

Adjusting ATE Brakes

John King shares his method

This design of braking system is, to say the least, over complex and a bit of a pain in the posterior to get it so that they actually work. I have had several BMW bikes equipped with this type of brake and over the years have come to the conclusion that you can get them to work, and work well, but to do so you must be prepared to take your time and not rush matters. There are publications, some of which are best described as a mechanical version of Grimm's Fairy Tales, which give their method of adjusting the callipers. This involves chalk or marker pen, but I prefer to rely on my ears and the feel of the wheel as it rotates off the ground. I have started right at the beginning so that you can really see what is involved and be able to follow my reasoning. I hope this guide will help you.

Master Cylinder Preparation

Start off with a completely empty and clean master cylinder removed from the bike. Wipe it out as best you can, then spray inside the reservoir with brake and clutch cleaner and leave to dry out. Do likewise with the cylinder itself making sure there is no 'crud' trapped at the top or bottom of the bore. This last step is not strictly necessary unless you are replacing the seals.

If you are fitting a master cylinder repair kit check the interior of the cylinder bore. If you can see blemishes that could be corrosion think about looking further. Insert a thin piece of soft wire with a small length bent over at 90 degrees and pass this, side to side or up and down over the area of the corrosion. If you cannot feel anything catching, you should be O.K. If the end of the wire catches on the area you are concerned about, then fitting a repair kit will only delay the inevitable because

this 'rough' area will ruin a seal in a matter of months, if not weeks, and a new cylinder will be the only option. They are pricey too – around £290. ATE master cylinders are made from cast iron and the corrosion, once started, will only get worse. However, if you are going ahead and fitting a new master cylinder seal repair kit, ensure you get the correct one because there are 2 different sizes of cylinder. The sizes are marked on the external casting.

Liberal cover the new seal kit with brake fluid and insert it into the cylinder and fit the circlip. This master cylinder has the brake light switch screwed into the 'nose' of the casting and this must be fitted correctly or you may get a leak. If refurbishing the unit this switch



ATE Brake Calliper

should be removed so that you can thoroughly clean out any sludge that lurks inside. First wrap two or three of layers of PTFE tape around the brake light switch thread which is tapered and screw in by hand, then give ½ - 1 more turn with a spanner or until the switch tightens up. Now fit the master cylinder to the frame with the large Jubilee clip. I make up a pad of a couple of layers of gaffer tape on the frame to stop paint damage. Fit the Jubilee clip and tighten as much as you can, ensuring the master cylinder remains vertical to the central line of the frame. Don't forget to re-connect the wires to the brake light switch. Which side they go to is immaterial.

Now fit the small push rod into the rear of the cylinder, lightly greasing both ends with something like HMP grease, then bring the operating arm into contact, fitting the rubber 'boot' over the top so the claw sticks out. Screw the adjusting screw right in so that it gives the maximum free play when you come to fit the cable. Connect the operating cable into the claw using a little ordinary grease; then thread the cable up to the handlebars. With the lever off the bars, grease the nipple

socket and inset the cable and 'drum' nipple into the socket. Arrange the lever so that you can insert the pivot pin (lightly greased) and then fit the locknut underneath and tighten it so that there is still an easy lever movement. Now adjust the master cylinder adjuster so that there is just about no play in the cable when the slack is taken up. Some people (me) like a bit more free play so that a better purchase can be obtained on the lever and the fingers are not always stretched to grip the lever. Leave the master cylinder dry at this stage.

Removing the callipers

Undo the hexagonal headed cover (17mm) located under the calliper (see the picture). Be prepared to catch the short coil spring, which will drop out. Take an 8mm threaded bolt (use one of the axle clamp bolts at the bottom of the forks which is the correct thread) and screw this bolt into the hole, which you will see behind where the short spring came from. Wind it in about 1/2 an inch. Now give a firm tug (several) and if it is not seized, the adjusting spindle will come out. This spindle **MUST** be clear of any corrosion. It is a high tensile steel item, but it will rust if not kept well greased. NOTE. There is wide deep groove like the top of a flat screw in the base of the spindle. You will need to use this later, so make sure this is clear of any muck. Now simply disconnect the brake pipe from the calliper and pull the calliper backwards. There may be a thin shim washer under the calliper when you pull it back. Save this and reuse when fitting all back together

Overhauling the callipers

Having previously removed the brake callipers and the pads, (save the pads for the time being), remove the pistons and thoroughly clean out all the crud from behind the piston and the fluid entry hole. The pistons will be tight, or even **VERY** tight and may need a little effort to remove them! The external seals should be examined and if damaged, replaced. The pistons are made of stainless steel so should



Brake calliper adjusting cap

not show any rust. Remove the seals inside the calliper using a small electrician's flat bladed screwdriver. Put them to one side. Clean out the groove where the seal came from, as it will have some crud inside which will make the piston hard to move when in service. Use of brake and clutch cleaner spray, and a little bit of effort with an old toothbrush, makes the job very easy.

Examine the seals and if there are no wear marks or cuts/splits, cover them with brake fluid and re-fit into the grooves. Cover the now clean piston with brake fluid and insert into the cylinder in the same way it came out. Now fit the outer dust seals (which you have also liberally coated with brake fluid) onto the calliper ensuring that the inner lip of the seal is properly inserted in the groove at the top of the cylinder. Finally push the piston right to the back of the cylinder.

Refitting the callipers

Re-fit the overhauled calliper into the pivots on the fork-leg (with the shim if there was one). Liberally grease the steel pivot pin with lithium HMP grease (not a copper based grease) and insert it into the hole and push it right up as far as it will go. It may prove to be tight and be 'sticky', but persevere and it will go. Now, do all of the same as above for the other calliper. Afterwards re-fit the brake pipes and bleed nipples to the callipers. Nip up the brake pipes and the right hand side bleed

nipple but leave the left side bleed nipple finger tight.

Now take the old brake pads and on one of them there should be a small rubber 'O' ring on a spigot. Remove this 'O' ring and fit onto the respective new brake pads if needed. If the pads are worn and show two separate surfaces, they have been adjusted incorrectly in the past and are best thrown away. These pads with the spigots are the ones that are in contact with the calliper pistons. Lightly grease the spigots (HMP grease) and insert the spigot into the piston recess. Fit the outer brake pad. These 'O' rings are very important, because if they are missed out you will never get a properly adjusted brake. If the ones you have are in poor condition, spares are available and are cheap as chips. Repeat for the other side. Refit the wheel making sure the brake discs enter the gap between the two pads on either side. This can be a bit of a fiddle. Fit the spindle and tighten the left hand side nut, then fit the two pinch bolts and tighten to the correct torque setting.

Bleeding the system

Return to the Master cylinder and fill this with fresh brake fluid. (DOT4 grade). Fit a piece of clear tubing over the left hand nipple and put one side in an old glass jar. Now undo the left hand calliper brake screws and as the brake line is almost vertical, the brake fluid should almost self-bleed. If it is reluctant to



The reservoir and warning light connections



The preferred adjusting tool

do so several soft half-strokes of the brake lever should get any air trapped in the master cylinder clear and fluid should then trickle through. Be warned though, a full stroke of the lever will have fluid spurting out of the top of the reservoir. As the fluid seeps down the pipe, air in the pipe will find its way up to the master cylinder and into the reservoir. Some will also exit past the bleed nipple. Once fluid is seen to seep out of the bleed nipple let it flow for a short while then just nip it up. Now fit the plastic tube to the right side nipple and open it up. Let the fluid seep out and then nip that up also. Return to the left hand nipple, undo it by half to three quarters of a turn and lightly pump the handlebar brake lever about 10 times or until there are no bubbles escaping. (don't forget to check that the reservoir is kept topped up). Do likewise with the right hand calliper. Top up the reservoir until the fluid is up to the level of the filler. Fit the cap and connect the two wires that lead to the fluid level warning light.

Now the tricky bit. Making sure the front wheel is off the ground, remove the right hand brake calliper and insert a piece of wood which is thick enough to stop the pads from closing up. Use a bungee elastic to support the calliper to ease any strain on the flexible pipe. Squeeze the brake lever and at the same time turn the wheel by hand. Once the wheel becomes too stiff to turn this is the point where the adjustment can be done.

Adjusting the callipers

Read this section carefully and follow to the letter. Using a screwdriver with a wide flat blade, (I use an impact screwdriver which is fitted with the widest blade I have, giving me a good purchase to adjust the spindles), turn the spindle clockwise using the screwdriver blade fitted into the wide groove in the adjusting spindle. The wheel will then become free to turn. Turn the wheel by hand and at the same time turn the spindle clockwise until the pads begin to make firm contact again with the brake disc and the wheel becomes harder to

turn.

Now turn the adjustment until the wheel just become free to move with only a little contact as it does so. Squeeze the brake lever again and turn the wheel again. If it binds at all, lightly back off the adjustment again until there is only a little contact with the disc. Your left hand calliper should now be correctly adjusted. Refit the small spring and the blanking cap.

Remove the bits of wood and fit the calliper to the right side and adjust the calliper exactly as before. But, note there will be some contact with the disc on the left side already so bear this in mind when carrying out the adjustment. Top up the reservoir if needed, re-fit the tank and fuel pipes & the jobs done! The pads, as in the case of all new brakes will take a while to 'bed in' but the way I have described when they are 'bedded in' will let you have as good braking as is possible from single piston ATE callipers. I can almost lock my front wheel of my '79 R100RT on dry tarmac and you don't need any better than that.

Point to note.

If pads that have been used previously in badly adjusted callipers are re-used, you will be extremely lucky to get a good brake effect, because adjusting them properly will be a very hit and miss affair. If they were badly adjusted before you will find that instead of the whole pad area bearing onto the disc only a small section will come into contact and this will wear a bevelled edge onto the pad and also increase wear on the disc. This may be one of the reasons that some riders condemn ATE brakes as being ineffective.