



*Stopping at Nothing to Get You Stopped*

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## Hydraulic System Operation with a floating Caliper

The hydraulic system is self-adjusting. The reservoir is vented and must be the highest point in the hydraulic system. There is a bypass valve in the master cylinders that opens the hydraulic system to atmosphere when fully extended (the shaft on the MC's must be allowed to fully extend when at rest). The self-adjusting nature allows the system to compensate for pad wear, disc wear, and fluid temperature changes.

When the system is serviced air free and the piston in the caliper is fully seated in the housing, the first stroke application of the cylinder shaft closes the bypass valve and allows fluid to be pushed toward the caliper. The fluid will move the piston out of the caliper until either maximum stroke of the shaft is achieved or the piston moves far enough to allow the caliper for the caliper to center on and build pressure against the brake disc. If the initial stroke of the shaft is not sufficient to close the gap in the caliper to allow pressure to build against the disc, a second stroke may be required. If this is the case, the caliper will remain in position where the last pressure moved it (piston semi extended and/or caliper semi centered on the disc). The second stroke should generally be sufficient to center the caliper and move the piston out of the housing sufficient to build pressure. Once this has been achieved, release of the master cylinder will simply allow the caliper to 'relax'. The caliper should remain in position in the brake plate. The piston should only retract by the resiliency of the o-ring, and the running clearance between the disc and the brake pads should be extremely small. It should be on the order of 0.010 inch. This running clearance should remain constant throughout the remaining wear life of the pads and the disc. As long as the bypass valve is open by virtue of the cylinder shaft fully extended and the reservoir vent is open to atmosphere, the hydraulic system will always maintain the very small running clearance. If the fluid has heated during use, the excess fluids will be allowed to vent to the reservoir. As the fluid cools, fluid will be drawn back into the system from the reservoir and any vacuum relieved. The feel to the pilot's foot on the brake should feel very much the same in terms of brake engagement and response from foot pressure throughout the wear life of the system

In order for the system to function properly, it is key that the shafts on the master cylinders are able to fully extend when at rest. The reservoir must be vented to atmosphere. The caliper must be able to float freely in the brake plate. If the caliper cannot float freely in the brake plate so that it can center on the disc, it will act like a spring and the running clearance may be too large for a single stroke of the cylinder to close the running clearance. Keep in mind that the caliper housing will move away from the disc when pressure is applied. It cannot be prevented from such movement from nearby structure. Also, the brake line connection to the housing must be completely flexible so that the caliper can float freely. A soft metal line is not a suitable replacement for a nylon, sheathed nylon, or braided stainless enclosing a nylon line. Even a soft metal line becomes a spring that will tend to position the caliper and return it to a position rather than allow it to remain as last pressurized and centered on the disc.