



# SILVER SPORT Transmissions



## HYDRAULIC MASTER KIT INSTRUCTIONS FOR 1992-2002 RX7

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## **SYSTEM DESCRIPTION:**

This system uses a firewall-mounted hydraulic master cylinder with remote reservoir and a combination slave cylinder/release bearing assembly. This combination bearing is called a concentric slave cylinder (CSC) and **it is designed to be in constant contact with the pressure plate fingers**. The CSC is compressed by the pressure plate fingers when at rest. When the clutch pedal is depressed, the master cylinder forces fluid into the CSC, causing it to expand and depress the pressure plate fingers, thereby releasing the clutch.

This system works best with **DOT 4** brake fluid, **even though the reservoir lid says DOT 3**. **DO NOT use DOT 5 brake fluid!** The seals in the CSC are not compatible with DOT 5 fluid, and will be ruined on contact with it. We recommend using a high-performance, extra-high-temp name brand **DOT 4** brake fluid from ATE, Wilwood, or others.

## **KIT CONTENTS**

Please confirm that all parts have been received. The parts contained in your Master Cylinder kit vary by car model, and will include:

- Fluid reservoir, hose, and fittings
- Mount block and gasket
- Rod end and pedal attachment hardware
- Master cylinder
- Hardware



## REMOVE STOCK MASTER CYLINDER

1. Disconnect the master cylinder from the clutch pedal by removing the retaining clip from the pin.
2. Loosen the clip from the line which attaches to the master cylinder.
3. Remove the clutch line from the brake master cylinder reservoir.



4. Remove the high pressure hydraulic line from the master cylinder.
5. Remove the 2 nuts from inside the car which hold the master cylinder to the firewall.
6. Remove the stock master cylinder from the car.

## INSTALL MASTER CYLINDER

1. From the engine compartment, insert the master cylinder pushrod through the firewall and center the master cylinder pushrod in the hole, keeping the mount block against the firewall. Confirm that the pushrod points toward and reaches the clutch pedal attachment point (see "PEDAL ATTACHMENT" section).
2. Install the 2 washers, lock washers and nuts on the inside of the firewall on the studs for the bracket and tighten to 15ft.-lbs.
3. The master cylinder must be positioned so that the pushrod moves in and out in a straight line. The master cylinder will not tolerate a side load, and will wear out very quickly if the pushrod is going in at an angle. **Make sure the pushrod is straight in line with the master cylinder!**

4. Assemble barb fitting to master cylinder at port located furthest from firewall. Use caution not to over tighten and break fittings.

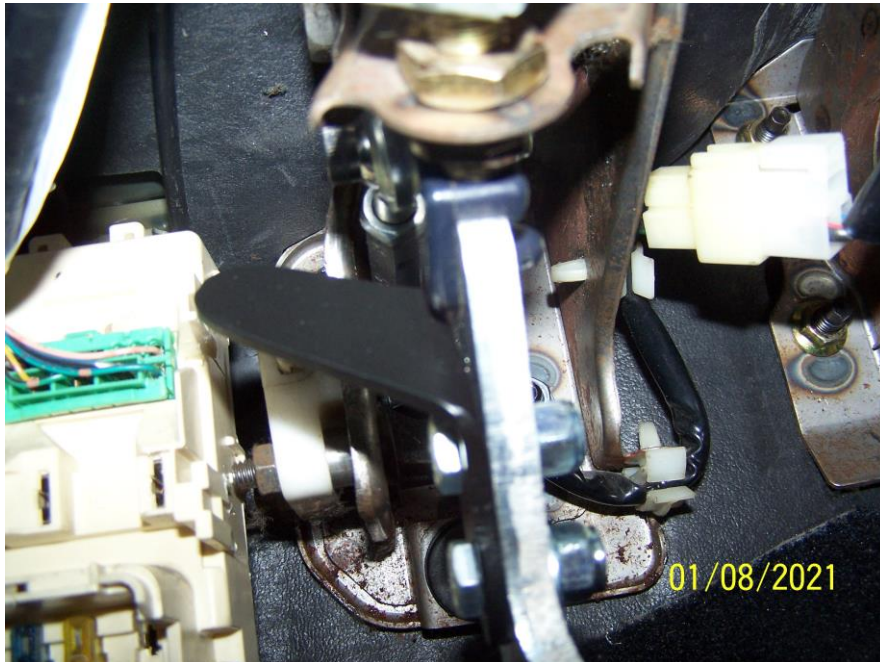


### **PEDAL ATTACHMENT**

1. Cut out template TMI-00102 and line up existing holes to mark the place to drill. Drill (2) 0.27in holes in the clutch pedal in the places marked.

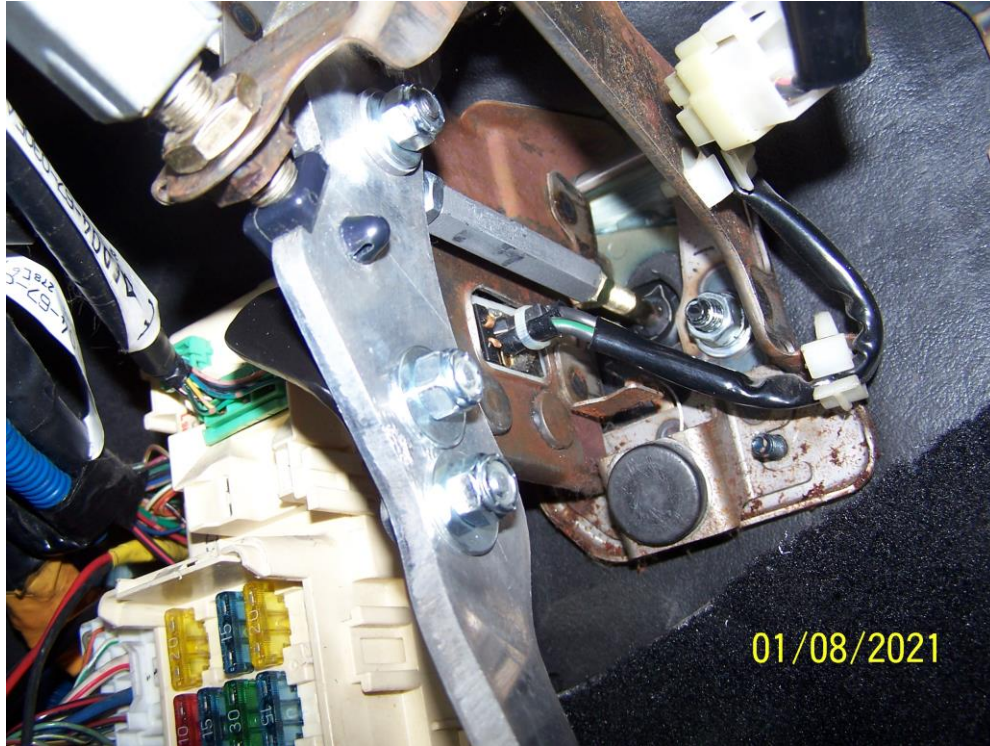


2. Use the (2) ¼"-20 x1" bolts, washers and ¼"-20 nuts provided and secure the start switch bracket onto the clutch pedal.

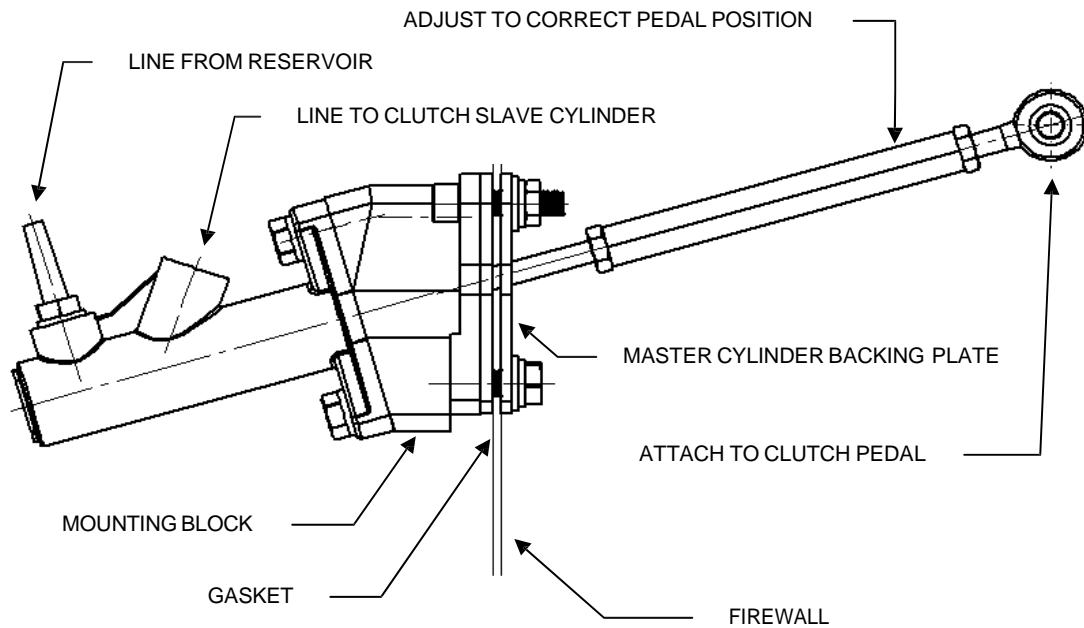


3. Adjust rod position to achieve proper pedal height with master cylinder pushrod **EXTENDED ALL THE WAY OUT**. If the master cylinder is not fully extended when the pedal is at rest, the master cylinder can be difficult to bleed **and can overextend the CSC and cause it to fail**. Make sure the pushrod travels in and out of the master cylinder in a straight line and does not contact the firewall, mount block, or backing plate at any point during its travel. When desired pedal height is achieved, tighten locknuts on pushrod and rod end.
4. Assemble spacer into pedal. Attach bolt through the rod end and spacer to pedal with washer and lock nut. Tighten to 6 ft.-lbs.

5. **DO NOT** depress the pedal any more than necessary before fluid is added to the system.  
**DOT 4 BRAKE FLUID STRONGLY RECOMMENDED.**



**Typical Master Cylinder Assembly:**



## **FLUID RESERVOIR MOUNTING**

1. Remove the studs or nuts on the left hand (driver) side of the brake master cylinder.
2. Place reservoir bracket over the stud in the brake master cylinder, replace the original studs or nuts and tighten completely. Alternatively, the reservoir may be attached directly to firewall.
3. Assemble the reservoir to the bracket using hardware supplied.



## **HYDRAULIC LOW PRESSURE HOSE MOUNTING**

1. Run the rubber supply hose from the bottom of the reservoir nipple to the barb fitting in the clutch master cylinder, and determine the exact length for the supply hose. The hose should be neither tight nor excessively loose, and should clear all moving steering gear and exhaust components. Take care to prevent foreign debris from entering hose.
2. Cut the line to desired length, ensure that no foreign matter is in the hose. Then, loosely assemble hose clamps.
3. Install hose to the master cylinder, then to the reservoir. When installing hose to the reservoir, hold the top of the reservoir to prevent overloading and damaging the mounting ears.

## **HYDRAULIC HIGH PRESSURE HOSE MOUNTING**

1. After bolting the transmission/bellhousing unit to the engine, feed the braided hose up along the drivers side of the car.
2. Attach the remaining end of the braided steel line to the clutch master cylinder and tighten. Use caution not to over tighten and break the fitting.
3. Final tighten all transmission mounting bolts.
4. Inspect the supply line inside bellhousing and confirm the hoses have ample clearance to the rotating clutch plate. It is extremely important that the hydraulic clutch hose **DOES NOT** come into contact with the clutch plate, as serious damage could result.

**NOTE: DOT 4 BRAKE FLUID STRONGLY RECOMMENDED, (even though the lid says DOT 3).  
SHIELD HYDRAULIC LINES FROM HEAT, ESPECIALLY NEAR EXHAUST.**



## **HYDRAULIC FLUID FILL & BLEED – ON CAR**

You will need two people to bleed this clutch system when installed on the vehicle. Use caution to prevent brake fluid from contacting paint, as damage will likely occur. If your vehicle has an over-center spring installed, it will tend to hold the clutch pedal to the floor until the system is bled enough to return the pedal itself. Remove reservoir cap from the reservoir.

1. Fill the reservoir full with **DOT 4 brake fluid**. During the next steps check regularly to **make sure that the reservoir does not run out of fluid**. If this happens you will have to start the process over.
2. Open the bleeder screw to allow air to escape from the system. Give the fluid a few minutes to make its way down to the bleeder screw, while watching the fluid level in the reservoir and refilling as necessary. Allow fluid to drip from the bleeder screw into a suitable container.
3. It may be necessary to prime the master cylinder by removing the high pressure hose at the master cylinder and block the fitting outlet to draw fluid into the cylinder when stroking the pedal. When the cylinder is primed, reattach the pressure line and continue the bleeding procedure. Take care not to spill brake fluid on any painted surfaces.
4. When the drip becomes a steady stream, close the bleeder screw. Refill the fluid reservoir. Open the bleeder screw slightly and have your helper depress the pedal **slowly**. Close the bleeder as soon as the pedal reaches the floor. Then have your helper **slowly** release the pedal. **Pressing or releasing the pedal too quickly will cause brake fluid to squirt from the top of the reservoir**. The pedal may need to be manually pulled up from the floor during these steps. Repeat this process several times, refilling the reservoir every 3 strokes or so.
5. When the bleeder stops spitting air, close and tighten the bleeder screw. Pump the pedal several times to check for proper feel. Repeat the process if the pedal is not firm throughout its travel, or if it seems that the clutch is not releasing fully. **Make sure Master cylinder is fully extended when the clutch pedal returns to its home position (no tension on the pushrod with the clutch pedal all the way up)**.
6. **VACUUM BLEEDING PROCEDURE:** If bleeding proves difficult for one reason or another, a manual vacuum bleeder can be used to draw a vacuum on the reservoir and thereby the entire system and pull trapped air into the reservoir. With the rubber baffle removed from the reservoir and the cap installed, apply vacuum to the vent hole in the center of the cap. You may try stroking the pedal while vacuum is being applied. Repeat until the system is bled. It may take 20-30 minutes or even more in order for the vacuum method to get all the air out of the system.
7. Upon successful bleeding, fluid level will need to be lowered to approximately 1/3 full. Excess fluid may be removed from the reservoir by siphoning with a hand-held vacuum pump or with a spoon or medicine cup. Reinstall rubber baffle and cap.
8. Inspect for leaks, and replace the bellhousing inspection cover.
9. Check fluid level and add if necessary after the first test drive or after vehicle sits overnight.

**NOTE: If you having a difficult time bleeding the clutch please call SST. It may be necessary to bleed the clutch again after minimal use, as operation may dislodge some trapped air.**

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# INSPECTION AND TESTING

**USE EXTREME CAUTION WHEN TESTING CLUTCH RELEASE SYSTEM.  
DO NOT TEST IN HIGH TRAFFIC OR PUBLIC AREAS.**

## ENGINE-OFF TEST

With the parking brake set, test the release and engagement of the clutch mechanism. Check for the following:

1. Clutch pedal completely up at its home position when released, and that the **master cylinder pushrod is fully extended** when the pedal is all the way up.
2. Clutch pedal does not hit brake lamp bracket or other bracket.
3. Low resistance for initial travel when depressing clutch pedal. Clutch resistance increasing at 1/3 of full stroke and remaining approximately constant through full travel to the floor.
4. Clutch pedal travel to floor without over-travel of clutch plate. Over-travel is characterized by a sudden hard pedal. This should not be a problem if the "Hydraulic Bearing Cushion Measurement" was accurately made.
5. Clutch pedal travel to floor without bottoming out hydraulic bearing. Bottoming out is characterized by a sudden high pressure required to exert further pedal stroke. If this condition occurs, damage to the master cylinder seals or slave cylinder may result from continued operation. **NOTE: The hydraulic slave cylinder has approximately 7/8 inch total stroke, minus the cushion that was measured earlier. Most clutches release within 1/2 inch travel.**
6. Smooth system operation with no abnormal noises.

## ENGINE-ON TEST:

Hold brake, place transmission in neutral, start engine. Achieve idle of 1000 rpm or less.

1. Depress clutch pedal.
2. Ease shifter into first gear. **CAUTION:** If grinding occurs, pull back to neutral and stop engine. Repeat bleeding process and verify that the master cylinder pushrod is moving a full 1.4" (1-3/8").
3. Slowly release clutch pedal while maintaining brake pedal pressure. Confirm engine is being loaded as clutch pedal is released.
4. Repeat test step 1-3 through all gears, including reverse. **NOTE for TKO ONLY: Reverse is not synchronized in the TKO 5 speed, and grinding may occur. This can be eliminated through placing shifter in a forward gear immediately before proceeding to reverse.**

## **CARE AND MAINTENANCE**

Your SST hydraulic clutch actuator system is designed to give you years of trouble-free service. In order to maximize the life of the system:

- Periodically check fluid level, hose clamps and hoses for damage.
- Flush the hydraulic fluid every 2 years with new, clean **DOT 4** brake fluid.

## **SYSTEM SPECIFICATIONS**

Master cylinder: Bore = 0.750"  
Stroke = 1.400"

Fluid: DOT 3 brake fluid is acceptable, **DOT 4** is strongly recommended. **DO NOT USE DOT 5 FLUID.**

### **CONTACT INFORMATION**

SILVER SPORT TRANSMISSIONS  
2250 STOCK CREEK BOULEVARD  
ROCKFORD, TENNESSEE 37853-3043

Phone: (865) 609-8187  
Toll Free: (888) 609-0094  
Fax: (865) 609-8287

[WWW.SHIFTSST.COM](http://WWW.SHIFTSST.COM)

*SILVER SPORT TRANSMISSIONS IS DEDICATED TO YOUR SATISFACTION AND ENJOYMENT OF THIS PRODUCT. PLEASE SEND US PICTURES OF YOUR CAR ALONG WITH A TESTIMONIAL OF HOW YOU RATE THIS PRODUCT. WE WILL BE POSTING MANY CUSTOMER FEEDBACK LETTERS AND PICTURES ON OUR WEBSITE AND BROCHURES.*

**ENJOY YOUR SILVER SPORT  
TRANSMISSION SYSTEM!**

## TROUBLESHOOTING GUIDE

### HIGH PEDAL EFFORT

- The most common cause for a high pedal effort is having the pushrod connected too low on the pedal. Moving the pushrod connection point up closer to the pedal pivot point will reduce the pedal effort. Doing this may also require that the master cylinder be repositioned.
- If the pushrod is not straight in line with the master cylinder, that will also cause increased pedal effort and will wear the master cylinder prematurely.
- Make sure there are no kinks in the braided steel line.

### BLACK FLUID

- If the fluid in the system turns black or has debris in it, that typically means that the pushrod is not straight with the master cylinder. If the pushrod is at an angle to the master cylinder, this will cause the master cylinder to wear prematurely. The black specks are actually oxidized aluminum particles.

### CLUTCH WON'T DISENGAGE WHEN HOT, PEDAL GETS SPONGY

- If the fluid gets too hot, it can boil and create bubbles in the system. Route hydraulic lines as far away from the exhaust as possible, and shield them if needed. Make sure you are using **fresh hi-temp DOT4 brake fluid** in the system. Brake fluid that has been sitting on the shelf for a long period of time will absorb moisture from the atmosphere, even if the container is closed. Moisture in the fluid can lower the boiling point significantly.

### CLUTCH SLIPS OR DISENGAGES PREMATURELY

- You may be “upside down” on the hydraulic bearing cushion measurement. If your “X” measurement is smaller than your “Y” measurement, this will give you a negative cushion, and the pressure plate fingers are actually being depressed all the time. Double check your hydraulic bearing cushion measurements and your math.

### CSC FAILURE, CSC LEAKING FLUID, CSC HAS COME APART

- Your hydraulic bearing cushion measurement is likely too big (greater than 3/8”) OR the master cylinder pushrod is adjusted too tight and is not allowing the master cylinder to return to the fully extended position. Recheck your cushion measurements and your math, as well as the pushrod adjustment. The CSC is not able to be rebuilt. It is an OE part that we modify so that it will work with our transmissions.

**If you are still having issues, call Silver Sport Transmissions' Customer Service and Technical Support at (888) 609-0094.**