

Document Number: 040-00062 <input type="button" value="Form Instructions"/>	Rev	Description	Date	ECO#	
	1	SERVICE MANUAL	2/13/2008	00239	
Title	SERVICE MANUAL, REAR BRAKE CALIPER REPLACEMENT				
Operation Description	Sub Assembly				
Standards	Man Occup.	Machine Occup.	Cycle Time	Setup Time	Batch Qty
Equipment List	Equipment	Manufacturer		Qty	
	1- Rear brake caliper (left and/or right)	T3 Motion		1 or 2	
	2- Phillips screw driver	Any		1	
	3- ½ inch socket w/ratchet & extension	Any		1	
	4- ½ inch Open end / box wrench	Any		1	
	5- Torque wrench with 7/16 inch Allen	Any		1	
	6- Moving dolly or other support	Any		1	
Reference Docs	Document #	Description	Document #	Description	
Related Files					
RESP ENGR	Mark Jones				
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SERVICE MANUAL

Item#	Part #	Description	Qty
1	100-50013	Rear Brake Caliper	1



Serious electrical shock can occur if precautions are not followed.



- **ALWAYS TURN OFF POWER BREAKER IN GLOVE BOX AND REMOVE POWER MODULES BEFORE PERFORMING ANY ELECTRICAL WORK.**



Power breaker in glove box



Power modules

- **ALSO SET THE PARKING BRAKE PRIOR TO ANY WORK.**



Parking brake

The work to be done for the Brake Caliper replacement requires the parking brake to be set and NOT set through the various steps. Pay attention to the specific steps to set and release the parking brake accordingly.

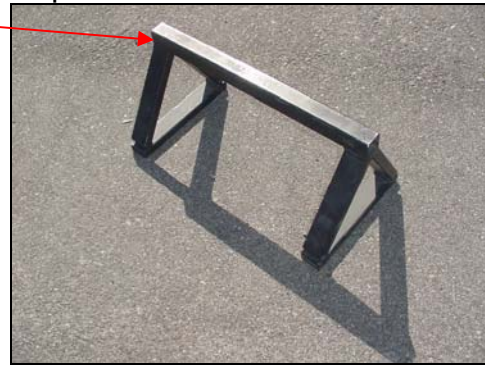
WORK INSTRUCTIONS:

- 1.0 Recommended tools for replacing the brake caliper assembly.
See equipment table above for the details.

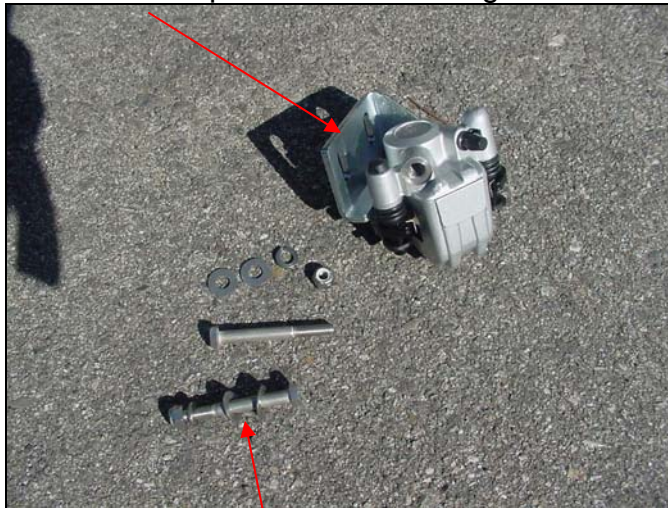


1/2 inch socket w/ ratchet & extension
1/2 inch box/open end wrench
12mm line wrench
Torque wrench with 7/16 inch Allen driver

- 1.1 A moving dolly or stand, similar to this is required to elevate the vehicle.



- 1.2 A new rear brake caliper and its mounting hardware.



Note the order of the washers on the bolt.
From left to right on the bottom assembly:
Nylock nut, lock washer, flat washer, another flat washer.

- 2.0 Use the wrench to break the four lug bolts loose. Do Not Remove them yet, just loosen them.



- 2.1 Set the T3 unit on the dolly, or other support so the rear wheels are off the ground. It may be helpful to remove the batteries to lighten the vehicle.



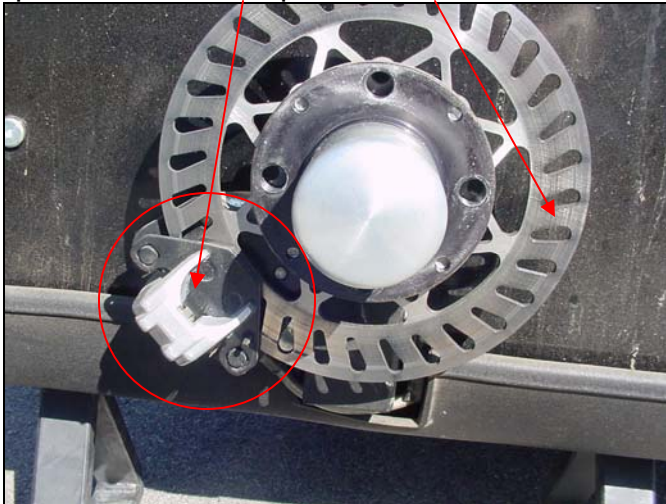
- 2.2 Remove the loosened lugs by hand.



2.3 Slide the wheel off the unit.



3.0 Close up of rear brake caliper and rotor assemblies.

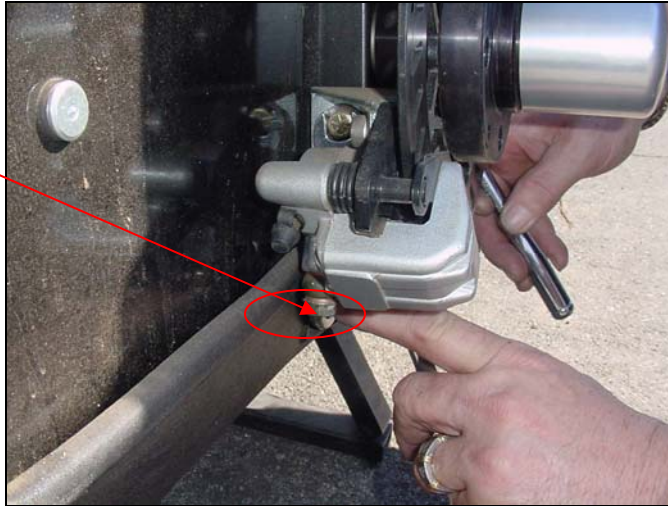


3.1 Release the parking brake.



- 3.2 See note below, and then remove the nuts/bolts that mount the caliper bracket to the frame. Start with the top bolt assembly. Use the ½ inch open end wrench and ½ inch socket wrench. Then remove the bottom bolt assembly.

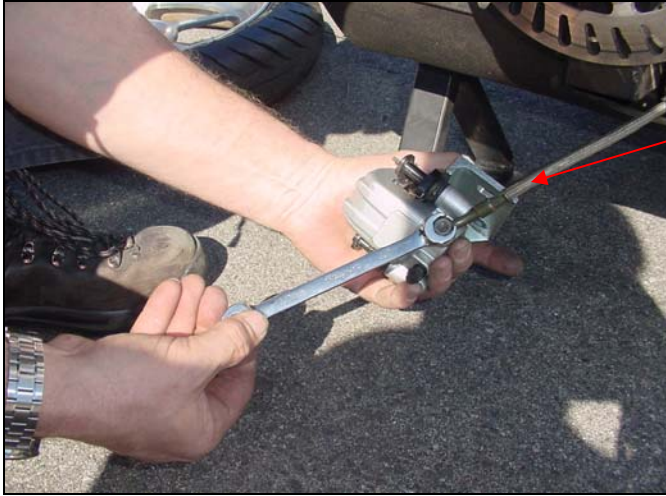
Note:
Using the 12mm line wrench, loosen the brake line fitting, then immediately snug it back down just enough that it doesn't leak. This will make it easier to remove later.



- 3.3 Remove the caliper. It may be tight, but it will slide off the rotor.



3.4 Remove the brake line fitting you loosened in step 3.2 with the same 12mm line wrench. Now reverse the procedure and install the new caliper to the brake line.

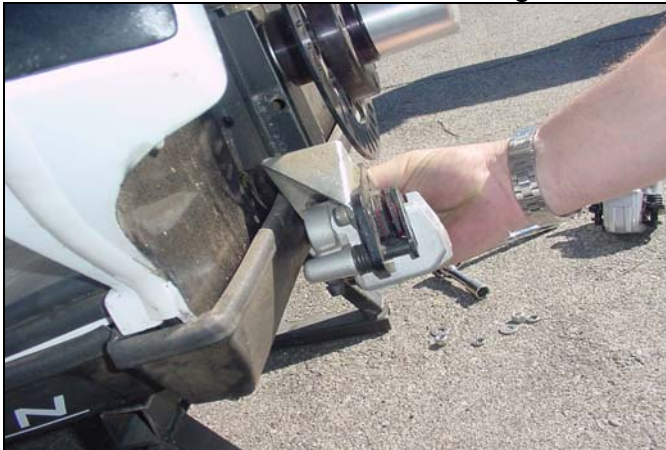


Note the orientation of the brake line and fitting to the caliper. Make to install the new set the same way. (This is a right side, the left side will be a mirror image of the right.)

4.0 Slide a new bolt and a flat washer through the mounting bracket. Refer to step 1.2 for a picture of the hardware and the order it is used to mount the bracket to the frame. Start with the bottom hole.



4.1 Insert the bolt into the lower frame mounting hole as shown.



- 4.2 With a finger, guide and align the bolt with the forward mounting hole in the frame.



- 4.3 Once through, install another flat washer, a lock washer and a nylock nut. Then install the upper bolt, washers and nut. Do not tighten them down just yet.



- 4.4 Set the parking brake again. Check alignment of the caliper to the rotor, if it is not straight, release parking brake and align, the reset parking brake. You may need a helper for this.



- 4.5 Making sure the caliper is aligned and true to the rotor, torque the mounting bolts to 25 foot pounds.

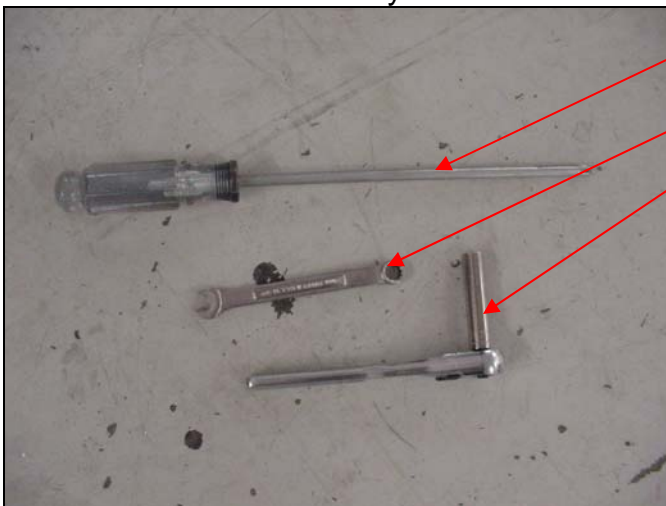


- 4.6 Release parking brake and spin the rotor, it should spin freely. If it doesn't, loosen the mounting bolts and repeat steps 4.4 and 4.5 adjusting the alignment.



- 5.0 You will need to bleed the brake system. You will need these additional tools.

You will also need DOT3 or DOT4 brake fluid.

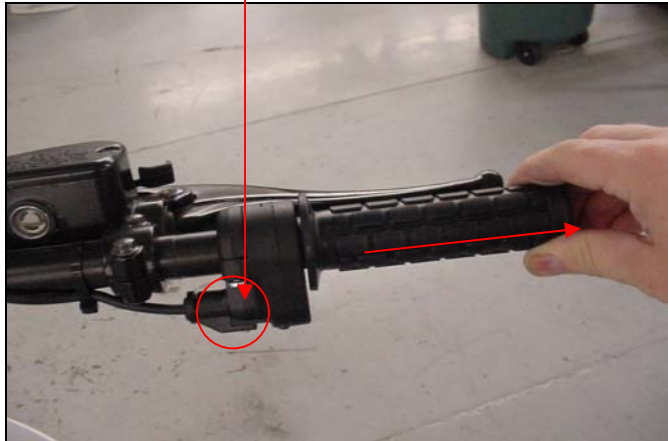


Phillips screwdriver
8mm or 5/16 line wrench
8mm or 5/16 socket wrench

- 5.1 Protect the paint of the front and right hand side of the T3 unit from brake fluid damage by covering it with plastic sheeting as shown.



- 6.0 Loosen the top Phillips screw of the throttle assembly and slide it over to the right, do not remove it.



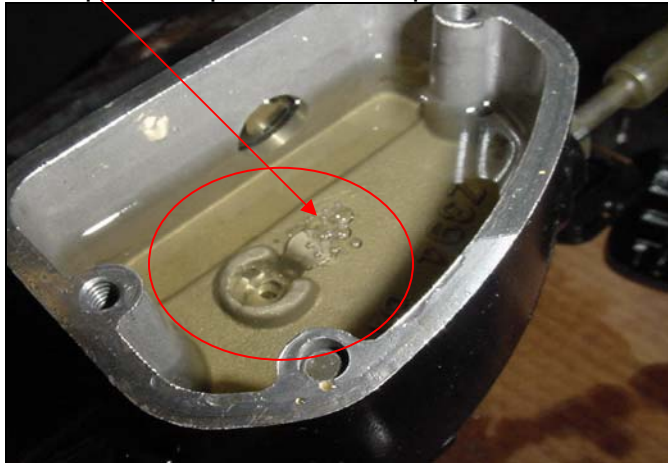
- 6.1 Loosen the 8mm clamp bolts, slide the master cylinder over to the right side of the vehicle, while rotating it rearward so the reservoir is level, and retighten the bolts.



- 6.2 Remove the reservoir cover from the master cylinder with the Phillips screwdriver.



- 6.3 Add brake fluid to the reservoir if necessary, and pump the brake lever slowly. Watch for bubbles coming up from the valve in the bottom of the reservoir. If no bubbles are present, proceed to step 6.4.



Continue to pump the brake lever until no bubbles appear for at least 25 consecutive pumps.

If brake lever is firm, and If bubbles have stopped, proceed to step 8.0.
If bubbles have stopped and brake lever is not firm, proceed to step 9.0.

- 6.4 Top off brake fluid to this point.



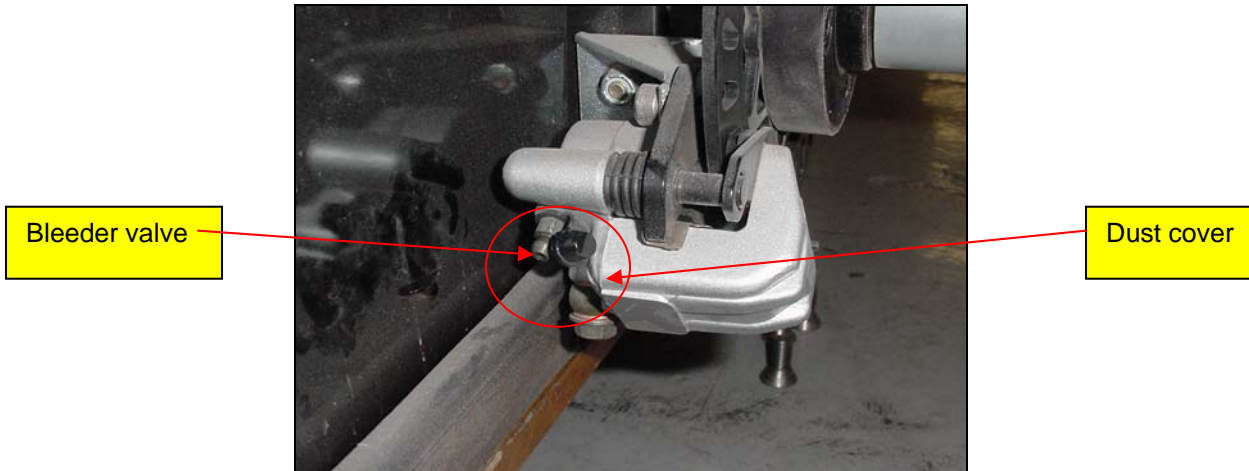
7.0 Bleeding the brake lines and calipers. **Read the entire procedure before attempting to bleed the brakes.**

If you do not have a power bleeding system, follow these instructions to bleed the lines and calipers manually. The procedure is essentially the same as an automobile.

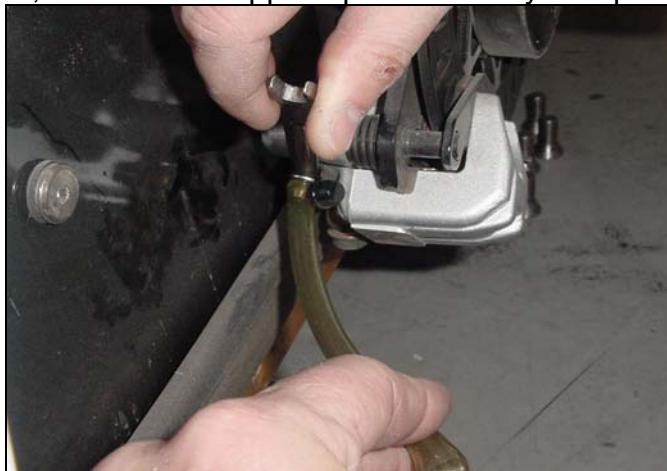
Bleeding the brake lines and calipers is a two person job unless you a power bleeding system.

It is assumed if you have a power bleeder you know how to use it and the details of bleeding the T3 brake system are provided for clarification.

7.1 Remove the dust cover from the bleeder valve.



7.2 Using the 8mm line wrench, loosen then snug back down the bleeder. You will need a helper to pump the brake lever 5 to 10 times and hold it in the brakes applied position. Then you open the bleeder to release the brake fluid and close the bleeder. Then your helper can pump then repeat the pumping of the lever, hold it in the applied position and you repeat the bleeding.



Note clear tubing slipped onto the bleeder after the wrench is on the fitting. This will contain the brake fluid and help you see the bubbles or lack there of. It is advisable to allow the tube to drain into a bottle.

- 7.3 Continue repeating this procedure and watch the fluid coming out of the caliper. At first you may not see any bubbles, but often as the fluid is pushed through the line they will emerge. The goal is to eliminate all air from the line. When you no longer see any bubbles, and/or the brake lever pumps up or becomes firm, or if you cannot get the lever firm, but no air is coming out, you can tighten the bleeder and replace the dust cap and proceed to the next step.
- 7.4 Top off the brake fluid as shown in step 6.4. and repeat steps 7.1 through 7.3 on the opposite side. Both sides must be done anytime the system is opened.
- 8.0 When done bleeding both sides, replace reservoir cap and two Phillips screws. Loosen the two 8mm clamp bolts and remount the master cylinder to its previous placement. (See steps 6.0 through 6.2 for photos and details.)
- 9.0 Slide the wheel & tire assembly on and line up the lug holes in the wheel with the threaded holes for the lug bolts in the hubs.



- 91 Hand tighten the lugs to seat the wheel against the hub.



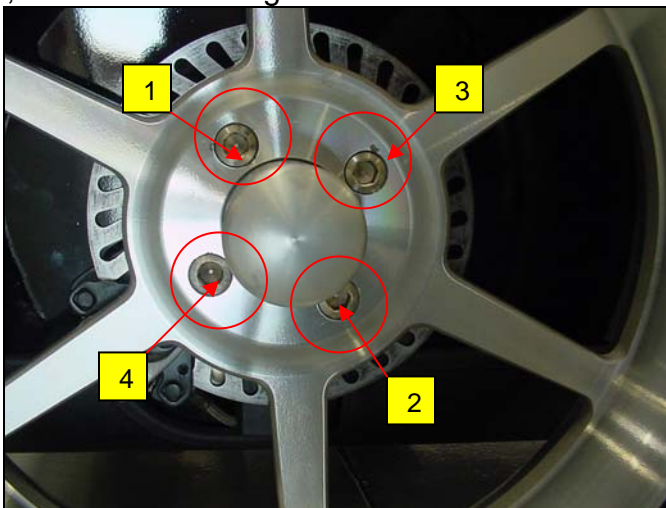
9.2 Remove the dolly or other support and set the T3 unit on the ground.



9.3 Torque the lugs to 40 foot pounds using the torque wrench. Follow the torque pattern in photo 7.1.



9.4 Torque pattern for even tightening. Double check the torque repeating the pattern, but do not over tighten.



Start test braking at very slow speeds for safety.

For addition information, contact T3 Motion at: (714)-619-3600.