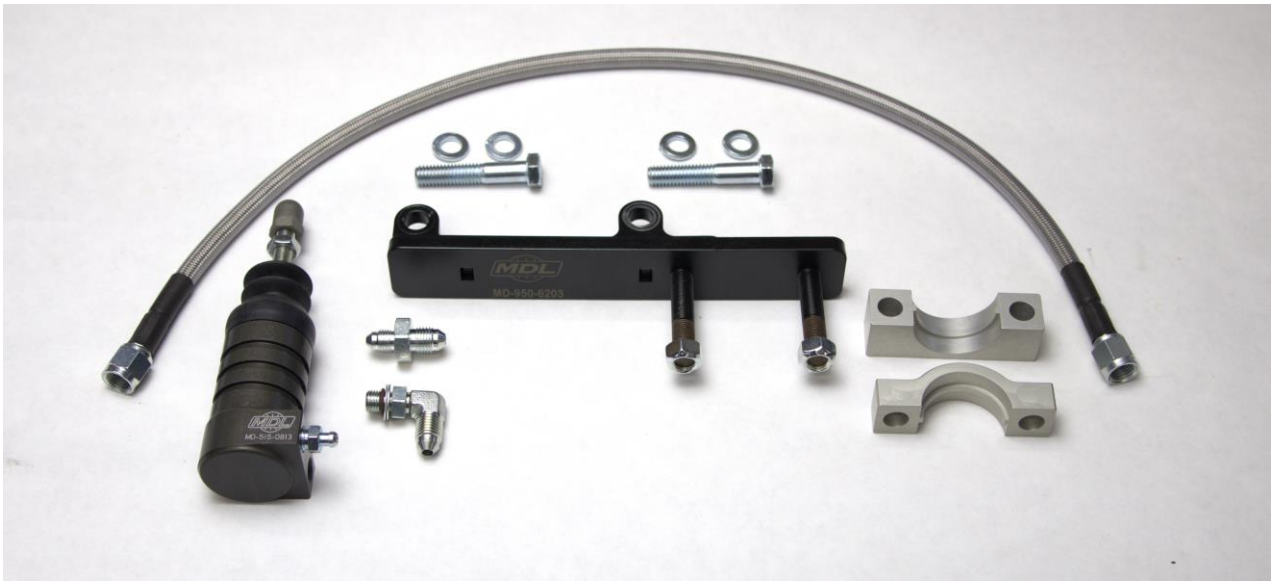
"FIVE AND SIX SPEED CONVERSION SPECIALISTS"

MD-910-1121
GM Long Dimple Fork External Slave Cylinder Installation Instructions for 3 & 4 Speed Bell Housings and Mechanical Linkage.



Read These Instructions Completely Before Beginning

1. Before You Begin
   1.1. This kit will not require disassembly of the vehicle to install, providing all existing parts installed are compatible.

   1.2. General vehicle mechanical knowledge and an understanding of the terminology are required to install this kit.

   1.3. You must have a constant-duty, or constant contact, throw out (t/o) bearing. Most clutch systems and aftermarket replacement bearings are supplied with constant contact sealed bearings which maintain the grease internally and are non-serviceable. If you do not have a constant contact t/o bearing it will need to be replaced.

Seal Shown on the back side of the bearing, indicating constant-contact style bearing.

1.4. The t/o bearing internal sleeve must not drag on the bearing retainer guide tube. Drag of the bearing in either direction on the tube indicates bearing sleeve wear, possible galling, or being dry. An inspection and lubrication may be required.

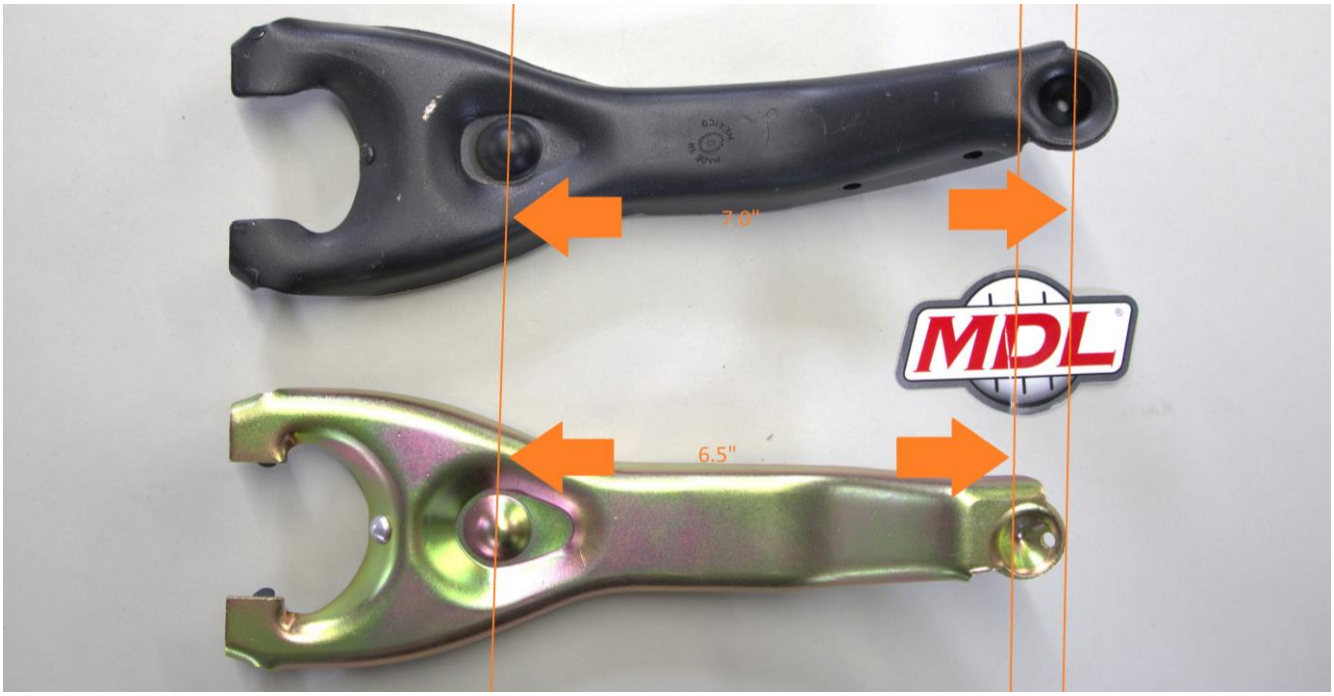
1.5. DO NOT VACUUM OR PUMP BLEED THIS SYSTEM. It is not brakes. Single seal push-pull systems will create micro bubbles in the fluid and in some instances harm the seals internally. The preferred method is to pressure bleed from the top down. Modern Driveline offers a hydraulic clutch system "bleeder kit". The bleeder kit comes standard in all Modern Driveline master cylinder kits and is also available separately as a purchase item.

1.6. This kit will not work with all long-tube headers. If your vehicle already has long tube headers and unaltered factory mechanical linkage this kit is designed to fit. Modern Driveline offers internal release bearings for assured clearance and function.

1.7. This kit has been proven on factory style 621 & 403 aluminum bells. Other factory bells, Quick Time, and other bell brands will need to be altered to clear. Modern Driveline offers internal release bearings for assured clearance and function.

1.8. Your clutch fork must be correct for the bell housing. GM dimple forks CAN be interchanged since the distance from the t/o bearing to the fulcrum pivot are the same. There are two types of clevis/pin forks that can also be interchanged with dimple forks, noted below.

Short Dimple Fork, Fulcrum to Dimple: 6.5" (MD-401-3001)
Long Dimple Fork, Fulcrum to Dimple: 7.0" (MD-401-3000)
Early Clevis Fork, 55-62 (MD-401-3002)
Late Clevis Fork, 64-81 (MD-401-3003)



Center of fulcrum to center of dimple. Long and short dimple forks shown with dimensions.

2. Clutch Height Matters

2.1. Our Slave kit has 3 adjustable positions plus a threaded nut for fine-tune adjustments.

2.2. All parts in this kit are designed with nominal clutch lever height in mind. The Ideal clutch fork position will contact the throw out bearing "full time" and be perpendicular @ 50% of the travel to release the clutch. This is a number in space so to put it differently… the fork will be slightly forward of center before pressing on the pedal, and slightly rearward when the pedal is pressed to the floor.

2.3. A clutch fork return spring will be required for this kit, which will already be part of the vehicle components. This spring must be strong enough to hold pressure on the slave cylinder rod.

2.4. To make it easy… MDL has accounted for fork position by knowing the crank protrusion, flywheel thickness, t/o bearing thickness, and new clutch lever height.

2.5. It is important to make sure the clutch fork is in the proper position. If the fork is not in the correct position, it means you may have the wrong clutch configuration, pressure plate not torqued/seated on flywheel, wore-out mechanical release 3-finger pressure plate, a disk that is too thin or too thick, wrong throw-out bearing, damaged or wrong fork, diaphragm pressure plate finger height too low, damaged or bent fulcrum.

3. Information about this kit

3.1 This cylinder can travel up to 1.25". Most installations will not use all the travel of this cylinder.
3.2 For most mechanical linkage systems, you will only need to travel the cylinder up to 1" to release the clutch. This cylinder has a 0.812" bore.
3.3 .812" bore x 1" stroke = .52 cu/in fluid volume requirement.
3.4 .812" bore x 1.2" stroke = .62 cu/in fluid volume requirement.
3.5 The existing MDL Master Cylinder systems with 0.7" bore x 1.4" stroke are designed to use 0.52" cu/in fluid volume and are considered compatible with this slave cylinder kit.

3.6 To increase the travel of this slave cylinder beyond 1”, a 0.75” bore master kit is required, standard on most GM MDL Master Cylinder systems.
3.7 You will use MD-910-1120 MDL Slave Cylinder Kit and a short dimple fork as an option to increase pressure plate travel.
3.8 The bleed screw can be installed in either port.
3.9 The Slave cylinder mounts forward of the clutch fork.
3.10 Our mock-up bell housing and transmission have certain items removed for clarity.

4. NON-Warrantable Conditions

4.1. Do not remove nuts from bracket or cylinder until instructed.
4.2. The bracket has the lock nuts pre-installed onto the studs to indicate no cross-threading and the nuts will go on. Damaged threads are not warrantable.
4.3. The slave cylinder has the nuts pre-installed onto the rod to indicate no cross-threading and the nuts will go on. Damaged threads are not warrantable.
4.4. Do not over-torque parts.
4.5. Do not add parts to our kit.
4.6. Required vehicle components are your responsibility.

5. Tools, Shop Supplies, and Notes

5.1. 3/8”-16 Thread Tap for Bracket mounting bolts (engine block to bell).
5.2. Anti-seize lubricant. used on threaded components for this kit.

5.3. Standard shop tools.
5.4. Sharpie marker.
5.5. DOT 3 brake fluid. This system is DOT3 or DOT 4 brake fluid compatible. Do not use DOT 5 silicone based, or any high temperature resistant brake fluids designed for more than 550ºF as some brands will cause the seals to swell.
5.6. MDL Bleeder Kit (recommended, supplied with all new MDL Master Cylinder Kit purchases).
5.7. Soapy water in a spray bottle (brake fluid clean-up).
5.8. 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.

6. Provisional Parts

6.1. The lock washers used on the forward side of the mounting bracket will not be required if the bell housing does not have counterbored fastener locations.

7. Options

7.1. You may use the straight reducer fitting OR the elbow with captive O-ring and captive washers on the lower slave cylinder port. The straight reducer fitting does not require an O-ring because it seats on the tapered surface.

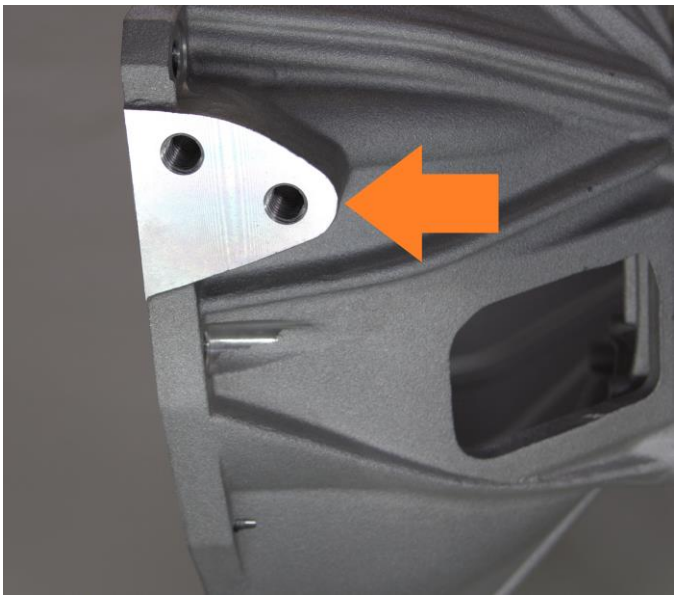
8. Disassembly

8.1. This step applies to a vehicle with an existing mechanical linkage system. Do not remove the clutch fork unless a different fork is needed per the Before You Begin section above. Remove the clutch fork spring, Z-bar spring @ firewall (if equipped), frame fulcrum pivot and hardware, Z-bar, upper and lower Z-bar rods, engine fulcrum pivot, and hardware. Remove the spring attached to the clutch pedal under the dash. Retain the clutch fork spring, this will be re-attached to the clutch fork.

8.2. Remove the two left side existing bell housing bolts. Clean the block threads using a 3/8”-16 tap. Remove any residual oils.

8.3. For aluminum bells with this type of machined surface… remove enough material so the slave cylinder bracket will clear. See picture with orange arrow.

Removal of bolts and thread tap usage shown.

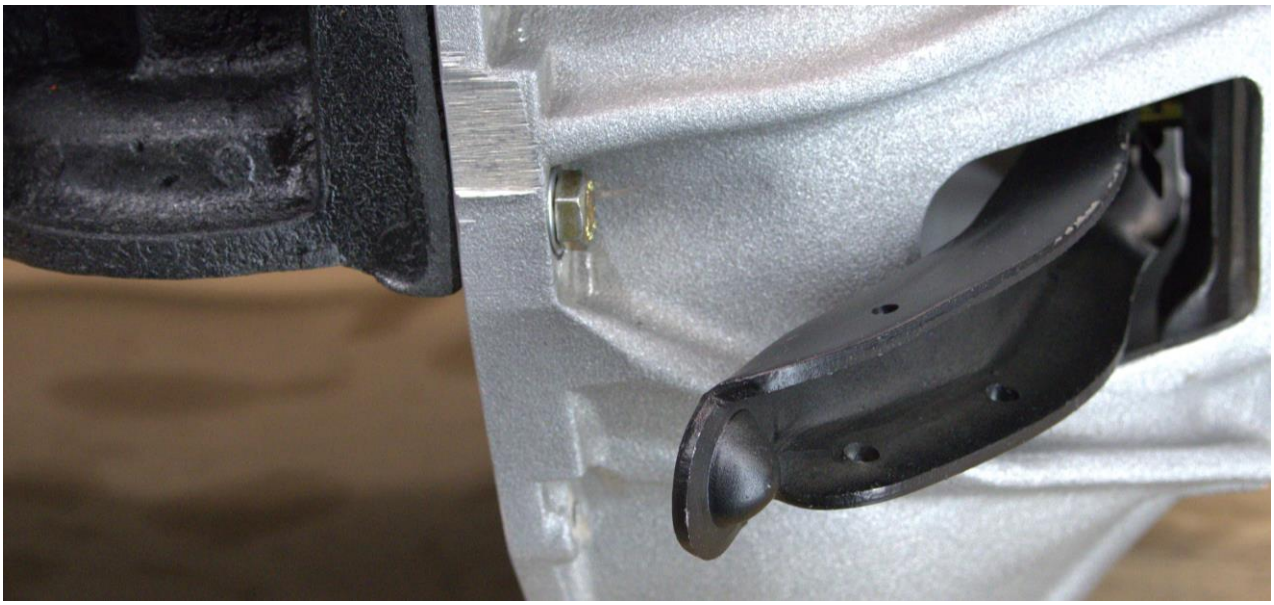


Machined surface to be modified.

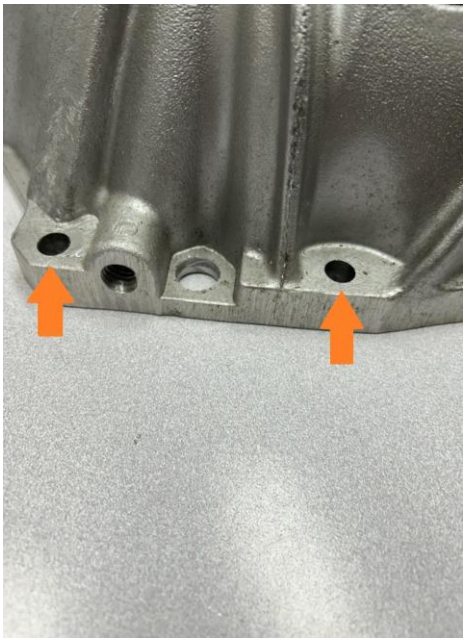
9. Installation

9.1. Clean as you go. Remove excess Anti-seize compound (the glitter bomb of car-guys), use soapy water on spilled brake fluid, general cleanliness for all fitting and line-end ports.

9.2. Inspect the position of the clutch fork with t/o bearing touching the pressure plate fingers per the Clutch Height Matters section above - outside end of the fork will be more forward in the bell housing opening.



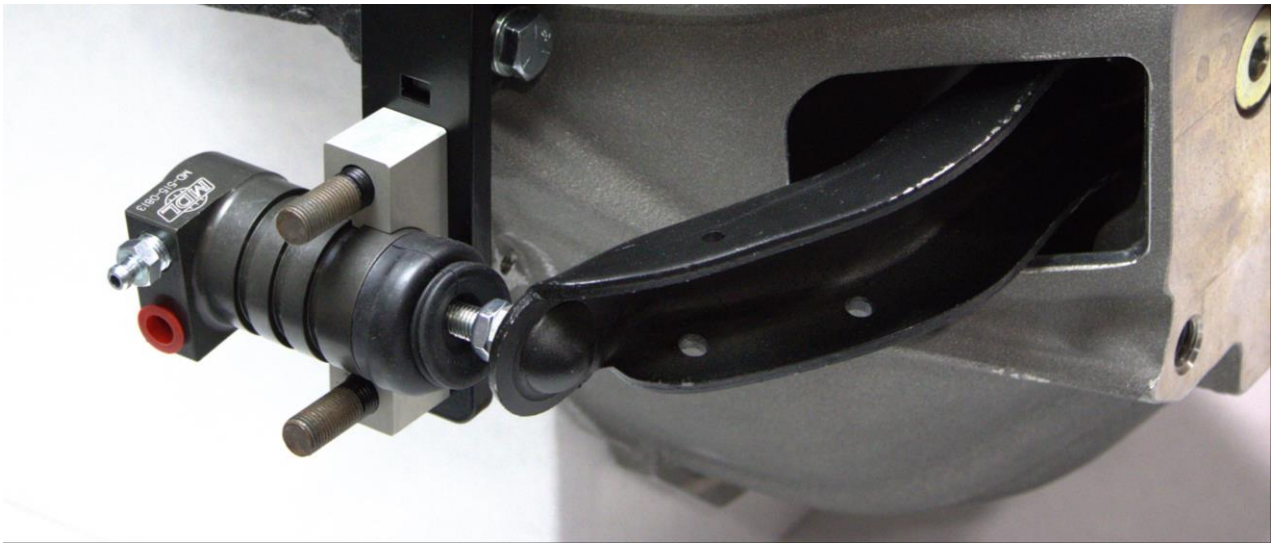
9.3. Apply Anti-seize lubricant to the supplied bolt threads and install the bracket with lock washers, two on each side of the bracket (4 total). Torque 3/8"-16 bolts to 30 ft/lbs. The lock washers being installed on the forward side of the bracket will fit into the counterbore on the bell and serve as spacers to keep the bracket parallel for the installation. For bell housings that DO NOT have a counterbore at the fastener location… do not use the (2) lock washers on the forward side of the mounting bracket.



No counter bore at these fastener locations.

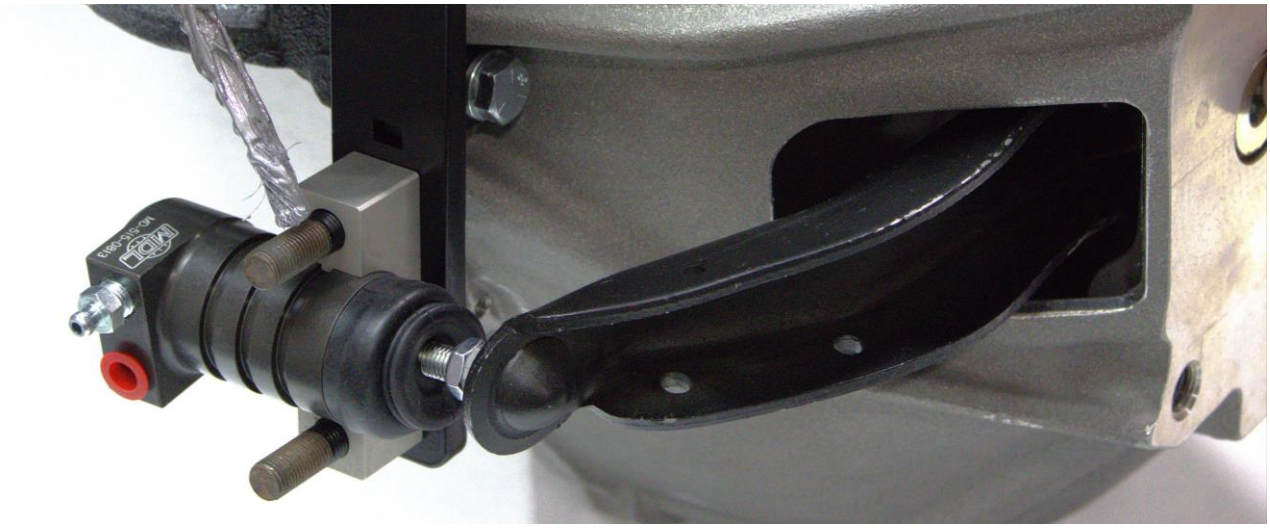
9.4. Remove the acorn nut from the slave cylinder, do not remove jamb nut. Apply Anti-seize lubricant to the threads and re-install the acorn nut on the slave cylinder as far as it will go on, minimum 0.5”.

9.5. Remove the locknuts from the bracket assembly. Install the lower clamp half on the bracket and position the slave cylinder, compressing the slave cylinder completely as you install. Catch the furthest groove forward you can. Ideally the slave cylinder compressed will sit in the center of three grooves of the slave cylinder body. Some un-compression of the slave cylinder may occur. This is acceptable up to 0.200” slave cylinder rod movement. DO NOT PRY PARTS IN TO PLACE. All effort to be done by hand only.

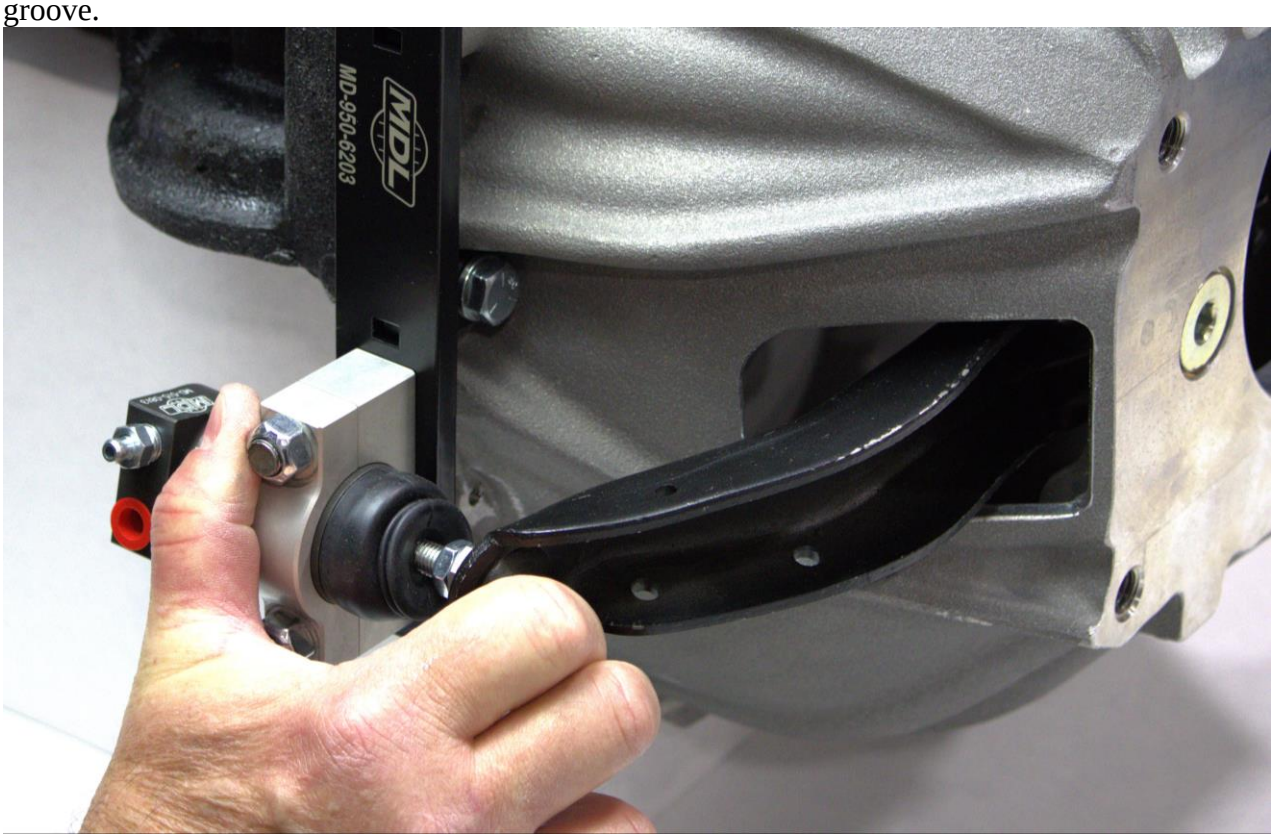


Slave cylinder shown in most rearward groove.

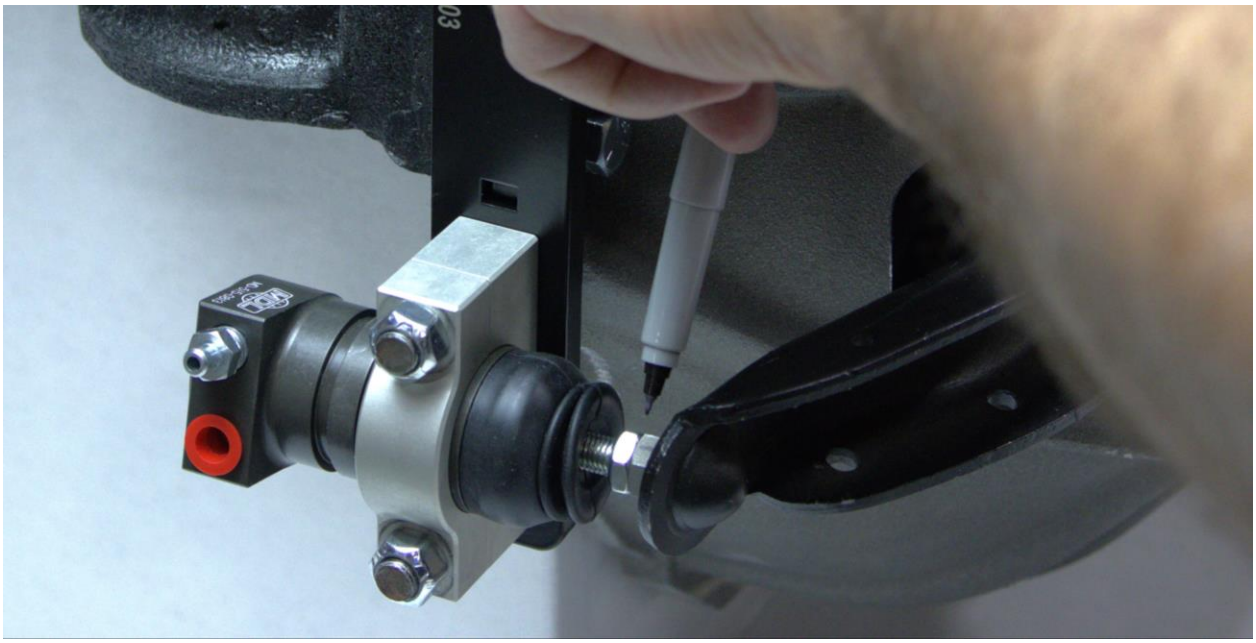
9.6. Apply anti-seize lubricant to the bracket threads, install the upper clamp half and hand thread the locknuts back on to the bracket threads. Do not tighten locknuts.



9.7. Check for fork movement: The slave cylinder applies light internal spring pressure on the clutch fork and throw-out bearing. By hand… try to move the outside end of the fork forward. If you can compress the slave cylinder rod more than 0.400” you must remove the slave cylinder and catch a more forward groove.



9.8. Apply a sharpie mark on the acorn nut. Un-thread the acorn nut up to 5 full turns. Remaining lash/gap is acceptable. This will allow the slave cylinder to travel up to 1.1” and not bottom out. Do not exceed 5 full turns.



9.9. Re-check fork movement. You should be either zero-lash, or with the 5-full turns have up to 0.100" slave rod movement. This is acceptable until a functional system check is accomplished.

Setting up the Acorn Nut and adjusting out the jamb nut.

9.10. Hold acorn nut and torque slave cylinder rod jamb nut to 15 ft/lbs, wrist tight.

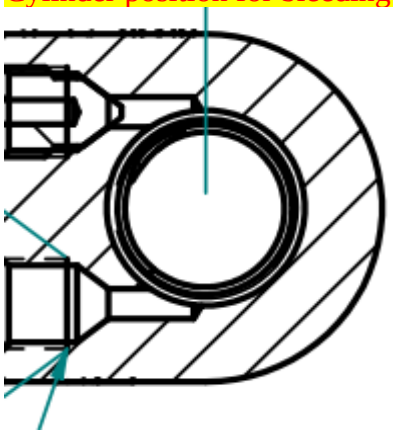
9.11. Tighten / loosen locknuts on bracket to the point of still allowing the cylinder to spin.

9.12. Re-attach your clutch fork spring to the clutch fork (not shown).

9.13. Rotate the cylinder to the desired installed position and check for braided line routing and clearance. Make sure the steel braided line does not interfere with any moving parts and is at least 2" away from the exhaust. Slave cylinder fitting will be installed in the following steps.

9.14. You may use the straight reducer fitting OR the elbow with captive o-ring and captive washers on the lower slave cylinder port. The straight reducer fitting does not require an o-ring because it seats on the tapered surface.

9.15. Cylinder position for bleeding MUST be with ports on the side and bleed port on top.



9.16. The cylinder may be re-positioned after bleeding.

9.17. Select the straight or 90 degree fitting that best supports your installation needs to clear exhaust and appearance. Install elbow or straight fitting in the steps that follow.

9.18. Remove the bleed screw temporarily.

9.19. Straight fitting: Install the straight reducer fitting in the lower port and torque to 15 ft/lbs, wrist tight.

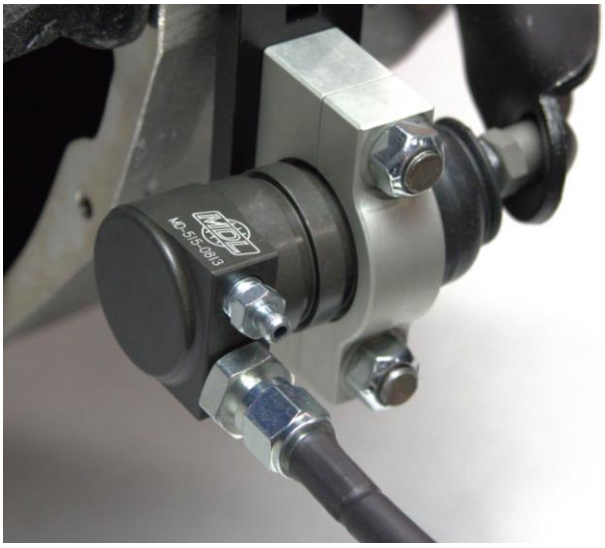
9.20. Elbow fitting: Screw the fitting into the lower port until the O-ring lightly touches the slave cylinder body, then continue to rotate the fitting until the desired position is attained. Support elbow fitting with 7/16" wrench and torque the jamb nut to 15 ft/lbs., wrist tight.

9.21. Re-install bleeder screw in the upper port and tighten to wrist tight.

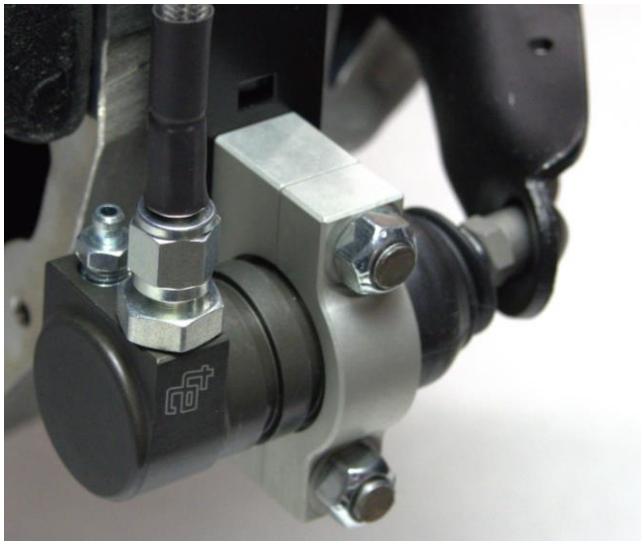
9.22. Tighten all braided line ends to their respective fittings. Support must be provided for all fitting connections, Failure to do so may result in damage to components. Torque to 20-25 ft/lbs.

9.23. If the orientation of your installation has the bleed screw and fitting on the side with bleed screw on top… torque the bracket locknuts to 25 ft/lbs.

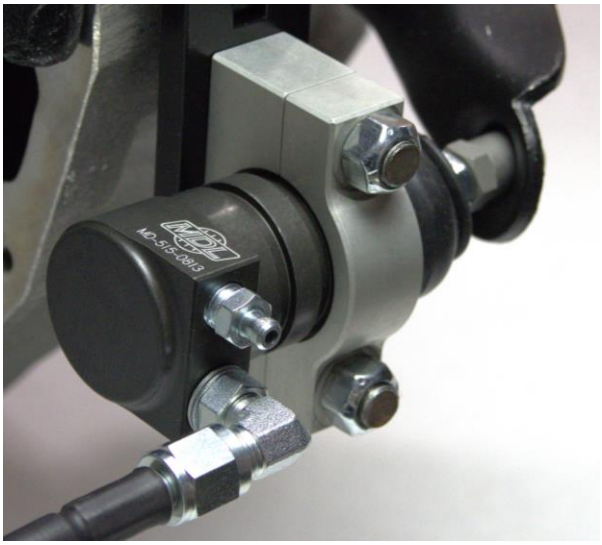
9.24. If the correct orientation for you is with ports on top… bleed the system with ports on the side, re-orient, then torque bracket locknuts to 25 ft/lbs.



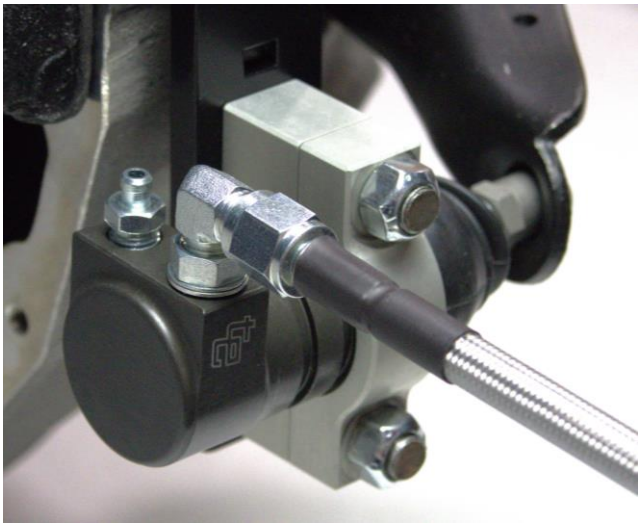
Straight Fitting, Out



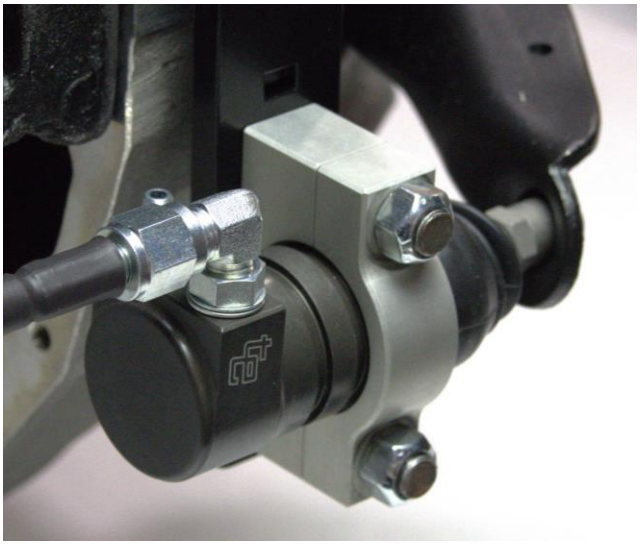
Straight Fitting, Up



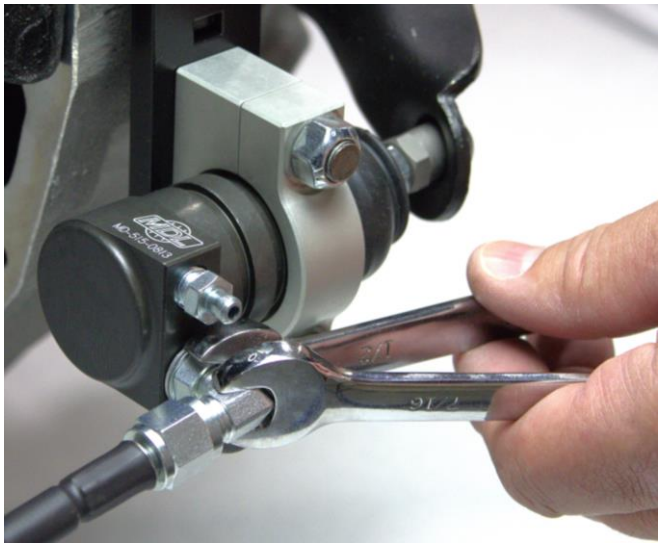
Elbow Fitting, Out / Forward



Elbow Fitting, Up / Out



Elbow Fitting, Up / Forward



Example: Elbow Tightening

10. Reminders

10.1. DO NOT VACUUM OR PUMP BLEED THIS SYSTEM. Modern Driveline offers a hydraulic clutch system "bleeder kit". The bleeder kit comes standard in all Modern Driveline master cylinder kits and is also available separately as a purchase item. The one-person bleeder kit is made ONLY for reservoirs with a round opening measuring between 1.30" & 1.55" in diameter. DOT 3 brake fluid only.

10.2. Important: Once your new hydraulic system is active, **the rod coming out of the slave cylinder will travel up to 1.2"**, depending on *master cylinder* bore and stroke (being used). Less than 0.75" of slave rod travel may result in a clutch that does not release properly. The slave cylinder push rod should move immediately when the pedal is pressed. Lack of immediate movement or a spongy feeling clutch pedal indicates air is still in the system.

10.3. Periodic adjustment is required for this system. In the initial set-up above, When the clutch starts to release higher than it used to, re-check the installation to see that parts have not come loose. This periodic adjustment will extend clutch life and throw-out bearing life by eliminating preload and premature wear. Once again, make sure the throw-out bearing is contacting the pressure plate when making any adjustments so as not to over-travel the slave cylinder.

10.4. Further assistance and tech support is available by calling Modern Driveline at 208-453-9800 M-F 8-5 Mountain time. Email – Tech@ModernDriveline.com . Please contact us first for any issues.

10.5. Enjoy your new hydraulic system and Thank You for choosing Modern Driveline. We appreciate your business.