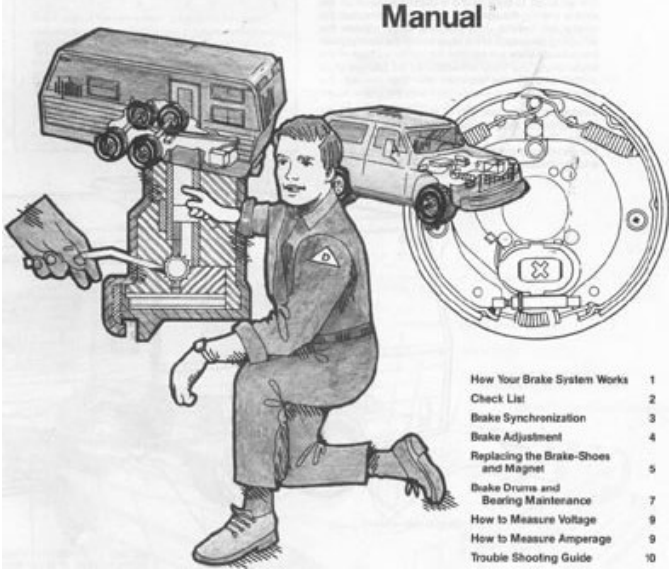
Dexter

Maintenance Manual



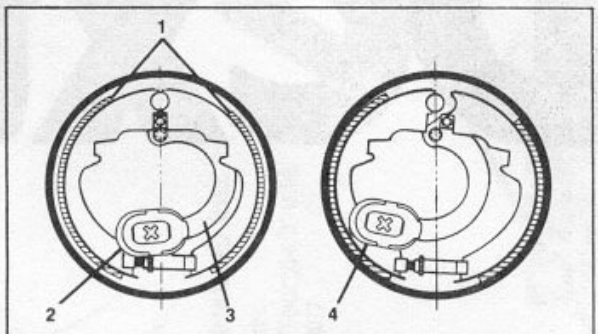
How Your Brake System Works

The electric brakes on your trailer are similar to the drum brakes on your automobile. The basic difference is that your automobile brakes are actuated by hydraulic pressure while your trailer brakes are actuated by an electromagnet.

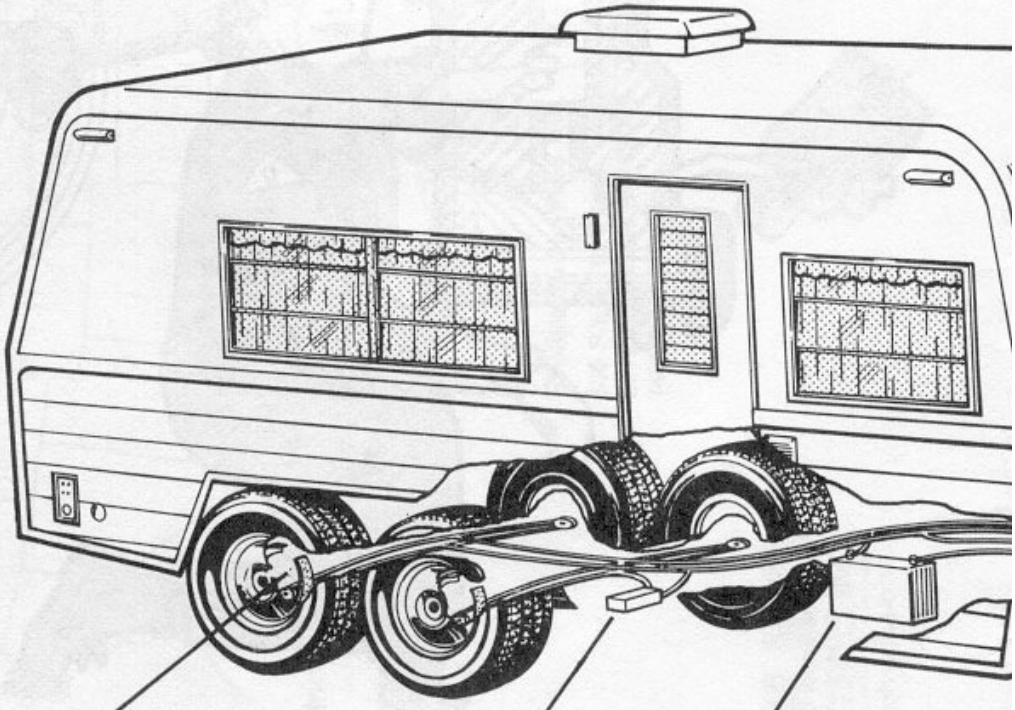
With all of the brake components connected into the system, the brakes will operate as follows:

When electrical current is fed into the system by the controller, it flows to the electromagnet in the brakes. The high capacity electromagnets are energized and are attracted to the rotating armature surface on the drums, moving the actuating levers in the direction the drums are turning. The resulting force causes the actuating cam block at the shoe end of the lever to push the primary shoe out against the inside surface of the brake drum. The force generated by the primary shoe acting through the adjuster link then moves the secondary shoe out into contact with the brake drum.

Increasing the current flow to the magnet causes the magnet to grip the armature surface of the drum more firmly. This results in increasing pressure against the shoes and brake drum until the desired stop is accomplished.



The electric brake in a relaxed (left drawing) and activated (right drawing) position. The outermost circle represents the brake drum. When in a relaxed (non-functioning) position, there is a gap between the brake shoes (1) and the drum, and the magnet (2) is in the centered position. The magnet is attached to a lever (3) whose function is to force the shoe against the drum when the magnet is energized. (4) shows the position of the magnet as it is energized and attracted to the moving armature. This movement causes the lever to push the brake shoes against the drum.



DEXTER ELECTRIC BRAKES

OPTIONAL FRONT AXLE RESISTOR ELIMINATES FRONT WHEEL LOCK-UP AND FRONT AXLE BOUNCE IF PROBLEMS OCCUR WITH TANDEM AXLE TRAILERS.

BATTERY — TO POWER EMERGENCY STOPS IN EVENT OF BREAKAWAY.

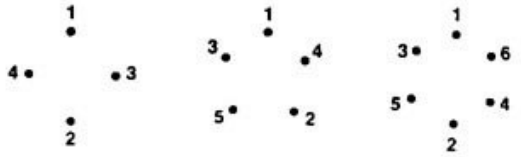
1

Check List

Travel Trailer axle assemblies are made to be used ... not abused. There are a number of simple rules to follow in caring for your trailer axle assembly that can add to its life — and in the case of some of these rules, you may be protecting your own life as well. Using the following check list before starting a trip with your trailer is highly recommended. The list has been compiled after years of experience and talking to thousands of trailer owners.

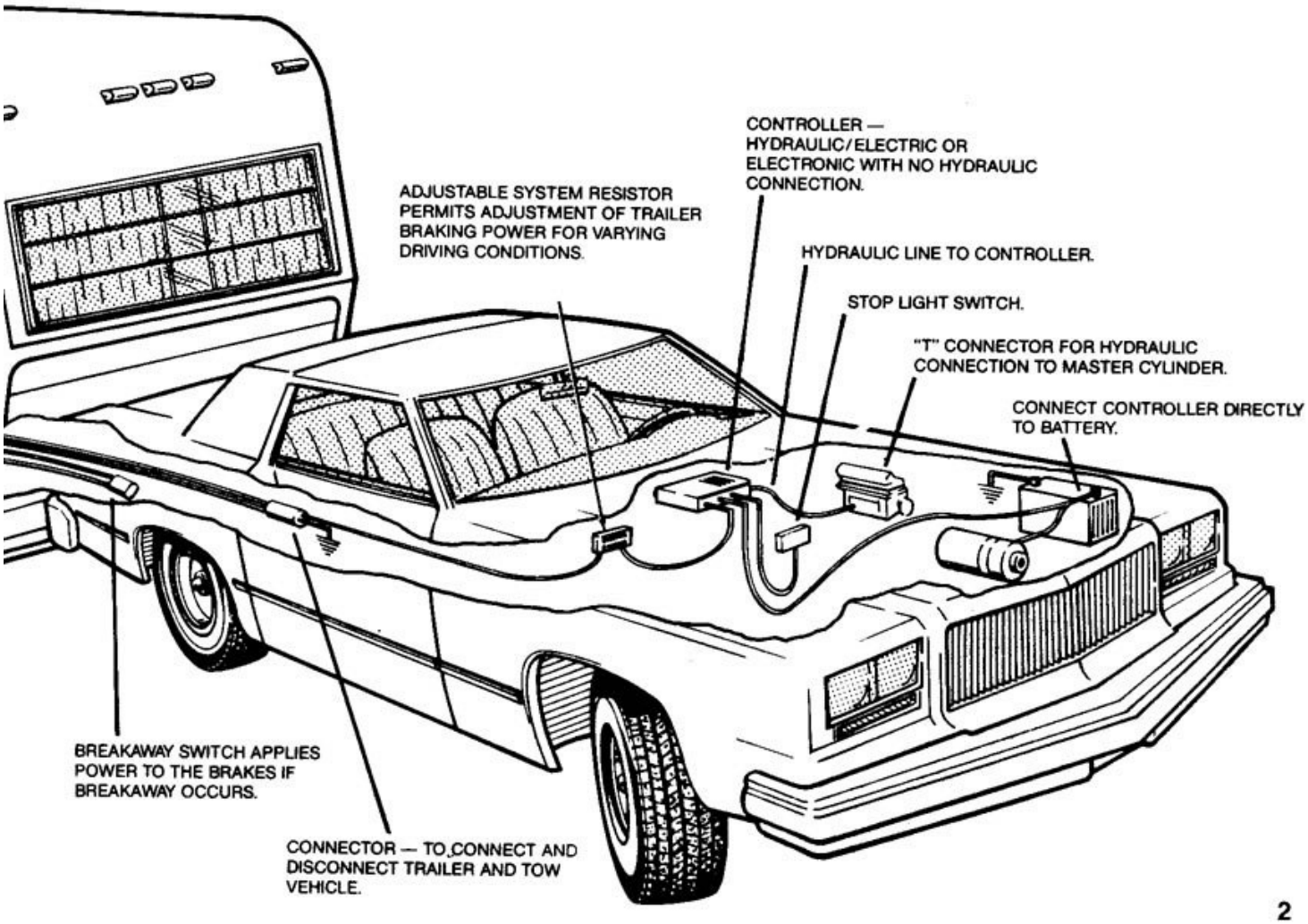
1. Check hitch. Is it showing wear? Is it properly lubricated?
2. Fasten safety chains and breakway switch actuating chain securely. Make certain breakaway battery is fully charged.
3. Inspect towing hook-up for secure attachment.
4. Place approximately 10% of the trailer's total weight on the hitch for heavy trailers and up to 15% hitch load for light trailers.
5. Do not overload. Stay within your trailer's gross vehicle rated capacity. (Consult your trailer's identification plate.)
6. Inflate tires according to manufacturer's specifications; inspect tires for cuts, excessive wear, etc.
7. Check wheel mounting nuts/bolts with a torque wrench. Torque wheel nuts/bolts to 95 lb.-ft. before first road use and after each wheel removal. Retorque to 95 lb.-ft. at 25 miles and again next 50 miles. Check periodically thereafter.

   Tighten in this order:



4 Bolt Hub 5 Bolt Hub 6 Bolt Hub

8. Make certain brakes are functioning properly.
9. Check tightness of hanger and shackle bolts and U-bolt nuts (See tightening torque table.)
10. Check operation of all lights.



Brake Synchronization

Your trailer brakes are designed to work in synchronization with your tow vehicle brakes. Do not use trailer brakes or tow vehicle brakes alone to stop the combined trailer-tow vehicle load.

Your trailer and tow vehicle will seldom have the right amperage flow to the brake magnets to give you comfortable safe braking unless you make proper brake system adjustments. Changing trailer load and driving conditions as well as uneven generator and battery output can mean unstable current flow to your brake magnets. It is therefore imperative that you maintain and adjust your brakes as set forth in this manual and perform the synchronization procedure noted below.

Proper synchronization of tow vehicle to trailer braking can be accomplished only by road testing. Brake "Lockup, Grabbiness or Harshness" is quite often lack of synchronization between the tow vehicle and the trailer weight being towed and too high of a threshhold voltage (over 2 volts).

There are two synchronization adjustments available:

1. System Resistor — which regulates the maximum braking power of the trailer brakes.
2. The max.-min. gain adjustment (either handle or dial) on the controller — which controls the tow vehicle brake line pressure at which the controller begins to pass current to the trailer brakes.

To synchronize:
Start by setting the slide on the System Resistor in the middle of the coil and the controller adjustment near the center of its setting and making certain the trailer brakes are properly adjusted.

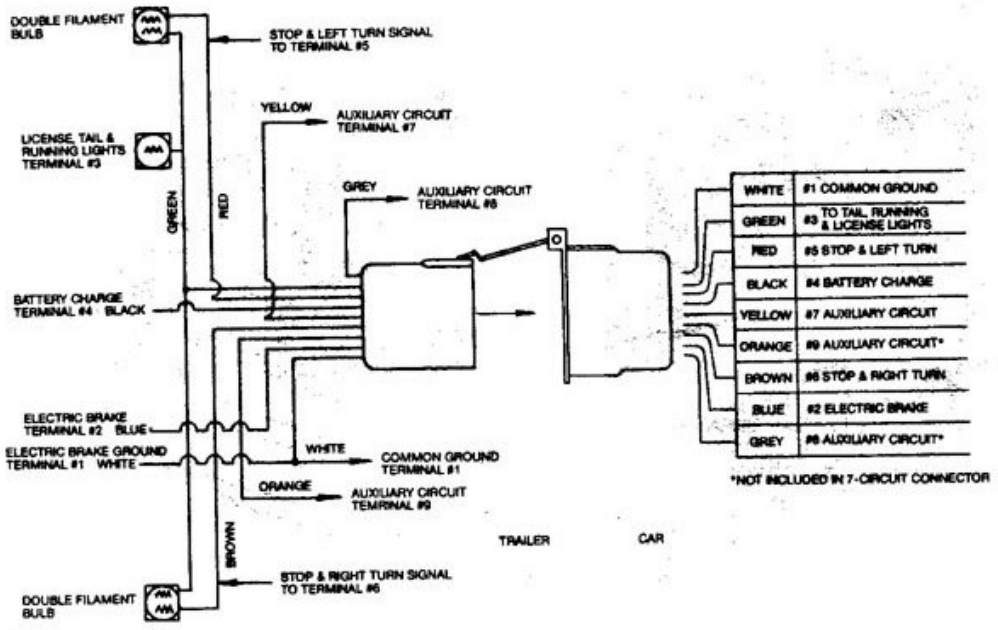
CAUTION: Before making road tests, make sure the area of the road you will be using is clear of vehicular traffic and pedestrian traffic.

Make hard stops from 20 mph on a dry concrete road free of sand and gravel. If the trailer brakes lock and slide, add more resistance to the circuit with the System Resistor. If they do not, take resistance out of the circuit. Adjust the resistor to the point of brake lockup and wheel skid.

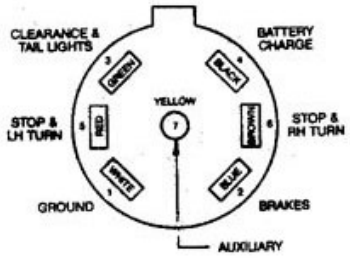
Make a number of 30 mph hard stops to check braking at this speed. If the trailer brakes lag behind the tow-vehicle, turn the controller adjustment in the direction for more or maximum braking. If the trailer brakes come in ahead of the tow vehicle brakes, turn the controller adjustment in the opposite direction for less braking. For improved combined vehicle drivability, it is recommended that the controller be adjusted to allow the trailer brakes to come in slightly ahead of the towing vehicle brakes.

When this adjustment has been completed, make a hard stop or two from 20 mph to check for wheel lockup and whether further fine tuning of the System Resistor is required.

TYPICAL TRAILER WIRING DIAGRAM

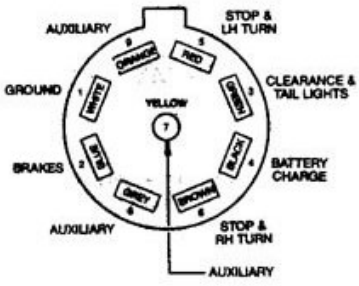


7-CIRCUIT RECEPTACLE



VIEW LOOKING INTO TOW VEHICLE RECEPTACLE

9-CIRCUIT RECEPTACLE



VIEW LOOKING INTO TOW VEHICLE RECEPTACLE

Brake Adjustment

Brakes should be adjusted after the first 200 miles and at 3000 mile intervals, or as use and performance requires. The brakes should be adjusted in the following manner:

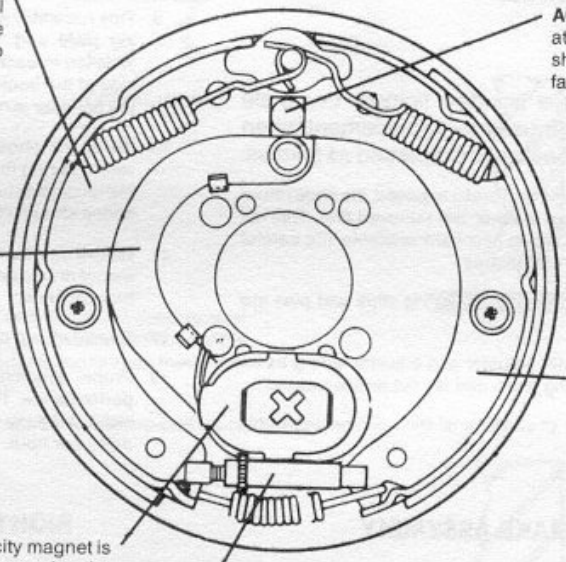
1. Jack up a wheel and check that it rotates freely.
2. Remove the adjusting hole cover from the adjusting slot on the bottom of the backing plate.
3. With a screwdriver or a standard adjusting tool, rotate the star-wheel of the adjusting link by moving tool "down" to expand and tighten the brake shoes. Adjust shoes out until the pressure of the linings against the drum makes the wheel very difficult to turn.
4. Now, rotate the star-wheel in the opposite direction by moving tool up 8 to 12 clicks. Wheel should turn freely.
5. Replace adjusting hole cover and lower the wheel to the ground.
6. Repeat the above procedure for the other brakes.

CAUTION: NEVER CRAWL UNDER YOUR TRAILER WHILE IT IS RESTING ON TRAILER JACKS.

PRIMARY SHOE — When activated against the brake drum, surface frictional forces are generated between the brake drum and the shoe. These forces act to stop drum rotation.

ACTUATING BLOCK — Movement of actuating lever presses block against primary shoe forcing shoe against the inside surface of brake drum.

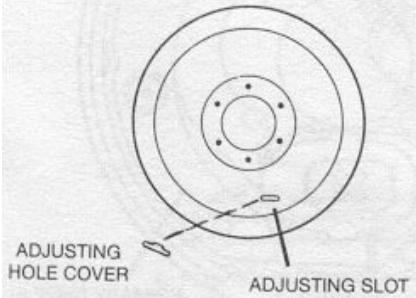
ACTUATING LEVER — A simple pivoted lever with magnet mounted on one end and actuating block at the other end. Forces generated by the magnet are multiplied by the lever ratio of the arm.

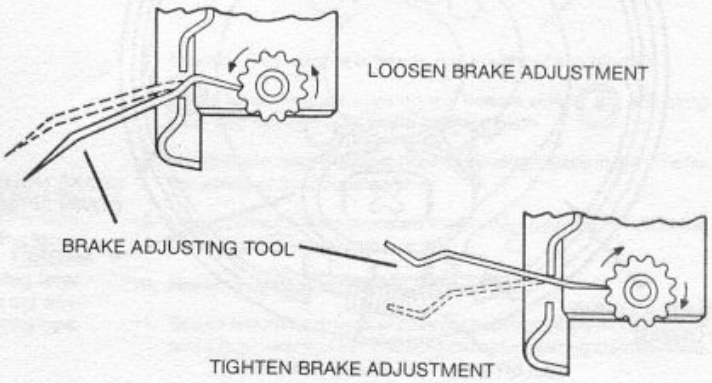


SECONDARY SHOE — The force of the primary shoe activating this shoe is multiplied by the secondary shoe and stopping power is increased.

MAGNET — The high capacity magnet is attracted to the rotating drum moving the actuating lever. This forces the actuating block against the primary shoe when the vehicle is traveling forward, against the secondary shoe if the vehicle is backing.

ADJUSTER LINK — The forces generated by the primary shoe are transmitted through this link to the secondary shoe moving it into contact with the brake drum. Also, it is used to adjust the brake shoes for brake lining wear.





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Replacing the Brake-Shoes and Magnet

Brakes must be inspected and serviced at yearly intervals or as use and performance requires. Magnets and shoes must be changed when they are worn or scored thereby preventing adequate vehicle braking.

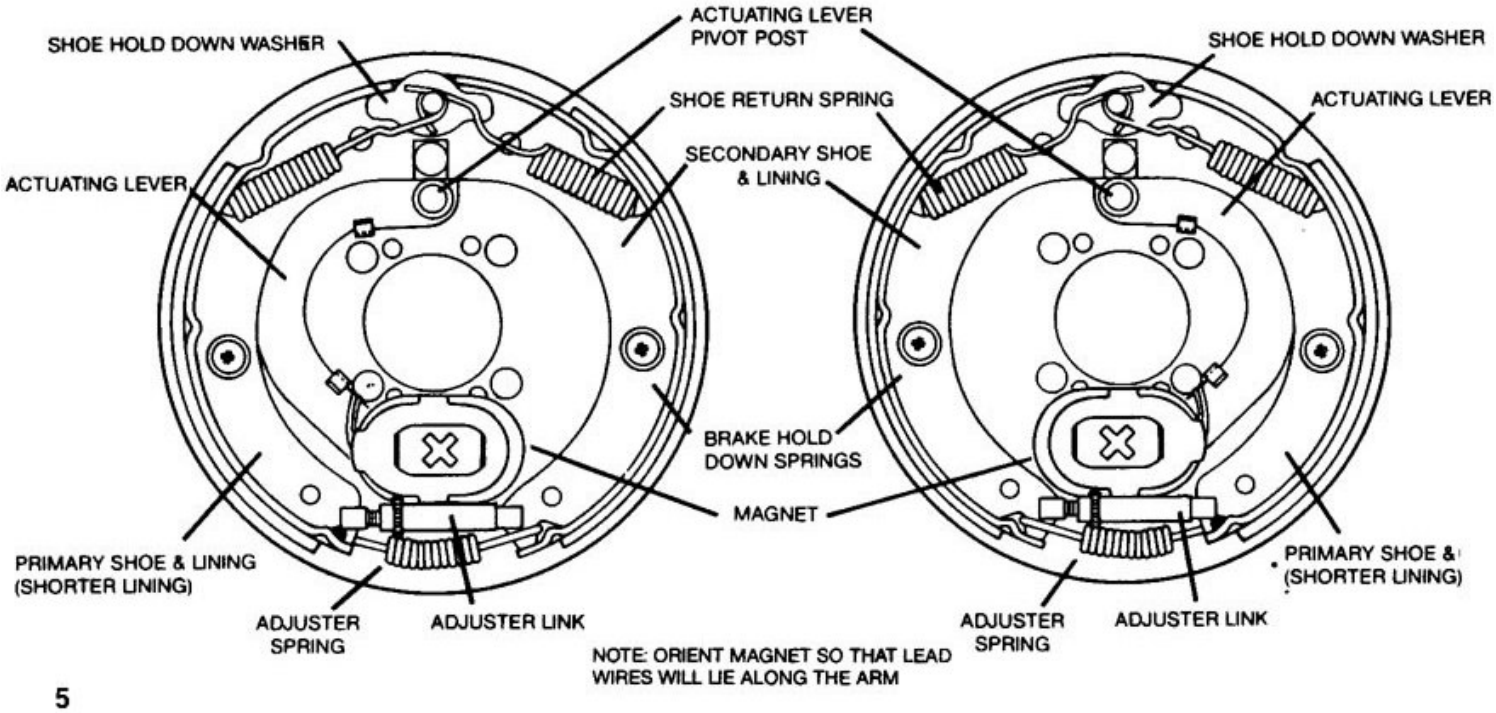
SHOE AND LININGS

A look at the linings will tell if they are useable. Replacement is necessary if the lining is worn thin (1/16" or less) or contaminated with oil or grease. It is important to replace both shoes on each brake and both brakes on the same axle. Check shoe return and adjusting springs for stretch or deformation and replace if deformed or stretched.

Your Dexter brakes have bonded linings; complete shoe assemblies must be used for replacement when linings are worn out. Shoes can be replaced as follows:

1. With hub and drum removed, and brake exposed, the shoe return springs and the hold down washer are removed first. This removal will be facilitated if spring pliers are available. (Be careful not to deform spring end with pliers.)
2. The two shoe hold down springs or spring clips and pins are then removed.
3. Remove the two shoes with adjuster and adjuster spring as an assembly, from the backing plate, and lay flat on the ground.
4. Spread the anchor ends of shoes until the adjuster assembly drops out.
5. Remove actuating lever. Inspect magnet lead in wire for cracking or cuts in the insulation. If magnet is to be replaced, follow instructions noted under Magnet Replacement.
6. Clean backing plate. Remove all dirt and old grease. Lubricate the six pads where the shoes and actuating lever ride against the plate with a light film of grease. Lightly grease actuating lever pivot post and install actuating lever with curve of actuator lever towards front of trailer. Make certain magnet wire is properly postitioned under lever and in clips to prevent cutting.
7. Disassemble adjuster, clean off old grease. Relubricate the threads and reassemble the adjuster. Moly-Grease or any other good general purpose grease should be used.
8. Install the adjuster spring with the primary and secondary shoes. Then spread the shoes apart and install the adjuster assembly. The star-wheel end of the adjuster should be in line with the slot in the backing plate.
9. This assembly should then be properly positioned on the backing plate and the hold down spring or spring clip and pin installed in each shoe. The primary shoe should be on forward side of the backing plate facing front of trailer with the curve of the actuator arm lying under the web of this shoe.
10. Install the shoe hold down washer and the secondary shoe return spring first, then the primary return spring. Move actuating lever to actuate shoes — movement should be smooth and shoes should return to proper position.
11. Before remounting drums, grease the wheel bearings, then mount drums and adjust bearings per instructions under bearing maintenance.
12. Repeat above procedure for the other brakes.
13. Proper breaking-in of new brake lining is essential to brake performance. This can be accomplished by performing 15-20 slow and easy brake stops from 40 miles per hour down to 20 miles per hour.

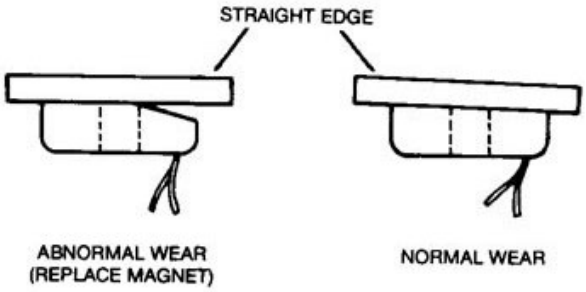
LEFT HAND BRAKE ASSEMBLY **RIGHT HAND BRAKE ASSEMBLY**



MAGNET CHECK & REPLACEMENT

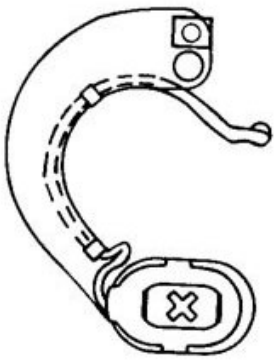
If the magnet face is worn unevenly or abnormally as checked by laying a straight edge along the face over the length of the magnet, or if the magnet coil has opened up or shorted out, the magnets on both left and right hand brake on an axle must be replaced.

It is recommended that the armature surface be refaced when replacing magnets. (See Brake Drum Section.)

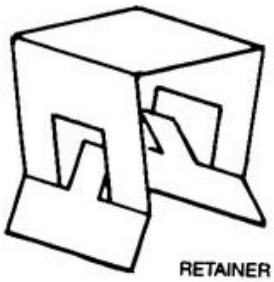


TO REMOVE:

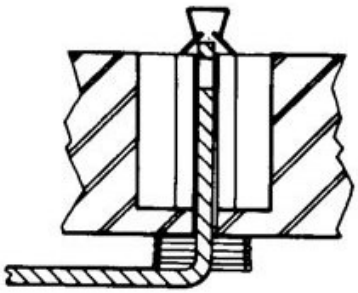
1. Note the routing of the magnet lead wire along with the bottom of the actuating lever before removing it, so that the lead wires of the replacement magnet can be properly routed to keep them from being damaged by brake operation.
2. Disconnect the magnet wire from connections to the axle cross wires.

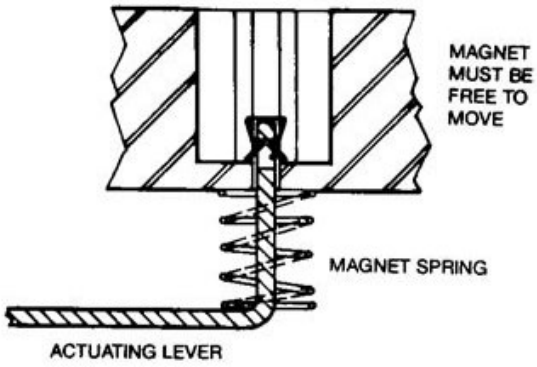


3. Remove the strain relief bushing from the back of the backing plate and pull magnet wire through the hole and out of the clips on the actuator lever. Do not remove clips from actuating lever.
4. Push magnet down until it bottoms against the actuating lever and remove the magnet retainer clip. If it is one of the old wire retainers, use needle nose pliers. If it is the snap-on spring type, pop it off with a screw driver and discard it.



5. Mount new magnet on the actuating lever and install new retainer clip and spring. Push magnet down against spring on the actuating lever and then push retainer clip down until it snaps in place with the two small fingers locking in the hole in the actuating lever.





6. Make certain magnet is free to move without any binding.
7. Route wires through clips on the bottom side of the actuating lever and through hole in the backing plate.
8. Install strain relief bushing, allowing enough slack in the wire for the swing of the actuating lever.
9. Inspect wire position to assure it will not be pinched or cut during normal brake operation.
10. Reconnect wires to the axle cross wires.
11. Before mounting drums, grease the bearings, then mount drums and adjust bearings per instructions under bearing maintenance.

Brake Drums and Bearing Maintenance

BRAKE DRUMS

Remove drums and inspect for heavy scoring. If drum is scored or worn more than .020" oversized, or has run out exceeding .015," the drum should be turned. If scoring or other wear is greater than .090," replace the drum.

The hub/drum has a machined inner surface against which the magnet operates. This is the armature surface. If this surface is badly scored or worn unevenly, it should be refaced to a 120 microinch finish, by removing not more than 1/32" material. If this surface is refaced, new magnets will have to be installed.

The armature face must be refaced whenever new magnets are installed to asure proper contact of the magnet with the armature face. Most brake service centers can do this procedure.

Maximum Rebore Diameter			
Brake Drum Size	7"	10"	12"
Max. Drum Diameter	7.090"	10.090"	12.090"

NOTE:
It is important to protect the wheel bearing bores from metallic chips which result from the drum boring or armature facing operations. Make certain the wheel bearing cavities are clean and free from contamination before re-installing bearings and seals. Allowing contaminants to be present in the wheel bearing bores will lead to premature wheel bearing failure.

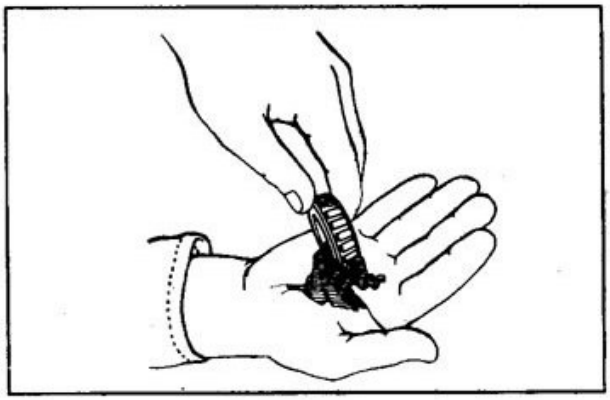
BEARING MAINTENANCE

BEARING ADJUSTMENT:
If bearing adjustment is required or the brake drum has been removed for any reason, the following procedure must be followed to insure a correct bearing adjustment of .001 to .012 end play.

1. While rotating hub slowly to seat the bearings, tighten spindle nut to approximately 50 ft. lbs. (12" wrench or pliers with full hand force.)
2. Loosen nut slightly to remove preloaded torque. Do not rotate hub.
3. Finger tighten nut until just snug and place cotter pin in the first nut castelation which lines up with cotter pin hole in spindle.
4. Bend over cotter pin legs to secure nut and clear grease or oil cap.
5. Nut should be free to move with only restraint being the cotter pin.

BEARING LUBRICATION

Along with bearing adjustment, proper bearing lubrication is essential to the functioning and reliability of your axle. It is important to protect bearings from contaminants at all times whether in operation or during inspection or overhaul.

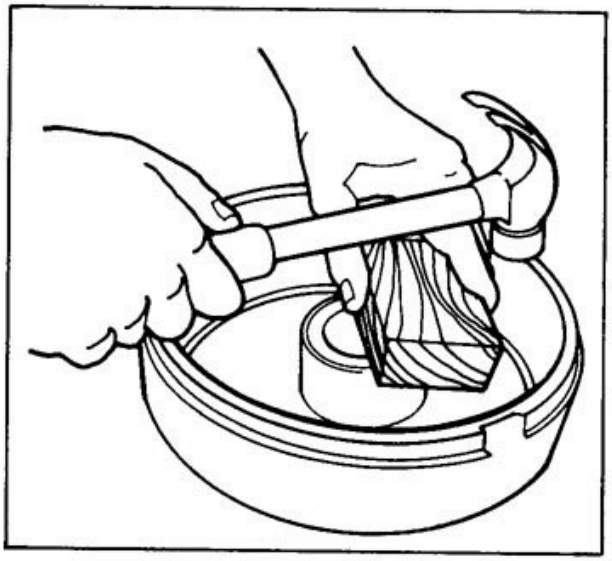


Work the grease into the bearing until the bearing is completely filled. The technique used here is to push a segment of the bottom (the wider end) of the bearings into the outer edge of the grease pile closest to the thumb. Keep doing this until the bearing interior is completely filled and the grease oozes out both from the top and from between the rollers. Then rotate the bearing to repeat this operation on the next segment. Keep doing this until you have the entire bearing completely filled with grease. Before installing bearing place a light coat of grease on the bearing cups which are pressed in the drum.

Recommended Wheel Bearing Lubrication Specifications	
Grease:	
Thickener Type	:Lithium Complex or Equivalent
Dropping Point	:230°C (446°F) Minimum
Consistency	NLGI No. 2
Additives	:EP, Corrosion and Oxidation Inhibitors
Base Oil	Solvent Refined Petroleum Oil
Base Oil Viscosity	@ 40°C (104°F): 150 cSt (695 SUS) Minimum
Viscosity Index	:80 Minimum
Pour Point	:-10°C (14°F) Minimum
Oil: (Only for use with hubs equipped with oil option) SAE 90 Hypoid Gear (Hypoid Rear Axle Oil) Fill hub with oil to level indicated on oil cap	

Bearing Grease Seal

Whenever the drum is removed, inspect the grease seal to assure that it is not nicked or torn and is still capable of sealing the bearing cavity. If there is any question, **replace the grease seal** using a clean block to tap seal into position. Lubricant leaking from the bearings onto the lining or armature face will adversly affect the operation of your brakes.



STORAGE PREPARATION

If the trailer is to be stored for a period of time or over the winter, it is important that the trailer be properly prepared for storage.

1. Remove emergency breakaway battery and store inside, out of the weather. Charge battery at least every 90 days.
2. Jack up trailer and place jack stands under the axle at the spring tie plates so that the weight will be off the tires.
3. Oil mechanical moving parts such as the hitch, and suspension parts, that are exposed to the weather.
4. Boat trailer brakes are subject to repeated immersion. Before storing, remove brake drums, clean, dry, and relubricate moving brake components. Inspect bearings. Clean and Lubricate. (See Bearing Lubrication)

AFTER "PROLONGED STORAGE" INSPECTION PROCEDURE

Before removing trailer from jack stands:

1. Remove all wheels and hubs or brake drums. Note which spindle and brake the drum was removed from, so that it can be reinstalled in the same location.
2. Inspect suspension for wear. Oil all spring and shackle bolt moving parts.
3. Check tightness of hanger and shackle bolts and U-bolts nuts. (See recommended Torque Requirements.)
4. Check brake linings, brake drum, armature face for wear or scoring.
5. Check magnet for electrical short or open condition with an ohm meter. Should check 3.2 ohms. If worn, replace following instructions under "Magnet Check & Replacement."
6. Lubricate all brake moving parts. A moly-disulfide grease is recommended for this purpose, but oil may be used sparingly. **CAUTION: Do not get oil or grease on brake linings or magnet face.**
7. Remove any rust from braking surface of drums and from the armature faces with a fine emery paper or crocus cloth. Protect bearings from contamination while so doing.
8. Inspect oil or grease seals for wear or nicks. If damaged or worn, replace.
9. Lubricate hub bearings. See Bearing Lubrication for type of lubricant and procedure.
10. Reinstall hubs and adjust bearings per instructions under Bearing Maintenance.
11. Mount wheels, torque wheel bolts or nuts for proper tightness.
12. Adjust brakes per instructions.
13. Remove jack stands and connect trailer to tow vehicle. Inflate tires per manufacturer's specifications. Make a dozen or so stops from 40 to 20 mph. Resynchronize tow vehicle-trailer brake system per instructions. Brake performance should be normal after these stops. If not, consult trouble-shooting section.
14. Recheck wheel bolt or nut torque after resynchronizing and within 50 to 100 miles after replacing wheels.
15. Check tires for proper inflation, cuts, wear, etc.

TORQUE VALVES

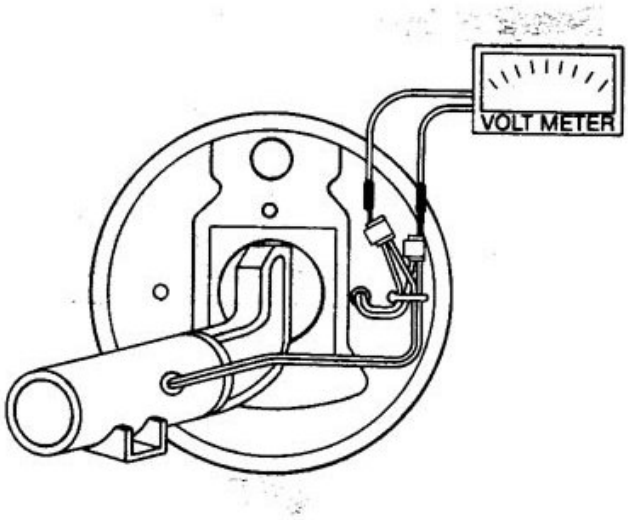
	Description	Torque (Ft. Lbs.) Min.	Max.
Suspension	3/8 "U" Bolt Spring Mount	35	40
	1/2 "U" Bolt Spring Mount	50	60
	Shackle Bolt	Snug Fit only	
	Spring Eye Bolt	Parts must rotate	
	Equalizer Bolt	freely. Locking	
		nuts or cotter pin	
		are used to	
		retain nut-bolt	
		assembly	
Wheel Mounting	1/2-20 Nut	85	95
	1/2-20 Bolt	85	95
Brake Mounting	5 Bolt 12" Brake	25	35
	4 Bolt 7"-10"-12" Brake	50	55

How to Measure Voltage

System voltage is measured at the magnets by connecting the volt meter leads to the magnet lead wires in the connectors. The engine of the towing vehicle should be running when checking the voltage so that a low battery will not affect readings.

Voltage in the system should begin at 0 volts and, as the controller manual bar is slowly actuated, should gradually increase to about 12 volts. This is referred to as modulation. No modulation means that when the controller begins to apply voltage to the brakes it applies an immediate high voltage which causes the brakes to apply instantaneous maximum power.

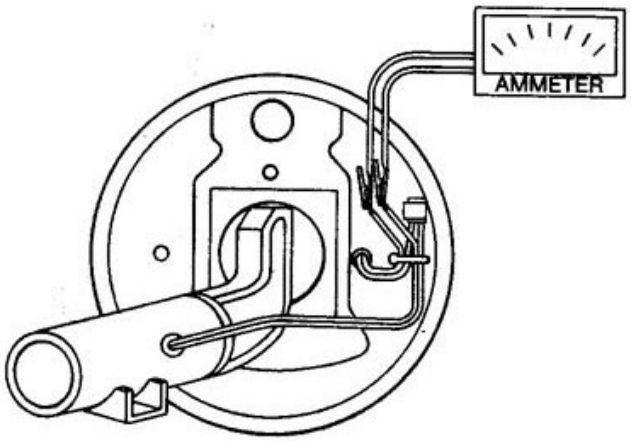
The threshold voltage of a controller is the voltage applied to the brakes when the controller first turns on. The lower the threshold voltage the smoother the brakes will operate. Too high of a threshold voltage (in excess of 2 volts as quite often found in heavy duty controllers) can cause grabby, harsh brakes.



How to Measure Amperage

System amperage is the amperage being drawn by all brakes on the trailer. The engine of the towing vehicle should be running when checking the amperage so that the system is operating at rated voltage. One place to measure the 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 the line. Each magnet is designed to draw approximately 3 amps at 12 volts D.C. If you have tandem axles with four brakes your system amperage should be approximately 12 amps. Make certain your ammeter has sufficient capacity.

Individual magnet amperage draw can be measured by inserting the ammeter in the line at the magnet you want to check. Simply disconnect one of the magnet lead wires at the axle connection and attach the ammeter between the two connections.



Trouble Shooting Guide

When the brakes are not performing properly, the first step in correcting the problem is to adjust the brakes. If after adjusting the brakes, they are still not performing properly, then proceed to the chart at the right.

Problem	Potential Electrical Causes	Potential Mechanical Causes
No Brakes	E1, E4	M1, M2
Weak Brakes	E3, E4	M1, M2
Intermittent, Surging Brakes	E2, E3	M1, M4
Dragging Brakes	E2, E3	M1, M2, M3
Noisy Brakes		M1, M2, M4
Grabby, Locking Brakes	E2, E4	M1, M2, M3

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