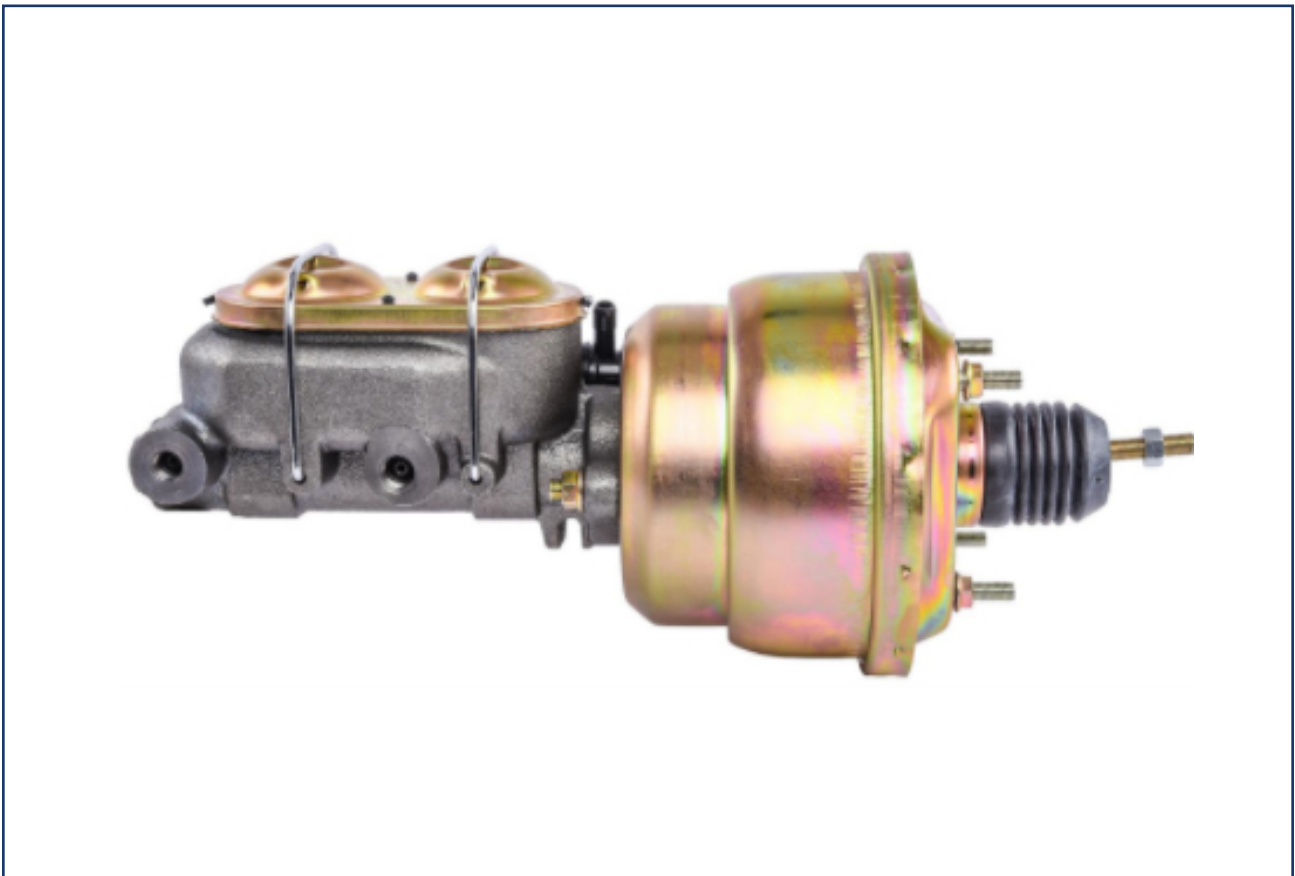




631488 POWER BRAKE BOOSTER CONVERSION KIT



INSTALLATION INSTRUCTIONS

NOTE: ALWAYS REFER TO THE VEHICLE OWNER'S MANUAL FOR CORRECT TORQUE SPECIFICATIONS WHEN INSTALLING KIT.



WARNING Proper operation of your brakes is essential for your safety and the safety of others. Any brake service should be performed **ONLY** by persons experienced in the installation and proper operation of brake systems. It is the responsibility of the person installing any brake component or kit to determine the suitability of the component or kit for the particular application. After installation, and before operating your vehicle, be sure to test the function of the brakes under controlled conditions. **DO NOT DRIVE WITH UNTESTED BRAKES!**

IMPORTANT Take time to read all the literature that came with this kit. Before beginning installation check the provided list of parts against what you received to ensure that all parts are present. While this kit was designed to make the process of changing brake parts as simple as possible, **NOTE: WITH SOME KITS IT MAY BE NECESSARY TO MAKE MINOR CHANGES TO YOUR CAR! READ ALL WARRANTY DISCLAIMERS AND RETURN POLICIES INCLUDED IN THIS KIT PRIOR TO INSTALLATION!**

NOTE Always utilize safety restraints when operating the vehicle. The installation of disc brakes will require the use of 15" wheels. Any attempt to install disc brake with a 14" wheel will be the customer's responsibility.

NOTE This kit is an aftermarket solution. It is not intended to be a direct installation or OEM replacement. Due to changes in production in certain years, your car may require modifications beyond these instructions for this kit to install properly.

NOTE: ALWAYS REFER TO THE VEHICLE OWNER'S MANUAL FOR CORRECT TORQUE SPECIFICATIONS WHEN INSTALLING KIT.

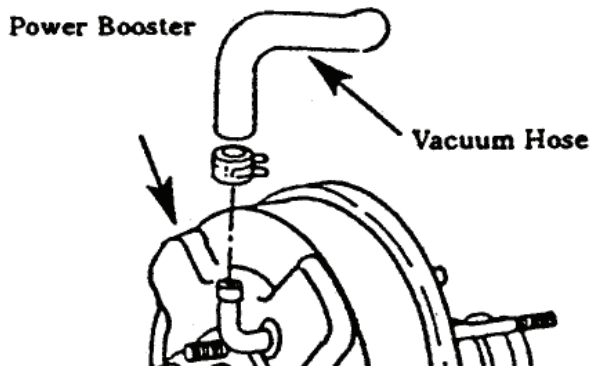
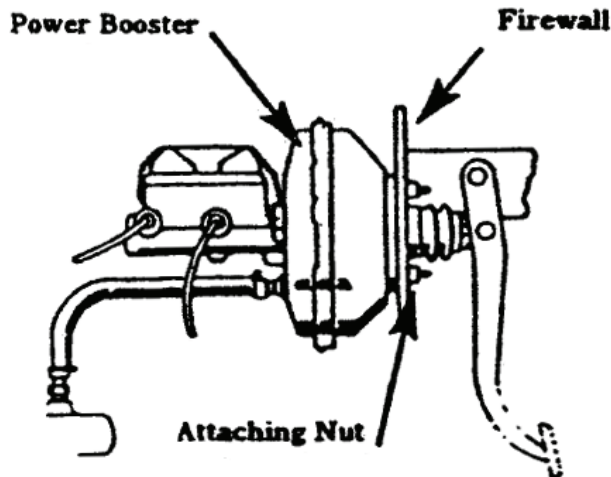
REMOVING THE ORIGINAL POWER BOOSTER

BEFORE YOU BEGIN, READ THIS:

You are urged to refer to a suitable service manual when attempting to make repairs. If you do not have such a manual or lack the experience to make such repairs, you should use the services of a qualified technician.

NOTE: Before beginning work, be sure vehicle is parked in a level area and that wheels are chocked to prevent unintentional movement.

1. Disconnect the ground cable from the battery.
Vent any vacuum from the booster by applying the brakes several times. You will notice a change to a hard pedal when all vacuum has been vented
2. Carefully disconnect hydraulic lines from the master cylinder.
3. Remove the nuts attaching the master cylinder to the power booster.
4. Separate the master cylinder from the booster mounting studs. Keep the master cylinder level
CAUTION: DO NOT let brake fluid contact painted surfaces as the fluid will damage paint. Should fluid get on paint, immediately flush with water.
5. Disconnect vacuum hose(s) from the power booster.
6. Working under the instrument panel, disconnect the power booster rod linkage / from the brake pedal. NOTE: Two piece rods may have to be disassembled before the linkage can be removed from the vehicle.
7. Remove the nuts holding the power brake booster unit to the firewall. NOTE: The nuts may be located under the dash or on the engine side of the firewall.
8. Rotate the rod linkage if necessary and guide it through the firewall as you remove the power booster. Do not force the rod in either direction as this will damage the hub and reduce the booster's core credit value.
9. Remove linkage parts from the original power booster for installation on the replacement unit. **IMPORTANT:** Be sure to save any spacers or non-riveted mounting brackets since they must be reused when installing the replacement unit. These parts are critical to the operation of the replacement power booster.
10. Put the old power booster into carton to assure proper cored credit upon return.



INSTALLING THE POWER BOOSTER

1. Install linkage from the old unit onto the replacement unit (if applicable). Important: Install spacers, gaskets and or mounting brackets from the old unit onto the replacement unit.
2. Rotate the rod linkage as required to guide it through the firewall and position the replacement power booster. Do not force the rod in either direction as this will damage the hub and void the warranty.

Installation Instructions

NOTE: Two piece rods may have to be reassembled after the replacement booster is in the vehicle.

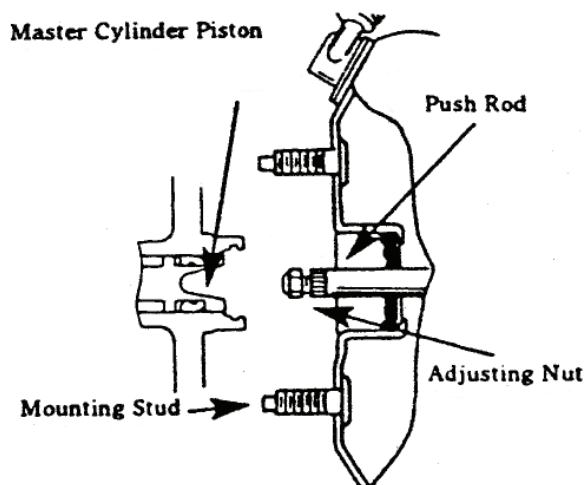
3. Install and tighten the power booster mounting nuts.
4. Working under the instrument panel, connect the rod linkage to the brake pedal. NOTE: Pedal free play should be 1/16" to 1/4". Adjust pedal stop or stop light switch behind brake pedal if necessary.
5. Carefully locate the master cylinder onto the power booster mounting studs.
6. Install and tighten the master cylinder-to-booster mounting nuts.
7. Connect the vacuum hose(s) to the power brake booster.
8. Connect hydraulic lines to the master cylinder with the fittings just snug. While an assistant applies moderate pressure to the brake pedal, loosen one brake line fitting to let any trapped air from the connection. Then tighten the fitting before releasing the pedal. Wait 15 seconds and then repeat the process (including the 15 second delay) for each fitting on the master cylinder. Make sure the brake fluid reservoir is kept properly filled during and after this process.

MASTER-CYLINDER PUSH ROD ADJUSTMENT

NOTE: Correct push rod length is essential to reliable braking. If the rod is too long, it causes the compensating ports in the master cylinder to be closed off, eventually resulting in brake drag. If the push rod is too short, there will be excessive brake pedal travel and possible there will be a groaning noise from the brake booster. Use the following procedure to check the push rod adjustment.

CAUTION: Wear protective goggles when performing the following procedure! Brake fluid may erupt from the master cylinder with sufficient force to cause personal injury.

1. Remove the master cylinder reservoir cap or cover.
2. While an assistant slightly depresses the brake pedal, watch for fluid to erupt in the reservoir when the pedal is depressed 3/8" to 1/2". This indicates correct push rod length. On dual system master cylinder, fluid may spurt only from the front reservoir.
3. If the pedal travels more than 1/2" before master cylinder fluid erupts, the push rod is too short. If nothing happens no matter how far the pedal is depressed, the push rod is probably too long.
4. To adjust the push rod length, first remove the master cylinder from the power booster. Using a pair of pliers, turn the push rod adjusting nut in to shorten and out to lengthen the push rod.
5. If the push rod is nonadjustable, use shims between the master cylinder and power booster to shorten it. If too short, remove existing shims or remove the push rod from the booster and replace it with one of the proper length.
6. Install the master cylinder onto the power booster and recheck push rod length.
7. Connect the vacuum hose(s) to the power booster.
8. Reconnect the ground cable to the battery.
9. Make sure the braking system works correctly before moving the vehicle. If the pedal is soft or has excessive travel, it may be necessary to bleed the entire braking system.



WHAT TO DO IF YOU SUSPECT YOUR BOOSTER IS NOT WORKING

BASIC TEST

1. With the engine off depress and release the brake pedal several times to eliminate vacuum from the power section.
2. Depress the pedal and hold down with light pressure, 15 to 25 lbs.
3. Start engine.
4. If the power unit is operating the pedal will drop slightly. Less pressure will be needed to hold the pedal down.

IF BOOSTER IS NOT OPERATING (GIVING A VERY HARD PEDAL)

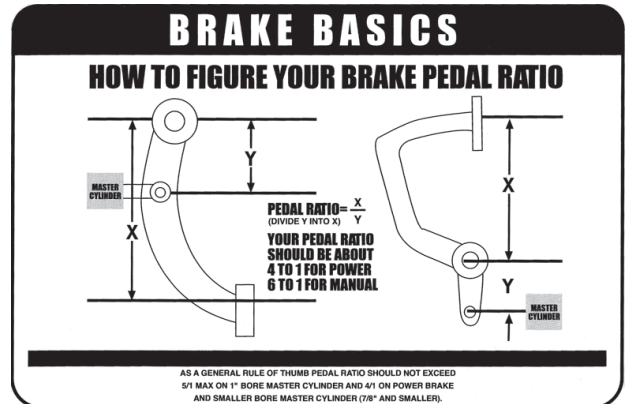
1. Disconnect the vacuum hose from the booster check valve and check the vacuum level at this point with the engine running with a vacuum gauge. You should have at least 18" vacuum to the booster. Anything lower will begin to give a hard pedal. If the vacuum level is below 18" you may be able to tune the engine and bring the vacuum level up to that level. If the vacuum level is around 16" the addition of a vacuum reserve canister will improve the braking. If the vacuum level is below 16" you will need to add an electric vacuum assist pump to supplement the engine vacuum.
2. If the vacuum level at the check valve is 18" check that the booster check valve is working. Disconnect the vacuum hose at the check valve and attach a piece of tubing. Blow into the valve. If air passes through the valve is defective and must be replaced. Also look into the hose attachment neck on the check valve and be sure there is no obstruction inside the valve.
3. Check your booster for a vacuum leak. With everything hooked up run the engine at moderate speed. Release the accelerator and turn the engine off. Wait 90 seconds and apply the brakes. If the brake applications are power assisted there is no leak. If there is no power assist the booster is defective and must be replaced.

IF THE BOOSTER IS OPERATING BUT YOU STILL HAVE A HARD PEDAL

1. Your combination valve may have tripped shutting off fluid flow to the front or rear brakes. This condition will produce a very hard pedal. Check that fluid passes through the valve to both the front and rear by cracking a bleeder screw and observing a good flow of fluid. If one half of the system does not have flow, re-center the valve.
2. You may have frozen rear wheel cylinders or frozen caliper pistons. If these components freeze you can get a very hard pedal.
3. Your pedal ratio may be too low. Check your pedal ratio. The pedal ratio must be in between 4:1 to 5:1. Some of the older cars that had power brakes used a ratio of almost 1:1. If you add a vacuum booster to this type of car you will have a very hard pedal. Typically we are talking about late 50's cars. Adjust ratio as necessary.
4. Your booster may be undersized for the weight of the vehicle or the bore size of the master. If you try to use a small diameter booster such as a 7" street rod booster for a heavy car you will get a very hard pedal. Compounding the problem is an attempt to use a large bore master (1-1/4" or larger) on a small booster.

IF YOUR BRAKE PEDAL IS VERY SENSITIVE AND THE BRAKES GRAB

1. Your pedal ratio may be too high. Power brakes will require a 4:1 to 5:1 ratio. If your ratio is around 6:1 you are getting too much mechanical advantage making the brakes extremely sensitive. Adjust the ratio to correct level.
2. The booster may be too large for the weight of the vehicle. Lightweight vehicles with large boosters give you "touchy brakes". This effect may be dampened somewhat by going to a larger bore master.



Installation Instructions

3. Too large a booster for front drum brakes. Drum brakes do not require as much pressure as disc brakes (500 psi vs. 1,000 psi). If your booster is very large (11") and you have drum brakes you are over-boosted. Do a pressure test to determine what you have.
4. The booster has a cracked internal hub. When there is a crack in the phenolic hub inside the booster it will be either totally on or totally off. Any slight pressure to the pedal will cause the brakes to lock up. The booster must be replaced.

TEN REASONS FOR A POOR BRAKE PEDAL

CAUSE	REASON
Bleeder screws on calipers not on top.	The bleeder screws on calipers must be at the 12:00 position on the caliper to allow all the air to escape during bleeding. A very common mistake installers will make is to reverse the side the caliper goes on giving you a situation where the caliper bleeder screw is facing down. It's also common to use the wrong caliper on a bolt on disc kit giving a situation where the bleeder hole is shifted from the 12:00 position producing a pocket of air at the top of the caliper bore which can not be dislodged. Check your bleeder hole orientation.
A defective master cylinder which does not hold pressure.	If brake fluid bypasses a pressure seal on a master cylinder you will get a pedal that fades. To test for this obtain two inverted flare plugs at an auto parts store and plug both master cylinder outlets. Try your pedal. If the pedal is high and firm the master is good. If the pedal fades the master is bad. Replace master as necessary.
No residual pressure valve to rear drums.	Drum brakes require the use of a 10 lb residual pressure valve in the line. This residual pressure counter balances the drum brake spring tension keeping the shoes close to the drums. This results in a higher firmer pedal. You can test this by clamping off the rear hose removing the rear drums from the system. Now test your pedal. If the pedal gets better you will need to splice a 10 lb residual pressure valve into the rear line.
Hard line that loops up.	Hard brake line that loops up and then back down will tend to trap air. It doesn't take much air to cause problems so check your lines carefully.
Incorrect master cylinder.	If the bore size of the master cylinder is too small for the fluid requirements of the system you will get a very poor pedal. This will happen most frequently with four piston calipers and with four wheel disc brakes. The only solution for this is to install a larger bore master cylinder or a true four wheel disc master.
Incorrectly bled or adjusted rear calipers.	Rear calipers that have an internal parking brake with a lever can be troublesome. These calipers must be adjusted so that the piston is moved out and the pads are close to the rotor. If this initial adjustment is not made the pistons will travel outward during activation but no squeezing of the rotor will occur. This can be checked by clamping off the rear hoses and checking if the pedal gets better. Adjust as necessary.
Incorrect booster pin length.	The booster pin that pushes on the master cylinder must almost be touching the master cylinder piston face. A gap larger than 1/32" will begin to introduce a spongy pedal. Adjust as necessary.
Silicone brake fluid.	While silicone fluid is great because it does not attack paint it also aerates very easily and can give a spongy pedal.
Rear wheel cylinders too large.	Rear drum wheel cylinders that are too large will give a poor pedal. Check as in step six above.
Loose front wheel bearings.	Loose front wheel bearings will cause rotor wobble. This will cause the caliper pistons to retract too far into the caliper giving a spongy pedal every time you hit the brakes. Check and adjust as necessary.

PROPORTIONING VALVE KIT INSTALLATION INSTRUCTIONS



WARNING Proper operation of your brakes is essential for your safety and the safety of others. Any brake service should be performed **ONLY** by persons experienced in the installation and proper operation of brake systems. It is the responsibility of the person installing any brake component or kit to determine the suitability of the component or kit for the particular application. **DO NOT DRIVE WITH UNTESTED BRAKES!**

Adjustable proportioning valves are essentially pressure reducing valves and are often utilized in disc/drum, disc/disc and drum/drum braking systems. The valve is used to control front-to-rear brake pressure bias and will work for all types of vehicles. Install this valve between the distribution block and the rear flex hose in the front-to rear rigid brake line. Always use tube wrenches to tighten fittings properly. Final settings of this valve will depend on your particular vehicle, and individual preference.

SPECIFICATIONS

“IN” (Stamped on valve) – Rigid brake line from the distribution block to this port. On early cars: the master cylinder rear port to this port.

“OUT” (Stamped on valve) – Rigid brake line to the rear flex hose.

“DECREASE” – Reduces the brake line pressure to the rear brakes.

“INCREASE” – Increases the pressure to the rear brakes.

Maximum pressure regulation: 300 psi. Inlet port of valve: 1/8 – 27 NPT

Standard adaptors: 3/8” – 24 for 3/16” line.

Mounting hole diameter: .250” (two).

NOTE: AFTER INSTALLATION REFER TO MASTER CYLINDER MANUFACTURER INSTRUCTIONS FOR PROPER BLEEDING