



67-69 Camaro

Hydraulic Clutch Master Cylinder Installation Instructions Read These Instructions Completely Before Beginning

These instructions are for hydraulic master cylinder installations using an external slave cylinder or a hydraulic throw-out bearing. If your car has been modified from a stock configuration, certain steps may not apply. Existing alterations to your vehicle are your responsibility.



1.0 Tools and Notes

- 1.1 Drill motor, #7 drill bit, nibbler or grinding tip, sharpie marker, 5/16", 7/16", 1/2" and 9/16" wrenches and / or socket / ratchet, silicone sealant, loctite, a second person.

- 1.2 This Hydraulic Master Cylinder Kit utilizes most of the stock clutch push-rod hole location. It will need to be elongated to make room for the Clutch Master Cylinder Body.
- 1.3 Safety Equipment – Always wear ANSI approved safety goggles/glasses when working with metal and fluids. Wear proper gloves when working with hot surfaces and corrosive fluids.

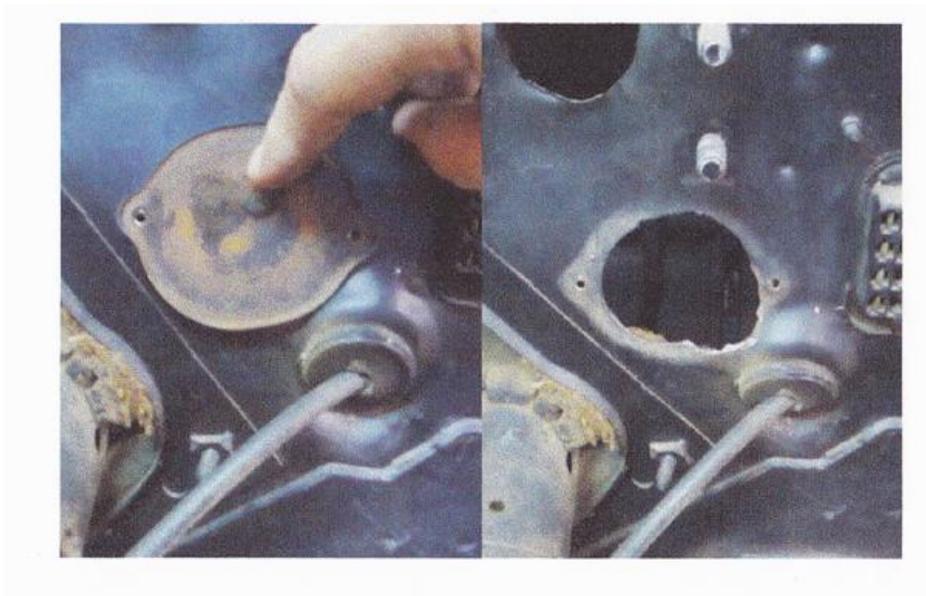
2.0 Disassembly

If your vehicle is already disassembled, skip to the Assembly Instructions. If you are converting an automatic car, some disassembly steps do not apply.

- 2.1 Remove brake master cylinder and brake booster as required, disconnecting the brake lines.
- 2.2 Do not remove the clutch pedal. Remove all clutch linkage or automatic linkage from engine, transmission, frame, and clutch pedal.

3.0 Assembly

- 3.1 Note: Our mock-up vehicle has certain items removed for clarity.
- 3.2 Using a nibbler or grinding bit, elongate the firewall opening to the inside edge of the line drawn, or as shown for existing manual shift cars.



- 3.3 Pre-assemble the Master Cylinder and firewall plate assembly as shown. You may install the elbow fitting, seal, and roll pin now or after you've installed the master cylinder to the body.



- 3.4 Temporarily install bracket and master assembly. Verify enough of the firewall has been trimmed away to avoid damage to the master cylinder body. Use the rubber plug to fill the remaining are of the hole. Trim to fit using scissors. Note: You may trim the OEM metal cover tab and install with silicone, if you have one, instead of using the supplied rubber plug.

- 3.5 Remove all components and clean matting surfaces. Apply silicone sealant lightly to the master cylinder body where it penetrates the firewall, and on the cut surface of the rubber plug. Reinstall plate assembly (making sure the rod end is on the inside of the clutch pedal), rubber plug, brake master cylinder / booster and tighten all four mounting nuts for plate assembly.

Note: You may trim the OEM metal cover tab and install with silicone, if you have one, instead of using the supplied rubber plug.



- 3.6 While the sealant is still wet, from under the dash apply sealant to edges of parts to form a fillet seal (bevel edge build-up), preventing moisture and debris from entering inside.
- 3.7 The rod-end may have been pre-adjusted to the correct height for the clutch pedal. If adjustments are made, make sure there are at least 5 full threads penetrating the rod end.
- Note: There is no adjustment on the rod/ladder joint, this has been put together with loctite.
- 3.8 Install 5/16-24 x 1.250" long bolt thru rod end, washer and clutch pedal and tighten using nylon nut. The washer goes between the rod-end and clutch pedal as a spacer.
- 3.9 Re-install brake lines and distribution block as required.
- 3.10 Verify actuation – the clutch pedal should bottom out on the carpeting at the same time the master cylinder bottoms out. If you have no carpeting or insulation under the clutch pedal, a stop block is recommended so that master cylinder will not be damaged. If the pedal bottoms out on the carpeting without bottoming out the master cylinder no further adjustments are necessary until the hydraulic system is activated with the clutch. If the pedal stops before hitting the carpeting, adjust male rod end to lower the clutch pedal. Adjust pedal stop as necessary and know the pedals may not be at the same height. Verify no binding of rod-end and clutch pedal. Verify parallel alignment of all components. Actuation should be smooth. Verify the master cylinder rod travels the full stroke of 1.4" for proper clutch release.
- 3.11 Locate and mount the reservoir anywhere above the master cylinder. You may shorten the reservoir hose as required. Mark the hole locations with a Sharpie. Using 1/4" sheet metal screws, pre-drill holes using a #7 drill bit prior to attaching reservoir. Install reservoir using 3/8" wrench or socket/ratchet. Do not over-tighten. Make sure reservoir line does not interfere with any moving parts.
- 3.12 Do not tighten fittings – this will cause damage to the seat of the hose end and fittings. Attach the steel braided line to the 90 degree elbow on the master cylinder and slave cylinder or hydraulic throw out bearing making sure line has clearance to exhaust system and will not interfere with any moving parts.
- 3.13 Close the bleed screw on the slave cylinder or hydraulic throw out bearing. Remove the bladder & fill reservoir with DOT 3 brake fluid. Do not install bladder at this time. Install cap tightly.
- 3.14 **Caution: Always wear ANSI approved goggles/glasses when working with fluids. Wear proper gloves when working with corrosive fluids.** Purging the system—Pressure bleeding is the only way to remove all the air from the system. Loosen the bleed screw on the slave cylinder or hydraulic throw-out bearing. Allow gravity to fill the system until fluid comes out the bleed screw then close. Top-off reservoir and re-install cap. Using a second person, open the bleed screw and apply 5-10 psi thru the vent hole in the reservoir cap using a rubber tipped air nozzle. **Air pressure must be regulated to 5-10 psi or you could damage components.** Since the reservoir is small, the bleed screw should only be open for about 5 seconds. You will see a solid stream of

fluid come out, followed by air bubbles, followed by another solid stream of fluid. Immediately close the bleed screw when you see the second solid stream of fluid to prevent draining the reservoir. Top off fluid to the step line in the reservoir and install bladder and cap. Do not overfill or brake fluid will spill.

- 3.15 Do not start car at this time. With system full of fluid, test by actuation pedal a few times. You should have clutch *feel* but it will not be a *heavy* clutch. Repeat the above process if necessary.
- 3.16 Position rear wheels on jack stand (free to rotate). With transmission in neutral, start car. Push in clutch pedal. Transmission should go into 1st gear easily. Slowly release clutch pedal. Pedal should start to engage the clutch at a comfortable level of the pedal travel (about 1.0" – 1.5" from floor) Adjust slave cylinder first, master cylinder second, to change clutch engage/ release point. A new or rebuilt transmission should have all the gears run thru (in the driveway, partially releasing clutch) before road testing the new hydraulic clutch.
- 3.17 Remove jack stands and test drive. Upon return, verify steel braided line clearance and support. The line should never come in contact with the exhaust.
- 3.18 If the clutch feels spongy or releases too close to the floor, repeat step 3.12. FYI – micro bubbles may be present in the system due to actuation, accumulation on rubber parts, and machining marks within the system. Repeating step 3.14 is recommended, before or after test driving.
- 3.19 Further assistance and tech support is available by calling Bowler Performance Transmissions at 618-94.3-4856 M-TH 8-5
- 3.20 Enjoy your new hydraulic system and Thank You for choosing Bowler.

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