



Thank you for purchasing a HyTech Hydraulic Clutch System from APEX Drivetrain Solutions. We know how you are about following instructions, but please, make this time an exception and follow the instructions. Proper installation is easy and gives a great result. Improper installation is painful and takes a long time. **NOTES** appear throughout to help you avoid mistakes and common misunderstandings. There three main steps in your hydraulic clutch installation:

1. Mounting the master cylinder
2. Installing the hydraulic slave bearing
3. Filling and bleeding the system

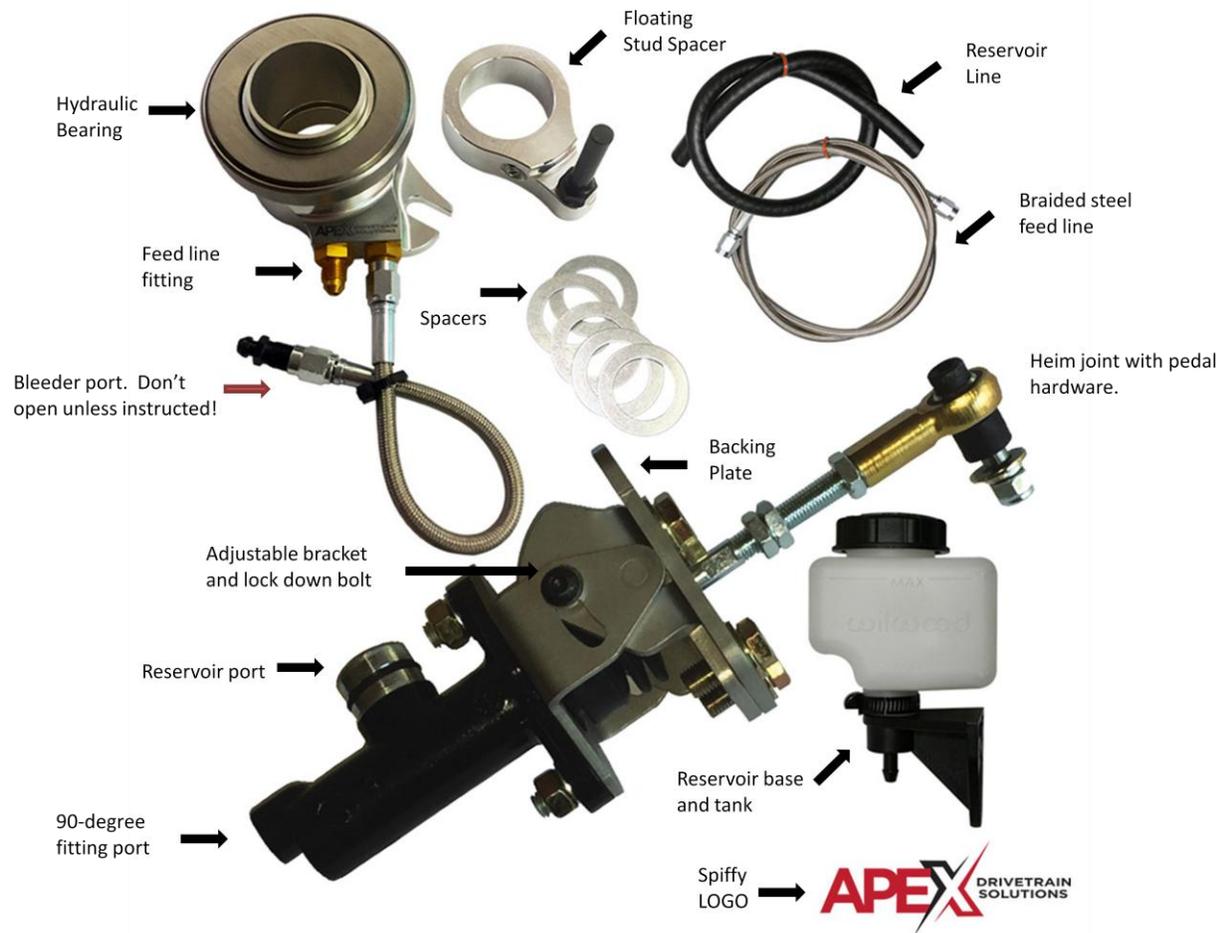
A few **NOTES** before starting:

Your slave and master are volume matched so you will not pop your bearing with this master cylinder. However, double pumping the master during bench bleeding can over stroke the slave so we strongly suggest bleeding after installation. Don't worry, it's easy.

ALWAYS use high temp DOT4 brake fluid. No DOT3, no DOT5, no Silicone, no Cherry Sprite. We recommend Wilwood or Pentosin fluid, which are both easy to find and have stratospheric boiling points.

Your APEX Chrome hydraulic bearing is pre-bled. This makes bleeding the system easy and insures that the part leaves the factory sealed and ready to go. Please don't pop the bearing apart or take the fluid cap off prematurely. We don't want to hear you scream.

The next page is a picture of one of our systems with the parts labeled. There is some mild variation between kits so don't panic if you don't see the exact same stuff. The last page is a trouble shooting guide. Please use them. A little knowledge goes a long way.



Master Cylinder Mounting:

Your master cylinder is mounted on the firewall adjacent to the clutch pedal and generally uses the original hole in the firewall where the clutch rod would have passed through the firewall. Locate this hole in the firewall.

NOTE: If your car does not have this opening use a 1" hole saw to make an opening centered 1/2" to the left of the clutch arm on a flat area of the firewall lower than the clutch rod mounting hole in the clutch pedal arm.

Remove the backing plate from the adjustable firewall bracket, which is already connected to the master cylinder. This will go on the inside of the firewall and will act as a template for drilling your mounting holes. Center the backing plate over the clutch rod hole and mark your through holes. The bracket has six holes, but only two are generally necessary. Choose the ones with the best clearance.

NOTE: The firewall bracket sandwiches the firewall and clamps down on it. You can actually bolt the two center bolts through the clutch rod hole without drilling if the clutch rod opening is large enough.

Mounting the master cylinder is a two person job. Loosen the black bolts on the side of the bracket just enough to move the bracket angle. Install the supplied reservoir nipple (Yes, it says nipple. Stay focused.) on the master cylinder and secure with one of the black hose clamps. Install the 90-degree fitting in the end of the master.

Insert the assembly into the clutch rod opening from the engine side. Have a buddy place the backing plate over the master cylinder pushrod and line it up to the bracket. Bolt through from the inside and tighten.

Place the coupler nut (the long hex shaped thing) on the end of the master rod.

Now bolt the Heim joint to the hole in your pedal. The Heim joint can sit directly on the pedal arm if necessary. The black rubber spacer allows you to move the shoulder bolt left to right to align the Heim joint with the master rod.

There is a long piece of 5/16"-24 allthread in your kit that connects the master cylinder to the Heim joint. This is a cut to fit rod. Pull the pedal all the way up to the stop and measure from the center of the coupler nut to the Heim joint face. Add 1/2" for thread engagement into the Heim joint and cut the rod to fit.

Thread the supplied jam nuts up either end of your cut rod. Thread the rod into the Heim joint and the coupler nut and use the jamb nuts to lock the rod in place.

Now gently push the pedal down through a full stroke and make sure the coupler nut does not hit the firewall bracket. This aligns the master cylinder bracket to the correct operating angle. Leave everything in place and tighten the black allen bolts on the sides of the bracket to fix it in place.

Hydraulic Bearing Installation:

OK, this is where most people get all confused over nothing. Simply put, just like a mechanical bearing, your hydraulic bearing needs to have a gap between it and the clutch when installed. This required gap is between .150" and .200". For reference this is a little more than 1/8" and a little less than 1/4".

NOTE: You will need a caliper to do this right so if you don't have one, please stop before you hurt something and buy one or borrow one.

There are two types of APEX Bearing. One type for GM, the other for Ford and MOPAR.

A GM bearing slides right onto the bearing tube on the front of your transmission. If you have a GM T56 or Magnum install the provided bearing tube using the 6mm bolts before continuing.

A Ford/MOPAR bearing has a floating stud that goes on first. If you have a floating stud, which is teardrop shaped and has a set screw in it, slide it onto the transmission first and secure it against the front of the tranny with the set screw.

Step One: Wet the o-ring inside the hole in the bearing assembly with silicone paste or WD40. Spray it on your finger and wipe it around the o-ring.

Step Two: Slide the bearing onto the bearing guide tube as far as it will go.

Step Three: Measure from the front of the transmission where it touches the back of the bell housing to the face of the bearing. It is easiest to place a flat edge against the bearing and measure from the trans to the flat edge.

Record your measurement here: Dimension A _____

Step Four: Mount the bell housing on the back of your block and measure from the back of the bell housing where it touches the transmission to the fingers on your clutch pressure plate.

Record your measurement here: Dimension B _____

Now carefully slide the slave off without popping it apart.

!!!!!!!!!!!!!!BIG NOTE: Your slave is full of fluid. If you pull it apart your day is going to get much longer so be careful. Use a crow's foot or wide bladed screwdriver to gently pry from the center back of the bearing assembly if needed. If you feel the bearing assembly stretch let go, take a deep breath and try again!!!!!!!!!!!!!!

Step Five: NOW FOR THE MATH (Cue horror movie music)

GM Customers do this: $B - A - .175 = X$

$$X / .092 = \text{Spacer Count}$$

Now remove the bolt from your transmission that corresponds to the fork on the bearing assembly and replace it with the provided guide stud (black thing with a hex head in the middle). For GM T56 and Magnum customers the guide stud is silver and fits in the hole in the provided bearing tube. The line fittings should be oriented toward the fork hole or T56/Magnum line opening.

Stack the resulting number of spacers on the bearing tube. Note that you may not need any spacers at all so don't be surprised if your spacer count is zero. Take your A measurement again and subtract it from B. B - A should now be between .150 and .200.

This bearing spacing is pretty flexible and can be as little as .080" safely, but as the fingers on your clutch rise with wear this gap will close and you will have to reinstall, so try to hit the proper range if possible.

NOTE: GM bell housings are very shallow. On occasion you may get a negative space, which means the bearing is stuffed into the fingers with no spacers. If this condition occurs, place a washer or two over each transmission to bell bolt between the transmission and the bell to gain space. No, this isn't a problem. No, a cat won't get in your bell housing. Yes, it works fine. Have a little trust.

Ford and MOPAR Customers do this: $B - A = X$

$$X / .063 = \text{Spacer Count}$$

The floating stud carries the guide stud (short black thing with the hex head in the middle) on in these systems. If you do not require the floating stud to get your measurements in line then remove the bolt on the front of your transmission that corresponds to the fork in the bearing assembly and replace it with the guide stud (longer black thing with a hex head in the middle).

Take your A measurement again and subtract it from B. $B - A$ should now be between .150 and .200.

Stack the resulting number of spacers against the transmission. The spacers always go on first. Install the floating stud if needed then the bearing assembly.

Step Six: (Everyone) Remove the cap from the line fitting on the bearing assembly and install the long braided steel line.

Quick TIP: We like to fill our braided steel line with fluid before installation for quicker bleeding. If you want to try, put your finger over the bottom end, fill from the top tapping the bottom end to let the air out. When fluid runs onto your hand, place a finger over the top to hold the fluid like you would a drinking straw and thread the line onto the slave. Cap the end with a bolt or rubber plug so the fluid doesn't run out. You don't have to do this, but it helps.

Step Seven: For everyone but T56 and Magnum customers, put the slave in the bell housing with the lines coming out of the fork hole. Stab the transmission into the bell and slide the slave back on as you go.

For T56 and Magnum customers leave the slave on the transmission and feed the lines out of the line hole in the side of the bell housing as you stab the transmission.

Final Steps and Bleeding:

Fasten the feed line to the 90-degree fitting on the master.

Install the reservoir base anywhere above the master, making sure there is clearance for the tank, using two provided self tapping screws.

Fasten the tank to the reservoir base using the second black hose clamp.

Run the cut to fit reservoir hose from the tank to the master and fasten with provided silver hose clamps.

Take the top off the tank and fill the tank 3/4 full with high temp DOT4 fluid. Not DOT3, NOT DOT5. We recommend Wilwood or Pentosin fluid, which are both readily available. If you have a choice at the parts store or website choose the highest boiling point available.

Let the system sit for about ten minutes.

Bleeding:

It's time to bleed the system, which simply requires you to pump the clutch pedal all the way up and down for what will seem like eternity but is usually only about ten minutes.

IMPORTANT!!!! Before you start pumping the pedal make sure that when the pedal is all the way up the master cylinder rod is all the way out as far as it can come. If it is partially depressed even a bit you will never get the system bled. EVER! If required, adjust the coupler nut on the rod before continuing.

Now, start slowing moving the pedal from all the way up to all the way down. SLOWLY! You may have to hook your shoe under the pedal and lift it at the beginning. After a few minutes you should start to feel resistance. Keep pumping, making sure the reservoir does not run dry.

NOTE: Pumping like a madman will not speed up the process and can cause brake fluid to spew out of the reservoir and melt your expensive paint. Go easy, and place a few rags between the reservoir and the paint for safety's sake.

Your master cylinder bracket acts as a pedal stop. This is not to protect your hydraulic bearing, it is to protect your clutch, which can get pushed too far and cause damage. Once the system is functional, use the coupler nut or an extra jamb nut to limit downward travel of the rod to just after full release. We like to jack the car up with the rear wheels off the ground, push the pedal until the wheels stop moving and mark the rod with a paint pen then set the stop.

When you have full release of the clutch your are done. Just top off the reservoir, install the cap, check for any leaks and enjoy. And don't forget to tell your friends and forum buddies about APEX Drivetrain Solutions' killer hydraulic clutch systems.

TROUBLE SHOOTING:

Please read this carefully as we cannot tell you anything more on the phone than you can read here. It's a pretty simple system after all. Think of it as a full water balloon at the top of a hose (master) and an empty one at the bottom (slave). Squeeze the top one and the bottom one fills up. Simple.

PROBLEM	CAUSE	SOLUTION
System Won't Bleed	Master rod not at full stroke	Adjust pedal rod to allow full travel
	System is not sealed	Check all fittings and hoses
	You popped your slave	Bleed like brakes, pumping the pedal several times, hold, and having a buddy crack the bleeder line to get the air out. Sucks but works fine.
Clutch Won't Release	Air in system	Keep bleeding. Sometimes it takes longer than you expect.
	Incorrect gap	Recheck your math and make sure your gap falls into the required range.
	Bad or bound clutch	We have seen it before. Some pressure plates freeze or bind on installation. If your pedal is rock hard and the clutch won't release, it's the clutch.
Master Rod Binding	Misalignment of master	Loosen the black allen head bolts on the sides of the master bracket and repeat alignment procedure. Also, make sure your left to right adjustment on the Heim joint aligns the rod with the master.
High Pedal Effort	Bad pedal ratio	Your foot should move 5-6" to move the master 1". If it moves less, try raising the rod on the pedal to gain the proper leverage.
	Bad or bound clutch	We have seen it before. Some pressure plates freeze or bind on installation. If your pedal is rock hard and the clutch won't release, it's the clutch.
	High effort clutch	Some clutches are just a bear to push. A hydraulic clutch can help but it can't cure a super high effort clutch.
	Over engaged clutch	If you are pushing the bearing past the pressure plate's limits set the pedal stop as described in the last step of the instructions.