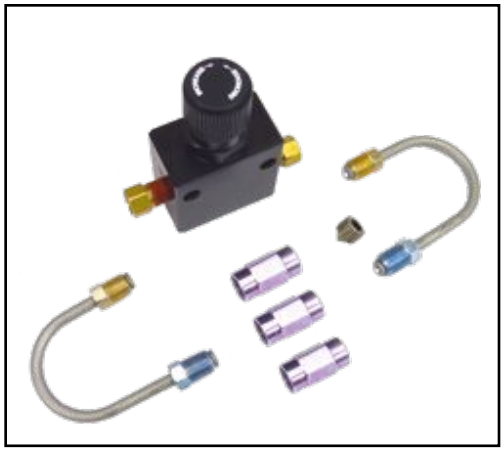
Instructions Created by an:

Automotive Service Excellence
MASTER AUTO TECHNICIAN

86-88.5 Suzuki Samurai Proportioning Valve Kit
(SKU# SB-PPV1)

Installation Instructions



CAUTION: Safety glasses should be worn at all times when working with vehicles and related tools and equipment.

Suggested Tools:

- Tubing Wrench: 10mm
- Socket: 10 mm
- Ratchet
- Combination Wrench: 3/8,7/16 & 1/2
- Brake Fluid, DOT 3
- PB Blaster
- Twin Post Lift (Optional)
- Floor Jack and (4) Jack Stands (Optional)

FOR ADDITIONAL COPIES OF THESE AND OTHER INSTRUCTIONS GO TO:
www.lowrangeoffroad and click on the **"INSTRUCTIONS"** tab.

A word about Brake Fluid

1. Brake fluid will tarnish and in some cases remove paint. If brake fluid should accidentally come in contact with painted surfaces, flush immediately with clean water.

2. Brake fluid can absorb moisture from the air. Moisture can lower the boiling point of the brake fluid and cause critical internal brake components to rust. For these reasons you should keep the container closed when not pouring from it. Further, to insure you are using good, clean, contaminate free brake fluid, always use fluid from a sealed container.

3. Always use the manufacturer recommend brake fluid. Suzuki recommends using DOT 3 Brake Fluid in their Samurai's and Sidekicks.

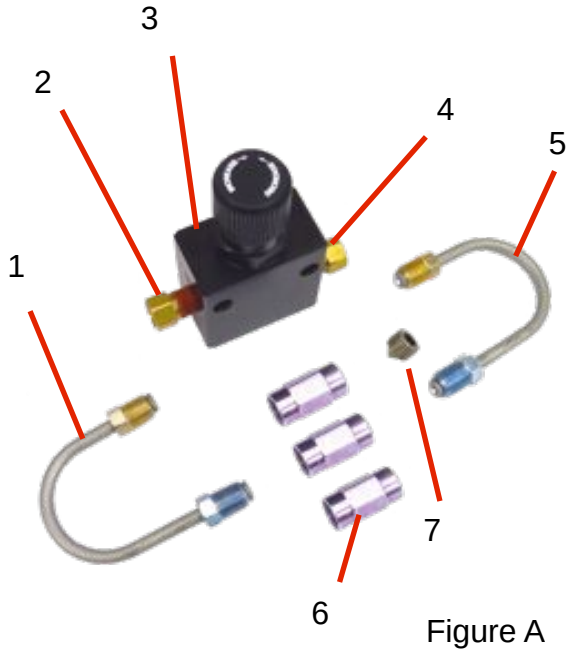
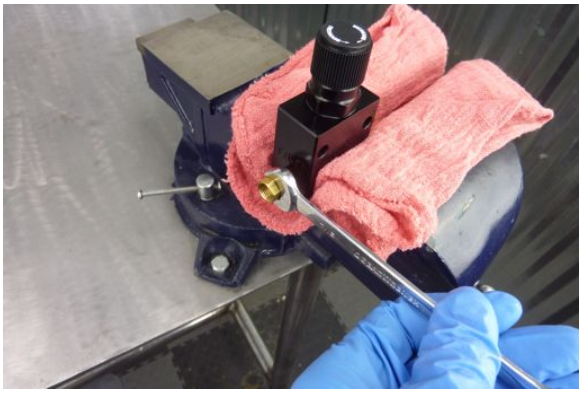


Figure A

Qty	Number	Description
1	1	Inlet Hard Line
1	2	PV Inlet Fitting
1	3	Proportioning Valve
1	4	PV Outlet Fitting
1	5	Outlet Hard Line
3	6	Metric Union
1	7	Metric Plug (not used in this application

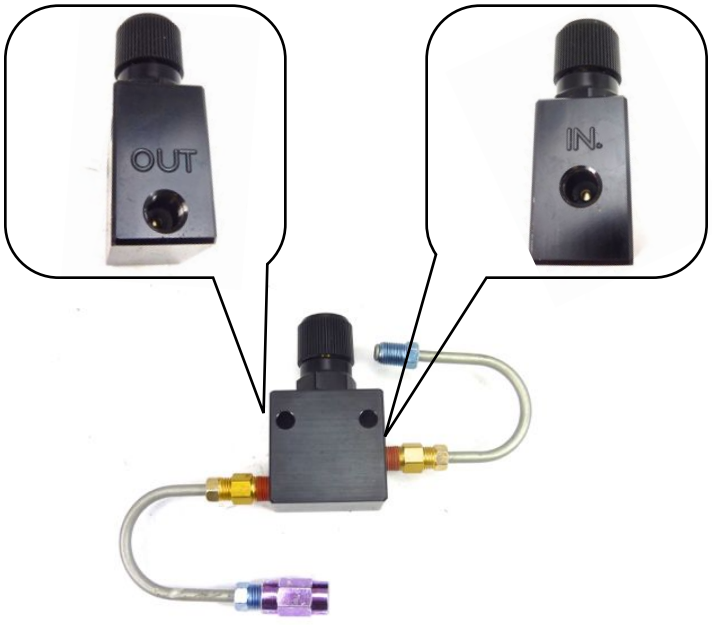


Step 1

Install and tighten the outlet fitting using a 7/16” open end wrench.

Step 2

Install and tighten the inlet fitting in the same way.



Step 3

Set up the rest of the proportioning valve assembly as shown here. Leave all these fittings loose for now and set this assembly aside.

Step 4

Disconnect the front brake line using a 10 mm tubing wrench.

Caution: Brake fluid will leak out. You may want to put a cloth or a pan underneath the brake line fitting to catch the drips.

Note: The corners of these fittings are easily rounded. Always use a tubing (or flare nut) wrench to loosen brake lines the first time.

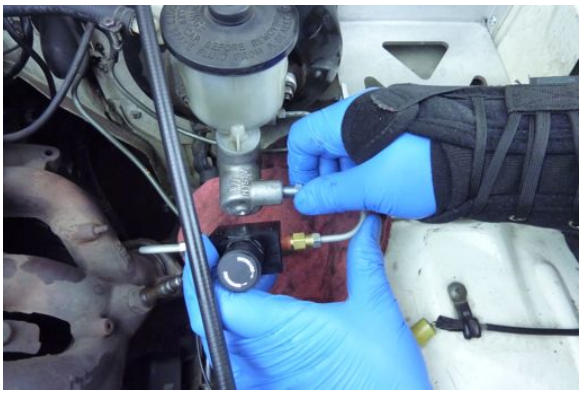
Step 5

Carefully bend the brake line slightly downward.

Caution: Do not kink the brake line.

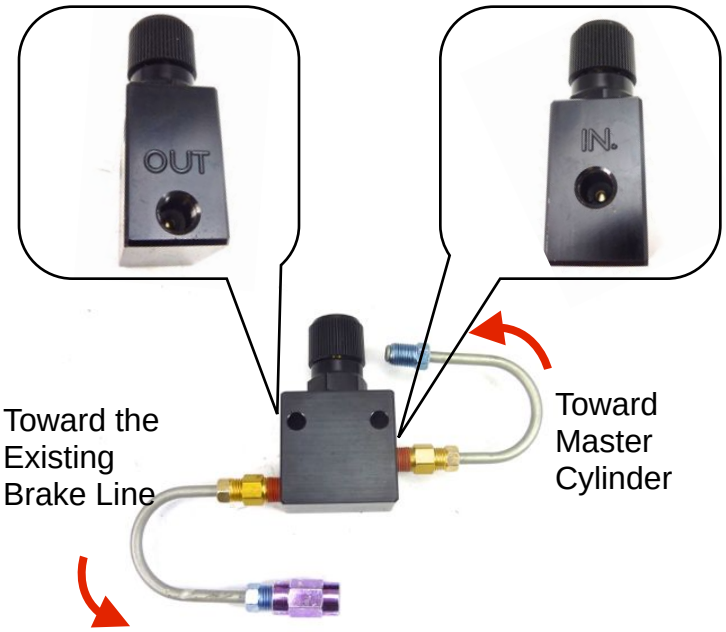
Step 6

Position the proportioning valve assembly as shown and connect the brake line you disconnected earlier to the metric union.



Step 7

Connect the inlet hardline to the master cylinder. Leave all fittings hand tight for now.



Tech Tip 7

Be sure the inlet of the proportioning valve is oriented toward the master cylinder and the outlet is oriented toward the brake line going toward the wheels.

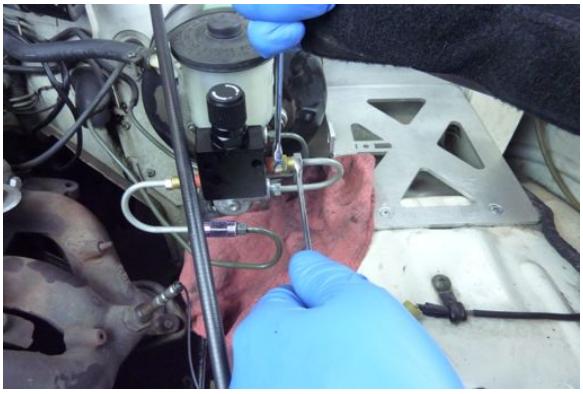
Step 8

Position the proportioning valve as shown here.

Tightening all the fittings.

Step 9

Tighten the fitting at the master cylinder using a 10 mm metric tubing wrench.

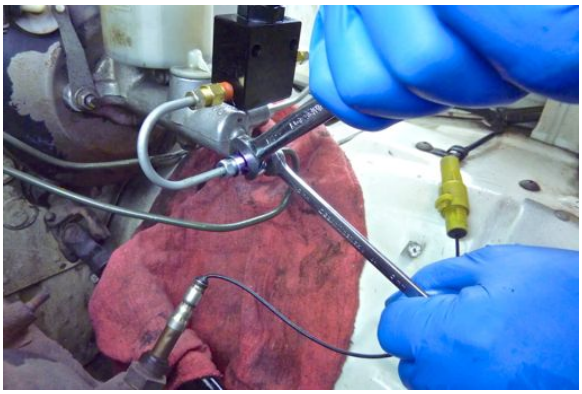


Step 10

Hold the proportioning valve inlet fitting with a 7/16” wrench and tighten the inlet hard line fitting using a 3/8 open end wrench.

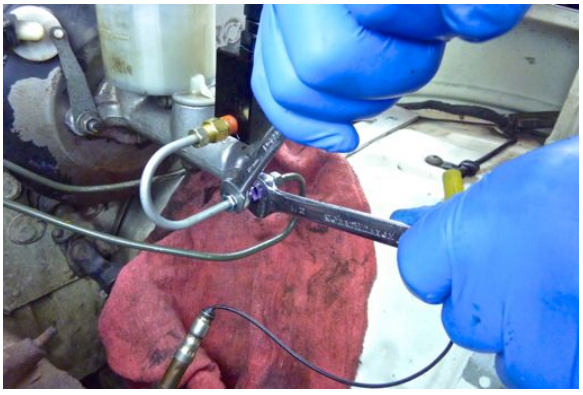
Step 11

Repeat Step 10 on the proportioning valve outlet fitting.



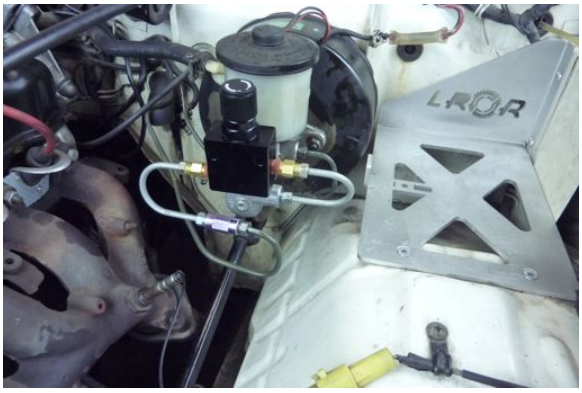
Step 12

Hold the metric union with a 1/2” open end wrench and tighten the fitting with a 10 mm open end wrench.



Step 13

Repeat the previous step on the other fitting connected to the metric coupler.



Tech Tip 13

This is what the proportioning valve assembly should look like when finished.

Brake System Parts Identification

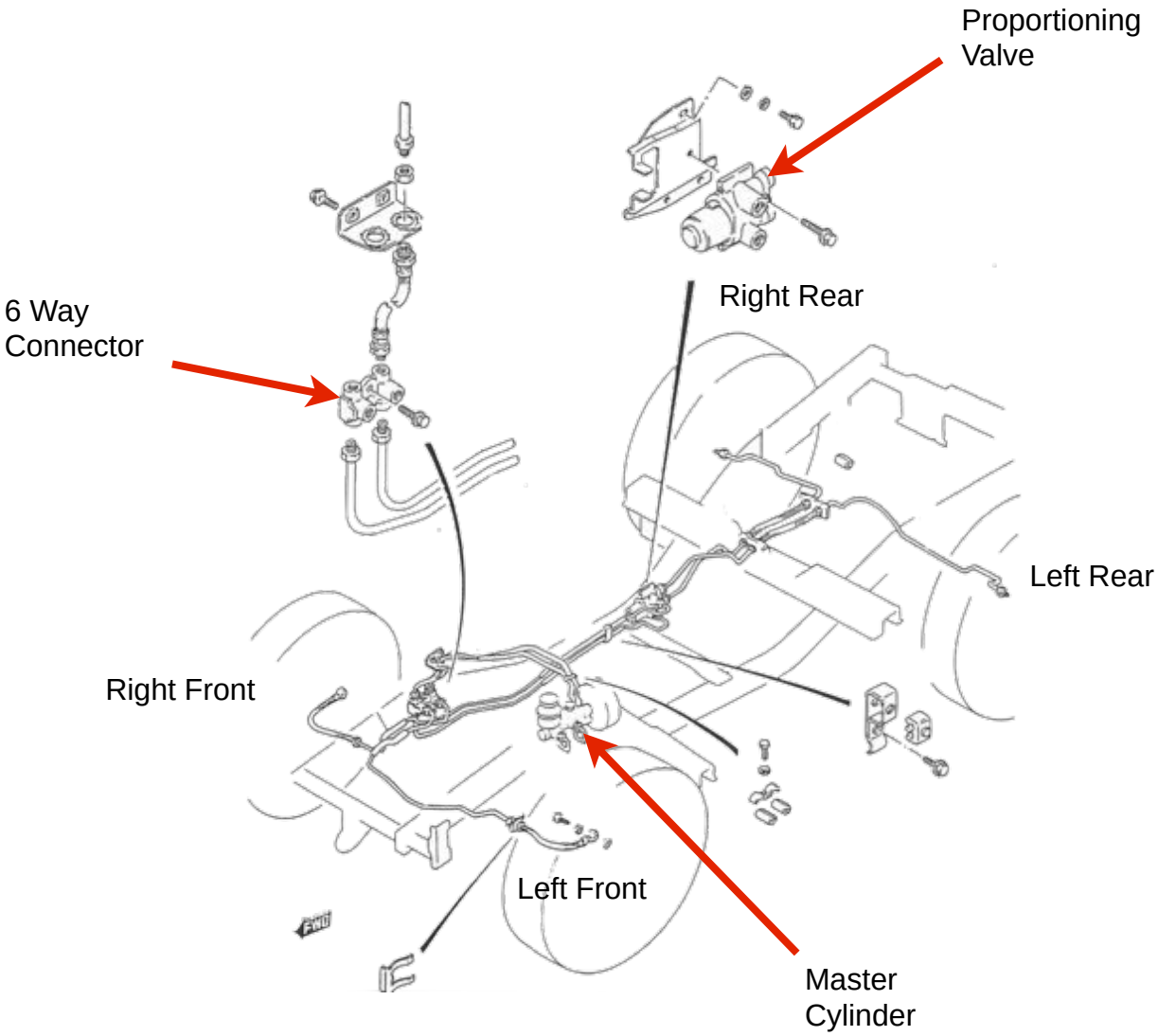


Figure B

Swapping Two Brake Lines at the 6 Way Connector.

This procedure converts the braking system from a “diagonal spit” braking system to a “front-rear split” system. Diagonal split means that one piston in the master cylinder controls the Right Front and the Left Rear Wheels and the other piston controls the Left Front and the Right Rear Wheels (See Figure C). After completing the procedures outlined below the system will be a front-to-rear split braking system (See Figure D). Meaning one piston in the master cylinder will control both front wheels and other piston will control both rear wheels. Converting to a front-to-rear split system will allow for an adjustable proportioning valve to be installed controlling the amount of braking done by the rear wheels.

Diagonal Split System

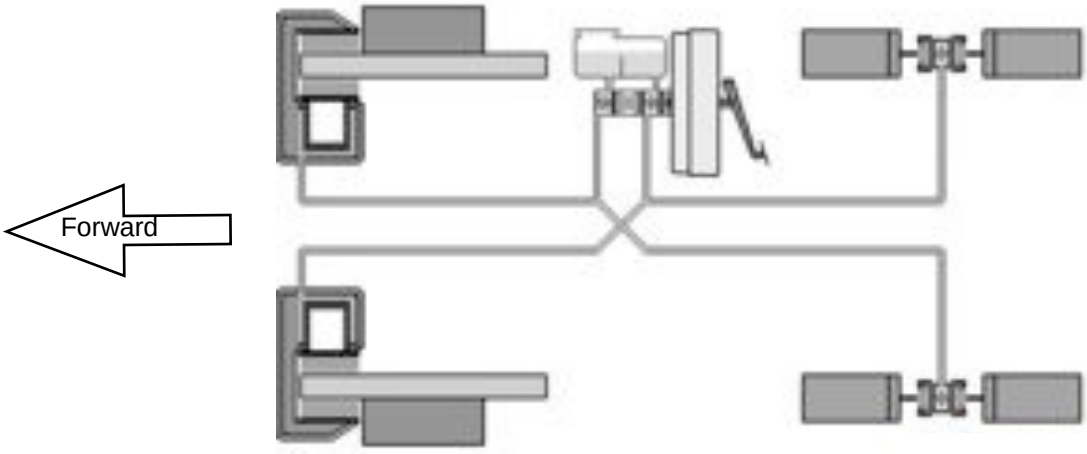


Figure C

Front-to-Rear Split System

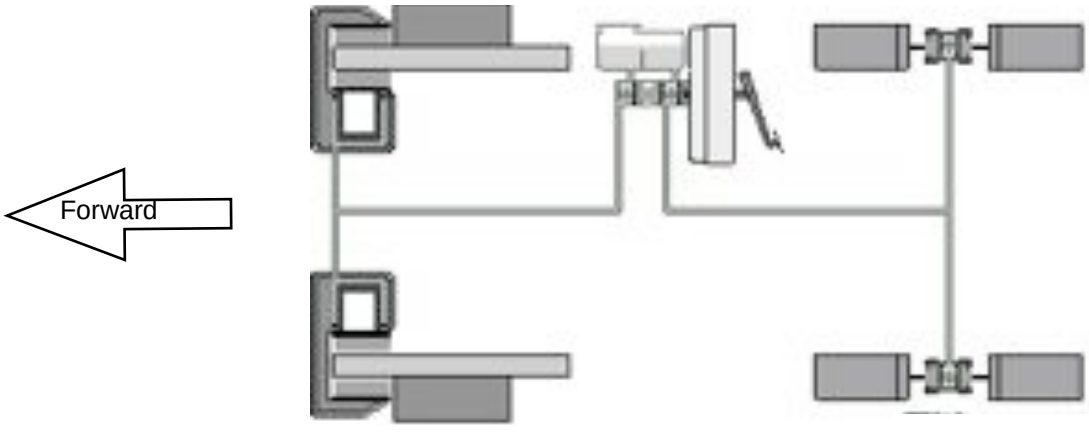


Figure D

Lifting and Supporting the Vehicle

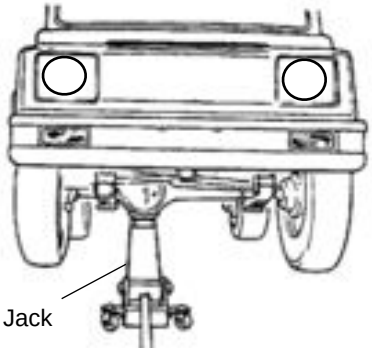
Tech Tip

When working on suspension, brakes or drive train parts it is a good idea to spray all fasteners with penetrating oil a day ahead. If not done a day ahead, an hour or even minutes before is helpful.

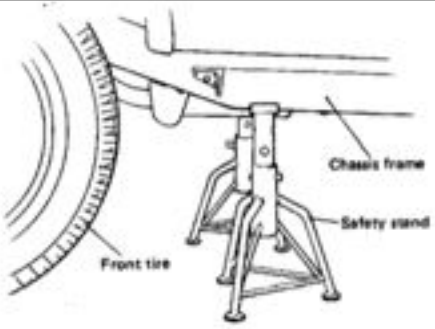
Step 14 Optional

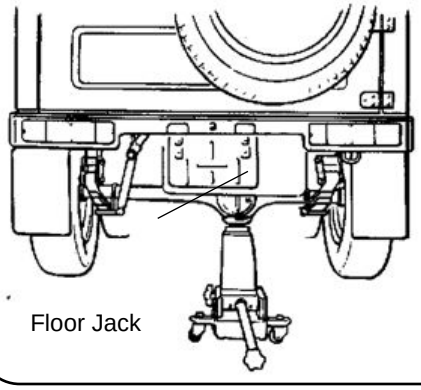
Lift and support the vehicle on a twin post lift.

Note: We used a twin post lift, but this job could also be done with a floor jack and (4) safety stands. It is also possible to do this job with the wheels on the ground if you desire.

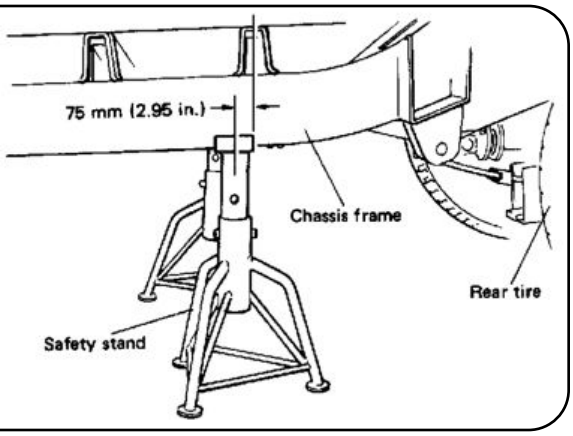


Front





Rear

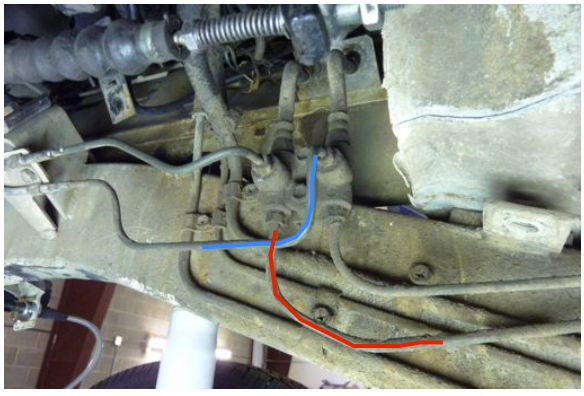


Step 15

Remove the brake line shield by removing the (2) bolts using a 10 mm socket.

Step 16

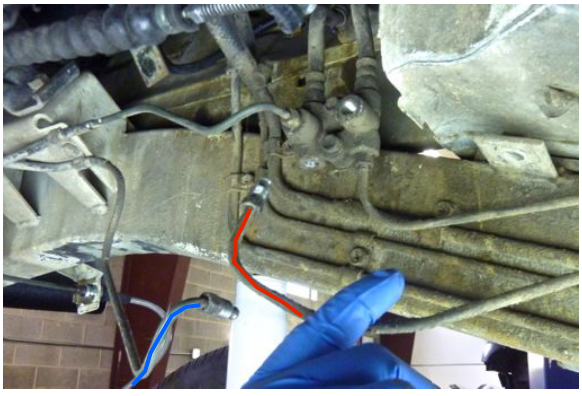
Set the shield aside.



Tech Tip 16

Our objective is to swap these two brake lines.

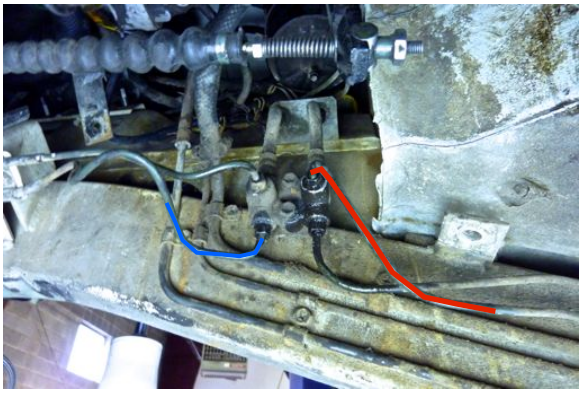
Note: This will allow the front brake line of the master cylinder to control both rear brakes and the rear brake line of the master cylinder to control both front brakes.



Step 17

Disconnect these two lines from the 6 way connector using a 10mm tubing wrench.

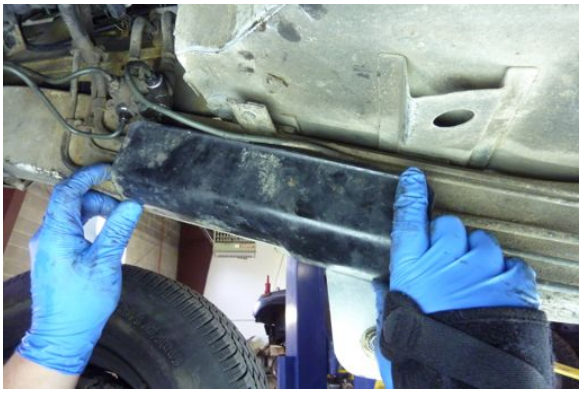
Note: Fluid will run out, so place a pan under the fittings before you disconnect them.



Step 18

Carefully bend each brake line and reconnect them as shown here.

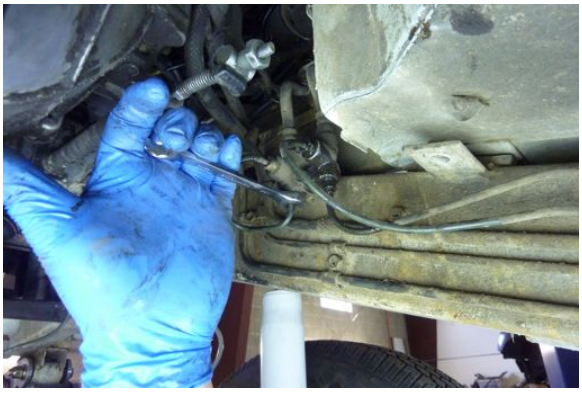
Caution: Be careful. If you try to make a bend that is too sharp the tubing will kink restricting flow of the fluid. Further, once the brake line becomes kinked any attempt to straighten it usually results in breaking the brake line.



Step 20

Replace the brake line shield.

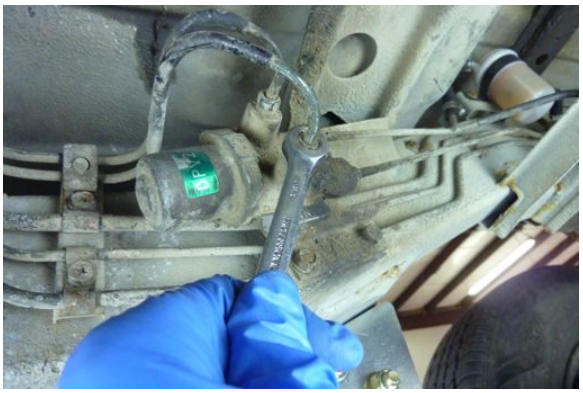
Caution: Be sure the shield does not rub or contact the brake lines. Anything that is in constant contact with the brake lines can rub through, over time causing a leak.



Step 19

Double check all the brake lines at the 6 way connection. Be sure all the fittings are tight and the brake lines are routed in a safe damage fee location.

Bypassing the OEM Proportioning Valve



Step 21

Loosen all four of the brake lines at the proportioning valve using a 10mm tubing wrench. (See Figure B for proportioning valve location)

Caution: These fittings can become rusted or corroded. You may want to spray them with a good penetrating

Step 22

Disconnect all four brake lines from the proportioning valve.

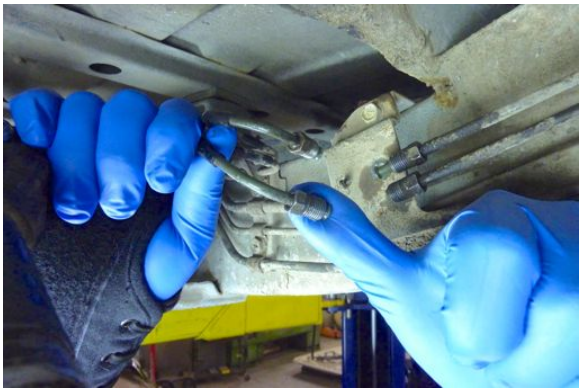
Step 23

Dismount the proportioning valve using a 10mm socket.

Step 24

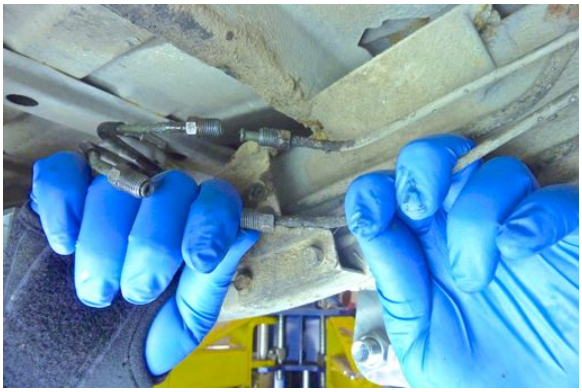
Remove the proportioning valve and set it aside.

Note: This part will not be needed for this install.



Step 25

Carefully bend the (2) inlet brake lines from a 90° angel to about a 45° angle as shown.



Step 26

Carefully bend the (2) outlet brake lines from a 0° (or straight) angle to about a 45° angle as shown.

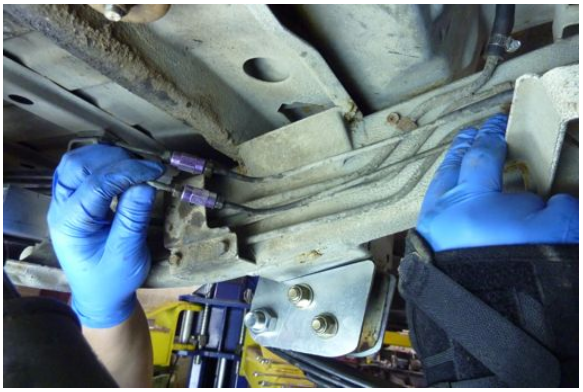
Step 27

Install the (2) supplied metric couplers as shown.

Caution: Do not cross-thread these fittings. You may need to bend the brake lines a little more or less to get the fittings to start threading properly.

Step 28

Hold the metric coupler using a 1/2” wrench and tighten the fittings using a 10 mm tubing wrench.



Step 29

Position the brake lines so that they do not rub, get dented or damaged in any way.

Tech Tip 29

This is what they should look like when completed.

Final Checks

Step 30

Double check to see that all the fittings are tight.

Step 31

Double check all the brake line connections at the master cylinder. Be sure all the fittings are tight and the brake lines are routed in a safe damage fee environment.

Step 32

Bleed the brake system according Suzuki Service Instructions.

Note: For detailed instructions on bleeding Samurai brakes, go to www.lowrangeoffroad.com. Click on Instructions/Samurai Instructions/ Samurai Brake System Bleed. Or click HERE if you are viewing these instructions via computer, tablet or smart phone.

Important Note: Come back to these instructions after successfully bleeding the system. You will need to adjust the proportioning valve. See the instructions on the next page.

Step 33

1. Rotate proportioning valve dial counterclock-wise completely. This will fully decrease rear brake pressure.

2. Check tires for proper tire pressure. Tires with improper tire pressure will greatly effect this calibration procedure.

3. Locate an open dry hard surfaced parking lot (with no other vehicles around) to perform this calibration procedure. Calibration procedure requires at least 2 people to perform (1 Driver, 1 Observer).

4. Drive vehicle slowly and apply brakes to ensure calipers are functioning. If vehicle pulls hard in one direction when brakes are applied, calipers need inspection. **Do not perform this calibration procedure if calipers are not functioning properly**. Consult Suzuki service manual for inspection procedure.

5. In an open lot, drive vehicle 20 mph and apply brakes in an attempt to lock tires. The Observer needs to watch behavior of tires outside the vehicle. When braking, the Observer will see one of three possible situations:

   A) Front and rear tires lock simultaneously and equally.

   B) Front tires lock completely with rear tires slightly chirping (on the verge of locking).

   C) Front tires not locking at all and rear locking completely.

6. Proper brake bias will result when situation B in step 5 is reached. If situation A occurs, rotate proportioning valve dial clockwise 1/4 turn and repeat step 5. If situation C occurs, rotate proportioning valve counterclockwise 1/4 turn and repeat step 5. Although unlikely, if adjustment is necessary and no adjustment is left in proportioning valve dial, contact Low Range Off-Road for assistance.

Congratulations!

You have finished the proportioning valve installation. We hope these instructions have been helpful. If you have suggestions how we could make our instructions (or products better please email us at sales@lowrangeoffroad.com.

As always, If you experience any difficulty during the installation of this product please contact Low Range Off-Road Technical Support at 801-805-6644 M-F 7:30am-5:30pm MST. Thank you for purchasing from Low Range Off-Road.

WARNING

These instructions are designed as a general installation guide. Installation of many Low Range Off-Road products require specialized skills such as metal fabrication, welding and mechanical trouble shooting. If you have any questions or are unsure about how to proceed, please contact our shop at 801-805-6644 or seek help from a competent fabricator. Using fabrication tools such as welders, torches and grinders can cause serious bodily harm and death. Please operate equipment carefully and observe proper safety procedures.

Rock crawling and off-road driving are inherently dangerous activities. Some modifications will adversely affect the on-road handling characteristics of your vehicle. All products sold by Low Range Off-Road are sold for off road use only. Any other use or application is the responsibility of the purchaser and/or user. Some modifications and installation of certain aftermarket parts may under certain circumstances void your original dealer warranty. Modification of your vehicle may create dangerous conditions, which could cause roll-overs resulting in serious bodily injury or death. Buyers and users of these products hereby expressly assume all risks associated with any such modifications and use.