Steering, Brake & Suspension Specialists

#APV-DB "Prop and Stop Block" Instructions

Adjustable Prop Valve, Stop Light Switch and Distribution Block

UNDERSTANDING THE VALVE

PROPORTIONING VALVE

The front to rear brake balance is partly controlled by the proportioning valve. The proportioning valve is used to reduce the rear brake pressure that exits the valve. The pressure required for the valve to start reducing pressure is known as the split or knee point. After the incoming pressure is higher than the split point, the pressure leaving the valve will be less than the pressure entering the valve. Let's look at an example where the brakes are applied in a hard stop. (For this example assume the valve is adjusted to a split point of 500psi.) The front and rear pressure will rise equally until the split point has been reached (500psi). After that the rear pressure will rise at about half the rate the front does. With 1000psi at the front brakes there will be about 750psi to the rear brakes. (The first 500psi is equal; increasing the front another 500psi will increase the rear by 250psi.)

CONNECTING THE VALVE

The proportioning valve assembly uses standard 3/16" tubing flare fittings at all of the tube ports, and a 1/8 pipe connection at the brake light switch. The port on the valve marked FI is the front incoming connection. It will connect to the front port on the master cylinder.

- The port on the valve marked RI is the rear incoming connection. It will connect to the rear port on the master cylinder.
- The 2 ports marked FO are for the front out connections. One or both of them will be connected to the front brakes.
- If you only use 1 of these ports you must plug the other port. The plug is not supplied.
- The port on the valve marked RO is the rear out connection. The entire brake system should be dry fitted and adjusted before any brake fluid is added, or the system is bled.

This is done so that you can remove part of the system in order to make an adjustment and not loose any fluid or have to re-bleed the brakes.

BLEEDING THE SYSTEM

Do not attempt to bleed the brakes until after the complete brake system as been dry fitted. If you are replacing the master cylinder, or the brake reservoir has been emptied you will need to bench bleed the master cylinder.

BENCH BLEEDING THE MASTER CYLINDER

The master cylinder can be bench bled by two different methods. The conventional method requires a tool like a screwdriver be used to cycle the master cylinder by hand. This method causes a small amount of foam in the master cylinder. The other method is to use a syringe to push fluid thru the master cylinder. This method will not cause the fluid to foam.

The conventional method: Mount, hold, clamp or secure the master cylinder in a level position. A bench vise is a good way to keep the master cylinder level. Fill the master cylinder reservoir/s with brake fluid. If you have a master cylinder bleed kit, install the fittings into the master cylinder, connect the hoses to the fittings, and put the other end of the hose into the master cylinder reservoir. If you do not have a master cylinder bleed kit you will want to have some sort of container under the master cylinder to catch the fluid that comes out of the master cylinder ports. With your screwdriver like tool compress the master cylinder piston until it reaches the bottom of its travel. Release the pistons so that it will return to the "at rest" position. Continue to cycle the master cylinder until no more air comes out of the master cylinder ports.

The syringe method: Mount, hold, clamp or secure the master cylinder in a level position. A bench vise is a good way to keep the master cylinder level. Fill the master cylinder reservoir/s with brake fluid. If you have a master cylinder bleed kit, install the fittings into the master cylinder, connect the hoses to the fittings, and put the other end of the hose into the master cylinder reservoir. If you do not have a master cylinder bleed kit you will want to have some sort of container under the master cylinder to catch the fluid that comes out of the master cylinder ports. Using the syringe, inject brake fluid directly into the larger of the two openings in the bottom of each master cylinder reservoir. The larger hole is closest to the master cylinder mounting flange. It is known as the take up port. As fluid enters the take up port, it will fill the take up portion of the master cylinder and then begin to fill the rest of the master cylinder. Continue using the syringe to inject fluid into the master cylinder until no more air comes out of the master cylinder ports. You will need to do this for each circuit in the master cylinder. There is a take up port for each circuit.

Immediately after bench bleeding the master cylinder reinstall it back onto the car and connect the brake lines. The more quickly it is reinstalled the less chance of getting air back into the master cylinder.

BLEEDING THE BRAKES

The purpose for bleeding the brakes is to remove all of the air from within the brake system. Any amount of air trapped in the brake system is dangerous. It will cause the brake pedal to feel spongy, soft, low, and may completely prevent the brakes from working. You will need to push the air out of the system by moving a large amount of fluid thru the system as quickly as possible. An air bubble will rise up to the highest point it can. A bubble will never move down on its own, it will need to be forced down with a flow of brake fluid. If you attempt to "gravity bleed" the system you will never remove all of the air. In some applications you may need to use a pressure bleeder in order to remove all of the air. A typical pressure bleeder can move several gallons of fluid non stop in under 1 minute.

Example; you have a long run of brake line that runs up and down. As you pump the pedal you move enough fluid to push the air bubble almost to the bottom of the run. As you release the pedal, gravity pulls the fluid to the bottom of the run while the bubble moves back to the top. The bubble will have a "yo-yo" action where it goes down and up but never gets removed from the brake line no mater how many times you pump the pedal.

Top off the master cylinder reservoir with new brake fluid before you begin to bleed the brake system. Check the reservoir often. As you bleed the brakes, count how many pumps you have done and check the brake fluid level. You should be able to get an idea of how often to check the fluid level. As a general rule you can get 10-15 pumps from the rear circuit before the brake fluid becomes low and 7-12 pumps in the front circuit. If you allow the master cylinder to draw air into the master cylinder bore, or run the master cylinder out of fluid you will need to bench bleed the master cylinder again. To avoid spilling brake fluid keep the lid on the master cylinder as you pump the brakes. When the brake pedal is released the brake fluid will flow back into the reservoir and create a small fountain than can splash and spill over the top of the master cylinder.

Begin at the caliper/wheel cylinder that is farthest from the master cylinder. This will minimize the chance of cycling the isolation valve. As you bleed each caliper/wheel cylinder a small amount of brake fluid will be expelled out of the bleed screw. It is recommended that you use a small piece of clear hose attached to the bleed screw to direct this used brake fluid into a container to prevent making a mess with the brake fluid. You can watch the fluid coming out of the hose and know when the air is removed.

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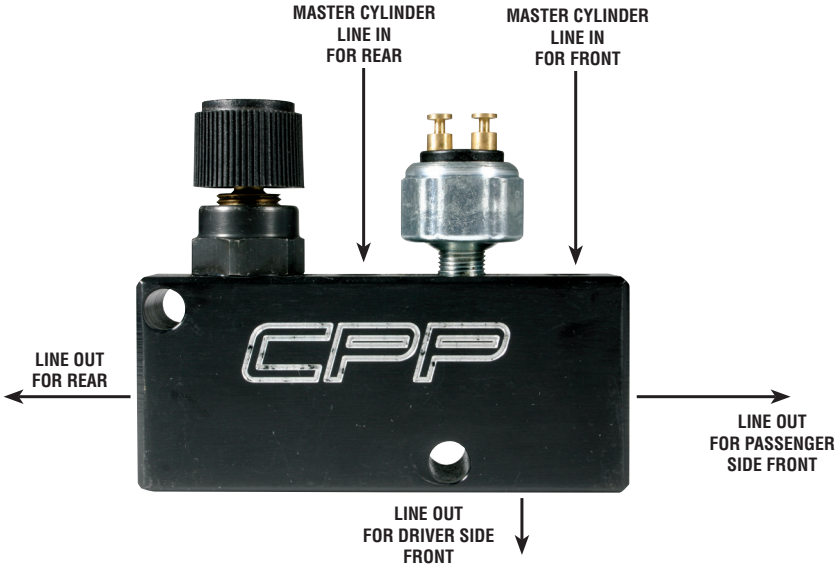
#APV-DB "Prop and Stop Block" Instructions *(Continued)*



Have an assistant apply a moderate amount of pressure to the brake pedal. Open the bleed screw and allow the air and fluid to be vented from the brake system. Your assistant should press the brake pedal to the floor in a smooth relaxed motion. Do not have the assistant hold the pedal on the floor before the bleed screw is opened. If the brake pedal is held against the floor then there maybe several thousand psi of hydraulic pressure behind the bleed screw; this is dangerous. Opening the bleed screw with that much pressure could injure you or cause damage to your vehicle. Close the bleed screw before your assistant allows the brake pedal to come back up. Continue bleeding the system until there are no signs of air coming out of the bleed screw. Move to the wheel that is the next farthest distance from the master cylinder. Note; If the bleed screw port does not intersect the caliper bore at its highest point it may be necessary to temporarily reposition the caliper so that the bleed screw port is at the highest part of the caliper bore.

After all of the calipers/ wheel cylinders are bled you should be finished. If the master cylinder mounts so that the front is higher than the back it is possible to get an air bubble trapped inside master cylinder bore. No amount of bleeding will remove this bubble. It is possible to create a back flow that will expel the last bubble trapped within the master cylinder bore. Simply unbolt the master cylinder from the booster, point the master cylinder slightly nose down. For front disc brakes use a small pry bar to pry the inner pad away from the brake disc. This will compress the caliper piston back into the caliper bore and move a large amount of brake fluid from the caliper bore back into the master cylinder reservoir and push that last bubble out of the master cylinder bore and into the reservoir. On rear disc brakes with a parking brake a similar effect can be created by simply applying and releasing the parking brake several time. With drum brakes use a tool like a screwdriver to actuate the master cylinder. As the return springs pull the brake shoes back, the wheel cylinders will compress and push the brake fluid back into the reservoir. Reattach the master cylinder to the booster. On disc brake vehicles you will need to cycle the brake pedal several times to extend the caliper piston out of its bore, and bring the pads back into contact with the disc.

Top off the master cylinder with brake fluid. Install the master cylinder lid. Check that the brakes are working before you attempt to drive vehicle.

ADJUSTING THE VALVE

Adjust the valve to allow maximum rear brake by turning the adjustment knob clockwise (the knob will become closer to the body of the valve) until it reaches the end of its adjustment. In a safe location apply the brakes hard and observe if the front tires skids before the rear tires. If the front tires skid first, there are no adjustments that need to be done. If the rear tires skid first reduce the rear brake pressure by turning the adjustment knob counter-clockwise (the knob will move out farther away from the body of the valve.) Continue to make adjustments as needed until either the front and rear tires begin to skid at the same time, or the front tires begin to skid just slightly before the rear tires.

CONNECTING THE BRAKE LIGHT SWITCH

This switch is used to activate the rear brake lights. This is not for the brake warning light on the instrument panel. Connect one of the wires to a power source and the other wire to the rear brake lights. When pressure is applied to the switch the contacts will close completing the circuit for the rear brake lights.

PLEASE NOTE: The installer needs to make sure that nothing can make contact with a brake hose, caliper, or other brake component at any point through the entire range of steering and suspension movement. The installer also needs make sure none of the steering or braking components can become bound or jammed at any time through the range of suspension or steering movement.

GENERAL TORQUE SPECIFICATIONS:					
1/4″	grade 5	10lb/ft	1/4″	grade 8	14lb/ft
5/16″	grade 5	19lb/ft	5/16″	grade 8	29lb/ft
3/8″	grade 5	33lb/ft	3/8″	grade 8	47lb/ft
7/16″	grade 5	54lb/ft	7/16″	grade 8	78lb/ft
1/2″	grade 5	78lb/ft	1/2″	grade 8	119lb/ft
9/16″	grade 5	114lb/ft	9/16″	grade 8	169lb/ft
5/8″	grade 5	154lb/ft	5/8″	grade 8	230lb/ft

NOTE: With 18" and larger wheels we recommend 1/2" wheel studs. The larger the wheel diameter, the greater the force is on the wheel studs. Please inquire about replacement wheel stud kits available from CPP.

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