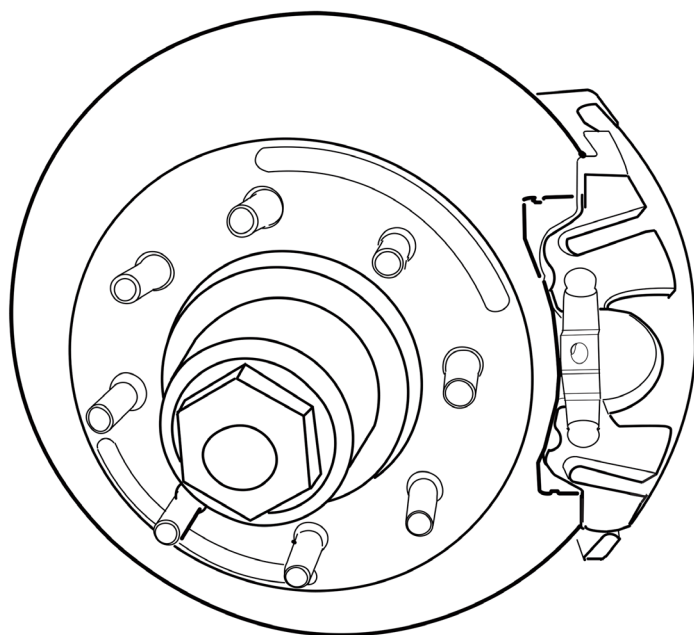




Electric to Hydraulic Disc Brake Conversion

Installation and Owner's Manual

(For Aftermarket Applications)

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Introduction

Document Information

The hydraulic disc brake assembly and kits are an additional option for replacement brakes or the installation of current industry standards in braking.

Trailer Axle Brake Inspection

In general, based on normal activity, trailer brakes should be checked annually or every 36,000 miles, whichever comes first. If above normal trailer activity is experienced, then more frequent brake component inspections are recommended. In the event the braking system encounters symptoms of improper application or failure, immediate inspection and service **MUST** be performed.



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Component Inspection Periods

Periodic Bearing Inspection - Should be performed annually or every 36,000 miles, whichever comes first.

Bearing Inspection - Should be performed annually or every 36,000 miles, whichever comes first, under normal use, or every 3,000 - 6,000 mile increments above normal use.

Brake Cleaning and inspection - Should be performed annually under normal use or every 3,000 - 6,000 mile increments above normal use.

Bearing Lubrication Inspection - Should be performed annually unless periodic brake inspection reveals abnormal braking performance.

Safety Information

WARNING

THE "WARNING" SYMBOL ABOVE IS A SIGN THAT AN INSTALLATION PROCEDURE HAS A SAFETY RISK INVOLVED AND MAY CAUSE DEATH OR SERIOUS INJURY IF NOT PERFORMED SAFELY AND WITHIN THE PARAMETERS SET FORTH IN THIS MANUAL. ALWAYS WEAR EYE PROTECTION WHEN PERFORMING THIS INSTALLATION PROCEDURE. OTHER SAFETY EQUIPMENT TO CONSIDER WOULD BE HEARING PROTECTION, GLOVES, AND POSSIBLY A FULL FACE SHIELD, DEPENDING ON THE NATURE OF THE INSTALLATION PROCEDURE.

WARNING

PERFORMING SERVICE, REPAIR OR ROUTINE MAINTENANCE WORK CAN CAUSE PERSONAL INJURY OR DEATH. USE PERSONAL PROTECTIVE EQUIPMENT (PPE) WHENEVER PERFORMING SERVICE WORK OR ROUTINE MAINTENANCE. MAKE SURE WORK SPACE IS CLEAN AND FREE OF SLIP OR TRIP HAZARDS.

Resources Required

- Cordless or Electric Drill or Screw Gun
- Appropriate Drive Bits
- Flaring Tool
- Reamer/De-burring Tool
- 2 1/2" Wrench
- 7/16" Wrench
- 3/8" Wrench
- 1/2" Wrench
- Torque Wrench
- "P" Fasteners
- Self-Tapping Screws
- Screw Clips
- Metal Hydraulic Brake Line 1/4" and 3/16"
- Pre-made Soft Line Extensions
- 3/16" Flaring Fittings — T's, Barrels, Plugs and Fittings
- Department of Transportation (DOT) 3 or 4 Brake Fluid
- Zip Ties
- Wire Nuts
- Heat Shrink Butt Connectors
- 12 AWG Wire
- Hard-line Brake Pipe Cutter



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Parts List

Part#	Description	Qty
688768	5.2-6k Disc Brake Conversion Kit (Tandem axle) 6 Lug 1/2" Studs	1
688789	5.2-6k Disc Brake Conversion Kit (Triple axle) 6 Lug 1/2" Studs	1
688835	5.2-8k HYBRID disc brake conversion kit (Tandem axle) – 5 bolt brake flange 8 Lug 1/2" Studs	1
688836	5.2-8k HYBRID disc brake conversion kit (Triple axle) – 5 bolt brake flange 8 Lug 1/2" Studs	1
689017	5.2-8k HYBRID disc brake conversion kit (Tandem axle) – 5 bolt brake flange 8 Lug 5/8" Studs	1
689018	5.2-8k HYBRID disc brake conversion kit (Triple axle) – 5 bolt brake flange 8 Lug 5/8" Studs	1
689156	5.2-8k HYBRID disc brake conversion kit (Tandem axle) – 5 bolt brake flange 8 Lug 9/16" Studs	1
689159	5.2-8k HYBRID disc brake conversion kit (Triple axle) – 5 bolt brake flange 8 Lug 9/16" Studs	1
689389	5.2-8k HYBRID disc brake conversion kit (Tandem axle) – 5 bolt brake flange 8 Lug 5/8" Studs – OIL BATH	1
689391	5.2-8k HYBRID disc brake conversion kit (Triple axle) – 5 bolt brake flange 8 Lug 5/8" Studs – OIL BATH	1
689410	8k Disc Brake Conversion Kit (Tandem Axle) – 4 Bolt Flange 8 Lug 9/16" Stud	1
689413	8k Disc Brake Conversion Kit (Triple Axle) – 4 Bolt Flange 8 Lug 9/16" Stud	1
689421	8k Disc Brake Conversion Kit (Tandem Axle) – 4 Bolt Flange 8 Lug 5/8" Stud	1
689423	8k Disc Brake Conversion Kit (Triple Axle) – 4 Bolt Flange 8 Lug 5/8" Stud	1
689464	8k Disc Brake Conversion Kit (Tandem Axle) – 4 Bolt Flange 8 Lug 5/8" Stud – OIL BATH	1
689466	8k Disc Brake Conversion Kit (Triple Axle) – 4 Bolt Flange 8 Lug 5/8" Stud – OIL BATH	1

Installation

Mount Hydraulic Brake Actuator

1. Locate wiring for the brake system near the coupler of the trailer.
2. Mark the 12 volt wire, the ground wire, the control wire and the breakaway wire.
3. Determine pump location. Ensure the location gives access to run wires and brake lines.
4. Using the provided "L" bracket and self-tapping screws, mount the pump on a compartment sidewall or to the floor.

NOTE: A dampening material may be used under the pump to reduce vibrations when the pump is running.

5. Mount the control (resistor) in the same compartment near the pump.
6. Using wire nuts, connect the marked wires to the pump.

NOTE: The pump requires four wires to function properly: Black is 12 volts of constant power, blue is to the tow vehicle brake controller wire, white is the ground and yellow is for the emergency breakaway system.

NOTE: Make sure all four wires are a minimum of 12 AWG.

7. Connect the blue and white wires from the control to the blue and white wires of the pump.

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Electric Brake Hubs Removal

NOTE: It is normal to have a small residual amount of grease on the exterior of a new hub. Most of the time, simply wiping off the residual grease is an appropriate solution. However, if there is noticeable diminished braking capability or grease continues to weep, the hub should be checked by a qualified service provider. It is not normal for a hub to continue to weep grease after its initial installation. Excess grease can coat the brake pads, magnets and braking surfaces inside of the hub.

⚠ WARNING

THE UNIT MUST BE SUPPORTED PER MANUFACTURER'S RECOMMENDATIONS BEFORE WORKING UNDERNEATH. FAILURE TO DO SO MAY RESULT IN DEATH OR SERIOUS INJURY.

Brake Hub Removal

⚠ WARNING

ALWAYS LIFT THE UNIT BY ITS FRAME AND NEVER BY ITS AXLE OR SUSPENSION. AXLE AND SUSPENSION COMPONENTS ARE NOT DESIGNED, OR RATED, FOR THE DEAD-WEIGHT, POINT-OF-CONTACT LOADS THAT THE TRAILER'S FRAME IS. DO NOT GO UNDER THE TRAILER UNLESS IT IS SUPPORTED BY APPROPRIATELY RATED JACKSTANDS. IMPROPERLY SUPPORTED UNIT CAN COLLAPSE, CAUSING POSSIBLE SERIOUS PERSONAL INJURY OR DEATH.

⚠ WARNING

WEAR APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT (PPE) WHEN PERFORMING SERVICE OR MAINTENANCE OPERATIONS. ALWAYS WEAR EYE PROTECTION WHEN SERVICING TRAILER AXLES, BRAKES, HUBS, SPRINGS AND WHEELS. NOT USING PPE MAY RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

Disassemble the brake hub assembly for inspection, maintenance or service as follows:

1. Make sure unit is on level ground.
2. Chock tires before beginning wheel disassembly.

NOTE: Chocked tires will prevent trailer from rolling while brakes are disengaged during disassembly, cleaning, inspection and assembly operations.

3. Loosen wheel lug nuts before raising the trailer to prevent tire from spinning during lug nut removal.
4. After lug nuts have been loosened, raise the unit until the tire spins freely.
 - A. Continue to lift and support trailer per manufacturer's recommendations.
 - B. Use appropriately rated jack stands.
 - C. Place jack stands under the unit's frame only.
5. Remove all lug nuts from wheel, then remove wheel from brake hub (**Fig.1**).
 - A. Set wheel and lug nuts aside for later re-assembly.
 - B. Do not lean removed tire against unit or any jacks. Leaning a heavy tire against a suspended trailer could cause damage to the outside of the unit or place undue side pressure against a jack, possibly causing the unit to become unstable.

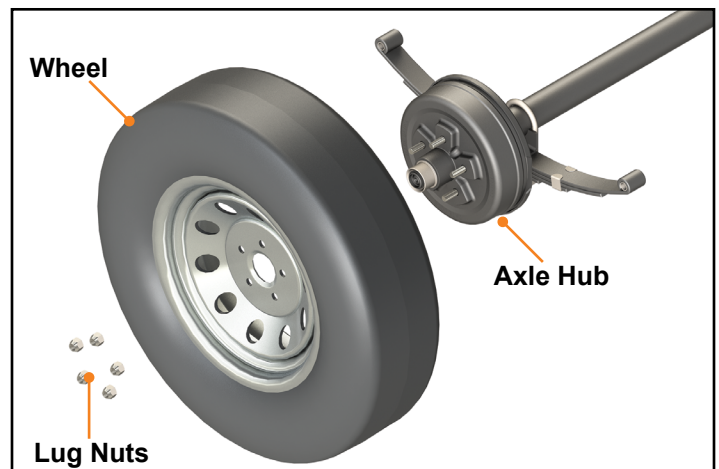


Fig.1

Electric to Hydraulic Disc Brake Conversion Installation and Owner's Manual (For Aftermarket Application)

6. Prior to brake hub disassembly, create a clean area to place removed parts to prevent possible contamination or damage to removed parts.

7. Remove dust cover from hub by prying its edge out of the hub (**Fig.1**).

A. If servicing a brake drum, remove the lubed dust cap with the installed lubed rubber plug.

B. If brake assembly is equipped with oil lubrication, place a drip pan underneath the hub.

I. Unscrew oil cap using a 2 1/2" socket wrench.

II. Let oil drain into drip pan.

8. Pull cotter pin from castle (spindle) nut and discard.

A. The cotter pin is a one-time-use item. Do not re-install removed cotter pin.

9. Remove the castle nut (**Fig.2**).

NOTE: Remaining grease on components can act as a mastic. Inspect removed castle nut for attached spindle washer.

10. If spindle washer did not come off with the castle nut, inspect the outer bearing. Grease may have allowed the washer to stick to it.

A. Remove spindle washer (**Fig.2**).

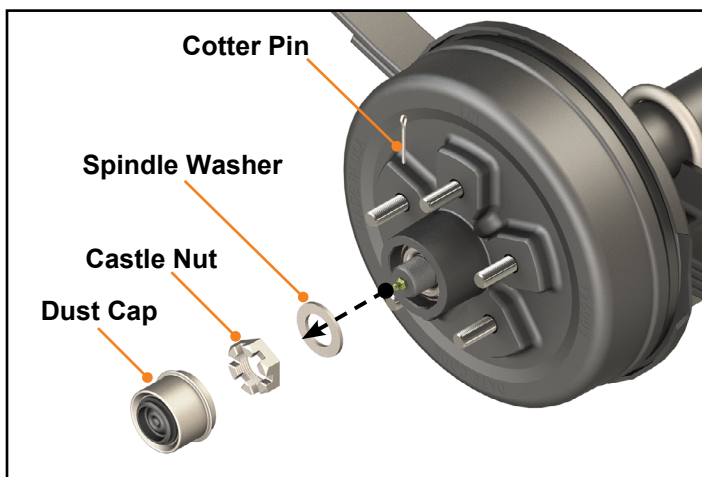


Fig.2

11. Pull brake or idler hub off of spindle as follows (**Fig.3**):

A. Make sure brakes have been disengaged.

B. To prevent outer bearing cone falling freely from the assembly, place one hand on the backside outer rim of the hub and the other hand over the outside of the hub bore to cover the bearing cone.

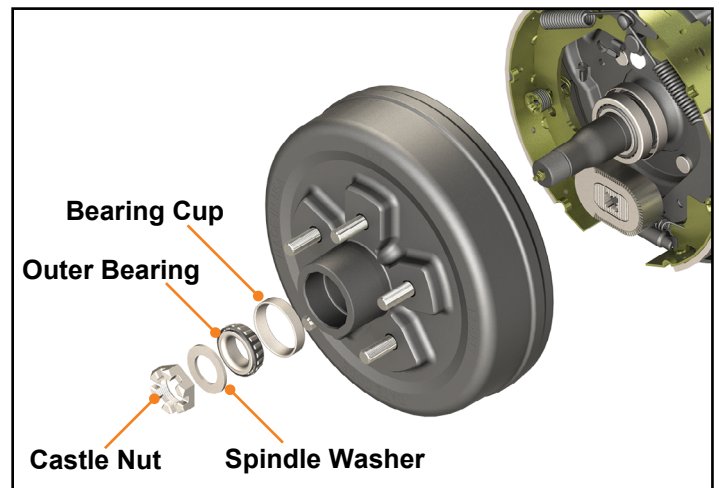


Fig.3

C. Slightly turn the hub while pulling to free the hub from the spindle.

I. The outer bearing cone will want to drop out of the hub. Secure the bearing and place it in the clean, removed part area.

II. The inner bearing cone and cup remains installed within the hub, contained by the grease seal, and will not fall out.

III. Set the brake aside.

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Hydraulic Disc Brake Preparation

1. Make sure bearing cup (race) is installed in disc brake rotor hub. If not, install race.
2. Thoroughly pack inner and outer bearings with grease.
3. Lightly grease all bearing seals.
4. Insert inner bearing into the disc brake rotor hub.
5. Carefully press seal into the disc brake rotor hub.
6. Apply grease to the hub spindle.

Disc Brake Assembly Installation

Install the disc onto the spindle as follows:

1. Inspect disc brake for cleanliness.
2. If bearing cup is installed in the disc brake bearing bore, go to the Inner Bearing Cone and Grease Seal Installation.
3. If the race is not installed in the disc brake, do as follows:
 - A. Place disc on a solid, clean flat surface.
 - B. Identify the appropriate bearing cup for installation.

⚠ CAUTION

BEARING CUP INSTALLATION IS A PRECISE PROCEDURE. WHEN INSTALLED, THE BEARING CUP MUST BE FULLY SEATED AGAINST THE RETAINING SHOULDER OF THE DISC BRAKE. IF THE CUP IS NOT SEATED CORRECTLY, DAMAGE TO THE COMPLETED DISC BRAKE ASSEMBLY MAY OCCUR, VOIDING WARRANTY.

⚠ WARNING

BECAUSE BEARING CUP INSTALLATION IS A PRECISE PROCEDURE, CONSULT LIPPERT PRIOR TO REPLACING A BEARING CUP. THE TRAILER SHOULD BE TAKEN TO A CERTIFIED SERVICE CENTER FOR THIS WORK TO BE DONE.

4. Gently place new bearing cup into bearing bore.
5. Using a brass drift punch, lightly tap around the outer edge of the cup to drive the cup into the bearing bore.
6. Continue tapping the drift punch around the circumference of the cup's edge until the cup is fully seated against the bearing bore retaining shoulder.

7. Wipe the inside of the race with a clean, lint-free cloth. Inspect the bearing race to make sure no damage occurred during installation.

8. After bearings have been installed in the brake, go to Inner Bearing Cone and Grease Seal Installation procedure.

NOTE: The caliper should be mounted on the rear side of the axle. In Fig.4 which is a roadside view, the caliper will appear in the 3 o'clock position. In a curbside view, the caliper is also mounted to the rear of the axle but will appear in the 9 o'clock position.

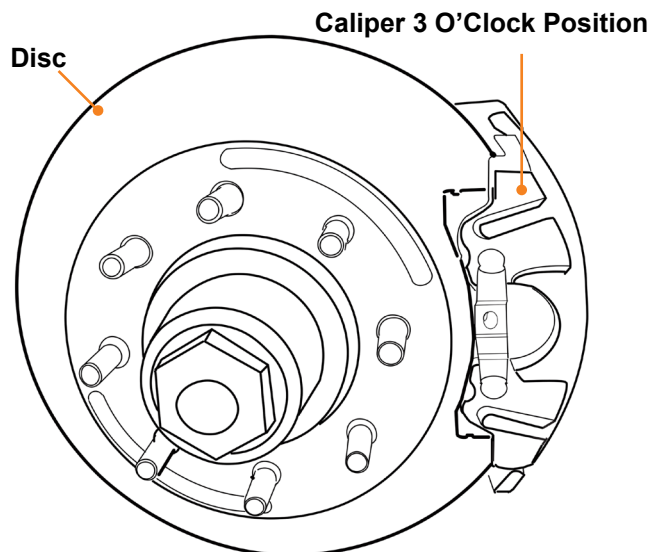


Fig.4 Roadside View

9. Replace backing plate with new caliper mounting bracket that includes universal hydraulic brake caliper bracket. Fasten backing plate with $\frac{3}{8}$ " nuts (on a 2" shoe with a 5-bolt pattern) or $\frac{1}{2}$ " nuts (on a 3 $\frac{3}{8}$ " wide shoe with a 4-bolt mounting pattern).

10. Torque $\frac{3}{8}$ " nuts in star pattern to 35 ft-lb. Torque $\frac{1}{2}$ " nuts in star pattern to 65 ft-lb.

11. Place disc rotor on spindle and slide rotor fully to the rear of the spindle. Do not compromise the seal.

12. Install the retaining washer.

13. Install the spindle nut hand tight, torque to 50 ft-lb, back off to remove torque then finger tighten. Install new cotter pin.



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14. Install the brake caliper and bolt onto the universal hydraulic brake caliper bracket. Torque mounting bolts to 40 ft-lb.

15. Repeat steps in Remove Electric Brake Hubs, Prepping Hydraulic Disc Rotor Hub and Disc Brake Assembly Installation sections for the remaining axles.

Inner Bearing Cone and Grease Seal Installation

⚠ WARNING

POTENTIAL ASBESTOS DUST HAZARD. DO NOT USE COMPRESSED AIR, A DRY BRUSH OR DRY RAG TO REMOVE BRAKE DUST. DISTURBED BRAKE DUST CAN BECOME AN AIRBORNE IRRITANT THAT CAN BE INHALED OR INGESTED, CAUSING SERIOUS PERSONAL ILLNESS OR DEATH. WEAR APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT (PPE). USE AEROSOL BRAKE CLEANER TO WASH BRAKE DUST AWAY.

⚠ WARNING

WEAR PERSONAL PROTECTIVE EQUIPMENT (PPE) WHEN USING CAUSTIC MATERIALS. AEROSOL, LIQUID AND OIL-BASED PASTE MATERIALS CAN PRESENT SPLASH HAZARDS AND SKIN CONTACT ENVIRONMENTS THAT CAN RESULT IN SERIOUS ADVERSE EYE AND SKIN IRRITATIONS. FOLLOW ALL RECOMMENDED SAFETY PRECAUTIONS WHEN USING SUCH MATERIALS.

Bearing grease should be replaced every 36,000 miles or 12 months, whichever comes first.

1. Make sure all mating surfaces for new bearing cone and grease seal are clean.

2. Bearing cones should be packed by machine whenever possible. However, packing bearings by hand is an acceptable alternative. Hand-pack inner bearing cone as follows:

A. Place generous amount of grease into the palm of your hand.

NOTE: Select an appropriate grease that is temperature-

rated for the wheel's application. See Approved Sources table in the Recommended Wheel Bearing Lubrication section.

B. Press widest end of bearing into the outer edge of the grease pile, forcing grease into the inner area of the bearing between two adjacent rollers.

C. Repeat the process while turning bearing cup surface (race).

3. Install new grease-packed bearing cone into the cup.

Lippert recommends replacing the grease seal whenever bearing packing is required. Install a new grease seal into the hub bore.

New Seal Installation

1. Place the new grease seal into the seal bore as follows:

A. Apply a light film of sealant onto the outer rim of the seal.

B. Make sure seal is set square to the hub seal bore before pressing the seal all the way in or the seal may become damaged.

2. Use a clean, hardwood block of wood and hammer to drive the seal into the seal bore.

A. Place the wood block evenly across the seal.

B. Hold the wood block firmly in-place as you begin to tap the seal squarely into the seal bore with the hammer.

C. Continue to tap the seal inward until the seal's outer face is flush to the disc seal bore face.

Bearing Lubrication - Oil

The axle bearings are lubricated with a SAE 80W-90 hypoid gear oil. Periodically check oil levels as follows:

1. Make sure unit has been parked for a few minutes to allow oil to cool and run back to the bottom for an accurate read.

2. Check and refill brake hub oil to the level indicated on the plastic oil cap.

3. To fill brake hub with oil, remove rubber plug or cap plug from the hub's oil cap.



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4. Fill oil through the plastic cap oil level is complete.
5. Insert rubber plug or cap plug into plastic oil cap.

⚠ CAUTION

DO NOT OVER-TIGHTEN PLASTIC OIL CAP. OVER-TIGHTENING CAN DAMAGE O-RING, RESULTING IN AN OIL LEAK.

6. Tighten oil cap to 25 ft-lb. Do not over tighten oil cap or an oil leak may occur.

NOTE: Refer to Approved Sources chart for recommended axle bearing lubricants. Oil designations include: SAE 90, SAE 80W-90, and SAE 75W-90.

⚠ CAUTION

NEVER INSTALL A REMOVED OIL SEAL. INSTALLING A REMOVED OIL SEAL MAY DAMAGE THE SEAL, RESULTING IN AN OIL LEAK DURING NORMAL COMPONENT OPERATION.

⚠ CAUTION

MAKE SURE THE OIL SEAL IS PROPERLY ORIENTED DURING PART INSTALLATION. MOST OIL SEALS HAVE ONE SIDE MARKED "AIR SIDE." THIS SIDE MUST FACE OUTWARDS AND NOT TOWARDS THE BEARING OR COMPONENT FAILURE WILL OCCUR.

Oil Seal

A new two-part oil seal **MUST** be installed whenever the brake is removed for maintenance. The inside diameter of the two-part seal presses onto the spindle journal, the outside diameter of the seal presses into the hub seal bore. Make sure when installing a new oil seal the side marked "AIR SIDE" is facing outward, away from the bearing cone.

Installing The Brake Lines

1. Determine the length of metal hydraulic brake line needed to extend from the pump to the center/side of the first axle.
2. Cut a $\frac{3}{16}$ " "feeder" line to length and deburr each end.

3. Install a $\frac{3}{16}$ " - $\frac{1}{4}$ " conversion fitting on the pump, and then connect and run the cut-and-prepped line from pump to axle area.

A. Connect the $\frac{3}{16}$ " feed line to the $\frac{3}{16}$ " fitting on the pump and the other end to the axle.

NOTE: All hydraulic connections are hand-tightened plus $\frac{1}{4}$ " turn if dry, plus $\frac{1}{2}$ " turn if wet.

4. Attach brake line to the main rail or frame if running it alongside the trailer, or attach it to the cross members if going down the center.

5. With the $\frac{3}{16}$ " metal brake line, cut, deburr, flare and connect the remaining metal lines needed depending on the number of axles.

NOTE: Make sure to cut the metal lines to a length that will allow movement of the rubber brake lines, when attached.

6. Connect all metal brake lines to the new backing plate using "T" connectors and plugs.

7. Attach the lines to the frame rail or cross members.

8. Attachment to the underbody/frame/cross members is to use screw clips and "P" fasteners.

NOTE: If extending from one side of the axle to the other, it is permissible to zip tie the metal line to the axle beam.

9. Connect the pre-assembled rubber flex brake lines to the metal line ends by hand-tightening and then using $\frac{1}{4}$ " turn by a wrench.

NOTE: Make sure male end connecting to the brake caliper is at a 90° angle.

NOTE: Make sure there is room for the axle to move up and down, and that the lines will not pinch at any point.



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Bleeding The System

1. Fill the pump reservoir with Department of Transportation (DOT) 3 or 4 brake fluid. Pump reservoir capacity is 10 oz. maximum.
2. Use a rubber tube and catch pan/bottle on the bleeder valves to prevent spillage of brake fluid.
3. Turn on the pump to build pressure while a second person cracks the top bleeder valve with a $\frac{3}{8}$ " wrench.
4. When the fluid no longer contains air bubbles, tighten bleeder valve.
5. Bleed the pump first, then move to the caliper furthest from the pump. Continue the bleeding process while moving to the calipers closer to the pump, and then repeat the process on the other side.

NOTE: Refill the reservoir often to ensure the pump maintains a full level of brake fluid. If the pump reservoir is not full, air will get into the lines and the bleeding process must be repeated.

Post Disc Brake Installation

Disc Brake Rotor and Pad Inspection

Disc brake pads are a consumable item. Visually inspect disc brake pads every 36,000 miles or 12 months, whichever comes first. Disc brake rotor and brake pad surfaces should be visually checked at the same time. If there are deep grooves on one or both rotor surfaces this is an indication of caliper piston, slider bolt or residual pressure problems. Disc brake rotors should be turned when disc brake pads are replaced. Disc brake pads are available through auto parts stores.

Disc Brake Caliper

If the disc brake caliper mounting bolts removed to service the brake system, do as follows:

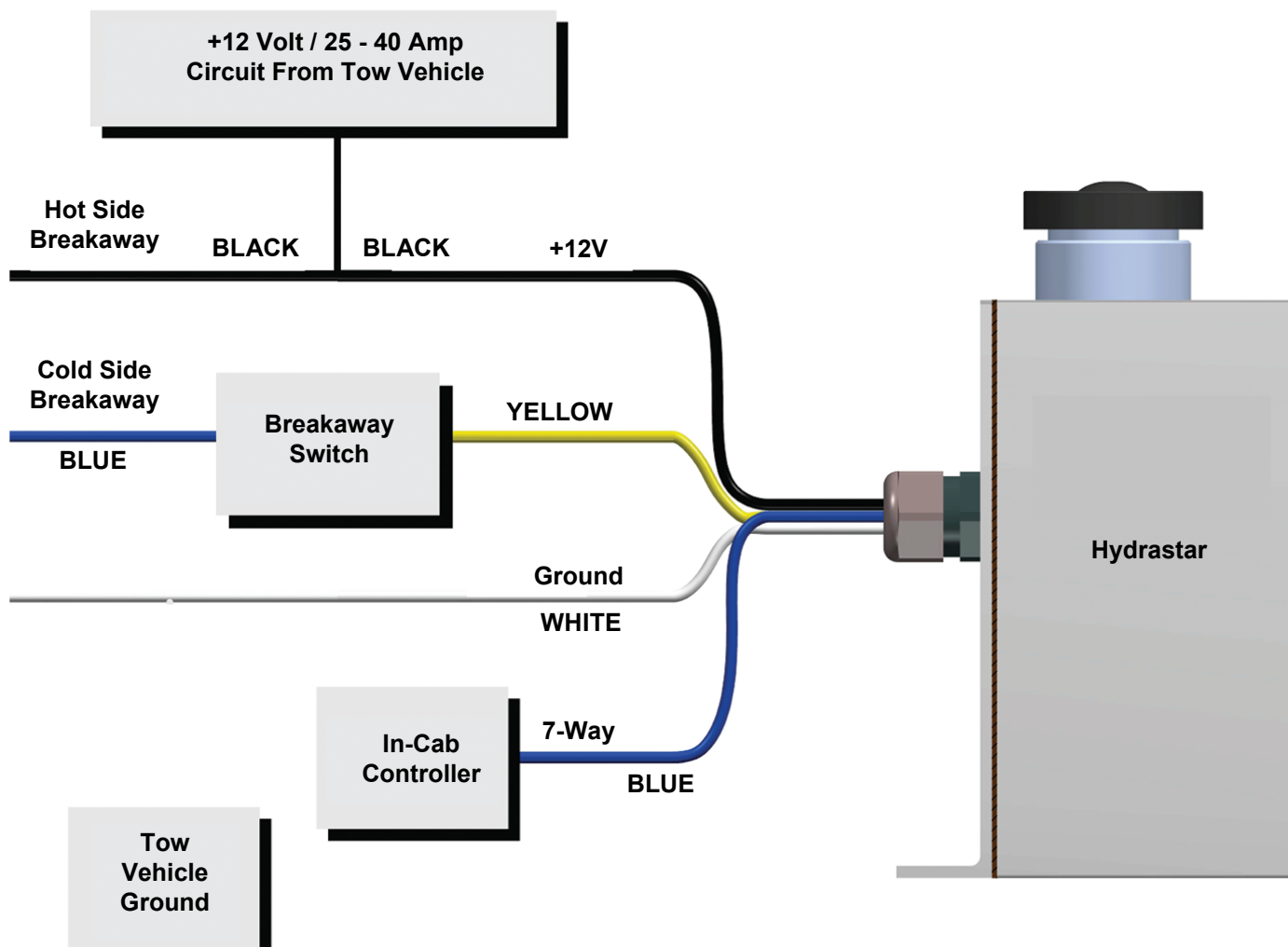
1. Lubricate the inside of the rubber slider bolt caliper bushings.
 - A. The rubber bushings are not compatible with petroleum-based grease. Use silicone-based grease only.
 - B. Do not paint
2. Apply blue thread-locking compound to the threaded area of the caliper mounting bolts.
3. Install caliper mounting bolts. Torque bolts to 40-50 ft-lb.

Recommended Wheel Bearing Lubrication

Approved Sources:

Source	Brand
Mobil Oil	Mobilgrease HP
Exxon/Standard	Ronex MP
Kendall Refining Co.	Kendall L-427
Ashland Oil Co.	Valvoline Val-plex EP Grease
Pennzoil Prod. Co.	Premium Wheel Bearing Grease 707L

Wiring Diagram



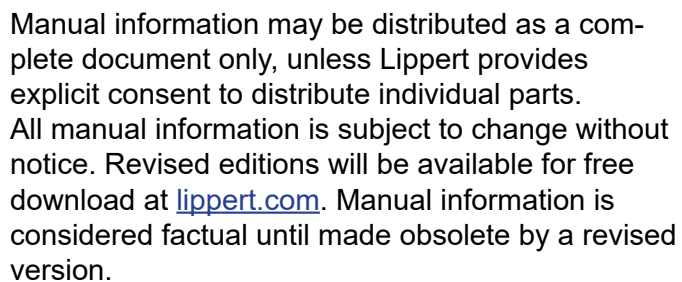
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