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AEROFLOW PERFORMANCE BRAKE MASTER CYLINDER

WARNING!

THIS PRODUCT REQUIRES DETAILED KNOWLEDGE OF AUTOMOTIVE SYSTEMS. WE RECOMMEND THAT THIS INSTALLATION BE CARRIED OUT BY A QUALIFIED AUTOMOTIVE TECHNICIAN.

The selection and installation of brake components should only be done by personnel experienced in the proper installation and operation of braking systems. The installer must use his/her own discretion to determine the suitability of the brake components and brake kits for every particular application.

INTRODUCTION

Congratulations on your purchase of Aeroflow Performance Brake Master Cylinder. Aeroflow Performance products cannot and will not be responsible for any damage, or other conditions resulting from misapplication of the parts described herein. However, it is our intention to provide the best possible products for our customer, products that perform properly and satisfy your expectations. Should you have any questions? Please call technical support at +61 2 8825 1900 and have the product part number on hand when calling.

Whether you're building a brake system from scratch, or upgrading from an older outdated worn system. The Aeroflow Performance brand new slimline brake master cylinders install easily, as most mount in the stock location. They feature dual reservoirs and shallow pockets which accommodate front disc/rear drum brakes or 4-wheel disc systems. We offer a variety of designs to provide compatibility with manual brakes as well as power-assisted applications. Each master cylinder has a GM universal mount spacing (3-3/8") to suit a variety of universal or bolt-on applications. Available in a smooth top in chrome or black finish and in 1" or 1-1/8" bore sizes and constructed from cast aluminium.



INSTALLATION GUIDELINES

Removing an Old Master Cylinder

1. **CAUTION:** Perform all work on a level surface. Chock the wheels, set the emergency brake and put the transmission in Park.
2. Protect painted surfaces from brake fluid and place absorbent materials under the master cylinder. Since brake fluid is caustic to paint, use a fender cover mat to avoid spills. All spills should be immediately clean with water.
3. Spray the master cylinder nuts and fittings with penetrating spray.
4. Mark which lines connect to which port on the master cylinder and which supplies fluid to the front and rear wheels respectively.
5. Make a note of the brake pedal ride height inside the cab of the vehicle. Use a wooden block to rest the pedal on so you will have a reference when you set it back up.
6. Use flare nut wrenches to loosen the master cylinder nuts. On stubborn fittings, sometimes attempting to tighten them before loosening them helps break them free. Be careful with the tube nut hex heads and tubes themselves if you are re-using them.
7. Again, to protect important painted surfaces you might cover the master cylinder with a plastic trash bag and or wrap it with shop rags or towels. Consider removing all of the old brake fluid from master cylinder first.
8. Inside the car, disconnect the master cylinder rod's clevis from the brake pedal swing arm and note which hole it was connected to.

Installing the Master Cylinder.

- Always mount the master cylinder to a secure, reinforced element of the chassis. There should be no movement or deflection at the mount point when brake pedal pressure is applied.
- Always bench bleed the master cylinder unit before installing. This process is shown below.
- Prior to attaching the brake lines, fill the reservoirs with new brake fluid and purge any air from the master cylinder.
- Be sure the cylinder is level during the bleeding operation. If the cylinder is not level when mounted in the vehicle, you can perform this operation prior to attaching the master cylinder to its mount.
- Once all fluid connections have been made, the complete system must be bled and checked for leaks prior to any test of the vehicle.
- Check the length and diameter of the push rod from the pedal or power booster. It should fully engage the bottom of the recess in the master cylinder piston assembly without interference along the sides or shoulders.

Plumbing Notes and Precautions

- Each master cylinder has one 9/16-18" and one 1/2-20" on each side. Only two of these connections are required for use when plumbing up the brake system.
- The other two unused connections must be blocked off.
- Pressure may be taken from either side of the master cylinder.
- After selecting the size and location of the outlet ports to be used, lubricate adapter fitting threads lightly with silicone or lithium-based grease, then install the fittings and plugs.
- Each of the master cylinder ports are designed for use with double flared brake line. Or fittings that use an inverted flare to seal.
- Always use double flared lines. Do not attempt to use single flared connections in your brake system. Do not use additional sealant or any other type of gaskets on the fittings, lines, or plugs.
- Connect one of the primary outlet ports (A) to the brakes at the end of the vehicle with the greatest total effective piston bore area. On most vehicles, this will be the front brake line.
- Connect one of the secondary outlet ports (B) to the brakes at the end of the vehicle with the lesser total effective piston bore area. On most vehicles, this will be the rear brake line.
- Use of braided hose flexible lines should be limited to the connection between the fixed chassis and moving suspension components. All other lines along the fixed chassis should be hard steel or stainless lines.
- On four-wheel disc brake applications, where the fluid reservoir is mounted higher than the caliper bleed screws, a residual pressure valve is usually not required.
- On any disc brake applications where the fluid reservoir is mounted lower than the caliper bleed screw may require a 2-pound residual pressure valve (Sold Separately AF387-02). This can prevent fluid drain back and excessive pedal travel on initial engagement.
- All drum brake applications require an inline 10-pound residual pressure valve (Sold Separately AF387-10).
- The Use an adjustable proportioning valve can be installed to set the front to rear brake bias. (Sold Separately AF64-3042).

BENCH BLEEDING THE MASTER CYLINDER

"Bench bleeding" (removing air from the master cylinder) must be completed BEFORE the replacement unit is installed in the vehicle. Otherwise, the brake pedal will be insufficient and **THE WARRANTY WILL BE VOID!**

1. Position the replacement master cylinder in a vice so that the jaws clamp onto the mounting flange. **DO NOT TIGHTEN THE VISE JAWS ON THE MASTER CYLINDER BODY!** This will cause damage and void the warranty.
2. Install bleeder tubes, if available, into the brake line outlet ports or use plugs to seal the ports.
3. Add enough clean brake fluid to the reservoir so that the bleeder tube ends are submerged beneath the fluid level.
4. Use a wooden dowel or similar tool to slowly push the master cylinder piston in about one inch, then release the piston slowly.
 - I. **CAUTION:** Be careful to avoid spraying brake fluid! Keep your face away from the open reservoir.
5. Wait 15 seconds and repeat step 5 until you no longer see air bubbles in the reservoir.
6. Replace the reservoir cover. Do not remove bleeder tubes from the brake line fittings yet.
 - I. **NOTE:** Some fluid around the mouth of the piston bore is normal and does not indicate leakage. This is a rust inhibitive bore lubricant used during assembly.

BLEEDING THE LINES ON CAR

1. Remove the master cylinder cover and check the fluid level. Be sure to check the fluid level often during the bleeding process. And add fluid as necessary to prevent air from entering the master cylinder. If this happens you **MUST** start over at bench bleeding the master cylinder.
2. Replace the master cylinder cap.
3. You will need an assistant to pump the brake pedal while you open and close the bleeder screws at the appropriate times during this process.
4. The wheel farthest away from the master cylinder is bled first which in most cases is in this order: Right rear, left rear, right front and left front. Failure to bleed in the proper order will cause air to remain in the lines.
5. Crack the bleeder screws at the appropriate wheel just enough to make it easy to loosen later. Attach a length of clear plastic tube to the end of the bleeder screw. Submerge the other end of the tube into a container filled with brake fluid.
6. Crack the bleeder screw open just enough to allow fluid to leave the valve and have an assistant slowly and firmly apply pressure to the pedal. Have the assistant hold pressure on the pedal until you see no more air bubbles coming out of the hose. Close the bleeder screw and have the assistant release the brake pedal. Repeat this step until no more air is seen leaving the tube.
7. Proceed to the next wheel in the bleeding order and repeat steps 6 & 7 for each. Be sure to check the fluid level in the master cylinder frequently.
8. Refill the master cylinder to the appropriate level when finished with the entire bleeding process.
9. Check the pedal, it should feel solid when depressed with no sponginess and should hold under constant pressure without dropping. If you still have a spongy pedal, repeat the entire process.
10. Before operating the vehicle test the brakes under controlled conditions. Make several stops in a safe area from low speeds gradually working up to operating speeds.

BRAKE TESTING

- Make sure pedal is firm: Hold firm pressure on pedal for several minutes, it should remain in position without sinking. If pedal sinks toward floor, check system for fluid leaks. **DO NOT** drive vehicle if pedal does not stay firm or can be pushed to the floor with normal pressure.
- At very low speed apply brakes hard several times while turning steering from full left to full right, repeat several times. Remove the wheels and check that components are not touching, rubbing, or leaking.
- Carefully examine all brake components, brake lines, and fittings for leaks and interference.
- Make sure there is no interference with wheels or suspension components.
- Drive vehicle at low speed making moderate and hard stops. Brakes should feel normal and positive. Again, check for leaks and interference.
- Always test vehicle in a safe place where there is no danger to (or from) other people or vehicles.
- Always wear seat belts and make use of all safety equipment.

THE MOST COMMON REASON FOR A POOR PEDAL

1. The bleeder screws on the calipers are not facing up.
2. The master cylinder was not bench bled or was not bled completely.
3. Defective master cylinder with pitted cylinder bore or defective seals.
4. Master cylinder bore size too small for system volume requirements.
5. Master cylinder mounted lower than the calipers or wheel cylinders without the use of a residual valve.
6. Lines or components near a heat source.
7. No residual valve to rear drums.

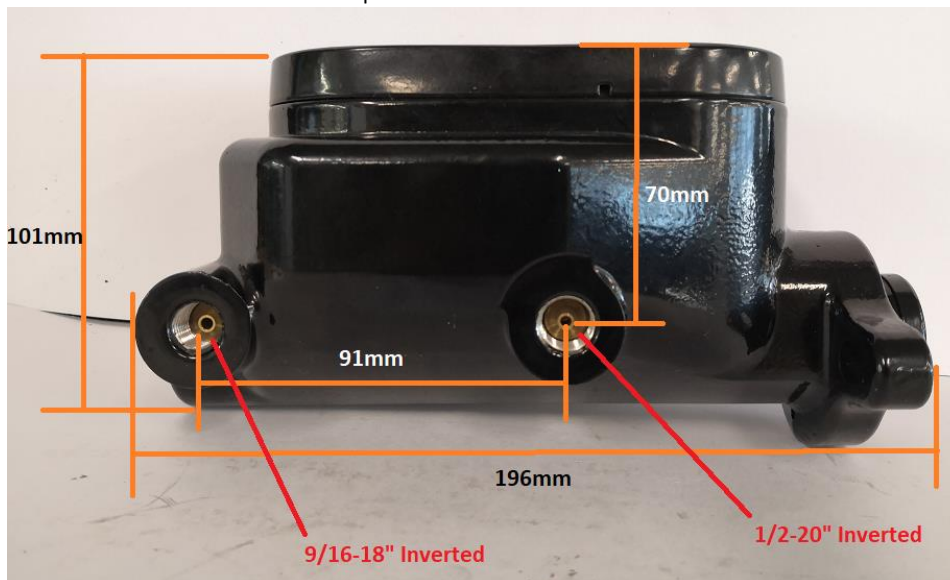
8. Drum brake wheel cylinders too large.
9. Rear caliper parking / pistons not set up properly with a rear disc system.
10. Rear calipers not being bled properly. Most four-wheel disc brake problems come from the rear.
11. Improper pedal adjustment with too much play.
12. Old or inferior quality brake hoses.

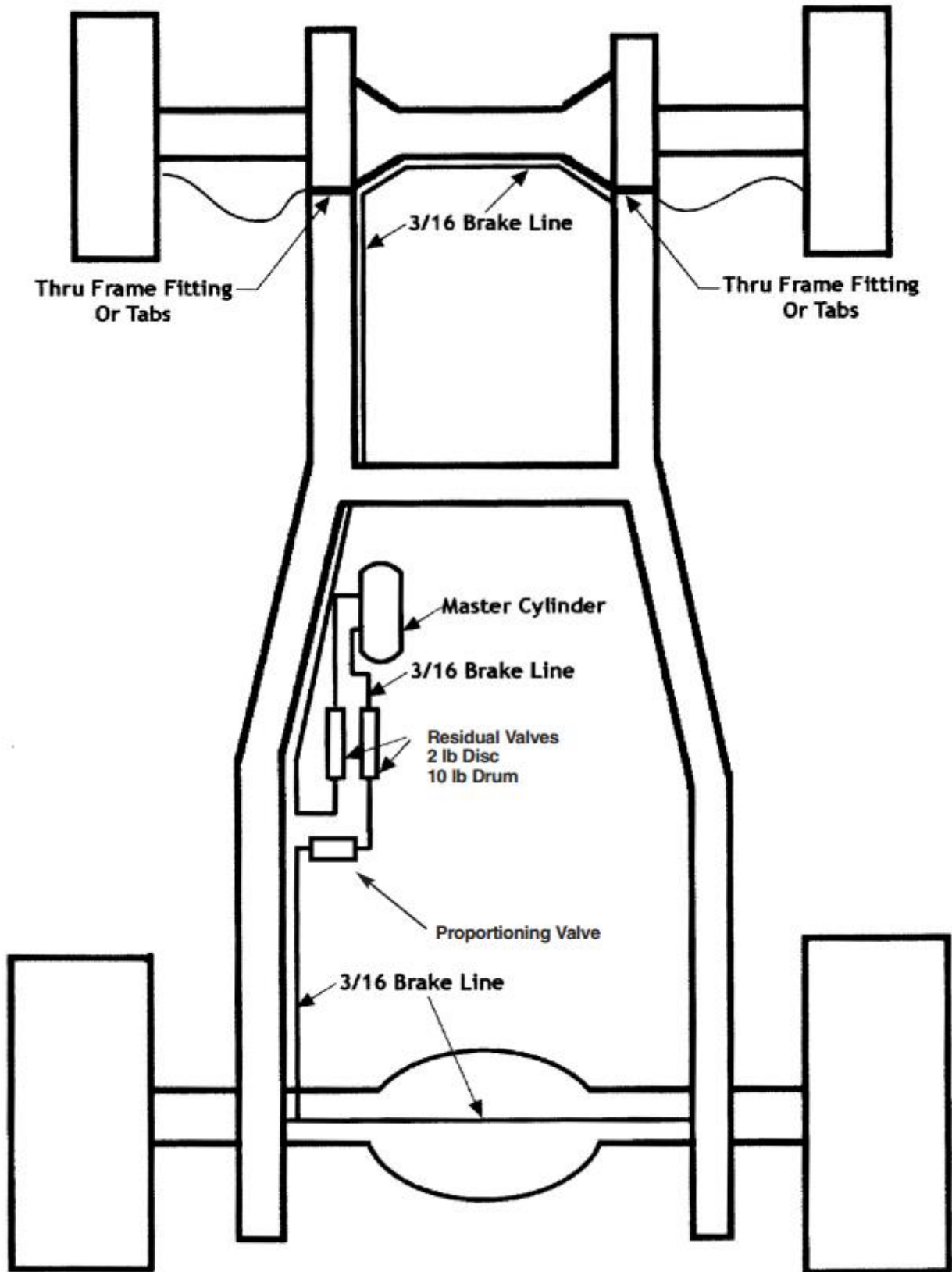
HOW TO PROPERLY DIAGNOSE A BRAKE PROBLEM

If you have very poor brakes, a spongy pedal or no pedal at all you will have to do some diagnostics to determine where the problem is in your system. Is it the master cylinder, the front brakes or the rear brakes? These tests assume that your system is properly installed and bled. Perform these simple tests to find where the problem is. Once you know where the problem is it will much easier to fix.

1. Disconnect the brake lines from the master cylinder while leaving it on the vehicle.
2. Obtain solid tapered plugs for the master cylinder outlets with the correct thread pitch.
3. Plug the master cylinder outlets. Step on the pedal and hold pressure for about 30 seconds. If the pedal remains firm then the master cylinder is good. If the pedal sinks to the floor, then the master cylinder is bad.
4. If the master cylinder is fine, connect the line to the front brakes. If the pedal remains firm then the problem is not coming from the front brakes. If the pedal sinks to the floor or is excessively spongy then the problem is with the front brakes.
5. Connect the rear line and if the pedal goes bad then the problem is in the rear. You may also check whether your lack of a pedal comes from the front or rear this way. If you are sure the master cylinder is good, clamp off the front rubber hoses and try the pedal. If you get a good pedal then you know the problem is from the front calipers. Try it on the rear if the front is fine. IF YOU HAVE A GOOD PEDAL BUT YOUR CAR WILL NOT STOP, YOU MUST OBTAIN PRESSURE READINGS AT THE MASTER CYLINDER AND THE FRONT AND REAR WHEELS.

Disc brakes minimum pressure 800 PSI Drum brakes minimum pressure 400 PSI





For more information or technical enquires

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