



ALL-WHEEL STEER HEADER TRANSPORTS



6-WHEEL ALL-WHEEL STEER HEADER TRANSPORT MAINTENANCE

4-WHEEL ALL-WHEEL STEER HEADER TRANSPORT MAINTENANCE

**INNOVATING
THE FUTURE OF
AGRICULTURE**

TRANSPORTATION

UNVERFERTH MFG. CO., INC.
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SECTION IV

Maintenance

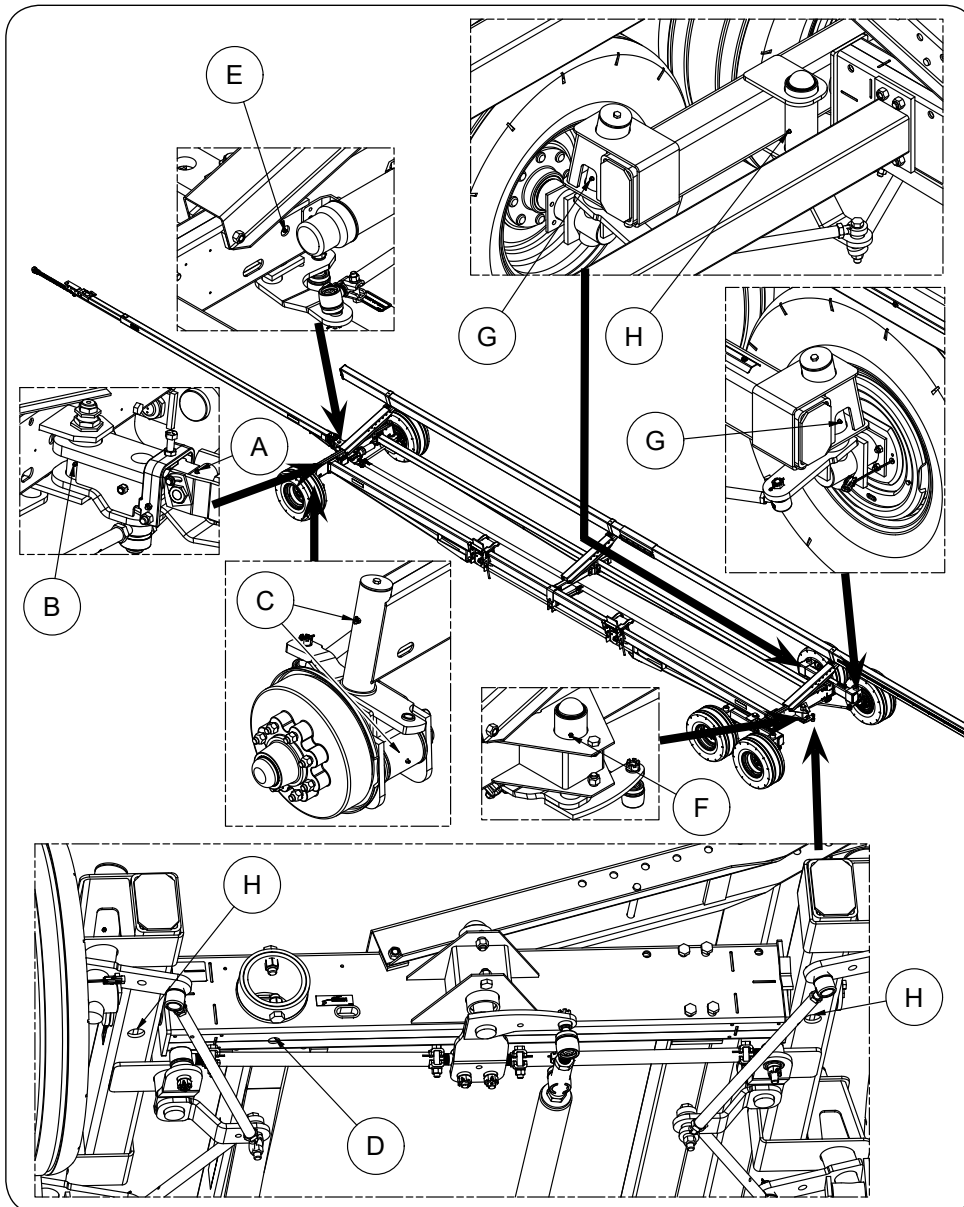
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General Maintenance Information

For header transport and bearing longevity, as well as ease of operation, periodic lubrication is essential. This also helps to flush out moisture and dirt. Lubricate with an SAE multi-purpose grease.

Grease Gun Lube Points — Lube Cycle

Item	Description	Points	Grease
A	Tongue Hitch Pin (End of Steering Hinge)	1	Once/Year
B	Steering Hinge Pin (Front of Front Frame) Rotate tongue to access zerk.	1	Once/Year
C	Front Axle Spindle Bearings (Both Ends)	2	Once/Year
D	Swivel Trunnion (Bottom Rear End of Rear Axle)	1	Once/Year
E	Front Pivot (Rear of Front Frame)	1	Once/Year
F	Rear Pivot	1	Once/Year
G	Rear Axle Spindle Bearings (Both Ends)	4	Once/Year
H	Rear Axle Pivots (Both Ends)	2	Once/Year



General Maintenance Information (continued)

Steering Bearings — 2

Inspect yearly. Grease as needed.

Wheel Bearings — 6 (Repack Grease Yearly)

The wheel bearings should be cleaned, replaced, and adjusted once per season. Use a number 2 wheel bearing grease to repack and adjust the bearings to a free rolling fit with no end play.

Hub Installation

1. Lubricate seal lip with grease.
2. While rotating hub, place the hub on the spindle, make sure to not damage the seal lip.
3. Be sure the outer cone slides on the spindle and into the cup.
4. Assemble the washer and nut.
5. While rotating the hub, torque the spindle nut to 20-25 ft. lbs.
6. Back the spindle nut off until the next slot.
7. Insert the cotter pin (9391-035) and bend the ends to secure.
8. Install the hub cap.

IMPORTANT

- *For maximum bearing life, never tow the header transport in excess of 20 m.p.h.*

Periodically during usage, check the following:

1. Tongue pivot pin.
2. Tie rod connections at radius arm and at steering hinge.
3. Check all hardware for tightness
4. Tire pressure -- follow manufacturer's specification (too high or too low pressure causes abnormal tread wear).
5. Wheel lug nuts -- wheel torque requirements.

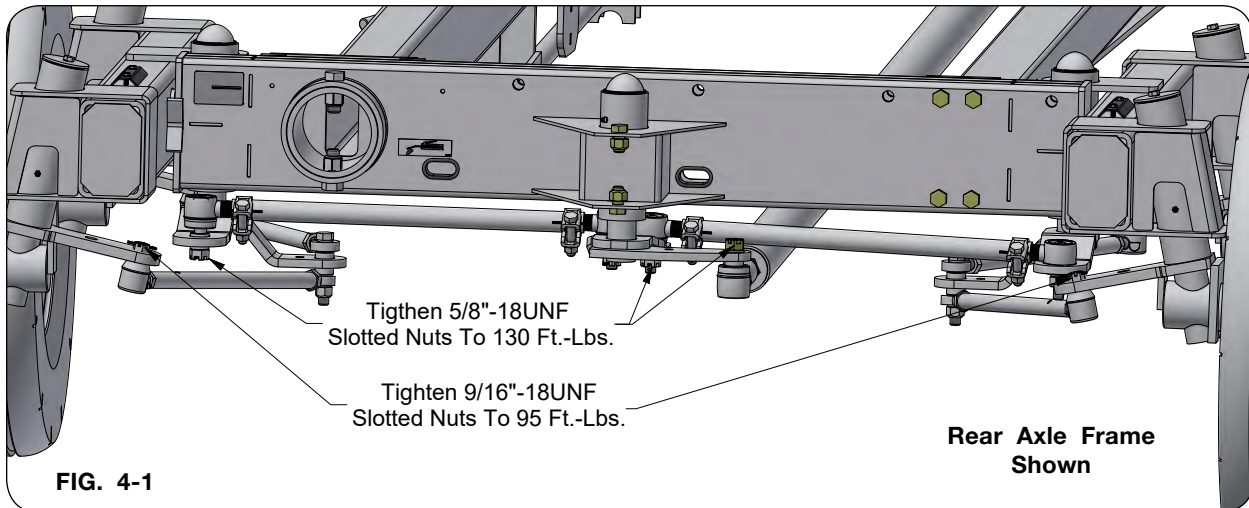
After each season:

1. Check welds on front and rear axles of the lower rest tube and brace tube.
2. Tie rods -- adjust to minimum 1/8" toe-in (1/8" to 1/4" toe measured at tires).
3. It is recommended for improved tire life that tires be rotated diagonally.

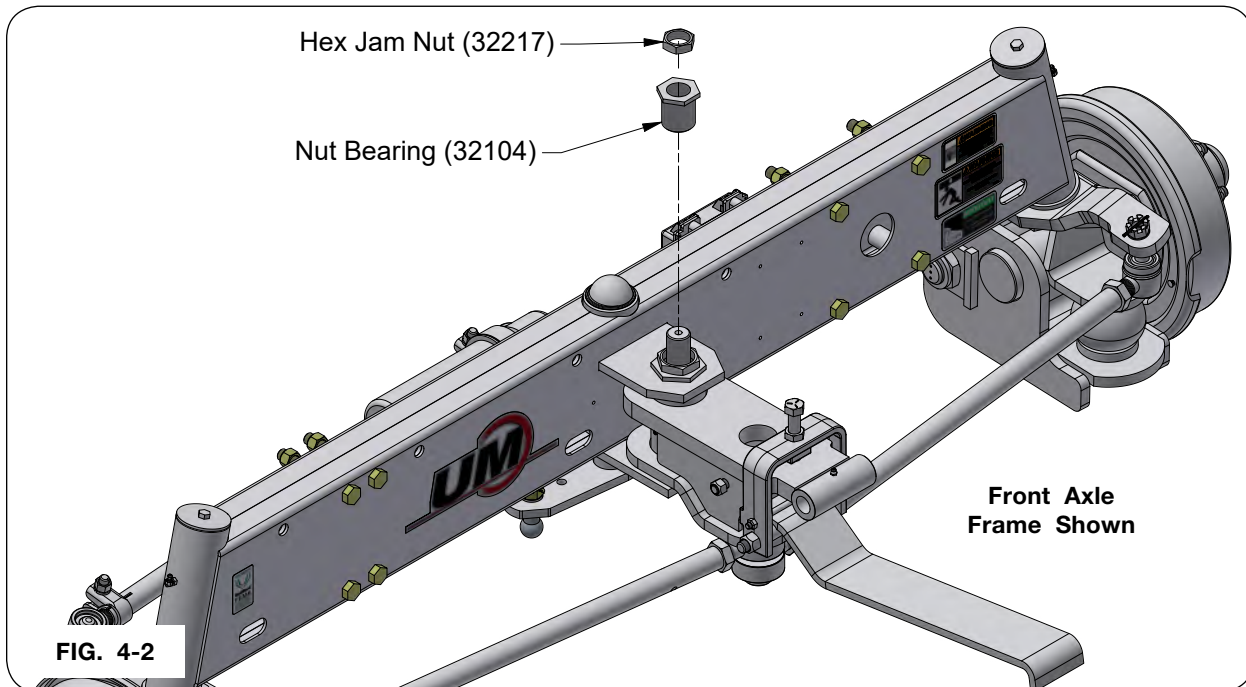
General Maintenance Information (continued)

Pivot Bearings

1. Tighten the front and rear axle frame 9/16"-18UNF slotted hex nuts to 95 ft.-lbs. and 5/8-18UNF slotted hex nuts to 130 ft.-lbs. (FIG. 4-1). Continue to tighten nut to the next slot and install cotter pin.

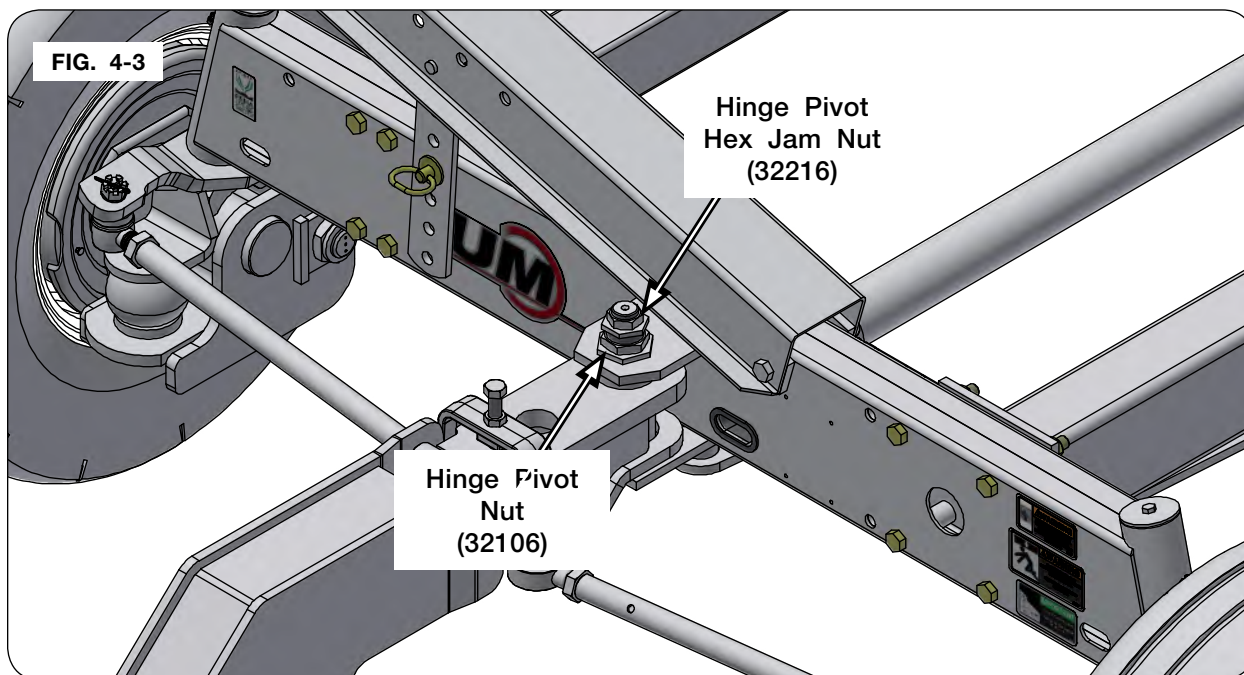


2. Tighten nut bearing (32104) to 45 ft.-lbs.

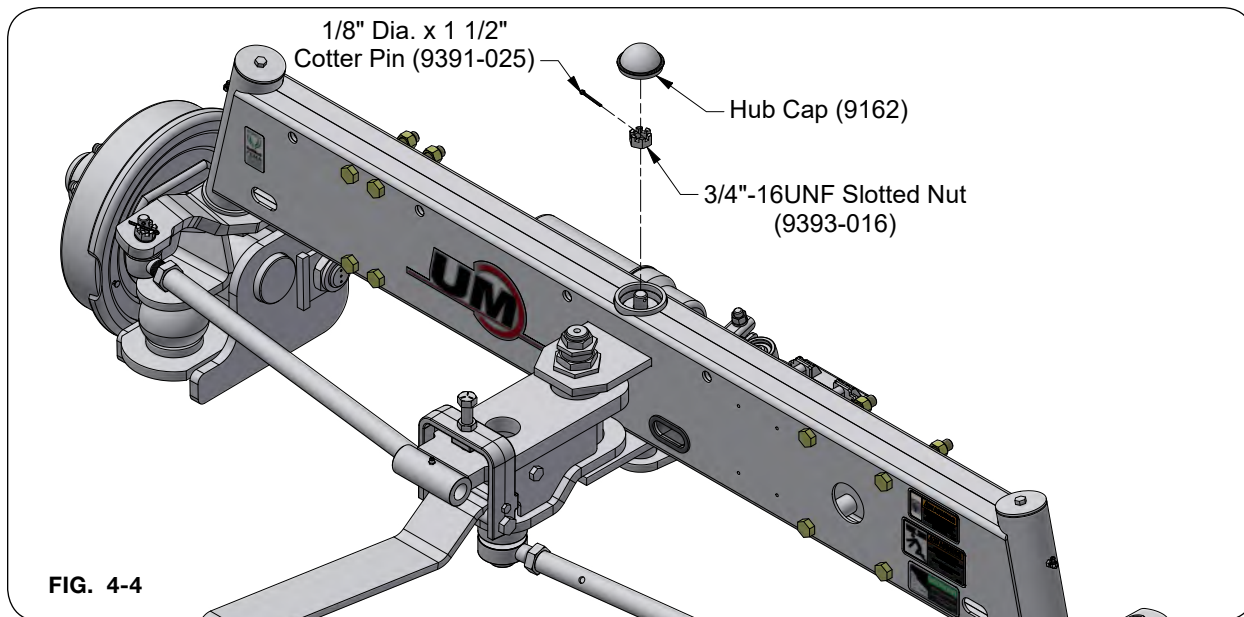


General Maintenance Information (continued)

3. Tighten 1 1/2" x 1/2" hinge pivot hex jam nut (32217) to 45 ft.-lbs.



4. Tighten hinge pivot nut (32105) to 200 ft.-lbs. to seat rear pivot into bottom plate.
5. Tighten 2" x 1/2" thread 1 3/4"-20 hinge pivot hex jam nut (32216) to 45 ft.-lbs.
6. Tighten 3/4"-16UNF slotted nut (9393-016) to 45 ft.-lbs.

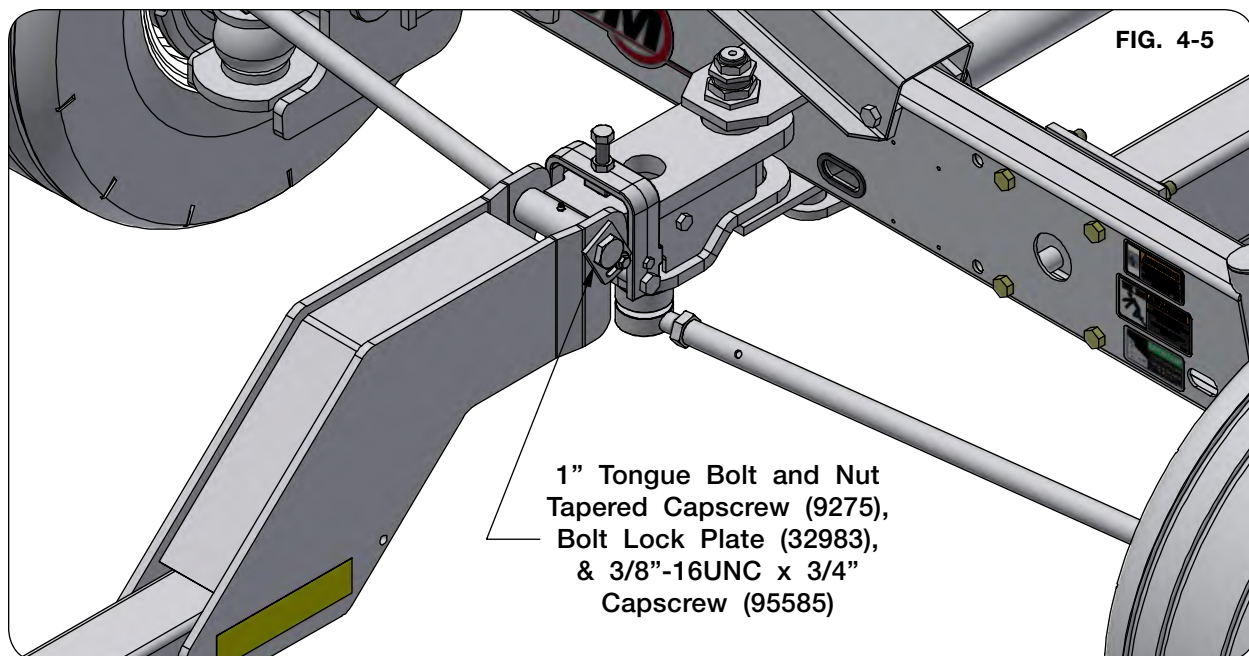


7. Continue to tighten 3/4"-16UNF slotted nut (9393-016) until slot in nut aligns with hole in shaft.
8. Install cotter pin and hub cap.

General Maintenance Information (continued)

Tongue Removal

1. Park the unit on a firm, level surface. Block the tires to keep the machine from moving. Set the towing vehicle parking brake, shut off the engine, and remove the ignition key.
2. Using a safe lifting device rated for 150 lbs., properly support the tongue. Lift the tongue high enough until the leaf spring is no longer in contact with the underside of the tongue.
3. Pull the main harness forward to expose the tongue to main frame harness connections. Detach the harness from the rear axle and upper tube conduit. Then you can disconnect the 2 harnesses prior to removing the tongue.
4. Remove the 3/8" bolts securing the lock plates to the tongue and remove the lock plates.
5. Remove nut 9500918 and bolt 9500917 that secures the tongue to the steering hinge.
6. Remove the tongue from the turning plate.



Storage

Your implement is an important investment. Spend a little time to protect it from destructive rust and corrosion. You will be repaid in longer service life and better performance.

Before placing the implement in storage:

1. Wash and dry thoroughly
2. Repaint any chipped or scraped areas.
3. Inspect for damaged or worn parts. Replace before next season.
4. Store implement inside, away from livestock.
5. Use support stands rated at 1,200 lbs. to keep unloaded implement off the tires.

Wheels and Tires

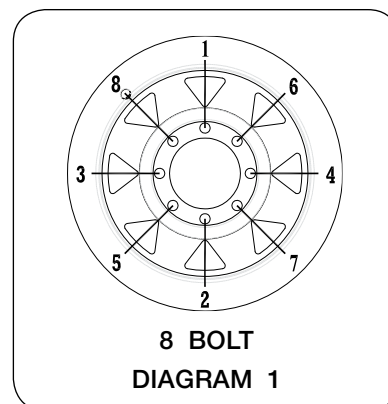
Wheel Nut Torque Requirements

CAUTION

- IMPROPERLY TORQUED WHEEL NUTS/BOLTS CAN CAUSE A LOSS OF IMPLEMENT CONTROL AND MACHINE DAMAGE. TORQUE WHEEL NUTS/BOLTS TO VALUES IN TABLE. CHECK TORQUE BEFORE USE, AFTER ONE HOUR OF UNLOADED USE OR AFTER FIRST LOAD, AND EACH LOAD UNTIL WHEEL NUTS/BOLTS MAINTAIN TORQUE VALUE. CHECK TORQUE EVERY 10 HOURS OF USE THERE-AFTER. AFTER EACH WHEEL REMOVAL START TORQUE PROCESS FROM BEGINNING. WARRANTY DOES NOT COVER FAILURES CAUSED BY IMPROPERLY TORQUED WHEEL NUTS/BOLTS.

Failure to check torque before first load may damage wheel nut/bolt seats. Once seats are damaged, it will become impossible to keep nuts/bolts tight. Tighten nuts/bolts to applicable torque value shown in table. Start all nuts/bolts by hand to prevent cross threading. Torque nuts/bolts in the recommended sequence as shown in Diagram 1.

WHEEL HARDWARE	
SIZE	FOOT-POUNDS
9/16-18 (UNF)	110 ft.-lbs.



Tire Pressure

The following is to be used as a **general guide** for tire inflation and pressures can vary depending on specific brand of tire used. **It is important that tires are inspected after unit is loaded.** The tire should stand up with no side-wall buckling or distress as tire rolls. Record the pressure needed to support the full load and maintain this pressure to achieve proper tire life. **Do not exceed maximum recommended tire pressure.**

MODEL	TIRE SIZE & PRESSURE
AWST-42, 48, 52 and 62	320/65 x 15 - 70 PSI

(All tire pressures in psi)

Tire Warranty

For questions regarding new tire warranty, please contact your local original equipment tire dealer. Used tires carry no warranty. Following are phone numbers and Websites for your convenience:

Firestone www.firestoneag.com
Phone 800-847-3364

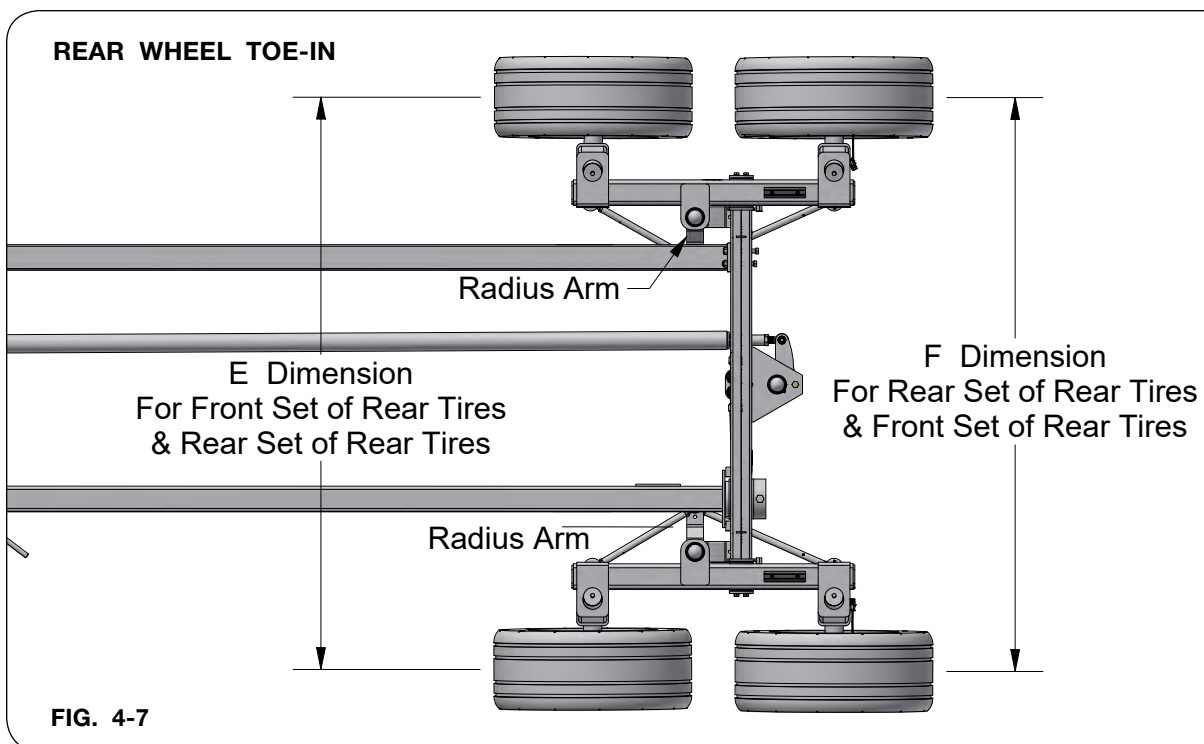
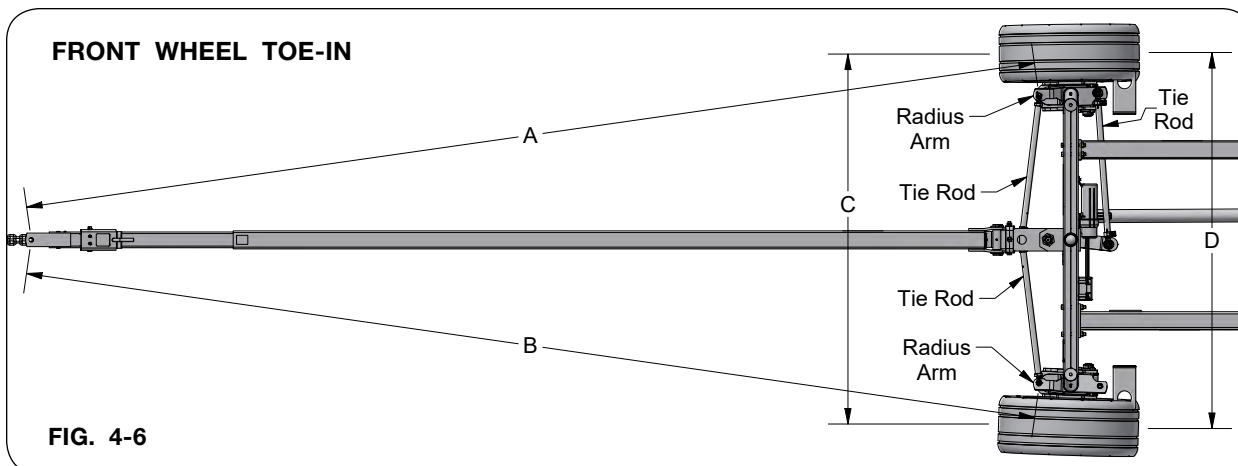
Adjusting Wheel Toe-In

IMPORTANT

- *After first use, recheck toe-in. Front wheel toe-in has been preset at the factory. If adjustment becomes necessary, use the following procedure.*

1. Park the unit on a firm level surface. Block the tires to prevent it from moving. Set the towing vehicle parking brake, shut off the towing vehicle and remove the ignition key.
2. Place the tongue in the straight and horizontal position. This can be checked by measuring reference lines "A" and "B". These measurements are the same when the tongue is straight forward.
3. To adjust the toe-in of the tire on the front axle, measure the distance between the wheels at the centerline of the tires. Dimension "C" should be 1/8" to 3/8" shorter than dimension "D". If not, loosen the locknuts on both ends of both front tie rods. Adjust both front tie rods evenly as needed. Retighten the locknuts and recheck the dimensions.
4. Verify both right-hand tires align parallel to each other. Adjust short tie rods connected to tandem spindles to align parallel if necessary. Verify and adjust same on left-hand side if necessary.
5. To adjust both right-hand and left-hand tandem tires to run parallel to each other, adjust the two center cross tie rods under rear axle, keeping lengths equal.
6. To adjust the toe-in of the tires on the rear axle, measure the distance between the wheels at the center line of the tires. Dimension "E" should be 0" to 1/4" shorter than dimension "F". If not, loosen the locknuts on both ends of the rear-most tie rod. Adjust this tie rod as needed. Retighten the locknuts and recheck the dimensions. Rear tandem front and rear tires will generally run parallel to each other. However, they are factory set with 1/8" toe-in (FIG. 4-7 dimensions E & F), so some compensation must be allowed for visual alignment. Also, rear tandems tread width is 11" wider than the front axle.

Adjusting Wheel Toe-In (continued)



Procedure To Correctly Adjust Front-To-Rear Trailing

The unit should trail with the rear axle directly behind the front axle. To correct the front-to-rear trailing, any of the three inner tie rods can be adjusted. It is recommended to use the tie rod behind the front axle to make this adjustment.

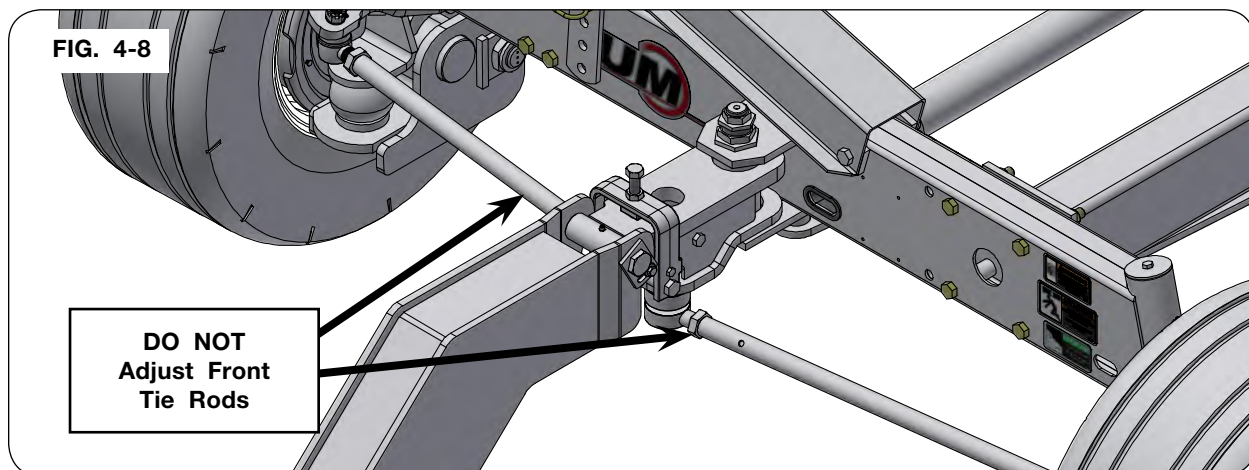
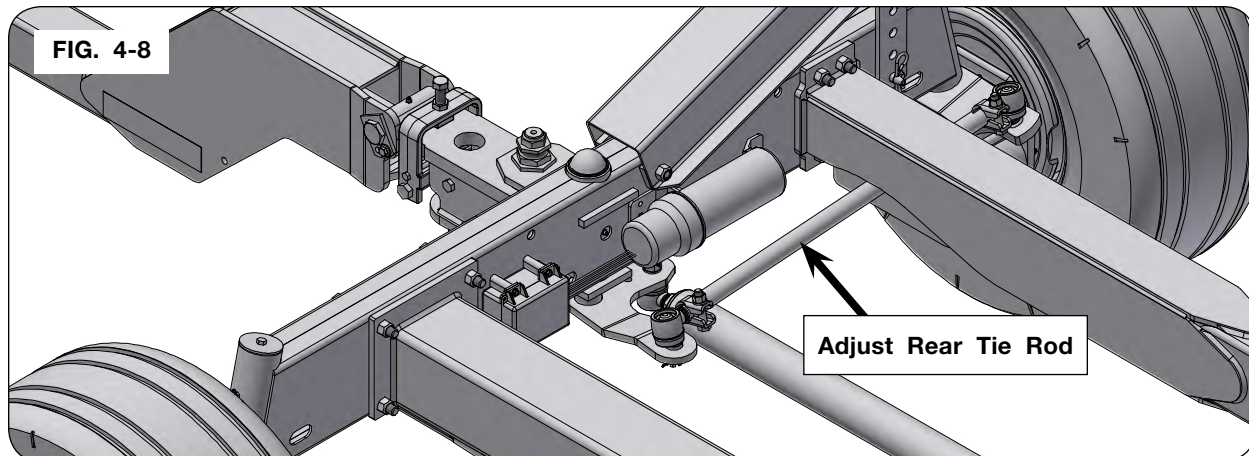
If the rear of the unit is trailing to the left, as you observe in the direction of forward travel, the tie rod must be extended. If the rear of the unit trails to the right, as you observe in the direction of forward travel, the tie rod must be shortened.

1. Loosen the locknuts on both ends of the tie rod and rotate the center tube to extend or shorten the tie-rod.

NOTE: Lengthening the tie rod shifts the rear axle to the left. Shortening the tie rod shifts the rear axle to the right.

2. Retighten the locknuts, pivot the tongue side-to-side and check for any interference.
3. Drive the unit and check the front-to-rear trailing. Repeat the procedure as necessary.

NOTE: 1/4" turn of tie rod shifts rear axle 1" with respect to the front axle.



Brake Cleaning and Inspection

Your header transport brakes must be inspected and serviced immediately if a loss of performance is experienced. With normal use, servicing at one year intervals is usually adequate. With increased usage, this work should be performed more frequently as required. Magnets and shoes must be changed when they become excessively worn or scored, a condition which can reduce vehicle braking. Clean the backing plate, magnet arm, magnet, and brake shoes. Make certain that all the parts removed are replaced in the same brake and drum assembly. Inspect for any loose or worn parts, stretched or deformed springs and replace as necessary.

WARNING

- **POTENTIAL ASBESTOS DUST HAZARD - SOME BRAKE LININGS MAY CONTAIN ASBESTOS DUST, WHICH HAS BEEN LINKED TO SERIOUS OR FATAL ILLNESSES. CERTAIN PRECAUTIONS NEED TO BE TAKEN WHEN SERVICING BRAKES:**
 1. Avoid creating or breathing dust.
 2. Avoid machining, filing or grinding the brake linings.
 3. Do not use compressed air or dry brushing for cleaning (dust can be removed with a damp brush).

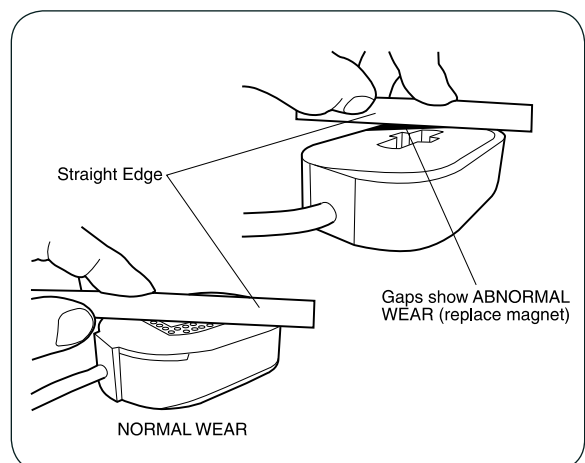
Brake Lubrication

Before reassembling, apply a light film of grease or anti-seize compound on the brake anchor pin, the actuating arm bushing and pin, and the areas on the backing plate that are in contact with the brake shoes and magnet lever arm. Apply a light film of grease on the actuating block mounted on the actuating arm.

NOTE: Do not get grease or oil on the brake linings, drums or magnets.

Magnets

Your electric brakes are equipped with high quality electromagnets that are designed to provide the proper input force and friction characteristics. Your magnets should be inspected and replaced if worn unevenly or abnormally. Use a straightedge to check magnet condition. For best results, the magnet should be flat. Even if wear is normal as indicated by your straightedge, the magnets should be replaced if any part of the magnet coil has become visible through the friction material facing of the magnet. It is also recommended that the drum armature surface be refaced when replacing magnets. Magnets should also be replaced in pairs - both sides of an axle.

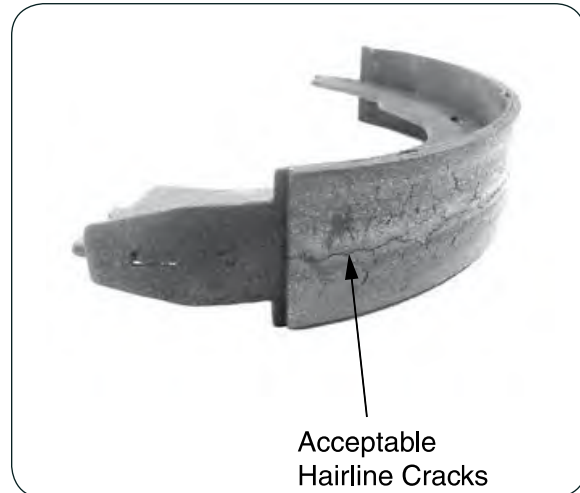


Brake Cleaning and Inspection (continued)

Shoes and Linings

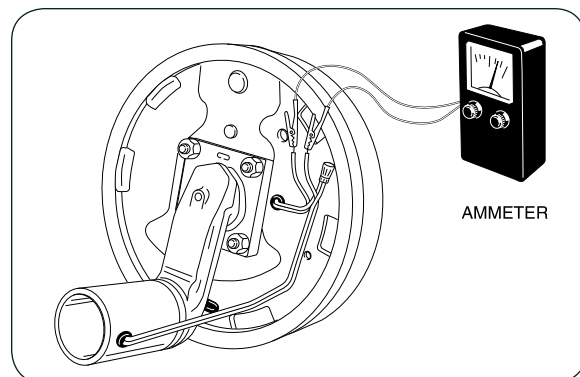
A simple visual inspection of your brake linings will tell if they are usable. Replacement is necessary if the lining is worn (to within 1/16" or less), contaminated with grease or oil, or abnormally scored or gouged. Hairline heat cracks are normal in bonded linings and should not be cause for concern. When replacement is necessary, it is important to replace both shoes on each brake and both brakes of the same axle. This will help retain the "balance" of your brakes.

After replacement of brake shoes and linings, the brakes must be re-burnished to seat in the new components. This should be done by applying the brakes 20 to 30 times from an initial speed of 40 m.p.h., slowing the vehicle to 20 m.p.h. Allow ample time for brakes to cool between applications. This procedure allows the brake shoes to seat in to the drum surface.



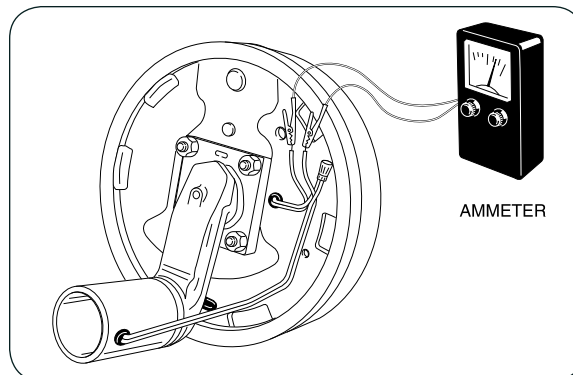
How to Measure Voltage

System voltage is measured at the magnets by connecting the voltmeter to the two magnet lead wires at any brake. This may be accomplished by using a pin probe inserted through the insulation of the wires. The engine of the towing vehicle should be running when checking the voltage so that a low battery will not affect the readings. Voltage in the system should begin at 0 volts and, as the controller bar is slowly actuated, should gradually increase to about 12 volts. If the controller does not produce this voltage control, consult your controller manual. The threshold voltage of a controller is the voltage applied to the brakes when the controller first turns on. Lower threshold voltage will provide for smoother braking. If the threshold voltage is too high, the brakes may feel grabby and harsh.



How to Measure Amperage

System amperage is the current flowing in the system when all the magnets are energized. The amperage will vary in proportion to the voltage. The engine of the tow vehicle should be running with the header transport connected when checking the header transport braking system. One place to measure system amperage is at the BLUE wire of the controller which is the output to the brakes. The BLUE wire must be disconnected and the ammeter put in series into the line. System amperage draw should be as noted in the following table.



Make sure your ammeter has sufficient capacity and note polarity to prevent damaging your ammeter. If a resistor is used in the brake system, it must be set at zero or bypassed completely to obtain the maximum amperage reading. Individual amperage draw can be measured by inserting the ammeter in the line at the magnet you want to check. Disconnect one of the magnet lead wire connectors and attach the ammeter between the two wires. Make sure that the wires are properly reconnected and sealed after testing is completed. The most common electrical problem is low or no voltage and amperage at the brakes. Common causes of this condition are:

1. Poor electrical connections
2. Open circuits
3. Insufficient wire size
4. Broken wires
5. Blown fuses (fusing of brakes is not recommended)
6. Improperly functioning controllers or resistors

Another common electrical problem is shorted or partially shorted circuits (indicated by abnormally high system amperage). Possible causes are:

1. Shorted magnet coils
2. Defective controllers
3. Bare wires contacting a grounded object

Finding the cause of a short circuit in the system is done by isolating one section at a time. If the high amperage reading drops to zero by unplugging the header transport, then the short is in the header transport. If the amperage reading remains high with all the brake magnets disconnected, the short is in the header transport wiring. All electrical troubleshooting procedures should start at the controller. Most complaints regarding brake harshness or malfunction are traceable to improperly adjusted or nonfunctional controllers. See your controller manufacturer's data for proper adjustment and testing procedures. For best results, all the connection points in the brake wiring should be sealed to prevent corrosion. Loose or corroded connectors will cause an increase in resistance which reduces the voltage available for the brake magnets.

Brake Size	Amps/Magnet	Two Brakes	Four Brakes	Six Brakes	Magnet Ohms
7 x 1¼	2.5	5.0	10.0	15.0	3.9
10 x 1½	3.0	6.0	12.0	18.0	3.2
10 x 2¼	3.0	6.0	12.0	18.0	3.2
12 x 2	3.0	6.0	12.0	18.0	3.2
12¼ x 2½	3.0	6.0	12.0	18.0	3.2

Brake Drum Inspection

There are two areas of the brake drum that are subject to wear and require periodic inspection. These two areas are the drum surface where the brake shoes make contact during stopping and the armature surface where the magnet contacts (only in electric brakes).

The drum surface should be inspected for excessive wear or heavy scoring. If worn more than .020" oversized, or the drum has worn out of round by more than .015", then the drum surface should be re-machined. If scoring or other wear is greater than .090" on the diameter, the drum must be replaced.

The machined inner surface of the brake drum that contacts the brake magnet is called the armature surface. If the armature surface is scored or worn unevenly, it should be re-faced to a 120 micro inch finish by removing not more than .030" of material. To insure proper contact between the armature face and the magnet face, the magnets should be replaced whenever the armature surface is re-faced and the armature surface should be re-faced whenever the magnets are replaced.

IMPORTANT

- *It is important to protect the wheel bearing bores from metallic chips and contamination which result from drum turning or armature re-facing operations. Make certain that the wheel bearing cavities are clean and free of contamination before reinstalling bearing and seals. The presence of these contaminants will cause premature wheel bearing failure.*

Troubleshooting Brakes

Most electric brake malfunctions, that cannot be corrected by either brake adjustments or synchronization adjustments, can generally be traced to electrical system failure. Voltmeters and ammeters are essential tools for proper troubleshooting of electric brakes. Mechanical causes are ordinarily obvious, i.e. bent or broken parts, worn out linings or magnets, seized lever arms or shoes, scored drums, loose parts, etc. Please consult the following troubleshooting charts in this section of the manual to determine the causes and solutions for common problems found in header transport braking systems.



CAUTION

- **OVERLY AGGRESSIVE BRAKING CAN CAUSE A DANGEROUS LOSS OF CONTROL AND RESULT IN PERSONAL INJURY OR DEATH. ADJUST IMPLEMENT BRAKE CONTROLLER TO AVOID WHEEL LOCKUP AND SLIDING.**

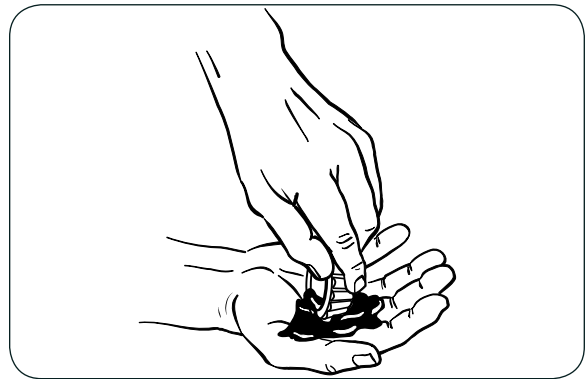
Bearing Inspection

Wash all grease and oil from the bearing cone using a suitable solvent. Dry the bearing with a clean, lint-free cloth and inspect each roller completely.

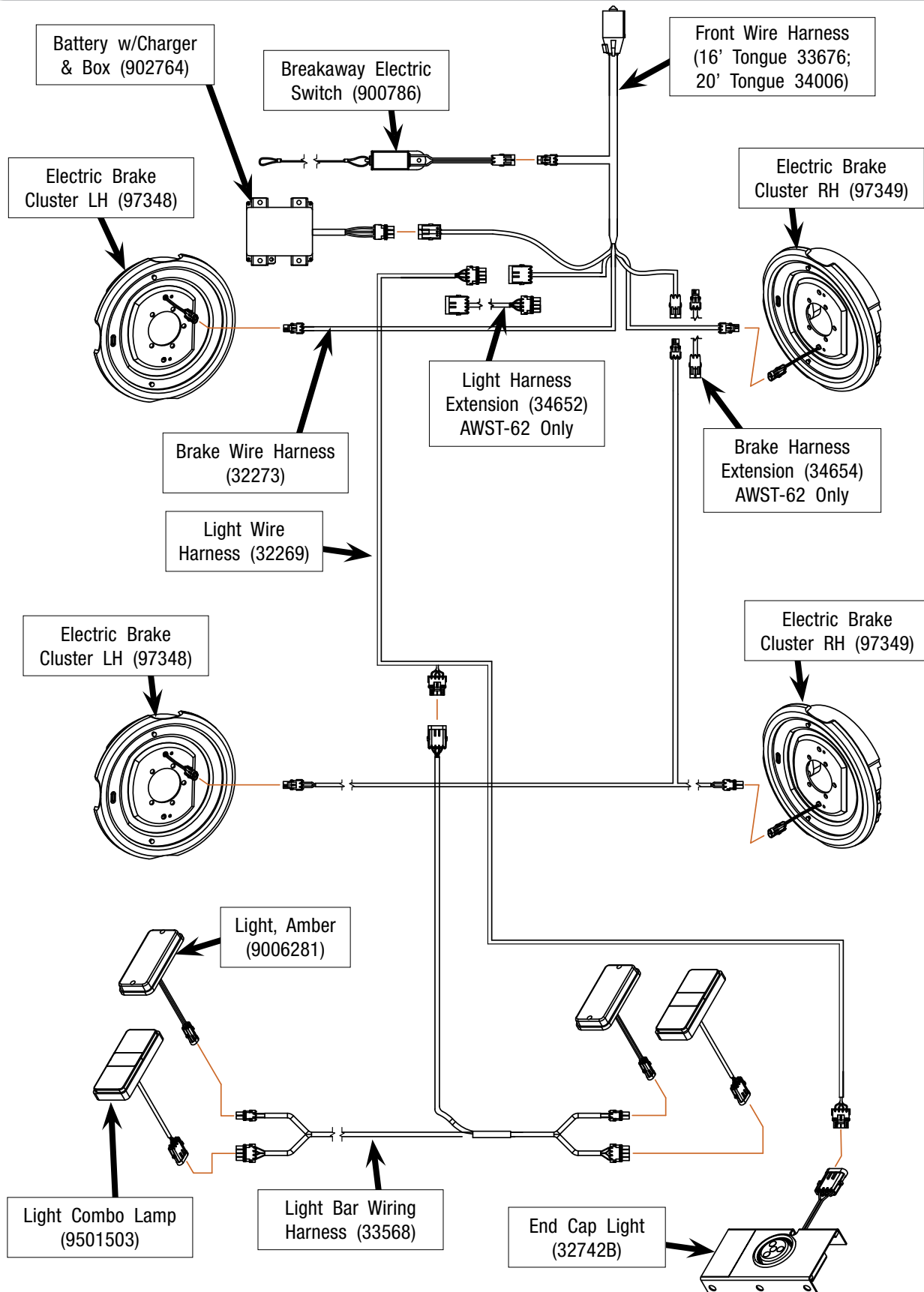
Bearing Lubrication

Along with bearing adjustment, proper lubrication is essential to the proper function and reliability of your header transport axle. Bearings should be lubricated every 12 months or 12,000 miles. The method to repack bearing cones is as follows:

1. Place a quantity of grease into the palm of your hand.
2. Press a section of the widest end of the bearing into the outer edge of the grease pile closest to the thumb forcing grease into the interior of the bearing.
3. Repeat this while rotating the bearing from roller to roller.
4. Continue this process until you have the entire bearing completely filled with grease.
5. Before reinstalling, apply a light coat of grease on the bearing cup.

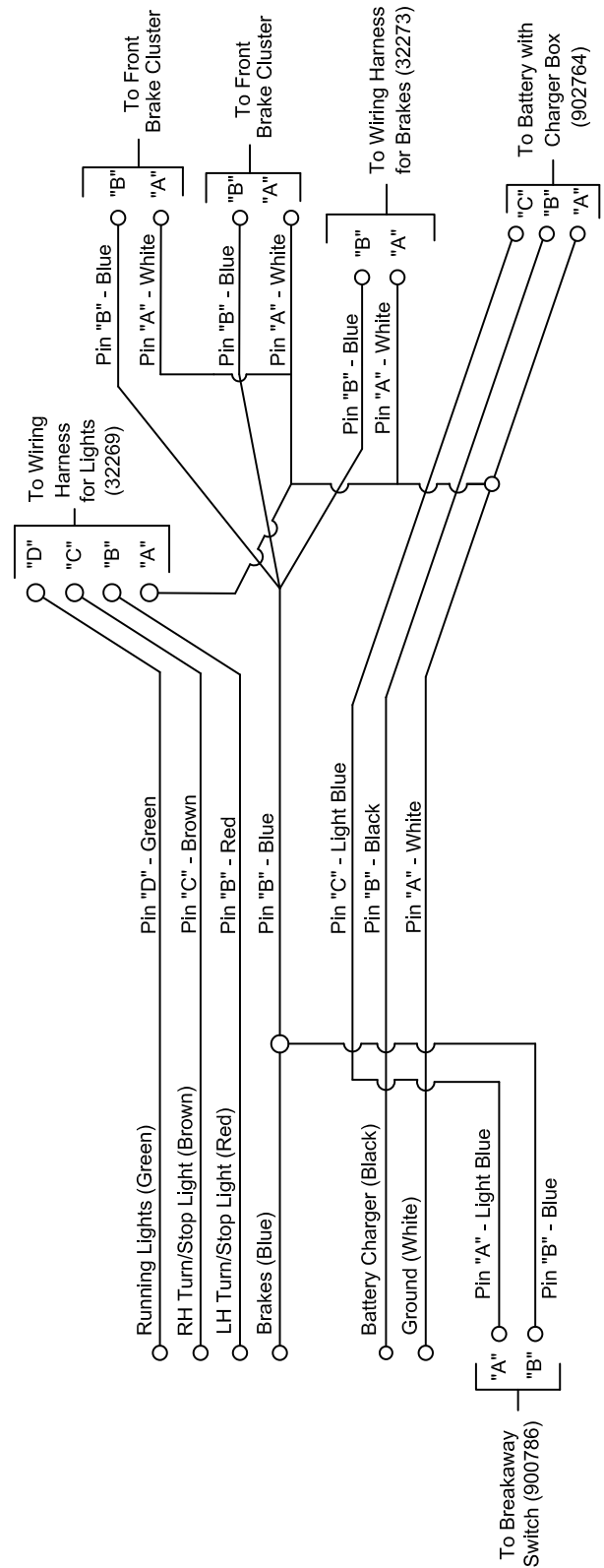
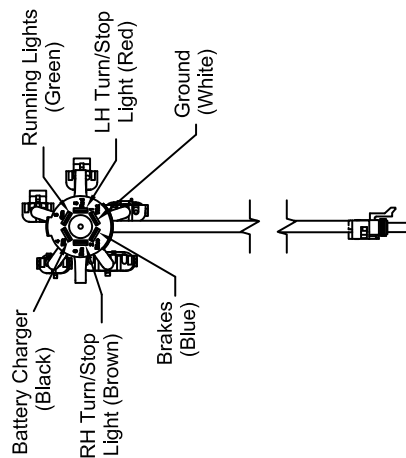
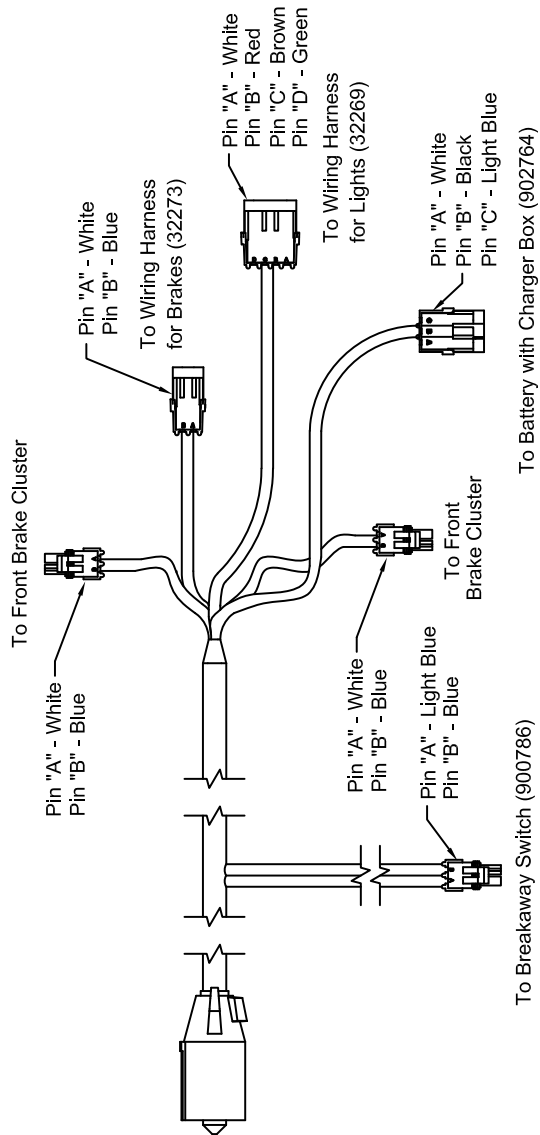


Electrical Layout

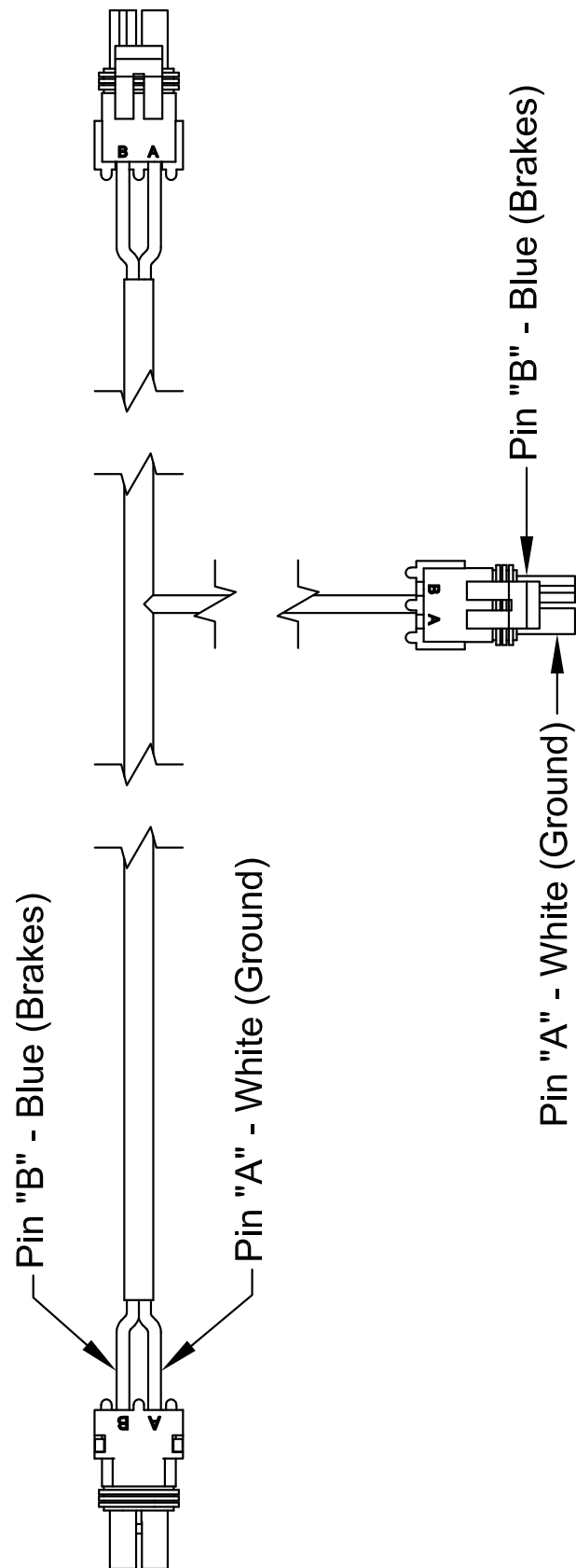


Front Harness for Brakes Electrical Schematic

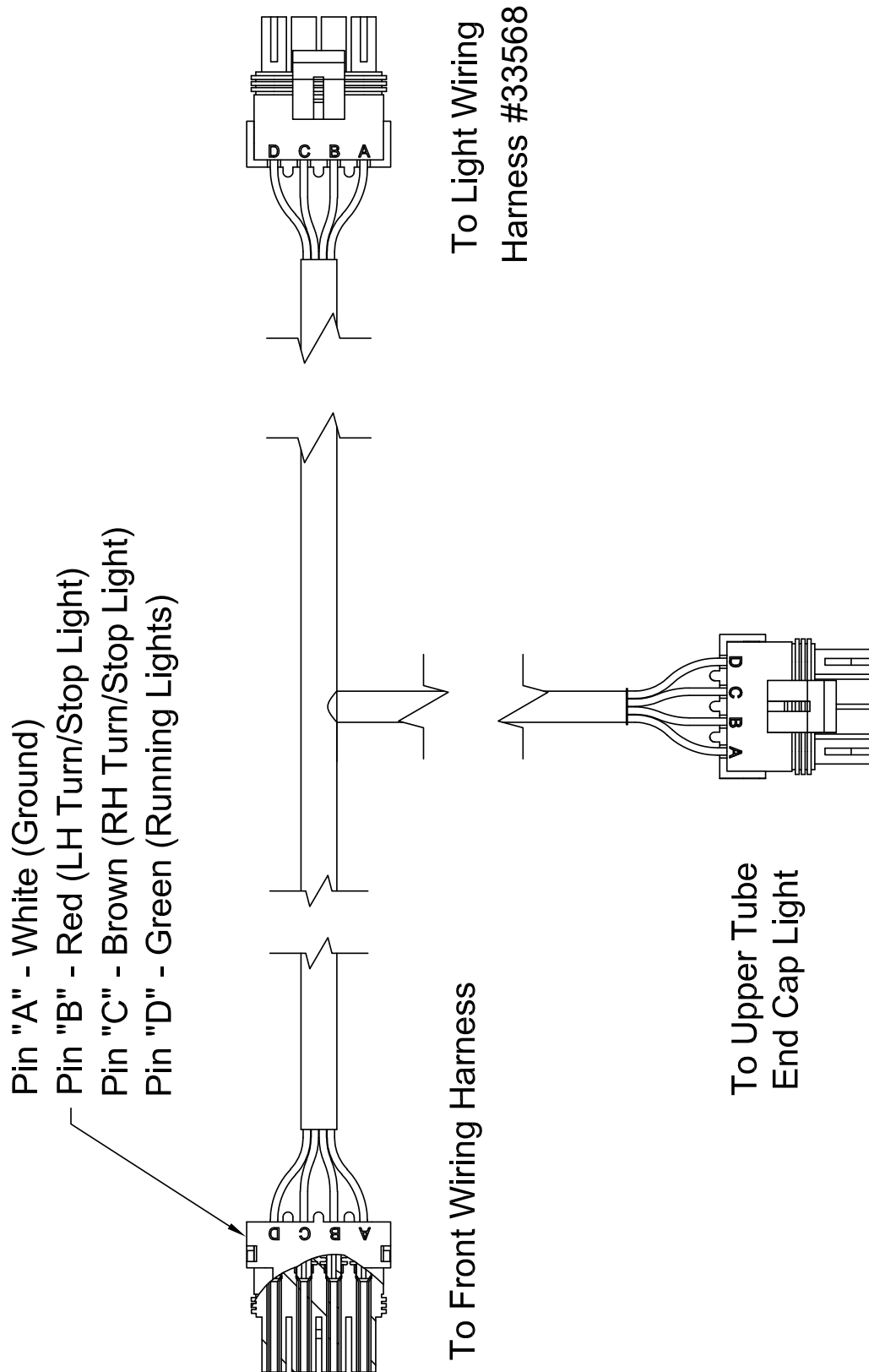
16' Tongue (#33676) & 20' Tongue (#34006)



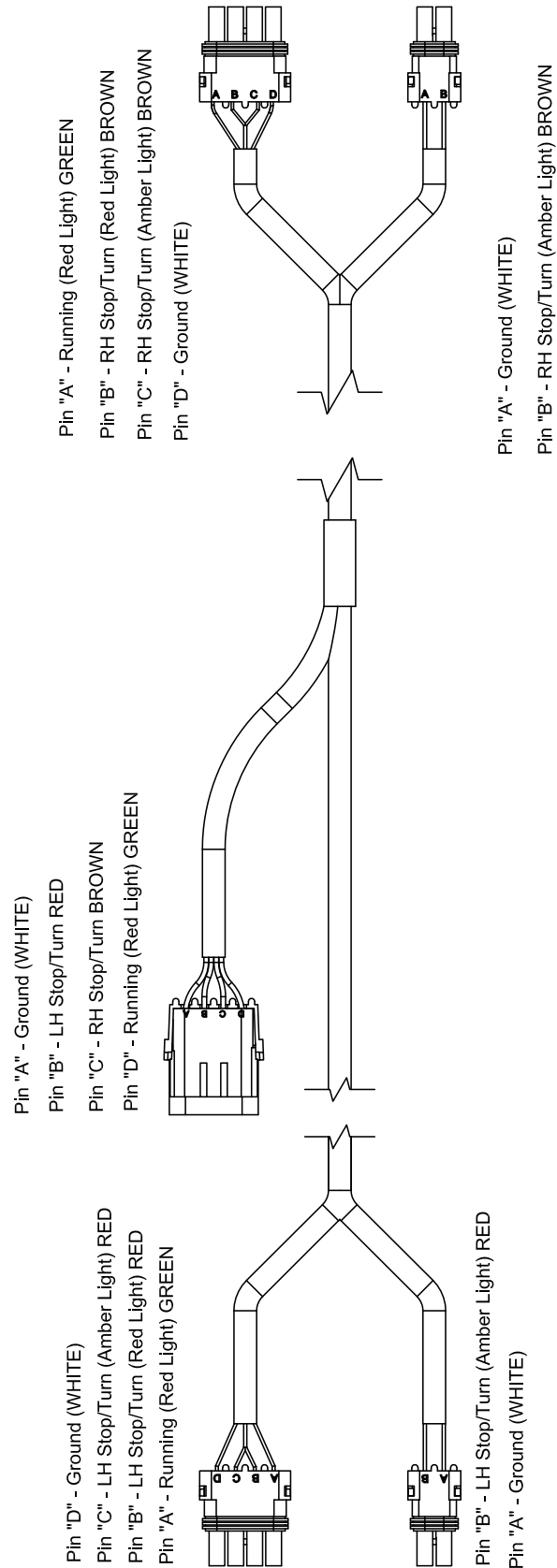
Rear Brake Harness Electrical Schematic (#32273)



Light Harness Electrical Schematic (#32269)



Rear Light Harness Electrical Schematic (#33568)



Complete Torque Chart

Capscrews - Grade 5

NOTE:

- Grade 5 capscrews can be identified by three radial dashes on the head.
- For wheel torque requirements, refer to Wheels and Tires.
- Tighten U-bolts evenly and equally to have the same number of threads exposed on each end.



SIZE	FOOT POUNDS	NEWTON METERS
1/4-20	8-10	11-13
1/4-28	9-11	12-15
5/16-18	15-17	20-23
5/16-24	17-19	23-26
3/8-16	25-28	34-38
3/8-24	28-31	38-42
7/16-14	40-45	54-61
7/16-20	45-50	61-68
1/2-13	62-68	84-92
1/2-20	68-75	92-102
9/16-12	90-98	122-133
9/16-18	100-110	134-148
5/8-11	120-135	162-183
5/8-18	124-137	168-186
3/4-10	200-220	270-300
3/4-16	210-230	285-310
7/8-9	330-350	425-475
7/8-14	360-380	460-515
1-8	500-525	675-710
1-14	540-560	730-760
1 1/8-7	600-635	815-860
1 1/8-12	665-700	920-950
1 1/4-7	850-895	1150-1215
1 1/4-12	940-990	1275-1340
1 3/8-6	1125-1175	1525-1590
1 3/8-12	1280-1335	1735-1810
1 1/2-6	1500-1560	2035-2115
1 1/2-12	1685-1755	2285-2380
NOTE: Spindle arm ball joint, torque to 130 ft.-lbs.		

IMPORTANT

- Follow these torque recommendations except when specified in text.

SECTION IV

Maintenance

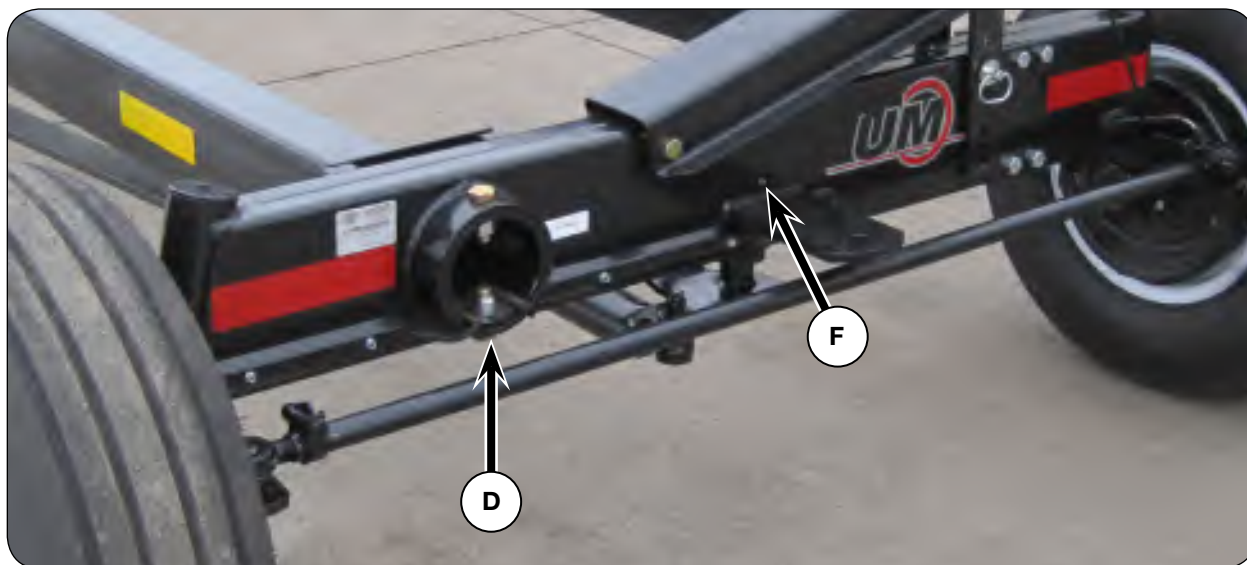
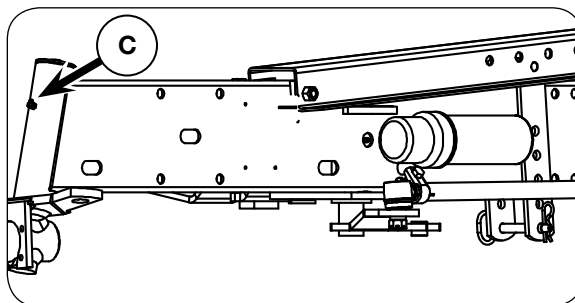
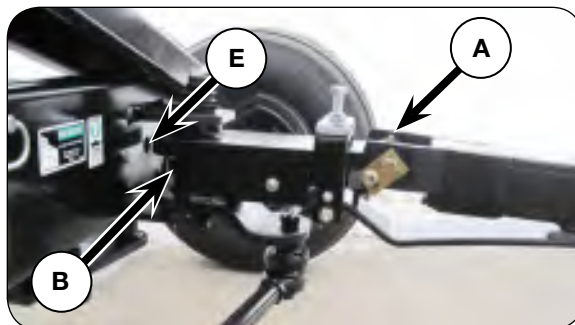
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General Maintenance Information

For header transport and bearing longevity, as well as ease of operation, periodic lubrication is essential. This also helps to flush out moisture and dirt. Lubricate with an SAE multi-purpose grease.

Grease Gun Lube Points — Lube Cycle

- A. Tongue Hitch Pin (End of Steering Hinge) - 1 Point; Grease Once/Year
- B. Steering Hinge Pin (Front of Front Frame) - 1 Point; Grease Once/Year
Rotate tongue to access zerk.
- C. Spindle Bearings (Both Ends of Front Axle) - 2 Points; Grease Once/Year
- D. Swivel Trunnion (Rear End of Rear Axle) - 1 Point; Grease Once/Year
- E. Front Pivot; Once/Year
- F. Rear Pivot; Once/Year



General Maintenance Information (continued)

Miscellaneous Lube Points

Oil or grease the extension part of the extendable tongue when needed.

Wheel Bearings — 8 Points Repack Grease Yearly

The wheel bearings should be cleaned, replaced, and adjusted once per season. Use a number 2 wheel bearing grease to repack and adjust the bearings to a free rolling fit with no end play.

Hub Installation

1. Lubricate seal lip with grease.
2. While rotating hub, place the hub on the spindle, make sure to not damage the seal lip.
3. Be sure the outer cone slides on the spindle and into the cup.
4. Assemble the washer and nut.
5. While rotating the hub, torque the spindle nut to 20-25 ft. lbs.
6. Back the spindle nut off until the next slot.
7. Insert the cotter pin (9391-035) and bend the ends to secure.
8. Install the hub cap.

IMPORTANT

- *For maximum bearing life, never tow the header transport in excess of 20 m.p.h.*

Periodically during usage, check the following:

1. Tongue pivot pin.
2. Tie rod connections at radius arm and at steering hinge.
3. Check all hardware for tightness
4. Tire pressure -- follow manufacturer's specification (too high or too low pressure causes abnormal tread wear).
5. Wheel lug nuts -- wheel torque requirements.

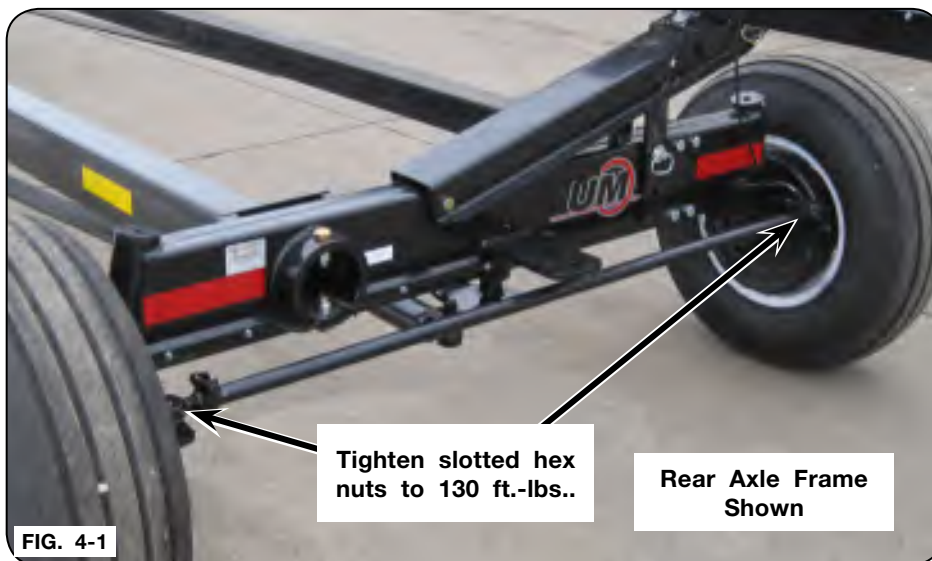
After each season:

1. Check welds on front and rear axles of the lower rest tube and brace tube.
2. Tie rods -- adjust to minimum 1/8" toe-in (1/8" to 1/4" toe measured at tires).
3. It is recommended for improved tire life that tires be rotated diagonally.

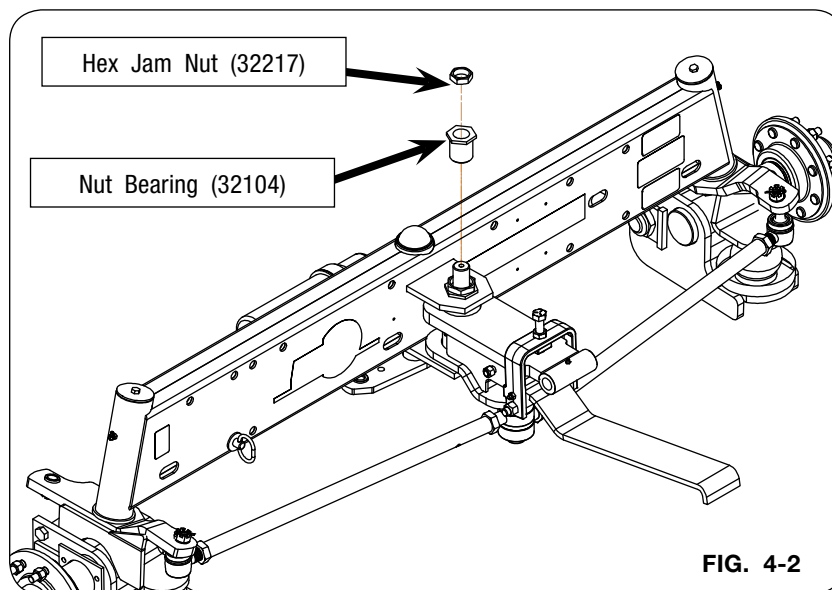
General Maintenance Information (continued)

Pivot Bearings

1. Tighten the front and rear axle frame slotted hex nuts to 130 ft.-lbs. (FIG. 4-1). Continue to tighten nut to the next slot and install cotter pin.

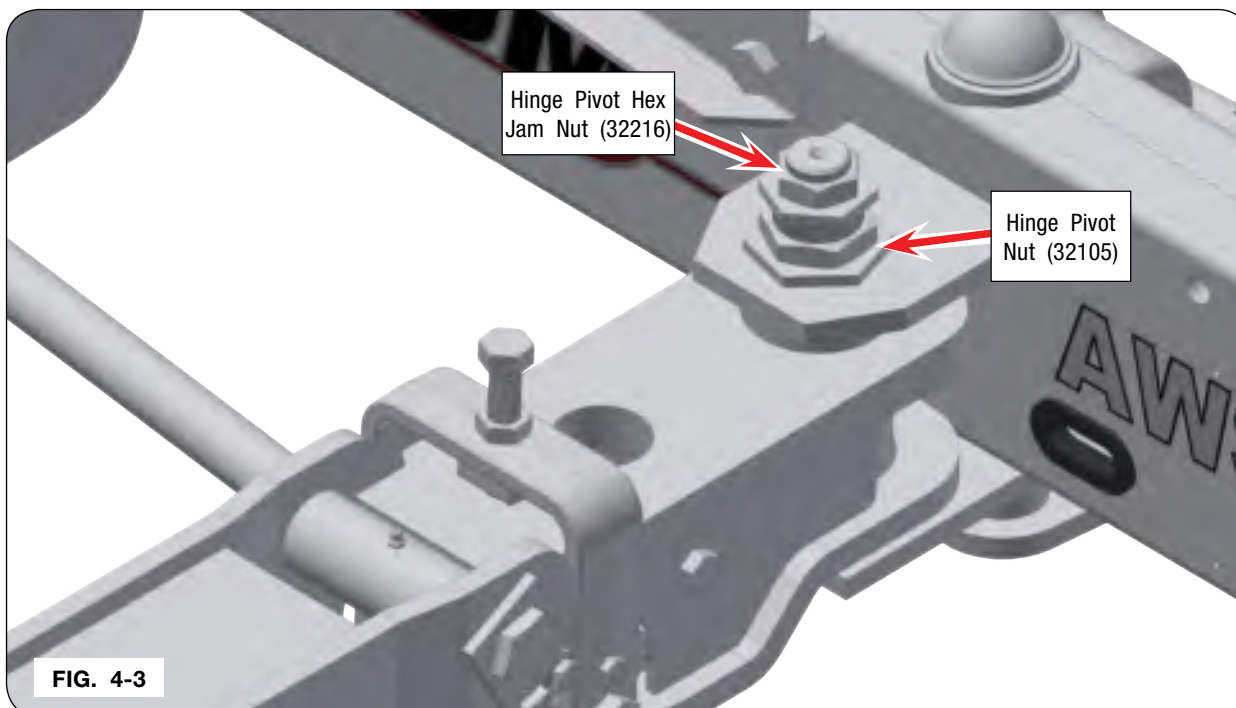


2. Tighten nut bearing (32104) to 45 ft.-lbs..

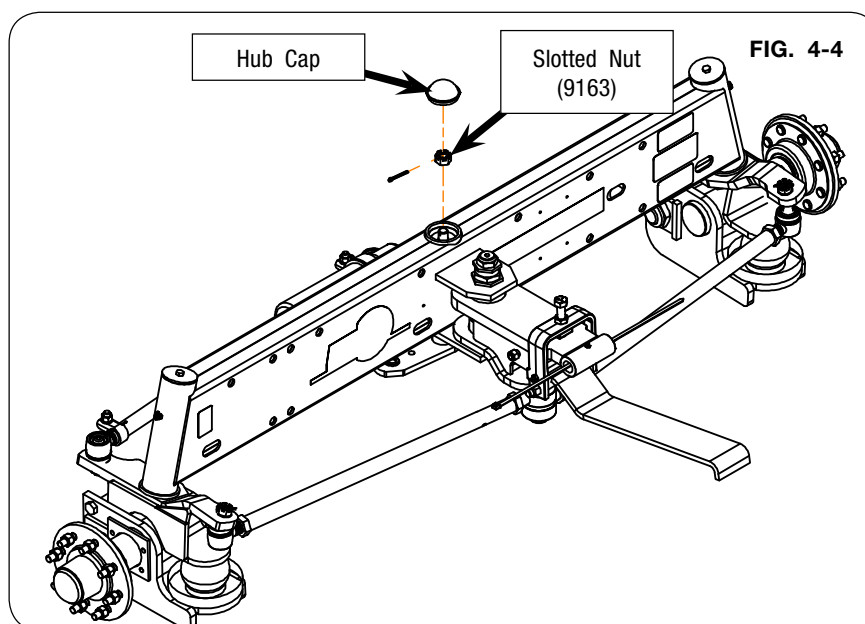


General Maintenance Information (continued)

3. Tighten 1 1/2" x 1/2" hinge pivot hex jam nut (32217) to 45 ft.-lbs.



4. Tighten hinge pivot nut (32105) to 200 ft.-lbs. to seat rear pivot into bottom plate.
5. Tighten 2" x 1/2" thread 1 3/4"-20 hinge pivot hex jam nut (32216) to 45 ft.-lbs..
6. Tighten 3/4"-16UNF slotted nut (9163) to 45 ft.-lbs..

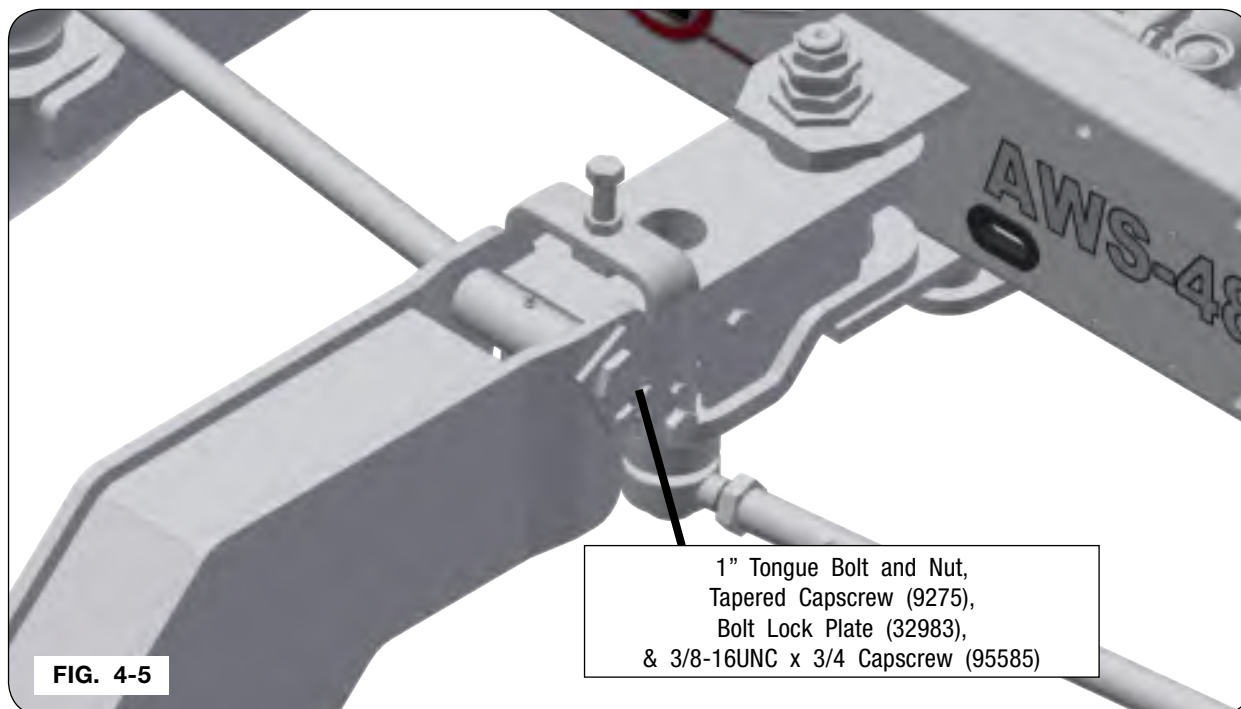


7. Continue to tighten 3/4"-16UNF slotted nut (9163) until slot in nut aligns with hole in shaft.
8. Install cotter pin and hub cap.

General Maintenance Information (continued)

Tongue Removal

1. Park the unit on a firm, level surface. Block the tires to keep the machine from moving. Set the towing vehicle parking brake, shut off the engine, and remove the ignition key.
2. Using a safe lifting device rated for 150 lbs., properly support the tongue. Lift the tongue high enough until the leaf spring is no longer in contact with the underside of the tongue.
3. Remove the 3/8" bolts securing the lock plates to the tongue.
4. Remove the lock plates.
5. Remove nut 9500918 and bolt 9500917 that secures the tongue to the steering hinge.
6. Remove the tongue from the turning plate.



Storage

Your implement is an important investment. Spend a little time to protect it from destructive rust and corrosion. You will be repaid in longer service life and better performance.

Before placing the implement in storage:

1. Repaint any chipped or scraped areas.
2. Inspect for damaged or worn parts. Replace before next season.
3. Store implement inside, away from livestock.
4. Use support stands rated at 1,000 lbs. to keep unloaded implement tires off bare ground.

Wheels and Tires

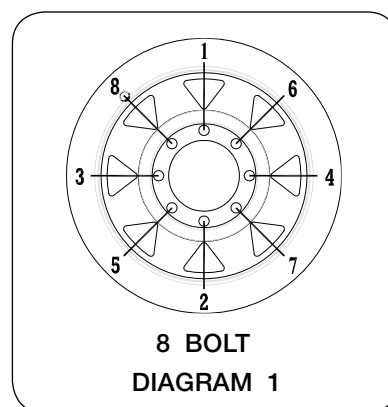
Wheel Nut Torque Requirements

CAUTION

- IMPROPERLY TORQUED WHEEL NUTS/BOLTS CAN CAUSE A LOSS OF IMPLEMENT CONTROL AND MACHINE DAMAGE. TORQUE WHEEL NUTS/BOLTS TO VALUES IN TABLE. CHECK TORQUE BEFORE USE, AFTER ONE HOUR OF UNLOADED USE OR AFTER FIRST LOAD, AND EACH LOAD UNTIL WHEEL NUTS/BOLTS MAINTAIN TORQUE VALUE. CHECK TORQUE EVERY 10 HOURS OF USE THERE-AFTER. AFTER EACH WHEEL REMOVAL START TORQUE PROCESS FROM BEGINNING. WARRANTY DOES NOT COVER FAILURES CAUSED BY IMPROPERLY TORQUED WHEEL NUTS/BOLTS.

Failure to check torque before first load may damage wheel nut/bolt seats. Once seats are damaged, it will become impossible to keep nuts/bolts tight. Tighten nuts/bolts to applicable torque value shown in table. Start all nuts/bolts by hand to prevent cross threading. Torque nuts/bolts in the recommended sequence as shown in Diagram 1.

WHEEL HARDWARE	
SIZE	FOOT-POUNDS
9/16-18 (UNF)	110 ft.-lbs.



Wheels and Tires (continued)

Tire Pressure

The following is to be used as a **general guide** for tire inflation and pressures can vary depending on specific brand of tire used. **It is important that tires are inspected after unit is loaded.** Start with minimum pressure indicated below. The tire should stand up with no side-wall buckling or distress as tire rolls. Record the pressure needed to support the full load and maintain this pressure to achieve proper tire life. **Do not exceed maximum recommended tire pressure.**

MODEL	TIRE SIZE & PRESSURE
AWS-30 & AWS-36	11L x 15 - 90 PSI
	225/75 x 15 - 65 PSI
	320/65 x 15 - 70 PSI
AWS-42 & AWS-48 & AWS-52	11L x 15 - 90 PSI
	235/85R x 16 - 80 PSI
	320/65 x 15 - 70 PSI

(All tire pressures in psi)

Tire Warranty

For questions regarding new tire warranty, please contact your local original equipment tire dealer. Used tires carry no warranty. Following are phone numbers and Websites for your convenience:

Carlisle www.carlisletire.com
Phone 800-260-7959
Fax 800-352-0075

Complete Torque Chart

Capscrews - Grade 5

NOTE:

- Grade 5 capscrews can be identified by three radial dashes on the head.
- For wheel torque requirements, refer to Wheels and Tires.
- Tighten U-bolts evenly and equally to have the same number of threads exposed on each end.



SIZE	FOOT POUNDS	NEWTON METERS
1/4-20	8-10	11-13
1/4-28	9-11	12-15
5/16-18	15-17	20-23
5/16-24	17-19	23-26
3/8-16	25-28	34-38
3/8-24	28-31	38-42
7/16-14	40-45	54-61
7/16-20	45-50	61-68
1/2-13	62-68	84-92
1/2-20	68-75	92-102
9/16-12	90-98	122-133
9/16-18	100-110	134-148
5/8-11	120-135	162-183
5/8-18	124-137	168-186
3/4-10	200-220	270-300
3/4-16	210-230	285-310
7/8-9	330-350	425-475
7/8-14	360-380	460-515
1-8	500-525	675-710
1-14	540-560	730-760
1 1/8-7	600-635	815-860
1 1/8-12	665-700	920-950
1 1/4-7	850-895	1150-1215
1 1/4-12	940-990	1275-1340
1 3/8-6	1125-1175	1525-1590
1 3/8-12	1280-1335	1735-1810
1 1/2-6	1500-1560	2035-2115
1 1/2-12	1685-1755	2285-2380

IMPORTANT

- Follow these torque recommendations except when specified in text.

Adjusting Wheel Toe-In

IMPORTANT

- After first use, recheck toe-in. Front wheel toe-in has been preset at the factory. If adjustment becomes necessary, use the following procedure.
1. Place the tongue in the straight and horizontal position. This can be checked by measuring reference lines “A” and “B”. These measurements are the same when the tongue is straight forward.
 2. To adjust the toe-in of the tire on the front axle, measure the distance between the wheels at the center line of the tires. Dimension “C” should be $\frac{1}{8}$ ” to $\frac{3}{8}$ ” shorter than dimension “D”. If not, loosen the locknuts on both ends of both front tie rods. Adjust both front tie rods evenly as needed. Retighten the locknuts and recheck the dimensions.
 3. To adjust the toe-in of the tires on the rear axle, measure the distance between the wheels at the center line of the tires. Dimension “E” should be $\frac{1}{8}$ ” to $\frac{3}{8}$ ” shorter than dimension “F”. If not, loosen the locknuts on both ends of the rear-most tie rod. Adjust this tie rod as needed. Retighten the locknuts and recheck the dimensions.

FRONT WHEEL TOE-IN

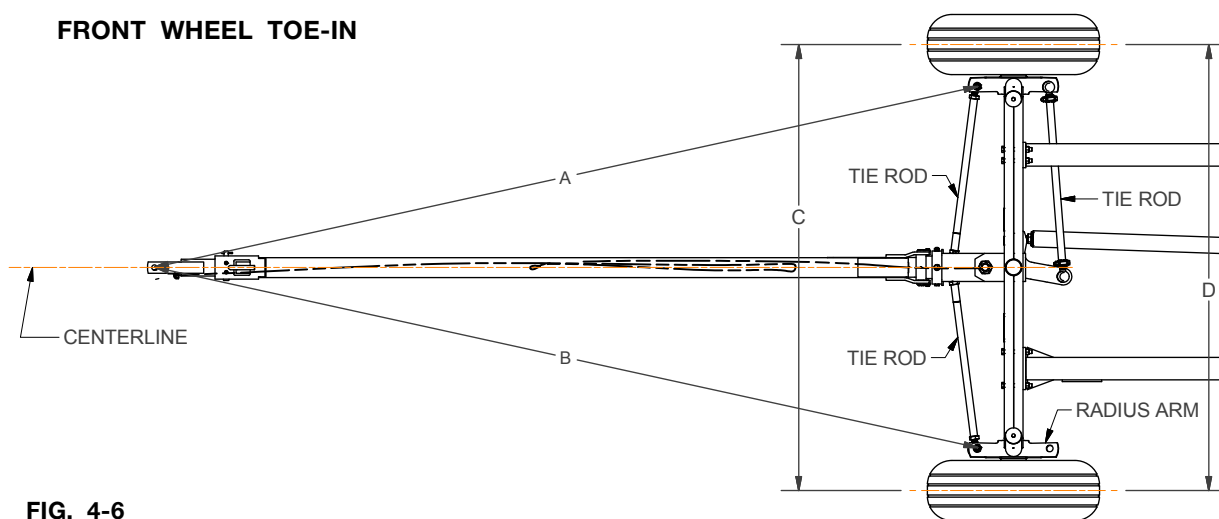


FIG. 4-6

REAR WHEEL TOE-IN

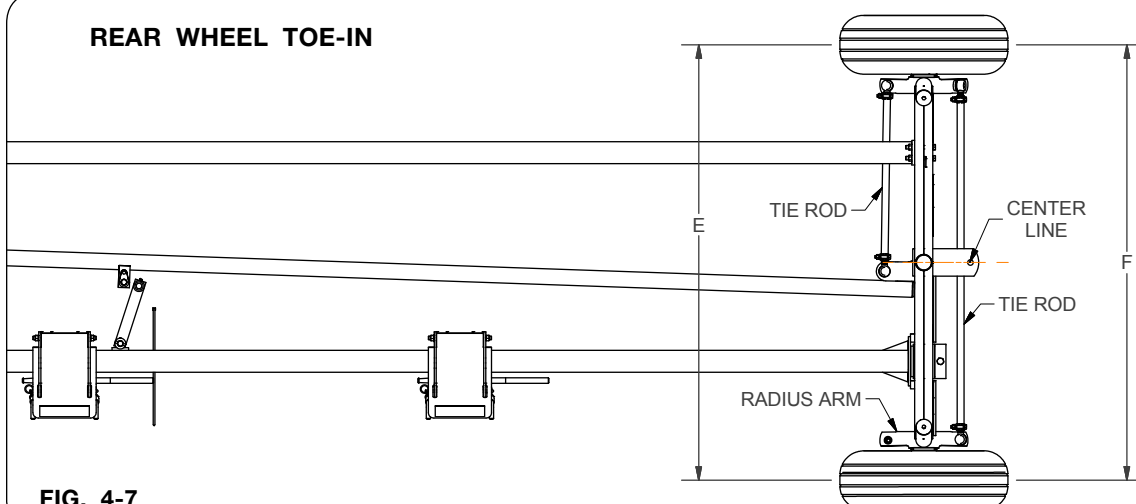


FIG. 4-7

Procedure To Correctly Adjust Front-To-Rear Trailing

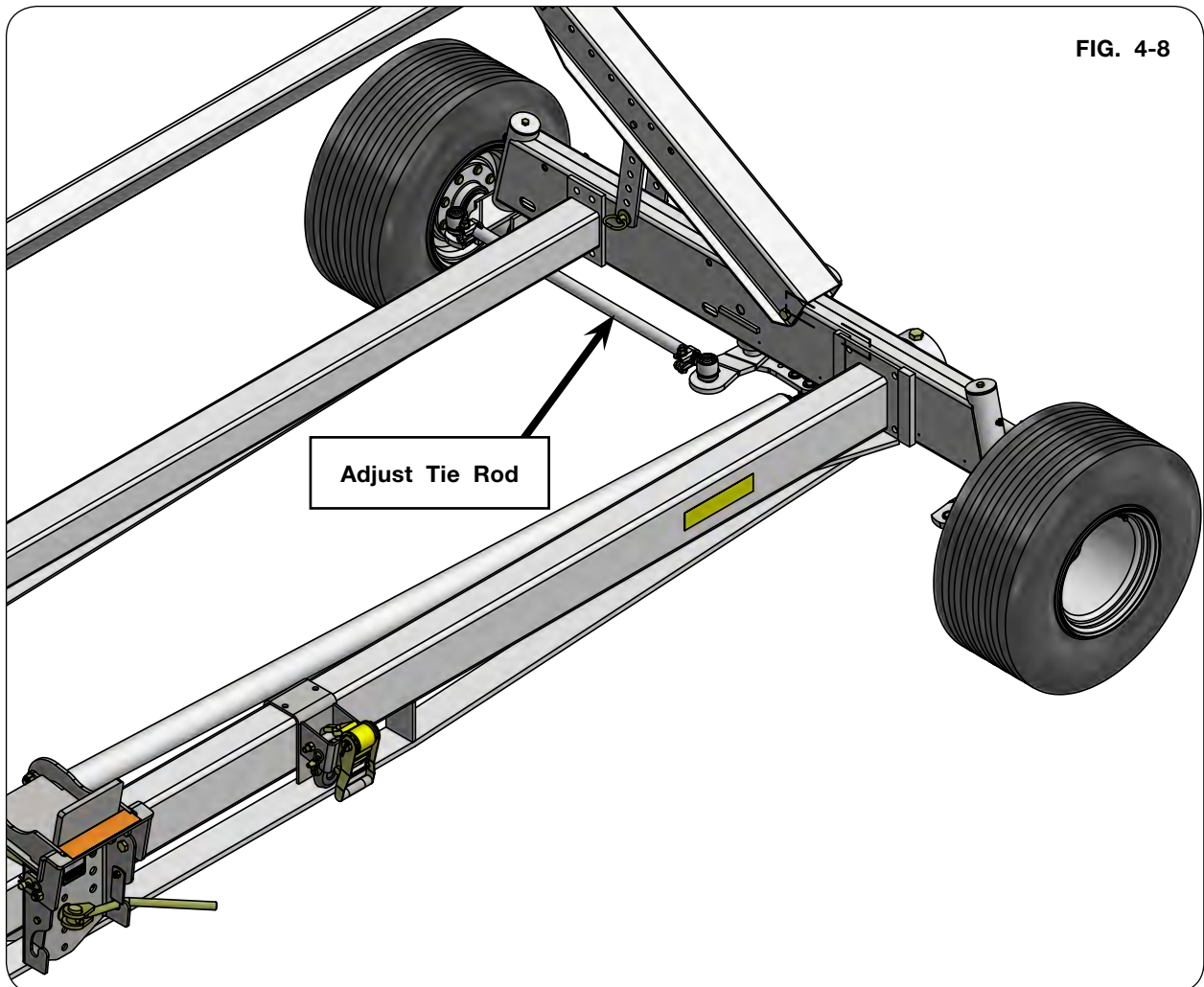
With a header properly secured to the header transport, the unit should trail with the rear axle directly behind the front axle. To correct the front-to-rear trailing, any of the three inner tie rods can be adjusted. It is recommended to use the tie rod in front of the rear axle to make this adjustment.

If the rear of the unit is trailing to the left, as you observe in the direction of forward travel, the tie rod must be extended. If the rear of the unit trails to the right, as you observe in the direction of forward travel, the tie rod must be shortened.

1. Loosen the locknuts on both ends of the tie rod and rotate the center tube to extend or shorten the tie-rod.
2. Retighten the locknuts, pivot the tongue side-to-side and check for any interference.
3. Drive the unit and check the front-to-rear trailing. Repeat the procedure as necessary.

NOTE: 1/4" turn of tie rod shifts rear axle 1" with respect to the front axle.

NOTE: The unit may trail differently when unloaded.



Brake Cleaning and Inspection

Your header transport brakes must be inspected and serviced immediately if a loss of performance is experienced. With normal use, servicing at one year intervals is usually adequate. With increased usage, this work should be performed more frequently as required. Magnets and shoes must be changed when they become excessively worn or scored, a condition which can reduce vehicle braking. Clean the backing plate, magnet arm, magnet, and brake shoes. Make certain that all the parts removed are replaced in the same brake and drum assembly. Inspect for any loose or worn parts, stretched or deformed springs and replace as necessary.

WARNING

- **POTENTIAL ASBESTOS DUST HAZARD - SOME BRAKE LININGS MAY CONTAIN ASBESTOS DUST, WHICH HAS BEEN LINKED TO SERIOUS OR FATAL ILLNESSES. CERTAIN PRECAUTIONS NEED TO BE TAKEN WHEN SERVICING BRAKES:**
 1. Avoid creating or breathing dust.
 2. Avoid machining, filing or grinding the brake linings.
 3. Do not use compressed air or dry brushing for cleaning (dust can be removed with a damp brush).

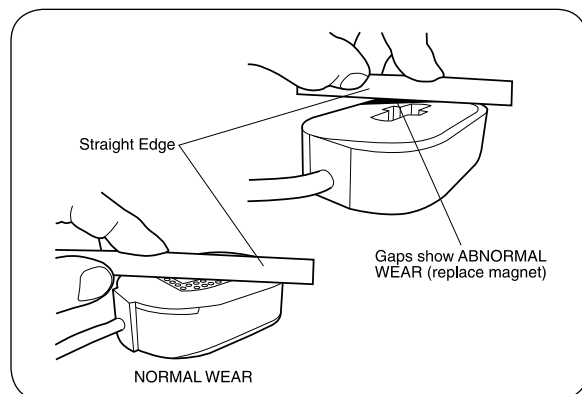
Brake Lubrication

Before reassembling, apply a light film of grease or anti-seize compound on the brake anchor pin, the actuating arm bushing and pin, and the areas on the backing plate that are in contact with the brake shoes and magnet lever arm. Apply a light film of grease on the actuating block mounted on the actuating arm.

NOTE: Do not get grease or oil on the brake linings, drums or magnets.

Magnets

Your electric brakes are equipped with high quality electromagnets that are designed to provide the proper input force and friction characteristics. Your magnets should be inspected and replaced if worn unevenly or abnormally. Use a straightedge to check magnet condition. For best results, the magnet should be flat. Even if wear is normal as indicated by your straightedge, the magnets should be replaced if any part of the magnet coil has become visible through the friction material facing of the magnet. It is also recommended that the drum armature surface be refaced when replacing magnets. Magnets should also be replaced in pairs - both sides of an axle.

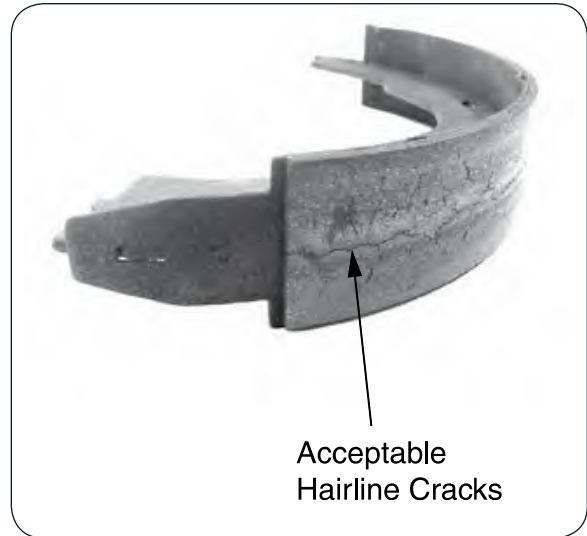


Brake Cleaning and Inspection (continued)

Shoes and Linings

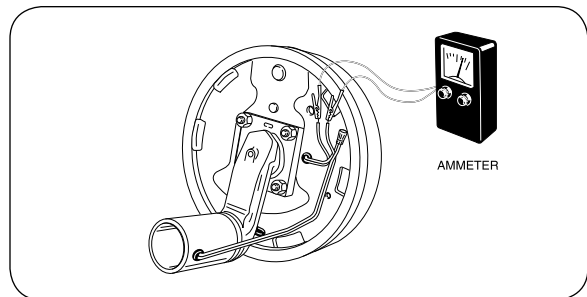
A simple visual inspection of your brake linings will tell if they are usable. Replacement is necessary if the lining is worn (to within 1/16" or less), contaminated with grease or oil, or abnormally scored or gouged. Hairline heat cracks are normal in bonded linings and should not be cause for concern. When replacement is necessary, it is important to replace both shoes on each brake and both brakes of the same axle. This will help retain the "balance" of your brakes.

After replacement of brake shoes and linings, the brakes must be re-burnished to seat in the new components. This should be done by applying the brakes 20 to 30 times from an initial speed of 40 m.p.h., slowing the vehicle to 20 m.p.h. Allow ample time for brakes to cool between applications. This procedure allows the brake shoes to seat in to the drum surface.



How to Measure Voltage

System voltage is measured at the magnets by connecting the voltmeter to the two magnet lead wires at any brake. This may be accomplished by using a pin probe inserted through the insulation of the wires. The engine of the towing vehicle should be running when checking the voltage so that a low battery will not affect the readings. Voltage in the system should begin at 0 volts and, as the controller bar is slowly actuated, should gradually increase to about 12 volts. If the controller does not produce this voltage control, consult your controller manual. The threshold voltage of a controller is the voltage applied to the brakes when the controller first turns on. Lower threshold voltage will provide for smoother braking. If the threshold voltage is too high, the brakes may feel grabby and harsh.



How to Measure Amperage

System amperage is the current flowing in the system when all the magnets are energized. The amperage will vary in proportion to the voltage. The engine of the tow vehicle should be running with the header transport connected when checking the header transport braking system. One place to measure system amperage is at the BLUE wire of the controller which is the output to the brakes. The BLUE wire must be disconnected and the ammeter put in series into the line. System amperage draw should be as noted in the following table.

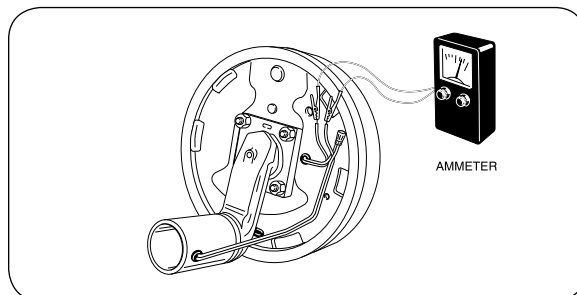
Make sure your ammeter has sufficient capacity and note polarity to prevent damaging your ammeter. If a resistor is used in the brake system, it must be set at zero or bypassed completely to obtain the maximum amperage reading. Individual amperage draw can be measured by inserting the ammeter in the line at the magnet you want to check. Disconnect one of the magnet lead wire connectors and attach the ammeter between the two wires. Make sure that the wires are properly reconnected and sealed after testing is completed. The most common electrical problem is low or no voltage and amperage at the brakes. Common causes of this condition are:

1. Poor electrical connections
2. Open circuits
3. Insufficient wire size
4. Broken wires
5. Blown fuses (fusing of brakes is not recommended)
6. Improperly functioning controllers or resistors

Another common electrical problem is shorted or partially shorted circuits (indicated by abnormally high system amperage). Possible causes are:

1. Shorted magnet coils
2. Defective controllers
3. Bare wires contacting a grounded object

Finding the cause of a short circuit in the system is done by isolating one section at a time. If the high amperage reading drops to zero by unplugging the header transport, then the short is in the header transport. If the amperage reading remains high with all the brake magnets disconnected, the short is in the header transport wiring. All electrical troubleshooting procedures should start at the controller. Most complaints regarding brake harshness or malfunction are traceable to improperly adjusted or nonfunctional controllers. See your controller manufacturer's data for proper adjustment and testing procedures. For best results, all the connection points in the brake wiring should be sealed to prevent corrosion. Loose or corroded connectors will cause an increase in resistance which reduces the voltage available for the brake magnets.



Brake Size	Amps/Magnet	Two Brakes	Four Brakes	Six Brakes	Magnet Ohms
7 x 1¼	2.5	5.0	10.0	15.0	3.9
10 x 1½	3.0	6.0	12.0	18.0	3.2
10 x 2¼	3.0	6.0	12.0	18.0	3.2
12 x 2	3.0	6.0	12.0	18.0	3.2
12¼ x 2½	3.0	6.0	12.0	18.0	3.2

Brake Drum Inspection

There are two areas of the brake drum that are subject to wear and require periodic inspection. These two areas are the drum surface where the brake shoes make contact during stopping and the armature surface where the magnet contacts (only in electric brakes).

The drum surface should be inspected for excessive wear or heavy scoring. If worn more than .020" oversized, or the drum has worn out of round by more than .015", then the drum surface should be re-machined. If scoring or other wear is greater than .090" on the diameter, the drum must be replaced.

The machined inner surface of the brake drum that contacts the brake magnet is called the armature surface. If the armature surface is scored or worn unevenly, it should be re-faced to a 120 micro inch finish by removing not more than .030" of material. To insure proper contact between the armature face and the magnet face, the magnets should be replaced whenever the armature surface is re-faced and the armature surface should be re-faced whenever the magnets are replaced.

IMPORTANT

- *It is important to protect the wheel bearing bores from metallic chips and contamination which result from drum turning or armature re-facing operations. Make certain that the wheel bearing cavities are clean and free of contamination before reinstalling bearing and seals. The presence of these contaminants will cause premature wheel bearing failure.*

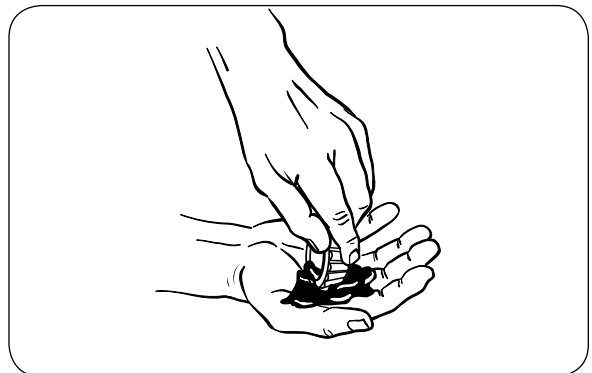
Bearing Inspection

Wash all grease and oil from the bearing cone using a suitable solvent. Dry the bearing with a clean, lint-free cloth and inspect each roller completely.

Bearing Lubrication

Along with bearing adjustment, proper lubrication is essential to the proper function and reliability of your header transport axle. Bearings should be lubricated every 12 months or 12,000 miles. The method to repack bearing cones is as follows:

1. Place a quantity of grease into the palm of your hand.
2. Press a section of the widest end of the bearing into the outer edge of the grease pile closest to the thumb forcing grease into the interior of the bearing.
3. Repeat this while rotating the bearing from roller to roller.
4. Continue this process until you have the entire bearing completely filled with grease.
5. Before reinstalling, apply a light coat of grease on the bearing cup.



Troubleshooting Brakes

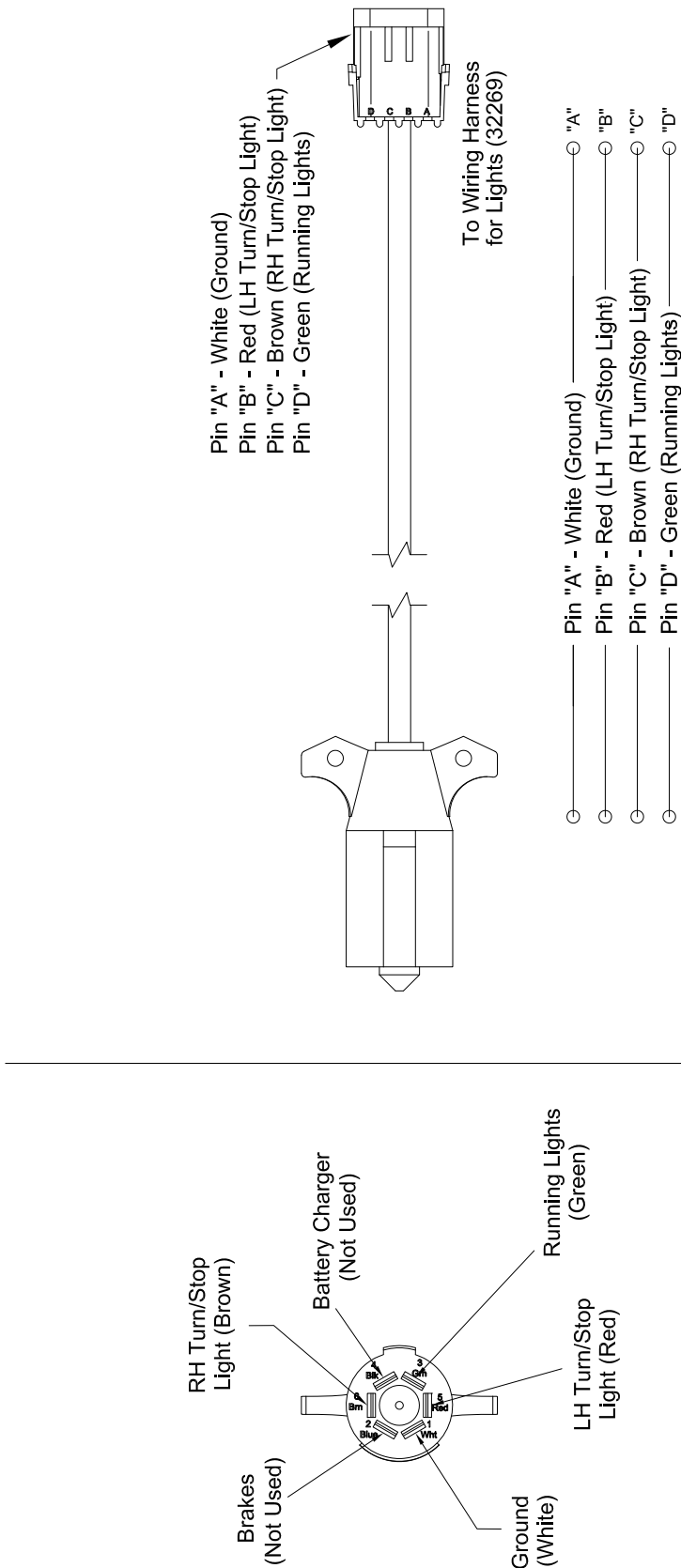
Most electric brake malfunctions, that cannot be corrected by either brake adjustments or synchronization adjustments, can generally be traced to electrical system failure. Voltmeters and ammeters are essential tools for proper troubleshooting of electric brakes. Mechanical causes are ordinarily obvious, i.e. bent or broken parts, worn out linings or magnets, seized lever arms or shoes, scored drums, loose parts, etc. Please consult the following troubleshooting charts in this section of the manual to determine the causes and solutions for common problems found in header transport braking systems.



CAUTION

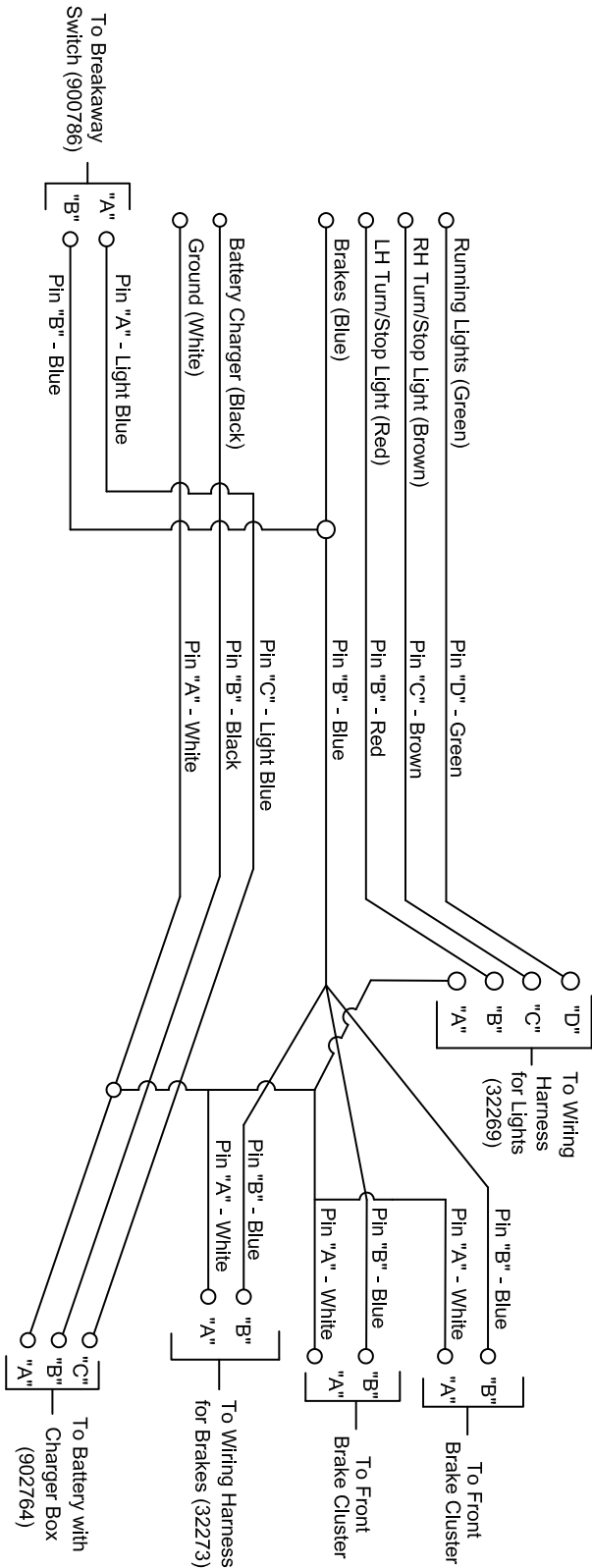
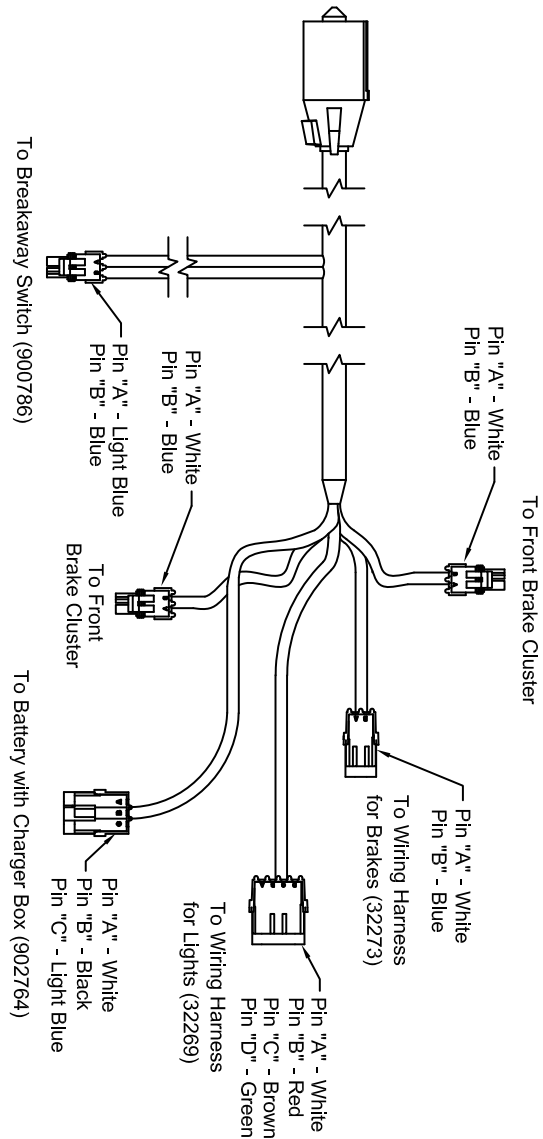
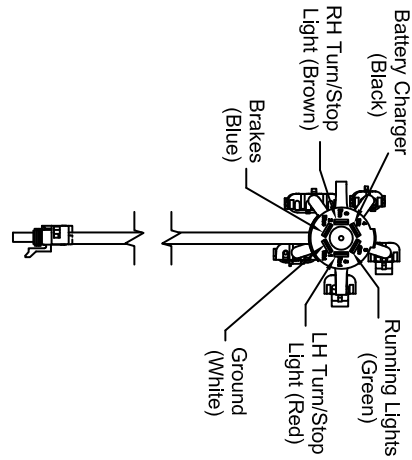
- **BEST BRAKING PERFORMANCE IS ACHIEVED WITH A CONTROLLER SETTING THAT IS JUST SHORT OF WHEEL LOCK UP OR SLIDE. OVERLY AGGRESSIVE BRAKING WHICH RESULTS IN WHEEL LOCK UP AND SLIDING, CAN CAUSE A DANGEROUS LOSS OF CONTROL AND RESULT IN PERSONAL INJURY OR DEATH.**

Front Harness for Non-Brakes Electrical Schematic (#9504152)

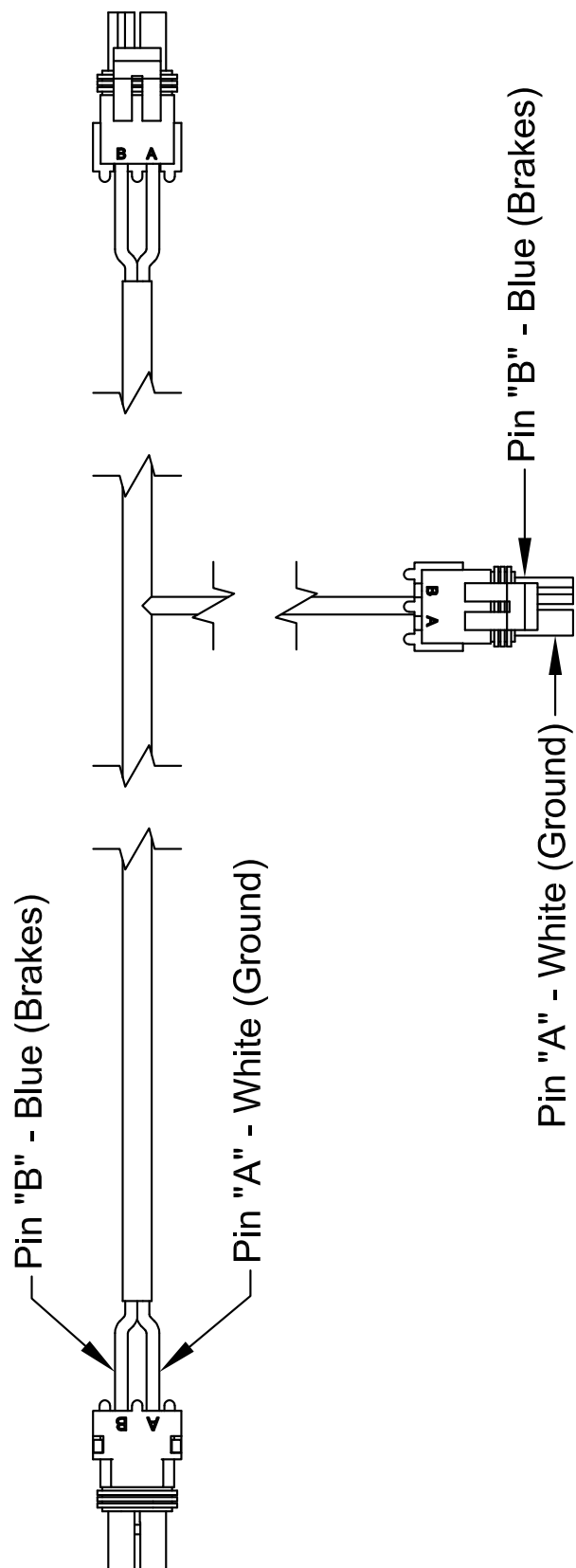


Front Harness for Brakes Electrical Schematic

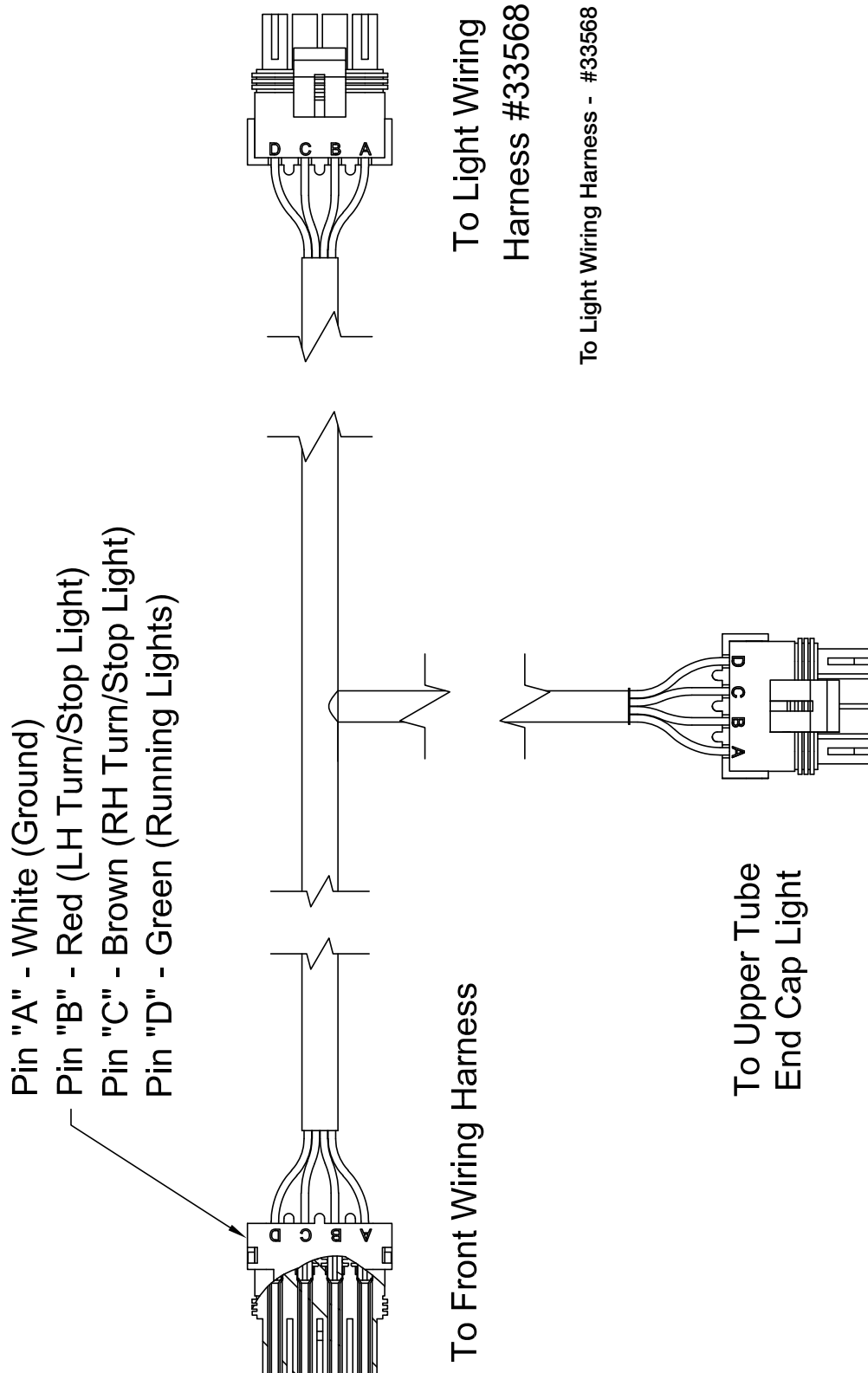
16' Tongue (#33676) & 12' Tongue (#9504155)



Rear Brake Harness Electrical Schematic (#32273)



Light Harness Electrical Schematic (#32269)



Rear Light Harness Electrical Schematic (#33568)

