

## Kettle Front Disc Brake Master Cylinder Re-build

Okay, so the Disc brakes on your bike have for the last 25-30+ years been slowing things down more or less as you want them to ..... or have they???? There comes a time when for safety sake, that the dripping spongy thing the brake lever is connected to needs your attention. Or, you may have bought a complete Master Cylinder for a fiver at an Autojumble which looks better than yours like I did and not knowing its history you **must** re-build it! It is of course **vitaly** important that you make sure you get the correct part for the job. I mistakenly picked up a Master Cylinder for a smaller Suzuki, which is designed to operate a single front calliper/disc, not two. It has a smaller cylinder bore which gives less braking effort (Hydraulic multiplier to give it its correct term) and is therefore **NOT** suitable for use on a heavy Kettle. If you were to fit one of these smaller bore Master Cylinders it would require tendon popping effort to get your bike to stop in any manner which could be described as safe, so pass it on/sell it to your mate with a GT380/GT500/GT550 and they can put it to proper use .... you get the message? The correct Kettle unit will have the letter "D" (for Dual?) cast into the underside. So, if you're too ashamed to admit that you feel like an 8 stone weakling when pulling your brake lever it may be worth checking ..... you never know! Plus ..... your new Genuine Suzuki Master Cylinder re-furbishment Kit won't be of any use because it will be too big to fit in the bore!

On the matter of safety, everyone knows that your brakes save your life every time you apply them, so it is essential that they are set up and maintained properly. If you are in **any** doubt at all about your abilities to repair or refurbish your brakes, leave it to the professionals at your local bike workshop or someone you know is competent to do the work!! You **must** be satisfied that all of the other bits that the Master Cylinder connects to, being the hoses, three way joint, callipers and brake pads are in good serviceable condition. The fluid that operates the brakes will be replaced with new during a re-build so there should be no doubt about its serviceability. Having established all other components are in good working order and you have confidence in your abilities to carry out the job, give it a try. Safety warning over!!!!

Genuine Suzuki Kits to re-furbish your Master Cylinder are available from your regular Kettle parts supplier Part No. 59600-45811 and should cost about £20.

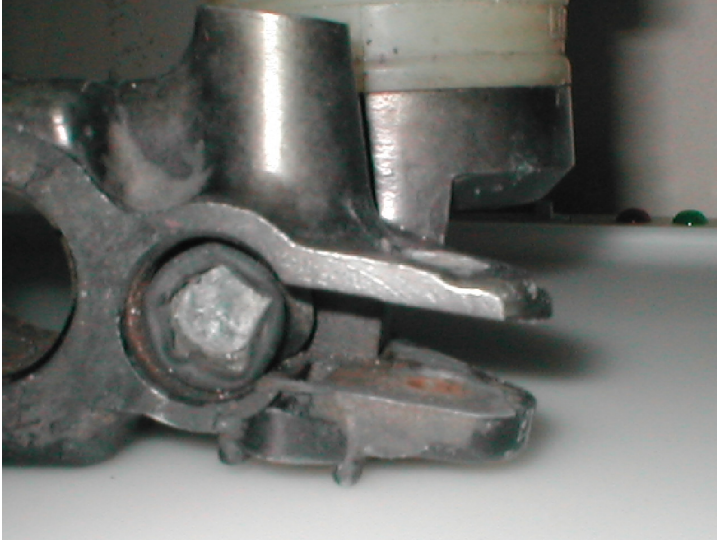


The Kits contain all of the parts that you need to get the Master Cylinder back up to scratch, as long as the bore is not worn, scored or corroded and as mentioned above it is essential that you ensure the fluid lines and both Brake Callipers (including pads) are in good condition. It is unlikely, as they seem to last forever, but if you remove the plastic reservoir (which I recommend you do for a thorough cleaning of your system) the rubber seal it fits into should be inspected for deterioration and replaced if necessary.

### **The Strip Down**

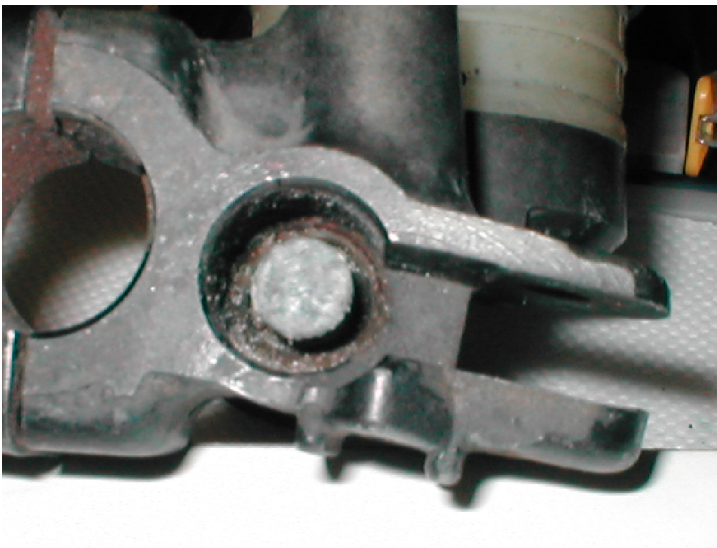
The Haynes Manual on page 122 has a whole (small) paragraph on stripping the Master Cylinder with cutaway/exploded diagrams on page 123 which I find to be of limited use so I have included some photos that might help make the process a bit more hassle free!

### **Brake lever removed**



Although the plunger operated freely, it was clear it hadn't been disturbed for some time by the amount of corrosion and other deposits found when the rubber boot was removed making the re-build essential. The rubber "top hat" shaped boot which may, as in this case, have begun to perish and split, is held in place by a moulded-in wire circlip. As the boot is to be replaced it can be extracted with a pair of narrow pliers and it doesn't matter if you have to pull it out in several pieces. If the rubber is brittle through perishing, the wire circlip that retains it may stay stuck in place and you will need to prise it out with a small screwdriver or something similar. What you see next will give an indication of how much grief you will have when attempting to release and remove the second "proper" circlip which holds all of the moving parts in place!!!!

### **Not too much corrosion on this one**



**The circlip retaining the plunger can be seen more clearly after cleaning with WD40**



The circlip is nearly 2.5 cms into the body of the Master Cylinder with access restricted by the plunger and body of the unit. Years of corrosion can as mentioned above make the removal of the circlip difficult, but in this instance I scraped off as much debris and rust as I could with a small screwdriver and left it standing for a couple of days with a good application of WD40. This was enough to get the worst off and the circlip was removed quite easily. Remember you are going to replace all of the internal components that you remove so you needn't worry about contaminating or otherwise damaging the rubber seals. I don't have a set of long nosed circlip pliers, so the first time I did this job I had to grind some metal off the shoulders of my circlip pliers to get a better reach.

## All internal components removed

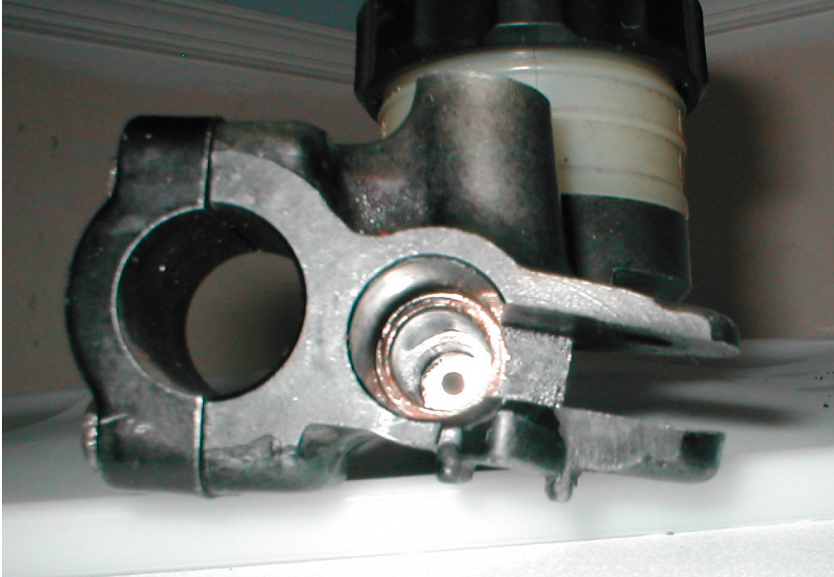


Once the circlip has been removed all of the internals can be pulled out and the bore inspected for wear or damage. Lay out the components as they came out so that you won't become confused when fitting the replacements and will re-assemble them in the right order. Please note the wire circlip on the far right is actually moulded into the rubber boot, but I pulled it out to illustrate what holds it in place, so you won't find one loose in the re-furb kit.

If the bore is free from corrosion and has **NO** discernable lip which would indicate excessive wear, grooves, or deep scratches that may allow fluid to leak past the seals, the Master Cylinder can be re-used. However, you must take time to make sure that the bore and small internal fluid channels are **perfectly clean** with **NO** bits of debris that might float around and cause a blockage in the fluid lines and result in no brakes or indeed locked brakes! Believe me, it doesn't take much!

Again, if you are in **any** doubt over the serviceability of the stripped Master Cylinder get it checked out by a competent person or ditch it!!

## A good useable Master Cylinder bore



## The Cleanup

Before installing the new components from the kit you will need to turn your attention to the part of the Master Cylinder where the fluid lives, the reservoir and its component parts. The reservoir will most certainly contain an accumulation of sludge being a mixture of dirt suspended in the brake fluid and the remnants of old de-composing fluid. If these deposits are not removed you will introduce this sludge into your newly re-built braking system reducing efficiency, possibly causing blockages in the lines/callipers and grinding moving surfaces which could cause failure in the not too distant future. The plastic reservoir is secured with a metal plate and two screws and once they have been removed, it can be pulled out of its housing. It may be extremely tight as the rubber ring that seals it will probably not have been disturbed for many years so expect to use some force. You will now be left with the metal body of the Master Cylinder and the serious supercleaning can now begin! Use your favourite cleaning agent to remove **all** traces of debris, giving special attention to the two tiny channels which link the reservoir with the cylinder bore as well as the plastic reservoir and its fasteners. When you are satisfied that all of the components are scrupulously clean, clean them again just for good measure, particularly as you will probably have spent quite some time getting this far ..... you don't want to have to start all over again do you?

I did say use your favourite cleaning agent and there are many on the market that do an excellent job. One important thing to bear in mind , you must ensure that all traces of whatever you use are removed before re-assembly as you want nothing but clean fresh brake fluid in your system without any contaminants or anything that might cause the rubber seals or hoses to perish. Some rely on

petroleum based cleaners and brake fluid for a full clean but I cannot emphasise enough the need to ensure that there is nothing but **NEW** brake fluid in the Master Cylinder and all other parts of your braking system ..... your life might depend upon it!

Brake fluid comes in 3 commonly used types, DOT3, DOT4 and DOT5 and whilst they all serve the same purpose they have different properties so you will need to know what you can and can't do with them. None of the different types of brake fluid should be mixed as they can react badly with each other and corrode your brake system. Try not to shake a tin/bottle of fluid as this will introduce air bubbles into it and as we know, we bleed brakes to get all of the air out, so don't make this job worse by adding it yourself.

DOT3 and DOT4 are very effective paint strippers, so don't spill it on your shiny paintwork ....but you knew that anyway!!! As DOT3 and DOT4 brake fluid absorbs water, don't be tempted to use that rusty old tin that has been on the shelf in the shed for years as firstly it will be past it's sell by date starting to decompose and secondly it will have absorbed moisture from the air reducing its boiling point causing a loss of braking efficiency as things warm up just when you need it!!!! For this reason you should avoid opening your Kettles brake fluid reservoir and always keep containers of brake fluid tightly sealed.

DOT5 fluid does not absorb water so the higher boiling point it has will remain relatively stable. However, this does not mean that water cannot get into your brake system by other means and any that does will tend to form pure water pockets with a much lower boiling point than the brake fluid, which could cause brake failure during hard use and corrode your brake system.

Now might be a good time to apply a few coats of satin black paint, although I know some do prefer the look of an untouched Master Cylinder! You will of course make sure you mask off any areas where paint shouldn't be to prevent blockages or any forms of possible contamination.

### **Re-Assembly**

As all of the parts will now be extremely clean and/or new, the re-build should be the painless bit. The reservoir and retaining plate with its 2 screws should be installed first. Make sure the rubber ring that seals the reservoir is in good condition, if not fit a new one.

## Cleaned and ready go back on the Kettle



Assemble the replacement parts from the kit in the correct order; the same way the old ones came out, lubricating the bore and rubber seals with your favourite grade and brand of brake fluid being careful not to damage any of the components. Carefully push them into the cylinder bore, making sure that they go in without having to use excessive force. Install the retaining circlip until it is properly located; remember it stops all of the internals from popping out! Try the piston for smooth operation. I would recommend that you do not install the "top hat" dust seal until you have fully assembled your braking system, bled it and are sure that all operates properly. The reason, if you make a mistake in the way you assemble any of the internal components you will need to strip it down again to put the matter right. In 9 out of 10 instances you will trash the dust seal taking it out again and that's another 20 quid for a new kit to get a good dust seal or re-fit the damaged one which will now allow dirt and moisture to get into your newly re-furbered Master Cylinder ..... not recommended!!!! To fit the dust seal once you are satisfied that all is well you just need to remove the brake lever, push it into place, then re-install the lever. Job done!!!!!!

Refurbishing a Master Cylinder needn't be a daunting task as long as you think CLEAN, CLEAN, CLEAN and install all of the bits and pieces in the right order, flushing any old fluid out of the brake lines/callipers and properly bleeding the air out of your system. Test ride your Kettle and take it easy for the first few miles until you get used to the improved braking effect .....that is, provided all of the bits that connect to the Master Cylinder are in good order!!!!