers if so equipped on each side to help support the unit.
- g. Open the lids or roll tarp cover.
- h. Start conveyor or material removal system.
- i. Open the rear discharge chute to start the flow of material. Do not overload the conveyor or receiving system.

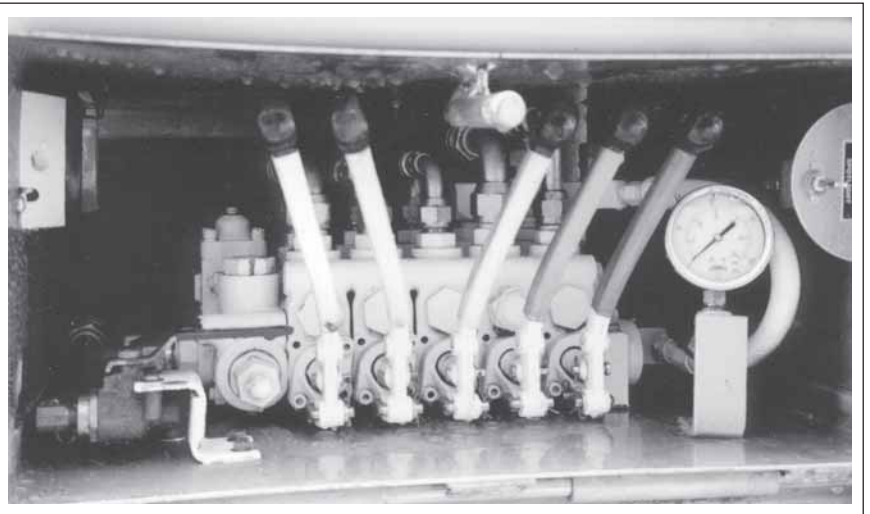


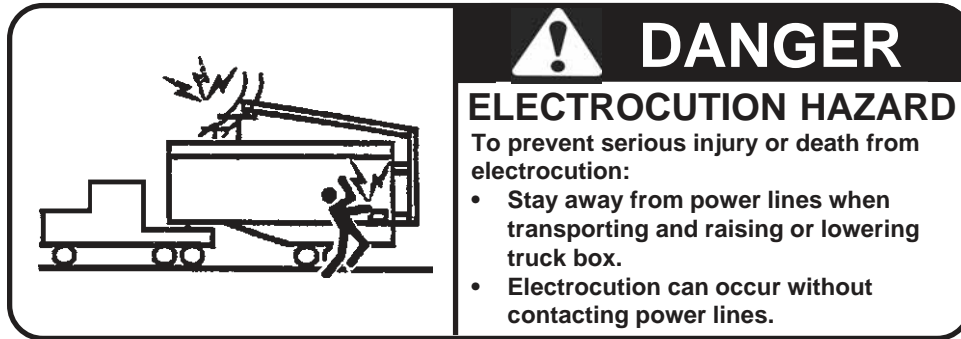
Fig. 4-44 CONTROL BOX (SEMI)



Fig. 4-45 SOCK

4.8 OPERATION (cont'd)

- j. Raise the box slowly when the flow of material out of the rear door stops. Raise only enough to maintain an even flow of material. Stay away from power lines.



- k. Start the cross auger when the box is fully up and the material has stopped flowing. This will clean out the corners and bring the remaining material to the center for discharge. Use flow divider in the control box to set the speed of the cross auger to evenly bring the material to the center for discharge.
- l. Stop conveyor or material removal system, stop cross auger and close rear discharge door.
- m. Feather the hoist valve to slowly lower the box to the frame.

IMPORTANT

Lowering the box rapidly and then stopping suddenly will cause large pressure spikes in the hoist hydraulic system as the box stops. Feathering the valve carefully will minimize the pressure spikes. This is particularly important if the box contains front compartments that are full of material.

- n. If there are not more compartments to unload at this location, disengage PTO, raise stabilizers and stow discharge sock. Move to new unloading location.



Raising



Raised

Fig. 4-46 HOIST

- o. If your unit is equipped with dividers forming additional compartments, locate the unit for unloading as described above (Steps a through g).
- p. Enter box to release divider anchor pins.
- q. Stand back from the divider and pull the handle up to release the lower anchor pins.

NOTE

When the anchor pins release, the force from the material behind the divider will move the bottom of the divider into the open area. Keep your feet away from the divider to allow it to move.

- r. Repeat steps h through l to unload the compartment.
- s. Repeat steps m through p for each additional compartment.
- t. Remove and stow the dividers and discharge sock when the unloading has been completed.



Anchored



Released

Fig. 4-47 DIVIDER HANDLE

4.8 OPERATION (cont'd)

9. Pneumatic Unloading:

- a. Position the unit on a firm, level surface with all axles on the ground. On the semi units, be sure the tractor is pointed straight ahead. Do not position the unit(s) where there are overhead obstructions or near overhead power lines.
- b. Position the unit to insure only a minimum length of hose is required and all lines are routed as straight as possible.
- c. Remove the delivery hose from its stowed position and attach to the rear airlock outlet. Secure with the anchor bolts.
- d. Connect and secure the delivery hose to the pipes/hoses on the storage bin or barn. Check during operation to be sure they are sealed, secured and not leaking.
- e. Place the switch valve in the blowing, unloading position.
- f. Be sure the dust collector has been cleaned and check that the dust collector lid is opened.
- g. Engage PTO clutches and set the engine at rated RPM (Refer to step #6 b for engaging procedure).
- h. Exhaust air from the air suspensionsystem if so equipped.

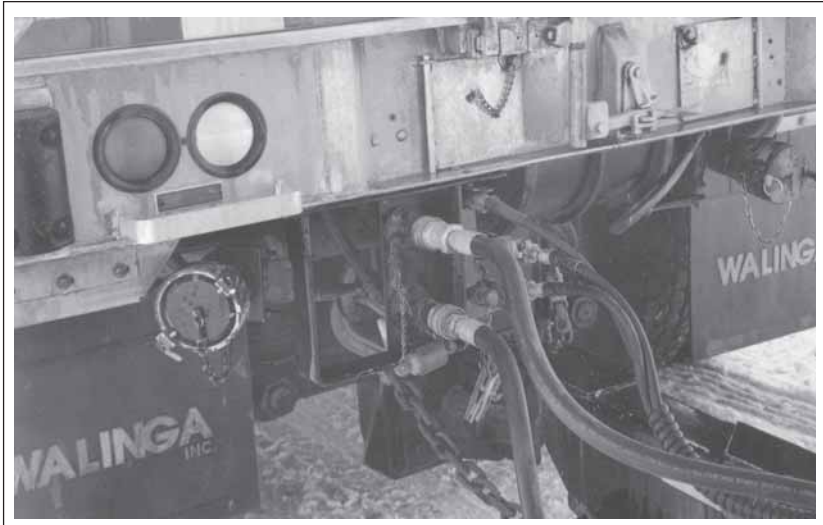


Fig. 4-48 AIRLOCK OUTLET



Fig. 4-49 DUST COLLECTOR



Fig. 4-50 PTO CONTROLS

- i. On the semi units, lower the stabilizers on each side to help support the frame.



Fig. 4-51 STABILIZERS

- j. Open the lids or roll tarp covers.
- k. Slowly open the airlock slide over the rear airlock.



Control




Airlock Slide

Fig. 4-52 AIRLOCK

4.8 OPERATION (cont'd)

- I. Raise the box slowly when the flow of material into the airlock stops. Raise only enough to maintain an even flow of material. Stay away from power lines.



! DANGER

ELECTROCUTION HAZARD

To prevent serious injury or death from electrocution:

- Stay away from power lines when transporting and raising or lowering truck box.
- Electrocution can occur without contacting power lines.

- m. Start the cross auger when the box is fully up and the material has stopped flowing. This will clean out the corners and bring the remaining material to the center to move into the airlock. Use flow divider in the control box to set the speed of the cross auger to evenly bring the material to the center to move into the airlock.
- n. Wait for all the material to move through the airlock and into the barn or bin.
- o. Close the cover over the airlock.
- p. Feather the hoist valve to slowly lower the box to the frame.

IMPORTANT

Lowering the box rapidly and then stopping suddenly will cause large pressure spikes in the hoist hydraulic system as the box stops. Feathering the valve carefully will minimize the pressure spikes. This is particularly important if the box contains front compartments that are full of material.

- q. If there are not more compartments to unload at this location, disengage PTO, raise stabilizers, disconnect air lines and stow in their storage compartments. Move to new unloading location.



Raising



Raised

Fig. 4-53 HOIST

- r. If your unit is equipped with dividers forming additional compartments, locate the unit for unloading as described above (Steps a through g).
- s. Enter box to release divider anchor pins.
- t. Stand back from the divider and pull the handle up to release the lower anchor pins.

NOTE

When the anchor pins release, the force from the material behind the divider will move the bottom of the divider into the open area. Keep your feet away from the divider to allow it to move.

- u. Repeat steps k through p to unload the compartment.
- v. Repeat steps q through u for each additional compartment.
- w. Remove and stow the dividers and air lines when the unloading has been completed.



Anchored



Released

Fig. 4-54 DIVIDER HANDLE

4.8 OPERATION (cont'd)

10. Maximum Pneumatic Loading Capacity:

The optimum loading capacity is set and controlled by the operator using the intake nozzle. In addition, raising the box a few feet above the frame keeps the flex jumper hose in a large arc with minimum material restrictions. To set the capacity, follow this procedure:

- a. Prepare the unit for operation. Be sure the engine is running at rated speed.
- b. Close the air slide on the intake nozzle.
- c. Push the nozzle into the grain or material until the inlet is completely covered and the system fills.
- d. When the system fills with material or grain, it will surge or pulsate.
- e. Open air slide slowly until surging or pulsating stops.
- f. This will provide maximum capacity for the system.



Intake Nozzle



Unit

Fig. 4-55 LOADING

11. Maximum Pneumatic Unloading Capacity:

The optimum unloading capacity is set and controlled by the operator at the control panel. The system moves the most material when the air system pressure ranges between 8 and 10 psi (54 to 68 kPa). To set the capacity, follow this procedure:

- a. Prepare the unit for operation. Be sure the engine is running at rated speed.
- b. Start the rear airlock and run at 65-75 RPM.
- c. Slowly open the sliding cover over the airlock.
- d. Watch the air system pressure gauge while opening the sliding cover.
- e. Stop moving the sliding cover when the pressure in the air system ranges between 8 and 10 psi (54 to 68 kPa). This nominal pressure range will provide maximum unloading capacity.



Pressure Gauge/Handle



Airlock Slide

Fig. 4-56 UNLOADING

4.8 OPERATION (cont'd)

12. Raising Hoist:

Each unit is equipped with a large multi-stage hydraulic cylinder to raise the front of the box for unloading. It is a simple system that allows for simple, fast and convenient unloading. However, each operator must be aware of the common sense rules that must be followed when using the hoist.

- a. Position unit on a firm level surface before raising hoist or unloading. Soft or uneven terrain can result in frame tipping when raising hoist.
- b. Do not raise hoist unless there is a firm level surface under all tires and each axle.
- c. On semi units, position tractor and trailer in a straight line to provide maximum stability when raising hoist.



Fig. 4-57 RAISING HOIST

- d. On semi units equipped with stabilizers, lower stabilizer legs before raising hoist.
- e. Do not go under or within tipping arc of box frame when hoist is operating. Keep others away.
- f. Stay away from power lines when raising hoist. Electrocution can occur without direct contact.
- g. Use care when on ladder or on top of unit to prevent falling. Stay away from power lines to prevent electrocution.
- h. Stay out of body compartment when unloading, when cross auger is running and when engine is running.
- i. Lower box to the frame before releasing the latches on the bottom of the divider(s).
- j. Do not raise hoist in high wind conditions.
- k. Do not move unit unless box is fully down.
- l. Do not park unit with box in the raised position.
- m. Do not use the cylinder as a stabilizer when the hoist is raised. The cylinder is strictly a lifting device and is not a structural member of the unit.
- n. Have parking brakes set before raising hoist.
- o. Stay at controls while using the hoist or unloading. Lower hoist immediately if shifting or leaning of the box occurs.
- p. Feather the unit down slowly to avoid a high-pressure build-up in the cylinder when the box stops suddenly.

These instructions are posted next to the control box to remind the operator of recommended procedures.

13. Unplugging - Pneumatic Loading:

If the unit plugs during the pneumatic loading phase, follow this procedure to unplug:

- a. Place all controls in neutral/OFF.
- b. Disengage PTO clutches, stop engine, remove ignition key and wait for all moving parts to stop.
- c. Remove the intake jumper hose and tube from the receiver unit.
- d. Remove the material screen from the receiver.
- e. Remove the flex jumper hose from the airlock output fitting.
- f. Clean out the receiver and the top and bottom of the airlock.

NOTE

It may be helpful to start engine, engage power and run the airlock momentarily in reverse to dislodge any jammed material. Do not place hands into airlock when it is turning or running.

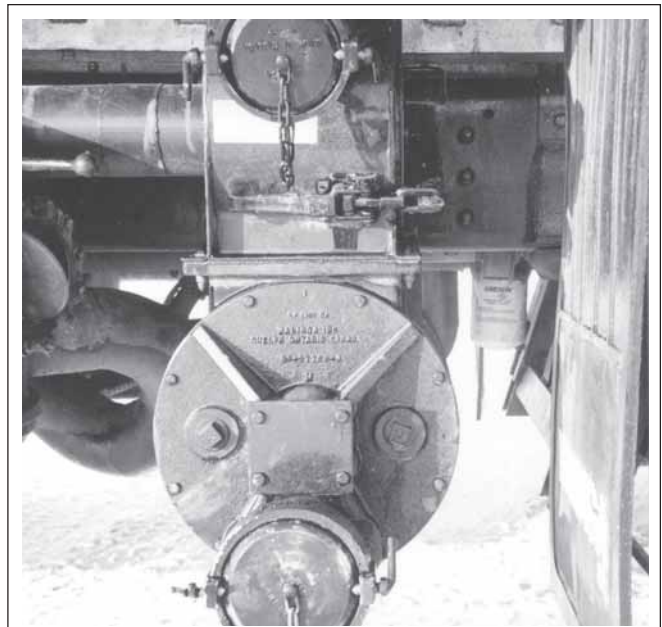
WARNING

ROTATING AIRLOCK BLADES HAZARD
KEEP AWAY

To prevent serious injury or death:

1. Place all controls in neutral, stop engine, remove ignition key and wait for all moving parts to stop before opening access door.
2. Close access door before operating.
3. Keep hands, feet, hair and clothing away from moving parts.

- g. Loosen bottom cover of dust collector and remove all collected material.
- h. Close and secure bottom cover.
- i. Install and secure material screen.
- j. Attach and secure flex jumper hose, inlet fitting and intake hose.



System



Airlock

Fig. 4-58 INTAKE SYSTEM

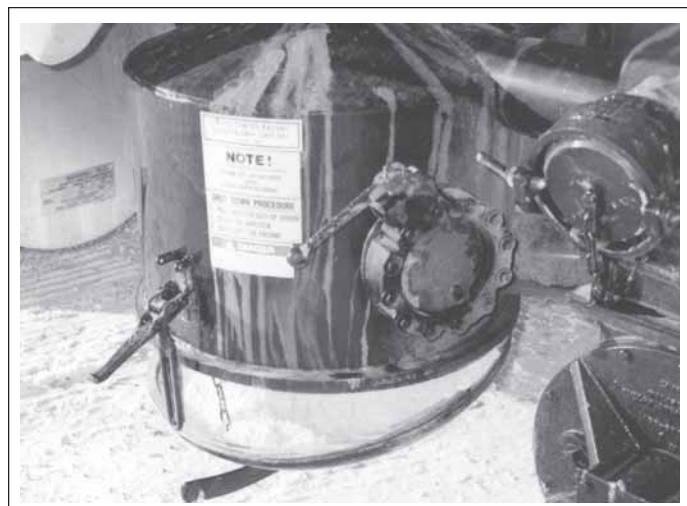


Fig. 4-59 DUST COLLECTOR

4.8 OPERATION (cont'd)

14. Unplugging - Pneumatic Unloading:

If the unit plugs during the pneumatic unloading phase, follow this procedure to unplug:


- a. Close airlock slide and lower box down to the frame.
- b. Place all controls in neutral/OFF.
- c. Disengage PTO clutches, stop engine, remove ignition key and wait for all moving parts to stop.
- d. Remove the discharge hose from airlock.
- e. Remove the material on top of the airlock.
- f. Open airlock slide and remove material from the top of the airlock.
- g. Clean out the bottom of the airlock.

NOTE

It may be helpful to start engine, engage power and run the airlock momentarily in reverse to dislodge any jammed material. Do not place hands into airlock when it is turning or running.



WARNING



ROTATING AIRLOCK BLADES HAZARD KEEP AWAY

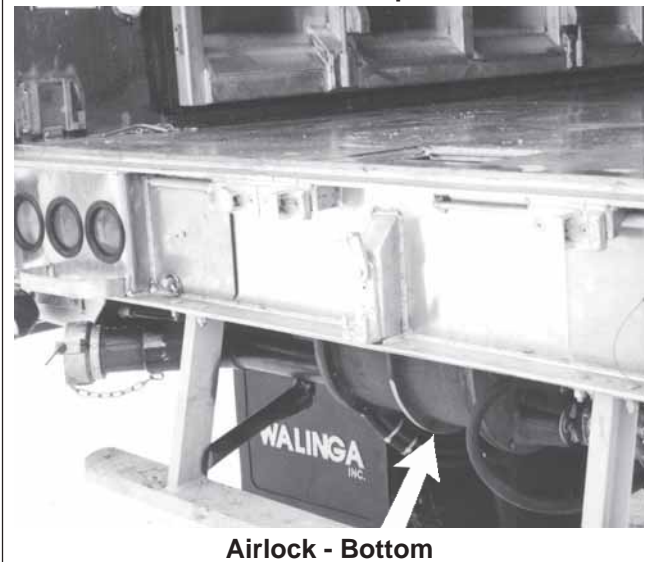
To prevent serious injury or death:

1. Place all controls in neutral, stop engine, remove ignition key and wait for all moving parts to stop before opening access door.
2. Close access door before operating.
3. Keep hands, feet, hair and clothing away from moving parts.

- h. Close airlock slide.
- i. Install and secure discharge hose.



Airlock - Top



Airlock - Bottom

Fig. 4-60 UNLOADING



Fig. 4-61 DUST COLLECTOR

15. Blowing Suggestions:

Follow these suggestions when using the blower:

- a. Never run the engine faster than the maximum speed indicated in the cab.
- b. Each application or place of delivery will differ and this will determine the required speed. The type of material blown will determine it as well. Corn or wheat require greater speed and pressures when blown an equal distance compared to what mash or crumbles will require. In other words heavy feed or grain - greater engine/blower speed - lighter feed or grain, less engine blower speed.
- c. The condition and the size of the delivery lines to the barn bin or tanks also determine the required speed. If these lines leak badly, more air is needed to replace the wasted air and therefore greater speed of the blower is required. Too small a line to the bin, for instance a 3" line, will slow the operation considerably. The recommended size is 4" diameter. Too many elbows will slow the operation. (General rule of thumb: 1 elbow = 4 ft. of line).
- d. To determine how fast the engine should be running while unloading, this rule of thumb may be used. After the unit has been set up and has started blowing at maximum speed with the slide as far open as possible, slow the engine down until the engine begins to labour or the delivery hoses begin to pulsate. After this has been achieved, increase RPM slightly to allow unit to run smoothly.



Fig. 4-62 LOADING

16. Minimizing Breakage:

The breakage of pellets or crumbles can be avoided by:

- a. Slowing down the speed at which the material is moved through pipes.
- b. Having as few elbows as possible, and by making the radius of the necessary bends as smooth and as big as possible.
- c. Keep the delivery hoses and pipes full of feed and use a minimum of air. Result: Very little breakage, dust or separation and a satisfied customer.
- d. Pellets and crumbles should be pushed through the pipes, not shot through them.
- e. Remember that breakage increases as the air and feed speed increases; not the engine speed, but the speed at which the pellets travel through the pipe.
- f. Obstructions in the line like screws to fasten couplings to the pipe/hose dents in the line and material build-up at elbows.

4.8 OPERATION (cont'd)

17. Operating Suggestions:

- a. Use only fully trained operators at all times. Review safety and operating instructions annually.
- b. Position the unit on a firm level surface to unload. Be sure the tractor and trailer are in a straight line for unloading to provide maximum stability.
- c. Be sure all the axles are supported by firm soil before raising the hoist.



Fig. 4-63 UNLOADING

- d. Stay away from power lines when raising the hoist or climbing on the top platform. Electrocutation can occur without direct contact.

	<p>! DANGER</p> <p>ELECTROCUTION HAZARD</p> <p>To prevent serious injury or death from electrocution:</p> <ul style="list-style-type: none">• Stay away from power lines when transporting and raising or lowering truck box.• Electrocutation can occur without contacting power lines.
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- e. Keep the air lines as short as possible to minimize air and friction losses.
- f. Do not kink air lines. Route in large arcs to eliminate abrupt changes in direction.



Fig. 4-64 PNEUMATIC LOADING

- g. Raise box a few feet above the frame during pneumatic loading to prevent kinking of flex jumper hose.
- h. Always wear hearing protection when around blower. Prolonged exposure to high ambient noise can cause hearing loss.

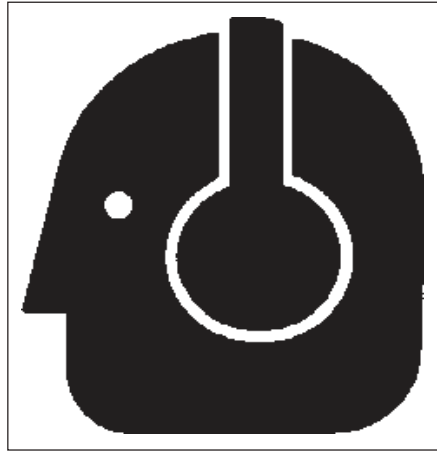


Fig. 4-65 HEARING PROTECTION

4.9 TRANSPORTING

Although all operating and transporting instructions are common sense, it is wise to review them periodically to refresh your memory. Good operational procedures result in a safe workplace for the operator and others.

4.9.1 OPERATING INSTRUCTIONS

Since this equipment can be used in a variety of conditions, it is difficult to give instructions appropriate for all applications. However, these general guidelines apply to all situations:

1. Be sure that the trailer is securely attached to the towing vehicle and locked into position.
2. Be sure that the air, hydraulic and electrical lines are securely connected and that they have sufficient slack for turns.
3. Be sure that the brakes are properly adjusted and in good working condition.
4. Be sure that the electrical harness is securely attached and all lights and reflectors are clean and operating.
5. Maintain the mud flaps in good condition to minimize road splash in wet conditions.
6. Always maintain the unit in good mechanical condition.

4.9 TRANSPORTING (cont'd)

4.9.2 BRAKING GUIDELINES

Safe, reliable and trouble-free operation of your unit requires that the brakes be maintained in good operating condition at all times and the driver follows good application techniques when driving. The irresponsible use of brakes by the driver when traveling can contribute to low brake life or result in system malfunctions, short life and poor tire wear patterns. The following list summarizes some basic operational guidelines for the driver.

1. Check the function of the brake system at the start of each day.
2. Maintain a safe vehicle speed at all times. Slow down for rough road or slippery surface conditions, winding roads or congested areas.
3. Always provide sufficient vehicle spacing on the road to allow for a safe stopping distance.
4. Apply brakes gradually to produce an even deceleration until the vehicle is stopped.
5. Watch traffic patterns ahead. Anticipate pattern changes that could result in an emergency. Apply the brakes gradually in sufficient time to produce a controlled stop.
6. Shift to a lower gear to use engine compression as the retarding force when going down steep grades.
7. Do not apply brakes for a long period of time such as when traveling on a long downgrade. The brakes will overheat. Instead, apply both the tractor and trailer brakes for short periods of time and the brakes have a chance to cool between applications.
8. Dry the brakes by applying them several times after going through water.
9. Release the brakes just before going over railroad tracks or other rough conditions. By allowing the wheels to turn over rough road surfaces, there will be no shock loads to the brake system components or produce flat spots on the tires.
10. Wet, icy or snow-packed surfaces require special care. Make cautious, intermittent applications by fanning or pumping the brakes to reduce speed without skidding or locking the wheels.
11. Use wheel chocks, apply trailer and tractor parking brakes and place tractor in low gear when parking the unit.
12. Maximum brake retarding occurs just before the wheels lock up and the tires skid. Release the brakes should you feel them lock-up and reapply them.
13. When trailer brakes are applied with hot drums, it may result in a cracked drum. Allow them to cool before reapplying the brakes.
14. Fanning or repeated on-and-off applications will use up the system air reserves. This procedure is not recommended unless adverse road conditions are encountered. The wasting of air reserves in this way could result in insufficient application pressure should an emergency arise.
15. Hard or panic stops can overheat the linings and drums. Overheating will cause brake fade. Severe overheating and fade can result in the complete loss of braking capability. This will substantially reduce the expected life of brakes.

4.9.3 TIRES

When operating the unit, it is the responsibility of the driver to check the tires frequently. Inflation pressures, wear patterns and matching are critical parameters that must be monitored. The following factors affect tire care:

1. **Inspection frequency:** Tires should always be checked at the start of a day and twice during the day or every 4 operating hours, whichever comes first. It is also a good practice to check the tires at each rest period during the day. When a driver hears unusual noise or experiences unusual handling characteristics, the first item to check is the tires. Problems found early, during frequent tire checks, can save more serious problems later on. A sampling of typical abnormal wear patterns are shown in the Maintenance section along with their causes. Always correct the cause of the tire wear problem before proceeding.
2. **Inflation pressure:** Tires should always be operated at their specified pressures. At their specified pressures, the tire is designed to run with the full width of the tread flat on the contact surface. Operating at other than specified pressures will change the tread contact patterns and can dramatically shorten tire life. In addition, the tires will run hotter and can lead to blow-outs.

Check tire pressure when the tire is cold. A hot tire can read as much as 20 psi higher than a cold tire. If tires are over-inflated, check for poor load distribution, uneven surface contact, over-loading or poor operating conditions.

3. **Tire matching:** Do not mix ply types on the same axle. Their operating characteristics are different and will lead to uneven tire loading, rapid tire wear and adverse handling characteristics. Matching also includes combining tires that have the same amount of tread remaining. A tire with more tread has a larger rolling radius and will have to carry a higher load. The best performance will be obtained when the rolling radius is within 1/8" for all tires on an axle.

4.10 OPTIONAL EQUIPMENT

The trailers can be equipped with several options or attachments to adapt it to special customer requirements.

1. **Selector Valve:**

An air controlled selector valve is available to direct the air for loading or unloading the unit.



Fig. 4-66 SELECTOR VALVE

2. Several types of compartment covers are available. Select the style that best fits your application.



Individual



Multiple Compartment Cover

Fig. 4-67 COVERS

4.10 OPTIONAL EQUIPMENT (cont'd)

- Dust Collector Breather:**
An optional breather valve is for the side of the air cleaner canister. When opened, it will provide sufficient air to operate the pneumatic system.

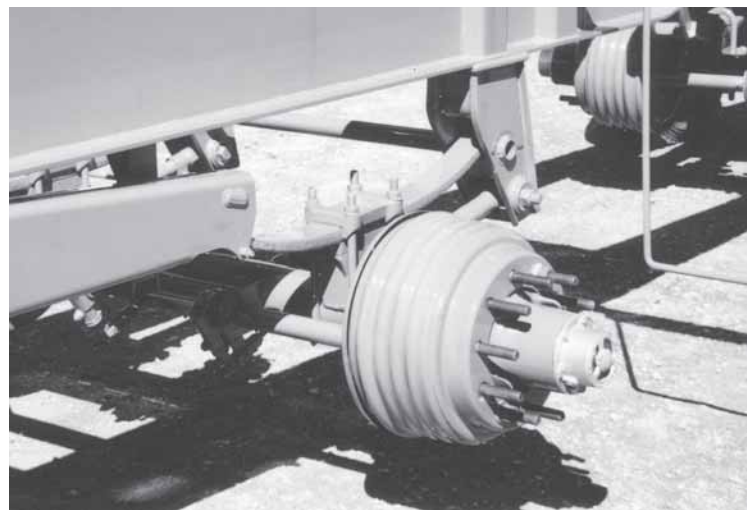


Fig. 4-68 BREATHER

- Suspension Systems:**
A variety of types and styles of running gear is available for use on the trailer including air or mechanical suspensions. Select the type that best suits your application.



Air



Mechanical

Fig. 4-69 SUSPENSION TYPES

5 SERVICE AND MAINTENANCE

Review the manual provided with the truck for service and maintenance information.

This section provides information on daily and periodical service and maintenance of the Trailer unit. Follow these recommendations for safe and dependable operation of the Trailer unit. Refer to the safety section at the front of the operator's manual for all applicable safe maintenance and operating procedures.

Be sure that all operators are familiar with the operation and maintenance procedures and related safety information contained in the operator's manual.



MAINTENANCE SAFETY

1. Read and understand all the information in the Operator's Manual regarding maintenance, adjusting and servicing the Bag/Bulk unit.
2. Place all controls in neutral, disengage PTO clutch, stop the engine, remove ignition key and set the park brake before adjusting, servicing or maintaining any part of the Bag/Bulk unit.
3. Block or support the box before servicing or maintaining any components on truck frame or running gear.
4. Follow good shop practices:
 - Keep service area clean and dry.
 - Be sure electrical outlets and tools are properly grounded.
 - Use adequate light for the job at hand.
5. Block wheels before de-activating brakes.
6. Maintain air system and brake components in top condition at all times.
7. Maintain fasteners in running gear systems at their specified torque at all times.
8. Lower box to the frame, disconnect hydraulic lines and relieve pressure before working on hoist.
9. Establish and maintain a Trailer Preventative Maintenance (TPM) program on your equipment. Some jurisdictions require this program and the maintenance of records on every commercial vehicle on the road for future reference.

5.1 SERVICE

5.1.1 FLUIDS AND LUBRICANTS

1. **Grease:**
Use an SAE multi-purpose lithium based grease with extreme pressure (EP) characteristics.
2. **Wheel Hub Oil:**
 - a. Use an SAE 80W90 for normal temperature conditions (-10°F to 100°F ambients).
 - b. Use an SAE 85W140 for hot temperature conditions (100°F and hotter ambients).
 - c. Use an SAE 30W motor oil for ambients below -10°F.

Capacity: 1 pint (500 ml) approximately

3. **Hydraulic Oil:**
Refer to 5.1.3 for Hydraulic Oil Specifications.
4. **Storing Lubricants:**
Your unit can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture and other contaminants.

5.1.2 GREASING

Refer to Section 5.1.1 for recommended grease. Use the Service Record checklist provided to keep a record of all scheduled servicing.

1. It is recommended that a hand-held grease gun be used for greasing. An air-powered greasing system can damage the seals on bearings and lead to early failure.
2. Wipe grease fitting with a clean cloth before greasing, to avoid injecting dirt and grit.
3. Replace and repair broken fittings immediately.
4. If fittings will not take grease, remove and clean thoroughly. Also clean lubricant passageway. Replace fitting if necessary.

5.1.2 Greasing (cont'd)

NOTE:

When greasing bearings it is very important that bearings are not over-greased.

The use a handgun is recommended .

When greasing bearings once a month or every 10,000 miles apply only one pump of grease per bearing. This applies to all auger and paddle bearings when servicing the unloading system. (for details and specs on greasing refer to section 5 and 7 of this operator's manual)

IF A BEARING IS OVER-GREASED IT WILL VOID THE WARRANTY

5.1.3 HYDRAULIC SYSTEM

1. Oil Specifications:

PUMP MODEL	Min. Start-up (No Load)	Minimum Operating Temperature	Maximum Operating Temperature
P197 (PERMCO)	-16°C/3°F	-2°C / 28°F	82°C /180°F
P3100 / P5000/ DMD25-064 (PERMCO)	-16°C/3°F	-10°C / 14°F	82°C /180°F

NOTE:

To avoid damage to equipment HYDREX* XV hydraulic oil must be used. The use of alternative hydraulic oils without Walinga's written consent may void the terms of the equipment warranty.

- a. All hydraulic systems will be filled with Hydrex XV.
- b. Check with dealer or factory for oil requirements when using other oils or in other temperature ranges.
- c. When operating a unit and the oil temperature is over 180°F (82°C), the pump system must be shut down, or run slower until the system cools down.
- d. If overheating persists, check the system for possible causes (see Section 10.7).
- e. Hydraulic oil filter must be changed before the gauge needle is in red on 10 MICRON return filters.
- f. Hydraulic oil should be checked regularly. (Testing of oil is recommended once a year).
- g. Always maintain a proper level in the hydraulic tank and keep oil clean.
- h. Do not over speed the hydraulic pump, it causes overheating of the hydraulic oil. (Run the engine as shown on RPM tag on dash).
- i. Check vent filler cap and keep it clean.

2. System Operation:

- a. Be sure your oil specifications meet or exceed the pump manufacturer requirements.
- b. Do not exceed starting and operating temperatures as specified above.
- c. When operating a unit and the oil temperature is over 180°F (82°C), the pump system must be shut down, or run slower until the system cools down.

6 TRAILER SERVICING INTERVALS

A standard servicing schedule on your trailer unit is provided as a guide for your convenience. In unusual or extreme operating conditions, increase the frequency or perform additional service items to customize this schedule to your application.

Refer to the Service Section of the truck manual for truck servicing information.

A. Servicing: 8 Hours, Daily or 500 Miles

1. Drain moisture from air tanks (use cables to open drain valves).



Tank Drain



Valve

Fig. 6-1 DRAIN CABLE(S) (TYPICAL)

2. Check tire air pressure. Add as required.



Fig. 6-2 TIRES (TYPICAL)

Weekly, 10 Days or 5000 Miles

1. Grease slack adjusters
(1 location each adjuster).

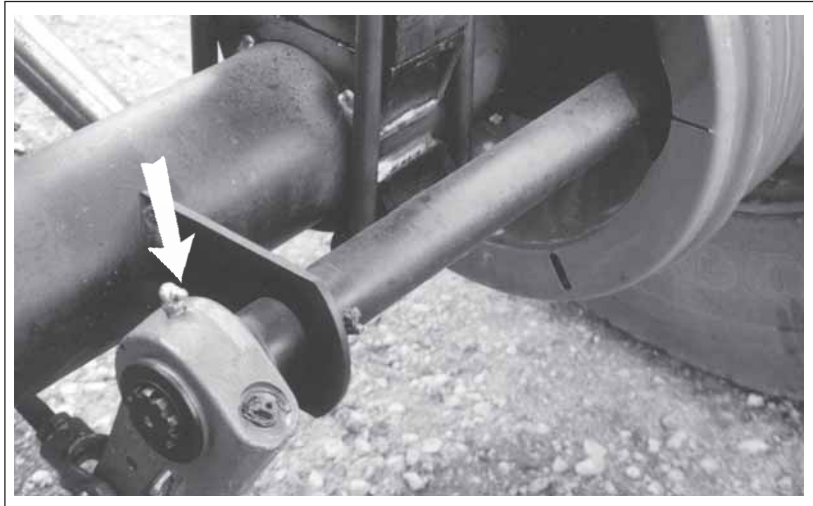


Fig. 6-3 SLACK ADJUSTER (TYPICAL)

2. Grease camshaft bearings
(1 location each camshaft).

IMPORTANT

Do not overgrease.



Fig. 6-4 CAMSHAFT BEARING

Weekly, 10 Days or 5000 Miles (cont'd)

3. Check wheel hub oil levels.

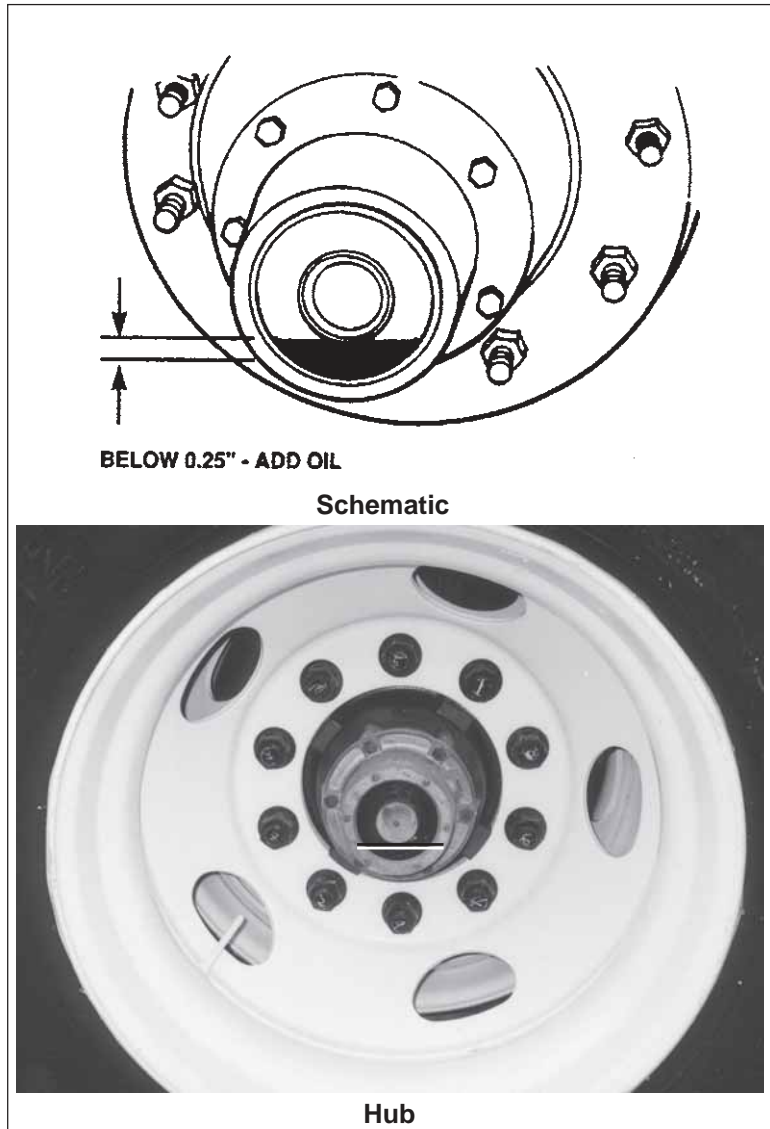


Fig. 6-5 HUB OIL LEVEL

4. Retorque the following fasteners:

- a. Brake/wheel end system fasteners. Refer to Section 8.8.

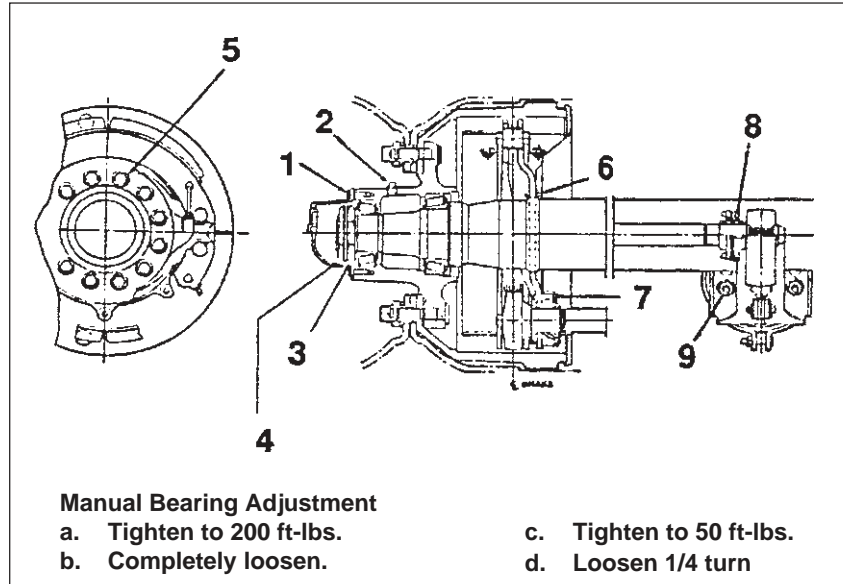


Fig. 6-6 BRAKE/WHEEL END

- b. Landing gear bolts.

1/2 in.	115 ft. lbs.
5/8 in.	220 ft. lbs.



Fig. 6-7 LANDING GEAR MOUNTING BOLTS

Weekly, 10 Days or 5000 Miles (cont'd)

- c. Retorque cast spoke wheel rim nuts if so equipped.

Table 1 Recommended Wheel Bolt Torque (Spoke Wheels)

Bolt Size	Ft-lbs Torque (Dry)
5/8" - 11	150 - 175
3/4" - 10	210 - 260

IMPORTANT

Do not over-torque fasteners. Over-torquing can strip threads, collapse spacers or lead to other problems that cause loose fasteners. Use an accurate torque wrench when tightening fasteners.

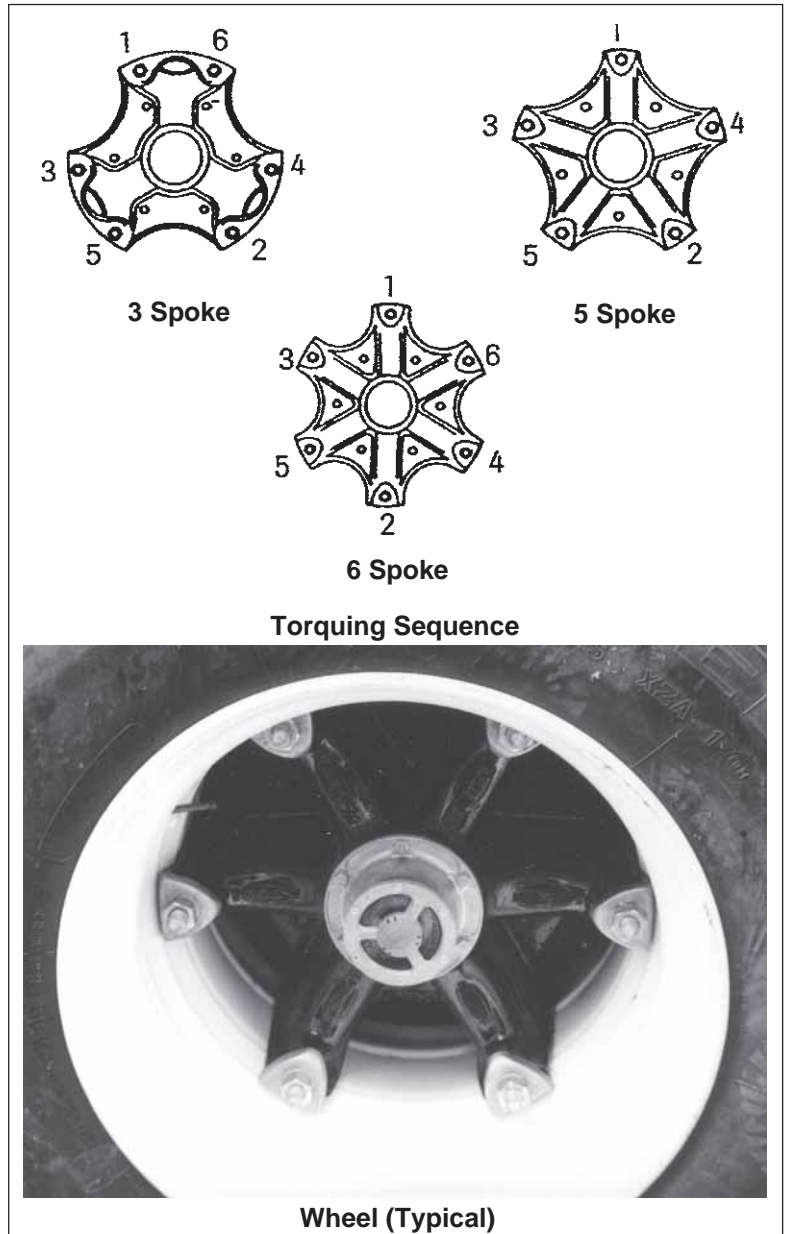


Fig. 6-8 CAST WHEEL RIM NUTS

Weekly, 10 Days or 5000 Miles
(cont'd)

- d. Retorque for stud pilot inner and outer wheel nuts if so equipped.

Table 2 Recommended Wheel Stud Torque (Disc Wheels)

Stud Size	Wheel Type	Ft-lbs Torque (Dry)
3/4" - 16	Disc	450 - 500
1-1/8" - 16	Disc	450 - 500
15/16 - 12	Disc	750 - 900
1-5/16 - 12	Disc	750 - 900
	Bud Unimount 10	390 - 440
	WHD-8	400 - 600

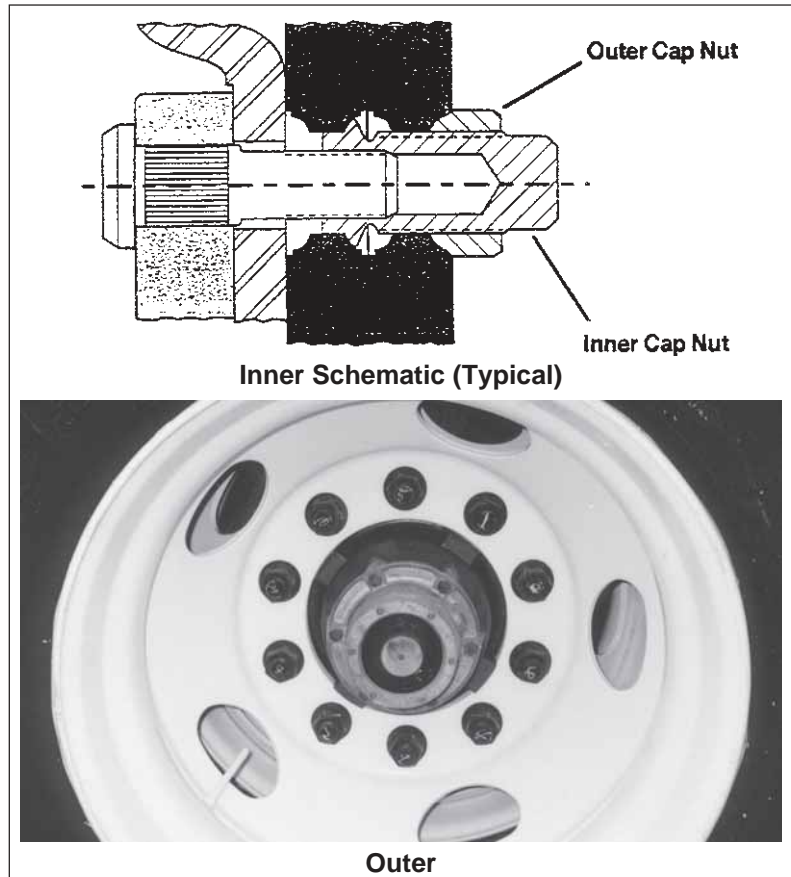


Fig. 6-9 10 STUD WHEEL NUTS

- e. Retorque hub piloted wheel single nuts if so equipped.

Table 3 Recommended Wheel Stud Torque

Stud Size	Ft-lbs Torque (Oiled)
M22 x 1.5 (33 mm or 1-1/2 Hex)	450 - 500
M20 x 1.5 (30 mm Hex)	280 - 330

IMPORTANT

Do not over-torque fasteners. Over-torquing can strip threads, collapse spacers or lead to other problems that cause loose fasteners. Use an accurate torque wrench when tightening fasteners.

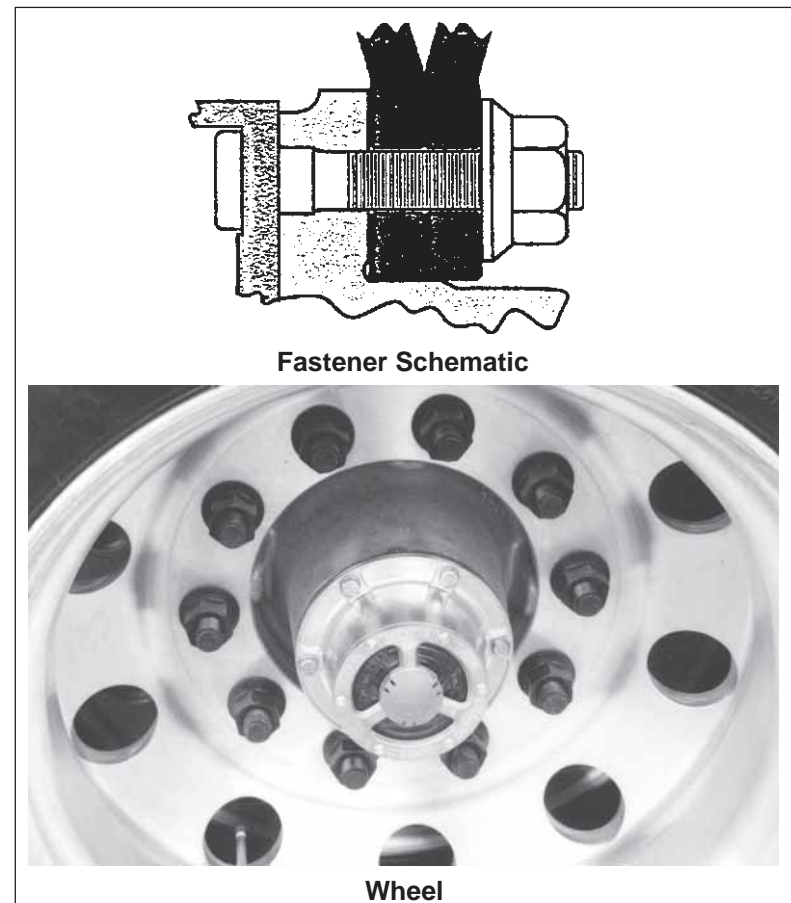


Fig. 6-10 SINGLE NUTS

Weekly, 10 Days or 5000 Miles (cont'd)

- f. Retorque suspension system fasteners. (Refer to charts for torque levels in Maintenance Section 8.1.)

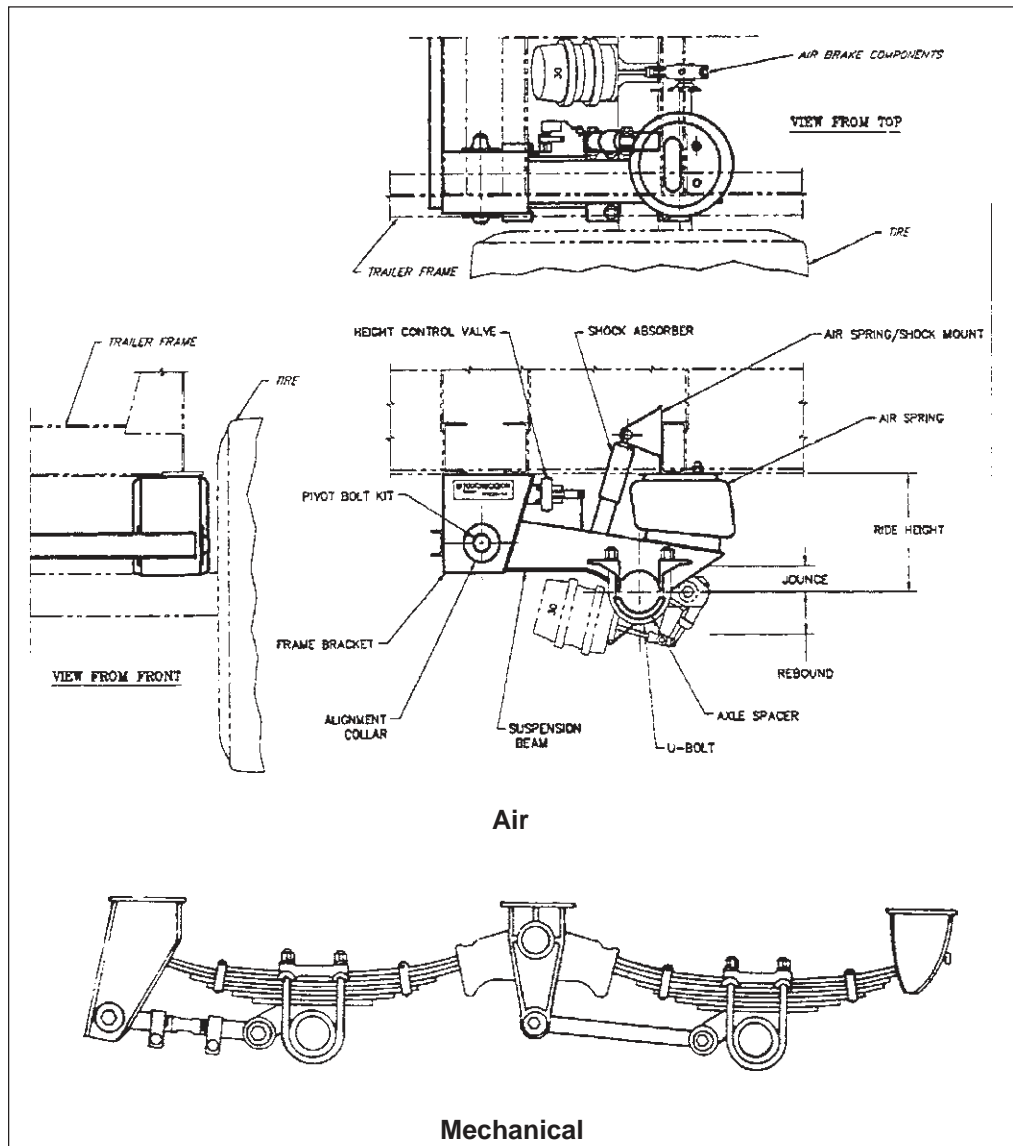


Fig. 6-11 SUSPENSION SYSTEM U-BOLTS

10,000 Miles (15,000 km) or Monthly

1. Grease landing gear bearings.

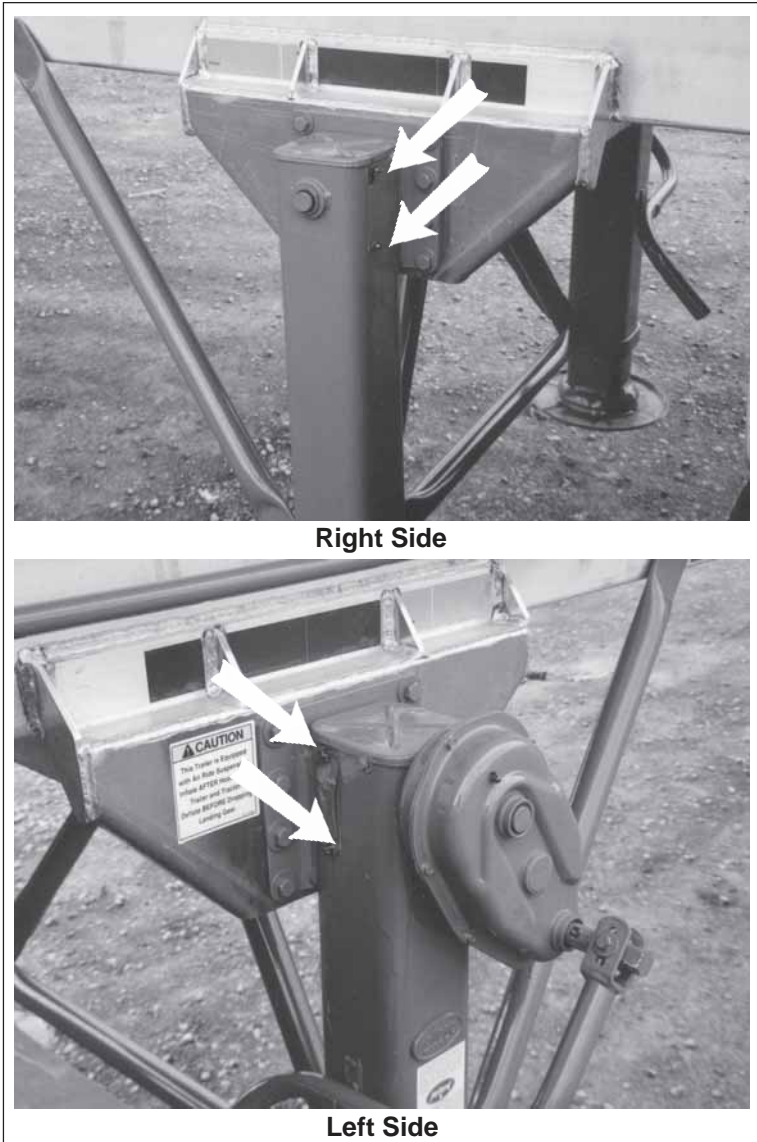


Fig. 6-12 LANDING GEAR

2. Retorque landing gear and suspension.
 - a. Landing gear.
 - b. Torque mechanical system suspension (refer to Section 8.1).

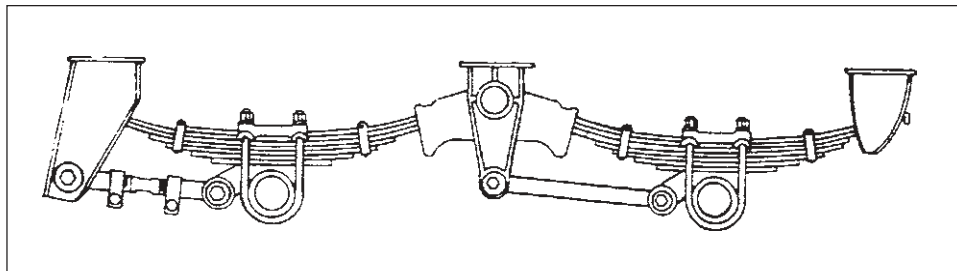


Fig. 6-13 MECHANICAL SUSPENSION SYSTEM

25,000 Miles (40,000 km), Quarterly or Every 3 Months

1. Check condition of wheel ends.
Release brakes, jack up the axle and spin the wheel. Check:
 - a. Wheel bearings.
 - b. Wobble.
 - c. Rims and tires.
 - d. Brake drag.



Fig. 6-14 WHEEL END

2. Inspect frame and structure for bends, distortions or cracks.
 - a. Kingpin.
 - b. Fifth wheel and mounts.
 - c. Longitudinal and transverse frames.
 - d. Compartment structure.
 - e. Unloading system structure.
 - f. Suspension system anchorage.
 - g. Axles.
 - h. Optional Accessories
 - i. Side Covers
 - ii. Top Covers



Fig. 6-15 TRAILER (TYPICAL)

3. Inspect electrical system components for:
 - a. Binding.
 - b. Rubbing/abrasion.
 - c. Looseness/dangling.
 - d. Cracks/tears in harness.
 - e. Burned out lights.

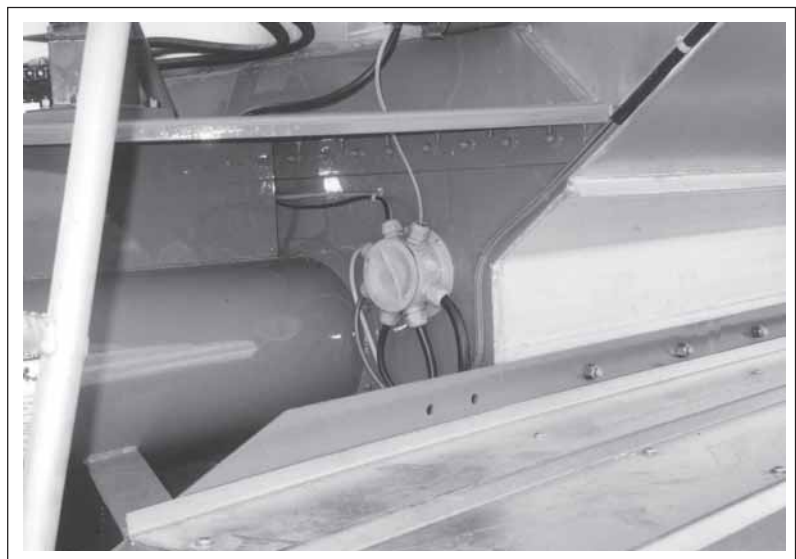


Fig. 6-16 ELECTRICAL (TYPICAL)

4. Inspect air system and components for:
 - a. Leakage by performing leak-down test.
 - b. Rubbing/abrading.
 - c. Cracked hoses.

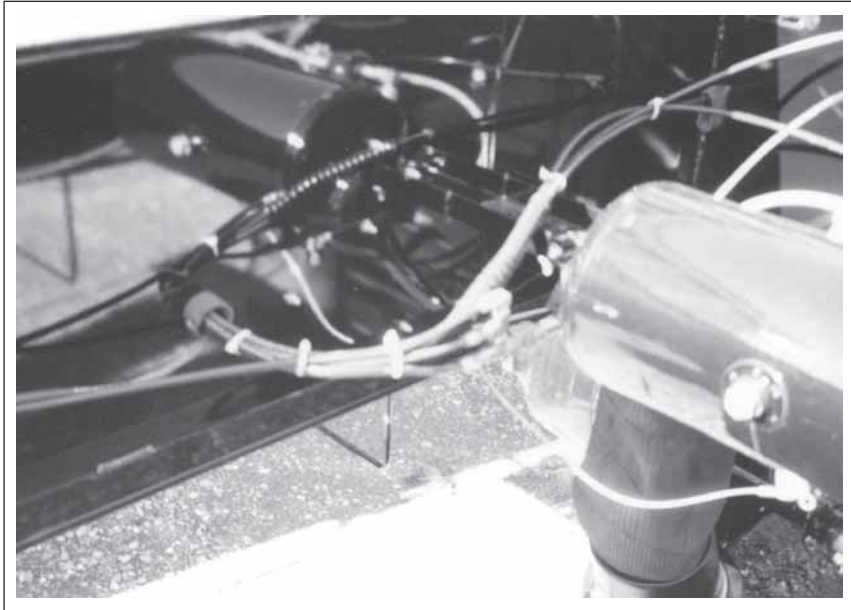


Fig. 6-17 AIR SYSTEM (TYPICAL)

5. Clean gladhand screens if so equipped.

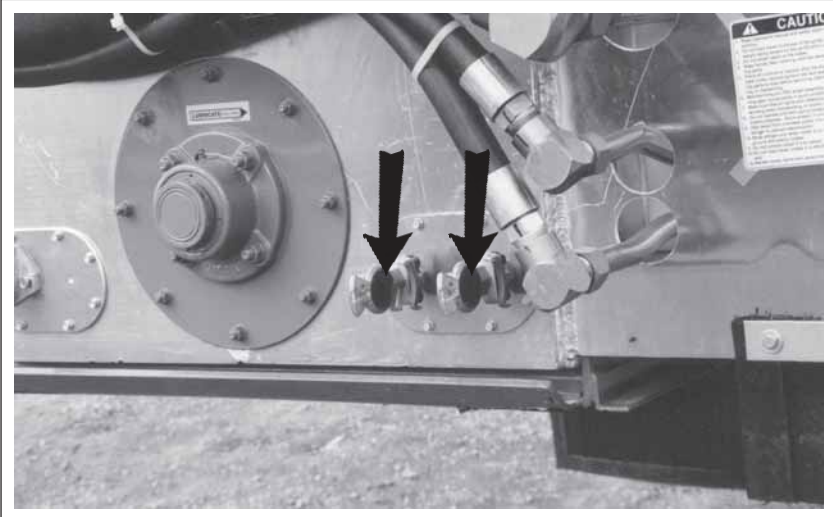


Fig. 6-18 SCREENS

6. Check brake lining thickness. Replace as required.

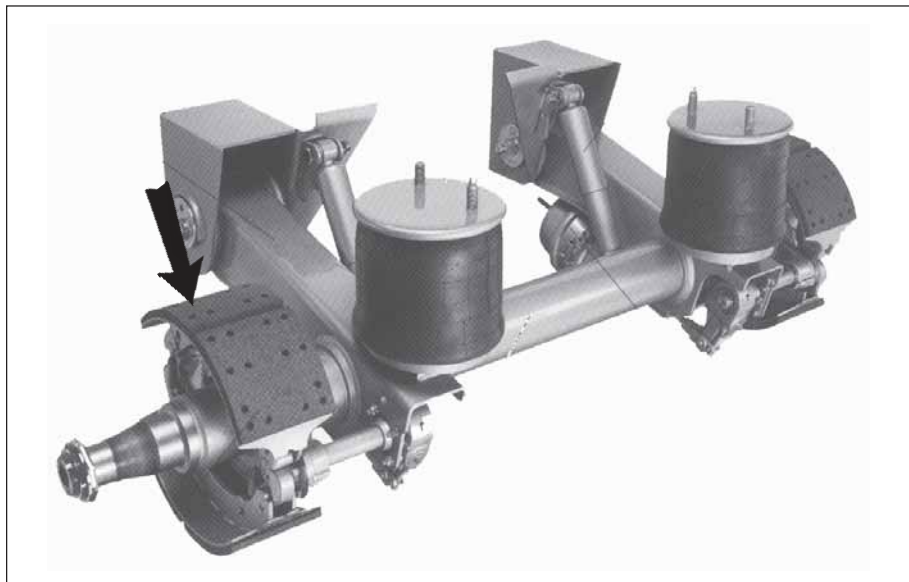


Fig. 6-19 BRAKE LINING

100,000 Miles (150,000 km) or Annually

1. Reline brakes as required.

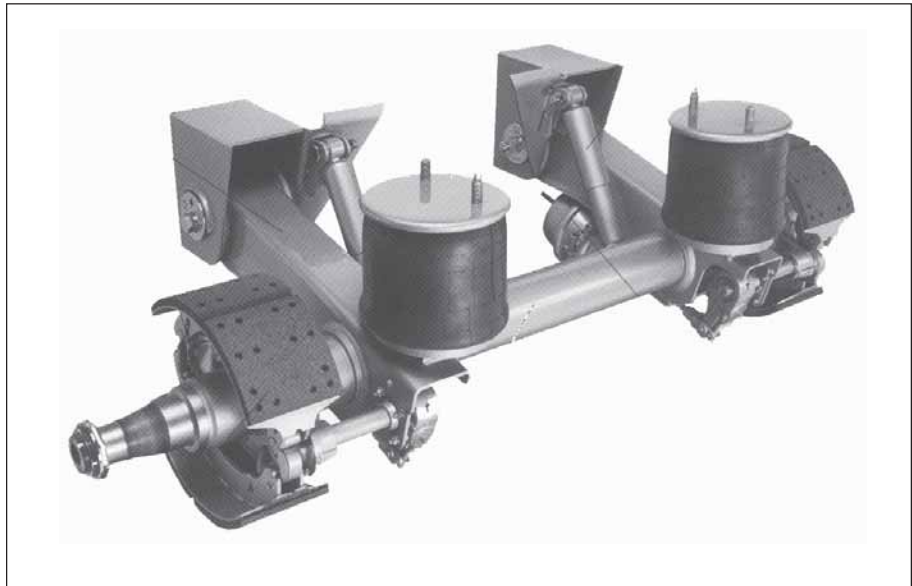


Fig. 6-20 BRAKES

2. Change oil in hubs.



Fig. 6-21 HUB OIL (TYPICAL)

6.1 SERVICE RECORD SUMMARY (LUBRICATION)

LOCATION	DESCRIPTION	FREQUENCY	LUBRICANT
Fifth wheel. Coat pivot pins and lock	Coat bearing surface.	Daily or as needed.	Chassis grease.*
Landing gear	Gearbox and screws.	Periodic basis (weekly).	Chassis grease.*
Wheels	Check oil level.	Weekly, 10 Days or 5000 m (8000 km)	
	Bearings.	25,000 miles (40,000 km).	SAE 80W90 gear oil.
	Change oil.	100,000 miles (150,000 km).	SAE 80W90 gear oil.
Brakes			
Camshaft bearing	Lubricate	5,000 miles (8,000 km) or monthly.	Chassis grease.*
Slack adjuster	Lubricate	5,000 miles (8,000 km) or monthly.	Chassis grease.*
Brake shoe anchor pin bushing	Lubricate	30,000 miles (50,000 km) or yearly.	Chassis grease.*
Also at brake reline.		As appropriate.	
* Use a good quality lithium based extreme pressure grease throughout. MIL-G-25013C in below -40°F.			
NOTE: Do not use excessive lubricant.			

7 UNLOADING SYSTEM SERVICING

7.1 SERVICING INTERVALS

A standard servicing schedule on your trailer unit is provided as a guide for your convenience. In unusual or extreme operating conditions, increase the frequency or perform additional service items to customize this schedule to your application.

Refer to the Service Section of the truck manual for truck servicing information.

A. Servicing:

Daily, 8 Hours or 500 Miles

1. Check hydraulic system filter.



Fig. 7-1 HYDRAULIC SYSTEM FILTER

2. Check oil level in blower front and rear reservoirs.

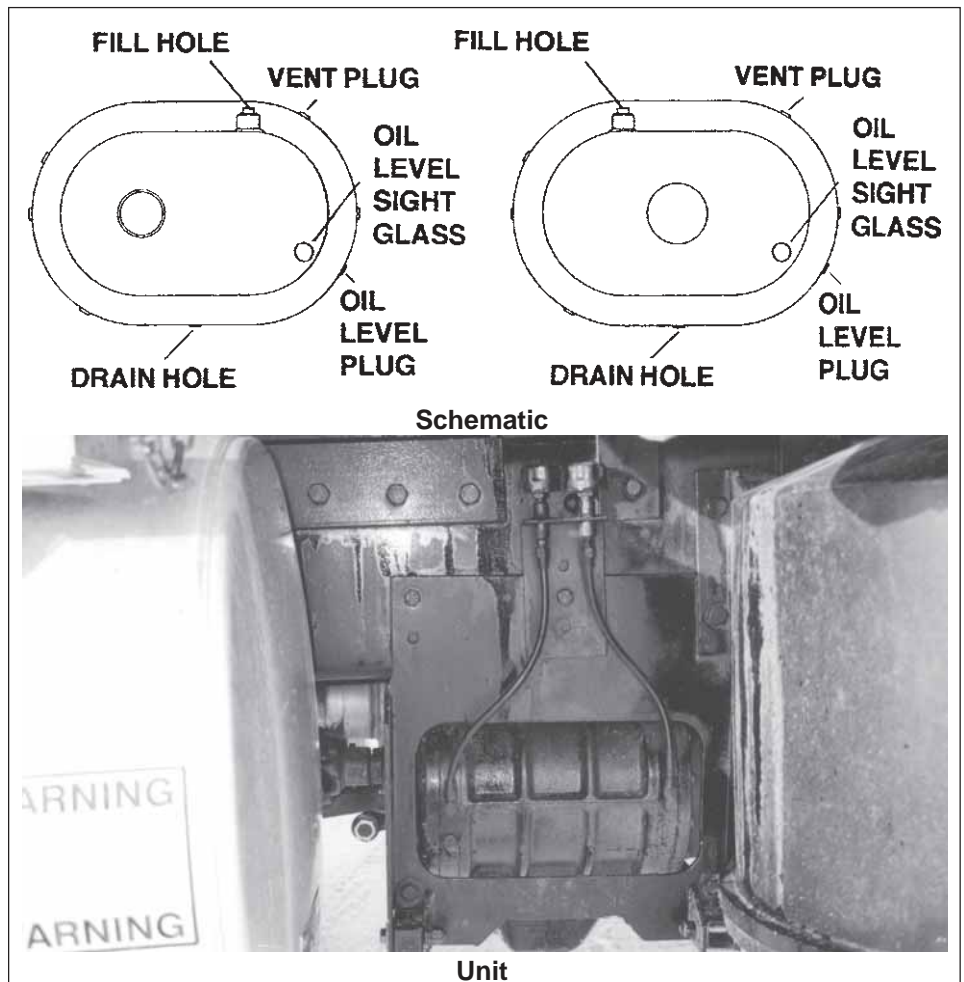


Fig. 7-2 BLOWER

Weekly, 10 Days or 5000 Miles

1. Grease PTO shaft to the blower.

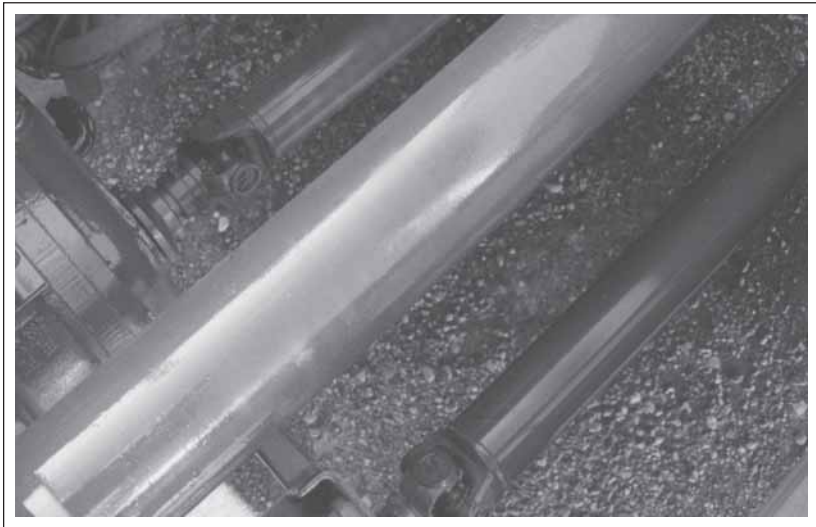
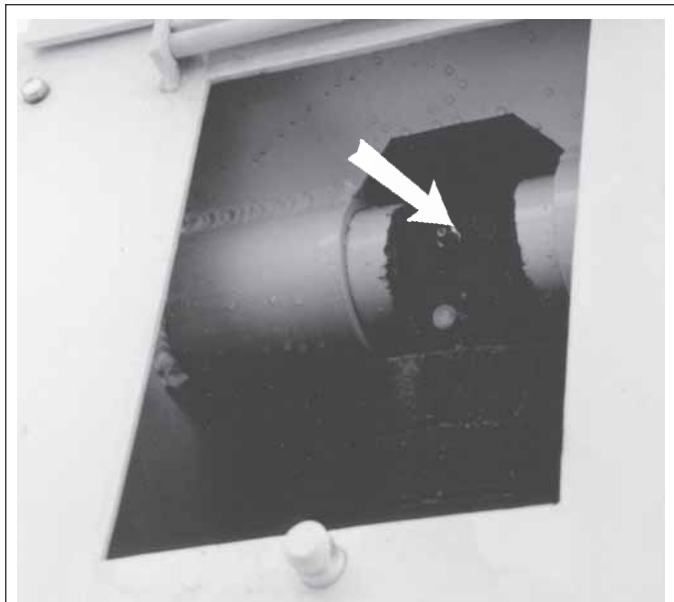


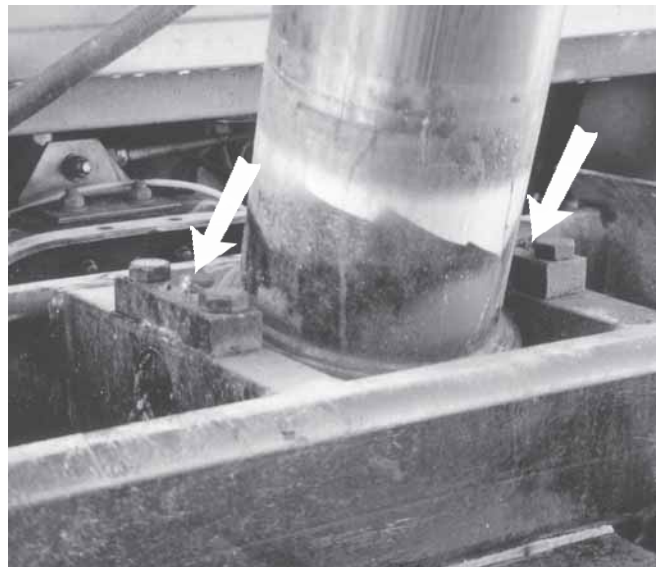
Fig. 7-3 PTO SHAFT

2. Grease the hoist.
 - a. Upper anchor pin (1 location).



Upper

- b. Lower anchor pin (2 locations).



Lower

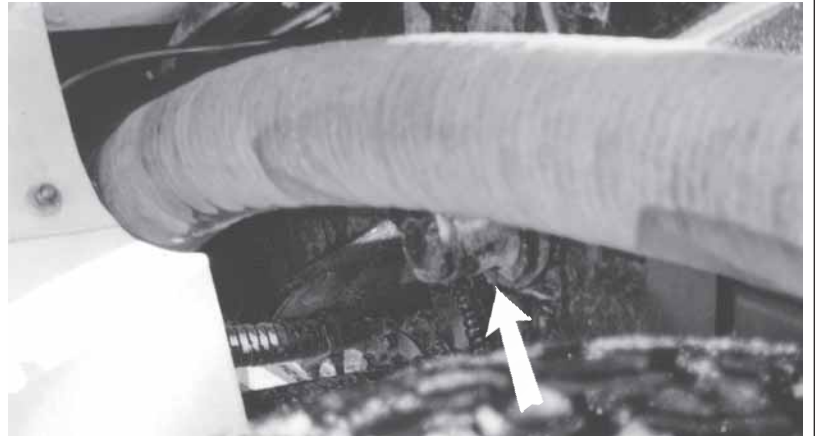
Fig. 7-4 HOIST PINS

**Weekly, 10 Days or 5000 Miles
(cont'd)**

3. Grease rear box hinges (2 locations).



Left



Right

Fig. 7-5 BOX HINGES (TYPICAL)

4. Grease rear doors, locks and bushings (16 locations).



Fig. 7-6 REAR DOORS

**Weekly, 10 Days or 5000 Miles
(cont'd)**

5. Grease roof hatch lock and bushings (4 locations).

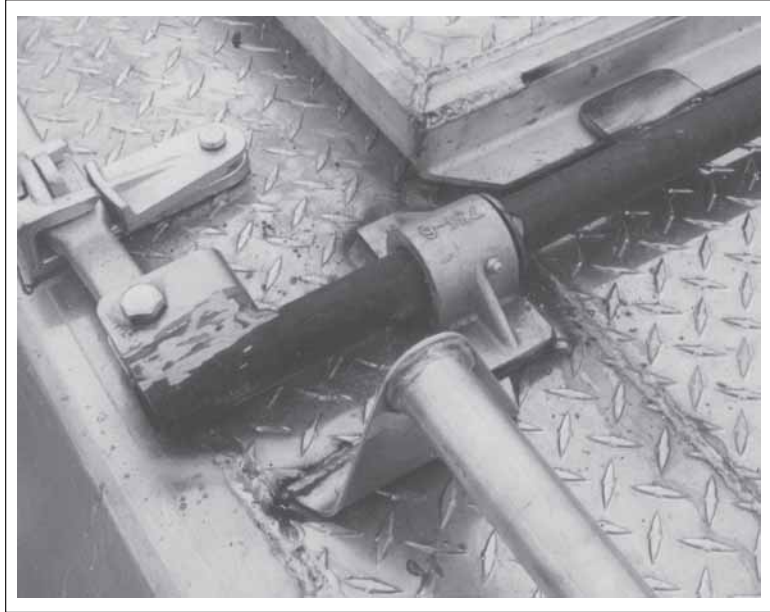


Fig. 7-7 ROOF HATCH LOCK

6. Grease pup hitch ball.

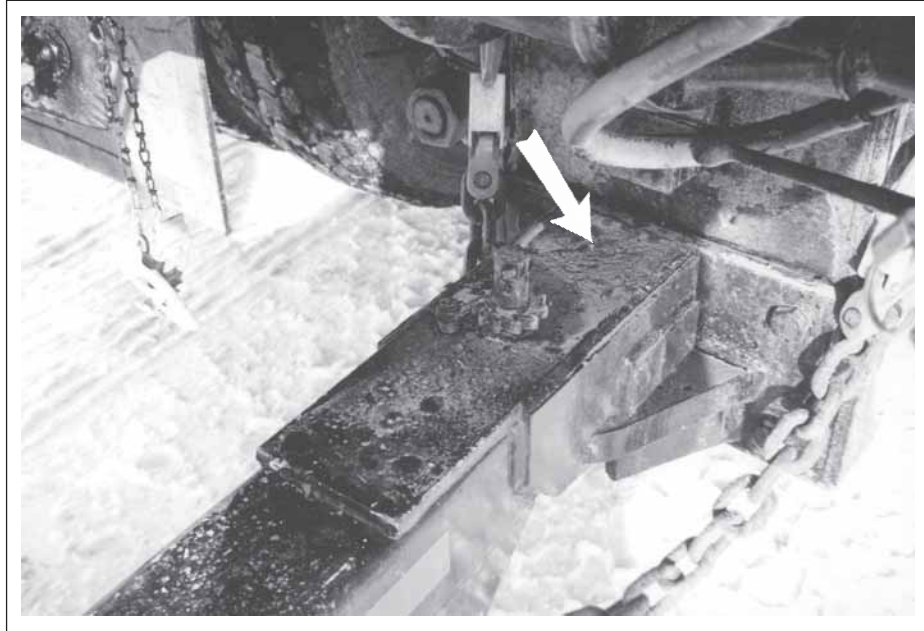


Fig. 7-8 PUP HITCH BALL

**Bi-Monthly, 2 Weeks or
10,000 Miles**

1. Grease cross auger bearings
(2 locations).

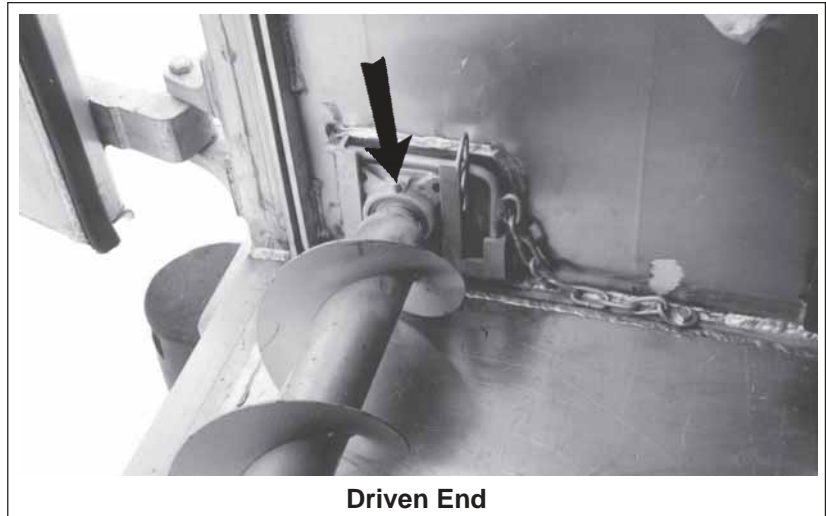


Fig. 7-9 CROSS AUGER

2. Check oil level in hydraulic tank.

NOTE

Always check oil level when the oil is cold and the box is fully down. Oil should be no less than 1-1/2 inches below level plug.

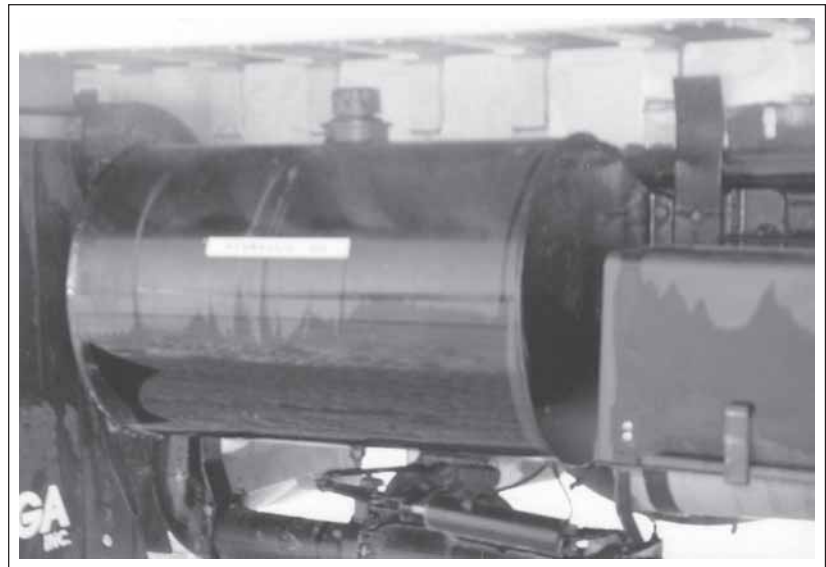


Fig. 7-10 HYDRAULIC TANK (TYPICAL)

20,000 Miles (45,000 km) or Monthly

1. Change oil in the blower reservoirs. Use only Walinga #98-13813-6.

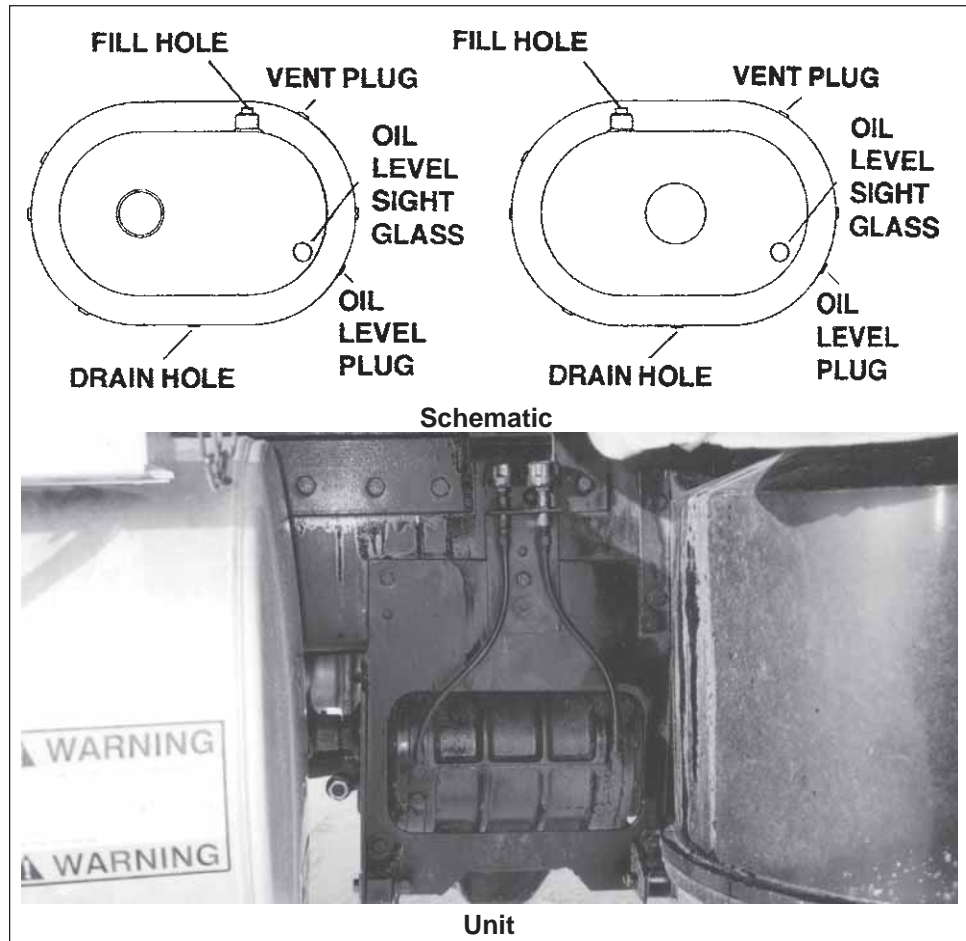


Fig. 7-11 BLOWER

2. Check air lock tip clearance.



Front



Rear

Fig. 7-12 TIP CLEARANCE

100,000 Miles (150,000 km) or Annually

1. Change hydraulic system oil.

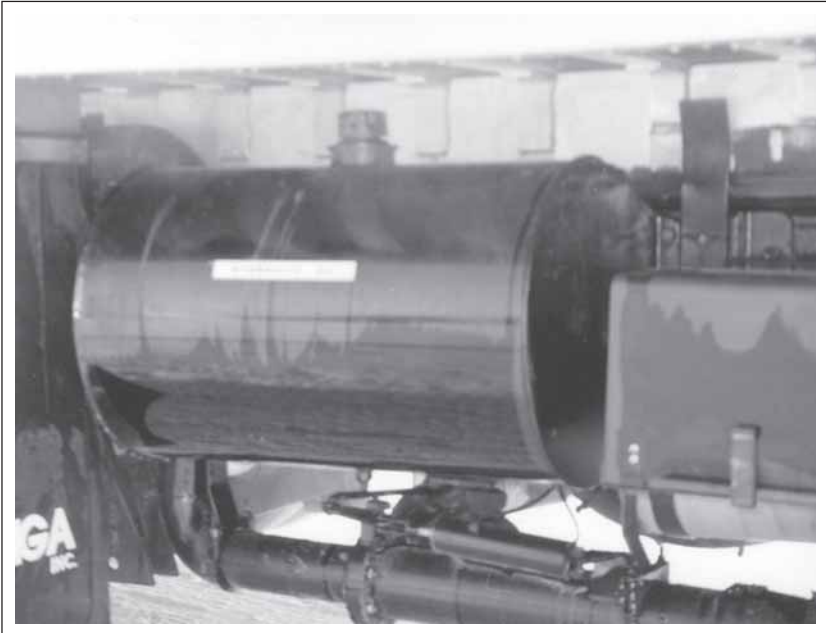


Fig. 7-13 DRAIN PLUG

2. Change hydraulic system filter.

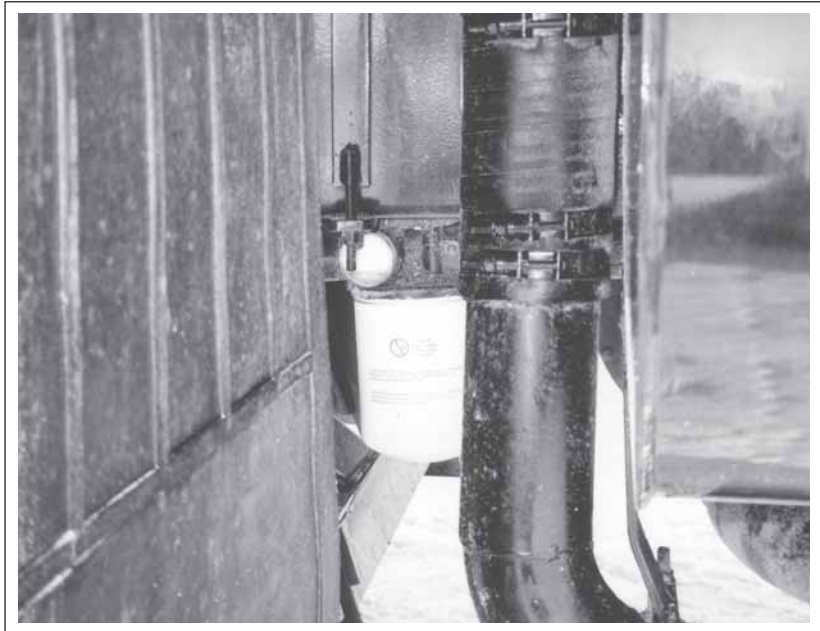


Fig. 7-14 FILTER

7.2 SERVICE RECORD

See Lubrication and Maintenance sections for details of service. Copy this page to continue record. Use Walinga #98-13813-6 for Blower. Hydraulic Oil use: Hydrex XV.

ACTION CODE: L LUBRICATE C CHANGE
 š CHECK

HOURS

MAINTENANCE	SERVICED BY																		
8 Hours, Daily or 500 Miles																			
š Hydraulic System Filter																			
š Oil Level in Blower Reservoirs																			
Front & Rear																			
Weekly, 10 Days or 5000 Miles																			
L PTO Shaft to the Blower																			
L Hoist																			
Upper Anchor Pin (1)																			
Lower Anchor Pin (2)																			
L Rear Box Hinges (2)																			
L Rear Doors, Locks & Bushings																			
L Roof Hatch Lock & Bushings																			
L Pup Hitch Ball																			
L Hoist																			
Bi-Monthly, 2 Weeks or 10,000 Miles																			
L Cross Auger Bearings (2)																			
š Oil Level in Hydraulic Tank																			
20,000 Miles or Monthly																			
C Oil in Blower Reservoirs																			
š Air Lock Tip Clearance																			
100,000 Miles or Annually																			
C Hydraulic System Oil																			
C Hydraulic System Filter																			

8 PERIODIC MAINTENANCE AND ADJUSTMENTS



MAINTENANCE SAFETY

1. Read and understand all the information in the Operator's Manual regarding maintenance, adjusting and servicing the Bulk Feed unit.
2. Place all controls in neutral, disengage PTO clutch, stop the engine, remove ignition key and set the park brake before adjusting, servicing or maintaining any part of the Bulk Feed unit.
3. Follow good shop practices:
 - Keep service area clean and dry.
 - Be sure electrical outlets and tools are properly grounded.
 - Use adequate light for the job at hand.
4. Block wheels before de-activating brakes.
5. Maintain air system and brake components in top condition at all times.
6. Maintain fasteners in running gear systems at their specified torque at all times.
7. Establish and maintain a Trailer Preventative Maintenance (TPM) program on your equipment. Some jurisdictions require this program and the maintenance of records on every commercial vehicle on the road for future reference.

Your trailer can only operate at top efficiency when it is maintained in good operating condition. The maintenance procedures are summarized from the component manufacturers instructions included with this manual. Only standard industry and component procedures are required to keep your trailer in top condition. All maintenance intervals are established for normal operating conditions. In light or intermittent conditions, the servicing and maintenance intervals can be extended. In heavy, extended or severe off-highway application, reduce the intervals for servicing and maintenance to keep the equipment in good condition. When a problem is found, correct the condition before continuing.

A good maintenance program will find conditions early when they are easily and quickly corrected before they become major problems. Operating your trailer in a defective condition, can lead to serious mechanical problems or can create safety hazards for the driver, bystanders or other operators.

8.1 TORQUE SPECIFICATION SUMMARY

Table 1 Recommended Torque Specifications

1. Air Ride Suspension		
Description	Size	Torque
Quik-Align™ Pivot Bolt	7/8"-9	475-525 Ft. Lbs
Shock Bolt	3/4"-10	150-175 Ft. Lbs.
Air Spring Bolt (Lower)	1/2"-13	25-35 Ft. Lbs.
Air Spring Nut (Upper)	3/4"-16	45-55 Ft. Lbs.
Brake Dust Shield Bolt	5/16"-18	160-180 In. Lbs.
ABS Bracket Bolt	1/4"-20	75-100 In. Lbs.

Table 1 Recommended Torque Specifications (cont'd)

2. Mechanical Suspension

Description	Size	Torque	
		Ft. Lbs.	N.m
Equalizer Shaft (All Spread) 49" Spread 54"-65-1/2" Spread 72"-109" Spread	1-1/4" Nut	575-625	780-850
	3/4" Capscrew	200-225	270-305
	2-1/2" Nut	300-325	410-445
	1-1/2" Nut	200-225	270-305
U-Bolt Nuts		300-325	410-445
Torque Arm Bolt Nuts	1"	160-200	216-270
Torque Arm Clamping Nuts	1/2"	80	110
	3/4"	175-200	236-270
Spring Retainer Nuts	1/2"	80	110

3. Wheel End Components

Description	Torque Range		Fastener Size
	(lb-ft)	N.m	
1. Hub-cap bolts	10-15	13-20	5/16"
2. Hub fill plug	15-20	20-27	3/8"
3. Adjustment nut - manual bearing adjustment (double nut)	Tighten to 200, loosen, tighten to 50, loosen 1/4 turn and check end play	136 68	Size depends on axle model and adjustment method.
4. Jam nut - manual bearing adjustment	250-300	340-408	
5. Brake mounting bolt	130-165	177-224	5/8"
6. Two-piece dust shield bolts (shown) • Forged spider	15-20	20-27	3/8"
7. Bolt-on bushing bolts	25-35	34-48	3/8"
8. Cam bushing bolts	25-35	34-48	3/8"
9. Air chamber nuts	80-125	109-170	5/8"

4. Wheel Nut

Stud Size	Wheel Type	Ft-lbs Torque (Dry)	Bolt Size	Ft-lbs Torque (Dry)
3/4" - 16	Disc	450 - 500	5/8" - 11	150 - 175
1-1/8" - 16	Disc	450 - 500	3/4" - 10	210 - 260
	Bud Unimount 10	390 - 440		
	WHD-8	400 - 600		

8.2 KINGPIN AND FIFTH WHEEL PLATE

The kingpin at the front of the trailer is the structural component used to transmit accelerating and decelerating loads into the trailer frame. It must be in good condition to perform as required.

Visually inspect the kingpin as part of the pre-trip inspection, at 5,000 miles (8,000 km) or weekly and annually as part of your normal preventative maintenance program. Be sure the kingpin does not have excessive wear, looseness, chipped out areas, cracks or bent mounting frame. If any kingpin shows such defects, it should be replaced immediately.



Fig. 8-1 KINGPIN

Visually inspect the frame and structure for bends, cracks or distortions as part of the pre-trip inspection procedure. Thoroughly inspect the structural integrity of the assembly every 25,000 miles (40,000 km) or every three months as part of your preventative maintenance program. Replace the entire assembly if any structural defects are found.

8.3 FIFTH WHEEL

A fifth wheel system is used on the towing tractor to secure the kingpin and carry the weight of the attached trailer. It must be maintained in good condition to perform as intended.

Visually inspect the fifth wheel as part of the pre-trip inspection to check for cracks, bends, chips or distortions of the frame and upper plate.



Fig. 8-2 FIFTH WHEEL

NOTE

Use a high-pressure washer or steam cleaner to remove all the dirt and grease from the fifth wheel assembly prior to each weekly inspection. Apply a fresh coat of grease to the fifth wheel assembly prior to hooking-up the trailer.

Clean the assembly every 5,000 miles (8,000 km) or bi-monthly and annually to perform a thorough inspection. Check the frame and upper plate for cracks, bends, chips or distortions.

When the components are clean, check that the lock closes completely around the kingpin.

To adjust the lock:

1. Obtain a Holland kingpin lock tester and place in the throat of the lock. Close the lock.
2. The jaws should be snug around the tester but not binding.
3. Use the adjusting nut on the front edge of the fifth wheel to set the clearance of the jaws.
4. Use a light oil to lubricate all moving parts prior to returning to service.

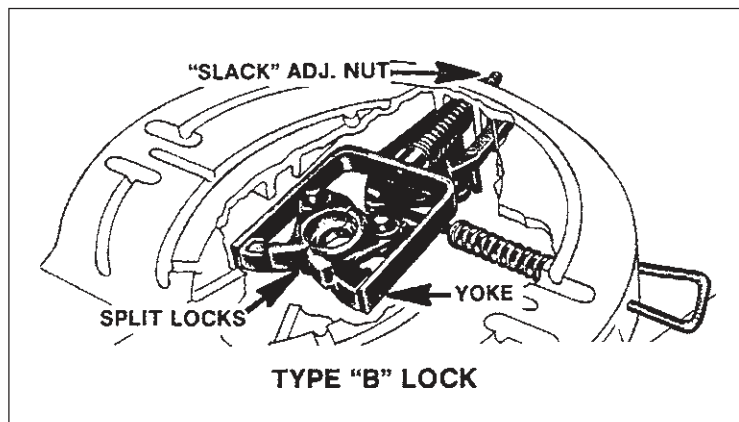


Fig. 8-3 KINGPIN LOCK

8.4 AXLE ALIGNMENT

A standard axle is used as the main transverse structural member to transmit loads between the trailer frame and the surface contacting components. All running gear components are attached to or form part of the axle assembly.

Although there is very little that can go wrong with the axle itself, loose, bent or damaged attaching components can cause the axle to go out of alignment. This misalignment will be found during the regularly scheduled 25,000 mile inspection. However, axle misalignment shows itself most commonly by accelerated tire wear and dogtracking by the trailer. Visually check the tire wear when checking air pressure. The driver should identify these handling characteristics to service personnel for correction.

To check axle alignment, follow this procedure:

1. Select a working area that is level, with a compacted surface and is large enough to provide access from all sides.
2. Move the trailer forward and backward several times to remove any binding from the components.
3. Stop the trailer when moving in the forward direction without using trailer brakes. This will give the components a forward bias with no binding.
4. Unhook the trailer and support on the landing gear at the normal height or parallel to the ground.
5. Install a commercially available axle extender on each axle or remove the wheels to prevent any components from interfering with the measurements.

6. Attach an S hook to a steel tape and measure the distance between the kingpin and the end of each axle. Dimensions A and B should be equal within $\pm 1/8$ inch (0.125 in) (3.1 mm).
7. Adjust the suspension mounting system as required to set dimension A and B within $1/8$ inch (0.125 in) (3.1 mm). Refer to suspension system instruction brochure for detailed adjustment procedure.

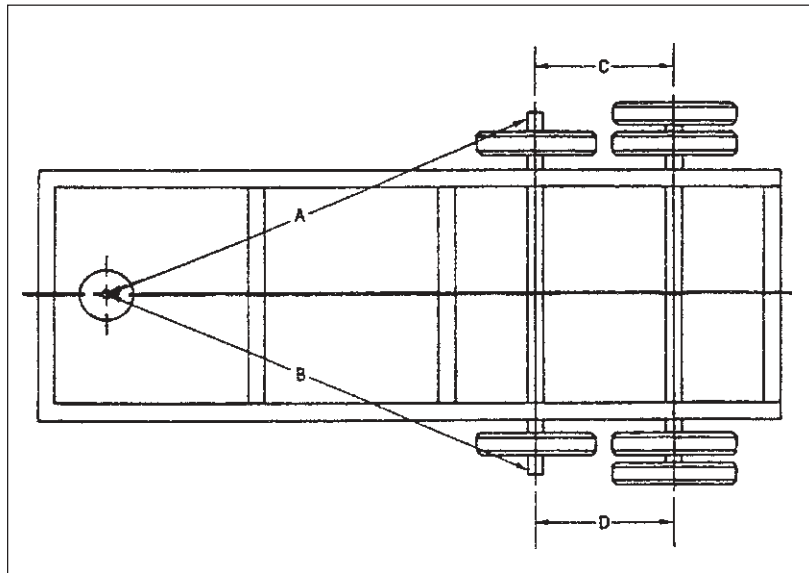


Fig. 8-4 AXLE DIMENSIONS

8. Use a trammel bar to measure the road and curbside dimensions between the first and second axles. Dimensions C and D should be within $1/16$ inch (0.0625 in) (1.6 mm).

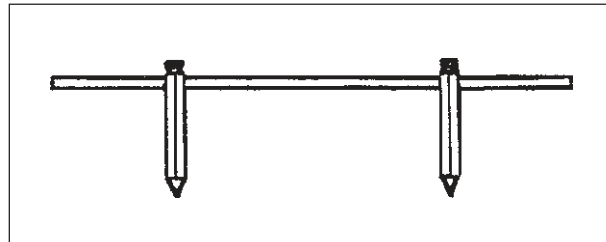


Fig. 8-5 TRAMMEL BAR

9. Adjust the suspension system as required to set this dimension to its recommended tolerance.
10. Repeat measuring and adjustment procedure on the third axle if so equipped.
11. Tighten all fasteners to their specified torque. Do not allow any suspension system or running gear fasteners to loosen.

IMPORTANT

Always use a torque wrench when tightening fasteners. The correct torque on a fastener provides the proper clamping force on the adjacent components and they will perform as expected.

12. The front axle must be aligned to the kingpin with second and third axles adjusted to the front axle.
13. Always check axle alignment after repairing the suspension system.

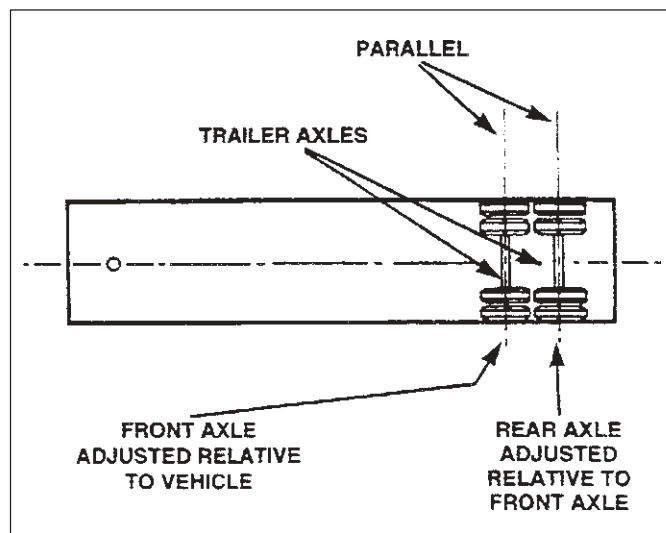


Fig. 8-6 ALIGNED

8.5 WHEEL HUBS/BEARINGS

Some axles use an oil bath design for lubricating wheel bearings. It is a virtual zero maintenance system providing that the oil remains in the hub.

Visually check the hub every day for leaks when checking tire pressure during pre-trip, daily, refueling, or rest stop inspections. If oil leaks are detected on any hub, repair the leak and refill the hub before proceeding.

A. Oil Leaks:

Visually inspect the hub for leaks every time the tire pressures are checked. Leaks will normally be visible as dust collects on the escaping oil. Stop and correct the leak immediately to prevent running the hub low on oil. Running low or without oil will quickly overheat the hub and cause the bearings to seize. Change the oil in the hub when installing new seals to correct a leak.

B. Oil Level:

1. Check the oil level in each wheel hub every 5,000 miles (8,000 km) or weekly and whenever an oil leak is found. Clean the end plate of the hub to remove the dust, dirt or mud build-up.

The oil should be visible to the top of the outer concentric circle of the end cap. Add oil as required through the fill plug in the hub. Always use clean oil and prevent contaminants from entering the hub when adding or changing oil.

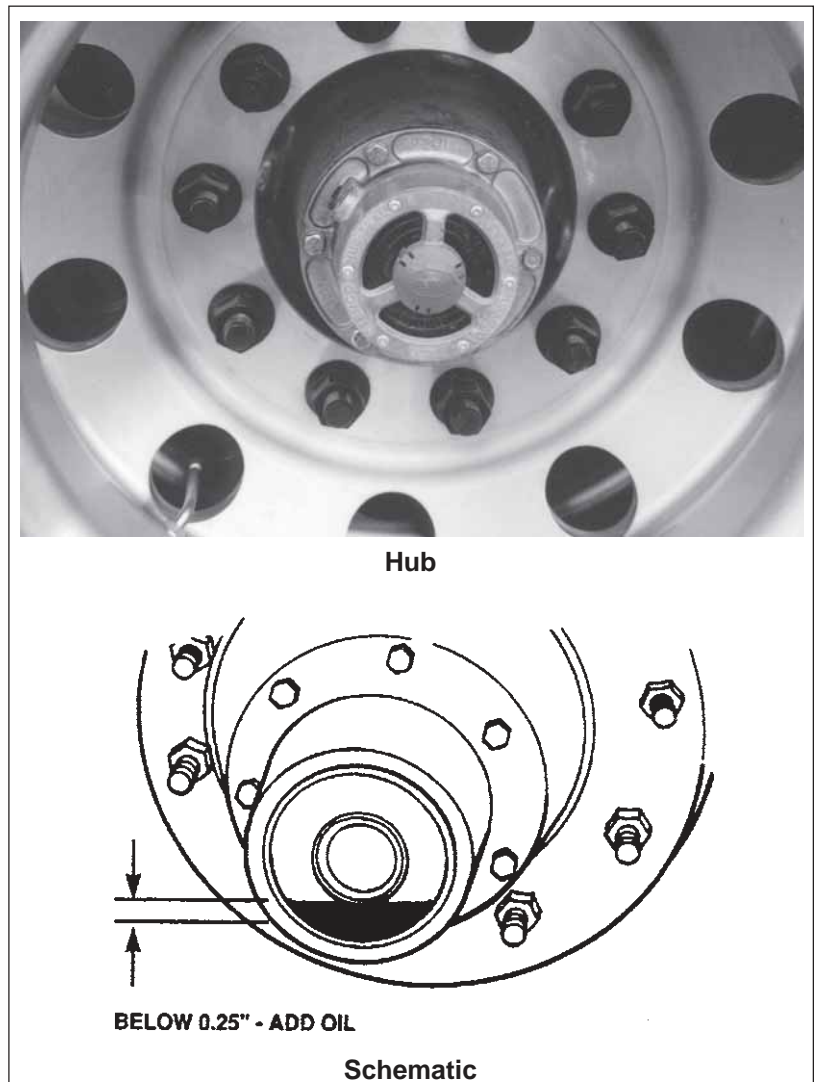


Fig. 8-7 OIL LEVEL

2. Change the oil every 100,000 miles (160,000 km), annually or whenever the axle nuts are retorqued or the brakes are relined. The hub cavities must be opened when retorquing axle nuts and changing oil should be done as part of the procedure.

C. **Wheel Bearings:**

Wheel bearings carry and transmit the load between the wheels and the axles. In addition to proper lubrication, the bearings must have the recommended end play to perform as expected. Bearing end play is set and controlled by the torque of the axle nuts on the end of each spindle. Each hub must seat securely on its bearings to prevent wobble or slop in the system. Turning the wheel or wobbling it indicates the condition and tightness of the hub/bearing assembly.

1. **Turning/Wobble:**

- a. Park the trailer on a level, hard surface and release the brakes.
- b. Place chocks in front of and behind each wheel.
- c. Jack each axle up until the tire clears the ground.
- d. Support the axle on a safety stand to prevent slipping or tipping.
- e. Turning the wheel slowly to check the condition of the bearings and to determine if the brakes are dragging.



Fig. 8-8 WHEELS

- f. **Dragging Brakes:** Can be felt as a steady drag on the turning of the wheel or at the same position or arc of the rotation. Adjust the brakes to eliminate the drag before resuming work.
- g. **Bearing Condition:** Can be felt as the wheel turns. Bearings in good condition turn easily and smoothly. Bearings in poor or bad condition can be felt through the wheels as scraping, grinding, dragging or bumps. Replace bearings before resuming work.
- h. **Wobble:** Grasp each side of the wheel or tire and wiggle the wheel and assembly. If the wheel or hub wobble on the spindle, the bearings have lost their end play and the axle nuts require tightening.

NOTE

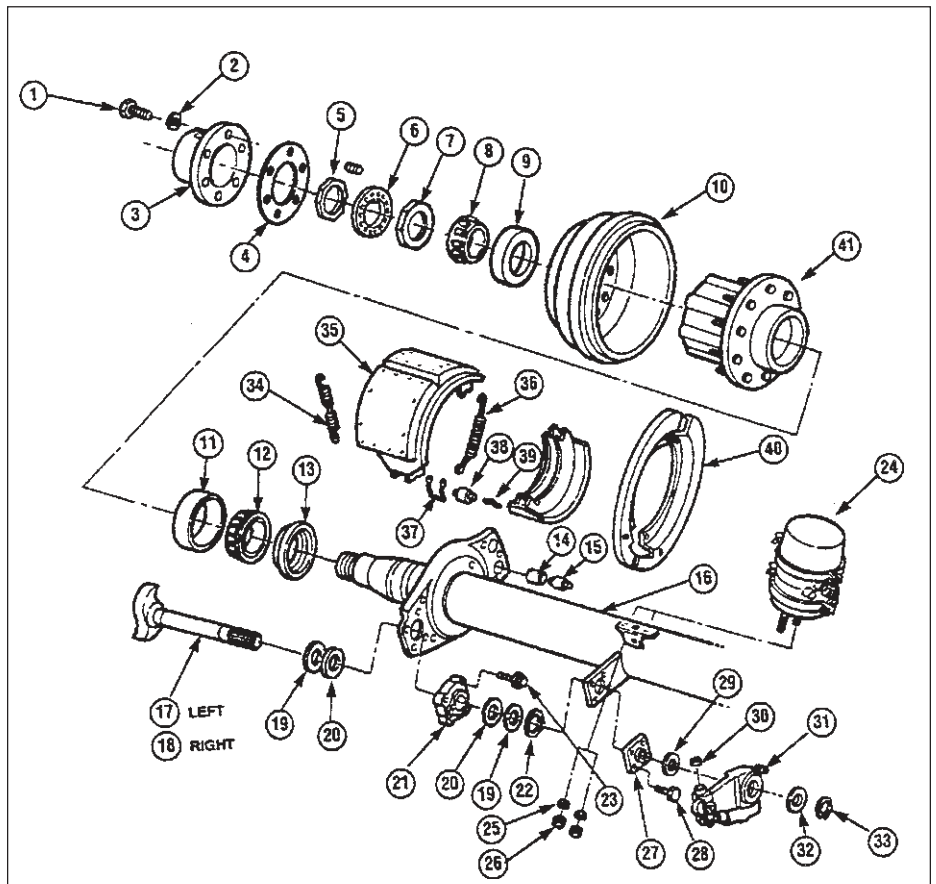
If the bearings are not in good condition, replace them before setting the end play.

8.5 WHEEL HUBS/BEARINGS (cont'd)

C. Wheel Bearings (cont'd):

2. Bearing End Play:

- a. Place a pan under the hub drain plug.
- b. Remove the drain plug from the hub and drain the oil.
- c. Remove the hub end plate and lay to the side.
- d. Remove the set screw from the jam nut.
- e. Remove the jam nut and perforated lock washer from the spindle.
- f. Use a torque wrench to tighten the adjusting nut 200 ft-lbs. (136 N.m) while rotating the wheel assembly in both directions.
- g. Back the adjusting nut off to zero torque.
- h. Retorque the adjusting nut again to 50 ft-lbs (68 N.m) of torque while rotating the wheel assembly in both directions.
- i. Loosen the nut 1/4 turn.
- j. Install the perforated lock washer. Be sure the adjusting nut pin aligns with the hole in the lock washer. Turn washer over and/or adjusting parts as required.
- k. Install jam nut and tighten to 250-300 ft-lbs. (340-408 N.m).



ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Capscrew	22	Snap ring
2	Lockwasher	23	Capscrew
3	Hub cap	24	Air chamber
4	Gasket	25	Lockwasher
5	Wheel bearing jam nut	26	Locknut
6	Lockwasher	27	Camshaft bushing assembly
7	Wheel bearing adjusting nut	28	Capscrew
8	Cone outer wheel bearing	29	Washer slack adjuster
9	Cup - bearing outer	30	Locknut - slack adjuster
10	Brake drum	31	Automatic slack adjuster
11	Cup - bearing inner	32	Washer slack adjuster
12	Cone - bearing inner	33	Snap ring slack adjuster
13	Seal wheel-bearing	34	Spring - brake shoe return
14	Bushing anchor pin	35	Brake show and lining assy.
15	Pin anchor	36	Spring - brake shoe retaining
16	Beam axle	37	Retainer - brake shoe roller
17	Camshaft (left)	38	Roller - brake shoe
18	Camshaft (right)	39	Pin - shoe return spring
19	Washer	40	Dust shield
20	Seal	41	Hub
21	Bushing		

Fig. 8-9 SPINDLE COMPONENTS

- I. Check bearing end play by:
 - i. Attaching a magnetic base dial gauge indicator to the end of the spindle.
 - ii. Push the wheel in while rotating the wheel slightly until the dial gauge reading doesn't change.
 - iii. Zero dial gauge.
 - iv. Pull wheel assembly out while rotating wheel slightly until dial reading doesn't change.
 - v. Dial indicator will read bearing end play.
 - vi. If end play does not register between .001-.005 inches (0.025-.125 mm), readjust end play.
 - vii. Replace components if readjusting does not give end play tolerance within specs.

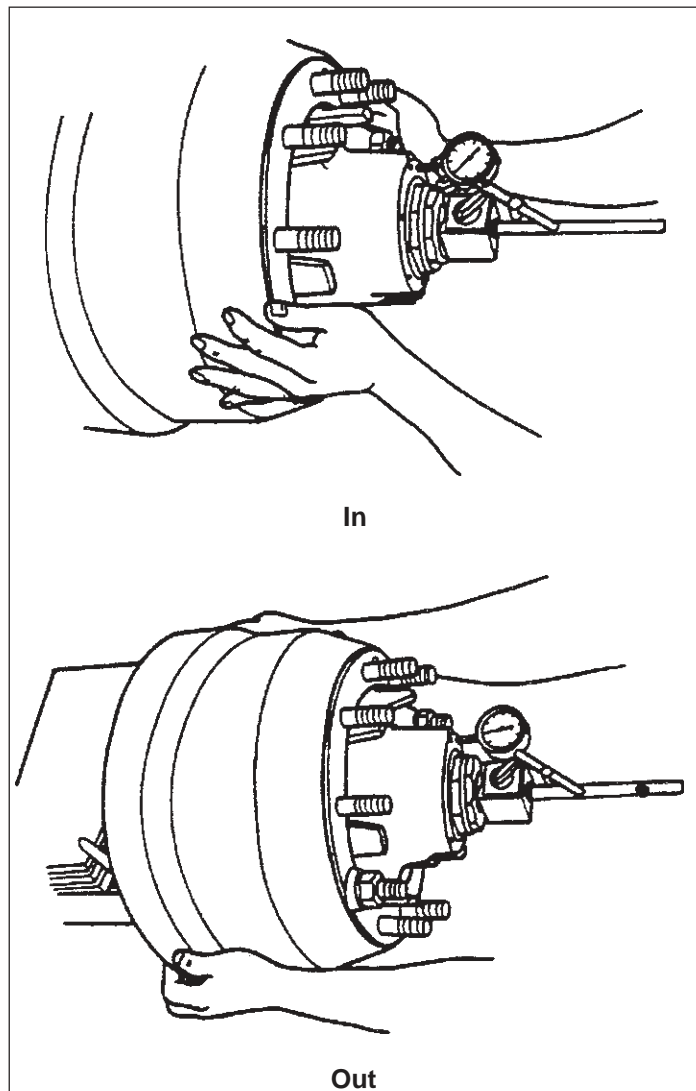


Fig. 8-10 DIAL INDICATOR

- m. Install a new gasket on hub face cap.
- n. Install hub face cap and tighten mounting cap screws to their specified torque.
- o. Add the specified amount of oil to the hub and secure fill plug. Check for leaks. Correct leaks before resuming operation.
- p. Remove safety stand from under axle and lower wheel to the ground.
- q. Repeat checks on all other axles.

8.6 WHEELS

A variety of steel or aluminum wheels can be used on the trailer depending on customer preference or application requirements. Wheels must be maintained in good condition and all fasteners tightened to their specified torque level to obtain the expected life and performance.

Loose fasteners are the most common cause of wheel problems on a trailer. Always retorque the wheel fasteners per the break-in schedule of 100, 500, 1500 and 5,000 miles (160, 800, 2500 and 8000 km) when the unit is new and after a wheel has been removed. Always use an accurate calibrated torque wrench when tightening fasteners. A loose fastener is defined as one that is not tightened to its specified torque. A loose fastener does not provide the required clamping, anchoring or holding forces to stabilize the adjacent components. Insufficient clamping forces can lead to flexing, bending, cracking, hole elongation or other component deterioration that cause failures and/or accidents. Always keep fasteners tightened to their specified torque. Over-torquing can overload certain components, causing compression cracks and strip nuts or studs. Over-torquing fasteners can be as detrimental as under-torquing. Always tighten fasteners to their specified torque.

Use an accurate torque wrench to retorque wheel fasteners every 10,000 miles (15,000 km) or monthly whichever comes first. Always retorque wheels per the break-in schedule whenever a wheel is removed and remounted.

Always follow the recommended mounting procedure when installing wheels to the trailer.

1. **Disc Wheels (Stud Pilot Style):**
 - a. Mount single or inner dual wheel on hub. Be careful not to damage the threads on any of the studs.
 - b. Snug the nuts up in the alternating sequence shown to center it on the hub and insure an even contact between the wheel and hub.

IMPORTANT

Left-hand threads are used on the left side of the vehicle. Right-hand threads on right.

- c. Tighten nuts to their specified torque using the same alternating sequence.
- d. Mount outer dual. Do not damage the threads when sliding the wheel over the studs.
- e. Snug up the nuts in the alternating sequence shown to center it on the hub and to provide even contact.
- f. Tighten the outer wheel nuts to their specified torque.

IMPORTANT

When retorquing inner nuts of double nut design, always back off outer nut several turns, then retorque them.

Table 2 Recommended Wheel Stud Torque (Disc Wheels)

Stud Size	Wheel Type	Ft-lbs Torque (Dry)
3/4"-16	Disc	450 - 500
1-1/8"-16	Disc	450 - 500
15/16-12	Disc	750 - 900
1-5/16-12	Disc	750 - 900
	Bud Unimount 10	390 - 440
	WHD-8	400 - 600

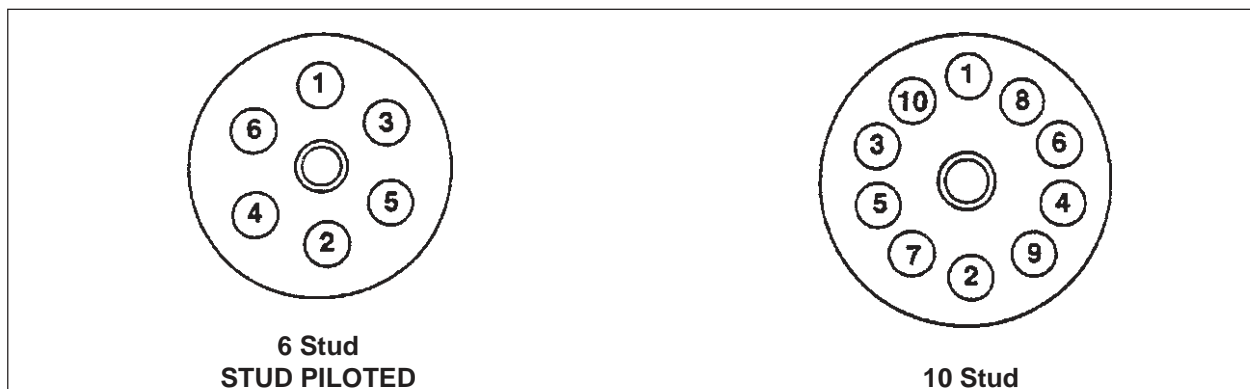


Fig. 8-11 NUT TORQUE SEQUENCE

2. **Hub Piloted Wheels:**

- a. Mount inner wheel on the hub.
- b. Slide on the hub guide until the wheel is snug against the hub. Be careful not to damage the threads on any of the studs.
- c. Mount outer dual wheel on the hub and snug up against the inner wheel.

NOTE

Add a drop or 2 of oil on the end of the bolt, threads and the nuts and flanges.

- d. Install nuts and tighten in alternate sequence shown.

Table 3 Recommended Wheel Bolt Torque

Stud Size	Ft-lbs Torque (Oiled)
M22 x 1.5 (33 mm or 1-1/2 Hex)	450 - 500
M20 x 1.5 (30 mm Hex)	280 - 330

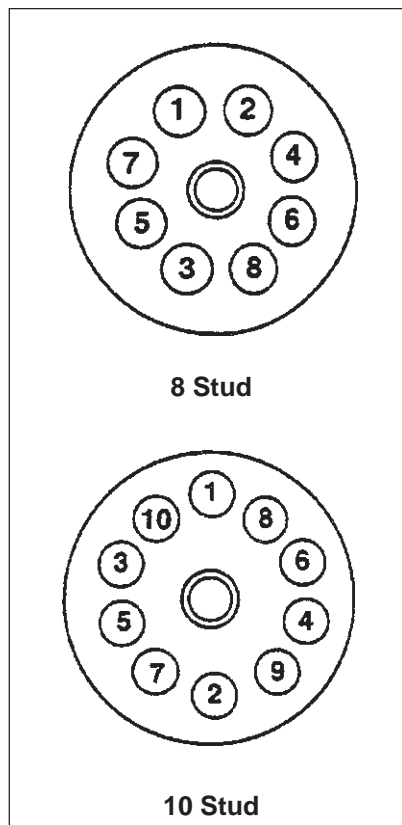


Fig. 8-12 HUB PILOTED

3. **Rim/Wheel (Cast Spoke):**

- a. Inspect and clean all the parts. Replace any damaged components.
- b. Place rims and spacer band on wheel. Be sure to space valve stem between spokes.
- c. Secure clamps evenly in position.
- d. Snug up the nuts in the alternating sequence shown to allow the inside rim to seat itself on the mounting bevel and avoid wheel wobble.
- e. Tighten the nuts evenly in small increments in the shown alternating sequence until all nuts are tightened to their specified torque.
- f. Check for runout and redo if necessary.

Table 4 Recommended Wheel Bolt Torque (Spoke Wheels)

Bolt Size	Ft-lbs Torque (Dry)
5/8" - 11	150 - 175
3/4" - 10	210 - 260

IMPORTANT

Do not over-torque fasteners. Over-torquing can strip threads, collapse spacers or lead to other problems that cause loose fasteners. Use an accurate torque wrench when tightening fasteners.

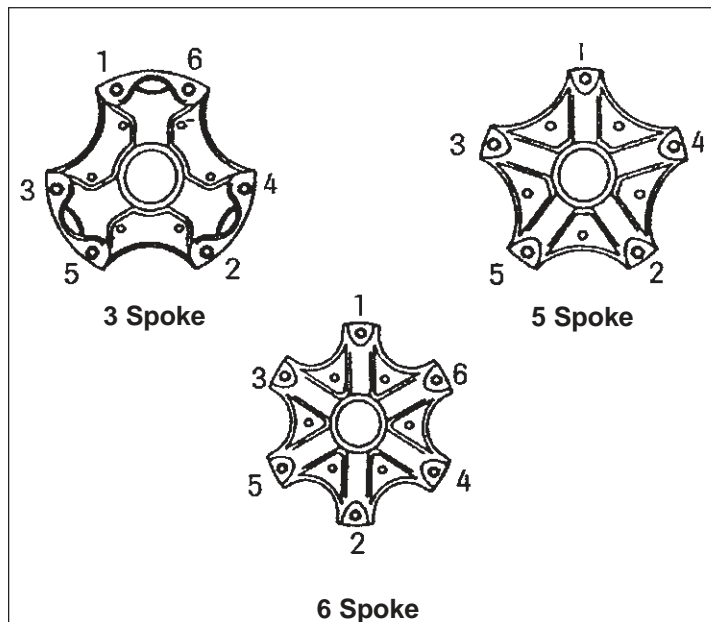


Fig. 8-13 RIM/WHEEL TORQUE SEQUENCE

8.7 TIRES

Tires are one of the most important components on a trailer and must be maintained in top condition to obtain their desired load carrying capacity and durability. Tire wear rate can be used as an indicator of the condition of the axle alignment or suspension system. Poorly maintained tires will wear rapidly or deteriorate and fail quickly and suddenly. A poorly maintained tire can and will affect adjacent components leading to their potential failure as well.

Proper tire maintenance includes but is not limited to:

1. Inflation Pressure:

Operating at an incorrect inflation pressure is the most common maintenance problem with tires. Tires should be checked frequently to be sure they are at their specified pressure.

It is recommended that tire pressure be checked at the start of each working day and at least one other time during the day. Always use an accurate hand gauge when checking the pressure and check each tire. Carry it with your unit so it is always available when needed. Best time to take tire pressure is when tire is cold. Every tire has its specified operating pressure molded into the sidewall. Adjust the pressure as required to obtain the specified inflation pressure when the tire is cold.

Tire pressure will normally increase 10 to 15 psi during operation as the tire heats up. If the pressure exceeds this normal increase, it indicates the tire may be overloaded, underinflated, driven too fast, improperly sized or a combination of these factors. Identify the cause of the problem and correct it before resuming work.

a. Underinflation:

Operating at lower than the specified pressure is a tire's worst enemy. Use an accurate tire pressure gauge to check the pressure at the start of each working day, every few hours during the day and/or whenever the handling characteristics change suddenly. Underinflation will increase tread wear and cause a deterioration of the tire body leading to a separation of the tread from the body. An underinflated tire is soft and deflects more than it should causing fatigue cracks or breaks in the body cord construction leading to sudden air loss.

Operation with a low or flat tire on a dual will generate a lot of heat in the underinflated tire from internal friction that it can and will disintegrate or catch on fire. It also causes overloading of the adjacent tire on the axle or axles and could lead to their failure also.

b. Overinflation:

Inflating a tire over its specified pressure can lead to serious problems also. Overinflation creates a more rigid tire that does not absorb road shocks as well as it should. Shock loading from impacting bumps or pot holes can break the fabric of the tire and/or transmit the higher loads into the rim, wheel and adjacent components causing them to fail as well. Overinflated tires cut, snag or puncture more easily than properly inflated tires. Also overinflating tire will not increase its load carrying capacity.

2. Tire Matching and Spacing on Duals

Tires on a dual assembly must be matched for size (diameter or rolling radius) and type of construction to obtain the desired and expected performance and life.

a. Matching of Size:

Tire sizes can vary between manufacturers and as they wear. Special care must be taken to be sure the tire size (rolling radius, diameter or circumference) is within the following dimensions:

Rolling radius: 1/8 inch (3 mm)
Diameter: 1/4 inch (6 mm)
Circumference: 3/4 inch (19 mm)

Measure the tire when it is mounted, inflated to its specified pressure and not loaded. The easiest method is to use a steel tape to measure the circumference of the tire.

Unequal sized tires will require the larger tire to carry more of the load and potentially overload it. Overloading accelerates the wear and can lead to tire failure. When the one tire fails, the remaining tire or tires will then also be overloaded. The smaller tire will not contact the road surface properly and will wear in an irregular manner giving poor durability.

b. Tire Construction:

Customers can use radial or bias ply tires on their trailer. However, it is recommended that different types of tires not be mixed on an axle. Each type of tire has different deflection, cornering and spring characteristics. These differing characteristics cause the tires to always fight each other during operation and will give erratic handling and poor wear characteristics when mounted on the same axle. Different types can be mounted on different axles but not on the same axle.

c. Tire Spacing:

A wide variety of rims can be used on the trailer and each will provide a different offset. Select the rims to provide sufficient space and clearance between the sidewalls of the tires. Normally there should be at least 2 inches (50 mm) and 3 inches (75 mm) between the sidewall of a bias ply and radial dual tire assembly respectively. This spacing will provide sufficient clearance for each type of tire to deflect as they rotate and when they impact a pothole or bump in the road. If they touch during operation, they will wear or abrade at the contact point. In addition, tires that are too close do not shed dirt, trash or stones that can get between them during operation as well as properly spaced tires.

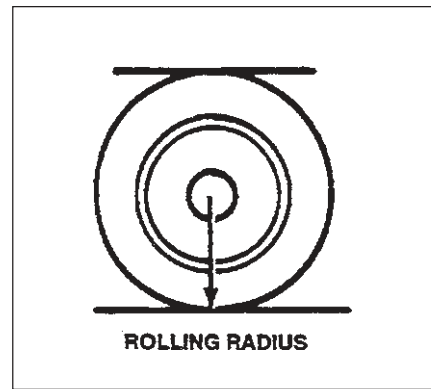


Fig. 8-14 TIRE DIMENSIONS

8.8 BRAKES

All components in the brake system must be maintained in good condition for the system to perform at top efficiency. It is recommended that brakes and associated components be checked, serviced and maintained per the Trailer Preventative Maintenance Schedule (TPM) for the trailer. In this section, the basic brake disassembly and assembly procedure will be covered. Refer to the axle manufacturers service manual for a more detailed repair and rebuilding procedure.

Check brakes frequently to keep them in top condition. Poorly maintained brakes will not stop the trailer as effectively as well-maintained brakes and in the extreme could fail completely leaving no brakes or no ability to stop the unit.

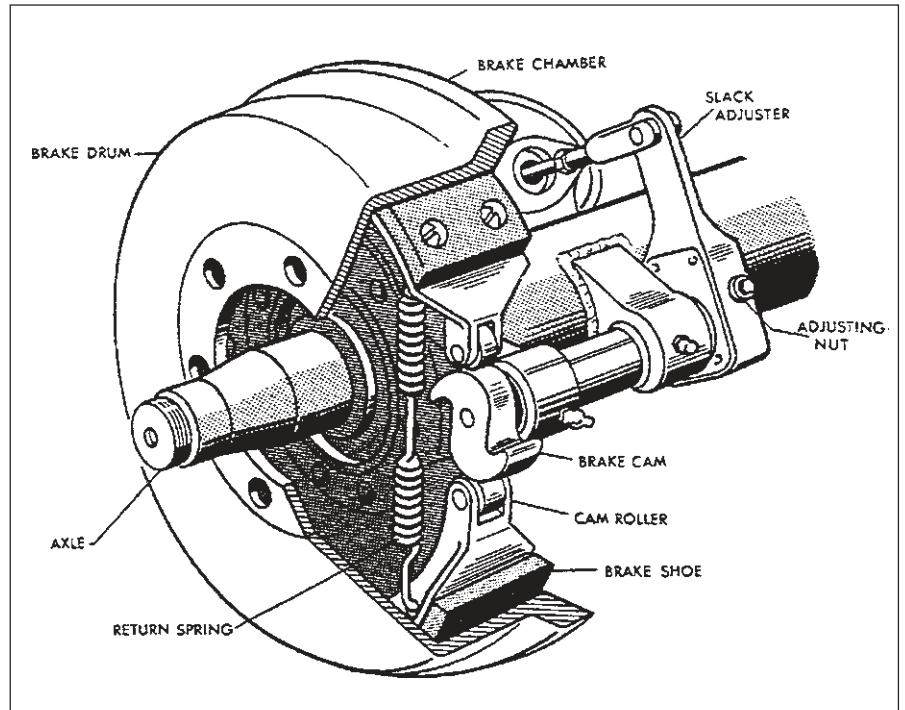


Fig. 8-15 BRAKE SYSTEM

It is recommended that the driver checks the brakes at least once during each working day when checking tire pressure and performing a quick visual of the unit. Use your hand to check the temperature of the drum. All drums should be approximately the same temperature if the system is functioning properly. If any drum is significantly warmer or colder than the rest, it indicates a problem. Determine the cause of the problem and correct it before resuming work. By discovering and correcting it while it is minor, major repair, expense and down time can be prevented.

At 25,000 miles (40,000 km) or every 3 months when the axle is raised off the ground for the complete wheel end inspection, check the brakes at the same time. When the wheels are turned by hand, the wheel end should decrease speed slowly. If it does not, the brakes could be dragging or there could be a problem with the bearings. Dragging brakes will also be detected by hot drums during the daily drum temperature checks. Adjust the brakes to correct the problem.

Remove the brake dust covers (if so equipped) to access the shoes. Check the thickness of the linings. Reline or replace shoes when the lining thickness is less than 1/8 inch (3 mm). Uneven wear among the brake shoes on a trailer indicate that the braking system has not been set or maintained properly causing uneven application and wear. If uneven lining wear appears, reset the system to provide even application of all the shoes. Do not operate when the linings are less than 1/8 mile (3 mm) to prevent the lining anchor rivet or bolts from contacting the drum. Head contact with the drum will cut grooves in the surface and require extra machining to remove them when rebuilding the brakes.

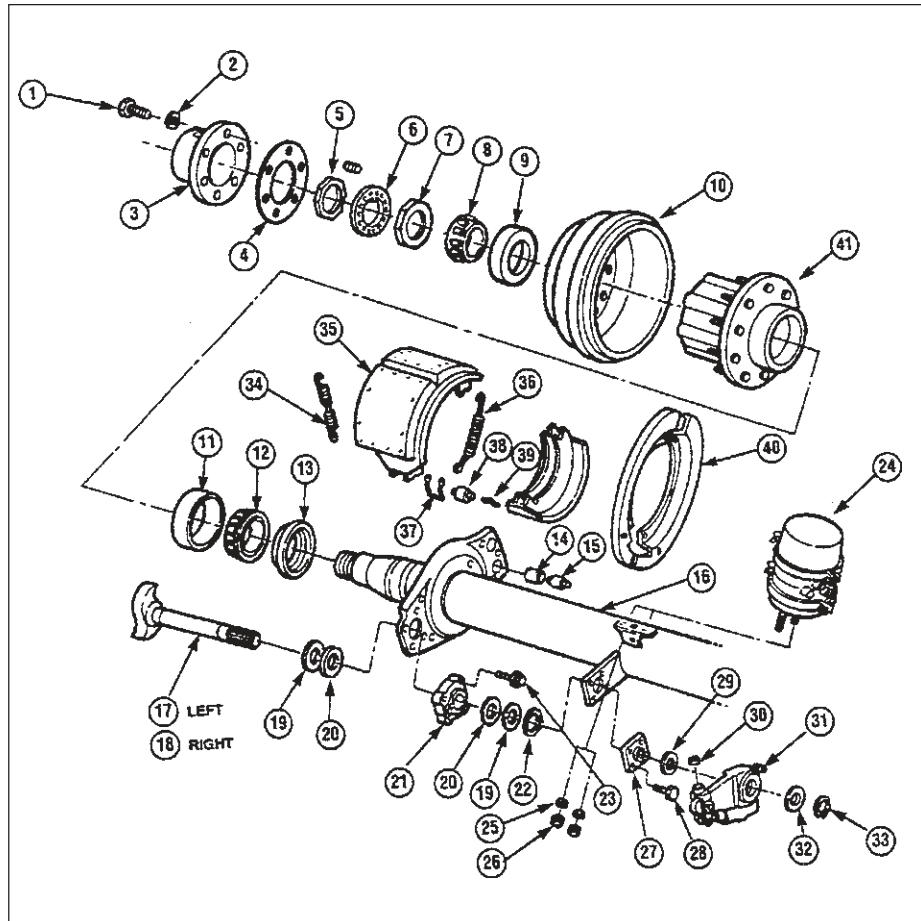


Fig. 8-16 EXPLODED VIEW

Several types of friction material are available for use on the brake shoes. Each has its own friction coefficient and braking characteristics. Select the one that best fits your application but do not mix materials on the same trailer. Differing materials require different application forces to obtain the same braking force and a braking system can only apply one force when it is properly set.

Recent changes in environmental laws have banned the use of asbestos including brake linings. Always use the appropriate safety gear when removing brake shoes containing asbestos from your trailer. Replace the shoes that are equipped with approved material.

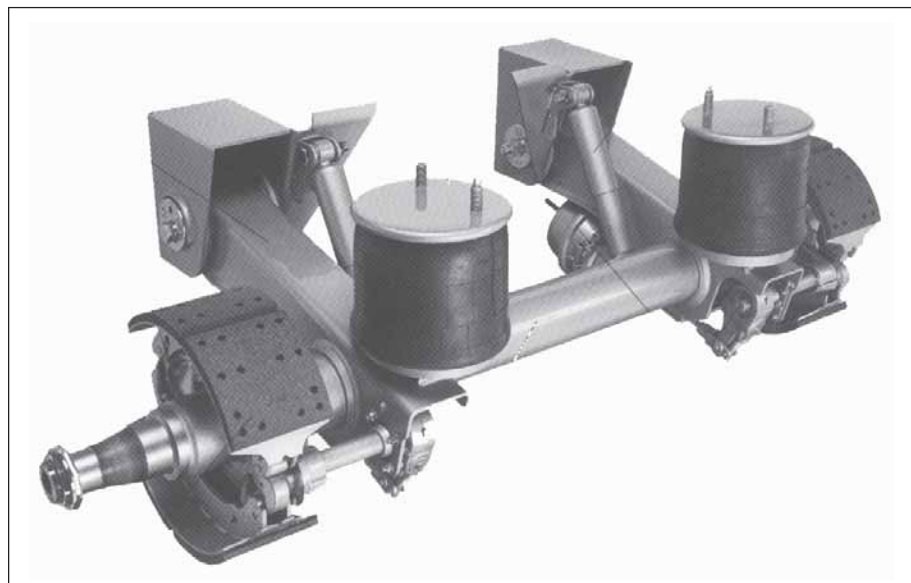


Fig. 8-17 AXLE

A. Removing Brakes:

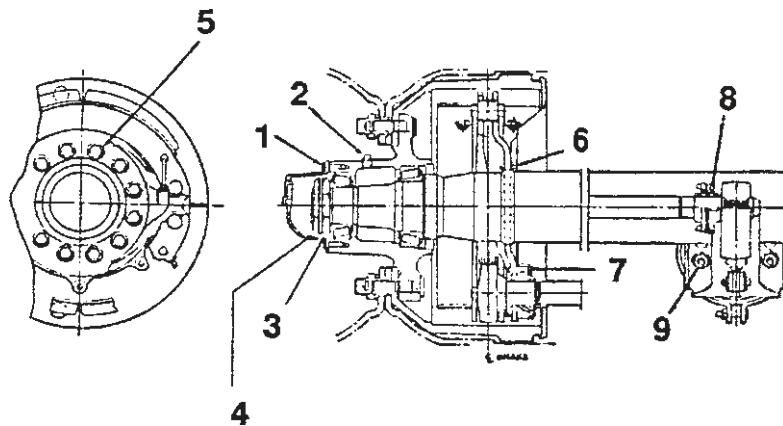
1. Position the trailer on a level hard surface.
2. Exhaust all the air from the air system.
3. Jack the axle up and place on safety stands.
4. Remove the wheel assembly from the axle.
5. Release the slack adjuster (Refer to Section 8.6).
6. Disable or cage spring brakes if so equipped.
7. Drain oil from hub and remove spindle end components.
8. Remove the hub and drum assembly. Support with a hoist as the assembly slides off the spindle. Use a puller if required.
9. Remove roller retaining clip from the bottom and top brake shoe cam rollers.
10. Disconnect and remove bottom shoe return spring.
11. Rotate bottom shoe to remove retaining springs.
12. Lift top shoe to remove.
13. Disconnect push rod from slack adjuster.
14. Back off and remove slack adjuster.
15. Remove cam shaft.

B. Installing Brakes:

1. Inspect all the components. Replace any that are cracked, bent or worn.
2. Lubricate the camshaft spline, slack adjuster gear and slack adjuster pins with anti-seize compound.
3. Install cam shaft and slack adjuster. Secure with snap rings.
4. Adjust slack adjuster to its required angle and attach to the push rod. Release slack adjuster pawl if so equipped.
5. Use a good quality brake grease to lubricate the anchor pins and rollers where they contact the brake shoes.
6. Place the upper shoe in position.
7. Place the lower shoe in position and attach 2 new retaining springs.
8. Rotate lower shoe forward and attach new brake shoe return spring.
9. Install both cam rollers and secure with retainers.
10. Install and secure the remaining wheel and components.
11. Repeat with other wheel ends as required.
12. Tighten all fasteners to their specified torque.

Manual Bearing Adjustment

- a. Tighten to 200 ft-lbs.
- b. Completely loosen.
- c. Tighten to 50 ft-lbs.
- d. Loosen 1/4 turn



Description	Torque Range		Fastener Size
	(lb-ft)	N.m	
1. Hub-cap bolts	10-15	13-20	5/16"
2. Hub fill plug	15-20	20-27	3/8"
3. Adjustment nut - manual bearing adjustment (double nut)	Tighten to 200, loosen, tighten to 50, loosen 1/4 turn	136 68	Size depends on axle model and adjustment method.
4. Jam nut - manual bearing adjustment	250-300	340-408	
5. Brake mounting bolt	130-165	177-224	5/8"
6. Two-piece dust shield bolts (shown) • Forged spider	15-20	20-27	3/8"
7. Bolt-on bushing bolts	25-35	34-48	3/8"
8. Cam bushing bolts	25-35	34-48	3/8"
9. Air chamber nuts	80-125	109-170	5/8"

Fig. 8-18 BRAKE/WHEEL END COMPONENTS

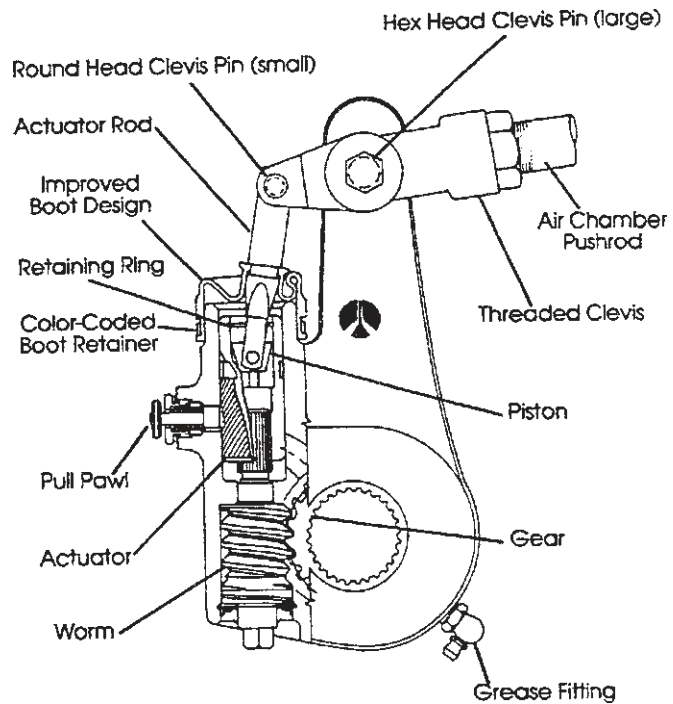
8.9 SLACK ADJUSTERS

8.9.1 ROCKWELL AUTOMATIC SLACK ADJUSTER

1. The air chamber push rod extends beyond its pre-determined optimum stroke length, the change in geometry between the chamber pushrod and slack lever arm raises the slack adjuster actuator rod.
2. The piston contacts the retaining ring and lifts the actuator.
3. If adjustment is required, the spiral serrations on the actuator are lifted over the serrations on the pawl.
4. When the push rod retracts, it forces the actuator downward into the pawl serrations and the actuator rotates.
5. As the actuator rotates downward, it turns the worn gear that turns the gear/spline/camshaft to maintain the brake adjustment.
6. Pull the pawl out and block in the out position when disassembling the brake system.
7. Use the bottom nut to turn and adjust the gear position.



Installed



Schematic

Fig. 8-19 ROCKWELL SLACK ADJUSTER (TYPICAL)

8.9 SLACK ADJUSTERS (cont'd)

8.9.2 MANUAL AND AUTOMATIC SLACK ADJUSTER MAINTENANCE

In an S-cam type foundation brake, the final link between the pneumatic system and the foundation brake is the slack adjuster. The arm of the slack adjuster is fastened to the push rod of the chamber with a clevis and the spline end is installed on the brake camshaft.

Primarily, the slack adjuster is a lever that converts the linear force of the air chamber push rod into a torque which turns the brake camshaft and applies the brakes.

Two types of slack adjusters are in use: manual type slack adjusters, which periodically require a manual adjustment and automatic slack adjusters which will automatically adjust during normal service braking applications. All slack adjusters utilize the worm and gear principle and fundamentally differ only in their torque limit specification.

MANUAL SLACK ADJUSTERS

Manual slack adjusters contain four basic components: the body, worm gear, worm shaft, and locking screw or collar. See Fig. 8-20.

The worm shaft of a slack adjuster incorporates an external adjusting hex. Turning the adjusting hex rotates the worm shaft which turns the worm gear and brake cam shaft, thus spreading the brake shoes and reducing drum-to-lining clearance.

Higher torque-rated slack adjusters use the lock ball or plunger and worm shaft indent principle adjustment lock. The lock ball or plunger must engage the worm shaft indent after the adjustment is completed. An audible metallic click can be heard when engagement is made.

IMPORTANT

Manual and automatic slack adjusters are for brake adjustment and will not compensate for faulty foundation brakes.

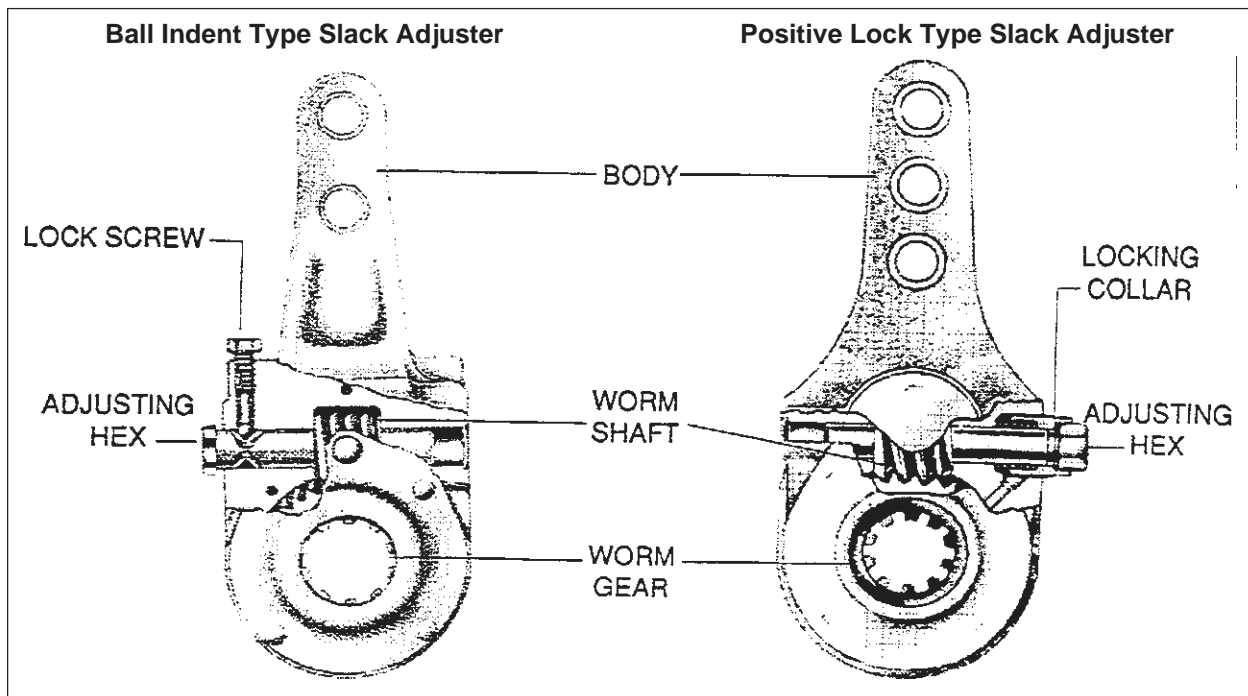


Fig. 8-20 MANUAL SLACK ADJUSTERS

AUTOMATIC SLACK ADJUSTERS

While automatic slack adjuster designs vary in the manner in which they are installed and operate, all are designed to automatically maintain a predetermined shoe-to-drum clearance or brake chamber stroke. Some automatic slack adjusters adjust upon the brake application stroke, others adjust upon release. Automatic slack adjusters can greatly reduce manual adjustments. **Automatic slack adjusters do not reduce the need for periodic maintenance.**

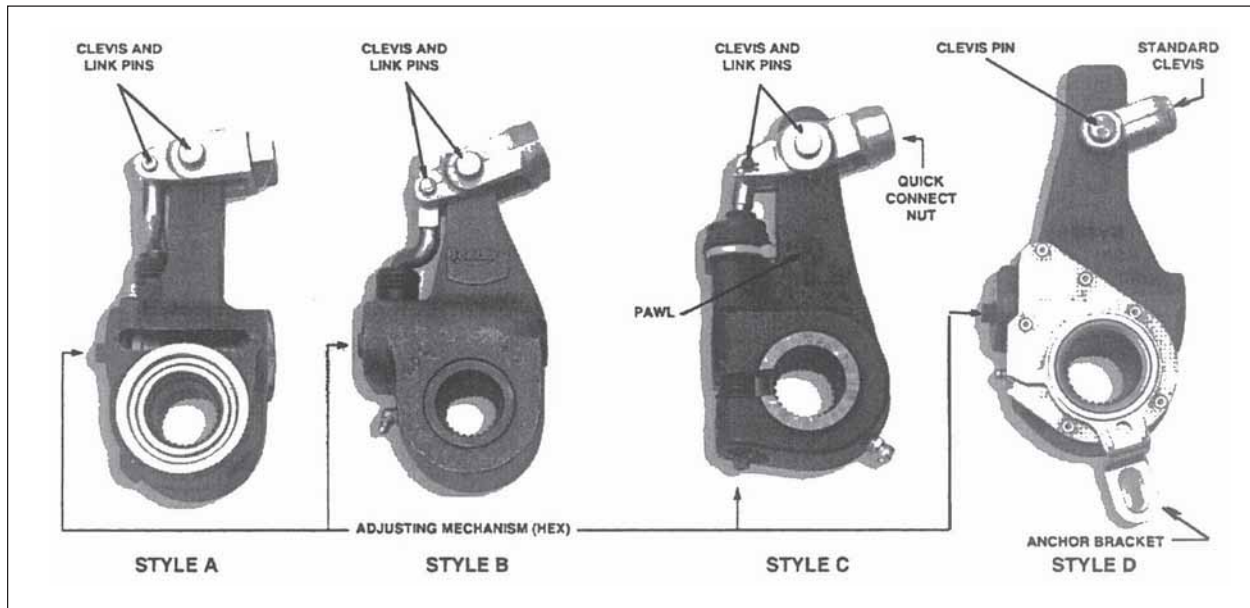


Fig. 8-21 AUTOMATIC SLACK ADJUSTERS

8.9 SLACK ADJUSTERS (cont'd)

8.9.2 MANUAL AND AUTOMATIC SLACK ADJUSTER MAINTENANCE (cont'd)

BRAKE ADJUSTMENT PROCEDURE

NOTE

All adjustments should be made with cold brake drums and the brakes fully released.

A. Manual Slack Adjuster Brake Adjustment Procedure

1. Slack adjusters with locking collar (positive lock type):

Jack up the vehicle. Thoroughly clean the adjusting hex and locking sleeve area. Position a wrench or socket over the adjusting hex and disengage the locking sleeve by depressing it. With the locking sleeve fully depressed, adjust the brakes while rotating the tire and wheel. Use the wrench or socket to turn the adjusting hex until the shoes contact the drum. Then back off the adjusting hex until the tire and wheel turn freely. The actuator stroke should be as short as possible without the brakes dragging.

If the vehicle cannot be jacked up, thoroughly clean the adjusting hex and locking sleeve area. Position a wrench or socket over the adjusting hex and disengage the locking sleeve by depressing it. With the locking sleeve fully depressed, use the wrench or socket to turn the adjusting hex until it will go no further indicating that either the shoes have contacted the drum or the adjusting hex has been turned in the wrong direction. Pull on the slack adjuster to make sure it will not move. If there is movement, adjustment was made in the wrong direction and the adjusting hex must be turned in the opposite direction until it will go no further.



WARNING

To avoid possible injury, proper precautions must be taken to prevent automatic actuation of the brake chambers while adjusting slack adjusters. Always block the wheels or mechanically secure the vehicle. Spring brakes must be mechanically caged or released with air. All brakes should be released.

After establishing solid shoe-to-drum contact, back off the adjusting hex 1/4 turn for worn linings and 1/2 turn when relining brakes. The actuator stroke should be as short as possible without the brakes dragging. Measure the chamber power stroke at 80-90 psi as described in subsection "B", "Automatic Slack Adjuster Brake Adjustment Procedure," below. Take a free stroke measurement as outlined in the section entitled FAILURE ANALYSIS. Make sure you have at least 3/8" of free stroke. Free strokes less than 3/8" can cause brake drag. If you cannot maintain the maximum legal stroke and the free stroke is less than 3/8", contact the brake manufacturer for foundation or brake geometry problems.



CAUTION

When the manual slack adjuster brake adjustment is completed, the adjusting hex should be positioned so the locking sleeve engages it, thus locking it in place. If the locking sleeve does not engage the adjusting hex, the slack adjuster can back itself off.

2. **Slack adjuster with lock screw ball indent type lock mechanism:**
Back off (turn counter-clockwise) the worm shaft lock screw (if applicable). Make the necessary adjustment by turning the adjusting hex as described in item number 1, directly above. Following brake adjustment, make certain that the lock ball or plunger engages the worm shaft indent. Without such engagement, the slack adjuster can back itself off.

Table 5 Chamber Type vs. Maximum Legal Stroke at 80 PSI Brake Application Pressure

Chamber Type	Maximum Legal Stroke
12	Less than 1-3/8"
16	Less than 1-3/4"
20	Less than 1-3/4"
24	Less than 1-3/4"
24 Long Stroke	Less than 2.0"
30	Less than 2.0"
36	Less than 2-1/4"

B. Automatic Slack Adjuster Brake Adjustment Procedure

An automatic slack adjuster should not have to be manually adjusted except for initial installation and at brake reline. Instead of manually adjusting the slack, the following procedure should be followed during inspection:

Chamber Power Stroke:

A power stroke at 80-90 psi brake application pressure will check both adjustment and foundation brake condition. Perform the following:

1. Measure the brake chamber face to the center of the clevis pin at all wheel locations (see Fig. 8-22).
2. Make brake applications until the air reservoir gauge reads 90-100 psi. Then have an assistant make a full brake application and hold it.

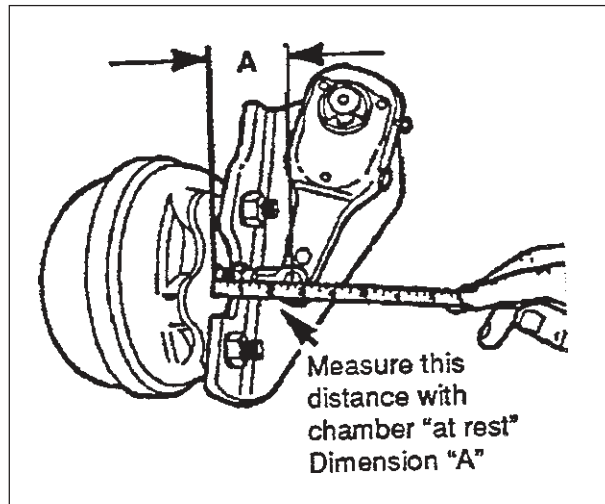


Fig. 8-22 PUSH ROD "AT REST"

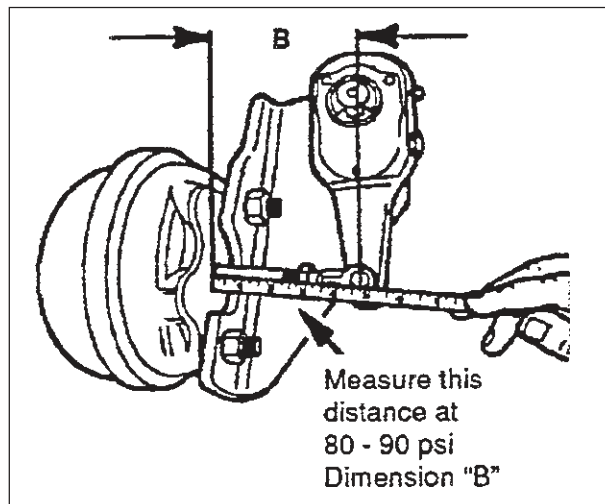


Fig. 8-23 PUSH ROD "EXTENDED"

3. Measure the brake chamber face to the center of the clevis pin (see Fig. 8-23).
4. The difference between the brakes released and applied measurements is the power stroke measurement. If the stroke is less than the maximum stroke for the chamber size (see Table 5), the inspection is complete. If the power stroke is more than the maximum stroke for the chamber size (see Table 5), refer to the section entitled FAILURE ANALYSIS.

8.9 SLACK ADJUSTERS (cont'd)

8.9.2 MANUAL AND AUTOMATIC SLACK ADJUSTER MAINTENANCE (cont'd)

AUTOMATIC SLACK ADJUSTER ADJUSTMENT PROCEDURE AT RELINE AND INSTALLATION

An automatic slack adjuster should be manually adjusted after a brake reline and/or installation using the following procedure:

1. Position a wrench or socket over the adjusting mechanism.

NOTE

If the automatic slack adjuster is equipped with a pawl, remove the pawl for the brake adjustment and then properly reinstall the pawl (see Fig. 8-24 Style C). Tighten the pawl to 15-20 ft-lbs.

2. Rotate the adjusting mechanism until the brake shoes contact the drum. Pull on the slack adjuster by hand to make sure it will not move. If there is movement, adjustment was made in the wrong direction and the adjusting hex must be turned in the opposite direction until it will go no further.
3. Reverse the rotation, backing the slack adjuster off one-half (1/2 turn).
4. Measure the chamber power stroke at 80-90 psi brake application pressure as described in the previous section.
5. Take a free stroke measurement as outlined in the section entitled FAILURE ANALYSIS. Make sure you have at least 3/8" free stroke. Free strokes of less than 3/8" can cause brake drag. If you cannot maintain the maximum legal stroke and the free stroke is less than 3/8", contact the brake manufacturer for foundation or brake geometry problems.

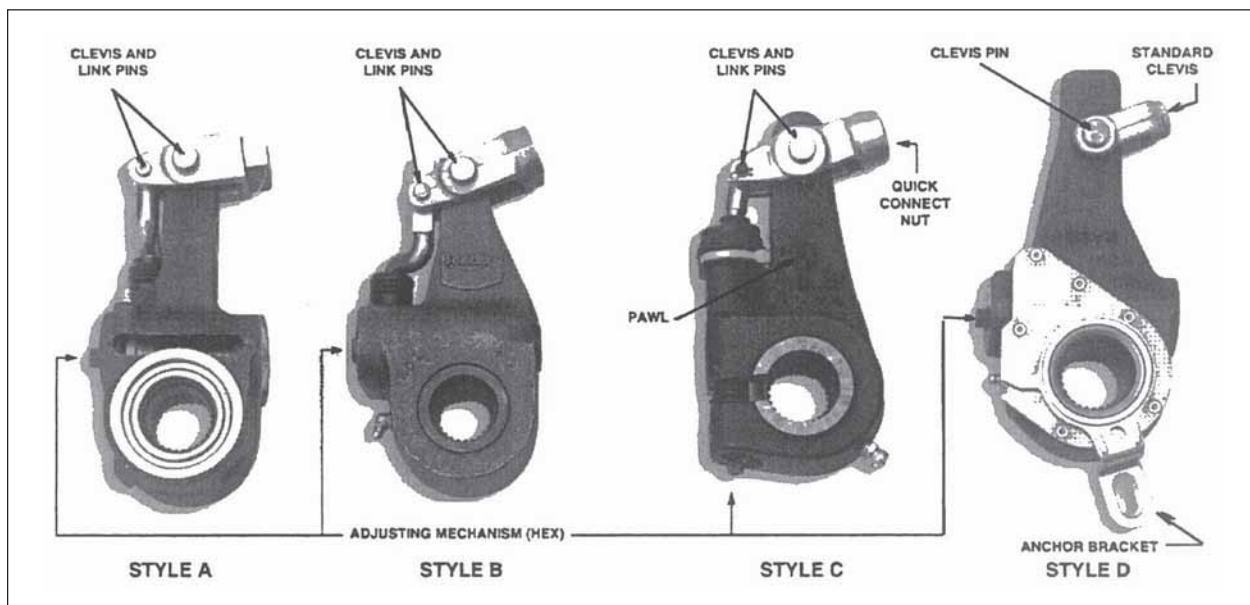


Fig. 8-24 SLACK ADJUSTER TYPES

ROADSIDE BRAKE ADJUSTMENT

If the driver has to adjust brakes on the road, the following procedure is recommended:

If the vehicle is equipped with an automatic slack adjuster, use a pry bar to pull on the slack adjuster. If movement is more than 5/8", a manual adjustment should be made following the same procedure as described below for a manual slack adjuster. If the automatic slack adjuster is equipped with a pawl, remove the pawl for the brake adjustment and then properly reinstall the pawl. If the automatic slack adjuster needs adjustment, inform maintenance personnel.

1. Block the wheels or mechanically secure the vehicle. On the brakes to be adjusted, spring brakes must be mechanically caged or released with air.
2. Rotate the adjusting mechanism until the brake shoes contact the drum. Using a pry bar, pull on the slack adjuster by hand to make sure it will not move. If there is movement, adjustment was made in the wrong direction and the adjusting mechanism must be turned in the opposite direction. Tap the brake drum with a wrench; you should hear a dull clunk indicating the brake linings are tight against the drum.

3. Back off the slack adjuster a small amount at a time, while tapping on the brake drum with a wrench in between adjustments. Stop backing off the adjuster when you hear a clear ringing sound from the brake drum when tapped with a wrench.
4. Using a pry bar, pull on the slack adjuster by hand. If movement is more than 5/8", adjustment was not done properly or there is a problem with the foundation brake.

NOTE

Some brake chamber push rods are marked to warn of an over-stroke condition. While the marking themselves may vary, the marking system has two basic features. They are: There is a mark on the brake chamber push rod near its clevis attachment to signal that it incorporates a stroke alert indicator (see Fig. 8-25 B). There also is a mark on the brake chamber push rod opposite its clevis attachment end which is exposed from the brake chamber wherever over-stroke occurs (see Fig. 8-25 C).

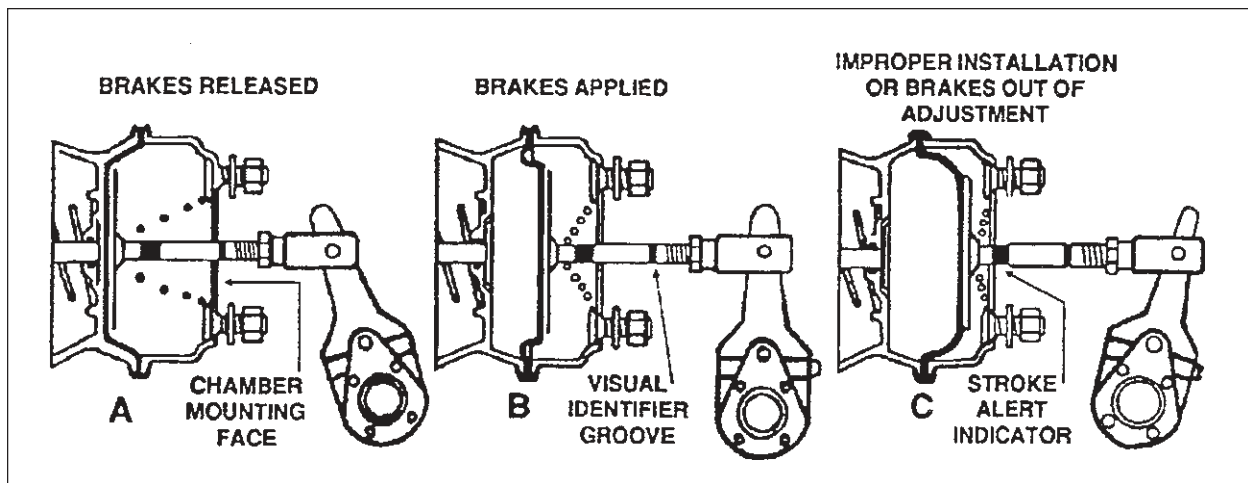


Fig. 8-25 PUSH ROD POSITION

8.9 SLACK ADJUSTERS (cont'd)

8.9.2 MANUAL AND AUTOMATIC SLACK ADJUSTER MAINTENANCE (cont'd)

FAILURE ANALYSIS

Manual Slack Adjuster Failure Analysis

Manual slack adjusters should be inspected for gear set wear. To do this, back off the adjusting hex until all spring pressure is relieved from the clevis. Work the adjusting nut 1/4 turn back and forth while watching for cam rotation. If you have 1/8 to 1/4 turn of play without the cam rotating, the manual slack should be replaced. Repeat this procedure every 1/4 turn of the adjusting nut to check the whole gear set.

Automatic Slack Adjuster Failure Analysis

If the power stroke is at or more than the maximum stroke, measure free stroke to determine if the slack adjuster is operational.

FREE STROKE MEASUREMENT

Free stroke is the amount of slack arm movement required to move the brake shoes against the drum. To measure free stroke, perform the following:

1. With brakes released, measure from the brake chamber face to the center of the clevis pin.
2. With a lever, pry the slack adjuster arm until the brake shoes contact the drum and measure the slack adjuster movement (see Fig. 8-26).
3. The difference between the brake released and applied measurements is the free stroke. The free stroke should be 3/8" - 5/8". If the free stroke is in the correct range, the out of spec stroke is due to a foundation brake problem. Check for missing or worn components, cracked brake drums, or improper lining-to-drum contact. If the free stroke is greater than recommended, an automatic slack adjuster function test should be performed.

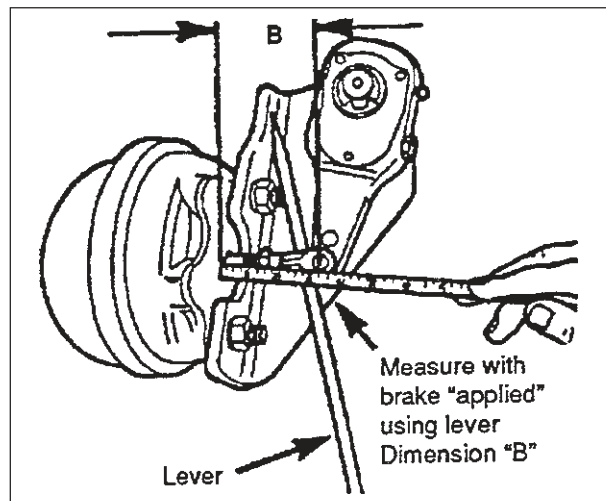


Fig. 8-26 FREE STROKE

AUTOMATIC SLACK ADJUSTER FUNCTION TEST

1. Remove the pawl, then rotate the adjusting mechanism at least one complete turn as if backing off the brake adjustment (see Fig. 8-27 Style C). The pawl must be installed properly and tightened to 15 - 20 ft-lbs. after backing off the adjuster.
2. Apply the brakes several times and observe whether the adjustment mechanism is rotating in the direction needed to reduce brake chamber pushrod stroke. If the adjusting mechanism does not rotate, the slack adjuster should be replaced.
3. Check back-off torque by rotating the adjusting hex as follows:
 - Style A:** Minimum 15 ft-lbs. counter-clockwise (CCW).
 - Style B:** Minimum 15 ft-lbs CCW.
 - Style C:** Less than 45 in-lbs. CCW (pawl removed)
 - Style D:** Minimum 15 ft-lbs CCW

Consult the manufacturer for more information.

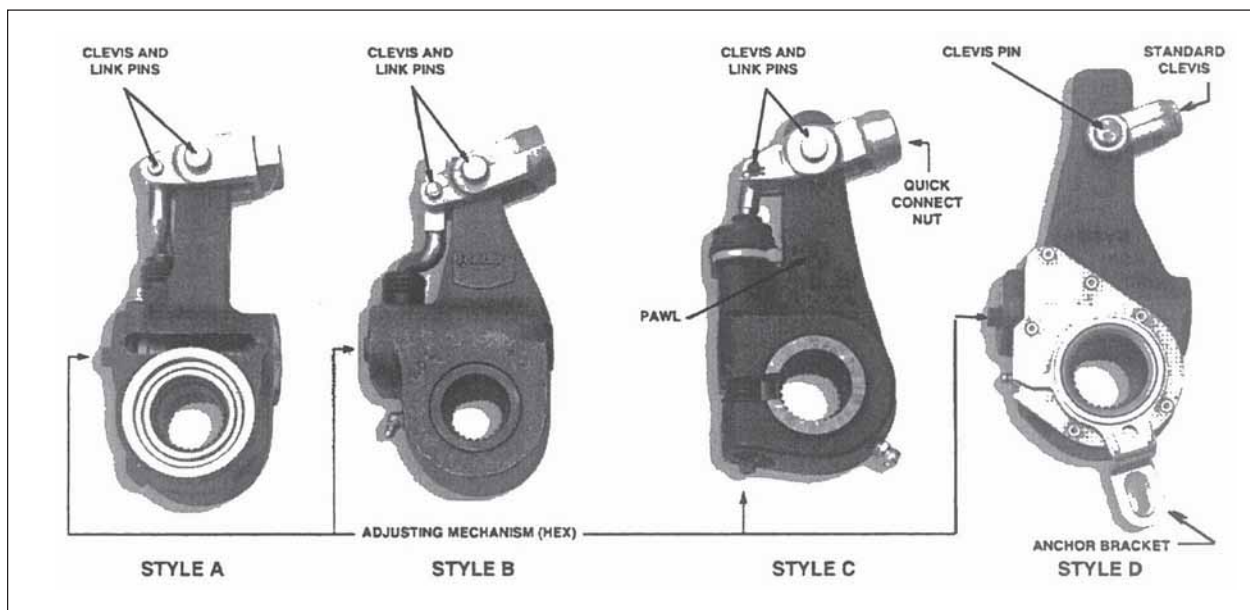


Fig. 8-27 SLACK ADJUSTER TYPES

PREVENTATIVE MAINTENANCE

Every month, 8,000 miles, or 300 operating hours, check brake chamber push rod travel; stroke should be as short as possible without the brakes dragging or the push rod binding. Adjust manual slacks if necessary. Due to different operating conditions, adjustments may be necessary at earlier intervals.

Every 6 months, 50,000 miles, or 1,800 operating hours, lubricate all slack adjusters and clevis pins with manufacturer's recommended lubricant. Check for worn clevises, clevis pins, clevis pin bushings, and control arm/bracket wear. Failure to replace worn components will increase chamber stroke. Lubrication and inspection may be necessary at earlier intervals due to different operating conditions.

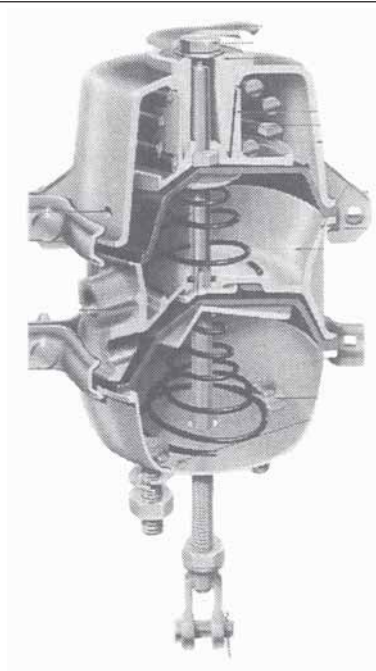
8.10 AIR CHAMBER/SPRING BRAKE

Air chambers mounted on the axle use the air supply/pressure from the tractor to apply the service brakes for stopping the vehicle. In addition this air chamber may be equipped with a spring brake that applies the brake when the service side of the brake loses air. The spring brake side of the system is used as a parking and/or emergency brake if the service side fails.

Spring brakes should not be serviced by anyone in the field unless they have been trained in the proper procedure. Do not work on the brakes unless the springs are caged or locked out. Do not move the trailer if the springs are caged.

When caging or locking out the spring brakes, follow this procedure:

1. Place chocks in front of and behind the trailer wheels.
2. Insert the release bolt, stored on the side of the chamber, into the hole in the head and through the piston.
3. Turn the release bolt clockwise until it stops and locks.
4. Pull release bolt out as far as possible and run the nut down while holding the bolt in place.
5. Use a wrench to turn the release bolt nut clockwise until the bolt extends about 3 inches.
6. Be sure the release bolt is locked in position.
7. The spring is now caged and the trailer can be moved.
8. Always release the spring before placing the trailer back in service.



Schematic



Axle

Fig. 8-28 SPRING BRAKE

8.11 SUSPENSION SYSTEM

The suspension system is the group of components that connect the axle to the main trailer frame and absorb the shock loads from the road. Walinga trailers can be equipped with either a mechanical or air ride suspension system. Either system works well and will provide many years of trouble-free service.

8.11.1 AIR RIDE SUSPENSION

An air ride suspension consists of air springs that are inflated and pressurized by the trailer air system and controlled by a height control valve. It is a simple system that requires minimal servicing and maintenance to perform well.

Visually inspect the trailer at the start of the day or trip to check the condition of the suspension. When the suspension is in good condition, the frame will be level and at the proper ride height. Also, check for loose fasteners or damaged components. Correct any problems before placing the trailer into service. Problems caught early and corrected minimize cost and downtime.

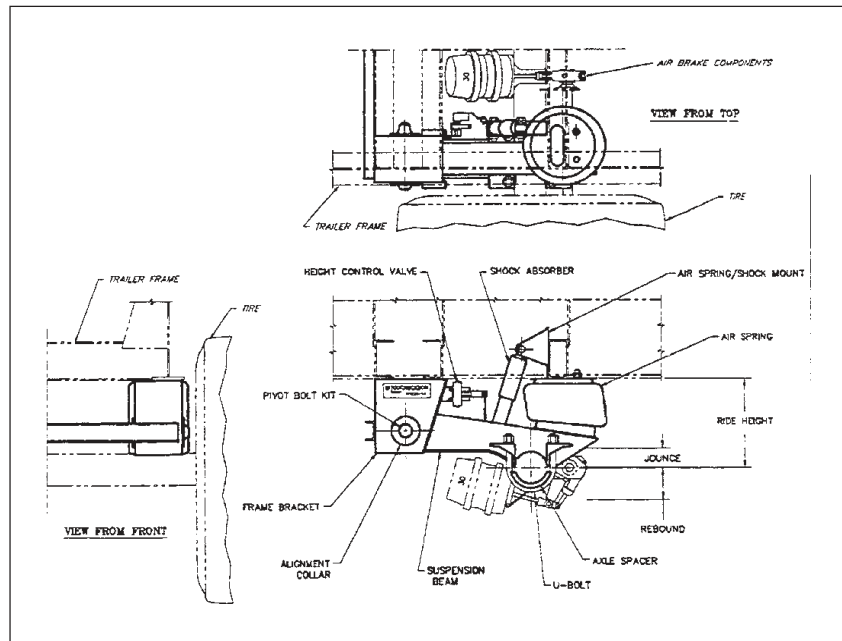


Fig. 8-29 SUSPENSION

Table 6 Bolt Torque Values For Hendrickson Turner Suspensions

Description	Size	Torque
Quik-Align™ Pivot Bolt	7/8"-9	475-525 Ft. Lbs
Shock Bolt	3/4"-10	150-175 Ft. Lbs.
Air Spring Bolt (Lower)	1/2"-13	25-35 Ft. Lbs.
Air Spring Nut (Upper)	3/4"-16	45-55 Ft. Lbs.
Brake Dust Shield Bolt	5/16"-18	160-180 In. Lbs.
ABS Bracket Bolt	1/4"-20	75-100 In. Lbs.

Every 5,000 miles (8,000 km) or monthly, check the clearance around all the suspension system components. Correct any interference problem. Retorque all the fasteners to their specified torque.

Every 25,000 miles (40,000 km) or 3 months, visually inspect all components and welds for cracks, distortions or other damage. Repair or replace all defective components before placing unit into service.

8.11 SUSPENSION SYSTEM (cont'd)

8.11.1 AIR RIDE SUSPENSION (cont'd)

Typical repairs include but are not limited to:

1. Air Spring Replacement:

Air springs are designed to be virtually trouble-free throughout their life. Problems seldom occur unless they are cut, punctured, abraded, pinched or torn and then they must be replaced.

- a. Block the wheels to prevent trailer movement.
- b. Exhaust air from the suspension system.
- c. Raise and support the frame on safety stands.

NOTE

Do not raise frame too high unless shock absorbers are installed to prevent over-extending the air spring.

- d. Disconnect the air lines to the air spring(s).
- e. Loosen mounting bolts and remove air spring(s).
- f. Install new air spring(s).
- g. Tighten mounting bolts to their specified torque of 50 ft. lbs. (68 N.m).
- h. Install air lines and tighten to their specified torque.
- i. Repeat on other air springs.
- j. Remove stands from under frame.

2. Shock Absorber Replacement:

Shock absorbers remove energy from the suspension system as the trailer encounters holes and bumps on the road surface. They also act as a stop for the air springs to prevent the axle from moving too far away from the frame and tearing or damaging the air spring.

- a. Remove the upper and lower mounting bolts.
- b. Remove old shock and install new one.

IMPORTANT

Use only correct Hendrickson Turner replacement parts. Substitute parts do not work with the suspension system.

- c. Secure shock by tightening mounting bolts to their specified torque of 250 ft. lbs. (338 N.m).

3. Pivot Bushing:

Pivot bushings are a very durable, long lasting component. Bushing failures are rare and should be attempted only when all other problem causes have been eliminated. A bushing removal/installation tool is available from Hendrickson Turner when replacing the bushing and can be borrowed from your dealer or distributor. A 10 ton portable hydraulic press must be supplied by the customer. Purchase the bushing replacement kit that includes a new bushing, pivot bolt kit and lubricant.

When replacing the bushing, follow this procedure:

- a. Use a torch to "cut off" the Huck fasteners from the clamping bolt.
- b. Press out the old bushing and press in the new one.
- c. Install the clamping bolt and tighten the fastener to 800 ft. lbs. (1080 N.m).
- d. Tack weld the nut to the bolt to prevent loosening.

4. **Air Control (Ride Height Control):**
 An air ride suspension system uses the air from the tractor to pressurize the air springs. A single height control valve is used to monitor the height of the frame above the axle and add/exhaust air from the system as required to maintain this dimension. Normally this dimension is set for your trailer and never changes.

The height control valve is located on the rear axle of the axle assembly area on the trailer and controls the adding/exhausting of air to the air springs. As the dimension between the frame and axle increases, the control lever moves down and air is exhausted from the system. As the dimension decreases, air is added to raise the frame. All valves incorporate a 5 to 15 second time delay to minimize jerking or cycling. Replace valve if not functioning properly.

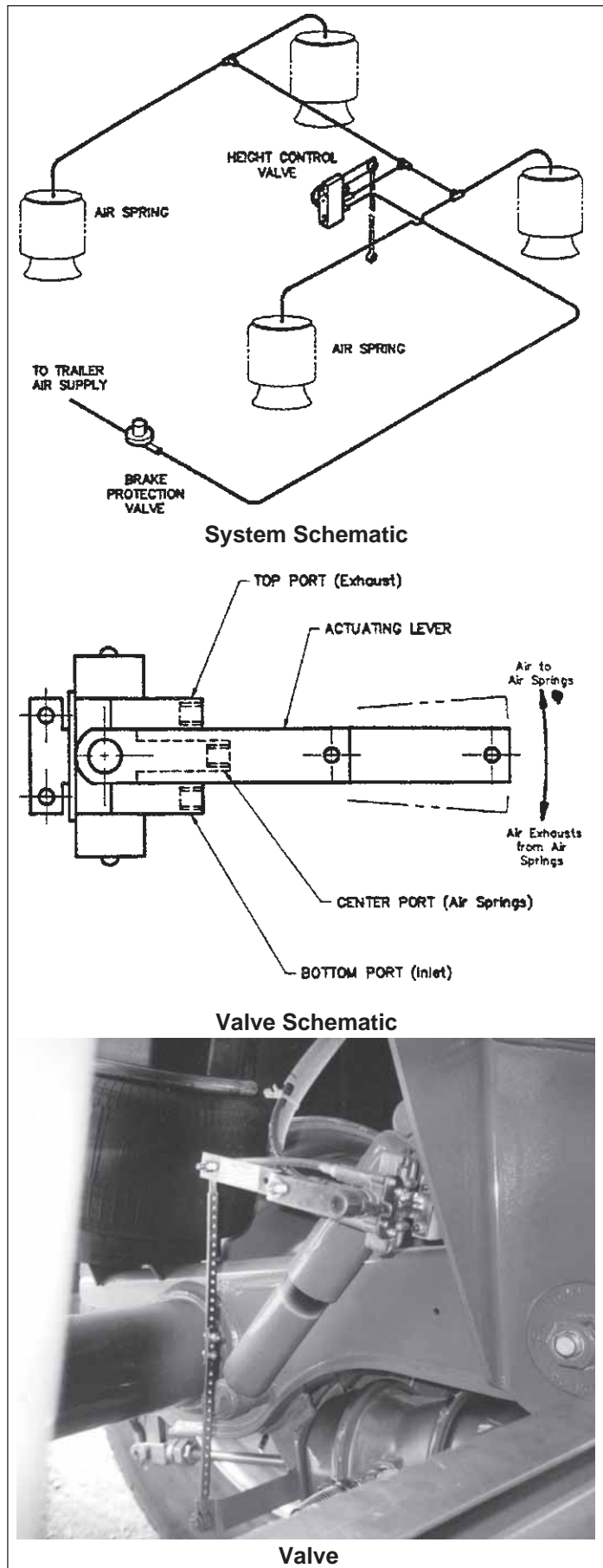


Fig. 8-30 RIDE HEIGHT CONTROL

8.11 SUSPENSION SYSTEM (cont'd)

8.11.1 AIR RIDE SUSPENSION (cont'd)

5. Dump Valve:

All air control systems are equipped with a dump valve that allows the operator to exhaust the air from the system as required.

a. **Always dump the air when parking the trailer and before unhooking.**

b. Dumping the air is optional when:

- i. **Loading:** The rapid or sudden addition of load to the trailer can cause the control valve to search for neutral. Exhausting the air rests the frame on the interval bumper and prevents the valve from searching. When the loading is completed, close the valve to repressurize the system.

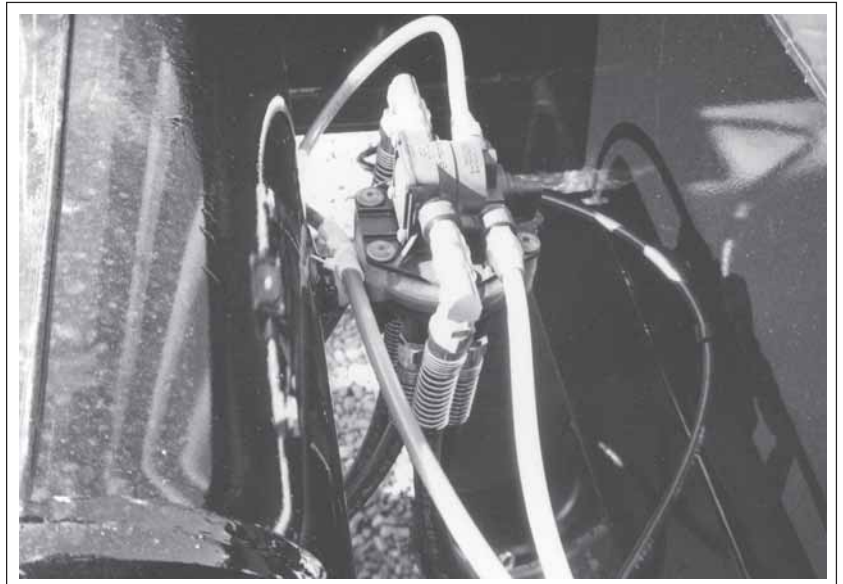


Fig. 8-31 DUMP VALVE

- ii. **Unloading:** Dumping rapidly can also require the valve to search for neutral. Close the valve when the unloading is completed to repressurize the system.

8.11 SUSPENSION SYSTEM (cont'd)

8.11.2 MECHANICAL SUSPENSION

Two types of mechanical suspensions are available on the trailer and must be specified and ordered from the factory. Both work well and provide the customer with a choice.

The standard suspension for the tandem and triaxle models are the Reyco 21B 8 leaf and the Hutch 9700 3 leaf. Both are designed to require minimal service and maintenance on a trailer. However, these service intervals and maintenance procedures must be followed:

Service Intervals:

1. Follow the break-in procedure specified in Section 4.3.
 2. Visually inspect the suspension at the start of the day or trip for bent, broken or loose components. Always correct these conditions and perform a complete check-out of the suspension before placing the trailer back in service.
 3. After each additional 25,000 miles (40,000 km), or every 3 months, retorque all the fasteners to their specified torque per the following table. Always use an accurate torque wrench when retorquing fasteners and attach to the nut.
 4. 25,000 miles (40,000 km) or every 3 months, inspect the following:
 - a. Check position of clamp if moveable clamps used. Clamping legs must be centered over slot in end tube.
 5. In addition to checking the alignment at the recommended intervals, axle alignment should be checked when any of the following conditions occur:
 - a. Discovery of loose fasteners or components.
 - b. Discovery of elongated holes in a suspension system component.
 - c. Whenever bushings are replaced.
 - d. Whenever excessive or abnormal tire wear is observed.
- b. Check fit and function of all bushings.
 - c. Check all hanger and hanger bracing welds for cracks.
 - d. Check all other welds for signs of cracks or distortion.
 - e. Check fit of springs in hangers and equalizers.
 - f. Check equalizers for excessive wear at spring ends.
 - g. Check suspension system alignment.

IMPORTANT

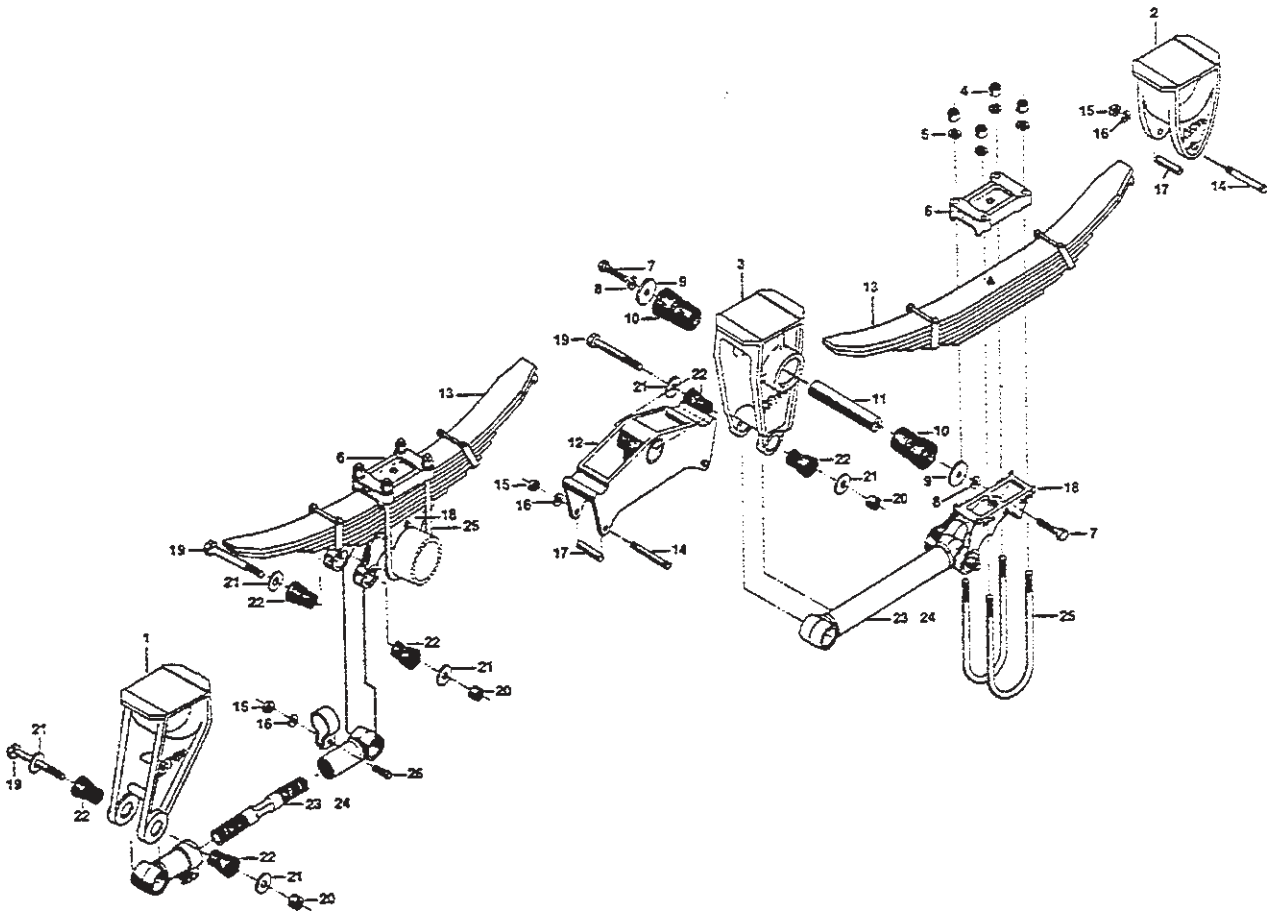
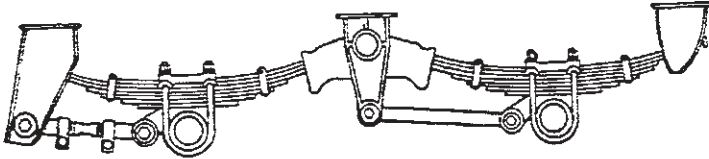
A loose fastener is defined as one whose torque has dropped below its specified level.

Table 7 Suspension Fastener Torque Requirements

Description	Size	Torque	
		Ft. Lbs.	N.m
Equalizer Shaft (All Spread)	49" Spread	575-625	780-850
	54"-65-1/2" Spread	200-225	270-305
	72"-109" Spread	300-325	410-445
		200-225	270-305
U-Bolt Nuts		300-325	410-445
Torque Arm Bolt Nuts	1"	160-200	216-270
Torque Arm Clamping Nuts	1/2"	80	110
	3/4"	175-200	236-270
Spring Retainer Nuts	1/2"	80	110

8.11 SUSPENSION SYSTEM (cont'd)

8.11.3 SUSPENSION SYSTEM SCHEMATICS



8.12 TIRE WEAR PATTERNS

The way your tires wear is a good indicator of other parts of the suspension. Abnormal wear patterns are often caused by the need for simple maintenance or axle alignment.

a. **Over-Inflation:**

Excessive wear at the center of the tire indicates the air pressure in the tire is consistently too high. The tire is riding on the center of the tread and wearing it prematurely. Occasionally, this wear pattern can result from outrageously wide tires on narrow rims. The cure for this is to replace either the tires or the wheels.

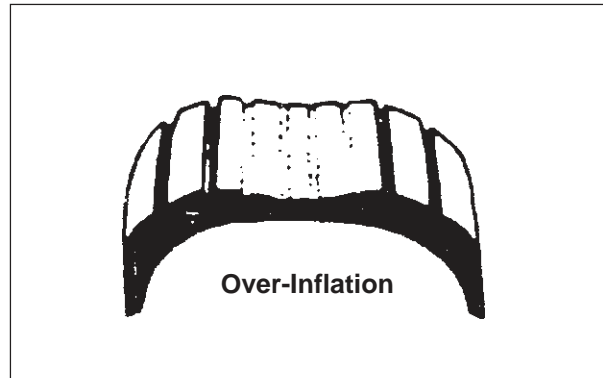


Fig. 8-32 OVER-INFLATED

b. **Under-Inflation:**

This type of wear usually results from consistent under-inflation. When a tire is under-inflated, there is too much contact with the road by the outer treads, which wear prematurely. When this type of wear occurs, and the tire pressure is known to be consistently correct or the need for axle alignment could be indicated.

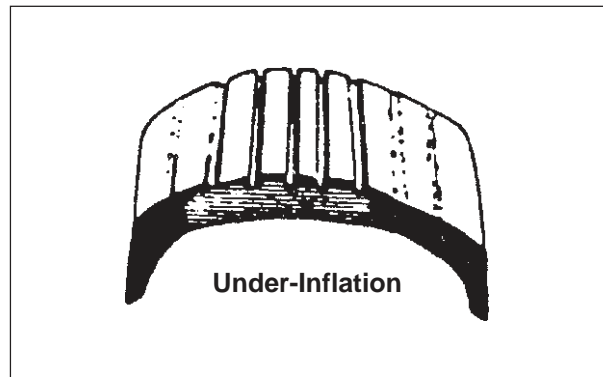


Fig. 8-33 UNDER-INFLATED

c. **Feathering:**

Feathering is a condition when the edge of each tread rib develops a slightly rounded edge on one side and a sharp edge on the other. By running your hand over the tire, you can usually feel the sharper edges before you will be able to see them. The most common causes of feathering are incorrect toe-in setting, deteriorated bushing in the suspension or misalignment.

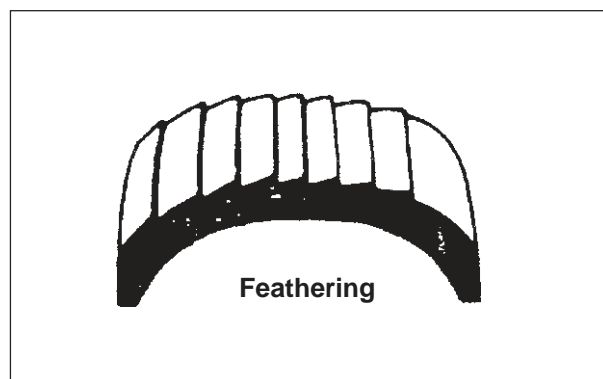


Fig. 8-34 FEATHERING

d. **One-Side Wear:**

When an inner or outer rib wears faster than the rest of the tire, the need for axle alignment is indicated. There is excessive camber in the axle causing the wheel to lean too much excessive load on the one side of the tire. Misalignment could also be due to sagging springs, or worn suspension system components.

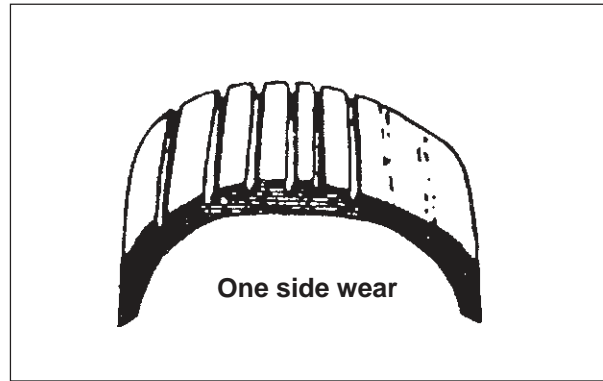


Fig. 8-35 ONE-SIDE WEAR

e. **Cupping:**

Cups or scalloped dips appearing around the edge of the tread almost always indicate worn (sometimes bent) suspension parts. Adjustment of axle alignment alone will seldom cure the problem. Any worn component that connects the wheel to the suspension can cause this type of wear. Occasionally, wheels that are out of balance will wear like this, but wheel imbalance usually shows up as bald spots between the outside edges and center of the tread.

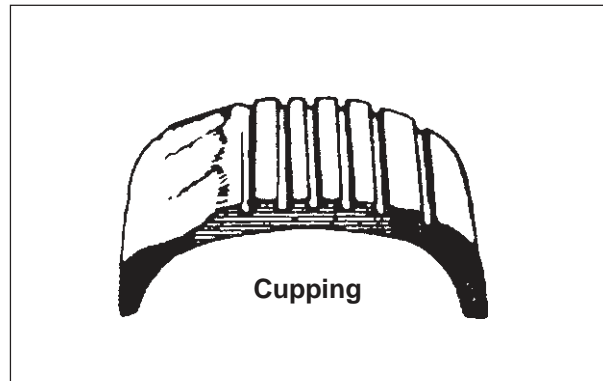


Fig. 8-36 CUPPING

f. **Second Rib Wear:**

Second rib wear is usually found only in radial tires, and appears where the steel belts end in relation to the tread. It can be kept to a minimum by paying careful attention to tire pressure and frequently rotating the tires. This is often considered normal wear but excessive amounts indicate that the tires are too wide for the wheels.

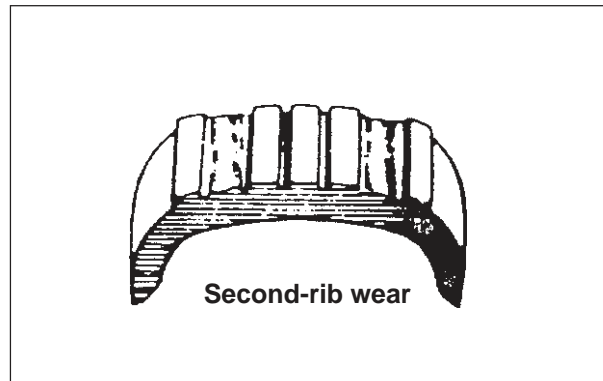


Fig. 8-37 SECOND RIB WEAR

8.13 AIR SYSTEM

Trailers are equipped with an air system, that is pressurized by a compressor on the tractor, for operating the discharge gates, brakes and air suspension (if so equipped). All components must be in good condition for the system to function and perform as intended. The air system must be inspected to be kept in good condition and functional checks performed to be sure it is operating as required.

8.13.1 AIR SYSTEM INSPECTION

The pre-trip or pre-start inspection include several air system related checks, inspections or tasks including but not limited to:

Daily

1. Check that the glad hands are clean and in good condition. Check seals in glad hand. Clean, repair or replace as required.
2. Check that the air hoses between the tractor and the trailer are routed to prevent rubbing, chaffing or pinching. Reroute to correct condition if required.
3. Drain moisture from all air tanks. Pull on the cable attached to drain valve on the bottom of each tank until the water or spray no longer can be seen.

IMPORTANT

Tanks must be drained daily in high humidity and cold temperature conditions to prevent getting water or ice in the system.

4. Check that all the lines and hoses conveying air along the frame are tied up and secured to prevent dragging, scuffing or snagging. Tie up or protect as required to correct the condition. Damaging an air system component can cause a sudden loss of pressure and result in a loss of service brakes.

IMPORTANT

New FMVSS-121 regulations mandate higher pressures in the supply line to insure proper brake operation. Set the compressor pressure for cut-in to 105 psi and cut-out to 120 psi. Do not use additives in the air systems.

8.13.2 AIR SYSTEM FUNCTIONAL

A vehicle air system is a combination of the components on the tractor and the trailer. All must be maintained in good condition for the entire system to function as required. Although a visual check will indicate the outer condition of the components, it does not indicate the leaks or responsiveness of the system. To evaluate the integrity and responsiveness of the system, perform these functional checks:

1. Attach the trailer to a tractor and connect all the air and electrical lines.
2. Block wheels.
3. Stop tractor engine and exhaust air from all tanks.
4. Start engine and run at fast idle (1200-1500 RPM) to charge the air system.

Verify that:

- a. Low pressure alarm goes off when the system pressure exceeds 50 psi.
- b. Increasing the system pressure between 50 psi and 80 psi takes less than 3 minutes.
- c. The compressor cuts out when the system pressure exceeds 120 psi.
- d. Fan brakes to use air. Compressor must engage when system pressure drops below 105 psi.

NOTE

Release spring brakes before fanning service brakes.

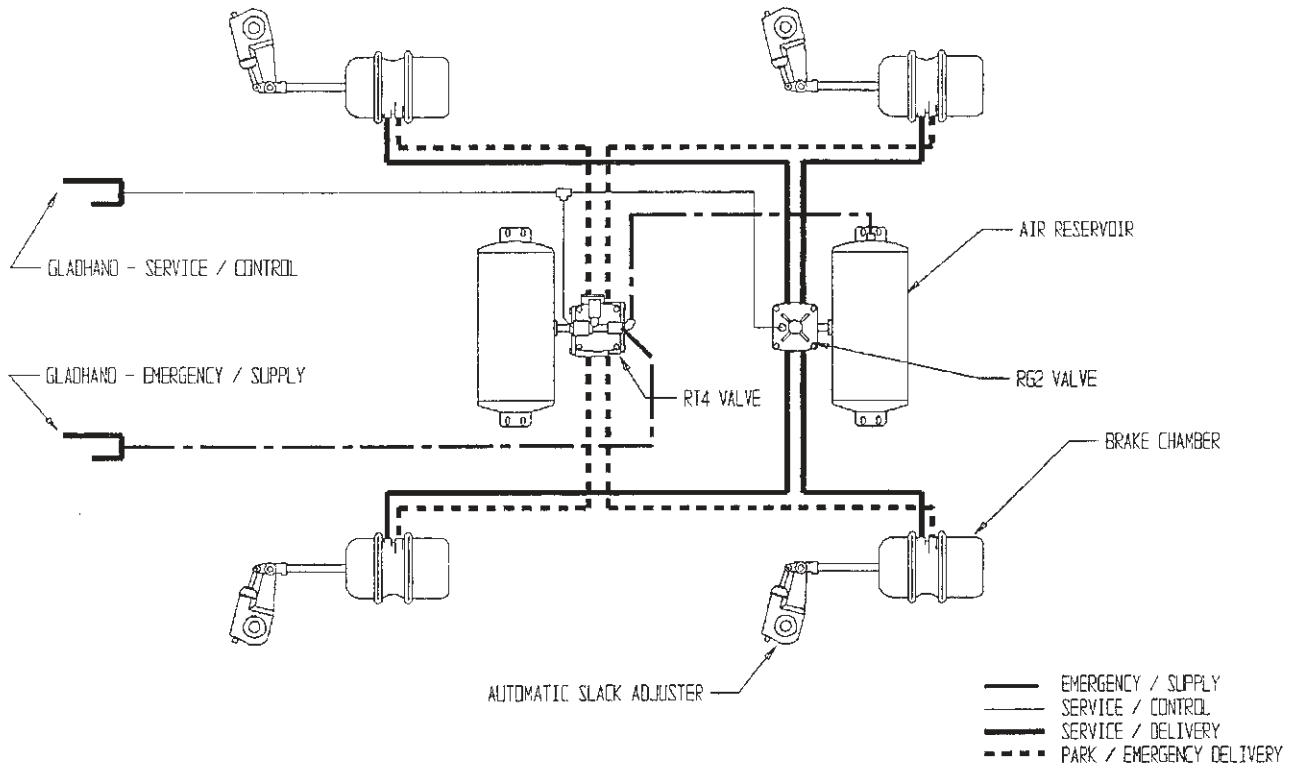
5. Push emergency valve to charge trailer system. Apply and release service brakes.
6. Build system above 120 psi and stop engine.

Verify that:

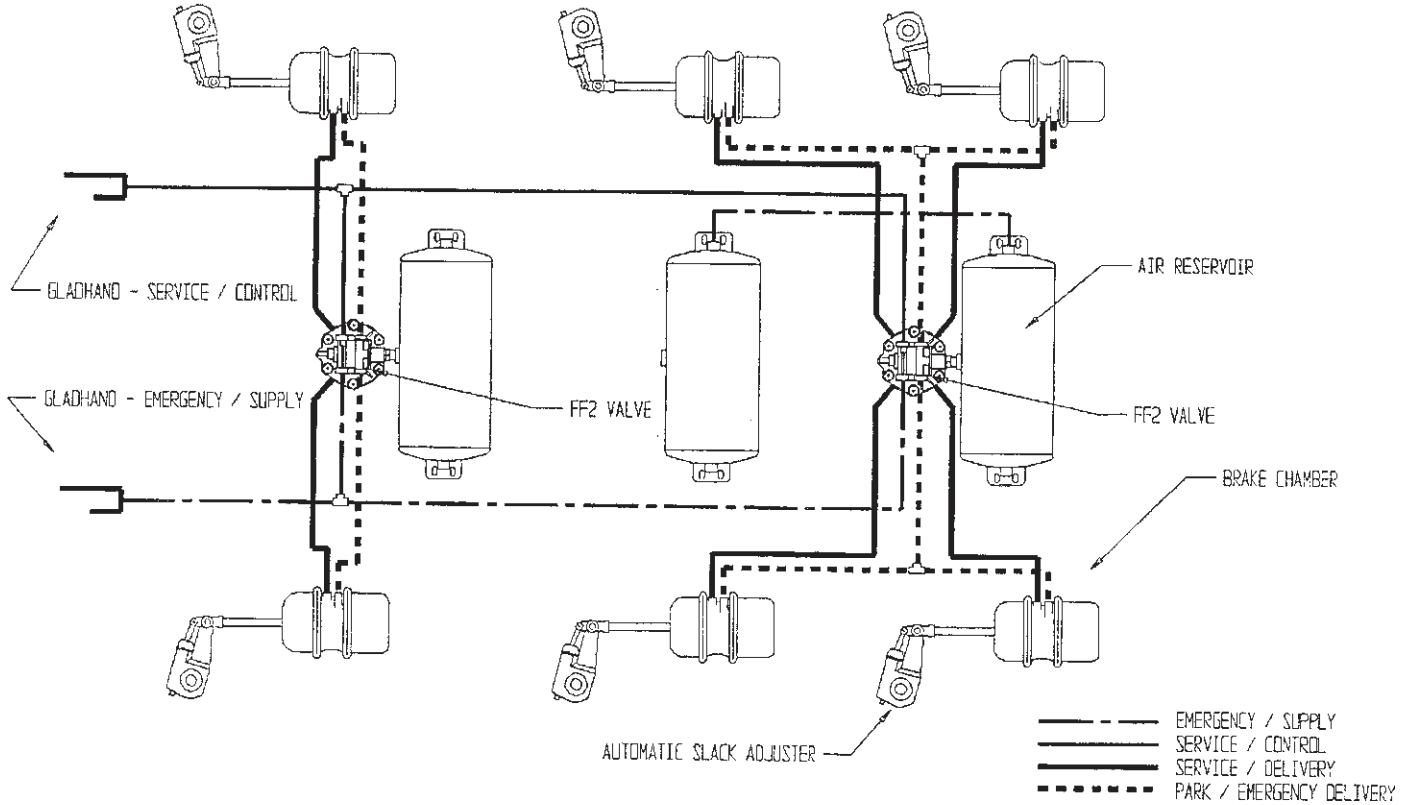
- a. Main tank pressure does not drop more than 18 psi when brakes are fully applied using brake pedal. If pressure drop exceeds 18 psi, adjust brakes and recheck.
- b. System pressure should not drop more than 4 psi per minute. Listen for audible leaks.
- c. Release foot valve, fan treadle to drop main reservoir pressure. Brakes should dynamite automatically when the pressure drops below 60 psi.

Adjust or repair system until these conditions are met.

8.13.3 AIR SYSTEM SCHEMATICS



Tandem Axles - 2 Tank 2 Valve



Triaxle - Tridem W/FF2

8.14 ABS VEHICLE CONTROL SYSTEM

Trailers can be equipped with a system that controls the brakes on a vehicle to prevent wheel lock-up when braking. The system consists of an ECU (Electronic Control Unit), Modulator (ABS modulator valve), tooth wheel, wheel speed sensor and wiring harness. The system configuration is determined by the number of wheel sensors and relay valves in the system. The system is designed with a self-diagnostic feature that monitors the condition of the system and can indicate system faults through a series of cooled flashing lights. Each operator and/or serviceman should have a copy of the Service Booklet from Rockwell that explains the Blink Code Diagnostics System. Use the ECU/Valve serial number and configuration to specify the applicable booklet for your system.

1. Power:

The system can be powered by tapping into the "live" wiring harness or through the brake light circuit. With the former, the system is ON whenever the ignition key is turned on. With the latter, the system is ON when the brakes are applied.

2. Function:

Sensors on each wheel monitor wheel speed and transmit a signal to the ECU. During heavy, severe and emergency braking or hazardous road conditions, the ECU monitors and compares the speed of each wheel to determine if any are slowing too rapidly. If a wheel is slowing too rapidly, the ECU works with the modulator valve to relieve the air pressure to the brake son that wheel to prevent lock-up. By preventing wheel lock-up, each wheel provides maximum braking force and eliminates trailer instability.

3. Warning Lamp:

Each system is equipped with a warning lamp to display the condition of ABS system to the driver/operator. Be familiar with the meaning of the warning lamp codes before using the trailer.

- a. On a **stoplight activated** system, the warning lamp comes ON when you apply the brakes and goes OFF when you release the brakes on a stationary vehicle.

Warning Lamp With Stoplight Power

Brakes	Fault in System	Vehicle Speed	Warning Lamp
Released	N.A.	N.A.	Off
Applied	N.A.*	< 4 mph	On
Applied	No	> 4 mph	Flashes once, then stays off for remainder of stop.
Applied	Yes	N.A.*	On for duration of stop.

* At less than 4 mph, you cannot tell whether the light indicates a fault or an incomplete self-check. To tell if there is a fault, you must apply the brakes while driving faster than 4 mph to see if the light stays on during the application.

- b. On a **constant-power** system, the warning lamp comes ON when you turn the ignition ON and goes OFF when the vehicle exceeds 4 mph (6 km/h).

Warning Lamp With Constant Power

Ignition	Fault in System	Vehicle Speed	Warning Lamps (on Trailer and Dash)
Off	N.A.	N.A.	Off
On	N.A.**	< 4 mph	On**
On	No	> 4 mph	Off
On	Yes	N.A.**	On

* The light comes on at the initial activation of the ECU, not each time the vehicle slows down below 4 mph. Until the vehicle initially exceeds 4 mph, you cannot tell if the light indicates a fault or an incomplete self-check. To tell if there is a fault, you must drive faster than 4 mph and see if the light stays on. Once vehicle speed exceeds 4 mph, the light remains off unless a fault occurs or the ignition is turned off and then turned on again.

4. **Faults:**

Whenever there is a fault/problem with the system or any of its components, the warning lamp will not come ON per the tables listed on the previous page. The system is designed with an internal self-diagnostic and memory system to tell service personnel the cause and location/site of the fault/problem through their diagnostic blink code system.

5. **Blink Code Diagnostics:**

A system can be accessed using a special diagnostic tool to plug into the ECU to identify the faults/problems and locations. Purchase the appropriate tool and Maintenance Booklet for your system to keep it in good operating condition. Each system is designed with blink code diagnostic code to identify fault cause and location as defined in Maintenance booklet. Always correct any faults as they are identified to maintain the unit in top operating conditions.

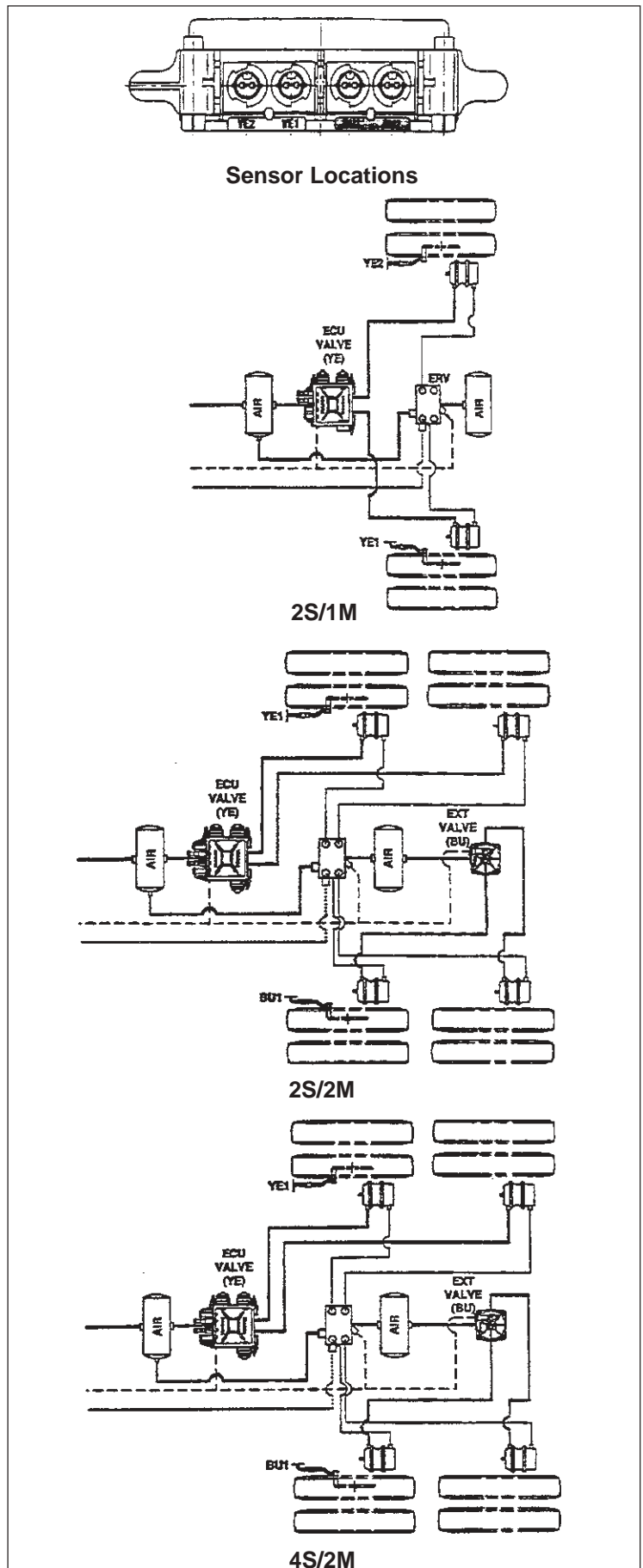
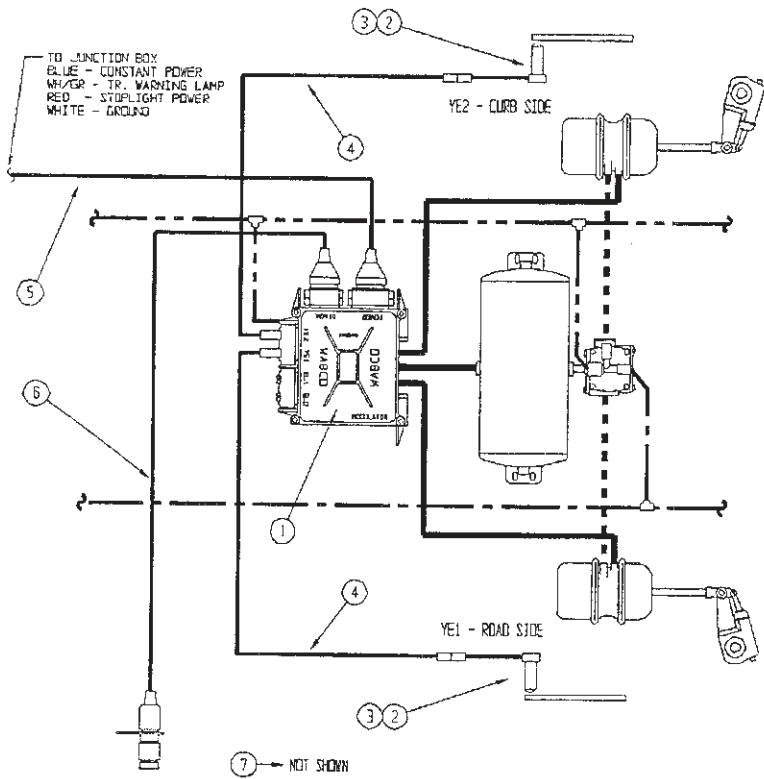


Fig. 8-38 ABS CONFIGURATION

8.15 ABS SCHEMATICS

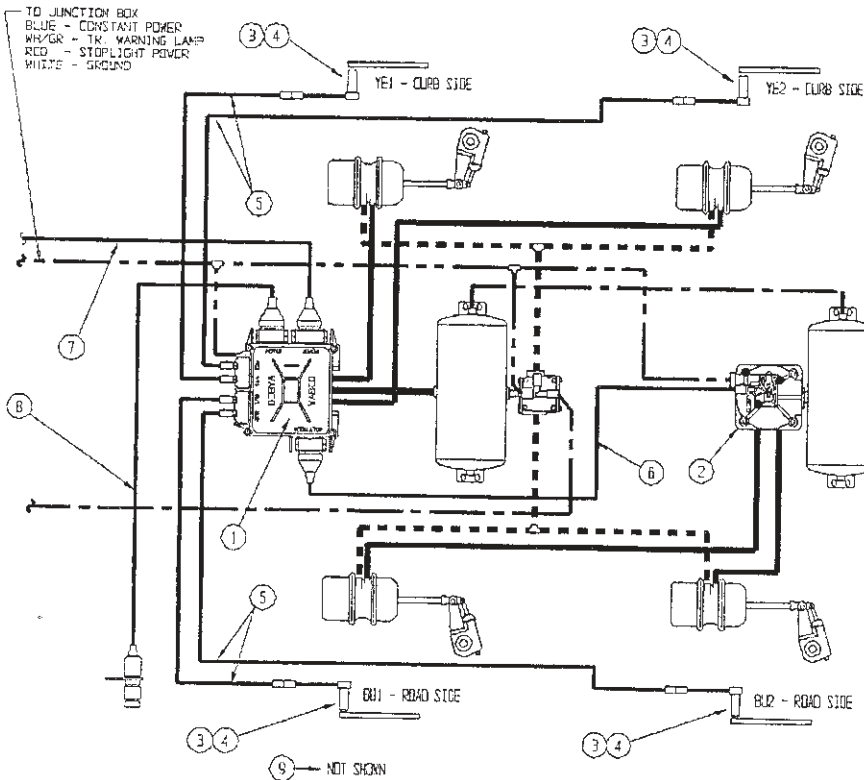


- EMERGENCY / SUPPLY
- - - SERVICE / CONTROL
- SERVICE / DELIVERY
- - - - - PARK / EMERGENCY DELIVERY

NOTE: FOR LIFT AXLE APPLICATION, INSTALL NORMALLY CLOSED PRESSURE SWITCH INTO SUSPENSION LIFT AIR CIRCUIT IN ORDER TO DISCONNECT ECU GROUND CIRCUIT. (DISABLES ABS FOR LIFT AXLE WHEN AXLE IS IN RAISED POSITION)

2S/1M

ITEM	QTY.	MATERIAL	MATERIAL SPECIFICATION	STOCK NUMBER
7	1	# 3305-T-1242	ECU MOUNTING BRACKET	79-17672-6
6	1	# A1-3237-L-1130	DIAGNOSTIC CABLE W/TOOL	79-17673-6
5	1	# 449 315 150 0	POWER CABLE - 4 COND. - 15 n.	79-17674-6
4	2	# 449 713 018 0	SENSOR EXT. CABLE - 1.8 n.	79-17691-6
3	2	# 899 760 510 4	SENSOR CLIP	79-17677-6
2	2	# 441 032 809 0	SENSOR ASS'Y - 1 n. LEAD	79-17679-6
1	1	# 472 500 011 0	ECU VALVE - 2S/1M	79-17682-6



- EMERGENCY / SUPPLY
- - - SERVICE / CONTROL
- SERVICE / DELIVERY
- - - - - PARK / EMERGENCY DELIVERY

NOTE: - SYSTEM SHOWN AS PER TANDEM AXLE SETUP.

- FOR TRIDEM AXLE SETUP, USE SENSORS ON FIRST AND LAST AXLES ONLY.
- INSTALL SERVICE/DELIVERY LINES FOR CENTER AXLE SIMILARLY AS SHOWN.

4S/2M

ITEM	QTY.	MATERIAL	MATERIAL SPECIFICATION	STOCK NUMBER
9	1	# 3305-T-1242	ECU MOUNTING BRACKET	79-17672-6
8	1	# A1-3237-L-1130	DIAGNOSTIC CABLE W/TOOL	79-17673-6
7	1	# 449 315 150 0	POWER CABLE - 4 COND. - 15 n.	79-17674-6
6	1	# 449 421 028 0	RELAY VALVE EXT. CABLE - 2 n.	79-17675-6
5	4	# 449 713 030 0	SENSOR EXT. CABLE - 3 n.	79-17676-6
4	4	# 899 760 510 4	SENSOR CLIP	79-17677-6
3	4	# 441 032 809 0	SENSOR ASS'Y - 1 n. LEAD	79-17679-6
2	1	# 472 195 032 0	RELAY VALVE - 4 PORT	79-17679-6
1	1	# 472 500 012 0	ECU VALVE - 4S/2M (AUTO CON.)	79-17680-6

8.16 ELECTRICAL SYSTEM

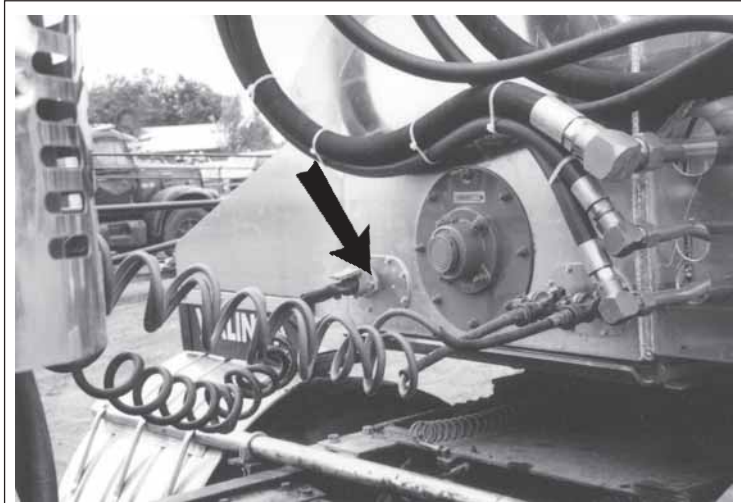
All trailers are equipped with an electrical system for providing power for lights and electrical controls. All components are designed to minimize the effects of foul weather and adverse operating conditions. However, it is the responsibility of the operator to check and verify that all components are in good condition and functioning as intended.

During the daily or pre-trip inspection, always verify that each light functions as required. It may be helpful to work with another individual to verify the function of the brake or turn signal lights. A properly functioning electrical system is the only way an operator can communicate his intentions to other drivers. Checking the electrical system includes but is not limited to:

1. Replace any bulb that is burned out.
2. Clean all reflective lenses. Replace any that are cracked or broken.
3. Clean all connections and terminals to a light that is flickering.
4. Reroute and secure any wires or cables that are dangling or have snagged on something.
5. Check the integrity of the seal around each light. Replace any seal that is cracked or damaged.

Table 8 Trailer Light Requirements

Function	P/N	Size (Watts)
4" Tail Lamp		8
Signal/Brake		27
Side Signal		27
Clearance		8
Marker		5



Electrical Connectors



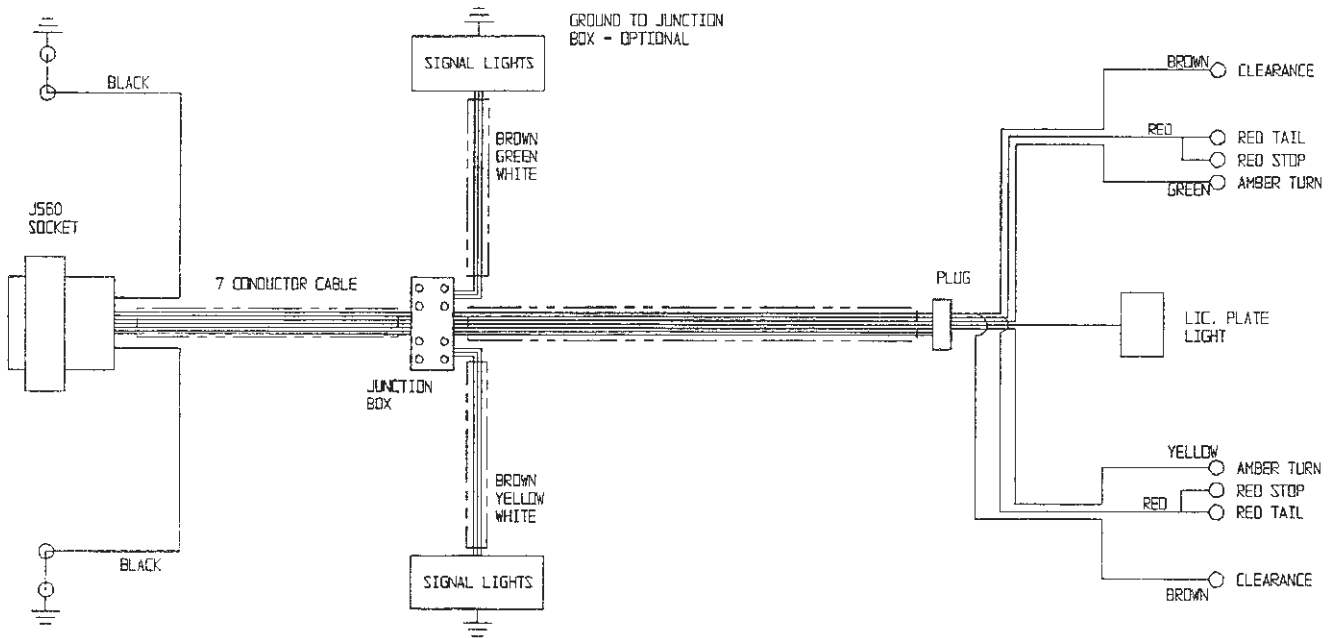
Terminal Box



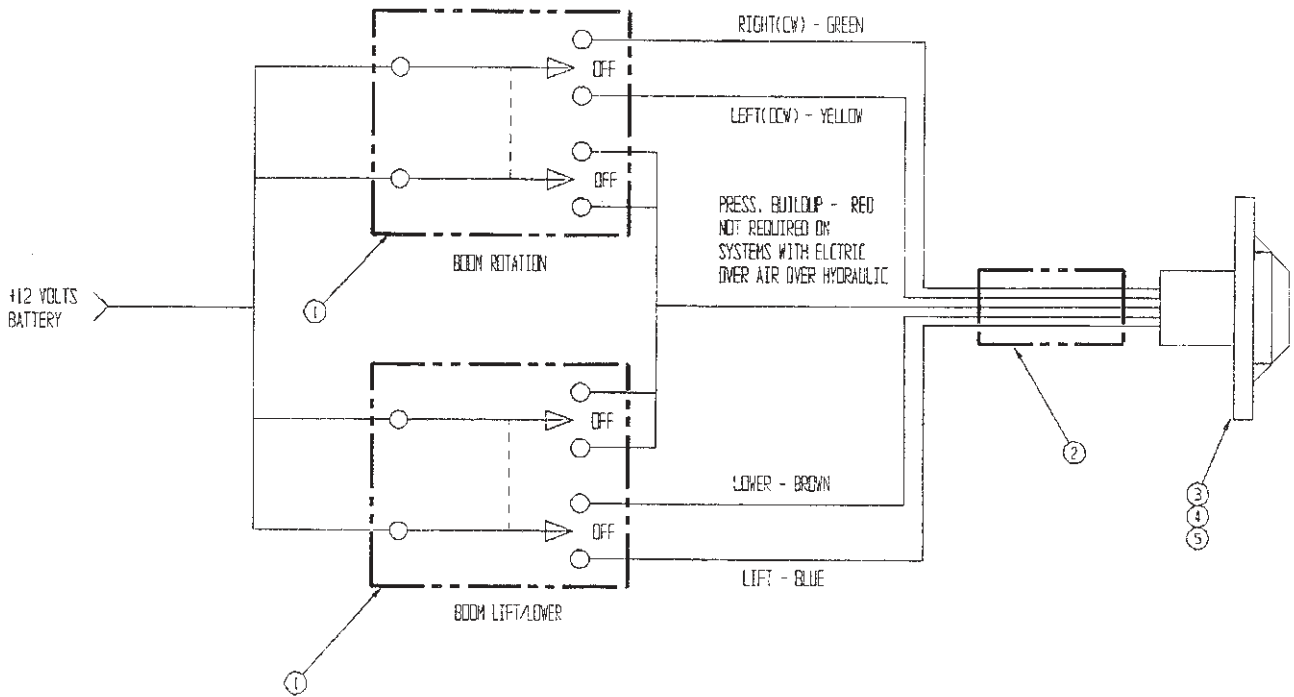
Rear

Fig. 8-39 LIGHTING

8.16.1 ELECTRICAL SCHEMATICS



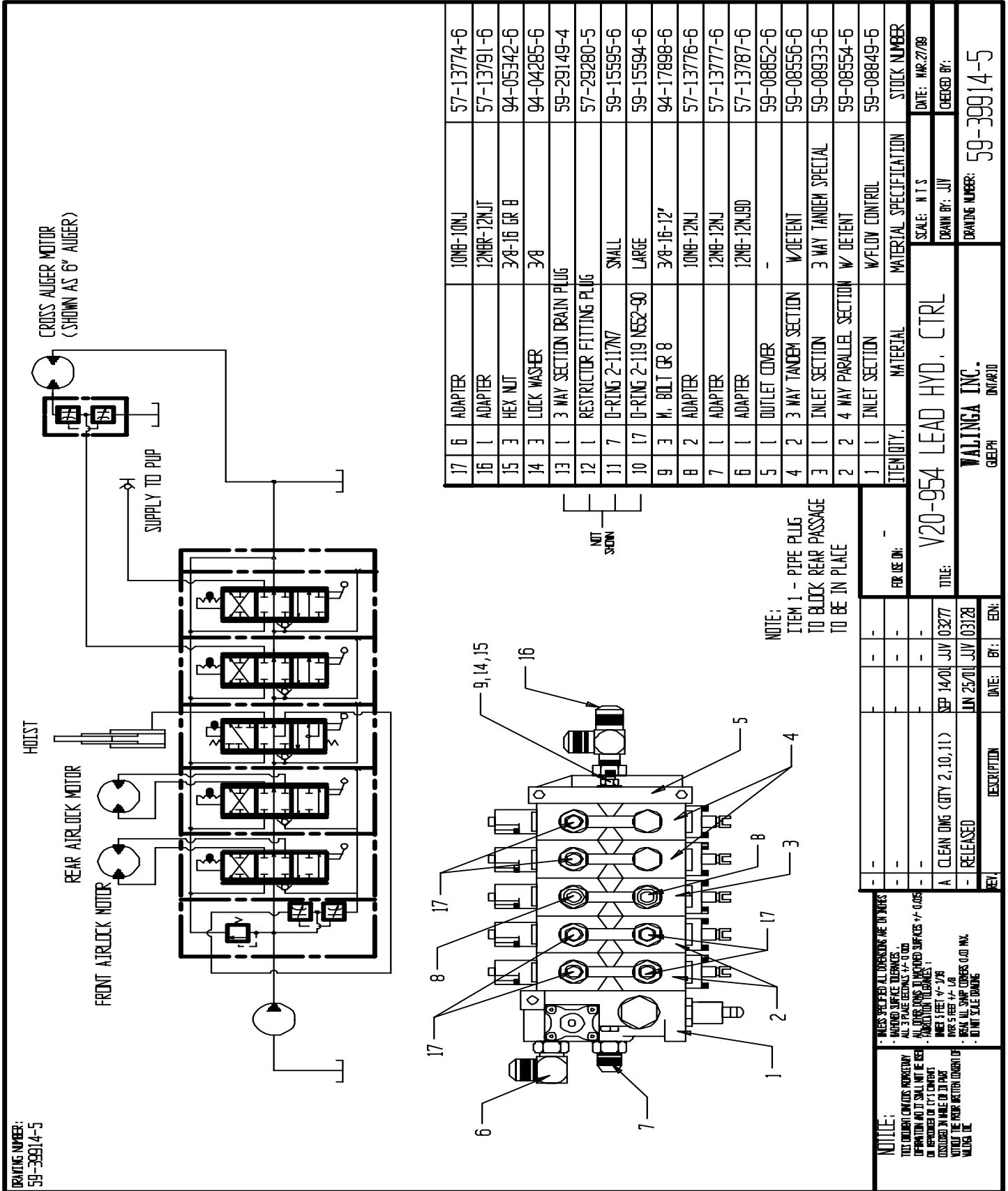
Light Schematic



5	1	BLK. ELEC. COILED CABLE (W/4E ENCS)	NOT SHOWN	B2-15882-6
4	1	DUST CAP	NET SHOWN	B2-00993-6
3	1	CONNECTOR - 7 PEG/E SOCKET		B2-01942-6
2	10 FT.	7 WIRE CABLE		B2-00524-6
1	2	TOGGLE SWITCH - OP/ON - OFF - OI		B2-13708-6
ITEM	QTY.	MATERIAL		STOCK NUMBER

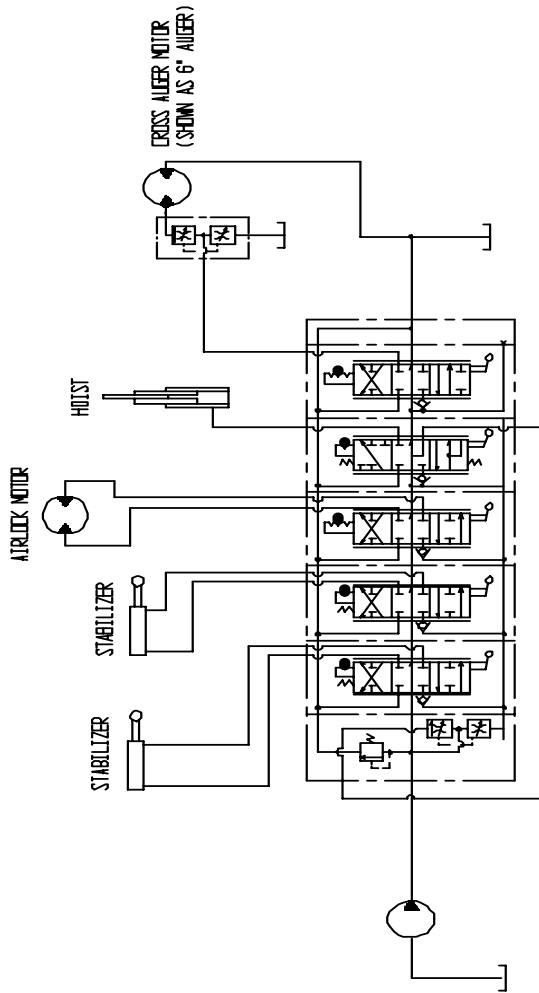
Remote Switch Schematic

8.17 HYDRAULIC SCHEMATICS



Bag Bulk Lead Unit With 6 Inch Crossover

DRAWING NUMBER:
59-07377-5



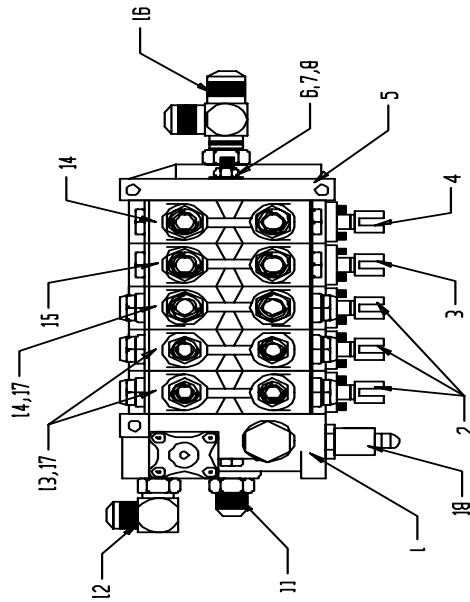
20	1	3 WAY SECTION DRAIN PLUG	-	59-29149-4
19	1	RESTRICTOR FITTING PLUG	-	57-29280-5
18	1	RELIEF CARTRIDGE	WHA - 2300 PSI	59-18227-6
17	6	PORT RELIEF	1800 PSI	59-18228-6
16	1	ADAPTER	12MR-12MJT	57-13791-6
15	2	ADAPTER	10MB-12MJ	57-13776-6
14	4	ADAPTER	10MB-10MJ	57-13774-6
13	4	ADAPTER	10MB-8MJ	57-16786-6
12	1	ADAPTER	12MB-12MJ 90 DEG	57-13787-6
11	1	ADAPTER	12MB-12MJ	57-13777-6
10	7	O-RING	2-117 SMALL	59-15594-6
9	17	O-RING	2-119 LARGE	59-15594-6
8	3	HEX NUT	3/8 - 16	94-05342-5
7	3	LOCK WASER	3/8	94-04285-5
6	3	BOLT GR. 8 HI PLTD	3/8-16-12	94-17898-5
5	1	OUTLET COVER	-	59-08852-5
4	1	3 WAY TANDEN SECTION	W/ DETENT	59-08556-6
3	1	3 WAY TANDEN SPECIAL SECTION	INLET	59-08933-6
2	3	4 WAY PARALLEL SECTION	2 W/ SPRING, 1 W/ DETENT	59-08554-6
1	1	INLET SECTION	W/ FLOW CONTROL	59-08849-6

NOT SHOWN

NOT SHOWN

NOT SHOWN

NOT SHOWN



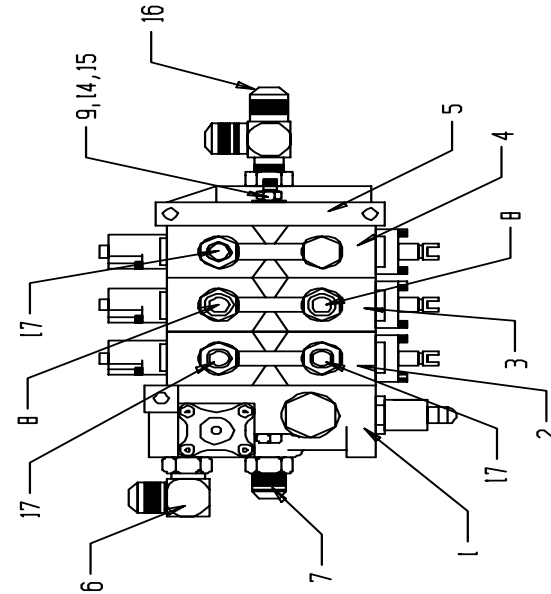
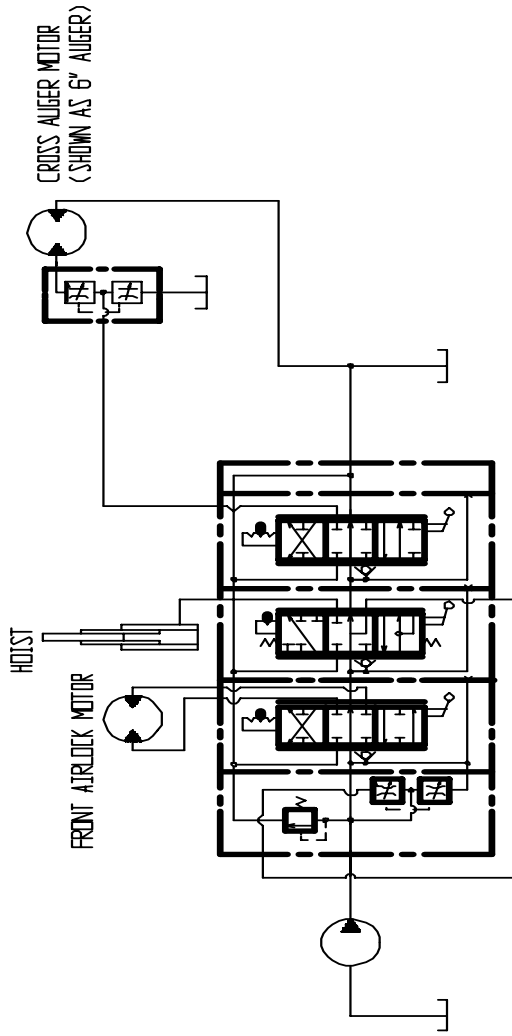
REV	DESCRIPTION	DATE	BY	EDN
A	REDRAWN / UPDATED	APR 30/02	JUV	037/9
TITLE: CTRL ASSY TRLR W/ STABL				
MATERIAL SPECIFICATION				
ITEM QTY. MATERIAL				
FOR USE ON: -				
SCALE: N.T.S				
DATE: MAR 27/89				
DRAWN BY: JUV				
CHECKED BY:				
DRAWING NUMBER: 59-07377-5				

NOTICE:
THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND IT SHALL NOT BE LOANED, REPRODUCED OR IT'S CONTENTS DISCLOSED IN WHOLE OR IN PART WITHOUT THE PRIOR WRITTEN CONSENT OF WALINGA INC.

FINES SPECIFIED ALL DIMENSIONS ARE IN INCHES
 - UNFINED SURFACE DIMENSIONS
 - ALL 3 PHASE DIMENSIONS +/- 0.00
 - ALL DIMENSIONS ON MACHINED SURFACES +/- 0.005
 - FABRICATION TOLERANCES:
 - DIMS 1/8" TO 1" +/- 0.010
 - DIMS 1" TO 3" +/- 0.015
 - DIMS 3" TO 6" +/- 0.020
 - DIMS 6" TO 12" +/- 0.030
 - DIMS OVER 12" +/- 0.040

Bag Bulk Unit Trailer Assembly With Stabilizer

DRAWING NUMBER:
59-22923-5



17	3	ADAPTER	10NB-10NJ	57-13774-6
16	1	ADAPTER	12NB-12NJ	57-13791-6
15	3	HEX NUT	3/8-16 GR B	94-05342-6
14	3	LOCK WASHER	3/8	94-04285-6
13	1	3 WAY SECTION DRAIN PLUG		59-29149-4
12	1	RESTRICTOR FITTING PLUG		57-29280-5
11	5	D-RING 2-117N7	SMALL	59-15595-6
10	11	D-RING 2-119 N532-90	LARGE	59-15594-6
9	3	N. BOLT GR B	3/8-16-8"	94-13462-6
8	2	ADAPTER	10NB-12NJ	57-13776-6
7	1	ADAPTER	12NB-12NJ	57-13777-6
6	1	ADAPTER	12NB-12NJSD	57-13787-6
5	1	OUTLET COVER	-	59-08852-6
4	1	3 WAY TANDEM SECTION	W/O TENT	59-08556-6
3	1	INLET SECTION	3 WAY TANDEM SPECIAL	59-08933-6
2	1	4 WAY PARALLEL SECTION	W/O TENT	59-08554-6
1	1	INLET SECTION	W/FLOW CONTROL	59-08849-6

NOTE:
ITEM 1 - PIPE PLUG
TO BLOCK REAR PASSAGE
TO BE IN PLACE

ITEM QTY.	MATERIAL	MATERIAL SPECIFICATION	STOCK NUMBER
FR USE ON:			
TITLE:		V20-953 HYD. CTRL	SCALE: N.T.S.
DATE:		JUN 14/01	DATE: MAR 27/89
REV:			CHECKED BY:
DESCRIPTION			DRAWN BY: JUV
DATE:		JUN 25/01	DRAWING NUMBER: 59-22923-5
REV:			

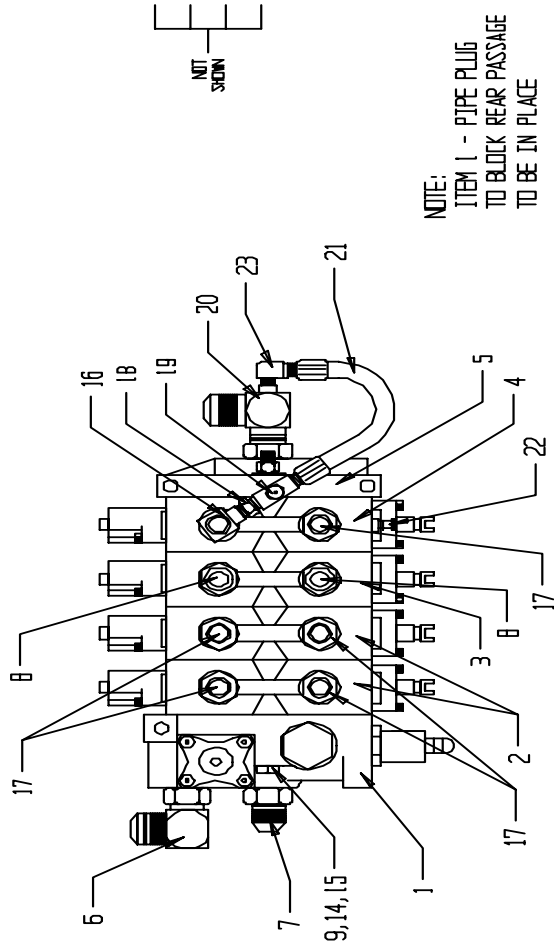
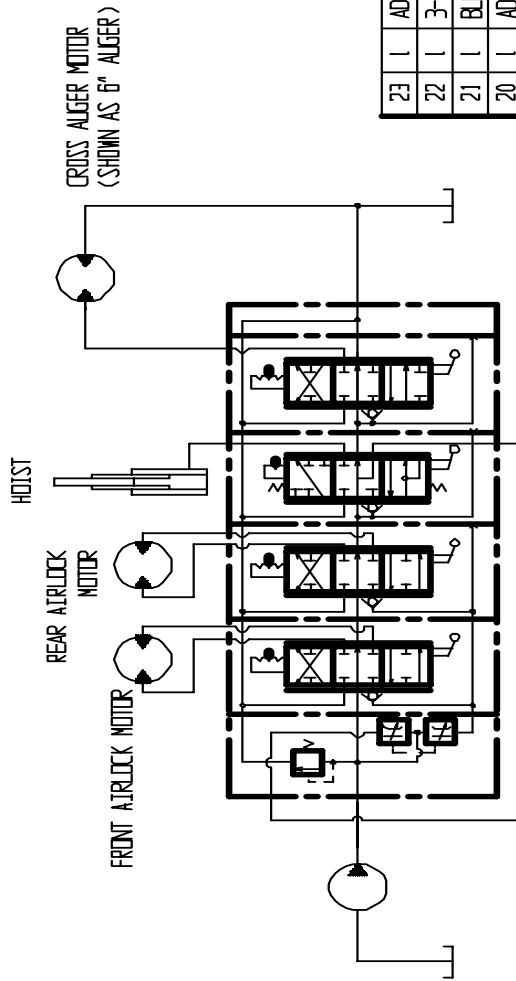
NOTE:
THIS DELIVERY CONDITION INDICATES
OPERATION AND IT SHALL NOT BE USED
OR REWORKED BY THE CONTRACTOR
EXCEPT BY WRITTEN INSTRUCTIONS
ISSUED BY THE PROJECT MANAGER
NOTIFY THE PROJECT MANAGER OF
ANY DEFECTS
WALINGA, INC.

UNLESS SPECIFIED ALL DIMENSIONS ARE IN INCHES
- HATCHED SURFACE TOLERANCES:
ALL 3 PHASE DECIMALS +/- 0.00
ALL OTHER DIMS. TO HATCHED SURFACES +/- 0.05
- FINISH TOLERANCES:
DIMES 3 FEET +/- .005
DIMES 5 FEET +/- .008
- REK ALL SHARP CORNERS 0.01 MAX.
- DO NOT SCALE DRAWING

Bag Bulk Blower Unit With 6 Inch Crossauger

8.17 HYDRAULIC SCHEMATICS (cont'd)

DRAWING NUMBER:
59-06007-5



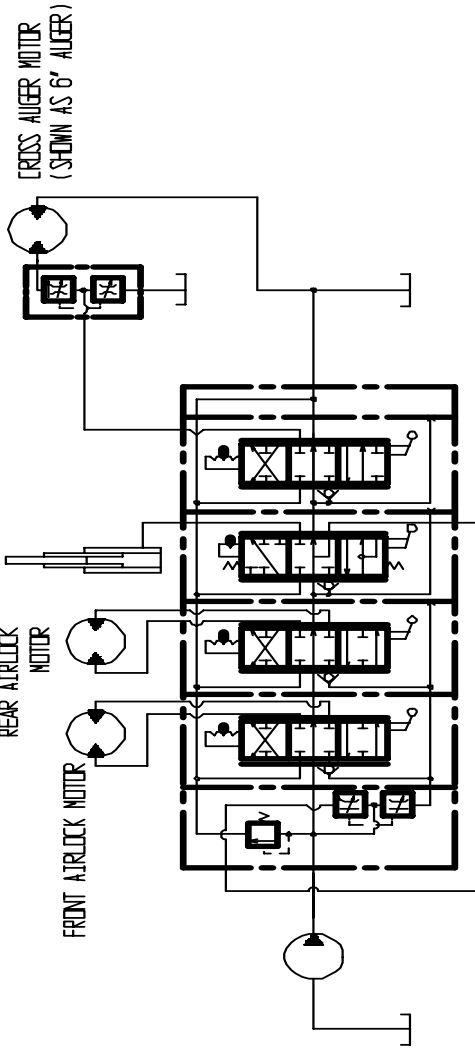
23	1	ADAPTER	4FP-4NP90	57-16475-6
22	1	3-WAY DRAIN PLUG	-	59-29149-4
21	1	BLEED OFF LINE	-	57-40638-5
20	1	ADAPTER	12NJ-12NB9D GAUGE PORT	57-17996-6
19	1	NEEDLE VALVE	1/4" NPT	59-04150-6
18	1	ADAPTER	4NP-4NP	57-16502-6
17	5	ADAPTER	10NB-10NJ	57-13774-6
16	1	ADAPTER TEE	10NB-4FP-10MJ	57-14114-6
15	3	HEX NUT	3/8 - 16 GR B	94-05342-6
14	3	LOCK WASHER	3/8	94-04285-6
13	1	3 WAY SECTION DRAIN PLUG	-	59-29149-4
12	1	RESTRICTOR FITTING PLUG	-	57-29280-5
11	6	O-RING 2-117N7	SMALL	59-15595-6
10	14	O-RING 2-119 NB52-90	LARGE	59-15594-6
9	3	M. BOLT GR B	3/8-16-10"	94-13844-6
8	2	ADAPTER	10NB-12NJ	57-13776-6
7	1	ADAPTER	12NB-12NJ	57-13777-6
6	1	ADAPTER	12NB-12NB9D	57-13787-6
5	1	OUTLET COVER	-	59-08852-6
4	1	3 WAY TANDEM SECTION	W/O TEE	59-08556-6
3	1	INLET SECTION	3 WAY TANDEM SPECIAL	59-08933-6
2	2	4 WAY PARALLEL W/ DETENT	-	59-08554-6
1	1	INLET SECTION	W/FLOW CONTROL	59-08849-6

FOR USE ON:	-	ITEM QTY.	MATERIAL	MATERIAL SPECIFICATION	STOCK NUMBER
TITLE:	V20-954 CTRL ASSY W/ NEEDLE VALVE				
SCALE:	N.T.S				
DATE:	SEPT 17/01				
DRAWN BY:	JUV				
CHECKED BY:	JUV				
DRAWING NUMBER:	59-06007-5				
REV	DESCRIPTION	DATE	BY	ENR	
-	-	-	-	-	
-	-	-	-	-	
B	ITEM 23 ADDED	FEB 18/02	JUV	03714	
A	RE-DRAWN / UPDATED	SEP 17/01	JUV	03274	

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 UNLESS SPECIFIED ALL DIMENSIONS ARE IN INCHES
 - HONED SURFACE TOLERANCES
 - ALL 3 PHASE ELECTRICALS +/- 0.00
 - ALL OTHER DIMS. TO HONED SURFACES +/- 0.005
 - FINISH TO ALL DIMENSIONS
 - DIMS 3 FEET +/- 1/8
 - DIMS 5 FEET +/- 1/8
 - REAL ALL SHARP CORNERS (C/D MAX)
 - IN IT SCALE DRAWING

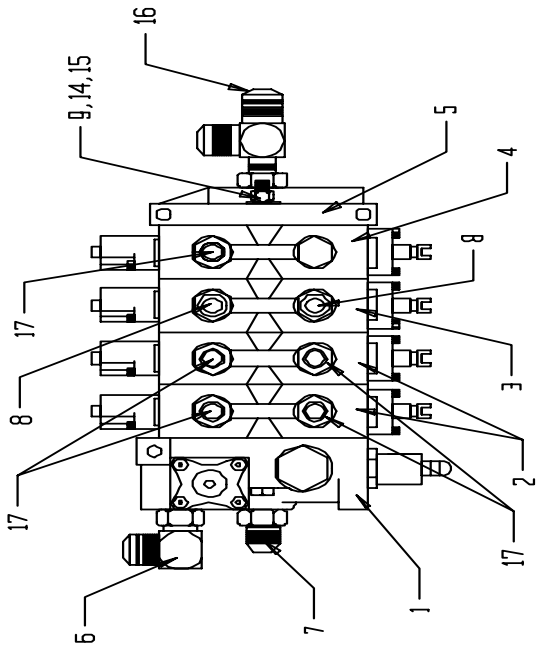
Bag Bulk Blower Transfer With 4 Inch Crossauger

DRAWING NUMBER:
59-22922-5



17	5	ADAPTER	10NB-10NJ	57-13774-6
16	1	ADAPTER	12NB-12NJ	57-13791-6
15	3	HEX NUT	3/8 - 16 GR 8	94-05342-6
14	3	LOCK WASHER	3/8	94-04285-6
13	1	3 WAY SECTION DRAIN PLUG		59-29149-4
12	1	RESTRICTOR FITTING PLUG		57-29280-5
11	6	O-RING 2-117N7	SMALL	59-15595-6
10	14	O-RING 2-119 N552-90	LARGE	59-15594-6
9	3	M. BOLT GR 8	3/8-16-10'	94-13844-6
8	2	ADAPTER	10NB-12NJ	57-13776-6
7	1	ADAPTER	12NB-12NJ	57-13777-6
6	1	ADAPTER	12NB-12NJ90	57-13787-6
5	1	OUTLET COVER	-	59-08852-6
4	1	3 WAY TANDEM SECTION	W/DETENT	59-08556-6
3	1	INLET SECTION	3 WAY TANDEM SPECIAL	59-08933-6
2	2	4 WAY PARALLEL W/ DETENT		59-08554-6
1	1	INLET SECTION	W/FLOW CONTROL	59-08849-6

NOTE:
ITEM 1 - PIPE PLUG
TO BLOCK REAR PASSAGE
TO BE IN PLACE



NOTE:
THIS EQUIPMENT OPERATES PROPERLY ONLY IF MAINTAINED AND OPERATED IN ACCORDANCE WITH THE INSTRUCTIONS AND SAFETY PRECAUTIONS CONTAINED IN THE OPERATOR'S MANUAL.
UNLESS SPECIFIED ALL DIMENSIONS ARE IN INCHES
• MINIMUM SURFACE TOLERANCES:
ALL 3 PLATE DIMENSIONS +/- 0.005
ALL OTHER DIMENSIONS ON HORIZONTAL SURFACES +/- 0.005
• DIMENSIONS ON VERTICAL SURFACES:
DIMENSIONS 1 FEET +/- 0.005
DIMENSIONS 6 INCHES TO 1 FEET +/- 0.005
DIMENSIONS 1/8 INCH TO 6 INCHES +/- 0.005
DIMENSIONS 1/16 INCH TO 1/8 INCH +/- 0.005
• BREAK ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED
• DIMENSIONS IN PARENTHESES ARE FOR REFERENCE ONLY

REV	DESCRIPTION	DATE	BY	ENR
B	REWORK	JUN 25/01	JULY 03/28	
C	CLEAN BDN (CHG ITEM 17)	SEP 14/01	JULY 03/27	

ITEM QTY.	MATERIAL	MATERIAL SPECIFICATION	STOCK NUMBER
TITLE: V20-954 HYD. CTRL			
SCALE: N T S			
DATE: MAR 27/89			
DRAWN BY: JUV			
CHECKED BY:			
DRAWING NUMBER: 59-22922-5			
WALINGA INC.			
GELPH INT/ARD			

Bag Bulk Blower Transfer Unit With 6 Inch Crossauger

9 MAINTENANCE UNLOADING SYSTEM

9.1 BLOWER OIL CHANGING AND BREATHER CLEANING

The gears that drive and time the blower lobes run in an oil bath for lubrication. Maintaining the correct level in the reservoirs and changing every 100 hours or monthly will insure proper lubrication.

When maintaining the blower, follow this procedure:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, disengage PTO clutches, stop engine, set park brake, remove ignition key and wait for all moving parts to stop.
3. **Checking Oil Level:**
 - a. Remove the level plug in each reservoir or check the sight glass.

(Type or Oil see page 7-6).

- b. Oil in the reservoir should just fill the treads of the level plug hole.
 - c. Add oil if low or allow the reservoir to drain if overfilled.

IMPORTANT

It is necessary to maintain the recommended oil level in the reservoir. A low level causes heating from lack of lubrication and rapid gear and bearing wear. Too much oil causes heating from oil churning and can cause seal and breather leaks.

- d. Install and tighten the level plug.

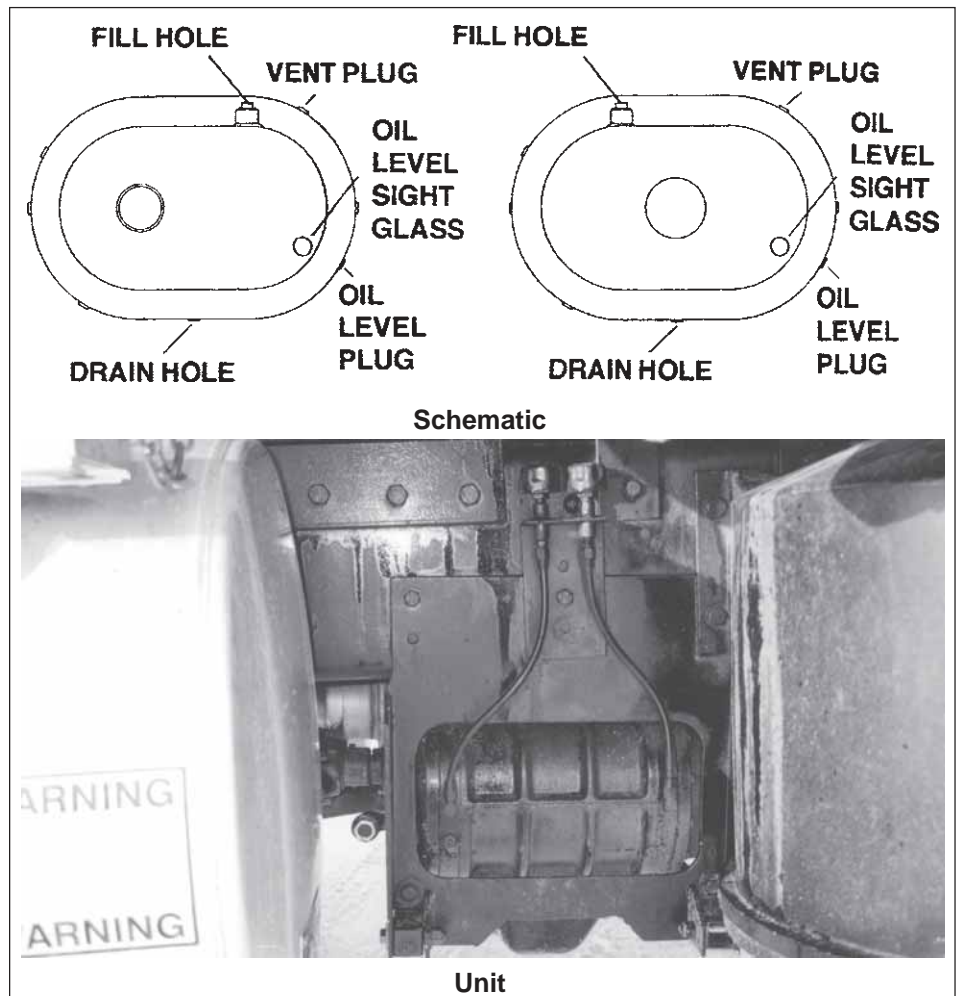


Fig. 9-1 BLOWER

4. **Changing Oil:**
 - a. Place a collection pan or pail under each drain plug.
 - b. Remove each drain plug.
 - c. Flush each case and allow several minutes to drain.
 - d. Dispose of the oil in an approved manner. Do not contaminate the worksite with used oil.
 - e. Install and tighten the drain plugs.
 - f. Remove fill and level plugs.
 - g. Add Walinga Blower oil or equivalent to each reservoir until the oil is just starting to come out of the level plug hole.

IMPORTANT

Condensation forms and collects inside the reservoirs during machine operation. Changing oil removes this water and prevents it from damaging the gears and bearings.

- h. Install and tighten the level and fill plugs.

5. **Cleaning Breathers:**

- a. Remove breathers and blow out with an air hose.
- b. If dirt has caked up in the breather, soak in good solvent and then blow out. It may be necessary to use a probe to loosen the dirt.
- c. Install and tighten the breather.
- d. Clean vents in end plates located under the blower on either side of the drain plug.



Fig. 9-2 VENTS

9.2 AIRLOCK

The airlocks act as a seal between the atmospheric and pressure sides of the machine and are located under the back end of the box and left front corner. As the rotor turns, a pocket is filled with material when it points upward. As the pocket rotates, it is moved to the bottom and is moved into the pressure side of the system. The grain is picked up by the stream of pressurized air and moved out the discharge piping for loading or unloading.

Efficient operation of the airlock requires a close fit between the tips of the rotor and the case to maintain a seal between atmospheric and pressure sides.

When checking or maintaining the airlock, follow this procedure:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, disengage PTO clutches, stop engine, set park brake, remove ignition key and wait for all moving parts to stop.
3. **Checking Tip Clearance:**
 - a. Checking the airlock can be done through the sliding cover or through material screen canister.
 - b. Use a feeler gauge to check the clearance between the tip and the case. Inspect each tip over its entire width.
 - c. The clearance of the tips must be maintained at 0.004 to 0.006* inches at all times. Adjust or replace tips as required to insure system sealing. (*614 units .007 to .009).
 - d. Replace any tips that are bent, chipped or broken.

NOTE

Blades are reversible if not excessively damaged.



Front



Rear



Airlock

Fig. 9-3 TIP CLEARANCE

4. **Wiper Blade:**

A wiper blade is located at the top of the airlock to clean the tips as the airlock turns. To check the wiper blade, follow this procedure:

- a. Open the sliding cover or material screen canister.
- b. Reach into the top of the airlock and feel the condition of the wiper blade.
- c. Replace if it is damaged in any way.



Fig. 9-4 AIRLOCK WIPER BLADE

5. **Blade Replacement:**

- a. Open the sliding cover or material screen canister.
- b. Remove the tips from the rotor and the wiper blade from the housing.
- c. File the ends of each replacement blade so there is approximately 0.006 inches of clearance between the ends and the housing.
- d. Mount the blades to their respective vane and tighten bolts finger tight.
- e. Rotate airlock rotor slightly to set the clearance between the blade and the case. Be sure to set it at 0.004 inches of clearance. Use a feeler gauge.
- f. Tighten the center bolt first. Then the others.
- g. Rotate the airlock and listen if it touches the housing anywhere. A slight touch is alright.
- h. Repeat mounting procedure with the other blades.
- i. Turn the rotor after each blade is installed to be sure it does not contact the case.
- j. Mount the new wiper blade. Be sure the wiper contacts each tip slightly as the airlock turns.
- k. Pour 1/2 gallon Varsol into the airlock.
- l. Install plate over the top of airlock.
- m. Run the airlock at operating speed.
- n. Clean thoroughly.
- o. Blow out varsol.
- p. Remove plate over airlock.
- q. Close sliding cover or material screen canister.

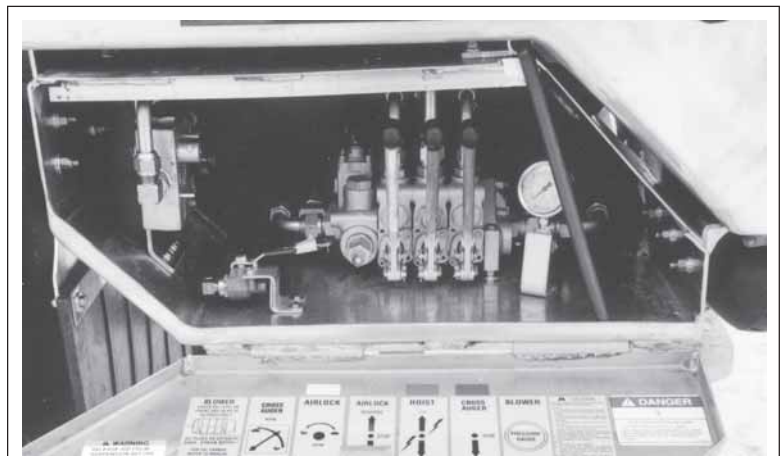
9.3 AIR SYSTEM RELIEF VALVES

The air in this system is moved by the blower. It draws air into the intake side and creates a vacuum that can pick up and draw material into the system. As the air moves through the blower, it becomes pressurized and flows through the airlock to move material out of the system and to its destination. As the flow into the intake is restricted, the vacuum will build until it exceeds the setting of the intake relief valve. The valve opens to supply a flow of air to the blower to prevent overheating. A relief valve on the pressure side will also open to allow air flow if the airlock (outlet pressure side of the circuit) is restricted or plugged.

The vacuum side relief valve is set to open at 15 in. Hg vacuum and the pressure side at 15 psi. Both must function at very close to these specified levels to insure optimum capacity and performance. After prolonged use, the springs in these valves can weaken causing the valve to open prematurely and affect machine performance. Dirt and debris can get caught in the valve seat allowing air leakage that affects system performance.

To maintain air system relief valves, follow this procedure:

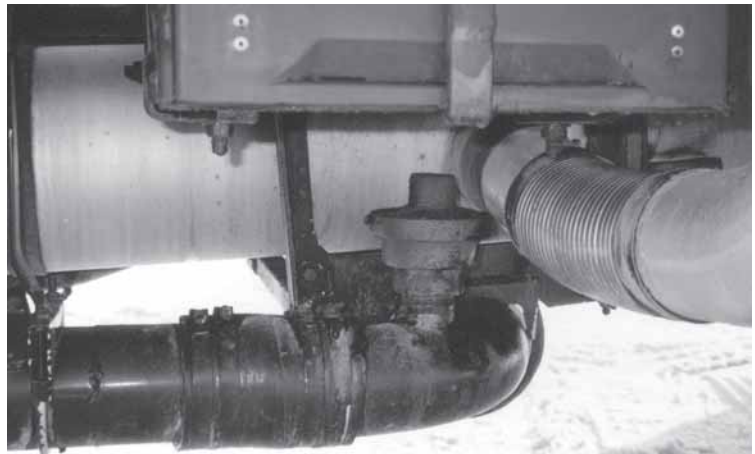
1. Listen for the valves opening during operation. They will sound like a popping or a whistle if they are opening.
2. Watch the gauges in the control box to monitor the pressure in the vacuum and pressure sides of the air circuit.
3. Restrict the flow into the intake side of the air system until you hear the valve open. The vacuum gauge should read 15 in. Hg. If it does not, replace valve.
4. Restrict the output side until you hear the valve open. The pressure gauge should read 15 psi. If it does not, replace the valve.
5. Place all controls in neutral or OFF, stop engine, remove ignition key and wait for all moving parts to stop.



Gauges



Vacuum



Pressure

Fig. 9-5 RELIEF VALVES (TYPICAL)

6. Remove old valve and replace it with a new one.
7. Tighten valve into fitting to secure.

10 TROUBLE SHOOTING

The Walinga Bulk Feed Unit uses an auger, air or a dual system for unloading material as required. It is a simple and reliable system that requires minimal maintenance.

In the following section, we have listed many of the problems, causes and solutions to the problems that you may encounter.

If you encounter a problem that is difficult to solve, even after having read through this trouble shooting section, please call your local Walinga dealer or distributor. Before you call, please have this Operator's Manual and the serial numbers from your trailer ready.

PROBLEM	CAUSE	SOLUTION
1. Air Ride Suspension		
Trailer leans...		
...constantly in one direction	Suspension beams installed out of parallel.	Determine which beam is out of parallel, cut from axle, reposition and re-weld.
...varies from side to side.	Axle welds missing or broken.	Clear away old welds, reposition the beams to be parallel and re-weld to axle.
...varies in one direction.	Failed pivot bushing (rare).	Contact Hendrickson Turner Technical Service Department.
<hr/>		
Trailer "Dog-Tracks"...		
...constantly to one side.	Trailer out of alignment.	Remove weld from the alignment collars on those axles requiring adjustment. Realign per procedure provided by Hendrickson Turner.
...from side to side.	Missing or broken alignment collar welds.	Clear away failed welds and realign per procedure provided by Hendrickson Turner.
...to one side under load.	Suspension not square to axle.	Contact the Hendrickson Turner Technical Service Department.
	Air springs misaligned.	Compare the installation to the suspension drawing and reposition mountings as required.
	Failed pivot bushing (rare).	Contact the Hendrickson Turner Technical Service Department.

PROBLEM

CAUSE

SOLUTION

1. Air Ride Suspension (cont'd)

Bushing Walk

The suspension beams have shifted from the center of the pivot bushings).

Incorrect alignment.

Re-bush the suspension and re-align as per Hendrickson Turner instructions.

Suspension beams out of parallel (vertically or longitudinally).

Determine which beam(s) is out of position, cut from axle, reposition and weld. Re-bush both suspension pivots.

Frame bracket centers do not match the suspension beam centers.

Compare the installation dimensions to the suspension assembly drawing. Reposition the incorrect components and re-bush both suspension pivots.

Use of improper bushing lubricant.

Re-bush using lubricant supplied by Hendrickson Turner.

Pivot can be moved vertically.

Faulty or worn bushing.

Replace bushing.

Bushing protrudes from the bushing tube.

Failed bushing.

Rubber protruding from both ends of the bushing tube is normal. Excess rubber protruding from one end can indicate a bushing walk condition.

PROBLEM

CAUSE

SOLUTION

2. Mechanical Suspension

Improper suspension spring action.

Broken or cracked spring leaves.

Replace complete spring.

Uneven load distribution.

Rearrange load for proper distribution.

Weak spring.

Replace spring.

Springs out of alignment in hangers due to loose U-bolts.

Align springs and tighten U-bolts to proper torque.

PROBLEM**CAUSE****SOLUTION****3. Tires**

	Over or under inflation.	Inflate to proper pressure.
	Loose wheel stud nuts or clamps.	Tighten wheel stud nuts or clamps.
	Loose or tight wheel bearing.	Adjust bearings.
	Axle bent or out of alignment.	Straighten, align or replace axle.
	Tires not properly matched.	Match tires.
	Improper acting brakes.	Correct brakes as required.
	Rapid stopping.	Apply brakes slowly when approaching stops.
	High speed.	Reduce speed.
<hr/>		
	Over or under inflation.	Inflate to proper pressure.
	Excessive speed on turns.	Reduce speed.
	Tire wobble due to uneven rim clamping.	Torque tighten all rim clamps.
	Worn or damaged wheel bearings.	Replace bearings.
	Bent wheel or rim.	Replace wheel or rim.
	Bent axle.	Replace or straighten axle.
<hr/>		
	Leaf spring broken.	Replace leaf or complete spring.
	Bent axle.	Replace or straighten axle.
	Frame or suspension (axles) out of alignment.	Straighten frame or align axles.
<hr/>		
Loss of tire air pressure.	Puncture in tire.	Repair or replace tire.
	Faulty valve or valve core.	Replace valve assembly or core.
	Wheel or rim damage.	Replace wheel or rim.

PROBLEM	CAUSE	SOLUTION
4. Electrical		
Lights flicker or do not come on.	Bad connection.	Check electrical system circuits.
	Frayed wires.	Repair as required.
	Battery on tractor not sufficiently charged.	Charge battery.
	Damaged or disconnected wire on ground cable.	Repair or replace cable.
	Poor ground at sockets.	Repair as necessary.
Complete loss of trailer lights.	Broken main harness.	Repair or replace.
	Junction box failure.	Replace junction box.
	Frayed wires.	Repair as required.
	Damaged or disconnected ground cable.	Repair or replace cable as required.
	Loose or corroded connection in ground lead between tractor and trailer.	Repair or replace.
Lights flash improperly or appear to be crossed.	Internal short in junction box.	Repair or replace junction box.

PROBLEM**CAUSE****SOLUTION****5. Air System**

Excessive compressor cycling.

Air leak.

Check air line fittings and hose connections on service or supply line.

Check service chamber at clamp housing, push rod for damage.

Check service chamber diaphragm.

Check emergency chamber clamp and vent holes for leakage.

Repair or replace air chamber as required.

Check FFVII brake valve if so equipped. Repair or replace as required.

Trailer brakes slow and sluggish.

System or component failure.

Check slack adjuster and chamber/spring brake push rod alignment for interference.

Assure slack adjuster and chamber/spring brake push rod angle 90° applied with proper adjustment.

Assure open lines - no kinks, bends, closed shut-off cocks, restrictions, excessive elbows.

Assure adequate tractor brake function.

Have authorized service center check for adequate pressure and timing balance relative to tractor/trailer application.

PROBLEM

CAUSE

SOLUTION

5. Air System (cont'd)

Trailer brakes drag.

System or component failure

Assure emergency line exceeds 120 psi pressure; check and maintain governor at max. cut-in.

Check slack adjuster and chamber/spring brake push rod alignment for interference.

Assure slack adjuster and chamber/spring brake push rod angle 90° applied with proper adjustment.

Assure open lines - no kinks, bends, closed shut-off cocks, restrictions, excessive elbows.

Check for trapped service air pressure at trailer service/delivery hoses. If air pressure is noted, check for full release of all application valves (tractor/truck/trailer).

Trailer brakes won't apply (service).

System or component failure.

Check air delivery to emergency system.

Check air delivery to service gladhand.

Check air delivery to air chamber or spring brake.

Check air delivery to all reservoirs at system working pressure.

Check slack adjuster and chamber/spring brake push rod alignment for interference.

Check slack adjuster and chamber/spring brake push rod angle 90° applied with proper adjustment.

Park/emergency brakes won't release.

System or component failure.

Check air jumper hoses are not crossed between tractor and trailer.

Check air delivery to emergency gladhands exceeds 120 psi.

Check air delivery to FFV valve.

Check air delivery to all reservoirs at system working pressure.

PROBLEM**CAUSE****SOLUTION****5. Air System (cont'd)**

Park/emergency brakes won't release (cont'd).

System or component failure (cont'd).

Check open lines - no kinks, bends, closed shut-off cocks, restrictions, excessive elbows.

Check that brake shoes are not frozen to drums.

Park/emergency brakes won't hold.

System or component failure.

Check slack adjuster and chamber/spring brake push rod alignment for interference.

Assure slack adjuster and chamber/spring brake push rod angle 90° applied with proper adjustment.

Air reservoir leaks or loose mounting.

System or component failure.

Replace/use rubber grommets with integral brackets.

Semi-trailer "Runs-Up" on tractor.

Check brake linkage.

Assure slack adjuster and chamber/spring brake push rod angle 90° applied with proper adjustment.

Check gladhand connection.

Assure open lines - no kinks, bends, closed shut-off cocks, restrictions, excessive elbows.

Have authorized service center check for adequate pressure and timing balance relative to tractor/trailer application.

Poor braking performance.

Uneven brakes.

Check slack adjuster and chamber/spring brake push rod angle 90° applied with proper adjustment.

Check open lines - no kinks, bends, closed shut-off cocks, restrictions, excessive elbows.

Check for leaks in system by applying service brake and inspecting.

PROBLEM

CAUSE

SOLUTION

5. Air System (cont'd)

Poor braking performance (cont'd).

Trailer brake lining wear excessive.

Have authorized service center check for adequate pressure and timing balance relative to tractor/trailer application.

Proceed per problem "trailer brakes drag."

Trailer brakes slow to apply.

Check slack adjuster and chamber/spring brake push rod angle 90° applied with proper adjustment.

Check air delivery to all reservoirs at system working pressure.

Check open lines - no kinks, bends, closed shut-off cocks, restrictions, excessive elbows.

Have authorized use of "jumper hose analyser" and duplex gauge to pin-point brake imbalance.

Check functional return spring in service chamber or spring brake.

Check open lines - no kinks, bends, closed shut-off cocks, restrictions, excessive elbows.

Trailer service brakes slow to release.

Have authorized use of "jumper hose analyser" and duplex gauge to pin-point brake imbalance.

Slack adjuster not auto-adjusting.

Check for damaged actuator rod. Replace as required.

Slack adjuster internal components seized. Replace.

Cracked housing.

Replace slack adjuster.

Worn clevis pin bushing.

Replace bushing

PROBLEM

CAUSE

SOLUTION

5. Air System (cont'd)

Poor braking performance (cont'd).

Full function valve (FFV) leaks at exhaust port with all brakes released.

Replace FFV valve.

Full function valve (FFV) leaks at exhaust port with service brakes applied.

Replace FFV valve.

Spring parking brake (service only service chamber side of spring brake) drags or won't release.

Check for:

- Improper adjustment, restriction or broken line.
- Diaphragm failure.
- System pressure too low (120 psi min).
- Replace entire unit or piggy-back emergency section.

Spring parking brake leaks when pressurized for park brake release.

Check for:

- Ruptured spring side diaphragm.
- Hose leaks.
- Repair hose leak or replace spring brake chamber.

PROBLEM	CAUSE	SOLUTION
6. Hydraulic System		
No oil pressure.	Hose hook up incorrect.	Reverse hoses on pump.
	Loose coupling in driveline.	Check setscrews in driveline.
	Loose connection.	Check hose fittings.
	Air in oil.	Check hose fittings.
Noisy pump.	Bent drive shaft.	Check driveline.
	Low oil supply.	Increase oil in reservoir.
	Air in oil.	Check hose fittings.
Cross auger running in reverse.	Wrong motor rotation.	Switch oil lines on cross auger motor.
Auger does not turn when motor is running.	Key in auger bushing is sheared.	Replace key.
	Motor shaft is broken.	Remove motor and check shaft.
Cross auger is exceedingly noisy.	Loose bearing.	Tighten bearing.
	Key in motor shaft is sheared.	Remove and straighten.
Evidence of oil in feed.	Auger is bent.	Remove motor and seal.
	Leaking oil seal on auger motor.	Replace seal.

PROBLEM	CAUSE	SOLUTION
7. Orbit Motor		
Slow operation.	Plugged filter.	Replace filter element or clean filter.
	Relief setting too low.	Set relief valve for proper PSI.
	Worn pump.	Repair or replace pump.
	Worn motor.	Replace worn parts or motor.
	Extremely high fluid temperature causing pump and motor to slip (temp. increase as pump and motor wear).	Increase reservoir size and use a high viscosity index such as 20W40.
	Inadequate size oil lines.	Increase oil lines.
	Pump cavitation.	Increase oil line size to pump, in cold weather, use 5W20 oil.
Motor will not turn.	Shaft seized in housing due to excessive side load or misalignment (Note 500 lb. max. radial loading on shaft).	Replace housing assembly set if damaged.
	Large contaminating particles in fluid such as machining chips or sand - very dirty fluid.	Flush new systems - use better filtration.
	Broken shaft from extreme side loads or misalignment.	Correct and replace.
Motor runs without turning shaft.	Broken shaft.	Replace shaft assembly - check housing for wear and replace if necessary.
Motor turns in wrong direction after being replaced.	Hose connections wrong.	Reverse connections.
Leak at shaft.	Worn or cut quad-ring.	Replace quad-ring, polish shaft at seal area with #600 wet or dry sanding cloth.

PROBLEM	CAUSE	SOLUTION
7. Orbit Motor (cont'd)		
Leak between flange and housing.	Loose flange.	Tighten.
	Damaged seal between housing flange.	Replace seal. Check housing surface at seal for sharp nicks or deep scratches.
	Leak in body plug seal.	Replace faulty o-rings.
<hr/>		
Leak between housing and wear plates or between wear plates and gerotor.	End cap bolts loose. (Note: All motors are tested and rated of a maximum back pressure of 1000 PSI).	Tighten the cap screws at gerotor end of motor - if the threads are accidentally stripped in the housing, the hole may be drilled and tapped deeper and the motor reassembled w/longer bolts.
<hr/>		
Leak between gerotor and end cap.	Dirt between surfaces.	Reassemble - clean and dry parts.
	Scratches or nicks on surfaces.	Polish very carefully on a flat, hard surface - use #600 or finer abrasive cloth and very little pressure - avoid rounding edges.
<hr/>		
Cracked front flange.	Use installation bolts which are too long and bottom against housing.	Replace flange and use proper size bolts.
<hr/>		
Leak at oil ports.	Poor fittings.	Replace fittings carefully.
	Damaged threads.	Replace housing or use nut such as true seal.

PROBLEM	CAUSE	SOLUTION
8. Hoist		
Failure to tip.	Shortage of oil.	Fill up tank.
	Air locked in system.	Bleed pump, check joints in low pressure flexible pipe.
	Oil not reaching ram.	Check for shortage of oil, wrong grade of oil, or faulty pump.
	Oil not reaching pump.	Check for stoppage in feed pipe and oil filter.
	Control valve spool clogged.	Clean out valve thoroughly.
	Pressure relief valve.	Insert gauge and check pressure, this should be 1800 psi.
Body creeps slowly downwards.	Dirt wedged under lowering valve, check valve or overload valve seat.	Flush valves by opening and closing quickly with pump running. If this does not cure the trouble, remove and clean valve thoroughly.
Sluggish operation.	Shortage of oil.	Refer to 1 a).
	Air locked in system.	Refer to 1 b).
	Leaking joints.	Tighten all joints.
	Worn pump.	Replace if necessary.
Hoist operates jerkily.	Air locked in system.	Refer to 1.

11 SPECIFICATIONS

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

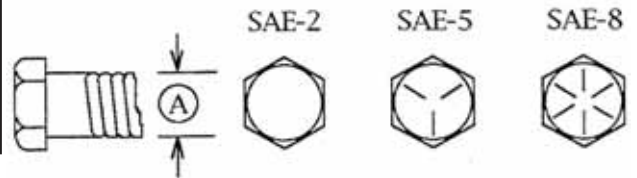
11.1 BOLT TORQUE

CHECKING BOLT TORQUE

The tables shown below give correct torque values for various bolts and capscrews. Tighten all bolts to the torques specified in chart unless otherwise noted. Check tightness of bolts periodically, using bolt torque chart as a guide. Replace hardware with the same strength bolt.

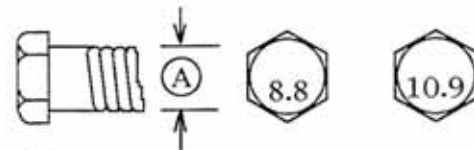
ENGLISH TORQUE SPECIFICATIONS

Bolt Diameter "A"	Bolt Torque*					
	SAE 2 (N.m) (lb-ft)		SAE 5 (N.m) (lb-ft)		SAE 8 (N.m) (lb-ft)	
1/4"	8	6	12	9	17	12
5/16"	13	10	25	19	36	27
3/8"	27	20	45	33	63	45
7/16"	41	30	72	53	100	75
1/2"	61	45	110	80	155	115
9/16"	95	60	155	115	220	165
5/8"	128	95	215	160	305	220
3/4"	225	165	390	290	540	400
7/8"	230	170	570	420	880	650
1"	345	225	850	630	1320	970



METRIC TORQUE SPECIFICATIONS

Bolt Diameter "A"	Bolt Torque*			
	8.8 (N.m) (lb-ft)		10.9 (N.m) (lb-ft)	
M3	.5	.4	1.8	1.3
M4	3	2.2	4.5	3.3
M5	6	4	9	7
M6	10	7	15	11
M8	25	18	35	26
M10	50	37	70	52
M12	90	66	125	92
M14	140	103	200	148
M16	225	166	310	229
M20	435	321	610	450
M24	750	553	1050	774
M30	1495	1103	2100	1550
M36	2600	1917	3675	2710



Torque figures indicated above are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or capscrews unless otherwise specified in this manual. When using locking elements, increase torque values by 5%.

* Torque value for bolts and capscrews are identified by their head markings.

11.2 HYDRAULIC FITTING TORQUE

TIGHTENING FLARE TYPE TUBE FITTINGS *

1. Check flare and flare seat for defects that might cause leakage.
 2. Align tube with fitting before tightening.
 3. Lubricate connection and hand tighten swivel nut until snug.
 4. To prevent twisting the tube(s), use two wrenches. Place one wrench on the connector body and with the second tighten the swivel nut to the torque shown.
- * The torque values shown are based on lubricated connections as in reassembly.

	Tube Size OD (in.)	Nut Size Across Flats (in.)	Torque Value*		Recommended Turns To Tighten (After Finger Tightening)	
			(N.m)	(lb-ft)	(Flats)	(Turn)
	3/16	7/16	8	6	1	1/6
	1/4	9/16	12	9	1	1/6
	5/16	5/8	16	12	1	1/6
	3/8	11/16	24	18	1	1/6
	1/2	7/8	46	34	1	1/6
	5/8	1	62	46	1	1/6
	3/4	1-1/4	102	75	3/4	1/8
	7/8	1-3/8	122	90	3/4	1/8

TIGHTENING O-RING FITTINGS *

1. Inspect O-ring and seat for dirt or obvious defects.
2. On angle fittings, back the lock nut off until washer bottoms out at top of groove.
3. Hand tighten fitting until back-up washer or washer face (if straight fitting) bottoms on face and O-ring is seated.
4. Position angle fittings by unscrewing no more than one turn.
5. Tighten straight fittings to torque shown.
6. Tighten while holding body of fitting with a wrench.

	Tube Size OD (in.)	Nut Size Across Flats (in.)	Torque Value*		Recommended Turns To Tighten (After Finger Tightening)	
			(N.m)	(lb-ft)	(Flats)	(Turn)
	3/8	1/2	8	6	2	1/3
	7/16	9/16	12	9	2	1/3
	1/2	5/8	16	12	2	1/3
	9/16	11/16	24	18	2	1/3
	3/4	7/8	46	34	2	1/3
	7/8	1	62	46	1-1/2	1/4
	1-1/16	1-1/4	102	75	1	1/6
	1-3/16	1-3/8	122	90	1	1/6
	1-5/16	1-1/2	142	105	3/4	1/8
	1-5/8	1-7/8	190	140	3/4	1/8
	1-7/8	2-1/8	217	160	1/2	1/12

- * The torque values shown are based on lubricated connections as in reassembly.

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INC.

Head Office:
RR#5
Guelph, Ontario, N1H 6J2
PHONE (888) 925-4642
FAX (519) 824-5651
www.walinga.com

FACTORY DISTRIBUTION AND SERVICE CENTRES:

IN CANADA:

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- 579 4th Street NW
Sioux Center, Iowa USA 51250
Tel (800) 845-5589 Fax (712) 722-1128

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