The ABS FAQ

The General ABS FAQ

by Andy #982
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Request: Would someone with an ABS-equipped GS (or now Dakar) could check out the component locations, get the figure for the air gap and check the practicality of checking out the system. A spy in BMW would also be useful, as resetting the error memory is usually just a case of grounding one of the pins on the test plug for a given time. I don't know which pin or for how long.

ABS is not something you can really work on yourself, but can do some basic checks and have an idea if the dealer is B' sing you.

How do I know if my Bike has ABS

 **If your bike looks like this one, where the red circle is, then it does NOT have ABS.**

What is ABS for?

- ABS (Anti-Lock braking) is a safety device. It allows the rider to squeeze the brakes as hard as they like without risk of the wheels locking. A locked wheel has no effective grip with a smooth road surface and as such gives no aid to balance, control or braking. A locked wheel will try to pass a turning one. A good demonstration is to roll a toy car down a sloped table at a slight angle. Repeat using putty to lock the front or rear wheels. ABS is about control in emergencies.
- ABS is not fool proof, it is set for a specific surface usually with the Mu (grip) level of iced tarmac. Put it on another surface and you start to loose efficiency until on gravel or snow ABS in its basic form is less efficient than locked wheels. Plus, a number of ABS failures like sensor chatter can only be detected after the system starts to cycle. If you can't complete the non-ABS stop you are in trouble.
- ABS braking is different to non-ABS. Non-ABS you feed the pressure and feel for the deep slip, releasing the pressure when you need to steer or when you get lock. ABS you just squeeze as hard as possible and leave the system to do its job. You ignore the brake feel.
- ABS is a safety device not an aid to performance. Think of the ABS like a cars air bag. If it activates, something is wrong. You cannot beat the laws of physics, break that law and you don't just get a ticket.
- I would pay for ABS if available, but I would also buy a non-ABS bike if I preferred another model and it was not available. Bike ABS is pretty crude in the scheme of things, but if it saves your life, someone else's life or even the machine, its worth it.
- Dakar ABS. The only boosted motorcycle system is on the K1200LT. The rest of the BMW systems are variations on the original system going back to the K100 police models. They all use an electric solenoid/pump system for the fluid recirculation back to the ABS modulator. All the brake force is produced by the rider but is modified by the hydraulics. The reason for the light feel is the larger master cylinder. The ABS means the designers can worry less about control feel as if the operator over does it, the ABS will limit the brake force to the maximum the road can take.

Can a good rider do better than ABS?

- ABS lengthens the theoretical stopping distance as it lets the brakes off when the wheel approaches lock. However, a rider faced with a real surface is unlikely to find the optimum brake force at the first attempt (the one that counts) and will never dare use the front brake (the most effective) enough because of the fall down risk associated with a locked front wheel. ABS used correctly therefore gives shorter real life emergency stops. ABS is required to meet 75% of the theoretical deceleration at the first attempt under EC directives. Most vehicles achieve 95% plus or beat the theoretical (proving the theoretical search using valves able to adjust brake pressure by 0.1 bar was not done to its full conclusion).

What about off road?

- Off road, a wheel in deeper slip (nearer to locking) produces a small pile of particles (snow, gravel, dirt etc.) ahead of the wheel. This gives improved braking. This is why ABS has the off road/off switch. This should only be used on loose surfaces, not ice.

What do the warning lights mean?

- The ABS warning light sequence includes different flash sequences for different errors. These are known only to BMW (at present). The simple rule is, if the light is on you have full non-ABS braking, but may not have ABS. When the ignition is keyed, the ABS will test its components (you will hear clicks etc. as the modulators fire) and should reset if disturbed by a minor fault. If all is well the ABS light goes out. ABS cannot test its sensors fully until above 15kph. Below this speed you may not have ABS. Most systems do work down to about 7kph. The light will not come on again if both wheels decelerate in a normal way. Stoppies or wheelies may be logged as ABS faults and bring the light on.

What is the most common failure/cost of ownership?

- ABS is sensitive to battery voltages as it needs to differentiate between positive and negatives in its software to count the sensor wheel teeth against time. If the voltage is too low, the ABS lights flash alternately. It is OK to ride with care in this condition, but you do not have ABS. The first check on a failed ABS system is the supply voltage.
- Wheels sensors and sensor rings are external and are prone to damage during wheel removal. Off road use may cause damage if dirt forces the sensor away from the sensor wheel.
- On board radios or microwave phones may cause the ABS to detect a fault and shut down. The system should reset itself when the source of interference is removed.
- If you insist on using the full potential of the ABS and use the available stopping power, the disks and pads will wear faster.
- Only BMW can interrogate the ECU, but the system should run for years with little or no attention. The engine ECU will give more trouble, it works harder and in a worse environment.

Should I modify my riding?

- Riding with ABS is no different to non-ABS. You should not rely on ABS to save you from poor riding. Some ABS faults can only be detected when the ABS cycles. At this point you are in trouble. When ABS cycles, the controls may transmit some of the modulations into the controls. This is normal and the rider should continue with a steady squeeze/push on the controls.
- ABS activation may cause the brake pedal or lever to **pulse**, this is normal, but will only occur under harsh braking on low grip surfaces. Peoples first ABS stop can be worrying. There have been a number of incidents with Landrovers in the late 80's when people felt the ABS pulse and stopped pushing the pedal. The wheels don't lock if you do this, but its generally unhealthy.

What can I do myself to maintain the system?

- The ABS system is basically maintenance free. If it has problems the warning light will stay on when the bike is moving. Then, basic checks can identify the problem without recourse to the dealer.
- ABS senses the wheel speeds by inductive sensors. These are just a coil that a toothed wheel induces a voltage in. The frequency gives the wheels speed, the amplitude gives information about the condition of the toothed wheel. An ABS sensor can be checked simply by spinning the wheel and checking for an output voltage. A sensor that is open circuit is failed. If the airgap between the sensor and toothed wheel is too great the voltage will be low. BMW specify the air gap on the R-series at 0.3 to 0.4mm.
- Experience suggests the sensors will be OK at 0.1 to 0.7mm. I would not recommend resetting the sensor air gap if the system is working, as part of normal maintenance. I would suggest the gap is monitored. The air gap should be the same right around the toothed wheel.
  Damage to the teeth on the wheel will prevent the ABS working. Never lay the wheel with the ABS sensor ring face down. The sensor wheel needs to be free of chips, have no missing teeth and run out should be limited within the air gap specification. Worn wheel bearings may first come to light when the ABS detects runout or other chattery signals from the wheel.
- The ABS modulator is just a pair of electrical solenoids that allows brake fluid to circulate in a bypass to the master cylinder to brake calliper circuit, reducing pressure and releasing the

brakes. Again this solenoid coil can be checked for continuity. At ignition on or when the bike moves off it should self test. This will be heard by the rider as a click or slight screech/clunk noise. The solenoid is the two can shaped things with the ABS ECU bolted on the back. It should be under the faux tank.

- The ECU is not very bright and only knows about battery voltage, warning light condition, wheel speeds and modulator coils. BMW diagnostics only tell them what the ECU thinks is the problem. If in doubt get BMW to clear the memory, then test ride the bike and recheck. In effect the ECU only knows what pin of the ECU the problem is on. ABS is not rocket science, but the ECU modulator assembly is too expensive to change on the off chance. Take care that dealers check out other possibilities before blaming the electronics.
- Bleeding an ABS bike is no different to non-ABS, but may take longer due to the additional piping. The ABS should never be powered up when there is no fluid in a circuit as the modulators may require the fluid for internal lubrication. This may not be 100% correct. Refer ABS & Brake Bleeding. Can I still do it myself?
- The sensors can be changed at home with no diagnostic equipment if the power is off. The ECU and modulator block can likewise be changed as a unit. The master cylinder/reservoirs and callipers can be changed in the same way as a non-ABS bike.

Can I modify the bike?

- ABS can be upset by changed wheel sizes. The system needs to know how fast the bike is going to work out if a wheel is going into slip. If a wheel or tyre is changed the wheel may spin faster or slower for a given vehicle speed. This will effect the systems knowledge of what is going on around it. The BMW system is not particularly sensitive to this so there should be no problems changing tyres. Wheel size changes are an unknown quantity on the F, but as a rough guide, +/- 10% on rolling circumference should be OK. The R system works with wheels from 15 (sidecar) to 19 (GS).
- Radios/mobile phones may give trouble if too close. Nothing should share the power supply to the ABS ECU.

edited by Kristian #562, but only for jargon, not for content.!

How do I de-activate the ABS.?

by Art #884, Pelle, Andy#982

Simply:

- Turn Key on (Running or not)
- Wait for lights to go out
- Hold ABS button, center of bars, until red ABS light starts blinking.
- Release = deactivated
- Red light blinks until it is reactivated.
- To reactivate, turn bike off then back on, reactivation takes place automatically.
- Note that it can't be deactivated while moving. I have no sensible explanation to why but I tried it while moving the other day. I just had to know.
- If you are having a hard time turning off your ABS, just rock the bike backwards or forwards a few inches (it wouldn't even take that much) and try the regular procedure again. (Seacuke #1214).

Feedback:

- I turned my ABS off for the first time this weekend while on a rough road leading to a trail head in the Wallowa-Whitman National Forest near the Snake River. I discovered that I had to start the engine, press down the ABS switch until it started flashing, then immediately release. If I kept it pressed too long it went back to ABS. Lowered the tire pressure to 25 lbs for the dirt and

rough, loose rocks. The 'lil GSA did itself proud and kept the shiny side up. North"wet" Poulsbo, WA. Northwet #1101

- Hi... I have some question about ABS in my Dakar... I some times deactivate the ABS... but a week ago, I notice this: -with the bike with engine turn off I can deactivate the abs pressing the switch about 3 seconds... If I continue pushing the button, the LEDs turn off... but I cannot deactivate the abs again holding the button.... I have to turn key off-on and then I can deactivate it again... (this could be a security system... since if the button ABS was broken or it was connected by a problem.... the bike always deactivate abs at turn on... or it will be flashing the lights intermittently... (abs on/off...) -with the bike running... I stop... if I don't push the front brake, the abs cannot deactivate... but if i push the front brake, and then hold the button, I can deactivate it... again... if I hold it more than 3 seconds... ABS led go off... and I have to turn off the bike, to can deactivate again ABS... is this normal...? I don't remember how ABS worked the first days... but I think that I could hold the button... and if the ABS doesn't deactivate... I can hold again the button and do it.... the abs works fine, no problem or led... Zippo.
- Well I finally took the 650GSA (2002) off road today at Haspin Acres Indiana (www. motocrosspark.com) after putting about 1,300 paved miles on the bike. I was very impressed with the bikes handling of the pretty rough trails. Needless to say it would have been a more enjoyable ride had I been able to turn off the ABS! After several attempts by myself and another chain ganger we gave up. We still had a blast, and we were the only two riders who did not trailer their bikes to the park. Back to the problem… I was able to turn the ABS off before I had the first service preformed by the BMW dealership two weeks ago. Anyone experienced a similar problem? Joe
- Last weekend I went for an offroad ride, stopping several times to take pictures or wander around to rest. It seemed that about 50% of the time it was an easy matter to get the ABS turned off, just mashing the button for a couple secs after the bike was running. Other times... it wouldn't turn itself off regardless of what kind of mechanications I went through. (Even went so far as to sacrifice a chicken over the switch...) (Ok, maybe not quite that far.) Until I figured something out. After running a little bit, I could stop, then turn the ABS off no problem. I shortened my "little bits" into just pushing the bike forward or backward a few inches... and it worked. What seems to be the case is that if the ABS sensor is reading "on" - meaning one of the little metal bars is right next to the magnet, you can't turn the ABS off. (Or vice versa, I don't know which) - sooooo.... if you are having a hard time turning off your ABS, just rock the bike backwards or forwards a few inches (it wouldn't even take that much) and try the regular procedure again. Of course, until verified by other sources YMMV. Seacuke #1214
- Next.

ABS "Stoppies"

by Andy Leeds UK #982

Stoppies are theoretically possible but practically hard to do.

You need to keep the rotational decel'n on the front and rear wheels matched within about 5% until the ABS cuts out at 5-7 kph. This way the ABS thinks you just slowed the whole machine as no wheel varies too much from the reference speed. There is a prize for anyone who can do this!

Winding the front brake on while locking the rear hard just as it lifts could be the key. The system will be confused into thinking its the rear that locked not the front. It will then modulate the rear. Again there is a prize if you can do this without the ABS beating your reaction, allowing the rear to spin up and then deciding to modulate the front to match the reference speed.

The conventional clutch and front brake stab will tell the ABS that the front did an impossibly quick decel'n and will result in immediate modulation.

My ABS doesn't seem to work. Is there anything I can check myself.?

by Andy #982

Maybe.

- The switch should just be a point contact device. Take the cover off the switch and use something else to touch the wires together (another switch is safer). If ABS goes off it is the switch. It is illegal in Europe to turn ABS off on any vehicle except those designed for specific off road use by trained drivers. Motorcycles are a grey area though. BMW are covering themselves by not letting you turn if off while moving. It saves them the law suit where the guy claims he didn't make the 40 mph posted bend at 70 because the ABS off function triggered itself. An actual ABS failure would be stored in the error memory. ABS off activation cannot be logged, otherwise a guy who rides off road everyday will have a full memory and maybe no ABS after 255 rides.
- When you set off, the ABS modulator valve will fire as a test (clunk click noise on the R). If you do this with the rear brake lightly depressed you will get the feed back into the pedal. Feed back is almost unavoidable on a hydraulic system, but at least lets you know that the system is active. If the system is active when it should not be , i.e. at low speed, high grip surface stops, you have a sensing problem. A modulator or electrical problem would be detected by the ECU and the warning light would come on. The bike calculates its speed from both wheels and modulates when a single wheel speed is too low or both wheels slow faster than the vehicle is capable of. Sensor air gaps set incorrectly, or damaged sensor polewheels give problems with the speed calculation and hence unpredictable modulation. BMW will not be able to reset the ABS protocols (this is highly tested and is tuned to the vehicle type), but they will be able to look at the individual sensor signals. You can do a basic test yourself. Unplug the sensors (ignition off) and connect a voltmeter to the two connections on the sensor. Spin the wheel and look at the voltage produced by the sensor. Both sensors should produce the same voltage at the same RPM (typically 0.5V at 30 rpm, but that will vary with sensor types). Voltage should be steady for a steady speed. Do not turn on the ignition with sensors disconnected. The ECU will log a fault and I bet BMW have the warning lights set so they stay on until the dealer has your credit card details.
- The ABS warning light tells you that ABS is not available. This is either because the system believes there is a problem or simply cannot understand what is going on. The basic brake system will be fully functional. ABS has no knowledge of the base brakes, only wheel speeds and its own components.
- Favourite failure is low battery. A 12 volt ABS system typically needs 11 to 15 volts to work. Any less and it cannot tell the 1's from the 0's on digital signals. This is check number 1.
- Number 2 is the signals from the polewheels. These are the toothed wheels on the hubs. Check for chips, missing teeth and the polewheel to sensor air gap right round the wheel. Make sure the sensor cannot move in relation to the polewheel. If the signal is not believable, the ABS will shut down. The system needs vehicle speed to work out which wheel is locked. Given the bike has only two chances to work out if this is correct, it takes very little to exceed the set parameters and generate a signal chatter fault. Wheelies and Stoppies will not help. You do not have a failed sensor or the light would be on from ignition on due to the short or open circuit.
- Next fault is the stop light circuit. The ABS looks at the vehicle all the time but will only calculate wheel decelerations and fire modulators together during a brake application. If a brake light is stuck on, the system will eventually decide this is a failure and shut down.
- Finally, do the modulators fire (clunk noise at ignition on or when you pull away)? If the modulators do not respond to a test signal the system will shut down. They will fire as the system resets. The bike is OK to ride even with failed ABS, but be careful. Our competitors make this system, but ABS is ABS.

What about ABS on DIRT?

Q. Why switch off ABS on dirt?

OK I understand there might be times that you need the (hopefully for 190Kg) controlled slide that non-ABS wheels can give you, I also understand that you might have to grab (block everything on) the side of a hill when climbing on it, but for cool no-tarmac riding (a village back street)... why switch it off?

A. Various Reasons.

- The ABS on the F650GS seems to cycles so slowly that it make it very tough in the dirt. Instead of anti-lock you get lock roll lock, in a kind of bucking feeling. Kari from CalBMW mentioned that he uses the ABS on the R*GS when riding on dirt roads as it has a MUCH higher cycle time. He didn't use ABS while riding a Hollister hills this weekend... (but he was on a OLD R80RT (I think... I remember him telling me it didn't start life as a GS) cum R100GS. PQBon.
- Particularly in slow, technical riding you'll want complete control over your brakes, so shut off the ABS. if you're flying down a long graded dirt road, there's no reason not to use ABS. Mark #403
- Although I am not a technical person, I believe that under certain conditions, when braking on loose material, the ABS can be fooled when material builds up under the rear wheel. So it is not just a matter of more control without ABS. It involves ABS functioning improperly under certain off-road conditions. Technical experts: is this generally correct? If so, how does it work? If not, what is the scoop Don #783
- When skidding, the build-up of dirt in front of the tire can help slow down the vehicle (I learned this about cars, but assume it translates to bikes also). with ABS, you never get that because the wheel keeps turning. Mark #403
- Most of this stuff was covered in the prior (very lengthy) discussions on ABS use vs. non-ABS use. You switch off ABS in dirt because that's simply not where you're supposed to use it. The design specification for ABS are for paved road surfaces compromised by surface irregularities/ contamination. When you ride off-road one of the skills that you're supposed to learn is really how your brakes work and how much they can really stop the bike. You're supposed to develop a feel for the brakes such as to be able to do threshold braking. And you'll quickly learn that 100% of your stopping power is really from the front wheel and that the back brake is mostly for directional or attitude control. The human brain is a much better computer with thousands of years of evolution vs. anything that BMW/Bosch have developed in the system. You as the pilot should continue to refine this developed system and trust it instead of handing off responsibility to an inferior system. It really has nothing to do with sliding the bike but has to do with your ability to stop the bike on all different kinds of surfaces according to your inputs. At one time you might want maximum over-braking then to back off only a little bit - then to be back on max then off - you can do this manually but you can't do this with ABS. Riding off-road is a ballet between throttle, clutch, brake and weight shifting like no other in motorcycling except trials riding. You want to get hard on the front brake to pre-load the suspension such that you can loft the front wheel easier to clear an obstacle then grab some brake and do it - if you've got ABS on then the computer thinks that something is going wrong and tries to stop the wheel from locking - bad things happen when you can't slow down and get the front suspension compressed to help spring you over the obstacle and your front wheel goes in to the ditch or clanks off a rock sending you flying. Sure, ABS is a REAL safety feature here! When you're climbing a hill you're CLIMBING it (notice the emphasis) you're not really going to want to make a full stop up the hill when climbing. That's the last thing that you want to do. What you describe as cool no tarmac riding, a village back street does not really qualify as off-road. It might be an unpaved surface but that's city riding not off-road. Even given this if you know what your brakes do and how to really use them you can out-brake the ABS manually. Of course there are always situations like that donkey cart coming out of the side alley in front of you where neither ABS nor good manual braking will help you. These are the positional/situational problems where basic physics always wins. You can't have two objects occupy the same time and space at the same time without hard results. Also given objects travelling along a path at a certain velocity with given mass, inertia, and abilities to decelerate/manoeuvre will also lead to different results according to their control elements. Davidhpark, #711
- I know about ABS. It is my profession. I work with ABS day to day. I am a professional with practical experience of vehicle testing. ABS will outperform any rider no matter how skilled on any surface it is designed for in terms of stopping distance and control at the first attempt. Just to clarify, the surface the system is designed for, this will be the street, with ice or water on it, or any similar hard surface. The Human brain is amazing but it gets its information from feel not direct from the wheels. Perhaps Mr Park can tell us his percentage wheel slip while performing his feats of ABS beating braking or even the distances achieved? In a test environment with a known surface, it typically takes 10 or more attempts to get close enough to the ABS braking performance to do a legal comparison. ABS seems to lock and cycle slowly because it is maintaining a deep slip, it is holding the correct amount of braking. This is the area just before

wheel lock where the wheel produces maximum braking. The wheel is actually turning much slower than the vehicle is travelling. Unlike the locked wheel it can be steered and provides gyroscopic forces to keep the bike upright. A locked wheel provides almost zero stopping power (see skiing and ice skating). Road ABS cannon handle loose surfaces such as dirt or ice because it uses a fixed rate of slip. This slip rate is incorrect for a surface where the pile of debris ahead of the wheel can be used to increase the contact area of the tyre and its general adhesion. In this case deeper slip makes more debris and lets the wheel make a trench to give better control. The simple solution is to turn the ABS off. Vehicles where control is more vital and weight is not an issue use either dual slip rate ABS (trucks have a switch that changes the ABS slip rate) or multi rate (e.g. Land Rover monitors gearbox for level of off road). The problem we have with the F650 ABS is peoples different riding requirements. The ABS is designed for wet roads. A small amount of dirt like sand blown onto a road or a hard dry dirt track acts like water on tarmac. The tyres can move the particles like they move water. Sand like on a beach gives the berm/wave effect so you want ABS switched off. Wet mud behaves both ways depending on the depth and consistency. Grass makes a big difference too even when mashed into the mud as it can either make a smooth surface (good ABS) or make the pile round the wheels stiffer (good non-ABS). The decision on when to switch off the ABS is down to the rider, who needs to know what is and is not off-road from the braking point of view. The BMW bike system is too basic to do this job itself, but there again bikers tend to be smarter than the average 4x4 driver. The only hard rule is to switch back on when you hit the tarmac if you want to get you money's worth out of the system. Andy Leeds UK #982

- To answer this question go riding in any loose surface conditions (hard pack does not really count). You will hate having the ABS engaged if you ride even moderately hard there. It actually makes the bike harder to control in my opinion. The ABS takes a lot of control away from you in low traction conditions. To ride successfully and perhaps safely off road one needs to master the modulation of both front and rear brakes up to and including full lock. Locking the wheels can be used to help steer the bike when throttle induced wheel spin is not appropriate. On larger GS bikes I would defer to others. With that much bike and possibly different ABS it might make sense on your basic hard pack dirt road. I think it has a lot to do with how you ride off road. Not all dirt riding is the same. Riding a dirt road that a passenger car could use is different than riding trails or desert at speed. ...and I could be full of cr*p too. Just my thoughts. BradG#1002

ABS Malfunction Questions

- **ABS Problems #1: Front Brake Unusable**
- **ABS Problems #2: Stopped Working**
- **ABS Problems #3: ABS light coming on?**

Refer Also:

- **Speedo ABS Sensor FAQ**
- **Brake Maintenance FAQ GS**

ABS Problems #1:

Q. Has anyone heard of the front brake becoming unusable because of the ABS sensor being positioned too far from the sensor ring?

I'm not referring to the ABS system itself not functioning, which should happen it the gap between sensor and ring is too great, but rather the hydraulic part of the brake system not operating. After doing some work on my F650 GS yesterday which involved removing and reinstalling the front brake sensor, I went for a ride this afternoon, and when I attempted to apply the front brake the lever would not move significantly, ABS pulsations could be felt in the lever, and the pads did not engage the rotor - there was no braking whatsoever despite very hard pressure on the brake lever. When the bike speed dropped to about walking speed, the lever could then be pulled toward the bar, the pulsations were no

longer felt, and the pads engaged the rotor. I assume the ABS system had shut down at that speed as it is supposed to do at around 10 mph. After I positioned the sensor closer to the sensor ring and test rode the bike (VERY carefully), the brake function was totally normal in every way. It has been my understanding that if the ABS system failed on our bikes that the brakes would function normally hydraulically, and normal braking force would occur, the only difference being that the ABS would not be functioning. On one other occasion I positioned the ABS sensor too far away from the sensor ring and what happened on that occasion was that the red ABS warning light came on but the brakes functioned normally in terms of stopping the bike. There was no change in the ability to compress the brake lever or stop the bike, as happened today. I've discussed this with the service manager at my local dealer, and he's also baffled by this, having never heard of such an occurrence. I don't find anything about this in the FAQs either. I'm leaving on a weekend trip early tomorrow AM, and even though the brakes seem to be completely normal at this time (I test road the bike extensively with many brake applications), starting a trip with any question about the front brake is obviously worrisome. Mike #926

A:

- By checking the rotation of the rear wheel you can determine if it has ground contact or not. When a wheel locks up, the ABS releases the brake pressure and waits for the wheel to start rotating again, the more weight that is upon the wheel the faster this happens, (this is why the front brake can pulsate at higher frequency than the rear wheel). If the wheel is losing ground contact, by using the front wheel rotation as a reference you can detect the beginning flight... If you're not using the rear brake, then you can detect the same thing the other way around. rakaD
- Assuming that the sensor setup is the same as my K75, be sure to check the sensor gap at SEVERAL (6 recommended?) intervals around the wheel ring, as the wheel ring is probably not absolutely round due to manufacturing tolerances. Still not sure that could solve your dilemma, though. Any chance that you crimped the sensor wire while working, maybe creating an internal (intermittent?) short within the lead wiring (that would cause no pulses, so ABS computer would assume "wheel locked" and release caliper pressure to try to get wheel spinning again...as long as the short remained, ABS computer wouldn't allow caliper pressure---until your low speed kicked the computer off)? Marty #436
- You can take the sensor and throw it away and the brakes will still work fine. The ABS will not but the brakes will work as normal brakes should. The ABS sensor gap on these is not critical. If you check the spec there is a big range they allow. Sounds to me like you did something else too that caused your problem. Did you have the wheel off? Maybe the pads got cocked? I don't know but I do know there are very few things that will make the ABS effect the braking action and when it does you can feel it in the lever. StuporXtech #1130 01 Dakar Or
- If the ABS does not detect front wheel rotation pulses when riding, it will after a few meters diagnose a sensor problem, lit the warning light, and the brakes will work as if the ABS didn't exist. In other words, the sensor must have been operating while you were riding. The sensor might have been just on the edge of not working. If however, and now I'm speculating, (or call it guessing), something flexed just a tiny bit when you started to brake, the borderline function of the sensor might have caused it to miss some of the pulses, fooling the ABS to detect a locked wheel. This flexing could be caused by an under tightened front wheel shaft, a floating part of the brakes might be stuck, pressing the wheel sideways, or whatever, please take a look. I have spent days in meetings, trying to predict possible errors that may occur upon electronic safety systems. One one hand it is hard to think of everything, on the other hand sometimes you think of a problem, but find that it's so unlikely that you make a note of it, but let it pass. The problem could also be caused by a defect cable that might cause glitches when the fork was pressed together, but such things are probably detected by the electronics. rakaD
- Any sensor fault will put the warning light on. The only ABS failure than would cause the front brake not to work would be a pair of part stuck solenoids. The ABS light would be on and there would be a distinct lack of clicking from the unit at ignition on. I'll bet real money the problem is with the basic hydraulics. Andy Leeds UK #982.

ABS Problems #2:
by Haakon#626 (Norway, F650GS)

Q. Has anyone had problems with their ABS? Mine stops working after riding a couple miles. It was at first intermittent but now it seems all the time. At the same time the Speedo stops working. (At least I am not putting miles on the Bike!!) Anyone have similar problems? The bike is still under warranty and is at the dealer now.

A. ABS Fault-Check Procedure

i. This are the first checks to make - not water-related except if one of the sensor "ends" is damaged, the water can do a lot of harm.
ii. First check that the sensors have the right distance from the rotor on the left side of both front and rear wheels-Distance between rotor and sensor must be between 1.00mm and 0,10mm (0,04 and 0,004 in). Raise each wheel and check at several spots on the rotor. It might be slightly bent at some places. One or more washers adjust the distance.
iii. Then check that the sensing "end" of the sensor is not damaged (due to the gap set too close, sand and stones or a warped rotor.
iv. Then we start on the water/ rain: Check that there is no water or corrosion on either connector- just trace the wires from the sensors. The one front the rear wheel is a small connector on the left side of the EFI unit under the seat. The one from the front wheel I do not remember where is located so just trace the wire. When you have the seat off, check the big connector in the EFI unit as well. Just pull the red "handle" to the left and gently raise the connector at the same time. I had a lot of water in that connector.
v. Then we start on the more difficult part: On the right side of the bike, behind the rear suspension spring tension adjuster knob/ handle you have the connector to the ABS unit. To be able to check it out it is best to remove the adjuster complete with bracket and move it out of the way. It is raining (seems the spring is upon us here in southern Norway) and dark outside so I'd rather stay inside.
vi. I have had to change both the EFI (Electronic Fuel Injection) unit AND the ABS unit due to water in all connectors. The water induced corrosion so bad that some of the "pins" in the units had disappeared- just some nice green stuff indicating where they had been. Check it all out - those parts are very expensive and do not trust BMW to change them under warranty as they did for me. Just one question: At the same time you have had the ABS fault, did you also notice any jerking and surging from the engine? I had that and "Supertech" explained that was because the EFI believed the bike was at a standstill and thus reduced the fuel/ air ratio. My mechanic confirmed this!

Connection at Motronic: 

Connection at Wheel  (Sensor Detects Slotted Disk as is passes by - Check for Mud, Sensor Mounting Bolts, Brake Disk & Sensor Disk Bolts)

Feedback:

- I have exactly the same problem right now. It started after the BMW dealer in Rio changed my sprockets and chain, and then a car cleaner at the dealer gave the bike a power wash. I rode away, noticed the ABS light come on and rode straight back. To fix it the mechanic took off the seat and sprayed WD40 then compressed air on two connectors - the one under the seat held on by a rubber band, and the big one just inside from around where your right thigh/knee would be when riding. The ABS and speedo worked again. until, that it, the bike got caught in a deluge

while parked on the mainland next to Ihla Grande (south of Rio). Let me say - we are talking rain so heavy that it bounces up and hits you in the head. so heavy that locals use scuba gear when they go for walks, so heavy that... well you get the picture. When I started the bike up again the abs/speedo was not working. a day later, after things had dried out I suppose, it started working again. Then there was another biblical deluge - this one in missiones - north eastern Argentina. This time I was riding the bike and noticed that the abs/speedo gave out after about 5 minutes of really really hard rain. great feature - abs that does not work in the rain.... I expected it to dry out but here I am, 1500 kms later and it only worked for 5 minutes when I started the bike yesterday. So now I will go and look at those connectors..... let me know if the dealer found the answer in another place. y_kiwi, Lance, #1303, '01 F650GS, '96 G650ST.

- The first time I had a problem with the ABS and Speedo was in a hard rain. It was last fall in the back end of a hurricane. Yesterday when it happened it was a clear day. But I did wash the bike the night before. Other times it has not been a heavy rain. I also did notice surging but my bike is one of the first ones and has never been quite right with all the re-mapping they have done. honeybrk
- Haakon. Great Reply. I wish I had seen it before yesterday. But I basically did all that you said - except I did not find (or look for) the abs connector under the seat. There seemed to be a tiny bit of water and corrosion (the bike was parked by the sea...) in the ABS unit connector. (thank goodness I figured out to remove the suspension knob first) I dealt with this and now the bike seems ok. today's run to Santiago will test that for sure. Yes - the bike did not run well - I guessed that the EFI was not getting the speed reading so had to make things up a bit or reset to safe mode. so fuel economy was down and idling was very rough. Cheers and thanks all, Lance, Lance, #1303, '01 F650GS, '96 G650ST.

ABS Problems #3: ABS Light Coming on

Refer the Speedo ABS Sensor FAQ

- Just thought I would update everyone on my ABS problem. The ABS light was coming on, the speedo would not work and there was additional surging. It was intermittent but seemed to be more likely to act up in heavy rain. The bike is still under warranty so I took it back to my dealer. Today (Saturday) a week later I picked it up. The problem was indeed the sensor. The back sensor to be exact. The wire had a split in the insulation that looked like it had been there for a while. The new sensor was installed and it was all covered by the warranty. So far it seems to be OK. I road it home in the rain - 40 miles of light rain to deluge conditions. honeybrk

ABS & Brake Bleeding. Can I still do it myself?

For Normal bikes without ABS see the Brake Maintenance FAQ, Otherwise note this:

Q. I have bled many brakes, many times, but I cannot seem to get the air out of my 02 GSLA FRONT brakes. Any suggestions on making a "hard job" easy? If I let the bike sit a few days, I can get the lever to go to the bars; if I ride it every day, the lever is still spongy, but will go to the bars when the ABS kicks in..... Not a safe condition. Steve#1059

According to the Shop Manual, you need a piece of BMW equipment called a BMW MoDiTeC to do it right. Bobcatou

This site, http://www.bendixbrakes.com/en_us/faq/index.html has this Q&A.

Q. Do you bleed ABS systems the same way as conventional brake systems?
A. Both conventional and ABS braking systems are bled in similar fashion. Certain ABS systems require the use of a bi-directional scan tool to cycle internal solenoids to purge the system of air.

Generally NO you Can't Feedback

- Some ABS components (e.g. the ABS pump/unit under the seat) requires a black box device (MoDiTeC) to bleed the ABS system completely. The device can safely energize the ABS unit to enable bleeding. Brad, N. CA., 2001 F650GS - Inmate #1002
- Here's a little surprise pointed out to me by Stuportech and confirmed by a dealer tech that I trust. In order to change the fluid and bleed properly, the 01's and later have to be hooked to the MoDiTech. Huh? You've got to be kidding! Crazy, but true. Since this is an annual event we changed our own. Got all the air out, had no problems, then Stuportech told me about the MoDiTech. Checked it out, got confirmation. Had it done the proper way. Color of fluid way lighter. Hmmmmm. Shelley in NM
- You can not bleed the unit without MoDiTeC or some other means to open the valves in that unit to allow the fluid to circulate. I know few believe me on this point it is fact. Perhaps some has worked out a way to open these but I know of no way but with Mr Mo. The facts in Can I bleed an ABS Bike referred to below are mostly true when dealing with ABS1 and ABS 2 bikes. The GS has ABSN which is different than any other BMW ABS system and needs to be treated as such. Steve 1130 Or
- I've never messed with brakes- so the air has been in the system from DAY 1. At the second service, I forgot to mention it and low and behold, no-one discovered a spongy lever. The dealer told me he would bleed with the MoDiTech unit. That is the only way to properly bleed the ABS brakes. Thanks everyone. Steve#1059
- In the repair manual with date 02/00, on pages 34.5, 34.8, 34.11, 34.12, 34.17 (two times on same page) and 34.19 the following text is highlighted: **Important:** If the vehicle is equipped with ABS, the brake system has to be bled using the BMW MoDiTeC, and the Control Units, Toolbox ABS, routine; this procedure is supplementary to that described in the Repair Manual. If the BMW MoDiTeC is not used there is a danger of residual air remaining in the control circuits of the ABS system. The repair manual downloaded from Motofiches (date 10/99) is incomplete and not very accurate. My manual could be dated by now as well. Pelle. Sweden..
- Unless someone has come up with a jumper system, you can't get the brake fluid all changed on 650 GS ABS bikes. The ABS system stores some and you must open the valves to get it bleed. Has someone come up with a procedure that allows a person to open these valves without MoDiTeC? Most folks I find are not even aware that this is necessary.
- On ABSN equipped GS's The ABS functions by releasing the brake pressure thru electric valves when the ABS is applies. These valves hold fluid inside them and when bleeding the brakes to "change the fluid" there will always be old fluid held in this system. If you want to change all the fluid, and you should, after bleeding the brake in a conventional manner, You must use MoDiTeC to release these valves and flush new fluid into to ABS unit and old fluid out. You must then re-bleed the brakes. This will completely change the Brake fluid as we all should do yearly. I know of no way to open these valves without MoDiTeC. It is also a little known fact that the master cylinders must be rebuilt every 18,000 miles on bikes with ABSN. I find this strange myself since you can't buy brake master cylinder rebuild kits for bikes other than the 650. They will only sell you a complete cylinder for safety reasons. As they should. Supertech
- Do the valves remain closed even if you turn the ABS off? If turning the ABS off opens these valves couldn't you bleed the brakes with the engine running?. Shelley798 USA, NM
- Sorry. When ABS is off these valves stay closed. They relieve braking pressure and you would have no brakes at all with them left open. Supertech
- Hit a wallaby and slid along the dirt road right side down. Surprisingly little damage to bike: indicator, brake pedal, scratches on plastic, dent in muffler cover. Was able to ride slowly home. However, somehow this little excursion must have allowed air into the front braking system as I

have no front brake pressure. There was a hint of brake fluid on top edge of reservoir but no sign of leaks anywhere else. Have tried Flash's method: loosen bleed screw, pull lever to bars and tie there, tighten bleed screw, leave overnight. Have done this 3 times and still no pressure. I am faced with a 1000km round trip to nearest dealer to bleed the brake. Have any of the clever contributors to this site found a way to properly bleed ABS brakes without hooking up to the BMW computer? Free wallaby steaks available for a method that works. Rick, '01 F650GS, Queensland, Australia.

Bleeding ABS - OK "but CAN I do it myself" if I'm REALLY Stuck Responses:

See also http://www.stoptech.com/whitepapers/bleeding_abs_122701.htm

- 1: I have changed the brake fluid here at home, no problems at all. (Reason: I suddenly lost my front brake power due to water in the fluid, just 4 months after I had changed the fluid. I had used fluid from a can that had been opened- and closed- a year before. Always use fluid from a new can and dispose of what is left. It is a real scare to suddenly loose the brakes and not worth the expense of some brake fluid.)
  2: I had to change the ABS unit (large aluminum block placed under the ECU).

  The reason was as with all other problems on my bike, water and corrosion. This time it was in the large connector you can (almost) see behind the right side down-tube, just over and to the back of the oil filter. I suggest you remove the rear- shock adjuster knob and check the connector on your bike, the Bosch ABS unit is very expensive. I have not used any pressure cleaning on my bike nor have I drowned it in water. I have just been riding in a lot of rain. OK- We changed the unit and my mechanic bled the brakes with a vacuum unit. Both the front and rear brake felt real stiff and good, no trace of sponginess or feather- feel in the handles. In fact, the brakes felt better than before. My mechanic demanded I take a careful test ride, but as it was cold, raining, and late in the evening I promised to take it easy and just go home, some 2 hour ride in the dark. As I was eager to test out my "new" bike, I used the engine and brakes to the maximum. After a couple of "test" wheel- lock breakings, where the ABS got to work I could "bottom" both front and rear brakes. When I got home, I tried to bleed the brakes but it did not help at all. I also tried to have the ABS work when bleeding but to no avail. Back to the workshop and hook up the MoDiTec unit. After all the preliminary steps, we started the bleeding procedure. Nothing seemed to happen but suddenly we heard a buzzing sound from the ABS and a geyser of air and fluid erupted from the reservoir. We did this several times- but now with the lid screwed on. I got my brakes back and working. I am a bit pissed off that I have to go to a workshop to bleed the brakes but it seems there is no alternative. IMPORTANT: I do not think you **have** to do the MoDiTec bleed if you just change a brake line or such. The reason I had to do it was to "shake" loose small bubbles trapped in the ABS internals. If the ABS is not disturbed the whole system is just as any other brake system? Haakon#626 (Norway, F650GS)
- I'm wondering how the air got in there in the first place? Did this happen when you were bleeding them? I ask because it is possible to have air in parts of the system that cannot be bled in the conventional manner. I'm not at all sure of the details but it has been stated here a few times that some ABS components (maybe the ABS pump/unit under the seat) requires a black box device (MoDiTeC I think it's called) to bleed the ABS system completely. The device can safely energize the ABS unit to enable bleeding. I bled my ABS brakes recently without a problem but I was very careful to not allow any air into the system to avoid having to take it to the dealer. This may not be the case for you but I mention it because it sounds as if you have already tried the obvious. My other thought is to use a suction pump to pull the fluid out. Maybe the air is located so high in the line that you can't force it down. But that seems unlikely doesn't it? Brad, N. CA., 2001 F650GS - Inmate #1002
- Loosen the bleed screw. Pull the lever to the bar and TIE it there. Tighten the bleed screw. Park the bike with the master cylinder as high as possible. Leave it over night. Problem solved. Flash 412 (CO)
- I have changed the brake fluid without any trouble, plain lever operation/ bleed screw procedure as on any other vehicle. Just one question: you say the brakes work fine if you use the bike every day and that you get the "sponge" brakes after a few days with bike parked! I would guess that air in the fluid was air in the fluid? Try Flash's remedy, it often works wonders. I once had a

very small leak at the master cylinder that I only found when I used a strong rubber band to pull the lever. After half an hour the lever was nearly touching the handlebar. That small leak let some air into the system over time, without any trace of fluid anywhere. Haakon#626 (Norway, F650GS)

- I've bled my abs equipped bikes brakes several times with a suction bleeder (a MityVac) with no difficulty. Due to the length of the brake lines a lot of fluid needs to be pulled through the system, but it's always been a relatively easy task - I simply follow the instructions that came with the bleeder. I've never had to involve the bikes computer. Mike #926 Calif.
- I suppose if a guy bleeds the brakes, changes the fluid. Take the bike out and ABS stops the bike a couple of times. Re-bleeds the brakes and repeat this cycle a couple of times a guy could do a decent job. Problem being you have to get the fluid out of the ABS unit and it doesn't come out when bleeding. MoDiTec simply opens the valve so you can do this. F650GS Dakar, Oregon. Steve 1130 Or.

Can I turn off ABS LED?

- No the light flash's as a safety so you have a reminder you have the ABS off. You can not turn that light off. KiwiDakar (02)

What About Retrofitting ABS?

by Andy Leeds UK #982

Refitting ABS is not an option. First you need a new brake system and new wheels. That's more than 1500 Euros to start with. Next you need a "competent" person to write you a report saying its fitted and working to the exact same spec as what BMW fit OE. If you are lucky your local authorities will then accept the registration. If not they will ask to see the type approval certificate, BMW will refuse to give you a copy and you have a worthless bike.

Can a Good Rider REALLY do better than ABS?

Pqbon vs. Andy #982

PQbon, referring to Andy #982 original comment above. i.e. Can a good rider do better than ABS?

ABS does NOT actually lengthen the theoretical stopping distance. ABS only kicks in when the wheel is already locked. It unlocks it. A good rider will be unaffected by ABS since he can modulate his breaking before the wheel locks up and the ABS kicks in and starts pulsing the breaks.

So to reiterate. If you are a super-duper motorcycle god ABS will be invisible to you. When the young child runs in front of your bike by the school or when you realize that there is stop sign you didn't see or when the car in front of you drops its tranny you will modulate your breaks and defeat the lock up. For the rest of us we can grab the front breaks in and mash the rear pedal and stop with out worrying about a low or high side from the skid (or the skid not stopping us fast enough and we kill the kid, run the stop, or hit the new transmission laying in the road in front of us...)

For any who doubt this look at how the ABS works. Your front and rear wheels have optical sensors the use a slotted ring. If one wheel is spinning and the other is stopped and the breaks are on the ABS can pulse the locked up wheel's brake. This in NO way interferes with an EXPERT from stopping the bike really quickly because the ABS can only detect a lockup... It can do this faster then a person can but it can't (not with the system on the GS) intervene before the front and rear are spinning at different rates (only really possible with one wheel either locked or almost locked.) Some ABS systems can do prediction. however, the system on the GS/Dakar isn't that sophisticated.

Now to put it succinctly ABS is reactive. ABS won't do anything unless YOU the rider has already screwed the pouch by grabbing front brake before the weight transfer or holding the rear after the weight is transferred.

Andy #982 replies:

Just a couple of points, ABS sensors are inductive not optical. The sensor ring makes a voltage and a sine wave amplitude. This gives all sorts of information about the wheels condition as well as rotational speed. ABS cycles in deep slip not at the point of wheel lock. Any braking involves slip. To simplify the bike does 100 kph, the wheels turn equivalent to 99 kph you have slip and hence braking.

A locked wheel has 100 % slip. Above 80% slip the brake force actually drops and the wheels ability to transmit side forces becomes low. You cannot steer and have no centrifugal force to help balance. ABS aims to stay in the 5% slip region below the uncontrollable zone. As 80% slip is exceeded it lets the brakes go but then immediately reapplies to try and get back to the maximum braking point. Hydraulic systems are slow a rider is slower. A typical full ABS cycle on air is 0.02 seconds. To pass EC/98/12 an ABS system has to equal 75% of the deceleration achieved using micro adjustment valves. You do the same stop time and time again adding a 0.1 bar pressure on single wheels until the wheels lock for more than 0.25 sec. Then you do an ABS stop and compare the deceleration. Who says test tracks are interesting (yawn)!

My original post is correct about the theoretical stopping distance. If some one was lucky enough to hit 80% slip and stay there they would beat the ABS cycling between 75 and 82 %. If such a person exists they'll be taking over the world not playing on F650's. The rider who can beat ABS first time out is a job for geneticists not engineers. Theory and practice are separated by the human element.

Weight transfers off the rear wheel making it unable to transfer torque to energy to the road. The tyre contact area gets smaller, the brake torque is high, the wheel does into deep slip and ABS cycles. Weights transfers onto the front wheel, increasing tyre contact area. You have to brake very very hard to exceed the available grip at the front.

Opinions on ABS

- Just stumbled across the following lines from a site on the web and thought I'd pass it along to those who might be interested. (full article at link shown below). Having ABS, I mashed both brakes during my riding exam, and came to a pretty good stop. If ABS allows me to use both brakes to their fullest capability, then I guess I like ABS. Scott, ID

  According to the American Motorcycle Safety Foundation, if you try to get the best out of both brakes in an emergency, you will get the best out of neither. The MSF says you can't concentrate FULLY on both brakes at one time. You know your mother's old nag, "You can't concentrate on two things at one time"!

  So, to get the best braking, you have to concentrate using either the front or the back brake and, since the front brake gives up to 80% of your braking power and incorrect application is likely to make you fall off, it makes sense to concentrate on the front brake.

  The American Motorcycle Safety Foundation teaches their instructors that "in an emergency braking situation you should apply the back brake hard and let the back wheel slide if it wants to. This way you can concentrate on what is happening up front; there's enough to think about in the use of the front brake."
  from: http://www.webbikeworld.com/Motorcycle-Safety/braking-tips.htm
- I think my brain is pretty cool. It has this one section, called the "autonomic brain center" that does a lot of stuff for me that I don't have to think about, like breathing, heart pumping, etc. The brain takes care of other things, too. A lot of times, all I want is something done, like, pick up a pencil and I don't even have to think about what muscles to move and when, I just decide to pick up the pencil and the ol' brain just puts all the pieces together and voila, the pencil is picked up. The consciousness center of my brain basically decides what I want and then the motor section coordinates all the details without the conscious having to tell everybody what to do. I like this arrangement. Same thing happens when I want to stop my bike. I just want it to stop

and the brain does the rest. It knows what levers to pull or push and just does it. I really don't have to 'think' about it, I want it done and the brain takes care of all the details. I think this is why I had a big problem in the braking exercises during the experienced rider MSF course. They didn't like it when I said I never 'think' about braking, I just do it. They tried to get me to "concentrate" on this or that but I just couldn't. Of course, I came to a stop where they wanted. They didn't think I was "concentrating" enough or looking in the proper direction but I passed all the tests. The worst part was the rear wheel skid thing. They wanted me to keep skidding the rear tire until I came to a complete stop. It was very difficult to do this because my brain instinctively told the foot muscles to slowly let up on the rear brake pedal when the butt detected a skid (a distant skid, not local). It took several tries but I finally succeeded in having the rear tire skid to a stop. I was glad I could do it but I've never done it since. Doesn't make sense to me. But MSF swears by it. These are the same MSF people who like to critique my riding, unsolicited, while leaning out the window of their cars at various intersections of this fine city. They ask if my F is my "first bike." Nope, it's like the eight or ninth one, I stopped counting a while back. If they don't ride here, what makes them think they can tell me how to ride here? Ya know, I've had a bike with ABS. It caused a lot of problems, especially on slippery surfaces. My brain and I didn't like the bike's ABS computer doing the thinking for us. I got rid of that bike. And it is well known that certain moto magazine editors in the USA can stop comparable bikes in less distance WITHOUT ABS than with ABS. I'll keep my brain and my non-ABS bike until some unelected unaccountable tolerant open-minded liberal bureaucrap in California makes it impossible for me to choose a bike without ABS. I'd suggest you don't "use your brakes" but that you simply stop your bike. And practice stopping it WHERE you WANT it to stop. Shank NYC USA

- For me the proof was in the pudding at the last braking and cornering course I did with Top Riders (Qld Australia) at the Darlington Park Race Track. By the end of the day after a lot of tuition and practice, front brake only, back brake only and combinations I was stopping from about 120k around 20 to 25 metres shorter than when I started. I have been riding for a while and was really surprised and pretty happy with the results. Tuition by experts and practice wont do any harm unless you come out of it under the delusion you are bullet-proof. Ratso
- I also agree Shank, all except the part about not wanting ABS. I never trust the ABS to save me, if it activates I consider myself to have failed braking. If the rear wheel ABS activates it's no big deal, but if the front wheel ABS would activate, I would realize that it might have saved me from crashing, and start practicing my braking skills more often. Braking by reflex? Yes I fully agree, and you can train your reflexes! By the way, the difference between genders is smaller than the difference between individuals, so don't believe that only a woman can do two things simultaneously. Let me give you an example, men are usually taller than women, but some women are taller than most men. rakaD
- Shank is (predictably) right on: the skill should be developed to a level where it "just happens." Those who practice martial arts, baseball, etc. etc. spend hours honing their respective skills so when their time comes to to perform, they react with precision and skill without thinking about it. Why should a motorcyclist, whose life may depend on his/her skill level, settle for less? The MSFs claim that you can only do one thing at a time might very well apply to a nervous, shiny new rider, but personally I can't begin to agree that it applies to anybody else. Better to teach the new rider to coordinate hand and foot, rather than take the hopeless position that only one body part can be trained to respond. Absurd! As for *ABS: >And it is well known that certain moto magazine editors >in the USA can stop comparable bikes in less distance >WITHOUT ABS than with ABS.* I don't doubt that, but I'm no expert track rider, nor do I think I have the presence of mind (just yet) to rely on the autonomic response to be in prime condition during an unexpected event. Until then, I suspect my ABS is more reliable. I think. Actually, a co-worker and I discussed this recently, and his recollection of the "expert rider" comparison was that yes, they could stop faster WITHOUT ABS under CONTROLLED conditions. But, and this is second hand info, but these same riders apparently would prefer to have ABS on their bikes, admitting their brains will not likely perform at 110% during an emergency, that they might not be able to "process the feedback" well enough when it counts. I haven't read these articles, but this was what I was told.
- Females do have a much more highly developed corpus collosum than males (these are the nerve fibers that link the two hemispheres of the brain). As with any upgrade/modification, it does have its advantages and disadvantages. It makes them much better communicators but

hampers spatial tasks and concentration and to some extent, hand-eye and hand-hand coordination. Now before anyone gets their knickers in a knot, this is not the case with ALL XX chromosome types. But I did once have this very smart, very communicative girlfriend (who became a lawyer, which requires excellent communicative skills and linking A and B together) but she could not pack her bags, or arrange boxes in the trunk of her car and watching her trying to use a manual egg beater was hilarious (laughing got me hit, hard, with pudgy little girl fists, which only made me laugh harder, then the brick got dropped in the purse and I was summarily whacked). I haven't practiced braking in a while but what I used to do was go into an empty parking lot with two colored stones or whatever for markers. I would put a marker out, ride up to it at some pre-determined speed and then hit the binders for all I was worth (skidding not allowed) and where I stopped I'd place the other marker. Then I would try it again and try to stop before I reached the second marker. It's tough and can be frustrating. But practicing either brake by itself was something I never did. I will try that next time I do braking practice. Thanks for the idea, Ratso. Lately I've been working on choosing and maintaining a cornering line. Maybe it's time for some braking practice. Shank NYC USA

- I think Andy Leeds had the best comment about ABS. if ABS kicks in, that is a signal that you've overdone something and made a mistake. Always brake as if you don't have ABS, and then be very glad that you do if it kicks in. Regarding the rear brake, it DOES have some stopping power at the very beginning of the braking cycle, before the weight has shifted forward, but after that it will add nothing if you are using the front brake to it's limit. Mason #631
- The rear brake is going to provide some force. Braking is about the friction between the tyre and the road, the brakes been able to produce a massive amount of friction by comparison. The friction at the tyre is a factor of road surface (Mu) and contact area. Contact area is related force that flattens the tyre down onto the road. Mu depends on the road maker and the weather. BTW get those tyre pressure right too if you want to brake hard. The front has all the advantages. The weight transfers onto it. This is why lots of bikes have two disks on the front. The rear has weight coming off right to the point where you do a stoppie, its only advantage is that if it locks, its tendency to accelerate past the front takes time to become critical. With a 50/50 brake split static, the front typically produces 75% of the force. If you want to do this scientifically for your riding measure the disk temp. Temperature is related almost directly to the amount of work the brake did. Brakes mostly turn kinetic energy into heat. The ABS is going to find the critical area where slip is maximised without loosing sideforce etc. But, and it is is a big but, if the rider panics (like the magazine editors) and tries to beat the system, it cannot work as designed. If you release or modulate the pedal, the system must assume you have finished braking. The rider beats the ABS but not in a good way. Cars can have brake assist where this reaction is detected and ignored, but on a bike, this is going to be difficult to get right and so is not yet available (that I am aware of). With ABS, forget technique, just squeeze the controls and ride. You still need to be able to ride non-ABS for that day when the fuse blows. Non-ABS, we are taught a totally different technique in the UK to that described on MSF. You apply the front brake until you feel deceleration, then the rear, then feed in both until you have enough. That said, there are a lot of riders (mostly cruiser riders) who think the front brake is too hard to control (fear a lock) and other (typically sports types) who never use the rear (fearing a slide no doubt). You need to be able to use both. You need to be able to find (but not pass) the point where the front is in too deep a slip to control. You also need to ba able to detect and react to a rear wheel lock. Mostly you need to be able to decide in an instance if the surface will take the braking you need. If you have space to risk locking the rear but going down would be lethal (motorway lane), give priority to the rear control and only give the front what you know it can take etc. Given you have to make this decision in an instance, I'd tend to agree its a feel thing and practice is best. Women do tend to be better at multi tasking. As a result, they can be better riders and drivers. The big advantage they have is that they identify the risk sooner and prioritise the response. Braking technique apart, if they (or a man) brake sooner, you'll get away with less skill at skid control. There is no reason a guy can't achieve the same level, we just need to practice more. British Army 6P's: PPPPPP, Planning and Preparation, Prevent P*** Poor Performance. Andy Leeds UK #982
- Speaking of ABS... I'd like to hear opinions about how much of a safety factor you all think ABS is. A co-worker went down on the Bay Bridge last week. He is a very experienced rider. He says that a car came over into his lane, and despite restrained braking, his front wheel locked on the wet pavement and down he went. Luckily his injuries were minor. The bike is probably totalled.

Do you think that ABS would have helped? Or is it that sometimes you hit a slick spot and there is little you can do except be prepared by wearing good safety equipment? Mr Stan F650GS

- MrStan, In the situation that you described ABS definitely would have helped. In a low traction environment you don't need to be an expert to get max braking with ABS. That's the beauty of it. It takes the guess work out of the available braking traction. Tom McCallum.

- Last week I was riding down a two-lane highway, a few car lengths behind a pickup truck. In the oncoming lane, I see that the driver wants to make a left hand turn across my lane up ahead. I instinctively flip on my high beams, and cover the brake and clutch. Sure enough, as soon as the truck passed her, she starts her turn. Half way through, she sees me, and stops, blocking my lane. Everything went down....clutch, brake, shifter, rear brake. Under my right hand I felt this "pulse...pulse...pulse....pulse...pulse...", and a similar feeling under my right foot. She finally gunned it, and I stopped a few feet shy of where she would have been. No doubt about it....that "pulse...pulse...pulse...pulse" of the ABS stopped me from going down. I love my ABS. Doug, '03 Silver CS.

- I've ridden both with and without ABS since it was introduced on bikes in 1988. It was an important reason for choosing my present bike so obviously I'm positive about it. However ABS should never be used as an excuse for not practicing efficient braking without the aid of the anti-lock. On the GS ABS can be disabled by a switch. The front ABS-sensor on the CS is fitted with one screw and if the sensor is removed and tie-wrapped away you will effectively disable ABS for your practicing sessions. Of course all the common sense things applies here about not overdoing it, making sure there are no objects to crash into and no crowds of people around. Having an experienced rider there to give you tips is usually valuable as well. Good luck! Pelle F650 GSDA '02, Stockholm, Sweden.
  ABS only helps significantly in a straight line stop (unlike a car, but still better than none). BMW recommends replacing rubber brake hoses (I forget the interval) as they tend to get fatigued over time. Part of the improvement people feel can be traced to having "new" brake lines instead of "tired" ones. But my guess is the steel ones are at least as cheap as new replacement BMW rubber ones, so why not improve? Marty #436-Chicago-97 F650F

- I just read the ABS FAQ and thought I might mention two situations where ABS was a factor - Any comments appreciated.

  1- I Love ABS :
  Recently on my wan into town after a short rain shower a car swerved to avoid something and ended up in the clear lane I was riding in, I was behind a guy driving some kind of roadster, we both hit the brakes, we were on a slow bend, I watched as his bike fish tailed under him due to the lean form the corner and the fright he got that made him lock up the rear. While he was busy trying not to dump the bike and not to soil his pants, I was able to actually steer away from him while I hammered the brakes stopping just short of the car which now had a roadster in its wing and the rider on the hood. I know you could say that a great rider could have managed this without ABS but I am willing to bet that even the best lock it up from time to time.

  2 - I Hate ABS :

  A pedestrian stepped backwards off the sidewalk right into my path, I was in traffic and had nowhere to go, Trusting in my god ole ABS I Clamped on the brakes, the bike began to stop BUT as far as I can tell the road surface was uneven, not slippery just bumpy, All of a sudden my brakes kick back against me so much that they release and the bike lurches forward until I can get a good squeeze - i figure that I probably jumped forward about 7 feet - enough to give the pedestrian a good thump. Without ABS I would have been fine as I would not have hit the brakes so hard (lesson learned) BUT HAS this happened to anyone else, I have since replicated this just to be sure (no pedestrians involved) and If you really hit the brakes and the road surface changes - like a seam in the concrete or a bump- it seems to really confuse the ABS and you really loose your brakes for a second. '03 F650GS, Dublin, Ireland. gkb
- Every thing has pros and cons, as you note gkb, including ABS. I for one, prrefer not to have it, as it costs too much, adds extra weight, is difficult to service, is tough on the bike's electrical

system, I am very careful when riding in the rain and give vehicles in front of me lots of space and I have other bikes without ABS that I ride every day and would be confused in an emergency as to which bike I was riding at the time. However, I can certainly see the value in ABS and in fact specifically ordered my car with it. I would never discourage anyone from getting a bike with ABS, it is just not for me. After 40 years of riding non-ABS bikes, I have gotten used to not having it and I am digging my heels in against the progress of new technology. Richard #230

- << I figure that I probably jumped forward about 7 feet - enough to give the pedestrian a good thump >> Yep, that is ABS behaviour when crossing a very slippery object (iron manhole cover) while braking hard. Although I think most of the time it is less than 7 feet (unless the slippery patch is big) it certainly has a worrying feel to it. The pause in the breaking actually feels as 'acceleration' to me. IMO there's no real alternative to this behaviour as well, you cannot invent friction where there is (almost) none. The F650 is my 4th motorcycle with ABS. If in the past it saved me 3 times from dropping the bike, I find it money well spend. And during normal breaking it is not in the way. On top of that on an F650 it is not heavy and reasonable priced in comparison with what it used to weigh an cost on K and R models. To me ABS is a very valuable add-on on a motorcycle and one of the reasons I ended up with the F650GS instead of an Aprilia or the like. Robin '03 F650GSA, Amsterdam, Holland.
- << I figure that I probably jumped forward about 7 feet - enough to give the pedestrian a good thump >> The bike will seem to "jump forward" if it encounters a complete loss of traction -- having no traction it will release the brake to keep the wheels rolling rather than locking. If there's really no traction there then there is nothing you could have done better without ABS -- you would have slid forward no matter what, except you would have wheels locked and may have dumped the bike instead. If there's no traction then there is no traction and no amount of brake manipulation, ABS or not, will keep you from sliding or jumping forward. You might also consider -- consider only, I'm not saying it happened -- that you could have mistaken the ABS pumping action for release of brakes. On the F650 when the ABS is activated you'll feel like the brake lever is being released and re-applied rapidly. But in truth it doesn't fully release the brakes, it eases them off only to the degree required to keep the wheels rolling. After we got our CSA I went out on the first rainy day (only a couple of days after we got the bike) and deliberately tried to lock the brakes, got the full ABS action. I wanted to learn what it would feel like on this bike and best to find out under controlled conditions (well, semi-controlled -- a public road with no one on it). Aside: Some time ago my wife, a beginning rider, watched a woman on another bike lock up the rear wheel on a panic stop, fishtail, and finally dump the bike, taking a fairly painful whack in the process and damaging the bike. Between that and having experienced how easy it is to lock the rear wheel on the Intruder my wife was riding at the time, I think it made her very leery of really hitting the brakes hard, afraid of crashing the way she'd seen the other woman do. When she started riding the CS I told her not to worry about that: "If you have to make a panic stop, don't be afraid to apply both brakes as hard as you can -- they will not lock up and you won't dump the bike the way that other woman did." A few days ago she misjudged a traffic light, ended up making a full-on panic stop to keep from going into the intersection, hit the brakes *really* hard, and...just stopped. No skid, no slide despite the grungy surface near the intersection -- just a scary moment that turned out fine. Should she have judged the traffic light better? Yes, and with more experience she'll likely be better at it, but one cannot expect expert judgment and behavior from someone just starting out (and even "experts" make mistakes sometimes). For the moment I was very glad that she, though a novice, still felt the confidence to hit the brakes full-on without fear of locking and crashing, and thereby avoided going into the live intersection, where consequences could well have been far more tragic. DesertRider '03 F650CS (hers) / '02 TW200 (hers too)
- During the MSF class a few months back, my wife was constantly locking up the brakes of the bike - some exercises they encouraged it (to experience the feeling), while others she did it inadvertently. She made the comment that while she knew she was getting a bike with ABS and this wouldn't be a problem, she still wanted to get the feel of brakes locking up, etc - but also didn't want to be timid on the brakes if she needed to do some kind of a hard/emergency stop. I'll have to say that for a beginner (me and the wife), the ABS was a factor in purchasing the CS' that we ended up with.....p.s. I've only activated the ABS on my bike once - crossing railroad tracks (metal plates) and had to brake - felt the ABS kicked in - no sliding, etc. '03 F650CSA (Titan Silver) (mine) and '03 F650CSA (Graphite Metallic) (better half), Cincinnati, Ohio.

- Trusting in my god ole ABS I Clamped on the brakes, the bike began to stop BUT as far as I can tell the road surface was uneven, not slippery just bumpy. I don't have ABS on my motorcycle, so this may or may not apply, but I occasionally browse a similar message board for my car (a Subaru), and lots of people there have complained about the ABS behavior on bumpy roads. The consensus there seems to be that the wheels momentarily lose contact with the road surface, which confuses the ABS sensors (I don't know if the wheels lock up for a split second, or if the wheel speed changes dramatically in some other fashion). Apparently, there's nothing that can be done, other than to be aware that this is a possibility under hard braking on rough surfaces. Just something else to think about. 1999 Cagiva Gran Canyon. Former 1997 F650 owner currently on parole. May be sent back to the Chain Gang for parole violations (i.e., test-driving a 2003 F650). Urbana, IL, USA. josh #581
- I used to have a Chevy Blazer with abs (was glad to get rid of that pos) and they acted the same way over a bumpy surface. I don't believe the abs was confused though, a tire in the air has absolutely no traction, so it would take a complete absence of braking to get the wheel to turn again, which is what the abs is supposed to do. The net effect then is that over chatter bumps, the abs will turn off the brakes. This would happen during normal braking, not just hard braking, if you were going over the bumps fast enough. '01 Dakar, Nashville. SScratch
- Every thing has pros and cons. I for one, prefer not to have it, as it costs too much, adds extra weight, is difficult to service, is tough on the bike's electrical system - Richard #230
- The F650 is my 4th motorcycle with ABS. If in the past it saved me 3 times from dropping the bike, I find it money well spent - Robin '03 F650GSA, Amsterdam, Holland.
- Next

The Brake Bleeding/Maintenance FAQ

by Kristian #562:
Please read the Disclaimer before attempting any work in this FAQ.
23/11/01

If you are looking for information on how to CHANGE your Brake Pads, see the Brake Pad FAQ

For Other Brake Questions see the:

- **Brake Light FAQ**
- **Brake Questions Misc FAQ - Includes General Maintenance, Problem Solving and Aftermarket Parts**
- **What about ABS & Bleeding Brakes**
- **Brake Maintenance FAQ GS**

DISCLAIMER: My Father told me a long, long time ago, if you are buying a used vehicle, there's two things you need to make REALLY sure of; Brakes & Tyres. Changing the Brake Fluid is a simple job, but nevertheless should not be done someone who is not that confident with their mechanical abilities. I'd say that very little mechanical experience is OK if you are mechanically *inclined*. Having "No Brakes" is not much fun and is just plain dangerous. ed

Take great care with brake fluid. It will rot pretty much anything known to man, especially organic stuff like eyeballs and skin. Keep it off the paint and if you spill any wash it off with gallons of cold water. Think acid and you'll be safe enough. Andy #982

Why should I bleed my brakes ?:

Well there are several reasons:

1. New Brake fluid is fairly incompressible. So when you squeeze your brake, the force in the piston at the Lever goes to the piston at the calliper with the fewest losses. Over time however, a couple of things happen. One is that air can get into the system, either by absorption directly into the brake fluid or more commonly by absorption of water, which contains air.

   Air is much more compressible than Brake Fluid. Think in terms of childhood games with a needle-less syringe filled with water. If you put your finger over the end and squeeze the plunger, it doesn't move at all, or not so you'd notice. With air in the syringe rather than water you can compress it a fair bit. Same happens when air gets absorbed into your brake fluid. It's what makes your brakes feel mushy or squishy.

2. The second thing that happens is that the brake fluid can absorb water. This water very often gets into the system as a result of condensation due to heat, from when the brakes or hoses get hot. Water can have dissolved oxygen in it, which when hot expands into small air-bubbles. Enough of

these can also make the fluid more compressible. The water, if left in the system, can cause corrosion of the Cylinder, which is what eventually ruins your seals. When you bleed your brakes and the old fluid is brown, part of that is the corrosion.

3. Water in the fluid will boil and change state from compressible gas to incompressible fluid during the brake application, the change in volume causing a change in brake force. Old brake fluid can cause a failure that is fast and dramatic. i.e. if they get hot from constant use down a hill, you can have a situation where you will have NO BRAKES. So change the fluid regularly.
4. Basically, if you ever do anything that results in fluid coming out anywhere except the filler, you need to think about bleeding. The F classics are very easy to bleed. I don't know about the ABS bikes, they might take longer. If you take the lever off the master cylinder there is no need to bleed.

How often should I bleed my brakes ?

Dot. 4 Brake fluid or any new brake fluid is clear. If the brake fluid in your sight glass on the Handlebar becomes a darkish brown, it's time to change your brake fluid. Good brake fluid is clear as a rule. Bad fluid can be clear, but tends to be cloudy. If it is clear the only way to test it is to measure the boiling point. This is not recommended at home, it is easier just to replace it at the set intervals.! If there's two things you want to be absolutely sure of on your bike it's Tyres and Brakes. (and the Chain Master Clip, but that would be 3 things). Otherwise the BMW Manual recommends every two years. Many people do it annually, especially if they winterise their bikes.

- Brake fluid can turn very dark in color very rapidly and there is no reason to assume this was not done. Brake fluid turns dark quicker the more the brake is used and the more moisture it is around. The rear brake on these is right out in the open and you must use a lot of rear brake. I have seen this rear brake fluid look like coffee in way less than 6k miles on my bike and others. StuporXtech #1130 01 Dakar Or
- Brake fluid can turn nasty in a few thousand miles (especially the front), which is why it's on the annual service checklist. If it didn't get horrible, why would we tell you to change it? :-) Todd #389

How should I bleed my brakes ?

Bleeding your brakes involves replacing the old contaminated fluid with new fluid. Assuming you have the stock bleed nipples:

Note Well:

1. Brake Fluid is like Paint Stripper. If you spill any on your paintwork it will eventually strip the paint. So don't drip any or spill any, if you can help it.!
2. I hesitate to write this because I am afraid someone (children) might try it, but DON'T it's dangerous. If you have a Pool or Pool Chlorine lying around somewhere, **DO NOT** let Pool Chlorine and Brake Fluid Mix. The chemical reaction produces a LOT of heat and a wicked flame. In enclosed spaces it is particularly dangerous. This goes for using Glass Jars that MAY have had Chlorine in it or any Cleaners, like Washing Powder which contains Chlorine, that may have been placed in a Jar.
3. Don't get any on your eyes and try to keep it off your skin.

Parts/Consumables:

- **By New Dot 4 Brake Fluid. It breaks down with time (absorbs water), so buy fresh stuff, not something you have had on the shelf for 5 years. Buy a SMALL bottle, because if you leave it opened for too long, it's almost as useless as used brake fluid.**

Notes on Brake Fluid:

- DOT4 will definitely harm paint. DOT5 is silicone based fluid, which is also the one less likely to absorb moisture. Unfortunately Brembo specifically recommends against using silicone based fluids in their products, citing chemical incompatibility with the composition of their rubber. DOT3 and DOT4 are American test performance standards, not chemical content standards. In Europe

and Japan (probably the rest of the world) brake fluid meeting DOT3 standards was superseded by European standards years (decades?) ago. Those European standards are what DOT4 is intended to match. Todd#389.

- DOT4 is DOT4, no matter whose name is on the bottle or how much more than the $0.89/pint stuff it co$t$ (with a BMW label). DOT3, DOT4 brake fluid differences? Just boiling point. But this idea does NOT hold for any other DOT ratings, ONLY 3 and 4. Flash.
- Also, DOT 3, DOT 4 and DOT 5.1 are all water based and I believe can be interchanged and mixed without problems. DOT 5 is a whole different beast, and not recommended. Mason #631 - 97ST in PA.
- FYI you can get racing brake fluid with a higher boiling point. This way it can heat more without fade. The Brembo breaks on the BMW are really good parts just need to have fluid that can handle it too. The name of one brand is fast blue I think. Don, Rochester, NY. ***You do NOT need this Type of Brake Fluid and it MAY have other considerations you are not aware of. Do not be tempted, unless you KNOW what you are doing. ed.***

Tools:

- A 11mm Spanner. Use a Ring Spanner, not an open ended spanner, if you can help it. It stops rounding the Nipple Nut and is easier to Nip the Nut closed with a ring spanner.
- Allen keys (In toolkit, to remove the Side Panels)
- A well-fitting Philips Screwdriver, for the Front Brake Reservoir.
- A clear plastic hose about 2 feet long, just big enough to fit over the bleed nipple. Too big and it will leak and things can get really messy.
- A Glass Jar, not too tall that it will fall over. Don't use one that had Chlorine in it.
- A helper, if you don't have speed-bleeders (but don't call Helpers Tools, they don't like it ... especially Women).
- If you are a messy creature, consider Wearing Gloves and Goggles.

Safety

Spilt brake fluid should be washed off using a low pressure stream of fresh water. If you get in on your hands, you want to run them under a cold tap for at least 10 minutes. Don't use soap until you've washed and dried them, the soap can contain Chlorine type stuff. Brake fluid in a cut stings like mad, so you need to try and get water in the hole to wash it out. Latex medical gloves give reasonable splash protection. I'd recommend use of safety glasses.

Getting to Work:

If you are replacing your Brake Pads at the SAME time, (see the Brake Pad Replacement FAQ) note that the NEW pads are thicker than the old ones, and hence push the Piston in the Brake Calliper back a bit. Thus, once installed the Brake Fluid Level in the reservoir will be HIGHER than with the old pads. SO do the Brake Pad Replacement First and then the Brake Bleeding. If your Brake Reservoir was full BEFORE you replace the pads then, try and remove some fluid with a Turkey Baster or something first, otherwise when you squeeze back the piston in the Calliper to get your new pads IN you will cause the reservoir to OVERFLOW.

Rear Brake:

1.) Remove the Seat and Remove the Right Hand Side Panel (Two Allen Bolts)
2.) Under the Coolant Reservoir Tank is the Rear Brake Reservoir. (That one is too full).
3.) Before you start. Make sure your reservoir and reservoir cap is clean. If you get dirt into the lines its like letting air in, because, dirt is also compressible. Remove the Reservoir Cap and have your New Brake Fluid Bottle handy.
4.) Locate the Rear Brake Bleed Nipple. Remove the Rubber Dust Cap.
5.) Now put your ring spanner over the Nipple FIRST, then attach the Plastic Hose, pushing it firmly over the nipple. Put the other end of the hose in the Jar.
6.) Get your helper ready at the brake pedal.
7.) Now just cracking open the nut, simultaneously get your helper to SLOWLY depress the Brake

Pedal, and ask them to tell you how far down it's going as they do it.
8.) When it's almost all the way down, Nip the Brake Nipple closed. Do this before your helper lets the Brake Pedal come up, otherwise you will suck not only the old fluid, but also air, back into the system. Nip means just tighten till it seats, then gibe it a very small amount more.
9.) Repeat this exercise #7-#8, until the Brake fluid level is on minimum, but do NOT let it get empty, or you will introduce Air into the System.
10.) Top up the Reservoir and repeat the Brake Depress/Nipple Nut Open/Close (#7-#8) sequence.
11.) Keep repeating the reservoir fill exercise until the Fluid that comes out of the hose looks like the clear fluid that you are putting in. It should be only 2 or 3 reservoir fills.
12.) When it runs clear, Torque the Brake Nipple closed, clean the Nipple, put on the rubber dust cap. Do NOT over-tighten the bleed nut. It is steel and the alloy in the Calliper much softer. I stripped one on my car 15 years ago and it was an expensive lesson.
13.) Top up the Reservoir to Max., replace the Reservoir Cap and Replace the Side Panel.

Front Brake:

1.) The Front Brake Reservoir is on the Handlebar, next to the Throttle.
2.) Before you start. Make sure your reservoir and reservoir cap is clean. If you get dirt into the lines its like letting air in, because, dirt is also compressible. Remove the Reservoir Cap and have your New Brake Fluid Bottle handy.
3.) Undo the Screws on the Reservoir Cover and remove the cover. Inside is a Black Rubber Diaphragm with a Triangular bit hanging down underneath it. Remove this from the Reservoir.
4.) Locate the Front Brake Bleed Nipple. (top of Photo). Remove the Rubber Dust Cap.
5.) Now put your ring spanner over the Nipple FIRST, then attach the Plastic Hose, pushing it firmly over the nipple. Put the other end of the hose in the Jar.
6.) Get your helper ready at the brake pedal.
7.) Now just cracking open the nut, simultaneously get your helper to SLOWLY squeeze the Brake Lever, and ask them to tell you how much it is to almost fully pulled in.
8.) When it's almost all the way in, Nip the Brake Nipple closed. Do this before your helper lets the Brake Lever out, otherwise you will suck not only the old fluid, but also air, back into the system.
9.) Repeat this exercise #7-#8, until the Brake fluid level is on minimum, but do NOT let it get empty, or you will introduce Air into the System.
10.) Top up the Reservoir and repeat the Brake Depress/Nipple Nut Open/Close (#7-#8) sequence.
11.) Keep repeating the reservoir fill exercise until the Fluid that comes out of the hose looks like the clear fluid that you are putting in. It should be only 2 or 3 reservoir fills.
12.) When it runs clear, Torque the Bake Nipple closed, Clean the Nipple, put on the rubber cap. Do NOT over-tighten the bleed nut. It is steel and the alloy in the Calliper much softer. I stripped one on my car 15 years ago and it was an expensive lesson.
13.) Top up the Reservoir to Max., replace the Reservoir Cap Screw up the Two Screws. They do NOT need to be Mega-Tight. You will either strip the screws or the worse the Reservoir.

Wipe all surfaces clean. Test you have Working Brakes before you ride off.

If you have replaced your Brake Lines or done some work which resulted in Brake the reservoir emptying you might have to flush quite a few reservoirs-full of brake fluid through the system and pump the lever a bit to actually make the brake actuate at all. It might FEEL like nothing's happening for a while, i.e. like there is absolutely no resistance, but persist with the Bleed Nipple open and do NOT let the reservoir go empty.

Note: Bleeding Brakes FAQ Clarifications:

1. **When you open the Bleeder Nipple (or Speedbleeder) and squeeze the brake lever/pedal to force fluid out, you do NOT need to have the cover and diaphragm on the master cylinder. i. e. you do not need to put the master cylinder cover back on before applying pressure as it is not a Pressurized Chamber. However, please SQUEEZE SLOWLY or the plunger will squirt brake fluid all over your PAINT!**
2. **To bleed brakes I loop some clear hose up and over the mudguard and down into a bottle. This way you don't have to tighten the nipple up as there is always fluid in the hose and air can't get in. You might use a bit more fluid but I never use an opened bottle at a later date anyway. Rick, 01 F650GS, Qld-Australia.**

Aftermarket Solutions (for Bleeding Brakes)
or (I don't have a wife/girlfriend/friend/son/daughter to help me. Isn't there an easier way ?)

Yes, there are several Aftermarket Solutions:

- **Speedbleeders:**
- **Vacuum Pump:**
- **Reverse Bleed:**

Speedbleeders:

- A Speedbleeder is simply a replacement bleed nipple with a non-return valve in it. This basically allow you to open up the nipple, and either vacuum pump or squeeze the old brake fluid though the system, without having to nip the bleed nipple closed after every Brake Pedal Depression or Squeeze of the Brake Lever respectively.
- Installation. When you install them you can simply replace the stock bleed nipple with the Speedbleeder nipple. Do NOT over torque when fitting, it will shear off in your calliper and then you're in trouble. If you're not confident get a PROPER mechanic to do it. You do not want to dice with your brakes.
- If you're installing a new SS brake line simultaneously with the Speedbleeders, install your new SS-line and do the initial line-fill using the stock bleed nipple. After you've got fluid in the line, THEN install the Speedbleeder for the final purge. This goes only for the first time because you have no reason to empty the system afterwards.
- The package the Speed Bleeders came in gives the part number as SB1010S. The thread pitch of the bleeder is M10x1.0. You can order them on-line at www.speedbleeder.com.

Vacuum Pump:

This device allows you to SUCK the old fluid out and the new fluid through, rather than having to PUSH it through with the pedal or the lever. It saves you having to have someone else squeeze the pedal or lever. It can be used in conjunction with the Speedbleeders to make the job simple and easy without having to contort yourself between the Nipple and the Handlebars or Brake Pedal.

See Web Bike World Article on Vacuum Pumps.

- Vacuum and pressure bleeders aren't all they are cracked up to be. A certain UK 4x4 manufacturer got into a fair bit of trouble about 4 years ago with these things because they were only bleeding the part of the system they had flow in while the bleed unit was on. The only way to be certain you've got all the air out (with ABS in particular, which needs the Motronic to be operated) is to bleed, use the system then bleed again. Bleeding by hand does this as you go along so its only one job albeit a longer one. Andy Leeds UK #982

Reverse Bleed:

- Today I started doing part of my 12,000 mile service and since my friend seemed so sure about the rear brake fluid had not been change I decided to start with that. After doing a little research on various methods of flushing and bleeding I decided on the reverse bleed method because its seems easier to make those bubbles go up than down. After hooking up the pump to the bleed screw and getting my new fluid ready I used a bulb type thingy to suck the old fluid out of the rear brake reservoir. Next I loosened the bleed screw and applied some new brake fluid under pressure. As the reservoir filled I noticed it was of about the same color that was in there before. I repeated the steps of sucking out the reservoir and adding new through the bleed fitting. This time the fluid that came up from the system was almost black. Really nasty. I repeated the process 4 times and the 5th time I was happy with real clear fluid. Wamer #1021 CA
- Personally, I'd never do a reverse bleed for an annual service, since it's hard to get all the crud out. Usually the contents of the caliper looks worse than in the reservoir and I'd rather the crud not flow back thru my $$ master cylinder. I cannot imagine why you would choose that particular method,

but to each his own. Todd #389

What if it is till Spongy AFTER Bleeding?

Loosen the bleed screw. Pull the lever to the bar and TIE it there. Tighten the bleed screw. Park the bike with the master cylinder as high as possible. Leave it over night. Problem solved. Flash 412 (CO).

Feedback

- Parking Brake and Quick Brake Bleeder. I keep a strip of double-sided Velcro wrapped around my handlebars. When, for some reason, I don't want the front wheel to move, I move it to the brake lever. But it's more than just a parking brake. On the VX, the front brakes would periodically get mushy. I'm not sure why. I used to do a full bleed every time, and after a while I just learned to live with mushy brakes. But then someone told me this trick: if you squeeze the lever for a long time (like overnight), and then release it, you may get a "free bleed" without having to open anything up. The theory is that there may be a small bubble of air trapped just below the fluid pump. When you brake, it gets forced down the line a bit, and returns to where it was when you release. But if you squeeze and hold, it will slowly drift back up to the top. Then, when you finally release, it will get pulled back through the valve into the reservoir. Seemed to work for me.
- Yesterday I changed the pads and fluid on my '94 Classic F with the sticking master cylinder plunger. It solved one problem but now I have a couple more. I must have got some air in the system as they are a bit spongy now. I will bleed them again hopefully to sort that out. The new pads though are binding on the discs. I have re-loosened the bolts and axle and tightened them up again but to no avail. Also when I was bleeding the brakes (old fluid the colour of a premium brand dark ale-not good) the plunger stuck every time when I was pumping the system. I had to give it a couple of taps to get it free. It doesn't stick now when in use, but I have a suspicion that the air in the system may be putting sufficient back pressure to keep it free (also causing pads to bind). Any suggestions? Pat #1210 - Dublin, Ireland
- Gettin' the air out. Hint: When pumping the brake, don't pump it all the way to the handlebar, go v e r y s l o w. Don't pump fast, go nice and slow. Other tricks: close the bleed valve, pump up lots of pressure, hold lever tight, open bleed valve and watch the bubbles jet out of there. Flash method: Open bleed valve, pull lever all the way to the handlebar, tie lever to the handle bar, close bleed valve. Get a good night's rest, untie lever from handlebar, pump up the pressure to see if all air bubbles are gone. Another hint: While the bleed valve is open and fluid is slowly coming out, do your best drummer imitation on the brake line, a good R&B beat should do it, it knocks the lil' bubbles off the brake line wall. Tapping the caliper and M/C helps, too. Brakes bleed best when the caliper pistons are all the way into their bores. New pads sometimes feel spongy when the pads are not bedded into the disc. Bed them in real good with the Flash New Brake Pad Bed Method (tm) (should be in the FAQ) and then see if they feel spongy. If you can do the water pump repair (something I AM NOT looking forward to), you can rebuild your Master Cylinder. In fact, I'm willing to trade an M/C rebuild on your bike for a water pump R&R on my bike if you want. Shank

Is there anything else I should check on my Brake System while I’m at it ?

Yes:

1. Check the Calliper Mounting Bolts (Front Only, the rear is mounted on the Axle.). Note if you DO undo these bolts for any reason, see the Brake Calliper Retaining Bolt Warning.
2. Another thing to check is that the calliper pins are free. Our brakes are what's called floating callipers which means the calliper floats on a mount which keeps it cantered on the disk as the pads wear. This way the brakes require no adjustments throughout the life of the pads. If the calliper begins to bind on the pins, or the wheel or fork is put incorrectly, the calliper applies uneven pressure to the pads, lessening the brakes' effectiveness. All that is required is to loosen all the stuff on the bottom of the fork a little bit, as if removing the wheel. Sit on the bike and pump the fork up and down a time or two, then re-torque everything.

How to check it: The way to check for the whole calliper thing is: Put the bike on the centre stand. Somehow apply weight to the back wheel, easiest way is to have someone sit on the luggage rack, and spin the front tire once it's off the ground. If you have an off centre disk, it will bind at some point and if you listen to the brake you will hear the disk drag more at one point than the rest. (It's normal for the disk to drag a little, but a good spin should keep the wheel turning for 10-20 revolution at least). (From Unknown contributor).

3. Grease the Plunger, under the rubber sock. (You need to Remove the Brake Lever to get this out.)
4. Check the Brake Pedal Pulse FAQ
5. Check the Brake Squeal FAQ.
6. Check the Brake Light FAQ.

Empty Sight Glass?

Q. I look in my Sight Glass (on the Front Master Cylinder and it appears empty?) What's with that?
A. It's Probably just OVER Full, so you can't see it, but check for leaks anyway

Feedback:

- I took my '03 GSA out for a spin early last evening, because the sun FINALLY popped out...and when I put her back in the garage I went over some of the components (which I do before and after every ride).....I noticed that the front brake fluid level seems to be lower than the spy-glass (in other words, I can't see any fluid...I swear I stayed there with a flash light for like an hour checking every angle.....I had to do some hard breaking due to some SUV's who forgot that stop means stop... could that have anything to do with the level dropping? I've only had the bike for three weeks and it only has 220 miles on it...I'll be really surprised if the brakes are screwed (or will I).....by the way, the front brakes work great (but now I don't want to ride the bike with this looming, should I just top off the fluid? Omniconn - Georgia
- I would just top it off and check if there are any leaks. Pull in the lever and check if there is any signs of brake fluid at the top or bottom of the brake cable. Remember that brake fluid damages paintwork and plastics if it gets in touch with it. It only takes half a minute or so to get your mirror holder to look like a zebra (That's what mine looks like...). If the level is way down in the tank I'd also air it, but if the brakes feels great you're probably fine. You could of course also check the brake pads for wear, but since you haven't used the bike so much that shouldn't be a problem. When the brake pads wears the fluid level sinks. Regards, Spakur #1117, Icelander in Malmö, Sweden, 1995 Classic Red F650 with 65.000+ KM
- When new, DOT4 brake fluid is nearly clear. Don't want to imply you can't tell the difference but can you actually see fluid sloshing around when you wiggle the bars? Either it was that way when you bought it, you wore out your pads way faster than expected or you have a leak if the level is really that low. If it was full to start with it had to go somewhere. As Spakur says, check for leaks and wear, then, if all looks good top it off with DOT4 fluid and monitor it. If you're not comfortable doing it yourself then you might want to talk to your dealer's service department. What Spakur means when he says "air it" is to bleed the brake line of any air that might have gotten in. Personally, if I was near my dealer with a new bike I would make it their problem to bleed the system. Brad, N. CA., 2001 F650GS - Inmate #1002
- My guess is that the brake fluid reservoir is overfull, rather than empty. Wrap the reservoir in rag (to stop any drips) and whip the top off. I bet its full! EssexDakar, Mike, London, UK -- '02 Dakar -- '98 DR350
- I'm with Essex. Probably filled above the window, or just new/clear/hard-to-see. Marty #436-Chicago-97 F650F
- Just so that we can have some closure on this, it was filled to the brim...thanks again for the pointer! '03 F650GS, Georgia.

What is the Rotor Wear Limit?

When the Brake discs measure <4.5mm or are warped or BADLY scored. Measure SEVERAL places around the disc.

Feedback:

- Well, Flash, asked me how I thought I warped my rear rotor. After receiving my replacement BRAKING rotor in only 5 days from Dennis Kirk (as the Galfer was 8 weeks delivery), I think I see the reason for my rotor warp, as well as now appreciating the beauty of a floating rotor (which I now wish I had instead of the model I ordered). My first impression in taking off the old rotor and checking the new rotor for fit is that the machined mating surfaces of the HUB itself are slightly warped. That possibly means that the hub is slightly warped. I've never broken a spoke but I've had to tighten a few, not unexpected for all the offroad I do, and all of the spokes still seem to twang similarly, but there's not a lot of meat in that part of the hub - it's an intricate casting, but thin. Something to keep in mind as you play around down there, or a possible reason to search out a floating (rear) rotor next time around. Nothing that 3 minutes in a large machine shop wouldn't fix. HsN.
- The "real" brake limit is the limit of the stroke on the pistons or when the thin disk gets thin and warps. Both failures can be dangerous. BMW's service limit is reasonable and when you get to it its time to look for new disks. BMW work on the basis that at the limit you won't make the next service, but that can be 1 mile up the road or 5999. It depends on how you ride. Andy Leeds (UK) #982
- Having a classic F650/95/53000km. Checked front and rear disc brake thickness. About 4mm. Oliver in Oz.
- I've just had mine renewed - 4,5mm front, 4,2mm back - cost 132.50 and 125.00 euros (US$) original BMW. The old ones had just over 20.000 miles but looked pretty groovy if you see what I mean. I let the dealer change them - about 1/2 hour but I didn't fancy rounding the hex screws. Chris #1068
- Brake replacement - classic F. I can't say it's a fact, but it sure SEEMS like all my rotor wear happened in the first 12K miles that I was using stock pads. In the 12K since, using Galfer greens (twice), it seems the rotor has stopped wearing. Guess I'll take a measurement when I install the EBC Kevlar pads sitting on the shelf. Mark#403.
- Next.

Self-Bleeding Brakes ?

Q. My front brake was getting a little less crisp than I like it, so I was preparing to bleed the system. Like y'do. Before I started, I squeezed the brake hard, to see if I could bring the lever in to reach the handlebar, which I couldn't. but the squishy sensation has gone. ok, ok, I am aware that you can 'pump up' a brake system by repeated presses but this was just ONE HARD PULL on the lever, with the ignition and therefore the ABS on. Why has the brake stayed crisp and sharp for a week now without having to repeat the hard press? Adamx#1001. Any ideas?

A. Moisture/water in brake fluid + some inspired riding? Haakon #626

1. What Haakon said.
2. a small bubble that finally floated up past the piston into the reservoir.
3. a small piece of rust or crud stuck in the piston seal/cup.
4. an early indication that your bore is rusted, or
5. your piston seal/cup is worn and close to failure. Especially likely if your master cylinder is older, and you bleed the brakes by over pumping the lever instead of pressure or vacuum bleeding. Todd #389.

When should I replace the Master Cylinder Boots?

by Raymo #1173 Chicago '01GS

The service manual indicates that the front & rear master cylinder primary sealing boots should be replaced every 24K miles for ABS bikes.

Rear Brake Free Play Adjustment?

Q. Can you adjust the rear brake pedal freeplay? I have to push the pedal over an inch before the brakes start engaging. It seems that the plunger is on a threaded rod with a nut, but I can't figger out how to adjust it so that there's less play.

A. Loosen the locknut. Turn the rod. It will go in/out depending on which way you turn it. Get it where you want it and then tighten the locknut. Flash #412

The Brake Pad FAQ

compiled & edited by Kristian #562
Please read the Disclaimer before attempting any work in this FAQ.

If you are looking for information on how to BLEED your Brakes, see the Brake Maintenance FAQ
For Other Brake Questions see the:
Brake Light FAQ
Brake Questions Misc FAQ
The ABS FAQ

Brake Pad Replacement FAQ:

by Kristian #562
15/10/01

DISCLAIMER: My Father told me a long, long time ago, if you are buying a used vehicle, there's two things you need to make REALLY sure of; Brakes & Tyres. Changing the Brake Pads is a simple job, but nevertheless should not be done someone who is not that confident with their mechanical abilities. I'd say that very little mechanical experience is OK if you are mechanically inclined. Having no Brakes is not much fun and is just plain dangerous. See also the Brake Maintenance FAQ.

It's also a good time to bleed the brakes, i.e. change the brake fluid, which absorbs air with time and becomes a more compressible fluid, with the resultant that your Brakes get spongy. Bleeding Brakes is left to another FAQ at this Stage.

Note 1: You CANNOT swap pads from front to rear on either model. The OEM pads have a chamfered corner (angled) that you can see with a flashlight. If there is no chamfer left the pads need to be replaced. BradG

Note 2: Most brake pads have some type of wear indicator: Typically an angled cut on a corner of the pad material, or a groove of a certain depth. When it reaches that it's time to change. Don't let them go down less than 1mm.

Note 3: Yes, the GS and the Classic Brake Pads are the SAME.

1. See the Maintenance Log on Flash's F650 FAQ Maintenance Log for the Type of Brake Pads available for the F650. The EBC & Galfer Pads are recommended, the Ferodo Squeak, in my experience. I've had both EBC & Ferodo. Here are some more details on the Galfer pads, from Shank:

   Bendix (out of production) The part # is **(WAS)**: MA174. Impossible to find as they don't make them any more! Apparently they are SBS Pads.

   From: "Jones, Peter EXPORT" <Peter.Jones@Honeywell.com>
   To: "'faq A f650.com'"
   Subject: FW:

Date: Wed, 20 Nov 2002 19:06:44 -0700

Sorry but Bendix Australia do not make any pads to suit motor cycles and have not since the late 1970s.

Regards, Peter.

----- Original Message -----

From: Gary Kies <ftmweb@pacbell.net>
Subject: Re: Bendix Motorbike Brakes
To: Snipped

Yes, we do sell Bendix brake pads. We do not stock the MA174 or any other compound of the 174 style. Have your dealer contact Parts Unlimited for SBS brand pads.

BMW Replacement Pads

This weekend I installed a replacement set of genuine BMW replacement front brake pads on my 1997 Funduro. The entire job only took 30 minutes and I discovered that you receive several extra parts in the pad kit for the additional $15 that you pay over the cost of after-market pads. In addition to the pads, I received the retaining pin, the J-clip to hold it in place, the upper pad spring and another plate (that I had never noticed before) that fits vertically in front of the pads. These look like parts that are worth replacing occasionally, as they tend to get rusty and gorpy after a few years of use in the calipers. So far, my renovated brakes are working great. While I was at it, I also changed the brake fluid, just for fun. Richard #230, Pacifica, CA

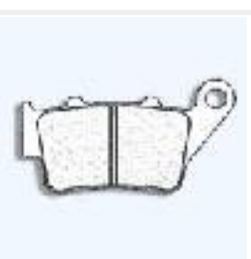
BMW Part #'s:

- 34 11 2 345 445 Front brake pad kit (inc hardware)
- 34 21 2 345 449 Rear brake pad kit (inc hardware)

Carbon Lorraine

The site has a a Catalogue for you to choose which bike and which usage. (AV=AVANT=Front in French); (AR=ARRIERE=Rear in French)

For the Classic they list:
Front: Model #2396. Choose A3 or S1
Rear: Model #2353 Choose RX or S2

Reference : 2396	Reference : 2353
	
108,5 x 40,1 x 7,7 mm	78 x 41,3 x 9 mm

For the GS/Dakar they only list the A3 and the RX

EBC Kevlar Front FA209, EBC (Black?) Rear FA213 . I measured a new set of EBC pads I bought for a 97ST. Each front pad has 5/32" (4 mm) of material. Each rear has 1/4" (7 mm). The bottom of the wear indicator slot is about 1.5 mm. Teddco

Ferodo FDB2006 Front, FDD2005 Rear. (But they are hard and I think they squeak).
FDB2006ST (ST=Sintered, but Sintered Pads CAN eat Rotors!)
Refer Opinions on Pads below.

Galfer Part Numbers are: FD172 for the front. FD165 for the rear.

Available pad compound numbers are: Kevlar 1532 for the Greens, Carbon & Kevlar 1434 for the Blues, Semi-Metallic Carbon 1054 for the Blacks.
Some people use green in front, blue in rear, although some members say the Greens wear fast. Note that one downside to aftermarket pads is they don't come with the additional hardware (clips/pins), although you can normally re-use the OEM ones. Check them well however.!

You may also see these numbers on the **Galfer** Pad Box: (Thanks to HsN for all these numbers)
Galfer Green (Kevlar) front 172G**1532**
Galfer Blue Rear 165G**1434**
Galfer Black Rear 165G**1054**

I went to the source (www.galferusa.com). order a set of FD172 G-1532 pads. they are the Galfer greens for the front, from '93-present. FD172 is the style, G-1532 is the compound. These are the "green" Kevlar, organic compound that have excellent stick, no fade and are easy on the rotors, unlike the sintered H or GG pads. There are part number differences for the rear beginning in '01, and I have no idea why. for your bike the number is FD186, but the person I spoke to said CalBMW should call them about availability of different compounds. So if you really want Galfers for the rear, have them call Galfer. I think most people go with Galfer blacks in the rear, which I believe they have. Personally, I've been running the same stock rear pads for 25K miles, and they are at about 75%. I don't want anything grippier on the rears than what I've already got, nor something that wears faster. I was getting about 6-8K miles out of my Galfer fronts. Galfer is online at www.galferusa.com. Mark #403.

SBS


Numbers are Front SBS674, Rear SBS675 for Classic, GS, Dakar and Scarver.

2. So far this FAQ deals only with the Short, Fast & Simple Way of changing your pads. If you have low miles and do little dirt, no problem. Otherwise I would recommend taking off the Rear Wheel/Front Wheel and giving yourself a bit of room, **but this is not necessary** if you know what you doing and are careful or need to replace your pads in a hurry. So long as you know that:
3. **Taking off the wheels** also allow you to clean (Compressed Air is Good) all the Brake Pad Dust from around the pads. It allows you to check the state of the springs which sit behind the edge of the Brake Pad.
4. **Taking off the wheels** also allow you to clean around the outside of the Brake Piston Dust because when you push it back in (to fit in the new Pads with more MEAT on them) you may push some of the dirt stuck on the Piston into the Sealing Rings around the Piston, causing Brake Leaks. These sealing rings seal the Piston and the Casing so when you apply the Brakes, Fluid doesn't escape. It will also allow you to take out the anti-squeal spring and bend it so that it holds the pads more firmly. This is the little spring BEHIND the squared-off end of the

Pad, so you will need to remove your wheel and disc to access it.

5. **Taking off the wheels** will also allow, if you got **OEM** Pads, to replace the Spring that comes with the OEM pads or taking it out and giving the existing one a little bend. Aftermarket Pads don't come with the spring.

   For Rear Wheel Removal & Replacement, see the Rear Wheel Removal FAQ.
   For Front Wheel Removal & Replacement, see the Front Wheel Removal FAQ. You do NOT need to remove the Brake Caliper. If you do remove the caliper WATCH THE THREADS of the two bolts. Make sure they are PRISTINE before you replacement or you will Jam them in the caliper and wreck the threads when removing them to see what the problem is. A good reason NOT to remove the Caliper too often.

6. When your brake pads wear the little Piston that Pushes them out move more toward the Brake Disc, resulting in a drop of your Brake Fluid level as the displacement of the Piston is replaced by the Fluid. IF you have been filling up your Brake Fluid reservoirs to the maximum, when you push the Pistons BACK to get the old Pads out and the new ones in, the reservoir can overflow. So step one is to check your reservoir level and if it is Full, then get a Turkey Baster and remove some fluid, say back to the minimum. This is mostly applicable to the Rear Brake Reservoir as the front one is more tightly sealed. Remember that Brake Fluid is caustic and will strip your Paint, so try not to spill any. You will need to remove the RHS body panel to get to the Reservoir.
7. Rear Brake: After you have emptied your reservoir a little, remove the Stainless Safety Split Pin (The pin with a 90 degree bend, top of picture) with a pair of needle-nose pliers: This pin is at the end of the Steel Retaining Pin holding the upper end of the Brake Pads.
8. After you pulled out the Safety pin, Drive out the Retaining Pin, using a Small Drift, through the small hole. Drive it from the outside TOWARD the Hub. There is a small expansion shell retainer at the end of the Pin closest the Hub, so it IS DIFFICULT to get it started. A couple of good whacks are required.
9. The Pads are now free. Grab the upper end of the Pad farthest from the Hub (Outside Pad) and pull it firmly and slowly away from the hub, perpendicular to the hub. Do NOT try to remove it at this stage, what you are trying to do here is push the Piston back into its mounting. This is when the reservoir level fills up. When you feel it is back as far as you can go and the pad is loose against the Disc, remove the outside Pad, by lifting it up just a little and moving the whole thing toward the Disc. You can then Pull it out beside the Disc.
10. BE CAREFUL YOU DO NOT LOOSEN/DISLODGE THE SPRING STEEL CLIPS.!
11. If you do dislodge the spring, the Manual says Make sure the spring is correctly seated and installed right way around: engraved arrow must point in forward direction of travel.
12. Wiggle the Brake Assembly so that the other (inside pad) Pad has more room and remove this Pad in the same way. NOTE the direction the Pads came out. The new Pads go back the same way.
13. That's the removal completed. At this stage you can give the Disc Brake a bit of a clean. Compressed Air if you have it or a brush and some water if not. You can also try to clean the piston a bit, but you MUST be VERY careful it doesn't pop out of the Disk Brake Housing. To do this very gently squeeze the brake handle or Pedal until the Brake piston is JUST far enough out that you can see the clean shiny silver-coloured piston. Give the rest of the piston, from the silver part to the end closest the pad a good clean. I would recommend only cleaning the piston AFTER you have cleaned the rest of the Brake Housing, to avoid contaminating the piston, or you will be looking at putting in new brake seals soon too.! You will need to PUSH the piston back as far as it will after cleaning, as indicated in (8) above or you will not get the new Pads in. Check the Pistons are CLEAN. What often happens is that as the pads wear the pistons extend further and further out of the caliper until you change the pads. Then with new pads you push 'em back in again. But if you didn't clean the piston's at all, all that gunge ends up going back into the seal and can cause the piston's to "stick" somewhat, which often causes Binding Brakes.
14. Pad Replacement. Some people put Copaslip (A Copper Dry Grease) on the BACK of the New Brake Pads to stop Brake Squeal before replacement. If you do this DO NOT get any on the Pad. i.e. the material that touches the Disc.

15. Slip the new Pads into place, first the inside one, sliding it down close to the Disc, then moving it toward the hub into position so that the tab at the end fits snugly into the disk assembly. Make sure the springs were not dislodged. Note that before the retaining Pin goes in the Pads fall down a little. Wiggle the Brake assembly across away from the hub and install the outside Pad, again sliding it down close to the disc and then pushing it into position so that the tab at the end fits snugly into the disk assembly. If you cannot get the second pad in you probably didn't push the piston across far enough.

    Alternatively, Chris in Santa Cruz, CA #782 writes: The key to the spring is to place the pads in first, put the furthest away pin in next to hold the pads, then slide the spring underneath the first pin and while pressing the other end of the spring down slide the second pin in.

16. **Put anti-seize on the pins! See Brake Pad Pin Removal Problems.**
17. Lift the Tabs at the upper end of the Disks up and slide in the retaining Pin, from the Hub outward, making sure the expansion-shell end of the pin is closest the Hub. DRIVE, with a few good whacks, the pin into position. Install the Spring Split Pin. Give your Foot Brake a couple of good pumps until it engages. It will take a couple, at first it feels like NO Brakes. Check your reservoir level and top up if necessary. Top up with DOT 4 Brake Fluid.
18. For the Front Brakes, you will need to remove the Plastic Cover First, it's just a couple of Allen Screws, then the procedure is exactly the same as the rear Brake. I don't think it's necessary to empty some of the Front Brake Reservoir (RHS of the Handlebar just next to the Throttle), however if you cannot get the Piston pushed Back Far Enough, you may need to empty it a little first. Undo the Two Screws, take off the Lid, CAREFULLY Pull OUT the Rubber Diaphragm and get to work with the Baster. Use some cloths to stop Brake Fluid Dripping onto your paint.
19. Lastly: IMPORTANT. The brakes will NOT engage immediately. You must give them a good couple of Grabs (Front) or Pumps (Rear) to bring them to a point where they are useable again. So if you live on a hill, don't go scooting off down the road without doing this first, please. I'd like to see the Chain Gang Membership to increase, not decrease :-)

Notes: Fork Oil or Brake Fluid on Brake Disk/Pads

Q. Will it eventually burn off? Do I need a special cleaner for the pads?

- You can buy liquid brake parts cleaner at an auto supply store. When this happens to me, it will usually burn off after a couple of stops. Try washing your bike and brake disc. Spin the wheel with some of the soap on it and flush with a weak stream of water. Immediately go for a ride and stop several times to dry the brakes out. Richard #230
- Easy, Just by a container of brake cleaner. Spray is any where you can. It will dry instantly and you will have no problems at all. Dutch Polisher.

General Feedback on Brake Pad Replacement:

- Brake replacement - classic F. I put anti-seize on the pins and just pry the piston back into the caliper with a piece of wood between the piston and the disc. Do this slowly and remove fluid as it accumulates in the reservoirs if you need to. I would probably go ahead and bleed the brakes if I had not done it in at least a year. You can use a drift punch or flatten the end of a 16P nail to drive out the pins. I always pre lube tight pieces with WD40 numerous times before the actual time I do the work. A good shop would remove the wheels, clean the calipers with brake cleaner as well as clean and grease the sliding bits. I just checked that there was easy movement. A good shop might also take the glaze off the discs with some very fine abrasive paper. Anyway, just my thoughts on it. Oh yeah, and the clips that lock the pins in have a specific orientation that will keep the bent bit from rubbing on the disc after the pads wear down. The key to the spring is to place the pads in first, put the furthest away pin in next to hold the pads, then slide the spring underneath the first pin and while pressing the other end of the spring down slide the second pin in. Chris in Santa Cruz, CA #782
- The biggest hassle for me is getting the spring back into the upper portion of the caliper and the pads in place and keeping everything together when fitting the new pads and caliper over the

disc. The pads always seem to want to fall out as I am re-installing the caliper. Richard #230, Pacifica, CA

Brake Pad Pin Removal Problems?

by Andy Leeds UK #982

With the first MOT (annual inspection starting when 3 years old) coming up, I decided to change the front pads. What an absolute pig of a job. Getting the caliper off and pushing the pistons back is easy enough. Take car mind, the fluid goes back into the reservoir with some pressure and will spray over the paintwork if you don't lay a rag over the reservoir. The BMW manual says to drive the pin out with the caliper on the bike (having pulled the pin out), but this proved impossible. Removing the caliper showed the problem. The pin is untreated steel with a monkey metal bush at the head end, the caliper is aluminium. As grease is an alien concept to BMW, both the tapered end of the pin and the bushed end had seized solid. No amount of hammering or even a 3 tonne press at work would shift it, although I did manage to compress a tool steel press pin by about 2mm (don't tell the workshop manager!).

The solution was as follows, but requires a bit more equipment than most people will have. First of all you saw the middle section out of the pin so you can get the pads out. Next you use a 4mm drill and a pillar drill to drill out the tapered section of the pin. This is where you need to be very careful. The tapered end of the pin tends to push the drill into the caliper, that cuts like butter. That's why your DIY hand drill is not such a good idea. Once you have a hole, you can drive out this section of the pin with a hammer and drift. The bottom is just as bad. You need to drill with 4mm from the top (you need a long 4mm drill and a length of steel tube as a support), then use the hole as a start for a 6mm drill from the other end. The good news is that once you have the caliper cleaned up, the pins are available from Motorworks and its is the same pin front and rear.

As a preventative measure I would suggest that people consider removing the pin before it seizes and dabbing a bit of copper grease on the ends that meet the caliper. This should not cause a problem as the pin is retained by the head and its clip, and can be done with the caliper on the bike. The design (if not the parts) are the same on the FI bikes as on the classics and I bet BMW haven't started greasing things. A bit of grease now may save a lot of drilling and brake bleeding later.

Cost of prevention: 10 minutes and £0.01
Cost of fix (drilling): 4 hours, 2 trips to Motorworks (60 miles) , £1 for a pin and £3.75 for brake fluid
Cost of fix (if you slip with hand drill): £85 for second hand caliper in Motorworks catalogue.

Points worth noting are:

- My retaining pin was seized and had to drilled out. That's UK salted roads for you, But I think the pin has missed a surface treatment too. Motorworks were able to supply a pin, but I bet BMW would only sell you a new caliper. When you push the pistons back the fluid really sprays out (much worse than any other vehicle I've worked on), so lay a rag over the reservoir or lay the cover back on as a spray shield. A bottle of DOT 4 is useful if you loose any fluid. The system is pretty easy to bleed, so if its easier, you could take the caliper off the banjo bolt. The BMW idea of not taking the caliper off until after you drive the pin out only works if the last person put copper grease on the pin. The pin is not in the Brembo caliper repair kit BTW, this is a seal kit only.
- Looking at the colour of what drilled out and the inside of the bits of pin that finally pushed out (red/brown), both the tapered end of the pin and the bush were corroded in place. I would however bet that the pin was on the big side to start with to get that sort of interference fit just by corrosion. Given that the new pin only needed a light tap to line up, if anything was oversize it was the old pin. Thinking about it, perhaps the pin had missed a surface treatment too as the head end is very rusty too. Similar truck pins are treated then ground to size.
- The copper grease should not melt out just by friction heat and if it does it will fall away from the pads rubbing surface. Lithium type grease would do the job too but would pick up more crud and is harder to apply in reasonable quantities.

What Life can I expect out of Brake Pads?

How long is a Piece of String ? As always, this is a very subjective thing, and differs depending on Brake Pad Compound, Driving Styles and Conditions. So as always with this TYPE of questions, here are some experiences:

- I put 10,000 miles on my front stock brake pads and they were hardly worn when I changed them with Braking blue pads. Those pads wore out in 12,000 miles. The rear stock pads only went 15,000 miles. It is not the thickness of the pads that matters, but their compound.
- I just replaced the front & rear w/EBC Kevlar, which I use on all my bikes, at 17,000 miles. I still had some pad left, although much thinner than new. I felt that the braking action had deteriorated over the last couple thousand miles, so went with new pads. It's my belief that braking action is lost as the pads wear thin due to the effects of heat over time. I could be over analyzing this, but it seems that with thinner pads, the ability for heat to transfer through the backing and into the calliper is increased, ability to dissipate decreased as the heat continues to build in the calliper, brake fade increased, which is the feeling I have experienced when pads get thin. Besides, the job is SO easy, and at a minimum, you could remove the pads, clean and lightly lube the calliper contact points and pad pins, remove any dust build-up from around the piston boots, and sand the pads with some course non-metallic sandpaper.
- Don't forget the face mask and ventilation if you want to sand the glaze of your existing pads.
- I have also noticed that as the pads wear to half thickness they seem to loose bite. I never wear them all the way down anyway.
- Pad performance is affected by heat building up in the pad material. The reason though is usually not that the pad is affected by heat in the thin material. Rather, the thin material allows more heat to transfer through to the backing plates, into the calliper and that in turn overheats the brake fluid. Severe cases result in boiled fluid, air in the lines and a complete loss of braking. The pads only have a bevelled corner to show wear., nothing metal. I got 12k out of my stock pads before I was sick and tired of the squealing. they had plenty of material left. I got 6K out of my next set (Galfer green pads), but when I changed them, I realized there was a good amount of material left there too. the Galfer green pads are SO much better than stock. I'm on my second set. but I have a set of EBC Kevlar waiting on the shelf. they're cheaper and more easily found than the Galfers, so I thought I'd try them.
- My stock rear pads look hardly used at all after 21K miles.
- I put 10,000 miles on my front stock brake pads and they were hardly worn when I changed them with Braking blue pads. Those pads wore out in 12,000 miles. The rear stock pads only went 15,000 miles. It is not the thickness of the pads that matters, but their compound. Richard #230
- I just replaced the front & rear w/EBC Kevlar, which I use on all my bikes, at 17,000 miles. I still had some pad left, although much thinner than new. I felt that the braking action had deteriorated over the last couple thousand miles, so went with new pads. It's my belief that braking action is lost as the pads wear thin due to the effects of heat over time. I could be over analyzing this, but it seems that with thinner pads, the ability for heat to transfer through the backing and into the calliper is increased, ability to dissipate decreased as the heat continues to build in the calliper, brake fade increased, which is the feeling I have experienced when pads get thin. Besides, the job is SO easy, and at a minimum, you could remove the pads, clean and lightly lube the calliper contact points and pad pins, remove any dust build-up from around the piston boots, and sand the pads with some course non-metallic sandpaper. Gary in Ohio
- Don't forget the face mask and ventilation if you want to sand the glaze of your existing pads. Simon (in Ireland)
- Gary, I think that you are right. I have also noticed that as the pads wear to half thickness they seem to loose bite. I never wear them all the way down anyway. Steve#417
- Yes, pad performance is affected by heat building up in the pad material. The reason though is usually not that the pad is affected by heat in the thin material. Rather, the thin material allows more heat to transfer through to the backing plates, into the calliper and that in turn overheats the brake fluid. Severe cases result in boiled fluid, air in the lines and a complete loss of braking. I've done it any number of times in that over-priced racing car that Flash doesn't like :). One last question for those that have had the pads off, do the pads have the little metal projection like found on cars to rub (and squeal) against the rotor when the pad is at minimum

thickness? I don't do much sport riding on the bike (sorry, car nut) so I use it for daily commuting. Maximum brake performance isn't really much of an issue for me. The pads only have a bevelled corner to show wear., nothing metal. I got 12k out of my stock pads before I was sick and tired of the squealing. they had plenty of material left. I got 6K out of my next set (Galfer green pads), but when I changed them, I realized there was a good amount of material left there too. the Galfer green pads are SO much better than stock. I'm on my second set. but I have a set of EBC Kevlar waiting on the shelf. they're cheaper and more easily found than the Galfers, so I thought I'd try them. my stock rear pads look hardly used at all after 21K miles. Mark #403

- I've been using the Galfer greens in the front for about 10K miles (on my second set). I found them to wear very fast, although pads are a snap to swap, so no big deal. personally, I find the stock rears to be more than adequate, and after 22K miles, I'm still on my first set. I have a set of EBC Kevlar pads I will use up front next (cheaper than the Galfers), but so far, I haven't found a need to go with a different brand in the rear. the Galfers seemed like they are more cheaply made in that the edges crumble, while it doesn't look like the EBCs do that. one downside to aftermarket pads is they don't come with the additional hardware (clips/pins). I guess one reason to go with a different brand in the rear would be to spare your rotor Mark #403
- As far as I'm concerned, brake pads are like Flash's girlfriends; cheap and easily replaced. If my Galfer Greens last only six thousand miles, I'm fine with it. The blues are good for the rear brake because they have a lower coefficient of friction than the greens. I like Galfer pads because they DON'T have a lot of initial bite and have SUPERIOR fade resistance. In fact, the coefficient of friction for the greens INCREASES with heat. I also find that they skate a lot less when wet (like when riding in the rain). I think they give me a much more sensitive feel. And I'm a VERY sensitive guy. And all of us sensitive guys like a lot of sensitive feel for our sensitive brakes. With Galfer pads, it's like braking with nothing on. This is how I treat my brakes; I put new pads in and fill up the master cylinder, when the I can see the fluid getting low in the M/C, it's time to replace the brake pads. Usually this happens once a year. I'm finding that the rear brake eats brake pads quicker than the front and rightfully so, more swept area in the rear (oh come on, I'm leaving this out there for all sorts of jokes). Shank
- I've been very happy with the Galfer green pads. excellent stopping power, no real noticeable fade, no noise, but only last 6-8K miles. my next set, waiting to be installed, will be the EBC Kevlar. I think they are probably much easier to find. Are you using your rear brake too much? My disks are the opposite measurements, and I'm still on my stock rear brake pads after 24K miles (and they have plenty more). in normal commute riding, i don't use the rear brake most of the time, only under hard braking or "spirited" backroad riding. Mark #403.
- I usually change my pads out at 2 mm. I have found that the after-market pads that I have tried seem to wear very fast and don't work any better than the stock BMW pads. I replaced my blue Braking pads with the stock BMW ones (at about $10 more per set) and they seem to be working well and wearing about half as quickly.
- Although Richard doesn't find any difference in braking between stock and aftermarket, YOU might. Richard, by his own admission, is not the most aggressive rider. however, if you ride hard and are on the brakes a lot, you will notice a difference between the stock pads and a set of Kevlar pads or Galfer "green" pads. the stock pads will get very hot and the friction coefficient is reduced more quickly than the aftermarket pads...this becomes "brake fade". they also wear your rotor more quickly (I think they are semi-metallic). the aftermarket pads will not fade on you anywhere NEAR the way the stock pads will. however, they WILL wear MUCH faster. personally, I'd rather have consistent stopping and spare my expensive rotor...just my preference. Now, if you are only getting 3K miles out of your stock pads, you've got a problem. I'm very hard on my front brakes and I got about 12K out of them, with some to spare. My Galfer greens are toast in 6K. Is your caliper retracting properly? Have you checked how freely your wheel spins when off the ground? (See the Brake Maintenance FAQ) My rear stock pads have over 27K miles on them and look almost new. Mark #403, '99 F650, Bay Area, California.
- Next.

Brake Squeal FAQ:

by Kristian #562, Flash #412

27/10/01

Q. I've just changed my brake pads. Why do they Squeal. It's really annoying.!

Brake squeal is caused by the pads vibrating against the caliper/piston (vibration=noise=squeal).

Otherwise:

1. **Solution 1:** Rear Wheel Only. Check your wheel alignment. i.e. for the rear pads, check the numbers in the little tabs on the side of the Swingarm. They must be the same on both sides of the Wheel. It is easy, if you took your tyre off to say change the pads to get the wheel out of alignment even IF the marks read the same. The reason is that you MUST PUSH the wheel forward to the end of the adjustment travel (and keep it there) when reinstalling the tyre, otherwise the marks can "float" around inside the swing arm and give you incorrect readings. Don't forget to DO UP those adjustment bolts AFTER you have torqued the rear wheel Nut, so you don't lose the End-Plates and Bolts, they can work their way loose.! You won't lose the rear wheel, don't worry, just the Bolts/ Endplates, if they somehow undo ALL the way. You do not need to take the tyre off to change the pads btw, see the FAQ above for details. There is no such adjustment on the front wheel. See the Rear Wheel Removal FAQ for more information.

2. **Solution 2:** Check your "Floating Disc Brake Unit" CAN actually "float" on the Brake Disc. i.e. the Disc Brake Unit, sits on the Wheel Axle Shaft AND is NOT jammed up against the Swingarm somehow a this could also put it out of alignment with respect to the Disc. You should be able to wobble it a lit bit. For the REAR brake, on the inside of the LHS Swingarm there is a little nib welded in place which stops the whole Disc Unit from rotating. Make sure this little Nib is IN the SLOT in the Disc Unit. Another thing to check is that the calliper pins are free. Our brakes are what's called floating calliper which means the calliper floats on a mount which keeps it centred on the disk as the pads wear. This way the brakes require no adjustments throughout the life of the pads. If the calliper begins to bind on the pins or (as in my case) the wheel or fork is put incorrectly the calliper applies uneven pressure to the pads, lessening the brakes' effectiveness. All that's required is to loosen all the stuff on the bottom of the fork a little bit, as if removing the wheel. Sit on the bike and pump the fork up and down a time or two, then re-torque everything. To my long winded post above I would like to add: The way to check for the whole calliper thing is:

   - Put the bike on the centre stand.
   - Somehow apply weight to the back wheel, easiest way is to have someone sit on the luggage rack, and spin the front tire once it's off the ground.
   - If you have an off center disk, it will bind and one point and if you listen to the brake you will hear the disk drag more at one point than the rest.
   - (It's normal for the disk to drag a little, but a good spin should keep the wheel turning for 10-20 revolution at least).

3. **Solution 3:** Take out the anti-squeal spring and bend it so that it holds the pads more firmly. This is the little spring BEHIND the squared-off end of the Pad, so you will need to remove your wheel and disc to access it. Bend the spring/seat until it is tight on the pads. You will see what I mean if you look at it. There is also one on the top of the calliper which can be bent downwards slightly.

4. **Solution 4:** Sand the surface of the Pads (the Pad Compound) lightly with sand paper, on a flat surface. This will remove the Glaze that builds up over time. You may need to do these several times over the life of the Pad. Some riders believe it comes from using the Brake too Lightly. This has not been confirmed.

5. **Solution 5:** Put "Copaslip", a sort of copper based "dry" grease on the BACK of the brake pads (Just where they contact the Pad Holders). When you do this make very sure you DO NOT get ANY of the grease on the pad compound. Or you will have NO BRAKES at all.! **"Dave # 093**

wrote: Get yourself some brake specific grease--high temp grease made especially for brakes. Get a small container because it will last for the rest of your life. Apply a thin layer of this stuff to BACK of the brake plates--where they touch the callipers, not where they touch the disk and the squeak will be gone.". Or use a small amount of High Temperature silicone on the BACK of the pads.

6. **Solution 6:** This one normally ALWAYS fixes the problem. Change See Flash's Maintenance Log Maintenance Log for the Type of Brake Pads available for the F650. The EBC & Galfer Pads are recommended, the Ferodo ones Squeak, badly, in my experience. I've had both EBC & Ferodo. I believe the Ferodo ones are made in Italy and hence, as the F was originally made in Italy at the Aprilia Factory, MAY be the OEM ones you get when you order replacements from BMW. The EBC & Galfer Pads use a softer compound, hence may not last quite as long, but they grip well and I like to have good brakes over anything else, bar tyres. you can actually SEE the harder specks in the Ferodo pads too.

7. **Solution 7:** For the short term, try some Brakkleen. But in the long run, it probably won't fix your problem

Thanks to Dave# 093 for the tip on "Brake Grease." and Rick #815

Feedback:

- Decided to experiment in removing the horrible squawking noise from my rear brake. Removed the pads and cleaned them by placing them face down on some 320 grit wet and dry paper, using a sheet of glass as backing (nice and flat) keeping the paper nice and wet, I managed to scuff off the glazed material from the pads, washed them off, dried and refitted. Road test revealed no more noise and the braking is good.....see how long it lasts before I get the noise back again. Well.....it did not work :-(I have the squawk back again. Next move is remove pads and make 2 hacksaw cuts into the pad material, similar to the front pads, but at a slight angle across the pad itself. Like Todd said, will clean the rotor this time around. Jack F650GS Australia
- To complete your process, while the brake pads are removed I take a cotton rag, wet it with brake cleaner, and wipe the rotor while spinning it to clean off the grease. I do this several times with fresh brake cleaner and rag surfaces - that way I know that the rotor is clean when it first meets the new pad surface you prepared. Most of the time when you have problems with brake noise due to contamination of the rotor/pads, it all starts with a greasy handprint during a tire change or wheel adjustment. Todd #389
- Rear brake squeal was driving me nuts. I believe there's a solution short of replacing otherwise okay pads. So far, so good. I bought a can of this spray called Brakekleen. I dropped the rear wheel so that I would have good access to most of the pad surfaces. With the wheel dropped, you can spray into the inside of the pads, as well as the gap between the outside of the pads and the thingamajig that squeezes them. First short bursts to blow out the dust, then I saturated all of it. Have a rag to catch the run-off. I Rode all afternoon in traffic without any squeal. Job took about ten minutes. It was chain lube time anyway. It's baaaaaack, but I'm not complaining. The Brakekleen spray did stop the horrific rear brake squealing for about 900 miles. Not bad for such little expense and trouble. Pads still good, so still no need to replace them. About 50 of those miles was some hard braking and corning on a go-cart track where I was talking the MSF's advanced rider course. Roy 1095
- Brake squeal is caused by the pads vibrating against the caliper/piston (vibration=noise=squeal). Take the pads out, lube the back of the pads with BMW#10 or axle grease or Vaseline or anti-seize or anything else that's gooey and will stay in place. I've been doing this for years on a plethora of bikes (Hondas, Suzukis, BMWs, Moto Guzzis) and it works. Give it a try. Shank NYC USA
- I tried the Brakekleen and got about 300 squeal free miles for the trouble. Next step I pull the pads and try the high temp grease trick. IMHO the Brakekleen treatment is a bit messy and the stuff is bad for plastic finishes. I think it was intended for use in cleaning parts NOT on a vehicle. Cover everything plastic in sight if you decide to use the spray. Next stop, new pads. BradG 1002, N, CA '01GS.
- The brake cleaners as specified, will not eat the brake seals, IMO. Just don't use carb cleaners, electric motor cleaners, etc on brake parts. It may be harmful and cause bad reactions with

brake fluid. Maybe! Use "rubber gloves" from one who did this a ton, in earlier years and did NOT....Skin may be fairly resistant to a lot of things, but not all. Randy748/Calif.

- I'll confirm what Mark403 says about the Galfer Green pads. I put Blue on the rear and eliminated my brake squeal too. BradG.
- Yes, I thought the same thing. Had the problem start at 3500Km. One day I was looking at a brochure and in the fine print, pads are covered till 7500Km. Finally fixed at 15000Km. Now all my HD biker friends can stop riding me. Rick #815 BC Can.
- My '01 GS-A developed a significant rear squeal when I was out on a hundred mile ride. It was there again after only a few easy stops on my next ride. I used some brake cleaner which helped for a short while but, came back the next day. I'd like to avoid having the bike tied up at the dealer if at all possible. Logan's Ride 2001 F650GSA Chicago, IL.
- When it sometimes happens to me, I find a place well away from folks, stick the bike in first gear and ride along with plenty of throttle and with the rear brake on (and off) hard till the squealing noise goes away. After a short while it disappears, (till the next time). I just put it down to glazing of the pads. Trevor 999 UK 01 GS
- My tip. Enjoy it. I have the same noise at times. Comes and goes. No reason to it. I use lots of rear brakes on my Dakar. It tends to hold the nose up. Over the last couple years there has been lots written about this on the board so you are not a lone ranger. Fact is Disc brakes have been noisy at times since the invention of them. As long as the pads are good. Enjoy. F650GS Dakar, Oregon. Steve 1130 Or
- When we got our 02 650GSA last May, it developed the rear brake squeal at about 150 miles on the bike. I figured it had glazed over from all the washing and cleaning it got from sitting on the showroom floor along with a little dust from the dirt road we live on. If I applied the rear brake to the point that it was getting quite warm, the squealing would go away for about 20 miles. I took it buy the dealer at about 500 miles on the bike and pointed out that it was getting to the point that when it would squeal (howling now) you would actually lose a little breaking action and I was afraid of developing a wear pattern in the disc that could cause future pads to developed a squeal again. They said that they could schedule me in about 3 weeks to look at it. I couldn't believe that they would not even try to do a quick sand job on the pads or anything else since I would have considered it to be kind of a "Safety Issue". They didn't even want to take the bike out to see how bad it was. Even though I don't use the rear brakes much, it concerned me because we sold our Honda XR650L for the BMW 650 so that my wife could ride it also. I'd like her to have all the braking power available of the bike if she should need it. Anyway, I was a little ticked so on my way out of the dealership, I bought a set of EBC Pads and in less than 2 minutes had them in and haven't had a squeal since. The bikes got over 4k miles now. A couple of weeks ago we picked up a 2002 650GSAL for my wife (because she liked the 650 GS so much I couldn't get it away from her and when she found out BMW made a lowered one, I new we'd end up with two 650's) and so far no squealing brakes. If it starts, I'm just going to put in new pads right off. It's worth the dollars not to mess with the dealer if they want to drag it out. It's over a 100 mile round trip for me to go to the dealer plus they can seldom do the work at the time you bring it in so that you don't have to drop it off for a couple of days. Maybe your dealer would be the type to toss you some new pads and say go for it.
  BBach, 02 650GSA, Brian #1324
- My squealing started when I changed my pads half a year ago (at 60.000KM). I used the same brand as before (SBS). The squealing is almost gone now after 5000KM of use. Regards, Spakur #1117, Icelander.

Opinions on Pad Types

- I have recently install a set of Ferodo Road Sinter brake pads on my 01 Dakar. Part # FDB2006ST. Wow what an improvement. This thing really stops now. I have no ABS and one has to be careful. You can lock the front wheel with little effort. I know I have read on board of Dakar guys saying they can't use front ABS. The wheel doesn't lock. It does now. It is great to have a little more braking power available. www.braketech.com is the place to find them. Steve 1130 Or
- Sintered pads, especially HH, will eat your rotors like candy. may want to take some

measurements with caliper now, and keep a close eye. of course, Ferodo says they are kind to your rotors....what are they supposed to say? I've been using the Galfer green pads which are not metal sintered (Kevlar/organic pad) and are much kinder to the rotor, no fade, and easy two finger lock-up. Pads are cheaper than rotors.

- I also put new EBC pads on the rear, and discovered the same thing you describe: the rear brake now slows the bike down, sorta. But will only lock up if I really stomp on the brake pedal while using the front brake hard. Then the rear tire becomes unloaded enough to slide. At first I didn't like this, but the more I live with it the better it feels. Almost like the poor man's ABS! Bob#550 (Olympia WA)
- I've been very happy with the Galfer green pads. excellent stopping power, no real noticeable fade, no noise, but only last 6-8K miles. my next set, waiting to be installed, will be the EBC Kevlar. I think they are probably much easier to find. Are you using your rear brake too much? My disks are the opposite measurements, and I'm still on my stock rear brake pads after 24K miles (and they have plenty more). in normal commute riding, i don't use the rear brake most of the time, only under hard braking or "spirited" back road riding. Mark #403
- Try some Galfer pads - makes a world of difference on most bikes, and as Jinx recommended, make sure the brakes are properly bled and aligned. Lauren
- I think the Ferodo pads are dreadful. They are hard as hell, squeal, and have bits of copper in them. Kristian #562.
- I am not sure how thick new pads are, but I believe the minimum recommended thickness for old pads is about 1 mm. I usually change my pads out at 2 mm. I have found that the after-market pads that I have tried seem to wear very fast and don't work any better than the stock BMW pads. I replaced my blue Braking pads with the stock BMW ones (at about $10 more per set) and they seem to be working well and wearing about half as quickly. Richard #230
- I also replaced my rear brake pads along with the chain (I like this, chain and brake pads wore out at the same time, must be that Bavarian engineering). I replaced the stock pads with EBC pads that came with the bike when I got the bike. I like the EBC pads, no matter how hard I stomp on the rear brake, the tire won't lock up. Which is just perfect. Oh yeah, one more comment on the front sprocket shaft and whether or not you O-ring, circlip or whatever. I think this is classic Italian manufacturing (even though the engine was supposedly manufactured in Austria); whatever you have on your bike is what they had at the moment. In other words, Your Shaft May Vary. Shank NYC USA.
- Although Richard doesn't find any difference in braking between stock and aftermarket, YOU might. Richard, by his own admission, is not the most aggressive rider. however, if you ride hard and are on the brakes a lot, you will notice a difference between the stock pads and a set of Kevlar pads or Galfer "green" pads. the stock pads will get very hot and the friction coefficient is reduced more quickly than the aftermarket pads...this becomes "brake fade". they also wear your rotor more quickly (I think they are semi-metallic). the aftermarket pads will not fade on you anywhere NEAR the way the stock pads will. however, they WILL wear MUCH faster. Personally, I'd rather have consistent stopping and spare my expensive rotor...just my preference. Mark #403.
- I bought Galfer pads at World Superbike a couple of weekends ago for US$29 for the front (green) and US$18 for the rear (black). According to the receipt, I got 'em from:
  Giocar America, 57 W. Mc. Farlane Av. Ventura, CA 93001, Ph. 805-653-5012 | Tech support 800-685-6633 (I also picked up some Ferodo rears from someone else for $12 on closeout.) Flash #412.
- Next.

Brake Light FAQ (Final Draft)

compiled & edited by Kristian #562
Please read the Disclaimer before attempting any work in this FAQ.

Man, you must be burned out!

Steve #001
8/22/99

Does your taillight burn out prematurely? Hey, we're not getting personal, we're just asking. Many riders have had this problem. The taillight flexes when the bike is ridden; the entire assembly flops up and down. The tail light filament breaks, but the brake light continues to operate. So don't get burned out man.

VERY often it's just your contacts. See the Section below: My Brake Light Doesn't Work for more details on reasons why it may not be working.

What's the Replacement Bulb for the Brake Light ?

by Hombre Sin Nombre
21/11/01

Correct Bulb Type:

The Correct bulb is listed in the Owners Manual. The bulbs are #7528 or a #7225 available at any parts store.

Note that it has been said that the bike does not use #1157s: This is what was said. "While they are very similar apparently the 1157s don't quite fit or work. The correct bulb can be found in any auto parts store. The stem will be silver-coloured instead of brass. Sylvania bulbs come in black and green packages and the number is stamped in the stem. If you use an 1157 it will work for many years and when it goes out the base will be corroded into the socket, you will break the glass trying to get it out, and end up having to buy a new brake light instead of just a bulb."

However physical dimensions (but not electrical specs) of the #1157, #2057, and (BMW OEM) #7528 are IDENTICAL and INTERCHANGEABLE. Perhaps somebody bought a cheap generic discount bulb, had it corrode or break off. The stock taillight assembly is vented to the air, and the plain brass lamps are more subject to corrosion than the plated bulbs.

In the USA you can buy cheap generic bulbs with that do not meet ECE specs. ECE specs require bulbs to be rated at 12 volts DC, and to have plated bases and larger contacts.

US spec bulbs often have plain brass bases, and can be rated at operational voltages of 12.8-14 volts DC.

The #1157, #2057 and #2357 bulbs are common types often available in the USA as generic discount bulbs made to meet the lower US specs. The #7528 and #7225 are a newer Euro style bulb, made in Europe, not commonly used in the USA, and therefore only available made to higher ECE specs. (Most US industrial electronic supply catalogs do not even list the #7528 or #7225 bulbs.)

For a few cents more, higher quality #1157, #2057, and #2357 ECE spec bulbs are also available. Other than that, the main difference between the #1157/#2057 and the #7528/#7225 is that the latter bulbs have a brighter brakelight (35 MSCD/candlepower, as opposed to 32 for the #1157/#2057), but less longevity (150 hours as opposed to 1200 hours).

SO, FINALLY, lacking the OEM #7528, your best substitute for the OEM #7528 would be the #2357 built to ECE specs, but it's likely no brighter than the #7528, as the #2357 is spec'd at higher voltage, but it would have a much longer life expectancy than the #7528. Note that the #7225 has a much dimmer running light - just 1.2 candlepower.

ALL the bulbs below are Ba15d (dual contact/dual filament) INDEX BASE (axially offset pins, one direction only). External dimensions are identical. Physical differences vary only in terms of construction materials. The bulbs below differ only in terms of the lamp filaments/wattage/output/expected life, as noted:

BULB#	# Voltage	Amperage/Filament	MSCD	Hours/Watts	ECE Ratings
1157	12.8/14	2.10/0.59	32/3	1200/5000	
2057	12.8/14	2.10/0.48	32/2	1200/5000	
2357	12.8/14	2.23/0.59	40/3	400/5000	
7528	12.0/12	1.75/0.42	35/3	150/1500	21/5W
7225	12.0/12	1.75/0.33	35/1.2	150/1500	21/4W

MSCD is "Mean Spherical Candela", or "candlepower".

(edited) chart source: http://lighting.mbz.org/tech/info/lights/signal_bulbs/

My Brake Light Doesn't Work (at ALL/Only with the Rear/Brake/Stays On all the time)

by Flash #412, Richard #230, Mark#403, Marc in CA, Francois, Jim Powell and Kristian #562
11/11/01

This isn't really one question, because there are a few different reasons why it doesn't work, so this FAQ separates them out according to symptoms. Here are the Questions again:

1. My Brake Light Doesn't Work at ALL
2. My Brake Light only works when I use the Rear (Foot Pedal) Brake
3. My Brake Light only works when I use the Front (Hand Lever) Brake
4. My Brake Light is always on.

1. My Brake Light Doesn't Work at ALL

As neither Brake works the Light it most likely to be the Bulb itself, or the Contacts. The Soft Copper Contact metal seems to be a very common problem, even more so than burnt-out bulbs, but first have a look at the bulb. If it is the Contacts, removing the lens cover and wiggling the bulb, pushing in slightly, should produce a working brake light in certain bulb positions.

To check the Contacts, try simply scraping the copper contacts with a sharp knife and then scraping a very small amount of lead off the end of the bulb, on a rough stone or with an emery board or piece of sandpaper, just to scrape off any oxidation. Then slightly bend out the copper contacts towards you (i.e. To rear of bike, closer to the bottom bulb contact), and reinsert the bulb. To bend the Contacts you will need a piece of bent wire or something you can hook the contact towards you with. Don't pull them too far, older copper gets brittle and they could break.

- Refer the **Front Brake Switch FAQ for details on how to check and change the front brake switch**

2. My Brake Light only works when I use the Rear (Foot) Brake.

The symptoms indicate the Front Brake Switch is out of order. There is a little microswitch acted upon by your front brake hand lever, just at the pivot of the lever. It is attached with some tiny nuts and screws. Loosen the screws ever so slightly and adjust the switch. If that doesn't make your brake light come on when you squeeze the lever, it could be the switch is either stuck or bad. You could give it a squirt of WD40 to free it up. If you remove the switch be very VERY careful not to lose the little piece called the "druckstuck" (literally push piece, very precise these Germans) that goes between the tit on the switch and the lever itself.

- Refer the **Front Brake Switch FAQ for details on how to check and change the front brake switch**

3. My Brake Light only works when I use the Front (Hand Lever) Brake.

You will need to check inside this Rubber Cap, as it houses the electrical Switch Contacts for the Rear Brake Pedal. Often it can get dirty in the Cap, so pull the cap off and give the wires a good clean, remove the wires and clean the contacts, reinsert the wires. Clean inside the Cap before reinsertion.

Alternatively you could have a problem with the "pinbolt" between the brake pedal and the brake cylinder. Just loosened the nut and extend the pinbolt a couple of turns.

4. My Brake Light is always On.

i. Check the Blade Switch at the Rear Brake Pedal. There is a small blade spring which is used to push the tit in the switch back into the switch. The blade spring is supposed to sit on top of a bar that is on the right hand side of the brake pedal and as you depress the pedal it pushes the spring up and then activates the light through the switch. If the blade spring gets under the pedal (which it can easily do) the brake light stays on. Easy to check before starting to pull micro switches apart. Ratso.

OR

To check this condition first you have to know what is ON, i.e. is that the Brake Light or just the taillight. To do this,

i. Find the microswitch at the Front Brake Lever and note how its tiny "nipple" gets pressed in when the brake lever is disengaged, and is released so that it protrudes when the brake lever is engaged or pulled.
ii. When you press the microswitch nipple (using e.g. a fine jeweller's screwdriver), if it has NOT previously been pressing in properly, your brake light should dim down to the normal taillight mode.
iii. The solution is to loosen the two tiny screws ever so slightly and adjust the switch. If that doesn't make your brake light come on when you squeeze the lever, it could be the switch is either stuck or bad. You could give it a squirt of WD40 to free it up. If you do undo the screws completely to clean it or replace it, be very VERY careful not to lose the little piece called the "Druckstuck" (literally push piece, very precise these Germans) that goes between the tit on the switch and the lever itself.
iv. Now, when the brake lever is disengaged, the nipple remains sufficiently pressed in so that the brake light doesn't stay "always on."

OR:

i. Check the Bolt holding the Brake pedal is not loose or bent. Remove, grease and replace if necessary. Note that this bolt ALSO holds the Chain Roller (See the Chain Roller FAQ).

- Refer the **Front Brake Switch FAQ for details on how to check and change the front brake switch.**

5. Brake Lights Intermittent

i. If you've just installed new lights lights (especially flashers) check the Bulb Wattage is correct! Don't forget to check the bulbs. A driving light bulb on my ST took six months to finally burn out, and when it did it, took the fuse with it. The filament was broken but showed continuity with a VOM check. Sometimes it came on by itself, other times it would light up if I tapped it, and it always came on and stayed on if it was hot from operating and then was turned off and then back on again. teddco. Refer the Aftermarket Lights FAQ.
ii. If your battery discharged some over the winter, your alternator and VR system may be trying to charge the battery while running your (flashing hyperlights) and brake lights. Some electromechanical flasher systems draw a lot of current and could hang up with open contacts in a low voltage condition. In that case, your brake lights may be on (switch contacts closed), but the voltage may be too low to actually brightly light up the bulb and run the flasher. If not, it could be an intermittent open circuit or a high-resistance short to ground. Time to drag out the Voltmeter and

check voltages and resistances.

iii. I had intermittent brake lights on my ST because of the floppy tail light assembly. I removed the lens and the bulb and gently pried the contact for the bulb out a little bit. No problems since. Paul #1289.

Finally:

If none of the above solutions work, **check the under seat wiring/connectors to the back light.** Take off the seat. Look at the bunch of connectors in the area of the seat lock mechanism. The wire for the brake light goes through one of those. You might want to break the connection and check it for corrosion. A little bit of Vaseline (petroleum jelly) on those connectors is not a bad idea. You might want to change out the bulb, too, just on general principles. Sometimes one end of the filament becomes "unhooked" but can spot-weld itself if it is in just the right place when the bulb is turned on. That sort of intermittent action will give you fits, too. It might just be your bulb contacts and for some reason you forgot to turn on the ignition key before checking if the light was working. Flash

Feedback:

- I finally got the darn thing to work correctly. I think the key was I started to pay attention to what was going on. When I tightened the switch down, it was rolling up towards the lever casting. I jammed a piece of plastic in the slot above the Druckstuck (turns out I have one of those), and with a little whittling, it all came together. It was very similar to Rand#1111's solution, although no hand guards were involved. Ed.
- Assuming your Druckstuck is still in place (it's required) you might consider this. Something similar to this happened to me - the plastic body of the switch deforms slightly when the screws are tightened enough to hold it in place. Even tho they are not very tight, it's just a plastic casing, and with the pressure of the screws it eventually crushes. Take it out, and it (slowly) springs back, and the switch works fine. Instead of using washers in the same deformed spots I made a tiny protective plate out of .8mm aluminum, the size of the switch, about 3/8"x5/8", with holes for the 2 screws. I put it between the switch and the nuts. Now I can tighten up the screws without deforming the switch. Todd #389.
- I had the same problem and the mechanic at the BMW dealer would pull out the contacts to make a tighter fit but that would only last till the next bump. One day a friend told me he liked riding behind me, cause he liked watching the taillight bouncing up and down like crazy. So figuring it's the bouncing around that's causing my problem, I did two things. It's been two years so my memory might be a bit rusty but I think the tail light is held on by 4 bolts (or maybe two :)). The bolts go through a rubber grommet with a metal tube in the center. I got rid of the tube so I could tighten the taillight tighter. The whole plastic fender assembly moves a lot too. Right above the taillight lens it curves around a part of the frame. I put a radiator clamp around the plastic and the frame part. you might have to take off the luggage rack to see this. I haven't had to replace a bulb in two years. Charlie #070 from Pennsylvania
- I had the exact same problem, riding along and the rear taillight would flicker. I didn't know till a buddy and I went on a ride early one morning. I found the wire into the white connector to have come loose. It's under the seat just aft of the Voltage rectifier next to a couple others. Wamer #1021 CA
- got irritated at the lack of reliability of the plastic housing. Here's how I fixed it and haven't had a problem since: http://www.calsage.com/bmw_f650.htm. John #549
- I have had experience with what Pete describes above. I put a little solder on the contact and dragged it on the one with the round contacts and it works perfectly. I was finding that my bulb was working when it was screwed partially in but when it was fully in it only worked intermittently and it works all the time and every time. Nicola (UK) #1061
- I had similar intermittent problems, but with my brake light. Take the assembly off, and check the metal contacts for two things: [1] corrosion on the contacts [2] that the metal contacts aren't loose where they mount into the plastic assy. the latter was the problem with my brake light; it kept slipping in the plastic "base" and the contacts would not meet the bulb correctly, and arcing caused the contacts on the bulb to melt and not work after a while. wiring between the light and plug by the voltage regulator is also known to become bare in spots, but since you say that tapping the lens will help, that probably isn't it, but worth checking, perhaps, also. a loose brakelight assembly will exaggerate these problems. hope this helps. I worked with mine for a while and finally dropped the $35 for the assembly , as it was broken anyway and the brake light, IMO, is a much bigger deal. tom [981]
- The metal contact tabs that touch the back of the light bulb just need to be bent out to apply more pressure to the bulb. Works every time. DON#301(Oregon)
- One other area to check out for intermittent taillight problems. My 2000 F650GS had this problem, drove me mad until I saw that if the handlebars were moved, the taillight would go on & off. Soon traced the fault to the electrical fitting on the bottom of the ignition switch. If I moved the wiring harness where it went into the terminal assembly at the base of the ignition switch, the taillight only would go on & off. I removed a small screw in the side of the ignition switch, which allowed the electrical connector with wiring to be removed from the bottom of the switch. Although the electrical terminal part looks to be able to be disassembled, I opted for the dealer to replace the terminal part complete with the wiring harness attached, which is then re routed back into the main wiring harness. They did this for me under warranty, no more problems. I know the Classics are different to the GS's, but they do share this electrical part at the base of the ign. switch, so hope this helps. Fitz from Oz.
- Brake Light would not go off. The same happened to me. Turned out the bolt holding my brake pedal was a little loose, which allows the blade to slip down alongside or beneath the pedal arm. My bolt happened to be bent, I replaced it and torqued it properly and things were better. I did have to bend the blade a little away from the motor to keep it from slipping back...apparently it was a little out of whack from slipping down there. Nice opportunity to clean and grease the whole assembly & replace a worn roller. Andy #618 (MD - '99 F650).
- Brake Light would not go off. I have had the same thing happen a couple of times. I accidentally pulled the spring back to where it belonged by accident, while feeling around for the switch. Knew where to look the second time. Any chance you bent the contacts too far and the tail light contact is touching the brake one as well (or you got the bulb in backwards)? Both switches being failed/out of adjustment just seems too coincidental, especially since you were just messing with the tail light socket.
  Same thing (sorta) happened to mine, once. The little tab that goes over the brake lever slid off somehow...just a matter of sliding it back over the lever (and wondering why it moved in the first place). Marty #436-Chicago-97 F650F.
- Brake Light would not go off. My brake light would not go off. My rear brake pedal turned out to be the problem, there is a small blade spring which is used to push the tit in the switch back into the switch. The blade spring is supposed to sit on top of a bar that is on the right hand side of the brake pedal and as you depress the pedal it pushes the spring up and then activates the light through the switch. If the blade spring gets under the pedal (which it can easily do) the brake light stays on. Easy to check before starting to pull micro switches apart. Ratso
- Suggest you disassemble the front switch assembly and see if the brake light goes out when the switch is moved farther from the brake lever. If it does, carefully find the correct position and tighten the tiny screws little by little, constantly re-checking light operation. The switch seems awfully sensitive to position and touching the screws ever so gently upsets it (mine, at least). I had exactly the same problem, which I solved with the above method two months ago. It's already coming back, and the next time I fix it I'll try a tiny drop of glue to hold the switch in position and perhaps make it a little less vibration sensitive. veggie_deluxe
- Check to see that the handguards are not touching the front brake switch and causing it to not be activated. I needed to Dremel out a small portion inside mine for this reason 2 weeks ago. langlois '97 F650, Arlington, Va.
- Next.

It is possible BMW have replaced the Front Brake Switch:

- On another note I highly recommend reading the FAQ before attempting any maintenance on the bike without the shop manual. My front brake switch went bad from corrosion on a lead so I took it off and tried to get a replacement at radio shack but no luck (they no longer carry anything useful) so I got a new one from the dealer for 20 bucks. I lost the plunger that went from the break lever to the switch though because I did not

know it was there. I am waiting for a new one from the dealer. Worst part is I looked foolish in front of the repair guy at the dealer! Oh well lesson learned. **One final note BMW improved the switch!** They set the new one up slightly different. It now has the wires protected so it will not rust out like my other one. Unfortunately this may be the reason it will not fit under the hand guards as some people have noted. If I get a chance I will post pictures. The bike is a 98 Classic. Assuming the switch has not been changed that would be the year. I bought the bike used so I have know real way of knowing. The old switch was about 2/3 the size of the new switch in width and had 2 separate connectors separated by 1/2 and inch front and back. The new switch has one set of wires going into it in the middle. It looks like they took the old switch and added a plastic cap to protect the wires from corroding like mine did. I will try to get pictures. Don - Rochester, NY.

Replacing the Entire Brake Light Assembly

Bryan
December '01

- The light assembly is mounted to the bike with rubber grommets.
- Inside the rubber parts are small metal spacers (they look like tubes), to limit how far you can tighten the mounting bolts.
- Remove the spacers, which let you compress the rubber parts a bit more than the factory had in mind.

Loose Tail Light Assembly Fix

Solution 1
Dave
November '01

I have a temporary fix for mine.

- First check all four screws holding the taillight assembly.
- Two are in the “trunk” and two are below the trunk in the rear fender area.
- After you are sure everything is in place and the screws are tight, you can run a zip tie under the rear reflector and through the mounting holes for the luggage rack (of course, this is assuming you don’t have a luggage rack installed..).
- A black zip tie will blend in. This won’t keep the screws from coming loose, but it will hold things together if they do.
- I’m considering super-gluing washers at the attachment points so I can bolt the assembly on and it can’t slip out.
- If you decide to do this, be very careful backing the screws all the way out.
- Too much torque and you could snap the plastic that the clips for the screws are on.
- I can't imagine what they were thinking when they designed that setup for a dual-purpose bike! Good luck, Dave

Solution 2
by Tom#981
01-Feb-02

- I replaced my whole light assembly a couple months back as the prongs that contact the bulb were moving around in the assy. this caused some arcing, and the contacts on the bulb got disfigured... but also check the mounting of the assembly , to make sure it's tight.
- When I reassembled it, I took about an 1/8 of an inch or so off of the length of the spacers that fit over the mounting bolts, to allow a bit more tightening of the bolts, compressing the rubber grommets, resulting in less movement of the assembly.

Solution 3
by John #549
Apr '02

I got tired of the cheesy and cheap rear light housing and the contacts never staying in contact -- no brake light or no running light. After putting in a halogen light for the winter (from Dennis Kirk) the additional heat from the bulb melted the thermoplastic housing and made the situation worse. Rats. Here's a solution:

- First, go to PEP Boys or other local auto parts store and by a cheap aftermarket stop/taillight replacement fixture. I got mine for about $5 US. I then drilled out the rivets holding the metal light socket into the fixture and threw away the fixture.
- To make that taillight perform good again, first take off the lens, then remove the nuts under the fender and disconnect the wiring spade connectors.
- Next, use a Dremel (TM) tool, or other suitable tool to remove the back side plastic protrusion from the housing and enlarge the housing hole to accept the new metal socket.
- Now fit the new socket, screw it into the plastic housing using sheet metal screws, and affix replacement male spade connectors to the new socket.
- Finally, connect the male spade connectors to the existing F650 taillight wiring. Connect fixture ground to the brown wire, the running light element to the blue/white wire, and the stop light element to the grey/red wire. Reattach the housing.
- Ahhh, that's better. Now the bulb actually stays in contact with the terminals.

	Taillight assembly modification of a metal light receptacle. From the back of the assembly. Note trimmed plastic area (click photo to enlarge). Wires are terminated with male spade connectors that attach directly to the BMW wiring.
	Taillight assembly modification from lens side of the assembly. Socket does not protrude all the way through to prevent the bulb from contacting the lens.

http://www.calsage.com/bmw_f650.htm

Solution 4
Pete

- On the F the rear connector is a pile of .....
- One way to fix it, take the tail light off, remove the bulb, carefully push the centre contact forward a few mm.
- Then take a tube of neutral cure silicone and put a blob on the back of the contact, pull the dispenser back and make an arc to the plastic around

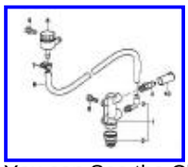
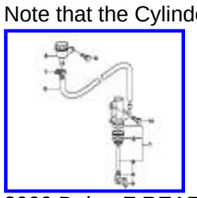
the connector. Repeat 3 more times at 90 degrees.
- Leave to set.
- Fill in the gaps with fresh silicone.
- Note this takes time and attention, what you are doing is building a flexible backshell for the tail light connector.
- Works wonders though and also makes an amazing difference to the life of bulbs.

Solution 5
Paul #1289, Red '99 F650ST, Quebec.

- Figured out a fix to the floppy tail light. Riding this weekend I noticed my taillight was pretty loose - even though the 3 bolts that hold it to the fender were tight. I followed Tom#981's advice in the Lighting FAQ which suggests removing about an 1/8" of material from the metal bushings inside the rubber grommets. Still I found the whole thing to be too shaky.
- For clarity, I refer to the rear fender as being 2 parts - the one over the wheel which I'll call the fender and the part that holds the license plate and tail light which I'll call the rear fender.
- I removed the luggage rack, dropped the fender and removed the rear fender. I found that the rear fender is attached to the bike with 2 small bolts and 2 plastic nubs that sit inside holes with rubber bushings located on the frame.
- I drilled out these nubs with a 5/16" bit. I then reattached the rear fender to the bike with the 2 original bolts and added 2 Allen head bolts, washers and nuts right through the two holes I made and secured to the frame through those rubber bushings. It no longer moves.
- Considerations: Change the bolts I added to stainless. I chose Allen head bolts to provide clearance for the tail light housing's flange. I still had to file the housing a little bit to get it to fit. A way around this might be to use a pan-head screw or even a carriage bolt.
-  

Hydraulic Brake Light Switch? (Rear)

Yes it is Possible:

- Part # for Classic 1996 F
- 1996 Classic F BRAKE MASTER CYLINDER 34 31 2 345 311 Part #1
- 1996 Classic F STOP LIGHT SWITCH 61 31 2 346 505 Part #4
- 1996 Classic F STOP LIGHT SWITCH MUDGUARD 61 31 2 346 631 Part #10
- 
- You can See the Classic 1996 Cylinder has an Upper Threaded Opening for the Switch, whereas neither the Later Classic F, nor the GS have that. How do I work this out.? Well, the Parts List for the US Version of the F650, the 97 Onwards, NO LONGER lists the Part #4 or Part #10.
- See this Gif of the 1997 Onwards Parts #'s for what I mean.
No.	34_0681 Description	Supplement	Qty	From	Up To	Cat	Tr	Dr	St	CV	Part Number	AT	R	TI
1	BRAKE MASTER CYLINDER	D=11	1								34 31 2 345 311		1	
2	DUST CAP		1								34 31 2 345 452			
3	HOSE CONNECTOR		1								34 21 2 345 450			
5	FLUID CONTAINER		1								34 21 2 345 313			
6	HOSE	250MM	1								34 32 2 345 316		1	T
7	HOSE CLAMP	D=10	2								17 11 2 345 070			
8	HEX BOLT	M6X20	2								13 71 2 343 300			
9	BOLT	M6X12	1								34 11 2 345 493			
- However the Cylinder is the Same, so my guess is they just Plugged the hole. So you can probably go ahead and but part number 4 & 10 for the 1996 and hook up the wires if you want. It can get Muddy and Wet there though.
- Note that the Cylinder Part #1 has Changed on the GS, so this is not an option on that bike.
- 
- 2000 Dakar F REAR BRAKE MASTER CYLINDER 34 31 2 345 748 Part #1

Feedback:

- My '96 had the hydraulic switch when I got it second-hand. It looks factory rather than aftermarket. It now needs replacing so if you find the switch, please post part #. (A KTM switch looks right apart from the electrical connector). If you remove the right side passenger footpeg, you'll have access to the rear brake master cylinder. If it's the same as mine, it has space for two outlets, the lower one goes off to (the slave cylinder ?) on yours the top one probably just has a blanking plug, mine has a brake switch there. The BMW parts list PDF file that was floating around for a while has a clear picture. The brake switch goes where "Item #4" is. Should be easy to do if you know how to bleed the brakes and the switch probably isn't hard to get. The first bike shop I checked had one that'd fit if I replaced the electrical connector. Pete
- Aftermarket hydraulic switch: www.denniskirk.com. Look for hydraulic brake switch, from Goodridge (maker of fine brake hydraulic products), about $16 (I think). I have one for my front brake, haven't installed it just yet. I used some phone wire lying around the alleyway left behind by Verizon to fix the rear brake switch (Wingnut Use-of-Available-Materials Skill Award). Shank
- If you're REALLY considering putting in the hydraulic switch, you should definitely look at this first. It works on a different principle (engine vacuum), and would be much safer and easier to install. It activates the brake light whenever you are relying on engine braking: The **DecelLight**. http://www.motoloco.com/DeCelLight.htm. Mason #631 - 97ST in PA.
- Next.

Rear Brake Switch

See the Front Brake Switch FAQ for Switch Alternatives

- "Always on rear brake light". I've attached a pic of the Classic's rear brake switch "lever" (the little brass tab that sits on top of the rear brake pedal near the swingarm). I've had the little brass tab slip off the top of the brake lever to the inside of the lever (big foot syndrome?). When it does, the rear brake comes on (like if the pedal was depressed) and stays on until you lift the little tab back onto the top of the brake pedal lever again, where it belongs. Real quick fix, if you know what/where to look. Marty #436.
- I'm having trouble with the rear brake switch on my '97 F650. I've replaced it twice, and each time the metal tang breaks off. Has anyone else had this happen? Any ideas how to keep it from happening? Thanks. Kathy
- Yes. It is a common problem of the design of the switch, and on the other side, it is the same system used in the oil pressure sensor that also fails commonly. Fede.
- Rear light problems. Check the earth side first. The tail light on the F is one of those built in weak spots. The contacts are made out of chess and bend very easily. I had the exact trouble Fede described. On the theory that two circuits (?) are not working, the earth is the obvious area of concern. Both connections at the tail light become common and then go to earth. Andy Leeds UK #982.
- Here's my final report in the hopes that it will help the next person. My problem turned out to be a slightly misshapen spring actuator on the rear switch, which, in addition, I had incorrectly installed UNDER the tab on the brake pedal following removal and minor straightening (This is a $50 part!). Kristian's FAQ update on spring/tab relationship (even the shop manual is unclear on this point) was timely, and appreciated. Lessons learned: 1. Should have mentioned brake pedal adventure in original post which doubtless would have lead ace Chain Gang diagnosticians directly (via Occam's Razor) to the problem; 2. Normal metallic clicks in brake pedal operation can be mistaken for proper microswitch operation; 3. Adequate light and reading glasses can be helpful. Thanks again. David808
- I just saw this as I was doing a bit of a browse, I had the same problem a while ago and posted it on the board and we exchanged a couple of posts. The little spring switch for the rear brake seems to cause a few problems. My description of the problem in my last post was not to eloquent but if its still not clear you could send me an email and I will try and go through the procedure. I would think that this little spring would be no 1 on the checklist if your brake lights wont go off regards Roger F650GS Dakar, Queensland, Australia. Ratso.
- That little brass tab on top of the brake pedal somehow got pushed off toward the inside of the bike so it wasn't on top of the brake pedal anymore (it slides down behind the pedal a bit). This makes the switch think that the brake pedal was depressed (until fixed). Really quick and easy fix if you know what to look for and what to do (just lift the tab back on top of the brake pedal). I was thinking of the pictures of the rear switch itself (and the contorted brass actuating mechanism) that I tried to take from the other side, below, inside (and everywhere else!).
- Next.

Misc. Braking Questions FAQ

compiled & edited by Kristian #562
Please read the Disclaimer before attempting any work in this FAQ.

Problems & Solutions

Aftermarket Brake Parts

Misc. Brake Questions

Other (Separate) Brake FAQs:

- **See the Brake Maintenance FAQ**
- **See the Brake Pad FAQ**
- **See the Brake Light FAQ**
- **See the The ABS FAQ**
- **See the Brake Maintenance FAQ GS - ONLY Problems SPECIFIC to the GS/Dakar**

Bad master cylinder, caliper or brake fluid?

Problem: I recently bought a 2000 F650 and after about 50 miles, the front brake lever went all the way to the bar. I could pump it up, but after that first occurrence, it frequently, but not always, went to the bar. Took it back to the dealer and they said the master cylinder needs replacing (after the technician originally thought they were OK, because of the intermittent problem). While waiting for the part, I read the brake FAQ and decided to change the fluid in both front and rear brakes, as the brake fluid was the color of coffee ... actually more like espresso!. Now, I've ridden the bike about 10 miles and the brakes seem nice and tight. Is it possible that I really do have a bad master cylinder, or could changing the brake fluid fixed the problem? Also, if the brake lever goes to the bar, how would one know if it's a bad master or front caliper?

Solution: Well, after changing the "espresso" brake fluid to "gin" color, I went out and practiced panic stops from 25 to 45 mph, and brakes are still working fine, so I'm inclined to think it was bad fluid and not a bad master cylinder. Phoenixtoohot

Feedback:

- It sounds to me like you had a lot of air in your fluid. My fluid looked just like that the first time I changed it, less than a year after the bike was assembled by the Italians. Maybe they were using espresso. If it was me, I would change out the fluid once more, just to be sure that you got all of the expresso out of the lines. A careful bleed of the brakes will easily get all of the air out of the lines and if the brakes feel fine then, that was your problem and I would worry about the competence of your mechanic. In my limited experience, a bad master cylinder will cause the brake lever to slowly come back to the grip over a period of time, not come back immediately - that indicates air in the line. Richard #230: 1997 Funduro
- *"Even bad brake fluid wouldn't let the lever come all that way in"* BZZZzzzttT! A few small air bubbles in the brake fluid sure will allow the lever to come to the bar. Brake fluid absorbs water from the atmosphere. Brake fluid can reach temperatures higher than the boiling point of water. Steam/water vapor bubbles are more or less the same as air bubbles once they form in your brake line.
- *"Even bad brake fluid wouldn't let the lever come all that way in"* Not true. Had this problem with rear brake after braking a lot. Changed the fluid, solved the problem... If your problem happens after some braking, than I would go for the fluid. gim '97 F650, Waltham, MA.
- I once used brake fluid from a tightly closed container that had only been opened once before, some 2-3 months earlier. Soon after, on a trip with some "inspired" riding I suddenly lost the rear brakes, due to vapor lock. When I had the brake fluid checked (I really did not think it could be the fluid, but found no other cause) we found a too high water content. Brake fluid is highly hygroscopic (Absorbs water). haakon#626 (Norway,12-1999- F650GS).

Rear Brake Failure?

Change your Fluid REGULARLY! Check your Brake Hoses!

Feedback:

- Coming back from Santa Cruz today when, after a lot of breaking on rt 9 (beautiful ride with lots of curves in the woods), the pedal went all the way down with no braking at all. It happened progressively, but fast. After the third time after I felt the pedal somewhat different, there was no more braking action. I thought the brake line broke, leaking fluid. NOPE. It was just the temperature. After waiting for half an hour (adjusted chain tension in the meanwhile), the bike was fully back to normal. Is it possible the problem was caused by the fluid ? I believe that it hasn't been changed for a long time (never by me at least :( )...I plan to bleed the brakes anyway, but it would be nice to know if this problem can be caused by old fluid. If this is not the case, then I have to try to brake less the next time :) gim (orange '97ST)
- Brake fluid is hygroscopic, it absorbs water from the air. This is one reason you are supposed to change it annually. Water lowers the boiling point of brake fluid. When it boils, there are gas bubbles in the lines. These compress when you apply lever instead of moving the pads. When it cools, they go away. Don't use your brakes so much. And change your brake fluid. Flash #412 (CO)
- Had the same problem.... the fluid in the stock bike sux. Flush the system had new Dot4 put in ....never had problem again. scx

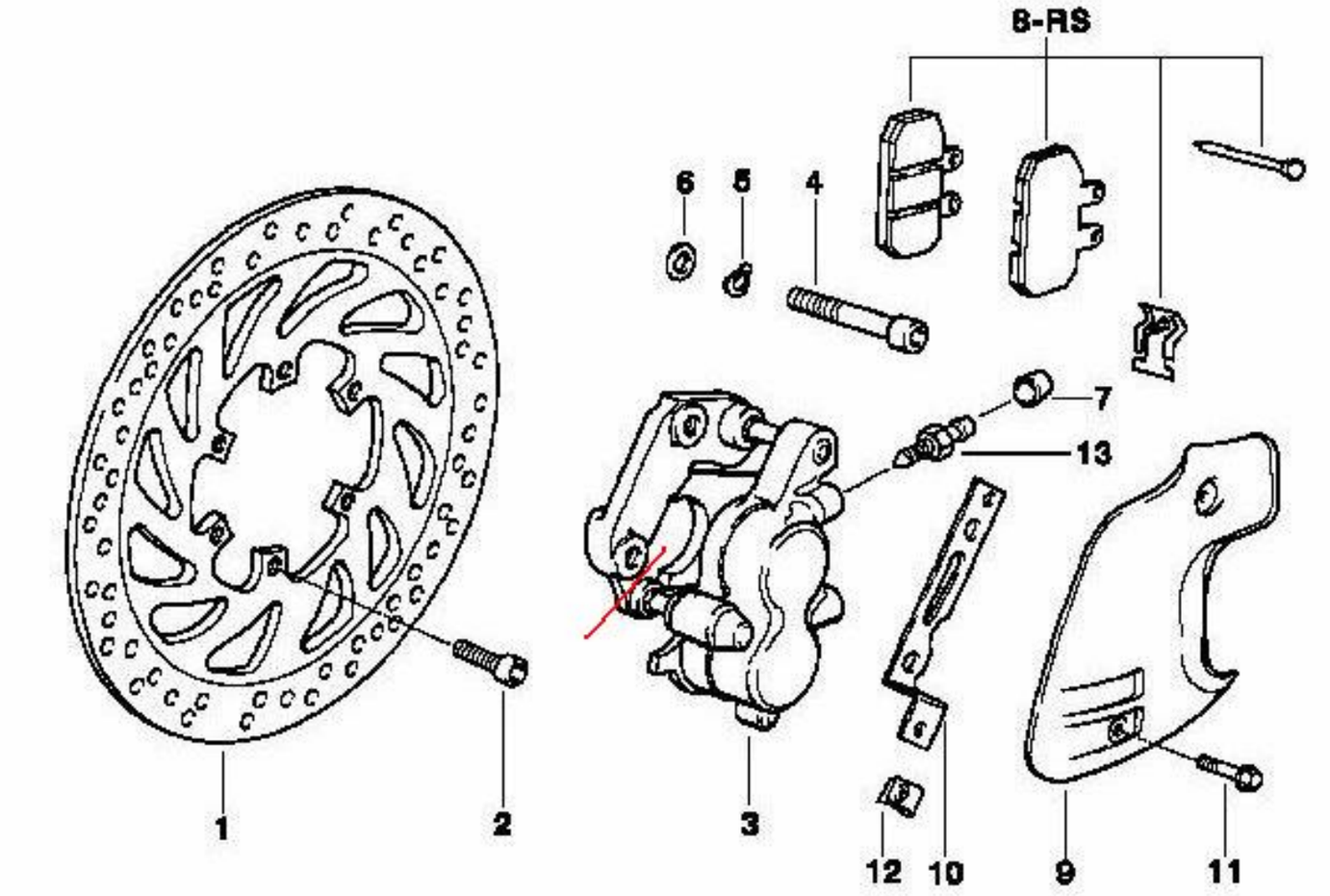
Brake Mount Failures?

Only ever heard of ONE instance. ed.

Instance 1

OK, right to the point here. I have just had the sh*t scared out of me by a brake mount failure that caused a total loss of the front brakes at speed on my 98 F650ST. I went to brake at 30-40mph and there was a CRACK followed by the clunk of my entire front brake caliper assembly rotating out of place on its remaining mounting bolt resulting in no brakes and a floppy brake lever. On examination the lower of the two caliper mounts (where the caliper is bolted to the fork leg) had fractured vertically through the bolt hole, leaving the caliper hanging on via the upper mount and the break pads totally dislodged and hanging loose.

Q1. Has anyone heard of it happening before?
Q2. Is this a known issue?
Q3. Is this something that BMW should know about?
Q4. Is this a weld repair or a new lower fork job?



I would advise anyone to take a close look at the brake mountings on the forks and check for cracks just in case. This was really sudden and with no warning. Had it happened at motorway speeds I would not be here to make this post. I have just had all the covers off this and taken a look in the cold light of day. The good news appears to be that the mountings to the fork leg are ok. The bad news is that it is the caliper mounting plate that has failed. This plate connects the caliper to the forks and mounts two pins that allow the caliper to move. The mounting for the lower of these pins has fractured vertically. You can see a diagram above of the brake assembly. The mounting that has fractured is just below the lower of the two bolt holes on fig. 3 (see above). As you can imagine, my BMW dealer is taking a real interest in this and will be looking at this ASAP with a view to kicking it up the BMW ladder if there is no sign of external forces at work. MrWolf, Dave-O'C-98 F650 ST

- **<Q1. Has anyone heard of it happening before?>** Not that I know of.
  <Q2. Is this a known issue?> Obviously not.
  <Q3. Is this something that BMW should know about?> Absolutely. Based on the history of the bike, I would possibly involve a lawyer as well. Who has maintained the bike? BMW Factory service? You personally? A previous owner who's work no one can verify? If I had to venture a guess, I would suspect someone has radically overtightened that bolt, although I'm not completely ruling out that a completely normal outer fork tube torqued to the proper specs would break.
  <Q4. Is this a weld repair or a new lower fork job?> Given your experience, would you ever really trust a repaired bit? I would work on a replacement, preferably on BMWs dime. David #476, '99 F650.
- I would not use welding as an option for this repair given the importance and the nature of it. Will in CA
- I'd love to have a look at that fracture. My guess is that you'll find an inclusion (looks like a chunk of slag). Marty #436-Chicago-97 F650F

Leaking Brake Line?

- I posted an earlier message this past Tuesday (24-Sep) about a possible rear brake line that was leaking. Well just for the hell of it I bled the rear brake line as per FAQ (many thanks to the contributors). After the job was completed I found that I had drops of liquid under the bike. Shining the light between the rear wheel and the engine while depressing the brake pedal quickly illustrated that there was indeed a leaking brake line. In front of the rear wheel and behind the transmission the rear brake line has some fittings to join two separate pieces of brake line. It is the fitting that is leaking. So off to the dealer for a warranty repair for a 2001 F650GS with 14500km (9000 miles). Perhaps first I will try to see if I can tighten, if it is lose, the fitting. Though it looks very crowded at the fitting. Rodger#1046
- Took the MC to the dealer this morning. Dealer has concurred that the rear brake line is leaking. The whole brake line will be replaced under warranty. The parts were ordered today (Monday) and could arrive within a couple of days. Rodger Lucas (#1046) 2001 F650GS 14500 km (non ABS).

- Next.

Leaking Front Master Cylinder?

If it leaks, it will quickly corrode metal parts, including allows and strip paint. Clean it up quickly and fix it!

Causes:

1. **Reservoir Overfilled.**
   Solution. Take out some Fluid with a CLEAN Turkey Baster or Better yet, BLEED some fluid out.
2. **Seal Problem #1:** There is a bit of rubber, from one of the punched holes on the diaphragm, that is still attached, but on the inside, so you can't see it. It raises the lip of the seal enough to cause leaking. btw, CHECK for splits or defects in the sealing lip of the Diaphragm first. If there is a defect, that's where it's weeping from, and you will need a new diaphragm. No amount of sanding of the lid will help you if the Diaphragm is split or has an extrusion (manufacturing) defect.
   Solution. Undo Screws, Check Diaphragm, Reinstall. Do NOT Overtighten the Screws. If the Seal is good, it will seal just fine. One thing you should always do is to coat the threads of the master cylinder lid screws with anti-seize compound. If there are any screws that are going to corrode on your bike it is going to be these screws. (Richard #230). **If all else fails, replace the diaphragm and make sure that the vent grooves in the top of the master cylinder cover are clean.**
3. **Seal Problem #2:** Rubber diaphragm under the lid was not re-installed or tightened (most likely too tight) correctly, or if there is a problem with the vent holes under the cap.
   Solution. Undo Screws, Check Diaphragm, Reinstall. Do NOT Overtighten the Screws. If the Seal is good, it will seal just fine. If all else fails, replace the diaphragm and make sure that the vent grooves in the top of the master cylinder cover are clean.

Feedback:

- Brake oil container overflow Hi! I had a short ride around town last night along w/ my buddy. I rode a 2002 F650GS (non ABS) while my friend brought an F650CS w/ ABS (my old bike). After stopping for a short break, I noticed that both our brake oil reservoir (on the right side of the handlebar) had some oil stains. Probably from an overflow. I'm going to have both of our bikes checked tomorrow and I hope the mechanic can solve our problem. Our bikes are still new and we've run only about 500kms each. I got both bikes from the same bike dealer. Just curious, can there be any other reason for the oil overflow aside from maybe the bike dealer put too much brake oil? Has anyone have this same situation? Jagged.
- I have a problem with brake fluid weeping out of the front master cylinder. (this is for an '03 CS w/ 7k). Within a couple weeks of having the bike, someone pointed out that fluid was weeping out, and claimed the dealer must have overfilled the reservoir. This was ~1500 miles. I flushed the fluid for both front and rear cylinders, and I haven't had any more weeping until now. I've put about 1500 miles on the bike since early march, but the weeping didn't start until yesterday. Just a drip yesterday, but several drips today. The only thing I can think of is temperature - it warmed up nicely today. But why didn't I have any weeping last season? I changed the fluid at the height of the summer heat. If anything, shouldn't I need to top the fluid up due to brake pad wear? I can remove some fluid easily but I want to make sure I'm not experiencing an underlying problem. (It is leaking From the weep holes. I think it might also be leaking from the front of the cover seal, but I'm not certain that wetness also originated from the weep holes. Since it's coming out the weep holes, I thought it was a fluid-level problem. Thing is it's weeping out the weep holes, so do I really have a leak problem? If there was a problem with the seal I'd expect fluid to leak somewhere else). Thanks for the tips! wicked94pgt BBG#22 F650CS, Natick, MA
- My GS wept from Day 1. Problem? There was a bit of rubber, from one of the punched holes on the diaphragm, that was still attached, but on the inside, so you couldn't see it. It raised the lip of the seal enough to cause leaking. Solution 1. Pull the diaphragm out of the cap unit and check it thoroughly. Solution 2. I also got some VERY fine wet and dry and sanded a smidgen off the outer edge of the cover (after removing the rubber diaphragm), so that I was sure the lid wasn't engaging the reservoir top before the seal could seal properly. If you do that, do just a VERY small amount and CLEAN CLEAN CLEAN CLEAN it of all filings before replacement. btw, CHECK for splits or defects in the sealing lip of the Diaphragm first. If there is a defect, that's where it's weeping from, and you will need a new diaphragm. No amount of sanding of the lid will help you if the Diaphragm is split or has an extrusion (manufacturing) defect. (Is rubber extruded?). Kristian#562

Front Master Cylinder Rebuild?

Q. The front brake plunger on my '94 Classic F is sticking. Does this mean that it is shot and really should be replaced or can it be stripped and greased up. I saw on the Motobins website that they only supply the master

cylinder and throttle assembly as one unit. Is this correct? Pat#1210

According to the GS Manual this item should be replaced (Front/Rear Master Cylinder Cup) every 40,000kms for Bikes WITH ABS. This Boot can be replaced.

The BMW part #'s:

- **The Classic Part No. for the Boot is Unknown.**
- **The GS Repair Kit Front Master Cylinder (What is IN it is unknown) is 32 72 7 655 396**
- **The GS Repair Kit Rear Master Cylinder (What is IN it is unknown) is ALSO 32 72 7 655 396. (So it looks like the Piston is the SAME for Both F/R).**
- **Chances are the Classic uses the same as the GS and that SOME other bike uses a Similar Piston. Anyone?**

Feedback

- Theoretically the master cylinder and caliper can be rebuilt. I tried to buy a rebuild kit for a leaky BMW master cylinder and was told that they don't sell master cylinder rebuild kits, I would have to buy a new master cylinder for some astronomical sum. That was a different BMW than my '99 Classic. So, I'd imagine that there is a rebuild kit for the master cylinder but that no dealer outside of BMWAG has one in stock and they can't be shipped overseas for national security reasons. I think your front brake caliper probably just needs to be cleaned. Shank NYC USA

What about Sticky Pistons/Dragging or "Binding" Brakes

by Andy #982, Mark #403 & Kristian #562

Severity: It can be dangerous, so fix it soon! Here are some examples:

- Rear brake catches fire. First I sign is when I went to change gear and the bike starting slowing at rapid rate. BMW surging I thought. About 5 miles later I stopped at the traffic lights and motorist behind start waving at me, this when I discovered that rear brake assembly was on fire, not far from the fuel tank under the seat. Bloody quick dismount from bike and called the fire department. Five minutes late two fire engines arrived! Communications problem? Only real damage seems to be the rear brake assembly and speedo sensor. The bike has only done 14,000 on mixture of dirt and highway (no speed limits in my home state of NT). Has any one had problems of rear brake overheating? I was only doing about 125 KPH at the time of the problem. Iain

- I've had problems with the rear brake sticking, thus causing overheating, but thankfully not as serious as what you experienced. It can get pretty hot real quick. Oyvind #1052, Norway

- No fire, but really hot. Having the rear brake adjusted with too little slack will do this. You get the brakes hot, the fluid expands a little and the pads are always touching, which makes the fluid hotter, which makes the pads push harder on the disk. Pete

Generally:

1. The brakes drag (slightly) to stop anything getting between the pad and disk that might cause scoring. Its simpler for the OEM than fitting any other sort of protection to the pad/disk.

2. If the wheel spins freely for maybe 10 seconds (or less, even a 3-4 good rotations) after a good shove, all is OK despite some slight rubbing (not squealing) noise.

3. If it is dragging, in other words it gets hot to touch even if you do NOT use the brake, check the fluid level before anything else and see if removing some helps. Stay within the sight glass limits, but you'll find half full to low may be better than full.

4. If you've played around with your forks/axle lately, you may have put the bike together with a slightly different wheel position. There's a surprising amount of variation in how the forks will come to rest with everything loosened up, and how they will end up when you tighten the triple clamps, axle pinch bolts and fork brace. If you tighten things up with a slightly different angle than you had previously, you can get additional brake drag until the pads "seat" themselves again to the new position. See the Front Wheel Removal FAQ for tips on how to put the forks back properly and the Rear Wheel Removal FAQ for the rear.

5. For the Rear Check the Brake Plunger moves freely. For the Classic, Undo the The Allen Key Screw (i.e. the Brake Pedal Bolt). Take it off the Axle and Grease the Axle, and the Plunger and connections. Put some Vaseline or Grease in the rubber boot.

6. Next check Check the Rotor is not Warped. They warp easily if they get too heat for too long or they are dropped when you do a wheel change or any maintenance work e.g. Bearings. Here are some New Rotor sources.

7. Next idea is to replace the fluid and bleed. Old fluid with water in it can expand under heat before it all goes spongy.

8. Next idea is to check the Pistons are CLEAN. What often happens is that as the pads wear the pistons extend further and further out of the caliper until you change the pads. Then with new pads you push 'em back in again. But if you didn't clean the piston's at all, all that gunge ends up going back into the seal and can cause the piston's to "stick" somewhat.

9. Don't forget to ALSO check whether or not the master piston returns completely!

10. After that its strip down and new seal time at which point you'll want to check the FAQ or maybe see a mechanic. If a seal kit is available, just get a clean place to work and replace every seal in the kit. Clean everything as you go, you are looking in particular for anything that might prevent fluid getting back to the master cylinder. Lift the rear wheel up an check if the brakes are slightly on even if you're not breaking. If they are, this often causes over heating and you have to overhaul your brakes, which isn't very hard. If you find any inside dirt coating the brake cylinder or piston then polish it away using a light rubbing but never polish in and out, go around and around or you may cause leakage through micro scratches. Then use new gaskets/o-rings.

Feedback/Suggestions:

- Sticky M/C piston sounds very strange. Brembo makes a special piston Vaseline for that. I'd buy a rebuild kit, pop the old piston out (hammer and ten penny nail are all the tools you'll need), lube up the new one, slather the seals and pop that in (hammer and 11mm socket (or close enough) are the tools you'll need). I still say that if you are getting drag on the front brake, you have mung and debris on your caliper pistons preventing them from seating all the way. Take out the pads, pump the lever a couple of times to get the pistons to stick out a little more than usual. Spray profusely with brake cleaner, get out of there before the fumes go to your head, when the fumes clear, open bleed valve (or take the top off the M/C reservoir) and cram (and I mean CRAM!) the pistons all the way into their bores, use a C-clamp if you have to (I've done it in the past), then put in the new pads, make sure the reflex pins are pushed all the way into their bores as well (and make sure the reflex pins are substantially greased up and not sticking in their bores). Don't forget to to put a lil' grease or Auntie Seize on the backs of the pads to curtail squealing. And THEN, if you still have a bit of brake drag, go for a ride. I put on stainless lines and new Galfer pads this weekend, I had some front brake drag initially but after bedding in the pads a la Method du L'iclair (Flash), no more front brake drag. Shank
- Further to my recent postings about my front brakes (sticking plunger binding discs etc) I have the following update: After replacing the pads (the old discs still had life left in them) and bleeding that God 'awful brown gritty stuff from the lines and replacing it with nice clear brake fluid my pads were binding on the discs. I took the whole thing apart again but to no avail. Fearing the worst for my master cylinder and calipers I took it to the shop. They stripped them down as best they could, cleaned the caliper pistons copaslipped the back of the pads and again bled the system. This still didn't fix it, so last night I put the old pads back in and lo and behold problem gone. One of my colleagues at work ('91 K100) suggested that the pistons had corroded on the outside (the bike had been laid up for some time before I bought it) so since the new pads meant pushing the pistons home they simply jammed in the bore. Logical? Pat #1210.
- Logical? Possibly. But sticking pistons is what I suggested upon your first post. And I still stand by that statement. Take the pistons out, ScotchBrite' em real good and (please read carefully) lube the slide pins of the caliper, these can also contribute to sticky brakes when new pads are put in. Ok, so replacing the new pads with old has temporarily fixed the problem. What are ya gonna do when the old pads have no more meat left on'em? Shank.
- Bound rear brake. After removing my rear wheel (Classic '97) and replacing it. I checked the brake whilst on the centre stand by pressing it down checking it had come on and then checking that it had released. Riding to work this morning all went to pot :(After using the break a few times it started to bind. it just is not releasing, luckily I only had 500m to go after they bound (was really lucky with the lights) and was able to go really slow after that. There was no pressing the pedal when the wheel was off. That is a silly thing to

do. All I did was the wheel off, change tyre, wheel on procedure that I have done loads of times before. Normally it is all hunky dory. Even this time, the wheel went on first attempt. It is straight, that was checked and rechecked. I know I can release the brake at the pedal end with the bolts. But is this just going to mask a problem or is it the correct fix? So, my bike is outside work, the rear break is pretty much locked, questions are: 1, What do I do to unlock it? 2, Why did it happen?.

- What xls said, check you didn't lose the L or R Spacers when you put the wheel back on AND check the brake caliper mount on the swingarm is nice and loose but in position on that little lug before you go tightening up the main axle nut. Good point Chris, James I put a dab of Copaslip (a sort of copper impregnated "dry" grease on those pins to help it along. (Don't get near PADS.!). Try that first, then remove the wheel and recheck. Check Alignment at same time, sometimes goes on skew when torquing main nut, unless you have third hand to push k.
- Make sure the pads are not stuck on the retaining pins as well. You should be able to move them slightly independent of the pins. I also just thought that if your rotors are worn and the pads are supposed to fit between the lips at each edge perhaps a pad is riding on a lip. The goal should be to have the pads riding on the pins and against the rotor in the same way as before you pulled the wheel. Chris in Santa Cruz, CA #782 - 30-Jul-02
- Bound rear brake - Answer. Ok, I have found the cause. After checking the wheel/axel end all seemed OK. I went to the brake pedal end, detached the brake pedal from the brake plunger and moved it up and down. It was sticking, definitely not rising by itself. So, I worked the pedal up and down a little, It is now not perfect but it is better. A clean / grease up of the area is in order. : J@mes NZ #848.
- *Sigh* We've gone over this before, I'm SURE it's in the FAQ somewhere, but for those of you city folks just too damn busy to read the FAQ, read on and, please, if you would be so very kind.....BLOODY PAY ATTENTION!!!
    - Take the pads out.
    - Remove the caliper from the fork slider.
    - Pump the brake lever to get the pistons out far enough to see a clean spot on them, BUT NOT TOO FAR!
    - Spray profusely with brake cleaner, use two cans if you have to.
    - Take whatever brake fluid remains in the reservoir out, use a turkey baster, eye dropper... whatever or simply use the Flash method and turn the bike over to get it out.
    - CRAM the pistons ALLLLLLL the way into their bores. (now here's the REALLY important part, please pay attention)
    - Remove the piston assembly from the back assembly. Yes, they do come apart.
    - Go ahead, give a good try, they'll come apart. Nope, you won't break anything.
    - Clean the mung, bung and grunge off the slide pins. Grease them profusely. Use lots of grease. No, MORE than that. That's it, grease it up good. While you're at it, fill the lil' rubber booty thingies with grease.
    - Now put the slide pins back into their lil' rubber booty thingies. Yes, cram'em in there. No, you're not going to break anything Yes, you are putting the caliper back together.
    - CRAM those slide pins in there. So what if some grease comes out, wipe it off. No, you aren't going to hurt anything. Sheesh. REALLY cram'em in there. Ok, pull'em out a bit, make sure there's some resistance. Now cram'em back in there really good. NO, REALLY cram them in there. Keep cramming. I don't think they're all the way in yet. (Don't ya just hate it when ya hear that?)
    - Ok, when you see the lil' hat part of the lil' rubber booty thingies pulsing with each cram, they might be close to being all the way in there.
    - Try squeezing the lil' hat part to poot out the rest of the air trapped in there. Now cram'em in some more. Oh come on, put some testosteronized muscle into it, CRAM'EM!! Sheesh, how can someone so limp-wristed ride a bike? I said, CRAM'EM IN THERE LIKE A MAN, DAMMIT!!!! Very nice, now stop yer crying.
    - Put a light coat of grease on the part of the pistons which face the pad.
    - No, you won't hurt anything. Yes, grease on the pad surface or the rotor is bad but you are not putting grease there. Put a light coating on the backs of the pads. Just a LIGHT coating!
    - Ok, now grease the leaf springs, LIGHTLY.
    - Grease the pin that holds the pads in a bit. LIGHTLY. Just a nice light coating, helps the pads slide on the pins, reduces corrosion ("rust" for you simpletons).
    - Now put the pads in the caliper. CAREFULLY, you don't want the pad surface touching any of the surfaces you just lightly greased.
    - Ok, drain a little gas from the tank, put the gas on a rag and wipe off the pad surface and try again. Good, now it's all back together.
    - Put the caliper onto the rotor.
    - Torque the caliper to the fork slider. Yes, a whole 50Nm. No, I don't know the foot-

pounds. Foot-pounds are STOOPIT, get a torque wrench that reads Newton-meters. Sheesh. Come on, Torquemada was Spanish, he don't know nuffin'bout no footy-pounds.
    - Yes, it's spozed to make that sound when you torque it properly. NO, don't touch the brake lever yet.
    - Put some brake fluid, FRESH brake fluid in the reservoir. NOT TOO MUCH!! You really don't wanna fill it up all the way. Pump the brakes up, slowly.
    - Yes, if you pump it quickly with the reservoir cap off it will shoot out brake fluid onto your tank just like that. Best to pump slowly, with the cap on and a nice clean WET towel on your tank. Yep, that's it.
    - Ok, now you feel some resistance in the brake lever? Good. Take the reservoir cap off, fill with brake fluid to JUST BELOW the top of the sight glass.
    - Push the rubber bladder thingy in the reservoir cap back into it's non-expanded shape.
    - Put the reservoir cap back on. Screw it down.
    - Pump the brakes up. Release the lever. Spin the wheel. It should spin freely with only the slightest drag if any. Now, wasn't that easy? You're welcome. Now give me my fifty bucks you twit and get outta my way. Shank (eloquent as always, ed)
- Contrary to what Andy says, my front tire has never spun for 15 seconds before being dragged to a stop by the front brakes, not even when new. I MIGHT get a few full rotations out of it on a good day. If you've played around with your forks/axle lately, you may have put the bike together with a slightly different wheel position. I've done this several times while trying to get the front wheel lined up properly. there's a surprising amount of variation in how the forks will come to rest with everything loosened up, and how they will end up when you tighten the triple clamps, axle pinch bolts and fork brace. and if you tighten things up with a slightly different angle than you had previously, you can get additional brake drag until the pads "seat" themselves again to the new position. The last time I straightened my forks in the clamps, after riding for a long time with them just the slightest bit askew, my brakes dragged horribly for a day or two, and eventually everything was fine again. it may not seem to make much sense, but the tolerance between the pads and rotor is virtually nil and my experience playing with the fork position has been consistent with it's temporary effect on the brakes. As they say, YMMV. Mark #403
- Rear Brake riding the disc. Yes, it's happened to me, twice. Each time I replaced rear brake pads on my '99 Classic. There were two things that were wrong:

  Problem #1: The slide pins were sliding as intended.
  Reason: Not greased properly at the factory (natch, Italian bike).
  Solution: Pull apart caliper, sand off rust on slide pins, slather with copious amounts of BMW #10 (which I find superior in resisting water and oxidation).

  Problem#2: Caliper piston did not want to return to "home" position all the way into it's bore.
  Reason: Lots and lots of dirt, sand, mung, pigeon excrement, and various other detritus indigenous to NYC stuck to exposed sides of piston not allowing it to recess fully into it's bore.
  Solution: Take pads out, pump pedal SLOWLY and SLIGHTLY to expose piston a little more than usual. Spray profusely with lots and lots of highly toxic ozone-depleting brake cleaner spray. Let it dry. Then cram pistons back into the bore. Make sure that brake fluid reservoir is NOT overfilled at this point. Which could also be a reason why the piston would not want to recess fully into it's bore.

  A slight slather of BMW #10 (or axle grease or Auntie Sieze's salve) on the backs of the pads (the part that DOESN'T touch the brake disc) can keep the squealing pigs of braking from singing their song. Good luck. Shank NYC.
- I've had problems with my rear brake sticking, resulting in severe heat up, brake pad wear and a potential fire hazard. It turns out that dirt has gotten under the rubber boot of the rear master cylinder and stops the master piston(?) from returning completely. It's a warranty repair, including changing the worn pads, since there is no periodic maintenance prescribed for the master cylinder according to my dealer. Hmm, being too impatient to wait for my appointment at the dealer, having a slow day at work, and with a good riding opportunity coming up this weekend, I decided to have a look at the master cylinder myself. I won't have the brake fixed by Friday if I don't do it myself, and I won't do the trip without a functioning rear brake, so I really don't care that much if I loose some Kroner worth of warranty parts. After disconnecting and removing the master cylinder, I tried to blow out the piston with compressed air. No Luck. I then used a thin dowel (2.5 mm) through the brake pipe connection at the top and carefully tapped out the piston. The piston slides in a nylon liner, and it seems this liner has become slightly disfigured and pinches the piston so it couldn't slide all the way back. I applied some Brembo mounting fluid from the repair set for the rear master cylinder, (which consists of a small gasket and a sachet of mounting fluid, and is of course grossly overpriced), and reassembled the cylinder. Working the piston up and down inside the cylinder, I was able to take enough nylon off to make the piston move freely again. I have no idea why this has happened, but I suspect there may be some corrosion of the aluminum behind the nylon, due to road salt perhaps. Another option is that the cylinder has been damaged in a fall when off-roading. This seems less likely, since I always fall down on my left hand side (no kidding (well, there was this one time...)). Sorry, no pics. I don't

have a Digital camera (yet). Perhaps the most important lesson to be learned is to also check the master cylinder in addition to caliper and piston if you ever experience sticky brakes. Removing the rubber boot at the bottom of the master cylinder and looking up, you'll see a white nylon sleeve and a black piston which slides inside it, held in place by a locking ring. The piston should slide all the way down to the locking ring when the brake is released, if not the brake fluid will not be able to return from the caliper and the brakes will stick. As the sticky brake heats up, the brake fluid expands and increases the pressure and thus the braking action. I reckon whoever it was that reported their rear brake on fire a week ago (?) must have had the same problem with the master piston not returning completely. Oyvind #1052, Norway.

- Next.

Other reasons for Brakes heating up

Caliper out of Alignment

Problem: Caliper torture. I already have a warped rotor, I confirmed I have a minor hub warp (.05-.06mm) problem, and I don't want to tighten the rotor any more than I have to, as I have had previous problems with rotors warping due to overtightening. I'm trying to shim the mounting points (actually, just 1 or maybe 2 spots) on the hub as flat as possible, before I tighten the rotor to it, and the rotor starts going thru heating and cooling cycles. I'm tempted to go for Loctite 243 (for removal without heat) and maybe 10Nm. But I did measure, and it looks like the longer GS will fit the Classic, and if I ever have to do this again I will order the longer bolts. I've been looking at those seating clearances also. They might be affected if the spacer were the wrong thickness (unlikely), if the wheel bearings weren't fully seated (mine are fully seated, crushing/ holding the wheel bearing spacer in place, OR if the rotor mounts cut into the wheel hub are machined too deeply, causing the rotor to be seated farther inboard, which is what I'm think may be my problem, but is much harder to check without disassembly. If that was the case, I could make the axle spacer on that side a few mm thinner to shift the rotor outboard. As it is, for my caliper to fully release off the inboard side of the rotor, the caliper has to slide inboard EVERY SINGLE BIT that is available, including compressing/crushing the slide pin guide bellows. When the bellows expands/pushes ever so slightly (we're talking about less than a millimeter), as is it's rubber nature, the caliper binds that tiny bit.....actually the front caliper releases even less, and binds more, but has never even gotten warm to the touch, despite the rotor getting hot when used hard. If the rear caliper weren't so consistently too hot to touch, to the point where I worry about the rubber seals, I'd ignore it. The brakes have always worked perfectly, except for the heat. And without actually dissembling the caliper (which I won't do unless I have spare seal rings) I've tried all my tricks - I've flushed the caliper 4-5 times, expanded out the pistons and cleaned/ sprayed them, removed the slide rubbers, cleaned them and tried 3 different hi temp caliper greases (synthetic and non synthetic) on them, crushed them shut and bled out the excess air and grease from the sliders, used older thinner pads which give me an additional mm of clearance, used new OEM pads with new clip and pin hardware, checked the release freeplay on the master cylinder, and retracted the pads, filled the master cylinder halfway, sealed it, and then pumped the pads down, creating a minor vacuum in the m/c. I've serviced plenty of disk brakes, but I'm at a loss on this one..... maybe a stupid question - I'm not used to Brembos. I've been reinstalling my cleaned greased slide rubber bushing by forcing it into the caliper hole, and then installing the base plate slide pin, then bleeding the bellows as I crush the caliper. You aren't supposed to place the slide rubber on the pin and THEN force the rubber thru the caliper hole are you? Seems hard to do without lubing the outside of the rubber to go thru the caliper hole, like you'd tear the pin thru the rubber. I dunno - no hurry, but clever ideas are welcome. Otherwise, I just freakin love my bike! HsN

Solution: None.

Brakes work for about 50 applications and then it grabs the disk.

Problem: I got a 2001 F650GS, as far as I am concerned it is a lemon. Any way, was riding to work yesterday, stopped at the light and I can smell this sharp burning odour. looked at my rear brake and my calliper has smoke coming out of it. I did notice earlier that the bike is kind of sluggish, but did not think much of it at the time, riding in city traffic and all... My rear calliper seized I thought, so I took the screwdriver out of the bike kit and to my surprise I was able to spread the shoes with little effort, that goes for the calliper itself, it was free to move. I do have excessive travel on my brake pedal, brakes work for about 50 applications and then it does the same thing (grabs the disk), ABS work. One thing I noticed that when I apply and release brake I can see the piston move back and forth about 1/16".There is no way it should move that much, at the time when brakes will not release the brake pedal feels solid, like it was from new. Any thoughts? I think it might be the master cylinder, or some kind of check valve in ABS system. Pooshkin '01 F650GS, Winnipeg, Canada.

Solution: Just about a month later, I finally got all new rear braking system:), dealer had no clue what to do, did not care about what I had to say. I got new disc, caliper, shoes, master cylinder, they had to take parts off a brand new bike. It was getting pretty strange what it was doing, the bike was applying rear brake by itself. Pooshkin '01 F650GS, Winnipeg, Canada.

Feedback:

- Brake fluid is hygroscopic, absorbs water from the air. Consider changing your brake fluid and then bleeding the system if necessary. Flash #412
- Wonder if you have water (steam) or air in the system (soft pedal) that expands significantly as the fluid gets hotter due to use. At some point, the brake starts dragging, creates heat which expands the fluid, creating more brake pressure, more drag, more heat, etc... I think I'd try a brake bleed using fresh brake fluid first (but BMW "claims" you need their special vacuum brake bleeder to do this properly). Lots cheaper than ripping into BMW's "black boxes." Marty #436-Chicago-97 F650F
- It's almost certainly a problem with your master cylinder, AND it's a warranty item. There's a white plastic sleeve inside the master cylinder. I had corrosion between the cast metal body and the plastic sleeve. This made the diameter of the plastic cylinder slightly smaller, preventing the piston from retreating completely when released. Thus, the fluid can't return to the reservoir, causing the problems you've described. It was fixed under warranty, and the mech filled the rubber boot with grease. This has do far prevented any more corrosion from occurring. Oyvind #1052, '01 F650GS Dakar, Bergen, Norway.

Brake Calliper Retaining Bolt Warning

IMPORTANT: If you ever remove the Front Brake Calliper for any work, Steering Head Bearings, Fork replacement, whatever, make sure the Bolt threads are clean and there are absolutely NO bits of Aluminium or any other dirt or swarf jammed in the threads. If there is, use a fine screwdriver and a wire brush to clean them thoroughly. In addition check there are no bits of Aluminium in the threads of the Calliper itself. Test that it can be wound all the way in BY HAND before tightening. If it jams going in by hand, take it out and check it and clean it again until you CAN screw it in BY HAND.

The reasons should be apparent, however any small amount of Aluminium in the thread will start the bolt jamming. If you tighten it further with a socket or spanner, it can't screw in any more and starts ripping threads out. Then with more Aluminium now jammed in the threads, as you back it out it rips even more Aluminium out. You do not want this to happen. Really Bad Karma. Do not exceed the specified torque.

Why Does my Brake Pedal Pulse ?

3 Reasons:

1. Loose Brake Pedal Axle.
2. Worn Roller. See The Chain Roller FAQ
3. ABS Activation

Loose Brake Pedal Axle (Most Common)

- If your chain is too loose, particularly if your brake pedal bolt is too loose (because the lower chain roller is on the same bolt) you can feel the chain bouncing off the roller via the pedal. Take a look at the bolt and the chain slack. Costs nothing to correct if it is the problem and wastes virtually no time to check if it isn't. The Allen Key Screw to do up: (i.e. the Brake Pedal Bolt). *Flash#412*

Missing lower chain roller.

- My chain is rubbing against the chain guard attached to the brake pedal which is resulting in a pulsating feeling in the pedal. The chain is giving the recommended 20mm and I just lubed and tightened the screw for the pedal and chain guard. If I tighten the screw too tight, which appears to be the answer, the pedal won't return far enough to disengage the brake light.

ABS Activation

- ABS activation may cause the brake pedal or lever to pulse, this is normal, but will only occur under harsh braking on low grip surfaces. Peoples first ABS stop can be worrying. There have been a number of incidents with Landrovers in the late 80's when people felt the ABS pulse and stopped pushing the pedal. The wheels don't lock if you do this, but its generally unhealthy. Andy #982

Front Brake Play

See the **Cable FAQ**

Sources of Aftermarket Brake Calipers, Rotors, Brake Lines

Terminology:

Floating rotors are not "attached" to the rotor carrier. There are "half holes" in the rotor and the carrier and there are rivets that keep the rotor positioned in the carrier. They have a slight amount of wiggle room. The REASON is so that when they get hot, they can expand without warping because nothing is NAILED down. They are free axially only. Draw two concentric circles. On the inner circle, draw a set of six or eight tiny circles, spaced equidistantly. Now, cut out the tiny circles. Then cut on the inner circle. The piece from the outer to the inner, with the tiny circles, is what the actual ROTOR part of a floating rotor looks like. Now loosely rivet it to the inner circle at the tiny circles and figure out how to mount the inner circle to your hub and you have a floating rotor assembly. Get it? Floating calipers are free to move across the thickness dimension of the rotors, to adjust their position as the pads wear. The two "floats" are orthogonal and therefore can be used in concert or individually, as you like. Flash #412

OEM Brakes:

Our front Brakes are 30/32 mm Two Pot Brembos and the rear is a single pot 34mm Brembo.
The Caliper No's are F 22.5553, R 22.5546.

OEM F650 Classic Part#:
Front:
Disc Part # 34 21 2 345 323
Brake Caliper # 34 11 2 345 319
Rear:
Disc Part # 34 21 2 345 314
Brake Caliper # 34 21 2 345 312

OEM F650 GS/Dakar Part#
Front
Disc Part # 34 11 2 345 824
Brake Caliper # 34 11 2 345 854
Rear
Disc Part # 34 21 2 345 314
Brake Caliper # 34 11 2 345 856

Frenotec has OEM Brembo Parts, but doesn't specifically list the BMW F650. It does say "New cast caliper with 4 individual pads. Provides better braking pressure and feel than older style calipers. Will upgrade most Ducati, Aprilia, Moto Guzzi systems". **If you find one that fits, please let us know , ed!**

Aftermarket Brake Parts Sources:

- **Brakes - Nagesti**
- **Brakes - Spiegler**

Brakes - Aprilia:

- The Aprilia Pegaso, being almost the same bike as the F650 Classic, has Rotors that could be used as replacements.

Brakes - Braking: www.braking.com

- I have my fingers crossed that Dennis Kirk will be able to get me a BRAKING rotor for about $125. (I think that's BRAKING part # front rotor AP13FL and rear rotor BW05RI). Haven't found a price from a Brembo dealer yet, if you happen to know any that are retail friendly. http://www.braking.com/Eng/DISCHI.HTM. Todd#389

Brakes - Ducati:

- Apparently the Ducati Monster has the same Brembo Brakes as the F650.

Brakes - EBC: www.ebcbrakes.com

- When setting up an extra set of wheels for our 01 GSA, I ordered the EBC rotors and sent them back after finding that the rear (?) wasn't compatible with the ABS sensor plate. They also looked like they belonged on a mini-bike, as far as finish was concerned. I ended up using Braking rotors, front was a floater, for the carbed model with no problems. Did you need to do any adaptation to get the Braking rotor to work with ABS? Not at all, bolted right on. No problems and looks better than the OEM's, and still cheaper too. I bought through Dennis Kirk. Iceman.
- www.accwhse.com has EBC rotors for the f650 for $200 front, $130, rear. according to the website, these are floating rotors. the number below is for the front. the rear can be found by looking up "profiles" on the accwhse.com website and looking for the BMW F650. (60506) $199.95 EBC Rotor Left #MD650LS Mark #403.
- Despite the BMW fiche part numbers being different, the EBC catalog specifically lists their rotors as fitting across the F650 line, meaning the EBC front fits all years Funduro/ST/GS/CS front, EBC rear rotor fits all years Funduro/ST/GS/CS rear. Not sure about the calipers. It might mean the Classic/GS rotors might be different, but interchangeable? I'm about to break down and order a Braking rear rotor as a replacement, the cheapest alternative I've been able to find. Never used the brand before, but I can't see waiting 8 weeks for a Galfer (which is competitively $, but backordered). HsN

Brakes - Galfer: www.galferusa.com

by Todd#389

Q. Can one use a floating rotor (which Galfer offers as an option) WITH a floating caliper (like we have on the F650)? I always thought it was either/or, but I ain't owned any fancy bikes.

- In my quest for what's available to replace my slightly warped rear rotor, I emailed Galfer USA (below) to ask what they have available for replacement F650 rotors, and got a reply from their agent, Cyclebrakes, with some part numbers (not available on their website) that might be useful in the FAQ's. The stuff isn't cheap, tho the Galfer floating front rotor sounds interesting, competitively priced the same $176 as an OEM rear rotor from CalBMW. I have my fingers crossed that Dennis Kirk will be able to get me a BRAKING rotor for about $125. (I think that's BRAKING part # Front rotor AP13FL and Rear Rotor BW05RI). Haven't found a price from a Brembo dealer yet, if you happen to know any that are retail friendly. Hey, since the Motorworks and Motobins websites list rear rotors for 60-80 UKPounds (cast iron and OEM), considering the weight, I guess shipping could justify much of the $40 difference compared to a US price for an OEM rotor? btw, the www.cyclebrakes.com website lists some interesting items I haven't seen offered elsewhere, including thumb-brakes and Galfer brake fluid. I hope some of this is interesting/useful, helpful comments welcomed.

  Reply from Cyclebrakes below:

  Hi Todd,

  We were forwarded your inquiry from Galfer as we handle their retail inquiries and orders. We also carry EBC so between the two manufacturers, we have stuff for your bike in stock. Ready to ship is a Galfer Front Rotor with Free Black, carbon-semi-metallic pad (or upgrade), Galfer or EBC rear pads and EBC Rear Rotor (pad not included).

Galfer carries a front rotor, #DF663, in stock, $175.99 includes Free Black pads, #FD172 on current sale. You may upgrade to Kevlar or Sintered HH pads for only $20 per caliper. It is a FLOATING rotor which means better performance and less chance for warping. #DF703 not in stock, will have to request from Europe which is 6-8 weeks if they have it ready to ship, $159.99, also includes Free Black pad, #FD165. Again, you may upgrade to Kevlar or Sintered HH pads for only $20 per caliper. EBC front rotor, #MD650, not in stock, $155.99 ETA 1 week, may not be floating (haven't seen a picture) Rear #MD651, $155.99 in stock. If you want EBC pads then they are front, #FA209 and rear, #FA208 both available in sintered HH, $36.99 per caliper. EBC rotors do not include Free Pads.

We also have Galfer steel-braided brake lines: FK003D166 front and rear, $53 for front and add rear only $40 with free color choice on plastic outer sheath: red, blue, yellow, smoke, black or clear.

To complete your order we will need: ORDER INFORMATION: Bike Info and parts desired. Name & Phone Number, Credit Card Number (Visa/MC), Ship-to address, Billing address (where CC statements are sent) if different from shipping, address, We make every attempt to ship same day and we're located in southern, California. This quote is good for two weeks.

Thanks for your request,
Take care,
Melissa
Phone: 805-452-5957
Fax: 805-653-5016, Attn: Cycle Brakes
sales@cyclebrakes.com
www.cyclebrakes.com

Brakes - Harrison: http://www.billet.co.uk/

Direct Links to Harrison's F650 Specific Pages

- **http://www.billet.co.uk/index2.html,**
- **http://www.billet.co.uk/callistpages/euro_orig.html**
- **http://www.billet.co.uk/callistpages/euro_2k1.html**

"Thanks for your mail Kristian. Apols for the delayed reply. The caliper that we make specifically for the F650 (front only) is the #235. It has 54mm spacing on the mounts. As far as we know the fitment is the same for the "Classic" f650 and the newer F650GS, but would like to have a confirmation of any differences if any of your riders are knowledgeable on the subject. Our caliper is direct fit, and designed to work with the factory disc.

We will be updating the website shortly, but the fitment is currently posted on the 'new products' page.

Prices are (GBP£ excluding courier and VAT if applicable):

Billet Original facia design:
6-Piston Polished £239 each
6-Piston Clear or black anodised £259 each

'2k1' or New 'Signature' facia design:
6-Piston polished £271 each
6-Piston Clear or black anodised £289 each

Robert"

- Money spent on braided hoses and aftermarket pads will give the most improvement for money spent. If you like spending money Harrison billet now has a 6 piston caliper (about $450) and there is a 320mm front rotor available. Not sure if these parts fit the newer GS series but they do fit the original 94-2000 classics. Peter Jensen #233

Brakes - MAP Engineering: www.map-engineeering.com

- MAP Engineering makes an oversize front rotor for the older 650 that I swear will fit the Dakar. But MAP remains un-convinced. At least that was there story when I wanted to buy one last summer. Jinx

- 

Brakes - Motorworks:

- Motorworks can supply Italian disks or cast iron ones. If you want performance over looks go to the iron. Remember you'll need new pads too, its false economy not to change as a set. Aprillia dealers can probably supply too. Andy Leeds UK #982

Brakes - Nagesti:

- This link will lead you to a Japanese company that seems to make replacements for everything under the (rising) sun. if nothing else, this link has dimensions for everything as well. http://www.nagesti.com/ng/ingles/index.htm Mtbiero (cugino Pegaso)

Brakes - Spiegler:
www.spiegler.de

- A high-end German manufacturer of brake parts, 8piston callipers, rotors, some handlebar/foot-peg items that we all dream about, with some US dealers. Even for the F650. Downloadable catalogs w/prices. www.spiegler.de/gb/index.html

Feedback on Aftermarket Brake Parts

AM - Calipers

- Pegaso Cousin Offers Thanks. What a great forum you have here. thanks for all the help. This is what I have found recently that may be of interest. I've been looking into upgraded calipers for my Pegaso, and the best I can find to date is a commitment from Harrison Billet in England that they will have a unit for the F650 next month. I know the Pegaso and F650 share rotors, but before I drop major money on a 4, 6 or 8 piston caliper, I would really like to know if we share calipers as well. The Brembo part number on my caliper (visible from the back side, looking thru the spokes) is:

  22.5553

  This is a two piston single action/floating caliper (both pistons on one side) style Brembo. It is common on KTM's, husky's, Husabergs, Cagiva and other Euro Enduros. Is there a kind soul out in F650 land that is willing to take a peek at the backside of their front caliper and tell me the part number (Brembo, not BMW). Thanks.

  Prices FWIW:
  Harrison 4 piston #173 ~= $260
  Harrison 6 piston #214 ~= $321
  Beringer 4 piston #240 ~= $460
  Spiegler 4 piston $437
  Spiegler 8 piston $491

  There doesn't seem to be any opposed piston caliper advertised as a drop in replacement (yet), however, http://www.jacklilley.com/jlcart/ lists supermoto caliper kits from Beringer for Husky's, KTM etc, that may fit, but they haven't responded to my e-mails yet. Spiegler has caliper kits that will fit, but take an intermediate bracket. In looking at a Brembo specs page at http://www.redracingparts.com/en/english.htm together with some application info I got from http://www.tawvehicle.com/brembo.htm.

  I think the latest Brembo 4 piston series, the "6800" series with part numbers like 20.6800.x5 could be

made to work in place of the 22.5553 caliper, with a simple-to-fabricate flat hanger plate. this is yet another option, however I'll hold out for the Harrison as our calipers are the same. mtiberio, DOD #1010, Former AMA Pro Twins National #10, 4 time WERA Super Vintage National Champion.

- Frenotec (www.frenotec.com) has OEM Brembo Parts, but doesn't specifically list the BMW F650. It does say "New cast caliper with 4 individual pads. Provides better braking pressure and feel than older style calipers. Will upgrade most Ducati, Aprilia, Moto Guzzi systems". **If you find one fits, let us know!**
- Checking http://www.tawvehicle.com/calcross2.htm#BMW cross-reference list doesn't give any BMW F650 Caliper Part.
- Redracing do not have them either:

  Reply-To: <red@redracingparts.com>
  From: "Giovanni Bertone - RED Racing Parts" <red@redracingparts.com>
  To: "'Kristian <snip>
  Subject: R: Calipers for Brembo Brakes
  Date: Sun, 4 May 2003 14:44:31 +0200
  Organization: RED Racing Parts

  I'm sorry but we don't sell this calipers.

  Best Regards

  Giovanni Bertone
  RED Racing Parts
  red@redracingparts.com
  www.redracingparts.com

  > -----Messaggio originale-----
  > Da: Kristian snip [mailto:snip]
  > Inviato: sabato 3 maggio 2003 6.41
  > A: red@redracingparts.com
  > Oggetto: Calipers for Brembo Brakes
  >
  > Hi,
  >
  > I help write the FAQs for faq.f650.com. We're looking for replacement Brembo Calipers. Our front Brakes are 30/32 mm Two Pot Brembos and the rear is a single pot 34mm Brembo.
  > The Serial No. on the Brake is F 22.5553, R 22.5546
  >
  > Do you stock this Caliper?
  >
  > Rgds
  >
  > Kristian

AM - Rotors

- While the BRAKING rotor is not actually installed yet, it's fit and finish seem good. Compared to OEM it has slightly smaller "feet" meeting the hub, and machined completely flat. Double sealed tamper resistant factory packaging. But I thought it was interesting that there are easily TWICE as many ventilating holes in the BRAKING rotor as compared to the OEM rotor. That might be interesting. HsN
- Despite the BMW fiche part numbers being different, the EBC catalog specifically lists their rotors as fitting across the F650 line, meaning the EBC front fits all years Funduro/ST/GS/CS front, EBC rear rotor fits all years Funduro/ST/GS/CS rear. Not sure about the calipers - takes me forever to download the .pdf to view the applications.
  It might mean the Classic/GS rotors might be different, but interchangeable? http://www.ebcbrakes.com/.
- Next.

AM - Rotor Bolt Sizes & Torques

- **Q. The Classic Factory Manual says to use Loctite 270 and 12Nm on the rotor bolts.** I never actually looked at that before, assuming that the 270 was actually the Loctite 262 (red, maximum strength, and often requires heat). Not so - Loctite 270 is a PERMANENT maximum strength green threadlocker that ALWAYS requires heat for removal. Like for setting studs. My rotor bolts were certainly not set with 270 as

they came off so easily you could have used a folding pocket wrench set. So I looked in the GS .pdf manual (old edition), and there it says to use good old basic Loctite 243 and 9Nm, as opposed to the 12Nm for the Classic. What gives? Especially since the rear rotor on the Classic and the GS are identical part numbers, certainly fastened by similar size bolts, why new lower torque's? I think that green Loctite 270 is overkill for this application, and it certainly wasn't used on mine. Except that BMW specifies otherwise, Loctite 262 is my goop of choice, as an upgrade from 243, BUT lowly 243 is specified in the GS .pdf. Any comments on the change from 12Nm to 9Nm? All obscure trivia, I know, but maybe worth sharing with other aficionados? So, any enlightened choices between 12Nm and 9 Nm on the bolts? I'm thinking of 9Nm and Loctite 262, to lessen warping and yet obtain better threadlock. HsN.

Thanks very much for the confirmation (Below). I find it interesting that they changed both the specs (Loctite and Torque) DOWN. HsN

- **A.**
  - I checked the new GS manual and it says to use LocTite 243 both front and rear, with 9.0 Nm.
  - The bolts for the GS-GS/ Dakar are M6x20 and for the Classic M6x16.
  - I checked some torque tables I have and here is what found regarding M6 bolts

• **Bolt Quality (Strength Rating)**	**8.8 (Low Tension-Standard Hardware Store Bolts).**	**10.9 (Medium Tensile Strength - Medium-Stress Applications)**	**12.9 (High Tensile Strength - Special Applications)**
Molybdenum lubricated:	8.9 Nm	12.5Nm	15.0 Nm
Clean and dry:	10.5 Nm	15.0 Nm	17.5 Nm

  - The reason for the lubed/ dry differences is to compensate for the friction / torsional stress so that the "clamping" force is equal.
- You said you have socket head on yours - on my GS there is Allen screws with short head. Re: my torque table, almost all Allen screws is 12.9 quality. but due to the often-sharp corner under the head they are best torque as 10.9 screws. All short head Allen screws MUST be handled as 10.9 or less, despite the fact that the material usually are heat treated to 12.9 tensile strength. I would think 9Nm is to be used on the later models, not because of the bolt quality, but rather because of the "weak" point here: the aluminum hub. It is all too easy to strip threads in aluminum, if the latter have inferior or "standard/ inexpensive" quality. The reason the low head Allen screws must be less torqued is due to a design compromise. Because of the low head, the bottom of the "hole" must be so deep that the material remaining is thinner than on the normal Allen screws. Haakon #626, Norway.

AM-Brake Lines (or Are Steel Braided Brake Hoses Better than the OEM Rubber ones?)

This subject is like discussing OIL. There are 1001 differing opinions. Like the OIL discussion, a cross section of these opinions is presented here. You choose which camp you fall in.

Note: BMW already (and only) installs steel brake lines on the F650 bikes that come with ABS and then ONLY the front.

- I asked my BMW shop about steel lines at my 6000 mile service and he talked me out of them. Said they look cool, but don't offer any benefit on our bikes. FYI
- Steel brake lines make a difference. Anyone who says they don't has never experienced the difference. In some cases it is dramatic. When I put steel brake lines on my 2002 the difference was amazing.
- On the F650 you can see the stock line expanding as you increase pressure. If you practice stops from 60 MPH using maximum braking and then practice again using steel lines (especially the front) you would have to notice a difference. Just my opinion.
- An SS-line on the rear is a total waste, IMHO. On the front... like POWER BRAKES when compared to rubber hoses. YMMV.
- SS lines still not needed! Either end...Anybody can stop the bike as stock with maximum efficiency. Only the most performance minded see any good in these, as I'm one of those guys, but still don't think they are

needed. They do have an effect, however, I agree. You'd better be good at your braking skills if you need the extra performance.

- SS Lines greatly reduce the effort needed to brake with one finger while descending a hill standing up on the pegs (to lower the centre of gravity!) This, IMHO, is worth the cost. The fact that they last 5 times as long is just a bonus.
- Anyone who says SST lines don't make any difference has never tried them. they make the brakes have a much more linear feel in terms of pressure applied to the lever equating to braking applied to the rotor. The stock lines expand more as you brake harder.
- SST lines are not needed on any bike, so that's a moot point. but they do make a huge difference in how the brakes feel. The SST line made a bigger difference to him than adding the 320mm MAP rotor.
- Get the SST line, get some good pads, like Galfer greens, change your fluid and bleed your lines and you will never have anything to complain about regarding the f650's braking capabilities. My ring finger and pinkie haven't touched the brake lever since I made those changes.
- I agree again, that they make a difference, but are not required, because feel to one rider is not the same for another. I've ridden both types of lines and prefer the rubber hose and they last a long time. Can't remember ever having changed a brake hose (stock one). My braking ability is not diminished one bit because the lack of SS lines. They are very nice and a plus for some, but not all If you can lock the front wheel, I say that's all the feel you better have. The stock lines will do that fairly easily. Just don't do it. Some like a lighter feel on the brakes and its accomplished with SS lines.
- **Galfer Brake Lines:** The number on the box was FK003D166- don't know if that's the part number or not. I got it from http://www.map-engineering.com/index.htm for my '99; it was around $45 plus shipping last winter.
- For you guys asking about brake bleeding: For the cost of one garage fluid change/bleed you can buy an excellent vacuum bleeder or Speedbleeders (and probably stainless lines as well) and do your own in 10 minutes. On our F's it's totally simple requiring no wheel removal or anything. An SS-line on the rear is a total waste, IMHO. On the front... like POWER BRAKES when compared to rubber hoses. Flash #412

- I've installed both Speedbleeders front and rear and a steel braided front brake line on my f650ST 97. The problem is that to install the brake line you have to empty the system and then the speed bleeder won't work because there will no pressure. So you have to fill up the system with the old bleeder on, using a vacuum pump (speed bleeders don't work with a vacuum pump), then install the speed bleeder and process as described in the instructions. That goes only for the first time because you have no reason to empty the system afterwards. The rear, where I kept the OEM brake line was a piece of cake. We did it on Tom #773 bike and mine and doing it yourself depends on your level of self-confidence (I am in the process of building it...). I guess the whole thing should not take more than 30 minutes at the shop so we're not talking about a lot of money and if you don't feel to confident let a mechanic do it. My 2 cents. Jean #636

- What you could do is install your new SS-line and do the initial line-fill using the stock bleed screw. After you've got fluid in the line, THEN install the Speedbleeder for the final purge. Flash #412.

- I had the unfortunate experience of the most severe sphincter-sucking-up-seat-vinyl stop in the life of my F650. I believe that if it hadn't been for the new stainless line and the Galfers, I would've gone up that SUVs tailpipe. And that would've made my day quite difficult. Stainless ROCKS!! New brake fluid is good. Galfers are AWESOME! Shank NYC USA

- Money spent on braided hoses and aftermarket pads will give the most improvement for money spent. If you like spending money Harrison billet now has a 6 piston caliper (about $450) and there is a 320mm front rotor available. Not sure if these parts fit the newer GS series but they do fit the original 94-2000 classics. Peter Jensen #233

- Front - The biggest improvement was adding a braided steel line. The Dakar, with it's 210mm fork travel, has a very long hose. Lot's of flex. With a multi-day bleed job, it was much better. Rear - I think a lot of the problem comes from wheel alignment. I have become fanatical about alignment since it appears to have a big effect on rear brake performance. Even a little cocking of the rear rotor will cause about half the efficiency to go away. I have heard good things about after-market pads, but will wear out the stockers first. (Cheap that I am). I am sure the stock pads were supplied by the low bidder. With braided lines up front, and maybe some EBC pads front and rear, I think the brakes would be okay. And probably as much as you would ever want off road. Jinx

- I've put on a braided line and bled it which has made a difference but nowhere near the result that I ultimately desire-I have to confess that I haven't had a look at the wheel alignment issue that was

suggested - so there might be some gains to be had without spending anything but time. I have only put a braided line on the front because the Brembo dealer was scratching his head over the routing of the rear brake line-it looks pretty complex (or so he said), I will be looking at it tonight (just as soon as I put the fuel nanny on - but that's another thread). Ziegfried

- The old brake line on the Dakar was a little too stressed to me due to the handlebar risers... just a little too tight for comfort. I replaced it this evening with a Touratech stainless steel version. The difference, like others have said, is night and day. Makes me want to beef up the front springs now. Gerry #951 (Phoenix AZ).

- So I read about how it's a good idea to swap out the brakelines for the steel versions, and then realized that the front brake line on my bike is already steel braid. Do they normally come this way stock or did I just get lucky? I bought the bike brand new from a dealer. '03 black GS, Colorado

- I believe that BMW only installs steel brake lines on the bikes that come with ABS. Apparently they believe that BMW riders are not skilled enough to be able to handle the improved feel of a firm brake line. In my experience, No. Your hands are much more sensitive to feel than your foot, with the clod-hopper attached. In any case, with weight transfer when braking hard, the rear brake doesn't really need the same feel as the front. The rubber hoses are OK, but they flex a bit when used and tend to put a little extra give into the brake feel. Steel brake lines are noticeable better, but you won't notice the difference at the rear brake. Richard #230

- The front is but have you checked out the rear? My '01 model still has rubber hose from the rear master cylinder to the rear caliper. I think Touratech makes a steel line for the rear. That said, lots of people don't care that much about the feel of the rear brake. Brad, N. CA., 2001 F650GS - Inmate #1002

- Next.

Contact Area & Front Wheel vs. Rear Wheel

Q. So, because I'm very curious (its good I'm not a cat), I did some research on MC Dynamics and believe I can summarize what I have read so far. Please correct me if I am wrong.

Given an unlimited coefficient of friction at the front tire contact patch and given that the COM (center of mass) of the rider/MC system is higher than the center of the front wheel, the MC will eventually tilt forward after shifting 100% of the mass to the front wheel. For optimal braking the COM should be as low and as far back as possible. I'll give a link for the source of this info below.

So, assuming that the COM of the bike is a constant (ignoring brake dive for the moment), then the rider's addition to the calculation for COM comes at the pegs, handlebars, knees/thighs, and bottom. Clearly, if we could get 100% of our mass while braking at 1g on the footpegs (lower than the center of the wheels) that would be great (its impossible of course). So, the best we can hope to do with COM is limited by how far back we can sit on the bike and still operate the brake lever while trying to keep as much force off the handlebars as possible (get yourselves a thighmaster). You need to sit as far back as possible to counteract as much as possible the effect of the force put on the handlebars (trying to tilt the bike over). The more weight you can keep on the rear tire the more you can use its coefficient of friction in addition to the front. Hopefully, I've gotten most of this right...here's the link I mentioned: http://www.dinamoto.mecc.unipd.it/ Chris in Santa Cruz, CA #782 - 19-Mar-02

A. The basic answer is Yes!

Weight transfer needs to be balanced against what a brake can absorb in terms of energy which is a combination of down force, tyre contact area and the brakes ability to generate heat and then get rid of it. Brake balance changes weight transfer during the stop.

If things are uneven, you get events such as ABS activation of a lifted wheel that will change weight transfer again and upset the whole vehicle calculation.

Instrumentation consists of wheel speed sensors (like ABS), vehicle speed (via radar) and pressure transducers in the brake lines. Everything is plotted against time, so you can get vehicle deceleration, wheel angular deceleration etc. Temperature transducers are useful to sort vehicles that don't work as the disk or drum temperature pretty much tells you how much work a brake is doing. This calculation is pure energy, so must be basically true, especially if both axles have the same airflow etc. Kinetic energy becomes heat, first law of thermo dynamics applies.

Temperature kit is cheap if anyone wants to play. All you need is a couple of rubbing thermocouples and a

voltmeter with two channels and you can pretty much measure your own brake split for a given ride or manoeuvre." Andy Leeds UK #982

2-Up Braking

- My guess is that stopping distance will be longer...more mass to stop. The good news is that both tires should have more traction to stop (more weight on them), and with the rearward bias (of passenger), the rear brake will become much more effective. Expect to get cracked in the back of your helmet with your passenger's helmet (depending on height & seat configurations). You may even get pushed onto the gas tank, so be well braced!!! Just be sure your passenger buys into this "exercise". Marty #436-Chicago-97 F650F

Brake Links

- http://www.wabco-auto.com/Intl/en/inform/index.htm If you click on Index and then enter training on the blue bit on the left, it will take you to a big document about trailer ABS. The first couple of pages have some of the theory, but obviously it then descends into product specific stuff about trucks and trailers. Have a read of this if you like while try a couple of other sites to see what is about. Andy Leeds UK #982
- http://www.autosite.com/garage/encyclop/tocdoc14.asp. I'm glad this site is still there. It cover a fair bit of info on hydraulic brakes. Andy Leeds UK #982

Speedo/ABS Sensor FAQ

Please read the Disclaimer before attempting any work in this FAQ.
by Haakon##626 & Kristian #562
edited by Kristian #562

- **My Speedo is not Working** (or Working erratically or Stops in the Rain or after Bike Washing) and my Bike is Bucking like Galloping Girty
- **My Speedo is losing Mileage!**
- **Odometer Rounding Error?**
- **Speedo or Tach lags actual Speed/RPM**
- **My Speedo Buzzes?**
- **Checking your Speedo**
- **Why, when I roll the Bike Back in Neutral with the Engine running does the Idle rise?**
- **If I have ABS, is the Speedo run off the Front or the Rear Sensor?**

For the Classic refer Speedo Classic FAQ

My Speedo is not Working

Symptoms:

- Bike Bucks & Surges. Make sure you've checked the Surging & Stalling F.I. FAQs.
- Speedo is erratic, sometimes goes down to Zero, then back up to the correct speed or it stops altogether.
- "Popping" when the throttle is closed, e.g. when using engine braking.
- Also the occasional habit the engine has to just stop dead when the clutch is pulled with the throttle closed. - Not all the time - it seems like the tick-over RPM at times is set to 0 and not 1400-1500.
- I go off and ... Speedo is OK. A few miles down the road I look again and ..... 0 mph, I'm in 4th Gear 4000 rpm.?? A few more miles and I'm watching it go zooming up very occasionally but mainly hugging 0 mph for dear life. And occasionally at IDLE at the Stop Lights it went to 10mph. Beautiful. AND to top it off, when it started failing the bike was lurching like a wild thing (go girly !). I have read about the "connection" of the Speedo Sensor to the FI but WTF is this.!! I loved my Classic. It had a MECHANICAL Speedo Cable and there was no connection to the Carbs. What is this.?
- When it rains (or I've washed the bike) the Speedo stops working.

Q. Why does this happen.?
A1. The ABS/Speedo Sensor off the rear wheel feeds back to the Motronic and if the sensor goes (or maybe it's just covered in mud, so CHECK the Rear wheel first), it affects the Speedo.
A2. The Speedo itself has some poor Connections/Rusty or poor wiring. refer the Wiring Diagrams in the GS Documentation Section for the Speedo Connections to Cross-Check with the Photos Below.

Q. Is this common.?
A. How many instances do you need before it becomes common.? Yes. there are quite a few people who have had these symptoms. Here they are:

- I have just returned from a 250KLm dirt ride. during the ride the bike (2001GS) missed firing on acceleration and gradually got worse when I slowed down preparing to stop and check, it actually died on me. After waiting for 5 mins it fired up OK and off I went , however it started

missing again at times and this time actually died on me under acceleration. This may only be a coincidence and I know I'm not dreaming however I "lost" 30 klms off my trip meter during all of this stopping and starting period, I clearly saw 275klms on the trip meter and say 15 mins later it read 256klms. Any advice on possible causes would be appreciated. Finally rode home last 90klms with no further problems ! Aussie-John #334

- Mine died completely AND affected the engine performance. Went pfft. HK$1500 (divide by 7.73 for US$) later, the cable was replaced. Kristian #562
- Sometime ago, I did an experiment.....I disconnected the Speedo sensor at the wiring harness under the seat and went for a ride, straight up I discovered that idle speed went up and stayed there (about 2000RPM) also the bike surged and carried on at sub 4000RPM rev ranges. On start-up, the engine immediately revved to 3000RPM on a closed throttle (this is a mystery ... could be coincidence) UNLESS the ECU reads all inputs at ignition on.....would not get a signal from the speed sensor anyway, because bike is not moving. At the time, I was having unexplained idle speed problems and a failure to start after several cranks. I now suspect I COULD have had a bad batch or 2 of Shell Optimax fuel. I reset the ECU and the bike was OK for a while, then the problems would reoccur after about 50km of riding. The bike seems to have got over its case of indigestion and has run perfect for the last 2000 kilometres or so. I think fuel MAY have been the problem all along.....but I did discover the importance of the speedo sensor/ wiring :-) Jack (Aus).
- Zero rpm idle-What gives. I took the bike ('01 F650GS - nearly 10 000km/6000 miles) out today to do some errands around town. First off, the speedo didn't work, although it was fine yesterday. The needle just sat at zero. At least the Tach worked, and that is better than vice versa. After the first stop, I got back on the bike and that's when the fun began. By the way, I am fanatic about the correct starting procedure: ignition on; wait till water temp light goes out; press starter, no throttle. I hold my right hand palm up under the starter button so that there's no way I can inadvertently touch the throttle. The bike fired and died. Tried it again, with the same result: the revs plummeted to zero. After several tries, in desperation I gave it some throttle. So it started, but I couldn't let go of the throttle. If I did the revs dropped like a stone. So I tried to ride the thing. It's quite hard to ride with no idle, especially if you are not used to holding the throttle on all the time. (Why would you be?) In ten blocks I must have had to restart it ten times as I rode. I'd roll back the throttle to change gears (it's kind of automatic}, and the motor would immediately die. Pulled into a plaza to tell Riding Buddy that riding this blessed machine was impossible. We decided to go straight home at that point. The ignition was off for about three minutes while we chatted. I started the bike for the horrible ride home. Guess what! It started like a charm, and it was perfectly fine for the remainder of our errands. I HATE mechanical things I don't understand. With a passion. This is my first FI bike. What the blazes is going on? Is it going to happen again? The speedo I can deal with, but helpful comments about the disappearing idle setting would be much appreciated. mspeed
- I have something fairly similar with my '01 F650GS. Speedo quit a little while back (and odometer, of course)-my post of May 4, under Zero rpm idle. When it first quit, it set the idle at zero rpm-brutally difficult to ride. After resetting the ignition, the engine ran fine, but the Speedo was dead. A few days later, the Speedo started working again. O.K. for a short distance, then off again. Some days it worked, some days it didn't. Mechanic was baffled, but replaced the instrument cluster. He did check the sensor, he said, and it seemed clean and normal. I had the 10 000 km (6000 mile) service done at the same time, so he gave the bike a pretty good going over. Worked like a charm-for 350 km. Speedo quit again. (I didn't report back to this board on the problem-as I promised to-since the problem hadn't been solved.) This time on the cycle that the speedo quit, the engine surged very badly just under 4000 rpm, farted and popped on deceleration, and stalled very uncharacteristically. The engine was fine when I let the ignition recycle. Then the pattern of intermittent functioning has started again, but the engine is running normally. Today the Speedo is working. Your information may be very helpful to my mechanic, along with my log of weird speedo behaviour. mspeed #1023.
- My speedo has started acting up. 1st time was last week. After washing the bike the speedo suddenly stopped working, showing 0 km/h. After a while it came back on, presumably after something had dried up. Today it's pouring down, and the speedo suddenly quit again. Since this behaviour is clearly linked to high humidity, I'd suspect a faulty contact somewhere. Or is the CW that my speedo or motronic unit is fragged and I need to get a replacement? It's an '01 Dakar, so still plenty of warranty left. Oyvind #1052

- Same problem here ('01 GS). Had the instrument cluster replaced a month ago. Speedo worked for a while, and then started quitting again. It was raining for two of the last three "quitting sessions"-during which the bike acts like "galloping girty" to use Kristian's marvellous phrase (which I haven't heard for decades). Taking the bike in Thursday to have the sensor replaced. Stay tuned. mspeed #1023 Toronto
- I just got a used '01 Dakar and the previous owner said that he had the Tach stop for a while then start again. I haven't seen it happen yet but I'll keep an eye on it. Gary K.
- I have the same thing with my F650GS meters. I have checked all connectors and wires. Could be just the sensor gap distance of the speed sensor on the back wheel. But keep your eye on the rev-counter the next rides. If the instrument cluster is KAPUT you are going to notice the following symptoms: Speedometer and rev counter stop working after a few miles riding, odo and clock starting to flash. After turning the ignition off the odo and clock keep flashing. If this is the case, disconnect the instrument connector located on the back of the cluster. If not, the instruments will drain your battery! The faulty instruments causing a big drain current. The instruments need to be replaced. Maarten
- On a recent cross country trip I had the same problem with my speedo. It would go to 0 mph, then later would come back on. Only happened in the rain. I'm going to check all the connections as I do my next service and if that doesn't take care of the problem I'll let my friendly local dealer replace the instrument. I've already talked to the dealer tech and he says there is no repair they are authorized to do. Replacement is the only answer. Homeless (CO).
- Speedo and odo stopped working. Pick up from rear wheel OK & working. Anybody had similar - got any suggestions. Mr Grumpy.
- My replacement clocks started misbehaving at about the same mileage. I'm waiting for an explanation from BMW (think I'll grow a beard whilst I wait!). See thread from last week, below. Ride safely. Paul W.
- I Went for a ride today on my '01 F650GS. On the way home there was a noticeable hesitation. Then several miles latter again. Almost seemed like I was running out of gas, but the warning light didn't come on. Got gas and she only needed 3.3 gals, but stalled pulling into the gas station. Then on the way home from the gas station there was the big hesitation twice more. Then I noticed that the ABS warning light had come on. The abs warning light went off. Got off at my exit and she stalled coming to a light BUT this time I lost all electrics. I went to put the side stand down so I could get off and push her to the side and the electrics came back (Clock read 00:01). Started her and got her home after stalling several times and big hesitations. Dave # 717
- My replacement clocks have failed at 1200 miles with the mileage recorder going backwards again. Apparently BMW can't find the cause or cure. Anyone had similar experience or found a cure? Today I did 3 short trips and ended up with less miles showing than when I set out. jus
- After I got a new EFI box (Motronic unit) with the 9.3 program I had the same S/S as everyone else. I got the new 10.? program and was mostly satisfied. Over time I more and more often had all sorts of strange symptoms, "farting" when going downhill and using more or less engine brake. Stuttering when accelerating. Small engine stuttering at all sorts of throttle openings but most noticeable at low revs, (3500-4000 RPM) quite natural that I feel it better then as the power pulses does not come as often. I was not happy with this and checked almost everything - fuel pressure ALMOST ALL el. connectors. (Did NOT check the big one I have at the ABS unit- very hard to come to and the manual says to remove the rear sub frame!). I came to the conclusion that it had to be the "old" injector and the new program which was the cause. My ABS warning light had a habit of coming on and off at times, but I did not at all think that had anything to do with the FI. I was waiting to get a new injector under warranty. Sometimes the speedometer was working, sometimes not. At times both the ABS warning was on and the speedometer was dead, but not always. The rate at when the engine was sick was slowly increasing as was the rate at when the ABS and/ or speedo were malfunctioning. Still I did not make the connection. I did not get a new injector so my mechanic had to order it once more. To be able to do that we had to connect the bike to the marvellous BMW diagnostic computer to get some bike data! We got the data and my mechanic would not let me leave before he had sorted out the ABS "thing". Before I had always told him to let it be as I did not use the ABS that often and did not need it- except for the speedometer. He managed to get the ABS plug out and

guess what, it was filled with dry copper- oxide and 2-3 of the pins were missing- same thing as I had in the EFI plug some 1 year earlier. That was when I found the speedo- EFI connection in the diagrams AND "Stuportech" confirmed that the EFI used signals from the speedometer. I must say I was a bit doubtful, but at the same time hoped it was so as then there was a real chance I could get a working bike again. Haakon #626.

- Rain=speedometer 0,need advise I need your help. When it's raining, my speedometer stop working. It restart dry. My dealer doesn't make test drive on wets days and they don't know this problem. Some of you had this fix, can you tell me what was done. Thank you. Gilles Qc, Can GS01
- I had a mystery on-again off-again speedometer. It was driving me nuts. Replacing the instrument cluster was tried, with no success. It finally became apparent that the speedo only went off after it rained, or after washing the bike (not with a high-pressure hose). Electrical circuits checked out O.K. Everything then pointed to the rear-wheel sensor. That was replaced, and the problem was finally solved. Bonne chance, Gilles. mspeed #1023 Toronto, Canada.
- Red lining a GS . No, not a tale of an adrenaline packed high speed ride. Rather more mundane I'm afraid……..When switching from my (already suspect) odometer to trip meter the Tach flicks round to full revs and then returns. Fortunately my engine is far too sensible to 'follow' the Tach and continues at its own pace. Would bring a whole new meaning to 'surging' problems! Oh don't you just love electronics! Paul W (UK) Dakar.
- You may have damaged the face of the sensor, exposing the metal inside. The metal inside is black, so it may be hard to distinguish from the plastic. A temp fix while you wait for a replacement is to tape up the face of the sensor with some electrical tape when it's dried out. You may also want to use a slightly thicker washer to increase the distance between the sensor and the slotted ring on the wheel. Oyvind #1052, Norway.
- Yesterday after about 200 miles of a 300 mile ride, I was stopped at a red light, engine quit just as light turned green. I pulled in the clutch attempted restart, no good. put it in neutral it started ok. After getting into 4th gear, I looked down at the odometer, it read 151 miles more than it did about a half mile back. It was in the "trip" mode, not total miles. Selected total miles, appeared normal. Back to trip miles, still reading too high from previous. Any one with similar experience or how to fix? '01 Dakar, 11,800 miles, battery checked 500 miles previous and only other change was I installed BMW electric outlet. The idle problem of engine dying at a stop light has occurred about 3 or 4 times in 11K miles.
- I recently had the speedo/ABS sensor cable thingy go bad. At the same time I noticed that the bike was starting slowly like the battery was drained. I was not too surprised as the battery is about 2 years old, it is winter, the bike is outside all of the time, I use the heated grips and I have driving lights. I don't do the grips and the lights at the same time. Anyway, the ABS light wouldn't go out which I initially figured was low voltage. As it turns out, the sensor was bad. I ended up replacing the battery anyway. The new battery has been in for 2 weeks and I went out yesterday after the bike had been sitting for 3 days and the battery was totally dead. Even the clock was not on. I charged the battery but it still does not seem to be charging while I ride. Oh by the way, I ride 40-50 freeway miles round trip each day. The battery does not seem to be getting charged when I ride. How do I check the output of the charging system? Do the brushes go bad? I had this happen on a bike years ago. Any other suggestions?. Well the bike went to the dealer where the ABS/Speedo sensor was replaced. Nothing changed, still no speedo, no ABS, idled high at intersections, not charging, etc. The problem (according to the dealer) ended up being the connection between the wiring harness and the ABS unit. The connection was corroded. This at least will solve one problem and hopefully will resolve the charging issue as well. Has anyone else experienced this? It seemed odd given that the bike is not quite 2 years old. Well the parts are on order so I'll wait and see. Thanx for all of the feedback. Brendon
- When it rains (or I've washed the bike) the Speedo stops working - is this a known problem? - Sorry if its been asked before - I don't get around to visiting the site as much as I used to. Chris#1068. F650GS, Los Angeles.
- I have also had intermittent speedometer troubles after or during rain. I hate intermittent problems because they just are not reproducible at the shop. As I am still under warranty I am determined to make this reproducible. This evening I put the bike up on the centerstand, started the motor and put the bike in first gear. While the rear wheel is spinning I slow soaked (i.e. a dribble of water coming out of the hose) the rear speed sensor. Well after 5 minutes the speedometer stopped working. This is excellent as I am scheduled for a new rear tire in two

weeks so before I go I will soak the rear speed sensor and when I get to the shop I will say, "See, it ain't working!" The bike is 2001 F650GS with 17000km. wethogs Lucas (#1046)

- Obviously another brilliant design from BMW... or rather lack of testing outside the lab perhaps. I've been thinking about this one for a while, since my Speedo Sensor failed. We have a few recorded cases of Speedometeritis, but either not too many people bother, or not too many people ride in the rain. Oyvind probably rides in snow and that gets stuck big time...Oyvind mentions shimming it with a washer to move the pickup away from the slotted wheel. This idea has merit in that mud or stones won't clog it, however, with regards the water, I was thinking about my Unsaturated Soil Mechanics classes several years ago and was thinking the meniscus from water is quite a tough little number. Menisci like "dirty" surfaces (not Really Dirty) just not clean. Any meniscus attached to the pickup head has only one surface to adhere to, so it's an unlikely candidate for where the water collects, although not an impossible one, as there is a small recess. However those slots on the wheel attached to the hub are prime candidates. In static applications, Menisci like small slots, as the surface tension doesn't have to overcome the weight of the water and 4 sides of a narrow slot is Menisci heaven. Ah ... you say what about the centripetal force from the wheel? Well, that's true, and I must admit I haven't conducted Rodgers experiment so I don't know. Perhaps Rodger can run it again, and shine a light , both metaphorically and physically, on the notion and location, of it being water in the slots. A good test would be to soap the slots, to check water doesn't accumulate. The only other possibility is of course that the head isn't water tight and leaks, causing contact failure. Early morning musings. Kristian#562

Solutions:

Q. How do I fix it myself.?

- **Check the ABS/Speed Sensor at the Wheel and at the Motronic yourself**
- **Get BMW to Replace the ABS/Speed Sensor Cable/Brake Rotor Bolts**
- **Get BMW to check/replace the Motronic**
- **Check the Instrument Connections or Get BMW to Check the Speedo Instrument for you**

A1. Check the ABS/Speed Sensor at the Wheel and at the Motronic. If you've checked all the connections and it STILL doesn't work, get it replaced by BMW. We might be able to find an aftermarket source of the sensor sometime in the future, but for the moment, that's the only option.

- Sensor may just be loose or covered in mud, so CHECK the Rear wheel first, it affects the Speedo. A simple test for an inductive sensor if you can get at a wiring plug up the frame (assuming it works off the ABS ring) is to go across both pins of the sensor with a multimeter set at AC volts. Spin the wheel and the induced voltage will give a steady reading at a steady speed. On DC it will jump as the counter teeth go by. If the reading is below about 0.3V AC at 30rpm, the electronics will typically have a problem counting the pulses, but the only fixed rule is no voltage, no speedo. If you have no voltage, check the resistance across the two pins. Fried sensors tend go open circuit as the fine wire at the coil end melts. Andy Leeds UK #982
- Speedo. My speedo used to read a bit erratic, but a thorough cleaning of chain lube from the sensor wheel and sensor seemed to cure it. RDW
- Rear brake rotor blues. About two weeks ago, the ABS warning light on my 2001 F650GS came on and my speedometer began reading 0 at all speeds. I looked at the setup, but couldn't see anything obviously wrong. Called my dealer (Irv Seaver of Orange, CA--great people) and they thought the ABS/odometer sensor had gone south. They had to order it from Germany to be replaced under warranty. A few days later I was waxing my chain when I heard a grinding sound from the left side of the rear wheel. It turned out that one of the screws holding the rear brake rotor on was sheared off, and two others were part-way out and bent over at a 45deg. angle. The grinding sound was these bolts hitting various bits as they rotated. It may well have been the bolt that sheared off that caused the problem with the ABS sensor. I had the bike towed to Seaver, where everything (including the scratched rear wheel) was replaced under warranty. I

have a habit of checking to see if anything has vibrated loose every 1000 miles, but I have to say that I never thought to check the torque on the screws holding the brake rotors on. They are all snug now, with a bit of Loctite to help keep them that way. I got the bike new in September 2001. It had gone about 9000 miles all hiway when I saw the bent bolts. The ABS/odometer sensor quit at 8223. The service manager at Seaver mentioned he had seen one other F650 GS that had a bolt from the rear rotor come loose, but he thought that was a fluke. (I think it may have been another chain ganger that owns the other GS--I remember a post from a while ago about it, but I couldn't find it with the search.). The bolts on the rear brake rotor had not been touched since factory assembly, as far as I know. It might be a good idea to check your brake rotor bolts, even on a brand new bike. Dan#823

- Check all your electrical connectors for water. First of all check the Motronic and ABS connectors! With no ABS check the connector form the rear wheel sensor (on my bike with ABS it is next to the Motronic, on the left side). Just trace the wiring. My bike was NOT made for use in rain. I have tried to disconnect the front, the rear and both speed sensors. It is only when I have both disconnected that the engine starts to stumble. When I disconnect either one, both the ABS warning lamp comes on and the Speedo stops working but it seems both has to be out of work to get the engine to stumble. Haakon #626

Connection at Motronic: 

Connection at Wheel  (Sensor Detects Slotted Disk as is passes by):

Check for Mud, Sensor Mounting Bolts, Brake Disk & Sensor Disk Bolts

A2. You can't fix the Sensor Cable but you can check the pickup at the wheel. If cleaning it one of the solutions below doesn't work, get BMW to **check/replace the <u>ABS/Speed Sensor Cable</u>** for you. We will look at finding a source of a new OEM Sensor, but don't hold your breath.

- At the beginning of May I reported on a speedo that did weird things, and only worked half the time. I promised to post feedback on the outcome. The instrument cluster was replaced under warranty, but that wasn't the root of the problem. The speedo continued working intermittently. However, a pattern emerged. Trouble would start up again after I washed the bike (and I am talking about a bucket and rag, not high-pressure hoses) or if I rode in the rain. At the end of June, the sensor was replaced, also under warranty, and I am happy to say that I have since ridden over 1600 miles (2600km), including some fairly serious hammering in the dirt at Parry Sound and Trenton, along with the subsequently necessary washes, with no further problems. Bingo! mspeed #1023
- When my Speedo started being erratic, sometimes going down to Zero, then back up to the correct speed or it stopped altogether, accompanied by bucking and surging, BMW replaced the Speedo Sensor Cable to the Rear wheel and all was O.K. Kristian #562.
- My speedo hasn't liked the rain lately, either. I pulled out the sensor and found that the face of the sensor had been scraped off, exposing some metal inside it, by the slotted "sensor ring" on the hub. The latter is a thin gauge metal ring which is may become a little bent. In addition, there's a very small gap between the sensor and the ring. I've taped up the face of the sensor and put on a slightly thicker washer to increase the distance between the sensor and the "ring" while I wait for a replacement. The plastic facing of the ABS/speedo sensor has probably been worn off because:

a) The sensor is too close to the slotted ring and the two have touched when riding.
b) A small rock or similar has gotten in between ring and sensor, e.g. when riding through deep mud.
c) The sensor has been damaged when removing or installing rear wheel.. The sensor should be removed before working on the bak wheel to avoid damage.

When the metal inside is exposed to the rain, there's a bridged current or something and the sensor stops working. Solutions:

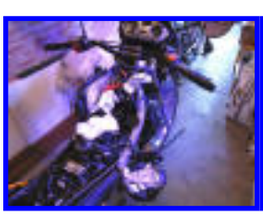
a) Go to your dealer and try to have it replaced under warranty. This has worked for me once. The second time it happened I went for option b).
b) Take the sensor out of its mount and dry it thoroughly, e.g. with a hair dryer or leaving the bike in a dry garage for day or so. Mix up a little epoxy glue and spread thinly over exposed surface, let it cure. Increase the distance between ring and sensor by using a thicker washer when re-installing. Problem solved! Oyvind #1052, Bergen, Norway. Oyvind #1052

- Haakon #626(Norway-F650GS). As the sensor is high-priced and we have not yet found a cheaper solution, you might try to adjust it further away from the slotted ring. On my bike, it works reliably at a distance of 2 mm. Those of you with ABS maybe had better keep it within the 1,0- 0,1 mm limit. If the speedo fails to work at times, no big deal. If the ABS fails when you need
- Check the Brake Rotor Bolts didn't foul the Sensor/Cable. See Loose GS/Dakar Rear Brake Rotor Bolts.

A3. Get BMW to **check/replace the Motronic** for you.

- I had the same experience. The only fix was a new motronic unit. Replaced under warranty. No problem since. Ooops not quite true. I now have my third new Motronic unit. It was also replaced when my bike suddenly was completely unwilling to start. But the speedo is ok. Terje '00 GS

A4. You can't fix the Speedo, but you can check the connections yourself. Get BMW to **check the Speedo** for you. Some riders have had the Speedo replaced TWICE and it still breaks down.







Speedo Losing Mileage?

Symptoms:

- 3 months ago I had new clock fitted because the mileage recorder was losing up to 2 miles on switching off. All was well with the new clocks until today. I got off the bike with 1200 showing. On restarting it was back to 1199. Does anyone know the actual/likely cause? How many people have had a similar experience? I don't want to replace the clocks again only to have the same problem 1000 miles down the road. Jus
- At my 6000 mile service my 'clocks' were replaced under warranty because the odo 'lost' miles. I am not the only GS owner to experience this. For the first 1000 miles thereafter odo and trip were in perfect unison, until this weekend when I 'lost' 30 miles between fill ups. So new clocks

every 3 weeks for me then. Paul W (UK) Dakar

- To be truthful I think they are cheap gauges. I see all kinds of weird stuff with mine both Tach and speedo. At times you can set the Tach at 5 grand the the speedo will swing 15 mph. The odometer loses a mile or so at times when restarted. But face it. You can buy 2 KLR's for the price of a GS. Better parts cost more and I don't think too many $12,000 F650GS would be sold. I think that is why they don't use the big GS wheels and I am sure the list goes on. None the less I love my Dakar and would buy another one if mine went away. Supertech
- My bike stayed at 3040 miles for two days and on the second day started cutting out if I dropped the rpm at all, I could see the trip meter go up bet the main clock didn't change or would go up until the bike was turned of ...next time I switched on 3040 again...Its fine now but I dunno. At one point I was not able to get the bike to start. I Have exactly the same problem as Marko posted below. Graham
- I noticed today that my odometer loses some miles. It is missing ~400-500 miles. Few weeks ago I had almost 4900miles and today I have 4443 miles on it !!!
  Bike is -01 Dakar. Marko also said that he lost idle one day (I think we both have the same gremlins). Marko
- Dakar Does Mileage Trick. On a 20 mile ride around town this morning, the ODO on my Dakar twice lost the mileage it accumulated from the previous reading when I turned the key off and on again. It was pretty cold about 20 degrees F. Never noticed that before. This is one spooky motorcycle!. echo
- I've had this problem with my 2002 F650GS since I got it... CalBMW looked into it a little but BMW stone walled them and I didn't push it. Cheers, PQBON.

Solutions:

Well if you've checked your Sensor and Sensor Connections (See Above), checked for Rusty Speedo Connections, you might just have to go to BMW and tell them "it doesn't work." Sorry. We'll keep you posted.

Odometer Rounding Error?

Symptoms:

- In regards to the odometer rounding error, my dealer told me that "they all do this - it is not a problem." Is this BS? I know some have had them replaced for this, so does anyone know the BMW service bulletin number or some such that I can give to the dealer? MichaelC #941
- My odometer has been replaced once, and now after 2500 miles, new odometer does exactly same as the old one...Soon BMW will announce that previously service has been every 6000 miles, new interval is 6 months... ;-) Marko Dallas, TX (orig Finland)
- My odometer would drop 1-2 miles every time I turned the engine off. There are times when I can make several stops doing errands and return home with the same mileage I left with! I just did a trip of 1,115 miles according to MS Trips & Streets (computer mapping program) and my '01 F650GS odometer indicates only 1,080 miles ??? My odometer didn't record 35 miles!!. Generally I don't get upset because I figure my warranty will last a little longer, but 3.2% error is a bit much. Generally BMW motorcycles are 3-5% over the real mileage. Which means my F650GS is 6-8% less than a typical BMW motorcycle. Dave # 717
- My odometer steals 2km (and always 2 as far as I have seen) after a stop, but not always. I would say, about 5-10% of my rides. I will ask about that at the next service. NLS
- Mine is acting up too.... and of course the speedometer is showing 3.5 mi/hr faster than I'm actually going. Omnikron.
- I got lucky.....told my dealer that my speedo had the same sorts of problem.....at the last service they fitted a new one....it did not work at all!!! They reinstalled my old one again So.....I thought it looked like I will be waiting another 10,000km to get mine fixed...wrong :-). They mailed me a complete new instrument panel and said they were happy for me to fit it and return my old one.....now I am doing warranty repairs on my own bike :-) Beats waiting till the next service!

Jack

Solutions:

Well if you've checked your Sensor and Sensor Connections (See Above), checked for Rusty Speedo Connections, you might just have to go to BMW and tell them "it doesn't work." Sorry. We'll keep you posted.

Speedo or Tach Lags actual Speed/RPM

by Supertech

Q. I have a '01 F650GS, and I've noticed that in first and second gear under hard acceleration the engine revs up faster than the Tach needle moves. In other words I will hit the rev limiter while the Tach reads approx 6000 rpm. Also I have noticed the speedo will kind of lag behind on harder acceleration too, like it sticks around 50-55 mph too long, and then the speedo needle will "catch up" to the actual speed. Buck
A. I ride lots of these and I think it is the way they are.

My Speedo Buzzes?

Buzzing From around the Fairing/Speedo Area. Electrical/Speedo Problem?

Symptoms.

- I do most of the work on my bikes but the electrical systems are not my bag. I recently replaced the battery on my 01 GSA (Which I purchased used) positive first then negative and when I connected the new battery the Tach made several rapid clicks for about 5 seconds. After that, the speedo made four short clicks every 15 seconds for about 5 minutes. You can just barely tell that the speedo and Tach are moving during the clicking. Is this normal? I'm guessing not. The bike seems to run fine. Any thoughts? Thanks for any feedback.
- I have a 2002 GS Dakar. After doing some electrical work on it today (I had the battery out) I noticed that there was a 'ticking ' or what sounded like a relay cycling, coming from the headlight/ dash nacelle for about 90 secs after I turned the ignition on. I have never noticed it before, and am hoping its nothing I have done in my playing with the electrics. The 'ticking 'was coming from the headlight/dash nacelle. Any Ideas what this is?
- I installed my new BMW hot grips last night: 1 hour for the new bars, etc., 2 hours to route the wiring, etc. And the ride to work this AM was great! Except for the buzzing speedo on starting . . . when I turn the key to the "on" position, the speedo needle buzzes for about 4 seconds, then stops. When I installed the grips I disconnected the battery because the instructions said so; in hindsight I don't think THAT was necessary. What MAY have been necessary was to disconnect in the terminals in the correct order. Feeling a bit contrary, I decided to remove the "+" first. When I re-connected it, I did the "+" first. My question: What have I done, and what can I do to stop the buzz? Obvious first step is to remove the battery the CORRECT way, and re-install. But before I tear the lid off once again I thought I'd solicit any insights. Scott, ID.

Answers That's quite normal - you often get those clicking noises.

- It sometimes happens when you haven't disconnected the battery either. Have a listen next time you switch off the engine. Trevor #999.
- My bike did EXACTLY the same thing when I reconnected the battery a couple of months ago. Scared the daylights out of me; I thought that darn ticking was NEVER going to stop. I wondered if the bomb was actually going to explode. (I’m a bit of a Nervous Nellie when it comes to electrical stuff, anyway.) It’s running perfectly well now, and when I asked my mechanic about it afterwards, he said, “Ah, they do that sometimes. Nothing to worry about.”

Just one of those black box mysteries, I guess. mspeed.

- This isn't related to the sequence of connecting the battery cables. I've noticed this each time I disconnect the battery. It does go away after a few days. But isn't it the Tach needle, not the speedo? I could speculate that this might indicate the ECU is in learn-mode. After the battery is disconnected, the ECU loses all stored parameters related to your particular engine. It has to re-learn them again. That's my best guess, though there are other possibilities. Raymo #1173 Chicago '01GS
- Raymo, Just as you predicted, the buzzing speedo quit buzzing after a few days. These bike computers are weird. Scott, ID
- Make sure "Resetting the BMS Unit (Motronic)" is followed.

Why, when I roll the Bike Back in Neutral with the Engine running does the Idle rise?

No-one's ever mentioned that when you reverse your bike, with the engine idling, the revs go up a lot. It's because of the Speedo ABS Sensor feeding back to the FI. quite normal!. Kristian #562

If I have ABS, is the Speedo run off the Front or the Rear Sensor?

Haakon#626 (Norway, F650GS)

Answer: REAR. I just checked, in the pouring rain.

- Disconnected the rear ABS sensor- dead speedometer.
- Disconnected the front ABS sensor- speedometer worked.

The Speedo FAQ

compiled & edited by Kristian #562
Please read the Disclaimer before attempting any work in this FAQ.

Under-Reading Speedo.

Q. Has anyone come had problems with their speedometer under-reading (as opposed to just plain not working sometimes)? Mine seems to be 7 - 12 Mph slow all the time. The dealer says that it's a known problem, for which BMW don't currently have a fix, but I've not seen anyone mention it anywhere. It's a bit off-putting, not to mention probably illegal.

A. (From Flash #412) You CAN fix it yourself if you care to. Remove the instrument. Remove the bezel. Lift the needle up over the stop and note it's resting position. Pop the needle off. Reinstall the needle, with the resting position 10-12 mph faster than it used to was. Reassemble the rest in reverse order. Oh... and be sure to complain to the DoT about this safety issue. If enough folks complain about "a known problem," the DoT will force BMW to issue a recall and everyone gets a new, ACCURATE speedo for free.

We have Veglia (aka Vague-Liar) Tach and Speedos in our F650s. These are common Italian gauges. On the back is what BMW calls a "gearbox" (62 11 2 346 455). In the picture below, this is the black thing that has been removed and set aside next to the instrument. There is also a WHITE GEAR on the back of the instrument. (It just pulls off.) The parts are the same for the Tach and speedo. It is possible a Ducati or Moto Guzzi or Aprilia will have a gauge that fits.









Feedback:

- Yup - same on all my other bikes. My Dakar is off a couple mph at the low end and about 5 or 6 at higher speeds like 70+. I use my GPS to tell me how fast I'm going, but I'm intrigued with Flash's fix. Might try that. Martin the Geezer.

Trip Meter Repair

by Jim 99 F650

I'm relatively new to the F650 world but I have 30+ years of motorcycling, and thought this may be of help to someone, use it if you like. I just had the tripmeter reset to quit working, turning the reset knob did nothing. I removed the windshield and front fairing and gained access to the the odometer and reset knob and found there's a short connecting flexible cable from the knob to the back of the odometer. The end on the odometer was slipping on the shaft due to a small pin missing that held the cable to the shaft. After lining up the holes on the cable and shaft I slipped a small piece of stiff wire through it and repair was done.

Checking your Speedo

Refer Speedo Spreadsheet (htm) or Excel File Speedo.xls or gearing_v12.xls

Q. I have all the information except that I'm not sure if these numbers are correct for a stock 99 F. These are all guesses.
Wheel Rim Size (Funduro) 17" ?
Engine Minimum RPM 1500
Engine Maximum RPM 7500
Change Down RPM 3500
Change Up RPM 5000
Maximum Power RPM 5000
Also, what is Tire Depth % ?

Answer:
Wheel Rim size (Funduro) 17" > Yes
Engine Minimum RPM 1500 > Depends of gearing and driving style. I personally don't go under 2K save 1st gear
Engine Maximum RPM 7500 > I do believe, don't have bike or manual here. This info's in yours.
Change Down RPM 3500 > Personal preference
Change Up RPM 5000 > Same
Maximum Power RPM 5000 > Manual

Also, what is Tire Depth % ? > Amount of tread (New Tire=100%, Cords 0%) left on your tire. None of us can check that. For most tires and riders, you can check mid way through by comparing the tread in the middle of the rear tire with the tread on the outside (which rarely gets worn). David #476, '99 F650.

Bouncing Speedo Needle

by Flash #412

Problem: My 97' f classic has a jumping speedo needle, and it looks like the trip meter is stuck at the tenth miles flipover, it happens at all speeds and resetting the trip meter works only for 10 or 20 miles then the trouble starts again. Has any one else had problems like this one?

Solutions: The bouncing can probably be fixed by removing the cable from the instrument, withdrawing the cable from the housing, lubing it with light lithium grease and reinstalling it. Fixing your trip meter issue will probably require you to remove the instrument, disassemble, clean, lubricate and

reassemble it. See the above FAQ for some help getting inside

Feedback:

- My speedo had the exact same symptoms, and I found that the problem was where the speedo-cable was clipped onto the front forks. There is a small black hook that holds the cable and stops it from flopping around. On my bike, the outer cable plastic and the inner metal has worn through and I suspect that the inner cable gets hooked on the metal that is supposed to shield it. All I did was to straighten the cable and taped it up. works fine for now, but I will be replacing the speedo cable soon. Deon, 97 F650 - Red, Pretoria, South Africa.