BRAKE LINE BLEEDING

Most low and soft pedal problems are caused by air in the hydraulic lines, which requires bleeding of the hydraulic system. By using the pump with brake bleeding accessories, the system can be bled easily. Follow a wheel-to-wheel sequence beginning with the wheel closest to the master cylinder.

The Kit provides a simple, clean, and quick method for bleeding the fluid lines in the automotive brake system. The creation of a vacuum in the reservoir jar causes fluid to be drawn into the reservoir jar. It should be noted that a tiny stream of bubbles may be noticed in the hose after all of the air is bled from the lines. This is caused by air seeping around the threads of the loosened bleeder fitting and being drawn back through the fitting by the suction of the pump. Once the air is removed from within the system, these tiny bubbles will in no way jeopardize the bleeding operation, since they are present only at the fitting and do not enter the system. If you wish, you can put grease or Teflon tape around the threads of the fitting to eliminate most of the bubbles.

The correct bleeding procedure follows:

1) Always make certain that the master cylinder reservoir is filled and that a supply of new, clean brake fluid of the proper type is on hand to top off the reservoir as the fluid level drops during bleeding. Make sure that all the bleeding fittings are clean prior to beginning of the bleeding procedure.
2) Bleed the hydraulic system in the following order:
   a) Master cylinder bleeder fittings, if equipped. (If installing a new or rebuilt master cylinder, follow the bench bleeding procedure which follows.)
   b) Bleeder fittings on the combination valve, if equipped.
   c) Wheel cylinders and calipers in succession beginning with the wheel closest to the master cylinder, and working to the farthest one.

NOTE: Wheel balancing sequence varies among manufacturers. Follow manufacturer's recommended sequence (if known). Procedure given in this article specifies to begin bleeding wheel closet to master cylinder. Regardless of sequence used, always ensure all air is purged from system.

3) Slip 1-1/2" of tubing between the pump and the lid of reservoir jar at port marked "TO PUMP" (FIGURE 15).
4) Attach 3-1/2" plastic hose to the bottom of the cap (if not already attached).
5) Affix at least a 12" piece of tubing to the other reservoir jar port. Be certain that the cover of the reservoir jar is secure, but don't overtighten.
6) Select the appropriate adapters. The snap-over adapters (L-shaped) are different sizes (small, medium, large). They should fit snugly over the brake bleeding fitting in order to seal properly. The tapered adapters fit inside the thru-hole of fitting and will generally seal well when inserted tightly with a pressing and twisting motion. Attach adapter to reservoir hose.
7) Place wrench on brake bleeding fitting; attach adapter and pump assembly and pump 10-15 times.
   NOTE: If bubbles coming out of the fitting are very small and even in size, the air is probably coming from within the system. It is not necessary to eliminate these bubbles as they do not affect brake operation. If desired, these bubbles can generally be eliminated by placing grease or Teflon tape around the threads, to act as a seal.
8) Open fitting slightly, only enough to cause the fluid to enter jar (usually 1/4 to 1/2 turn).
9) After evacuating about 2" of fluid into jar, tighten fitting. Keep master cylinder full.

   Repeat all previous steps on all remaining wheels. If fluid is not drawn into the jar after opening the fitting, make certain the lid of the jar is tight. You will not be able to produce the necessary vacuum in the jar if the lid does not fit securely. Occasionally some dirt will get into the brake line, in which case the pump may not be totally effective. If this happens, have someone touch the brake pedal once

lightly, with the bleeding valve open, then proceed to use the pump.

MOTORCYCLE BLEEDING PROCEDURE

Before bleeding the system, ensure that
1) the brake caliper pistons are free to move within the calipers.
2) the master cylinder piston is free to return to the end of its stroke, and
3) inspect the line to ensure that all fittings are tight.

FRONT BRAKE

1) Pump brake lever to seat caliper pads against rotor.
2) Cover gas tank with plastic protective sheet if using DOT 3 fluid (not necessary if using DOT 5 fluid).
3) Remove master cylinder reservoir cap and fill reservoir.
4) Attach a 5/32" ID connection hose to brake bleeding fitting.
5) Pump several times to create vacuum. Crack bleeder valve with box wrench, extracting fluid into reservoir. (Stop and add fluid when master cylinder begins to get low. Do not allow air to enter line.) At this point, all air should be out of system and line full of fluid. **(Note:** if air is entering the pump hose from around bleeder fitting, remove bleeder fitting and apply Teflon tape to threaded portion of bleeder screw only. This will prevent air seepage around threads of bleeder screw.)
6) While maintaining vacuum on the pump line, tighten bleeder fitting.
7) Top off reservoir and reinstall cover. Check brake by pumping lever several times. Pedal should have a positive, solid feel. If not, repeat bleeding process as more air may have entered the system. Inspect line to ensure all fittings are tight. If brake still feels slack, consult a service technician.
   For dual disc front brakes, repeat bleeding process as though there are two separate systems.

REAR BRAKE

Removing all air from the rear brake line is the same as for the front. The rear brake reservoir is usually located beneath one of the side covers.
1) Remove the master cylinder cap and fill to near full.
2) Attach the pump hose to the bleeder fitting and pump the handle several times to create a vacuum.
3) Crack the bleeder with a box wrench. Because of the short line, most of the air should be evacuated the first time.

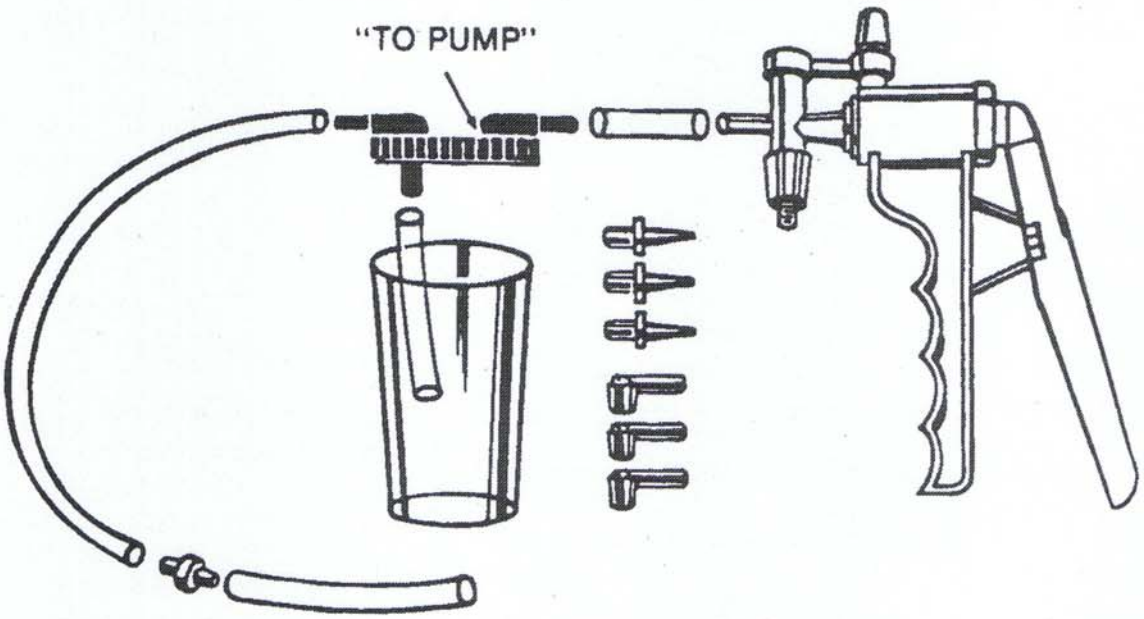

FIGURE 15: No. 6820 Brake Bleeding Kit

4) By closing the valve and repeating the process, all of the air should be eliminated from the system. Stop and add more fluid when master cylinder gets low.
5) Top off and recap the reservoir.

TROUBLESHOOTING

1) If, after bleeding procedure, the brake continues to be unresponsive, you may have water in the system, in which case it will need to be disassembled and cleaned by a qualified service technician.
2) If the brake squeaks slightly after bleeding, the disc and pads must be cleaned.
3) Although DOT 3 fluid is recommended by most manufacturers, it has a tendency to collect moisture - which causes the common discoloration you see - and that means decreased efficiency. DOT 5 is silicone based and does not have the same tendency to collect moisture. It also has a higher tolerance. DOT 5, however, is not always easy to find and the two types of fluid must not be mixed.
4) Rubber hoses are supplied stock on most motorcycles, but they have a tendency to expand, which may result in a spongy brake feel after a lot of riding. Braided steel line will not expand like this.
   There is also a hose adapter and 5/32" ID hose in the kit for bleeding hydraulic motorcycle brakes. Be sure the caliper and master cylinder pistons are free and all fittings are tight. Cover the gas tank with rubber or plastic protective sheet.
   Connect the adapter and 5/32" ID hose to the end of the long tube and connect to caliper bleeder fitting. Bleed as with an automobile.

BENCH BLEEDNG THE MASTER CYLINDER

Whenever a master cylinder has been removed from a vehicle or a new one is being installed, the master cylinder must be bench bled. Failure to bench bleed is the main reason for unsuccessful master cylinder replacement. Bench bleeding greatly decreases the chance that any air will be caught in the cylinder upon reinstallation. This bleeding technique utilizes this Kit. Follow this procedure:

1) Plug outlet holes of the master cylinder and gently clamp it in a vise with the push rod end slightly elevated. **NOTE:** Damage may result if master cylinder is clamped by the bore or if reservoirs are clamped too tightly.
2) Fill the master cylinder with an approved type brake fluid and keep it filled at all times during the procedures.
3) Remove a plug from the master cylinder and attach the proper adapter to this master cylinder outlet port. Connect the pump tube to the reservoir jar and the jar tube to the adapter (FIGURE 16).
4) Pump the pump and observe air and fluid flowing into the reservoir until clear, bubble-free fluid appears.
5) Plug the outlet tightly and repeat step 4 on the other outlet ports.
6) Clamp master cylinder in a vise with the push rod end down slightly. Slowly slide the master cylinder push rod back and forth about 1/8", until no air bubbles can be seen in the reservoirs.
7) Remount the master cylinder with the push rod end up and follow steps 3 & 4 on all outlet ports. Plug ports tightly. The master cylinder is now free of air and ready to install.

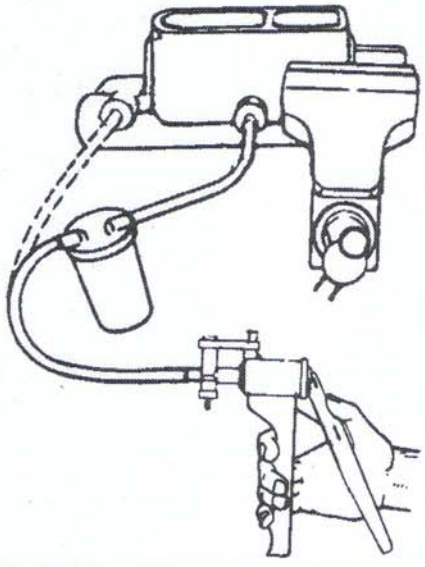

FIGURE 16: Bench Bleeding