



## Technical Support Library

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### RSV - R1/R6 Caliper Swap

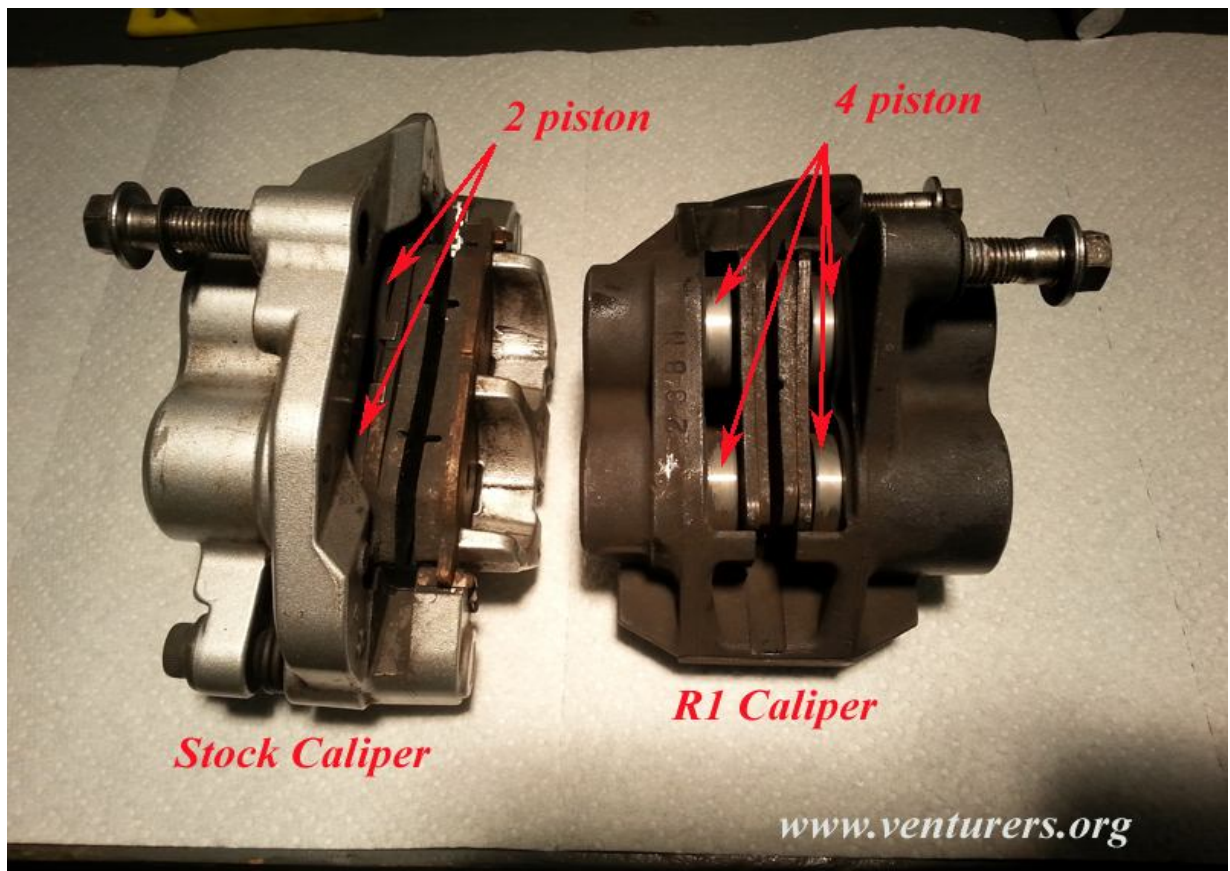
by Gary Mace (Venturous)

For 13 years and 116,000 miles, my Royal Star Venture (2<sup>nd</sup> Gen) stock brakes served me just fine. But we recently started towing a camping trailer and with that extra weight, I decided to explore improving the brakes. What I found is a lot of Royal Star Venture owners have swapped the stock calipers to calipers from a Yamaha R1 or R6.

You can find these calipers by searching R1 or R6 caliper on eBay. Below is what you are looking for. They are a direct bolt-on replacement. You will see some with blue stars and some with gold stars. The blue star have a steel piston which are said to not need rebuilding as often, however they are subject to rust which can cause caliper sticking. The gold star R1 calipers have aluminum pistons which will not rust and are less likely to have sticky calipers. I opted to find the gold star aluminum piston R1 calipers.



The stock calipers are a two piston floating style. The R1 are a fixed four piston design.



There are different styles of R1 calipers. Some that bolt up just like our stock calipers as shown above. Others however bolt on from the side instead of the front and are **NOT** what you want. These also have the gold star and will be listed as R1 calipers. But these **will not** work. See photo below.



Compatible calipers can be found from a 2003 or earlier YZF-R1 or 2004 or earlier YZF-R6



**Master Cylinder Option.** Many RSV owners have simply swapped calipers and report an improvement in braking. Others have also swapped the stock 5/8" (15.875mm) master cylinder for a 14mm master cylinder and report even better feel. Some may wonder how a smaller diameter master cylinder piston would be better than a larger. This was best explained to me by Venturer member "Blackmax88" who wrote:

A "large" diameter master cylinder piston will deliver the hydraulic fluid volume to shift the caliper pistons with less stroke of the master cylinder piston and less brake lever movement on the handle bars but will require more finger pressure on the brake lever and result in less 'feel' for a given pressure on the brake pads.

A "small" diameter master piston will deliver higher brake fluid pressure with less brake lever finger pressure but also less volume, so requiring more master piston and more brake lever movement but you get more 'feel' at the lever ( since the lever has to travel further ).

With this information, I opted to go ahead and swap out the master cylinder with a 14mm master cylinder. These can be found by searching "14mm Road Star master". Just be sure it is a 14mm version. This will be marked on it. A little polishing and these can look better than new.



Compatible master cylinders can be found from 2004 or newer Yamaha 1700 Road Stars. There may be some other models that used this as well.

**Brake Pads.** The pads recommended with these R1 calipers are EBC HH Sintered pads shown below. FA252HH



**Brake Lines.** The one physical difference between the stock and R1 calipers is the location of the brake line connection. If using your stock rubber brake lines, they can be gently twisted to fit the R1 location. But much care must be taken to not kink or over stress the line. If you have previously switched to stainless steel (SS) lines, this may not be possible. If you have SS lines or wish to upgrade to SS lines, you would need to find custom made lines or some that have adjustable ends that can twist to different positions.





You could twist the line either clockwise or counterclockwise. Since I have chrome caliper covers, I twisted mine clockwise so the hose was bent in toward the fender. Be sure to position the line so you can still access your bleeder screw. After you connect the hose to the caliper you will need to twist and move the hose bracket so it aligns with the mounting screw location.



So.... this project is really fairly easy.

1. First acquire the right parts. Ebay or a cycle salvage yard is a good source. You will need a set of R1/R6 calipers. If you desire to do the master cylinder change, you will need a Road Star 14mm master cylinder. New EBC HH pads. Fresh DOT 4 brake fluid. Finally, if not using stock rubber lines, you will need to find SS lines that will work.
2. Next, be sure to protect your bikes paint with old towels or blankets. Brake fluid is **very** bad on paint. If you do get any your bike, wash it well immediately.
3. Drain the brake fluid from your front calipers. This can be done by connecting a hose to your caliper bleeders, opening the bleeders and pumping brake lever. I used a vacuum bleeder which does a better and faster job.
4. Disconnect the brake lines from calipers. If swapping MC, remove the brake line from MC. Be sure not to loose the washers.

5. If swapping MC, remove the screw that holds the brake switch to the bottom of MC. Remove the brake lever and mirror. Then remove the two screws and remove the MC from bike.
6. Remove the stock calipers from bike.
7. Clean the R1 calipers well and install new EBC FA251HH pads into the R1 calipers.
8. Install the R1 calipers to bike. Connect the brake line using care not to over stress the brake line. See photos above.
9. If swapping your MC, install the 14mm MC. Reinstall mirror, lever, and finally reconnect the brake line.
10. Refill the MC with DOT 4 brake fluid. Bleed brake system.
11. Finally, reinstall any bling. Be sure to check for leaks and all hose connections and recheck brake fluid level after a day or so.

